

IV. Milk Creek MLSA

This individual chapter focuses on the Milk Creek MLSA. The first section "A", provides a more specific description of unique resources or factors associated with this LSR than was presented in the general "forest-wide" chapters. Section "B" begins the analysis portion of this document assessing relationships between this LSR and neighboring LSR/MLSA's. Section "C" continues that analysis focusing on this individual LSR.

The subheadings in "B" and "C" follow the module sequence as shown on the "LSR Analysis Flow Chart" in Chapter VII and in Appendix A. A fire plan is also included at the end of Section "C" to provide more specific detail than that in the fire management plan included in the Chapter VII. Section D includes a table summarizing all of the projects identified from the analysis of each module completed in sections "B" and "C".

It is also important to note that the type of activities derived from these modules all strive to restore or maintain late successional habitat and species, as such these modules recommend "ecologically derived" projects. The social module, on the other hand, is designed to review projects that do not incorporate these restoration or maintenance objectives. The social module is designed to provide a "road map" to use when planning begins on a specific project that is derived from some social need such as building a new hiker or motorized trail, expanding a ski area, or widening a powerline right-of-way. Since the social module is not used to identify "ecologically derived" projects, the module is not included in this or any of the other individual LSR/MLSA chapters. The Assessment Team did complete a social module for the Three Creeks ORV Trail project on the Entiat Ranger District to validate the module. This module analysis is included in Appendix X.

A. General Description of MLSA

1. Vegetation

This section describes the current condition of vegetation groups (see Vegetative Landscape section above) within the Milk Creek MLSA. Data was derived by aerial photo interpretation, stand exam information, and field validation (see Vegetative Landscape section above). 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) Dry Forest Group

Twenty percent (3,075 acres) of the Milk Creek MLSA consists of the dry forest group (Appendix 6 of the Forest-Wide LSR/MLSA Assessment). Within this group, 61 percent (1,866 acres) is mapped as high density and 36 percent (1,103 acres) as created openings (Appendix 5)

In the Milk Creek MLSA, the Douglas-fir series comprises approximately 10 percent of the dry forest group, with dry grand fir communities supported on the remaining 90 percent of the area. In a few limited sites, ponderosa pine exists as the sole overstory dominant, but more commonly is co-dominant with Douglas-fir and in some locations, grand fir. In the driest associations, shrub understory composition is dominated almost exclusively by *Purshia tridentata* (Naches Mainstem Watershed Assessment 1995, Little Naches Watershed Assessment 1994). Shrubs such as *Artemisia tridentata*, *Berberis aquifolium*, *Arctostaphylos nevadensis*, and *Phlox speciosa* may also occur as subordinate members of these communities. Grasses include *Agropyron spicatum*, *Calamagrostis rubescens*, and *Carex geyeri*. Forb composition is represented by *Balsamorhiza caryana*, *Achillea*

millefolium, *Lupinus sulphureus*, and *Lomatium* spp. (Naches Mainstem Watershed Assessment 1995, Little Naches Watershed Assessment 1994).

b) Mesic Sites-

Mesic sites were only mapped on the northern portion of the Wenatchee National Forest. In contrast, on the southern portion of the forest, these mesic sites are replaced by moist grand fir plant associations (see Vegetative Landscape section above). In general, these sites occur on steep (>40% slope), northerly aspects and as stringer riparian areas within the dry forest group. This vegetation will be described in the following section.

c) Moist Grand Fir/Mesic Western Hemlock Vegetation Group

Approximately 69 percent (10,896 acres) of the Milk Creek MLSA supports moist grand fir or mesic western hemlock plant communities. The majority, or 87 percent (9,513 acres) of this forest group is currently mapped as layered and/or mature (mid- to late-successional). Created openings comprise approximately 11 percent (1,245 acres) of this group (Appendix 5).

Within this forest group, there is a moisture/temperature gradient which results in development of plant associations from dry, cool conditions adjacent the dry forest group to moist, cool adjacent the subalpine fir series. At the dry end of the moisture gradient, associations are dominated in the understory by herbaceous species such as *Calamagrostis rubescens*, *Festuca occidentalis*, *Carex concinnoides*, *Carex geyeri*, *Arnica latifolia*, *Lupinus latifolius*, and *Arenaria macrophylla*. Moist associations typically include a shrub component typified by species such as *Spirea betulifolia*, *Rosa gymnocarpa*, *Vaccinium* spp., *Symphoricarpos albus*, *Linnaea borealis*, *Chimaphila umbellata*, *Ribes lassiococcus*, and *Pyrola* spp. Forb composition in moister plant associations is lush and includes diverse species including *Achlys triphylla*, *Clintonia uniflora*, *Adenocaulon bicolor*, *Smilacina stellata*, *Rubus parviflora* and *Trillium ovatum* (Wenatchee National Forest, Ecology Plot Database, Naches Mainstem Watershed Assessment, 1995, Little Naches Watershed Assessment 1994).

d) Subalpine Fir Series

The subalpine fir series is not supported within the Milk Creek MLSA except for 15 acres near Lily Pond Lake which is mapped as subalpine park-like. This vegetation group does occur extensively to the northeast of the Milk Creek MLSA.

e) Wet Forest Group

This vegetation group constitutes two percent (389 acres) of the Milk Creek MLSA. Eighty-nine percent (348 acres) of this group is mapped as riparian forest and is restricted, for the most part, to areas adjacent to the Bumping and Naches Rivers and along Milk Creek. Forty-one acres (11 percent) of this group is mapped as mountain hemlock and is located in the vicinity of Lily Pond Lake.

Riparian forest is represented by a diversity of species which may include in the overstory grand fir, western hemlock, Douglas-fir, western larch, western red cedar, and black cottonwood. The understory composition includes the above tree species and shrubs such as *Alnus incana*, *Cornus canadensis*, *Symphoricarpos albus*. Herb composition is often scarce but can vary to include species such as *Smilacina stellata*, *Achlys triphylla*, and *Equisetum hymale*.

In the mountain hemlock series, tree overstory composition is generally dominated by mountain hemlock, and subalpine fir. Lodgepole pine is commonly a subordinate associate. Undergrowth composition may vary from relatively lush and dense to scarce. Species representing the shrub component of these communities may include *Rhododendron albiflorum*, *Rubus lassiococcus*,

Vaccinium spp., *Ribes viscosissimum*, *Pyrola* spp., *Lutkea pectinata* and *Xerophyllum tenax*. Representative herb composition includes *Luzula hitchcockii*, *Arnica latifolia*, *Achlys triphylla*, *Clintonia uniflora*, and *Polmonium pulcherrimum*.

f) Whitebark Pine/Subalpine Larch Group

No whitebark pine or subalpine larch series were mapped within the Milk Creek MLSA.

g) Non-Forest Vegetation Group

There are approximately 1,335 acres (9 percent) of non-forest vegetation in the Milk Creek MLSA. Included within this group are: talus (1,001 acres), wet meadow (114 acres), scree (72 acres), deciduous forest (60 acres), grassland/shrubland (33 acres), water (26 acres), dry meadow (15 acres), and bedrock (14 acres). Refer to the Forest-wide Overview discussion for descriptions of these vegetation types.

h) Species of Special Status

Within the Milk Creek MLSA, there is potentially suitable habitat for a number of species with special status. However, relatively few surveys have been conducted to determine presence or absence. Species with special status surveys should be carried out in conjunction with restoration projects, as well as, independently of other activities. It is important that species ranges are known so that accurate estimates of species viability can be assessed. In addition, little is known relative to the majority of species with special status habitat and biological requirements, and inventories provide a first and necessary step in obtaining this information.

There is one Forest Service sensitive (see Late-Successional Associated Plant Species) species within the Milk Creek MLSA (Appendix 7). *Cypripedium montanum* is documented from two locations. Based on it's occurrence on the Naches Ranger District, *C. montanum* appears to favor light disturbance such as low severity fire and light soil disturbance (Engle, personal observation).

i) Survey and Manage Species

There is one known survey and manage plant species within the Milk Creek MLSA. The lichen species, *Cyphelium inquinans* is known to be associated with western red cedar bark. Several additional species are suspected to occur, and the presence or absence of others is simply unknown (Appendix 7). The ROD provides standards and guidelines for survey and manage species, and should be referred to for management of these species within the Milk Creek MLSA.

Table IV-1, Sensitive and Survey and Manage Species in the Milk Creek MLSA

Group	Latin name	Common name	Federal *	State +	Forest Service ++	Presence **
VASCULAR PLANTS	<i>Agoseris elata</i>	tall agoseris		S		S
VASCULAR PLANTS	<i>Carex comosa</i>	bristly sedge		S		S
VASCULAR PLANTS	<i>Carex interrupta</i>	green-fruited sedge		M3		S

Group	Latin name	Common name	Federal *	State +	Forest Service ++	Presence **
VASCULAR PLANTS	<i>Cryptogramma stelleri</i>	Steller's rockbrake		S		S
VASCULAR PLANTS	<i>Cypripedium montanum</i>	mountain ladyslipper			SM	K
VASCULAR PLANTS	<i>Githopsis specularioides</i>	common blue-cup		S		S
VASCULAR PLANTS	<i>Orobanche pinorum</i>	pine broomrape		S		K
VASCULAR PLANTS	<i>Spiranthes porrifolia</i>	western ladies-tresses		S		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; “***” **Present (or absent in LSR/MLSA)** - “K” = Known, “S” = Suspected

j) Noxious Weeds

Although systematic surveys have not been completed, portions of the Milk Creek MLSA have been surveyed for noxious weed species. Documentation of noxious weed species has resulted from roadside surveys (McRae and Harrod unpubl.) and various vegetative reconnaissance. High densities of *Centaurea diffusa*, are present along roads, particularly Highway 410 and Road 1900. *Linaria dalmatica* is present and abundant in the lowest elevations along Highway 410. *Senecio jacobae* is known from several locations in the Quartz Creek area and along Road 1900. *Cirsium vulgare* and *C. arvense* are prevalent in areas with relatively recent ground disturbance. *Chrysanthemum leucanthemum*, *Hypericum perforatum*, *Verbascum thapsus*, *Convolvulus arvensis*, and *Hypochaeris radiata* occur with relatively low frequency throughout the analysis area. Survey for species presence and extent should be completed in order to develop a noxious weed 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 Milk Creek 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 MLSA. 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, candidate, 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 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 species as shown in Appendix 7. The most extensive of these were for the Harlequin duck, northern spotted owl and barred owl. Surveys for these species have been conducted over 100% of their available habitat within the MLSA.

b) Late Successional Species By Habitat Type

(1) Dry Forests

About 3,075 acres (20%) of Milk Creek MLSA is composed of the dry forest vegetation group. Fire climax ponderosa pine forests historically dominated these areas and 49 wildlife species are associated with these forests.

Currently, 1,866 acres (61%) of the dry forest is in a successional advanced condition. About 106 acres (3%) are in a low density condition and could be fire-climax.

Some species that are associated with the late-successional or fire-climax conditions of these forests and have special status include: tailed frog, larch mountain salamander, northern goshawk, bald eagle, Van Dyke's salamander, flammulated owl, pileated woodpecker, hairy woodpecker, white-headed woodpecker, black-backed woodpecker, Williamson's sapsucker, northern flicker, pygmy nuthatch, elk, long-legged myotis, long-eared myotis, silver haired bat, fringed myotis, western big-eared bat, pallid bat, marten, and fisher.

Historically, only a minor portion of these areas provided the structures that are associated with suitable spotted owl habitat (Thomas et al. 1990, Buchanan et al. 1995). However, fire exclusion has allowed successional advancement for suitable spotted owl habitat to develop in some areas (Agee and Edmunds 1992, Buchanan et al. 1995). These areas are now being used by spotted owls, however the risk of large scale disturbances causing large scale habitat loss is of major concern (Agee and Edmunds 1992, Buchanan et al. 1995, Gaines et al. in press). No known spotted owl activity centers occur in the dry forests.

(2) Mesic Sites Within the Dry Forest

The mesic sites within the Dry Forest group could only be mapped were not mapped. Mesic sites within the dry forests provide important wildlife habitat and add diversity across the landscape. It is suggested that these sites be identified during project level analysis and that the appropriate treatment criteria be applied.

Historically, fire occurred less frequently at these sites (refer to Chapter III) allowing for succession that resulted in more complex forest structure such as a higher canopy closure, multilayering, snags and down logs. These forests occurred in a variety of successional stages across the landscape. The late-successional conditions of these Mesic Forests provide habitat for about 66 wildlife species. The high potential for future fires presents a concern about the sustainability of these forests.

Wildlife species that occur in these habitats and are of special management status include: tailed frog, Van Dyke's salamander, Cascades frog, larch mountain salamander, 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, pygmy nuthatch, elk, long-legged myotis, long-eared myotis, fringed myotis, Yuma myotis, western big-eared bat, silver-haired bat, pallid bat, marten, and fisher.

These sites are capable of providing habitat structure that typically composes spotted owl nesting, roosting, foraging and dispersal habitat, while remaining within the historic range of variability.

(3) Moist Grand Fir Group/Mesic Western Hemlock

The Moist Grand Fir/Mesic Western Hemlock group covers about 10,896 acres (69%) of these areas. Historically, fire occurred less frequently than in the Dry and Mesic vegetation groups (refer to Chapter III), 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 on the WNF.

Currently, about 9,513 acres (87%) of this vegetation group that is in a late-successional condition. In the absence of any major disturbance, it is expected that in 100 years 10,758 acres (98%) of this habitat would be in a late-successional condition.

Wildlife species associated with the late-successional conditions of this vegetation group and are 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, Cascades frog, larch mountain salamander, Van Dyke's 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/Mesic Western Hemlock 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. Three (100%) of the spotted owl activity centers located within this LSR are located within this vegetation group or in the Wet Forest Group.

(4) Wet Forest Group

The Wet Forest Group covers about 389 acres (2%) of Milk Creek MLSA. Historically fire occurred relatively infrequently (refer to Chapter III) 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.

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, Van Dyke's 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. There are three spotted owl activity centers located within the Wet Forest and Moist Grand Fir/Mesic Western Hemlock groups. This is 100% of the total known activity centers within this MLSA.

(5) Subalpine Fir

Subalpine fir forests covered such a minor portion of this MLSA (15 acres) that is was not assessed.

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.

d) Endangered Or Threatened Wildlife Species

There are five wildlife species and one Critical Habitat Unit that are federally listed as Threatened or Endangered and could occur within the Milk Creek 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 Critical Habitat for spotted owls.

(1) Bald Eagle and Peregrine Falcon

The bald eagle is known to occur within the Milk Creek MLSA. No surveys for bald eagles have been completed. Peregrine falcons are known to occur within the Milk Creek MLSA.

(2) Northern Spotted Owl

A total of three spotted owl activity centers occur within the Milk Creek MLSA and all of their habitat has been inventoried. There is 9133 acres (58%) of spotted owl habitat for nesting/roosting, and foraging habitat within the Milk MLSA. There is potential for 12,383 acres of N/R/F habitat. The estimated amount of habitat within a 1.8 mile radius of these activity centers is shown in Appendix 15. Currently, two of these activity centers are at threshold habitat levels and one is below.

The following tables display spotted owl information associated with the Milk Creek MLSA.

Table IV-2, Spotted Owl Information for the Milk Creek MLSA

Northern Spotted Owl	Status ³	Ownership ⁴	Dry or Wet Owl ⁵	Threshold ⁶	Critical Habitat Unit (CHU)	Forest Interior? ⁸	Suitable Spotted Owl Habitat	Total Dispersal Habitat ⁹
SO838	PY	FS	Wet	At Threshold			3,787	387
SO840	PY	FS	Wet	Below Threshold			3,716	197
SO865	P	FS	Wet	At Threshold		Near	3,000	629

¹ Near the LSR or MLSA but not inside the LSR or MLSA.

² Spotted owl site overlaps with other LSR/MLSA.

³ RS = Residential Single; P = Pair; PY = Pair with Young, based on highest occupancy.

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

⁵ If the majority of suitable spotted owl habitat in .7 mile circle is dry or mesic, then it is a dry spotted owl. If the majority is wet, then it is a wet spotted owl.

⁶ **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.

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

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

Near = activity center is inside late successional habitat near forest interior.

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

¹⁰ 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.

¹¹ A larger circle will be needed if there is less than 100 acres of suitable habitat

(3) Critical Habitat Unit for Northern Spotted Owl

There are is one CHU slightly overlapping into the Milk MLSA, 35 acres from the Bumping WA15 CHU, there are no goals tied to this part of the CHU.

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.

(4) Grizzly Bear and Gray Wolf

No class 1 grizzly bear observations have been made within the either of these areas, however, they are suspected to occur in the Milk Creek MLSA. Gray wolves are also suspected to occur but presence has not been confirmed. No surveys for either of these species have been completed.

(5) Marbled Murrelet

There is no marbled murrelet habitat within the Milk MLSA.

e) Sensitive And Candidate Wildlife Species

There are 15 wildlife species that are on the R6 Sensitive Species list or are federal candidate species that could occur within the Milk Creek MLSA. These include the goshawk (*Accipiter gentilis*), willow flycatcher (*Empidonax trailii*), olive-sided flycatcher (*Contopus borealis*), tailed frog (*Ascaphus trueii*), spotted frog (*Rana pretiosa*), Cascades 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*).

(1) Birds

The goshawk is known to occur in this MLSA, however, no surveys have been completed. The little willow flycatcher and olive-sided flycatcher are suspected to occur in the Milk Creek MLSA. No surveys have been completed for these species.

(2) Amphibians

Surveys for the tailed frog have been completed in about 10% of their habitat and they are known to occur in the Milk Creek MLSA. It is unknown if the spotted frog occurs, although, about 10% of their habitat has been surveyed. Cascades frogs are known to occur and surveys have been completed in 10% of their habitat.

(3) Mollusks

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

(4) Mammals

The long-legged myotis and long-eared myotis are known to occur in both of these areas. Surveys have been completed over <5% of their habitat. The fringed myotis and Yuma myotis are both unknown in these areas. Surveys have been completed over <5% of their habitat. The western big-eared bat is known to occur within the Milk Creek MLSA where 30% of their habitat has been surveyed.

No surveys for the lynx, wolverine or fisher have been completed. It is unknown if the lynx occurs in the Milk Creek MLSA. The fisher is known to occur and the wolverine is suspected to occur.

f) Management Indicator Species

There are 12 wildlife species that are listed as management indicator species that occur or could occur within the Swauk LSR. 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*).

(1) Primary Cavity Excavators

No surveys for primary cavity excavators have been completed within the Milk Creek MLSA. The pileated woodpecker, hairy woodpecker, red-breasted sapsucker, and northern flicker are known to occur in this area. The downy woodpecker, three-toed woodpecker, and Williamsons sapsucker are suspected to occur in the Milk Creek MLSA.

(2) Ruffed Grouse and Beaver

No surveys for the ruffed grouse or beaver have been completed. They are both known to occur within the Milk Creek MLSA.

(3) Mule Deer, Elk

Mule deer and elk are known to occur and no surveys have been completed.

(4) Marten

Marten are known to occur and no surveys have been completed.

g) Survey And Manage, Protection And Buffer Species

There are eight species that do or could occur within the Milk Creek 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*).

(1) Birds

It is unknown if the great gray owl occurs within the Milk Creek MLSA and no surveys have been completed. No surveys have been completed for the flammulated owl, however, they are known to

occur. No surveys for the white-headed woodpecker, black-backed woodpecker, or pygmy nuthatch have been completed. These species are suspected to occur in the Milk Creek MLSA.

(2) Mollusks

It is unknown if the warty jumping slug, blue-gray tail-dropper, or papillose tail-dropper occur in the LSR/MLSA and no surveys have been completed.

(3) Amphibians

No surveys of the larch mountain salamander or the Van Dyke's salamander have been completed within the MLSA and it is unknown if they occur here.

h) Habitat Effectiveness

Habitat effectiveness was assessed using the current open road density and the amount of security habitat. The current open road density is 3.65 mi./sq.mi. in the Upper Nile LSR and is 5.04 mi./sq.mi. in the Haystack MLSA. The amount of security habitat is 2% in the Upper Nile LSR and 6% in the Haystack MLSA. Based upon these variables, the current level of habitat effectiveness for late-successional species in these areas is considered to be "low". This situation could be greatly improved through road obliterations identified during access and travel management planning.

3. Aquatic

The land within the Milk MLSA contains portions of 7 fish production units (subwatershed's). These subwatershed's are Mainstem Naches, Devil-Swamp, Milk, Lower Crow, Lower American Lower Bumping and Mainstem Little Naches. In Milk MLSA an estimated 2,482 acres (16%) of 15,711 acres are estimated to be within the Riparian Reserve. The average annual precipitation in Milk MLSA ranges between 35 and 60 inches. The "Land Type Associations" within the MLSA are described as having high deep seated failure hazard and or high moisture stress. Others have been described as having High sediment response and poor hydraulic regulation or well regulated hydraulic and high sediment response.

The Naches - Little Naches are key watersheds. The streams that drain from Milk MLSA include Devil, Swamp, Milk, Crow, West Quartz, Bumping River, American River, Little Naches River and Naches River.

4. Human Uses

a) Overview

Access to this MLSA is via Highway 410 which is open year-round. This highway is designated as the Mather Memorial Parkway which extends one half mile on either side of the highway. This designation reflects the area's importance for recreation use and travel.

b) Prehistoric and Historic Summary

There is a very high density of American Indian sites (the highest density on the Wenatchee National Forest) in this MLSA and the surrounding areas. These sites are especially prevalent along the main rivers and open ridgetops.

c) Recreation

(1) Developments

There are a number of campgrounds, picnic areas and other developed sites within this MLSA as detailed in the table below:

Table IV-3, Recreation Sites, Milk Creek MLSA

Site	No. of Units	Comments
Cedar Springs	15	
Crow Creek	15	Limited Development
Indian Flat		Reservation site
Little Naches	17	
Sawmill Flat	27	
Kaner Flat	42	
Milk Pond		Picnic Area, Limited Development
Halfway Flat	12	Limited Development Site
American Forks	25	
Boulder Cave		Picnic Area and Nat. Rec. Trailhead, Popular Day Use Site

Dispersed camping (camping outside of identified campgrounds) occurs throughout the MLSA however it is more prevalent in areas adjacent to both water and roads, especially along Highway 410 and the American River.

(2) Trails

Table IV-4, Trails Within Milk Creek MLSA

Trail No. or Name	Miles	Type	Comments
961	2	Single Tread, Motorized	
Trail to Boulder Cave	.8	Hiker Only	Paved, Accessible, National Recreation Trail
River Trail at Boulder Cave	1	Hiker Only	Paved, Accessible
Trail 965	1	Single Tread, Motorized	

In addition to these trails an outfitter guide uses non-system trails south and west of Highway 410. There are no system four wheel drive trails within this MLSA.

(3) Other Recreation Activities

Elk and deer hunting are very popular activities. During the hunting season dispersed sites are occupied throughout the MLSA. Fishing, picnicking, driving for pleasure, and rock collecting are other popular activities.

During the winter season snowmobiling is a popular activity. There are sno-parks at Crow Creek, junction of 1708 and 410, and at Boulder Cave. Groomed routes use forest roads 1709, 1706 and 1708. Other routes may be groomed in addition to these.

Cross-country skiing is another popular winter use of this area. This occurs on the Boulder Cave Road, Old River Road (forest road 1704), and some on the snowmobile routes.

Christmas tree cutting is also a very popular activity. Much of this occurs out of the Boulder Cave Sno-Park and along the main forest roads that are still free of snow.

(4) Recreation Special Uses

The Milk Creek MLSA includes several summer home tracts along the Naches River and one tract along the Little Naches River. Camp Rogamunda is the only organization site within this MLSA. An outfitter guide has a special use permit to offer saddle rides in this area.

d) Mining

There are a few small mining claims along the Naches River and Little Naches River, these are primarily recreational, searching for gold.

e) Landownership

All of this MLSA is in federal ownership.

f) Roads

Most of this MLSA is roaded and accessible by car.

g) Social and Economic Considerations

Recreation is the primary use of this area. The nearby town of Cliffdell provides lodging, gas and food services to recreationists.

B. Analysis Between LSR/MLSA's

1. Sustainability

The sustainability of LSR's/MLSA's across the forest is displayed in Table IV-5. The Milk Creek MLSA falls in the upper 1/3 of all LSR's/MLSA's in terms of the amount of at risk vegetation which puts it in the lower 1/3 in terms of overall sustainability. An important consideration in terms of sustainability is the relationship of the Milk Creek MLSA compared to its' neighboring LSR's/MLSA's. Three LSR's, (Manastash Ridge, Bumping and Upper Nile) and two MLSA's (Crow and Haystack) are for the purposes of this analysis considered to be neighbors. The following table shows the acres at risk and the ignition risk determined in the forest-wide sustainability analysis for Milk Creek and its five neighboring LSR's/MLSA's.

Table IV-5, Sustainability of Milk Creek MLSA (Acreage and Percent at Risk)

	LSR/MLSA at Risk	LS Forest at Risk	

LSR/MLSA	Acres	Pct.	Acres	Pct.	Ignition Risk
Milk Creek	11,432	73%	8,513	100%	Moderate
Manastash Ridge	38,858	37%	33,684	49%	Moderate
Crow	412	3%	412	4%	Moderate
Bumping	165	1%	165	2%	Moderate
Upper Nile	4,979	54%	4,589	73%	Moderate
Haystack	20,079	81%	16,154	100%	Moderate

The factor driving this analysis, looking at sustainability issues between LSR's/MLSA's, is the amount and location of at risk vegetation between the Milk Creek and its five neighbors. In other words, linkages in at risk vegetation that would facilitate the spread of fire from one LSR/MLSA to the other. Review of maps of at risk vegetation reveals that there are significant amounts of at risk vegetation between the Milk Creek and Manastash Ridge, Haystack and Upper Nile, and only minor amounts between Milk Creek and Bumping and Crow.

This creates a situation where fire burning within or between Milk Creek and either the Manastash Ridge, Upper Nile or Haystack presents a risk to the others. The potential for a fire occurring with resultant effects on any combination of these four LSR/MLSA's at one time is very high, similar to what happened with the 1994 fires on the north end of the forest. The area of highest priority is that area between Milk Creek and both Nile and Haystack. These two LSR/MLSA's both lie downwind of Milk Creek and provide additional linkages of at risk vegetation to other LSR's further downwind (Rattlesnake and Russell Ridge).

a) Implications

1. Reduce stand density in dense dry successional advanced vegetation types (types 12 and 22) where they exist between Milk Creek and either Manastash Ridge, Haystack or Upper Nile.

Potential Projects - Commercial Thinning

2. Reduce fuel loadings along roads that exist between these LSR's to increase the roads effectiveness as fuel-breaks.

Potential Projects - Piling of down fuels, firewood gathering, pruning to reduce vertical fuel concentrations (all vegetation types), construction of shaded fuel-breaks.

3. Reduce fuel loadings in young stands.

Potential Projects Precommercial thinning.

2. Northern Spotted Owl

The Milk Creek MLSA is not one of the "big 3" large population cluster/source center LSR's, for the recovery of the spotted owl. It is part of the smaller "local population" centers, which are linked to the metapopulations through dispersing individuals. The spotted owl is a Threatened species, with the recovery dependent on the implementation of the NWFP, especially in LSR/MLSA's (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 titled "Function of the LSR/MLSA Network." Connectivity specific to the Milk 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 Milk MLSA can be viewed from how well habitat is connected to surrounding LSR's or MLSA's. Species and the habitats they're associated with are presented in Appendix 6. Firstly, connectivity between Milk MLSA and the Bumping LSR exists for all dispersal classes within the dry/mesic and moist grand fir vegetation groups.

Within the wet forest group, connectivity for species with moderate and high dispersal capabilities is only provided by vegetation which occurs outside of the MLSA and LSR. No connectivity exists for species with low dispersal capabilities. This situation is a consequence of the limited occurrence of the wet vegetation group and it's juxtaposition on the landscape. Subalpine fir and whitebark pine/subalpine larch are not present in both the MLSA and LSR and therefore a discussion of connectivity is not warranted.

Connectivity between the Milk and Crow MLSA's occurs for all dispersal classes in the dry/mesic, moist grand fir, and wet forest groups. No connectivity exists for any dispersal class for subalpine fir or whitebark pine/subalpine larch vegetation groups, as these groups are not present in the MLSA or LSR.

Relative to the Manastash Ridge LSR, no connectivity exists in the dry/mesic forest group for species with low dispersal capabilities. Species with moderate and high dispersal capabilities are dependent on dry/mesic vegetation between these two areas. The lack of, or dependency on, surrounding vegetation for connectivity in the dry/mesic vegetation is a function of the inherent landscape pattern associated with this vegetation type. Connectivity exists for all dispersal classes within the moist grand fir and wet forest groups. No connectivity exists within the subalpine fir series or whitebark pine/subalpine larch forest group as these groups are not present, or are extremely limited, in the Milk MLSA and Manastash Ridge LSR.

Regarding the Upper Nile LSR, connectivity for species with low and moderate dispersal capabilities within the dry/mesic forest group is dependent on vegetation which occurs outside the MLSA/LSR. Connectivity does exist for species with high dispersal capabilities. Again, the lack of connectivity in the dry/mesic vegetation type is a function of the inherent landscape pattern associated with this type. Relative to the moist grand fir forest group, species with low dispersal capabilities are dependent on vegetation occurring outside of the network. Connectivity in this forest group is provided for species with moderate and high dispersal capabilities. No connectivity exists in the wet and whitebark pine forest groups or subalpine fir series for any dispersal class as these groups are either extremely limited, or absent, from one or both of the areas.

Connectivity between the Milk and Haystack MLSA's exists for all dispersal classes in the dry/mesic and moist grand fir forest groups. The wet forest, whitebark pine/subalpine larch forest, and subalpine series are not present and therefore a discussion of connectivity is not applicable here.

In general, few opportunities to improve habitat connectivity for vascular plant species associated with a particular forest vegetation group were identified as a result of this analysis. In the dry/mesic vegetation group, the lack of connectiveness is primarily a result of inherent landscape patterns. In

the moist grand fir vegetation group, maintenance of existing dispersal corridors and promotion of mature/late-successional vegetation may provide opportunities for improving connectivity.

b) Wildlife Connectivity

The following are the results of applying the forest wide connectivity module to the Milk Creek MLSA. A total of four potential linkages were assessed. These included Milk Creek to Manastash Ridge, Milk Creek to Crow, Milk Creek to Haystack, and Milk Creek to Bumping.

Table IV-6, Wildlife Connectivity, Milk Creek MLSA

Linkage	Distance (MI)	Low	Moderate	High	Index
MC/Manastash Ridge	0	Yes	Yes	Yes	3
MC/Crow	0.6	Yes	Yes	Yes	3
MC/Haystack	0.6	No	Yes	Yes	2
MC/Bumping	0.3	No	Yes	Yes	2
Overall Rating	2.5				

(1) Restoration Opportunities

There may be an opportunity to enhance the linkage between Milk Creek and Bumping. The current rating has been given a 2 because of the road. However, the two areas are close enough to meet the criteria of a type 3 linkage. Further site specific analysis could be used to verify the current rating and determine if it could be managed as a 3.

c) Northern Spotted Owl Connectivity

The objectives in the Milk Creek MLSA are similar to LSR's (to protect and enhance conditions of late successional and old growth forest ecosystems), however, MLSA's were identified for certain owl locations in drier provinces, where regular and frequent fires are a natural part of the ecosystem (NWFP A-4, C-23). The Milk Cr. MLSA is important for maintaining well distributed and well-connected spotted owl populations. The four 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 Bumping LSR, Manastash Ridge LSR, Crow MLSA, and the Haystack MLSA..

Habitat providing dispersal/connectivity corridors between LSR's (outside LSR/MLSA's) include: a small connection towards the William O. Douglas Wilderness to the west; Swamp Creek to Little Bald Mountain; Cliff Dale along the river; Milk Creek to Devil's Slide; South Fork Crow Creek; Willow Springs to Bumping; and Naches River. (see Forest Interior map). These connectivity corridors should be monitored for effectiveness, and should overlap into Riparian Reserves, unmapped LSR's, wilderness, etc.

C. Analysis Within LSR/MLSA

1. Unique Habitat and Species

The following is the discussion and results of the Unique Habitat and Species module for the Upper Nile LSR and the Haystack MLSA. See appendix for order, explanations and process of modules.

a) Forest-wide Overview of Unique Habitats and Species

Over all, this MLSA has a high quality of unique habitats and species for an MLSA. It has the only hibernacula of Townsend's western big-eared bat and cave sites, and has a high amount of talus and rock. It has the highest percentage of riparian reserves of any MLSA or LSR (16% or 2,482 acres). The Milk MLSA is in the transition zone for vegetation, and more disjunct forest species are found here, such as Alaska yellow cedar and Pacific yew. There are some sites used by American Indians, vision quest, cache sites, fishing and transportation. There is a fairly high number of wildlife species known to occur (42 spp) and plant species (28 species).

Snag concentrations and quality is lower. Road densities are very high especially in riparian reserves. Wilderness is not adjacent or surrounding this MLSA, so connectivity is not assured over time.

b) Unique Habitats and Species Within

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). As part of the analysis past management activities effect the function of unique habitats and species. For the Milk Creek MLSA these include: total open road density of 4.3 mi./sq. mi., security habitat of 2%, roads and trails in riparian reserves of 6.22 mi./sq. mi., and past harvest activities of >85% in the MLSA.

(1) Abundance and Ecological Diversity

Compared to all the other LSR/MLSA's, the Milk Cr. MLSA is moderate in providing high amounts of acreage and wide 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.

(2) Connectivity for Unique Habitats and Species

The Milk Cr. MLSA is moderate in quality of providing high connectivity in a landscape pattern for biological flow to sustain unique animal and plant communities. 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.

(3) Process and Function of Unique Habitats and Species

The Milk Cr. MLSA is moderate in 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.

Identified areas of high abundance, connectivity and function for unique habitats and species in the Chiwawa LSR are:

1. American River to Little Bald Trail: forest interior, wetlands, riparian reserves, talus, caves, rock.
2. Lilly Pond Lake to Milk Creek: Riparian reserves, forest interior, talus/rock, PETS, meadows.
3. Naches River (Boulder Cave to Bumping river): natural openings, forest interior, PETS spp, wetlands, riparian reserves, talus, caves, deciduous.
4. Upper Milk Creek : wetlands, riparian reserves, forest interior,
5. Little Naches River to Kaner Flats and west: forest interior, talus/rock, riparian reserves, wetlands, deciduous..
6. Swamp Creek.

The following is a summary of the Unique Habitats and Species Module. For more information see Unique Habitats Map and Tables, Forest Interior Map and Tables, Riparian Reserves and Rooding Map and Tables.

(a) Unique Habitats And Species Milk Mlsa Module

Landscape Analysis:

No sites known for bioregion or RNAs.

Micro-site Analysis:

RIPARIAN RESERVES 16% of LSR	NON-FORESTED VEG 9% of LSR
Streams, Wet Meadows, Seeps, Lakes	Talus 7%, Aspen & Cottonwood, Meadows, Natural Openings.

SURVEY & MANAGE PROTECTION & BUFFER	UNIQUE FORESTS
Long-eared Myotis, Long-legged Myotis,	Forest Interior Patches 9%,
Fungi, Lichens, Plants Cymo	Dry Forests, Disjunct Cedar,
Larch Mt. Salamander?,	Snags/Logs Low Quality.
Black-backed & White-headed woodpecker, Flammulated Owl, Silver-haired Bat.	Whitebark pine,

PETS/MIS/Traditional Use Sites

PETS - Western Big-eared Bat, Peregrine Falcon, Fisher, Goshawk, Spotted Owl, Bald Eagle, Harlequin Duck, Tailed Frog, Cascade Frog.

Plants. *Orbanche pinorum*

MIS - Elk, Mule Deer, Pileated Woodpecker, Marten, Ruffed Grouse, Beaver.

Traditional Use Sites - Vision Quest in Talus

c) Restoration Opportunities And Potential Projects for Unique Habitats and Species:

1. Reduce road and trail densities in riparian reserves.
2. Reduce open road densities throughout the LSR.
3. Increase amount of security habitat.
4. Increase and accelerate late successional habitat and forest interior habitat. Thin to accelerate old growth.
5. Reduce roads and trails in unique habitats (meadows, talus, wetlands, etc.).
6. Reduce noxious weed spread in meadows and natural openings.
7. Reduce roads in forest interior patches
8. Protect large trees and screen near talus, cliffs, caves, meadows.

9. Reduce encroaching trees in subalpine meadows.
10. Prescribed fire in ponderosa pine.
11. Reduce Fragmentation of Wet Forest.
12. Protect riparian from grazing.
13. Provide American Indian site access.
14. Maintain black-backed woodpecker nesting/roosting/foraging habitat.
15. Meet high end snag levels.
16. Create log den sites in low quality roaded/forest for marten, fisher, lynx.
17. Protect/maintain/enhance/monitor PETS.
18. Prescribed fire in natural openings as part of fire climax.
19. Interpret values and protection/maintenance of unique habitats and species, from high use road sites and recreation sites.
20. Acquire non-Forest System lands with high degree of unique species or habitat.
21. Habitat burns in Aspen. Fence/Recover Aspen From Grazing

d) Snag/Log/Green Tree Recruitment

The following is the discussion and results of the Snag/Log/Green Tree Recruitment sub-set module of the Unique Habitats module. 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.

A landscape level approach was used to analyze snag, green tree recruitment, and downed wood habitat. The landscape approach reviews the quality of snag, down logs, and green tree recruitment for the LSRs. GIS and specific knowledge was used: including: forest vegetation types and acreages, amount of forest burned, percentage of past timber harvest (clearcuts and partial cuts), road densities, security habitat, Riparian Reserve acreages, pathogens, the number of spotted owl home ranges, forest interior amounts, and the percentage of late successional habitat. The qualitative analysis for the LSR/MLSA included green tree availability, short term and long term snag/log availability, burn intensity, site specific wildlife needs, land allocation goals, and the quality of refugia/security habitats.

e) Snag/Downed Log/Green Tree Recruitment

(1) Quality Rating

Each attribute for snag/downed log/green tree recruitment has a rating (see chart), a final rating incorporates all values towards one rating for the LSR/MLSA. Actual snag, downed log and green tree recruitment numbers, sizes, stages of decay and species is not practical to analysis on a landscape basis. This can also be done on a 40 acre grid, or sub-watershed basis. When data is available, incorporate actual availability data into the analysis. Snag and Downed Log levels are based on WNF Snag Levels, Fire Recover y Snag Levels, Everett et al Spotted owl and Snag studies, and wildlife needs. Qualitative ratings are based on habitat needs for snag, downed log, and recruitment tree wildlife and plant species needs. Species using these habitats include:

pileated woodpecker	spotted owl	hoary bat	marten & fisher	tailed frog
black-backed	flamulated owl	silver-haired bat	flying squirrel	NW & PG salamander

woodpecker

white-headed
woodpecker

olive-sided flycatcher
V

great gray owl

Vaux's swift

big brown bat

voles, shrewmole

lynx

bald eagle

lichens & fungi

land snails

**** MILK MLSA SNAG ANALYSIS****

<u>HIGH QUALITY</u>	<u>MEDIUM QUALITY</u>	<u>LOW QUALITY</u>
Moist & Wet Veg Groups 71%	Subalpine Fir & Mesic Veg 0%	Dry & Whitebark 29%
>60% LS (non-dry) Habitat	15% - 60% LS Habitat 54%	<15% LS Habitat
80% - 100% LS (all) Habitat	40% - 80% LS/M Habitat 61%	<40% LS/M Habitat
> 30% Forest Interior (non-dry)	15% -29% Forest Interior Non-dry	<15% Forest Int ND 9%
>10% Forest Interior Dry	5% - 9% Forest Interior Dry	< 5% Forest Int Dry 0%
>16% in Riparian Reserves 16%	10% to 16% in 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 RR 6.22 mi/sq/mi
< 1 Mi/Sq Mi Open Roads	1 Mi to 2.5 Mi/Sq Mi Roads	> 2.5 Mi/Sq Mi Rds 4.3 mi/sq/mi
>70% Security Habitat	50% to 70% Security Habitat	<50% Security Hab 2%
>10% in Past Burns	--	<10% in Past Burns <10%
>50% Insect/Pathogens	25% - 50% Insect/Pathogens	< 25% Insect/Pathog (see Insect/Disease Write Up)
<10% Past CC Harvest	11% - 25% Past CC Harvest	>25% Past Ccs > 25%
<10% Past PC Harvest	11% - 50% Past PC Harvest	>50% Past PC 90%

f) Restoration Opportunities And Potential Projects For Snags/Logs

Reduce roads in riparian reserves; Reduce Roads in Forest Interior Patches
 Retain Snags at High End of Range; Incorporate Healthy Insect/Disease Levels,
 Complete snag analysis on 40 acre grid

g) Plant Species with Special Status

Two species with special status were identified to occur within the Milk MLSA (Appendix Heather ??). There are not immediate viability concerns associated with *Cypripedium montanum*. This is based on the relatively frequent occurrence of this species on the Naches Ranger District. Consequently, the Species with Special Status Module would recommend monitoring these species and subsequent development of a Conservation Strategy. Regarding the lichen species *Cyphelium inquinans*, very little information is available on the biology and ecology of this species. Documentation of this species from the Naches Ranger District suggests that this species is associated with various vegetation types and various substrates. Therefore, it is cautiously concluded that no immediate viability concerns exist for this species and monitoring and that development of a conservation strategy be completed for this species.

2. Connectivity (Plant and Wildlife)

a) Plant Connectivity

Connectivity can also be addressed by analyzing the connectedness of habitats or species populations within the MLSA/LSR. Within the Milk MLSA, most forest groups are relatively well connected. Disjunct species populations result from inherent breaks or openings in the landscape. At this time, information is not available to complete this type of analysis for survey and manage species within the Milk MLSA.

b) Wildlife Connectivity

The following are the results of applying the within MLSA Connectivity module.

Connectivity Variable	Dry	MGF/WH	Wet	Overall
%LS or Fire Climax	LS=L,FC=L	H	H	M
Open Road Density	L	L	L	L
Security Habitat	L	L	L	L
Interior Forest Roads	L	L	L	L
%Interior Forest	L	L	L	L

(1) Restoration Opportunities

The current level of open road density is 4.3 mi./sq.mi. and the amount of security habitat is 2%. The open road density within Riparian Reserves is 6.2 mi./sq.mi. The connectivity of habitats within the Milk Creek MLSA could be greatly improved through a reduction of the open road density and an increase in the level of security habitats. Priority areas for this to occur include within Riparian Reserves and interior forest patches. Road restoration could include road obliteration and revegetation to provide for suitable dispersal habitat for low mobility species.

Additional restoration opportunities includes fuels reduction and prescribed fire within the dense dry forests to improve connectivity of fire-climax associated species. Area within the Dry Forest and Moist Grand Fir/Western Hemlock vegetation groups that are currently in a created opening or single layered could be evaluated to determine if density management could occur to enhance the development of late-successional conditions.

(2) Habitat Effectiveness

Habitat effectiveness was assessed within the Milk Creek MLSA using the current open road density and the amount of security habitat. The current open road density is 4.3 mi./sq.mi. and the level of security habitat is 2%. Habitat effectiveness for late-successional associated species is currently considered to be "low". The long-term habitat effectiveness objective for LSR/MLSA is to manage towards a "high" level defined as <1mi./sq.mi. and >70% security habitat. These objectives could be integrated into access and travel management planning to improve the situation for these species.

3. Disturbance Risk Analysis

Twenty percent of the Milk Creek MLSA is in the dry forest group; of that, about half is successional-advanced. With the exception of small amounts of wet forest and non-forested areas, the balance (69%) consists of moist grand fir or mesic western hemlock associations. The wet forest is concentrated along the riparian zones of the Bumping and Naches Rivers and Milk Creek. Three fourths of the grand fir and hemlock forests are successional advanced, have entered multiple times for timber harvesting, and are heavily impacted by annosus root disease and, to a lesser extent, laminated root rot. It is literally possible to walk for miles within this MLSA and not leave a root disease pocket. Fuel levels are high, both in and outside the MLSA.

The Milk Creek MLSA is heavily roaded. There are ten developed campgrounds within the MLSA; recreational use is extremely heavy. A major highway across the crest of the Cascades bisects the Milk Creek MLSA. Human-caused ignitions along this highway are high, adding to the risk of fire. Fires originating within or outside the boundaries have the potential to destroy large portions of the MLSA.

The following information on insect activity in the Milk Creek MLSA is from data collected during the aerial surveys conducted by Region 6 Insect and Disease Group. Activity prior to 1980 was not available on the Forest at the time of this analysis. Light infestations or damage on less than 100 acres are not reported.

- Western pine beetle: 1986
- Mountain pine beetle (lodgepole pine): 1994
- Mountain pine beetle (w. white pine): 1981 (very heavy), 1983, 1986, 1988 (very heavy), 1993
- Mountain pine beetle (ponderosa pine): 1990
- Douglas-fir beetle: 1988

- Fir engraver: 1988-91 (very heavy)
- Spruce beetle: 1991
- Western spruce budworm: 1985
- Blackheaded budworm: 1985

Western white pine mortality associated with white pine blister rust and subsequent attack by mountain pine beetles is very high in this MLSA, as is grand fir mortality from the fir engraver. The former has the effect of changing species compositions and moving vegetation towards late successional stages by selectively eliminating a seral species. The latter 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.

Table IV-7, Disturbance Matrix, Milk Creek

Ve g Ty pe	Fir e	Dwarf mistletoes			Root disease			WPB R	WSB	DF B	FE	Total
		DF	WL	WH	AROS	HEAN	PHWE					
10	M	M	L	-	M	M	M	-	L	L	L	M
11	M	M	L	-	M	M	M	-	M	L	L	M
12	H	H	L	-	M	M	H	-	H	H	H	H
13	H	H	L	-	H	H	H	-	H	M	H	H
30	M	M	M	L	M	M	M	H	L	L	L	M
31	M	M	M	L	M	M	M	H	L	L	L	M
32	H	H	H	L	L	H	H	H	M	M	H	H
33	H	H	H	L	M	H	H	H	M	M	H	H
34	M	L	L	L	L	M	M	H	L	L	L	M
36	H	L	L	L	L	H	H	H	L	L	M	H
37	H	L	L	L	L	H	H	H	L	L	M	H
43	L	-	L	L	L	L	L	H	L	-	L	L
62	M	L	L	L	L	L	L	H	L	L	L	M
64	M	L	L	L	M	M	M	H	L	L	M	M

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 = 0; “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”

Seventy-two percent of the Milk Creek MLSA has a high composite risk to disturbances. Areas at risk include the dense, dry forest types, the partially-harvested dry forests, and the layered mature and partially-harvested moist grand fir and mesic western hemlock forests. The moist grand fir and mesic hemlock types are at high risk both from adjacency to drier forests and because insect and, especially, pathogen activity has greatly increased fuel loads and vertical and horizontal fuel connectivity within these vegetation types.

Management objectives to reduce risk of habitat loss from catastrophic wildfires and insect or disease outbreaks include reducing stand density, altering species composition, and reducing vertical and horizontal fuel continuity. Fuelbreaks to protect spotted owl habitat in moist grand fir and mesic hemlock stands should be a priority within this MLSA. Thinning outside spotted owl circles within the dry forest is needed to protect spotted owl habitat from fire. Because root disease is a major problem within the MLSA, altering species composition to favor resistant species is necessary for long term sustainability. Breaking up below-ground continuity of host species root systems is required to reduce the impact of root decay organisms throughout the MLSA. Below-ground continuity of susceptible species can be reduced by allowing group selection harvests of fir and hemlock between 0.5 to 2 acres and regenerating with ponderosa pine and western larch.

Silvicultural and other options to attain management objectives stated above include thinning (PCT/CT); pruning; fuelwood collection; mechanical fuel treatments; handpiling fuels; prescribed fire; and favoring the seral, fire-resistant species such as ponderosa pine, and western larch.

4. Northern Spotted Owl

The following is the discussion and results of the within LSR Spotted Owl Module for the Milk MLSA. This module reviews the home range sites for spotted owls, as well as connectivity within the LSR. See appendix for order, explanations and process 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.

a) Suitable Spotted Owl Habitat

The Milk MLSA has 9133 acres (58%) of nesting/roosting/foraging habitat, of that 8800 acres are in the wetter vegetation type and have a high chance of sustainability. There is a potential for the MLSA to have 12,383 acres (79%) in suitable. The most contiguous (sustainable) suitable spotted owl habitat in the MLSA is in the headwaters of Milk Creek and Lilly Pond, and in the northwest portion of the MLSA. To meet the recovery goals for the spotted owl, there is a need to increase/accelerate spotted owl habitat, especially accelerating old plantations.

This LSR/MLSA is 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

The Milk MLSA will manage for risk over spotted owls, in that threshold acres (40% of the home range) will be managed for. A total of 3 spotted owl activity centers are known within this MLSA. Currently, 2 sites are above threshold, and one site is below in the 500 acre core.

The three owl sites are wet, and have a good chance of sustainability. See chart below for restoration needs. Owl SO840 has above threshold acreage, but the 500 acre core is below, this site should be field verified for acreage and monitored the site. 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 acreages. Overtime, it is expected that higher quality and more sustainable habitat will be restored to LSR. The drier forests will eventually be managed for other late-successional species.

Table IV-8, Suitable Spotted Owl Habitat, Milk Creek

SUITABLE SPOTTED OWL HABITAT ¹⁰												
	1.8 mile Circle Around Activity Center				0.7 mile Circle Around Activity Center				.33 mile Circle Around Activity Center ¹¹			
Spotted owl	Dry	Mesic	Wet	Total	Dry	Mesic	Wet	Total	Dry	Mesic	Wet	Total
SO838	46	0	3,741	3,787	0	0	621	621	0	0	162	162 m
SO840	212	0	3,503	3,716	85	0	393	478	15	0	123	137 map
SO865	194	0	2,806	3,000	9	0	595	604	3	0	147	150 m

¹ Near the LSR or MLSA but not inside the LSR or MLSA.

² This spotted owl is inside Haystack MLSA but is close to Upper Nile LSR.

³ RS = Residential Single; P = Pair; PY = Pair with Young, based on highest occupancy.

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

⁵ If the majority of suitable spotted owl habitat in .7 mile circle is dry or mesic, then it is a dry spotted owl. If the majority is wet, then it is a wet spotted owl.

⁶ **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.

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

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

Near = activity center is inside late successional habitat near forest interior.

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

¹⁰ 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.

¹¹ A larger circle will be needed if there is less than 100 acres of suitable habitat

Restoration Opportunities: "m" Monitor site; "a" Accelerate habitat around site and home range; "p" Protect what nesting/roosting/foraging habitat exists.

c) Spotted Owl Dispersal And Connectivity

During dispersal, nesting, roosting, 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 Milk MLSA is 1777 acres (11%). Habitat providing dispersal/Connectivity corridors and patches within the LSR/MLSA is identified on the Forest Interior map and Suitable Spotted Owl Habitat Map.

Outside the LSR/MLSA network, dispersal habitat is found in all land allocations, and will be provided mainly in Riparian Reserves, in Unmapped LSRs in Matrix and in AMAs, and in wilderness areas (NWFP 1994, Ch 3-4 pg. 240-241).

d) Restoration Opportunities And Potential Projects

Restoration activities could include the use of silvicultural practices to promote the development of suitable spotted owl habitat within currently non-suitable habitats. The risk of habitat loss due to disturbances could be reduced by lowering fuels in non-habitat or high risk suitable habitat. Habitat effectiveness and connectivity could be improved through road closures and revegetation of the road bed. This would be especially effective in the areas identified as forest interior.

1. Improve and accelerate N/R/F habitat, to maintain high number of spotted owl pairs.
 - Clear cuts in wet/moist vegetation groups predicted to be habitat in 100 years.
 - Pole sized stands in wet/moist will be habitat in 50 years.
 - Clear cuts in mesic/dry vegetation groups will be habitat in 120 years.
 - Pole sized stands in mesic/dry will be habitat in 70 years.
2. Aggressive protection of remaining suitable spotted owl habitat, from outside LSR/MLSA, on Matrix lands.
3. Protect spotted owl home ranges within LSR/MLSA, between owl circles, by implementing risk reduction on first on non-suitable habitat, then on Dry and Mesic habitat:
4. Fuels reduction and hazard reduction occur outside N/R/F habitat in short term, shift emphasis in 50 years.
5. Monitor/maintain connectivity outside LSR.
6. Monitor spotted owl activity centers, 500 acre core and home ranges of owls below threshold or target acreage (see list).
7. Field verify habitat within 500 acre home ranges of spotted owl sites below threshold in that core, but above threshold in the home range.
8. Increase habitat effectiveness and connectivity by reducing open roads and revegeting road beds. Especially in forest interior habitat patches.

9. Maintain dispersal/connectivity habitat.
10. Acquire lands in Section 7.
11. Create small (1/4 to 2 acre) fuel breaks and fertilize.

5. Aquatic

a) Summary of Aquatic Goals

- Protect salmonid populations and habitat in core areas Mainstem Naches, Lower American, and Lower Bumping subwatershed's.
- Prevent increase in water temperature in Lower Bumping, Lower American and Mainstem Naches subwatershed's.
- Reduce water temperature in Naches drainage.
- Minimize fine sediment input.
- Increase LWD recruitment and riparian revegetation activities in upper end of the Mainstem Naches and lower part of Lower American subwatershed's.
- Reduce groundwater to surface water conversion by roads.
- Evaluate road surfacing and maintenance with an emphasis on reducing sediment input.
- Reduce or avoid increase in riparian roads.
- Manage upslope vegetation, roads, management and recreational activities to increase base flows, and to avoid increase in peak flows in the Naches basins.
- Preserve and restore all floodplain, side channel, and riparian wetland habitat, especially in C and E channel types in the Naches drainage.
- Protect and inventory upslope wetlands and ponds.
- Restore natural disturbance regimes (landslides, fire, flood, disease) as practicable.
- Discourage the spread of brook trout.
- Gather more information on non-salmonid aquatic biota.

b) Key Issues

1. Core fish areas have been identified within and downstream of Milk MLSA. Within the Mainstem Naches is a core area for spring chinook salmon. In the Mainstem Naches, Lower Bumping, Lower American and Mainstem Little Naches populations of spring chinook salmon and bull trout are found.
2. Federal candidate species and other species of concern: bull trout populations in the Mainstem Naches and Mainstem Little Naches could be impacted by MLSA management activities.
3. Anadromous salmonid populations occur within and below Milk MLSA. Anadromous salmonids within the MLSA include: steelhead, early-run (spring) chinook salmon.

Concerns include the lack of abundance of anadromous fish populations which are severely reduced from historic levels, within-population genetic and life-history diversity, condition of physical habitat and condition of water quality for incubation, rearing, over-wintering, migration, and spawning. Direct human interaction or harvest of

individuals may potentially reducing fitness of the spawning population. All life stages are probably vulnerable to impacts that are caused by management actions.

4. Resident salmonids. Redband/native rainbow trout occur throughout the MLSA. Cutthroat occur in substantial numbers.

Concerns include maintaining existing populations, protecting against habitat degradation, over-harvest, and non-natives.

5. Introduced species. Eastern Brook trout are known to occur in Devil-Swamp, Nile-Dry, Mainstem Little Naches, Lower Crow, Milk and Mainstem Naches subwatershed's.

Brook trout can have a deleterious genetic impact on bull trout, and may impact other natives through competition for food or habitat. Habitat changes or other management that would favor brook trout over native species, or would encourage the spread of brook trout, should be avoided.

6. Non-salmonid aquatic biota: We have little data for other aquatic biota in the area. Mountain White Fish and Sculpins (*Cottus* sp.) utilize stream with the MLSA. There are locally recorded sightings of aquatic amphibians within the MLSA. No sightings have been recorded for aquatic mollusks. No systematic surveys for mollusks, nor amphibians have been undertaken in this MLSA.

7. Water temperature. Within the Naches River drainage, it is important to avoid any increase in water temperature, and to lower water temperatures where possible. Maximum temperature in the Naches mainstem are recorded as reaching 69.6 degrees F. These temperatures exceed forest plan standards (max. temperature 68 F, Wenatchee National Forest 1994 monitoring report) and likely lower the fitness of the Naches's anadromous populations. Maintaining water temperature at or below the current level may be important for maintenance of the resident salmonid populations.

Maximum temperatures recorded during 1989-1994 temperature monitoring included some of the streams in the Milk MLSA area. Crow creek had 60-89 days/year where the temperature exceeded the Wenatchee Forest Plan temperature standard; temperatures reached between 65 and 69.9 degrees F. Other data from the maximum/minimum thermometer monitoring showed Devil creek 56, Swamp creek 57, Tributary to Milk Pond 60, upper Milk creek and lower Milk Creek at 61 degrees F. respectively.

Managing for lower water temperatures in the MLSA could include managing summer low flows, and/or groundwater - surface water partitioning. This could be accomplished by managing riparian and upslope vegetation, soils and roads.

8. Fine sediment. An increase in sediment load is often the most important adverse effect of forest management activities on streams. Large increases in the amount of sediment delivered to the steam channel can greatly impair, or even eliminate, fish and aquatic invertebrate habitat, and alter the structure and width of the stream banks and adjacent riparian zone. Sediment levels are a concern because they can cause failure of redds; increased suspended sediments will reduce the penetration of light and can reduce primary production, increase heat absorption, delay initiation of bedload transport.

Bedload is the material transported downstream by sliding, rolling, or bouncing along the channel bottom. Bedload is an important component of the total sediment load of a stream; it can determine the amount of micro habitat available for juvenile fish and invertebrates. Large amounts of easily transported bedload tend to fill in pools and reduce the larger-scale features that are important habitat. In general the courser material

provides more habitat space, where as fine sediments tend to fill up the interstitial spaces between larger particles.

There are at least common causes of sediment entering streams: roading, recreation, human settlements, timber harvest, fire, grazing, mass wasting and mining. Opportunities for all eight types of sediment input exists within or upstream from the MLSA. No fine sediment data is available within Milk MLSA.

Sediment transport. Milk MLSA lie primarily in a region of sediment input and transport; the mainstem Naches below Milk MLSA has a wider floodplain at some sites and can act as a region of sediment deposition. Fine sediment data is only available for the American River and portions of the Little Naches River, which are tributaries to the Naches. Fine sediments in the three tributaries of the Little Naches were sampled and had moderate to high concentrations of fine sediment. The American River is within Wenatchee Forest Plan standards all twelve samples.

9. Channel complexity. Channel complexity has implications for fish habitat and for the hydrologic regime (hydraulic retentivity). Components of channel complexity include: large woody debris (LWD), pool abundance, pool type, pool depth, width:depth ratio, substrate diversity, sinuosity, cover, undercut banks, bank vegetation, riparian vegetation, roughness coefficient, hydraulic retentivity, riparian wetlands, side channels, high flow refugia, and floodplain connectivity.

LWD plays key roles in stream bed and stream bank stability, fines/gravel retention, sinuosity, pool formation, side channel creation, nutrient retention (e.g. deciduous leaves, salmon carcasses), and nutrient input. Single pieces function differently from interwoven masses of LWD known as complexes.

Input mechanisms: small scale riparian disturbances to large scale hillslope disturbances. Management can impact aquatic LWD regimes in a number of ways including: removal from channel; removal from floodplain (down and/or potential); alteration of floodplain area or of frequency of "small" floods; removal from hillslope; or alteration of disturbance regimes controlling input (landslides, avalanches, fire, flood, disease).

Riparian road density is often inversely related to channel complexity. Our information on channel complexity is far from complete; riparian road density and LWD and pool abundance data is available for selected (R6 protocol - surveyed) streams.

The Naches River receives the majority of LWD from upstream. The 1992 stream survey reported a deficiency of LWD in the Naches River for the section surveyed.

Approximately half of the amount needed to meet Wenatchee Forest Plan standards was found. The above levels of LWD were influenced by in-channel removal of LWD following the flood of December 1977. During 1979 inchannel LWD was removed from the upper portion of the Naches Mainstem and burned on gravel bars. Some additional loss of inchannel LWD occurred as a result of firewood gathering. Normal channel actions of the river moving in its floodplain have improved the condition especially during 1995 and 1996.

10. Aquatic nutrient cycling depends in part on riparian understory vegetation, groundwater /surface water partitioning, in-channel LWD, hydraulic retentivity, pool depth and character, macroinvertebrate community structure, mass wasting disturbance regime, and returning anadromous biomass. We have inadequate data to evaluate aquatic nutrient cycling in Milk MLSA at this time; however we can be aware of it when managing any of the above inter-related factors.

11. Landtype. Milk MLSA includes landtypes C, F, G and J (see Landtype Association Response Map)
12. Channel type. In the absence of human influence, valley shape and geology determine the basic character of the stream channel. A steep boulder torrent, a moderate but continual step - pool - step, a broad meandering river, or a cliff-lined canyon, present different opportunities for aquatic biota. A given organism might require a number of different channel types for different aspects of its life. Various classification systems, such as Rosgen, have been constructed to characterize these differences. Common and fundamental to all systems are: 1) channel gradient, 2) channel confinement (the ability of the stream to move back and forth, or express sinuosity, often quantified as the width of the valley floor relative to the width of the channel), and 3) substrate size (whether the local geology provides huge boulders, moderate cobbles, or only sand and silt to the channel).

Channel type is a fundamental constraint on many other aquatic habitat parameters. The pools found in a steep boulder torrent will be fundamentally different from those in a broad meandering river in abundance, type, and depth. Human influences can alter conditions within a channel type (a meandering river could become shallower, silt filled, and lacking in riparian cover) or the channel type (a deep winding meadow trout stream could become a downcutting gully). If the channel type itself has been altered. It may never be possible to return a stream to its original condition ; however it may be possible to improve the channel condition that moves it toward the characteristics of the original, or at least stabilizes the channel (for example prevent further downcutting).

Channel types vary not only in their natural character (or range of variability of key parameters) but vary also in which human actions they respond to, the degree of their response, and how the response is manifested

An historic/current channel type analysis of Milk MLSA needs to be done. As a broad generalization, "A" (high gradient) channel types may present the greatest slope failure concerns, "B" (moderate gradient) channel types may be most stable and most resistant to management impacts and "C" and "E" (low gradient) channel types may be the most sensitive to on-site or upstream management impacts. C and E channel types provide key unique habitat for salmonids and other biota.

Meadows adjacent to C and E channel types may be priority for riparian road removal, human recreation reduction, and reduction in riparian grazing impact.

13. Peak flows. Floods have been a concern in the Naches basin, particularly where humans have build roads, residences and other improvements within the floodplain. The rain on snow floods of 1995/96 caused much damage to homes and other developments. Aquatic habitat for other organisms was improved over all. Some moderate peak flow events are necessary to maintain the substrate and channel conditions required by salmonids and other biota.

Protection of C and E channel meadows, side channels, and other floodplain areas, and careful upslope (vegetation, soil, wetland, road, grazing and recreation) management will help mitigate peak flow impacts on humans.

Peak and low flows in the Mainstem Naches subwatershed have been modified by the influences of the Bumping Dam, that is upstream of the MLSA area.

14. While normal low flows are necessary for salmonids and other biota, extreme low flows can strand organisms, reduce habitat, create passage barriers, reduce water temperatures, and reduce

the stream's ability to transport fine sediments. The management factors above that mitigate peak flows will also mitigate low flows.

15. Water withdrawals. Because of regulation of water upstream at Bumping dam and water withdrawn from the Naches during the summer for agriculture there is a potential for lower base flows, increasing water temperatures and fine sediment levels at key times and places for anadromous spawning, other management in the basin that impacts base flow, fine sediment, and water temperature, takes on heightened significance. The Bureau of Reclamation regulates the spill of water from both Bumping and Rimrock Dams and they adjust the flow rate to meet a variety of need. Flow amount in the Naches and Tieton rivers can vary by the day.
16. Road density. Road density is related to many other issues including fine sediment, mass failures (biotic passage barriers, coarse sediment input, LWD input), effective channel network (increased), hydrograph (peak flows, low flows, water temperature, biotic migration/passage, water/sediment balance, aggradation/degradation), groundwater/surface water partitioning (areas of groundwater upwelling have been documented as key winter thermal refugia for salmonids and may support unique flora/fauna; this is also a water temperature issue). Riparian roads have additional issues of floodplain loss, channel constriction and simplification and human presence (potential harvest, disturbance of spawning, habitat degradation, introduction of non-natives).

Total riparian road density in Riparian Reserves are 6.22 miles per square mile in Milk MLSA. The Riparian Reserves are estimated as 2,482 acres (16%) of the 15,711 acres within Milk MLSA.

Road management strategies include: 1) relocating riparian roads, 2) reducing the abundance of upslope roads to leave only a well planned core access network, and 3) reducing road-related surface erosion through such actions as frequent maintenance, surfacing, outsloping, drivable dips, seasonal closures cut-and-fill plantings or coverings, and culvert replacement or maintenance. These management actions are predicted to lead to immediate, long-term, widespread "improvements." Allowing the Riparian Reserves to return towards the natural condition of the water/sediment balance, fine sediment abundance, channel complexity, riparian health, and water temperature. Because of a high probability of improvement, and because these are fundamental parameters within which finer scale parameters (such as spawning gravel condition or pool abundance and depth) operate, road repair is generally a management action of high priority, high return, low risk, and nearly universal applicability.

17. Upslope vegetation has profound importance for the yearly streamflow pattern (hydrograph), affecting peak flows, low flows, and total yearly flow, as well as the timing of these flows. Percent canopy closure, or clear-cut acres, are measures often used to address this issue. Human management may have reduced canopy in the watershed (usually through timber harvest) or increased canopy in the watershed (usually through fire exclusion). Overstory canopy may have the greatest effect but understory vegetation, condition of the duff layer, and soil compaction are inter-related and also important, particularly in areas of drier climate. Vegetation, climate (precipitation patterns, rain-on-snow probabilities, and lightning strike patterns), and landtype interact

The Mainstem Naches and Wenas Watershed Assessment of 1995 assessed timber harvest in the riparian zone as having harvested 2.62 miles of stream bank in Devil-Swamp subwatershed, 8.03 miles in Mainstem Naches subwatershed's respectively.

18. Floodplain connectivity. Historic photos might reveal changes in off-channel habitat, floodplain area and riparian wetland habitat over time. Some of the floodplain area along the Mainstem Naches is privately owned. Habitat improvement projects on National Forest land have been constructed to create offchannel habitat have been successful in the recent past. Within the MLSA some of the floodplain area has been altered, see discussion of timber harvest within the riparian zone and riparian roading above.
19. Upslope wetlands and ponds may serve as "islands" and/or refugia for aquatic biota, especially those that do not co-exist with salmonids. They also have important roles in regulating summer base flows in the watershed. We have information regarding wetland locations, but little understanding of alterations in their ecosystem functions over the recent centuries.

As a broad generalization wetlands, especially in late-successional forests may be havens of biodiversity warranting very conservative management until better inventoried and understood.

20. Disturbance Regimes. We have come to recognize that suppression or alteration of natural disturbance regimes can lead to fundamental long-term resource change. This in turn has led to the realization that minimum viable populations or habitats must be large enough to withstand moderate disturbances. A complete description of natural disturbance regimes, their relationship to landtype, climate, and other factors, and their ecosystem roles, is still lacking. Aquatic systems are now seen to depend on disturbance by fire, flood, insect/disease, and landslides for input of the raw materials of channel construction, such as LWD and coarse substrate

In the Naches basin a high priority may be upslope and riparian hydrologic management to prevent disturbances from impacting human resources through flooding.

The MLSA system comprises a set of landscape patches where retention or recreation of primeval conditions is emphasized, allowing the maintenance of wildlife dependent on these conditions. From the aquatic perspective, we consider how this system of reserves and the aquatic corridors that link them can be managed for maximal viability of native aquatic species and the habitat conditions in which they evolved.

Although historic aquatic conditions are not known to the degree desirable this much is clear: many aquatic populations have lost some of their spatial, temporal, and genetic "safeguards;" the nature of the disturbances they experience has changed; individual health/reserves may be reduced (for example salmon enduring longer migration times concurrent with higher temperatures); and habitat conditions have declined in non-random ways, fragmenting populations. The MLSA network has the potential to strengthen viability of these at-risk aquatic populations.

6. Noxious Weeds

Ten noxious weed species were identified to occur within the Milk MLSA. These species are discussed in priority order as identified on the noxious weed analysis module. No Class A weeds are presently documented from this area. Class B-designate species include: *Linaria dalmatica*, *Senecio jacobae*, *Hypochaeris radicata* and *Chrysanthemum leucanthemum*. *Linaria dalmatica* is widespread within the Milk MLSA, particularly within the dry vegetation group. Infestation of this species is most severe on private lands within the MLSA. Furthermore, several main travel routes and summer home areas have been invaded, as well. Following through the noxious weed analysis (Appendix 1), control/eradication efforts for this species should focus on roadways, specifically, Highway 410 and Roads 1706 and 1709. The area in the vicinity of Boulder Cave and Camp Roganunda, are also areas considered for priority treatment. Cliffdell summer home group is also an area with a high priority for

treatment. *Senecio jacobae* is limited in its occurrence, found in small isolated pockets along Roads 1900, 1901 and 1903. Control measures for this species, such as hand pulling and biological control, should continue as this strategy has been relatively successful in the past. *Hypochaeris radicata* is also limited in its occurrence, generally associated with road shoulders at mid to high elevations where moisture is not limiting. A combination of hand pulling and herbicide spraying is recommended for control/eradication of this species. *Chrysanthemum leucanthemum* is known to occur as isolated patches in open areas and along roadways. Control efforts for this species should focus on activities such as hand pulling, herbicides, or a combination of these methods.

Centaurea diffusa was the only Class B weed identified, and would therefore be considered as second priority for treatment. *Centaurea diffusa* is widespread in the Milk MLSA. It occurs primarily along roadways and in waste places. Containment and prevention of further spread of this species should focus on major travelways such as Highway 410 and Roads 1706, 1709 and 1900.

Five Class C weeds were identified in the Milk MLSA. *Cirsium vulgare* and *C. arvense* are widespread and are documented from areas with recent ground disturbance, primarily areas previously harvested and/or heavily grazed by domestic livestock and wildlife. Containment and further spread of these species should focus on areas such as Devil Creek and Milk Creek. *Hypericum perforatum*, *Verbascum thapsus*, and *Convolvulus arvense* are all limited in their occurrence, found as small isolated populations. Handpulling and spot herbicide spraying, or a combination of these methods should be used.

7. Fire Management Plan

a) Overview

This plan is intended to provide guidance for the management of fire in the Milk Creek MLSA. It is intended to supplement the Fire Management Plan for the Late Successional Reserve System and will become a portion of the Fire Management Action Plan for the Wenatchee National Forest.

The disturbance regimes for the vegetation groups have been described in a separate portion of this plan. It is the intent of this plan to provide adequate protection of the reserve to allow management practices to be initiated which will provide for the protection of the Late Successional Associated species and associated unique habitats. These management actions are expected to include actions which will include the role of fire disturbance as an important process in the reserve.

b) Fire Prevention Actions

The following actions are site specific for the Milk Creek MLSA. They are intended to supplement the actions which will be implemented on a Forest wide basis.

1. Continue to implement campfire restrictions as warranted by increased fire danger.
2. Utilize educational opportunities at Boulder Cave and the East Portal Site
3. Initiate hazard reduction around developed and dispersed recreation sites and organizational camps such as:

Kaner Flat	Crow Creek	American Forks
Cedar Springs	Indian Flat	Halfway Flat
Sawmill Flat	Little Naches	Milk Pond
Boulder Cave	Pine Springs	Camp Roganunda

1. Emphasize fire prevention activities along major loop roads and high use dispersed sites such as Highway 410, FS Road 1900, FS Road 1707 - 1708, and FS Road 1709 - 1706.
2. Continue and improve fire prevention signing program on roads and trails included or adjacent to the MLSA. Coordinate with entire district signing program.
3. Make public user education geared to fire danger an emphasis item
4. Implement road restrictions and closures as warranted during periods of extreme fire danger.
5. Emphasize contact with the following special interest groups: ORV groups, summer home groups, organization camps, local user groups, grazing permittees, and other special use permittees.
6. As a hazard reduction measure emphasize fuel wood collection around recreation use sites in the dry forest type.
7. Maintain cooperative fire prevention efforts with Yakima County Fire Prevention Association, the local Nile - Cliffdale Fire District, and DNR.

c) Pre-fire Protection for Fires Originating Outside the MLSA

The following methods are proposed to protect the MLSA from fires originating outside Reserve boundaries.

1. Complete pre-attack planning process for MLSA; utilize natural fuel breaks
2. Stress prevention of fires outside MLSA boundaries
3. Strategic fuel manipulation to reduce size and intensity of fires within and adjacent to MLSA boundaries
e.g. fuel breaks - tie together existing fuel treatment areas utilizing natural openings, roads, ridgetops, etc. Priority areas are the ridge between Milk Creek and Quartz Creek; and the ridge between Devil Creek and the Bumping River.
4. Maintain existing pre-attack facilities (water chances) and seek opportunities for more, including helispot locations.

d) Fire Detection

1. Staffing of Clemans L.O. and aerial detection after lightning episodes will provide the primary detection resource for this MLSA.
2. This will be supplemented by emergency staffing at Little Bald and Kaner Overview during and after lightning episodes.
3. Seek opportunities for fuelbreaks and fuel management areas around summer homes within the MLSA boundary (Naches River corridor).
4. Work with the local residents, users, campground concessionaires, cooperators, and the state DOT on education of how to report fires.

e) Fire Suppression

1. Spotted owl activity centers are the highest priority for protection of resources (following protection of human life and improvements). All wildfires in the 1.8 mile buffer will be suppressed at minimum acres.
2. Aggressive initial attack will occur on all dry site ecosystems until vegetation management projects have modified the vegetative condition to where it is in synchrony with inherent disturbance regimes, recognizing the fluctuation in funding levels and the ability to meet the objectives.
3. Tactical suppression activities will take into consideration specific resource values such as the protection of riparian areas and private land from fires.
4. Improvements will be a priority for protection (summer homes, recreation facilities, Sawmill RAWS, etc.)
5. Pre-planned dispatch cards for initial attack will be prepared for the MLSA area
6. The FSA and Escaped Fire Situation Analysis process will be used to guide initial attack, Extended Attack, and large fire-suppression. Utilize pre-attack plans and materials.
7. Protect known threatened and endangered species habitat from fire (botanical).
8. Fire suppression actions will be implemented on an inter-agency basis as appropriate.

f) Vegetation and Fuels Management

1. Returning dry forest types to sustainable conditions is a priority
2. Suggested activities include pruning, thinning, commercial and pre-commercial thinning, wood gathering, mechanical treatments, and prescribed fire
3. High density, multi-story refugia in mesic sites will be maintained.
4. Prevent the spread of noxious weeds as feasible
5. Maintain a mosaic of age classes and structural conditions across the landscape outside dry forest to support species associated with late-successional forest

g) Prescribed Fires Opportunities

1. Recognize the use of prescribed fire as a primary management tool in this MSLA.
2. The development and subsequent implementation of prescribed fire plans should be on a landscape level both within and adjacent to the MLSA
3. Priorities for the use of prescribed fire are dry site ecosystems including dry meadows and steppe vegetation
4. Priority outcomes are hazard reduction and vegetation manipulation throughout the MLSA
5. To return landscapes to synchrony with inherent disturbance regimes, peruse opportunities to implement prescribed fire projects in a timely and economical manner
6. Projects should attempt to minimize risk of future catastrophic wildfires (those outside the range of inherent disturbance regimes with respect to size and/or severity)

h) Summary:

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

D. Restoration Opportunities and Potential Project Summary

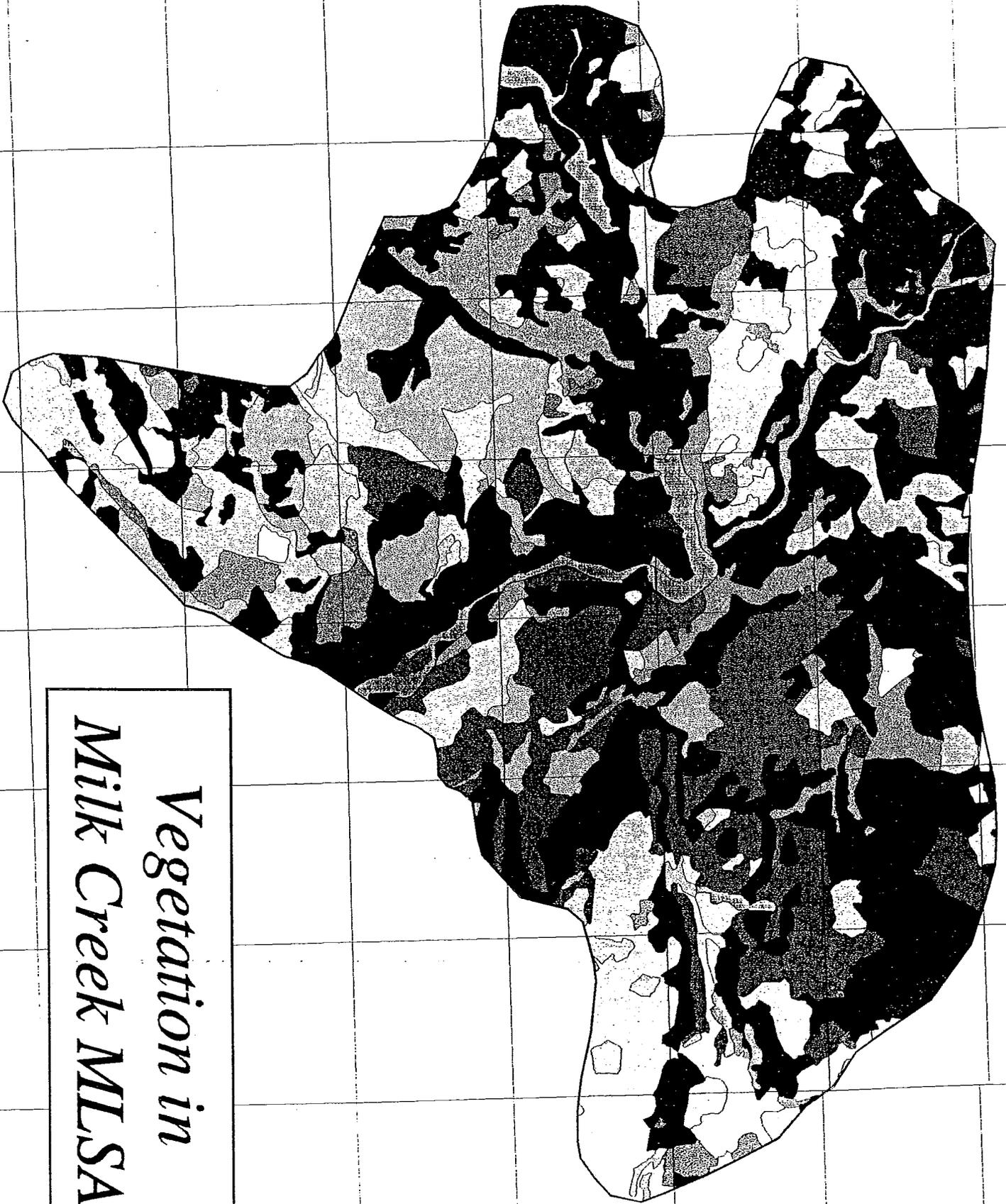
Table IV-9, Restoration Opportunities and Potential Projects, Milk Creek MLSA

Analysi s Module	Restoration Opportunity	Potential Projects	Sched -ule ¹
Forest- Wide Sustain- ability	1) Reduce fuel loading and stocking levels in dense successional advanced dry forest stands where they exist between Milk Creek and either Haystack/Upper Nile or Manastash Ridge.	1) Use commercial thinning, pruning, fuelwood collection and prescribed fire as described in disturbance module treatment key. Favor the development of seral species such as ponderosa pine and western larch. Locate and prescribe sufficient treatments to make landscape level changes in fire susceptibility.	A
	2) Reduce fuel loadings along roads that exist between these LSR's to increase the roads effectiveness as a fuelbreak.	2) Piling of down fuels, firewood gathering, pruning to reduce vertical fuel continuity, construction of shaded fuelbreaks.	B
	3) Reduce fuel loadings in young stands.	3) Precommercial thinning	C
Forest- Wide Spotted owl	Not Applicable		
Forest- Wide Connec- tivity	1) Verify linkage between Milk Creek and bumping for low mobility species.	2) Do site specific analysis to determine if Bumping road is affecting species movement and if anything can be done.	C
Unique Habitats and Species	1) Reduce road densities in riparian reserves and in talus areas.	Close or relocate roads as opportunities are identified in Access and Travel Management Planning.	A
	2) Maintain existing subalpine meadows.	2) Remove encroaching conifers from meadows.	C
	3) Increase the amount of interior forest area within the LSR.	3) Close roads near interior forest areas as opportunities are identified through Access and	A

Analysis s Module	Restoration Opportunity	Potential Projects	Sched- -ule ¹
		Travel Management Planning.	
	4) Accelerate the development of late successional forest.	4) Use commercial thinning to accelerate the development of layered stands as described in disturbance module treatment key.	C
	5) Verify the viability of <i>Cypripedium montanum</i> within the MLSA	5) Monitor known sites and develop conservation strategy for this species.	B
Connectivity Within the LSR	1) Reduce road densities in riparian reserves to improve connectivity for low mobility species that use these areas.	1) Close roads in riparian reserves as identified in Access and Travel Management Planning, revegetate disturbed areas.	A
Disturbance	1) Reduce the risk of habitat loss to wildfire by reducing stand density, altering species composition and reducing vertical and horizontal fuel continuity in the following forest types. (Dry Forest: Vegetation Type #12 - Dense Successionally Advanced, #13 - Partial Cut; Moist Grand Fir: #32 - Layered/Mature, #33 - Partial Cut; Mesic Western Hemlock: #36 - Layered Mature, #37 - Partial Cut) ²	1) Use commercial thinning, pruning, fuelwood collection and prescribed fire as described in disturbance module treatment key. Favor the development of seral species such as ponderosa pine and western larch. Priority areas for treatment of this stand type are: 1) Outside the LSR to the south and west, 2) Within the LSR but outside of activity centers. 3) Over threshold acres within the activity center. 4) See item 4 under spotted owls for treatment of threshold acres.	A
	2) Minimize the extent of stand replacement fires within the MLSA.	2) Conduct activities that improve the effectiveness of the existing road system as fuelbreaks, focus on highway 410 corridor.	B
Spotted Owl	1) See Appendix 39, Northern Spotted Owl Nest Site Protection Within LSRs and MLSAs.		A
	2) Maintain 500 acres of nesting habitat within the three Milk Creek spotted owl core areas.	2) No Ground or vegetation disturbing activity in spotted owl 504 core area.	A
	3) Improve sustainability of	3) Use commercial thinning,	C

Analysi s Module	Restoration Opportunity	Potential Projects	Sched -ule¹
	dense dry forest (type 12) outside of 1.8 mile spotted owl circles, but within the MLSA.	pruning and fuelwood collection..	
	4) Improve sustainability of dense dry forest (vegetation Type 12) within 0.7 to 1.8 mile home range area on threshold acres. Treatment should maintain suitability of habitat for nesting, roosting and foraging. (see spotted owl desired conditions)	4) Utilize commercial thinning, pruning and fuelwood collection.	A
	5) Improve habitat quality in dense single story stands in spotted owl circles 838, 840, and 865	5) Utilize silvicultural activities that accelerate the development of multi-layered stands. Focus on single layered pole size stands in moist grand fir and wet forest groups.	A
	6) Obtain information on spotted owl locations.	6) Survey areas to 1994 spotted owl protocol.	B
Aquatic	1) See goals listed in Aquatic section for Milk Creek.	1) Coordinate projects with Little Naches and Mainstem Naches Watershed Assessments.	
Noxious Weed	1) Limit the extent and spread of <i>Centaurea diffusa</i> which occurs primarily along roadways in the Milk Creek MLSA.	1) Consider treatments such as hand pulling and herbicides to limit extent and spread. Focus should be along highway 410, roads 1706, 1709, and 1900.	B
	2) Control or eradicate <i>Linaria dalmatica</i> where it occurs within the Milk creek MLSA.	2) Use combination of treatments such as hand pulling, and spot herbicide application to eliminate these populations. Focus on highway 410, roads 1706, and 1709. and the vicinity of Boulder Cave and camp Roganunda.	A
	3) Increase knowledge regarding noxious weed presence in Milk Creek MLSA.	3) Survey MLSA for presence of noxious weeds.	C
Fire Plan	1) Protect LS values from loss due to wildfire	1) See fire plan for specific actions	

- 1 Implementation Schedule; (A) = within 1 year; (B) = within 3 years; (C) = within 5 years
- 2 Refer to "LSR Vegetation Photo Mapping Key" in the Appendix for information on Vegetation types.



*Vegetation in
Milk Creek MESA*

Milk Creek Managed Late Successional Area
UNIQUE HABITATS



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

Map Scale: 1 inch = 0.946 miles



Milk Creek Managed Late Successional Area

SUITABLE SPOTTED OWL HABITAT



-  DRY Suitable Spotted Owl Habitat (N/R/F)
-  MESIC Suitable Spotted Owl Habitat (N/R/F)
-  WET Suitable Spotted Owl Habitat (N/R/F)
-  1.8 mile buffer around Spotted Owl Activity Centers
-  Spotted Owl Activity Centers
-  Managed Late Successional Area Boundary



Map Scale: 1 inch = 0.946 miles

Milk Creek Managed Late Successional Area
FOREST INTERIOR

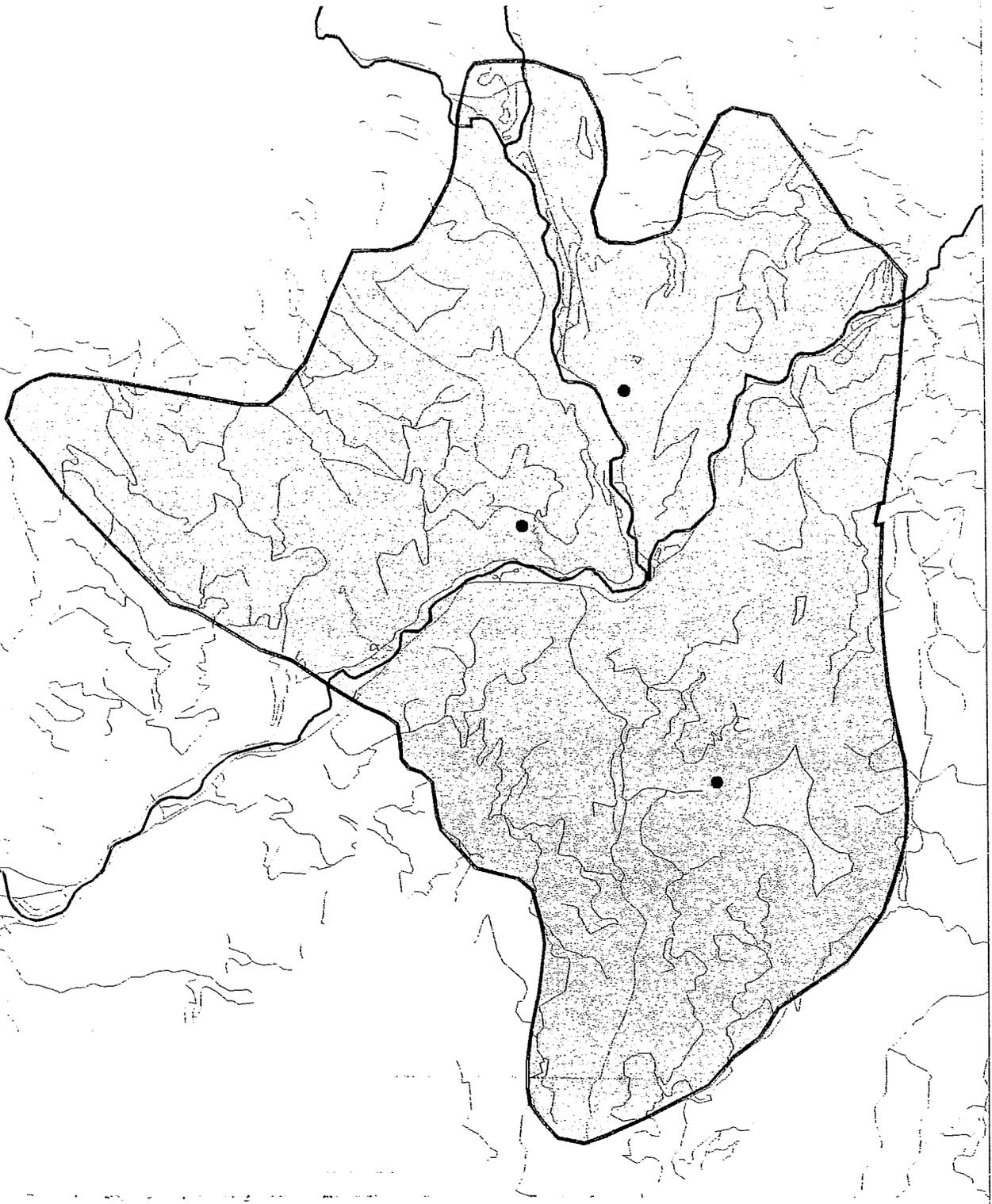


- ▨ DRY Forest Interior
- ▨ MOIST Forest Interior
- ▨ HIGH Forest Interior
- ~ Streams
- ~ Major Streams
- Spotted Owl Activity Centers
- ▲ Wildlife PETS
- ▭ Managed Late Successional Area Boundary



Map Scale: 1 inch = 0.946 miles

Milk Creek Managed Late Successional Area
SECURITY HABITAT



▭ Security Habitat
▭ NOT Security Habitat

— Open roads and motorized trails
- - Closed roads and non-motorized trails

~ Major Streams

● Spotted Owl Activity Centers

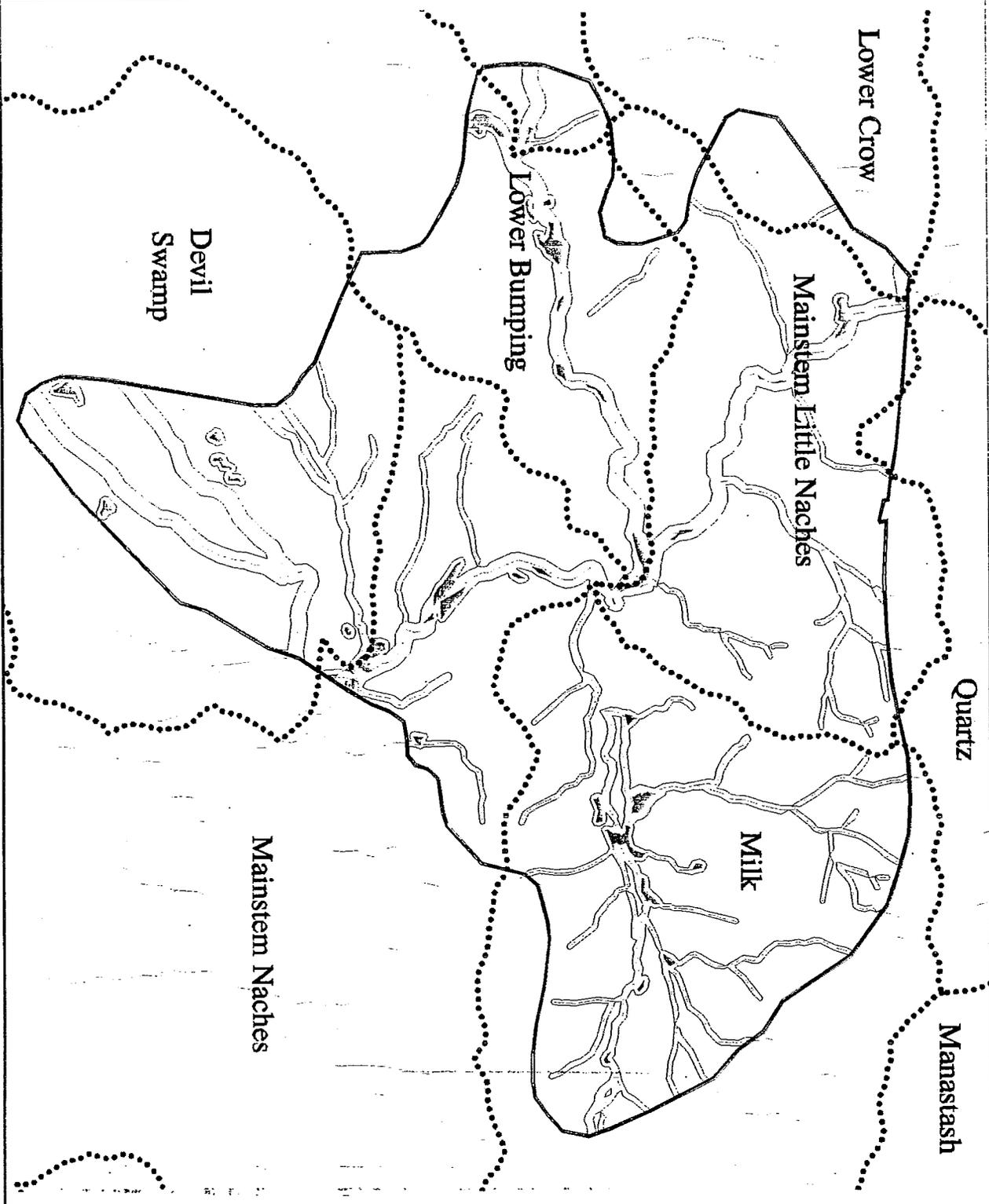
▲ Wildlife PETS

▭ Managed Late Successional Area Boundary

Map Scale: 1 inch = 0.946 miles

Milk Creek Managed Late Successional Area

FISH PRODUCTION UNITS (SUBWATERSHEDS)



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



Map Scale: 1 inch = 0.946 miles

V. Rattlesnake LSR

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 (see Chapter II, Vegetative Landscape) within the Rattlesnake LSR. Data was derived by a combination of aerial photo interpretation, stand exam information, and field validation (see Chapter II, Vegetative Landscape). It should be noted that site specific information regarding vegetation structure and distribution will need to be updated as restoration projects are initiated. The vegetation layer developed for this analysis serves as a starting point only. Information is provided below regarding each vegetation group.

a) Dry Forest Group

Twenty-three percent (2,371 acres) of the Rattlesnake LSR consists of the dry forest group. Within this group, 62 percent (1,480 acres) is mapped as partial cut. Twenty-four percent (557 acres) is mapped as high density, nine percent (206 acres) as created openings, and five percent (128 acres) as low density.

In the LSR, the dry forest group is comprised of a mix of Douglas-fir and dry grand fir series with the dry grand fir series predominate. Commonly, ponderosa pine and Douglas-fir exist as the overstory dominantes. The understory vegetation most often consists of a grass/forb mix, generally dominated by *Calamagrostis rubescens* and *Carex geyeri*. *Luina nardossama* and *Lupinus* spp. are generally well represented as a forb associates. Within these areas, the dry vegetation group is associated primarily with southerly aspects.

b) Moist Grand Fir Group/Mesic Western Hemlock

Approximately 29 percent (3,031 acres) of the Rattlesnake LSR supports moist grand fir plant communities. The majority, or 80 percent (2,433 acres) of this forest group is currently layered and/or mature (mid- to late-successional). Created openings comprise approximately 9 percent (283 acres) of this group (Appendix 5). Single layered stands comprises seven percent (193 acres) of the area. The remaining four percent (122 acres) is comprised of partial cut stands.

In the Rattlesnake LSR, all aspects are occupied by the moist grand fir series. Increasing elevation results in the development of either the subalpine fir or the wet forest vegetation group. Species composition in the moist grand fir type consists largely of, *Berberis nevadensis*, *Achlys triphylla*, *Clintonia uniflora*, *Linnaea borealis* and *Chimaphila umbellata*. In gaps and more open areas within the forest, *Lupinus* and *Vaccinium* species become dominate understory associates.

c) Subalpine Fir Series

In the Rattlesnake LSR, the subalpine fir series is distributed on high elevation dry sites. This series is located primarily along Bethel Ridge and Timberwolf Mountain. In the Rattlesnake LSR, 22 percent (2,337 acres) of the area supports this vegetation group. Of this total, 80 percent (1,856 acres) is mapped as layered and/or mature stands. Fourteen percent (334 acres) is mapped as single

layered stands. Six percent (146 acres) occurs as parkland, with the remaining, less than one percent (1 acre), mapped as created opening, single layered stands.

Subalpine fir is the most widespread species within the overstory of this series (Wenatchee National Forest, Ecology Plot Database). Common seral dominants include Douglas-fir, lodgepole pine, Engelmann spruce, and western larch. Understory composition is commonly lush with species such as *Valeriana sitchensis*, *Lupinus polyphyllus*, *Lupinus latifolius*, and *Calamagrostis rubescens*. *Arnica latifolia*, *Carex* spp., and *Luzula hitchcockii* are often dominant herb species. These communities may also be shrub dominated with common species such as *Vaccinium myrtillus*, *Vaccinium membranaceum*, *Vaccinium scoparium*, *Rubus lassiococcus*, *Chimaphila umbellata*, *Pachistima myrsinites*, *Pyrola* spp., and *Sorbus sitchensis*. Subordinate community associates may include *Polemonium pulcherrimum*, *Pedicularis racemosa*, and *Elymus glaucus*.

d) Wet Forest Group

Within the Rattlesnake LSR, the wet forest vegetation group is supported on 1,324 acres (13 percent of LSR). Eighty-two percent (1,080 acres) is mapped as layered and/or mature stands and fifteen percent (197 acres) as single layered stands. Created openings comprise 2 percent (23 acres) of the area., one percent (19 acres) is of parkland, with the remaining less than one percent (5 acres) mapped as riparian forest.

In the wet forest group, tree overstory composition is generally dominated by mountain hemlock, Pacific silver fir, and subalpine fir. Western larch, Douglas-fir, lodgepole pine, and whitepine are present as primary seral dominants. Undergrowth composition may vary from relatively lush and dense to scarce. The shrub component of these communities typically includes, *Rubus lassiococcus*, *Vaccinium scoparium*, *Ribes viscosissimum*, *Pyrola* spp., *Lutkea pectinata*, and *Xerophyllum tenax*. Associate herbs include *Luzula hitchcockii*, *Arnica latifolia*, *Achlys triphylla*, *Clintonia uniflora*, and *Polemonium pulcherrimum*.

e) Whitebark Pine Group

Less than one percent (26 acres) of the LSR is of the whitebark pine vegetation group. These stands occur as multiple layered stands distributed as small patches within a park-like arrangement. They are located entirely within the vicinity of Timberwolf Mountain on environmentally harsh sites. Predominate understory species include *Juniperis communis*, *Luzula hitchcockii*, and *Festuca viridula*.

f) Non-Forest Vegetation

There are approximately 1,396 acres (13 percent) of non-forest vegetation within the Rattlesnake LSR. Included in this group are: talus (859 acres), cliff (210 acres), wet meadow (203 acres), grassland/shrubland (57 acres), dry meadow (43 acres), bedrock (20 acres) and water (3 acres).

g) Noxious Weeds

Portions of the Rattlesnake LSR have been surveyed for noxious weed species that occur along roadsides and in areas previously harvested. High densities of *Centaurea diffusa* are present along roads. Other species within or threatening the Rattlesnake LSR include: *Chrysanthemum leucanthemum*, *Cirsium arvense*, and *Cirsium canadensis*. *Linaria dalmatica* is becoming established in areas adjacent to this area, and may become a threat in the future. *Verbascum thapsus* and *Convolvulus arvense* occur in the vicinity of the LSR as infrequent isolated patches. Surveys for species presence and extent should be completed in order to develop a noxious management plan for these areas (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 Rattlesnake LSR. 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 Rattlesnake LSR 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 tailed frogs, spotted frogs and Cascades frogs. Northern spotted owl inventories have been conducted over 100% of the suitable habitat within the LSR.

b) Late Successional Species By Habitat Type

(1) Dry Forests

About 2,371 acres (23%) of the Rattlesnake LSR is composed of the dry forest vegetation group. Fire climax ponderosa pine forests historically dominated these areas and 49 wildlife species are associated with these forests.

Currently, 557 acres (23%) of the dry forest is in a successional advanced condition. About 128 acres (5%) are in a low density condition and could be fire-climax.

Some species that are associated with the late successional or fire-climax conditions of these forests and that have special management status include: tailed frog, larch mountain salamander, northern goshawk, bald eagle, flammulated owl, pileated woodpecker, hairy woodpecker, white-headed woodpecker, black-backed woodpecker, Williamson's sapsucker, northern flicker, chestnut backed chickadee, pygmy nuthatch, elk, long-legged myotis, long-eared myotis, silver haired bat, fringed myotis, western big-eared bat, pallid bat, marten, and fisher.

Historically, only a minor portion of these areas provided the structures that are associated with suitable spotted owl habitat (Thomas et al. 1990, Buchanan et al. 1995). However, fire exclusion has allowed successional advancement for suitable spotted owl habitat to develop in some areas (Agee and Edmunds 1992, Buchanan et al. 1995). These areas are now being used by spotted owls, however the risk of large scale disturbances causing large scale habitat loss is of major concern (Agee and Edmunds 1992, Buchanan et al. 1995, Gaines et al. in press). No spotted owl activity centers occur in the Dry Forests within the Rattlesnake LSR.

(2) Mesic Sites Within the Dry Forest

The mesic forest group could not be mapped for this LSR because of limitations posed by having to model the vegetation. Mesic sites within the dry forests provide important wildlife habitat and add diversity across the landscape. It is suggested that these sites be identified during project level analysis and that the appropriate treatment criteria be applied.

Historically, fire occurred less frequently at these sites (refer to Chapter III) allowing for succession that resulted in more complex forest structure such as a higher canopy closure, multilayering, snags and down logs. These forests occurred in a variety of successional stages across the landscape. The late-successional conditions of these Mesic Forests provide habitat for about 66 wildlife species. The high potential for future fires presents a concern about the sustainability of these forests.

Wildlife species that occur in these habitats and are of special management status include: tailed frog, Cascades frog, larch mountain salamander, 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, chestnut-backed chickadee, pygmy nuthatch, elk, long-legged myotis, long-eared myotis, fringed myotis, Yuma myotis, western big-eared bat, silverhaired bat, pallid bat, marten, and fisher.

This forested vegetation group is capable of providing habitat structure that typically composes spotted owl nesting, roosting, foraging and dispersal habitat, while remaining within the historic range of variability.

(3) Moist Grand Fir Group

The Moist Grand Fir group covers about 3,031 acres (29%) of the LSR. Historically, fire occurred less frequently than in the Dry and Mesic vegetation groups (refer to Chapter III), 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 Rattlesnake LSR.

Currently, about 2,433 acres (80%) of the Moist Grand Fir group in this LSR is in a late-successional condition. In the absence of any major disturbance, it is expected that in 50 years 2,626 acres (87%), and in 100 years 3,031 acres (100%) of this habitat would be in a late-successional condition.

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, 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 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. No known spotted owl activity centers are located within this vegetation group.

(4) Wet Forest Group

The Wet Forest Group covers 1,324 acres (13%) of the Rattlesnake LSR. Historically fire occurred relatively infrequently (refer to Chapter III) 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, 1,080 acres (82%) are in a late-successional condition. In the absence of any large scale disturbances in 50 years 1,277 acres (96%) would be in a late-successional condition, and in 100 years 1,300 acres (98%) would be late-successional.

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. Three known spotted owl activity centers (SO801, SO815, SO859) are located within this vegetation group in the LSR.

(5) Subalpine Fir

Subalpine Fir covers about 2,337 acres (22%) of the LSR. 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 1,856 acres (79%) of the Subalpine Fir forests are in a late-successional condition. In the absence of any large scale disturbances it is expected that in 50 years 2,190 acres (94%), and in 100 years 2,191 acres (94%) 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, Cascades 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 and one Critical Habitat that are federally listed as Threatened or Endangered and could occur within the Rattlesnake LSR. 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 Critical Habitat Unit for spotted owls.

The bald eagle is suspected to occur within the Rattlesnake LSR and none of the available habitat has been surveyed. It is suspected that peregrine falcons occur within the LSR and none of their habitat has been surveyed.

(a) Northern Spotted Owls

There are 3 pairs of spotted owls within the Rattlesnake LSR. All of the LSR spotted owl pairs have successfully reproduced young.

The Rattlesnake LSR has wetter forest types, (wet 13%, moist 29%, and multi-story subalpine fir 17%). There is a large amount of the LSR in dry forest type (23%). The Rattlesnake LSR adjoins the William O. Douglas Wilderness on its western end. The wilderness habitat has contiguous forest structure, and is quite important to the functioning of the LSR.

The Rattlesnake LSR provides connectivity from north to south in the eastern Cascades. It provides essential breeding habitat connectivity between the Bumping LSR and the Tieton LSR. The Rattlesnake LSR supports a population cluster of 3 spotted owl pairs. This LSR is important to the range wide distribution for the northern spotted owl.

Within the Rattlesnake LSR, 100% of the spotted owl habitat has been surveyed for spotted owls.

The estimated amount of habitat within a 1.8 mile radius of the activity centers is shown in Table 1? "Spotted Owl Information for Rattlesnake LSR". One of the spotted owl home ranges (SO815 Bethel Ridge) is below threshold acres of 2,663 acres nesting/roosting/foraging habitat within 1.8 miles radius AND 500 acres of habitat within 0.7 miles radius. The other 2 sites (SO801 and SO859) are at threshold acreage, but below target acres of 3,994 acres per site. See appendix 12 "Spotted Owl Activity Centers, Reproductive Status and Habitat Availability" and 12a (owl sites from 1996 field data).

Table -?-V-1, Spotted Owl Information for Rattlesnake LSR (from 1996 field season)

Spotted Owl Rattlesnake	Repro Status ³	Ownership ⁴	Dry or Wetter Owl ⁵	Threshold ⁶	Critical Habitat Unit (CHU)	Forest Interior? ⁸	Existing SSOH 1.8 mi Radius & 0.7 mi R ¹⁰	Activity Center 100 Ac ¹¹ in 0.33 mi	Total Dispersal Habitat ⁹
SO801	PY	FS	Wetter	At Threshold	WA-16	Inside	3,899 in 1.8mi 749 in 0.7 mi	171 ac w/n 0.33mi	1,060 1.8mi
SO815	PY	FS	Wetter	Below Threshold	WA-16	Near	2,183 in 1.8mi 500 in 0.7 mi	110 ac w/n 0.33mi	1,659 1.8mi
SO859	PY	FS	Wetter	At Threshold	WA-16		3,463 in 1.8mi 568 in 0.7 mi.	99 ac w/n 0.33mi	1,494 1.8 mi.

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

³ Site based on highest Reproductive occupancy: RS = Residential Single; P = Pair; PY = Pair with Young, HS = Historic Single..

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

⁵ 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..

⁶ **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.

⁷ The activity center is within 1/2 mile of the **CHU**.

⁸ **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.

⁹ **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 **Wetter dispersal** includes codes 31, 35, 61, and 41.

¹⁰ **Habitat** within 1.8 mile radius. **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.

¹¹ 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.

(b) Critical Habitat Unit for Northern Spotted Owls

There is one spotted owl Critical Habitat Unit (CHU) WA-16, which overlaps onto the northern half of the Rattlesnake LSR. There are three owl pairs within the CHU, they are the same ones that are within the LSR. The CHU provides connectivity from north to south in the eastern Cascades. It provides essential breeding habitat connectivity between the Bumping CHU WA-15, the Rimrock CHU WA-17 and the North Fork Tieton CHU WA-18. This CHU is important to the range wide distribution for the northern spotted owl.

There is 61% of the CHU overlapping into the Rattlesnake LSR. The LSR portion of the CHU includes all the owl pairs. The part of the CHU to the north in Three Creeks, includes some spotted owl suitable habitat, which spotted owl SO801 and SO859 probably use. The CHU goal is to support 2+ pairs of owls (USFWS Memorandum, 1991). Currently there are 3 pairs within the CHU. See Table 1? "Spotted Owl Information", Table 2? "Connectivity Between LSRs: Spotted Owl Pairs in LSRs and MLSAs, and CHU Goals", Appendix 13: "LSR/MLSA S.Owl Acreage's", Appendix 12 & 12a "Spotted Owl Activity Centers etc.", and Appendix 34: "CHU Maps Wenatchee National Forest".

Connectivity between CHUs is especially prevalent through adjacent wilderness habitat in the Rattlesnake Creek to North Fork Rattlesnake Creek for access to Upper Nile LSR. Connectivity to Bumping LSR is through Wilderness habitat of Rattlesnake, Rattlesnake Meadows, Deep Creek and Copper Creek. Connection to the Tieton LSR can be through Wilderness via Rattlesnake Meadows and Indian Creek, as well as through the Russell Ridge MLSA and the Lost Lake 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.

(c) Grizzly Bear and Gray Wolf

No class 1 grizzly bear observations have been made within the Rattlesnake LSR. Grizzly bears and gray wolves are suspected to occur within the LSR and none of their available habitat has been surveyed.

(d) Marbled Murrelet

The Rattlesnake LSR is outside of the 55 mile marine foraging zone for marbled murrelets. It is not expected that marbled murrelets would be located this far from marine foraging.

(2) Sensitive 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 Rattlesnake LSR. These include the goshawk (*Accipiter gentilis*), willow flycatcher (*Empidonax trailii*), olive-sided flycatcher (*Contopus borealis*), tailed frog (*Ascaphus trueii*), spotted frog (*Rana pretiosa*), Cascades 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 and it is suspected that the little willow flycatcher and the olive-sided flycatcher occur. No surveys have been completed.

(b) Amphibians

Surveys for amphibians have been 10% completed within the Rattlesnake LSR. It is known that the tailed frog, spotted frog and Cascades frog occur in the LSR.

(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 the Rattlesnake LSR.

Surveys for lynx, wolverine and fisher have not been conducted. All three are suspected to occur in the LSR.

(3) Management Indicator Species

There are 12 wildlife species that are listed as management indicator species that occur or could occur within the Rattlesnake LSR. 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 formal surveys for primary cavity excavators have been completed. The pileated woodpecker and northern flicker are known to occur within the LSR and the remaining MIS primary cavity excavators are suspected to occur.

(a) Ruffed Grouse and Beaver

No surveys for the ruffed grouse or beaver have been completed and they are suspected to occur in the LSR.

(b) Mule Deer, Elk

Mule deer and elk are known to occur in the LSR. No surveys have been completed.

(c) Marten

Marten are suspected to occur in the LSR and none of their available habitat has been surveyed.

(5) Survey And Manage, Protection And Buffer Species

There are eight species that do or could occur within the Rattlesnake LSR 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

It is suspected that the great gray owl, white-headed woodpecker, black-backed woodpecker, pygmy nuthatch and three-toed woodpecker occur within the Rattlesnake LSR. The flammulated owl is known to occur. No surveys have been completed.

(b) Mollusks

It is unknown if the warty jumping slug, blue-gray tail-dropper, or papillose tail-dropper occur in the LSR and no surveys have been completed.

(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 LSR is 1.9 mi./sq.mi. and the amount of area in security habitat is 23%. This information shows that habitat effectiveness is considered to be "moderate" (between 1 and 2 mi./sq.mi.) relative to roads and "low" relative to security habitat (<50%). 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 Rattlesnake LSR is located on the Naches Ranger District. From a recreation/social perspective this is one of the more lightly used areas on the ranger district.

b) Prehistoric and Historic Summary

This LSR contains some evidence of prehistoric and historic use.

c) Recreation

(1) Campgrounds

There are no developed recreation facilities located within this LSR.

(2) Dispersed Camping

There are some scattered hunter dispersed campsites. Areas of concentration of dispersed camping occur at the Cash Prairie and MJB trailheads. This camping is mostly associated with hiker and horse wilderness users.

(3) Trails

Cash Prairie and MJB trailheads provide access the William O. Douglas Wilderness. The steep MFB trail access the rugged country of the Rattlesnake drainage. The trail from Cash Prairie accesses the west Bethel Ridge area. The Cash Prairie receives moderate use; the MJB trail receives less.

Two system 4x4 driveways cross the area. Forest Road 1500325 runs along Bethel Ridge and 1500680 connects Forest Road 1500 to the Little Rattlesnake.

(4) Winter Use

The Bethel Ridge Road is a very popular groomed route with snowmobilers.

(5) Other Recreation

Big game (elk and deer) hunting occurs in this LSR.

d) Mining

There are no mining activities within this MLSA.

e) Social and Economic Considerations:

The LSR has several electronic sites on Bethel Ridge authorized by special use permit.

B. Analysis Between LSR/MLSAs

1. Sustainability

a) Sustainability Analysis

The sustainability of LSRs/MLSAs across the Forest is displayed in the following table. The Rattlesnake LSR falls in the upper 1/3 of all LSR/MLSAs in terms of amount of vegetation at risk to loss from catastrophic fire. An important consideration in terms of sustainability is the relationship between the Rattlesnake LSR and its neighboring LSR/MLSAs. This includes the amount of at risk vegetation within the LSR/MLSAs as well as the extent of at risk vegetation between them. For the purposes of this analysis four LSR/MLSAs are considered to be neighbors: Haystack; Upper Nile, Lost Lake; and, Russell Ridge.

The following table shows a comparison of the acres at risk and the ignition risk determined in the Forest-wide sustainability analysis for the Rattlesnake LSR and its four neighboring LSR/MLSAs.

Table V-2, Acres at Risk and Ignition Risk, Rattlesnake LSR.

LSR/MLSA	% of LSR/MLSA at Risk		% of LS Forest at Risk		Ignition Risk
	Acres	Pct.	Acres	Pct.	
Rattlesnake	6,641ac	63%	4,846ac	82%	Moderate

LSR/MLSA	% of LSR/MLSA at Risk		% of LS Forest at Risk		Ignition Risk
	Acres	Pct.	Acres	Pct.	
Haystack	20,079ac	81%	16,174ac	100%	Moderate
Upper Nile	4,979ac	54%	4,589ac	73%	Moderate
Russell Ridge	7,024ac	57%	6,586ac	82%	Moderate
Lost Lake	5,069ac	73%	4,891ac	100%	Moderate

When looking at sustainability issues between LSRs/MLSAs, the factor driving the analysis is the amount and location of at-risk vegetation between the Rattlesnake LSR and its four neighbors. In other words, identifying linkages in at-risk vegetation that would facilitate the spread of fire from one LSR/MLSA to another.

There is a significant amount of at risk vegetation occurring between the Rattlesnake LSR and both the Upper Nile LSR and Haystack MLSA. This includes both moist grand fir and dry forest vegetation groups. Approximately half of the dry forest vegetation has been partial cut in the past. This cutting has not significantly changed the at risk condition of these dry forest communities because the harvest did not focus on the smaller dense understory trees. The potential for a fire occurring with resultant effects on all of these LSR/MLSAs at the same time is high.

The situation as it relates to the Russell Ridge and Lost Lake MLSAs is a bit different. The Rattlesnake LSR is in close proximity to the Russell Ridge MLSA and approximately 3 miles from the Lost Lake MLSA and there is some at risk vegetation between all of them, but not to the same degree as between Haystack, and Upper Nile. For this reason there is a lesser risk of fire spread between these LSR/MLSAs. The high elevation areas along Bethel ridge separate Rattlesnake from Russell Ridge. Although there is a short distance separating the two it is not comprised of at risk vegetation. The Oak Creek watershed separates Rattlesnake from Lost Lake. Much of this watershed consists of shrub steppe communities.

(1) Implications

1. Reduce stand density in dense dry successional advanced vegetation types (types 12 and 22) where they exist between Haystack, Upper Nile and Rattlesnake LSR/MLSAs as a first priority and between Rattlesnake and Russell Ridge and Lost Lake as a second priority.

Potential Projects - Commercial Thinning

2. Encourage private land owners in the Lower Rattlesnake to take stand density management actions on private forested areas.

Potential Projects - Communicate need to local landowners.

3. Reduce fuel loading along Bethel ridge in order to improve the ridge line as a fuelbreak between Rattlesnake and Russell Ridge LSR/MLSAs.

Potential Projects - Piling of down fuels, firewood gathering, pruning to reduce vertical fuel concentrations (all vegetation types), construction of shaded fuel breaks.

- 4) Reduce fuel loading in young stands where they occur between Rattlesnake, Haystack, Upper Nile and Lost Lake LSR/MLSAs.

Potential Projects - Precommercial Thinning.

- 5) Reduce fuel loading in the shrub steppe plant community in the Oak Creek watershed.

Potential Projects - Prescribed Fire.

2. Forest-Wide Northern Spotted Owl

The Rattlesnake LSR is not designated as one of the Forest's three large population cluster/source center LSRs, for the recovery of the spotted owl. The Rattlesnake LSR is part of the smaller "local population" centers, which are linked to the meta-populations through dispersing individuals (see LSR/MLSA maps Chapter I, page 8 & 9, of the main document). 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 "Function of the LSR/MLSA Network" section of the "Late Successional Reserve and Managed Late Successional Area Assessment, Wenatchee National Forest". Connectivity specific to the Rattlesnake LSR for vascular plants is analyzed from two perspectives here. Refer to the Forest-wide Assessment discussions for connectivity description for lichens, bryophytes, and fungi.

First, connectivity relative to the Rattlesnake LSR can be viewed from how well habitat is connected to surrounding LSR's or MLSA's. Within the dry vegetation group, connectivity exists for the moderate and high dispersal class species between the Rattlesnake LSR and the Haystack/Upper Nile MLSA/LSR. The low dispersal class species are dependent on vegetation between Rattlesnake and Haystack/Upper Nile. Connectivity for all dispersal classes between Rattlesnake LSR and Russell Ridge MLSA is dependent on vegetation between the areas. Connectivity exists between Rattlesnake LSR and Lost Lake MLSA for the high dispersal class but, is dependent upon vegetation between for the moderate and low dispersal classes.

Relative to species associated with the moist grand fir/mesic western hemlock vegetation group, connectivity exists for the high dispersal class between the Rattlesnake LSR and the Haystack/Upper Nile MLSA/LSR. The moderate and low dispersal class species are dependent on the vegetation between these areas. Connectivity between Rattlesnake LSR and Russell Ridge MLSA exists for the high dispersal class, while the moderate and low dispersal classes are dependent upon vegetation between. Connectivity between the Rattlesnake LSR and the Lost Lake MLSA is dependent on vegetation between the areas for the moderate and high dispersal classes. No connectivity exists for the low dispersal class between the Rattlesnake LSR and the Lost Lake MLSA. The lack of connectivity is due to the great distances resulting from the geographic location of this vegetation group on the landscape.

Relative to species associated with the subalpine vegetation group, between Rattlesnake LSR and Haystack/Upper Nile MLSA/LSR for all dispersal classes, connectivity is dependent on the vegetation between areas. Connectivity exists between the Rattlesnake LSR and the Russell Ridge MLSA for the moderate and high dispersal classes. The low dispersal class is dependent on vegetation between. There is no connectivity for any dispersal class between Rattlesnake LSR and Lost Lake MLSA. The lack of connectivity is a function of the isolated nature of this vegetation group in the Lost Lake MLSA.

Relative to species associated with the wet forest vegetation group, connectivity is dependent on vegetation between Rattlesnake LSR and Haystack/Upper Nile MLSA/LSR for all dispersal classes. Connectivity exists between Rattlesnake LSR and Russell Ridge MLSA for the high dispersal group, and is dependent on vegetation between for the moderate and low dispersal classes. There is no connectivity for any dispersal class between Rattlesnake LSR and Lost Lake MLSA. This is due to the absence of the wet vegetation group in the Lost Lake MLSA.

Because whitebark pine only occurs within the Rattlesnake LSR as isolated patches, no connectivity exists for this vegetation group.

In general, few opportunities to improve habitat connectivity for vascular plant species associated with a particular forest vegetation group were identified as a result of this analysis. In the dry and wet vegetation groups, the lack of connectivity is a result of inherent landscape patterns. In the moist grand fir/mesic western hemlock vegetation group, maintenance of existing dispersal corridors and promotion of mature/late-successional vegetation may provide opportunities for improving connectivity.

(1) Rattlesnake LSR Vascular Plant Connectivity

The following table presents the results of the connectivity analysis applied to the Rattlesnake LSR. Comparisons are made between the Rattlesnake LSR and the three neighboring LSR/MLSA's in terms of plant species being able to disperse from one LSR to the other. Determinations are made for each vegetation group common to the LSR's for each of 3 dispersal classes.

Table V-3, Rattlesnake LSR 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
Hay/Up. Nile	D	Y	Y	D	D	Y	D	D	D	D	D	D	A	A	A
Russell Ridge	D	D	D	D	D	Y	D	Y	Y	D	D	Y	A	A	A
Lost Lake	D	D	Y	N	D	D	N	N	N	A	A	A	A	A	A

Dispersal Codes: Y=Yes (Connectivity); N=No (Not Connected); A=Veg Group Absent; D=Dependent (Connectivity Depends on Habitat Outside LSR/MLSA)

Dispersal Classes: 1=Capable of dispersing up to 1 mile; 2=Capable of dispersing up to 3 miles; 3=Capable of dispersing up to 5 miles.

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 the Rattlesnake MLSA and adjacent LSR/MLSAs the dispersion index was used (as described in Appendix 1). A total of three potential linkages were evaluated: Rattlesnake to Haystack MLSA, Rattlesnake to Russell MLSA, and Rattlesnake to Lost Lake MLSA. The overall dispersion index for this LSR was 1.75.

Table V-4, Dispersion Indices for the Rattlesnake MLSA

Linkage	Distance (Miles)	High	Moderate	Low	Index
RA-Haystack	3	Yes	No	No	1

Linkage	Distance (Miles)	High	Moderate	Low	Index
RA-Russell	0.5	Yes	Yes	No	2
RA-Lost Lake	5	Yes	No	No	1
Overall					1.3

c) Northern Spotted Owl Connectivity

The Rattlesnake LSR includes 3 spotted owl pairs, which form a cluster, for connectivity to the north and south, and to the east and west. The Rattlesnake LSR encompass 61% of CHU WA-16 for spotted owls. CHUs were identified early in the recovery process for the northern spotted owls. The adjacent wilderness habitat is important to continue these linkages for spotted owls.

For final recovery of the northern spotted owl, smaller LSRs/MLSAs like these, contribute to the objective of occupied home ranges (See table 2? "Connectivity Between LSRs: Spotted Owl Pairs in LSRs and MLSAs, and CHU Goals" below). The CHUs in the Rattlesnake LSR has a goal of 2+ pairs of spotted owls (it currently has 3 pairs of owls)

Table V-5, Connectivity Between LSRs: Spotted Owl Pairs in LSRs and MLSAs and CHU Goals

LSR or MLSA Status and Connectivity	S.Owl Pairs --1994, FSEIS Appendix G, Table G-3	Highest Occupancy and Reproductive Status, for Field Seasons		Number of Owl Pairs CHU Should Support, as per USFWS - CHU discussion.	
		1995	1996		
Bumping RW126	2 Pairs	7 Pairs	4 sites + 4 ¹	4+ Pairs	WA-15
Upper Nile RW127	2 Pairs + 1 Res. Single	1 Pair + 1 R S	2 sites	--	NA
Haystack DM10	--	7 Pairs + 1 RS	8 sites	--	NA
Rattlesnake RW128	3 Pairs	3 Pairs	3 sites	2+ Pairs	WA-16
Russell Rdg DM11	--	2 Pairs	2 sites	--	NA
Tieton RW153	8 Pairs	13 Pairs	10 sites + 4 site ¹	6+ Pairs	WA-17 WA-18
Lost Lake DM12	--	1 Pair	1 site	1 Pair	WA-17

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

² Spotted owl activity center on Private Land.

The Rattlesnake LSR is situated in proximity to 6 other LSR/MLSAs. There is potential for dispersal to occur between the Rattlesnake LSR and the following: Upper Nile LSR/Haystack MLSA; Bumping LSR; Lost Lake MLSA; Tieton LSR/Russell Ridge MLSA. Connectivity of particular importance is: within W.O. Douglas Wilderness (Indian Creek, Rattlesnake Meadows, Rattlesnake Creek and North Fork Rattlesnake); and through the Russell Ridge MLSA to Tieton along Indian Creek. A poor connection could disperse spotted owls to the Lost Lake MLSA through Soup/House/Tieton Basin. See Forest Interior Map and Suitable Spotted Owl Habitat Maps.

The adjoining Wilderness Area habitat is important for all of these LSR/MLSA connections. Some matrix lands are important for connectivity between LSR/MLSAs. These connectivity corridors

should be monitored for effectiveness, and should overlap into Riparian Reserves, unmapped LSR's, wilderness, etc. 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 and 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).

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

1. Protection of LSR habitat from outside LSR on Matrix lands to the north, east and west. Protection of late-successional habitat from fires started within the W.O. Douglas Wilderness.
2. Monitor or provide connectivity between LSR/MLSAs, particularly: between Bumping LSR and Rattlesnake LSR through Rattlesnake Meadows in the William O. Douglas Wilderness.
3. Coordinate sustainable habitat and fire risk reduction on adjacent State of Washington Lands.

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 Rattlesnake LSR. For more information see Unique Habitats and Forest Interior Maps at the end of this chapter and the Unique Habitats and Species Table (Appendix 37), and Forest Interior Tables (Appendix 19), Riparian Reserves Map, Road Density tables (Appendix 20). 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 can be evaluated for biodiversity, connectivity and function. The LSR/MLSAs are compared Forest-wide for unique habitats and species abundance, connectivity and function (see Forest-wide Assessment, Chapter VII). The Rattlesnake LSR has some diverse habitat, and a good connectivity through the William O. Douglas Wilderness.

The most unusual thing about this area is the diversity between dry forest, subalpine fir forests and wetter forests. The Rattlesnake LSR has a high degree of rock habitat along Bethel Ridge.

Forest-wide the Rattlesnake LSR is in the group of low moderate quality for unique habitats and species abundance, and moderate quality for connectivity and function. The following table describes some features of unique habitats and species analysis.

Table V-6, Unique Habitats Overview by LSR/MLSA

UNIQUE HABITATS	RATTLESNAKE LSR
Total Acreage in LSR/MLSA	10,484 acres
Non-Forest Vegetation	13% (1,396 acres)
Riparian Reserves	12% (1,223 acres)
Late Successional/Wetter	55% (5,727 acres)

	(21% SAF, 34% Moi/Wet)
Dense Dry Forest or Dry Late-successional Forest	5% (557 acres)
Forest Interior	11% (1,171 acres) *<
Wildlife Species - Known L-S and PETS	27 species
Plant Species - Known PETS, S&M, or L-S Associated species.	27 species
Past Timber Harvest Activities	Moderate amounts, 14+%
Security Habitat	Low amounts, 24% (2,566 acres)
Open Road/Motorized Trail Density	moderate road/trail density, 1.9 miles per square mile
Roads and Trails in Riparian Reserves	high road/trail density, 2.9 miles per square mile

*< low amounts Forest-wide

The Rattlesnake LSR is not within noted distribution centers of rarity and endemism for animal and plant species, as per Columbia Basin Ecosystem Plan (Marcot et al, 1995 Draft). There are no Research Natural Areas or Special Interest Areas identified in the WNF Plan. It is adjacent to the W.O.D. Wilderness area on the western edge, and the Oak Creek Wildlife Recreation Area on the eastern edge.

Identified areas of high abundance, connectivity and function for unique habitats and species within the Rattlesnake LSR are:

- **Bethel Ridge:** Rock, Cliff, Talus, Dry Meadows, Forest Interior, Security Habitat, Riparian Reserves, PETS Spp., mountain goat, Connectivity.
- **Headwaters Little Rattlesnake:** Forest Interior, wetlands, riparian reserves, spotted owls, talus, cliffs.
- **Timberwolf** - Meadows, wet lands, riparian reserves, Forest Interior, Talus, rock, cliff, whitebark pine, 3000' elevational gradient change.
- **Rattlesnake Meadows/Strawberry Meadows/Devils Canyon** - Connectivity.

(2) Abundance and Ecological Diversity

Analysis for unique habitats and species abundance and ecological diversity 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. Compared to all the other LSR/MLSA's, the Rattlesnake LSR is in the lower amount for providing high amounts of acreage and wide variety of plant communities and environments. See Forest-Wide LSR/MLSA Chapter VII pages 115-120, Unique Habitats and Species by LSR/MLSA.

(3) Connectivity for Unique Habitats and Species

Analysis for unique habitat connectivity 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. This also includes past management activities. The LSR does provide a connection from the Wildlife Recreation Area to Wilderness. Compared to all the other LSR/MSLA's, the Rattlesnake LSR has moderate quality connectivity in a landscape pattern for biological flow to sustain unique animal and plant communities.

(4) Process and Function of Unique Habitats and Species

Analysis for the function of habitats 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. This also includes past management activities. The Rattlesnake LSR is in the lower amounts of function. See Chapter VII, Forest-Wide Function of the Network for Unique Habitats and Species and Forest-wide Unique Habitats and Species by LSR/MSLA Table in Appendix 37.

b) Unique Habitats and Species Known Within LSR

(1) Unique Habitats and Species Site Specific Analysis

The following is a summary of the Unique Habitats and Species Module for the Rattlesnake LSR. For more information see Unique Habitats Map at the end of this chapter, Forest Interior Map and Tables (Appendix 19), Riparian Reserves and Roding Map and Tables (Appendix 20), Late Successional Habitat (Appendix 4 and 5). For process see Unique Habitats and Species Module in Appendix 1 for order, explanations and process of modules.

Table V-7, Unique Habitats and Species, Site Specific Analysis

Habitats and Species	Rattlesnake LSR
Riparian Reserves	Over-all 12% of LSR in riparian, low amounts.
	Streams (1223 acres), Open water trace % (3 acres), Wet Meadows 2% (203 acres), and Seeps.
Non-Forested Vegetation	Total of 13% (1396 acres) of LSR.
	Talus 8% (859 acres), Rock trace % (20 acres), Cliff 2% (210 acres).
	Subalpine Meadows some %, Dry Meadows (43 acres),
	Natural Openings trace % (57 acres), Shrub/Brushfields 0 % (0 acres)
Unique Forest Groups	Forest Interior Patches 11% (1171 acres), low amounts.
	Late Successional Forest (wetter) 55% (5727 acres), SAF 21%, moist/wet 34%.
	Deciduous Trees trace , Aspen.
	Disjunct forest - dry forest inclusions in wet and high elevation.
	Whitebark Pine/Subalpine Larch trace % (26 acres).

Habitats and Species	Rattlesnake LSR
	Snags/Logs moderate Quality from Landscape Level
Animal - Species of Special Status and Late Successional Associated Species	27 Animal Species Known to Occur in LSR/MLSA
Threatened, Endangered or Sensitive Species	2 Species: Spotted Owl, CHU.
	4 Species of Concern: Goshawk, Tailed frog, spotted frog, Cascade frog.
Survey & Manage and Protection & Buffer	1 Species: Flammulated owl.
Management Indicator Species (WNF):	8 Species: Spotted Owl, Pileated Woodpecker, Primary Cavity Excavators, Elk, Mule Deer, Mountain Goat, cutthroat, chinook.
Migratory Birds	+ Species: along the streams, rivers, shrub fields, meadows.
Other Late Successional Associated	10+ Species: Barred owl, pygmy owl, saw-whet owl, flicker, Northwest salamander, Long-toed salamander, rough-skinned newt, flying squirrel, red-backed vole.
Significant Fish Populations	Fish Species: Native cutthroat in Little Rattlesnake.
Plants - Late Successional Associated Species and Species of Special Status	
PETS - Plants	1 species: <i>Orbanche pinorum</i> .
Survey & Manage and Protection and Buffer Plants	Fungi (0 species), Lichens (0 species), Vascular Plants (0 species) - need surveys.
Other Plant Species.	2 Washington State Monitor species: <i>Cypripedium montanum</i> , <i>Saxifraga intergrifolia</i> var. <i>apetala</i> .
American Indian Uses	Traditional Use Sites: Travel routes up and down valley, lithic scatters.
	Vision Quest Sites: Potential vision quest in rock and off major ridges and peaks.
	Traditional Food Plants:.
	Food Gathering: fishing, elk and deer hunting.

c) Rattlesnake LSR Potential Treatments For Unique Habitats And Species:

• **MONITOR:**

1. Validate vegetation mapping of unique habitats.
 2. Monitor effect of introductions big horn sheep and wild turkey on native flora and fauna.
 3. Monitor connectivity and flora/fauna health as result of the Oak Creek Wildlife Recreation Area and William O. Douglas Wilderness Area.
 4. Validate unique habitats assumptions, determine guild species use.
 5. Monitor, inventory and maintain high amounts of unique habitats and species (areas listed above);
 6. Monitor and maintain connectivity corridors. Provide habitat for wide ranging species, that LSR/MLSAs are only a portion of their range, i.e. gray wolf, wolverine and lynx.
 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;
- **WEEDS** (Knapweed, etc.):
 8. Reduce noxious weeds in the road edges and units.
 - **ROADS**
 9. Reduce roads in Forest Interior patches: headwaters Little Naches.
 10. Reduce roads/trails/campgrounds in riparian reserves, and increase Security Habitat especially along the Little Naches.
 11. Reduce roads and off road vehicles in mountain goat habitat.
 12. Reduce roads and trails in unique habitats: meadows, talus, wetlands.
 13. Reduce open road/motorized trail density.
 14. Do road access plan to allow lynx travel/denning/foraging habitats.
 15. Retain American Indian access to traditional use sites;
 - **HABITAT IMPROVEMENT**
 16. Accelerate old plantations in moist forest types, towards late successional.
 17. Dry meadow restoration and native species composition.
 18. Use prescribed fire in ponderosa pine with low density and large tree sizes.
 19. Use Prescribed Natural Fire for whitebark pine forests, shrub fields and subalpine meadows, in LSR/MLSAs and adjacent Wilderness areas.
 20. Reduce encroaching trees in some subalpine meadows and shrub fields; where fire historically maintained them as meadows .
 21. Reduce fragmentation of wet forest.

22. Reduce impacts from elk herds, especially riparian reserves and areas to accelerate towards late-successional habitat.

- **PROTECT**

23. Protect late successional wetter habitat from fire risk.

24. Protect large trees and screen near cliffs, caves, meadows;

25. Protect caves and cliff/caves for 250' around (roads/trails/cutting) to benefit bat species, mountain goats and peregrine falcon eyrie.

26. Protect 300' around subalpine meadows. Buffer around meadows.

27. Meet high end snag levels and spp

- **COORDINATE**

28. Coordinate with Washington DFW, elk overgrazing meadows and riparian.

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 Rattlesnake. This analysis revealed that the Rattlesnake LSR has a medium degree of available snags and future green tree recruitment snags and logs. See Appendix 1, Unique Habitats module and Snag sub-module, 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.

Table V-8, Rattlesnake LSR Snag Habitat Quality/Landscape Scale

<u>HIGH QUALITY</u>	<u>***MEDIUM QUALITY</u>	<u>LOW QUALITY</u>
Moist & Wet Veg Groups 42%	Subalpine Fir & Mesic Veg 22%	Dry & Whitebark Veg 23%
>60% LS (non-dry) Habitat	15% - 60% LS Habitat 55%	<15% LS Habitat
80% - 100% LS (all) Habitat	40% - 80% LS/M Habitat 60%	<40% LS/M Habitat
> 30% Forest Interior (non-dry)	15% -29% Forest Int Non-dry	<15% Forest Interior Not Dry 12% *<
>10% Forest Interior Dry	5% - 9% Forest Interior Dry	< 5% Forest Interior Dry 0%
>16% in Riparian Reserves	10% to 16% Riparian Reserves 12%	<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 2.90 mi/sq/mi
< 1 Mi/Sq Mi Open Roads	1 Mi to 2.5 Mi/Sq Mi Roads	> 2.5 Mi/Sq Mi Roads

<u>HIGH QUALITY</u>	<u>***MEDIUM QUALITY</u>	<u>LOW QUALITY</u>
	1.9 mi/sq/mi	
>70% Security Habitat	50% to 70% Security Habitat	<50% Security Habitat 24%
>10% Past Burns Provide Snags		<10% Past Burns Provide Snags <10%
>50% Insect/Pathogens (see Insect/Disease Write Up)	25% - 50% Insect/Pathogens 25-50%%	< 25% Insect/Pathogens
<10% Past CC Harvest 5%	11% - 25% Past CC Harvest	>25% Past CC Harvest
<10% Past PC Harvest	11% - 50% Past PC Harvest 14%	>50% Past PC Harvest

(Percentages in bold indicate values for LSR) *** indicates overall rating for snag quality.

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

1. Reduce roads in Forest Interior patches: headwaters Little Naches.
2. Reduce roads/trails/campgrounds in riparian reserves, and increase Security Habitat especially along the Little Naches.
3. Accelerate old plantations towards late successional.
4. Monitor for snag dependent species, and snag longevity, especially in old plantations and in dry forest type.
5. Complete snag analysis on 40 acre grid prior to any reduction of forest structure habitat. Retain snags at high end of range. Manage insects and disease at endemic levels.

e) Species with Special Status (Plant)

Within the Rattlesnake LSR, there is potential habitat for a number of special status species, however, 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 is one Forest Service sensitive species (*Orobanche pinorum*) and two Washington state monitor species (*Cypripedium montanum* and *Saxifraga integrifolia* var. *apetala*) within the Rattlesnake LSR. Information regarding the biology or ecology of these species is limited, but some information is summarized here.

In general, *Orobanche pinorum* occurs on steep exposed slopes, with loose shallow soils. The species is most closely associated with the Douglas-fir and grand fir plant associations. The occurrence of *O. pinorum* is largely dependent on the occurrence of *Holodiscus discolor*, as *O. pinorum* is a parasite on the roots of the *Holodiscus*. *Cypripedium montanum* appears to favor light disturbance such as low severity fire and light soil disturbance (Engle, personal observation). *Saxifraga integrifolia* var. *apetala* commonly occurs on shallow, lithosol soils along ridgetops where moisture accumulates in the early spring.

f) Survey and Manage Species (Plant)

There is a limited number of survey and manage plant species documented from the Rattlesnake LSR (Appendix 7). Several species are suspected to occur in the area. (Appendix 7). The ROD provides standards and guidelines for survey and manage species, and these should be addressed within the LSR. An important point is that only very general surveys have been completed for non-vascular plants and projects should be initiated which carry out surveys which comply with current direction and survey protocol.

2. Plant Connectivity

Connectivity can also be addressed by analyzing the connectedness of habitats or species populations within the MLSA/LSR. Within the Rattlesnake LSR, most forest groups are relatively well connected. Disjunct species populations result from inherent breaks or openings in the landscape. At this time, information is not available to complete this type of analysis for survey and manage species within the Rattlesnake LSR.

3. Wildlife Connectivity

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

Table V-9, Connectivity Rankings for Rattlesnake LSR

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

Currently, the availability of habitat in a late-successional or fire-climax condition is high in all vegetation groups except the dry forests. Restoration projects that promote the development of fire-climax conditions would improve the connectivity in this forest group. The overall open road density and level of security habitat provides for a low to moderate level of connectivity. However, the existing roads are concentrated in Riparian Reserves. The current level of forest interior connectivity is considered to be low, as a result of habitat patches being fragmented by roads. 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.

(I) Restoration Opportunities

(a) -- Dry Forest Group

There is an opportunity to improve connectivity within the dry forest vegetation group through the implementation of thinning, prescribed fires, and road closures with associated revegetation.

(b) Moist Grand Fir, Wet Forest, Subalpine Fir, Riparian Reserves

There is an opportunity to improve habitat connectivity within riparian reserves and interior forest patches by reducing the number of roads. This could include relocating roads or revegetating them to provide for connectivity for low mobility wildlife species.

4. Disturbance Risk Analysis

Sixty percent of the 10,484 acre Rattlesnake LSR contains late-successional forest; however 63% of the LSR (6,641 acres) is in the low sustainability forest types. Only 13% of the LSR is within the wet forest group. The vulnerability of the Rattlesnake LSR to fires is both a function of vegetation composition and risk of ignition. In addition, serious root disease problems are increasing mortality levels and fuel loads. *Phellinus weirii* and *Heterobasidion annosum* (laminated root rot and annosus root disease) are the two major root decay pathogens involved. Both pathogens affect vegetation in the dry forest group and in mesic western hemlock and moist grand fir vegetation types. Annosus root disease is also found within the wet forest group, especially in stands dominated by mountain hemlock.

Dwarf mistletoes are a serious problem in Douglas-fir growing on drier sites; only within the wet forest group is it not a problem. Larch mistletoe is a scattered problem, especially on drier sites where it tends to accelerate successional trajectories. White pine blister rust is scattered throughout the LSR from the moist grand fir type throughout the mesic hemlock and wet types. It's also found in the few pockets of whitebark pine within the LSR. In white bark pine forests, the blister rust tends to kill one or several of the multiple stems of a tree, but rarely kills the entire tree.

Western spruce budworm outbreaks occurred in dry and moist forest groups, excluding the mesic hemlock type, from the mid 1980s until the early 1990s. Defoliation was moderate and topkill common. Budworm activity peaked during 1992 and crashed in 1993, possibly as a result of an extremely cold winter in 1992-93. The area within the Rattlesnake was never sprayed. Many stands within the LSR continue to be at risk to future budworm outbreaks, since forest compositions and structures have not changed appreciably since the last outbreak. Fir engraver mortality is extremely high, especially in stands where budworm outbreaks occurred and/or where root disease is a problem. Douglas fir beetle mortality is localized and tends to occur in dry, dense forest types; it is associated with root disease and mistletoe infestation. Western pine beetle is killing large pines in overstocked stands, especially along the cliffs on the north and east boundaries of the LSR. Mountain pine beetle mortality is scattered and limited to overstocked stands; the potential exists for more widespread mortality. Larch budmoth caused localized, extensive damage in 1985.

The area has been heavily grazed by both domestic livestock and elk. At the turn of the century, grazing pressure was mainly from sheep and later cattle. A sheep allotment currently exists within the LSR, but grazing pressure from the current allotment is minimal. Damage to soils, changes in plant composition, and altered successional trajectories are the result of past, not current, livestock grazing. Large herds of elk are causing damage within portions of the LSR. Elk herds are maintained at unnaturally high levels as a result of social pressures, especially from hunters, and fed throughout the winter at state feeding stations. Grazing and browsing by deer and elk have eliminated the shrub component of stands in some areas. Many native grasses are being replaced by introduced species or noxious weeds. In addition, soil compaction associated with past livestock and current elk grazing is changing forests from more mesic to drier types. This is particularly true where multiple harvests have occurred in flatter, drier portions of the reserves and in meadows, including higher elevation, wet meadows.

The following information on insect activity in the Rattlesnake LSR is from data collected during the aerial surveys conducted by Region 6 Insect and Disease Group. Light infestations or damage on less than 100 acres are not reported. Past insect data for this LSR extends back only to 1980.

- Mountain pine beetle (whitebark pine): 1995
- Mountain pine beetle (western white pine): 1990
- Larch budmoth: 1985 (high)
- Fir engraver: 1989, 1993,
- Douglas-fir beetle: 1988
- Western spruce budworm: 1988-89, 1991-92

Susceptibility of the Rattlesnake LSR to fires, insects, and pathogens is shown in the following table. 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 V-10, Disturbance Matrix for Rattlesnake LSR

Veg Type	Fire	Dwarf Mistletoe		Root Disease			WPBR	WSB	DFB	FE	MPB	WPB	Total
		DF	WL	AROS	HEAN	PHWE							
10	L	L	-	M	M	M	-	L	L	L	L	L	L
11	M	M	L	M	M	M	-	M	L	L	L	L	M
12	H	H	L	M	M	H	-	H	H	H	L	H	H
13	H	H	L	H	H	H	-	H	M	H	M	H	H
30	M	M	M	M	M	M	H	L	L	L	-	L	M
31	M	M	M	M	M	M	H	L	L	M	M	L	M
32	H	H	H	L	H	H	H	H	M	H	M	M	H
33	H	H	H	M	H	H	H	H	M	H	M	M	H
40	L	L	L	L	L	L	M	L	L	L	-	L	L
41	H	L	L	L	L	L	H	L	L	L	H	L	H
42	H	L	L	L	M	L	H	L	M	M	H	M	H
43	L	-	-	L	L	L	M	L	-	M	M	L	-
60	M	L	L	L	M	M	H	L	L	L	-	L	M
61	M	L	L	L	M	M	H	L	L	L	-	L	M
62	M	L	L	L	M	M	H	L	M	M	-	L	M
63	L	-	-	L	L	L	M	L	-	M	M	L	-
64	L	L	L	L	M	M	H	L	L	L	-	L	L
65	L	L	L	L	M	M	H	L	L	L	-	L	L
71	M	-	-	L	L	L	M	L	L	M	M	L	M

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 = 0; “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”

Opportunities exist within the Rattlesnake LSR for commercial thinning to move dense, successional advanced stands within the dry forest group toward more open structures dominated by ponderosa pine. Similar opportunities exist in stands that have been entered for harvest multiple times, except that large pines may be absent. Improved conditions within past harvest units can be accomplished by thinning (PCT) and reducing the basal area of root-rot susceptible species (true firs and hemlocks). Commercial thinning in single-layer stands will accelerate transition to multiple canopy layers. Small group selection harvests in areas with root diseases can promote diversity with respect to age and size; these areas should be planted with early successional disease resistant and/or tolerant species. Fuel breaks should be created on the north and east boundaries in the dry vegetation. Fuelwood collection can be encouraged along roads being maintained as fire breaks. In addition, fuel breaks should utilize natural and created openings.

5. Northern Spotted Owl

The following is the discussion and results of the within LSR/MLSA Spotted Owl Module for the Rattlesnake LSR. There are a total of 3 spotted owls in the LSR. The Rattlesnake LSR primarily has wetter forested habitat. The spotted owl module reviews the home range sites for spotted owls, the spotted owl pair goals for LSR/MLSAs, as well as connectivity within the LSR/MLSAs. See Table 3 ?, “Individual LSR/MLSA Spotted Owl Analysis and Objectives”, for home range acreage needs, pair goals and existing status of spotted owl pairs. Appendix 1 further describes the order, explanations and process of modules, specifically the “Northern Spotted Owl Module, Individual LSR/MLSA”. Also 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.

Table V-11, Individual LSR/MLSA Spotted Owl Analysis and Objectives for Rattlesnake LSR

WNF LSR & MLSA	LSR/MLSA IN DRY OR WETTER FOREST VEG		SPOTTED OWL PAIR HOME RANGE ACREAGE FOR LSR OR MLSA			S.OWL PAIRS to MAINTAIN EXISTING OR CHU GOALS?		EXISTING S.OWL PAIRS LSR & MLSA	# OF POTENTIAL, SUSTAINABLE OWLS
	DRY LSR OR MLSA	WET LSR OR MLSA	Threshold 2,663 ac per Pair	Ind Owl is Wet or Dry	Target 3,994 ac per Pair	Main-tain Exist-ing # Pr	Meet CHU Goal # Pr	# Spotted Owl Pairs Known as of 1996 Field Season	# Pairs (2663a) Sustainable Based on Potential Wetter Habitat
Upper Nile LSR		Wet		Yes	X	2 Pairs		2 Pairs	3 Pairs
Haystack MLSA	Dry		Yes			8 Pairs Hab		8 Pairs	3 Pairs
Rattlesnake LSR		Wet		Yes	X		2+ Pairs	3 Pairs	3 Pairs Threshold

									(2 Pr Target)
Russell MLSA		Wet	Yes			2 Pairs		2 Pairs	2 Pairs
Tieton LSR		Wet		Yes	X		6+ Pairs	10 Pairs	11 Pairs Threshold (7 Pairs Target)

LSRs and MLSAs are important for maintaining well distributed and well-connected spotted owl populations. 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). Protection and enhancement of habitat includes providing late successional and old growth forest ecosystems, and habitat for late successional forest related species, including the northern spotted owl (NWFP A-4, 1994). Spotted owl management strategies include:

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);

- 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 Rattlesnake LSR is primarily in wetter forest habitats (29% moist forest, 13% wet forest, 22% subalpine fir forest). There are 3 spotted owl sites within Rattlesnake LSR, each of them are in wetter habitats, primarily in the moist. There are two sites, SO801 and SO859 that have a fairly high amount of subalpine fir habitat (this should be field verified for habitat acreage). The Desired Condition for "wetter" spotted owl home ranges in LSRs is 60% of the 1.8 mile home range radius, which is 3,994 acres. There are no dry owl sites in the LSR. See description of habitat in DEC's and DC's, Chapter VII page 92-95. Though the Rattlesnake LSR is a wetter reserve, there is still a large part in dry (the northeast portion). The dry portion includes some spotted owl habitat, which is at risk over the long term (>50 years). The strategy for the Rattlesnake LSR is to shift habitat within (accelerate old

plantations and thinnings), to the wetter areas in the west. Wetter LSRs manage for spotted owl habitat, over risk and hazard reduction. The LSRs, in general, accept more risk from fire than does management in MLSAs. The MLSAs, in general, accept more risk from fire, than does management in Matrix.

The Rattlesnake LSR has three activity centers for spotted owls, which have all reproduced young. The three spotted owl sites make up a cluster groups for spotted owls. Clusters of owls provide better function for LSR and species recovery, than do isolated owl sites.

Though private and non-federal lands are sometimes within LSR/MLSA boundaries, they do not apply towards management for late-successional habitat. There are no private land parcels within the LSR. Immediately adjacent to the eastern boundary of the Rattlesnake LSR is the Oak Creek Wildlife Recreation Area for elk. This is primarily on State Department of Fish and Wildlife lands. There is very little spotted owl habitat on these lands. Coordination between agencies would be beneficial for management strategies for late successional species in the Rattlesnake LSR and for early successional species in the Wildlife Recreation Area.

a) Suitable Spotted Owl Habitat

The existing amount of nesting/roosting/foraging habitat within the Rattlesnake LSR is 5,632 acres (54%) of spotted owl habitat. There are currently 3 pairs of spotted owls in this LSR. The existing habitat could support 2+ pairs of spotted owls at threshold acreage (2,663 acres/pair) or 1+ pairs at target amounts (3,994 acres/pair). See Table 4?, "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 in a mix of forest groups, with moist forests (29%) being the most prevalent, followed by dry (23%), subalpine fir (22%) and wet (13%). The wetter forest groups make up over 42% of the LSR. This wetter spotted owl habitat has a higher chance of sustainability, than dry and mesic forest groups. There is no mesic forest groups in this LSR.

There is potential for spotted owl habitat to reach 7,082 acres (68%) in Rattlesnake LSR. Potential spotted owl habitat is if, over time, all forests that are capable of producing, will produce closed canopy, multi-story stands. This includes 300 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.

Sustainable spotted owl habitat could be 6,525 (62%) in the wet, moist, and multi-story subalpine fir forests. Sustainable spotted owl habitat is if all forests that are in the wetter forest groups are allowed to grow into a closed canopy, multi-story stand. This habitat would be sustainable over time (50+ years). The LSR currently supports 3 pairs of spotted owls. Over time, it could sustain 2.5 pairs at threshold acreage or 1.6 pairs of owls at target acreage (3,994 acres/pair). The CHU goal of this LSR is to support 2+ pairs, this is likely to be achieved.

Dispersal habitat (which may grow into foraging, roosting and nesting), covers 2,652 acres (25%) of the Rattlesnake LSR. It is predominately in the dry forest groups, with some mix of the others. (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 headwaters Little Rattlesnake to Coral Meadow, then extends into Wilderness towards Rattlesnake Meadows/Strawberry Meadows (See Forest Interior Map and Suitable Spotted Owl Habitat Map). The adjacent Wilderness area provides added owl habitat.

Potential disruption to spotted owl habitat from risk of fire is moderate to high. This LSR has a low amount of contiguous forest (11% Forest Interior), compared to all the LSR/MLSAs on the Forest.

The acceleration of late successional habitat in fragmented moist and wet forest groups would help this LSR to function towards spotted owl recovery.

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

Table V-12, Spotted Owl Habitat, Potential Habitat and Sustainable Habitat in LSR/MLSAs.

LSR or MLSA	1996 Known Pairs & Singles	CHU S.Owl Pair Goals	Existing Suitable Spotted Owl Habitat			Potential Suitable Spotted Owl Habitat			Sustainable Suitable Spotted Owl Habitat			% Forest Interior
			Total Acres	Thres hold Pairs	Target Pairs	Total Acres	Thres hold Pairs	Target Pairs	Total Acres	Thres hold Pairs	Target Pairs	
Bumping RW126	4 sites + 4 ¹ WILDERNESS	4+ Pr	9238	3.5 Pairs	2.3 Pairs	13126	4.9 Pairs	3.3 Pairs	12961	4.9 Pairs	3.2 Pairs	48%
Up Nile RW127	2 sites	--	6136	2.3	1.5	7354	2.8	1.8	7095	2.7	1.8	10%
Haystack DM10	8 sites WILDERNESS	--	9998	3.8	NA	17665	6.6	NA	6794	2.6	NA	11%
Rattle-snake RW128	3 sites	2+ Pr	5632	2.1	1.4	7082	2.7	1.8	6525	2.5	1.6	11%
Russell DM11	2 sites WILDERNESS	--	6042	2.3	NA	9323	3.5	NA	5275	2.0	NA	10%
Tieton RW153	10 sites +4 site ¹ WILDERNESS	6+ Pr	25587	9.6	6.4	32747	12.3	8.2	29616	11.1	7.4	17%
Lost Lk DM12	1 site	1 Pr	3588	1.4	NA	5112	1.9	NA	1956	0.7	NA	11%

This LSR/MLSA is 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

The goals for the Rattlesnake LSR spotted owl home range is Target/Optimum habitat (3,994 acres within 1.8 miles radius). Within the Rattlesnake LSR there are 3 spotted owl activity centers.

The estimated amount of habitat within a 1.8 mile radius of the 3 activity centers is shown in Table 5? "Suitable Spotted Owl Habitat" below. There is one owl (SO815 Bethel Ridge) below threshold acreage. There are 2 owls (SO801 Little Rattle and SO859 Coral Meadow) at Threshold acreage, but

they include a significant amount of subalpine fir habitat, that may in reality bring these 2 pairs down below threshold as well. The owl habitat mapping needs to be verified for this LSR.

No spotted owls in the Rattlesnake LSR are above Target/Optimal levels. As wetter forests begin recovery of multi-story/closed canopy stand structure, the owls in this LSR may include better habitat. It is doubtful that the Bethel owl (SO815) can be sustained in the long-term. It is likely that over-time, these owl sites may shift to more contiguous in the wetter forests. Spotted owl habitat acreage needs to be validated and site centers monitored. Spotted owl habitat acreage should be re-evaluated for all owls. It appears that spotted owls in this LSR, may use elliptical, rather than circular home ranges, especially Bethel Ridge SO815 and Coral Meadow SO859.

The spotted owl below threshold (SO815 Bethel Ridge) is on the eastern portion of the LSR. It is of highest priority to provide suitable habitat, especially in it's 0.7 mile core area. Connectivity habitat should be improved towards the Coral Meadow owl SO859 and into the habitat for the Little Rattle owl SO801. Spotted owls could benefit from accelerating forests towards late-successional habitat. This should occur in wet/moist forest groups in dispersal habitat and in past harvest units. See Table 5? "Suitable Spotted Owl Habitat" for prioritization and restoration opportunities.

There are 3 spotted owl sites may be at a high risk from fire both inside and outside the LSR. Protection from dry forest within, and from Matrix habitat outside should be a priority.

There is some dispersal habitat in each owl site, see @@@ Table 6? "Dispersal Habitat for Spotted Owls".

There are several spotted owls in the adjacent Wilderness that provide genetic interchange and are connected to the spotted owl cluster inside the LSR. These adjacent sites should be monitored. The LSR appears to be fully occupied by spotted owls.

For Forest Interior (contiguous forest blocks), the LSR is low in forest interior. The Forest Interior blocks have been fragmented over time. There is also a substantial amount of natural fragmentation due to the terrain and vegetation types. Potential areas to provide more contiguous habitat is in between Soda Spring Meadow and Bethel Ridge, and in the headwaters of Little Rattlesnake. There is potential to restore sustainable habitat in the wetter forest groups. Overtime, it is expected that higher quality and more sustainable habitat will be restored to the wetter LSR/MLSA. The drier forests within the LSR/MLSA will eventually be managed for other late-successional species.

The adjacent forested habitats of the William O. Douglas Wilderness areas and the headwaters Three Creek areas, are important for the functioning of connectivity. Connectivity potential is along the north slopes of Bethel Ridge within the LSR, and in Indian Creek, Rattlesnake Meadows in the WODW.

Table V-13, Suitable Spotted owl Habitat, Rattlesnake LSR (1996 S. Owl Activity Centers, Appendix 12a)

LSR & MLSA	SUITABLE SPOTTED OWL HABITAT ¹⁰												Restor- -ation
	1.8 mile Circle Around Activity Center						0.7 mile Circle Around Activity Center						Opps & Prior ity
Spotted owl	Dry	Mesic	Moist	SAF	Wet	Total	Dry	Mesic	Moist	SAF	Wet	Total	* & #

SUITABLE SPOTTED OWL HABITAT ¹⁰													Restor- -ation	
LSR & MLSA	1.8 mile Circle Around Activity Center						0.7 mile Circle Around Activity Center						Opps & Prior ity	
	Spotted owl	Dry	Mesic	Moist	SAF	Wet	Total	Dry	Mesic	Moist	SAF	Wet		Total
RATTLE-SNAKE LSR														
SO801 Lil Rattle	76	0	1,396	1,358	1,069	3,899	72	0	521	127	28	749	m,a, #3	
SO815 Bethel Rdg	283	0	1,735	166	0	2,183	50	0	450	0	0	500	m,a,p #1	
SO859 Coral Mdws	110	0	2,206	1,078	70	3,463	0	0	375	188	5	568	m,a,p #2	
Historical Owls														
Unknown														

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

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.

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

mesic includes code 22; and

wetter includes:

Moist codes 32, 36,

SAF codes 42

Wet codes 62, 64.

* **Restoration Opportunities:** M = Monitor Habitat & Site; P = Protect Habitat From Risk; A = Accelerate Habitat Towards Nesting, roosting, Foraging; C = Coordinate Habitat and Site Management, or Acquire Habitat.

Table V-14, Dispersal Habitat for Spotted Owls in Rattlesnake LSR (1996 S. Owl Activity Centers, Appendix 12a)

LSR & MLSA	Pair Status	Dispersal Habitat			
		Dry Acres	Mesic Acres	Wetter Acres	Total
Spotted Owl					

LSR & MLSA	Pair Status	Dispersal Habitat			
		Dry Acres	Mesic Acres	Wetter Acres	Total
Spotted Owl					
RATTLE-SNAKE LSR					
SO801	PY	224	0	836	1,060
SO815	PY	1,567	0	92	1,659
SO859	PY	918	0	576	1,494

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

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 Wetter dispersal includes codes 31, 35, 61, and 41.

c) Spotted Owl Dispersal And Connectivity

Currently, the Rattlesnake LSR provides habitat for 3 pairs of owls. The LSR can sustain 2+ pairs of owls over time, and provide genetic exchange within the Rattlesnake LSR and between other LSRs and MLSAs. Nearly the whole LSR is within occupied spotted owl home ranges, though much of the habitat from the Little Rattlesnake north is not suitable for spotted owls. Possible connectivity monitoring would be along the north aspects of Bethel Ridge into Wilderness in the headwaters of the Little Rattlesnake. Spotted owl SO801 (Little Rattle) is in an important linkage between the Rattlesnake LSR cluster and spotted owl clusters in the William O. Douglas Wilderness, specifically in the Rattlesnake Creek/Rattlesnake Meadows areas.

The adjoining Wilderness Area habitat is extremely important for all LSR/MLSA connections. Some matrix lands are important for connectivity between LSR/MLSAs. These connectivity corridors should be monitored for effectiveness, and should overlap into Riparian Reserves, unmapped LSR's, wilderness, etc.

During dispersal, nesting, roosting, foraging habitat is used, as well as habitat of lower quality (dispersal habitat). Dispersal habitat within the Rattlesnake LSR is 25%. Dispersal habitat will grow up to be nesting/roosting/foraging for spotted owls. Habitat providing dispersal/connectivity corridors within the LSR is the north aspects of Bethel Ridge and the headwaters of Little Rattlesnake (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. Late successional habitat is fairly abundant in the Rattlesnake LSR, yet it is highly fragmented. Wetter forest late successional habitat is 55%, and the forest interior is 11%. The high road densities (2.90 miles per square mile) and really low security habitat (24%) 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 and 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 for Spotted Owls

• **Monitor Effectiveness**

1. Meet goals of the Rattlesnake LSR of 2+ pairs of spotted owls. Monitor Activity Centers, Core Areas and Home Ranges.
2. Monitor the Bethel owl (SO815), can it be sustained in the long-term?
3. Monitor connectivity within LSR along the north aspects of Bethel Ridge into Wilderness and in the headwaters of the Little Rattlesnake. Especially from SO801 Little Rattle, to owls in Wilderness.
4. Monitor important connectivity between LSRs/MLSAs for effectiveness, especially Rattlesnake Meadows and Rattlesnake Creek areas in Wilderness.

• **Monitor Validity**

5. Validate the vegetation mapping.
6. Spotted owl habitat acreage, needs to be validated. All home range habitat for the Rattlesnake owl sites should be re-evaluated, and ground truthed. SO815 Bethel Ridge is below Threshold. SO801 Little Rattle and SO859 Coral Meadow home ranges may show too much habitat in high elevations, and also be below Threshold.
7. Validate the long-term the assumption that the LSR has sustainable habitat (moist forest groups) to support Rattlesnake LSR 2+ pairs of owls. The adjacent wilderness habitat is important to continue this linkage for spotted owls.

• **Monitor Implementation**

8. Consider reconfigure spotted owl habitat home range, based on foraging pattern, rather than 1.8 mile circle, especially Bethel Ridge SO815 and Coral Meadow SO859.
9. 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**

10. Some suitable owl habitat and all Rattlesnake LSR owl sites may be vulnerable to the risk of fire in dry forest types, and may need some fire risk protection, on habitat within and outside of LSR.
11. Fuels reduction and hazard reduction occur outside N/R/F 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.

• **Maintain**

12. The adjacent forested habitats of the William O. Douglas Wilderness are important for the functioning of connectivity.

• **Habitat Improvement**

13. See Table 5? "Suitable Spotted Owl Habitat" for prioritization and restoration opportunities. Prioritized sites are: #1 SO815 monitor, protect habitat and accelerate - especially in the 0.7 mile radius. See list for additional.

14. The spotted owls below threshold (SO815) are of highest priority to improve habitat, accelerate non-suitable habitat towards late successional. Re-figure owl habitat for SO801 and SO859 to determine if they are below threshold and need higher priority for habitat improvement.
15. Potential habitat includes 300 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.
16. Improve and accelerate N/R/F habitat in wet forest groups, to maintain number of spotted owl pairs. Accelerate dispersal habitat and old plantations: This is especially towards the Coral Meadow owl SO859 and into the habitat for the Little Rattle owl SO801.
 - Clear cuts in wet/moist vegetation groups predicted to be habitat in 100 years.
 - Pole sized stands in wet/moist will be habitat in 50 years.
 - Clearcuts in mesic/dry vegetation groups will be habitat in 120 years.
 - Pole sized stands in mesic/dry will be habitat in 70 years.
17. Increase habitat effectiveness and connectivity by reducing open road density and revegetating road beds, especially in Forest Interior patches. Especially between Soda Spring Meadow and Bethel Ridge, and in the headwaters of Little Rattlesnake.

Coordinate

18. Coordination between the Rattlesnake LSR and the Oak Creek Wildlife Recreation Area between agencies would be beneficial for management strategies for late successional species in the LSR and for early successional species in the Wildlife Recreation Area.

6. Aquatic

The Rattlesnake LSR is located within the Little Rattlesnake subwatershed. The Little Rattlesnake is a tributary to Rattlesnake Creek. Rattlesnake Creek flows into the Naches River which is a tributary to the Yakima River, joining the Yakima near the city of Yakima. Fish habitat within the Yakima Subbasin has been greatly impacted by human development including urban, agriculture, recreation, logging and grazing. The Rattlesnake system, including the Little Rattlesnake, has not been as greatly impacted and provides important fish habitat.

a) Geomorphology

The Rattlesnake LSR lies within the Cascade Mountains, Non Glaciated subsection. The predominate landform within the LSR is the Structurally Controlled Mountain Slope, Volcanic/Pyroclastic landform. Basalt flows, often interbedded with older pyroclastic material, is a dominant feature. The primary landform processes are fluvial downcutting through basalt and mass wasting.

Within the Structurally Controlled Mountain Slope Landforms the basalt flows are interbedded with older pyroclastic material. The pyroclastics have weathered into fine textured material. The fine textured pyroclastics can become saturated overtime and create large deep seated landslides. Where water becomes saturated localized smaller landslides may occur. The degree to which the basalt flows are interbedded with pyroclastics determines landform properties. Where there is little pyroclastic material, high soil moisture stress may be expected, with poor stream flow regulation, little soil development and a high percolation rate into the basalt. Fine sediment production is not a great concern as there is little soil. Where the basalts are interbedded with the pyroclastics soil moisture stress is not as much a problem. The pyroclastics quickly weather to a fine textured material.

capable of storing near surface water. The fine textured material may generate fine sediment and deep seated landslides may occur. Localized landslides may also be triggered where surface waters become concentrated. The water holding capacity of the pyroclastics helps regulate stream flows to a small degree.

(1) Management Concerns Due to Geomorphology

The basalt landforms are fairly resistant to management. Due to the coarse material, fine sediment delivery to streams is generally not a concern. In the absence of the pyroclastic material the landform is not subject to debris flows or landslides and stream banks are well armored. Soil moisture stress makes maintenance of organic ground cover important. Low stream flows make maintenance of stream shading important. Riparian areas associated with perennial streams, seeps and springs are probably especially important to riparian dependent wildlife in the dry landscape.

Where the basalt is interbedded with pyroclastic material deep seated landslides may occur along the flow margins. Concentration of water may also trigger localized landslides. The fine textured pyroclastic material may make native surface roads soft, subject to rutting and erosion. Where roads concentrate water landslides may occur. Fine sediment delivery to streams is thus a management concern. Due to the high maintenance needed for native surface roads, potential for fine sediment and landslides, roads need to be well designed and located.

Stream banks are fairly stable where they are anchored by the basalt bedrock but banks are subject to erosion when composed of the fine texture pyroclastics. Most large wood and other organic material probably enters streams from the riparian area due to blow-down or bank erosion. Maintenance of riparian trees and shrubs is therefore important for future large wood delivery to streams, protecting banks from accelerated bank erosion, and filtering fine sediment as well as shading the aquatic and riparian environment.

b) Little Rattlesnake Subwatershed

The Little Rattlesnake joins the Rattlesnake just upstream of the confluence of Rattlesnake Creek with the Naches River. The Naches River Subbasin is important for long term recovery of anadromous fish in the Yakima Basin. Much of the wild spring chinook production and about 40% of the wild steelhead produced in the Yakima comes from the Naches system Coho salmon once inhabited the Naches watershed and the species is actively being reintroduced. One of the sites for the initial coho reintroduction efforts is near the confluence of the Rattlesnake and the Naches River. The Naches subbasin within the Wenatchee National Forest is considered a key watershed under the Northwest Forest Plan.

The Little Rattlesnake subwatershed is considered to be significant for westslope cutthroat trout due to an apparent healthy population. It is not known if spring chinook, summer steelhead, bull trout or redband are present although it is very possible since they are all present in the mainstem Rattlesnake. Amphibian species known to inhabit the Little rattlesnake subwatershed include Cascade frog, western long-toed salamander, rough-skinned newt, tailed frog, Pacific tree frog and western toad.

(1) Little Rattlesnake Late Successional Habitat Management Concerns

The Little Rattlesnake is significant for westslope cutthroat trout. Protecting and rehabilitating habitat conditions for the cutthroat trout population needs to be a priority. The Little Rattlesnake population is adjacent to another significant cutthroat population in the Nile subwatershed. Management activities should address maintaining these populations as a connected block of habitat which could help anchor cutthroat populations in the lower part of they Naches Subbasin. The long

term persistence of a species in a watershed is better protected where large blocks of habitat with strong populations can be maintained.

The Little Rattlesnake also needs to be managed in context with the larger Rattlesnake watershed. Portions of the Rattlesnake are considered significant for spring chinook salmon and summer steelhead. The Little Rattlesnake may well be utilized by the Rattlesnake populations. The Rattlesnake also contains a fluvial bull trout population that probably will be considered significant. The possibility of bull trout inhabiting the Little Rattlesnake needs further exploration.

7. Noxious Weeds

Containment of existing populations and prevention of further spread is the recommended treatment in the Rattlesnake LSR. Seven noxious weed species were identified to occur within or adjacent to these areas. These species are discussed in priority order as identified by the noxious weed analysis module. There are no Class A weeds presently documented from these areas. Class B-designate weeds include: *Linnaria dalmatica* and *Chrysanthemum leucanthemum*. *Linnaria dalmatica* is becoming established in the vicinity of the LSR and may represent a future threat if not contained to within its present boundaries (See the Milk Creek MLSA). *Chrysanthemum leucanthemum* is known to occur as isolated patches in open forest and along roadways. Control efforts for this species should focus on activities including hand pulling, herbicides or a combination of these methods.

Centaurea diffusa is the only Class B weed identified in the LSR and is the second priority for treatment. It occurs primarily along roadways and waste places. *C. diffusa* may have the potential to establish in the dry forest within this LSR due to the limited precipitation associated with this area. Containment and prevention of further spread of this species should focus on major travelways.

Class C species present include, *Cirsium vulgare*, and *Cirsium canadensis*. *Cirsium vulgare* and *C. arvense* are widespread and are documented from areas with recent ground disturbance, primarily areas previously harvested and/or heavily grazed by domestic livestock and wild ungulates. Containment and further spread of these species should focus on heavily used dispersed sites. *Verbascum thapsus* occurs as isolated patches along roadways and in waste places. *Convolvulus arvense* is known from along road shoulders. Its occurrence is generally infrequent and in small numbers. Hand-pulling and spot herbicide spraying or a combination of these methods should be used for these species.

8. Fire Management Plan

a) Overview

This plan is intended to provide guidance for the management of fire in the Rattlesnake LSR. 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 Rattlesnake LSR. 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.
6. Emphasize contact with special interest groups (e.g., ORV groups, grazing permittees, residential homeowner groups, organization camps, local user groups, 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. Emphasize wildfire risk awareness education for home/landowners in urban/wildland interface areas.
10. Initiate hazard reduction actions around dispersed recreation sites.
11. Initiate hazard reduction actions along roads.

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

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

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

d) Fire Detection

1. Staffing of Clemans Lookout, supplemented with aerial detection after lightning episodes, will provide the primary detection resource for this LSR.
2. Aerial detection may be supplemented with emergency staffing at Timberwolf Mountain and Little Bald Mountain Lookout.
3. 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 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. Manage to sustain dry forest types.
3. Manage for mesic sites with high density, multi-story refugia.
4. Strategic fuel manipulation to reduce the size and intensity of fires within, and adjacent to, the LSR boundaries (e.g., pruning, thinning, and fuel breaks). Provide a change in the continuity/arrangement of, at risk, vegetation/fuels. Emphasis to utilize existing fuel treatment areas, natural openings, roads, ridgetops, etc. Priority area: Bethel Ridge.
5. Emphasize roadside fuel modification and fuel wood collection.
6. 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.
7. Utilize vegetation and fuel treatment methods to facilitate meadow restoration projects.
8. 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 and in areas adjacent to this LSR.
2. Priority outcomes throughout the LSR 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. The application of prescribed fire, where appropriate, to facilitate meadow restoration projects.
5. Projects should be of scale/location to enhance landscape-level diversity tied to inherent disturbance regimes.
6. 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.

D. Restoration Opportunities and Potential Project Summary

Table V-15, Restoration Opportunities and Potential Projects, Rattlesnake LSR.

Analysis Module	Restoration Opportunity	Potential Projects	Schedule ¹
Forest-Wide Sustainability	1) Reduce stand density in dense successional advanced (types 12 and 22) where they exist between the Rattlesnake, Haystack and Upper Nile LSR/MLSAs.	1) Use commercial thinning, pruning, fuelwood collection and prescribed fire as described in the disturbance module treatment key. Favor the development of seral species such as ponderosa pine and western larch. Locate and prescribe treatments to make landscape level changes in fire susceptibility.	A
	2) Encourage private landowners in the lower Rattlesnake watershed to take similar density management as described in 1 above	2) See 1 above.	B
	3) Improve or maintain existing fuelbreaks (Bethel Ridge)	3) Piling of down fuels, firewood gathering, pruning, shaded fuel breaks, and encouragement of less flammable deciduous vegetation.	A
	4) Reduce fuel loading in young stands.	4) Pre-commercial thinning.	C
	5) Maintain desired fuel levels and vegetation characteristics in low density dry vegetation types.	5) Prescribed fire.	C
	6) Reduce fuel loading in shrub steppe plant community in the Oak Creek watershed.	6) Prescribed fire.	C
Forest-Wide Spotted owl	Not Applicable. (This LSR is not one of the 3 LSRs on the forest designated as a source population area.)	Not Applicable.	

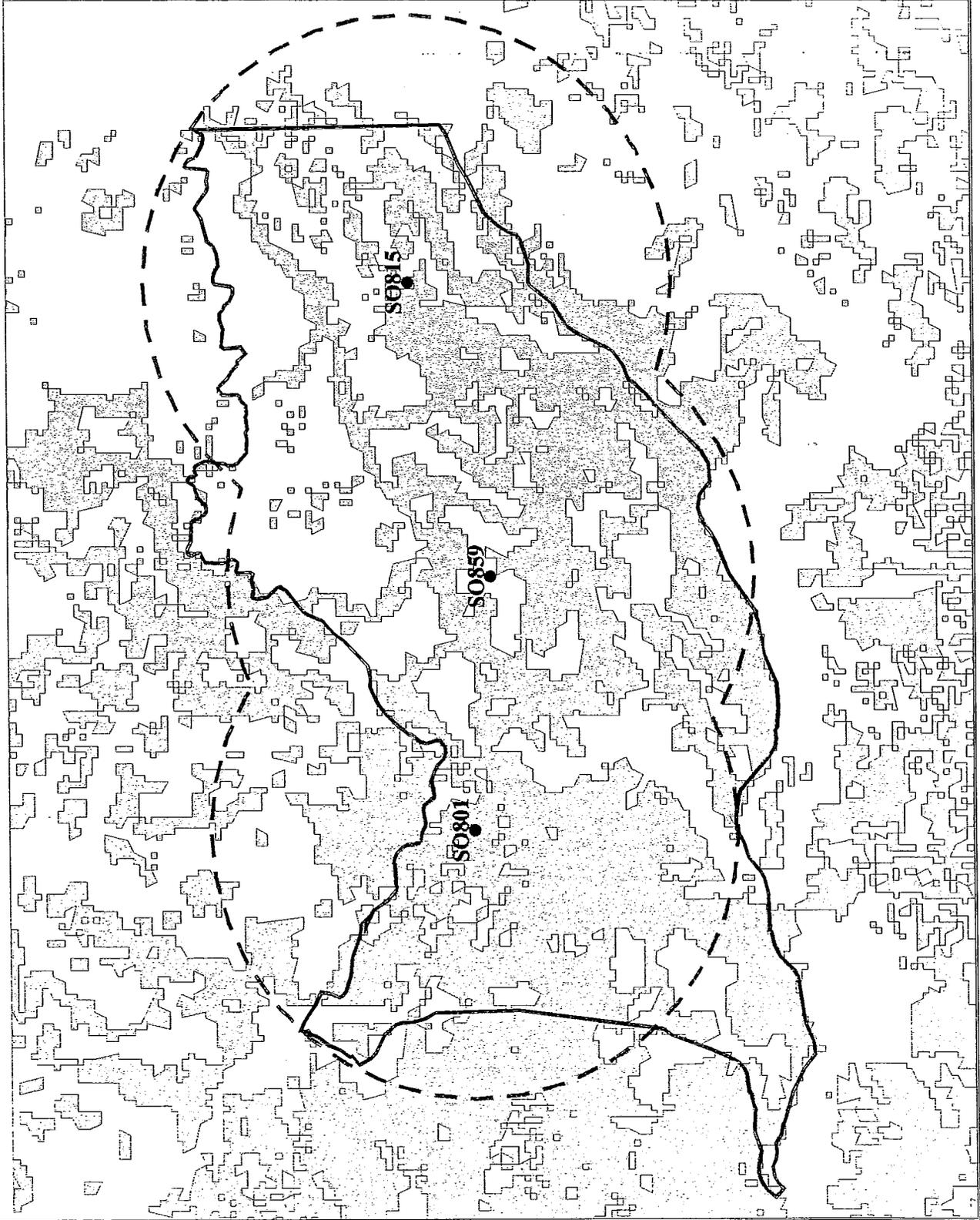
Analysis Module	Restoration Opportunity	Potential Projects	Schedule¹
Forest-Wide Connectivity	None Identified. Breaks in connectivity identified are inherent to the landscape.	None Identified	
Unique Habitats & Species	1) Reduce road densities in riparian reserves.	1) Close or relocate roads as opportunities are identified in Access and Travel Management Planning.	A
	2) Reduce road densities in Forest Interior Areas.	2) Close or relocate roads as opportunities are identified in Access and Travel Management Planning.	A
	3) Retain whitebark pine forests and subalpine meadows.	3) Prescribed fire.	B
Connectivity Within the LSR	1) Promote the development of fire climax stands within the dry forest vegetation group.	1) Thin from below favoring ponderosa pine. Use prescribed fire where current fuel loading permit the attainment of objectives.	A
	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
Disturbance	1) Reduce the risk of habitat loss to wildfire by reducing stand density, altering species composition and reducing vertical and horizontal fuel continuity in dry forest types.	1) Use commercial thinning, pruning, fuelwood collection and prescribed fire as described in disturbance module treatment key. Favor the development of seral species such as ponderosa pine. Priorities should be 1) Dispersal habitat. 2) NRF habitat within the LSR/MLSA but outside of owl circles, 3) See item #2 under spotted owl for treatment of NRF habitat on threshold acres..	A

Analysis Module	Restoration Opportunity	Potential Projects	Schedule¹
Spotted Owl	1) See Appendix 39, Northern Spotted Owl Nest Site Protection Within LSRs and MLSAs.		A
	2) Improve sustainability of dense dry forest (vegetation Type 12) within 0.7 to 1.8 mile home range area on threshold acres. Treatment should maintain suitability of habitat for nesting, roosting and foraging. (see spotted owl desired conditions)	2) Utilize commercial thinning, pruning and fuelwood collection.	A
	3) Obtain information on spotted owl locations.	3) Survey areas to 1994 spotted owl protocol.	B
Aquatic	1) See late successional habitat implications in Aquatic section.	1) Coordinate projects with Rattlesnake Watershed Assessment planned for completion in FY 1997.	B
Noxious Weed	1) Limit the extent and spread of <i>Chrysanthemum leucanthemum</i> , and <i>Centaurea diffusa</i> within the Rattlesnake LSR.	1) Consider treatments such as hand pulling and herbicides to limit extent and spread,	A
	2) Increase knowledge regarding noxious weed presence in the Rattlesnake LSR.	2) Survey LSR for presence of noxious weeds.	C
Fire Plan	1) Protect LS values from loss due to wildfire	1) See fire plan for specific actions	

¹ Implementation Schedule; (A) = within 1 year; (B) = within 3 years; (C) = within 5 years

Rattlesnake Late Successional Reserve

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

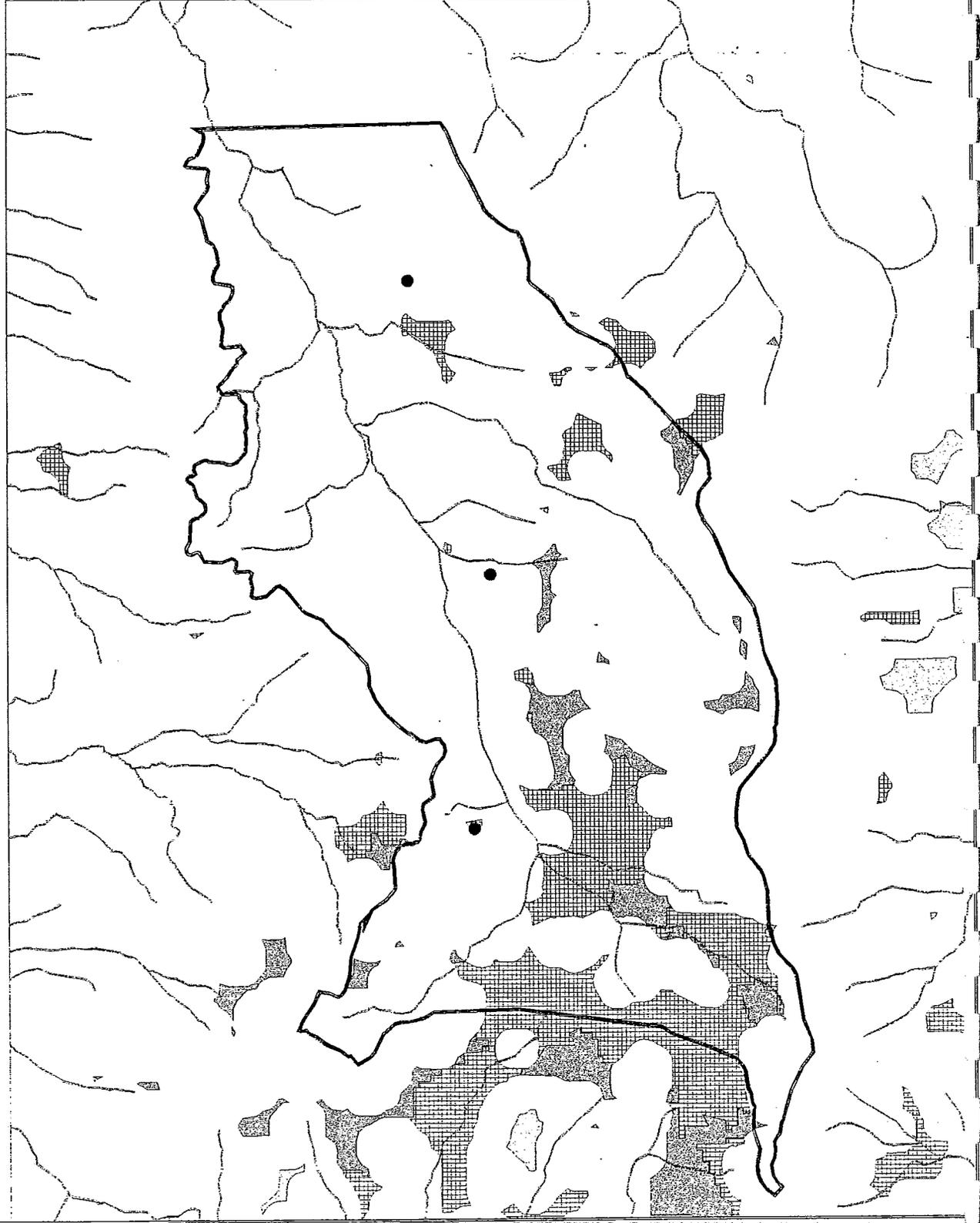
∩ Late Successional Reserve Boundary



Map Scale: 1 inch = 0.999 miles

Rattlesnake Late Successional Reserve

FOREST INTERIOR

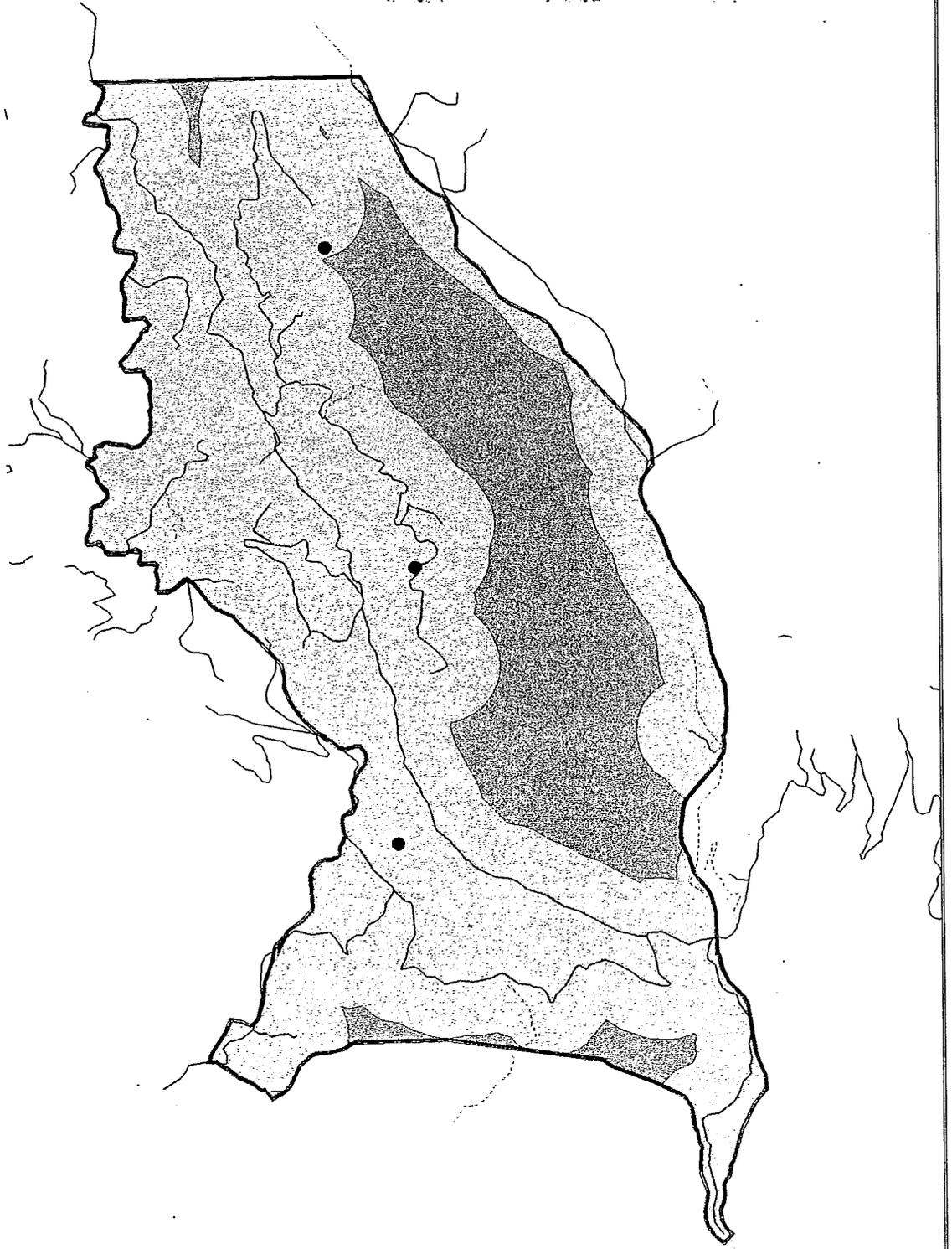


- DRY Forest Interior
- ▣ MOIST Forest Interior
- ▤ HIGH Forest Interior
- Major Lakes
- ~ Streams
- Spotted Owl Activity Centers
- ▲ Wildlife PETS
- ⌞ Late Successional Reserve Boundary



Map Scale: 1 inch = 0.999 miles

Rattlesnake Late Successional Reserve
SECURITY HABITAT

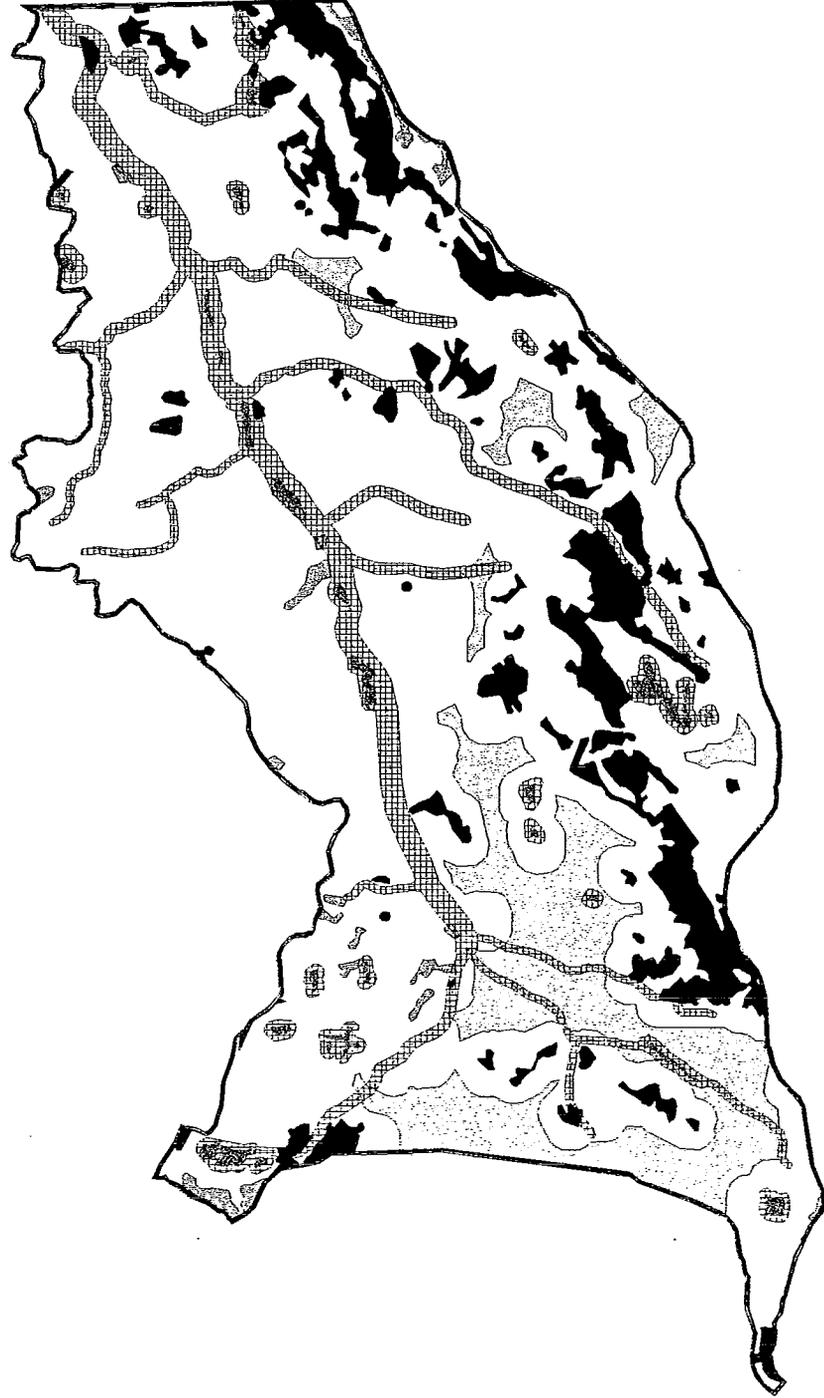


-  Security Habitat
-  NOT Security Habitat
-  Major Lakes
-  Open roads and motorized trails
-  Closed roads and non-motorized trails
-  Spotted Owl Activity Centers
-  Wildlife PETS
-  Late Successional Reserve Boundary



Map Scale: 1 inch = 0.999 miles

Rattlesnake Late Successional Reserve
UNIQUE HABITATS



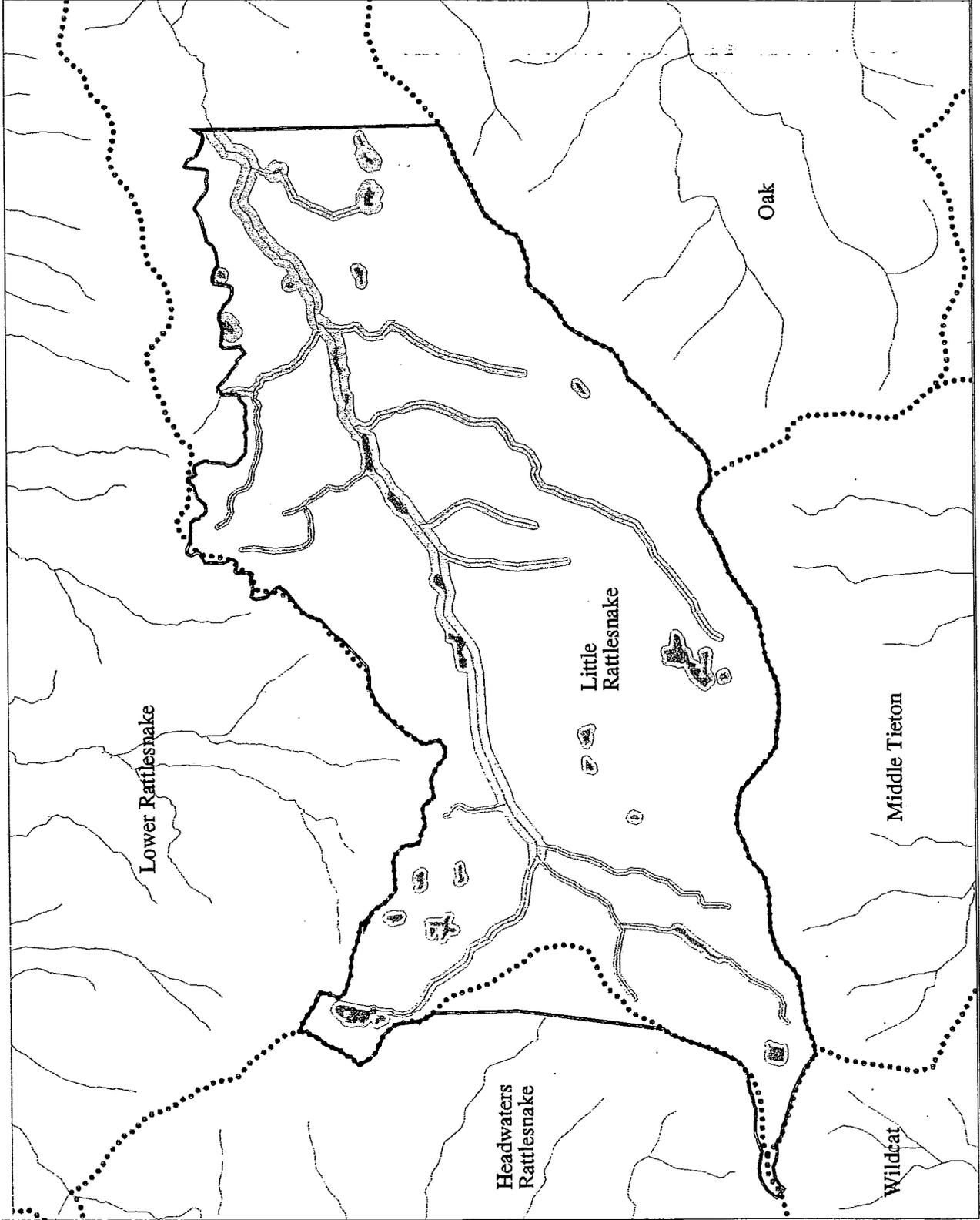
- Large Forest Interior Patches
- Whitebark Pine, Meadows, Shrub, Natural Opening, Deciduous Forest
- Talus, Scree, Bedrock, Cliff
- Wenatchee Forest Plan Allocations RN1, SI1, SI2
- Riparian Reserves
- Lakes and Wetlands
- Streams
- Spotted Owl Activity Centers
- Wildlife PETS
- Late Successional Reserve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



Map Scale: 1 inch = 0.999 miles

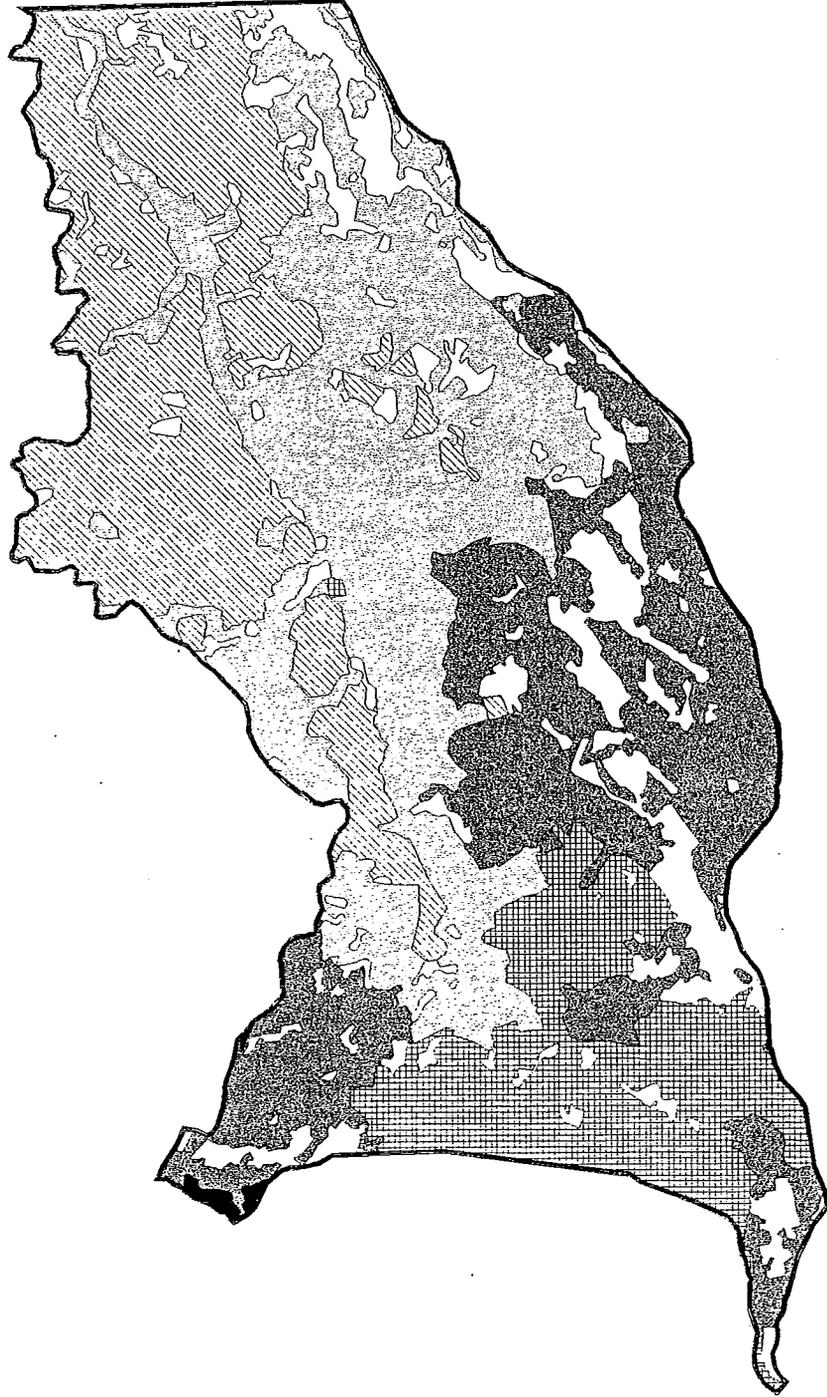
Rattlesnake Late Successional Reserve

FISH PRODUCTION UNITS (SUBWATERSHEDS)



Rattlesnake Late Successional Reserve
VEGETATION SERIES

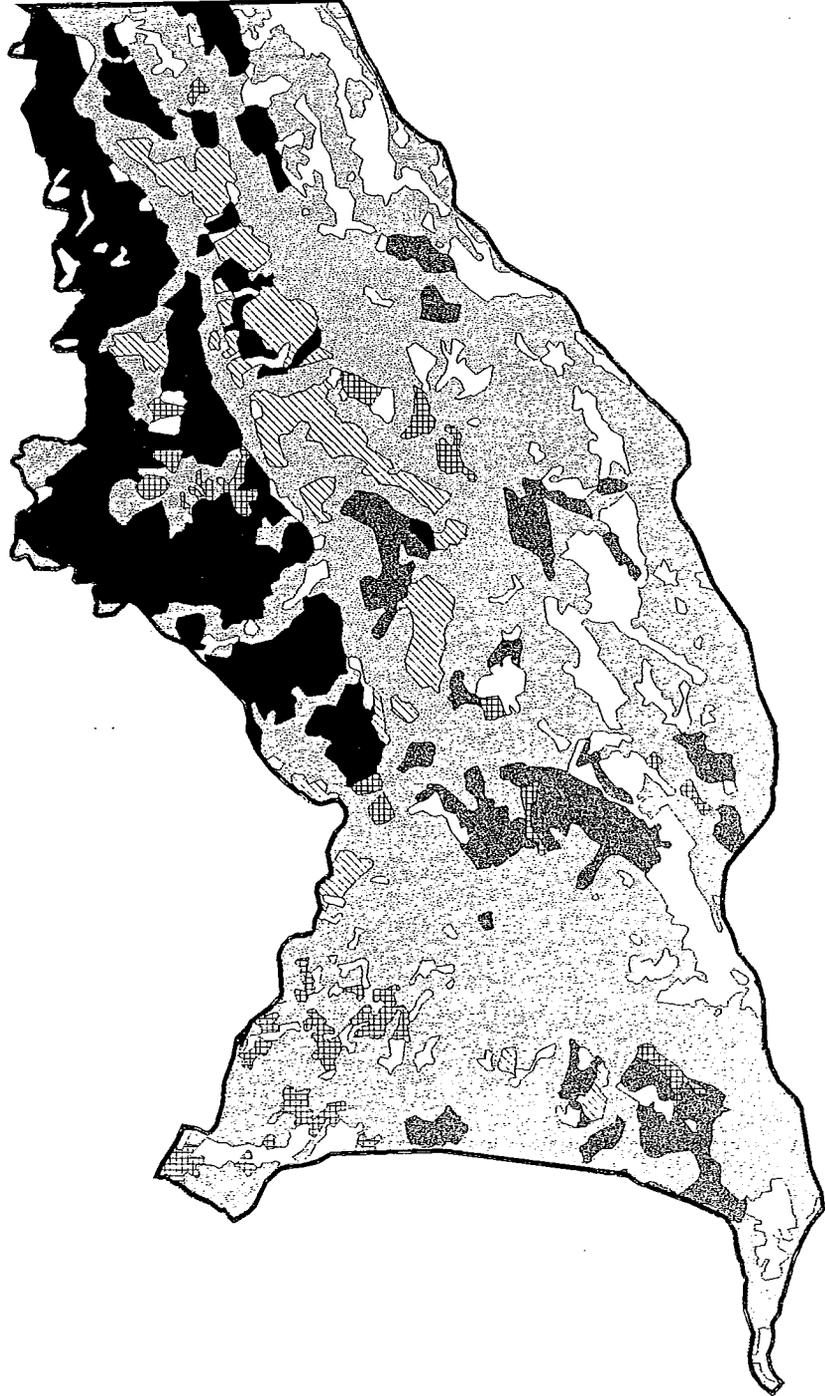
-  Dry and Mesic
-  Moist Grand Fir and Mesic Western Hemlock
-  Subalpine Fir and Lodgepole Pine
-  Wet Forest
-  Whitebark Pine and Subalpine Larch
-  Nonforest
-  Late Successional Reserve Boundary



Map Scale: 1 inch = 0.999 miles

Rattlesnake Late Successional Reserve
VEGETATION STRUCTURE

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



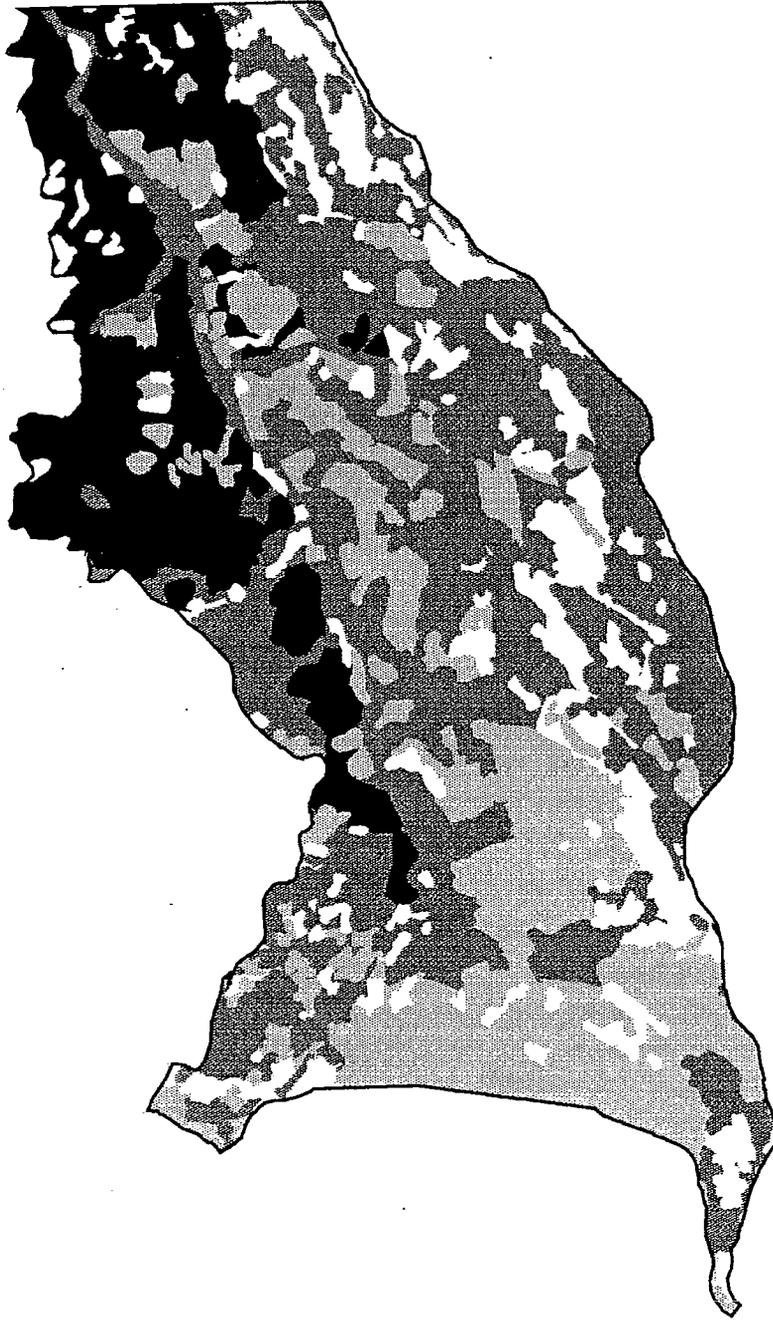
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Rattle Snake LSR

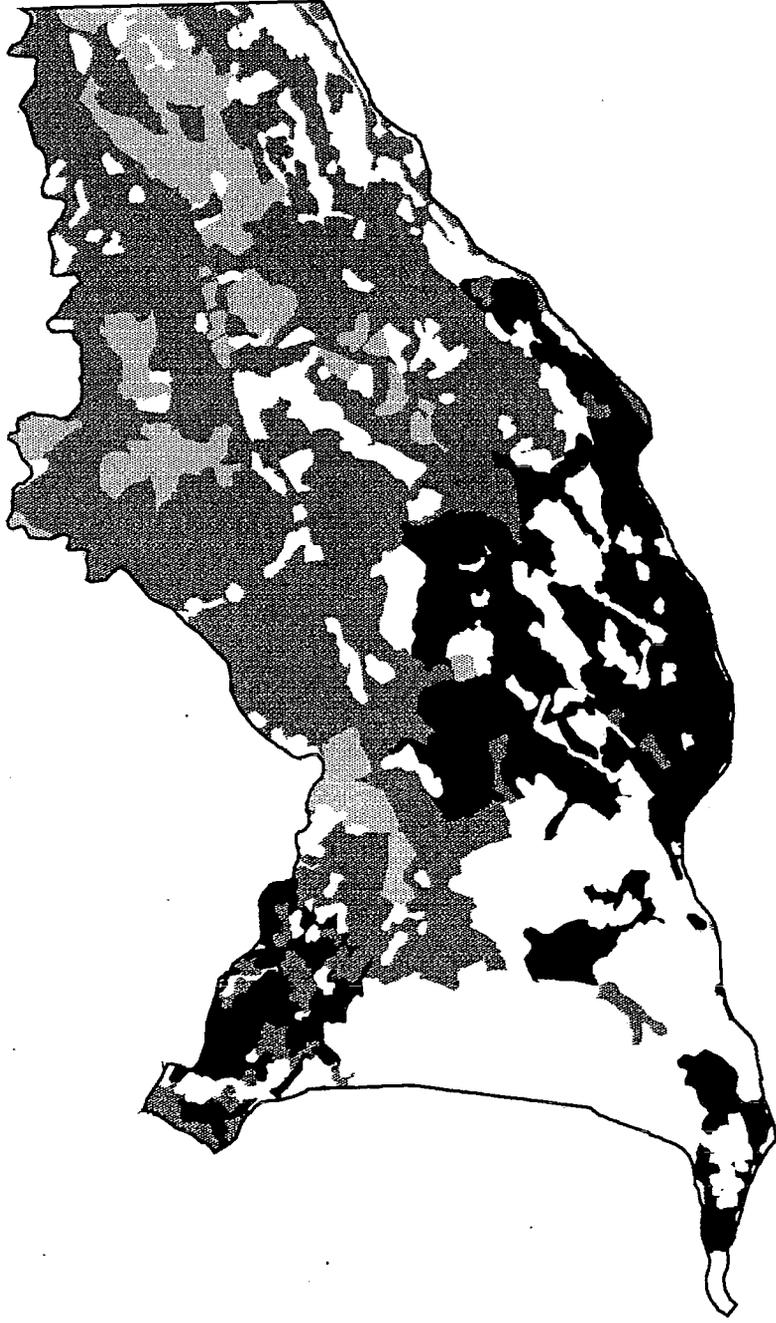
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Rattle Snake LSR





Rattle Snake LSR



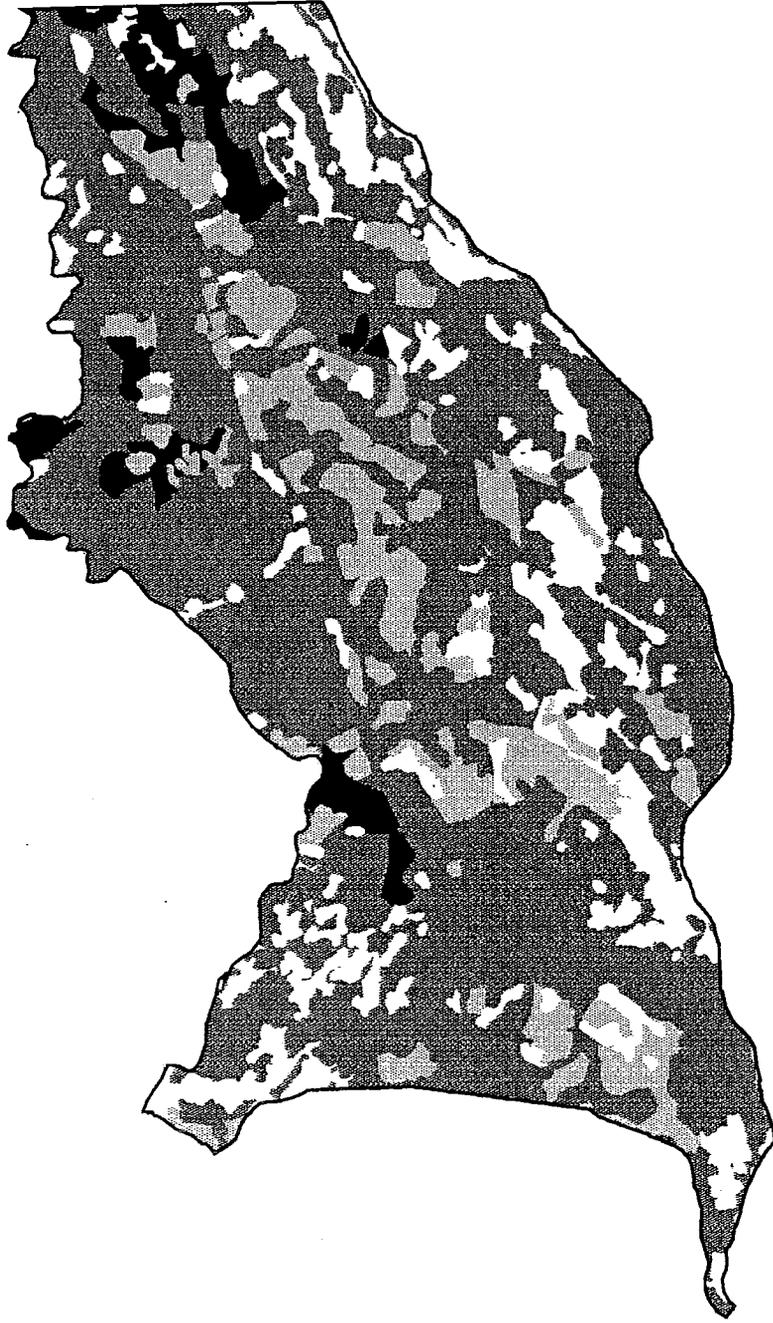


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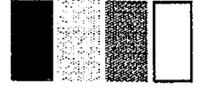
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Rattle Snake LSR

DFB

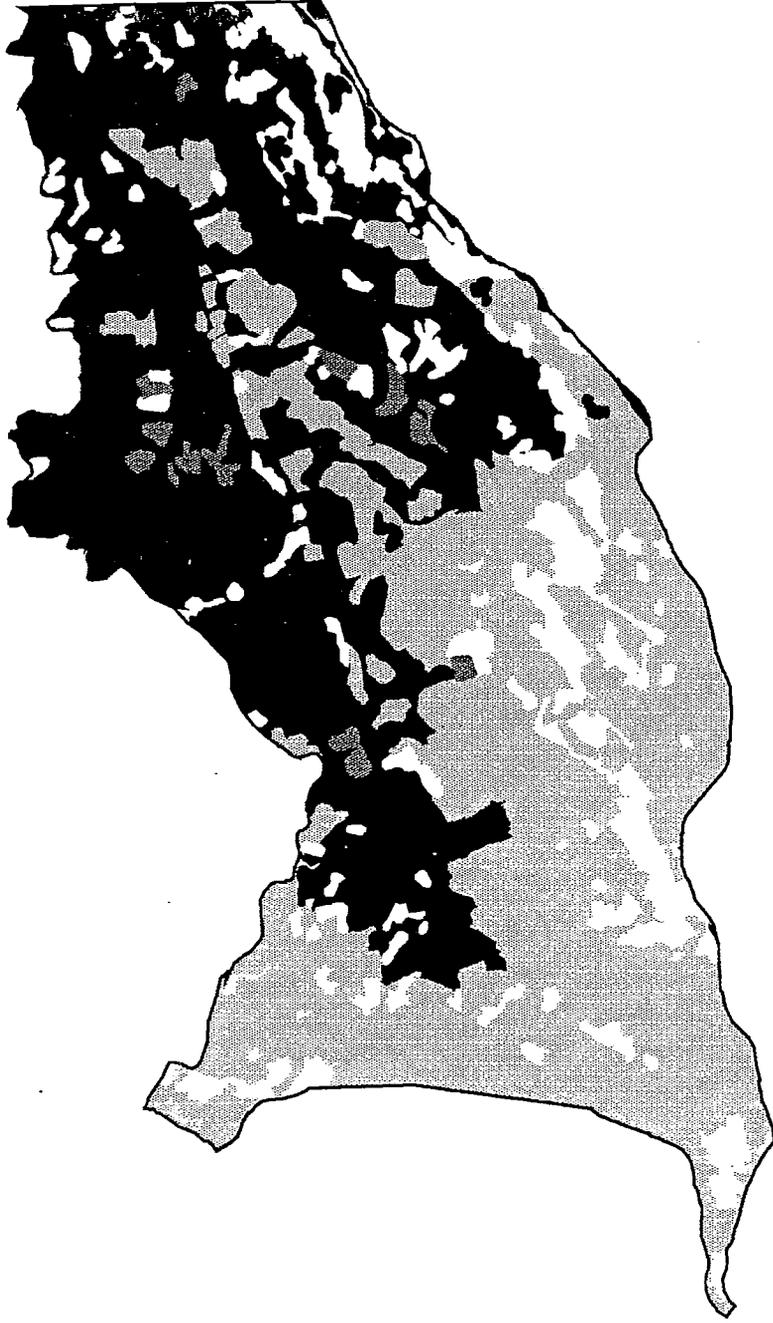


High Risk
Low Risk
Moderate Risk
No Risk

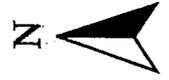
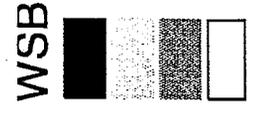


0.5 0 0.5 1 Miles





Rattle Snake LSR



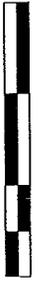


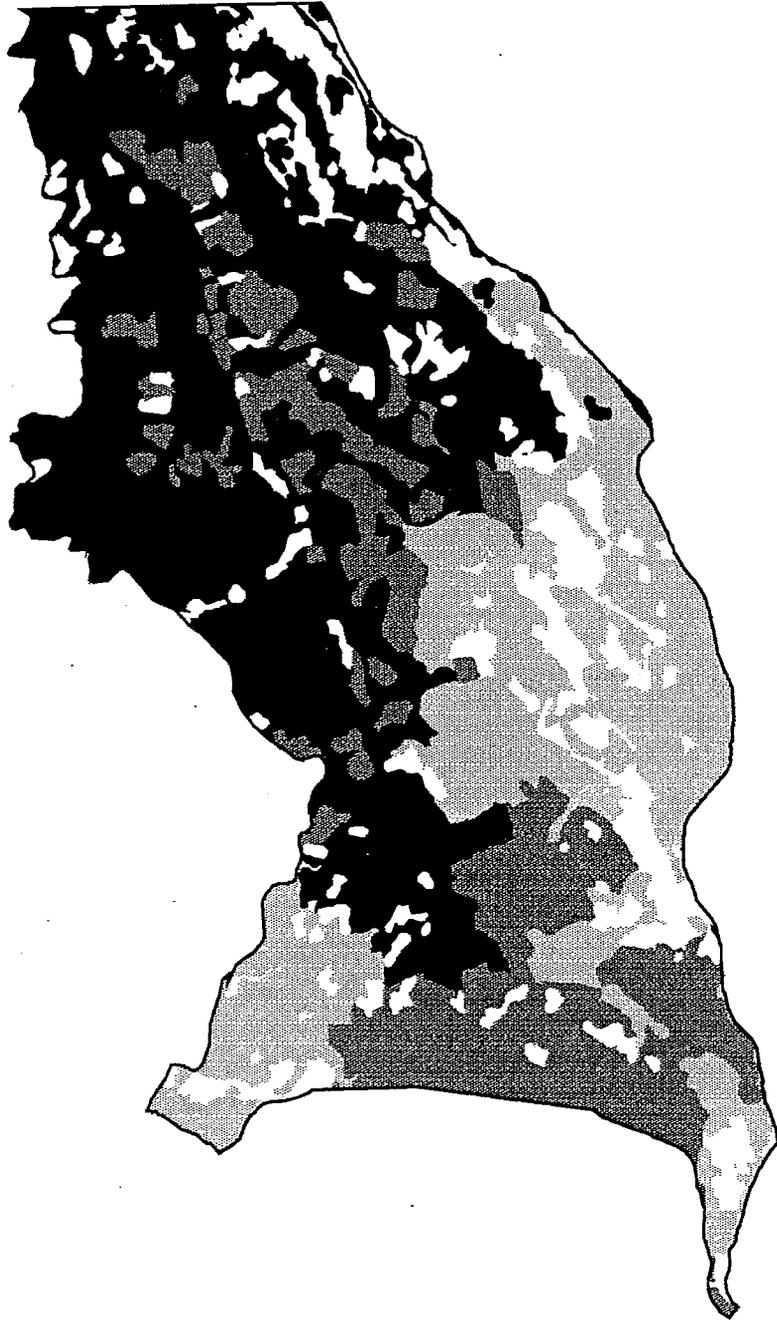
Rattle Snake LSR

WPBR

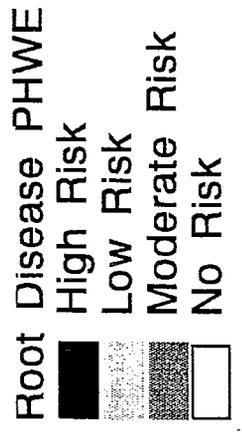


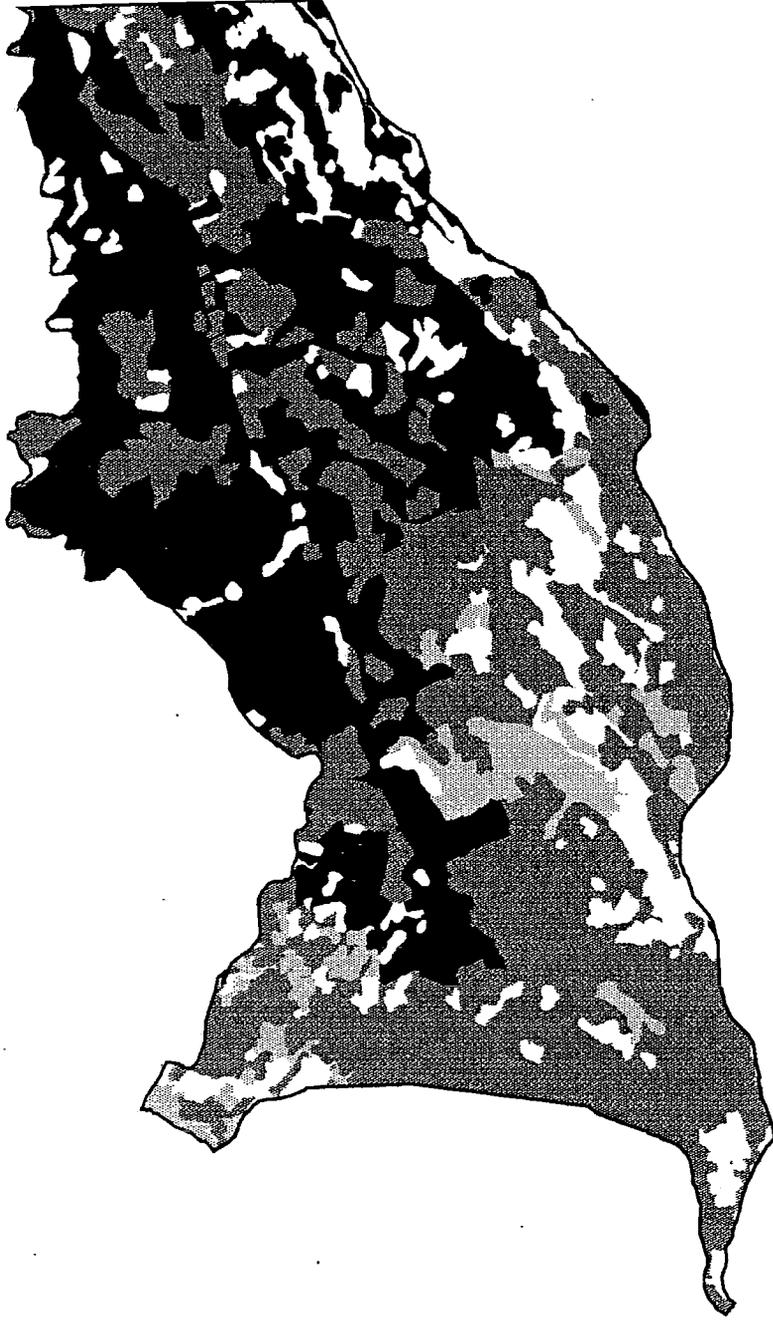
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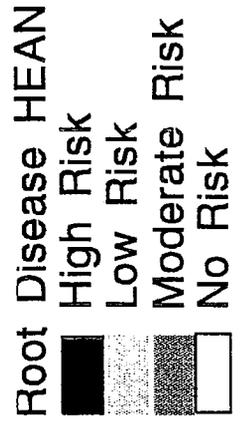


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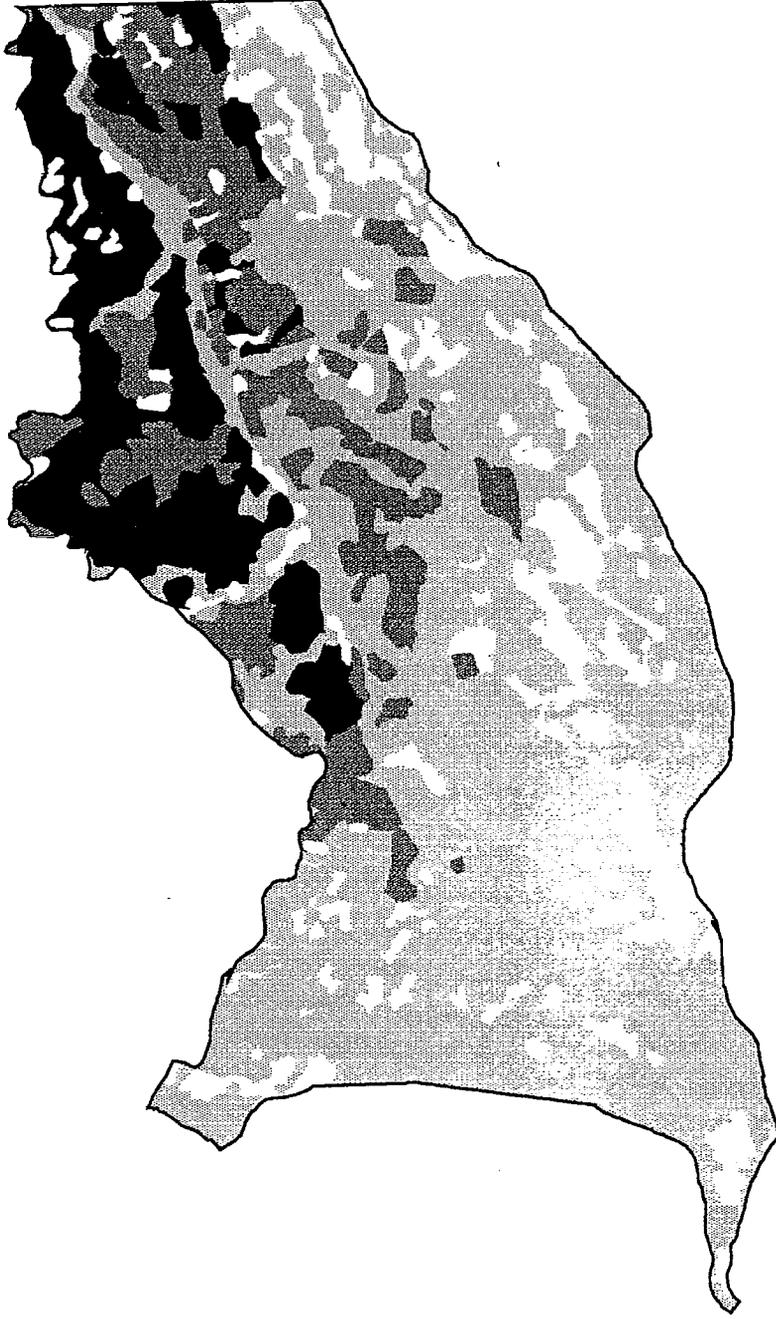


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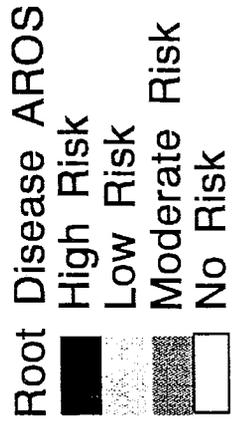


0.5 0 0.5 1 Miles



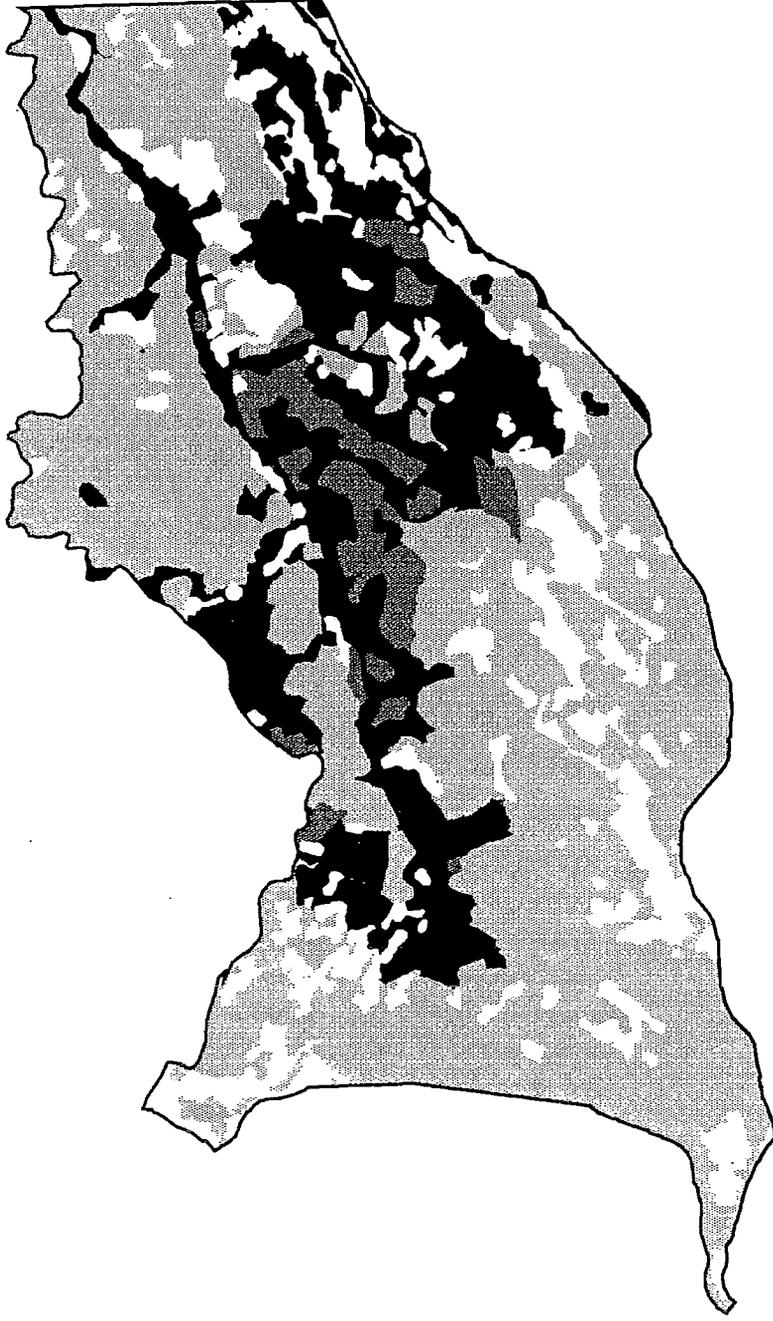


Rattle Snake LSR



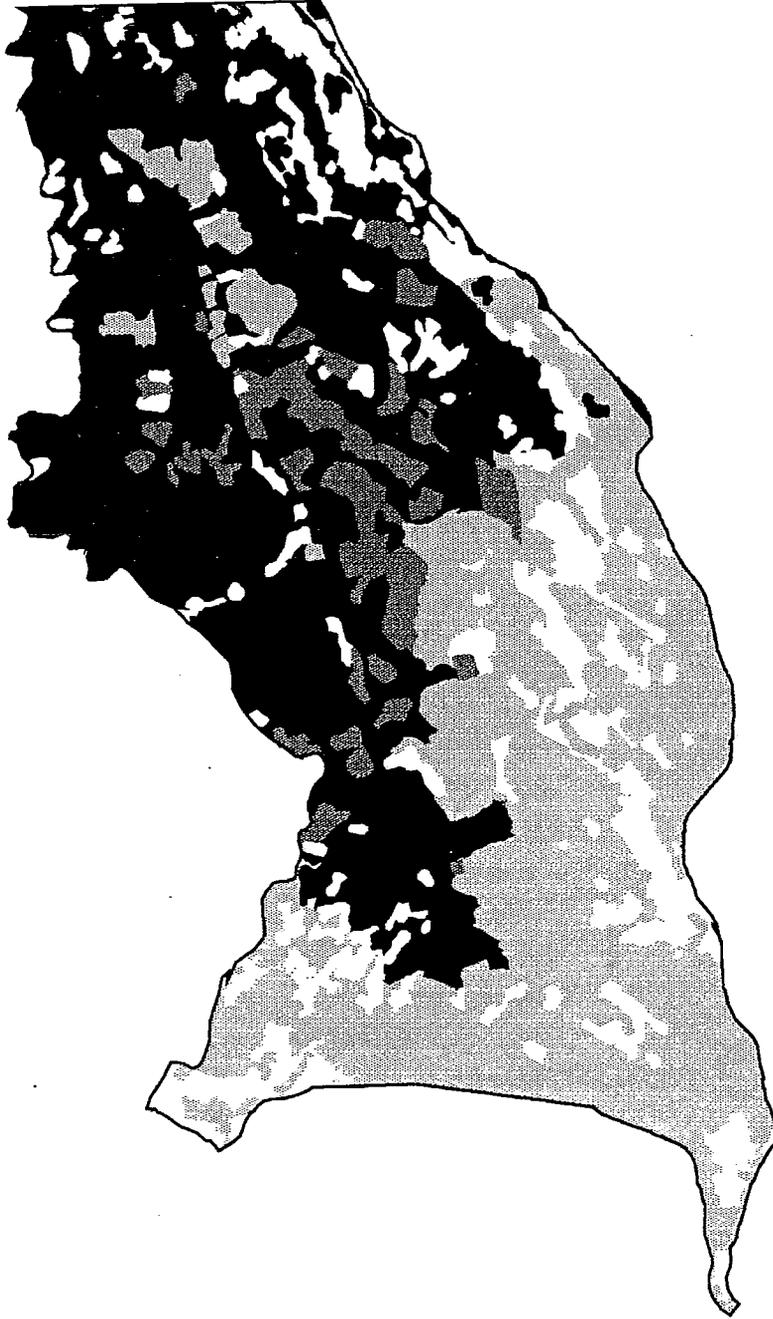
0.5 0 0.5 1 Miles



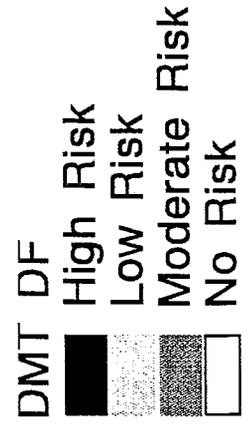


Rattle Snake LSR





Rattle Snake LSR





Rattle Snake LSR

Fire

High Risk	Low Risk	Moderate Risk	No Risk
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0.5 0 0.5 1 Miles

