

## VII. Teanaway 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 Vegetative Landscape section) within the Teanaway LSR. Data was derived from modeling. 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

The dry forest group is found in the southern half of the LSR. Twenty-four percent (8322 acres) of the Teanaway LSR consists of the dry forest group. Within this group, 45% (3740 acres) is mapped as high density and 37% is mapped as created openings. The created openings are due to past fires, exposed bedrock, and the presence of serpentine substrates. The created openings due to presence of serpentine substrates may provide very harsh sites and typically depauperate stands (Lillybridge, et al., 1995).

##### b) Mesic Forest Sites

No mesic forest sites were mapped within the Teanaway LSR. If mesic forest sites exist embedded within dry forest sites or the drier sites within the moist grand fir group, they were of a scale not discernible in our mapping process.

##### c) Moist Grand Fir Group

Twenty-eight percent (9417 ac) of the Teanaway LSR consists of the moist grand fir group, the most of any forest group or series. About 69% (6492 ac) of this forest group exists as currently layered and/or mature (mid to late successional). The moist grand fir group exists in the south part of the Teanaway LSR in the Beverly Creek and Jungle Creek drainages and north and east of Yellow Hill, primarily interspersed and adjacent to the dry forest group and occurring on the northerly aspects. The moist grand fir group also extends into the middle and northern parts of the LSR in the Middle and North Fork Teanaway drainages, grading into the wet and subalpine fir forest groups on southerly aspects. The 23% (2188 ac) of single layered grand fir and 8% (737 ac) of grand fir in created openings is distributed throughout the LSR adjacent to or embedded within the layered/mature grand fir and may reflect past fire history and factors such as serpentine and bedrock outcrops.

Within this group, there is a moisture/temperature gradient which results in development of plant associations from dry, cool conditions adjacent to the dry forest group, to moist, cool associations adjacent to the subalpine fir and wet forest groups. At the dry end of the moisture gradient, associations are dominated in the understory by herbaceous species such as *Achlys triphylla*, *Berberis nervosa*, and *Arnica latifolia*. Moister associations typically include a shrub component typified by

species such as *Spiraea betulifolia lucida*, *Vaccinium* spp., and *Pachistima myrsinites* (Wenatchee National Forest, Ecology Plot Database).

d) Subalpine Fir Series

The subalpine fir series constitutes 23% (7725 ac) of the Teanaway LSR. Most of this forest group runs from Malcolm Mountain in the center of the LSR to the Esmerelda Peaks to the north and Iron Peak and the headwaters of Beverly and Bean Creeks to the north and east. Another area runs from Yellow Hill to Jolly Mountain to the west. Sixty-six percent (5073 ac) is layered/mature forest, while 25% (1941 ac) is in created openings and only 9% (710 ac) is single layered.

Subalpine fir is the most widespread species within the overstory (Wenatchee National Forest, Ecology Plot Database). Common seral dominants include lodgepole pine and Engelmann spruce. Understory composition may be shrub dominated, with common species represented by *Pachistima myrsinites* and *Vaccinium* spp. Herb composition may also be lush with species such as *Chimaphila umbellata occidentalis*, *Valeriana sitchensis*, *Calamagrostis rubescens*, and *Carex*, *Pyrola*, and *Lupinus* spp. dominating.

e) Wet Forest Group

The wet forest group makes up 12% (3991 ac) of the Teanaway LSR vegetation. Most of this, (71%, 2817 ac) is layered/mature. Another 24% (967 ac), is in created openings and 5% (203 ac) is single layered (poles). This group occurs primarily on northern aspects in upper Jolly Creek and up the Middle and North Forks of the Teanaway River. In the wet forest group, tree overstory composition is generally dominated by western hemlock and pacific silver fir. Douglas-fir is an important seral species here and western white pine and grand fir are locally subordinate species. Species representing the shrub component of these communities typically include *Rhododendron albiflorum*, *Acer circinatum*, and *Luetkea pectinata*. *Taus brevifolia* and *Juniperus communis montana* are also known to reside here (J. Richards, personal communication). Representative herb species include *Achlys triphylla*, *Arnica latifolia*, and *Polemonium pulcherrimum* (Wenatchee National Forest, Ecology Plot Database).

f) Whitebark Pine/Subalpine Larch

There were 89 acres of the whitebark pine/subalpine larch vegetation group mapped for the Teanaway LSR. These disjunct areas occurred in the northeast portion of the LSR and on Jolly Mountain to the west. All areas were above 6000' in elevation and were typically abutted by areas mapped as rock, cliff, and talus. The vegetative modeling used (see Vegetative Landscape section) may not have been able to provide a highly accurate distinction between rock and this open grown vegetative group. Site specific analyses tied to restoration projects will be needed in order to rectify this potential discrepancy.

g) Non-forest Vegetation

There are approximately 4500 acres (13%) of the Teanaway LSR mapped as non-forest vegetation. While most of these acres are depicted as cliff (1390 ac), bedrock (1120 ac), and talus (1273 ac), there were also 496 acres of upland meadows, 144 acres of brushfields, and 73 acres of wet meadows mapped. The upland meadows were mapped in the Jolly Mountain, upper Jolly Creek, Iron Peak, and Esmerelda Peaks areas. These were depicted as adjacent to rock or talus and created openings of subalpine fir and would need further analysis to be considered accurate for restoration projects.

## h) Species with Special Status

Within the Teanaway LSR there is potential habitat for a number of special status or survey and manage species. With the exception of the proposed Eldorado RNA area, there have been few vascular plant surveys and no known nonvascular species surveys within the entire LSR. 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 of special status habitat and biological requirements, and inventories provide a first and necessary step in obtaining this information.

There are six Forest Service listed sensitive species within the Teanaway LSR (Appendix 6): *Agoseris elata*, *Chaenactis thompsonii*, *Orobanche pinorum*, *Pellaea breweri*, *Silene seelyi*, and *Cypripedium fasciculatum*. While habitat requirements for *Chaenactis thompsonii* are not completely known, it's endemism to the Wenatchee Mountain's serpentines has been noted (Franklin and Dyrness 1973). *Pellaea breweri* and *Silene seelyi* occupy habitats of rocky areas and crevices to talus (Hitchcock and Cronquist 1973). As over 10% of the Teanaway LSR is mapped as this habitat, surveys are necessary to determine the extent of these known populations. *Orobanche pinorum* is often found within the *Pseudotsuga menziesii* dry forest associations with it's obligate host, *Holodiscus discolor* (Harrod et al. in press). Selected information regarding it's biology and ecology is available in Ellis et al. 1994, and from observation records filed at the Leavenworth Ranger District.

*Cypripedium fasciculatum* has also been the focus of a number of research and monitoring projects over the past four years on the Wenatchee National Forest. Information collected concerning it's pollination ecology, seed dispersal and germination, and fire ecology is available at the Leavenworth Ranger District. *Cypripedium fasciculatum* is also listed in the ROD as a survey and manage species with relevant standards and guidelines for it's management addressed there.

Two other survey and manage species suspected to occur in the Teanaway LSR, are the fungal species, *Cantharellus subalbidus* and *Clavulina cinerea*. *Cantharellus subalbidus*, the white chanterelle, and *Clavulina cinerea*, a coral fungus, are "confidently" suspected to occur here given the vegetation types and otherwise known range of these species. There may be many other survey and manage species of fungi and lichens which reside in the LSR but no known survey records are available. Vascular and nonvascular species surveys should be a priority project within the Teanaway LSR.

**Table VII-1, Sensitive and Survey and Manage Species in the Teanaway LSR**

Group	Latin Name	Common Name	Fed.	State	FS
VASCULAR PLANT	<i>Agoseris elata</i>	tall agoseris		S	
VASCULAR PLANT	<i>Chaenactis thompsonii</i>	Thompson's chaenactis		S	
VASCULAR PLANT	<i>Cypripedium fasciculatum</i>	clustered lady's-slipper	SP	T	SM
VASCULAR PLANT	<i>Pellaea breweri</i>	Brewer's cliff-brake		S	
VASCULAR PLANT	<i>Silene seelyi</i>	Seely's silene	SP	T	
VASCULAR PLANT	<i>Orobanche pinorum</i>	pine broomrape		S	

Spotted Owl	Repro Status <sup>3</sup>	Ownership <sup>4</sup>	Dry or Wetter Owl <sup>5</sup>	Threshold <sup>6</sup>	Critical Habitat Unit (CHU)	Forest Interior? <sup>8</sup>	Existing SSOH 1.8 mi Radius & 0.7 mi R <sup>10</sup>	Activity Center 100 Ac <sup>11</sup>	Total Dispersal Habitat <sup>9</sup>
s.owls									

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

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

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

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

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

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

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

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

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

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

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

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

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

#### (b) Critical Habitat Unit for Northern Spotted Owls

There are two Critical Habitat Units (CHU), WA-12 and WA 13, for spotted owls overlapping into the Teanaway LSR. These CHUs are in the south half of the LSR. The CHU WA-12 Swauk, overlaps onto 8% (2,573 acres) of the LSR. The WA-13 Teanaway, overlaps onto 20% (9,361 acres) of the LSR. Together these two CHUs should support 5 pairs of owls. (See Table 4 -- LSR Connectivity, Appendix 13: LSR/MLSA S.Owl Acreage's, and Appendix 34: CHU Maps Wenatchee National Forest).

This Critical Habitat Unit was developed to provide essential nesting, roosting, foraging and dispersal habitat. Critical habitat of high quality suitable habitat in the Teanaway River connect to other CHUs. There is a concern to provide essential east-west breeding habitat connectivity across the Cascade Crest from the Swauk CHU to the Mount Baker Snoqualmie CHUs (Middle Fork Snoqualmie and Greenwater). The Teanaway CHU's also provide north-south linkages from the Manastash Ridge to the Icicle. Breeding habitat connectivity exists in these areas. This CHU is important for range-wide distribution of spotted owl habitat.

The adjacent forested habitats of the Alpine Lakes Wilderness areas are important for the functioning of this connectivity. Specifically into Van Epps Pass/Ingalls and upper Icicle/Jack Creek.

In all LSR/MLSA, 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 Teanaway LSR (Almack et al. 1993). Grizzly bears are suspected to occur within the LSR and about 10% of their available habitat has been surveyed. Gray wolves are suspected to occur within the LSR and about 10% of their habitat has been surveyed.

(d) Marbled Murrelet

The Teanaway is 8 miles east of the 55 mile marine foraging zone for marbled murrelets. There are no known marbled murrelet sites in the Teanaway LSR. One marbled murrelet detection has been recorded on the east side of the Crest near Snoqualmie Pass, in a portion of the Wenatchee National Forest administered by the Mount Baker-Snoqualmie National Forest. It is not expected that marbled murrelets would be located this far from marine foraging.

(2) Sensitive Wildlife Species and Species of Concern

There are 15 wildlife species that could occur in the Teanaway 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 surveys have been completed on about 10% of their available habitat. It is unknown if the little willow flycatcher and suspected that the olive-sided flycatcher occur. No surveys have been completed.

(b) Amphibians

Surveys for amphibians have been completed on about 5% of the habitat within the Teanaway LSR. It is known that the Cascades frog occurs in the LSR, and it is unknown if the spotted frog and tailed frog occurs 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 Teanaway LSR.

2. Encourage private land owners in the vicinity of these LSR/MLSA's to take stand density management actions on private forested areas including education on the ecological values of maintaining large ponderosa pine. The highest priority for this would be between the Teanaway and Swauk LSRs in the lower Teanaway watershed.

**Potential Projects** - Communicate need to local landowners. Work through State and Private Forestry to help local landowners manage their forests.

3. Reduce fuel loading along roads that exist between these LSR/MLSA's to increase the roads effectiveness as fuel breaks. This could be done in the Stafford Creek area between the Teanaway and Swauk LSRs, along the old Belwett Pass road and along US Highway 97.

**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.

**Potential Projects** - Precommercial Thinning.

5. Maintain desired fuel levels and vegetation characteristics in low density dry forest vegetation types.

**Potential Projects**- Prescribed fire.

## 2. Forest-Wide Northern Spotted Owl

The Teanaway 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 Teanaway LSR is part of the smaller "local population" centers, which are linked to the metapopulations through dispersing individuals (see LSR/MLSA maps on 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/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 Teanaway LSR for vascular plants is analyzed here. Refer to the Forest-wide Assessment discussions for connectivity description for lichens, fungi, and bryophytes.

First, connectivity relative to the Teanaway LSR can be viewed from how well habitat is connected to surrounding LSR's or MLSA's (see the following table). With the dry forest group, connectivity for all dispersal classes exists between the Teanaway LSR and the Swauk LSR. Moderate and high dispersal species are dependent upon habitat existing between the Teanaway LSR and the Boundary Butte, Camas, and Sand Creek LSR's. There is no species connectivity for all dispersal classes between the Teanaway LSR and the Icicle and Manastash Ridge LSR's.

Table VII-4, Teanaway-- Vascular Plant Connectivity

	Vegetation Group
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LSR/MLSA	Dry/Mesic			Moist GF			Subalpine			Wet			Whitebark		
Dispersal Class	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Icicle	N	N	N	N	N	D	N	N	D	N	N	D	N	N	N
Boundary Butte	N	D	D	N	N	D	N	D	D	A	A	A	A	A	A
Camas	N	D	D	N	N	D	A	A	A	A	A	A	A	A	A
Sand Creek	N	D	D	N	N	D	A	A	A	A	A	A	A	A	A
Swauk	Y	Y	Y	Y	Y	Y	N	N	N	Y	Y	Y	N	D	Y
Manastash Ridge	N	N	N	N	Y	Y	N	N	N	N	Y	Y	N	N	N

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

Similar to the dry forest group, species of all dispersal classes within the moist grand fir group are connected from the Teanaway LSR to it's nearest neighbor, the Swauk LSR. In addition, moderate and high dispersal species within the grand fir group are connected between the Teanaway and Manastash Ridge LSR's although low dispersal species are not. High dispersal class species may be connected, dependent on habitat existing between the Icicle, Boundary Butte, Camas, Sand Creek LSR's and the Teanaway LSR.

In the subalpine fir forest group, moderate and high dispersal class species may be connected between the Boundary Butte and Teanaway LSR's dependent on habitat existing between them. High dispersal class species may also be connected between the Teanaway and Icicle LSR's, again, dependent on habitat existing between them. The subalpine fir group species of all dispersal classes are not connected or are absent from the Camas, Sand Creek, Swauk, and Manastash Ridge in relation to the Teanaway LSR.

The wet forest group is similar to the moist grand fir group in it's degree of connectivity. The Teanaway LSR is connected to the Swauk LSR for all dispersal classes and to the Manastash Ridge LSR for moderate and high dispersal class species. The wet forest group is not connected or the vegetation group does not exist for the Boundary Butte, Camas, and Sand Creek LSR's. In addition, low dispersal species are not connected between the Teanaway and Manastash Ridge LSR's, and for low and moderate dispersal species between the Teanaway and the Icicle LSR. High dispersal species within the wet forest group may be connected between the Icicle and Teanaway LSR's if habitat exists between them.

Whitebark pine is present in the Teanaway LSR but is not connected or does not exist in the Icicle, Boundary Butte, Camas, Sand Creek, Swauk, and Manastash Ridge LSR's. It has also been recognized that the opportunity exists to enhance connectivity for some species between the Teanaway and Manastash Ridge LSRs through coordination with the evolving Snoqualmie Pass Adaptive Management Area (AMA) EIS. Connectivity for all dispersal classes within the dry and mesic vegetation groups may not be positively altered due to development within the I-90 Corridor that has already occurred at the lower elevations. Medium and high dispersal classes within the moist grand fir and wet forest groups could conceivably be enhanced if activities within the AMA promoted the link.

No projects were identified to improve connectivity of habitat between LSR's/MLSA's outside of the coordination with the AMA activities. Disconnectivity identified in this analysis results from inherent breaks in the vegetative landscape.

amounts of habitats and species: 13% in non-forested vegetation types (high amounts of cliffs, rock and talus); 8% in Forest Interior habitat (very low amounts); 55% in Late Successional (11% fire climax habitat); 48 wildlife late-successional associated species and Species of Special Status, and 25 plant late-successional associated species and species of special status.

One of the unique attributes about the Teanaway LSR is the serpentine soils. These soils/rock formation create unique habitats (seeps, meadows, rock, talus), with many unique species associated. There is the proposed Eldorado RNA, as a result of these unusual soils and vegetation classes. The soils are also very unstable, resulting in limited roading. Much of the LSR is remote, thus not well inventoried for fish, wildlife or plants. The Middle Fork Teanaway may act as a refugia for unique habitats and species, it should have an emphasis for monitoring. This LSR is also a convergence of forest types, with dry ponderosa pine types included in mountain hemlock types, and subalpine fir growing at lower elevations. The interior of the LSR is composed of wet forest types, surrounded by subalpine fir or dry forests.

The northern portion of the Teanaway LSR is within the Spine of the Cascades (see Appendix 1 Unique Habitats Module and Appendix 17: Distribution Centers Map) area of plant and animal rarity or endemism along the eastern Cascades, as per Columbia Basin Ecosystem Plan (Marcot et al, 1995 Draft). The Eldorado Creek Proposed RNA (WNF LRMP 1990) for plant communities found on serpentine derived soils, is within the Teanaway LSR. There are no Special Interest Areas identified in the WNF Plan. Most of the LSR is within a Special Area Scenic/Recreation (SI1), as noted in the Alpine Lakes Management Plan.

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

**Headwaters Esmeralda/DeRoux:** Large amounts Cliffs, Rock, Talus, Subalpine Meadows, Riparian Reserves, Wetlands, Whitebark pine/subalpine fir, Pacific Yew, largest block Forest Interior in LSR, Security Habitat, High-use Trails.

**Slopes of Jolly and Headwaters Middle Fork Teanaway:** Security Habitat, Subalpine Meadows, Rock/Cliffs and Talus, Whitebark pine/Subalpine larch, Shrub fields, Riparian Reserves, Wetlands, some Forest Interior, Refugia for wildlife species.

**Eldorado RNA:** Serpentine rock/talus/cliffs, Subalpine Meadows, Security Habitat, Riparian Reserves, some Forest Interior, PETS plants, Mountain Hemlock with Ponderosa Pine.

**Yellow Hill, Middle Fork, Malcolm, Jungle Creek:** Spotted owls, PETS Spp, Grizzly Bear possible, some Security Habitat, Forest Interior, Wetlands, Riparian Reserves, Rock, Shrubs.

**Beverly and Bean Creeks:** Rock/Talus/Cliffs, Subalpine Meadows, Riparian Reserves, upper part excellent Security Habitat, some Forest Interior, Cattle Grazing lower portion..

Each LSR/MLSA can be evaluated for biodiversity, connectivity and function (see Function of Unique Habitats in the main body of the Forest-wide Assessment, Chapter VII pages 115-116). Past management activities affect the function of unique habitats and species. This includes open roads, roading of riparian reserves, past harvest activities, grazing and mining. For the Teanaway LSR these include: total open road density of 0.8 miles per square mile (low densities); security habitat of 56% (moderate); roads and trails in riparian reserves of 3.32 miles per square mile (high densities); and past harvest activities of 20% (moderate amounts). The Teanaway LSR also includes mining operations and cattle grazing.

## (2) Abundance and Ecological Diversity

Forest-wide, the Teanaway LSR has high amounts of unique habitats and species abundance. This includes acreage for unique plant and animal habitats, juxtaposition of habitats, availability of

wilderness or areas of rarity, and known observations from the plant and animal species list. There is 13% of the LSR in non-forested vegetation types, and there are 48 wildlife species of Special Status and 25 plant species of special status. See Chapter VII pages 117-120, Forest-wide Unique Habitats and Species by LSR/MLSA.

(3) Connectivity for Unique Habitats and Species

This LSR provides moderately high amounts of connectivity for unique habitats and species. 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. The Teanaway is among the LSRs with a moderate amount of connectivity. The remote areas are naturally fragmented, due to the high amount of rock in this LSR. Moderate connectivity for unique habitats is due to the low amounts of Forest Interior (8%), moderate Security Habitat (56%), and moderate amounts of Late Successional habitat (55%). This LSR does have an RNA within its boundary, is part of an area of rarity, and is adjacent to the Alpine Lakes Wilderness to the north. To further understand the relationship of the LSR with others on the Forest, inventory unique habitat/species. Connectivity for unique habitats can be improved along the North Fork Teanaway (Forest Interior, Riparian Reserves).

(4) Process and Function of Unique Habitats and Species

The LSR has a high degree of function for unique habitats and species, as determined by the amounts of Special Status plants and animals, juxtaposition to wilderness and areas of rarity. This includes development and maintenance of unique ecosystems, including ecological values for unique species and populations. The plant and animal species list for known observations makes up a large part of this analysis, as well as proximity to wilderness and areas of rarity, which sustain habitat function. See Chapter VII, Forest-Wide Function of the Network for Unique Habitats and Species and Forest-wide Unique Habitats and Species by LSR/MLSA.

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 Teanaway LSR. For more information see Unique Habitats Maps, Unique Habitats and Species Table and Forest Interior Map and Tables (Appendix 19), Riparian Reserves Map, Road Density tables (Appendix 20), Security Habitat Maps (Appendix 32), 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. The Teanaway LSR unique habitats was modeled from the vegetation mapping, this needs to be verified, and ground-truthed.

**Table VII-7, Unique Habitats and Species Module Summary**

Habitats & Species	Teanaway LSR
<b>Riparian Reserves</b>	Over-all 12% of LSR in riparian reserves, moderate amounts.
	Streams (3,941 acres), Open water (some on forks of the Teanaway and small lakes),
	Wet Meadows (73 acres), and Seeps.
<b>Non-Forested Vegetation</b>	13% (4,499 acres) of LSR, a high amount.
	Cliffs Serpentine 4% (1390 acres), Talus/Cirques 4% (1273 acres), Rock 3% (1120 acres). A higher amount for the Forest. Suspect wolverine in the Cirques.

Habitats & Species	Teanaway LSR
	Subalpine Meadows 1% (496 acres), Dry Meadows 0 (0%).
	Shrub/brushfields <1% (144 acres), Natural openings 0 (0%).
<b>Unique Forest Groups</b>	Late Successional Forest totals 55% (18,832 acres).
	L-S/Fire Climax 11% (3740 acres).
	Forest Interior Patches 8% (2815 acres) The lowest LSR amount of Forest Interior on the Forest (except the small burned LSR). Significant Forest Interior Patches - Headwaters Middle Fork, Yellow Hill to Middle Fork, De Roux Creek to Eldorado Creek, Jungle Creek.
	Whitebark Pine/Subalpine Larch - Trace % (89 acres) from Iron Peak to Ingalls Pass .
	Dry Forests in southeast part of LSR, (ponderosa pine mixed with Mountain Hemlock in the RNA);
	Disjunct Forests: Low elev Subalpine fir at Yellow Hill; P.Yew, W. Red Cedar & Cottonwood,
	Deciduous Trees - Trace % (- acres) Aspen. & Cottonwood.
	Snags/Logs - Moderate Quality from Landscape Level (can improve: late-successional; reduce roads).
<b>Animal - Late Successional Associated Species and Species of Special Status</b>	48 Animal Species
<b>Pets - Animals</b>	6 species: Bald Eagle, Spotted Owls, Critical Habitat Unit, Steelhead, Bulltrout (?), Red Band Trout (?).
<b>Survey &amp; Manage and Protection &amp; Buffer</b>	7 species: Lynx, Flammulated Owl, White-headed Woodpecker, Black-backed Woodpecker, Long-legged Myotis, Fringed Myotis, Silver-haired Bat
<b>MIS (Management Indicator Species - WNF)</b>	12 Species: Bald Eagle, Spotted Owl, Pileated Woodpecker, Three-toed Woodpecker, Primary Cavity Excavators, Ruffed Grouse, Marten, Beaver, Elk, Mule Deer, Mt. Goat, Cutthroat Trout.
<b>Other Animal Species of Special Status</b>	4 Species of Concern: Northern Goshawk, Long-legged Myotis, Fringed Myotis, Yuma Myotis
	4+ Birds: along the streams, rivers, shrub fields, meadows. Gold-crowned Kinglet, Hermit Thrush, Townsend's Thrush, Red Crossbill,
	13 + Late Successional Species: Barred Owl, Pygmy Owl, Saw-whet Owl, Coopers Hawk, Sharp-shinned Hawk, Downy Woodpecker, Red-breasted Sapsucker, Franklin's Grouse (high elevation forests), Cascade Frog, Long-toed Salamander, Flying Squirrel, Shrewmole, Red-backed Vole,
	Significant Fish Populations: Cutthroat Trout and Steelhead in upper North Fork. Bull Trout isolated. Middle Fork may have Red Band Trout, if so would be a refugia, need surveys. Reintroduce Spring Chinook. Recovery of watershed.
<b>Plant Late Successional Associated Species and</b>	

Habitats & Species	Teanaway LSR
Species of Special Status	
PETS Plants	6 Species: <i>Cyfa</i> , <i>Agel</i> , <i>Chih</i> , <i>Sise</i> , <i>Orpi</i> , <i>Pebr</i>
Survey & Manage and Protection & Buffer	Unknown, need surveys: Fungi, Lichens, Vascular Plants <i>Cyfa</i> .
Other Plant Species of Special Status	_ Spp on State List: <i>Annu</i>
	_ Spp are Late-successional associated species.
American Indian Uses	Traditional Use Sites: Travel way to Cle Elum Valley.
	Vision Quest Sites: Potential in talus, and off major ridges and peaks.
	Traditional Food Plants: Huckleberry, Roots.
	Food Gathering: Elk, Deer, Mountain Goat, Fish.

(2) Restoration Opportunities and Potential Treatments Unique Habitats and Species Within LSR/MLSA:

• **Monitor:**

1. The Teanaway LSR unique habitats was modeled from the vegetation mapping, this needs to be verified, and ground truthed.
2. To further understand the relationship of this LSR, to others on the Forest, inventory unique habitats and species.
3. The Middle Fork Teanaway may act as a refugia for unique habitats and species, it should have an emphasis for monitoring.
4. Middle Fork may have Red Band Trout, if so would be a refugia, need surveys.
5. Monitor and inventory areas of high amounts and complexities of unique habitats and species.
6. Survey for fungi and lichens where forested habitat types converge.
7. Inventory for wolverine in the Talus/Cirques (winter track surveys).
8. Monitor and maintain unique habitat concentrations;
9. Monitor and maintain connectivity corridors (Middle Fork/Jolly, Eldorado RNA, De Roux/Esmeralda, Yellow Hill/Malcolm/Jungle, Beverly/Bean).
10. Monitor large old clearcuts for snag levels and wildlife/plant species use;
11. Survey & Manage prior to activities: Great Gray Owl, Larch Mt. Salamander, Lynx, Mollusks and other S&M or P&B species, fungi, lichen, bryophytes, vascular plants.
12. Follow PETS, Species of Concern, Species of Special Status guidelines in Biological Evaluations for projects.
13. Inventory and monitor Eldorado RNA. Continue the Forest process to establish this RNA.
14. Validate unique habitats assumptions, mapping, and species use of habitats/guild.

15. Survey and compare Teanaway LSR serpentine plant populations with others in Washington to determine unique status and pursue Forest and Region Botanical Special Interest Area status and allocation.
  16. Perform lichen surveys in LSR to determine the presence and extent of rare species.
  17. Perform fungi surveys in the LSR during conditions of sporophyte presence to determine presence and extent of rare species. Surveys need to be done over a period of years due to infrequent fruiting of some species. Concentrate surveys in areas of forest vegetation group convergence to maximize range of potential habitat.
  18. Perform rare and sensitive plant surveys in the Yellow Hill, Esmeralda Peaks, and Iron Peak areas and other areas of unique vegetation or concentrations of current sensitive plant populations.
- **Habitat Improvement:**
    1. Improve unique habitats connectivity along the North Fork Teanaway by increasing Forest Interior, and improving Riparian Reserves (reduce road/campground/trails and limit grazing and mining in riparian).
    2. Promote development of Forest Interior Acres, particularly in moist vegetation areas, through road obliteration and acceleration of habitat.
    3. Thin to accelerate late successional characteristics in clearcuts and areas near private land.
    4. Reduce encroaching trees in subalpine meadows and shrubfields; where fire historically maintained them as meadows,.
    5. Use of Prescribed Fire to improve ponderosa pine fire climax forests, between LSRs and along the slopes of the Teanaway Valley.
    6. Use of Prescribed Natural Fire for whitebark pine forests, shrubfields and subalpine meadows, in adjacent Wilderness.
  - **Weeds (Knapweed, Hounds' Tongue, Scotch Broom):**
    7. Reduce spread of weeds into meadows and natural opening off roads, trails and campgrounds.
    8. Reduce noxious weed spread in clearcuts, partial cuts, trailheads, and roads through-out the LSR.
    9. Keep weeds from encroaching into LSR from roads in lower Teanaway.
  - **Roads:**
    10. To improve riparian connectivity, reduce road/trail/campground densities along riparian reserves inside and outside of LSR.
    11. Reduce roads and trails talus and cirques.
    12. Increase Security Habitat in Middle Fork and Esmeralda.
    13. Reduce roads in forest interior patches.
    14. Reduce roads and trails in Mountain Goat Habitat (summer & winter ranges).

- **Access:**
  15. Retain American Indian access to traditional use sites;
- **Protect:**
  16. Protect and enhance riparian areas, wetlands, intermittent streams, and dispersal corridors in Riparian Reserves.
  17. Protect large trees and screen near talus, cliffs, caves, meadows.
  18. Protect/maintain/enhance/monitor PETS species.
  19. Meet high end snag levels and spp;
  20. Protect caves and cliff/caves for 250' around (roads/trails/cutting) to benefit bat species.
  21. Protect 300' around subalpine meadows..
- **Coordinate and/or Acquire:**
  22. Acquire non-Forest System lands with high degree of unique species or habitat.
  23. Coordinate unique habitat management on private lands outside of the LSR, especially Plum Creek lands in the Yellow Hill to Stafford Creek..
- **Interpret:**
  24. Interpret values and protection/maintenance of unique habitats and species.
  25. Continue proposal and designation process for Eldorado area as Research Natural Area.

c) 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 Teanaway LSR. Over-all, the **Teanaway LSR has a Moderate quality** of available snags and future green tree recruitment snags and logs. See Appendix 1 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 VII-8--, Teanaway LSR Snag Habitat Quality/Landscape Scale

<u>HIGH QUALITY</u>	<u>**MEDIUM QUALITY</u>	<u>LOW QUALITY</u>
Moist & Wet Veg Groups <b>40%</b>	<b>Subalpine Fir &amp; Mesic Veg</b> 23%	<b>Dry &amp; Whitebark Veg</b> 24%
>60% LS (non-dry) Habitat	15% - 60% LS Habitat <b>44%</b>	<15% LS Habitat
80% - 100% LS (all) Habitat	40% - 80% LS/M Habitat <b>55%</b>	<40% LS/M Habitat
> 30% Forest Interior (Non-dry)	15% -29% Forest Int Non-dry	<15% Forest Interior Non-Dry <b>8% **</b>
>10% Forest Interior Dry	5% - 9% Forest Interior Dry	< 5% Forest Interior Dry <b>1%</b>

<u>HIGH QUALITY</u>	<u>**MEDIUM QUALITY</u>	<u>LOW QUALITY</u>
>16% in Riparian Reserves	10% to 16% Riparian Reserves <b>12%</b>	<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 <b>3.32 mi/sq/mi</b>
< 1 Mi/Sq Mi Open Road <b>0.8 mi/sq/mi **</b>	1 Mi to 2.5 Mi/Sq Mi Roads	> 2.5 Mi/Sq Mi Roads
>70% Security Habitat	50% to 70% Security Habitat <b>56%</b>	<50% Security Habitat
>10% in Past Burns-snags available		<10% in Past Burns <b>&lt; 10%</b>
>50% Insect/Pathogens (See Disturbance Section for more detail)	25% - 50% Insect/Pathogens <b>25% to 50%</b>	< 25% Insect/Pathogens
<10% Past CC Harvest <b>&lt; 10%</b>	11% - 25% Past CC Harvest	>25% Past CC Harvest
<10% Past PC Harvest <b>&lt; 10%</b>	11% - 50% Past PC Harvest	>50% Past PC Harvest

(Percentages in bold indicate values for LSR, the "\*" indicate overall snag quality)

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

1. Increase Forest Interior patch, by accelerate late-successional moist/wet forest groups (plantations and thinnings).
2. Reduce roads in Forest Interior patches at Jungle Creek and Eldorado Creek.
3. Reduce roads in Riparian Reserves, especially in Beverly Creek.
4. Improve riparian structure in Beverly Creek and North Fork Teanaway Creek.
5. Increase Security Habitat in Yellow Hill and Eldorado Areas.
6. Monitor for snag dependent species, especially in roaded areas of North Fork.
7. Monitor for snags in mining areas.
8. Retain snags at high end of range. Manage at endemic insect/disease levels.
9. Complete snag analysis on 40 acre grid, prior to any reduction of forest structure habitat.

## 2. Plant Connectivity

Connectivity can be addressed by qualitatively describing the connectedness of habitats within the LSR. Most of the forest habitat types are well connected within the Teanaway LSR with the exception of the whitebark pine and upland meadow communities, which of necessity, correspond more directly to the soils, topography, and elevation continuity. In the Teanaway LSR, the vegetation groups are sometimes interrupted or disjunct due to serpentine outcrops or rock and talus at higher elevations, but this is inherent to the landscape and no projects have been identified to improve this condition.

## 3. Wildlife Connectivity

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

**Table VII-9, Connectivity Rankings for Teanaway LSR**

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

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

(1) Restoration Opportunities

(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) Wet Forest Group, Riparian Reserves and Subalpine Fir Forests

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. It may be possible to use silvicultural methods, such as thinning, to promote the development of late-successional forest structures in areas not currently in a late-successional condition.

#### 4. Disturbance Risk Analysis

A little over half the 34,043 acre Teanaway LSR is in forest structures and compositions that are not sustainable in late-successional conditions. Only 12% of the LSR consists of vegetation in the wet forest group, 24% is within the dry forest group, 28% in the moist grand fir plant associations, and 23% in subalpine fir. At least 2/3rds of the grand fir and subalpine fir vegetation types are successional advanced and are upslope from dry forest types. Boise-Cascade owns land adjacent to the LSR, contributing to the risk from fires originating outside LSR boundaries. The area is heavily used by hunters and other recreationists.

Although few stand exams exist for most of the LSR, forest stands in the Teanaway LSR appear to have suffered heavy mortality from insects. Aerial surveys suggest mortality from insects increased substantially over the past four decades. Western white pine mortality attributed mountain pine beetle attacks increased exponentially from the 1950s until the early 1980s, with a subsequent decline due more to lack of western white pine than to decreased insect activity. Mountain pine beetles generally attack white pines already infected by white pine blister rust. The synergistic action of the mountain pine beetle and the non-native pathogen is resulting in the loss of mature western white pine in stands once dominated by this species. There are relatively few mature western white pines remaining in the Teanaway LSR most of which that does remain are infected by the rust and will eventually be killed by it or by opportunistic mountain pine beetles. Western spruce budworm outbreaks occurred in and around the Teanaway LSR in the late 1970s and early 1980s. Many stands are susceptible to future outbreaks of this insect since stand structures and compositions are not appreciably different from those that sustained outbreaks of the budworm.

Large witches' brooms are common in Douglas-fir throughout the drier portions of the LSR. These contribute to an increased risk for fires to move into the canopy. Root and stem decay pathogen centers may also be prevalent throughout the drier portions of the LSR, especially in stands that were partially harvested.

The lower portions of the LSR were railroad logged during the 1920s; this was essentially a highgrade harvest of large ponderosa pine. Coupled with fire exclusion livestock grazing and suppression, removal of the large old pines allowed Douglas-fir and grand fir to establish and grow. These post-harvest, post-settlement stands are increasingly more dense than pre-settlement stands and composed of species that are more susceptible to insects and diseases than were the less dense presettlement forests composed of pine and western larch. Mortality of grand fir from fir engraver beetles is high, especially in stands that were previously defoliated by budworms and/or impacted by root decay pathogens. Mortality of large Douglas-fir from Douglas-fir beetles could become a problem as well. These insects, too, concentrate their activity in stands previously impacted by budworm defoliation, root diseases, or infestations of dwarf mistletoe.

From before the turn of the century until the 1950s the LSR experienced heavy pressure from livestock grazing. A sheep driveway from Gallagher Head Lake over Fortune Pass served in excess of 30,000 sheep per year during the 1920s. After the 1920s, the grazing allotment was primarily used for cattle. The allotment extended from Teanaway Ridge and included much of Stafford Cr., Upper Jack Cr., Dicky Cr., Bean Cr., and Beverly Cr. A sheep allotment that extended west of the Teanaway Ridge to the head of Lk. Cle Elum existed until the 1950s. Although the Teanaway LSR was heavily grazed in the past, the compaction so evident in the Swauk LSR and in several LSRs and MLSAs on the Naches RD appears to be of less magnitude, perhaps resulting from the extensive serpentine soils in the Teanaway LSR that restrict vegetative growth and thus were not trampled for as long a duration as more lush vegetation on non-serpentine derived soils.

Some areas in the Upper Middle Fork of the Teanaway River experienced what appears to be arrested successional development as a result of heavy grazing and fire. With both fires and grazing absent for 30 years, these brushfields and meadows are rapidly developing toward a forested vegetation type.

Aerial surveys conducted by the Insect and Disease Group of Region 6 since the late 1940s indicate the following insect outbreaks occurring within the Teanaway LSR:

- Mountain pine beetle (w. white pine): 1953, 1960, 1963, 1965, 1975, 1977-78, 1980-82, 1984, 1986, 1988, 1990-91
- Mountain pine beetle (ponderosa pine): 1974

- Douglas-fir beetle: 1952-54, 1973, 1975, 1988
- Fir engraver: 1973, 1988-89 (heavy), 1990-91
- Spruce beetle: 1975
- Western spruce budworm: 1972-78, 1980-81, 1985

The susceptibility of stands in the Teanaway LSR to fires and several biotic disturbance agents is shown in the following tables. Mortality 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 (for example, western spruce budworm and Douglas-fir beetle or fir engraver). Moreover, risk to the biotic disturbance agents generally elevates the risk of catastrophic fires by potentially increasing fuel levels.

**Table VII-10, Disturbance Matrix, Teanaway LSR**

Veg Type	Fire	Dwarf Mistletoes			Root Disease		WPB	FE	WSB	DFB	MPB	WPB	TOTAL
		PP	DF	WL	AROS	HEAN							
10	M	M	M	L	L	M	-	L	L	L	L	L	M
11	M	M	M	L	M	M	-	M	M	L	L	M	M
12	H	H	H	L	M	M	-	H	H	H	L	H	H
13	H	H	H	L	M	M	-	H	H	M	L	M	H
20	M	L	M	M	M	M	-	L	L	L	L	L	M
21	M	M	M	M	M	M	-	L	L	M	L	L	M
22	H	M	H	H	M	M	-	L	M	H	L	L	H
23	H	M	M	M	L	L	-	L	M	M	L	L	H
30	M	L	M	M	L	M	H	L	L	L	L	L	M
31	M	L	M	M	L	M	H	L	L	L	L	L	M
32	H	L	H	H	L	M	H	H	M	M	L	L	H
33	H	L	H	H	M	H	H	H	M	M	L	L	H
40	L	-	L	L	L	L	H	L	L	L	L	L	L
41	M	-	L	L	L	L	H	L	L	L	H	L	M
42	H	-	L	L	L	L	H	M	L	M	H	L	H
43	M	-	L	L	L	L	H	L	L	L	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”

Areas at risk to catastrophic fires and other disturbances include the dense, dry forest types, the partially-harvested dry forests, the mesic sites within dry forest, layered mature and partially-harvested moist grand fir, and the single-layered and layered subalpine fir forests. The moist grand fir and subalpine fir types are at high risk both from adjacency to drier forests and because insect and pathogen activity has greatly increased fuel loads and vertical and horizontal fuel connectivity within these vegetation types.

There are limited opportunities for silviculturally manipulating vegetation within the Teanaway LSR. These limitations result from the lack of roads and from restrictions imposed by the Alpine Lakes Plan. Opportunities that do exist include thinning to reduce stand density in established plantations and developing shaded fuel breaks along Teanaway Ridge to prevent fires originating on Boise-Cascade timberlands from moving through the Teanaway LSR and into the Swauk LSR.

## 5. Northern Spotted Owl

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

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

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

The Teanaway LSR is a mapped LSR, primarily in wetter forest habitats. The Desired Condition for spotted owl habitat in wetter LSRs is 60% of the 1.8 mile home range radius, which is 3,994 acres. This wetter LSR will manage for spotted owl habitat, over risk and hazard reduction. See description of habitat in DEC's, Chapter VII page 92-95. LSRs, in general, accept more risk than does management in MLSAs.

The Teanaway LSR has 4 activity centers for spotted owls. These four are in a cluster in the southern part of the LSR. They are also overlapped with the three sites adjacent to the LSR. Effectively, there is a cluster of 7 spotted owl sites in this lower country. Clusters of owls provide better function for LSR and species recovery, than do isolated owl sites.

There is no private land within the LSR, however private lands adjoins the southern boundary of the LSR (8 mile length). Action on private land outside the LSR could effect 3 of 4 LSR owls. Only owl

SO398 would not be affected by loss of habitat outside the LSR. These private land parcels could have coordination of habitat and site management, or possible acquisition of habitat.

a) Suitable Spotted Owl Habitat

The existing amount of nesting/roosting/foraging habitat within the Teanaway LSR is 16,352 acres (48% of the LSR). There are currently 4 pairs of spotted owls in this LSR. The existing habitat could support 6 pairs of owls at threshold acreage (2,663 acres/pair) or 4 pairs at target acreage (3,994 acres/pair). See Table VII-11, Spotted Owl Habitat, Potential Habitat, and Sustainable Habitat in LSRs/MLSAs., which displays the potential number of owl pairs for the various scenarios. The existing habitat is primarily in wet, moist, and multi-structure subalpine fir forests, 14,475 acres (43%). This wetter spotted owl habitat has a higher chance of sustainability, than do dry and mesic forest groups. The LSR's predominate forest vegetation is moist and wet forests (13,408 acres - 39%), followed by Dry forest (24%) and Subalpine fir forests (23%).

There is a potential for the LSR to reach 22,931 acres (67%) of suitable habitat, mostly in the wetter forest groups. Sustainable spotted owl habitat within the LSR is approximately 19,191 acres in moist/wet/multi-story subalpine fir. The LSR currently supports 4 known pairs of owls, with another 3 pairs overlapping into the LSR. Over time (50 years +), it could sustain 5 pairs of owls at target acreage. See Table VII-11, Spotted Owl Habitat, Potential Habitat, and Sustainable Habitat in LSRs/MLSAs.

Dispersal habitat (which may grow into foraging, roosting, and nesting ), covers 3,402 acres (9%) of the Teanaway LSR. Dispersal habitat is in a mix of moist, dry and wet vegetation types. Habitat analysis for the Teanaway LSR is based on vegetation mapping, and a model of spotted owl habitat structure (see Appendix 13: Suitable Habitat Acreage's, Appendix 4 & 5: Vegetation Acreage's for LSRs/MLSAs, and Suitable Spotted Owl Habitat Maps). The map and acreage's must be validated prior to project implementation.

The most contiguous and sustainable suitable spotted owl habitat in the Teanaway LSR is in the DeRoux/North Fork area, Middle Fork/Koppen Mtn, and the upper Jungle/Middle Fork/Yellow Hill area. See Forest Interior Map and Suitable Spotted Owl Habitat Map). Dispersal habitat in the remote areas should be allowed to advance successional, to provide added owl habitat. Dispersal habitat in the managed stands should be accelerated towards foraging/roosting/nesting habitat.

Potential disruptions to spotted owl habitat from risk of fire is moderate. There is some potential disruption of habitat from forest fragmentation on intermingled ownership along the southern boundary of the LSR. To meet the recovery goals for the spotted owl, there is a need to increase/accelerate spotted owl dispersal habitat within the spotted owl core areas and home ranges. Coordination with adjacent private land owners is important for the functioning of spotted owls in the south of the LSR.

Table VII-11, Spotted Owl Habitat, Potential Habitat, and Sustainable Habitat in LSRs/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
			Acres	Thresh hold	Target	Acres	Thresh	Target	Acres	Thres hold	Target	

LSR or MLSA	1996 Known Pairs & Singles	CHU S. Owl Pair Goals	Existing		Potential		Sustainable		% Forest Inter- ior			
			Suitable Owl Habitat	Spotted Owl Habitat	Suitable Owl Habitat	Spotted Owl Habitat	Suitable Owl Habitat	Spotted Owl Habitat				
				Pairs	Pairs		Pair	Pair		Pair	Pair	
Icicle RW132	2 sites	1 Pr	7861 acres	3.0 Pairs	2.0 Pairs	10680 acres	4 pairs	2.7 pairs	9412 acres	3.5 pairs	2.4 pairs	18%
Swauk RW 129	23 sites +2 site <sup>1</sup>	20+ Pr	45675 acres	17.2 Pairs	11.4 Pairs	73792 acres	27.7 Pairs	18.5 Pairs	39452 acres	14.8 Pairs	9.9 Pairs	12%
Teanaway RW130	4 sites +3 site <sup>1</sup>	5 Pr	16352	6.1	4.1	22931	8.6	5.7	19191	7.2	4.8	8%
Manastash Ridge RW 125	30 + 5 <sup>1</sup> (11 Site <sup>2</sup> ) Much Pvt	20+ Pr	68147 acres	25.6 Pairs	17.1 Pairs	92577 acres	34.8 Pairs	23.2 Pairs	88893 acres	33.4 Pairs	22.3 Pairs	7%

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

There are 4 spotted owl pairs within the Teanaway LSR, an additional 3 sites are outside, immediately adjacent to the LSR. The estimated amount of habitat within a 1.8 mile radius of the 4 activity centers is shown in Table VII-12, Suitable Owl Habitat, Teanaway LSR (1996 S. Owl Activity Centers, App 12a). One owl SO306, South Jungle, is below threshold acreage (2,663 acres within 1.8 mile and 500 acres within 0.7 miles). This owl SO306, is of highest priority to provide future habitat and protect from habitat losses. The other three (SO319, SO356 and SO398) spotted owls' home ranges are above threshold acres, but below LSR target acreage. Two of these, SO319 and SO398, are within the wetter forest groups. One site is dry, SO356 North Jungle. No owls are above target acreage of 3,994 acres/1.8 miles.

There is some dispersal habitat that can be accelerated towards threshold goals for SO306, SO319, and SO398. Habitat and acreage should be validated for owl SO356, which is a dry owl and above threshold. Of note, 3 of the 4 spotted owl home range acreage's include habitat on private land in the Standup Creek, Jungle Creek, Rye Creek and Yellow Hill areas (SO306, SO319, SO356). Only owl SO398, Johnson Creek, does not include private land in it's acreage. All owl sites should be monitored.

The three spotted owls adjacent to the LSR (SO342, S0344 AND S0381) provide genetic interchange and are connected in clusters to interior owls. These adjacent sites should be monitored, it is likely they may move nest sites into the LSR, over time. The remainder of the LSR should be inventoried for additional spotted owl sites, especially in the Middle Fork areas.

There is great potential to restore sustainable habitat in the wetter forest groups for long-term population viability (Johnson Creek/North Fork, Yellow Hill). There is also a need to protect existing habitat and home ranges, especially in sites below threshold and target acreage's. See Restoration Opportunities and site Priority in Table VII-12. Overtime, it is expected that higher quality and more sustainable habitat will be restored to LSR. The drier forests within the LSR will eventually be managed for other late-successional species.

The adjacent forested habitats of the Alpine Lakes Wilderness are important for the functioning of connectivity. Connectivity potential is in Fortune, Icicle and Jack Creeks.

Table VII-12, Suitable Owl Habitat, Teanaway LSR (1996 S. Owl Activity Centers, App 12a)

SUITABLE SPOTTED OWL HABITAT <sup>10</sup>														Restore
Teanaway LSR	1.8 mile Circle						0.7 mile Circle						Opps & Prior ity	
	Around Activity Center						Around Activity Center							
Spotted owl	Dry	Mesic	Moist	SAF	Wet	Total	Dry	Mesic	Moist	SAF	Wet	Total	* & #	
SO306 S.Jungle	665	0	1,640	0	71	2,376	55	0	434 wet	0	0	490	a,m,c,p #1	
SO319 N.Frk	782	0	1,653	0	371	2,806	172	0	291 wet	0	66	529	m,p,c,a #4	
SO342 <sup>1</sup> Standup	802	0	1,418	32	213	2,465	142	0	273 wet	0	0	415	m,c	
SO344 <sup>1</sup> Yellow Hill	777	0	1053			1832	211 dry	0	103			314	m,c,a,p	
SO356 N.Jungle	837	0	2,411	0	135	3,384	301 dry	0	256	0	0	556	m,p,c,a #2	
SO381 <sup>1</sup> Middle Fork	590	0	1,754	52	0	2,397	142	0	485 wet	0	0	627	m,a,c	
SO398 Johnson	629	0	1,925	222	188	2,964	249	0	292 wet	0	0	541	m,a,p #3	
Historic														

SUITABLE SPOTTED OWL HABITAT <sup>10</sup>													Restore
Teanaway LSR	1.8 mile Circle						0.7 mile Circle						Opps & Priority
	Around Activity Center						Around Activity Center						
Spotted owl	Dry	Mesic	Moist	SAF	Wet	Total	Dry	Mesic	Moist	SAF	Wet	Total	* & #
SO306 S.Jungle	665	0	1,640	0	71	2,376	55	0	434	0	0	490	a,m,c,p #1
SO319 N.Frk	782	0	1,653	0	371	2,806	172	0	291	0	66	529	m,p,c,a #4
Owl													m

LSR	Pair	Dispersal Habitat			
Teanaway	Status	Dry	Mesic	Wet	
Spotted Owl		Acres	Acres	Acres	Total
SO306	PY	387	0	285	673
SO319	PY	569	0	354	923
SO342 <sup>1</sup>	PY	730	0	430	1,160
SO344 <sup>1</sup>	PY	610	0	209	819
SO356	PY	601	0	553	1,154
SO381 <sup>1</sup>	PY	624	0	461	1,085
SO398	PY	664	0	732	1,396
Historic Owl					

<sup>1</sup> 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.

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

mesic includes code 22; and

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

<sup>11</sup> **Activity Center**, a larger circle will be used if there is less than 100 acres of suitable habitat within 0.33 miles of activity center.

\* **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.

#### c) Spotted Owl Dispersal And Connectivity

Currently, the Teanaway LSR provides habitat for 4 pairs of owls, with an additional 3 pairs utilizing LSR habitat. The LSR can sustain 5 pairs of owls over time, and provide genetic exchange within the Teanaway LSR and between other LSRs and MLSAs. Important connectivity between home ranges are habitat fragments in the North Fork, Middle Fork and Jungle Creek areas.

Important connectivity between LSRs/MLSAs include: Paris/Boulder/Cle Elum River/Waptus; Easton; Standup/Stafford/Bear; Esmeralda/Fortune/Van Epps/Jack /Icicle. Other connectivity's include: Cooper Lake, and Davis/Domerie/Cabin. The Alpine Lakes Wilderness is an important linkage for north-south and east-west dispersal and genetic interchange.

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 Teanaway LSR is 6,512 acres (19%). Dispersal habitat will grow up to be nesting/roosting/foraging for spotted owls. Habitat providing dispersal/Connectivity corridors and patches within the LSR include: North Fork, Middle Fork, Jungle Creek, Beverly Creek, Johnson Creek (see Forest Interior map and Suitable Spotted Owl Habitat Map).

The function of dispersal/connectivity habitat for spotted owls depends on the amount and juxtaposition of late-successional, forest interior, and dispersal habitat. The Teanaway LSR has 44% in late-successional wetter forest habitat, this could increase to 54%. There is very low amount of wetter forest interior habitat (8% or 2,520 acres). Fragmentation of forest interior is a result of natural rocky soils/landscapes and created openings in wet forest groups; and partial cutting in the drier types. There is very little forest interior, dry habitat (1%). This forest interior dry habitat may currently provide good connectivity for spotted owls, but over time is not sustainable. The low road densities (0.8 miles per square mile) and moderate security habitat (56%) 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

##### • Monitor Effectiveness

1. Meet goals of the Teanaway LSR for 5 pairs of spotted owls. Monitor Activity Centers, Core Areas and Home Ranges.
2. Monitor LSR function with current cluster of 4 owl, reproductive status and demography.
3. Monitor 3 outer owl pairs, adjacent to LSR, for providing genetic interchange and possibility of selecting new nest sites within the LSR.

4. The remainder of the LSR should be inventoried for possible spotted owl sites, especially in the Middle Fork areas.
  5. Monitor sites that have not been located and/or had surveys conducted in the past 5 years. Monitor historical owl sites.
  6. Monitor adjacent and wilderness spotted owl sites.
  7. Monitor connectivity outside LSR
- **Monitor Validity**
    8. Validate the spotted owl habitat model, and owl acreage prior to project implementation.
    9. Field verify habitat and activity center locations.
    10. The spotted owl site below threshold needs to be monitored for habitat verification - South Jungle SO306. Three other owl sites are below threshold, SO344 Yellow Hill, and SO381 Middle Fork, SO342 Standup.
    11. Validate the long-term the assumption that the Teanaway LSR sustainable habitat (moist forest groups) can support 4 pairs of owls. The adjacent wilderness habitat is important to continue this linkage for spotted owls.
  - **Monitor Implementation**
    12. Reconfigure spotted owl habitat home range, based on foraging pattern, rather than 1.8 mile circle, especially in the Johnson Creek SO398 site.
    13. 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**
    14. There is also a need to protect existing habitat and home ranges, especially in sites below threshold and target acreage's.
    15. All owl sites may be affected by the amount of high risk dry forest types, and may need some fire risk protection, on habitat outside of LSR.
    16. 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.
    17. Protect and/or create connectivity outside LSR: Standup Creek, AMA/Manastash Ridge connectivity.
  - **Maintain**
    18. Some habitat restoration of dispersal acres is in remote areas (upper Middle Fork and DeRoux Cr.) and should develop naturally towards late successional habitat.
    19. Sustain spotted owl habitat inside LSR.
    20. Maintain dispersal/connectivity habitat within LSR (see unique habitats list).
    21. Maintain dispersal/connectivity habitat and connectivity towards other LSR/MLSA.
  - **Habitat Improvement**
    22. See spotted owl "Restoration Opportunities and site Priority" in Table VII-13, Restoration Opportunities and Potential Projects, Teanaway LSR. Prioritized sites are #1 SO306 accelerate habitat, #2 SO356, #3 SO398, #4 SO319.
    23. There is great potential to restore sustainable habitat in the wetter forest groups for long-term population viability (Johnson Creek/North Fork, Yellow Hill).

24. To meet the recovery goals for the spotted owl, there is a need to increase/accelerate spotted owl dispersal habitat within the spotted owl core areas and home ranges. Accelerate dispersal habitat within 1.8 miles radius for owls SO306, SO319, S0398. Monitor and verify habitat around SO356.
  25. The Stafford Ridge and Standup Creek areas have some at risk dry forest, in the connection between the Teanaway and Swauk LSRs.
  26. Dispersal habitat in the remote areas should be allowed to advance successional, to provide added owl habitat.
  27. Dispersal habitat in the past harvest areas should be accelerated towards foraging/roosting/nesting habitat.
  28. Potential habitat includes 4,500 acres of wetter forests, 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.
  29. Improve and accelerate N/R/F habitat in wet forest groups, to maintain number of spotted owl pairs. Accelerate dispersal habitat and old plantations.
    - Plantations in wet/moist vegetation groups predicted to be habitat in 100 years.
    - Pole sized stands in wet/moist will be habitat in 50 years.
    - Plantations in mesic/dry vegetation groups will be habitat in 120 years.
    - Pole sized stands in mesic/dry will be habitat in 70 years.
  30. Increase habitat effectiveness and connectivity by reducing open road density and revegetating road beds, especially in Forest Interior patches.
- **Coordinate**
    31. Coordination with adjacent private land owners is important for the functioning of spotted owls in the south of the LSR, particularly in the Standup Creek, Jungle Creek, Rye Creek and Yellow Hill areas.
    32. Action on private land outside the LSR could effect 3 of 4 LSR owls. Only owl SO398 would not be affected by loss of habitat outside the LSR. These private land parcels could have coordination of habitat and site management, or possible acquisition of habitat.

## 6. Aquatic

The Teanaway LSR is located within the Teanaway watershed. The Teanaway River is the second largest tributary to the Yakima River flowing into the Yakima near the town of Cle Elum. Human activities have greatly impacted fish populations, aquatic and riparian habitat in the Yakima River and the Teanaway is no exception. Anadromous fish populations in the Yakima were decimated by the turn of the century. Much, but not all of the decline can be attributed to fisheries in the lower Columbia. Within the Yakima Basin construction of unsladdered irrigation dams, entrainment of fry and smolts in unscreened irrigation canals, periodic destruction of spawning beds by log drives, habitat loss and fishing all played a role. Problems associated with irrigation, agriculture and urban development continue to plague fish habitat in the Yakima River. Programs are currently being implemented to restore anadromous fish populations in the Yakima River and its tributaries.

a) Geomorphology

The Teanaway is located in the Upper Yakima Swauk Sandstone Hills subsection. The dominate landform within the subsection are the Structurally Controlled Mountain Slopes. The landforms are characterized by poor hydrologic regulation, high surface erosion and/or shallow rapid failure hazard and high sediment delivery.

Fluvial and mass wasting processes through sandstone creates numerous V-shaped, narrow valleys. Basalt dikes provide some structural control to hill slopes and streams. Erosion of shallow soil over the basalt has helped create steep slopes. Spur ridges with exposed basalt bedrock jut into the confined valleys causing abrupt channel alignment changes. The exposed basalt help control channel banks and stream base levels.

The steep slopes, shallow soil profile and structurally controlled ridges rapidly concentrate runoff into numerous, often ephemeral first order channels which not only deliver water downstream but accelerate erosion and triggers debris slides. Debris slides primarily deliver sediment. These landforms are rapidly eroding and streams are downcutting. The exposed basalt ridges help control the downcutting. Efficient sediment delivery and erodible stream banks (where bedrock is not exposed) make fine sediment deposition in fish bearing channels a concern. The rapid runoff with poor soil moisture holding capacity creates a flashy flow regime with low summer baseflows. The low summer baseflows create the potential for high summer water temperatures. Large wood is not an important pool forming agent (compared to other landtypes such as the glacial systems in the Wenatchee Highlands subsection) as obstructions tend to collect and fill with sediment. Wood is important to control downcutting and to provide cover and microhabitats in stream channels.

There exists a small amount of glacial cirque landtype in the headwaters of the Middle and North Forks Teanaway. Several small lakes are located in the cirque landtype.

(1) Management Concerns Due to Geomorphology

Steep, erosive soils combined with numerous first order drainages create an efficient water and sediment delivery mechanism to perennial streams. Management actions or high intensity fires which remove ground cover vegetation protecting the soil surface may accelerate surface erosion. High intensity rainfall events may deliver large pulses of fine sediment and other material to streams. With the rapid runoff, and the erosive characteristics of the landtype, management actions need to prevent or minimize activities which will accelerate erosion and increase the rate of water transport downstream. Roads, skid trails and trails can concentrate water effectively increasing the drainage network further accelerating water and sediment delivery downstream.

Management actions need to prevent concentrated surface runoff accelerating surface erosion, minimize the interception and concentration of flows on roads and trails which may accelerate water and fine sediment delivery to streams, and accelerate the incidence of debris flows. Management of riparian areas for aquatic resources should focus on maintaining bank stability given the rapid downcutting of streams. Riparian vegetation is important to act as a vegetative filter of fine sediment transported through surface erosion or debris flows. Shade from riparian vegetation is needed to ameliorate possible high summer stream temperatures. While large wood may not be as important for pool formation as in other landtypes, tree root systems are important for bank stability. Wood in channels is also important to create microhabitats and in-channel cover. Large wood within stream channels also provide a grade control by trapping sediment.

b) Teanaway River Watershed

The Teanaway River is the second largest tributary to the Yakima River. Historically spring chinook salmon, summer steelhead and coho salmon were found in the Teanaway. Coho have been extirpated from the system and there are very few chinook. It is not known if there are any chinook currently inhabiting the watershed within the LSR. Roza dam on the Yakima River was a significant passage impediment to steelhead into the upper Yakima River system including the Teanaway. Passage at Roza Dam has been improved but steelhead numbers are very low, the high return to the Upper Yakima being only 125 fish in the last few years. A few adult steelhead do occasionally return to the Teanaway.

Historic bull trout distribution is unknown but their numbers are probably greatly reduced. The only known population is a relict, resident population in the North Fork. Past hatchery plantings have probably influenced the native redband and westslope cutthroat populations.

Irrigation withdrawals, agriculture and floodplain development, grazing and past logging have altered riparian habitat in the Teanaway system. There are three Teanaway subwatersheds included within the LSR; the Lower and Upper North Fork Teanaway and Middle Fork Teanaway. The North Fork Teanaway, Middle Fork Teanaway and the Teanaway Rivers are all included on the Environmental Protection Agency 303(d) list due to temperature.

(1) Lower and Upper North Fork Teanaway subwatersheds

The Lower North Fork Teanaway subwatershed extends from the confluence with the West Fork Teanaway (forming the mainstem Teanaway) upstream to Stafford Creek. Stafford Creek is a separate subwatershed. By far most of the land within the subwatersheds is in private ownership. National Forest Land is basically restricted to the headwaters of tributaries. Riparian and aquatic habitat in the Lower North Fork has been impacted by past timber harvest, cattle grazing, water withdrawal, and home development. Most of the upper North Fork subwatershed is National Forest Land. Other than a valley bottom road and some past riparian logging, adjacent to the North Fork, aquatic and riparian habitat has not been greatly impacted by man.

Native salmonids known to inhabit the Lower North Fork include bull trout, redband/rainbow, and summer steelhead. The subwatershed is considered significant for bull trout and summer steelhead. A small remnant resident population of bull trout appears to inhabit the North Fork Teanaway. Although the population is small it is considered significant because it is the only known population in the Teanaway system. This population may be effectively isolated now due to habitat alteration in the Teanaway and mainstem Yakima. If bull trout are to be "recovered" in the Teanaway watershed this small population may be the only one with which to build around.

The Lower North Fork subwatershed is considered significant for steelhead are considered significant for a reason similar to the bull trout. The North Fork is the only Teanaway tributary with known returning steelhead, small as the numbers may be. The North Fork Teanaway is also the tributary most likely to be used, at least initially, for steelhead supplementation programs to rebuild Teanaway steelhead populations (Tina Mayo, fisheries biologist, Cle Elum Ranger District, personnel communication). Both the steelhead and resident redband populations have likely been influenced by past hatchery planting. The Teanaway River steelhead are considered to be part of the Naches/upper Yakima River population. Gene flow from hatchery steelhead and between hatchery rainbows and steelhead is apparent in the Naches/upper Yakima population ( BPA 1996).

Spring chinook salmon historically inhabited the Teanaway and likely North Fork Teanaway. Spring chinook runs to the upper Yakima River are very depressed. A few chinook may still be found in the

North Fork Teanaway but basically we do not know. The North Fork Teanaway, is targeted for spring chinook supplementation under the Yakima Fisheries Project.

Westslope cutthroat trout may inhabit some headwater tributaries in the Lower North Fork Teanaway but their distribution is not known. Cutthroat do inhabit the Upper North Fork subwatershed and are considered significant due to an apparent healthy population of westslope cutthroat in the upper portions of the watershed. The genetic integrity of the population though is not known. As with the Lower North Fork, and for the same reasons, the Upper North Fork Teanaway subwatershed is considered significant for bull trout and summer steelhead. Redband/rainbow are also found in the subwatershed.

(2) Middle Fork Teanaway subwatershed

The Middle Fork Teanaway joins the West Fork Teanaway approximately two miles upstream of the West Fork, North Fork confluence. The lower six-seven miles of the Middle Fork flows through private lands with similar impacts to aquatic and riparian habitat as seen in the other portions of the Teanaway watershed. The majority of the Middle Fork watershed though is on National Forest Land and is unroaded with little resource development. Spring chinook, summer steelhead and bull trout use of the subwatershed is unknown although the habitat is available. Westslope cutthroat and redband/rainbow are present. Because the watershed is unroaded it may be valuable to investigate the genetic status of the trout. Stocking of fish has occurred throughout the Forest and lack of roads does not mean historically the stream was not stocked by horse back, but it may be worth investigating.

c) Teanaway Late Successional Management Considerations

The aquatic resources and habitat in the Teanaway watershed have been severely impacted but the watershed may be very important to the restoration of fish populations. Because of downstream habitat alteration the habitat on National Forest Lands may be especially important. The Middle Fork Teanaway within the National Forest is a naturally functioning watershed. Although it is not initially a priority for re-establishing anadromous fish populations, probably due to limited access, the Middle Fork may provide an important habitat refugia for re-establishing fish populations. The inaccessibility of the watershed may be especially beneficial for a species such as bull trout which are very sensitive to habitat alteration and angling. If the existing westslope and redband/rainbow trout populations represent native genotypes the importance of the Middle Fork subwatershed would be greatly enhanced. Any land management activities, including management for late successional habitat objectives should pose very little risk to aquatic resources until the importance of the watershed for aquatic/riparian resources can be established.

The North Fork Teanaway is important to anadromous fish restoration efforts in the Yakima subbasin and for providing habitat for the only known bull trout population in the Teanaway watershed. Watershed restoration to compliment the species restoration should be a priority for management. Management for late successional habitat should be designed to help achieve watershed and aquatic habitat objectives to rebuild the anadromous fish and bull trout. Any short term risk that an activity may pose to the aquatic environment should be clearly offset by a long term gain that will benefit the species restoration efforts.

## 7. Noxious Weeds

Four noxious weed species were identified to occur within or immediately adjacent to the Teanaway LSR. These species are discussed in priority order as identified by the noxious weed analysis module. There are no Class A weed species presently documented from this area. Class B and Class B-designate weeds include: *Centaurea diffusa*, *C. pratensis*, *Cynoglossum officianale*, and *Cytisus*

*scoparius*. These species are found along roadsides within and leading into the LSR, particularly along Highway 970 and Forest Roads #9701, 9737, and 9738. Following through the noxious weed module, *Cytisus scoparius* and *Cynoglossum officinale* are limited in extent and should be controlled or eradicated. The other *Centaurea* species are more widespread and containment and prevention of spread projects should focus on areas of high recreation use and travel such as the roadsides, and developed and dispersed recreation sites. Harrod (1994) provides a brief synopsis of control methods available and recommendations for noxious weed management.

## 8. Fire Management Plan

### a) Overview

This plan is intended to provide guidance for the management of fire in the Teanaway 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 Teanaway 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., grazing permittees, summer home groups, organization camps, organized rockhounding groups, 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. Seek opportunities to initiate hazard reduction actions around private lands (e.g., land in the southern half of the LSR).
11. Initiate hazard reduction actions around developed and dispersed recreation sites, such as:
  - Beverly Campground

- ETC... (Additional sites may be added if overlooked)
- 12. As a hazard reduction measure emphasize fuel wood collection in designated areas around recreation use sites.
- 13. Initiate hazard reduction actions around the proposed establishment of the Eldorado Creek Research Natural Area.
- 14. 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 Red Top 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 Jolly Mountain.
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 areas: Stafford Creek, Teanaway Ridge, and Yellow Hill area.
5. Emphasize roadside fuel modification and fuel wood collection (e.g., the Teanaway River Valley and the Blewett Pass area).
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. 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. Projects should be of scale/location to enhance landscape-level diversity tied to inherent disturbance regimes.
5. Projects should attempt to minimize the risk of future catastrophic wildfires (those outside the range of inherent disturbance regimes with respect to size and/or severity).

h) Summary

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

### D. Restoration Opportunities and Potential Project Summary

**Table VII-13, Restoration Opportunities and Potential Projects, Teanaway LSR**

Analysis Module	Restoration Opportunity	Potential Projects	Schedule <sup>1</sup>
<b>Forest-Wide Sustain-ability</b>	1) Reduce stand density in dense successional advanced (types 12 and 22) where they exist between the Teanaway and Swauk LSRs and the upper Peshastin Creek watershed.	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	A

<b>Analysis Module</b>	<b>Restoration Opportunity</b>	<b>Potential Projects</b>	<b>Schedule<sup>1</sup></b>
		susceptibility.	
	2) Encourage private landowners in the lower Teanaway watershed to take similar density management as described in 1 above	2) See 1 above.	B
	3) Improve or maintain existing fuelbreaks (Stafford Creek and old Blewett Pass road.)	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) Precommercial thinning.	C
<b>Forest-Wide Spotted owl</b>	Not Applicable. (This LSR is not one of the 3 LSRs on the forest designated as a source population area.)	Not Applicable.	
<b>Forest-Wide Connectivity</b>	None Identified. Breaks in connectivity identified are inherent to the landscape.	None Identified	
<b>Unique Habitats &amp; Species</b>	1) Reduce road densities in riparian reserves.	1) Close or relocate roads as opportunities are identified in Access and Travel Management Planning.	A
	2) Retain whitebark pine forests and subalpine meadows.	2) Prescribed fire.	B
	3) Provide protection to the unique attributes in Eldorado Creek.	3) Continue designation process to establish Eldorado Creek as a Research Natural Area.	A
<b>Connectivity Within the LSR</b>	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

<b>Analysis Module</b>	<b>Restoration Opportunity</b>	<b>Potential Projects</b>	<b>Schedule<sup>1</sup></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
	4) Promote the development of whitebark pine populations.	4) Prescribed Fire and Prescribed Natural Fire.	C
<b>Disturbance</b>	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) NRF habitat within the owl circle on above threshold acres, (all Teanaway owls are at or below threshold) 4) See item #2 under spotted owl for treatment of NRF habitat on threshold acres.	A
<b>Spotted Owl</b>	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
	4) Accelerate the development of suitable spotted owl habitat within the three owl circles that are	4) Utilize Silvicultural activities that accelerate the development of multi-layered stands. Focus on single layered pole sized stands in	C

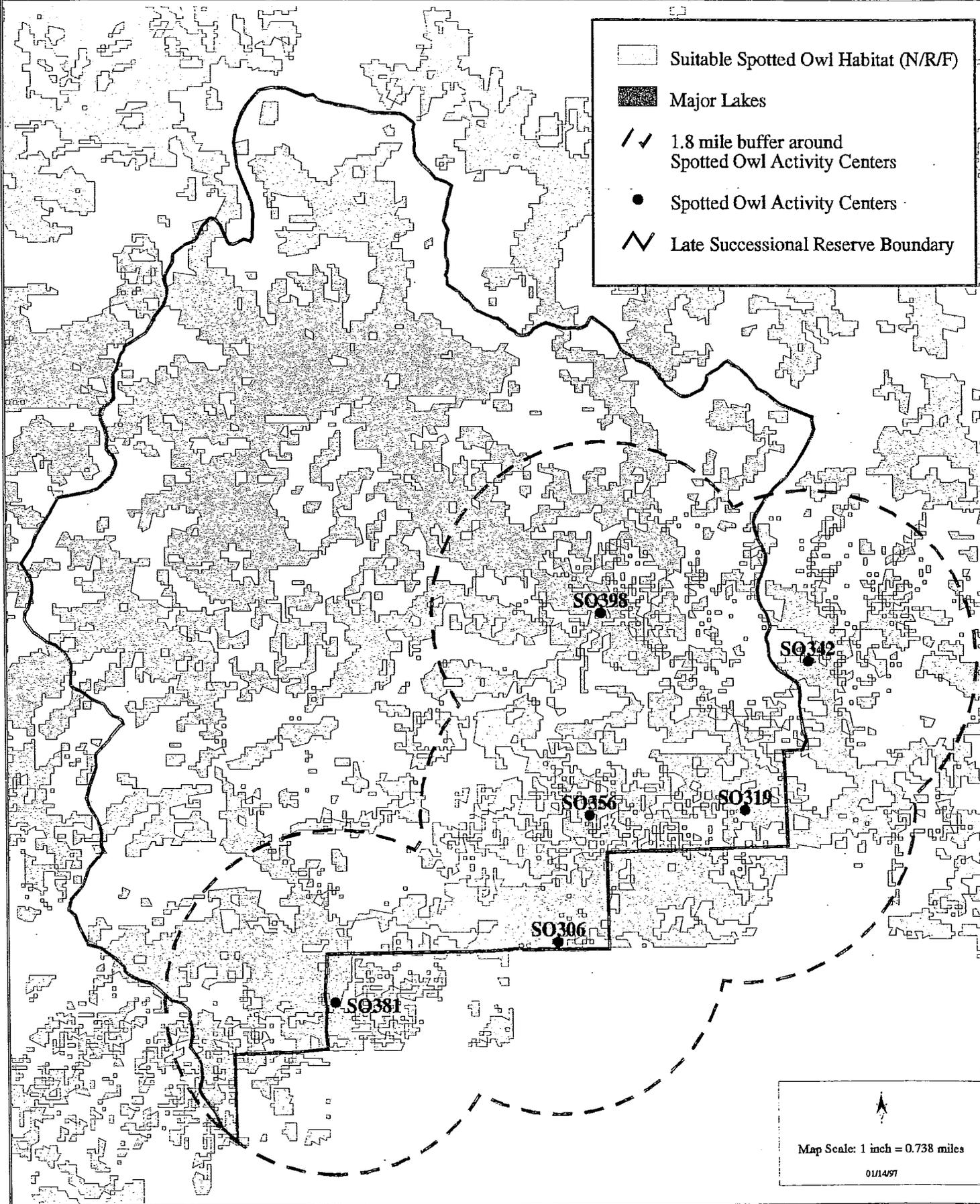
<b>Analysis Module</b>	<b>Restoration Opportunity</b>	<b>Potential Projects</b>	<b>Schedule<sup>1</sup></b>
	below threshold (#306, #344 and #381.)	moist grand fir and wet forest groups.	
<b>Aquatic</b>	1) See late successional habitat implications in Aquatic section.	1) Coordinate projects with Teanaway Watershed Assessment planned for FY 98.	B
<b>Noxious Weed</b>	1) Control or eradicate <i>Cytisus scoparius</i> and <i>Cynoglossum officinale</i> populations where they occur.	1) Use combination of treatments such as hand pulling and spot herbicide application to eliminate these populations.	A
	2) Increase knowledge regarding noxious weed presence in the Icicle LSR.	2) Survey LSR for presence of noxious weeds.	C
	3) Limit the extent and spread of noxious weeds within and leading into the LSR.	3) Focus activities in areas of high vector movement (trailheads, recreation sites, roadsides).	B
	4) Contain and attempt to control <i>Centaurea diffusa</i> and <i>C. pratensis</i> populations where they occur along forest system roads leading into the Teanaway LSR.	4) Use combination of treatments such as hand pulling, biological methods, mowing, or spot herbicide application to contain and control these populations.	B
<b>Fire Plan</b>	1) Protect LS values from loss due to wildfire	1) See fire plan for specific actions	

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

*Teanaway Late Successional Reserve*

# **SUITABLE SPOTTED OWL HABITAT**

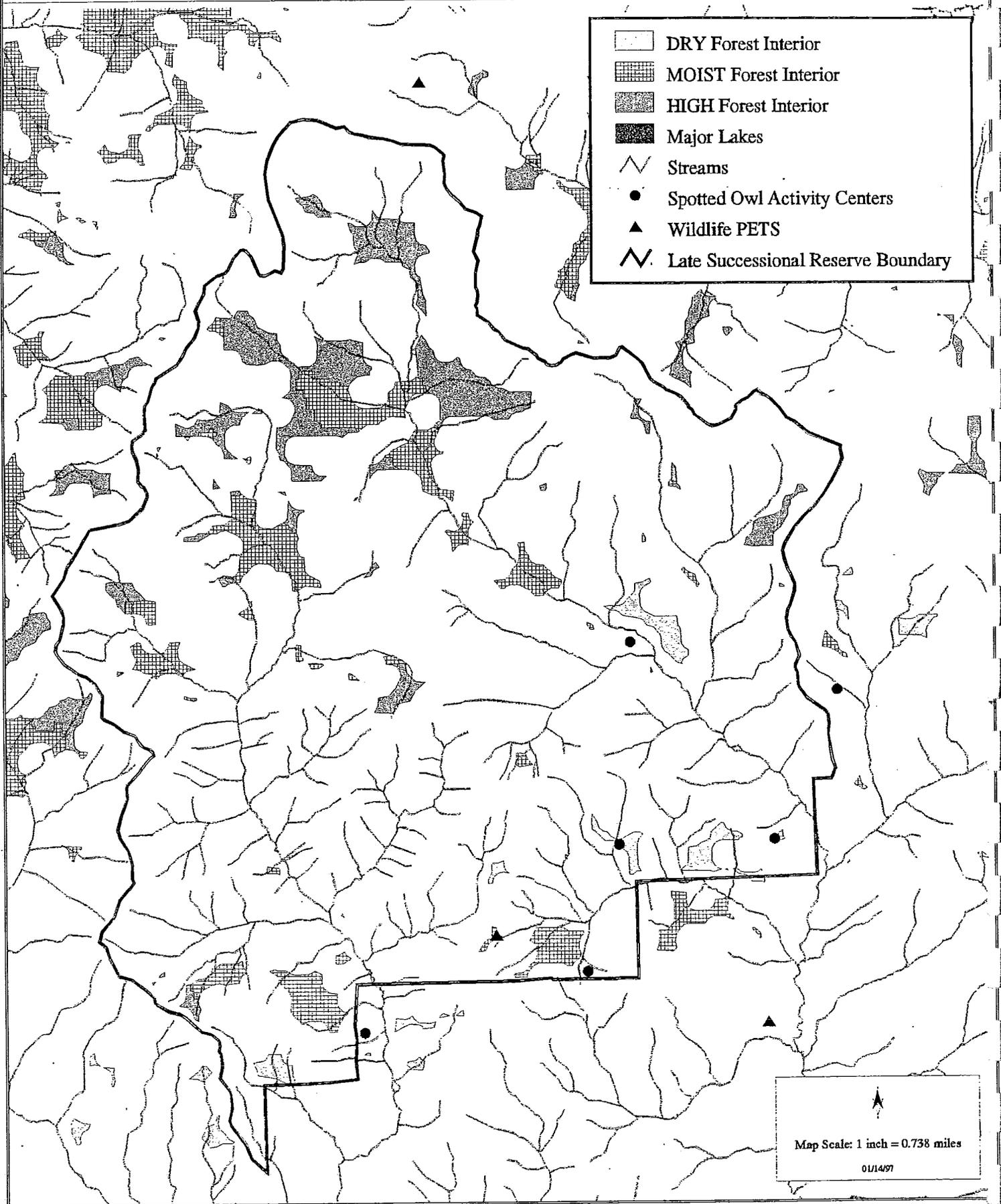
-  Suitable Spotted Owl Habitat (N/R/F)
-  Major Lakes
-  1.8 mile buffer around Spotted Owl Activity Centers
-  Spotted Owl Activity Centers
-  Late Successional Reserve Boundary



Map Scale: 1 inch = 0.738 miles  
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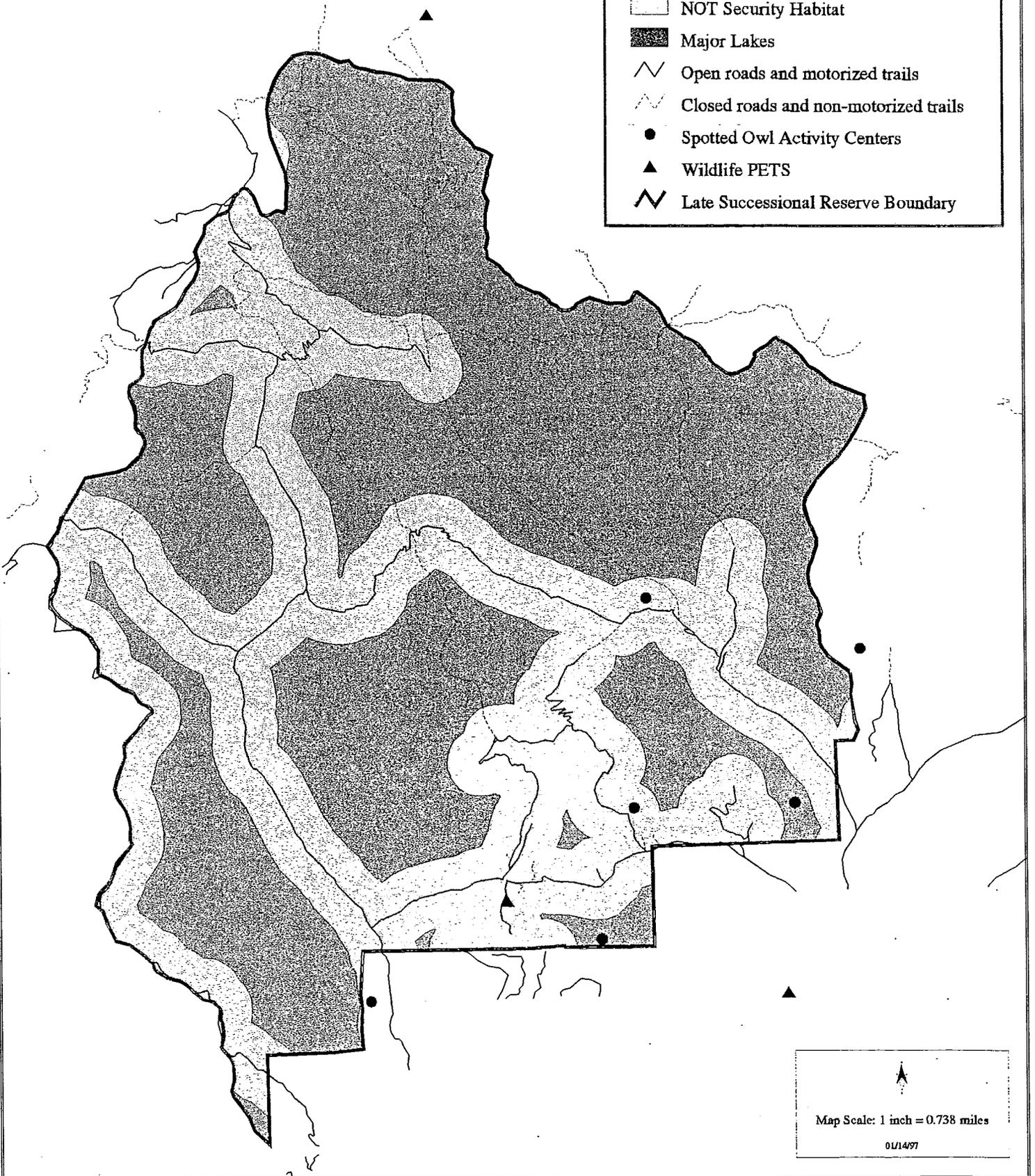
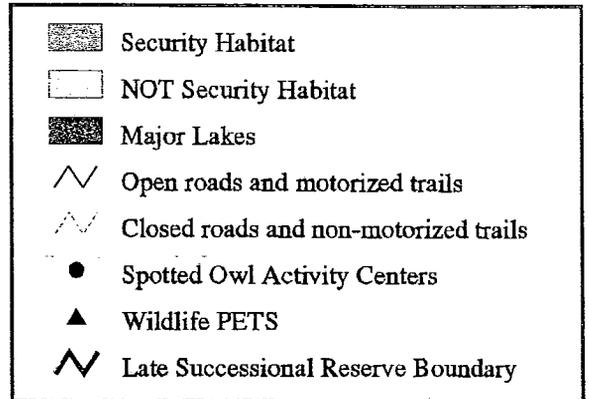
*Teanaway Late Successional Reserve*

# ***FOREST INTERIOR***



# *Teanaway Late Successional Reserve*

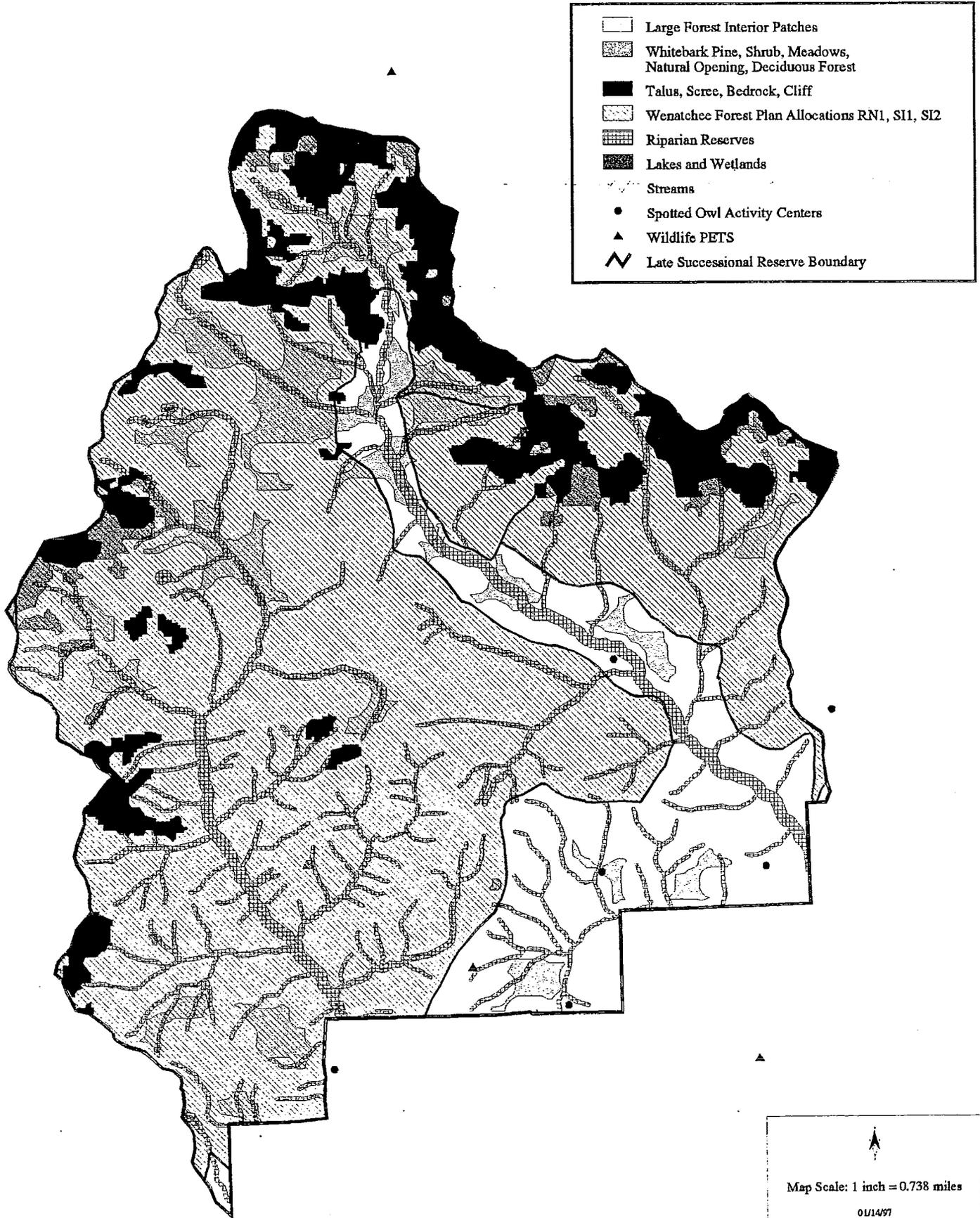
## **SECURITY HABITAT**



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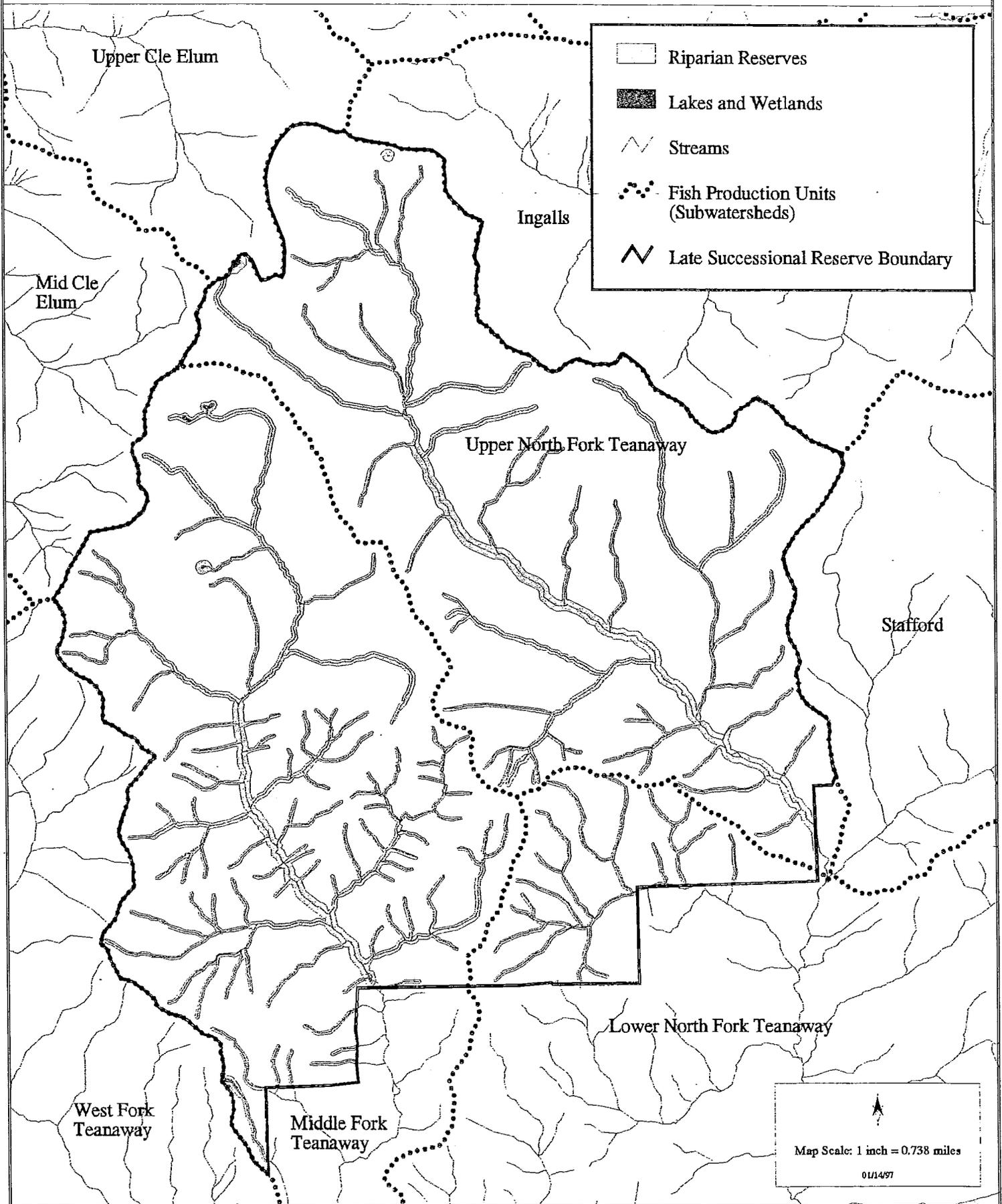
# *Teanaway Late Successional Reserve*

## **UNIQUE HABITATS**



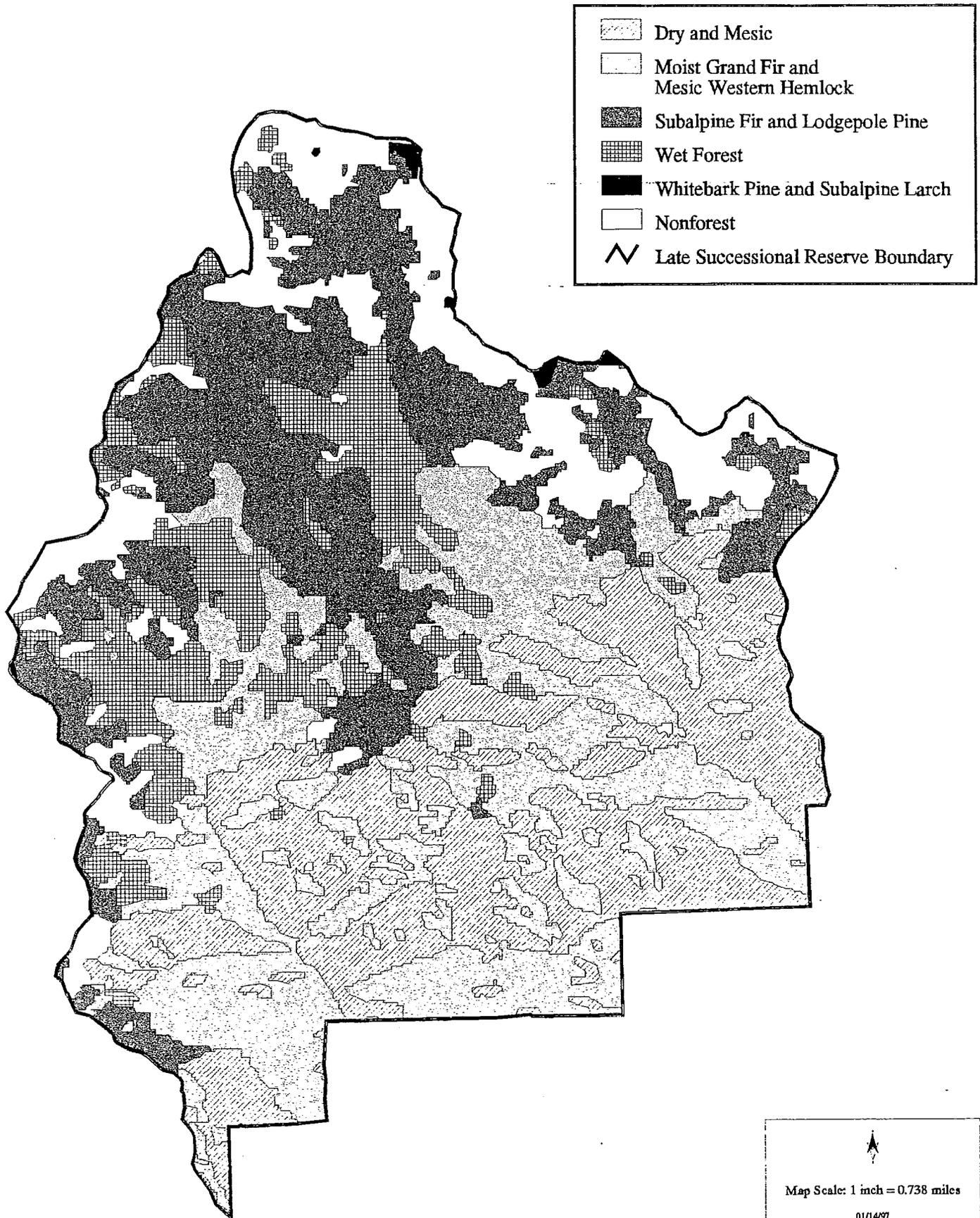
# Teanaway Late Successional Reserve

## FISH PRODUCTION UNITS (SUBWATERSHEDS)



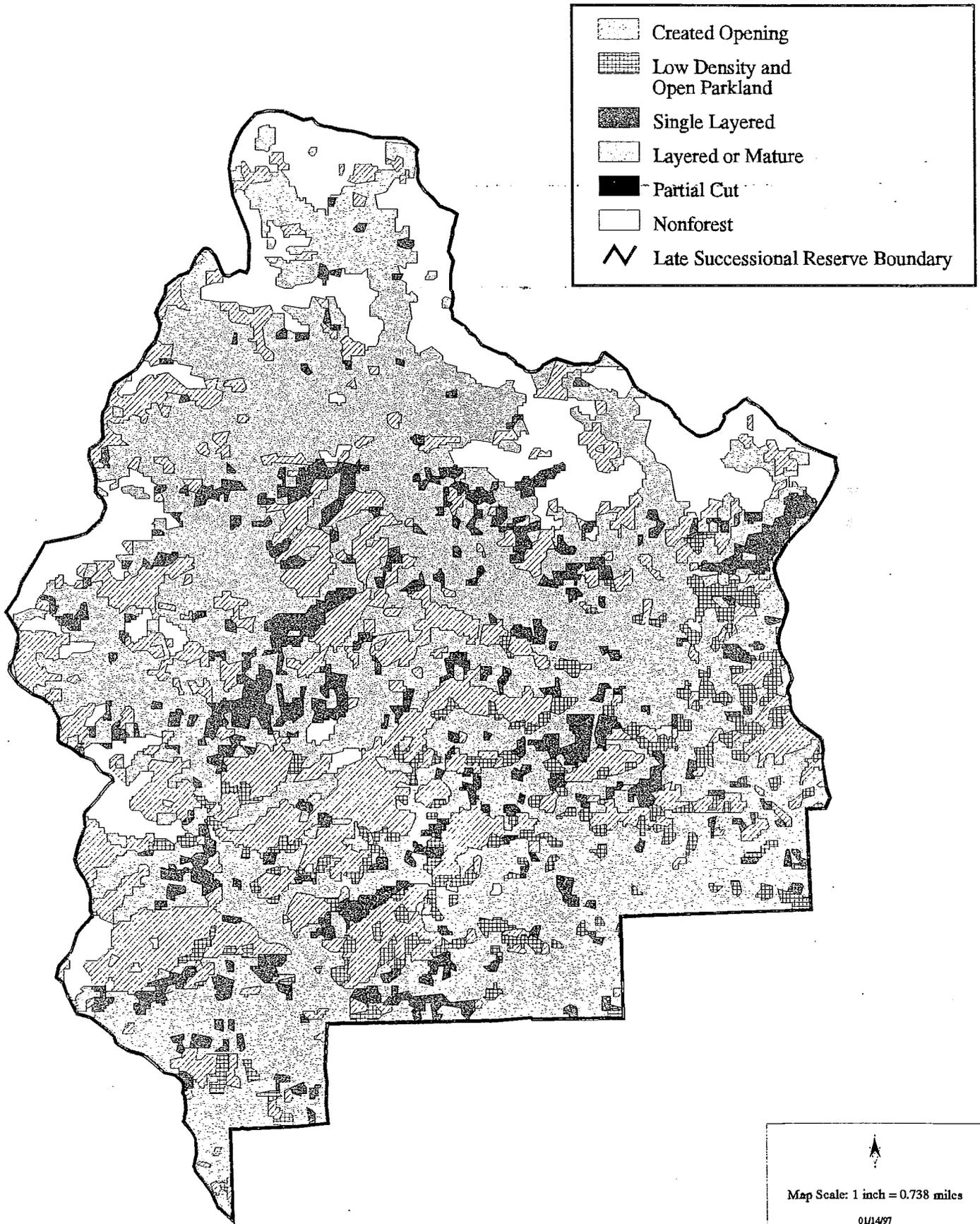
# *Teanaway Late Successional Reserve*

## **VEGETATION SERIES**

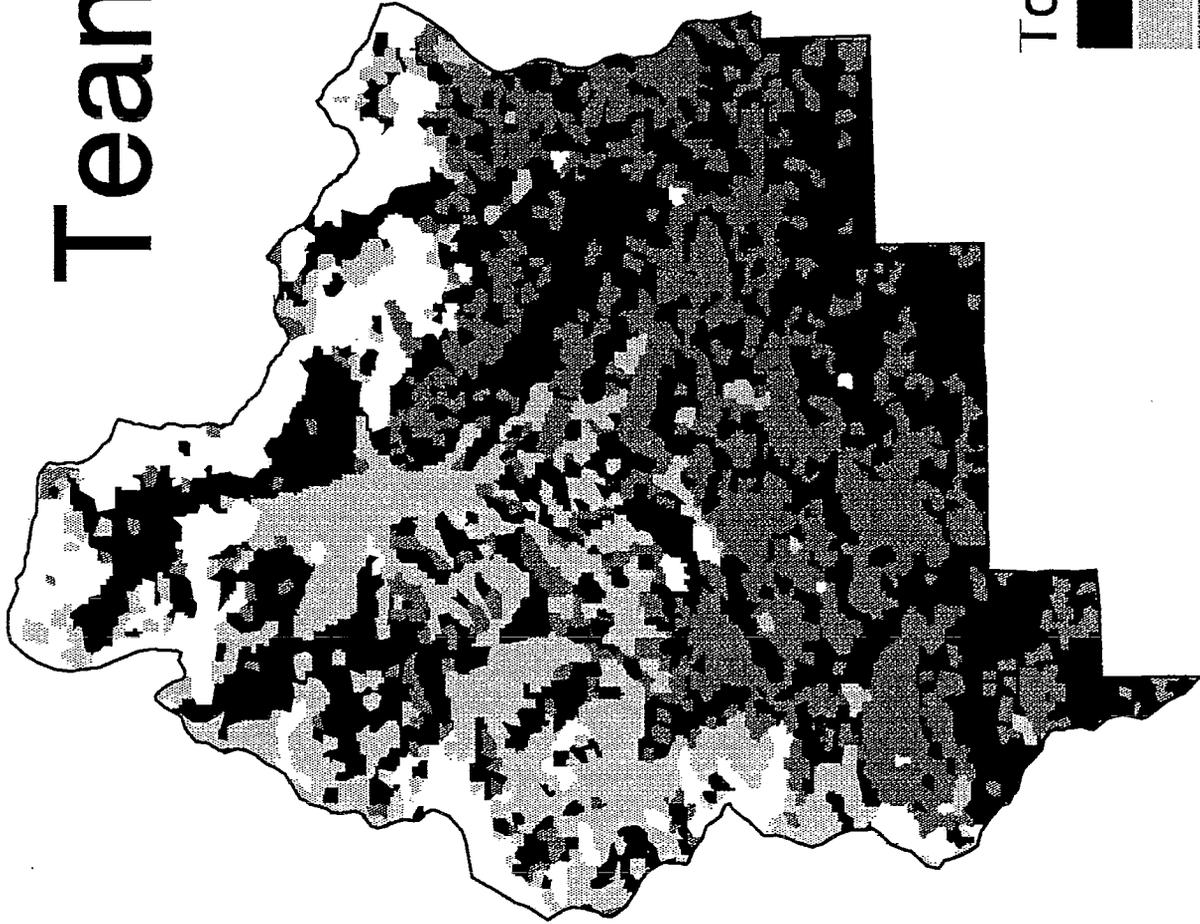


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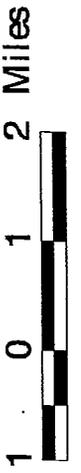
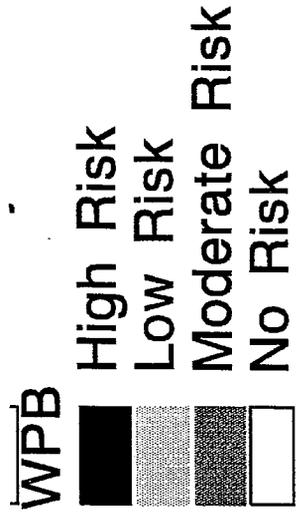
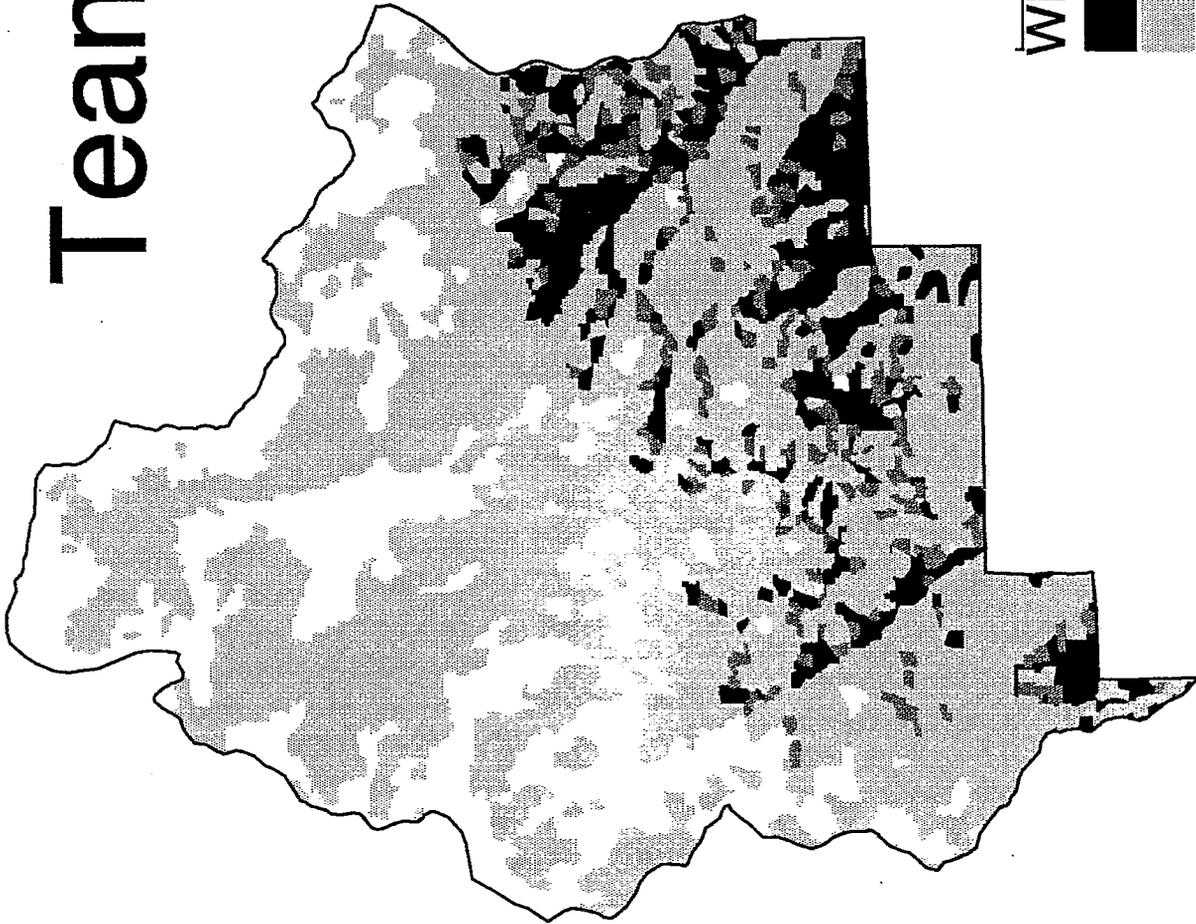
*Teanaway Late Successional Reserve*  
**VEGETATION STRUCTURE**



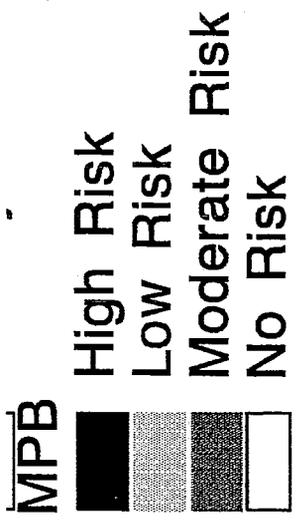
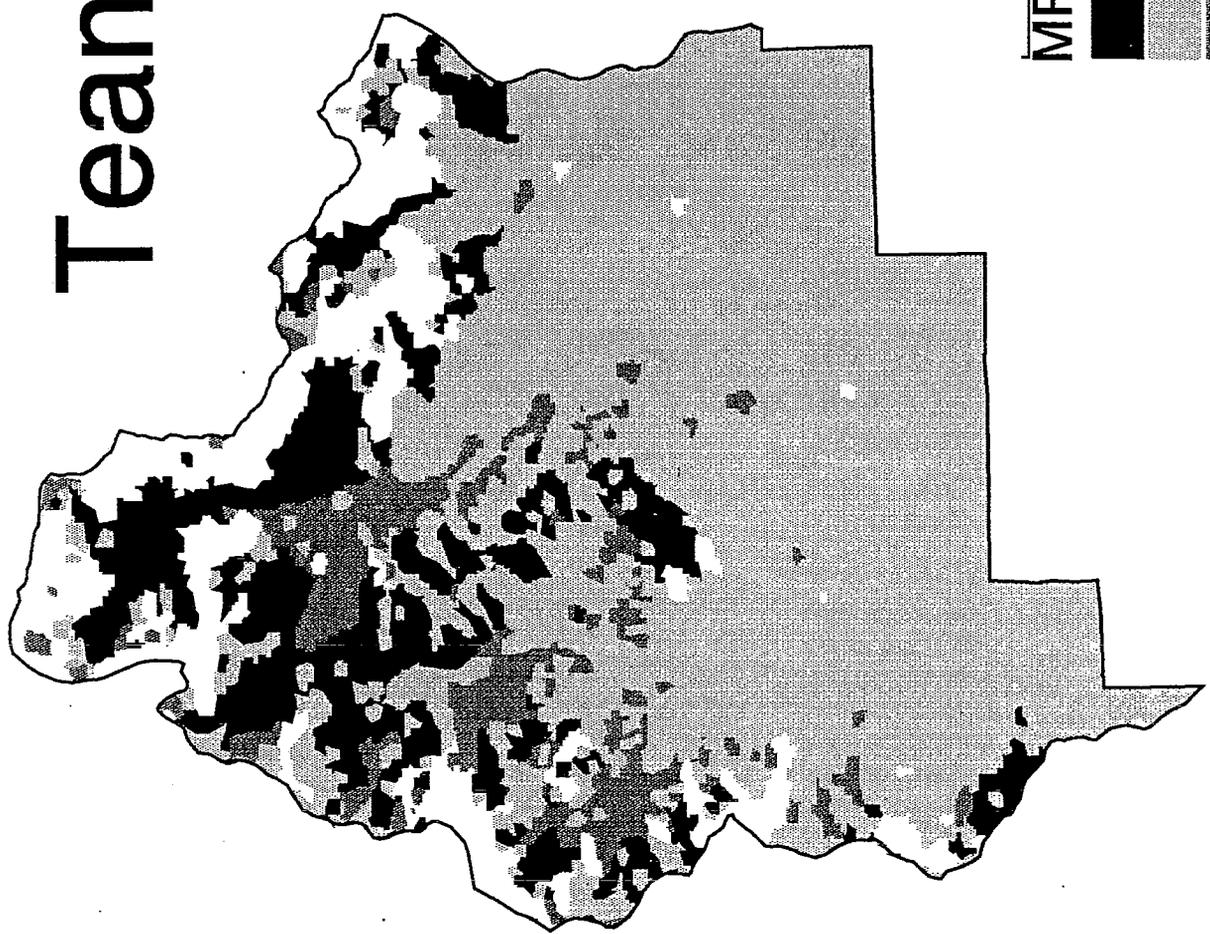
# Teanaway LSR



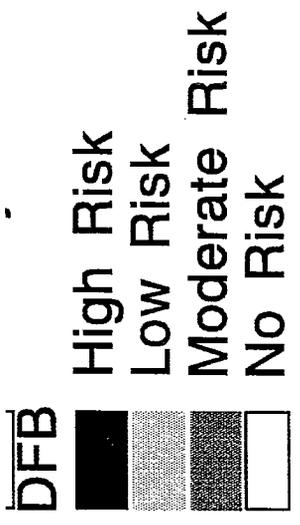
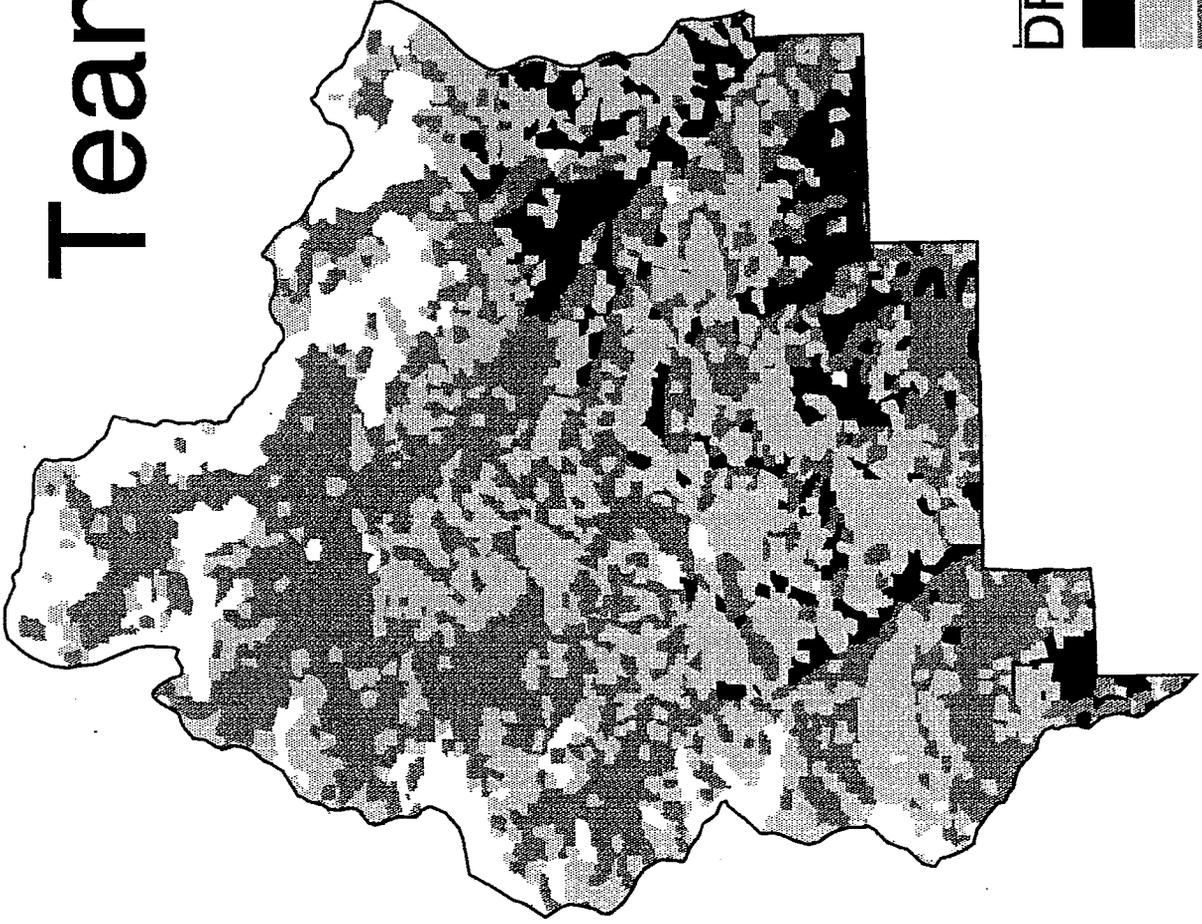
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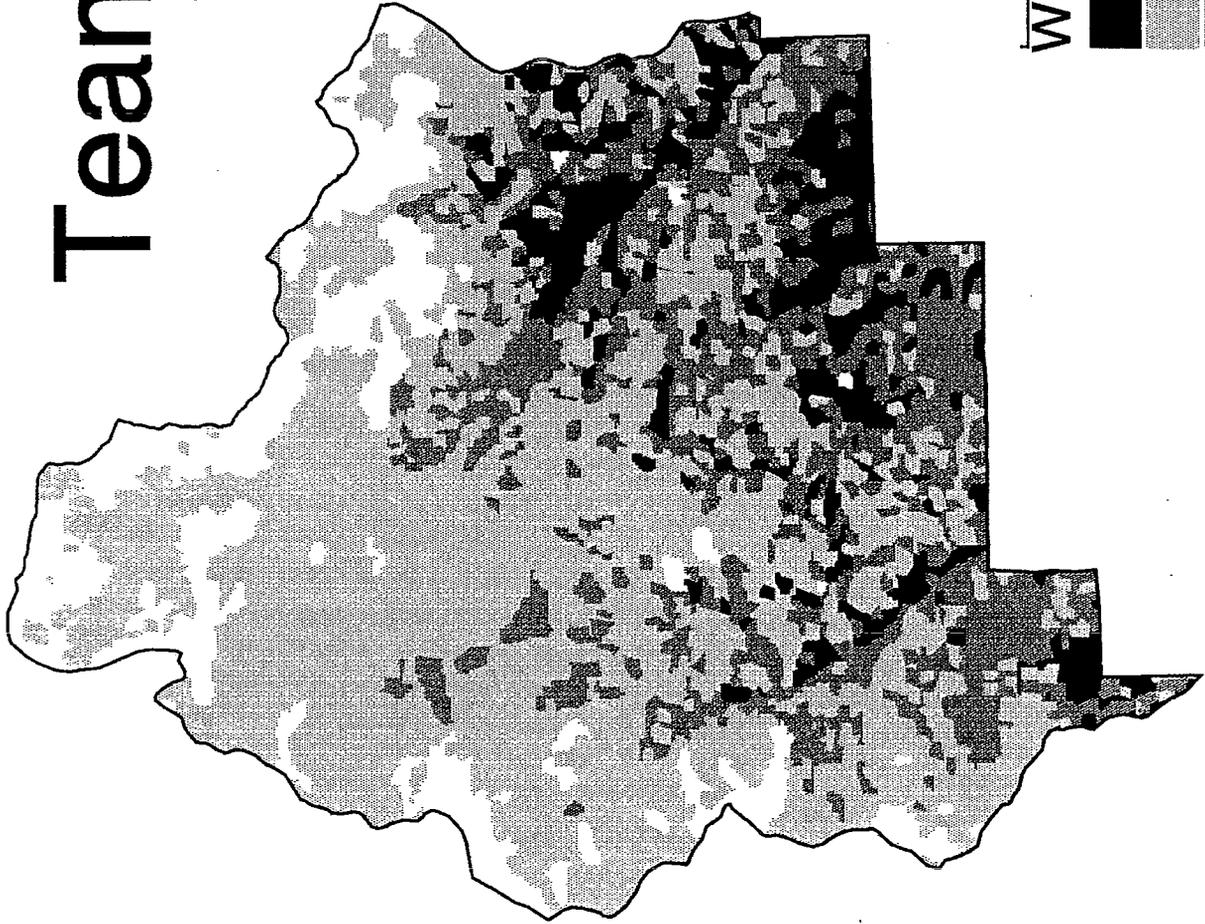
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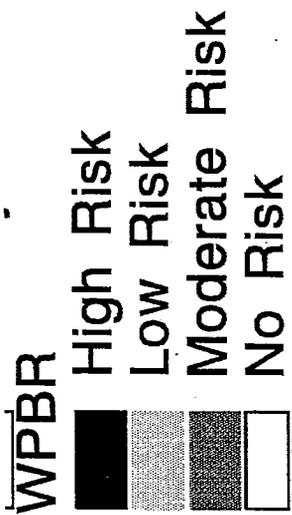
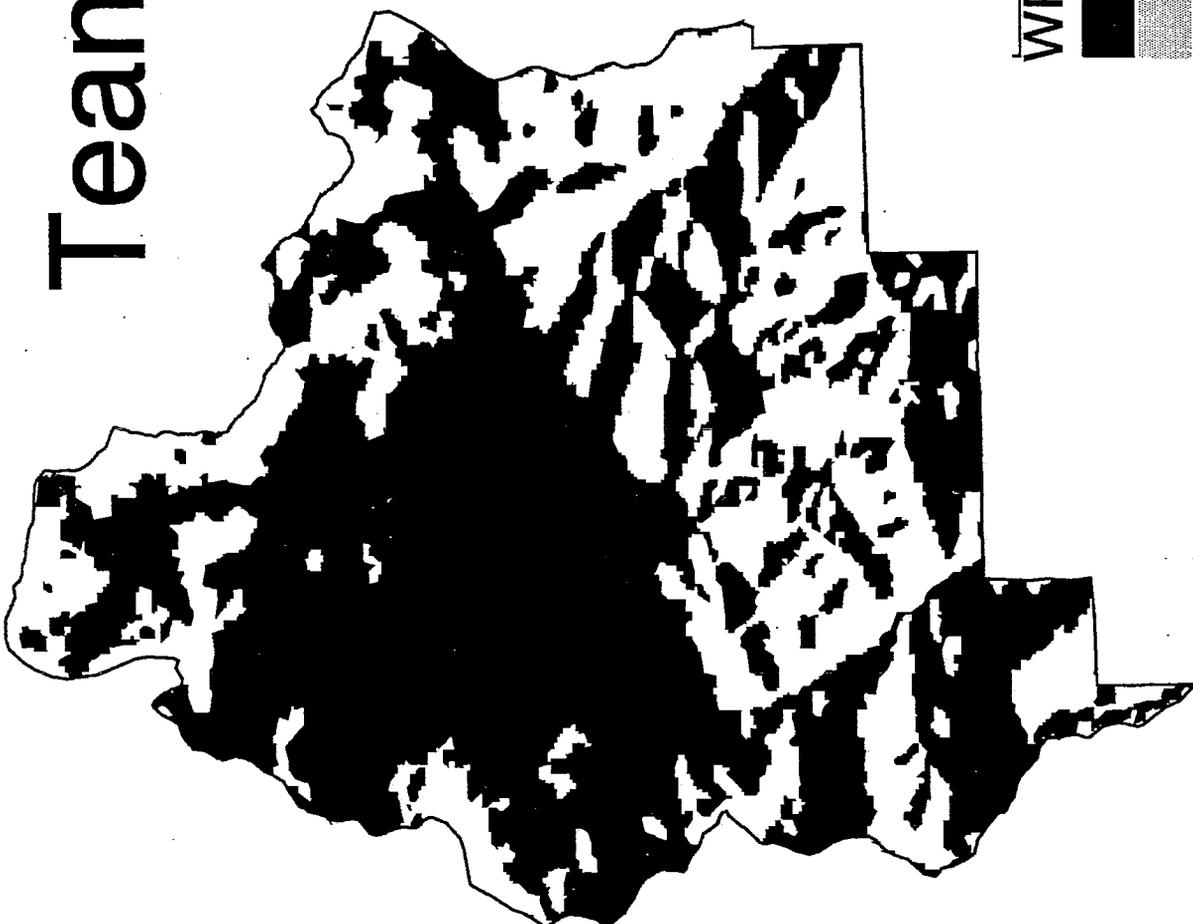
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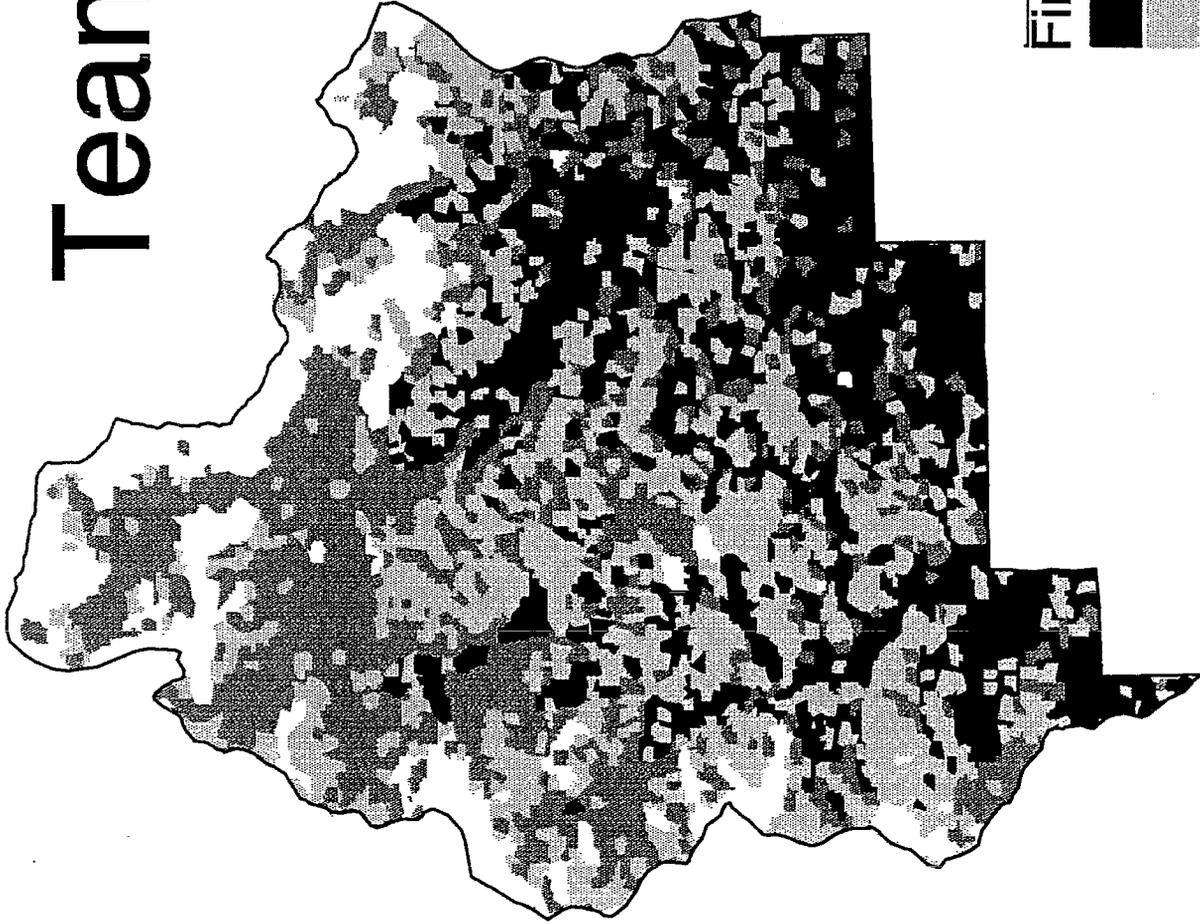
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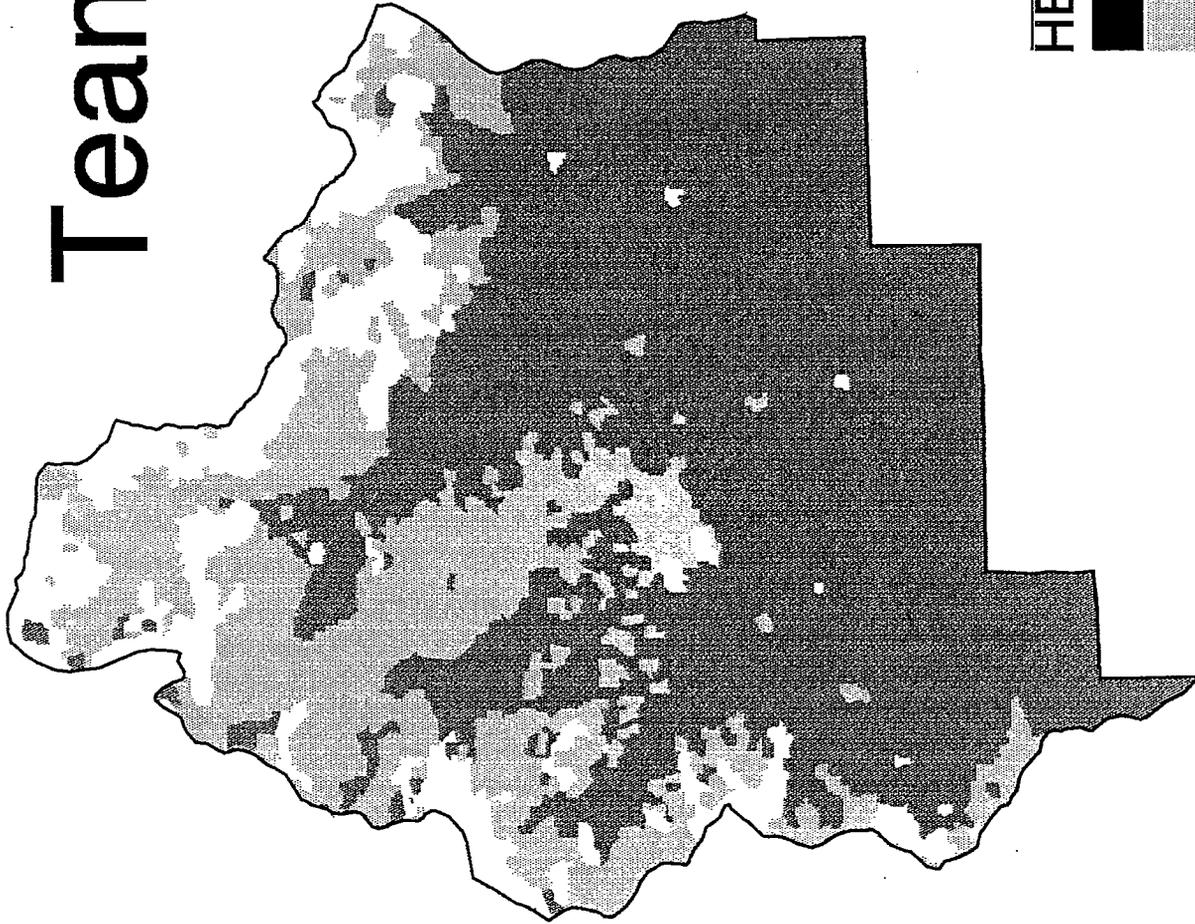
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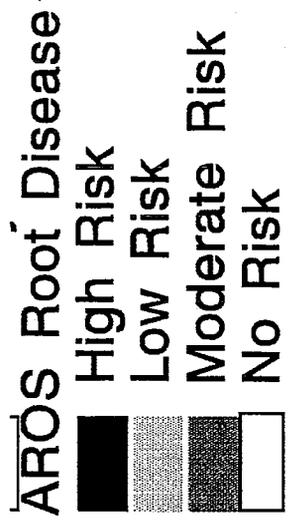
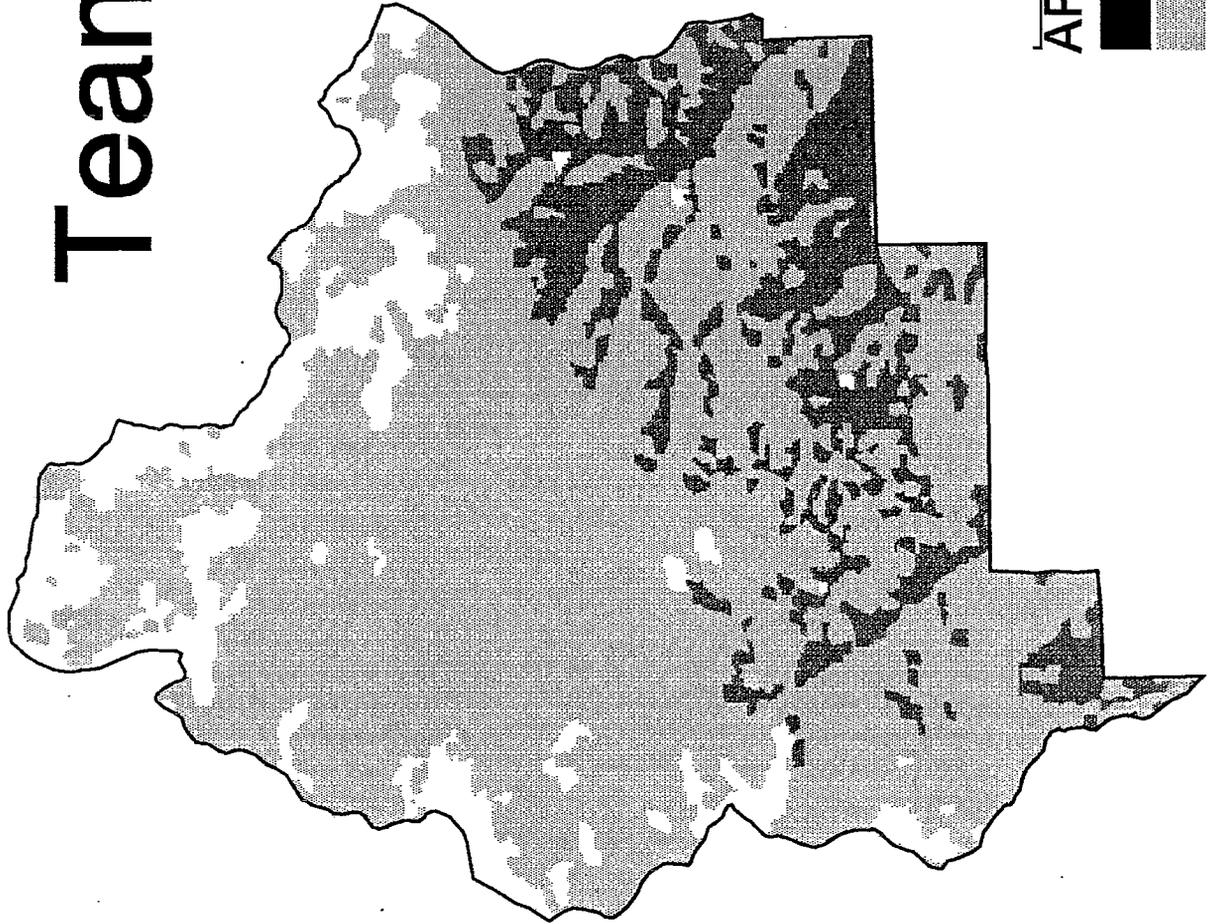
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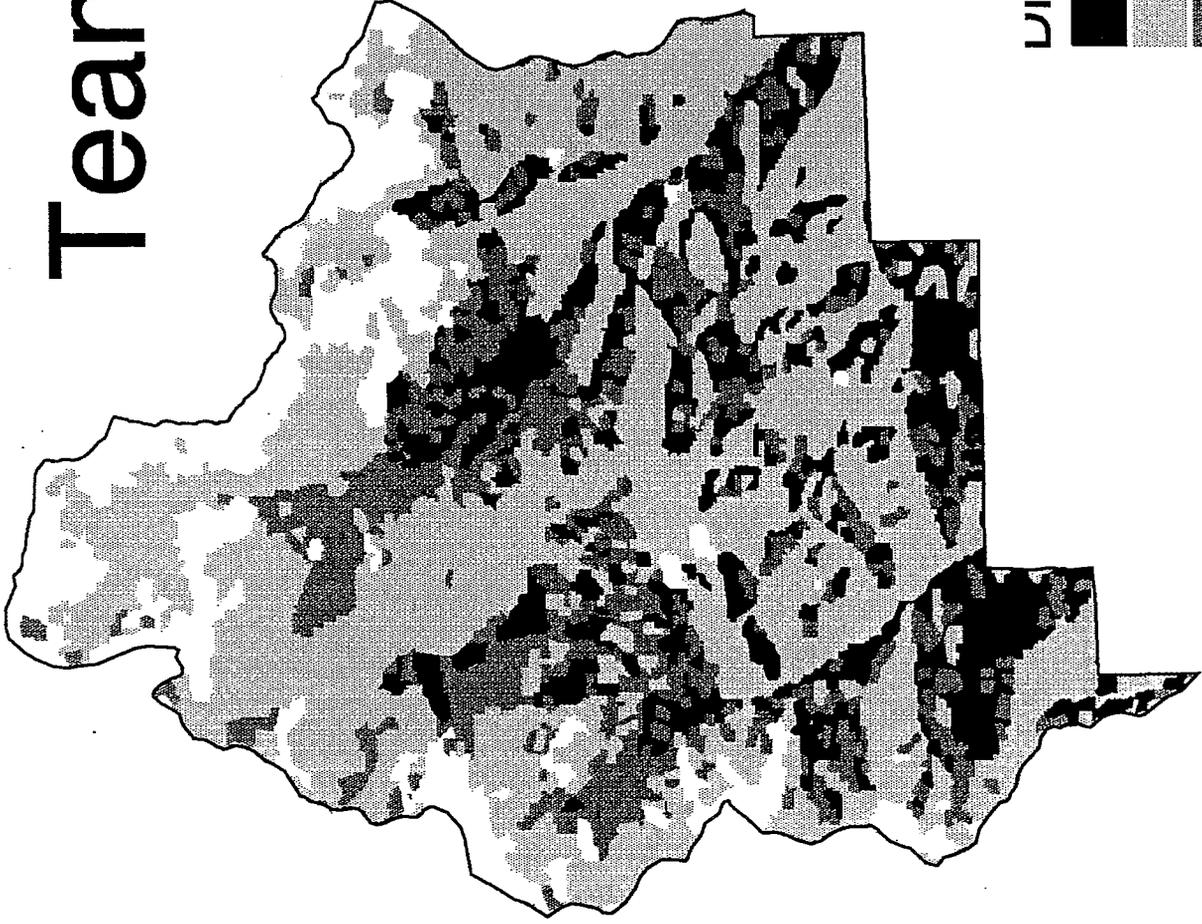
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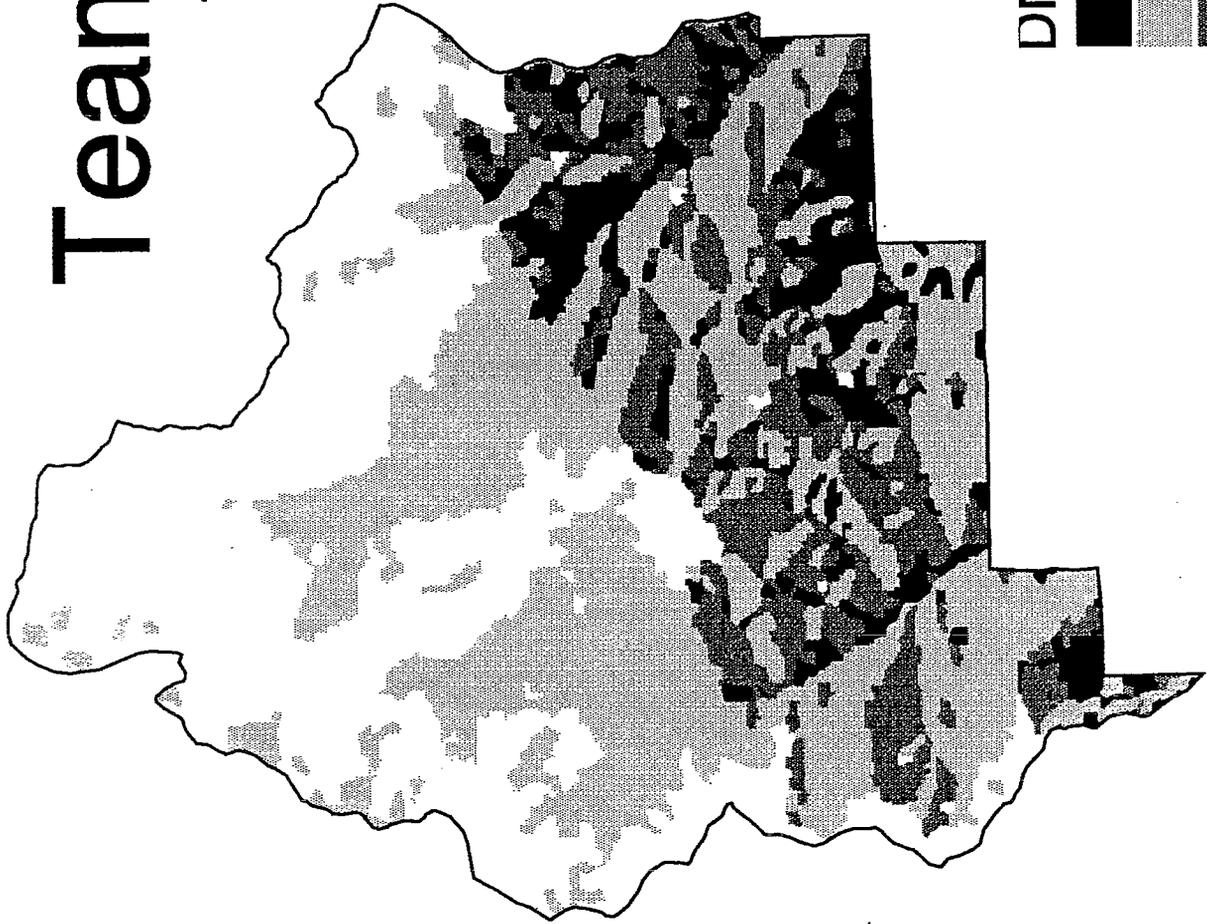
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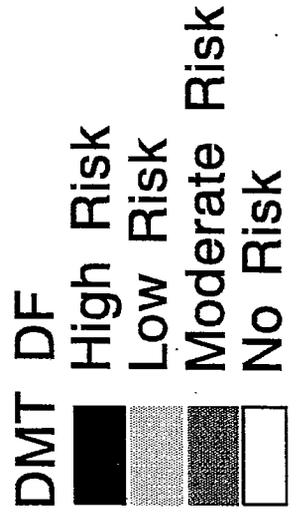
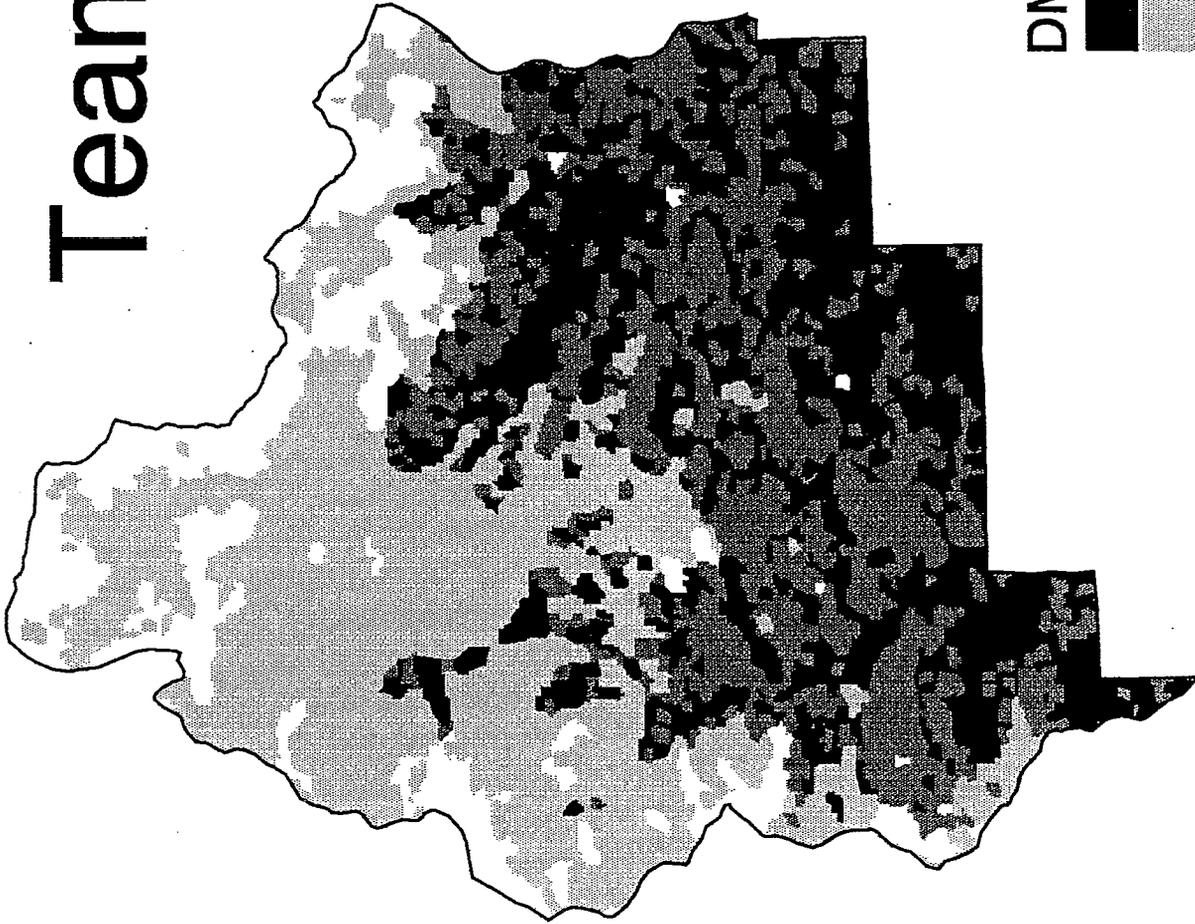
# Teanaway LSR



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