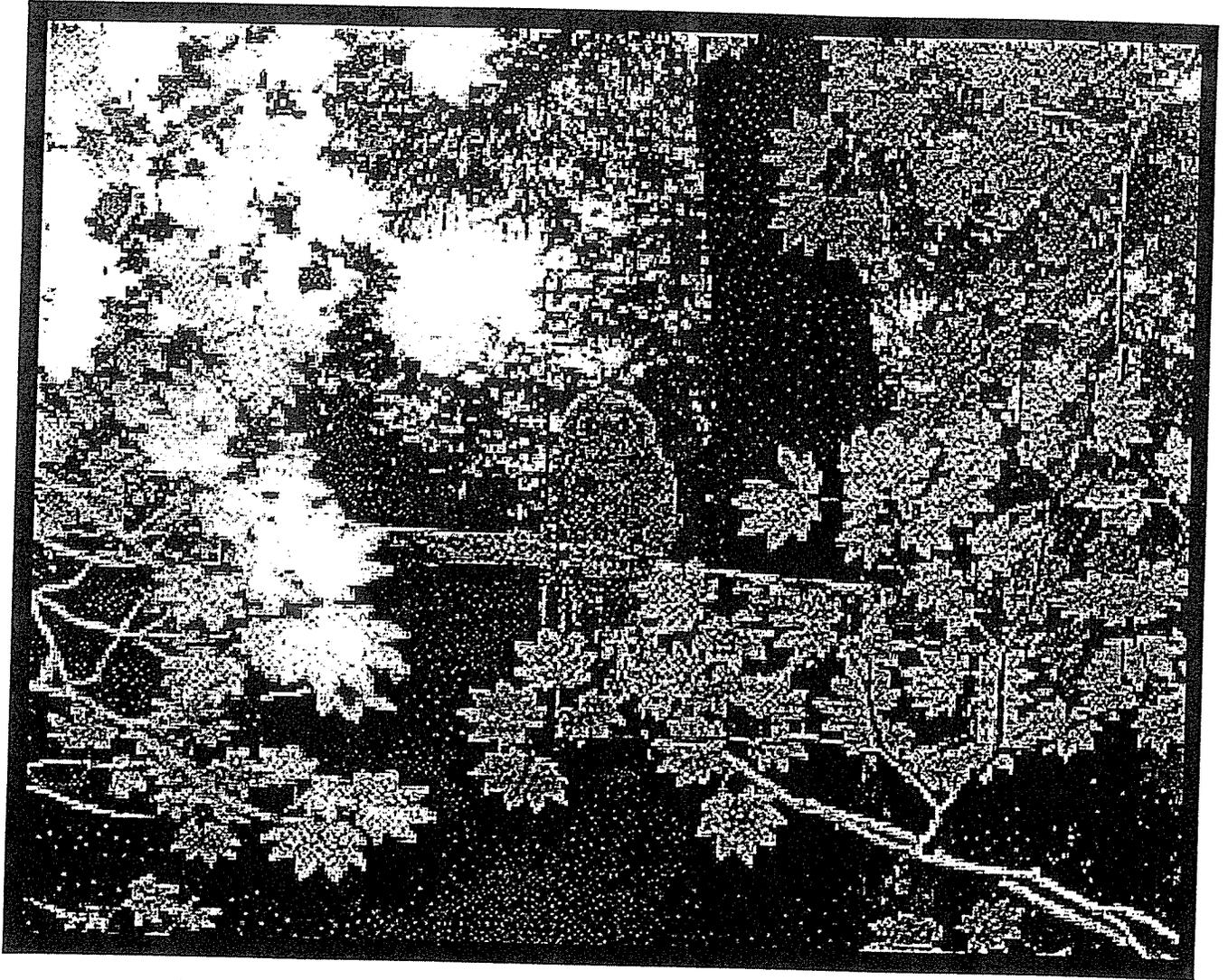


III.B. Wildlife - Terrestrial Species



Northern Spotted Owl in the Breitenbush

III. BIOLOGICAL DOMAIN

C. Species and Habitats - Terrestrial Wildlife

1. Characterization

- a) *What is the relative abundance and distribution of species of concern that are important in the watershed (e.g. threatened or endangered species, special status species, species emphasized in other plans)? What is the distribution and character of their habitats?*

This analysis will primarily focus on the following species: peregrine falcon, bald eagle, northern spotted owl, red tree vole and big game. Habitats of interest that will be discussed include snags and down wood habitats and a special wildlife area designated in the Forest Plan. There will also be a general overview of other species of concern and their potential habitats within the watershed.

Endangered species

- *Peregrine Falcon (Falco peregrinus anatum)*

There is one known peregrine falcon eyrie within the Breitenbush watershed. Disclosure of the location of the site is prohibited without approval, as this is sensitive information. This site was located in 1992 and has successfully fledged young every year except this year (1996).

Currently there is a mosaic of habitats within a three mile radius of the nest site, providing a good mix of talus, rock cliffs, early successional and late successional habitat. The Urban Link Trail, which could potentially impact the peregrine, is proposed in the vicinity of the nest site.

The management goal for the Peregrine Falcon Management Unit, which includes the Breitenbush watershed, is two stable pairs. The Willamette National Forest, which is also within the same unit, has 11 established pairs, well over the established management goal for this area.

Threatened species

- ***Bald Eagle (Haliaeetus leucocephalus)***

Bald Eagle habitat within the Breitenbush watershed exists primarily along the North Fork Breitenbush River and around high elevation lakes. This habitat is in fair to good condition.

The Bald Eagle Management Zone (Zone 12), which includes the Detroit Ranger District and Breitenbush watershed, has a recovery population goal of 25 breeding pairs and a habitat management goal of 42 pairs. The Willamette National Forest, which is in this zone and includes Detroit Ranger District, has 9 occupied sites, 8 of which were active in 1995.

Two of the Forest's 9 bald eagle sites exist on the Detroit Ranger District, but neither are in the Breitenbush watershed; however, approximately 300 acres of the Kinney Creek Bald Eagle Management Area lie within the watershed.

- ***Northern Spotted Owl (Strix occidentalis caurina)***

There are 20 northern spotted owls with home range centers inside the Breitenbush watershed. Eight of these owls are in Late Successional Reserve (LSR) R0214.

Late Successional Reserve R0214 makes up approximately 23% of the Breitenbush watershed. It comprises approximately 14,559 acres and is located in the east side of the watershed bordered by the Mt. Jefferson Wilderness.

LSR R0214 has the following habitat available for spotted owls within the Breitenbush watershed:

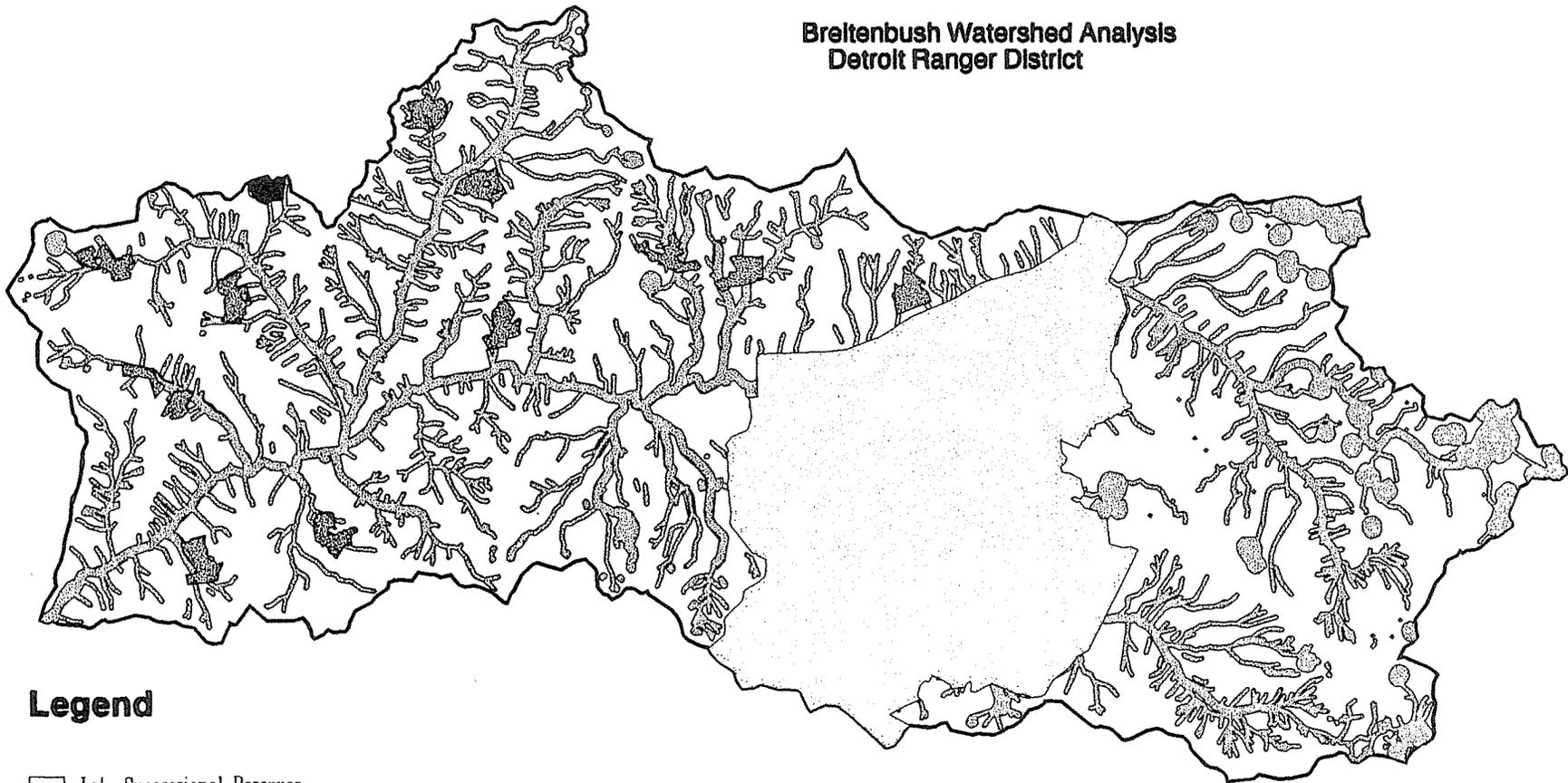
Type of Habitat	Percentage of LSR
Nesting	14%
Foraging	32%
Dispersal	24%
Atypical nesting or foraging*	1%

*Not typical habitat but spotted owls were either present or used the areas.

The nesting habitat within the LSR is scattered throughout the area in small

Wildlife Habitat Designations

Breitenbush Watershed Analysis
Detroit Ranger District



Legend

-  Late Successional Reserves
-  Late Successional Reserves
Spotted Owls
-  Riparian Reserves
-  Special Wildlife Habitat

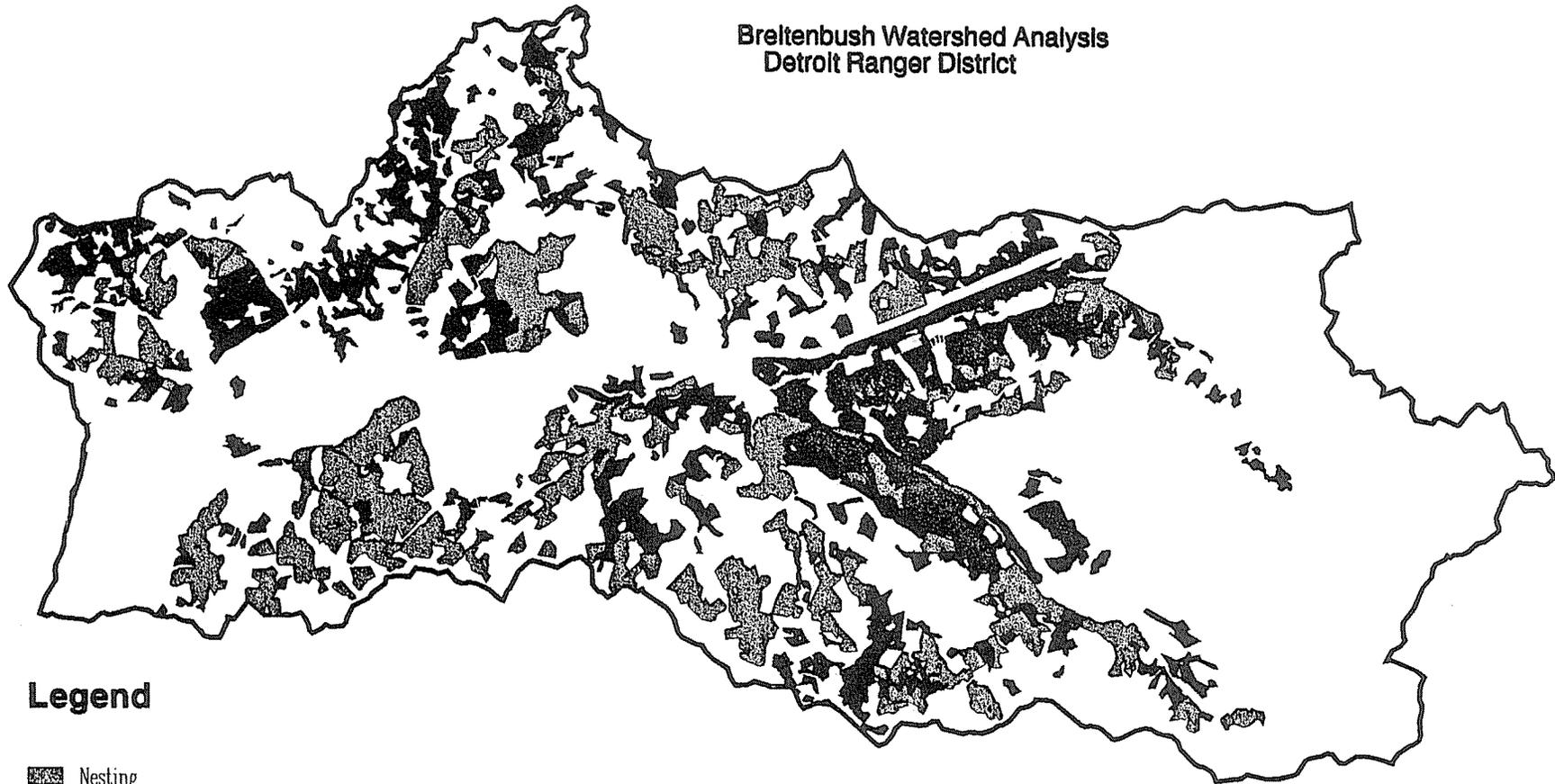


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Owl Habitat

Breitenbush Watershed Analysis
Detroit Ranger District



Legend

-  Nesting
-  Atypical Nesting
-  Foraging
-  Atypical Foraging



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patches averaging about 60 to 100 acres in size. Foraging habitat is usually found in large linear blocks, especially along Devils Ridge and the north-facing slope along the North Fork Breitenbush River. There are also some mid-sized patches of habitat between Skunk Creek and Devils Creek. The rest of the LSR is fragmented with both nesting and foraging patches. Within the LSR, there are also large openings or non-habitat from previous harvest activities. These are located in the South Fk. Breitenbush, Roaring Creek and Upper Devils Creek. It will take approximately 80 to 150 years before late successional characteristics could be attained here.

Record of Decision, Table C-3 Species

- ***Red Tree Vole***

The population of red tree voles in the Breitenbush drainage is unknown at this time. The vole is important as a prey species for the spotted owl, as well as, other owls, martens and fishers. It tends to be more abundant in mature and old growth stands, which provide optimum habitat. Fragmentation of old growth is a concern for this species.

The red tree vole is a survey and manage - Category 2 species. Direction for these species is to survey prior to initiating activities and manage sites accordingly. The protocol for surveys is currently being developed.

Other Species or Habitats of Interest

- ***Big Game***

Deer are abundant in the Breitenbush watershed. Elk are also present, but not in the numbers that deer are.

The Wisdom Model was used to determine big game habitat effectiveness in the Breitenbush. The model shows that forage is limiting not only in winter range, but in summer range as well. This may not be an entirely accurate depiction of all areas, because the computer model does not represent forage generated in thinning stands well. In some thinned areas, there may actually be more forage than predicted by the model.

Road densities, another component of habitat effectiveness, exceed desirable levels throughout the watershed in winter range and in three Management Emphasis Areas (MEA) (*figure III- _*) in summer range.

The primary thermal cover in the watershed is in the Mt. Jefferson Wilderness and above road 46 while the upper Humbug area provides the primary optimal cover for big game.

- *Snag and Down Woody Habitat*

Snags and down woody material are below desired levels in many areas of the watershed, primarily on managed stands and in areas of past fires.

Changing management requirements, coupled with a major wind storm in 1990, heavy snow breakage, a flood in 1996, spruce budworm infestations, and fires have contributed to increasing numbers of snags and amount of down wood in some areas of the watershed in recent years.

- *Special Wildlife Habitat Area*

Dunlap Lake was designated in the Forest Plan to protect or enhance unique habitats and botanical sites which are important components of healthy, biologically diverse ecosystems. Dunlap Lake does not seem to fit the Forest Plan definition of a special wildlife habitat area. It has low species and habitat diversity. In addition, the area receives moderate recreation use, which may affect habitat usability.

The following is a list of species, not mentioned previously, that have potential habitat within the watershed. An * next to a species denotes species seen in the watershed through observation by district personnel.

Record of Decision, Table C-3 Species:

- Great Gray Owl *
- Black-backed Woodpecker
- Lynx
- Fringed Myotis
- Silver-haired Bat
- Long-eared Bat
- Long-legged Bat
- Pallid Bat

Appendix I-2 Species:

- Cascade Torrent Salamander
- Tailed Frog
- Clouded Salamander
- Oregon Slender Salamander
- Common Merganser *
- Hoary Bat
- Fisher
- American Marten

R-6 Willamette National Forest Sensitive Species :

- Red-legged Frog *
- Northwestern Pond Turtle
- Harlequin Duck *
- Greater Sandhill Crane
- Townsend's Big-eared Bat *
- White-footed Vole
- Invertebrates

ODFW Sensitive Species List

- Wolverine
- Barrow's Goldeneye

Seventeen guilds (groups of species using the same habitat in a similar way) are represented by this list of species of concern. These guilds should be considered for emphasis in future management activities to assess impacts to these species of concern's habitats.

2. **What values are associated with species and habitats?**

- a) Species and habitats have aesthetic, economic, recreational, and spiritual value.
- b) Native wild gene pools have ecological value.
- c) Native species have value to ecosystem function.
- d) Habitat components necessary to sustain the variety of species indigenous to the area has ecological values (i.e. habitat distribution, connectivity, etc.)

3. **What are the highest priority issues or resource concerns associated with species and habitats?**

- a) Having habitat components necessary to sustain a variety of species native to the area.
- b) Conflicting habitat needs for various species (i.e. big game and spotted owls).

4. **What are the management direction/activities, human uses, or natural processes that affect species and habitats?**

a) *Current Conditions*

i) *What are the current habitat conditions and trends for the species of concern identified above?*

Habitat in the Breitenbush watershed was mapped into wildlife guilds, or groups of species using the same habitat in a similar way (Mellon, 1995). Within the Breitenbush watershed, there are 24 wildlife guilds represented.

Contrast Species: Preferred habitat for these species is a combination of early and late seral stages. Species of concern are golden eagles and great gray owls in the large home range guilds and Lewis's woodpecker in the small home range guilds. Another group of animals in this guild are big game (i.e. deer and elk).

There is habitat within both the Pacific silver fir and western hemlock zones. The habitat within this guild is concentrated in larger patches in Short Creek to Breitenbush Mountain, Devils Creek around Eagle Rock, and part of Cliffs Creek. There are also smaller fragmented blocks of habitat that are grouped together in East Humbug and Byars headwaters and Devils Creek headwaters around Spire Rock

that large home range species can use. Connectivity between patches is fair to good for medium home range species and minimal for small home range species. There are gaps within the habitat for this guild primarily in the Canyon Creek area, western and lower Humbug areas, Eagle Rock, Scorpion, and the wilderness.

Late seral habitat provides adequate snags and down wood, but in early seral habitat, snags and down woody material may be more limiting.

The Canyon Creek area and wilderness may never be able to produce late seral habitat needed for these species. Late seral habitat will likely increase within the LSR and riparian reserves and timber harvest will likely result in early seral stands being retained across the watershed outside the LSR.

Generalist Species: These species use a variety of seral stages. There are no species of concern in any of the home range size guilds in this watershed.

Habitat meeting requirements for generalist species is prevalent throughout the watershed. Snag and down wood availability is variable in the Breitenbush. Some areas have abundant habitat and others, especially in areas that were harvested prior to 1990, do not.

Early Seral: Species of concern in this habitat type are mountain quail which is a small home range mosaic species; and mountain bluebird and western meadowlark which are also small home range species, but they prefer patches.

Early seral habitat for species with varying home range sizes is widely distributed across the watershed, mainly as a result of timber harvest, although significant patches of this habitat type are also a result of past fires, most notably around Eagle Rock. The major limiting factor in this habitat is lack of snags and/or down woody material due to past management practices and fires.

Late Seral: Species of concern in this habitat type are marten, fisher, pileated woodpecker, northern spotted owl, and northern goshawk in the large home range category; black-backed woodpecker and northern three-toed woodpecker in the medium home range category; and Oregon slender salamander, western red-backed vole, and Williamson's sapsucker in the small home range category.

Overall, highly suitable habitat is limited to places where the large patches of late-successional habitat remain in Leone-Hill Creeks, Devils Ridge, and the east facing slope into Humbug Creek and near the confluences of Leone and Hill Creeks. The Pacific silver fir zone has the majority of the highly and moderately suitable habitat in the watershed.

Most of the highly suitable habitat contains adequate numbers of snags and down woody material.

Large home range species: connectivity is good in the eastern half of the watershed. But as you move west, connectivity lessens.

Medium home range species: Species of concern in this category, the black-backed woodpecker and northern three-toed woodpecker, are mainly found in the mountain hemlock zone or upper elevations, where there is virtually no habitat in this watershed. Gaps in habitat for medium home range species are most critical in the upper elevations, mainly the wilderness.

Small home range species: Connectivity is fair to good, with the most isolation occurring on the west slope of East Humbug Creek, however this borders the wilderness which offers connectivity outside the watershed. Gaps occur in Wind and Slide Creek area and around Eagle Rock.

Riparian: Species of concern in this habitat type are common merganser, Harlequin duck, Cascade torrent salamanders, tailed frogs, Barrows goldeneye and the Bufflehead.

There are seven riparian guilds and one guild that focuses on special habitats. Of the seven riparian guilds, one guild focuses on the aquatic portion of the habitat, three guilds represent species using both the aquatic and terrestrial riparian vegetation and the remaining three guilds represent species using only the terrestrial riparian vegetation. These are further divided by the seral class in which they occur.

There are 5,016 acres of inventoried special habitats within the watershed, 5% of which are water. Most of the water is comprised of lakes which are primarily found in the wilderness or the Olallie Lake Scenic Area. For the riparian guild which focuses on the aquatic portion of the habitat, Detroit Lake, Dunlap Lake, Leone Lake and the lakes in the wilderness and the Olallie Lake Scenic Area probably provide the greatest amount of suitable habitat. There are several smaller ponds but these may not be large enough to support some species within the guild.

Riparian guilds, focused on riparian habitat in the early seral stages, comprise about 18% of the riparian reserves in the watershed. These areas are concentrated mainly in the Eagle Rock fire area, Slide Creek, lower Byars Creek, and Canyon Creek. There are also riparian areas which are highly fragmented. These are located in Mink Creek, East Humbug Creek, Devils Creek, and Hills Creek. The majority of these are concentrated in the southwest portion of the watershed. Connectivity out of the watershed is fair. Links out of the watershed can occur via East Humbug

Creek, Eagle Rock area and Canyon Creek.

Riparian guilds, focused on habitat in the mid to late seral stages, comprises 69% of the riparian reserves in the watershed and is widely distributed throughout. The major concentrations of late seral habitat occur along the main stem of the Breitenbush River, South Breitenbush River, Mansfield Creek, the upper reaches of East Humbug Creek, the upper reaches of Byars and Humbug Creeks, Cliffs Creek and portions of Leone and Hill Creeks.

Riparian guilds focused on habitat regardless of seral stage satisfies the generalist species. This guild should be well provided for within the watershed due to a mix of seral classes throughout the watershed.

Snags and Down Woody Material: The current condition of snags and down woody material are displayed in the graphs below. Averages were developed for various stand types and changes in management for different time periods.

Snag levels will be retained in harvest units to comply with Forest Plan standards and guidelines. Within the LSR, snags will be created across the landscape as late-successional habitat is developing. Thus, snag levels should increase in this area. Snags will continue to be created either by disease, wind, etc. Levels should average out across the landscape as snags are created in harvest units, but many natural snags will be lost due to harvest activities and OSHA requirements. Fire suppression will also continue, which will allow stands to mature, resulting in larger snags. However, the possibility of snags being created by fire may be lost. Snags can be created in areas where levels are deficient that are adjacent to harvest units by means of KV funding. Snag levels in riparian reserves will continue to increase as well.

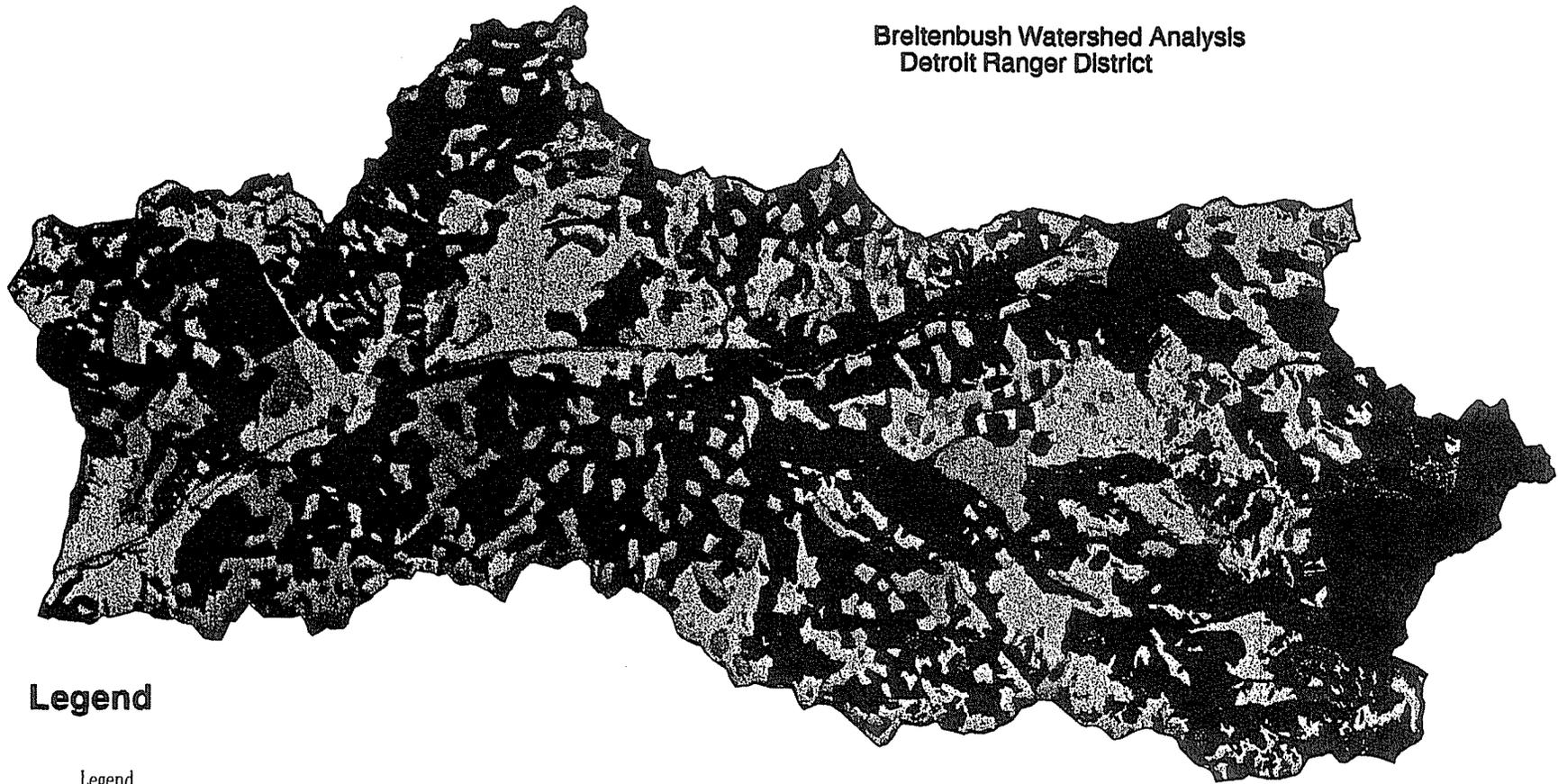
There are areas of the watershed that may never produce the size and quantity of snags required by Forest Plan standards and guidelines. These include the wilderness and the Canyon Creek area due to high elevation and rocky ground.

Besides these areas, snag levels are below standards and guidelines in Short Creek, Eagle Rock, and Scorpion Creek. On the other hand, snag levels are adequate or exceed standards in the Humbug, Cliffs Creek, Devils, and parts of Skunk Creek.

Down woody material: A minimum of 240 linear feet/acre will be retained on future harvest units, unless higher levels are prescribed or ecosystem conditions are such that they cannot support this much down woody material. Within the LSR, levels will continue to increase as late-successional stands develop. Down woody material will continue to be created by wind, disease, etc. This will probably occur along

Down Woody Debris

Breitenbush Watershed Analysis
Detroit Ranger District



Legend

- Legend
- High
 - Medium High
 - Low Medium
 - Low
 - Non Forest
 - Pvt



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edges of harvest units and ridgetops. As with snag levels, down woody material levels should even out across the landscape over time. Levels within riparian reserves will increase. Fire suppression will allow habitat to mature creating larger diameter wood. Down woody material will not be consumed as frequently due to fire suppression efforts. Wilderness areas and the Canyon Creek area may not produce desired levels or sizes of down woody material because of rocky soils and/or high elevation growing sites.

The following table defines the number of snags and tons of down wood per acre for each of four rating classes (low, low-med, med-high, and high) used in the graphs below.

Rating Class	Snags (# per acre)	Down Woody Material (tons per acre)
Low	<1	<5
Low - Medium	1-4	5-17
Medium - High	5-7	18-30
High	8+	30+

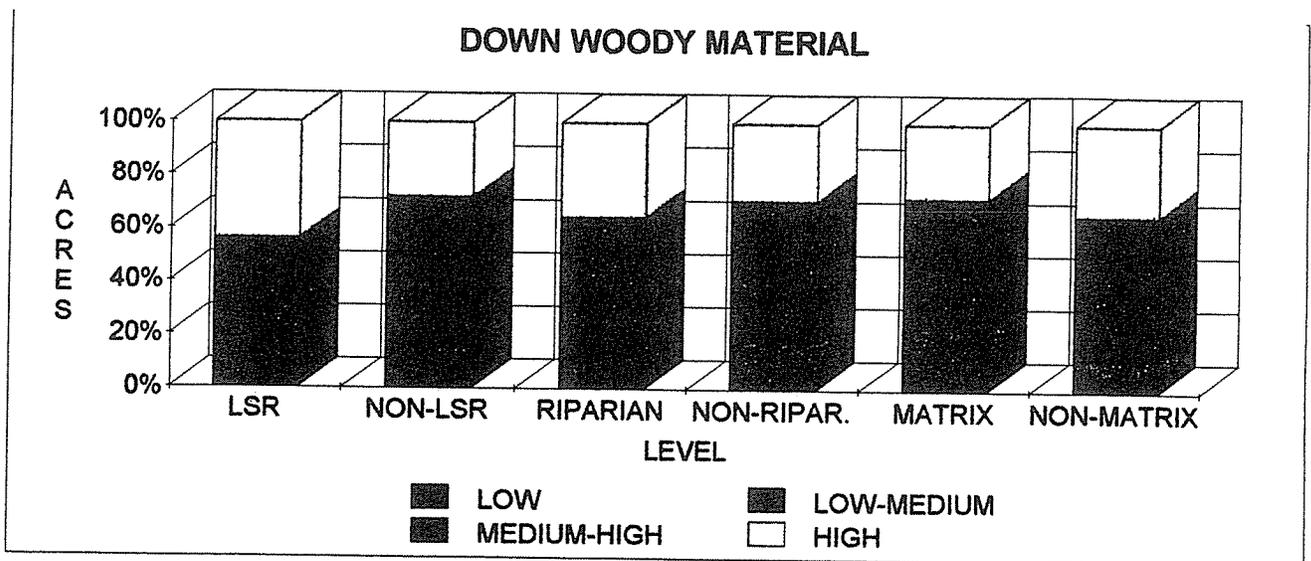
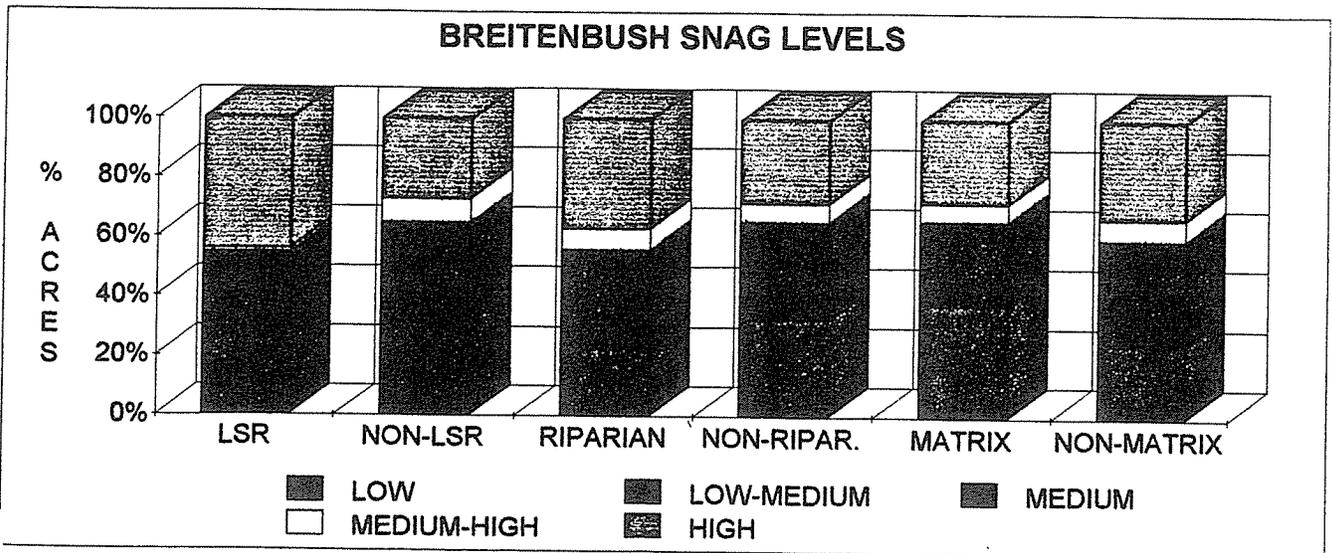
Assumptions in querying snag and down woody material:

Snags

- (Low) - pre-1990 harvested units
- (Low - Medium) - stands 9.0" - 20.9" dbh, natural
- (Medium) - post 1990 harvest units
- (Medium - High) - stands 21" - 31.9"
- (High) - stands 32"+

Down Woody Material

- (Low) - harvested units (1970-1990)
- (Low - Medium) - stands 9.0"-20.9" dbh
- (Medium - High) - stands 21"-32" dbh, pre-1970 harvested units, and post 1990 harvested units
- (High) - stands 32"+ dbh



ii) *What are the risks to maintenance of late-successional habitat within the late successional reserve?*

Fire is probably the biggest risk to maintenance of late-successional habitat within the late successional reserve (LSR) in this watershed. The following factors contribute to this risk by fire: the fire history of the watershed, the incidence of human and lightning caused fires, and high fuel loading in some areas from snow breakage or tree mortality caused by insects, etc.

Although most of the owl habitat within the LSR is currently moderate to low fire hazard, there are a few areas mainly along ridges and on drier site types where fire hazard is high. Owl pairs 14, 66 and 89 would likely be affected the most by a significant fire event. There is also a large patch of foraging habitat along the wilderness boundary, near Crown Lake, that provides important dispersal habitat that could be at risk from wildfire.

To date, most of the spruce budworm infestations in the Breitenbush watershed have occurred outside the LSR. However, in 1992 approximately 3,200 acres of Outerson and Skunk Creek areas showed signs of budworm infestation which affected some spotted owl nesting and foraging habitat. Most of the infestation was in smaller patches of habitat, but one mid-sized patch of nesting habitat was affected. This infestation may provide greater diversity for the area by increasing the amount of snags and later on, the amount of down woody material. However, it will decrease canopy closure but may create gaps which are important in older forest ecosystems.

Approximately 75% of the budworm infested area is rated as medium to high fire hazard. Of this, approximately 30% is nesting habitat and 20% is foraging habitat, so potential for loss of habitat from wildfire is great. Two known spotted owl pairs are located within this area.

Most of the nesting habitat within the LSR is located in the southwest corner, near the budworm infestation, making it crucial to try and retain this habitat. If a fire event were to occur in this area, it may also hinder dispersal due to the juxtaposition of habitat. It would also reduce the number of pairs within the LSR.

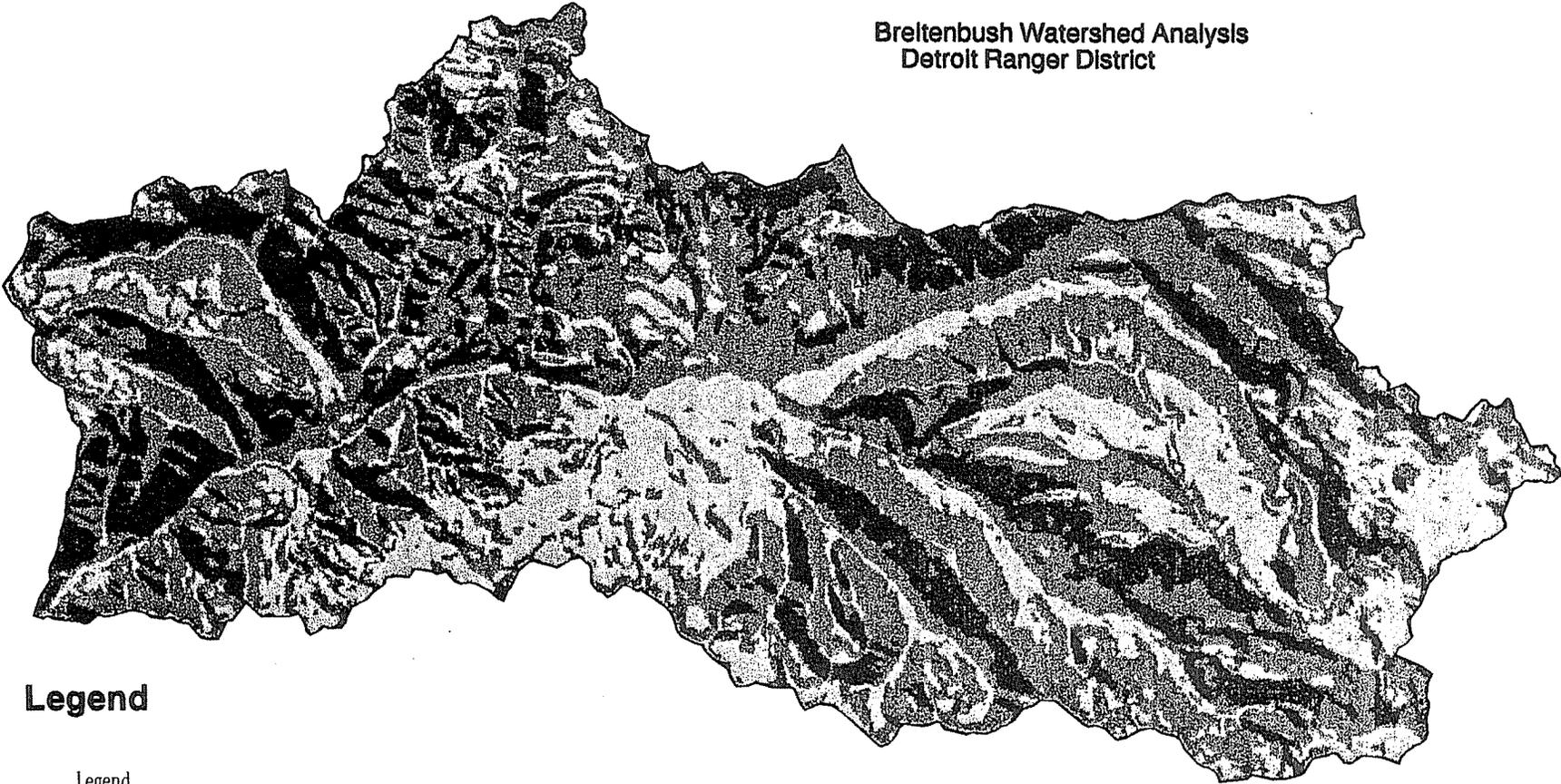
In some areas of late-successional habitat, in the watershed, there is considerable down woody material due to snow breakage this past winter, build up over the past few years, and increased insect mortality. If a significant fire event were to occur, existing late-successional habitat may be jeopardized, especially in and adjacent to the LSR. These fires would probably burn hotter and grow larger due to some of these conditions. Fuel loading reductions may be necessary in some areas to prevent a large scale loss of habitat. This may also be required in the LSR. Adequate amounts of down woody material should be left but reducing levels in specific areas may reduce the chances of a major fire event.

iii) *How do existing habitat conditions provide for spotted owl dispersal outside the late successional reserve?*

Dispersal habitat was assessed using the "11- 40" rule. This requires a quarter township to have at least 50% of the habitat at 11" dbh or greater and 40% or

Fire Hazard Matrix

Breitenbush Watershed Analysis
Detroit Ranger District



Legend

- Legend
- High Hazard
 - Medium Hazard
 - Low Hazard



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greater canopy closure to provide adequate dispersal capabilities.

Dispersal habitat outside the LSR is good within 16 of the 22 quarter townships containing >60% of their acreage as dispersal habitat or better.

Of 22 quarter townships in the analysis area, the following is a break out of the condition of the quarter townships.

Above 70%	- 9 QT's
60 - 70%	- 7 QT's
50 - 60%	- 4 QT's
Below 50%	- 2 QT's

There are two quarter townships that are below 50%, 09062 and 10061. Quarter township 09062 encompasses the Eagle Rock area which is an area of young stands due to a fire occurrence and harvest activities. This quarter township is currently at 39.8% for 11-40 conditions. Riparian reserves within this quarter township show little dispersal capability now (Cultus Creek and tribs). It is estimated that this area will not meet 11-40 conditions for 30-40 years to come.

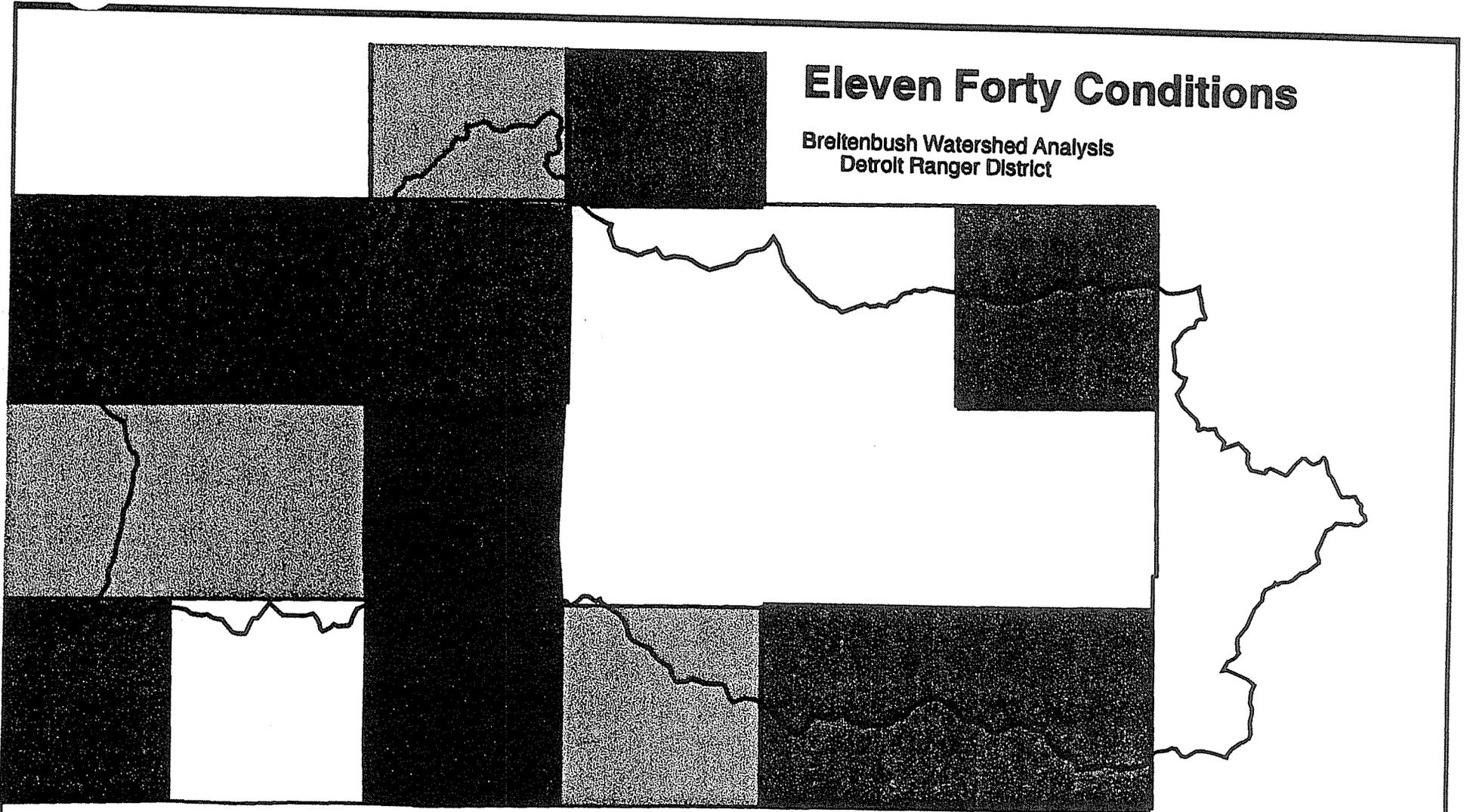
Quarter township 10061 is almost entirely outside the watershed, except for a few acres, but it is important because it is currently at 49.7%, it contains a linear band of private land near the watershed boundary, and more harvest can be expected on this private land. Because of the orientation of the private land along the southern watershed boundary and projected harvest activities, this private land may limit dispersal over time. For these reasons, it is important to maintain connectivity through this area.

Santiam Pass Area of Concern (AOC): The northern portion of the Santiam Pass Area of Concern lies within the watershed and covers most of the area below Road 46. This area was identified by U.S. Fish and Wildlife Service because of a concern for limiting intra-provincial movement and owl distributions. The US Fish and Wildlife Service noted that population levels are low within this area and that habitat quality and quantity are greatly reduced. The Santiam Pass AOC does not include the majority of the Eagle Rock fire area. This may add to dispersal problems in this area. Four known pairs lie within the Santiam Pass AOC. Two of these are in a take situation while the remaining two are near the 40% level.

Connectivity: Connectivity from the Late Successional Reserve (LSR) to matrix lands is variable. In some areas connectivity is pretty good while in other areas fragmentation may be hampering dispersal. The area around the Eagle Rock fire provides minimal connectivity and in fact may be a barrier to dispersal. Connectivity

Eleven Forty Conditions

Breitenbush Watershed Analysis
Detroit Ranger District



Legend

-  Below 50%
-  50 - 60%
-  60 - 70%
-  Above 70%

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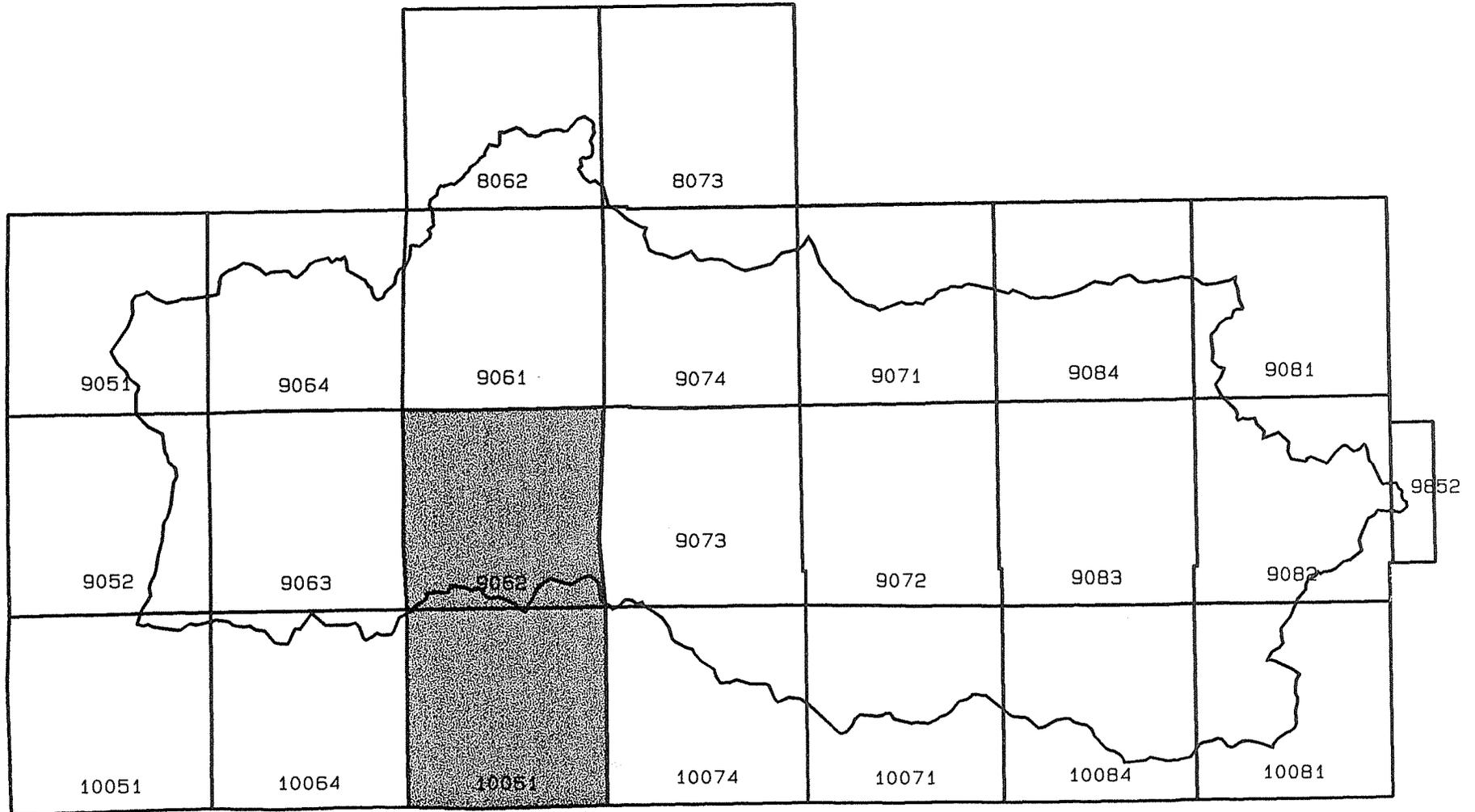
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Quarter Townships below 11-40

Breitenbush Watershed Analysis
Detroit Ranger District



Scale 1:150000

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to neighboring Late Successional Reserves is fair, with fragmentation being the major issue.

iv) What is the condition of the riparian reserves in the watershed in terms of spotted owl dispersal habitat and the distribution of those conditions?

Under the amended Forest Plan, one of the objectives of riparian reserves was to serve as connectivity corridors among the Late-Successional Reserves. The specific issues addressed by riparian reserves for spotted owls is retention of adequate habitat conditions for dispersal. Riparian reserves, in the Breitenbush watershed, were analyzed for dispersal habitat conditions using the 11-40 Rule. Even though the 11-40 Rule is not a standard and guideline, it was used for lack of a better method to determine adequate dispersal habitat.

Overall, riparian reserves within the watershed are in good condition with approximately 70% of the riparian reserves meeting 11-40 conditions. Many riparian reserves are in better shape than the surrounding quarter townships in which they are located.

Riparian reserves in quarter township 10064 fall below 50%, but only a small portion of this quarter township is within the watershed, in the headwaters of Wind and Slide Creeks.

Riparian reserves in quarter township 09062 are near minimum levels at 50.8%. While the entire quarter township is below 50% due to the Eagle Rock fire. There are three main creeks within the quarter township, Cultus Creek, Cliffs Creek, and a Leone Creek tributary. Cliffs Creek has remained fairly intact and is typed as old growth. The Leone Creek tributary is highly fragmented, while the majority of Cultus Creek is in a stand initiation stage.

Overall, riparian reserves in the Late Successional Reserve are in good shape with the exception of the headwaters of Skunk Creek which are heavily fragmented.

- v) *What is the condition of big game habitat relative to land management planning standards and guidelines for habitat effectiveness? Does the current big game network meet standards and guidelines of the NW Forest Plan?*

There are several trends showing up from an analysis of Habitat Effectiveness using the Wisdom Model. Every Management Emphasis Area (MEA) is below standards and guidelines (S&G's) for forage overall and in winter range with the exception of Slide MEA. However, because of limitations of the model, more forage may be available than the model displays. For instance, thinning units provide forage which is not well represented by the model.

Devils, Short and Slide MEA's exceed acceptable road densities overall and all MEA's exceed acceptable road densities in winter range.

The Habitat Effectiveness Index (HEI) is below standards and guidelines in Humbug and Short MEA's where forage is very limited. Roads may also be a factor in bringing the Habitat Effectiveness Index of the Short MEA below standards and guidelines. There has been a fair amount of thinning in these areas which may be providing some forage that is not well represented in the Wisdom Model.

Because of the overall lack of forage in the watershed, big game may be turning to some of the special habitat areas for forage. These areas may become overutilized in some cases, thus degrading habitat for other species and in turn, decreasing the amount of available forage.

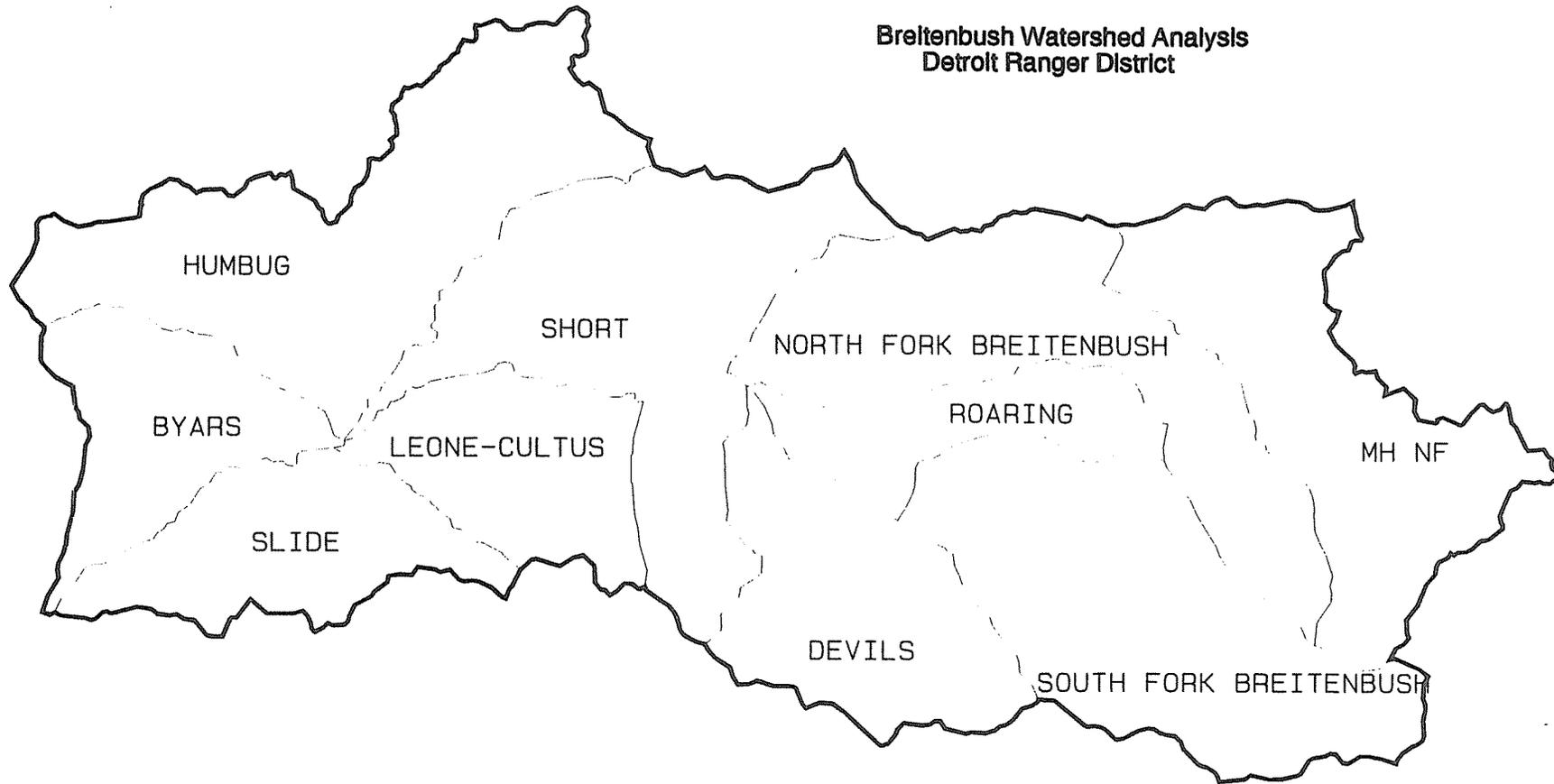
The Mt. Jefferson Wilderness and the area above Road 46 are primarily thermal cover and Upper Humbug is primarily optimal cover. Below Road 46, optimal and hiding cover are interspersed with forage. There are a fair amount of shelterwoods in this watershed which provide forage for big game, however, most of the forage represented in this watershed is of a lower quality than it could be.

Conflicting Habitat Objectives: The Breitenbush watershed contains several different land allocations but three main ones exist as a result of the Northwest Forest Plan (Late-Successional Reserves, Riparian Reserves and Matrix). These land allocations require that different objectives be met over the landscape.

A portion of Late-Successional Reserve (LSR) number RO214 lies within the watershed. Big game management objectives and late-successional reserve objectives are not entirely compatible. A small amount of winter range is present within the LSR. Cover will remain the same or increase with time providing higher quality cover. However, forage will become increasingly limited over time in the

Elk Emphasis Areas

Breitenbush Watershed Analysis
Detroit Ranger District



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LSR. LSR standards and guidelines do not allow harvest in stands over 80 years old so new forage creation opportunities in this area are limited.

In the LSR, thinnings may occur in stands less than 80 years old, for the purpose of enhancing late successional stand characteristics. For a time, these thinnings may provide lichens, etc. that serve as forage for big game, especially during the winter. However, edges will decrease, which may limit the use in this area. Special habitats may be over-utilized for a short time until the carrying capacity decreases. With the onset of the Northwest Forest Plan, Forest Service objectives for LSR's and Oregon Department of Fish and Wildlife objectives for big game are no longer in concert in these areas.

The majority of winter range follows riparian reserves and extends upslope from these. Riparian reserve objectives are compatible with providing high quality cover, but are counter to development of edges and forage. Over time, forage availability will decrease in these areas. Big game, along with many early seral associated species, will likely encounter population reductions under this scenario until natural fire creates new habitat conditions.

In Matrix lands, where most of the timber harvest will occur, big game cover will likely decrease while forage increases. Open road densities could decrease due to lack of funding for road maintenance. Many short spur roads could be closed, which will lesson disturbance. Carrying capacity may decrease somewhat over time due to the limited amount of cover in matrix or the quality of habitat that is present. Thermal cover may be converted to hiding cover over time.

vi) *What and where are the unique special habitats in the watershed?*

Special habitats represent a small percentage of the total watershed. The majority of these special habitats lie within the Mt. Jefferson wilderness and the Ollalie Lake Scenic Area. The following table depicts the different types of special habitats and the number of acres found in the watershed.

Figure III- . Special habitat types and amount

SPECIAL HABITAT	ACRES
Alder	47
Cinder /Rock/Talus	3292
Dry Meadows	1
Moist to Wet Meadows	549
Moist Meadows	94
Shrub	774
Water	252
Wet Meadows	6

The map on the following page (figure III-_) depicts the distribution of special habitats throughout the watershed.

Talus represents the largest component of the special habitats within the watershed. Species dependent on this special habitat are primarily the yellow-bellied marmot and pika. Other species do use this habitat type but are not totally dependent on it. Certain species of amphibians and reptiles can also be found in talus areas.

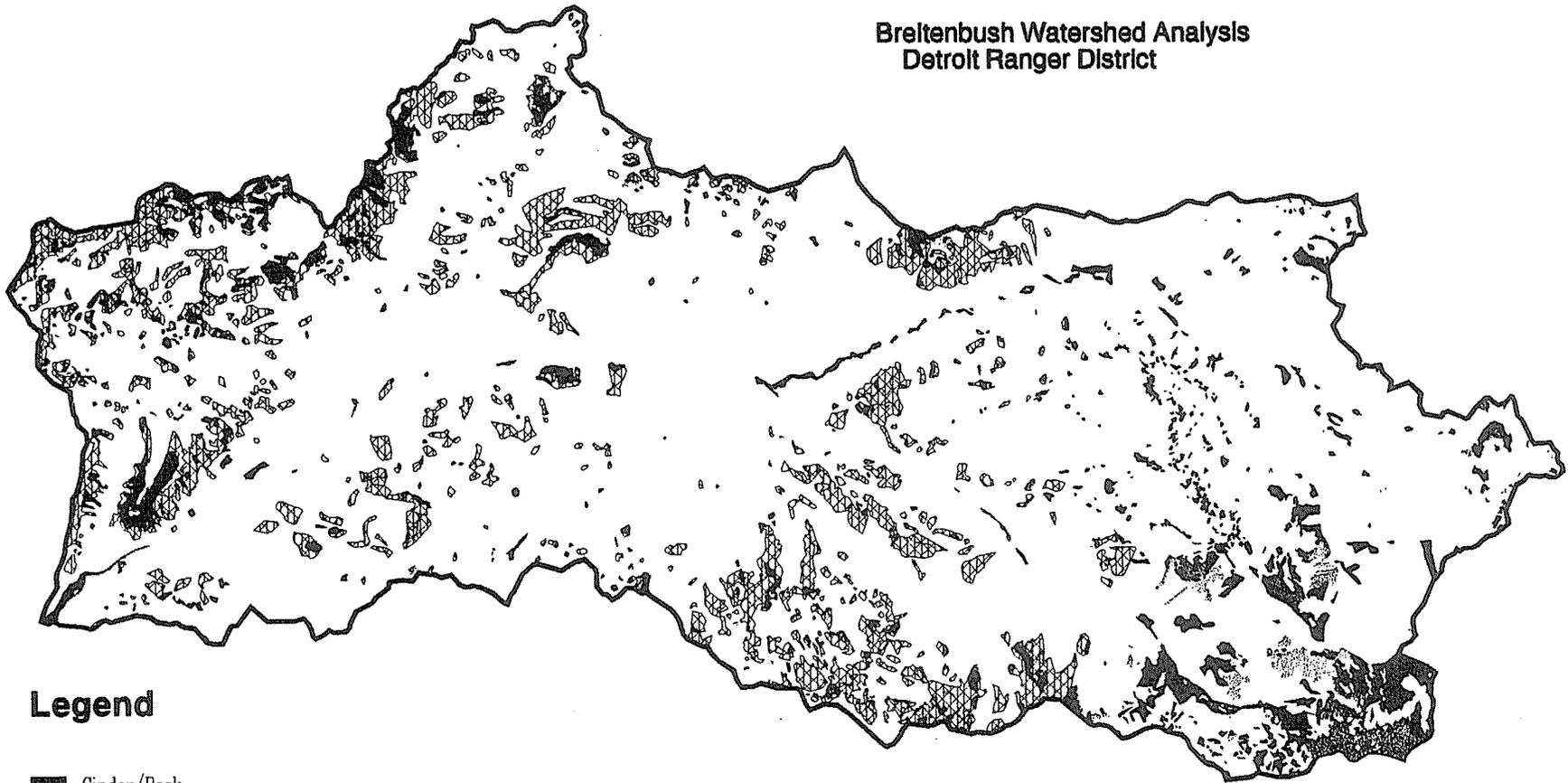
Shrub is the second largest special habitat component in the watershed. This habitat type provides habitat for a number of bird species and small mammals as well as some amphibians. Most of this component is associated with riparian reserves. It also provides a food supply for species like black bear and elk.

Moist and wet meadows are the third largest special habitat component. The majority of these are located within the Mt. Jefferson wilderness. Species like the sandhill crane and the spotted frog are dependent on this habitat type. Neotropical migrant songbirds also use this habitat type for hiding, nesting and foraging habitat.

Five species of concern are dependent on special habitats. Habitat for all five species is present within the watershed. However, pine habitat may be very limited and only occurs in the wilderness areas which may limit the presence of white-headed

Special Habitats

Breitenbush Watershed Analysis
Detroit Ranger District



Legend

-  Cinder/Rock
-  Grasslands
-  Dry Meadow
-  Subalpine Moist to Wet Meadow
-  Moist Meadow
-  Shrub
-  Alder
-  Water
-  Unsuitable Soils

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b) Reference Conditions

- i) *What was the historical relative abundance and distribution of species of concern and the condition and distribution of their habitats in the watershed?***

Little is known of the historic abundance and distribution of wildlife within the watershed. Populations fluctuate over time and species come and go as the habitats they depend on change through succession, catastrophic events or land management practices. Change is an inevitable and necessary attribute of biological systems.

Snag and Down Woody Habitat: Several historic fires have occurred in the Breitenbush watershed, resulting in highly variable snag and down wood densities across the landscape, depending on the severity of the fire.

c) Comparison of Current and Reference Conditions

- i) *What are the natural and human causes of change between historical and current species distribution and habitat quality for species of concern in the watershed?***

Some species which occur in the watershed have well documented trends in population declines over part or all of their range. Bats, amphibians, neotropical migrant birds, many cavity dependent species and fur bearers, are or have been, represented in the watershed and all have seen a general decline in numbers and distribution throughout their range. However, population declines may be due to more than just the watershed condition. Outside conditions also play a role. Widespread use of DDT and deforestation in Central and South American countries continues to effect many neotropical migrant birds, in addition to habitat impacts of the breeding habitat here in this watershed. Habitat loss throughout their range and loss of specific habitat components are beginning to show declines in many of these species.

The processes which shape the current forest landscape within the watershed also affect the species composition and abundance. Species which utilize a wide range of habitat types and seral stages such as the Roosevelt Elk or the American crow, are more likely to maintain relatively stable populations over time than a specific habitat dependent species such as the northern spotted owl, which may find itself homeless over large parts of its range due to catastrophic fires or harvest of old growth forests.

An analysis was done to determine differences in seral classes between 1996 and 1895 within the watershed. An accurate picture of 1895 stand conditions is difficult to assess because of the availability of information. A lot can be inferred from existing conditions and a lot can be pieced together from old photographs, etc. It was determined that there was approximately 12% more stand initiation and 22% more old growth in 1895 as compared with today's totals. Today there is more stem exclusion and stand reinitiation as compared to 1895. It appears that the structural stages are more evenly distributed today than in 1895. In 1895, the structural stages were more skewed, with the majority of the landscape being in stand initiation and old growth. This is only a small snapshot in time though. Conditions in 1695 may have been completely different.

Some assumptions can be made from these findings. Early and late seral species were probably favored in 1895, as well as, the large and medium home range species due to fire occurrence. Small home range species may have been eliminated or greatly reduced in areas due to the presence of fire, but these should have been very localized. Dispersal across these areas may have been difficult as well. During this period, mosaic and contrast species were probably not as abundant due to the nature of the openings. Fires tended to burn large areas. However, patchy fires may have provided habitat for these species though.

Most of the early seral habitat occurred in the Mountain Hemlock zone. This would have benefitted high elevation early seral species such as bluebirds, golden-crowned sparrows, and the badger. Old growth species would have also been highly favored, especially species who depend on interior habitat like the northern spotted owl, marten, and the red tree vole. An assumption can also be made that special habitats would have been maintained due to the frequent fire cycle and that encroachment may not have been a problem for meadow areas and other special habitats. Species within special habitat guilds may have maintained stable populations due to this.

Now, in 1996, mosaic, contrast, and patch species are favored such as the barred owl, great horned owl, and goshawk. Interior habitat is declining and edge habitat is increasing. We may be inadvertently increasing predator numbers, thus skewing populations. Connectivity may also be lessened with fragmentation of large patches of habitat into smaller patches due to harvest activities. Mid seral species also seem to be favored more now such as the flying squirrel and hermit warbler due to harvest rotations. This may also be due to fire suppression efforts where frequent fires occurred in the past.

The vegetation report outlined some differences and similarities between vegetation of 1895 and 1996. The following will look at these in terms of wildlife:

1. Smaller openings now than in the past. In the past, openings were created from disturbance events such as fire on a larger scale and wind on a smaller scale. These probably resulted in large openings. Today, due to harvest practices and fire suppression efforts, the landscape is more fragmented with smaller openings. This fragmentation creates more habitat today for contrast and mosaic species due to the high edge effect. It also lessens the amount of interior habitat available. Connectivity between stands may be reduced. Early successional habitat has been reduced slightly overall today than in the past. However, the areas where this habitat type exists may not be the same. Typically, wilderness, ridgelines, and south facing slopes may have more early successional habitat available in 1895 where today, this habitat type is scattered across the landscape. An assumption can be made that populations of species may be more distributed across the landscape now than in the past.

2. Disturbances episodic in the past with fires rather than continuous with timber harvest and sustained yields. In the past, it was not always certain that a particular seral stage would be present. But when it was present, it may have been available in larger patches. This could be said of early and late seral habitat. From a snap shot look at 1895, it was found that stand initiation and old growth were the primary seral stages at that time. Today, however, seral stages are distributed more evenly. This may be creating a greater variety of habitats for species than was available 100 years ago, allowing for more mid seral, contrast, and mosaic species. However, while increasing the number of species present in the watershed, total population numbers for interior species may be decreasing. Natural stand age distribution, shows that quite a bit of time passed between episodic events. Reproductive success was probably not affected as much with these types of events other than habitat being lost in specific areas. These events were probably of short duration also which may or may not have disrupted reproductive success. Today, disturbance such as timber harvest, is more frequent. This may have an effect on species ability to successfully reproduce and may interrupt the timing of things. Seasonal restrictions are based on dates of probable reproductive behavior. However, due to weather conditions, natural events, etc., reproductive timing could either be delayed or early, thus our activities may be affecting these individuals.

3. Tree reestablishment after disturbance slower in the past versus current reforestation. In the past, early successional habitat was present for a longer period of time which may have been important due to the sporadic occurrence of this seral class. The same would be said of mid seral habitat, as early seral habitat matured. This may have allowed species to occur for longer periods of time in certain areas and provide a source for other areas as the landscape changed over time. Tree reestablishment also provided for natural regeneration and a natural species mix. Exotic diseases such as white pine blister rust and species such as

scotch broom, would not have been as much of a factor in 1895 as they are today. Today, mid to late seral habitat may be attained at a faster rate due to silvicultural activities such as pre-commercial thinning, commercial thinning, etc. This is important due to habitat and interior habitat loss. Today, a wide species mix is used to replant areas. These are native species but may not be indicative of particular stands. Diseases have also been introduced which have had an effect on some species, particularly white bark pine. This may have an affect on species that rely on this habitat type. However, with a wider variety of tree species present, it may allow for more species to occupy the watershed.

4. Underburned conditions common in the past, no comparable condition other than shelterwoods. Underburning enhanced the understory and secured the regeneration of species like sugar pine. It also provided for pockets of diversity in which snags and down woody material were created. These habitat components are very important to many wildlife species. Underburning may have also created forage across the landscape for big game species. This may have supplemented early successional habitat. Underburning may have created many unique habitat niches also. Today, underburning is limited in scope. It is used primarily to lessen the chance for large scale habitat loss due to fire. Unique plants and trees are being reduced such as sugar pine which may be reducing certain wildlife species from occupying historic ranges.

5. Understory reinitiation timeline speeded up by thinning versus natural timeframe. In the past, the stem exclusion stage may have been present for a longer period of time. Natural thinning of the stand may have been prolonged. Those trees less dominant would be shaded out and out-competed. Today, we have faster growing trees which equates to mid and late seral habitat being attained sooner. This is important today due to the reduced amounts of mid and late seral habitat in the watershed. Today's practices can select and remove diseased trees and leave dominant trees within the stands. Snags and down woody material can also be created if levels are deficient.

6. Increased abundance of shade tolerant tree species due to lack of fire. Fire suppression has allowed species such as western hemlock, redcedar and Pacific silver fir to develop additional canopy levels along with Douglas-fir at a greater level than occurred in many stands in the past. This may provide more habitat for species utilizing this type of habitat than was available 100 years ago.

7. Multi-species planting results in more species at an earlier age than usually found in natural fire regenerated stands. Multi-species planting ensures biodiversity. This allows for a seed source for uncommon species in heavily managed areas where it may not be available.

8. Meadow and other special forest habitats currently being encroached by conifers due to fire suppression. In the past, reoccurring fires kept these areas in check. It removed encroaching conifers and other species from invading and taking over. Due to fire suppression, these habitats are being slowly lost. This is a natural process if all the elements are allowed to occur. Guilds may be lost or the number of species lost due to this. Endemic, rare species may be eliminated or reduced.

9. Fewer snags and logs on harvested units in areas that have had long fire return intervals, less difference where fires were frequent. Snags and down woody material were well distributed across the landscape if the fire was not all consuming. Legacies were left in early and mid seral stands for several decades. Many species require snags and down woody material for part or most of their life cycle. Reductions in these habitat components may lead to reduced populations from lack of denning, hiding, and foraging habitat. It may be several decades before replacement snags and down material will be on site that is of adequate size and diameter. Harvest activities and other land management activities, could compound the problem of reduced numbers of snags and down material. This could further decrease populations. Many of the species who require down material and snags also prefer interior habitat. Or at least these species who do prefer it, will be decreased. Mosaics, patch and early seral species will benefit.

10. Higher fire hazard, fuel buildup due to fire suppression in areas with short fire return interval. With frequent fire occurrences, small fuels were probably burned up periodically which lessened the chance for a large scale event to take place. Snags and down material were well distributed across the landscape. In the event of an all consuming fire event, all fuels were eliminated. Today, there are high numbers of snags and down material in unmanaged areas due to insect and disease, harvest practices, and wind events. Risk for a stand replacement fire is growing. However, due to decreased amounts of interior habitat, increased levels of down material in these stands may make up for the lack of it in surrounding areas. However, if a stand replacement event occurs, down material and snag levels may be severely reduced causing populations of dependent species to decrease rapidly and may even eliminate some species from occupying the area for several decades.

11. Higher spruce budworm mortality due to stand conditions resulting from fire suppression. In the past, there were large contiguous stands of late-successional habitat which may have had large concentrations of insects. Snags and down material were probably more abundant. This probably resulted in pockets of diversity throughout the landscape. With the onset of fire suppression, stands are allowed to get older which equates to more structure being maintained such as snags and down material. This increases the fire danger in some areas. Increased fire danger within the LSR may not be consistent with the intent of this land allocation.

Efforts should be made to reduce levels of budworm mortality without jeopardizing the late-successional stands within the LSR.

12. Increased tree growth in managed versus natural stands at a comparable age. Early seral habitat would have been present for a longer period of time thus delaying the onset of mid and late-successional habitat. Now with silvicultural activities, we can increase tree growth within stands in order to achieve late-successional habitat characteristics at a faster rate. This is done by aerial fertilization which may introduce more nitrogen into the system than was previously here. However, due to the reduced amount of late-successional habitat, this is a preferred method. Application rates of nitrogen are relatively low and the benefits are greatly enhanced.

13. Other

There are other natural and human causes of change between historical and current conditions. The introduction of exotic species, both plant and animal, have non-desired effects. Non-native plant species out compete native vegetation and may eliminate or reduce native vegetation. This may displace or reduce populations able to utilize these areas. These plants may also be toxic to wildlife such as tansy ragwort. These do not offer any forage value but species such as scotchbroom, may add cover to an area. Non-native animal species such as the brown-headed cowbird and bullfrog, introduce elements into the system not previously present. Native wildlife may not have defense mechanisms to deal with these species. This could lead to over-predation, low reproductive success, and undue stress.

There is also an increase in edge species not commonly found in the watershed 100 years ago. This is due to fragmentation caused by timber harvest, road building, etc. This increase may have an effect on interior dependent species.

Recreation use has also increased. This can lead to degraded habitat and disturbance. However, there is an opportunity to increase awareness and educate the public on wildlife needs and needs of habitat in general.