Watershed Analysis

North Bank WAU
(Watershed Analysis Unit)

Roseburg District BLM

Updated as of

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FOR ALL DISCIPLINES
-How have previous management practices affected the existing watershed?

HUMAN USES
-What were the predominant human uses of this watershed up to present day?

VEGETATION
-What is the current array of vegetation types?
-What is the existing distribution of noxious weeds?
-What is the desirable vegetative condition for federal lands within this watershed, and what natural processes should be reintroduced/mimicked to achieve that goal?
-What methods of control will best keep noxious weed populations to a minimum?

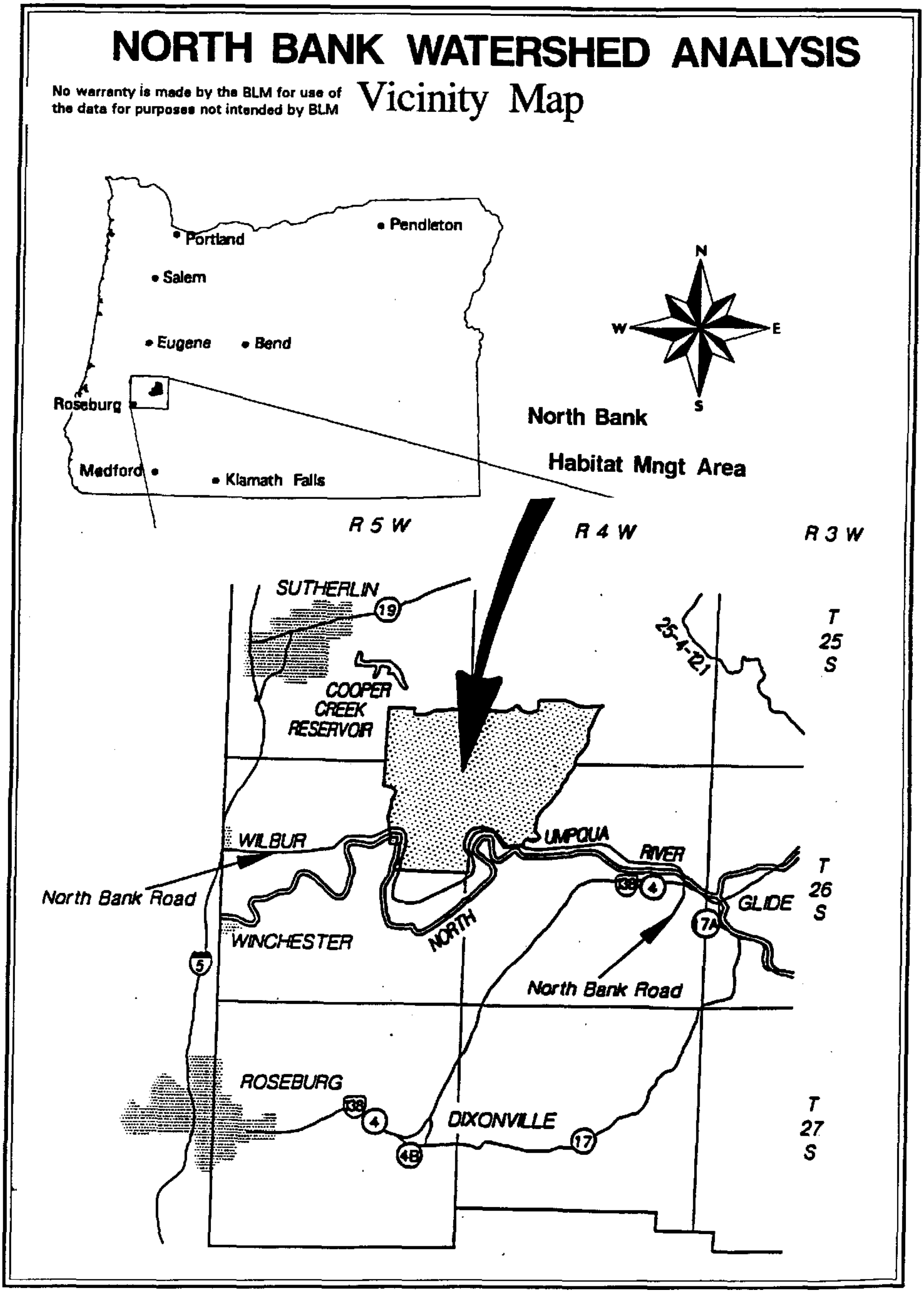
WILDLIFE HABITAT AND SPECIES
-What species of concern currently utilize this watershed?
-What are the current population estimate numbers of CWTD?
-What is their trend?
-How will managing vegetation for CWTD affect other species?

HYDROLOGY, STREAM CHANNEL, AND WATER QUALITY
-What are the hydrologic flows and their current trends?
-What are the current trends of stream channels and what were they like historically?
-What are the current trends in water quality?
-What are current stream temperatures?
-How has previous land management activities (ie. grazing, timber harvest, road densities) affected the hydrologic flows and water quality?

GEOLOGY AND SOILS
-What significant geological/management events have affected stream channels?
-What is the most significant sediment input to this particular watershed?
-What are the trends in sediment input?
-What soil types are limiting vegetation?

AQUATIC HABITAT AND FISH
-What are the conditions of the riparian areas?
-What are their trends?
-What is the distribution of fish species?
-What are their condition and trend?
-How will changes in management of the riparian habitat effect aquatic species?

Figure 1-1


NORTH BANK WATERSHED ANALYSIS
No warranty is made by the BLM for use of the data for purposes not intended by BLM
Vicinity Map
Portland
Pendleton
Salem
Eugene
Bend
Roseburg
Medford
Klamath Falls
N
W
E
S
North Bank
Habitat Mngt Area
R 5 W
R 4 W
R 3 W
SUTHERLIN
19
COOPER CREEK RESERVOIR
25-4-21
T 25 S
WILBUR
UMPQUA
RIVER
North Bank Road
138
4
T 26 S
GLIDE
7A
WINCHESTER
NORTH
5
North Bank Road
ROSEBURG
138
4
DIXONVILLE
4B
17
T 27 S

OVERVIEW OF NORTH BANK WAU

A. General Description

Size and Location: The North Bank Watershed Analysis Unit (WAU) contains approximately 9,338 acres. This 15 square mile portion of the watershed is located on the lower valley slopes along the lower portion of the North Umpqua river across from Whistler's Bend Campground and Recreation Site (**Figure 1-1**). The Umpqua river system which includes the North and South Umpqua encompasses approximately 1300 square miles that flows 200 miles from the Cascade crest through the Oregon Coast Range to the Pacific Ocean.

Specific Description: The North Bank WAU mostly consists of 3 drainages, Powerline, Jackson Wayside, and Round Timber (**Figure 1-2**). Some portions of the North Bank Habitat Management Area (NBHMA), approximately 300 acres, extend into drainages to the north that flow into Cooper Creek Reservoir, Sutherlin and Calapooya creeks. Approximately 25 acres extends into Cooper Creek drainage to the east. Because the main focus of this watershed analysis was the Habitat Management Area for the Columbian White Tailed Deer (CWTD), the small portions that fall outside of the main 3 drainages will be included as part of this analysis but the majority of the analysis will focus around the 3 main drainages mentioned above. Sutherlin and Cooper Creek Reservoir drainages to the north were analyzed as part of the proposed Engles Exchange preliminary work. All 3 of the above drainages are a part of the Lower North Umpqua 5th field watershed which contains approximately 106,187 acres and consists of 16 drainages. North Bank WAU was selected for analysis to provide baseline information to use in developing the North Bank Habitat Management Plan.

Climate and Vegetation: Average annual rainfall is between 34 and 38 inches. Most of the precipitation occurs in the form of rain since the highest elevation within the WAU is approximately 1980 feet. Annual temperatures average 54°F with summer maximum temperatures typically in the low 80's°F and winter minimum temperatures are in the mid 30's°F. The landscape is dominated by a mix of grasslands, oak/savannah woodlands, and younger conifer stands. The grasslands and oak/savannah woodlands seem to have predominated this landscape over the past history as a result of soil types and fire regimes. The young conifer stands are a result of harvesting the older timber stands during the last 100 years and replanting of those lands to Douglas-fir (**Figures 3-1, 3-4**).

People and Recreation: The lands within the North Bank WAU have almost exclusively been used for grazing and ranch land over the last century along with timber. A portion of these lands (approximately 6,632 acres) was acquired by the BLM in 1994 to secure habitat for the Columbian White Tailed Deer (CWTD) and was designated the North Bank Habitat Management Area (NBHMA). Since that time NBHMA has been open to the public for travel by foot and currently a plan is being developed for how this area will be managed and what types of recreation will be allowed.

B. Ownership and Federal Land Use Allocations

The land ownership of the North Bank WAU consists of a large number of small ranches and ranchettes with the majority of the WAU administered by the BLM. The breakdown of the private land owners and federally administered lands as well as the land use allocations on federal lands is shown on **Figure 1-3** and **Table 1-1**. The smaller lots and ranchettes (less than 50 acres) mostly occur along the North Umpqua river. Outside the North Bank WAU the land is managed mostly under private ownership as part of larger ranch complexes and used for grazing and agriculture.

Of the 9,338 acres within North Bank WAU, approximately 6,632 acres (71%) is federally managed under the following Forest Plan and Roseburg District RMP land use allocations (**Figure 1-3, Table 1-1**) (note: the acres are estimates based on computer generated maps):

1. O&C Lands, Area of Critical Environmental Concern (ACEC)

ACEC's are lands designated to maintain or protect specific resource values. The lands within the NBHMA were acquired specifically to secure habitat for the CWTD but more generally for the " . . . protection or enhancement of habitat for special status species occurring or potentially occurring on the parcel" (Decision Record for . . . Environmental Assessment for Proposed Dunning Ranch Exchange, page v). Of the 6,632 acres acquired in the land exchange, approximately 6,208 acres were designated as ACEC.

2. O&C Lands, General Forest Management Area (GFMA)

The objective of these lands is to manage on a regeneration harvest cycle of 70 to 110 years, leaving a biological legacy of 6 to 8 trees per acre to assure forest health. There is approximately 279 acres of GFMA in North Bank WAU. It appears that most of this acreage currently exists in young pre-commercial age class (0 to 25 years) due to previous harvesting.

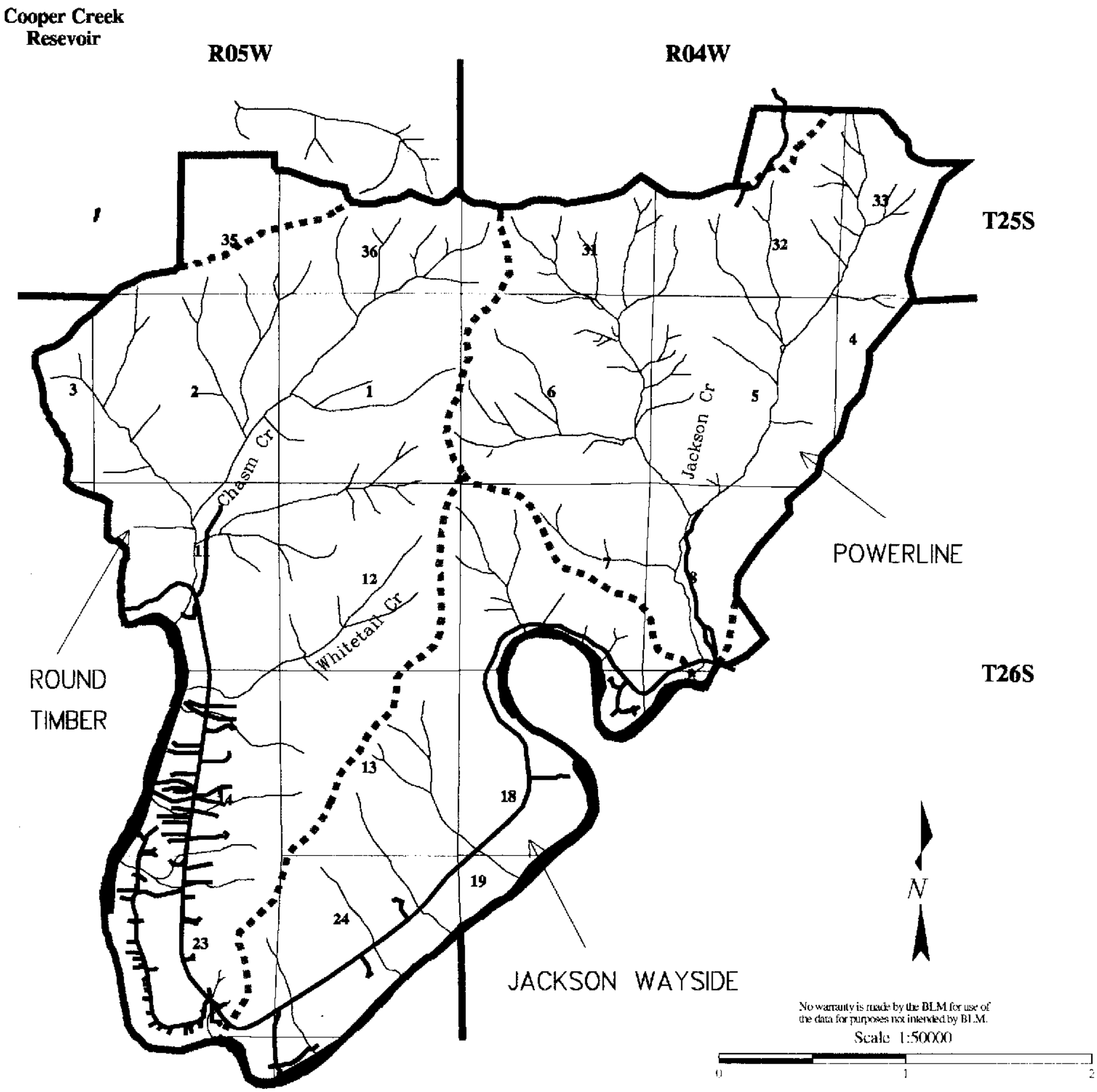
3. Riparian Reserves

The riparian reserves were established on federal lands as one component of the Aquatic Conservation Strategy to protect the health of the aquatic system and its dependent species and provide incidental benefits to upland species. The reserves were designated to help maintain and restore riparian structures and functions, benefit fish and riparian-dependent non-fish species, enhance habitat conservation for organisms dependent on the transition zone between uplands and riparian areas, improve travel and dispersal corridors for terrestrial animals and plants, and provide for greater connectivity of late-successional forest habitat (ROD, B-13).

The riparian reserves were estimated from the stream network characterized by the Geographic Information System (GIS) computer database. A slope distance of approximately 180 feet was used as representing the average site-potential tree height for the North Bank WAU (ROD, pg. 9). The site-potential tree height of 180 feet was determined from 14 plots taken within the Lower North Umpqua watershed. Thus the following riparian reserve widths were used for the estimating the total amount of riparian reserves: 180 feet (55 meters) for intermittent, non-fish bearing streams and 360 feet (110 meters) for fish bearing streams. Because many of the actual field intermittent streams are unmapped and because only known fish bearing streams based on a fish presence/absence inventory conducted in 1996 on BLM lands was used for the 400 foot riparian reserve width, the total amount of riparian reserves represented in this analysis is most likely underestimated. Actual projects would use on-the-ground stream information.

Figure 1-2

North Bank Drainages & Main Roads

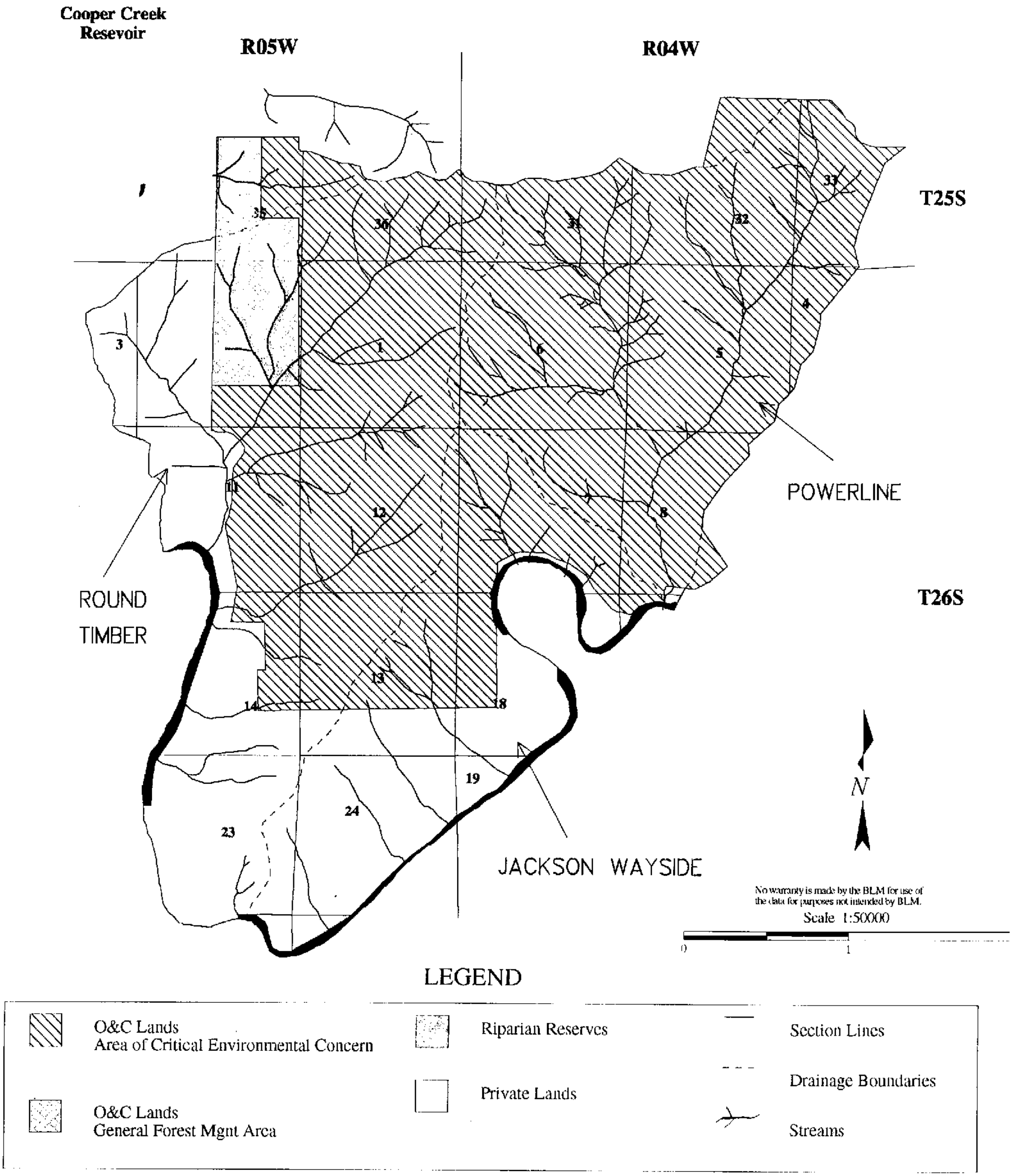


LEGEND

Drainage Boundaries	Streams
Asphalt or Rocked Roads	Section Lines

Figure 1-3

North Bank Ownership & Land Use



North Bank Ownership & Land Use

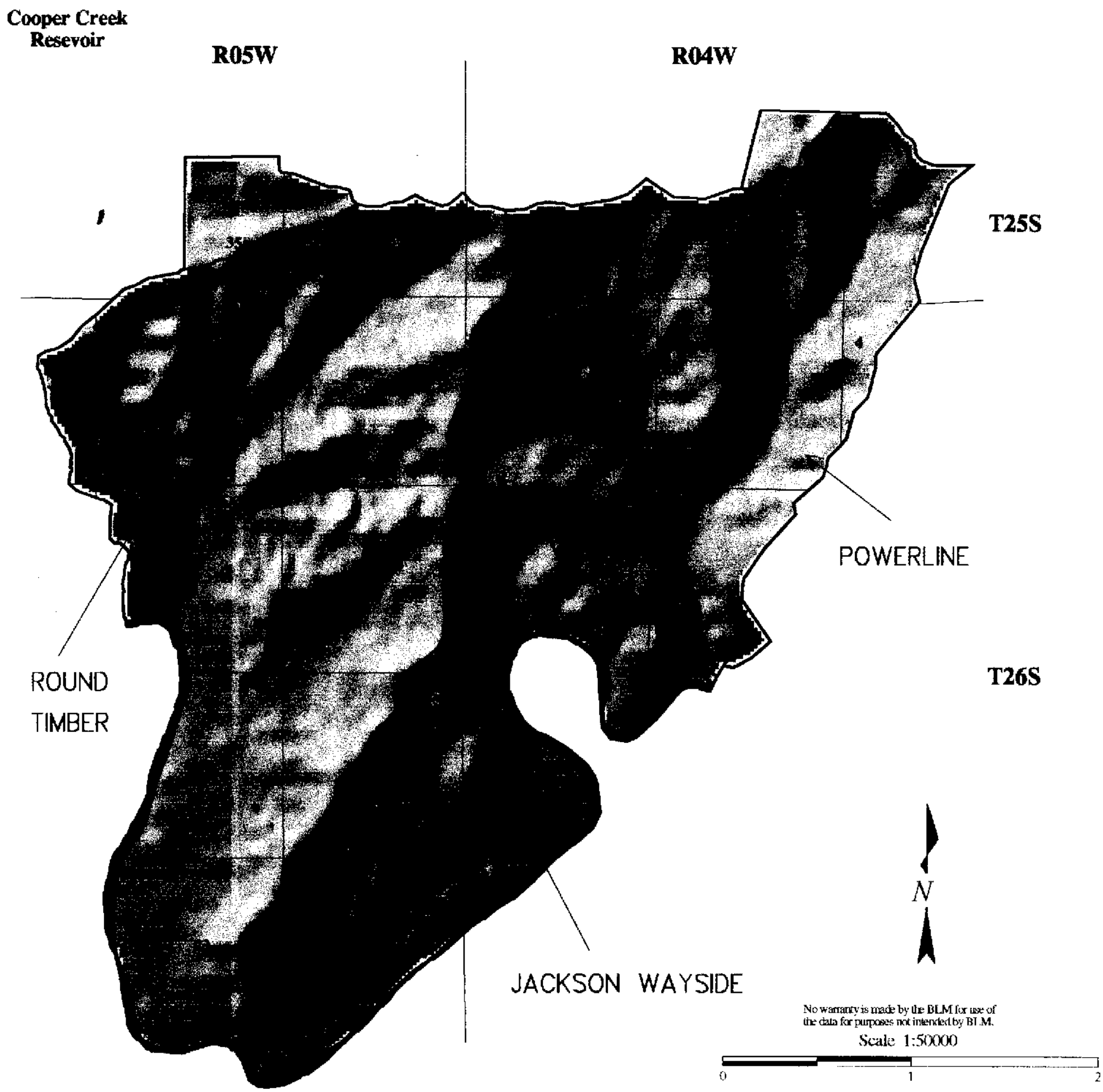
TABLE 1-1

DRAINAGES	Total Acres	Area of Critical Environmental Concern acres	%	General Forest Management Area acres	%	Riparian Reserve acres	%	Private Lands acres	%
Cooper Cr Res [1]	224	124	55%	70	31%	30	13%	-----	-----
Jackson Wayside	1988	804	40%	-----	-----	-----	-----	1184	60%
Powerline	2902	2894	99.5%	-----	-----	-----	-----	8	0.5%
Round Timber	4124	2286	55%	209	5%	115	3%	1514	37%
Misc Outskirts [1]	100	100	100%	-----	-----	-----	-----	-----	-----
TOTAL	**9338**	**6208**	**66%**	**279**	**3%**	**145**	**2%**	**2706**	**29%**

[1] These areas are only portions of their total drainage but are part of the North Bank Habitat Management Area

Figure 1-4

Shaded Relief Map of North Bank WA Area



LEGEND

HUMAN USES

Key Question: What were the predominant human uses of this watershed up to present day?

A. Prehistoric Uses

Human use along the North Umpqua River in the vicinity of the North Bank WAU possibly extends as far back as 11,000 years ago. A local collector, Earl Henbest, reported finding a base fragment of a Clovis point and a complete Folsom point along the river not far from the North Bank property. Although the validity of the Folsom point has been questioned, the Clovis fragment is generally accepted as valid. A similar base fragment has been found about 10 miles to the east in the Little River drainage. The Clovis culture has been dated elsewhere in North America to between 11,000 and 11,500 years ago. The reporting of two Clovis specimens within a few miles of each other is uncommon in western Oregon, where only ten other specimens have been reported, and lends credence to the notion of a big-game hunting tradition being present.

Evidence of more recent occupations along the river are not so uncommon. Fourteen prehistoric archaeological sites have been recorded between Winchester and Glide. Several of them are reported to be pithouse villages. Several are known to have been shellfish processing stations. Others are undoubtedly fishing camps. Although none of the sites have been examined very extensively, there is enough documentation to suggest that the river corridor in the vicinity of North Bank was utilized quite heavily for the extraction of resources such as fish, river mussel, and camas, and that the flat, broad terraces provided opportunities for the development of substantial villages.

Only one of the fourteen sites is located within the North Bank WAU. Limited auguring in 1981 revealed artifacts suggesting the site may have functioned as a village, occupied within the last 6,000 years.

Evidence of prehistoric use of the upland portions of the North Bank WAU is lacking at this time. Future inventories may reveal the presence of temporary, seasonal camps located along the upper drainages and ridge crests. However, there may have been no substantial occupation of the uplands given that almost all land within the WAU is within three miles of the river.

Prehistoric use of the North Bank WAU appears to have followed a pattern observed over much of western North America. The initial occupation was perhaps by the transitory Clovis peoples who focused on the hunting of big game, such as mammoth and ground sloth. As time passed and the big game populations disappeared, the people broadened their resource base to include many plants and animals. They became more sedentary, eventually aggregating in pithouse villages.

B. Historic Uses Since the Mid 1800's

This pattern was changed with the advent of Euroamerican settlement in the mid-nineteenth century. The Oregon Donation Land Act of 1850 allowed an individual to acquire 320 acres of land and a married couple 640 acres. The purpose of the Oregon Donation Land Act was to promote agricultural development and ensure rapid settlement. Along with the Land Act of 1820, which allowed for the outright purchase of public land, the Donation Land Act was instrumental in changing the North Bank area from broad spectrum hunting and gathering uses to agricultural pursuits.

Within the area of the WAU several people filed Donation Land Claims (DLC) before the act expired in 1855. These included Croesus Comstock, Horatio Hoskins, C. B. Reeder, Harvey McCumber, and A. A. Tyrell. The Comstock DLC was entirely within the WAU, in the Jackson Creek drainage. Nearly the entire Reeder and McCumber DLCs were within the WAU, in the vicinity of Chasm Creek on the west side. Only small portions of the Tyrell and Hoskins DLCs were in the watershed. In total, about 1,100 acres of the current NBHMA were claimed as DLCs.

Much of the NBHMA passed into private ownership through the provisions of the Land Act of 1820. Two individuals, Carsena Huntley, who had a DLC just east of the NBHMA at the mouth of Huntley Creek, and Fen Sutherlin, whose base was to the north in Camas Swale, were the major purchasers. Between 1864 and 1870 Sutherlin acquired about 2,300 acres, primarily on the west side of the property. Huntley, between 1859 and 1870, bought about 2,000 acres, primarily on the east side. Several other buyers, including J. F. Adams and John Dixon, acquired smaller parcels. Sutherlin and Huntley also eventually bought out most of the holders of the original DLCs, so that by 1870 the NBHMA was essentially owned by two individuals with an east-west split of the ownership. This bifurcation of ownership would persist for many years, as Bernard Grubbe eventually acquired the western holdings of Sutherlin and George Pospisil obtained Huntley's eastern holdings. The property was finally aggregated in 1989 by James Dunning when he purchased the eastern portion from Pospisil and the western portion from the Grubbe estate.

In the early 1990s the Roseburg District began to look at ways to secure the Columbian White-tail deer habitat that would make the de-listing of the species possible. As word of the desire to secure habitat circulated, Shaun Leenders and Ernst Laemmert of 2Linc. purchased an option on the Dunning property and proposed to BLM that the Dunning property be exchanged for scattered parcels of public land. Over several years the details were worked out and the property passed to BLM ownership in 1994.

C. Vegetation Descriptions in the Mid 1800's

Cadastral survey notes on file at the Douglas County Surveyor's Office were examined in an attempt to assess vegetation conditions at the time of early Euroamerican settlement. Five survey episodes were examined:

1851 - James E. Freeman surveyed the west boundaries of T25S, R4W and T26S, R4W.

1853 - Robert Elder and Henry S. Glide surveyed the south boundary of T25S, R5W and subdivided T26S, R5W.

1855 - Harvey Gordon and Charles T. Gardner surveyed the south boundary and subdivided T25S, R4W.

1855 - Addison R. Flint subdivided T26S, R4W.

1871 - W. H. Byars subdivided T25S, R5W and re-subdivided T25S, R4W.

Depending on the specifics of any given contract, the surveyor would typically set posts or monuments at the section corners and quarter corners. They would usually note two trees at the quarter corners and four at the section corners. They would note the species, the diameter and the distance from the corner. The surveyor would also generally comment on the topography and vegetation at the end of each section line.

The examination of the notes revealed the presence of 90 bearing trees along 26 section lines within the bounds of the NBHMA. The species noted, the number of trees, their average diameter, and the range of diameter are as follows:

Species	number	Average diameter	Diameter range
Hardwoods			
Black oak	28	12.5"	3" - 30"
White oak	16	10.6"	5" - 16"
Yellow oak	16	13.6"	6" - 20"
Madrone	8	11.4"	2" - 20"
Ash	4	9.8"	6" - 13"
Maple	2	7.5"	3" - 12"
Alder	1	13.0"	
TOTAL	75(83%)		

Softwoods			
Fir	11	20.1"	3" - 50"
Pine	3	33.0"	15" - 48"
Redwood (?)	1	8.0"	
TOTAL	15 (17%)		

The summary comments at the end of each section line vary considerably, depending on the individual surveyor's style. Two phrases standout, however, with seven notations each - prairie and oak openings (or scattering oak). Oak and fir timber are mentioned five times, and "good grazing land" is mentioned three times. Although impossible to quantify objectively, the comments give the general impression that the vegetation consisted largely of grass and scattered hardwoods on most of the slopes, with fir in the larger draws and on the north slopes, and riparian-type hardwoods such as maple, ash, and alder along the streams. This does not seem to be very different from what we see today, suggesting that the overstory hasn't changed that much. Perhaps the grass and understory species have changed more.

D. Present Day Use

Because the land encompassed by the NBHMA is generally steep and was never particularly suited for crops, it was probably used primarily for cattle range during the last 145 years. Although no records have yet been found relating specifically to the NBHMA's use as range, several nearby ranches are known. Meshek Tipton, who settled in the Glide area in 1855 and would eventually own over 7,000 acres, called one of his lots of nearly a thousand acres his "little pasture" and raised cattle and sheep on it. Carsena Huntley, who acquired nearly 8,000 acres in the vicinity of his DLC, raised sheep, cattle, and horses on his pastures, presumably including his portion of the NBHMA. He was especially noted for raising purebred Shorthorn Durham cattle and American mares. Informal conversation with current adjacent landowners suggests that the pattern established in the general vicinity of the NBHMA also occurred on the property and persisted until acquisition by BLM.

VEGETATION

A. Vegetative Characterization

The North Bank WAU consists of 9338 acres of ranches and ranchettes. Approximately six thousand, six hundred and thirty-two acres (6,632), 71% of the watershed, are contained on the federally managed North Bank Habitat Management Area (NBHMA). Major vegetative types include rock outcrops, grasslands and improved pasture, oak savannah, oak woodlands, hardwood/coniferous woodlands, riparian vegetation, wetlands, and unknown type. Preliminary vegetative mapping was completed for the NBHMA (**Table 3-1, Figure 3-1**) using this typing scheme and will eventually be extended to the rest of the WAU. The acreage is approximate based on GIS computer generated information.

Table 3-1 Vegetative types of the North Bank Habitat Management Area.

Type	Area (acres)
Rock outcrop	17.0
Grassland and improved pasture	1226.0
Oak savannah	687.0
Oak woodlands	1170.0
Hardwood/conifer forest	3465.0
Riparian	79.0
Wetland	37.0
Total	6681.0

Hickman (1994:8) characterized this area with the following: "Soils, aspect, and landscape position all have a great deal to do with the ecological potential at a given location. Natural cover includes a wide variety of native plant communities...Uplands with the most favorable soils have coniferous forests of Douglas-fir and subordinate species such as Pacific madrone, bigleaf maple, California black oak, ponderosa pine, incense cedar and sometimes Oregon white oak. Drier type soils in the uplands support hardwood dominated stands of Pacific madrone, Oregon white oak and sometimes California black oak but may also contain minor amounts of Douglas-fir, ponderosa pine and incense cedar. Some shallow slopes support only scattered Oregon white oak and grass or shrubs such as wedgeleaf ceanothus and Pacific poison oak...This zone is separated ecologically from the adjacent vegetative zones by its dry, warm climate, the high proportion of hardwoods in the uplands, and the absence of indicator species from the Grand Fir Zone."

When the NBHMA was acquired by the Bureau a timber appraisal was completed. That appraisal roughly broke the NBHMA into four forest types: hardwood stands, conifer stands, mixed stands, and pasture (**Table 3-2**).

The NBHMA has been designated primarily as an Area of Critical Environmental Concern except approximately 400 acres are available for timber management as O&C land (**Figure 1-3**).

There has been no attempt to characterize the landscape parametrics because of the gross nature of vegetative typing that has occurred. Landscape parametric/pattern indices would be better left until after a finer/more precise attempt has been made to type the plant associations/habitat types.

Table 3-2 Forest types on the North Bank Habitat Management Area.	
Type	Area (acres)
Hardwood	1846
Conifer	806
Mixed	1131
Pasture	2817
Total	6600
Differences in total acreage between Table 3-1 and Table 3-2 are the result of different mapping techniques (GIS vs hand mapping and dot gridding, respectively).	

B. Seral Stages

There has been no efforts to type the vegetation into age classes or seral stages. Gross estimates of the forested habitats, based upon limited on-the-ground review, indicate that:

1) the oaks are typically over 100 years old, dense oak woodlands are in the process of undergoing competition mortality, little oak regeneration is evident; and
2) the conifers are in a young to mature stage, typically under 100 years of age; conifer regeneration is abundant in forested habitats.

C. Causal Processes

1. Climate, Soil, and Management Interactions

Natural processes that influence the vegetation in North Bank include climate, soil, and fire. Man influenced processes include grazing, conversion, introduced vegetation, and fire.

Franklin and Dyrness (1973) classifies this region as a portion of the "Interior Valley Region of Western Oregon. They describe this area as "...relatively warm, dry regions, too dry for many of the mesic species found on adjacent mountain slopes..." (Franklin and Dyrness 1973:110). Information taken from the KQEN weather station in Roseburg, approximately 15 miles SW of North Bank, shows an average temperature of 54.2 °F (range 84.1-48.0 °F) (NOAA 1992); normal rainfall in Roseburg is 32.73 inches per year, approximately 86 percent occurs from October to April (NOAA 1992) (**Figure 3-2**). "Summers are hot and dry, potential evapotranspiration far exceeding the moisture buildup during the mild, wet winters." (Franklin and Dyrness 1973:110). Available moisture limits the ability of many soil types to support extensive stands of vegetation.

Based upon soil complexes, approximately 2100 acres of the WAU is capable of producing commercial quality conifer forest; another 4600 acres can support oak woodlands (USDA-SCS 1994). Very little correlation seems to exist between the existing vegetation types and soil complexes. Tree growth appears to be restricted on the shallowest soils (**Figure 6-7**, page 6-13).

According to Fred Reenstjerna at the local museum it was common practice in the 1800's for the homesteaders to clear the land of the "useless" softwood trees like Douglas fir and to encourage the development of grass and forbs for grazing animals. These settlers used the hardwood trees for building homes, barns, and other structures. The hardwoods were considered more valuable for lumber and land was cleared to benefit grazing animals. Settlers would use fire at times to rid the land of slash and brush and increase forage.

The lands in and around the North Bank area were considered good grazing lands according to surveyor notes from 1850's. The general description of T. 26 S., R. 4 W. was "the township contains large amounts of good grazing land well adapted to the raising of stock." Further, the land was described as hilly, with few scattered trees, mostly oaks and second rate clay loam soils.

Grasslands within the analysis area have been subjected to grazing by cattle and sheep; introduction of exotic vegetation, intentionally and unintentionally; and controlled burning to remove rank vegetation. The forests have been harvested, commercially to meet the needs of the farmer/rancher; fire has been excluded; and stands have been converted to pasture/grasslands. A recent intrusion into the landscape, in the last 15-20 years, is the dividing of the large ranches into smaller ranchettes--these are more residential areas and not commercially oriented operations.

Examination of the oak woodlands shows two distinct cohorts, a cohort of open grown trees and ones approximately 120-130 years old that developed in denser conditions.

Maps of vegetative conditions in 1900 and 1936 (**Figures 3-3, 3-4**, respectively) both show large expanses of grasslands/non-timbered areas. These maps only present a general view of the land, which was influenced by the fact that since before the 1850's, grazing was the primary use. The surveyor's notes from 1855 indicated that these areas were tree covered. In T. 25 S., R. 5 W., Sections 35 & 36, the lands were described as very hilly having some first rate timber with some areas of scattered oak and some laurel, fir, and pine. Conifers tended to be concentrated on the ridgetops. References to woodlands on **Figures 3-3** undoubtedly refer to oak woodlands; and references to volume would be interpreted as different size classes of conifer (most likely Douglas-fir).

Does this represent a "natural condition" ? Probably not, if it is true that Native Americans did utilize fire to modify the landscape and vegetation.

2. Fire

Fire has played a role in the development of the current landscape, although to what extent we will never fully understand. Native Americans had for thousands of years burned off the river bottoms and valley areas where they had resided. Many burns were completed in late summer and early fall and sometimes these fires burned up into the timbered foothills until extinguished by heavy rains. This is substantiated in historical documentation from the 1851 Diary of George Riddle. "In all the low valleys of the Umpqua there was very little undergrowth, the annual fires set by the Indians preventing young growth of timber. The North Bank area lands were probably burned on a regular basis in the past, first by Indians, and then later by homesteaders.

The picture in the 1850's is not too unlike today's landscape. Currently there are numerous oak openings and prairies, with fir timber and other softwood trees on the north slopes and in the ravines and wet draws. Fire was not the only disturbance agent affecting the ranch vegetation. Today's landscape was created by intensive grazing, timber harvest and the selected use of fire to encourage grasses and forage species. Recent observations showed that field burning on the east side of the North Bank WAU was used on a more regular basis than any other part of WAU. The NBHMA in the most recent past under private ownership was split east and west. It appears that the eastern portion was more actively managed for cattle. When timber was harvested, the slash was not burned regularly, but grazing animals were left to forage for grass in the newly created openings, which allowed residual slash to be broken down or crushed. The larger existing grass prairie and openings have tractor skid trails on many of the ridge lines suggesting a pattern of field burning in more recent years.

Currently there are not many older trees left in the North Bank WAU, a result of extensive logging from the 1960's. Observations indicate there is little evidence of fire scarring on the stumps or remaining live trees. Natural fire has not affected this area much since Douglas Fire Protection Agency records were kept starting in 1967. Only five (5) lightning caused fires have been recorded on or immediately adjacent to the ranch since 1967. These fires were all small in size, less than 10 acres.

3. Fuel Description

This information is derived from on the ground reconnaissance and the use of the current Northbank Vegetation map. **Table 3-1** shows that approximately 18% or over 1200 acres of land within the NBHMA is classified as grassland. The fire behavior fuel model for this type is FM 1, and describes typical western grasses as fuel. Fires in these types are surface fires that can move very rapidly. Much of this grassland type has been burned periodically to benefit cattle. Burning this fuel type regularly appears to be beneficial to grazing animals as it provides for better forage. Some grasses when not burned regularly develop a large amount of basal fuel, which when finally burned can cause damage or death of the plant due to higher burning intensities. Conversely, frequent burning opens up the opportunity for alien annual grasses to invade. If grazing practices are no longer allowed on this property a regular burning regime of 3-5 years may be needed to maintain these grasslands

According to **Table 3-1** the hardwood/conifer type accounts for around 52% of the NBHMA. This is misleading when compared with field observations. Much of this type consists of a scattering of mature oak , hardwoods, and younger conifers overtopping grasslands and a component of brush. There are areas with dense conifer stands, usually in the draws and on the north slopes. Conifers occupied more of the site in the past, but were logged off in the last 30-40 years. Many times the oak/hardwoods were left for shade trees or provided little value for harvest. Some of the land was burned to reduce slash and encourage grasses. The use of fire for slash burning is not that well documented here and may have been a limited application. A more common approach may have been extensive grazing which reduced slash through compaction.

Another 27% of the Ranch is considered oak woodland and oak savannah. In the more open oak/hardwood areas, grazing has reduced much of the brush, and crushed or compacted much of the natural fuel (ie branches and stems). Many of these oak / hardwood area's have been heavily grazed, and occasionally burned, leaving little natural fuel to accumulate. These conditions will change without fire or grazing being applied. These vegetation types can be considered fuel model FM 9, which are characterized as moderately fast moving ground fires that can flare up when a "jackpot" of heavy fuels is encountered. The intensity of most fires in these types is low to moderate, with flashy, short-duration fires moving quickly through the woodlands. As grazing is curtailed, ground fuels and ladder fuels, (ie. brush and conifers reproduction) will increase as will the fire intensity. Mature oaks are considered somewhat resistant to fire with their relatively thick bark and height of crown above ground level. If fire and grazing are no longer applied, fuel loadings will increase and eventually put these oak stands at risk of stand replacing fire. A combination of manual fuel treatments and burning on a 5-10 year rotation is being used by Department of Natural Resources in Washington to maintain oak woodlands.

D. Current Vegetative Condition

Key Questions: What is the current array of vegetation types?
What is the existing distribution of noxious weeds?

1. Vegetative Description

a. Botanical Survey

An extensive botanical survey was completed on the NBHMA shortly after it was acquired by the Bureau (Appendix 1). Ninety-two (92) exotic plant species have been identified (Appendix 2). Exotic species are so widespread that we have been unable to identify any patches of native plant assemblages. Eleven (11) noxious weed species have been identified (**Table 3-3**). There have been a number of patches of noxious weeds (mainly thistle and Scotch broom) identified (**Figure 3-5**); yellow star thistle, tansy ragwort, field morning-glory, common and giant horsetail, and St. John's-wort are so common and widespread that mapping accurately is difficult. Six (6) special status plant species are known to occur on the NBHMA (**Table 3-4**).

Table 3-3 Noxious weed species on the North Bank Habitat Management Area.		
Family	Species	Common Name
Asteraceae	*Carduus pycnocephalus*	Italian plumeless thistle
	Centaurea solstitialis	yellow star-thistle
	Cirsium arvense var. *horridum*	Canada thistle
	Cirsium vulgare	common thistle
	Senecio jacobaea	tansy ragwort
	Silybum marianum	milkthistle
Convolvulaceae	*Convolvulus arvensis*	field morning-glory
Equisetaceae	*Equisetum arvense*	common horsetail
	E. telmateia var. *braunii*	giant horsetail
Fabaceae	*Cytisus scoparius*	Scotch broom
Hyperaceae	*Hypericum perforatum*	common St. John's-wort

Table 3-4 Special status plant species on the North Bank Habitat Management Area.		
Family	Species	Common Name
Apiaceae	*Perideridia erythrorhiza*	false caraway
	P. howellii	Howell's false caraway
Brassicaceae	*Arabis koehleri* var. *koehleri*	shrubby rockcress
Iridaceae	*Sisyrinchium hitchcockii*	Hitchock's blue-eyed grass
Hydrophyllaceae	*Romanzottia thompsonii*	Thompson's mistmaiden
Polypodiaceae	*Pellaea andromedaefolia*	coffee-fern

b. Timber Appraisal

The appraisal of timber on the NBHMA identified 3783 acres of forested land (**Table 3-2**, Hardwood, Conifer, & Mixed). Commercial tree species include Douglas-fir, big-leaf maple, California black oak, incense ceder, Pacific madrone, Oregon ash, ponderosa pine, red alder, white alder, Oregon white oak. Within the hardwood stands there are 111 trees per acre (tpa); the average tree size is 11.1 inches DBH, approximately 64 feet to a commercial top. Within the conifer stands there are 32 tpa; the average tree size is 14.3 inches DBH, approximately 49 feet to a commercial top. Within the mixed stands there are 77.4 tpa; the average tree size is 12.7 inches DBH, approximately 60 feet to a commercial top.

Individual stand data is not available at this time. From increment cores of several oaks it is believed that the majority of the oak woodlands became established after the last major stand replacing event. Ages on those trees varied between 110 and 130 years of age (at DBH). The majority of the trees exhibited characteristics of coppice regeneration, consistent with the ability of oaks to sprout from the root collar. The larger oaks that exhibited stem characteristics of being open grown were not cored. The average core ages of conifer species, Douglas-fir and incense cedar, were less than 100 years. This is consistent with the idea of conifers regenerating under Oregon white oak canopies.

Evident in the oak woodlands is mistletoe and root rot (Armillaria spp.). The extent and impact of these to forest health concerns is unknown at this time.

c. Plant Associations

Work by Smith (1985), across the river from North Bank, identified 11 plant associations; 2 grassland associations, 1 shrub association, 6 hardwood forest associations, and 2 coniferous forest associations:

Cynosurus echinatus/Taeniatherum asperum
Bromus mollis/C. echinatus
Rhus diversiloba/C. echinatus
Quercus garryana/R. diversiloba/T. asperum/C. echinatus
Q. garryana/R. diversiloba/T. asperum
Q. garryana/R. diversiloba/Dactylis glomerata
Pseudotsuga menziesii/Q. garryana/R. diversiloba/Polystichum munitum
Q. garryana/Arbutus menziesii/R. diversiloba/C. echinatus
A. menziesii/R. diversiloba/Festuca arundinacea
Q. garryana/Fraxinus latifolia/Rosa elganteria/Juncus effusus
P. menziesii/Corylus cornuta/C. echinatus

All of these, or similar associations, are likely to exist on the North Bank.

2. Implications of Vegetative Patterns

Key Questions: What is the desirable vegetative condition for federal lands within this watershed, and what natural processes should be reintroduced/mimicked to achieve that goal?
What methods of control will best keep noxious weed populations to a minimum?

a. Overall Vegetation

The NBHMA was acquired to provide secure habitat for the Columbian white-tailed deer, in partial fulfillment of the recovery plan for that species. Additionally, there is a Habitat Management Plan being completed for that area that will develop specific vegetative management guidelines.

Some vegetative trends are evident though. Without some disturbance it is likely that the NBHMA will continue along the successional pathway outlined above. Natural disturbance has been eliminated -- fire; and the major man caused disturbances -- grazing and timber harvesting -- have been eliminated, since coming under BLM management. Fire's main role in this system was to maintain the oak woodlands in an open condition and to retard conifer regeneration. Currently the oak woodlands appear to be overly dense with suppression mortality occurring (based on observation, very little information exists regarding management of Oregon white oak). Fuel loads within the stand are accumulated with suppression mortality that periodic fire would have naturally kept at minimal levels. Because of the long history of management on this ground, and in habitat elsewhere through western Oregon, information on natural levels of down woody debris is unknown to us at this time. The development of conifer regeneration under the oak stands is also creating a fuel ladder. Naturally occurring periodic wildfires that would have had the beneficial effect of alleviating fuel loading in the understory while maintaining the larger overstory trees. Currently any fire now has the potential to crown and eliminate the entire stand.

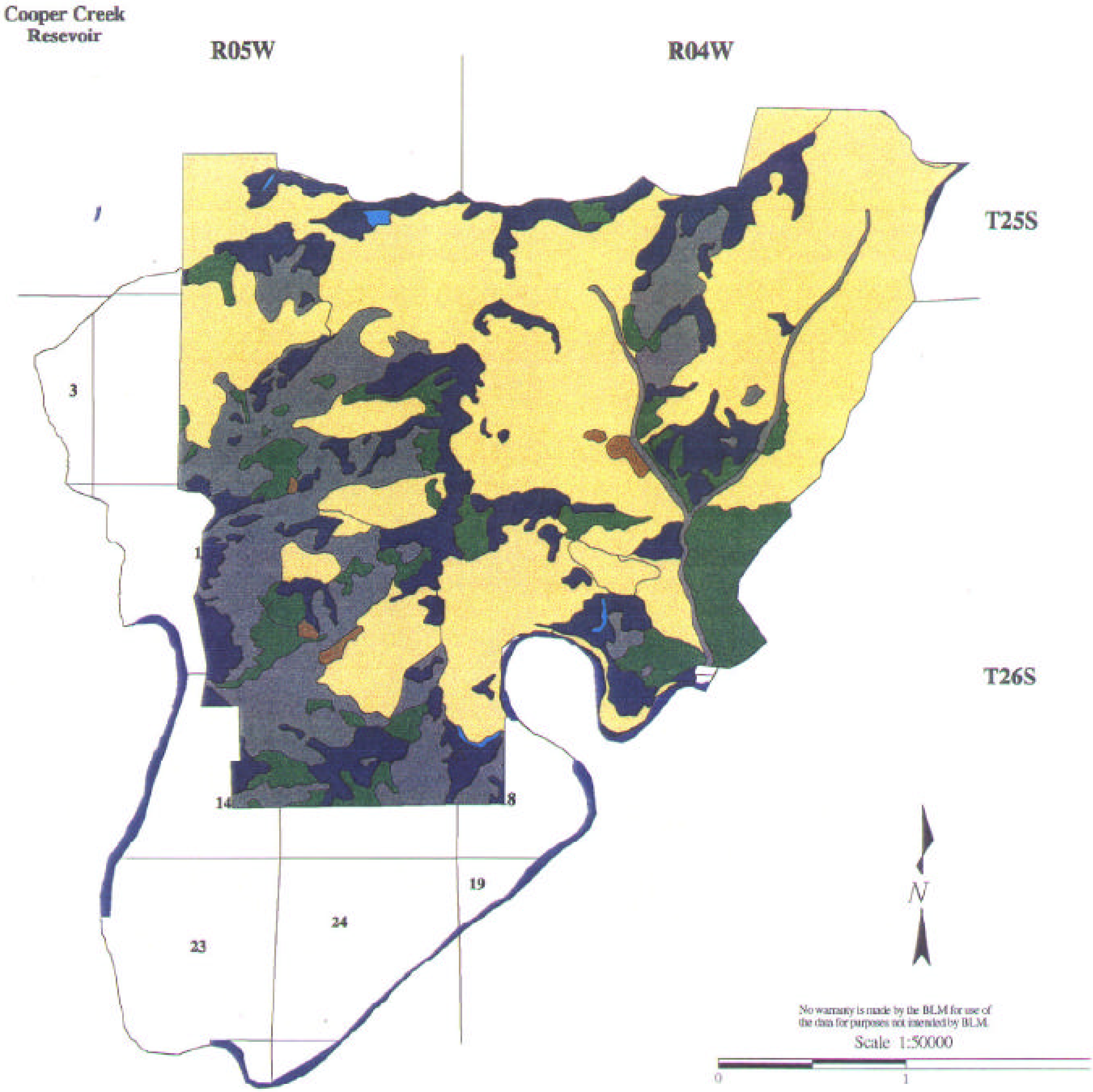
Grazing, and to a lesser extent fire, maintained the grasslands in a shorter/sparser condition such that they provided foraging opportunities for wintering raptors. Without this disturbance grasses are longer and thicker in the fall and winter, providing greater hiding cover for forage species. Concurrently with the greater development of grasses and the lack of burning is the potential for beginning to develop a organic layer in the soil profile. A thatch layer/organic mat would have the potential to create much hotter fire conditions, effecting the soil and soil organisms to a much greater extent.

Fire, or a fire mimic, would appear to be most beneficial in maintaining/restoring the "natural" conditions that existed on the NBHMA prior to settlement by Caucasian.

b. Noxious Weeds

The current vegetative composition on the NBHMA, and similarly North Bank WAU, is a direct result of forest conversion to pasture; and management practices that intentionally and unintentionally introduced exotic species. Removal of these exotic species could be effected using a number of methods: fire, herbicides, mowing, hand pulling, etc. Manual methods are labor intensive and usually expensive when compared to other methods of vegetative control. These methods are best utilized to control in areas of limited extent, or areas that are sensitive to the other methods. The use of mechanical methods is limited by topography and accessibility. Biological controls are available; these include insects, fungi, or bacteria. In general, biological controls are fairly inexpensive and may be used to target selected species. Herbicides are available to use in limited application, and would be most useful to eradicated isolated populations of noxious weeds (e.g. distaff thistle and tansy ragwort). The most effective method would probably involve a combination of methods appropriate for the site and target species. If applied incrementally (100-200 acres at a time), monitoring would be instrumental in insuring that we were not repeating past mistakes. The Bureau also has instruction to prevent and control the spread of noxious weed (BLM Manual 9015).

Figure 3-1. Vegetation map of the North Bank Habitat Management Area.



LEGEND

			Hardwood/conifers		Oak savannah		Rock outcrop
	Grasslands		Oak woodlands		Riparian		Wetlands

Figure 3-2 Climatic Data for Roseburg, Oregon.

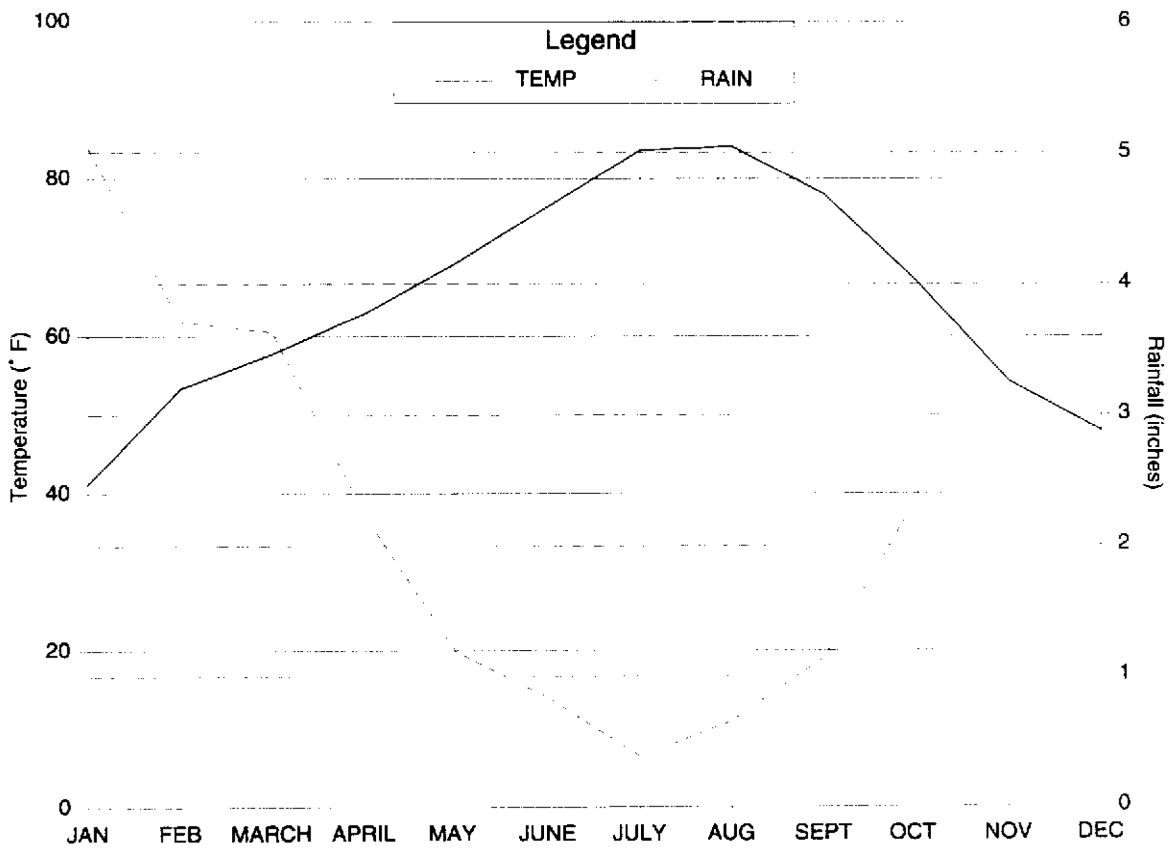


Figure 3-3. 1900 Vegetation map for the North Bank watershed analysis unit.

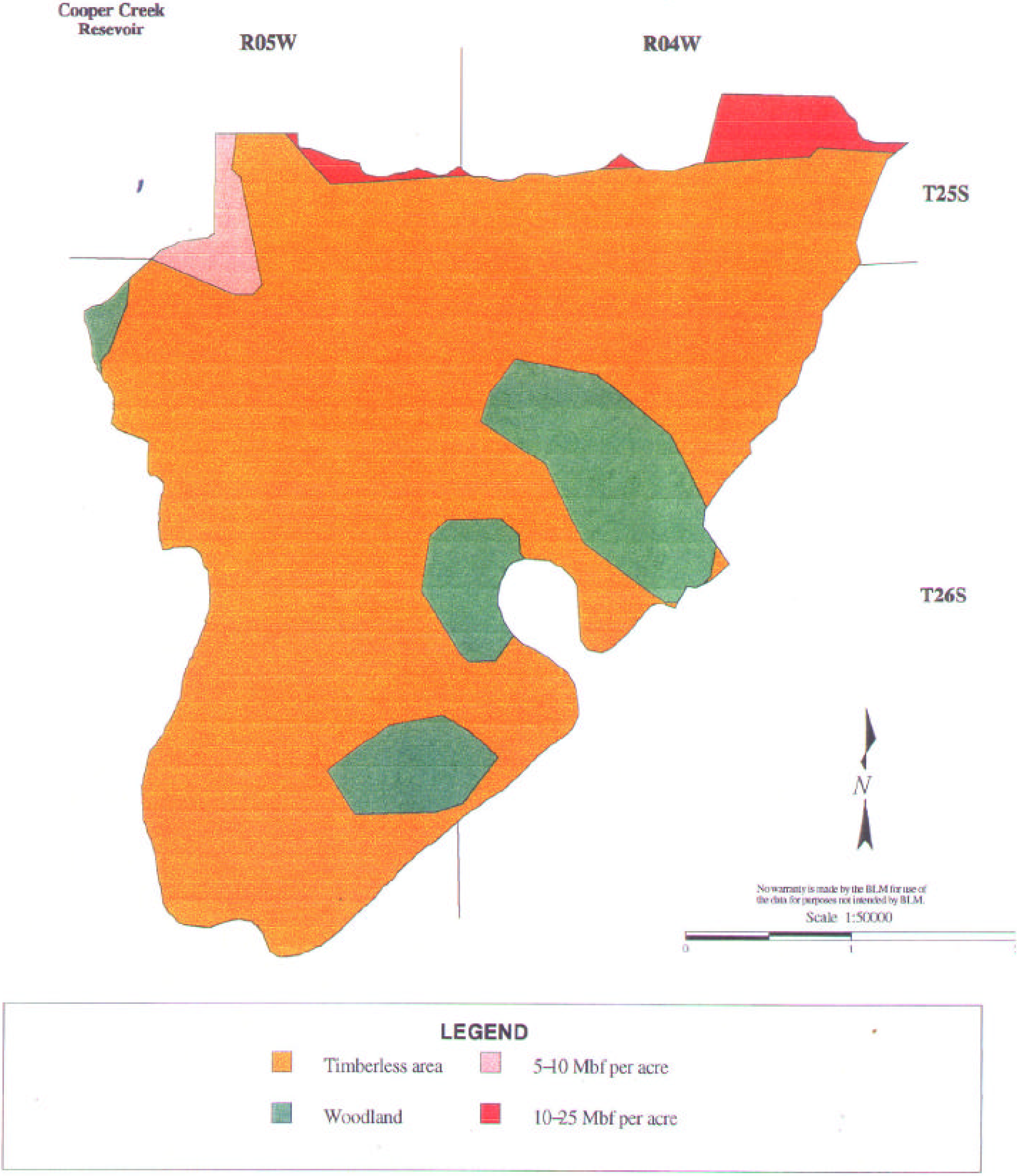


Figure 3-4. 1936 Vegetation map for the North Bank watershed analysis unit.

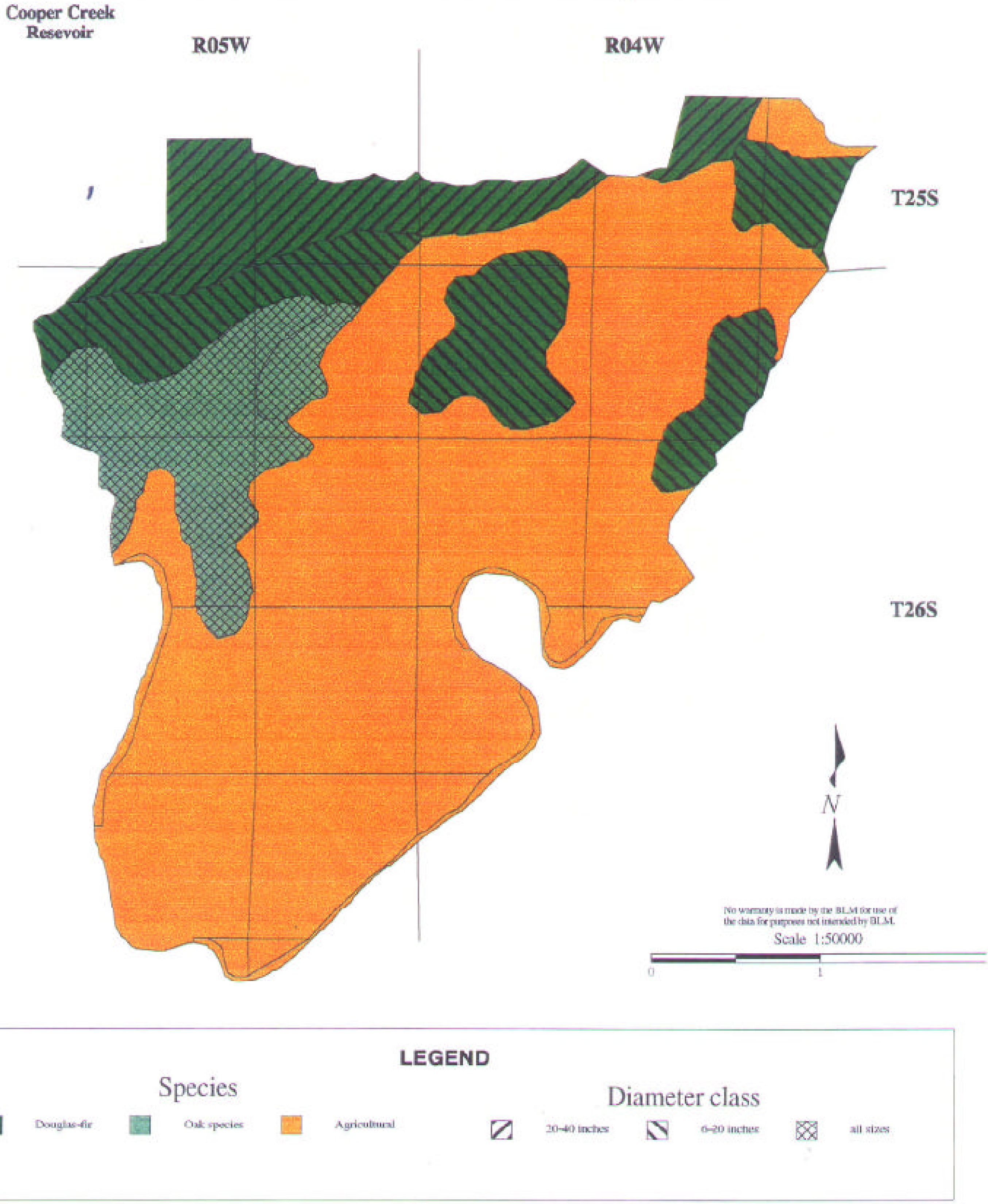
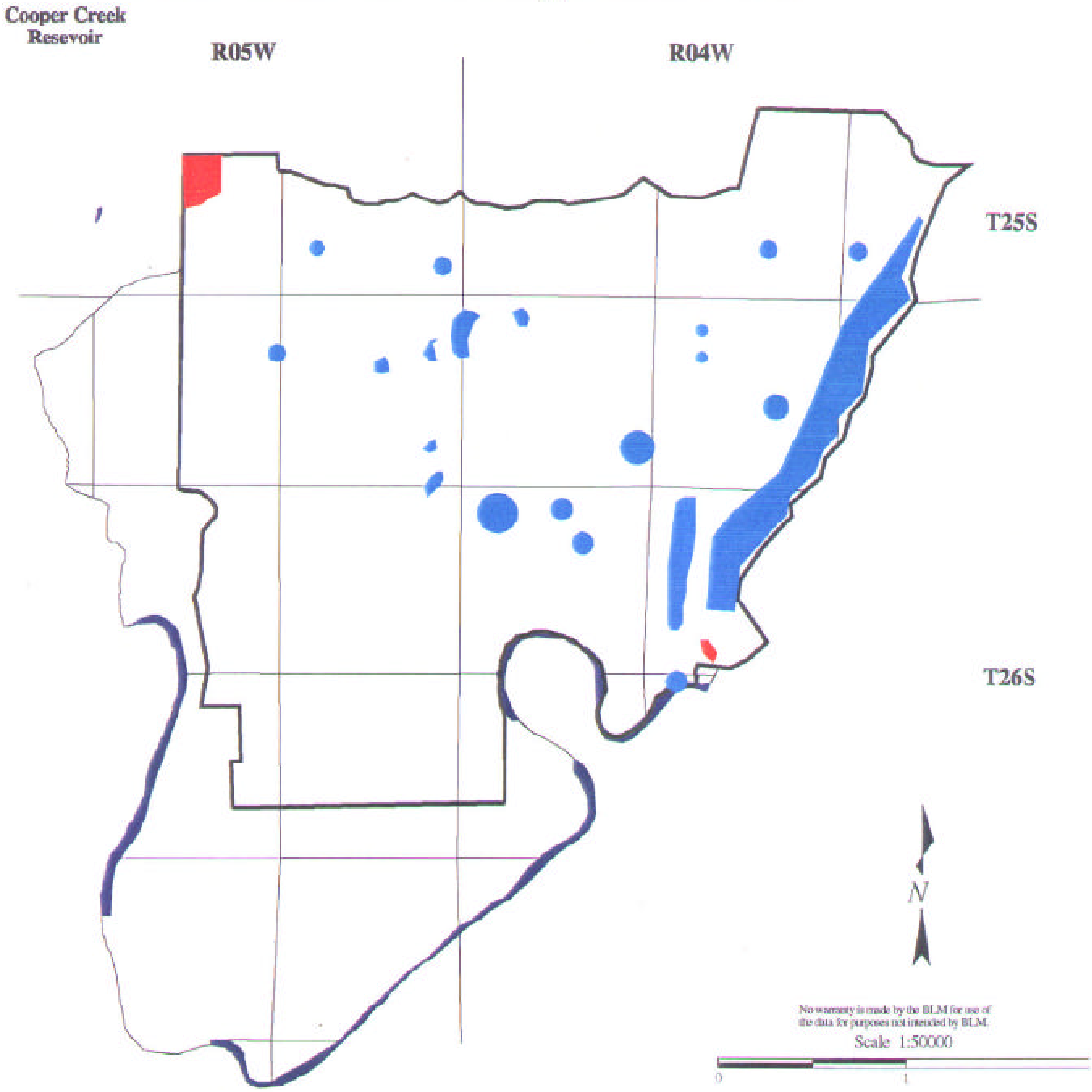


Figure 3-5. Noxious weeds on the North Bank Habitat Management Area



LEGEND

Red	Scotchbroom	Blue	Various thistles (including Italian, Canada, bull, and milk)

WILDLIFE HABITAT AND SPECIES

A. Wildlife Species

Key Question: What species of concern currently utilize this watershed?

The North Bank WAU maintains a wide diversity of habitat types utilized by vertebrate species. The mosaic of habitat types, ranging from the grassland/pasture types to mixed conifer/hardwood habitats, creates highly diverse wildlife communities.

There are approximately 135 species of birds that are present or are expected to occur on the analysis area, based on species distribution and habitat types that are present. Most of the species listed on the attached Avifauna List for the North Bank Habitat Management area, (NBHMA), ACEC, have been confirmed as utilizing the analysis area. (Appendix 2). Many of the species listed nest on the area. Some use the habitats for wintering, and others pass through during migrations.

Of the bird species that utilize the area, three are listed federally. Bald Eagles winter in the analysis area. Peregrine falcons have been noted using the area for hunting although little opportunity exists for this species to nest in the area and Northern Spotted Owls nest just to the north of the analysis area and may occasionally forage into the area. Additionally, Golden Eagles, protected under the Eagle Act, nest and utilize the analysis area year round. (For species status, see Appendix 1).

In addition to the species listed as sensitive or as species of concern, groups of species are of special interest to the Bureau: These groups are to receive management emphasis on bureau lands when they occur. These groups include all raptor species and migratory Neotropical species such as the warblers. Due to ownership and habitat distribution patterns in the analysis area, the NBHMA probably supports the highest diversity and densities of avian species that are in the "groups of concern" within the analysis area.

Other portions of the analysis area, outside of the NBHMA, consist of two active ranches that support livestock production and several areas of developed rural residential housing. Due to pasture clearing and maintenance, diversity of avian and mammalian wildlife species is probably less than that of habitat areas that are not being impacted by grazing/pasture management.

The majority of residential development has been established along North Umpqua River frontage within the riparian zone. Development in this zone has adversely impacted many wildlife species through habitat removal, habitat denial (fencing) , disturbance and the increased presence of household predators such as dogs and cats.

The riparian zone along the North Umpqua is a key habitat for white-tailed deer, especially during the summer months when water supplies in the uplands dry up. This creates a conflict with some of the homeowners as deer are attracted to succulent forage in the form of ornamental plants used for landscaping. This problem may be compounded, as many of the residents also artificially feed deer on their respective properties. As a result of the human influence in the area, deer tend to concentrate and stay in the residential areas. This situation leaves the population in those areas more susceptible to disease and genetics problems than would be found in more natural conditions.

Of the approximately 52 mammal species and one marsupial species in the analysis area, (Appendix 2), the Columbian white-tailed deer, (CWTD), Odocoileus virginianus leucurus , is listed as Federally Endangered. Of the remaining species, four are listed by the State of Oregon as sensitive, seven are Bureau Sensitive, and one is a survey and manage species identified in table C-3 in the Record Of Decision. (Appendix 1)

The analysis area contains habitat for and populations of approximately 16 species of reptiles and ten species of amphibians. Of these, six species are on the sensitive species list for Oregon and are also Bureau sensitive species. (Appendix 1,2)

Of the vertebrate species that occur in the analysis area, Columbian black-tailed deer, cougar, bear and western grey squirrels are considered game animals by the Oregon Department of Fish and Wildlife, (ODFW). Game birds that occur in the area include: mountain quail, California valley quail, blue grouse, wild turkey, doves, band-tailed pigeons, Canada geese, ducks and other waterfowl.

Animals classed as predators that may have an adverse economic impact to livestock or other domestic animals being maintained in the analysis area include: coyote, cougar, bear, bobcat, fox (two species), raccoon, weasel, mink, skunk, bald and golden eagles, cooper's and sharp shinned hawks, and great horned owl. coyote, cougar, bobcat and eagles are the principle predators that have an impact to livestock.

Quantitative data for most vertebrate species of wildlife found in the analysis area is lacking. Most of the information on occurrence of species is based on anecdotal information gained by speaking with neighbors of the NBHMA, or other residents/users that are familiar with the area or field observations by BLM personnel. Some information is available from inventories that were begun on the NBHMA prior to its' acquisition by BLM in 1994. Other inventories have been conducted that have included the area of this analysis, however, those efforts did not break out the land contained in this analysis area. Examples of these types of surveys/inventories would include spotlight counts for deer and a mid-winter raptor route.

A fifty mile raptor survey route that included seven miles of roadway within the analysis area was begun in 1983. This route was run until January, 1994 and will be re-initiated in January, 1997. During the period this route was active, high raptor use was noted along North Bank Road, including the seven mile section in the analysis area. This portion of the entire route was the most productive for raptor sightings per mile traveled, of any of the areas traversed by the route.

Over the duration of this raptor survey effort, rural residential development within the analysis area has increased, with many areas that were open pasture or meadows now supporting houses. The magnitude of development appears to have had an adverse impact on raptors in the lower elevation portions of the analysis area. Observations made during the raptor surveys show that most activity by wintering raptors is located in the least developed portions of the analysis area.

Prior to survey efforts, the area along north bank road was noted as a concentration area for wintering raptors by this writer. When residential development began, power was supplied to the homes by overhead transmission lines. The configuration of these lines were of concern as they posed a significant electrocution hazard for raptors, including eagles, that wintered in the area. This concern was passed on to key biologists working for Pacific Power. After an analysis by Pacific Power indicated that raptor electrocutions were probably occurring, the company reconfigured the cross arms on the transmission lines to reduce the hazard to raptors.

With the development of housing in the area, the NBHMA and undeveloped ranches will be the key habitat areas for most raptor species that winter or breed in the analysis area. Confirmed nesting has been made for: osprey, cooper's hawk, American kestrel, red-tailed hawk, pygmy owl, great horned owl. Nesting is "probable" for golden eagle, northern harrier, screech owl, barn owl, sharp-shinned hawk and turkey vulture. "Probable" nesting is based on the presence of the species in suitable habitat during breeding season and/or the presence of fledglings during the post nesting season.

Neither the threatened bald eagle or endangered peregrine falcon are known to nest in the analysis area. There is an active bald eagle nest site approximately three air miles from the northeast corner of the analysis area and birds do forage and winter within the analysis area. One nesting attempt for bald eagles was noted just south of the North Umpqua River in past years, however, red-tailed hawks were found in the nest when it was revisited later in the nesting season. Information on other avian species groups outside of the raptors is lacking, not only in the analysis area but throughout the low elevation oak woodland habitat type in the Umpqua Valley. This dearth of information was noted in a paper by Cross and Simmons, 1983. (references) They described passerine bird populations on selected tracts of lowland oak habitat, three of which were in close proximity to and probably representative of habitat found in the analysis area. Other than this one paper, little reference is available for bird populations in the hardwood areas that are represented in the analysis area.

Of the mammalian species that occur in the management area, the CWTD, a federally listed Endangered species, and the red tree vole, (RTV), a survey and manage species, are of primary management concern.

The RTV is a species that has been thought to depend on mature to old growth coniferous forests. This type of habitat is largely lacking on the analysis area, however, the RTV has been found in small stands of second growth conifers located on the NBHMA. This indicates that this species can and does occupy mixed hardwood/conifer forest types and may be more widespread that previously thought.

The occurrence and distribution of RTV's in the North Bank analysis area is unknown at this time. More inventory efforts will be needed to determine the status of the species and habitat affinities within the analysis area. Potential habitat does occur in small stands throughout the analysis area, both on private lands and on the NBHMA.

B. Columbia White-tailed Deer (CWTD)

Key Questions: What are the current population estimate numbers of CWTD?
What is their trend?
How will managing vegetation for CWTD affect the other species?

The CWTD occurs throughout the analysis area, including those areas developed for residential housing. The CWTD was listed as federally endangered in 1978, after it was determined that the white-tailed deer occurring in the Umpqua Basin were the Columbian subspecies. The sub-population of CWTD in the Umpqua valley had, historically, occurred throughout the valley bottoms in fairly high numbers. As development and habitat removal took place, distribution of CWTD began to become restricted. Highest numbers were found in the vicinity of Roseburg, with a good population occurring north and east of the city.

From 1928 to 1952, the triangular area from Roseburg to Wilbur to Glide was designated as a white-tail deer refuge. This area included portions of the analysis area along North Bank Road, which was constructed in the 1950s. Prior to the early 1960s, very little development was evident along North Bank Road from Wilbur to Glide. Land ownership in the area along North Bank Road consisted primarily of five or six major ranches. As access increased into the North Bank area, several portions of ranches were sold to developers and rural residential development began.

Initial developments began along Echo Bend, in the vicinity of Dixon Falls on the North Umpqua River. As this area was developed and demand for housing grew in the area, other parcels such as the area now designated as Acorn Drive were developed. All of this increasing development has had an impact on CWTD. Within the analysis area, many areas along the river are no longer available to deer, as they have been fenced, or cover has been eliminated. This was one of the principle habitat areas utilized by CWTD. Along with an increasing rural population, traffic became one of the principle mortality factors for CWTD all along the North Bank Road.

The population of CWTD within the analysis areas has experienced wide fluctuations in the past, even prior to development. Representative population fluctuations may be seen in **Graph 4-1** which gives CWTD trend counts in the Umpqua valley between 1975 and 1994. During the mid 1960s it was not unusual to see between 70 to 120 head of CWTD along the road between Wilbur and Glide. (Personal Observation by Jerry Mires).

One event during contemporary times that probably had the most impact to the numbers of CWTD throughout the range of the Umpqua population was a severe storm during the winter of 1969-70. Approximately three feet of snow fell during this storm and sub-zero temperatures were maintained for approximately 10 days. This single event, possibly connected with other factors, decreased the CWTD population down to a total estimated level of approximately five to six hundred animals. The surviving animals appeared to be concentrated near Roseburg, along Newton Creek and the foothills surrounding the city.

By 1971, it was unusual to see more than one or two individual CWTD along North Bank Road between Wilbur and Glide. Since this time, the CWTD population has rebuilt to an estimated level of 6,000-7,000 animals. (See Graph 1). This population has re-occupied historical range, which includes the analysis area. Currently, CWTD are found from Glendale to the south and to Elkhead on the north. East, the species is found past Glide on Highway 138 and south along the bottom lands of Little River. To the west, the population has expanded its' range to Umpqua, and possibly beyond.

Within the analysis area, some work has been done to determine population levels and density of CWTD. This effort is a result of the acquisition of the NBHMA by BLM. Since the habitat area was acquired, an attempt has been made to inventory CWTD numbers with the use of Forward Looking Infra-red scanners (FLIRS) in a helicopter. In 1994, FLIRS was used on the NBHMA for an initial census of the CWTD population (**Table 4-1**). That effort resulted in a estimated population of 152 CWTD within the boundaries of the management area. This corresponded to a density of approximately 14.8 CWTD/square mile. If these population numbers are extrapolated to the entire analysis area, approximately 212 CWTD would be expected to occur in the analysis area.

During survey efforts in 1995, the number of CWTD detected within the boundaries of the NBHMA declined to a density of 11.1 animals/square mile. This would correspond to a population level of approximately 162 CWTD within the analysis area (**Table 4-1**).

When reviewing the estimated density levels, it should be noted that they are a result of numbers of deer/total area. The area within the boundaries of the NBHMA contains areas that are not the most suitable habitat for CWTD and are probably not used. If these areas are deleted from the figures, the density of CWTD per unit of suitable habitat would be higher. Considering that much of the lower elevation lands preferred by CWTD are outside of the boundaries of the management area, number and density estimates of deer across the analysis area are probably conservative.

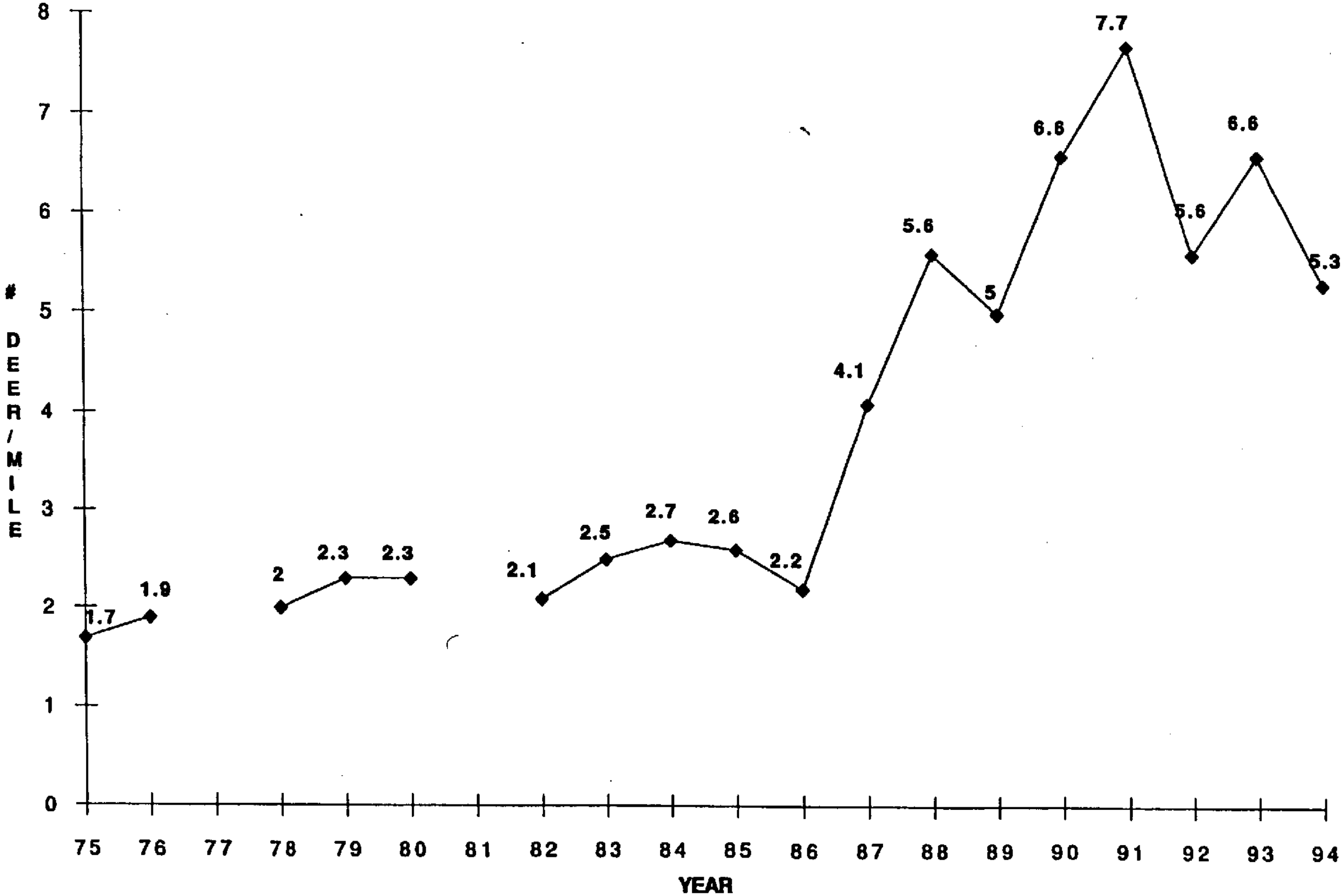
From observation the principle habitats utilized by CWTD seem to be the oak savannah/oak forest types with riparian habitat areas within oak complexes the preferred habitat. This habitat type occurs principally in lower elevation areas throughout the Umpqua Valley. This also corresponds to the lands that are most desirable for development or ranching. Due to this situation, commercial and residential development and clearing for pasture and pulpwood has heavily impacted the oak habitat areas found in the valley. This process appears to have accelerated during the last 15 years throughout the range of the Roseburg population of CWTD, including the analysis area.

Along with direct loss of habitat is the apparent slow regeneration of white oak woodland. Based on preliminary work done in the analysis area, (see vegetation section), the younger closed oak stands appear to be from 80 to 110 years of age. There is very little evidence of younger established seedlings within the areas that have been surveyed in the analysis area. This lack of regeneration may be the result of land management practices and may not be a problem if practices are changed. Restoration of oak habitats must take place if populations of CWTD and other oak dependent wildlife are to be maintained over time.

The key to maintaining a viable population of CWTD within the analysis area is to ensure that the NBHMA is managed to maintain or develop habitat types that will support CWTD. Vegetation manipulation through the use of fire or other methods will maintain preferred habitats and may be used to alter currently unsuitable habitats for CWTD or other wildlife. Because little is known about CWTD habitat utilization, research has been initiated to determine habitat needs. Favoring vegetation that increases the CWTD population may have impacts on other species of concern. How changes in vegetation will impact other species is currently unknown. Research will be needed to analyze how vegetative changes will impact other species of concern.

Graph 4-1

CWTD TREND



INCOMPLETE DATA FOR 1977 & 1981

DATA FROM OREGON DEPARTMENT OF FISH & WIDLIFE

Table 4-1

FLIR DEER CENSUS DATA

AREA	N. BANK			ENGLE			RAMP CAN.			TOTAL			GLIDE TRANS.
SIZE	10.28 sq. mi.			4.38 sq. mi.			1.05 sq. mi.			15.71 sq. mi.			0.56 sq. mi.
DATE	4/94	1/95	**1/96**	4/94	1/95	**1/96**	4/94	1/95	**1/96**	4/94	1/95	**1/96**	**1/96**
COVERAGE	90%	90%	? ?	80%	80%	? ?	90%	85%	? ?				? ?
CWTD													
observed	128	95	**52**	258	149	**14**	63	28	**19**	449	272	**85**	**2**
adjusted	152	114		343	216		75	51		571	381		
% of total	42	30	**31**	68	54	**32**	62	62	**66**	57	43	**35**	
BTD													
observed	180	224	**118**	121	127	**30**	39	17	**10**	340	368	**158**	**10**
adjusted	214	269		161	184		47	31		422	484		
UNK													
observed	25	29	**26**	41	58	**20**	9	26	**20**	75	113	**66**	**10**
TOTAL													
observed	333	348	**196**	420	334	**64**	111	71	**49**	864	753	**309**	**22**
adjusted	366	383		504	401		122	82		992	865		
PER SQ. MI.													
CWTD	14.8	11.1		78.3	49.4		71.8	48.4		36.3	24.4		
BTD	20.8	26.1		36.7	42.1		44.5	29.4		26.8	31.0		
*TOTAL	35.6	37.2		115.1	91.5		116.3	77.8		63.2	55.4		

*Includes unclassified deer

1/96 flight had new pilot and new observers, doubtful if data indicates coverage similar to previous years

COMMENTS ON 1/96 FLIGHT: Compared to 4/94 - 364 (81%) fewer CWTD observed & 182 (54%) fewer BTD observed
Compared to 1/95 - 187 (69%) fewer CWTD observed & 210 (57%) fewer BTD

DATA FROM OREGON DEPARTMENT OF FISH AND WILDLIFE

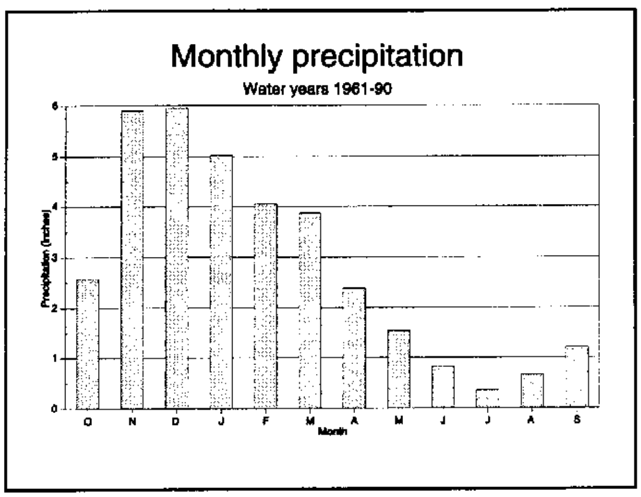
HYDROLOGY, STREAM CHANNEL, AND WATER QUALITY

A. Climate

The North Bank WAU has a Mediterranean type climate, characterized by cool, wet winters and hot, dry summers. There are no known weather stations located within the WAU. The National Oceanic and Atmospheric Administration (NOAA) has a weather station located at Winchester, Oregon, approximately five miles southwest of the WAU. The climate data presented are 1961-90 mean data from Owenby and Ezell, 1992.

Reference was made earlier (page 3-2) about information kept from the KQEN weather station. The annual normal precipitation for the Winchester station is 34 inches. The percent of precipitation received from October to April is 87% of the yearly average. Precipitation is generally rainfall, since the WAU is below 2000 feet.

Figure 5-1 - Monthly precipitation at Winchester, Oregon for water years 1961 to 1990



The Winchester station was a precipitation only station during the 1961-1990 time period. Temperature data for the station is limited (1991-1994). From this limited information, the annual normal temperature for the Winchester station is approximately 54°F. Summer maximum temperatures are typically in the low 80's°F and winter minimum temperatures are in the mid 30's°F.

The watershed analysis area is characterized as a rain dominated precipitation regime. The transient snow zone, which is between 2000 and 5000 feet in elevation falls outside the North Bank WAU.

B. Streamflow Characteristics

Key Question: What are the hydrologic flows and their current trends?

1. Existing Stream Network

There are approximately 49.2 miles of stream in the North Bank WAU. Stream density for Jackson Wayside is 6.9 mi/mi^2, Powerline is 4.39 mi/mi^2, and Round Timber is 3.48 mi/mi^2 (**Table 5-2**). This information was derived from aerial photos and satellite imagery. The actual stream lengths (in miles) may be greater and natural streams that flow during winter rainstorms may not have been mapped, therefore, drainage density may be higher than that shown in **Table 5-2**.

2. Peak Flows

There are no gaging stations within the WAU.

The United States Geologic Survey (USGS) method as suggested by Harris et. al (1979) can be used to estimate the magnitude and frequency of floods for the drainages of the North Bank WAU. The method requires the area of lakes and ponds, drainage area, and precipitation intensity. Precipitation intensity (I) is defined as the maximum 24-hour rainfall having a recurrence interval of 2 years. Precipitation intensity values were determined from a map prepared by the United States National Oceanic and Atmospheric Administration (1973).

Table 5-1 Flood Frequency Estimates

Estimated magnitude and probability of instantaneous peak flow. Area is the drainage area of the drainage. Discharge is cfs for indicated recurrence interval, years and annual exceedance probability, in percent.

DRAINAGE	AREA, mi^2	I, inches	2 50%	5 20%	10 10%	25 4%	50 2%	100 1%
Chasm Creek	3.79	3	270	412	506	636	742	842
Whitetail Creek	0.90	3	78	116	143	177	203	231
Jackson Creek	4.48	3	311	477	586	739	900	1017

3. Low Flows

A low flow discharge was estimated on 08/15/96 at T.25 S.,R.4 W., Section 08, NW 1/4. The discharge was estimated to be about .01 cfs *This is the only discharge measurement known to be taken in the WAU.* The very low flow was believed to be from groundwater that surfaces and reenters that streambed. Flow was very low and pools were present. Fish were observed in the pools.

Old survey notes indicate that surveyors were encountering dry streams 150 years ago. Exact locations on the streams are inconclusive, so we don't know if it is the same streams that go dry today. Neither do we know the weather pattern at the time (For example, was it a drought year?). Currently Jackson Creek becomes intermittent during the summer in the lower reaches, but there is more perennial flow higher in the watershed. A consequence of stream downcutting is a loss of wetland habitat and water storage ability. Perennial flows in lower Jackson Creek may have occurred before it became entrenched due to land management practices. It follows that restoring perennial flows to Jackson Creek would also seem achievable.

C. Stream Channel Condition

Key Questions: What are the current trends of stream channels and what were they like historically?

No survey identifying the location of headcuts and drainage incision was conducted on the Chasm or Jackson drainage systems. Field investigation was limited and some information regarding drainage incision has been interpreted from Proper Functioning Condition (PFC) survey notes to be further discussed in the **Aquatic Habitat and Fish** *section. The following is a summary from those notes.*

Chasm drainage:
In general, the lower portions of Chasm Creek have steep, unvegetated banks that are incised to a depth of about

15 feet. There is a significant nick point upstream where the road crosses the stream (**Figure 5-3**) at a shotgun culvert, and the incision is not as deep in the area observed above this point. This site is of concern if any road improvements or decommissioning/restoration are proposed here. Also, a side channel was visited and an active headcut was observed in the channel. The PFC survey notes indicated that a large portion of the mainstream and the confluence of smaller tributaries intersecting Chasm Creek are deeply incised as well. Other areas are downcut to a lesser degree than this site or have not been visited.

Jackson drainage:
Only the lower portion of Jackson Creek was inspected. The downcut channel did not display the same characteristics as Chasm Creek. Riparian vegetation, such as sedges are becoming established on some of the banks. Banks are being undercut and sloughing into the creek, widening the channel. Large charred wood was observed to be lodged into the channel banks in places. It is believed that the wood was in the channel and undercut banks collapsed onto the wood trapping and/or anchoring it in place. It is highly speculative to try and date the age of the incision by the presence of the entrapped charred logging wood debris in the channel. It is unknown if this wood was intentionally left in the channel, if it washed down from harvest units above, or if it is from localized logging activities that may have occurred at a later date. The tributaries of Jackson Creek have not been inspected. The PFC survey notes indicated that the a large portion of west fork and the upper east fork of Jackson Creek are highly downcut and other areas are downcut to a lesser degree than these sites. Other sites have not been visited during the PFC survey.

Whitetail drainage:
The PFC survey notes indicate that Whitetail Creek was severely downcut.

Stream channels within the North Bank WAU are not the type that would be expected based on the valley. The stream type in Jackson Creek for the first mile is a "G" (entrenched, low W/D ratio, moderate sinuosity) and some "B" (moderately entrenched, moderate W/D ratio, moderate sinuosity). Based on the valley type, the most logical stream type would be a "C" (slightly entrenched, moderate to high W/D ratio, high sinuosity). The "B" channels are stable, although they are typically expected in steeper valleys. The "G" channels may appear to degrade further before they reach a stable state. After the first mile, the Jackson Creek valley steepens and the channel types change. This is also the case on the west side of the ranch (Barney Creek, Whitetail Creek, Chasm Creek). The channel that would be predicted in these valleys is the "B" channel. However, the channels are "F" (entrenched, moderate to high W/D ratio, high sinuosity) and "G" types. The streams are severely downcut to the point that they reach a grade control. Sometimes these grade controls are natural (bedrock) and other times they are manmade (culverts). If the control is high in the watershed, the stream usually remains stable upstream. However, if the control is low in the watershed (as is the case with most of the culverts), the stream usually becomes entrenched again once there is enough of a change in elevation to allow the stream to entrench. When a stable stream enters an entrenched stream, headward erosion occurs until that stream reaches a grade control. The streams higher in the watershed are usually not entrenched. This suggests that the major mechanism causing entrenchment is the headward erosion started in the main channels.

The evolution from "B" to "G" to "F" and a "C" to "G" represents a channel adjustment to alterations in the driving variables. The driving variables that determine the stream channel dimensions, pattern and profile include things such as flow regimes, geomorphology, soil type, gradient, and riparian vegetation. Of these variables, streamflow magnitude and riparian vegetation probably have the highest likelihood of being altered by past land management practices.

There is no detectable change in vegetation between the stable stream reaches and the unstable or downcut ones. Neither is there a change in land use or management. A comparison of the road location and density to the stability of the stream channels (as well as a tour of the area during a downpour) suggests that a major channel altering mechanism is the road network. The road density on the ranch is higher than most basins with intensive timber harvest. A majority of the roads have water running down them during moderate intensity rainfall. This is water that ordinarily would be subsurface. This increases the magnitude of stream flows that determine the channel characteristics. The channels react by downcutting. Furthermore, it seems that the streams that are the most downcut are the ones that have valley bottom roads paralleling them. This suggests that impacts from the road network have manifested themselves in the lower stream reaches first, where the cumulative impacts are the greatest, and are working upstream.

D. Water Quality

Key Question: What are the current trends in water quality?
What are current stream temperatures?

1. Standard by Law

The Clean Water Act of 1977 states " (Sec 101 a.) The objective of this Act is to restore and maintain the chemical, physical, and biological integrity of the Nations' waters." The Act directs the State to set water quality standards that are not to be exceeded. Water quality will be managed to protect and recognize beneficial uses.

The Oregon Administrative Rules Antidegradation Policy (OAR 340-41-026) intent is to maintain water quality of the state. The general policy for surface waters is "to guide decisions that affect water quality such that unnecessary degradation from point and non-point sources of pollution is prevented, and to protect, maintain, and enhance existing surface water quality to protect all existing beneficial uses." The Standards for this policy for the Umpqua Basin is set forth in Oregon Administrative Rules (OAR 340-41-282). OAR 340-41-282 sets forth specific water quality standard which are not to be exceeded, designed to protect designated beneficial uses.

OAR 340-41-282; Table 3, identifies Beneficial Uses for the Umpqua Basin. *For All Other Tributaries to Umpqua, North & South Umpqua Rivers* the following are considered beneficial uses:

*Public Domestic Water Supply
*Industrial Water Supply
*Livestock Watering
*Salmonid Fish Rearing
*Resident Fish & Aquatic Life
*Fishing
*Water Contact Recreation
*Hydro Power
*Private Domestic Water Supply
*Irrigation
*Anadromous Fish Passage
*Salmonid Fish Spawning
*Wildlife & Hunting
*Boating
*Aesthetic Quality

2. Sedimentation and Turbidity

The Department of Environmental Quality (DEQ) conducted an assessment of non-point source (NPS) pollution related water quality conditions, the results were published in 1988 (*1988 Oregon Statewide Assessment of Non-point Sources of Water Pollution*). No streams within the WAU were listed. Cooper Creek and Huntley Creek, the next two drainages east of the WAU were identified as "No Problem/or No Data Available".

Streams carry suspended particles or sediment. Particle size depends on the amount of flow. According to Hem (1985) generalized terminology call sediment having particle diameters ranging from 0.24 to 4 μm "clay", 4 to 64 μm silt and 64 μm to 2 mm "sand". In general, suspended sediment may be considered a pollutant when it exceeds natural concentration by increasing the turbidity to a point that it affects the biotic balance.

Sediment data has not been collected in the North Bank WAU.

Turbidity is defined as the amount of light that is scattered or absorbed by a fluid (MacDonald, 1990). The scattering increases with suspended particulate matter, which may be organic or inorganic. High turbidity levels can impact salmonids feeding and growth of salmonids and other fish species. Levels of the range of 25-70 nephelometric turbidity units (NTU, measured by photoelectric turbidimeters) impairs the ability of salmonids to find and capture food. Growth is reduced and gill tissue is damaged after 5-10 days of exposure to turbidities of 25 NTU. Turbidity can also impact drinking water, recreational and aesthetic uses of water. Also, turbidity that reduces light penetration in water can decrease primary productivity.

The DEQ has set forth in Oregon Administrative rules, Chapter 340-41-282 water quality standards for the Umpqua River Basin. The water quality characteristics that are managed to protect recognized beneficial uses include turbidity. The standards set forth that no more than a ten percent increase in natural stream turbidities shall be allowed, as measured relative to a control point immediately upstream of the turbidity causing activity.

No known turbidity data is available for the North Bank WAU.

3. pH

The DEQ has set forth in Oregon Administrative rules, Chapter 340-41-282 water quality standards for the Umpqua River Basin. The water quality characteristics that are managed to protect recognized beneficial uses include water pH. The standards identify that pH values shall not fall outside the range of 6.5 to 8.5. pH levels of greater than 9 and less than 6.5 can have an adverse affect on fish and aquatic insects (MacDonald, 1990). However, sub-lethal affects of higher pH levels on fish are not known.

The *Little River Watershed Analysis (1995)* pointed out that accumulation of algae in streams could affect pH. The process of photosynthesis consumes H+ ions during the daylight hours, elevating pH (more alkaline) and at night pH decreases. Shaded stream reaches and on cloudy days not as much photosynthesis occurs and pH levels are lower. In river waters not influenced by pollution, the process of photosynthesis by aquatic organisms take up dissolve CO_2 during daylight and release CO_2 at night by respiration, fluctuation of pH may occur with the maximum pH values reaching as high as 9.0 (Hem, 1985).

The Little River Watershed Analysis identified conditions that could promote algae growth and accumulations were 1.)lack of riparian shade can increase productivity of algae, 2.) the presence of bedrock creates habitat for algae, but poor habitat for algae eating insects, and 3.) nutrient availability (increase). The Analysis also identified conditions that could promote lower pH included 1.) riparian shade 2.) gravel/cobble substrate and large wood in streams, which provide habitat for algae eating insects, 3.) forest stands upslope which cycle and store nitrogen in vegetation and soil so that it is not available to for runoff.

A pH sample was taken at T. 25 S., R. 4 W., Jackson Creek, Section 08, NW 1/4 on 08/15/96 at 11:05 a.m. The sample had a pH of 8.1. This is the only pH sample known to be taken in the WAU.

4. Stream Temperature

No stream temperature data exists for the WAU. A temperature monitoring site was set up in 1994, on Jackson Creek. No reliable data was collected, however, because the stream dried up at this location during the monitoring period.

E. Impacts from Past Land Management

Key Question: How has previous land management activities (ie grazing, timber harvest, road densities) affected hydrologic flows and water quality?

1. Fire and Grazing

Fire history of the North Bank WAU is not fully understood. It is believed that the area may have been burned by Native Americans and later by homesteaders to convert the land to grazing land. However, any information regarding the fire frequency and intensity is not available.

Limited information is available regarding past land management activities. Since about 1864, portions of the North Bank WAU property has been in private ownership. It is believe that it was used primarily for cattle range during the last 145 years. No records are found directly related to the North Bank WAU's use as range, therefore, it is difficult to determine when grazing began and the intensity of grazing the land may have received. Grazing pressure may have been lighter in steep, rough terrain and heavier in low lying areas and riparian areas. However, this is not possible to determine without "use maps" through time. Grazing may have resulted in compaction in uplands and riparian areas, reducing the infiltration capacity of the soils. Generally, grazing pressure may have been higher in riparian areas, (perhaps more commonly in the dry season) because of availability of water and presence of lush vegetation. Bank and vegetation trampling, compaction, and removal of streambank and riparian vegetation could have created a degraded riparian condition. Furthermore, the riparian areas cover smaller areas of the landscape than does the upland sites, therefore, grazing impacts would have been concentrated in a smaller area. Although historic disturbances to the stream channel are undocumented, grazing in the past may have impacted the stream channels.

2. Timber Harvest and Roads

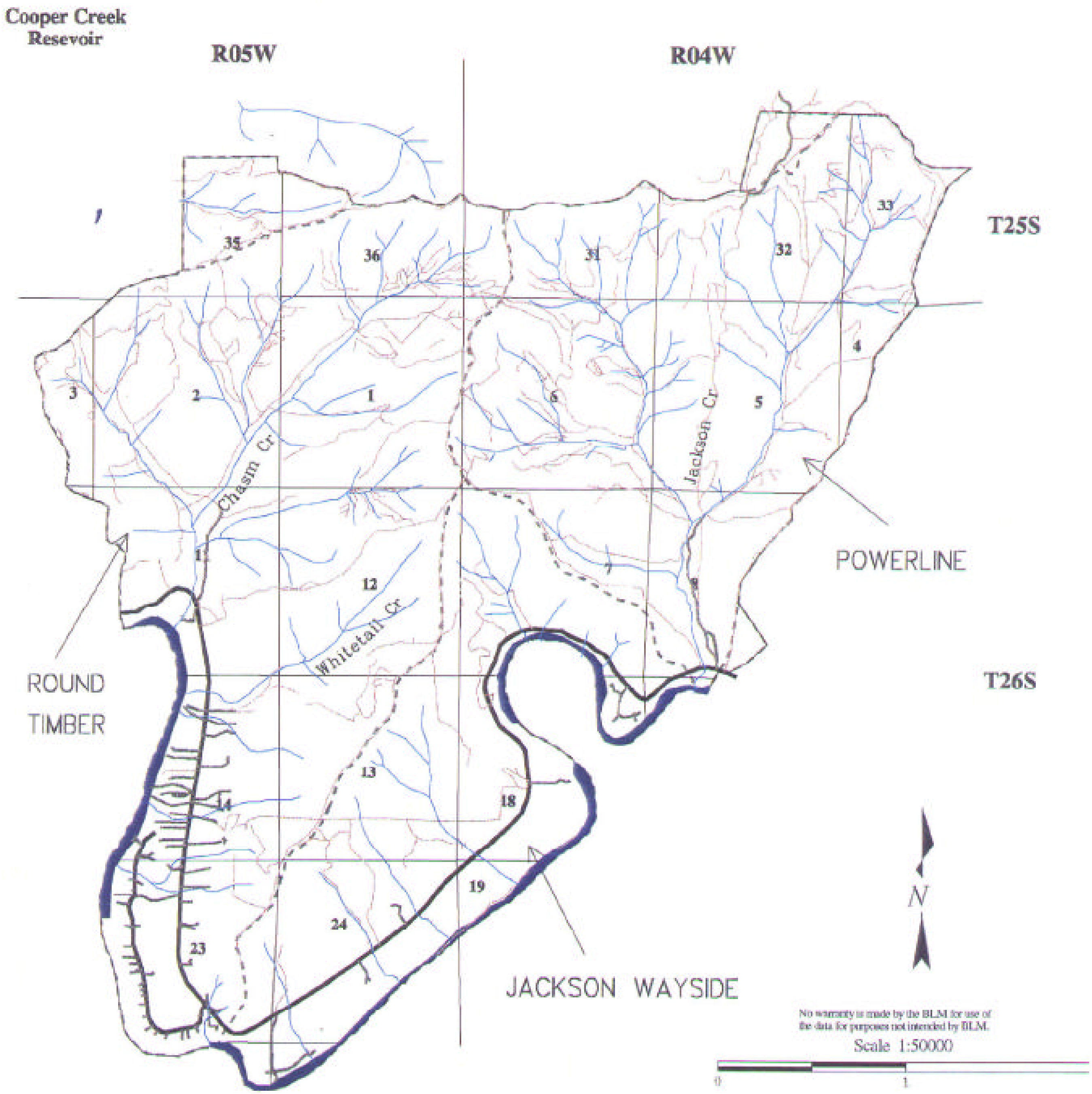
The timber harvest activities on the ranch prior to 1963 are unknown. The 1963 aerial photos reveal timber harvest activities in the Chasm and Jackson Creek Drainage systems. The largest harvest areas were roughly estimated to cover 45% of the Chasm drainage system by 1963 and roughly 45% of the Jackson drainage system. The large harvest areas were generally concentrated in headwaters of these drainages. The harvest was generally clearcut or some partial harvest. Skid trails are numerous in the harvest units and often times ran along valley bottoms and in stream channels.

Road and skid trail densities ranged from 4.93 mi/mi^2 to 11.52 mi/mi^2 in the North Bank WAU (**Figure 5-2, Table 5-2**). Road miles were interpreted from aerial photos, satellite imagery and input in the BLM GIS system. Actual road/skid trail miles may actually be higher. Skid trails and road construction was due to timber harvest and ranch access. As previously mentioned, timber harvest activities had numerous skid trails associated with it and were in valley bottoms and in stream channels. The compacted surface of roads decreases infiltration, increasing runoff. Although some of the older skid trails and unused roads have been vegetated, the compaction of these roads is persistent. Also, the road may intercept subsurface flow changing it to surface runoff, which is more rapidly delivered to the drainage system (Wemple, 1994). With an increase in surface flow as a result of ditch lines in the North Bank WAU, the rain may get into streams quicker. Once in the ditch, much of the water reaches the local stream channels faster than in an non-roaded situation. Road/skid trail densities are two-fold or greater the density of the streams. As previously mentioned, road and stream densities may actually be higher than those identified in **Table 5-2**. Road and skid trails may be contributing to increased winter peak flows in the North Bank Ranch WAU.

Land management activities, fire/burning, cattle grazing, timber harvest and roads have likely impacted the drainages. Cattle grazing may have resulted in a degraded riparian area, with further impacts from timber harvest and road building, which could have aggravated or accelerated the impacts on the stream channels and riparian areas. Bank steepening and instability will increase sediment load (MacDonald 1991). Although sediment data is not available, it is believed that sediment load has increased in the incised Chasm and Jackson drainage systems. Aerial photos from 1963 did not reveal whether the deep incision of these stream channels was present at that time or what degree of downcutting was present. However, the steep, unvegetated banks indicate that this is a relatively recent occurrence, probably since white man settlement.

Figure 5-2

North Bank Roads, Skid Trails, & Streams



LEGEND

Asphalt Surface	Natural Surface	Section Lines & NU River
Crushed Rock Surface	Streams	Drainage Boundaries

North Bank Roads, Skid Trails, & Streams

TABLE 5-2

DRAINAGES	Total Acres	Stream Lengths (miles)	Stream Density (mi/mi^2)	Asphalt Road (miles)	Rocked Road (miles)	Natural Road (miles)	Road Density (mi/mi^2)
Cooper Cr Res [1]	224	-----	-----	-----	-----	3	8.57
Jackson Wayside	1988	6.9	2.22	4.3	1.8	9.2	4.93
Powerline	2902	19.9	4.39	0.2	1.4	35.9	8.27
Round Timber	4124	22.4	3.48	4.4	7.3	35	7.25
Misc Outskirts [1]	100	-----	-----	-----	0.4	1.4	11.52

[1] These areas are only portions of their total drainage but are part of the North Bank Habitat Management Area

GEOLOGY AND SOILS

A. Geology and Topography

The entire North Bank WAU is shown as Roseburg volcanics (as classified by Baldwin, 1974) and associated sedimentary deposits on the Compilation Geologic Map of the Southern Tyee Basin, Southern Coast Range, Oregon by Alan and Andy Niem, 1990. Molenaar(1985) classified the formation as Siletz River Volcanics. **Figure 6-1** comes from the Niems map. A brief description of each delineation is given below.

Roseburg Volcanics (Tev) are tholeiitic pillow basalts that are intertongued with minor amounts of sedimentary rocks (Ter) and locally overlain by tuffs and tuffaceous siltstone. The sedimentary section is interpreted as accreted submarine fan in a trench/slope setting. The rocks date back to the Paleocene and early Eocene about 55 to 64 million years ago.

Inner Fan Facies (Ter1): channelized conglomerates and very thick-bedded, coarse-grained, pebbly, graded to massive lithic sandstone.

Middle Fan Facies (Ter2): thick-bedded, fine to coarse-grained lithic sandstone with thin gray siltstones interbeds.

Slope Mudstones (Ter4): massive to laminated mudstone, channeled mudstone, and minor rhythmically interbedded siltstone and claystone.

Tuffs(Tert): Thick sequence of palagonite tuff and deep marine tuffaceous siltstone.

The dip of the strata is consistently to the SE at a steep 30 to 66 degrees.

The characteristic terrain is moderately to highly dissected hills on moderately steep slopes which are predominantly 30 to 60 percent **(Figure 6-2)**. Slopes greater than 60 percent may comprise as much as 5 percent of the area (The soil slope class map under represents slopes greater than 60 percent). The watersheds of Chasm and Jackson Creeks comprise the majority of the WAU. They and at least one other watershed has significant floodplain and fan deposits of very deep alluvium. Many stream channel segments of these creeks and their larger tributaries are deeply incised with near vertical banks. Downcutting may be as deep as 30 feet although 8 to 20 feet is more typical. There is about 8.5 miles of frontage with the North Umpqua River. Most of this frontage is very deep alluvial terraces.

Elevations range from 520 feet at the North Umpqua River to 1980 feet at the headwaters of Jackson Creek. The topographic relief from the drainage bottom of the major creeks to the adjacent ridge tops is typically 500 to 900 feet. **Figures 6-3 and 6-4** are the portions of the 7.5 minute topographic maps which cover the WAU.

B. Soils

Information from the Natural Resource Conservation Service's Douglas County Soil Survey is used in this report. The soil mapping unit map and tables of selected mapping unit properties are given in the appendix. **Figures 6-2, 6-5, 6-6, 6-7, and 6-8** are maps derived from combining soil mapping units of similar properties for a given category.

About 90 percent of the North Bank WAU is occupied with clayey and very clayey soils high in montmorillonite (**Figure 6-5**). Montmorillonite is a type of clay with high shrink-swell capability with wetting and drying. Deep cracks commonly form in these soils during the dry season and seal up with very slow infiltration and permeability in the wet season. These soils formed in both upland sites(colluvial soils and soils formed over bedrock) and alluvium. Their depth ranges from very shallow over hard basalt to very deep. High organic matter content typically extends deep down the soil profile.

The upland soils are typically well drained and have a xeric moisture regime (67 percent of WAU). A large percentage of soils in riparian zones, floodplains, and fans have drainage ranging from moderately well drained to poorly drained where water tables are near or at the surface for lengthy periods of the year (**Figure 6-6**). Poorly *drained montmorillonitic soils have been known to support the endangered plant Plagiobothrys hirtus.*

Soil depths ranging from very shallow to very deep are all well represented at the upland sites. Shallow and very shallow soils over hard bedrock are common but possibly not quite as extensive as the soil survey indicates based from on site investigations. Soils are typically very deep in the alluvium (**Figure 6-7**).

About 90 percent of the soils are in hydrologic group D (high runoff potential). Shallow soils high in montmorillonitic clays, shallow and very shallow soils over hard bedrock and poorly drained soils account for the high percentage. Hydrologic group ratings are based solely on the physical properties of the soil and bedrock after prolonged wetting. Slope and climatic factors are not considered in the rating (**Figure 6-8**).

1. Past History Effects on Soils

Key Question: What significant geological/management events have affected stream channels?

Survey notes taken in the 1850s indicate that much of the land was grasslands or grass-oak savannas, particularly on south facing slopes. Much of the woodland with merchantable conifers was ground-based harvested in the fifties and early sixties based on the interpretation of the 1963 aerial photos. This activity left an extensive system of skid trails and narrow haul roads. The skid trails were often bladed on the steeper slopes. They were also located in riparian zones. Sedimentation from these disturbances was probably significant until healing occurred. Compaction was probably also significant. There may have been trails and compaction from possible earlier harvesting which are not evident in the 1963 aerial photos on lands converted to grasses. A percentage of woodlands could have been cleared for the sole purpose of conversion to grazing. The trampling of cattle over time was probably also an important factor in compaction and reduced infiltration.

Livestock grazing, timber harvesting and the associated roads and trails may have had their greatest impact on stream channel morphology. I suspect that the bare and deeply incised channels with their near vertical to undercut banks were in part created since white settlement. Very deep montmorillonitic soils may be particularly prone to slumping and downcutting. During the dry season deep cracks which may act as planes of weakness form. As a channel gets established in these soils, slumps rotate along these weakness planes intersecting the banks and at the headcuts of the channels. These planes of weakness would also contribute to the slough of undercut banks and erosion at the headcuts. Add to this the disturbances of road and trail construction, harvesting, and grazing, particularly in the riparian zones, downcutting may have been accelerated as the streams sought their baselines.

These activities would tend to increase runoff during the wet season due to compaction and drainage interception. The extra energy input from the increased runoff could contribute to headcutting and bank failures of channels already weakened from livestock trampling and removal of vegetation. The amount and significance of these accelerating factors is impossible to quantify based on current knowledge. Jerry Mires observed that the stream channels appeared to have been protected from downcutting in the very deep alluvium by a pavement of rock fragments which developed naturally over time through the erosion process. He theorizes that the increased runoff from historic management upset the channel equilibrium resulting in increased peak flows which broke through the pavement and created a new sequence of downcutting. One of the possible consequences of any recent downcutting could have been the lowering of water tables on the adjacent floodplains.

Substantial sheet erosion may have been a problem on overgrazed lands, if overgrazing was occurring.

The first powerline and its associated road on the ridgeline separating the two forks of Jackson Creek was constructed before 1963. It has grades as steep as 32 percent. Some of the bladed trails which go directly up ridge noses may have been created as fire breaks.

Only a few small translational slides were identified from the aerial photos from August 1963 to July 1994. The large precipitation events of the 1996-97 wet season have produced a number of small translational failures originating in the hollows of the upland slopes. Shallow translational failures in the recent past were more common than the aerial photo record indicates. The presence of many of them might have been quickly masked by rapid reestablishment of grass and forbs. Small slumps which usually are difficult to detect on aerial photos probably were quite common and where associated with seeps, especially where they intersected roadcuts. Large slumps and slump-earthflow combinations probably occasionally occurred.

2. Current Condition

Key Questions: What is the most significant sediment input to this particular watershed?
What are the trends in sediment input?

About five percent of the road and major trail surfaces within the North Bank Habitat Area currently have serious erosion problems or potentially serious problems in the making. Those and others identified in the field are marked on **Figure 6-9** and briefly described below. The numbers correspond to their locations on the map. I only walked one third of the roads and trails shown on the map.

The overall impression is that the road and trail system is in pretty good shape from an erosion and slope stability standpoint. Most road and trail segments have grassed over. Some segments whose beds are cut into bedrock and have only a thin veneer of fine earth covering them and are bare of vegetation are experiencing some sheet erosion. Most problem segments seem to be those where steep grades and deeper soils coincide, where culverts have inadequate capacities or maintenance, and where disrupted drainage flows down road surfaces and then escapes on deeper soils or stream banks sensitive to erosion. Widely scattered roadcut slumps are responsible for some of the drainage problems. Most problems are probably due to inadequate design or maintenance.

See **Table 6-1 and Figure 6-9** for specific erosion and sedimentation problems identified on the ground.

Compaction has been persistent in the old trail and roadbeds although grass has helped to alleviate the compaction and give structure to the top foot of soil. The effects this compaction may currently have on increased surface runoff is unknown. The effects are probably less than that following the peak harvesting years of the fifties and sixties. Channeling of water into creeks is still a problem with a number of roads.

Sheet erosion is probably a problem with the bare, incised stream banks. It is probably not a problem on the densely vegetated floodplains. In the upland areas where annual grasses and other weeds have replaced perennials some sheet erosion may be occurring. On a few slopes spot checks indicated there does not appear to be a sheet erosion problem. Where it might exist, improvement over time can be expected due to the recent cessation of cattle grazing.

The amount of sediment reaching streams from roads and trails is probably small compared to that generated by stream bank and headcut erosion and mass wasting. The channel of Jackson Creek appears to still be downcutting at problem site #8. Other channels in alluvium have reached bedrock and are no longer downcutting. Determinations of downcutting were not made for most of the segments in the deep alluvium. Elijah Waters examination could not detect changes in stream channels by comparing the 1963 and 1994 aerial photos. This may be an indicator that downcutting and widening of channels was not significant during the 31 year interim. Based on this observation and his Rosgen survey, livestock grazing may not have had much influence and the current channel morphology may owe its existence largely to natural processes as the streams seek their stable baselines. It is possible that there was a period of management induced acceleration prior to 1963 but processes substantially slowed down with at least one exception (problem site #8) due to the possible near approach of the streams' baselines in the deep alluvium.

Landslides were not detected on the July 1994 aerial photos although one small slump was discovered in a roadcut (item #2 in **Table 6-1**) as well as a slump near the ridgetop in the SE1/4NW1/4 Sec.32, T25S, R4W. It is on a 30 to 36 percent slope, is about 60 feet deep and 40 feet wide and has a head scarp of about five feet. The soil is about 40 inches deep and montmorillonitic and has strong structure. The slump is in a slight hallow with a higher moisture content than the surrounding ground. Water is pooled at its toe on the road below.

All field observations were prior to the big storm of November 17 which gave over four inches of rain to the Roseburg area in a 24 hour period and subsequent large storms which cumulatively caused much landslide and flood damage in the region. Jerry Mires reported translational failures in the southern part of North Bank Management Area.

3. Vegetation's Relationship to Soils, Topography, Climate, and Management

Key Question: What soil types are limiting vegetation?

The 1963 and 1994 aerial photos were compared for differences in vegetation. Open heavily grassed areas in the 1963 photos had virtually the same boundaries in 1994. One would have suspected more fluctuations in the boundaries if only grazing pressure was accounting for the maintenance of grass.

Areas which were logged prior to 1963 showed signs of coming back totally or partially to trees. The same was true for areas logged between 1963 and 1994. Areas commonly changing to grass were skid trails and apparent landing and log deck areas. There is one sizable area along the west Fork of Jackson Creek in the SE1/4 of Sec. 6, T26S, R4W adjacent to a shed which was logged and maintained in grass, apparently due to grazing pressure. Wet meadows remained largely unchanged. There seems to be a strong influence from aspect especially along the ridgeline northern border of the WAU.

Observations in the field showed that very shallow soils over hard relatively non-fractured bedrock was supporting very few or no trees. The areas colored red on the soil depth map **(Figure 6-7)** are those where very shallow soils are mapped as a major component in the soil survey. Wet meadows and certain patches of very deep alluvium lacked trees.

4. Hypothesis of Vegetation and Soil Relationships

1. A relatively large area of the North Bank WAU is naturally unsuited for trees where soils are very shallow over relatively non-fractured bedrock. Small patches of trees would indicate more favorable microsites.

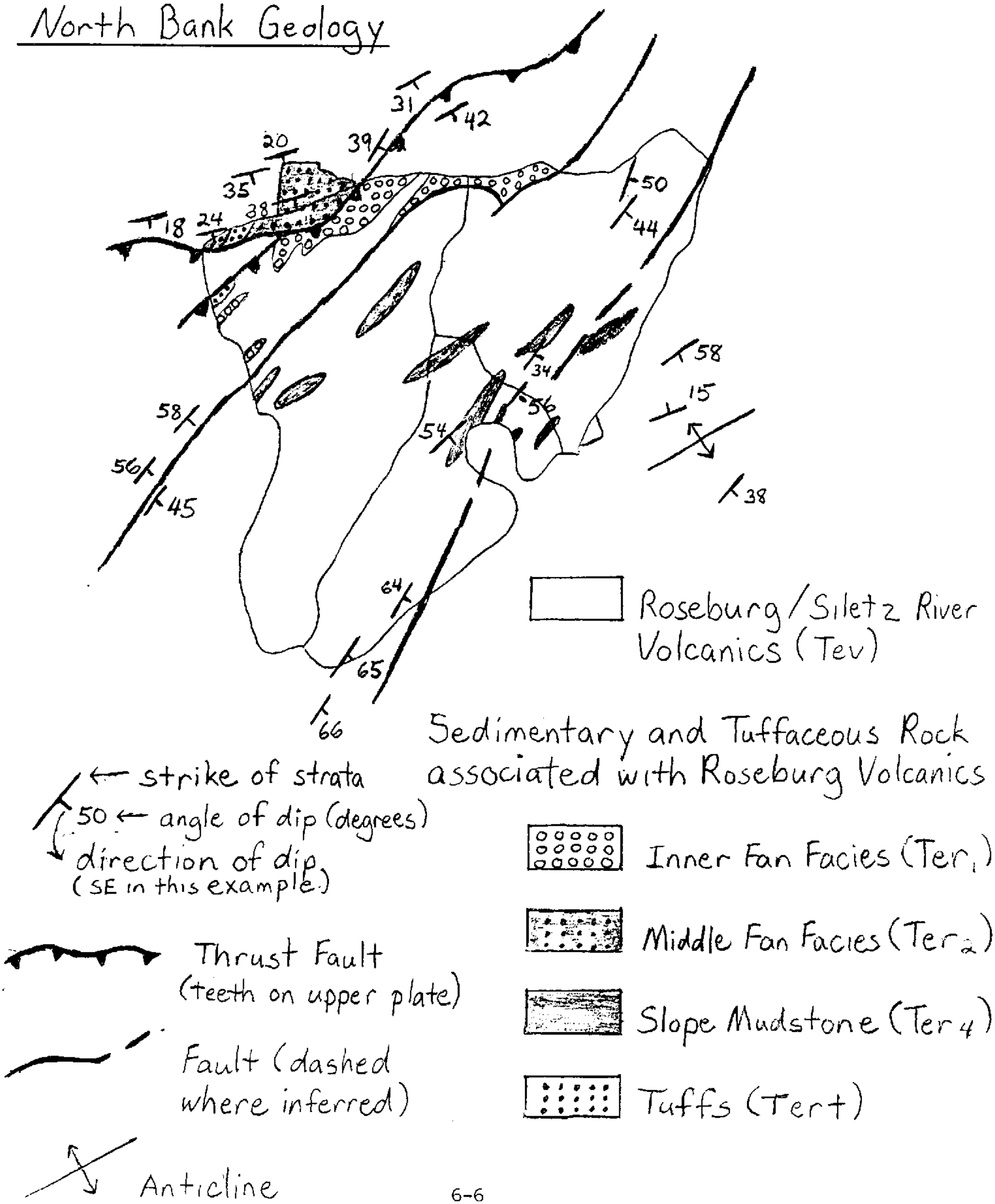
2. Where soils get a little deeper or bedrock is softer or more fractured, sparse trees may grow on the well drained sites of south aspects and denser trees may grow on north aspects or in swales or other topographic positions such as the toes of slopes where moisture accumulates. These may support only grass if management practices or impacts such as burning, harvesting, compaction, excessive erosion and grazing occur.

3. Moderately deep to very deep, well drained soils and deep to very deep moderately well drained soils will generally support trees unless management practices or impacts such as burning, harvesting, compaction and grazing maintains them in grass and shrubs.

4. Research has been demonstrating that changes in the soil pH and microbiology can favor broadleaf trees and grasses over conifers and vice-a-versa. Management can trigger these shifts. A soil with an acidic soil and a fungal-dominant microbiology favors conifers. A more basic and bacteria-dominant soil environment favors broadleafs and grasses. A low elevation soil with high base saturation like the montmorillonitic soils is more likely to have a higher pH than a higher elevation soil with mixed mineralogy in this region. Harvesting conifers and then maintaining the land in grassland through management in the WAU may have altered an already delicate balance to a bacteria-dominant situation which could perpetuate grassland or a grassland-oak savanna

type even well after the end of grazing. If this scenario has taken place, then some of the land non-forested on both the 1963 and 1994 aerial photos has the soil depth and bedrock capable of supporting conifers.

Figure 6-1


North Bank Geology
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Roseburg/Siletz River Volcanics (Tev)
Sedimentary and Tuffaceous Rock associated with Roseburg Volcanics
← strike of strata
50 ← angle of dip (degrees)
direction of dip (SE in this example)
Inner Fan Facies (Ter1)
Middle Fan Facies (Ter2)
Slope Mudstone (Ter4)
Tuffs (Tert)
Thrust Fault (teeth on upper plate)
Fault (dashed where inferred)
Anticline

Figure 6-2

Soil Slope Classes

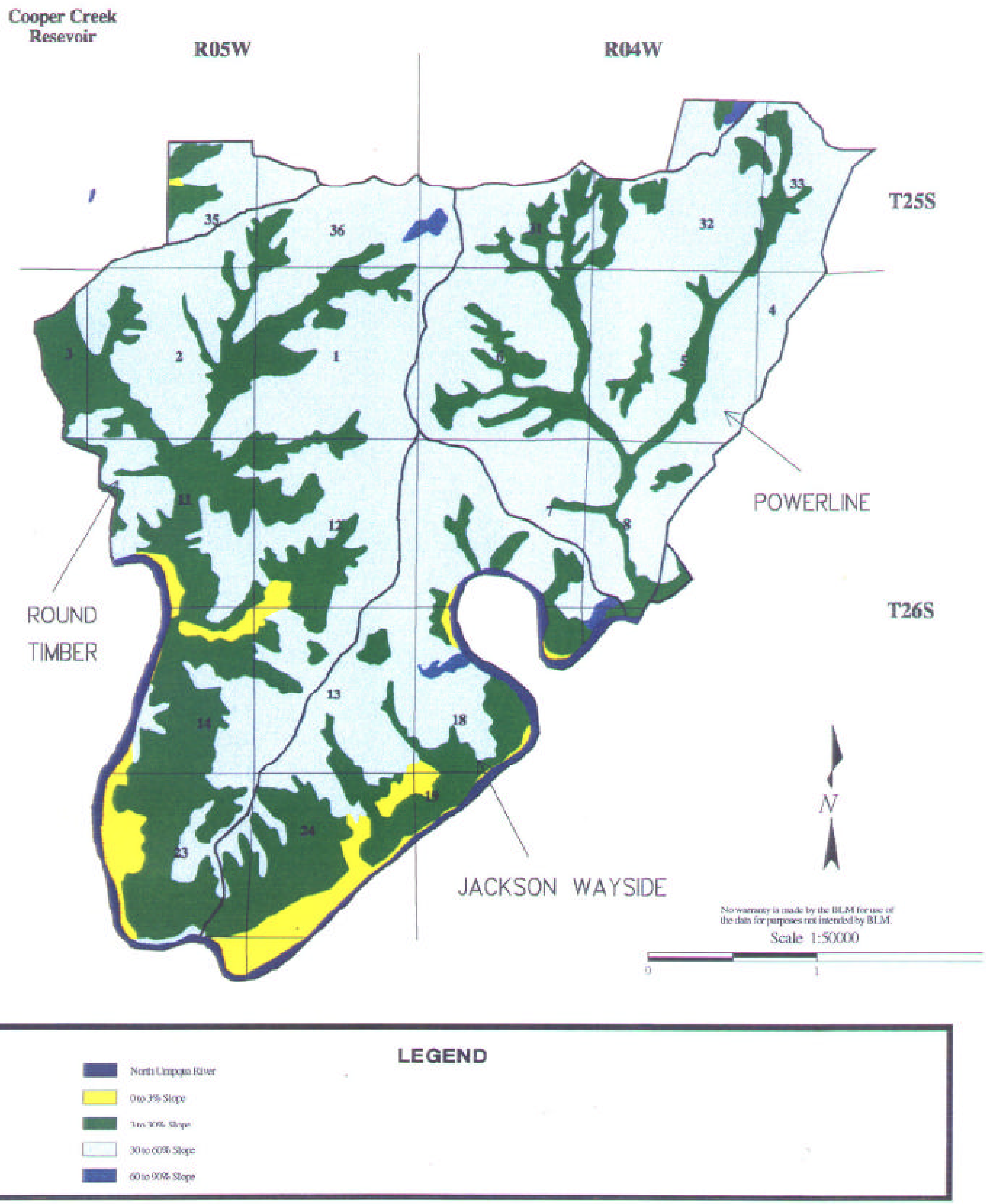


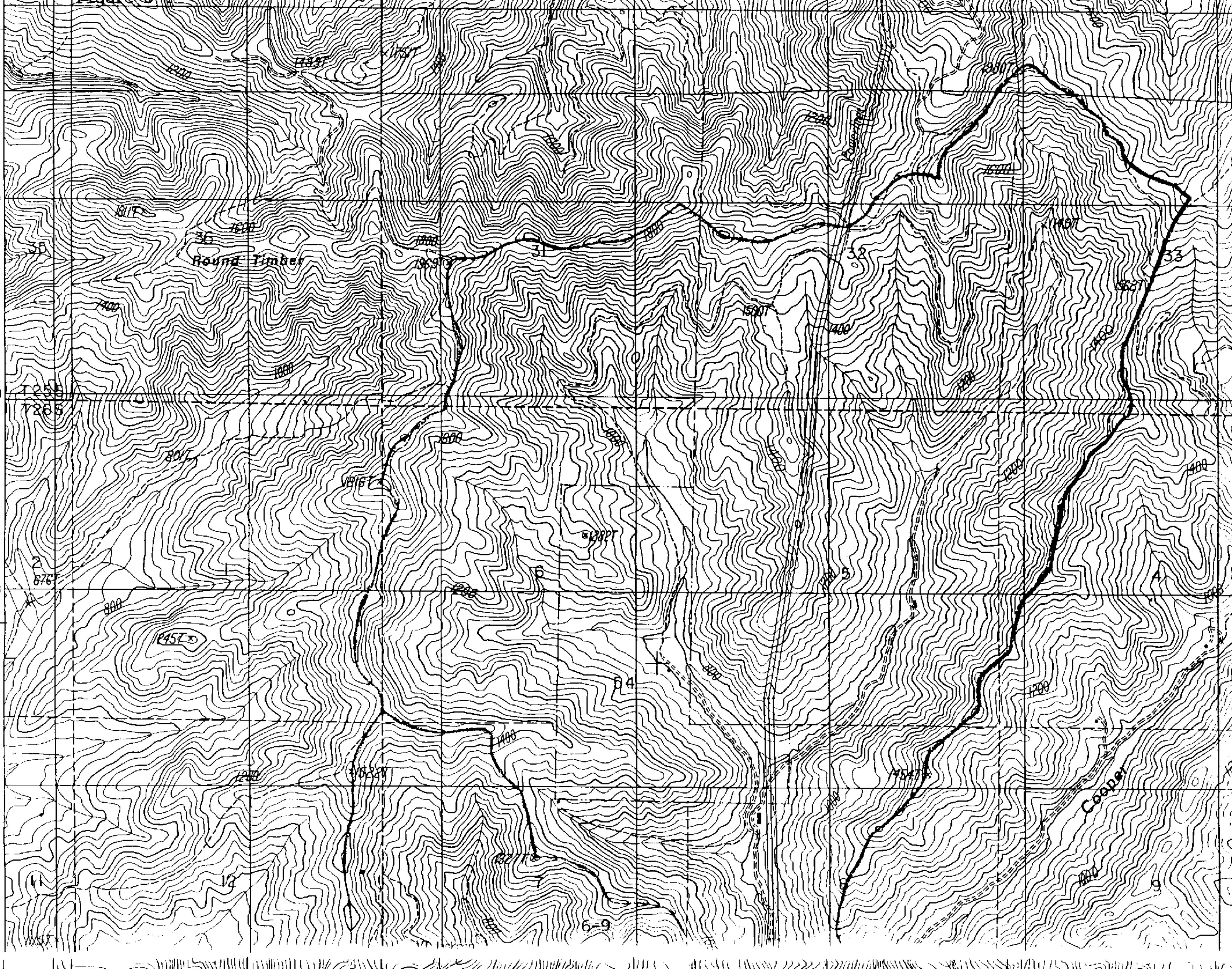
Figure 6-8

ROUND TIMBER DRAINAGE

Topographic Map

1:24,000
40 ft. Contour

Figure 6-4



Round Timber
Cooper
36
35
31
32
33
6
5
4
2
11
12
8
9
6-4
6-9
T25S
T26S
4801
4800
4799
4798
4797
20'

Figure 6-4 (cont.)

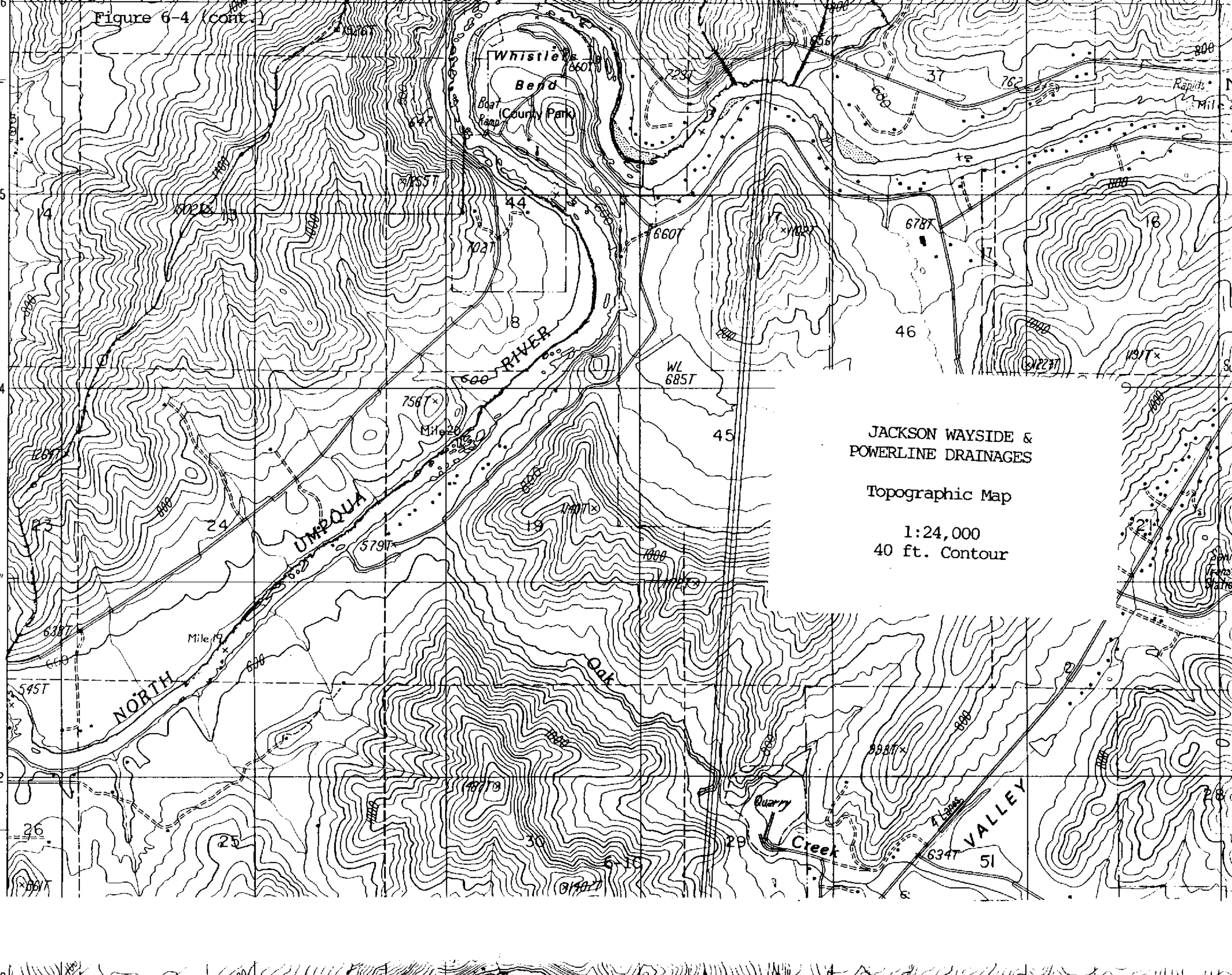
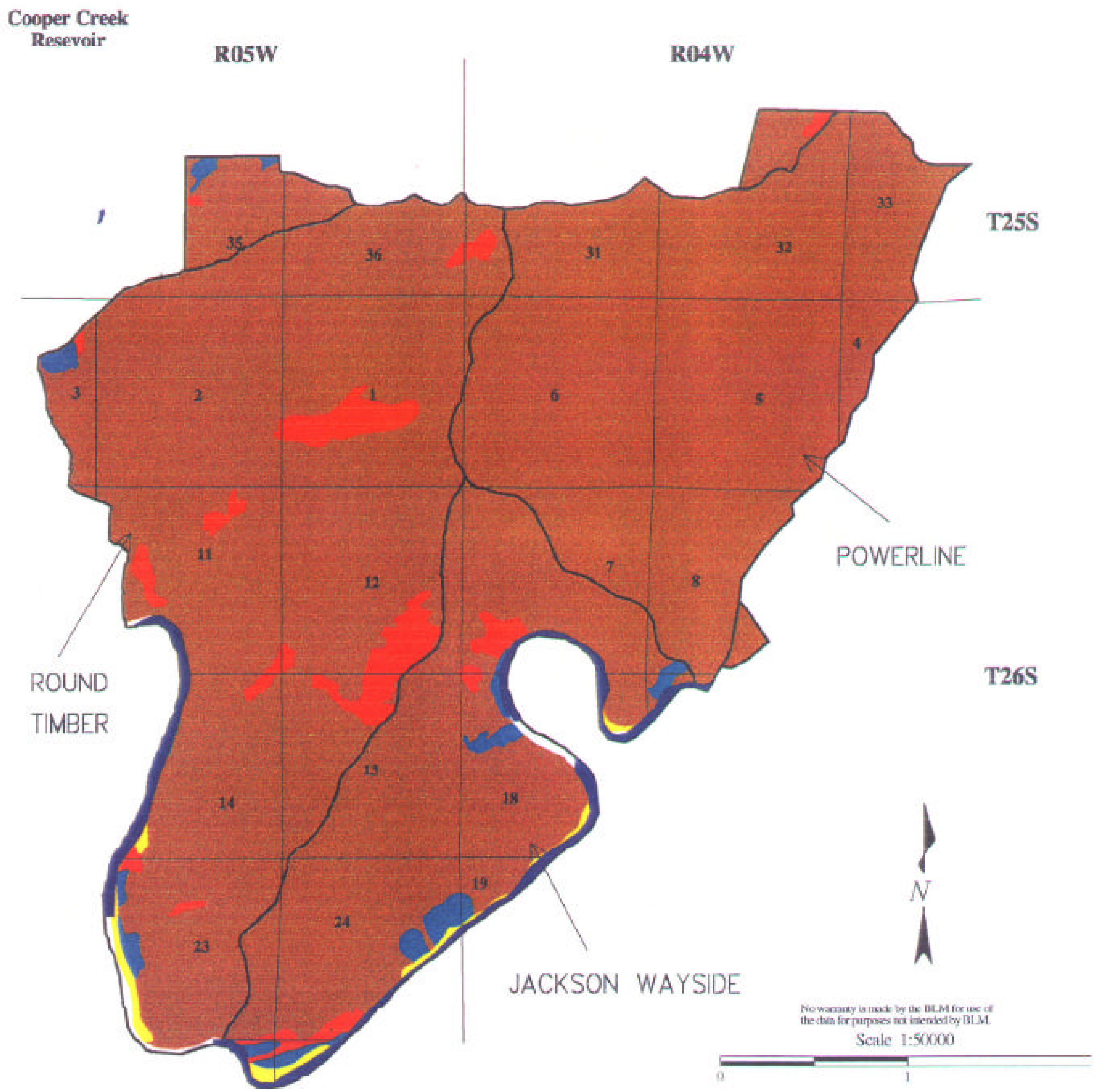


Figure 6-5

Soil Texture



LEGEND

- North Umpqua River
- Sandy and Sandy Skeletal (Mixed Mineralogy)
- Loamy (Mixed Mineralogy)
- Clayey (Mixed Mineralogy
- Clayey (Montmorillontic Mineralogy)

Figure 6-6

Soil Moisture Regimes and Soil Drainage

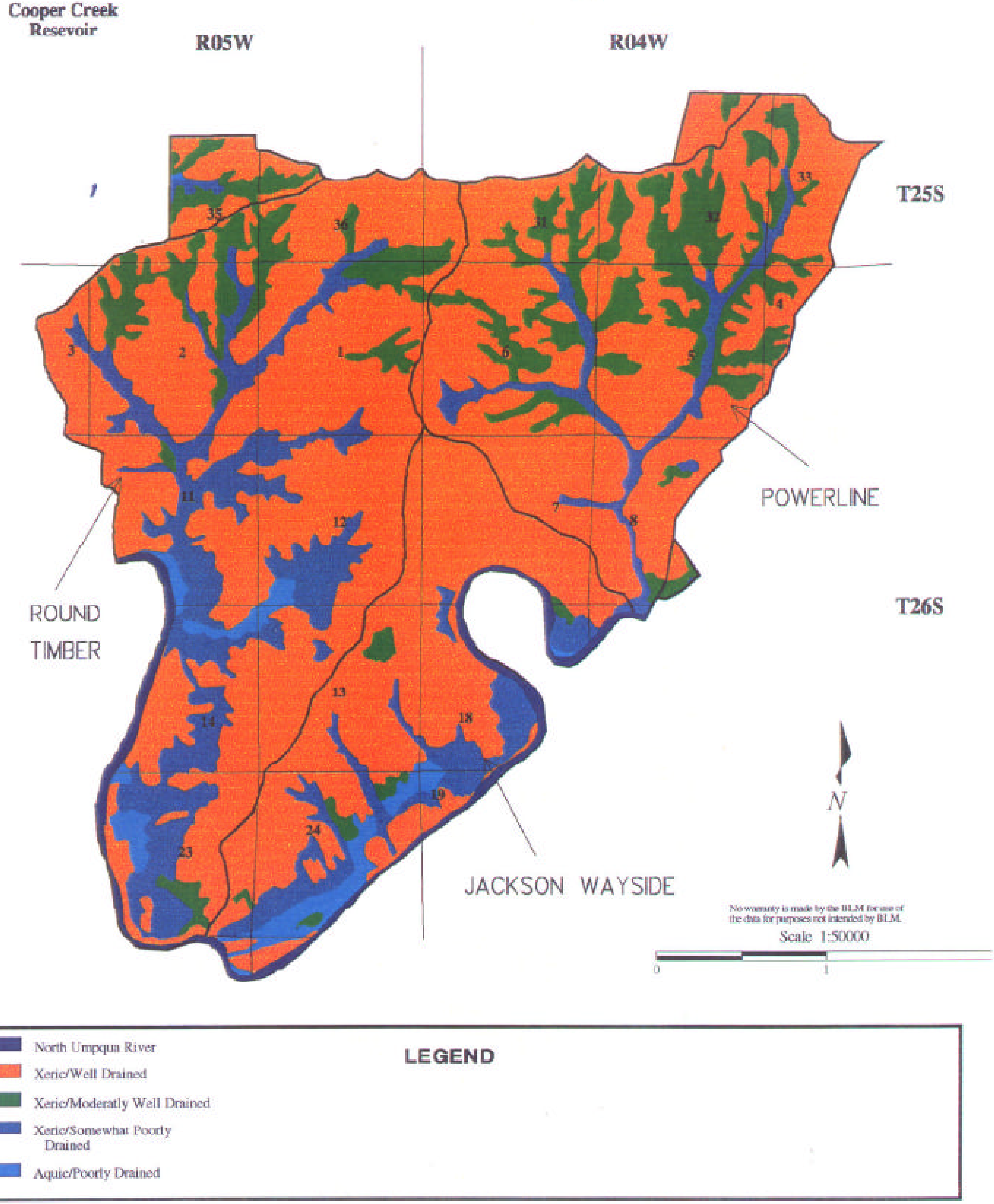
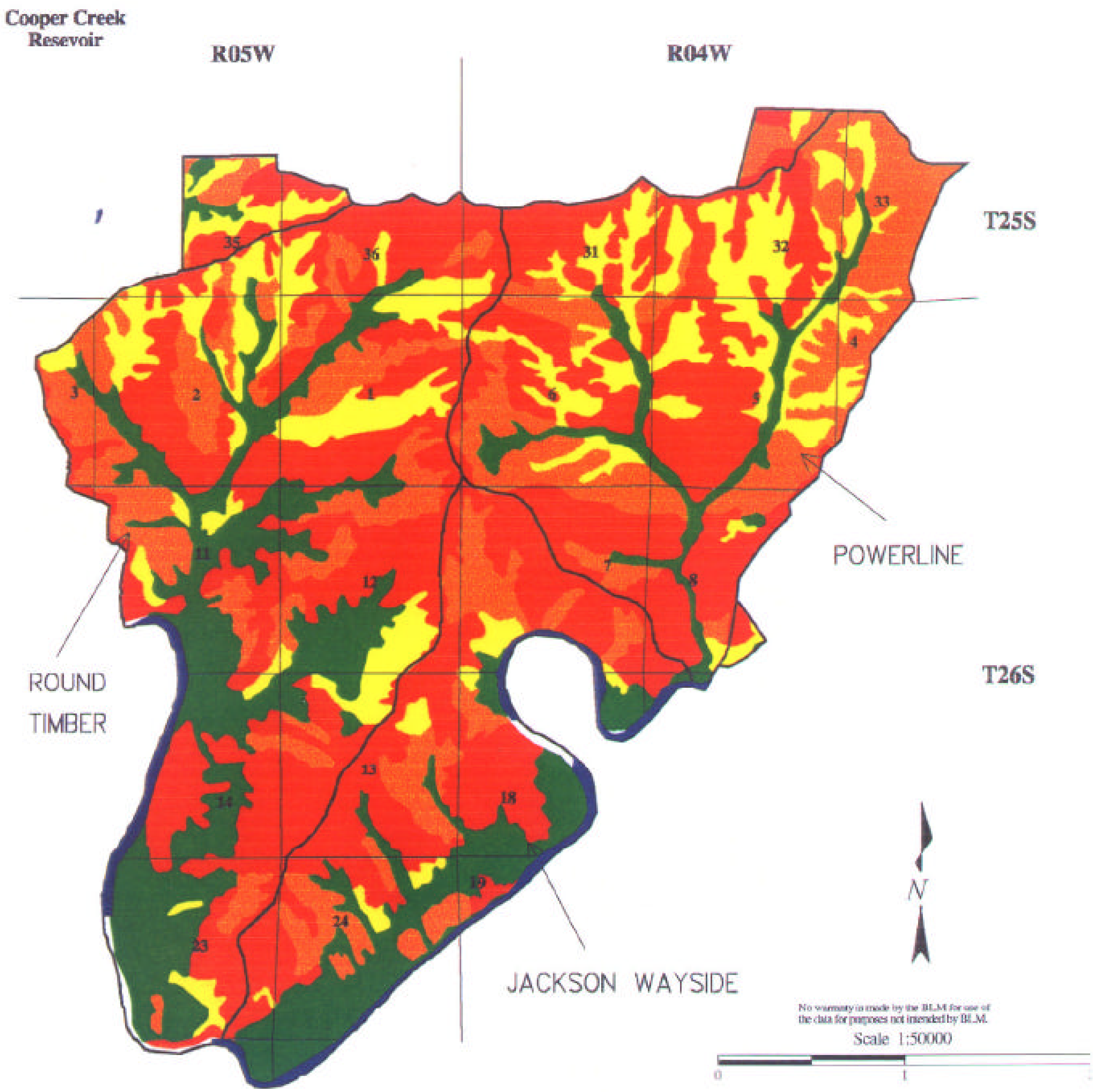


Figure 6-7

Soil Depth



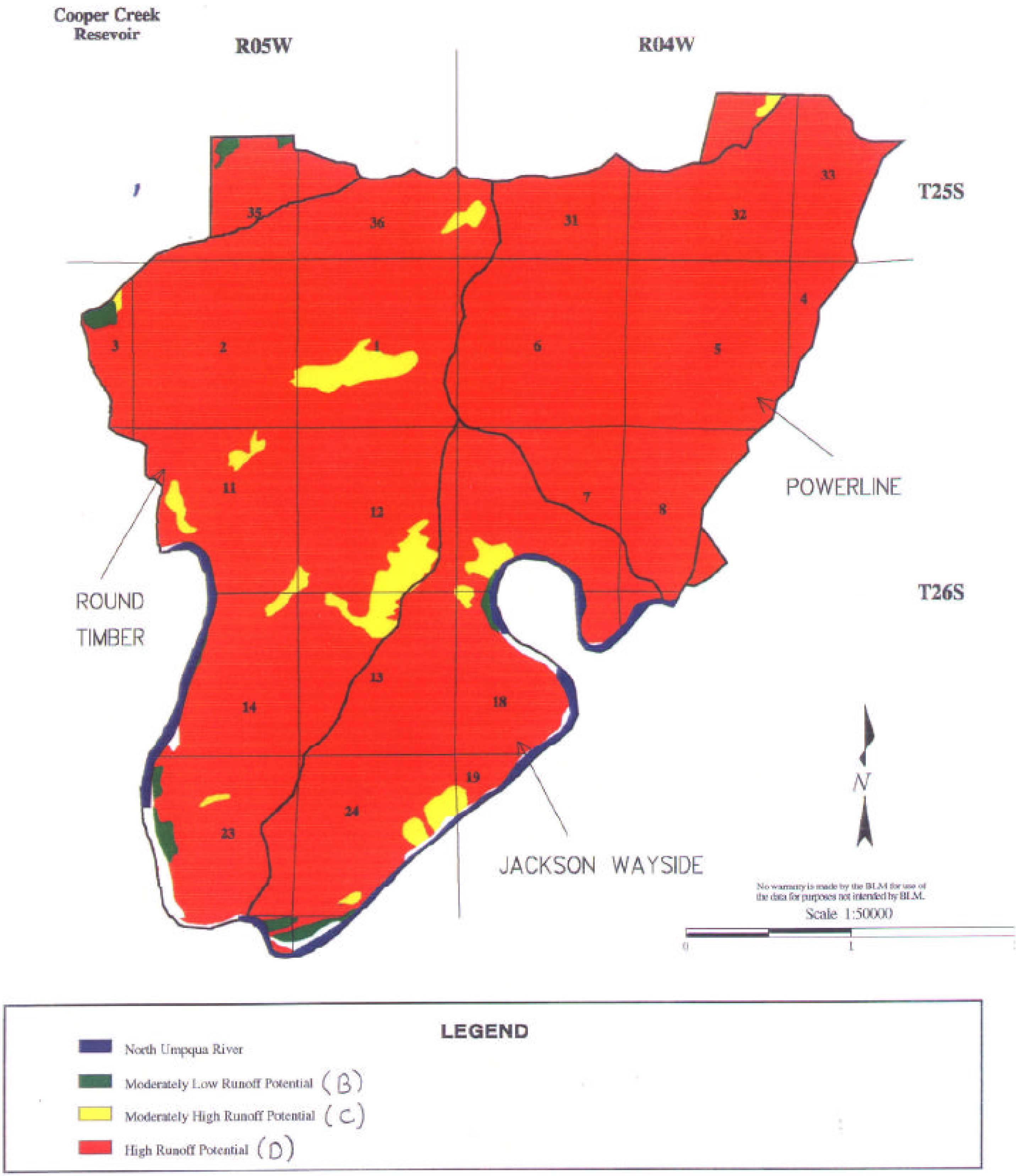
LEGEND

- North Umpqua River
- SH Units/SH-RO Complexes RO Units
- MD-SH Complexes MD-SH-VD Complexes
- MD Units
- VD Units

RO = Rock Outcrop
SH = Shallow (5 to 20 inches to bedrock)
MD = Moderately Deep (20 to 40 inches to bedrock)
Deep = 40 to 60 inches to bedrock
VD = Very Deep (greater than 60 inches to bedrock)

Figure 6-8

Soil Hydrologic Groups



EROSION/SEDIMENTATION SOURCES

Table 6-1

1. Unsurfaced powerline road in the SW1/4 Sec.5, T26S, R4W: Grades are 20 to 32 percent. Eroding ruts up to 18 inches deep have developed on roadbed surfaces that are 10 to 70 percent grassed. This stretch is just above Jackson Creek. The road will probably continue to be needed for powerline access. Outsloping, waterbarring and rocking should be considered. If it remains unrocked, wet season closure to the public should be considered.

2. Unsurfaced powerline road in the NW1/4 Sec.5, T26S, R4W: Small slump failure in road cut caused by a seep.

3. Unsurfaced powerline road in the SW1/4 Sec.32, T26S, R4W: A seep in a swale is being intercepted by the road. The flow travels down a rill up to 10 inches deep for a short distance before filtering in a grassy slope. Sediment is not reaching a stream.

4. Unsurfaced powerline road in the SW1/4 Sec.32, T26S, 4W: Steep graded segment with eroding ruts up to 12 inches deep. The sediment is filtering on a grassy slope near the ridgetop.

5. Lightly rocked powerline road near the center of Sec.32, T26S, R4W: Boggy condition is present. Drainage work is needed.

6. Unsurfaced "Soggy Bottoms Way" road in the SW1/4 Sec.32, T26S, R4W: Narrow, steep sided gullies in deep montmorillonitic soils were created by road drainage. The eastern most one is caused by drainage traveling down rill in middle of road.

7. Unsurfaced "Blacktail Basin" Road in the NE1/4 Sec.5, T26S, R4W: Road is endangered by the bank undercutting of the deeply incised Jackson Creek at a bend. Cracks have formed adjacent to the road indicating that a slab of bank is ready to slough.

8. Unsurfaced "Blacktail Basin" Road in the SE1/4 Sec.5, T26S, R4W: Sediment plugged culvert at a small drainage crossing is directing flow onto the road causing damage.

9. Unsurfaced "Chasm Creek" Road in the SW1/4 Sec.11, T26S, R5w: Two spots where water drains from road to the stream bank causing a small gully.

10. Unsurfaced "Chasm Creek" Road in the NW1/4 Sec.4, T26S, R5W: Two ft. culvert is exposed and nonfunctional. Stream flow has channeled beneath it and down the middle of the road creating a two ft. deep channel. About 100 ft. downstream it passes over another exposed nonfunctional 12 inch culvert and departs the road at that point.

11. Unsurfaced "Bear Tree" Trail in the NE1/4 Sec.2, T26S, R5W: Steep lengthy grade of 27 percent has 6 inch deep eroding ruts between grassed surface and a low lying berm on the outside. Most sediment probably filters out on grassy slope below.

12. Unsurfaced "Blacktail Ridge" Road: Rilling occurring on moderately steep grade.

13. Rocked "Soggy Bottoms Way" Road crossing of a tributary to the west fork of Jackson Creek in the SE1/4 Sec. 6, T26S, R4W: The undersized culvert washed out this wet season and channel cutting upstream apparently occurred.

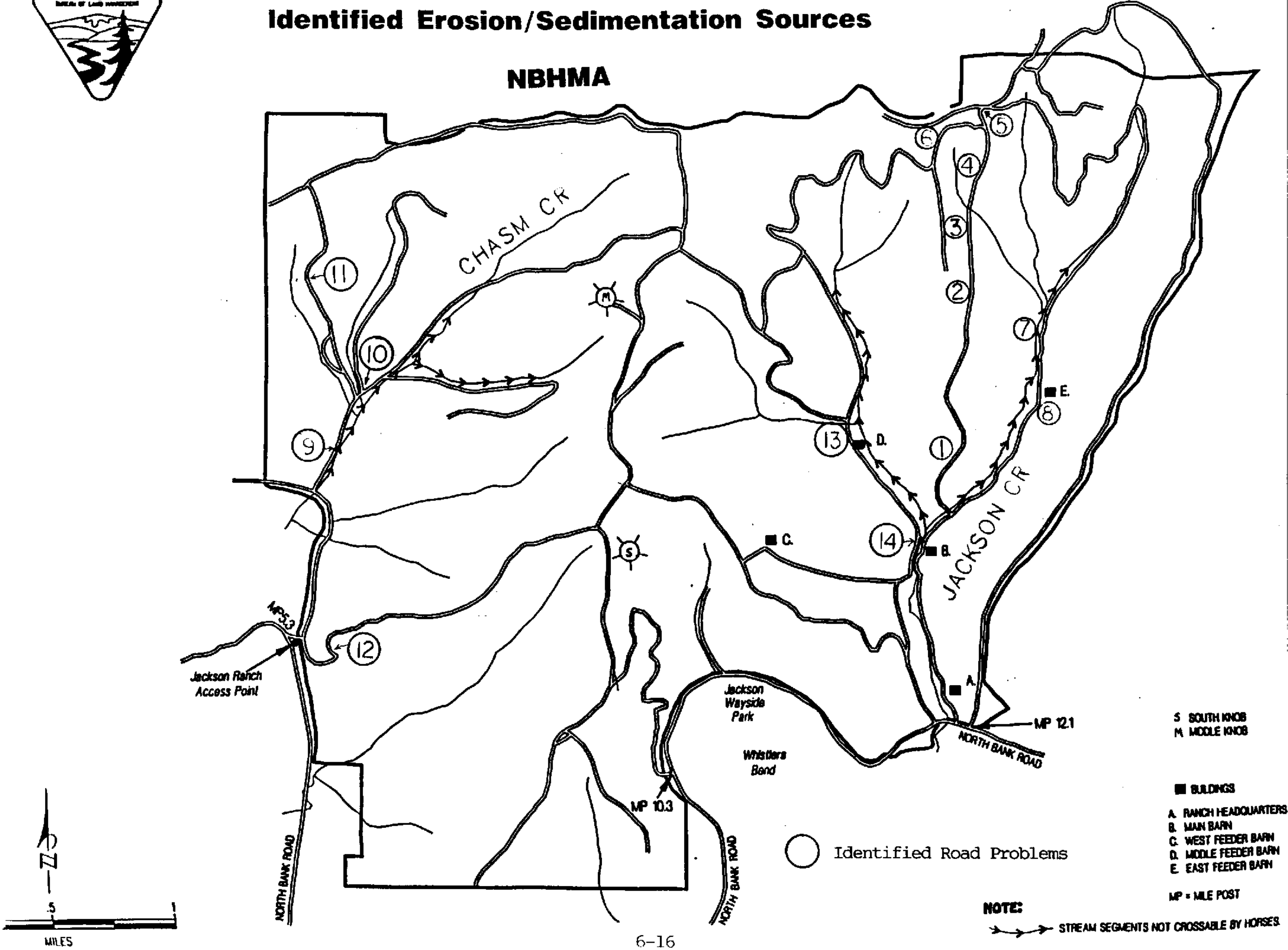
14. Rocked "Soggy Bottoms Way" Road crossing of Jackson Creek next to the main barn in the NW1/4 Sec. 8, T26S, R4W: Five feet diameter culvert and fill washed out this wet season. Rilling is occurring on the moderate grade beyond the crossing.

Jerry Mires in addition to the above identified problems on the "Thistle Ridge" trail in the NE1/4 Sec.7, T26S, R4W and the eastern part of the Chasm Creek" Road. Jerry also identified an area of slumpy ground near the center of Sec.6, T25S, R4W.

Figure 6-9

Identified Erosion/Sedimentation Sources

NBHMA



AQUATIC HABITAT AND FISH

A. Fish Distribution

Key Question: What is the distribution of fish species?
What are their condition and trend?

The streams within the North Bank WAU currently have little potential for increased fish production. The limits of fish distribution are pretty well defined based on migration barriers. There are approximately 9 miles of fish bearing streams on federal lands (**Figure 7-1**). However, the actual fish distribution will vary throughout the year based on the availability of water. The lower mile of Jackson Creek has the most potential for fisheries production, and it is severely limited by lack of water in the summer. Surveys in this stream indicate that the stream dries to intermittent pools during the summer months. The survival of juvenile fish in these isolated pools is dependant on the temperature and amount of hiding cover in the pools. Literally hundreds of dead juvenile fish have been observed in these pools due to overheating. Also, mammalian and avian predators are known to visit these pools looking for an easy meal. The streams on the west half have not been as thoroughly sampled for fish. However, cutthroat trout have been observed in limited surveys. It is possible that there is something on the private land below that prevents anadromous fish from pioneering these streams. Coho surveys on Jackson Creek indicate that fish do not get into the stream until December. During this time the river and the stream rise enough to allow upstream migration. Up to 7 coho redds per mile have been counted on the lower mile of Jackson Creek. A majority of the recovered carcasses of spawned out coho indicate that they are of hatchery origin, suggesting that the population is not self sustaining. A few cutthroat trout and steelhead have been sampled in Jackson Creek as well. Historical records suggest that at one time there was a much greater fisheries output from Jackson Creek. A 1906 sportsmen magazine article was written about the North Umpqua cutthroat trout fishing in the Whistlers Bend area. In this article, two men landed and harvested 85 sea-run cutthroat trout in less than one day of fishing. It is ironic that 85 cutthroat trout have not returned over Winchester dam in a single year for over ten years.

ODFW habitat surveys are available for Jackson Creek. The surveys rate the stream as "poor". The limiting factor is a lack of water. Based on the current condition of the fish bearing streams and the condition of the watershed, it is unlikely that fish habitat or production will improve significantly in the near future. Active restoration starting outside of the stream channels, is needed to improve conditions for fish, and results may not be realized for a long period of time.

B. Riparian Area Condition

Key Questions: What are the conditions of the riparian areas?
What are their trends
How will changes in management of the riparian habitat effect aquatic species?

A riparian zone is the transitional area between the aquatic and terrestrial ecosystems. Riparian vegetation is important in bank stability and stream temperatures. It is also believed that riparian zones are important in controlling the amount of sediment and nutrients that reach the stream from upslope sources (MacDonald, 1991).

The Bureau of Land Management (BLM) established national goals and objectives for managing riparian resources on public land. A primary goal is to restore and maintain riparian areas so that 75 percent or more are in proper functioning condition (PFC) by 1997. The *Riparian Area Management, Process for assessing Proper Functioning Condition (TR 1737-9 1993)* states:

> "The overall objective of this goal is to achieve an advanced ecological status, except where resource management objectives, including PFC, would require an earlier successional stage, thus providing the widest variety of vegetation and habitat diversity for wildlife, fish and watershed protection. This objective is important to remember because riparian-wetland areas will function properly long before they achieve an advance ecological status."

Four functional ratings are used, they are defined in *Riparian Area Management, Process for assessing Proper Functioning Condition (TR 1737-9 1993)* as follows:

Proper functioning condition: "Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high waterflow... The function condition of riparian-wetland areas is a result of interaction among geology, soil, water and vegetation".

Functional -at risk - "Riparian wetland areas that are in functional condition but an existing soil, water or vegetation attribute makes them susceptible to degradation".

Nonfunctional - "Riparian-wetland areas that clearly are not providing adequate vegetation, landform, or large woody debris to dissipate stream energy associated with high flows and thus are not reducing erosion, improving water quality, etc. The absence of certain physical attributes such as floodplain where one should be are indications of non-functioning conditions".

Unknown - Riparian-wetland areas that BLM lacks sufficient information on to make any form of determination.

Trend is not reported for areas that are nonfunctional. Trend, as it relates to PFC is related to specific objectives and is not part of the report for assessing proper functioning condition. Areas that are functioning-at risk report trend. This may be used to help prioritize management because of a decline in resource values is apparent.

An assessment for PFC was completed in early November, 1996 on Chasm Creek, Jackson Creek, Whitetail Creek , unnamed stream and their tributaries (**Figure 7-2**). A breakdown of the functional ratings is given as follows:

Chasm Creek -	0.54 miles of functioning-at risk; upward trend 1.75 miles of functioning-at risk; downward trend 0.81 miles of functioning-at risk; trend not apparent 1.31 miles non-functioning
Jackson Creek -	4.56 miles of functioning-at risk; upward trend 2.67 miles of functioning-at risk; downward trend 1.01 miles of functioning-at risk; trend not apparent
Whitetail Creek -	1.37 miles of functioning-at risk; downward trend
Unnamed #1	0.57 miles of PFC 0.81 miles of functioning-at risk; downward trend
Unnamed #2	0.40 miles of functioning-at risk; upward trend 0.65 miles of functioning-at risk; downward trend

The assessment for PFC within the WAU breaks down more generally as follows:

Proper functioning Condition	3.5%
Functional-at Risk/downward trend	44 %

Functional-at Risk/upward trend	33.5%
Functional-at Risk/trend not apparent	11 %
Nonfunctional	8 %

Changes in the management of the riparian areas, from past practices, should prove a benefit to aquatic species. The cessation of grazing will allow the vegetation to recover to the seral condition appropriate for that soil and moisture regime. These conditions may range from grassland through shrubs, hardwoods, all the way to coniferous forests. Acceleration of vegetative development could be achieved through planting or release operations. Vegetation types should not be encouraged that would not naturally exist, given soil or moisture limitations.

C. Wetlands

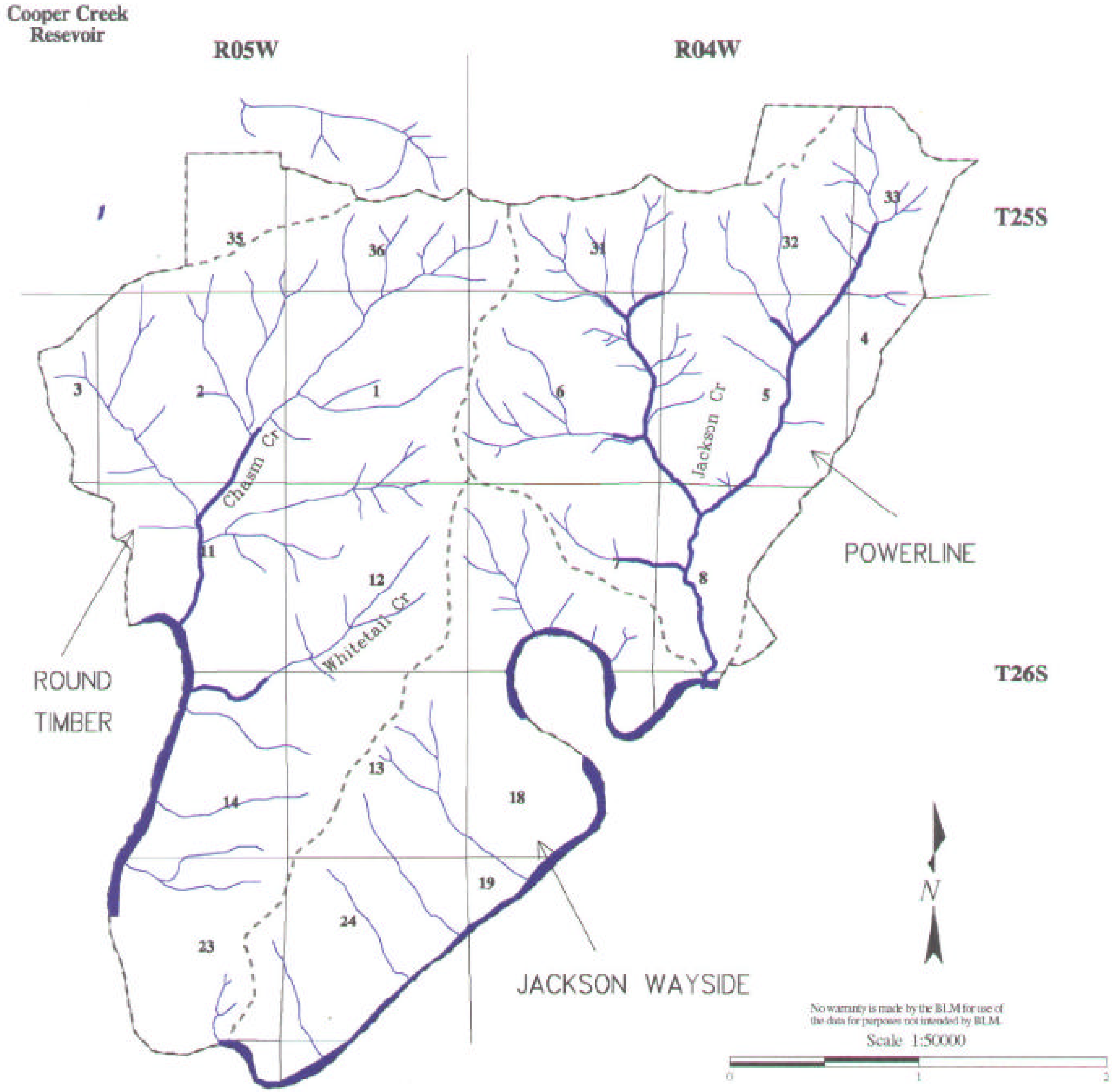
No wetland identification survey has been completed on the North Bank WAU. Limited field observation identified areas that may potentially be larger wetlands. However, it has not been determined if these sites are true wetlands. These sites are identified on **Figure 7-3**. As stated, location of large or small wetlands is far from complete and there may be more large and small potential wetland sites.

The wetness of an area is influenced by many factors, such as precipitation, stratigraphy, topography, soil permeability and plant cover. For water table to impact the vegetation, it must occur within the major portion of the root zone (COE, 1987).

The potential wetland site identified on **Figure 7-3** in T.26 S., R.5 W., Section 1 is located in a topographic low, adjacent to drainages. Soils are clayey with montmorillonitic mineralogy. These soils absorb water more slowly, have slow permeability, and remain saturated much longer than sandy or loamy soils (COE, 1987). Soil and topographic position characteristics have the potential for the presence of a wetland. Ground water levels have dropped in areas proximate to the downcut channels and may have altered the water table influence on the potential wetland. Verification of whether this is a wetland, may assist in a plan for locating other potential wetland sites. Also, the potential wetland site identified on **Figure 7-3** in T.26 S., R.4 W., Section 6 has the natural surface/subsurface flow interrupted by a road, which is intercepting and channeling water away from wetland sites below the road.

Figure 7-1

North Bank Main Streams & Fish Distribution

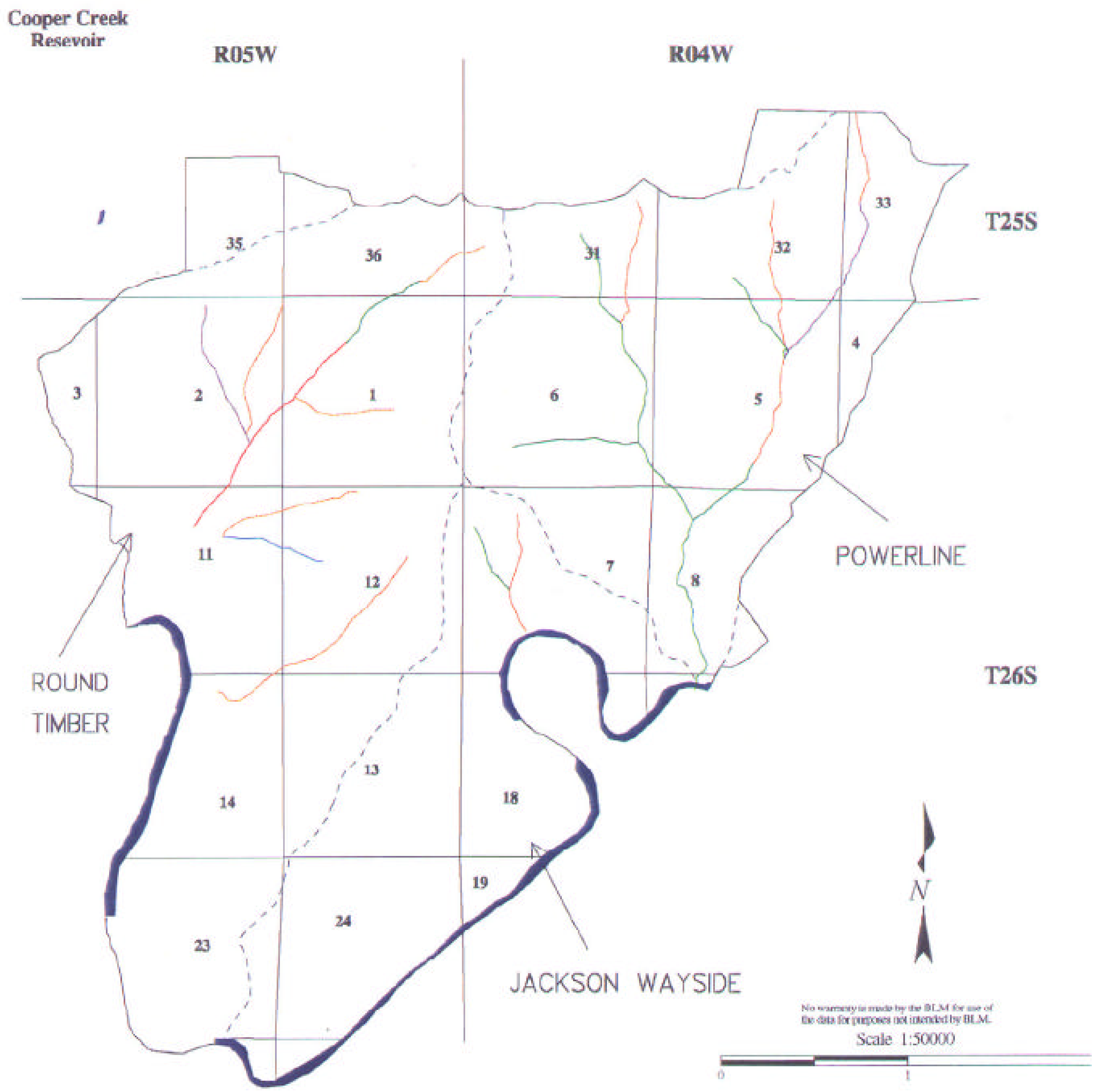


LEGEND

Streams	Section Lines
Known Fish Bearing Streams	Drainage Boundaries

Figure 7-2

North Bank Riparian Functioning Condition



LEGEND

Proper Functioning Condition

Functioning At Risk –Upward

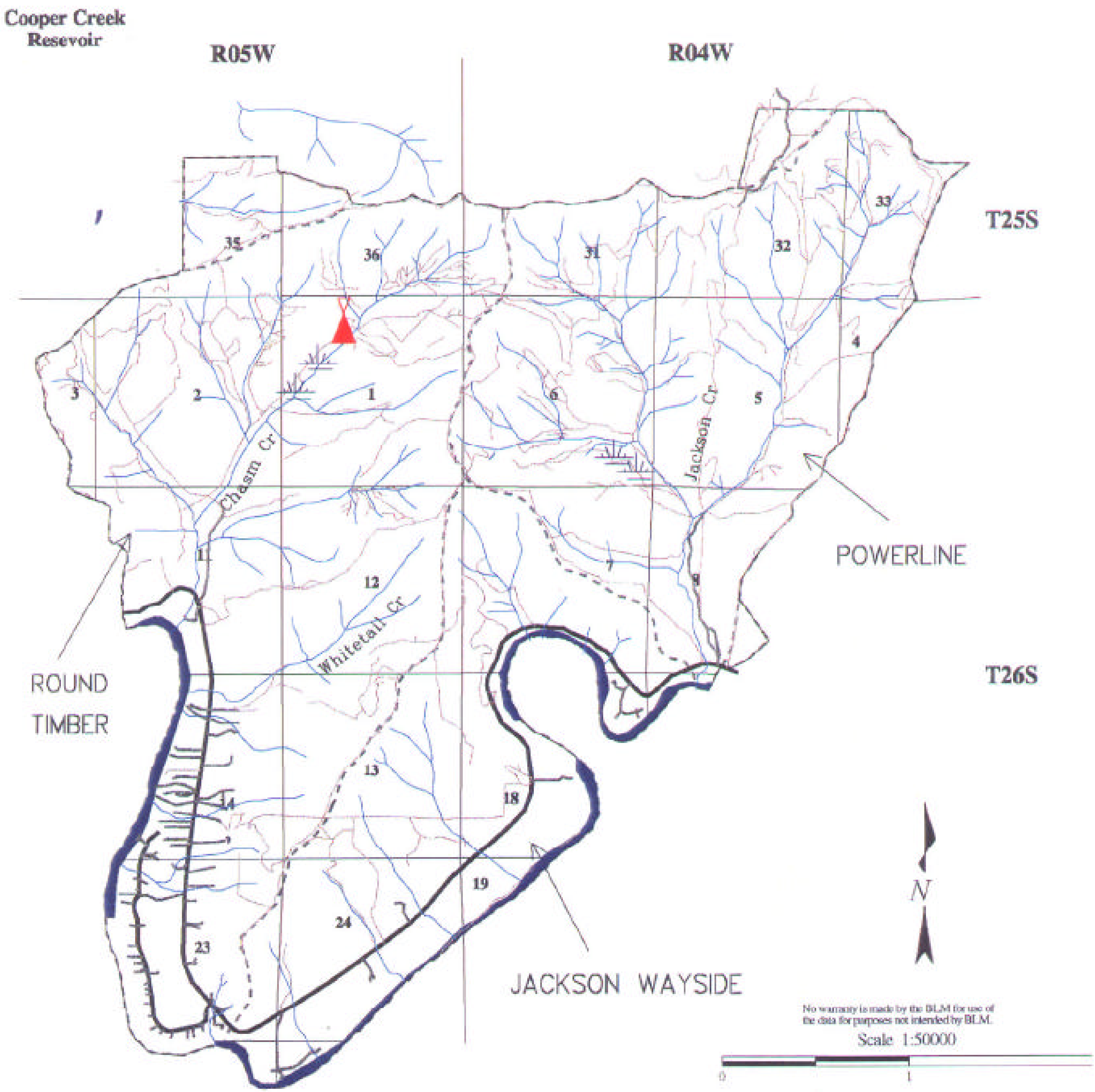
Functioning At Risk –Downward

Functioning At Risk –Not Apparent

Nonfunctional

Figure 7-3

North Bank Wetlands, Nick Points



LEGEND

Asphalt Surface	Streams	Potential Wetlands
Crushed Rock Surface	Section Lines & NU River	Culvert Nick Points
Natural Surface	Drainage Boundaries	

RESTORATION OPPORTUNITIES

A. Vegetation/Wildlife

1. Identify overly dense stands and implement some sort of thinning strategy that would maintain site occupancy while providing for healthy, vigorous growth.

2. Create and maintain a mosaic of natural vegetation types.

2. Implement a burning strategy to control conifer regeneration in the oak stands and to maintain early seral stages such as grasslands. This would restore oak habitats for greater use by the CWTD. Burning to maintain grasslands will also help provide winter foraging opportunities for raptors.

3. Identify areas and strategies for establishing natural plant assemblages.

4. Implement appropriate strategy to control/eliminate noxious weed concentrations identified on **Figure 3-5**.

B. Stream Channel, Hydrology, Geology/Soils

1. Identify and prioritize areas of active headcutting (an abrupt gradient change that progresses upstream) and stabilize these areas. Jackson Creek should be first since it has the most fish potential.

2. Identify and prioritize roads and skid trails for decommissioning/reclamation based on resource impacts and management needs.

3. Bring roads up to BMP standards (ie. Outslope, rolling drainage dips, rocking road surfaces, and/or additional measures) , which should address hydrologic and sediment problems. Caution - some culverts are functioning as nick points and should be carefully evaluated before work begins. For a preliminary list of erosion and sedimentation problems see **Erosion/Sedimentation Sources Table 6-1** and its accompanying map, **Figure 6-9** on **pages 6-15 and 6-16**. Consider developing seasonal restrictions for use on roads that may be sensitive to erosion.

C. Aquatic Habitat and Fish

1. Plant riparian vegetation in stable stream reaches where it doesn't already exist.

NOTE:

Proposed engineering solutions to any of the above problem areas should work in conjunction with natural processes to ensure maximum effectiveness.

MONITORING/DATA NEEDS

A. Vegetation

1. A finer scale vegetation map should be completed; including information on species, diameter, canopy condition, height, site class, and vigor.

2. The NBHMA provides a large scale opportunity for research on Oregon white oak management and natural grassland restoration. Opportunities need be explored with NBS and local universities and colleges for ideas and/or funding to conduct appropriate research. Research could be initiated/information gathered that would assist in developing density management diagrams for the Oregon white oak.

3. Plant disease centers should be located and mapped.

B. Wildlife

1. Research is needed that more completely outlines the habitat needs of the CWTD and shows what impacts vegetation manipulation would have on other species of concern. This would help guide what type of vegetation needs to be emphasized to encourage the CWTD population.

C. Hydrology

1. Develop a monitoring plan to identify major wetland sites.

2. Establish photo monitoring sites on the following:
   a.) selected reclamation sites (before & after)
   b.) selected channel lengths, to monitor natural recovery.

D. Geology/Soils

1. When specific grassy areas are considered for establishment of trees and shrubs first conduct a low intensity site specific survey of soil depths and bedrock hardness to determine where severe soil limitations exist.

2. Identify unstable stream banks and prioritize for stabilization **(see Table 6-1, #7)**

E. Aquatic Habitat and Fish

1. Fish habitat. Survey Jackson Creek every 5-10 years using the ODFW methodology to determine if there is a change in the stream habitat as a result of a change in land management.

2. Rosgen Channel surveys. Establish reference reaches for Rosgen channel classification surveys to determine a change in the channel condition and stability as a result of changes in land management and restoration activities.

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