

GROWING & LOGGING TREES SINCE 1864

Habitat
Conservation Plan
for the
Robert B. Eddy Tree Farm

Port Blakely Tree Farms, L.P.
Seattle, Washington
April 1996

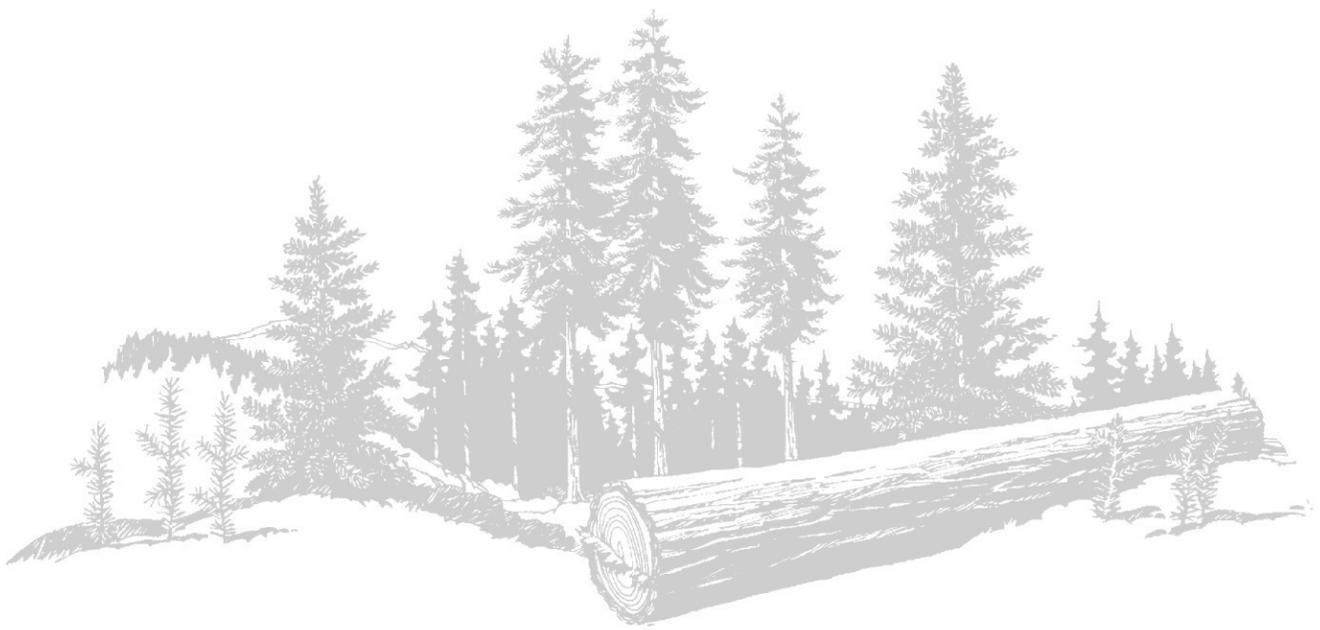


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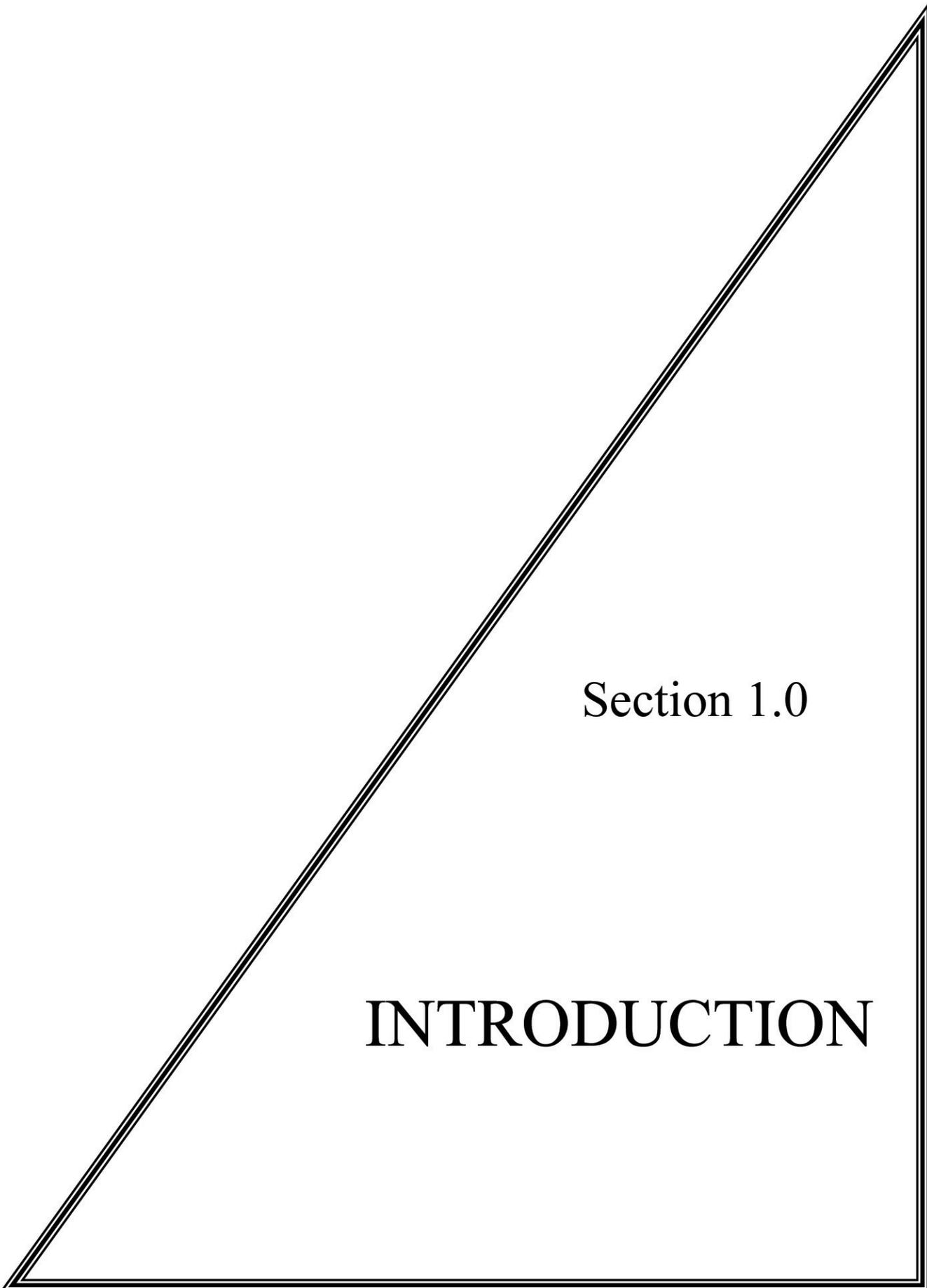
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Section 1.0

INTRODUCTION

1.0 INTRODUCTION

Port Blakely Tree Farms, L.P. owns and manages approximately 7486 acres of commercial forestland in Pacific and Grays Harbor Counties, Washington — the Robert B. Eddy Tree Farm (the plan area). This plan area is within the range of the northern spotted owl (*Strix occidentalis caurina*) and marbled murrelet (*Brachyramphus marmoratus*); both of which are listed as threatened under the Endangered Species Act of 1973, as amended (ESA). Recent surveys have identified the presence and use of the plan area by one, or more, spotted owls. Since 1993, Port Blakely has been operating under a no-take agreement for spotted owls — negotiated with the US Fish & Wildlife Service. Potentially suitable marbled murrelet habitat is present on the plan area, but use of the area by marbled murrelets has not been documented. Port Blakely has prepared this Habitat Conservation Plan (HCP) to support an incidental take permit for northern spotted owls and marbled murrelets in accordance with section 10(a)(1)(B) of the ESA. The plan area is within the geographic range of peregrine falcons and bald eagles, and these species may occur on or near the plan area during the life of the plan. Although Port Blakely's actions under this HCP are not intended to include incidental take of peregrine falcons or bald eagles, they are nevertheless requesting that these species be listed on the permit.

The objective of conservation measures proposed in this HCP is to assure that any incidental take (as defined in the ESA) resulting from Port Blakely's forest management activities, is mitigated and minimized to the maximum extent practicable, and that such takings will not appreciably reduce the likelihood of the survival and recovery of the affected species in the wild. This objective not only applies to incidental take of species listed at present, but to incidental take of species listed during the life of the plan.

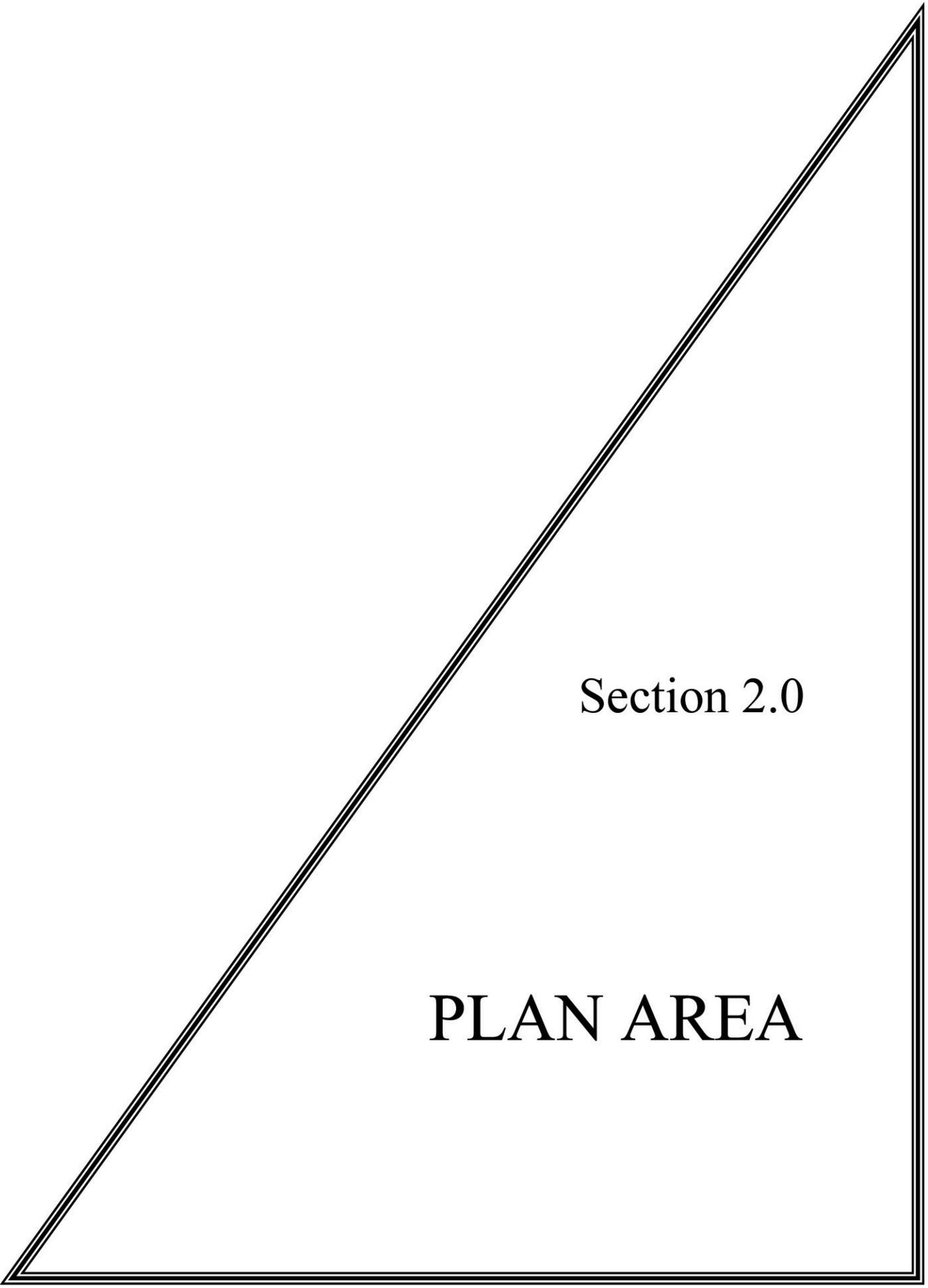
Port Blakely's forest management objective is to maintain growth and production of forest products so that maximum quality and yield is sustained over the long term. This is to be accomplished while accommodating the habitat needs for fish and wildlife species that currently occur on the company's managed forestlands. When a listed species occurs that requires specific habitat management or conservation, it is more efficient and effective for Port Blakely to accommodate the listed species' habitat needs in a way that accommodates habitat needs of other species that might be impacted — especially those that may become listed in the future. This is the basis for a multiple-species HCP.

Upon acceptance of this HCP, the USFWS and NMFS will issue to Port Blakely an incidental take permit for listed species; and will add to this permit any subsequently listed species associated with habitats on the plan area. Port Blakely will minimize and mitigate impacts of incidental take by managing the plan area under the provisions of this HCP for 50 years (until 2045). The term of the incidental take permit sought is for 50 years.

Port Blakely proposes that they be able to terminate the incidental take permit at any time during the planning period, so long as they have adequately mitigated for take of a covered species since it's listing and inclusion on the incidental take permit. For species

listed in Appendix E, Port Blakely proposes that they be given assurances in the Implementation Agreement (IA) that all such mitigation would be considered adequate such that there will be no further mitigation required should Port Blakely decide to terminate the permit (see analysis in Section 4.0 of EA). If Port Blakely does terminate the permit, they will be subject to all take prohibitions in effect at that time.

Port Blakely considered the option of adopting a take avoidance strategy for listed species and found the option to be undesirable from the perspective of short-term financial risks and long-term financial uncertainty — especially when risks of future listings were considered.



Section 2.0

PLAN AREA

2.0 PLAN AREA

2.1 Physical Description

The Robert B. Eddy Tree Farm (plan area) includes 7486 acres of commercial forestland distributed across 18 sections within T15N, R06W and T15N, R07W in Pacific and Grays Harbor Counties (Figure 2-1).

2.12 Location

The plan area is within the Willapa Hills of Southwestern Washington, approximately 10 miles east and 4 miles north of Raymond, and 15 miles west and 4 miles south of Capitol State Forest. Access to the area is from the Oakville-Brooklyn County Road. Table 2-1 includes legal descriptions of the properties included within the plan area.

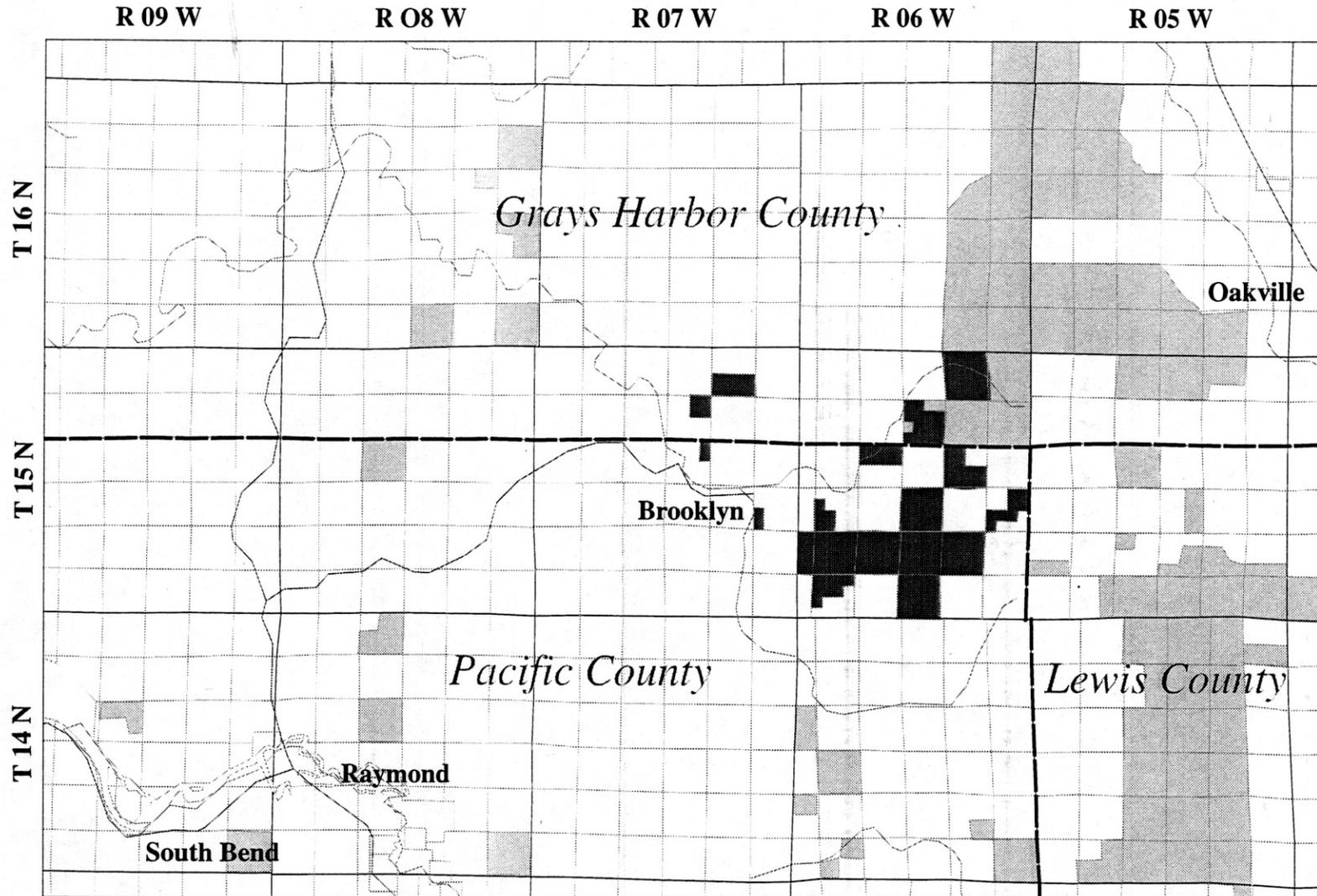
2.13 Topography

The plan area is characterized by dissected topography. Slopes of 30–60% generally predominate along the drainages into the five major creeks of the area (Dean Creek, Redfield Creek, Martin Creek, Raimie Creek, and Moss Creek). Slope-gradients adjacent to first and second-order headwaters are 50–100%. Slopes on top of the narrow ridges range from 1–8%, with slopes of 8–30% along the lower portions of major drainages. Elevation ranges from 300 to 1200 feet.

2.14 Geology & Soils

The Willapa Hills are composed of an underlayment of oceanic basalt with layers of oceanic sediment of sand at the base, graded up into clay at the top. These sedimentary layers vary in thickness, from 1–>100 feet. This geology creates an unstable landscape, evident by several ancient deep-seated failures, along with numerous shallow-rapid landslides.

Specific geology of the plan area is complex, being composed primarily of uplifted marine sediments deposited during the Miocene and Oligocene/Eocene (Walsh et al. 1987). Deposits of volcanic rock (Grande Ronde Basalt) traverse the area from north to south, being bisected by a fault line running east to west. Outcrops of loose surface basalt are present in many portions of the area, due to erosion of the marine sediment parent materials leaving basalt exposed to downslope movement. Also, movement along the fault-line appears to have spread weathered basalt along the surface from east to west. Bedrock basalt remains exposed in several areas, these being relatively high in elevation (>1000 feet).



Robert B. Eddy Tree Farm

Figure 2-1. HCP area location map.

- Port Blakely Tree Farms
- DNR managed land

Soils are dominated by deep, well-drained silt loams formed in weathered sandstone or colluvium derived from sandstone, siltstone, or basalt. The most common soils are the Elochoman, Zenkner, and Lytell series which are all deep (>60 inches) and well drained (SCS, 1986). On gentle slopes (<30%), these soils have a low potential for erosion, but the erosion potential increases as the slope increases. Wetland soils occur along the major creeks and in several scattered depressions on relatively flat ground.

2.2 Land Use

2.21 Forest Management

Forest management has been the primary land use within the plan area. Most of the old-growth forest in the plan area was clearcut and railroad logged in the 1920's through early 1940's by the Saginaw Timber Company. Port Blakely purchased from the Saginaw Timber Company, in 1969, most of what is now the Robert B. Eddy Tree Farm. At that time, the property was dominated by 20–40 year-old stands of second-growth Douglas-fir and western hemlock. Since purchase, Port Blakely has managed the plan area as commercial forestland. This includes road-building, mineral extraction, thinning, and clearcut harvest of merchantable timber.

2.22 Mineral Production

There are two rock pits on the plan area that Port Blakely maintains for forestry use. Rock is periodically mined for use as ballast and top-dressing for construction and maintenance of roads within, and adjacent to, the plan area.

2.3 Vegetation

The plan area is within the Coast Ranges Province, in transition between the *Picea sitchensis* and *Tsuga heterophylla* vegetation zones (Franklin and Dyrness 1973). At present, approximately 80% of the plan area is covered by mature second-growth forests being >50 years old (Figure 2-2). Douglas-fir (*Pseudotsuga menziesii*) and western hemlock (*Tsuga heterophylla*) are the major species in over 85% of these stands. Conifers of minor abundance include sitka spruce (*Picea sitchensis*) and western redcedar (*Thuja plicata*). Deciduous hardwood species, located mainly in major drainages, are the dominant component on the remainder of the area. The major hardwood species in these drainages is red alder (*Alnus rubra*). Vine maple (*Acer circinatum*) and bigleaf maple (*A. macrophyllum*) are locally abundant in these hardwood stands and in conifer understories. Hardwoods of minor abundance include bitter cherry (*Prunus emarginata*), black cottonwood (*Populus trichocarpa*), and Oregon ash (*Fraxinus latifolia*).

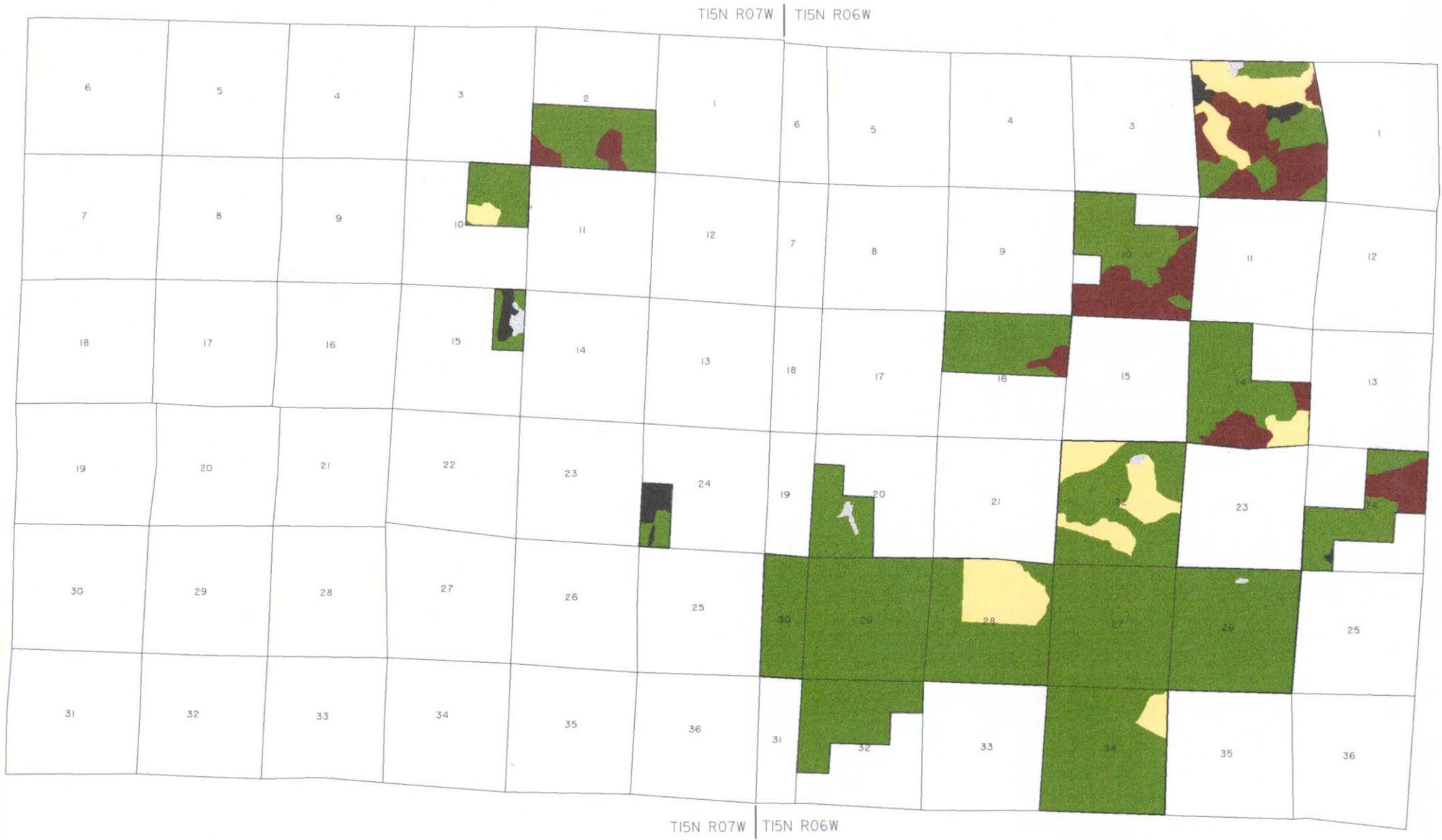
Table 2-1. Ownership of Port Blakely Tree Farms within the Robert B. Eddy Tree Farm.

Section	Township	Range	Description	Deeded Acres
02	15N	6W	ALL (oversized section)	742.9
10	15N	6W	NW $\frac{1}{4}$; S $\frac{1}{2}$ NE $\frac{1}{4}$; SE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$; S $\frac{1}{2}$ SW $\frac{1}{4}$	514.5
14	15N	6W	S $\frac{1}{2}$; NW $\frac{1}{4}$	480.0
16	15N	6W	N $\frac{1}{2}$	314.5
20	15N	6W	SW $\frac{1}{4}$; SW $\frac{1}{4}$ NW $\frac{1}{4}$	200.0
22	15N	6W	ALL	640.0
24	15N	6W	NE $\frac{1}{4}$; N $\frac{1}{2}$ SW $\frac{1}{4}$; SW $\frac{1}{4}$ SW $\frac{1}{4}$; NW $\frac{1}{4}$ SE $\frac{1}{4}$	320.0
26	15N	6W	ALL	640.0
27	15N	6W	ALL	640.0
28	15N	6W	S $\frac{1}{2}$; W $\frac{1}{2}$ NW $\frac{1}{4}$	640.0
29	15N	6W	ALL	640.0
30	15N	6W	ALL (short section)	219.0
32	15N	6W	NW $\frac{1}{4}$; NW $\frac{1}{4}$ SW $\frac{1}{4}$; W $\frac{1}{2}$ NE $\frac{1}{4}$; NE $\frac{1}{4}$ NE $\frac{1}{4}$	320.0
34	15N	6W	ALL	640.0
02	15N	7W	S $\frac{1}{2}$	320.0
10	15N	7W	NE $\frac{1}{4}$	160.0
15	15N	7W	E $\frac{1}{2}$ NE $\frac{1}{4}$	96.1
24	15N	7W	W $\frac{1}{2}$ SW $\frac{1}{4}$	80.0
Total deeded acres ¹				7607.0

¹Note that planimetric acreage is 7486

The interactions of harvest timing, fire history, site characteristics, and successional advancement has resulted in a relatively diverse mosaic of existing species compositions and structural conditions. Most of the 30–50 year-old conifer stands have uniformly closed canopies and presently have understories that are only sparsely vegetated. Many stands older than this seem to have entered the “understory reinitiation” stage (Oliver and Larsen 1990), especially if they have been thinned. However, substantial defect resulting from black bear (*Ursus americanus*) damage, freeze damage, and dwarf mistletoe (*Arceuthobium* spp.) infection has resulted in some structural heterogeneity in all stands within the plan area.

Understory vegetation on upland sites is dominated by vine maple (*Acer circinatum*), salal (*Gaultheria shallon*), and Oregon grape (*Berberis nervosa*); with a herbaceous ground-layer composed primarily of sword fern (*Polystichum munitum*), wood sorrel (*Oxalis oregana*), and bryophytes. On moist and riparian sites, understories are often dominated by salmonberry (*Rubus spectabilis*), fool’s huckleberry (*Menziesia ferruginea*), and devil’s club (*Oplopanax horridum*); with a herbaceous ground-layer of skunk cabbage (*Lysichitum americanum*); and a diverse community of ferns, clubmosses (*Lycopodium* spp., *Selaginella* spp.), bryophytes, and lichens. All vascular plant species known or likely to be found on the plan area are listed in Table 2-2.

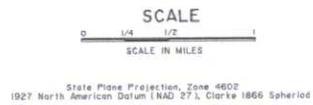


Port Blakely Tree Farms

Robert B. Eddy Tree Farm

Figure 2-2. Forest successional stages as of 1995.

Source Data:
 Washington State
 Department of Natural Resources (DNR)
 Northwest Aerial Reconnaissance
 Poulsbo, WA



LEGEND

Successional Stage

- Early
- Mid
- Mature
- Late
- Non Forest

Table 2-2. Vascular plant species known, or likely to be found on the Robert B. Eddy Tree Farm.

Trees

Douglas-fir	<i>Pseudotsuga menziesii</i>
Sitka spruce	<i>Picea sitchensis</i>
Pacific yew	<i>Taxus brevifolia</i>
Western redcedar	<i>Thuja plicata</i>
Western hemlock	<i>Tsuga heterophylla</i>
Pacific silver fir	<i>Abies amabilis</i>
Bigleaf maple	<i>Acer macrophyllum</i>
Red alder	<i>Alnus rubra</i>
Pacific madrone	<i>Arbutus menziesii</i>
Pacific dogwood	<i>Cornus nuttallii</i>
Oregon ash	<i>Fraxinus latifolia</i>
Black cottonwood	<i>Populus trichocarpa</i>

Shrubs

Vine maple	<i>Acer circinatum</i>
Oregon grape	<i>Berberis nervosa</i>
Hazelnut	<i>Corylus cornuta</i>
Salal	<i>Gaultheria shallon</i>
American holly	<i>Ilex opaca</i>
Fool's huckleberry	<i>Menziesia ferruginea</i>
Devil's-club	<i>Oplopanax horridum</i>
Cascara	<i>Rhamnus purshiana</i>
Stink currant	<i>Ribes bracteosum</i>
Wild rose	<i>Rosa gymnocarpa</i>
Thimbleberry	<i>Rubus parviflorus</i>
Salmonberry	<i>Rubus spectabilis</i>
Red elderberry	<i>Sambucus racemosa</i>
Huckleberry	<i>Vaccinium spp.</i>

Forbs

Vanilla leaf	<i>Achlys triphylla</i>
Angled bitter-cress	<i>Cardamine angulata</i>
Few seeded bitter-cress	<i>Cardamine oligosperma</i>
Thistle	<i>Cirsium spp.</i>
Bleeding heart	<i>Dicentra formosa</i>
Fairybell	<i>Disporum smithii</i>
Bedstraw	<i>Galium spp.</i>
Rattlesnake plantain	<i>Goodyera oblongifolia</i>
Skunk cabbage	<i>Lysichitum americanum</i>
Miners lettuce	<i>Montia sibirica</i>
False lily-of-the-valley	<i>Maianthemum dilatatum</i>

Table 2-2. Continued.

Wood sorrel	<i>Oxalis oregana</i>
Twisted stalk	<i>Streptopus amplexifolius</i>
Foamflower	<i>Tiarella trifoliata</i>
Starflower	<i>Trientalis latifolia</i>
Western meadowrue	<i>Thalictrum occidentale</i>
Pig-a-back	<i>Tolmiea menziesii</i>
Trillium	<i>Trillium ovatum</i>
Stinging nettle	<i>Urtica dioica</i>
Inside-out flower	<i>Vancouveria hexandra</i>
Violet	<i>Viola spp.</i>

Grasses and grass-likes (tribes listed below represent species likely to be found)

Bentgrass tribe	<i>Agrostideae</i>
Canary grass tribe	<i>Phalarideae</i>
Fescue tribe	<i>Festuceae</i>
Sedges	<i>Carex spp.</i>
Rushes	<i>Juncus spp.</i>

Ferns and allies

Maidenhair fern	<i>Adiantum pedatum</i>
Green spleenwort	<i>Asplenium viride</i>
Lady fern	<i>Athyrium filix-femina</i>
Shield fern	<i>Dryopteris expansa</i>
Sword fern	<i>Polystichum munitum</i>
Braken fern	<i>Pteridium aquilinum</i>
Equisetum	<i>Equisetum spp.</i>
Clubmoss	<i>Lycopodium spp.</i>
Selaginella	<i>Selaginella spp.</i>

2.4 Wildlife

At least 158 species of vertebrate wildlife are known to occur, or are likely to use habitats on the plan area (Table 2-3). The herpetological community is dominated by amphibians, being both terrestrial and aquatic breeders. Many of the amphibian species depend upon stream and riparian habitats for breeding, and several are closely associated with streams during their entire life-cycle. Except for larger ungulates, the mammalian community is primarily dominated by bats, rodents, and insectivores. Many of the rodent species are mycophagous and nocturnal (e.g., northern flying squirrel, forest deer mouse, southern red-backed vole) providing the primary prey base for northern spotted owls. These and other species (Townsend's chipmunk) provide prey for other forest raptors such as the northern goshawk. Very little is known of the distribution and habitat use by bats in southwestern Washington. The plan area supports a varied avian community with the component species, many of which are neotropical migrants, depending upon a wide variety of successional stages for breeding habitats. Cavity-using species, both primary excavators and secondary nesters, make up a significant portion of the bird community. Wildlife species of particular management significance or concern are described in the Environmental Assessment.

2.41 Federally Listed Species

Two species, the northern spotted owl and marbled murrelet, are listed as threatened under ESA, and are likely to use habitats on the plan area. Status on the plan area of these two species is individually addressed in 2.411 and 2.412. Two other listed species; the bald eagle and peregrine falcon (*Falco peregrinus*) may occur within the vicinity but are not known to extensively use the plan area. According to the US Fish & Wildlife Service, wintering bald eagles may be found within the vicinity from October 31 through March 31 (see Environmental Assessment — Appendix B). Individual bald eagles are occasionally sighted in the vicinity, but are not known to have nesting or communal roosting sites on the plan area. Opportunities for development of future bald eagle winter communal roost are limited by lack of suitable aquatic habitats (estuarine or riverine systems) on the plan area. Peregrine falcons are not known to use the plan area, and are not likely to nest because of a lack of suitable substrate (i.e., cliffs). Typical winter foraging habitats for peregrine falcons are not present on or adjacent to the plan area (intertidal flats, estuaries, and large wetlands). Therefore, Port Blakely does not anticipate incidental take of either of these species. Thus mitigation measures specific to conservation of peregrine falcons and bald eagles are not proposed. However, the overall improvements in riparian resources, fisheries, and water quality resulting from the combination of proposed conservation measures would be of benefit to these species.

Table 2-3. Wildlife species known or likely to use habitats on the plan area.

Amphibians and reptiles

Northwestern salamander	<i>Ambystoma gracile</i>
Long-toed salamander	<i>Ambystoma macrodactylum</i>
Cope's giant salamander	<i>Dicamptodon copei</i>
Pacific giant salamander	<i>Dicamptodon tenebrosus</i>
Columbia torrent salamander	<i>Rhyacotriton kezeri</i>
Rough-skinned newt	<i>Taricha granulosa</i>
Dunn's salamander	<i>Plethodon dunni</i>
Van Dyke's salamander	<i>Plethodon vandykei</i>
Western red-backed salamander	<i>Plethodon vehiculum</i>
Ensatina	<i>Ensatina eschscholtzii</i>
Tailed frog	<i>Ascaphus truei</i>
Western toad	<i>Bufo boreas</i>
Pacific treefrog	<i>Pseudacris regilla</i>
Red-legged frog	<i>Rana aurora</i>
Bullfrog	<i>Rana catesbeiana</i>
Painted turtle	<i>Chrysemys picta</i>
Northern alligator lizard	<i>Elgaria coerulea</i>
Rubber boa	<i>Charina bottae</i>
Northwestern garter snake	<i>Thamnophis ordinoides</i>
Common garter snake	<i>Thamnophis sirtalis</i>

Mammals

Elk	<i>Cervus elaphus</i>
Columbia black-tailed deer	<i>Odocoileus hemionus columbianus</i>
Black bear	<i>Ursus americanus</i>
Mountain lion	<i>Felis concolor</i>
Bobcat	<i>Lynx rufus</i>
Raccoon	<i>Procyon lotor</i>
Striped skunk	<i>Mephitis mephitis</i>
Pacific fisher	<i>Martes pennanti</i>
Mink	<i>Mustela vison</i>
Long-tailed weasel	<i>Mustela frenata</i>
Ermine	<i>Mustela erminea</i>
Long-eared myotis	<i>Myotis evotis</i>
Fringed myotis	<i>Myotis thysanodes</i>
Long-legged myotis	<i>Myotis volans</i>
Townsend's big-eared bat	<i>Plecotus townsendii</i>
Big brown bat	<i>Eptesicus fuscus</i>
Silver-haired bat	<i>Lasionycteris noctivagans</i>
Hoary bat	<i>Lasiurus cinereus</i>
Yuma myotis	<i>Myotis yumanensis</i>
California myotis	<i>Myotis californicus</i>

Table 2-3. Continued.

Keen's myotis	<i>Myotis keenii</i>
Little brown myotis	<i>Myotis lucifugus</i>
Western small-footed myotis	<i>Myotis ciliolabrum</i>
Common opossum	<i>Didelphis marsupialis</i>
Snowshoe hare	<i>Lepus americanus</i>
Porcupine	<i>Erethizon dorsatum</i>
Beaver	<i>Castor canadensis</i>
Mountain beaver	<i>Aplodontia rufa</i>
Northern flying squirrel	<i>Glaucomys sabrinus</i>
Douglas' squirrel	<i>Tamiasciurus douglasii</i>
Townsend's chipmunk	<i>Tamias townsendii</i>
Muskrat	<i>Ondrata zibethica</i>
Long-tailed vole	<i>Microtus longicaudus</i>
Creeping vole	<i>Microtus oregoni</i>
Southern red-backed vole	<i>Clethrionomys gapperi</i>
Forest deer mouse	<i>Peromyscus keeni</i>
Deer mouse	<i>Peromyscus maniculatus</i>
Marsh shrew	<i>Sorex bendirii</i>
Montane shrew	<i>Sorex monticolus</i>
Trowbridge's shrew	<i>Sorex trowbridgii</i>
Vagrant shrew	<i>Sorex vagrans</i>
Coast mole	<i>Scapanus orarius</i>
Townsend's mole	<i>Scapanus townsendii</i>
Shrew-mole	<i>Neurotrichus gibbsii</i>
<u>Birds</u>	
Bufflehead	<i>Bucephala albeola</i>
Barrow's goldeneye	<i>Bucephala islandica</i>
Common goldeneye	<i>Bucephala clangula</i>
Common merganser	<i>Mergus merganser</i>
Hooded merganser	<i>Lophodytes cucullatus</i>
Wood duck	<i>Aix sponsa</i>
Great blue heron	<i>Ardea herodias</i>
Bald eagle	<i>Haliaeetus leucocephalus</i>
Cooper's hawk	<i>Accipiter cooperii</i>
Northern goshawk	<i>Accipiter gentilis</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Sharp-shinned hawk	<i>Accipiter striatus</i>
Turkey vulture	<i>Cathartes aura</i>
Blue grouse	<i>Dendragapus obscura</i>
California quail	<i>Callipepla californica</i>
Ruffed grouse	<i>Bonasa umbellus</i>
Marbled murrelet	<i>Brachyramphus marmoratus</i>
Table 2-3. Continued.	

Band-tailed pigeon	<i>Columba fasciata</i>
Mourning dove	<i>Zenaida macroura</i>
Barred owl	<i>Strix varia</i>
Great gray owl	<i>Strix nebulosa</i>
Great horned owl	<i>Bubo virginianus</i>
Northern pygmy-owl	<i>Glaucidium gnoma</i>
Northern saw-whet owl	<i>Aegolius acadicus</i>
Northern spotted owl	<i>Strix occidentalis caurina</i>
Western screech-owl	<i>Otus kennicottii</i>
Anna's hummingbird	<i>Claypte anna</i>
Rufous hummingbird	<i>Selasphorus rufus</i>
Belted kingfisher	<i>Ceryle alcyon</i>
Downy woodpecker	<i>Picoides pubescens</i>
Hairy woodpecker	<i>Picoides villosus</i>
Northern flicker	<i>Colaptes auratus</i>
Pileated woodpecker	<i>Dryocopus pileatu</i>
Red-breasted sapsucker	<i>Sphyrapicus ruber</i>
Hammond's flycatcher	<i>Empidonax hammondi</i>
Olive-sided flycatcher	<i>Contopus borealis</i>
Pacific slope flycatcher	<i>Empidonax difficilis</i>
Western wood-pewee	<i>Contopus sordidulus</i>
Willow flycatcher	<i>Empidonax trailli</i>
Vaux's swift	<i>Chaetura vauxi</i>
Barn swallow	<i>Hirundo rustica</i>
Cliff swallow	<i>Hirundo pyrrhonota</i>
Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>
Purple martin	<i>Progne subis</i>
Tree swallow	<i>Tachycineta bicolor</i>
Violet-green swallow	<i>Tachycineta thalassina</i>
American crow	<i>Corvus brachyrhynchos</i>
Common raven	<i>Corvus corax</i>
Gray jay	<i>Perisoreus canadensis</i>
Steller's jay	<i>Cyanocitta stelleri</i>
Black-capped chickadee	<i>Parus atricapillus</i>
Chestnut-backed chickadee	<i>Parus rufescens</i>
Red-breasted nuthatch	<i>Sitta canadensis</i>
Brown creeper	<i>Certhia americana</i>
Bewick's wren	<i>Thryomanes bewickii</i>
House wren	<i>Troglodytes aedon</i>
Marsh wren	<i>Cistothorus palustris</i>
Winter wren	<i>Troglodytes troglodytes</i>
American dipper	<i>Cinclus mexicanus</i>
Golden-crowned kinglet	<i>Regulus satrapa</i>

Table 2-3. Continued.

Ruby-crowned kinglet	<i>Regulus calendula</i>
American robin	<i>Turdus migratorius</i>
Hermit thrush	<i>Catharus guttatus</i>
Swainson's thrush	<i>Catharus ustulatus</i>
Townsend's solitaire	<i>Myadestes townsendi</i>
Varied thrush	<i>Ixoreus naevius</i>
Western bluebird	<i>Sialia mexicana</i>
Bushtit	<i>Psaltriparus minimus</i>
Northern shrike	<i>Lanius excubitor</i>
Hutton's vireo	<i>Vireo huttoni</i>
Solitary vireo	<i>Vireo solitarius</i>
Warbling vireo	<i>Vireo gilvus</i>
Black-throated gray warbler	<i>Dendroica nigrescens</i>
Common yellowthroat	<i>Geothlypis trichas</i>
Hermit warbler	<i>Dendroica occidentalis</i>
MacGillivray's warbler	<i>Oporornis tolmiei</i>
Orange-crowned warbler	<i>Vermivora ruficapilla</i>
Townsend's warbler	<i>Dendroica townsendi</i>
Wilson's warbler	<i>Wilsonia pusilla</i>
Yellow-rumped warbler	<i>Dendroica coronata</i>
Yellow warbler	<i>Dendroica petechia</i>
Western tanager	<i>Piranga ludoviciana</i>
Chipping sparrow	<i>Spizella passerina</i>
Dark-eyed junco	<i>Junco hyemalis</i>
Golden-crowned sparrow	<i>Zonotrichia atricapilla</i>
Rufous-sided towhee	<i>Pipilo erythrophthalmus</i>
Song sparrow	<i>Melospiza melodia</i>
White-crowned sparrow	<i>Zonotrichia leucophrys</i>
Red-winged blackbird	<i>Agelaius phoeniceus</i>
American goldfinch	<i>Carduelis tristis</i>
Black-headed grosbeak	<i>Pheucticus melanocephalus</i>
Evening grosbeak	<i>Coccothraustes vespertinus</i>
Pine siskin	<i>Carduelis pinus</i>
Purple finch	<i>Carpodacus purpureus</i>
Red crossbill	<i>Loxia curvirostra</i>

2.411 Northern Spotted Owl Status

Port Blakely and surrounding landowners began spotted owl surveys within the vicinity of plan area in 1991. Potentially suitable habitats within, and adjacent to, the plan area have been surveyed per US Fish & Wildlife Service endorsed protocol since 1992. Surveys have resulted in several scattered detections of single spotted owls. These surveys have resulted in establishment, and subsequent movement of one resident single site center (status 3). One site center of a breeding pair has been established approximately 1.5 miles from the plan area.

2.412 Marbled Murrelet Status

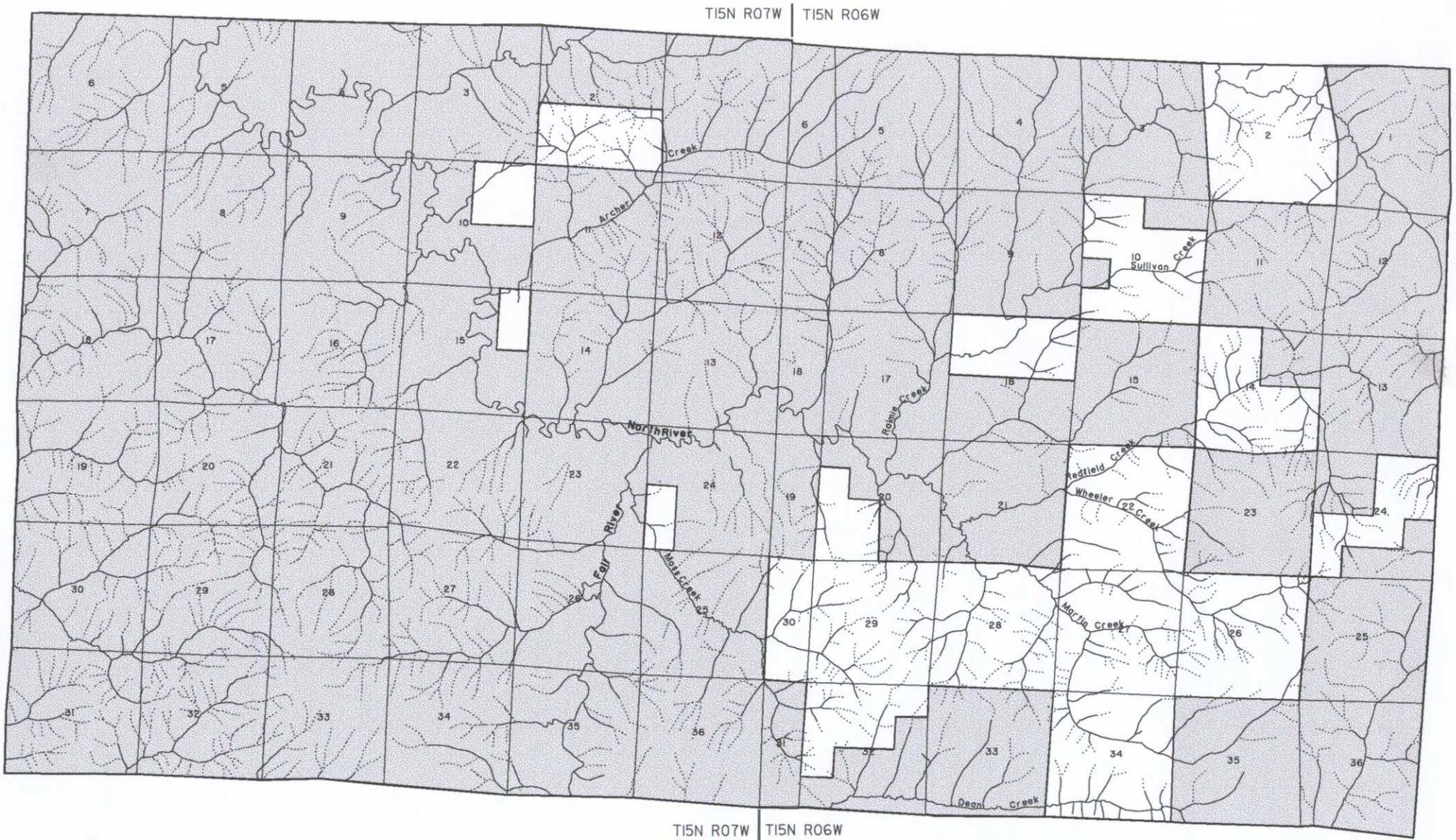
Port Blakely has completed marbled murrelet surveys on approximately 120 acres, and is in the process of conducting surveys on several other stands of potentially suitable habitats. Thus far, no presence or occupancy by marbled murrelets has been determined on the plan area.

2.5 Surface Water

The plan area contains approximately 45 miles of perennial streams and 37 miles of seasonal streams across four Watershed Administrative Units (WAUs). Most of the streams flow into the North River through either the Fall River, Raimie Creek, or Redfield Creek (Figure 2-3). A small portion of the plan area (approximately 160 acres) is within the Garrard Creek sub-basin, flowing into the Chehalis River. The North River flows into Willapa Bay, while the Chehalis flows into Grays Harbor.

2.6 Fish

The plan area contains approximately 25.5 miles of fish-bearing streams (Figure 2-4). The occurrence of fish within streams on the plan area has recently been updated by Port Blakely and stream survey crews from Washington Department of Fish & Wildlife (WDFW). This resulted in a >75% increase in fish-bearing stream mileage from that on record with the Washington Department of Natural Resources (DNR). Coho salmon (*Oncorhynchus kisutch*) and cutthroat trout (*Oncorhynchus clarki clarki*) make up the majority of the known fish populations. Chinook salmon (*Oncorhynchus tshawytscha*) and steelhead (*Oncorhynchus mykiss*) are known to use two of the major tributaries (Raimie Creek and Redfield Creek). Brook lamprey (*Lampetra richardsoni*), along with various species of sculpin (*Cottus* spp.), and minnows (family Cyprinidae) are also present within most of the fish-bearing streams. Descriptions of species of concern and discussions of historic regional status of fisheries conditions is presented in the Environmental Assessment.

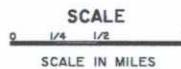


Port Blakely Tree Farms

Robert B. Eddy Tree Farm

Figure 2-3. Stream network within the planning area.

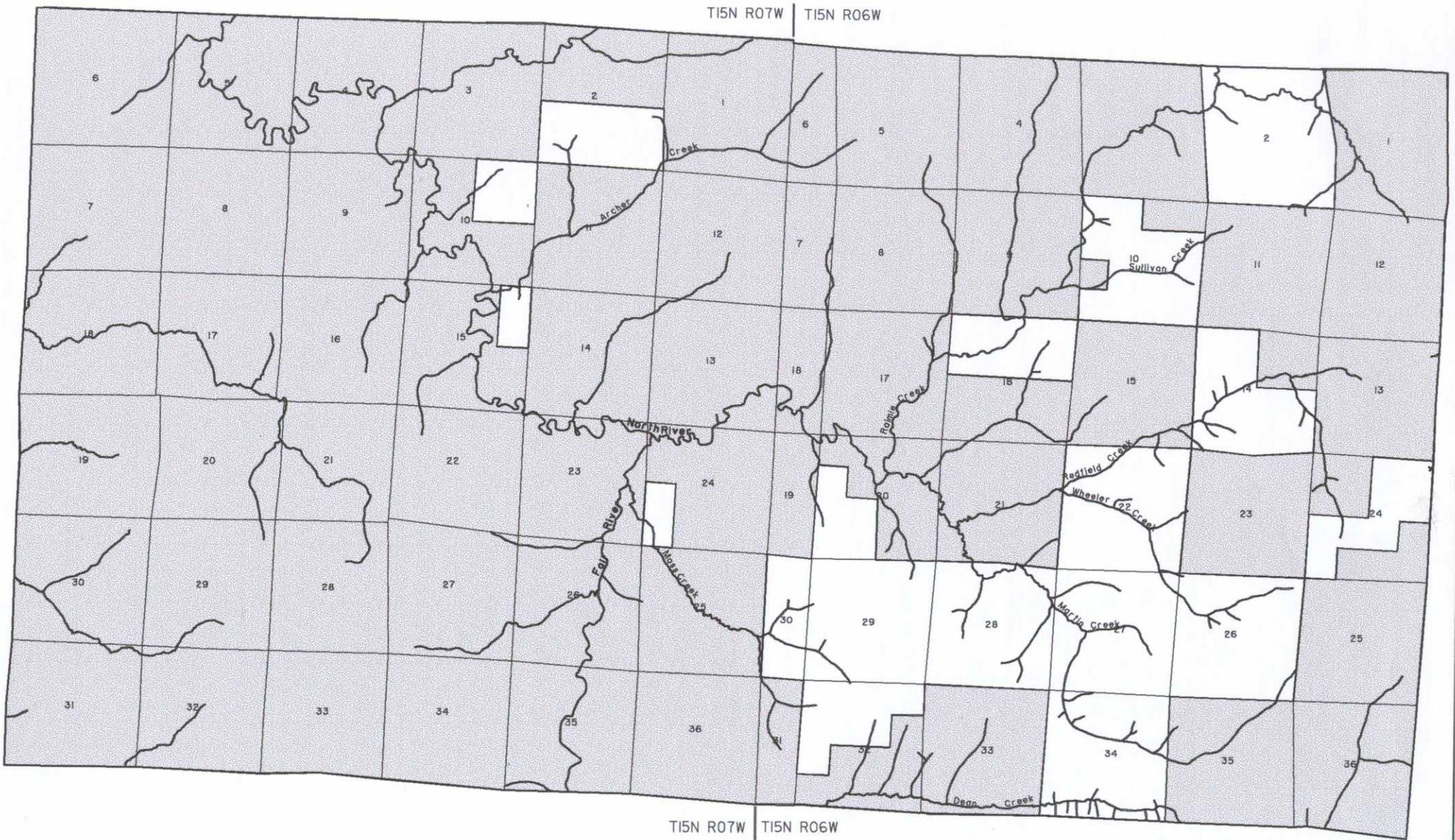
Source Data:
 Washington State
 Department of Natural Resources (DNR)
 Northwest Aerial Reconnaissance
 Poulsbo, WA



State Plane Projection, Zone 4602
 1927 North American Datum (NAD 27), Clarke 1866 Spheroid

LEGEND

- Perennial streams
- - - Seasonal streams

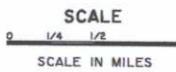


Port Blakely Tree Farms

Robert B. Eddy Tree Farm

Figure 2-4. Known fish-bearing streams.

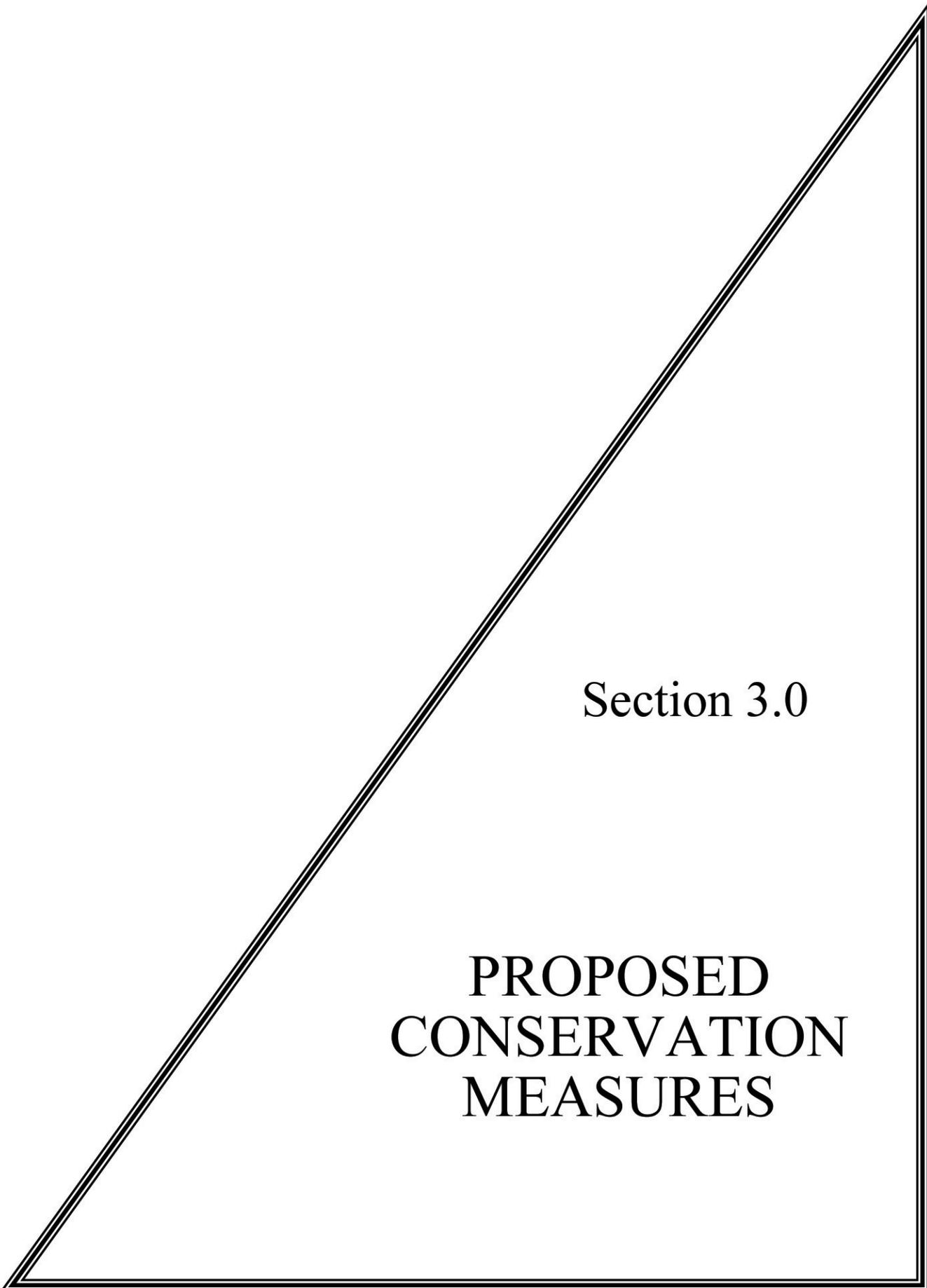
Source Data:
 Washington State
 Department of Natural Resources (DNR)
 Northwest Aerial Reconnaissance
 Poulsbo, WA



State Plane Projection, Zone 4602
 1927 North American Datum (NAD 27), Clarke 1866 Spheroid

LEGEND

~ Fish bearing waters



Section 3.0

**PROPOSED
CONSERVATION
MEASURES**

3.0 PROPOSED CONSERVATION MEASURES

Conservation measures for protection and management of fish and wildlife habitats on the Robert B. Eddy Tree Farm will include the following: a) adjustment of harvest schedules to accommodate the need for a wider variety of successional stages over the life of the plan; b) habitat enhancements in conjunction with silvicultural procedures; c) a riparian management process for addressing mass wasting, surface erosion, and riparian function and; d) site-specific management for protecting important nesting and denning areas for species of concern. The specific conservation measures are stated below.

3.1 Harvest Scheduling

- **Port Blakely will adjust rate-of-harvest and adopt a variable rotation length in order to develop and maintain a wider range of successional stages available across the plan area.**

Even-aged timber harvests will be accomplished according to the schedule displayed in Figure 3-1. This harvesting schedule identifies management units that will be harvested during five-year intervals through the term of the HCP.

3.2 Silviculture

Port Blakely will apply silvicultural prescriptions¹ in the form of commercial thinning and wildlife leave-tree retention with the objective of maintaining and developing important within-stand forest habitat functions for terrestrial species, including development of suitable owl habitat over the life of the plan.

- **Port Blakely will thin merchantable stands using prescriptions designed to accelerate the development of characteristics associated with late-successional habitats.**

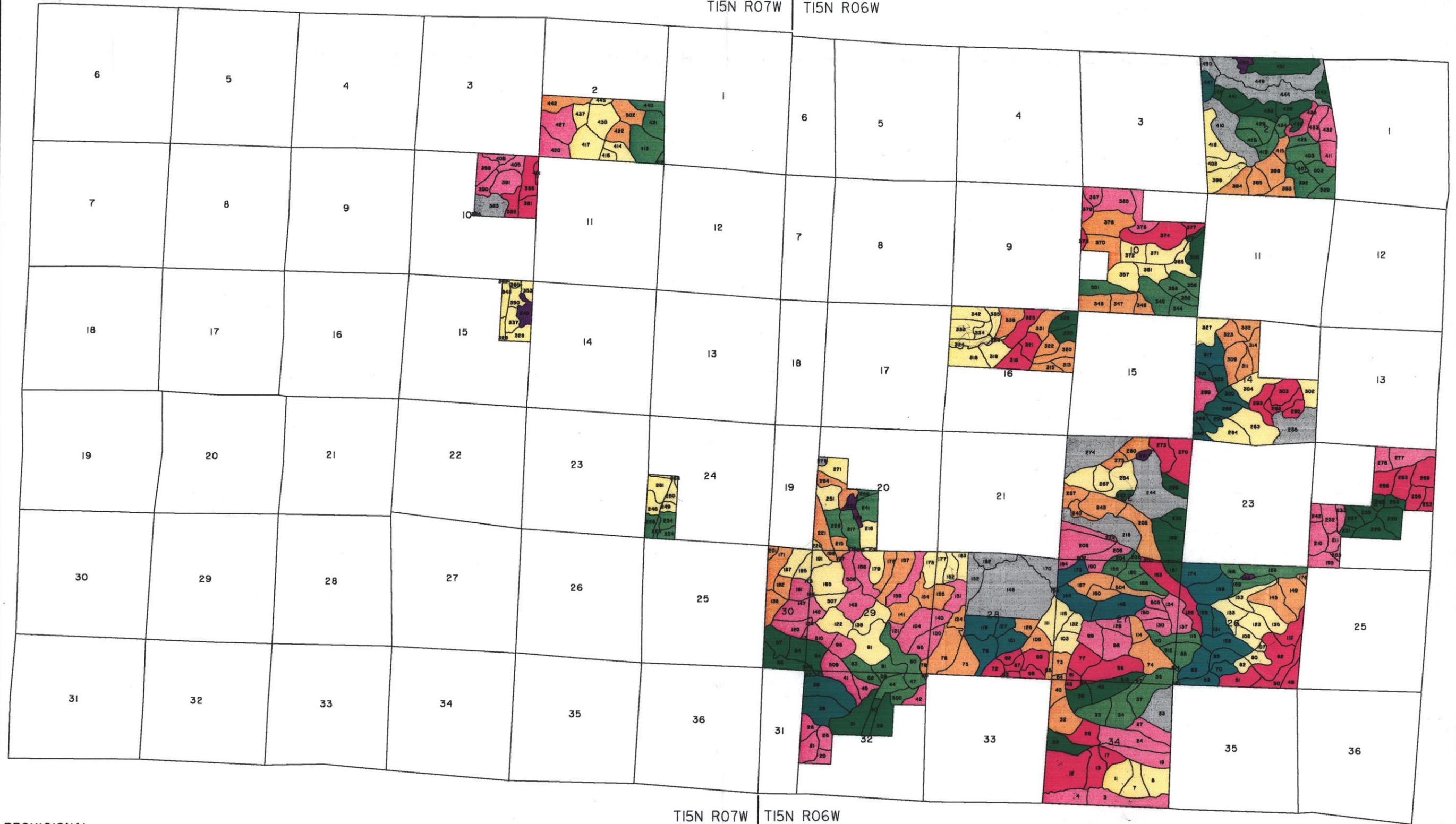
During the planning period, Port Blakely will commercially thin approximately 2011 acres of existing second-growth and >4000 acres of third-growth plantation, using the following thinning guidelines.

- ◇ Harvest approximately 30% of trees >6 inches dbh,² resulting in a basal area decrease of 15–20%.
- ◇ Mark and remove intermediate, suppressed, and overstocked trees; causing an immediate increase in stand average dbh.

¹ Washington Forest Practices Timber Harvest Regulations (Chapter 222-30 WAC) in effect as of 7/95 are used here as a default for practices not specifically addressed by these proposed conservation measures.

² Diameter at breast height (4.5 feet).

T15N R07W | T15N R06W



T15N R07W | T15N R06W

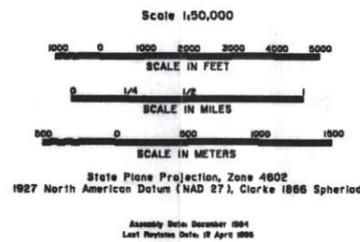
PROVISIONAL

Port Blakely Tree Farms
Robert B. Eddy Tree Farm

Figure 3-1. Harvest period for stands scheduled for harvest during planning period.

Source Data:
Washington State
Department of Natural Resources (DNR)
Northwest Aerial Reconnaissance
Poulsbo, WA

Prepared By:
Terrain Resources Ltd.
Lethbridge, AB
Canada



Unit No. Management Units

Legend

- 1995-2000
- 2015-2020
- 2000-2005
- 2020-2025
- 2005-2010
- 2025-2030
- 2010-2015
- Not Harvested in Planning Period

- ◇ Retain snags, potential nesting trees, and live cavity-trees that do not pose a hazard to operators or obstruct operations.
 - ◇ Retain all conifers larger than 30 inches dbh that do not pose a hazard to workers or obstruct operations.
 - ◇ Retain mid- and understory shade-tolerant conifers (e.g., western red cedar) where occurring in discrete patches.
 - ◇ Use cable-yarding techniques where appropriate (i.e., slope gradients >30%). This technique reduces ground disturbance and creates increased opportunities for understory development by establishing yarding corridors.
- **Within each even-aged harvest unit, Port Blakely will retain at least 4 hard snags or cavity trees per acre >15 inches dbh, at least 2 of these being >20 inches dbh where they exist.³ Where these snags do not exist, at least 2 green trees⁴ >6 inches dbh will be retained for each required snag >15 inches dbh; these being >8.5 inches dbh for each required snag >20 inches dbh. All green recruitment trees must have >1/3 live crown where they exist. Where snags or cavity trees cannot be safely maintained at harvest, a minimum of 8 green recruitment trees >6 inches dbh will be maintained per acre of final harvest, 4 of these must be >8.5 inches dbh. Following harvest, average distance between groupings of snags, cavity trees, or green recruitment trees will be no further than 1000 feet, and no point within the unit will be further than 800 feet from snags, or green recruitment trees.**

3.3 Stream and Riparian Management

Protection and management of stream and riparian habitats will be provided through prescription processes for addressing mass wasting, surface erosion, streambank stability, stream shading, recruitment of large woody debris (LWD), and riparian composition. These conservation measures are primarily supported by prescriptions in Appendices B, C, and D.

³ Any snag or leave-tree that is deemed unsafe for workers by a Port Blakely forester or contractor, or Washington State Labor & Industry official will be felled and left in the unit as LWD.

⁴ Conifers will be preferred for leave-trees when they exist. In stands that are hardwood dominated, the ratio of conifer to hardwood for retention will reflect that of the overall stand.

3.31 Mass Wasting

- **Prior to all even-aged harvests, Port Blakely will conduct a mass wasting risk assessment, considering deliverability to surface water (DNR Type 1-5 streams) and potential for mass wasting.**
- **Port Blakely will follow standardized management prescriptions designed to avoid management-related slope failures.**

The mass wasting analysis and prescription procedure is contained in Appendix B.

3.32 Surface Erosion — Large Equipment Operation

In addition to Washington Forest Practices Rules and Regulations — 7/95 concerning tractor and wheeled skidding systems (WAC 222-30-070), postharvest site preparation (WAC 222-30-090), and slash disposal (WAC 222-30-100) Port Blakely will employ the following measures:

- **Ground-based logging systems will be limited to slope gradients <30%; and will only be conducted on well-drained soils, except in the low rainfall months of May through September.**
- **Mechanical site preparation with ground-based equipment will be limited to slope gradients <30%, and will only be conducted in the low rainfall months of May through September.**

3.33 Surface Erosion — Roads

In addition to Washington Forest Practices Rules and Regulations — 7/95 concerning road construction and maintenance (WAC 222-24), Port Blakely will employ the following measures:

- **Port Blakely will reduce to the smallest possible amount all construction of new roads across or parallel to any DNR Type 1-5 stream, or across steep (>50%) or unstable slopes.**
- **Construction of new roads will utilize ridges and naturally stable soils, where this can be accomplished without significant increases in overall road lengths.**
- **Construction adjacent to surface water and on stream sideslopes >50% will utilize full-bench, endhaul or overhaul methods.**

- **When necessary to minimize increases in road densities by logging across DNR Type 1-3 streams, Port Blakely will only use full-suspension sky-line logging systems and will restrict yarding corridor crossings to <1 per 150 feet along the stream — corridor width will not exceed 20 feet. This will occur on <10% of the total DNR Type 1-3 stream length.**
- **Port Blakely will accomplish specific actions outlined in a Road Maintenance Plan (Appendix C) within 5 years. These mitigating actions will bring standards of all existing roads up to, or in excess of, Washington Forest Practices Rules and Regulations — 7/95 concerning road construction and maintenance (WAC 222-24).**
- **Following the 5-year road maintenance plan, Port Blakely will conduct annual road maintenance maintaining existing roads up to, or in excess of, Washington Forest Practices Rules and Regulations — 7/95 concerning road construction and maintenance (WAC 222-24).**

3.34 Riparian Function

- **Port Blakely will maintain bank stability along all DNR Type 1-3 streams through maintenance of a no-harvest zone (NHZ) of at least 25 feet on both sides of the stream.**

For those areas having a high potential for mass wasting on oversteepened sideslopes, the NHZ will be delineated through a mass wasting prescription. On all other areas, the minimum NHZ will be 25 feet from the ordinary high water mark (OHWM), channel disturbance zone (CDZ), or channel migration zone (CMZ) (depending upon presence). In addition, a NHZ will be observed for at least 25 feet around any off-channel habitat within a valley floor or flood plain.

- **Port Blakely will maintain existing stream shade above acceptable thresholds as determined by Washington State Forest Practices Board Manual — 7/95.**
- **Port Blakely will provide for large woody debris (LWD) recruitment adjacent to all DNR Type 1-3 streams by maintaining beyond the OHWM, CDZ, or CMZ a riparian management zone (RMZ) up to 122 feet slope distance, not to exceed 100 feet horizontal distance; minimum width being 50 feet horizontal distance.**

Width of RMZ will vary depending on riparian landform (i.e., drainage systems, shape of the terrain, and soil parent material). Guidelines for establishing RMZ boundaries are presented in Appendix D.

- **Within an RMZ, Port Blakely will maintain at harvest >60 trees per acre of conifer, >9 inches dbh; or maintain >100 square feet basal area per acre with >70% accounted for by conifer species. Preference will be given to shade-tolerant species with >30% live crown. In addition, at least 8 trees >16 inches dbh per 1000 feet of stream will be retained on both sides of the stream.⁵**
- **Port Blakely will convert RMZs dominated by hardwood (>70% basal area) to conifer by removing hardwood canopy outside of the NHZ and planting >300 seedlings per acre — giving preference to western redcedar and sitka spruce on moist sites; Douglas-fir being planted on well-drained sites. Existing conifer will be maintained within the RMZ.⁶**
- **Port Blakely will provide for LWD recruitment on all areas with a high potential for slope failures into DNR Type 1-5 streams by maintaining a NHZ or partial harvest zone (PHZ) encompassing the area of slope instability.⁷**
- **Port Blakely will provide for LWD recruitment into perennial DNR Type 4 and 5 streams, as well as riparian habitat refugia, by establishing discontinuous patches of trees and undisturbed understory adjacent to stream channels at the rate of 30 trees per 1000 feet of perennial Type 4 and 5 stream.**

3.4 Site-specific Management

3.41 Northern Spotted Owls

- **Port Blakely will maintain a no-harvest zone encompassing the best 70 acres of suitable habitat surrounding any known nesting site of northern spotted owls.**
- **Port Blakely will follow-up on all incidental sightings of northern spotted owls verified during the nesting season (1 March–31 July). Suitable habitat within 1/2 mile of the sighting will be surveyed at least once to detect any nesting activity. No other surveys for northern spotted owls will be required.**
- **All known nesting sites will be monitored on an annual basis, and the nest site will be considered abandoned following three consecutive years of no nesting attempts.**

⁵ These trees are intended to add to stream-bank stability in the event of dam-break flood. These trees will also provide larger recruitment trees for in-channel LWD and riparian wildlife needs.

⁶ Limited conifer removal may be necessary to facilitate operations.

⁷ This is a clarification of one result of the Mass Wasting Procedure (Appendix B).

- To avoid nest site disturbance, all harvesting and road-building operations will be restricted within 1/4 mile of nest site during the nesting season (1 March–31 July). The Service may be consulted for case-by-case exceptions to this restriction.

3.42 Northern Goshawks

- Port Blakely will maintain a no-harvest zone encompassing the known active nesting stand for up to three breeding pairs of northern goshawks at any one time. Any one protected nesting stand will include all known (previously constructed) alternate nests within the stand, each protected stand including at least 80 acres, and will be no larger than 120 acres.
- Port Blakely will follow up on all incidental sightings of northern goshawks verified during the nesting season (1 March–31 July). Suitable habitat within 1/2 mile of the sighting will be surveyed at least once to detect any nesting activity. No other surveys for northern goshawks will be required.
- All known nesting sites will be monitored on an annual basis, and the nest site will be considered abandoned following three consecutive years of no nesting attempts.

3.43 Marbled Murrelets

- Within the first five years of the HCP term, all stands initially identified as potential suitable habitat for marbled murrelets will be surveyed by protocol now in effect; developed by the Pacific Seabird Group (PSG), Marbled Murrelet Technical Committee (Ralph, et al. 1994).
- All potential suitable marbled murrelet habitat (identified in Figure 4-7, Section 4.63) will be deferred from harvest until protocol surveys have been conducted. Once protocol surveys have been conducted, and a site is not found to be occupied, no further surveys will be required for that stand, unless following a verifiable incidental sighting (see below).
- All stands of potentially suitable habitat found to be “occupied” per 1995 PSG protocol will be protected from harvest, and will be further protected with a 300 foot managed buffer around the occupied stand of suitable habitat.⁸ A site will be considered occupied until further protocol surveys find the site to be unoccupied.

⁸ Marbled murrelet occupied site protection will follow recommendations contained in the report of the Science Advisory Group to the Forest Practices Board on Marbled Murrelet Rule-Making (Cummins et al. 1993).

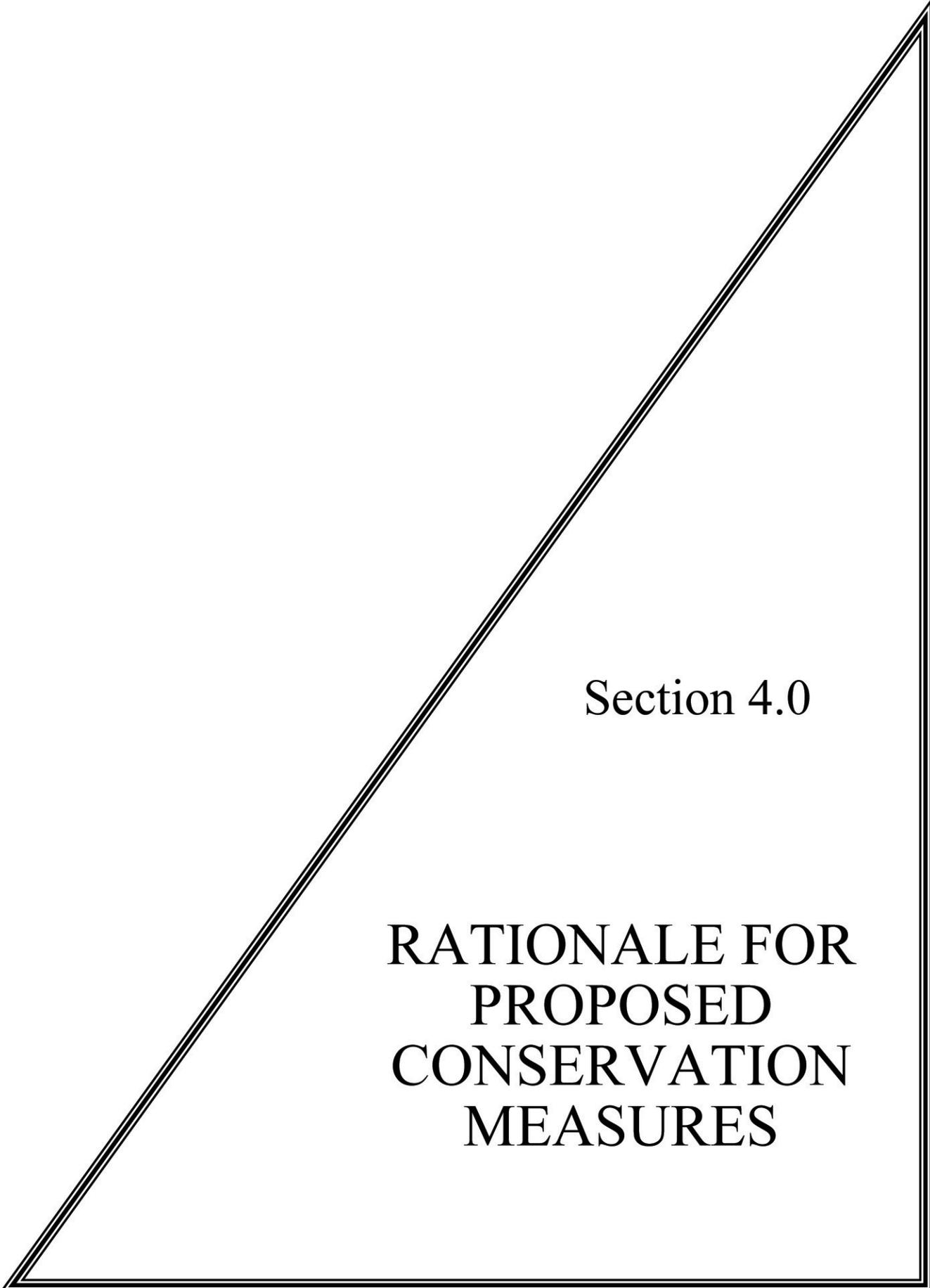
- **Any verifiable incidental sightings of marbled murrelets on the plan area will be followed by a protocol survey of the nearest potentially suitable habitat.**

3.44 Other Species

- **Port Blakely will, in good faith, consider requests from the Service to provide temporary protection for a limited number of known nesting or denning sites for listed birds or mammals that have been specifically determined by the Service's Final Rule to List as being habitat-limited by suitable nesting or denning sites.**

3.5 Emergency Actions

Port Blakely may elect to take emergency actions which do not immediately conform to the above conservation measures, but only in response to wildfires, storms, insects, disease or other comparable events. In the event that Port Blakely elects to take any such emergency actions, Port Blakely shall (i) use reasonable efforts to promptly notify the Agencies of its actions and the reasons therefore, (ii) conform its actions to the above conservation measures to the maximum extent reasonably possible, while remaining consistent with its need to respond to the emergency event, (iii) use all available means to avoid and minimize additional incidental take of currently listed species, and (iv) provide such further mitigation as the Agencies may reasonably determine to be necessary to compensate for those effects on the habitats of listed species that result from Port Blakely's actions — this will apply to actions that were not consistent with the above conservation measures and result in habitat loss which would not have otherwise occurred had Port Blakely not responded to the emergency. Port Blakely's obligations remain subject to the terms of Section 5(d) in the Implementation Agreement.



Section 4.0

**RATIONALE FOR
PROPOSED
CONSERVATION
MEASURES**

4.0 RATIONALE FOR PROPOSED CONSERVATION MEASURES

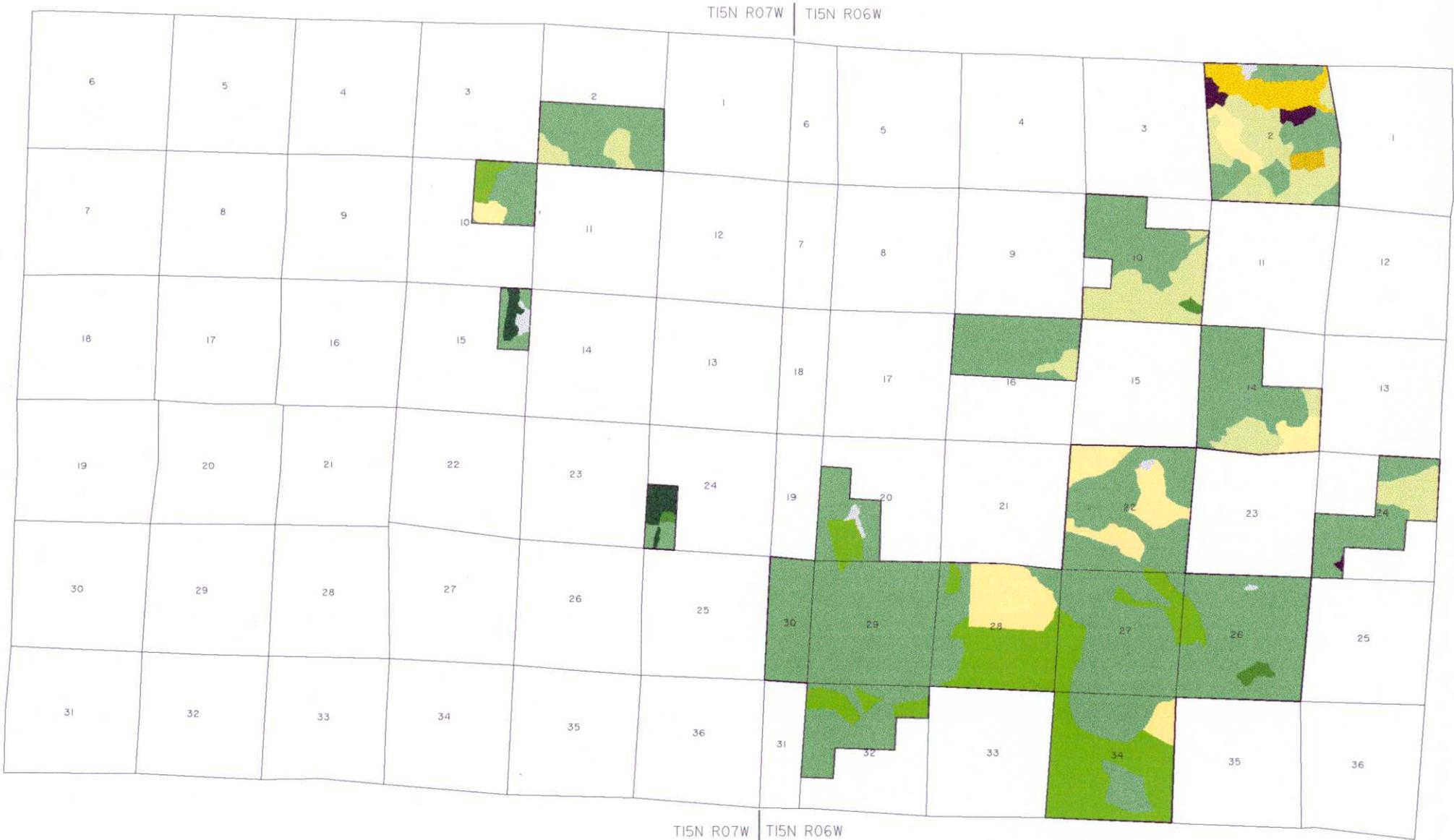
The purpose of this section is to provide specific rationale used for developing proposed conservation measures in Section 3.0. This also serves as an analysis of the effects of proposed conservation measures on habitat resources of the plan area. In preparing prescriptions, we focused on management and protective actions for maintaining and developing important terrestrial, riparian, and aquatic habitats. Harvest scheduling was used as an overall approach to maintain a variety of successional stages throughout the planning period. Silvicultural techniques such as commercial thinning and leave-tree retention were proposed to accelerate the development of selected habitat components. In addition, we proposed a management strategy for protecting and developing riparian and aquatic habitats, using riparian management zones (RMZs) and operational standards to minimize mass wasting and surface erosion. Finally, we proposed site-specific protection for known nesting and denning sites for species-of-concern.

4.1 Harvest Scheduling

The plan area is currently dominated by naturally-regenerated second-growth coniferous forest. Previous harvest on the plan area caused a skewed forest age-class distribution, with stands in the 50–60 year age-class representing about 65% of the forested area (Figure 4-1). Douglas-fir is a dominant overstory species in approximately 70% of the stands. Young Douglas-fir plantations account for about 10% of the forested area.

Table 4-1. Acreage by age-class and dominant tree species for forested stands on the plan area, 1995.

Age Class (Yrs)	Douglas-fir	Western hemlock	Red alder	Total	Percent
0–10	584	0	0	584	7.8
10–20	134	0	0	134	1.8
30–40	25	0	0	25	0.3
40–50	332	349	92	773	10.4
50–60	3214	1122	462	4798	64.4
60–70	867	101	20	988	13.2
70–80	6	28	0	34	0.5
80–90	11	26	33	71	1.0
>90	0	40	0	40	0.5
Grand Total	5173	1666	608	7448	100



Port Blakely Tree Farms

Robert B. Eddy Tree Farm

Source Data:
 Washington State
 Department of Natural Resources (DNR)
 Northwest Aerial Reconnaissance
 Poulsbo, WA



State Plane Projection, Zone 4602
 1927 North American Datum (NAD 27), Clarke 1866 Spheroid

LEGEND
 Age Class

- | | | |
|---------|---------|------------|
| 0 - 10 | 40 - 50 | 80 - 90 |
| 10 - 20 | 50 - 60 | > 90 |
| 20 - 30 | 60 - 70 | Non Forest |
| 30 - 40 | 70 - 80 | |

Figure 4-1. Forest age classes as of 1995.

Port Blakely manages Douglas-fir/western hemlock forests on an even-aged system with clearcut harvest at approximately 70 years of age. In general, within such a managed forest landscape, habitat needs for a wider variety of species are more likely to be met, over time, if a variety of successional stages (i.e., stand structures) are maintained (Oliver 1992). Our long-term objective for harvest scheduling was, therefore, to change the age-class distribution on the plan area, creating a wider variety of successional stages. We modeled several alternative harvest schedules; the proposed alternative providing an optimization among operational constraints, company-wide sustained yield targets, and landscape-level habitat needs.

A total of 6386 acres were projected for clearcut harvest during the life of the plan. These harvests were scheduled to occur over a 35 year period. We varied rotation lengths from 50–100 years (Figures 4-2 and 4-3), with progressively longer rotation ages through time (Table 4-2). The resulting age-class distribution is more likely to maintain those species that are associated with later successional stages than is a harvest schedule that is based on a uniform rotation age (i.e., 70 years). Once a diversity of forest successional stages is attained, a uniform rotation age could then be used to sustain the desired mix of age classes.

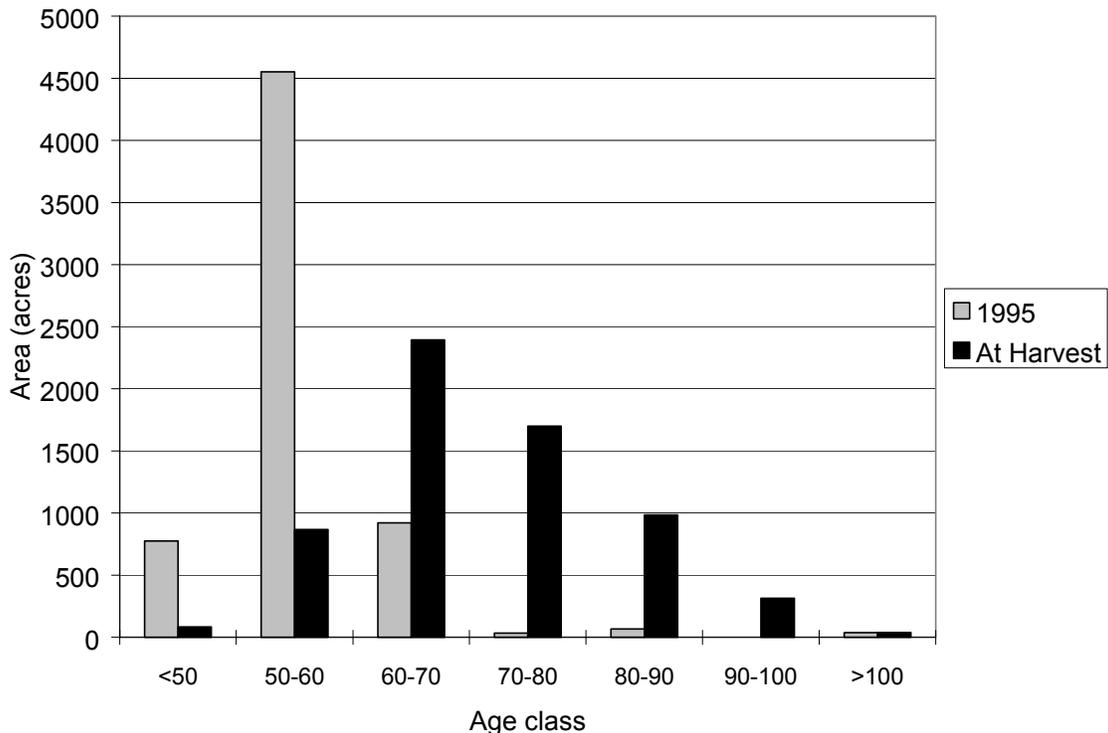
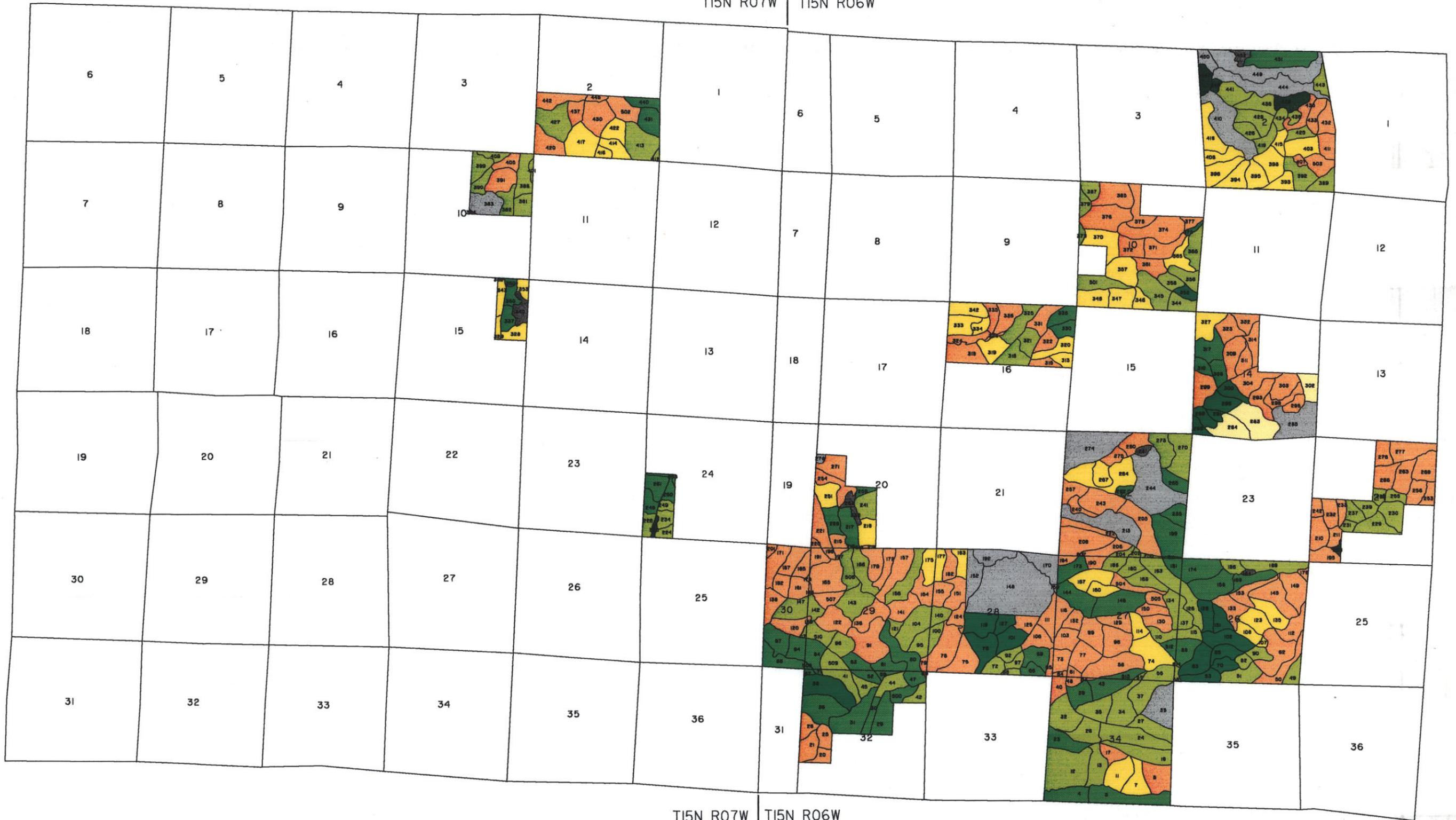


Figure 4-2. Present (1995) age-classes compared with age-at-harvest, for stands to be harvested during planning period.

T15N R07W | T15N R06W



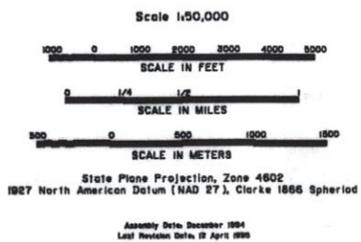
PROVISIONAL

Port Blakely Tree Farms
Robert B. Eddy Tree Farm

Figure 4-3. Forest age-class at harvest under proposed harvest schedule.

Source Data:
Washington State
Department of Natural Resources (DNR)
Northwest Aerial Reconnaissance
Poulsbo, WA

Prepared By:
Terrain Resources Ltd.
Lethbridge, AB
Canada



Unit No. Management Units

Legend

- | | |
|-----------|----------------------------------|
| < 50 yrs | 90-100 yrs |
| 50-60 yrs | >100 yrs |
| 60-70 yrs | Not Harvested in Planning Period |
| 70-80 yrs | Non-forest |
| 80-90 yrs | |

Table 4-2. Area (acres) within each age-class of forest stands harvested during each five-year period (1995–2030) through the term of the HCP.

Age	Five-year period ¹							Total
	1	2	3	4	5	6	7	
<50	84	0	0	0	0	0	0	84
50–60	533	310	0	0	25	0	0	868
60–70	563	801	628	382	22	0	0	2395
70–80	25	33	523	416	535	168	0	1700
80–90	64	0	48	28	216	397	232	986
90–100	0	0	0	0	9	0	305	314
>100	0	0	3	0	2	23	12	40
Total	1269	1144	1201	826	809	589	549	6386

¹ 1=1995–2000; 2=2000–2005; 3=2005–2010; 4=2010–2015; 5=2015–2020; 6=2020–2025; 7=2025–2030

4.11 Spotted Owl Habitat

Quantity and quality of suitable owl habitat was a primary consideration in the harvest scheduling process. Approximately 2772 acres currently have characteristics of young forest marginal (YFM) habitat (Figures 4-4 and 4-5), as defined by the Spotted Owl Science Advisory Group report to the Washington State Forest Practices Board (SAG report, Hanson et al. 1993) — see Habitat Evaluation Process, Appendix A.

In general, stands targeted for harvest early in the planning period (i.e., first 20 years) were those considered to be relatively low in habitat quality; typically lacking in important structures such as large snags (>20 inches dbh) and accumulations of large woody debris (LWD), thus not serving as suitable habitat for spotted owls. Stands postponed for harvest were those of “higher quality,” having many of the features associated with late-successional habitats, and meeting the suitable habitat criteria for YFM in the SAG report.

Considering the effects of commercial thinning on understory development (see Section 4.41), YFM habitat is projected to increase by approximately 19% over the next 10–15 years (Figure 4-4). This near-term increase in suitable YFM habitat is primarily accounted for by mid-successional or mature stands that currently meet LWD cover requirements, but have not yet reinitiated understory shrub development (see Appendix A). Results of commercial thinning on the plan area, and on lands similar to those within the plan area, indicate that substantial understory shrub growth (>15% foliar cover) requires 3–8 years of post-thinning development time, depending upon site conditions.

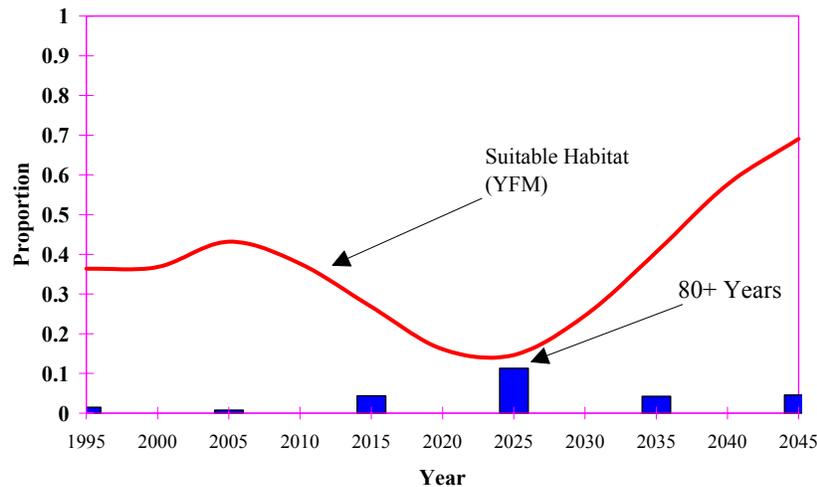
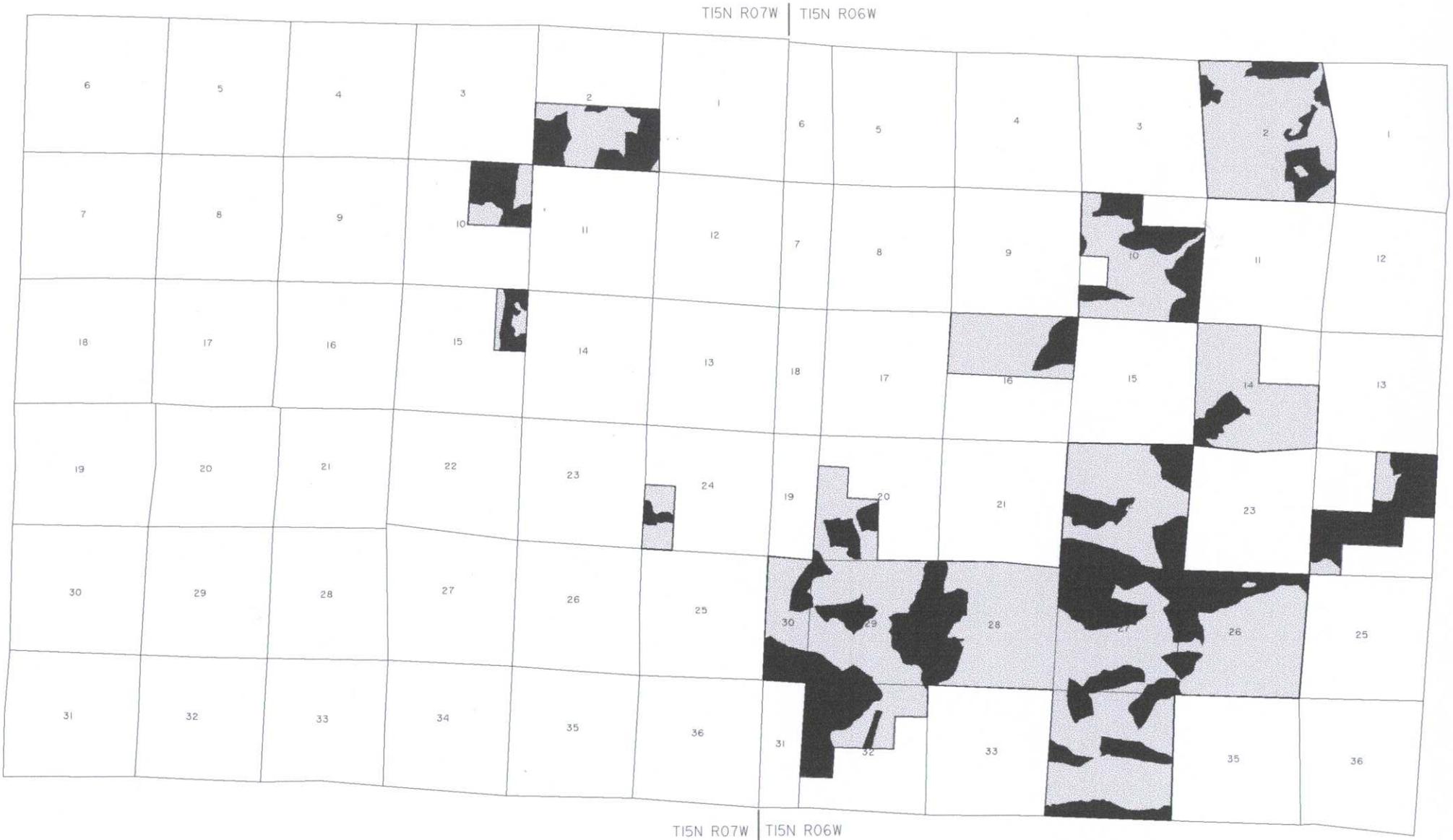


Figure 4-4. Proportion of plan area as suitable habitat for spotted owls (young forest marginal, Hansen et.al. 1993) and in >80 year-old age-class during the 50 year planning period (1995–2045) under HCP proposed alternative.

Stands reaching suitable YFM habitat conditions during the next 10–15 years are such stands that are currently scheduled for thinnings in the first five years of the planning period, or those that have recently been thinned using the guidelines in Section 3.2.

The near-term increase in acreage of suitable YFM habitat will be followed by a decline to the year 2025. At this “low point”, stands >80 years old will account for about 77% of total YFM habitat, somewhat minimizing effects of lesser acreage in this condition. Stands harvested in the first 10–15 years of the planning period will begin to meet structural definitions of YFM habitat by 30 years post-harvest.¹ As a result, the projected quantities of YFM habitat at the end of the planning period will be approximately 90% higher than at present (Figures 4-4 and 4-6). Because silvicultural practices detailed in Section 3.2 will be followed for the life of the plan, increases in acreage of suitable YFM habitat will extend well beyond the 50 year term of this HCP. Furthermore, subsequent harvest cycles should result in a somewhat lesser decrease in suitable habitat due to the shift in age-class distribution away from a single dominant age class.

¹ Over 85% of the forested stands within the plan area have site indices >125 (base age 50). Dominant and co-dominant trees in these regenerating stands are therefore at least 85 feet in height prior to age 28; thus meeting the height requirement for suitable YFM habitat (see Appendix A).



Port Blakely Tree Farms

Robert B. Eddy Tree Farm

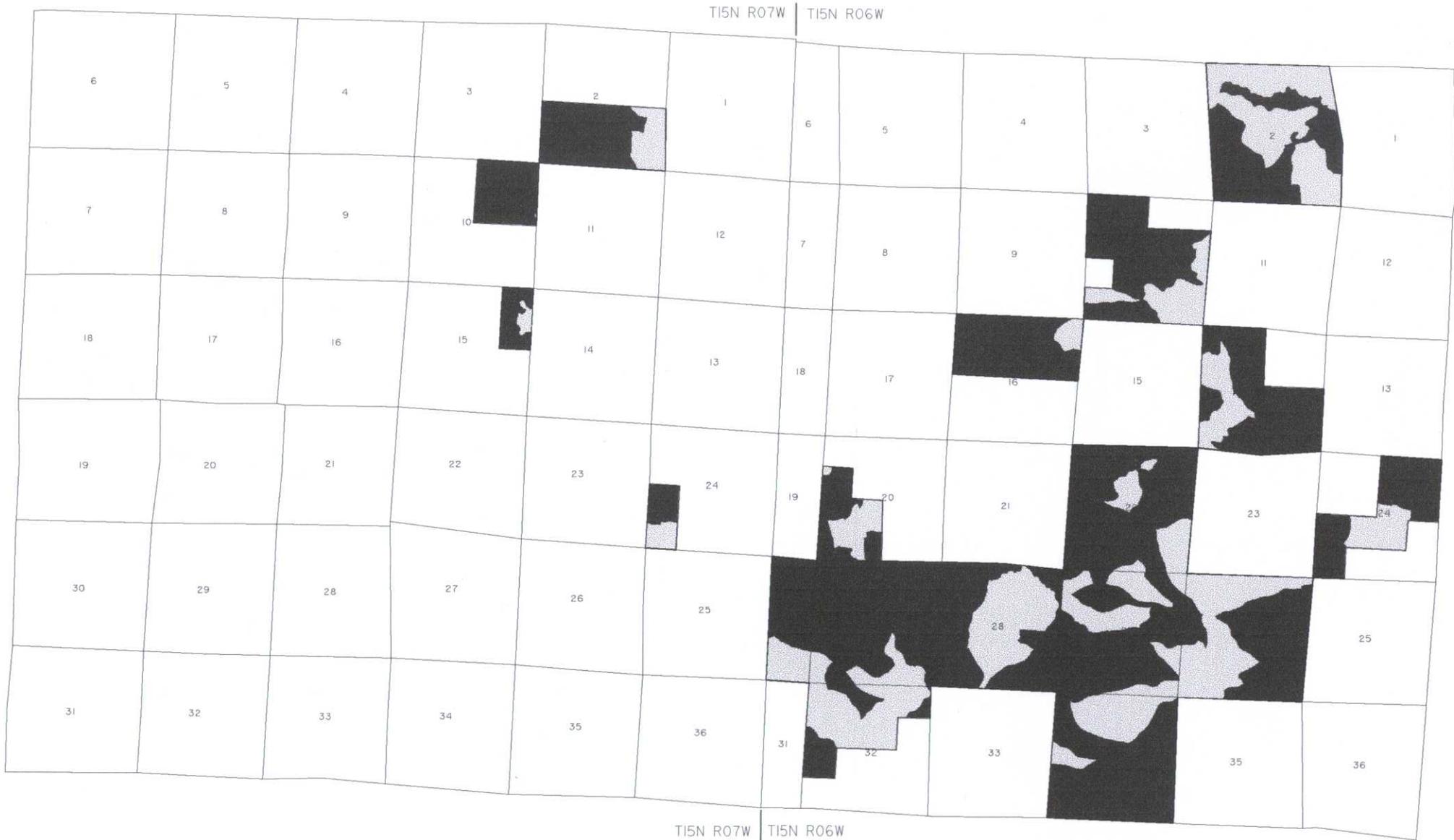
Figure 4-5. Suitable young forest marginal (YFM) owl habitat, 1995.

Source Data:
 Washington State
 Department of Natural Resources (DNR)
 Northwest Aerial Reconnaissance
 Poulsbo, WA

SCALE
 0 1/4 1/2 1
 SCALE IN MILES
 State Plane Projection, Zone 4602
 1927 North American Datum (NAD 27), Clarke 1866 Spheroid

LEGEND

- NON
- YFM



Port Blakely Tree Farms

Robert B. Eddy Tree Farm

Figure 4-6. Suitable young forest marginal (YFM) owl habitat, projected for 2045.

Source Data:
 Washington State
 Department of Natural Resources (DNR)
 Northwest Aerial Reconnaissance
 Poulsbo, WA

SCALE
 0 1/4 1/2 1
 SCALE IN MILES
 State Plane Projection, Zone 4602
 1927 North American Datum (NAD 27), Clarke 1866 Spheroid

LEGEND

□ NON
 ■ YFM

4.2 Silvicultural Procedures

Several investigations in western Washington suggest that mid-rotation thinning, in combination with cavity-tree retention and/or creation, can accelerate development of late successional habitat features in young forests. Thinnings and cavity-tree retention have been suggested as a primary management technique for enhancing forest understories for northern flying squirrels (*Glaucomys sabrinus*) (Carey and Johnson 1995), the primary prey species of spotted owls in western Washington (Thomas et al. 1990). Leave-tree retention is further recommended for maintaining cavity-nesting birds in managed forests (Newton 1994).

We proposed thinning and leave-tree retention as conservation measures to mitigate for harvest of suitable owl habitat. In addition, the leave-tree retention proposal is intended to further accommodate the needs of cavity-nesting birds.

4.21 Commercial Thinning

Thinning of second-growth coniferous forests in western Washington has been proposed by Oliver (1992) as a critical element of an overall landscape strategy for creating and maintaining terrestrial wildlife habitats in young managed forests. Likewise, silvicultural systems that include thinnings may enhance stream ecosystems through accelerated development of functional riparian habitats in managed forests (Swanson and Berg 1991, Berg 1995). Thinning of Douglas-fir/western hemlock forests allows for competitive release of canopy dominants and shade-tolerant understory trees, resulting in multiple canopy layers, increases in canopy depth, and enlargement of tree crowns (Oliver et al. 1991); all of which are associated with suitable spotted owl habitats, and tend to increase niche availability for breeding birds.

Port Blakely has conducted thinnings on its forestlands since 1942. The company has participated in several long-term research efforts aimed at improving this silvicultural technique. This has resulted in substantial operational experience for commercial thinning to be used as both a silvicultural, and habitat development technique. In cooperation with researchers at University of Washington, Port Blakely initiated, in 1993, a paired-comparison experiment on the plan area to determine the influence of commercial thinning on arboreal rodents (i.e., northern flying squirrels and Townsend's chipmunk), forest floor small mammals (rodents and insectivores) and terrestrial amphibians. Experimental design included the use of four untreated control stands, each paired with a treatment stand of similar pretreatment condition. Pre- and post-treatment sampling of wildlife species was accompanied by intensive habitat measurements across the experimental stands. Commercial thinning procedures for this investigation were designed on-site to accommodate the habitat needs for a variety of forest wildlife species. Resulting changes in tree densities, basal area, and diameter distributions were adopted as thinning guidelines for the proposed

conservation measures. The installed experimental treatments will further facilitate effectiveness monitoring.

During the planning period, Port Blakely will thin approximately 2011 acres of existing second-growth, using prescriptions designed to accelerate development of understory shrub cover, mid-story canopy layering, and more variable size-class distributions. Snags and cavity trees will be maintained to provide additional structure. Most thinning operations for those management units existing as naturally-regenerated second-growth will be conducted in the first five years of the planning period. Subsequent thinnings will be conducted on even-aged planted stands as those stands reach age 20-30 years (variable by site and market conditions). About 70% of the plan area is terrain that may be economically thinned using current methods.

4.22 Leave-tree Retention

Cavity-nesting birds have been identified as an ecological group that may experience declines in managed forest landscapes of the Pacific Northwest (Holthausen and Marcot 1991). Numerous field investigations have identified a shortage of cavities excavated in snags and live trees as limiting factors for cavity-nesting birds in managed forests (see Neitro et al. 1985 and Newton 1994 for reviews). Likewise, some mammals (e.g., northern flying squirrels) may be limited by a lack of suitable denning sites provided by cavities. Of 139 species of birds and mammals known or likely to use habitats on the plan area, approximately 32% use snags or cavity trees for nesting, roosting, denning, or hibernation.

Provision of cavities for secondary cavity-nesters in managed forests is facilitated by the presence and variety of primary cavity excavators; which in turn are influenced by the densities, size, species, and spatial distributions of snags and defective trees. The rationale for developing conservation measures for leave-tree retention was thus based upon provision of future snags and green recruitment trees for maintaining populations of primary cavity excavators. This is a mitigation measure for harvest of habitats suitable for species utilizing snags and cavity trees.

Most cavity-nesting birds in the Pacific Northwest prefer snags at least 15 inches dbh (Mannan et al. 1980, Neitro et al. 1985). However, some species, such as pileated woodpeckers, may require larger diameter snags (>24 inches dbh) for construction of nesting cavities, while still using smaller diameter snags for foraging and roosting. Northern flying squirrels may prefer snags >20 dbh (Carey, A., Unpubl. Data, cited in Hansen et al. 1993).

Our objective is to develop densities and size classes of snags and/or live cavity trees for meeting habitat needs of primary cavity-nesters and flying squirrels during the rotation succeeding clearcut harvest. Our process incorporates identification and retention of relatively large snags and defective trees (cavity-trees) where they exist, along with dedicating living trees from the previous commercial rotation for snag production in the succeeding rotation.

Known ranges of six species of primary cavity-nesting birds overlap the plan area. We used the Snag Recruitment Simulator (SRS), Westside model (Software developed by B.G. Marcot 1992, USDA Forest Service, based on Neitro et al. 1985) to estimate snag densities for maintaining these species in forested habitats. The SRS model estimated 383 snags per 100 acres (3.8 snags per acre) as the minimum requirement for maintaining all primary cavity-nesters at a 100% population level (Table 4-3).

Table 4-3. Minimum snag/cavity-tree densities (per 100 acres) for maintaining primary cavity-nesting species at 100% population level in forested habitats on the plan area.

Species	dbh class	Hard	Soft	Total
Downy woodpecker	>11"	8	8	16
Red-breasted sapsucker	>15"	45	0	45
Hairy woodpecker	>17"	192	0	192
Northern flicker	>17"	24	24	48
Red-breasted nuthatch	>17"	76	0	76
Pileated woodpecker	>24"	6	0	6
Total		351	32	383

With the SRS model as a guide, we set a target density of 4 snags per acre (>15 inches dbh). In order to meet criteria for YFM owl habitat (snag requirements for northern flying squirrels), at least 2 of the 4 must be >20 inches dbh. Realizing that target diameters were minimum, we were reasonably certain that several (>6/100 acres) larger diameter (>24 inches dbh) cavity trees would be produced with such a prescription target, thus meeting model criteria for pileated woodpeckers (Table 4-3). Snags of these densities and dbh classes currently exist on <10% of the plan area (see Appendix A). Therefore, a reasonable development period had to be incorporated into this conservation measure. Thirty years post-harvest was set as the age for attaining the required snag densities, as this is the age at which >90% of the regenerated stands will have dominant tree heights >85 feet (a characteristic required for YFM habitat).

Assuming a minimum growth-rate of 0.4 inches dbh per year,² a conifer must be >8.5 inches dbh to achieve a >20 inch dbh in 30 years. Likewise, a conifer must be >6 inches dbh to achieve a >15 inch dbh in 30 years. For targeting leave-tree densities, we made an assumption that, on the average, only 50% of the green trees left within a harvest unit will survive and attain the desired diameter and structural characteristics.

Where snags and/or live cavity trees do not exist, the above rationale results in a management prescription of retaining at least 8 green recruitment trees per acre at time of harvest. Minimum diameter would be 6 inches dbh, with at least 4 of these exceeding 8.5 inches dbh. Where hard snags and/or cavity trees of the required diameter exist within a stand, we reasoned that these should be retained where possible. Each snag or cavity tree of the required dbh retained, would reduce by two the number of green recruitment trees required for retention (these being of the above diameter required to reach the diameter class of the snag retained). In order to provide some level of future snag dispersal throughout the harvest unit, we set an average distance between groupings of snags, cavity trees, or green recruitment trees to be no further than 1000 feet, and no point within the unit to be further than 800 feet from snags, or green recruitment trees.³

Within some even-aged harvest units the cumulative densities, size-classes, species composition, and distribution of trees left for mass wasting and riparian management will exceed these prescribed leave-tree retention standards.

4.3 Stream and Riparian Management

Aquatic and riparian habitats on the plan area represent critical resources for all species of fish and amphibians, while supporting many species of mammals and birds. Riparian zones are among the most heavily used wildlife habitats in the Pacific Northwest, supporting an estimated 359 species during some seasons or parts of their life cycle (Brown 1985). A similar disproportion of management-sensitive flora and invertebrate fauna are likely to be associated with riparian habitats (Thomas et al. 1993). Although riparian habitats make up a minor portion of the landscape, they are disproportionately more productive and provide more habitat niches for terrestrial species than do other types of habitats. The objective of Port Blakely's stream and riparian management strategy is to accommodate additional habitat needs for these terrestrial species while giving primary emphasis to the functioning of aquatic ecosystems.

Management response of stream habitats for native fish, amphibians, and other aquatic species on the plan area is somewhat governed by geomorphology. The

² This results in a conservative growth-rate estimate. Expected growth rates are 50–100% higher.

³ This spacing prescription was derived from an operational perspective; in that it is what Port Blakely's harvesting operators can attain without substantially reducing operational efficiency.

variation in topographic relief has not only resulted in high stream densities; but also in wide variability of stream habitats — not all of which are used by fish, or by the same species of fish. Although occurrence and abundance of fish species are different among the fish-bearing streams within the plan area, we are uncertain about the future distribution of various species. Therefore, considering the 50-year term of this HCP, we propose to apply our management prescriptions without regard to occurrence of particular species of concern. In other words, conservation measures for fish-bearing streams are proposed as if all such streams were inhabited by anadromous salmonids.

Forest management may impair fish habitats and water quality on the plan area through: 1) increased landslides (mass wasting) related to tree removal and road construction; 2) sedimentation from surface erosion related to large equipment operation and roads; 3) reductions in streambank stability due to adjacent timber harvest; 4) reductions in ability of streamside vegetation to mediate water temperatures by canopy removal; and 5) reductions in large woody debris (LWD) delivery through elimination of streamside forests. Hydrology of the area may be influenced by increased run-off and/or changes in peak flow. The ability of any management strategy on the plan area to have an influence on this dynamic is quite low due to relatively small ownership within any one watershed basin.

Washington Forest Practices Standard Methodology for Conducting Watershed Analysis (*Version 2.1*) addresses the cumulative effects of the above management concerns through a standardized process that results in management prescriptions tailored to each Watershed Administrative Unit (WAU). However, a landowner must own greater than 10% of a WAU in order to formally initiate watershed analysis. In reality, most watershed analyses are either initiated by Washington DNR or the majority landowner within the WAU. On the plan area, Port Blakely does not have this alternative. The management strategy taken here is based on watershed analysis; and Port Blakely's proposed conservation measures will be submitted for use as our "alternative prescriptions" when and if watershed analysis is formally initiated on the WAUs within the plan area.

4.31 Overall Approach

Protection and management of stream and riparian habitats will be provided through prescription processes for addressing mass wasting, surface erosion, streambank stability, stream shading, recruitment of large woody debris (LWD), and riparian composition.

Mass wasting and surface erosion were addressed separately. We identified conditions under which mass wasting and surface erosion could become a problem; described a procedure for risk assessment; and we indicated management prescriptions given various levels of risk.

Protection and management of riparian function (bank stability, stream shading, LWD recruitment, and riparian composition) were addressed through

a system of site-specific prescriptions. For this, we delineated several riparian landforms, identified target stand conditions, and provided a prescription process for attaining the desired riparian composition for a particular riparian landform.

4.32 Mass Wasting

Our objective in analysis of mass wasting potential is to identify those factors necessary for minimizing management-related slope failures. To accomplish this, a risk assessment and prescription procedure was compiled in the form of a management response matrix using a modification of the overall model of risk assessment from Washington State Watershed Analysis. This risk assessment and management response will be applied to all operations adjacent to DNR Type 1-5 waters. Resultant prescriptions will include, but are not limited to, leave areas along unstable slopes and drainage sideslopes, alternative logging methods, and partial harvest methods. Specific actions for mass wasting analysis and prescription application is in Appendix B.

4.33 Surface Erosion

For surface erosion, our objective was to develop management direction and response for minimizing management-related delivery of fine sediment to surface waters. We address surface erosion concerns through operational constraints on use of large equipment for logging, site preparation, and road construction and maintenance. In addition, we have prepared a road maintenance plan with detailed management response to specific road and drainage problems. The soils within the plan area generally become subject to erosion following operations during wet seasons (May through September) on slope gradients >30%. The rationale for minimizing surface erosion was developed on a site-specific basis, with specific management prescriptions outlined in Section 3.4 and Appendix C.

4.331 Existing Roads

There are approximately 55 miles of private logging roads traversing the plan area, yielding a road density of 4.7 miles per square mile. Many sections of existing roads do not meet current standards for new road construction. Some of these roads constitute a significant risk to aquatic habitats by increasing potential for both mass wasting and erosion into surface waters.

Port Blakely has established a road maintenance plan (Appendix C), identifying each road segment needing maintenance and/or reconstruction. The road maintenance measures in Appendix C are designed to bring existing roads up to, or in excess of, DNR Forest Practices Rules and Regulations for new road construction (WAC 222-24) within five years.

After this initial five-year period, Port Blakely will perform annual maintenance activities within the plan area.

4.332 New Roads

Washington Forest Practices Rules and Regulations addresses surface erosion concerns for road construction and maintenance (WAC 222-24). In order to further minimize potential for management-related water quality problems due to surface erosion, additional precautions were considered for prescribing conservation measures. In general, these included minimizing road construction on sensitive areas and upgrading cross-drain specifications to withstand a 100 year flooding event.

Approximately 10% of the DNR Type 1-3 stream network isolates certain timber stands from harvest unless new roads are constructed. We reasoned that on most of these sites, the use of alternative logging methods as opposed to building new road would result in lesser amounts of surface erosion. When necessary to reduce road densities by logging across DNR Type 1-3 streams, full-suspension sky-line logging systems would be preferable with yarding corridor crossings to <1 per 150 feet along the stream — corridor width not exceeding 20 feet.

4.34 Riparian Function

The approach taken for maintaining riparian function relied on establishment of riparian management zones (RMZs) to provide sufficient bank stability, stream-shading, and LWD recruitment. Our objective is to maintain important habitat elements for aquatic species, while providing additional benefits for riparian-associated wildlife species.

4.341 Bank Stability

Our objective for maintaining bank stability is to maintain live root systems from trees and shrubs immediately adjacent to the stream channel of fish-bearing streams. This will be accomplished with a no-harvest zone (NHZ) of at least 25 feet adjacent to both sides of all DNR Type 1-3 streams.⁴ For those areas having a high potential for mass wasting on oversteepened sideslopes, the NHZ will be delineated through a mass wasting prescription (see Appendix B). In addition, a NHZ will be observed for at least 25 feet around any off-channel habitat within a valley floor or flood plain. In order to further provide long-term bank stability, at least 8 trees >16 inches dbh per 1000 feet of stream length will be retained adjacent to the stream; if these do not exist within the no-harvest zone, the closest trees meeting this criteria in the RMZ will be retained.

⁴ The no-harvest zone will be measured from the ordinary high water mark (OHWM), channel disturbance zone (CDZ), or channel migration zone (CMZ); whichever is outermost.

4.342 Stream Shading

Water temperature in fish-bearing streams, especially those with relatively narrow channels, is somewhat controlled by shade provided by streamside vegetation and adjacent tree canopies (Sullivan et al. 1990). Thus, stream temperature may become vulnerable to shade removal through harvest of adjacent tree canopy. Maintenance of adequate canopy closure (variable by geographic region and elevation) is necessary for minimizing water temperature extremes resulting from canopy removal.

Our objective for maintaining adequate stream shading is to maintain canopy closures over fish-bearing stream channels that will minimize high water temperature extremes. This will be accomplished by using a Method for Determination of Adequate Shade Requirements on Streams, based on a system developed by Sullivan et al. (1990); and described in the Washington State Forest Practices Board Manual — 7/95.

4.343 Large Woody Debris Recruitment

Our objective for LWD recruitment is to maintain and enhance riparian forests in the area from which a majority of in-channel LWD is likely to originate. This will be accomplished by prescribing a site-specific riparian management strategy at time of harvest, thus providing an RMZ tailored to landform characteristics. Retention and development of habitat in this RMZ will benefit other species associated with riparian habitats.

Recruitment of high quality LWD into channels similar to those on the plan area is likely to occur from an area relatively close to the stream channel (Swanson and Lienkaemper 1978), decreasing rapidly with lateral distance from the stream channel (Robison and Beschta 1990). McDade et al. (1990) found that >90% of the LWD in streams traversing mature conifer stands in western Oregon originated within 100 feet from the stream channel. This suggests a guideline for RMZ widths where other identifiable factors cannot be used to determine appropriate widths.

Primary LWD delivery processes vary within the stream network depending upon stream size/order and landform characteristics (Keller and Swanson 1979, Swanson and Lienkaemper 1978). In heterogeneous, highly dissected topographies, factors such as sideslope gradient and local geology are likely to determine delivery rates and processes of delivery to the stream channel (MacDonald et al. 1991). These interactions make it possible to tailor RMZs to the riparian landscape. Acknowledging these dynamics, we divided stream channels on the plan area into *riparian landforms* (*sensu* Kovalchik and Chitwood 1990) characterizing drainage systems and shape of the terrain. Within each riparian landform we identified variations in land surfaces that provide physical boundaries from which management prescriptions are targeted. These include sideslopes, terraces, abandoned flood plains, active

flood plains, channel shelves, streambanks, active channels, and overflow channels. We used a horizontal distance of 100 feet as an outer RMZ boundary when landform characteristics do not suggest otherwise. When sideslope gradient exceeds 70%, we place the outer RMZ boundary at 122 feet slope distance, which is equivalent to 100 feet horizontal distance at 70% slope. A minimum RMZ width of 50 feet is prescribed, regardless of landform characteristics. Finally, for each riparian landform, we defined an area from which the majority of LWD recruitment potential is likely to occur. These riparian landform characterizations and management guidelines for establishing RMZ boundaries are presented in Appendix D.

Many RMZs may be partially harvested without significant risk of slope failure. When partial harvests are appropriate, our management objective is to retain a composition and size class of trees at post-harvest sufficient for developing a mature/late successional forest half-way through the next rotation (approximately 35 years). Four mature conifer stands were chosen within the plan area as representative of the desired future condition for riparian forest (Table 4-4). These are used as reference stands for approximating target RMZ stand conditions.

Minimum targets for riparian forests at 35 years following harvest are >50 trees per acre averaging >24 inches dbh, with basal area >150. Assuming a minimum growth-rate of 0.4 inches dbh per year, a conifer must be >8.5 inches dbh in order to achieve a 24 inches dbh in 35 years. Assuming 15% windthrow and 2% suppression mortality, a tree density of >60 trees per acre must be maintained in order to achieve a target of 50 trees per acre in 35 years.

Table 4-4. Average stand measures for four reference stands used for determining approximate RMZ target desired conditions.

Legal	Dom. sp. ¹	dbh	Age	Trees/acre	BA
S34-15,6	SS,RA	24	85	34	108
S14-15,6	WH,DF	24	111	57	171
S2-15,6	WH,RC	22	103	102	226
S2-15,6	WH, DF	20	70	112	238
Average		23	92	76	186

¹ DF=Douglas-fir, WH=western hemlock, SS=sitka spruce, C=western redcedar, RA=red alder

Conifer sources of LWD are likely to reach a larger size and (regardless of size) last much longer in the stream channel than LWD from hardwood species (Harmon et al. 1986). We, therefore, proposed to convert hardwood dominated riparian forests to conifer species where this can be done without increasing risks of slope failure. The objective this RMZ prescription is to regenerate selected sections of RMZ to produce a mature conifer-dominated riparian forest at 70 years from time of harvest— this will be approximately the end of the next rotation for the adjacent stand.

4.3431 Non-fishbearing Streams

Mass wasting prescriptions will result in provision of LWD recruitment potential along many DNR Type 4 and 5 streams on the plan area. All areas with a high potential for slope failure into non-fishbearing streams will be left with a no-harvest or partial-harvest zone encompassing the area of slope instability. In excess of 50% of harvest units containing DNR Type 4 and 5 streams will be treated with no-harvest or partial-harvest zones adjacent to the streams. More than 35% of the entire perennial non-fishbearing stream distance on the plan area will receive no-harvest or partial-harvest zones adjacent to the stream channel as the result of these mass wasting prescriptions. In addition, when perennial DNR Type 4 and 5 streams would otherwise not receive a mass wasting prescription, discontinuous patches of trees and undisturbed understory will be left adjacent to stream channels at the rate of 30 trees (>9 inches dbh) per 1,000 feet of perennial non-fishbearing streams. This latter prescription is intended to assure provision of additional LWD adjacent to non-fishbearing streams as well as providing additional riparian habitat refugia for organisms associated with non-fishbearing streams (e.g., stream-breeding amphibians).

4.4 Site-Specific Management

Site-specific management protocols were developed for protecting known nesting sites of northern spotted owls, marbled murrelets, and northern goshawks. Our objective was to provide a degree of nest-site protection for the species of interest while providing Port Blakely with a level of certainty as to future operations. The specific protocols for these three species are outlined in Section 3.0 Proposed Conservation Measures.

4.41 Northern Spotted Owls

All spotted owl site centers that have been established are for resident single status only. Therefore, use of site-specific management protocols are largely contingent upon actually finding future nesting sites. Very few, if any, nesting sites are anticipated due to low population levels in southwestern Washington, combined with the small size of the plan area (relative to known spotted owl home ranges).

Therefore, it was decided that Port Blakely could protect any known nest sites on the plan area by maintaining a no-harvest area encompassing the best 70 acres, as well as providing seasonal disturbance restrictions in a 1/4 mile radius around the nest site.

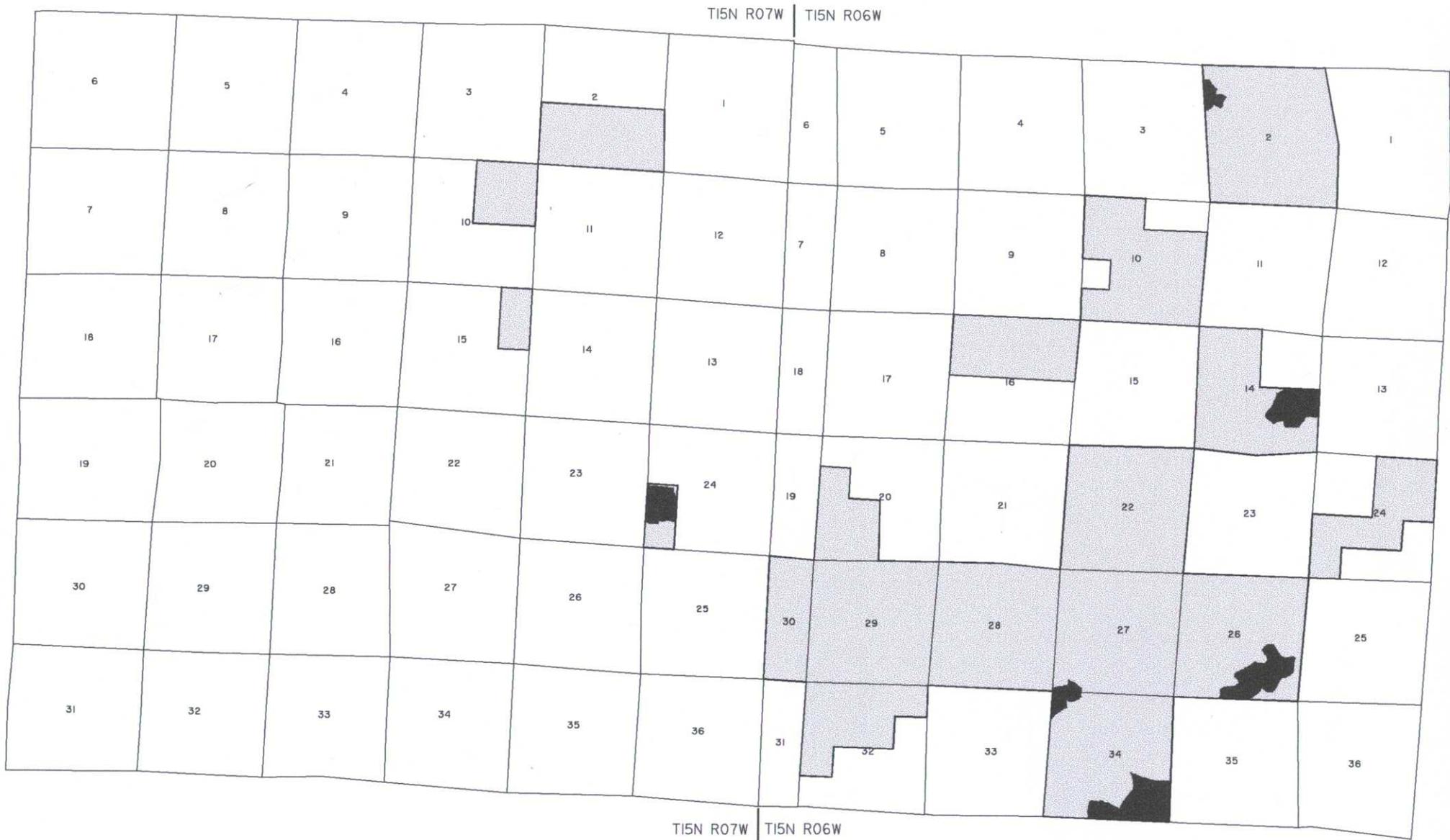
4.42 Northern Goshawks

One northern goshawk nest is known on the plan area. This nest site will receive protection for as long as it remains active. Although populations of goshawks are relatively low in southwestern Washington, occurrence of incidental sightings suggest that more nest sites (perhaps two more) are possible on the plan area. Therefore, it was decided that Port Blakely could protect up to three known active nesting sites at any one time by maintaining a no-harvest zone encompassing the known active nesting stand (approximately 80 acres, but no larger than 120 acres).

4.43 Marbled Murrelets

Following three years of protocol surveys, there has been no marbled murrelet presence detected on the plan area. Suitable marbled murrelet habitat is characterized, among other things, by the presence of nesting platforms at least 6 inches in diameter and >50 feet high, created by large limbs, or structural defect. Management units were visually assessed for presence of suitable nesting platforms while conducting the habitat analysis (Appendix A). Any stand having at least two platforms per acre over an area of at least five acres was considered to be potentially suitable nesting habitat for marbled murrelets. This assessment resulted in identification of approximately 332.5 acres of management units containing potentially suitable habitat on the plan area (Figure 4-7) — some of which had previously been identified and surveyed.

Survey and protection of any known occupied suitable habitat would constitute a take avoidance approach to marbled murrelets. Immediate harvest of habitat not found to be occupied would also fall within a take avoidance approach. Under a “no-action” alternative deferral for future harvest of such habitat may again require surveys prior to harvest. In order to remove this disincentive for deferring harvest of potentially suitable habitat, it was decided that Port Blakely would not be required to resurvey such habitat prior to harvest in the future.



Port Blakely Tree Farms

Robert B. Eddy Tree Farm

Figure 4-7. Management units containing potential marbled murrelet habitat, 1995.

Source Data:
 Washington State
 Department of Natural Resources (DNR)
 Northwest Aerial Reconnaissance
 Poulsbo, WA



State Plane Projection, Zone 4602
 1927 North American Datum (NAD 27), Clarke 1866 Spheroid

LEGEND

- Non
- Potential Marbled Murrelet Habitat

4.5 Synthesis

All categories of fish and wildlife habitats currently existing on the plan area will be retained as a result of the HCP. However, the sufficiency of the HCP does not depend entirely upon the notion of providing for a representation of generalized habitat types. A primary benefit is the improvement in habitat quality that is expected to be achieved through the conservation measures. As an example of the overall benefits of this HCP, Appendix E displays a projection of associated habitat benefits for vertebrate species with special status on the plan area.

Many of the species covered by the HCP are dependent upon existence of one or more forest structural classes for meeting their life requisites. Without up front deferment of timber harvest for selected stands representing important structural classes (e.g., later successional stages), several species would likely not receive conservation benefits from the HCP. Harvest scheduling is particularly important for species such as the northern spotted owl that require threshold amounts of certain habitat types.

In addition to the more uniform provision of various forest age-classes provided under the HCP, the use of intermediate silvicultural prescriptions (i.e., commercial thinning) further provides for development of critical structural features in existing stands. These conservation measures further accelerate successional advancement to the benefit of all species that depend upon those structural conditions associated with late-successional forests.

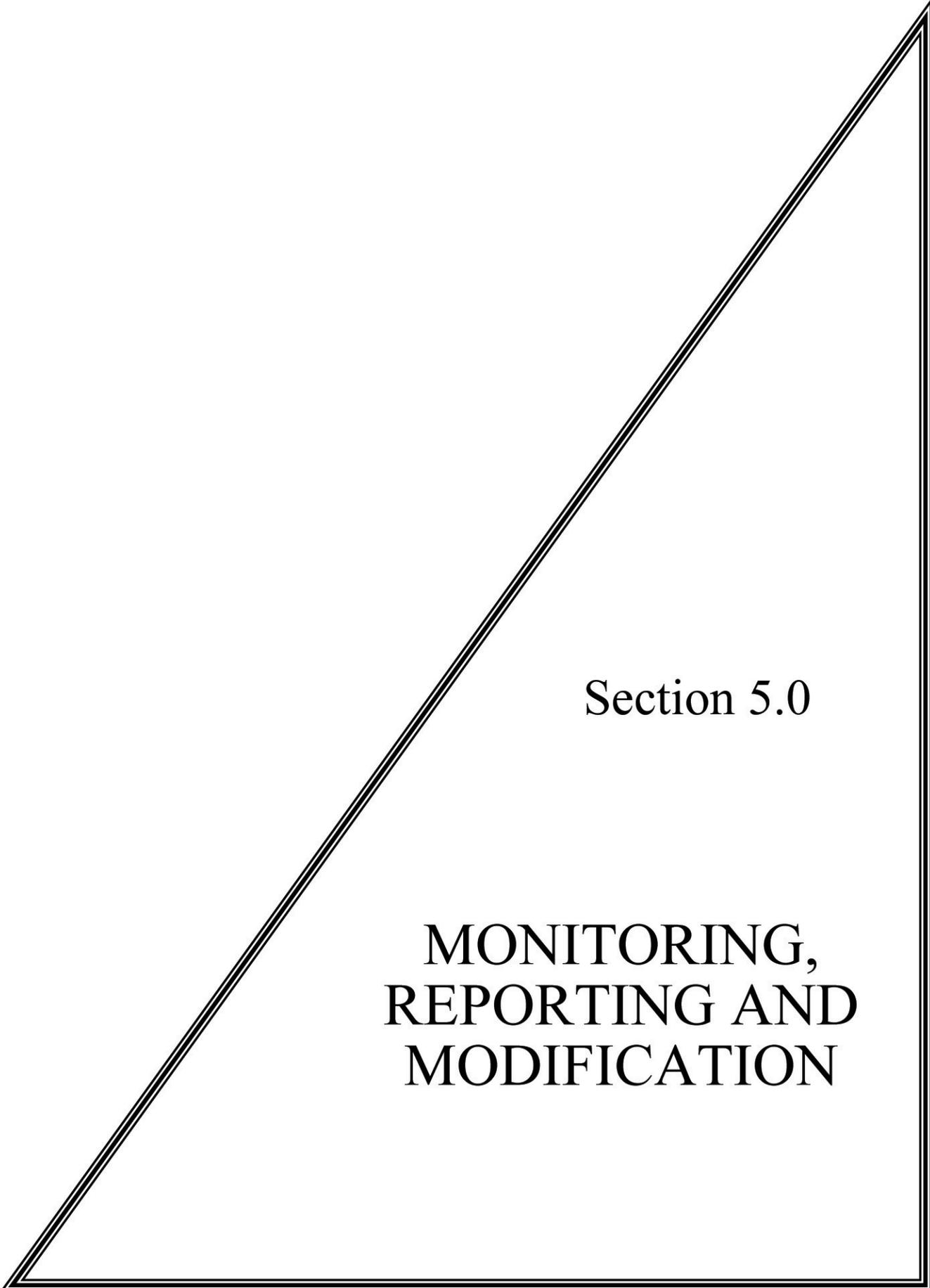
The functional approach taken for leave-tree retention would provide snag and cavity-tree development to the benefit of not only primary cavity excavating birds, but to a wider range of cavity-dependent species likely to use the plan area. Development of forest habitats with relatively high snag and cavity-tree densities creates additional habitat types that are not widely available on the plan area at present — and these would not likely become available if the HCP were not implemented.

Conservation measures for stream and riparian dependent species shall ultimately provide late-successional riparian habitat types that are not widely available on the plan area at present — and these would not become as available if the HCP were not implemented. Thus, aquatic and riparian-dependent fauna would benefit not only from short-term protection of existing habitats but should receive a long-term benefit from an overall improvement in habitat quality. Stream and riparian management commitments, although characterized here as providing prerequisites for fully-functioning stream and riparian habitats, will also provide additional landscape-level benefits to species that do not necessarily confine their use to riparian habitats.

Occurrence and habitat relationships of invertebrate fauna are poorly known; but those invertebrates likely to be impacted by forest management are aquatic or flightless understory specialists associated with late successional and riparian habitats (Olson 1992: cited in Thomas et al. 1993, USDI 1992, Thomas et al. 1993). Thomas et al. (1993) lists 24 species of diplopods (millipedes), 8 species of

arachnids (spiders and harvestman), 34 species of insects, and 43 species of molluscs as being associated with late-successional understory conditions; they also list 34 insects and 45 molluscs as being associated with stream and riparian habitats. These species, if present on the plan area would receive conservation benefit from the combined habitat improvements proposed in this HCP.

In summary, when compared with the no-action alternative of not issuing an incidental take permit, the cumulative effect of the proposed conservation measures results in retention and improvement of habitat features within all fish and wildlife habitats succeeding from silvicultural practices conducted in accordance with the HCP.



Section 5.0

**MONITORING,
REPORTING AND
MODIFICATION**

5.0 MONITORING, REPORTING AND MODIFICATION

The HCP will be monitored with surveys designed to evaluate implementation and effectiveness of proposed conservation measures. Compliance monitoring will be reported every two years, and is intended to document and evaluate Port Blakely's performance under this HCP. Effectiveness monitoring will be reported every five years, and is intended to determine the efficacy of the prescribed conservation measures in meeting habitat management targets. Effectiveness monitoring will providing feedback for further assurance of reaching habitat targets. Port Blakely will provide a first-year update on the compliance and effectiveness monitoring efforts, including an installation report for the effectiveness monitoring program.

Experimental management will be used to further develop information on species:habitat relationships and alternative management techniques for maintaining habitats capable of supporting species of concern. Experimental management will be used throughout the life of the plan as directed by Port Blakely's resource managers. We cannot anticipate what management techniques will become available given future developments in forestry and wildlife science. Therefore, experimental management projects cannot be specified as a condition of the HCP. It is better that Port Blakely be given the opportunity to develop and propose alternative management strategies as an incentive for such research.

5.1 Compliance Monitoring

Port Blakely will submit biennial¹ compliance reports to the Service, documenting forest management actions covered under the HCP. These reports will provide the following:

- Maps and tabular data displaying all thinnings and clearcut harvest units within the plan area from the preceding two years.
- Results of systematic post-harvest sampling efforts within management units harvested by clearcut during the preceding two years. This reporting will document leave-tree densities and size classes.
- Documentation of landform characteristics of all clearcut harvest units for mass wasting analysis. This reporting will document prescriptions for avoiding mass wasting.
- Documentation of all new road construction and road maintenance actions taken toward meeting the specific actions outlined in the Road Maintenance Plan (Appendix C).

¹ The first compliance report will be submitted at the end of the first operating year; thereafter compliance reporting will be on a biennial basis.

- Results of systematic post-harvest sampling efforts along all DNR Type 1-4 streams adjacent to management units harvested by clearcut during the preceding two years. This reporting will document riparian landforms, stream-shading, riparian buffer widths, and leave-tree densities prescribed for maintaining riparian function.
- Progress and results of marbled murrelet surveys conducted during the previous two years.
- Any likely changes in fish distribution due to removal of obstructions per the road maintenance plan.
- Locations of all site-specific protection efforts along with a description of all management actions taken for site-specific protection.

5.2 Effectiveness Monitoring

Effectiveness monitoring will involve repeated sampling of habitat attributes across the plan area on a series of plots, points, and stream segments. Sampling design will vary according to habitat attributes of interest; but the goal will be to document changes in important habitat attributes due to management effort, and compare these changes with targeted habitat conditions used as rationale for proposed conservation measures. This will require incorporation of statistical controls in order to reliably distinguish between management and non-management related influences. Effectiveness monitoring reports will be submitted to the Service every five years. These reports will document results of the following monitoring efforts:

- At five-year intervals, Port Blakely will resample habitat attributes in all 400 management units delineated in Appendix A. This will result in updated maps and tabular data displaying changes in successional stages, age-class distributions, and suitable YFM habitat across the plan area. In the event that actual levels of suitable YFM habitat deviate from that displayed in Figure 4-4, management response for correcting deficiencies in habitat development will be reported in detail.
- Effects of thinning on canopy development, understory composition, snag densities, and LWD loadings will be monitored across an experiment comparing four thinned stands paired with four control stands. This experiment was established in October 1993 prior to thinning treatments. Stands were thinned during summer 1994, using thinning guidelines ultimately adopted for this HCP. Habitat attributes were sampled at 32 plots within each stand at both pre- and post-treatment. These stands will be periodically resampled for at least the next five years. As changes in habitats relative to various thinning treatments become apparent, Port Blakely's implementation of thinning prescriptions may be altered to more reliably meet

targeted conditions. These incremental adjustments will be reviewed with the Service(s) at each five-year report.

- Growth and survival of leave-trees will be monitored across the plan area by marking a large sample of trees retained within clearcut harvest units and following their survival, height, and diameter growth at periodic intervals (e.g., 1, 3, 5, and 10 years). These will include trees left within RMZs, as well as those left in clumps and as individuals across a harvest unit. Sampling will be designed to incorporate topography, species, size (dbh and height), and tree spacing as variables for determining survival (i.e., susceptibility to windthrow). Given these monitoring data, Port Blakely will incrementally adjust leave-tree retention practices to maximize survival and effectiveness of leave-trees, further assuring that targeted densities (see Section 4.22) are achieved or exceeded. Results of the monitoring/adjustment effort will be subsequently reviewed with the Service(s) at five-year increments. This monitoring effort may be discontinued upon agreement among the Service(s) and Port Blakely that the conservation measures, as implemented, exceed targeted densities, size-classes, and distributions of snag and cavity trees.
- The occurrence of shallow-rapid landslides and deep-seated failures will be remotely monitored by periodic aerial photography (at five-year intervals between photo coverage). Causes and effects will be determined for each occurrence. If any slope failures are found to be management-related, Port Blakely will report on measures taken to avoid resource damage and future occurrences due to similar management practices. Baseline conditions will be reported as a supplement to the first compliance report.
- A stream habitat monitoring program will be established to survey summer stream temperatures, substrate quality, LWD loadings, and stream channel characteristics across a range of riparian landforms on the plan area. Monitoring protocols will be based on TFW Ambient Monitoring program modules. In addition, a subset of those stream segments with channel gradients <4% will be monitored for the presence of high-quality pools (Platts et al. 1983). At least 10% of available high-quality pools will be repeatedly monitored. Surveys will be installed and evaluated prior to the first biennial reporting period, and will be presented as a supplement to the first compliance report.

5.3 Experimental Management

Port Blakely has established several experimental management efforts in conjunction with other private landowners and university researchers. The results of these projects are intended to provide us with management implications for addressing the needs of wildlife in managed forests. Until now, these projects have focused on effects of thinning and clearcutting on small mammals and forest amphibians; effects of commercial thinning on arboreal rodents; influence of

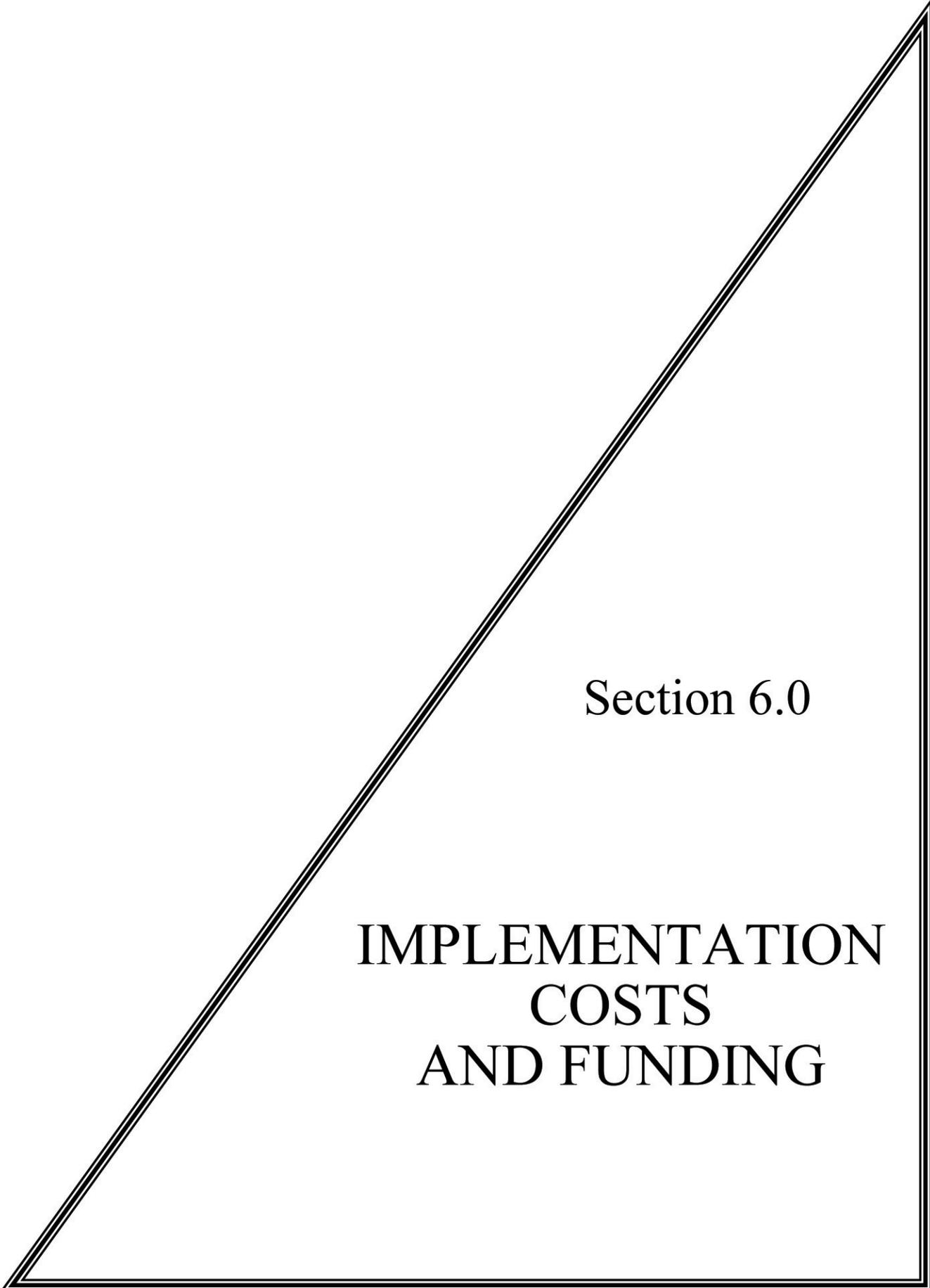
stream geomorphology on amphibian abundance and occurrence; den-site selection by northern flying squirrels; and use of artificial cavities by northern flying squirrels.

Several of these efforts also involve Port Blakely lands that are not included within the plan area, as well as other landowners' properties. Results of these experiments will be published as technical manuscripts and journal articles. These will be made available to the Service as they are published. New experiments may be initiated as our research program develops. As the management implications of these research programs suggest alternative methods for meeting management objectives of the HCP, Port Blakely may seek revision of certain sections of the HCP to incorporate such methods.

5.4 Modifications

The Implementation Agreement allows for processing of amendments to this HCP. Modifications that may be made at the discretion of Port Blakely include various editorial changes including corrections of maps and figures that do not change the validity of analyses or the intended meaning of the conservation measures or terms of monitoring and reporting. In addition, Port Blakely may elect to include in the HCP, and permit, land acquisitions made after the issuance of the permit, but only if those lands are within 3 miles of the original plan area and contain only those habitats and listed species that are known to exist within the original plan area.² On these additional lands all proposed conservation measures for 3.2 Silviculture, 3.3 Stream and Riparian Management, 3.4 Site-specific Management, and 3.5 Emergency Actions will apply. In addition, these lands will be included in reports of compliance and effectiveness monitoring, as described above.

² The HCP team considered the general uniformity in habitat characteristics, tree growth, and forest development of second- and third-growth commercial forestlands in the immediate vicinity (within 3 miles) of the plan area in judging the adequacy of the proposed conservation measures for realizing similar conservation benefit on those adjacent lands. Use of this modification process for newly acquired lands was restricted to a 3 mile limit because this was the area from which the interdisciplinary HCP team found species ranges, habitat types, and riparian landforms to be comparable to those on the plan area. Furthermore, the early history of timber harvest throughout this three mile zone was comparable and there are no known habitat types that are significantly different from those on the plan area. Thus, potential for incidental take, habitat response to conservation measures, and species response to habitats within this immediate area are consistent with those analyzed under the HCP and accompanying EA.



Section 6.0

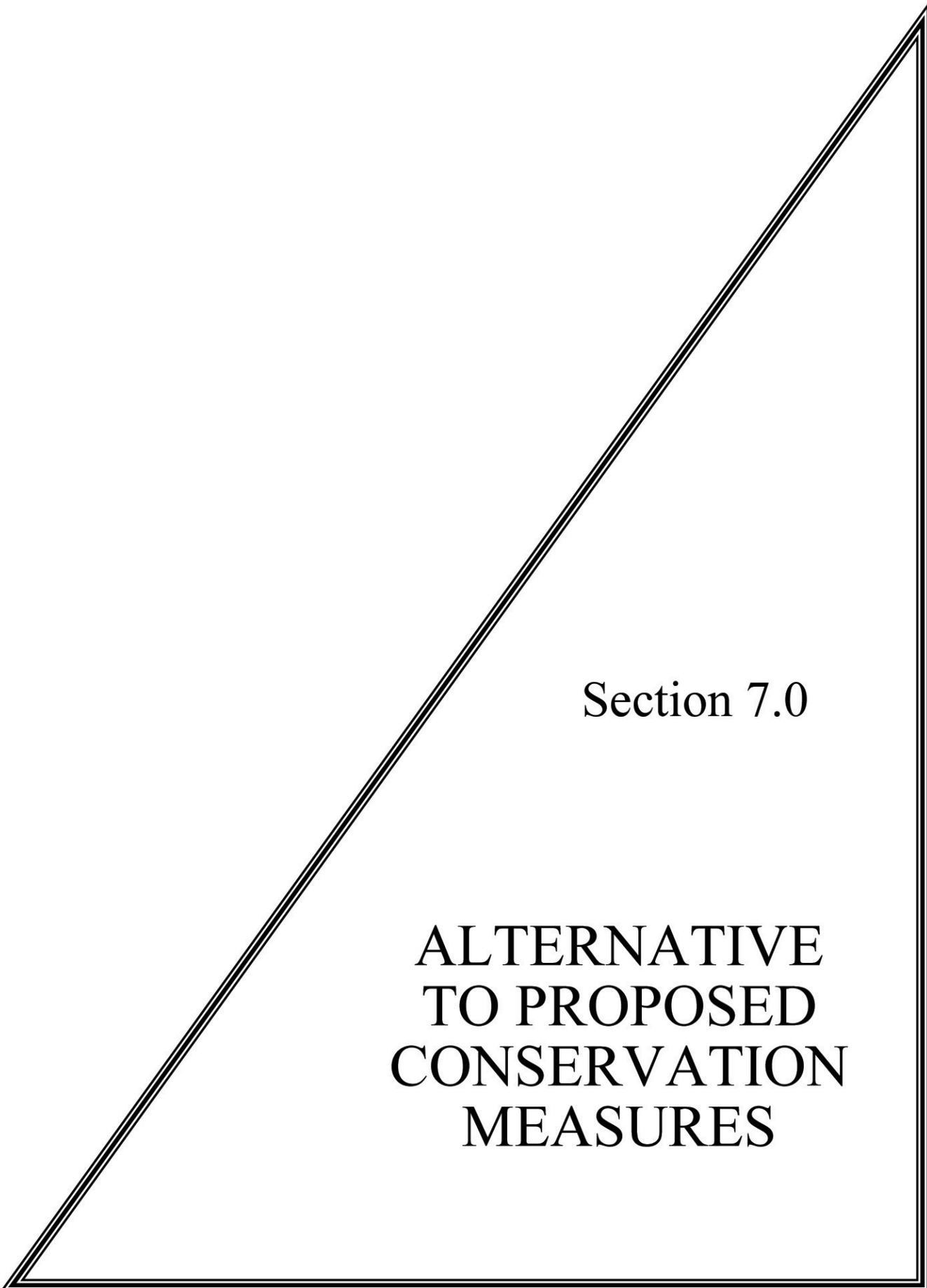
**IMPLEMENTATION
COSTS
AND FUNDING**

6.0 IMPLEMENTATION COSTS AND FUNDING

Conservation measures, monitoring, and reporting will be conducted by Port Blakely's staff and contractors as a routine business practice. The HCP will require Port Blakely to defer some timber harvests beyond normal rotation age, apply intensive silvicultural prescriptions, designate and reserve harvestable timber, conduct road reconstruction, and expend extra personnel time and expense for monitoring and reporting — all of which will be accomplished according to the Implementation Agreement (Appendix G). These actions represent either a direct financial expense to the company or an indirect cost in forgone revenue. Indirect costs through lost opportunity to harvest timber are considerable but not easily quantified, and Port Blakely elects not to make those figures public.

The direct costs for preparation of this HCP and accompanying EA were not more than \$250,000, and the estimated direct costs for ongoing implementation of the HCP will be no more than \$3,000,000 on a five-year basis. Port Blakely's stable financial condition stands as an assurance that it has the resources to fund implementation of this HCP. Funding for the costs will come from Port Blakely's continued commercial operations on the ownership. Given conservative estimates of timber markets and projections of future harvest rates under the HCP, Port Blakely estimates that future revenues from timber harvest on the plan area, on the average will exceed \$10,000,000 on a five-year basis. Thus, implementation of the HCP can be comfortably supported by projected revenues from commercial operations on the plan area.

The Chief Executive Officer and General Partner of Port Blakely Tree Farms has represented that the company's forecast of available cash flows can comfortably support this investment and will update and confirm the above estimates at five-year intervals. To this end, Port Blakely has agreed to provide the Services, at the time of reporting of effectiveness monitoring (see Section 5.0), with certifications updating the estimated costs of implementation and the projected revenues.



Section 7.0

ALTERNATIVE
TO PROPOSED
CONSERVATION
MEASURES

7.0 ALTERNATIVE TO PROPOSED CONSERVATION MEASURES

Section 10 of ESA and its implementing regulations require that an HCP discuss alternatives to the proposed take and why any such measures are not proposed. Port Blakely has assessed how such measures could be assembled and the result is a “no action” alternative, where the action is issuing an incidental take permit. In effect, the alternative to the proposed action would require avoidance of taking listed species. Below is a discussion of how this approach would work out “on-the-ground.” Chapter 4 of the accompanying Environmental Assessment discusses the impacts of the respective alternatives on the affected environment.

In order to avoid incidental take of northern spotted owls, Port Blakely would continue to survey for spotted owls and protect suitable habitat within the vicinity of known owl sites. This would continue until a site was considered abandoned under USFWS protocol (i.e., three years of owl absence).

For stands that are not suitable habitat, and for *all* stands outside of the vicinity of known owl sites, Port Blakely would continue timber harvests under the constraints of WAC 222-30-025 (Even-aged harvest — Size and timing). Harvest rates would be primarily determined by rotation age (approximately age 70), with little consideration for maintaining suitable habitat across the plan area. Mature stands that are not suitable habitat at present would not likely reach that condition prior to harvest.

Under this “no action” alternative, spotted owl survey detections are likely to decrease due to landscape-level reductions in suitable habitat. As owl sites move, or more likely, become abandoned, most suitable habitat would eventually be available for harvest. As suitable habitat becomes available, it would likely be harvested.

This scenario would probably result in projected age-class distributions illustrated in Figure 7-1. Current conditions are heavily skewed toward the 50–60 year-old age-class. Thus, with predicted harvests, future age-class distributions would be unlikely to support any new owl sites for several decades; and then the same problem of a heavily-skewed age-class distribution shall present future managers with a dilemma similar to what we have today. By contrast, if the proposed action is adopted, the projected age-class distributions would become more varied over time — this is illustrated in Figure 7-2.

Under the “no action” alternative, Port Blakely would take the necessary precautions to avoid incidental take of marbled murrelets. All potentially suitable marbled murrelet habitat would be surveyed for murrelet presence and/or occupancy using the two-year protocol recommended by USFWS. Upon the conclusion of surveys, a stand of potentially suitable habitat would be eligible for harvest. In order to avoid the risk of future constraints on that timber, such stands would likely be harvested during the year following protocol surveys. As of 1995, there is no known occupancy by marbled murrelets within the plan area. This is following two years of survey in several stands of potentially suitable habitat. If completed surveys indicate no current occupancy, the

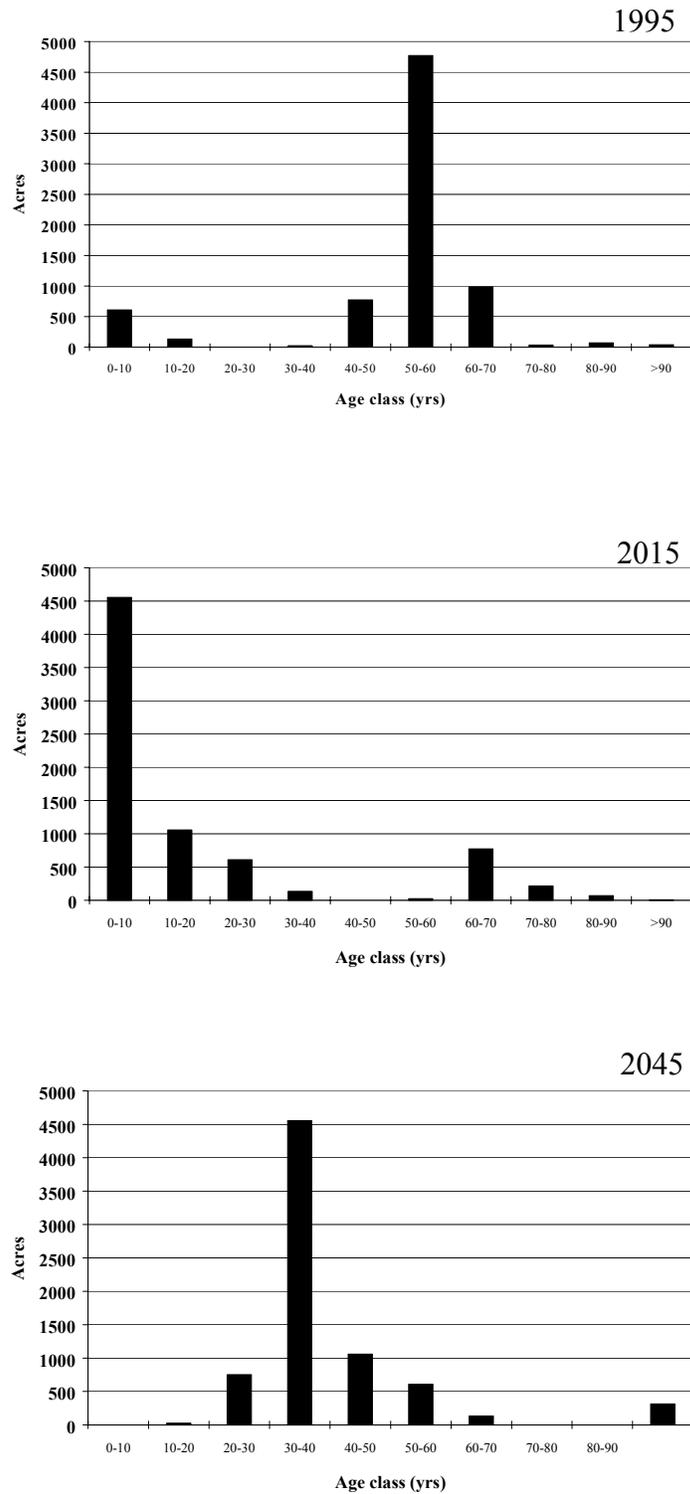


Figure 7-1. Present (1995) and projected (2015 and 2045) forest age-class distribution for the Robert B. Eddy Tree Farm under a “no action” alternative.

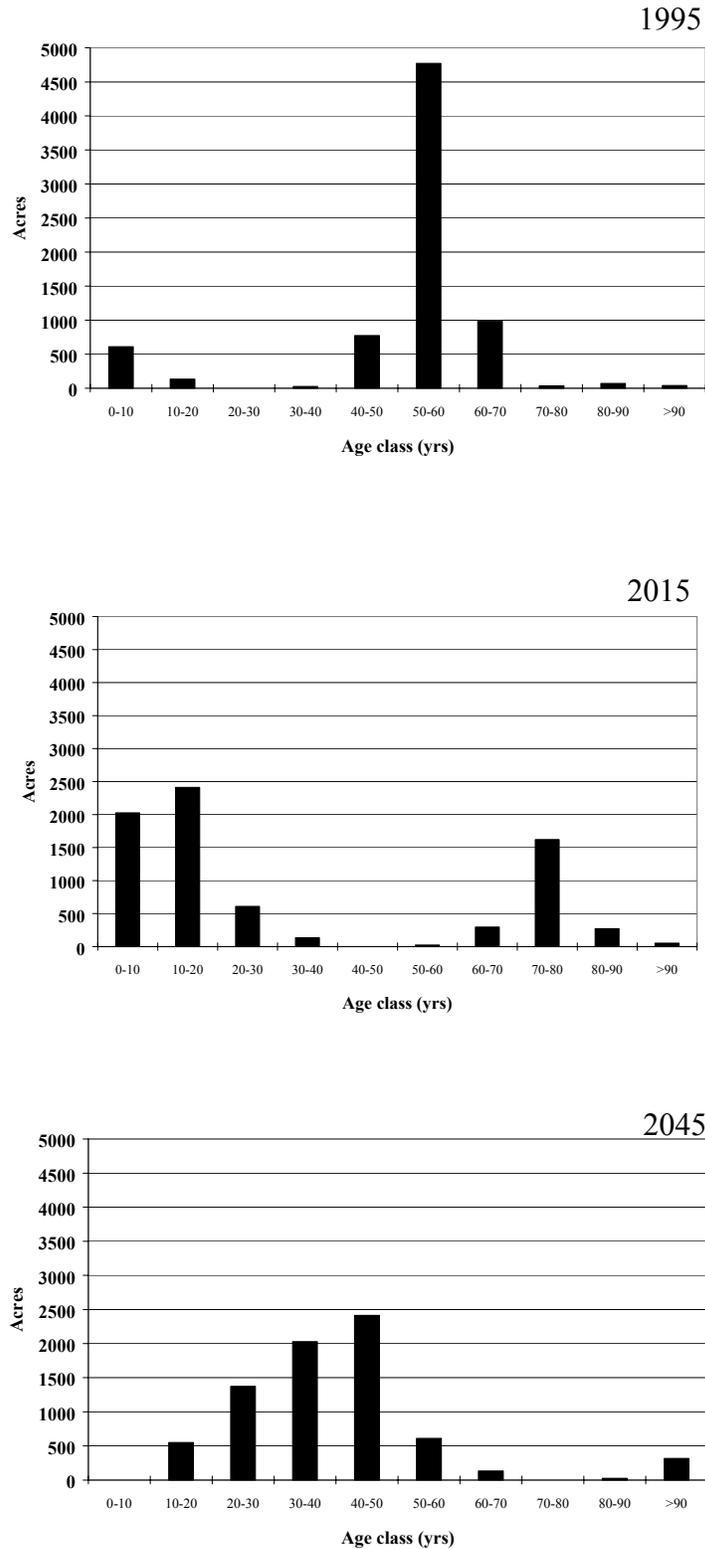


Figure 7-2. Present (1995) and projected (2015 and 2045) forest age-class distribution for the Robert B. Eddy Tree Farm under the proposed harvest scheduling.

immediate harvest of potentially suitable habitat virtually guarantees that there will be no future use by murrelets within the plan area. By contrast, if the proposed action is adopted, some stands of potentially suitable habitat will be deferred from harvest for up to 30 years — this will provide opportunities for murrelet occupancy and use during this time period.

Under the “no action” alternative, Port Blakely would not have an incentive to continue habitat development through thinning, leave-tree retention, and expanded riparian protection. We would continue to meet the needs of some species through following Washington State Forest Practices Rules and Regulations.

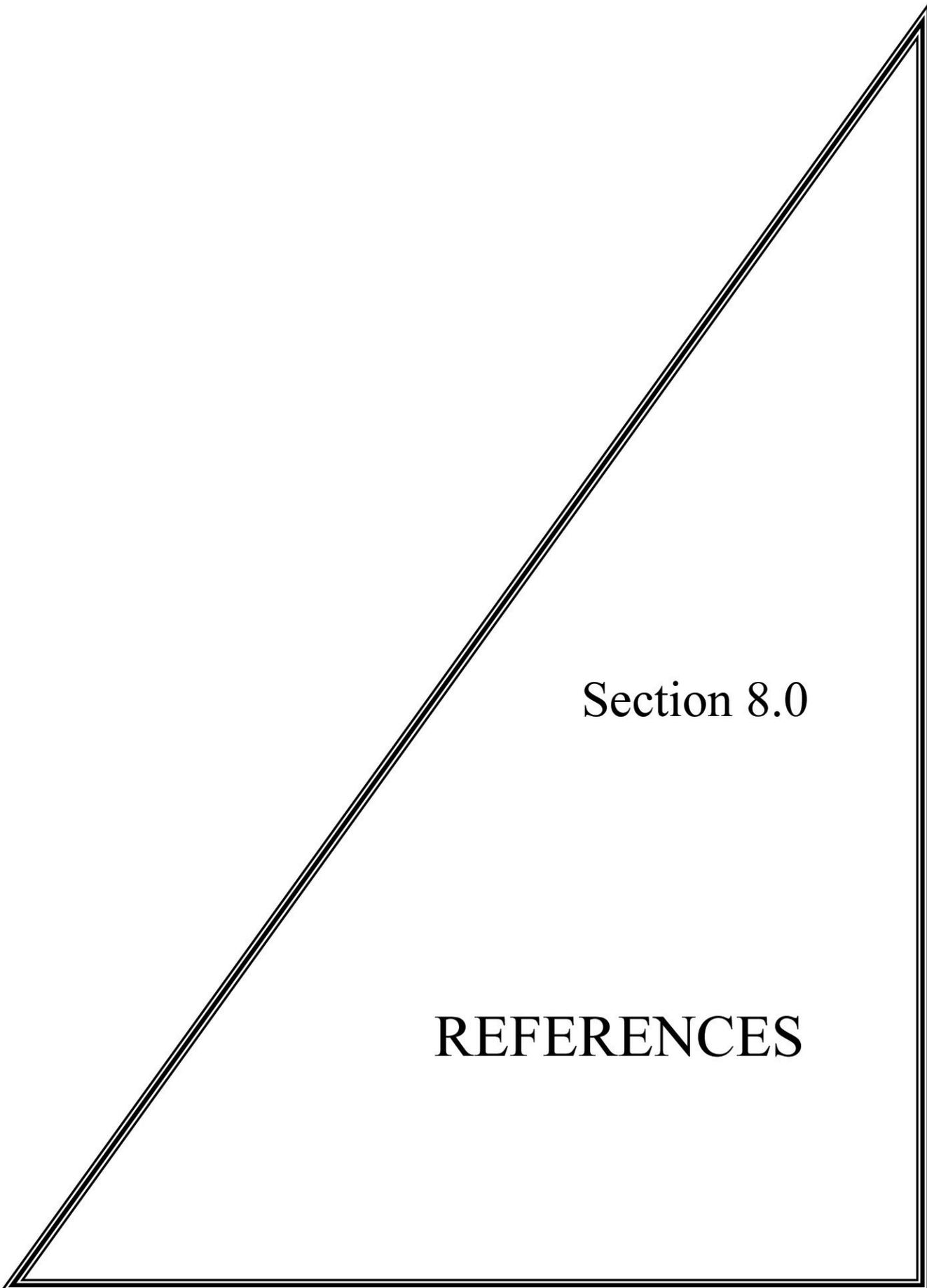
Port Blakely’s riparian strategy under the “no action” alternative would be dictated primarily by current Washington Forest Practices Rules and Regulations. In the absence of steep slopes, these regulations require that Port Blakely leave only a 25 or 50-foot RMZ (depending on stream width) and permit selective harvesting within this zone. Port Blakely would manage harvests of its timberlands on steep slopes so as to avoid mass wasting and excess surface erosion.

Port Blakely does not have sufficient land in any single watershed administrative unit (WAU) to commence watershed analysis under WAC 222. With one exception, neither the other landowners within these WAUs nor the DNR have elected to commence watershed analysis. Whether such an analysis will be conducted in the future is unknown. In the absence of watershed analysis, permits for timber harvest will be analyzed on a case-by-case basis making watershed-wide analyses of the potential effects of any proposed harvest activities difficult and costly.

The plan area contains a number of older roads which if constructed today would require substantial additional measures to protect against surface erosion, mass wasting, and other risks. Under the “no action” alternative, Port Blakely will have no immediate obligation and little economic incentive to improve the condition of these roads.

In general, under the “no action” alternative, Port Blakely would continue to meet the needs of some wildlife species by following Washington State Forest Practices Rules and Regulations. If, and when, additional species occupying the plan area become protected by ESA, Port Blakely would take necessary precautions to avoid incidental take. There would be no apparent incentive, however, to develop management strategies for assuring future conservation for such species.

If Port Blakely proceeds without an HCP, conservation measures described as part of the HCP alternative would not likely be implemented; thus reducing benefits to fish and wildlife. Also, proceeding without the incidental take permit issued for the HCP alternative would result in substantial uncertainty concerning future availability of timber for harvest within the plan area. For these reasons, Port Blakely did not consider alternatives other than “no action” to be viable alternatives to the proposed action of an HCP.



Section 8.0

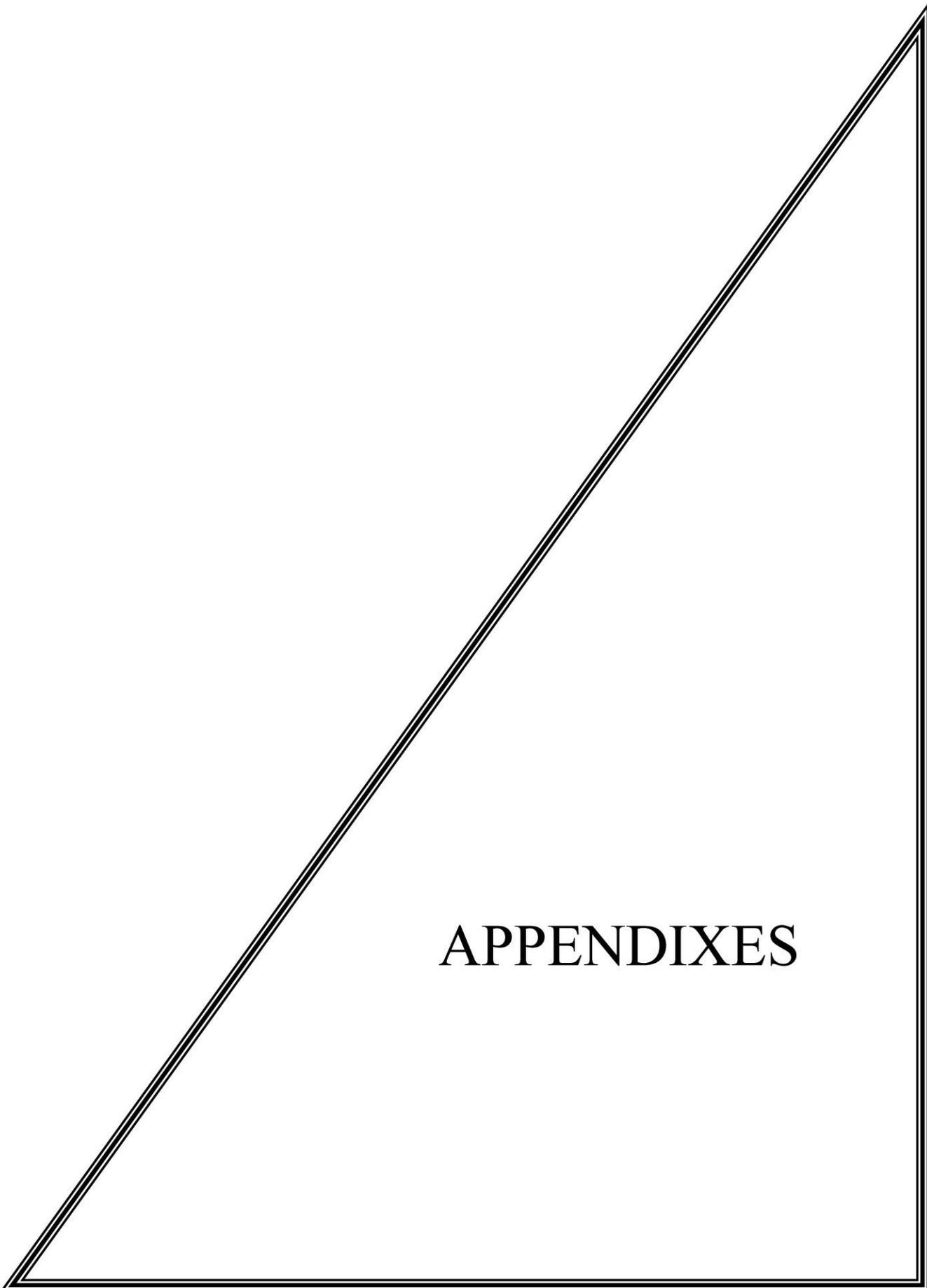
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APPENDIXES

APPENDIX A: FOREST HABITAT EVALUATION

A forest habitat evaluation was conducted across the plan area in 1995 using a combination of forest inventory records and field surveys. Purpose of this evaluation was to reliably quantify forest habitat attributes for determining habitat condition for northern spotted owls, and provide a baseline for subsequent habitat monitoring.

To accomplish this, the plan area was divided into 400 discrete management units.¹ Management units were delineated by roads, habitat type, streams, ridges, property boundaries, and section lines. Habitat features and timber types within a management unit were considered fairly uniform throughout. Each management unit was sampled with counts and estimates made along one, or more, strip transects across the unit (66 feet by 660 feet, 1 acre). Within each unit we recorded canopy closure, snag densities by diameter class (12–20 inches and >20 inches dbh), foliar cover by understory shrubs, and ground cover by LWD (>4 inches diameter). Percent cover by shrubs and LWD were recorded by coverage intervals: 0, 1–5, 5–15, 15–25, 25–60, 60–70, 70–85, and 85–100%. Estimates of shrub and LWD cover were calibrated from measured research plots prior to survey. Stem densities, age height, and diameter distributions were derived from Port Blakely's forest inventory.

Habitat Definition

For identifying and projecting the development of suitable habitat for northern spotted owls, we adopted a definition of young forest marginal (YFM) habitat as defined in the Science Advisory Group report to the Washington State Forest Practices Board (Hansen et al. 1993) — the “SAG report”. The SAG report defines YFM habitat as “...younger forest that provides some of the characteristics spotted owls need for roosting, foraging, and dispersal. Young forest marginal habitat is distinguished by the presence of some of the characteristics that provide roosting opportunities and/or are associated with healthy prey populations.”

The characteristics for YFM habitat are as follows:

1. Conifer dominated.
2. >70% canopy cover.
3. 115–280 trees per acre (>4 inches dbh) with dominant and co-dominant conifers >85 feet in height; or greater than 2 canopy layers [Berger-Parker Index (BPI) >2.2].
4. At least 2 snags per acre (dbh >20 inches, height >12 feet, functional cavity structure); or >10% ground cover by down wood (>10 cm diameter) and shrub cover of 15–70%.

¹ With the exception of riparian and wetland management zones, each management unit will be treated as a homogenous stand.

With one exception,² interval categories for percent cover by shrubs and LWD were adapted to meet interval categories necessary for classifying YFM habitat.

Habitat Classification

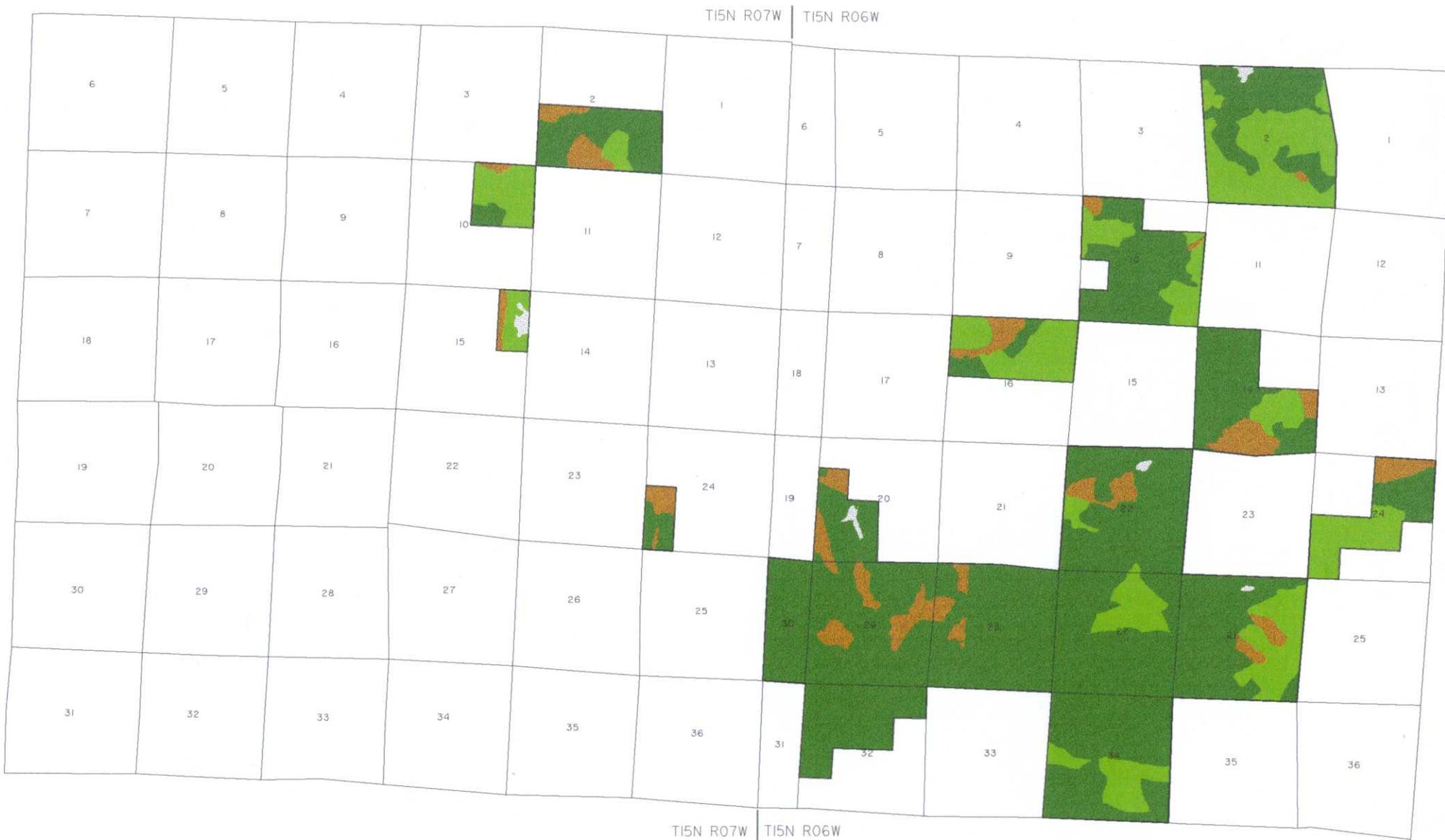
Port Blakely maintains inventory records for the plan area, with the most recent inventory completed in 1993. Although collected and summarized at a scale different than the specific management units used here, these records were useful for determining stem densities, diameter distributions, and dominant species. This information was used in conjunction with the habitat survey data to accomplish the habitat classification using the YFM habitat definitions. These inventory records indicated that approximately 85% of management units on the plan area were currently covered by stands dominated by Douglas-fir and western hemlock. The remainder were dominated by red alder (Figure A-1).

Management units accounting for 6736 acres were sampled. The remainder were either young plantation (<15 years) or were non-forested. All forested stands had canopy closures >70%. Stem densities were variable, with many hemlock dominated stands exceeding the 280 TPA criteria for YFM habitat. Snag densities are presented in Table A-1 along with Figures A-2 and A-3. Only 10% of the plan area had densities of large snags (>20 inches dbh) exceeding the 2 per acre criteria for YFM habitat. Cover by LWD exceeded 15% on approximately 86% of the plan area (Table A-2, Figure A-4). Cover by understory shrubs fell within the 15–70% range on approximately 44% of the plan area (Table A-2, Figure A-5). The combination of LWD cover and shrub cover required for YFM classification was met on approximately 42% of the plan area.

Using the measured combination of factors required for young forest marginal habitat, a set of potentially suitable habitat stands was developed. Those that were considered questionable in either direction (suitable or not) from field notes and site-specific knowledge were revisited. In some cases, management units that were considered to be hardwood dominated in the forest inventories — at one scale — were actually conifer dominated at the management unit scale. Some of these met criteria for YFM habitat. Approximately 36% of the plan area met combinations of habitat criteria required for YFM classification.

The habitat attributes of each management unit remain in a database maintained by Port Blakely and will be expanded and resampled at five-year intervals as part of the monitoring commitment under the HCP. These data will allow overall evaluation of snag recruitment and LWD recruitment, and understory development as influenced by natural succession and silvicultural treatments.

² The required LWD coverage for YFM habitat is >10% (Hansen et al. 1993); however, we used cover categories that broke at 15%. We, therefore, only consider YFM habitat classification when LWD cover exceeds 15%, as opposed to 10%.



Port Blakely Tree Farms

Robert B. Eddy Tree Farm

Figure A-1. Dominant tree species as of 1995.

Source Data:
 Washington State
 Department of Natural Resources (DNR)
 Northwest Aerial Reconnaissance
 Poulsbo, WA

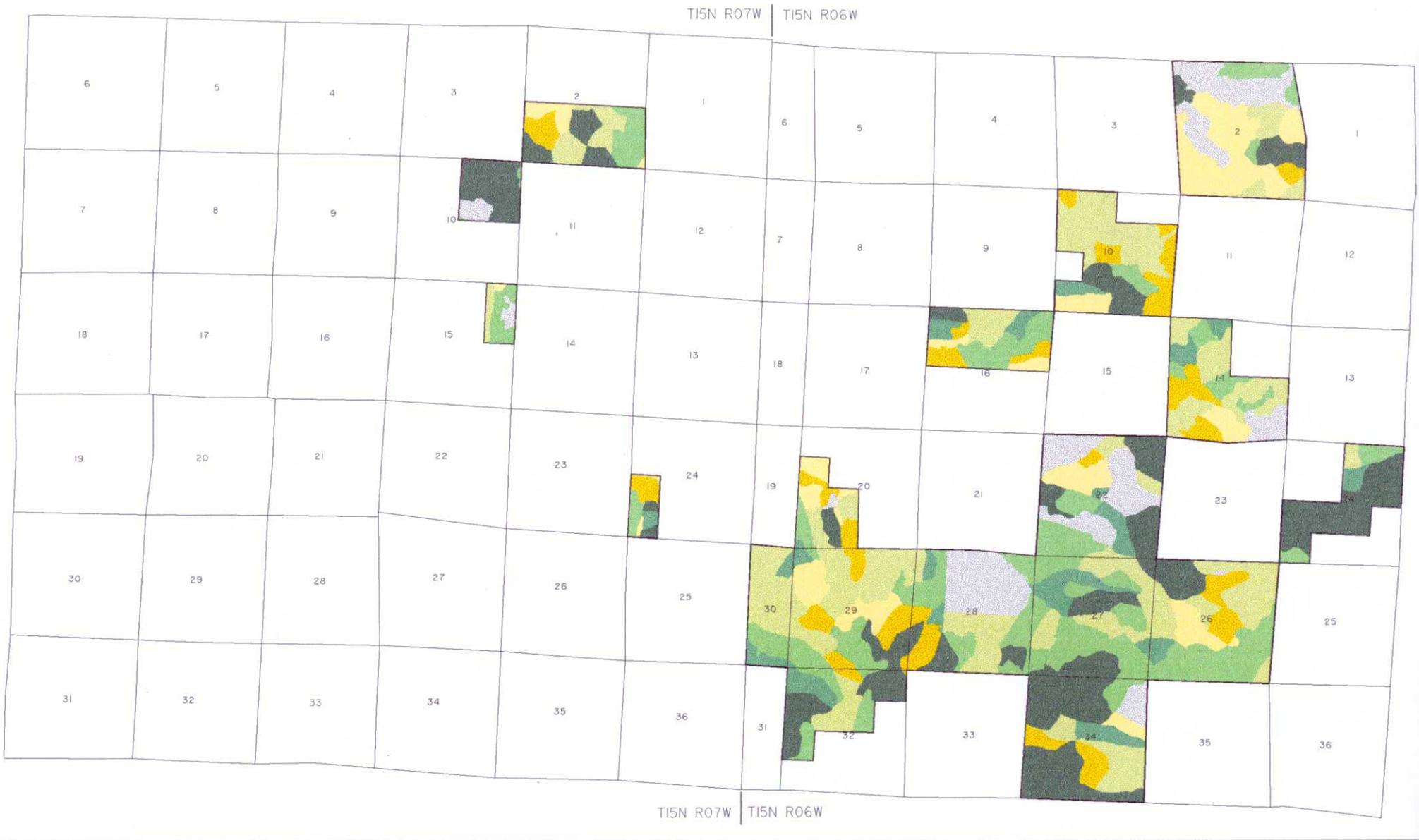


State Plane Projection, Zone 4602
 1927 North American Datum (NAD 27), Clarke 1866 Spheroid

LEGEND

Dominant species

- Douglas fir
- Western hemlock
- Red alder
- Non Forest



Port Blakely Tree Farms

Robert B. Eddy Tree Farm

Figure A-2. Snag densities >12" dbh as of 1995.

Source Data:
 Washington State
 Department of Natural Resources (DNR)
 Northwest Aerial Reconnaissance
 Poulsbo, WA

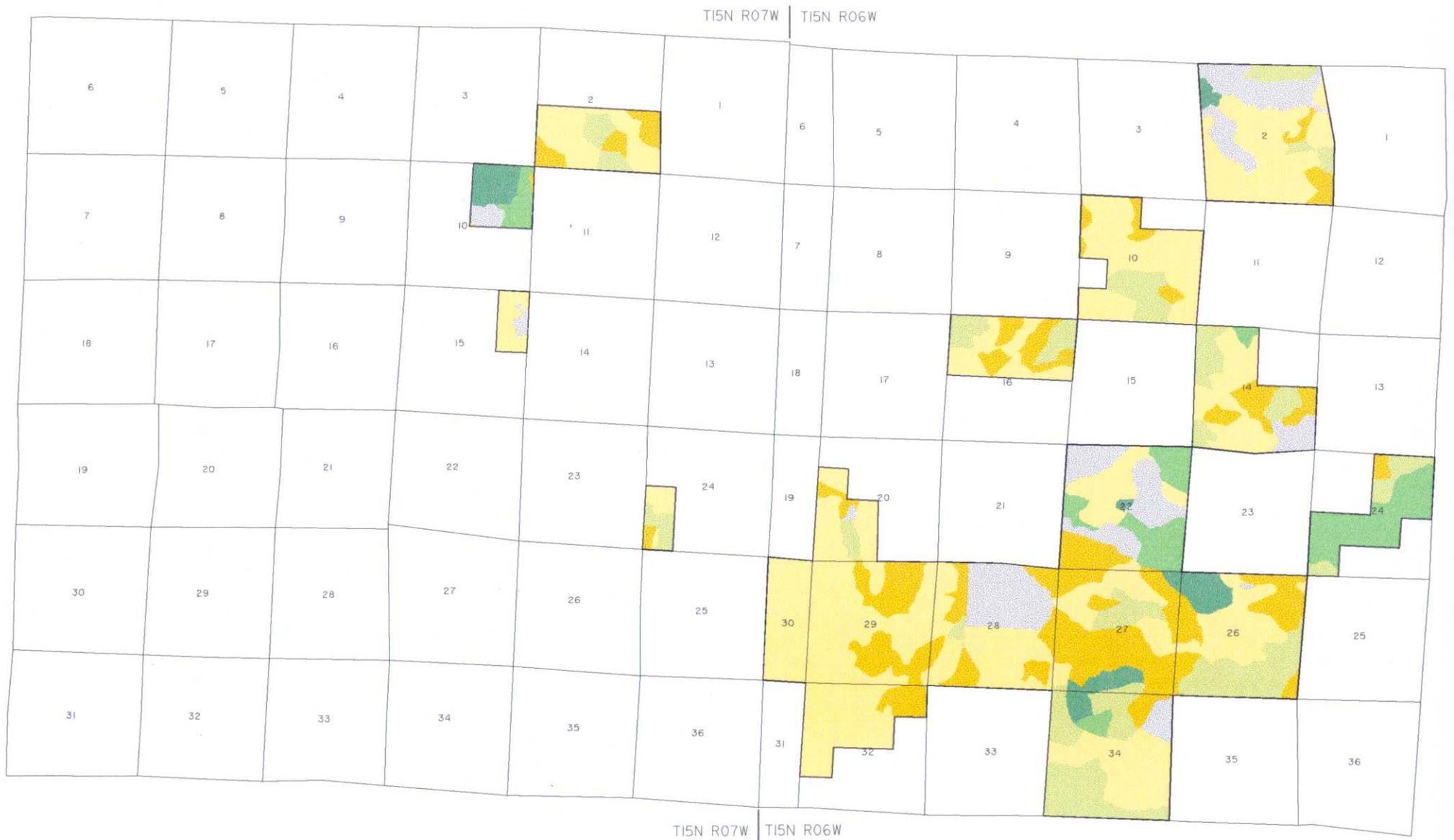


State Plane Projection, Zone 4602
 1927 North American Datum (NAD 27), Clarke 1866 Spheroid

LEGEND

Snags per acre





Port Blakely Tree Farms

Robert B. Eddy Tree Farm

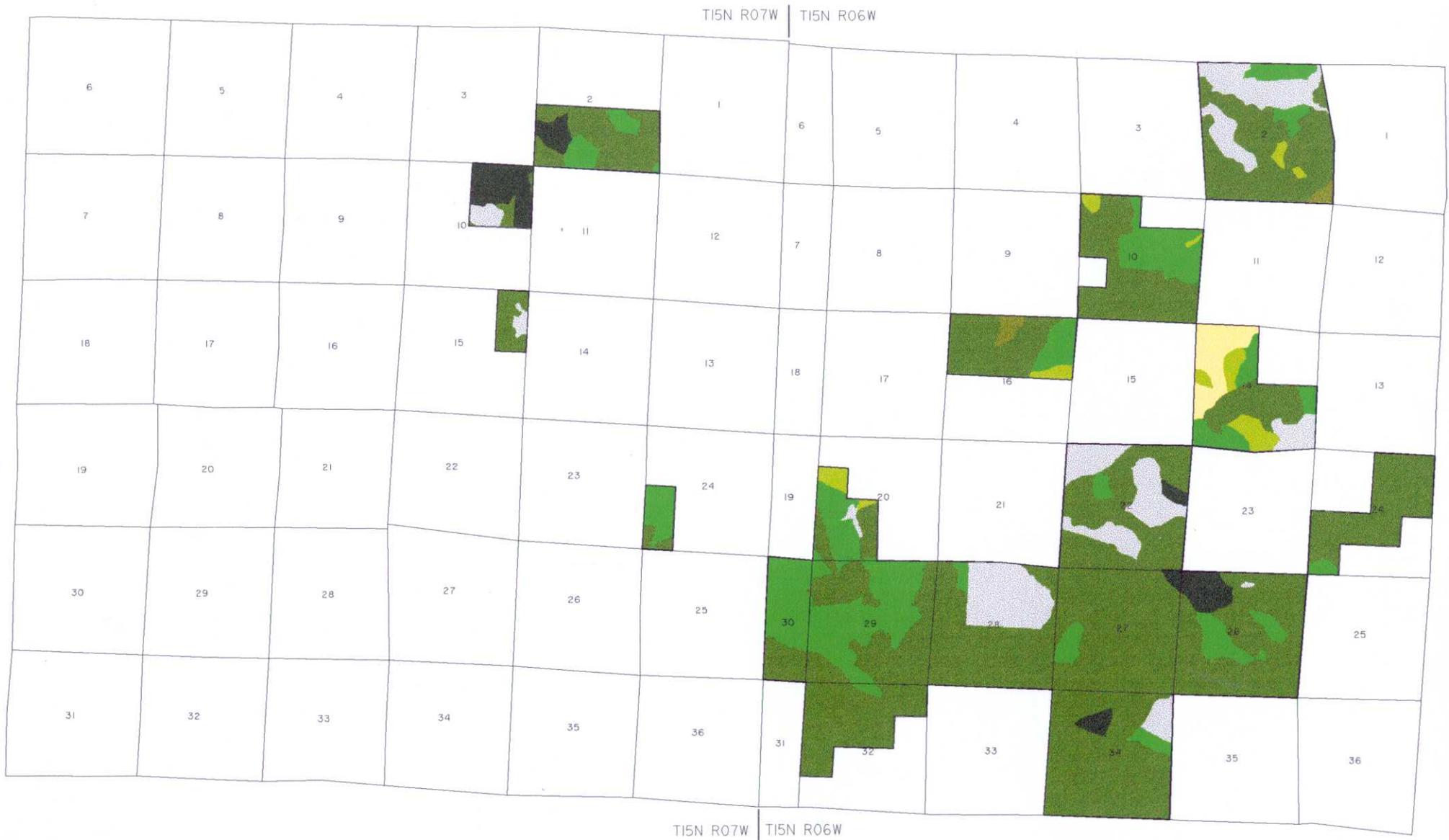
Figure A-3. Snag densities >20" dbh, as of 1995.

Source Data:
 Washington State
 Department of Natural Resources (DNR)
 Northwest Aerial Reconnaissance
 Poulsbo, WA

SCALE
 0 1/4 1/2 1
 SCALE IN MILES
 State Plane Projection, Zone 4602
 1927 North American Datum (NAD 27), Clarke 1866 Spheroid

LEGEND
 Snags per acre

- 0
- < 1
- 1 - 2
- 2 - 3
- > 3
- Not sampled



Port Blakely Tree Farms

Robert B. Eddy Tree Farm

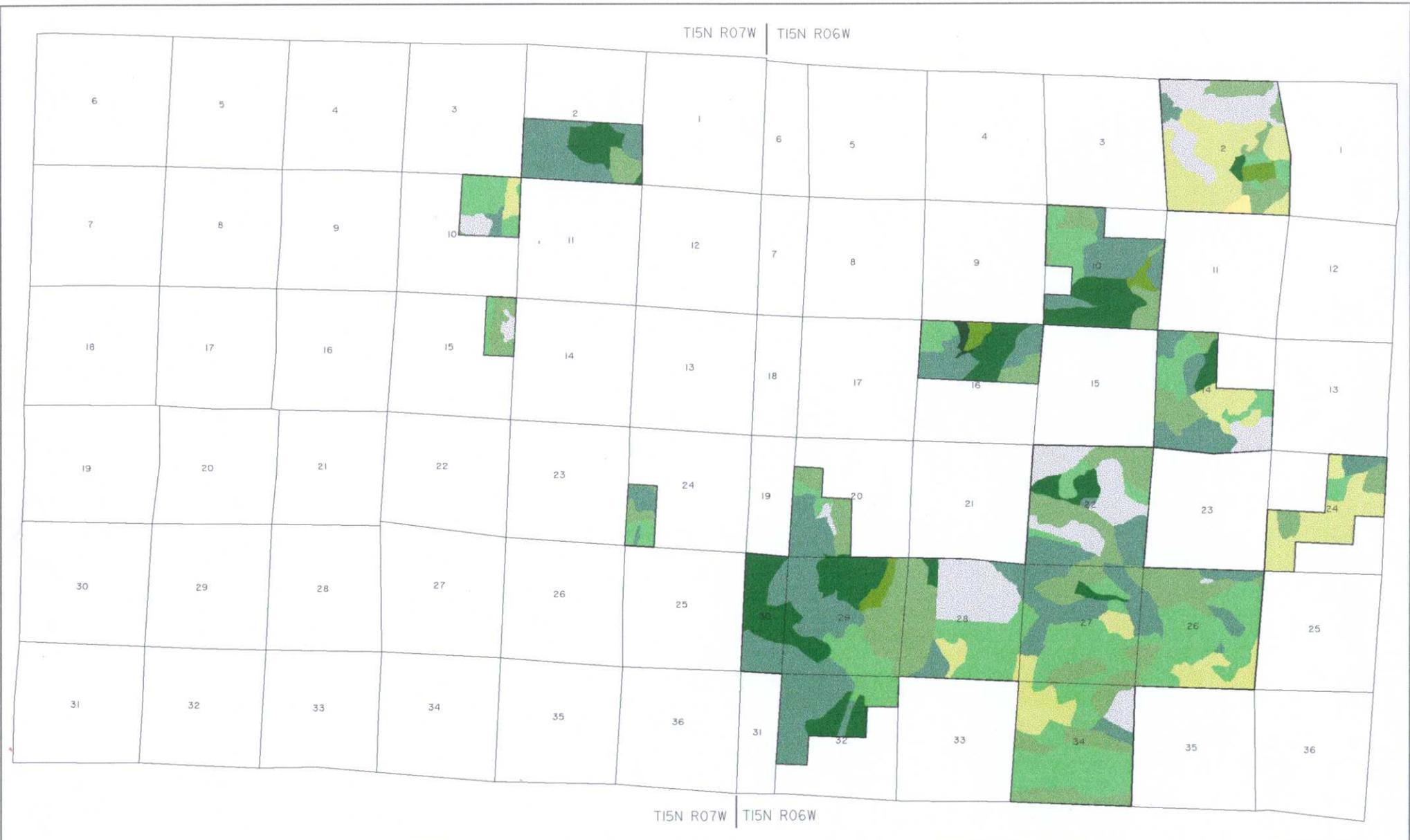
Figure A-4. Large woody debris accumulation, as of 1995.

Source Data:
 Washington State
 Department of Natural Resources (DNR)
 Northwest Aerial Reconnaissance
 Poulsbo, WA



State Plane Projection, Zone 4602
 1927 North American Datum (NAD 27), Clarke 1866 Spheroid





Port Blakely Tree Farms

Robert B. Eddy Tree Farm

Figure A-5. Understory shrub cover as of 1995.

Source Data:
 Washington State
 Department of Natural Resources (DNR)
 Northwest Aerial Reconnaissance
 Poulsbo, WA



State Plane Projection, Zone 4602
 1927 North American Datum (NAD 27), Clarke 1866 Spheroid

LEGEND

Percent foliar cover					
	0		25 - 60		Not sampled
	0 - 5		60 - 70		
	5 - 15		70 - 85		
	15 - 25		85 - 100		

Table A-1. Area (acres) and number of management units (MUs) by snag density class for snags 12–20 inches and >20 inches dbh.

Snag DBH Class (inches)		Snag Density Class (number per acre)					NA
		0	0–1	1–2	2–3	>3	
12–20	Area	881	750	2123	1480	1498	754
	MUs	51	43	122	89	77	18
>20	Area	3470	1400	1103	506	253	754
	MUs	205	76	55	29	17	18

NA=Not analyzed; either young plantation (<15 years), or non-forest.

Table A-2. Area (acres) and number of management units (MUs) within LWD and understory shrub cover classes.

LWD(>4 inches) Cover Classes		Shrub Cover Classes									Total
		0	1–5%	5–15%	15–25%	25–60%	60–70%	70–85%	85–100%	NA	
1–5%	Area	0	0	59	39	25	0	0	0	0	123
	MUs	0	0	3	2	1	0	0	0	0	6
5–15%	Area	0	0	29	53	67	0	10	0	0	160
	MUs	0	0	4	6	2	0	1	0	0	13
15–25%	Area	0	41	125	112	621	50	313	0	0	1263
	MUs	0	3	7	7	37	2	21	0	0	77
25–60%	Area	15	797	1365	1156	1037	25	466	14	0	4874
	MUs	1	48	73	66	58	1	21	2	0	270
60–70%	Area	0	16	0	0	0	22	0	0	0	38
	MUs	0	1	0	0	0	1	0	0	0	2
70–85%	Area	0	49	106	81	39	0	0	0	0	275
	MUs	0	2	7	4	1	0	0	0	0	14
NA	Area	0	0	0	0	0	0	0	0	754	754
	MUs	0	0	0	0	0	0	0	0	18	18
Total	Area	15	903	1685	1440	1790	97	789	14	754	7486
	MUs	1	54	94	85	99	4	43	2	18	400

Note: Gray area designates combination of LWD and shrub cover required for suitable YFM habitat classification.
 NA=Not analyzed; either young plantation (<15 years), or non-forest.

APPENDIX B: MASS WASTING ANALYSIS

Mass wasting analysis will be accomplished by identifying sensitive geomorphic conditions and prescribing actions necessary to minimize management-related slope failures. General characteristics of landforms prone to mass wasting within the plan area are oversteepened (>70%) stream sideslopes and basin headwalls, and saturated convex slopes with >50% gradient.¹ Landforms within each harvest unit will be assigned to risk assessment categories (see below). Then, using the management response matrix (Figure B-1), a prescription will be developed for each unstable area within the unit. When conditions seem marginal between any two risk categories, a geomorphologist, forest engineer, or others qualified in mass wasting assessment will be consulted for management guidance; or the higher risk category will be used — this will be at the discretion of Port Blakely.

<i>Risk Assessment Categories</i>	
<u>Deliverability to surface water</u>	
Low	The unit does not include >30% sideslopes of Type 1-5 streams.
Medium	The unit contains 30-70% sideslopes of Type 1-5 streams.
High	The unit contains >70% sideslopes of Type 1-5 streams.
<u>Potential for Mass wasting</u>	
Low	Concave slopes and low gradient (<50%) sideslopes; or moderate gradient (<70%) sideslopes with no signs of deep-seated failures, shallow-rapid landslides, slumping, soil movement, or sideslope seepage.
Medium	Slightly convex slopes (<50%) having signs of deep seated failures with seepage indicators (e.g., wetland plants); or moderate gradient (50-70%) sideslopes and/or headwalls with seepage indicators.
High	Saturated convex slopes >50% or over-steepened (>70% slope) sideslopes and headwalls, containing wetland plant indicators with signs of deep-seated failures and shallow-rapid landslides; indicators of recent soil movement (e.g., pistol-gripped butts on conifers).

¹ These are characteristics unique to the geology of the plan area, having been identified through field inspection as characteristics associated with past slope failures.

		<u>Deliverability to surface water</u>		
		Low	Medium	High
<u>Potential for mass-wasting</u>	Low	SFP	SFP	PS, ESM
	Medium	SFP	FS ESM	FS, VM ESM, PH
	High	FS, ESM, VM	FS, VM ESM, PH	No harvest zone

Figure B-1. Management response matrix.

Management Actions

ESM = Exposed Soil Management: Minimizes potential for mass wasting by developing a grass or hay layer over exposed soils; reduces potential for shallow-rapid landslides initiated by surface erosion.

Prescription: Spread hay or straw with perennial grass seed. May include hydramulching in road-accessible areas.

VM = Vegetation Management: Minimizes potential for mass wasting by maintaining existing root structure on harvested red alder and bigleaf maple, and by maintaining brush and shrub cover. Healthy root structure contributes to soil cohesion reducing the potential of shallow-rapid landslides.

Prescription: No site preparation or herbicide treatment on unstable area. Plant shade-tolerant conifers.

FS = Full Suspension: Minimizes potential for mass wasting by eliminating yarding-related soil disturbance and compaction. Maintains shrub and slash cover on unstable areas thus reducing the potential for surface erosion and shallow-rapid landslides.

Prescription: Logs will be fully suspended off the ground while yarding through the unstable area.

PS = Partial Suspension: Minimizes potential for mass wasting by reducing yarding-related soil disturbance and compaction. Minimizes disturbance of shrub and slash cover on unstable area.

Prescription: Logs will be partially suspended off the ground while yarding through the unstable area.

SFP = Standard Forest Practices: Logging will follow standard Washington DNR Forest Practices.

PH = Partial Harvest: Minimizes the potential for mass wasting by maintaining tree canopy and live root structure within unstable area.

Prescription: Harvest within area of potentially unstable slope will retain >60 TPA conifer or >100 sq.ft. basal area dominated by conifer.²

² Retention prescription is the same as for managed conifer RMZs -- see Section 4.343 for rationale.

APPENDIX C: ROAD MAINTENANCE PLAN

The road maintenance plan identifies concerns for surface erosion and mass wasting for each road segment within a stream basin on the plan area. Management actions are described for eliminating the problem, and/or minimizing the likelihood of sediment delivery to surface waters. All roads have been inspected by a forest engineer to identify existing road conditions which have the potential to contribute silt and sediment to surface waters. Location, specific problem and appropriate management response were identified and are presented below. Roads with highest risk for delivering sediment to surface waters will be targeted for earliest management action.

Management ¹ Basin	Road Segment	Pr - Problem M - Management Response
Upper Raimie	1	<p>Pr: Standing water on north side of road.</p> <p>M: Install two additional 18-inch by 26-foot crossdrains.</p>
Upper Raimie	2	<p>Pr: No guard rails on Raimie Creek Bridge creates a safety concern. Ten foot bridge width is too narrow for safe log hauling.</p> <p>M: Redeck bridge to 14 foot width using treated wood, 18-inch guardrails, and continuous wood surface to prevent sediment entry.</p> <p>Pr: Steep adverse grade with inadequate crossdrains. Inadequate surface for logging traffic.</p> <p>M: Install three additional crossdrains with settling ponds and energy dissipaters. Surface with 6 inches of 3-inch-minus rock before hauling.</p>
Upper Raimie	4	<p>M: Existing road upgraded summer of 1994 in conjunction with new road construction in the area. 40 yard-per-station spread of 2-inch-minus crushed rock applied as running surface to the existing ballast. Additional crossdrains installed where needed.</p>

¹ Management basins and segment numbers refer to the Basin Planning map (Figure C-1).

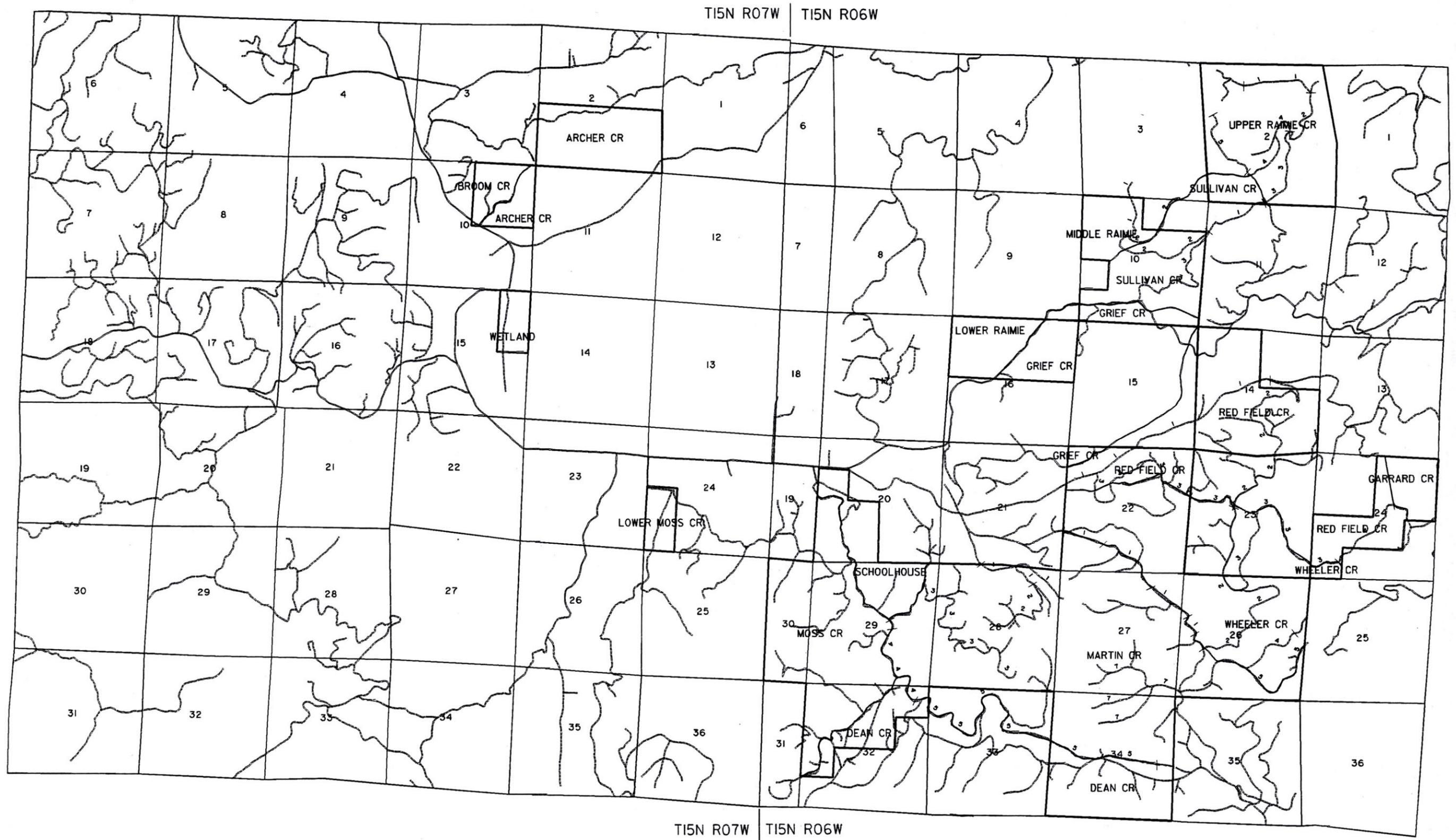
Management Basin	Road Segment	Pr - Problem M - Management Response
Upper Raimie	5	<p>Pr: Dirt road on steep sidehill using endhaul construction methods with minimal volume accessed by the system.</p> <p>M: Construct impassable waterbars until harvest in period 1. After harvest, road segment will be waterbarred, culverts removed and road bed either seeded with a mixture of rye and clover or surfaced with 6 inches of rock</p>
Sullivan Creek	1	<p>Pr: Undersized culvert (24 inches) placed in Type 4 tributary to Sullivan Creek. Insufficient curve radius to allow Lowboy traffic over culvert. DNR property. Direct entry of ditchwater into stream.</p> <p>M: Replace existing pipe with 48-inch by 70-foot. aluminized culvert. Fill inside corner to obtain a 60 degree radius curve with clean pitrun rock from Redfield Creek pit. DNR permission needed to begin project; HPA may be needed. Crossdrains installed on both sides of crossing to deliver ditchwater onto forest floor.</p>
Sullivan Creek	2	<p>Pr: Cutslope failure occurred winter of 1994/95 due to oversteepened slope caused by 1993 Weyerhaeuser reconstruction of switchback. DNR property; approximately 1500 cubic yards of material require endhaul.</p> <p>M: Consult with Weyerhaeuser on project timing and waste area site.</p>
Sullivan Creek	3	<p>M: Two additional cross drains needed on the grade paralleling Sullivan Creek.</p>
Middle Raimie Cr.	1	<p>M: No extraordinary maintenance needed. Future road construction planned in NW¼, Section 10.</p>

Management Basin	Road Segment	Pr - Problem M - Management Response
Middle Raimie Cr.	2	M: Old road grade will require reconstruction.
Lower Raimie Cr.	1	M: The existing road subgrade was summer of 1994. Ballasting is needed using 3-inch-minus rock from Redfield Creek pit.
Grief Creek	1	M: Future road construction is planned in the east half of section 16 tying into Weyerhaeuser's road system in section 15.
Redfield Creek	1	Pr: The road is adjacent to Redfield Creek which increases the potential for delivered siltation from truck traffic if it is used as a haul route during the rainy season. There are no guardrails on the bridge over Redfield creek. The crossdrains are in excellent condition after being reconstructed in 1991. M: Limit the transportation of Port Blakely logs to the summer months only. Construct guardrails on the bridge. Top road with 5 inches of 1-3/4 inch rock.
Redfield Creek	2	M: Road was reconstructed in 1991. Adequate crossdrains were installed with 4-inch ballast covering the subgrade. Road segment requires 1-3/4 inch topping rock >3 inches in depth. Segment spurs were constructed in 1992 to acceptable new road standards.
Redfield Creek	3	M: Road segment constructed in 1991 using acceptable construction methods.
Redfield Creek	3	PR: Old railroad grade is impassable and has inadequate drainage. M: Reconstruction to bring this road segment up to acceptable new road standards.

Management Basin	Road Segment	Pr - Problem M - Management Response
Wheeler Creek	1 (M-600)	<p>Pr: Inadequate surface drainage. Ditches filled from cutslope sloughing.</p> <p>M: Four additional 18-inch crossdrains are needed to decrease ditchwater flow. Clean and end-haul ditch material. Seed or hay exposed soils.</p>
Wheeler Creek	2 (H-line)	<p>Pr: Old railroad grade reconstructed in the 1970's. Inadequate crossdrain densities where grade traverses steep and unstable sideslopes having degradable ballast rock. Direct entry of ditchwater into Type 4 and 5 streams. Wheeler Creek crossing has a perched culvert blocking fish passage.</p> <p>M: Six additional 18-inch crossdrains are needed to minimize surface erosion into streams. Road system needs an additional 6-inch lift of 2-inch-minus surface rock. Replacement of culverts to allow fish passage has potential for indirect impacts to sensitive amphibians — USFWS and NMFS will be consulted prior to replacement of culvert.</p>
Wheeler Creek	3	Old railroad grade that requires reconstruction.
Wheeler Creek	4	<p>Pr: Road segment is a reconstructed railroad grade with the last portion crossing a high gradient Type 5 stream. Old puncheon failed causing a debris torrent; inadequate cross drains.</p> <p>M: The failed crossing requires stabilization. Three 18-inch crossdrains will be installed.</p>
Wheeler Creek	5	No extraordinary maintenance required.
Martin Creek	1	Road segment requires brushing and catch-basins on crossdrains.

Management Basin	Road Segment	Pr - Problem M - Management Response
Martin Creek	2	<p>Pr: Sidecast construction methods were used on slopes >55% resulting in cutbank failures in two areas. Inadequate crossdrain density.</p> <p>M: Option #1: Abandon sidehill portion of road segment, and tie the upper portion to the ID team road. Culverts would be removed, impassable waterbars would be constructed and all exposed soil that could deliver sediment to flowing water would be covered with hay.</p> <p>Option #2: Reconstruct existing road segment and endhaul the slumps, install additional crossdrains and clean out ditchlines.</p>
Martin Creek	3	<p>Pr: Road segment constructed in 1990 on steep and unstable slopes, using extensive endhaul construction with full bench subgrade. Road prism is sound with adequate drainage, but cutslope gravel has plugged the ditches.</p> <p>M: Ditches will be cleaned biennially.</p>
Martin Creek	4 (G-line)	<p>Pr: Fill failure at the beginning of the segment; inadequate drainage.</p> <p>M: Relocate centerline into hill (endhaul construction) expanding road width. Install three additional 18-inch crossdrains.</p>
Martin Creek	5	<p>Pr: Inadequate crossdrains density. Railroad grade fill at east end of section 34 on G-1000 needs culvert.</p> <p>M: Install three 18-inch crossdrains on mainline and two on the ridge spur.</p>
Martin Creek	6	<p>Pr: Subgrade constructed in 1990, but was never ballasted.</p> <p>M: Road segment will receive ballast and surfacing.</p>

Management Basin	Road Segment	Pr - Problem M - Management Response
Martin Creek	7	Pr: System constructed in 1991 using poor quality rock for ballast. M: Road segment requires topping rock before heavy use.
Martin Creek	8	Pr: Active mainline (H-line) with two puncheon drains on steep sideslopes. M: Requires 18-inch culverts in each puncheon fill.
Dean Creek	1	M: The spurs in section 34 require additional rock ballast and crossdrains. The railroad fills need culvert installations. Section 32 has three railroad fills that also require culverts and stabilization.
Moss Creek	1	Road segments constructed in 1993 and ballasted summer of 1995. Crossdrains and slopes are in excellent condition.
Archer Creek	1	Pr: Spurs constructed in 1995 and cut and fill slopes were covered with hay. Road segments need surfacing. M: Surface road segments summer of 1996.
Broom Creek	1	Pr: Roads do not have adequate surfacing for clearcut harvesting during rainy season. M: Surface before harvesting.

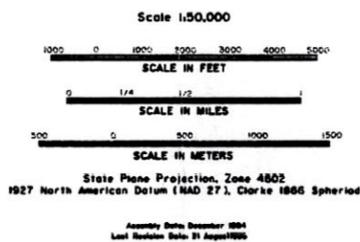


Port Blakely Tree Farms
Robert B. Eddy Tree Farm

Figure C-1. Road network and stream basin planning map.

Source Data:
Washington State
Department of Natural Resources (DNR)
Northwest Aerial Reconnaissance
Poulsbo, WA

Prepared By:
Terrain Resources Ltd.
Lethbridge, AB
Canada



Legend

- Stream Basin
- County Roads
- Secondary Roads

APPENDIX D: RIPARIAN LANDFORMS

Our use of riparian landforms is intended to provide consistent application of site-specific riparian management prescriptions. Here we make the assumption that characteristic combinations of channel gradient, channel confinement, channel width, sideslope gradient, and geology tend to repeat themselves within a basin. Furthermore, we assume that these are the primary factors governing rates and processes of LWD recruitment into stream channels. Our objective is to define the area from which the major portion of in-channel LWD is likely to originate — this being unique to a landform — and provide guidance for RMZ boundaries based on geomorphic features that govern LWD recruitment processes.

Channel Network¹

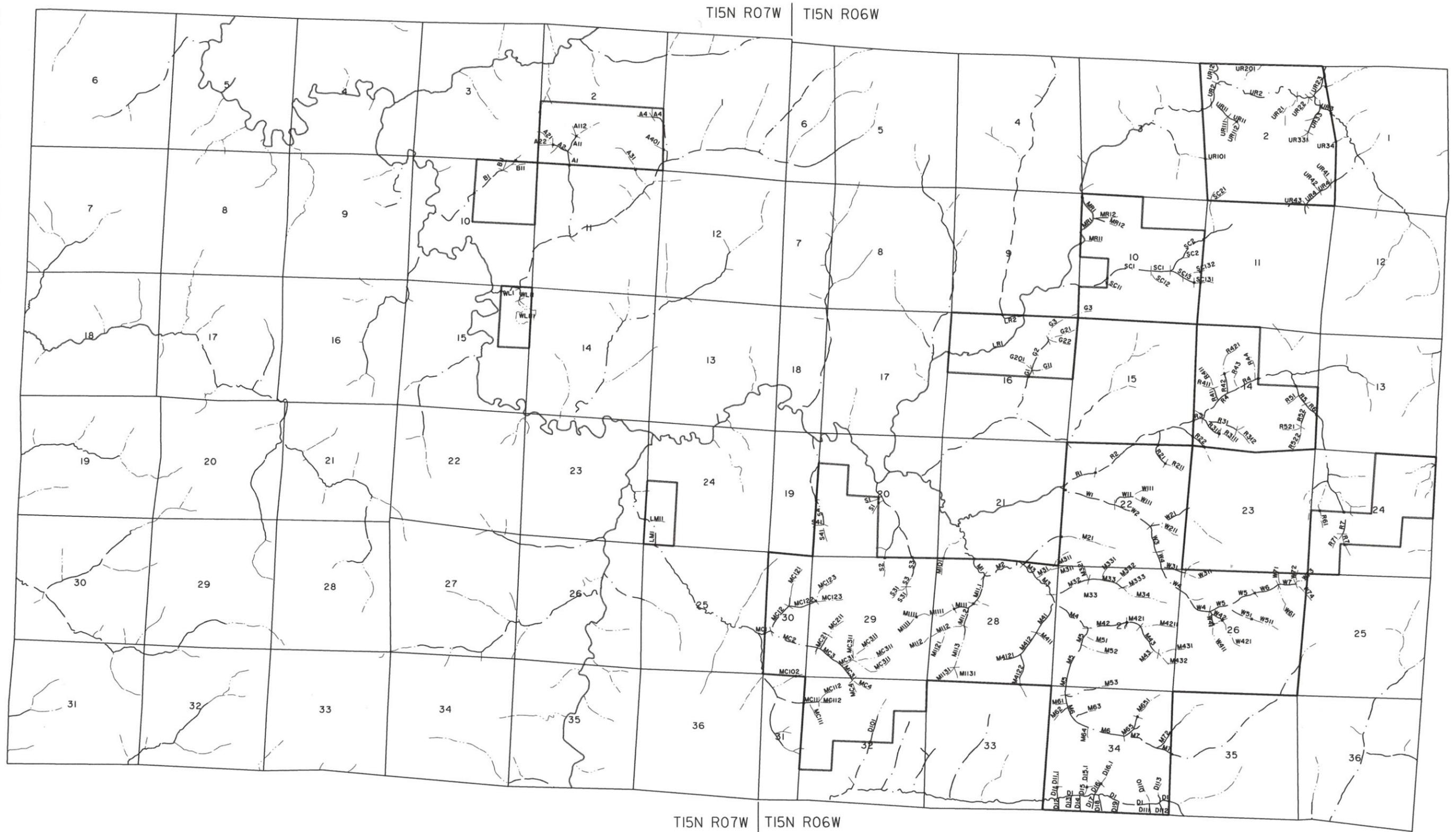
There are approximately 45 miles of perennial streams within the Plan Area — 57% of which are known to be fish-bearing (Figure D-1). Small DNR Type 3 waters account for >80% of the fish-bearing stream mileage.

Channel Response Categories

The channel network on the plan area was categorized in terms of a channel response matrix per Washington Forest Practices: Standard Methodology for Conducting Watershed Analysis (Version 2.1). Combinations of channel gradient and channel confinement (Tables D-1 and D-2) were used to divide stream segments into the channel response categories. Most stream segments (>50%) were known from on-site visits, and were used to cross-check classification from 1993 aerial photos and contour maps derived from USGS Digital Elevation Models.

Channel classification resulted in 194 stream segments within 10 channel response categories (Table D-3). Of these, 67% were high-gradient (>8% slope) with total channel confinement; thus illustrating the influence of the steep, highly dissected terrain dominating the plan area.

¹ Channel network of the Plan area was defined through combination of DNR data and extensive field verification while conducting forest inventory and road construction. All stream data are maintained on a GIS database.

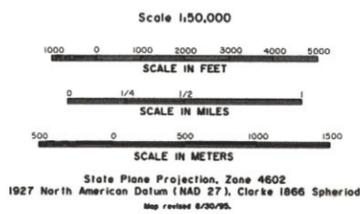


Port Blakely Tree Farms
Robert B. Eddy Tree Farm

Figure D-1. Channel segments delineated for perennial stream network.

Source Data:
Washington State
Department of Natural Resources (DNR)
Northwest Aerial Reconnaissance
Poulsbo, WA

Prepared By:
Terrain Resources Ltd.
Lethbridge, AB
Canada



- Streams (Type 1)
- Streams (Type 2)
- Streams (Type 3)
- Streams (Type 4)

Table D-1. Channel gradient categories used for Channel Response classification.

Gradient	% Slope
Low I	<1
Low II	1-2
Moderate I	2-4
Moderate II	4-8
High I	8-20
High II	>20

Table D-2. Channel confinement categories used for Channel Response classification.

Channel Confinement	Valley width (VW): Channel width (CW) ratio
Confined	$VW < 2CW$
Moderately confined	$2CW < VW < 4CW$
Unconfined	$VW > 4CW$

Riparian Landforms

Within each channel response category there is variability in the sideslope formation and local geology. We used these factors to further identify riparian landforms that more accurately describe drainage systems and shape of the terrain. This classification resulted in several riparian landforms within each channel response category. Some of these were similar enough among two or more channel response categories to be summarized with respect to management strategy (riparian boundaries). This resulted in ten basic riparian boundary prescriptions. Each combination of boundary prescription and channel response category represents a separate riparian landform (see Table D-3). In other words, due to multiple riparian landforms being identified within each channel response category, more than one prescription is indicated for each combination of channel gradient and confinement. In practice, choice of prescription will require site-specific inspection to determine riparian landform; this is most effectively accomplished during lay-out of harvest units.

Table D-3. Channel response matrix for riparian landforms within the Plan area.

	Channel gradient %					
	<1	1-2	2-4	4-8	8-20	>20
Unconfined	2 segments 0.45 miles <i>Prescription</i> ¹ I, II	10 segments 3.54 miles <i>Prescription</i> I, II, III, IV, VII	7 segments 2.45 miles <i>Prescription</i> I, II, VII	1 segment 0.17 miles <i>Prescription</i> I, II, VII		
Moderately Confined			5 segments 1.76 miles <i>Prescription</i> I, V, IV, VII	29 segments 7.57 miles <i>Prescription</i> I, V, VI, VII	6 segments 1.66 miles <i>Prescription</i> VII, VIII, IX, X	
Confined				4 segments 1.0 miles <i>Prescription</i> VIII, IX, X	24 segments fish-bearing 5.20 miles <i>Prescription</i> VII, VIII, IX, X 29 segments not fish-bearing ² 6.18 miles	77 segments not fish-bearing 14.3 miles

¹Prescriptions refer to Riparian Management strategies described in text and figures D-2 to D-7.²Riparian management for streams that are not fish-bearing are covered by Mass Wasting (Appendix B) and habitat refugia prescriptions (Section 3.5332)

Riparian Boundary Prescriptions

Riparian boundary prescriptions, described below, define the area within which riparian forest management specifications of Section 3.533 will be applied.² Prescriptions appropriate for the landforms within the channel response categories are noted in Table D-3. The following boundary prescriptions are accompanied by riparian landform profiles that illustrate the RMZ boundaries and prescriptions (Figures D-2 to D-7).

Prescription I, Figure D-2.

Prescription I includes harvest of all hardwoods from the area adjacent to the stream channel, outside of a 25 foot no-harvest zone.³ In general, this prescription is appropriate where hardwood (e.g., red alder) has become the dominant overstory tree (>70%), and where sideslopes are <50% and channel gradients are <8%. Elsewhere, sideslopes are likely prone to slope failure. Channels are unconfined, or moderately confined. Primary mechanisms of LWD recruitment in these riparian landforms are by bank undercutting and windthrow.

Prescription II, Figure D-2.

Prescription II includes retention of a 100 foot RMZ, including a 25 foot NHZ, measured from the edge of a channel migration zone (CMZ) along unconfined channels with <8% gradient. Sideslopes are generally of low-gradient in these landforms, with very little opportunity for a major slope-break. Primary mechanisms of LWD recruitment in these riparian landforms are by bank undercutting and windthrow.

Prescription III, Figure D-3.

Prescription III includes retention of an RMZ ranging from 50 feet to 200 feet with a 100 foot average, including a 25 foot NHZ, measured from the edge of seasonally inundated wetland vegetation resulting from downstream beaver-dam(s). This riparian landform is currently restricted to a few low-gradient (<2%) portions of Dean, Martin, and Raimie Creeks. Sideslopes are generally of low gradient, with little or no canopy-closure over the stream channel. Primary mechanisms of LWD recruitment in these riparian landforms are by deadfall, beaver activity, and windthrow.

² Stream channels are not necessarily composed of the same riparian landform on both sides of the channel. In the field, each side of these “mixed” riparian landforms will receive separate prescriptions.

³ This prescription includes establishment of shade-tolerant conifers as specified in Section 3.533.

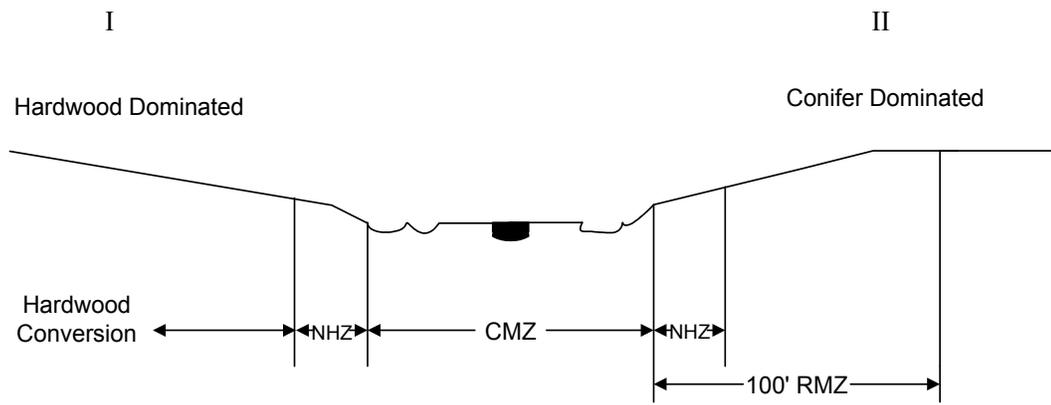


Figure D-2. Riparian boundary prescriptions I and II.

Prescription IV, Figure D-3.

Prescription IV includes retention of an RMZ ranging from 50 feet to 100 feet with a 75 foot average, including a 25 foot NHZ, measured from the edge of seasonally inundated wetland vegetation resulting from downstream beaver-dam(s). The only difference between landforms receiving prescriptions III and IV is a larger area of open water (>5 acres) in the former. Primary mechanisms of LWD recruitment in these riparian landforms are by deadfall, beaver activity, and windthrow.

Prescription V, Figure D-4.

Prescription V includes retention of a 100 foot RMZ, including a 25 foot NHZ, measured from the edge of a channel disturbance zone or CMZ along moderately confined channels with <8% gradient. These riparian landforms are characterized by uninterrupted sideslopes of 50–70%, but do not have high potentials for mass wasting. Primary mechanisms of LWD recruitment in these riparian landforms are by natural treefall, windthrow, and bank undercutting.

Prescription VI, Figure D-4.

Prescription VI includes retention of an NHZ extending from the edge of a channel disturbance zone (CDZ) or CMZ along a sloping valley floor (>50 feet wide) to the toe of an adjacent sideslope. The sloping valley floors of these riparian landforms are composed of colluvium from small (<1/2 acre) shallow rapid slope failures. The NHZ will be extended onto adjacent sideslopes to encompass seeps and springs — potential sources of future slope failures. Primary mechanisms of LWD recruitment in these riparian landforms are by mass wasting, and bank undercutting.

Prescription VII, Figure D-5.

Prescription VII includes retention of an RMZ extending from the edge of ordinary high water mark (OHWM) to a slope-break of >20% on the adjacent sideslope. The RMZ includes a 25 foot NHZ measured from OHWM. These riparian landforms are common along second- and third-order tributaries having confined, moderate to high-gradient channels. Primary mechanisms of LWD recruitment in these riparian landforms are by windthrow and natural treefall from the adjacent sideslopes.

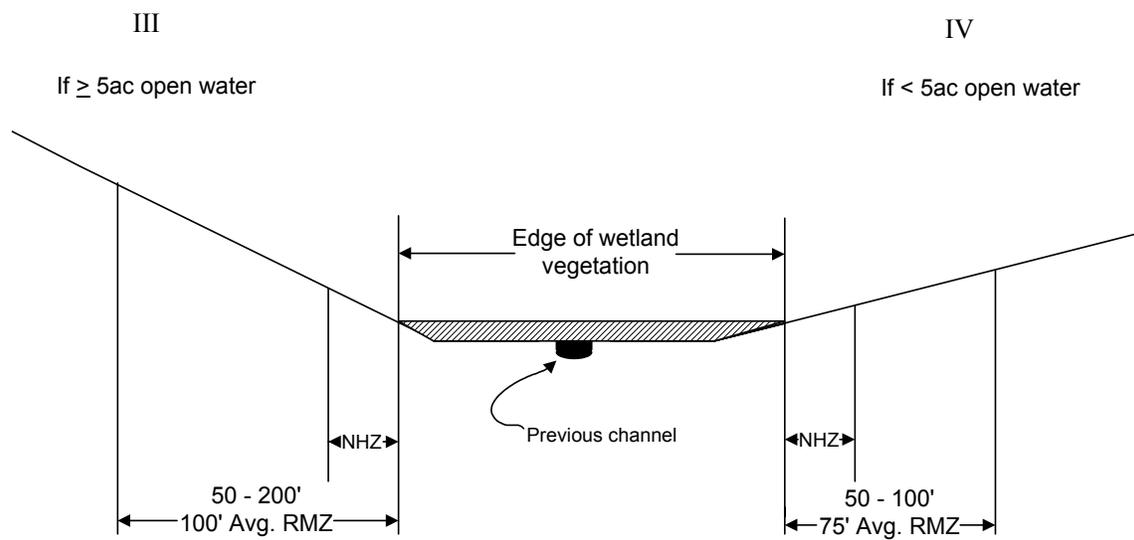


Figure D-3. Riparian boundary prescriptions III and IV.

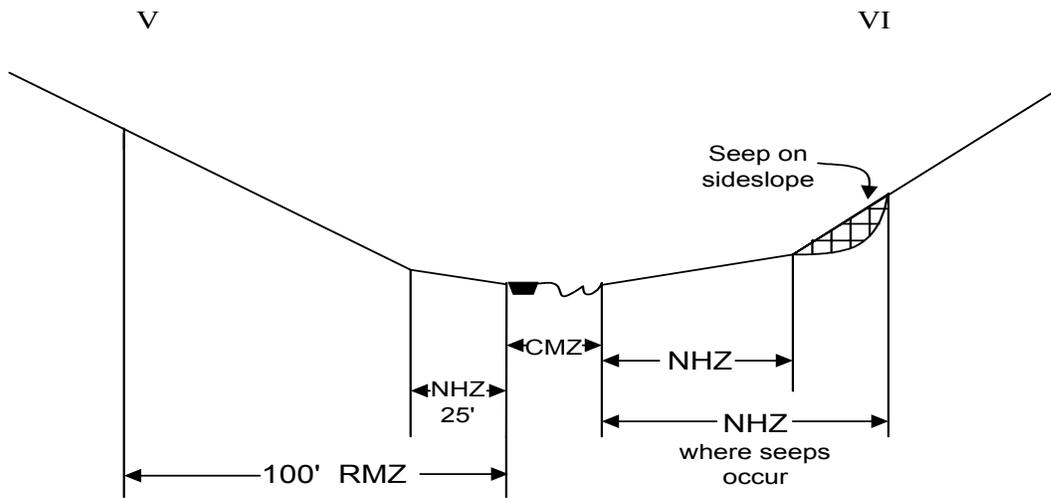


Figure D-4. Riparian boundary prescriptions V and VI.

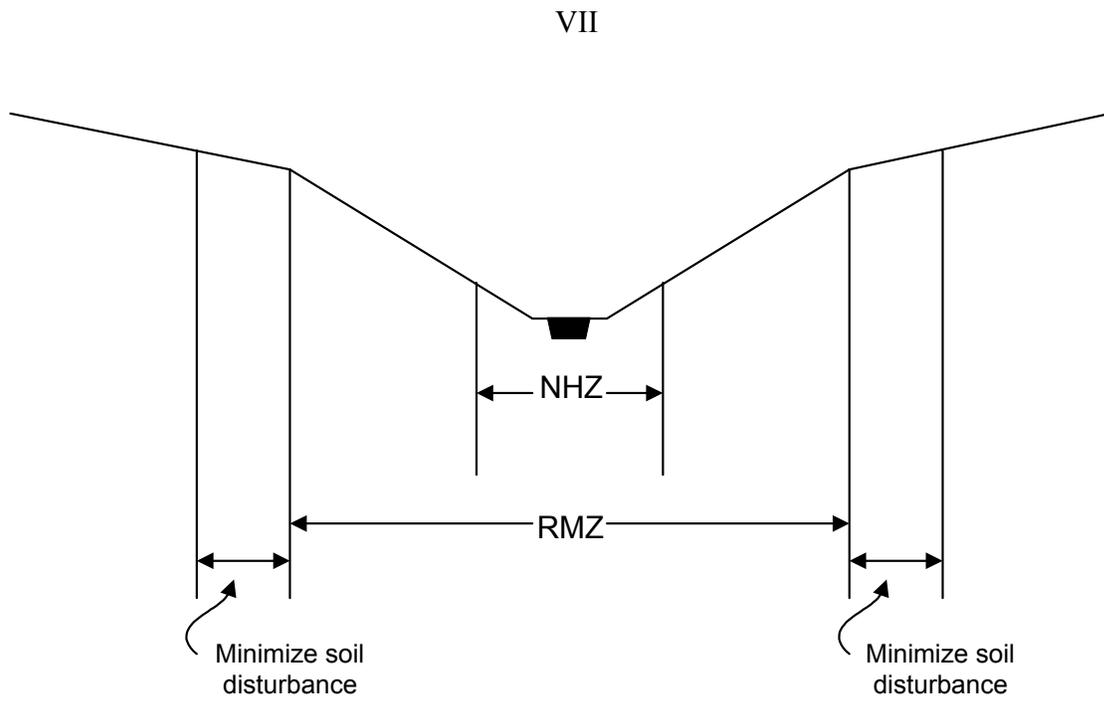


Figure D-5. Riparian boundary prescription VII.

Prescription VIII, Figure D-6.

Prescription VIII includes retention of an NHZ extending from the edge of ordinary high water mark (OHWM) to a slope-break of >20% on the adjacent sideslope. The adjacent sideslopes of these landforms have a high potential for mass wasting, thus requiring the NHZ. In some places, these sideslopes will not extend to a 50 foot horizontal distance prior to slopebreak. When this occurs, an RMZ will be extended out to 50 feet horizontal distance. These riparian landforms are common along second-order, high-gradient headwaters and tributaries. Primary mechanisms of LWD recruitment in these riparian landforms are by mass wasting from the adjacent sideslopes.

Prescription IX, Figure D-6.

Prescription IX includes retention of a 100 foot RMZ (horizontal distance), including a 25 foot NHZ, measured from the edge of OHWM. These riparian landforms have uninterrupted sideslopes with gradients of >50%. Where slopes are >70%, except when dictated by mass wasting analysis, the RMZ boundary will not extend beyond a 122 foot slope distance (equal to 100 feet horizontal distance for a 70% slope). These riparian landforms are common along second-order, high-gradient headwaters and tributaries. Primary mechanisms of LWD recruitment in these riparian landforms are by windthrow, and natural treefall; and when the potential is high, mass wasting.

Prescription X, Figure D-7.

Prescription X includes retention of an NHZ extending from the edge of ordinary high water mark (OHWM) to a slope-break of >20% on the adjacent sideslope. These riparian landforms have steep, unstable slopes, with a high potential for mass wasting up to the break in the sideslope; which is >50 feet horizontal distance from the OHWM. These channels are generally high-gradient first- and second-order headwaters, traversing sandstone and siltstone geologies. Many high-gradient DNR Type 4 streams will receive a similar prescription — but through the mass wasting analysis.⁴ Primary mechanisms of LWD recruitment in these riparian landforms is by mass wasting and natural treefall.

⁴ When any DNR Type 1–5 waters receive protection through mass wasting analysis, the protection encompasses the entire high risk/deliverability area.

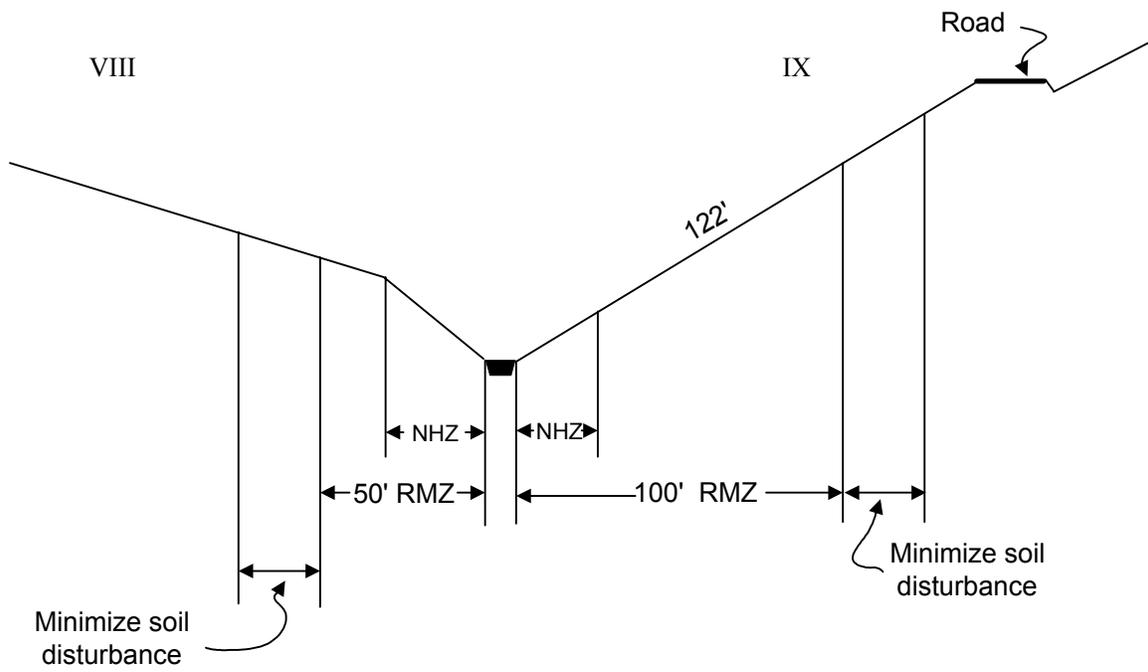


Figure D-6. Riparian boundary prescriptions VIII and IX.

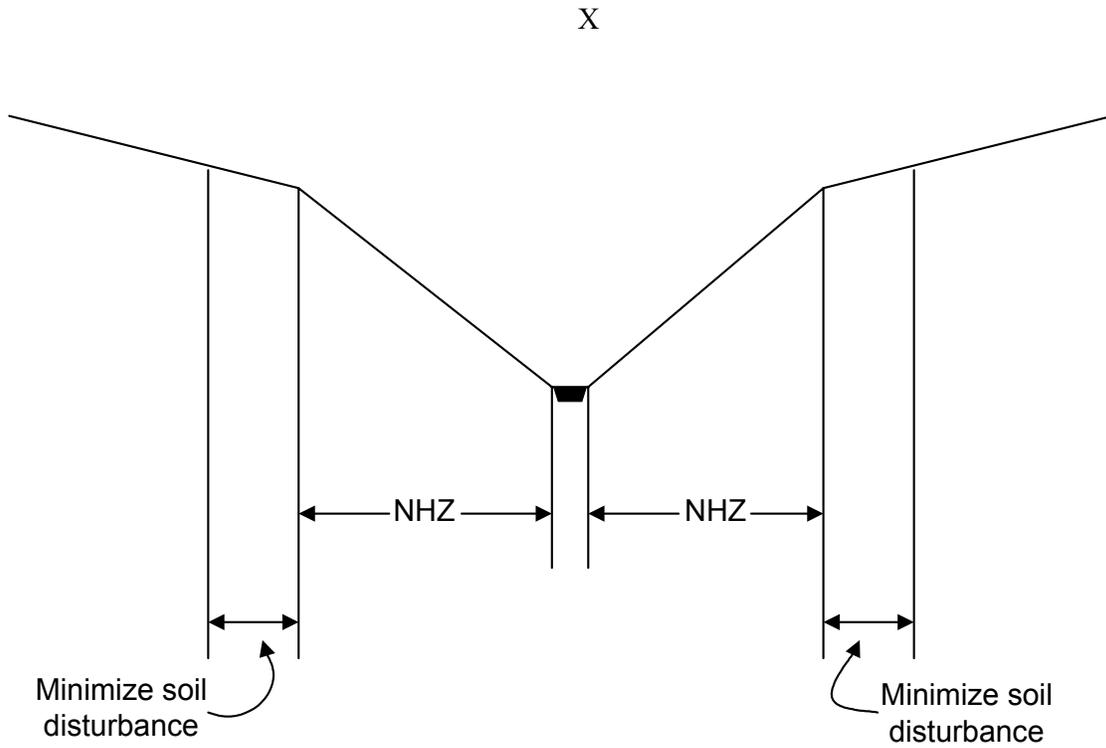


Figure D-7. Riparian boundary prescription X.

APPENDIX E

Species associated with forest successional stages and/or habitat features influenced by the HCP (P = primary habitat, S = secondary habitat). Specific habitat requirements and HCP effects for each species are detailed in the Environmental Assessment.

Species	Successional Stage *					LWD	Understory	Riparian	Aquatic
	ESF	MSF	MF	LSF	Snags				
FISH									
Olympic mudminnow								X	X
Coho salmon								X	X
Chinook salmon								X	X
Steelhead								X	X
Pink salmon								X	X
Chum salmon								X	X
Sockeye salmon								X	X
Coastal cutthroat trout								X	X
Bull trout								X	X
Pacific lamprey								X	X
River lamprey								X	X
AMPHIBIANS									
Cope's giant salamander	P	(PS)	(PS)	P				X	X
Pacific giant salamander		(PS)	(PS)	P/S		X		X	X
Columbia torrent salamander		P/S	P/S	P				X	X
Dunn's salamander	S	S/P	(PS)	P		X		X	
Van Dyke's salamander		S	(PS)	P/S		X		X	
Tailed frog	S	P/S	P/S	P/S		X		X	X
Northern red-legged frog	S	P/S	P/S	P/S				X	X
BIRDS									
Harlequin duck		P	P	P				X	X
Marbled murrelet		S	S	P				X	
Northern goshawk		S	P/S	P/S	X				
Bald eagle	S		S	(PS)	X			X	
Peregrine falcon					X			X	X
Northern spotted owl		S	S	P/S	X		X		
Pileated woodpecker	S	S	S	P/S	X	X			
Downy woodpecker			P/S	P/S	X			X	
Hairy woodpecker		S	S	P/S	X	X			
Northern flicker	P/S	S	P/S	P/S	X	X			
Red-breasted sapsucker		S	S	S	X				
Olive-sided flycatcher	S	S	P/S	P/S			X		
Little willow flycatcher	P	P						X	
Vaux's swift	P	S	S	P/S	X				
Red-breasted nuthatch		S	P	P	X	X			
Western bluebird	P				X				
MAMMALS									
Long-eared myotis	S	S/P	(PS)	P/S	X			FEEDING	
Long-legged myotis	S/P	S/P	P/S	P/S	X			X	
Yuma myotis	P	S/P	P	P	X			FEEDING	
Townsend's big-eared bat	S	S	S	S				FEEDING	
Pacific fisher		S	P	P	X	X			
Northern flying squirrel		S	P	P	X	X	X		
Townsend's chipmunk	S	P/S	P/S	P/S		X	X		
Southern red-backed vole		P	P	P		X	X		
Forest deer mouse			P	P		X	X		

* ESF =Early successional forest, MSF = Mid-successional forest, MF = Mature forest, LSF = Late-successional forest; P=Primary use for breeding, resting, and foraging. S = Secondary use for breeding, resting, and foraging. P/S = Combination of primary and secondary use, with disproportionately more primary use, S/P = Combination of secondary and primary use, with disproportionately more secondary use, (PS) = Equal combination of primary and secondary use (use data based on Thomas et al. 1993).

**APPENDIX F: LIST OF PREPARERS,
CONTRIBUTORS, AND ADVISORS**

Port Blakely HCP Team	HCP Role
R. Neal Wilkins Port Blakely Tree Farms Wildlife Biologist	Project Co-manager Wildlife and Fisheries
Court Stanley Port Blakely Tree Farms District Forester	Project Co-manager Forest Management
Gerald Bailey Port Blakely Tree Farms Assistant Field Representative	Field Implementation
Michael Buchanan Port Blakely Tree Farms Inventory Forester	Forest Inventory
Linda Coleman Port Blakely Tree Farms Centralia Office Manager	Word processing, Graphics
Lee Erickson Port Blakely Tree Farms Forestry Operations Manager	Operations Evaluation
Duane Evans Port Blakely Tree Farms Inventory Forester	Forest Inventory
Timothy McBride Port Blakely Tree Farms Assistant Wildlife Biologist	Wildlife Habitat Inventory
Michael Mosman Port Blakely Tree Farms Forestry Analyst	Forestry Analysis
Robert Shelton Port Blakely Tree Farms Forestry Operations Manager	Operations Evaluation

Tim Thompson
Gordon Thomas Honeywell

Policy Affairs

Jeffrey Van Duzer
Davis Wright Tremaine
Attorney

Legal Affairs

Philip Woods
Port Blakely Tree Farms
GIS Manager

GIS Mapping

Brian Wilson
Terrain Resources
GIS Analyst/Modeling Specialist

GIS Mapping

Federal and State Agency Advisors

Curt Smitch, Program Leader
John Engbring, Assistant Program Leader
Brian Bogaczyk, Fish & Wildlife Biologist, USFWS Lead
David Hirsh, Program Analyst
Sharon Kramer, Fisheries Biologist
Ted Thomas, Forest Ecologist
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Pacific Northwest Habitat Conservation Plan Program
Olympia, WA

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Endangered Species Branch
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David Whipple, Wildlife Biologist, Division Coordinator
Joe Buchanan, Wildlife Biologist
Mark Hunter, Fisheries Biologist
Washington State Department of Fish and Wildlife
Olympia, WA

APPENDIX G: IMPLEMENTATION AGREEMENT

IMPLEMENTATION AGREEMENT

Port Blakely Robert B. Eddy Tree Farm

This IMPLEMENTATION AGREEMENT ("Agreement") is entered into as of this _____ day of _____, 1996, by and between PORT BLAKELY TREE FARMS (LIMITED PARTNERSHIP) ("Port Blakely"), the UNITED STATES FISH AND WILDLIFE SERVICE, an agency of the Department of the Interior of the United States of America ("USFWS"), and the NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, through the National Marine Fisheries Service ("NMFS"), an agency of the Department of Commerce of the United States of America. USFWS and NMFS are each referred to herein individually as an "Agency" and collectively as the "Agencies."

BACKGROUND INFORMATION

A. Port Blakely owns approximately 7,486 acres of commercial forest land distributed across 18 sections within T15N,R06W and T15N,R07W in Southwest Washington, as more fully described on the attached Exhibit A. Such property, as modified from time to time in accordance with Section 4 hereof, is referred to herein as the "Tree Farm."

B. The forest area of the Tree Farm was naturally regenerated following clearcut logging in the late 1920s, 1930s and early 1940s. Second-growth Douglas-fir and Western Hemlock are now dominant on approximately 79% of the Tree Farm. Hardwoods comprise approximately 13% of the ownership with Red Alder as the dominant species. Douglas-fir plantations (<15-year old) comprise 4% of the Tree Farm. Nonforest areas comprise another 4% and include wetlands, rockpits and roads. Port Blakely acquired most of the Tree Farm in 1969 and has managed the Tree Farm primarily for commercial timber production with some minor collateral uses such as rock quarries since that time.

C. During the course of its ownership and operation of the Tree Farm, Port Blakely has identified a number of wildlife species which visit or permanently reside in the Tree Farm and which are either (1) listed as "threatened" or "endangered" under the federal Endangered Species Act, 16 U.S.C. § 1531, et seq. (the "ESA"); (2) have been proposed by the Agencies for listing as "threatened" or "endangered" under the ESA; or (3) are identified by the Agencies or Port Blakely as candidates for listing as "threatened" or "endangered" under the ESA. A complete list of such species which have been identified as visiting or residing on the Tree Farm as of the date of this Agreement is attached hereto as Exhibit B. A complete list of all species known to visit or reside on the Tree Farm is attached hereto as Exhibit C.

D. Under the ESA and current Agency regulations, it is unlawful for a landowner to "take" any member of a species listed as "threatened" or "endangered" in the course of carrying out an otherwise lawful land use activity without an "incidental take permit" issued under ESA § 10(a) after approval by the applicable agencies of a habitat conservation plan. Port Blakely has applied for an incidental take permit ("ITP") relating to its proposed activities on the Tree Farm authorizing the incidental take of any member of any covered species listed during the life of the ITP as "threatened" or "endangered" under the ESA as amended or any successor statute. Notwithstanding anything herein to the contrary, however, Port Blakely reserves its right to deny that its current or future activities on the Tree Farm require an ITP.

E. In order to preserve additional habitat for the covered species, in order to support the issuance of an incidental take permit in respect of species currently listed as "threatened" or "endangered," and in order to qualify as soon as possible for an addition to the ITP should any additional species be listed as "threatened" or "endangered," Port Blakely has prepared a habitat conservation plan ("HCP") for the conservation of the covered species. The HCP has been prepared with the cooperation and assistance of the Agencies, the Washington State Department of Wildlife, and many others after lengthy study and discussion and is based upon the best scientific and commercial data currently available.

F. Each of the parties hereto recognizes that Congress has expressed its intention that the federal government work closely with the non-federal sector to protect listed and unlisted species and their habitats over the long term, as follows:

"Although the conservation plan is keyed to the permit provisions of the Act which only apply to listed species, the Committee intends that conservation plans may address listed and unlisted species. . . .

The Committee intends that the Secretary may utilize this provision to approve conservation plans which provide long-term commitments regarding the conservation of listed as well as unlisted species and long-term assurances to the proponent of the conservation plan that the terms of the plan will be adhered to and that further mitigation requirements will only be imposed in accordance with the terms of the plan. In the event that an unlisted species addressed in an approved conservation plan is sub-

sequently listed pursuant to the Act, no further mitigation requirements should be imposed if the conservation plan addressed the conservation of the species and its habitat as if the species were listed pursuant to the Act. . . .

It is also recognized that circumstances and information may change over time and that the original plan may need to be revised. To address the situation the Committee expects that any plan approved for a long-term permit will contain a procedure by which the parties will deal with unforeseen circumstances." H.R. Rep. No. 97-835, 97th Cong., 2d Sess. 30-31 (1982).

G. Among other things, the Secretaries of the Interior and Commerce have authority under the ESA to determine whether any species is endangered or threatened, to regulate the taking of an endangered or threatened species, to encourage interested parties to develop and maintain conservation programs, to issue permits for the taking of endangered or threatened species and to enforce the provisions of the ESA. In executing this Agreement, the Agencies are also acting pursuant to the Fish & Wildlife Coordination Act, 16 U.S.C. § § 661-666(c).

H. Among other things, the HCP has been designed to provide immediate and long-term benefits to local and regional populations of covered species and, to the maximum extent practical, to minimize and mitigate the effects of any incidental take of any covered species from otherwise lawful uses of the Tree Farm by requiring Port Blakely to, among other things, (a) engage in certain silvicultural activities designed to develop stands of timber which will serve as suitable habitat for certain covered species; (b) adjust harvest rates to provide nesting, roosting and foraging habitat as well as dispersal opportunities for the Northern Spotted Owl; (c) establish reserves or refuge areas for the preservation and protection of certain covered species; and (d) maintain certain no-harvest and limited harvest zones in riparian areas for the protection of salmon and other species dependent upon the riparian areas for certain of their life requisites. Port Blakely will also provide information on the use of managed timber stands by certain species through monitoring and reporting.

I. The purpose of this Implementation Agreement is to implement the HCP on which the ITP is based.

NOW THEREFORE, the parties hereto hereby agree as follows:

AGREEMENT

1. **Definitions.** The following terms shall have the following meanings for all purposes of this Agreement:

a. "Agency" means either USFWS or NMFS, as appropriate.

b. "Agreement" shall mean this Implementation Agreement as the same may be amended from time to time.

c. "Covered Species" shall mean all species of fish and wildlife (including vertebrate and invertebrate species) which now or hereafter visit or permanently reside in the Tree Farm and which are dependent for all or part of their life requisites on habitat types found in the Tree Farm. Such species include but are not limited to those species (1) listed as "threatened" or "endangered" under Section 4 of the ESA, (2) listed on Exhibit B, or (3) listed on Exhibit C.

d. "Endemic Species" shall mean any Covered Species where eighty percent (80%) or more of its members are located on the Tree Farm. Any determination of which Covered Species are Endemic Species shall be based on the best scientific information then available.

e. "ESA" shall mean the Endangered Species Act, 16 U.S.C. § 1531, et seq., as the same may be amended or reauthorized from time to time and any successor statute or statutes.

f. "Extraordinary Circumstances" shall have the meaning given in and shall be determined in accordance with the terms of Sections 5(d)(ii) through (vi), inclusive.

g. "HCP" shall mean the habitat conservation plan prepared by Port Blakely pursuant to Section 10(a) of the ESA in connection with this Agreement as the same may be amended from time to time in accordance with the terms hereof.

h. "ITP" shall mean the incidental take permit to be issued by the Agencies to Port Blakely as provided in this Agreement as the same may be amended from time to time in accordance with the terms hereof.

i. "Mandated Modification" shall mean any modification to existing Agency regulations adopted after the date hereof where such modification was required by (1) an Act of Congress enacted after the date hereof or (2) a final order of any federal court determining that but for such modification,

compliance with or enforcement of such regulation by the Agency would violate applicable law.

j. "New Species Addition Date" shall have the meaning given in Section 3(c)(iii).

k. "Required Factors" shall mean

(A) the size of the current range of the affected species;

(B) the percentage of such species' range adversely affected by the HCP;

(C) the percentage of such species' range conserved by the HCP;

(D) the ecological significance of that portion of the range of the species affected by the HCP;

(E) the level of knowledge about the affected species and the degree of specificity of the species' conservation program under the HCP;

(F) whether the HCP was originally designed to provide an overall net benefit to the affected species and contained measurable criteria for assessing the biological success of the HCP; and

(G) whether failure to adopt additional conservation measures would appreciably reduce the likelihood of survival and recovery of the particular affected species in the wild.

l. "Tree Farm" shall mean the Robert B. Eddy Tree Farm, owned by Port Blakely in Southwest Washington as described on the attached Exhibit A, as it may be modified in accordance with this Agreement.

2. Findings. *The following findings are included here for illustration only at this time. They will not become final until after the opportunity for public comment on the HCP and related documents. Based upon the best scientific and commercial data available, the Agencies make the following findings:*

a. The taking of any member of any Covered Species in accordance with the HCP will be incidental to the carrying out of otherwise lawful activities;

b. assuming compliance with its obligations hereunder, Port Blakely will minimize and mitigate the impacts of

the incidental taking of Covered Species to the maximum extent practicable;

c. Port Blakely has ensured that adequate funding for the HCP will be provided;

d. this Agreement provides adequate procedures to address unforeseen circumstances which may arise hereafter;

e. the taking of any Covered Species identified on Exhibits B or C hereto which is currently or hereafter listed as endangered or threatened under the ESA in accordance with the HCP will not appreciably reduce the likelihood of the survival and recovery of such species in the wild;

f. the measures required by the Agencies as being necessary or appropriate for purposes of the HCP will be met;

g. the Agencies have received the required assurances that the HCP will be implemented;

h. the protection afforded by the implementation of the HCP adequately provides for all Covered Species which now occur or hereafter will occur on the Tree Farm;

i. the HCP meets each of the requirements of a conservation plan as described by Section 10(a)(2)(A) of the ESA; and

j. where the terms of the HCP have been determined by reference to state law and regulation as in effect on the date hereof, such as the current provisions of Washington Administrative Code Chapter 222-24, the resulting prescriptions are adequate and necessary for the purposes of this Agreement.

3. Responsibilities of the Parties

a. Port Blakely's Responsibilities. In consideration of the issuance of an ITP authorizing any incidental take which may result from activities conducted in accordance with the HCP, and in consideration of the assurances provided by this Agreement, Port Blakely agrees to

(i) perform all obligations in the HCP, the ITP and this Agreement for the term of this Agreement; and

(ii) to fully fund all costs needed to perform its affirmative obligations under the ITP and the HCP.

b. Agencies' Responsibilities. The Agencies each agree pursuant to their respective jurisdictions

(i) to issue an ITP substantially in the form previously provided to Port Blakely upon execution of this Agreement authorizing any incidental take of the Northern Spotted Owl, the Marbled Murrelet, the Bald Eagle, and the Peregrine Falcon which may result from activities conducted in accordance with the HCP;

(ii) to add to the ITP any other species which is listed as "threatened" or "endangered" under the ESA during the term of this Agreement in accordance with Section 3(c) hereof; and

(iii) to the maximum extent practicable, to cooperate with and provide technical assistance to Port Blakely as well as to attend meetings requested by Port Blakely to consider matters relevant to the Tree Farm, the HCP, the ITP, or any of the operations or other activities contemplated thereunder.

c. Additions of Species to ITP.

(i) Each Covered Species which is listed as "threatened" or "endangered" under the ESA after the date hereof but during the term of this Agreement, shall upon written request by Port Blakely be added by the Agencies to the ITP on or before the New Species Addition Date unless either (A) Port Blakely is in material breach of the terms and conditions of this Agreement; or (B) (1) the addition of such species without additional mitigation would result in an appreciable reduction in the likelihood of survival and recovery of such species in the wild; (2) drawing upon all means available to the Agencies, including nongovernment sources of funds and other alternative methods of mitigation or adjustment, the Agencies will be unable to achieve the necessary mitigation unless the HCP is amended; (3) the Agencies shall have proposed amending the mitigation measures required of Port Blakely in the HCP so as to avoid an appreciable reduction in the likelihood of survival and recovery of such species in the wild, to the extent such an amendment is possible; (4) such proposed amendment shall propose changing the mitigation measures required of Port Blakely in the HCP to the minimum extent possible to avoid an appreciable reduction in the likelihood of survival and recovery of such species in the wild and shall not include payment of additional compensation, apply to parcels of land available for harvest or other uses under the HCP, or apply to lands not in the Tree Farm; and (5) Port Blakely shall have refused to consent to such proposed amendment and shall have failed to propose an alternative amendment to the mitigation measures set forth in the HCP which, if adopted, would avoid the appreciable reduction in the likelihood of survival and recovery of such species in the wild which would otherwise have resulted from the addition of such species to the ITP.

(ii) In respect of any Agency refusal to add a species under Section 3(c)(i)(B) hereof, the Agencies shall have the burden of demonstrating that each of the factors justifying such refusal exists through clearly documented written findings based upon the best scientific and commercial data available. Consistent with Section (B)(1) of the Interagency Cooperative Policy for Peer Review in Endangered Species Activities (59 Fed Reg 34, 270), each Agency will obtain the peer review of the scientific data on which the Agency bases such findings to ensure that such findings are based on the best scientific data available. The Agency will request peer review in a timely manner so that the reviews will be completed within thirty (30) days. In the event peer review is not available prior to the New Species Addition Date findings made without peer reviewed data will be effective although, at the request of Port Blakely, such findings may be subject to reconsideration by the Agency as soon as such peer reviewed data becomes available. Port Blakely shall be afforded an opportunity to present any information concerning the Agencies' determinations or to suggest alternative mitigation measures. Port Blakely will not, however, be required to conduct any additional research, gather any additional data or otherwise make any significant expenditures of funds to gather or analyze information in connection with the potential inclusion of such species in the ITP. In deciding whether to refuse to add a species under Section 3(c)(i)(B) hereof, the Agencies shall consider all relevant factors including, but not be limited to, the Required Factors.

(iii) As used herein "New Species Addition Date" shall be defined as follows:

(A) In the case of a listing of a new species under the ESA (other than an emergency listing), the "New Species Addition Date" shall be the later of the date one hundred ninety-five (195) days after notice from Port Blakely requesting that such species be added to the ITP or the date on which the listing first becomes effective.

(B) In the case of an emergency listing of a species other than an Endemic Species, the "New Species Addition Date" shall be the later of thirty (30) days after notice from Port Blakely requesting that such species be added to the ITP (the "Emergency Listing Notice") or the date on which the emergency listing first becomes effective. The addition of such species to the ITP pursuant to this subsection shall continue to be effective until the later of the date one hundred ninety-five (195) days after the Emergency Listing Notice or the effective date of any related final listing regulation, provided, however, if prior to such date the species is added to the ITP pursuant to subsection (D) hereof or such species is no longer listed as "threatened" or "endangered" under the ESA, the addition of such

species pursuant to the terms of this subsection 3(c)(iii)(B) shall cease to be effective.

(C) In the case of an emergency listing of an Endemic Species, the "New Species Addition Date" shall be the soonest possible date after the Emergency Listing Notice. The addition of such species to the ITP pursuant to this subsection shall continue until the later of the date one hundred ninety-five (195) days after the Emergency Listing Notice or the effective date of any related final listing regulation provided, however, if prior to such date the species is added to the ITP pursuant to subsection (D) hereof or such species is no longer listed as "threatened" or "endangered" under the ESA, the addition of such species pursuant to the terms of this subsection 3(c)(iii)(C) shall cease to be effective.

(D) In the case of a final listing of a species that was the subject of an emergency listing, the "New Species Addition Date" shall be the later of the date one hundred ninety-five (195) days after the Emergency Listing Notice or the effective date of any final listing regulation.

If the Agency has found that adding a species to the ITP without additional mitigation would jeopardize the continued existence of such species in the wild and, that drawing upon all means available to the Agency, the Agency will be unable to achieve the necessary mitigation unless the HCP is amended, the "New Species Addition Date" may be extended by the parties hereto to permit additional opportunity to discuss and, where possible, agree upon appropriate additional mitigation measures. The Agency shall complete any necessary consultations and shall take all other acts, if any, which it is obligated to take under the ESA and under any other applicable laws prior to the New Species Addition Date. Port Blakely shall be entitled to request inclusion of any species in the ITP at any time.

d. Monitoring and Inspection Rights.

(i) Port Blakely will provide the Agencies with the reports described in Section 5.0 of the HCP at the notice address then in effect for such Agencies and will provide any available information reasonably requested by either Agency to verify the information contained in such reports. In addition, in connection with each monitoring report to be delivered pursuant to Section 5.2 of the HCP, an officer of Port Blakely (or its general partner) shall provide a certificate to the effect that Port Blakely has sufficient resources to fund its remaining affirmative obligations under the HCP as of such date.

(ii) Either Agency may inspect the Tree Farm in accordance with its applicable regulations. Except where an

Agency has reason to believe that Port Blakely may be acting in violation of applicable laws or regulations or in breach of the ITP or this Agreement (an "Enforcement Inspection"), any Agency intending to inspect the Tree Farm will notify Port Blakely at least twenty-four (24) hours in advance of its inspection and will allow Port Blakely's representatives to accompany the Agency's representatives making such inspection. If under applicable law either Agency is entitled and elects to delegate its inspection rights hereunder to another federal agency, to a state agency, or to some other entity or individual the delegating Agency shall provide (or shall cause its delegatee to provide) Port Blakely with a complete list of the individuals who will be conducting an inspection on its behalf reasonably in advance of the time when any such individuals shall enter upon the Tree Farm provided, however, that this requirement will not apply to an Enforcement Inspection. Each Agency shall ensure that any individual conducting an inspection of the Tree Farm on its behalf performs such inspection in compliance with all regulations and statutes applicable to the Agency and in compliance with all of the terms and conditions of this Agreement, including without limitation, the requirement of advance notice where applicable. Except in the case of an Enforcement Inspection, to assist Port Blakely in meeting its obligations under the HCP, any Agency inspecting the Tree Farm (whether directly or through its delegatee) will promptly brief Port Blakely on the information learned during any such inspection. However, any proposed or tentative conclusions regarding legal consequences of activities or conditions observed in such inspection may be withheld from Port Blakely pending review by Agency's attorneys and officials, and disclosed to Port Blakely only when the Agency is prepared to disclose such conclusions as an official position of the Agency. Nothing in this Agreement is intended to restrict or otherwise limit the authority of federal or state officers to conduct compliance checks relating to the enforcement of hunting and fishing regulations or laws other than the ESA to the extent authorized by applicable laws and court rulings.

4. Changes in Land Base.

(a) Land Acquisitions.

(i) In General. Nothing in this Agreement, the HCP or the ITP shall limit Port Blakely's rights to acquire additional lands in and around the Tree Farm or elsewhere. Unless such lands are added to the Tree Farm in the manner provided below, however, any such lands as may be acquired by purchase, exchange or otherwise will not be covered by the ITP and therefore will be subject to the same ESA provisions and related regulations with respect to fish and wildlife species as if owned by another private party. Nothing in this Agreement,

the HCP or the ITP shall require Port Blakely to include in the Tree Farm or to add to the ITP any additional lands it may acquire. Any lands which Port Blakely elects to include in the HCP and the ITP in accordance with this Agreement shall thereafter constitute a portion of the Tree Farm and all references to the "Tree Farm" shall be deemed to include a reference to such acquired lands.

(ii) Inclusion of Certain Additional Property. If Port Blakely acquires any additional lands which lands are (A) within three miles of any lands in the Tree Farm; (B) do not contain any new habitat types or new habitat features not analyzed in the original HCP; and (C) are not inhabited or regularly visited by any listed species of wildlife not included in the Covered Species, Port Blakely, in its sole discretion, may elect to include such lands in the HCP and the ITP in accordance with Section 5(c)(i) hereof.

(iii) Further Acquisitions. Port Blakely may acquire any other lands and request that the HCP and ITP be modified to include such lands in the Tree Farm. Any such a request will be processed in accordance with Section 5(c)(ii) hereof.

(b) Land Dispositions.

(i) In General. Port Blakely may not sell any lands included in the Tree Farm to, or exchange any portion thereof with, any other party during the term of this Agreement unless either (A) the HCP and ITP are modified to delete such lands in accordance with Section 5(c)(ii) hereof or (B) the lands are transferred to a third party who has agreed to be bound by the terms of the HCP and otherwise meets the requirements set forth in Section 4(b)(ii) below. In responding to any request to delete lands from the HCP and the ITP where such proposed modification is to be processed under Section 5(c)(ii) hereof, the Agencies shall consent to such proposed modification unless they find that the requested deletion of land would compromise the effectiveness of the HCP. If Port Blakely sells or exchanges any of the lands comprising a portion of the Tree Farm and such transfer is permitted by the terms hereof, from and after such transfer, such lands shall not be deemed a portion of the Tree Farm and all references to "Tree Farm" shall be deemed not to include a reference to such transferred lands.

(ii) Transfers to New Landowner Bound by HCP. Port Blakely may sell or exchange lands comprising a portion of the Tree Farm to a Permitted Transferee. As used herein, a "Permitted Transferee" shall mean a transferee (A) who has elected to be bound by the HCP as it applies to the transferred lands; (B) who has, in the reasonable opinion of the Agencies,

sufficient financial resources to adequately fund its affirmative obligations under the HCP and who meets the requirements under 50 CFR § 13.21(b) and (c); and (C) who has entered into an agreement in form and substance reasonably satisfactory to the Agencies, which agreement may identify the responsibilities under the HCP which apply to the transferred lands and shall contain terms and covenants substantially similar to the terms hereof provided, however, that such agreement may limit the right of the Permitted Transferee to terminate its agreement prior to the termination of this Agreement. Upon request of the Permitted Transferee, the Agencies will issue an incidental take permit to the Permitted Transferee covering the transferred lands. Port Blakely will not be responsible for the performance of the HCP on lands transferred to a Permitted Transferee.

5. Modifications.

a. Modifications to Agreement. This Agreement may be amended only with the written consent of each of the parties hereto.

b. Modifications to ITP. The ITP may be amended in accordance with applicable Agency regulations codified at 50 C.F.R. Parts 13, 17, 200 and 222, provided that a determination that "just cause" or "necessity" to amend the ITP exists will be made by either Agency only if (i) the amendment is necessary to add a species as required pursuant to Section 3(c) hereof; (ii) the amendment is necessary to reflect a change in the boundaries of the Tree Farm made pursuant to Section 4 hereof; or (iii) the amendment is necessary to reflect an amendment to the HCP made pursuant to Section 5(c) or 5(d) hereof.

c. Modifications to HCP Proposed by Port Blakely. The HCP may be modified in accordance with the following terms and conditions.

(i) Port Blakely Minor Modifications. Port Blakely may make the following minor modifications to the HCP. Such modifications will be effective sixty (60) days after receipt of written notice by the Agencies. The Agencies will promptly make the necessary conforming changes. Such minor modifications are limited to the following:

(A) corrections of typographic, grammatical, and similar editing errors which do not change the intended meaning;

(B) correction of any maps or exhibits to correct errors in mapping and to reflect previously approved changes in the HCP; and

(C) the addition of lands where such addition is permitted pursuant to Section 4(a)(ii) of this Agreement.

(ii) **Other Port Blakely Modifications.** In addition, the HCP may be modified in response to other requests made by Port Blakely in accordance with the following procedure:

(A) In connection with any requested modification initiated by Port Blakely other than a modification of the type described in Section 5(c)(i), Port Blakely will provide the Agencies with a written description of the proposed modification and a brief description of the likely effects of the proposal on the Covered Species and habitat types found on the Tree Farm.

(B) Within sixty (60) days after receipt of the proposal and the related materials described in subclause (A) above (or such longer period as is agreeable to the parties hereto), the Agencies will notify Port Blakely if the proposed modification must be processed as a "material modification" pursuant to Section 5(c)(ii)(C) below.

(C) If the Agencies determine that any proposed modification is a "material modification", within sixty (60) days after receipt of Port Blakely's proposal (or such longer period as is agreeable to the parties hereto), the Agencies shall notify Port Blakely of the process they intend to use to obtain public comments on the proposal and the date by which they expect the public comment process to be completed. The Agencies shall thereafter promptly initiate and complete the process for obtaining public comments.

(D) Within thirty (30) days (or such longer period as is agreeable to the parties hereto) after (1) the date on which the Agencies notify Port Blakely that the proposed modification is not a "material modification" or (2) the date identified pursuant to Section 5(c)(ii)(C) as the anticipated date for the completion of the public comment period, the Agencies shall provide Port Blakely with a written notice either consenting to the proposed modification in full, declining to consent to the proposed modification in full, or consenting to the proposed modification in part (e.g. as to some portions but not all of the Tree Farm or as to some but not all of the species) and declining to consent to the proposed modification in part. If the Agencies would otherwise decline to consent to all or part of a proposed modification hereunder, the Agencies shall first consult with Port Blakely and, where possible, shall suggest reasonable conditions or alterations to the proposal which if accepted by Port Blakely would permit the Agencies to agree to the proposed modification. The Agencies shall not

decline to consent to a proposed modification hereunder unless they find, following review of public comments, if applicable, that the HCP, after giving effect to such modification, and the conduct of the permitted activities thereunder would not meet the requirements of Section 10(a)(2)(B) of the ESA.

(E) If because of material changes in circumstances, continued compliance with the HCP would place Port Blakely at a competitive disadvantage as compared to other private owners of comparable commercial timberlands in the area that are then occupied or used by Covered Species, then, at the request of Port Blakely, the Agencies will use their best efforts to minimize such economic penalties by consenting to proposed modifications to the maximum extent possible, while still meeting their responsibilities under the ESA.

d. Modifications to HCP Proposed by Agencies.

Except as provided for in this Section 5(d), the Agencies may not seek modifications to the HCP or further mitigation from Port Blakely, including without limitation, modifications or further mitigation to address unforeseen circumstances related to a Covered Species.

(i) The Agencies may propose the following minor modifications to the HCP:

(A) corrections of typographic, grammatical, and similar editing errors which do not change the intended meaning; and

(B) correction of any maps or exhibits to correct errors in mapping and to reflect previously approved changes in the HCP.

(ii) The Agencies may require additional mitigation pursuant to Section 7(a) as a condition to lifting a suspension of the ITP.

(iii) The Agencies may seek additional mitigation from Port Blakely in accordance with this Section 5(d)(iii) if Extraordinary Circumstances have occurred. If an Agency determines that additional mitigation is required due to Extraordinary Circumstances, such mitigation shall be provided on federal land or through other means available to the Agency, including nongovernment sources of funds and other methods of mitigation, to the maximum extent possible. Only if the protective measures available to the Agency are insufficient may the Agency request additional mitigation from Port Blakely, which in any event shall be limited to the original terms of the HCP to the maximum extent possible. Without the consent of Port Blakely, additional mitigation requests shall not involve the

payment of additional compensation, apply to parcels of land available for harvest or other uses under the HCP, or apply to lands other than Tree Farm.

(iv) As used in this Agreement, "Extraordinary Circumstances" shall mean a major adverse change not reasonably anticipated on the date of this Agreement in the condition or population of a Covered Species included in the ITP or in the condition of the habitat or other biological resources of the Tree Farm in respect of which revisions of the HCP to add additional mitigation measures are necessary to avoid appreciably reducing the likelihood of the affected species' survival and recovery in the wild. Changes in operational or management prescriptions resulting from adaptive management contemplated by the HCP are neither unforeseen circumstances nor Extraordinary Circumstances even though such changes may require more or less restrictions on operations than were provided for under the original HCP.

(v) The Agency shall have the burden of demonstrating that Extraordinary Circumstances actually exist and that, pursuant to Section 5(d)(iii) hereof, the Agency is entitled to seek additional mitigation requirements from Port Blakely. The Agency's findings of Extraordinary Circumstances must be clearly documented and based upon the best scientific and commercial data available. In determining whether Extraordinary Circumstances exist, the Agencies shall consider all relevant factors, including without limitation, the Required Factors. Peer review of such technical information will be conducted pursuant to Section 5(d)(vii) hereof.

(vi) Port Blakely shall be afforded an opportunity to present information concerning the Agency's determination that Extraordinary Circumstances have occurred, to present information as to whether the Agency is entitled to seek additional mitigation from Port Blakely under the terms of Section 5(d)(iii) hereof, and to suggest alternative mitigation measures. Port Blakely will not, however, be required to conduct additional research, gather additional data or otherwise make any significant expenditures of funds to gather or analyze information in connection with this finding.

(vii) Consistent with Section (B)(1) of the Interagency Cooperative Policy for Peer Review in Endangered Species Activities (59 Fed Reg 34, 270), the Agency will obtain the peer review of the scientific data on which the Agency bases a finding of Extraordinary Circumstances to ensure that any such finding is based on the best scientific data available. The Agency will promptly seek peer review so that the reviews will be completed within thirty (30) days. In the event peer review is not available in time to enable the Agency to meet its

obligations established by statute, regulation or this Agreement, a finding of Extraordinary Circumstances made without peer reviewed data will be effective although, at the request of Port Blakely, it may be subject to reconsideration by the Agency as soon as peer reviewed data becomes available.

6. Remedies and Enforcement.

a. In General. The parties hereto shall have all the remedies available in equity (including specific performance and injunctive relief) and at law to enforce the terms of this Agreement and the ITP provided, however, no party shall be liable in damages to any other party for breach of this Agreement, for any performance or failure to perform a mandatory or discretionary obligation arising under this Agreement, or for any other cause of action arising under this Agreement. All parties shall retain whatever liability they would possess for their present and future acts or failure to act without the existence of this Agreement and Port Blakely shall retain whatever liability it possesses as an owner of interests in land.

b. Informal Dispute Resolution. If either Agency has reason to believe that Port Blakely may have violated the ITP, the HCP or this Agreement with respect to any Covered Species, including unlisted species, it will notify Port Blakely in writing of the specific provisions which may have been violated, the reasons the Agency believes Port Blakely may have violated them, and the mitigation the Agency proposes to impose to correct or compensate for the alleged violation. Port Blakely will then have sixty (60) days, or such longer time as may be mutually acceptable, to respond. If any issues cannot be resolved within thirty (30) days, or such longer time as may be mutually acceptable, after Port Blakely's response is due, the parties will consider non-binding mediation and other alternative dispute resolution processes. The parties reserve the right, at any time without completing informal dispute resolution, to use whatever enforcement powers and remedies are available by law or regulation, including but not limited to, in the case of the Agencies, suspension or revocation of the ITP.

7. Termination, Revocation and Suspension.

a. Right to Suspend ITP.

(i) In accordance with the process contained in applicable regulations (currently codified at 50 C.F.R. Parts 13, 17, 220 and 222 and 15 C.F.R. Part 904, Subpart D) either Agency may suspend the ITP for (A) any material violation by Port Blakely of the ITP or this Agreement; (B) any material violation by Port Blakely of any applicable laws or regulations governing the conduct of the permitted activity; (C) any failure by Port

Blakely to pay any fee, penalty or cost owed to the Agencies; or (D) any other basis for suspension expressly provided for in a Mandated Modification to an Agency regulation.

(ii) Except where the Agency determines that emergency action is necessary to protect any endangered or threatened species, such Agency shall not suspend the ITP without first providing Port Blakely notice in writing of the facts or conduct which may warrant the suspension and the actions necessary to redress the violation(s) and achieve compliance with the ITP and this Agreement. Such notice will be provided in accordance with applicable regulations. The Agency shall also consult with Port Blakely concerning actions to be taken to effectively redress the violation(s) that would otherwise necessitate a suspension. In addition, the Agencies agree to make good faith efforts to resolve any disputes with Port Blakely in accordance with the informal dispute resolution mechanism described in Section 6(b) hereof prior to suspending the ITP, unless an immediate suspension is necessary to protect any Covered Species.

(iii) In connection with any notice of suspension given to Port Blakely hereunder, the Agencies shall at the same time provide Port Blakely with a written statement of the actions reasonably required to redress the violation(s). Any suspension under this subsection 7(a) shall be lifted immediately upon the reasonable determination by the Agency, that the violation(s) has been effectively redressed. Upon full performance of the necessary actions specified by the Agency in its written notice, the Agency shall immediately lift the suspension.

(iv) It is the intent of the parties hereto that in the event of any suspension of the ITP, all parties shall act expeditiously to cooperate to lift any suspension of the ITP to carry out the objectives of this Agreement.

b. Right to Terminate and Revoke.

(i) The ITP may be terminated at any time by Port Blakely in accordance with applicable regulations. At any time, Port Blakely may also elect to terminate the ITP with respect to one or more particular species and to leave the ITP in effect as to all other species therein provided for.

(ii) The ITP may be revoked by the Agencies only if (A) Port Blakely has materially violated the terms of the ITP or this Agreement and such breach continues for sixty (60) days after Port Blakely receives written notice thereof from the Agencies (or if such breach cannot reasonably be cured within such sixty (60) days, Port Blakely has failed to take reasonable steps to effect such cure and to diligently pursue the completion

thereof at all times thereafter) provided, however, that the Agencies need not provide such an opportunity to cure if the violation is willful; (B) Port Blakely fails to take any actions reasonably identified by the Agencies as necessary to redress any violation pursuant to Section 7(a)(iii) within sixty (60) days (or if such actions cannot reasonably be completed within such sixty (60) days, Port Blakely has failed to take reasonable steps to implement such actions and to diligently pursue the completion thereof at all times thereafter); (C) Port Blakely becomes a "disqualified person" as such term is defined in 50 C.F.R. § 13.21(c); (D) the population of any listed species covered by the ITP declines as the result of an Extraordinary Circumstance to the extent that continuation of the permitted activity would be detrimental to maintenance or recovery of the affected population; or (E) any other basis for revocation occurs where such basis is expressly provided for in a Mandated Modification to an Agency regulation.

The Agencies agree not to exercise their rights of revocation under Section 7(b)(ii)(D) unless Port Blakely has declined to consent to a modification to the HCP requested by the Agencies in accordance with Section 5(d)(iii) hereof. The procedures and burden of demonstration provided for in Sections 5(d)(v), (vi) and (vii) shall apply to any revocation under Section 7(b)(ii)(D). Any revocation under Section 7(b)(ii)(D) shall be limited to the affected species. The parties recognize and intend that the bases for revocation of the ITP hereunder may limit the discretion of the Agencies otherwise afforded by applicable regulations.

c. Effect of Termination or Revocation. Any termination or revocation of the ITP under Section 7(b)(i) or (ii) (other than a termination pursuant to Section 7(b)(i) limited to one or more species but less than all of the species then provided for in the ITP or a revocation pursuant to Section 7(b)(ii)(D)) automatically terminates the HCP and this Agreement. Activities thereafter conducted on the Tree Farm will be subject to all applicable provisions of the ESA and related regulations all as if the ITP had never been issued. A termination pursuant to Section 7(b)(i) limited to one or more species but less than all of the species then provided for in the ITP or a revocation pursuant to Section 7(b)(ii)(D) shall apply only to the affected species and the HCP and this Agreement shall continue in full force and effect as to all other Covered Species.

(i) As analyzed in the HCP, and subject to the proviso in the next succeeding sentence, the parties hereto acknowledge that Port Blakely's compliance with the HCP and this Agreement will result in Port Blakely having fully mitigated for any incidental take of any Covered Species identified on Exhibit B prior to the occurrence of such take. Therefore, if Port Blakely

is in compliance with the terms of this Agreement, upon termination or revocation of the ITP, Port Blakely shall have no further obligations hereunder or under the ESA with regard to Covered Species identified on Exhibit B for take that occurred during the term of this Agreement provided, however, that if this Agreement is terminated at any time during the first five (5) years after the date hereof, Port Blakely shall provide such further mitigation as the Agencies may reasonably determine to be necessary to fully mitigate for the take of any species of fish then listed as threatened or endangered under the ESA for which adequate mitigation was not provided under the HCP prior to termination.

(ii) For any Covered Species not identified on Exhibit B which is hereafter listed as "threatened" or "endangered" under the ESA and which Port Blakely proposes to have added to the ITP, on or before the New Species Listing Date, the Agencies shall make a clearly documented written determination based upon the best scientific and commercial data then available (which data shall be peer reviewed to the extent practicable) and notify Port Blakely in writing as to whether Port Blakely's compliance with the HCP and this Agreement will result in Port Blakely having fully mitigated for any incidental take of such species prior to the occurrence of such take. The Agencies will not decline to find that Port Blakely's compliance with the HCP and this Agreement would result in Port Blakely having fully mitigated for any incidental take as herein required based solely on the possibility that in the future information might be developed or discovered which would support a contrary finding. In determining whether compliance with the HCP will result in Port Blakely's having fully mitigated for any incidental take of such species prior to the occurrence of such take, the Agency shall include in its assessment of the mitigation to be provided by Port Blakely, all actions taken by Port Blakely pursuant to the HCP since the date of this Agreement including actions taken prior to the listing of the such species and shall credit Port Blakely with such pre-listing actions benefiting the affected species. In assessing the likely level of incidental take of such species, only actions constituting "take" under the ESA after the date that such species is added to the ITP shall be considered.

(iii) If, under Section 7(c)(ii), the Agencies determine for any species that full mitigation will occur prior to any take of such species, upon termination or revocation of the ITP thereafter, if Port Blakely is in compliance with the terms of this Agreement, Port Blakely shall have no further obligations hereunder or under the ESA with regard to such species for take that occurred during the life of this Agreement.

(iv) If, under Section 7(c)(ii), the Agencies determine for any species that full mitigation will not necessarily have occurred prior to any take of such species, Port Blakely shall have the right to revoke its request that such species be added to the ITP. If Port Blakely does not revoke its request and if such species is added to the ITP, upon termination or revocation of the ITP thereafter, Port Blakely shall provide such further mitigation as the Agencies may reasonably determine to be necessary to fully mitigate for the take of any such species for which adequate mitigation (both pre- and post-listing) was not provided under the HCP prior to termination.

(v) If Port Blakely challenges any determination or finding made by either Agency under this Section 7(c), the Agency shall have the burden of demonstrating that each such determination was justified and based upon the best scientific and commercial data then available (which data shall be peer reviewed to the extent practicable). Port Blakely shall be afforded an opportunity to present information concerning the Agencies' determinations.

d. **Procedure for Revocation.** If either Agency revokes the ITP in accordance with the terms hereof, such Agency shall comply with all procedural aspects of its applicable regulations.

8. Miscellaneous.

a. **Severability.** If any provision of this Agreement is found invalid or unenforceable, all of the other provisions of this Agreement shall remain in effect to the extent they can be reasonably applied in the absence of such invalid or unenforceable provision.

b. **Notices.** Each party will designate a representative to whom notices under this Agreement shall be directed. The initial designated representatives are:

Port Blakely:

Telephone: _____
Fax: _____

USFWS:

Regional Director
U.S. Fish & Wildlife Service
911 N.E. 11th Avenue
Portland, Oregon 97232-4181
Telephone: 503-231-6118
Fax: _____

NMFS:

Regional Director
National Marine Fisheries Service
7600 Sand Point Way, N.E.
Seattle, Washington 98115-0070
Telephone: _____
Fax: _____

Names, addresses, telephone and facsimile numbers of the designated representatives may be changed at any time by notice to the other parties hereto. Notices will be deemed received when delivered personally to the office of the designated representative, on electronic confirmation that facsimile message has been received at the "fax" number most recently provided for the recipient representative, or five days after deposit in the United States registered mail, addressed to the recipient representative at the address most recently provided by the party being notified.

c. Terms Do Not Run With the Land. The terms hereof are not intended to run with the land and will not bind subsequent purchasers of timberlands in the Tree Farm except as set forth in Section 4 hereof.

d. Entire Agreement. This Agreement supersedes any and all other agreements, either oral or written, between the parties hereto with respect to the subject matter hereof and contains all of the covenants and agreements among them with respect to said matters. Each party acknowledges that no representation, inducement, promise or agreement, oral or otherwise, has been made by any other party or anyone acting on behalf of any party which are not contained herein.

e. Execution in Counterparts. This Agreement may be executed in any number of duplicate originals. A complete original of this Agreement shall be maintained in the official records of each party hereto.

f. No Third-Party Beneficiaries. This Agreement is not intended to create and does not create any third-party beneficiary interest herein in the public or in any member thereof, nor shall it authorize anyone not a party to this Agreement to maintain a suit for personal injuries, property damages or otherwise in respect hereof.

g. References to Regulations, Etc. Any reference in this Agreement or the HCP to any regulation or rule of any governmental entity including the Agencies, departments and subagencies thereof shall be deemed to be a reference to such regulation or rule as such regulation or rule is then in effect, except that if such regulation or rule has been modified after

the date hereof and if such modification was not a Mandated Modification, then at the request of Port Blakely, such reference shall be deemed to be a reference to such regulation or rule as in effect on the date of this Agreement.

h. Term of Agreement. The ITP, the HCP, and this Agreement will remain in effect for fifty (50) years from the effective date of the ITP unless earlier terminated as herein provided. Amendments to the ITP issued during the term of this Agreement for Covered Species unlisted at the time of signing of this Agreement but subsequently listed as threatened or endangered under the ESA shall remain in effect from the date such species are added to the ITP for at least the then remaining term of this Agreement.

i. Relationship to HCP. The HCP and its terms are incorporated herein by this reference. The terms of this Agreement and those of the HCP shall be interpreted as supplementary to each other, but in the event of any direct contradiction, the terms of this Agreement will control.

j. Relationship to ESA. The terms of this Agreement shall be governed by and construed in accordance with the ESA. Moreover, nothing in this Agreement is intended to limit or diminish the legal obligations and responsibilities of USFWS and NMFS as agencies of the federal government.

k. Availability of Funds. Implementation of the HCP and this Agreement by the Agencies shall be subject to the availability of appropriated funds.

IN WITNESS WHEREOF the parties hereto have caused this Agreement to be executed as of the date first above written.

PORT BLAKELY TREE FARMS (LIMITED
PARTNERSHIP)

By _____
Its _____

UNITED STATES FISH & WILDLIFE
SERVICE

By _____
Its _____

NATIONAL MARINE FISHERIES SERVICE

By _____
Its _____

**APPENDIX H: ADDENDUM TO THE HABITAT
CONSERVATION PLAN FOR THE ROBERT B. EDDY TREE
FARM, PORT BLAKELY TREE FARMS, L.P.**

10 JULY 1996

Chapter 3.0, Section 3.2 Silviculture, Page 3-3:

The following is inserted after the first sentence of the last bullet of Section 3.2:

Minimum height for snags is 12 feet.

The following is added to the end of Section 3.2:

- Without development of specific conservation measures, Port Blakely will not conduct any management activities within or adjacent to any of the following habitat types: forested wetlands >1 acre that are not related to riparian areas; non-forested wetlands >0.25 acres; bogs or fens >0.25 acres, talus slopes >0.25 acres; cliffs or caves. Note: Following extensive survey, none of these habitat types are known on the plan area.

Chapter 3.0, Section 3.33 Surface Erosion — Roads, Page 3-4.

In the third bullet of Section 3.33, the word “stream” is deleted.

Chapter 3.0, Section 3.34 Riparian Function, Page 3-5.

The following is added as a note to the text following the first bullet:

Note: Definition of a *channel migration zone*, as used here, is the same as in Washington Forest Practices, Standard Methodology for Conducting Watershed Analysis, November 15, 1995.

Chapter 3.0, New Section: 3.6 Notifications, Page 3-8:

The following is added as Section 3.6 Notifications.

Port Blakely will notify the Services at least 30 days prior to any application of pesticides >1 acre, other than those registered as herbicides or surfactant. The purpose of this notification will be to allow the Services to advise Port Blakely on any steps that should be taken to avoid or minimize impacts of the application to then-listed species.

Chapter 4.0, Section 4.22 Leave-tree Retention, Page 4-12:

The following is added to the final paragraph of Section 4.22 on page 4-12:

Likewise, the cumulative results of these retention standards will exceed the standards of WAC 222-30-020 (7/95).

Chapter 4.0, Section 4.5 Synthesis, Page 4-21:

In the first paragraph, the wording of the final sentence is changed as follows:

As an example of the overall benefits of this HCP, Appendix E summarizes associated habitat benefits for species with special status on the plan area.

Chapter 5.0, Section 5.2 Compliance Monitoring, Page 5-3:

The sixth bullet within the section is revised to read:

- Progress and results of surveys for listed species and other species of concern conducted during the previous two years.

Chapter 5.0, Section 5.2 Effectiveness Monitoring, Page 5-3:

In the third sentence of the third bullet of Section 5.2, change “(see Section 4.22)” to “(see Section 4.22 and 4.343).”

In the first sentence of the last bullet of Section 5.2, insert “LWD source distance,” following “LWD loadings,”.

The following sentence is added to the last bullet of Section 5.2:

Should repeated monitoring reveal a declining trend in stream habitats, Port Blakely will respond with incremental changes in the implementation of conservation measures and report the results of such changes to the Services.

Appendix B: Mass Wasting Analysis, Page B-1:

The word “convex” is deleted from the Medium and High categories of *Potential for Mass Wasting*.

Appendix D: Riparian Landforms, Pages D-7 to D-11:

The following is added to text of Prescriptions VII , VIII, IX, and X:

This prescription includes an area receiving minimal soil disturbance from the outermost edge of the RMZ to the edge of the drip-line of the outermost trees within the RMZ. No large equipment will enter this zone.

