Appendix F
Final Environmental Impact Statement
Tripod Fire Salvage Project

Forest Vegetation and Plant Communities

CHANGES BETWEEN DRAFT EIS AND FINAL EIS

Implementation / Marking Guide
- Added information to Burned forest habitat, snag, and coarse woody debris retention criteria and Ten Percent Area Habitat Retention Guidelines
- Revised description of Dead Trees to be Salvage Harvested
- Added information to Predicting Survival of All Other Fire-Injured Trees and revised Figure F-1

Implementation Guide – Danger Trees
- Renamed Marking Procedure as Danger Tree Identification Procedure and provided additional information to describe the procedure in greater detail

Forest Vegetation
- Revised the minimum acceptable stocking levels in Figure F-2

IMPLEMENTATION / MARKING GUIDE

The purpose of this marking guide is to implement the salvage harvest prescriptions for the Tripod Fire Salvage Project.

Treatment Objectives

Remove merchantable fire-killed trees.
Remove merchantable trees that are expected to die within 1 year after timber marking as a result of fire injuries sustained during the Tripod Fire.
Retain fire-injured trees that are predicted to survive for more than 1 year after timber marking.
Retain dead or dying trees for burned forest, snag, and coarse woody debris dependent species.

Most of the time it will not be difficult to determine if an individual tree in the Tripod Fire Project area would be considered dead or dying. Dead trees can be identified by blackened boles and the complete absence of needles, or with crowns having all brown needles, or with crowns having “fading” or “dry-appearing” (off-color) green needles throughout the crown.

At other times, it will be more difficult to determine the survivability of fire-injured trees with partially or completely green crowns. To determine a survival prediction for fire-injured trees, the “Rating Guide for Tree Survival” section is included in this guide.

Burned forest habitat, snag, and coarse woody debris retention

Criteria Common to Salvage Harvest Areas:

Retain all snags less than 10 inches DBH in all harvest units.

Retain all snags less than 12 inches DBH in harvest units located in capable lynx habitat currently in an unsuitable condition. Refer to Appendix B for a list of harvest units located in capable lynx habitat..

Retain all trees (live and dead) greater than 28 inches DBH in all harvest units (greater than or equal to 21 inches DBH in Alternative E).

Retain all trees (live and dead) greater than 18 inches DBH in harvest units CE01, CE02, CE03, CE08, GA01, and GA07.

Retain ten percent of the area within each harvest unit in an unharvested condition.

Retain 40 acres of unharvested forest habitat (including retention areas within harvest units) that is representative of post-fire conditions in all 100 acre neighborhoods within and adjacent to harvest units.

Retain 6 acres of unharvested forest habitat (including retention areas within harvest units) that is representative of post-fire conditions in all 20 acre neighborhoods within and adjacent to harvest units located in capable lynx habitat currently in an unsuitable condition. Refer to Appendix B for a list of harvest units located in capable lynx habitat.

Retain all fire injured trees that do not meet the description of a dead tree and have a moderate or high probability of surviving.

Retain all down wood including merchantable trees that are lying on the ground at the time of timber marking.

Ten Percent Area Habitat Retention Guidelines

Designate ten percent of the area in each unit to be excluded from salvage harvest. Individual non-harvest retention patches located within harvest units will have a minimum size of 0.12 acre (approximately 1/8 acre). Most patches will be circular shaped and include all trees (live and dead) with boles located within 40 feet slope distance of a designated tree located in the center of each patch. Retain eight 40 foot radius non-harvest patches for every 10 acres included in a harvest unit.. Provide for snag dependant wildlife using the following criteria to select the center trees for each retention patch using the following criteria:

Select a tree killed by the fire or fire damaged tree with a low probability of survival (refer to the following section on identifying dead trees and predicting tree survival).

Select a tree that is ≥ 10 inches DBH and ≤ 28 inches DBH.

Select a tree that has as many of the following characteristics as possible (in priority order):

1. In a location not likely to constitute a safety hazard or impede logging operations which would require the tree to be felled.
2. Is currently being used by cavity nesting wildlife.
3. Has a substantial defect such as a broken top, lightning scar, disease, or a forked, bent, or twisted bole.
4. Is large compared to other trees within 30 meters distance.

5. Is likely to remain standing for several years (not burned through at the base).
6. Ponderosa pine is favored over other tree species.
7. Provides for a scattered distribution within each harvest unit.
8. Includes additional defective trees or pre-fire snags within the 1/8 acre retention patch to form a cluster of cavity user habitat.

Circular retention patch center trees will be designated as leave trees and will be marked with two parallel bands of orange paint located at or above eye level and stump marks located on the uphill and downhill side of the tree. All other trees within circular retention patches will be designated for retention in the timber sale contract. Each patch center tree will be surrounded by trees and snags representative of current site conditions (including tree size, stem density, fire-related tree mortality, and insect and disease levels) within the 40 foot radius "no-cut" zone surrounding the tree. If designated retention patch trees must be felled during logging operations, the timber sale administrator will require replacement trees with similar characteristics to be retained nearby.

Identifying dead trees and predicting tree survival

Fire-injured trees will be evaluated to determine the probability of survival using the protocol described in the report entitled "Factors Affecting Survival of Fire Injured Trees: A Rating System for Determining Relative Probability of Survival of Conifers in the Blue and Wallowa Mountains" (Scott et al. 2002). This report and two associated amendments (Scott et al. 2003 and Scott and Schmitt 2006) are referred to as the "Scott Guidelines".

Specific measurement criteria proposed by the Forest to identify dead trees and implement the protocol to predict tree survival were reviewed and approved by Don Scott, the primary author of the Scott Guidelines and Craig Schmitt, coauthor of the Scott Guidelines and two papers that define mortality in western conifers (Schmitt and Filip 2005; Filip et al. 2007). The protocol and criteria to be used in the Tripod Fire are compatible with Pacific Northwest Region direction regarding conifer mortality determination (Goodman 2005).

Dead Trees to be Salvage Harvested

Refer to Appendix B for the range of tree diameters that will be harvested in each salvage harvest unit. Merchantable trees located outside of non-harvest retention areas that meet the following descriptions would be considered dead and available for salvage harvest:

Trees with crowns completely consumed by fire and other fire damaged trees with no live needles or live buds.

Trees with evidence of successful bark beetle attack around the complete circumference of the bole. Evidence can include beetle boring frass, woodpecker feeding activity, pouch fungus (*Cryptoporus volvatus*) conks, or loose or sloughing bark exposing insect galleries.

Mature and overmature ponderosa pines (≥ 21" dbh and usually older than 180 years) that have roots severely damaged by basal scorch will be considered dead when

dead cambium is found in all 4 quadrants out of 4 samples taken from "recesses" around the circumference of the root collar (Scott and Schmitt 2006; Filip et al. 2007). Trees other than mature or overmature ponderosa pines girdled by fire with dead or discolored cambium on three or more quadrants (bole faces) around the base of the tree at the root collar or on the top surfaces of lateral roots near the root collar (Schmitt and Filip 2005; Filip et al. 2007).

Depending on tree species, dead cambium may be recognized by galleries of bark beetles or wood borers, sapwood infiltration with resin, or phloem and cambium that is stained, dehydrated, leathery-like, sticky with resin, or infiltrated with fungal mycelium (Filip et al. 2007).

Predicting Survival of All Other Fire-Injured Trees

Fire injured trees not considered dead will be evaluated to determine the probability of survival using the protocol described in the report entitled "Factors Affecting Survival of Fire Injured Trees: A Rating System for Determining Relative Probability of Survival of Conifers in the Blue and Wallowa Mountains" (Scott et al. 2002). This report and two associated amendments (Scott et al. 2003 and Scott and Schmitt 2006) are referred to as the "Scott Guidelines".

Field testing of the rating system was conducted in the Tripod Fire area by Methow Valley Ranger District personnel and a forest entomologist and forest pathologist from the Wenatchee Pest Management Service Center of the Okanogan and Wenatchee National Forests. Field testing indicated that young and immature ponderosa pines < 21" DBH with high levels of crown scorch would rarely receive a composite rating score associated with "low" probability of surviving. This conflicted with experience from previous fires on the Forest and with the tree mortality probability tables provided for ponderosa pines in Appendix 1 of the Scott Guidelines.

Composite scores used to define young and immature ponderosa pine trees < 21 inches DBH with a "low" probability of survival were adjusted based on discussions with the primary author of the Scott Guidelines (Don Scott, pers. comm. 2007). The adjustment was made to correlate "low" survival with a mortality probability of 75 percent or higher as described in the ponderosa pine mortality tables in Appendix 1 of the Scott Guidelines. Fire damaged pine trees ≤ 16 inches DBH with scorch heights greater than 75% of total tree height would be considered to have a "low" probability of survival with the adjustment. Fire damaged pine trees 16.1 to 20.9 inches DBH with scorch heights greater than 80% of total tree height would be considered to have a "low" probability of survival with the adjustment. Adjusted composite scores to be applied in the Tripod Fire Salvage Project for young and immature ponderosa pines with "low" probability of survival probabilities are described in the following tree survival scoring guide.

Merchantable fire injured trees in salvage harvest units (located outside of non-harvest retention areas) rated by the following Scoring guide for rating tree survival in the Tripod Fire with a composite rating score that falls within a "Low" probability to survive decision class will be available for harvest. Refer to Appendix B for the range of tree diameters to be harvested in each salvage unit.

Figure F-1: Scoring guide for rating tree survival in the Tripod Fire

Young and Immature Ponderosa Pine (Small Trees ≤ 16 inches DBH)	
High Probability of Tree Surviving = Composite Rating Score	3-8
Moderate Probability of Tree Surviving = Composite Rating Score	10-13
Low Probability of Tree Surviving = Composite Rating Score (with total scorch height greater than 75% of total tree height)[1]	14-15*
Low Probability of Tree Surviving = Composite Rating Score	16-21*
Young and Immature Ponderosa Pine (Large Trees 16.1 to 20.9 inches DBH)	
High Probability of Tree Surviving = Composite Rating Score	3-9
Moderate Probability of Tree Surviving = Composite Rating Score	13-16
Low Probability of Tree Surviving = Composite Rating Score (with total scorch height greater than 80% of total tree height)[2]	17-19*
Low Probability of Tree Surviving = Composite Rating Score	20-25*
Mature and Overmature Ponderosa Pine (Trees ≥ 21 in. DBH; usually >180 years old)	
High Probability of Tree Surviving = Composite Rating Score	1-7
Moderate Probability of Tree Surviving = Composite Rating Score	8-15
Low Probability of Tree Surviving = Composite Rating Score	16-24
Young and Immature Douglas-fir (< 20 in. DBH)	
High Probability of Tree Surviving = Composite Rating Score	3-6
Moderate Probability of Tree Surviving = Composite Rating Score	8-16
Low Probability of Tree Surviving = Composite Rating Score	17-25
Mature and Overmature Douglas-fir (≥ 20 in. DBH)	
High Probability of Tree Surviving = Composite Rating Score	3-10
Moderate Probability of Tree Surviving = Composite Rating Score	11-17
Low Probability of Tree Surviving = Composite Rating Score	18-31*
All Size Classes of Engelmann spruce	
High Probability of Tree Surviving = Composite Rating Score	2-6
Moderate Probability of Tree Surviving = Composite Rating Score	9-14
Low Probability of Tree Surviving = Composite Rating Score	17-33*
All Size Classes of Lodgepole Pine	
High Probability of Tree Surviving = Composite Rating Score	2-5
Moderate Probability of Tree Surviving = Composite Rating Score	6-10
Low Probability of Tree Surviving = Composite Rating Score	12-30*
All Size Classes of Western Larch	
High Probability of Tree Surviving = Composite Rating Score	3-6
Moderate Probability of Tree Surviving = Composite Rating Score	7-13
Low Probability of Tree Surviving = Composite Rating Score	14-17
All Size Classes of Subalpine Fir	
High Probability of Tree Surviving = Composite Rating Score	3-4
Moderate Probability of Tree Surviving = Composite Rating Score	5-10
Low Probability of Tree Surviving = Composite Rating Score	11-30

(* indicates where the composite rating score for predicting tree survival has been adjusted for the Tripod Fire Salvage Project)

1 Based on Tree Mortality Probability Tables 3-5 provided in Appendix 1 of the Scott Guidelines.2 Based on Tree Mortality Probability Tables 6 and 7 provided in Appendix 1 of the Scott Guidelines.

Specific assumptions for the Tripod Fire were developed for some rating factors in the Scott Guidelines. The following assumptions and criteria will be applied when rating fire injured trees in the Tripod Fire with the Scott Guidelines to determine the probability of survival:

Factor 1 The Tripod Fire was a late season fire. All areas considered for salvage burned on or after August 1.

Factor 2 Trees generally exhibit good growth and vigor on northerly aspects with deep soils. Trees generally exhibit poor growth and vigor on east, south, and westerly aspects.

Factor 4 Dwarf mistletoe does not occur in ponderosa pine within the Tripod Fire Salvage Project area. Subalpine fir and Engelmann spruce are not affected by dwarf mistletoe. Factor 4 will not be applied when ponderosa pine, subalpine fir and Engelmann spruce are rated to determine the probability of survival.

Factor 6 All salvage harvest units with fire-injured ponderosa pine, lodgepole pine, and Engelmann spruce are located within less than 0.25 mile from bark beetle infestations that could attack these species. Douglas-fir beetle infestations are located within 0.25 to 2.0 miles from all salvage units with fire-injured Douglas-fir. Bark beetle infestations that could attack fire-injured subalpine fir are located more than two miles away from salvage harvest units (Connie Mehmel, pers. comm. 2007).

Factor 9 Total scorch height criteria for young and immature ponderosa pines < 21 inches DBH were calculated based on tree height and diameter data collected in the Tripod Fire area. These data were collected in proposed salvage harvest units and a linear regression equation for tree heights and diameters was developed. This information was used to estimate tree mortality probabilities with Behave Plus model (Andrews and Bevins 1999) and develop revised scorch height rating factors that accurately represent the size of fire damaged ponderosa pines in the salvage project area.

The revised total scorch height scores for fire-injured ponderosa pines < 21 inches DBH are as follows:

Trees 9 inches DBH	Score
Total scorch height 0 to 29 feet	1
Total scorch height 30 to 34 feet	2
Total scorch height ≥ 35 feet	3

Trees 12 inches DBH	Score
Total scorch height 0 to 36 feet	1
Total scorch height 37 to 42 feet	2
Total scorch height ≥ 43 feet	3

Trees 15 inches DBH	Score
Total scorch height 0 to 44 feet	1
Total scorch height 45 to 50 feet	2
Total scorch height ≥ 51 feet	3

Trees 18 inches DBH	Score
Total scorch height 0 to 52 feet	1
Total scorch height 53 to 59 feet	2
Total scorch height ≥ 60 feet	3

Trees 20.9 inches DBH	Score
Total scorch height 0 to 61 feet	1
Total scorch height 62 to 69 feet	2
Total scorch height ≥ 70 feet	3

IMPLEMENTATION GUIDE – DANGER TREES

The purpose of this guide is to implement danger tree felling and removal treatments for the Tripod Fire Salvage project. One of the underlying needs of the project is to improve public safety for visitors within the project area by reducing hazards associated with danger trees in areas where they travel and recreate. The objective of this guide is to identify and remove trees in those areas which pose a potential hazard. The majority of these trees have been damaged or killed by the Tripod Fire.

A Danger Tree*...is any tree that is hazardous to people or facilities because of:*

location
lean
physical damage
overhead hazards
deterioration of limbs, stem or root system
a combination of the above.

Chapter 2 of the Final Environmental Impact Statement is excerpted below

Roadside Danger Tree Removal

Roadside danger trees will be felled along Forest roads open for public use (Objective Maintenance Level 2 and higher). On closed roads (Objective Maintenance Level 1) that are temporarily opened during implementation of project (salvage harvest and post-harvest) activities, danger trees expected to become a hazard would be felled. Danger trees located within riparian habitat conservation areas (RHCAs) would be cut and left to provide additional coarse woody debris. Danger trees felled outside of RHCAs would be available for removal as firewood or other forest products where economically feasible. Tracked or wheeled equipment used to remove danger trees located outside of ground based logging salvage harvest units would not be permitted to operate off of roads.

Danger trees along roads would be evaluated in accordance with the *Field Guide for Danger Tree Identification and Response*, Pacific Northwest Region 2005 (USDA 2005 and USDI 2005a). Qualified persons as defined in the aforementioned field guide will identify and evaluate danger trees. A danger tree is defined as any standing tree that presents a hazard to people due to conditions such as, but not limited to, deterioration or physical damage to the root system, trunk, stem, or limbs and the direction or lean of the tree (FSM 7733). The Field Guide classified danger trees into three categories; low, likely or imminent potential to fail.

Only danger trees with an imminent potential to fail and a potential failure zone that includes roads open for public use or closed roads temporarily opened for project activities will be felled. Trees with an imminent potential to fail are so defective or rotten that little effort is required to make them fail. The potential failure zone usually includes the area within one and one-half tree lengths from the base of the tree, and this can vary depending on slope, tree height, lean, individual tree characteristics, and other factors.

DANGER TREE IDENTIFICATION PROCEDURE

Roadside danger trees will be identified and evaluated according to the process described in the Field Guide for Danger Tree Identification and Response, Pacific Northwest Region, 2005 (USDA 2005 and USDI 2005a). Qualified persons will identify and evaluate danger trees as required by the field guide. A qualified person is defined as a person who has knowledge, training, and experience in identifying danger trees, their potential failure zones, and measures to eliminate the danger. Fell all danger trees in the imminent potential to fail category with potential failure zones that include a Forest road open for public use (maintenance objective level 2 or higher) or a road temporarily opened during the implementation of salvage harvest and post-harvest activities (maintenance objective level 1). As a general rule, the potential failure zone will include the area located 100 feet slope distance above and below the road. See the descriptions listed below.

Potential Failure Zone

The potential failure zone is the area that could be reached by any part of a failed tree. When a tree fails, the tree or its parts may strike other trees and cause them to fail as well. The parts may slide or roll. This is especially true in dead timber. When determining the failure zone, the following conditions must be evaluated:

- Portion of tree that has a potential to fail.
- Ground slope.
- Amount and direction of lean.
- Height of tree.

Imminent

Identify tree defects and determine the tree's potential to fail.
A tree may have an **imminent potential to fail**, if it is so defective or rotten, that it would take little effort to make it fail during project implementation. It is much more apt to fail

than those trees rated as likely to fail. Trees with an imminent potential to fail include those that have the following conditions (1, Pgs. 35-65):

Root sprung.
Recent lean.
Missing bole wood due to fire or damage.
Significant heart or sap rot.
Loose bark.
Dwarf mistletoe bole swellings if they have decay that extends to an area more than half of the bole diameter.
Fungus cankers on the bole when the canker width is more than half of the bole diameter.
Dead tops with significant sap rot.
Hung up tops, limbs, or hung up tops.
Dead trees which are not sound.
Fire damaged or killed trees which are not sound.
Trees with multiple defects.

FOREST VEGETATION

Figure F-2: Minimum Tree Stocking Standards

Forest Type	Plant Association Group(s)	Minimum Acceptable Stocking: Live Trees per Acre[1]
Dry Forest	hot-dry ponderosa pine and Douglas-fir	50
Dry Forest	warm-dry Douglas-fir	60
Dry Forest	warm-mesic Douglas-fir	100
Mixed Conifer	cool-dry Douglas-fir	80
Mixed Conifer	cool-mesic Douglas-fir < 5,000' elevation	100
Montane Forest	cool-dry subalpine fir	100
Montane Forest	cool-mesic Douglas-fir > 5,000' elev. & cool-mesic, cold-mesic, and cold dry subalpine fir	200

1. Minimum acceptable stocking for planted sites is at the third year following planting. Planted and natural seedlings must be at least 12 inches tall and free of damage to be counted. Seedlings must be well distributed within reforestation units.

Figure F-3: Tree Planting Recommendations

Plant Association Groups (PAG)	Seedlings per acre[1]	Average Spacing	Approximate Species Composition of Planting Mix (Percent)					
			PP*	DF**	ES	WL***	LP****	SF
hot-dry ponderosa pine & Douglas-fir	151	17 feet	100%	NR				
warm-dry Douglas-fir	170	16 feet	100%	NR				
warm-mesic Douglas-fir	222	14 feet	80% or greater	20% or less				
cool-dry Douglas-fir	194	15 feet	60% or greater	20% or less		20% or less	NR	
cool-mesic Douglas-fir < 5,000' elev.	222	14 feet	50% or less	20% or less		30% or greater	NR	
cool-dry subalpine fir	194	15 feet	30% or less	70% or greater			NR	NR
cool-mesic Douglas-fir > 5,000' elev.	222	14 feet	20% or less	60% or greater		20% or less	NR	
cool-mesic & cold-mesic subalpine fir	302	12 feet		40% or greater	40% or greater	20% or less	NR	NR
cold-dry subalpine fir	302	12 feet			10% or less	20% or less	70 % or greater	NR

Species column heading codes are: PP = ponderosa pine; DF = Douglas-fir; ES = Engelmann spruce; WL = western larch; LP = lodgepole pine; SF = subalpine fir. NR = natural regeneration (indicating species expected to establish without planting)

Species compositions for planting mix recommendations are based on plant association guides for the Okanogan and Wenatchee National Forests (Williams and Lillybridge 1983. and Lillybridge et al 1995) and consultation with John Townsley, silviculturist, Okanogan and Wenatchee National Forests.

***** The proportion of ponderosa pine in the planting mix may be increased on southerly aspects (southeast to southwest) and decreased on northerly aspects (northeast to northwest) in the cool-dry Douglas-fir and cool-mesic Douglas-fir < 5,000' elevation PAGs. Plant ponderosa pine in the cool-mesic Douglas-fir > 5,000' elevation PAG only on sites where it was present prior to the fire.

****** Plant Douglas-fir in the warm-mesic Douglas-fir, cool-dry Douglas-fir, or cool-mesic Douglas-fir < 5,000' elevation PAGs where Douglas-fir stocking is desired and Douglas-fir natural regeneration is not likely to occur.

******* Western larch may be included in the planting mix within its naturally occurring range. Western larch may be substituted for Douglas-fir where appropriate in the cool-dry Douglas-fir PAG and cool-mesic Douglas-fir < 5,000' elevation PAG. Outside of the natural range of western larch, the proportion of other species in the recommended planting mix may increase.

******** Include lodgepole pine in the planting mix on sites in the cool-mesic Douglas-fir > 5,000' elevation PAG and the cool-dry, cool-mesic, and cold-mesic subalpine fir PAGs where prescribed natural regeneration treatments are unsuccessful and lodgepole pine was present in the stand prior to the fire. Substitute lodgepole pine for western larch, ponderosa pine, or Douglas-fir to create a planting mix that approximates the proportion of lodgepole pine stocking present prior to the fire.

1. Actual number of seedlings per acre planted will be developed in site specific prescriptions prepared by a silviculturist.

Figure F-4: Forest Habitat Types and Plant Association Groups

Forest Habitat Type	Plant Association Group	Plant Association[1]
Dry Forest	hot–dry ponderosa pine	ponderosa pine/pinegrass-bluebunch wheatgrass
Dry Forest	hot–dry ponderosa pine	ponderosa pine/bitterbrush-bluebunch wheatgrass
Dry Forest	hot–dry Douglas-fir	Douglas-fir/bitterbrush
Dry Forest	hot–dry Douglas-fir	Douglas-fir/bitterbrush/ bluebunch wheatgrass
Dry Forest	cool–dry Douglas-fir	Douglas-fir/bitterbrush/pinegrass
Dry Forest	hot–dry Douglas-fir	Douglas-fir/pinegrass-bluebunch wheatgrass
Dry Forest	hot–dry Douglas-fir	Douglas-fir/common snowberry/ bluebunch wheatgrass
Dry Forest	warm–dry Douglas-fir	Douglas-fir/bearberry-bitterbrush
Dry Forest	warm–dry Douglas-fir	Douglas-fir/bearberry
Dry Forest	warm–dry Douglas-fir	Douglas-fir/bearberry/pinegrass
Dry Forest	warm–dry Douglas-fir	Douglas-fir/mountain snowberry
Dry Forest	warm-mesic Douglas-fir	Douglas-fir/common snowberry
Dry Forest	warm-mesic Douglas-fir	Douglas-fir/common snowberry/pinegrass
Mixed Conifer	cool–dry Douglas-fir	Douglas-fir/pinegrass
Mixed Conifer	cool–dry Douglas-fir	Douglas-fir/pachistima/pinegrass
Mixed Conifer	cool–dry Douglas-fir	Douglas-fir/pachistima
Mixed Conifer	cool–dry Douglas-fir	Douglas-fir/shiny-leaf spirea/ pinegrass
Mixed Conifer	cool–mesic Douglas-fir (below 5,000 feet elevation)	Douglas-fir/dwarf huckleberry
Mixed Conifer	cool–mesic Douglas-fir (below 5,000 feet elevation)	Douglas-fir/low huckleberry
Mixed Conifer	cool–mesic Douglas-fir (below 5,000 feet elevation)	Douglas-fir/low huckleberry/pinegrass
Montane	cool–dry subalpine fir	Subalpine fir/pinegrass
Montane	cool–dry subalpine fir	Subalpine fir/pachistima/pinegrass
Montane	cool–mesic Douglas-fir (above 5,000 feet elevation)	Douglas-fir/dwarf huckleberry
Montane	cool–mesic Douglas-fir (above 5,000 feet elevation)	Douglas-fir/low huckleberry
Montane	cool–mesic Douglas-fir (above 5,000 feet elevation)	Douglas-fir/low huckleberry/pinegrass
Montane	cool-mesic subalpine fir	Subalpine fir/pachistima
Montane	cool-mesic subalpine fir	Subalpine fir/twinflower
Montane	cool-mesic subalpine fir	Subalpine fir/dwarf huckleberry
Montane	cool-mesic subalpine fir	Subalpine fir/big huckleberry
Montane	cold-mesic subalpine fir	Subalpine fir/Cascade azalea
Montane	cold-mesic subalpine fir	Subalpine fir/Cascade azalea/ smooth woodrush
Montane	cold-mesic subalpine fir	Subalpine fir/grouse huckleberry/ smooth woodrush
Montane	wet subalpine fir	Engelmann spruce/equisetum
Montane	cold-dry subalpine fir	Subalpine fir/grouse huckleberry
Montane	cold-dry subalpine fir	Subalpine fir/grouse huckleberry/pinegrass

1. Lillybridge et al. 1995

Figure F-5: Scientific and Common Plant Names

Scientific Name	Common Name
Abies lasiocarpa	Subalpine Fir
Acer circinatum	Vine Maple
Agropyron spicatum	Bluebunch wheatgrass
Alnus incana	Mountain Alder
Alnus sinuata	Sitka Alder
Amelanchier alnifolia	Serviceberry
Arctostaphylos uva-ursi	Bearberry or Kinnikinnick
Artemisia species	Sagebrush
Betula papyrifera	Paper Birch
Calamagrostis rubescens	Pinegrass
Ceanothus velutinus	Snowbrush ceanothus
Equisetum species	Horsetail
Gaultheria ovatifolia	Western Teaberry
Gymnocarpium dryopteris	Pacific Oakfern
Larix lyallii	Subalpine Larch
Larix occidentalis	Western Larch
Linnaea borealis v. longiflora	Twinflower
Lupinus species	Lupines
Menziesia ferruginea	Rusty Menziesia
Pachistima myrsinites	Oregon Boxwood or Pachistima
Picea engelmannii	Engelmann Spruce
Pinus albicaulis	Whitebark Pine
Pinus contorta	Lodgepole Pine
Pinus ponderosa	Ponderosa Pine
Populus tremuloides	Quaking Aspen
Populus trichocarpa	Black Cottonwood
Pseudotsuga menziesii	Douglas Fir
Purshia tridentata	Bitterbrush
Rhododendron albiflorum	Cascade Azalea
Rubus acaulis	Dwarf Raspberry
Salix glauca	Grayleaf Willow
Salix tweedyi	Tweedy's Willow
Saxifraga rivularis	Weak Saxigrage
Spiraea betulifolia lucida	Shinyleaf Spirea
Symphoricarpus albus	Common snowberry
Vaccinium alaskense	Alaska Blueberry
Vaccinium caespitosum	Dwarf Huckleberry
Vaccinium membranaceum	Big Huckleberry
Vaccinium scoparium	Grouse Huckleberry or Grouse Whortleberry
Valeriana sitchensis	Sitka Valerian