POTR/CARU ASSOCIATION HQG1 11

Populus tremuloides/Calamagrostis rubescens
quaking aspen/pinegrass

DISTRIBUTION AND ENVIRONMENT

The POTR/CARU Association is a minor type on the Colville N.F. The seven plots representing the type are from the Okanogan N.F. The limited data suggests the type is found primarily on upland habitats. Stands were located on gentle slopes (11-31%) on south to west aspects. Elevations ranged from 4200 to 6200 ft.

Soils have a moderate humus layer derived from decaying aspen leaves and herbs. Many aspen and herb roots are concentrated in this layer. The moist mineral soil is often high in organic matter. Soil textures on the few soil pits ranged from silty clay to fine sandy loams over gravelly subsoils. Compacted subsoils often curtailed root growth as well as causing water retention near the soil surface.

VEGETATION

Plot data indicates a well-defined type with undergrowth vegetation similar to the PSME/CARU Association. Quaking aspen dominates the overstory and regeneration layers. Conifers are present in many stands and include (in order of importance) lodgepole pine, Douglas-fir and western larch. Some of these communities appear stable but others are apparently successional to the PSME/CARU or possibly ABLA2/CARU Associations. Shrubs are poorly represented except in early serai stages. Pinegrass dominates the herb layer. Other common herbs include California brome, blue wildrye, lupine spp. and western meadowrue.

Table 84. Common plants of the POTR/CARU Association (n=7).

		CON	COVER
TREE OVERSTORY LAYER			
POTR	quaking aspen	100	42
PICO	lodgepole pine	57	8
LAOC	western larch	73	11
TREE UNDERSTORY LAYER			
POTR	quaking aspen	86	13
SHRUBS AND SUBSHRUBS			
SHCA	russett buffaloberry	42	3
HERBS			
CARU	pinegrass	100	59
BRCA	California brome	57	2
LUPIN	lupine spp.	86	4
THOC	western meadowrue	86	15
ELGL	blue wildrye	42	9

MANAGEMENT IMPLICATIONS

Wildlife/Range- POTR/CARU stands provide important habitat for various birds and other wildlife species (Thomas *et al.* 1979). Common flickers, black-capped chickadees, hairy woodpeckers and yellow-bellied sapsuckers are a few of the bird species which nest in aspen stands. Deer and ocassionally, moose and elk, have been observed feeding and bedding in aspenstands. Deer frequently use aspen

Figure 138. Photo of the POTR/CARU Association.

stands for fawning areas (Kovalchik 1987). Although small in area, aspen provides a critical source of landscape diversity and should be managed with emphasis on providing habitat for wildlife (Kovalchik 1987).

Herbage production is considerably greater than virtually any other plant association described in this classification. Two plots averaged 1,212 Ibs. of herbage per acre, and use by all classes of wild and domestic ungulates is high. Many stands have been heavily grazed, changing the understory dominance from pinegrass to species such as Kentucky bluegrass, blue wildrye and various native and introduced bromes and forbs. Overgrazing may eventually eliminate both aspens and conifers, converting sites to herbaceous meadows.

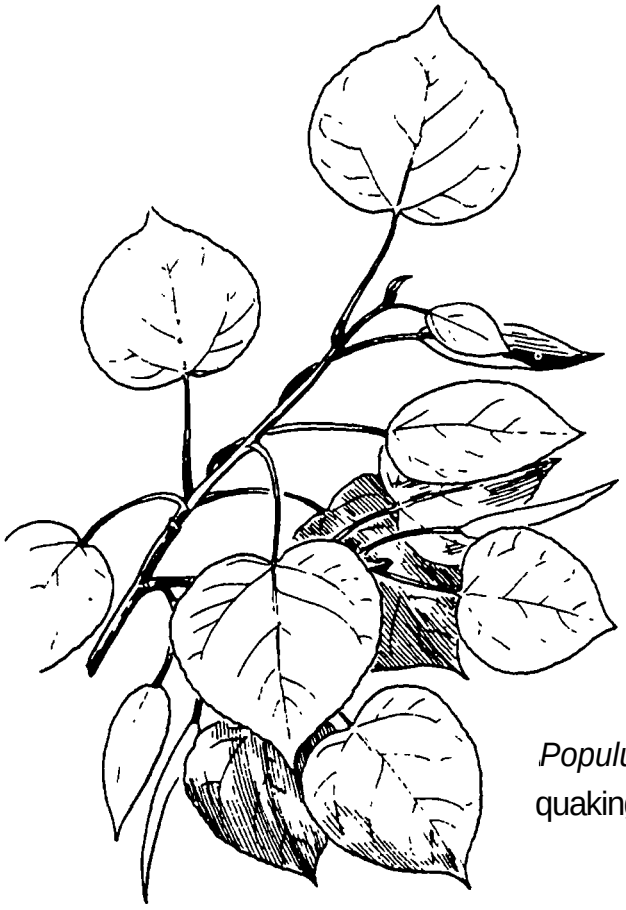
Silviculture- Growth rates and stocking appear moderate compared to POTR/SYAL. Two intensive plots had basal area averages of 130 sq. ft./acre, while site index values for western larch and lodgepole pine averaged 55 and 49 ft., respectively (50 year basis). Although conifers are present on many plots, succession to conifer climax appears to be very slow Managers should consider the important ecological diversity provided by aspen groves when planning management activities for these stands. Clearcutting will favor aspen while partial cutting may favor conifer species (Kovalchik 1987) Cutting should not result in any significant increase in water tables on POTR/CARU sites.

The dense pinegrass sod will provide considerable competition with conifer regeneration, especially after clearcutting or in very open stands.

Fire suppression has contributed to the conversion of aspen stands to conifers or meadows (Kovalchik 1987). Fire can be an important tool for stimulating aspen suckers and rejuvenating deteriorating stands. Protection from browsing may also be needed for enhancement of aspen stands.

COMPARISONS

Similar POTR/CARU types have been described in the Intermountain Region (Mueggler 1988, Mueggler and Campbell 1982) and also for northcentral Washington (Williams and Lillybridge 1983). The POTR/CARU Association has been observed on the Wenatchee N.F. in central Washington and in parts of Montana,



Populus tremuloides
quaking aspen

PSME/ARUV ASSOCIATION CDG1 23

Pseudotsuga menziesii/Arctostaphylos uva-ursi

Douglas-fir/bearberry

DISTRIBUTION AND ENVIRONMENT

The PSME/ARUV Association is a minor type on the Colville N.F. and there are few plots representative of it. It was not described in the field version of this guide (Williams *et al.* 1990) but subsequent field observations and additional data analysis indicates that it deserves mentioning as an incidental type. The type is more common on the Okanogan N.F. than on the Colville N.F. It is most common on the Republic and Kettle Falls Ranger Districts, but may be found on the other ranger districts as well.

The PSME/ARUV Association characterizes west or south facing aspects on slopes steeper than 20%, usually with exposed rock or boulders. The type occurs on mid- to upper-slope positions or rocky ridgetops with moderate to steep slopes on warm aspects. Elevations usually range between 4,000 and 5,500 ft. Most sites have considerable surface rock exposed, and are generally convex in shape. Gentle slopes and glacial outwash terraces and terra»e sideslopes may key to the type but most of these sites seem best viewed as a warm-dry extension of the PSME/VACA Association.

Soils are formed in mixed glacial till and colluvium. Soils are effectively shallow usually with less than 20 in. (50 cm) of rooting depth with 30% or more gravels and cobbles in the profile. Some ash may be mixed in the upper horizons but the lower horizons are invariably high in rock content that limits root development.

VEGETATION

Typically these are open forest stands with a low growing undergrowth (Figure 139). Douglas-fir dominates mid to late serai and climax stands Ponderosa pine, western larch and lodgepole pine are usually part of the tree sere and ponderosa pine and western larch may linger as relics for centuries. Lodgepole pine is shorter lived are rarely persists in the stands past 200 years. All of the mentioned tree species are capable of pioneering on these habitats, but only Douglas-fir is tolerant enough to persist in the absence of disturbances such as fire. Douglas-fir is the only significant regeneration species although any of the serai species may reproduce in openings.

The undergrowth is a mixture of prostrate shrubs, low-growing shrubs, grasses and forbs. Bearberry is the characteristic species and usually the dominant shrub component. Shiny-leaf spirea and pachistima are the other common shrubs. Pinegrass and northwestern sedge are the dominant herbaceous species. Grass and forb cover is often variable; apparently because of differences in soil depth, surface rock exposure and past grazing use. Other forbs may be abundant but seldom have any consistency between stands.

Figure 139. Photo of the PSME/ARUV Association.

MANAGEMENT IMPLICATIONS

Wildlife/Range- Sites are often extensively grazed by domestic livestock and many areas are in old sheep driveways. We speculate that past abusive grazing may have altered sites that formerly supported the PSME/CARU or perhaps even the ABLA2/CARU Associations to PSME/ARUV conditions through soil erosion offine-textured materials and consequent proportional increase in rock content of the remaining regolith. The type has value for wildlife because the exposed, upper elevation sites become snow-free early in the season and snow removal by wind reduces snow depths.

Silviculture- Growth rates tend to be slow and few trees attain diameters greater than 30 inches even after 200 or more years of growth. This may be due to landscape level fire patterns more than intrinsic environmental differences. Environmental extremes make tree regeneration difficult. Problems include large diurnal temperature range, strong pinegrass competition, droughty soil, rocky sites and winter kill by desiccation. In addition, many stands are near the upper elevation limits for the Douglas-fir Series and night time frost may be a problem. Young trees need shelter from excessive sun, high daytime soil temperatures and re-radiation frost at night. Expect severe regeneration problems on clearcuts. Broadcast burning may cause mortality to planted trees because blackened soil surfaces may raise temperatures at the soil surface to lethal levels. Sites are often so

stony that planting of trees is very difficult or impossible. All of these factors made tree establishment difficult. Clearcuts may remain unforested for decades. Shelter is essential for regeneration, providing some type of protection from high insolation rates. As the forest canopy closes the sites become more suitable for Douglas-fir establishment. Dwarf mistletoe is common in Douglas-fir trees on these sites, as is western pine beetle on ponderosa pine. The presence of armillaria and laminated root rot is common, primarily infecting Douglas-fir.

Many mature trees greater than 10" DBH have charcoal on the bark and fire scars are common. Light underbums were probably common on this type under pre-settlement conditions. Upper slope sites are pre-disposed to lighting strikes and natural fire frequencies appear to have occurred on 5 to 20 year intervals. Most of the important undergrowth species are well adapted to frequent, light underbums. These adaptations usually include rapid resprouting combined with a rhizomatous growth habit. This combination allows a species to rapidly re-establish itself following fire. Snowbrush ceanothus is a common serai shrub after a fire or similar disturbance and may persist for decades even under a tree canopy because of the open nature of many stands. Russet buffaloberry is another nitrogen-fixing shrub that forms an important part of the sere after wildfire. Pinegrass is the major herb and responds vigorously to most disturbances and is especially well adapted to periodic underbuming. Several of our plots also contain low huckleberry. These sites are all on south aspects and may reflect some environmental variation our data are inadequate to reflect.

COMPARISONS

Lillybridge *el al.* (1995) describe an PSME/ARUV/CARU Association which is nearly identical to the type described for the Colville N.F. Pfister *et al.* (1977) describe a PSME/ARUV Habitat Type for central Montana, but species composition and environmental conditions are different. Brayshaw (1965) in British Columbia describes a PSME-PIPO/ARUV association that appears comparable to ours. Most Canadian workers defined their associations more broadly than us so types are often not directly comparable. Daubenmire and Daubenmire (1968) in eastern Washington and northern Idaho, and Pfister *et al.* (1977) in Montana, Steele *et al.* (1981) in central Idaho, Cooper *et al.* (1991) in north Idaho and McLean (1970) in the southern interior of British Columbia all describe a PSME/CARU Habitat Type-Bearberry Phase following the pattern set by Daubenmire and Daubenmire (1968). However, some of these sites may better fit our PSME/VACA Association.

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APPENDIX 1

- Selected plant species adaptations to fire
- List of important trees, shrubs, subshrubs and herbs
- Mean cover and constancy of important plant species by plant association

Table 85. Summary of postfire survival strategy and fire response for some shrubs and herbaceous plants occurring in forests west of the Continental Divide in Montana.

SPECIES	POSTFIRE SURVIVAL STRATEGY	COMMENTS ON FIRE RESPONSE
SHRUBS		
Ainus sinuata Sitka alder	Sprouts from surviving root crown.	Usually increases on site following fire. Early seed production (after 5 years) aids in this increase.
Acer circinatum Vine maple	Sprouts from surviving root crown.	Shade tolerance allows it to persist between fires and then resprout and increase in density after a fire. Characteristic of strongly maritime environments.
Acerglabrum var. *douglasn* Douglas maple	Sprouts from surviving root crown.	Less shade tolerant than *A. circinatum* but responds in a similar fashion. Characteristic of relatively xeric to mesic sites Usually increases following fire.
Amelanchier ainifolia Western servicebeny	Sprouts from surviving root crown, frequently producing multiple stems.	Pioneer species, usually survives even severe fires especially if soil is moist at time of fire. Coverage usually increases following fire.
Arctostaphylos nevadensis Pmemat manzanita	May sprout from a root crown; regeneration from stolons more common. May have somewhat fire-resistant seeds.	Susceptible to fire-kill. Will survive some low severity fires when duff is moist and therefore not consumed by fire May invade burned area from unbumed patches.
Arctostaphylow uva-ursi Bearberry (kinnikinnik)	Similar to A. *nevadensis.*	See *A. nevadensis*
Artemisia arbuscula Low sagebrush	Wind-dispersed seed.	Individual shrubs are susceptible to fire-kill. Reseeds from adjacent unbumed areas. Does not respout.
Artemisia tridentata vaseyana Mountain big sagebrush	Wind-dispersed seed. Subspecies *vaseyana* stores seed in the soil that germinates as a result of fire-induced heating.	Individual shrubs are susceptible to fire-kill. Recovery is hastened when a good seed crop exists before burning.

Table 85. continued.

SPECIES	POSTFIRE SURVIVAL STRATEGY	COMMENTS ON FIRE RESPONSE
Artemisia tripartitia Three-tip sagebmsh	Wind dispersed seed. Sprouts from a surviving root crown.	One of the few sagebrush species that resprouts after a fire. Hot fires under drought conditions may kill the plants. Fires when the soil is moist are more favorable for resprouting.
Berberis repens Creeping Oregon grape	Sprouts from surviving rhizomes that grow 0.5 to 2 inches (1 -5 to 5 cm) below soil surface.	Moderately resistant to fire-kill. Usually survives all but severe fires that remove duff and cause extended heating of upper soil.
Ceanothus sanguineus Redstem ceanothus	Soil-stored seed germinates following heat treatment. It can also sprout from root crowns following a cool fire.	Usually increases following fire, often dramatically. Seeds may remain dormant in the soil for decades until fire or mechanical scarification breaks seed dormancy.
Ceanothus velutinus Snowbrush ceanothus	Similar to C. *sanguineus.*	See C. *samguineus.*
Comus canadensis Bunchberry dogwood	Sprouts from surviving rhizomes growing 2 to 5 inches (5 to 13 cm) below soil surface	Moderately resistant to fire-kill. Will survive all but severe fires that remove duff and cause extended heating of upper soil.
Comus stolonifera Red-osier dogwood	Sprouts from surviving rhizomes or stolons (runners).	Susceptible to fire-kill. Will survive all but severe fires that remove duff and cause extended heating of upper soil.
Holodiscus discolor Oceanspray	Regenerates from soil-stored seed or sprouts from surviving root crown	Moderately resistant to fire-kill Is often enhanced by fire.
Juniperus communis Common juniper	Bird-dispersed seed.	Susceptible to fire-kill. Seed requires long germination period.
Juniperus horizontalis Creeping juniper	Similar to *J. communis.*	See./, *communis*
Ledum glandulosum Western ledum	Fire avoider, rhizomes.	Unknown, probably poor response.

Table 85. continued.

SPECIES	POSTFIRE SURVIVAL STRATEGY	COMMENTS ON FIRE RESPONSE
Linnaea borealis longiflora Twinflower	Sprouts from surviving root crown located just below soil surface. Fibrous roots and runners at soil surface.	Susceptible to fire-kill. May survive some cool fires where duff is moist and not consumed. Can invade burned area from unbumed patches.
Lonicera utahensis Utah honeysuckle	Sprouts from surviving root crown.	Often has a reduction in cover and frequency following fire.
Memiesia ferruginea Rusty menziesia	Normally a fire avoider. Sprouts from surviving root crown if duff is not burned.	Susceptible to fire-kill. Moderate to severe fires reduce survival and slow redevelopment.
Opiopanax horridum Devil's club	May sprout from root crown.	Susceptible to fire-kill.
Pachistima myrsinites Pachistima	Sprouts from surviving root crown and from buds along taproot	Moderately resistant to fire-kill. Usually survives low to moderate severity fires that do not consume the duff and heat soil excessively. Usually increases.
Philadelphus lewisii Lewis mockorange	Sprouts from root crown.	Fire resistant; a vigorous resprouter.
Physocarpus malvaceus Mountain ninebark	Sprouts from surviving root crown or horizontal rhizomes.	Fire resistant. Resprouts well although spreading may be somewhat delayed.
Potentilla fruticosa Shrubby cinquefoil	Sprouts from surviving root crown.	Susceptible to fire-kill, but may survive low to moderate fires.
Prunus emargmata Bittercheny	Sprouts from surviving root crown, perhaps from short rhizomes.	Oten increases in cover after a fire. Multiple sprouts often increase density of stems.
Prunus virgimana Chokecherry	Sprouts from surviving root crown; occasionally from rhizomes.	Usually increases coverage following fire.

Table 85. continued.

SPECIES	POSTFIRE SURVIVAL STRATEGY	COMMENTS ON FIRE RESPONSE
Purshia tridentata Bitterbrush	A weak sprouter. Animal-dispersed seed and seed caches present on area prior to fire.	Susceptible to fire-kill, especially in summer and fall. Rarely seen decumbent growth form sprouts vigorously, columnar form sprouts weakly if at all and sprouts rarely persist more than a season or two. Spring bums enhance sprouting, fall bums are best for regeneration by seed
Rhododendron albiflorum Cascades azalea	A fire avoider Weak sprouter from root crown.	Susceptiable to fire kill. Rarely resprouts except where duff was not consumed.
Ribes cereum Wax currant	Weak sprouter from root crown, soil stored seed	Dry habitat makes individual shrubs susceptible to fire kill. Stored seed in soil may germinate after a fire. Rarely increases after a fire.
Ribes lacustre Prickly currant	Sprouts from surviving root crown that is located beneath soil surface.	Resistant to fire-kill. Usually increases even after severe fire. Seedlings may establish after low or moderate fires
Ribes viscosissimum Sticky currant	A weak sprouter; soil-stored seed may require heat treatment. Seeds remain viable in the soil for years.	Relatively shade intolerant and is normally an early to mid-successional species on forested sites. Individual shrubs are susceptiable to fire kill; but density may increase dramatically after a fire from germination of soil-stored seed even if few or no plants were evident immediately prior to fire.
Rosa gymnocarpa Baldhip rose	Sprouts from surviving root stock.	Very hot fires that consume the duff kills most individuals.
Rosa nutkana hispida Bristly nootka rose	Sprouts from surviving root stock or short rhizomes May store seed in soil for a year or two	Very hot fires may reduce cover and resprouting.
Rosa woodsil ultramontana Wood's rose	Sprouts from surviving root stock or short rhizomes. May store seed in soil for 1 -2 years	Very hot fires may reduce cover and resprouting.

Table 85. continued.

SPECIES	POSTFIRE SURVIVAL STRATEGY	COMMENTS ON FIRE RESPONSE
Rubus lasiococcus Dwarf bramble	Sprouts from surviving root crown. Stolons freely rooting.	Susceptible to fire that removes the duff and humus. Root crowns are near soil surface. Can invade burned area from unbumed patches.
Rubus parviflorus Thunblebeny	Sprouts from surviving rhizomes; seedlings from soil-stored and possible bird dispersed seed. Seed in sod may remain viable for years	Spreads vigorously from rhizomes; rapid recovery after fire and may germinate from stored seed.
Rubus pedatus Five-leaved bramble	Sprouts from surviving root crowns Stolons freely rooting.	Susceptible to fire that removes the duff and humus. Can invade from unbumed patches.
Salix scouleriana Scouler willow	Sprouts from root crown/ caudex Has numerous wind-borne seeds.	Resprouts vigorously after fire and seeds germinate readily on moist burned sites.
Shepherdia canadensis Russet buffalobeny	Sprouts from surviving root crown and from buds along taproot	Moderately resistant to fire-kill. Will usually survive cool to moderately severe fires that fail to consume duff and heat soil extensively.
Sorbus scopulina Mountain ash	Sprouts from deep-seated rhizomes.	Resprouts vigorously after fire.
Spiraea betulifolia Shiny-leaf spirea	Sprouts from surviving root crown and from rhizomes that grow 2 to 5 inches (5 to 13 cm) below surface	Resistant to fire-kill. Will usually survive even a severe fire. Generally increases coverage following fire.
Symphoncarpos albus Common snowberry	Sprouts vigorously from surviving rhizomes that are located between 2 and 5 inches (5 to 13 cm) below soil surface.	Resistant to fire-kill. Will usually survive even severe fires. Greatly enhanced by cool to moderately severe fires
Symphoricarpos mollis hesperius Creeping snowberry	Sprouts from root crown. Training branches may root freely.	Moderately resistant to fire-kill. Often quickly invades burned areas from unburned sites
Symphoricarpos oreophilus utahensis Mountam snowberry	Sprouts from root crown. No rhizomes or trailing branches	Usually survives most fires in its habitat. Often favored by relatively cool, fast-moving fires every 8-10 yr.

Table 85. continued.

SPECIES	POSTFIRE SURVIVAL STRATEGY	COMMENTS ON FIRE RESPONSE
Taxus brevifolia Pacific yew	Bird-dispersed seed	Easily killed by fire because of thin bark
Vaccinium membranaceum Big huckleberry	Shallow and deep rhizomes.	Moderately resistant to fire-kill. Will usually survive cool to moderately severe fires. Repeated severe fires will reduce cover.
Vaccinium myrtillus Low huckleberry	Sprouts from surviving rhizomes in duff and upper few inches of soil.	Moderately resistant to fire-kill. Normally survives cool to moderately severe fires.
Vaccinium scoparium Grouse huckleberry	Sprouts from surviving rhizomes that grow in duff layer or at surface of soil.	Moderately resistant to fire-kill. Will usually survive cool to moderately severe fires that fail to consume the lower layer of duff.
FORES;		
Adenocaulon bicolor Pathfinder	Sprouts from rhizomes near mineral soil surface.	Moderately susceptible to fire-kill. May survive moderately severe fires that fail to consume lower duff.
Apocynum androsaemifolium Spreading dogbane	Sprouts from surviving rhizomes.	Generally maintains pre-fire frequency following fire.
Aralia nudicaulis Wild sarsaparilla	Sprouts from surviving rhizomes	Generally resistant to fire-kill.
Arnica cordifolia Heartleaf arnica	Sprouts from surviving rhizomes that creep laterally from 0.4 to 0.8 inches (1 to 2 cm) below soil surface Wind-dispersed seed.	Susceptible to fire-kill. Shoots produce small crowns within the duff that are easily killed by all but cool fires that occur when duff is moist. May rapidly invade burned area via wind-bome seed.
Arnica latifolia Broadleaf arnica	Sprouts from surviving rhizomes that creep laterally in the soil.	Susceptible to fire-kill. Will usually survive cool to moderately severe fires. May exhibit rapid initial regrowth accompanied by heavy flowering and seedling establishment.

Table 85. continued.

SPECIES	POSTFIRE SURVIVAL STRATEGY	COMMENTS ON FIRE RESPONSE
Aster conspicuus Showy aster	Sprouts from surviving rhizomes that mostly grow from 0.5 to 2 inches (1.5 to 5 cm) below soil surface.	Moderately resistant to fire-kill. Will usually survive cool to moderately severe fires that do not result in excessive soil heating. May rapidly increase following fire.
Astragalus miser Timber milkvetch	Sprouts from buds along surviving taproot that may be 2 to 8 inches (5 to 20 cm) below root crown.	Resistant to fire-kill. Can regenerate from taproot even when entire plant crown is destroyed. Can send up shoots and set seed the first year. May increase dramatically following fire Note Milkvetch is poisonous to sheep and cattle.
Balsamorhiza sagittate Arrowleaf balsamroot	Regrowth from surviving thick caudex.	Resistant to fire-kill. Will survive even the most severe fire.
Chimaphila umbellata Prince's pine	Rhizomes in duff near mineral soil surface.	May survive moderate fires that do not thoroughly heat duff
Clintonia uniflora Queencup beadlily	Sprouts from surviving rhizomes.	Usually decreases following fire. Postfire environment evidently not conducive to rapid recovery.
Dispomm hookeri Hooker fairybells	Rhizomes 0 5 to 2 inches (1 to 5 cm) deep in the soil.	Initally decreased by fire but often recovers to prebum levels relatively rapidly. Recovery may depend on intensity of bum and survival of rhizomes
Disporum trachycarpum Wartberry fairybells	Similar to *D. hookeri*	See *D. hookeri.*
Epilobium angustifolium Fireweed	Sprouts from rhizomes and germinates from wind-blown seed	Needs mineral soil for best seedling establishment. An early serai species that can persist for years vegetatively and then flower the first summer after a fire with copious seed production. Rapid invader of burned sites and may be a community dominate for the first few years after a fire

Table 85. continued.

SPECIES	POSTFIRE SURVIVAL STRATEGY	COMMENTS ON FIRE RESPONSE
Equisetum arvense Common horsetail	Spreading rhizomes and wind-dispersed minute propagules.	Frequency unchanged or increased after fire. Especially favored by moist mineral soil exposure.
Fragaria virginiana Virginia strawberry	Sprouts from surviving stolons (runners) at or just below soil surface.	Susceptible to fire-kill. Will often survive cool fires that do not consume duff because of high duff moisture content
Galium triflorum Sweetscented bedstraw	Sprouts from surviving rhizomes; barbed, animal-borne seeds	Susceptible to fire-kill. Usually a sharp decrease following severe fire. Can increase following spring and fall fires.
Iliamna longisepala Longsepal globemallow	Soil-stored seed	Responds vigorously to severe burning, a pioneer species.
Iliamna rivularis Streambank globemallow	Same as /. *longisepala*	See /. *longisepala*
Osmorhiza chilensis Mountain sweetroot	Short shallow roots; barbed, animal-dispersed seeds.	Moderately fire resistant; temporary increase after fire.
Pyrola secunda Sidebells pyrola	Sprouts from surviving rhizomes that grow mostly in the duff or at soil surface	Susceptible to fire-kill. Coverage frequently reduced following fire. May survive cool fires when duff moisture is high.
Smilacma racemosa Feather solomonplume	Sprouts from surviving stout creeping rhizomes.	Moderately resistant to fire-kill. May be killed by severe fires that remove duff and heat soil excessively. Usually maintains pre-fire frequency.
Smilacina stellata Starry solomonplume	Sprouts from surviving creeping rhizomes	Moderately resistant to fire-kill. May be killed by severe fires that remove duff and heat soil excessively. Frequency often reduced following fire.
Streptopus amplexifolius Claspleaf twistedstalk	Fire avoider. Extensively rhizomatous	Decreased by fire but moist habitats tend to protect rhizomes. May not flourish in post-fire environment.
Streptopus rosea Rosy twistedstalk	Fire avoider Extensively rhizomatous.	Little is know but presumably responds similarily to *S. amplexifolius.*

Table 85. continued.

SPECIES	POSTFIRE SURVIVAL STRATEGY	COMMENTS ON FIRE RESPONSE
Thalictrum occidentals Western meadowrue	Sprouts from surviving rhizomes.	Susceptible to fire-kill. Frequency usually reduced following fire. May survive cool fires that do not consume duff.
Trautvetteria carohniensis False bugbane	Fire avoider. Widely spreading rhizomes.	Slight decrease after a fire but moist to wet habitats allow most rhizomes to survive most fires.
Xerophyllum tenax Beargrass	Sprouts from surviving stout shallow rhizomes.	Individual plants are susceptible to fire-kill if the duff and soil are heated. Will survive cool fires that do not consume lower duff. Resprouts flower vigorously after a fire until new overstory canopy develops. Usually increases following a fire.
Zigadenus elegans Mountain death-camas	Survives from surviving onion-like (tumcated) bulb.	Resistant to fire-kill.
GRASSES/GRASSLIKES:		
Agropyron spicatum Bluebunch wheatgrass	Seed germination and some sprouts from root crowns or even surviving rhizomes.	Usually not seriously damaged by fire. Response depends on severity of fire and physiological state of plant. Damage will be greatest following dry year.
Bromus tectorum Cheatgrass	Annual plant that relies on seed reserves in soil; variable germination seasons; relatively high heat resistance of seed.	Individual plants susceptiable to heat-kill. Surviving seed germinate at various time during the year-fall, late winter, spring. Early summer bums before seed mature are more effective for controlling cheatgrass than midsummer and fall bums
Calamagrostis canadensis Bluejoint reedgrass	Invader, wind-disseminated seed; aslso an enduring sprouter	Increases on wet to moist posture sites

Table 85. continued.

SPECIES	POSTFIRE SURVIVAL STRATEGY	COMMENTS ON FIRE RESPONSE
Calamagrostis rubescens Pinegrass	Sprouts from surviving spreading rhizomes that grow within the top 2 inches (5 cm) of soil.	Moderately resistant to fire-kill. Will usually survive cool to moderately severe fires that do not heat the rhizomes. Burned areas are often successfully invaded by pinegrass. Often flowers abundantly after burning.
Carex concinnoides Northwestern sedge	Sprouts from short, shallow rhizomes	Moderately resistant to fire and usually returns to pre-burn levels within a few years. Rarely increases aggressively.
Carex geyeri Elk sedge	Sprouts from surviving rhizomes	Invades burned areas and forms dense stands. Often increases following most fires severe enough to heat but not completely consume duff.
Carex rossii Ross sedge	Seed stored in duff or soil that germinates when heat treated. Also sprouts from surviving root crown	Increased coverage usually results following most fires severe enough to heat but not completely consume duff. Often increases after a fire.
Festuca idahoensis Idaho fescue	Seed germination and sprouts from residual root crown	Susceptible to fire-kill. Response will vary with severity of fire and physiological state of plant. Can be seriously harmed by hot summer and fall fires. Only slightly damaged during spring or tall when soil moisture is high.
Festuca scabrella Rough fescue	Seed germination and residual plant survival (root crown)	Usually harmed by spring burning.
Koeleria cristata Junegrass	Seed germination and residual plant survival (root crown).	Susceptible to fire-kill. Response will vary according to fire severity and physiological state of plant.
Luzula hitchcockii Smooth woodrush	Sprouts from surviving rhizomes	Often a slight increase following fire.

Sources: Bradley 1984; Crane *etal.* 1983; Daubenmire and Daubenmire 1968; Kramer 1984; Lotan *etal.* 1981; Lyon and Stickney 1976; McLean 1969; Miller 1977; Mueggler 1965; Noste 1985; Rowe 1983; Stickney 1981; Volland and Dell 1981; Wright 1978, 1972; Wright and Bailey 1982.

Table 86. List of important trees, shrubs, subshrubs, and herbs by code, scientific name and common name.

Code	Scientific name	Common name
TREES		
ABGR	*Abies grandis*	grand fir
ABLA2	*Abies lasiocarpa*	subalpine fir
BEOC	*Betula occidentalis*	western water birch
BEPA	*Betula papyri/era*	paper birch
LAOC	*Larix occidentalis*	western larch
PIEN	*Picea engelmannii*	Engelmann spruce
PIGL	*Picea glauca*	white spruce
PIAL	*Pinus albicaulis*	whitebark pine
PICO	*Pinus contorta*	lodgepole pine
PIMO	*Pinus monticola*	western white pine
PIPO	*Pinus ponderosa*	ponderosa pme
POTR	*Populus tremuloides*	quaking aspen
POTR2	*Populus trichocarpa*	black cottonwood
PSME	*Pseudotsuga menziesil*	Douglas-fir
TSHE	*Tsuga heterophylla*	western hemlock
THPL	*Thuja plicata*	western redcedar
SHRUBS AND SUBSHRUBS		
ACGLD	*Acer glabrum* var. *douglasii*	Douglas maple
ALSI	*Ainus sinuata*	Sitka alder
AMAL	*Amelanchier ainifolia*	serviceberry
ARNE	*Arctostaphylos nevadensis*	pmemat manzanita
ARUV	*Arctostaphylos uva-ursi*	bearberry
BEAQ	*Berberis aquifohum*	Oregon grape
CASSI	*Cassiope* species	moss-heather
CESA	*Ceanothus sanguineus*	redstem ceanothus
CEVE	*Ceanothus velutinus*	snowbrush ceanothus
CHME	*Chimaphila memiesn*	little prince's pine
CHUMO	*Chimaphila umbellata* var. *occidentalis*	western prince's pme
COCA	*Comus canadensis*	bunchberry dogwood
COST	*Comus stolonifera*	red-osier dogwood
HODI	*Holodiscus discolor*	ocean-spray
LEGL	*Ledum glandulosum*	Labrador tea
LIBOL	*Linnaea borealis* var *longiflora*	twuiflower

Table 86. continued.

Code	Scientinc name	Common name
SHRUBS AND SUBSHRUBS, cont		
LOCI	*Lonicera ciliosa*	trumpet honeysuckle
LOIN	*Lonicera involucrata*	bearberry honeysuckle
LOUT	*Lonicera utahensis*	Utah honeysuckle
MEFE	*Menziesia ferruginea*	rusty menziesia
OPHO	*Opiopanax horridum*	devil's club
PAMY	*Pachistima myrsmities*	pachistima
PEFR3	*Penstemon fruiticosus*	shrubby penstemon
PHLE2	*Philadelphus lewisn*	mockorange
PHEM	*Phyllodoce empetriformis*	red mountain heath
PHMA	*Physocarpus malvaceus*	ninebark
PUTR	*Purshia tridentata*	bitterbrush
PYAS	*Pyrola asarifolia*	alpine pyrola
PYCH	*Pyrola chlorantha*	green pyrola
PYSE	*Pyrola secunda*	sidebells pyrola
PYUN	*Pyrola uniflora*	woodnymph pyrola
RHAL	*Rhododendron albijlorum*	Cascade azalea
RICE	*Ribes cereum*	wax currant
RILA	*Ribes lacustre*	prickly currant
RIVI	*Ribes viscosissimum*	sticky currant
ROGY	*Rosa gymnocarpa*	baldhip rose
RONUH	*Rosa nutkana* var. *hispida*	bristly nootka rose
ROSA	*Rosa* spp.	rose species
ROWO	*Rosa woodsii*	Wood's rose
RUPE	*Rubus pedatus*	five-leaved bramble
RUPA	*Rubus parviflorus*	western thimbleberry
SACE	*Sambucus cerulea*	blue elderberry
SALIX	*Salix* spp	willow species
SASC	*Salix scouleriana*	Scouler willow
SHCA	*Shepherdia canadensis*	russet buffalobeny
SOSC2	*Sorbus scopulina*	mountain ash
SPBEL	*Spirea betulifolia* var. *lucida*	shiny-leaf spirea
SYAL	*Symphoricarpos albus*	common snowbeny
SYOR	*S. oreophilus* var. *utahensis*	mountain snowbeny
TABR	*Taxus brevifolia*	Pacific yew
VACA	*Vaccinium caespitosum*	dwarf huckleberry
VACCI	*Vaccinium* spp.	huckleberry species
VAME	*Vaccinium membranaceum*	big huckleberry
VAMY	*Vaccinium myrtillus*	low huckleberry

Table 86. continued.

Code	Scientific name	Common name
SHRUBS AND SUBSHRUBS, cont.		
VASC	*Vaccimum scopanum*	grouse huckleberry
XETE	*Xerophyllum tenax*	beargrass
HERBS		
ACMI	*Achillea millefolium*	yarrow
ACRU	*Actaea rubra*	baneberry
ADBI	*Adenocaulon bicolor*	pathfinder
AGSP	*Agropyron spicatum*	bluebunch wheatgrass
AGIN	*Agropyron spicatum* var. *inerme*	beardless bluebunch wheatgrass
ANPI	*Anemone piperi*	Piper anemone
ANTEN	*Antennaria* species	pussytoes species
ANAN	*Antennaria anaphaloides*	tall pussytoes
ANMI	*Antennaria microphylla*	rose pussytoes
ANRA	*Antennaria racemosa*	raceme pussytoes
ANUM	*Antennaria umbrinella*	umber pussytoes
APAN	*Apocynum androsaemifolium*	spreading dogbane
AQUIL	*Aquilegia* species	columbine species
ARNU3	*Aralia nudicaulis*	wild sarsaparilla
ARNIC	*Arnica* species	arnica species
ARCO	*Arnica cordifolia*	heartleaf arnica
ARIA	*Arnica latifolia*	broadleaf arnica
ASCA3	*Asarum caudatum*	wild ginger
ASMI	*Astragalus miser*	starved milkveteh
ASCO	*Aster conspicuus*	showy aster
ASTER	*Aster* species	aster species
ATFI	*Athyrium filix-femina*	ladyfem
BASA	*Balsamorhiza sagittata*	arrowleaf balsamroot
BROMU	*Bromus* species	bromegrass species
BRTE	*Bromus tectorum*	cheatgrass
BRSU	*Bromus suksdorfii*	Suksdorfbrome
BRVU	*Bromus vulgaris*	Columbia brome
CACO	*Carex concinnoides*	northwestern sedge
CAGE	*Carex geyeri*	elk sedge
CAREX	*Carex* species	sedge species
CARO	*Carex rossn*	Ross sedge
CACA	*Calamagrostis canadensis*	bluejoint reedgrass
CARU	*Calamagrostis rubescens*	pinegrass
CASTI	*Castilleja* species	paintbrush species

Table 86. continued.

Code	Scientific name	Common name
HERBS, cont.		
CEDI	*Centaurea diffusa*	diffuse knapweed
CIAL	*Circaea alpina*	circaea
CLCO	*Clematis columbiana*	rock clematis
CLUN	*Clintonia uniflora*	queencup beadlily
COGR	*Collinsia grandiflora*	bluetips collinsia
COPA	*Collinsia parviflora*	little flower collinsia
COGR2	*Collomia grandiflora*	large flowered collomia
CRAT	*Crepis atrabarba*	slender hawksbeard
DENU3	*Delphinium nuttallianum*	larkspur
DIHO	*Disporum hookeri*	Hooker fairybells
DITR	*Disporum trachycarpum*	wartberry fairybells
ELGL	*Elymus glaucus*	blue wildrye
EPAN	*Epilobium angustifolium*	fireweed
EQUIS	*Equisetum* species	horsetail species
EQAR	*Equisetum arvense*	common horsetail
EQSC	*Equisetum scirpoides*	sedgelike horsetail
ERHE	*Enogonum heracleoides*	Wyeth buckwheat
FEID	*Festuca idahoensis*	Idaho fescue
FEOC	*Festuca occidentalis*	western fescue
FRAGA	*Fragana* spp.	strawberry species
GATR	*Galium triflorum*	sweetscented bedstraw
GOOB	*Goodyera oblongifolia*	western rattlesnake plantain
GYDR	*Gymnocarpium dryoptens*	oak fern
HECY	*Heuchera cylindrical*	roundleaf alumroot
HIERA	*Hieracium* species	hawkweed species
HIAL	*Hieracium albiflorum*	white hawkweed
HICY	*Hieracium cynoglossoides*	houndstongue hawkweed
HYMO	*Hypopitys monotropa*	pinesap
KOCR	*Koeleria cristata*	prairie Junegrass
LICHE	Lichen species	lichen species
LIRU	*Lithospermum ruderale*	wayside gromwell
LODI	*Lomatium dissectum*	fem-leaved lomatium
LUHI	*Luzula hitchcockii*	smooth woodrush
LUPIN	*Lupinus* species	lupine species
LULA	*Lupinus latifolius*	broadleaf lupine
LUSE	*Lupinus sericeus*	silky lupine
LUWY	*Lupinus wyethii*	Wyeth lupine
MITEL	*Milella* species	nuterwort species
MOSS	Moss species	moss species

Table 86. continued.

Code	Scientific name	Common name
HERBS, cont.		
OSCH	*Osmorhiza chilensis*	sweetroot
PEER	*Pedicularis bracteosa*	bracted pedicularis
PEPR2	*Penstemon pruinosus*	prickleaf penstemon
PERA	*Pedicularis racemosa*	sickletop pedicularis
PESA	*Petasites sagittatus*	arrowleaf butterbur
POA	*Poa* species	bluegrass species
PONE	*Poa nervosa*	Wheeler bluegrass
SEIN	*Senecio integerrimus*	western groundsel
SETR	*Senecio triangularis*	arrowleaf groundsel
SMRA	*Smilacma racemosa*	feather solomonplume
SMST	*Smilacina stellata*	starry solomonplume
STAM	*Streptopus amplexifolius*	claspleaf twisted stalk
TAOF	*Taraxacum officinale*	common dandelion
THOC	*Thalictrum occidentale*	western meadowrue
TRCA3	*Trautvetteria caroliniensis*	false bugbane
TIUN	*Tiarella unifoliata*	coolwort foamflower
VASI	*Valeriana sitchensis*	Sitka valerian
VIAD	*Viola adunca*	Hook violet
VIGL	*Viola glabrella*	pioneer violet
VIOR2	*Viola orbiculata*	round-leaved violet
ZIVE	*Zigadenus venenosus*	meadow death-camas

Table 87. Mean cover and constancy of important plant species in the Douglas-fir Series by plant association.

SPpr-TPS S»PbLibi>	PIPO-PSME/ACSP 5 PLOTS		PSME/CARU 42 PLOTS		PSME/PHMA 33 PLOTS		PSME/PHMA-UBOL 51 PLOTS	
TREE OVERSTORY LAYER	CON	COV	CON	COV	CON	COV	CON	COV
Abies grandis					9	2	2	1
Abies lasiocarpa			2	1			2	1
Betula papyrifera							2	1
Larix occidentalis			62	17			92	8
Pinus albicaulis								
Pinus contorta			21	9	12	10	27	10
Picea engelmannii							6	1
Pinus monticola								
Pinus ponderosa	100	29	52	18	58	11	37	8
Pseudotsuga menziesil	80	8	98	29	97	47	100	43
Thuja plicata								
Tsuga heterophylla								
TREE UNDERSTORY LAYER								
Abies grandis					9	2	4	1
Abies lasiocarpa			2	1				
Pinus albicaulis								
Picea engelmannii							6	4
Pinus ponderosa	80	4	14	2				
Pseudostuga menziesii	80	2	95	8	79	4	82	7
Thuja plicata								
Tsuga heterophylla							2	1
SHRUBS AND SUBSHRUBS								
Acer douglasii			7	1	33	4	29	5
Ainus sinuata			2	4			2	3
Amelanchier almfolia	40	2	31	2	85	7	86	3
Arctostaphylos uva-ursi	40	3	52	3	12	2	57	5
Berberis aquifolium	*20*	8	14	3	79	5	69	4
Berbens nervosa							2	1
Chimaphila umbellata			12	2	15	2	29	3
Comus canadensis							8	2
Comus stolonifera							2	1
Holodiscus discolor			7	1	70	6	25	7
Juniperus communis			5	1			2	1
Linnaea borealis			10	5			51	5
Lonicera ciliosa			5	6	6	2	14	2
Lonicera utahensis			12	2	9	4	39	4

Table 87 (cont.). Mean cover and constancy of important plant species in the Douglas-fir Series by plant association.

SPECIES	PIPO-PSME/AGSP 5 PLOTS		PSME/CARU 42 PLOTS		PSME/PHMA 33 PLOTS		PSME/PHMA-UBOL 51 PLOTS	
SHRUBS AND SUBSHRUBS, confc	CON	COV	CON	COV	CON	COV	CON	COV
Menziesia ferruginea								
Ophpanax horridum								
Pachistima myrsinites			52	3	55	2	67	3
Physocarpus malvaceus			10	3	91	29	98	23
Pyrola asarifolia								
Pyrola secunda			10	1	9	1	10	1
Rhododendron albiflorum								
Ribes lacustre			2	1			4	2
Rosa gymnocarpa			17	5	70	5	63	5
Rubus parviflorus			5	2	6	2	14	2
Rubus pedatus								
Salvescouleriana	20	1	21	3	9	3	18	3
Shepherdia canadensis			12	1	6	2	25	4
Sorbus scopulina			2	3	9	1	10	2
Spiraea betulifolia	20	10	33	7	91	6	88	9
Symphoricarpos albus	20	2	38	2	76	8	75	5
Symphoricarpos oreophilus			17	3	12	5	2	1
Taxus brevifolia								
Vaccimum caespitosum					9	2	14	5
Vaccinium membranaceum			10	3	3	1	12	3
Vaccimum myrtillus			2	5				
Vaccinium scoparwm			2	3				
Xerophyllum tenax								
HERBS								
Achillea millefolium	100	3	60	2	27	3	33	2
Actaea rubra							2	1
Adenocaulon bicolor					9	2	12	2
Agropyron inerme	20	35						
Agropyron spicatum	80	33	2	20	15	10	8	8
Aralia nudicaulis							4	2
Arnica cordifolia			62	4	73	9	75	6
Asarum caudatum								
Athyrium filix-femina								
Balsamorhiza sagittata	80	12			6	2		
Bromus tectorum	60	2	5	2	12	1	4	2
Bromus vulgaris			2	2	24	3	25	4
Calamagrostis canadensis								

Table 87 (cont.). Mean cover and constancy of important plant species in the Douglas-fir Series by plant association.

SPECIES	PIPO-PSME/AGSP 5 PLOTS		PSME/CARU 42 PLOTS		PSME/PHMA 33 PLOTS		PSME/PHMA-UBOL 51 PLOTS	
HERBS, cont	CON	COV	CON	COV	CON	COV	CON	COV
Calamagrostis rubescens	60	7	100	46	88	11	98	22
Carex concinnoides			43	4	12	2	37	2
Carex rossn	60	1	31	2	45	2	25	2
Circaea alpina								
Clintonia uniflora					3	2	8	2
Disporum hookeri					3	5		
Disporum trachycarpum			5	1	73	3	57	3
Equisetum arvense								
Eriogonum heracleoides	80	2						
Festuca idahoensis	80	7	12	4	6	4	8	1
Galium tnflorum			2	1	18	1	16	2
Goodyera oblongifolia			12	1	39	1	43	2
Gymnocarpium dryopteris								
Hieracium albiflorum			36	2	61	2	55	2
Hypopitys monotropa								
Koeleria cristata	80	2	10	2	3	1		
Lithospermum ruderale	60	1	10	1	6	1		
Lupinus sericeus	80	13	38	5	18	5	18	8
Luzula hitchcockii								
Osmorhiza chilensis			17	1	36	2	33	2
Pediculous bracteosa			7-	1			2	1
Pedicularis racemosa			2	2				
Poa pratensis	20	3	2	1	3	3		
Poa sandbergii	60	3						
Senecio triangularis								
Smilacina racemosa			24	1	73	3	69	2
Smilacina stellata			5	1	18	2	24	2
Streptopus amplexifolius								
Thalictrum occidentale			21	3	18	2	33	3
Tiarella unifoliata			2	1	3	2		
Trautvetteria caroliniensis			2	1				
Tnllium ovatum			2	1	3	1		
Valenana sitchensis			2	1				
Viola adunca			10	1	9	1	14	2
Viola canadensis								
Viola orbiculata								

Table 87 (cont.). Mean cover and constancy of important plant species in the Douglas-fir Series by plant association.

SPECIES	PSME/SYAL 13 PLOTS		PSME/SYOR 9 PLOTS		PSME/VACA 12 PLOTS		PSME/VAME 11 PLOTS	
TREE OVERSTORY LAYER	CON	COV	CON	COV	CON	COV	CON	COV
Abies grandis								
Abies lasiocarpa								
Betula papyri/era								
Larix occidentalis	8	40	44	17	75	12	100	16
Pinus albicaulis								
Pinus contorta	8	10			83	19	91	22
Picea engelmannii					25	4	18	2
Pinus monticola								
Pinus ponderosa	85	35	67	16	42	12	27	3
Pseudotsuga memiesii	85	26	100	36	92	24	100	23
Thuja plicata								
Tsuga heterophylla								
TREE UNDERSTORY LAYER								
Abies grandis								
Abies lasiocarpa					8	3	27	2
Pinus albicaulis								
Picea engelmannii					42	2	9	4
Pinus ponderosa	31	1	11	1	17	3		
Pseudostuga menziesii	69	4	89	3	100	11	82	7
Thuja plicata								
Tsuga heterophylla							9	1
SHRUBS AND SUBSHRUBS								
Acer douglasii	23	2	22	4	17	2	9	5
Alms sinuata							45	8
Amelanchier ainifolia	69	4	56	4	92	2	73	3
Arctostaphylos uva-ursi			44	1	100	7	55	5
Berberis aquifolium	54	3	11	10	67	1	55	5
Berberis nervosa								
Chimaphila umbellata					67	4	45	5
Comus canadensis					33	7		
Comus slalom/era					8	2		
Holodiscus discolor	23	2	11	1			18	2
Juniperus communis								
Linnaea borealis					83	14	73	15
Lonicera citiosa					8	1	9	4
Lonicera utahensis					67	5	36	4

Table 87 (cont.). Mean cover and constancy of important plant species in the Douglas-fir Series by plant association.

SPECIES	PSME/SYAL 13 PLOTS		PSME/SYOR 9 PLOTS		PSME/VACA 12 PLOTS		PSME/VAME 11 PLOTS	
SHRUBS AND SUBSHRUBS, confc	CON	COV	CON	COV	CON	COV	CON	COV
Menziesiaferrugmea								
Opiopanax horridum								
Pachistima myrsinites	38	4	11	6	75	2	91	14
Physocarpus malvaceus					17	1		
Pyrola asanfolia								
Pyrola secunda					33	2	36	2
Rhododendron albiflorum								
Ribes lacustre					8	2	9	1
Rosa gymnocarpa	31	6	11	3	33	3	64	6
Rubus parviflorus					25	2	27	2
Rubus pedatus								
Sahx scouleriana	31	2			8	2	55	6
Shepherdia canadensis	15	3			67	9	18	2
Sorbus scopulina					8	1	18	1
Spiraea betulifolia	46	5	33	3	92	11	82	6
Symphoncarpos albus	100	43			75	5	27	1
Symphoncarpos oreophilus			100	11	8	1		
Taxus brevifolia								
Vaccinium caespitosum	8	5			100	5	9	1
Vaccinium membranaceum					25	6	55	18
Vaccinium myrtillus					8	3	36	18
Vaccinium scoparium					8	5	45	13
Xerophyllum tenax								
HERBS								
Achillea millefolium	54	2	89	2	42	3	9	1
Actaea rubra								
Adenocaulon bicolor							18	3
Agropyron inerme			22	5				
Agropyron spicatum	15	2	33	2	8	5		
Aralia nudicaulis								
Arnica cordifolia	54	5	44	4	50	6	27	5
Asarum caudatum								
Athynum filix-femma								
Balsamorhiza sagittata	15	1	11	20				
Bromus tectorum	15	2	22	2				
Bromus vulgaris	8	1	22	3	25	1	9	2
Calamagrostis canadensis								

Table 87 (cont.). Mean cover and constancy of important plant species in the Douglas-fir Series by plant association.

SPECIES	PSME/SYAL 13 PLOTS		PSME/SYOR 9 PLOTS		PSME/VACA 12 PLOTS		PSME/VAME 11 PLOTS	
HERBS, cont.	CON	COV	CON	COV	CON	COV	CON	COV
Calamagrostis rubescens	85	14	89	29	100	27	100	21
Carex concinnoides	8	1	22	1	42	3	55	2
Carex rossii	8	1	44	2	8	1	9	2
Circaea alpina								
Clintonia uniflora							18	4
Disporum hookeri					8	1		
Disporum trachycarpum			22	2	42	2		
Equisetum arvense					8	2		
Enogonum heracleoides								
Festuca idahoensis	15	2	22	6				
Galiiim triflorum			11	1	8	2		
Goodyera oblongifolia	8	3			25	1	18	2
Gymnocarpium dryopteris								
Hieracium albiflorum	31	2	11	2	33	2	73	2
Hypopitys monotropa								
Koelena cristata			22	4				
Lithospermum rvderale	31	1	11	1				
Lupinus sericeus	23	14	56	5	33	4	9	10
Luzula hitchcockii								
Osmorhiza chilensis	62	2			25	1	36	2
Pedicularis bracteosa							27	2
Pedicularis racemosa								
Poapratensis	8	25			8	2		
Poa sandbergii			11	2				
Senecio triangularis								
Smilacina racemosa	15	2	67	1	58	3	36	2
Smilacina stellata					25	2	36	1
Streptopus amplexifolius								
Thalictrum occidentals	23	4	44	3	42	2	18	1
Tiarella unifoliata								
Trautvettena caroliniensis					8	1		
Tnllium ovatum								
Valenana sitchensis								
Viola adunca					67	2		
Viola canadensis								
Viola orbiculata					8	2	36	3

Table 88. Mean cover and constancy of important plant species in the Grand Fir Series by plant association.

SPECIES	ABGR/ACGL/CLUN 4 PLOTS		ABGR/PHMA 7 PLOTS		ABGR/VACA 9 PLOTS		ABGR/VAME/CLUN 8 PLOTS	
TREE OVERSTORY LAYER	CON	COV	CON	COV	CON	COV	CON	COV
Abies grandis	75	24	43	15	44	9	75	23
Abies lasiocarpa					11	5		
Betula papyrifera	50	3			11	5		
Larix occidentalis	75	17	71	5	89	20	100	12
Pinus albicaulis								
Pinus contorta	50	7	29	10	100	19	50	4
Picea engelmannii	25	8			33	3		
Pinus monticola			29	3	11	5	13	5
Pinus ponderosa	50	5.5	57	22	44	12	13	1
Pseudotsuga menziesii	100	24	100	37	100	10	100	38
Thuja plicata			14	1				
Tsuga heterophylla								
TREE UNDERSTORY LAYER								
Abies grandis	100	3	71	2	100	4	75	3
Abies lasiocarpa	25	1			11	1	25	2
Pinus albicaulis								
Picea engelmannii	25	2			44	2		
Pinus ponderosa					11	1		
Pseudostuga menziesii	50	1	43	1	100	4	50	1
Thuja plicata					11	1		
Tsuga heterophylla					11	2		
SHRUBS AND SUBSHRUBS								
Acer douglasil	100	11	86	2	11	1	63	1
Ainus sinuata					22	11	13	5
Amelanchier ainifolia	100	2	100	2	89	3	100	3
Arctostaphylos uva-ursi	25	1			89	8		
Berberis aquifolium	100	5	71	7	100	4	13	2
Berberis nervosa								
Chimaphila umbellata	75	4	71	3	78	4	25	2
Comus canadensis					56	9		
Comus stolonifera	50	3						
Holodiscus discolor	50	2	100	9	33	5	63	3
Juniperus communis								
Linnaea borealis	100	20	29	2	89	10		
Lonicera ciliosa	50	2	43	2	89	3	25	2
Lonicera utahensis	50	2	29	3	22	2	100	4

Table 88 (cont.). Mean cover and constancy of important plant species in the Grand Fir Series by plant association.

SPECIES	ABGR/ACGL/ CLUN 4 PLOTS		ABGR/PHMA 7 PLOTS		ABGR/VACA 9 PLOTS		ABGR/VAME /CLUN 8 PLOTS	
SHRUBS AND SUBSHRUBS, confc	CON	COV	CON	COV	CON	COV	CON	COV
Memiesia ferruginea								
Opiopanax horridum								
Pachistima myrsinites	75	3	86	3	100	3	75	3
Physocarpus malvaceus	50	2	86	13	33	2	38	23
Pyrola asarifolia					22	1		
Pyrola secunda	50	3	14	1			38	1
Rhododendron albiflorum								
Ribes lacustre	25	1			11	1	13	1
Rosa gymnocarpa	25	6	100	6	100	5	88	10
Rubus parviflorus	50	3	57	2	33	4	75	3
Rubuspedatus								
Salix scouleriana	50	5	14	3	44	2		
Shepherdia canadensis					56	9		
Sorbus scopulina	50	1	29	1	22	2	88	2
Spiraea betulifolia	25	8	100	7	89	7	100	6
Symphoricarpos albus	100	4	71	4	78	7	38	3
Symphoricarpos oreophilus								
Taxus brevifolia			14	1			13	1
Vaccinium caespitosum					67	3		
Vaccinium membranaceum			71	5	67	3	100	23
Vaccinium myrtillus					44	12		
Vaccinium scoparium					22	9		
Xerophyllum tenax								
HERBS								
Achillea millefolium					22	3		
Actaea rubra								
Adenocaulon bicolor	75	2	71	8	33	2	75	9
Agropyron inerme								
Agropyron spicatum								
Aralia nudicaulis								
Arnica cordifolia			29	2	22	4	50	2
Asarum caudatum			14	1			13	1
Athyriumftlix-femma								
Balsamorhiza sagittata								
Bromus tectorum								
Bromus vulgaris	50	3	29	1	33	5	88	2
Calamagrostis canadensis								

Table 88 (cont.). Mean cover and constancy of important plant species in the Grand Fir Series by plant association.

SPECIES	ABGR/ACGL/ CLUN 4 PLOTS		ABGR/PHMA 7 PLOTS		ABGR/VACA 9 PLOTS		ABGR/VAME /CLUN 8 PLOTS	
HERBS, cont	CON	COV	CON	COV	CON	COV	CON	COV
Calamagrostis rubescens	25	2	71	6	100	17	38	1
Carex concinnoides	50	3	71	2	33	2	75	1
Carex rossii			57	2	33	1	50	2
Circaea alpma			14	1			13	1
Clintonia uniflora	50	2	57	2	56	3	100	3
Disporum hookeri			14	1			13	1
Disporum trachycarpum	50	2	29	3	11	3	13	1
Equisetum arvense							13	1
Eriogonum heracleoides								
Festuca idahoensis	25	1					50	2
Galium triflorum	50	2	71	3	44	2	75	3
Goodyera oblongifolia			43	2	11	2	63	2
Gymnocarpium dryopteris								
Hieracium albiflorum	75	2	100	2	100	3	75	2
Hypopitys monotropa								
Koeleria cristata								
Lithospermum ruderale								
Lupinus sericeus	25	1			22	4	13	1
Luzula hitchcockil								
Osmorhiza chilensis	100	2	86	2	67	3	100	3
Pedicularis bracteosa							38	1
Pedicularis racemosa								
Poa pratensis	50	1			11	3		
Poa sandbergii								
Senecio triangularis								
Smilacina racemosa	25	2	29	3	22	2	75	2
Smilacina stellata	100	3	86	5	67	7	100	5
Streptopus amplexifolius								
Thalictrum occidentale	50	2	43	3	22	3	100	4
Tiarella unifoliata								
Trautvetteria caroliniensis							13	2
Trillium ovatiim			14	1	11	1	13	1
Valeriana sitchensis								
Viola adunca			14	1	44	2		
Viola canadensis								
Viola orbiculata	50	4	29	3	44	3	13	1

Table 89. Mean cover and constancy of important plant species in the Subalpine Fir Series by plant association.

SPECIES	ABLA2/CARU 7 PLOTS		ABLA2/CLUN 15 PLOTS		ABLA2/COCA 19 PLOTS		ABLA2/LEBOL 13 PLOTS	
TREE OVERSTORY LAYER	CON	COV	CON	COV	CON	COV	CON	COV
Abies grandis								
Abies lasiocarpa	71	6	93	24	68	13	54	16
Betula papyri/era					11	6		
Lanx occidentalis	100	10	80	13	74	8	69	21
Pinus albicaulis								
Pinus contorta	29	20	60	11	47	4	38	18
Picea engelmannii	29	2	93	14	100	26	85	26
Pinus monticola			13	1				
Pinus ponderosa					11	1		
Pseudotsuga menziesii	100	36	53	10	95	23	54	19
Thuja plicata			7	5				
Tsuga heterophylla			33	4				
TREE UNDERSTORY LAYER								
Abies grandis			20	1				
Abies lasiocarpa	71	2	93	11	53	7	54	9
Pinus albicaulis	14	1						
Picea engelmannii	14	2	53	3	84	5	77	4
Pinus ponderosa								
Pseudostuga memiesii	86	10	20	3	58	4	54	7
Thuja plicata			13	2				
Tsuga heterophylla			7	2				
SHRUBS AND SUBSHRUBS								
Acer douglasii			13	7	26	10	15	2
Ainus sinuata			33	9	26	3	15	1
Amelanchier ainifolia	43	2	40	2	84	3	38	1
Arctostaphylos uva-ursi	29	2	7	6	11	7	8	5
Berberis aquifolium			27	3	53	3	23	3
Berberis nervosa								
Chimaphila umbellata			73	3	63	3	62	2
Comus canadensis			13	3	100	14	23	2
Comus slalom/era			13	1	68	5	15	1
Holodiscus discolor					5	3		
Juniperus communis	14	1						
Linnaea borealis	29	3	73	8	95	13	77	10
Lonicera ciliosa					5	2		
Lonicera utahensis	29	4	87	4	84	4	46	3

Table 89 (cont.). Mean cover and constancy of important plant species in the Subalpine Fir Series by plant association.

SPECIES	ABLA2/CARU 7 PLOTS		ABLA2/CLUN 15 PLOTS		ABLA2/COCA 19 PLOTS		ABLA2/UBOL 13 PLOTS	
SHRUBS AND SUBSHRUBS, cont.	CON	COV	CON	COV	CON	COV	CON	COV
Menziesia ferruginea								
Opiopanax horridum								
Pachistima myrsmites	71	3	87	3	63	3	38	2
Physocarpus malvaceus					16	1	23	2
Pyrola asarifolia			13	2				
Pyrola secunda	43	1	87	3	79	3	92	2
Rhododendron albijiorum								
Ribes lacustre			60	1	79	3	69	3
Rosa gymnocarpa	29	10	20	2	68	4	8	2
Rubus parviflorus			53	2	74	3	38	3
Rubus pedatus					5	3	8	1
Salix scoulenana	43	2	7	1				
Shepherdia canadensis			7	15	11	3	8	1
Sorbus scopulina			40	1	11	2		
Spiraea betulifolia	71	4	33	3	42	6	8	15
Symphoricarpos albus	14	2	20	2	63	5	62	4
Symphoricarpos oreophilus	14	1						
Taxus brevifolia								
Vaccinium caespitosum	29	2			11	3		
Vaccinium membranaceum	14	2	27	3	42	7		
Vaccinium myrtillus	43	2	53	10	16	6	15	2
Vaccinium scoparium	14	15	27	5	32	4	8	1
Xerophyllum tenax								
HERBS								
Achillea millefolium	57	2	7	1			8	1
Actaea rubra					32	3	15	3
Adenocaulon bicolor			53	3	11	1		
Agropyron inerme								
Agropyron spicatum								
Aralia nudicaulis					11	18		
Arnica cordifolia	100	9	27	10	21	4	15	2
Asarum caudatum								
Athyrium filix-femina			13	1				
Balsamorhiza sagittata								
Bromus tectorum								
Bromus vulgaris	29	2	67	3	53	3	23	2
Calamagrostis canadensis					5	3		
Calamagrostis rubescens	100	56	53	4	68	4	38	7

Table 89 (cont). Mean cover and constancy of important plant species in the Subalpine Fir Series by plant association.

SPECIES	ABIA2/CARU 7 PLOTS		ABLA2/CLUN 15 PLOTS		ABLA2/COCA 19 PLOTS		ABLA2/UBOL 13 PLOTS	
HERBS, cont	CON	COV	CON	COV	CON	COV	CON	COV
Carex concinnoides	43	3	27	2	26	3	31	3
Carex rossii			13	3			23	3
Circaea alpina					5	1		
Clintonia uniflora			93	6	68	3	15	2
Disporum hookeri					5	4	8	3
Disporum trachycarpum					53	2	15	2
Equisetum arvense			7	2	21	2		
Eriogonum heracleoides								
Festuca idahoensis								
Galium tnflorum			60	1	84	3	54	2
Goodyera oblongifolia	14	2	60	2	79	2	62	1
Gymnocarpium dryoptens					26	18		
Hieracium albiflorum	57	2	53	2	37	2	23	2
Hypopitys monotropa								
Koeleria cristata								
Lithospermum ruderale								
Lupinus sericeus	29	2			5	1		
Luzula hitchcockii								
Osmorhiza chilensis	57	3	67	2	79	3	46	2
Pedicularis bracteosa	57	2						
Pedicularis racemosa			40	2	11	1		
Poapratensis								
Poa sandbergii								
Senecio tnangularis								
Smilacina racemosa	43	3	13	1	32	2	8	1
Smilacina stellata			67	4	63	3	46	1
Streptopus amplexifolius			7	2	26	3	15	1
Thalictrum occidentale	86	3	73	2	26	3	54	2
Tiarella unifoliata			47	2	16	1	23	2
Trautvetteria carolimensis	29	2	7	2	26	7	15	3
Trillium ovatum			7	1				
Valeriana sitchensis			13	2				
Viola adunca	14	1			5	4	8	1
Viola canadensis					5	10		
Viola orbiculata			80	3	16	1	23	1

Table 89 (cont.). Mean cover and constancy of important plant species in the Subalpine Fir Series by plant association.

SPECIES	ABLA2/RHAL 11 PLOTS		ABLA2/RHAL-XETE 11 PLOTS		ABLA2/TRCA3 8 PLOTS		ABLA2/VACA 15 PLOTS	
TREE OVERSTORY LAYER	CON	COV	CON	COV	CON	COV	CON	COV
Abies grandis					50	14		
Abies lasiocarpa	100	26	100	35	88	23	20	5
Betula papyri/era								
Larix occidentalis	73	11	27	7	75	21	93	18
Pinus albicaulis			9	2				
Pinus contorta	82	10	36	5	50	16	73	20
Picea engelmannn	45	18	82	13	88	15	47	7
Pinus monticola	18	8	9	3				
Pinus ponderosa							7	1
Pseudotsuga memiesii	27	5	18	3	88	7	73	23
Thuja plicata			9	2	13	1		
Tsuga heterophylla			18	3				
TREE UNDERSTORY LAYER								
Abies grandis	9	1			38	1	13	3
Abies lasiocarpa	100	14	100	10	88	3	60	6
Pinus albicaulis								
Picea engelmannii	36	3	73	3	63	1	67	3
Pinus ponderosa								
Pseudostuga memiesii	9	2					93	6
Thuja plicata	9	2	9	8	13	2	7	1
Tsuga heterophylla	18	1	27	2				
SHRUBS AND SUBSHRUBS								
Acer douglasil			9	1			7	2
Ainus sinuata	18	1	9	5	25	2	13	4
Amelanchier ainifolia			9	4	13	2	80	2
Arctostaphylos uva-ursi	9	2					87	9
Berberis aquifolium	9	1					73	2
Berberis nervosa								
Chimaphila umbellata	55	2			13	2	73	4
Comus canadensis							33	6
Comus stolonifera					13	3		
Holodiscus discolor							7	1
Juniperus communis							7	1
Linnaea borealis	18	3			13	3	93	19
Lonicera ciliosa							20	2
Lonicera utahensis	73	4	82	4	75	3	67	3

Table 89 (cont.). Mean cover and constancy of important plant species in the Subalpine Fir Series by plant association.

SPECIES	ABLA2/RHAL 11 PLOTS		ABLA2/RHAT^ XETE 11 PLOTS		ABLA2/TRCA3 8 PLOTS		ABLA2/VACA 15 PLOTS	
SHRUBS AND SUBSHRUBS, confc	CON	COV	CON	COV	CON	COV	CON	COV
Menziesia ferruginea	36	33	64	17				
Opiopanax horridum								
Pachistima myrsinites	55	5	82	4	63	2	93	5
Physocarpus malvaceus								
Pyrola asarifolia	9	1	18	3	50	4		
Pyrola secunda	55	3	73	3	100	2	60	2
Rhododendron albiflorum	100	22	100	36	13	1		
Ribes lacustre	36	2	18	1	63	4	13	3
Rosa gymnocarpa					13	2	53	3
Rubus parviflorus					25	3	27	3
Rubus pedatus	18	15			25	10		
Salix scouleriana	9	3			13	2	33	4
Shepherdia canadensis							47	6
Sorbus scopuhna	9	1	100	3	25	2	7	1
Spiraea betulifolia	9	1			50	2	60	5
Symphoricarpos albus					13	1	20	2
Symphoricarpos oreophilus								
Taxus brevifolia								
Vaccinium caespitosum							67	6
Vaccinium membranaceum	55	15	100	18	63	19	33	5
Vaccinium myrtillus	55	12	9	5	13	4	27	10
Vaccinium scoparium	64	14	9	2	38	3	40	5
Xerophyllum tenax			100	15				
HERBS								
Achillea millefolium							27	2
Actaea rubra					13	1		
Adenocaulon bicolor								
Agropyron inerme								
Agropyron spicatum								
Aralia nudlcaulis								
Arnica cordifolia	27	1	9	2	25	6	33	3
Asarum caudatum								
Athyrium filix-femina	18	9			13	6		
Balsamorhiza sagittata								
Bromus tectorum								
Bromus vulgaris	9	2			13	2	20	2
Calamagrostis canadensis					13	2		
Calamagrostis rubescens	18	2			13	3	100	27

Table 89 (cont). Mean cover and constancy of important plant species in the Subalpine Fir Series by plant association.

SPFPTFS SPECIES	ABIA2/RHAL 11 PLOTS		ABLAZ/RHAI^ XETE 11 PLOTS		ABLA2/TOCA3 8 PLOTS		ABLA2/VACA 15 PLOTS	
HERBS, cont	CON	COV	CON	COV	CON	COV	CON	COV
Carex concinnoides	18	2			13	3	53	3
Carex rossil	9	1					20	1
Circaea alpina								
Clintonia uniflora	18	10	9	3	75	7	27	3
Disporum hookeri			9	1	13	1		
Disporum trachycarpum							13	4
Equisetum arvense								
Eriogonum heracleoides								
Festuca idahoensis								
Galium triflorum	18	5			50	3	7	2
Goodyera oblongifolia	45	2	36	2	75	1	47	2
Gymnocarpium dryoptens	18	13			13	3		
Hieraciiim albiflorum	36	2	9	1	13	1	80	2
Hypopitys monotropa	9	1	18	2				
Koelena cristata								
Lithospermum ruderale								
Lupinus sericeus							33	6
Luzula hitchcochi	27	1	45	4				
Osmorhiza chilensis	27	3	9	2	63	2	40	1
Pedicularis bracteosa			18	1	63	2	13	1
Pediculans racemosa	27	1	18	1	25	2	7	2
Poa pratensis								
Poa sandbergil								
Senecio triangularis	18	9						
Smilacina racemosa					38	2	47	2
Smilacina stellata	9	5	9	1	38	5	33	3
Streptopus amplexifolius	18	3			25	3		
Thalictrum occidentale	18	2			75	4	20	2
Tiarella unifoliata	18	13	64	3	25	12		
Trautvettena caroliniensis	18	3			100	15		
Trillium ovatum					50	1		
Valeriana sitchensis	18	1	18	1	25	2		
Viola adunca							20	2
Viola canadensis	18	9						
Viola orbiculata	36	2	45	2	88	4	20	2

Table 89 (cont.). Mean cover and constancy of important plant species in the Subalpine Fir Series by plant association.

SPECIES	ABLA2/VAME 24 PLOTS		ABLA2/VASC 6 PLOTS		ABLA2/XETE 15 PLOTS		PIEN/EQUIS 5 PLOTS	
TREE OVERS-TORY LAYER	CON	COV	CON	COV	CON	COV	CON	COV
Abies grandis	21	6						
Abies lasiocarpa	71	15	100	31	100	35	80	13
Betula papyri/era								
Larix occidentalis	96	19	17	2	40	10	20	2
Pinus albicaulis								
Pinus contorta	79	22	100	26	50	6		
Picea engelmannii	38	13			70	11	100	44
Pinus monticola	4	1						
Pinus ponderosa	8	3						
Pseudotsuga memiesit	67	18	17	3	50	6	40	3
Thuja plicata					10	2		
Tsuga heterophylla					10	5		
TREE UNDERSTORY LAYER								
Abies grandis	25	2						
Abies lasiocarpa	79	11	100	14	100	20	80	5
Pinus albicaulis					10	1		
Picea engelmannii	42	6			70	3	100	2
Pinus ponderosa								
Pseudostuga memiesii	42	5			10	6	20	1
Thuja plicata	8	2			40	2		
Tsuga heterophylla					30	1		
SHRUBS AND SUBSHRUBS								
Acer douglasii	13	1			10	1		
Ainus sinuata	25	3					80	9
Ametanchier ainifolia	42	2			10	5	20	1
Arctostaphylos uva-ursi	13	4						
Berberis aquifolium	13	3						
Berberis nervosa								
Chimaphila umbellata	75	3	67	2	20	3	60	1
Comus canadensis							100	8
Comus stolonifera	4	1					100	5
Holodiscus discolor	4	1						
Juniperus communis								
Linnaea borealis	38	9					80	4
Lonicera ciliosa								
Lonicera utahensis	62	3	33	2	70	3	20	2

Table 89 (cont). Mean cover and constancy of important plant species in the Subalpine Fir Series by plant association.

SPECIES	ABLA2/VAME 24 PLOTS		ABLA2/VASC 6 PLOTS		ABLA2/XETE 15 PLOTS		PIEN/EQUIS 5 PLOTS	
SHRUBS AND SUBSHRUBS, confc	CON	COV	CON	COV	CON	COV	CON	COV
Menziesiafemiginea					30	1		
Opiopanax horridum								
Pachistima myrsinites	92	6	67	6	40	3		
Physocarpus malvaceus								
Pyrola asarifolia	4	2			10	1	60	5
Pyrola secunda	50	3	33	8	40	2	80	2
Rhododendron albiflorum	8	2			50	3		
Ribes lacustre	17	2					100	4
Rosa gymnocarpa	38	3					20	3
Rubus parviflorus	21	2					60	1
Rubus pedatus							60	3
Salix scoulenana	13	5			10	1		
Shepherdia canadensis	4	25						
Sorbus scopulina	38	2	50	2	100	4		
Spiraea betulifolia	62	6			20	3		
Symphoncarpos albus	13	1					40	3
Symphoricarpos oreophilus								
Taxus brevifoha	4	1						
Vaccinium caespitosum	4	1			20	5		
Vaccinium membranaceum	54	18	17	2	90	24		
Vaccinium myrtillus	58	10	50	10	50	10	60	3
Vaccinium scoparium	25	15	67	25	30	16		
Xerophyllum tenax	4	2			100	31		
HERBS								
Achillea millefolium	13	2	33	1	10	2		
Actaea rubra							40	2
Adenocaulon bicolor	17	2						
Agropyron inerme								
Agropyron spicatum								
Aralia nudicaulis								
Arnica cordifolia	38	3	17	8			40	1
Asarum caudatum								
Athynum filix-femina							80	3
Balsamorhiza sagittata								
Bromus tectorum								
Bromus vulgaris	33	2			10	2		
Calamagrostis canadensis							100	5
Calamagrostis rubescens	79	25	17	8	10	10		

Table 89 (cont.). Mean cover and constancy of important plant species in the Subalpine Fir Series by plant association.

SPECIES	ABLA2/VAME 24 PLOTS		ABLA2/VASC 6 PLOTS		ABLA2/XETE 15 PLOTS		PIEN/EQUIS 5 PLOTS	
HERBS, cont	CON	COV	CON	COV	CON	COV	CON	COV
Carex concinnoides	33	2	33	2	10	3		
Carex rossii	8	3	33	2	10	2		
Circaea alpina							20	1
Clintonia uniflora	33	2			10	2	40	3
Disporum hookeri								
Disporum trachycarpum								
Equisetum arvense							80	36
Eriogonum heracleoides								
Festuca idahoensis								
Galium triflorum	13	1					40	2
Goodyera oblongifolia	42	2			30	2	20	1
Gymnocarpium dryopteris							80	19
Hieracium albiflorum	75	2	17	2	60	2		
Hypopitys monotropa	8	3	50	2				
Koeleria cristata								
Lithospermum ruderale								
Lupinus sericeus	4	10						
Luzula hitchcocldi					60	3		
Osmorhiza chilensis	54	2			10	2	60	2
Pedicularis bracteosa	17	2						
Pedicularis racemosa	13	1			10	1		
Poapratensis								
Poa sandbergii								
Senecio triangularis							60	2
Smilacina racemosa	13	2						
Smilacina stellata	29	1			10	1	40	2
Streptopus amplexifolius	4	2					80	4
Thalictrum occidentale	33	4			10	2		
Tiarella unifoliata	8	1					60	5
Trautvetteria caroliniensis	4	1					80	2
Trillium ovatum								
Valeriana sitchensis	13	1	83	3	10	1		
Viola adunca								
Viola canadensis								
Viola orbiculata	79	3	17	2	20	2		

Table 90. Mean cover and constancy of important plant species in the Western Hemlock Series by plant association.

SPECIES	TSHE/ARNU3 11 PLOTS		TSHE/CLUN 58 PLOTS		TSHE/GYDR 15 PLOTS		TSHE/MEFE 11 PLOTS	
TREE OVERSTORY LAYER	CON	COV	CON	COV	CON	COV	CON	COV
Abies grandis	91	25	66	15	73	13		
Abies lasiocarpa			12	4	7	1	91	11
Betula papyri/era	27	2	17	5				
Larix occidentalis	64	14	79	15	33	11	9	40
Pinus albicaulis								
Pinus contorta	36	6	33	11			9	15
Picea engelmannii	9	7	22	7	13	6	91	18
Pinus monticola	64	10	53	5	33	3	9	1
Pinus ponderosa	18	3	7	6				
Pseudotsuga menziesii	82	12	79	16	20	11	36	8
Thujaplicata	91	11	95	25	100	37	27	2
Tsuga heterophylla	91	17	74	19	100	28	73	36
TREE UNDERSTORY LAYER								
Abies grandis	73	3	52	5	53	2	9	1
Abies lasiocarpa			24	2			91	5
Pinus albicaulis								
Picea engelmannii	18	1	7	1	7	1	27	1
Pinus ponderosa								
Pseudostuga menziesii	27	3	24	4			18	1
Thuja plicata	91	6	95	10	87	6	27	2
Tsuga heterophylla	82	7	83	4	100	4	91	6
SHRUBS AND SUBSHRUBS								
Acer douglasii	55	3	34	5	33	2	9	1
Ainus sinuata			22	3				
Amelanchier ainifolia	64	1	43	2	7	2	9	1
Arctostaphylos uva-ursi	9	2	7	2				
Berbens aquifolium	82	3	41	3				
Berberis nervosa								
Chimaphila umbellata	100	3	74	4			36	2
Comus canadensis	45	2	9	3	7	20		
Comus stolomfera								
Holodiscus discolor	36	1	16	3				
Juniperus commums								
Linnaea borealis	100	11	81	8	87	7	9	3
Lonicera ciliosa	36	3	17	2				
Lonicera utahensis	64	2	67	2	60	2	91	6

Table 90 (cont.). Mean cover and constancy of important plant species in the Western Hemlock Series by plant association.

SPECIES	TSHE/ARNU3 11 PLOTS		TSHE/CLUN 58 PLOTS		TSHE/GYDR 15 PLOTS		TSHE/MEFE 11 PLOTS	
SHRUBS AND SUBSHRUBS, conL	CON	COV	CON	COV	CON	COV	CON	COV
Memiesiaferruginea			2	3	7	2	100	8
Ophpanax horridum			2	1	33	1		
Pachistima myrsinites	45	2	78	5	53	2	100	4
Physocarpus malvaceus	9	1	16	10				
Pyrola asarifolia	18	1	24	2	33	2	9	2
Pyrola secunda	45	2	74	2	47	2	73	3
Rhododendron albiflorum							91	10
Ribes lacustre			9	1			45	3
Rosa gymnocarpa	82	3	69	3	27	3		
Rubus parviflorus	73	4	43	2	33	1	45	7
Rubus pedatus			5	3			45	19
Salix scouleriana			3	4				
Shepherdia canadensis	18	4	19	3				
Sorbus scopulina	9	3	21	2	7	1	91	2
Spiraea betulifolia	73	3	31	3			9	1
Symphoricarpos albus	55	2	21	3	13	2		
Symphoricarpos oreophilus								
Taxus brevifolia			10	3	47	4		
Vaccinium caespitosum								
Vaccinium membranaceum	64	4	55	3	73	3	100	12
Vaccinium myrtillus	27	1	26	7			9	1
Vaccinium scoparium	9	1	9	2				
Xerophyllum tenax			7	1			91	14
HERBS								
Achillea millefolium								
Actaea rubra	9	1	9	1	33	2	18	2
Adenocaulon bicolor	45	2	26	4	73	3	9	2
Agropyron inerme								
Agropyron spicatum								
Aralia nudicaulis	91	18			7	5		
Arnica cordifolia	9	1	5	6				
Asarum caudatum	18	1	9	3	53	4	9	2
Athyrium filix-femina	27	2	3	1	87	2	27	4
Balsamorhiza sagittata								
Bromus tectorum								
Bromus vulgans	55	2	29	3	27	2	45	2
Calamagrostis canadensis								
Calamagrostis rubescens	18	1	16	6				

Table 90 (cont). Mean cover and constancy of important plant species in the Western Hemlock Series by plant association.

SPECIES	TSHE/ARNU3 11 PLOTS		TSHE/CLUN 58 PLOTS		TSHE/GYDR 15 PLOTS		TSHE/MEFE 11 PLOTS	
HERBS, cont	CON	COV	CON	COV	CON	COV	CON	COV
Carex concinnoides	9	1	12	1				
Carex rossii	27	1	5	1			9	2
Circaea alpina			2	1				
Clintonia uniflora	82	5	93	3	100	6	55	9
Disporum hooken	18	3	9	2	80	3	18	9
Disporum trachycarpum	64	1	16	2	7	5		
Equisetum arvense					7	1		
Enogonum heracleoides								
Fesluca idahoensis								
Galium triflorum	73	2	22	2	73	2	45	3
Goodyera oblongifolia	36	2	71	2	73	2	45	2
Gymnocarpium dryoptens			5	2	100	15	45	13
Hieracmm albtflorum	36	1	41	2			36	2
Hypopitys monotropa			3	1				
Koelena cristata								
Lithospermum mderale								
Lupinus senceus								
Luzula hitchcockii								
Osmorhiza chilensis	55	2	33	2	67	2	36	2
Pedicularis bracteosa					7	2	27	2
Pediculans racemosa	18	2	9	1				
Poa pratensis								
Poa sandbergii								
Senecio triangularis								
Smilacina racemosa	9	2	22	1			18	2
Smilacina stellata	82	5	59	3	100	5	36	7
Streptopus amplexifolius					27	2	18	2
Thalictrum occidentals	9	1	16	3	13	2	45	3
Tiarella umfoliata	45	2	41	2	93	7	73	7
Trautvettena caroliniensis	9	1	2	8	27	4		
Tnllium ovatum	64	1	59	1	73	2	27	2
Valeriana sitchensis								
Viola adunca								
Viola canadensis			2	1	13	2	18	4
Viola orbiculata	91	2	88	3	87	3	55	5

Table 90 (cont.). Mean cover and constancy of important plant species in the Western Hemlock Series by plant association.

SPECIES	TSHE/RUPE 15 PLOTS		TSHE/XETE 8 PLOTS	
TREE OVERSTORY LAYER	CON	COV	CON	COV
Abies grandis				
Abies lasiocarpa	53	6	63	5
Betula papyri/era	7	1		
Larix occidentalis	27	8	38	6
Pinus albicaulis				
Pinus contorta	7	30	13	60
Picea engelmannii	47	7	75	6
Pinus monticola	33	9	38	4
Pinus ponderosa				
Pseudotsuga menziesii	27	1	13	1
Thuja plicata	93	29	88	16
Tsuga heterophylla	100	36	88	46
TREE UNDERSTORY LAYER				
Abies grandis	*1*	2		
Abies lasiocarpa	47	2	63	2
Pinus albicaulis				
Picea engelmannii	13	2	13	2
Pinus ponderosa				
Pseudostuga menziesii				
Thuja plicata	93	5	75	8
Tsuga heterophylla	100	5	100	10
SHRUBS AND SUBSHRUBS				
Acer douglasii	13	3	13	2
Ainus sinuata			13	7
Amelanchier ainifolia			13	3
Arctostaphylos uva-ursi				
Berberis aqwfolium			13	2
Berberis nervosa				
Chimaphila umbellata	13	1	75	5
Comus canadensis				
Comus stolonifera				
Holodiscus discolor				
Juniperus communis				
Linnaea borealis	47	9	75	9
Lonicera ciliosa				
Lonicera utahensis	73	3	100	3

Table 90 (cont). Mean cover and constancy of important plant species in the Western Hemlock Series by plant association.

SPECIES	TSHE/RUPE 15 PLOTS		TSHE/XETE 8 PLOTS	
SHRUBS AND SUBSHRUBS, confc	CON	COV	CON	COV
Menziesiaferruginea	73	2	50	3
Opiopanax horridum	13	1		
Pachistima myrsinites	80	3	100	5
Physocarpus malvaceus				
Pyrola asarifolia	13	3	63	3
Pyrola secunda	87	3	88	3
Rhododendron albiflorum	27	2	38	2
Ribes lacustre	33	1	38	1
Rosa gymnocarpa			13	7
Rubus parviflorus	47	2	25	3
Rubus pedatus	100	9	25	4
Salix scouleriana			13	3
Shepherdia canadensis			13	15
Sorbus scopulina	7	1	13	1
Spiraea betulifolia	7	1	13	8
Symphoricarpos albus				
Symphoricarpos oreophilus				
Taxus brevifolia	7	6		
Vaccinium caespitosum				
Vaccinium membranaceum	93	7	88	8
Vaccinium myrtillus	7	2	38	8
Vaccinium scoparium	7	1		
Xerophyllum tenax	20	2	100	9
HERBS				
Achillea millefolium				
Actaea rubra	7	2		
Adenocaulon bicolor	13	3	63	2
Agropyron inerme				
Agropyron spicatum				
Aralia nudicaulis				
Arnica cordlfolla	13	1	13	3
Asarum caudatum				
Athyrium filix-femina	53	3	25	1
Balsamorhiza sagittata				
Bromus tectorum				
Bromus vulgaris	20	4	25	2
Calamagrostis canadensis				
Calamagrostis rubescens			13	3

Table 90 (cont). Mean cover and constancy of important plant species in the Western Hemlock Series by plant association.

SPECKS	TSME/RUPE 15 PLOTS		TSHE/XETE 8 PLOTS	
HERBS, cont	CON	COV	CON	COV
Carex concinnoides				
Carex rossil				
Circaea alpina				
Clintonia uniflora	100	7	100	6
Disporum hookeri	47	3	50	2
Disporum trachycarpum				
Equisetvm arvense				
Eriogonum heracleoides				
Festuca idahoensis				
Galium triflorum	40	3		
Goodyera oblongifolia	73	2	75	2
Gymnocarpium dryopteris	100	12	25	2
Hieracium albi/Iorvm	7	1	38	2
Hypopitys monotropa			13	1
Koelena cristata				
Lithospermum ruderale				
Lupinus sericeus				
Luzula hitchcocldi			13	1
Osmorhiza chilensis	60	2	50	1
Pedicularis bracteosa			25	1
Pedicularis racemosa	7	1	50	2
Poapratensis				
Poa sandbergii				
Senecio triangulans	7	1		
Smilacina racemosa	13	2	13	1
Smilacina stellata	40	2	25	3
Streptopus amplexifolius	93	2	13	1
Thalictrum occidentale	53	2	25	2
Tiarella unifoliata	93	8	88	5
Trautvetteria caroliniensis	27	1		
Trillium ovatum	93	2	75	2
Valeriana sitchensis			13	1
Viola adunca				
Viola canadensis	7	2	25	2
Viola orbiculata	100	4	88	3

Table 91. Mean cover and constancy of important plant species in the Western Redcedar Series by plant association.

SPECIES	THPL/ARNU3 16 PLOTS		THPL/CLUN 31 PLOTS		THPL/OPHO 6 PLOTS		THPL/VAME 20 PLOTS	
TREE OVERSTORY LAYER	CON	COV	CON	COV	CON	COV	CON	COV
Abies grandis	75	13	48	22	100	13	70	8
Abies lasiocarpa							40	5
Betula papyri/era	50	6	29	4			5	5
Larix occidentalis	75	8	90	12			95	15
Pinus albicaulis								
Pinus contorta	31	4	32	14			65	19
Picea engelmanmi	56	14	26	7			15	3
Pinus monticola	19	2	16	4			5	5
Pinus ponderosa	13	33	26	9				
Pseudotsuga menziesii	100	18	87	21	33	8	95	19
Thuja plicata	94	24	68	34	100	35	55	11
Tsuga heterophylla	13	2	6	1	100	23		
TREE UNDERSTORY LAYER								
Abies grandis	56	5	71	4	17	1	65	4
Abies lasiocarpa			13	3			40	3
Pinus albicaulis								
Picea engelmannii	44	4	10	1			10	1
Pinus ponderosa								
Pseudostuga menziesii	38	2	39	5			80	4
Thuja plicata	94	4	90	6	67	4	100	4
Tsuga heterophylla			3	1	100	2	10	1
SHRUBS AND SUBSHRUBS								
Acer douglasii	94	4	71	4	83	3	40	5
Ainus sinuata	13	3	6	2			45	5
Amelanchier ainifolia	63	2	48	2			70	3
Arctostaphylos uva-ursi			16	4			55	4
Berbens aquifolium	75	3	68	4			80	3
Berberis nervosa			3	2				
Chimaphila umbellata	31	2	77	5			75	5
Comus canadensis	63	6						
Comus stolonifera	19	1	3	1	33	2	5	1
Holodiscus discolor	19	2	29	11			30	3
Juniperus communis								
Linnaea borealis	94	6	81	12	67	3	70	16
Lonicera ciliosa	13	4	35	3			25	2
Lonicera utahensis	38	2	65	2			80	4

Table 91 (cont.). Mean cover and constancy of important plant species in the Western Redcedar Series by plant association.

SPECIES	THPL/ARNU3 16 PLOTS		THPL/CLUN 31 PLOTS		THPL/OPHO 6 PLOTS		THPL/VAME 20 PLOTS	
SHRUBS AND SUBSHRUBS, confc	CON	COV	CON	COV	CON	COV	CON	COV
Menziesiaferruginea								
Opiopanax horridum					100	9		
Pachistima myrsinites	56	1	84	10			95	7
Physocarpus malvaceus	44	2	42	3			30	3
Pyrola asarifolia			3	2	50	2	20	3
Pyrola secunda	56	2	61	1	17	1	25	2
Rhododendron albiflorum								
Ribes lacustre	31	3	6	3	67	2	10	2
Rosa gymnocarpa	88	4	77	5			95	4
Rubus parviflorus	69	5	48	5			50	12
Rubus pedatus					33	1		
Salix scouleriana			26	2			30	4
Shepherdia canadensis	6	2	16	4			45	4
Sorbus scopulina			10	1			65	2
Spiraea betulifolia	19	2	55	6			70	5
Symphoricarpos albus	56	4	45	3	33	3	10	4
Symphoricarpos oreophilus								
Taxus brevifolia			3	1	50	3		
Vaccinium caespitosum			6	3			5	2
Vaccinium membranaceum	6	1	13	2	33	2	95	14
Vaccinium myrtillus			23	1			30	12
Vaccinium scoparium								
Xerophyllum tenax							15	8
HERBS								
Achillea millefolium	6	1	3	1				
Actaea rubra	50	2			100	4		
Adenocaulon bicolor	44	2	45	4	83	2	40	3
Agropyron inerme								
Agropyron spicatum								
Aralia nudicaulis	81	12					5	1
Arnica cordifolia			13	4			15	2
Asarum caudatum	31	6	3	1	100	7		
Athyriumfilix-femina	19	4	6	2	100	29	5	1
Balsamorhiza sagittata								
Bromus tectorum								
Bromus vulgaris	63	3	32	2	33	1	50	3
Calamagrostis canadensis					17	1		
Calamagrostis rubescens	19	2	26	7			40	9

Table 91 (cont). Mean cover and constancy of important plant species in the Western Redcedar Series by plant association.

SPECIES	THPL/ARNU3 16 PLOTS		THPL/CLUN 31 PLOTS		THPL/OPHO 6 PLOTS		THPL/VAME 20 PLOTS	
HERBS, cont.	CON	COV	CON	COV	CON	COV	CON	COV
Carex concinnoides			23	1			50	2
Carexrossii	13	1	6	1			10	1
Circaea alpma	19	6			100	2	10	5
Clintonia unijiora	81	4	65	4	100	4	85	4
Disponim hookeri	19	4	10	8	83	3	20	3
Disporum trachycarpum	56	2	29	2			25	2
Equisetum arvense	25	1	3	2				
Eriogonum heracleoides								
Festuca idahoensis								
Galium triflorum	69	3	19	2	100	2	35	3
Goodyera oblongifolia	31	1	61	2	67	2	60	2
Gymnocarpium dryopteris	6	1	3	15	100	23		
Hieracium albiflorum	44	1	58	2			60	3
Hypopitys monotropa	6	1	3	1				
Koeleria cristata								
Lithospermum ruderale								
Lupmus sericeus								
Luzula hitchcockii								
Osmorhiza chilensis	63	3	42	2	67	2	40	3
Pediculans bracteosa							25	2
Pedicularis racemosa			3	1			5	2
Poapratensis	6	3						
Poa sandbergil								
Senecio triangularis					50	2		
Smilacina racemosa	25	1	35	1			55	2
Smilacina stellata	75	5	58	4	83	9	65	4
Streptopus amplexifolius	19	1	3	4	83	3		
Thalictrum occidentals	13	5	29	3			35	4
Tiarella umfoliata	50	5	6	6	100	7	15	6
Trautvetteria caroliniensis	6	1	3	8	33	4	10	40
Trillium ovatum	44	3	23	2	50	2	15	2
Valeriana sitchensis							5	4
Viola adunca	6	2	3	1				
Viola canadensis	19	2			50	3		
Viola orbiculata	50	2	68	2	50	3	90	4

Table 92. Mean cover and constancy of important plant species for the Incidental Vegetation Types by community type.

SPECIES	PIAL 6 PLOTS		PICO/SHCA 20 PLOTS		POTR/CARU 7 PLOTS		POTR/SYAL 3 PLOTS	
TREE OVERSTORY LAYER	CON	COV	CON	COV	CON	COV	CON	COV
Abies grandis								
Abies lasiocarpa	50	7	5	5				
Betula papyri/era			5	20				
Larix occidentalis			60	13			73	11
Pinus albicaulis	100	13						
Pinus contorta	17	8	100	46	57	8	82	10
Picea engelmannii	17	5	15	2				
Pinus monticola								
Pinus ponderosa			10	3				
Populus tremuloides					100	42	100	77
Pseudotsuga memiesii	50	15	50	5	14	5	33	2
Thuja plicata			5	1				
Tsuga heterophylla								
TREE UNDERSTORY LAYER								
Abies grandis			20	3				
Abies lasiocarpa	17	1	45	2			33	10
Pinus albicaulis	83	2						
Picea engelmannii	17	2	30	8			33	15
Pinus ponderosa							100	2
Populus tremuloides					86	14	100	10
Pseudostuga memiesii			65	4	14	2	100	5
Thuja plicata			35	1				
Tsuga heterophylla			10	2				
SHRUBS AND SUBSHRUBS								
Acer douglasii			45	2				
Ainus sinuata			35	5				
Amelanchier ainifolia			60	4			67	3
Arctostaphylos uva-ursi			35	11				
Berberis aquifolium			70	4				
Berberis nervosa								
Chimaphila umbellata			90	5				
Comus canadensis			20	12				
Comus stolonifera			15	2				
Holodiscus discolor			30	4				
Juniperus communis	17	30	5	2	14	1		
Linnaea borealis			75	23	14	1		
Lonicera ciliosa			10	3				
Lonicera utahensis			40	2				

Table 92 (cont.). Mean cover and constancy of important plant species for the Incidental Vegetation Types by community type.

SPECIES	PIAL 6 PLOTS		PICO/SHCA 20 PLOTS		POTR/CARU 7 PLOTS		POTR/SYAL 3 PLOTS	
SHRUBS AND SUBSHRUBS, confc	CON	COV	CON	COV	CON	COV	CON	COV
Menziesiafermginea			5	3				
Opiopanax homdum								
Pachistima myrsmites	67	2	90	5	29	3		
Physocarpus malvaceus			25	2				
Pyrola asanfolia			5	1				
Pyrola secunda			45	2				
Rhododendron albiflorum								
Ribes lacustre			5	1			33	5
Rosa gymnocarpa			75	4			33	2
Rubus parviflorus			40	3				
Rubus pedatus								
Salix scouleriana			60	4				
Shepherdia canadensis			70	7	42	3	33	1
Sorbus scopulina			25	1				
Spiraea betuhfolia			95	7				
Symphoricarpos albus			65	3	14	2	100	34
Symphoricarpos oreophilus					14	2		
Taxus brevifolia								
Vaccimum caespitosum			25	5				
Vaccinium membranaceum	17	3	55	11				
Vaccinium myrtillus			45	9				
Vaccimum scoparium	50	3	30	17				
Xerophyllum tenax			5	1				
HERBS								
Achillea millefolium	100	5	30	2	57	2	66	1
Actaea rubra							33	1
Adenocaulon bicolor			20	3				
Agropyron inerme								
Agropyron spicatum					14	1	33	4
Aralia nudicaulis								
Arnica cordifolia	33	2	35	3				
Asarum caudatum								
Athyrium filix-femina							33	1
Balsamorhiza sagittata					29	1		
Bromus tectorum								
Bromus vulgaris			20	3				
Calamagrostis canadensis								
Calamagrostis rubescens	100	10	90	19	100	59	33	30

Table 92 (cont.). Mean cover and constancy of important plant species for the Incidental Vegetation Types by community type.

SPECIES	PIAL 6 PLOTS		PICO/SHCA 20 PLOTS		POTR/CARU 7 PLOTS		POTR/SYAL 3 PLOTS	
HERBS,cont	CON	COV	CON	COV	CON	COV	CON	COV
Carex concinnoides	17	3	20	2				
Carex rossii	67	6	15	1				
Circaea alpina								
Clintonia uniflora			35	5				
Disporum hookeri			5	2				
Disporum trachycarpum			20	2			33	1
Equisetum arvense								
Eriogonum heracleoides								
Festuca idahoensis	50	6						
Galium triflorum			20	2				
Goodyera oblongifolia			20	2				
Oymnocarpium dryopteris								
Hieracium albiflorum			75	2	14	1		
Hypopitys monotropa								
Koeleria cristata	33	3						
Lithospermum ruderale							33	1
Lupinus sericeus	17	5	15	3				
Luzula hitchcockil	17	5						
Osmorhiza chilensis			35	3	29	2	66	4
Pedicularis bracteosa			5	1				
Pedicularis racemosa								
Poa pratensis					14	3		
Poa sandbergii								
Senecio triangularis								
Smilacina racemosa			20	2				
Smilacina stellata			40	1	14	3	66	2
Streptopus amplexifolius								
Thalictrum occidentale			10	2	86	15	100	2
Tiarella unifoliata								
Trautvetteria caroliniensis							33	5
Trillium ovatum								
Valeriana sitchensis								
Viola adunca			10	8				
Viola canadensis								
Viola orbiculata			60	3				

APPENDIX 2

- Stocking, basal area and stand density index
- Site index and growth basal area

Table 93. Trees per aere, total basal area, qu;adratic mean diameter, stand density index, and herbage production avieraged by type.

TYPE	NUMBER TREES/AC[1]	TBA (ff/ac)[2]	QUADRATIC MEAN DIAMETER[3]	STAND DENSE?f INDEX[4]	HERBAGE (Ib/ac)[5]
ABGR/ACGLD/CLUN	589	258	9	491	19
ABGR/VAME/CLUN	392	261	11	457	64
ABGR/PHMA	302	252	12	423	92
ABGR/VACA	508	191	8	375	101
ABLA2/CARU	409	245	12	419	194
ABLA2/CLUN	563	254	9	481	43
ABLA2/COCA	338	238	11	413	39
ABLA2/LBOL	392	232	12	407	18
ABLA2/RHAL	656	213	9	412	48
ABLA2/RHAL-XETE	557	222	10	411	12
ABLA2/TRCA3	638	270	8	517	167
ABLA2/VACA	437	151	8	301	125
ABLA2/VAME	975	237	7	498	66
ABLA2/VASC	1173	277	6	596	5
ABLA2/XETE	1040	236	7	499	5
PIAL	180	52	9	101	113
PICO/SHCA	779	173	6	375	75
PIEN/EQUIS	302	233	12	397	129
PIPO-PSME/AGSP	49	64	16	99	435
PSME/CARU	321	207	12	355	311
PSME/PHMA	310	240	13	405	47
PSME/PHMA-LIBOL	331	209	11	368	102
PSME/SYAL	174	186	13	297	65
PSME/SYOR	127	145	15	226	172
PSME/VACA	420	201	9	372	103
PSME/VAME	878	204	7	426	57
THPL/ARNU3	389	288	12	485	65
THPL/CLUN	547	258	10	476	28
THPL/OPHO	145	359	21	485	206
THPL/VAME	568	204	8	402	75
TSHE/ARNU3	498	237	10	436	128
TSHE/CLUN	547	258	10	476	28
TSHE/GYDR	406	420	18	632	54
TSHE/MEFE	273	233	14	382	60
TSHE/RUPE	223	390	19	550	43
TSHE/XETE	307	312	14	500	13

' Average number of trees per acre.
'Average total basal area.
[3] Average quadratic mean diameter (QMD). QMD is the diameter of a tree of average basal area.
[4] Average stand density index. Reineke's (1933) equation for mixed-conifer forests was used for all associations and community types in this table
[5] Average dry weight of herb (grasses, forbs, and ferns) standing crop at sampling time

Table 94. Site index and growth basal area by species and type, and volume growth estimates by type.

TYPE (SI base years)	ABGR (50)	ABLA2 (50)	LAOC (50)	PIEN (50)	PICO (50)	PIPO (100)	PIMO (50)	PSME (50)	THPL (50)	TSHE (50)	GBA VOL' (ft3/ac/yr)
			67/233					74/360			168
ABGR/ACGLD/CLUN	59/456[2]				79/208	135/207		73/240			126
ABGR/PHMA			66/168		60/164	114/190		68/205			92
ABGR/VACA			43/169					58/278			119
ABGR/VAME/CLUN	72/361		49/192		52/170			48/188			65
ABLA2/CARU		58/278	57/182	60/288	59/277						(PIEN) 114
ABLA2/CLUN		48/199	68/169	68/237				59/251			111
ABLA2/COCA		60/202	62/182	62/210				57/202			73
ABLA2/LBOL		39/206	48/164	51/246							(PEN)(95
ABLA2/RHAL		42/211	46/135	44/202	54/191						(PIEN)i60
ABLA2/RHAL-XETE		66/242	57/272	65/216	53/251			62/283			124
ABLA2/TRCA3	62/134		65/108		60/110			47/169			55
ABLA2/VACA		57/259	60/252	64/257	54/206			56/248			93
ABLA2/VAME		46/239			50/238						(PICO) 83
ABLA2/VASC		39/222	30/205	47/218	54/167			55/255			99
ABLA2/XETE				63/191							(PIEN) 86
PIEN/EQUIS								25/101			17
PIAL			60/142		61/162						(LAOC) 72
PICO/SHCA						79/73					(PIPO) 25
PIPO-PSME/AGSP											

Table 94 (cont). Site index and growth basal area by species and type, and volume growth estimates by type.

TYPE (SI base years)	ABGR (50)	ABLA2 (50)	LAOC (50)	PIEN (50)	PICO (50)	PIPO (100)	PIMO (50)	PSME (50)	THPL (50)	TSHE (50)	GBAVOL (ft3/ac/yr)
PSME/CARU			49/K51			98/153		49/173			59
PSME/PHMA								61/220			96
PSME/PHMA-LIBOL			57/1;51		66/169	92/170		53/178			64
PSME/SYAL						103/234		76/234			117
PSME/SYOR						81/82		47/126			34
PSME/VACA			57/1'?!		50/164						(LAOC) 79
PSME/VAME			60/2<38		60/210			61/185			80
THPL/ARNU3			81/3'76	64/254		122/316		69/371	.55/380		183
THPL/CLUN	65/301		65/1-73		65/140	114/179		64/235	43/317		102
THPL/OPHO									58/473		(THPL) 200
THPL/VAME	74/292		57/1(S3		50/149			57/180			75
TSHE/ARNU3	81/286		73/2'70			128/315	66/270	65/209		69/287	(LAOC) 139
TSHE/CLUN	66/286		68/2-16	59/199	59/199	118/254	54/283	69/245	45/317	68/285	120
TSHE/GYDR	78/373		70/4-12						57//496	76/506	(LAOC) 208
TSHE/MEFE		49/238	61/3:10	54/261				66/310			135
TSHE/RUPE		58/289		70/409							(PEN) 176
TSHE/XETE				61/375						56/362	(PEN) 122

[1] Average GBA volume production for each type. GBA VOL is an empirical estimate of cubic wood production that is the product of GBA x SI x c, where c is a species-specific constant. The constant for Douglas-fir (PSME) is used unless otherwise noted.

lumbers in this part of the table use this format: site index/growth basal area (SI/GBA). These are average values for that species in that type.

APPENDIX 3

- Birds of the Colville National Forest
- Mammals of the Colville National Forest
- Reptiles and Amphibians of the Colville National Forest
- Fishes of the Colville National Forest

Table 95. Birds of the Colville National Forest and vicinity. Data compiled by T. Burke and J. Nisbet (1979). Nomenclature from American Birding Association. Abundance codes: C=common, U=uncommon, I=introduced, 0=occassional. Seasonality codes: P=permanent resident, S=summer resident, W=winter visitor, M=migrant.

Species name	Scientific name	Abundance and SeasonaUty
Family- *Gaviidae*		
1 COMMON LOON	*Gavia immer*	U/SM
2 ARCTIC LOON	*Gavia arctica*	0/M
Family- *Podicipedidae*		
3 RED-NECKED GREBE	*Podiceps grisegena*	U/SM
4 HORNED GREBE	*Podiceps auritus*	U/SM
5 EARED GREBE	*Podiceps nigricollis*	U/SM
6 WESTERN GREBE	*Aechmophorus occidentalis*	C/SM
7 PIED-BILLED GREBE	*Podilymbus podiceps*	C/SM
Family- *Pelicanidae*		
8 AMERICAN WHITE PELICAN	*Pelecanus erythrorhynchos*	U/M
Family- *Ardeidae*		
9 GREAT BLUE HERON	*Ardea herodtas*	C/S
10 BLACK-CROWNED NIGHT HERON	*Nycticorax nycticorax*	0/M
11 AMERICAN BITTERN	*Botaurus lentiginosus*	U/B
Family- *Anatidae*		
12 TUNDRA SWAN	*Cygnus columbianus*	0/W
13 TRUMPETER SWAN	*Olor buccinator*	0/M
14 CANADA GOOSE	*Branta canadensis*	C/S
15 GREATER WHITE-FRONTED GOOSE	*Anser albifrons*	U/M
16 SNOW GOOSE	*Chen caemlescens*	U/M
17 ROSS'GOOSE	*Chen rossii*	0/M
18 MALLARD	*Anas platyrhynchos*	C/S
19 GADWALL	*Anas strepera*	U/S
20 NORTHERN PINTAIL	*Anas acuta*	C/S
21 GREEN-WINGED TEAL	*Anas crecca*	C/S
22 BLUE-WINGED TEAL	*Anas discors*	C/S
23 CINNAMON TEAL	*Anas cyanoptera*	C/S
24 AMERICAN WIDGEON	*Anas americana*	C/SM
25 NORTHERN SHOVELER	*Anas clypeata*	C/S
26 WOOD DUCK	*Aix sponsa*	U/S
27 REDHEAD	*Aythya americana*	C/S
28 RING-NECKED DUCK	*Aythya collaris*	C/S
29 CANVASBACK	*Aythya valisineria*	U/M
30 GREATER SCAUP	*Aythya marila*	U/M
31 LESSER SCAUP	*Aythya affims*	C/S
32 COMMON GOLDENEYE	*Bucephala clangula*	C/MW
32 COMMON GOLDENEYE	*Bucephala clangula*	C/MW

Table 93. (cont.). Birds of the Colville National Forest and vicinity.

Species name	Scientific name	Abundance and Seasonality
Family- ***Anatidae,*** **cont.**		
33 BARROW'S GOLDENEYE	*Bucephala islandica*	C/SW
34 BUFFLEHEAD	*Bucephala albeola*	C/SW
35 HARLEQUIN DUCK	*Histrionicus histrionicus*	O/M
36 WHITE-WINGED SCOTER	*Melanitta fusca*	0/M
37 RUDDY DUCK	*Oxyura jamaicensis*	C/S
38 HOODED MERGANSER	*Lophodytes cucullatus*	C/SW
39 COMMON MERGANSER	*Mergus merganser*	u/sw
Family- ***Cathartidae***		
40 TURKEY VULTURE	*Cathartes aura*	u/s
Family- ***Accipitridae***		
41 NORTHERN GOSHAWK	*Accipiter gentilis*	u/s
42 SHARP-SHINNED HAWK	*Accipiter striatus*	C/S
43 COOPER'S HAWK	*Accipiter cooperii*	C/S
44 RED-TAILED HAWK	*Buteo jamaicensis*	C/SW
45 SWAINSONSHAWK	*Buteo ywainsoni*	O/M
46 ROUGH-LEGGED HAWK	*Buteo lagopus*	C/W
47 FERRUGINOUS HAWK	*Buteo regalis*	O/M
48 GOLDEN EAGLE	*Aquila chrysaetos*	U/SW
49 BALD EAGLE	*Haliaeetus leucocephalus*	T/W
50 NORTHERN HARRIER	*Circus cyaneus*	C/S
51 OSPREY	*Pandion haliaetus*	C/S
Family- ***Falconidae***		
52 GYRFALCON	*Faico rusticolus*	0/W
53 PRAIRIE FALCON	*Faico mexicanus*	O/M
54 PEREGRINE FALCON	*Faico peregnnus*	E/M
55 MERLIN	*Faico columbaris*	U/S
56 AMERICAN KESTREL	*Faico sparverius*	C/S
Family- ***Phasianidae***		
57 BLUE GROUSE	*Dendragapus obscurus*	C/P
58 SPRUCE GROUSE	*Dendragapus canadensis*	U/P
59 RUFFED GROUSE	*Bonasa umbellus*	C/P
60 WHITE-TAILED PTARMIGAN	*Lagopus leucurus*	NA
61 CALIFORNIA QUAIL	*Callipepla califomicus*	I/P
62 RING-NECKED PHEASANT	*Phasianus colchicus*	I/P
63 CHUKAR	*Alectoris chukar*	I/P
64 GRAY PARTRIDGE	*Perdixperdix*	I/P
65 WILD TURKEY	*Meleagris gallopavo*	I/P
Family- ***Gruidae***		
66 SANDHILL CRANE	*Grus canadensis*	U/M

Table 95 (cont). Birds of the Colville National Forest and vicinity.

Species name	Scientific name	Abundance and Seasonalitv
Family- *Rallidae*		
67 VIRGINIA RAIL	*Rallus limicola*	C/S
68 SORA	*Porzana Carolina*	C/S
69 AMERICAN COOT	*Fulica americana*	C/SW
Family- *Charadriidae*		
70 KILLDEER	*Charadnus vociferus*	C/S
71 BLACK-BELLIED PLOVER	*Pluvialus squatarola*	0/M
Family- *Scolopacidae*		
72 COMMON SNIPE	*Gallinago gallinago*	C/S
73 LONG-BILLED CURLEW	*Numenius amencanus*	0/M
74 SPOTTED SANDPIPER	*Actitus macularia*	C/S
75 SOLITARY SANDPIPER	*Tnnga solitaria*	U/M
76 GREATER YELLOWLEGS	*Tringa melanoleuca*	C/M
77 LESSER YELLOWLEGS	*Tnnga flavipes*	C/M
78 PECTORAL SANDPIPER	*Calidris melanotos*	U/M
79 BAIRD'S SANDPIPER	*Calidris bairdu*	U/M
80 LEAST SANDPIPER	*Calidris mmulilla*	C/M
81 SEMIPALMATED SANDPIPER	*Calidris pusilla*	U/M
82 WESTERN SANDPIPER	*Calidris maun*	C/M
83 SANDERLING	*Calidris alba*	0/M
84 LONG-BILLED DOWITCHER	*Limnodromus scolopaceus*	U/M
85 STILT SANDPIPER	*Micropalama himantopus*	0/M
87 WILSON'SPHALAROPE	*Phalaropus tricolor*	U/SM
88 RED-NECKED PHALAROPE	*Phalaropus lobatus*	0/M
Family- *Recurvirostridae*		
86 AMERICAN AVOCET	*Recurvirostrata amencana*	0/M
Family- *Laridae*		
89 HERRING GULL	*Larus argentatus*	0/M
90 CALIFORNIA GULL	*Larus califomicus*	U/M
91 RING-BILLED GULL	*Larus delawarensis*	C/M
92 BONAPARTE'S GULL	*Larus Philadelphia*	0/M
93 FORSTER'S TERN	*Sterna forsteri*	U/M
94 BLACK TERN	*Chlidonias niger*	C/S
Family- *Columbidae*		
95 ROCK DOVE	*Columba livia*	I/P
96 MOURNING DOVE	*Zenaida macroura*	C/SW
Family- *Strigidae*		
97 WESTERN SCREECH OWL	*Otus kenmcottii*	C/P
98 FLAMMULATED OWL	*Otus flammeolus*	0/S
99 GREAT-HORNED OWL	*Bubo virginianus*	C/P
100 SNOWY OWL	*Nyctea scandiaca*	0/W

Table 95 (cont.). Birds of the Colville National Forest and vicinity.

Species name	Scientific name	Abundance and Seasonality
Family- *Strigidae*, cont.		
101 NORTHERN HAWK OWL	*Sumia ulula*	0/W
102 NORTHERN PYGMY OWL	*Glaucidium gnoma*	C/P
103 BURROWING OWL	*Athene cunicularia*	0/M
104 BARRED OWL	*Strix varia*	U/P
105 GREAT GRAY OWL	*Strix nebulosa*	OAV
106 LONG-EARED OWL	*Asio otus*	C/S
107 SHORT-EARED OWL	*Asioflammeus*	U/P
108 BOREAL OWL	*Aegolius funereus*	0/W
109 NORTHERN SAW-WHET OWL	*Aegolius acadicus*	U/P
Family- *Caprimulgidae*		
110 COMMON POORWILL	*Phalaenoptilis nuttallii*	C/S
111 COMMON NIGHTHAWK	*Chordeiles minor*	C/S
Family- *Apodidae*		
112 VAUX'S SWIFT	*Chaetura vauxi*	C/S
113 WHITE-THROATED SWIFT	*Aeronautes saxatalis*	u/s
Family- *Trochilidae*		
114 BLACK-CHINNED HUMMINGBIRD	*Archilochus alexandri*	C/S
115 RUFOUS HUMMINGBIRD	*Selasphorus rufus*	C/S
116 CALLIOPE HUMMINGBIRD	*Stellula calliope*	C/S
Family- *Alcedinidae*		
117 BELTED KINGFISHER	*Ceryle alcyon*	C/P
Family- *Picidae*		
118 NORTHERN FLICKER	*Colaptes auratus*	C/P
119 PILEATED WOODPECKER	*Dryocopus pileatus*	C/P
120 LEWIS'WOODPECKER	*Melanerpes lewis*	u/s
121 YELLOW-BELLED SAPSUCKER	*Sphyrapicus vanus*	C/S
122 WILLIAMSONS SAPSUCKER	*Sphyrapicus thyroideus*	0/SM
123 HAIRY WOODPECKER	*Picoides villosus*	C/P
124 DOWNY WOODPECKER	*Picoides pubescens*	C/P
125 WHITE-HEADED WOODPECKER	*Picoides albolarvatus*	U/P
126 BLACK-BACKED WOODPECKER	*Picoides arcticus*	U/P
127 THREE-TOED WOODPECKER	*Picoides tridactylus*	U/P
Family- *Tyrannidae*		
128 EASTERN KINGBIRD	*Tyrannus tyrannus*	C/S
129 WESTERN KINGBIRD	*Tyrannus verticalis*	C/S
130 SAY'S PHOEBE	*Sayomis soya*	u/s
131 WILLOW FLYCATCHER	*Empidonax traillii*	C/S
132 LEAST FLYCATCHER	*Emptdonax minimus*	o/s
133 HAMMOND'S FLYCATCHER	*Empidonax hammondii*	C/S
134 DUSKY FLYCATCHER	*Emptdonax oberholseri*	C/S

Table 95 (cont.). Birds of the Colville National Forest and vicinity.

Species name	Scientific name	Abundance and Seasonalitv
Family- *Tyrannidae*, cont.		
135 PACIFIC-SLOPE FLYCATCHER	*Empidonax difficilis*	u/s
136 WESTERN WOOD-PEWEE	*Contopus sordidulis*	c/s
137 OLIVE-SIDED FLYCATCHER	*Contopus borealis*	c/s
Family- ***Alaudidae***		
138 HORNED LARK	*Eremophila alpestris*	C/MW
Family- ***Hirundinidae***		
139 VIOLET-GREEN SWALLOW	*Tachycineta thalassma*	C/S
140 TREE SWALLOW	*Tachycineta bicolor*	*C/S*
141 BANK SWALLOW	*Riparia riparia*	C/S
142 NORTHERN ROUGH-WINGED SWALLOW	*Stelgidopteryx serripennis*	*C/S*
143 BARN SWALLOW	*Hirundo rustica*	C/S
144 CLIFF SWALLOW	*Hirundo pyrrhonota*	C/S
Family- ***Corvidae***		
145 GRAY JAY	*Perisoreus canadensis*	C/P
146 STELLER'S JAY	*Cyanocitta stellen*	C/P
147 BLACK-BILLED MAGPIE	*Pica pica*	C/P
148 COMMON RAVEN	*Corvus corax*	C/P
149 AMERICAN CROW	*Corvus brachyrhynchos*	C/S
150 CLARK'S NUTCRACKER	*Nucifraga colum biana*	C/P
Family- ***Paridae***		
\51 BLACK-CAPPED CHICKADEE	*Parus atricapillus*	C/P
152 MOUNTAIN CHICKADEE	*Parus gambeli*	C/P
153 BOREAL CHICKADEE	*Parus hudsomcus*	R/P
154 CHESTNUT-BACKED CHICKADEE	*Parus rufescens*	U/P
Family- ***Sittidae***		
155 WHITE-BREASTED NUTHATCH	*Sitta carolinensis*	C/P
156 RED-BREASTED NUTHATCH	*Sitta canadensis*	C/P
157 PYGMY NUTHATCH	*Sitta pygmaea*	U/P
Family- ***Certhiidae***		
\58 BROWN CREEPER	*Certhia americana*	C/P
Family- ***Cinclidae***		
\59 AMERICAN DIPPER	*Cinclus mexicanus*	C/P
Family- ***Troglodytidae***		
160 HOUSE WREN	*Troglodytes aedon*	U/S
161 WINTER WREN	*Troglodytes troglodytes*	C/P
162 MARSH WREN	*Cistothorus palustris*	CP/SC
163 CANYON WREN	*Catherpes mexicanus*	U/P
164 ROCK WREN	*Salpinctes obsoletus*	U/P

Table 95 (cont.). Birds of the Colville National Forest and vicinity.

Species name	Scientific name	Abundance and Seasonality
Family- ***Mimidae***		
165 GRAY CATBIRD	***Dumetella carolinensis***	c/s
Family- ***Muscicapidae***		
166 AMERICAN ROBIN	***Turdus migratorius***	C/SM
167 VARIED THRUSH	***Ixoreus naevius***	C/S
168 HERMIT THRUSH	***Cathams guttatus***	C/S
169 SWAINSON'S THRUSH	***Catharus ustulatus***	C/S
170 VEERY	***Catharus fuscescens***	C/S
171 WESTERN BLUEBIRD	***Sialia mexicana***	u/s
172 MOUNTAIN BLUEBIRD	***Sialia currucoides***	c/s
173 TOWNSEND'S SOLITARE	***Myadestes townsendi***	c/s
174 GOLDEN-CROWNED KINGLET	***Regulus satrapa***	C/P
175 RUBY-CROWNED KINGLET	***Regulus calendula***	c/s
Family- ***Motacillidae***		
176 WATER PIPIT	***Anthus spmoletta***	C/M
Family- ***Bombycillidae***		
177 BOHEMIAN WAXWING	***Bombycilla garrulus***	c/w
178 CEDAR WAXWING	***Bombycilla cedrorum***	c/s
Family- ***Laniidae***		
179 NORTHERN SHRIKE	***Laniiis excubitor***	c/w
180 LOGGERHEAD SHRIKE	***Lamus ludovicianus***	u/s
Family- ***Sturnidae***		
181 EUROPEAN STARLING	***Stumus vulgaris***	I/p
Family- ***Vireonidae***		
182 SOLITARY VIREO	***Vireo solitarius***	c/s
183 RED-EYED VIREO	***Vireo olivaceus***	c/s
184 WARBLING VIREO	***Vireo gilvus***	u/s
Family- ***Passeridae***		
185 HOUSE SPARROW	***Passerdomesticus***	vs
Family- ***Embemidae***		
186 TENNESSEE WARBLER	***Vermivora peregrina***	0/M
187 ORANGE-CROWNED WARBLER	***Vennivora celata***	c/s
188 NASHVILLE WARBLER	***Vermivora ruficapilla***	c/s
189 YELLOW WARBLER	***Dendroica petechia***	c/s
190 YELLOW-RUMPED WARBLER	***Dendroica corona/a***	c/s
191 TOWNSEND'S WARBLER	***Dendroica townsendi***	u/s
192 NORTHERN WATERTHRUSH	***Seiurus noveboracensis***	o/s
193 MacGILLIVRAY'S WARBLER	***Oporomis tolmiei***	c/s
194 COMMON YELLOWTHROAT	***Geothlypis trichas***	c/s

Table 95 (cont.). Birds of the Colville National Forest and vicinity.

	Species name	Scientific name	Abundance and Seasonality
Family- ***Emberizidae*, cont.**			
195	YELLOW-BREASTED CHAT	*Icteria virens*	U/S
196	WILSON'S WARBLER	*Wilsonia pusilla*	c/s
197	AMERICAN REDSTART	*Setophaga ruticilla*	c/s
198	BOBOLINK	*Dolichonyx oryzivorus*	U/S
199	WESTERN MEADOWLARK	*Stumella neglecSa*	c/s
200	YELLOW-HEADED BLACKBIRD	*Xanthocephalus xanthcep.*	c/s
201	RED-WINGED BLACKBIRD	*Agelaius phoeniceus*	c/s
202	NORTHERN ORIOLE	*Icterus galbula*	U/S
203	BREWER'S BLACKBIRD	*Euphagus cyanocephalus*	c/s
204	BROWN-HEADED COWBERD	*Molothrus ater*	c/s
205	BLACK-HEADED GROSBEAK	*Pheucticus melanocephalu*	U/S
206	LAZULI BUNTING	*Passenna amoena*	c/s
207	WESTERN TANAGER	*Piranga ludoviciana*	c/s
208	RUFOUS-SIDED TOWHEE	*Pipilo erythrophthalmus*	c/s
209	SAVANNAH SPARROW	*Passerculus sandwichensis*	CM
210	GRASSHOPPER SPARROW	*Ammodramus savannarum*	U/S
211	VESPER SPARROW	*Pooecetes grammeus*	c/s
212	DARK-EYED JUNCO	*Junco hyemalis*	C/P
213	AMERICAN TREE SPARROW	*Spizella arborea*	U/M
214	CHIPPING SPARROW	*Spizella passenna*	c/s
215	CLAY-COLORED SPARROW	*Spizella pallida*	o/s
216	BREWER'S SPARROW	*Spizella brewen*	U/S
217	WHITE-CROWNED SPARROW	*Zonotnchia leucophrys*	C/SM
218	FOX SPARROW	*Passerella iliaca*	c/sw
219	LINCOLN'S SPARROW	*Melospiza lincolnii*	0/M
220	SONG SPARROW	*Melospiza melodia*	C/P
221	LAPLAND LONGSPUR	*Calcarius lapponicus*	o/w
222	SNOW BUNTING	*Plectrophenax nivalis*	o/w
Family- ***Fringillidae***			
223	EVENING GROSBEAK	*Coccothraustes vespertinus*	c/sw
224	PURPLE FINCH	*Carpodacus purpureus*	o/w
225	CASSIN-S FINCH	*Carpodacus cassinn*	c/sw
226	HOUSE FINCH	*Carpodacus mexicanus*	c/sw
227	PINE GROSBEAK	*Pinicola enucleator*	C/P
228	ROSY FINCH	*Leucosticte arctoa*	u/w
229	COMMON REDPOLL	*Carduelis flammea*	u/w
230	HOARY REDPOLL	*Carduelis homemanni*	o/w
231	PINE SISKIN	*Carduelis pinus*	C/P
232	AMERICAN GOLDFINCH	*Carduelis tristis*	c/s
233	RED CROSSBILL	*Loxia curvirostra*	C/P
234	WHITE-WINGED CROSSBILL	*Loxia leucoptera*	u/w

Table 96. Mammals of the Colville National Forest and vicinity. Data compiled by T. Burke (1976). Abundance codes: C= common, U= uncommon, X= unknown, 1= introduced, R= rare.

	Species name	Scientific name	Abundance
Order- ***Insectivora***			
	PYGMY SHREW	*Microsorex hoyi*	X
	MASKED SHREW	*Sorex cinereus*	u
	NORTHERN WATER SHREW	*Sorex palustris*	u
	VAGRANT SHREW	*Sorex vagrans*	C
	DUSKY SHREW	*Sorex obscurus*	C
Order- ***Chiroptera***			
6	LITTLE BROWN MYOTIS	*Myotis lucifugus*	C
7	YUMA MYOTIS	*Myotis yumanensis*	×
8	LONG-EARED MYOTIS	*Myotis evotis*	X
9	FRINGED MYOTIS	*Myotis thysanodes*	u
10	LONG-LEGGED MYOTIS	*Myotis volans*	X
11	CALIFORNIA MYOTIS	*Myotis califomicus*	C
12	SMALL-FOOTED MYOTIS	*Myotis subulatus*	×
13	SILVER-HAIRED BAT	*Lasionycteris noctivagans*	X
14	BIG BROWN BAT	*Eptesicus fuscus*	C
15	RED BAT	*Lasiurus borealis*	×
16	HOARY BAT	*Lasiurus cinereus*	×
17	TOWNSEND'S BIG-EARED BAT	*Plecotus towsendi*	X
18	PALLID BAT	*Antrozous pallidus*	X
Order- ***Lagomorpha***			
19	PKA	*Ochotona princeps*	C
20	SNOWSHOE HARE	*Lepus americanus*	C
21	MOUNTAIN COTTONTAIL	*Sylvilagus nuttalli*	×
Order- ***Rodentia***			
22	YELLOW PINE CHIPMUNK	*Eutamias amoenus*	C
23	RED-TAILED CHIPMUNK	*Eutamias ruficaudus*	C
24	WOODCHUCK	*Marmota monax*	X
25	YELLOW-BELLIED MARMOT	*Marmota flaviventris*	C
26	HOARY MARMOT	*Marmota caligata*	u
27	COLUMBIAN GROUND SQUIRREL	*Citellus columbianus*	C
28	MANTLED GROUND SQUIRREL	*Citellus lateralis*	u
29	RED SQUIRREL	*Tamiasciurus hudsomcus*	C
30	NORTHERN FLYING SQUIRREL	*Glaucomys sabrinus*	C
31	NORTHERN POCKET GOPHER	*Thomomys talpoides*	C
Order- ***Rodentia***			
32	GREAT BASIN POCKET MOUSE	*Perognathus parvus*	×
33	BEAVER	*Castor canadensis*	C
34	DEER MOUSE	*Peromyscus maniculatus*	C
35	BUSHY-TAILED WOODRAT	*Neotoma cinerea*	C
36	BOREAL RED-BACKED VOLE	*Clethrionomys gappen*	C
37	HEATHER VOLE	*Phenacomys intermedius*	u

Table 96 (cont). Mammals of the Colville National Forest and vicinity.

Specie;sname		Scientific name	Abundance
Order- *Rodentia*, cont.			
38	MEADOW VOLE	*Microtus pennsylvanicus*	C
39	MOUNTAIN VOLE	*Microtus montanus*	X
40	LONG-TAILED VOLE	*Microtus longicaudus*	X
41	WATER VOLE	*Arvicola richardsoni*	X
42	SAGEBRUSH VOLE	*Lagurus curtatus*	X
43	MUSKRAT	*Ondatra zibethicus*	C
44	NORTHERN BOG LEMMING	*Synaptomys borealis*	U
45	NORWAY RAT	*Rattus norvegicus*	IX
46	HOUSE MOUSE	*Mus musculus*	I
47	WESTERN JUMPING MOUSE	*Zapus princeps*	C
48	PORCUPINE	*Erethizon dorsatum*	C
Order- *Carnivora*			
49	COYOTE	*Canis latrans*	C
50	GRAY WOLF	*Cams lupus*	X
51	RED FOX	*Vulpesfulva*	X
52	BLACK BEAR	*Ursus americanus*	C
53	GRIZZLY BEAR	*Ursus arctos*	R
54	RACCOON	*Procyon lotor*	C
55	AMERICAN MARTEN	*Martes americana*	C
56	FISHER	*Martes pennanti*	R
57	SHORT-TAILED WEASEL	*Mustela erminea*	C
58	LONG-TAILED WEASEL	*Mustela frenata*	C
59	MINK	*Mustela vison*	C
60	WOLVERINE	*Gulo luscus*	R
61	BADGER	*Taxidea taxus*	U
62	STRIPED SKUNK	*Mephitis mephitis*	C
63	RIVER OTTER	*Lutra canadensis*	U
64	MOUNTAIN LION	*Felis concolor*	C
65	LYNX	*Lynx canadensis*	U
66	BOBCAT	*Lynxrufus*	C
Order- *Artiodactyla*			
67	ROCKY MOUNTAIN ELK	*Cervus canadensis*	C
68	MULE DEER	*Odocoileus hemionus*	C
69	WHITE-TAILED DEER	*Odocoileus virgimanus*	C
70	MOOSE	*AIces aloes*	U
71	WOODLAND CARIBOU	*Rangifer tarandus*	R
72	MOUNTAIN GOAT	*Oreamnos americanus*	I
73	ROCKY MOUNTAIN BIGHORN SHEEP	*Ovis canadensis*	I

Table 97. Reptiles and amphibians found on the Colville National Forest and vicinity. Data from Slater (1963, 1964).

	Common name	Scientific name
1	BLOTCHED TIGER SALAMANDER	*Ambystoma tigrinum*
2	CENTRAL LONG-TOED SALAMANDER	*Ambystoma macrodactylum*
3	GREAT BASIN SPADEFOOT	*Scaphiopus inennontanus*
4	WESTERN TOAD	*Bufo boreus*
5	PACIFIC TREE FROG	*Hyla regilla*
6	SPOTTED FROG	*Ranapretiosa*
7	NORTHERN LEOPARD FROG	*Rana pipens*
8	BULLFROG	*Rana catesbeiana*
9	PAINTED TURTLE	*Chrysemys picta*
10	WESTERN SKINK	*Eumeces sidltonianus*
11	NORTHERN ALLIGATOR LIZARD	*Gerrhonotus coeruleus*
12	ROCKY MOUNTAIN RUBBER BOA	*Charina bottae*
13	WESTERN YELLOW-BELLIED RACER	*Coluber constrictor*
14	GREAT BASIN GOPHER SNAKE	*Pituophis melanoleucus*
15	VALLEY GARTER SNAKE	*Thamnophis sirtalis*
16	WANDERING GARTER SNAKE	*Thamnophis elegans*
17	NORTHERN PACIFIC RATTLESNAKE	*Crotalus viridus*

Table 98. Fishes of the Colville National Forest and vicinity.

	Species name	Scientific name
1	White Sturgeon	*Acipenser transmontanus*
2	Kokanee (Silver Trout)*	*Onchorhynchus nerka kennerlyi*
3	Westslope Cutthroat Trout*	*Onchorhynchus clarki lewisi*
4	Coastal Rainbow Trout*	*Oncorhynchus myhss irideus*
5	Redband Trout (Interior Rainbow)*	*Oncorhynchus mykiss gairdneri*
6	Brown Trout*	*Saimo tmtta*
7	Brook Trout*	*Salvelinus fontinalis*
8	Bull Trout*	*Salvelinus confluentus*
9	Lake Trout*	*Salvelinus namaycush*
10	Pygmy Whitefish*	*Prosopium coulteri*
11	Mountain Whitefish*	*Prosopium williamsoni*
12	Grass Pickerel	*Esox americanus*
13	Common Carp*	*Cypnnus carpio*
14	Tench*	*Tinea tinea*
15	TuiChub	*Gila bicolor*
16	Redside Shiner*	*Richardsonius balteatus*
17	Northern Squawfish*	*Ptychocheilus oregonensis*
18	Peamouth	*Mylocheilus caurinus*
19	Chiselmouth	*Acrocheilus alutaceus*
20	Longnose Dace	*Rhimchthys cataractae*
21	Leopard Dace	*Rhinichthys falcatus*
22	Speckled Dace*	*Rhinichthys osculus*
23	Bridgelip Sucker*	*Catostomus columbianus*
24	Largescale Sucker*	*Catostomus macrocheilus*
25	Black Bullhead	*Ictalurus melas*
26	Yellow Bullhead	*Ictalurus natalis*
27	Brown Bullhead*	*Ictalurus nebulosus*
28	Threespine Stickleback	*Gasterosteus aculeatus*
29	Burbot (Lingcod)*	*Lota lota*

Table 98 (cont). Fishes of the Colville National Forest and vicinity.

	Species name	Scientific name
30	Smallmouth Bass*	*Micropterus dolomieui*
31	LargemouthBass*	*Micropterus salmoides*
32	Black Crappie*	*Pomoxis nigromaculatus*
33	Green Sunfish	*Lepomis cyanellus*
34	Pumpkinseed Sunfish*	*Lepomis gibbosus*
35	Walleye	*Stizostedion vitreum*
36	Yellow Perch*	*Perca flavescens*
37	PncklySculpin(l)	*Coitus asper*
38	Mottled Sculpin (1)	*Coitus bairdi*
39	Piute Sculpin*	*Coitus beldingi*
40	Torrent Sculpm(l)	*Coitus rhotheus*
41	Shorthead Sculpm (1)	*Coitus confusus*
42	Slimy Sculpin*	*Cottus cognatus*
43	Arctic Grayling*	*Thymallus arcticus*

* Species found in waters on the Colville N.F. proper.
(1) Sculpin are present in waters on the Forest, but data on species is incomplete.

APPENDIX 4

- **Field Form for Plant Association Identification**

ECOLOGY FIELD FORM - COLVILLE NATIONAL FOREST

DATE / / T N R E SEC E

DISTRICT

COMPARTMENT CELL OBSERVER

GENERAL LOCATION

PLANT ASSOCIATION COMMUNTTYTYPE

ELEVATION FT. SLOPE % ASPECT

POSITION:(circle)
1-Ridge
2-Upper 1/3
3-Mid slope
4-Lower 1/3
5-Bench or flat
6-Valley bottom

SLOPE CONFIGURATION^circle)
1-Convex
2-Straight(flat)
3-Concave

% CROWN COVER: (1/10th acre)

PERCENT	AREArft^2^	RADIUS fft.1
Trace	<43.6	<3.7
1%	43.6	3.7
5%	217.8	8.3
10%	435.6	11.8

Scientific name	Code	Common name	%COVER OSf>12')	%COVER USr<12')
TREES				
1 *Abies grandis*	ABGR	grand fir		
2 *Abies lasiocarpa*	ABLA2	subalpine fir		
3 *Betula papyri/era*	BEPA	paper birch		
4 *Larix occidentalis*	LAOC	western larch		
5 *Picea engelmannii*	PEN	Engelmann spruce		
6 *Pinus albicaulis*	PIAL	whitebark pine		
1 *Pinus contorta*	PICO	lodgepole pine		
8 *Pinus monticola*	PIMO	western white pine		
9 *Pinus ponderosa*	PIPO	ponderosa pine		
10 *Populus tremuloides*	POTR	quaking aspen		
11 *Populus trichocarpa*	POTR2	black cottonwood		
12 *Pseudotsuga menziesii*	PSME	Douglas-fir		
13 *Thuja plicata*	THPL	western redcedar		
14 *Tsuga heterophylla*	TSHE	western hemlock		
SHRUBS AND SUBSHRUBS				
1 *Acerglabrum* var. *Douglasii*	ACGLD	Douglas maple		
2 *Ainus sinuata*	ALSI	Sitka alder		
3 *Amelanchier ainifolia*	AMAL	serviceberry		
4 *Arctostaphylos uva-ursi*	ARUV	bearbeny		
5 *Berberis aquifolium*	BEAQ	Oregon grape		
6 *Comus canadensis*	COCA	bunchberry dogwood		
7 *Comus stolonifera*	COST	red-osier dogwood		
8 *Holodiscus discolor*	HODI	ocean-spray		
9 *Linnaea borealis*	LIBOL	twinflower		
10 *Memiesia ferruginea*	MEFE	rusty menziesia		
11 *Opiopanax horridum*	OPHO	devil's club		
12 *Pachistima myrsinites*	PAMY	pachistima		
13 *Physocarpus malvaceus*	PHMA	nmebark		
14 *Pyrola secunda*	PYSE	sidebells pyrola		

ECOLOGY FIELD FORM - COLVILLE NATIONAL FOREST

Scientific name	Code	Common name	%COVER
SHRUBS AND SUBSHRUBS			
15 *Rhododendron albiflorum*	RHAL	Cascade azalea	
16 *Ribes lacustre*	RILA	prickly currant	
17 *Rubus parviflorus*	RUPA	thunbleberry	
18 *Rubus pedatus*	RUPE	five-leaved bramble	
\ 9 *Sahx scouleriana*	SASC	Scouler willow	
20 *Shepherdia canadensis*	SHCA	russet buffaloberry	
21 *Sorbus scopulina*	SOSC2	mountain ash	
22 *Spirea betulifolia* var. *lucida*	SPBEL	shiny-leaf spirea	
23 *Symphoricarpos albus*	SYAL	common snowberry	
24 *Symphoricarpos oreophilus*	SYOR	mountam snowberry	
25 *Vaccinium caespitosum*	VACA	dwarf huckleberry	
26 *Vaccinium membranaceum*	VAME	big huckleberry	
27 *Vaccinium myrtillus*	VAMY	low huckleberry	
28 *Vaccinium scoparium*	VASC	grouse huckleberry	
29 *Xerophyllum tenax*	XETE	beargrass	
HERBS			
1 *Actaea rubra*	ACRU	baneberry	
2 *Adenocaulon bicolor*	ADBI	pathfinder	
3 *Agropyron spicatum*	AGSP	bluebunch wheatgrass	
4 *Aralia nudicaulis*	ARNU3	wild sarsaparilla	
5 ./Irwt'co *cordifolia*	ARCO	heartleaf arnica	
6 *Asarum caudatum*	ASCA3	wild ginger	
7 *Athyrium ftlix-femina*	ATFI	lady-fem	
8 *Balsamorhiza sagittata*	BASA	arrowleaf balsamroot	
9 *Calamagrostis rubescens*	CARU	pinegrass	
10 *Clintonia uniflora*	CLUN	queencup beadlily	
11 *Equisetum arvense*	EQAR	common horsetail	
12 *Equisetum sylvaticum*	EQSY	wood horsetail	
13 *Fetsuca idahoensis*	FEID	Idaho fescue	
14 *Galium triflorum*	GATR	sweetscented bedstraw	
15 *Goodyera oblongifolia*	GOOB	w. rattlesnake plantain	
16 *Gymnocarpium dryopteris*	GYDR	oak-fem	
17 *Lupmus* species	LUPIN	lupine species	
18 *Luzula hitchcocfdi*	LUHI	smooth woodrush	
19 *Senecio triangularis*	SETR	arrowleaf groundsel	
20 *Smilacina racemosa*	SMRA	feather solomonplume	
21 *Smilacina stellata*	SMST	starry solomonplume	
22 *Streptopus amplexifolius*	STAM	claspleaf twisted-stalk	
23 *Tiarella unifoliata*	TIUN	coolwort foamflower	
24 *Trautvetteria caroliniensis*	TRCA3	false bugbane	
25 *Trillium ovatum*	TROV	white trillium	
26 *Valeriana sitchensis*	VASI	Sitka valeriana	
27 r/o/a *orbiculata*	VIOR2	round-leaved violet	

ADDITIONAL SPECIES OR OBSERVATIONS

GLOSSARY OF TERMS

Absent Not found in the plot, community or association.

Abundant When relating to plant canopy cover in association descriptions or key, any species with 25% or more cover (after Pfister *et al.* 1977).

Accidental A species infrequently found in a particular habitat that is present as an accident or fluke of establishment.

All-aged A condition of a forest or stand that contains trees of all or almost all age classes. It is generally a primary stand where individuals have entered at various times when and where suitable conditions such as space has allowed. *(See* **Uneven-aged).**

Allelopathy The influence of one plant upon another by products of metabolism. "Chemical warfare of plants".

Alpine The part of a mountain above the tree line; or refers to plants that grow in that environment. Thus by definition there is no such thing as an alpine tree because alpine means "above the tree line".

Annual A plant that grows, matures, produces seed and dies in only one year.

Association a. A unit of vegetation classification based on the projected climax community type. b. A group of plants growing together in a climax state, c. An assemblage of species recognized and characterized by certain characteristic dominates, d. R. Daubenmire: "...a particular combination of climax tree and understory dominants..." (Daubenmire 1968).

Awn A slender bristle or hairlike projection.

Biennial A plant that completes its life cycle in 2 years and then dies.

Bunchgrass A grass that grows from a bunch or clump *(see* **Caespitose,** *Contrast with* **Rhizomatous.)**

Caespitose Growing in dense tufts, *i.e.* bunchgrass.

Canopy The cover of branches and foliage formed collectively by the crowns of adjacent trees.

Clearcut The cutting method that describes the silvicultural system in which harvesting removes most or all of the existing trees over a considerable area at one time. An even-aged forest usually results.

Climax A self-replacing association or species; with no evidence of replacement by other plants.

Climax community The stable community in an ecological succession which is able to reproduce itself indefinitely under existing environmental conditions in the absence of disturbance. Viewed as the final stage or end-point in plant succession for a site. The climax community develops and maintains itself in steady state conditions (without disturbance). Often termed the association.

Climax species Species that are self perpetuating in the absence of disturbance without evidence of replacement by other species. Usually considered the most shade tolerant and competitive species.

Oimax vegetation The pattern or complex of climax communities in a landscape corresponding to the pattern of environmental gradients or habitats (Gabriel and Talbot 1984).

Clone A group of individuals that originated vegetatively from a single individual.

Codominant Species in a mixed stand that are about equally numerous and vigorous, forming part of the upper canopy of a forest.

Common When used in association descriptions or keys any species with 1% or more cover in the stand (several individuals present) (after Pfister *et al.* 1977). Often may include species with cover values somewhat less than 1% since trace was not recorded in the Colville N.F. data.

Community A general term for an assemblage of plants living together and interacting among themselves in a specific location; no particular ecological status is implied.

Community type An aggregation of all plant communities with similar structure and floristic composition. A unit of vegetation within a classification with no particular successional status implied.

Constancy The number of occurrences of a species in a series of plots divided by the total number of plots (expressed as a percentage and all plots must be the same size), *i.e.* If a particular association has 10 plots and a species is found in 8 of the 10 then its constancy is 80%.

Cover Usually meant as canopy cover which is the gross outline of the foliage of an individual plant or group of plants within a stand or plot. Expressed as a percent of the total area of the plot and may exceed 100% if more than one layer is considered.

Decumbent Lying on the ground with a prostrate base and erect tips.

Depauperate Poorly developed in terms of both species and cover of individuals.

Dominant A taxon or group oftaxa which by their collective size, mass, or numbers exert the most influence on other components of the ecosystem (Daubenmire 1978).

Duff The partially decomposed organic matter (litter of leaves, flowers and/or fruits) found beneath plants, as on a forest floor.

Ecotone The boundary or transition zone between plant communities.

Edaphic Refers to the soil.

Ephemeral Lasting only a short time.

Epiphyte An organism that grows on another plant, but is not parasitic on it.

Even-aged management The application of a combination of actions that results in the creation of stands in which trees of essentially the same age grow together. The difference in age between trees forming the main canopy level of a stand usually does not exceed 20 percent of the age of the level of a stand at maturity. Cutting methods producing even-aged stands are clearcut, shelterwood, or seed tree.

Evergreen Foliage remains green throughout the year; not deciduous.

Forb An herb. Any herbaceous plant that is not grasslike.

Genus A taxonomic class below a family and above a species *(e.g.* all pines are of one genus).

Graminoid Refers to an herb with long narrow leaves such as grasses and grasslike plants (sedges and rushes).

Grass Any member of the family Gramineae.

Grasslike Includes plants such as sedges and rushes that resemble grasses in gross morphology but are not part of the family Gramineae. *See* **Graminoid.**

Group selection The cutting method which describes the silvicultural system in which trees are removed periodically in small groups resulting in openings that do not exceed 1 to 2 acres in size. This usually leads to the formation of an uneven-aged stand.

Habit The general growth form and appearance of a species.

Habitat The area or type of environment in which an organism or population normally lives or occurs.

Habitat type Defined originally by R. Daubenmire to mean: "All the area that now supports, or within recent time has supported, and presumably is still capable of supporting, one plant association..." (Daubenmire 1968). An aggregation of all land areas capable of supporting similar plant communities at climax (Pfister *et al.* 1977).

Herb A plant with a fleshy stem that dies back to ground level each year. A non-woody plant.

Herbaceous Leaf-like in color and texture; non-woody.

Hydric A relative term used with xeric and mesic to denote the wetness of a site. Xeric-mesic-hydric indicates from dry to wet. Hygric is a synonymous term that is probably more appropriate (or correct).

Hygric ***See*** **Hydric.**

Increaser A native plant that increases under disturbance (usually grazing). It carries a negative connotation for determination of range condition.

Indicator species A species which is sensitive to important environmental feature of a site such that its constancy or abundance reflect significant changes in environmental factors. A plant whose presence indicates specific site conditions or a type.

Individual tree selection The cutting method that describes the silvicultural system in which trees are removed individually over an entire stand over time. This usually results in uneven-aged stands.

Invader A introduced plant that increases after its introduction into a site; generally after some type of disturbance. As used in range management the term carries the connotation of being undesirable for grazing.

Krummholz The stunted growth habit, literally crooked wood, caused by wind and found in certain tree species at their upper limit of distribution.

Layering The ability of a plant to form roots where its stem comes in contact with the ground, *(e.g.* western redcedar or Pacific yew)

Litter The uppermost layer of organic debris on a forest floor consisting essentially of freshly fallen or only slightly decomposed vegetative matter.

Mesic A relative term used with xeric and hydric to denote the wetness of a site. Xeric-mesic-hydric indicates from dry to wet. Characterized by intermediate moisture conditions, neither decidedly wet nor dry.

Meso-, or Mes A prefix used to indicate middle or intermediate condition such as mesic (intermediate in terms of moisture and/or temperature; or along a gradient of riparian conditions such as riparian, meso-riparian, xero-riparian to non-riparian communities or species).

Microsite A small area (usually only a few square feet) of different site or habitat conditions from that surrounding it. *(e.g.* A small concave area within a larger area of convex slope.)

Moderate Used in the context of not extreme in terms of temperature, elevation and moisture.

Montane The biogeographic zone made up of relatively moist cool upland slopes between the lower and upper timberlines, generally characterized by large evergreen trees as a dominant life form.

Mottling Variation of coloration in soils as represented by localized spots, patches, or blotches of contrasting color. Commonly develops under alternating wet and dry periods with associated reduction and oxidation environments. Mottling generally indicates poor aeration and impeded drainage (Youngblood *et al.* 1985).

Old-growth Stands which are generally well past the age of maturity as defined by the culmination of mean annual increment and often exhibit characteristics of decadence. These characteristics may include, but are not limited to: low growth rates, dead and dying trees, snags, and down woody material. The stands are usually characterized by large diameter trees relative to species and site potential, multi-layered canopies and a range in tree diameter sizes. The specific attributes of an old-growth stand are primarily dependent on plant associations and forest cover type (Bums and Honkala 1990).

Perennial A plant that lives more than 2 years.

Pioneer A plant capable of invading a newly exposed soil surface and persisting there until supplanted by successor species.

Plot A circumscribed sampling area for vegetation (Lincoln *et al.* 1982).

Poorly represented When relating to plant coverage in association descriptions or keys, includes any species with less than 5% cover, including absent. In practice often indicates species that are not especially apparent (after Pfister *et al.* \977).

Pole-size A young tree generally with a d b.h. of not less than 4 in. or greater than 12 in.

Presence The state or fact of being present; or similar to constancy except that all the plots need not be the same size.

Present Found in the plot (not obviously restricted to atypical microsites) (after Pfister *et al.* 1977).

Principal layer The layer which defines the characteristic physiognomy of the vegetation (at any geographic or classification scale) being considered.

Prostrate Growing flat along the ground.

Pumice A volcanic glass full of cavities and very light in weight.

Regolith "All loose earth material above the underlying solid rock; more or less equivalent to the term soil..." (Lincoln *etal*. 1982).

Reproducing successfully An evaluation of the reproductive success of trees where a species appears capable of reproducing itself under current conditions (mainly applied to closed canopy conditions). Generally 10 or more individuals per acre is used as an arbitrary starting point for evaluation. Other items normally considered include 1) the health and vigor of individuals, 2) the species in question are not restricted to atypical microsites and 3) are usually in more than one size class in the understory (after Pfister *et al.* 1977).

Rhizomatous Having rhizomes.

Rhizome A root-like underground stem that sends out shoots from its upper surface and roots from the under surface.

Riparian That land, next to water, where plants dependent on a perpetual source of water occur (Kovalchik 1987).

Riparian ecosystem Interacting system between aquatic and terrestrial situation, identified by soil characteristics, and distinctive vegetation that requires or tolerates free or unbound water (Youngblood *et al.* 1985).

Riparian species Plant species occurring within the riparian zone. Obligate species require the environmental conditions within the riparian zone; facultative species tolerate the environmental conditions, therefore may also occur away from the riparian zone (Youngblood *et al.* 1985).

Riparian zone A geographically delineated portion of the riparian ecosystem (Youngblood *etal.* 1985).

Rootstock Rhizome.

Rosette A basal cluster of leaves, flowers, etc.; arranged in a circle or disc.

Rush Grasslike plants of the family Juncaceae, with hollow or pithy stems that are usually round in shape and without nodes.

Sapling A tree more than 3 ft. in height and less than 4 inches in d.b.h.

Scarce When relating to plant coverage in association descriptions or keys, includes any species absent or with less than 1% cover (only one or two small plants).

Secund Having the flowers or branches all on one side of the axis *(e.g. Pyrola secunda).*

Sedge A grasslike plant of the family Cyperaceae that resemble grasses but have solid (often triangular) stems without nodes.

Seedling A tree grown from seed that has not yet reached a height of 3 ft. or exceeded 2 inches in d.b.h.

Seed tree The cutting method that describes the silvicultural system in which the dominant feature is the removal of all trees except for a pre-determined number of seed bearers left singly or in small groups. The seed trees are often harvested when regeneration is established. This usually results in an even-aged stand.

Serai A species or plant community that is replaced by another (over time) as succession progresses. *See* **Sere.**

Sere The complete sequence of ecological communities successively occupying an area.

Series An aggregation oftaxonomically related associations that takes the name of climax species that dominate the principal layer (Driscoll *et al.* 1984). A group of associations or habitat types with the same dominant climax species.

Serotinous Late in developing; particularly applied to fruit and cones that remain closed for a year or more after the seeds mature.

Serpentine A mineral or rock consisting essentially of a hydrous magnesium silicate. It usually has a dull green color and often a mottled appearance.

Shelterwood The cutting method that describes the silvicultural system in which trees are harvested in two or more successive cuttings. This process provides a source of seed and/or protection for regeneration. An even-aged stand usually results.

Shrub A woody perennial that differs from trees in that it is typically smaller in stature and has multiple stems from the ground. They tend to be categorized as follows: Low shrubs are up to 2 feet tall; Medium shrubs are 2 to 6 feet high; and tall shrubs are more than 6 feet tall. *See* **Subshrub.**

Site An area delimited by fairly uniform climatic and soil conditions. Similar to habitat.

Site index (SI) A measure of site class based upon the height of the dominant trees in a stand at an arbitrarily chosen age, most commonly 100 years.

Solum The upper and most weathered part of the soil profile, i.e., the A and B horizons.

Species A taxonomic class below that of genus; generally refers to organisms capable of interbreeding.

Stable The condition of little or no perceived change in plant communities that are in relative equilibrium with existing environmental conditions; describes persistent but not necessarily culminating stages (climax) in plant succession (Youngblood *etal.* 1985).

Stand Vegetation occupying a specific area and sufficiently uniform in species composition, age arrangement, structure and condition as to be distinguished from the vegetation on adjoining areas. A group of plants with a more-or-less uniform condition(s) such as composition, age, structure, condition, etc. Stands are real entities and can be sampled. Compare association, habitat type, community.

Stolen A creeping stem above the ground that roots at the nodes. *Compare with* **Rhizome.**

Stoloniferous Having or bearing stolons.

Subalpine A forested zone just below the treeless (alpine) zone. *See* **Alpine.**

Subshrub A very low (usually less than Ifoot tall) and semi-woody plant with a persistent, somewhat woody base. Some consider them as woody herbs. PYSE, CHUMO and LIBOL are examples ofsubshrubs. (SufTrutescent is the proper botanical term for semi-shrubby plants.)

Succession The replacement of one type of community or species by another. Often given the connotation of leading towards the climax but this is not necessarily so in all uses.

Succulent With thick, fleshy stems or leaves.

SufTrutescent Semi-woody, or half shrubby. *See* **Subshrub.**

Suppressed Very slowly growing trees with crowns in the lower layer of the canopy. Such trees are subordinate to dominants, codominants, and intermediates in the crown canopy.

Tiller A shoot from the base of a grass.

Timberline The upper or lower limit beyond which trees do not grow. The lower timberline is usually related to drought and the upper to low temperatures. *See* **Tree line.**

Trailing Prostrate, but not rooting.

Tree A woody plant with a single stem (usually) and more than 8 feet tall.

Tree line The limit beyond which trees do not grow except perhaps in a stunted form. *Compare with* **Timberline.**

Undergrowth A generalized term that refers to the plants under a taller canopy of vegetation such as shrubs under a canopy of trees. *See* **Understory.**

Understory Sometimes has the same meaning as undergrowth but usually carries the connotation of meaning small trees.

Uneven-aged A condition of forest or stand that contains a mix of trees that differ markedly in age.

Well represented When relating to plant coverage in association descriptions or keys, any species with more than 5% canopy cover (readily apparent) (after Pfister *et al.* 1977).

Wintergreen Green throughout the year. Evergreen but without the connotation that evergreen carries of being specific to tree foliage.

Xero- A Greek prefix meaning dry; *i.e.* xerophyte = a dryness enduring or drought tolerant plant. Compare with the meaning of Mesic and **Hydric** (hygric).

Xeric Characterized by or adapted to a dry habitat. *Compare with* **Hydric.**

Zone The geographic area of uniform macroclimate where the climatic associations share the same characteristic species of the principal layer. Note: The zone has been used by Daubenmire (1978) to describe the geographical area over which one association is climatic climax. His definition is more specific than the definition given above. The definition as used herein approximates the geographical area of a series, or possibly portions of other series, rather than the area of one association.

Williams, Clinton 1C; Kelley, Brian F.; Smith, Bradley G.; Lillybridge, Terry R. 1995. Forested plant associations of the Colville National Forest. Gen. Tech. Rep. PNW-GTR-360. Portland, OR. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 375 p. In cooperation with: Pacific Northwest Region, Colville National Forest.

A classification of forest vegetation is presented for the Colville National Forest in northeastern Washington State. It is based on potential vegetation with the plant association as the basic unit. The classification is based on a sample of approximately 229 intensive plots and 282 reconnaisance plots distributed across the forest from 1980 to 1983. The hierarchical classification includes 5 forest tree series and 39 plant associations or community types. Diagnostic keys are presented for each tree series and plant association or community type. Descriptions include information about plant association or community species composition, occurrences, distribution, environment and soils, forest productivity, management implications and relations to other vegetation classifications. Background information is also presented on the ecology, geology, soils, climate, and fire history of the Colville National Forest.

Keywords: Vegetation classification, climax plant communities, potential vegetation, plant association, vegetation series, forest ecology, fire, wildife, range, northeastern Washington.

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