APPENDIX

SUITABLE SPECIES FOR STREAMSIDE STABILIZATION

INTRODUCTION

The objective of this section is, through a review of the literature, to identify and characterize those common tree and shrub species that would be suitable candidates for riparian plantings in streamside stabilization projects of the Oregon Department of Transportation (ODOT) of Oregon. The product is a set of tables, one for each ODOT eco-region, that describe the riparian species found in the eco-region. The species lists are not exhaustive; less common species are not included.

ECO-REGIONS

For the purposes of this report, the five ODOT Maintenance Region and District Map (Sept. 1997) eco-regions, 1) Portland Metro Area; 2) Northwest Oregon; 3) Southwest Oregon; 4) Central Oregon and 5) Eastern Oregon, were used for identifying and grouping suitable riparian vegetation. The boundary between eco-region 4 and the three eco-regions lying to the west approximately follows the crest of the high Cascades. At the northern and particularly the southern ends, this boundary deviates from the Cascade crest. For the purpose of matching vegetation to eco-region, this boundary was assumed to follow the Cascade crest through its length.

OREGON NATURAL VEGETATION ZONES

Each of ODOT's five eco-regions encompasses several of natural vegetation zones. These zones are characterized by different combinations of dominant tree and shrub species. The established vegetation zones of Franklin and Dyrness *(1973; 1988)* provided a suitable scale for the research and identification of riparian woody species. At a minimum, the dominant riparian trees and shrubs representative of each Franklin and Dyrness vegetation zone were identified, compiled and reduced to suitable candidates for each eco-region. In grouping species from different vegetation zones into a single, large scale ODOT eco-region, invariably some species are grouped together which do not naturally occur together. The Vegetation Classification Tables are designed to present information useful in determining plant associations appropriate to different riparian sites.

RIPARIAN ZONES

Riparian zones can be characterized "…as an ecotone between aquatic and upland ecosystems but have distinct vegetation and soil characteristics" *(Johnson and McCormick, 1979)*. "As ecotones, they [can] encompass sharp gradients of environmental factors, ecological processes and plant communities" *(Gregory et al., 1991)*. Ultimately, riparian zones can be broadly viewed as three-dimensional zones of direct interaction between the aquatic and terrestrial ecosystems *(Swanson et al. 1982)*. In this document, "riparian" will be restricted to lotic (riverine) ecosystems. In general, the gradients are not as sharp in western Oregon, producing broader riparian zones compared with similar streams east of the Cascades.

VEGETATION SELECTION STRATEGY

The common riparian woody vegetation is listed table-form for each ODOT eco-region. Ecological characteristics are provided for each species to assist in matching species to specific project sites. Physiological characteristics pertinent to establishment and streambank stabilization are also evaluated. For a species' characteristic, where no information was available from the general literature or could be provided by the authors, NI is assigned in the tables. For a project, the first step is determining the site elevation and identifying species normally occurring at that elevation found in that eco-region. In addition to elevation range, the natural range of a species may be further restricted geographically within an eco-region. The Ecology-Associations category broadly describes geographic distribution within an eco-region for each species.

It should be re-emphasized at this point that riparian interfaces produce complex and varied ecosystems and that this document is only meant to act as a guide. For comparison, a survey of nearby riparian zones is appropriate at each project site to assess local ecological conditions and associated plant communities. Since the tables characterize only common woody species for generalized ecological conditions, a survey is necessary for two reasons. First, the research sites from available literature represent only a sampling of the range of riparian communities found across the state. Second, in compiling the tables at the eco-region level, local community (site specific) detail was necessarily generalized.

Riparian zones are also complex at the site scale, with different plant communities suitable for different locations within the zone. For any project, the riparian zone needs to be delineated and subdivided into lateral levels (defined under Riparian Zone Levels) as necessary for the specific site. At this point, plant species can be evaluated for use in respective Riparian Zone Levels. First, the Riparian Zone Level category provides a general guide for each species. Further information relevant to matching species to locations within the riparian zone is provided in the Wetland Indicator Status, Shade Tolerance, Flood Tolerance and Drought Tolerance categories. Additional ecological requirements and common plant associations may be described in the Ecology-Associations category. Site specific variables that influence riparian communities include hydrology, substrate, microclimate, aspect, slope and valley constraint.

For any specific streambank location, the Tables will indicate that many plant species can grow there. Not all of these species can be grown successfully together; some will outcompete others. An inspection of nearby riparian plant communities will indicate which combinations are most likely to work.

Since a main purpose of plantings is streambank stabilization, a category describing rooting characteristics pertinent to plant stability and soil binding is provided. Further, riparian zones are dynamic, subjecting plants to stresses affecting survivability. Growth response to damage and disturbance is described in the tables for each species. Since reproduction is important to long-term community function, key sexual and vegetative reproduction characteristics are described.

Further research along several fronts could benefit ODOT's streambank stabilization projects in the future. Under-represented riparian communities, and those in areas of most concern to ODOT, should be adequately studied. Comparisons of community response to ecological

processes and variables between project sites and natural systems should also be evaluated for developing future standards for measuring project success.

CLASSIFICATION TABLE CATEGORIES

The following categories of information are provided for each species in the following tables:

Scientific and Common Names

Scientific and common names are provided for all species listed. Except for three species of willow, scientific names follow Hitchcock and Cronquist *(1973).* Scientific names for the three willows (Salix boothii, Salix lucida and Salix Eastwoodiae) follow The Jepson Manual *(1993).* Additional nomenclature in common use (synonymy) is provided in parenthesis.

Wetland Indicator Status (WIS)

The Wetland Indicator Status (WIS) is derived from the U. S. Fish and Wildlife Service "National List of Plant Species that Occur in Wetlands" *(Reed 1988, National List of Vascular Plant Species that Occur in Wetlands: 1996 National Summary 1997).* WIS categories estimate the probability of a species naturally occurring in wetland versus nonwetland across its entire range. For the purposes of this paper, the WIS published for region 9, the Northwest, was used.

Table A.1: WIS Categories

CATEGORY	DESIGNATION	WETLAND PROBABILITY
OBL	Obligate Wetland species: almost always occur in wetlands	>99
FACW	Facultative Wetland species: usually occur in wetlands	67 to 99
FAC	Facultative Wetland species: equally likely to occur in wetlands or nonwetlands	34 to 66
FACU	Facultative Upland species: usually occur in nonwetlands	1 to 33
UPL	Obligate Upland species: almost always occur in nonwetlands	<1
NI	No indicator status:	

A probability (expressed as estimated frequency of occurrence) for example, of 67% - 99% (Facultative Wetland), means that across its range, of randomly selected sample plots containing the species, 67% - 69% would be found in a wetland. For Facultative categories, a positive (+) sign indicates a frequency toward the higher end of that specific category (more frequently found in wetlands). A negative (-) sign indicates a frequency toward the lower end of that category (less frequently found in wetlands).

Elevation

Within each ODOT eco-region the approximate maximum elevation range (ft) for each species is provided. Elevation values in parenthesis, where included, indicate a more typical range. Changes in elevation normally result in changes in climatic variables (temperature, precipitation) which significantly influence vegetation composition. Elevation, in combination with other characteristics, particularly ecological associations, can provide a useful general guideline for a species potential range. However, the elevation range alone should not be construed as being precise, since multiple variables including local and regional geographic setting, microclimate and basin characteristics all play vital roles in determining a species range. Species presence may be especially variable at the lower and upper elevation range limits. Ultimately, a field survey should be conducted of each site to confirm the information compiled in this document.

Riparian Zone Level

Transversely, the riparian zone has been divided into three levels, low (L), middle (M), and top (T) or transition. The low level includes the streambank that is seasonally inundated, located between normal low and high water levels. The middle zone, including the active floodplain, is above the typical high water level, but is subject to flooding by less-frequent high water events. The water table is near the surface in this zone and has a strong influence on the plant community. The top zone, often including older terraces, provides a transition with the upland community, but is still under influence by the stream. Due to variation in hydrology and geomorphology, riparian zone levels cannot be defined simply in terms of distance. Stream valley constraint and geomorphology are not characterized in these tables, but may be addressed as warranted under Ecology-Associations.

Ecology-Associations

Additional information refining species regional ranges is provided under this heading. Vegetation zone distribution *(Franklin and Dyrness, 1988)* and geographic restrictions are included. Specific plant associations and stream basin characteristics are described where appropriate. Variability at the site level and between sites is inherent in riparian zones. The listed plant associations are not meant to be comprehensive, nor will all species listed necessarily occur together at a given site. Field surveys are important to refine associations at specific project sites.

Shade Tolerance

Tolerance for shade is presented in a five point scale, with 1, indicating very shade intolerant (requires open space), through 5, indicating very shade tolerant (can grow under an overstory). For species where values were not provided in the available literature, tolerance values were assigned based on the authors' experience.

Flood Tolerance

Tolerance for flooding is presented in a five point scale, with 1, indicating very flood intolerant, through 5, indicating very flood tolerant. For species where values were not provided in the available literature, tolerance values were assigned based on the authors' experience.

Drought Tolerance

Tolerance for drought is presented in a five point scale, with 1, indicating very drought intolerant, through 5, indicating very drought tolerant. For species where values were not provided in the available literature, tolerance values were assigned based on the authors' experience.

Damage Response

Vegetative growth response to damage and disturbance, including type and rate (if available) of response, is provided under this heading.

Roots and Soils

Rooting characteristics and soils information pertinent to soil binding, plant stability and plant tolerances are provided under this heading.

Sexual Reproduction

Fruit type and dispersal characteristics that may be pertinent for plant community development are described under this heading.

Vegetative Reproduction

Natural vegetative reproduction capabilities beyond the vegetative growth response to damage and disturbance are described under this category.

Table A.2: Eco-Region 1

SCIENTIFIC NAME	COMMON NAME	WIS	ELEVATION (FT.)	RZ LEVEL	ECOLOGY-ASSOCIATIONS
CONIFER TREES					
Abies amabilis	Pacific silver fir	FACU	2000 - 5700 (4000 - 5700)	M-T	predominantly Cascades; very moist sites; low frost tolerance; with western hemlock, Alaska cedar, mountain hemlock, western redcedar, Engelmann spruce
Chamaecyparis nootkatensis	Alaska cedar (yellow cedar)	FAC	3000 - 7000+ (5000 - 7000+)	M-T	Cascades; with silver fir, western hemlock, mountain hemlock, western redcedar, Engelmann spruce, silver fir, huckleberrys
Picea engelmannii	Engelmann spruce	FAC	2000 - 7500 (3800 - 7500)	M-T	Cascades; extending to lower elevation limits only in cold air drainages; with western hemlock, silver fir, mountain hemlock, western redcedar, Alaska cedar
Pseudotsuga menziesii var. menziesii	Douglas-fir	FACU+	0 - 4700	M-T	throughout; upland transition; many associates
Thuja plicata	western redcedar	FAC	0 - 6500+	M-T	throughout, uncommon in Willamette Valley; with conifers at all elevations plus alders, maples, sword fern, thimbleberry, currants, huckleberrys
Tsuga heterophylla	western hemlock	FACU-	0 - 5000+	M-T	throughout; uncommon in Willamette Valley; with conifers at all elevations plus alders, maples, sword fern, thimbleberry, currants, huckleberrys
Tsuga mertensiana	mountain hemlock	FACU	5000 - 7000+	M-T	highest forested zone of Cascades; with silver fir, Engelmann spruce, Alaska cedar, western redcedar, black huckleberry, white rhododendron
BROADLEAF TREES					
Acer macrophyllum	bigleaf maple	FACU-	0 - 3000	L-T	throughout; wide variety of associates
Alnus rhombifolia	white alder	FACW	0 - 400	L-M	Willamette Valley; flood deposition sites; with black cottonwood, Oregon ash, willows
Alnus rubra	red alder	FAC	0 - 3000 (0 - 2300)	L-M	throughout; flood deposition sites; pure stands or with conifers, broadleaf trees, willows, salmonberry, thimbleberry, stink currant; also along larger rivers
Fraxinus latifolia	Oregon ash	FACW	0 - 4700 (0 - 3000)	L-M	throughout; in all riparian associations for its elevation range, including swampy sites
Populus trichocarpa	black cottonwood	FAC	0 - 4500	L-M	throughout; most common along larger rivers; flood deposition sites; with broadleaf trees, Douglas-fir, western redcedar, willows
Quercus garryana	Oregon white oak	UPL	100 - 4000	M-T	primarily Willamette Valley and foothills; with bigleaf maple, Douglas-fir, western redcedar, western hemlock, Oregon ash, many shrubs

SCIENTIFIC NAME	COMMON NAME	WIS	ELEVATION (FT.)	RZ LEVEL	ECOLOGY-ASSOCIATIONS
SHRUBS					
Acer circinatum	vine maple	FAC-	0 - 3500	M-T	throughout; uncommon in Willamette valley; under conifers, red alder, bigleaf maple, with sword fern, red huckleberry, hazelnut
Alnus incana (A. tenuifolia)	mountain alder (thin leaf alder)	FACW	4000 - 6000	L-M	Cascades; flood deposition and scour; western hemlock through mountain hemlock zones; with subalpine spiraea, salmonberry, stink currant, willows (Geyer, Scouler, Sitka, Pacific)
Alnus sinuata	Sitka alder	FACW	2000 - 6000 (3000 - 6000)	M	Cascades; flood deposition and scour; western hemlock through mountain hemlock zones; with red alder, black cottonwood, stink currant, salmonberry, thimbleberry, willows (Geyer, Scouler, Sitka)
Athyrium filix-femina	lady fern	FAC	0 - 7000	M-T	throughout; with many associates
Cornus stolonifera var. occidentalis	western dogwood (red-osier dogwood)	FACW	0 - 4000	M	throughout; flood deposition sites; open edges; with red alder, black cottonwood, western hemlock, thimbleberry, willows, Douglas hawthorn
Corylus cornuta var. californica	beaked hazelnut (California hazelnut)	FACU	100 - 2000	T	throughout; under forested canopy; only in upland transition; with sword fern, red huckleberry, vine maple
Crataegus douglasii var. suksdorfii	Douglas Hawthorn	FAC	0 - 3500+	L-T	Willamette Valley and low Cascades; somewhat open sites, swampy edges; with western dogwood, willows, rose, Douglas spiraea
Lonicera involucrata var. involucrata	black twinberry	FAC+	100 - 6000	M-T	throughout; wooded sites, also open shrubby sites with alders and willows
Physocarpus capitatus	Pacific ninebark	FACW-	0 - 2000	M	throughout, most common in Cascades; edges, somewhat open sites; with western dogwood, salmonberry, stink currant, rose
Polystichum munitum var. munitum	sword fern	FACU	0 - 4000+	M-T	throughout; under conifers, maples, Oregon white oak, with beaked hazelnut, red huckleberry, vine maple
Rhododendron albiflorum	white rhododendron	FAC	4000 - 7000	M-T	Cascades; Pacific silver fir through mountain hemlock zones; with Alaska cedar, big huckleberry, Alaskan blueberry
Ribes bracteosum	stink currant	FAC	100 - 5000	L-T	throughout; uncommon in Willamette valley; under red alder, western redcedar, western hemlock, with salmonberry, Pacific ninebark, thimbleberry, with mountain alder at higher elevations
Rosa gymnocarpa	baldhip rose	FACU	0 - 5000	T	throughout; open to wooded sites; with Pacific ninebark, thimbleberry

SCIENTIFIC NAME	COMMON NAME	WIS	ELEVATION (FT.)	RZ LEVEL	ECOLOGY-ASSOCIATIONS
SHRUBS, continued					
Rosa nutkana	nootka rose	FAC	0 - 5000	M-T	throughout; generally open sites; with black cottonwood, western dogwood, Douglas spiraea, thimbleberry, Pacific ninebark
Rubus parviflorus var. parviflorus	thimbleberry	FAC-	0 - 6000	M-T	throughout; under red alder, western redcedar, western hemlock, with salmonberry, stink currant, red elderberry, baldhip rose with Sitka alder at higher elevations
Rubus spectabilis	salmonberry	FAC+	0 - 4500+	L-M	throughout; dominant in Coast Range; red alder stands, with stink currant, thimbleberry, Pacific ninebark, with Sitka alder and mountain alder at higher elevations
Salix exigua ssp. Melanopsis (S. melanopsis)	dusky willow (sandbar willow)	FACW	0 - 500	L	Columbia River gorge and Willamette Valley; pioneer on flood deposition sites; with Pacific willow, Sitka willow
Salix fluviatalis	Columbia River willow	OBL	0 - 200	L-M	Columbia River banks, along lower Willamette River; with Sitka willow, soft-leaved willow
Salix geyeriana var. meleina	Geyer willow	FACW+	100 - 6000	L	Cascades and foothills; pioneer on flood deposition sites; along low gradient streams
Salix lucida ssp. Lasiandra (S. lasiandra var. lasiandra)	Pacific willow	FACW+	0 - 4500+	L-M	throughout, including floodplains and banks of large rivers; with Sitka willow
Salix piperi	dune willow (piper willow)	FACW	0 - 4500	L	mostly east of the Willamette River; swampy sites
Salix scouleriana	Scouler willow	FAC	100 - 4500+	L-T	throughout; not in standing water; species can also be upland transition
Salix sessilifolia	soft-leaved willow	FACW	0 - 500	L	Columbia River gorge and Willamette Valley; with Sitka willow, Columbia River willow
Salix sitchensis	Sitka willow	FACW	0 - 5500+	L-M	throughout; with western dogwood, alders, willows
Sambucus racemosa var. arborescens	red elderberry	FACU	0 - 2000	L-T	in red alder stands and under conifers; with thimbleberry, stink currant, salmonberry
Spiraea densiflora var. densiflora	subalpine spiraea	NI	4000 - 5500+	L-M	Cascades; open sites; replaces Douglas spiraea at higher elev. under western redcedar, Engelmann spruce, Alaska cedar, alders, with stink currant, willows (Geyer, Pacific, Scouler, Sitka)
Spiraea douglasii var. douglasii	Douglas spiraea	FACW	100 - 4500+	L-M	throughout; open sites, also in swampy sites with ash and willow (Geyer, Pacific, Scouler, Sitka), also salmonberry, Douglas hawthorn, rose

SCIENTIFIC NAME	COMMON NAME	WIS	ELEVATION (FT.)	RZ LEVEL	ECOLOGY-ASSOCIATIONS
SHRUBS, continued					
Vaccinium Alaskaense	Alaskan blueberry	NI	2000 - 6500	M-T	Cascades; mountain streambanks; under conifers, with stink currant, salmonberry, white rhododendron, huckleberrys
Vaccinium parvifolium	red huckleberry	NI	0 - 4000	M-T	under conifers, especially western hemlock and mixed forest, western redcedar, with sword fern, vine maple, beaked hazelnut
Vaccinium membranaceum	black huckleberry (big whortleberry)	FACU+	4000 - 7000	T	Cascades, Pacific silver fir and mountain hemlock zones; thrives in open areas, also under conifers including Alaska cedar; with white rhododendron, Alaskan blueberry

Table A.3: Eco-Region 1, Continued

SCIENTIFIC NAME	SHADE	FLOOD	DROUGHT	DAMAGE RESPONSE	ROOTS AND SOIL	SEXUAL REPRODUCTION	VEGETATIVE REPRODUCTION
CONIFER TREES							
Abies amabilis	5	4	1	new leader from above ground buds	shallow rooted when mature; moist, acidic soil	wind dispersed seed, short distance	none
Chamaecyparis nootkatensis	4	5	2	branch layering; new leader from above ground buds	shallow rooted; tolerates coarse, infertile soils	wind dispersed seed	branch layering
Picea engelmannii	3+	4	2+	branch layering; new leader from above ground buds	generally shallow rooted; moist, mineral soil	wind dispersed seed	branch layering near timberline
Pseudotsuga menziesii var. menziesii	3	3	4	new leader from above ground buds	potentially deep rooted; variety of soils	wind and animal dispersed seed	none
Thuja plicata	5	4+	2	branch layering; rooting of broken branches; new leader from above ground buds	extensive roots; does not penetrate dense soil; tolerates infertile soils	wind dispersed seed	branch layering
Tsuga heterophylla	5	3	3	branch layering; seedlings produce basal sprouts; new leader from above ground buds	shallow rooted; variety of acidic soils	wind dispersed seed, long distance	branch layering, rare
Tsuga mertensiana	4+	3	1	branch layering; new leader from above ground buds	shallow rooted; coarse soils	wind dispersed seed	branch layering, rare
BROADLEAF TREES							
Acer macrophyllum	4	4	3	basal sprouts, prolific	shallow, extensive roots; soils can be coarse	wind and animal dispersed seed	layering
Alnus rhombifolia	2	5	2	basal sprouts, (when small)	fibrous roots; moist, coarse and fine soils; nitrogen fixer	wind and water dispersed seed	rare layering in wet areas, sprouts
Alnus rubra	1	4	2	basal sprouts, (when small)	extensive, fibrous, roots rapid growth; nitrogen fixer; coarse mineral soil	wind dispersed seed	branch layering, rare
Fraxinus latifolia	3	5	3	basal sprouts, vigorous	moderately shallow, fibrous, extensive roots	wind dispersed seed	branch layering
Populus trichocarpa	1	5	2	basal and rare root sprouts, vigorous	deep, extensive roots; variety of soils	wind and water dispersed seed	absis shoots, root sprouts

SCIENTIFIC NAME	SHADE	FLOOD	DROUGHT	DAMAGE RESPONSE	ROOTS AND SOIL	SEXUAL REPRODUCTION	VEGETATIVE REPRODUCTION
BROADLEAF TREES, continued							
Quercus garryana	2	3	5	basal and rare root sprouts	extensive roots with deep taproot; variety of soils, tolerates coarse soil	gravity and animal dispersed acorns	none
SHRUBS							
Acer circinatum	5	4	2	basal sprouts, rapid	root crown; deep, well drained soil	poor seed producer, animal dispersed	branch layering
Alnus incana (A. tenuifolia)	2	4	1	basal sprouts (when small), poor	root crowns; coarse soils	small winged nutlets	branch layering
Alnus sinuata	2	4	1	basal sprouts (when small), poor	root crown; coarse soils	small winged nutlets	branch layering
Athyrium filix-femina	4	3	2	rhizome sprouts	rhizomatous	wind dispersed spores	rhizomes
Cornus stolonifera var. occidentalis	3	5	3	rhizome and basal stem sprouts	root crown, rhizomatous; moist, sandy soils	wind and bird dispersed seeds	rhizomes, root shoots, layering
Corylus cornuta var. californica	4	3	4	basal sprouts, rapid	root crown; variety of soils tolerates coarse soil	animal dispersed nuts	branch layering
Crataegus douglasii var. suksdorfii	2	4	4	root sprouts, moderate	root crown; fine, moist soils	semi-shelled fruit, bird dispersed	NI
Lonicera involucrata var. involucrata	3	3	3	basal and root sprouts	NI	berries	branch layering
Physocarpus capitatus	3	4	3	basal sprouts, moderate	NI	seed	NI
Polystichum munitum var. munitum	5	2	3	rhizome sprouts	rhizomatous	wind dispersed spores	limited to division of rhizome
Rhododendron albiflorum	3	2	3	basal sprouts	root crown?	seeds	NI
Ribes bracteosum	3	3	3	basal sprouts, rapid	rhizomatous	animal dispersed berries	rhizomes
Rosa gymnocarpa	2	4	4	basal and rhizome sprouts	rhizomatous	animal dispersed "hips" with seed	rhizomes
Rosa nutkana	2	4	4	basal and rhizome sprouts	rhizomatous	animal dispersed "hips" with seed	rhizomes
Rubus parviflorus var. parviflorus	4	4	2	basal, root and rhizome, sprouts, rapid	rhizomatous; variety of soils, tolerates infertile, coarse soils	raspberry-like, animal dispersed	rhizomes

SCIENTIFIC NAME	SHADE	FLOOD	DROUGHT	DAMAGE RESPONSE	ROOTS AND SOIL	SEXUAL REPRODUCTION	VEGETATIVE REPRODUCTION
SHRUBS, continued							
Rubus spectabilis	4	3	2	basal and rhizome sprouts, rapid	rhizomatous; variety of soils, tolerates infertile, coarse soils	animal dispersed raspberries	rhizomes, branch layering
Salix exigua ssp. Melanopsis (S. melanopsis)	1	5	NI	basal and root sprouts, moderately rapid	rhizomatous; coarse soils	wind dispersed seed	rhizomes, buried detached stems
Salix fluviatalis	NI	5	NI	basal and root sprouts	sandy to coarse soils	wind dispersed seed	root sprouts
Salix geyeriana var. meleina	1	5	1	basal sprouts, moderate	root crown; deep, fine soils	wind dispersed seed	buried detached stems
Salix lucida ssp. Lasiandra (S. lasiandra var. lasiandra	1	5	1	basal sprouts	root crown	wind dispersed seed	detached stems
Salix piperi	1	5	NI	basal sprouts	acidic, fine soils	wind dispersed seed	NI
Salix scouleriana	2	5	NI	basal sprouts, rapid	root crown	wind dispersed seed	NI
Salix sessilifolia	2	5	NI	basal and root sprouts, rapid	NI	wind dispersed seed	NI
Salix sitchensis	1+	5	NI	basal sprouts, rapid	coarse soils	wind dispersed seed	NI
Sambucus racemosa var. arborescens	2	3	4	rhizome and basal sprouts, moderate	rhizomatous; coarse soils	animal dispersed berries	layering, rhizomes
Spiraea densiflora var. densiflora	NI	NI	NI	rhizomes? and basal sprouts, moderate	rhizomatous	wind and animal dispersed seed	rhizomes?
Spiraea douglasii var. douglasii	2	5	2	rhizome and basal sprouts, moderate	rhizomatous; finer soils	animal dispersed seed	rhizomes
Vaccinium alaskaense	NI	NI	NI	basal, root and rhizome sprouts	rhizomes, fine to sandy soils	small berries, animal dispersed	rhizomes, clonal
Vaccinium membranaceum	5	5	2	basal and rhizome? sprouts, rapid	rhizomatous?; coarse, acidic, infertile soils	small berries, animal dispersed	branch layering, rare
Vaccinium parvifolium	4	3	2	rhizome and basal sprouts,	rhizomatous; coarse, acid, soils	small berries, animal dispersed	rhizomes

Table A.4: Eco-Region 2

SCIENTIFIC NAME	COMMON NAME	WIS	ELEVATION (FT.)	RZ LEVEL	ECOLOGY-ASSOCIATIONS
CONIFER TREES					
Abies amabilis	Pacific silver fir	FACU	2000 - 5700 (4000 - 5700)	M-T	predominantly Cascades; very moist sites; low frost tolerance; with western hemlock, Alaska cedar, mountain hemlock western redcedar, Engelmann spruce
Chamaecyparis nootkatensis	Alaska cedar (yellow cedar)	FAC	3000 - 7000+ (5000 - 7000+)	M-T	Cascades; with silver fir, western hemlock, mountain hemlock, western redcedar, Engelmann spruce, silver fir, huckleberrys
Picea engelmannii	Engelmann spruce	FAC	1900 - 7500 (3800 - 7500)	M-T	Cascades; extending to lower elevation limits only in cold air drainages; with western hemlock, silver fir, mountain hemlock, western redcedar, Alaska cedar
Picea sitchensis	Sitka spruce	FAC	0 - 1500	M-T	coastal fog zone; with western hemlock, western redcedar, red alder, Douglas-fir, sword fern, red huckleberry, red elderberry
Pseudotsuga menziesii var. menziesii	Douglas-fir	FACU	0 - 4700	M-T	throughout; upland transition; many associates
Thuja plicata	western redcedar	FAC	0 - 6500+	M-T	throughout, uncommon in Willamette Valley; with conifers at all elevations plus alders, maples, sword fern, thimbleberry, currants, huckleberrys
Tsuga heterophylla	western hemlock	FACU-	0 - 5000+	M-T	throughout; uncommon in Willamette Valley; with conifers at all elevations plus alders, maples, sword fern, thimbleberry, currants, huckleberrys
Tsuga mertensiana	mountain hemlock	FACU	5000 - 7000	M-T	highest forested zone of Cascades; with silver fir, Engelmenn spruce, Alaska cedar, western redcedar, black huckleberry, white rhododendron
BROADLEAF TREES					
Acer macrophyllum	bigleaf maple	FACU-	0 - 3000	L-T	throughout; wide variety of associates
Alnus rhombifolia	white alder	FACW	0 - 400	L-M	Willamette Valley; flood deposition sites; with black cottonwood, Oregon ash, willows
Alnus rubra	red alder	FAC	0 - 3000 (0 - 2300)	L-M	throughout; flood deposition sites; pure stands or with conifers, broadleaf trees, willows, salmonberry, thimbleberry, stink currant; also along larger rivers
Fraxinus latifolia	Oregon ash	FACW	0 - 4700 (0 - 3000)	L-M	throughout; in all riparian associations for its elevation range, including swampy sites
Populus trichocarpa	black cottonwood	FAC	0 - 4500	L-M	throughout; most common along larger rivers; flood deposition sites; with broadleaf trees, Douglas-fir, western redcedar, willows
Quercus garryana	Oregon white oak	UPL	100 - 4000	M-T	primarily Willamette Valley and foothills; with bigleaf maple, Douglas-fir, western redcedar, western hemlock, Oregon ash many shrubs

SCIENTIFIC NAME	COMMON NAME	WIS	ELEVATION (FT.)	RZ LEVEL	ECOLOGY-ASSOCIATIONS
SHRUBS					
Acer circinatum	vine maple	FAC-	0 - 3500	M-T	throughout; uncommon in Willamette valley; under conifers, red alder, bigleaf maple, with sword fern, red huckleberry, hazelnut
Alnus incana (A. tenuifolia)	mountain alder (thin leaf alder)	FACW	3000 – 6000 (4000 - 6000)	L-M	Cascades; flood deposition and scour; western hemlock through mountain hemlock zones; with subalpine spiraea, salmonberry, stink currant, willows (Geyer, Scouler, Sitka, Pacific)
Alnus sinuata	Sitka alder	FACW	2000 – 6000 (3000 - 6000)	L-M	Cascades; flood deposition and scour; western hemlock through mountain hemlock zones; with red alder, black cottonwood, stink currant, salmonberry, thimbleberry, willows (Geyer, Scouler, Sitka)
Athyrium filix-femina	lady fern	FAC	0 - 7000	M-T	throughout; with many associates
Cornus stolonifera var. occidentalis	western dogwood (red-osier dogwood)	FACW	0 - 4000	M	throughout; flood deposition sites; open edges; with red alder, black cottonwood, western hemlock, thimbleberry, willows, Douglas hawthorn
Corylus cornuta var. californica	beaked hazelnut (California hazelnut)	FACU	100 - 2000	M-T	throughout; under forested canopy; only in upland transition; with sword fern, red huckleberry, vine maple
Crataegus douglasii var. suksdorfii	Douglas Hawthorn	FAC	0 - 3500+	L-T	throughout; somewhat open sites, swampy edges; with western dogwood, willows, rose, Douglas spiraea
Lonicera involucrata var. involucrata	black twinberry	FAC+	100 - 6000	M-T	throughout; wooded sites, also open shrubby sites with alders and willows
Myrica californica	Pacific wax-myrtle	FACW	0 - 500	L-M	coastal, low flood plains; Sitka spruce zone
Physocarpus capitatus	Pacific ninebark	FACW-	0 - 2000	M	throughout, most common in Cascades; edges, somewhat open sites; with western dogwood, salmonberry, stink currant
Polystichum munitum var. munitum	sword fern	FACU	0 - 4000+	M-T	throughout; under conifers, maples, Oregon white oak, with beaked hazelnut, red huckleberry, vine maple
Rhododendron albiflorum	white rhododendron	FAC	4000 - 7000	M-T	Cascades; Pacific silver fir through mountain hemlock zones; with Alaska cedar, big huckleberry, Alaskan blueberry
Ribes bracteosum	stink currant	FAC	100 - 5000	L-T	throughout; uncommon in Willamette valley; under red alder, western redcedar, western hemlock, with salmonberry, Pacific ninebark, thimbleberry, with mountain alder at higher elevations
Rosa gymnocarpa	baldhip rose	FACU	0 - 5000	T	throughout; open to wooded sites; with Pacific ninebark, thimbleberry
Rosa nutkana	nootka rose	FAC	0 - 5000	M-T	throughout; generally open sites; with black cottonwood, western dogwood, Douglas spiraea, thimbleberry, Pacific ninebark
Rubus parviflorus var. parviflorus	thimbleberry	FAC-	0 - 6000	M-T	throughout; under red alder, western redcedar, western hemlock, with salmonberry, stink currant, red elderberry, with Sitka alder at higher elevations

SCIENTIFIC NAME	COMMON NAME	WIS	ELEVATION (FT.)	RZ LEVEL	ECOLOGY-ASSOCIATIONS
SHRUBS, continued					
Rubus spectabilis	salmonberry	FAC+	0 - 4500+	L-M	throughout; dominant in Coast Range; red alder stands, with stink currant, thimbleberry, Pacific ninebark, with Sitka alder and mountain alder at higher elevations
Salix exigua ssp. Melanopsis (S. melanopsis)	dusky willow (sandbar willow)	FACW	0 - 500	L	Willamette Valley; pioneer on flood deposition sites; with Pacific willow, Sitka willow
Salix geyeriana var. meleina	Geyer willow	FACW+	100 - 6000	L	Cascades and foothills; pioneer on flood deposition sites; along low gradient streams
Salix hookeriana	Hooker willow (coast willow)	FACW-	0 - 500	L	within 5 miles of the coast; can be along standing water
Salix lucida ssp. Lasiandra (S. lasiandra var. lasiandra)	Pacific willow	FACW+	0 - 4500+	L-M	throughout, including floodplains and banks of large rivers; with Sitka willow
Salix piperi	dune willow (Piper willow)	FACW	0 - 4500	L	throughout; swampy sites
Salix scouleriana	Scouler willow	FAC	100 - 4500+	L-T	throughout; not in standing water; species can also be upland transition
Salix sessilifolia	soft-leaved willow	FACW	0 - 500	L	Willamette Valley; with Sitka willow, Columbia River willow
Salix sitchensis	Sitka willow	FACW	0 - 5500	L-M	throughout; with western dogwood, alders, willows
Sambucus racemosa var. arborescens	red elderberry	FACU	0 - 2000	M-T	in red alder stands and under conifers; with thimbleberry, stink currant, salmonberry
Spiraea densiflora var. densiflora	subalpine spiraea	NI	4000 - 5500+	L-M	Cascades; open sites; replaces Douglas spiraea at higher elev. under western redcedar, Engelmann spruce, Alaska cedar, alders, with stink currant, willows (Geyer, Pacific, Scouler, Sitka)
Spiraea douglasii var. douglasii	Douglas spiraea	FACW	100 - 4000+	L-M	throughout; open sites, also in swampy sites with ash and willow (Geyer, Pacific, Scouler, Sitka), also salmonberry, Douglas hawthorn, rose
Vaccinium Alaskaense	Alaskan blueberry	NI	2000 - 6500	M-T	primarily Cascades; mountain streambanks; under conifers, with stink currant, salmonberry, white rhododendron, huckleberrys
Vaccinium membranaceum	black huckleberry (big whortleberry)	FACU+	4000 - 7000	T	Cascades; Pacific silver fir and mountain hemlock zones; thrives in open areas, also under conifers including Alaska cedar; with white rhododendron, Alaskan blueberry
Vaccinium parvifolium	red huckleberry	NI	0 - 4000	M-T	under conifers, especially western hemlock and mixed forest, western redcedar, with sword fern, vine maple, beaked hazelnut

Table A.5: Eco-Region 2, Continued

SCIENTIFIC NAME	SHADE	FLOOD	DROUGHT	DAMAGE RESPONSE	ROOTS AND SOIL	SEXUAL REPRODUCTION	VEGETATIVE REPRODUCTION
CONIFER TREES							
Abies amabilis	5	4	1	new leader from above ground buds	shallow rooted when mature; moist, acidic soil	wind dispersed seed, short distance	none
Chamaecyparis nootkatensis	4	5	2	branch layering; new leader from above ground buds	shallow rooted; tolerates coarse, infertile soils	wind dispersed seed	branch layering
Picea engelmannii	3+	4	2+	branch layering; new leader from above ground buds	generally shallow rooted; moist, mineral soil	wind dispersed seed	branch layering near timberline
Picea sitchensis	4	4	1	branch layering; new leader from above ground buds	variable, long lateral roots shallow in wet areas,	wind dispersed seed	layering
Pseudotsuga menziesii var. menziesii	3	3	4	new leader from above ground buds	potentially deep rooted; variety of soils	wind and animal dispersed seed	none
Thuja plicata	5	4+	2	branch layering; rooting of broken branches; new leader from above ground buds	extensive roots; does not penetrate dense soil; tolerates infertile soils	wind dispersed seed	branch layering
Tsuga heterophylla	5	3	3	branch layering; new leader from above ground buds; basal sprouts from seedlings	shallow rooted; variety of acidic soils	wind dispersed seed, long distance	branch layering, rare
Tsuga mertensiana	4+	3	1	branch layering; new leader from above ground buds	shallow rooted; coarse soils	wind dispersed	branch layering, rare
BROADLEAF TREES							
Acer macrophyllum	4	3+	3	basal sprouts, prolific	shallow, extensive roots; soils can be coarse	wind and animal dispersed seed	branch layering
Alnus rhombifolia	2	5	2	basal sprouts (when small)	fibrous roots; moist, coarse and fine soils; nitrogen fixer	wind and water dispersed seed	rare layering in wet areas, sprouts
Alnus rubra	1	4	2	basal sprouts (when small)	extensive, fibrous, roots rapid growth; nitrogen fixer; coarse mineral soil	wind dispersed seed	branch layering, rare
Fraxinus latifolia	3	5	3	basal sprouts, vigorous	moderately shallow, fibrous, extensive roots	wind dispersed seed	branch layering

SCIENTIFIC NAME	SHADE	FLOOD	DROUGHT	DAMAGE RESPONSE	ROOTS AND SOIL	SEXUAL REPRODUCTION	VEGETATIVE REPRODUCTION
BROADLEAF TREES, continued							
Populus trichocarpa	1	5	2	basal and rare root sprouts, vigorous	deep, extensive roots; variety of soils	wind and water dispersed seed	absis shoots root sprouts
Quercus garryana	2	3	5	basal and rare root sprouts	extensive roots with deep taproot, variety of soils, tolerates coarse soil	gravity and animal dispersed acorns	none
SHRUBS							
Acer circinatum	5	4	2	basal sprouts, rapid	root crown; deep well drained soil	poor seed producer; animal dispersed	branch layering
Alnus incana (A. tenuifolia)	2	4	1	basal sprouts (when small), poor	root crowns; coarse soils	small winged nutlets	branch layering
Alnus sinuata	3	4	1	basal sprouts (when small), poor	root crown; coarse soils	small winged nutlets	branch layering
Athyrium filix-femina	4	3	2	rhizome sprouts	rhizomatous	wind dispersed spores	rhizomes
Cornus stolonifera var. occidentalis	3	5	3	rhizome and basal stem sprouts	root crown, rhizomatous; moist, sandy soils	wind and bird dispersed seeds	rhizomes, root shoots, layering
Corylus cornuta var. californica	4	3	4	basal sprouts, rapid	root crown; variety of soils tolerates coarse soil	animal dispersed nuts	branch layering
Crataegus douglasii var. suksdorfii	2	4	4	root sprouts, moderate	root crown; fine, moist soils	semi-shelled fruit, bird dispersed	NI
Lonicera involucrata var. involucrata	3	3	3	root sprouts	NI	berries	branch layering
Myrica californica	1	4	2	NI	NI	small winged nutlets	branch layering
Physocarpus capitatus	3	4	3	basal sprouts, moderate	NI	seed	NI
Polystichum munitum var. munitum	5	2	3	rhizome sprouts	rhizomatous	wind dispersed spores	limited to division of rhizome
Rhododendron albiflorum	3	2	3	basal sprouts	root crown?	seeds	NI
Ribes bracteosum	3	3	3	basal sprouts, rapid	rhizomatous	animal dispersed berries	rhizomes
Rosa gymnocarpa	2	4	4	basal and rhizome sprouts	rhizomatous	animal dispersed "hips" with seed	rhizomes
Rosa nutkana	2	4	4	basal and rhizome sprouts	rhizomatous	animal dispersed "hips" with seed	rhizomes

SCIENTIFIC NAME	SHADE	FLOOD	DROUGHT	DAMAGE RESPONSE	ROOTS AND SOIL	SEXUAL REPRODUCTION	VEGETATIVE REPRODUCTION
SHRUBS, continued							
Rubus parviflorus var. parviflorus	4	4	2	basal, root and rhizome , sprouts, rapid	rhizomatous; variety of soils, tolerates infertile, coarse soils	raspberry-like, animal dispersed	rhizomes
Rubus spectabilis	4	3	2	basal and rhizome sprouts, rapid	rhizomatous; variety of soils, tolerates infertile, coarse soils	animal dispersed raspberries	rhizomes, branch layering
Salix exigua ssp. Melanopsis (S. melanopsis)	1	5	NI	basal and root sprouts, moderately rapid	rhizomatous; coarse soils	wind dispersed seed	rhizomes, buried detached stems
Salix geyeriana var. meleina	1	5	1	basal sprouts, moderate	root crown; deep, fine soils	wind dispersed seed	buried detached stems
Salix hookeriana	1	5	NI	basal sprouts, moderate	NI	wind dispersed seed	NI
Salix lucida ssp. lasiandra (S. lasiandra var. lasiandra)	1	5	1	basal sprouts	root crown	wind dispersed seed	buried detached stems and layering
Salix piperi	1	5	NI	basal sprouts	fine, acidic soils	wind dispersed seed	buried detached stems and layering
Salix scouleriana	2	5	2	basal sprouts, rapid	root crown	wind dispersed seed	buried detached stems and layering
Salix sessilifolia	2	5	NI	basal and root sprouts, rapid	NI	wind dispersed seed	buried detached stems and layering
Salix sitchensis	1	5	NI	basal sprouts, rapid	coarse soils	wind dispersed seed	buried detached stems and layering
Sambucus racemosa var. arborescens	2	3	4	rhizome and basal sprouts, moderate	rhizomatous; coarse soils	animal dispersed berries	layering, rhizomes
Spiraea densiflora var. densiflora	NI	NI	NI	rhizomes? and basal sprouts, moderate	rhizomatous?	wind and animal dispersed seed	rhizomes
Spiraea douglasii var. douglasii	2	5	2	rhizome and basal sprouts, moderate	rhizomatous; finer soils	animal dispersed seed	rhizomes
Vaccinium alaskaense	NI	NI	NI	basal, root and rhizome sprouts	rhizomes, fine to sandy soils	small berries, animal dispersed	rhizomes, clonal
Vaccinium membranaceum	5	3	2	basal and rhizome? sprouts, rapid	rhizomatous?; coarse, acidic, infertile soils	small berries, animal dispersed	branch layering, rare
Vaccinium parvifolium	4	3	2	rhizome and basal sprouts	rhizomatous; coarse, acid, soils	small berries, animal dispersed	rhizomes

Table A.6: Eco-Region 3

SCIENTIFIC NAME	COMMON NAME	WIS	ELEVATION (FT.)	RZ LEVEL	ECOLOGY-ASSOCIATIONS
CONIFER TREES					
Abies amabilis	Pacific silver fir	FACU	2000 - 6000 (4000 - 6000)	T	Cascades (north of Crater Lake); with western hemlock, Engelmann spruce, western redcedar, mountain hemlock
Abies concolor	white fir (California white fir)	NI	2000 - 6000+	M-T	variable ecology; mixed conifers; Cascades (south of Crater Lake) dominant at 5000 ft. elevation; in Siskiyous dominant >5500 ft. elevation; with Douglas-fir, western hemlock, western redcedar
Abies magnifica var. shastensis	California red fir (Shasta red fir)	NI	4500 - 7000 (4500 - 6000)	T	Cascades; Siskiyous? typically higher than white fir and mixed conifer zone; with western white pine, mountain hemlock, and associates
Calocedrus decurrens (Libocedrus decurrens)	incense-cedar	NI	1000 - 6500	T	interior valleys, Siskiyous and Cascades; mixed conifers, especially western hemlock, Douglas-fir, white fir, oaks
Chamaecyparis lawsonia	Port Orford cedar	FACU+	0 - 4500	M-T	coast to western Siskiyous, less than 100 miles inland, south of Coos Bay; mixed forest with Sitka spruce, western hemlock, red alder, tanoak, Douglas-fir, California laurel
Picea engelmannii	Engelmann spruce	FAC	3800 - 7500	M-T	Cascades; extending to lower elevation limits only in cold air drainages; with western hemlock, silver fir, mountain hemlock, western redcedar
Picea sitchensis	Sitka spruce	FAC	0 - 1000	M-T	coastal fog zone; with western hemlock, western redcedar, red alder Douglas-fir, sword fern, evergreen huckleberry, salal
Pinus monticola	western white pine	FACU	2000 - 6000 (4000 - 6000)	T	Cascades, rare in Siskiyous up to 6500 ft.; with conifers up to the mountain hemlock zone, many associates
Pseudotsuga menziezii var. menziesii	Douglas-fir	FACU+	100 - 5700 (1000 - 5700)	T	throughout; upland transition; many associates
Taxus brevifolia	Pacific yew	FACU-	200 - 4000	M-T	throughout; under conifers, alders, bigleaf maple, with salal, vine maple, Oregon grape, beaked hazelnut, evergreen huckleberry
Thuja plicata	western redcedar	FAC	0 - 7100	M-T	coast to Cascades, not in Siskiyous; with conifers, plus alders, maples, sword fern, huckleberrys at lower elevations
Tsuga heterophylla	western hemlock	FACU-	0 - 6600	M-T	Coast Range and Cascades; with conifers plus alders, maples, sword fern, huckleberrys
Tsuga mertensiana	mountain hemlock	FACU	5000 - 7300	T	Cascades, Siskiyous?; with California red fir, slender salal, black huckleberry, Oregon boxwood, dwarf bramble
BROADLEAF TREES					
Acer macrophyllum	bigleaf maple	FACU-	0 - 3800 (0 - 3000)	L-T	throughout; wide variety of associates

SCIENTIFIC NAME	COMMON NAME	WIS	ELEVATION (FT.)	RZ LEVEL	ECOLOGY-ASSOCIATIONS
BROADLEAF TREES, continued					
Alnus rhombifolia	white alder	FACW	100 - 4500	L-M	interior valleys and Siskiyous; flood deposition sites; with black cottonwood, Oregon ash, willows
Alnus rubra	red alder	FAC	0 - 5100 (0 - 2300)	L-M	throughout, except central-eastern Siskiyous; flood deposition sites pure stands or with conifers; with broadleaf trees, salmonberry and willows along larger rivers
Fraxinus latifolia	Oregon ash	FACW	0 - 4700 (0 - 3000)	L-M	coast to Cascades; prominent in interior valleys, not Siskiyous; many associates
Lithocarpus densiflora (Pasonia densiflora)	tanoak	NI	0 - 4000 (500 - 3000)	T	coast to western Siskiyous; with mixed evergreen, conifer and hardwood forests; with Douglas-fir, golden chinkapin, ponderosa pine, white fir, California laurel, vine maple
Populus trichocarpa	black cottonwood	FAC	0 - 4500	L-M	throughout; most common along larger rivers; flood deposition sites; with broadleaf trees, Douglas-fir, western redcedar, willows
Quercus garryana	Oregon white oak	UPL	100 - 4000+	T	interior valleys and Siskiyous; upland transition; with bigleaf maple, Douglas-fir, tanoak, California laurel
Umbellularia californica	California laurel (California bay)	FAC-	0 - 4000	L-T	coast to western Siskiyous and interior valleys; mixed evergreen and hardwood forests; with firs, oaks, white pine, huckleberrys, Pacific dogwood, also black cottonwood, big leaf maple, alders
SHRUBS					
Acer circinatum	vine maple	FAC-	0 - 4000+	M-T	throughout, except eastern Siskiyous; open woods under conifers especially Douglas-fir; many associates
Amelanchier alnifolia var. semiintegrifolia	serviceberry	FACU	0 - 4500	T	Cascades and Siskiyous; mixed conifers, with tanoak, sword fern, beaked hazelnut, low Oregon grape, Pacific dogwood
Athyrium felix-femina	lady fern	FAC	100 - 7000	M-T	throughout; many associates
Berberis nervosa (Mahonia nervosa)	low Oregon grape (dull Oregon grape)	FACU	100 - 5000	T	under Douglas fir, western redcedar, western hemlock, with salal, beaked hazelnut, vine maple, sword fern, evergreen huckleberry
Castanopsis chrysophylla	golden chinkapin (giant chinquapin)	NI	500 - 4000	T	Cascades and Siskiyous; mixed conifers; with Douglas-fir, western hemlock, white fir, oaks
Cornus nuttallii	Pacific dogwood	NI	4000 - 5000	T	throughout, though generally less than 200 miles inland; western hemlock, mixed conifer and white fir zones; under mixed conifers, with chinkapin, California laurel, maples, Pacific dogwood
Cornus stolonifera var. occidentalis	western dogwood (red-osier dogwood)	FACW	0 - 5000	L-M	interior valleys and lower Cascades; on flood deposition sites; with western hemlock, black cottonwood, willows, alders
Corylus cornuta var. californica	beaked hazelnut (California hazelnut)	FACU	100 - 2000	M-T	throughout; under oaks, maples and conifers, with sword fern, evergreen huckleberry, low Oregon grape, salal

SCIENTIFIC NAME	COMMON NAME	WIS	ELEVATION (FT.)	RZ LEVEL	ECOLOGY-ASSOCIATIONS
SHRUBS, continued					
Gaultheria ovatifolia	slender salal (Oregon wintergreen)	FAC	4500 - 6000+	M	higher Cascades; under California red fir, mountain hemlock, Pacific silver fir, with black huckleberry, Oregon boxwood, dwarf bramble
Gaultheria shallon	salal	FACU	0 - 4500	T	coast to western Siskiyous; under oaks, conifers, tolerates salt spray; vine maple, beaked hazelnut, evergreen huckleberry, sword fern, low Oregon grape
Pachistima myrsinites	Oregon boxwood	NI	1000 - 5500+ (3000 - 5500+)	T	Cascades; under conifers, with chinkapin, huckleberrys, serviceberry, slender salal, dwarf bramble
Polystichum munitum var. munitum	sword fern	FACU	0 - 4500	M-T	Coast Range, Cascades (interior valleys ?) under conifers and mixed forest; with vine maple, beaked hazelnut, evergreen huckleberry, low Oregon grape
Rhododendron occidentale	western azalea	FAC	0 - 4500+	M	coast to western Siskiyous; ultrabasic sites; with Port Orford cedar, western white pine, California laurel, sword fern
Rosa gymnocarpa	bald-hip rose	FACU	0 - 5000	M-T	throughout; common in cascades under mixed conifers
Rubus lasiococcus	dwarf bramble	NI	4000 - 6000+	M-T	higher Cascades; with persistent snowpack; under Pacific silver fir, mountain hemlock, with slender salal, Oregon boxwood, black huckleberry
Rubus spectabilis	salmonberry	FAC+	0 - 4500	L-M	coastal mountains and lower Cascades; dominant pioneer, under conifers, red alder, with vine maple
Salix exigua ssp. melanopsis (S. melanopsis)	dusky willow (sandbar willow)	FACW	0 - 1000	L	low elevation; pioneer on flood deposition sites; with Pacific willow
Salix geyeriana var. meleina	Geyer willow	FACW+	3000 - 5900	L	not coastal; pioneer on flood deposition sites; along low gradient streams
Salix lucida ssp. lasiandra (S. lasiandra var. lasiandra)	Pacific willow	FACW+	0 - 4500+	L-M	throughout; including floodplains and banks of large rivers
Salix lutea	yellow willow	OBL	0 - 5000+	L	throughout; with black cottonwood, Oregon ash, alders, willows
Salix scouleriana	Scouler willow	FAC	100 - 4500	L- T	throughout; not in standing water; species can be upland transition
Vaccinium membranaceum	black huckleberry (big whortleberry)	FACU+	4500 - 6500+	T	Cascades and western Siskiyous; thrives in open areas and under conifers, with dwarf bramble, Oregon boxwood, slender salal
Vaccinium ovatum	evergreen huckleberry	NI	0 - 3000	T	coast to western Siskiyous; under conifers and mixed forest; with sword fern, beaked hazelnut, vine maple, salal, low Oregon grape

Table A.7: Eco-Region 3, Continued

SCIENTIFIC NAME	SHADE	FLOOD	DROUGHT	DAMAGE RESPONSE	ROOTS AND SOIL	SEXUAL REPRODUCTION	VEGETATIVE REPRODUCTION
CONIFER TREES							
Abies amabilis	5	4	3	new leader from above ground buds	shallow rooted when mature; moist, acidic soil	wind dispersed seed, short distance	none
Abies concolor	4	3	2	new leader from above ground buds	variable roots; mineral soil	wind dispersed seed, short distance	none
Abies magnifica var. shastensis	4	NI	1+	new leader from above ground buds	shallow in wet areas, immature soils	wind dispersed seed	none
Calocedrus decurrens (Libocedrus decurrens)	3	3	4	new leader from above ground buds	spreading, extensive roots variety of soils	wind dispersed seed, long distance	none
Chamaecyparis lawsoniana	4	3	2	new leader from above ground buds; limited layering	dense fibrous system with sinkers, tolerates ultramafic soils	wind dispersed seed	limited layering
Picea engelmannii	3+	4	2+	branch layering; new leader from above ground buds	generally shallow rooted; moist, mineral soil	wind dispersed seed	branch layering
Picea sitchensis	4	4	1	branch layering; new leader from above ground buds	variable, long lateral roots shallow in wet areas; acidic soils	wind dispersed seed	branch layering
Pinus monticola	3	3	2+	new leader from above ground buds	mostly shallow and lateral with sinkers, tolerates ultramafic soils	wind dispersed seed	none
Pseudotsuga menziezii var. menziesii	3	3	4	new leader from above ground buds	variable, potentially deep rooted; variety of soils	wind and animal dispersed seed	none
Taxus brevifolia	5	3	2	basal and root sprouts, branch layering; new leader from ground buds	deep, widespread roots; deep, moist acidic soils	fleshy arils	branch layering
Thuja plicata	5	4	2	rooting of broken branches; branch layering; new leader from above ground buds	extensive roots; does not penetrate dense soil; tolerates infertile soils	wind dispersed seed	branch layering
Tsuga heterophylla	5	3	1+	branch layering; new leader from above ground buds; seedlings sprout basaly	shallow rooted; variety of acidic soils	wind dispersed seed, long distance	branch layering, rare
Tsuga mertensiana	4+	3	2	branch layering; new ldr. from above ground buds	shallow rooted; coarse soils	wind dispersed seed	branch layering, rare

SCIENTIFIC NAME	SHADE	FLOOD	DROUGHT	DAMAGE RESPONSE	ROOTS AND SOIL	SEXUAL REPRODUCTION	VEGETATIVE REPRODUCTION
BROADLEAF TREES							
Acer macrophyllum	4	3+	3	basal sprouts, prolific	shallow, extensive roots; soils can be coarse	wind and animal dispersed seed	layering
Alnus rhombifolia	2	5	2	basal sprouts, (when small)	fibrous roots; moist, coarse and fine soils; nitrogen fixer	wind and water dispersed seed	rare layering in wet areas, sprouts
Alnus rubra	2	4	2	basal sprouts, (when small)	fibrous roots; moist, coarse soils; nitrogen fixer	wind and water dispersed seed	branch layering, rare
Fraxinus latifolia	3	4+	3	basal sprouts, vigorous	moderately shallow, fibrous, extensive roots	wind dispersed seed	branch layering
Lithocarpus densiflora	4	3	NI	basal sprouts, prolific	deep taproot; tolerates coarse soils	gravity and animal dispersed acorns	root burl sprouts
Populus trichocarpa	1	4	1	basal and rare root sprouts, vigorous	deep, extensive roots; variety of soils	wind and water dispersed seed	absis shoots, root sprouts
Quercus garryana	2	3	5	basal and rare root sprouts	extensive roots, with deep taproot; variety of soils, tolerates coarse soil	gravity and animal dispersed acorns	layering
Umbellularia californica	3	2	3	basal sprouts, prolific	variable roots, potentially deep and widespread; tolerates ultramafic soil	heavy seed, dispersed by gravity, water, animals	NI
SHRUBS							
Acer circinatum	5	4	2	basal sprouts, rapid	root crown; deep well drained soils	poor seed producer, animal dispersed	layering, shallow root sprouts
Amelanchier alnifolia var. semiintegrifolia	2	3	4	basal and rhizome sprouts, moderate	rhizomatous (extensive) with massive root crown; tolerates infertile soils	berry like pomes	layering, rhizomes
Athyrium felix-femina	4	3	2	rhizome sprouts	rhizomatous	wind dispersed spores	rhizomes
Berberis nervosa (Mahonia nervosa)	5	3	4	rhizome sprouts, moderate	rhizomatous; variety of soils, tolerates coarse soils	berries	rhizomes, layering?
Castanopsis chrysophylla	4	3	4	basal sprouts ?	basal root burl; tolerates infertile, coarse soils	animal dispersed nuts	sprouts?
Cornus nuttallii	4	4	1+	basal sprouts	deep with large taproot; fine soils	seeds (drupe)	NI
Cornus stolonifera var. occidental	2	5	3	root and basal sprouts	root crown, rhizomatous; sandy moist soils	wind and bird dispersed seeds	rhizomes, root shoots and layering

SCIENTIFIC NAME	SHADE	FLOOD	DROUGHT	DAMAGE RESPONSE	ROOTS AND SOIL	SEXUAL REPRODUCTION	VEGETATIVE REPRODUCTION
SHRUBS, continued							
Corylus cornuta var. californica	4	3	4	basal sprout, rapid	root crown; variety of soils, tolerates coarse soils	animal dispersed nuts	branch layering
Gaultheria ovatifolia	NI	NI	NI	NI	NI	animal dispersed berries	spreading mats
Gaultheria shallon	4	3	2	rhizome, root and basal sprouts, moderate	shallow network of roots and rhizomes; tolerates coarse, infertile soils	animal dispersed berries	rhizomes, layering, root sprouts
Pachistima myrsinites	3	2	5	root and basal sprouts, moderate	deep taproot; tolerates coarse soils	seed viable for decades	branch layering
Polystichum munitum var. munitum	5	3	3	rhizome sprouts	rhizomatous; tolerates ultramafic soil	wind dispersed spores	limited to division of woody rhizome
Rhododendron occidentale	4	3	4	basal sprouts	root crown ?	seeds	NI
Rosa gymnocarpa	4	3	4	basal sprouts, moderate	rhizomatous; coarse soil	animal dispersed "hips" with seed	rhizomes
Rubus lasiococcus	2	NI	2	NI	moderate depth roots	animal dispersed raspberries	branch layering
Rubus spectabilis	3	4	2	basal and rhizome sprouts, rapid	rhizomatous, clonal; wide range of soils	animal dispersed raspberries	rhizomes
Salix exigua ssp. melanopsis	1	5	NI	basal and root sprouts, moderately rapid	rhizomatous; coarse soils	wind dispersed seed	rhizomes; buried detached stems
Salix geyeriana var. meleina	1	5	1	basal sprouts, moderate	root crown; deep fine soils	wind dispersed seed	buried detached stems
Salix lucida ssp. lasiandra (S. lasiandra var. lasiandra)	1	5	1	basal sprouts, moderate	root crown; coarse soils	wind dispersed seed	buried detached stems
Salix lutea	1+	5	1	basal sprouts, moderate	root crown; coarse soils	wind dispersed seed	buried detached stems
Salix scouleriana	2	5	2	basal sprouts, rapid	root crown	wind dispersed seed	buried detached stems
Vaccinium membranaceum	5	3	2	basal sprouts, rapid rhizome sprouts?	rhizomatous?, coarse acid soils, also infertile soils	small berries, animal dispersed	branch layering, rare
Vaccinium ovatum	5	3	2	basal sprouts	massive root crown and taproot, coarse acid soils	small berries, animal dispersed	branch layering ?

Table A.8: Eco-Region 4

SCIENTIFIC NAME	COMMON NAME	WIS	ELEVATION (FT.)	RZ LEVEL	ECOLOGY-ASSOCIATIONS
CONIFER TREES					
Abies amabilis	Pacific silver fir	FACU	3800 - 6000	M-T	Cascades; high precipitation sites; with mountain hemlock, Engelmann spruce, western white pine, dwarf bramble, red mountainheath, huckleberrys
Abies grandis	grand fir	FACU-	1500 - 5500+ (2000 - 5000)	M-T	above basins, but lower in the north; with ponderosa pine, western larch, lodgepole pine, Douglas-fir, black cottonwood, aspen, western redcedar, mountain alder, serviceberry, Scouler willow
Calocedrus decurrens (Libocedrus decurrens)	incense-cedar	NI	500 - 6500	T	Cascades, Ochocos (uncommon); lowest forest zones and higher; with Douglas-fir, ponderosa pine, western white pine, grand fir, oak
Larix occidentalis	western larch	FACU+	3000 - 6500 (3000 - 5000)	M-T	Cascades (north), Ochocos; with conifers especially Douglas-fir, western redcedar, western white pine, huckleberrys
Picea engelmanni	Engelmann spruce	FAC	2000 - 7000+ (4000 - 6000)	M-T	Cascades, Ochocos (uncommon); with lodgepole pine, mountain hemlock, Pacific silver fir; extending to lower limits only in cold air drainages
Pinus contorta var. latifolia	lodgepole pine	FAC-	3000 - 5500+	M-T	mostly central and southern; not below Douglas-fir/grand fir in the north Cascades; variable ecology; often dominant stands
Pinus monticola	western white pine	FACU	1000 - 6500 (2000 - 6000)	M-T	generally montane; with many conifers including Pacific silver fir, western redcedar, also with aspen, willows, currants, huckleberrys, serviceberry
Pinus ponderosa	ponderosa pine	FACU-	500 - 6500	T	typically the first forest zone above the shrub-steppe/basins; at the higher elevations in the south; with Douglas-fir, grand fir, western white pine, Oregon white oak, aspen, mallow ninebark, bearberry
Pseudotsuga menziesii var. glauca	Douglas-fir	FACU+	1000 - 5000	T	forested zone above ponderosa pine or abutting shrub-steppe; up to 6000 ft. in south; with many trees, mallow ninebark, huckleberrys, bearberry
Taxus brevifolia	Pacific yew	FACU-	1000 - 4500+	M-T	under conifers; ponderosa pine, Douglas-fir, incense cedar, western hemlock, Pacific silver fir; with vine maple
Thuja plicata	western redcedar	FAC	500 - 7000	M-T	more common in the north Cascades; with streamside conifers at all elevations; also with mountain alder, serviceberry
Tsuga heterophylla	western hemlock	FACU-	1500 - 5000	T	mostly central and north Cascades; with conifers, lady fern, huckleberrys, currants
Tsuga mertensiana	mountain hemlock	FACU	5000 - 7500	T	montane; highest forested zone; with Pacific silver fir, Engelmann spruce, western white pine, western larch, huckleberrys

SCIENTIFIC NAME	COMMON NAME	WIS	ELEVATION (FT.)	RZ LEVEL	ECOLOGY-ASSOCIATIONS
BROADLEAF TREES					
Alnus rhombifolia	white alder	FACW	500 - 2000	L-M	Columbia River tributaries and lower Cascade foothills; with black cottonwood, willows (arroyo, Pacific, coyote)
Populus tremuloides	trembling aspen	FAC+	3000 - 6000+	M-T	mostly montane; at the higher elevations in the south; terraces and wet meadows; aggressive pioneer; with Woods rose, currants, serviceberry, Douglas spiraea, willows (Geyer, Lemon, Pacific)
Populus trichocarpa	black cottonwood	FACW	500 - 5500	L-M	flood deposition sites, mostly along larger rivers and streams; with alders, willows, red-osier dogwood
Quercus garryana	Oregon white oak	UPL	500 - 3800	T	Mt. Hood Cascades, Columbia River gorge; with ponderosa pine Douglas-fir, grand fir, Pacific yew, incense cedar, many shrubs
SHRUBS					
Acer circinatum	vine maple	FACU+	500 - 5000	M-T	central Cascades and north; under conifers, especially grand fir, western redcedar, western hemlock, oak, with prickly currant, Pacific yew
Alnus incana (A. tenuifolia)	mountain alder	FACW	2400 - 5700	L-M	widespread, variety of streams, with willows, aspen and black cottonwood, grand fir; flood deposition sites
Amelanchier alnifolia var. alnifolia	serviceberry	FACU	500 - 4500	M-T	widespread; also with grand fir, Douglas-fir, black cottonwood, Douglas hawthorn and white alder
Arctostaphylos uva-ursi	bearberry (kinnikinnick)	FACU-	4300 - 6000+	M-T	mostly east of Cascades; dryer margins, at cool sites with lodgepole pine, ponderosa pine; excellent ground cover
Artemesia cana var. bolander	silver sagebrush bolander	FAC	3500 -5500	M-T	shrub-steppe regions, alkaline basins; narrow drainage border
Artemesia cana var. viscidula	silver sagebrush mountain	FAC	5500 - 7000	M-T	Ochocos and Klamath Mountains; mountain prairies
Betula glandulosa var. glandulosa	bog birch	OBL	3000 - 6200	L-M	bogs; common in Cascades, less so east; under Engelmann spruce, lodgepole pine, with bog blueberry, mountain alder, willows (Booth, Lemmon, Geyer)
Cornus stolonifera var. stolonifera	red-osier dogwood	FACW	500 - 5000	L-M	widespread, flood deposition sites; with black cottonwood, willows and alders
Cratagus douglasii var. douglasii	Douglas hawthorn (black hawthorn)	FAC	500 - 6000	M-T	Ochocos and north central Cascades; somewhat open sites, dryer floodplains of the ponderosa pine and Douglas-fir zones; with serviceberry, Douglas spiraea, Woods rose, common snowberry
Phyllodoce empetriformis	red mountainheath	FAC	5700 - 7000	M-T	Cascades; subalpine to alpine meadows and streambanks; with bog blueberry, undergreen willow, Eastwood willow

SCIENTIFIC NAME	COMMON NAME	WIS	ELEVATION (FT.)	RZ LEVEL	ECOLOGY-ASSOCIATIONS
SHRUBS, continued					
Physiocarpus malvaceus	mallow ninebark	FAC+	1000 - 6000	M	commonly under ponderosa pine and Douglas fir, also Engelmann spruce, aspen, grand fir; with common snowberry, serviceberry, willows
Ribes lacustre	prickly currant (black gooseberry)	FAC+	2200 - 6400	M-T	variety of streams, disturbed sites; less so with lodgepole in basins
Rosa woodsii var. ultramontana	Woods rose	FACU	3000 - 5000+	M-T	a dominant shrub; with Douglas hawthorn, common snowberry, serviceberry, Douglas spiraea
Rubus lasiococcus	dwarf bramble	NI	4500 - 6500+	M-T	montane; with black huckleberry, grouse huckleberry, red mountainheath
Salix boothii	Booth willow	OBL	1000 - 7300	L	variety of riparian sites, flood deposition; with red-osier dogwood, willows (Geyer, Lemmon), alders, bog birch; not typically forested, but aspen, lodgepole pine and Engelmann spruce may be nearby
Salix commutata	undergreen willow	OBL	4000 - 7000	L	mostly Cascades, marshy - boggy sites; with willows (Eastwood, Booth), bog blueberry, red mountainheath
Salix eastwoodiae	Eastwood willow	FACW	4000 - 7000	L	Cascades, uncommon east; wet meadows, dwarfed in bogs; with willows (Eastwood, Booth), bog blueberry, red mountainheath
Salix exigua ssp. exigua (S. exigua)	coyote willow	FACW	500 - 5000	L-M	streambanks and gravel bars (flood deposition); foothills and basins; with black cottonwood, red-osier dogwood, alders; at somewhat higher elevations in the south
Salix geyeriana	Geyer willow	OBL	3000 - 5600	L-T	widespread, especially common in basins; flood deposition sites; with willows (Booth, Lemmon), bog birch, Douglas spiraea
Salix lemmonii	Lemmon willow	FACW+	500 - 6200	L-M	throughout; open meadows, low gradient streams and rivers; shrub steppe zone; lodgepole pine and Douglas-fir forests, with willows, bog birch, Douglas spiraea
Salix lucida ssp. caudata (Salix lasiandra var. caudata)	Pacific willow	FACW+	500 - 5000+	L-M	stream flood deposition sites; with black cottonwood, alders, red-osier dogwood, willows (coyote, Lemmon)
Salix lutea	yellow willow	OBL	500 - 5500	L-M	streambanks (flood deposition sites), mostly in low elevation steppe zone, with black cottonwood, red-osier dogwood, willows(coyote, Pacific), also with mountain alder at mid elevation
Salix scouleriana	Scouler willow	FAC	500 - 5000+	L-T	streambanks; species is also upland transition
Spiraea douglasii var. menziesii	Douglas spiraea	FACW	2200 - 5900	M	variety of streams to bottomlands; with lodgepole pine, Engelmann spruce, aspen, alders, willows, dwarf bramble; forms dense thicket

SCIENTIFIC NAME	COMMON NAME	WIS	ELEVATION (FT.)	RZ LEVEL	ECOLOGY-ASSOCIATIONS
SHRUBS, continued					
Symphoricarpos albus var. laevigatus	common snowberry	FACU	2200 - 5800	T	well drained riparian sites; widespread but more common in north, central Cascades; with upland transitional shrubs; especially Douglas hawthorn, serviceberry, Woods rose
Vaccinium membranaceum	black huckleberry (big whortleberry)	FACU+	5000 - 6500+	T	mostly Cascades; under conifers, with grouse huckleberry, dwarf bramble, red mountainheath
Vaccinium occidentale	bog blueberry	FACW+	4200 - 6000+	L-M	bogs and meadow margins; mostly Cascades; under aspen, cedar; with bog birch, mountain alder, red mountainheath, willows(undergreen, Eastwood)
Vaccinium scoparium	grouse huckleberry	FACU-	4000 - 7500	T	sub-alpine to alpine; under mountain hemlock, lodgepole pine, Engelmann spruce, Pacific silver fir, with black huckleberry, red mountainheath, dwarf bramble

Table A.9: Eco-Region 4, Continued

SCIENTIFIC NAME	SHADE	FLOOD	DROUGHT	DAMAGE RESPONSE	ROOTS AND SOIL	SEXUAL REPRODUCTION	VEGETATIVE REPRODUCTION
CONIFER TREES							
Abies amabilis	5	4	1	new leader from above ground buds	shallow rooted when mature; moist, acidic soil	wind dispersed seed, short distance	none
Abies grandis	4	3	2+	new leader from above ground buds	intermediate roots, shallower and lateral on wet sites; coarse soils	wind dispersed seed, short distance	NI
Calocedrus decurrens (Libocedrus decurrens)	3	3	4	new leader from above ground buds	spreading, extensive roots; variety of soils	wind dispersed seed long distance	none
Larix occidentalis	1	3	3	new leader from above ground buds	deep, extensive roots; mineral soil	wind dispersed seed	none
Picea engelmanni	3+	4	2+	branch layering; new leader from above ground buds	generally shallow rooted; moist, mineral soil	wind dispersed seed	branch layering
Pinus contorta var. latifolia	1	4	5	basal sprouts; new leader from above ground buds	variable roots, shallow on wet soils; good on infertile soil	wind dispersed seed	NI
Pinus monticola	3	3	2+	new leader from above ground buds	mostly shallow and lateral with sinkers; tolerates coarse soils	wind dispersed seed	none
Pinus ponderosa	2	3	5	new leader from above ground buds	lateral after rapid early taproot; coarse soils	wind and gravity dispersed seed	none
Pseudotsuga menziesii var. glauca	3	3	4	new leader from above ground buds	variable, potentially deep rooted; variety of soils	wind and mammal dispersed seed	none
Taxus brevifolia	5	3	3+	basal and root sprouts; branch layering; new leader from ground buds	deep, widespread, fibrous roots; deep, moist, acidic soils	berry-like aril	branch layering
Thuga plicata	5	4+	3	branch layering; rooting of broken branches; new leader from above ground buds	extensive roots; does not penetrate dense soil; tolerates infertile soils	wind dispersed seed	branch layering
Tsuga heterophylla	5	3	1+	branch layering; new leader from above ground buds; seedlings sprout basaly	shallow rooted; variety of acidic soils	wind dispersed seed, long distance	branch layering, rare

SCIENTIFIC NAME	SHADE	FLOOD	DROUGHT	DAMAGE RESPONSE	ROOTS AND SOIL	SEXUAL REPRODUCTION	VEGETATIVE REPRODUCTION
CONIFER TREES, continued							
Tsuga mertensiana	4+	5	1	branch layering; new leader from above ground buds	shallow rooted; coarse soils	wind dispersed seed	branch layering, rare
BROADLEAF TREES							
Alnus rhombifolia	3	5	2	basal sprouts	fibrous roots; moist, coarse soil	wind and water dispersed seed	sprouts, layering in wet areas
Populus tremuloides	1	3+	1+	basal and root sprouts	clonal, shallow, extensive roots with spaced sinkers; poor on coarse soil	wind dispersed seed	root sprouts, clonal
Populus trichocarpa	1	5	1+	basal and root sprouts, vigorous	deep, extensive roots; variety of soils	wind and water dispersed seed	absis shoots, root sprouts
Quercus garryana	2	4	4	basal and rare root sprouts	extensive roots, with deep taproot; variety of soils, tolerates coarse soil	gravity and animal dispersed acorns	none
SHRUBS							
Acer circinatum	5	4	2	basal sprouts, rapid	root crown, deep, well drained soils	poor seed producer, animal dispersed	branch layering, root sprouts
Alnus incana (A. tenuifolia)	1+	5	1	basal sprouts, poor	root crown; coarse soils	small winged nutlets	branch layering
Amelanchier alnifolia var. alnifolia	2	3	4	basal and rhizome sprouts, moderate	massive root crown with extensive rhizomes; tolerates infertile soils	berry-like pomes	rhizomes
Arctostaphylos uva-ursi	3	4	4+	basal and rhizome sprouts, moderate	rhizomatous, moderate depth roots; coarse soils	berry-like drupes	rhizomes, layering
Artemesia cana var. bolander	1	3	5	basal sprouts, rapid	rhizomatous, shallow to deep; alkaline soils	wind dispersed seed	rhizomes, layering
Artemesia cana var. viscidula	1	3	5	basal sprouts, rapid	rhizomatous, shallow to deep; variety of soils	wind dispersed seed	rhizomes, layering
Betula glandulosa var. glandulosa	4	4	1+	basal sprouts, rapid	root crown; organic soils	wind dispersed seed	insignificant
Cornus stolonifera var. stolonifera	2	5	3	rhizomes and basal sprouts	root crown, rhizomatous; coarse soils	wind and bird dispersed seed	rhizomes, root shoots, layering
Cratagus douglasii var. douglasii	2	4	3	basal and root sprouts, moderate	root crown; deep fine soils	semi-shelled fruit, bird dispersed	NI

SCIENTIFIC NAME	SHADE	FLOOD	DROUGHT	DAMAGE RESPONSE	ROOTS AND SOIL	SEXUAL REPRODUCTION	VEGETATIVE REPRODUCTION
SHRUBS, continued							
Phyllodoce empetriformis	NI	NI	NI	NI	coarse soils	seeds	NI
Physiocarpus malvaceus	2	2	4+	basal sprouts, moderate	root crown; finer soils	gravity dispersed seeds	rhizomes
Ribes lacustre	3	4	4	rootstock regrowth, moderate rhizome and basal sprouts	shallow from root crown rhizomatous?	animal dispersed berries	none?
Rosa woodsii var. ultramontana	4	2+	4	basal and rhizome sprouts moderate	rhizomatous and shallow fibrous roots	animal dispersed "hips" with seed	rhizomes, layering
Rubus lasiococcus	2	NI	2	NI	moderate depth roots	animal dispersed raspberries	branch layering
Salix boothii	1+	5	2	basal sprouts, moderate	root crown	wind dispersed seed	NI
Salix commutata	1	5	2	basal sprouts, moderate	root crown	wind dispersed seed	NI
Salix eastwoodiae	1	5	2	basal sprouts, moderate	root crown	wind dispersed seed	NI
Salix exigua ssp. exigua (S. exigua)	1	5	NI	basal sprouts, moderately rapid	rhizomatous; coarse soils	wind dispersed seed	rhizomes, buried detached stems
Salix geyeriana	1	5	1	basal sprouts, moderate	root crown; deep fine soils	wind dispersed seed	buried detached stems
Salix lemmonii	1+	5	3	basal sprouts, moderate	root crown; fine to coarse soils	wind dispersed seed	buried detached stems and roots
Salix lucida ssp. caudata (S. lasiandra var. caudata)	1	5	1	basal sprouts, moderate	root crown; coarse soils	wind dispersed seed	buried detached stems
Salix lutea	1+	5	1	basal sprouts, moderate	root crown; coarse soils	wind dispersed seed	buried detached stems
Salix scouleriana	3	5	2	basal sprouts, moderate	root crown	wind dispersed seed	buried detached stems
Spiraea douglasii var. menziesii	1+	4+	2+	basal and rhizome sprouts, slow to moderate	rhizomatous; finer soils	seeds	rhizomes
Symphoricarpos albus var. laevigatus	4	3	3	rhizome and basal sprouts, rapid	rhizomatous; finer soils	berries, animal dispersed	rhizomes
Vaccinium membranaceum	5	5	2	basal sprouts, rapid rhizome sprouts?	rhizomatous?; coarse acid soils, also infertile soils	small berries, animal dispersed	branch layering, rare
Vaccinium occidentale	3	5	2	rhizome and basal sprouts, moderate	rhizomatous; coarse acid soils, also infertile soils	animal dispersed berries	rhizomes, layering
Vaccinium scoparium	3	3	2	rhizome and basal sprouts	rhizomatous; coarse acid soils, also infertile soils	animal dispersed berries	rhizomes, layering?

Table A.10: Eco-Region 5

SCIENTIFIC NAME	COMMON NAME	WIS	ELEVATION (FT.)	RZ LEVEL	ECOLOGY-ASSOCIATIONS
CONIFER TREES					
Abies grandis	grand fir	FACU-	1500 - 6000 (2000 - 5000)	M-T	mostly Blues and Wallowas; many associates including ponderosa pine, lodgepole pine, Douglas-fir, western larch, black cottonwood, Rocky Mountain maple, mountain alder, scouler willow, serviceberry
Abies lasiocarpa	subalpine fir	FACU	3000 - 7000+ (4600 - 7000)	T	Blues and Wallowas; with Engelmann spruce, lodgepole pine, western larch, Rocky Mountain maple
Larix occidentalis	western larch	FACU+	3000 - 6000+	M-T	Blues and Wallowas; with Engelmann spruce, lodgepole pine, subalpine fir, Rocky Mountain maple
Picea engelmannii	Engelmann spruce	FAC	3500 - 7000 (5000 - 7000)	M-T	Blues and Wallowas; with lodgepole pine, western larch, subalpine fir, Rocky Mountain maple, prickly currant, stinking currant
Pinus contorta var. latifolia	lodgepole pine	FAC-	3000 - 7000	M-T	Blues and Wallowas; tolerates infertile soils; variable ecology; ponderosa pine through subalpine fir zones; can be dominant
Pinus ponderosa	ponderosa pine	FACU-	2800 - 5300	T	Blues and Wallowas; with Douglas-fir, grand fir, Douglas hawthorn, aspen, mallow ninebark, common snowberry
Pseudotsuga menziesii var. glauca	Douglas-fir	FACU+	2800 - 5300	M-T	Blues and Wallowas; many associates
Taxus brevifolia	Pacific yew	FACU-	1000 - 4500+	M-T	northeastern Oregon; with grand fir, Douglas-fir, Rocky Mountain maple, serviceberry, mallow ninebark
BROADLEAF TREES					
Alnus rhombifolia	white alder	FAC	500 - 1500	L-M	flood deposition sites, major rivers and lower tributaries; with black cottonwood, willows (arroyo, Pacific)
Populus tremuloides	trembling aspen	FAC+	3000 - 6000+	M-T	mostly in mountains, aggressive pioneer, wet meadows; with mountain alder, red-osier dogwood, prickly currant, common snowberry
Populus trichocarpa	black cottonwood	FACW	500 - 5500	L-M	northern half of region, river floodplains, streambanks; with grand fir, Douglas-fir, Rocky Mountain maple, willows (Pacific, yellow, Booth), red-osier dogwood, mountain alder, common snowberry
SHRUBS					
Acer glabrum var. douglasii	Rocky Mountain maple	FAC	2500 - 6000+ (2500 - 4500)	M-T	ponderosa pine and Douglas-fir zones and higher; with black cottonwood, aspen, alders, birch, willows, red-osier dogwood, currants, Woods rose, also with conifers
Alnus incana (A. tenuifolia)	mountain alder	FACW	3000 - 6500	M	ponderosa zone and higher, also in southeast; dominant in v-shaped valleys; flood deposition and scour sites; not usually with willows; with black cottonwood, red-osier dogwood, currants

SCIENTIFIC NAME	COMMON NAME	WIS	ELEVATION (FT.)	RZ LEVEL	ECOLOGY-ASSOCIATIONS
SHRUBS, continued					
Alnus sinuata	Sitka alder	FACW	3500 - 6000	L-M	ponderosa zone and higher, also in southeast; flood deposition and scour sites; with currants, willows
Amelanchier alnifolia	serviceberry (saskatoon)	FACU	1000 - 6000+	M-T	northern half of region, shrub-steppe through montane; with black cottonwood, white alder, Douglas hawthorn, Rocky Mountain maple, thimbleberry, mallow ninebark
Artemesia cana var. bolander	silver sagebrush bolander	FAC	3500 - 5500	M-T	steppe regions, alkaline basins; primary shrub lining streams
Artemesia cana var. viscidula	silver sagebrush mountain	FAC	5500 - 7000	M-T	mountain prairies; lining small, low gradient streams
Athyrium felix-femina	lady fern	FAC	3300 - 7000+	M-T	Blues and Wallowas, wooded streambanks
Betula glandulosa var. glandulosa	bog birch	OBL	5000 - 7500	L-M	Blues and Wallowas; streams and boggy sites; under lodgepole pine, Engelmann spruce, subalpine fir, with willows (undergreen, Eastwood)
Betula occidentalis var. occidentalis	water birch	FACW	3000 - 6000	L-M	ponderosa pine zone and higher; with black cottonwood, alders, serviceberry, stinking currant, willows
Cornus stolonifera var. stolonifera	red-osier dogwood	FACW	3300 - 5500	M	flood deposition sites; with willows, alders, serviceberry, Rocky Mountain maple, common snowberry, currants; also in the southeast
Crataegus douglasii var. douglasii	Douglas hawthorn (black hawthorn)	FAC	1000 - 6000	M-T	widespread; with conifers, black cottonwood, serviceberry, thimbleberry, common snowberry, Woods rose
Pachistima myrsonites	Oregon boxwood	NI	4500 - 6000	T	Blues and Wallowas; under conifers, also with aspen, Rocky Mountain maple, serviceberry and mallow ninebark
Phisiocarpus malvaceus	mallow ninebark	FAC+	1000 - 6000 (2000 - 6000)	M-T	variable ecology; under ponderosa pine, Douglas-fir, grand fir, Engelmann spruce, aspen, with serviceberry, Douglas hawthorn
Ribes aureum	golden currant	FAC+	1500 - 4500+	T	mostly eastern; with yellow willow and Woods rose
Ribes hudsonianum var. petiolare	stinking currant	OBL	3500 - 6500	L	Blues and Wallowas; wooded sites, flood deposition; with mountain alder, red-osier dogwood, currants
Ribes lacustre	prickly currant (black gooseberry)	FAC+	3500 - 6500+	M-T	wooded sites, flood deposition to transition; higher elevations in southeast; many associates
Ribes viscossisimum var. viscossisimum	sticky currant	FAC	3500 - 6500+	M-T	variable ecology; creek banks; with alders
Rosa gymnocarpa	baldhip rose	FACU	2500 - 6000	T	ponderosa pine zone and higher; wooded sites, higher elevations in southeast; with mountain alder, thimbleberry, currants, red-osier dogwood

SCIENTIFIC NAME	COMMON NAME	WIS	ELEVATION (FT.)	RZ LEVEL	ECOLOGY-ASSOCIATIONS
SHRUBS, continued					
Rosa woodsii var. ultramontana	Woods rose	FACU	2000 - 5000+ (3000 - 5000+)	M-T	throughout, higher elevations in southeast; ponderosa pine zone and higher; dominant shrub with many associates
Rubus parviflorus	thimbleberry	FACU+	3000 - 5500	T	northern part of region, ponderosa pine zone and higher; under conifers, with mountain alder, Douglas hawthorn, serviceberry, Woods rose, common snowberry
Salix boothii	Booth willow	OBL	3900 - 6000	L	wide distribution, shrub-steppe and higher; pioneer on flood deposition sites; with Douglas-fir and Engelmann spruce, Woods rose, currants, willows (Geyer, yellow, Lemmon)
Salix commutata	undergreen willow	OBL	5000 - 7500	L	generally montane; swampy sites with Engelmann spruce, Eastwood willow, bog birch
Salix eastwoodiae	Eastwood willow	FACW	5000 - 7500	L	mountain bogs; with Engelmann spruce, undergreen willow, bog birch
Salix exigua ssp. exigua (S. exigua)	coyote willow	OBL	500 - 5000	L-M	throughout, basins through foothills; pioneer on flood deposition sites; with mountain alder, Yellow willow, Pacific willow
Salix exigua ssp. melanopsis (S. melanopsis)	dusky willow	FACW	4500 - 6500	L-M	pioneer on flood deposition; higher elevations than coyote willow
Salix geyeriana var. geyeriana	Geyer willow	FACW+	3900 - 6000	L-T	wide distribution, ponderosa pine zone to subalpine; dominant on low gradient streams; with currants, willows (Booth, Lemmon, yellow)
Salix lasiolepus	arroyo willow (red willow)	FACW	5000 -6000	L-M	rocky streambanks; with black cottonwood, white alder, Pacific willow
Salix lemmonii	Lemmon willow	FACW+	500 - 6500+	L-M	wide distribution, steppe-shrub zone and higher; low gradient streams; with Douglas-fir, lodgepole pine, bog birch and willows (Geyer)
Salix lucida ssp. caudata (S. lasiandra var. caudata)	Pacific willow	FACW+	500 - 6000	L-M	throughout; pioneer on flood deposition sites; with black cottonwood, coyote willow, yellow willow
Salix lutea	yellow willow	OBL	3000 - 6500+	L-M	widespread, flood deposition sites; with black cottonwood, mountain alder, coyote willow, Pacific willow
Salix scouleriana	Scouler willow	FAC	500 - 5500	L-T	widespread, common in v-shaped valleys; species is also upland transition
Spiraea densiflora var. splendens	subalpine spiraea	NI	5500 - 7000+	M-T	Blues and Wallowas
Symphoricarpus albus var. laevigatus	common snowberry	FACU	3000 - 5500+	T	open woods and prairie sites; under Ponderosa pine, black cottonwood, aspen, with Douglas hawthorn, Rocky Mountain maple, serviceberry, thimbleberry, Woods rose
Vaccinium membranaceum	black huckleberry (big whortleberry)	FACU+	4600 - 7000	T	Blues and Wallowas; under conifers with mountain alder, prickly currant, Oregon boxwood, grouse huckleberry

SCIENTIFIC NAME	COMMON NAME	WIS	ELEVATION (FT.)	RZ LEVEL	ECOLOGY-ASSOCIATIONS
SHRUBS, continued					
Vaccinium occidental	bog blueberry	FACW+	4200 - 6000+	L-M	bogs and meadow margins; under aspen, cedar; with bog birch, mountain alder, willows (undergreen, Eastwood)
Vaccinium scoparium	grouse huckleberry	FACU-	5000 -7500	T	Blues and Wallowas; shady sites with black huckleberry

Table A.11: Eco-Region 5, Continued

SCIENTIFIC NAME	SHADE	FLOOD	DROUGHT	DAMAGE RESPONSE	ROOTS AND SOIL	SEXUAL REPRODUCTION	VEGETATIVE REPRODUCTION
CONIFER TREES							
Abies grandis	4	3	3+	new leader from above ground buds	intermediate roots, shallower and lateral on wet sites; coarse soils	wind dispersed seed, short distance	NI
Abies lasiocarpa	5	4+	2+	branch layering; new leader from above ground buds	generally shallow rooted; variety of soils	wind dispersed seed, short distance	branch layering, near timberline
Larix occidentalis	1	3	3+	new leader from above ground buds	deep, extensive roots; mineral soil	wind dispersed seed	none
Picea engelmannii	3+	4	2+	branch layering; new leader from above ground buds	generally shallow rooted; moist, mineral soil	wind dispersed seed	branch layering
Pinus contorta var. latifolia	1	5	5	basal sprouts; new leader from above ground buds	variable roots, shallow on wet soils; good on infertile soil	wind dispersed seed	NI
Pinus ponderosa	2	3	5	new leader from above ground buds	lateral after rapid early taproot; coarse soils	wind and gravity dispersed seed	none
Pseudotsuga menziesii var. glauca	3	3	4	new leader from above ground buds	variable, potentially deep rooted; variety of soils	wind and mammal dispersed seed	none
Taxus brevifolia	5	3	3+	basal and root sprouts; branch layering; new leader from ground buds	deep, widespread, fibrous roots; deep, moist, acidic soils	wind dispersed berry-like aril	branch layering
BROADLEAF TREES							
Alnus rhombifolia	3	5	2	basal sprouts	fibrous roots; moist, coarse soil	wind and water dispersed seed	sprouts, layering in wet areas
Populus tremuloides	1	4	1+	basal and root sprouts	clonal, shallow, extensive roots with spaced sinkers; poor on coarse soil	wind dispersed seed	root sprouts, clonal
Populus trichocarpa	1+	4+	1+	basal and root sprouts, vigorous	deep, extensive roots; variety of soils	wind and water dispersed seed	absis shoots, root sprouts
SHRUBS							
Acer glabrum var. douglasii	4	4	NI	basal sprouts, numerous	large root crown, deep system; coarse soils	wind dispersed seed	none
Alnus incana (A. tenuifolia)	1+	5	1	basal sprouts, poor	root crown; coarse soils	small winged nutlets	branch layering

SCIENTIFIC NAME	SHADE	FLOOD	DROUGHT	DAMAGE RESPONSE	ROOTS AND SOIL	SEXUAL REPRODUCTION	VEGETATIVE REPRODUCTION
SHRUBS, continued							
Alnus sinuata	2	5	1	basal sprouts (when small), poor	root crown, coarse soils	small winged nutlets	branch layering
Amelanchier alnifolia var. alnifolia	2	3	3	basal and rhizome sprouts, moderate	massive root crown with extensive rhizomes; tolerates infertile soils	berry-like pomes	rhizomes
Artemesia cana var. bolander	1	3	5	basal sprouts, rapid	rhizomatous, shallow to deep; alkaline soils	wind dispersed seed	rhizomes, layering
Artemesia cana var. viscidula	1	3	5	basal sprouts, rapid	rhizomatous, shallow to deep; variety of soils	wind dispersed seed	rhizomes, layering
Athyrium felix-femina	4	3	2	rhizome sprouts	rhizomatous	wind dispersed spores	rhizomes
Betula glandulosa var. glandulosa	4	4	2	basal sprouts, rapid	root crown; soils can be coarse	wind dispersed seed	insignificant
Betula occidentalis var. occidentalis	1	5	2	basal sprouts	shallow, dense roots; coarse soils	wind dispersed seed	insignificant
Cornus stolonifera var. stolonifera	2	5	3	rhizomes and basal sprouts	root crown, rhizomatous; coarse soils	wind and bird dispersed seed	rhizomes, root shoots, layering
Crataegus douglasii var. douglasii	2	4	3+	basal and root sprouts, moderate	root crown; deep fine soils	semi-shelled fruit, bird dispersed	NI
Pachistima myrsinites	3	2	5	root and basal sprouts, moderate	deep taproot; tolerates coarse soils	seed viable for decades	branch layering
Physiocarpus malvaceus	2	2+	4+	basal sprouts, moderate	root crown	seeds	rhizomes
Ribes aureum	3	3	4	rhizome and basal sprouts, rapid?	rhizomatous	animal dispersed berries	rhizomes
Ribes hudsonianum var. petiolare	NI	4	4	spouts?	rhizomatous?	animal dispersed berries	rhizomes?
Ribes lacustre	NI	4	4	rootstock regrowth, moderate; sprouts?	rhizomatous?	animal dispersed berries	rhizomes?
Ribes viscossisimum var. viscossisimum	NI	NI	NI	sprouts?	rhizomatous?	animal dispersed berries	rhizomes?
Rosa gymnocarpa	4	3	4	basal and rhizome sprouts, moderate	rhizomatous and shallow fibrous roots; coarse soil	seed in "hips", bird dispersed	rhizomes, layering
Rosa woodsii var. ultramontana	4	2+	5	basal and rhizome sprouts, moderate	rhizomatous and shallow fibrous roots	seed in "hips", bird dispersed	rhizomes, layering

SCIENTIFIC NAME	SHADE	FLOOD	DROUGHT	DAMAGE RESPONSE	ROOTS AND SOIL	SEXUAL REPRODUCTION	VEGETATIVE REPRODUCTION
SHRUBS, continued							
Rubus parviflorus	3	NI	2	basal, root and rhizome sprouts, rapid	rhizomatous	animal dispersed seed	rhizomes
Salix boothii	2	5	2	basal sprouts, moderate	root crown; soils can be coarse	wind dispersed seed	NI
Salix commutata	1	5	2	basal sprouts, moderate	root crown; organic soils	wind dispersed seed	NI
Salix eastwoodiae	1	5	2	basal sprouts, moderate	root crown; soils can be coarse	wind dispersed seed	NI
Salix exigua ssp. exigua (S. exigua)	1	5	NI	basal stem sprouts, moderately rapid	rhizomatous; coarse soil	wind dispersed seed	rhizomes
Salix exigua ssp. melanopsis (S. melanopsis)	1	5	NI	basal stem sprouts, moderately rapid	rhizomatous	wind dispersed seed	rhizomes
Salix geyeriana var. geyeriana	1	5	1	basal sprouts, moderate	root crown; soils can be coarse	wind dispersed seed	buried detached stems
Salix lasiolepus	1+	5	3	NI	NI	wind dispersed seed	NI
Salix lemmonii	1+	5	3	basal sprouts, moderate	root crown; fine to coarse soils	wind dispersed seed	buried detached stems and roots
Salix lucida var. lasiandra (S. lasiandra)	1	5	1	basal sprouts, moderate	root crown; coarse soils	wind dispersed seed	buried detached stems
Salix lutea	2	5	2	basal sprouts, moderate	root crown; coarse soils	wind dispersed seed	buried detached stems
Salix scouleriana	3	5?	2	basal sprouts, moderate	root crown	wind dispersed seed	buried detached stems
Spiraea densiflora var. splendens	1+	4+	2+	rhizomes? and basal sprouts, moderate	rhizomatous	seeds	rhizomes
Symphoricarpus albus var. laevigatus	4	3	3+	rhizomes and basal sprouts, rapid	rhizomatous	berries, animal dispersed	rhizomes
Vaccinium membranaceum	5	5	3	basal sprouts, rapid rhizome sprouts?	rhizomatous?; coarse acid soils, also infertile soils	small berries, animal dispersed	branch layering, rare
Vaccinium occidental	3	5	3	rhizomes and basal sprouts, moderate	rhizomatous; coarse acid soils, also infertile soils	animal dispersed berries	rhizomes, layering
Vaccinium scoparium	3	3	3	rhizomes and basal sprouts	rhizomatous; coarse acid soils, also infertile soils	animal dispersed berries	rhizomes, layering?

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