



# Field Guide to Riparian Plant Communities in Northwestern Oregon

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# Field Guide to Riparian Plant Communities in Northwestern Oregon

*Condensed from*

Riparian Plant Communities of Northwest Oregon:  
Streamside Plant Communities

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*And*

Native Freshwater Plant Associations of Northwestern Oregon

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**TABLE OF CONTENTS FOR THE FIELD GUIDE TO RIPARIAN PLANT COMMUNITIES IN NORTHWESTERN OREGON**

**Introduction to the Field Guide to Riparian Plant Communities in Northwestern Oregon** ..... 2

    Purpose ..... 2

    Study area ..... 4

    Primary key to Field Guide to Riparian Plant Communities in Northwestern Oregon ..... 5

**Table of Contents for Riparian Plant Communities in Northwest Oregon: Streamside Plant Communities of Northwest Oregon** ..... 7

**Table of Contents for Native Freshwater Plant Associations of Northwestern Oregon** ..... 186

**APPENDICES**

**Appendix I Species list**..... 332

**Appendix II References** ..... 356

# **INTRODUCTION TO THE FIELD GUIDE TO RIPARIAN PLANT COMMUNITIES IN NORTHWESTERN OREGON**

## **Purpose**

This field guide combines classifications of common streamside plant communities and native freshwater wetland communities in Northwest Oregon. It is a condensed version of two separate works which are both available on the CD that accompanies this book. The information is also available for reference or to download as a zipfile from the Interagency Clearinghouse of Ecological Information, Pacific NW Region website: <http://www.reo.gov/ecoshare/Publications/Documents/FieldGuides/NWOriparian/>

In both the CD and downloadable versions, the full guide is broken down into smaller file sizes for ease of downloading and printing. The files were created in Adobe Acrobat 5.0. Links within the document will lead you to appropriate sections. For example, opening the “Title Page, Acknowledgements, Table of Contents” file allows the reader to browse the contents of the entire guide. When the open-handed cursor turns into a pointing hand, there is a link available. Throughout the entire Table of Contents the pointing hand should be visible. Clicking on the link to which the hand is pointing will open the appropriate file and lead the reader to the selected section. The reader can return to files previously viewed by either clicking on the “Back” button in the browser or by finding green boxes within the document that direct the reader to other sections of the Guide.

The purpose of the field guide is to allow an observer to identify communities in the field from key indicator species and environmental factors. A more complete discussion is available from the larger guides.

This field guide is organized in two major sections: streamside communities and freshwater wetland communities. Each section has its own introduction, keys, and community descriptions.

Many sites along streams or rivers include patches of wetlands where drainage is very poor. The most distinctively ‘wetland’ wetland-communities are identified and described only in the wetlands section. Wetland communities which commonly occur on floodplains are included in the streamside keys, with leads to the wetland association name and page number in the wetland section.

The appendix provides a list of species occurring frequently in the riparian plant communities. The list is sorted first by scientific name, and then by common names. Wetland Indicator Status is included (US Army

Corps of Engineers 1987). Names of non-native species in Appendix I, Species List, are italicized.

**The full guides offer more information on the communities contained in the field guide. Please refer to these full guides which include:**

In Riparian Plant Communities of Northwest Oregon: Streamside Plant Communities:

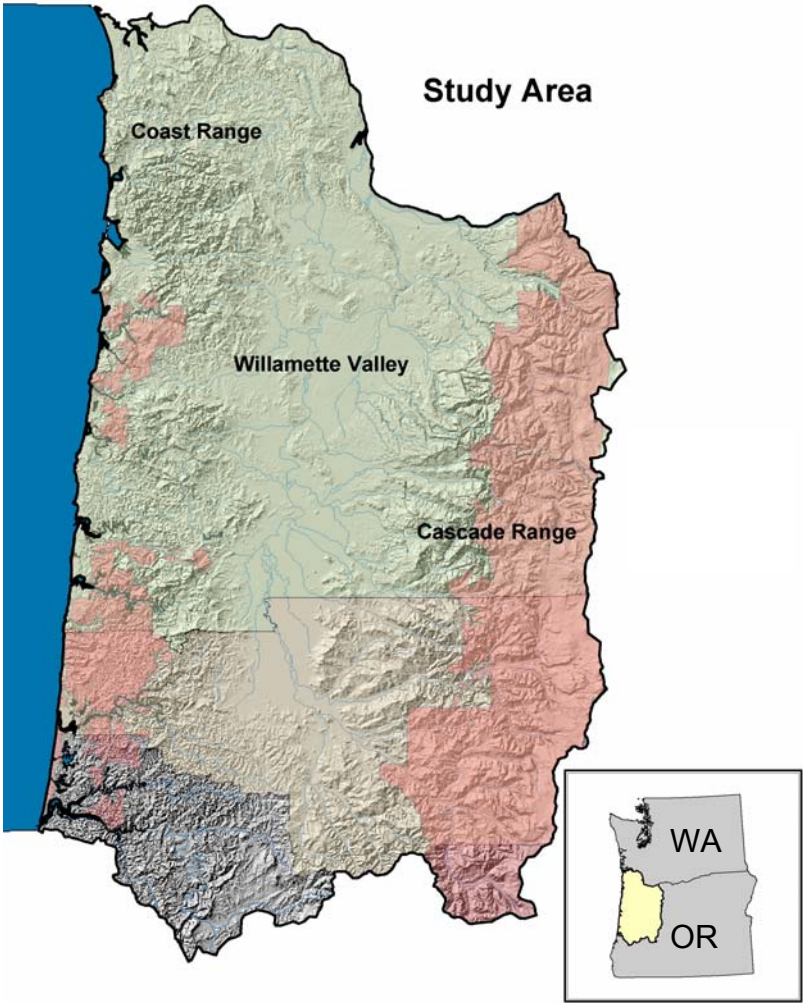
- More detailed description of study methods, data sources, analyses.
- Ecosystem processes influencing streamside communities.
- Comparison of Coast and Cascades: major patterns by geomorphic group
- Non-native plant species in riparian zones.
- Plant community distribution shown in valley cross-sections
- Community descriptions, including color photographs, soil profile sketches, and wetland rating.
- More inclusive cover/constancy tables for each community (Appendix in an Excel table).

In Native Freshwater Plant Associations of Northwestern Oregon:

- More detailed description of study methods, data sources, analyses
- National Vegetation Classification system units, Nature Serve ecological system name, and global and state rank.
- More detailed information on environment and ecology.
- Global distribution of the plant association.
- List of other studies related to the plant community.
- More complete cover/constancy tables for each community.

The two sections are organized differently. The streamside section is divided first into three geographic areas, then by geomorphic groups. The wetlands section divides communities into forest and woodland, shrubland, herbaceous, and nonvascular groupings, and includes information on geographic distribution in the descriptions of each type.

The streamside study area includes only sites west of the Cascades Crest. Note that the wetlands section includes a small section of the east slope of the Cascades and along the lower Columbia River.





**PRIMARY KEY TO FIELD GUIDE TO RIPARIAN PLANT COMMUNITIES IN NORTHWESTERN OREGON**

This key, based on site characteristics and vegetation, leads to the major keys for both sections in the guide.

- 1a. In or bordering perennial or seasonal pools, ponds, and lakes ..... **Wetland keys**
- 1b. Habitat otherwise.....2
- 2a. Within freshwater intertidal or subtidal zone along coastal rivers, or hydrated by these zones ..... **Wetland keys**
- 2b. Above hydrating influence of freshwater intertidal or subtidal zones ..... 3
- 3a. In stream channels, along edges of active streams or rivers, or on steep or rocky stream banks, sometimes irrigated by seepage or waterfall spray .....4
- 3b. Habitat otherwise .....7
- 4a. Aquatic beds submerged or floating in perennial stream channels or exposed in intermittent channels..... **Wetland keys**
- 4b. Vegetation not aquatic beds ..... 5
- 5a. *Artemisia lindleyana* dominant or codominant ..... **Wetland keys**
- 5b. *Artemisia lindleyana* absent ..... 6
- 6a. *Euthamia occidentalis* dominant or codominant..... **Wetland keys**
- 6b. *Euthamia occidentalis* absent ..... **Streamside keys**
- 7a. Depressions or seepage areas adjacent to montane *Phyllodoce* heath near timberline ..... **Wetland keys**
- 7b. Not associated with montane *Phyllodoce* heath ..... 8
- 8a. Perennially wet organic or muck soils ..... **Wetland keys**
- 8b. Soils otherwise ..... 9
- 9a. *Alnus incana*, *Alnus viridis* ssp. *sinuata*, *Cornus sericea*, *Spiraea douglasii*, or *Salix* dominant or codominant, on deep silty loam soils ..... **Wetland keys**
- 9b. Dominant species otherwise, or the same species on shallow or rocky soils ..... 10

- 10a. Seasonally-flooded *Salix* or *Populus tremuloides* in depressions over bedrock ..... **Wetland keys**
- 10b. Vegetation and substrate otherwise ..... 11
- 11a. *Picea sitchensis* and *Pinus contorta* var. *contorta* swamps ..... **Wetland keys**
- 11b. Vegetation otherwise ..... 12
- 12a. Seasonally to perennially wet herbaceous marsh, prairie, or montane meadow, sometimes in depressions over bedrock, or associated with seepage or intermittent streams in prairie ..... **Wetland keys**
- 12b. Vegetation and habitat otherwise ..... 13
- 13a. Floodplains, stream terraces, or swales with shallow soils over cobbles, colluvium, or bedrock, or no soil ..... **Streamside keys**
- 13b. Floodplains, stream terraces, or swales with deep silt loam soils .. 14
- 14a. Primary species in shrub or herb layers *Spiraea douglasii*, *Symphoricarpos albus*, *Athyrium filix-femina*, *Carex aquatilis* var. *aquatilis*, *Carex deweyana* ssp. *leptopoda*, *Carex obnupta*, *Lysichiton americanus*, or *Oenanthe sarmentosa*, often with seasonally-flooded pools ..... 15
- 14b. Shrub or herb layers otherwise, seasonally-flooded pools usually lacking ..... **Streamside keys**
- 15a. *Oplopanax horridus*, *Ribes bracteosum*, *Rubus spectabilis*, or *Vaccinium ovalifolium* codominant or conspicuous, or *Carex obnupta* absent or inconspicuous ..... **Streamside keys**
- 15b. *Oplopanax horridus*, *Ribes bracteosum*, *Rubus spectabilis*, or *Vaccinium ovalifolium* absent or inconspicuous, or *Carex obnupta* codominant or conspicuous..... **Wetland keys**

**TABLE OF CONTENTS FOR STREAMSIDE PLANT COMMUNITIES  
OF NORTHWEST OREGON**

**Introduction to the Streamside Plant Communities** ..... 11

    Scope/study area..... 11

    Methods/data sources ..... 12

    Community description ..... 12

    About keys ..... 15

**CASCADES**

**Cascades key** ..... 17

**In channel** ..... 25

    Montia parvifolia: MOPA2..... 26

    Mimulus guttatus: MIGU ..... 27

    Corydalis aquae-gelidae: COAQ ..... 28

    Petasites frigidus group: PEFR5 group ..... 29

    Petasites frigidus-*Salix sitchensis* phase:  
        PEFR5-SASI2 phase ..... 31

    Petasites frigidus-*Equisetum arvense* phase:  
        PEFR5-EQAR phase ..... 32

**Channel margin-cobble bars/banks** ..... 34

    Petasites frigidus-Stachys cooleyae: PEFR5-STCO14 ..... 35

    Boykinia occidentalis-Mitella ovalis: BOOC2-MIOV ..... 37

    Tiarella trifoliata: TITR ..... 39

    Ribes bracteosum/Petasites frigidus: RIBR/PEFR5..... 41

**Cobble bars and low floodplains** ..... 43

    Senecio triangularis-Aster modestus: SETR-ASMO3 ..... 44

    Alnus rubra/Alymus glaucus: ALRU2/ELGL ..... 46

    Rubus parviflorus/Achlys triphylla: RUPA/ACTR..... 48

    Alnus rubra/Tolmeia menziesii-Claytonia sibirica:  
        ALRU2/TOME-CLSI2 ..... 50

    (*Alnus rubra-Acer macrophyllum*)/*Ribes bracteosum-Rubus*  
    *spectabilis/Tolmeia menziesii*:  
        (ALRU2-ACMA3)/RIBR-RUSP/TOME ..... 52

*Rubus spectabilis/Tolmeia menziesii* group:  
    RUSP/TOME GROUP: ..... 54

*Rubus spectabilis/Tolmeia menziesii-shrub* phase:  
            RUSP/TOME-*shrub* phase ..... 56

*Rubus spectabilis/Tolmeia menziesii-Alnus rubra* phase:  
            RUSP/TOME -ALRU2 phase..... 58

Ribes bracteosum-Rubus spectabilis/Tiarella trifoliata-Mitella ovalis: RIBR-RUSP/TITR-MIOV .....	60
Ribes bracteosum-Rubus spectabilis/Oxalis group: RIBR-RUSP/OXALI GROUP:.....	62
Ribes bracteosum-Rubus spectabilis/Oxalis- <i>shrub phase</i> : RIBR-RUSP/OXALI- <i>shrub phase</i> :.....	64
Ribes bracteosum-Rubus spectabilis/Oxalis- <i>Alnus rubra phase</i> : RIBR-RUSP/OXALI-ALRU2 <i>phase</i> .....	65
Alnus viridis: ALVI5.....	66
Vaccinium ovalifolium: VAOV .....	68
<b>Steep banks/terraces</b> .....	70
Oxalis-Hydrophyllum tenuipes: OXALI-HYTE .....	71
(Alnus rubra-Acer macrophyllum)/Oxalis: (ALRU2-ACMA3)/OXALI .....	73
Rubus spectabilis/Oxalis group: RUSP/OXALI GROUP: .....	75
Rubus spectabilis/Oxalis- <i>shrub phase</i> : RUSP/OXALI- <i>shrub phase</i> .....	77
Rubus spectabilis/Oxalis- <i>Alnus rubra phase</i> : RUSP/OXALI-ALRU2 <i>phase</i> .....	78
Rubus spectabilis/Oxalis- <i>Thuja plicata phase</i> : RUSP/OXALI-THPL <i>phase</i> .....	80
Alnus rubra/Symphoricarpos albus-Rubus spectabilis: ALRU2/SYAL-RUSP .....	82
<b>High terraces/major floodplains</b> .....	84
(Acer macrophyllum-Alnus rubra)/Acer circinatum/Tiarella trifoliata: (ACMA3-ALRU2)/ACCI/TITR.....	85
Forested Corylus cornuta/Polystichum munitum group: Forested COCO6/POMU GROUP:.....	87
Forested Corylus cornuta/Polystichum munitum- <i>hardwood phase</i> : Forested COCO6/POMU- <i>hardwood phase</i> .....	89
Forested Corylus cornuta/Polystichum munitum- <i>Tsuga heterophylla/Acer circinatum/Oxalis phase</i> : Forested COCO6/POMU-TSHE/ACCI/OXALI <i>phase</i> .....	91
Forested Corylus cornuta/Polystichum munitum- <i>Acer macrophyllum/Acer circinatum phase</i> : Forested COCO6/POMU-ACMA3/ACCI <i>phase</i> .....	93
<b>Others (seeps, swamps, wetlands, other)</b> .....	95
Adiatum pedatum: ADPE.....	96
Senecio triangularis-Caltha leptosepala: SETR-CALE4.....	98

Oplopanax horridum-Rubus spectabilis group: OPHO-RUSP GROUP: .....	99
Oplopanax horridum-Rubus spectabilis phase: OPHO-RUSP- <i>shrub phase</i> .....	101
Oplopanax horridum-Rubus spectabilis- <i>Alnus rubra phase</i> : OPHO-RUSP- <i>ALRU2 phase</i> .....	102
Oplopanax horridum-Rubus spectabilis- <i>Thuja plicata phase</i> : OPHO-RUSP- <i>THPL phase</i> .....	104
Picea engelmannii/Vaccinium membranaceum: PIEN/VAME.....	106
Vaccinium ovalifolium-Rubus spectabilis/Lysichiton americanum: VAOV-RUSP/LYAM3 .....	108
Thuja plicata/Rubus spectabilis/Lysichiton americanum- Oxalis: THPL/RUSP/LYAM3-OXALI .....	110
Abies amabilis/Vaccinium ovalifolium: ABAM/VAOV .....	112

## COAST RANGE

<b>Coast Range key</b> .....	114
------------------------------	-----

<b>In channel</b> .....	118
Equisetum: EQUIS.....	119
Chrysosplenium glechomifolium: CHGL5 .....	121
Oenanthe sarmentosa: OESA .....	123

<b>Mid-channel bars or channel margin</b> .....	125
Oxalis-Tolmeia menziesii: OXALI-TOME .....	126
Rubus spectabilis-Ribes bracteosum/Chrysosplenium glechomifolium: RUSP-RIBR/CHGL5 .....	128

<b>Active channel shelf/active floodplain/first floodplains</b> .....	130
Rubus spectabilis-Ribes bracteosum group: RUSP-RIBR group...	131
Rubus spectabilis-Ribes bracteosum- <i>Stachys phase</i> : RUSP-RIBR- <i>STACH phase</i> .....	133
Rubus spectabilis-Ribes bracteosum- <i>Tiarella trifoliata phase</i> : RUSP-RIBR- <i>TITR phase</i> .....	135
Oplopanax horridum-Ribes bracteosum: OPHO-RIBR .....	137
Rubus spectabilis/Tolmeia menziesii-Oxalis group: RUSP/TOME-OXALI group .....	139
Rubus spectabilis/Tolmeia menziesii-Oxalis- <i>Mitella ovalis phase</i> : RUSP/TOME-OXALI- <i>MIOV phase</i> .....	141
Rubus spectabilis/Tolmeia menziesii-Oxalis- <i>Polystichum munitum phase</i> : RUSP/TOME-OXALI- <i>POMU phase</i> .....	143

<b>Terraces/steep toeslopes &amp; Steep slide areas</b> .....	145
Corylus cornuta-Acer circinatum/Oxalis: COCO6-ACCI/OXALI.....	146
Rubus spectabilis/Polystichum munitum: RUSP/POMU.....	148
Vaccinium alaskaense-Rubus spectabilis: VAAL-RUSP.....	150
Acer macrophyllum/Corylus cornuta-Rubus spectabilis:	
ACMA3/COCO6-RUSP.....	151
Rubus spectabilis-Acer circinatum: RUSP-ACCI.....	153

**WILLAMETTE VALLEY**

<b>Willamette Valley Key</b> .....	155
(Acer macrophyllum-Alnus)/Urtica dioica:	
(ACMA3-ALNUS)/URDI.....	161
Populus trichocarpa/Equisetum hyemale: POBAT/EQHY.....	162
(Fraxinus latifolia-Populus trichocarpa)Corylus cornuta/	
Hydrophyllum tenuipes: (FRLA-POBAT)/COCO6/HYTE.....	163
<i>Symphoricarpos albus/Urtica dioica group: SYAL/URDI GROUP</i> .	165
Symphoricarpos albus/Urtica dioica- <i>Fraxinus latifolia/Sambucus</i>	
<i>racemosa-Corylus cornuta phase:</i>	
SYAL/URDI-FRLA/SARA2-COCO6 phase.....	166
Symphoricarpos albus/Urtica dioica-( <i>Acer macrophyllum-</i>	
<i>Populus trichocarpa</i> )/ <i>Corylus cornuta phase:</i>	
SYAL/URDI-(ACMA3-POBAT)/COCO6 phase.....	168
Symphoricarpos albus/Urtica dioica-( <i>Acer macrophyllum-</i>	
<i>Populus trichocarpa</i> )/ <i>Oemleria cerasiformis phase:</i>	
SYAL/URDI-(ACMA3-POBAT)/OECE phase.....	170
Fraxinus latifolia/Acer circinatum/Hydrophyllum tenuipes-Urtica	
dioica: FRLA/ACCI/HYTE-URDI.....	172
Hardwood/Rubus spectabilis/Hydrophyllum tenuipes:	
Hardwood/RUSP/HYTE.....	174
(Populus trichocarpa-Fraxinus latifolia)/Rubus spectabilis-	
Symphoricarpos albus:	
(POBAT-FRLA)/RUSP-SYAL.....	176
(Fraxinus latifolia-Quercus garryana)/Symphoricarpos albus:	
(FRLA-QUGA4)/SYAL.....	178
Acer macrophyllum/Symphoricarpos albus: ACMA3/SYAL.....	180
Forested Symphoricarpos albus/Maianthemum stellatum:	
Forested SYAL/MAST4.....	181
Fraxinus latifolia/Symphoricarpos albus/Camassia quamash:	
FRLA/SYAL/CAQU2.....	183
Thuja plicata/Maianthemum stellatum: THPL/MAST4.....	184

## **Introduction to the Streamside Plant Communities**

### **Purpose**

The classification is mainly floristic, that is, it relies on plant species composition and abundance to sort samples into groups. The analysis then explores what conditions the samples have in common. The major descriptors for these conditions are broad bioregional area, elevation, geomorphic surface, soil texture, soil depth, and substrate type.

### **Scope/study area**

The streamside section is divided into the three major regions in Northwest Oregon. For the Westside Cascades and Coast Range, the community descriptions are organized along a geomorphic gradient: stream level, floodplain, terrace, to valley wall. The Willamette Valley section is not divided by geomorphic surfaces.

Sites were selected to represent relatively unmanaged reaches, though clearly overall watershed condition affected channel conditions and disturbance events. Sites with adjacent clearcuts or in stream buffers were not sampled.

Plots were excluded where communities were dominated by non-native species. It is clear that the samples from the Valley represent the rare exceptional remnants, and that the majority of similar geomorphic settings there support more altered, invaded communities.

### **Methods**

Data from several different though similar protocols have been integrated for this classification. Of the 680 plots assigned to streamside plant communities, 441 were in the Cascades, 146 in the Coast, and 93 in the Willamette Valley. Information on some variables is incomplete. This is particularly true for soil data.

The sampling protocols consisted of locating a cluster of plots at a site or else along a transect across a creek. Each plot was chosen to represent a different community/geomorphic surface.

## Plot methods

Variable plot sizes were used to fit geomorphic and community boundaries. For USFS and BLM plots, data included location, environmental factors (elevation, aspect, slope, etc.), geomorphic surface, substrate, and vegetation composition and abundance. Tree sizes and ages were collected for a sub-sample of trees rooted in the plot in some data sets.

## Data analysis

Two-way indicator-species analysis (TWINSPLAN) (Hill 1979) was the primary method in classifying the communities. Because the environmental variables were so inconsistent among the datasets, environmental factors were evaluated qualitatively in refining communities and interpreting relationships between the plant communities and physical settings.

Some species were excluded from the analysis: the epiphyte *Polypodium glychirrizae* (licorice fern), and plants identified in the field to group only (eg willow, grass, carex, composite, etc.). Also, a species was dropped from a plot if it was noted as occurring in that plot only on stumps or logs. Some datasets had limited information on whether tree cover was from trees rooted in the community or simply overhanging it. Where plot information showed that recorded tree cover for a plot was most likely coming from outside the community, the species was dropped from that plot.

Some communities were fairly rare in the sample because they aren't common under undisturbed canopies. Willow types are under represented in the streamside section for this reason, and also because they were sometimes identified only to genus when they were found on plots. However, several more willow types are described in the wetland section.

## **Community descriptions**

Each community description contains:

- table of the most common and abundant species
- plot elevation ranges
- description of the geomorphic environment and soils
- short narrative on plant community
- description of similar types if applicable.



Each community description is titled with scientific name, common name, and PLANTS code from the USDA National Resource Conservation Service PLANTS database (USDA-NRCS 1999). Common names are from local references, especially from Pojar and MacKinnon (1994). Scientific names follow taxonomy consistent with the Oregon Flora Project unofficial 2003 working list, though taxonomy for that project will be finalized with publication of the *Flora of Oregon* (Dr. Scott Sundberg, personal communication, November 18, 2002). For forested communities where the overstory may be either or both of two species, the two species are listed in parentheses. For example (*Alnus rubra*-*Acer macrophyllum*) indicates that *Alnus rubra* and/or *Acer macrophyllum* are found in the community. Sample size and plot origin are noted.

Note that the larger version of the streamside section uses common names in most descriptions. The condensed field guide relies on scientific names, in part to be consistent between the streamside and wetland sections, but also because the scientific names are less ambiguous.

Each community description features a table summarizing the most common species present. The community tables are sorted by layer: overstory trees (>12' tall), tree seedlings (<12 feet tall), shrubs, and herbs. Within each layer, species are sorted by constancy (% of plots within the community which had the species), and then by abundance (typical cover--average cover for the species on those plots where the species occurred). In the Willamette Valley section, trees of all sizes are treated as a single layer. Note that names of exotic species included in the community tables are italicized.

## Geomorphic surfaces

Several geomorphic surface names are used to describe major physical settings. Note that floristics and soils were more closely related than floristics and surface. Since the soil and substrate are directly related to the geomorphic surfaces and their typical disturbances, the surface

<b>GEOMORPHIC SURFACE</b>	<b>CHARACTERISTICS</b>
Sand/gravel bars	Deposits of sands or gravels, often over coarser materials—generally within normal high water line
Cobble bar	Cobble surface generally within or adjacent to stream, on island or bank—under water during normal high flow; generally with shallow sandy soils
Boulder bar	Boulder dominated deposit—at least partially flooded annually; generally with shallow sandy soils, though some old glacial Cascades sites are exceptions
Active/annual floodplain	Flattish surface at or near water level even at low flow—under water during normal high flow
Floodplain	Flat to gently sloping surface subject to fairly frequent floods—soils generally enriched with fines; generally shallow water table
Lower terrace	Flat to gently sloping surface subject to infrequent floods-alluvial or colluvial origin; soils variable
Upper terrace	Elevated flat to gently sloping surface subject to catastrophic flooding only; often present at tributary junctions; generally deep well-drained soils
Steep bank/cutbank	Over-steepened slope with lower margin near active fluvial zone; sometimes slide scars; often unstable;
Valley wall	Generally steep slopes from valley floor to hillside slope break (inner gorge wall)
Toeslope	Gentle to steep slope at base of hillside, often well-watered
Overflow channel/old channel	Side channels active during high flow; often with obvious sub-surface flow

proves to be very important in understanding where and how the communities develop.

Substrate

Silt, sand, gravel, cobble, boulder, and bedrock are common terms in description of soil or substrate. Silts are fine texture, high in moisture and nutrient holding capacity. Sands are gritty, dry, and poor in fertility. Gravels, cobbles, and boulders make up bars and banks. High proportions of such coarse sediments generally indicate excessive drainage and poor moisture conditions during the dry season. Sites with bedrock near the surface often have very poor drainage.

Substrate size classes

Sand	<2 mm	Grainy
Fine gravel	2-24 mm	Pea to marble size
Coarse gravel	24-64 mm	Marble to tennis ball
Cobble	64-256 mm	Tennis ball to basketball
Boulder	256-1096 mm	Basketball and larger
Bedrock	> 1096 mm	Large solid surface

\* Most substrate descriptions in this section combine fine and coarse gravel.

**About keys**

Keys are at the beginning of each section (Cascades, Coast, and Willamette Valley).

Keys are guidelines, not rules. Small constellations of species usually, but not always, occur in combinations and amounts that lend themselves to keys. Invariably, there are exceptions.

Use the key, then look at the description for the community. Does it have the right combination of major species? Does the environment (elevation, geomorphic surface, soil description) seem to fit? Ignore the trees for a moment. Does it have indicators such as *Petasites frigidus*, *Adiantum pedatum*, *Lysichiton americanum*? Does it have shrubs or not? Does it have *Rubus spectabilis* or *Ribes bracteosum*? Both? Which saxifrages (*Tolmeia menziesii*, *Tiarella trifoliata*, *Boykinia occidentalis*, *Mitella ovalis*)? More *Athyrium filix-femina* or more *Polystichum munitum*? What about *Oxalis*? Follow the major leads to get to some reasonable choices.

If the plant-oriented key doesn't seem to lead to the right place, use the geomorphic surface as a guide. Look through the community descriptions that fit the physical setting for the community. Is it within the normal high water line (within channel)? On cobble bars or channel margins? On terraces or steep banks?

There can be groups of species which co-occur as indicators. The key may have a lead that says, "if the sum of Species A, B, and C is greater than species X...". In the field, you may have one or two of A, B, and C, and they may be about the same as species X. This sort of variability can be expected. If the rest of the community description fits your site, then this choice is reasonable.

The tree component seems particularly variable. Where tree names are included in the community name, it shows that most plots had the tree species. However, they also may be absent. The community name should be interpreted as indicating that the community has the potential to include mature trees. Note that with rather small sample sizes, not all of the trees that might occur were recorded. For example, it is very likely that some communities labeled as *Alnus rubra* types or *Acer macrophyllum* types could easily support the other species. Where communities are named as hardwood types, conifers can occur, but are not consistent. If your site has conifers as well as hardwoods, it can still be included in the hardwood type.

## Northwest Oregon Westside Cascades

### Cascades key

- A. Herbaceous community, *Petasites frigidus* not dominant herb; rocky substrate within channel
1. *Montia parvifolia* dominant; small patches on bedrock or boulders  
..... **Montia parvifolia** p. 26
  2. *Corydalis aquae-gelidae* dominant; narrow gravel deposits beside cold water channels ..... **Corydalis aquae-gelidae** p. 28
  3. *Mimulus guttatus* dominant; in cobbles or on boulders  
..... **Mimulus guttatus** p. 27
- B. *Petasites frigidus* dominant or codominant herb
1. *Salix sitchensis* an important shrub; point bars or cobble bars within highwater line  
..... **Petasites frigidus-Salix sitchensis phase** p. 31
  2. *Equisetum arvense* present  
..... **Petasites frigidus-Equisetum arvense phase** p. 32
  3. *Ribes bracteosum* a dominant shrub; channel margins  
..... **Ribes bracteosum/Petasites frigidus** p. 41
  4. *Ribes bracteosum* and *Salix sitchensis* absent or minor; sandy cobble or boulder bars/active channel shelves  
..... **Petasites frigidus-Stachys cooleyae** p. 35
- C. *Mitella ovalis* and *Boykinia occidentalis* both present; channel margins ..... **Boykinia occidentalis-Mitella ovalis** p. 37
- D. *Tiarella trifoliata* dominant herb, shrubs absent or trace; channel margins ..... **Tiarella trifoliata** p. 39
- E. *Oxalis* dominant, with *Hydrophyllum tenuipes*; *Polysticum munitum* and *Athyrium filix-femina* often abundant; *Alnus rubra* overstory may be present; moderate to steep banks  
..... **Oxalis-Hydrophyllum tenuipes** p. 71

- F. *Adiatum pedatum* an important herb; seeps, often steep, rocky banks..... **Adiatum pedatum** p. 96
- G. *Senecio triangularis* and *Heracleum lanatum* and/or *Boykinia major* present; shrubs nearly absent; fine soils, water tables near the surface, moderate to high elevations  
..... **Senecio triangularis-Caltha leptosepala** p. 98

See related communities in herbaceous wetlands key (Christy pp. 204), especially *Calamagrostis canadensis* Association (Christy p. 256), *Caltha leptosepala* ssp. *howellii* Association (Christy p. 259), and *Caltha leptosepala* ssp. *howellii*-*Carex obnupta* Association (Christy p. 260)

- H. *Senecio triangularis*, with *Heracleum lanatum*, *Aster modestus*, and/or *Aconitum columbianum*; shrubs varied; flat to gently sloping cobble bars or active floodplains at mid- to high elevations  
..... **Senecio triangularis-Aster modestus** p. 44

See related communities in herbaceous wetlands key (Christy pp. 204), especially *Senecio triangularis* Association (Christy p. 322)

**For more herb-dominated communities (aquatic beds, emergent marshes, marshes, fens/peatlands, or wet prairies), see herbaceous wetlands key (Christy pp. 204).**

I. *Alnus rubra*/herb communities

1. *Elymus glaucus* dominant under *Alnus rubra*; cobbly floodplains or islands..... **Alnus rubra/Alymus glaucus** p. 46
2. *Claytonia sibirica* and *Tolmeia menziesii* dominant under *Alnus rubra*; active floodplains/cobble bars  
..... **Alnus rubra/Tolmeia menziesii-Claytonia sibirica** p. 50
3. *Oxalis* dominant, with *Hydrophyllum tenuipes*. *Polysticum munitum* and *Athyrium filix-femina* often abundant. *Alnus rubra* overstory may be present; Moderate to steep banks  
..... **Oxalis-Hydrophyllum tenuipes** p. 71
4. *Oxalis* and *Polysticum munitum* co-dominant under variety of tree species; *Acer circinatum* often important, other shrubs minor or absent; steep banks, terraces  
..... **Alnus rubra~Acer macrophyllum/Oxalis** p. 73

5. *Alnus rubra*/*Lysichiton americanus* swamps

- a. *Carex obnupta*  $\geq 5\%$ , dominant or co-dominant with *Lysichiton americanus*  
.....***Alnus rubra*/*Carex obnupta*-*Lysichiton americanus***  
(Christy p. 209)
- b. *Carex obnupta*  $< 5\%$ , *Athyrium filix-femina* may be co-dominant with *Lysichiton americanus*.  
...***Alnus rubra*/*Athyrium filix-femina*-*Lysichiton americanus***  
(Christy p. 208)

J. Shrub communities (may have tree overstories)—not dominated by *Rubus spectabilis* and/or *Ribes bracteosum*

- 1. *Vaccinium ovalifolium*-*Vaccinium alaskaense* dominant or co-dominant
  - a. Two or more members of the moderate to high elevation suite of herbs (*Achlys triphylla*, *Cornus canadensis*, *Linnea borealis*, *Tiarella trifoliata*, *Clintonia uniflora*) represented; active floodplains, banks, cobble bars, moderate to higher elevations  
.....***Vaccinium ovalifolium*** p. 68
  - b. *Rubus spectabilis* an important shrub, mature conifer cover  $< 20\%$ , *Lysichiton americanus* present; poorly drained sites at moderate to higher elevations  
..... ***Vaccinium ovalifolium*-*Rubus spectabilis*/*Lysichiton americanus*** p. 108
  - c. Mature conifer cover  $> 20\%$  and *Abies amabilis* present  $> 5\%$ ; wetland indicators (*Caltha leptosepala*, *Lysichiton americanus*, or *Viola palustris*) present; silver fir zone; alternating hummocks and swales  
.....***Abies amabilis*/*Vaccinium ovalifolium* wetland** p. 112
- 2. *Vaccinium membranaceum* dominant, under *Picea engelmannii* in mountain hemlock zone  
..... ***Picea engelmannii*/*Vaccinium membranaceum*** p. 106
- 3. *Alnus viridis* dominant, often with *Vaccinium ovalifolium* and *Ribes lacustre*, with members of the moderate to high elevation suite of herbs (*Achlys triphylla*, *Cornus canadensis*, *Linnea borealis*, *Tiarella trifoliata*, *Clintonia uniflora*) represented; cobble bars and active floodplains in mid-to upper elevations..... ***Alnus viridis*** p. 66

4. *Rubus parviflorus* among several shrubs with members of the moderate to high elevation suite of herbs (*Achlys triphylla*, *Cornus canadensis*, *Linnea borealis*, *Tiarella trifoliata*, *Clintonia uniflora*) represented, *Rubus spectabilis* minor or absent; low terraces or narrow flats behind cobble levees  
..... **Rubus parviflorus/Achlys triphylla** p. 48
5. *Symphoricarpos albus* dominant, *Rubus spectabilis*  $\geq 5\%$ ; terraces/steep banks  
... **Alnus rubra/Symphoricarpos albus-Rubus spectabilis** p. 82
6. *Corylus cornuta*  $> 5\%$ , often large floodplains and terraces of major rivers  
... **Forested Corylus cornuta/Polystichum munitum** group p. 87
  - a. *Polystichum munitum*  $> Oxalis$   
..... **Corylus cornuta/Polystichum munitum-hardwood phase**  
p. 89
  - b. *Acer circinatum* dominant or co-dominant
    - 1) *Oxalis*  $> Polystichum munitum$ ; *Tsuga heterophylla* often in tree layer  
..... **Corylus cornuta/Polystichum munitum-Tsuga heterophylla/Acer circinatum-Oxalis phase** p. 91
    - 2) *Oxalis* absent, *Polystichum munitum*  $< 5\%$ , *Acer macrophyllum* and *Pseudotsuga menziesii* frequently in tree layer  
..... **Corylus cornuta/Polystichum munitum-Acer macrophyllum/Acer circinatum phase** p. 93
7. *Corylus cornuta*  $\leq 5\%$ , *Tiarella trifoliata*  $\geq 2\%$ ; several tree species in overstory including *Acer macrophyllum*, *Thuja plicata*, *Tsuga heterophylla*; wide terrace/elevated floodplains of large river valleys  
..... **(Acer macrophyllum-Alnus rubra)/Acer circinatum/Tiarella trifoliata** p. 85
8. *Cornus sericea* dominant shrub, herb layer  $> 10\%$  *Lysichiton americanus*  
..... **Cornus sericea/Lysichiton americanus** (Christy p. 226)
9. *Spiraea douglassii* thicket ..... **Spiraea douglassii** (Christy p. 242)



10. Willow communities

- a. *Salix lucida* co-dominant with *Salix sitchensis*, *Lysichiton americanus* swamp  
.....***Salix lucida* ssp. *lasiandra*/*Salix sitchensis*/*Lysichiton americanus*** (Christy p. 240)
- b. *Salix lucida* minor or absent, *Salix sitchensis* dominant, with *Lysichiton americanus* and/or *Carex aquatilis* the dominant herbs..... ***Salix sitchensis* complex** (Christy p. 241)

11. *Thuja plicata* dominant overstory tree, *Lysichiton americanus* dominant herb, *Oxalis* <5%

.....***Thuja plicata*/*Lysichiton americanus*** (Christy p. 220)

K. Shrub layers dominated by *Rubus spectabilis*, *Ribes bracteosum* and/or *Oplopanax horridum*

- 1. *Oplopanax horridum* dominant or co-dominant with *Rubus spectabilis* and/or *Ribes bracteosum*  
.....**Oplopanax horridum-Rubus spectabilis group** p. 99
  - a. *Thuja plicata* overstory  
.....**Oplopanax horridum-Rubus spectabilis-*Thuja plicata* phase** p 104
  - b. *Alnus rubra* and/or *Tsuga heterophylla* dominant tree overstory (*Thuja plicata* minor or absent)  
.....**Oplopanax horridum-Rubus spectabilis-*Alnus rubra* phase** p. 102
  - c. Tree overstory absent  
..... **Oplopanax horridum-Rubus spectabilis-*shrub phase***  
p. 101

2. *Ribes bracteosum* dominant or co-dominant

- a. *Ribes bracteosum* dominant or co-dominant with *Rubus spectabilis*, *Petasites frigidus* or *Stachys cooleyae* the dominant herb; cobble bars/banks, active floodplains  
..... **Ribes bracteosum/Petasites frigidus** p. 41
- b. *Rubus parviflorus* among several shrubs with members of the moderate to high elevation suite of herbs (*Achlys triphylla*, *Cornus canadensis*, *Linna borealis*, *Tiarella trifoliata*, *Clintonia uniflora*) represented, *Rubus spectabilis* minor or absent  
..... **Rubus parviflorus/Achlys triphylla** p. 48
- c. *Oxalis* <3%, *Tolmeia menziesii* >2%; *Alnus rubra* and/or *Acer macrophyllum* often present  
..... **(Alnus rubra-Acer macrophyllum)/Ribes bracteosum-Rubus spectabilis/Tolmeia menziesii** p. 52
- d. *Oxalis* >3%
  - 1) *Oxalis*, *Tiarella trifoliata* and *Mitella ovalis* each >3%  
..... **Ribes bracteosum-Rubus spectabilis/Tiarella trifoliata-Mitella ovalis** p. 60
  - 2) *Mitella ovalis* absent  
..... **Ribes bracteosum-Rubus spectabilis/Oxalis group**  
p. 62
    - a) Tree overstory present, generally *Alnus rubra* and/or *Thuja plicata*  
..... **Ribes bracteosum-Rubus spectabilis/Oxalis Alnus rubra phase** p. 65
    - b) Tree overstory absent or minor  
... **Ribes bracteosum-Rubus spectabilis/Oxalis shrub phase** p. 64

3. *Rubus spectabilis* dominant shrub; *Ribes bracteosum* absent or minor
- a. *Lysichiton americanus* swamps
- 1) *Rubus spectabilis* and *Vaccinium ovalifolium* generally co-dominant shrubs. Other cool, moist indicator shrubs (*Ribes lacustre*, *Alnus incana*, *Viburnum edule*) often present, mature conifer cover <20%, *Lysichiton americanus* present  
..... **Vaccinium ovalifolium-Rubus spectabilis/Lysichiton americanum** p. 108
- 2) *Thuja plicata* in overstory; *Oxalis*  $\geq 5\%$ ; *Ribes bracteosum* can be present  
..... **Thuja plicata/Rubus spectabilis/Lysichiton americanum-Oxalis** p. 110
- b. *Symphoricarpos albus* dominant or co-dominant, *Rubus spectabilis*  $\geq 5\%$ ; terraces/steep banks  
..... **Alnus rubra/Symphoricarpos albus-Rubus spectabilis** p. 82
- c. *Tolmeia menziesii* important herb  
..... **Rubus spectabilis/Tolmeia menziesii group** p. 54
- 1) *Tolmeia menziesii*  $> Oxalis$ ; *Rubus parviflorus* often important; trees absent or minor  
..... **Rubus spectabilis/Tolmeia menziesii-shrub phase** p. 56
- 2) *Alnus rubra* and/or *Acer macrophyllum* in overstory, *Tolmeia menziesii* dominant or codominant with *Oxalis*  
..... **Rubus spectabilis/Tolmeia menziesii-Alnus rubra phase** p. 58

- d. *Oxalis* dominant herb, *Tolmeia menziesii* minor or absent;  
 terrace, banks, floodplains  
 ..... **Rubus spectabilis/Oxalis group** p. 75
- 1) *Thuja plicata* in overstory  
 ..... **Rubus spectabilis/Oxalis-Thuja plicata phase** p. 80
- 2) *Alnus rubra* in overstory  
 ..... **Rubus spectabilis/Oxalis-Alnus rubra phase** p. 78
- 3) Overstory trees minor or absent  
 ..... **Rubus spectabilis/Oxalis-shrub phase** p. 77

***For more shrub-dominated communities (shrub swamps), see  
 shrubland wetlands key (Christy p. 200).***

***For more tree-dominated communities (forested swamps), see  
 forest and woodlands wetlands key (Christy p. 198).***

**In channel plant communities**

Montia parvifolia, MOPA2 ..... p. 26

Mimulus guttatus, MIGU..... p. 27

Corydalis aquae-gelidae, COAQ..... p. 28

Petasites frigidus group, PEFR5 GROUP ..... p. 29

- Petasites frigidus-*Salix sitchensis* phase, PEFR5-SASI2 phase... p. 31
- Petasites frigidus-*Equisetum arvense* phase,  
PEFR5-EQAR phase ..... p. 32

***Montia parvifolia***  
**Streambank springbeauty**  
**MOPA2**

N=4 (MHNF 4)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Shrubs</b>		
Rubus spectabilis	50	2
<b>Herbs</b>		
Montia parvifolia	100	14
Mimulus guttatus	75	3
Oxalis	75	1
Tolmiea menziesii	50	2
Claytonia sibirica	50	2
Galium triflorum	50	1
Polystichum munitum	50	1
Circaea alpina	50	1

**Elevations:** 800 to 2500 feet (average 1550 feet).

**Geomorphic surfaces:** Active channel area

**Substrate/soils:** Occurs as small patches growing in pockets on bedrock or large boulders.

**Community:** The Montia parvifolia community is herb dominated; *Montia parvifolia* with minor amounts of *Mimulus guttatus* and *Oxalis* are typical.

***Mimulus guttatus***  
**Yellow monkeyflower**  
**MIGU**

N=9 (MHNF 8, WNF 1)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Herbs</b>		
<i>Mimulus guttatus</i>	100	22
<i>Epilobium</i> sp.	100	8
<i>Cardamine cordifolia</i>	44	2
<i>Glyceria striata</i>	33	8
<i>Athyrium filix-femina</i>	33	3
<i>Montia parvifolia</i>	33	3
<i>Luzula parviflora</i>	33	2

**Elevations:** 240 to 3800 feet (average 2685 feet).

**Geomorphic surfaces:** Active channel area

**Substrate/soils:** Pockets of sand or silt in cobbles, logs, or boulders.

**Community:** The *Mimulus guttatus* community is a patchy herbaceous type found on boulders or cobbles at or within the high water line. *Mimulus guttatus* is the dominant herb, though fireweeds are also present. Grasses are almost always present (89% constancy), averaging 7% cover. Graminoids are present in 56% of the plots, averaging 5% cover. The surrounding plant series include western hemlock and silver fir.

***Corydalis aquae-gelidae***  
**Cold-water cordyalis**  
**COAQ**

N=3 (MHNF 3)

SPECIES	CONSTANCY %	TYPICAL COVER %
<b>Herbs</b>		
<i>Corydalis aquae-gelidae</i>	100	67
<i>Senecio pseud aureus</i>	67	5
<i>Senecio triangularis</i>	67	2
<i>Aconitum columbianum</i>	67	1
<i>Aster modestus</i>	67	1
<i>Delphinium glareosum</i>	67	1

**Elevations:** 3140 feet to 3170 feet (average 3155 feet).

**Geomorphic surfaces:** Gravel/cobble bars on islands or banks, within a foot of high water line.

**Substrate/soils:** 0 to 2 cm of sands or silts over the coarser fragments.

**Community:** *Corydalis aquae-gelidae* is an herbaceous community of mid- to upper elevations. It is dominated by *Corydalis aquae-gelidae*, which dominates the narrow gravel deposits beside cold water channels. *Alnus incana* and *Physocarpus capitatus* may be present in trace amounts. Adjacent upland plant associations are in the silver fir and western hemlock plant series.

Plot notes from one site measured in mid-July noted that the corydalis was growing in the stream, though the site might be above water level during summer low flow.

*Corydalis aquae-gelidae* is a Sensitive Plant Species for Oregon and Washington. The community is fairly uncommon. All three plots in this sample are from Stone Creek, Bear Springs Ranger District, Mt. Hood NF.



***Petasites frigidus* group**  
**Coltsfoot group**  
**PEFR5 group**

Group description followed by descriptions of two phases: *Petasites frigidus-Salix sitchensis* phase and *Petasites frigidus-Equisetum arvense* phase

N=11 (MHN 11)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-seedlings</b>		
Alnus rubra	64	2
<b>Shrubs</b>		
Salix sitchensis	82	23
Rubus spectabilis	27	3
<b>Herbs</b>		
Petasites frigidus	91	25
Mimulus guttatus	82	2
Equisetum arvense	73	15
Stachys cooleyae	73	3
Grass (unknown)	55	1
Athyrium filix-femina	45	2
Aster modestus	45	1
Tolmiea menziesii	45	1
Oxalis	45	1
Montia parvifolia	45	1
Cinna latifolia	36	1

**Elevations:** 220 to 2280 feet (average 1650 feet).

**Geomorphic surfaces:** Cobble or boulder bars or banks at or below the normal high water line. The surfaces are subject to seasonal high energy flow.

**Substrate/soils:** Sands or gravelly sands in a cobble or boulder matrix with very little accumulation of fine sediments or organic material. They are wet much of the year, but have little moisture or nutrient holding capacity.

**Community:** The Petasites frigidus group is a lower elevation early seral community within the active channel. *Salix*, *Petasites frigidus*, *Equisetum arvense*, and *Oxalis trilliifolia* are common pioneer species on freshly scoured or deposited cobble bars. They are among the riparian species that can be delivered to a site by flood waters and root in an in- or near-channel surface.

**Similar types:** The Petasites frigidus-Salix sitchensis phase and Petasites frigidus-Equisetum arvense phase are similar to the Petasites frigidus-Stachys cooleyae plant community. The Petasites frigidus-Stachys cooleyae type tends to have more active floodplain species (*Ribes bracteosum*, *Stachys cooleyae*, *Athyrium filix-femina*, *Oxalis trilliifolia*), and less *Mimulus guttatus*, a very wet indicator.

***Petasites frigidus-Salix sitchensis* phase**  
**Coltsfoot-Sitka willow phase**  
**PEFR5-SAS12 phase**

N=6 (MHNF 6)

SPECIES	CONSTANCY %	TYPICAL COVER %
<b>Trees-seedlings</b>		
<i>Alnus rubra</i>	50	2
<b>Shrubs</b>		
<i>Salix sitchensis</i>	100	32
<i>Rubus spectabilis</i>	33	4
<b>Herbs</b>		
<i>Petasites frigidus</i>	83	10
<i>Stachys cooleyae</i>	67	5
<i>Mimulus guttatus</i>	67	3
<i>Equisetum arvense</i>	50	1
<i>Oxalis</i>	50	1
<i>Montia parvifolia</i>	50	1
<i>Tolmiea menziesii</i>	50	1

**Elevations:** 220 to 2100 feet (average 1550 feet).

**Geomorphic surfaces:** Cobble bars or lower banks, often point bars, within the normal high water line.

**Substrate/soils:** Sands or gravelly sands in a cobble or boulder matrix. One plot was on bedrock “with some pockets of cobbles, sands, and gravels”. These sites are inundated annually, and have not accumulated fine sediments, organic matter, or litter. They are generally wet for much of the year, but have little moisture or nutrient holding capacity

**Community:** *Petasites frigidus-Salix sitchensis phase* is an early seral community of the active channel area. Young *Alnus rubra* and minor amounts of *Rubus spectabilis* are sometimes found. *Salix sitchensis* dominates the community. *Salix*, *Petasites frigidus*, and *Oxalis trillifolia* are among the riparian species that can be delivered to a site by flood waters and root in an in- or near-channel surface.

***Petasites frigidus- Equisetum arvense* phase**  
**Coltsfoot-common horsetail phase**  
**PEFR5-EQAR phase**

N=5 (MHNF 5)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-seedlings</b>		
Alnus rubra	80	3
<b>Shrubs</b>		
Salix sitchensis	60	6
<b>Herbs</b>		
Petasites frigidus	100	37
Equisetum arvense	100	22
Mimulus guttatus	100	2
Stachys cooleyae	80	3
Unknown grass	80	1
Athyrium filix-femina	60	2
Aster modestus	60	1
Epilobium glaberrimum	40	8
Circaea alpina	40	1
Tolmiea menziesii	40	1
Angelica arguta	40	1
Cinna latifolia	40	1
Montia parvifolia	40	1
Juncus ensifolius	40	Tr
Oxalis	40	Tr

**Elevations:** 1480 to 2280 feet (average 1510 feet).

**Geomorphic surfaces:** Cobble bars (often point bars) at or below normal high water line. The surfaces are subject to seasonal high energy flow.

**Substrate/soils:** Sand pockets in cobbles. These sites do not have developed soils, and have very little accumulations of fine sediments or organic material. They are wet much of the year, but have little moisture or nutrient holding capacity.

**Community:** The *Petasites frigidus-Equisetum arvense* phase is an herbaceous community within the active channel. Minor amounts of *Alnus rubra* seedlings and *Salix sitchensis* frequently occur. Sedges and rushes are generally present (80% constancy), summed cover averaging 4%. *Mimulus guttatus*, particularly, indicates that these sites are very wet much of the year.

*Petasites frigidus* and *Equisetum arvense* are common pioneer species on freshly scoured or deposited cobble bars. *Petasites frigidus* and *Oxalis* often root from pieces deposited during the flood.

**Channel margins-cobble bars/banks**

Petasites frigidus Boykinia occidentalis-Stachys cooleyae,  
PEFR5-STCO14 ..... p. 35

Boykinia occidentalis-Mitella ovalis, BOOC2-MIOV ..... p. 37

Tiarella trifoliata, TITR ..... p. 39

Ribes bracteosum/Petasites frigidus, RIBR/PEFR5 ..... p. 41

***Petasites frigidus-Stachys cooleyae***  
**Coltsfoot-Cooley's betony**  
**PEFR5-STCO14**

N=45 (MHNF 27, WNF 16, EBLM 2)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-seedlings</b>		
Alnus rubra	51	13
Thuja plicata	27	3
<b>Shrubs</b>		
Acer circinatum	40	19
Rubus spectabilis	33	2
Ribes bracteosum	31	2
<b>Herbs</b>		
Petasites frigidus	87	20
Galium triflorum	78	2
Stachys cooleyae	64	10
Claytonia sibirica	58	1
Athyrium filix-femina	56	6
Tolmiea menziesii	56	4
Oxalis	42	5
Mimulus guttatus	36	2
<i>Lactuca muralis</i>	33	1
Montia parvifolia	31	1

**Elevations:** 920 to 3520 feet (average 2,370 feet).

**Geomorphic surfaces:** Sandy cobble bars, boulder bars, and active channel shelves. Surfaces are inundated annually. Height above normal high water averaged <1 foot.

**Substrate/soils:** Undeveloped thin layers of coarse sand over gravels, cobbles, and boulders. Water table depths of 3-40 cm were recorded. Thin silty sand horizons can develop due to presence of large wood trapping the finer sediments. Moisture and nutrient retention are poor, due to limited accumulation of fine sediments and organic matter.

**Community:** *Petasites frigidus-Stachys cooleyae* is the most common Cascades streamside community, although none was found in Salem

BLM plots. This is an herb dominated community which can support very young *Alnus rubra* or *Thuja plicata*, but seldom saplings. There is often an overhanging *Acer circinatum* canopy, but the shrub layer is generally sparse.

**Similar types:** The Petasites frigidus-Stachys cooleyae community is similar to the Petasites frigidus group (Alnus viridis/Petasites frigidus and Petasites frigidus-Equisetum arvense), largely found within the high water line. The Petasites frigidus-Stachys cooleyae type has a wider range of species that can occur on floodplains. It appears to bridge the in-channel and channel margin/active floodplain transition.



***Boykinia occidentalis-Mitella ovalis***  
**Coast boykinia-oval-leaved mitrewort**  
**BOOC2-MIOV**

N=22 (WNF 13, EBLM 5, SBLM 4)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
<i>Alnus rubra</i>	18	37
<b>Trees-seedlings</b>		
<i>Alnus rubra</i>	27	22
<i>Tsuga heterophylla</i>	27	12
<i>Thuja plicata</i>	18	3
<b>Herbs</b>		
<i>Mitella ovalis</i>	100	4
<i>Boykinia occidentalis</i>	95	14
<i>Galium triflorum</i>	91	3
<i>Athyrium filix-femina</i>	64	6
<i>Tolmiea menziesii</i>	55	15
<i>Oxalis</i>	50	12
<i>Stachys</i>	50	11
<i>Carex deweyana</i>	50	11
<i>Adiantum pedatum</i>	50	4
<i>Petasites frigidus</i>	45	7
<i>Lactuca muralis</i>	45	5
<i>Tiarella trifoliata</i>	45	4
<i>Polystichum munitum</i>	41	4
<i>Bromus vulgaris</i>	41	4
<i>Claytonia sibirica</i>	41	1

**Elevations:** 920-3085 feet (average 2,170 feet).

**Geomorphic surfaces:** Cobble and boulder bars and islands, alluvial fans, and lower banks.

**Substrate/soils:** Relatively shallow (average 37 cm), very gravelly horizons over gravels, cobbles and boulders. A horizons are loamy (silt loam, silty clay loams, sandy clay loams, or loamy sand). B horizons are often sandy clay loams or loamy sands.

**Community:** Boykinia occidentalis-Mitella ovalis is an herb dominated community of low to moderate elevations. Stands of *Alnus rubra* saplings occur in some samples. This community is frequently reset by floods and does not support mature conifers or older hardwoods. The shrub layer is sparse. The herb layer is marked by dominance of saxifrages, grasses, and graminoids. Grasses are almost always present (95% constancy), summed cover averaging 21%. Graminoids (sedges or wood-rushes) are present in 81% of the plots, averaging 17% cover.

***Tiarella trifoliata***  
**Foamflower**  
**TITR**

N=3 (WNF 2, MHNF 1)

SPECIES	CONSTANCY %	TYPICAL COVER %
<b>Trees-seedlings</b>		
<i>Tsuga heterophylla</i>	100	5
<b>Shrubs</b>		
<i>Rubus spectabilis</i>	67	1
<b>Herbs</b>		
<i>Tiarella trifoliata</i>	100	13
<i>Galium aparine</i>	100	7
<i>Athyrium filix-femina</i>	100	2
<i>Claytonia sibirica</i>	100	Tr
<i>Anemone deltoidea</i>	67	8
<i>Polystichum munitum</i>	67	6
<i>Circaea alpina</i>	67	5
<i>Tolmiea menziesii</i>	67	3
<i>Mitella ovalis</i>	67	2
<i>Galium triflorum</i>	67	1
<i>Montia parvifolia</i>	67	Tr

**Elevations:** 2740 to 3400 feet (average 3,165 feet).

**Geomorphic surfaces:** Cobble bars, islands and lower banks.

**Substrate/soils:** Coarse sands in a matrix of cobbles.

**Community:** *Tiarella trifoliata* is an herb dominated community of cooler, moderate elevation sites. *Tsuga heterophylla* seedlings were recorded on all plots, but no older trees were present. The shrub layer is nearly absent, though *Rubus spectabilis* may be in trace amounts. The herb layer is marked by dominance of saxifrages and ferns. Two samples were within the silver fir zone. All samples were north of the North Santiam River

**Similar types:** This community is very similar to the Boykinia occidentalis-Mitella ovalis type. The Tiarella trifoliata type is cooler and

more northerly than the lower, warmer *Boykinia occidentalis*-dominated community that was sampled only south of the North Santiam River.

***Ribes bracteosum*/*Petasites frigidus***  
**Stink currant/coltsfoot**  
**RIBR/PEFR5**

N=16 (MHNF 12, WNF 3, SBLM 1)

SPECIES	CONSTANCY %	TYPICAL COVER %
<b>Trees-overstory</b>		
<i>Alnus rubra</i>	19	53
<b>Trees-seedlings</b>		
<i>Alnus rubra</i>	25	8
<i>Thuja plicata</i>	25	2
<b>Shrubs</b>		
<i>Ribes bracteosum</i>	100	31
<i>Rubus spectabilis</i>	75	8
<b>Herbs</b>		
<i>Petasites frigidus</i>	94	20
<i>Athyrium filix-femina</i>	75	3
<i>Galium triflorum</i>	75	1
<i>Stachys cooleyae</i>	63	10
<i>Tolmiea menziesii</i>	56	7
<i>Circaea alpina</i>	56	2
<i>Oxalis</i>	50	5
<i>Claytonia sibirica</i>	44	2
<i>Bromus vulgaris</i>	38	7
<i>Lactuca muralis</i>	31	4

**Elevations:** 1390 to 3000 feet (average 2360 feet).

**Geomorphic surfaces:** Cobble bars and banks, islands, inactive channels, and active floodplains. Inundated annually.

**Substrate/soils:** Pockets of shallow (ave.19cm) sand, gravelly sand, or cobbly sand over gravels and cobbles. Most plots showed <1 cm litter and no organic layer.

**Community:** *Ribes bracteosum*/*Petasites frigidus* is a shrub and herb dominated community of moderate elevations. The canopy is very open, tree cover averaging only 16%. Mature *Alnus rubra* were in only 19% of the plots (canopy heights average 55 feet). Three cohorts of *Alnus* were

aged on one plot (16 years, 20 years, 47 years), suggesting repeated floods. Grasses are present in 75% of the plots (ave. 4% cover). Graminoids occur on 56% of the plots (ave. 9% cover).

The presence of shrubs and some *Alnus* indicate that the surfaces have some stability and are not reset annually. Note the low *Rubus spectabilis* and *Oxalis* cover compared to cobble substrates with more developed soils, and the dominance of the *Petasites frigidus* and *Stachys cooleyae* typical of herb dominated channel margin types.

## **Cobble bars and low floodplains**

Senecio triangularis-Aster modestus, SETR-ASMO3.....	p. 44
Alnus rubra/Alymus glaucus, ALRU2/ELGL.....	p. 46
Rubus parviflorus/Achlys triphylla, RUPA/ACTR .....	p. 48
Alnus rubra/Tolmeia menziesii-Claytonia sibirica, ALRU2/TOME-CLSI2 .....	p. 50
(Alnus rubra-Acer macrophyllum)/Ribes bracteosum-Rubus spectabilis/Tolmeia menziesii, (ALRU2-ACMA3)/ RIBR-RUSP/TOME .....	p. 52
Rubus spectabilis/Tolmeia menziesii group-RUSP/TOME GROUP:..	p. 54
○ Rubus spectabilis/Tolmeia menziesii- <i>shrub phase</i> , RUSP/TOME- <i>shrub phase</i> .....	p. 56
○ Rubus spectabilis/Tolmeia menziesii- <i>Alnus rubra phase</i> , RUSP/TOME- <i>ALRU2 phase</i> .....	p. 58
Ribes bracteosum-Rubus spectabilis/Tiarella trifoliata-Mitella ovalis, RIBR-RUSP/TITR-MIOV .....	p. 60
Ribes bracteosum-Rubus spectabilis/Oxalis group, RIBR-RUSP/OXALI GROUP .....	p. 62
○ Ribes bracteosum-Rubus spectabilis/Oxalis- <i>shrub phase</i> , RIBR-RUSP/OXALI- <i>shrub phase</i> .....	p. 64
○ Ribes bracteosum-Rubus spectabilis/Oxalis- <i>Alnus rubra phase</i> , RIBR-RUSP/OXALI- <i>ALRU2 phase</i> .....	p. 65
Alnus viridis, ALVI5 .....	p. 66
Oval leaved huckleberry, VAOV.....	p. 68

**Senecio triangularis-Aster modestus**  
**Arrowleaf groundsel-great northern aster**  
**SETR-ASMO3**

N=9 (MHNF 8, WNF 1)

SPECIES	CONSTANCY %	TYPICAL COVER %
Trees-overstory		
Picea engelmannii	22	10
<b>Trees-seedlings</b>		
Tsuga heterophylla	56	2
Picea engelmannii	44	2
Shrubs		
Spiraea douglasii	67	2
Alnus incana	56	8
Physocarpus capitatus	56	6
<b>Herbs</b>		
Senecio triangularis	89	9
Heracleum lanatum	89	4
Aster modestus	78	8
Aconitum columbianum	78	6
Vancouveria hexandra	78	4
Stachys cooleyae	78	3
Galium triflorum	78	2
Mertensia paniculata	78	2
Senecio pseudoaureus	67	10
Trautvetteria caroliniensis	56	5
Athyrium filix-femina	56	5
Achlys triphylla	56	2
Tiarella trifoliata var. unifoliata	56	1
Valeriana sitchensis	56	1
Viola glabella	44	3
Cornus unalaschkensis	44	1

**Elevations:** 3120 to 4810 feet (average 3,360 feet).



**Geomorphic surfaces:** Active floodplains, cobble bars, and inactive channels. Slopes were extremely gentle, from 0 to 7%. The community is typically adjacent to the channel, 0 to 2 feet above the stream.

**Substrate/soils:** Shallow silts, sandy silts or mucks over gravels and cobbles. Water tables were generally within 30cm of the surface.

**Community:** Senecio triangularis-Aster modestus is an herb-rich community of flat cobbly surfaces in cool, higher elevations. *Picea engelmannii* can occasionally be found in the overstory. Shrubs are generally present.

Most of the samples came from Stone Creek on the Mt. Hood NF, near Timothy Lake. The Willamette sample came from the Mink Lake Basin in Three Sisters Wilderness. Adjacent upland plant associations ranged from mountain hemlock types, through silver fir associations, to cool western hemlock associations in cold air drainage environments.

***Alnus rubra/Elymus glaucus***  
**Red alder/blue wildrye**  
**ALRU2/ELGL**

N=9 (MH 7, WNF 2)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
Alnus rubra	100	58
<b>Trees-seedlings</b>		
Pseudotsuga menziesii	56	4
Acer macrophyllum	56	1
Alnus rubra	44	36
Thuja plicata	44	1
<b>Shrubs</b>		
Rubus ursinus	67	6
Rubus spectabilis	67	3
<b>Herbs</b>		
Elymus glaucus	100	29
Polystichum munitum	89	3
<i>Lactuca muralis</i>	78	3
Claytonia sibirica	67	11
Tolmiea menziesii	67	5
Athyrium filix-femina	56	1
Equisetum arvense	44	2
<i>Digitalis purpurea</i>	44	2
Stachys cooleyae	44	1
Galium triflorum	44	1
Maianthemum stellatum	44	1

**Elevations:** 1090 feet to 2220 feet (average 1765 feet).

**Geomorphic surfaces:** Cobble floodplains or islands 0-6 feet above normal high waterline (average 2.5 feet).

**Substrate/soils:** 5 to 45 cm of gravelly sands, very fine sand, or silty sands over gravel and/or cobbles. Litter is often washed away by winter flow, and little organic material accumulates on these sites.

**Community:** Alnus rubra/Alymus glaucus is a grassy mid-elevation forested floodplain community of the larger creeks and rivers. The overstory is dominantly *Alnus rubra*, less than 25 years old in the sample. Tree regeneration is often a dense stand of young *Alnus rubra*, but generally includes *Pseudotsuga menziesii* and *Acer macrophyllum*, or *Thuja plicata*. The shrub layer is sparse. Total grass cover in Alnus rubra/Alymus glaucus is the highest among all streamside communities in this section. Geomorphic surface, substrate, lack of soil development, and stand ages indicate that this community is frequently flooded, and is reset every few decades.

**Similar types:** Alnus rubra/Alymus glaucus is similar to Alnus rubra/Rubus spectabilis, but has lower, less constant *Rubus spectabilis* and fewer ferns. It may occur on drier, coarser substrates, perhaps farther away from the water table during the summer.

***Rubus parviflorus/Achlys triphylla***  
**Thimbleberry/Vanilla-leaf**  
**RUPA/ACTR**

N=10 (MHNF 10)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-seedlings</b>		
Taxus brevifolia	60	17
Tsuga heterophylla	60	13
Thuja plicata	50	7
<b>Shrubs</b>		
Rubus parviflorus	100	8
Acer glabrum var. douglasii	70	12
Ribes lacustre	60	12
Berberis nervosa	60	3
Acer circinatum	50	15
Ribes bracteosum	50	10
Rosa pisocarpa	40	5
Paxistima myrsinites	30	3
<b>Herbs</b>		
Achlys triphylla	90	4
Linnaea borealis	50	21
Cornus unalaschensis	50	5
Galium triflorum	50	2
Tiarella trifoliata var. unifoliata	40	3
Trillium ovatum	40	1
Polystichum munitum	30	1
Luzula parviflora	30	1
Epilobium	30	1
Anemone lyallii	30	1
<i>Lactuca muralis</i>	30	1

**Elevations:** 2400 feet to 3680 feet (average 3150 feet).

**Geomorphic surfaces:** Low terraces or narrow flats, often behind cobbly levees and between steep conifer dominated valley walls or toeslopes on one side, and the channel. 0 to 3 feet above normal high water line.

**Substrate/soils:** Shallow silts or sands in a matrix of cobbles.

**Community:** Rubus parviflorus/vanilla-leaf is a shrub community of mid- to higher elevations. Conifer regeneration is plentiful (average 27% cover). Few seedlings appear to reach maturity. Mature trees occur on only 20% of plots. The important shrub species include a mix of upland and riparian species.

Adjacent upland plant associations were in the western hemlock series; most often Western hemlock/rhododendron/Oregon grape. The most common herb species in the Rubus parviflorus/Achlys triphylla community occur in the Western hemlock/rhododendron/Oregon grape upland plant association.

***Alnus rubra/Tolmeia menziesii-Claytonia siberica***  
**Red alder/piggyback plant-Siberian miner's lettuce**  
**ALRU2/TOME-CLSI2**

N=11 (MHNF 9, WNF 2)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
<i>Alnus rubra</i>	100	69
<i>Acer macrophyllum</i>	27	28
<b>Trees-seedlings</b>		
<i>Pseudotsuga menziesii</i>	45	3
<i>Tsuga heterophylla</i>	45	1
<i>Thuja plicata</i>	36	21
<i>Acer macrophyllum</i>	36	17
<b>Shrubs</b>		
<i>Rubus spectabilis</i>	64	4
<i>Rubus parviflorus</i>	36	28
<b>Herbs</b>		
<i>Claytonia sibirica</i>	100	13
<i>Tolmiea menziesii</i>	91	23
<i>Stachys cooleyae</i>	82	3
<i>Lactuca muralis</i>	73	3
<i>Petasites frigidus</i>	73	2
<i>Galium triflorum</i>	73	2
<i>Oxalis</i>	56	3
<i>Athyrium filix-femina</i>	45	9
<i>Dicentra formosa</i>	45	1
<i>Polystichum munitum</i>	36	11
<i>Circaea alpina</i>	36	5
<i>Hydrophyllum tenuipes</i>	36	Tr
<i>Epilobium glaberrimum</i>	36	Tr

**Elevations:** 1390 to 2500 feet (average 1960 feet).

**Geomorphic surfaces:** Cobble or boulder bars, active floodplains, banks, and islands.

**Substrate/soils:** Thin (2-35cm) layers of sands or gravelly sands over sandy cobbles, gravels, and boulders.

**Community:** *Alnus rubra*/Tolmeia menziesii-Claytonia sibirica is an herb-dominated community which occurs under a dense young *Alnus rubra* canopy in moderately low elevations. *Rubus spectabilis* is frequent but not abundant.

Stands are often sapling and pole size *Alnus rubra* (<9" dbh), less than 25 years old. Seedlings from several tree species are common, especially *Thuja plicata*, *Pseudotsuga menziesii*, *Tsuga heterophylla*, and *Acer macrophyllum*. The conifers are not found as overstory trees with this community.

Shallow sands, high ground cover of exposed surface boulders, frequently flooded geomorphic surfaces, and very young *Alnus rubra* stands suggest that this community develops with frequent, fairly high energy flooding. *Rubus spectabilis*-*Ribes bracteosum* communities or similar *Rubus spectabilis* types might develop if these surfaces receive silt deposits and accumulate organic matter in the upper horizons.

**(*Alnus rubra*-*Acer macrophyllum*)/*Ribes bracteosum*-*Rubus spectabilis*/*Tolmiea menziesii*  
 (Red alder-big leaf maple)/stink currant-salmonberry/piggyback  
 plant  
 (ALRU2-ACMA3)/RIBR-RUSP/TOME**

N=14 (MHNF 9, WNF 5)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
<i>Alnus rubra</i>	64	41
<i>Thuja plicata</i>	29	26
<i>Acer macrophyllum</i>	21	52
<b>Trees-seedlings</b>		
<i>Tsuga heterophylla</i>	43	2
<i>Acer macrophyllum</i>	36	4
<b>Shrubs</b>		
<i>Ribes bracteosum</i>	100	24
<i>Rubus spectabilis</i>	79	17
<i>Acer circinatum</i>	36	16
<b>Herbs</b>		
<i>Tolmiea menziesii</i>	100	11
<i>Athyrium filix-femina</i>	79	10
<i>Galium triflorum</i>	79	2
<i>Stachys cooleyae</i>	79	2
<i>Claytonia sibirica</i>	79	2
<i>Oxalis</i>	71	2
<i>Polystichum munitum</i>	57	2
<i>Lactuca muralis</i>	43	1
<i>Hydrophyllum tenuipes</i>	36	7
<i>Circaea alpina</i>	36	6
<i>Montia parvifolia</i>	36	4
<i>Petasites frigidus</i>	36	1

**Elevations:** 800 to 3000 feet (average 2225 feet).



**Geomorphic surfaces:** Cobble bars, boulder bars, and active floodplains. Plots averaged 1.6 feet above average high water line and 15 feet away from the channel.

**Substrate/soils:** Sands to gravelly sands (average 30 cm) over sand in a matrix of cobbles and/or boulders. Note that the similar Alnus rubra/Ribes bracteosum-Rubus spectabilis/Oxalis community generally has soils with more silt in the top horizons.

**Community:** (Alnus rubra-Acer macrophyllum)/Ribes bracteosum-Rubus spectabilis/Tolmeia menziesii is a moderate elevation community. The canopy is most commonly found dominated by *Alnus rubra*, but the same understory occurs under *Acer macrophyllum*, especially on the Willamette NF. In the North Fork Clackamas drainage, *Thuja plicata* can be found in the overstory with the *Alnus rubra*. Overstory trees averaged 30% canopy cover. Canopy height averaged 62 feet. Near-channel geomorphic surfaces, coarse soil texture, and low cover of *Polystichum munitum* and *Oxalis* suggest that this community is reset more frequently than the Ribes bracteosum-Rubus spectabilis/Oxalis-Alnus rubra phase.

***Rubus spectabilis/Tolmiea menziesii* group**  
**Salmonberry/piggyback plant group**  
**RUSP/TOME group**

Group description followed by descriptions of two phases: *Rubus spectabilis/Tolmiea menziesii* –shrub phase, and *Rubus spectabilis/Tolmiea menziesii-Alnus rubra* phase

N=25 (MHNF 16, EBLM 5, WNF 2, SBLM 2)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
Alnus rubra	76	47
Acer macrophyllum	28	29
<b>Trees-seedlings</b>		
Acer macrophyllum	40	5
Alnus rubra	36	12
Tsuga heterophylla	20	7
Thuja plicata	20	2
<b>Shrubs</b>		
Rubus spectabilis	100	24
Rubus parviflorus	44	12
<b>Herbs</b>		
Tolmiea menziesii	92	13
Galium triflorum	76	4
Claytonia sibirica	68	7
Athyrium filix-femina	64	17
Stachys cooleyae	64	7
Oxalis	60	8
Polystichum munitum	56	5
<i>Lactuca muralis</i>	56	3
Petasites frigidus	44	27
Circaea alpina	44	9

**Elevations:** 220 to 4120 feet (average 1875 feet).

**Geomorphic surfaces:** Cobble bars, banks, islands, and annual floodplains. Plots averaged 4 feet above average high water line, and 21 feet from the average high water line.

**Substrate/soils:** Loamy sands in the A horizon (ave. 8 cm) over B horizons (ave. 18cm) of sands mixed with gravel or gravel/cobble. C horizons are also sands with gravels or gravels mixed with cobbles and boulders. Half the pits show buried soils which are exploited by roots. O horizons are 2 to 3 cm thick.

**Community:** The Rubus spectabilis/Tolmeia menziesii group generally has young *Alnus rubra* and/or young *Acer macrophyllum*, but can occur without trees. *Tolmeia menziesii*, *Stachys cooleyae* and *Petasites frigidus* are common in active floodplain/stream bank communities. *Polystichum munitum* and *Oxalis* tend to have lower cover where *Ribes bracteosum* is dominant, as in the closely related *Ribes bracteosum* type: (Alnus rubra-Acer macrophyllum)/Ribes bracteosum-Rubus spectabilis/Tolmeia menziesii. *Polystichum munitum* and *Oxalis* cover are lower in this group overall than in the somewhat similar steep bank/terrace Rubus spectabilis/Oxalis group. Low *Oxalis* and *Polystichum munitum* covers generally are associated with slightly coarser soil textures or shallower soil depths. Dense stands of *Alnus rubra* can reestablish in the loamy sands on top of the gravel/cobble substrate. Often the trees can tap into buried O and A layers.

***Rubus spectabilis*/*Tolmeia menziesii*-shrub phase**  
**Salmonberry/piggyback plant–shrub phase**  
**RUSP/TOME-shrub phase**

N=5 (EBLM 2, SBLM 1, MHNF 1, WNF 1)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Shrubs</b>		
<i>Rubus spectabilis</i>	100	27
<i>Rubus parviflorus</i>	60	12
<i>Acer circinatum</i>	40	8
<b>Herbs</b>		
<i>Athyrium filix-femina</i>	100	29
<i>Galium triflorum</i>	100	6
<i>Tiarella trifoliata</i>	80	9
<i>Circaea alpina</i>	60	19
<i>Tolmiea menziesii</i>	60	18
<i>Boykinia occidentalis</i>	60	16
<i>Petasites frigidus</i>	60	12
<i>Bromus sitchensis</i>	60	7
<i>Lactuca muralis</i>	60	6
<i>Claytonia sibirica</i>	60	5
<i>Bromus vulgaris</i>	40	9
<i>Oxalis</i>	40	8
<i>Mitella ovalis</i>	40	7
<i>Adiantum pedatum</i>	40	6
<i>Carex deweyana</i>	40	5
<i>Stellaria crispa</i>	40	3
<i>Equisetum arvense</i>	40	2
<i>Montia parvifolia</i>	40	2
<i>Anaphalis margaritacea</i>	40	1

**Elevations:** 1050 to 4120 feet (average 2,250 feet).

**Geomorphic surfaces:** Cobble/boulder bars, islands, and annual floodplains.

**Substrate/soils:** Loam or loamy sands in the A horizon (ave. 5 cm) over B horizons (ave. 22 cm) of loamy sand or sand mixed with gravel or

gravel/cobble. C horizons are also sands with gravels or gravels mixed with cobbles and boulders. Some pits show buried soils which are exploited by roots. Development of O horizon 1 to 4 cm thick, as well as the A horizon suggest that although disturbance may be relatively frequent, there is enough time for some soil building processes.

**Community:** Rubus spectabilis/piggybank plant-shrub phase is an herb-dominated community with a strong *Rubus spectabilis* and *Rubus parviflorus* component. Grasses are typically abundant (11% average summed cover and 80% constancy). *Polystichum munitum* and *Oxalis*, markers of deeper, finer substrates and less frequent disturbance, are minor or absent from most of this community.

***Rubus spectabilis/Tolmeia menziesii-Alnus rubra* phase**  
**Salmonberry/piggyback plant-red alder phase**  
**RUSP/TOME-ALRU2 phase**

N=20 (MHNF 15, EBLM 3, SBLM 1, WNF 1)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
<i>Alnus rubra</i>	95	51
<i>Acer macrophyllum</i>	35	29
<b>Trees-seedlings</b>		
<i>Acer macrophyllum</i>	50	6
<i>Alnus rubra</i>	40	13
<b>Shrubs</b>		
<i>Rubus spectabilis</i>	100	25
<i>Rubus parviflorus</i>	40	11
<i>Rubus ursinus</i>	35	11
<b>Herbs</b>		
<i>Tolmiea menziesii</i>	100	13
<i>Claytonia sibirica</i>	70	8
<i>Galium triflorum</i>	70	3
<i>Oxalis</i>	65	8
<i>Polystichum munitum</i>	65	6
<i>Athyrium filix-femina</i>	55	15
<i>Stachys cooleyae</i>	55	4
<i>Lactuca muralis</i>	55	3
<i>Petasites frigidus</i>	40	24
<i>Circaea alpina</i>	40	7

**Elevations:** 220 to 2780 feet (average 1,780 feet).

**Geomorphic surfaces:** Cobble/boulder bars and islands, and active floodplains.

**Substrate/soils:** Loamy sands in the A horizon (ave. 9 cm) over B horizons (ave. 17cm) of sands mixed with gravel or gravel/cobble. C horizons are also sands with gravels or gravels mixed with cobbles and boulders. Some profiles have buried soils which are exploited by roots. Development of O horizon 2 to 5 cm thick, as well as the A horizon suggest that although disturbance may be relatively frequent, there is

enough time for some soil building processes. Deeper soils seem to be associated with tributary junctions and active alluvial fans.

**Community:** The Rubus spectabilis/piggybank plant-*Alnus rubra* phase is a low to moderate elevation community dominated by *Alnus rubra*, sometimes with *Acer macrophyllum*. *Polystichum munitum* is more constant than *Athyrium filix-femina*. *Athyrium filix-femina* also occurs at lower cover in this phase than in the Rubus spectabilis/Tolmeia menziesii-shrub phase. Graminoids (sedges, rushes, woodrush) are common and abundant, occurring on 70% of the plots and averaging 14% summed cover. True grasses occur on 60% of the plots, averaging 24% summed cover.

This community often supports dense stands of *Alnus rubra* that can reestablish in the loamy sands on top of the gravel/cobble substrate. Often the trees can tap into buried O and A layers. Conifer saplings were not observed in the sample, probably due to substrate limitations and disturbance frequency.

***Ribes bracteosum-Rubus spectabilis/Tiarella trifoliata-Mitella ovalis***  
**Stink currant-salmonberry/foamflower-oval-leaved mitrewort**  
**RIBR-RUSP/TITR-MIOV**

N=17 (EBLM 8, SBLM 8, WNF 1)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
Acer macrophyllum	12	24
<b>Trees-seedlings</b>		
Tsuga heterophylla	18	5
<b>Shrubs</b>		
Ribes bracteosum	100	24
Rubus spectabilis	88	27
Vaccinium parvifolium	47	4
<b>Herbs</b>		
Athyrium filix-femina	100	16
Tiarella trifoliata	94	12
Polystichum munitum	88	19
Mitella ovalis	88	8
Oxalis	82	29
Tolmiea menziesii	76	13
Galium triflorum	76	4
Adiantum pedatum	71	7
Carex deweyana	71	2
Blechnum spicant	59	8
Boykinia occidentalis	53	6
Petasites frigidus	53	5
Circaea alpina	47	4
Bromus	41	4
Stellaria crispa	41	2

**Elevations:** 920 to 3400 feet (average 1600 feet).

**Geomorphic surfaces:** Bars, banks, islands, and floodplains.

**Substrate/soils:** Gravels or gravels with cobbles in the A horizon, gravels/cobbles in the B horizon, over cobbles, boulders, or bedrock. A



horizon loamy sands or sandy loams average 11 cm. C, BC, or R horizons generally were found at 33 cm.

**Community:** Ribes bracteosum-Rubus spectabilis/Tiarella trifoliata-Mitella ovalis is a shrub-dominated community mainly of the lower elevations. Very few overstory trees were recorded (24% of plots). Few tree seedlings appear to survive to maturity. The rich herb layer is dominated by ferns and several saxifrages. The herb layer has the highest average cover (81%) among the Cascades *Rubus spectabilis* types. Grasses are almost always present (94% constancy), summed cover averaging 7%. Graminoids (sedges and wood-rush) occur on 76% of the plots, averaging 13% summed cover.

All BLM Ribes bracteosum-Rubus spectabilis group plots are in this community. Diagnostic species for the low elevation Cascades/Cascades foothills include *Boykinia occidentalis*, *Mitella ovalis*, and *Carex deweyana*. *Ribes bracteosum* generally indicates cobbly and thin soiled environments, but the soils have enough fines to support the *Oxalis*. The complement of saxifrages appears to tolerate frequent flooding, as well.

**Similar types:** This community appears to be a lower-elevation analogue of the Ribes bracteosum-Rubus spectabilis/Oxalis group.

***Ribes bracteosum-Rubus spectabilis/Oxalis* group**  
**Stink currant-salmonberry/sorrel group**  
**RIBR-RUSP/OXALI group**

Group description followed by constancy tables only for two phases:  
*Ribes bracteosum-Rubus spectabilis/Oxalis*- shrub phase and *Ribes bracteosum-Rubus spectabilis/Oxalis-Alnus rubra* phase

N= 35 (MHNF 31, WNF 1, SBLM 2, EBLM 1)

SPECIES	CONSTANCY %	TYPICAL COVER %
<b>Trees-overstory</b>		
Alnus rubra	60	29
Thuja plicata	26	16
<b>Trees-seedlings</b>		
Alnus rubra	40	7
Tsuga heterophylla	26	2
<b>Shrubs</b>		
Ribes bracteosum	100	23
Rubus spectabilis	89	21
<b>Herbs</b>		
Oxalis	100	20
Athyrium filix-femina	83	7
Tolmiea menziesii	71	5
Polystichum munitum	63	5
Stachys cooleyae	54	2
Galium triflorum	49	2
Claytonia sibirica	46	1
Circaea alpina	43	2
unknown grass	40	3

**Elevations:** 800-3040 feet (average 2080 feet).

**Geomorphic surfaces:** Bars, banks, islands, and floodplains.

**Substrate/soils:** Poorly developed gravelly soils over cobbles or boulders. Top horizons are silty sands or sandy silts to about 30cm, over extremely cobbly or gravelly sand. Some pits had water tables within 35-50cm, but most were at least 1 meter above the water table during summer low flow.

The plot with the highest *Thuja plicata* component was the only plot where a gley layer was found within a meter of bedrock.

**Community:** The Ribes bracteosum-Rubus spectabilis/Oxalis group most often occurs as the *Alnus rubra*-dominated Ribes bracteosum-Rubus spectabilis/Oxalis-Alnus rubra phase. In the North Fork Clackamas drainage, *Thuja plicata* also is commonly found in the overstory. Where no mature trees are present (Ribes bracteosum-Rubus spectabilis/Oxalis-shrub phase), high shrub cover remained constant, but low shrub cover doubled, and herb cover increased 130%, though understory species composition is the same. *Alnus* canopy is moderate (average 33% cover; average plot canopy height 46'). Logs often act as substrate for upland species not typically rooted in the community.

This community has much less *Polystichum munitum* and *Athyrium filix-femina* than the Rubus spectabilis/Oxalis group, which has more loams, deeper top horizons, and more organic matter and which often has older, larger trees.

***Ribes bracteosum-Rubus spectabilis/Oxalis*-shrub phase**  
**Stink currant-salmonberry/sorrel-shrub phase**  
**RIBR-RUSP/OXALI-shrub phase**

N=13 (MHNF 11, EBLM 1, SBLM 1)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Shrubs</b>		
<i>Ribes bracteosum</i>	100	30
<i>Rubus spectabilis</i>	92	26
<b>Herbs</b>		
<i>Oxalis</i>	100	27
<i>Athyrium filix-femina</i>	92	9
<i>Tolmiea menziesii</i>	69	4
<i>Stachys cooleyae</i>	69	3
<i>Tiarella trifoliata</i>	62	3
<i>Polystichum munitum</i>	54	7
Grass (unknown)	54	5
<i>Galium triflorum</i>	54	3
<i>Corydalis scouleri</i>	46	10
<i>Adiantum pedatum</i>	46	2
<i>Claytonia sibirica</i>	46	1
<i>Circaea alpina</i>	38	2

Only the constancy table is included for this phase, which is extremely similar in occurrence and composition to the *Alnus rubra* dominated phase of the Stink-currant-*Rubus spectabilis*/*Oxalis* group. It seems likely that *Alnus rubra* phase can develop from the shrub-dominated phase, in intervals between stand-resetting floods.

Refer to the *Ribes bracteosum-Rubus spectabilis/Oxalis* group section (above) for a fuller description of the community.

***Ribes bracteosum-Rubus spectabilis/Oxali-Alnus rubra* phase**  
**Stink currant-salmonberry/sorrel-red alder phase**  
**RIBR-RUSP/OXALI-ALRU2 phase**

N=22 (MHNF 19, WNF 2, SBLM 1)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
Alnus rubra	95	29
Thuja plicata	41	16
<b>Trees-seedlings</b>		
Alnus rubra	45	4
<b>Shrubs</b>		
Ribes bracteosum	100	20
Rubus spectabilis	86	18
Acer circinatum	36	9
<b>Herbs</b>		
Oxalis	100	16
Athyrium filix-femina	77	6
Tolmiea menziesii	73	5
Polystichum munitum	68	3
Stachys cooleyae	45	2
Hydrophyllum tenuipes	45	2
Galium triflorum	45	2
Circaea alpina	45	1
Claytonia sibirica	45	1
Petasites frigidus	36	5

Only the constancy table is included for this phase, which is extremely similar in occurrence and composition to the shrub-dominated phase of the Stink-currant-Rubus spectabilis/Oxalis group. It seems likely that Alnus rubra phase can develop from the shrub-dominated phase, in intervals between stand-resetting floods.

Refer to the Ribes bracteosum-Rubus spectabilis/Oxalis group section (above) for a fuller description of the community.

***Alnus viridis***  
**Sitka alder**  
**ALVI5**

N=14 (MHNF 13, WNF 1)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-seedlings</b>		
Tsuga heterophylla	43	12
<b>Shrubs</b>		
Alnus viridis	100	18
Vaccinium ovalifolium	79	14
Ribes lacustre	64	6
Viburnum edule	57	11
Rubus spectabilis	57	4
Ribes bracteosum	43	6
Rubus parviflorus	43	4
Menziesia ferruginea	36	6
Gaultheria ovatifolia	36	2
<b>Herbs</b>		
Achlys triphylla	79	6
Tiarella trifoliata var. unifoliata	71	2
Cornus unalaschensis	64	7
Linnaea borealis	57	12
Athyrium filix-femina	57	7
Streptopus amplexifolius	43	1
Orthilia secunda	36	2
Clintonia uniflora	36	2
Mitella breweri	36	1
Senecio triangularis	36	Tr

**Elevations:** 3270 to 4720 feet (average 3,784 feet).

**Geomorphic surfaces:** Flat to very gently sloping cobble bars, cobbly islands, or active floodplains.

**Substrate/soils:** Shallow layers (generally <20cm) of silt, sand, or silty sand over cobbles or within a cobble matrix. Two plots with deeper (36-52 cm) soils had rhododendron in the shrub layer.

**Community:** The Alnus viridis community is a shrubby mid- to upper-elevation community. It occurs in the upper range of the western hemlock zone, in the silver fir zone, and into the mountain hemlock zone. Cold air drainage effects can be seen in this community. For example, *Tsuga mertensiana* seedlings are found where silver fir associations form the adjacent upland associations. Mature conifers are seldom present. Mature hardwood trees were not recorded in the sample, though *Alnus rubra* seedlings occurred on 28% of the plots.

**Similar types:** The Vaccinium ovalifolium community is very similar in composition and distribution to the Alnus viridis type and could be considered a phase of the same basic community. The Vaccinium ovalifolium community can occur on a wider range of geomorphic surfaces, and occasionally on deeper, poorly drained soils. The Alnus viridis community is more restricted to cobble bars and islands very close to or within the normal high water line.

***Vaccinium ovalifolium***  
**Oval-leaved huckleberry**  
**VAOV**

N=18 (MHNF 14, WNF 2, SBLM 2)

SPECIES	CONSTANCY %	TYPICAL COVER %
<b>Trees-seedlings</b>		
<i>Tsuga heterophylla</i>	56	7
<i>Abies amabilis</i>	39	7
<i>Taxus brevifolia</i>	33	8
<b>Shrubs</b>		
<i>Vaccinium ovalifolium/V. alaskaense</i>	100	18
<i>Ribes lacustre</i>	72	3
<i>Rubus spectabilis</i>	67	11
<i>Menziesia ferruginea</i>	39	10
<i>Sorbus sitchensis</i>	39	4
<i>Ribes bracteosum</i>	33	5
<i>Viburnum edule</i>	33	3
<b>Herbs</b>		
<i>Achlys triphylla</i>	94	6
<i>Cornus unalaschkensis</i>	89	7
<i>Linnaea borealis</i>	56	6
<i>Tiarella trifoliata</i> var. <i>unifoliata</i>	56	5
<i>Clintonia uniflora</i>	56	4
<i>Streptopus amplexifolius</i>	44	1
<i>Athyrium filix-femina</i>	33	9
<i>Boykinia major</i>	33	6
<i>Gymnocarpium dryopteris</i>	33	5
<i>Streptopus lanceolatus</i> var. <i>curvipes</i>	33	2

**Elevations:** 3000 to 4340 feet (average 3,705 feet).

**Geomorphic surfaces:** Active floodplains, banks, and cobble bars.

**Substrate/soils:** Relatively shallow top horizons of silts or silty sands (average 24 cm) in a matrix of cobbles. Exposed bedrock or large boulders were also noted. This community also occurs on deep (>80cm) but poorly drained soils, with silt or silts over sands, and mottling at 25 cm. The latter sites may be related to the *Abies amabilis/Vaccinium*



ovalifolium community, where mature trees are found on well-drained microsites provided by hummocks.

**Community:** The Vaccinium ovalifolium community occurs at higher elevations than similar *Rubus spectabilis*-dominated types. It is generally found in the silver fir zone, but is also found in the upper western hemlock zone. The distribution extends into the mountain hemlock zone. Cold air drainage effects are often evident in this community. Few tree seedlings reach maturity. This community seems to be the higher elevation analogue for the Rubus spectabilis/Oxalis types, considering soils, geomorphic surfaces, and stand structure.

**Similar types:** The Alnus viridis community is very similar in composition and distribution to the Vaccinium ovalifolium type, and could be considered a phase of the same basic community. The Alnus viridis type occurs exclusively adjacent to the channel on shallow silty sands or sands on cobble bars, cobbly floodplains or islands. It does not occur with deeper poorly drained soils.

**Steep banks/terraces**

Oxalis-Hydrophyllum tenuipes, OXALI-HYTE..... p. 71

(Alnus rubra-Acer macrophyllum)/Oxalis,  
(ALRU2-ACMA3)/OXALI ..... p. 73

Rubus spectabilis/Oxalis group, RUSP/OXALI GROUP:..... p. 75

- Rubus spectabilis/Oxalis-*shrub phase*,  
RUSP/OXALI-*shrub phase* ..... p. 77
- Rubus spectabilis/Oxalis-*Alnus rubra phase*,  
RUSP/OXALI-*ALRU2 phase*..... p. 78
- Rubus spectabilis/Oxalis-*Thuja plicata phase*,  
RUSP/OXALI-*THPL phase* ..... p. 80

Alnus rubra/Symphoricarpos albus-Rubus spectabilis,  
ALRU2/SYAL-RUSP ..... p. 82

***Oxalis-Hydrophyllum tenuipes***  
**Sorrel-Pacific waterleaf**  
**OXALI-HYTE**

N=7 (WNF 4, MHNF 1, EBLM 1, SBLM 1)

SPECIES	CONSTANCY %	TYPICAL COVER %
<b>Trees-overstory</b>		
<i>Alnus rubra</i>	14	60
<b>Herbs</b>		
<i>Oxalis</i> ( <i>O. trillifolia</i> )	100	36
<i>Hydrophyllum tenuipes</i>	100	5
<i>Galium triflorum</i>	86	2
<i>Polystichum munitum</i>	71	17
<i>Athyrium filix-femina</i>	71	15
<i>Tolmiea menziesii</i>	71	1
<i>Stachys cooleyae</i>	43	14
<i>Adiantum pedatum</i>	43	5
<i>Claytonia sibirica</i>	43	1
<i>Prosartes hookeri</i>	43	1

**Elevations:** 1150 feet to 2600 feet (average 2142 feet).

**Geomorphic surfaces:** Moderate to steep banks, occasionally adjacent to an active channel shelf or active floodplain. Surfaces tend to be steep and above average winter flow. This is a moist bank community, but generally not one subject to yearly scour or deposition.

**Substrate/soils:** Soils ranged from sands mixed with gravels and cobbles, to deeper soils with silty clay loam to silty clay textures in a gravel/cobble matrix. Two soil descriptions noted colluvial materials in the substrates.

**Community:** *Oxalis-Hydrophyllum tenuipes* is a low to moderate elevation herbaceous community. *Alnus rubra* and *Acer macrophyllum* seedlings and saplings are occasionally present. Overhanging conifer cover can be dense. The shrub layer is generally minor, though a thick *Acer circinatum* canopy was recorded on two plots.

**Similar types:** The *Oxalis-Hydrophyllum tenuipes* community is similar to the (*Alnus rubra*-*Acer macrophyllum*)/*Oxalis* type, but without a tree

component. Riparian indicators more common or abundant in the Oxalis-Hydrophyllum tenuipes community include *Athyrium filix-femina* and *Stachys cooleyae*. The herbaceous type may represent similar bank environments, but slightly wetter and/or younger than (Alnus rubra-Acer macrophyllum)/Oxalis.

**(*Alnus rubra*-*Acer macrophyllum*)/*Oxalis*  
 (Red alder-big leaf maple)/Sorrel  
 (ALRU2-ACMA3)/OXALI**

N=16 (MHNF 8, WNF 5, EBLM 3)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
<i>Alnus rubra</i>	56	50
<i>Acer macrophyllum</i>	38	47
<i>Tsuga heterophylla</i>	38	35
<i>Thuja plicata</i>	31	28
<b>Trees-seedlings</b>		
<i>Tsuga heterophylla</i>	38	3
<b>Shrubs</b>		
<i>Acer circinatum</i>	63	20
<i>Rubus ursinus</i>	50	2
<i>Oemleria cerasiformis</i>	38	2
<b>Herbs</b>		
<i>Oxalis</i>	100	27
<i>Polystichum munitum</i>	88	21
<i>Galium triflorum</i>	81	1
<i>Athyrium filix-femina</i>	63	5
<i>Lactuca muralis</i>	56	1
<i>Adiantum pedatum</i>	50	2
<i>Tolmiea menziesii</i>	44	3
<i>Claytonia sibirica</i>	44	1
<i>Corydalis scouleri</i>	38	31
<i>Bromus vulgaris</i>	38	6
<i>Vancouveria hexandra</i>	38	4
<i>Petasites frigidus</i>	38	1

**Elevations:** 920 to 2580 feet (average 1734 feet).

**Geomorphic surfaces:** Steep cobbly or bouldery banks (12-45% slope), or on terraces.

**Substrate/soils:** Soils on the steep banks are shallow loams or silty sands in a matrix of cobbles or boulders. Terrace plots had loamy clay,

silty clay or silts in the top horizons, above clays or sandy clays over cobbles. Deep organic layers were noted on some plots. Soil depths were 45 to 60 cm. Anaerobic conditions were noted for one plot where gleying occurred within the top 20 cm.

**Community:** The (*Alnus rubra*-*Acer macrophyllum*)/*Oxalis* community can occur under a variety of tree species. Hardwood or mixed hardwood-conifer canopies are most common. Typical shrub cover is low, with *Acer circinatum* often the abundant species. *Corydalis scouleri* is an important associated species in this community in the Mt. Hood NF.

Terrace plots had older trees (140-275 years old,). Tree ages and geomorphic surfaces suggest that this environment is not reset often by floods. Bank plots supported younger stands (9-70 years). Some stands had multiple ages which suggest successive non-stand replacement floods.

**Similar types:** The *Oxalis*-*Hydrophyllum tenuipes* community is very similar to the (*Alnus rubra*-*Acer macrophyllum*)/*Oxalis* type, but without the tree component. The herbaceous type may represent similar bank environments, but slightly wetter and/or younger.

***Rubus spectabilis/Oxalis* group**  
**Salmonberry/Sorrel group**  
**RUSP/OXALI group**

Group description followed by descriptions of three phases: *Rubus spectabilis/Oxalis*–shrub phase, *Rubus spectabilis/Oxalis-Alnus rubra* phase, and *Rubus spectabilis/Oxalis-Thuja plicata* phase

N=28 (MHNH 15, EBLM 7, SBLM 4, WNF 2)

SPECIES	CONSTANCY %	TYPICAL COVER %
<b>Trees-overstory</b>		
<i>Alnus rubra</i>	50	43
<i>Thuja plicata</i>	21	48
<b>Shrubs</b>		
<i>Rubus spectabilis</i>	100	21
<i>Vaccinium parvifolium</i>	43	6
<i>Ribes bracteosum</i>	32	2
<b>Herbs</b>		
<i>Oxalis</i>	100	29
<i>Polystichum munitum</i>	89	25
<i>Athyrium filix-femina</i>	64	14
<i>Galium triflorum</i>	54	3
<i>Claytonia sibirica</i>	50	3
<i>Adiantum pedatum</i>	43	6
<i>Tolmiea menziesii</i>	43	4
<i>Stachys cooleyae</i>	43	3
<i>Tiarella trifoliata</i>	36	6
<i>Circaea alpina</i>	36	3
<i>Bromus vulgaris</i>	32	4

**Elevations:** 800 to 2740 feet (average 1667feet).

**Geomorphic surfaces:** Terraces, banks, and floodplains.

**Substrate/soils:** Mt. Hood soil data show most plots had a top layer (average 11cm) of silty sand, sandy silt, sand or silty clay loam over sands in a cobble matrix. Soil data from BLM sites showed that loams (silt loam, loam, silty clay loam, sandy clay loam) formed the A and AB

layer (ave 18cm.). The B layer (aver 41 cm) was most commonly loamy, but ranged from sand to sandy clay. Gravels made up more of the coarse fragments in the A and B horizons than cobbles. All soil pits had cobbles and/or boulders in the R layer.

**Community:** Rubus spectabilis/Oxalis is a moderate elevation community that occurs with *Alnus rubra* (Rubus spectabilis/Oxalis-Alnus rubra phase) and/or *Thuja plicata* (Rubus spectabilis/Oxalis-Thuja plicata phase), but frequently occurs without trees in the overstory (Rubus spectabilis/Oxalis-shrub phase). Shrub and herb composition in all three groups is very similar. Among *Rubus spectabilis* communities, Rubus spectabilis/Oxalis occurs on soils with deeper organic layers and finer size fractions, smaller coarse fragments, and deeper soils. The sites are more fertile and with higher moisture availability. Older tree ages as well as smaller coarse fragment sizes and finer soil textures suggest that these sites have less frequent disturbance and slower water during floods. Multiple tree ages on some sites may indicate flooding which does not necessarily remove existing trees.



***Rubus spectabilis*/Oxali-shrub phase**  
**Salmonberry/Sorrel-shrub phase**  
**RUSP/OXALI-shrub phase**

N=11 (MHNF 4, SBLM 3, EBLM 3, WNF 2)

SPECIES	CONSTANCY %	TYPICAL COVER %
<b>Trees-overstory</b>		
Tsuga heterophylla	18	15
<b>Trees-seedlings</b>		
Tsuga heterophylla	18	5
<b>Shrubs</b>		
Rubus spectabilis	100	18
Vaccinium parvifolium	45	5
Acer circinatum	36	18
<b>Herbs</b>		
Oxalis	100	32
Polystichum munitum	100	24
Athyrium filix-femina	82	12
Adiantum pedatum	73	5
Galium triflorum	64	2
Claytonia sibirica	55	2
Tiarella trifoliata	36	7
Blechnum spicant	36	6
Bromus vulgaris	36	5
Tolmiea menziesii	36	3
Montia parvifolia	36	2

Only the constancy table is included for this phase, which is extremely similar in occurrence and composition to the *Alnus rubra* dominated phase of the Rubus spectabilis/Oxalis group. It seems likely that *Alnus rubra* phase can develop from the shrub-dominated phase, in intervals between stand-resetting floods.

Refer to the Rubus spectabilis/Oxalis group section (above) for a fuller description of the community.

***Rubus spectabilis*/*Oxalis-Alnus rubra* phase**  
**Salmonberry/sorrel-red alder phase**  
**RUSP/OXALI-ALRU2 phase**

N=11 (MHNF 7, EBLM 4)

SPECIES	CONSTANCY %	TYPICAL COVER %
<b>Trees-overstory</b>		
<i>Alnus rubra</i>	100	53
<b>Trees-seedlings</b>		
<i>Acer macrophyllum</i>	45	3
<i>Thuja plicata</i>	36	2
<i>Tsuga heterophylla</i>	36	1
<b>Shrubs</b>		
<i>Rubus spectabilis</i>	100	22
<i>Vaccinium parvifolium</i>	36	8
<i>Ribes bracteosum</i>	36	3
<b>Herbs</b>		
<i>Oxalis</i>	100	27
<i>Polystichum munitum</i>	73	21
<i>Tolmiea menziesii</i>	55	6
<i>Galium triflorum</i>	55	3
<i>Stachys cooleyae</i>	55	3
<i>Athyrium filix-femina</i>	45	18
<i>Bromus vulgaris</i>	45	4
<i>Adiantum pedatum</i>	36	7
<i>Tiarella trifoliata</i>	36	6
<i>Claytonia sibirica</i>	36	5
<i>Maianthemum stellatum</i>	36	4
<i>Circaea alpina</i>	36	4

Only the constancy table is included for this phase, which is extremely similar in occurrence and composition to the shrub dominated phase of the *Rubus spectabilis*/*Oxalis* group. It seems likely that *Alnus rubra* phase can develop from the shrub-dominated phase, in intervals between stand-resetting floods.

Grasses are generally present (73% constancy), averaging 5% cover. Graminoids occur on 55% of the plots, averaging 6% cover. Refer to the Rubus spectabilis/Oxalis group section (above) for a fuller description of the community.

***Rubus spectabilis*/*Oxalis-Thuja plicata* phase**  
**Salmonberry/sorrel-western redcedar phase**  
**RUSP/OXALI-THPL phase**

N=6 (MHNF 4, EBLM 1, SBLM 1)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
Thuja plicata	100	48
Alnus rubra	33	32
<b>Trees-seedlings</b>		
Tsuga heterophylla	33	1
<b>Shrubs</b>		
Rubus spectabilis	100	24
Vaccinium parvifolium	50	7
Ribes bracteosum	50	2
Oplopanax horridum	33	1
<b>Herbs</b>		
Oxalis	100	26
Polystichum munitum	100	23
Athyrium filix-femina	67	18
Claytonia sibirica	67	2
Blechnum spicant	50	13
Dicentra formosa	50	10
Circaea alpina	50	4
Stachys cooleyae	50	1
Trillium ovatum	50	Tr
Viola glabella	33	25
Corydalis scouleri	33	23
Hydrophyllum tenuipes	33	20
Tiarella trifoliata	33	9
Galium triflorum	33	5
Maianthemum dilatatum	33	4

**Elevations:** 1060 to 2200 feet (average 1750 feet).

**Geomorphic surfaces:** Terraces or islands elevated above normal high water level.

**Substrate/soils:** Generally deeper and finer texture than most *Rubus spectabilis* communities. Top horizons were loams (sandy loam, silt loam) over sandy clay loams to silty clays. Two detailed profile descriptions recorded buried soils, one clearly associated with charcoal and coarse woody material. One pit showed poor drainage: mottling at 25cm and gleying at 55 cm, with water at 70 cm. Another pit had water level at 90 cm. Surface organic layers were shallow to extremely thick (2-40 cm).

**Community:** The *Rubus spectabilis/Oxalis-Thuja plicata phase* has a well developed overstory of *Thuja plicata*, sometimes with *Alnus rubra*. Elevated geomorphic surface, finer soil textures, clay illuviation, and larger tree sizes suggest that these sites, though periodically flooded, have a relatively long interval between major events which reset the stands. One plot note speculated that the *Thuja plicata* appeared to stabilize the surface, though it was still subject to flooding.

***Alnus rubra/Symphoricarpos albus-Rubus spectabilis***  
**Red alder/common snowberry-salmonberry**  
**ALRU2/SYAL-RUSP**

n=2 (MH 2)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
Alnus rubra	100	43
<b>Trees-seedlings</b>		
Alnus rubra	100	1
Acer macrophyllum	50	8
<b>Shrubs</b>		
Symphoricarpos albus	100	43
Rubus spectabilis	100	10
Rubus parviflorus	100	5
Acer circinatum	50	12
Rosa pisocarpa	50	10
Salix sitchensis	50	8
Corylus cornuta	50	7
Salix scouleriana	50	7
Ribes bracteosum	50	2
<b>Herbs</b>		
Pteridium aquilinum	100	13
Stachys cooleyae	100	4
unknown grass	100	3
Corydalis scouleri	50	8
Scirpus microcarpus	50	8
Oxalis	50	3
Heracleum lanatum	50	2
Polystichum munitum	50	2

**Elevations:** 1600 feet.

**Geomorphic surfaces:** Upper banks. Plots were two feet above normal high waterline, and 4 to 10 feet from the waterline.

**Substrate/soils:** Deep very gravelly to cobbly sands. The ground surface was 60-65% litter covering bare ground. Exposed surface rock

(gravel, cobbles, boulders, bedrock) was very low (12% cover) for riparian shrub types.

**Community:** Both plots are from the Salmon River on the Mt. Hood NF. Alder canopy is moderate (15-70%, 30-50' canopy height). The community has one of the densest shrub layers among the Cascades types. The adjacent plant association in the sample was Western hemlock/Oregon Oxalis-NWO Cascades.

This community has a very small sample size. This description is unlikely to describe the range of conditions associated with such habitats. More intensive sampling along the transition between the Willamette Valley/foothills and the Cascades could provide more data on this community which seems to blend the Willamette Valley Symphoricarpos albus-Corylus cornuta type with the Cascades *Rubus spectabilis* groups.

**High terraces/major floodplains**

(*Acer macrophyllum*-*Alnus rubra*)/*Acer circinatum*/*Tiarella trifoliata*,  
ACMA3-ALRU2)/ACCI/TITR ..... p. 85

Forested *Corylus cornuta*/*Polystichum munitum* group,  
Forested COCO6/POMU GROUP: ..... p. 87

- Forested *Corylus cornuta*/*Polystichum munitum*-*hardwood phase*,  
Forested COCO6/POMU-*hardwood phase* ..... p. 89
- Forested *Corylus cornuta*/*Polystichum munitum*—*Tsuga heterophylla*/*Acer circinatum*/*Oxalis phase*,  
Forested COCO6/POMU-TSHE/ACCI/OXALI phase ..... p. 91
- Forested *Corylus cornuta*/*Polystichum munitum*-*Acer macrophyllum*/*Acer circinatum phase*,  
Forested COCO6/POMU-ACMA3/ACCI phase ..... p. 93



**(*Acer macrophyllum*-*Alnus rubra*)/*Acer circinatum*/*Tiarella trifoliata*  
 (Big leaf maple-red alder)/vine maple/foamflower  
 (ACMA3-ALRU2)/ACCI/TITR**

N=9 (WNF 9)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
<i>Acer macrophyllum</i>	67	36
<i>Thuja plicata</i>	56	36
<i>Tsuga heterophylla</i>	56	15
<i>Alnus rubra</i>	44	64
<i>Pseudotsuga menziesii</i>	33	16
<b>Trees-seedlings</b>		
<i>Thuja plicata</i>	78	1
<i>Abies grandis</i>	67	5
<i>Tsuga heterophylla</i>	56	3
<i>Acer macrophyllum</i>	56	3
<b>Shrubs</b>		
<i>Acer circinatum</i>	100	40
<i>Rubus ursinus</i>	89	3
<i>Oemleria cerasiformis</i>	67	8
<b>Herbs</b>		
<i>Polystichum munitum</i>	89	9
<i>Tiarella trifoliata</i>	89	7
<i>Claytonia sibirica</i>	89	1
<i>Athyrium filix-femina</i>	78	10
<i>Tolmiea menziesii</i>	78	7
<i>Galium triflorum</i>	78	2
<i>Hydrophyllum tenuipes</i>	78	2
<i>Asarum caudatum</i>	78	2
<i>Maianthemum stellatum</i>	78	1
<i>Circaea alpina</i>	67	3
<i>Adiantum pedatum</i>	67	3
<i>Bromus vulgaris</i>	67	1

**Elevations:** 2140 to 4220 feet (average 2,520 feet).

**Geomorphic surfaces:** High terraces or wide, elevated floodplains, generally adjacent to or associated with overflow channels. This suggests subsurface flow through the underlying cobble valley fill. One plot is from an intermittent channel in the same area which also suggests seasonal subsurface flow.

**Substrate/soils:** No soil data are available. However, the community composition indicates deep loamy well drained soils capable of supporting trees and thick *Acer circinatum*.

**Community:** (*Acer macrophyllum*-*Alnus rubra*)/*Acer circinatum*/*Tiarella trifoliata* is a mid-elevation forested floodplain community. The overstory generally has *Acer macrophyllum* and/or *Alnus rubra*, with a mixture of conifers. The shrub layer is dominated by *Acer circinatum* over a diverse herb layer. Grasses are almost always present (89% constancy), averaging 4% cover.

**Forested *Corylus cornuta*/*Polystichum munitum* group**  
**Forested California hazel/sword fern group**  
**Forested COCO6/POMU group**

Group description followed by descriptions of three phases: Forested *Corylus cornuta*/*Polystichum munitum*-hardwood phase, Forested *Corylus cornuta*/*Polystichum munitum*-*Tsuga heterophylla*/*Acer circinatum* /*Oxalis* phase, and Forested *Corylus cornuta*/*Polystichum munitum*-*Acer macrophyllum*/*Acer circinatum* phase

N=20 (WNF 18, EBLM 1, Willamette Valley 1)

This constancy table is for the entire group combined. The individual phases are then presented separately.

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
<i>Acer macrophyllum</i>	42	31
<i>Alnus rubra</i>	33	42
<i>Pseudotsuga menziesii</i>	33	25
<i>Calocedrus decurrens</i>	33	12
<b>Trees-seedlings</b>		
<i>Acer macrophyllum</i>	50	3
<b>Shrubs</b>		
<i>Corylus cornuta</i>	100	25
<i>Acer circinatum</i>	92	24
<i>Rubus ursinus</i>	92	4
<i>Vaccinium parvifolium</i>	67	3
<i>Oemleria cerasiformis</i>	58	3
<i>Symphoricarpos albus</i>	42	5

\* Herb species listed on next page.

**Elevations:** 1050 to 2380 feet (average 1444 feet).

**Geomorphic surfaces:** Two variants: one present on upper banks and toeslopes; the other in wide river valleys on old terraces of large rivers below dams.

SPECIES	CONSTANCY %	TYPICAL COVER %
<b>Herbs</b>		
<i>Polystichum munitum</i>	92	27
<i>Oxalis</i>	83	19
<i>Vancouveria hexandra</i>	75	5
<i>Galium triflorum</i>	75	1
<i>Athyrium filix-femina</i>	58	3
<i>Adiantum pedatum</i>	58	2
<i>Adenocaulon bicolor</i>	50	Tr
<i>Maianthemum stellatum</i>	50	Tr
<i>Bromus vulgaris</i>	42	1
<i>Thalictrum occidentale</i>	42	Tr
<i>Stachys cooleyae</i>	42	Tr
<i>Claytonia sibirica</i>	42	Tr

**Substrate/soils:** No soils data are available.

**Community:** This group may be considered a single community, with a variety of tree species over an understory dominated by *Acer circinatum* and *Corylus cornuta*, with the herb layer made up primarily by *Polystichum munitum* and *Oxalis*. Samples come from the low elevation central Willamette NF and Eugene BLM McKenzie Resource Area.

The old terrace locations may be altered by changed flood regimes below dams. In the absence of large flows, the terrace variant could eventually develop a *Tsuga heterophylla*-*Pseudotsuga menziesii* overstory, similar to the other bank/toe slope variant.

**Forested *Corylus cornuta*/*Polystichum munitum*-hardwood phase**  
**Forested California hazel/sword fern-hardwood phase**  
**Forested COCO6/POMU-hardwood phase**

N=6 (WNF 6, from 2 sites)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
Calocedrus decurrens	67	12
Alnus rubra	50	48
Acer macrophyllum	33	40
Pseudotsuga menziesii	33	19
Populus trichocarpa	33	15
Fraxinus latifolia	17	40
Abies grandis	17	12
Thuja plicata	17	3
<b>Trees-seedlings</b>		
Acer macrophyllum	50	4
Thuja plicata	33	4
Fraxinus latifolia	33	1
<b>Shrubs</b>		
Corylus cornuta	100	30
Rubus ursinus	100	6
Acer circinatum	83	22
Symphoricarpos albus	83	5
Oemleria cerasiformis	83	4
<b>Herbs</b>		
Polystichum munitum	100	33
Oxalis	83	10
Bromus vulgaris	83	1
Vancouveria hexandra	67	4
Galium triflorum	67	1
Thalictrum occidentale	67	1
Festuca subulata	67	Tr
Carex deweyana	50	4
Prunella vulgaris	50	Tr
Stachys cooleyae	50	Tr

**Elevations:** 1090 to 1210 feet (average 1150 feet).

**Geomorphic surfaces:** Large flat to gently sloping terraces or abandoned channels in wide river valleys.

**Substrate/soils:** Underlying substrates are generally cobbly. Soils data are not available.

**Community:** Forested *Corylus cornuta*/Polystichum munitum-hardwood phase is a low elevation forested floodplain community sampled on large terraces along the South Fork McKenzie River. The overstory is typically hardwood dominated, but conifers, especially *Calocedrus decurrens*, are also present. Grasses are fairly important (83% constancy), averaging 5% cover.

The Forested *Corylus cornuta*/Polystichum munitum-hardwood phase indicates moister conditions than the *Acer macrophyllum*/*Acer circinatum* phase, but is drier than the *Tsuga heterophylla*/*Acer circinatum*/*Oxalis* phase within the group.

**Similar types:** This community is similar to the Willamette Valley *Symphoricarpos albus*/*Urtica dioica*-*Fraxinus latifolia*/*Sambucus racemosa*-*Corylus cornuta* phase.

**Forested *Corylus cornuta*/*Polystichum munitum*-*Tsuga heterophylla*/*Acer circinatum*/*Oxalis* phase**  
**Forested California hazel/sword fern-western hemlock/vine maple/sorrel phase**  
**Forested COCO6/POMU-TSHE/ACCI/OXALI phase**

N=6 (WNF 5, EBLM 1)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
<i>Tsuga heterophylla</i>	50	38
<i>Acer macrophyllum</i>	50	15
<i>Pseudotsuga menziesii</i>	33	35
<b>Trees-seedlings</b>		
<i>Tsuga heterophylla</i>	67	5
<i>Alnus rubra</i>	50	7
<i>Acer macrophyllum</i>	50	1
<b>Shrubs</b>		
<i>Acer circinatum</i>	100	27
<i>Corylus cornuta</i>	100	15
<i>Vaccinium parvifolium</i>	100	3
<i>Rubus ursinus</i>	83	1
<i>Berberis nervosa</i>	50	3
<i>Rubus parviflorus</i>	50	1

\* Herb species listed on next page.

**Elevations:** 1050 feet to 2380 feet (average 1745 feet).

**Geomorphic surfaces:** Toeslopes, upper banks, and terraces.

**Substrate/soils:** One soil description from a steep valley wall showed a deep silty loam to silty clay soil.

SPECIES	CONSTANCY %	TYPICAL COVER %
<b>Herbs</b>		
Oxalis	83	36
Polystichum munitum	83	15
Vancouveria hexandra	83	8
Athyrium filix-femina	83	4
Adiantum pedatum	83	3
Galium triflorum	83	1
Maianthemum stellatum	83	Tr
Tiarella trifoliata	67	5
Achlys triphylla	67	1
Adenocaulon bicolor	67	Tr
Trillium ovatum	67	Tr
Blechnum spicant	50	2
Linnaea borealis	50	2
Prosartes	50	1
Claytonia sibirica	50	Tr
Anemone deltoidea	50	Tr
<i>Lactuca muralis</i>	50	Tr

**Community:** Forested Corylus cornuta/Polystichum munitum-Tsuga heterophylla/Acer circinatum/Oxalis phase is a lower elevation forested riparian community. Several plots had a well developed conifer overstory, often with mature (41-320 year old) *Tsuga heterophylla* or extremely large *Pseudotsuga menziesii*.

The Forested Corylus cornuta/Polystichum munitum-Tsuga heterophylla/Acer circinatum/Oxalis phase indicates the moistest environments in the group.

**Similar types:** This community is similar to the upland Western hemlock/Oregon Oxalis-NWO Cascades plant association, but the riparian character is marked by the presence of *Alnus rubra*, *Athyrium filix-femina*, *Adiantum pedatum*, and *Blechnum spicant*. *Oxalis trilliifolia*, also a riparian indicator, was noted on several plots.



**Forested *Corylus cornuta*/*Polystichum munitum*-*Acer macrophyllum*/*Acer circinatum* phase**  
**Forested California hazel/sword fern-*big leaf maple*/*vine maple* phase**  
**Forested COCO6/POMU-ACMA3/ACCI phase**

N=8 (WNF 7, Willamette Valley 1)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
<i>Acer macrophyllum</i>	75	39
<i>Pseudotsuga menziesii</i>	63	45
<i>Abies grandis</i>	25	25
<i>Fraxinus latifolia</i>	25	4
<b>Trees-seedlings</b>		
<i>Acer macrophyllum</i>	63	2
<i>Tsuga heterophylla</i>	63	1
<i>Fraxinus latifolia</i>	38	1
<b>Shrubs</b>		
<i>Rubus ursinus</i>	100	4
<i>Acer circinatum</i>	88	45
<i>Corylus cornuta</i>	88	17
<i>Oemleria cerasiformis</i>	50	4
<i>Symphoricarpos albus</i>	50	2
<i>Rubus parviflorus</i>	50	2
<b>Herbs</b>		
<i>Galium triflorum</i>	100	2
<i>Polystichum munitum</i>	88	2
<i>Bromus vulgaris</i>	75	8
<i>Fragaria vesca</i>	63	1
unknown grass	50	11
<i>Synthyris reniformis</i>	50	3
<i>Hypericum perforatum</i>	50	2
<i>Maianthemum stellatum</i>	50	2
<i>Anemone deltoidea</i>	50	1

**Elevations:** 255 feet to 2350 feet (average 1675 feet).

**Geomorphic surfaces:** Old cobbly floodplains, often in wide river valleys with major side channels or overflow channels. Flooding would occur only during major flood events.

**Substrate/soils:** Cobbly. No soils data are available for these samples. Cobbly sites are generally very well drained, with relatively poor water holding capacity.

**Community:** Forested Corylus cornuta/Polystichum munitum-Acer macrophyllum/Acer circinatum phase is a dry shrubby forested community of large streams and rivers at low to moderate elevations. The herb layer is dominated by grasses; summed cover averaged 15% (constancy 88). Many of the species present indicate warm dry environments (*Satureja douglasii*, *Synthyris reniformis*, *Fragaria vesca*, *Symphoricarpos albus*). The adjacent upland plant associations often indicate more mesic conditions. Willamette NF plots are all from the South Fork McKenzie River drainage, within the western hemlock plant series. This is a reversal from the common pattern in forested riparian communities, where the streamside vegetation indicates moister conditions than on the adjacent hillsides.

Forested Corylus cornuta/Polystichum munitum-Acer macrophyllum/Acer circinatum phase is the driest community in the Forested Corylus cornuta/Polystichum munitum group.

**Others (seeps, swamps, wetlands, other)**

Adiatum pedatum, ADPE ..... p. 96

Senecio triangularis-broad-leaved marsh-marigold, SETR-CALE4.... p. 98

Oplopanax horridum-Rubus spectabilis group,  
OPHO-RUSP GROUP: ..... p. 99

- Oplopanax horridum-Rubus spectabilis-*shrub phase*,  
OPHO-RUSP-*shrub phase* ..... p. 101
- Oplopanax horridum-Rubus spectabilis-*Alnus rubra phase*,  
OPHO-RUSP-*ALRU2 phase*..... p. 102
- Oplopanax horridum-Rubus spectabilis-*Thuja plicata phase*,  
OPHO-RUSP-*THPL phase* ..... p. 104

Picea engelmannii/Vaccinium membranaceum, PIEN/VAME ..... p. 106

Vaccinium ovalifolium-Rubus spectabilis/Lysichiton americanum,  
VAOV-RUSP/LYAM3 ..... p. 108

Thuja plicata/Rubus spectabilis/Lysichiton americanum-Oxalis,  
THPL/RUSP/LYAM3-OXALI ..... p. 110

Abies amabilis/Vaccinium ovalifolium, ABAM/VAOV ..... p. 112

***Adiantum pedatum***  
**Maidenhair fern**  
**ADPE**

N=23 (WNF 10, MHNF 7, EBLM 5, SBLM 1)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-seedlings</b>		
Tsuga heterophylla	35	5
<b>Shrubs</b>		
Rubus spectabilis	39	4
<b>Herbs</b>		
Adiantum pedatum	100	23
Polystichum munitum	78	12
Oxalis	65	20
Athyrium filix-femina	65	14
Galium triflorum	61	4
Mitella ovalis	43	5
Vancouveria hexandra	43	5
Tiarella trifoliata	39	5
Claytonia sibirica	39	1
Trillium ovatum	39	1
Blechnum spicant	35	15
Aruncus dioicus	35	9

**Elevations:** 240 to 4620 feet (average 2,030 feet).

**Geomorphic surfaces:** Steep cutbanks and cliffs, averaging over 100% slope, or gentler mossy bedrock surfaces bathed by groundwater or waterfall spray.

**Substrate/soils:** Two general types were found: Some soils were 2 to 5 cm of silt, sand, or clay over bedrock, with soil held together by fern roots and protected by the thick organic layer largely composed of old fern fronds. Other soils were deeper (30 to 100 cm), with saturated layers at 50 to 70 cm, generally over bedrock. Water often is described as flowing over bedrock contact or through cracks or between layers in the rock. Slides are the most likely major disturbance for these surfaces.

**Community:** Adiantum pedatum is an herb-dominated community on steep cutbanks, cliffs, bedrock, and seeps. Shallow soils with saturated horizons and/or bedrock relatively near the surface on steep slopes limit development of the tree component.

***Senecio triangularis-Caltha leptosepala***  
**Arrowleaf groundsel-broad-leaved marsh-marigold**  
**SETR-CALE4**

N=7 (MHNF 4, WNF 2, SBLM 1)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Shrubs</b>		
Vaccinium ovalifolium	29	5
<b>Herbs</b>		
Senecio triangularis	100	19
Caltha leptosepala	57	18
Mimulus guttatus	57	2
Boykinia major	43	7
Calamagrostis canadensis	43	7
Pleuropogon refractus	43	5
Veratrum viride	43	5
Epilobium anagallidifolium	43	5
Stachys cooleyae	43	2
Epilobium glaberrimum	43	1
Saxifraga odontoloma	29	37
Epilobium ciliatum ssp. watsonii	29	19
Trautvetteria caroliniensis	29	4
Carex luzulina	29	2
Castilleja	29	1
Platanthera stricta	29	1

**Elevations:** 3120 to 4420 feet (average 3,720 feet).

**Geomorphic surfaces:** Variable.

**Substrate/soils:** Always in fine textured soil with water very near the surface. Two plots were on steep muck covered bedrock or cobbles by waterfalls or cascades. Two others were in silts over rock by channel margins, while two were in wetlands.

**Community:** Senecio triangularis-broad-leaved marsh-marigold is an herbaceous community of moderate to high elevations, mainly in the silver fir and mountain hemlock zones.

***Oplopanax horridum-Rubus spectabilis* group**  
**Devils club-salmonberry group**  
**OPHO-RUSP group**

Group description followed by descriptions of three phases: *Oplopanax horridum-Rubus spectabilis*-shrub phase, *Oplopanax horridum-Rubus spectabilis-Alnus rubra* phase, and *Oplopanax horridum-Rubus spectabilis-Thuja plicata* phase

N=31 (MHNH 23, WNF 4, EBLM 2, SBLM2)

This constancy table is for the entire group combined.

SPECIES	CONSTANCY %	TYPICAL COVER %
<b>Trees-overstory</b>		
Alnus rubra	42	24
Thuja plicata	23	27
<b>Trees-seedlings</b>		
Tsuga heterophylla	23	1
<b>Shrubs</b>		
Oplopanax horridum	100	31
Rubus spectabilis	77	23
Ribes bracteosum	71	14
<b>Herbs</b>		
Oxalis	87	22
Athyrium filix-femina	84	13
Tolmiea menziesii	68	8
Polystichum munitum	55	7
Galium triflorum	45	2
Maianthemum stellatum	42	2
Claytonia sibirica	42	1
Hydrophyllum tenuipes	39	10

**Elevations:** 920 to 4120 feet (average 2370 feet).

**Geomorphic surfaces:** Two general types of sites: gentle (0-20% slope) cobbly floodplains or stream banks on steep (80-100% slope) seepy cliffs and upper banks. The *Thuja plicata* phase can occupy other environments which suggest sub-surface flow, including wetland perched on a terrace and an adjacent area with subsurface flow, abandoned

beaver sites, a muddy overflow channel, and a mostly saturated mid-channel island.

**Substrate/soils:** Substrates vary, from shallow silty sands over cobbles to deeper soils (silt, silty sands, loams, sandy silts) with cobbly matrix. The finer textured top horizons and deeper soils are more common in the *Alnus rubra* and *Thuja plicata* phases. The group seems strongly associated with wet well-aerated rooting zones.

**Community:** The *Oplopanax horridum*-*Rubus spectabilis* group crosses a wide elevational range in the Cascades. *Alnus rubra* and/or *Thuja plicata* make up the tree layer where present. The shrub layer is dominated by *Oplopanax horridum*. *Rubus spectabilis* and *Ribes bracteosum* are generally present and abundant.

**Similar types:** The *Oplopanax horridum*-*Rubus spectabilis* group is similar to the *Ribes bracteosum*-*Rubus spectabilis*/*Oxalis* group.



***Oplopanax horridum-Rubus spectabilis*-shrub phase**  
**Devils club-salmonberry-*shrub phase***  
**OPHO-RUSP-*shrub phase***

N=14 (MHN 11, WNF 2, EBLM 1)

SPECIES	CONSTANCY %	TYPICAL COVER %
<b>Shrubs</b>		
<i>Oplopanax horridum</i>	100	34
<i>Rubus spectabilis</i>	71	20
<i>Ribes bracteosum</i>	64	10
<b>Herbs</b>		
<i>Oxalis</i>	86	21
<i>Athyrium filix-femina</i>	79	10
<i>Tolmiea menziesii</i>	71	4
<i>Polystichum munitum</i>	57	8
<i>Gymnocarpium dryopteris</i>	50	7
<i>Galium triflorum</i>	50	4
<i>Maianthemum stellatum</i>	36	2
<i>Claytonia sibirica</i>	36	1

**Elevations:** 800 to 4120 feet (average 2354 feet).

**Geomorphic surfaces:** Gentle (0-20% slope) cobbly floodplains and stream banks or on steep (80-100% slope) seepy cliffs and upper banks.

**Substrate/soils:** Substrates vary, from shallow silty sands over cobbles to deeper soils with a cobbly matrix. One site was a rock cliff. The community seems strongly associated with wet well-aerated rooting zones.

**Community:** *Oplopanax horridum-Rubus spectabilis-shrub phase* is a shrub and herb dominated community found across a wide elevation range. *Oplopanax horridum* and *Rubus spectabilis* are the dominant shrubs; *Ribes bracteosum* is also commonly present but at lower cover.

***Oplopanax horridum-Rubus spectabilis-Alnus rubra* phase**  
**Devil's club-salmonberry-red alder phase**  
**OPHO-RUSP-ALRU2 phase**

N=11 (MHNF 9, SBLM 2)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
Alnus rubra	73	24
Tsuga heterophylla	36	20
<b>Shrubs</b>		
Oplopanax horridum	100	32
Rubus spectabilis	82	25
Ribes bracteosum	82	19
Vaccinium ovalifolium/V.alaskaense	45	11
<b>Herbs</b>		
Oxalis	91	20
Athyrium filix-femina	82	13
Hydrophyllum tenuipes	64	6
Tolmiea menziesii	55	9
Polystichum munitum	55	7
Streptopus amplexifolius	45	2
Maianthemum stellatum	45	2
Dicentra formosa	45	2
Claytonia sibirica	45	1
Stachys cooleyae	36	5
Galium triflorum	36	1
Trillium ovatum	36	1

**Elevations:** 1420 to 3190 feet (average 2400').

**Geomorphic surfaces:** Two general types of sites: gentle (2-19% slope) cobbly floodplains and stream banks or on steep (60-100% slope) seepy cliffs and cut banks.

**Substrate/soils:** Substrates vary, from shallow silty sands over cobbles to deeper soils (silt, silty sands, loams, sandy silts) with a cobbly matrix. The finer textured top horizons are somewhat deeper than the *Oplopanax horridum-Rubus spectabilis-shrub phase*. The community seems strongly associated with wet well-aerated rooting zones.

**Community:** Oplopanax horridum-Rubus spectabilis-Alnus rubra phase is a community with a fairly open overstory of *Alnus rubra* and/or *Tsuga heterophylla* over a thick shrub layer. The herb layer is somewhat sparser than similar Oplopanax horridum phases.

Young *Alnus rubra* stands were most common, but *Tsuga heterophylla* up to 110 years were recorded. One low elevation site had a 153 year old *Abies grandis* present. This suggests that these communities are subject to periodic flooding that can be powerful enough to eliminate the overstory trees. However, for some sites, intervals between flooding may be long enough for conifer establishment and growth to sizes which may allow the trees to survive less severe flood events.

**Similar types:** This community could be considered a phase of the Ribes bracteosum-Rubus spectabilis/Oxalis group, but it occurs with species combinations common in higher elevation communities, including *Vaccinium ovalifolium*, *Maianthemum stellatum* and *Steptopus amplexifolius*.

***Oplopanax horridum-Rubus spectabilis-Thuja plicata* phase**  
**Devil's club-salmonberry-western redcedar phase**  
**OPHO-RUSP-THPL phase**

N=6 (MHNF 3, WNF 2, EBLM 1)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
Thuja plicata	100	35
Alnus rubra	67	27
Acer macrophyllum	33	48
Taxus brevifolia	33	8
<b>Trees-seedlings</b>		
Thuja plicata	50	3
<b>Shrubs</b>		
Oplopanax horridum	100	26
Rubus spectabilis	83	21
Ribes bracteosum	67	13
Sambucus racemosa	50	6
<b>Herbs</b>		
Athyrium filix-femina	100	18
Tolmiea menziesii	83	14
Oxalis	83	29
Polystichum munitum	50	8
Hydrophyllum tenuipes	50	3
Maianthemum stellatum	50	3
Galium triflorum	50	2
Claytonia sibirica	50	Tr

**Elevations:** 920 to 2600 feet (average 2035 feet).

**Geomorphic surfaces:** Variable, including a wetland perched on a terrace and an adjacent area with subsurface flow, around abandoned beaver sites, a muddy overflow channel, and a mostly saturated mid-channel island.

**Substrate/soils:** Relatively deep with organic matter accumulating at the surface. Textures were silt loams or silty clay loams over clay, sandy clay or sand. The two sites associated with old beaver activity showed high organic matter mixed with sand in the top horizons over cobbles.

Soil textures and tree ages suggest that erosive flooding may be relatively infrequent. Soils stay wet most of the year.

**Community:** Oplopanax horridum-Rubus spectabilis-Thuja plicata phase is a community with an overstory of *Thuja plicata* and *Alnus rubra* or *Acer macrophyllum*. *Thuja plicata* stands were older than most trees sampled in *Rubus spectabilis* communities, and averaged 32" dbh (range 14-45"). *Alnus rubra* in one stand were over 100 years.

**Similar types:** Thuja plicata/Oplopanax horridum-Rubus spectabilis has more *Oplopanax horridum*, *Ribes bracteosum*, and *Tolmeia menziesii* than Thuja plicata/Rubus spectabilis/Oxalis. It also has less *Polystichum munitum*. Together, these suggest that the *Oplopanax horridum* community is somewhat wetter.

***Picea engelmannii/Vaccinium membranaceum***  
**Engelmann spruce/big huckleberry**  
**PIEN/VAME**

N=3 (WNF 3)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
<i>Picea engelmannii</i>	100	20
<i>Tsuga mertensiana</i>	67	8
<i>Abies lasiocarpa</i>	67	4
<b>Trees-seedlings</b>		
<i>Abies lasiocarpa</i>	100	3
<i>Tsuga mertensiana</i>	67	1
<b>Shrubs</b>		
<i>Vaccinium membranaceum</i>	100	18
<i>Ribes</i>	100	9
<i>Rubus pedatus</i>	67	3
<b>Herbs</b>		
<i>Achlys triphylla</i>	100	5
<i>Clintonia uniflora</i>	100	4
<i>Valeriana sitchensis</i>	100	2
<i>Orthilia secunda</i>	100	1
<i>Trillium ovatum</i>	100	Tr
<i>Tiarella trifoliata</i>	67	3
<i>Mitella breweri</i>	67	3
<i>Athyrium filix-femina</i>	67	3
<i>Viola glabella</i>	67	2
<i>Viola</i>	67	2
<i>Senecio triangularis</i>	67	1
<i>Trisetum cernuum</i>	67	1
<i>Xerophyllum tenax</i>	67	1
<i>Anemone deltoidea</i>	67	1

**Elevations:** 4720 to 4880 feet (average 4805 feet).

**Geomorphic surfaces:** Banks, cobble/boulder bars, and overflow channels, often along intermittent channels

**Substrate/soils:** No soils data are available for these sites.

**Community:** *Picea engelmannii/Vaccinium membranaceum* is a community sampled in the high elevation Mink Lake Basin in the Willamette NF's Three Sisters Wilderness area. Adjacent stands for all three sites are in the Mountain hemlock/*Vaccinium membranaceum/*beargrass plant association. Trees may be rooted in the plots or may overhang the banks and bars. The shrub layer is fairly sparse. The herb layer has species common to the mesic Mountain hemlock/*big leaf huckleberry/queencup beadlily* upland plant association, including *Achlys triphylla*, *Clintonia uniflora*, *Valeriana sitchensis*, and *Orthilia secunda*. However, it also includes low cover of more riparian species such as *Mitella brewerii* and *Athyrium filix-femina*, as well as *Picea engelmannii*. Trees noted on one plot were saplings and poles. These surfaces may be flooded during high winter flow.

***Vaccinium ovalifolium-Rubus spectabilis/Lysichiton americanum***  
**Oval-leaved huckleberry-salmonberry/skunk cabbage**  
**VAOV-RUSP/LYAM3**

N=9 (MHNF 9)

<b>Species</b>	<b>Constancy %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
Alnus rubra	33	48
<b>Trees-seedlings</b>		
Alnus rubra	33	9
Abies amabilis	33	2
<b>Shrubs</b>		
Rubus spectabilis	100	10
Vaccinium ovalifolium	89	20
Ribes bracteosum	56	12
Ribes lacustre	44	3
Alnus incana	33	27
Viburnum edule	33	7
Menziesia ferruginea	33	5
Lonicera involucrata	33	4
<b>Herbs</b>		
Lysichiton americanum	100	8
Tiarella trifoliata var. unifoliata	67	3
Gymnocarpium dryopteris	56	7
Achlys triphylla	56	4
Athyrium filix-femina	56	4
Streptopus lanceolatus var. curvipes	56	4
Streptopus amplexifolius	56	3
Boykinia major	44	12
Cornus unalaschkensis	44	4

**Elevations:** 3000 to 4130 feet (average 3725 feet).

**Geomorphic surfaces:** Inactive side channels or other sites where subsurface flow was noted. One site was in a wetland associated with a lake. Plots averaged less than 5% slope. Most samples are on Lowe Creek, Clackamas Ranger District, Mt. Hood NF.



**Substrate/soils:** Water tables were encountered in all soil pits at depths from 2-65 cm (average 36 cm). Mottles at 10-30 cm were found in a third of the pits. Several sites had muck layers over sandy horizons. Most were relatively deep soils (average 78 cm), with silty sands, sands, or silts over gravels or cobbles. Sandy horizons often overlay horizons of silt or sandy silt.

**Community:** Vaccinium ovalifolium-Rubus spectabilis/Lysichiton americanum is a higher elevation forested swamp community generally found in the silver fir zone. It is a shrub dominated type that can occur under an *Alnus rubra* canopy (average 19 foot canopy height). *Alnus rubra* stands ranged from seedlings/sapling stages to older patches with ages up to 115 years old. One site had *Picea engelmannii* in the overstory.

These sites are too poorly drained for many conifer species. Many of the surfaces are clearly subject to frequent flooding as well.

***Thuja plicata/Rubus spectabilis/Lysichiton americanum/Oxalis*  
Western red cedar/salmonberry/skunk cabbage-sorrel  
THPL/RUSP/LYAM3-OXALI**

N=6 (MHNF 4, SBLM 1, EBLM 1)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
Thuja plicata	67	18
Alnus rubra	50	18
<b>Shrubs</b>		
Rubus spectabilis	83	16
Ribes bracteosum	67	46
Oplopanax horridum	67	2
Sambucus racemosa	50	1
<b>Herbs</b>		
Oxalis	100	19
Lysichiton americanum	100	13
Athyrium filix-femina	100	9
Mitella ovalis	50	8
Dryopteris carthusiana	50	4
Polystichum munitum	50	2

**Elevations:** 1460 to 3600 feet (average 2507 feet).

**Geomorphic surfaces:** Surfaces with subsurface flow adjacent to creeks, old stream channels, stream bank seeps, or in a fen.

**Substrate/soils:** Poorly drained. Mottling or gleying were found at an average of 25 cm. Summer water table was at 15-19 cm. Top horizons were generally silt loams or silty clay loams over silty clays or sandy clays. Few sites had exposed surface coarse fragments. Several sites had mucky top layers.

**Community:** Thuja plicata/Rubus spectabilis/Lysichiton americanum/Oxalis is a forested wetland community in moderate elevations. Overstory trees averaged 33%, though some may have been overhanging this community (84 feet average canopy height). Trees on plots in this community were larger than most other *Rubus spectabilis* types. Site trees ranged from 61 to 96 years old. One plot had *Thuja plicata* with diameters up to 43”.

Poorly drained soils limit this community to species which can be successful with high water tables and occasional flooding, such as *Thuja plicata* and *Lysichiton americanum*.

***Abies amabilis* *Vaccinium ovalifolium***  
**Silver fir/oval-leaved huckleberry**  
**ABAM/VAOV**

N=4 (MHNF 4)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
<i>Abies amabilis</i>	100	18
<i>Chamaecyparis nootkatensis</i>	75	9
<i>Tsuga heterophylla</i>	75	7
<i>Picea engelmannii</i>	50	10
<i>Alnus rubra</i>	50	9
<b>Trees-seedlings</b>		
<i>Abies amabilis</i>	100	5
<i>Tsuga heterophylla</i>	100	2
<i>Chamaecyparis nootkatensis</i>	75	5
<i>Alnus rubra</i>	50	7
<i>Picea engelmannii</i>	50	1
<b>Shrubs</b>		
<i>Vaccinium ovalifolium</i>	100	32
<i>Rhododendron albiflorum</i>	75	11
<i>Ribes lacustre</i>	75	2
<i>Rubus spectabilis</i>	75	1
<i>Viburnum edule</i>	75	Tr
<i>Sorbus sitchensis</i>	50	2
<i>Gaultheria ovatifolia</i>	50	2
<i>Vaccinium membranaceum</i>	50	1
<i>Spiraea douglasii</i>	50	Tr

\* Herb species listed on next page.

**Elevations:** 3040 to 4520 feet (average 4000 feet).

**Geomorphic surfaces:** Flat with forested hummocks, typically found in wetlands along perennial or intermittent channels.

**Substrate/soils:** Deep muck/peat accumulations, with evidence of buried soils. Soils are generally wet, with the water table from 0 to 35 cm.

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Herbs</b>		
Cornus unalaschkensis	100	13
Clintonia uniflora	100	1
Tiarella trifoliata var. unifoliata	75	6
Athyrium filix-femina	75	6
Achlys triphylla	75	6
Caltha leptosepala	50	8
Carex echinata	50	5
Trautvetteria caroliniensis	50	3
Lysichiton americanum	50	2
Valeriana sitchensis	50	2
Viola glabella	50	1
Streptopus amplexifolius	50	1
Viola palustris	50	1

**Community:** *Abies amabilis/Vaccinium ovalifolium* is a wet forested community in the silver fir zone. This is a diverse mixed community of alternating hummocks and swales. Mature trees occur on slightly raised hummocks, often of rooted wood.

The difference between the oldest and youngest site trees on a plot averaged 98 years. In these communities, tree establishment appears to be gradual, occurring either in response to small intermediate disturbances or singly. Major disturbance intervals in this community may be fairly long.

## Northwest Oregon Coast Range

### Coast Range key

A. Herbaceous community within channel-immersion tolerant species present, often grassy and weedy

1. *Chrysosplenium glechomifolium*  $\geq 5\%$   
.....**Chrysosplenium glechomifolium** p.121

2. *Equisetum* present, *Equisetum*  $>$  *Oenanthe sarmentosa*  
..... **Equisetum** p.119

See *Equisetum arvense* for wetland phase (Christy p.296)

3. *Oenanthe sarmentosa* present, *Oenanthe sarmentosa*  $>$  *Equisetum* ..... **Oenanthe sarmentosa** p.123

See *Oenanthe sarmentosa* for wetland phase (Christy p. 312)

B. Herbaceous community at channel margin or mid-channel bar, immersion tolerant species (*Chrysosplenium glechomifolium*, *Oenanthe sarmentosa*, *Mimulus guttatus*) absent. *Oxalis*, *Athyrium filix-femina*, and *Tolmeia menziesii* codominant, *Rubus spectabilis* and *Ribes bracteosum* absent ..... **Oxalis-Tolmeia menziesii** p.126

**For more herb-dominated communities (aquatic beds, emergent marshes, marshes, fens/peatlands, or wet prairies), see herbaceous wetlands key (Christy pp. 204).**

C. Shrub communities; trees may be present (See also D, E and F for special tree communities.)

1. *Corylus cornuta* dominant

a. *Rubus spectabilis* important shrub  
..... **Acer macrophyllum/Corylus cornuta-Rubus spectabilis**  
p. 151

b. *Rubus spectabilis* absent, *Acer circinatum* important shrub  
..... **Corylus cornuta-Acer circinatum/Oxalis** p. 146

2. *Rubus spectabilis* and/or *Ribes bracteosum* >5% or dominant shrubs

a. *Ribes bracteosum* an important shrub

- 1) *Oplopanax horridum* dominant or co-dominant, *Rubus spectabilis* minor or absent  
.....**Oplopanax horridum-Ribes bracteosum** p. 137
- 2) Immersion tolerant species *Chrysosplenium glechomifolium* and/or *Oenanthe sarmentosa* present, at channel margin  
...**Rubus spectabilis-Ribes bracteosum/Chrysosplenium glechomifolium** p. 128
- 3) Immersion tolerant species absent  
..... **Rubus spectabilis-Ribes bracteosum group** p. 131
  - a) *Tiarella trifoliata* > sum of *Stachys*, *Claytonia sibirica* and *Mimulus dentatus*, or sum of the 3 <5%  
..... **Rubus spectabilis-Ribes bracteosum-Tiarella trifoliata phase** p. 135
  - b) Sum of *Stachys*, *Claytonia sibirica* and *Mimulus dentatus* >5%  
..... **Rubus spectabilis-Ribes bracteosum-Stachys phase** p. 133

b. *Rubus spectabilis*>5%, *Ribes bracteosum* minor or absent

- 1) *Vaccinium alaskaense* dominant  
..... **Vaccinium alaskaense-Rubus spectabilis** p. 150
- 2) *Corylus cornuta* dominant or codominant with *Rubus spectabilis*  
.....**Acer macrophyllum/Corylus cornuta-Rubus spectabilis** p. 151
- 3) Sum of *Athyrium filix-femina* and *Tolmeia menziesii*>  
*Polystichum munitum*  
.....**Rubus spectabilis/Tolmeia menziesii-Oxalis group**  
p. 139

- a) *Athyrium filix-femina*>*Polystichum munitum* or *Mitella ovalis*>2%  
 .....**Rubus spectabilis/Tolmeia menziesii-Oxalis-Mitella ovalis phase** p. 141
- b) *Polystichum munitum*>*Athyrium filix-femina*, or *Mitella ovalis* absent  
 .....**Rubus spectabilis/Tolmeia menziesii-Oxalis-Polystichum munitum phase** p. 143
- 4) *Polystichum munitum*>sum of *Athyrium filix-femina* and *Tolmeia menziesii* *Rubus spectabilis* communities on terraces, steep banks, and slides, transitional to upland
  - a) Steep bank/slides, moist indicators (*Stachys*, *Tolmeia menziesii*) absent or very minor  
 ..... **Rubus spectabilis-Acer circinatum** p. 153
  - b) *Stachys* and/or *Tolmeia menziesii* always present  
 ..... **Rubus spectabilis/Polystichum munitum** p. 148
- 3. *Spiraea douglassii* thicket, see *Spiraea douglassii* Association (Christy p. 242)

**D. *Alnus rubra*/*Lysichiton americanum* swamps**

- 1. *Carex obnupta* >=5%, dominant or co-dominant with *Lysichiton americanum*  
 .....***Alnus rubra*/*Carex obnupta*-*Lysichiton americanus***  
 (Christy p. 209)
- 2. *Carex obnupta* <5%, *Athyrium filix-femina* may be co-dominant with *Lysichiton americanum*,  
 ..... ***Alnus rubra*/*Athyrium filix-femina*-*Lysichiton americanus*** (Christy p. 208)

**E. Sitka spruce swamps**

- 1. *Carex obnupta* dominant herb, with *Lysichiton americanum* and *Oenanthe sarmentosa* in wet hollows  
 .....***Picea sitchensis*/*Carex obnupta*-*Lysichiton americanus*** (Christy p. 215)



2. *Lysichiton americanum* swamp, *Carex obnupta* minor or absent, *Cornus sericea* dominant shrub  
..... ***Picea sitchensis/Cornus sericea/Lysichiton americanus*** (Christy p. 216)

F. Willow communities

1. *Salix lucida* co-dominant with *Salix sitchensis*, *Lysichiton americanum* swamp  
..... ***Salix lucida ssp. lasiandra/Salix sitchensis/Lysichiton americanus*** (Christy p. 240)
2. *Salix lucida* minor or absent, *Salix sitchensis* dominant, with *Lysichiton americanum* and/or *Carex aquatalis* var. *dives* the dominant herbs..... ***Salix sitchensis complex*** (Christy p. 241)

***For more shrub-dominated communities (shrub swamps), see shrubland wetlands key (Christy p. 200).***

***For more tree-dominated communities (forested swamps), see forest and woodlands wetlands key (Christy p. 198).***

**In channel:**

Equisetum: EQUIS ..... p. 119

Chrysosplenium glechomifolium: CHGL5 ..... p. 121

Oenanthe sarmentosa: OESA..... p. 123

**Equisetum**  
**Horsetail**  
**EQUIS**

N=7 (SNF 6, EBLM 1)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-seedlings</b>		
Alnus rubra	29	Tr
<b>Shrubs</b>		
Rubus spectabilis	71	1
<b>Herbs</b>		
Equisetum	100	28
Athyrium filix-femina	86	4
Stachys mexicana	86	2
Oxalis trilliifolia	71	9
<i>Digitalis purpurea</i>	71	4
Tolmiea menziesii	71	3
Oenanthe sarmentosa	71	3
Galium triflorum	71	1
<i>Holcus lanatus</i>	57	5
Glyceria striata	57	4
Mimulus moschatus	57	3
<i>Senecio jacobaea</i>	57	2
Mimulus dentatus	57	2
Veronica americana	57	2
<i>Cirsium arvense</i>	57	1
Viola glabella	57	Tr
Carex deweyana	43	4
<i>Stellaria media</i>	43	3
Petasites frigidus	43	2
<i>Rumex obtusifolius</i>	43	2
Scirpus microcarpus	43	2
Claytonia sibirica	43	1
Prunella vulgaris	43	1
Bromus vulgaris	43	1
Stellaria crispa	43	1
<i>Cirsium</i>	43	Tr

Juncus	43	Tr
Chrysosplenium glechomifolium	43	Tr
Polystichum munitum	43	Tr
Cardamine occidentalis	43	Tr

**Elevations:** 30 to 600 feet (average 280 feet).

**Geomorphic surfaces:** Gently sloping sandy gravel/cobble bars within annual flood zone in wide valleys (>100m). Summer low flow is generally within 20 cm. A second setting occurs with beaver dams. These sites are flooded much of the winter.

**Substrate/soils:** Depositional bar sites have pockets or thin layers of sand overlaying coarser alluvium. Beaver dam sites can have fairly deep poorly drained soil. One pit had a water table within 10 cm of the surface and mottling at 36cm, soil textures silt over silt loam. Another site had coarse sand deposited over fine sand, overlying sandy clay, and clay.

**Community:** The Equisetum community is a weedy, grassy community with almost no shrub layer and very low overhanging tree cover. *Alnus rubra* seedlings may be present, but no mature trees are found. Grasses average 27% summed cover; graminoids (sedges, bulrushes) 4% cover. Weeds such as *Phalaris arundinacea* can completely dominate this open, frequently disturbed community. Both settings provide good seedbeds for opportunistic weedy species and species tolerant of flooding.

***Chrysosplenium glechomaefolium***  
**Water-carpet**  
**CHGL5**

N=7 (SNF 5, SBLM 2)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Shrubs</b>		
Rubus spectabilis	86	16
Sambucus racemosa	57	16
<b>Herbs</b>		
<i>Chrysosplenium glechomifolium</i>	100	25
<i>Athyrium filix-femina</i>	100	7
<i>Oxalis</i>	86	18
<i>Tolmiea menziesii</i>	86	13
<i>Oenanthe sarmentosa</i>	71	9
<i>Stachys mexicana</i>	71	4
<i>Mitella ovalis</i>	57	11
<i>Claytonia sibirica</i>	57	10
<i>Poa trivialis</i>	43	54
<i>Urtica dioica</i> ssp. <i>gracilis</i>	43	9
<i>Polystichum munitum</i>	43	6
<i>Mitella caulescens</i>	43	3
<i>Glyceria striata</i>	43	3
<i>Blechnum spicant</i>	43	2
<i>Equisetum</i>	43	2
<i>Bromus vulgaris</i>	43	2
<i>Stellaria crispa</i>	43	2
<i>Mimulus dentatus</i>	43	1
<i>Digitalis purpurea</i>	43	Tr

**Elevations:** 30 to 1440 feet (average 315 feet).

**Geomorphic surfaces:** Often directly adjacent to the channel, in overflow channels, or in a swamp. Most sites are at or just above summer low flow.

**Substrate/soils:** Generally on gravel or cobble substrates. Sandy loams over sands, or sandy clay loams over sandy clays over coarse alluvium. Rooting depth is limited by water or anaerobic conditions near the surface.

**Community:** Chrysosplenium glechomifolium is an herbaceous community occurring on surfaces that are inundated much of the year. Flood tolerant indicators include *Chrysosplenium glechomifolium*, *Oenanthe sarmentosa*, and *Ranunculus repens* var. *repens*. *Rubus spectabilis* and *Sambucus racemosa* can occur in this community, but often provide overhanging cover only. This open, frequently disturbed community has the highest typical cover in grasses of all streamside types in northwest Oregon. It can also be extremely weedy. *Poa trivialis* and *Ranunculus repens* var. *repens* can be dominants on some plots. Giant knotweeds (*Polygonum cuspidatum*, *P. sachalinense*, *P. polystachyum*) can also invade this community.

These sites are too frequently disturbed and under water too long to develop a stable tree and shrub component.

**Oenanthe sarmentosa**  
**Waterparsley**  
**OESA**

N=5 (SNF 5)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
Alnus rubra	20	25
<b>Trees-seedlings</b>		
Alnus rubra	40	Tr
<b>Shrubs</b>		
Rubus spectabilis	80	2
Sambucus racemosa	80	2
Ribes bracteosum	40	1
<b>Herbs</b>		
Oenanthe sarmentosa	100	17
Athyrium filix-femina	100	3
Tolmiea menziesii	80	17
<i>Ranunculus repens var. repens</i>	80	16
Oxalis trilliifolia	60	5
Urtica dioica ssp. gracilis	60	5
<i>Rumex obtusifolius</i>	60	4
Galium triflorum	60	1
<i>Digitalis purpurea</i>	60	Tr
Claytonia sibirica	60	Tr
Agrostis exarata	40	48
Heracleum lanatum	40	38
Scirpus microcarpus	40	13
Glyceria striata	40	5
Mitella ovalis	40	3
Festuca subulata	40	3
Carex deweyana	40	2
<i>Holcus lanatus</i>	40	1
Prunella vulgaris	40	1
Stachys mexicana	40	1
Stellaria crispa	40	Tr

**Elevations:** 30 to 420 feet (average 225 feet).

**Geomorphic surfaces:** Annually flooded sandy bars and islands, or bedrock channel margins.

**Substrate/soils:** Sands to loamy sands or silt loams in cobbles and boulders, saturated, anaerobic conditions in the lower profile, with summer water tables within 45 to 60 cm of the surface.

**Community:** Oenanthe sarmentosa is an herb dominated community, though *Rubus spectabilis* and *Sambucus racemosa* are frequently present at very low cover. Grasses, graminoids, and exotic species are prominent in this open, frequently disturbed type. Grasses average 38% summed cover. Graminoids (sedges, bulrushes) average 18% summed cover. Exotic species are present on every plot, averaging 38% cover.

These surfaces are flooded much of the winter. Disturbance and rooting conditions prevent succession to stable conifer stands. Risk of invasion by aggressive exotic species is high.

The Oenanthe sarmentosa community can be adjacent to the channel, or it can occur above the Equisetum or Chrysosplenium glechomifolium types.



**Mid-channel bars or channel margin:**

Oxalis-Tolmeia menziesii, OXALI-TOME ..... p. 126

Rubus spectabilis-Ribes bracteosum/Chrysosplenium  
glechomifolium, RUSP-RIBR/CHGL5 ..... p. 128

***Oxalis-Tolmeia menziesii***  
**Sorrel-piggyback plant**  
**OXALI-TOME**

N=13 (EBLM 6, SBLM 4, SNF 3)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Shrubs</b>		
Vaccinium parvifolium	46	9
<b>Herbs</b>		
Oxalis	100	32
Athyrium filix-femina	100	17
Tolmiea menziesii	100	16
Polystichum munitum	77	14
Stachys	62	14
Mitella ovalis	54	13
Adiantum pedatum	54	7
Galium triflorum	54	4
Stellaria crispa	54	2
Claytonia sibirica	46	4
Tiarella trifoliata	38	12
unknown grass	38	8
Circaea alpina	38	5

**Elevations:** 100 to 915 feet (average 650 feet).

**Geomorphic surfaces:** Narrow active annual floodplains and steep stream banks.

**Substrate/soils:** Generally fairly shallow, with mottling and/or gleying within 50 cm. Water tables are often within 50 cm. O layers are well developed. A horizons are silt loams or sandy loams. B horizons are sandy clay loams, silty clay loams, or silty sands. Gleyed horizons can be perched above bedrock or cobble/gravel creekbed material. Multiple B horizons in some soil pits are evidence of repeated floods resetting the surfaces.

These active floodplains have well developed soils, but rooting conditions are affected by the shallow water table. The geomorphic surfaces are flooded annually.

**Community:** Oxalis-Tolmeia menziesii is an herbaceous community of low to moderate elevations across the Coast Range. Overhanging deciduous tree canopy is common, although only one plot had an *Alnus rubra* seedling (15 years old). The shrub layer is generally minor.

This community lacks the species such as *Oenanthe sarmentosa* or *Chrysosplenium glechomifolium* which are well adapted to depositional bars frequently under prolonged flooding. The community also had a much lower percentage of grasses and weeds than the in-channel herbaceous communities.

***Rubus spectabilis-Ribes bracteosum/Chrysosplenium  
glechomifolium***  
**Salmonberry-stink currant/water-carpet**  
**RUSP-RIBR/CHGL5**

N=19 (SNF 14, SBLM 4, EBLM 1)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
Alnus rubra	26	69
<b>Shrubs</b>		
Rubus spectabilis	100	22
Ribes bracteosum	84	17
<b>Herbs</b>		
Athyrium filix-femina	95	17
Tolmiea menziesii	95	13
Chrysosplenium glechomifolium	89	10
Oxalis	86	25
Polystichum munitum	74	11
Galium triflorum	68	3
Stachys mexicana	68	2
Oenanthe sarmentosa	63	5
Viola glabella	63	1
Claytonia sibirica	53	2
Mimulus dentatus	47	5
Mitella ovalis	47	3
Mimulus guttatus	47	2
Equisetum	47	1
Blechnum spicant	42	3
Stellaria crispa	42	1
Carex	37	2
Tiarella trifoliata	37	2
Glyceria striata	37	1
Carex deweyana	37	1
Bromus vulgaris	37	1
Cardamine angulata	37	tr

**Elevations:** 50 to 1440 (average 560 feet).

**Geomorphic surfaces:** Mid-channel bars, annual floodplains and stream banks. These sites are flooded much of the winter. Some surfaces were bisected by active or overflow channels.

**Substrate/soils:** Seepy silt-covered bedrock floodplains or gravel-, cobble-, and boulder-bars. Soils varied. The community generally occurs where water is within 70 cm. Annual floodplain plots had sandy loams or loamy sands with mottles or gleying within 60 cm overlaying coarse alluvium or bedrock. Depositional bars had shallow sand layers over cobbles. Sites are most often directly adjacent to the channel. Occasionally, the Equisetum or Chrysosplenium glechomifolium communities can be found between the channel and the Rubus spectabilis-Ribes bracteosum/Chrysosplenium glechomifolium community.

**Community:** The Rubus spectabilis-Ribes bracteosum/Chrysosplenium glechomifolium community is a mid-channel bar or channel-margin type. Overstory *Alnus rubra*, *Acer macrophyllum*, and *Picea engelmannii* 5 to 45 years old, are found on a few plots. Some members of a suite of flood-tolerant indicators are always present, including *Chrysosplenium glechomifolium*, *Oenanthe sarmentosa*, *Mimulus guttatus*, and *Scirpus microcarpus*. Where trees are present, shrub covers are higher and *Polystichum munitum* more common. Where trees are absent, *Petasites frigidus* tends to occur more often.

**Active channel shelf/active floodplain/first floodplains**

Rubus spectabilis-Ribes bracteosum group: RUSP-RIBR GROUP .p. 131

- Rubus spectabilis-Ribes bracteosum-*Stachys phase*:  
RUSP-RIBR-*STACH phase* .....p. 133
- Rubus spectabilis-Ribes bracteosum-*Tiarella trifoliata phase*:  
RUSP-RIBR-*TITR phase* .....p. 135

Oplopanax horridum-Ribes bracteosum: OPHO-RIBR..... p. 137

Rubus spectabilis/Tolmeia menziesii-Oxalis group:  
RUSP/TOME-OXALI GROUP .....p. 139

- Rubus spectabilis/Tolmeia menziesii-Oxalis-*Mitella ovalis phase*:  
RUSP/TOME-OXALI-*MIOV phase* .....p. 141
- Rubus spectabilis/Tolmeia menziesii-Oxalis-*Polystichum munitum phase*: RUSP/TOME-OXALI-*POMU phase* ..... p. 143

***Rubus spectabilis-Ribes bracteosum* group**  
**Salmonberry-stink currant group**  
**RUSP-RIBR group**

Group description followed by descriptions of two phases: *Rubus spectabilis-Ribes bracteosum-Stachys* phase and *Rubus spectabilis-Ribes bracteosum-Tiarella trifoliata* phase.

N=28 (SBLM 14, EBLM 8, SNF 6)

This constancy table is for the entire group combined. The individual phases are then presented separately.

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
Alnus rubra	36	40
<b>Shrubs</b>		
Ribes bracteosum	100	23
Rubus spectabilis	96	48
Acer circinatum	39	15
Sambucus racemosa	36	15
<b>Herbs</b>		
Oxalis	89	22
Athyrium filix-femina	89	10
Tolmiea menziesii	86	18
Polystichum munitum	79	15
Galium triflorum	61	5
Stachys	57	17
Stellaria crispa	46	1
Mimulus dentatus	43	5
Adiantum pedatum	43	3
Claytonia sibirica	43	3
Tiarella trifoliata	36	12
Mitella caulescens	36	9
Circaea alpina	36	5

**Geomorphic surfaces:** Active annual floodplains and cutbanks. Summer water tables are below 50 cm.

**Substrate/soils:** Surfaces are relatively stable, and have well developed A and B horizons under organic layers 3 to 10 cm deep. Buried soils in several plots show that these sites experience major erosion/deposition events. A horizons are loams (ave. 15 cm). B horizons are most often sandy loams (ave. 19 cm), but can be loamy sands to sands.

These sites are frequently flooded, but not often subject to high energy flows that would remove organic material and fines. Many sites accumulated logs that could also slow flood waters and protect vegetation.

**Community:** The Rubus spectabilis-Ribes bracteosum group is very common on active floodplains and banks. *Alnus rubra* or *Acer macrophyllum* can establish and survive moderate disturbances. Shrub competition may reduce tree regeneration. The Rubus spectabilis-Ribes bracteosum-Stachys phase soils are generally coarser and shallower, with more sandy loams and sands in the top horizons. The Rubus spectabilis-Ribes bracteosum-Tiarella trifoliata phase appears to have deeper, more organic-rich and finer textured soils. *Rubus spectabilis* cover is very high in the Tiarella trifoliata phase, averaging 59%.



**Rubus spectabilis-Ribes bracteosum-Stachys phase**  
**Salmonberry-stink currant-betony phase**  
**RUSP-RIBR-*STACH* phase**

N=9 (SBLM 6, EBLM 3)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
Alnus rubra	56	27
<b>Shrubs</b>		
Rubus spectabilis	100	27
Ribes bracteosum	100	20
Sambucus racemosa	44	12
Oplopanax horridum	33	19
<b>Herbs</b>		
Athyrium filix-femina	100	7
Tolmiea menziesii	89	25
Oxalis	89	23
Stachys	89	11
Galium triflorum	89	6
Polystichum munitum	78	15
Mimulus dentatus	78	6
Claytonia sibirica	78	4
Circaea alpina	67	6
Stellaria crispa	67	3
Stachys	56	10
Bromus	56	8
Carex deweyana	56	7
Adiantum pedatum	56	3
Mitella caulescens	44	11
Blechnum spicant	44	5
<i>Digitalis purpurea</i>	44	1
Montia parvifolia	33	10
Chrysosplenium glechomifolium	33	7
Hydrophyllum	33	3
Ranunculus uncinatus	33	2

SPECIES	CONSTANCY %	TYPICAL COVER %
unknown grass	33	2
<i>Cardamine angulata</i>	33	1
<i>Dicentra formosa</i>	33	1

**Elevations:** 320 to 1390feet (average 780 feet).

**Geomorphic surfaces:** Bars, islands, or active floodplains within normal high water line. Some plots were on steep cutbanks with shallow soils.

**Substrate/soils:** Soils tend to be somewhat coarser and shallower than the average for the group, with more sandy loams and sands in the top horizons. A horizons average 11 cm, and B horizons average 14 cm.

**Community:** Rubus spectabilis-Ribes bracteosum-Stachys phase is shrub dominated, with a rich herb layer.

Within the Rubus spectabilis-Ribes bracteosum group, the Rubus spectabilis-Ribes bracteosum-Stachys phase has more consistent *Stachys*, *Claytonia sibirica*, and *Mimulus dentatus*. Average *Rubus spectabilis* cover in the Stachys phase is less than half the average cover in the Tiarella trifoliata phase.

*Alnus rubra* and *Acer macrophyllum* can establish and persist in this community. Deciduous tree ages ranged from 10 to 105 years. No overstory conifers were recorded.

***Rubus spectabilis-Ribes bracteosum-Tiarella trifoliata* phase**  
**Salmonberry-stink currant-foamflower phase**  
**RUSP-RIBR-*TITR* phase**

N=18 (SBLM 7, SNF 6, EBLM 5)

SPECIES	CONSTANCY %	TYPICAL COVER %
<b>Trees-overstory</b>		
Alnus rubra	28	52
<b>Shrubs</b>		
Ribes bracteosum	100	25
Rubus spectabilis	94	63
Acer circinatum	50	16
Sambucus racemosa	33	16
Vaccinium parvifolium	33	3
<b>Herbs</b>		
Oxalis	89	20
Polystichum munitum	83	15
Tolmiea menziesii	83	13
Athyrium filix-femina	83	11
Tiarella trifoliata	50	12
Galium triflorum	44	2
Stachys	39	4
Adiantum pedatum	39	3
Stellaria crispa	39	tr
Hydrophyllum tenuipes	33	5

**Elevations:** 320 to 1540 feet (average 710 feet).

**Geomorphic surfaces:** Active annual floodplains adjacent to the channel, sometimes within normal high water line. This type also occurs in sites such as a large raised alluvial fan at a tributary junction and on steep slopes on very narrow second order streams without a developed valley floor.

**Substrate/soils:** A horizons are loams and silt loams, averaging 20 cm depth. B horizons are sandy loams or silt loams, and average 25 cm depth. The *Rubus spectabilis-Ribes bracteosum-Tiarella trifoliata* phase appears to have deeper, more organic rich, and finer textured soils than the *Stachys* phase.

**Community:** Rubus spectabilis-Ribes bracteosum-Tiarella trifoliata phase has extremely dense shrub cover. *Rubus spectabilis* cover is very high (average 59%) in the Tiarella trifoliata phase, approximately twice the average in the Stachys phase. *Alnus rubra* can establish and persist in this type. Competition from dense *Rubus spectabilis* may reduce tree survival.

***Oplopanax horridum-Ribes bracteosum***  
**Devil's club-stink currant**  
**OPHO-RIBR**

N=3 (SBLM 3)

<b>Species</b>	<b>Constancy %</b>	<b>Typical cover %</b>
<b>Trees-seedlings</b>		
Tsuga heterophylla	33	8
Abies grandis	33	Tr
<b>Shrubs</b>		
Oplopanax horridum	100	57
Ribes bracteosum	100	42
<b>Herbs</b>		
Oxalis	100	50
Athyrium filix-femina	100	25
Adiantum pedatum	100	7
Tiarella trifoliata	100	7
Galium triflorum	67	3
Tolmiea menziesii	67	3
Maianthemum dilatatum	33	30
Bromus	33	20
Blechnum spicant	33	10
Carex deweyana	33	10
Stachys mexicana	33	7
Viola glabella	33	5
unknown grass	33	5
Chrysosplenium glechomifolium	33	3
Oenanthe sarmentosa	33	2
Streptopus amplexifolius	33	2
Thalictrum occidentale	33	2
Mimulus dentatus	33	Tr
Mitella caulescens	33	Tr

**Elevations:** 1120 to 1540 feet (average 1300 feet).

**Geomorphic surfaces:** Annual floodplains and a steep stream bank.

**Substrate/soils:** Organic layers averaged 3 cm, much less than in the *Rubus spectabilis*-*Ribes bracteosum* group. A layers were silty clay loams or loamy sands (average 12 cm), over sandy clay loam or silty clay loam B horizons (average 18 cm). C horizons were sandy clays or sands in cobbles or gravels. Gley layers, indicating anaerobic conditions, were noted in two plots at an average depth of 28 cm. In those two soils, summer water table was found at an average depth of 60 cm.

**Community:** *Oplopanax horridum*-*Ribes bracteosum* is a shrub dominated community. In this small sample, it occurred at moderate elevations on Salem BLM Coast Range lands.

Small sample size limits confidence in the full description of this community. *Rubus spectabilis* did not occur in these plots. However, *Rubus spectabilis* was present on other plots on all three locations. *Oplopanax horridum* can indicate well aerated saturated conditions. *Adiantum pedatum*, always present in these plots, also frequently indicates water flowing through the soil profile for much of the year.

***Rubus spectabilis*/*Tolmeia menziesii*-*Oxalis* group**  
**Salmonberry/piggyback plant-sorrel group**  
**RUSP/TOME-OXALI group**

Group description followed by descriptions of two phases: *Rubus spectabilis*/*Tolmeia menziesii*-*Oxalis*-*Polystichum munitum* phase and *Rubus spectabilis*/*Tolmeia menziesii*-*Oxalis*-*Mitella ovalis* phase  
 N=24 (SNF 15, SBLM 5, EBLM 4)

This constancy table is for the entire group combined. The individual phases are then presented separately.

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
Alnus rubra	38	54
<b>Shrubs</b>		
Rubus spectabilis	100	32
Acer circinatum	42	31
Sambucus racemosa	42	26
Vaccinium parvifolium	42	1
<b>Herbs</b>		
Tolmiea menziesii	100	20
Athyrium filix-femina	100	14
Stachys	92	9
Oxalis	88	35
Polystichum munitum	83	15
Galium triflorum	63	3
Stellaria crispa	63	3
Claytonia sibirica	54	2
Tiarella trifoliata	46	8
Mitella ovalis	42	17
Carex deweyana	42	8
Blechnum spicant	38	6
Adiantum pedatum	38	3
Marah oreganus	38	2
Viola glabella	38	1

**Elevations:** 30 to 1390 feet (average 430 feet).

**Geomorphic surfaces:** Active floodplains, stream banks, and low terraces.

**Substrate/soils:** Depth to water table was 40-94 cm. Gleying is noted in most soil descriptions (ave. 43 cm depth). Several sites had buried soils; one had 5 distinct A horizons. The organic layer averaged 4 cm. A horizons are silt loam, occasionally clay loam or sand. B horizons are loamy. Coarse fragments are low. Bedrock or cobble streambed is within 1m.

**Community:** *Rubus spectabilis*/*Tolmeia menziesii*-*Oxalis* group is a widespread shrubby type. *Alnus rubra* forms an overstory in a third of the plots. *Sitka spruce* co-occurred with the *Alnus* on 3 plots; *Acer macrophyllum* was found on 3 plots. Wildlife use is heavy. Elk browse reduced *Rubus spectabilis*, *Polystichum munitum*, *Athyrium filix-femina*, and grasses significantly.

*Rubus spectabilis*/*Tolmeia menziesii*-*Oxalis*-*Mitella ovalis* phase is generally on floodplains and lower banks. *Rubus spectabilis*/*Tolmeia menziesii*-*Oxalis*-*Polystichum munitum* phase is found on steep banks/valley walls and low terraces.



***Rubus spectabilis/Tolmeia menziesii-Oxalis-Mitella ovalis* phase**  
**Salmonberry/piggyback plant-sorrel-oval-leaved mitrewort phase**  
**RUSP/TOME-OXALI-MIOV phase**

N=8 (EBLM 4, SNF 3, SBLM 1)

SPECIES	CONSTANCY %	TYPICAL COVER %
<b>Trees-overstory</b>		
Alnus rubra	25	50
<b>Shrubs</b>		
Rubus spectabilis	100	32
Vaccinium parvifolium	50	1
Acer circinatum	38	25
<b>Herbs</b>		
Athyrium filix-femina	100	26
Tolmiea menziesii	100	7
Oxalis	88	38
Polystichum munitum	88	6
Stachys	88	5
Mitella ovalis	75	23
Tiarella trifoliata	75	9
Stellaria crispata	63	1
Blechnum spicant	50	5
Galium triflorum	50	5
Adiantum pedatum	50	3
Carex deweyana	38	11
Circaea alpina	38	4
Galium aparine	38	4
Hydrophyllum tenuipes	38	1

**Elevations:** 100 to 915 feet (average 550 feet).

**Geomorphic surfaces:** Annual floodplains and low banks. Summer water tables are within 42-94 cm of the surface.

**Substrates/soils:** Soils are fairly shallow, averaging 63 cm to bedrock or cobble streambed. Textures are fine, generally silt loam A horizons, and silt loam, loamy sand, or sandy clay loam B horizons. Gley layers are

common in soil descriptions, at less than 50 cm depth. Several pits showed buried soils which are tapped by roots.

**Community:** Rubus spectabilis/Tolmeia menziesii-Oxalis-[Mitella ovalis phase](#) is shrub dominated. No trees were found within this phase, though overhanging tree canopies can be dense. *Athyrium filix-femina* cover is almost always higher than *Polystichum munitum* cover, which marks this phase as slightly wetter than the Rubus spectabilis/Tolmeia menziesii-Oxalis-[Polystichum munitum phase](#).

The Rubus spectabilis/Tolmeia menziesii-Oxalis-[Mitella ovalis phase](#) appears to be too shallow, poorly drained, and too frequently disturbed to support a tree component. However, soil organic material and moisture holding capacity are high.

***Rubus spectabilis*/*Tolmiea menziesii*-*Oxalis*-*Polystichum munitum*  
phase  
Salmonberry/piggyback plant-sorrel-*sword fern* phase  
RUSP/TOME-OXALI-*POMU* phase**

N=16 (SNF 12, SBLM 4)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
<i>Alnus rubra</i>	44	55
<i>Acer macrophyllum</i>	19	37
<i>Picea sitchensis</i>	19	28
<b>Trees-seedlings</b>		
<i>Picea sitchensis</i>	19	1
<b>Shrubs</b>		
<i>Rubus spectabilis</i>	100	33
<i>Sambucus racemosa</i>	56	24
<i>Acer circinatum</i>	44	34
<i>Ribes bracteosum</i>	38	1
<i>Vaccinium parvifolium</i>	38	Tr
<b>Herbs</b>		
<i>Tolmiea menziesii</i>	100	29
<i>Athyrium filix-femina</i>	100	5
<i>Stachys</i>	94	12
<i>Oxalis</i>	88	27
<i>Polystichum munitum</i>	81	22
<i>Claytonia sibirica</i>	75	3
<i>Galium triflorum</i>	69	2
<i>Stellaria crispa</i>	63	4
<i>Marah oreganus</i>	50	2
<i>Viola glabella</i>	50	1
<i>Carex deweyana</i>	44	6
<i>Mimulus dentatus</i>	38	2
<i>Mimulus guttatus</i>	38	Tr

**Elevations:** 30 to 1390 feet (average 370 feet).

**Geomorphic surfaces:** Steep banks and low terraces.

**Substrate/soils:** Moderately deep (60 to 90 cm). Most profiles are above summer water table level. A horizons are silt loams or clay loams 12-20 cm deep over silty clay loams, clay loams or loamy clay B horizons 48 to 55 cm deep. Some profiles showed buried soils. One profile had gleying at 75 cm. Note that the Mitella ovalis phase had shallower depths to anaerobic conditions and/or bedrock, and consistently higher water table.

**Community:** Rubus spectabilis/Tolmeia menziesii-Oxalis-Polystichum munitum phase is shrub-dominated. *Alnus rubra*, *Acer macrophyllum*, and *Sitka spruce* can establish and survive on these sites. More trees are found in this phase of the Rubus spectabilis/Tolmeia menziesii-Oxalis group than in the Mitella ovalis phase. *Athyrium filix-femina* is always present but at lower cover than *Polystichum munitum*, which is not true for the Mitella ovalis phase of this group.

Elk browse on some plots was noted to significantly affect cover of *Rubus spectabilis*, *Polystichum munitum*, *Athyrium filix-femina*, and grasses.

*Rubus spectabilis* competition for tree regeneration can be severe.

**Terraces/steep toeslopes**

Corylus cornuta-Acer circinatum/Oxalis: COCO6-ACCI/OXALI ..... p. 146

Rubus spectabilis/Polystichum munitum: RUSP/POMU ..... p. 148

Vaccinium alaskaense-Rubus spectabilis: VAAL-RUSP ..... p. 150

Acer macrophyllum/Corylus cornuta-Rubus spectabilis:  
ACMA3/COCO6-RUSP ..... p. 151

**Steep slide areas**

Rubus spectabilis-Acer circinatum: RUSP-ACCI ..... p. 153

***Corylus cornuta-Acer circinatum/Oxalis***  
**California hazel-vine maple/sorrel**  
**COCO6-ACCI/OXALI**

N=2 (EBLM 2)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
Acer macrophyllum	50	80
Tsuga heterophylla	50	40
<b>Shrubs</b>		
Corylus cornuta	100	28
Acer circinatum	100	18
Gaultheria shallon	50	Tr
<b>Herbs</b>		
Oxalis	100	55
Polystichum munitum	100	15
Athyrium filix-femina	100	13
Bromus vulgaris	100	3
Adenocaulon bicolor	100	2
Circaea alpina	100	2
Blechnum spicant	50	15
Galium triflorum	50	5
Tiarella trifoliata	50	5
Hydrophyllum tenuipes	50	3
Equisetum	50	2
unknown grass	50	2
Adiantum pedatum	50	Tr
Asarum caudatum	50	Tr
Bromus sitchensis	50	Tr
Streptopus lanceolatus var. curvipes	50	Tr
Trillium ovatum	50	Tr
Viola	50	Tr

**Elevations:** 840 to 915 feet.

**Geomorphic surfaces:** Gently sloping floodplains or terraces.

**Substrate/soils:** Fairly shallow soil (54 to 59 cm). A horizons are silt loams 5-10 cm thick. B horizons are loam or sandy loam 18-41 cm deep,

over sand/sandstone C layers. One site had mottling (evidence of fluctuating anaerobic conditions) at 46 cm, and summer water table at 64 cm. Rooting depth was 50 to 60 cm.

**Community :** Corylus cornuta-Acer circinatum/Oxalis occurs under heavy *Acer macrophyllum* or *Tsuga heterophylla* overstories. Both plots are from Eugene BLM's South Valley area, and represent the southeast Coast Range. In this low precipitation zone of the Coast Range, *Rubus spectabilis* distribution is much more confined in the riparian areas. The geomorphic surfaces, moderately deep soil, and tree ages (*Tsuga heterophylla* 38 years, *Acer macrophyllum* 108) suggest that these sites are not frequently reset, though still subject to flood effects.

**Similar types:** This community is a moister version of the Cascades' Forested Corylus cornuta/Polystichum munitum group. In areas with higher precipitation in the Coast Range, similar geomorphic surfaces and soils would support a *Rubus spectabilis* community, possibly a member of the Rubus spectabilis/Tolmeia menziesii-Oxalis group.

***Rubus spectabilis/Polystichum munitum***  
**Salmonberry/sword fern**  
**RUSP/POMU**

N=25 (SNF 18, EBLM 4, SBLM 3)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
Alnus rubra	48	46
Acer macrophyllum	20	43
<b>Shrubs</b>		
Rubus spectabilis	100	56
Acer circinatum	68	19
Sambucus racemosa	60	14
Ribes bracteosum	56	2
Vaccinium parvifolium	48	1
<b>Herbs</b>		
Polystichum munitum	100	23
Oxalis	92	21
Stachys	84	6
Athyrium filix-femina	84	4
Tolmiea menziesii	72	4
Claytonia sibirica	64	1
Galium triflorum	60	2
Stellaria crispa	56	1
Luzula parviflora	44	Tr
Blechnum spicant	40	3
Maianthemum dilatatum	40	2
Marah oreganus	36	1
Viola glabella	36	Tr

**Elevations:** 100 to 870 feet (average 450 feet).

**Geomorphic surfaces:** Gentle terraces or steep banks and valley walls.

**Substrate/soils:** Deep (average 77 cm) well drained loams (silt loams, silty clay loams, sandy loams, and loams), though some profiles had clays in the C horizons. These sites had deep, organic rich substrates; rooting conditions are excellent. Most sites too high for frequent flooding.



**Community:** The *Rubus spectabilis*/*Polystichum munitum* community is a common terrace/valley wall. Mature *Alnus rubra* are recorded in almost half the plots. Conifers were present on 24% of the plots. The group is dominated by extremely dense *Rubus spectabilis*. Saxifrages and *Athyrium filix-femina* are at very low cover compared to most of the communities closer to the stream channel.

Terraces were most likely to have overstory trees rooted in the plots. Three quarters of the plots with gentle slopes ( $\leq 20\%$ ) had mature trees. Less than half the steep slopes ( $>20\%$ ) had trees. Tree ages ranged from 21 to 135 years. Light limitation from *Alnus rubra* canopy as well as the *Rubus spectabilis* may limit conifer establishment and survival.

Significant elk or deer browse was frequently observed in this community. Mountain beaver burrows were noted on several of the steep plots.

***Vaccinium alaskaense-Rubus spectabilis***  
**Alaska huckleberry-salmonberry**  
**VAAL-RUSP**

N=1 (SBLM 1)

<b>SPECIES</b>	<b>TYPICAL COVER %</b>
<b>Shrubs</b>	
<i>Vaccinium alaskaense/Vaccinium ovalifolium</i>	85
<i>Rubus spectabilis</i>	30
<i>Vaccinium parvifolium</i>	10
<i>Menziesia ferruginea</i>	8
<b>Herbs</b>	
<i>Polystichum munitum</i>	65
<i>Blechnum spicant</i>	10
<i>Scolopus hallii</i>	9
<i>Oxalis trilliifolia</i>	8
<i>Athyrium filix-femina</i>	7
<i>Boykinia occidentalis</i>	3
<i>Prosartes hookeri</i>	2
<i>Streptopus amplexifolius</i>	2

**Elevation:** 1200 feet.

**Geomorphic surfaces:** The plot is on a steep toeslope position.

**Substrate/soils:** Fairly deep (100cm+) colluvial soil. There is a deep (20cm) O layer. The A layer is a clay loam, the BA layer is loamy clay, and the Bt horizon (at 70cm) is a clay. Gravels make up the minor coarse fragment component.

**Community:** This is a single plot which represents a coastal variant of the Cascadian *Vaccinium ovalifolium* type. The plot is from Salem BLM's Warnicke Creek in the Valley of the Giants area. This area has plant associations that indicate cool, moist environments more similar to some Cascadian conditions than most of the Coast Range (eg Western hemlock/Vaccinium alaskaense/oxalis-NWO Coast, and Western hemlock/oxalis-Achlys triphylla). One other plot from the Warnicke Creek cluster is incorporated in the Cascadian *Boykinia occidentalis-Mitella ovalis* description.

**Acer macrophyllum/Corylus cornuta-Rubus spectabilis**  
**Big leaf maple/California hazel-salmonberry**  
**ACMA3/COCO6-RUSP**

N=3 (SNF 3)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
Acer macrophyllum	100	67
Pseudotsuga menziesii	67	35
Thuja plicata	33	35
Rhamnus purshiana	33	25
<b>Trees-seedlings</b>		
Acer macrophyllum	33	5
Thuja plicata	33	4
<b>Shrubs</b>		
Corylus cornuta	100	25
Rubus spectabilis	100	13
Rhamnus purshiana	100	1
Vaccinium ovatum	67	13
Acer circinatum	67	3
Gaultheria shallon	67	1
Sambucus racemosa	67	1
<b>Herbs</b>		
Polystichum munitum	100	65
Galium triflorum	100	Tr
Stachys mexicana	67	3
Athyrium filix-femina	67	1
Claytonia sibirica	67	1
Marah oreganus	67	1
Tellima grandiflora	67	1
Blechnum spicant	67	Tr
Oxalis	67	Tr
Tolmiea menziesii	67	Tr

**Elevations:** 150 to 270 feet (average 230 feet).

**Geomorphic surfaces:** Very steep valley walls/toeslopes or elevated terraces.

**Substrate/soils:** Silt loams to loams.

**Community:** Acer macrophyllum/Corylus cornuta-Rubus spectabilis is a warm, well drained forested community sampled in the southern Siuslaw NF. These sites are either on raised terraces immune to most floods or on steep colluvial valley walls. The main processes controlling vegetation in this community are not fluvial. *Rubus spectabilis* cover is relatively minor, and other riparian species such as *Athyrium filix-femina*, *Tolmeia menziesii*, or *Stachys* are present but in low abundance. This community is a transitional type, moister than the upslope plant associations but dominated by upland species. Succession to conifers occurs over time, though extremely steep slopes may limit stability.

***Rubus spectabilis*-*Acer circinatum***  
**Salmonberry-vine maple**  
**RUSP-ACCI**

N=8 (EBLM 4, SNF 3, SBLM 1)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
<i>Alnus rubra</i>	25	23
<i>Pseudotsuga menziesii</i>	25	18
<b>Shrubs</b>		
<i>Rubus spectabilis</i>	100	51
<i>Acer circinatum</i>	88	43
<i>Vaccinium parvifolium</i>	75	5
<i>Sambucus racemosa</i>	38	7
<i>Rhamnus purshiana</i>	38	6
<b>Herbs</b>		
<i>Polystichum munitum</i>	100	34
<i>Oxalis</i>	100	15
<i>Athyrium filix-femina</i>	88	11
<i>Adiantum pedatum</i>	50	3
<i>Claytonia sibirica</i>	50	1
<i>Galium triflorum</i>	50	1
<i>Blechnum spicant</i>	38	12
<i>Stachys mexicana</i>	38	4
<i>Dicentra formosa</i>	38	3
<i>Tiarella trifoliata</i>	38	2
<i>Stellaria crispa</i>	38	1

**Elevations:** 75 to 1230 feet (average 600 feet).

**Geomorphic surfaces:** Very steep valley walls and cutbanks, averaging 91% slope. Fluvial processes are most likely to affect this community indirectly, if channel changes undercut the over-steepened slopes to cause slides.

**Substrate/soils:** Deep and well drained. A horizons are silt loams, silty clay loams, or sandy silts averaging 22 cm thick. AB horizons are sandy loams, silt loams, silty clay loams or clay loams averaging 27 cm. B horizons are silty clays, silt loams, sandy silts or sandy loams, averaging

35 cm. C horizons are found at an average depth of 104 cm. Only one profile showed anaerobic conditions, with mottling at a meter. Coarse fragments above the C horizon in the profile were generally colluvial, rather than alluvial, in origin.

**Community:** Rubus spectabilis-Acer circinatum is a shrub dominated community found on steep valley walls and toeslopes. Riparian indicators such as *Tolmeia menziesii* are minor or absent in this community. *Rubus spectabilis* competition and slope instability may limit long-term conifer development in this community. On one plot, tree regeneration followed creation of an opening from a log falling onto the site. Such events may allow scattered conifers to establish. Some of the largest, oldest conifers in the sample occurred in this community.

## Willamette Valley

### Willamette Valley key

- A. *Equisetum hyemale* the dominant herb under *Populus trichocarpa* overstory ..... **Populus trichocarpa/Equisetum hyemale** p. 162
- B. *Maianthemum stellatum* the dominant herb
1. *Symphoricarpos albus* the dominant shrub under hardwood overstory  
..... **Forested Symphoricarpos albus/Maianthemum stellatum** p. 181
  2. *Symphoricarpos albus* absent or minor, *Thuja plicata* dominant overstory species.. **Thuja plicata/Maianthemum stellatum** p. 184
- C. *Rubus spectabilis* dominant or co-dominant shrub under hardwood overstory
1. *Symphoricarpos albus* present (>trace)  
..... **(Populus trichocarpa-Fraxinus latifolia)/Rubus spectabilis-Symphoricarpos albus** p. 176
  2. *Symphoricarpos albus* absent  
.... **Hardwood/Rubus spectabilis/Hydrophyllum tenuipes** p. 174
- D. *Symphoricarpos albus* the dominant shrub, *Rubus spectabilis* absent or minor; under hardwood overstory
1. *Maianthemum stellatum* the dominant herb  
..... **Forested Symphoricarpos albus/Maianthemum stellatum** p. 181
  2. *Camassia quamash* the dominant herb under *Fraxinus latifolia* overstory  
..... **Fraxinus latifolia/Symphoricarpos albus/Camassia quamash** p. 183
  3. *Urtica dioica* and/or *Hydrophyllum tenuipes* together >5%  
..... **Symphoricarpos albus/Urtica dioica group** p. 165
    - a. *Oemleria cerasiformis* >5%  
. **Symphoricarpos albus-Urtica dioica-(Acer macrophyllum-Populus trichocarpa)/Oemleria cerasiformis phase** p. 170

- b. *Fraxinus latifolia* an overstory dominant, *Sambucus racemosa* dominant or co-dominant shrub  
 ..... **Symphoricarpos albus-Urtica dioica-Fraxinus latifolia/Sambucus racemosa-Corylus cornuta phase** p. 166
- c. *Symphoricarpos albus* the dominant shrub, or co-dominant with *Corylus cornuta*  
 . **Symphoricarpos albus-Urtica dioica-(Acer macrophyllum-Populus trichocarpa)/Corylus cornuta phase** p. 168
- 4. *Urtica dioica* and *Hydrophyllum tenuipes* absent, herb layer sparse, *Rubus ursinus* generally present
  - a. *Fraxinus latifolia* or *Quercus garryana* overstory, *Carex obnupta* absent or minor  
 ..... **(Fraxinus latifolia-Quercus garryana)/Symphoricarpos albus** p. 178
  - b. *Acer macrophyllum* and/or *Populus trichocarpa* overstory  
 ..... **Acer macrophyllum/Symphoricarpos albus** p. 180
- 5. *Urtica dioica* and *Hydrophyllum tenuipes* absent, *Carex obnupta* >20% under *Fraxinus latifolia* overstory  
 ..... **Fraxinus latifolia/Symphoricarpos albus** (Christy p. 214)
- E. *Corylus cornuta* dominant shrub under hardwood overstory
  - 1. *Symphoricarpos albus* >5%  
 ..... **Symphoricarpos albus-Urtica dioica-(Acer macrophyllum-Populus trichocarpa)/Corylus cornuta phase** p. 168
  - 2. *Symphoricarpos albus* <5%  
 ..... **(Fraxinus latifolia-Populus trichocarpa)/Corylus cornuta/Hydrophyllum tenuipes** p. 163
- F. *Sambucus racemosa* dominant shrub, *Symphoricarpos albus* also important shrub species, *Fraxinus latifolia* an overstory dominant, *Urtica dioica* and/or *Hydrophyllum tenuipes* >5%  
 ..... **Symphoricarpos albus-Urtica dioica-Fraxinus latifolia/Sambucus racemosa-Corylus cornuta phase** p. 166



- G. Vine maple dominant shrub, common snowberry absent or minor, California hazel minor, Oregon ash and overstory dominant, Pacific waterleaf abundant, nettle often co-dominant herb.  
 ..... **Fraxinus latifolia/Acer circinatum/Hydrophyllum tenuipes-Urtica dioica** p. 172
- H. Shrubs absent or trace, *Urtica dioica* >50, *Acer macrophyllum* and/or *Alnus* overstory ..... (**Acer macrophyllum-alder**)/*Urtica dioica* p. 161
- I. *Spiraea douglasii* >10%, and dominant shrub
1. *Spiraea douglasii* the dominant shrub under *Fraxinus latifolia*  
 ..... **Fraxinus latifolia/Spiraea douglasii** (Christy p. 213)
  2. *Spiraea douglasii* thicket without tree canopy  
 ..... **Spiraea douglasii** (Christy p. 242)
- J. *Cornus sericea* dominant shrub under *Populus trichocarpa* overstory, *Impatiens capensis* often dominant herb  
 ..... **Populus balsamifera ssp. trichocarpa/Cornus sericea, Impatiens capensis** (Christy p. 218)
- K. Willow shrub swamp
1. *Salix hookeriana* shrub swamp, *Carex obnupta* often important herb.....**Salix hookeriana-(Salix sitchensis)** (Christy p. 237)
  2. *Salix lucida* shrub swamp .....**Salix lucida ssp. lasiandra/Urtica dioica ssp. gracilis** (Christy p. 239)
  3. *Salix sitchensis* dominant, with *Lysichiton americanum* and/or *Carex aquatalis* var. *dives* the dominant herbs  
 ..... **Salix sitchensis** complex (Christy p. 241)
- L. *Fraxinus latifolia* overstory above sedge dominated herb layer
1. *Spiraea douglasii* <=10% but most abundant shrub, *Carex aquatalis* var. *dives* >=20% and dominant herb under *Fraxinus latifolia* overstory  
 . **Fraxinus latifolia/Carex aquatalis var. aquatalis** (Christy p. 210)

2. *Carex deweyana* and/or *Juncus patens* dominant herbs under *Fraxinus latifolia* overstory, *Rubus ursinus* and *Spiraea douglasii* may be present  
..... ***Fraxinus latifolia/Carex deweyana-Urtica dioica ssp. Gracilis*** (Christy p. 211)
3. *Carex obnupta*  $\geq 20\%$  and dominant herb under *Fraxinus latifolia* overstory, *Rubus ursinus*, *Spiraea douglasii*, and *Symphoricarpos albus* may be present  
..... ***Fraxinus latifolia/Carex obnupta*** (Christy p. 212)

***For more herb-dominated communities (aquatic beds, emergent marshes, marshes, fens/peatlands, or wet prairies), see herbaceous wetlands key (Christy pp. 204).***

***For more shrub-dominated communities (shrub swamps), see shrubland wetlands key (Christy p. 200).***

***For more tree-dominated communities (forested swamps), see forest and woodlands wetlands key (Christy p. 198).***

**Willamette Valley**

(*Acer macrophyllum*-*Alnus*)/*Urtica dioica*: (ACMA3-ALNUS)/URDI..p. 161

*Populus trichocarpa*/*Equisetum hyemale*: POBAT/EQHY ..... p. 162

(*Fraxinus latifolia*-*Populus trichocarpa*)/*Corylus cornuta*/  
*Hydrophyllum tenuipes*: (FRLA-POBAT)/COCO6/HYTE ..... p. 163

*Symphoricarpos albus*/*Urtica dioica* group: SYAL/URDI GROUP .... p. 165

- *Symphoricarpos albus*/*Urtica dioica*-*Fraxinus latifolia*/  
*Sambucus racemosa*-*Corylus cornuta* phase:  
SYAL/URDI-FRLA/SARA2-COCO6 phase..... p. 166
- *Symphoricarpos albus*/*Urtica dioica*-(*Acer macrophyllum*-  
*Populus trichocarpa*)/*Californiahazel* phase:  
SYAL/URDI-(ACMA3-POBAT)/COCO6 phase..... p. 168
- *Symphoricarpos albus*/*Urtica dioica*-(*Acer macrophyllum*-  
*Populus trichocarpa*)/*Oemleria cerasiformis* phase  
SYAL/URDI-(ACMA3-POBAT)/OECE phase ..... p. 170

*Fraxinus latifolia*/*Acer circinatum*/*Hydrophyllum tenuipes*-*Urtica*  
*dioica*, FRLA/ACCI/HYTE-URDI ..... p. 172

Hardwood/*Rubus spectabilis*/*Hydrophyllum tenuipes*, Hardwood/  
RUSP/HYTE..... p. 174

(*Populus trichocarpa*/*Fraxinus latifolia*)/*Rubus spectabilis*-  
*Symphoricarpos albus*, (POBAT-FRLA)/RUSP-SYAL..... p. 176

(*Fraxinus latifolia*-*Quercus garryana*)/*Symphoricarpos albus*,  
(FRLA-QUGA4)/SYAL..... p. 178

*Acer macrophyllum*/*Symphoricarpos albus*, ACMA3/SYAL ..... p. 180

Forested *Symphoricarpos albus*/*Maianthemum stellatum*,  
Forested SYAL/MAST4 ..... p. 181

*Fraxinus latifolia*/*Symphoricarpos albus*/*Camassia quamash*,  
FRLA/SYAL/CAQU2 ..... p. 183

*Thuja plicata*/*Maianthemum stellatum*, THPL/MAST4 ..... p. 184

**A note on alder:** Both white alder (*Alnus rhombifolia*) and red alder (*Alnus rubra*) are present in riparian areas of low elevations of the central and southern Willamette Valley. The two species have similar appearance, and can grow next to each other. *Alnus rubra* is found at slightly higher elevations along the valley margin and in the NW Oregon Cascades and Coast Range. No *Alnus rhombifolia* was recorded in the Willamette Valley plots; only 6 of the sites had alder. Unfortunately, it is not possible to tell if the two species were distinguished in the field. Visits in 2004 to the three most northerly alder sites found only *Alnus rubra*. Whether the same is true in the more southerly Willamette Valley riparian zones is uncertain. Therefore, most references in the Willamette Valley section have been generalized to *Alnus/Alder*.

**(*Acer macrophyllum*-*Alnus*)/*Urtica dioica*  
 (Big leaf maple-alder)/nettle  
 (ACMA3-ALNUS)/URDI**

N=6 (Willamette Valley 6)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees</b>		
<i>Acer macrophyllum</i>	50	100
<i>Alnus</i>	50	62
<b>Shrubs</b>		
<i>Sambucus racemosa</i>	50	1
<b>Herbs</b>		
<i>Urtica dioica</i> ssp. <i>gracilis</i>	100	76
<i>Hydrophyllum tenuipes</i>	100	44
<i>Carex deweyana</i>	83	7
<i>Tellima grandiflora</i>	67	9
<i>Galium aparine</i>	67	8
<i>Claytonia sibirica</i>	33	5
<i>Equisetum arvense</i>	33	4
<i>Stellaria calycantha</i>	33	Tr

**Elevations:** less than 600 feet.

**Geomorphic environment:** Environmental data for this type are minimal. Sites were classed as floodplain forests. Two plots are from Clackamas County (Willamette and Clackamas Rivers), two plots from Marion County (Mill Creek), and two from Polk County (Luckiamute River). The plots ranged from 0 to 15 feet above summer flow (average 6 feet), and from 0 to 200 feet from the main channel (average 52 feet).

**Community:** (*Acer macrophyllum*-alder)/*Urtica dioica* is a deciduous forested floodplain community. The overstory can be either *Acer macrophyllum* or *Alnus*. *Populus trichocarpa* and *Fraxinus latifolia* can also occur. With *Fraxinus latifolia*, the forb component has more wet indicator species. The shrub layer is sparse, over a thick herb layer.

***Populus trichocarpa/Equisetum hyemale***  
**Black cottonwood/scouring-rush**  
**POBAT/EQHY**

N=5 (Willamette Valley 5)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees</b>		
<i>Populus trichocarpa</i>	80	66
<i>Alnus</i>	40	42
<i>Acer macrophyllum</i>	40	33
<b>Shrubs</b>		
<i>Symphoricarpos albus</i>	40	5
<i>Acer circinatum</i>	40	4
<i>Rubus ursinus</i>	40	1
<b>Herbs</b>		
<i>Equisetum hyemale</i>	100	64
<i>Polystichum munitum</i>	80	13
<i>Urtica dioica</i> ssp. <i>gracilis</i>	40	2

**Elevations:** average 480 feet.

**Geomorphic environment:** The sampling ecologist noted locations as temporarily flooded higher terraces near the large rivers, such as the Willamette and North Santiam. Plots averaged 20 feet above the main channel, and were from 200-500 feet from the main channel. No soils data are available. One site was in Yamhill County (Willamette River), and 4 sites were in Marion County (North Santiam River-Geren Island).

**Community:** *Populus trichocarpa/Equisetum hyemale* is a forested floodplain community. The overstory is most often *Populus trichocarpa* and/or *Alnus* or *Acer macrophyllum*, but *Alnus* can be the only tree species present. *Abies grandis* and *Pseudotsuga menziesii* were also recorded on one plot. The shrub layer is generally sparse. The herb layer is a dense sward of *Equisetum hyemale* with *Polystichum munitum*.

**(*Fraxinus latifolia*-*Populus trichocarpa*)/*Corylus cornuta*/*Hydrophyllum tenuipes*  
(Oregon ash-black cottonwood)/California hazel/Pacific waterleaf  
(FRLA-POBAT)/COCO6/HYTE**

N=5 (Willamette Valley 5)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees</b>		
<i>Fraxinus latifolia</i>	40	83
<i>Populus trichocarpa</i>	40	70
<i>Acer macrophyllum</i>	20	25
<b>Shrubs</b>		
<i>Corylus cornuta</i>	100	50
<i>Oemleria cerasiformis</i>	60	8
<i>Rubus spectabilis</i>	60	1
<i>Symphoricarpos albus</i>	40	2
<i>Sambucus racemosa</i>	40	1
<i>Acer circinatum</i>	40	1
<b>Herbs</b>		
<i>Hydrophyllum tenuipes</i>	100	75
<i>Galium aparine</i>	60	Tr
<i>Carex deweyana</i>	60	Tr
<i>Urtica dioica</i> ssp. <i>gracilis</i>	40	5
<i>Stachys cooleyae</i>	40	3
<i>Athyrium filix-femina</i>	40	1
<i>Claytonia sibirica</i>	40	1
<i>Tellima grandiflora</i>	40	Tr

**Elevations:** less than 600 feet.

**Geomorphic environment:** Environmental data for this type are minimal. Sites were classed as floodplain forests, slough or shrub. The plots ranged from 3 to 21 feet above summer flow (average 13 feet), and from 9 to 500 feet from the main channel (average 232 feet). Three plots are from Clackamas County (Willamette River, Pudding River, Eagle Creek), two plots from Marion County (Willamette River).

**Community:** (*Fraxinus latifolia*-*Populus trichocarpa*)/*Corylus cornuta*/*Hydrophyllum tenuipes* is generally a forested floodplain

community. The overstory is dominated by *Fraxinus latifolia*, *Populus trichocarpa*, or sometimes *Acer macrophyllum*.

**Similar types:** This type seems somewhat wetter than the strongly related Symphoricarpos albus/Urtica dioica group: (*Fraxinus latifolia/Sambucus racemosa-Corylus cornuta phase* and (*Acer macrophyllum-Populus trichocarpa)/Corylus cornuta phase*). (*Fraxinus latifolia-Populus trichocarpa)/Corylus cornuta/Hydrophyllum tenuipes* has less *Rubus ursinus*, *Sambucus racemosa*, *Symphoricarpos albus* and *Urtica dioica*, and more *Corylus cornuta*, *Oemleria cerasiformis*, and *Hydrophyllum tenuipes*.



**Forested *Symphoricarpos albus*/*Urtica dioica* group**  
**Forested common snowberry/nettle group**  
**Forested SYAL/URDI group**

Group constancy table followed by descriptions for three phases: *Symphoricarpos albus*/*Urtica dioica*-*Fraxinus latifolia*/*Sambucus racemosa*-*Corylus cornuta* phase, *Symphoricarpos albus*/*Urtica dioica*-(*Acer macrophyllum*-*Populus trichocarpa*)/*Sambucus racemosa*-*Corylus cornuta* phase and *Symphoricarpos albus*/*Urtica dioica*-(*Acer macrophyllum*-*Populus trichocarpa*)/*Sambucus racemosa*-*Oemleria cerasiformis* phase

N=34 (Willamette Valley 34)

Constancy table for the group as a whole:

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees</b>		
<i>Acer macrophyllum</i>	65	70
<i>Populus trichocarpa</i>	38	58
<i>Fraxinus latifolia</i>	26	46
<b>Shrubs</b>		
<i>Symphoricarpos albus</i>	91	37
<i>Sambucus racemosa</i>	50	9
<i>Corylus cornuta</i>	41	15
<i>Rubus ursinus</i>	38	12
<b>Herbs</b>		
<i>Oemleria cerasiformis</i>	38	8
<i>Urtica dioica</i> ssp. <i>gracilis</i>	88	39
<i>Hydrophyllum tenuipes</i>	85	32
<i>Galium aparine</i>	50	1
<i>Carex deweyana</i>	47	3
<i>Claytonia sibirica</i>	44	14

**Community:** The *Symphoricarpos albus*/*Urtica dioica* group is the most commonly sampled type in the communities from the Willamette Valley.

***Symphoricarpos albus/Urtica dioica-Fraxinus latifolia/Sambucus racemosa-Corylus cornuta* phase**  
**Common snowberry/nettle-Oregon ash/red elderberry-California hazel phase**  
**SYAL/URDI-FRLA/SARA2-COCO6 phase**

N=7 (Willamette Valley 7)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees</b>		
Fraxinus latifolia	100	44
Alnus	29	60
<b>Shrubs</b>		
Sambucus racemosa	100	15
Corylus cornuta	57	16
Symphoricarpos albus	57	13
Rubus ursinus	43	31
Acer circinatum	29	42
Crataegus douglasii	29	30
Rubus spectabilis	29	2
<b>Herbs</b>		
Urtica dioica ssp. gracilis	100	51
Hydrophyllum tenuipes	71	53
Tellima grandiflora	57	14
Carex deweyana	57	8
Athyrium filix-femina	29	2
Claytonia sibirica	29	1
Tolmiea menziesii	29	1
Marah oreganus	29	1
Cardamine oligosperma	29	Tr
Polystichum munitum	29	Tr

**Elevations:** less than 600 feet.

**Geomorphic environment:** Environmental data for this type are minimal. Sites were classes as floodplain forests (79%) or sloughs (21%). Half the samples were from the mainstem Willamette River. Surface clay deposits were noted on 2 plots. The plots ranged from 1 to 21 feet above summer flow (average 12 feet), and from 0 to 500 feet

from the channel (average 117 feet). Four plots are from Marion County, two plots each from Benton, Clackamas, Polk, and Yamhill Counties, and 1 plot from Linn County.

**Community:** Symphoricarpos albus/Urtica dioica-Fraxinus latifolia/Sambucus racemosa-Corylus cornuta phase is a forested floodplain community . The overstory is *Fraxinus latifolia*, often with *Alnus* and occasionally *Quercus garryana*.

**Similar types:** This phase of the Symphoricarpos albus/Urtica dioica group has lower and less constant *Symphoricarpos albus* cover than the Acer macrophyllum-Populus trichocarpa phase. With the overstory of *Fraxinus latifolia* and *Alnus*, it indicates a slightly wetter environment.

***Symphoricarpos albus/Urtica dioica* -(*Acer macrophyllum*-*Populus trichocarpa*)/*Corylus cornuta* phase  
**Common snowberry/nettle-(*Big leaf maple*-*black cottonwood*)/*California hazel* phase  
 SYAL/URDI-(ACMA3-POBAT)/COCO6 phase****

N=13 (Willamette Valley 13)

SPECIES	CONSTANCY %	TYPICAL COVER %
<b>Trees</b>		
<i>Acer macrophyllum</i>	69	75
<i>Populus trichocarpa</i>	54	64
<b>Shrubs</b>		
<i>Symphoricarpos albus</i>	100	42
<i>Corylus cornuta</i>	62	16
<i>Rubus ursinus</i>	62	7
<i>Sambucus racemosa</i>	62	5
<i>Rubus spectabilis</i>	38	3
<b>Herbs</b>		
<i>Urtica dioica</i> ssp. <i>gracilis</i>	92	41
<i>Hydrophyllum tenuipes</i>	85	33
<i>Carex deweyana</i>	38	1
<i>Galium triflorum</i>	31	11
<i>Claytonia sibirica</i>	31	Tr

**Elevations:** less than 600 feet.

**Geomorphic environment:** Environmental data for this type are minimal. Sites were classes as floodplain forests (79%) or sloughs (21%). Half the samples were from the mainstem Willamette River. Surface clay deposits were noted on 2 plots. The plots ranged from 1 to 21 feet above summer flow (average 12 feet), and from 0 to 500 feet from the channel (average 117 feet). Four plots are from Marion County, two plots each from Benton, Clackamas, Polk, and Yamhill Counties, and 1 plot from Linn County.

**Community:** *Symphoricarpos albus/Urtica dioica*-(*Acer macrophyllum*-*Populus trichocarpa*) *Corylus cornuta* phase is a forested floodplain community. The overstory is *Acer macrophyllum* and/or *Populus trichocarpa*. The shrub layer is dominated by *Symphoricarpos albus*, with *Corylus cornuta*, *Rubus ursinus*, and *Sambucus racemosa* as the most

common associated species. *Urtica dioica* and *Hydrophyllum tenuipes* are both very abundant.

***Symphoricarpus albus/Urtica dioica-(Acer macrophyllum-Populus trichocarpa)/Oemleria cerasiformis* phase  
**Common snowberry/nettle-(Big leaf maple-black cottonwood)/Indian plum phase  
 SYAL/URDI-(ACMA3-POBAT)/OECE phase****

N=14 (Willamette Valley 14)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees</b>		
Acer macrophyllum	86	65
Populus trichocarpa	36	57
<b>Shrubs</b>		
Symphoricarpus albus	100	40
Oemleria cerasiformis	71	11
<b>Herbs</b>		
Hydrophyllum tenuipes	93	23
Galium aparine	93	1
Urtica dioica ssp. gracilis	79	29
Claytonia sibirica	64	23
Carex deweyana	50	1
Dicentra formosa	43	7
Tellima grandiflora	36	20
Polystichum munitum	36	2

**Elevations:** less than 600 feet.

**Geomorphic environment:** Environmental data for this type are minimal. Sites were classes as floodplain forests (86%) or sloughs (14%). The plots ranged from 1 to 18 feet above summer flow (average 8 feet), and from 0 to 200 feet from the main channel (average 72 feet). Five of the samples were from the mainstem Willamette River; five were from the mainstem Clackmas River; three were from the Luckiamute River; one from Ankeny Slough (USFWS). Five plots are from Clackamas County, four plots from Marion County, three plots from Polk County, and two plots from Lane County.

**Community:** *Symphoricarpus albus/Urtica dioica-(Acer macrophyllum-Populus trichocarpa)/Oemleria cerasiformis* phase is a forested floodplain community. The overstory is *Acer macrophyllum* and/or *Populus trichocarpa*. *Symphoricarpus albus* dominates the shrub layer,

with *Oemleria cerasiformis* as an important associated species. The lush understory is typically composed of *Hydrophyllum tenuipes*, *Galium aparine*, *Urtica dioica*, *Claytonia sibirica*, and *Carex deweyana*.

***Fraxinus latifolia/Acer circinatum/Hydrophyllum tenuipes-Urtica dioica***  
***Symphoricarpos albus/Urtica dioica***  
**Oregon ash/vine maple/Pacific waterleaf-nettle**  
**FRLA/ACCI/HYTE-URDI**

N=8 (Willamette Valley 8)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees</b>		
<i>Fraxinus latifolia</i>	75	69
<i>Acer macrophyllum</i>	25	63
<i>Alnus</i>	25	45
<b>Shrubs</b>		
<i>Acer circinatum</i>	100	59
<i>Corylus cornuta</i>	25	9
<i>Oemlaria cerasiformis</i>	25	5
<b>Herbs</b>		
<i>Hydrophyllum tenuipes</i>	88	52
<i>Urtica dioica</i> ssp. <i>gracilis</i>	75	21
<i>Tellima grandiflora</i>	63	2
<i>Carex deweyana</i>	63	1
<i>Dicentra formosa</i>	50	5
<i>Claytonia sibirica</i>	50	4
<i>Galium aparine</i>	50	2
<i>Polystichum munitum</i>	38	3

**Elevations:** less than 600 feet.

**Geomorphic environment:** Environmental data for this type are minimal. Sites were classed as floodplain forests (7 plots) or sloughs (1 plot). The plots ranged from 0 to 15 feet above summer flow (average 5 feet), and from 0 to 100 feet from the channel (average 19 feet). Sites ranged from small creeks (Senecal, Marion County) to the Clackmas River. Five plots are from Clackamas County (four from Milo McIver State Park), and one plot each from Linn, Marion, and Polk Counties.

**Community:** *Fraxinus latifolia/Acer circinatum/Hydrophyllum tenuipes/Urtica dioica* is a forested floodplain community. The overstory is *Fraxinus latifolia*, often with *Acer macrophyllum* or *Alnus*. The *Alnus* species present in these plots was *Alnus rubra*. The shrub layer is



dominated by *Acer circinatum*, with *Corylus cornuta* and *Oemleria cerasiformis* as the most common associated species. The herb layer generally has abundant *Hydrophyllum tenuipes*, with *Urtica dioica* a co-dominant. *Tellima grandiflora* and *Carex deweyana* also occur in over half the plots.

**Similar types:** This community shares many species with the Symphoricarpos albus/Urtica dioica-Fraxinus latifolia/Sambucus racemosa-Corylus cornuta phase, but with *Acer circinatum* in the place of *Symphoricarpos albus*.

**Hardwood/Salmonberry/Pacific waterleaf  
 Hardwood/*Rubus spectabilis*/*Hydrophyllum tenuipes*  
 Hardwood/RUSP/HYTE**

N=5 (Willamette Valley 5)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees</b>		
Alnus	40	80
Populus trichocarpa	40	55
Fraxinus latifolia	20	100
Acer macrophyllum	20	90
<b>Shrubs</b>		
Rubus spectabilis	100	50
Corylus cornuta	60	10
Sambucus racemosa	40	8
<b>Herbs</b>		
Hydrophyllum tenuipes	100	38
Carex deweyana	80	3
Urtica dioica ssp. gracilis	60	28
Galium aparine	60	25
Claytonia sibirica	60	11
Dicentra formosa	40	9
Athyrium filix-femina	40	2
Polystichum munitum	40	1
Stachys cooleyae	40	1

**Geomorphic environment:** Soil, substrate and geomorphic surface data are unavailable. Plots were 2 to 12 feet above river level (average 7 feet), and from 1 to 200 feet from the main creek channel. Plots were located in Benton (Camp Adair) and Clackamas (Milo McIver State Park, Molalla River State Park) counties.

**Community:** Hardwood/*Rubus spectabilis*/*Hydrophyllum tenuipes* is a Willamette Valley forested floodplain community. It can occur under a range of overstory tree species, including *Alnus*, *Populus trichocarpa*, *Fraxinus latifolia*, and *Acer macrophyllum*. *Rubus spectabilis* is the dominant shrub, though *Corylus cornuta* and *Sambucus racemosa* commonly occur. The herb layer is dominated by *Hydrophyllum tenuipes* and *Urtica dioica*, almost always with *Carex deweyana* present. *Galium*

*aparine* and *Claytonia sibirica* are also common and abundant. *Alnus rubra* was confirmed at the Clackamas County sites.

**(*Populus trichocarpa*-*Fraxinus latifolia*)/*Rubus spectabilis*-*Symphoricarpos albus*  
 (Black cottonwood-Oregon ash)/salmonberry-snowberry  
 (POBAT-FRLA)/RUSP-SYAL**

n=7 (WV 7)

SPECIES	CONSTANCY %	TYPICAL COVER %
<b>Trees</b>		
<i>Populus trichocarpa</i>	86	65
<i>Fraxinus latifolia</i>	43	73
<i>Acer macrophyllum</i>	14	10
<b>Shrubs</b>		
<i>Rubus spectabilis</i>	100	76
<i>Symphoricarpos albus</i>	86	10
<i>Sambucus racemosa</i>	86	5
<i>Rubus ursinus</i>	43	6
<i>Cornus sericea</i>	43	5
<b>Herbs</b>		
<i>Urtica dioica</i> ssp. <i>gracilis</i>	71	21
<i>Hydrophyllum tenuipes</i>	71	1
<i>Impatiens capensis</i>	57	Tr

**Geomorphic environment:** One Molalla River State Park site was visited in 2004. The community there is on the main floodplain of the Willamette River, near the confluence with the Molalla River. The plot is on a gentle, slightly convex surface. Silt deposited on tree boles in the plot showed evidence of flood waters from 8 to 9 feet deep. The soil pit was in a deep silt deposit, probably resulting from the last major flood. In a concavity at one end of the surface, the community transitioned into a *Fraxinus latifolia*-*Populus trichocarpa* dominated *Carex obnupta* wetland.

Soil, substrate and geomorphic surface data are unavailable for the other sites. Plots were 9 to 21 feet above river level (average 14 feet), and from 115-500 feet from the channel. Plots were located in Clackamas (Molalla SP), Marion (Minto, Wilsonville), Polk (Luckiamute) and Yamhill (Grand Island) counties.

**Community:** (*Populus trichocarpa*-*Fraxinus latifolia*)/*Rubus spectabilis*-*Symphoricarpos albus* is a shrubby Willamette Valley forested floodplain community. Tree canopy is fairly dense *Populus trichocarpa* and/or

*Fraxinus latifolia*. The thick shrub layer is dominated by *Rubus spectabilis* with *Symphoricarpos albus* and *Sambucus racemosa*. The herb layer is very sparse. The most common and abundant herb is *Urtica dioica*, though *Hydrophyllum tenuipes* and *Impatiens capensis* are usually present.

**(*Fraxinus latifolia*-*Quercus garryana*)/*Symphoricarpos albus*  
(Oregon ash-Oregon white oak)/common snowberry  
(FRLA-QUGA4)/SYAL**

N=11 (Willamette Valley 11)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees</b>		
<i>Fraxinus latifolia</i>	82	62
<i>Quercus garryana</i>	64	62
<b>Shrubs</b>		
<i>Symphoricarpos albus</i>	100	70
<i>Rubus ursinus</i>	82	3
<i>Oemleria cerasiformis</i>	36	10
<b>Herbs</b>		
<i>Polystichum munitum</i>	45	6
<i>Galium aparine</i>	45	2
<i>Carex deweyana</i>	36	4
<i>Torilis</i>	36	Tr

**Elevations:** less than 600 feet.

**Geomorphic environment:** Environmental data for this type are minimal. Muddy Creek in the Finley Wildlife Refuge was visited in 2004. The community there is on the floodplains of a tightly meandering low gradient creek that is deeply incised with rectangular cross section. The Muddy Creek floodplain is wide. Terraces are barely in evidence. Floodplains are inundated annually. Silt lines in this community on both sides of the creek are about two feet higher than bankfull.

Soil, substrate and geomorphic surface data are unavailable for the other sites. The plots ranged from 1 to 18 feet above summer flow (average 8 feet), and from 3 to 500 feet from the channel (average 41 feet). Four plots were from Linn County (Butte, Little Muddy, and N. Santiam drainages), three plots from Clackamas County (Camassia Creek, Milo Mclver State Park-Clackamas River), three plots from Benton County (William L. Finley National Wildlife Refuge-Muddy Creek), and one from Polk County (Soap Creek).

**Community:** (*Fraxinus latifolia*-*Quercus garryana*)/*Symphoricarpos albus* is a floodplain forest community. It has a *Fraxinus latifolia* and/or *Quercus garryana* overstory over a thick shrub layer dominated by

*Symphoricarpos albus*. *Rubus ursinus* is the most common associated species. *Oemleria cerasiformis* is often present. The herb layer is relatively sparse. *Polystichum munitum* and *Galium aparine* are the most typical species.

**Acer macrophyllum/Symphoricarpos albus**  
**Big leaf maple/common snowberry**  
**ACMA3/SYAL**

N=2 (Willamette Valley 2)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees</b>		
Acer macrophyllum	100	55
Populus trichocarpa	50	75
<b>Shrubs</b>		
Symphoricarpos albus	100	88
Rubus ursinus	100	6
Oemleria cerasiformis	50	2
Rubus spectabilis	50	2
<b>Herbs</b>		
Carex deweyana	100	Tr
Hydrophyllum tenuipes	100	Tr
Heracleum lanatum	50	3
Galium triflorum	50	1

**Elevations:** less than 600 feet.

**Geomorphic environments:** Environmental data for this type are minimal. The plots ranged from 12 to 21 feet above summer flow, and from 30 to 200 feet from the channel. Both plots are from the main Willamette River, one site from a slough in Linn County, the other from a floodplain forest plot near Wilsonville in Marion County.

**Community:** Sample size is extremely limited for this community. *Acer macrophyllum/Symphoricarpos albus* is a floodplain forest. It occurs with an overstory of *Acer macrophyllum* and often *Populus trichocarpa*. *Symphoricarpos albus* dominates the understory. *Rubus ursinus* is the other typical associated shrub species. The herb layer is very sparse under the dense shrub layer, with *Carex deweyana* and *Hydrophyllum tenuipes* present in trace amounts.



**Forested *Symphoricarpos albus*/*Maianthemum stellatum*  
 Forested common snowberry/starry false Solomon's seal  
 Forested SYAL/MAST4**

N=4 (Willamette Valley 4)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
<i>Fraxinus latifolia</i>	50	80
<i>Acer macrophyllum</i>	50	29
<i>Pseudotsuga menziesii</i>	25	90
<i>Populus trichocarpa</i>	25	50
<i>Alnus</i>	25	20
<i>Thuja plicata</i>	25	15
<i>Taxus brevifolia</i>	25	5
<b>Shrubs</b>		
<i>Symphoricarpos albus</i>	100	56
<i>Oemleria cerasiformis</i>	50	18
<i>Acer circinatum</i>	50	12
<i>Corylus cornuta</i>	50	4
<i>Rubus ursinus</i>	50	Tr
<b>Herbs</b>		
<i>Maianthemum stellatum</i>	100	43
<i>Galium aparine</i>	75	Tr
<i>Equisetum hyemale</i>	50	10
<i>Vancouveria hexandra</i>	50	1
<i>Impatiens capensis</i>	50	1
<i>Thalictrum occidentale</i>	50	Tr

**Elevations:** less than 600 feet.

**Geomorphic environment:** Environmental data for this type are minimal. The plots ranged from 2 to 8 feet above summer flow, and from 0 to 30 feet from the channel. Remarks on one plot sheet record that clay covered 90% of the plot. Two plots were from the Clackamas River (Clackamas County), one from the Middle Fork Willamette River (Lane County), and one from the Willamette River (Marion County).

**Community:** Forested *Symphoricarpos albus*/false Solomon's-seal is a floodplain community. It can occur under dense canopies of *Fraxinus*

*latifolia*, *Populus trichocarpa*, *Acer macrophyllum*, or *Pseudotsuga menziesii*. A thick shrub layer is dominated by *Symphoricarpos albus*. *Oemleria cerasiformis* and *Acer circinatum* are often abundant, while *Corylus cornuta* and *Rubus ursinus* are also frequently present. *Maianthemum stellatum* is the dominant herb.

***Fraxinus latifolia/Symphoricarpos albus/Camassia quamash*  
Oregon ash/common snowberry/common camas  
FRLA/SYAL/CAQU2**

N=3 (Willamette Valley 3)

SPECIES	CONSTANCY %	TYPICAL COVER %
<b>Trees</b>		
<i>Fraxinus latifolia</i>	100	52
<i>Quercus garryana</i>	67	80
<b>Shrubs</b>		
<i>Symphoricarpos albus</i>	100	59
<i>Spiraea douglasii</i>	67	1
<i>Rosa eglanteria</i>	67	1
<b>Herbs</b>		
<i>Camassia quamash</i>	100	32
<i>Ranunculus uncinatus</i>	67	3
<i>Rumex crispus</i>	67	Tr
<i>Galium aparine</i>	67	Tr

**Elevations:** less than 600 feet.

**Geomorphic environment:** Environmental data for this type are minimal. Sites were classed as floodplain forests. Water table depth was at the surface. The plots ranged from 5 to 8 feet above summer flow (average 6 feet), and from 15 to 50 feet from the main channel (average 30 feet). All three plots are from at William L. Finley Wildlife Refuge Benton County (Muddy Creek).

**Community:** *Fraxinus latifolia/Symphoricarpos albus/Camassia quamash* is a forested floodplain community. The overstory is *Fraxinus latifolia*, usually with *Quercus garryana*. The shrub layer is dominated by *Symphoricarpos albus*, with *Spiraea douglassii* and the non-native *Rosa eglanteria* as commonly associated species. *Camassia quamash* is the herb layer dominant. *Ranunculus uncinatus*, the exotic *Rumex crispus*, and *Galium aparine* are often present but at low cover.

*Camassia quamash* is an ephemeral species, and similar habitats sampled late in the summer might not show the presence of this species. Such a small sample size does not present strong evidence on typical composition or abundance.

**Western redcedar/Starry false Solomon's-seal  
THPL/MAST4**

N=5 (WNF 4, Willamette Valley 1)

<b>SPECIES</b>	<b>CONSTANCY %</b>	<b>TYPICAL COVER %</b>
<b>Trees-overstory</b>		
Thuja plicata	100	68
Acer macrophyllum	60	41
Taxus brevifolia	60	29
Pseudotsuga menziesii	40	19
Alnus	40	8
<b>Trees-seedlings</b>		
Thuja plicata	60	3
Acer macrophyllum	40	11
Tsuga heterophylla	40	7
<b>Shrubs</b>		
Oemleria cerasiformis	80	1
Rubus ursinus	80	1
Acer circinatum	60	38
Oplopanax horridum	40	2
<b>Herbs</b>		
Maianthemum stellatum	100	30
Polystichum munitum	80	8
Galium triflorum	80	1
Anemone deltoidea	80	1
Trillium ovatum	80	Tr
Athyrium filix-femina	60	4
Vancouveria hexandra	60	2
Osmorhiza berteroi	60	1
Tiarella trifoliata	60	1
Petasites frigidus	40	3
Aruncus dioicus	40	2
Prosartes hookeri	40	1
Adiantum pedatum	40	1
Hydrophyllum tenuipes	40	1
Bromus vulgaris	40	Tr

**Elevations:** less than 600 to 2390 feet.

**Geomorphic environment:** Low terraces or elevated islands on unconstrained reaches of relatively large 4<sup>th</sup> to 6<sup>th</sup> order streams in the margins of the Willamette Valley. Soils data are from one plot. It had a loamy top horizon with increasing gravel content with depth. No surface coarse fragments were recorded from that site. The Willamette Valley site was on the lower Clackamas River. Willamette NF samples were from the South Fork McKenzie watershed.

**Community:** The *Thuja plicata*/*Maianthemum stellatum* community occurs under dense *Thuja plicata* canopy, often with *Acer macrophyllum* and *Taxus brevifolia*. *Pseudotsuga menziesii* and *Alnus* may also be present. *Acer circinatum* is the most abundant shrub and is present in almost two-thirds of the plots. *Oemleria cerasiformis* and *Rubus ursinus* are typically present in trace amounts. The understory is dominated by *Maianthemum stellatum*, with *Polystichum munitum* the second important species.

These sites are reset infrequently, though flooding may allow establishment of *Alnus rubra* without removing the existing overstory. Presence of wet-indicator species, such as *Oplopanax horridum*, *Athyrium filix-femina* and *Petasites frigidus* as well as the *Thuja plicata* overstory mark this community as riparian.

**TABLE OF CONTENTS FOR NATIVE FRESHWATER PLANT ASSOCIATIONS OF NORTHWESTERN OREGON**

**Introduction** ..... 190  
 Major Wetland Types ..... 190  
 Disturbance Processes ..... 193  
 Exotic Plants ..... 195  
 Methods ..... 196  
 Results ..... 197  
 Key to Native Freshwater Wetland Plant Associations of  
 Northwestern Oregon ..... 198

**I. FOREST AND WOODLAND ASSOCIATIONS**

**Forest and woodland associations key** ..... 198  
*Alnus rubra*/*Athyrium filix-femina* - *Lysichiton americanus*  
 Association ..... 208  
*Alnus rubra*/*Carex obnupta* - *Lysichiton americanus* Association... 209  
*Fraxinus latifolia*/*Carex aquatilis* var. *aquatilis* Association ..... 210  
*Fraxinus latifolia*/*Carex deweyana* - *Urtica dioica* ssp. *Gracilis*  
 Association ..... 211  
*Fraxinus latifolia*/*Carex obnupta* Association ..... 212  
*Fraxinus latifolia*/*Spiraea douglasii* Association ..... 213  
*Fraxinus latifolia*/*Symphoricarpos albus* Association ..... 214  
*Picea sitchensis*/*Carex obnupta* - *Lysichiton americanus*  
 Association ..... 215  
*Picea sitchensis*/*Cornus sericea*/*Lysichiton americanus*  
 Association ..... 216  
*Pinus contorta* var. *contorta*/*Carex obnupta* Association ..... 217  
*Populus balsamifera* ssp. *trichocarpa* /*Cornus sericea*/*Carex*  
*deweyana* ssp. *leptopoda* ..... 218  
*Populus tremuloides*/*Carex obnupta* Association ..... 219  
*Thuja plicata*/*Lysichiton americanus* Association ..... 220  
*Tsuga heterophylla*/*Ledum glandulosum*/*Carex obnupta* –  
*Lysichiton americanus* Association ..... 221

**II. SHRUBLAND ASSOCIATIONS**

**Shrubland associations key** ..... 200  
*Alnus incana*/*Lysichiton americanus* Association ..... 222  
*Alnus viridis* ssp. *sinuata*/*Lysichiton americanus* Association ..... 223  
*Alnus viridis* ssp. *sinuata*/*Scirpus microcarpus* Association ..... 224  
*Betula nana*/*Carex aquatilis* var. *dives* Association ..... 225  
*Cornus sericea*/*Lysichiton americanus* Association ..... 226  
*Kalmia microphylla*/*Carex aquatilis* var. *dives* Association ..... 227

Ledum glandulosum - Gaultheria shallon/Carex obnupta Association .....	228
Ledum glandulosum/Carex obnupta/Sphagnum Association .....	229
Ledum glandulosum/Darlingtonia californica/ Sphagnum Association .....	230
Ledum glandulosum - Myrica gale Association.....	231
Ledum glandulosum/Sanguisorba officinalis/Sphagnum Association .....	232
Malus fusca/Carex obnupta Association.....	233
Myrica gale/Carex aquatilis var. dives Association .....	234
Salix commutata Association .....	235
Salix geeyeriana complex .....	236
Salix hookeriana - (Salix sitchensis) Association.....	237
Salix hookeriana - Malus fusca/Carex obnupta - Lysichiton americanus Association .....	238
Salix lucida ssp. lasiandra/Urtica dioica ssp. gracilis Association .....	239
Salix lucida ssp. lasiandra/Salix sitchensis/Lysichiton americanus Association .....	240
Salix sitchensis complex .....	241
Spiraea douglasii Association .....	242
Spiraea douglasii - Vaccinium uliginosum/Carex obnupta – Deschampsia caespitosa Association .....	243
Spiraea douglasii/Sphagnum Association .....	244
Vaccinium caespitosum/Sanguisorba officinalis - Carex obnupta Association .....	245
Vaccinium caespitosum/Xerophyllum tenax - Sanguisorba officinalis Association .....	246
Vaccinium uliginosum/Carex obnupta Association .....	247
Vaccinium uliginosum/Deschampsia caespitosa - Carex obnupta Association .....	248
Vaccinium uliginosum/Dodecatheon jeffreyi - Caltha leptosepala ssp. howellii Association.....	249

### III. HERBACEOUS ASSOCIATIONS

<b>Key to herbaceous associations .....</b>	<b>204</b>
Athyrium filix-femina Association .....	250
Azolla (filiculoides, mexicana) Association .....	251
Bidens cernua Association .....	252
Bidens frondosa Association .....	253
Boykinia major Association .....	254
Brasenia schreberi Association .....	255
Calamagrostis canadensis Association .....	256
Calamagrostis nutkaensis Association .....	257
Callitriche heterophylla Association .....	258

<i>Caltha leptosepala</i> ssp. <i>howellii</i> Association .....	259
<i>Caltha leptosepala</i> ssp. <i>howellii</i> - <i>Carex obnupta</i> Association .....	260
<i>Camassia quamash</i> Association.....	261
<i>Carex amplifolia</i> Association.....	261
<i>Carex angustata</i> Association .....	263
<i>Carex aperta</i> Association.....	264
<i>Carex aquatilis</i> var. <i>aquatilis</i> Association .....	265
<i>Carex aquatilis</i> var. <i>dives</i> Association .....	266
<i>Carex aquatilis</i> var. <i>dives</i> - <i>Comarum palustre</i> Association .....	267
<i>Carex buxbaumii</i> Association .....	268
<i>Carex cusickii</i> Association .....	269
<i>Carex deweyana</i> ssp. <i>leptopoda</i> Association .....	270
<i>Carex exsiccata</i> Association.....	271
<i>Carex feta</i> Association.....	272
<i>Carex lasiocarpa</i> Association .....	273
<i>Carex lenticularis</i> Association.....	274
<i>Carex limosa</i> Association .....	275
<i>Carex luzulina</i> Association.....	276
<i>Carex nebrascensis</i> Association.....	277
<i>Carex nigricans</i> Association .....	278
<i>Carex obnupta</i> Association.....	279
<i>Carex pachystachya</i> Association.....	280
<i>Carex scopulorum</i> Association .....	281
<i>Carex simulata</i> .....	282
<i>Carex utriculata</i> Association .....	283
<i>Ceratophyllum demersum</i> Association .....	284
<i>Deschampsia caespitosa</i> montane "wet meadow" complex.....	285
<i>Deschampsia caespitosa</i> - <i>Artemisia lindleyana</i> Association .....	287
<i>Deschampsia caespitosa</i> - <i>Danthonia californica</i> Association.....	288
<i>Deschampsia caespitosa</i> - <i>Juncus balticus</i> Association.....	289
<i>Dulichium arundinaceum</i> Association.....	290
<i>Eleocharis acicularis</i> Association.....	291
<i>Eleocharis ovata</i> - <i>Ludwigia palustris</i> Association.....	292
<i>Eleocharis palustris</i> Association .....	293
<i>Eleocharis quinqueflora</i> Association.....	294
<i>Elodea canadensis</i> Association .....	295
<i>Equisetum arvense</i> Association.....	296
<i>Eragrostis hypnoides</i> - <i>Gnaphalium palustre</i> Association .....	297
<i>Euthamia occidentalis</i> Association .....	298
<i>Glyceria striata</i> Association.....	299
<i>Hippuris vulgaris</i> Association.....	300
<i>Hydrocotyle ranunculoides</i> Association .....	301
<i>Isoetes nuttallii</i> Association.....	302
<i>Juncus balticus</i> Association.....	303
<i>Juncus effusus</i> Association .....	304



Juncus nevadensis Association .....	305
Lemna minor Association.....	306
Lilaeopsis occidentalis Association.....	307
Ludwigia palustris - Polygonum hydropiperoides Association .....	308
Menyanthes trifoliata Association .....	309
Nephrophyllidium crista-galli Association .....	310
Nuphar lutea ssp. polysepala Association .....	311
Oenanthe sarmentosa Association .....	312
Paspalum distichum Association .....	313
Polygonum amphibium Association .....	314
Potamogeton natans Association .....	315
Ranunculus aquatilis Association .....	316
Ranunculus flammula Association .....	317
Sagittaria latifolia Association .....	318
Sanguisorba officinalis - Carex aquatilis var. dives Association .....	319
Schoenoplectus acutus Association .....	320
Scirpus microcarpus Association .....	321
Senecio triangularis Association .....	322
Sparganium angustifolium Association .....	323
Sparganium eurycarpum Association .....	324
Torreyochloa pallida var. pauciflora Association.....	325
Trichophorum caespitosum Association .....	326
Triteleia hyacinthina Association.....	327
Typha latifolia Association .....	328
Utricularia macrorhiza Association .....	329

## **NONVASCULAR ASSOCIATIONS**

<b>Key to nonvascular associations .....</b>	<b>207</b>
Fontinalis antipyretica Association.....	330
Polytrichum commune Association .....	331

## Introduction

This wetlands section provides keys, descriptions, and stand tables for 122 native freshwater plant associations (14 forest and woodland, 28 shrub, 78 herbaceous, 2 nonvascular) in northwestern Oregon, based on analysis of data from 1,992 plots distributed throughout the study area. Descriptions are provided for eight other plant associations for which there are no plot data. Northwestern Oregon as defined in this section includes the north half of both the Coast Range and Western Cascade ecoregions, and all of the Willamette Valley ecoregion. The Western Cascade ecoregion also includes a significant portion of the east slope of the Cascade Range, down to an elevation of about 3,000 feet in the north to 5,000 feet in the south. Note that the streamside section does not include the east slope of the Cascade Range. Data from some wetlands in coastal Douglas County and western Klamath County were also included where wetland associations from these adjoining areas are known or suspected to occur within the study area.

This section describes only wetland associations with seasonal to perennial hydration, excluding irregularly flooded streamside vegetation (see streamside section of this field guide, or McCain 2004 for a more complete treatment). Salt marsh and brackish plant associations were also excluded, as were undersampled freshwater stands of *Carex lyngbyei* and *Schoenoplectus americanus* that occur up to 50 miles upstream from salt water in the Columbia River

## Major Wetland Types

**Aquatic beds.** Freshwater ponds, lakes, and sloughs are habitat for aquatic bed and emergent marsh associations and occur throughout northwestern Oregon. Along the coast, most large lakes formed when shifting sands blocked streams draining the Coast Range, creating deep lakes with steep slopes whose water levels may drop as much as 6-8 feet during the summer. Lakes and ponds also occur within the dune sheet in areas where the water table is at the surface. They are typically shallow and subject to seasonal changes in water levels, and some are unique because of their large size and extensive aquatic bed and emergent plant associations. Ponds, lakes, and sloughs are also associated with floodplains of major rivers throughout the study area, particularly on broad flats associated with the Willamette and Columbia Rivers. Water levels here typically recede in summer, so gravel banks and mud flats may appear, stranding some aquatic plants, but creating habitat for emergent species. Peatlands and headwater basins also contain pools, ponds, and tarns with aquatic bed associations. Ponds

and pools may also occur midslope, associated with benches and slump or sag ponds in landslide topography, often associated with marshes or peatlands that develop on these sites. Aquatic bed vegetation in ponds is usually entirely submerged or may have leaves floating at the surface. Most vegetation is rooted in sand, gravel, silt or mud, but some species are free-floating and drift about with wind and current. Extensive monotypic stands are typical of this kind of vegetation. If the water body is large enough, discrete clumping or zonation of single species can be seen, with mixtures occurring in the ecotones. Since 1850, much of this habitat has been lost to river channelization, has silted in naturally, or has been filled or recontoured for agriculture.

**Marshes.** Marsh associations occur in depressions in various landforms, particularly headwall basins and floodplains. They may also occur midslope, associated with benches and slump or sag ponds in landslide topography. Water levels typically recede in summer, exposing gravel or mud flats and creating habitat for some seasonal species. Aquatic species may become stranded in these communities and persist with modified morphology, if the substrate is wet enough. If good zonation is present, it is possible to see weak-stemmed or decumbent species in the deeper water, or species specifically adapted to later exposure on mud flats, followed by taller herbs and shrubs on the landward side. Perennially wet marshes are usually too wet for the noxious grass *Phalaris arundinacea* to become established. Channelization, flood control and agriculture have caused extensive losses of these habitats. The *Sagittaria latifolia* association that was once common throughout the region in floodplain marshes inundated until midsummer largely has been displaced by *Phalaris arundinacea* except in the Columbia River bottoms. Mud flat associations along the lower Columbia River have suffered a similar fate.

**Peatlands.** Most peatlands in Oregon are fens rather than bogs, being hydrated by mineral-rich surface or groundwater, lacking a domed peat profile, and having a pH generally higher than 5.5. Many fens, however, contain localized *Sphagnum* hummocks or lawns with a pH as low as 4, and may be classified as "poor fen." They occur in depressions in various landforms, particularly in interdunal depressions, headwall basins, and floodplains. Peatlands may also occur around midslope slump or sag ponds in landslide topography. They are usually perennially saturated but local areas of surface drying are not uncommon. These wetlands are widespread in northwestern Oregon but usually small in area, and occurrences in the Willamette Valley are now rare. Drainage, filling, peat mining, conversion to commercial cranberry production, and plant succession have destroyed many sites, and losses continue to occur despite wetland regulations that were designed to protect them.

The small area they occupy in the landscape is causing some conservation organizations to pass them over in the "bigger is better" philosophy that currently dominates the field. It is important to properly document the components of these ecosystems and to develop new conservation priorities to help protect representative examples in the state. Coastal fens in Oregon are floristically distinct from those north of the Columbia River (e.g., Golinski 1999; Vitt et al. 1999) and those at higher elevations in the Cascade and Coast Ranges (Seyer 1979, 1981, 1983; Wilson 1986; Frenkel et al. 1986), making them unique in North America and highly-ranked elements in state Heritage Program methodology.

**Wet prairies.** The name prairie refers here to wet grasslands that developed on clay or silt loam soils in the Willamette Valley, on the Columbia River bottoms, and along the coast. Although best known for *Deschampsia caespitosa*, they contain many other species of grasses, sedges and herbs. Before flood control, wet prairies on the Columbia River bottoms were frequently flooded well into summer, and not much is known about their original composition because widespread invasion of *Phalaris arundinacea* has displaced many native species. Some stands were probably *Deschampsia caespitosa* prairie and others were *Carex aperta* prairie, and they intergraded with a complex of marshes and sloughs on the river bottoms. Willamette Valley prairie developed on heavy clay loam soils that created a seasonally perched water table that was often isolated hydrologically from streams and rivers. These sites are usually dry by late spring but depressions may retain water well into the summer. Few vernal pools are known to remain in the Willamette Valley and none are described in this guide. The Willamette Valley prairie is unique and one of the rarest ecosystems in the Pacific Northwest, containing a number of endemic plant species. It developed under a regime of frequent fire from both lightning and native Americans (Boyd 1999), but after settlement by Euroamericans it went into rapid decline. Considerable research is now being done on fire ecology and restoration in this habitat, but after twenty years of study most plant associations still remain unpublished. The few Willamette Valley prairie associations described in this guide are provided to help document the vegetation, but much work remains to be done.

**Shrub swamps.** Shrub swamps are wetlands dominated by shrubs and they occur at all elevations throughout northwestern Oregon. They occur on floodplains and basins, and most tolerate a variable water regime. Community structure ranges from scattered shrubs with intervening herbaceous component, to dense and impenetrable stands of *Salix*, *Cornus stolonifera*, and *Spiraea douglasii*. Riparian shrub swamp associations are highly variable and difficult to classify. Many contain

various mixtures of the same species, with or without a partial tree canopy. Historically, willow swamps were the second most abundant wetland vegetation (after wet prairies) forming a wet landscape described by early explorers and land surveyors of the region. Many of these systems were maintained or enhanced by beavers and have since been lost to drainage and conversion to farming.

**Forested wetlands (swamps).** This section includes only forested wetland associations occurring in seasonally to perennially flooded depressions, or with perennially wet soils throughout the stands. The major associations are dominated by *Alnus rubra*, *Fraxinus latifolia*, *Picea sitchensis*, or *Thuja plicata*. The extent of forested wetlands in northwestern Oregon is now much diminished from what it was in 1850. General Land Office survey notes from the 1850's show that riparian forest in the Willamette Valley was in some areas as much as five miles wide, but most stands are now reduced to narrow strips fringing streams and rivers (Benner and Sedell 1997). Probably at least 100,000 acres of this forest were cleared for agriculture and fuelwood. On the coast, old-growth *Picea sitchensis* swamp is very rare because most stands were readily accessible for logging and suitable sites may never have been numerous or extensive. Of an estimated 14,000 acres in Oregon in 1850, about 1,700 remain today, representing an 88 percent loss.

## **Disturbance Processes**

The major agents of wetland disturbance in northwestern Oregon have been beavers, floods, landslides, tsunamis, windthrow, fire, and people. These forces mediate the supply, movement, and chemistry of water and sediments and shape the development of different types of vegetation.

**Beavers.** Beavers occur throughout the Pacific Northwest, their work most evident as beaver dams, beaver ponds, and plugged culverts. Less evident is the extensive cropping of wetland and streamside vegetation by beavers that den in streambanks without the familiar dams or lodges. Many wetlands developed on sediments trapped by long-vanished beaver dams, and in narrow drainages these wetlands persist as series of terraces extending upstream in stairstep fashion, the beaver dams no longer visible. Although beavers are seemingly ubiquitous today, some researches have estimated that historic populations in Oregon were ten times larger than what they are today. Their numbers were decimated first by commercial trapping prior to 1845, then by diminishing wetland acreage caused by their trapping, and finally by a rush of agricultural drainage projects.

**Floods.** Floods are the primary force influencing landforms and vegetation on river bottoms. They vary in magnitude and either destroy, create, or maintain wetlands. High-energy floods in constrained valleys may fill wetlands with sediment and create new wetlands by reworking sediments to create depressions. They frequently destroy beaver dams and expose accumulated sediments to erosion and rapid invasion by upland species. They also have less impact on some wetlands by simply rehydrating them after summer drying. Floods had their greatest effect on wetlands prior to construction of flood control dams in the Willamette River basin and on the Columbia River. Historically, two distinct seasonal flood regimes existed, one initiated by winter rain west of the Cascades, the other by spring snowmelt east of the Cascades. Winter floods ("rain floods") primarily affected the Willamette Valley and spring floods ("freshets") affected the Columbia River bottoms. Along the Columbia River, flood heights gradually diminished downstream, and below river mile 40 the broad estuary and strong tidal influence dissipated its effects. Floodwaters of 20 to 30 feet at Vancouver would rise to only 2 to 5 feet in the estuary (U.S. Army Corps of Engineers 1948, 1988). The spring floods on the Columbia River bottoms kept much of the floodplain under water until June or sometimes July, maintaining much wet prairie and seasonal willow and ash swamps that were later invaded by *Phalaris arundinacea* in the absence of prolonged flooding.

**Landslides.** Like floods, landslides and debris torrents both create and destroy wetlands. Those occurring midslope may form isolated slump or sag ponds that are often associated with marshes and peatlands. Larger-scale landslide topography usually contains clusters of ponds over a large area. Debris torrents are concentrated in narrow stream valleys and scour riparian marshes and beaver impoundments associated with the streambed. Wetlands sometimes form in the jumbled deposits at the base of the flow.

**Tsunamis.** Sediment cores indicate that tsunamis have repeatedly inundated salt marshes, swamps, and peatlands along the coast of the Pacific Northwest. Burial by marine sediments and associated tectonic uplift or subsidence destroys wetlands and creates new ones, but these processes are not well documented in Oregon.

**Windthrow.** Windthrow is usually a minor agent of disturbance in our wetlands but locally could be catastrophic in a major storm. *Picea sitchensis* swamps on the coast are the most vulnerable wetlands. The roots of *Picea* cannot grow in perennially wet, anoxic soil and instead form wide-spreading but very shallow systems that, combined with buttresses at the base of the trunk, serve to keep the tree rocking back and forth on the spongy substrate. Windthrow is common in these

stands, creating canopy gaps for the dense shrub layer and reproducing trees. Windthrow of small trees is sometimes seen in peatlands where the weight of the tree becomes insupportable in the soft ground.

**Fire.** Fire probably played a major role historically in most wetlands in northwestern Oregon except for the wettest of coastal swamps. Ignition sources were both aboriginal and by lightning, the former being most common in the Willamette Valley (Boyd 1999). Fire-scarred trees or stumps may often be found in the center of wetlands, and soil pits or sediment cores frequently contain charcoal, but these are the only evidence for fire in and around wetlands. While forest fires in upland settings have been well studied locally, no studies have focused on the role of fire in Oregon wetlands except for Willamette Valley prairie.

**People.** Although people have lived in northwestern Oregon for at least 10,000 years, large-scale human-caused changes to wetlands did not occur until after 1850. The greatest losses of wetland habitat in northwestern Oregon are directly attributable to settlement and land conversion. Agricultural drainage, livestock grazing, logging, groundwater pumping, urban and industrial development, and road construction have all taken their toll and made some wetland associations extremely rare. Recreational off-road vehicles, horseback riding, and hiking can damage wetlands if traffic is concentrated in fragile areas.

## Exotic Plants

Despite their location, certain wetland habitats appear to be especially vulnerable to invasion by exotic species. Recently drained sites with exposures of bare sediments, such as those occurring behind broken or abandoned beaver dams, are favored habitat for upland weeds as long as inundation does not recur in the second growing season. In contrast, seasonally-flooded mudflat associations on floodplains are rarely invaded by weeds as long as water persists into the growing season and suppresses weed development. Some aquatic bed associations are vulnerable to aggressive aquatic weeds and can be completely replaced by them. Well-known weedy species in our area include *Myriophyllum aquaticum*, *Egeria densa*, *Ludwigia uruguayensis*, *Potamogeton crispus*, and *Myriophyllum spicatum*. The most serious pests of lower-elevation emergent marsh and wet prairie are *Phalaris arundinacea*, *Agrostis stolonifera*, *Poa pratensis*, *Iris pseudacorus*, and *Alopecurus pratensis*. *Phalaris arundinacea* and *Agrostis stolonifera* are less common above 4,000 feet in the Cascade Range, but *Poa pratensis* extends well into subalpine meadows, where it may have been introduced as a forage species in range improvement programs, or brought in inadvertently by

sheep.

## Methods

**Datasets.** The datasets used in this analysis were collected by many individuals from 1966 to the present, and are listed in the full guide. Data were collected from a variety of plots sizes and transects scattered throughout the study area, and were usually placed subjectively in order to characterize perceived differences in vegetation. Plots of 10-500 m<sup>2</sup> ("macroplots") were usually sampled to characterize homogeneous stands, while plots of 0.10-1 m<sup>2</sup> ("microplots") were sampled to characterize either homogeneous stands remote from ecotones or changing zones of vegetation within ecotones. Microplots were either free-standing or sampled along transects. Whenever possible, plots were located in sites free of obvious human-caused disturbance. It is difficult to avoid disturbed sites at lower elevations, where pervasive ditching, drainage, and eutrophication have affected virtually all larger wetlands at one time or another.

All plot data included percent cover of individual species and the vegetation layer to which the species belong. Environmental variables varied widely among datasets and were absent for some.

**Data analysis.** This section attempts to describe only wetland associations with seasonal to perennial hydration. Plant associations were identified using cluster analysis, TWINSPAN, and Bray-Curtis ordination provided in PC-ORD (McCune and Mefford 1999), and manual analysis of association tables generated by ECOTOOLS (Smith 1997). In all cases, cover values were averaged for all plots within a plant association. Because of the differences in plot size and environmental data gathered in macroplots and microplots, data from these two plot types were analyzed separately. Although bryophytes are extremely good indicators of certain wetland plant associations, many datasets did not identify individual species. Where data are available, the species are enumerated in the descriptions of each association.

**Classification.** The classification in this section conforms with the National Vegetation Classification System (NVCS): [<http://biology.usgs.gov/npsveg/nvcs.html>]; <http://www.natureserve.org/explorer/servlet/NatureServe?init=Ecol>]. Each association is named after one or more diagnostic species in each vegetation layer. Following the NVCS, a 25% cover cutoff was used to segregate tree and shrub associations from herbaceous associations. Dominant species in the herb layer were defined as having at least 20%



cover, following the 1987 Wetland Delineation Manual (U.S. Army Corps of Engineers 1987), or having the highest cover available in depauperate stands.

Many wetland species tend to form monotypic stands over relatively large areas but they also often form mixed stands with other types. When species are capable of forming monotypic stands of 100 m<sup>2</sup> or more, they were recognized as distinct plant associations instead of patches. In the field, monotypic types are generally >25 m<sup>2</sup> except for vernal pool associations that may occur in patches as small as 1-5 m<sup>2</sup>.

## Results

**Keys and descriptions.** Identification keys and descriptions are provided for 122 plant associations (14 forest and woodland, 28 shrub, 78 herbaceous, 2 nonvascular). Abbreviated stand tables are provided with the description for each association when plot data are available. Descriptions for several associations include phases that have been identified or are expected to occur in the region. Each phase is described briefly or is simply listed if detailed analysis has not been done.

For convenience, *Salix lucida* ssp. *lasiandra* associations were placed together with other *Salix* associations in the shrub class, despite the fact that under favorable conditions *Salix lucida* ssp. *lasiandra* can reach tree height of 30 or 40 feet in western Oregon. In the stand tables for each association it is listed as a tree.

# KEY TO NATIVE FRESHWATER WETLAND PLANT ASSOCIATIONS OF NORTHWESTERN OREGON

- 1a. Combined tree cover generally at least 25%  
 ..... Key to **Forest and Woodland Associations** (p. 198)
- 1b. Combined tree cover generally < 25 % ..... 2
- 2a. Combined shrub cover generally at least 25%  
 ..... Key to **Shrubland Associations** (p. 200)
- 2b. Combined shrub cover generally < 25% ..... 3
- 3a. Graminoid, forb, or fern cover generally at least 25 %, or highest cover available in layer; bryophyte, lichen, or algal cover various  
 ..... Key to **Herbaceous Associations** (p. 204)
- 3b. Graminoid, forb, or fern cover generally < 25%; bryophyte, lichen, or algal cover generally > 25%, or highest cover available in layer  
 ..... Key to **Nonvascular Associations** (p. 207)

## I. FOREST AND WOODLAND ASSOCIATIONS

Mature trees > 12 feet tall, crowns overlapping, cover generally 60-100%.

Note: Some stands with tree cover at least 25 % may key to shrubland or herbaceous associations if trees are only occasional or peripheral in the associations.

Characterized by having one of the following tree species, either mature or reproducing, generally with at least 20% cover:

- (1) *Abies amabilis* ..... A
- (2) *Abies lasiocarpa* ..... B
- (3) *Alnus rubra* ..... C
- (4) *Fraxinus latifolia* ..... D
- (5) *Picea engelmannii* ..... E
- (6) *Picea sitchensis* ..... F
- (7) *Pinus contorta* var. *contorta* [shore pine]  
 ..... *Pinus contorta* var. *contorta*/*Carex obnupta* (p. 217)
- (8) *Pinus contorta* var. *latifolia* [lodgepole pine] ..... G
- (9) *Populus balsamifera* ssp. *trichocarpa*  
 ..... *Populus balsamifera* ssp. *trichocarpa* /*Cornus sericea* /  
*Carex deweyana* ssp. *leptopoda* (p. 218)
- (10) *Populus tremuloides*  
 ..... *Populus tremuloides* /*Carex obnupta* (p. 219)

- (11) *Salix lucida* ssp. *lasiandra*  
 ..... **Key to Shrubland Associations** (p. 200)
- (12) *Thuja plicata* .....A
- (13) *Tsuga heterophylla* .....A

A. *Abies amabilis*, *Thuja plicata*, and/or *Tsuga heterophylla*:

- 1a. *Ledum glandulosum* present  
 ..... *Tsuga heterophylla* /*Ledum glandulosum*/  
*Carex obnupta* - *Lysichiton americanus* (p. 221)
- 1b. *Ledum glandulosum* absent ..... 2
- 2a. *Thuja plicata* present  
 .....*Thuja plicata*/*Lysichiton americanus* (p. 220)
- 2b. *Thuja plicata* absent .**Key to Herbaceous Associations** (p. 204)

B. *Abies lasiocarpa*:

- 1a. *Vaccinium uliginosum* with > 20% cover  
 ..... **Key to Shrubland Associations** (p. 200)
- 1b. *Vaccinium uliginosum* with < 20% cover or absent  
 .....**Key to Herbaceous Associations** (p. 204)

C. *Alnus rubra*:

- 1a. *Carex obnupta* with at least 5% cover and usually dominant or  
 codominant with *Lysichiton americanus*  
 .....*Alnus rubra*/*Carex obnupta* - *Lysichiton americanus* (p. 209)
- 1b. *Carex obnupta* with < 5% cover or absent; *Athyrium filix-femina*  
 and/or *Lysichiton americanus* usually with  $\geq$  20% cover  
*Alnus rubra*/*Athyrium filix-femina* - *Lysichiton americanus* (p. 208)

D. *Fraxinus latifolia*: Characterized by having one of the following species,  
 usually with at least 20% cover, but sometimes less in stands with  
 depauperate understories:

- (1) *Callitriche heterophylla*  
 .....**Key to Herbaceous Associations** (p. 204)
- (2) *Carex aquatilis* var. *aquatilis*  
 ..... *Fraxinus latifolia*/*Carex aquatilis* var. *aquatilis* (p. 210)
- (3) *Carex deweyana*, sometimes with as little as 1% cover in stands  
 with depauperate understory .....*Fraxinus latifolia*/  
*Carex deweyana* - *Urtica dioica* ssp. *gracilis* (p. 211)
- (4) *Carex obnupta* .....*Fraxinus latifolia*/*Carex obnupta* (p. 212)
- (5) *Spiraea douglasii* .....*Fraxinus latifolia*/*Spiraea douglasii* (p. 213)
- (6) *Symphoricarpos albus*  
 ..... *Fraxinus latifolia*/*Symphoricarpos albus* (p. 214)

- E. *Picea engelmannii*:
  - 1a. *Vaccinium uliginosum* with > 20% cover  
 ..... **Key to Shrubland Associations** (p. 200)
  - 1b. *Vaccinium uliginosum* with < 20% cover or absent .....  
 ..... **Key to Herbaceous Associations** (p. 204)
  
- F. *Picea sitchensis*:
  - 1a. *Cornus sericea* present; on tidal surge plain of large coastal rivers  
 ..*Picea sitchensis*/*Cornus sericea*/*Lysichiton americanus* (p. 216)
  - 1b. *Cornus sericea* absent; not on surge plain  
*Picea sitchensis*/*Carex obnupta* - *Lysichiton americanus* (p. 215)
  
- G. *Pinus contorta* var. *latifolia* [lodgepole pine]:
  - 1a. *Vaccinium uliginosum* with > 20% cover  
 ..... **Key to Shrubland Associations** (p. 200)
  - 1b. *Vaccinium uliginosum* with < 20% cover or absent  
 ..... **Key to Herbaceous Associations** (p. 204)

## II. SHRUBLAND ASSOCIATIONS

Mature shrubs < 12 feet tall, crowns overlapping or remote, shrub cover generally > 25 %, tree cover generally < 25 %.

Note: Some stands with shrub cover at least 25 % may key to herbaceous associations if shrubs are only occasional or peripheral in the associations.

Characterized by having one of the following shrub species with highest cover, usually at least 20%, or highest cover available in layer:

- (1) *Alnus incana* ..... *Alnus incana*/*Lysichiton americanus* (p. 222)
- (2) *Alnus viridis* ssp. *sinuata* ..... A
- (3) *Betula nana* ..... B
- (4) *Cornus sericea* ..... *Cornus sericea*/*Lysichiton americanus* (p. 226)
- (5) *Corylus cornuta* ..... **Key to Herbaceous Associations** (p. 204)
- (6) *Kalmia microphylla* ..... C
- (7) *Gaultheria shallon* ..... D
- (8) *Ledum glandulosum* ..... E
- (9) *Lonicera caerulea* ..... **Key to Herbaceous Associations** (p. 204)
- (10) *Lonicera involucrata* . **Key to Herbaceous Associations** (p. 204)
- (11) *Malus fusca* ..... F
- (12) *Myrica gale* ..... G
- (13) *Rosa pisocarpa* ..... **Key to Herbaceous Associations** (p. 204)
- (14) *Rosa gymnocarpa* .... **Key to Herbaceous Associations** (p. 204)

- (15) *Salix commutata* ..... *Salix commutata* (p. 235)
- (16) *Salix geyeriana* ..... *Salix geyeriana* (p. 236)
- (17) *Salix hookeriana* ..... H
- (18) *Salix lucida* ssp. *lasiandra* ..... I
- (19) *Salix sitchensis* ..... *Salix sitchensis* (p. 241)
- (20) *Spiraea douglasii* ..... J
- (21) *Vaccinium caespitosum* ..... K
- (22) *Vaccinium macrocarpon*  
..... *Vaccinium uliginosum*/*Carex obnpta* (p. 247)
- (23) *Vaccinium oxycoccos*  
..... *Vaccinium uliginosum*/*Dodecatheon jeffreyi* – *Caltha leptosepala* ssp. *howellii* (p. 249)
- (24) *Vaccinium uliginosum* ..... L

A. *Alnus viridis* ssp. *sinuata*:

- 1a. *Lysichiton americanus* with at least 20% cover  
..... *Alnus viridis* ssp. *sinuata*/*Lysichiton americanus* (p. 223)
- 1b. *Lysichiton americanus* with < 20% cover or absent ..... 2
  
- 2a. *Scirpus microcarpus* with at least 20% cover  
..... *Alnus viridis* ssp. *sinuata*/*Scirpus microcarpus* (p. 224)
- 2b. *Scirpus microcarpus* with < 20% cover or absent  
..... **Key to Herbaceous Associations** (p. 204)

B. *Betula nana*:

- 1a. *Vaccinium uliginosum* with at least 20% cover  
..... *Vaccinium uliginosum*/*Dodecatheon jeffreyi* -  
*Caltha leptosepala* ssp. *howellii* (p. 249)
- 1b. *Vaccinium uliginosum* with < 20% cover or absent  
..... *Betula nana*/*Carex aquatilis* var. *dives* (p. 225)

C. *Kalmia microphylla*:

- 1a. *Vaccinium uliginosum* with at least 20% cover  
..... *Vaccinium uliginosum*/*Dodecatheon jeffreyi* -  
*Caltha leptosepala* ssp. *howellii* (p. 249)
- 1b. *Vaccinium uliginosum* with < 20% cover or absent  
..... *Kalmia microphylla*/*Carex aquatilis* var. *dives* (p. 227)

- D. *Gaultheria shallon*:
- 1a. *Vaccinium uliginosum* and *Deschampsia caespitosa* present  
..... *Vaccinium uliginosum/Deschampsia caespitosa* -  
*Carex obnupta* (p. 248)
  - 1b. *Vaccinium uliginosum* and *Deschampsia caespitosa* absent  
*Ledum glandulosum* - *Gaultheria shallon/Carex obnupta* (p. 228)
- E. *Ledum glandulosum*:
- 1a. *Gaultheria shallon* with at least 20% cover  
*Ledum glandulosum* - *Gaultheria shallon/Carex obnupta* (p. 228)
  - 1b. *Gaultheria shallon* with < 20% cover or absent ..... 2
  - 2a. *Myrica gale* with at least 20% cover  
.....*Ledum glandulosum* - *Myrica gale* (p. 47)
  - 2b. *Myrica gale* with < 20% cover or absent ..... 3
  - 3a. *Carex obnupta* most conspicuous species in herb layer or evident adjacent to plot  
..... *Ledum glandulosum/Carex obnupta/Sphagnum* (p. 229)
  - 3b. *Carex obnupta* not most conspicuous species in herb layer ..... 4
  - 4a. *Darlingtonia californica* present or evident adjacent to plot;  
*Sanguisorba officinalis* absent  
. *Ledum glandulosum/Darlingtonia californica/Sphagnum* (p. 230)
  - 4b. *Darlingtonia californica* absent; *Sanguisorba officinalis* present  
..*Ledum glandulosum/Sanguisorba officinalis Sphagnum* (p. 232)
- F. *Malus fusca*:
- 1a. *Salix hookeriana* conspicuous in plot or evident adjacent to plot;  
coastal ..... *Salix hookeriana* - *Malus fusca/Carex obnupta* -  
*Lysichiton americanus* (p. 238)
  - 1b. *Salix hookeriana* absent; not coastal  
.....*Malus fusca/Carex obnupta* (p. 233)
- G. *Myrica gale*:
- 1a. *Ledum glandulosum* generally with at least 20% cover  
.....*Ledum glandulosum* - *Myrica gale* (p. 231)
  - 1b. *Ledum glandulosum* with < 20% cover or absent  
.....*Myrica gale/Carex aquatilis var. dives* (p. 234)

- H. *Salix hookeriana*:
- 1a. *Malus fusca* conspicuous in plot or evident adjacent to plot  
..... *Salix hookeriana* - *Malus fusca*/*Carex obnupta* -  
*Lysichiton americanus* (p. 238)
  - 1b. *Malus fusca* absent ..... 2
  - 2a. *Carex obnupta* and *Lysichiton americanus* usually both present in plot or evident adjacent to plot; coastal ..... *Salix hookeriana* -  
*Malus fusca*/*Carex obnupta* - *Lysichiton americanus* (p. 238)
  - 2b. *Lysichiton americanus* absent; not coastal  
.....*Salix hookeriana* - (*Salix sitchensis*) (p. 237)
- I. *Salix lucida* ssp. *lasiandra*:
- 1a. *Salix sitchensis* present in plot or evident adjacent to plot, usually with > 20% cover ..... *Salix lucida* ssp. *lasiandra*/  
*Salix sitchensis*/*Lysichiton americanus* (p. 240)
  - 1b. *Salix sitchensis* with < 20% cover or absent  
..... *Salix lucida* ssp. *lasiandra*/*Urtica dioica* ssp. *gracilis* (p. 239)
- J. *Spiraea douglasii*:
- 1a. *Vaccinium uliginosum*, *Deschampsia caespitosa*, and *Sphagnum* usually present or evident adjacent to plot  
..... *Spiraea douglasii* - *Vaccinium uliginosum*/  
*Carex obnupta* - *Deschampsia caespitosa* (p. 243)
  - 1b. *Vaccinium uliginosum* and *Deschampsia caespitosa* absent ..... 2
  - 2a. *Salix hookeriana* conspicuous in plot or evident adjacent to plot  
..... *Salix hookeriana* - *Malus fusca*/*Carex obnupta* -  
*Lysichiton americanus* (p. 238)
  - 2b. *Salix hookeriana* absent ..... 3
  - 3a. *Carex cusickii* present or evident adjacent to plot  
.....*Spiraea douglasii*/*Sphagnum* (p. 244)
  - 3b. *Carex cusickii* absent, other herbs <10 % cover or absent  
..... *Spiraea douglasii* (p. 242)
- K. *Vaccinium caespitosum*:
- 1a. *Xerophyllum tenax* present or evident adjacent to plot, flooded openings absent ..... *Vaccinium caespitosum*/  
*Xerophyllum tenax* - *Sanguisorba officinalis* (p. 246)
  - 1b. *Xerophyllum tenax* absent, flooded openings present  
..... *Vaccinium caespitosum*/*Sanguisorba officinalis* -  
*Carex obnupta* (p. 245)

- L. *Vaccinium uliginosum*:
  - 1a. *Spiraea douglasii* codominant or evident adjacent to plot  
 ..... *Spiraea douglasii* - *Vaccinium uliginosum*/*Carex obnupta* -  
*Deschampsia caespitosa* (p. 243)
  - 1b. *Spiraea douglasii* not codominant ..... 2
  - 2a. Herb layer with < 10 % cover or absent  
 ..... *Vaccinium uliginosum*/*Dodecatheon jeffreyi* -  
*Caltha leptosepala* ssp. *howellii* (p. 249)
  - 2b. Herb layer with at least 10% cover, usually > 20% ..... 3
  - 3a. *Dodecatheon jeffreyi* and *Caltha leptosepala* ssp. *howellii* with  
 highest cover available in herb layer  
 ..... *Vaccinium uliginosum*/*Dodecatheon jeffreyi* -  
*Caltha leptosepala* ssp. *howellii* (p. 249)
  - 3b. *Dodecatheon jeffreyi* and *Caltha leptosepala* ssp. *howellii* not  
 with highest cover available in herb layer ..... 4
  - 4a. *Salix hookeriana* present or conspicuous adjacent to plot  
 ..... *Vaccinium uliginosum*/*Carex obnupta* (p. 247)
  - 4b. *Salix hookeriana* absent  
 ..... *Vaccinium uliginosum*/*Deschampsia caespitosa* - *Carex*  
*obnupta* (p. 248)

### III. HERBACEOUS ASSOCIATIONS

Graminoid, forb, or fern cover generally > 25 %; tree and shrub cover generally < 25%.

One the following herb species with highest cover in herb layer, usually at least 20% or highest cover available in depauperate stands, or one of 2-3 most abundant species in herb layer:

- (1) *Athyrium filix-femina* ..... *Athyrium filix-femina* (p. 250)
- (2) *Azolla filiculoides* or *A. mexicana*  
 ..... *Azolla (filiculoides, mexicana)* (p. 251)
- (3) *Bidens cernua* ..... *Bidens cernua* (p. 252)
- (4) *Bidens frondosa* ..... *Bidens frondosa* (p. 253)
- (5) *Boykinia major* ..... *Boykinia major* (p. 254)
- (6) *Brasenia schreberi* ..... *Brasenia schreberi* (p. 255)
- (7) *Calamagrostis canadensis* .... *Calamagrostis canadensis* (p. 256)
- (8) *Calamagrostis nutkaensis* ..... *Calamagrostis nutkaensis* (p. 257)
- (9) *Callitriche heterophylla* ..... *Callitriche heterophylla* (p. 258)
- (10) *Caltha leptosepala* ssp. *howellii* ..... A



(11)	<i>Camassia quamash</i> .....	<i>Camassia quamash</i> (p. 261)
(12)	<i>Carex amplifolia</i> .....	<i>Carex amplifolia</i> (p. 262)
(13)	<i>Carex angustata</i> .....	<i>Carex angustata</i> (p. 263)
(14)	<i>Carex aperta</i> .....	<i>Carex aperta</i> (p. 264)
(15)	<i>Carex aquatilis</i> var. <i>aquatilis</i> .....	<i>Carex aquatilis</i> var. <i>aquatilis</i> (p. 265)
(16)	<i>Carex aquatilis</i> var. <i>dives</i> .....	B
(17)	<i>Carex buxbaumii</i> .....	<i>Carex buxbaumii</i> (p. 268)
(18)	<i>Carex cusickii</i> .....	<i>Carex cusickii</i> (p. 269)
(19)	<i>Carex deweyana</i> .....	<i>Carex deweyana</i> ssp. <i>leptopoda</i> (p. 270)
(20)	<i>Carex exsiccata</i> .....	<i>Carex exsiccata</i> (p. 271)
(21)	<i>Carex feta</i> .....	<i>Carex feta</i> (p. 272)
(22)	<i>Carex lasiocarpa</i> .....	<i>Carex lasiocarpa</i> (p. 273)
(23)	<i>Carex lenticularis</i> .....	<i>Carex lenticularis</i> (p. 274)
(24)	<i>Carex limosa</i> .....	<i>Carex limosa</i> (p. 275)
(25)	<i>Carex luzulina</i> .....	<i>Carex luzulina</i> (p. 276)
(26)	<i>Carex nebrascensis</i> .....	<i>Carex nebrascensis</i> (p. 277)
(27)	<i>Carex nigricans</i> .....	<i>Carex nigricans</i> (p. 278)
(28)	<i>Carex obnupta</i> .....	<i>Carex obnupta</i> (p. 279)
(29)	<i>Carex pachystachya</i> .....	<i>Carex pachystachya</i> (p. 280)
(30)	<i>Carex scopulorum</i> .....	<i>Carex scopulorum</i> (p. 281)
(31)	<i>Carex simulata</i> .....	<i>Carex simulata</i> (p. 282)
(32)	<i>Carex utriculata</i> .....	<i>Carex utriculata</i> (p. 283)
(33)	<i>Ceratophyllum demersum</i> .....	<i>Ceratophyllum demersum</i> (p. 284)
(34)	<i>Deschampsia caespitosa</i> .....	C
(35)	<i>Dulichium arundinaceum</i> .....	<i>Dulichium arundinaceum</i> (p. 290)
(36)	<i>Eleocharis acicularis</i> .....	<i>Eleocharis acicularis</i> (p. 291)
(37)	<i>Eleocharis ovata</i> .....	<i>Eleocharis ovata</i> - <i>Ludwigia palustris</i> (p. 292)
(38)	<i>Eleocharis palustris</i> .....	<i>Eleocharis palustris</i> (p. 293)
(39)	<i>Eleocharis quinqueflora</i> .....	<i>Eleocharis quinqueflora</i> (p. 294)
(40)	<i>Elodea canadensis</i> .....	<i>Elodea canadensis</i> (p. 295)
(41)	<i>Equisetum arvense</i> .....	<i>Equisetum arvense</i> (p. 296)
(42)	<i>Eragrostis hypnoides</i> .....	<i>Eragrostis hypnoides</i> - <i>Gnaphalium palustre</i> (p. 297)
(43)	<i>Euthamia occidentalis</i> .....	<i>Euthamia occidentalis</i> (p. 298)
(44)	<i>Glyceria striata</i> .....	<i>Glyceria striata</i> (p. 299)
(45)	<i>Gnaphalium palustre</i> .....	<i>Eragrostis hypnoides</i> - <i>Gnaphalium palustre</i> (p. 297)
(46)	<i>Hippuris vulgaris</i> .....	<i>Hippuris vulgaris</i> (p. 300)
(47)	<i>Hydrocotyle ranunculoides</i> .....	<i>Hydrocotyle ranunculoides</i> (p. 301)
(48)	<i>Isoetes nuttallii</i> .....	<i>Isoetes nuttallii</i> (p. 302)
(49)	<i>Juncus balticus</i> .....	<i>Juncus balticus</i> (p. 303)
(50)	<i>Juncus effusus</i> .....	<i>Juncus effusus</i> (p. 304)
(51)	<i>Juncus nevadensis</i> .....	<i>Juncus nevadensis</i> (p. 305)
(52)	<i>Lemna minor</i> .....	<i>Lemna minor</i> (p. 306)
(53)	<i>Lilaeopsis occidentalis</i> .....	<i>Lilaeopsis occidentalis</i> (p. 307)

- (54) *Ludwigia palustris*  
..... *Ludwigia palustris* - *Polygonum hydropiperoides* (p. 308)
- (55) *Menyanthes trifoliata* ..... *Menyanthes trifoliata* (p. 309)
- (56) *Nephrrophyllidium crista-galli*  
..... *Nephrrophyllidium crista-galli* (p. 310)
- (57) *Nuphar lutea* ssp. *polysepala*  
..... *Nuphar lutea* ssp. *polysepala* (p. 311)
- (58) *Oenanthe sarmentosa* ..... *Oenanthe sarmentosa* (p. 312)
- (59) *Paspalum distichum* ..... *Paspalum distichum* (p. 313)
- (60) *Polygonum amphibium* ..... *Polygonum amphibium* (p. 314)
- (61) *Polygonum hydropiperoides*  
..... *Ludwigia palustris* - *Polygonum hydropiperoides* (p. 308)
- (62) *Potamogeton natans* ..... *Potamogeton natans* (p. 315)
- (63) *Ranunculus aquatilis* ..... *Ranunculus aquatilis* (p. 316)
- (64) *Ranunculus flammula* ..... *Ranunculus flammula* (p. 317)
- (65) *Sagittaria latifolia* ..... *Sagittaria latifolia* (p. 318)
- (66) *Sanguisorba officinalis* ..... D
- (67) *Schoenoplectus acutus* ..... *Schoenoplectus acutus* (p. 320)
- (68) *Scirpus microcarpus* ..... *Scirpus microcarpus* (p. 321)
- (69) *Senecio triangularis* ..... *Senecio triangularis* (p. 322)
- (70) *Sparganium angustifolium* ..... *Sparganium angustifolium* (p. 323)
- (71) *Sparganium eurycarpum* ..... *Sparganium eurycarpum* (p. 324)
- (72) *Torreyochloa pallida* var. *pauciflora*  
..... *Torreyochloa pallida* var. *pauciflora* (p. 325)
- (73) *Trichophorum caespitosum*  
..... *Trichophorum caespitosum* (p. 326)
- (74) *Triteleia hyacinthina* ..... *Triteleia hyacinthina* (p. 327)
- (75) *Typha latifolia* ..... *Typha latifolia* (p. 328)
- (76) *Utricularia macrorhiza* ..... *Utricularia macrorhiza* (p. 329)

- A1. *Sanguisorba officinalis* usually codominant, *Carex obnupta* and/or *Carex cusickii* conspicuous in plot or evident adjacent to plot; Coast Range ..... *Caltha leptosepala* ssp. *howellii* - *Carex obnupta* (p. 260)
- A2. *Sanguisorba officinalis*, *Carex obnupta*, *Carex cusickii* absent or with < 5% cover; Cascade Range *Caltha leptosepala* ssp. *howellii* (p. 259)
- B1. *Nuphar lutea* ssp. *polysepala* present; coastal  
..... *Carex aquatilis* var. *dives* - *Comarum palustre* (p. 267)
- B2. *Nuphar lutea* ssp. *polysepala* absent; montane  
..... *Carex aquatilis* var. *dives* (p. 266)
- C1. *Carex unilateralis* and *Danthonia californica* usually present  
..... *Deschampsia caespitosa* - *Danthonia californica* (p. 288)

- C2. *Carex unilateralis* and *Danthonia californica* absent ..... 2
  - 2a. *Artemisia lindleyana* present, *Juncus balticus* absent; low elevation ..... *Deschampsia caespitosa* - *Artemisia lindleyana* (p. 287)
  - 2b. *Artemisia lindleyana* absent; Cascade Range ..... 3
    - 3a. *Juncus balticus* codominant ..... *Deschampsia caespitosa* - *Juncus balticus* (p. 289)
    - 3b. *Juncus balticus* not codominant; any other combinations of species ..... *Deschampsia caespitosa* montane "wet meadow" complex (p. 285)
- D1. *Carex aquatilis* var. *dives* conspicuous in plot or evident adjacent to plot; *Carex obnupta* and *Carex cusickii* absent; Cascade Range ..... *Sanguisorba officinalis* - *Carex aquatilis* var. *dives* (p. 319)
- D2. *Carex aquatilis* var. *dives* absent, *Carex obnupta* and/or *Carex cusickii* conspicuous in plot or evident adjacent to plot; Coast Range ..... *Caltha leptosepala* ssp. *howellii* - *Carex obnupta* (p. 259)

**IV. NONVASCULAR ASSOCIATIONS**

Bryophyte, lichen, or algal cover generally > 25%; graminoid, forb, fern, tree, or shrub cover generally < 25%.

Most abundant species in moss layer:

- 1a. *Fontinalis antipyretica* ..... *Fontinalis antipyretica* (p. 330)
- 1b. *Polytrichum commune* ..... *Polytrichum commune* (p. 331)

## I. FOREST AND WOODLAND ASSOCIATIONS

### *Alnus rubra*/*Athyrium filix-femina* - *Lysichiton americanus*

Red alder/lady fern - skunk cabbage

Plots sampled: 21 (macro)



#### Environment:

Elevation (ft): ave. 1549  
(500-4130)

Slope (deg): ave. 1 (0-5)

Landform position:

floodplains, terraces

Hydrology: seasonally  
moist to perennially  
moist

Soils: mostly loam, some  
organic muck or rocky

**Description:** Habitat is woodland or forest, sometimes with seasonal pools. Stands are dominated by *Alnus rubra* in both mature and reproducing layers, with a small representation of *Thuja plicata* in both layers. *Rubus spectabilis* is abundant in the shrub layer in about half of the plots.

*Lysichiton americanus* and *Athyrium filix-femina* dominate the herb layer, which contains over 65 other species, most with low constancy and cover. Moss cover is usually on elevated microsites such as logs and tip-up mounds.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Alnus rubra</i>	95	72	0	95
<i>Thuja plicata</i>	10	Tr	0	7
<i>Acer macrophyllum</i>	5	Tr	0	4
<b>Reproducing trees</b>				
<i>Alnus rubra</i>	19	3	0	30
<i>Thuja plicata</i>	10	Tr	0	3
<i>Tsuga heterophylla</i>	5	Tr	0	3
<i>Picea engelmannii</i>	5	Tr	0	2
<i>Malus fusca</i>	5	Tr	0	2
<b>Shrub layer</b>				
<i>Rubus spectabilis</i>	43	3	0	50
<i>Acer circinatum</i>	24	4	0	50
<b>Herb layer</b>				
<i>Lysichiton americanus</i>	100	50	3	95
<i>Athyrium filix-femina</i>	95	17	0	85
<i>Oenanthe sarmentosa</i>	57	4	0	30
<i>Stachys ciliata</i>	52	2	0	10
<i>Claytonia sibirica</i>	48	3	0	35
<i>Tolmiea menziesii</i>	33	3	0	25
<i>Urtica dioica</i> ssp. <i>gracilis</i>	33	1	0	10
<b>Moss layer</b>				
Moss	43	7	0	80

***Alnus rubra*/Carex obnupta - Lysichiton americanus**

Red alder/slough sedge - skunk cabbage

Plots sampled: 26 (6 macro, 20 micro)



**Environment:**

Elevation (ft): ave. 300 (30-2800)

Slope (deg): ave. 1 (0-10)

Landform position:  
floodplains, basins, lower slopes, benches

Hydrology: perennially saturated or perennially moist

Soils: mostly organic, some silt loam or sand

**Vegetation and ecology:**

Habitat is forested wetland (swamp). Some sites are silted-in beaver ponds, and others are in peatlands where the association occurs in nutrient-rich lags adjacent to uplands. Alders are usually between 20-50 years old and relatively few species are present in the shrub and herb layers. *Thuja plicata*, *Picea sitchensis*, and *Tsuga heterophylla* are peripheral or limited to elevated microsites. The shrub layer may be more dense on stumps and logs. *Polystichum munitum* may be abundant on logs and stumps. Expanses of treacherously deep muck frequently occur between clumps of *Carex* and *Lysichiton*. *Sphagnum* does not occur in this association but *Eurhynchium praelongum* is common. Stands along streams may be flooded for brief periods after winter storms.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Alnus rubra</i>	100	89	40	95
<i>Thuja plicata</i>	8	1	0	20
<i>Picea sitchensis</i>	8	1	0	15
<i>Franqula purshiana</i>	8	Tr	0	10
<i>Tsuga heterophylla</i>	8	Tr	0	3
<b>Reproducing trees</b>				
<i>Thuja plicata</i>	4	Tr	0	10
<i>Picea sitchensis</i>	4	Tr	0	1
<i>Pseudotsuga menziesii</i>	4	Tr	0	Tr
<b>Shrub layer</b>				
<i>Rubus ursinus</i>	15	Tr	0	4
<i>Salix hookeriana</i>	12	3	0	50
<i>Gaultheria shallon</i>	12	Tr	0	5
<b>Herb layer</b>				
<i>Carex obnupta</i>	100	29	5	85
<i>Lysichiton americanus</i>	92	57	0	90
<i>Athyrium filix-femina</i>	23	1	0	10
<i>Polystichum munitum</i>	15	2	0	45
<b>Moss layer</b>				
Moss	8	Tr	0	3
<b>Unvegetated</b>				
Bare ground	50	7	0	35

***Fraxinus latifolia*/Carex aquatilis var. aquatilis**

Oregon ash/aquatic sedge

Plots sampled: 2 (macro)



**Environment:**

Elevation (ft): 500

Slope (deg): 0

Landform position:  
floodplains, basins

Hydrology: seasonally wet  
to flooded

Soils: clay loam with  
seasonal perched water  
table

**Vegetation and ecology:**

Habitat is riparian forest. This association is known from only two plots and but is described here because it may be a relic of a more widespread historic vegetation type. It represents a mix of lowland and cold-soil vegetation of higher elevations. The shrub

layer is diverse but cover is not particularly high. Proximity to settlement and agriculture is indicated by presence of exotic species such as *Crataegus monogyna*, *Phalaris arundinacea*, *Poa trivialis*, and *Lolium arundinaceum*.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Fraxinus latifolia</i>	100	75	70	80
<b>Shrub layer</b>				
<i>Spiraea douglasii</i>	100	7	3	10
<i>Rubus ursinus</i>	100	4	2	5
<i>Lonicera involucrata</i>	100	3	3	3
<i>Symphoricarpos albus</i>	50	2	0	3
<i>Amelanchier alnifolia</i>	50	1	0	1
<i>Rosa nutkana</i>	50	Tr	0	1
<i>Crataegus douglasii</i>	50	Tr	0	Tr
<i>Crataegus monogyna</i>	50	Tr	0	Tr
<b>Herb layer</b>				
<i>Carex aquatilis</i>	100	50	20	80
<i>Veratrum californicum</i>	100	14	3	25
<i>Carex deweyana</i> ssp. <i>leptopoda</i>	100	4	2	5
<i>Carex obnupta</i>	100	3	2	3
<i>Geum macrophyllum</i>	100	2	2	2
<i>Phalaris arundinacea</i>	100	2	1	2
<i>Epilobium ciliatum</i>	100	2	1	2
<i>Galium triflorum</i>	100	Tr	Tr	Tr
<i>Mimulus guttatus</i>	50	13	0	25
<i>Oenanthe sarmentosa</i>	50	4	0	8

***Fraxinus latifolia*/*Carex deweyana* - *Urtica dioica* ssp. *gracilis***

Oregon ash/Dewey sedge - California nettle

Plots sampled: 2 (macro)



**Environment:**

Elevation (ft): ave. 255  
(10- 500)

Slope (deg): 0

Landform position:  
bottoms

Hydrology: seasonally  
flooded to moist

Soils: silt loams

**Vegetation and ecology:**

Habitat is riparian forest. These stands occur in depressions on river and creek bottoms and were subject to sometimes prolonged seasonal inundation prior to flood control in western Oregon.

Floodwaters may pool and persist into the growing season, suppressing herbaceous vegetation. *Urtica dioica* ssp. *gracilis* may be abundant in the herb layer although it is not represented in these plots. Depressions may contain no vegetation, only litterfall or recent deposits of silt, and these may become densely colonized by *Fraxinus* seedlings during the year following deposition. Tree trunks usually have thick sleeves of mosses that trap sediment and mark high water lines with silt stains. Many stands that now only flood occasionally probably contain more herbaceous vegetation than what existed before flood control. Invasion by *Phalaris arundinacea* and *Solanum dulcamara* can be particularly severe around openings in the canopy, displacing smaller native species.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Fraxinus latifolia</i>	100	78	75	80
<b>Shrub layer</b>				
<i>Rubus ursinus</i>	50	9	0	18
<i>Spiraea douglasii</i>	50	5	0	10
<b>Herb layer</b>				
<i>Carex deweyana</i> ssp. <i>leptopoda</i>	100	31	1	60
<i>Juncus patens</i>	50	13	0	25
<i>Phalaris arundinacea</i>	50	3	0	5
<i>Veronica scutellata</i>	50	1	0	2
<i>Geum macrophyllum</i>	50	1	0	1
<i>Juncus tenuis</i>	50	1	0	1
<i>Juncus effusus</i>	50	Tr	0	Tr
<i>Agrostis exarata</i>	50	Tr	0	Tr
<i>Perideridia gairdneri</i>	50	Tr	0	Tr
<i>Stellaria calycantha</i>	50	Tr	0	Tr
<i>Elymus glaucus</i>	50	Tr	0	Tr
<b>Moss layer</b>				
Moss	100	6	1	11

**Fraxinus latifolia/Carex obnupta**

Oregon ash/slough sedge

Plots sampled: 18 (macro)



**Environment:**

Elevation (ft): ave. 669  
(500-1700)

Slope (deg): ave. 0 (0-2)

Landform position:  
floodplains and benches

Hydrology: seasonally  
flooded to saturated

Soils: silt and clay loams,  
some organic

**Vegetation and ecology:**

Habitat is riparian forest. The shrub layer is diverse but averages less than 10 percent cover, with occasionally high cover of *Rubus ursinus*, *Symphoricarpos albus*, *Cornus sericea*, or *Acer circinatum*. *Carex obnupta* dominates the herb layer. Forty other herbaceous species are reported from plots but most have less than 15 percent cover. The presence of *Veratrum viride* and *Rudbeckia occidentalis* in a stand of *Fraxinus* is unusual because these species are more typical of elevations above 2000-3000 feet.

Species	Cons t	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Fraxinus latifolia</i>	100	64	25	90
<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>	11	1	0	15
<i>Frangula purshiana</i>	11	Tr	0	5
<i>Abies grandis</i>	6	Tr	0	Tr
<b>Reproducing trees</b>				
<i>Fraxinus latifolia</i>	11	Tr	0	1
<i>Alnus rubra</i>	6	Tr	0	Tr
<b>Shrub layer</b>				
<i>Rubus ursinus</i>	67	6	0	36
<i>Rosa nutkana</i>	33	Tr	0	1
<i>Symphoricarpos</i> <i>albus</i>	28	3	0	20
<i>Spiraea douglasii</i>	22	1	0	8
<i>Physocarpus</i> <i>capitatus</i>	22	Tr	0	3
<i>Corylus cornuta</i>	22	Tr	0	2
<b>Herb layer</b>				
<i>Carex obnupta</i>	100	76	25	100
<i>Polypodium</i> <i>glycyrrhiza</i>	50	Tr	0	Tr
<i>Carex deweyana</i> ssp. <i>leptopoda</i>	33	2	0	15
<i>Polystichum</i> <i>munitum</i>	33	1	0	10
<b>Moss layer</b>				
Moss	83	12	0	50



## *Fraxinus latifolia/Spiraea douglasii*

Oregon ash/Douglas spiraea

Plots sampled: 3 (macro)



### Environment:

Elevation (ft): 500

Slope (deg): 0

Landform position:  
floodplains

Hydrology: seasonally  
flooded to saturated

Soils: silt and clay loams

### Vegetation and ecology:

Habitat is riparian  
woodland or forest with  
open to closed canopy.

*Fraxinus latifolia* is the only tree species present, and stands are characterized by a very dense shrub layer of *Spiraea douglasii* with little else present but *Carex obnupta*. Stands may be extensive along floodplains and some have no doubt developed on abandoned pasture land and old prairie.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Fraxinus latifolia</i>	100	74	50	90
<b>Shrub layer</b>				
<i>Spiraea douglasii</i>	100	85	60	100
<i>Cornus sericea</i>	25	Tr	0	1
<b>Herb layer</b>				
<i>Carex obnupta</i>	25	10	0	40
<i>Ranunculus uncinatus</i>	25	Tr	0	1
<i>Apiaceae</i>	25	Tr	0	Tr
<i>Rumex crispus</i>	25	Tr	0	Tr
<i>Poa trivialis</i>	25	Tr	0	Tr
<i>Epilobium ciliatum</i>	25	Tr	0	Tr
<b>Moss layer</b>				
Moss	50	1	0	4

**Fraxinus latifolia/Symphoricarpos albus**

Oregon ash/snowberry

Plots sampled: 2 (macro)



**Environment:**

Elevation (ft): ave. 790  
(500-1080)

Slope (deg): ave. 1 (0-1)

Landform position:  
floodplain depressions

Hydrology: seasonally  
flooded

Soils: silt and clay loams

**Vegetation and ecology:**

Habitat is riparian forest. *Fraxinus latifolia* is typically the only tree present in these stands.

*Symphoricarpos albus* and *Rubus ursinus* may cover up to half the shrub layer, and *Corylus cornuta* may

sometimes have cover up to 40 percent. The herb layer is dominated by monotypic stands of *Carex obnupta* with few other species present. Depressions with *Carex obnupta* may remain flooded into the growing season.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Fraxinus latifolia</i>	100	80	75	85
<b>Shrub layer</b>				
<i>Symphoricarpos albus</i>	100	55	50	60
<i>Rubus ursinus</i>	100	33	Tr	65
<i>Corylus cornuta</i>	50	20	0	40
<i>Cornus sericea</i>	50	6	0	12
<i>Amelanchier alnifolia</i>	50	5	0	10
<i>Acer circinatum</i>	50	Tr	0	Tr
<b>Herb layer</b>				
<i>Carex obnupta</i>	100	60	45	75
<i>Carex deweyana</i> ssp. <i>leptopoda</i>	100	1	Tr	2
<i>Athyrium filix-femina</i>	50	1	0	2
<i>Galium triflorum</i>	50	1	0	1
<i>Botrychium virginianum</i>	50	Tr	0	Tr
<i>Galium aparine</i>	50	Tr	0	Tr
<b>Moss layer</b>				
Moss	100	3	1	5

***Picea sitchensis*/*Carex obnupta* - *Lysichiton americanus***

Sitka spruce/slough sedge - skunk cabbage

Plots sampled: 27 (7 macro, 20 micro)



**Environment:**

Elevation (ft): ave. 24 (20-40)

Slope (deg): 0

Landform position:  
floodplains, basins  
Hydrology: perennially saturated  
Soils: organic or muck

**Vegetation and ecology:**

Habitat is forested wetland (swamp) in coastal fens. The association occurs peripheral to open mire or shrub-swamp and often develops in nutrient-rich

lags adjacent to uplands. *Eurhynchium praelongum* is the most common moss, but several species of *Sphagnum* become more frequent near the Columbia River and northward with increasing precipitation. *Picea sitchensis* grows slowly in perennially saturated soils and trees with diameters of 25-40 inches have been found to be 200-500 years old, generally much older than upland spruce with comparable diameters. These "swamp spruce" have a characteristic growth form with shallow and spreading root systems, buttressed trunks, and reduced crown spread. Large wads of *Polypodium scoleri*, and thick mats of epiphytic mosses, particularly *Antitrichia curtispendula*, are typical on upper trunks and limbs. Windthrow is frequent, creating gaps for regeneration of *Picea*, often as resprouts from fallen boles.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Picea sitchensis</i>	100	66	30	85
<i>Alnus rubra</i>	19	2	0	25
<i>Thuja plicata</i>	7	1	0	30
<i>Tsuga heterophylla</i>	4	1	0	20
<b>Reproducing trees</b>				
<i>Tsuga heterophylla</i>	4	Tr	0	1
<b>Shrub layer</b>				
<i>Gaultheria shallon</i>	37	4	0	30
<i>Rubus spectabilis</i>	30	3	0	20
<i>Vaccinium parvifolium</i>	30	3	0	20
<b>Herb layer</b>				
<i>Carex obnupta</i>	96	66	0	95
<i>Lysichiton americanus</i>	74	20	0	70
<i>Oenanthe sarmentosa</i>	22	1	0	20
<i>Maianthemum dilatatum</i>	22	1	0	8
<b>Moss layer</b>				
Moss	11	3	0	70

***Picea sitchensis*/*Cornus sericea*/*Lysichiton americanus***

Sitka spruce/creek dogwood/skunk cabbage

Plots sampled: 15  
(macro)



**Environment:**

Elevation (ft): ave. 5 (5-6)

Slope (deg): 0

Landform position:

floodplains

Hydrology: seasonally  
flooded to perennially  
saturated

Soils: muck or organic

**Vegetation and ecology:**

Habitat is forested wetland (swamp) on floodplains of large coastal rivers, with daily freshwater tidal flooding. Stands occur on natural levees along river channels and larger tidal creeks, and form perimeters around typically lower and wetter interiors composed of either willow swamp or emergent marsh. *Tsuga heterophylla* is occasional on logs and stumps. A nearly impenetrable shrub layer is characteristic of these stands.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Picea sitchensis</i>	100	24	5	65
<i>Alnus rubra</i>	73	7	0	20
<i>Thuja plicata</i>	67	8	0	25
<i>Frangula purshiana</i>	67	4	0	20
<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>	60	19	0	80
<b>Reproducing trees</b>				
<i>Thuja plicata</i>	13	Tr	0	2
<i>Picea sitchensis</i>	13	Tr	0	1
<b>Shrub layer</b>				
<i>Cornus sericea</i>	100	22	3	50
<i>Rubus spectabilis</i>	87	6	0	25
<i>Rosa nutkana</i>	80	3	0	10
<i>Rubus ursinus</i>	80	1	0	4
<i>Rubus parviflorus</i>	73	3	0	10
<i>Vaccinium parvifolium</i>	73	1	0	2
<i>Gaultheria shallon</i>	67	4	0	15
<i>Oemleria cerasiformis</i>	67	1	0	5
<i>Symphoricarpos albus</i>	67	1	0	5
<i>Acer circinatum</i>	60	5	0	20
<i>Malus fusca</i>	60	3	0	10
<i>Salix sitchensis</i>	40	5	0	40
<b>Herb layer</b>				
<i>Lysichiton americanus</i>	100	10	2	35
<i>Athyrium filix-femina</i>	93	2	0	10
<i>Adiantum pedatum</i>	93	1	0	2
<i>Impatiens capensis</i>	80	10	0	50
<i>Carex obnupta</i>	73	6	0	35
<i>Oenanthe sarmentosa</i>	60	2	0	5

***Pinus contorta* var. *contorta*/Carex obnupta Association**

Shore pine/slough sedge

Plots sampled: 93 (11 macro, 82 micro)



**Environment:**

Elevation (ft): ave. 76 (20-100)

Slope (deg): 0

Landform position: former deflation plains, ancient marine terraces

Hydrology: seasonally flooded, dry in summer

Soils: sand, sometimes with duripan

**Vegetation and ecology:**

Habitat is seasonally-flooded depressions in stabilized sand dunes along the coast. Most stands are 30-75 years old,

with canopy cover between 0-85 percent. *Pinus contorta* is usually the only reproducing conifer present. The sparse shrub layer grows on mounds in and around the depressions. The density of the herb layer varies inversely with depth and duration of winter flooding. Drought-tolerant *Warnstorfia exannulata*, *Sphagnum mendocinum*, *Polytrichum commune*, and *Fontinalis howellii* are the most conspicuous mosses. Inclusions of the *Salix hookeriana* - *Malus fusca*/*Carex obnupta* - *Lysichiton americanus* association may occur in deeper depressions where water persists later in the season. Sand in dried-up depressions is often stained with iron. Peat does not develop at these sites because summer drying oxidizes any organic material.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Pinus contorta</i> var. <i>contorta</i>	99	30	0	85
<b>Shrub layer</b>				
<i>Vaccinium ovatum</i>	16	1	0	15
<i>Vaccinium uliginosum</i>	12	2	0	75
<i>Gaultheria shallon</i>	10	1	0	40
<b>Herb layer</b>				
<i>Carex obnupta</i>	100	27	1	75
<i>Dichanthelium acuminatum</i> var. <i>fasciculare</i>	9	1	0	15
<i>Deschampsia caespitosa</i>	6	1	0	50
<i>Agrostis</i>	5	Tr	0	10
<i>Argentina egedii</i>	3	Tr	0	20
<i>Juncus lesueurii</i>	3	Tr	0	10
<b>Moss layer</b>				
Moss	76	30	0	95
<b>Unvegetated</b>				
Bare ground	14	7	0	95
Litter	1	Tr	0	15

***Populus balsamifera* ssp. *trichocarpa* /*Cornus sericea*/*Carex deweyana* ssp. *leptopoda***

Black cottonwood/creek dogwood/Dewey sedge

Plots sampled: 3 (macro)



**Environment:**

Elevation (ft): ave. 8 (5-10)

Slope (deg): 0

Landform position:  
floodplains

Hydrology: perennially saturated

Soils: silt loam or muck

**Vegetation and ecology:**

Habitat is forested wetland (swamp) in floodplains of large coastal rivers, with daily freshwater tidal flooding. Portions are flooded at high tide, but

trees are restricted to areas elevated above the water. *Fraxinus latifolia* may be frequent. The shrub layer may include *Salix sitchensis* and very low cover of other species such as *Rubus ursinus*, *Rubus spectabilis*, *Malus fusca*, and *Physocarpus capitatus*. Because much of the understory is flooded at high tide, there are few herbaceous species present with any appreciable cover. Seeds of weedy *Phalaris arundinacea*, *Iris pseudacorus*, and *Ranunculus repens* are capable of rafting into the interior of stands at high tide and can occur almost anywhere. Despite the relative abundance of *Impatiens capensis*, which may not be native to the Pacific Northwest, *Carex deweyana* ssp. *leptopoda* is used here to distinguish these occurrences west of the Cascade Range from some *Populus balsamifera* ssp. *trichocarpa*/*Cornus sericea* stands reported from east of the Cascades.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>	100	48	30	75
<i>Salix lucida</i> ssp. <i>lasiandra</i>	67	8	0	15
<b>Shrub layer</b>				
<i>Cornus sericea</i>	100	47	20	60
<i>Rubus ursinus</i>	67	2	0	3
<i>Rubus spectabilis</i>	67	2	0	4
<b>Herb layer</b>				
<i>Impatiens capensis</i>	100	33	25	50
<i>Carex deweyana</i> ssp. <i>leptopoda</i>	100	1	1	2
<i>Athyrium filix-femina</i>	67	1	0	2
<i>Lysichiton americanus</i>	67	1	0	2
<i>Scutellaria lateriflora</i>	67	1	0	1
<i>Solanum dulcamara</i>	33	Tr	0	1
<i>Callitriche</i>	33	Tr	0	1
<i>Prunella vulgaris</i>	33	Tr	0	1

**Populus tremuloides/Carex obnupta**

Quaking aspen/slough sedge

Plots sampled: 1 (macro)



**Environment:**

Elevation (ft): 500

Slope (deg): 0

Landform position:  
floodplains, depressions

Hydrology: seasonally  
flooded to saturated

Soils: silt loam or organic

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Populus tremuloides</i>	100	50	50	50
<b>Shrub layer</b>				
<i>Spiraea douglasii</i>	100	80	80	80
<i>Salix hookeriana</i>	100	10	10	10
<b>Herb layer</b>				
<i>Carex obnupta</i>	100	Tr	Tr	Tr
<b>Moss layer</b>				
Moss	100	98	98	98

**Vegetation and ecology:** The single known occurrence of this association in Oregon is in a seasonally-flooded depression on shallow-soiled basalt scabland. It is described here because it may be a relic of type that was more widespread historically. Seasonal flooding is from precipitation but summer drying precludes formation of peat. The moss layer is covered up to 98 percent by *Sphagnum mendocinum*. Large expanses of swamp vegetation once occurred in the northern Willamette and Tualatin valleys and this association may have been part of it. *Populus tremuloides* still occurs in a number of low-elevation sites in Clackamas, Multnomah and Washington Counties, but most are on uplands that do not support wetland vegetation, and it becomes very rare at low elevations south of Clackamas County. These wetlands are thought to be more frequent in western Washington and perhaps extend to southwestern British Columbia but have not been sampled adequately. *Spiraea douglasii* and other species of *Sphagnum* have been observed in some stands in Washington. Despite the abundance of *Spiraea douglasii* in this association, *Carex obnupta* is used here to distinguish these low-elevation occurrences west of the Cascade Range from some *Populus tremuloides/Spiraea douglasii* stands reported from east of the Cascades.

***Thuja plicata/Lysichiton americanus***

Western red cedar/skunk cabbage

Plots sampled: 8 (macro)



**Environment:**

Elevation (ft): ave. 2925  
(1300-3800)

Slope (deg): ave. 6 (0-14)

Landform position:  
floodplains, benches,  
and various slope  
positions with impeded  
drainage

Hydrology: perennially  
moist

Soils: loams

**Vegetation and ecology:**

Habitat is forested wetland (swamp) with shallow depressions among the trees. Stands are dominated by *Pseudotsuga menziesii*, when present, is usually peripheral in stands because of wet soils. *Rubus spectabilis* and *Vaccinium ovalifolium*

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Thuja plicata</i>	100	36	15	80
<i>Abies amabilis</i>	50	10	0	25
<i>Tsuga heterophylla</i>	50	8	0	30
<i>Pseudotsuga menziesii</i>	50	3	0	15
<b>Reproducing trees</b>				
<i>Thuja plicata</i>	63	2	0	5
<i>Tsuga heterophylla</i>	50	1	0	3
<i>Abies amabilis</i>	38	1	0	2
<b>Shrub layer</b>				
<i>Rubus spectabilis</i>	63	1	0	2
<i>Vaccinium ovalifolium</i>	50	3	0	8
<i>Acer circinatum</i>	38	Tr	0	2
<b>Herb layer</b>				
<i>Lysichiton americanus</i>	100	28	8	60
<i>Athyrium filix-femina</i>	63	2	0	6
<i>Galium triflorum</i>	63	Tr	0	1
<i>Blechnum spicant</i>	50	6	0	30
<i>Maianthemum dilatatum</i>	38	1	0	7
<i>Viola glabella</i>	38	1	0	5
<i>Listera</i>	38	Tr	0	Tr
<i>Asarum caudatum</i>	38	Tr	0	Tr
<b>Moss layer</b>				
Moss	38	3	0	10

occur in about half the plots, while the herb layer is dominated by *Lysichiton americanus*. *Athyrium filix-femina* has fairly high constancy but consistently low cover. Both shrub and herb layers are extremely diverse, with over 70 species present in the latter, sometimes making classification difficult. Trees and shrubs occupy elevated microsites, while *Lysichiton americanus* occupies wetter bottoms. *Sphagnum* occurs only at higher elevations.



***Tsuga heterophylla*/*Ledum glandulosum*/*Carex obnupta* - *Lysichiton americanus***

Western hemlock/Labrador tea/slough sedge - skunk cabbage

Plots sampled: 8 (macro)



**Environment:**

Elevation (ft): 25

Slope (deg): 0

Landform position:

floodplains, basins

Hydrology: perennially

saturated to flooded

Soils: organic muck and peat

**Vegetation and ecology:**

Habitat is forested wetland

(swamp) in coastal fens.

Stands occur adjacent to

open peatlands and shrub-

swamps. Most trees and

shrubs occur on elevated

microsites such as

decaying logs, stumps, and old root wads.

Both *Thuja plicata* and *Pinus*

*contorta* var. *contorta* may be suppressed or killed in waterlogged soils.

The dense shrub layer may contain small amounts of *Myrica californica*.

*Sphagnum palustre* or *S. henryense* are conspicuous in the moss layer.

Stands are subject to windthrow in severe winter storms but appear to be

self-perpetuating in the absence of major disturbance.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Tsuga heterophylla</i>	100	19	4	60
<i>Pinus contorta</i> var. <i>contorta</i>	75	11	0	60
<i>Thuja plicata</i>	38	7	0	32
<i>Picea sitchensis</i>	25	2	0	8
<b>Shrub layer</b>				
<i>Gaultheria shallon</i>	100	21	12	40
<i>Ledum glandulosum</i>	100	14	4	32
<i>Vaccinium ovatum</i>	75	4	0	8
<i>Vaccinium parvifolium</i>	38	2	0	4
<b>Herb layer</b>				
<i>Carex obnupta</i>	100	42	16	60
<i>Lysichiton americanus</i>	100	4	4	4
<i>Juncus</i>	88	11	0	20
<i>Oenanthe sarmentosa</i>	50	2	0	4
<i>Blechnum spicant</i>	38	2	0	4
<b>Moss layer</b>				
Moss	100	20	4	36

## II. SHRUBLAND ASSOCIATIONS

### *Alnus incana*/*Lysichiton americanus*

White alder/skunk cabbage

Plots sampled: 7 (macro)



#### Environment:

Elevation (ft): ave. 3789  
(3120-4580)

Slope (deg): ave. 5 (0-15)

Landform position:  
floodplains, basins,  
benches, slopes

Hydrology: seasonally  
moist to perennially  
saturated

Soils: mostly organic,  
some loam

#### Vegetation and ecology:

Habitat is montane fens and shrub-swamp. *Alnus incana* may form dense stands with a variety of other shrubs. Over 60 species occur in the herb layer, making the understory extremely diverse and stands difficult to classify. This is why a number of publications have used "mesic forb" to characterize these stands.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Picea engelmannii</i>	57	4	0	15
<i>Tsuga heterophylla</i>	29	1	0	7
<i>Thuja plicata</i>	14	2	0	15
<i>Abies amabilis</i>	14	1	0	5
<b>Reproducing trees</b>				
<i>Tsuga heterophylla</i>	57	1	0	3
<i>Picea engelmannii</i>	29	1	0	5
<i>Abies amabilis</i>	14	1	0	5
<i>Thuja plicata</i>	14	1	0	4
<i>Abies grandis</i>	14	Tr	0	Tr
<b>Shrub layer</b>				
<i>Alnus incana</i>	100	50	20	81
<i>Ribes bracteosum</i>	43	2	0	10
<b>Herb layer</b>				
<i>Lysichiton americanus</i>	100	34	8	75
<i>Athyrium filix-femina</i>	86	14	0	55
<i>Glyceria striata</i>	86	5	0	15
<i>Carex laeviculmis</i>	71	6	0	20
<i>Senecio triangularis</i>	71	4	0	10
<i>Stachys ciliata</i>	71	1	0	4
<i>Veronica americana</i>	71	Tr	0	1
<i>Maianthemum stellatum</i>	57	2	0	6
<i>Trautvetteria caroliniensis</i>	57	1	0	7
<i>Viola glabella</i>	57	1	0	5
<b>Moss layer</b>				
Moss	14	6	0	40

***Alnus viridis* ssp. *sinuata*/*Lysichiton americanus***

Sitka alder/skunk cabbage

Plots sampled: 3 (macro)



**Environment:**

Elevation (ft): ave. 3287  
(2100-4400)

Slope (deg): ave. 2 (0-4)

Landform position:  
depressions, seepage  
slopes

Hydrology: moist to  
perennially saturated

Soils: mostly organic,  
some silt loam

**Vegetation and ecology:**

This association is a  
wetter variant of the *Alnus  
viridis* ssp. *sinuata* -  
*Athyrium filix-femina*

association and contains considerably more *Lysichiton americanus* in the herb layer. Trees are scarce and are peripheral or limited to seedlings, and include *Pinus monticola*, *Thuja plicata*, *Tsuga heterophylla*, or *Picea engelmannii*. *Alnus viridis* ssp. *sinuata* is the primary shrub with lesser amounts of *Ribes bracteosum*, *Ribes lacustre*, and up to eight other species of shrubs that may form very dense thickets. The herb layer is diverse with over 30 species reported, but *Lysichiton americanus*, *Athyrium filix-femina*, *Glyceria striata*, *Senecio triangularis*, *Stachys ciliata*, *Scirpus microcarpus*, and *Oenanthe sarmentosa* are the most abundant. The diverse understory makes stands difficult to classify, and this is why a number of publications have used "mesic forb" to characterize these stands.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Pinus monticola</i>	33	2	0	5
<b>Reproducing trees</b>				
<i>Thuja plicata</i>	33	3	0	10
<i>Tsuga heterophylla</i>	33	Tr	0	Tr
<i>Picea engelmannii</i>	33	Tr	0	Tr
<b>Shrub layer</b>				
<i>Alnus viridis</i> ssp. <i>sinuata</i>	100	72	60	90
<i>Ribes bracteosum</i>	67	4	0	10
<b>Herb layer</b>				
<i>Lysichiton americanus</i>	100	53	25	80
<i>Athyrium filix-femina</i>	67	9	0	20
<i>Glyceria striata</i>	67	8	0	20
<i>Mimulus guttatus</i>	67	Tr	0	1
<i>Epilobium ciliatum</i> ssp. <i>watsonii</i>	67	Tr	0	Tr
<b>Moss layer</b>				
Moss	33	5	0	16

***Alnus viridis* ssp. *sinuata*/Scirpus microcarpus**

Sitka alder/small-fruited bulrush

Plots sampled: 2 (macro)



**Environment:**

Elevation (ft): ave. 3315  
(3280-3350)

Slope (deg): 2

Landform position:  
depressions, seepage  
slopes

Hydrology: seasonally  
moist to moist

Soils: silt loam

**Vegetation and ecology:**

This association is a variant of the *Alnus viridis* ssp. *sinuata*/*Athyrium filix-femina* association that contains primarily *Scirpus*

*microcarpus* in the herb layer. Trees are scarce and peripheral or limited to seedlings, and include *Pinus contorta* var. *latifolia*, *Picea engelmannii*, *Abies amabilis*, *Thuja plicata*, and *Tsuga heterophylla*. *Alnus viridis* ssp. *sinuata* is the primary shrub with a lesser amount of *Amelanchier alnifolia* recorded, and may form very dense thickets. The herb layer is diverse with 20 species recorded, but *Scirpus microcarpus*, *Viola palustris* and *Cornus Canadensis* are the most abundant. The diverse understory makes stands difficult to classify, and this is why a number of publications have used "mesic forb" to characterize these stands.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Pinus contorta</i> var. <i>latifolia</i>	50	30	0	60
<i>Picea engelmannii</i>	50	2	0	3
<b>Reproducing trees</b>				
<i>Picea engelmannii</i>	50	1	0	2
<i>Abies amabilis</i>	50	1	0	1
<i>Thuja plicata</i>	50	Tr	0	Tr
<i>Tsuga heterophylla</i>	50	Tr	0	Tr
<b>Shrub layer</b>				
<i>Alnus viridis</i> ssp. <i>sinuata</i>	100	58	50	65
<i>Amelanchier alnifolia</i>	50	5	0	10
<b>Herb layer</b>				
<i>Scirpus microcarpus</i>	100	65	60	70
<i>Orthilia secunda</i>	100	1	1	1
<i>Viola palustris</i>	50	10	0	20
<i>Cornus canadensis</i>	50	8	0	15

**Betula nana/Carex aquatilis var. dives**

Bog birch/Sitka sedge

Plots sampled: 2 (macro)



**Environment:**

Elevation (ft): ave. 3959  
(3300-4618)

Slope (deg): 0

Landform position:

depressions

Hydrology: perennially  
saturated to flooded

Soils: organic

**Vegetation and ecology:**

Habitat is montane fens.

Although no trees were

recorded from the plots,

*Pinus contorta* var. *latifolia*

and *Picea engelmannii* may

be peripheral or occur on

elevated microsites. *Betula nana* is the primary shrub, and with a variety of other shrubs such as *Salix myrtillifolia*, *Salix geyeriana*, *Spiraea douglasii*, or *Alnus incana*, it may form very dense thickets 8-10 feet tall. The herb layer is mostly a monotypic stand of *Carex aquatilis* var. *dives* with trace amounts of *Lysichiton americanus*, *Eleocharis quinqueflora*, *Polygonum bistortoides*, *Equisetum arvense*, and about 10 other species. Some stands may remain flooded with shallow water well into the growing season.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Shrub layer</b>				
<i>Betula nana</i>	100	43	35	50
<i>Salix myrtillifolia</i>	50	28	0	55
<i>Salix geyeriana</i>	50	20	0	40
<i>Spiraea douglasii</i>	50	15	0	30
<i>Alnus incana</i>	50	5	0	10
<i>Lonicera involucrata</i>	50	5	0	10
<b>Herb layer</b>				
<i>Carex aquatilis</i> var. <i>dives</i>	100	65	60	70
<i>Lysichiton americanus</i>	100	2	Tr	3
<i>Eleocharis quinqueflora</i>	50	3	0	5
<i>Polygonum bistortoides</i>	50	2	0	3
<i>Equisetum arvense</i>	50	2	0	3
<i>Hypericum anagalloides</i>	50	1	0	2
<b>Moss layer</b>				
Moss	50	10	0	20

## *Cornus sericea*/*Lysichiton americanus*

Creek dogwood/skunk cabbage

Plots sampled: 2 (macro)



### Environment:

Elevation (ft): ave. 2500,  
(1640-3360)

Slope (deg): 0

Landform position:

floodplains, basins

Hydrology: perennially  
saturated or seasonally  
flooded

Soils: organic or muck

### Vegetation and ecology:

Habitat is montane shrub  
swamp. This association is  
typically a tall, dense stand  
of *Cornus sericea* with  
lesser amounts of *Acer*

*circinatum*. and *Rubus ursinus*. The herb layer is primarily a stand of *Lysichiton americanus* with small amounts of *Lemna minor* and *Carex obnupta*, depending on elevation and amount of seasonal flooding. Very few other herbs are present and expanses of mud or muck are typical. Mosses are conspicuous and bare ground is an artifact of seasonal flooding.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Frangula purshiana</i>	50	2	0	3
<b>Reproducing trees</b>				
<i>Fraxinus latifolia</i>	50	3	0	6
<b>Shrub layer</b>				
<i>Cornus sericea</i>	100	80	65	95
<i>Acer circinatum</i>	100	4	1	6
<i>Rubus ursinus</i>	100	1	Tr	2
<b>Herb layer</b>				
<i>Lysichiton americanus</i>	100	20	15	25
<i>Lemna minor</i>	50	3	0	5
<i>Carex obnupta</i>	50	2	0	3
<b>Moss layer</b>				
Moss	50	30	0	60
<b>Unvegetated</b>				
Litter	50	10	0	20
Bare ground	50	3	0	5

***Kalmia microphylla*/*Carex aquatilis* var. *dives***

Swamp laurel/Sitka sedge

Plots sampled: 6 (3 macro, 3 micro)



**Environment:**

Elevation (ft): ave. 4338, (2300-5410)

Slope (deg): ave. 1 (0-2)

Landform position:

depressions, flats

Hydrology: moist to perennially saturated

Soils: mostly organic, some silt loam

**Vegetation and ecology:**

Habitat is montane fens. This type occurs at small scale on isolated hummocks within a wet lawn matrix, and at larger scale around hummocky edges of mires. Trees occur on elevated hummocks or "tree islands" . The herb layer has more than 20 species recorded, but has low cover and the moss layer is most

conspicuous. *Carex aquatilis* var. *dives* is usually more abundant than indicated in these plots, these being more of a *Sphagnum* phase with fewer herbs present. The moss layer is composed almost entirely of tightly-packed mats of *Sphagnum capillifolium* and *Aulacomniun palustre*.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Pinus contorta</i> var. <i>latifolia</i>	17	3	0	20
<b>Reproducing trees</b>				
<i>Pinus contorta</i> var. <i>latifolia</i>	17	Tr	0	1
<i>Pinus monticola</i>	17	Tr	0	1
<i>Picea engelmannii</i>	17	Tr	0	1
<i>Tsuga mertensiana</i>	17	Tr	0	Tr
<i>Tsuga heterophylla</i>	17	Tr	0	Tr
<b>Shrub layer</b>				
<i>Kalmia microphylla</i>	100	24	15	35
<i>Vaccinium uliginosum</i>	33	2	0	10
<i>Vaccinium</i>	17	6	0	35
<i>Gaultheria</i>	17	Tr	0	2
<b>Herb layer</b>				
<i>Carex echinata</i> ssp. <i>echinata</i>	33	3	0	15
<i>Drosera rotundifolia</i>	33	3	0	10
<i>Carex aquatilis</i> var. <i>dives</i>	33	1	0	3
<i>Lysichiton americanus</i>	33	Tr	0	1
<b>Moss layer</b>				
Moss	100	81	36	100
<b>Unvegetated</b>				
Litter	50	5	0	10

**Ledum glandulosum - Gaultheria shallon/Carex obnupta**

Labrador tea - salal/slough sedge

Plots sampled: 33 (2 macro, 31 micro)



**Environment:**

Elevation (ft): ave. 86, (20-1030)

Slope (deg): ave. 0 (0-4)

Landform position:  
floodplains, benches,  
and flats

Hydrology: seasonally  
moist to perennially  
saturated

Soils: organic

**Vegetation and ecology:**

Habitat is coastal fens. It occurs around the edges of open mires subject to successional infilling by trees and shrubs, and in regenerating swamp that has been logged, burned, or killed by prolonged flooding.

The diverse shrub layer

includes elements from open peatlands, shrub swamp, and swamp forest. The herb layer contains more than 20 species from both open mire and developing forest, but there are no obvious dominant species. *Sphagnum palustre* and *Sphagnum henryense* are conspicuous in the moss layer, with up to 80 percent cover, with trace amounts of *Sphagnum mendocinum* and *Sphagnum capillifolium*. This ecotonal association is valuable as edge habitat for a variety of animals and is always present in mires with a range of seral stages.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Pinus contorta</i> var. <i>contorta</i>	21	4	0	40
<b>Reproducing trees</b>				
<i>Tsuga heterophylla</i>	15	Tr	0	5
<i>Frangula purshiana</i>	15	Tr	0	5
<i>Picea sitchensis</i>	12	Tr	0	3
<i>Thuja plicata</i>	12	Tr	0	2
<i>Alnus rubra</i>	3	Tr	0	1
<b>Shrub layer</b>				
<i>Ledum glandulosum</i>	100	37	25	80
<i>Gaultheria shallon</i>	100	18	4	50
<i>Spiraea douglasii</i>	52	4	0	20
<b>Herb layer</b>				
<i>Carex aquatilis</i> var. <i>dives</i>	64	19	0	60
<i>Carex obnupta</i>	52	11	0	60
<i>Agrostis exarata</i>	45	3	0	15
<i>Cornus canadensis</i>	39	2	0	15
<i>Blechnum spicant</i>	30	1	0	10
<b>Moss layer</b>				
Moss	48	10	0	80
<b>Unvegetated</b>				
Litter	15	2	0	20



**Ledum glandulosum/Carex obnupta/Sphagnum**

Labrador tea/slough sedge/sphagnum

Plots sampled: 92 (micro)



**Environment:**

Elevation (ft): ave. 57 (20-2800)

Slope (deg): 0

Landform position:  
floodplains, basins

Hydrology: perennially saturated

Soils: organic

**Vegetation and ecology:**

Habitat is coastal fens in poorly-drained basins, and on floating lake-fill mats. Well-developed *Sphagnum* hummocks 1-3 feet taller than surrounding wet hollows are typical. *Vaccinium oxycoccos*, *Drosera rotundifolia*, *Lysichiton americanus*, *Eriophorum chamissonis*, *Trientalis europaea* ssp.

*arctica*, *Carex echinata* ssp. *phyllomanica*, and *Carex leptalea* are diagnostic species even though they may not always be abundant. The *Sphagnum* hummocks are sufficiently elevated above the influence of groundwater to be somewhat drier and they have lower pH and nutrient status than what is found in hollows. Hollows consist almost entirely of lawns of *Sphagnum angustifolium*, *Sphagnum pacificum*, or bare mud.

**Phases:** (1) *Sphagnum palustre* and/or *Sphagnum henryense*, (2) *Sphagnum fuscum*.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Pinus contorta</i> var. <i>contorta</i>	23	2	0	30
<b>Reproducing trees</b>				
<i>Thuja plicata</i>	27	3	0	40
<i>Tsuga heterophylla</i>	1	Tr	0	10
<i>Frangula purshiana</i>	1	Tr	0	1
<b>Shrub layer</b>				
<i>Ledum glandulosum</i>	100	25	2	60
<i>Vaccinium oxycoccos</i>	48	4	0	35
<i>Spiraea douglasii</i>	33	4	0	35
<i>Vaccinium uliginosum</i>	21	2	0	30
<b>Herb layer</b>				
<i>Carex obnupta</i>	74	12	0	60
<i>Drosera rotundifolia</i>	51	2	0	20
<i>Carex echinata</i> ssp. <i>phyllomanica</i>	41	4	0	35
<i>Lysichiton americanus</i>	28	4	0	40
<i>Blechnum spicant</i>	24	3	0	35
<i>Eriophorum chamissonis</i>	24	1	0	15
<b>Moss layer</b>				
Moss	92	55	0	100
<b>Unvegetated</b>				
Litter	3	Tr	0	30

**Ledum glandulosum/Darlingtonia californica/Sphagnum**

Labrador tea/darlingtonia/sphagnum

Plots sampled: 60 (1 macro, 59 micro)



**Environment:**

Elevation (ft): ave. 40 (20-40)

Slope (deg): 0

Landform position:  
floodplains, basins

Hydrology: perennially saturated

Soils: organic

**Vegetation and ecology:**

Habitat is coastal fens in poorly-drained basins, on floating lake-fill mats, or on duripan soils with perched water tables. Woody vegetation is confined to *Sphagnum* hummocks. *Darlingtonia californica*, *Drosera rotundifolia*, *Eriophorum chamissonis*, *Carex aquatilis* var. *dives*, and *Comarum palustre* dominate the herb layer, and *Empetrum nigrum* is occasional.

**Phases:** (1) *Sphagnum palustre* and/or *Sphagnum henryense*, (2) *Sphagnum fuscum*.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Pinus contorta</i> var. <i>contorta</i>	25	Tr	0	5
<b>Reproducing trees</b>				
<i>Tsuga heterophylla</i>	17	Tr	0	2
<i>Picea sitchensis</i>	10	Tr	0	5
<i>Frangula purshiana</i>	2	Tr	0	1
<b>Shrub layer</b>				
<i>Ledum glandulosum</i>	100	31	10	60
<i>Vaccinium oxycoccos</i>	67	9	0	40
<i>Vaccinium uliginosum</i>	63	18	0	70
<i>Spiraea douglasii</i>	25	2	0	25
<b>Herb layer</b>				
<i>Darlingtonia californica</i>	100	18	1	50
<i>Drosera rotundifolia</i>	87	1	0	10
<i>Eriophorum chamissonis</i>	65	10	0	35
<i>Carex aquatilis</i> var. <i>dives</i>	53	2	0	15
<i>Comarum palustre</i>	37	5	0	35
<i>Carex cusickii</i>	30	3	0	30
<i>Carex leptalea</i>	28	2	0	25
<b>Moss layer</b>				
Moss	100	59	1	99

## ***Ledum glandulosum* - *Myrica gale***

Labrador tea - sweet gale

Plots sampled: 0



### **Environment:**

Elevation (ft): ave. 40 (20-40)

Slope (deg): 0

Landform position: depressions and flats

Hydrology: perennially saturated

Soils: organic or muck

**Vegetation and ecology:** Habitat is coastal fens. The association has been observed in the field but not sampled, so a quantitative description of the vegetation is not available. It forms dense shrub stands 3-6 feet tall on perennially-saturated peat in minerotrophic peatlands, and occurs in low-gradient drainages where water is ponded. Standing water may occur in hollows. Trees are absent, and the shrub layer is composed exclusively of *Ledum glandulosum* and *Myrica gale* in approximately equal amounts with total shrub cover about 95 percent. The herb layer has not been documented, but is no doubt depauperate because of dense shading. The moss layer contains scattered mats of *Sphagnum angustifolium* with lesser amounts of *Sphagnum palustre* or *Sphagnum henryense*. *Myrica gale* fixes atmospheric nitrogen and is an important source of this element in mires. The tall growth of shrubs in this association may indicate past or ongoing disturbance to groundwater flows or water quality.

This association is only known from the northern coast of Oregon, where it occurs in Gearhart Bog in Clatsop County. Early collections indicate that *Myrica gale* once extended as far south as Lincoln County, with a questionable record from Curry County, but Clatsop County is currently the southernmost known locality.

**Ledum glandulosum/Sanguisorba officinalis/Sphagnum**

Labrador tea/burnet

Plots sampled: 45 (micro)



**Environment:**

Elevation (ft): ave. 283,  
(100-2800)

Slope (deg): 0

Landform position:  
floodplains,  
depressions, ancient  
marine terraces

Hydrology: mostly  
perennially saturated,  
some seasonally  
flooded

Soils: mostly organic,  
some sandy

Species	Const	Percent cover		
		Ave	Min	Max
<b>Reproducing trees</b>				
<i>Fragula purshiana</i>	2	Tr	0	8
<b>Shrub layer</b>				
<i>Ledum glandulosum</i>	100	27	3	80
<i>Gaultheria shallon</i>	27	1	0	10
<i>Rubus ursinus</i>	9	Tr	0	4
<i>Vaccinium uliginosum</i>	4	1	0	35
<b>Herb layer</b>				
<i>Sanguisorba officinalis</i>	100	21	3	60
<i>Carex echinata</i> ssp. <i>phyllomanica</i>	67	3	0	15
<i>Blechnum spicant</i>	64	15	0	60
<i>Agrostis exarata</i>	53	2	0	12
<i>Drosera rotundifolia</i>	38	1	0	3
<i>Sisyrinchium</i> <i>californicum</i>	33	4	0	30
<b>Moss layer</b>				
Moss	73	28	0	99

**Vegetation and ecology:**

Habitat is coastal and Coast Range fens. The association typically forms well-developed hummocks 1-2 feet taller than surrounding mire vegetation. Mature trees are absent. Several unusual species occur in this association along the southern coast of Oregon but do not extend to the northernmost sites. *Veratrum californicum* and *Carex buxbaumii* are more typical of middle to upper elevations in the Cascade Range, while *Sisyrinchium californicum*, *Helenium bolanderi*, *Rhynchospora capitellata*, *Senecio triangularis* var. *angustifolius*, and *Lilium occidentale* are more typical of mires in northern California. Hummocks are dominated by *Sphagnum palustre* and *Sphagnum henryense*, and may include *Cladina portentosa* ssp. *pacifica*. Hollows consist almost entirely of lawns of *Sphagnum angustifolium* and *Sphagnum pacificum*, but bare mud bottoms or standing water are occasional. Many of the hollows are in elk and deer trails, and may serve to channel mineral-rich water through the mires.

**Malus fusca/Carex obnupta**

Crabapple/slough sedge

Plots sampled: 1 (macro)



**Environment:**

Elevation (ft): 200-2560

Slope (deg): 0

Landform position:  
floodplains, depressions,  
benches

Hydrology: seasonally flooded to perennially moist

Soils: muck or loam

Species	Const	Percent cover		
		Ave	Min	Max
<b>Shrub layer</b>				
<i>Malus fusca</i>	100	60	60	60
<i>Salix geyeriana</i>	100	10	10	10
<i>Spiraea douglasii</i>	100	3	3	3
<b>Herb layer</b>				
<i>Carex obnupta</i>	100	97	97	97
<i>Veronica scutellata</i>	100	Tr	Tr	Tr

**Vegetation and ecology:** Habitat is depressions in both deciduous and coniferous forest. Several examples of this association have been observed in the field but only one plot has been sampled. All trees are peripheral to the wetlands. The most typical expression known to the author is a dense, monotypic stand of *Malus fusca* with a monotypic understory of *Carex obnupta*. Depending on hydroperiod, the understory ranges from nearly 100 percent cover of *Carex obnupta* to very low cover of any other vegetation because of prolonged seasonal ponding. The plot reported here also contains *Salix geyeriana* and *Spiraea douglasii*. The association may have been more widespread historically, as large expanses of swamp vegetation once occurred in the northern Willamette and Tualatin valleys. These wetlands have not been sampled adequately.

***Myrica gale*/Carex aquatilis var. dives**

Sweet gale/Sitka sedge

Plots sampled: 1 (macro)



**Environment:**

Elevation (ft): 3100

Slope (deg): 1

Landform position:  
floodplains, montane  
basins

Hydrology: perennially  
saturated

Soils: organic

Species	Const	Percent cover		
		Ave	Min	Max
<b>Shrub layer</b>				
<i>Myrica gale</i>	100	60	60	60
<i>Spiraea douglasii</i>	100	2	2	2
<i>Betula nana</i>	100	1	1	1
<b>Herb layer</b>				
<i>Carex aquatilis</i> var. <i>dives</i>	100	25	25	25
<i>Sanguisorba officinalis</i>	100	25	25	25
<i>Agrostis thurberiana</i>	100	Tr	Tr	Tr

**Vegetation and ecology:** Habitat is fens. This association has not been sampled extensively and more plots are needed. Trees are absent, and the shrub layer is composed primarily of *Myrica gale* from 2-4 feet tall with cover up to 95 percent. The single montane plot reported here also contains *Spiraea douglasii* and *Betula nana*, but coastal expressions would not contain *Betula*. The herb layer here contains *Carex aquatilis* var. *dives* in both coastal and montane sites, and the moss layer may contain *Sphagnum*. *Myrica gale* fixes atmospheric nitrogen and is an important source of this element in mires. It appears to favor edges of pools and former ditches that have infilled with poorly-consolidated peat, where water movement and nutrient status may be greater than in other peatland situations. In Oregon, it occurs at Gearhart Bog in Clatsop County, and may never have been very extensive. Early collections indicate that *Myrica gale* once extended as far south as Lincoln County, with a questionable record from Curry County, but Clatsop County is currently the southernmost known locality. Kunze (1994) noted that most occurrences of this association in the northern Puget Trough are in poor condition, presumably because of human disturbance, and that *Myrica gale* was once more widespread.

## *Salix commutata*

Undergreen willow

Plots sampled: 4 (1 macro,  
3 micro)



### Environment:

Elevation (ft): 5250

Slope (deg): 6

Landform position: slope

Hydrology: perennially  
saturated

Soils: organic

### Vegetation and ecology:

Habitat is subalpine fens.

The association occurs at

the wet end of subalpine heath and intergrades with the *Carex nigricans* and *Carex scopulorum* associations. Woody plants are confined to hummocks and the remaining vegetation is wet lawn. The plots reported here do not record any trees but *Tsuga mertensiana* and *Abies lasiocarpa* may be present on hummocks. *Salix commutata* is the primary species in the shrub layer, with an average cover of 26 percent and ranging from 20-35 percent. The other four shrub species recorded occur at low constancy and very low cover. The primary species in the herb layer are *Carex nigricans* and *Carex scopulorum*, one or the other of which is usually present in the plot. *Juncus balticus* may form significant patches, but the other species recorded all occur with very low cover.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Shrub layer</b>				
<i>Salix commutata</i>	100	26	20	35
<i>Spiraea densiflora</i>	25	2	0	8
<i>Cassiope mertensiana</i>	25	2	0	7
<i>Kalmia microphylla</i>	25	2	0	7
<b>Herb layer</b>				
<i>Carex nigricans</i>	75	31	0	75
<i>Carex scopulorum</i>	75	13	0	25
<i>Pedicularis attollens</i>	75	1	0	2
<i>Aster alpigenus</i>	50	1	0	5
<i>Ligusticum grayi</i>	50	1	0	4
<i>Tofieldia glutinosa</i> ssp. <i>occidentalis</i>	50	Tr	0	1
<i>Juncus balticus</i>	25	4	0	15

## *Salix geyeriana* complex

Geyer willow

Plots sampled: 7 (macro)



### Environment:

Elevation (ft): ave. 4552  
(2560-6575)

Slope (deg): ave. 0 (0-1)

Landform position:

floodplains, basins

Hydrology: seasonally to  
perennially flooded

Soils: mostly organic,  
some loam

### Vegetation and ecology:

Habitat is montane fens.

Plots are highly variable.

Species with significant  
patch size suggest five  
phases that need more  
study:

**Phases:** (1) *Carex aquatilis* var. *aquatilis*, (2) *Carex aquatilis* var. *dives*, (3) *Carex nigricans* - *Carex scopulorum*, (4) *Carex obnupta*, (5) *Scirpus microcarpus*.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Shrub layer</b>				
<i>Salix geyeriana</i>	100	56	20	98
<i>Spiraea douglasii</i>	43	8	0	40
<i>Salix myrtillofolia</i>	29	3	0	10
<i>Salix commutata</i>	29	1	0	10
<b>Herb layer</b>				
<i>Veronica americana</i>	57	Tr	0	1
<i>Carex aquatilis</i> var. <i>dives</i>	43	21	0	60
<i>Dodecatheon jeffreyi</i>	43	1	0	4
<i>Carex aquatilis</i> var. <i>aquatilis</i>	29	6	0	40
<i>Carex utriculata</i>	29	5	0	30
<i>Hypericum anagalloides</i>	29	3	0	15
<i>Calamagrostis stricta</i> ssp. <i>inexpansa</i>	29	1	0	7
<i>Equisetum arvense</i>	29	1	0	5
<i>Muhlenbergia filiformis</i>	29	1	0	5
<i>Lysichiton americanus</i>	29	1	0	2
<i>Antennaria argentea</i>	29	Tr	0	2
<i>Epilobium ciliatum</i> ssp. <i>watsonii</i>	29	Tr	0	1
<i>Platanthera dilatata</i>	29	Tr	0	1
<i>Veronica serpyllifolia</i>	29	Tr	0	1
<i>Geum macrophyllum</i>	29	Tr	0	1
<i>Carex scopulorum</i>	14	6	0	40
<i>Carex nigricans</i>	14	6	0	40
<i>Scirpus microcarpus</i>	14	3	0	20
<i>Carex obnupta</i>	14	1	0	10
<b>Moss layer</b>				
Moss	29	9	0	60



## *Salix hookeriana* - (*Salix sitchensis*)

Hooker willow - (Sitka willow)

Plots sampled: 2 (macro)



### Environment:

Elevation (ft): ave. 1044  
(500-1587)

Slope (deg): ave. 1 (0-1)

Landform position:  
floodplains, basins

Hydrology: seasonally flooded to perennially moist

Soils: silt loam

Species	Const	Percent cover		
		Ave	Min	Max
<b>Shrub layer</b>				
<i>Salix hookeriana</i>	100	78	65	90
<i>Salix sitchensis</i>	50	8	0	15
<i>Spiraea douglasii</i>	50	3	0	6
<b>Herb layer</b>				
<i>Carex obnupta</i>	50	40	0	80
<b>Moss layer</b>				
Moss	100	41	Tr	81

**Vegetation and ecology:** Habitat is depressions in floodplains and potholes in basalt scabland. The association is undersampled but reported here because it is common and widespread in the Willamette Valley, along the Columbia River, and at lower elevations in the Cascade Range. It represents clonal shrub swamps of the inland morphotype of *Salix hookeriana* that was previously called *Salix piperi*. Shrub swamps of this species occur in two phases determined by composition of the herb layer. Stands are typically dense thickets and are either monotypes of *Salix hookeriana* or have admixtures of *Salix sitchensis* and/or *Spiraea douglasii*. In the two plots reported here, *Salix hookeriana* has an average cover of 78 percent and ranging from 65-90 percent. Densely branched adventitious roots on the lower stems of *Salix hookeriana* and large whitish mats of dried algae may remain draped like tents over roots and trunks after water levels recede. *Fontinalis antipyretica* and *Dichelyma uncinata* are conspicuous in the moss layer.

**Phases:** (1) Monotypic *Salix hookeriana*, (2) *Carex obnupta*.

***Salix hookeriana* - (*Malus fusca*)/*Carex obnupta* - *Lysichiton americanus***

Hooker willow - Oregon crabapple/slough sedge - skunk cabbage

Plots sampled: 16 (macro)



**Environment:**

Elevation (ft): ave. 34 (10-100)

Slope (deg): ave. 0 (0-1)

Landform position:

floodplains, basins

Hydrology: perennially saturated

Soils: organic

**Vegetation and ecology:**

Habitat is shrub swamp in peat-filled basins, adjacent to lakes and ponds, on old deflation plains, and interspersed with open mire in fens. Perennially wet soils usually preclude

establishment of conifers, but occasional *Alnus rubra*, *Pinus contorta* var. *contorta*, or *Picea sitchensis* may occur on hummocks or peripheral to the wetland. The shrub layer is dense and tangled. The herb layer, usually dominated by *Carex obnupta* and *Lysichiton americanus*, may have expanses of deep muck soil exposed in the most shaded places. Epiphytic mosses and *Polypodium glycyrrhiza* are abundant in the canopy of tall shrubs. The moss layer contains mostly *Eurhynchium praelongum*, but one site is habitat for the rare *Limbella fryei*. *Sphagnum palustre* occurs in this association in Clatsop County, and occurs in similar sites farther north. Stands appear to be long-lived, maintained by wet soils and gap succession. The willows sustain frequent crown damage from winter storms and heavy browsing by beavers, followed by vigorous resprouting. The association is prime feeding and denning habitat for beaver.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Alnus rubra</i>	31	2	0	15
<i>Picea sitchensis</i>	19	3	0	25
<b>Shrub layer</b>				
<i>Salix hookeriana</i>	88	30	0	95
<i>Spiraea douglasii</i>	88	13	0	50
<i>Malus fusca</i>	81	45	0	95
<i>Lonicera involucrata</i>	38	1	0	5
<i>Ledum glandulosum</i>	31	1	0	3
<b>Herb layer</b>				
<i>Carex obnupta</i>	100	40	2	75
<i>Lysichiton americanus</i>	63	18	0	50
<i>Oenanthe sarmentosa</i>	31	Tr	0	3
<i>Athyrium filix-femina</i>	31	Tr	0	2
<i>Blechnum spicant</i>	25	Tr	0	1
<b>Moss layer</b>				
Moss	25	2	0	14

***Salix lucida* ssp. *lasiandra*/*Urtica dioica* ssp. *gracilis***

Pacific willow/California nettle

Plots sampled: 6 (macro)



**Environment:**

Elevation (ft): ave. 98 (10-500)

Slope (deg): 0

Landform position:  
floodplains, basins

Hydrology: seasonally  
flooded to perennially  
saturated

Soils: mostly silt loam,  
some sandy loam

**Vegetation and ecology:**

Habitat is shrub swamp  
around shallow lakes and  
ponds, and along low-

gradient streams and river channels. In some stands *Salix lucida* ssp. *lasiandra* may not exceed shrub height. Because of a history of grazing and proximity to agricultural and urban areas, the herb layer is usually dominated by exotic cultivars of *Phalaris arundinacea*. Sites with seasonal inundation may have a higher component of native species in the herb layer such as *Urtica dioica* ssp. *gracilis*, *Bidens frondosa*, and *Leersia oryzoides*. Many sites are associated with shallow ponds and associated mudflat vegetation. Stands are used extensively by beaver and *Salix lucida* ssp. *lasiandra* resprouts vigorously following cropping. Trees appear to senesce after about 40 years and may not readily reproduce if stands are heavily infested with *Phalaris arundinacea*. Stands are often flooded in winter and historically were sometimes flooded into the growing season, but they need late-season draw-down to survive. Use of water control structures to keep shallow lakes flooded in summer have killed several large stands of *Salix lucida* ssp. *lasiandra* in the Portland area, destroying valuable shrub swamp but creating new mudflat habitat.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Salix lucida</i> ssp. <i>lasiandra</i>	100	67	50	90
<i>Fraxinus latifolia</i>	17	1	0	3
<b>Shrub layer</b>				
<i>Cornus sericea</i>	33	1	0	5
<i>Sambucus racemosa</i>	17	7	0	40
<i>Salix sitchensis</i>	17	5	0	30
<i>Salix fluviatilis</i>	17	1	0	4
<b>Herb layer</b>				
<i>Phalaris arundinacea</i>	83	19	0	40
<i>Impatiens capensis</i>	50	12	0	35
<i>Urtica dioica</i> ssp. <i>gracilis</i>	33	13	0	40
<i>Bidens frondosa</i>	33	9	0	50
<i>Leersia oryzoides</i>	33	7	0	20
<b>Moss layer</b>				
Moss	17	Tr	0	1

***Salix lucida* ssp. *lasiandra*/*Salix sitchensis*/*Lysichiton americanus***  
 Pacific willow/Sitka willow/skunk cabbage

Plots sampled: 9 (macro)



**Environment:**

Elevation (ft): ave. 239 (5-2100)

Slope (deg): ave. 0 (0-1)

Landform position:

floodplains, basins

Hydrology: perennially saturated

Soils: mostly loam, some organic

**Vegetation and ecology:**

Habitat is floodplain depressions and sites with freshwater tidal irrigation.

The association forms dense shrub swamps with considerable amounts of standing water. *Salix lucida* ssp. *lasiandra* is often only shrub or tall shrub height. *Picea sitchensis*, *Alnus rubra*, and *Populus balsamifera* ssp. *trichocarpa* are only occasional and

confined to hummocks. The shrub layer contains almost 20 different species. More than 30 species are reported from the herb layer, but cover is usually low because of the dense shrub layer. *Lysichiton americanus*, *Athyrium filix-femina*, *Impatiens capensis*, *Oenanthe sarmentosa*, *Carex obnupta* and *Carex aquatilis* var. *dives* are hallmarks of freshwater tidal surge plain along the lower Columbia River.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Salix lucida</i> ssp. <i>lasiandra</i>	89	20	0	60
<i>Picea sitchensis</i>	22	1	0	5
<b>Reproducing trees</b>				
<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>	11	1	0	5
<b>Shrub layer</b>				
<i>Salix sitchensis</i>	89	28	0	75
<i>Spiraea douglasii</i>	78	11	0	30
<i>Cornus sericea</i>	67	13	0	70
<i>Rubus ursinus</i>	67	1	0	3
<i>Lonicera involucrata</i>	56	1	0	5
<i>Rosa nutkana</i>	44	2	0	10
<i>Rubus spectabilis</i>	44	2	0	5
<b>Herb layer</b>				
<i>Lysichiton americanus</i>	100	19	1	60
<i>Athyrium filix-femina</i>	78	10	0	60
<i>Impatiens capensis</i>	78	8	0	30
<i>Oenanthe sarmentosa</i>	67	4	0	20
<i>Scirpus microcarpus</i>	67	3	0	7
<i>Vicia gigantea</i>	44	Tr	0	1
<i>Carex obnupta</i>	33	7	0	55
<i>Equisetum fluviatile</i>	33	1	0	2
<i>Veratrum californicum</i>	33	Tr	0	2
<i>Phragmites australis</i>	33	Tr	0	2

## ***Salix sitchensis* complex**

Sitka willow

Plots sampled: 7 (macro)



### **Environment:**

Elevation (ft): ave. 2789  
(500-4474)

Slope (deg): ave. 1 (0-3)

Landform position:  
floodplains, basins

Hydrology: perennially  
moist to saturated

Soils: mostly organic, some  
loam

### **Vegetation and ecology:**

Habitat is depressions on floodplains and in fens. Plots are highly variable and probably composed of numerous phases that need further study. *Alnus rubra*, *Picea engelmannii*, and *Abies amabilis* are reported in small amounts but are probably peripheral to the wetlands.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Alnus rubra</i>	14	Tr	0	2
<b>Reproducing trees</b>				
<i>Picea engelmannii</i>	14	1	0	8
<i>Abies amabilis</i>	14	Tr	0	Tr
<b>Shrub layer</b>				
<i>Salix sitchensis</i>	100	70	25	99
<i>Spiraea douglasii</i>	29	4	0	20
<i>Alnus viridis</i> ssp. <i>sinuata</i>	29	1	0	5
<i>Salix geyeriana</i>	14	4	0	30
<i>Vaccinium uliginosum</i>	14	4	0	25
<b>Herb layer</b>				
<i>Lysichiton americanus</i>	71	16	0	70
<i>Carex aquatilis</i> var. <i>dives</i>	43	18	0	90
<i>Senecio triangularis</i>	29	1	0	5
<i>Carex echinata</i> ssp. <i>echinata</i>	29	1	0	2
<i>Viola palustris</i>	29	Tr	0	2
<b>Moss layer</b>				
Moss	14	Tr	0	1

**Phases:** (1) Monotypic *Salix sitchensis* , (2) *Lysichiton americanus*, (3) *Carex aquatilis* var. *dives*, (4) *Carex obnupta*, (5) *Scirpus microcarpus*.

## *Spiraea douglasii*

Douglas spiraea

Plots sampled: 4 (macro)



### Environment:

Elevation (ft): ave. 2235  
(500-4100)

Slope (deg): 1 (0-5)

Landform position: toe  
slopes, floodplains,  
basins

Hydrology: seasonally to  
perennially moist

Soils: mostly loam, some  
organic

Species	Cons t	Percent cover		
		Ave	Min	Max
<b>Shrub layer</b>				
<i>Spiraea douglasii</i>	100	95	90	100
<i>Salix hookeriana</i>	25	3	0	10
<i>Crataegus douglasii</i>	25	1	0	4
<b>Herb layer</b>				
<i>Polygonum punctatum</i>	25	1	0	3
<i>Myosotis laxa</i>	25	Tr	0	Tr
<i>Poa trivialis</i>	25	Tr	0	Tr
<i>Rumex crispus</i>	25	Tr	0	Tr
<i>Epilobium ciliatum</i>	25	Tr	0	Tr
<i>Stellaria media</i>	25	Tr	0	Tr
<b>Moss layer</b>				
Moss	50	1	0	2

**Vegetation and ecology:** Habitat is shrub swamp in riparian zones, prairies, and fens. Plots are highly variable and indicate that numerous phases are present that need further study. Twenty-seven other plots were left unclassified. The association described here is more or less monotypic and common at lower elevations. Trees are absent or peripheral. The shrub layer is dominated by *Spiraea douglasii* with an average cover of 95 percent, and is so dense that the herb layer is nearly nonexistent. Changes in hydrology may enhance dense stands. More northerly examples may contain *Myrica gale* and *Ledum glandulosum*. Stands may be extensive along floodplains and some have no doubt developed on abandoned pasture land and old prairie.

***Spiraea douglasii* - *Vaccinium uliginosum*/*Carex obnupta* - *Deschampsia caespitosa***

Douglas spiraea - bog blueberry/slough sedge - tufted hairgrass

Plots sampled: 57 (2 macro, 55 micro)



**Environment:**

Elevation (ft): ave. 27 (20-100)

Slope (deg): 0

Landform position:  
floodplains, basins

Hydrology: seasonally to  
perennially moist

Soils: mostly organic, some sand

Species	Const	Percent cover		
		Ave	Min	Max
<b>Shrub layer</b>				
<i>Spiraea douglasii</i>	89	46	0	85
<i>Vaccinium uliginosum</i>	77	34	0	90
<i>Salix hookeriana</i>	18	2	0	25
<b>Herb layer</b>				
<i>Carex obnupta</i>	53	8	0	50
<i>Deschampsia caespitosa</i>	35	8	0	45
<b>Moss layer</b>				
<i>Sphagnum</i>	63	27	0	95
Moss	2	Tr	0	2

**Vegetation and ecology:** Habitat is coastal marshes and fens. The association forms wet lawns, low hummocks, and lake-fill mats, and occurs as a primary vegetation type on denuded peat or in degraded sites once dominated by *Ledum* associations. Trees are absent, and no reproducing trees were observed. The herb layer is not particularly diverse, with only 9 species. *Sphagnum angustifolium* is the primary moss, occurring in 61 percent of the plots, with cover ranging from 0-95 percent. A network of elk trails in the peatland facilitate flows of mineral-rich water and may have long-term effect on vegetation by influencing the location and configuration of hummock-hollow topography. The abundance of *Spiraea douglasii*, the relatively poor development of hummocks, and a depauperate herb layer may indicate past or ongoing disturbance to groundwater flows or water quality. *Spiraea douglasii* tends to increase cover in disturbed peatlands, where the abundance, density, and size of the shrubs may indicate past or ongoing perturbation. This association is most frequent where human development, particularly roads, have impacted peatlands, and may be enhanced by eutrophic runoff from agricultural or urbanized areas.

***Spiraea douglasii*/Sphagnum**

Douglas spiraea/sphagnum

Plots sampled: 7  
(macro)



**Environment:**

Elevation (ft): 130

Slope (deg): 0

Landform position:

floodplains, basins

Hydrology: perennially saturated

Soils: organic

Species	Cons t	Percent cover		
		Av e	Min	Max
<b>Reproducing trees</b>				
<i>Fraxinus latifolia</i>	14	Tr	0	1
<b>Shrub layer</b>				
<i>Spiraea douglasii</i>	100	51	10	75
<i>Rubus ursinus</i>	29	2	0	12
<b>Herb layer</b>				
<i>Carex cusickii</i>	86	45	0	85
<i>Menyanthes trifoliata</i>	86	1	0	1
<i>Lycopus americanus</i>	71	5	0	20
<i>Agrostis capillaris</i>	57	1	0	1
<i>Lemna minor</i>	29	Tr	0	1
<b>Moss layer</b>				
<i>Sphagnum</i>	100	57	20	90

**Vegetation and**

**ecology:** Habitat is edges of lakes and ponds, or on floating lake-fill mats in fens. The association is primarily shrub swamp and is known from only one site in Oregon, but is thought to be representative of similar stands in western Washington that have not been well studied. The moss layer is dominated by a saturated lawn of *Sphagnum squarrosum* with up to 90 percent cover beneath the shrubs. A small portion of the mat has well-developed hummocks of *Sphagnum palustre* 1-2 feet tall, and such hummocks are unknown elsewhere in Oregon except in coastal peatlands. The association may have been more widespread in Oregon historically, as large expanses of swamp vegetation once occurred on organic soils in the northern Willamette and Tualatin valleys. Similar sites on Sauvie Island (Multnomah County) and Lake Labish (Marion County) were destroyed by agricultural development as early as 1912. *Spiraea douglasii* is very common in western Oregon, but no examples are known to occur on floating mats of peat, and none with *Sphagnum*. The closest similar occurrences may be in the northern Puget Trough.



***Vaccinium caespitosum/Sanguisorba officinalis - Carex obnupta***

Dwarf huckleberry/ burnet - slough sedge

Plots sampled: 9 (micro)



**Environment:**

Elevation (ft): 2800

Slope (deg): 0

Landform position: flats, basins

Hydrology: seasonally flooded to perennially moist

Soils: organic

**Vegetation and ecology:**

Habitat is montane fen.

The association consists of

low hummocks of *Vaccinium caespitosum* interspersed around seasonally-flooded openings with a variable cover of stunted *Carex obnupta* and the tiny black liverwort *Cephaloziella*. *Vaccinium caespitosum* typically covers 30-70 percent of the stands but is sometimes sparse, and *Sanguisorba officinalis* may cover up to 95 percent of the herb layer. Stunted *Spiraea douglasii* and *Camassia quamash* suggest that the soil has low nutrient status. *Thuja plicata*, *Rhododendron macrophyllum*, and *Gaultheria shallon* occur on logs and elevated areas. The mosses *Sphagnum mendocinum* and *Aulacomnium palustre* occur among the *Vaccinium* hummocks and may cover 50-95 percent of the moss layer. *Anemone oregana* var. *felix*, a rare plant, is present in these stands. This association is known from three or four sites within a few miles of each other in the Coast Range, and is distinct from occurrences of *Vaccinium caespitosum* in remnants of Willamette Valley prairie.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Shrub layer</b>				
<i>Vaccinium caespitosum</i>	100	19	1	70
<b>Herb layer</b>				
<i>Sanguisorba officinalis</i>	78	59	0	95
<i>Carex obnupta</i>	67	15	0	50
<i>Caltha leptosepala</i> ssp. <i>howellii</i>	67	8	0	25
<i>Camassia quamash</i>	44	5	0	25
<i>Gentiana sceptrum</i>	44	1	0	3
<i>Senecio pseudoureus</i>	33	1	0	2
<i>Carex cusickii</i>	22	1	0	10
<i>Agrostis</i>	22	Tr	0	2
<b>Moss layer</b>				
Moss	67	31	0	95
<i>Sphagnum</i>	11	6	0	50

***Vaccinium caespitosum/Xerophyllum tenax - Sanguisorba officinalis***

Dwarf huckleberry/beargrass - burnet

Plots sampled: 8 (micro)



**Environment:**

Elevation (ft): 2800

Slope (deg): 0

Landform position:  
floodplains, basins

Hydrology: perennially  
moist

Soils: organic

Species	Const	Percent cover		
		Ave	Min	Max
<b>Shrub layer</b>				
<i>Vaccinium caespitosum</i>	88	12	0	40
<b>Herb layer</b>				
<i>Xerophyllum tenax</i>	100	56	25	80
<i>Sanguisorba officinalis</i>	100	35	2	50
<i>Carex cusickii</i>	25	Tr	0	1
<b>Moss layer</b>				
Moss	50	24	0	90
<i>Sphagnum</i>	38	8	0	50

**Vegetation and ecology:** Habitat is montane fen. The association is characterized by hummocks of *Xerophyllum tenax* interspersed with pockets of *Sanguisorba officinalis*, throughout which are distributed tightly-packed mats and hummocks of red *Sphagnum capillifolium* and *Sphagnum mendocinum*. *Vaccinium caespitosum*, *Pteridium aquilinum*, and *Carex obnupta* are occasional to frequent associates. The juxtaposition of the typically upland *Xerophyllum* with typically wetland *Sanguisorba* and *Sphagnum* is peculiar, although *Xerophyllum* occasionally occurs in seasonal wetlands. Occasional rocks and the presence of dead *Thuja plicata* nearby with *Xerophyllum* suggest that this association occurs in a long-term hydrologic tension zone between upland and wetland. Changes in water levels may be mediated by beavers, humans, climatic variability, or combinations of these variables. Long-lived elements of both upland and wetland have commingled to form a plant association with a limited distribution. The hummocks of *Sphagnum capillifolium* are in part elevated above groundwater influence, lowering the nutrient status of this association.

This association is known from three or four sites within a few miles of each other in the Coast Range.

## *Vaccinium uliginosum*/*Carex obnupta*

Bog blueberry/slough sedge

Plots sampled: 13 (7  
macro, 6 micro)



### Environment:

Elevation (ft): 40-100

Slope (deg): 0

Landform position:

deflation plains and  
marine terraces

Hydrology: seasonally  
flooded to perennially  
moist

Soils: mostly organic,  
some sand underlain by  
duripan

### Vegetation and ecology:

Habitat is marsh flooded seasonally to a depth of 12 inches and usually moist throughout the growing season. Stands are remote from saltwater intrusion but may be subject to salt spray. The herb layer has a significant component of seasonally wet deflation plain species. *Vaccinium macrocarpon* occurs in some stands and probably originated from nearby cranberry beds where it has been grown commercially since 1885. Active and abandoned cranberry bogs are located in Clatsop County and along the southern coast of Oregon, and cranberry is readily dispersed into native wetlands by birds and vegetative fragmentation.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Pinus contorta</i> var. <i>contorta</i>	85	4	0	20
<i>Picea sitchensis</i>	8	Tr	0	2
<i>Frangula purshiana</i>	8	Tr	0	1
<b>Shrub layer</b>				
<i>Vaccinium uliginosum</i>	85	45	0	80
<i>Salix hookeriana</i>	85	10	0	35
<i>Gaultheria shallon</i>	46	1	0	3
<i>Malus fusca</i>	38	1	0	3
<i>Spiraea douglasii</i>	31	2	0	10
<i>Myrica californica</i>	31	1	0	15
<i>Vaccinium ovatum</i>	31	1	0	5
<b>Herb layer</b>				
<i>Carex obnupta</i>	100	22	1	60
<i>Veronica scutellata</i>	85	1	0	5
<i>Argentina egedii</i>	77	7	0	40
<i>Juncus lesueurii</i>	54	2	0	10
<i>Ranunculus flammula</i>	46	1	0	5
<i>Deschampsia caespitosa</i>	31	9	0	60
<i>Aster chilensis</i>	31	2	0	20
<i>Hypochaeris radicata</i>	31	1	0	5
<i>Lycopus uniflorus</i>	31	Tr	0	2

**Vaccinium uliginosum/Deschampsia caespitosa - Carex obnupta**

Bog blueberry/tufted hairgrass - slough sedge

Plots sampled: 73 (micro)



**Environment:**

Elevation (ft): ave. 130  
(50-160)

Slope (deg): 0

Landscape position: old  
deflation plains and  
marine terraces

Hydrology: seasonally  
flooded, moist to dry in  
summer

Soils: sand underlain by duripan

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Pinus contorta</i> var. <i>contorta</i>	11	Tr	0	15
<b>Shrub layer</b>				
<i>Vaccinium uliginosum</i>	70	24	0	90
<b>Herb layer</b>				
<i>Deschampsia caespitosa</i>	85	32	0	80
<i>Carex obnupta</i>	71	10	0	50
<i>Sanguisorba officinalis</i>	49	2	0	15
<b>Moss layer</b>				
<i>Sphagnum</i>	81	29	0	95
Moss	73	11	0	50

**Vegetation and ecology:** Habitat is seasonally wet openings in coastal *Pinus contorta* var. *contorta* forest. Stands are flooded seasonally to a depth of 12 inches and are dry by midsummer. Substrate is sand or a thin organic layer over sand, often with iron-cemented hardpan. *Pinus contorta* var. *contorta* is sparse and mostly restricted to the periphery of stands. *Sanguisorba officinalis*, *Gentiana sceptrum*, and *Pteridium aquilinum* may be present in the herb layer in small amounts. *Sphagnum mendocinum* and the lichen *Cladina portentosa* ssp. *pacifica* are very conspicuous at some sites. The association appears to be declining because of successional changes caused by dune stabilization and possibly by cessation of stand-replacing fires. It is also vulnerable to recreational and residential development, and construction of commercial cranberry bogs. Threats from development are greatest between the Siuslaw River and Heceta Head. Some stands are adjacent to areas favored for mushroom picking and can be damaged by off-road vehicles used for mushroom harvest or general recreation.

***Vaccinium uliginosum*/*Dodecatheon jeffreyi* - *Caltha leptosepala* ssp. *howellii***

Bog blueberry/Howell's marsh marigold

Plots sampled: 42 (18 macro, 24 micro)



**Environment:**

Elevation (ft): ave. 4363 (1900-5410)

Slope (deg): ave. 0 (0-2)

Landform position: toe slopes, floodplains, basins

Hydrology: perennially moist to perennially saturated

Soils: mostly organic, some loam.

**Vegetation and ecology:**

Habitat is montane fens.

*Vaccinium uliginosum* plots are highly variable and indicate that numerous phases are present and need further study. Trees and shrubs are confined to hummocks or "tree islands" and the rest of the plot is a wet lawn

with a large diversity of herbaceous species. Hummocks with very low shrub cover are composed mostly of the mosses *Sphagnum capillifolium* and *Aulacomnium palustre*.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Pinus contorta</i> var. <i>latifolia</i>	17	2	0	35
<i>Picea engelmannii</i>	14	3	0	60
<b>Reproducing trees</b>				
<i>Picea engelmannii</i>	17	1	0	40
<i>Pinus contorta</i> var. <i>latifolia</i>	17	1	0	7
<i>Abies amabilis</i>	12	1	0	15
<i>Abies lasiocarpa</i>	10	1	0	50
<b>Shrub layer</b>				
<i>Vaccinium uliginosum</i>	100	41	5	85
<i>Spiraea douglasii</i>	33	3	0	55
<i>Kalmia microphylla</i>	26	1	0	25
<b>Herb layer</b>				
<i>Dodecatheon jeffreyi</i>	81	7	0	25
<i>Caltha leptosepala</i> ssp. <i>howellii</i>	64	11	0	55
<i>Carex aquatilis</i> var. <i>dives</i>	57	10	0	85
<i>Ligusticum grayi</i>	43	6	0	75
<i>Deschampsia caespitosa</i>	40	2	0	20
<i>Platanthera dilatata</i>	38	Tr	0	5
<i>Senecio triangularis</i>	31	1	0	11
<b>Moss layer</b>				
Moss	62	42	0	100
<b>Unvegetated</b>				
Litter	14	2	0	40

### III. HERBACEOUS ASSOCIATIONS

#### *Athyrium filix-femina*

Lady fern

Plots sampled: 1 (macro)



#### Environment:

Elevation (ft): 10

Slope (deg): 0

Landform position:  
floodplains

Hydrology: perennially  
saturated

Soils: organic or silt loam

#### Vegetation and ecology:

Habitat is marsh just above the freshwater intertidal zone along larger coastal rivers. The association is undersampled but has been observed in a number of sites along the lower Columbia River and is also known from similar

habitats in Washington. *Picea sitchensis* or *Tsuga heterophylla* may occur on logs or stumps, and the shrub layer is patchy. These floodplains are extremely diverse and also contain a number of weedy species such as *Agrostis stolonifera*, *Lysimachia terrestris*, *Juncus effusus*, and *Iris pseudacorus*. Stands are just above the reach of daily freshwater tidal flooding, but soils are saturated year-round. The tidally-influenced hydration, species composition, and rank growth of *Athyrium filix-femina* sets this apart from other associations containing considerable amounts of *Athyrium*.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Shrub layer</b>				
<i>Rosa nutkana</i>	100	2	2	2
<i>Spiraea douglasii</i>	100	2	2	2
<i>Salix hookeriana</i>	100	2	2	2
<i>Lonicera involucrata</i>	100	2	2	2
<b>Herb layer</b>				
<i>Athyrium filix-femina</i>	100	60	60	60
<i>Scirpus microcarpus</i>	100	25	25	25
<i>Agrostis stolonifera</i>	100	5	5	5
<i>Lotus corniculatus</i>	100	5	5	5
<i>Aster subspicatus</i>	100	4	4	4
<i>Typha latifolia</i>	100	2	2	2
<i>Lysimachia terrestris</i>	100	2	2	2
<i>Argentina egedii</i>	100	2	2	2
<i>Oenanthe sarmentosa</i>	100	2	2	2
<i>Iris pseudacorus</i>	100	2	2	2
<i>Schoenoplectus acutus</i> var. <i>occidentalis</i>	100	2	2	2
<i>Juncus effusus</i>	100	1	1	1
<i>Carex obnupta</i>	100	1	1	1

***Azolla (filiculoides, mexicana)***

Mosquitofern

Plots sampled: 1 (macro)



Species	Const	Percent cover		
		Ave	Min	Max
<b>Herb layer</b>				
<i>Azolla mexicana</i>	100	99	99	99

**Environment:**

Elevation (ft): 500

Slope (deg): 0

Landform position: floodplains, flats

Hydrology: seasonally to perennially flooded

Soils: loam, silt loam

**Vegetation and ecology:** Habitat is low-elevation eutrophic ponds, lakes, and sloughs with little water movement. Species of *Azolla* occur throughout northwestern Oregon, but stands extensive enough to be considered occurrences of this association are most common in low-elevation areas in the Coast Range and Willamette Valley. They typically form nearly monotypic green or reddish mats that float on the surface of lakes and ponds, often growing so dense that no open water is visible. *Azolla* needs open water to proliferate in winter and spring but it tolerates being stranded on mudflats when shallow pools dry out in summer. Mudflat sites are not uncommon, particularly on large floodplains, and in this habitat the *Azolla* mat develops a peculiar lumpy surface with varied microtopography. Elements of the *Lemna minor* association (*Lemna*, *Spirodela*, *Ricciocarpos*) may often be intermixed with *Azolla* but are always subordinate to *Azolla*. Eutrophic conditions favored by this association may be enhanced by enriched runoff in agricultural or urban landscapes.

## ***Bidens cernua***

Nodding beggartick

Plots sampled: 9 (macro)



### **Environment:**

Elevation (ft): ave. 282 (8-500)

Slope (deg): ave. 0 (0-1)

Landform position:

floodplains, flats

Hydrology: seasonally flooded to perennially saturated

Soils: silt loam

### **Vegetation and ecology:**

Habitat is low-elevation eutrophic marsh and mudflats along low-gradient streams and around

shallow ponds. The association is strictly herbaceous and dominated by *Bidens cernua* and a variety of other marsh species that tolerate early-season flooding and summer drying that exposes mudflats with subirrigation. Other typical species present in lesser amounts include *Polygonum hydropiperoides*, *Sagittaria latifolia*, *Eleocharis palustris*, *Ludwigia palustris*, and *Leersia oryzoides*, but more than 15 other species are recorded. This association was probably fairly widespread in the Willamette Valley prior to flood control, but is now mostly restricted to the Columbia River floodplain in the Vancouver Basin. Prolonged pooling in depressions and freshwater tidal flooding along streams helps to keep invasive *Phalaris arundinacea* from invading stands.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Herb layer</b>				
<i>Bidens cernua</i>	100	56	20	90
<i>Polygonum hydropiperoides</i>	56	14	0	80
<i>Sagittaria latifolia</i>	44	5	0	20
<i>Eleocharis palustris</i>	44	3	0	20
<i>Ludwigia palustris</i>	33	3	0	15
<i>Leersia oryzoides</i>	22	3	0	20
<i>Alisma triviale</i>	22	1	0	3
<i>Callitriche</i>	22	1	0	3
<i>Sparganium angustifolium</i>	22	Tr	0	2
<i>Polygonum persicaria</i>	22	Tr	0	3
<i>Schoenoplectus americanus</i>	11	4	0	40
<i>Panicum capillare</i>	11	1	0	10
<i>Schoenoplectus tabernaemontani</i>	11	1	0	5



## ***Bidens frondosa***

Devil's beggartick

Plots sampled: 2 (macro)



### **Environment:**

Elevation (ft): 500

Slope (deg): 0

Landform position:

floodplains, flats

Hydrology: seasonally flooded to moist

Soils: silt loam

Species	Const	Percent cover		
		Ave	Min	Max
<b>Herb layer</b>				
<i>Bidens frondosa</i>	100	95	90	100
<i>Nuphar lutea</i> ssp. <i>polysepala</i>	50	5	0	10
<i>Poaceae</i>	50	2	0	4
<i>Rorippa curvisiliqua</i>	50	Tr	0	Tr
<i>Polygonum persicaria</i>	50	Tr	0	Tr
<i>Lemna minor</i>	50	Tr	0	Tr

**Vegetation and ecology:** Habitat is low-elevation marsh and mudflats along low-gradient streams and around shallow ponds. The association typically forms nearly monotypic stands of *Bidens frondosa* that can have up to 100 percent cover. *Nuphar lutea* ssp. *polysepala* is the second most abundant species reported from plots, with traces of other aquatic or mudflat species. This association was probably fairly widespread in the Willamette Valley prior to flood control, but is now mostly restricted to the Columbia River floodplain in the Vancouver Basin. Prolonged pooling in depressions and freshwater tidal flooding along streams helps to keep invasive *Phalaris arundinacea* from invading stands.

## *Boykinia major*

Large boykinia

Plots sampled: 2 (macro)



### Environment:

Elevation (ft): ave. 1663  
(40-3285)

Slope (deg): 0

Landform position:  
depressions, flats

Hydrology: perennially  
saturated

Soils: organic

### Vegetation and ecology:

Habitat is coastal and montane fens, particularly sphagnum mires. The association needs more plot data, but a variety of

occurrences have been observed in the field. It occurs in both open peatlands and under a partial canopy of *Thuja plicata*. *Boykinia major* is the primary species and forms a wet lawn with lesser amounts of *Lysichiton americanus*, *Carex echinata* ssp. *echinata*, *Carex utriculata*, *Blechnum spicant*, *Juncus ensifolius*, *Cicuta douglasii*, and *Calamagrostis canadensis*, depending on elevation. The moss layer is almost entirely *Sphagnum*.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Shrub layer</b>				
<i>Spiraea douglasii</i>	50	1	0	1
<b>Herb layer</b>				
<i>Boykinia major</i>	100	60	50	70
<i>Lysichiton americanus</i>	100	12	4	20
<i>Carex echinata</i> ssp. <i>echinata</i>	100	3	Tr	5
<i>Hypericum anagalloides</i>	100	1	Tr	1
<i>Carex utriculata</i>	50	15	0	30
<i>Blechnum spicant</i>	50	8	0	15
<i>Juncus ensifolius</i>	50	5	0	10
<i>Cicuta douglasii</i>	50	5	0	10
<i>Calamagrostis canadensis</i>	50	5	0	10
<i>Viola</i>	50	3	0	5
<i>Carex obnupta</i>	50	1	0	2
<i>Juncus</i>	50	1	0	1
<b>Moss layer</b>				
Moss	100	20	20	20

***Brasenia schreberi***

Watershield

Plots sampled: 0



**Environment:**

Elevation (ft): 10-2000

Slope (deg): 0

Landform position: basins

Hydrology: perennially flooded

Soils: organic

**Vegetation and ecology:** Habitat is low-elevation ponds, lakes, and sloughs. This is a rooted aquatic bed association that is widespread in western Oregon but has not been sampled and little information is available. *Brasenia schreberi* forms mats of floating leaves on the surface of the water and the network of submerged stems and undersides of leaves provide important habitat for aquatic invertebrates and fish. The association is not as common in northwestern Oregon as the *Nuphar* association. This association favors oligotrophic or mesotrophic waters and may be outcompeted by more aggressive species in eutrophic waters enhanced by enriched runoff in agricultural or urban landscapes.

## *Calamagrostis canadensis*

Bluejoint

Plots sampled: 10 (4  
macro, 6 micro)



### Environment:

Elevation (ft): ave. 4821  
(3100-5410)

Slope (deg): ave. 1 (0-5)

Landform position:

floodplains, flats

Hydrology: moist to  
perennially saturated

Soils: mostly organic,  
some loam

### Vegetation and ecology:

Habitat is edges of montane fens. The association is extremely diverse. The shrub layer contains 14 different species, and more than 60 species are present in the herb layer, indicating that the association occurs in a transition zone between montane fen and upland forest and contains components of both systems. The remaining mass of species occur only in small amounts.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Picea engelmannii</i>	50	22	0	90
<i>Abies lasiocarpa</i>	20	1	0	8
<i>Pinus contorta</i> var. <i>latifolia</i>	20	1	0	10
<b>Reproducing trees</b>				
<i>Abies lasiocarpa</i>	30	5	0	45
<i>Abies amabilis</i>	30	Tr	0	3
<i>Pinus contorta</i> var. <i>latifolia</i>	20	Tr	0	3
<i>Picea engelmannii</i>	20	Tr	0	3
<b>Shrub layer</b>				
<i>Vaccinium uliginosum</i>	50	2	0	15
<i>Spiraea densiflora</i>	30	2	0	10
<b>Herb layer</b>				
<i>Calamagrostis canadensis</i>	100	46	12	95
<i>Caltha leptosepala</i> ssp. <i>howellii</i>	50	3	0	13
<i>Senecio triangularis</i>	50	1	0	5
<i>Carex aquatilis</i> var. <i>dives</i>	40	5	0	25
<i>Dodecatheon jeffreyi</i>	40	2	0	5
<i>Ligusticum grayi</i>	40	1	0	8
<i>Platanthera dilatata</i>	40	Tr	0	4
<b>Moss layer</b>				
Moss	40	18	0	100
<b>Unvegetated</b>				
Litter	30	11	0	70
Bare ground	10	1	0	10

## ***Calamagrostis nutkaensis***

Pacific reedgrass

Plots sampled: 0



### **Environment:**

Elevation (ft): 50-100

Slope (deg): 0

Landform position: floodplains, basins, flats

Hydrology: perennially saturated

Soils: organic

**Vegetation and ecology:** Habitat is coastal fens. The association has not been sampled but is present in small amounts on the north coast and in larger amounts on the south coast. It forms nearly monotypic stands of *Calamagrostis nutkaensis* with a few other species with low constancy and cover but not documented here. The moss layer may contain high cover of *Sphagnum* or may largely be concealed by litter. Some stands have expanses of mud between hummocks of *Calamagrostis* and open water is lacking. Large tussocks of *Calamagrostis nutkaensis* are slightly elevated above the surface of the mire and are used extensively by elk for bedding. The association is uncommon and the best occurrences are located along the coast in southern Oregon and northern California.

## ***Callitriche heterophylla***

Different-leaved water-starwort

Plots sampled: 6 (macro)



### **Environment:**

Elevation (ft): ave. 733 (500-1900)

Slope (deg): 0

Landform position:  
bottoms

Hydrology: seasonally to  
perennially flooded

Soils: organic or silty loam

<b>Species</b>	<b>Const</b>	<b>Percent cover</b>		
		<b>Ave</b>	<b>Min</b>	<b>Max</b>
<b>Mature trees</b>				
<i>Fraxinus latifolia</i>	17	17	0	100
<b>Herb layer</b>				
<i>Callitriche heterophylla</i>	100	86	75	99
<i>Oenanthe sarmentosa</i>	67	10	0	40
<i>Veronica scutellata</i>	33	Tr	0	1
<i>Lysichiton americanus</i>	17	3	0	20
<i>Torreyochloa pallida</i> var. <i>pauciflora</i>	17	1	0	5
<b>Moss layer</b>				
Moss	17	Tr	0	1

**Vegetation and ecology:** Habitat is low-elevation shallow pools, ponds, slow-moving streams, and flooded shrub swamps. *Fraxinus latifolia*, *Salix hookeriana*, *Salix lucida* ssp. *lasiandra*, *Salix sitchensis*, and *Spiraea douglasii* are typical associates in this habitat, but woody vegetation may also be entirely absent. *Callitriche heterophylla* is the primary species and is usually immersed with the topmost leaves floating on the surface of the water. Emergent species present may include *Oenanthe sarmentosa*, *Veronica scutellata*, *Cicuta douglasii*, *Torreyochloa pallida* var. *pauciflora*, and *Glyceria*.

***Caltha leptosepala* ssp. *howellii***

Howell's marsh marigold

Plots sampled: 7 (macro)



**Environment:**

Elevation (ft): ave. 4319  
(2800-5300)

Slope (deg): ave. 4 (0-15)

Landform position:  
seepage slopes to  
floodplains and flats

Hydrology: moist to  
perennially saturated

Soils: mostly organic,  
some loam

**Vegetation and ecology:**

Habitat is montane fens, forming lawns or flushes on gentle to moderate slopes below springs. Slopes are laced with rivulets or rills and irrigated by sheet flow. A number of phases are present that need further study. Woody plants have scanty cover and are primarily restricted to hummocks or "tree islands" within an herbaceous matrix, or they are peripheral to the wetland. The herb layer is extremely rich with almost 60 different species present from both wet flushes and drier hummocks or forest ecotones around the edges of these wetlands. *Senecio triangularis*, *Trifolium longipes*, *Trautvetteria caroliniensis*, and *Veratrum californicum* are conspicuous on hummocks. Rills are often filled with the aquatic moss *Fontinalis neomexicana*, and *Polygonum bistortoides* and the large leafy liverwort *Scapania paludosa* are also characteristic of these rills.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Picea engelmannii</i>	29	2	0	15
<i>Abies amabilis</i>	29	Tr	0	3
<i>Tsuga mertensiana</i>	29	Tr	0	1
<i>Larix occidentalis</i>	29	Tr	0	Tr
<b>Reproducing trees</b>				
<i>Picea engelmannii</i>	43	1	0	5
<i>Abies amabilis</i>	29	Tr	0	1
<i>Pinus contorta</i> var. <i>latifolia</i>	29	Tr	0	1
<b>Shrub layer</b>				
<i>Vaccinium caespitosum</i>	14	1	0	10
<i>Vaccinium uliginosum</i>	14	1	0	8
<b>Herb layer</b>				
<i>Caltha leptosepala</i> ssp. <i>howellii</i>	100	50	15	80
<i>Dodecatheon jeffreyi</i>	86	8	0	20
<i>Senecio triangularis</i>	71	1	0	5
<i>Hypericum anagaloides</i>	57	5	0	30
<i>Carex luzulina</i>	57	1	0	2
<i>Platanthera stricta</i>	57	1	0	5
<i>Tofieldia glutinosa</i>	43	1	0	3
<i>Equisetum arvense</i>	43	Tr	0	1
<b>Moss layer</b>				
Moss	29	19	0	95

***Caltha leptosepala* ssp. *howellii* - *Carex obnupta***

Howell's marsh marigold - slough sedge

Plots sampled: 30  
microplots



**Environment:**

Elevation (ft): 2800  
Slope (deg): ave. 5 (3-5)  
Landform position:  
floodplains, flats, basins  
Hydrology: perennially  
saturated  
Soils: organic

**Vegetation and ecology:**

Habitat is montane fens,  
forming lawns or flushes  
on gentle to moderate  
slopes below springs and  
seeps. Slopes are laced  
with rivulets or rills and  
irrigated by sheet flow.

Stands lack hummocks or "tree islands." The primary herbs may not be present in all plots but are conspicuous adjacent to plots. Use of *Carex obnupta* in the name separates this association from *Caltha* vegetation of the Cascades and indicates an affinity to low-elevation coastal peatlands. *Juncus balticus*, *Carex echinata* ssp. *phyllomanica*, *Scirpus microcarpus*, *Carex exsiccata*, and *Carex utriculata* occur in patches with low constancy and average cover but sometimes with cover up to 70 percent. Rills are characteristically filled with the aquatic moss *Fontinalis neomexicana* that becomes hidden by sedge growth as the season progresses. *Polygonum bistortoides* and the large leafy liverwort *Scapania paludosa* are also characteristic of these rills. The moss layer may have up to 95 percent cover, mostly consisting of *Sphagnum mendocinum* and *Aulacomnium palustre*.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Herb layer</b>				
<i>Caltha leptosepala</i> ssp. <i>howellii</i>	87	35	0	90
<i>Sanguisorba officinalis</i>	60	41	0	95
<i>Gentiana sceptrum</i>	50	1	0	5
<i>Carex obnupta</i>	37	9	0	45
<i>Carex cusickii</i>	37	6	0	30
<i>Equisetum arvense</i>	30	1	0	10
<i>Juncus ensifolius</i>	27	1	0	8
<i>Lysichiton americanus</i>	23	1	0	18
<i>Agrostis</i>	23	Tr	0	2
<i>Juncus balticus</i>	20	3	0	40
<i>Angelica genuflexa</i>	20	1	0	6
<i>Hypericum anagaloides</i>	20	1	0	5
<b>Moss layer</b>				
Moss	80	53	0	95
<b>Unvegetated</b>				
Litter	3	1	0	15



## *Camassia quamash*

Small camas

Plots sampled: 5 (1 macro, 4 micro)



### Environment:

Elevation (ft): ave. 220  
(150-500)

Slope (deg): ave. 2 (0-2)

Landform position:  
floodplains, flats,  
benches

Hydrology: seasonally  
flooded to seasonally  
moist

Soils: clay loam and  
shallow soil over bedrock

Species	Const	Percent cover		
		Ave	Min	Max
<b>Herb layer</b>				
<i>Camassia quamash</i>	100	25	20	40
<i>Saxifraga oregana</i>	40	8	0	30
<i>Ranunculus occidentalis</i>	20	6	0	30
<i>Triteleia hyacinthina</i>	20	2	0	10
<i>Hypochaeris radicata</i>	20	2	0	10
<i>Stellaria</i>	20	1	0	4
<i>Mimulus guttatus</i>	20	1	0	3
<i>Juncus bufonius</i>	20	Tr	0	1
<i>Aira caryophyllea</i>	20	Tr	0	1
<i>Galium aparine</i>	20	Tr	0	1
<b>Moss layer</b>				
Moss	80	76	0	100

**Vegetation and ecology:** Habitat is clay prairie and basalt scabland with a seasonally perched water table. *Camassia* is conspicuous in spring and forms dense stands of gorgeous blue flowers, but it all but disappears with summer drought. Because of its seasonal presence, low elevation, and proximity to agriculture, many exotic species are present. Weeds such as *Hypochaeris radicata*, *Stellaria*, *Aira caryophyllea*, and *Galium aparine* may be inconspicuous when *Camassia* is at its peak but may dominate sites once it has disappeared. Both white and blue forms of *Camassia quamash* may be present, as well as *Camassia leichtlinii*. Camas was one of the most important staple foods for the original native peoples of the Willamette Valley and wet prairies were intensively managed for food production. Arable prairies were converted to agriculture and those on scabland sites were grazed by livestock, so that most surviving remnants are degraded with exotic species. This association may intergrade with the *Triteleia hyacinthina* association in areas of shallow soil over bedrock that have a perched water table or seasonal seepage.

## ***Carex amplifolia***

Bigleaf sedge

Plots sampled: 1 (macro)



### **Environment:**

Elevation (ft): 3450

Slope (deg): 7

Landform position: seepage  
slopes, flats

Hydrology: perennially  
saturated

Soils: organic

Species	Const	Percent cover		
		Ave	Min	Max
<b>Herb layer</b>				
<i>Carex amplifolia</i>	100	40	40	40
<i>Lotus</i>	100	25	25	25
<i>Lysichiton americanus</i>	100	15	15	15
<i>Scirpus microcarpus</i>	100	10	10	10
<i>Mimulus guttatus</i>	100	5	5	5
<b>Moss layer</b>				
Moss	100	30	30	30

**Vegetation and ecology:** Habitat is seepage slopes, rivulets, or sheet flow associated with springs. The association is represented by only one plot but it has been well documented by other researchers. *Carex amplifolia* is the primary species with an average cover of 40 percent, with lesser amounts of an unidentified *Lotus*, *Lysichiton americanus*, and *Scirpus microcarpus*. Twelve other species are present in the herb layer. Most occurrences are east of the Cascade Range, but these plots appear to be similar to others reported.

## Carex angustata

Widefruit sedge

Plots sampled: 4 (2  
macro, 2 micro)



### Environment:

Elevation (ft): 4400

Slope (deg): ave. 2 (1-2)

Landform position:

floodplains, basins

Hydrology: seasonally

flooded to moist

Soils: loam or organic

### Vegetation and ecology:

Habitat is seasonally moist montane meadows. *Spiraea douglasii* is present in half the plots but with very low cover. *Carex angustata* is the principal species in the herb layer, with an average cover of 43 percent and ranging up to 70 percent, with lesser amounts of *Juncus balticus*, *Veratrum californicum*, *Deschampsia caespitosa*, *Dodecatheon jeffreyi*, and *Solidago canadensis*. More than 30 other species present in trace amounts represent a mix of drier meadow and forest ecotone. Presence of *Danthonia intermedia*, *Achillea millefolium*, *Potentilla gracilis*, *Stellaria crispa*, and *Poa pratensis* strongly suggest that some sites were once grazed by livestock.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Shrub layer</b>				
<i>Spiraea douglasii</i>	50	2	0	5
<i>Rosa pisocarpa</i>	25	5	0	20
<i>Vaccinium uliginosum</i>	25	5	0	20
<i>Lonicera</i>	25	3	0	12
<b>Herb layer</b>				
<i>Carex angustata</i>	100	43	20	70
<i>Juncus balticus</i>	75	5	0	10
<i>Veratrum californicum</i>	50	11	0	35
<i>Deschampsia caespitosa</i>	50	10	0	30
<i>Dodecatheon jeffreyi</i>	50	9	0	20
<i>Solidago canadensis</i>	50	7	0	25
<i>Polygonum bistortoides</i>	50	1	0	1

## *Carex aperta*

Columbia sedge

Plots sampled: 10 (macro)



### Environment:

Elevation (ft): ave. 510 (10-3150)

Slope (deg): ave. 0 (0-3)

Landform position:  
floodplains, toe slopes

Hydrology: seasonally  
flooded to seasonally  
moist

Soils: mostly silt loam, some organic

Species	Const	Percent cover		
		Ave	Min	Max
<b>Shrub layer</b>				
<i>Rubus armeniacus</i>	30	2	0	8
<i>Spiraea douglasii</i>	10	1	0	5
<b>Herb layer</b>				
<i>Carex aperta</i>	100	88	62	98
<i>Phalaris arundinacea</i>	70	37	0	97
<i>Epilobium ciliatum</i> ssp. <i>watsonii</i>	40	4	0	13
<i>Vicia</i>	30	4	0	19
<i>Cirsium arvense</i>	30	3	0	13
<i>Dipsacus fullonum</i>	30	3	0	19

**Vegetation and ecology:** Habitat is mostly low-elevation floodplains, but one site is known from a montane fen. Stands are seasonally flooded but dry by mid to late summer. The association was more widespread historically before diking and farming of the Columbia River lowlands, and the advent of exotic cultivars of *Phalaris arundinacea*. The few known stands that remain are either nearly monotypic *Carex aperta* in depressions too wet for *Phalaris arundinacea*, or in mixed stands dominated by *Phalaris arundinacea*. Elsewhere, it has been completely displaced by *Phalaris arundinacea*. The sedge itself is not rare but it is never plentiful. Most of the ten plots sampled here represent the monotypic expression, which may represent only the wettest end of the historic moisture gradient occupied by the association. Trees are absent or peripheral, but would include *Salix lucida* ssp. *lasiandra* and *Fraxinus latifolia*. Shrubs have low constancy and cover. Ten species are reported from the herb layer, including *Polygonum amphibium*, *Bidens cernua*, *Bidens frondosa*, and *Ludwigia palustris* that were not recorded in plots. *Carex aperta* once covered extensive areas of bottomland along the Columbia River and its tributaries between Longview and Skamania and into the Willamette Valley.

## *Carex aquatilis* var. *aquatilis*

Aquatic sedge

Plots sampled: 10 (macro)



### Environment:

Elevation (ft): ave. 4385  
(3320-5097)

Slope (deg): ave. 1 (0-3)

Landform position: slopes,  
benches, basins

Hydrology: perennially  
saturated

Soils: organic

### Vegetation and ecology:

Habitat is usually montane

fens. The association includes a heterogeneous mix of species that do not segregate in any meaningful way. Trees and shrubs are scarce. More than 50 species occur in the herb layer, but *Carex aquatilis* var. *aquatilis* is the most abundant and averages 61 percent cover and may have up to 99 percent cover. Many stands occur as monotypic reedswamp. Patches of other wetland species having low constancy but up to 50 percent cover include *Eleocharis quinqueflora*, *Carex luzulina*, *Boyerkinia major*, *Parnassia fimbriata*, *Carex aquatilis* var. *dives*, and *Caltha leptosepala* ssp. *howellii*. *Senecio triangularis* and *Aconitum columbianum* indicate some forest ecotone. Stands may occur on old beaver terraces on seepage slopes, and also in sag ponds on slopes prone to slumping. The *Carex aquatilis* var. *aquatilis* association is more common east of the Cascade Range and is mostly replaced by the *Carex aquatilis* var. *dives* association in and west of the Cascades.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Reproducing trees</b>				
<i>Abies lasiocarpa</i>	10	Tr	0	Tr
<i>Abies amabilis</i>	10	Tr	0	Tr
<b>Shrub layer</b>				
<i>Salix hookeriana</i>	10	1	0	10
<i>Spiraea douglasii</i>	10	1	0	8
<i>Alnus incana</i>	10	1	0	7
<b>Herb layer</b>				
<i>Carex aquatilis</i> var. <i>aquatilis</i>	100	61	30	99
<i>Hypericum anagaloides</i>	40	Tr	0	2
<i>Platanthera stricta</i>	30	Tr	0	Tr
<b>Moss layer</b>				
Moss	40	17	0	70

**Carex aquatilis var. dives**

Sitka sedge

Plots sampled: 71 (46 macro, 25 micro)



**Environment:**

Elevation (ft): ave. 4378 (2000-5428)

Slope (deg): ave. 1 (0-17)  
Landform position: slopes, benches, basins

Hydrology: seasonally flooded to perennially saturated

Soils: mostly organic, some loam

**Vegetation and ecology:**

Habitat is usually montane fens. The association is widespread and important in the Cascade Range and includes a heterogeneous mix of species that do not

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Picea engelmannii</i>	3	Tr	0	10
<i>Pinus contorta</i> var. <i>latifolia</i>	3	Tr	0	6
<b>Reproducing trees</b>				
<i>Pinus contorta</i> var. <i>latifolia</i>	4	Tr	0	2
<i>Tsuga heterophylla</i>	3	Tr	0	10
<i>Picea engelmannii</i>	3	Tr	0	3
<b>Shrub layer</b>				
<i>Vaccinium uliginosum</i>	14	1	0	20
<i>Spiraea douglasii</i>	14	1	0	15
<b>Herb layer</b>				
<i>Carex aquatilis</i> var. <i>dives</i>	100	54	5	99
<i>Dodecatheon jeffreyi</i>	37	3	0	20
<i>Carex utriculata</i>	24	4	0	40
<i>Hypericum anagalloides</i>	21	1	0	25
<b>Moss layer</b>				
Moss	23	4	0	95
<b>Unvegetated</b>				
Litter	31	4	0	40
Bare ground	23	11	0	95

segregate in any meaningful way. Trees and shrubs are scarce, although many different species are present. The herb layer is astonishingly diverse with more than 120 species recorded, but most of these have relatively low constancy and reflect the patchy distribution of many different taxa. Many stands occur as monotypic reedswamp with cover ranging from 5 to 99 percent, and some intergrade with the *Carex utriculata* association in seasonally flooded depressions. Stands may occur on old beaver terraces on seepage slopes, and also in sag ponds on slopes prone to slumping. *Carex aquatilis* var. *dives* can intermix with forest ecotone or meadow taxa as long as enough soil moisture is present. Plants become progressively dwarfed as conditions become drier.

**Carex aquatilis var. dives - Comarum palustre**

Sitka sedge - marsh cinquefoil

Plots sampled: 54  
(micro)



**Environment:**

Elevation (ft): ave. 35  
(20-40)

Slope (deg): 0

Landform position:  
floodplains, flats

Hydrology: perennially  
saturated

Soils: organic

**Vegetation and ecology:**

Habitat is coastal fens, floating lake-fill mats, and low-gradient drainages. The

association is primarily minerotrophic reedswamp. The surface usually has several inches of standing water and the vegetation is typified by vegetation requiring very wet to flooded conditions. Trees are rarely present, and shrubs are present in about half the plots and may also include *Spiraea douglasii*, *Lonicera involucrata*, and *Salix hookeriana*. The herb layer is diverse and may also include *Hypericum anagalloides*, *Oenanthe sarmentosa*, and *Lycopus uniflorus*. *Darlingtonia californica* is present along the mid-coast. *Carex obnupta* occurred only in trace amounts in the plots sampled, but may be more abundant than indicated in the stand table. *Sphagnum* and other mosses are absent except in hummocks of *Ledum* and *Spiraea*. The association is a transitional vegetation type between aquatic bed and open fen or shrub swamp.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Pinus contorta</i> var. <i>contorta</i>	2	Tr	0	2
<b>Reproducing trees</b>				
<i>Picea sitchensis</i>	2	Tr	0	1
<b>Shrub layer</b>				
<i>Ledum glandulosum</i>	37	6	0	35
<i>Vaccinium uliginosum</i>	33	6	0	40
<b>Herb layer</b>				
<i>Carex aquatilis</i> var. <i>dives</i>	100	47	5	90
<i>Comarum palustre</i>	83	17	0	55
<i>Nuphar lutea</i> ssp. <i>polysepala</i>	43	11	0	65
<i>Athyrium filix-femina</i>	31	3	0	30
<b>Unvegetated</b>				
Litter	24	5	0	40
Water	7	1	0	20

## ***Carex buxbaumii***

Buxbaum's sedge

Plots sampled: 5 (macro)



### **Environment:**

Elevation (ft): 4730

Slope (deg): 0

Landform position:  
floodplains, flats, basins

Hydrology: perennially  
saturated

Soils: organic

<b>Species</b>	<b>Const</b>	<b>Percent cover</b>		
		<b>Ave</b>	<b>Min</b>	<b>Max</b>
<b>Shrub layer</b>				
<i>Vaccinium uliginosum</i>	40	Tr	0	Tr
<i>Spiraea douglasii</i>	20	Tr	0	Tr
<b>Herb layer</b>				
<i>Carex buxbaumii</i>	100	49	35	70
<i>Lycopus uniflorus</i>	80	6	0	20
<i>Deschampsia caespitosa</i>	80	6	0	25
<b>Moss layer</b>				
Moss	20	Tr	0	1

**Vegetation and ecology:** Habitat is montane fens. The association occurs in open fens and around the edges of wet meadows, where it intergrades with slightly drier *Deschampsia caespitosa* associations. Trees are absent from these plots but may be present in some stands on elevated hummocks or "tree islands." *Vaccinium uliginosum* and *Spiraea douglasii* occur in trace amounts only, also on hummocks. *Carex buxbaumii* is the primary species, averaging 49 percent cover but ranging up to 70 percent cover in some stands. *Lycopus uniflorus* and *Deschampsia caespitosa* are present in lesser amounts, along with 17 other fen species in trace amounts.



## Carex cusickii

Cusick's sedge

Plots sampled: 3 (macro)



### Environment:

Elevation (ft): ave. 2057  
(1970-2200)

Slope (deg): 0

Landform position:  
floodplains, basins

Hydrology: perennially  
saturated

Soils: mostly organic, some  
loam

### Vegetation and ecology:

Habitat is low to mid-  
elevation fen and marsh.  
The association is  
composed of nearly  
monotypic stands of *Carex*

*cusickii*, with an average cover of 80 percent and with cover up to 90 percent. Eleven other species are recorded from the herb layer, but all occur only in trace amounts. No trees are recorded and one plot records *Mahonia aquifolium*, probably from an elevated position as this is not a wetland species. The moss layer is conspicuous with an average cover of 40 percent but some plots have cover of up to 100 percent. One or two phases need more sampling. One is a sphagnum fen habitat with *Comarum palustre*, *Lysichiton americanus*, *Menyanthes trifoliata*, *Drosera rotundifolia*, and *Eriophorum chamissonis*. The other occurs in marsh around shallow lakes, ponds, and sloughs where *Carex cusickii* forms pedestals among expanses of water and deep muck, with *Comarum palustre*, *Cicuta douglasii*, and *Oenanthe sarmentosa*.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Shrub layer</b>				
<i>Mahonia aquifolium</i>	33	Tr	0	Tr
<b>Herb layer</b>				
<i>Carex cusickii</i>	100	80	60	95
<i>Potentilla</i>	33	2	0	5
<i>Carex aquatilis</i> var. <i>aquatilis</i>	33	2	0	5
<i>Hypericum anagalloides</i>	33	1	0	3
<i>Dulichium arundinaceum</i>	33	1	0	2
<i>Carex leptalea</i>	33	Tr	0	1
<i>Carex utriculata</i>	33	Tr	0	1
<i>Poaceae</i>	33	Tr	0	1
<i>Viola</i>	33	Tr	0	Tr
<i>Lycopus uniflorus</i>	33	Tr	0	Tr
<i>Drosera rotundifolia</i>	33	Tr	0	Tr
<i>Carex echinata</i> ssp. <i>echinata</i>	33	Tr	0	Tr
<b>Moss layer</b>				
Moss	67	40	0	100

## Carex deweyana ssp. leptopoda

Dewey sedge

Plots sampled: 2 (macro)



### Environment:

Elevation (ft): 500

Slope (deg): 0

Landform position:

floodplains, flats

Hydrology: seasonally

flooded to moist

Soils: clay loam

### Vegetation and ecology:

Habitat is clay prairie with perched water table. This association is presumably a relic component of native Willamette Valley wet prairie. Although it occurs at low elevation, has a history of grazing,

and is surrounded by agriculture, relatively few exotic species are recorded in the plots. It is classified here as an association because of the significant cover of *Carex deweyana* ssp. *leptopoda* in prairie rather than its more common occurrence in *Fraxinus latifolia* woodland. A significant amount of *Deschampsia caespitosa*, *Carex pellita*, and *Carex unilateralis* are also present, which are indicators of prairie remnants in the Willamette Valley. The association may represent one of a number of poorly-described native prairie types now mostly decimated by settlement. Hopefully other stands can be found and documented.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Herb layer</b>				
<i>Carex deweyana</i> ssp. <i>leptopoda</i>	100	73	65	80
<i>Myosotis laxa</i>	100	23	15	30
<i>Deschampsia caespitosa</i>	100	11	2	20
<i>Carex pellita</i>	100	7	4	10
<i>Carex unilateralis</i>	100	7	4	10
<i>Juncus tenuis</i>	100	4	3	5
<i>Eleocharis acicularis</i>	100	1	Tr	1
<i>Epilobium ciliatum</i>	100	Tr	Tr	Tr
<i>Galium parisiense</i>	100	Tr	Tr	Tr
<i>Veronica scutellata</i>	50	10	0	20
<i>Carex feta</i>	50	8	0	15
<i>Callitriche heterophylla</i>	50	1	0	1
<i>Beckmannia syzigachne</i>	50	Tr	0	Tr
<i>Eleocharis palustris</i>	50	Tr	0	Tr
<i>Rumex crispus</i>	50	Tr	0	Tr
<b>Moss layer</b>				
Moss	50	4	0	8

**Carex exsiccata**

Western inflated sedge

Plots sampled: 33 (31 macro, 2 micro)



**Environment:**

Elevation (ft): ave. 2490 (100-5000)

Slope (deg): ave. 0 (0-3)

Landform position:  
floodplains, flats, benches

Hydrology: seasonally flooded to perennially saturated

Soils: organic, silt loam, or sand

**Vegetation and ecology:**

Habitat is small to large shallow basins.

Composition is diverse with no obvious segregate types. Stands are usually flooded seasonally to a

depth of one to three feet and may dry out by midsummer with the water table just below the soil surface. Stands are usually nearly monotypic reedswamp in standing water or bare mud, but sometimes *Carex exsiccata* occurs in wet lawns with combinations of more than 90 other herbaceous species. The diversity is due mainly to the variety of elevations at which the association occurs, but most of these species occur only in trace amounts. The association is present but uncommon at lower elevations along the coast and in interior valleys of western Oregon, and becomes more common at higher elevations in the Coast and Cascade Range.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Thuja plicata</i>	3	Tr	0	1
<i>Pseudotsuga menziesii</i>	3	Tr	0	1
<b>Reproducing trees</b>				
<i>Thuja plicata</i>	3	Tr	0	1
<i>Pseudotsuga menziesii</i>	3	Tr	0	1
<b>Shrub layer</b>				
<i>Spiraea douglasii</i>	18	Tr	0	5
<b>Herb layer</b>				
<i>Carex exsiccata</i>	100	69	20	100
<i>Veronica scutellata</i>	21	2	0	35
<i>Nuphar lutea</i> ssp. <i>polysepala</i>	15	2	0	20
<i>Carex obnupta</i>	15	1	0	10
<b>Moss layer</b>				
Moss	12	3	0	45
<b>Unvegetated</b>				
Bare ground	9	3	0	60
Litter	9	1	0	25

## Carex feta

Greensheath sedge

Plots sampled: 3 (macro)



### Environment:

Elevation (ft): 500

Slope (deg): 0

Landform position:

floodplains, flats

Hydrology: seasonally

flooded to wet

Soils: clay loam

### Vegetation and ecology:

Habitat is clay prairie with perched water table. The association is presumably a relic component of native Willamette Valley wet prairie. Although it occurs at low elevation, has a history of grazing, and is surrounded by agriculture, there are relatively few exotic species recorded in the plots. It is documented here as an association

because of the significant cover of *Carex feta* and *Carex deweyana* ssp. *leptopoda* in prairie with a significant amount of *Deschampsia caespitosa*. It may represent one of a number of poorly-described native prairie types now mostly decimated by settlement. Hopefully other stands can be found and documented.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Herb layer</b>				
<i>Carex feta</i>	100	42	35	50
<i>Carex deweyana</i> ssp. <i>leptopoda</i>	100	24	20	27
<i>Epilobium ciliatum</i>	100	1	Tr	1
<i>Galium parisiense</i>	100	Tr	Tr	1
<i>Deschampsia caespitosa</i>	67	15	0	30
<i>Oenanthe sarmentosa</i>	67	12	0	25
<i>Myosotis laxa</i>	67	11	0	25
<i>Eleocharis palustris</i>	67	7	0	20
<i>Veronica scutellata</i>	67	4	0	10
<i>Carex unilateralis</i>	33	2	0	6
<i>Carex pellita</i>	33	2	0	5
<i>Holcus lanatus</i>	33	1	0	4
<i>Rumex crispus</i>	33	1	0	3
<i>Callitriche heterophylla</i>	33	Tr	0	1
<i>Mentha arvensis</i>	33	Tr	0	1
<i>Ranunculus alismifolius</i>	33	Tr	0	Tr
<i>Beckmannia syzigachne</i>	33	Tr	0	Tr
<i>Juncus tenuis</i>	33	Tr	0	Tr
<i>Danthonia californica</i>	33	Tr	0	Tr
<b>Moss layer</b>				
Moss	33	3	0	10

## ***Carex lasiocarpa***

Slender sedge

Plots sampled: 25  
(macro)



### **Environment:**

Elevation (ft): ave. 4680  
(4100-4730)

Slope (deg): 0

Landform position:  
floodplains, flats

Hydrology: perennially  
flooded to perennially  
saturated

Soils: organic

**Vegetation and ecology:** Habitat is montane marshes and fens. This association

Species	Const	Percent cover		
		Ave	Min	Max
<b>Shrub layer</b>				
<i>Vaccinium uliginosum</i>	4	Tr	0	Tr
<b>Herb layer</b>				
<i>Carex lasiocarpa</i>	100	49	15	90
<i>Deschampsia caespitosa</i>	48	1	0	10
<i>Aster occidentalis</i>	32	1	0	10
<i>Juncus balticus</i>	28	1	0	25
<i>Carex utriculata</i>	24	3	0	30
<i>Galium trifidum</i>	24	Tr	0	1
<i>Potamogeton gramineus</i>	16	Tr	0	6
<i>Epilobium ciliatum</i>	16	Tr	0	Tr
<i>Calamagrostis stricta</i> ssp. <i>inexpansa</i>	12	1	0	15
<i>Carex aquatilis</i> var. <i>dives</i>	12	1	0	20
<i>Utricularia intermedia</i>	12	Tr	0	12
<i>Veronica scutellata</i>	12	Tr	0	10
<b>Moss layer</b>				
Moss	8	1	0	15

occurs at the eastern edge of the study area and is rare in Oregon. It occurs as nearly monotypic and sometimes extensive stands of *Carex lasiocarpa* with up to 90 percent cover, with lesser amounts of *Deschampsia caespitosa*, *Aster occidentalis*, *Juncus balticus*, *Carex utriculata*, *Calamagrostis stricta* ssp. *inexpansa*, and *Carex aquatilis* var. *dives*. Stands seen by the author are flooded 1-6 inches throughout the growing season.

## Carex lenticularis

Lakeshore sedge

Plots sampled: 14 (13 macro, 1 micro)



### Environment:

Elevation (ft): ave. 4151 (3240-5146)

Slope (deg): ave. 1 (0-2)

Landform position:  
floodplains, basins,  
benches

Hydrology: perennially saturated

Soils: mostly organic, some sandy

### Vegetation and ecology:

Habitat is montane wet meadows interspersed with forest edge. Trees and shrubs are mostly peripheral, occurring with low constancy and in trace amounts. The herb

layer is astonishingly diverse, with over 100 species, all from a fairly narrow elevational zone. *Carex lenticularis* may occur as nearly monotypic stands or with other wet meadow species. *Senecio triangularis* and *Polygonum bistortoides* occur in about half the plots but at very low cover. Other species with significant intermixed patches include an unidentified *Viola*, *Carex luzulina*, *Carex aquatilis* var. *dives*, and *Carex utriculata*. About one-fourth of the rest of the species occur in peripheral forest ecotone, where the substrate is elevated somewhat above the water table.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Salix scouleriana</i>	7	Tr	0	1
<i>Picea engelmannii</i>	7	Tr	0	Tr
<b>Reproducing trees</b>				
<i>Picea engelmannii</i>	7	Tr	0	5
<i>Abies amabilis</i>	7	Tr	0	2
<b>Shrub layer</b>				
<i>Salix</i>	14	1	0	8
<i>Cornus sericea</i>	14	1	0	5
<i>Spiraea douglasii</i>	14	Tr	0	3
<b>Herb layer</b>				
<i>Carex lenticularis</i>	100	47	20	75
<i>Senecio triangularis</i>	50	1	0	10
<i>Polygonum bistortoides</i>	43	1	0	3
<i>Viola</i>	29	4	0	30
<i>Carex luzulina</i>	29	2	0	15
<i>Carex exsiccata</i>	29	1	0	7
<i>Agrostis thurberiana</i>	29	1	0	5
<i>Veronica americana</i>	29	1	0	7
<b>Moss layer</b>				
Moss	21	8	0	95

## Carex limosa

Mud sedge

Plots sampled: 9 (micro)



### Environment:

Elevation (ft): 3360

Slope (deg): 0

Landform position:

floodplains, flats

Hydrology: perennially  
flooded to perennially  
saturated

Soils: organic

### Vegetation and ecology:

Habitat is montane fens and poor fens. This association is typically species-poor, with low species cover and with considerable expanses of water 1-3 inches deep, mud, or *Sphagnum* between sparsely-distributed plants. *Tsuga heterophylla* is the only tree recorded but is restricted to low hummocks where it may be chlorotic and stunted. *Carex limosa* is the primary species in the herb layer with cover ranging from 5-75 percent but averaging only 25 percent. *Menyanthes trifoliata* is the second most abundant herb, with lesser amounts of *Drosera rotundifolia*, *Dulichium arundinaceum*, and *Carex utriculata*, the last two species indicative of conditions bordering on reedswamp. Although not reflected in these plots, *Utricularia intermedia*, *Drosera anglica*, and algae are frequent in the shallow pools. The moss mat is conspicuous, with an average cover of 75 percent and ranging to 100 percent, and is usually composed of *Sphagnum*. Stands may intergrade with the *Eleocharis quinqueflora* and *Carex simulata* associations that often have similar sparse vegetation and sloppy substrate.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Reproducing trees</b>				
<i>Tsuga heterophylla</i>	11	Tr	0	1
<b>Herb layer</b>				
<i>Carex limosa</i>	100	25	5	75
<i>Menyanthes trifoliata</i>	89	16	0	30
<i>Drosera rotundifolia</i>	44	2	0	10
<i>Dulichium arundinaceum</i>	33	1	0	4
<i>Carex utriculata</i>	22	1	0	5
<i>Spiranthes romanzoffiana</i>	11	Tr	0	1
<b>Moss layer</b>				
Moss	78	75	0	100
<b>Unvegetated</b>				
Bare ground	22	7	0	40

## Carex luzulina

Woodrush sedge

Plots sampled: 8 (6 macro, 2 micro)



### Environment:

Elevation (ft): ave. 4378  
(3460-4760)

Slope (deg): ave. 1 (0-3)

Landform position:  
floodplains, flats, basins

Hydrology: seasonally to  
perennially moist

Soils: mostly organic,  
some loam

### Vegetation and ecology:

Habitat is mostly montane fens. While not recorded in these plots, *Pinus contorta* var. *latifolia*, *Picea engelmannii*, or *Abies lasiocarpa* may be present with shrubs on hummocks or "tree islands." The herb layer is a wet lawn with some 65 species reported from a fairly narrow elevational zone. *Carex luzulina* does not form dense monotypic stands like so many other sedges. Its cover ranges from sparse stands to dense, but averages only 34 percent. Other abundant lawn-forming species present include *Hypericum anagalloides*, *Deschampsia caespitosa*, *Dodecatheon jeffreyi*, *Caltha leptosepala* ssp. *howellii*, and *Carex aquatilis* var. *dives*. *Ranunculus gormanii*, *Microseris borealis*, and *Muhlenbergia filiformis* form large patches but occur at much lower constancy. The moss mat is conspicuous with an average cover of 29 percent but may range up to 90 percent.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Shrub layer</b>				
<i>Vaccinium uliginosum</i>	63	6	0	30
<i>Spiraea douglasii</i>	25	4	0	30
<b>Herb layer</b>				
<i>Carex luzulina</i>	100	34	8	75
<i>Hypericum anagalloides</i>	75	8	0	30
<i>Deschampsia caespitosa</i>	75	7	0	35
<i>Dodecatheon jeffreyi</i>	63	8	0	40
<i>Caltha leptosepala</i> ssp. <i>howellii</i>	63	4	0	17
<i>Carex aquatilis</i> var. <i>dives</i>	63	3	0	10
<i>Eleocharis quinqueflora</i>	63	3	0	7
<i>Pedicularis groenlandica</i>	63	1	0	3
<i>Ranunculus gormanii</i>	38	4	0	25
<i>Microseris borealis</i>	38	4	0	25
<i>Drosera anglica</i>	38	2	0	10
<i>Trifolium longipes</i>	38	2	0	10
<b>Moss layer</b>				
Moss	63	29	0	90
<b>Unvegetated</b>				
Water	25	9	0	40



## Carex nebrascensis

Nebraska sedge

Plots sampled: 3 (macro)



### Environment:

Elevation (ft): ave. 5415  
(5200-5700)

Slope (deg): 1

Landform position:

floodplains, flats

Hydrology: perennially  
saturated

Soils: organic

### Vegetation and ecology:

Habitat is montane fens and wet meadows. The association is very common in montane meadows of the intermountain west and is barely present along the eastern edge of the Cascade Range. *Picea engelmannii* and *Pinus contorta* var. *latifolia* are

present in trace amounts and are probably peripheral, while *Vaccinium uliginosum* has a cover of 15 percent in one plot. *Carex nebrascensis* is the primary species in the herb layer, with very small amounts of *Polygonum bistortoides*, *Dodecatheon alpinum*, *Eleocharis quinqueflora* and 8 other species. The hydroperiod for the plots reported here is wetter than the norm for this association and the species composition suggests that conditions are at the wet end of the spectrum.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Reproducing trees</b>				
<i>Picea engelmannii</i>	33	Tr	0	1
<i>Pinus contorta</i> var. <i>latifolia</i>	33	Tr	0	1
<b>Shrub layer</b>				
<i>Vaccinium uliginosum</i>	33	5	0	15
<i>Lonicera involucrata</i>	33	1	0	2
<i>Salix sitchensis</i>	33	Tr	0	1
<b>Herb layer</b>				
<i>Carex nebrascensis</i>	100	29	26	34
<i>Polygonum bistortoides</i>	67	1	0	2
<i>Dodecatheon alpinum</i>	67	1	0	1
<i>Eleocharis quinqueflora</i>	33	3	0	8
<i>Carex atrata</i> var. <i>atrosquama</i>	33	1	0	3
<i>Carex microptera</i>	33	1	0	3
<i>Equisetum arvense</i>	33	1	0	2
<i>Epilobium brachycarpum</i>	33	Tr	0	1
<i>Carex brunnescens</i>	33	Tr	0	1
<i>Deschampsia caespitosa</i>	33	Tr	0	1
<i>Ranunculus populago</i>	33	Tr	0	1
<i>Viola orbiculata</i>	33	Tr	0	1

## Carex nigricans

Black alpine sedge

Plots sampled: 14 (3 macro, 11 micro)



### Environment:

Elevation (ft): ave. 5747 (5175-6557)

Slope (deg): ave. 9 (0-25)

Landform position: various slope positions, floodplains, basins

Hydrology: seasonally moist to perennially saturated

Soils: organic or loam

### Vegetation and ecology:

Habitat is depressions and seepy alluvial fans in subalpine heath. This association is somewhat drier than the *Salix commutata* association but intergrades with it. It also intergrades with the *Carex scopulorum* association and upland *Phyllodoce empetriformis* heath. Stands on alluvial fans occur below springs and seeps and may be laced with rivulets or irrigated by sheet flow. Trees are absent and shrubs are confined to hummocks. The herb layer has over 35 different species present, but most occur at low constancy and cover. About half of the remaining herbs are wet lawn species and half are drier meadow species. This is not a productive habitat and considerable bare ground may be present in plots.

**Phases:** *Eleocharis quinqueflora*. It occurs at the wet end of the *Carex nigricans* association, containing more *Eleocharis quinqueflora* than *Carex*., and may intergrade with the *Eleocharis quinqueflora* association.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Shrub layer</b>				
<i>Salix commutata</i>	100	10	1	20
<i>Kalmia microphylla</i>	43	3	0	25
<i>Phyllodoce empetriformis</i>	36	1	0	5
<i>Gaultheria humifusa</i>	36	1	0	6
<i>Vaccinium uliginosum</i>	7	Tr	0	1
<i>Spiraea densiflora</i>	7	Tr	0	1
<i>Salix</i>	7	Tr	0	1
<i>Salix planifolia</i>	7	Tr	0	1
<b>Herb layer</b>				
<i>Carex nigricans</i>	100	33	5	95
<i>Carex scopulorum</i>	64	9	0	40
<i>Pedicularis attollens</i>	50	1	0	3
<i>Eleocharis quinqueflora</i>	36	4	0	20
<i>Ligusticum grayi</i>	29	2	0	26
<i>Tofieldia glutinosa</i> ssp. <i>occidentalis</i>	29	1	0	6
<i>Packeria cymbalarioides</i>	29	1	0	5

## *Carex obnupta*

Slough sedge

Plots sampled: 57 (15 macro, 42 micro)



### Environment:

Elevation (ft): ave. 394  
(20-2800)

Slope (deg): ave. 0 (0-4)

Landform position:  
floodplains, flats,  
benches

Hydrology: seasonally  
moist or flooded to  
perennially saturated

Soils: organic, muck, or  
loam

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Alnus rubra</i>	5	Tr	0	7
<i>Fraxinus latifolia</i>	4	Tr	0	12
<i>Calocedrus decurrens</i>	2	Tr	0	6
<b>Reproducing trees</b>				
<i>Alnus rubra</i>	5	Tr	0	7
<i>Acer macrophyllum</i>	2	Tr	0	Tr
<b>Shrub layer</b>				
<i>Rubus ursinus</i>	11	1	0	20
<b>Herb layer</b>				
<i>Carex obnupta</i>	100	66	20	99
<i>Athyrium filix-femina</i>	28	4	0	95
<i>Rorippa nasturtium-aquaticum</i>	23	3	0	40
<b>Moss layer</b>				
Moss	42	34	0	95

**Vegetation and ecology:** Habitats include isolated depressions with internal drainage, peatlands, shrub swamps, ancient marine terraces, and deflation plains. The *Carex obnupta* association is heterogeneous and difficult to segregate into meaningful types. Stands range from species-rich assemblages to monotypes, and dense to depauperate stands, the latter with only bare mud or sphagnum between the plants. Tussocks may be six inches in diameter, closely spaced and 1-3 feet tall, or 3 feet in diameter, 3-6 feet apart and growing up to 6 feet tall. Trees are mostly peripheral and 14 species of shrubs are reported, including *Rosa pisocarpa*, *Rosa gymnocarpa*, and *Corylus cornuta*. More than 80 species have been recorded from the herb layer, including *Oenanthe sarmentosa*, *Lysichiton americanus*, *Veronica americana*, *Carex exsiccata*, *Myosotis laxa*, and *Carex cusickii*. Common species in the moss layer include *Eurhynchium praelongum* and *Sphagnum mendocinum*. Some sites are old beaver swamps cleared for pasture and then abandoned because they were too wet for livestock. Beaver subsequently reclaimed most of these sites. Elk and beaver use may be heavy.

## ***Carex pachystachya***

Chamisso sedge

Plots sampled: 3 (macro)



### **Environment:**

Elevation (ft): 500

Slope (deg): 0

Landform position:

floodplains, flats

Hydrology: seasonally wet  
to moist

Soils: clay loam

Species	Const	Percent cover		
		Ave	Min	Max
<b>Herb layer</b>				
<i>Carex pachystachya</i>	100	62	25	95
<i>Agrostis stolonifera</i>	100	38	10	75
<i>Hordeum brachyantherum</i>	100	6	5	8
<i>Poa pratensis</i>	100	3	1	5
<i>Cirsium arvense</i>	67	2	0	5
<i>Vicia tetrasperma</i>	67	1	0	1
<i>Agrostis capillaris</i>	33	1	0	4
<i>Phalaris arundinacea</i>	33	Tr	0	1
<i>Rumex acetosella</i>	33	Tr	0	1

**Vegetation and ecology:** Habitat is clay prairie with perched water table. This association is presumably a relic component of native Willamette Valley wet prairie. Because of its low elevation, history of grazing, and proximity to agriculture, it is full of exotic species. It is documented here because of the significant cover of native *Carex pachystachya* and *Hordeum brachyantherum*, and it may represent one of a number of poorly-described native prairie types now mostly decimated by settlement. Hopefully stands in better condition can be found and documented.

## Carex scopulorum

Mountain sedge

Plots sampled: 8 (macro)



### Environment:

Elevation (ft): ave. 5747  
(5175-6557)

Slope (deg): ave. 9 (0-25)

Landform position: various  
slope positions,  
floodplains, basins

Hydrology: seasonally  
moist to perennially  
saturated

Soils: organic or loam

### Vegetation and ecology:

Habitat is depressions and seepy alluvial fans in subalpine heath. Stands of this association occur in transitional areas between the slightly wetter *Carex nigricans* association and slightly drier associations of

*Carex spectabilis* and upland *Phyllodoce* heath, and intergrade with both. Stands on alluvial fans occur below springs and seeps and may be laced with rivulets and or irrigated by sheet flow. Trees are absent, and shrubs are sparse. Other herbaceous species with significant patches include *Eleocharis quinqueflora*, *Eleocharis palustris*, and *Juncus balticus*.

**Phases:** *Eleocharis quinqueflora*. It occurs at the wet end of the *Carex scopulorum* association and intergrades with the *Carex nigricans* association. Stands contain more *Eleocharis quinqueflora* than *Carex nigricans* and *Carex brunnescens* may form significant patches.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Shrub layer</b>				
<i>Salix commutata</i>	25	1	0	4
<i>Salix sitchensis</i>	13	1	0	10
<i>Salix myrtillofolia</i>	13	Tr	0	1
<i>Kalmia microphylla</i>	13	Tr	0	1
<i>Spiraea densiflora</i>	13	Tr	0	1
<i>Phyllodoce empetriformis</i>	13	Tr	0	1
<b>Herb layer</b>				
<i>Carex scopulorum</i>	100	49	10	90
<i>Deschampsia caespitosa</i>	50	9	0	70
<i>Ligusticum grayi</i>	50	2	0	7
<i>Dodecatheon jeffreyi</i>	50	1	0	2
<i>Packera cymbalarioides</i>	50	1	0	2
<i>Muhlenbergia filiformis</i>	38	4	0	25
<i>Tofieldia glutinosa</i>	38	3	0	15
<i>Aster alpigenus</i>	38	2	0	10
<i>Carex nigricans</i>	38	2	0	5
<i>Epilobium alpinum</i>	38	Tr	0	1
<i>Equisetum arvense</i>	38	Tr	0	1
<b>Moss layer</b>				
Moss	25	6	0	30

## *Carex simulata*

Analogue sedge

Plots sampled: 5 (4 macro,  
1 micro)



### Environment:

Elevation (ft): ave. 4736  
(4730-4760)

Slope (deg): 0

Landform position:  
floodplains, flats, basins

Hydrology: perennially  
saturated

Soils: organic

### Vegetation and ecology:

Habitat is montane fens.

This association is better

known from east of the Cascade Range, and is not common in the study area. The hydroperiod for the plots reported here is much wetter than the norm for this association and they must be considered at the wet end of the spectrum. No trees or shrubs are present, and only ten species are reported from the herb layer. Stands may have considerable expanses of water 1-3 inches deep, mud, or *Sphagnum* between sparsely-distributed plants. *Carex simulata* is the most abundant herb, ranging from 25-65 percent cover and averaging 47 percent. *Juncus balticus* and *Deschampsia caespitosa* occur in about half the plots but with very low cover. *Carex utriculata* may have patches with up to 30 percent cover, indicating some conditions similar to reedswamp. Other species occur mostly in trace amounts. Stands may intergrade with the *Eleocharis quinqueflora* and *Carex limosa* associations that often have similar sparse vegetation and sloppy substrate. Because it is so wet, this association probably should be separated from other concepts of the *Carex simulata* association, but more study is needed.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Herb layer</b>				
<i>Carex simulata</i>	100	47	25	65
<i>Juncus balticus</i>	60	3	0	10
<i>Deschampsia caespitosa</i>	60	Tr	0	Tr
<i>Carex utriculata</i>	40	6	0	30
<i>Ranunculus flammula</i>	40	Tr	0	Tr
<i>Veronica scutellata</i>	40	Tr	0	Tr
<i>Eleocharis quinqueflora</i>	20	2	0	10
<i>Utricularia intermedia</i>	20	1	0	3
<i>Aster occidentalis</i>	20	Tr	0	1
<i>Mimulus primuloides</i>	20	Tr	0	Tr
<b>Moss layer</b>				
Moss	60	1	0	1
<b>Unvegetated</b>				
Water	20	12	0	60

## *Carex utriculata*

Beaked sedge

Plots sampled: 53 (30 macro, 23 micro)



### Environment:

Elevation (ft): ave. 4475  
(1080-5428)

Slope (deg): ave. 0 (0-2)

Landform position:  
floodplains, flats,  
basins, benches

Hydrology: seasonally  
flooded to moist

Soils: mostly organic,  
some loam

### Vegetation and ecology:

Habitat is montane fens.

This is a common and important association in the Cascade Range. Stands are usually seasonally flooded to a depth of 1-2 feet, or may dry out by midsummer with the water table just below the soil surface. Trees are restricted to elevated hummocks or "tree islands." *Alnus viridis* ssp. *sinuata* occurs on peaty flats or in depressions, while other shrub species are restricted to hummocks. The herb layer occurs as either a nearly monotypic reedswamp of *Carex utriculata* in standing water or bare mud, or as a component of wet lawn with more than 80 other species. The association has not been reported from lower elevations. Some stands were no doubt grazed by livestock in the past, and use by elk and deer may be heavy.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Pinus contorta</i> var. <i>latifolia</i>	2	1	0	38
<b>Reproducing trees</b>				
<i>Thuja plicata</i>	2	Tr	0	Tr
<i>Tsuga heterophylla</i>	2	Tr	0	Tr
<b>Shrub layer</b>				
<i>Spiraea douglasii</i>	6	Tr	0	2
<i>Alnus viridis</i> ssp. <i>sinuata</i>	4	1	0	60
<i>Lonicera caerulea</i>	4	1	0	50
<i>Vaccinium uliginosum</i>	4	Tr	0	1
<i>Vaccinium oxycoccos</i>	2	2	0	98
<i>Spiraea densiflora</i>	2	Tr	0	20
<i>Kalmia microphylla</i>	2	Tr	0	10
<b>Herb layer</b>				
<i>Carex utriculata</i>	100	52	5	100
<i>Deschampsia caespitosa</i>	21	3	0	50
<i>Carex aquatilis</i> var. <i>dives</i>	15	3	0	50
<i>Hypericum anagalloides</i>	13	3	0	60
<i>Calamagrostis canadensis</i>	11	2	0	45
<b>Moss layer</b>				
Moss	45	9	0	100
<b>Unvegetated</b>				
Litter	51	10	0	100
Bare ground	34	18	0	95
Water	4	1	0	50

## ***Ceratophyllum demersum***

Coontail

Plots sampled: 0



### **Environment:**

Elevation (ft): 10-1000

Slope (deg): 0

Landform position: floodplains, basins

Hydrology: aquatic, perennially flooded

Soils: organic

**Vegetation and ecology:** Habitat is low-elevation, low-gradient, eutrophic streams and rivers, ponds, lakes, and sloughs. This is a non-rooted aquatic association that is widespread in western Oregon, but it has not been sampled and little information is available. *Ceratophyllum demersum* forms dense, monotypic submerged beds that do not emerge above the surface of the water. Eutrophic conditions favored by this association may be enhanced by enriched runoff in agricultural or urban landscapes. Though a native species, *Ceratophyllum demersum* is a well-known pest in many lakes where rank aquatic vegetation interferes with recreation.



## ***Deschampsia caespitosa* montane "wet meadow" complex**

Tufted hairgrass



*Deschampsia caespitosa* probably has the widest ecological amplitude of any native wetland species in Oregon and historically has been one of our most important grasses. It occurs from coastal salt marsh to subalpine wetlands on a variety of environmental gradients. It forms a myriad of intergrading vegetation types that are often difficult to separate into meaningful entities. Added to this mix is the central role that *Deschampsia* played in farming and livestock grazing between 1850 and 1960, and the effect that these uses had on condition and species composition. At low elevations, some stands of *Deschampsia* survive as degraded relics of coastal or Willamette Valley prairie, while others are known to have developed on land previously plowed by farmers. Most stands at middle and high elevations were grazed by sheep and cattle during this period and the relative intensity of historic grazing continues to be mirrored in a wide variety of intergrading combinations of species. There are also at least three subspecies of *Deschampsia caespitosa* in the study area but it is not clear that any correlation exists between the distribution of subspecies and the different *Deschampsia* associations. Many stands of *Deschampsia caespitosa* have been sampled by many workers over the last 40 years, resulting in a huge species matrix representing various disturbance histories. Because of the difficulty of separating the myriad *Deschampsia* vegetation types, many workers have chosen to refer to these simply as "wet meadow", "mountain meadow", "moist meadow", or "tufted hairgrass meadow."

**Phases of *Deschampsia caespitosa* Association.** Most of the 13 phases listed below occur in montane fens or at the edges of wet meadows between 3300 and 6635 feet elevation. Unless noted otherwise, they form flushes on slopes below springs, or wet lawns on peaty flats, and are perennially saturated or flooded. Trees and shrubs are limited to hummocks, and the herb layer contains components from both wet lawn and hummocks. Many of these phases have very similar habitat conditions and probably simply represent different patch dynamics.

**(1) Monotypic *Deschampsia caespitosa*.** This vegetation is not the same as the much more widespread occurrence in relatively drier meadows on mineral soils that has a different species composition.

(2) *Caltha leptosepala* ssp. *howellii*.

(3) *Carex aquatilis* var. *dives*.

(4) *Carex buxbaumii* phase:

(5) *Carex exsiccata*.

(6) *Dodecatheon jeffreyi*.

(7) *Eleocharis quinqueflora*. Similar in habitat and elevational range as the *Eleocharis quinqueflora* association, but not as flooded and is more species-rich.

(8) *Hypericum anagalloides*.

(9) *Microseris borealis*.

(10) *Muhlenbergia filiformis*.

(11) *Ranunculus gormanii*. Restricted to the central Cascade Range in Lane, Deschutes, Douglas, and northwestern Klamath counties, coinciding with the primary range of *Ranunculus gormanii*.

(12) *Scirpus congdonii*.

(13) *Trifolium logipes*. Habitat is montane meadows and fringes of fens, transitional between wet *Deschampsia* fen on organic soils and the more widespread but drier *Deschampsia* "meadow" vegetation on seasonally moist loam or pumice. It contains elements of both habitats, but is closer to meadow than fen. Trees and shrubs are less likely to be confined to hummocks but still may be clumped.

***Deschampsia caespitosa* - *Artemisia lindleyana***

Tufted hairgrass - Columbia River wormwood

Plots sampled: 2 (macro)



**Environment:**

Elevation (ft): 40

Slope (deg): 0

Landform position:

floodplains

Hydrology: seasonally

flooded to moist

Soils: river cobbles, silt

**Vegetation and ecology:**

Habitat is cobble beds and silt along the Columbia River at the western end of the Columbia River Gorge. The cobble beds are inundated when Bonneville Dam

releases surplus water, usually in spring, and may be 1-2 feet above low summer flows. *Deschampsia caespitosa* was not recorded from one of the two plots sampled here but was present nearby and is also present in the Oregon site, and so is considered to be the principal species in the herb layer with at least 35 percent cover. The cobbles are coated with silt and covered with the lichen *Dermatocarpon*. More plots are needed to adequately describe this association, but it may be difficult to find remnants in good condition. Both *Artemisia lindleyana* and *Coreopsis tinctoria* var. *atkinsoniana* are more typical of riparian areas of eastern Oregon and Washington. It is probable that this association extended much further upriver, possibly throughout the Columbia River Gorge and into eastern Oregon and Washington, but all these areas are now drowned behind a series of dams.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Salix lucida</i> ssp. <i>lasiandra</i>	50	1	0	1
<b>Reproducing trees</b>				
<i>Fraxinus latifolia</i>	50	1	0	2
<b>Shrub layer</b>				
<i>Salix fluviatilis</i>	100	4	2	5
<i>Amorpha fruticosa</i>	50	1	0	2
<b>Herb layer</b>				
<i>Artemisia lindleyana</i>	100	23	20	25
<i>Coreopsis tinctoria</i> var. <i>atkinsoniana</i>	100	3	1	5
<i>Trifolium arvense</i>	100	2	1	3
<i>Aster</i>	100	2	1	2
<i>Medicago lupulina</i>	100	2	1	2
<i>Xanthium strumarium</i>	100	1	1	1
<i>Deschampsia caespitosa</i>	50	18	0	35

***Deschampsia caespitosa* - *Danthonia californica***

Tufted hairgrass - California oatgrass

Plots sampled: 3 (macro)



**Environment:**

Elevation (ft): 500

Slope (deg): 0

Landform position:

floodplains, flats

Hydrology: seasonally wet

Soils: clay loam

**Vegetation and ecology:**

Habitat is clay prairie with perched water table. This association is one of the better-known components of relic native Willamette Valley wet prairie. Stands sampled or observed elsewhere often have a higher component of *Danthonia californica*, and

this has traditionally been used to identify the association. Because it occurs at low elevation, has a history of grazing, and is surrounded by agriculture, there are a variety of few exotic species recorded in the plots. The only woody plant, *Rosa eglantheria*, is exotic. *Deschampsia caespitosa* is the primary species in the herb layer with an average cover of 47 percent and cover up to 60 percent. Other native species with significant cover are *Carex unilateralis* and *Plagiobothrys figuratus*, species typical of shallow depressions and suggesting that these stands are a little wetter or contain more depressions than sites with more *Danthonia californica*. Of the other 22 species, only six are exotic. This association may be one of a number of poorly-described native prairie types now mostly decimated by settlement. Hopefully other stands can be found and documented.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Shrub layer</b>				
<i>Rosa eglantheria</i>	33	Tr	0	Tr
<b>Herb layer</b>				
<i>Deschampsia caespitosa</i>	100	47	30	60
<i>Galium parisiense</i>	100	Tr	Tr	Tr
<i>Leucanthemum vulgare</i>	67	11	0	20
<i>Carex unilateralis</i>	67	5	0	15
<i>Epilobium ciliatum</i>	67	5	0	12
<i>Plantago lanceolata</i>	67	3	0	8
<i>Holcus lanatus</i>	67	Tr	0	1
<i>Hypochaeris radicata</i>	67	Tr	0	1
<i>Plagiobothrys figuratus</i>	33	7	0	20
<i>Potentilla gracilis</i>	33	5	0	16
<i>Mentha arvensis</i>	33	3	0	10
<i>Camassia quamash</i>	33	3	0	9
<i>Alopecurus saccatus</i>	33	1	0	3
<b>Moss layer</b>				
Moss	67	13	0	25

***Deschampsia caespitosa* - *Juncus balticus***

Tufted hairgrass - Baltic rush

Plots sampled: 7 (macro)



**Environment:**

Elevation (ft): 5167  
(4618-6317)

Slope (deg): 0

Landform position:  
floodplains, basins

Hydrology: perennially  
moist

Soils: organic and loam

**Vegetation and ecology:**

Habitat is wet to moist  
montane meadows and  
fens, and the association  
is more typical of  
meadows than fens.  
Trees are not well

represented but would include *Picea engelmannii* and *Abies lasiocarpa*. The shrub layer contains only *Salix geyeriana* at low constancy and low cover, which in many areas provides elevated substrate for seedlings of *Picea engelmannii* and *Abies lasiocarpa*. The herb layer contains about 40 species, *Deschampsia caespitosa* and *Juncus balticus* being the primary species, the former with average cover of 61 percent and ranging to 80 percent, and the latter about half that. Lesser species include *Muhlenbergia filiformis* and *Trifolium longipes*. The remaining species reflect a mix of wetland and drier meadow types. The rich mix of herbs, particularly *Antennaria rosea*, *Potentilla drummondii*, *Ranunculus alismifolius*, and *Fragaria virginiana*, suggest a history of grazing.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Shrub layer</b>				
<i>Salix geyeriana</i>	14	Tr	0	1
<b>Herb layer</b>				
<i>Deschampsia caespitosa</i>	100	61	40	80
<i>Juncus balticus</i>	100	26	10	50
<i>Muhlenbergia filiformis</i>	71	4	0	15
<i>Trifolium longipes</i>	57	2	0	15
<i>Aster foliaceus</i>	43	4	0	25
<i>Antennaria rosea</i>	43	3	0	10
<i>Gentiana newberryi</i>	29	8	0	30
<i>Potentilla drummondii</i>	29	2	0	10
<i>Ranunculus alismifolius</i>	29	1	0	7
<i>Dodecatheon jeffreyi</i>	29	1	0	6
<i>Aster alpigenus</i>	29	1	0	2
<i>Carex pachystachya</i>	29	Tr	0	2
<i>Fragaria virginiana</i>	29	Tr	0	1
<b>Moss layer</b>				
Moss	29	11	0	60

## *Dulichium arundinaceum*

Threeway sedge

Plots sampled: 9 (2  
macro, 7 micro)



### Environment:

Elevation (ft): ave. 2406  
(80-4730)

Slope (deg): 0

Landform position:  
basins, benches

Hydrology: perennially  
flooded to saturated

Soils: mostly organic,  
some sand

Species	Const	Percent cover		
		Ave	Min	Max
<b>Herb layer</b>				
<i>Dulichium arundinaceum</i>	100	56	10	90
<i>Menyanthes trifoliata</i>	67	7	0	30
<i>Drosera rotundifolia</i>	11	1	0	10
<i>Potamogeton gramineus</i>	11	Tr	0	4
<i>Lysichiton americanus</i>	11	Tr	0	2
<i>Carex aquatilis</i>	11	Tr	0	1
<i>Utricularia macrorhiza</i>	11	Tr	0	1
<i>Carex utriculata</i>	11	Tr	0	Tr
<i>Carex lasiocarpa</i>	11	Tr	0	Tr
<b>Moss layer</b>				
Moss	11	11	0	100

**Vegetation and ecology:** Habitat is fens and marshes. The association forms emergent stands around the edges of shallow lakes and in perennially or seasonally flooded shallow depressions. Most stands are monotypes of *Dulichium arundinaceum* with an average cover 56 percent and ranging from 10-90 percent. *Menyanthes trifoliata* is present in more than half the plots but with low average cover. The remaining seven species reported are very sparse, and much of the space between plants is open water or exposed mud in seasonally-flooded stands. The moss layer can be nonexistent or 100 percent cover of *Sphagnum*. At one time *Dulichium arundinaceum* was thought to be rare in Oregon but is more common than originally thought. There are a few limited occurrences of this association in the Willamette Valley and it may once have been more widespread before drainage and conversion to agriculture.

***Eleocharis acicularis***

Needle spikerush

Plots sampled: 1 (macro)



**Environment:**

Elevation (ft): 4730

Slope (deg): 0

Landform position:  
floodplains, basins

Hydrology: seasonally flooded to perennially saturated

Soils: organic or loam

Species	Const	Percent cover		
		Ave	Min	Max
<b>Herb layer</b>				
<i>Eleocharis acicularis</i>	100	60	60	60
<i>Elodea canadensis</i>	100	15	15	15
<i>Callitriche heterophylla</i>	100	10	10	10
<i>Sparganium angustifolium</i>	100	1	1	1
<b>Moss layer</b>				
Moss	100	10	10	10

**Vegetation and ecology:** Habitat is montane fens and seasonal pools in meadows. Plants may be relatively sparse with considerable open water or mud. This association is more common east of the Cascade Range. It is mostly a monotype of *Eleocharis acicularis* with lesser amounts of *Elodea canadensis*, *Callitriche heterophylla*, and *Sparganium angustifolium* recorded in this single plot. Pools may dry out in summer but the soil remains moist.

## *Eleocharis ovata* - *Ludwigia palustris*

Ovate spikerush - water purslane

Plots sampled: 5 (macro)



### Environment:

Elevation (ft): ave. 800  
(500-2000)

Slope (deg): 0

Landform position:  
floodplains, basins

Hydrology: perennially moist to perennially saturated

Soils: silt loam

Species	Const	Percent cover		
		Ave	Min	Max
<b>Herb layer</b>				
<i>Eleocharis ovata</i>	100	54	35	98
<i>Ludwigia palustris</i>	80	34	0	50
Lamiaceae	40	4	0	10
<i>Bidens cernua</i>	20	6	0	30
<i>Agrostis exarata</i>	20	Tr	0	Tr
<i>Epilobium ciliatum</i> ssp. <i>watsonii</i>	20	Tr	0	Tr

**Vegetation and ecology:** Habitat is edges and mudflats of shallow seasonal lakes, pools, and in freshwater tidal flats along larger coastal rivers. Stands are either monotypes of *Eleocharis ovata* or mixed in lawns with *Ludwigia palustris*, submerged early in the season but exposed on mudflats as water levels drop. Considerable amounts of open water or bare mud may be present. A few other emergent or mudflat species may be present but in low amounts. There may also be some admixture of the *Lilaeopsis occidentalis* association on mudflats.



## ***Eleocharis palustris***

Creeping spikerush

Plots sampled: 8 (7 macro, 1 micro)



### **Environment:**

Elevation (ft): ave. 1201 (8-4730)

Slope (deg): ave. 0 (0-1)

Landform position:

floodplains, basins

Hydrology: seasonally wet to perennially flooded

Soils: organic, sand, loam

Species	Const	Percent cover		
		Ave	Min	Max
<b>Shrub layer</b>				
<i>Salix hookeriana</i>	25	1	0	3
<i>Spiraea douglasii</i>	13	Tr	0	1
<b>Herb layer</b>				
<i>Eleocharis palustris</i>	100	59	30	100
<i>Deschampsia caespitosa</i>	38	3	0	10
<i>Carex obnupta</i>	38	1	0	5
<i>Phalaris arundinacea</i>	38	1	0	2
<i>Juncus nevadensis</i>	25	4	0	20
<i>Schoenoplectus americanus</i>	25	1	0	5
<i>Myosotis laxa</i>	25	Tr	0	2

**Vegetation and ecology:** Habitat is shallow depressions in meadows, fens, and marshes. Stands are predominantly herbaceous. The shrub layer is sparse, dominated by *Salix hookeriana* or *Spiraea douglasii* with low constancy and very low percent cover. *Eleocharis palustris* is the primary species in the herb layer, with average cover of 59 percent and cover ranging from 30-100 percent. About 40 other species are present in fairly low constancy, but with some have significant patches of *Juncus nevadensis*, *Polygonum hydropiperoides*, or *Juncus acuminatus*, depending on elevation. The diversity of species is due largely to the wide range of elevation and location for this association, which could not be separated satisfactorily into more coherent units.

***Eleocharis quinqueflora***

Few-flowered spikerush

Plots sampled: 34 (9 macro, 25 micro)



**Environment:**

Elevation (ft): ave. 4190 (3120-5410)

Slope (deg): ave. 0 (0-2)

Landform position:

basins, benches

Hydrology: perennially moist to perennially saturated

Soils: mostly organic, some loam

**Vegetation and ecology:**

Habitat is montane fens, wet edges of meadows, and sometimes on floating lake-fill mats. The association is primarily a wet lawn with woody vegetation confined to hummocks or "tree islands."

Stands may be perennially flooded with 1-3 inches of water, and these have fewer species than saturated stands. The herb layer has over 80 different species, and may include *Carex limosa*, *Utricularia intermedia*, *Eriophorum gracile*, and *Carex echinata* ssp. *echinata*. These wetlands were assumed to be *Sphagnum* mires until the late 1970s, when it was discovered that they were dominated by "brown mosses" such as *Hamatocaulis vernicosus*, *Tomentypnum nitens*, and *Meesia triquetra*, all well-known indicators of medium to rich fens.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Reproducing trees</b>				
<i>Picea engelmannii</i>	3	Tr	0	1
<i>Pinus contorta</i> var. <i>latifolia</i>	3	Tr	0	Tr
<i>Tsuga mertensiana</i>	3	Tr	0	Tr
<i>Abies lasiocarpa</i>	3	Tr	0	Tr
<b>Shrub layer</b>				
<i>Vaccinium uliginosum</i>	18	1	0	35
<i>Vaccinium oxycoccos</i>	15	1	0	15
<b>Herb layer</b>				
<i>Eleocharis quinqueflora</i>	100	27	3	90
<i>Drosera anglica</i>	59	7	0	30
<i>Carex simulata</i>	44	5	0	30
<i>Carex aquatilis</i> var. <i>dives</i>	35	4	0	25
<i>Mimulus primuloides</i>	32	2	0	20
<i>Dodecatheon jeffreyi</i>	32	2	0	25
<i>Hypericum anagalloides</i>	32	1	0	15
<b>Moss layer</b>				
Moss	62	33	0	95
<b>Unvegetated</b>				
Water	32	11	0	90
Litter	6	2	0	60

***Elodea canadensis***

Canadian waterweed

Plots sampled: 0



**Environment:**

Elevation (ft): 10-5000

Slope (deg): 0

Landform position: floodplains, basins

Hydrology: aquatic, submerged

Soils: organic

**Vegetation and ecology:** Habitat is lakes, ponds, and low-gradient rivers. This is a rooted or free-floating aquatic bed association that is widespread in western Oregon. It has not been sampled and little information is available. *Elodea canadensis* forms dense mats beneath the surface of the water and may provide important habitat for aquatic invertebrates and fish. This association may favor eutrophic conditions and may be enhanced by enriched runoff in agricultural or urban landscapes.

## *Equisetum arvense*

Field horsetail

Plots sampled: 2 (macro)



### Environment:

Elevation (ft): ave. 2115  
(1900-2329)

Slope (deg): ave. 7 (0-  
13)

Landform position:  
various slope  
positions, basins

Hydrology: perennially  
moist to saturated

Soils: mostly loam, some  
organic

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Pseudotsuga menziesii</i>	50	6	0	12
<i>Pinus ponderosa</i>	50	5	0	10
<b>Reproducing trees</b>				
<i>Quercus garryana</i>	50	Tr	0	Tr
<b>Shrub layer</b>				
<i>Rosa nutkana</i>	50	3	0	5
<i>Alnus incana</i>	50	1	0	1
<i>Symphoricarpos albus</i>	50	Tr	0	Tr
<i>Rubus ursinus</i>	50	Tr	0	Tr
<b>Herb layer</b>				
<i>Equisetum arvense</i>	100	88	80	95
<i>Hypericum anagalloides</i>	50	8	0	15
<i>Mimulus guttatus</i>	50	5	0	10

### Vegetation and ecology:

Habitat is seepy alluvial fans, slopes, wet meadows, and fens. This is mostly a low to mid-elevation association, often occurring in sites with some groundwater movement. It is often small-patch size in water tracks, and the plots suggest considerable inclusions of upland species that may be an artifact of plot size or configuration in a sinuous wetland configuration. Discounting the trees and shrubs that are mostly peripheral to the stand, the primary species in the herb layer is *Equisetum arvense*, with average cover of 88 percent and cover ranging from 80-95 percent. Other wetland associates with lesser cover include *Hypericum anagalloides* and *Mimulus guttatus*. Of the other 25 species, nearly half are upland taxa and should not be part of this association. This is a widespread and well-known association in other regions and obviously undersampled locally.

**Eragrostis hypnoides - Gnaphalium palustre**

Teal lovegrass - western marsh cudweed

Plots sampled: 4 (macro)



**Environment:**

Elevation (ft): ave. 385  
(40-500)

Slope (deg): 0

Landform position:  
floodplains

Hydrology: seasonally  
flooded to saturated

Soils: silt loam

**Vegetation and ecology:**

Habitat is low-elevation beds of dried shallow seasonal pools and lakes. Trees are peripheral but may include *Fraxinus latifolia*, *Populus balsamifera* ssp. *trichocarpa*, and *Salix fluviatilis*. The herb layer contains species adapted to early-season inundation and subsequent exposure as lakes and ponds dry up. Most exotic species are excluded by

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Salix lucida</i> ssp. <i>lasiandra</i>	50	Tr	0	Tr
<b>Herb layer</b>				
<i>Eragrostis hypnoides</i>	100	37	3	85
<i>Gnaphalium palustre</i>	75	27	0	90
<i>Rorippa curvisiliqua</i>	75	1	0	4
<i>Bidens frondosa</i>	50	2	0	6
<i>Polygonum hydropiperoides</i>	50	1	0	3
<i>Bidens cernua</i>	50	1	0	2
<i>Solanum dulcamara</i>	50	Tr	0	Tr
<i>Cirsium arvense</i>	50	Tr	0	Tr
<i>Lindernia dubia</i>	25	10	0	40
<i>Eleocharis ovata</i>	25	1	0	2
<i>Ludwigia palustris</i>	25	1	0	2
<i>Echinochloa crusgalli</i>	25	Tr	0	Tr
<i>Limosella aquatica</i>	25	Tr	0	Tr
<i>Polygonum amphibium</i>	25	Tr	0	Tr
<i>Panicum capillare</i>	25	Tr	0	Tr
<i>Rumex crispus</i>	25	Tr	0	Tr
<i>Scutellaria lateriflora</i>	25	Tr	0	Tr
<i>Senecio vulgaris</i>	25	Tr	0	Tr
<i>Epilobium ciliatum</i>	25	Tr	0	Tr
<b>Moss layer</b>				
Moss	25	3	0	10

inundation extending into the growing season. *Eragrostis hypnoides* forms a loose and patchy sod with *Gnaphalium* and considerable bare ground may be present. These sites appear to be drier than those occupied by the mudflat vegetation of the *Lilaeopsis occidentalis* or *Azolla* associations, the mud often cracking deeply and the top layer losing most of its moisture.

**Euthamia occidentalis**

Western goldentop

Plots sampled: 2 (macro)



**Environment:**

Elevation (ft): 20

Slope (deg): 2

Landform position: floodplains

Hydrology: moist

Soils: silt loam

Species	Const	Percent cover		
		Ave	Min	Max
<b>Reproducing trees</b>				
<i>Salix fluviatilis</i>	50	2	0	3
<b>Herb layer</b>				
<i>Euthamia occidentalis</i>	100	38	30	45
<i>Artemisia vulgaris</i>	100	1	1	1
<i>Cyperus erythrorhizos</i>	50	10	0	20

**Vegetation and ecology:** Habitat is gently sloping, silty river shores exposed at seasonal low flows, between the high water cutbank and the water line. No trees are present below the high water cutbank, but *Salix fluviatilis* and *Salix lucida* ssp. *lasiandra* are frequently present at the toe of the cutbank and sometimes form extensive stands along the flat shore adjacent to this association. The exotic *Amorpha fruticosa* is rapidly spreading along the riverbanks in this habitat. The herb layer contains over 20 different species, some exotics and some opportunists on seasonally scoured and inundated shorelines. *Euthamia occidentalis* is the principal species and forms tall stands with an average cover of 38 percent and ranging from 30-45 percent. Most of the other species are incidental and have low cover values, but are of interest because some are uncommon except in this habitat.

## *Glyceria striata*

Fowl mannagrass

Plots sampled: 5 (3  
macro, 2 micro)



### Environment:

Elevation (ft): ave. 3818  
(2800-4720)

Slope (deg): ave. 2 (0-3)

Landform position:

floodplains, basins

Hydrology: perennially  
saturated

Soils: organic, loam, or  
sand

### Vegetation and ecology:

Habitat is montane  
marshes, fens, and edges  
of wet meadows.

*Glyceria striata* forms tall  
and often nearly  
monotypic stands, and

some standing water may be present into the growing season. The plots reported here document occurrences of this association in fens. Most woody vegetation is peripheral to the wetland or confined to hummocks or "tree islands," and most herbaceous vegetation forms wet lawns. The herb layer contains almost 40 different species, including sometimes large patches of *Polygonum bistortoides*. Hummock or edge species such as *Veratrum viride*, *Rudbeckia occidentalis*, and *Senecio triangularis* may be conspicuous. This association is more common east of the Cascades. *Glyceria elata* is now considered a synonym of *Glyceria striata*.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Picea engelmannii</i>	20	4	0	22
<i>Tsuga mertensiana</i>	20	Tr	0	1
<b>Reproducing trees</b>				
<i>Tsuga mertensiana</i>	20	1	0	4
<b>Shrub layer</b>				
<i>Ribes</i>	20	3	0	16
<i>Alnus viridis</i> ssp. <i>sinuata</i>	20	1	0	5
<i>Spiraea douglasii</i>	20	Tr	0	1
<i>Vaccinium</i>	20	Tr	0	Tr
<b>Herb layer</b>				
<i>Glyceria striata</i>	100	48	13	80
<i>Viola</i>	60	10	0	35
<i>Veratrum viride</i>	40	15	0	40
<i>Deschampsia</i> <i>caespitosa</i>	40	5	0	15
<i>Caltha leptosepala</i> ssp. <i>howellii</i>	40	4	0	20
<i>Veronica americana</i>	40	4	0	12
<i>Epilobium ciliatum</i> ssp. <i>watsonii</i>	40	3	0	10

## *Hippuris vulgaris*

Common mare's-tail

Plots sampled: 5 (micro)



Species	Const	Percent cover		
		Ave	Min	Max
<b>Herb layer</b>				
<i>Hippuris vulgaris</i>	100	37	25	50
<i>Cicuta douglasii</i>	20	1	0	5
<b>Unvegetated</b>				
Water	100	62	50	75

### Environment:

Elevation (ft): 20

Slope (deg): 0

Landform position: floodplains, basins

Hydrology: seasonally flooded to perennially saturated

Soils: organic

**Vegetation and ecology:** Habitat is shallow depressions and pools in marshes and fens. This association is widespread but uncommon locally. The plots reported here are from the coast and probably don't reflect the range of subordinate species that may be present elsewhere. Stands are often extensive monotypes of *Hippuris vulgaris* with an average cover of 37 percent and ranging from 25 to 50 percent. Most of the remaining cover is open water or mud if water levels drop. These plots report *Cicuta douglasii* as an associate, and other species such as *Schoenoplectus acutus*, *Schoenoplectus tabernaemontani*, or *Potamogeton* may be present. Where pools dry up, the substrate remains moist to saturated, and *Hippuris* cannot survive complete desiccation.



***Hydrocotyle ranunculoides***

Floating marshpennywort

Plots sampled: 0



**Environment:**

Elevation (ft): 0-5000

Slope (deg): 0

Landform position: floodplains, flats, basins

Hydrology: seasonally flooded to perennially saturated

Soils: organic

**Vegetation and ecology:** Habitat is shallow lakes, ponds, pools, or low-gradient streams, sometimes in fens. This is a rooted aquatic bed association that is widespread in western Oregon but uncommon locally. It has not been sampled and little information is available. It forms nearly monotypic emergent stands that may cover the entire surface of shallow lakes, ponds, and pools in peatlands. Cover ranges from 60-95 percent. It is not clear if this association favors eutrophic conditions or may be enhanced by enriched runoff in agricultural or urban landscapes.

## *Isoetes nuttallii*

Nuttall's quillwort

Plots sampled: 5 (macro)



### Environment:

Elevation (ft): 500

Slope (deg): 0

Landform position:  
floodplains, basins

Hydrology: seasonally  
flooded to perennially  
moist

Soils: silt loam

Species	Const	Percent cover		
		Ave	Min	Max
<b>Herb layer</b>				
<i>Isoetes nuttallii</i>	100	57	40	85
<i>Lotus pinnatus</i>	60	12	0	50
<i>Poaceae</i>	60	7	0	25
<i>Veronica scutellata</i>	40	4	0	10
<i>Mimulus guttatus</i>	40	2	0	8
<i>Triteleia hyacinthina</i>	20	Tr	0	1
<i>Camassia quamash</i>	20	Tr	0	1
<i>Gratiola</i>	20	Tr	0	1
<i>Epilobium ciliatum</i>	20	Tr	0	1
<i>Juncus tenuis</i>	20	Tr	0	1

**Vegetation and ecology:** Habitat is beds of intermittent streams and seasonally-flooded pools in clay prairie, riparian woodland, or on shallow-soiled basalt scabland. This association forms linear bands of vegetation in ephemeral streams and pools. Trees and shrubs were absent from the plots described here that were sampled in open prairie. Of the ten species in the herb layer, *Isoetes nuttallii* is the principal species with average cover of 57 percent and ranging from 40-85 percent. *Lotus pinnatus* and an unidentified grass had 60 percent constancy and cover of 50 and 25 percent, respectively. Most of the remaining herbs occur only in trace amounts. A number of these species, including *Isoetes nuttallii*, dry up and disappear by midsummer. Other stands have been observed in mixed *Fraxinus latifolia* - *Quercus garryana* riparian forest.

**Juncus balticus**

Baltic rush

Plots sampled: 6  
(macro)



**Environment:**

Elevation (ft): ave. 5070  
(4400-6300)

Slope (deg): ave. 2 (0-9)

Landform position:  
floodplains, basins,  
benches

Hydrology: seasonally  
moist to perennially  
flooded

Soils: mostly loam, some  
organic

**Vegetation and ecology:**

Habitat is montane meadows and fens. This association occurs in both seasonally moist meadows as well as perennially wet fens. Species composition is diverset. Trees and shrubs are usually

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Picea engelmannii</i>	33	2	0	13
<i>Abies lasiocarpa</i>	33	1	0	2
<b>Reproducing trees</b>				
<i>Abies lasiocarpa</i>	17	1	0	3
<i>Picea engelmannii</i>	17	Tr	0	2
<b>Shrub layer</b>				
<i>Rubus lasiococcus</i>	33	Tr	0	Tr
<i>Vaccinium membranaceum</i>	33	Tr	0	Tr
<i>Vaccinium scoparium</i>	33	Tr	0	Tr
<b>Herb layer</b>				
<i>Juncus balticus</i>	100	48	25	80
<i>Polygonum bistortoides</i>	50	10	0	50
<i>Carex scopolorum</i>	50	4	0	12
<i>Pedicularis groenlandica</i>	50	1	0	6
<i>Caltha leptosepala</i> ssp. <i>howellii</i>	33	2	0	9
<i>Deschampsia caespitosa</i>	33	2	0	10
<i>Senecio triangularis</i>	33	2	0	10
<i>Mimulus guttatus</i>	33	2	0	10
<b>Moss layer</b>				
Moss	17	Tr	0	Tr

clumped in meadows and confined to hummocks in fens. The herb layer contains more than 60 different species, and *Trifolium longipes*, *Carex lenticularis*, and *Aster occidentalis* may form conspicuous patches. The species diversity in some stands no doubt reflects a history of grazing, and *Juncus balticus* itself is an increaser under moderate grazing. This association is widespread at higher elevations and is most common east of the Cascades Range.

**Juncus effusus**

Soft rush

Plots sampled: 6 (macro)



**Environment:**

Elevation (ft): ave. 1848  
(0-3450)

Slope (deg): ave. 2 (0-7)

Landform position:  
slopes, floodplains,  
basins

Hydrology: seasonally  
moist to perennially  
saturated

Soils: mostly loam, some  
organic

**Vegetation and ecology:**

Habitat is meadows, fens, and old pastures. This association is generally thought of as a disturbance type resulting from grazing, but some occurrences suggest that it is native in some places because they are unlikely to have ever been heavily grazed. It is widespread at a variety of elevations but is especially abundant at low elevations in western Oregon. The plots here are from the Coast Range and Cascade Range. Trees are nearly absent but may include *Alnus rubra*, *Fraxinus latifolia*, *Quercus garryana*, or conifers peripheral to the wetland. The herb layer includes about 60 different species. Old pastures at low elevations may also have large amounts of *Ranunculus repens* but this species wasn't recorded in these plots.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Alnus rubra</i>	17	Tr	0	Tr
<b>Reproducing trees</b>				
<i>Pseudotsuga menziesii</i>	17	1	0	3
<b>Shrub layer</b>				
<i>Salix sitchensis</i>	33	Tr	0	1
<b>Herb layer</b>				
<i>Juncus effusus</i>	100	52	20	85
<i>Juncus ensifolius</i>	100	2	Tr	5
<i>Hypericum anagalloides</i>	83	43	0	75
<i>Galium trifidum</i>	67	Tr	0	1
<i>Scirpus microcarpus</i>	50	5	0	25
<i>Equisetum arvense</i>	50	3	0	20
<i>Oenanthe sarmentosa</i>	50	3	0	20
<i>Carex obnupta</i>	50	1	0	5
<i>Mimulus moschatus</i>	50	Tr	0	1
<i>Lotus corniculatus</i>	33	4	0	20
<i>Athyrium filix-femina</i>	33	4	0	20
<b>Moss layer</b>				
Moss	83	11	0	49

**Juncus nevadensis**

Nevada rush

Plots sampled: 2 (macro)



**Environment:**

Elevation (ft): ave. 4560  
(4389-4730)

Slope (deg): 0

Landform position:

floodplains, basins

Hydrology: perennially saturated

Soils: organic or loam

**Vegetation and ecology:**

Habitat is montane marshes and fens.

*Juncus nevadensis* usually forms nearly

monotypic stands in seasonally or perennially

flooded shallow depressions and requires

more water than *Juncus balticus*. It is widespread

but most common east of the Cascade Range. The

two plots reported here occur in fens, where trees

and shrubs are mostly confined to hummocks or "tree islands" and the herb layer is mostly a wet lawn. This occurrence appears to be at the wet end of the spectrum for this association and needs more sampling. The moss layer in one plot is nearly 100 percent *Sphagnum*.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Reproducing trees</b>				
<i>Picea engelmannii</i>	50	Tr	0	Tr
<i>Pinus contorta</i> var. <i>latifolia</i>	50	Tr	0	Tr
<b>Shrub layer</b>				
<i>Vaccinium uliginosum</i>	50	2	0	4
<i>Salix geyeriana</i>	50	Tr	0	Tr
<i>Alnus incana</i>	50	Tr	0	Tr
<b>Herb layer</b>				
<i>Juncus nevadensis</i>	100	38	35	40
<i>Mimulus primuloides</i>	50	10	0	20
<i>Carex utriculata</i>	50	5	0	10
<i>Hypericum anagaloides</i>	50	5	0	10
<i>Triantha occidentalis</i>	50	4	0	7
<i>Carex simulata</i>	50	3	0	5
<i>Menyanthes trifoliata</i>	50	3	0	5
<i>Poa palustris</i>	50	3	0	5
<i>Carex aquatilis</i> var. <i>dives</i>	50	2	0	3
<i>Deschampsia caespitosa</i>	50	2	0	3
<i>Muhlenbergia filiformis</i>	50	1	0	2
<i>Lysichiton americanus</i>	50	1	0	1
<i>Sanguisorba occidentalis</i>	50	1	0	1
<i>Carex lasiocarpa</i>	50	1	0	1
<b>Moss layer</b>				
Moss	50	50	0	99

## ***Lemna minor***

Common duckweed

Plots sampled: 2 (macro)



### **Environment:**

Elevation (ft): ave. 650  
(sea level-800)

Slope (deg): 0

Landform position:  
floodplains, basins

Hydrology: seasonally to perennially flooded

Soils: silt loam

Species	Const	Percent cover		
		Ave	Min	Max
<b>Herb layer</b>				
<i>Lemna minor</i>	100	90	80	100
<i>Carex obnupta</i>	50	35	0	70
<i>Lysichiton americanus</i>	50	5	0	10
<i>Callitriche heterophylla</i>	50	1	0	1

**Vegetation and ecology:** Habitat is seasonal to perennial pools, ponds, lakes, and sloughs, usually at lower elevations. This association forms bright green floating mats on the surface of the water, usually growing so dense that no open water is visible. *Lemna* needs open water to proliferate in winter and spring but it tolerates being stranded on mudflats when ponds and pools dry out in summer. Although not included in these two plots, other small floating species are common components of this association, particularly *Spirodela polyrrhiza*, *Azolla*, *Wolffia*, and the aquatic liverworts *Ricciocarpos natans* and *Riccia fluitans*, but they are always subordinate to *Lemna*. All of these species can survive stranding on mud, but cannot survive complete desiccation. It is not clear if this association is enhanced by eutrophic conditions caused by enriched runoff in agricultural or urban landscapes.

***Lilaeopsis occidentalis***

Western grasswort

Plots sampled: 3 (macro)



**Environment:**

Elevation (ft): ave. 5 (1-10)

Slope (deg): 0

Landform position:  
floodplains

Hydrology: perennially moist

Soils: silt loam

**Vegetation and ecology:**

Habitat is mudflats in seasonal ponds and within or just above freshwater tidal zone of larger coastal rivers. This peculiar association is made up primarily of small, annual species on mud with a scattering of perennial species near the upper edge of the mudflats.

*Lilaeopsis occidentalis*, *Crassula aquatica*, and *Limosella aquatica* are always present but with diminishing percent cover.

They form clumps or mats that may migrate with receding moisture on seasonal lakebeds, or stay in place in perennially-irrigated muds within the freshwater tidal zone. *Eleocharis palustris*, *Eleocharis acicularis*, and an unidentified *Callitriche* are present in about half the plots, sometimes with cover up to 40 percent. *Lilaeopsis occidentalis* is more commonly seen in brackish estuaries but is also not infrequent in freshwater systems.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Herb layer</b>				
<i>Lilaeopsis occidentalis</i>	100	28	20	35
<i>Crassula aquatica</i>	100	13	1	35
<i>Limosella aquatica</i>	100	7	1	10
<i>Eleocharis palustris</i>	67	15	0	40
<i>Eleocharis acicularis</i>	67	7	0	10
<i>Callitriche</i>	67	2	0	5
<i>Schoenoplectus americanus</i>	33	3	0	10
<i>Bidens cernua</i>	33	1	0	3
<i>Sium suave</i>	33	1	0	3
<i>Polygonum hydropiperoides</i>	33	1	0	3
<i>Juncus oxymeris</i>	33	1	0	2
<i>Elodea canadensis</i>	33	Tr	0	1
<i>Equisetum arvense</i>	33	Tr	0	1
<i>Myriophyllum spicatum</i>	33	Tr	0	1
<i>Alisma triviale</i>	33	Tr	0	1
<i>Gratiola neglecta</i>	33	Tr	0	1
<i>Sagittaria latifolia</i>	33	Tr	0	1
<i>Myriophyllum ussuriense</i>	33	Tr	0	1
<i>Ceratophyllum demersum</i>	33	Tr	0	1
<i>Juncus nevadensis</i>	33	Tr	0	1

## *Ludwigia palustris* - *Polygonum hydropiperoides*

Water-purslane - swamp smartweed

Plots sampled: 16 (12 macro, 4 micro)



### Environment:

Elevation (ft): ave. 288 (10-500)

Slope (deg): 0

Landform position:  
floodplains, basins

Hydrology: seasonally flooded to moist

Soils: mostly silt loam, some organic

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Salix lucida</i> ssp. <i>lasiandra</i>	6	Tr	0	3
<b>Herb layer</b>				
<i>Polygonum hydropiperoides</i>	94	57	0	99
<i>Ludwigia palustris</i>	63	34	0	90
<i>Bidens cernua</i>	38	5	0	40
<i>Eleocharis palustris</i>	25	1	0	15

**Vegetation and ecology:** Habitat is shallow, seasonally flooded eutrophic lakes, ponds, and sloughs at low elevations, subject to drying in summer. It is more common in interior valleys on *Fraxinus latifolia* floodplains, but occurs sporadically along the coast. *Salix lucida* ssp. *lasiandra* is the only tree or shrub present but it has low constancy and cover because of extensive seasonal ponding. *Polygonum hydropiperoides* is the primary species with an average cover of 57 percent and ranges to 99 percent. It is not always present, and when absent the associated *Ludwigia palustris* is conspicuous. *Ludwigia* has a constancy of 63 percent, an average cover of 34 percent, and may range to 90 percent. Eighteen other species in the herb layer occur at low constancy and cover, except for significant patches of *Bidens cernua*, *Sagittaria latifolia*, or *Leersia oryzoides*. *Phalaris arundinacea* may also form patches but is inhibited by seasonal ponding. The association tolerates eutrophic conditions and flashy hydroperiods associated with urban and agricultural landscapes.



## *Menyanthes trifoliata*

Bogbean

Plots sampled: 5 (macro)



### Environment:

Elevation (ft): ave. 3664  
(sea level-4580)

Slope (deg): 0

Landform position:  
floodplains, benches,  
basins

Hydrology: perennially  
flooded or saturated

Soils: organic

### Vegetation and ecology:

Habitat is in perennially  
flooded or saturated

depressions, the edges of ponds, and in wet lawns in peatlands. This association is usually composed of nearly monotypic stands of *Menyanthes trifoliata*, with an average cover of 32 percent and ranging from 10-60 percent. Most of the remaining space between plants is open water, mud, or *Sphagnum*. About 10 other herbaceous species are recorded from these plots but all occur at low constancy and cover. Water levels may drop in summer but the substrate remains moist to saturated. The association is most common between 2,000 and 6,000 feet elevation throughout western Oregon. Several historic occurrences were known from the Willamette Valley but only two are currently known. *Menyanthes* is fairly common in coastal peatlands but its occurrence as a plant association is limited. Here it may occur in wet lawns with more typical coastal peatland species such as *Carex cusickii*, *Comarum palustre*, *Carex obnupta*, and *Eriophorum chamissonis*.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Herb layer</b>				
<i>Menyanthes trifoliata</i>	100	32	10	60
<i>Cicuta douglasii</i>	40	1	0	5
<i>Carex limosa</i>	40	1	0	5
<i>Lysichiton americanus</i>	40	1	0	5
<i>Carex echinata</i> ssp. <i>echinata</i>	40	Tr	0	Tr
<i>Carex arcta</i>	20	2	0	12
<i>Carex utriculata</i>	20	2	0	10
<i>Carex aquatilis</i> var. <i>dives</i>	20	1	0	5
<i>Drosera rotundifolia</i>	20	1	0	5
<i>Carex aquatilis</i>	20	1	0	5
<i>Cinna latifolia</i>	20	1	0	5
<i>Poa palustris</i>	20	1	0	4
<b>Moss layer</b>				
Moss	80	70	0	98

## *Nephrophyllidium crista-galli*

Deer cabbage

Plots sampled: 2 (macro)



### Environment:

Elevation (ft): ave. 3585  
(3550-3620)

Slope (deg): ave. 4 (2-6)

Landform position: slopes

Hydrology: perennially saturated

Soils: organic

### Vegetation and ecology:

Habitat is montane fens, forming extensive wet lawns or flushes on gentle to moderate slopes below springs and seeps. The slopes are laced with rivulets and are also irrigated by sheet flow. *Nephrophyllidium crista-*

*galli* resembles *Caltha leptosepala* ssp. *howellii* and forms similar but denser stands in similar sloping, seepy habitats. Woody plants have scanty cover and are primarily restricted to hummocks or "tree islands" within a matrix of wet lawn, or they are peripheral to the wetland. *Nephrophyllidium* is the primary species in the herb layer, with average cover of 75 percent and ranging from 60-90 percent. *Carex aquatilis* var. *aquatilis* and *Boykinia major* may form significant patches. The twelve other species occur at very low cover values. *Nephrophyllidium* is rare in Oregon and was only recently discovered on the Salem BLM District. It has also been called *Fauria crista-galli*. These are probably the southernmost occurrences of this species in North America.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Herb layer</b>				
<i>Nephrophyllidium crista-galli</i>	100	75	60	90
<i>Carex aquatilis</i> var. <i>aquatilis</i>	100	12	3	20
<i>Boykinia major</i>	100	9	3	15
<i>Tofieldia glutinosa</i>	100	4	2	5
<i>Polygonum bistortoides</i>	100	3	1	5
<i>Parnassia fimbriata</i>	100	1	1	1
<i>Agrostis thurberiana</i>	100	Tr	Tr	Tr
<i>Senecio triangularis</i>	100	Tr	Tr	Tr
<i>Carex laevisculmis</i>	50	3	0	5
<i>Poaceae</i>	50	Tr	0	Tr
<i>Platanthera stricta</i>	50	Tr	0	Tr
<i>Luzula campestris</i>	50	Tr	0	Tr
<i>Platanthera dilatata</i>	50	Tr	0	Tr
<i>Epilobium ciliatum</i> ssp. <i>watsonii</i>	50	Tr	0	Tr
<i>Hypericum anagalloides</i>	50	Tr	0	Tr
<b>Moss layer</b>				
Moss	50	45	0	90

## *Nuphar lutea* ssp. *polysepala*

Pond lily

Plots sampled: 5 (macro)



**Environment:**

Elevation (ft): ave. 2732,  
range 100-5010

Slope (deg): 0

Landform position:  
floodplains, basins

Hydrology: seasonally to  
perennially flooded

Soils: mostly loam, some organic

Species	Const	Percent cover		
		Ave	Min	Max
<b>Shrub layer</b>				
<i>Spiraea douglasii</i>	20	Tr	0	1
<b>Herb layer</b>				
<i>Nuphar lutea</i> ssp. <i>polysepala</i>	100	34	2	60
<i>Potamogeton natans</i>	60	4	0	20
<i>Sparganium angustifolium</i>	20	6	0	30
<i>Myriophyllum sibiricum</i>	20	4	0	20
<i>Lemna minor</i>	20	3	0	15

**Vegetation and ecology:** Habitat is eutrophic ponds, lakes, and sloughs. *Nuphar lutea* ssp. *polysepala* forms rooted aquatic beds in ponds and lakes. It tolerates seasonal drying that may reveal its enormous, prehistoric-looking fleshy rhizomes at the bottom of mud cracks. Trees and shrubs are peripheral to the wetland. The herb layer in these plots contains 18 species, dominated by *Nuphar* with an average of 34 percent cover and ranging from 2-60 percent. *Potamogeton natans*, *Sparganium angustifolium*, and *Myriophyllum sibiricum* form significant patches in these plots, and other commonly associated species include species of *Glyceria*, *Brasenia schreberi*, *Dulichium arundinaceum*, *Menyanthes trifoliata*, *Utricularia macrorhiza*, and *Carex exsiccata*. The leaves of *Nuphar* float on the surface of the water or protrude 1-2 feet above it. Stands may cover extensive areas or be relatively sparse.

## *Oenanthe sarmentosa*

Water parsley

Plots sampled: 7 (macro)



### Environment:

Elevation (ft): ave. 820  
(500-2340)

Slope (deg): ave. 0 (0-1)

Landform position:

floodplains, basins

Hydrology: seasonally  
flooded to perennially  
saturated

Soils: loam

### Vegetation and ecology:

Habitat is muddy openings  
in forested wetland  
(swamp), marsh, or shrub-  
swamp. *Oenanthe*

*sarmentosa* typically forms stands in muddy openings in both deciduous and coniferous swamp and is most common at lower elevations. *Alnus rubra* and *Fraxinus latifolia* are the primary deciduous species, and *Thuja plicata* and *Picea sitchensis* are the primary conifers, but none of these occur with much constancy or cover and are mostly peripheral to the wetland. Shrubs are also scarce, with *Salix sitchensis* being the most common one in the plots. The herb layer may be diverse and over 40 species are recorded here, but most of them occur with low constancy and cover. *Oenanthe sarmentosa* is the primary species with average cover of 68 percent and a range of 40-99 percent. Other species with significant patches include *Callitriche heterophylla*, *Typha latifolia*, *Eleocharis palustris*, *Ranunculus uncinatus*, and *Lysichiton americanus*. Stands are usually flooded early in the season and dry down in summer, but the soil usually remains moist.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Alnus rubra</i>	29	3	0	20
<i>Fraxinus latifolia</i>	14	11	0	80
<i>Thuja plicata</i>	14	Tr	0	Tr
<i>Frangula purshiana</i>	14	Tr	0	Tr
<b>Shrub layer</b>				
<i>Salix sitchensis</i>	29	1	0	5
<b>Herb layer</b>				
<i>Oenanthe sarmentosa</i>	100	68	40	99
<i>Carex deweyana</i> ssp. <i>leptopoda</i>	43	Tr	0	1
<i>Callitriche heterophylla</i>	29	10	0	70
<i>Typha latifolia</i>	29	6	0	40
<i>Eleocharis palustris</i>	29	5	0	25
<i>Poa trivialis</i>	29	3	0	20
<b>Moss layer</b>				
Moss	29	4	0	25

***Paspalum distichum***

Knotgrass

Plots sampled: 3 (macro)



**Environment:**

Elevation (ft): ave. 33

(20-40)

Slope (deg): ave. 2 (0-5)

Landform position:

floodplains, basins

Hydrology: seasonally flooded to perennially moist

Soils: silt loam, sand

**Vegetation and ecology:**

Habitat is shallow depressions in floodplains and wet prairie. This association forms dense, nearly monotypic stands on mud or sand flats. Stands are flooded seasonally but dry out in summer, although the water table is never far below the soil surface. Most occurrences are in the Willamette Valley and on the Columbia River floodplain in the Vancouver Basin. Eighteen species are recorded from the herb layer. *Paspalum distichum* may not be native to the Pacific Northwest, but it is included here until some convincing evidence can be found. It provides good forage for waterfowl but some managers consider it a nuisance in irrigation projects because it obstructs ditches.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Salix lucida</i> ssp. <i>lasiandra</i>	67	1	0	2
<b>Reproducing trees</b>				
<i>Salix lucida</i> ssp. <i>lasiandra</i>	33	2	0	5
<b>Shrub layer</b>				
<i>Salix fluviatilis</i>	33	1	0	3
<i>Salix sitchensis</i>	33	Tr	0	1
<b>Herb layer</b>				
<i>Paspalum distichum</i>	100	57	40	70
<i>Equisetum arvense</i>	67	14	0	40
<i>Eleocharis palustris</i>	67	7	0	15
<i>Phalaris arundinacea</i>	67	6	0	15
<i>Carex vulpinoidea</i>	67	5	0	10
<i>Helenium autumnale</i>	67	4	0	8
<i>Juncus effusus</i>	67	3	0	8
<i>Mentha pulegium</i>	67	2	0	5
<i>Polygonum hydropiperoides</i>	67	2	0	4
<i>Schoenoplectus tabernaemontani</i>	67	1	0	2
<i>Carex interrupta</i>	33	3	0	10
<i>Carex feta</i>	33	3	0	10
<i>Carex aperta</i>	33	2	0	5
<i>Lindernia dubia</i>	33	2	0	5

***Polygonum amphibium***

Water smartweed

Plots sampled: 0



**Environment:**

Elevation (ft): 10-1000

Slope (deg): 0

Landform position: floodplains, basins

Hydrology: submerged aquatic

Soils: organic

**Vegetation and ecology:** Habitat is low-elevation eutrophic ponds, lakes, and sloughs. This is a rooted aquatic bed association that is widespread in western Oregon but has not been sampled and little information is available. *Polygonum amphibium* may form extensive floating mats on the surface of lakes and ponds but it also tolerates seasonal drying. Stands sampled elsewhere are usually monotypic, with 30-95 percent cover. This association provides important habitat for aquatic invertebrates and fish. It is likely that it is enhanced by enriched runoff in agricultural or urban landscapes.

## **Potamogeton natans**

Floating-leaved pondweed

Plots sampled: 3 (2 macro, 1 micro)



### **Environment:**

Elevation (ft): ave. 633  
(100-1200)

Slope (deg): 0

Landform position:  
floodplains, benches,  
basins

Hydrology: seasonally to  
perennially flooded

Soils: silt loam, sand, organic

Species	Const	Percent cover		
		Ave	Min	Max
<b>Herb layer</b>				
<i>Potamogeton natans</i>	100	70	60	85
<i>Utricularia</i>	33	20	0	60
<i>Sparganium angustifolium</i>	33	12	0	35
<i>Spirodela polyrrhiza</i>	33	7	0	20
<i>Polygonum</i>	33	2	0	5
<i>Eleocharis palustris</i>	33	2	0	5
<i>Argentina egedii</i>	33	Tr	0	1
<i>Myosotis laxa</i>	33	Tr	0	1
<i>Veronica scutellata</i>	33	Tr	0	1
<i>Polygonum hydropiperoides</i>	33	Tr	0	Tr

**Vegetation and ecology:** Habitat is ponds, pools, lakes, and sloughs. This association forms rooted aquatic beds with mats of leaves that float on the surface of the water, and can tolerate seasonal drying if the substrate remains wet. *Potamogeton natans* is the primary species with an average cover of 70 percent and ranging from 60-85 percent. Other species present with significant patches include *Utricularia macrorhiza*, *Nuphar lutea* ssp. *polysepala*, and *Brasenia schreberi*. *Potamogeton* frequently intermixes with adjoining associations and many ecologists sample these mixed stands rather than the monotypic stands.

## *Ranunculus aquatilis*

Water crowfoot

Plots sampled: 3 (2 macro, 1 micro)



### Environment:

Elevation (ft): ave. 1483  
(500-2800)

Slope (deg): 0

Landform position:  
floodplains, benches

Hydrology: seasonally to perennially flooded

Soils: organic or loam

Species	Const	Percent cover		
		Ave	Min	Max
<b>Herb layer</b>				
<i>Ranunculus aquatilis</i>	100	88	75	98
<i>Alopecurus aequalis</i>	67	4	0	6
<i>Veronica scutellata</i>	67	3	0	6
<i>Callitriche</i>	33	18	0	55
<i>Eleocharis acicularis</i>	33	10	0	30
<i>Mentha arvensis</i>	33	4	0	12
<b>Moss layer</b>				
Moss	33	1	0	2

**Vegetation and ecology:** Habitat is shallow pools or ponds in open or wooded situations. *Ranunculus aquatilis* forms beds of rooted aquatic vegetation, usually in nearly monotypic stands. It occurs in both hardwood forests of *Fraxinus latifolia*, *Alnus rubra*, and *Acer macrophyllum*, and also in forests of *Pseudotsuga menziesii* and *Thuja plicata*. No woody vegetation is recorded from these plots. Twelve species are reported from the herb layer, *Ranunculus aquatilis* being the most abundant with an average cover of 88 percent and ranging from 75-98 percent. *Alopecurus aequalis* and *Veronica scutellata* occur in slightly over half the plots but at very low cover. An unidentified *Callitriche* and *Eleocharis acicularis* form some significant patches, but the rest of the species occur only in very small amounts. Smaller pools containing this association often dry up in summer and the plants die and disappear when desiccated. These seasonal pools are favored egg-laying sites for amphibians.



## *Ranunculus flammula*

Creeping buttercup

Plots sampled: 8 (1 macro, 7 micro)



### Environment:

Elevation (ft): ave. 3886  
(2800-5410)

Slope (deg): 0

Landform position:

floodplains, basins

Hydrology: seasonally

flooded to perennially moist

Soils: organic or loam

Species	Const	Percent cover		
		Ave	Min	Max
<b>Herb layer</b>				
<i>Ranunculus flammula</i>	100	51	15	70
<i>Carex aquatilis</i> var. <i>dives</i>	25	3	0	13
<i>Potamogeton</i>	13	6	0	45
<i>Carex utriculata</i>	13	3	0	20
<i>Dodecatheon jeffreyi</i>	13	Tr	0	1
<i>Carex lenticularis</i>	13	Tr	0	Tr
<b>Moss layer</b>				
Moss	25	1	0	5

**Vegetation and ecology:** Habitat is seasonally flooded depressions where peat or mud are exposed at low water. *Ranunculus flammula* forms sparse to dense aquatic mats in shallow depressions that dry out as summer progresses, when plants persist and flower in stoloniferous mats over the mud. Woody vegetation is peripheral to the wetland and may include various species of *Salix*, *Vaccinium uliginosum*, and *Spiraea douglasii*. *Ranunculus flammula* is the principal herbaceous species with an average cover of 51 percent and ranging from 15 to 90 percent. Five other species of herbs are recorded, all with low constancy and cover, except for patches of an unidentified *Potamogeton* and *Carex utriculata*. Occurrences can become quite dry late in the season and *Ranunculus flammula* disappears under heavy trampling by elk. These seasonal pools are favored egg-laying sites for amphibians.

## ***Sagittaria latifolia***

Broadleaf arrowhead

Plots sampled: 14 (8 macro, 6 micro)



### **Environment:**

Elevation (ft): ave. 121 (6-500)

Slope (deg): 0

Landform position:  
floodplains, basins

Hydrology: seasonally or  
perennially flooded to  
perennially saturated

Soils: silt loam

Species	Const	Percent cover		
		Ave	Min	Max
<b>Reproducing trees</b>				
<i>Salix lucida</i> ssp. <i>lasiandra</i>	7	1	0	10
<b>Herb layer</b>				
<i>Sagittaria latifolia</i>	100	52	25	85
<i>Eleocharis palustris</i>	64	4	0	15
<i>Bidens cernua</i>	36	7	0	35
<i>Schoenoplectus tabernaemontani</i>	36	3	0	35
<i>Lindernia dubia</i>	36	2	0	20
<i>Eleocharis ovata</i>	29	4	0	25
<i>Elatine</i>	21	2	0	20
<i>Ludwigia palustris</i>	21	Tr	0	2

**Vegetation and ecology:** Habitat is seasonal pools, ponds, sloughs, and freshwater tidal mudflats. This association forms emergent marsh and is primarily a low-elevation wetland type in western Oregon. Stands are flooded early in the season and may dry out as summer progresses, or may remain flooded throughout the growing season. Some are irrigated by daily freshwater tides along the lower Columbia River. They typically occur in floodplain openings ringed by often extensive stands of the *Salix lucida* ssp. *lasiandra* association and are generally too wet for *Fraxinus latifolia* or *Spiraea douglasii*. Twenty-nine herbaceous species are recorded from these plots, including *Sparganium angustifolium*, *Potamogeton natans*, and *Leersia oryzoides*. Conditions are usually too wet for *Phalaris arundinacea* except around the edges of ponds and sloughs where competition is intense. *Sagittaria latifolia* was a well-documented staple food of the Kalapuya and Chinook people and intensively managed. It was probably widespread on floodplains in the Willamette Valley but has become rare because of loss of pond and slough habitat to flood control, agriculture, urban development, and *Phalaris arundinacea*. The largest populations remaining in the region occur on Sauvie Island.

***Sanguisorba officinalis* - *Carex aquatilis* var. *dives***

Burnet - Sitka sedge

Plots sampled: 13 (8 macro, 5 micro)



**Environment:**

Elevation (ft): ave. 3148 (1650-3800)

Slope (deg): ave. 1 (0-3)

Landform position:

slopes, basins

Hydrology: perennially saturated

Soils: mostly organic, some loam

**Vegetation and ecology:**

Habitat is montane fens.

This association forms

sloping to level wet lawn vegetation interspersed with scattered hummocks or "tree islands." Stands are irrigated by sheet flow from springs and seeps.

Some stands occur in aapamire or "string fen," a distinctive boreal peatland formation where clusters of small elliptical or elongated pools 3-15 feet in diameter form on gentle slopes of peat, their long axes oriented parallel to the contour much like a series of small rice paddies on a hillside. A few sites containing aapamire are known from the Oregon Cascades and these may be the southernmost occurrence of this formation in North America. Woody vegetation is confined to hummocks. Almost 50 different species are reported from the herb layer. The primary species in the moss layer is *Sphagnum*.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Shrub layer</b>				
<i>Vaccinium uliginosum</i>	23	5	0	60
<i>Salix commutata</i>	23	1	0	6
<b>Herb layer</b>				
<i>Sanguisorba officinalis</i>	100	48	10	85
<i>Carex aquatilis</i> var. <i>dives</i>	77	20	0	70
<i>Caltha leptosepala</i> ssp. <i>howellii</i>	38	8	0	70
<i>Hypericum anagalloides</i>	31	2	0	25
<i>Parnassia fimbriata</i>	31	2	0	10
<i>Trientalis europaea</i> ssp. <i>arctica</i>	31	1	0	10
<i>Tofieldia glutinosa</i>	31	1	0	7
<i>Equisetum arvense</i>	31	Tr	0	1
<i>Platanthera dilatata</i>	31	Tr	0	Tr
<b>Moss layer</b>				
Moss	54	12	0	50

## *Schoenoplectus acutus*

Hardstem bulrush

Plots sampled: 7 (4  
macro, 3 micro)



### Environment:

Elevation (ft): ave. 26 (5-  
100)

Slope (deg): 0

Landform position:

floodplains, basins

Hydrology: seasonally

flooded to perennially flooded

Soils: mostly organic, some loam

Species	Const	Percent cover		
		Ave	Min	Max
<b>Shrub layer</b>				
<i>Vaccinium uliginosum</i>	14	Tr	0	1
<i>Spiraea douglasii</i>	14	Tr	0	1
<b>Herb layer</b>				
<i>Schoenoplectus acutus</i>	100	43	20	80
<i>Athyrium filix-femina</i>	29	4	0	25
<i>Iris pseudacorus</i>	29	4	0	15
<i>Oenanthe sarmentosa</i>	29	1	0	5
<i>Aster subspicatus</i>	29	1	0	4
<i>Lotus corniculatus</i>	29	Tr	0	1

**Vegetation and ecology:** Habitat is emergent marsh around the margins of lakes and ponds. *Schoenoplectus acutus* typically forms extensive, nearly monotypic stands that may tolerate summer drying as long as the substrate remains damp. Total herb cover is lowest in permanently-flooded stands. *Potamogeton natans* and *Brasenia schreberi* are frequent associates in flooded sites, but much of the remaining area is open water or litter between stems of *Schoenoplectus*. Other herbs in slightly drier sites may include *Typha latifolia*, and *Scirpus microcarpus*. The ground is typically covered with dense litter from the previous year's stand of *Schoenoplectus* unless the site has been burned. Although *Schoenoplectus acutus* thrives under perennially-flooded conditions, a deepening of water levels caused by new beaver dams or water control structures can completely kill extensive stands. This association appears to be most common along the coast and east of the Cascade Range, particularly in alkaline areas, while the *Schoenoplectus tabernaemontani* association appears to be more common in the interior valleys of western Oregon. This difference in distribution, if real, has been obscured to some extent in the Willamette Valley by plantings of *Schoenoplectus acutus* for wildlife habitat. Mixed stands are frequent in the Columbia River estuary. No plot data were available for the *Schoenoplectus tabernaemontani* association, but structure and associated species are quite similar.

## *Scirpus microcarpus*

Small-fruited bulrush

Plots sampled: 20 (15 macro, 5 micro)



### Environment:

Elevation (ft): ave. 2732  
(560-4100)

Slope (deg): ave. 2 (0-25)

Landform position:

slopes, basins

Hydrology: seasonally  
moist to perennially  
saturated

Soils: organic, loam, sand

### Vegetation and ecology:

Habitat is marshes, fens,  
or springs. Stands are  
highly variable and a  
number of different phases  
could be segregated with  
further study. Stands are

usually monotypic and may reach heights of 3 feet. Trees are peripheral to the wetlands and can be both deciduous or conifers. Eight shrubs are reported from these stands but all have negligible constancy and cover. Almost 80 species are reported from the herb layer, presumably because of the great variety of habitats and elevations in which the association occurs. *Scirpus microcarpus* is the primary species, with average cover of 75 percent and ranging from 15-98 percent. Most other species have much lower constancy and cover. Associated species with significant patches include *Lysichiton americanus*, *Athyrium filix-femina*, *Oenanthe sarmentosa*, *Stachys ajugoides* var. *rigida*, *Carex aquatilis* var. *dives*, and *Senecio triangularis*.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Shrub layer</b>				
<i>Alnus incana</i>	4	Tr	0	5
<i>Rosa pisocarpa</i>	4	Tr	0	2
<i>Salix</i>	4	Tr	0	1
<i>Salix commutata</i>	4	Tr	0	Tr
<i>Rubus laciniatus</i>	4	Tr	0	Tr
<i>Spiraea douglasii</i>	4	Tr	0	Tr
<i>Rubus spectabilis</i>	4	Tr	0	Tr
<i>Rubus ursinus</i>	4	Tr	0	Tr
<b>Herb layer</b>				
<i>Scirpus microcarpus</i>	100	75	15	98
<i>Glyceria striata</i>	39	2	0	15
<i>Mimulus guttatus</i>	35	1	0	10
<i>Lysichiton americanus</i>	30	4	0	35
<i>Athyrium filix-femina</i>	30	3	0	60
<i>Oenanthe sarmentosa</i>	26	6	0	80
<i>Stachys ajugoides</i> var. <i>rigida</i>	26	6	0	40
<b>Moss layer</b>				
Moss	30	4	0	49

## *Senecio triangularis*

Arrowleaf groundsel

Plots sampled: 21 (16 macro, 5 micro)



### Environment:

Elevation (ft): ave. 3805, range 3120-5150

Slope (deg): ave. 17, range 0-70

Landform position: floodplains, basins, slopes

Hydrology: seasonally moist to perennially saturated

Soils: organic, loam, or rocky

### Vegetation and

**ecology:** Habitat is hummocks or "tree islands" in peatlands, forest ecotone at edges of wetlands, or in openings on seepy slopes. It is best described as forest ecotone with at least seasonally wet soil. Floristically it is extremely diverse because it contains elements of both wetlands and uplands, and it is difficult to segregate into types that are meaningful. Twelve different species of trees are present, 20 species of shrubs, and an astonishing 130 species of herbs, but most of these occur at very low constancy and cover. Associated indicator species include *Aconitum columbianum*, *Veratrum viride*, *Veratrum californicum*, and *Rudbeckia occidentalis*. Other species with significant patches include *Trautvetteria caroliniensis*, *Trifolium longipes*, *Deschampsia caespitosa*, *Solidago canadensis*, and *Elymus glaucus*.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Picea engelmannii</i>	24	8	0	100
<i>Abies lasiocarpa</i>	10	1	0	15
<b>Reproducing trees</b>				
<i>Picea engelmannii</i>	33	1	0	7
<i>Tsuga heterophylla</i>	24	Tr	0	4
<b>Shrub layer</b>				
<i>Vaccinium ovalifolium</i>	29	1	0	7
<i>Alnus incana</i>	24	1	0	15
<b>Herb layer</b>				
<i>Senecio triangularis</i>	90	13	0	35
<i>Aconitum columbianum</i>	52	4	0	25
<i>Platanthera stricta</i>	48	Tr	0	3
<i>Trautvetteria caroliniensis</i>	43	6	0	60
<i>Stachys ciliata</i>	43	1	0	6
<i>Valeriana sitchensis</i>	43	Tr	0	3
<i>Tiarella trifoliata</i> var. <i>unifoliata</i>	38	Tr	0	2

## *Sparganium angustifolium*

Simplestem bur-reed

Plots sampled: 11 (6 macro, 5 micro)



### Environment:

Elevation (ft): ave. 1810  
(100-2800)t

Slope (deg): 0

Landform position:  
floodplains, basins

Hydrology: seasonally  
flooded to perennially  
flooded

Soils: organic or loam

Species	Const	Percent cover		
		Ave	Min	Max
<b>Shrub layer</b>				
<i>Spiraea douglasii</i>	9	1	0	12
<b>Herb layer</b>				
<i>Sparganium angustifolium</i>	100	60	20	80
<i>Callitriche heterophylla</i>	55	6	0	50
<i>Veronica scutellata</i>	45	1	0	4
<i>Oenanthe sarmentosa</i>	18	4	0	40
<i>Juncus effusus</i>	18	1	0	12
<i>Callitriche</i>	18	1	0	5
<i>Torreyochloa pallida</i> var. <i>pauciflora</i>	18	Tr	0	2

**Vegetation and ecology:** Habitat is seasonally or perennially-flooded shallow pools, ponds, and freshwater tidal flats. *Sparganium angustifolium* forms nearly monotypic stands and can fill entire basins. It tolerates draw-down of water levels in summer but the substrate must remain moist. Trees are absent from these plots and shrubs are scarce and usually peripheral to stands sampled. *Salix hookeriana* and *Spiraea douglasii* are typical associates. About 25 species are reported from the herb layer, but most occur only in trace amounts. *Sparganium angustifolium* is the primary species with average cover of 60 percent and ranging from 20-80 percent. *Callitriche heterophylla* is present in about half the plots, with cover up to 50 percent. Other species with significant patches include *Oenanthe sarmentosa*, *Potamogeton natans*, *Juncus effusus*, and *Carex obnupta*. Most of the area between plants is open water or bare mud. Growth is clonal, the plants spreading by rhizomes. These sites are favored feeding areas for beaver.

## ***Sparganium eurycarpum***

Broadfruit bur-reed

Plots sampled: 5  
(micro)



### **Environment:**

Elevation (ft): 20-200

Slope (deg): 0

Landform position: floodplains, basins

Hydrology: seasonally to perennially flooded

Soils: organic, loam

<b>Species</b>	<b>Const</b>	<b>Percent cover</b>		
		<b>Ave</b>	<b>Min</b>	<b>Max</b>
<b>Herb layer</b>				
<i>Sparganium eurycarpum</i>	100	34	20	45
<i>Cicuta douglasii</i>	20	2	0	10
<b>Unvegetated</b>				
Litter	100	45	15	70
Water	80	19	0	35

**Vegetation and ecology:** Habitat is shallow lakes, ponds, and sloughs. *Sparganium eurycarpum* forms nearly monotypic emergent stands with most of the space between plants occupied by litter or open water. *Sparganium* has an average cover of 34 percent and ranges from 20-45 percent cover. No other vegetation is reported here except for *Cicuta douglasii*, but almost any common emergent species could be present in small amounts. The association appears to be limited to low elevations.



**Torreyochloa pallida var. pauciflora**

Pale false mannagrass

Plots sampled: 6 (macro)



**Environment:**

Elevation (ft): ave. 1848  
(880-3825)

Slope (deg): ave. 0 (0-2)

Landform position:  
floodplains, basins,  
benches

Hydrology: perennially  
moist to flooded

Soils: mostly loam, some  
sand or organic

**Vegetation and ecology:**

Habitat is sodden edges  
of fens, meadows, and  
marshes, including  
beaver marshes.

*Torreyochloa pallida* var.  
*pauciflora* forms sparse to  
dense stands of low to  
moderate diversity. Most  
trees and shrubs are

peripheral but *Alnus rubra* may be present in small amounts. More than 35 species are reported from the herb layer, but most occur at very low constancy and cover. Most of the surface between plants is mud or open water.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Reproducing trees</b>				
<i>Alnus rubra</i>	17	Tr	0	Tr
<b>Shrub layer</b>				
<i>Salix sitchensis</i>	33	Tr	0	Tr
<i>Rubus ursinus</i>	17	Tr	0	Tr
<b>Herb layer</b>				
<i>Torreyochloa pallida</i> var. <i>pauciflora</i>	100	56	30	80
<i>Veronica americana</i>	67	1	0	3
<i>Scirpus microcarpus</i>	67	1	0	1
<i>Juncus effusus</i>	50	9	0	30
<i>Typha latifolia</i>	50	5	0	25
<i>Oenanthe sarmentosa</i>	50	1	0	5
<i>Lysichiton americanus</i>	33	9	0	50
<i>Callitriche</i>	33	2	0	6
<i>Sparganium angustifolium</i>	33	2	0	6
<i>Carex obnupta</i>	33	1	0	3
<i>Myosotis laxa</i>	33	Tr	0	2
<i>Phalaris arundinacea</i>	33	Tr	0	Tr
<i>Stellaria calycantha</i>	33	Tr	0	Tr
<b>Moss layer</b>				
Moss	17	Tr	0	Tr

***Trichophorum caespitosum***

Tufted clubrush

Plots sampled: 9 (macro)



**Environment:**

Elevation (ft): ave. 3442  
(2650-4240)

Slope (deg): ave. 5 (0-15)

Landform position:  
floodplains, basins

Hydrology: perennially  
moist to perennially  
saturated

Soils: mostly organic,  
some loam

**Vegetation and ecology:**

Habitat is montane fens, forming wet lawns on flats or gentle to moderate slopes below springs and seeps. *Trichophorum caespitosum* forms conspicuous tussocks. Trees and shrubs have scanty cover and are primarily restricted to hummocks or "tree islands" within a matrix of wet lawn, or they are peripheral to the wetland. Over 40 species are reported from the herb layer, most of them typical of wet lawns in fens. *Trichophorum caespitosum* is uncommon in Oregon and occurrences of this association are limited to the northern part of the Cascade Range.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Mature trees</b>				
<i>Pinus monticola</i>	11	Tr	0	2
<b>Reproducing trees</b>				
<i>Thuja plicata</i>	33	3	0	22
<b>Shrub layer</b>				
<i>Vaccinium uliginosum</i>	67	3	0	7
<i>Gaultheria ovatifolia</i>	33	Tr	0	1
<b>Herb layer</b>				
<i>Trichophorum caespitosum</i>	100	44	20	75
<i>Tofieldia glutinosa</i>	100	5	Tr	15
<i>Hypericum anagalloides</i>	89	29	0	65
<i>Caltha leptosepala</i> ssp. <i>howellii</i>	89	9	0	20
<i>Sanguisorba officinalis</i>	67	11	0	25
<i>Eriophorum gracile</i>	67	4	0	30
<i>Dodecatheon jeffreyi</i>	56	3	0	15
<i>Drosera rotundifolia</i>	56	2	0	6
<i>Agrostis thurberiana</i>	56	1	0	7
<i>Parnassia fimbriata</i>	56	1	0	5
<i>Gentiana sceptrum</i>	56	Tr	0	Tr
<i>Carex aquatilis</i> var. <i>dives</i>	44	7	0	30
<b>Moss layer</b>				
Moss	67	2	0	7

## *Triteleia hyacinthina*

White brodiaea

Plots sampled: 12  
(macro)



### Environment:

Elevation (ft): 500

Slope (deg): 0

Landform position:  
floodplains

Hydrology: seasonally  
moist

Soils: loam

Species	Const	Percent cover		
		Ave	Min	Max
<b>Herb layer</b>				
<i>Triteleia hyacinthina</i>	100	62	35	95
<i>Hypochaeris radicata</i>	92	12	0	40
<i>Camassia quamash</i>	75	11	0	30
<i>Danthonia californica</i>	50	1	0	3
<i>Prunella vulgaris</i>	33	8	0	45
<i>Lotus pinnatus</i>	33	1	0	8
<i>Centaurium erythraea</i>	33	Tr	0	2
<i>Hypericum anagalloides</i>	25	Tr	0	1
<i>Eleocharis acicularis</i>	25	Tr	0	1
<b>Moss layer</b>				
Moss	58	15	0	60

**Vegetation and ecology:** Habitat is seasonally wet prairie on shallow soil over basalt bedrock, with a perched water table. Woody species are absent from these plots but may include *Quercus garryana*, *Symphoricarpos albus*, or *Spiraea douglasii*. A shallow mantle of soil supports a mix of dry upland prairie species (e.g., *Poa scabrella*, *Festuca roemerii*, *Danthonia californica*, *Lomatium utriculatum*, *Plectritis congesta*) on convex surfaces and wet prairie species in concave surfaces. The concave surfaces pool water in winter and spring and support at least 25 herbaceous species recorded in these plots, about one-third of which are exotics. The moss layer may contain *Polytrichum piliferum* and *Racomitrium ericoides* that indicate severe drying later in the summer. Conspicuous sheets of algae turn white when they dry and delineate areas of seasonally pooled water, a good secondary indicator of hydric conditions in sites that don't otherwise meet wetland criteria because they lack hydric soils. A challenging aspect of this association is that most of the *Triteleia* is sterile, showing only short terete shoots, and because of this some researchers have called this the "unknown *Brodiaea* association." Stands intergrade with the *Camassia quamash* association where deeper pockets of soil occur.

## *Typha latifolia*

Broadleaf cattail

Plots sampled: 4 (macro)



### Environment:

Elevation (ft): ave. 1299  
(500-1950)

Slope (deg): 0-1

Landform position:

floodplains, basins,  
flats

Hydrology: seasonally  
moist to perennially  
saturated

Soils: loam

### Vegetation and ecology:

Habitat is shallow  
depressions, marshes,  
edges of lakes, and  
freshwater tidal flats.

This is a common

association but is overlooked and undersampled. The general aspect is usually a monotype of *Typha latifolia*, but closer inspection shows some differentiation based on patches of other vegetation. The only woody species recorded in these four plots are *Frangula purshiana* and *Salix hookeriana* with 25 percent constancy but with only trace cover. About twenty species are recorded from the herb layer. Some exotics are evident and indicate low elevation and proximity to settlement. Although this association is native, it appears to respond positively to eutrophic conditions caused by agricultural and urban runoff. Changes in surface and groundwater flows associated with road construction also appear to have a strong influence on this association.

Species	Const	Percent cover		
		Ave	Min	Max
<b>Reproducing trees</b>				
<i>Frangula purshiana</i>	25	Tr	0	Tr
<b>Shrub layer</b>				
<i>Salix hookeriana</i>	25	1	0	2
<b>Herb layer</b>				
<i>Typha latifolia</i>	100	54	40	65
<i>Myosotis laxa</i>	25	9	0	35
<i>Mentha</i>	25	8	0	30
<i>Scirpus microcarpus</i>	25	8	0	30
<i>Equisetum arvense</i>	25	3	0	13
<i>Carex stipata</i>	25	3	0	10
<i>Cirsium arvense</i>	25	2	0	9
<i>Glyceria striata</i>	25	2	0	7
<i>Stachys ciliata</i>	25	1	0	5
<i>Veronica scutellata</i>	25	1	0	5
<i>Cicuta douglasii</i>	25	1	0	3
<i>Elymus glaucus</i>	25	1	0	2
<b>Moss layer</b>				
Moss	25	24	0	95

## ***Utricularia macrorhiza***

Common bladderwort

Plots sampled: 0



### **Environment:**

Elevation (ft): 10-2000

Slope (deg): 0

Landform position: floodplains, basins

Hydrology: submerged aquatic

Soils: organic

**Vegetation and ecology:** Habitat is lakes and ponds, usually with perennial water. This is an unrooted aquatic bed association that is widespread in western Oregon but it has not been sampled and little information is available. *Utricularia macrorhiza* is insectivorous and characterized by its large bladders blackened with the remains of aquatic invertebrates. It forms sparse to dense masses of nearly monotypic submerged vegetation with cover ranging from 40-95 percent. It provides important habitat for aquatic invertebrates and fish. It is the most common *Utricularia* at lower elevations and the only one to form extensive stands, but it is not as common as some other aquatic bed associations. It is not clear if this association favors eutrophic conditions or may be enhanced by enriched runoff in agricultural or urban landscapes.

#### IV. NONVASCULAR ASSOCIATIONS

##### *Fontinalis antipyretica*

Fountain moss

Plots sampled: 1 (macro)



Species	Const	Percent cover		
		Ave	Min	Max
<b>Moss layer</b>				
Moss	100	10	10	10

##### **Environment:**

Elevation (ft): 3800

Slope (deg): 0

Landform position: floodplains, basins, benches

Hydrology: seasonally flooded to perennially flooded

Soils: organic or loam

**Vegetation and ecology:** Habitat is seasonally or perennially flooded pools, ponds, and sloughs. *Fontinalis antipyretica* usually forms extensive submerged beds that tolerate both perennial submergence or seasonal exposure. Beds may be 2-3 feet thick when submerged, and dry down to a 6-inch thick turf if the pool loses all its water in summer. Although this association is represented by only one plot and is obviously undersampled, it is widespread in the region. The plot data here represent a perennially flooded pool with a cover of only 10 percent, but covers of 80-100 are the norm. There is no evidence that this association increases under eutrophic conditions, and only a few stands have been observed that would approach these conditions. Most occur in clean, cold, slow or non-flowing water. Pearsons (1989) and Markle et al. (1991) found that this association provides important cover for the federally-listed Oregon chub. *Fontinalis neomexicana* is a related species that occurs in cold flowing water in both streams and fen or flush rivulets.

## ***Polytrichum commune***

Haircap moss

Plots sampled: 5 (micro)



### **Environment:**

Elevation (ft): 5410

Slope (deg): 0

Landform position: basins

Hydrology: perennially to  
seasonally moist

Soils: organic

Species	Const	Percent cover		
		Ave	Min	Max
<b>Herb layer</b>				
<i>Carex utriculata</i>	20	Tr	0	1
<b>Moss layer</b>				
Moss	100	64	5	100
<b>Unvegetated</b>				
Litter	100	21	1	95
Bare ground	20	17	0	85

**Vegetation and ecology:** This association is most common in seasonally-flooded depressions in the *Tsuga mertensiana* zone. Stands may occur in small depressions among trees, but most occur in larger seasonal ponds with no forest canopy. Heavy snow accumulations persist longer into the growing season and together with subsequent meltwater suppress most other vegetation. Stands are usually monotypic mats composed entirely of the moss *Polytrichum commune* up to 6 inches thick. Where slopes around depressions are steep enough, *Polytrichum* occupies a seasonally-flooded zone between upland and late-season ponded water often occupied by *Carex utriculata*, *Nuphar lutea* ssp. *polysepala*, or *Glyceria*. *Deschampsia caespitosa* is often present at the upper margin of this zone. In shallow depressions with less perceptible slopes, *Polytrichum* may completely carpet the bottom of the depression, forming extensive lawns. Thick mats act as insulating blankets and retain moisture throughout the growing season. The 1996 Torrey Lake fire in Lane County scorched or killed 60-99 percent of *Polytrichum* mats in some transects, but regeneration from uninjured tissue below the surface was evident within two years and is ongoing. Dead stands were replaced by *Glyceria* or *Calamagrostis*.

**Appendix I: Species list**  
**Alphabetized by scientific name**

Scientific name	Common name	Wetland	Origin	PLANTS code
<i>Abies amabilis</i>	Silver fir	FACU	native	ABAM
<i>Abies grandis</i>	Grand fir	FACU	native	ABGR
<i>Abies lasiocarpa</i>	Subalpine fir	FACU	native	ABLA
<i>Abies procera</i>	Noble fir	UPL	native	ABPR
<i>Acer circinatum</i>	Vine maple	FAC-	native	ACCI
<i>Acer glabrum</i> var. <i>douglasii</i>	Rocky Mountain maple	FAC	native	ACGLD4
<i>Acer macrophyllum</i>	Big leaf maple	FACU	native	ACMA3
<i>Achillea millefolium</i>	Yarrow	FACU	native	ACMI2
<i>Achlys triphylla</i>	Vanilla leaf	UPL	native	ACTR
<i>Aconitum columbianum</i>	Columbian monkshood	FACW	native	ACCO4
<i>Aconitum columbianum</i> ssp. <i>columbianum</i>	Columbian monkshood	FACW	native	ACCOC2
<i>Aconitum columbianum</i> ssp. <i>viviparum</i>	Columbian monkshood	FACW	native	ACCOV2
<i>Actaea rubra</i>	Red baneberry	UPL	native	ACRU2
<i>Adenocaulon bicolor</i>	Pathfinder	UPL	native	ADBI
<i>Adiantum pedatum</i>	Maidenhair fern	FAC	native	ADPE
<i>Ageratina occidentalis</i>	Western snakeroot	UPL	native	AGOC2
<i>Agoseris elata</i>	Tall agoseris	FAC	native	AGEL
<i>Agrostis capillaris</i>	<i>Colonial bentgrass</i>	FACU	exotic	AGCA5
<i>Agrostis exarata</i>	Spike bentgrass	FACW	native	AGEX
<i>Agrostis humilis</i>	Alpine bentgrass	FACW	native	AGHU
<i>Agrostis oregonensis</i>	Oregon bentgrass	FAC	native	AGOR
<i>Agrostis pallens</i>	Dune bentgrass	FACU	native	AGPA8
<i>Agrostis stolonifera</i>	<i>Creeping bentgrass</i>	FAC+	exotic	AGST2
<i>Alnus incana</i>	Mountain alder	FACW	native	ALIN2
<i>Alnus rubra</i>	Red alder	FAC	native	ALRU2
<i>Alnus viridis</i>	Sitka alder	FACW	native	ALV15
<i>Amaranthus</i>	Pigweed species	UNK	unknown	AMARA
<i>Amelanchier alnifolia</i>	Saskatoon serviceberry	FACU	native	AMAL2
<i>Anaphalis margaritacea</i>	Pearly everlasting	UPL	native	ANMA
<i>Anemone deltoidea</i>	Three-leaved anemone	UPL	native	ANDE3
<i>Anemone lyallii</i>	Lyall's anemone	UPL	native	ANLY
<i>Anemone oregana</i>	Blue windflower	FACU	native	ANOR
<i>Angelica arguta</i>	Sharptooth angelica	FACW	native	ANAR3



Scientific name	Common name	Wetland	Origin	PLANTS code
<i>Angelica genuflexa</i>	Kneeling angelica	FACW	native	ANGE2
<i>Antennaria argentea</i>	Silver pussytoes	FACU	native	ANAR5
<i>Anthoxanthum odoratum</i>	<i>Sweet vernalgrass</i>	FACU	exotic	ANOD
<i>Aquilegia formosa</i>	Sitka columbine	FAC	native	AQFO
<i>Aralia californica</i>	California spikenard	FAC+	native	ARCA2
<i>Arenaria</i>	Sandwort species	UNK	unknown	ARENA
<i>Arnica amplexicaulis</i>	Streambank arnica	FACW	native	ARAM2
<i>Arnica latifolia</i>	Broadleaf arnica	FAC-	native	ARLA8
<i>Artemisia douglasiana</i>	Douglas' sagewort	FACW	native	ARDO3
<i>Aruncus dioicus</i>	Nettle	FACU	native	ARDI8
<i>Asarum caudatum</i>	Wild ginger	FACU	native	ASCA2
<i>Aster alpigenus</i>	Alpine aster	FAC	native	ASAL2
<i>Aster modestus</i>	Great northern aster	FACW	native	ASMO3
<i>Athyrium filix-femina</i>	Lady fern	FAC+	native	ATFI
<i>Berberis aquifolium</i>	Tall Oregon grape	UPL	native	BEAQ
<i>Berberis nervosa</i>	Dwarf Oregon grape	UPL	native	BENE2
<i>Blechnum spicant</i>	Deer fern	FAC+	native	BLSP
<i>Borago</i>	Borage species	UNK	unknown	BORAG
<i>Botrychium multifidum</i>	Leathery grapefern	FAC	native	BOMU
<i>Boykinia major</i>	Large boykinia	FACW	native	BOMA3
<i>Boykinia occidentalis</i>	Coastal boykinia	FACW	native	BOOC2
<i>Bromus inermis</i>	<i>Smooth brome</i>	FAC	exotic	BRIN2
<i>Bromus pacificus</i>	Pacific brome	UPL	native	BRPA3
<i>Bromus rigidus</i>	<i>Ripgut brome</i>	UPL	exotic	BRDI3
<i>Bromus sitchensis</i>	Alaska brome	FACU	native	BRSI
<i>Bromus vulgaris</i>	Colombian brome	UPL	native	BRVU
<i>Calamagrostis canadensis</i>	Bluejoint	FACW	native	CACA4
<i>Calocedrus decurrens</i>	Incense cedar	UPL	native	CADE27
<i>Caltha leptosepala</i>	Broad-leaved marsh-marigold	OBL	native	CALE4
<i>Camassia quamash</i>	Common camas	FACW	native	CAQU2
<i>Campanula scouleri</i>	Scouler's bluebell	UPL	native	CASC7
<i>Cardamine angulata</i>	Angled bittercress	FACW	native	CAAN5
<i>Cardamine breweri</i>	Brewer's bittercress	FACW	native	CABR6
<i>Cardamine cordifolia</i>	Heartleaf bittercress	FACW	native	CACO6
<i>Cardamine occidentalis</i>	Western bittercress	FACW	native	CAOC
<i>Cardamine oligosperma</i>	Few-sided bittercress	FAC	native	CAOL
<i>Carex aquatilis</i>	Water sedge	OBL	native	CAAQ
<i>Carex aquatilis</i> var. <i>dives</i>	Sitka sedge	OBL	native	CAAQD

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<i>Carex athrostachya</i>	Slenderbeak sedge	FACW	native	CAAT3
<i>Carex deweyana</i>	Dewey's sedge	FACU	native	CADE9
<i>Carex echinata</i>	Prickly sedge	FACW	native	CAEC
<i>Carex hendersonii</i>	Henderson's sedge	FAC	native	CAHE7
<i>Carex integra</i>	Smoothbeak sedge	FACU	native	CAIN10
<i>Carex interrupta</i>	Greenfruit sedge	OBL	native	CAIN17
<i>Carex laeviculmis</i>	Smoothstem sedge	FACW	native	CALA13
<i>Carex lenticularis</i>	Tufted sedge	FACW	native	CALE8
<i>Carex luzulina</i>	Woodrush sedge	OBL	native	CALU7
<i>Carex mertensii</i>	Merten's sedge	FAC	native	CAME6
<i>Carex multcostata</i>	Manyrib sedge	FACU	native	CAMU6
<i>Carex obnupta</i>	Slough sedge	OBL	native	CAOB3
<i>Carex pachystachya</i>	Thick-headed sedge	FAC	native	CAPA14
<i>Carex saxatilis</i>	Russet sedge	FACW	native	CASA10
<i>Carex spectabilis</i>	Showy sedge	FACW	native	CASP5
<i>Castilleja miniata</i>	Common red paintbrush	FAC	native	CAMI12
<i>Ceanothus velutinus</i>	Snowbrush ceanothus	UPL	native	CEVE
<i>Cerastium fontanum</i> ssp. <i>vulgare</i>	<i>Big chickweed</i>	FACU	exotic	CEFOV2
<i>Cerastium glomeratum</i>	<i>Sticky chickweed</i>	UPL	exotic	CEGL2
<i>Chamaecyparis nootkatensis</i>	Alaska yellow-cedar	FAC	native	CHNO
<i>Chamerion angustifolium</i> var. <i>canescens</i>	Fireweed	FACU	native	EPAN2
<i>Chimaphila umbellata</i>	Prince's pine	UPL	native	CHUM
<i>Chrysolepis chrysophylla</i>	Chinquapin	UPL	native	CHCH7
<i>Chrysosplenium glechomifolium</i>	Water-carpet	OBL	native	CHGL5
<i>Cicuta douglasii</i>	Douglas' water-hemlock	OBL	native	CIDO
<i>Cimicifuga laciniata</i>	Mount Hood bugbane	FACW	native	CILA
<i>Cinna latifolia</i>	Wood reedgrass	FACW	native	CILA2
<i>Circaea alpina</i>	Enchanter's-nightshade	FAC	native	CIAL
<i>Cirsium arvense</i>	<i>Canada thistle</i>	FAC-	exotic	CIAR4
<i>Cirsium vulgare</i>	<i>Bull thistle</i>	FACU	exotic	CIVU
<i>Claytonia cordifolia</i>	Heart-leaved springbeauty	FACW	native	CLCO3
<i>Claytonia perfoliata</i>	Miner's lettuce	FAC	native	CLPE
<i>Claytonia sibirica</i>	Siberian miner's lettuce	FAC	native	CLSI2
<i>Clintonia uniflora</i>	Queencup beadlily	UPL	native	CLUN2

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<i>Collinsia parviflora</i>	Small-flowered blue-eyed Mary	UPL	native	COPA3
<i>Collomia heterophylla</i>	Varied leaf collomia	FACU	native	COHE2
<i>Coptis laciniata</i>	Gold thread	FAC	native	COLA3
<i>Corallorhiza maculata</i>	Western coral root	UPL	native	COMA4
<i>Cornus nuttallii</i>	Pacific dogwood	UPL	native	CONU4
<i>Cornus sericea</i>	Red osier dogwood	FACW	native	COSE16
<i>Cornus unalashkensis</i>	Dogwood bunchberry	FAC-	native	COUN
<i>Corydalis aquae-gelidae</i>	Cold-water corydalis	OBL	native	COAQ
<i>Corydalis scouleri</i>	Scouler's corydalis	FAC+	native	COSC4
<i>Corylus cornuta</i>	California hazel	FACU	native	COCO6
<i>Crataegus douglasii</i>	Black hawthorn	FAC	native	CRDO2
<i>Cynoglossum</i>	Hound's-tongue species	UNK	unknown	CYNOG
<i>Cytisus scoparius</i>	<i>Scotch broom</i>	UPL	exotic	CYSC4
<i>Dactylis glomerata</i>	<i>Orchard grass</i>	FACU	exotic	DAGL
<i>Delphinium glareosum</i>	Olympic larkspur	UPL	native	DEGL
<i>Delphinium nuttallianum</i>	Two-lobe larkspur	FAC	native	DENU2
<i>Delphinium occidentale</i>	<i>Western larkspur</i>	FACU	exotic	DEOC
<i>Delphinium trolliifolium</i>	Trollius-leaved larkspur	UPL	native	DETR2
<i>Deschampsia cespitosa</i>	Tufted hairgrass	FACW	native	DECE
<i>Deschampsia elongata</i>	Slender hairgrass	FACW	native	DEEL
<i>Dicentra formosa</i>	Pacific bleedingheart	UPL	native	DIFO
<i>Digitalis purpurea</i>	<i>Common foxglove</i>	FACU	exotic	DIPU
<i>Distichlis spicata</i>	Seashore saltgrass	FACW	native	DISP
<i>Dodecatheon dentatum</i>	Dentate shooting star	FACW	native	DODE
<i>Dryopteris carthusiana</i>	Wood fern	FAC+	native	DRCA11
<i>Eleocharis palustris</i>	Creeping spike-rush	OBL	native	ELPA3
<i>Elymus glaucus</i>	Blue wildrye	FACU	native	ELGL
<i>Enemion hallii</i>	Willamette false rue anemone	UPL	native	ENHA
<i>Epilobium anagallidifolium</i>	Alpine willowherb	FACW	native	EPAN4
<i>Epilobium ciliatum</i> ssp. <i>glandulosum</i>	Purple-leaved willowherb	FACW	native	EPCIG
<i>Epilobium ciliatum</i> ssp. <i>watsonii</i>	Purple-leaved willowherb	FACW	native	EPCIW
<i>Epilobium glaberrimum</i>	Smooth willowherb	FACW	native	EPGL
<i>Epilobium luteum</i>	Yellow willowherb	FACW	native	EPLU
<i>Epilobium minutum</i>	Small-flowered willowherb	UPL	native	EPMI
<i>Equisetum arvense</i>	Common horsetail	FAC	native	EQAR

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Equisetum hyemale	Scouring-rush	FACW	native	EQHY
Equisetum telmateia	Giant horsetail	FACW	native	EQTE
Erechtites minima	<i>Coastal burnweed</i>	FACU	exotic	ERM16
Erigeron peregrinus	Subalpine daisy	UPL	native	ERPE3
Festuca idahoensis	Idaho fescue	FACU	native	FEID
Festuca occidentalis	Western fescue	UPL	native	FEOC
Festuca subulata	Bearded fescue	FACU	native	FESU
Festuca trachyphylla	<i>Krajina hard fescue</i>	UPL	exotic	FEOV
Fragaria vesca	Woodland strawberry	FACU	native	FRVE
Fragaria virginiana	Wild strawberry	FACU	native	FRVI
Fraxinus latifolia	Oregon ash	FACW	native	FRLA
Fritillaria	Fritillaria species	UNK	native	FRIT1
Galium aparine	Cleaver	FACU	native	GAAP2
Galium oreganum	Oregon bedstraw	FACU	native	GAOR
Galium trifidum	Small bedstraw	FACW	native	GATR2
Galium triflorum	Sweetscented bedstraw	FACU	native	GATR3
Gaultheria ovatifolia	Oregon wintergreen	FAC	native	GAOV2
Gaultheria shallon	Salal	FACU	native	GASH
Geranium columbinum	<i>Longstalk cranesbill</i>	UPL	exotic	GECO
Geum macrophyllum	Large-leaved avens	FAC+	native	GEMA4
Glechoma hederacea	<i>Ground-ivy</i>	FACU	exotic	GLHE2
Glyceria grandis	Reed mannagrass	OBL	native	GLGR
Glyceria striata	Tall mannagrass	FACW	native	GLST
Goodyera oblongifolia	Rattlesnake plantain	FACU	native	GOOB2
Gymnocarpium dryopteris	Western oakfern	FAC	native	GYDR
Hedera helix	<i>English ivy</i>	UPL	exotic	HEHE
Heracleum lanatum	Cow-parsnip	FAC	native	HELA4
Heuchera cylindrica var. glabella	Beautiful alumroot	UPL	native	HECYG
Heuchera micrantha	Small-flowered alumroot	UPL	native	HEMI7
Hieracium albiflorum	White hawkweed	UPL	native	HIAL2
Hieracium gracile	Slender hawkweed	UPL	native	HIGR
Hieracium scouleri	Woolly-weed	UPL	native	HISC2
Holcus lanatus	<i>Common velvet-grass</i>	FAC	exotic	HOLA
Holodiscus discolor	Oceanspray	UPL	native	HODI
Huperzia chinensis	Star mustard	FACU	native	HUCH
Hydrophyllum tenuipes	Pacific waterleaf	FACU	native	HYTE
Hypericum anagalloides	Bog St. John's-wort	OBL	native	HYAN2

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<i>Hypericum formosum</i>	Western St. John's-wort	FAC	native	HYFO4
<i>Hypericum perforatum</i>	<i>Common St. John's-wort</i>	UPL	exotic	HYPE
<i>Hypochaeris radicata</i>	<i>Hairy cat's ear</i>	FACU	exotic	HYRA3
<i>Impatiens capensis</i>	Jewelweed	FACW	native	IMCA
<i>Juncus arcticus</i> var. <i>balticus</i>	Arctic rush	FACW	native	JUBA
<i>Juncus bufonius</i>	Toad rush	FACW	native	JUBU
<i>Juncus covillei</i>	Coville's rush	FACW	native	JUCO5
<i>Juncus effusus</i>	Common rush	FACW	native	JUEF
<i>Juncus ensifolius</i>	Dagger-leaved rush	FACW	native	JUEN
<i>Juncus parryi</i>	Parry's rush	FAC+	native	JUPA
<i>Juncus patens</i>	Spreading rush	FACW	native	JUPA2
<i>Juncus regelii</i>	Regel's rush	FACW	native	JURE
<i>Lactuca biennis</i>	Tall blue lettuce	FAC	native	LABI
<i>Lactuca muralis</i>	<i>Wall-lettuce</i>	UPL	exotic	MYMU
<i>Lactuca serriola</i>	<i>Prickly lettuce</i>	FACU	exotic	LASE
<i>Lapsana communis</i>	<i>Common nipplewort</i>	UPL	exotic	LACO3
<i>Lathyrus nevadensis</i>	Purple peavine	UPL	native	LANEP
<i>Leucanthemum vulgare</i>	<i>Oxeye daisy</i>	UPL	exotic	LEVU
<i>Ligusticum grayi</i>	Gray's lovage	UPL	native	LIGR
<i>Lilium columbianum</i>	Columbian lily	FAC	native	LICO
<i>Linnaea borealis</i>	Twinflower	FACU	native	LIBO3
<i>Listera borealis</i>	Northern twayblade	FACW	native	LIBO4
<i>Listera caurina</i>	Northwestern twayblade	FACU	native	LICA10
<i>Listera convallarioides</i>	Broad-leaved twayblade	FAC	native	LICO5
<i>Listera cordata</i>	Heartleaf twayblade	FAC	native	LICO6
<i>Lolium arundinaceum</i>	<i>Tall fescue</i>	FAC-	exotic	LOAR10
<i>Lonicera ciliosa</i>	Orange honeysuckle	UPL	native	LOCI3
<i>Lonicera involucrata</i>	Black twinberry	FAC+	native	LOIN5
<i>Lotus corniculatus</i>	<i>Bird's-foot trefoil</i>	FAC	exotic	LOCO6
<i>Lotus crassifolius</i>	Big deervetch	UPL	native	LOCR
<i>Lotus denticulatus</i>	Meadow birds-foot trefoil	UPL	native	LODE
<i>Lupinus</i>	Lupine species	UNK	unknown	LUPIN
<i>Luzula multiflora</i>	<i>Many-flowered wood-rush</i>	FACU	exotic	LUCA2
<i>Luzula multiflora</i> ssp. <i>multiflora</i>	<i>Many-flowered wood-rush</i>	FACU	exotic	LUCAM3
<i>Luzula parviflora</i>	Small-flowered wood-rush	FAC-	native	LUPA4

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<i>Lysichiton americanum</i>	Skunk cabbage	OBL	native	LYAM3
<i>Maianthemum dilatatum</i>	False lily of the valley	FAC	native	MADI
<i>Maianthemum racemosum</i>	False Solomon's-seal	FAC-	native	MARA7
<i>Maianthemum stellatum</i>	Starry false Solomon's-seal	FAC-	native	MAST4
<i>Marah oreganus</i>	Manroot	UPL	native	MAOR3
<i>Melica subulata</i>	Alaska oniongrass	UPL	native	MESU
<i>Mentha spicata</i>	<i>Spearmint</i>	OBL	exotic	MESP3
<i>Mentha Xpiperita</i>	<i>Peppermint</i>	FACW	exotic	MEPI
<i>Menziesia ferruginea</i>	Fool's huckleberry	FACU	native	MEFE
<i>Mertensia ciliata</i>	Ciliate bluebells	FACW	native	MECI3
<i>Mertensia paniculata</i>	Tall bluebells	FACW	native	MEPA
<i>Mimulus alsinoides</i>	Chickweed monkey-flower	OBL	native	MIAL3
<i>Mimulus dentatus</i>	Tooth-leaved monkeyflower	OBL	native	MIDE3
<i>Mimulus guttatus</i>	Yellow monkeyflower	OBL	native	MIGU
<i>Mimulus lewisii</i>	Pink monkeyflower	FACW	native	MILE2
<i>Mimulus moschatus</i>	Musk-flower	FACW	native	MIMO3
<i>Mitella breweri</i>	Brewer's miterwort	FAC	native	MIBR6
<i>Mitella caulescens</i>	Leafy mitrewort	UPL	native	MICA5
<i>Mitella ovalis</i>	Oval-leaved mitrewort	OBL	native	MIOV
<i>Mitella pentandra</i>	Five=stamen mitrewort	FAC	native	MIPE
<i>Moehringia macrophylla</i>	Big-leaved sandwort	UPL	native	MOMA3
<i>Montia linearis</i>	Narrow-leaved Montia	UPL	native	MOLI4
<i>Montia parvifolia</i>	Streambank springbeauty	FACW	native	MOPA2
<i>Muhlenbergia filiformis</i>	Slender muhlenbergia	FACW	native	MUF12
<i>Myosotis laxa</i>	Small-flowered forget-me-not	OBL	native	MYLA
<i>Nemophila parviflora</i>	Smallflower nemophila	UPL	native	NEPA
<i>Nothochelone nemorosa</i>	Woodland penstemon	UPL	native	NONE3
<i>Oemleria cerasiformis</i>	Indian plum	FACU	native	OECE
<i>Oenanthe sarmentosa</i>	Waterparsley	OBL	native	OESA
<i>Oplopanax horridum</i>	Devil's club	FAC+	native	OPHO
<i>Orthilia secunda</i>	Sidebells wintergreen	FACU	native	ORSE
<i>Osmorhiza berteroi</i>	Sweet cecily	FAC	native	OSBE
<i>Oxalis oregana</i>	Oregon oxalis	UPL	native	OXOR
<i>Oxalis suksdorfii</i>	Suksdorf woodsorrel	UPL	native	OXSU
<i>Oxalis trilliifolia</i>	Trillium-leaved sorrel	FAC+	native	OXTR

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<i>Parnassia californica</i>	California grass-of-Parnassus	OBL	native	PACA18
<i>Parnassia fimbriata</i>	Fringed grass-of-Parnassus	OBL	native	PAFI3
<i>Paxistima myrsinites</i>	Oregon boxwood	UPL	native	PAMY
<i>Pedicularis bracteosa</i>	Bracted lousewort	UPL	native	PEBR
<i>Penstemon serrulatus</i>	Coast penstemon	FACU	native	PESE5
<i>Perideridia montana</i>	Common yampah	FAC	native	PEMO7
<i>Petasites frigidus</i>	Coltsfoot	FACW	native	PEFR5
<i>Phacelia hastata</i>	Silverleaf phacelia	UPL	native	PHHA
<i>Phacelia nemoralis</i>	Shade phacelia	UPL	native	PHNE2
<i>Phalaris arundinacea</i>	<i>Reed canarygrass</i>	FACW	exotic	PHAR3
<i>Phlox gracilis</i>	Pink phlox	FACU	native	PHGRG
<i>Physocarpus capitatus</i>	Ninebark	FACW	native	PHCA11
<i>Picea engelmannii</i>	Engelmann's spruce	FAC	native	PIEN
<i>Picea sitchensis</i>	Sitka spruce	FAC	native	PISI
<i>Pinus contorta</i>	Lodgepole pine	FAC	native	PICO
<i>Pinus monticola</i>	Western white pine	FACU	native	PIMO3
<i>Plantago lanceolata</i>	<i>Ribwort</i>	FACU	exotic	PLLA
<i>Platanthera stricta</i>	Slender bog-orchid	FACW	native	PLST4
<i>Pleuropogon refractus</i>	Nodding semaphore grass	OBL	native	PLRE2
<i>Poa laxiflora</i>	Lax-flowered bluegrass	OBL	native	POLA3
<i>Poa palustris</i>	<i>Fowl bluegrass</i>	FAC	exotic	POPA2
<i>Poa trivialis</i>	<i>Rough bluegrass</i>	FACW	exotic	POTR2
<i>Polemonium carneum</i>	Great Jacob's-ladder	OBL	native	POCA4
<i>Polemonium occidentale</i>	Western polemonium	FACW	native	POOC2
<i>Polygonum bistortoides</i>	American bistort	FACW	native	POBI6
<i>Polygonum hydropiper</i>	<i>Marshpepper smartweed</i>	OBL	exotic	POHY
<i>Polygonum punctatum</i>	Dotted smartweed	OBL	native	POPU5
<i>Polygonum sachalinense</i>	<i>Giant knotweed</i>	FACU	exotic	POSA4
<i>Polypodium glycyrrhiza</i>	Licorice fern	OBL	native	POGL8
<i>Polystichum munitum</i>	Sword fern	FACU	native	POMU
<i>Populus trichocarpa</i>	Black cottonwood	FAC	native	POBAT
<i>Prosartes hookeri</i>	Hooker's fairybells	OBL	native	PRHO2
<i>Prosartes smithii</i>	Smith's fairybells	OBL	native	DISM2
<i>Prunella vulgaris</i>	Selfheal	FACU	native	PRVU
<i>Pseudotsuga menziesii</i>	Douglas-fir	FACU	native	PSME
<i>Pteridium aquilinum</i>	Western brackenfern	FACU	native	PTAQ

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<i>Pyrola asarifolia</i>	Pink wintergreen	FACU	native	PYAS
<i>Pyrrocoma uniflora</i>	Plantain goldenweed	FAC+	native	PYUN2
<i>Quercus garryana</i>	Oregon white oak	UPL	native	QUGA4
<i>Ranunculus flammula</i>	Lesser spearwort	OBL	native	RAFL2
<i>Ranunculus muricatus</i>	<i>Spinyfruit buttercup</i>	FACW	exotic	RAMU2
<i>Ranunculus repens</i>	<i>Creeping buttercup</i>	FACW	exotic	RARE3
<i>Ranunculus repens</i> var. <i>repens</i>	<i>Creeping buttercup</i>	FACW	exotic	RARER
<i>Ranunculus uncinatus</i>	Little buttercup	FAC	native	RAUN
<i>Rhamnus purshiana</i>	Cascara buckthorn	FACU	native	FRPU7
<i>Rhododendron albiflorum</i>	Cascade azalea	FACU	native	RHAL2
<i>Rhododendron macrophyllum</i>	Pacific rhododendron	UPL	native	RHMA3
<i>Ribes bracteosum</i>	Stink currant	FAC	native	RIBR
<i>Ribes divaricatum</i>	Wild gooseberry	FAC	native	RIDI
<i>Ribes lacustre</i>	Black gooseberry	FAC+	native	RILA
<i>Ribes sanguineum</i>	Red-flowering currant	UPL	native	RISA
<i>Rosa eglanteria</i>	<i>Sweetbriar rose</i>	FACW	exotic	ROEG
<i>Rosa gymnocarpa</i>	Baldhip rose	FACU	native	ROGY
<i>Rosa nutkana</i>	Nootka rose	FAC-	native	RONU
<i>Rosa pisocarpa</i>	Clustered wild rose	FAC	native	ROPI2
<i>Rubus armeniacus</i>	<i>Himalayan blackberry</i>	FACU	exotic	RUDI2
<i>Rubus lasiococcus</i>	Dwarf bramble	UPL	native	RULA2
<i>Rubus leucodermis</i>	Black raspberry	UPL	native	RULE
<i>Rubus parviflorus</i>	Thimbleberry	FAC-	native	RUPA
<i>Rubus pedatus</i>	Five-leaved bramble	FACU	native	RUPE
<i>Rubus spectabilis</i>	Salmonberry	FAC+	native	RUSP
<i>Rubus ursinus</i>	Trailing blackberry	FACU	native	RUUR
<i>Rudbeckia occidentalis</i>	Western coneflower	FAC-	native	RUOC2
<i>Rumex crispus</i>	<i>Curled dock</i>	FAC+	exotic	RUCR
<i>Rumex obtusifolius</i>	<i>Bitter dock</i>	FAC	exotic	RUOB
<i>Rumex salicifolius</i>	Willow dock	FACW	native	RUSA
<i>Sagina procumbens</i>	<i>Bird-eye pearlwort</i>	FAC	exotic	SAPR
<i>Salix lucida</i>	Pacific willow	FACW	native	SALUL
<i>Salix scouleriana</i>	Scouler's willow	FAC	native	SASC
<i>Salix sitchensis</i>	Sitka willow	FACW	native	SASI2
<i>Sambucus mexicana</i>	Blue elderberry	FACU	native	SAMEC2
<i>Sambucus racemosa</i>	Red elderberry	FACU	native	SARA2
<i>Satureja douglasii</i>	Yerba buena	UPL	native	SADO5
<i>Saxifraga mertensiana</i>	Wood saxifrage	FACW	native	SAME7



Scientific name	Common name	Wetland	Origin	PLANTS code
<i>Saxifraga nuttallii</i>	Nuttall's saxifrage	OBL	native	SANU3
<i>Saxifraga odontoloma</i>	Stream saxifrage	FAC+	native	SAOD2
<i>Saxifraga odontoloma</i>	Stream saxifrage	FACW	native	SAOD2
<i>Saxifraga oregana</i>	Oregon saxifrage	FACW	native	SAOR2
<i>Scirpus congdonii</i>	Congdon's bulrush	FACW	native	SCCO
<i>Scirpus microcarpus</i>	Small-flowered bulrush	OBL	native	SCMI2
<i>Scoliopus hallii</i>	Slink lily	FACU	native	SCHA2
<i>Scrophularia californica</i>	California figwort	FACW	native	SCCA2
<i>Sedum</i>	<i>Sedum</i> species	UNK	unknown	SEDUM
<i>Senecio jacobaea</i>	<i>Tansy ragwort</i>	FACU	exotic	SEJA
<i>Senecio pseud aureus</i>	Streambank groundsel	FACW	native	SEPS2
<i>Senecio triangularis</i>	Arrowleaf groundsel	FACW	native	SETR
<i>Senecio vulgaris</i>	<i>Common groundsel</i>	FACU	exotic	SEVU
<i>Solanum dulcamara</i>	<i>Bittersweet</i>	FAC+	exotic	SODU
<i>Sorbus scopulina</i>	Western mountain-ash	FACU	native	SOSC2
<i>Sorbus sitchensis</i>	Sitka mountain ash	UPL	native	SOSI2
<i>Spiraea douglasii</i>	Douglas spiraea	FACW	native	SPDO
<i>Stachys cooleyae</i>	Cooley's betony	FACW	native	STCO14
<i>Stachys mexicana</i>	Mexican betony	FACW	native	STAJR
<i>Stellaria calycantha</i>	Northern starwort	FACW	native	STCA
<i>Stellaria crispa</i>	Crisp sandwort	FAC+	native	STCR2
<i>Stellaria media</i>	<i>Chickweed</i>	FACU	exotic	STME2
<i>Stellaria umbellata</i>	Umbellate starwort	FACW	native	STUM
<i>Stenanthium occidentale</i>	Mountainbells	FAC	native	STOC
<i>Streptopus amplexifolius</i>	Clasping twistedstalk	FAC-	native	STAM2
<i>Streptopus lanceolatus</i> var. <i>curvipes</i>	Rosy twistedstalk	UPL	native	STLAC
<i>Streptopus streptopoides</i>	Small twistedstalk	UPL	native	STST3
<i>Symphoricarpos albus</i>	Common snowberry	FACU	native	SYAL
<i>Symphoricarpos mollis</i>	Trailing snowberry	FACU	native	SYHE
<i>Synthyris reniformis</i>	Snowqueen	UPL	native	SYRE
<i>Taraxacum officinale</i>	<i>Common dandelion</i>	FACU	exotic	TAOF
<i>Taxus brevifolia</i>	Pacific yew	FACU	native	TABR2
<i>Tellima grandiflora</i>	Fringecup	UPL	native	TEGR2
<i>Thalictrum occidentale</i>	Western meadowrue	FACU	native	THOC
<i>Thalictrum polycarpum</i>	Tall western meadowrue	UPL	native	THFEP2
<i>Thuja plicata</i>	Western redcedar	FAC	native	THPL

Scientific name	Common name	Wetland	Origin	PLANTS code
Tiarella trifoliata	Coolwort foamflower	FAC-	native	TITR
Tiarella trifoliata var. trifoliata	Coolwort foamflower	FAC-	native	TITR
Tiarella trifoliata var. unifoliata	Coolwort foamflower	UPL	native	TITRU
Tolmiea menziesii	Piggyback plant	FAC	native	TOME
Torilis	<i>Hedgeparsley</i>	UNK	exotic	TORIL
Torreyochloa pallida var. pauciflora	Weak alkali grass	OBL	native	TOPAP3
Toxicodendron diversilobum	Poison oak	UPL	native	TODI
Trautvetteria caroliniensis	False bugbane	FAC	native	TRCA
Trientalis arctica	Northern starflower	OBL	native	TREUA2
Trientalis latifolia	Western starflower	FAC-	native	TRLA6
Trifolium howellii	Howell's clover	FACW	native	TRHO
Trifolium longipes	Long-stalked clover	FAC-	native	TRLO
Trillium ovatum	Pacific trillium	FACU	native	TROV2
Trisetum canescens	Tall trisetum	FACU	native	TRCEC
Trisetum cernuum	Nodding trisetum	FACU	native	TRCE2
Tsuga heterophylla	Western hemlock	FACU	native	TSHE
Tsuga mertensiana	Mountain hemlock	FACU	native	TSME
Urtica dioica ssp. gracilis	Nettle	FAC+	native	URDI
Vaccinium alaskaense	Oval-leaf huckleberry	FACU	native	VAOV
Vaccinium deliciosum	Blueleaf huckleberry	UPL	native	VADE
Vaccinium membranaceum	Big huckleberry	FACU	native	VAME
Vaccinium ovalifolium	Oval-leaf huckleberry	UPL	native	VAOV
Vaccinium ovatum	Evergreen huckleberry	UPL	native	VAOV2
Vaccinium parvifolium	Red huckleberry	FACU	native	VAPA
Vaccinium scoparium	Grouse whortleberry	FACU	native	VASC
Valeriana occidentalis	Western valerian	FAC	native	VAOC2
Valeriana scouleri	Scouler's valerian	FAC	native	VASC2
Valeriana sitchensis	Sitka valerian	FAC	native	VASI
Vancouveria hexandra	Insideout flower	UPL	native	VAHE
Veratrum californicum	California false hellebore	FACW	native	VECA2
Veratrum viride	False hellebore	FACW	native	VEVI
Veronica americana	American brooklime	OBL	native	VEAM2
Veronica officinalis	<i>Common gypsyweed</i>	UPL	exotic	VEOF2
Viburnum edule	High-bush cranberry	FACW	native	VIED
Viburnum ellipticum	Oval-leaved viburnum	FACU	native	VIEL
Vicia americana	American vetch	FAC	native	VIAM

<b>Scientific name</b>	<b>Common name</b>	<b>Wetland</b>	<b>Origin</b>	<b>PLANTS code</b>
Vicia sativa	<i>Garden vetch</i>	UPL	exotic	VISA
Vinca	Periwinkle	UNK	unknown	VINCA
Viola canadensis	Canada violet	UPL	native	VICA4
Viola glabella	Stream violet	FAC	native	VIGL
Viola orbiculata	Round-leaved violet	UPL	native	VIOR
Viola palustris	Marsh violet	OBL	native	VIPA4
Viola sempervirens	Evergreen violet	UPL	native	VISE3
Whipplea modesta	Whipple vine	UPL	native	WHMO
Xerophyllum tenax	Beargrass	FACU	native	XETE

**Appendix I (continued): Species list**  
**Alphabetized by common name**

<b>Common name</b>	<b>Scientific name</b>	<b>Wetland</b>	<b>Origin</b>	<b>PLANTS code</b>
Alaska brome	<i>Bromus sitchensis</i>	FACU	native	BRSI
Alaska oniongrass	<i>Melica subulata</i>	UPL	native	MESU
Alaska yellow-cedar	<i>Chamaecyparis nootkatensis</i>	FAC	native	CHNO
Alpine aster	<i>Aster alpinus</i>	FAC	native	ASAL2
Alpine bentgrass	<i>Agrostis humilis</i>	FACW	native	AGHU
Alpine willowherb	<i>Epilobium anagallidifolium</i>	FACW	native	EPAN4
American bistort	<i>Polygonum bistortoides</i>	FACW	native	POBI6
American brooklime	<i>Veronica americana</i>	OBL	native	VEAM2
American vetch	<i>Vicia americana</i>	FAC	native	VIAM
Angled bittercress	<i>Cardamine angulata</i>	FACW	native	CAAN5
Arctic rush	<i>Juncus arcticus</i> var. <i>balticus</i>	FACW	native	JUBA
Arrowleaf groundsel	<i>Senecio triangularis</i>	FACW	native	SETR
Baldhip rose	<i>Rosa gymnocarpa</i>	FACU	native	ROGY
Bearded fescue	<i>Festuca subulata</i>	FACU	native	FESU
Beargrass	<i>Xerophyllum tenax</i>	FACU	native	XETE
Beautiful alumroot	<i>Heuchera cylindrica</i> var. <i>glabella</i>	UPL	native	HECYG
<i>Big chickweed</i>	<i>Cerastium fontanum</i> ssp. <i>vulgare</i>	FACU	exotic	CEFOV2
Big deervetch	<i>Lotus crassifolius</i>	UPL	native	LOCR
Big huckleberry	<i>Vaccinium membranaceum</i>	FACU	native	VAME
Big leaf maple	<i>Acer macrophyllum</i>	FACU	native	ACMA3
Big-leaved sandwort	<i>Moehringia macrophylla</i>	UPL	native	MOMA3
<i>Bird-eye pearlwort</i>	<i>Sagina procumbens</i>	FAC	exotic	SAPR
<i>Bird's-foot trefoil</i>	<i>Lotus corniculatus</i>	FAC	exotic	LOCO6
<i>Bitter dock</i>	<i>Rumex obtusifolius</i>	FAC	exotic	RUOB
<i>Bittersweet</i>	<i>Solanum dulcamara</i>	FAC+	exotic	SODU
Black cottonwood	<i>Populus trichocarpa</i>	FAC	native	POBAT
Black gooseberry	<i>Ribes lacustre</i>	FAC+	native	RILA
Black hawthorn	<i>Crataegus douglasii</i>	FAC	native	CRDO2
Black raspberry	<i>Rubus leucodermis</i>	UPL	native	RULE
Black twinberry	<i>Lonicera involucrata</i>	FAC+	native	LOIN5
Blue elderberry	<i>Sambucus mexicana</i>	FACU	native	SAMEC2
Blue wildrye	<i>Elymus glaucus</i>	FACU	native	ELGL
Blue windflower	<i>Anemone oregana</i>	FACU	native	ANOR
Bluejoint	<i>Calamagrostis canadensis</i>	FACW	native	CACA4

<b>Common name</b>	<b>Scientific name</b>	<b>Wetland</b>	<b>Origin</b>	<b>PLANTS code</b>
Blueleaf huckleberry	Vaccinium deliciosum	UPL	native	VADE
Bog St.John's-wort	Hypericum anagalloides	OBL	native	HYAN2
Borage species	Borago	UNK	unknown	BORAG
Bracted lousewort	Pedicularis bracteosa	UPL	native	PEBR
Brewer's bittercress	Cardamine breweri	FACW	native	CABR6
Brewer's miterwort	Mitella breweri	FAC	native	MIBR6
Broadleaf arnica	Arnica latifolia	FAC-	native	ARLA8
Broad-leaved marsh-marigold	Caltha leptosepala	OBL	native	CALE4
Broad-leaved twayblade	Listera convallarioides	FAC	native	LICO5
<i>Bull thistle</i>	Cirsium vulgare	FACU	exotic	CIVU
California false hellebore	Veratrum californicum	FACW	native	VECA2
California figwort	Scrophularia californica	FACW	native	SCCA2
California grass-of-Parnassus	Parnassia californica	OBL	native	PACA18
California hazel	Corylus cornuta	FACU	native	COCO6
California spikenard	Aralia californica	FAC+	native	ARCA2
<i>Canada thistle</i>	Cirsium arvense	FAC-	exotic	CIAR4
Canada violet	Viola canadensis	UPL	native	VICA4
Cascade azalea	Rhododendron albiflorum	FACU	native	RHAL2
Cascara buckthorn	Rhamnus purshiana	FACU	native	FRPU7
<i>Chickweed</i>	Stellaria media	FACU	exotic	STME2
Chickweed monkey-flower	Mimulus alsinoides	OBL	native	MIAL3
Chinquapin	Chrysolepis chrysophylla	UPL	native	CHCH7
Ciliate bluebells	Mertensia ciliata	FACW	native	MECI3
Clasping twistedstalk	Streptopus amplexifolius	FAC-	native	STAM2
Cleaver	Galium aparine	FACU	native	GAAP2
Clustered wild rose	Rosa pisocarpa	FAC	native	ROPI2
Coast penstemon	Penstemon serrulatus	FACU	native	PESE5
Coastal boykinia	Boykinia occidentalis	FACW	native	BOOC2
<i>Coastal burnweed</i>	Erechtites minima	FACU	exotic	ERMI6
Cold-water corydalis	Corydalis aquae-gelidae	OBL	native	COAQ
Colombian brome	Bromus vulgaris	UPL	native	BRVU
<i>Colonial bentgrass</i>	Agrostis capillaris	FACU	exotic	AGCA5
Coltsfoot	Petasites frigidus	FACW	native	PEFR5
Columbian lily	Lilium columbianum	FAC	native	LICO
Columbian monkshood	Aconitum columbianum	FACW	native	ACCO4

<b>Common name</b>	<b>Scientific name</b>	<b>Wetland</b>	<b>Origin</b>	<b>PLANTS code</b>
Columbian monkshood	Aconitum columbianum ssp. columbianum	FACW	native	ACCOC2
Columbian monkshood	Aconitum columbianum ssp. viviparum	FACW	native	ACCOV2
Common camas	Camassia quamash	FACW	native	CAQU2
<i>Common dandelion</i>	Taraxacum officinale	FACU	exotic	TAOF
<i>Common foxglove</i>	Digitalis purpurea	FACU	exotic	DIPU
<i>Common groundsel</i>	Senecio vulgaris	FACU	exotic	SEVU
<i>Common gypsyweed</i>	Veronica officinalis	UPL	exotic	VEOF2
Common horsetail	Equisetum arvense	FAC	native	EQAR
<i>Common nipplewort</i>	Lapsana communis	UPL	exotic	LACO3
Common red paintbrush	Castilleja miniata	FAC	native	CAMI12
Common rush	Juncus effusus	FACW	native	JUEF
Common snowberry	Symphoricarpos albus	FACU	native	SYAL
<i>Common St. John's-wort</i>	Hypericum perforatum	UPL	exotic	HYPE
<i>Common velvet-grass</i>	Holcus lanatus	FAC	exotic	HOLA
Common yampah	Perideridia montana	FAC	native	PEMO7
Congdon's bulrush	Scirpus congdonii	FACW	native	SCCO
Cooley's betony	Stachys cooleyae	FACW	native	STCO14
Coolwort foamflower	Tiarella trifoliata	FAC-	native	TITR
Coolwort foamflower	Tiarella trifoliata var. trifoliata	FAC-	native	TITR
Coolwort foamflower	Tiarella trifoliata var. unifoliata	UPL	native	TITRU
Coville's rush	Juncus covillei	FACW	native	JUCO5
Cow-parsnip	Heracleum lanatum	FAC	native	HELA4
<i>Creeping bentgrass</i>	Agrostis stolonifera	FAC+	exotic	AGST2
<i>Creeping buttercup</i>	Ranunculus repens	FACW	exotic	RARE3
<i>Creeping buttercup</i>	Ranunculus repens var. repens	FACW	exotic	RARER
Creeping spike-rush	Eleocharis palustris	OBL	native	ELPA3
Crisp sandwort	Stellaria crispa	FAC+	native	STCR2
<i>Curled dock</i>	Rumex crispus	FAC+	exotic	RUCR
Dagger-leaved rush	Juncus ensifolius	FACW	native	JUEN
Deer fern	Blechnum spicant	FAC+	native	BLSP
Dentate shooting star	Dodecatheon dentatum	FACW	native	DODE
Devil's club	Oplopanax horridum	FAC+	native	OPHO
Dewey's sedge	Carex deweyana	FACU	native	CADE9

<b>Common name</b>	<b>Scientific name</b>	<b>Wetland</b>	<b>Origin</b>	<b>PLANTS code</b>
Dogwood bunchberry	<i>Cornus unalaschensis</i>	FAC-	native	COUN
Dotted smartweed	<i>Polygonum punctatum</i>	OBL	native	POPU5
Douglas' sagewort	<i>Artemisia douglasiana</i>	FACW	native	ARDO3
Douglas spiraea	<i>Spiraea douglasii</i>	FACW	native	SPDO
Douglas' water-hemlock	<i>Cicuta douglasii</i>	OBL	native	CIDO
Douglas-fir	<i>Pseudotsuga menziesii</i>	FACU	native	PSME
Dune bentgrass	<i>Agrostis pallens</i>	FACU	native	AGPA8
Dwarf bramble	<i>Rubus lasiococcus</i>	UPL	native	RULA2
Dwarf Oregon grape	<i>Berberis nervosa</i>	UPL	native	BENE2
Enchanter's-nightshade	<i>Circaea alpina</i>	FAC	native	CIAL
Engelmann's spruce	<i>Picea engelmannii</i>	FAC	native	PIEN
<i>English ivy</i>	<i>Hedera helix</i>	UPL	exotic	HEHE
Evergreen huckleberry	<i>Vaccinium ovatum</i>	UPL	native	VAOV2
Evergreen violet	<i>Viola sempervirens</i>	UPL	native	VISE3
False bugbane	<i>Trautvetteria caroliniensis</i>	FAC	native	TRCA
False hellebore	<i>Veratrum viride</i>	FACW	native	VEVI
False lily of the valley	<i>Maianthemum dilatatum</i>	FAC	native	MADI
False Solomon's-seal	<i>Maianthemum racemosum</i>	FAC-	native	MARA7
Few-sided bittercress	<i>Cardamine oligosperma</i>	FAC	native	CAOL
Fireweed	<i>Chamerion angustifolium</i> var. <i>canescens</i>	FACU	native	EPAN2
Five-stamen mitrewort	<i>Mitella pentandra</i>	FAC	native	MIPE
Five-leaved bramble	<i>Rubus pedatus</i>	FACU	native	RUPE
Fool's huckleberry	<i>Menziesia ferruginea</i>	FACU	native	MEFE
<i>Fowl bluegrass</i>	<i>Poa palustris</i>	FAC	exotic	POPA2
Fringecup	<i>Tellima grandiflora</i>	UPL	native	TEGR2
Fringed grass-of-Parnassus	<i>Parnassia fimbriata</i>	OBL	native	PAFI3
Fritillaria species	<i>Fritillaria</i>	UNK	native	FRITI
<i>Garden vetch</i>	<i>Vicia sativa</i>	UPL	exotic	VISA
Giant horsetail	<i>Equisetum telmateia</i>	FACW	native	EQTE
<i>Giant knotweed</i>	<i>Polygonum sachalinense</i>	FACU	exotic	POSA4
Gold thread	<i>Coptis laciniata</i>	FAC	native	COLA3
Grand fir	<i>Abies grandis</i>	FACU	native	ABGR
Gray's lovage	<i>Ligusticum grayi</i>	UPL	native	LIGR

<b>Common name</b>	<b>Scientific name</b>	<b>Wetland</b>	<b>Origin</b>	<b>PLANTS code</b>
Great Jacob's-ladder	<i>Polemonium carneum</i>	OBL	native	POCA4
Great northern aster	<i>Aster modestus</i>	FACW	native	ASMO3
Greenfruit sedge	<i>Carex interrupta</i>	OBL	native	CAIN17
<i>Ground-ivy</i>	<i>Glechoma hederacea</i>	FACU	exotic	GLHE2
Grouse whortleberry	<i>Vaccinium scoparium</i>	FACU	native	VASC
<i>Hairy cat's ear</i>	<i>Hypochaeris radicata</i>	FACU	exotic	HYRA3
Heartleaf bittercress	<i>Cardamine cordifolia</i>	FACW	native	CACO6
Heartleaf twayblade	<i>Listera cordata</i>	FAC	native	LICO6
Heart-leaved springbeauty	<i>Claytonia cordifolia</i>	FACW	native	CLCO3
<i>Hedgeparsley</i>	<i>Torilis</i>	UNK	exotic	TORIL
Henderson's sedge	<i>Carex hendersonii</i>	FAC	native	CAHE7
High-bush cranberry	<i>Viburnum edule</i>	FACW	native	VIED
<i>Himalayan blackberry</i>	<i>Rubus armeniacus</i>	FACU	exotic	RUDI2
Hooker's fairybells	<i>Prosartes hookeri</i>	OBL	native	PRHO2
Hound's-tongue species	<i>Cynoglossum</i>	UNK	unknown	CYNOG
Howell's clover	<i>Trifolium howellii</i>	FACW	native	TRHO
Idaho fescue	<i>Festuca idahoensis</i>	FACU	native	FEID
Incense cedar	<i>Calocedrus decurrens</i>	UPL	native	CADE27
Indian plum	<i>Oemleria cerasiformis</i>	FACU	native	OECE
Insideout flower	<i>Vancouveria hexandra</i>	UPL	native	VAHE
Jewelweed	<i>Impatiens capensis</i>	FACW	native	IMCA
Kneeling angelica	<i>Angelica genuflexa</i>	FACW	native	ANGE2
<i>Krajina hard fescue</i>	<i>Festuca trachyphylla</i>	UPL	exotic	FEOV
Lady fern	<i>Athyrium filix-femina</i>	FAC+	native	ATFI
Large boykinia	<i>Boykinia major</i>	FACW	native	BOMA3
Large-leaved avens	<i>Geum macrophyllum</i>	FAC+	native	GEMA4
Lax-flowered bluegrass	<i>Poa laxiflora</i>	OBL	native	POLA3
Leafy mitrewort	<i>Mitella caulescens</i>	UPL	native	MICA5
Leathery grapefern	<i>Botrychium multifidum</i>	FAC	native	BOMU
Lesser spearwort	<i>Ranunculus flammula</i>	OBL	native	RAFL2
Licorice fern	<i>Polypodium glycyrrhiza</i>	OBL	native	POGL8
Little buttercup	<i>Ranunculus uncinatus</i>	FAC	native	RAUN
Lodgepole pine	<i>Pinus contorta</i>	FAC	native	PICO
<i>Longstalk cranesbill</i>	<i>Geranium columbinum</i>	UPL	exotic	GECO
Long-stalked clover	<i>Trifolium longipes</i>	FAC-	native	TRLO



<b>Common name</b>	<b>Scientific name</b>	<b>Wetland</b>	<b>Origin</b>	<b>PLANTS code</b>
Lupine species	Lupinus	UNK	unknown	LUPIN
Lyall's anemone	Anemone lyallii	UPL	native	ANLY
Maidenhair fern	Adiantum pedatum	FAC	native	ADPE
Manroot	Marah oreganus	UPL	native	MAOR3
<i>Many-flowered wood-rush</i>	Luzula multiflora	FACU	exotic	LUCA2
<i>Many-flowered wood-rush</i>	Luzula multiflora ssp. multiflora	FACU	exotic	LUCAM3
Manyrib sedge	Carex multcostata	FACU	native	CAMU6
Marsh violet	Viola palustris	OBL	native	VIPA4
<i>Marshpepper smartweed</i>	Polygonum hydropiper	OBL	exotic	POHY
Meadow birds-foot trefoil	Lotus denticulatus	UPL	native	LODE
Merten's sedge	Carex mertensii	FAC	native	CAME6
Mexican betony	Stachys mexicana	FACW	native	STAJR
Miner's lettuce	Claytonia perfoliata	FAC	native	CLPE
Mount Hood bugbane	Cimicifuga laciniata	FACW	native	CILA
Mountain alder	Alnus incana	FACW	native	ALIN2
Mountain hemlock	Tsuga mertensiana	FACU	native	TSME
Mountainbells	Stenanthium occidentale	FAC	native	STOC
Musk-flower	Mimulus moschatus	FACW	native	MIMO3
Narrow-leaved Montia	Montia linearis	UPL	native	MOLI4
Nettle	Aruncus dioicus	FACU	native	ARDI8
Nettle	Urtica dioica ssp. gracilis	FAC+	native	URDI
Ninebark	Physocarpus capitatus	FACW	native	PHCA11
Noble fir	Abies procera	UPL	native	ABPR
Nodding semaphore grass	Pleuropogon refractus	OBL	native	PLRE2
Nodding trisetum	Trisetum cernuum	FACU	native	TRCE2
Nootka rose	Rosa nutkana	FAC-	native	RONU
Northern starflower	Trientalis arctica	OBL	native	TREUA2
Northern starwort	Stellaria calycantha	FACW	native	STCA
Northern twayblade	Listera borealis	FACW	native	LIBO4
Northwestern twayblade	Listera caurina	FACU	native	LICA10
Nuttall's saxifrage	Saxifraga nuttallii	OBL	native	SANU3
Oceanspray	Holodiscus discolor	UPL	native	HODI
Olumpic larkspur	Delphinium glareosum	UPL	native	DEGL
Orange honeysuckle	Lonicera ciliosa	UPL	native	LOCI3
<i>Orchard grass</i>	Dactylis glomerata	FACU	exotic	DAGL

<b>Common name</b>	<b>Scientific name</b>	<b>Wetland</b>	<b>Origin</b>	<b>PLANTS code</b>
Oregon ash	Fraxinus latifolia	FACW	native	FRLA
Oregon bedstraw	Galium oregonum	FACU	native	GAOR
Oregon bentgrass	Agrostis oregonensis	FAC	native	AGOR
Oregon boxwood	Paxistima myrsinities	UPL	native	PAMY
Oregon oxalis	Oxalis oregana	UPL	native	OXOR
Oregon saxifrage	Saxifraga oregana	FACW	native	SAOR2
Oregon white oak	Quercus garryana	UPL	native	QUGA4
Oregon wintergreen	Gaultheria ovatifolia	FAC	native	GAOV2
Oval-leaf huckleberry	Vaccinium alaskaense	FACU	native	VAOV
Oval-leaf huckleberry	Vaccinium ovalifolium	UPL	native	VAOV
Oval-leaved mitrewort	Mitella ovalis	OBL	native	MIOV
Oval-leaved viburnum	Viburnum ellipticum	FACU	native	VIEL
<i>Oxeye daisy</i>	Leucanthemum vulgare	UPL	exotic	LEVU
Pacific bleedingheart	Dicentra formosa	UPL	native	DIFO
Pacific brome	Bromus pacificus	UPL	native	BRPA3
Pacific dogwood	Cornus nuttallii	UPL	native	CONU4
Pacific rhododendron	Rhododendron macrophyllum	UPL	native	RHMA3
Pacific trillium	Trillium ovatum	FACU	native	TROV2
Pacific waterleaf	Hydrophyllum tenuipes	FACU	native	HYTE
Pacific willow	Salix lucida	FACW	native	SALUL
Pacific yew	Taxus brevifolia	FACU	native	TABR2
Parry's rush	Juncus parryi	FAC+	native	JUPA
Pathfinder	Adenocaulon bicolor	UPL	native	ADBI
Pearly everlasting	Anaphalis margaritacea	UPL	native	ANMA
<i>Peppermint</i>	Mentha Xpiperita	FACW	exotic	MEPI
Periwinkle	Vinca	UNK	unknown	VINCA
Piggyback plant	Tolmiea menziesii	FAC	native	TOME
Pigweed species	Amaranthus	UNK	unknown	AMARA
Pink monkeyflower	Mimulus lewisii	FACW	native	MILE2
Pink phlox	Phlox gracilis	FACU	native	PHGRG
Pink wintergreen	Pyrola asarifolia	FACU	native	PYAS
Plantain goldenweed	Pyrrocoma uniflora	FAC+	native	PYUN2
Poison oak	Toxicodendron diversilobum	UPL	native	TODI
<i>Prickly lettuce</i>	Lactuca serriola	FACU	exotic	LASE
Prickly sedge	Carex echinata	FACW	native	CAEC

<b>Common name</b>	<b>Scientific name</b>	<b>Wetland</b>	<b>Origin</b>	<b>PLANTS code</b>
Prince's pine	Chimaphila umbellata	UPL	native	CHUM
Purple peavine	Lathyrus nevadensis	UPL	native	LANEP
Purple-leaved willowherb	Epilobium ciliatum ssp. glandulosum	FACW	native	EPCIG
Purple-leaved willowherb	Epilobium ciliatum ssp. watsonii	FACW	native	EPCIW
Queencup beadlily	Clintonia uniflora	UPL	native	CLUN2
Rattlesnake plantain	Goodyera oblongifolia	FACU	native	GOOB2
Red alder	Alnus rubra	FAC	native	ALRU2
Red baneberry	Actaea rubra	UPL	native	ACRU2
Red elderberry	Sambucus racemosa	FACU	native	SARA2
Red huckleberry	Vaccinium parvifolium	FACU	native	VAPA
Red osier dogwood	Cornus sericea	FACW	native	COSE16
Red-flowering currant	Ribes sanguineum	UPL	native	RISA
<i>Reed canarygrass</i>	Phalaris arundinacea	FACW	exotic	PHAR3
Reed mannagrass	Glyceria grandis	OBL	native	GLGR
Regel's rush	Juncus regelii	FACW	native	JURE
<i>Ribwort</i>	Plantago lanceolata	FACU	exotic	PLLA
<i>Ripgut brome</i>	Bromus rigidus	UPL	exotic	BRDI3
Rocky Mountain maple	Acer glabrum var. douglasii	FAC	native	ACGLD4
Rosy twistedstalk	Streptopus lanceolatus var. curvipes	UPL	native	STLAC
<i>Rough bluegrass</i>	Poa trivialis	FACW	exotic	POTR2
Round-leaved violet	Viola orbiculata	UPL	native	VIOR
Russet sedge	Carex saxatilis	FACW	native	CASA10
Salal	Gaultheria shallon	FACU	native	GASH
Salmonberry	Rubus spectabilis	FAC+	native	RUSP
Sandwort species	Arenaria	UNK	unknown	ARENA
Saskatoon serviceberry	Amelanchier alnifolia	FACU	native	AMAL2
<i>Scotch broom</i>	Cytisus scoparius	UPL	exotic	CYSC4
Scouler's bluebell	Campanula scouleri	UPL	native	CASC7
Scouler's corydalis	Corydalis scouleri	FAC+	native	COSC4
Scouler's valerian	Valeriana scouleri	FAC	native	VASC2
Scouler's willow	Salix scouleriana	FAC	native	SASC
Scouring-rush	Equisetum hyemale	FACW	native	EQHY
Seashore saltgrass	Distichlis spicata	FACW	native	DISP
Sedum species	Sedum	UNK	unknown	SEDUM
Selfheal	Prunella vulgaris	FACU	native	PRVU

<b>Common name</b>	<b>Scientific name</b>	<b>Wetland</b>	<b>Origin</b>	<b>PLANTS code</b>
Shade phacelia	<i>Phacelia nemoralis</i>	UPL	native	PHNE2
Sharptooth angelica	<i>Angelica arguta</i>	FACW	native	ANAR3
Showy sedge	<i>Carex spectabilis</i>	FACW	native	CASP5
Siberian miner's lettuce	<i>Claytonia sibirica</i>	FAC	native	CLSI2
Sidebells wintergreen	<i>Orthilia secunda</i>	FACU	native	ORSE
Silver fir	<i>Abies amabilis</i>	FACU	native	ABAM
Silver pussytoes	<i>Antennaria argentea</i>	FACU	native	ANAR5
Silverleaf phacelia	<i>Phacelia hastata</i>	UPL	native	PHHA
Sitka alder	<i>Alnus viridis</i>	FACW	native	ALVI5
Sitka columbine	<i>Aquilegia formosa</i>	FAC	native	AQFO
Sitka mountain ash	<i>Sorbus sitchensis</i>	UPL	native	SOSI2
Sitka sedge	<i>Carex aquatilis</i> var. <i>dives</i>	OBL	native	CAAQD
Sitka spruce	<i>Picea sitchensis</i>	FAC	native	PISI
Sitka valerian	<i>Valeriana sitchensis</i>	FAC	native	VASI
Sitka willow	<i>Salix sitchensis</i>	FACW	native	SASI2
Skunk cabbage	<i>Lysichiton americanum</i>	OBL	native	LYAM3
Slender bog-orchid	<i>Platanthera stricta</i>	FACW	native	PLST4
Slender hairgrass	<i>Deschampsia elongata</i>	FACW	native	DEEL
Slender hawkweed	<i>Hieracium gracile</i>	UPL	native	HIGR
Slender muhlenbergia	<i>Muhlenbergia filiformis</i>	FACW	native	MUFI2
Slenderbeak sedge	<i>Carex athrostachya</i>	FACW	native	CAAT3
Slink lily	<i>Scoliopus hallii</i>	FACU	native	SCHA2
Slough sedge	<i>Carex obnupta</i>	OBL	native	CAOB3
Small bedstraw	<i>Galium trifidum</i>	FACW	native	GATR2
Small twistedstalk	<i>Streptopus streptopoides</i>	UPL	native	STST3
Smallflower nemophila	<i>Nemophila parviflora</i>	UPL	native	NEPA
Small-flowered alumroot	<i>Heuchera micrantha</i>	UPL	native	HEMI7
Small-flowered blue-eyed Mary	<i>Collinsia parviflora</i>	UPL	native	COPA3
Small-flowered bullrush	<i>Scirpus microcarpus</i>	OBL	native	SCMI2
Small-flowered forget-me-not	<i>Myosotis laxa</i>	OBL	native	MYLA
Small-flowered willowherb	<i>Epilobium minutum</i>	UPL	native	EPMI
Small-flowered wood-rush	<i>Luzula parviflora</i>	FAC-	native	LUPA4
Small-flowered wood-rush	<i>Luzula parviflora</i>	FAC-	native	LUPA4
Smith's fairybells	<i>Prosartes smithii</i>	OBL	native	DISM2

<b>Common name</b>	<b>Scientific name</b>	<b>Wetland</b>	<b>Origin</b>	<b>PLANTS code</b>
<i>Smooth brome</i>	<i>Bromus inermis</i>	FAC	exotic	BRIN2
Smooth willowherb	<i>Epilobium glaberrimum</i>	FACW	native	EPGL
Smoothbeak sedge	<i>Carex integra</i>	FACU	native	CAIN10
Smoothstem sedge	<i>Carex laeviculmis</i>	FACW	native	CALA13
Snowbrush ceanothus	<i>Ceanothus velutinus</i>	UPL	native	CEVE
Snowqueen	<i>Synthyris reniformis</i>	UPL	native	SYRE
<i>Spearmint</i>	<i>Mentha spicata</i>	OBL	exotic	MESP3
Spike bentgrass	<i>Agrostis exarata</i>	FACW	native	AGEX
<i>Spinyfruit buttercup</i>	<i>Ranunculus muricatus</i>	FACW	exotic	RAMU2
Spreading rush	<i>Juncus patens</i>	FACW	native	JUPA2
Star mustard	<i>Huperzia chinensis</i>	FACU	native	HUCH
Starry false Solomon's-seal	<i>Maianthemum stellatum</i>	FAC-	native	MAST4
<i>Sticky chickweed</i>	<i>Cerastium glomeratum</i>	UPL	exotic	CEGL2
Stink currant	<i>Ribes bracteosum</i>	FAC	native	RIBR
Stream saxifrage	<i>Saxifraga odontoloma</i>	FAC+	native	SAOD2
Stream saxifrage	<i>Saxifraga odontoloma</i>	FACW	native	SAOD2
Stream violet	<i>Viola glabella</i>	FAC	native	VIGL
Streambank arnica	<i>Arnica amplexicaulis</i>	FACW	native	ARAM2
Streambank groundsel	<i>Senecio pseud aureus</i>	FACW	native	SEPS2
Streambank springbeauty	<i>Montia parvifolia</i>	FACW	native	MOPA2
Subalpine daisy	<i>Erigeron peregrinus</i>	UPL	native	ERPE3
Subalpine fir	<i>Abies lasiocarpa</i>	FACU	native	ABLA
Suksdorf woodsorrel	<i>Oxalis suksdorfii</i>	UPL	native	OXSU
Sweet cecily	<i>Osmorhiza berteroi</i>	FAC	native	OSBE
<i>Sweet vernalgrass</i>	<i>Anthoxanthum odoratum</i>	FACU	exotic	ANOD
<i>Sweetbriar rose</i>	<i>Rosa eglanteria</i>	FACW	exotic	ROEG
Sweetscented bedstraw	<i>Galium triflorum</i>	FACU	native	GATR3
Sword fern	<i>Polystichum munitum</i>	FACU	native	POMU
Tall agoseris	<i>Agoseris elata</i>	FAC	native	AGEL
Tall blue lettuce	<i>Lactuca biennis</i>	FAC	native	LABI
Tall bluebells	<i>Mertensia paniculata</i>	FACW	native	MEPA
<i>Tall fescue</i>	<i>Lolium arundinaceum</i>	FAC-	exotic	LOAR10
Tall mannagrass	<i>Glyceria striata</i>	FACW	native	GLST
Tall Oregon grape	<i>Berberis aquifolium</i>	UPL	native	BEAQ
Tall trisetum	<i>Trisetum canescens</i>	FACU	native	TRCEC

<b>Common name</b>	<b>Scientific name</b>	<b>Wetland</b>	<b>Origin</b>	<b>PLANTS code</b>
Tall western meadowrue	Thalictrum polycarpum	UPL	native	THFEP2
<i>Tansy ragwort</i>	Senecio jacobaea	FACU	exotic	SEJA
Thick-headed sedge	Carex pachystachya	FAC	native	CAPA14
Thimbleberry	Rubus parviflorus	FAC-	native	RUPA
Three-leaved anemone	Anemone deltoidea	UPL	native	ANDE3
Toad rush	Juncus bufonius	FACW	native	JUBU
Tooth-leaved monkeyflower	Mimulus dentatus	OBL	native	MIDE3
Trailing blackberry	Rubus ursinus	FACU	native	RUUR
Trailing snowberry	Symphoricarpos mollis	FACU	native	SYHE
Trillium-leaved sorrel	Oxalis trilliifolia	FAC+	native	OXTR
Trollius-leaved larkspur	Delphinium trolliifolium	UPL	native	DETR2
Tufted hairgrass	Deschampsia cespitosa	FACW	native	DECE
Tufted sedge	Carex lenticularis	FACW	native	CALE8
Twinflower	Linnaea borealis	FACU	native	LIBO3
Two-lobe larkspur	Delphinium nuttallianum	FAC	native	DENU2
Umbellate starwort	Stellaria umbellata	FACW	native	STUM
Vanilla leaf	Achlys triphylla	UPL	native	ACTR
Varied leaf collomia	Collomia heterophylla	FACU	native	COHE2
Vine maple	Acer circinatum	FAC-	native	ACCI
Wall-lettuce	Lactuca muralis	UPL	exotic	MYMU
Water sedge	Carex aquatilis	OBL	native	CAAQ
Water-carpet	Chrysosplenium glechomifolium	OBL	native	CHGL5
Waterparsley	Oenanthe sarmentosa	OBL	native	OESA
Weak alkali grass	Torreyochloa pallida var. pauciflora	OBL	native	TOPAP3
Western bittercress	Cardamine occidentalis	FACW	native	CAOC
Western brackenfern	Pteridium aquilinum	FACU	native	PTAQ
Western coneflower	Rudbeckia occidentalis	FAC-	native	RUOC2
Western coral root	Corallorhiza maculata	UPL	native	COMA4
Western fescue	Festuca occidentalis	UPL	native	FEOC
Western hemlock	Tsuga heterophylla	FACU	native	TSHE
<i>Western larkspur</i>	Delphinium occidentale	FACU	exotic	DEOC
Western meadowrue	Thalictrum occidentale	FACU	native	THOC
Western mountain-ash	Sorbus scopulina	FACU	native	SOSC2
Western oakfern	Gymnocarpium dryopteris	FAC	native	GYDR

<b>Common name</b>	<b>Scientific name</b>	<b>Wetland</b>	<b>Origin</b>	<b>PLANTS code</b>
Western polemonium	<i>Polemonium occidentale</i>	FACW	native	POOC2
Western redcedar	<i>Thuja plicata</i>	FAC	native	THPL
Western snakeroot	<i>Ageratina occidentalis</i>	UPL	native	AGOC2
Western St. John's-wort	<i>Hypericum formosum</i>	FAC	native	HYFO4
Western starflower	<i>Trientalis latifolia</i>	FAC-	native	TRLA6
Western valerian	<i>Valeriana occidentalis</i>	FAC	native	VAOC2
Western white pine	<i>Pinus monticola</i>	FACU	native	PIMO3
Whipple vine	<i>Whipplea modesta</i>	UPL	native	WHMO
White hawkweed	<i>Hieracium albiflorum</i>	UPL	native	HIAL2
Wild ginger	<i>Asarum caudatum</i>	FACU	native	ASCA2
Wild gooseberry	<i>Ribes divaricatum</i>	FAC	native	RIDI
Wild strawberry	<i>Fragaria virginiana</i>	FACU	native	FRVI
Willamette false rue anemone	<i>Enemion hallii</i>	UPL	native	ENHA
Willow dock	<i>Rumex salicifolius</i>	FACW	native	RUSA
Wood fern	<i>Dryopteris carthusiana</i>	FAC+	native	DRCA11
Wood reedgrass	<i>Cinna latifolia</i>	FACW	native	CILA2
Wood saxifrage	<i>Saxifraga mertensiana</i>	FACW	native	SAME7
Woodland penstemon	<i>Nothochelone nemorosa</i>	UPL	native	NONE3
Woodland strawberry	<i>Fragaria vesca</i>	FACU	native	FRVE
Woodrush sedge	<i>Carex luzulina</i>	OBL	native	CALU7
Woolly-weed	<i>Hieracium scouleri</i>	UPL	native	HISC2
Yarrow	<i>Achillea millefolium</i>	FACU	native	ACMI2
Yellow monkeyflower	<i>Mimulus guttatus</i>	OBL	native	MIGU
Yellow willowherb	<i>Epilobium luteum</i>	FACW	native	EPLU
Yerba buena	<i>Satureja douglasii</i>	UPL	native	SADO5

## Appendix II: References

- Benner, P.A. & J.R. Sedell. 1997. Upper Willamette River landscape: a historic perspective. Pp. 23-47 in: A. Laenen & D.A. Dunette (eds.). River quality: dynamics and restoration. CRC Press, Lewis Publishers, New York. 480 pp.
- Boyd, R. 1999. Strategies of Indian burning in the Willamette Valley. Pp. 94-138 in: R. Boyd (ed.). Indians, fire, and the land in the Pacific Northwest. Oregon State University Press, Corvallis. 313 pp.
- Frenkel, R.E., W.H. Moir & J.A. Christy. 1986. Vegetation of Torrey Lake Mire, central Cascade Range, Oregon. *Madroño* 33: 24-39.
- Golinski, K. 1999. Bogs of the lower Fraser Valley, an overview of regional significance. Report to British Columbia Environmental Assessment Office. University of Victoria. 12 pp. + tables.
- Hill, M. O. 1979. TWINSPLAN: a FORTRAN program for arranging multivariate data in an ordered two-way table by classification of the individuals and attributes. Ecology and Systematics, Cornell University, Ithaca, N. Y.
- Kunze, L.M. 1994. Preliminary classification of native, low elevation, freshwater wetland vegetation in western Washington. Natural Heritage Program, Department of Natural Resources, Olympia. 120 pp.
- Markle, D.F., T.N. Pearsons & D.T. Bills. 1991. Natural history of *Oregonichthys* (Pisces: Cyprinidae), with a description of a new species from the Umpqua River of Oregon. *Copeia* 1991: 277-293.
- McCune, B. & M.J. Mefford. 1999. PC-ORD for Windows. Multivariate analysis of ecological data. Version 4.01. MjM Software, Glendeden Beach, Oregon.
- Pearsons, T.N. 1989. Ecology and decline of a rare western minnow: the Oregon chub (*Oregonichthys crameri*). M.S. thesis. Oregon State University, Corvallis. 89 pp.
- Pojar, J., and A. MacKinnon. 1994. Plants of the Pacific Northwest Coast. B.C. Ministry of Forests and Lone Pine Publishing. Vancouver, British Columbia.



- Seyer, S. C. 1979. Vegetative ecology of a montane mire, Crater Lake National Park, Oregon. M.S. thesis. Oregon State University, Corvallis. 187 pp.
- Seyer, S. C. 1981. Survey of vegetation of 18 lakes in Wallowa-Whitman National Forest, Oregon. USDA Forest Service, Forest Sciences Laboratory, Corvallis, Oregon. 47 pp.
- Seyer, S. C. 1983. Ecological analysis, Multorpor Fen Preserve, Oregon. The Nature Conservancy, Oregon Field Office, Portland. 28 pp.
- Smith, B. 1997. ECOTOOLS. Version 2.3. USDA Forest Service, Okanogan National Forest, Washington.
- Sundberg, S. 2002. Personal communication.
- U.S. Army Corps of Engineers. 1948. Review report on Columbia River and tributaries. Appendix L. Main Columbia River below Yakima River. U.S. Army Corps of Engineers, North Pacific Division, Portland.
- U.S. Army Corps of Engineers. 1987. Corps of Engineers wetlands delineation manual. Technical Report Y-87-1. Department of the Army, Wetlands Research Program Environmental Laboratory. Vicksburg, Mississippi. 100 pp. + appendices.
- U.S. Army Corps of Engineers. 1988. Lower Columbia River flood control study. River mile 0 to 145. Summary Report. Columbia River and tributaries review study CRT 69. U.S. Army Corps of Engineers, Portland District.
- USDA-NRCS PLANTS database. 1999, USDA Natural Resources Conservation Service. National Plant Data Center. Baton Rouge, LA. 70974. (<http://plants.usda.gov>)
- Vitt, D.H., L.A. Halsey & J. Doubt. 1999. The distinctness of Burns Bog. Report to British Columbia Environmental Assessment Office. University of Alberta, Edmonton. 26 pp.
- Wilson, C.E. 1986. Floristic and edaphic aspects of vegetational patterns in subalpine mires of the Cascade Mountains of Oregon. M.S. thesis. University of Oregon, Eugene. 59 pp.