

## Key to Wetland and Riparian Plant Associations of Washington State (Version 1.0)

Prepared by  
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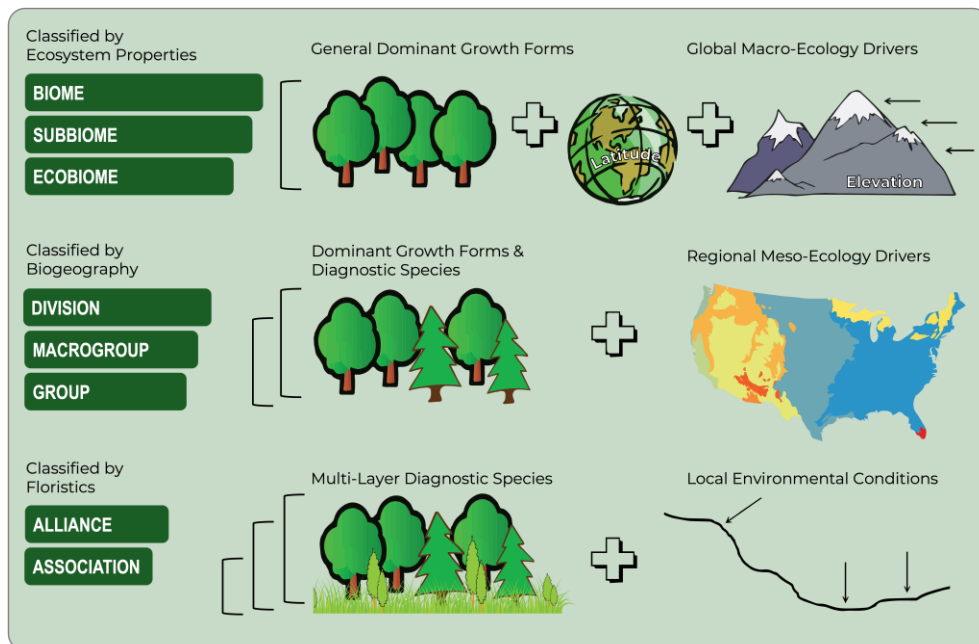
Our work was aided by decades of wetland plot data collected by Washington Natural Heritage Program ecologists, especially Linda Kunze, whose wetland classification and inventory work was foundational. The key also synthesizes data from thousands of plots and dozens of publications drawn from the rich history of ecosystem classification in the Pacific Northwest. The fingerprints of John Christy, Bud Kovalchik, and many other ecologists—and field crews—are all over the plant association concepts below.

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# Introduction

The U.S. National Vegetation Classification (USNVC, 2025) provides a common language for the effective management and conservation of plant communities in the United States. The classification standard was developed over many years by the Federal Geographic Data Committee (FGDC) Vegetation Subcommittee, with members from federal agencies, the Vegetation Panel of the Ecological Society of America, and NatureServe (<http://usnvc.org/overview>). The USNVC allows federal agencies to produce uniform statistics about vegetation resources across the nation, facilitate interagency cooperation on vegetation management issues that transcend jurisdictional boundaries, and encourage non-Federal partners to utilize and contribute to a common system when working with their Federal partners. The USNVC is also the system used by the Washington Natural Heritage Program for classifying, inventorying, assessing, and setting conservation priorities for the diverse ecosystems of Washington State (WADNR, 2025).

The USNVC is a hierarchical system consisting of eight levels, organized into three upper levels based primarily on physiognomic features, three middle levels that consider biogeographic and meso-climatic factors along with diagnostic species and life forms, and two lower levels based on floristics (FGDC, 2008; Faber-Langendoen et al., 2025) (Figure 1). The structure of early versions of the USNVC (FGDC, 1997) was in part based on an international vegetation classification developed by the United Nations Educational, Cultural, and Scientific Organization (UNESCO, 1973; Driscoll et al., 1984). Substantial revisions to the upper levels of the 1997 USNVC hierarchy were adopted by the FGDC in February 2008 (FGDC, 2008) and subsequent efforts incorporated more explicit ecological classifiers and connections to the Global Ecosystem Typology (Keith et al., 2022), resulting in the release of USNVC version 3.0 in 2025 (Faber-Langendoen et al., 2025).



**Figure 1.** The U.S. National Vegetation Classification Hierarchy.

The association is the finest unit of the USNVC. The association has historically been used by the Washington Department of Natural Resources, Natural Heritage Program (WNHP) as the primary unit for classifying ecosystems and identifying wetland conservation priorities (e.g., Wetlands of High Conservation Value). Associations are defined based on characteristic ranges of species composition, diagnostic species occurrence, habitat conditions, and physiognomy (Jennings et al., 2002, 2009). Associations reflect topo-edaphic climate, substrates, hydrology, and disturbance regimes. Associations are also the unit most commonly used by WNHP for classification of “element occurrences” (= specific locations with significant conservation value). When fine-scale association mapping is impractical, a coarser level of the hierarchy (USNVC group) is sometimes used.

WNHP has played a key role in the identification and development of USNVC associations for Washington State. WNHP ecologists continually work to synthesize the various vegetation classification efforts applicable to Washington with firsthand collection and analysis of vegetation plot data. Existing information has been synthesized in order to produce this synonymized key to the wetland and riparian plant associations occurring in Washington—both USNVC types and those that have not yet been incorporated into the national classification. This process will continue as new information becomes available. In the meantime, this key provides a resource for identifying wetland and riparian plant associations across Washington.

## Methods

This key consists of plant associations classified by WNHP via plot data analysis (e.g. Crawford 2004, Ramm-Granberg et al. 2021, etc.) and/or synonymized across more than 140 additional vegetation classifications from the Pacific Northwest. Methods varied considerably across the decades and between the organizations that collected these data. Plot location criteria, cover classes, the environmental variables that were recorded, and other methodology were not the same across all data sets. However, comparisons are still possible so long as plots were placed within homogeneous vegetation and missing data are handled appropriately (e.g. “NA” for missing data, rather than 0). Our synthesis consisted of quantitative (when plot data were available) and more qualitative analyses (incorporating classifications that lack readily available plot data).

### Quantitative Analysis

Over the years, great strides have been made in the analysis of plant community data. Some classification efforts referenced below consisted of simple “table work” in which plot data were placed side by side and similar plots were then grouped together by dominant or apparently diagnostic species. TWINSpan (Hill, 1979a; Gauch & Whittaker, 1981), DCA/DECORANA (Hill, 1979b; Hill & Gauch, 1980), and other computer-based ordination or group-identification methods used in legacy vegetation classifications have largely been replaced with non-parametric multivariate methods that perform better with simulated gradients and/or rely on less troublesome assumptions. This section summarizes the typical analytical methods used by WNHP when quantitative vegetation plot data are available for classification.

### Plot Data

Plot data collected by WNHP followed the Carolina Vegetation Survey method (Peet et al., 1998), built on modular 10m x 10m relevés. As previously noted, the specific methodologies for the remaining data sets in this synthesis vary, but all methods placed plots within homogeneous vegetation. Data sets had full species lists and—in most cases—GPS locations we could use to model climate and topographic data. All species names/codes were crosswalked to current taxonomic nomenclature as defined by Weinmann et al. (2002). Species occurring in fewer than 3 plots were removed from the data set. Most plots were identified to the association level in the field by the original surveyor. WNHP rekeyed each plot in the office using drafts of this key. Some *a priori* association assignments were changed during analysis as we iteratively tested and improved our key. Note that many of these ecosystem types extend well beyond the borders of Washington, but our compiled plot data set does not.

### Ordination

Cluster analyses and their resulting dendrograms are often used to create initial groupings (Williams et al., 1966; Lance & Williams, 1967, 1968; Field & McFarlane, 1968; Goodall, 1973). Non-Metric Multidimensional Scaling (NMS) ordinations are typically used to analyze compositional differences (Mather, 1976; Kruskal & Wish, 1978; McCune et al., 2002; McCune & Mefford, 2011). For each ordination, we choose the number of dimensions beyond which additional axes provided only minimal reductions in stress and checked this using Monte Carlo tests (Metropolis & Ulam, 1949). Multi-response Permutation Procedure (MRPP) may be used to test the distinction between groups (Mielke Jr et al., 1976; McCune et al., 2002; McCune & Mefford, 2011). Lastly, we use Indicator Species Analysis (ISA) (Dufrêne & Legendre, 1997) to

identify diagnostic/differential species for related associations. Species cover data are often used as both raw and log(+1)-transformed matrices in WNHP analyses. Beals Smoothing is sometimes applied to emphasize underlying patterns of species composition and de-emphasize dominant species (Beals, 1984).

WNHP statistical analyses and ordinations have been performed using PC-ORD v. 3.0 through 7.03 (McCune & Mefford, 2011) and R v 3.6 through 4.1 (RStudio Team, 2016; R Core Team, 2017). Table 1 shows the environmental variables available for many plots (some analyses that were restricted to individual data sets had more available variables).

**Table 1.** Common environmental variables used in analysis

Variable	Categories / Description
Wetland type	Ruderal, Riparian, Aquatic, Marsh/Wet Meadow, Swamp, Shrub Carr, Intermediate Fen, Poor Fen, Extremely Rich Fen, Bog, Bog Woodland, Seep/Spring
HGM	Hydrogeomorphic Wetland Classification — Riverine, Depressional, Slope, Lacustrine-Fringe, Organic-Flat, Freshwater-Tidal, Depressional-Interdunal (not available for all plots)
Ecoregion	Columbia Plateau, North Cascades, Northwest Coast, West Cascades, East Cascades, Canadian Rocky Mountains, Okanogan, Blue Mountains, Puget Trough
Lithology	Based on WA DNR Geology data layers — <a href="https://www.dnr.wa.gov/geologyportal">https://www.dnr.wa.gov/geologyportal</a>
Lat	Latitude
Long	Longitude
pH	pH (only measured in WNHP plots)
Corrected EC	Electro-conductivity, corrected for pH (only measured in WNHP plots)
Elevation	Elevation (m) (Derived from USGS digital elevation model and park-specific LiDAR)
Slope	Slope (°) (Derived from USGS digital elevation model and park-specific LiDAR)
January Precip.	Maximum temperature (°C) in January (based on PRISM 30-year average)
July Precip.	Maximum temperature (°C) in July (based on PRISM 30-year average)
January Max Temp	January precipitation average (mm) (based on PRISM 30-year average)
July Max Temp	July precipitation average (mm) (based on PRISM 30-year average)
Physiognomic Dominance	Conifer, Broadleaf, Shrub, Subshrub, Algae, Fern, Fern Ally, Forb, Grass, Non-grass graminoid, Liana, Lichen, Liverwort, Moss, Cyperaceae
Species Richness	Number of species in the plot

### Qualitative Analysis

Plot data are not always readily available for older vegetation classifications, but these classifications are still useful for synonymization and qualitative review of environmental drivers. Synonymization is simply the process of determining whether plant community “A” in one classification is describing the same ecological unit as plant community “B” in another, even if the association names may be somewhat different. This determination can be made by reviewing the synoptic tables (i.e. the summarized species composition tables typically published in each classification) and comparing the ranges and ecological settings of the two types.

# Key to Wetland Plant Associations

## Instructions

1. To key a stand of interest, select a relatively uniform area of vegetation and topography within the stand.
  - a. Confirm that the site is a wetland (the vegetation is distinct from neighboring uplands due to flooding or saturation, at least seasonally). It may not be a wetland in a jurisdictional sense.
  - b. Confirm that the site does not consist of cultural vegetation (vegetation structure / composition determined by regular human activity such as planting, tilling, cropping, mowing, and/or irrigating)
2. This key is not dichotomous. If the stand or plot meets the criteria in a line, read to the right, or (if blank) to the next indented line down. If the stand or plot does not meet the criteria, skip to the next line that is not indented from the current line.
  - a. Each key break is also preceded by a code indicating its position within the key. For example, key break 1c.2 ("*Populus trichocarpa* codominant") is the second break nested within key break 1c ("*Fraxinus latifolia* dominant or codominant), which in turn is the third break under key break 1 ("Westside Deciduous Trees Dominant"). Therefore, any subsequent key break code that starts with "1c.2" is a westside plant association dominated by deciduous trees, with *Fraxinus latifolia* dominant or codominant, and *Populus trichocarpa* codominant.
3. Some associations may be distinguished by multiple characteristics—these associations may be reached via more than one path in the key.
4. Percentage values refer to crown cover—the vertical projection below the entire crown of the plant. Do not subtract for spaces between leaves and branches
5. "Present" species are typically found in a representative plot (they regularly occur in the stand).
6. "Prominent" species are common within most plots (generally 3-15% cover) but do not make up the dominant vegetation.
7. "Dominant" and "Codominant" species are diagnostic species that have the greatest cover within their physiognomic strata (tree/shrub/herb)
8. "+" = add the crown cover of each of the species indicated (e.g., 7+22 = 29% cover). Overlap between species is counted twice. Any one species may be absent.
9. Each plant association includes the name, global and state conservation status ranks, element code (EL Code, in the USNVC), and the source of the association concept, as demonstrated below:

NAME: ..... **Carex amplifolia Wet Meadow**  
GLOBAL / STATE RANK — EL CODE: G3/S1? — CWWA000286  
SOURCE: ..... (Crowe & Clausnitzer 1997 p204)

10. All references from Washington and neighboring states/provinces (plus western Montana) are listed for each association.
  - a. In situations where references only exist from more distant states/provinces, a selection of references from those locales are listed in order to help describe the type.
  - b. Some associations occur both west and east of the Cascade Crest (or occur right along the Crest). Within the "West of Cascade Crest" key, we have generally only

listed references that describe the association as it is found in western Washington (and vice versa for the “East of Cascade Crest” key). In cases where there is little or no variation in the association when it occurs east or west of the crest, we have listed all relevant references.

- c. References to draft documents are only included if the classification unit was not included in a subsequent final publication by the same author(s).
  - d. If a reference is prefaced by a “>”, that indicates that the currently recognized association concept is broader than what was originally published in that document.
11. Some references (particularly Kunze 1984) consist of site-specific plant association *occurrence* descriptions, rather than summarized *concept* descriptions. In some instances, one association may have dozens of occurrence descriptions within the same document. Rather than list all of the page numbers on which these descriptions occur, we have simply noted one example page number, followed by a “+” (e.g. p49+).
12. The key is not the classification. After keying a stand, always consult the referenced descriptions/synoptic tables for additional details on vegetation composition, geographic distribution, and the typical environmental setting. If the description fits in most regards, you have likely made an accurate identification. If there are multiple inconsistencies between the stand and the description, consider trying the key again following slightly different leads or by increasing the flexibility of your cover estimates. Alternatively, the stand might represent an undocumented association, or an expansion of an existing association concept.
- a. To find descriptions for any other associations, see the listed reference (e.g., Crawford 2003) or click the EL Code (e.g., [CEGL006656](#)) to view the description on NatureServe Explorer (<https://explorer.natureserve.org/>).
  - b. Specific guidance for using NatureServe Explorer may be found here: <https://usnvc.org/wp-content/uploads/2025/10/NS-Explorer-Guidance.pdf>
  - c. Some associations (those with EL codes starting with ‘CTWA’ or ‘CWWA’) exist only in our state classification and have not yet been incorporated into the USNVC. These do not have descriptions on NatureServe Explorer. Note that some USNVC types are present in NatureServe Explorer, but lack descriptions.

### **Taxonomic standard**

All species names used in the key follow the Checklist of Vascular Plants of Washington (Weinmann et al., 2002; Hitchcock & Cronquist, 2018). However, FGDC requirements specify that association names follow US Department of Agriculture PLANTS nomenclature (Kartesz, 1999; USDA NRCS, 2006). Ecosystem classification and names align with USNVC version 3.0 (USNVC, 2025).

The following closely related species are used interchangeably in the key:

- Caltha leptosepala == C. biflora
- Cornus stolonifera == C. occidentalis, C. sericea
- Oxalis oregana == O. trilliifolia
- Glyceria elata == G. striata

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## Key to Physiognomic Categories

### West of Cascade Crest

Trees > 10%

Key to Westside Forest Types .....	p. 6
1 Deciduous Trees Dominant .....	p. 6
2 Conifers Dominant or Codominant .....	p. 13
2a <i>Sphagnum</i> prominent to dominant in ground layer .....	p. 13
2b <i>Sphagnum</i> absent OR uncommon and patchy .....	p. 15

Shrubs > 10%

3 Key to Westside Shrubland Types .....	p. 19
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Herbaceous Vegetation > 10%

4 Key to Westside Herbaceous Types .....	p. 29
4a Aquatic, submerged, or floating-leaved species dominant and emergent vegetation < 10% .....	p. 29
4b <i>Sphagnum</i> spp. codominant with vascular species .....	p. 32
4c Brackish/salt marsh or beach/coastal spit wetland .....	p. 33
4d Freshwater wetland; <i>Sphagnum</i> spp. sporadic or absent .....	p. 38
4d.1 Sedges ( <i>Carex</i> , <i>Eleocharis</i> , <i>Dulichium</i> , <i>Schoenoplectus</i> , <i>Scirpus</i> , or <i>Trichophorum</i> spp.) dominant .....	p. 38
4d.2 Rushes dominant .....	p. 45
4d.3 Grasses dominant .....	p. 46
4d.4 Forbs/ferns dominant .....	p. 48

Herbaceous Vegetation < 10%

5 Key to Westside Nonvascular & Sparse Vascular Vegetation Types .....	p. 53
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### East of Cascade Crest

(\*NOTE: When near the Crest--particularly at high elevations--attempt the westside key if no satisfactory association is reached within the eastside key)

Trees > 10%

Key to Eastside Forest Types .....	p. 54
6 Deciduous Trees Dominant .....	p. 54
7 Conifers Dominant or Codominant .....	p. 59

Shrubs > 10%

8 Key to Eastside Shrubland Types.....	p. 69
Herbaceous Vegetation > 10%	
9 Key to Eastside Herbaceous Types.....	p. 83
9a Aquatic, submerged, or floating-leaved species dominant and emergent vegetation < 10% .....	p. 83
9b Sedges ( <i>Carex</i> , <i>Bolboschoenus</i> , <i>Eleocharis</i> , <i>Dulichium</i> , <i>Eriophorum</i> , <i>Rhynchospora</i> , <i>Schoenoplectus</i> , <i>Scirpus</i> , or <i>Trichophorum</i> spp.) dominant ..	p. 85
9c Grasses dominant .....	p. 92
9d Rushes dominant .....	p. 97
9e Forbs/ferns dominant .....	p. 97
Herbaceous Vegetation < 10%	
10 Key to Eastside Nonvascular & Sparse Vascular Vegetation Types.....	p. 100
11 The wetland does not key to an existing association.....	p. 100

## Key to Westside Forest Types

### 1 *Deciduous Trees Dominant*

1a *Populus tremuloides* dominant, *Spiraea douglasii* and *Salix hookeriana* present, and *Carex obnupta* the dominant herb .....

#### ***Populus tremuloides* / *Carex obnupta* Swamp**

G2/S1? — [CEGL003371](#)

(Christy, 2004 p33; Kagan et al., 2004 p25; McCain & Christy, 2005 p219; Rocchio et al., 2012 pB-30)

1b *Quercus garryana* ≥ 25% AND *Fraxinus latifolia* usually ≥ 15% .....

#### ***Quercus garryana* - (*Fraxinus latifolia*) / *Symphoricarpos albus* Riparian Forest**

G2/S2 — [CEGL003299](#)

(Smith, 1985 p529; Chappell & Crawford, 1997 p119; Kagan et al., 2004 p29; Chappell, 2006a p123; Buechling et al., 2008 p9; Copass & Ramm-Granberg, 2016a pB-11)

1c *Fraxinus latifolia* dominant or codominant

1c.1 *Quercus garryana* present to codominant AND *Symphoricarpos albus* prominent .....

#### ***Quercus garryana* - (*Fraxinus latifolia*) / *Symphoricarpos albus* Riparian Forest**

G2/S2 — [CEGL003299](#)

(Smith, 1985 p529; Chappell & Crawford, 1997 p119; Kagan et al., 2004 p29; Chappell, 2006a p123; Buechling et al., 2008 p9; Copass & Ramm-Granberg, 2016a pB-11)

1c.2 *Populus trichocarpa* codominant

1c.2a *Cornus sericea* present to dominant shrub

1c.2a.1 *Impatiens capensis* ≥ 25% AND *Lysichiton americanus* present.....

***Populus balsamifera* ssp. *trichocarpa* / *Cornus sericea* / *Impatiens capensis* Riparian Forest**

G1/S1 — [CEGL003408](#)

[Note: Name needs to be resolved with current nativity status of *Impatiens capensis*]

(Christy & Putera, 1993 p41; Kunze, 1994 p60; Christy, 2004 p32; Kagan et al., 2004 p25)

1c.2a.2 *Impatiens capensis* may be present, but not dominant AND *Urtica dioica* present to dominant .....

***Fraxinus latifolia* - (*Populus balsamifera* ssp. *trichocarpa*) / *Cornus sericea* Riparian Forest**

G4/S2 — [CEGL003390](#)

(Christy & Putera, 1993 p41; Kunze, 1994 p52; Titus et al., 1996 p49; Kagan et al., 2004 p16; Copass & Ramm-Granberg, 2016a pB-12)

1c.2b *Acer circinatum* present to codominant.....

***Fraxinus latifolia* - *Populus balsamifera* ssp. *trichocarpa* / *Acer circinatum* Riparian Forest**

G3/S1 — [CEGL003404](#)

(Kagan et al., 2004 p16)

1c.2c *Corylus cornuta* and *Physocarpus capitatus* present to codominant .....

***Fraxinus latifolia* - *Populus balsamifera* ssp. *trichocarpa* / *Corylus cornuta* - *Physocarpus capitatus* Riparian Forest**

G3/S1? — [CEGL003364](#)

(Titus et al., 1996 p49; Kagan et al., 2004 p16)

1c.2d *Rubus spectabilis* dominant or codominant .....

***Fraxinus latifolia* - *Populus balsamifera* ssp. *trichocarpa* / *Rubus spectabilis* Riparian Forest**

G2/S1 — [CEGL003405](#)

(Titus et al., 1996 p49; Kagan et al., 2004 p16)

1c.2e *Symphoricarpos albus* ≥ 50% .....

***Fraxinus latifolia* - *Populus balsamifera* ssp. *trichocarpa* / *Symphoricarpos albus* Riparian Forest**

G4/S2? — [CEGL000641](#)

(Kunze, 1994 p53; Titus et al., 1996 p50)

1c.3 *Cornus sericea* present to dominant shrub .....

***Fraxinus latifolia* - (*Populus balsamifera* ssp. *trichocarpa*) / *Cornus sericea* Riparian Forest**

G4/S2 — [CEGL003390](#)

(Christy & Putera, 1993 p41; Kunze, 1994 p52; Titus et al., 1996 p49; Kagan et al., 2004 p16; Copass & Ramm-Granberg, 2016a pB-12)

- 1c.4 *Spiraea douglasii* dominant shrub .....  
**Fraxinus latifolia / Spiraea douglasii Swamp**  
G3/S2? — [CEGL003392](#)  
(Christy, 2004 p26; Kagan et al., 2004 p16; McCain & Christy, 2005 p213)
- 1c.5 *Symphoricarpos albus* ≥ 20% .....  
**Fraxinus latifolia / Symphoricarpos albus Riparian Forest**  
G4/S2? — [CEGL003393](#)  
(Heinitz, 1982 p20; Frenkel & Heinitz, 1987 p208; Kunze, 1994 p33; Christy, 2004; Kagan et al., 2004 p16; McCain & Christy, 2005)
- 1c.6 *Carex leptopoda*, *Carex obnupta*, and *Urtica dioica* present to dominant herbs .....  
**Fraxinus latifolia / Carex deweyana - Urtica dioica Riparian Forest**  
G1/S1 — [CEGL003365](#)  
(Kunze, 1994 p52; Christy, 2004 p24; Kagan et al., 2004 p16; McCain & Christy, 2005 p211)
- 1c.7 *Carex obnupta* ≥ 35% (dominant herb) and both *Carex leptopoda* and *Urtica dioica* ssp. *gracilis* absent .....  
**Fraxinus latifolia / Carex obnupta Swamp**  
G4/S2? — [CEGL000640](#)  
(Kunze, 1994 p33; Christy, 2004 p25; McCain & Christy, 2005 p212)
- 1d *Populus trichocarpa* dominant to codominant
- 1d.1 *Oplopanax horridus* ≥ 5%. Near Cascade Crest or further east. ....  
**Populus balsamifera ssp. trichocarpa / Oplopanax horridus - Acer glabrum Riparian Woodland**  
G2/S2 — [CEGL000482](#)  
(Kovalchik & Clausnitzer, 2004 p119)
- 1d.2 *Acer macrophyllum* codominant
- 1d.2a *Picea sitchensis* present to codominant AND *Oxalis oregana* present .....  
**Populus balsamifera ssp. trichocarpa - Picea sitchensis - (Acer macrophyllum) / Oxalis oregana Riparian Forest**  
G2G3/S2 — [CEGL003418](#)  
(Fonda, 1974 p931; Chappell, 1999 p27; Crawford et al., 2009 pA-220; Ramm-Granberg et al., 2021 pA-136)
- 1d.2b *Symphoricarpos albus* dominant shrub .....  
**Populus balsamifera ssp. trichocarpa - Acer macrophyllum / Symphoricarpos albus Riparian Forest**  
G3/S2S3 — [CEGL003363](#)  
(Titus et al., 1996 p45; Kagan et al., 2004 p24)
- 1d.2c *Equisetum hyemale* present to dominant herb .....  
**Populus balsamifera ssp. trichocarpa - Acer macrophyllum / Equisetum hyemale Riparian Forest**  
G3/S2? — [CEGL003406](#)  
(Titus et al., 1996 p45; Kagan et al., 2004 p24)

- 1d.3 *Alnus rubra* codominant
- 1d.3a *Symphoricarpos albus* dominant shrub .....  
**Populus balsamifera ssp. trichocarpa - *Alnus rubra* /  
*Symphoricarpos albus* Riparian Forest**  
G3/S2? — [CEGL003362](#)  
(Titus et al., 1996 p47; Kagan et al., 2004 p25)
- 1d.3b *Rubus spectabilis* dominant shrub .....  
**Populus balsamifera ssp. trichocarpa - *Alnus rubra* /  
*Rubus spectabilis* Riparian Forest**  
G2G3/S2? — [CEGL003407](#)  
(Titus et al., 1996 p47; Kagan et al., 2004 p25)
- 1d.3c *Carex obnupta* prominent to codominant.....  
**Populus balsamifera ssp. trichocarpa / *Cornus  
sericea* / *Carex obnupta* Riparian Forest**  
GNR/SNR — [CEGL002844](#)  
(Green & Klinka, 1994; Meidinger et al., 2005; Rocchio et al., 2012  
pB-29; Ramm-Granberg et al., 2021 pA-237)
- 1d.4 *Picea sitchensis* codominant AND *Oxalis oregana* present .....  
**Populus balsamifera ssp. trichocarpa - *Picea  
sitchensis* - (*Acer macrophyllum*) / *Oxalis oregana* Riparian Forest**  
G2G3/S2 — [CEGL003418](#)  
(Fonda, 1974 p931; Chappell, 1999 p27; Crawford et  
al., 2009 pA-220; Ramm-Granberg et al., 2021 pA-136)
- 1d.5 *Cornus sericea* present to dominant shrub
- 1d.4a *Impatiens capensis* ≥ 25% .....  
**Populus balsamifera ssp. trichocarpa / *Cornus sericea* / *Impatiens  
capensis* Riparian Forest**  
G1/S1 — [CEGL003408](#)  
[Note: Name needs to be resolved with current nativity status of  
*Impatiens capensis*]  
(Christy & Putera, 1993 p41; Kunze, 1994 p60; Christy, 2004 p32;  
Kagan et al., 2004 p25)
- 1d.5b *Carex obnupta* prominent to codominant.....  
**Populus balsamifera ssp. trichocarpa / *Cornus  
sericea* / *Carex obnupta* Riparian Forest**  
GNR/SNR — [CEGL002844](#)  
(Green & Klinka, 1994; Meidinger et al., 2005; Rocchio et al., 2012  
pB-29; Ramm-Granberg et al., 2021 pA-237)
- 1d.5c Not as above. Low-elevation valley bottoms just east of Cascade Crest .....  
**Populus balsamifera ssp. trichocarpa / *Cornus sericea* Riparian  
Forest**  
G3G4/S2? — [CEGL000672](#)  
(Crawford et al., 2009 pA-218; Ramm-Granberg et al., 2021 A-118)

1e *Acer macrophyllum* dominant

1e.1 *Picea sitchensis* present to codominant and *Oxalis oregana* present OR *Oxalis oregana* ≥ 5% .....

***Acer macrophyllum* / *Oxalis oregana* Riparian Forest**

G3G4/S2S3 — CWWA000205

(Crawford et al., 2009 pA-200; Ramm-Granberg et al., 2021 pA-125)

1e.2 *Symphoricarpos albus* dominant shrub AND *Urtica dioica* ssp. *gracilis* present to dominant ...

***Acer macrophyllum* / *Symphoricarpos albus* / *Urtica dioica* ssp. *gracilis* Riparian Forest**

G3/SU — [CEGL003396](#)

(Titus et al., 1996 p44; Kagan et al., 2004 p5)

1e.3 *Rubus spectabilis* dominant shrub .....

***Acer macrophyllum* / *Rubus spectabilis* Riparian Forest**

G4/S4 — [CEGL000561](#)

(Douglas, 1971; Crawford et al., 2009 pA-202; Rocchio et al., 2012 pB-27; Ramm-Granberg et al., 2021 pA-127)

1e.4 *Rubus ursinus* dominant .....

***Acer macrophyllum* / (*Rubus ursinus* - *Toxicodendron diversilobum*) Riparian Forest**

G3/SNR — [CEGL003395](#)

(Titus et al., 1996 p45; Kagan et al., 2004 p5)

1e.5 *Polystichum munitum* ≥ 25% AND both *Rubus spectabilis* and *Ribes bracteosum* minor or absent; OR *Polystichum munitum* present and *Tolmiea menziesii* ≥ 5% .....

***Acer macrophyllum* / *Polystichum munitum* - *Tolmiea menziesii* Riparian Forest**

G3G4/S3S4 — CWWA000206

(Crawford et al., 2009 pA-201; Ramm-Granberg et al., 2021 pA-126)

1e.6 *Urtica dioica* dominant (typically ≥ 50%) .....

***Acer macrophyllum* / *Urtica dioica* ssp. *gracilis* Riparian Forest**

G3/SU — [CEGL003397](#)

(Titus et al., 1996 p44; Kagan et al., 2004 p5)

1e.7 Not as above. *Maianthemum stellatum* present .....

***Acer macrophyllum* / *Maianthemum stellatum* Riparian Forest**

GNR/S2S4 — CWWA000440

(Crawford et al., 2009 pA-199; Ramm-Granberg et al., 2021 pA-138)

1f *Alnus rubra* dominant

1f.1 *Picea sitchensis* codominant AND *Carex obnupta* and/or *Lysichiton americanus* present to codominant.....

***Picea sitchensis* / *Rubus spectabilis* / *Carex obnupta* - *Lysichiton americanus* Swamp**

G2G3/S2 — [CEGL000400](#)

(Kratz, 1975 p23; Kunze, 1994 p91, 98; Chappell, 1999; Christy, 2004 p28; Crawford et al., 2009 pA-192)

1f.2 *Oplopanax horridus* ≥ 5%

1f.2a Maritime indicators present (*Polystichum munitum*, *Blechnum spicant*, *Tolmiea menziesii*). *Rubus spectabilis* and/or *Ribes bracteosum* usually prominent to codominant. West Cascades and Puget Trough .....

***Alnus rubra* / *Oplopanax horridus* - *Rubus spectabilis* Riparian Forest**

G4G5/S4 — [CEGL003399](#)

(Franklin et al., 1988 p56; Diaz & Mellen, 1996 p51; Crawford et al., 2009 pA-205; Ramm-Granberg et al., 2021 pA-130)

1f.2b *Athyrium filix-femina* dominates herb layer. *Maianthemum racemosum* usually present. East Cascades .....

***Alnus rubra* / *Oplopanax horridus* / *Athyrium filix-femina* Riparian Forest**

GNR/SNR — [CEGL006696](#)

(Kovalchik & Clausnitzer, 2004 p131)

1f.3 *Rubus parviflorus* ≥ 30% .....

***Alnus rubra* / *Rubus parviflorus* Riparian Forest**

G4/S3 — [CEGL003402](#)

(Diaz & Mellen, 1996 p63; Crawford et al., 2009 pA-207; Ramm-Granberg et al., 2021 pA-132)

1f.4 *Rubus spectabilis* dominant shrub

1f.4a *Carex obnupta* (always present) and/or *Lysichiton americanus* ≥ 5% .....

***Alnus rubra* / *Rubus spectabilis* / *Carex obnupta* - *Lysichiton americanus* Swamp**

G3G4/S3 — [CEGL003389](#)

(Kunze, 1994 p32; Christy et al., 1998 p64; Chappell, 1999 p12; Christy, 2004 p22; Crawford et al., 2009 pA-209; Ramm-Granberg et al., 2021 pA-142)

1f.4b *Chrysosplenium glechomifolium* ≥ 25% .....

***Alnus rubra* / *Rubus spectabilis* / *Chrysosplenium glechomifolium* Riparian Forest**

G3G4/S3S4 — CWWA000208

(Chappell, 1999 p14; Crawford et al., 2009 pA-198)

1f.4c *Rubus spectabilis* + *Ribes bracteosum* ≥ 20% .....

***Alnus rubra* / *Rubus spectabilis* Riparian Forest**

G4G5/S4S5 — [CEGL000639](#)

(Agee, 1987 p16; Kunze, 1994 p32; Mycek, 1994 p83; Diaz & Mellen, 1996 p67; Chappell, 1999 p9; Murray, 2000; Peter, 2000 p38; Crawford et al., 2009 pA-208; Copass & Ramm-Granberg, 2016b pB-29; Ramm-Granberg et al., 2021 pA-133)

1f.5 *Lysichiton americanus* dominates the herb layer OR *Athyrium filix-femina* dominates and *Lysichiton americanus* is present .....

***Alnus rubra* / *Athyrium filix-femina* - *Lysichiton americanus* Swamp**

G3G4/S3 — [CEGL003388](#)

(Kunze, 1994 p32; Murray, 2000 p42; Christy, 2004 p21; McCain & Christy, 2005 p208; Crawford et al., 2009 pA-196; Ramm-Granberg et al., 2021 pA-140)

- 1f.6 *Alnus viridis* ssp. *sinuata* ≥ 10% .....  
***Alnus rubra* / *Alnus viridis* ssp. *sinuata* Riparian Forest**  
 GNR/S3S4 — [CEGL006695](#)  
 (Kovalchik & Clausnitzer, 2004 p131)
- 1f.7 *Acer circinatum* ≥ 10%  
 1f.7a *Acer circinatum* dominant shrub (often ≥ 40%); *Abies grandis* absent; *Claytonia sibirica* usually present.....  
***Alnus rubra* / *Acer circinatum* / *Claytonia sibirica* Riparian Forest**  
 G4G5/S4 — [CEGL003298](#)  
 (Mycek, 1994 p89; Diaz & Mellen, 1996 p43; Crawford et al., 2009 pA-203; Ramm-Granberg et al., 2021 pA-128)
- 1f.7b *Abies grandis*, *Cornus stolonifera*, *Moehringia macrophylla*, and/or *Osmorhiza purpurea* present.....  
***Alnus rubra* / *Acer circinatum* Riparian Forest**  
 GNR/SNR — CWWA000298  
 (Kovalchik & Clausnitzer, 2004 p131)
- 1f.8 *Elymus glaucus* or *E. hirsutus* present to dominant AND *Poa trivialis* usually present .....  
***Alnus rubra* / *Elymus glaucus* Riparian Forest**  
 G4/S3S4 — [CEGL003398](#)  
 (Fonda, 1974 p931; Henderson et al., 1979 p37, 38; Diaz & Mellen, 1996 p47, 103; Chappell, 1999 p16; Crawford et al., 2009 pA-204; Ramm-Granberg et al., 2021 pA-129)
- 1f.9 *Glyceria striata* ≥ 30%; *Veronica americana* usually present .....  
***Alnus rubra* / *Glyceria striata* Riparian Woodland**  
 GNR/S2S4— CWWA000207  
 (Murray, 2000 p43; Crawford et al., 2009 pA-197; Ramm-Granberg et al., 2021 pA-141)
- 1f.10 *Oxalis oregana* and/or *O. trilliifolia* ≥ 25%.....  
***Alnus rubra* / *Oxalis (oregana, trilliifolia)* Riparian Forest**  
 G4/S3S4 — [CEGL003400](#)  
 (Diaz & Mellen, 1996 p55; Crawford et al., 2009 pA-212; Ramm-Granberg et al., 2021 pA-131)
- 1f.11 *Trautvetteria caroliniensis* or *Achlys triphylla* ≥ 15% AND *Vaccinium ovalifolium* usually ≥ 5% .....  
***Alnus rubra* / *Vaccinium ovalifolium* / *Trautvetteria caroliniensis* Riparian Forest**  
 G3G4/S3S4 — CWWA000044  
 (Diaz & Mellen, 1996 p107)
- 1f.12 *Stachys ciliata* + *Tolmiea menziesii* + *Tiarella trifoliata* + *Claytonia sibirica* + *Circaea alpina* + *Urtica dioica* + *Petasites frigidus* ≥ 10% .....  
***Alnus rubra* / *Stachys chamissonis* var. *cooleyae* - *Tolmiea menziesii* Riparian Forest**  
 G4/S3S4 — [CEGL003403](#)  
 (Murray, 2000 p43; Crawford et al., 2009 pA-210; Ramm-Granberg et al., 2021 pA-134)

1f.13 *Carex obnupta* dominant herb beneath open shrub layer. Usually occurs on formerly manipulated soils in Olympic rainshadow .....

***Alnus rubra* / *Carex obnupta* Ruderal Swamp**  
GNA/SNA — CWWA000438  
(Rocchio et al., 2012 pB-32)

1f.14 Not as above AND exotic grasses dominant .....

***Alnus rubra* / Nonnative Grasses Ruderal Flooded Forest**  
GNA/SNA — Not Tracked  
(Rocchio et al., 2012 pB-33)

1f.15 *Polystichum munitum* dominant (riparian/wetland associates such as *Claytonia sibirica*, *Athyrium filix-femina*, etc. may be prominent).....

***Alnus rubra* / *Polystichum munitum* Forest**  
G4/S4 — [CEGL000638](#)  
[This is an early seral upland community associated with disturbance]  
(Moral & Long, 1977; Agee, 1987; Chappell, 2001, 2006a; Crawford et al., 2009; Rocchio et al., 2012; Ramm-Granberg et al., 2021 pA-32)

1g *Prunus emarginata* dominant.....

***Prunus emarginata* Ruderal Flooded Forest**  
GNA/SNA — Not Tracked  
(Rocchio et al., 2012 pB-34; Copass & Ramm-Granberg, 2016b pB-32)

## **2 Conifers Dominant or Codominant**

### 2a Sphagnum prominent to dominant in ground layer

2a.1 *Pinus contorta* var. *contorta* dominant to codominant (typically stunted and many individuals < 5m), *Thuja plicata* ≥ 10%, AND *Myrica gale* ≥ 15% .....

***Pinus contorta* var. *contorta* - *Thuja plicata* / *Myrica gale* / *Sphagnum* spp. Treed Fen**  
G3G4/S1 — [CEGL001691](#)  
(Kunze, 1994 p76)

2a.2 *Pinus contorta* var. *contorta* dominant to codominant (typically stunted and many individuals < 5m)

2a.2a *Rhododendron neoglandulosum* (= *Ledum glandulosum*) ≥ 10% .....

***Pinus contorta* var. *contorta* / *Ledum glandulosum* / *Sphagnum* spp. Treed Bog**  
G1/SU — CWWA000121  
(Kagan et al., 2004 p21)

2a.2b *Ledum groenlandicum* ≥ 10% AND *Betula papyrifera* prominent to codominant .....

***Pinus contorta* var. *contorta* - *Betula papyrifera* / *Ledum groenlandicum* Treed Bog [Provisional]**  
GNRQ/S1 — CWWA000235  
(Unpublished notes by L. Kunze (WNHP), F. Caplow (WNHP), and G. B. Rigg (U of Washington))

- 2a.2c *Ledum groenlandicum* ≥ 10%, *Sphagnum* ≥ 20%, AND *Xerophyllum tenax* present.....  
***Pinus contorta* var. *contorta* / *Ledum groenlandicum* / *Xerophyllum tenax* / *Sphagnum* spp. Treed Bog**  
 GNRQ/S1 — CWWA000202  
 (WNHP Plot Data)
- 2a.2d *Ledum groenlandicum* or *Gaultheria shallon* ≥ 10% AND *Sphagnum* ≥ 20% .....  
***Pinus contorta* var. *contorta* / *Ledum groenlandicum* / *Sphagnum* spp. Treed Bog**  
 G3/S2 — [CEGL003337](#)  
 (Kunze, 1994 p19, 75; Crawford et al., 2009 pA-294; Ramm-Granberg et al., 2021 pA-184)
- 2a.3 *Thuja plicata* and/or *Tsuga heterophylla* dominant
- 2a.3a *Carex* spp. prominent to dominant (*C. obnupta*, *C. echinata*, *C. aquatilis* var. *dives*, and/or *C. utriculata* are typical), AND *Ledum groenlandicum* present to codominant. Outer Coast. ....  
***Tsuga heterophylla* - (*Thuja plicata*) / *Ledum groenlandicum* / *Carex* (*obnupta*, *utriculata*) / *Sphagnum* spp. Treed Bog**  
 GNR/S1 — CWWA000253  
 (Kunze, 1994 p78)
- 2a.3b *Lysichiton americanus* and *Blechnum spicant* abundant. *Gaultheria shallon*, *Menziesia ferruginea*, *Frangula purshiana*, and *Vaccinium alaskense* dominate the shrub layer AND > *Ledum groenlandicum*. Shrubs often rooted on woody debris. *Sphagnum* ≥ 10%. Trees can be large, but often have broken tops .....  
***Thuja plicata* - *Tsuga heterophylla* / *Lysichiton americanus* / *Sphagnum* spp. Treed Fen**  
 G3G4/S1S2 — [CEGL001787](#)  
 (Kunze, 1994 p77)
- 2a.3c *Ledum groenlandicum* + *Kalmia microphylla* ≥ 10% AND *Sphagnum* ≥ 25% beneath open canopy of stunted to moderately tall *Tsuga heterophylla* and/or *Thuja plicata*. *Gaultheria shallon* may codominate shrub layer .....  
***Tsuga heterophylla* - (*Thuja plicata*) / *Ledum groenlandicum* / *Sphagnum* spp. Treed Bog**  
 G3/S2 — [CEGL003339](#)  
 (Kunze, 1994 p20; Crawford et al., 2009 pA-296; Ramm-Granberg et al., 2021 pA-185)
- 2a.3d Dense, mature, nearly closed canopy of *Tsuga heterophylla* on peat soils. *Thuja plicata* may also be present. Understory is sparse, except in canopy gaps. *Sphagnum* present but usually < 5% AND feather mosses dominate forest floor. Peat substrate .....  
***Tsuga heterophylla* - (*Thuja plicata*) / *Sphagnum* spp. Treed Bog**  
 G1/S1 — [CEGL003417](#)  
 (Kunze, 1994 p20)
- 2a.4 *Pinus monticola* dominant, *Tsuga heterophylla* usually present, *Ledum groenlandicum* dominant in understory, AND *Pinus monticola* often the only regenerating tree.....  
***Pinus monticola* / *Ledum groenlandicum* / *Sphagnum* spp. Treed Bog**  
 G1/S1 — [CEGL003360](#)  
 (Kunze, 1994 p19)

2b Sphagnum absent OR uncommon and patchy

2b.1 *Pinus contorta* var. *contorta* present and typically only tree species. *Salix hookeriana* and/or *Myrica californica* commonly present. *Carex obnupta* present to dominant. Swales within stabilized dunes .....

***Pinus contorta* var. *contorta* / *Carex obnupta* Swamp**

G2/S1 — [CEGL000142](#)

(Wiedemann, 1984 p56; Christy et al., 1998 p60; Christy, 2004 p31;  
Kagan et al., 2004 p21; McCain & Christy, 2005 p217)

2b.2 *Picea sitchensis* dominant or co-dominant (generally  $\geq 20\%$ )

2b.2a *Tsuga heterophylla* and *Alnus rubra* codominant AND *Oxalis oregana* and *Chrysosplenium glechomifolium*  $\geq 15\%$  .....

***Picea sitchensis* - *Alnus rubra* / *Lysichiton americanus* -  
*Chrysosplenium glechomifolium* Swamp**

GNR/S2 — CWWA000233

(Chappell, 1999 p19)

2b.2b *Cornus sericea* AND *Lysichiton americanus* present to dominant .....

***Picea sitchensis* / *Cornus sericea* / *Lysichiton americanus* Swamp**

G2/S1 — [CEGL000055](#)

(Christy, 2004 p29; Kagan et al., 2004 p20; McCain & Christy, 2005  
p216)

2b.2c *Carex obnupta* and/or *Lysichiton americanus* present to dominant, *Alnus rubra* usually present to codominant.....

***Picea sitchensis* / *Rubus spectabilis* / *Carex obnupta* - *Lysichiton americanus* Swamp**

G2G3/S2 — [CEGL000400](#)

(Kratz, 1975 p23; Kunze, 1994 p91, 98; Christy et al., 1998 p62;  
Chappell, 1999 p12, 36; Christy, 2004 p28; Kagan et al., 2004 p20;  
McCain & Christy, 2005 p215; Crawford et al., 2009 pA-192;  
Ramm-Granberg et al., 2021 pA-145)

2b.2d *Oplopanax horridus*  $\geq 25\%$  .....

***Picea sitchensis* - *Tsuga heterophylla* - (*Alnus rubra*) / *Oplopanax horridus* / *Polystichum munitum* Swamp**

GNR/S2S3 — [CEGL005529](#)

(Crawford et al., 2009 pA-215; Ramm-Granberg et al., 2021 pA-145)

2b.2e *Rubus spectabilis* dominant shrub .....

***Picea sitchensis* - (*Alnus rubra*) / *Rubus spectabilis* / *Polystichum munitum* Riparian Forest**

GNR/S3 — [CEGL007297](#)

(Crawford et al., 2009 pA-213; Ramm-Granberg et al., 2021 pA-125)

2b.2f *Scirpus microcarpus* and/or *Glyceria* spp. dominant. *Lysichiton americanus* may be present.

***Picea sitchensis* / *Scirpus microcarpus* Riparian Woodland**

GNR/SNR — CWWA000434

(Crawford et al., 2009 pA-214)

2b.3 *Pinus contorta* var. *contorta* dominant or codominant AND *Thuja plicata* present. *Alnus incana* (or *Alnus viridis*, near the Cascade Crest) dominates understory with *Vaccinium uliginosum* and *Carex* species. Montane fens .....

***Pinus contorta* var. *contorta* - *Thuja plicata* / *Alnus incana* / *Carex aquatilis* var. *dives*, *echinata* ssp. *echinata*) Swamp**  
GNRQ/SU — CWWA000258  
(WNHP Plot Data)

2b.4 *Tsuga mertensiana* dominant or codominant with *Abies amabilis*

2b.4a *Oplopanax horridus* ≥ 5% to codominant with *Vaccinium ovalifolium* (= *alaskaense*).....

***Abies amabilis* - *Tsuga mertensiana* / *Oplopanax horridus* Swamp**  
G3G4/S3 — [CEGL000507](#)  
(Kovalchik & Clausnitzer, 2004 p19; Crawford et al., 2009 pA-191)

2b.4b *Caltha biflora* or *C. leptosepala* ≥ 5% .....

***Tsuga mertensiana* - *Abies amabilis* / *Caltha leptosepala* ssp. *howellii* Swamp**  
G3/S3 — [CEGL000501](#)  
(Henderson et al., 1992 p150; Crawford et al., 2009 pA-298; Ramm-Granberg et al., 2021 pA-123)

2b.5 *Abies amabilis* dominant or codominant AND *Tsuga mertensiana* absent or low cover

2b.5a *Oplopanax horridus* ≥ 5% .....

***Abies amabilis* - *Tsuga heterophylla* / *Oplopanax horridus* Swamp**  
G5/S5 — [CEGL000004](#)  
(Brockway et al., 1983 p62; Brockway & Topik, 1984 p5; Franklin et al., 1988 p58; Henderson et al., 1989 p198, 1992 p92; Crawford et al., 2009 pA-223; Ramm-Granberg et al., 2021 pA-120)

2b.5b *Rubus spectabilis* ≥ 10%. Valley bottoms .....

***Abies amabilis* / *Rubus spectabilis* - *Vaccinium alaskaense* Riparian Forest [Provisional]**  
G2G4Q/S2S4 — CWWA000200  
(Crawford et al., 2009 pA-233; Ramm-Granberg et al., 2021 pA-121)

2b.5c *Lysichiton americanus* ≥ 5% .....

***Tsuga heterophylla* - (*Thuja plicata* - *Alnus rubra*) / *Lysichiton americanus* - *Athyrium filix-femina* Swamp**  
GNR/S2S3 — [CEGL007322](#)  
(Crawford et al., 2009 pA-193; Rocchio et al., 2012 pB-31; Ramm-Granberg et al., 2021 pA-146)

2b.6 *Thuja plicata* dominant or codominant

2b.6a *Rubus spectabilis* and/or *Ribes bracteosum* ≥ 10% AND *Oxalis oregana* ≥ 20%.....

***Thuja plicata* / *Rubus spectabilis* / *Oxalis oregana* Riparian Forest**  
GNR/S2 — [CEGL007292](#)  
(Diaz & Mellen, 1996 p39)

2b.6b *Pinus contorta* present AND *Alnus incana* (or *Alnus viridis*, near the Cascade Crest) dominates understory with *Vaccinium uliginosum* and *Carex* species. Montane fens .....

***Pinus contorta* var. *contorta* - *Thuja plicata* / *Alnus incana* / *Carex*  
(*aquatilis* var. *dives*, *echinata* ssp. *echinata*) Swamp**

GNRQ/SU — CWWA000258

(WNHP Plot Data)

2b.6c *Oplopanax horridus* ≥ 5%

2b.6c.1 *Rubus spectabilis* present. Other maritime species prominent (e.g. *Polystichum munitum*, *Blechnum spicant*, *Vaccinium parvifolium*, *V. ovalifolium*, *Gaultheria shallon*, *Oxalis oregana*, and/or *Maianthemum dilatatum*) .....

***Tsuga heterophylla* - (*Pseudotsuga menziesii*) / *Oplopanax horridus*  
/ *Polystichum munitum* Swamp**

G4/S4 — [CEGL000497](#)

(Topik et al., 1986 p74; Franklin et al., 1988 p54; Henderson et al., 1989 p314, 1992 p50; Mycek, 1994 p79; Chappell, 2001 p31, 2006a p137; Crawford et al., 2009 pA-120; Ramm-Granberg et al., 2021 pA-147)

2b.6c.2 Maritime-associated species generally absent or low in cover. *Abies grandis*, *Asaraum caudatum*, and/or *Ribes lacustre* present. Near Cascade Crest and east .....

***Thuja plicata* - *Tsuga heterophylla* / *Oplopanax horridus* Rocky  
Mountain Swamp**

G3/S2S3 — [CEGL000479](#)

(Daubenmire, 1952 p315; < Daubenmire & Daubenmire, 1968 p35; Pfister et al., 1977 p74; Cooper et al., 1991 p27; Braumandl & Curran, 1992 p45; Hansen et al., 1995 p167)

2b.6d *Lysichiton americanus* dominant to codominant herb

2b.6d.1 *Gaultheria shallon* ≥ 10% .....

***Tsuga heterophylla* - *Thuja plicata* / *Vaccinium ovalifolium* -  
*Gaultheria shallon* / *Lysichiton americanus* Swamp**

GNR/S2 — [CEGL007939](#)

(Crawford et al., 2009 p A-195; Ramm-Granberg et al., 2021 pA-148)

2b.6d.2 *Rubus spectabilis* or *Athyrium filix-femina* dominant .....

***Tsuga heterophylla* - (*Thuja plicata* - *Alnus rubra*) / *Lysichiton*  
*americanus* - *Athyrium filix-femina* Swamp**

GNR/S2S3 — [CEGL007322](#)

(Crawford et al., 2009 pA-193; Rocchio et al., 2012 pB-31; Ramm-Granberg et al., 2021 pA-146)

2b.6e *Athyrium filix-femina*, *Circaea alpina*, *Petasites frigidus*, and/or *Stachys cooleyae* (=S. *chamissonis* var. *cooleyae*) dominate herb layer .....

***Thuja plicata* / *Athyrium filix-femina* - *Stachys chamissonis* var.  
*cooleyae* Riparian Forest**

GNR/S3? — [CEGL007290](#)

(Diaz & Mellen, 1996 p35)

2b.7 *Tsuga heterophylla* dominant or codominant

2b.7a *Lysichiton americanus* dominant to codominant herb

2b.7a.1 *Gaultheria shallon* ≥ 10% .....

***Tsuga heterophylla* - *Thuja plicata* / *Vaccinium ovalifolium* -  
*Gaultheria shallon* / *Lysichiton americanus* Swamp**

GNR/S2 — [CEGL007939](#)

(Crawford et al., 2009 pA-195; Ramm-Granberg et al., 2021 pA-148)

2b.7a.2 *Rubus spectabilis* or *Athyrium filix-femina* dominant .....

***Tsuga heterophylla* - (*Thuja plicata* - *Alnus rubra*) / *Lysichiton americanus* - *Athyrium filix-femina* Swamp**

GNR/S2S3 — [CEGL007322](#)

(Crawford et al., 2009 pA-193; Rocchio et al., 2012 pB-31; Ramm-Granberg et al., 2021 pA-146)

2b.7b *Oplopanax horridus* ≥ 5% .....

***Tsuga heterophylla* - (*Pseudotsuga menziesii*) / *Oplopanax horridus*  
/ *Polystichum munitum* Swamp**

G4/S4 — [CEGL000497](#)

(Topik et al., 1986 p74; Franklin et al., 1988 p54; Henderson et al., 1989 p314, 1992 p50; Mycek, 1994 p79; Chappell, 2001 p31, 2006a p137; Crawford et al., 2009 pA-120; Ramm-Granberg et al., 2021 pA-147)

2b.7c Dense, mature, nearly closed canopy of *Tsuga heterophylla* on peat soils with little understory. *Thuja plicata* may be present. *Sphagnum* present but usually < 5% .....

***Tsuga heterophylla* - (*Thuja plicata*) / *Sphagnum* spp. Treed Bog**

G1/S1 — [CEGL003417](#)

(Kunze, 1994 p20)

2b.7d *Polystichum munitum* + *Athyrium filix-femina* + *Tiarella trifoliata* ≥15%. *Rubus spectabilis* often present .....

***Tsuga heterophylla* - (*Pseudotsuga menziesii* - *Thuja plicata*) /  
*Polystichum munitum* - *Athyrium filix-femina* Swamp**

G3G4/S3 — [CEGL005576](#)

[This is a borderline wetland/upland association that is in an upland group]

(Chappell, 2001 p29, 2006a p135; Crawford et al., 2009 pA-216; Copass & Ramm-Granberg, 2016b pB-30; Ramm-Granberg et al., 2021 pA-40)

2b.8 *Abies lasiocarpa* or *Picea engelmannii* dominant or codominant AND *Rubus spectabilis* dominates shrub layer. *Lonicera involucrata* and/or *Ribes lacustre* often present .....

***Abies lasiocarpa* / *Rubus spectabilis* Riparian Forest [Provisional]**

G2G4Q/S2S4 — CWWA000203

(Crawford et al., 2009 pA-235)

2b.9 *Callitropsis nootkatensis* (= *Cupressus nootkatensis*) dominant AND *Oplopanax horridus* present to dominant .....

***Callitropsis nootkatensis* / *Oplopanax horridus* Swamp**

G3/S3? — [CEGL000349](#)

(Antos & Zobel, 1986 p1904; Crawford et al., 2009 pA-165)

2b.10 Not as above, deciduous trees at least prominent.....  
**Return to 'Deciduous Trees Dominant' Key (1)**

### 3 Key to Westside Shrubland Types

3a *Betula glandulosa* ≥ 50% AND *Carex aquatilis* var. *dives* ≥ 30%. Primarily found in eastern Washington, but present in the Cascades .....

***Betula glandulosa* / *Carex aquatilis* var. *dives* Shrub Fen**  
GNR/S1 — CWWA000209  
(Murray, 2000 p44; Christy, 2004 p39)

3b *Oplopanax horridus* ≥ 30%. *Acer circinatum*, *Ribes bracteosum*, or *Rubus parviflorus* often ≥ 10%.....

***Oplopanax horridus* Pacific Coast Wet Shrubland**  
G4/S4 — CWWA000114

(Henderson & Peter, 1982 p70; Mycek, 1994 p106; Diaz & Mellen, 1996 p119; Chappell, 1999 p35; Murray, 2000 p25; Peter, 2000 p30; Crawford et al., 2009 pA-229)

3c *Ledum groenlandicum* or *Kalmia microphylla* dominant or both codominant

3c.1 *Sphagnum* absent or minor

3c.1a *Vaccinium deliciosum* and *Phyllodoce empetrififormis* present AND *Carex nigricans* ≥ 5%. *Sphagnum* absent. Subalpine.....

***Kalmia microphylla* / *Carex nigricans* Wet Dwarf-shrubland**  
G3G4/S3 — [CEGL001402](#)

(Henderson, 1973 p113; Wooten & Morrison, 1995 p109; Crawford et al., 2009 pA-297; Ramm-Granberg et al., 2021 pA-197)

3c.1b *Carex cusickii*, *C. interior*, and/or *C. utriculata* dominant AND *Festuca rubra* present to prominent. *Triglochin maritima* often present. Peat soils associated with ultramafic bedrock.....

***Ledum groenlandicum* / *Carex (cusickii, interior, utriculata)* - *Festuca rubra* Shrub Fen**  
GNR/S1 — [CEGL006698](#)  
(WNHP Plot Data)

3c.1c *Carex cusickii* ≥ 25% .....

***Ledum groenlandicum* / *Carex cusickii* Shrub Fen [Provisional]**  
GNRQ/S1 — CWWA000228  
(WNHP Plot Data)

3c.1d *Gaultheria shallon* ≥ 25% .....

***Ledum groenlandicum* - *Gaultheria shallon* / *Sphagnum* spp. Shrub Bog**  
GNR/SNR — CWWA000226  
(Kunze, 1994 p17)

- 3c.2 Sphagnum codominant
- 3c.2a Empetrum nigrum prominent to codominant
- 3c.2a.1 Pinus contorta var. contorta ≥ 10% .....
- Pinus contorta var. contorta / Ledum groenlandicum / Xerophyllum tenax / Sphagnum spp. Treed Bog**  
GNRQ/S1— CWWA000202  
(WNHP Plot Data)
- 3c.2a.2 Pinus contorta var. contorta absent or minor .....
- Kalmia microphylla - Vaccinium oxycoccos / Empetrum nigrum / Sphagnum spp. Shrub Bog**  
GNR/S1 — CWWA000256  
(Kunze, 1994 p71)
- 3c.2b Carex livida or C. obnupta prominent .....
- Kalmia microphylla - Vaccinium oxycoccos / Carex (livida, obnupta) / Sphagnum spp. Shrub Bog**  
GNRQ/S1 — CWWA000223  
(Kunze, 1994 p71)
- 3c.2c Myrica gale ≥ 25% .....
- Ledum groenlandicum - Myrica gale / Sphagnum spp. Shrub Bog**  
G2/S1 — [CEGL003335](#)  
(Kunze, 1994 p72)
- 3c.2d Xerophyllum tenax present to prominent
- 3c.2d.1 Pinus contorta var. contorta ≥ 10% .....
- Pinus contorta var. contorta / Ledum groenlandicum / Xerophyllum tenax / Sphagnum spp. Treed Bog**  
GNRQ/S1— CWWA000202  
(WNHP Plot Data)
- 3c.2d.2 Pinus contorta var. contorta absent or minor .....
- Kalmia microphylla - Ledum groenlandicum / Xerophyllum tenax Shrub Bog**  
G1/S1 — [CEGL003359](#)  
(Kunze, 1994 p16, 70, 71)
- 3c.2e Gaultheria shallon ≥ 15%, Blechnum spicant ≥ 25%, AND Pteridium aquilinum ≥ 5%. Outer Coast. Peat often dry in late summer .....
- Kalmia microphylla - Ledum groenlandicum - Gaultheria shallon - Pteridium aquilinum / Sphagnum spp. Shrub Bog**  
GNRQ/S1 — CWWA000221  
(Kunze, 1994 p71)
- 3c.2f Carex utriculata ≥ 35% AND Sanguisorba officinalis ≥ 10%. Outer Coast .....
- Kalmia microphylla - Ledum groenlandicum / Carex utriculata / Sphagnum spp. Shrub Bog**  
GNRQ/S2 — CWWA000222  
(Kunze, 1994 p70)

- 3c.2g *Carex utriculata* prominent to codominant .....  
**Ledum groenlandicum / Carex utriculata / Sphagnum spp. Shrub Bog**  
 GNR/S2 — CWWA000229  
 (Kunze, 1994 p18)
- 3c.2h *Carex* spp. (especially *C. aquatilis* var. *dives* and *C. echinata*) present. *Caltha biflora* or *C. leptosepala* often present. Montane to subalpine .....  
**Kalmia microphylla / Carex spp. - Caltha leptosepala ssp. howellii / Sphagnum spp. Fen**  
 GNR/S2 — [CEGL006651](#)  
 (Christy, 2004 p41)
- 3c.2i *Typha latifolia* prominent to codominant .....  
**Ledum groenlandicum / Typha latifolia / Sphagnum spp. Shrub Bog [Provisional]**  
 GNRQ/S1 — CWWA000231  
 (Unpublished notes by L. Kunze (WNHP))
- 3c.2j *Gaultheria shallon* ≥ 25% .....  
**Ledum groenlandicum - Gaultheria shallon / Sphagnum spp. Shrub Bog**  
 GNR/SNR — CWWA000226  
 (Kunze, 1994 p17)
- 3c.2k *Ledum groenlandicum* ≥ 10% AND stunted *Pinus contorta* var. *contorta* ≥ 10% (many individuals < 5 m tall)
- 3c.2k.1 *Xerophyllum tenax* and *Empetrum nigrum* present.....  
**Pinus contorta var. contorta / Ledum groenlandicum / Xerophyllum tenax / Sphagnum spp. Treed Bog**  
 GNRQ/S1— CWWA000202  
 (WNHP Plot Data)
- 3c.2k.2 *Xerophyllum tenax* absent.....  
**Pinus contorta var. contorta / Ledum groenlandicum / Sphagnum spp. Treed Bog**  
 G3/S2 — [CEGL003337](#)  
 (Kunze, 1994 p19, 75)
- 3c.2l *Xerophyllum tenax* absent AND trees absent to very sparse. The following two types are floristically similar and are best differentiated in the field by structural characteristics.
- 3c.2l.1 Site is most often a floating/quaking mat, often adjacent to open water. The shrub layer is usually open and short (< 50 cm). *Sphagnum* forms low hummocks. *Rhynchospora alba* is sometimes prominent throughout the site (not limited to hollows or low points) .....  
**Kalmia microphylla - Vaccinium oxycoccos / Sphagnum spp. Shrub Bog**  
 GNR/S2 — CWWA000224  
 (Kunze, 1994 p15, 16)

3c.2l.2 Sphagnum forms moderate to well-developed hummocks. The shrub layer is open to quite dense and usually > 50 cm tall. Rhynchospora alba, if present, is limited to a few individuals or small patches in hollows or low points. May have sporadic Pinus contorta.....

**Ledum groenlandicum - Kalmia microphylla / Sphagnum spp. Shrub Bog**

G4/S2 — [CEGL003414](#)

(Kunze, 1994 p15-18; MacKenzie & Moran, 2004 p69; Crawford et al., 2009 pA-293; Copass & Ramm-Granberg, 2016b pB-51; Ramm-Granberg et al., 2021 pA-182)

3d Myrica gale dominant to codominant

3d.1 Ledum groenlandicum codominant. Kalmia microphylla may be present to codominant. Spiraea douglasii absent or minor (always < 10 %) AND Sphagnum codominant.....

**Ledum groenlandicum - Myrica gale / Sphagnum spp. Shrub Bog**

G2/S1 — [CEGL003335](#)

(Kunze, 1994 p72)

3d.2 Spiraea douglasii ≥ 10% and Sphagnum codominant .....

**Myrica gale - Spiraea douglasii / Sphagnum spp. Fen**

G2?/S1 — [CEGL003420](#)

(Kunze, 1994 p75)

3d.3 Sanguisorba officinalis and Sphagnum both present to codominant. Carex aquatilis var. dives or C. utriculata often codominant.....

**Myrica gale / Sanguisorba officinalis / Sphagnum spp. Fen**

G1?/S1? — [CEGL003419](#)

(Kunze, 1994 p73, 74)

3d.4 Boykinia sp. present to codominant

3d.4a Deschampsia caespitosa present to codominant. Carex obnupta may be present to prominent. Shrub layer usually < 0.3 m tall.....

**Myrica gale / Boykinia intermedia - Deschampsia caespitosa Shrub Swamp**

GNR/SNR — CWWA000255

(Kunze, 1994 p85)

3d.4b Carex obnupta present to codominant. Shrub layer usually ≥ 1.3 m tall .....

**Myrica gale / Boykinia intermedia - Carex obnupta Shrub Swamp**

G1/S1 — [CEGL003336](#)

(Kunze, 1994 p88)

3d.5 Carex utriculata or Carex aquatilis var. dives codominant (typically ≥ 10%) .....

**Myrica gale / Carex (aquatilis var. dives, utriculata) Fen**

G3/S2 — [CEGL003376](#)

(Kunze, 1994 p86, 87; Murray, 2000 p34; Christy, 2004 p50)

3d.6 Lysichiton americanus ≥ 25%.....

**Myrica gale / Lysichiton americanus Shrub Swamp**

G1/S1 — CWWA000109

(Kunze, 1994 p88)

3e *Malus fusca* dominant to codominant

3e.1 *Carex obnupta* ≥ 25%. *Salix hookeriana* usually present to codominant.....

***Salix hookeriana* - (*Malus fusca*) / *Carex obnupta* - *Lysichiton americanus* Wet Shrubland**

G3/S2 — [CEGL003432](#)

(Kunze, 1994 p93; Christy et al., 1998 p80; Christy, 2004 p54; Kagan et al., 2004 p31; McCain & Christy, 2005 p238; Rocchio et al., 2012 pB-63; Copass & Ramm-Granberg, 2016b pB-53)

3e.2 *Malus fusca* thicket. Understory may be sparse to absent .....

***Malus fusca* Shrub Swamp**

G3/S2S3 — [CEGL003385](#)

(Kunze, 1994 p34, 93; Christy, 2004 p49; MacKenzie & Moran, 2004 p193)

3f *Physocarpus capitatus* dominant AND *Carex obnupta* and *Athyrium filix-femina* dominate herb layer .....

***Physocarpus capitatus* Wet Shrubland**

GNRQ/S3? — CWWA000232

(Peter, 2000 p27)

3g *Acer circinatum* dominant (usually ≥ 50%)

3g.1 *Alnus incana* ≥ 10% .....

***Acer circinatum* - *Alnus incana* Wet Shrubland**

G4G5/S4S5 — CWWA000028

(Diaz & Mellen, 1996 p91; Kovalchik & Clausnitzer, 2004 p169)

3g.2 *Alnus viridis* ≥ 10%.....

***Alnus viridis* ssp. *sinuata* / *Acer circinatum* Shrub Swamp**

G4G5/S4— [CEGL001155](#)

(del Moral, 1973 p31; Crawford et al., 2009 pA-225; Ramm-Granberg et al., 2021 pA-190)

3g.3 *Athyrium filix-femina* present and *Tolmiea menziesii* ≥ 10% OR *Oplopanax horridus* and/or *Rubus spectabilis* codominant .....

***Acer circinatum* / *Athyrium filix-femina* - *Tolmiea menziesii* Shrub Swamp**

G5/S4 — [CEGL003291](#)

(Henderson & Peter, 1982 p72; Mycek, 1994 p100-101; Diaz & Mellen, 1996 p95; Crawford et al., 2009 pA-223; Ramm-Granberg et al., 2021 pA-188)

3g.4 Not as above. Little or no understory. *Ribes bracteosum*, *Rubus parviflorus*, *Achlys triphylla*, *Linnaea borealis*, *Mahonia nervosa*, *Rosa pisocarpa* often present but usually < 10% each .....

***Acer circinatum* / (*Pteridium aquilinum*) Wet Shrubland**

G4/S4 — CWWA000204

(Diaz & Mellen, 1996 p87; Crawford et al., 2009 pA-222; Ramm-Granberg et al., 2021 pA-187)

3h *Alnus incana* dominant. *Alnus viridis* may intergrade near the Cascade Crest.

3h.1 *Lysichiton americanus* ≥ 10% AND *Rhamnus purshiana* and *Salix geyeriana* present .....

***Alnus* (*incana*, *viridis* ssp. *sinuata*) / *Lysichiton americanus* - *Oenanthe sarmentosa* Shrub Swamp**

G1/S1 — [CEGL003293](#)

(Kunze, 1994 p28)

3h.2 *Lysichiton americanus* ≥ 5% and *Carex aquatilis* var. *dives* usually ≥ 5%. Primarily found in eastern Washington, but present in the Cascades .....

***Alnus incana* / *Lysichiton americanus* Wet Shrubland**

G3/S1S2 — [CEGL002629](#)

(Murray, 2000 p31; Christy, 2004 p36)

3h.3 *Glyceria striata* and *Senecio triangularis* each ≥ 5%. Primarily found in eastern Washington, but present in the Cascades .....

***Alnus incana* / *Glyceria striata* Wet Shrubland**

G3/S3 — [CEGL000228](#)

(Crowe & Clausnitzer, 1997 p132; Murray, 2000 p31; Kovalchik & Clausnitzer, 2004 p187)

3h.4 Montane to subalpine sedges dominate herb layer. Forbs may be diverse with significant cover.....

***Alnus incana* / *Carex* (*aquatilis*, *lenticularis*, *luzulina*, *pellita*) Wet Shrubland**

G3/S1 — [CEGL001144](#)

(Crowe et al., 2004a; the USNVC currently cites Crowe & Clausnitzer, 1997 p142 [which we attribute to CWWA000289] and Crowe et al., 2004b p197 [which we attribute to CWWA000290], further clarification of these concepts is needed)

3i *Alnus viridis* dominant (≥ 10%)

3i.1 *Oplopanax horridus* ≥ 5% OR *Rubus spectabilis* or *Ribes bracteosum* present AND *Athyrium filix-femina* present .....

***Alnus viridis* ssp. *sinuata* - *Rubus spectabilis* - (*Oplopanax horridus*) Wet Shrubland**

G4G5/S4 — CWWA000045

(> Henderson & Peter, 1982 p73; > Wooten & Morrison, 1995 p81; > Murray, 2000 p35; > Brett et al., 2001 p39; > Crawford et al., 2009 pA-226; Ramm-Granberg et al., 2021 pA-189)

3i.2 *Acer circinatum* ≥ 10% .....

***Alnus viridis* ssp. *sinuata* / *Acer circinatum* Shrub Swamp**

G4G5/S4 — [CEGL001155](#)

(del Moral, 1973 p31; Crawford et al., 2009 pA-225; Ramm-Granberg et al., 2021 pA-190)

3i.3 *Galium triflorum* + *Thalictrum occidentale* + *Viola glabella* + *Hydrophyllum fendleri* + *Heracleum maximum* + other mesic forbs ≥ 5% AND *Athyrium filix-femina* < 1% .....

***Alnus viridis* ssp. *sinuata* / Mesic Forbs Wet Shrubland**

GNR/S4S5 — [CEGL006657](#)

(Johnson & Clausnitzer, 1992 p148; Crowe & Clausnitzer, 1997 p146; Kovalchik & Clausnitzer, 2004 p177; Crawford et al., 2009 pA-224; Ramm-Granberg et al., 2021 pA-204)

3j *Cornus sericea* ≥ 5% AND *Spiraea douglasii* present to codominant

3j.1 *Salix* (*sitchensis*, *hookeriana*) ≥ 10%; *Malus fusca*, *Rosa nutkana*, and/or *Rubus spectabilis* present; Surge plains of large rivers .....

***Cornus sericea* - *Salix* (*hookeriana*, *sitchensis*) Shrub Swamp**

G3/S1 — [CEGL003292](#)

(Kunze, 1994 p59)

3j.2 *Cornus sericea* ≥ 10%, *Salix* spp. ≥ 30%, AND *Malus fusca*, *Rosa nutkana*, and *Rubus spectabilis* ABSENT. Permanently flooded areas NOT in freshwater tidal surge plain zone .....

***Cornus sericea* - *Salix* spp. - *Spiraea douglasii* Wet Shrubland**

GNR/S2 — CWWA000249

(Kunze, 1994 p29)

3k *Cornus sericea* ≥ 50% AND *Spiraea douglasii* absent.....

***Cornus sericea* Pacific Wet Shrubland**

GNR/SU — [CEGL005301](#)

(Diaz & Mellen, 1996 p115; Murray, 2000 p34; Rocchio et al., 2012 pB-61)

3l *Salix* spp. dominant

3l.1 *Salix commutata* ≥ 25%

3l.1a Fen indicators dominate. *Carex aquatilis* var. *dives* + *C. kelloggii* + *Leptarrhena pyrolifolia* + *Caltha biflora* + *Pedicularis groenlandica* + *Triantha occidentalis* ssp. *brevistyla* ≥ 10% .....

***Salix commutata* Wet Shrubland**

GNR/S2 — CWWA000236

(Henderson et al., 1979 p109, 113; Murray, 2000 p36; Christy, 2004 p51; Crawford et al., 2009 pA-299; Ramm-Granberg et al., 2021 pA-203)

3l.1b Mesic indicators dominate. *Valeriana sitchensis* + *Senecio triangularis* + *Potentilla flabellifolia* + *Arnica latifolia* or other mesic forbs ≥ 5% .....

***Salix commutata* / *Senecio triangularis* Wet Shrubland**

GNR/SNR — CWWA000397

(Kovalchik & Clausnitzer, 2004 p141; Ramm-Granberg et al., 2021 pA-202)

3l.2 *Salix pedicellaris* dominant or codominant. *Vaccinium uliginosum* ≥ 40% AND *Carex aquatilis* var. *dives* usually ≥ 5%. *Sphagnum* sometimes ≥ 5% .....

***Vaccinium uliginosum* / *Carex aquatilis* var. *dives* Shrub Fen**

G4/S2 — [CEGL001249](#)

(Murray, 2000 p40; Christy, 2004 p65)

3l.3 *Salix hookeriana* dominant to codominant

3l.3a *Carex obnupta* ≥ 25%. *Lysichiton americanus* present to codominant. *Malus fusca* usually present to codominant .....

***Salix hookeriana* - (*Malus fusca*) / *Carex obnupta* - *Lysichiton americanus* Wet Shrubland**

G3/S2 — [CEGL003432](#)

(Kunze, 1994 p93; Christy et al., 1998 p80; Christy, 2004 p54; Kagan et al., 2004 p31; McCain & Christy, 2005 p238; Rocchio et al., 2012 pB-63; Copass & Ramm-Granberg, 2016b pB-53)

3l.3b *Spiraea douglasii* ≥ 10% AND species diversity high .....

***Salix hookeriana* - *Spiraea douglasii* Shrub Swamp**

G3G4/S1 — [CEGL003386](#)

(Kunze, 1994 p90)

- 3l.3c *Carex obnupta* ≥ 10%. *Malus fusca* absent. *Myrica californica* often present. Found in interdunal swales.....
- Salix hookeriana / Carex obnupta - (Argentina egedii ssp. egedii)**  
**Shrub Swamp**  
 G4/S1? — CWWA000140  
 (Kunze, 1994 p90)
- 3l.3d *Salix hookeriana* and *Salix sitchensis* each ≥ 20%.....
- Salix hookeriana - (Salix sitchensis) Wet Shrubland**  
 G2/S2 — [CEGL003387](#)  
 (Kunze, 1994 p51; Christy, 2004 p53; Rocchio et al., 2012 pB-65;  
 Copass & Ramm-Granberg, 2016b pB-54)
- 3l.3e *Salix geyeriana* codominant.....
- Salix geyeriana - Salix hookeriana Wet Shrubland**  
 G1/S1 — [CEGL003295](#)  
 (Kagan et al., 2004 p30)
- 3l.3f Mixed willows. Otherwise not as above .....
- Salix (hookeriana, lucida ssp. lasiandra, sitchensis) Wet Shrubland**  
**[Provisional]**  
 G3Q/S3 — CWWA000167  
 (Kunze, 1994 p30; Copass & Ramm-Granberg, 2016a pB-20)
- 3l.4 *Salix lucida* ssp. *lasiandra* and *Salix fluviatilis* (=S. *exigua*, S. *sessilifolia*) each ≥ 20%.....
- Salix lucida ssp. lasiandra / Salix fluviatilis Riparian Woodland**  
 G3Q/S2 — [CEGL000949](#)  
 (Kunze, 1994 p50; Copass & Ramm-Granberg, 2016a pB-13)
- 3l.5 *Salix lucida* ssp. *lasiandra* ≥ 50% AND *Urtica dioica* present to codominant .....
- Salix lucida ssp. lasiandra / Urtica dioica ssp. gracilis Riparian Woodland**  
 G2/S1S2 — [CEGL003409](#)  
 (Kunze, 1994 p50; Christy, 2004 p55; Copass & Ramm-Granberg, 2016b pB-28)
- 3l.6 *Spiraea douglasii* codominant AND *Carex* spp. prominent to dominant.....
- Salix spp. - Spiraea douglasii / Carex (aquatilis var. dives, obnupta, utriculata) Wet Shrubland**  
 G3G4/S2 — CWWA000199  
 (Kunze, 1994 p90)
- 3l.7 *Salix sitchensis* dominant
- 3l.7a *Salix hookeriana* and *Salix sitchensis* each ≥ 20%.....
- Salix hookeriana - (Salix sitchensis) Wet Shrubland**  
 G2/S2 — [CEGL003387](#)  
 (Kunze, 1994 p51; Christy, 2004 p53; Rocchio et al., 2012; Copass & Ramm-Granberg, 2016b pB-54)

3l.7b Equisetum arvense usually present AND overall herb cover low. Coarse sediment abundant .....

**Salix sitchensis / Equisetum arvense - Petasites frigidus Wet Shrubland**

G4?/S4? — [CEGL003296](#)

(Mycek, 1994 p104; Diaz & Mellen, 1996 p135; Titus et al., 1996 p42, 1999; Chappell, 1999 p33; Crawford et al., 2009 pA-231; Ramm-Granberg et al., 2021 pA-194)

3l.7c Lysichiton americanus and Carex aquatilis var. dives usually present to codominant

**Salix sitchensis Wet Shrubland**

G4/S3? — [CEGL002896](#)

(Titus et al., 1996 p43; Kagan et al., 2004 p31; Crawford et al., 2009 pB-9; Ramm-Granberg et al., 2021 pA-195)

3l.7d Mixed willows. Otherwise not as above .....

**Salix (hookeriana, lucida ssp. lasiandra, sitchensis) Wet Shrubland [Provisional]**

G3Q/S3 — CWWA000167

(Kunze, 1994 p30; Copass & Ramm-Granberg, 2016a pB-20)

3l.8 Mixed willows. Otherwise not as above .....

**Salix (hookeriana, lucida ssp. lasiandra, sitchensis) Wet Shrubland [Provisional]**

G3Q/S3 — CWWA000167

(Kunze, 1994 p30; Copass & Ramm-Granberg, 2016a pB-20)

3m Spiraea douglasii dominant to codominant

3m.1 Ledum groenlandicum codominant AND Kalmia microphylla, Vaccinium oxycoccos, or Drosera rotundifolia present..... **see Ledum / Kalmia lead (3c) above**

3m.2 Salix spp. codominant AND Carex spp. prominent to dominant.....

**Salix spp. - Spiraea douglasii / Carex (aquatilis var. dives, obnupta, utriculata) Wet Shrubland**

G3G4/S2 — CWWA000199

(Kunze, 1994 p90)

3m.3 Sphagnum codominant (typically  $\geq 40\%$ ).....

**Spiraea douglasii / Sphagnum spp. Fen**

G3/S1 — [CEGL003416](#)

(Kunze, 1994 p18; Christy, 2004 p60; McCain & Christy, 2005 p244)

3m.4 Carex obnupta prominent to dominant. Peat soils; often associated with ultramafic bedrock .

**Spiraea douglasii / Carex obnupta Shrub Fen [Provisional]**

GNRQ/S1 — CWWA000239

(WNHP Plot Data)

3m.5 Carex aquatilis var. dives present to codominant. Lysichiton americanus can be codominant

**Spiraea douglasii / Carex aquatilis var. dives Fen**

G4/S2 — [CEGL003415](#)

(Kunze, 1994 p91)

- 3m.6 Not as above. Spiraea often dense and other species sparse .....  
**Spiraea douglasii Wet Shrubland**  
G5/S5 — [CEGL001129](#)  
(Kunze, 1994 p31; Murray, 2000 p38; Peter, 2000 p25)
- 3n Rosa nutkana dominant to codominant AND Deschampsia caespitosa codominant. Wet prairie  
shrubland that may occur in SW Washington .....  
**Rosa nutkana / Deschampsia caespitosa Wet Shrubland**  
G2/SU — [CEGL003344](#)  
(Boss, 1982 p98; Wilson et al., 1993 p33; Kagan et al., 2004 p29)
- 3o Rubus spectabilis dominant
- 3o.1 Ribes bracteosum present (often codominant and  $\geq 50\%$ ). Typically montane. ....  
**Ribes bracteosum - Rubus spectabilis Wet Shrubland**  
G5/S4S5 — CWWA000135  
(Henderson & Peter, 1982 p71; Diaz & Mellen, 1996 p123, 127,  
131; Murray, 2000 p35; Crawford et al., 2009 pA-230)
- 3o.2 Ribes hudsonianum present to codominant .....  
**Rubus spectabilis - Ribes hudsonianum Wet Shrubland**  
GNR/SNR — CWWA000419  
(Kovalchik & Clausnitzer, 2004 p225)
- 3o.3 Not as above. Rosa nutkana often codominant. Sambucus racemosa and Rubus parviflorus  
often prominent. Typically coastal.....  
**Rubus spectabilis Wet Shrubland**  
G4/SU — [CEGL003472](#)  
(Rocchio et al., 2012 p64; Copass & Ramm-Granberg, 2016b pB-  
52)
- 3p Ribes bracteosum  $\geq 50\%$  AND Athyrium filix-femina present.....  
**Ribes bracteosum / Athyrium filix-femina Wet Shrubland**  
GNR/SNR — CWWA000394  
(Murray, 2000 p35)
- 3q Vaccinium uliginosum  $\geq 40\%$  AND Carex aquatilis var. dives usually  $\geq 5\%$ . Sphagnum may be  $\geq 5\%$ .....  
**Vaccinium uliginosum / Carex aquatilis var. dives Shrub Fen**  
G4/S2 — [CEGL001249](#)  
(Murray, 2000 p40; Christy, 2004 p65)
- 3r Crataegus monogyna  $\geq 25\%$  .....  
**Crataegus monogyna / Mixed Forbs and Graminoids Ruderal Wet  
Shrubland**  
GNA/SNA — Not Tracked  
(Rocchio et al., 2012 pB-69)
- 3s Amorpha fruticosa  $\geq 25\%$  .....  
**Amorpha fruticosa Ruderal Wet Shrubland**  
GNA/SNA — CWWA000311  
(Crawford, 2003 p49; Copass & Ramm-Granberg, 2016a pB-16)

## 4 Key to Westside Herbaceous Types

### 4a Aquatic, submerged, or floating-leaved species dominant

- 4a.1 *Zostera marina* dominant. Shallow saltwater .....  
**Seagrass Meadow**  
GNR/S3 — [M1.1](#)  
[Note: This is a unit of the Global Ecosystem Typology (GET) classification and is no longer a USNVC association]  
(Dethier, 1990 p21, 31)
- 4a.2 *Azolla* (*mexicana*, *filiculoides*) ≥ 50% AND *Lemna minor* < *Azolla* spp. ....  
***Azolla* (*filiculoides*, *mexicana*) Aquatic Vegetation**  
G4/S4 — [CEGL003017](#)  
(Christy, 2004 p68; Kagan et al., 2004 p9)
- 4a.3 *Lemna minor* ≥ 40% AND > than *Azolla* spp. Emergent species may be present .....  
***Lemna minor* Aquatic Vegetation**  
G5/S5 — [CEGL003305](#)  
(Kunze, 1994 p46; Christy, 2004 p127)
- 4a.4 *Lemna* spp. other than *L. minor* ≥ 40% AND > than *Azolla* spp. Emergent species may be present ....  
***Lemna* spp. Western North American Aquatic Vegetation**  
G5/S5 — [CEGL005450](#)  
(USNVC, 2025)
- 4a.5 *Schoenoplectus subterminalis* ≥ 20% .....  
***Schoenoplectus subterminalis* Aquatic Vegetation**  
G3/S2? — [CEGL003309](#)  
(Kunze, 1994 p24)
- 4a.6 *Brasenia schreberi* ≥ 20% AND *Nuphar lutea* ssp. *polysepala* often present but < than *Brasenia* .....  
***Brasenia schreberi* Western Aquatic Vegetation**  
G4?/SNR — [CEGL005200](#)  
(Kunze, 1994 p22, 79)
- 4a.7 *Menyanthes trifoliata* dominant (≥ 25%) AND *Nuphar lutea* typically present .....  
***Menyanthes trifoliata* Aquatic Vegetation**  
G5/S4? — [CEGL003410](#)  
(Boggs, 2000 p163; Murray, 2000 p24; Christy, 2004 p130; McCain & Christy, 2005 p309)
- 4a.8 *Nuphar lutea* ssp. *polysepala* (=N. *polysepala*) ≥ 25% or > other aquatic species .....  
***Nuphar polysepala* Aquatic Vegetation**  
G5/S4S5 — [CEGL002001](#)  
(Kunze, 1994 p23, 80; Christy et al., 1998 p134; Murray, 2000 p24; Christy, 2004 p132; McCain & Christy, 2005 p311; Crawford et al., 2009 pB-12; Copass & Ramm-Granberg, 2016b pB-65)
- 4a.9 *Potamogeton natans* ≥ 25% .....  
***Potamogeton natans* Aquatic Vegetation**  
G5?/S5 — [CEGL002925](#)  
(Kunze, 1994 p23; Christy et al., 1998 p136; Boggs, 2000 p173; Murray, 2000 p25; Christy, 2004 p136)

- 4a.10 *Fontinalis antipyretica* forms extensive submerged (sometimes seasonally) beds .....  
**Fontinalis antipyretica (var. antipyretica, var. oregonensis)**  
**Nonvascular Aquatic Vegetation**  
G5/S4 — [CEGL003304](#)  
(Christy, 2004 p151)
- 4a.11 *Ceratophyllum demersum* forms dense, monotypic, submerged beds .....  
**Ceratophyllum demersum Western Aquatic Vegetation**  
G5/S4S5 — [CEGL004017](#)  
(Christy, 2004 p101; Crowe et al., 2004b p69; Kagan et al., 2004 p12)
- 4a.12 *Callitriche heterophylla* ≥ 75%. Emergent or woody species may be present.....  
**Callitriche (heterophylla, palustris) Aquatic Vegetation**  
G5/S2 — [CEGL003301](#)  
(Christy, 2004 p75; Crowe et al., 2004b p69)
- 4a.13 *Utricularia macrorhiza* ≥ 40% .....  
**Utricularia macrorhiza Aquatic Vegetation**  
G5/S4 — [CEGL003310](#)  
(Christy et al., 1998 p141; Christy, 2004 p150; Kagan et al., 2004 p35; McCain & Christy, 2005 p329)
- 4a.14 *Wolffia (borealis, columbiana)* dominant.....  
**Wolffia (borealis, columbiana) Aquatic Vegetation**  
G4/S1? — [CEGL003311](#)  
(Titus et al., 1996 p38; Kagan et al., 2004 p36)
- 4a.15 *Myriophyllum hippuroides* ≥ 40% .....  
**Myriophyllum hippuroides Aquatic Vegetation**  
G3/S2? — [CEGL003331](#)  
(Kunze, 1994 p46; Kagan et al., 2004 p19)
- 4a.16 *Myriophyllum sibiricum* ≥ 40% .....  
**Myriophyllum sibiricum Aquatic Vegetation**  
GUQ/SNR — [CEGL002000](#)  
(Johnson, 1939 p78, 1941 p331; Achuff et al., 2002; Weinmann et al., 2002; Kagan et al., 2004 p19)
- 4a.17 *Elodea canadensis* ≥ 50% .....  
**Elodea canadensis Aquatic Vegetation**  
G5/S4? — [CEGL003303](#)  
(Kunze, 1994 p55; Christy, 2004 p116; McCain & Christy, 2005 p295)
- 4a.18 *Isoetes nuttallii* ≥ 40% .....  
**Isoetes nuttallii Wet Prairie**  
G3/S1 — [CEGL003343](#)  
(Titus et al., 1996 p41; Christy, 2004 p123; Kagan et al., 2004 p17; McCain & Christy, 2005 p302)

- 4a.19 *Lobelia dortmanna* and/or *Isoetes echinospora* dominate.....  
***Isoetes echinospora* - (*Lobelia dortmanna*) Aquatic Vegetation**  
 GNR/SNR — CWWA000425  
 (MacKenzie & Moran, 2004 p153)
- 4a.20 *Ranunculus aquatilis* ≥ 75%.....  
***Ranunculus aquatilis* Aquatic Vegetation**  
 G5/S4 — [CEGL003307](#)  
 (Christy, 2004 p137; Kagan et al., 2004 p29; McCain & Christy, 2005 p316)
- 4a.21 *Ruppia maritima* dominant. Saline or brackish waters.....  
***Ruppia maritima* Tidal Marsh**  
 G5/SU — CWWA000187  
 (Eilers, 1974 p220; Kagan et al., 2004 p29)
- 4a.22 *Sagittaria latifolia* ≥ 25% or dominant .....  
***Sagittaria latifolia* Aquatic Vegetation**  
 G3/S1 — [CEGL003321](#)  
 (Kunze, 1994 p48; Christy, 2004 p139)
- 4a.23 *Polygonum amphibium* (= *Persicaria amphibium*) ≥ 30%. Often monotypic .....  
***Polygonum amphibium* Aquatic Vegetation**  
 G5/S3? — [CEGL002002](#)  
 (Kunze, 1994 p47; Christy et al., 1998 p133; Christy, 2004 p121; McCain & Christy, 2005 p314)
- 4a.24 *Sparganium angustifolium* ≥ 20% (often much higher).....  
***Sparganium angustifolium* Aquatic Vegetation**  
 G4/S3S4 — [CEGL001990](#)  
 (Kunze, 1994 p50, 59; Christy et al., 1998 p138; Christy, 2004 p144; McCain & Christy, 2005 p323)
- 4a.25 *Sparganium eurycarpum* ≥ 20% .....  
***Sparganium eurycarpum* Pacific Coast Marsh**  
 GNR/SNR — [CEGL009060](#)  
 (Kunze, 1994 p81; Christy, 2004 p145; McCain & Christy, 2005 p324)
- 4a.26 *Hippuris vulgaris* ≥ 25%. *Nuphar lutea* ssp. *polysepala* and/or *Sparganium angustifolium* often present. Monotypic stands may occur .....  
***Hippuris vulgaris* Aquatic Vegetation**  
 G5/S2 — [CEGL003315](#)  
 (Kunze, 1994 p22; Boggs, 2000 p160; Christy, 2004 p121; McCain & Christy, 2005 p300)
- 4a.27 *Lilaeopsis occidentalis* ≥ 20%. *Tillaea aquatica*, *Limosella aquatica*, *Eleocharis palustris* or *Oenanthe sarmentosa* often present to codominant.....  
***Lilaeopsis occidentalis* Mudflat**  
 G4/S2 — [CEGL003329](#)  
 (Kunze, 1994 p56, 97; Christy, 2004 p128)

- 4a.28 *Ludwigia palustris* and/or *Polygonum hydropiperoides* dominant .....  
**Ludwigia palustris - Polygonum hydropiperoides Mudflat**  
G2/S1S2 — [CEGL003330](#)  
(Kunze, 1994 p46; Christy, 2004 p129)
- 4b *Sphagnum* spp. codominant with vascular species**
- 4b.1 *Carex limosa* ≥ 25%. Near Cascade Crest. ....  
**Carex limosa / Sphagnum spp. Fen**  
GNR/SNR — CWWA000325  
(Chadde et al., 1998 p20; Kovalchik & Clausnitzer, 2004 p241)
- 4b.2 *Juncus balticus* (=J. arcticus ssp. littoralis) ≥ 20%.....  
**Juncus balticus - Comarum palustre / Sphagnum spp. Fen**  
**[Provisional]**  
GNRQ/S1 — CWWA000247  
(Kunze, 1994 p22)
- 4b.3 *Juncus supiniformis* ≥ 10% AND *Carex livida* and/or *Rhynchospora alba* present .....  
**Juncus supiniformis - (Carex livida, Rhynchospora alba) Fen**  
GNR/S1 — CWWA000201  
(Kunze, 1994 p68)
- 4b.4 *Carex lasiocarpa* ≥ 20% .....  
**Carex lasiocarpa / (Sphagnum spp.) Fen [Provisional]**  
GNR/SNR — CWWA000261  
(Kunze, 1994 p26)
- 4b.5 *Carex livida* ≥ 15% .....  
**Carex (livida, utriculata) / Sphagnum spp. Fen**  
G1G2/S1 — [CEGL003423](#)  
(Kunze, 1994 p66, 67)
- 4b.6 *Carex cusickii* ≥ 15% .....  
**Carex cusickii - (Carex aquatilis var. dives) / Sphagnum spp. Fen**  
G2/S1 — CWWA000061  
(Kunze, 1994 p13, 14)
- 4b.7 *Eleocharis quinqueflora* (=E. pauciflora) ≥ 25% AND *Eriophorum angustifolium* ssp. *angustifolium* or  
*E. chamissonis* ≥ 10% .....  
**Eriophorum angustifolium ssp. angustifolium - Eleocharis**  
**quinqueflora / Sphagnum spp. Fen**  
GNR/SNR — CWWA000429  
(Kovalchik & Clausnitzer, 2004 p241)
- 4b.8 *Trichophorum caespitosum* ≥ 20% and *Tofieldia glutinosa* almost always present .....  
**Trichophorum caespitosum Pacific Fen**  
GNR/S3 — [CEGL002679](#)  
(Murray, 2000 p29; Christy, 2004 p147; McCain & Christy, 2005  
p326)

4b.9 *Carex utriculata* ≥ 10%

4b.9a *Carex aquatilis* var. *dives* ≥ 10%, AND *Sanguisorba officinalis* present.....

***Carex utriculata* - *Carex aquatilis* var. *dives* - *Sanguisorba officinalis*  
/ *Sphagnum* spp. Fen**

G3?/S2 — [CEGL003422](#)

(Kunze, 1994 p68)

4b.9b *Carex kelloggii*, *Juncus ensifolius*, *Calamagrostis canadensis*, *Pedicularis groenlandica*,  
*Cicuta douglasii*, *Viola palustris*, *Eriophorum angustifolium*, and/or *Angelica genuflexa* present .....

***Carex utriculata* Pacific Coast Fen**

GNR/SNR — [CEGL006649](#)

(Kunze, 1994 p26, 83; Murray, 2000 p16; Christy, 2004 p100)

4b.10 *Carex aquatilis* var. *dives* dominant or codominant (≥ 20%) AND *Carex nigricans* and *Caltha biflora*  
(or *C. leptosepala*) present. *Sphagnum* spp. and *Carex utriculata* may be present to prominent. Montane  
to subalpine .....

***Carex* (*aquatilis* var. *dives*, *nigricans*, *utriculata*) - *Caltha*  
*leptosepala* ssp. *howellii* Fen [Provisional]**

G2G3Q/S1S2 — CWWA000169

(Henderson, 1973 p113; Kunze, 1991 p47, 49; Murray, 2000 p13)

4b.11 *Eriophorum angustifolium* spp. *subarcticum* var. *majus* ≥ 10%. Montane to subalpine .....

***Eriophorum angustifolium* ssp. *angustifolium* / *Sphagnum* spp. Fen**

GNR/S2 — [CEGL006650](#)

(Henderson, 1973 p112; Murray, 2000 p19; Kovalchik &  
Clausnitzer, 2004 p241)

4b.12 *Eriophorum chamissonis* ≥ 20%

4b.12a *Carex interior* present to prominent. Serpentine soils.....

***Eriophorum chamissonis* - *Carex interior* Fen**

GNR/S1 — CWWA000246

(Kunze, 1994 p14, 68)

4b.12b Not as above .....

***Eriophorum chamissonis* / *Sphagnum* spp. Bog & Acidic Fen**

G4/S1 — [CEGL003333](#)

(Kunze, 1994 p14, 68)

4b.13 *Rhynchospora alba* ≥ 15%. *Vaccinium oxycoccos* often codominant .....

***Rhynchospora alba* - (*Vaccinium oxycoccos*) / *Sphagnum* spp. Fen**

G3/S2 — [CEGL003338](#)

(Kunze, 1994 p14, 69)

#### **4c Brackish/salt marsh or beach/coastal spit wetland**

4c.1 *Ruppia maritima* dominant .....

***Ruppia maritima* Tidal Marsh**

G5/SU — CWWA000187

(Eilers, 1974 p220; Kagan et al., 2004 p29)

- 4c.2 *Carex lyngbyei* dominant to codominant
- 4c.2a *Distichlis spicata* or *Triglochin maritima* present to codominant .....
- Carex lyngbyei* - (*Distichlis spicata*, *Triglochin maritima*) Salt Marsh**
- G4/S2 — [CEGL003285](#)
- (Burg et al., 1980 p230; Kunze & Cornelius, 1982 p150; Kunze, 1984 p49+; Dethier, 1990 p34; Viereck et al., 1992 p185)
- 4c.2b *Deschampsia caespitosa* dominant or codominant .....
- Deschampsia caespitosa* - (*Carex lyngbyei*, *Distichlis spicata*) Salt Marsh**
- G3G4/S2 — [CEGL003357](#)
- (Burg et al., 1980 p230; Kunze & Cornelius, 1982 p151; Kunze, 1984 p87+; Dethier, 1990 p37)
- 4c.2c *Argentina egedii* present to codominant.....
- Carex lyngbyei* - *Argentina egedii* Salt Marsh**
- G4/S1? — [CEGL003289](#)
- (Kunze, 1984 p50, 127; Christy et al., 1998 p120)
- 4c.2d *Carex lyngbyei* dominant to codominant with a heterogeneous mix of mostly freshwater species .....
- Carex lyngbyei* Salt Marsh**
- G4/S2 — [CEGL003369](#)
- (Kunze, 1984 p49+, 1994 p96; Dethier, 1990 p33)
- 4c.3 *Deschampsia caespitosa* dominant or codominant
- 4c.3a *Carex lyngbyei*, *Triglochin maritima*, or *Distichlis spicata* present.....
- Deschampsia caespitosa* - (*Carex lyngbyei*, *Distichlis spicata*) Salt Marsh**
- G3G4/S2 — [CEGL003357](#)
- (Burg et al., 1980 p230; Kunze & Cornelius, 1982 p151; Kunze, 1984 p87+; Dethier, 1990 p37)
- 4c.3b *Argentina egedii* prominent. *Juncus balticus* (= *J. arcticus* ssp. *littoralis*) sometimes present .
- Deschampsia caespitosa* - *Argentina egedii* Salt Marsh**
- G3G4/S2 — [CEGL003383](#)
- (Kunze & Cornelius, 1982 p152; Kunze, 1984 p62; Dethier, 1990 p37; Christy et al., 1998 p122)
- 4c.3c *Sidalcea hendersonii* present to codominant .....
- Deschampsia caespitosa* - *Sidalcea hendersonii* Salt Marsh**
- G2/S1S2— [CEGL003384](#)
- (Cadrin & Yearsley, 2012)
- 4c.4 *Argentina egedii* dominant
- 4c.4a *Symphyotrichum subspicatum* present .....
- Argentina egedii* - *Symphyotrichum subspicatum* Salt Marsh**
- G3G4/S1 — [CEGL003288](#)
- (Eilers, 1974 p256; Kunze & Cornelius, 1982 p152; Kunze, 1984 p77+; Dethier, 1990 p37)

- 4c.4b *Calamagrostis nutkaensis* and *Juncus balticus* (=J. arcticus ssp. littoralis) present to codominant.....
- Calamagrostis nutkaensis - Argentina egedii - Juncus arcticus ssp. littoralis Salt Marsh**  
G1/S1 — [CEGL003421](#)  
(Kunze & Cornelius, 1982 p154; Dethier, 1990 p38)
- 4c.4c *Festuca rubra* and *Agrostis (stolonifera, gigantea)* present to codominant .....
- Festuca rubra - (Argentina egedii) Salt Marsh**  
G1/S1 — [CEGL003424](#)  
(Kunze & Cornelius, 1982 p152; Kunze, 1984 p86+; Dethier, 1990 p37)
- 4c.4d *Juncus balticus* (=J. arcticus ssp. littoralis) present to codominant .....
- Argentina egedii - Juncus arcticus ssp. littoralis Salt Marsh**  
G3G4/S2 — [CEGL003382](#)  
(Kunze & Cornelius, 1982 p152; Kunze, 1984 p69+; Dethier, 1990 p37, 38; Copass & Ramm-Granberg, 2016b pB-62)
- 4c.5 *Festuca rubra* dominant or codominant AND *Juncus breweri* (=lesueurii) present .....
- Festuca rubra - Juncus lesueurii Salt Marsh**  
G3/S1 — CWWA000180  
(Kunze & Cornelius, 1982 p152)
- 4c.6 *Calamagrostis nutkaensis* dominant AND *Argentina egedii* and *Juncus balticus* (=J. arcticus ssp. littoralis) present to codominant .....
- Calamagrostis nutkaensis - Argentina egedii - Juncus arcticus ssp. littoralis Salt Marsh**  
G1/S1 — [CEGL003421](#)  
(Kunze & Cornelius, 1982 p154; Dethier, 1990 p38)
- 4c.7 *Juncus balticus* (=J. arcticus ssp. littoralis) dominant
- 4c.7a *Calamagrostis nutkaensis* and *Argentina egedii* present to codominant .....
- Calamagrostis nutkaensis - Argentina egedii - Juncus arcticus ssp. littoralis Salt Marsh**  
G1/S1 — [CEGL003421](#)  
(Kunze & Cornelius, 1982 p154; Dethier, 1990 p38)
- 4c.7b *Argentina egedii* present to codominant AND *Calamagrostis nutkaensis* not present .....
- Argentina egedii - Juncus arcticus ssp. littoralis Salt Marsh**  
G3G4/S2 — [CEGL003382](#)  
(Kunze & Cornelius, 1982 p152; Kunze, 1984 p69+; Dethier, 1990 p37, 38; Copass & Ramm-Granberg, 2016b pB-62)
- 4c.8 *Juncus falcatus* present. *Juncus nevadensis* or *Trifolium wormskjoldii* may be present.....
- Juncus falcatus - Juncus (lesueurii, nevadensis) Wet Meadow**  
G3/S1? — CWWA000093  
(Kunze, 1994 p85)

4c.9 *Distichlis spicata* dominant

4c.9a *Carex lyngbyei* present and *Triglochin maritima* often present.....

***Carex lyngbyei* - (*Distichlis spicata*, *Triglochin maritima*) Salt Marsh**

G4/S2 — [CEGL003285](#)

(Burg et al., 1980 p230; Kunze & Cornelius, 1982 p150; Kunze, 1984 p49+; Dethier, 1990 p34; Viereck et al., 1992 p185)

4c.9b *Deschampsia caespitosa* present. *Carex lyngbyei* and *Triglochin maritima* often present .....

***Deschampsia caespitosa* - (*Carex lyngbyei*, *Distichlis spicata*) Salt Marsh**

G3G4/S2 — [CEGL003357](#)

(Burg et al., 1980 p230; Kunze & Cornelius, 1982 p151; Kunze, 1984 p87+; Dethier, 1990 p37)

4c.9c *Salicornia pacifica* (=virginica) and *Triglochin maritima* present to prominent. *Jaumea carnosa* often present to prominent .....

***Salicornia virginica* - *Distichlis spicata* - *Triglochin maritima* - (*Jaumea carnosa*) Salt Marsh**

G3/S2 — [CEGL003366](#)

(Burg et al., 1980 p229; Kunze & Cornelius, 1982 p148, 150; Kunze, 1984 p49+; Dethier, 1990 p34; Rocchio et al., 2012 pB-71)

4c.9d *Salicornia pacifica* (=virginica) usually present to codominant; however, *Distichlis spicata* may be monotypic; *Triglochin maritima* and *Jaumea carnosa* absent or if present in very small amounts .....

***Distichlis spicata* - (*Salicornia virginica*) Salt Marsh**

G4/S2 — [CEGL003356](#)

(Burg et al., 1980 p229; Kunze & Cornelius, 1982 p149; Kunze, 1984 p15+; Dethier, 1990 p32; Kagan et al., 2004 p14; Copass & Ramm-Granberg, 2016b pB-63)

4c.10 *Salicornia pacifica* (=virginica) dominant

4c.10a *Distichlis spicata* and *Triglochin maritima* present to prominent. *Jaumea carnosa* often present to prominent .....

***Salicornia virginica* - *Distichlis spicata* - *Triglochin maritima* - (*Jaumea carnosa*) Salt Marsh**

G3/S2 — [CEGL003366](#)

(Burg et al., 1980 p229; Kunze & Cornelius, 1982 p148, 150; Kunze, 1984 p49+; Dethier, 1990 p34; Rocchio et al., 2012 pB-71)

4c.10b *Distichlis spicata* codominant; *Triglochin maritima* and *Jaumea carnosa* absent or, if present, in very small amounts. ....

***Distichlis spicata* - (*Salicornia virginica*) Salt Marsh**

G4/S2 — [CEGL003356](#)

(Burg et al., 1980 p229; Kunze & Cornelius, 1982 p149; Kunze, 1984 p15+; Dethier, 1990 p32; Kagan et al., 2004 p14; Copass & Ramm-Granberg, 2016b pB-63)

4c.10c *Triglochin maritima* present to codominant. *Fucus distichus* often present .....

***Triglochin maritima* - (*Salicornia virginica*) Salt Marsh**

G4/S2 — [CEGL003381](#)

(Kunze & Cornelius, 1982 p148, 149; Kunze, 1984 p48+; Dethier, 1990 p34, 35)

- 4c.10d Monotypic stand of *Salicornia* spp. ....  
**Salicornia (bigelovii, depressa) Tidal Salt Marsh**  
 GNR/S2 — [CEGL003123](#)  
 (Kunze & Cornelius, 1982 p148, 149; Kunze, 1984 p25+; Dethier, 1990 p32, 33)
- 4c.11 *Glaux maritima* dominant .....  
**Glaux maritima Salt Marsh**  
 G3/S1? — [CEGL003286](#)  
 (Kunze, 1984 p48; Dethier, 1990 p31)
- 4c.12 *Ranunculus flammula* ≥ 15%, *Carex obnupta* ≥ 5%, AND *Juncus nevadensis* present.....  
**Ranunculus flammula - Juncus nevadensis - Carex lenticularis Marsh**  
 G1/S1 — [CEGL003426](#)  
 (Kunze, 1994 p82)
- 4c.13 *Schoenoplectus americanus* or *S. pungens* dominant.....  
**Schoenoplectus (americanus, pungens) Tidal Salt Marsh**  
 G3/S2 — [CEGL003367](#)  
 (Kunze & Cornelius, 1982 p10; Kunze, 1984 p104; Dethier, 1990 p35)
- 4c.14 *Schoenoplectus acutus* or *S. tabernaemontani* dominant. ....  
**Schoenoplectus (acutus, tabernaemontani) Tidal Marsh**  
 GNR/SNR — CWWA000435  
 (Dethier, 1990 p36; Copass & Ramm-Granberg, 2016b pB-57)
- 4c.15 *Bolboschoenus maritimus* (= *Schoenoplectus maritimus*) dominant .....  
**Bolboschoenus maritimus Tidal Salt Marsh**  
 G3/S1 — [CEGL003287](#)  
 (Kunze & Cornelius, 1982 p84, 150; Kunze, 1984 p105+; Dethier, 1990 p35; Copass & Ramm-Granberg, 2016b pB-64)
- 4c.16 *Triglochin maritima* dominant. *Salicornia pacifica* (= *virginica*) often present to codominant and *Fucus distichus* often present .....  
**Triglochin maritima - (Salicornia virginica) Salt Marsh**  
 G4/S2 — [CEGL003381](#)  
 (Kunze & Cornelius, 1982 p148, 149; Kunze, 1984 p48+; Dethier, 1990 p34, 35)
- 4c.17 *Juncus gerardi* dominant. *Juncus balticus* may be codominant .....  
**Juncus gerardi var. gerardi Brackish Wet Meadow**  
 GNRQ/SNR — CWWA000446  
 [Recent changes to the WA flora include both native and introduced populations of *Juncus gerardi*—this community is provisionally considered native]  
 (Rocchio et al., 2012 pB-70; Copass & Ramm-Granberg, 2016b pB-60)

4c.18 *Epilobium hirsutum* ≥ 50% .....  
**Epilobium hirsutum Ruderal Wet Meadow [Provisional]**  
GNA/SNA — Not Tracked  
(Copass & Ramm-Granberg, 2016b pB-47)

**4d Freshwater wetland; *Sphagnum* spp. sporadic or absent**

4d.1 Sedges (*Carex*, *Eleocharis*, *Dulichium*, *Schoenoplectus*, *Scirpus*, or *Trichophorum* spp.)  
dominant or codominant

4d.1a *Carex pansa* present. Water chemistry may be brackish .....  
**Carex pansa Interdunal Wet Meadow**  
GNR/S1? — [CEGL005713](#)  
(Reported, no WA plot data)

4d.1b *Carex limosa* ≥ 25% AND *Sphagnum* spp. prominent to codominant. Near Cascade Crest. ....  
**Carex limosa / Sphagnum spp. Fen**  
GNR/SNR — CWWA000325  
(Chadde et al., 1998 p20; Kovalchik & Clausnitzer, 2004 p241)

4d.1c *Carex limosa* and/or *C. magellanica* ssp. *irrigua* ≥ 25% AND *Sphagnum* spp. minor or absent. Near  
Cascade Crest .....  
**Carex limosa Fen**  
G2/S1 — [CEGL001811](#)  
(Chadde et al., 1998 p20; Kovalchik & Clausnitzer, 2004 p241)

4d.1d *Carex lyngbyei* dominant to codominant.....  
**Carex lyngbyei Salt Marsh**  
G4/S2 — [CEGL003369](#)  
(Kunze, 1984 p150, 1994 p96; Dethier, 1990 p33, 35)

4d.1e *Carex pellita* (= *C. lanuginosa*, misapplied) dominant or codominant (≥ 25%)  
4d.1e.1 *Carex obnupta*, *Deschampsia caespitosa*, *Carex unilateralis*, and/or *C. feta* often present.  
Wet prairies in Clark County .....  
**Carex pellita Wet Prairie**  
GNR/SNR — CWWA000269  
(Kunze, 1991)

4d.1e.2 Not as above. Montane wet meadows near Cascade Crest .....  
**Carex pellita Wet Meadow**  
G3/S1 — [CEGL001809](#)  
(Padgett et al., 1989 p108; Crowe & Clausnitzer, 1997 p186;  
Jankovsky-Jones et al., 2001 p130; Crowe et al., 2004b p109;  
Christy, 2013 p20)

4d.1f *Carex luzulina* prominent to dominant (≥ 10%). Diverse wet subalpine species w/ significant cover  
(*Vaccinium uliginosum*, *Hypericum anagalloides*, *Caltha biflora* or *C. leptosepala*, *Dodecatheon jeffreyi*,  
etc.) .....  
**Carex luzulina Pacific Coast Fen**  
GNR/S1 — CWWA000012  
(Christy, 2004 p93)

- 4d.1g *Carex aquatilis* var. *dives* dominant or codominant ( $\geq 20\%$ )
- 4d.1g.1 *Carex utriculata*  $\geq 25\%$ .....  
**Carex aquatilis var. dives - Carex utriculata Fen**  
G3G4/S2 — CWWA000057  
(Kunze, 1994 p26, 83; Peter, 2000 p24)
- 4d.1g.2 *Comarum palustre* present .....  
**Carex aquatilis var. dives - Comarum palustre Fen**  
G2/S2 — [CEGL003433](#)  
(Kunze, 1994 p84)
- 4d.1g.3 *Hypericum anagalloides* and *Eleocharis quinqueflora* present to prominent .....  
**Carex aquatilis var. dives - (Eleocharis quinqueflora) Fen**  
GNR/S3 — CWWA000211  
(Murray, 2000 p16)
- 4d.1g.4 *Carex nigricans* and *Caltha leptosepala* (or *C. biflora*) present. *Sphagnum* spp. and *Carex utriculata* may be present to prominent. Montane to subalpine .....  
**Carex (aquatilis var. dives, nigricans, utriculata) - Caltha leptosepala ssp. howellii Fen [Provisional]**  
G2G3Q/S1S2 — CWWA000169  
(Henderson, 1973 p113; Kunze, 1991 p47, 49; Murray, 2000 p13)
- 4d.1g.5 *Oenanthe sarmentosa* often present .....  
**Carex aquatilis var. dives Fen**  
G4/S3S4 — [CEGL001826](#)  
(Kovalchik, 1987 p187; Kunze, 1994 p84; Murray, 2000 p16; Christy, 2004 p83; Crowe et al., 2004b p84; McCain & Christy, 2005 p266)
- 4d.1h *Carex aquatilis* var. *aquatilis* dominant or codominant ( $\geq 20\%$ ). Primarily found in eastern Washington, but may be present near Cascade Crest .....  
**Carex aquatilis Wet Meadow**  
G5/S3 — [CEGL001802](#)  
(Crowe & Clausnitzer, 1997 p174; Chadde et al., 1998 p20; Crowe et al., 2004b p81; Kovalchik & Clausnitzer, 2004 p241; Christy, 2013 p16)
- 4d.1i *Carex aperta*  $\geq 50\%$  .....  
**Carex aperta Lowland Wet Meadow**  
G1?/S1 — [CEGL001801](#)  
(Kunze, 1994 p44)
- 4d.1j *Carex cusickii* dominant ( $\geq 25\%$ )
- 4d.1j.1 *Comarum palustre* and/or *Menyanthes trifoliata* present to codominant .....  
**Carex cusickii - (Menyanthes trifoliata) Fen**  
G2G3/S2 — [CEGL003332](#)  
(Kunze, 1994 p25)
- 4d.1j.2 *Festuca rubra* and/or *Juncus balticus* present to prominent. Serpentine fens .....  
**Juncus balticus - Festuca rubra - Carex cusickii Fen**  
GNR/S1 — [CEGL006697](#)  
(Kunze, 1994 p22)

- 4d.1k *Carex densa* dominant or codominant  
 4d.1j.1 *Deschampsia caespitosa* codominant.....  
**Carex densa - Deschampsia caespitosa Wet Prairie**  
 G2/S1 — [CEGL003455](#)  
 (Kagan et al., 2004 p11)
- 4d.1k.2 *Eleocharis palustris* codominant .....  
**Carex densa - Eleocharis palustris Wet Prairie**  
 G3/SU — [CEGL003456](#)  
 (Boss, 1982 p98; Kagan et al., 2004 p11)
- 4d.1l *Carex deweyana* ssp. *letopoda* (=C. *letopoda*) ≥ 50% AND *Deschampsia caespitosa* and *Carex unilateralis* almost always present .....  
**Carex deweyana ssp. letopoda Wet Prairie [Provisional]**  
 GNR/SU — CWWA000212  
 (Christy, 2004 p87)
- 4d.1m *Carex exsiccata* ≥ 20%. Frequently monotypic  
 4d.1m.1 Hemic or fibric peat layer present. Nearly permanently saturated.....  
**Carex exsiccata Fen [Provisional]**  
 GNR/SNR — CWWA000259  
 (Kunze, 1994 p28; Christy, 2004 p88)
- 4d.1m.2 Muck/sapric peat present along with mineral soils. Subject to greater hydrological fluctuation than the Poor Fen type.  
 4d.1m.2a Montane .....  
**Carex exsiccata Montane Marsh [Provisional]**  
 GNR/SNR — CWWA000260  
 (Kunze, 1994 p28; Christy, 2004 p88)
- 4d.1m.2b Puget Trough .....  
**Carex exsiccata Marsh**  
 G2G3/S2S3 — [CEGL003312](#)  
 (Kunze, 1994 p28; Christy, 2004 p88)
- 4d.1n *Carex feta* ≥ 25% AND C. *letopoda* and *Deschampsia caespitosa* almost always present .....  
**Carex feta Wet Prairie [Provisional]**  
 GNR/SU — CWWA000214  
 (Christy, 2004 p89)
- 4d.1o *Carex interrupta* dominant .....  
**Carex interrupta Marsh**  
 G3G4/S3? — CWWA000176  
 (Kovalchik, 1987 p138; Titus et al., 1999 p192)
- 4d.1p *Carex lasiocarpa* ≥ 20% .....  
**Carex lasiocarpa / (Sphagnum spp.) Fen [Provisional]**  
 GNR/SNR — CWWA000261  
 (Kunze, 1994 p26)

- 4d.1q *Carex kelloggii* var. *kelloggii* (=C. *lenticularis* var. *lipocarpa*) ≥ 20% .....  
**Carex lenticularis var. lipocarpa Wet Meadow**  
 GNR/S2S3 — [CEGL007249](#)  
 (Diaz & Mellen, 1996 p151; Crowe & Clausnitzer, 1997 p184; Titus et al., 1999; Murray, 2000 p17; Christy, 2004 p91; Crowe et al., 2004b p98; Kovalchik & Clausnitzer, 2004 p241; DiPaolo et al., 2018 pB-48)
- 4d.1t *Carex interior* present. *Hypericum anagaloides* and *Tofieldia glutinosa* usually present. Wetland influenced by ultramafic bedrock .....  
**Carex interior - Hypericum anagaloides Fen**  
 G2?Q/S2? — [CEGL001857](#)  
 (Henderson & Peter, 1982 p79)
- 4d.1s *Carex scopulorum* var. *bracteosa* ≥ 25% .....  
**Carex scopulorum var. bracteosa Wet Meadow**  
 G5/S3S4 — [CEGL001822](#)  
 (Christy, 2004 p98; McCain & Christy, 2005 p281)
- 4d.1t *Carex obnupta* ≥ 20%  
 4d.1t.1 *Argentina egedii* present to codominant .....  
**Carex obnupta - Argentina egedii ssp. egedii Wet Meadow**  
 G4/S2? — [CEGL001820](#)  
 (Kunze & Cornelius, 1982; Christy et al., 1998 p108)
- 4d.1t.2 *Ranunculus flammula* ≥ 15% AND *Juncus nevadensis* present.....  
**Ranunculus flammula - Juncus nevadensis - Carex lenticularis Marsh**  
 G1/S1 — [CEGL003426](#)  
 (Kunze, 1994 p82)
- 4d.1t.3 *Carex cusickii* ≥ 5%. *Festuca rubra* and *Juncus balticus* typically absent. Wetland influenced by ultramafic bedrock. Serpentine fens .....  
**Carex obnupta - (Carex cusickii) Fen**  
 GNR/SNR — CWWA000251  
 (WNHP Plot Data)
- 4d.1t.4 *Carex utriculata* and/or *Carex aquatilis* var. *dives* often present to codominant .....  
**Carex obnupta - (Carex aquatilis var. dives, utriculata) Marsh**  
 GNR/SNR — CWWA000250  
 (Peter, 2000 p27)
- 4d.1t.5 *Carex obnupta* ≥ 50% .....  
**Carex obnupta Wet Meadow**  
 G4/S4 — [CEGL003313](#)  
 (Kunze, 1994 p26, 42, 81; Murray, 2000 p17; Peter, 2000 p27)
- 4d.1u *Carex pachystachya* ≥ 25% .....  
**Carex pachystachya Wet Prairie**  
 GNR/SU — CWWA000215  
 (Christy, 2004 p97)

- 4d.1v *Carex unilateralis* prominent to codominant AND *Hordeum brachyantherum* ≥ 10% .....  
**Carex unilateralis - Hordeum brachyantherum Wet Prairie**  
G2/S1 — [CEGL001830](#)  
(Kagan et al., 2004 p12)
- 4d.1w *Carex unilateralis* AND *Eleocharis palustris* prominent to codominant.....  
**Eleocharis palustris - Carex unilateralis Wet Prairie**  
G2/S1 — [CEGL003411](#)  
(Lippert & Jameson, 1964 p189; Kagan et al., 2004 p15)
- 4d.1x *Carex nigricans* ≥ 5% AND *Kalmia microphylla* present. *Vaccinium deliciosum* and/or *Phyllodoce empetriformis* typically prominent .....  
**Kalmia microphylla / Carex nigricans Wet Dwarf-shrubland**  
G3G4/S3 — [CEGL001402](#)  
(Henderson, 1973 p113; Wooten & Morrison, 1995 p109; Crawford et al., 2009 pA-297; Ramm-Granberg et al., 2021 pA-197)
- 4d.1y *Carex spectabilis* ≥ 10%, *Carex nigricans* present, and *Potentilla flabellifolia* usually > 5% (and > *Caltha leptosepala/biflora* and *Leptarrhena pyrolifolia*) .....  
**Carex spectabilis - Potentilla flabellifolia Wet Meadow**  
G4Q/S3 — [CEGL001829](#)  
(Kovalchik & Clausnitzer, 2004 p241; Crawford et al., 2009 pA-302; Ramm-Granberg et al., 2021 pA-200)
- 4d.1z *Carex nigricans* dominant
- 4d.1z.1 *Caltha leptosepala* or *C. biflora* present. *Sphagnum* spp. usually present. ....  
**Carex (aqualilis var. dives, nigricans, utriculata) - Caltha leptosepala ssp. howellii Fen [Provisional]**  
G2G3Q/S1S2 — [CWWA000169](#)  
(Henderson, 1973 p113; Kunze, 1991 p47, 49; Murray, 2000 p13)
- 4d.1z.2 *Petasites frigidus* var. *frigidus*, *Mimulus lewisii*, and/or *Juncus mertensianus* often present. *Philonotis fontana* abundant. Seeps and springs .....  
**Carex nigricans - (Petasites frigidus var. frigidus) / Philonotis fontana Seep**  
GNR/S3 — [CEGL006699](#)  
(Henderson, 1973 p113)
- 4d.1z.3 *Carex nigricans* often monotypic, though other subalpine wetland species may be present. Snow beds .....  
**Carex nigricans Wet Meadow**  
G4/S4 — [CEGL001816](#)  
(Douglas, 1972 p150; Hamann, 1972 p67; Henderson, 1973 p98-99, 102; del Moral, 1979; Henderson et al., 1979 p123; Henderson & Peter, 1982 p80; Christy, 2004 p95; Crawford et al., 2009 pA-301; Ramm-Granberg et al., 2021 pA-198)
- 4d.1aa *Eleocharis obtusa* dominant or codominant with *Ludwigia palustris* .....  
**Eleocharis obtusa Mudflat**  
G4/SU — [CEGL003326](#)  
(Kagan et al., 2004 p14)

- 4d.1ab *Eleocharis palustris* ≥ 25%  
 4d.1ab.1 *Paspalum distichum* ≥ 40% and *Equisetum arvense* often present to codominant.....  
**Paspalum distichum Marsh**  
 G3/S2 — [CEGL003320](#)  
 (Kunze, 1994 p47; Christy, 2004 p134)
- 4d.1ab.2 *Lilaeopsis occidentalis* ≥ 20%. *Tillaea aquatica*, *Limosella aquatica*, or *Oenanthe sarmentosa* often present to codominant.....  
**Lilaeopsis occidentalis Mudflat**  
 G4/S2 — [CEGL003329](#)  
 (Kunze, 1994 p56, 97; Christy, 2004 p128)
- 4d.1ab.3 Not as above .....  
**Eleocharis palustris Pacific Coast Marsh**  
 GNR/SNR — CWWA000431  
 (Kunze, 1994 p55; Murray, 2000 p19)
- 4d.1ac *Eleocharis ovata* ≥ 25% .....  
**Eleocharis ovata - Ludwigia palustris Mudflat**  
 G2/S2 — CWWA000217  
 (Christy, 2004 p112)
- 4d.1ad *Dulichium arundinaceum* ≥ 10%  
 4d.1ad.1 Often monotypic on acidic peat soils. *Sphagnum* may be sporadic. *Scirpus subterminalis* and *Nuphar lutea* ssp. *polysepala* often present .....  
**Dulichium arundinaceum Pacific Coast Fen [Provisional]**  
 GNR/SNR — CWWA000265  
 (Kunze, 1994 p28; Christy, 2004 p110)
- 4d.1ad.2 May be monotypic to moderately diverse. Marshes on circumneutral, sapric peat/muck or mineral soil.....  
**Dulichium arundinaceum Shore Fen**  
 G3/S2S3 — [CEGL001831](#)  
 (Kunze, 1994 p28; Christy, 2004 p110)
- 4d.1ae *Paspalum distichum* ≥ 40%. *Equisetum arvense* and *Eleocharis palustris* often present to codominant.....  
**Paspalum distichum Marsh**  
 G3/S2 — [CEGL003320](#)  
 (Kunze, 1994 p47; Christy, 2004 p134)
- 4d.1af *Lilaeopsis occidentalis* ≥ 20%. *Tillaea aquatica*, *Limosella aquatica*, *Eleocharis palustris*, or *Oenanthe sarmentosa* often present to codominant.....  
**Lilaeopsis occidentalis Mudflat**  
 G4/S2 — [CEGL003329](#)  
 (Kunze, 1994 p56, 97; Christy, 2004 p128)
- 4d.1ag *Schoenoplectus americanus* or *S. pungens* dominant. Freshwater tidal site. ....  
**Schoenoplectus (americanus, pungens) Pacific Coast Marsh**  
 GNR/SNR — CWWA000443  
 (Kunze, 1994 p58)

4d.1ah *Schoenoplectus acutus* or *S. tabernaemontani* ≥ 10%. *Ranunculus flammula*, *Comarum palustre*, or *Nuphar lutea* ssp. *polysepala* may be present to codominant.....

**Schoenoplectus (acutus, tabernaemontani) Pacific Coast Marsh**

GNR/SNR — [CEGL006647](#)

(Kunze, 1994 p24, 49, 81; Christy, 2004 p141; McCain & Christy, 2005 p320)

4d.1ai *Scirpus microcarpus* ≥ 50% (often much higher) .....

**Scirpus microcarpus Pacific Coast Marsh**

GNR/SNR — CWWA000420

(Henderson & Peter, 1982 p76; Diaz & Mellen, 1996 p187; Murray, 2000 p27; Peter, 2000 p34; Christy, 2004 p142)

4d.1aj *Scirpus atrocinctus* dominant .....

**Scirpus atrocinctus Marsh [Provisional]**

GNRQ/SU — CWWA000238

(WNHP Plot Data)

4d.1ak *Schoenoplectus subterminalis* ≥ 20% .....

**Schoenoplectus subterminalis Aquatic Vegetation**

G3/S2? — [CEGL003309](#)

(Kunze, 1994 p24)

4d.1al *Carex utriculata* ≥ 25%

4d.1al.1 Organic soils (typically hemic peat) and other herbaceous species usually ≥ 5% (*Carex aquatilis* var. *dives*, *Hypericum anagalloides*, *Calamagrostis canadensis*, etc.). Montane or lowland fens .....

**Carex utriculata Pacific Coast Fen**

GNR/SNR — [CEGL006649](#)

(Kunze, 1994 p26, 83; Murray, 2000 p17; Christy, 2004 p100)

4d.1al.2 Mineral or sapric muck soils. *Carex utriculata* is generally tall and few other species present. Marshes .....

**Carex utriculata Marsh**

G5/S5 — [CEGL001562](#)

(Murray, 2000 p17)

4d.1am *Eleocharis quinqueflora* (=E. *pauciflora*) ≥ 25%

4d.1am.1 *Carex scopulorum* codominant .....

**Carex scopulorum - Eleocharis quinqueflora Fen [Provisional]**

GNR/SNR — CWWA000263

(Christy, 2004 p98)

4d.1am.2 *Eriophorum angustifolium* ssp. *angustifolium* and/or *E. chamissonis* ≥ 10% .....

**Eriophorum angustifolium ssp. angustifolium - Eleocharis quinqueflora / Sphagnum spp. Fen**

GNR/SNR — CWWA000429

(Kovalchik & Clausnitzer, 2004 p241)

4d.1am.3 Frequently monotypic. Montane to subalpine fens. Primarily found in eastern Washington, but present near Cascade Crest.....

**Eleocharis quinqueflora Fen**

G4/S3 — [CEGL001836](#)

(Padgett et al., 1989 p104; Hansen et al., 1995 p435; Crowe & Clausnitzer, 1997 p198; Murray, 2000 p19; Christy, 2004 p114; Crowe et al., 2004b p126; Kovalchik & Clausnitzer, 2004 p241; McCain & Christy, 2005 p294)

4d.1an Eriophorum angustifolium spp. subarcticum var. majus ≥ 10%. Montane to subalpine .....

**Eriophorum angustifolium ssp. angustifolium / Sphagnum spp. Fen**

GNR/S2 — [CEGL006650](#)

(Henderson, 1973 p112; Murray, 2000 p19; Kovalchik & Clausnitzer, 2004 p241)

4d.1ao Trichophorum caespitosum ≥ 20% and Tofieldia glutinosa almost always present .....

**Trichophorum caespitosum Pacific Fen**

GNR/S3 — [CEGL002679](#)

(Murray, 2000 p29; Christy, 2004 p147)

4d.1ap Ranunculus flammula ≥ 15%, Carex obnupta ≥ 5%, AND Juncus nevadensis present. NOT in coastal dunes .....

**Ranunculus flammula - Juncus nevadensis - Carex lenticularis Marsh**

G1/S1 — [CEGL003426](#)

(Kunze, 1994 p82)

4d.1aq Carex leporina dominant. Symphoricarpos albus and/or Juncus ensifolius may be present .....

**Carex leporina Ruderal Wet Meadow**

GNA/SNA — Not Tracked

[There has been recent taxonomic confusion as to the nativity of C. leporina (it appears, at this time, to be native)]  
(Rocchio et al., 2012 pB-66)

4d.1ar Sedges dominate on organic soils.....

**Return to 'Sphagnum spp. codominant with vascular species' (4b)**

4d.2 Rushes dominant

4d.2a Juncus falcatus present. Juncus nevadensis or Trifolium wormskjoldii may be present.....

**Juncus falcatus - Juncus (lesueurii, nevadensis) Wet Meadow**

G3/S1? — CWWA000093

(Kunze, 1994 p85)

4d.2b Juncus articulatus ≥ 50% .....

**Juncus articulatus Wet Meadow**

GNRQ/SU — CWWA000219

(Murray, 2000 p21)

4d.2c *Juncus balticus* (= *J. arcticus* ssp. *littoralis*) dominant

4d.2c.1 *Festuca rubra* and/or *Carex cusickii* present to prominent. Serpentine fens .....

***Juncus balticus* - *Festuca rubra* - *Carex cusickii* Fen**

GNR/S1 — [CEGL006697](#)

(Kunze, 1994 p22)

4d.2c.2 *Argentina egedii* NOT present. *Pteridium aquilinum* and *Juncus effusus* often prominent to codominant.....

***Juncus balticus* Pacific Coast Wet Meadow**

GNR/S3 — CWWA000248

(Kunze, 1994 p22; Christy, 2004 p124; McCain & Christy, 2005 p303; Rocchio et al., 2012 pB-58)

4d.2d *Juncus bufonius* dominant .....

***Juncus bufonius* Marsh**

G5/S5 — CTWA003316

(Titus et al., 1996 p41; Kagan et al., 2004 p17)

4d.2e *Juncus effusus* ≥ 20% .....

***Juncus effusus* var. *brunneus* Pacific Coast Wet Meadow**

G5/S5 — [CEGL003317](#)

(Murray, 2000 p23; Christy, 2004 p125; McCain & Christy, 2005 p304)

4d.3 Grasses dominant

4d.3a *Deschampsia caespitosa* dominant or codominant

4d.3a.1 *Artemisia lindleyana* ≥ 20%.....

***Deschampsia caespitosa* - *Artemisia lindleyana* Wet Meadow**

G1/S1 — [CEGL003425](#)

(Kunze, 1994 p41; Christy, 2004 p103; McCain & Christy, 2005 p287)

4d.3a.2 Wet prairie species present (*Carex unilateralis*, *Camassia quamash*, *Danthonia californica*, *Plagiobothrys figuratus*). Seasonally wet freshwater community in Puget Trough and Willamette Valley.....

***Deschampsia caespitosa* - *Danthonia californica* Wet Prairie**

G2/S1 — [CEGL001604](#)

(Christy, 2004 p108; Kagan et al., 2004 p14; McCain & Christy, 2005 p288)

4d.3a.3 Montane wetland species are codominant and may include *Carex aquatilis* var. *dives*, *C. utriculata*, *Pedicularis groenlandica*, and/or *Dodecatheon jeffreyi*.....

***Deschampsia caespitosa* Wet Meadow**

G4/S2? — [CEGL001599](#)

[Note: *Deschampsia caespitosa* has a wide ecological amplitude and is found in a myriad of intergrading vegetation types that can prove difficult to pull apart into meaningful associations]  
(Murray, 2000 p18)

4d.3a.4 *Carex densa* codominant.....

***Carex densa* - *Deschampsia caespitosa* Wet Prairie**

G2/S1 — [CEGL003455](#)

(Kagan et al., 2004 p11)

- 4d.3b *Eragrostis hypnoides* and/or *Gnaphalium palustre* dominant .....  
**Eragrostis hypnoides - Gnaphalium palustre Mudflat**  
G2/SU — [CEGL003327](#)  
(Christy, 2004 p118; McCain & Christy, 2005 p297)
- 4d.3c *Calamagrostis canadensis* ≥ 25%.  
4d.3c.1 *Spiraea douglasii* prominent. *Ledum groenlandicum* or *Comarum palustre* typically present .....  
**Calamagrostis canadensis Pacific Coast Fen**  
GNR/SNR — CWWA000442  
(WNHP Plot Data)
- 4d.3c.2 Not as above. Diverse montane wetland species (e.g. *Caltha leptosepala/biflora*, *Alnus incana*, *Carex kelloggii*) present.....  
**Calamagrostis canadensis Western Wet Meadow**  
G4/S3S4 — [CEGL001559](#)  
(Wooten & Morrison, 1995 p112; Murray, 2000 p13; Christy, 2004 p73)
- 4d.3d *Glyceria striata* ≥ 10% and often much greater (frequently monotypic). Standing water may be present in early growing season .....  
**Glyceria striata Pacific Coast Marsh**  
GNR/SNR — CWWA000422  
(Murray, 2000 p20; Christy, 2004 p120; McCain & Christy, 2005 p299)
- 4d.3e *Saussurea americana* + *Hydrophyllum fendleri* + *Bromus sitchensis* ≥ 35%, *Heracleum maximum* twusually present .....  
**Saussurea americana - Heracleum maximum Wet Meadow**  
G3G4/S2S3 — [CEGL001945](#)  
(Kuramoto & Bliss, 1970 p325; Henderson et al., 1979 p127; Crawford et al., 2009 pA-248; Ramm-Granberg et al., 2021 pA-201)
- 4d.3f *Heracleum maximum* codominant .....  
**Heracleum maximum Wet Meadow**  
G3G4/S3S4 — [CEGL005857](#)  
(Hop et al., 2007; Crawford et al., 2009 pA-245; Ramm-Granberg et al., 2021 pA-200)
- 4d.3g *Equisetum arvense* ≥ 25%, *Alopecurus pratensis* and/or other exotic grasses prominent to codominant, AND *Juncus balticus* absent .....  
**Equisetum arvense - Mixed Graminoid Ruderal Wet Meadow**  
GNA/SNA — Not Tracked  
(Rocchio et al., 2012 pB-67)
- 4d.3h *Phalaris arundinacea* ≥ 25% .....  
**Phalaris arundinacea Western Ruderal Marsh**  
GNA/SNA — [CEGL001474](#)  
(Copass & Ramm-Granberg, 2016a pB-19)

4d.4 Forbs/ferns dominant

- 4d.4a *Eragrostis hypnoides* and/or *Gnaphalium palustre* dominant.....  
**Eragrostis hypnoides - Gnaphalium palustre Mudflat**  
G2/SU — [CEGL003327](#)  
(Christy, 2004 p118; McCain & Christy, 2005 p297)
- 4d.4b *Ranunculus flammula* ≥ 15%, *Carex obnupta* ≥ 5%, AND *Juncus nevadensis* present.....  
**Ranunculus flammula - Juncus nevadensis - Carex lenticularis Marsh**  
G1/S1 — [CEGL003426](#)  
(Kunze, 1994 p82)
- 4d.4c *Menyanthes trifoliata* dominant (≥ 25%). *Nuphar lutea* typically present.....  
**Menyanthes trifoliata Aquatic Vegetation**  
G5/S4? — [CEGL003410](#)  
(Boggs, 2000 p163; Murray, 2000 p24; Christy, 2004 p130; McCain & Christy, 2005 p309)
- 4d.4d *Athyrium filix-femina* ≥ 15% (typically ≥ 50%). *Rubus spectabilis*, *Lysichiton americanum*, *Carex obnupta*, and *Oenanthe sarmentosa* < *Athyrium filix-femina*. Coastal .....  
**Athyrium filix-femina Coastal Marsh**  
G4?/S2 — CWWA000048  
(Kunze, 1994 p95; Peter, 2000 p32; Christy, 2004 p67)
- 4d.4e *Sagittaria latifolia* ≥ 25% or dominant .....  
**Sagittaria latifolia Aquatic Vegetation**  
G3/S1 — [CEGL003321](#)  
(Kunze, 1994 p48; Christy, 2004 p139)
- 4d.4f *Bidens cernua* ≥ 20% .....  
**Bidens cernua Mudflat**  
G3/S2S3 — [CEGL003324](#)  
(Kunze, 1994 p44; Murray, 2000 p12; Christy, 2004 p69; McCain & Christy, 2005 p252)
- 4d.4g *Bidens frondosa* ≥ 75% or dominant.....  
**Bidens frondosa Mudflat**  
G4/S1 — CTWA003325  
(Christy, 2004 p70; Kagan et al., 2004 p10)
- 4d.4h *Caltha biflora* or *C. leptosepala* ≥ 25%. *Dodecatheon jeffreyi* usually present and often ≥ 5% .....  
**Caltha leptosepala Wet Meadow**  
G4/S4 — [CEGL001954](#)  
(Henderson & Peter, 1982 p82; Murray, 2000 p14; Christy, 2004 p76; McCain & Christy, 2005 p259)
- 4d.4i *Caltha palustris* and *Lysichiton americanus* ≥ 5%. Overall cover may be as little as 25% .....  
**Caltha palustris - Lysichiton americanus Marsh**  
G3/S2 — CWWA000055  
(Kunze, 1994 p96)

- 4d.4j *Plectritis congesta* ≥ 10%; *Triteleia hyacinthina* codominant. Seepage areas on exposed bedrock or outcrops.....  
**Plectritis congesta Wet Bald**  
 GNRQ/S1 — CTWA003376  
 (Chappell, 2006b p30)
- 4d.4k *Triteleia hyacinthina* ≥ 35% AND > than *Camassia quamash*. Seasonal pools on exposed bedrock or outcrops .....  
**Triteleia hyacinthina Wet Bald**  
 GNR/S2 — CWWA000243  
 (Christy, 2004 p148; Chappell, 2006b p32)
- 4d.4l *Camassia quamash* dominant; *Triteleia hyacinthina* usually present to codominant. Seasonal pools on bedrock or rock outcrops.....  
**Camassia quamash - Triteleia hyacinthina Wet Bald**  
 GNR/S1S2 — CWWA000210  
 (Christy, 2004 p78; Chappell, 2006b p19)
- 4d.4m *Camassia quamash* ≥ 20%. *Camassia leichtlinii*, *Ranunculus occidentalis*, *Triteleia hyacinthina*, and/or *Saxifraga oregana* often present. Seasonally perched water table in clay-soiled prairies .....  
**Camassia quamash Lowland Wet Prairie**  
 G3/S1S2 — [CEGL003341](#)  
 (Christy, 2004 p78; McCain & Christy, 2005 p261; Copass & Ramm-Granberg, 2016a pB-21)
- 4d.4n *Paspalum distichum* ≥ 40%. *Equisetum arvense* and *Eleocharis palustris* often present to codominant.....  
**Paspalum distichum Marsh**  
 G3/S2 — [CEGL003320](#)  
 (Kunze, 1994 p47; Christy, 2004 p134)
- 4d.4o *Sullivantia hapemanii* abundant species on steep, wet cliffs .....  
**Sullivantia oregana - Adiantum pedatum Wet Cliff**  
 GNR/SNR — [CEGL005508](#)  
 (WNHP Observations)
- 4d.4p *Equisetum fluviatile* ≥ 40% .....  
**Equisetum fluviatile Pacific Coast Marsh**  
 GNR/SNR — [CEGL006645](#)  
 (Christy, 1993 p40; Kunze, 1994 p56,80; Boggs, 2000 p156)
- 4d.4q *Equisetum telmateia* ≥ 50% .....  
**Equisetum telmateia Marsh**  
 GNRQ/S4 — CWWA000218  
 (Murray, 2000 p20; Rocchio et al., 2012 pB-57; Copass & Ramm-Granberg, 2016b pB-30)
- 4d.4r *Euthamia occidentalis* ≥ 30%. *Cyperus* spp. often present .....  
**Euthamia occidentalis Mudflat**  
 G3/S3 — [CEGL003328](#)  
 (Kunze, 1994 p49; Christy, 2004 p119; McCain & Christy, 2005 p298)

4d.4s *Hippuris vulgaris* ≥ 25%. *Nuphar lutea* ssp. *polysepala* and/or *Sparganium angustifolium* often present. Monotypic stands may occur .....

**Hippuris vulgaris Aquatic Vegetation**

G5/S2 — [CEGL003315](#)

(Kunze, 1994 p22; Boggs, 2000 p160; Christy, 2004 p121; McCain & Christy, 2005 p300)

4d.4t *Lilaeopsis occidentalis* ≥ 20%. *Tillaea aquatica*, *Limosella aquatica*, *Eleocharis palustris*, or *Oenanthe sarmentosa* often present to codominant.....

**Lilaeopsis occidentalis Mudflat**

G4/S2 — [CEGL003329](#)

(Kunze, 1994 p56, 97; Christy, 2004 p128)

4d.4u *Ludwigia palustris* or *Polygonum hydropiperoides* dominant or both codominant .....

**Ludwigia palustris - Polygonum hydropiperoides Marsh**

G2/S1S2 — [CEGL003330](#)

(Kunze, 1994 p46; Christy, 2004 p129)

4d.4v *Oenanthe sarmentosa* ≥ 20%

4d.4v.1 *Lilaeopsis occidentalis* ≥ 20%. *Tillaea aquatica*, *Limosella aquatica*, or *Eleocharis palustris* often present to codominant.....

**Lilaeopsis occidentalis Mudflat**

G4/S2 — [CEGL003329](#)

(Kunze, 1994 p56, 97; Christy, 2004 p128)

4d.4v.2 *Oenanthe sarmentosa* ≥ 40% AND *Lilaeopsis occidentalis* absent.....

**Oenanthe sarmentosa Marsh**

G4/S3S4 — [CEGL003319](#)

(Christy, 2004 p133; Kagan et al., 2004 p19; McCain & Christy, 2005 p123; Rocchio et al., 2012 pB-60)

4d.4w *Mimulus guttatus* ≥ 20%

4d.4w.1 *Bryum miniatum* often present. Seeps .....

**Mimulus guttatus - (Mimulus spp.) Seep**

GNR/SNR — [CEGL005305](#)

(Weaver, 1917 p70; Padgett et al., 1989 p115)

4d.4w.2 *Glyceria striata*, *Claytonia sibirica*, and *Stachys cooleyae* (=S. *chamissonis* var. *cooleyae*) often present. Alluvial bars.....

**Mimulus guttatus Marsh**

G4/S4 — CWWA000105

(Diaz & Mellen, 1996 p171)

4d.4w.3 *Triteleia hyacintha* present. Balds. ....

**Mimulus guttatus - Triteleia hyacinthina Wet Bald**

GNR/S2 — [CEGL006654](#)

(Chappell, 2006b p28)

4d.4x *Mimulus lewisii* ≥ 25% .....

**Mimulus lewisii Wet Meadow**

GNR/S4? — [CEGL007765](#)

(Henderson, 1973 p107; Kovalchik & Clausnitzer, 2004 p264; Crawford et al., 2009 pB-22)

- 4d.4y *Petasites frigidus* ≥ 35%.....  
**Petasites frigidus Marsh**  
G5/S5 — CWWA000116  
(Mycek, 1994 p109; Diaz & Mellen, 1996 p179)
- 4d.4z *Polygonum amphibium* (=Persicaria amphibia) ≥ 30% and often monotypic .....  
**Polygonum amphibium Aquatic Vegetation**  
G5/S3? — [CEGL002002](#)  
(Kunze, 1994 p47; Christy et al., 1998 p133; Christy, 2004 p121;  
McCain & Christy, 2005 p314)
- 4d.4aa *Sparganium angustifolium* or *S. emersum* ≥ 20% (often much higher) .....  
**Sparganium angustifolium Aquatic Vegetation**  
G4/S3S4 — [CEGL001990](#)  
(Kunze, 1994 p50, 59; Christy et al., 1998 p138; Christy, 2004  
p144; McCain & Christy, 2005)
- 4d.4ab *Sparganium eurycarpum* ≥ 20% .....  
**Sparganium eurycarpum Pacific Coast Marsh**  
GNR/SNR — [CEGL009060](#)  
(Kunze, 1994 p81; Christy, 2004 p145; McCain & Christy, 2005  
p324)
- 4d.4ac *Stachys ciliata* ≥ 15%. *Mimulus guttatus*, *Athyrium filix-femina*, or *Galium triflorum* often present ....  
**Stachys ciliata Marsh**  
G4/S4 — CWWA000156  
(Diaz & Mellen, 1996 p195, 199)
- 4d.4ad *Adiantum pedatum* ≥ 10%.....  
**Adiantum pedatum Seep**  
GNR/SNR — CWWA000027  
(Diaz & Mellen, 1996 p147)
- 4d.4ae *Plagiobothrys scouleri* and/or *Plantago bigelovii* dominant. Occurs in vernal pools or vernal wet  
areas in bedrock.....  
**Plagiobothrys scouleri - Plantago bigelovii Vernal Pool**  
G2/S1? — [CEGL003459](#)  
(WNHP Plot Data)
- 4d.4af *Lysichiton americanus* ≥ 50% and *Athyrium filix-femina*, *Glyceria striata*, or *Senecio triangularis*  
often present .....  
**Lysichiton americanus Marsh**  
G4?/S3S4 — [CEGL003318](#)  
(Diaz & Mellen, 1996 p167; Murray, 2000 p23)
- 4d.4ag *Corydalis scouleri* ≥ 30% .....  
**Corydalis scouleri Wet Meadow**  
G3?Q/S3? — [CEGL001939](#)  
(Henderson & Peter, 1982 p81; Mycek, 1994 p110; Diaz & Mellen,  
1996 p175)

4d.4ah *Saussurea americana* + *Hydrophyllum fendleri* + *Bromus sitchensis* ≥ 35%, *Heracluem maximum* usually present to codominant .....

***Saussurea americana* - *Heracluem maximum* Wet Meadow**

G3G4/S2S3 — [CEGL001945](#)

(Kuramoto & Bliss, 1970 p325; Henderson et al., 1979 p127; Crawford et al., 2009 pA-248; Ramm-Granberg et al., 2021 pA-201)

4d.4ai *Heracluem maximum* dominant .....

***Heracluem maximum* Wet Meadow**

G3G4/S3S4 — [CEGL005857](#)

(Hop et al., 2007; Crawford et al., 2009 pA-245; Ramm-Granberg et al., 2021 pA-200)

4d.4aj *Saxifraga* (= *Micranthes*) *odontoloma* or *S. nelsonii* or ≥ 5%. *Senecio triangularis* usually present ....

***Saxifraga odontoloma* Wet Meadow**

GU/S3 — [CEGL001985](#)

(Crowe & Clausnitzer, 1997 p213; Kovalchik & Clausnitzer, 2004 p264)

4d.4ak *Trautvetteria caroliniensis* ≥ 25% .....

***Trautvetteria caroliniensis* - (*Senecio triangularis*) Wet Meadow**

GNR/S3? — CWWA000241

(Murray, 2000 p28, 29)

4d.4al *Senecio triangularis* ≥ 10% and *Aconitum columbianum*, *Valeriana sitchensis*, *Mertensia paniculata*, *Trifolium longipes*, and/or *Polygonum bistortoides* often present .....

***Senecio triangularis* Wet Meadow**

G5?/S3 — [CEGL001987](#)

(Diaz & Mellen, 1996 p191; Murray, 2000 p27; Christy, 2004 p143; McCain & Christy, 2005 p322)

4d.4am *Equisetum arvense* ≥ 30% (often much higher)

4d.4am.1 *Glyceria elata* + *Cinna latifolia* + *Mentha arvensis* + *Juncus ensifolius* ≥ 5% .....

***Equisetum arvense* Fen [Provisional]**

GNR/SNR — CWWA000267

(Diaz & Mellen, 1996 p159; Crowe & Clausnitzer, 1997 p210; Murray, 2000 p19; Crawford, 2003 p91)

4d.4am.2 Not as above .....

***Equisetum arvense* Wet Meadow**

G5/S5 — [CEGL003314](#)

(Diaz & Mellen, 1996 p159; Murray, 2000 p19; Christy, 2004 p117)

4d.4an *Typha latifolia* ≥ 20% (often much higher). Often monotypic .....

***Typha latifolia* Pacific Coast Marsh**

G5/S4S5 — [CEGL006648](#)

(Boss, 1982 p51; Kunze, 1994 p24; Titus et al., 1996 p39; Murray, 2000 p29; Christy, 2004 p149; Kagan et al., 2004 p35; McCain & Christy, 2005 p328; Copass & Ramm-Granberg, 2016b pB-58)

4d.4ao Equisetum arvense ≥ 25%, Juncus balticus absent, AND Alopecurus pratensis and/or other exotic grasses prominent to codominant .....

**Equisetum arvense - Mixed Graminoid Ruderal Wet Meadow**

GNA/SNA — Not Tracked

(Rocchio et al., 2012 pB-67)

4d.4aq Lythrum salicaria dominant .....

**Lythrum salicaria Western Ruderal Marsh [Provisional]**

GNA/SNA — Not Tracked

(Copass & Ramm-Granberg, 2016a pB-18)

4d.4aq Impatiens capensis ≥ 50% .....

**Impatiens capensis Ruderal Marsh [Provisional]**

GNA/SNA — Not Tracked

(Copass & Ramm-Granberg, 2016a pB-17)

**5 Key to Westside Nonvascular & Sparse Vascular Vegetation Types**

5a Fontinalis antipyretica forms extensive submerged (sometimes seasonally) beds .....

**Fontinalis antipyretica (var. antipyretica, var. oregonensis)**

**Nonvascular Aquatic Vegetation**

G5/S4 — [CEGL003304](#)

(Christy, 2004 p151)

5b Marchantia polymorpha and Philonotis fontana dominant .....

**Marchantia polymorpha - Philonotis fontana Seep**

G3Q/SU — CWWA000103

(Kagan et al., 2004 p19)

5c Polytrichum commune dominant in seasonally flooded depressions in Mountain Hemlock zone .....

**Polytrichum commune Seep**

G4/SU — CWWA000126

(Christy, 2004 p152)

## Key to Eastside Forest Types

### 6 *Deciduous Trees Dominant*

#### 6a *Betula papyrifera* ≥ 10%

6a.1 *Alnus incana* ≥ 10% .....  
**Betula papyrifera / Alnus incana Swamp**  
G2?/S1 — CWWA000174  
(Kovalchik & Clausnitzer, 2004 p133)

6a.2 *Cornus sericea* ≥ 10% .....  
**Betula papyrifera / Cornus sericea Swamp**  
GNR/SNR — CWWA000318  
(Kovalchik & Clausnitzer, 2004 p133)

6a.3 *Aralia nudicaulis* ≥ 10% .....  
**Betula papyrifera / Aralia nudicaulis Swamp**  
G2?/S1 — CWWA000175  
(Kovalchik & Clausnitzer, 2004 p133)

6a.4 *Cornus unalaschkensis* (= *C. canadensis*) ≥ 5% .....  
**Betula papyrifera / Cornus canadensis Swamp**  
GNR/SNR — CWWA000317  
(Kovalchik & Clausnitzer, 2004 p133)

6b *Acer macrophyllum* ≥ 10% AND *Holodiscus discolor* ≥ 5% .....  
**Acer macrophyllum / Holodiscus discolor Riparian Woodland**  
GNR/SNR — [CEGL006656](#)  
(Kovalchik & Clausnitzer, 2004 p137)

#### 6c *Populus tremuloides* ≥ 10%

6c.1 *Carex pellita* (= *C. lanuginosa*, misapplied) ≥ 25% AND *Calamagrostis canadensis* and  
*Maianthemum stellatum* present to prominent .....  
**Populus tremuloides / Carex pellita Swamp**  
G2/S1 — [CEGL000577](#)  
(Crowe & Clausnitzer, 1997 p78; Kovalchik & Clausnitzer, 2004 p109)

6c.2 *Cornus sericea* ≥ 10% or *Alnus incana* ≥ 25% .....  
**Populus tremuloides / Cornus sericea Riparian Forest**  
G4/S1S2 — [CEGL000582](#)  
(Crowe & Clausnitzer, 1997 p84; Crawford, 2003 p24; Kovalchik & Clausnitzer, 2004 p109)

6c.3 *Crataegus douglasii* ≥ 10% AND *Symphoricarpos albus* ≥ 5% .....  
**(Populus tremuloides) / Crataegus douglasii / Symphoricarpos albus Wet Shrubland**  
G3/S2? — [CEGL001096](#)  
(Daubenmire, 1970 p56; Crowe & Clausnitzer, 1997 p154; Crawford, 2003 p44; Crowe et al., 2004b p180)

- 6c.4 *Crataegus douglasii* ≥ 10% AND *Heracleum maximum* ≥ 5% .....  
**(*Populus tremuloides*) / *Crataegus douglasii* / *Heracleum maximum***  
**Wet Shrubland**  
G1/S1 — [CEGL001094](#)  
(> Daubenmire, 1970 p56, 125; Crawford, 2003 p46)
- 6c.5 *Symphoricarpos albus* ≥ 5% .....  
***Populus tremuloides* / *Symphoricarpos albus* Riparian Forest**  
G3?/S2 — [CEGL000609](#)  
(Williams & Lillybridge, 1983 p75; Crawford, 2003 p25; Kovalchik & Clausnitzer, 2004 p109)
- 6c.6 *Calamagrostis canadensis* ≥ 25% .....  
***Populus tremuloides* / *Calamagrostis canadensis* Swamp**  
G3/S1 — [CEGL000574](#)  
(Crowe & Clausnitzer, 1997 p84; Crowe et al., 2004b p388)
- 6d *Quercus garryana* ≥ 10%
- 6d.1 *Corylus cornuta* ≥ 5% .....  
***Quercus garryana* / *Corylus cornuta* - *Symphoricarpos albus***  
**Riparian Woodland**  
GNR/SNR — CWWA000392  
(Kovalchik & Clausnitzer, 2004 p135)
- 6d.2 *Philadelphus lewisii* and/or *Symphoricarpos albus* ≥ 10% .....  
***Quercus garryana* / *Symphoricarpos albus* Riparian Woodland**  
G2G3/S2S3 — [CEGL000553](#)  
(Evans, 1989 p18; Crawford, 2003 p28)
- 6d.3 *Elymus glaucus* ≥ 10% .....  
***Quercus garryana* / *Elymus glaucus* Woodland**  
G1G2/S1 — [CEGL000550](#)  
(John & Tart, 1986 p64; John et al., 1988 p113; Crawford, 2003 p28)
- 6e *Alnus rhombifolia* ≥ 10%
- 6e.1 *Betula occidentalis* ≥ 10% .....  
***Alnus rhombifolia* / *Betula occidentalis* Riparian Forest**  
G1/S1 — [CEGL000632](#)  
(Daubenmire, 1970 p60; Crawford, 2003 p31; Crowe et al., 2004b p359)
- 6e.2 *Celtis reticulata* (= *C. laevigata* var. *reticulata*) ≥ 10% .....  
***Alnus rhombifolia* / *Celtis laevigata* var. *reticulata* Riparian Forest**  
G1?/S1? — [CEGL000633](#)  
(Crawford, 2003 p31; Crowe et al., 2004b p356)
- 6e.3 *Cornus sericea* ≥ 10% .....  
***Alnus rhombifolia* / *Cornus sericea* Riparian Forest**  
GNR/SNR — CWWA000296  
(Crowe et al., 2004b p357)

- 6e.4 *Philadelphus lewisii* ≥ 10% .....  
**Alnus rhombifolia / Philadelphus lewisii Riparian Forest**  
G1/S1 — [CEGL000634](#)  
(Evans, 1989 p11; Moseley, 1998 p19; Jankovsky-Jones et al., 2001 p37; Crawford, 2003 p30; Crowe et al., 2004b p354)
- 6e.5 *Equisetum arvense* ≥ 10% .....  
**Alnus rhombifolia / Equisetum arvense Riparian Forest**  
GNR/SNR — CWWA000297  
(Crawford, 2003 p29)
- 6f *Populus trichocarpa* ≥ 10%
- 6f.1 *Oplopanax horridus* ≥ 5% .....  
**Populus balsamifera ssp. trichocarpa / Oplopanax horridus - Acer glabrum Riparian Woodland**  
G2/S2 — [CEGL000482](#)  
(Kovalchik & Clausnitzer, 2004 p119)
- 6f.2 *Salix lucida* ssp. *caudata* ≥ 25% .....  
**Populus balsamifera ssp. trichocarpa / Salix lucida ssp. caudata Riparian Woodland**  
G2/S1 — [CEGL003431](#)  
(Crowe & Clausnitzer, 1997 p88; Crowe et al., 2004b p328)
- 6f.3 *Alnus incana* ≥ 25%. *Alnus viridis* may intergrade near the Cascade Crest.
- 6f.3a *Cornus sericea* ≥ 10% .....  
**Populus balsamifera ssp. trichocarpa / Alnus incana - Cornus sericea Riparian Forest**  
GNR/SNR — CWWA000387  
(Crowe & Clausnitzer, 1997 p90; Kovalchik & Clausnitzer, 2004 p119)
- 6f.3b *Cornus sericea* < 10% .....  
**Populus balsamifera ssp. trichocarpa / Alnus incana Riparian Forest**  
G3/S3 — [CEGL000667](#)  
(Wooten & Morrison, 1995 p77; Kovalchik & Clausnitzer, 2004 p119; Crawford et al., 2009 pA-217)
- 6f.4 *Cornus sericea* ≥ 10% .....  
**Populus balsamifera ssp. trichocarpa / Cornus sericea Riparian Forest**  
G3G4/S2? — [CEGL000672](#)  
(Kovalchik, 1987 p136; Evans, 1989 p17; Hansen et al., 1995 p244; Hall & Hansen, 1997 p138; Crawford, 2003 p27; Kovalchik & Clausnitzer, 2004 p119)
- 6f.5 *Acer glabrum* ≥ 10% .....  
**Populus balsamifera ssp. trichocarpa / Acer glabrum Riparian Woodland**  
G2?/S2 — CWWA000020  
(Crowe & Clausnitzer, 1997 p92)

- 6f.6 *Alnus rhombifolia* ≥ 10% .....  
**Populus balsamifera ssp. trichocarpa - *Alnus rhombifolia* Riparian Forest**  
G1/S1 — [CEGL000668](#)  
(Daubenmire, 1970 p60; Evans, 1989 p11; Crowe et al., 2004b p331)
- 6f.7 *Betula occidentalis* ≥ 10% .....  
**Populus balsamifera ssp. trichocarpa - *Betula occidentalis* / *Philadelphus lewisii* Riparian Forest**  
GNR/SNR — CWWA000385  
(Crawford, 2003 p27)
- 6f.8 *Philadelphus lewisii* ≥ 10% .....  
**Populus balsamifera ssp. trichocarpa / *Philadelphus lewisii* Riparian Forest**  
GNR/SNR — CWWA000389  
(Crowe et al., 2004b p333)
- 6f.9 *Crataegus douglasii* ≥ 10% .....  
**Populus balsamifera ssp. trichocarpa / *Crataegus douglasii* Riparian Forest**  
G1/SH — [CEGL000673](#)  
(Crowe et al., 2004b p337)
- 6f.10 *Cicuta douglasii* ≥ 10% .....  
**Populus balsamifera ssp. trichocarpa / *Cicuta douglasii* Riparian Forest**  
G1/S1 — [CEGL000671](#)  
(Daubenmire, 1970 p60)
- 6f.11 *Juniperus scopulorum* ≥ 15% .....  
**Populus balsamifera ssp. trichocarpa / *Juniperus scopulorum* Riparian Forest**  
GNR/SNR — CWWA000388  
(Crawford, 2003 p27)
- 6f.12 *Salix exigua* ≥ 15% OR Sparse understory. Alluvial bars or deposits .....  
**Populus balsamifera ssp. trichocarpa / *Salix exigua* Riparian Forest**  
G1/S1 — [CEGL000676](#)  
(Wilderman, 1994 p27; Crawford, 2003 p27; Kovalchik & Clausnitzer, 2004 p119)
- 6f.13 *Symphoricarpos albus* ≥ 5% and *Rosa woodsii* usually present .....  
**Populus balsamifera (ssp. trichocarpa, ssp. balsamifera) / *Symphoricarpos* (albus, oreophilus, occidentalis) Riparian Forest**  
G2/S1S2 — [CEGL000677](#)  
(Kovalchik, 1987 p136; Evans, 1989 p17; Crowe & Clausnitzer, 1997 p94; Crawford, 2003 p26; Crowe et al., 2004b p348; Kovalchik & Clausnitzer, 2004 p119)

- 6f.14 Equisetum hyemale ≥ 5% .....  
**Populus balsamifera ssp. trichocarpa / Equisetum hyemale Riparian Forest**  
 GNRQ/S1 — CWWA000185  
 (Salstrom & Easterly, 1995 p6)
- 6f.14 Understory dominated by exotic herbaceous species .....  
**Populus balsamifera ssp. trichocarpa / Phleum pratense - Mixed Herbs Ruderal Riparian Forest**  
 GNA/SNA — [CEGL000675](#)  
 (Hansen et al., 1995 p250)
- 6g Alnus rubra ≥ 10%
- 6g.1 Oplopanax horridus ≥ 5% .....  
**Alnus rubra / Oplopanax horridus / Athyrium filix-femina Riparian Forest**  
 GNR/SNR — [CEGL006696](#)  
 (Kovalchik & Clausnitzer, 2004 p131)
- 6g.2 Cornus sericea ≥ 10%.....  
**Alnus rubra / Cornus sericea Riparian Forest**  
 GNR/SNR — CWWA000302  
 (Crowe & Clausnitzer, 1997 p100; Crowe et al., 2004b p381)
- 6g.3 Alnus viridis ssp. sinuata ≥ 10% .....  
**Alnus rubra / Alnus viridis ssp. sinuata Riparian Forest**  
 GNR/S3S4 — [CEGL006695](#)  
 (Kovalchik & Clausnitzer, 2004 p131)
- 6g.4 Physocarpus capitatus ≥ 10%.....  
**Alnus rubra / Physocarpus capitatus - Philadelphus lewisii Swamp**  
 G1/S1 — [CEGL000002](#)  
 (Crowe & Clausnitzer, 1997 p98; Crowe et al., 2004b p375)
- 6g.5 Acer circinatum ≥ 10% .....  
**Alnus rubra / Acer circinatum Riparian Forest**  
 GNR/SNR — CWWA000298  
 (Kovalchik & Clausnitzer, 2004 p131)
- 6g.6 Symphoricarpos albus ≥ 15% .....  
**Alnus rubra / Symphoricarpos albus Riparian Forest**  
 GNR/SNR — CWWA000304  
 (Crowe & Clausnitzer, 1997 p100; Crowe et al., 2004b p382)
- 6g.7 Petasites frigidus var. palmatus ≥ 25%.....  
**Alnus rubra / Petasites frigidus Riparian Forest**  
 G4/S4 — [CEGL003401](#)  
 (Crowe & Clausnitzer, 1997 p100; Crowe et al., 2004b p379)
- 6g.8 Achlys triphylla ≥ 10% .....  
**Alnus rubra / Achlys triphylla Riparian Forest**  
 GNR/SNR — CWWA000299  
 (Kovalchik & Clausnitzer, 2004 p131)

- 6g.9 *Athyrium filix-femina* ≥ 10% .....  
**Alnus rubra / Athyrium filix-femina - Asarum caudatum Riparian Forest**  
G1/S1 — [CEGL000008](#)  
(Crowe et al., 2004b p377)
- 6g.10 *Ranunculus repens* may be dominant and scattered shrubs may be present. *Alnus rubra* and/or *Populus trichocarpa* seedlings and saplings dominate, with variable density. Alluvial bars ..  
**Alnus rubra / Alluvial Bar Riparian Forest**  
GNR/SNR — CWWA000300  
(Crowe & Clausnitzer, 1997 p100)
- 6h *Salix amygdaloides* ≥ 20% .....  
**Salix amygdaloides / Rosa woodsii Riparian Woodland**  
G1Q/S1 — CWWA000444  
(Evans, 1989 p21; Crawford, 2003 p54)
- 6i *Salix alba* dominant .....  
**Salix (fragilis, alba) Ruderal Riparian Woodland**  
GNA/SNA — [CEGL005622](#)  
(Crawford, 2003 p49)
- 6j *Elaeagnus angustifolia* dominant .....  
**Elaeagnus angustifolia Ruderal Riparian Woodland**  
GNA/SNA — [CEGL005269](#)  
(WNHP Plot Data)
- 6k *Acer negundo* dominant or codominant .....  
**Acer negundo Ruderal Riparian Woodland**  
GNA/SNA — CWWA000284  
(Crawford, 2003 p49)
- 7 Conifers Dominant or Codominant**
- 7a *Tsuga mertensiana* ≥ 10%
- 7a.1 *Oplopanax horridus* ≥ 5% .....  
**Abies amabilis - Tsuga mertensiana / Oplopanax horridus Swamp**  
G3G4/S3 — [CEGL000507](#)  
(Kovalchik & Clausnitzer, 2004 p19; Crawford et al., 2009 pA-191)
- 7a.2 *Phyllodoce empetriformis* and/or *Vaccinium deliciosum* ≥ 5% .....  
**Tsuga mertensiana / Phyllodoce empetriformis - Vaccinium deliciosum Woodland**  
G4/S3S4 — [CEGL005579](#)  
(Henderson et al., 1989 p132, 1992 p156; Lillybridge et al., 1995 p190; Diaz et al., 1997 p63; Kovalchik & Clausnitzer, 2004 p19; Crawford et al., 2009 pA-189; Ramm-Granberg et al., 2021 pA-108)

- 7a.3 *Menziesia ferruginea* ≥ 5% AND *Vaccinium ovalifolium* (=alaskaense) present.....  
***Tsuga mertensiana* - *Abies amabilis* / *Vaccinium alaskaense* /  
*Rubus pedatus* Forest**  
G4G5/S4 — [CEGL005580](#)  
(Kovalchik & Clausnitzer, 2004 p19; Crawford et al., 2009 pA-178;  
Ramm-Granberg et al., 2021 pA-96)
- 7b *Larix lyallii* ≥ 10% AND *Phyllodoce empetrifolmis* and/or *Vaccinium delicosum* ≥ 10% .....  
***Larix lyallii* / *Vaccinium delicosum* - *Cassiope mertensiana*  
Woodland**  
G3/S2S3 — [CEGL000952](#)  
(Kovalchik & Clausnitzer, 2004 p103)
- 7c *Pinus contorta* ≥ 10%
- 7c.1 *Thuja plicata* present. *Alnus incana* dominates understory with *Vaccinium uliginosum* and  
*Carex* species. Montane fens .....  
***Pinus contorta* var. *contorta* - *Thuja plicata* / *Alnus incana* / *Carex*  
(aquatilis var. *dives*, *echinata* ssp. *echinata*) Swamp**  
GNRQ/SU — CWWA000258  
(WNHP Plot Data)
- 7c.2 *Spiraea douglasii* ≥ 25% *Pinus contorta* / *Spiraea douglasii*  
Swamp**  
G3G4/SNR — [CEGL002604](#)  
(John & Tart, 1986 p139; John et al., 1988 p125)
- 7c.3 *Carex utriculata* ≥ 25% .....  
***Pinus contorta* / *Betula glandulosa* / *Carex utriculata* Treed Fen**  
GNR/SNR — CWWA000371  
(Kovalchik & Clausnitzer, 2004 p105)
- 7c.4 *Calamagrostis canadensis* ≥ 25% .....  
***Pinus contorta* / *Calamagrostis canadensis* Treed Fen**  
G5/SNR — [CEGL000138](#)  
(Crowe & Clausnitzer, 1997 p51; Crowe et al., 2004b p462;  
Kovalchik & Clausnitzer, 2004 p106)
- 7d *Abies amabilis* ≥ 10%
- 7d.1 *Oplopanax horridus* ≥ 10% .....  
***Abies amabilis* - *Tsuga heterophylla* / *Oplopanax horridus* Swamp**  
G5/S5 — [CEGL000004](#)  
(Lillybridge et al., 1995 p162; Kovalchik & Clausnitzer, 2004 p29)
- 7d.2 *Acer circinatum* ≥ 10% .....  
***Abies amabilis* / *Acer circinatum* Riparian Forest**  
GNR/SNR — CWWA000272  
(Kovalchik & Clausnitzer, 2004 p38)
- 7d.3 *Menziesia ferruginea* ≥ 10% .....  
***Abies amabilis* / *Menziesia ferruginea* Forest**  
G4/S4 — [CEGL000224](#)  
(Kovalchik & Clausnitzer, 2004 p29; Crawford et al., 2009 pA-138;  
Ramm-Granberg et al., 2021 pA-82)

- 7d.4 *Rhododendron albiflorum* ≥ 10% AND *Vaccinium membranaceum* present.....  
**Abies amabilis / Rhododendron albiflorum Forest**  
G5/S4 — [CEGL000225](#)  
(Brockway et al., 1983 p63; Brockway & Topik, 1984 p5; Kovalchik & Clausnitzer, 2004 p29; Crawford et al., 2009 pA-139; Ramm-Granberg et al., 2021 pA-94)
- 7d.5 *Vaccinium membranaceum* ≥ 10% .....  
**Abies amabilis - Picea engelmannii / Vaccinium membranaceum Forest**  
GNR/SNR — CWWA000270  
(Kovalchik & Clausnitzer, 2004 p29)
- 7d.6 *Gymnocarpium dryopteris* ≥ 5%.....  
**Abies amabilis / Gymnocarpium dryopteris Swamp**  
GNR/SNR — CWWA000274  
(Kovalchik & Clausnitzer, 2004 p29)
- 7d.7 *Achlys triphylla* ≥ 5% .....  
**Abies amabilis - (Pseudotsuga menziesii) / Vaccinium membranaceum / Achlys triphylla Forest**  
G4/S4 — [CEGL005514](#)  
(Kovalchik & Clausnitzer, 2004 p29; Crawford et al., 2009 pA-134)
- 7d.8 *Tiarella trifoliata* var. *unifoliata*, *Trautvetteria caroliniensis* and/or *Streptopus lanceolatus* ≥ 5% .....  
**Abies amabilis - Tsuga heterophylla / Tiarella trifoliata var. unifoliata Riparian Forest**  
GNR/SNR — CWWA000271  
(Kovalchik & Clausnitzer, 2004 p29)
- 7d.9 *Athyrium filix-femina* ≥ 5% .....  
**Abies amabilis / Athyrium filix-femina Riparian Forest**  
GNR/SNR — CWWA000273  
(Kovalchik & Clausnitzer, 2004 p29)
- 7e *Tsuga heterophylla* ≥ 10%
- 7e.1 *Oplopanax horridus* ≥ 10% .....  
**Thuja plicata - Tsuga heterophylla / Oplopanax horridus Rocky Mountain Swamp**  
G3/S2S3 — [CEGL000479](#)  
(Daubenmire, 1952 p315; < Daubenmire & Daubenmire, 1968 p35; Pfister et al., 1977 p74; Cooper et al., 1991 p27; Braumandl & Curran, 1992 p45; Hansen et al., 1995 p167)
- 7e.2 *Lysichiton americanus* ≥ 5% .....  
**Picea engelmannii - Tsuga heterophylla / Lysichiton americanus Swamp**  
GNR/SNR — CWWA000376  
(John et al., 1988 p47; Lillybridge et al., 1995 p148; Kovalchik & Clausnitzer, 2004 p39)

- 7e.3 *Gymnocarpium dryopteris* ≥ 10%. Sub-hydric or wetter herbs such as *Circaea alpina*, *Streptopus amplexifolius*, *Trautvetteria caroliniensis*, and/or *Viola glabella* present.....  
**Tsuga heterophylla / Gymnocarpium dryopteris Forest**  
G3G4/S3 — [CEGL000494](#)  
(Cooper et al., 1991 p20; Hansen et al., 1995 p170; Lillybridge et al., 1995; Kovalchik & Clausnitzer, 2004 p39)
- 7e.4 *Asarum caudatum* ≥ 5% AND *Athyrium filix-femina* ≥ 1%. Cascade Mountains .....  
**Tsuga heterophylla / Asarum caudatum Forest**  
G4/SNR — [CEGL000490](#)  
(Cooper et al., 1991 p21; Lillybridge et al., 1995 p142; Kovalchik & Clausnitzer, 2004 p39)
- 7e.5 *Aralia nudicaulis* ≥ 10% and *Asarum* usually present. Rocky Mountains .....  
**Tsuga heterophylla / Aralia nudicaulis Forest**  
G3/S3 — [CEGL000488](#)  
(Pfister et al., 1977 p76; Cooper et al., 1991 p22; Williams et al., 1995 p199; Kovalchik & Clausnitzer, 2004 p39)
- 7e.6 *Clintonia uniflora*, *Paxistima myrsinites*, and/or *Viola orbiculata* ≥ 1% .....  
**Tsuga heterophylla / Clintonia uniflora Forest**  
G4/S4 — [CEGL000493](#)  
(Pfister et al., 1977 p74; Cooper et al., 1991 p23; Lillybridge et al., 1995 p146; Williams et al., 1995 p204; Kovalchik & Clausnitzer, 2004 p39)
- 7f *Thuja plicata* ≥ 10%
- 7f.1 *Oplopanax horridus* ≥ 5% .....  
**Thuja plicata - Tsuga heterophylla / Oplopanax horridus Rocky Mountain Swamp**  
G3/S2S3 — [CEGL000479](#)  
(Daubenmire, 1952 p315; < Daubenmire & Daubenmire, 1968 p35; Pfister et al., 1977 p74; Cooper et al., 1991 p27; Braumandl & Curran, 1992 p45; Hansen et al., 1995 p167)
- 7f.2 *Acer circinatum* ≥ 10% .....  
**Thuja plicata - (Abies grandis) / Acer circinatum Riparian Forest**  
GNR/SNR — CWWA000409  
(Kovalchik & Clausnitzer, 2004 p51)
- 7f.3 *Alnus incana* ≥ 10% .....  
**Thuja plicata / Alnus incana Riparian Forest**  
GNR/SNR — [CEGL006655](#)  
(Kovalchik & Clausnitzer, 2004 p51)
- 7f.4 *Vaccinium membranaceum* ≥ 10%. Rocky Mountains .....  
**Picea engelmannii - Thuja plicata / Vaccinium membranaceum Riparian Forest**  
GNR/SNR — CWWA000412  
(Kovalchik & Clausnitzer, 2004 p51)

- 7f. 5 *Paxistima myrsinites* ≥ 10%. Cascade Mountains .....  
**Thuja plicata / Paxistima myrsinites / Clintonia uniflora Riparian Forest**  
GNR/SNR — CWWA000411  
(Kovalchik & Clausnitzer, 2004 p51)
- 7f.6 *Lysichiton americanus* ≥ 5% .....  
**Picea engelmannii - Tsuga heterophylla / Lysichiton americanus Swamp**  
GNR/SNR — CWWA000376  
(John et al., 1988 p47; Lillybridge et al., 1995 p148; Kovalchik & Clausnitzer, 2004 p39)
- 7f.7 *Athyrium filix-femina* ≥ 5%.....  
**Thuja plicata / Athyrium filix-femina Swamp**  
G3G4/SNR — [CEGL000473](#)  
(Daubenmire & Daubenmire, 1968 p36; Cooper et al., 1991 p28; Hansen et al., 1995 p161; Kovalchik & Clausnitzer, 2004 p51)
- 7f.8 *Gymnocarpium dryopteris* ≥ 5%.....  
**Thuja plicata / Gymnocarpium dryopteris Riparian Forest**  
G3/SNR — [CEGL000476](#)  
(Clausnitzer & Zamora, 1987 p45; Kovalchik & Clausnitzer, 2004 p51)
- 7f.9 *Equisetum arvense* and/or *Carex disperma* ≥ 10% .....  
**Picea engelmannii - Thuja plicata / Equisetum arvense Swamp**  
GNR/SNR — CWWA000373  
(Kovalchik & Clausnitzer, 2004 p51)
- 7f.10 *Achlys triphylla* ≥ 5% .....  
**Abies grandis - Thuja plicata / Alnus viridis ssp. sinuata / Achlys triphylla Riparian Forest**  
GNR/SNR — CWWA000275  
(Kovalchik & Clausnitzer, 2004 p51)
- 7f.11 *Asarum caudatum* ≥ 5%. Cascade Mountains.....  
**Thuja plicata / Asarum caudatum Forest**  
GNR/SNR — [CEGL000472](#)  
(Kovalchik & Clausnitzer, 2004 p51)
- 7f.12 *Aralia nudicaulis*, *Asarum caudatum*, and/or *Actaea rubra* ≥ 5%. Rocky Mountains .....  
**Thuja plicata / Aralia nudicaulis Forest**  
G2/S2 — [CEGL000471](#)  
(Clausnitzer & Zamora, 1987 p43; Kovalchik & Clausnitzer, 2004 p51)
- 7f.13 *Clintonia uniflora* ≥ 1%. Rocky Mountains .....  
**Thuja plicata / Clintonia uniflora Forest**  
G4/S3 — [CEGL000474](#)  
(Pfister et al., 1977 p71; Cooper et al., 1991 p34; Williams et al., 1995 p246; Kovalchik & Clausnitzer, 2004 p51)

- 7g *Picea engelmannii* and/or *Abies lasiocarpa* ≥ 10%
- 7g.1 *Oplopanax horridus* ≥ 10% .....  
***Abies lasiocarpa* - *Picea engelmannii* / *Oplopanax horridus* Swamp**  
G3/SNR — [CEGL000322](#)  
(Jankovsky-Jones, 1997; Kovalchik & Clausnitzer, 2004 p63)
- 7g.2 *Betula glandulosa* ≥ 25% AND calcareous fen indicators such as *Tomentypnum nitens*,  
*Carex gynocrates*, *C. interior*, *C. buxbaumii*, *Dasiphora fruticosa* spp. *Floribunda*,  
*Symphytotrichum boreale*, *Salix brachycarpa*, *S. candida*, *Triglochin palustris* are present.....  
***Picea engelmannii* / *Betula glandulosa* / *Tomentypnum nitens* Treed Fen**  
GNR/SNR — CWWA000372  
(WNHP Plot Data)
- 7g.3 *Alnus viridis* ssp. *sinuata* ≥ 25% AND *Athyrium filix-femina* usually < 5% .....  
***Picea engelmannii* / *Alnus viridis* ssp. *sinuata* Riparian Forest**  
GNR/SNR — CWWA000377  
(Kovalchik & Clausnitzer, 2004 p63)
- 7g.4 *Rhododendron neoglandulosum* (= *Ledum glandulosum*) ≥ 10% .....  
***Abies lasiocarpa* / *Ledum glandulosum* Riparian Forest**  
G4/S1S2 — [CEGL000314](#)  
(Cooper et al., 1991 p46; Kovalchik & Clausnitzer, 2004 p63)
- 7g.5 *Rhododendron albiflorum* ≥ 10% AND *Luzula hitchcockii* ≥ 1% .....  
***Abies lasiocarpa* / *Rhododendron albiflorum* / *Luzula glabrata* var. *hitchcockii* Riparian Forest**  
GNR/SNR — CWWA000279  
(Lillybridge et al., 1995 p222; Kovalchik & Clausnitzer, 2004 p63)
- 7g.6 *Rhododendron albiflorum* ≥ 10%, *Luzula hitchcockii* absent, and numerous mesic/moist  
forbs such as *Senecio triangularis* or *Mitella pentandra* present.....  
***Abies lasiocarpa* / *Rhododendron albiflorum* / *Senecio triangularis* Woodland**  
G3G4/S2S3 — [CEGL002613](#)  
(Kovalchik & Clausnitzer, 2004 p63)
- 7g.7 *Vaccinium membranaceum* ≥ 10% .....  
***Abies lasiocarpa* / *Vaccinium membranaceum* Forest**  
G4/S3— [CEGL000342](#)  
(Hall, 1973 p40; Henderson et al., 1976, 1986, 1989 p260; Johnson & Simon, 1987 p253; Johnson & Clausnitzer, 1992 p33; Williams et al., 1995 p168; Kovalchik & Clausnitzer, 2004 p63; Crawford et al., 2009 pA-67; Ramm-Granberg et al., 2021 pA-5)
- 7g.8 *Cornus sericea* ≥ 10% OR *Symphoricarpos albus* ≥ 10% and *Cornus sericea* ≥ 1% .....  
***Picea engelmannii* / *Cornus sericea* Riparian Woodland**  
G3/S2? — [CEGL002677](#)  
(Crowe et al., 2004b p438; Kovalchik & Clausnitzer, 2004 p77)

- 7g.9 *Vaccinium cespitosum* or *Arctostaphylos uva-ursi* ≥ 5% .....  
**Abies lasiocarpa / Vaccinium cespitosum Riparian Forest**  
 GNR/SNR — CWWA000281  
 (Williams et al., 1995 p162)
- 7g.10 *Paxistima myrsinites* ≥ 10% .....  
**Abies lasiocarpa / Paxistima myrsinites Woodland**  
 G4/S4 — [CEGL000324](#)  
 (Williams & Lillybridge, 1983 p52; Kovalchik & Clausnitzer, 2004 p63)
- 7g.11 *Lysichiton americanus* ≥ 5% .....  
**Picea engelmannii - Tsuga heterophylla / Lysichiton americanus Swamp**  
 GNR/SNR — CWWA000376  
 (John et al., 1988 p47; Lillybridge et al., 1995 p148; Kovalchik & Clausnitzer, 2004 p39)
- 7g.12 *Carex scopulorum* var. *prionophylla* ≥ 10% .....  
**Picea engelmannii / Carex scopulorum var. prionophylla Swamp Woodland**  
 G3/S3 — [CEGL002630](#)  
 (Kovalchik & Clausnitzer, 2004 p77)
- 7g.13 *Carex interior* ≥ 10% .....  
**Picea engelmannii / Carex interior Swamp**  
 GNR/SNR — CWWA000379  
 Rocky Mountain Calcareous Swamp  
 (WNHP Plot Data)
- 7g.14 *Carex disperma* ≥ 10% AND *Equisetum arvense* < 5% .....  
**Picea (x *albertiana*, *engelmannii*) / Carex disperma Swamp**  
 G2Q/S1S2 — [CEGL000405](#)  
 (Steele et al., 1981 p47; Chadde et al., 1998 p18; WNHP observations & plot data)
- 7g.15 *Equisetum arvense* ≥ 10%; *Carex disperma* may be present to prominent .....  
**Picea engelmannii / Equisetum arvense Swamp**  
 G4/S3 — [CEGL005927](#)  
 (Steele et al., 1981 p49, 1983 p36; Williams & Lillybridge, 1983 p56; Kovalchik, 1987 p57; Lillybridge et al., 1995 p236; Williams et al., 1995 p184; Crowe & Clausnitzer, 1997 p46; Chadde et al., 1998 p18; Crowe et al., 2004b; Kovalchik & Clausnitzer, 2004 p77; Crawford et al., 2009 pA-190)
- 7g.16 *Trautvetteria caroliniensis* ≥ 5% .....  
**Abies lasiocarpa / Trautvetteria caroliniensis Riparian Forest**  
 G3/S3 — [CEGL000339](#)  
 (Johnson & Clausnitzer, 1992 p25; Williams et al., 1995 p157; Kovalchik & Clausnitzer, 2004 p63)

- 7g.17 *Trollius laxus* ≥ 5% .....  
**Picea engelmannii - (*Abies lasiocarpa*) / *Trollius laxus* Riparian Forest**  
 GNR/SNR — CWWA000375  
 (Kovalchik & Clausnitzer, 2004 p63)
- 7g.18 *Athyrium filix-femina* ≥ 10%  
 7g.18a *Abies lasiocarpa* ≥ 10% .....  
**Abies lasiocarpa / *Athyrium filix-femina* Riparian Woodland**  
 GNR/SNR — CWWA000002  
 (Crowe & Clausnitzer, 1997 p34; Kovalchik & Clausnitzer, 2004 p63)
- 7g.18b *Picea engelmannii* ≥ 10% .....  
**Picea engelmannii / *Athyrium filix-femina* Riparian Woodland**  
 GNR/SNR — CWWA000183  
 (Crowe & Clausnitzer, 1997 p42)
- 7g.19 *Gymnocarpium dryopteris* ≥ 5%  
 7g.19a *Abies lasiocarpa* ≥ 10% .....  
**Abies lasiocarpa / *Gymnocarpium dryopteris* Forest**  
 GNRQ/SNR — [CEGL002611](#)  
 (Clausnitzer & Zamora, 1987 p39; Kovalchik & Clausnitzer, 2004 p63)
- 7g.19b *Picea engelmannii* ≥ 10% .....  
**Picea engelmannii / *Gymnocarpium dryopteris* Forest [Provisional]**  
 GNR/SNR — CWWA000381  
 (Kovalchik & Clausnitzer, 2004 p77)
- 7g.20 *Streptopus amplexifolius* ≥ 1% AND *Cornus unalaschensis* (=C. canadensis) + *Aralia nudicaulis* < 1% .....  
**Abies lasiocarpa - Picea engelmannii / *Streptopus amplexifolius* Riparian Forest**  
 G4/S2S3 — [CEGL000336](#)  
 (Cooper et al., 1991 p48; Kovalchik & Clausnitzer, 2004 p63)
- 7g.21 *Rubus lasiococcus* ≥ 1% .....  
**Abies lasiocarpa / *Rubus lasiococcus* Riparian Forest**  
 GNR/SNR — CWWA000278  
 (Kovalchik & Clausnitzer, 2004 p63)
- 7g.22 *Calamagrostis canadensis* ≥ 5% and *Ligusticum canbyi*, *Trautvetteria caroliniensis*, and/or *Vaccinium cespitosum* often present .....  
**Abies lasiocarpa - Picea engelmannii / *Calamagrostis canadensis* Swamp**  
 G5/SNR — [CEGL000300](#)  
 (Pfister et al., 1977 p88; Steele et al., 1981 p61, 1983 p45; Cooper et al., 1991 p46; Hansen et al., 1995 p114; Crowe & Clausnitzer, 1997 p38; Crowe et al., 2004b p421)

- 7g.23 *Senecio triangularis* and/or *Saxifraga odontoloma* (= *Micranthes odontoloma*) ≥ 5%.....  
**Abies lasiocarpa / Senecio triangularis - Saxifraga odontoloma Riparian Forest**  
 GNR/SNR — CWWA000280  
 (Crowe et al., 2004b p419)
- 7g.24 *Cornus unalaschkensis* (= *C. canadensis*) ≥ 5%  
 7g.24a *Abies lasiocarpa* ≥ 10% .....  
**Abies lasiocarpa / Cornus canadensis Forest**  
 G3G4/S3S4 — [CEGL000309](#)  
 (Williams et al., 1995 p136; Kovalchik & Clausnitzer, 2004 p63)
- 7g.24b *Picea engelmannii* ≥ 10% .....  
**Picea engelmannii / Cornus canadensis Riparian Forest**  
 GNR/SNR — CWWA000380  
 (Kovalchik & Clausnitzer, 2004 p77)
- 7g.25 *Arnica latifolia*, *Polemonium pulcherrimum*, *Thalictrum occidentale*, and/or *Valeriana sitchensis* ≥ 5% .....  
**Picea engelmannii - Abies lasiocarpa / Valeriana sitchensis Riparian Forest**  
 GNR/SNR — CWWA000374  
 (Kovalchik & Clausnitzer, 2004 p63)
- 7g.26 *Aralia nudicaulis* ≥ 5%.....  
**Picea engelmannii / Aralia nudicaulis Riparian Forest**  
 GNR/SNR — CWWA000378  
 (Kovalchik & Clausnitzer, 2004 p77)
- 7h *Abies grandis* ≥ 10%  
 7h.1 *Acer circinatum* ≥ 10% .....  
**Abies grandis / Acer circinatum Forest**  
 G4/S3 — [CEGL000266](#)  
 (Topik et al., 1988 p91; Kovalchik & Clausnitzer, 2004 p89)
- 7h.2 *Acer glabrum* ≥ 10%.....  
**Abies grandis / Acer glabrum Forest**  
 G3/S2 — [CEGL000267](#)  
 (Clausnitzer, 1993 p27; Crowe & Clausnitzer, 1997 p58; Crowe et al., 2004b p304)
- 7h.3 *Symphoricarpos albus* and/or *Holodiscus discolor* ≥ 5%.....  
**Abies grandis / Symphoricarpos albus Riparian Forest**  
 GNR/SNR — CWWA000277  
 (Kovalchik & Clausnitzer, 2004 p89)
- 7h.4 *Athyrium filix-femina* ≥ 5% .....  
**Abies grandis / Athyrium filix-femina Riparian Forest**  
 G3Q/S1 — [CEGL000270](#)  
 (Crowe & Clausnitzer, 1997 p54; Crowe et al., 2004b p363)

- 7h.5 *Gymnocarpium dryopteris* ≥ 5%.....  
**Abies grandis / Gymnocarpium dryopteris Riparian Forest**  
 GNR/SNR — CWWA000276  
 (Johnson & Clausnitzer, 1992 p45; Crowe & Clausnitzer, 1997 p56;  
 Crowe et al., 2004b p366)
- 7h.6 *Achlys triphylla* ≥ 5%.....  
**Abies grandis / Achlys triphylla Forest**  
 G3/S3 — [CEGL000268](#)  
 (Topik et al., 1988 p95; Kovalchik & Clausnitzer, 2004 p89)
- 7h.7 *Trautvetteria caroliniensis* ≥ 5%.....  
**Abies grandis / Trautvetteria caroliniensis Forest**  
 G3/S1S2 — [CEGL000285](#)  
 (Johnson & Clausnitzer, 1992 p49; Crowe et al., 2004b p369)
- 7i *Pseudotsuga menziesii* ≥ 10%  
 7i.1 *Acer glabrum* and/or *Physocarpus malvaceus* ≥ 10% and/or *Symphoricarpos albus* ≥ 5%.  
 Floodplains.....  
**Pseudotsuga menziesii / Symphoricarpos albus Riparian Woodland**  
 G2?/S1S2 — CWWA000021  
 (Crowe & Clausnitzer, 1997 p66; Crowe et al., 2004b p317;  
 Kovalchik & Clausnitzer, 2004 p101)
- 7i.2 *Trautvetteria carolinensis* ≥ 5%.....  
**Pseudotsuga menziesii / Trautvetteria caroliniensis Woodland**  
 GNR/SNR — CWWA000391  
 (Crowe & Clausnitzer, 1997 p68)
- 7j *Pinus ponderosa* ≥ 10%; *Pseudotsuga menziesii* < 10%  
 7j.1 *Quercus garryana* ≥ 5% AND *Symphoricarpos albus* ≥ 5%.....  
**Pinus ponderosa - Quercus garryana / Symphoricarpos albus  
 Riparian Woodland**  
 G2G3/S2S3 — [CEGL000884](#)  
 (John & Tart, 1986 p75)
- 7j.2 *Crataegus douglasii* ≥ 25% AND *Symphoricarpos albus* present.....  
**Pinus ponderosa / Crataegus douglasii Riparian Woodland**  
 G1/S1 — [CEGL000855](#)  
 (Crowe & Clausnitzer, 1997 p72; Crowe et al., 2004b p324)
- 7j.3 *Symphoricarpos albus* ≥ 5%. Floodplain.....  
**Pinus ponderosa / Symphoricarpos albus Riparian Woodland**  
 G2/S1 — [CEGL000866](#)  
 (John & Tart, 1986 p91; Evans, 1989 p9; Crowe & Clausnitzer,  
 1997 p72; Crawford, 2003 p32; Crowe et al., 2004b p321)
- 7j.4 *Camassia quamash* ≥ 5% AND *Festuca idahoensis* usually absent.....  
**Pinus ponderosa / Camassia quamash Riparian Woodland**  
 GNR/SNR — CWWA000382  
 (John & Tart, 1986 p87)

7j.5 *Lomatium nudicaule* ≥ 5%, *Festuca idahoensis* usually present, AND *Camassia quamash* < 5%. Essentially a dry meadow (most of the year) with *Pinus ponderosa* limited to favorable microsites. ....

***Pinus ponderosa* / *Lomatium nudicaule* Riparian Woodland**

GNR/SNR — [CWWA000383](#)

(John & Tart, 1986 p85)

**8 Key to Eastside Shrubland Types**

8a *Kalmia microphylla* ≥ 5% AND *Carex nigricans* ≥ 10%; *Vaccinium deliciosum*, and *Phyllodoce empetrififormis* often present .....

***Kalmia microphylla* / *Carex nigricans* Wet Dwarf-shrubland**

G3G4/S3 — [CEGL001402](#)

(Wooten & Morrison, 1995 p109; Kovalchik & Clausnitzer, 2004 p141)

8b *Vaccinium cespitosum* ≥ 20% AND *Danthonia intermedia* ≥ 10% .....

***Vaccinium cespitosum* - (*Salix farriae*) / *Danthonia intermedia* Shrub**

**Fen**

G1G2/S1S2 — [CEGL000484](#)

(Kovalchik & Clausnitzer, 2004 p141)

8c *Sarcobatus vermiculatus* ≥ 10%

8c.1 *Distichlis spicata* ≥ 10% .....

***Sarcobatus vermiculatus* / *Distichlis spicata* Wet Shrubland**

G4/S2? — [CEGL001363](#)

(Daubenmire, 1970; Franklin & Dyrness, 1973; Mueggler & Stewart, 1980; Crawford, 2003)

8c.2 *Leymus cinereus* ≥ 10% .....

***Sarcobatus vermiculatus* / *Leymus cinereus* Wet Shrubland**

G3/S1 — [CEGL001366](#)

(Mueggler & Stewart, 1980 p74; Evens et al., 2020; also in unpublished data from w/ Tart 1987)

8d *Celtis reticulata* (= *C. laevigata* var. *reticulata*) ≥ 10%

8d.1 *Philadelphus lewisii* ≥ 10% .....

***Celtis laevigata* var. *reticulata* / *Philadelphus lewisii* Wet Scrub**

G1/S1 — [CEGL000792](#)

(Crawford, 2003 p55; Crowe et al., 2004b p187)

8d.2 *Toxicodendron rydbergii* ≥ 10% .....

***Celtis laevigata* var. *reticulata* / *Toxicodendron rydbergii* Wet Scrub**

G2/SNR — [CEGL003451](#)

(Crowe et al., 2002)

8d.3 *Pseudoroegneria spicata* ≥ 10% .....

***Celtis laevigata* var. *reticulata* / *Pseudoroegneria spicata* Wet Scrub**

G2G3/S1 — [CEGL001085](#)

(Tisdale, 1986 p30; Johnson & Simon, 1987 p198)

- 8e *Juniperus occidentalis* ≥ 10%  
 8e.1 *Philadelphus lewisii* ≥ 10% .....  
**Juniperus occidentalis / Philadelphus lewisii - Salix lasiolepis**  
**Riparian Woodland [Provisional]**  
 GNR/SNR — CWWA000360  
 (Crawford, 2003 p32)
- 8e.2 *Pseudoroegneria spicata* ≥ 10% .....  
**Juniperus occidentalis / Artemisia tridentata / Pseudoroegneria**  
**spicata Wooded Grassland**  
 G3G4/SNR — [CEGL001721](#)  
 (Crawford, 2003 p32)
- 8f *Salix* spp. ≥ 25% Cover  
 8f.1 *Salix pedicellaris* dominant, *Rhynchospora alba* ≥ 10%, and *Sphagnum* spp. present to  
 dominant .....  
**Salix pedicellaris / Rhynchospora alba / Sphagnum Shrub Fen**  
 GNR/SNR — CWWA000400  
 (WNHP Plot Data)
- 8f.2 *Salix commutata* ≥ 25%  
 8f.2a *Carex scopulorum* var. (*bracteosa*, *prionophylla*) ≥ 10% .....  
**Salix commutata / Carex scopulorum Wet Shrubland**  
 G3/SNR — [CEGL001189](#)  
 (Tuhy & Jensen, 1982; Crowe & Clausnitzer, 1997 p104; Kovalchik  
 & Clausnitzer, 2004 p141)
- 8f.2b Fen indicators dominate. *Carex aquatilis* var. *dives* + *C. kelloggii* + *Leptarrhena*  
*pyrolifolia* + *Caltha biflora* + *Pedicularis groenlandica* + *Triantha occidentalis* ssp.  
*brevistyla* ≥ 10% .....  
**Salix commutata Wet Shrubland**  
 GNR/S2 — CWWA000236  
 (Henderson et al., 1979 p109, 113; Murray, 2000 p36; Christy,  
 2004 p51; Crawford et al., 2009 pA-299; Ramm-Granberg et al.,  
 2021 pA-203)
- 8f.2c Mesic indicators dominate. *Valeriana sitchensis* + *Senecio triangularis* + *Potentilla*  
*flabellifolia* + *Arnica latifolia* or other mesic forbs ≥ 5% .....  
**Salix commutata / Senecio triangularis Wet Shrubland**  
 GNR/SNR — CWWA000397  
 (Kovalchik & Clausnitzer, 2004 p141; Ramm-Granberg et al., 2021  
 pA-202)
- 8f.3 *Salix drummondiana* ≥ 25% AND > *S. sitchensis*  
 8f.3a *Carex scopulorum* var. *prionophylla* ≥ 10% .....  
**Salix drummondiana / Carex scopulorum var. prionophylla Wet**  
**Shrubland**  
 G2G3/S2? — [CEGL001584](#)  
 (Kovalchik & Clausnitzer, 2004 p141)

- 8f.3b *Carex utriculata* ≥ 10%.....  
**Salix drummondiana / Carex utriculata Wet Shrubland**  
G4/S3 — [CEGL002631](#)  
(Hansen et al., 1995 p278; Kovalchik & Clausnitzer, 2004 p141;  
MacKenzie & Moran, 2004 p131)
- 8f.3c *Calamagrostis canadensis* ≥ 10%.....  
**Salix drummondiana / Calamagrostis canadensis Wet Shrubland**  
G3/S2? — [CEGL002667](#)  
(Tuhy & Jensen, 1982; Hansen et al., 1995 p272; Kovalchik &  
Clausnitzer, 2004 p141)
- 8f.4 *Salix lutea* ≥ 40%
- 8f.4a *Cornus sericea* ≥ 20%.....  
**Salix lutea / Cornus sericea Wet Shrubland**  
GNR/SNR — CWWA000399  
(Crawford, 2003 p50)
- 8f.4b *Salix exigua* ≥ 20% .....  
**Salix lutea - Salix exigua Wet Shrubland**  
GNR/SNR — CWWA000398  
(Crawford, 2003 p51)
- 8f.5 *Salix boothii* + *S. geyeriana* ≥ 25% (and > *S. sitchensis*)
- 8f.5a *Carex utriculata* ≥ 25%.....  
**Salix geyeriana / Carex utriculata Wet Shrubland**  
G5/SNR — [CEGL001207](#)  
(Padgett et al., 1989 p67; Crowe & Clausnitzer, 1997 p106)
- 8f.5b *Carex aquatilis* ≥ 10% .....  
**Salix (boothii, geyeriana) / Carex aquatilis Wet Shrubland**  
G3/S1? — [CEGL001176](#)  
(Kovalchik, 1987 p80; Crowe & Clausnitzer, 1997 p108)
- 8f.6 *Salix boothii* ≥ 25% AND > *S. sitchensis* .....  
**Salix boothii / Mesic Forbs Wet Shrubland**  
G3/SNR — [CEGL001180](#)  
(Padgett et al., 1989 p60; Jankovsky-Jones, 1997)
- 8f.7 *Salix exigua* ≥ 25%
- 8f.7a *Salix amygdaloides* ≥ 20%.....  
**Salix amygdaloides / Rosa woodsii Riparian Woodland**  
G1Q/S1 — CWWA000444  
(Evans, 1989 p21; Crawford, 2003 p54)
- 8f.7b *Salix lutea* ≥ 20% .....  
**Salix lutea - Salix exigua Wet Shrubland**  
GNR/SNR — CWWA000398  
(Crawford, 2003 p51)

8f.7c Moist/mesic graminoids such as *Carex pellita*, *Eleocharis palustris*, *Glyceria* spp. ≥ 30% .....

**Salix exigua / Mesic Graminoids Western Wet Shrubland**

G5/SNR — [CEGL001203](#)

(Evans, 1989 p20; Salstrom & Easterly, 1995 p5; Jankovsky-Jones, 1997 p84; Crawford, 2003 p52; Crowe et al., 2004b p291)

8f.7d *Equisetum* (*arvense*, *sylvaticum*, *palustre*, *hyemale*, *fluviatile*) ≥ 10% .....

**Salix exigua / Equisetum arvense Wet Shrubland**

G3?/S2S3 — [CEGL001201](#)

(Youngblood et al., 1985 p45; Crowe et al., 2004b p293; Kovalchik & Clausnitzer, 2004 p141)

8f.7e Herbs < 10% AND graminoids usually absent.....

**Salix exigua / Gravel Bar Wet Shrubland**

G5/S2 — [CEGL005656](#)

(Crowe & Clausnitzer, 1997 p114; Jankovsky-Jones, 1997 p82; Crowe et al., 2004b p293; Kovalchik & Clausnitzer, 2004 p141)

8f.7f Herbs may be ≥ 10% (rarely > 30%) and Graminoids usually present. May be synonymous with, or an early successional version of, *Salix exigua* / Mesic Graminoids Shrubland.....

**Salix exigua Riparian Wet Shrubland**

G5/S2 — [CEGL001197](#)

(Evans, 1989 p20; Hansen et al., 1995 p289; Salstrom & Easterly, 1995 p5; Jankovsky-Jones, 1997 p82; Crawford, 2003 p52; Crowe et al., 2004b p291)

8f.8 *Spiraea douglasii* ≥ 25% .....

**Spiraea douglasii - (*Salix sitchensis*, *drummondiana*) Shrub Swamp**

GNR/SNR — CWWA000405

(Kovalchik & Clausnitzer, 2004 p141)

8f.9 *Salix amygdaloides* dominant .....

**Salix amygdaloides / Rosa woodsii Riparian Woodland**

G1Q/S1 — CWWA000444

(Evans, 1989 p21; Crawford, 2003 p54)

8f.10 *Salix lasiandra* var. *caudata* dominant.....

**Salix lucida ssp. caudata Wet Shrubland**

G3Q/S1 — [CEGL001215](#)

(Weaver, 1917 p108; Evans, 1989 p22; Hansen et al., 1995 p316)

8f.11 *Salix lasiolepis* dominant (up to 100%).....

**Salix lasiolepis / Barren Ground Wet Shrubland**

G3?/SNR — [CEGL001216](#)

(Crawford, 2003 p53)

8f.12 *Salix bebbiana* dominant.....

**Salix bebbiana / Mesic Graminoids Wet Shrubland**

G3/SNR — [CEGL001174](#)

(Padgett et al., 1989 p77; Jankovsky-Jones, 1997; Crawford, 2003 p54)

- 8f.13 *Salix scouleriana* ≥ 25%  
 8f.13a *Paxistima myrsinites* ≥ 10% .....  
**Salix scouleriana / Paxistima myrsinites Wet Shrubland**  
 GNR/SNR — CWWA000402  
 (Kovalchik & Clausnitzer, 2004 p141)
- 8f.13b *Elymus glaucus* ≥ 10%.....  
**Salix scouleriana / Elymus glaucus Wet Shrubland**  
 GNR/SNR — CWWA000401  
 (Crowe & Clausnitzer, 1997 p117)
- 8f.14 *Salix farriae* and/or *S. planifolia* ≥ 25%  
 8f.14a *Eleocharis quinqueflora*, *Eriophorum* spp., *Carex limosa*, *Comarum palustre*,  
 and/or *C. magellanica* ssp. *irrigua* ≥ 10% .....  
**Salix farriae / Eleocharis quinqueflora Shrub Fen**  
 G2/S2 — [CEGL000229](#)  
 (Kovalchik & Clausnitzer, 2004 p141)
- 8f.14b *Carex nigricans* ≥ 10% AND *Kalmia microphylla* ≥ 5%.....  
**Kalmia microphylla / Carex nigricans Wet Dwarf-shrubland**  
 G3G4/S3 — [CEGL001402](#)  
 (Wooten & Morrison, 1995 p109; Kovalchik & Clausnitzer, 2004  
 p141)
- 8f.14c *Vaccinium cespitosum* ≥ 20% AND *Danthonia intermedia* ≥ 10% .....  
**Vaccinium cespitosum - (Salix farriae) / Danthonia intermedia Shrub Fen**  
 G1G2/S1S2 — [CEGL000484](#)  
 (Kovalchik & Clausnitzer, 2004 p141)
- 8f.14d *Carex scopulorum* var. (*bracteosa*, *prionophylla*) ≥ 10%.....  
**Salix planifolia / Carex scopulorum Shrub Fen**  
 G4/S3? — [CEGL001229](#)  
 (Wooten & Morrison, 1995 p78; Kovalchik & Clausnitzer, 2004  
 p141)
- 8f.14e *Carex aquatilis* and/or *C. utriculata* ≥ 10% .....  
**Salix (farriae, planifolia) / Carex utriculata Shrub Fen**  
 G3G4/S2? — [CEGL001228](#)  
 (Crowe et al., 2004b p270; Kovalchik & Clausnitzer, 2004 p141)
- 8f.15 *Betula glandulosa* ≥ 10% AND *Carex lasiocarpa* ≥ 10% .....  
**Betula glandulosa / Carex lasiocarpa Shrub Fen**  
 G3/S1 — [CEGL002700](#)  
 (Chadde et al., 1998 p19; Kovalchik & Clausnitzer, 2004 p155)
- 8f.16 *Salix melanopsis* and/or *S. sitchensis* ≥ 25%  
 8f.16a *Angelica arguta*, *Senecio triangularis*, and other mesic forbs ≥ 10% and *Alnus*  
*incana* occasionally codominant .....  
**Salix sitchensis - (Alnus incana) / Angelica arguta Wet Shrubland**  
 GNR/SNR — CWWA000403  
 (Crowe & Clausnitzer, 1997 p116; Kovalchik & Clausnitzer, 2004  
 p141)

- 8f.16b *Glyceria striata* or *Cinna latifolia* ≥ 10% .....  
**Salix sitchensis / Glyceria elata Wet Shrubland**  
 GNR/SNR — CWWA000404  
 (Kovalchik & Clausnitzer, 2004 p141)
- 8f.16c Sparse herbaceous layer. Alluvial bars.....  
**Salix (melanopsis, sitchensis) Cobble Bar Wet Shrubland**  
 G3G4/S1? — [CEGL002705](#)  
 (Diaz & Mellen, 1996 p135; Kerr, 2000; Crowe et al., 2004b p247;  
 Kovalchik & Clausnitzer, 2004 p141; Ramm-Granberg et al., 2021  
 pA-206)
- 8g *Oplopanax horridus* ≥ 25%.....  
**Oplopanax horridus Interior Wet Shrubland**  
 GNR/SNR — CWWA000368  
 (Kovalchik & Clausnitzer, 2004 p223)
- 8h *Betula glandulosa* ≥ 10%  
 8h.1 *Carex lasiocarpa* ≥ 10% .....  
**Betula glandulosa / Carex lasiocarpa Shrub Fen**  
 G3/S1 — [CEGL002700](#)  
 (Chadde et al., 1998 p19; Kovalchik & Clausnitzer, 2004 p155)
- 8h.2 *Carex utriculata* and/or *C. aquatilis* var. *aquatilis* ≥ 25% .....  
**Betula glandulosa / Carex utriculata Shrub Fen**  
 G4?/SNR — [CEGL001079](#)  
 (Bursik & Moseley, 1995; Hansen et al., 1995 p352; Jankovsky-  
 Jones, 1997 pB-15; Jankovsky-Jones et al., 1999; Kovalchik &  
 Clausnitzer, 2004 p155)
- 8h.3 *Calamagrostis canadensis* ≥ 10%.....  
**Betula glandulosa / Calamagrostis canadensis Shrub Fen**  
 GNR/SNR — CWWA000314  
 (WNHP observations)
- 8h.4 *Picea engelmannii* or *Abies lasiocarpa* >10% AND calcareous fen indicators such as  
*Tomentypnum nitens*, *Carex gynocrates*, *C. interior*, *C. buxbaumii*, *Dasiphora fruticosa* spp.  
*Floribunda*, *Symphyotrichum boreale*, *Salix brachycarpa*, *S. candida*, *Triglochin palustris* are  
 present .....  
**Picea engelmannii / Betula glandulosa / Tomentypnum nitens Treed  
 Fen**  
 GNR/SNR — CWWA000372  
 (WNHP Plot Data)
- 8i *Phyllodoce empetriformis* + other heather spp. ≥ 25%  
 8i.1 *Vaccinium deliciosum* ≥ *Cassiope mertensiana*. Subalpine.....  
**Phyllodoce empetriformis / Vaccinium deliciosum / Carex nigricans  
 Wet Dwarf-shrubland**  
 GNR/SNR — CWWA000370  
 (Kovalchik & Clausnitzer, 2004 p162)

- 8i.2 *Vaccinium deliciosum* < *Cassiope mertensiana* AND *Carex nigricans* present. Alpine.....  
**Cassiope mertensiana - Carex nigricans Alpine Wet Dwarf-shrubland**  
 GNR/SNR — CWWA000334  
 (Kovalchik & Clausnitzer, 2004 p162)
- 8j *Acer circinatum* ≥ 25%  
 8j.1 *Alnus viridis* ≥ 10% .....  
**Alnus viridis ssp. sinuata / Acer circinatum Shrub Swamp**  
 G4G5/S4 — [CEGL001155](#)  
 (del Moral, 1973 p31; Crawford et al., 2009 pA-225; Ramm-Granberg et al., 2021 pA-190)
- 8j.2 *Oplopanax horridus* + *Rubus spectabilis* + *Athyrium filix-femina* + *Tolmiea menziesii* + *Maianthemum stellatum* + *Stachys cooleyae* (= *S. chamissonis* var. *cooleyae*) ≥ 5%.....  
**Acer circinatum / Athyrium filix-femina - Tolmiea menziesii Shrub Swamp**  
 G5/S4 — [CEGL003291](#)  
 (Kovalchik & Clausnitzer, 2004 p169)
- 8j.3 *Alnus incana* or *Cornus sericea* present to codominant .....  
**Acer circinatum - Alnus incana Wet Shrubland**  
 G4G5/S4S5 — CWWA000028  
 (Diaz & Mellen, 1996 p91; Kovalchik & Clausnitzer, 2004 p169)
- 8j.4 Not as above. Little or no understory. *Ribes bracteosum*, *Rubus parviflorus*, *Achlys triphylla*, *Linnaea borealis*, *Mahonia nervosa*, *Rosa pisocarpa* often present but usually < 10% each .....  
**Acer circinatum / (Pteridium aquilinum) Wet Shrubland**  
 G4/S4 — CWWA000204  
 (Diaz & Mellen, 1996 p87; Crawford et al., 2009 pA-222; Ramm-Granberg et al., 2021 pA-187)
- 8k *Alnus viridis* ssp. *sinuata* ≥ 25% OR *Acer glabrum* dominant and *Alnus viridis* ≥ 5%. May intergrade with *Alnus incana* near the Cascade Crest.  
 8k.1 *Oplopanax horridus* ≥ 10% .....  
**Alnus viridis ssp. sinuata - Rubus spectabilis - (Oplopanax horridus) Wet Shrubland**  
 G4G5/S4 — CWWA000045  
 (> Henderson & Peter, 1982 p73; > Wooten & Morrison, 1995 p81; > Murray, 2000 p35; > Brett et al., 2001 p39; > Crawford et al., 2009 pA-226; Ramm-Granberg et al., 2021 pA-189)
- 8k.2 *Cornus sericea* (>*C. stolonifera*) ≥ 10% .....  
**Alnus viridis ssp. sinuata - Ribes lacustre - (Cornus sericea) Wet Shrubland**  
 GNR/SNR — CWWA000306  
 (Kovalchik & Clausnitzer, 2004 p177 [ALSI-RILA + ALSI-COST])

8k.3 *Rubus spectabilis*, *Rubus idaeus*, *Ribes hudsonianum*, and/or *Ribes bracteosum* ≥ 5%. East Cascades .....

***Alnus viridis* ssp. *sinuata* - *Rubus spectabilis* - (*Oplopanax horridus*) Wet Shrubland**

G4G5/S4 — CWWA000045

(> Henderson & Peter, 1982 p73; > Wooten & Morrison, 1995 p81;  
> Murray, 2000 p35; > Brett et al., 2001 p39; > Crawford et al.,  
2009 pA-226; Ramm-Granberg et al., 2021 pA-189)

8k.4 *Ribes lacustre* ≥ 5% .....

***Alnus viridis* ssp. *sinuata* - *Ribes lacustre* - (*Cornus sericea*) Wet Shrubland**

GNR/SNR — CWWA000306

(Kovalchik & Clausnitzer, 2004 p177 [ALSI-RILA + ALSI-COST])

8k.5 *Acer circinatum* ≥ 10% .....

***Alnus viridis* ssp. *sinuata* / *Acer circinatum* Shrub Swamp**

G4G5/S4 — [CEGL001155](#)

(del Moral, 1973 p31; Crawford et al., 2009 pA-225; Ramm-Granberg et al., 2021 pA-190)

8k.6 *Athyrium filix-femina* ≥ 10% and *Gymnocarpium dryopteris* usually ≥ 5%.....

***Alnus viridis* ssp. *sinuata* / *Athyrium filix-femina* - *Cinna latifolia* Wet Shrubland**

G4/S3 — [CEGL001156](#)

(Crowe & Clausnitzer, 1997 p112; Crowe et al., 2004b p241;  
Kovalchik & Clausnitzer, 2004 p177)

8k.7 *Galium triflorum* + *Thalictrum occidentale* + *Viola glabella* + *Hydrophyllum fendleri* + *Heracleum maximum* + other mesic forbs ≥ 5% AND *Athyrium filix-femina* < 1% .....

***Alnus viridis* ssp. *sinuata* / Mesic Forbs Wet Shrubland**

GNR/S4S5 — [CEGL006657](#)

(Johnson & Clausnitzer, 1992 p148; Crowe & Clausnitzer, 1997  
p146; Kovalchik & Clausnitzer, 2004 p177; Crawford et al., 2009  
pA-224; Ramm-Granberg et al., 2021 pA-204)

8k.8 Herbaceous cover < 10%. Alluvial bars .....

***Alnus viridis* ssp. *sinuata* / Alluvial Bar Wet Shrubland**

GNR/SNR — CWWA000307

(Kovalchik & Clausnitzer, 2004 p177)

8l *Alnus incana* ≥ 25%. *Alnus viridis* may intergrade near the Cascade Crest.

8l.1 *Salix sitchensis* ≥ 25%.....

***Salix sitchensis* - (*Alnus incana*) / *Angelica arguta* Wet Shrubland**

GNR/SNR — CWWA000403

(Crowe & Clausnitzer, 1997 p116; Kovalchik & Clausnitzer, 2004  
p141)

8l.2 *Betula occidentalis* ≥ 10% and *Cornus sericea* usually ≥ 10% .....

***Alnus incana* - *Betula occidentalis* Wet Shrubland**

G2G3/S1 — [CEGL001142](#)

(Wooten & Morrison, 1995 p72; Crowe et al., 2004b p223)

- 8l.3 *Cornus sericea* ≥ 10% and *Symphoricarpos albus* often present to codominant .....  
**Alnus incana / Cornus sericea Wet Shrubland**  
G3G4/S3 — [CEGL001145](#)  
(Evans, 1989 p10; Crowe & Clausnitzer, 1997 p134; Crawford, 2003 p38; Crowe et al., 2004b p217; Kovalchik & Clausnitzer, 2004 p187)
- 8l.4 *Spiraea douglasii* and/or *S. x pyramidata* ≥ 10% .....  
**Alnus incana / Spiraea douglasii Wet Shrubland**  
G3/S3? — [CEGL001152](#)  
(Crowe et al., 2004b p212; Kovalchik & Clausnitzer, 2004 p187)
- 8l.5 *Ribes* (*lacustre*, *hudsonianum*) ≥ 15% .....  
**Alnus incana / Ribes (inerme, hudsonianum, lacustre) Wet Shrubland**  
G3/S1 — [CEGL001151](#)  
(Crowe & Clausnitzer, 1997 p136; Crowe et al., 2004b p214)
- 8l.6 *Salix lutea* ≥ 10%.....  
**Alnus incana / Salix lutea Wet Shrubland**  
GNR/SNR — CWWA000294  
(Crawford, 2003 p43)
- 8l.7 *Symphoricarpos albus* ≥ 10% .....  
**Alnus incana / Symphoricarpos albus Wet Shrubland**  
G3G4/S3 — [CEGL001153](#)  
(Crowe & Clausnitzer, 1997 p140; Crowe et al., 2004b p220; Kovalchik & Clausnitzer, 2004 p187)
- 8l.8 *Carex scopulorum* var. *prionophylla* 10% .....  
**Alnus incana / Carex scopulorum var. prionophylla Wet Shrubland**  
G1/S1 — [CEGL000122](#)  
(Kovalchik & Clausnitzer, 2004 p187)
- 8l.9 *Carex amplifolia* 10% AND *Scirpus microcarpus* < 15% .....  
**Alnus incana / Carex amplifolia Wet Shrubland**  
GNR/SNR — CWWA000286  
(Crowe et al., 2004b p193)
- 8l.10 *Scirpus microcarpus* ≥ 25% and *Carex amplifolia* sometimes codominant .....  
**Alnus incana / Scirpus microcarpus Wet Shrubland**  
G2G3/S2 — [CEGL000481](#)  
(Crowe & Clausnitzer, 1997 p147; Crowe et al., 2004b p195; Kovalchik & Clausnitzer, 2004 p187)
- 8l.11 *Carex utriculata* and/or *C. aquatilis* ≥ 25% .....  
**Alnus incana / Carex utriculata Wet Shrubland**  
G4/S3S4 — CWWA000004  
(Crowe & Clausnitzer, 1997 p128; Crowe et al., 2004b p199; Kovalchik & Clausnitzer, 2004 p187)

- 8l.12 *Carex* (*bolanderi*, *infirmivervia*, *leptopoda*) ≥ 5% AND *Osmorhiza berteroi* present .....  
***Alnus incana* / *Carex (bolanderi, infirmivervia, leptopoda)* Wet Shrubland**  
GNR/SNR — CWWA000289  
(Crowe & Clausnitzer, 1997 p142; the USNVC currently lumps this type into C EGL001144)
- 8l.13 *Calamagrostis canadensis* ≥ 5% .....  
***Alnus incana* / *Calamagrostis canadensis* Wet Shrubland**  
G3Q/S2 — [CEGL001143](#)  
(Crowe & Clausnitzer, 1997 p147; Crowe et al., 2004b p198; Kovalchik & Clausnitzer, 2004 p187)
- 8l.14 *Lysichiton americanus* ≥ 5% .....  
***Alnus incana* / *Lysichiton americanus* Wet Shrubland**  
G3/S1S2 — [CEGL002629](#)  
(Murray, 2000 p31; Christy, 2004 p36; Kovalchik & Clausnitzer, 2004 p187)
- 8l.15 *Senecio triangularis* ≥ 5% (and > *Glyceria* spp.), *Athyrium filix-femina* ≥ 5%, and *Stachys cooleyae* (= *S. chamissonis* var. *cooleyae*) usually present .....  
***Alnus incana* / *Senecio triangularis* Wet Shrubland**  
GNR/SNR — CWWA000295  
(Murray, 2000 p31)
- 8l.16 *Glyceria* spp. and/or *Cinna latifolia* ≥ 10% AND > *Senecio triangularis* .....  
***Alnus incana* / *Glyceria striata* Wet Shrubland**  
G3/S3 — [CEGL000228](#)  
(Crowe & Clausnitzer, 1997 p132; Murray, 2000 p31; Crowe et al., 2004b p206; Kovalchik & Clausnitzer, 2004 p187)
- 8l.17 *Athyrium filix-femina* and/or *Dryopteris* spp. ≥ 5% AND > *Equisetum* spp. ....  
***Alnus incana* / *Athyrium filix-femina* Wet Shrubland**  
G3/S3? — [CEGL002628](#)  
(Crowe & Clausnitzer, 1997 p130; Crowe et al., 2004b p187)
- 8l.18 *Gymnocarpium dryopteris* ≥ 5% .....  
***Alnus incana* / *Gymnocarpium dryopteris* Wet Shrubland**  
GNR/SNR — CWWA000292  
(Crowe & Clausnitzer, 1997 p148; Kovalchik & Clausnitzer, 2004 p187)
- 8l.19 *Carex pellita* (= *C. lanuginosa*, misapplied) ≥ 10% .....  
***Alnus incana* / *Carex pellita* Wet Shrubland**  
GNR/SNR — CWWA000290  
(Crowe et al., 2004b p197; the USNVC currently lumps this type into C EGL001144)
- 8l.20 *Equisetum* (*arvense*, *sylvaticum*, *palustre*, *hyemale*, *fluviatile*) ≥ 10% .....  
***Alnus incana* / *Equisetum arvense* Wet Shrubland**  
G3/S3 — [CEGL001146](#)  
(Padgett et al., 1989 p49; Crowe & Clausnitzer, 1997 p138; Kovalchik & Clausnitzer, 2004 p187)

- 8l.21 *Angelica arguta* + *Maianthemum stellatum* + *Galium trifolium* + *Aconitum columbianum* + other mesic forbs  $\geq 25\%$  .....  
**Alnus incana / Mesic Forbs Wet Shrubland**  
G3/SNR — [CEGL001147](#)  
(Padgett et al., 1989 p48; Jankovsky-Jones, 1997 pB-8; Crowe et al., 2004b p211; Kovalchik & Clausnitzer, 2004 p187)
- 8l.22 *Phalaris arundinacea*  $\geq 25\%$  .....  
**Alnus incana / Phalaris arundinacea Ruderal Wet Shrubland**  
GNA/SNA — CWWA000293  
(Kovalchik & Clausnitzer, 2004 p187)
- 8l.23 Herbaceous cover < 10%. Alluvial bars .....  
**Alnus incana / Alluvial Bar Wet Shrubland**  
GNR/SNR — CWWA000288  
(Kovalchik & Clausnitzer, 2004 p187)
- 8m *Ribes* (*lacustre*, *hudsonianum*)  $\geq 25\%$  .....  
**Ribes lacustre - Ribes hudsonianum / Cinna latifolia Wet Shrubland**  
G2?/S1S2 — [CEGL003445](#)  
(Crowe & Clausnitzer, 1997 p150; Crowe et al., 2004b p189, 191)
- 8n *Cornus sericea*  $\geq 25\%$   
8n.1 *Symphoricarpos albus*  $\geq 5\%$  .....  
**Cornus sericea / Symphoricarpos albus Wet Shrubland**  
G4?/S3S4 — CWWA000177  
(Kovalchik & Clausnitzer, 2004 p201)
- 8n.2 *Athyrium filix-femina* and/or *Dryopteris* spp  $\geq 5\%$  AND > *Equisetum* spp. ....  
**Cornus sericea / Athyrium filix-femina Wet Shrubland**  
GNR/SNR — CWWA000336  
(Kovalchik & Clausnitzer, 2004 p201)
- 8n.3 *Saxifraga odontoloma* (= *Micranthes odontoloma*)  $\geq 10\%$  .....  
**Cornus sericea / Saxifraga odontoloma Wet Shrubland**  
GNR/SNR — CWWA000356  
(Crowe & Clausnitzer, 1997 p166)
- 8n.4 *Equisetum* (*arvense*, *sylvaticum*, *palustre*, *hyemale*, *fluviatile*)  $\geq 10\%$  .....  
**Cornus sericea / Equisetum arvense Wet Shrubland**  
GNR/SNR — CWWA000335  
(Kovalchik & Clausnitzer, 2004 p201)
- 8n.5 *Heracleum maximum*  $\geq 5\%$  and usually > any other herb .....  
**Cornus sericea / Heracleum maximum Wet Shrubland**  
G3/SNR — [CEGL001167](#)  
(Crawford, 2003 p47; Crowe et al., 2004b p165)

- 8n.6 *Angelica arguta* + *Maianthemum stellatum* + *Galium trifolium* + *Aconitum columbianum* + other mesic forbs  $\geq 25\%$ . Understory occasionally depauperate .....  
**Cornus sericea Rocky Mountain Wet Shrubland**  
G4Q/S2S4 — [CEGL001165](#)  
(Padgett et al., 1989 p87; Wooten & Morrison, 1995 p77; Crowe & Clausnitzer, 1997 p152; Jankovsky-Jones et al., 2001 p73; Crawford, 2003 p47; Kovalchik & Clausnitzer, 2004 p201)
- 8o *Crataegus douglasii*  $\geq 25\%$   
8o.1 *Spiraea douglasii*  $\geq 25\%$  .....  
**Crataegus douglasii / Spiraea douglasii Wet Shrubland**  
GNR/SNR — CWWA000337  
(Kovalchik & Clausnitzer, 2004 p211)
- 8o.2 *Symphoricarpos albus*  $\geq 10\%$  .....  
**(Populus tremuloides) / Crataegus douglasii / Symphoricarpos albus Wet Shrubland**  
G3/S2? — [CEGL001096](#)  
(Daubenmire, 1970 p56; Crowe & Clausnitzer, 1997 p154; Crawford, 2003 p44; Crowe et al., 2004b p180)
- 8o.3 *Rosa woodsii*  $\geq 10\%$ .....  
**Crataegus douglasii / Rosa woodsii Wet Shrubland**  
G2/S1 — [CEGL001095](#)  
(Kovalchik, 1987 p137; Evans, 1989 p14; Crawford, 2003 p45; Crowe et al., 2004b p179)
- 8o.4 *Heracleum maximum*  $\geq 10\%$ .....  
**(Populus tremuloides) / Crataegus douglasii / Heracleum maximum Wet Shrubland**  
G1/S1 — [CEGL001094](#)  
(> Daubenmire, 1970 p56, 125; Crawford, 2003 p46)
- 8p *Spiraea douglasii*  $\geq 25\%$   
8p.1 *Salix (sitchensis, drummondiana)*  $\geq 25\%$ .....  
**Spiraea douglasii - (Salix sitchensis, drummondiana) Shrub Swamp**  
GNR/SNR — CWWA000405  
(Kovalchik & Clausnitzer, 2004 p141)
- 8p.2 *Calamagrostis canadensis*  $\geq 10\%$ .....  
**Spiraea douglasii / Calamagrostis canadensis Shrub Swamp**  
GNR/SNR — CWWA000406  
(Kovalchik & Clausnitzer, 2004 p211)
- 8p.3 Frequently monotypic (herbs usually < 20%).....  
**Spiraea douglasii Inland Maritime Wet Shrubland**  
GNR/SNR — CWWA000407  
(Murray, 2000 p38, 39; Kovalchik & Clausnitzer, 2004 p211)
- 8q *Rubus spectabilis*  $\geq 25\%$  AND *Ribes bracteosum* + *Ribes hudsonianum*  $\geq 25\%$  .....  
**Rubus spectabilis - Ribes hudsonianum Wet Shrubland**  
GNR/SNR — CWWA000419  
(Kovalchik & Clausnitzer, 2004 p225)

- 8r *Ribes bracteosum* ≥ 50% AND *Athyrium filix-femina* present .....  
**Ribes bracteosum / Athyrium filix-femina Wet Shrubland**  
GNR/SNR — CWWA000394  
(Murray, 2000 p35)
- 8s *Rhamnus alnifolia* ≥ 25%.....  
**Rhamnus alnifolia Riparian Wet Shrubland**  
G3/S1? — [CEGL001132](#)  
(Crowe & Clausnitzer, 1997 p165)
- 8t *Rhododendron albiflorum* ≥ 25% .....  
**Rhododendron albiflorum Wet Shrubland [Provisional]**  
GNR/SNR — CWWA000393  
(Kovalchik & Clausnitzer, 2004 p227)
- 8u *Acer glabrum* var. *douglasii* ≥ 25% .....  
**Acer glabrum var. douglasii - (Symphoricarpos albus) Wet Shrubland**  
GNR/SNR — CWWA000282  
(Kovalchik & Clausnitzer, 2004 p221)
- 8v *Dasiphora fruticosa* ssp. *floribunda* ≥ 25%.....  
**Dasiphora fruticosa ssp. floribunda / Deschampsia caespitosa Wet Shrubland**  
G4/SNR — [CEGL001107](#)  
(Padgett et al., 1989 p89; Hansen et al., 1995 p364; Crowe & Clausnitzer, 1997 p156; Kovalchik & Clausnitzer, 2004 p227)
- 8w *Betula occidentalis* ≥ 25%  
8w.1 *Alnus incana* ≥ 15%.....  
**Alnus incana - Betula occidentalis Wet Shrubland**  
G2G3/S1 — [CEGL001142](#)  
(Wooten & Morrison, 1995 p72; Crowe et al., 2004b p223)
- 8w.2 *Symphoricarpos albus* ≥ 20% AND *Philadelphus lewisii* ≥ 10% .....  
**Betula occidentalis / Philadelphus lewisii - Symphoricarpos albus Wet Shrubland**  
G1G2/S1? — [CEGL000489](#)  
(Crawford, 2003 p40; Crowe et al., 2004b p175)
- 8w.3 *Cornus sericea* ≥ 15% AND *Philadelphus lewisii*, *Symphoricarpos albus*, and *Toxicodendron rydbergii* < 10% or absent .....  
**Betula occidentalis / Cornus sericea Wet Shrubland**  
G3/S1 — [CEGL001161](#)  
(Evans, 1989 p12; Padgett et al., 1989 p52; Jankovsky-Jones et al., 2001 p64; Crawford, 2003 p39)
- 8w.4 *Philadelphus lewisii* ≥ 10%, *Symphoricarpos albus* < 5%, AND *Rosa woodsii* < 10% .....  
**Betula occidentalis / Philadelphus lewisii Wet Shrubland**  
G2/S1S2 — [CEGL002668](#)  
(Crawford, 2003 p42; Crowe et al., 2004b p174)

- 8w.5 *Celtis laevigata* var. *reticulata* ≥ 20% .....  
***Betula occidentalis* - *Celtis laevigata* var. *reticulata* Wet Shrubland**  
G2/S1S2 — [CEGL003450](#)  
(Crowe et al., 2002)
- 8w.6 *Crataegus douglasii* ≥ 20% .....  
***Betula occidentalis* / *Crataegus douglasii* Wet Shrubland**  
G1/S1 — [CEGL001081](#)  
(Evans, 1989 p12)
- 8w.7 *Rosa woodsii* ≥ 10% .....  
***Betula occidentalis* / *Rosa woodsii* Wet Shrubland**  
GNR/S1S3 — CWWA000316  
(Crawford, 2003 p41)
- 8w.8 *Maianthemum stellatum*, *Heracleum maximum*, *Osmorhiza berteroi*, or *Thalictrum occidentale* usually present.....  
***Betula occidentalis* / *Maianthemum stellatum* Wet Shrubland**  
G4?/S1 — [CEGL001162](#)  
(Padgett et al., 1989 p53; Crowe & Clausnitzer, 1997 p164)
- 8w.9 *Equisetum arvense* ≥ 10% or understory sparse (or frequently dominated by exotic species).  
***Betula occidentalis* Wet Shrubland**  
G3G4/S1S3 — [CEGL001080](#)  
(Evans, 1989 p12; Hall & Hansen, 1997 p255; Crawford, 2003 p43)
- 8x *Philadelphus lewisii* ≥ 25%
- 8x.1 *Symphoricarpos albus* ≥ 10% .....  
***Philadelphus lewisii* / *Symphoricarpos albus* Wet Shrubland**  
G1G2/S1S2 — [CEGL000875](#)  
(Crawford, 2003 p56)
- 8x.2 *Clematis ligustifolia* ≥ 10% .....  
***Philadelphus lewisii* / *Clematis ligusticifolia* Wet Shrubland**  
GNR/SNR — CWWA000427  
(Crawford, 2003 p57)
- 8x.3 *Pseudoroegneria spicata* ≥ 10% .....  
***Amelanchier alnifolia* - *Philadelphus lewisii* / *Pseudoroegneria spicata* Wet Shrubland**  
GNR/SNR — CWWA000309  
(Crawford, 2003 p59)
- 8x.4 Other shrub species < 15% each and *Pseudoroegneria spicata* or *Elymus glaucus* may be present (< 10%).....  
***Philadelphus lewisii* Wet Shrubland**  
G2/S1S2 — [CEGL001170](#)  
(Crawford, 2003 p57; Crowe et al., 2004b p186)

8y Amelanchier alnifolia ≥ 25%  
8y.1 Toxicodendron rydbergii ≥ 10% .....  
**Amelanchier alnifolia / Toxicodendron rydbergii Wet Shrubland**  
GNR/SNR — CWWA000310  
(Crawford, 2003 p61)

8y.2 Pseudoroegneria spicata ≥ 10% .....  
**Amelanchier alnifolia - Philadelphus lewisii / Pseudoroegneria  
spicata Wet Shrubland**  
GNR/SNR — CWWA000309  
(Crawford, 2003 p59)

8z Prunus virginiana ≥ 25%, Rosa woodsii or Ribes aureum ≥ 5%, and Salix exigua or S. lasiolepis often  
present .....  
**Prunus virginiana - (Prunus americana) Wet Shrubland**  
G4Q/S2? — [CEGL001108](#)  
(Evans, 1989 p17; Hansen et al., 1995 p367; Crawford, 2003 p58)

8aa Artemisia ludoviciana ≥ 25% .....  
**Artemisia ludoviciana Wet Meadow**  
GNR/SNR — CWWA000312  
(Crawford, 2003 p60; Crowe et al., 2004b p157)

8ab Symphoricarpos albus ≥ 25% AND Alnus incana ≥ 5% .....  
**Alnus incana / Symphoricarpos albus Wet Shrubland**  
G3G4/S3 — [CEGL001153](#)  
(Crowe & Clausnitzer, 1997 p140; Crowe et al., 2004b p220;  
Kovalchik & Clausnitzer, 2004 p187)

8ac Symphoricarpos albus ≥ 25% AND Alnus incana < 5% .....  
**Rosa (woodsii, nutkana) Ruderal Wet Shrubland**  
GNA/SNA — CWWA000395  
(Crawford, 2003 p48)

8ad Tamarix spp. ≥ 25% .....  
**Tamarix spp. Ruderal Riparian Shrubland**  
GNA/SNA — [CEGL003114](#)  
(Hansen et al., 1995 p379)

8ae Amorpha fruticosa dominant .....  
**Amorpha fruticosa Ruderal Wet Shrubland**  
GNA/SNA — CWWA000311  
(Crawford, 2003 p49; Copass & Ramm-Granberg, 2016a pB-16)

## 9 Key to Eastside Herbaceous Types

### 9a Aquatic, submerged, or floating-leaved species dominant

9a.1 Potamogeton (foliosus, gramineus) ≥ 25% .....  
**Potamogeton (foliosus, gramineus) - (Stuckenia filiformis) Aquatic  
Vegetation**  
GNR/SNR — CWWA000418  
(Kovalchik & Clausnitzer, 2004 p231)

- 9a.2 *Potamogeton amplifolius* ≥ 25% .....  
**Potamogeton amplifolius Aquatic Vegetation**  
 GNR/SNR — CWWA000390  
 (Kovalchik & Clausnitzer, 2004 p231)
- 9a.3 *Potamogeton natans* ≥ 25% .....  
**Potamogeton natans Aquatic Vegetation**  
 G5?/S5 — [CEGL002925](#)  
 (Crowe et al., 2004b p73; Kovalchik & Clausnitzer, 2004 p231)
- 9a.4 *Sparganium eurycarpum* ≥ 25% .....  
**Sparganium eurycarpum Western Interior Marsh**  
 GNR/SNR — [CEGL009061](#)  
 (Crawford, 2003 p95; Christy, 2013 p35)
- 9a.5 *Sparganium angustifolium*, *S. emersum*, or *S. natans* ≥ 25% .....  
**Sparganium angustifolium Aquatic Vegetation**  
 G4/S3S4 — [CEGL001990](#)  
 [NOTE: This association currently includes stands dominated by  
 other species of *Sparganium* (partially due to taxonomic uncertainty  
 in source data)]  
 (Crowe et al., 2004b p58; Kovalchik & Clausnitzer, 2004 p231)
- 9a.6 *Menyanthes trifoliata* ≥ 25% AND *Comarum palustre* and *Carex* spp. absent or only at margins .....  
**Menyanthes trifoliata Aquatic Vegetation**  
 G5/S4? — [CEGL003410](#)  
 (Crowe & Clausnitzer, 1997 p200; Murray, 2000 p24)
- 9a.7 *Ranunculus aquatilis* ≥ 25% .....  
**Ranunculus aquatilis Aquatic Vegetation**  
 G5/S4 — [CEGL003307](#)  
 (Crawford, 2003 p95; Crowe et al., 2004b p60)
- 9a.8 *Polygonum amphibium* (= *Persicaria amphibium*) ≥ 30% and often monotypic .....  
**Polygonum amphibium Aquatic Vegetation**  
 G5/S3? — [CEGL002002](#)  
 (Hansen et al., 1995 p456; Jankovsky-Jones et al., 2001 p180)
- 9a.9 *Elodea canadensis* ≥ 50% .....  
**Elodea canadensis Aquatic Vegetation**  
 G5/S4? — [CEGL003303](#)  
 (Jankovsky-Jones et al., 2001 p182; Crawford, 2003 p95; Crowe et  
 al., 2004b)
- 9a.10 *Nuphar lutea* ssp. *polysepalum* ≥ 25% .....  
**Nuphar polysepala Aquatic Vegetation**  
 G5/S4S5 — [CEGL002001](#)  
 (Crowe et al., 2004b p62; Kovalchik & Clausnitzer, 2004 p231)
- 9a.11 *Nasturtium officinale* ≥ 25% .....  
**Nasturtium officinale Ruderal Marsh**  
 GNA/SNA — CWWA000366  
 (Crawford, 2003 p93)

**9b Sedges (*Carex*, *Bolboschoenus*, *Eleocharis*, *Dulichium*, *Eriophorum*, *Rhynchospora*, *Schoenoplectus*, *Scirpus*, or *Trichophorum* spp.) dominant**

9b.1 *Distichlis spicata* ≥ 25% AND *Carex praegracilis* and/or *Carex douglasii* ≥ 10% .....

***Distichlis spicata* / *Carex* (*praegracilis*, *douglasii*) Alkaline Wet Meadow**

GNR/SNR — CWWA000347

(Crawford, 2003 p82)

9b.2 *Eleocharis quinqueflora* (= *E. pauciflora*) ≥ 75%

9b.2a *Eriophorum angustifolium* ssp. *angustifolium*, *E. chamissonis*, and/or *Sphagnum* spp. ≥ 10% .....

***Eriophorum angustifolium* ssp. *angustifolium* - *Eleocharis quinqueflora* / *Sphagnum* spp. Fen**

GNR/SNR — CWWA000429

(Kovalchik & Clausnitzer, 2004 p241)

9b.2b *Eleocharis quinqueflora* forms a monoculture. Montane to subalpine fens. ....

***Eleocharis quinqueflora* Fen**

G4/S3 — [CEGL001836](#)

(Padgett et al., 1989 p104; Hansen et al., 1995 p435; Crowe & Clausnitzer, 1997 p198; Murray, 2000 p19; Christy, 2004 p114; Crowe et al., 2004b p126; Kovalchik & Clausnitzer, 2004 p241; McCain & Christy, 2005 p294)

9b.3 *Carex retrorsa* ≥ 25% .....

***Carex retrorsa* Marsh**

GNR/SNR — CWWA000441

(WNHP & USFS Plot Data)

9b.4 *Carex saxatilis* ≥ 25% and *Eriophorum* spp. sometimes prominent (≥ 15%).....

***Carex saxatilis* Fen**

G3/S1 — [CEGL001769](#)

(Padgett et al., 1989 p89; Kovalchik & Clausnitzer, 2004 p241)

9b.5 *Carex scopulorum* var. *prionophylla* ≥ 25% and *Senecio triangularis* often present .....

***Carex scopulorum* var. *prionophylla* Fen**

GNR/SNR — CWWA000331

(Crowe & Clausnitzer, 1997 p170; Kovalchik & Clausnitzer, 2004 p241)

9b.6 *Carex scopulorum* var. *bracteosa* ≥ 25%.....

***Carex scopulorum* var. *bracteosa* Wet Meadow**

G5/S3S4 — [CEGL001822](#)

(Crowe & Clausnitzer, 1997 p170; Crowe et al., 2004b p112; Kovalchik & Clausnitzer, 2004 p241)

9b.7 *Carex lacustris* ≥ 25% and *C. utriculata* and/or *C. lasiocarpa* may be prominent .....

***Carex lacustris* Western Marsh**

GNR/SNR — CWWA000324

(WNHP Plot Data)

- 9b.8 *Carex illota* ≥ 25% .....  
**Carex illota Wet Meadow**  
 GUQ/SNR — [CEGL001876](#)  
 (Kovalchik & Clausnitzer, 2004 p241)
- 9b.9 *Carex spectabilis* ≥ 10%, *Carex nigricans* present, and *Potentilla flabellifolia* usually > 5% (and > *Caltha leptosepala/biflora* and *Leptarrhena pyrolifolia*) .....  
**Carex spectabilis - Potentilla flabellifolia Wet Meadow**  
 G4Q/S3 — [CEGL001829](#)  
 (Kovalchik & Clausnitzer, 2004 p241; Crawford et al., 2009 pA-302; Ramm-Granberg et al., 2021 pA-200)
- 9b.10 *Carex rostrata* ≥ 25% .....  
**Carex rostrata Fen**  
 GNR/SNR — CWWA000330  
 (Kovalchik & Clausnitzer, 2004 p241)
- 9b.11 *Carex luzulina* ≥ 25% AND *Deschampsia caespitosa* + *Muhlenbergia filiformis* > 5% .....  
**Carex luzulina Rocky Mountain Fen**  
 GNR/SNR — [CEGL007253](#)  
 (Crowe & Clausnitzer, 1997 p172; Crowe et al., 2004b p101; DiPaolo et al., 2018 pB-51)
- 9b.12 *Carex cusickii* ≥ 25% and *Carex utriculata* or *Polemonium occidentale* usually present .....  
**Carex cusickii Fen**  
 G3/S2S3 — [CEGL000230](#)  
 (Crowe & Clausnitzer, 1997 p176; Crowe et al., 2004b p91; Kovalchik & Clausnitzer, 2004 p241)
- 9b.13 *Carex vesicaria* ≥ 25% .....  
**Carex vesicaria Wet Meadow**  
 G4Q/S4 — [CEGL002661](#)  
 (Crowe & Clausnitzer, 1997 p180; Crowe et al., 2004b p123; Kovalchik & Clausnitzer, 2004 p241)
- 9b.14 *Carex aquatilis* var. *dives* ≥ 25% .....  
**Carex aquatilis var. dives Fen**  
 G4/S3S4 — [CEGL001826](#)  
 (Kovalchik, 1987 p187; Kunze, 1994 p84; Murray, 2000 p16; Christy, 2004 p83; Crowe et al., 2004b p84; McCain & Christy, 2005 p266)
- 9b.15 *Carex aquatilis* var. *aquatilis* ≥ 15%  
 9b.15a *Deschampsia caespitosa* ≥ 25% .....  
**Deschampsia caespitosa - Carex aquatilis var. aquatilis Fen**  
 GNR/SNR — CWWA000343  
 (Christy, 2004 p103; Crowe et al., 2004b p142)
- 9b.15b Frequently monotypic, or with prominent *Carex utriculata* and few other species. Mineral soils .....  
**Carex aquatilis Wet Meadow**  
 G5/S3 — [CEGL001802](#)  
 (Crowe & Clausnitzer, 1997 p174; Chadde et al., 1998 p20; Crowe et al., 2004b p81; Kovalchik & Clausnitzer, 2004 p241; Christy, 2013 p16)

- 9b.15c *Carex aquatilis* var. *aquatilis* ≥ 25%. Diverse relative to 9b.15b. Organic soils .....
- Carex aquatilis var. aquatilis Fen**  
GNR/SNR — CWWA000321  
(Crowe & Clausnitzer, 1997 p174; Chadde et al., 1998 p20; Christy, 2004 p82; Crowe et al., 2004b p81; Kovalchik & Clausnitzer, 2004 p241; McCain & Christy, 2005 p265)
- 9b.16 *Carex amplifolia* ≥ 25% and *Glyceria elata* usually > 10% .....
- Carex amplifolia Wet Meadow**  
G3/S1? — [CEGL003427](#)  
(Crowe & Clausnitzer, 1997 p204; Murray, 2000 p14; Christy, 2004 p79; Crowe et al., 2004b p77; McCain & Christy, 2005 p262)
- 9b.17 *Carex aperta* ≥ 25% .....
- Carex aperta Rocky Mountain Wet Meadow**  
GNR/SNR — CWWA000437  
(Kovalchik & Clausnitzer, 2004 p241)
- 9b.18 *Carex limosa* ≥ 25% AND *Sphagnum* spp. prominent to codominant .....
- Carex limosa / Sphagnum spp. Fen**  
GNR/SNR — CWWA000325  
(Chadde et al., 1998 p20; Kovalchik & Clausnitzer, 2004 p241)
- 9b.19 *Carex limosa* and/or *C. magellanica* ssp. *irrigua* ≥ 25% AND *Sphagnum* spp. minor or absent.....
- Carex limosa Fen**  
G2/S1 — [CEGL001811](#)  
(Chadde et al., 1998 p20; Kovalchik & Clausnitzer, 2004 p241)
- 9b.20 *Carex buxbaumii* ≥ 35% and > *C. lasiocarpa*.....
- Carex buxbaumii Fen**  
G3/SNR — [CEGL001806](#)  
(Padgett et al., 1989 p97; Chadde et al., 1998 p20; Christy, 2004 p85; Crowe et al., 2004b p89; Kovalchik & Clausnitzer, 2004 p241; McCain & Christy, 2005 p268)
- 9b.21 *Carex lasiocarpa* ≥ 25% .....
- Carex lasiocarpa Fen**  
G4?/S3? — [CEGL001810](#)  
(Crowe & Clausnitzer, 1997 p200; Chadde et al., 1998 p20; Crowe et al., 2004b p96; Kovalchik & Clausnitzer, 2004 p241)
- 9b.22 *Carex kelloggii* var. *kelloggii* (= *C. lenticularis* var. *lipocarpa*) ≥ 20% .....
- Carex lenticularis var. lipocarpa Marsh**  
GNR/S2S3 — [CEGL007249](#)  
(Crowe & Clausnitzer, 1997 p184; Murray, 2000 p17; Crowe et al., 2004b p98; Kovalchik & Clausnitzer, 2004 p241)
- 9b.23 *Carex interior* + *Carex hystericina* ≥ 25% (often 100%) .....
- Carex interior - Carex hystericina Seep**  
GNR/SNR — CWWA000291  
(WNHP observations)

9b.24 *Carex pellita* (=C. lanuginosa, misapplied) ≥ 25%

9b.24a *Argentina anserina* ≥ 5% .....

**Carex pellita - Argentina anserina Wet Meadow**

GNR/SNR — CWWA000327

(Crawford, 2003 p64)

9b.24b *Eleocharis palustris* ≥ 5% .....

**Carex pellita - Eleocharis palustris Marsh**

GNR/SNR — CWWA000329

(Crawford, 2003 p65)

9b.24c *Scirpus microcarpus*, *Juncus ensifolius*, *J. balticus* (=J. arcticus ssp. littoralis), *Geum macrophyllum*, and/or *Potentilla gracilis* often present .....

**Carex pellita Wet Meadow**

G3/S1 — [CEGL001809](#)

(Padgett et al., 1989 p108; Crowe & Clausnitzer, 1997 p186; Jankovsky-Jones et al., 2001 p130; Crowe et al., 2004b p109; Christy, 2013 p20)

9b.25 *Carex simulata* ≥ 25%, *Carex interior* may be prominent, and *Carex pellita* may be present .....

**Carex simulata Fen**

G4/SNR — [CEGL001825](#)

[NOTE: May occur in wet meadow settings]

(Tuhy & Jensen, 1982; Kovalchik, 1987 p106; Evans, 1989 p35; Padgett et al., 1989 p104; Crowe & Clausnitzer, 1997 p200; Crawford, 2003 p71; Christy, 2004 p99; Crowe et al., 2004b p117; McCain & Christy, 2005 p282)

9b.26 *Carex utriculata* and/or *C. atherodes* ≥ 25% and *Typha latifolia* and/or *Mimulus guttatus* usually present .....

**Carex utriculata - Mimulus guttatus Marsh [Provisional]**

GNR/SNR — CWWA000332

(Crawford, 2003 p66)

9b.27 *Carex utriculata* ≥ 25%

9b.27a *Sphagnum* spp. prominent to codominant .....

**Carex utriculata / Sphagnum spp. Fen**

GNR/SNR — CWWA000333

(Crowe & Clausnitzer, 1997 p178; Murray, 2000 p17; Crowe et al., 2004b p120; Kovalchik & Clausnitzer, 2004 p241)

9b.27b Organic soils (typically hemic peat) AND other herbaceous species usually ≥ 5% (*Carex aquatilis* var. *dives*, *Hypericum anagalloides*, *Calamagrostis canadensis*, etc.). Montane fens .....

**Carex utriculata Rocky Mountain Fen**

GNR/SNR — [CEGL008374](#)

(Crowe & Clausnitzer, 1997 p178; Murray, 2000 p17; Crowe et al., 2004b p120; Kovalchik & Clausnitzer, 2004 p241)

9b.27c Mineral or sapric muck soils, *Carex utriculata* is generally tall, and few other species present. Marshes .....

**Carex utriculata Marsh**

G5/S5 — [CEGL001562](#)

(Crowe & Clausnitzer, 1997 p178; Murray, 2000 p17; Crowe et al., 2004b p120; Kovalchik & Clausnitzer, 2004 p241)

- 9b.28 *Carex nebrascensis* ≥ 25%  
 9b.28a *Carex pellita* (=C. lanuginosa, misapplied) present. Palouse .....  
**Carex nebrascensis - Carex pellita - Juncus balticus Wet Meadow**  
 GNR/SNR — CWWA000326  
 (Weaver, 1917 p104; Servheen et al., 2002 p7)
- 9b.28b *Argentina anserina* ≥ 5% .....  
**Carex nebrascensis - Argentina anserina Wet Meadow**  
 GNR/SNR — CWWA000355  
 (Evans, 1989 p25; Crawford, 2003 p67)
- 9b.28c *Carex pellita* absent, *Juncus balticus* (=J. arcticus ssp. littoralis) usually prominent, and all graminoids <<< *Carex nebrascensis* .....  
**Carex nebrascensis Wet Meadow**  
 GNR/S4 — [CEGL009055](#)  
 (Hall, 1973 p6; Kovalchik, 1987 p100; Hansen et al., 1995 p398; Crowe & Clausnitzer, 1997 p192; Jankovsky-Jones et al., 2001 p132; Christy, 2004 p94, 2013 p18; Crowe et al., 2004b p103; McCain & Christy, 2005 p277)
- 9b.29 *Deschampsia caespitosa* ≥ 25% and *Carex nebrascensis* ≥ 15% .....  
**Deschampsia caespitosa - Carex nebrascensis Wet Meadow**  
 G3?Q/SNR — CEGLO01601  
 [This type is recognized by WNHP, but no longer in the USNVC. *Deschampsia caespitosa* has a wide ecological amplitude and is found in a myriad of intergrading vegetation types that can prove difficult to pull apart into meaningful associations] (Servheen et al., 2002 p7; Crowe et al., 2004b p143)
- 9b.30 *Carex praegracilis* ≥ 25% .....  
**Carex praegracilis Wet Meadow**  
 G3G4/SNR — [CEGL002660](#)  
 (Evans, 1989 p25; Crowe & Clausnitzer, 1997 p199; Jankovsky-Jones et al., 2001 p134; Christy, 2013 p22)
- 9b.31 *Carex interrupta* dominant. Near Cascade Crest.....  
**Carex interrupta Marsh**  
 G3G4/S3? — CWWA000176  
 (Kovalchik, 1987 p138; Titus et al., 1999 p192)
- 9b.32 *Carex atherodes* ≥ 25% .....  
**Carex atherodes Interior West Wet Meadow**  
 GNR/SNR — [CEGL005662](#)  
 (Wilson et al., 2014 p92; WNHP Plot Data)
- 9b.33 *Carex diandra* dominant AND *Hamatocaulis vernicosus* dominates surface .....  
**Carex diandra / Hamatocaulis vernicosus Fen**  
 GNR/SNR — [CEGL002549](#)  
 (WNHP Plot Data)
- 9b.34 *Carex nigricans* ≥ 25%. Subalpine to Alpine.....  
**Carex nigricans Wet Meadow**  
 G4/S4 — [CEGL001816](#)  
 (Douglas, 1972 p150; Kovalchik & Clausnitzer, 2004 p241)

- 9b.35 *Carex canescens* ≥ 25% .....  
**Carex canescens Fen**  
 GNR/SNR — CWWA000322  
 (Crowe et al., 2004b p90)
- 9b.36 *Carex exsiccata* ≥ 20%. Frequently monotypic. Near Cascade Crest  
 9b.36a Hemic or fibric peat layer present. Nearly permanently saturated.....  
**Carex exsiccata Fen [Provisional]**  
 GNR/SNR — CWWA000259  
 (Kunze, 1994 p28; Christy, 2004 p88)
- 9b.36b Muck/sapric peat present along with mineral soils. Subject to greater hydrological  
 fluctuation than the Poor Fen type. ....  
**Carex exsiccata Montane Marsh [Provisional]**  
 GNR/SNR — CWWA000260  
 (Kunze, 1994 p28; Christy, 2004 p88)
- 9b.37 *Eleocharis macrostachya* ≥ 25%.....  
**Eleocharis macrostachya - (Eleocharis acicularis, Carex douglasii)**  
**Vernal Pool**  
 GNR/S1S3 — CWWA000348  
 (Björk, 1997 p10)
- 9b.38 *Eleocharis acicularis* ≥ 25% .....  
**Eleocharis acicularis Marsh**  
 G4/SNR — [CEGL001832](#)  
 (Christy, 2004 p111; Crowe et al., 2004b p74; McCain & Christy,  
 2005 p291)
- 9b.39 *Eleocharis quinqueflora* (=E. pauciflora) ≥ 25%  
 9b.39a *Eriophorum angustifolium* ssp. *angustifolium*, *E. chamissonis*, and/or *Sphagnum* spp. ≥  
 10% .....  
**Eriophorum angustifolium ssp. angustifolium - Eleocharis**  
**quinqueflora / Sphagnum spp. Fen**  
 GNR/SNR — CWWA000429  
 (Kovalchik & Clausnitzer, 2004 p241)
- 9b.39b *Eleocharis quinqueflora* forms a monoculture. Montane to subalpine fens. ....  
**Eleocharis quinqueflora Fen**  
 G4/S3 — [CEGL001836](#)  
 (Padgett et al., 1989 p104; Hansen et al., 1995 p435; Crowe &  
 Clausnitzer, 1997 p198; Murray, 2000 p19; Christy, 2004 p114;  
 Crowe et al., 2004b p126; Kovalchik & Clausnitzer, 2004 p241;  
 McCain & Christy, 2005 p294)
- 9b.40 *Eleocharis rostellata* dominant  
 9b.40a *Epipactis gigantea* present to codominant. Seeps.....  
**Eleocharis rostellata - Epipactis gigantea Seep**  
 GNR/SNR — CWWA000350  
 (WNHP Plot Data)

- 9b.40b *Schoenoplectus americanus*, *Muhlenbergia asperifolia*, and/or *Argentina anserina* present. Saline sites.....  
**Eleocharis rostellata Alkaline Wet Meadow**  
G3/SNR — [CEGL003428](#)  
(WNHP Plot Data)
- 9b.40c *Carex flava*, *Parnassia parviflora*, and/or *Symphyotrichum boreale* present. Calcareous peat soils.....  
**Eleocharis rostellata Fen**  
GNR/SNR — CWWA000352  
(Chadde et al., 1998 p21)
- 9b.41 *Eleocharis palustris* dominant  
9b.41a *Juncus bufonius*, *J. articulatus*, *Deschampsia danthonioides*, *Hordeum brachyantherum*, *Plagiobothrys* ssp., *Alopecurus saccatus*, *Downingia* spp., *Myosurus minimus*, *Lomatium bicolor*, and/or *Grindelia* spp. present. Intermittent to seasonal hydrology (vernal pools).....  
**Eleocharis palustris Vernal Pool**  
GNR/S3? — [CEGL006653](#)  
(Jankovsky-Jones et al., 2001 p145)
- 9b.41b *Eleocharis rostellata*, *Teucrium canadense*, *Carex sychnocephala*, *Schoenoplectus acutus*, *Hordeum jubatum*, and/or *Juncus balticus* usually present. Site has semi-permanent to widely fluctuating water levels, but remains wet throughout growing season. Marshes below lower treeline.....  
**Eleocharis palustris Arid Marsh**  
G3/S1? — CWWA000179  
(Evans, 1989 p28; Salstrom & Easterly, 1995 p4; Crowe & Clausnitzer, 1997 p182; Crawford, 2003 p68; Crowe et al., 2004b p66; Kovalchik & Clausnitzer, 2004 p231)
- 9b.41c Frequently monotypic, though *Carex utriculata*, *Cicuta douglasii*, *Comarum palustre*, *Glyceria borealis*, and/or *Lemna minor* may be present. Marshes and wet meadows above lower treeline.....  
**Eleocharis palustris Marsh**  
G5/S3? — [CEGL001833](#)  
(Evans, 1989 p28; Salstrom & Easterly, 1995 p4; Crowe & Clausnitzer, 1997 p182; Murray, 2000 p19; Crawford, 2003 p68; Crowe et al., 2004b p66; Kovalchik & Clausnitzer, 2004 p231)
- 9b.42 *Rhynchospora alba* ≥ 10% and *Sphagnum* spp. present to dominant.....  
**Rhynchospora alba / Sphagnum spp. Rocky Mountain Fen**  
**[Provisional]**  
GNR/SNR — CWWA000426  
(WNHP Plot Data)
- 9b.43 *Scirpus microcarpus* ≥ 25%.....  
**Scirpus microcarpus Marsh**  
G4/S3S4 — [CEGL003322](#)  
(Crowe & Clausnitzer, 1997 p206; Murray, 2000 p27; Kovalchik & Clausnitzer, 2004 p241)
- 9b.44 *Scirpus nevadensis* and *Distichlis spicata* codominant.....  
**Distichlis spicata - (Scirpus nevadensis) Alkaline Wet Meadow**  
G4/SNR — [CEGL001773](#)  
(Daubenmire, 1970 p77; Kagan et al., 2004 p14)

- 9b.45 *Schoenoplectus acutus* ≥ 25%.....  
**Schoenoplectus acutus Marsh**  
G5/S4 — [CEGL001840](#)  
(Evans, 1989 p30; Hansen et al., 1995 p458; Crawford, 2003 p70;  
Crowe et al., 2004b p71)
- 9b.46 *Schoenoplectus tabernaemontani* (=Scirpus validus) ≥ 25% .....  
**Schoenoplectus tabernaemontani Temperate Marsh**  
G5/S3S4 — [CEGL002623](#)  
(Kovalchik & Clausnitzer, 2004 p231)
- 9b.47 *Schoenoplectus americanus* ≥ 25%.....  
**Schoenoplectus americanus Western Marsh**  
G3Q/S1? — [CEGL001841](#)  
(Evans, 1989 p31; Crawford, 2003 p83; Crowe et al., 2004b p133)
- 9b.48 *Bolboschoenus fluviatilis* (=Schoenoplectus fluviatilis) ≥ 25%.....  
**Bolboschoenus fluviatilis Western Marsh**  
GNR/SNR — CWWA000319  
(Crawford, 2003 p71)
- 9b.49 *Bolboschoenus maritimus* (=Schoenoplectus maritimus) dominant.....  
**Bolboschoenus maritimus Marsh**  
G4/S1? — [CEGL001843](#)  
(Kagan et al., 2004 p32)
- 9c Grasses dominant**
- 9c.1 *Puccinellia nuttalliana* dominant. Shorelines of playas .....  
**Puccinellia nuttalliana Desert Wet Meadow**  
GNR/SNR — [CEGL009088](#)  
(Ungar, 1972; Cooper et al., 1999 p178; Thompson & Hansen,  
2002; WNHP Observations)
- 9c.2 *Torreyochloa pallida* var. *pauciflora* ≥ 25% .....  
**Torreyochloa pallida var. pauciflora Marsh**  
GNR/SNR — CWWA000413  
(Crowe et al., 2004b p65)
- 9c.3 *Glyceria borealis* ≥ 25% .....  
**Glyceria borealis Marsh**  
G4/S1 — [CEGL001569](#)  
(Hansen et al., 1995 p441; Crowe et al., 2004b p64; Kovalchik &  
Clausnitzer, 2004 p231)
- 9c.4 *Glyceria striata* ≥ 25% .....  
**Glyceria striata Wet Meadow**  
G3/S2 — [CEGL000219](#)  
(Crawford, 2003 p74; Crowe et al., 2004b p147)

- 9c.5 *Glyceria elata* ≥ 25% and *Athyrium filix-femina* and/or *Equisetum arvense* may be prominent .....  
**Glyceria elata Marsh [Provisional]**  
G3/S2 — CWWA000017  
(Crowe & Clausnitzer, 1997 p208; Kovalchik & Clausnitzer, 2004 p241)
- 9c.6 *Glyceria grandis* ≥ 25% .....  
**Glyceria grandis Marsh**  
G2/S1S2 — [CEGL003429](#)  
(Jankovsky-Jones et al., 2001 p149; Kovalchik, 2001)
- 9c.7 *Spartina pectinata* dominant .....  
**Spartina pectinata Western Wet Meadow**  
G3/S1 — [CEGL001476](#)  
(Evans, 1989 p32; Crawford, 2003 p79)
- 9c.8 *Danthonia californica* + *Senecio hydrophiloides* ≥ 50% .....  
**Danthonia californica - Senecio hydrophiloides Wet Meadow**  
GNR/SNR — CWWA000338  
(WNHP Plot Data)
- 9c.9 *Deschampsia caespitosa* ≥ 25%  
9c.9a *Carex aquatilis* var. *aquatilis* ≥ 15% .....  
**Deschampsia caespitosa - Carex aquatilis var. aquatilis Fen**  
GNR/SNR — CWWA000343  
(Christy, 2004 p103; Crowe et al., 2004b p142)
- 9c.9b *Danthonia* spp. ≥ 15% .....  
**Deschampsia caespitosa - Danthonia spp. Rocky Mountain Wet Meadow**  
GNR/SNR — CWWA000344  
(Crowe et al., 2004b p144)
- 9c.9c *Carex nebrascensis* ≥ 15%; *Danthonia* spp. usually minor .....  
**Deschampsia caespitosa - Carex nebrascensis Wet Meadow**  
G3?Q/SNR — [CEGL001601](#)  
[This type is recognized by WNHP, but no longer in the USNVC. *Deschampsia caespitosa* has a wide ecological amplitude and is found in a myriad of intergrading vegetation types that can prove difficult to pull apart into meaningful associations]  
(Servheen et al., 2002 p7; Crowe et al., 2004b p143)
- 9c.9d *Juncus balticus* ≥ 25% .....  
**Deschampsia caespitosa - Juncus balticus Wet Meadow**  
GNR/SNR — CWWA000345  
(Crawford, 2003 p79; Crowe et al., 2004b p145)
- 9c.9e *Ligustichum grayi* present and/or *Carex luzulina* + *Trifolium longipes* + *Polygonum bistortoides* + *Pedicularis groenlandica* ≥ 5%. *Lupinus latifolius* may be prominent .....  
**Deschampsia caespitosa - (Ligustichum grayi) Fen**  
GNR/SNR — CWWA000342  
(Murray, 2000 p18)

- 9c.9f *Symphotrichum spathulatum* ≥ 1% and *Carex aquatilis* var. *dives* may be prominent. ....  
**Deschampsia caespitosa - (*Symphotrichum spathulatum*) Fen**  
 GNR/SNR — CWWA000357  
 (Murray, 2000 p18)
- 9c.9g *Deschampsia caespitosa* dominates on peat soils (fens).....  
**Deschampsia caespitosa Fen**  
 GNR/SNR — CWWA000346  
 (Christy, 2004 p102; Crowe et al., 2004b p139)
- 9c.10 *Danthonia intermedia* ≥ 25%.....  
**Danthonia intermedia Wet Meadow**  
 GNR/SNR — CWWA000339  
 (Kovalchik & Clausnitzer, 2004 p241)
- 9c.11 *Danthonia unispicata* and *Poa secunda* codominant.....  
**Danthonia unispicata - *Poa secunda* Wet Meadow**  
 G3/SNR — [CEGL001783](#)  
 (Johnson & Simon, 1987 p143; Kagan et al., 2004 p24)
- 9c.12 *Calamagrostis canadensis* ≥ 25%.....  
**Calamagrostis canadensis Western Wet Meadow**  
 G4/S3S4 — [CEGL001559](#)  
 (Hansen et al., 1995 p424; Wooten & Morrison, 1995 p112; Crowe & Clausnitzer, 1997 p188; Chadde et al., 1998 p20; Murray, 2000 p14; Crowe et al., 2004b p136; Kovalchik & Clausnitzer, 2004 p241)
- 9c.13 *Leymus cinereus* ≥ 10%  
 9c.13a *Carex praegracilis* codominant and > *Distichlis spicata*.....  
**Leymus cinereus - *Carex praegracilis* Alkaline Wet Meadow**  
 GNR/SNR — CWWA000363  
 (Crawford, 2003 p86)
- 9c.13b *Distichlis spicata* ≥ 5% and > *Carex praegracilis*.....  
**Leymus cinereus - *Distichlis spicata* Alkaline Wet Meadow**  
 G3/S1 — [CEGL001481](#)  
 (Daubenmire, 1970 p50; Crawford, 2003 p85)
- 9c.13c *Leymus cinereus* the sole dominant grass.....  
**Leymus cinereus Alkaline Wet Meadow**  
 GNR/S1 — [CEGL009057](#)  
 (Mueggler & Stewart, 1980 p76; Johnson & Simon, 1987 p210; Evans, 1989 p29; Crawford, 2003 p86; Crowe et al., 2004b p151; Bell et al., 2009 p242; Erixson & Cogan, 2012 pD-21)
- 9c.13d *Bromus tectorum* ≥ 25%.....  
**Leymus cinereus - *Bromus tectorum* Ruderal Wet Meadow**  
 GNA/SNA — CWWA000362  
 (Crawford, 2003 p87)
- 9c.14 *Spartina gracilis* ≥ 25%.....  
**Spartina gracilis Alkaline Wet Meadow**  
 GU/S2? — [CEGL001588](#)  
 (Crawford, 2003 p84; Kagan et al., 2004 p32)

- 9c.15 *Distichlis spicata* ≥ 25%  
 9c.15a *Carex praegracilis* and/or *Carex douglasii* ≥ 10% .....  
***Distichlis spicata* / *Carex (praegracilis, douglasii)* Alkaline Wet Meadow**  
 GNR/SNR — CWWA000347  
 (Crawford, 2003 p82)
- 9c.15b *Distichlis spicata* forms a monoculture .....  
***Distichlis spicata* Alkaline Wet Meadow**  
 G5/S1? — [CEGL001770](#)  
 (Daubenmire, 1970 p45; Hansen et al., 1995 p431; Christy, 2013 p27)
- 9c.15c *Scirpus nevadensis* usually codominates and bare soil > 30% .....  
***Distichlis spicata* - (*Scirpus nevadensis*) Alkaline Wet Meadow**  
 G4/SNR — [CEGL001773](#)  
 (Daubenmire, 1970 p77; Kagan et al., 2004 p14)
- 9c.16 *Hordeum brachyantherum* ≥ 25% .....  
***Hordeum brachyantherum* Western Interior Lowland Wet Meadow**  
 GNR/S1S2 — [CEGL009059](#)  
 (Jankovsky-Jones et al., 2001 p151)
- 9c.17 *Hordeum jubatum* ≥ 25% .....  
***Hordeum jubatum* Great Basin Wet Meadow**  
 G4/SNR — [CEGL005285](#)  
 (Hansen et al., 1995 p443; Thompson & Hansen, 2002; Rocchio & Crawford, 2009)
- 9c.18 *Sporobolus airoides* ≥ 25% .....  
***Sporobolus airoides* Northern Intermountain Alkaline Wet Meadow**  
 GNR/SNR — CWWA000408  
 (Jankovsky-Jones et al., 2001 p163)
- 9c.19 *Deschampsia danthonioides* dominant. *Grindelia* spp., *Juncus bufonius*, *Plagiobothrys* spp.,  
*Navarretia* spp., *Polygonum polygaloides*, and other annuals present .....  
***Deschampsia danthonioides* Vernal Pool**  
 GNR/S1 — [CEGL006652](#)  
 (Björk, 1997 p10; Crawford, 2003 p88)
- 9c.20 *Camassia quamash* dominant or codominant .....  
***Camassia quamash* Rocky Mountain Wet Meadow**  
 GNR/SNR — CWWA000320  
 (Weaver, 1917 p105; Evans, 1989 p36; Servheen et al., 2002 p7)
- 9c.21 *Alopecurus geniculatus* ≥ 25% .....  
***Alopecurus geniculatus* Ruderal Wet Meadow**  
 GNA/SNA — CWWA000308  
 (Crawford, 2003 p76)

9c.22 *Agrostis (gigantea, stolonifera)* ≥ 25% and dominant and *Elymus repens* and *Juncus balticus* often present to prominent .....

***Agrostis (gigantea, stolonifera)* Ruderal Marsh**

GNA/SNA — [CEGL001558](#)

(Hansen et al., 1995 p420; Crawford, 2003 p77)

9c.23 *Elymus repens* ≥ 20% and additional exotic grasses prominent .....

***Elymus repens* Ruderal Meadow**

GNA/SNA — CWWA000358

(Crawford, 2003 p78)

9c.24 *Schedonorus pratensis* dominant and numerous other nonnative species present to prominent .....

***Schedonorus pratensis* Ruderal Wet Meadow**

GNA/SNA — Not Tracked

(Rocchio et al., 2012 pB-68)

9c.25 *Poa pratensis* ≥ 20% and additional exotic grasses prominent to codominant.....

***Poa pratensis* Ruderal Marsh**

GNA/SNA — [CEGL003081](#)

(Daubenmire, 1970 p82; Padgett, 1981 p71; Tuhy & Jensen, 1982; Kovalchik, 1987 p92; Padgett et al., 1989 p112; Hansen et al., 1995 p454; Crowe & Clausnitzer, 1997 p196; Kovalchik & Clausnitzer, 2004 p241)

9c.26 *Phalaris arundinacea* ≥ 25% .....

***Phalaris arundinacea* Western Ruderal Marsh**

GNA/SNA — [CEGL001474](#)

(Hansen et al., 1995 p447; Crawford, 2003 p75; Christy, 2013 p33)

9c.27 *Phragmites australis* dominant

9c.27a Native phenotype: Usually not monotypic; ligules > 1 mm; Lower glume usually > 4 mm; Upper glume usually > 6 mm; Dead leaf sheaths are loose and drop off easily .....

***Phragmites australis* ssp. *americanus* Western Native Marsh**

GNR/S1S2 — [CEGL006866](#)

(Evans, 1989 p36)

9c.27b Nonnative phenotype: Often monotypic; ligules < 1 mm; Lower glume usually < 4 mm; Upper glume usually < 6 mm; Dead leaf sheaths are tight and remain on dead stems; Dead stems often persist into next growing season .....

***Phragmites australis* ssp. *australis* Western Ruderal Wet Meadow**

GNA/SNA — [CEGL001475](#)

(Evans, 1989 p36; Hansen et al., 1995 p450; Kagan et al., 2004 p19; Copass & Ramm-Granberg, 2016b pB-59)

9c.28 *Equisetum arvense* ≥ 25% and *Alopecurus pratensis* and/or other exotic grasses prominent to codominant; *Juncus balticus* absent .....

***Equisetum arvense* - Mixed Graminoid Ruderal Wet Meadow**

GNA/SNA — Not Tracked

(Rocchio et al., 2012 pB-67)

**9d Rushes dominant**

9d.1 *Juncus balticus* ≥ 25%

9d.1a *Argentina anserina* ≥ 10% .....

***Juncus balticus* - *Argentina anserina* Wet Meadow**

GNR/SNR — CWWA000359

(Crawford, 2003 p69)

9d.1b Disturbance-tolerant species such as *Geum macrophyllum*, *Deschampsia caespitosa*, *Potentilla gracilis*, *Achillea millefolium*, *Persicaria hydropiperoides*, *Carex nebrascensis*, *C. pellita*, and/or *Epilobium ciliatum* usually present to prominent. Montane .....

***Juncus balticus* Wet Meadow**

G5/S3S4 — [CEGL001838](#)

(Padgett, 1981 p73; Evans, 1989 p30; Evenden, 1989 p47; Hansen et al., 1995 p445; Crowe & Clausnitzer, 1997 p194; Jankovsky-Jones et al., 2001 p153; Crawford, 2003 p71; Crowe et al., 2004b p129; Bell et al., 2009 p268; Erixson et al., 2011 pD-191; Christy, 2013 p29)

**9e Forbs/ferns dominant**

9e.1 *Navarretia* spp. + *Plagiobothrys* spp. ≥ 10% .....

***Navarretia leucocephala* - *Plagiobothrys leptocladus* - (*Downingia* spp.) Vernal Pool**

GNR/S1S3 — CWWA000367

(Björk, 1997 p10)

9e.2 *Polygonum polygaloides* dominant .....

***Polygonum polygaloides* Vernal Pool**

GNR/S1S3 — CWWA000384

(Björk, 1997 p10)

9e.3 *Camassia quamash* ≥ 5%, *Pinus ponderosa* present, AND *Festuca idahoensis* usually absent.....

***Pinus ponderosa* / *Camassia quamash* Riparian Woodland**

GNR/SNR — CWWA000382

(John & Tart, 1986 p87)

9e.4 *Lomatium nudicaule* ≥ 5%, *Festuca idahoensis* usually present, AND *Camassia quamash* < 5%.

Essentially a dry meadow (most of the year) with *Pinus ponderosa* in favorable microsites. ....

***Pinus ponderosa* / *Lomatium nudicaule* Riparian Woodland**

GNR/SNR — CWWA000383

(John & Tart, 1986 p85)

9e.5 *Salicornia* spp. ≥ 10% .....

***Salicornia rubra* Salt Flat**

GNR/SNR — CWWA000445

(Ungar, 1972; Weinmann et al., 2002)

9e.6 *Suaeda* spp. dominates with few other species present.....

***Suaeda (calceoliformis, moquinii)* Salt Flat**

GNR/SNR — CWWA000421

(WNHP Observations)

- 9e.7 *Wyethia amplexicaulis* ≥ 25% .....  
**Wyethia amplexicaulis Wet Meadow**  
 GNR/SNR — CWWA000416  
 (Weaver, 1917 p106; Servheen et al., 2002 p7)
- 9e.8 *Sullivantia hapemanii* abundant species on steep, wet cliffs .....  
**Sullivantia hapemanii - Mimulus spp. Wet Cliff**  
 GNR/SNR — [CEGL005509](#)  
 (WNHP Plot Data)
- 9e.9 *Athyrium filix-femina* and/or *Gymnocarpium dryopteris* ≥ 10% .....  
**Athyrium filix-femina - Gymnocarpium dryopteris Wet Meadow**  
**[Provisional]**  
 GNR/SNR — CWWA000313  
 (Crowe et al., 2004b p156; Kovalchik & Clausnitzer, 2004 p264)
- 9e.10 *Senecio triangularis* ≥ 5% .....  
**Senecio triangularis Wet Meadow**  
 G5?/S3 — [CEGL001987](#)  
 (Kovalchik, 1987 p124; Hansen et al., 1995 p464; Crowe & Clausnitzer, 1997 p212; Damm, 2001 p187)
- 9e.11 *Mimulus guttatus* ≥ 15% .....  
**Mimulus guttatus - (Mimulus spp.) Seep**  
 GNR/SNR — [CEGL005305](#)  
 (Weaver, 1917 p70; Padgett et al., 1989 p115)
- 9e.12 *Veronica americana* dominant .....  
**Veronica americana Marsh**  
 G3Q/S2 — CWWA000193  
 (Crowe & Clausnitzer, 1997 p213)
- 9e.13 *Mimulus lewisii* ≥ 25% .....  
**Mimulus lewisii Wet Meadow**  
 GNR/S4? — [CEGL007765](#)  
 (Henderson, 1973 p107; Kovalchik & Clausnitzer, 2004 p264; Crawford et al., 2009 pB-22)
- 9e.14 *Trollius laxus* and/or *Caltha biflora/leptosepala* ≥ 10% .....  
**Caltha leptosepala Wet Meadow**  
 G4/S4 — [CEGL001954](#)  
 (Padgett et al., 1989 p100; Kovalchik & Clausnitzer, 2004 p264)
- 9e.15 *Saxifraga* (= *Micranthes*) *odontoloma* or *S. nelsonii* or ≥ 5% .....  
**Saxifraga odontoloma Wet Meadow**  
 GU/S3 — [CEGL001985](#)  
 (Crowe & Clausnitzer, 1997 p213; Kovalchik & Clausnitzer, 2004 p264)
- 9e.16 *Adiantum pedatum* ≥ 25% .....  
**Adiantum pedatum Seep**  
 GNR/SNR — CWWA000027  
 (Diaz & Mellen, 1996 p147; Crowe & Clausnitzer, 1997 p213)

9e.17 *Solidago occidentalis* (=Euthamia occidentalis), *Apocynum cannabinum*, and/or *Coreopsis atkinsoniana* (=C. tinctoria) ≥ 25% .....

**Apocynum cannabinum - Artemisia (lindleyana, ludoviciana) Wet Meadow**

G3Q/S1 — CWWA000172  
(Salstrom & Easterly, 1995 p4)

9e.18 *Artemisia ludoviciana* ≥ 5% .....

**Artemisia ludoviciana Wet Meadow**

GNR/SNR — CWWA000312  
(Crawford, 2003 p60; Crowe et al., 2004b p157)

9e.19 *Lomatium grayi* ≥ 20% and *Artemisia ludoviciana* and/or *Clematis ligusticifolia* usually present .....

**Lomatium grayi Wet Meadow**

GNR/SNR — CWWA000364  
(Crawford, 2003 p92)

9e.20 *Camassia quamash* dominant or frequently codominant with *Carex nebrascensis*, *C. vesicaria*, and/or *Deschampsia caespitosa* .....

**Camassia quamash Rocky Mountain Wet Meadow**

GNR/SNR — CWWA000320  
(Weaver, 1917 p105; Evans, 1989 p36; Servheen et al., 2002 p7)

9e.21 *Equisetum fluviatile* ≥ 25% .....

**Equisetum fluviatile Marsh**

G4/S3? — [CEGL002746](#)  
(Hansen et al., 1995 p440; Titus & Christy, 1996; Kovalchik & Clausnitzer, 2004 p232; MacKenzie & Moran, 2004 p109)

9e.22 *Equisetum arvense* ≥ 25%

9e.22a *Juncus balticus* present and *Juncus balticus* + *Poa pratensis* ≥ 10% .....

**Equisetum arvense - Juncus balticus Wet Meadow**

GNR/SNR — CWWA000353  
(Crawford, 2003 p91)

9e.22b *Glyceria elata* + *Cinna latifolia* + *Mentha arvensis* + *Juncus ensifolius* ≥ 5% .....

**Equisetum arvense Fen [Provisional]**

GNR/SNR — CWWA000267  
(Diaz & Mellen, 1996 p159; Crowe & Clausnitzer, 1997 p210; Murray, 2000 p19; Crawford, 2003 p91)

9e.22c *Alopecurus pratensis* and/or other exotic grasses prominent to codominant AND *Juncus balticus* absent .....

**Equisetum arvense - Mixed Graminoid Ruderal Wet Meadow**

GNA/SNA — Not Tracked  
(Rocchio et al., 2012 pB-67)

9e.23 *Typha angustifolia* ≥ 25% and often much higher/monotypic .....

**Typha angustifolia Ruderal Western Marsh**

GNR/SNR — [CEGL008735](#)  
(WNHP Plot Data)

9e.24 *Typha latifolia* ≥ 25% and often much higher/monotypic .....  
**Typha latifolia Western Marsh**  
G5/S4 — [CEGL008734](#)  
(Hansen et al., 1995 p468; Crowe & Clausnitzer, 1997 p202;  
Jankovsky-Jones et al., 2001 p181; Crawford, 2003 p94; Crowe et  
al., 2004b p56; Kovalchik & Clausnitzer, 2004 p231)

9e.25 *Lepidium latifolium* dominant .....  
**Lepidium latifolium Ruderal Vegetation**  
GNA/SNA — Not Tracked  
(Crawford, 2003 p94)

## 10 Key to Eastside Nonvascular & Sparse Vascular Vegetation Types

10a *Scirpus nevadensis* and *Distichlis spicata* codominate .....  
**Distichlis spicata - (*Scirpus nevadensis*) Alkaline Wet Meadow**  
G4/SNR — [CEGL001773](#)  
(Daubenmire, 1970 p77; Kagan et al., 2004 p14)

10b *Suaeda* spp. dominates .....  
**Suaeda (*calceoliformis*, *moquinii*) Salt Flat**  
GNR/SNR — CWWA000421  
(WNHP Observations)

## 11 The wetland does not key to an existing association

11a If you first attempted the key using the westside key break, please try again with the eastside key  
(and vice versa), especially if near the Cascade Crest.....  
**Return to the top of the key**

11b Relax cover estimate cutoffs and try once again .....  
**Return to the top of the key**

11c Wetland is dominated by nonnative plants OR dominated by an assemblage of native plants that is  
the result of anthropogenic disturbance and does not have a known natural analogue .....  
**Undescribed Ruderal Wetland Association**

11d Wetland is dominated by native plants AND anthropogenic disturbance is absent or minor .....  
**Undescribed Native Wetland Association**

\*If you believe you have found an example of a native wetland plant  
association that is absent from our current classification, we encourage  
you to contact us. Please include spatial coordinates, a species list  
(preferably with cover estimates), environmental description, and any  
photos that you may have of the site. This information will be combined  
with other plot data to contribute to ongoing efforts to improve our  
knowledge and understanding of Washington's wetland ecosystems.

## Release Notes

Expect regular updates as the key continues to be field-tested. Plant taxonomy updates and revisions to the USNVC will be periodically incorporated, as well.

- **Initial Drafts:** Several draft versions were distributed beginning in 2016
- **Draft v2.1:** Incorporated WNHP revisions to the USNVC submitted as part of Revised Vegetation Classification for Mount Rainier, North Cascades, and Olympic National Parks (Ramm-Granberg et al., 2021). Incorporated USNVC EL Codes for easier database searches. Revised subgroup assignments and expanded references for some associations. Minor tweaks to various key breaks.
- **Draft v2.2:** Inserted missing plant association (CEGL003367). Fixed some incorrect page numbers in references. Added additional subgroup options for some associations. Updated 32 conservation status ranks. Fixed EL code for *Euthamia occidentalis* Mudflat.
  - **v2.2.1:** Updated EL code for *Alnus viridis* ssp. *sinuata* / Mesic Forbs and adjusted conservation status rank to reflect classification change. Miscellaneous formatting fixes. Updated reference for Ramm-Granberg et al. 2021. Updated subgroup options for western Washington deciduous-dominated riparian communities (North Pacific Lowland & Foothill Headwater Riparian Forest and North Pacific Lowland & Foothill Floodplain Forest subgroups).
- **Draft v2.3:** Assorted classification updates. Removed *Tsuga heterophylla* / *Acer circinatum* Riparian Forest (CWWA000414)—now considered synonymous w/ upland *Pseudotsuga menziesii* - (*Tsuga heterophylla*) / *Acer circinatum* - *Paxistima myrsinites* Forest (CEGL008271). Several *Deschampsia danthonioides* vernal pool associations consolidated into a single community. Modified classification of *Salix amygdaloides*-dominant wetlands. For eastside *Alnus viridis* communities, added text to the effect that *Acer glabrum* may dominate and *Alnus viridis* only  $\geq 5\%$ . Modified key break for *Tsuga heterophylla* / *Gymnocarpium dryopteris* Forest (CEGL000494) to clarify difference from *Tsuga heterophylla* / *Athyrium filix-femina* Forest (CEGL000491). Corrected typo in key break to *Alnus viridis* ssp. *sinuata* / *Acer circinatum* Shrub Swamp (CEGL001155) in Section 8. Added *Plectritis congesta* wet bald (CTWA003376) to the key. Miscellaneous updates of EL codes. Updated Conservation Status Ranks.
- **Draft v2.4:** Updated EL codes for a few state types (CWWA...) that have since been added to the USNVC (CEGL...). *Juncus gerardi* Brackish Wet Meadow (CWWA000446) provisionally considered native based on WA flora revisions.
- **Version 1 (December 10, 2025)**
  - Formatting changes.
  - Removed references to “subgroup” (a custom level of the USNVC created by WNHP). That classification is deprecated and WNHP is transitioning to using

USNVC alliances for applications that formerly used subgroups as a standard unit (including wetland Ecological Integrity Assessments).

- Updated current name, EL code, and conservation status ranks for numerous associations to match the US National Vegetation Classification version 3.0. Notable changes include:

- *Sparganium eurycarpum* Aquatic Vegetation (CEGL003323) split into *Sparganium eurycarpum* Pacific Coast Marsh (CEGL009060) and *Sparganium eurycarpum* Western Interior Marsh (CEGL009061).
- *Hordeum brachyantherum* Lowland Wet Meadow (CEGL003430) now tracked as *Hordeum brachyantherum* Western Interior Lowland Wet Meadow (CEGL009059) in Washington (coastal California stands split out into CEGL009058).
- There are now separate tidal/brackish and freshwater marshes dominated by *Schoenoplectus* (*acutus*, *tabernaemontani*):
  - *Schoenoplectus* (*acutus*, *tabernaemontani*) Tidal Marsh (CWWA000435)
  - *Schoenoplectus* (*acutus*, *tabernaemontani*) Pacific Coast Marsh (CEGL006647)

## Literature Cited

- Achuff P.L., R. I McNeil, M.L. Coleman, C. Wallis, and C. Wershler. 2002. Ecological land classification of Waterton Lakes National Park, Alberta. Volume I: integrated resource description. Parks Canada, Waterton Lakes National Park, AB.
- Agee J.K. 1987. The forests of San Juan Island National Historical Park. Unpublished report prepared for the National Park Service. University of Washington, Seattle, WA.
- Antos J.A. and D.B. Zobel. 1986. Habitat relationships of *Chamaecyparis nootkatensis* in southern Washington, Oregon, and California. *Canadian Journal of Botany* 64(9):1898–1909.
- Beals E.W. 1984. Bray-Curtis ordination: an effective strategy for analysis of multivariate ecological data. *Advances in ecological research* 14:1–55.
- Bell J., D. Cogan, J. Erixson, and J. Von Loh. 2009. Vegetation inventory project report, Craters of the Moon National Monument and Preserve. National Park Service, Fort Collins, CO.
- Björk C.R. 1997. Vernal pools of the Columbia Plateau, eastern Washington. The Nature Conservancy, Washington Field Office, Seattle, WA.
- Boggs K. 2000. Classification of community types, successional sequences, and landscapes of the Copper River Delta, Alaska. US Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR.
- Boss T.R. 1982. Vegetation ecology and net primary productivity of selected freshwater wetlands in Oregon. PhD Dissertation. Oregon State University, Corvallis, OR.
- Braumandl T.F. and M.P. Curran. 1992. *A field guide for site identification and interpretation for the Nelson Forest Region. Part 1 (2002 Update)*. British Columbia Ministry of Forests, Research Branch, Victoria, BC. Land Management Handbook Number 20.
- Brett B., K. Klinka, H. Qian, and C. Chourmouzis. 2001. Classification of high-elevation, non-forested plant communities in coastal British Columbia. University of British Columbia, Forest Sciences Department, Vancouver, BC.
- Brockway D.G. and C. Topik. 1984. Ecological classification and management characteristics of montane forest land in southwestern Washington. In: *Forest land classification: experiences, problems, perspectives. Proceedings of a symposium held at the University of Wisconsin at Madison on March 18-20, 1984* (ed. by J.G. Bockheim). Madison, WI.
- Brockway D.G., C. Topik, M.A. Hemstrom, and W.H. Emmingham. 1983. Plant association and management guide for the Pacific silver fir zone: Gifford Pinchot National Forest. US Department of Agriculture, Forest Service, Pacific Northwest Region, Portland, OR.
- Buechling A., E.R. Alverson, J. Kertis, and G. Fitzpatrick. 2008. Classification of Oak Vegetation in the Willamette Valley. Oregon Natural Heritage Information Center, Institute for Natural Resources, Oregon State University, Portland, OR.
- Burg M.E., D.R. Tripp, and E.S. Rosenberg. 1980. Plant associations and primary productivity of the Nisqually Salt Marsh on southern Puget Sound, Washington. *Northwest Science* 54(3):222–236.
- Bursik R.J. and R.K. Moseley. 1995. Ecosystem conservation strategy for Idaho panhandle peatlands. Idaho Department of Fish and Game, Conservation Data Center, Boise, ID.

- Cadrin C.M. and H.K. Yearsley. 2012. Ecological Community Summary: *Deschampsia cespitosa* - *Sidalcea hendersonii*. British Columbia Ministry of Environment, Conservation Data Centre, Victoria, BC. <https://a100.gov.bc.ca/pub/eswp/speciesSummary.do?id=20232>. Accessed: November 12, 2020.
- Chadde S., J.S. Shelly, R.J. Bursik, R.K. Moseley, A.G. Evenden, M. Mantas, F. Rabe, and B. Heidel. 1998. Peatlands on national forests of the northern Rocky Mountains: ecology and conservation. US Department of Agriculture, Forest Service, Rocky Mountain Research Station, Ogden, UT.
- Chappell C.B. 1999. Ecological classification of low-elevation riparian vegetation on the Olympic Experimental State Forest: a first approximation. Washington Natural Heritage Program, Department of Natural Resources, Olympia, WA.
- Chappell C.B. 2001. Draft upland forest vegetation classification for Fort Lewis Military Reservation, Washington. Unpublished report. Washington Natural Heritage Program, Department of Natural Resources, Olympia, WA.
- Chappell C.B. 2006a. Upland plant associations of the Puget Trough ecoregion, Washington. Washington Natural Heritage Program, Department of Natural Resources, Olympia, WA.
- Chappell C.B. 2006b. Plant associations of balds and bluffs of western Washington. Washington Natural Heritage Program, Department of Natural Resources, Olympia, WA. NHR-2006-02.
- Chappell C.B. and R.C. Crawford. 1997. Native vegetation of the south Puget Sound prairie landscape. *Ecology and conservation of the South Puget Sound prairie vegetation* (ed. by P. Dunn and E. K), pp. 107–124. The Nature Conservancy, Seattle, WA.
- Christy J.A. 1993. Classification and catalog of native wetland plant communities in Oregon. Oregon Natural Heritage Program, Portland, OR.
- Christy J.A. 2004. Native freshwater wetland plant associations of Northwestern Oregon. Oregon Natural Heritage Information Center, Institute for Natural Resources, Oregon State University, Portland, OR.
- Christy J.A. 2013. Wet meadow plant associations, Malheur National Wildlife Refuge, Harney County, Oregon. Oregon Biodiversity Information Center, Institute for Natural Resources, Portland State University, Portland, OR.
- Christy J.A., J.S. Kagan, and A.M. Wiedemann. 1998. Plant associations of the Oregon Dunes National Recreation Area: Siuslaw National Forest, Oregon. US Department of Agriculture, Forest Service, Pacific Northwest Region, Portland, OR.
- Christy J.A. and J.A. Putera. 1993. Lower Columbia River natural area inventory, 1992. Report to the Nature Conservancy, Washington Field Office, Seattle, WA. Oregon Natural Heritage Program, Portland, OR.
- Clausnitzer R.R. 1993. Grand fir series of northeastern Oregon and southeastern Washington: successional stages and management guide. US Department of Agriculture, Forest Service, Pacific Northwest Region.
- Clausnitzer R.R. and B.A. Zamora. 1987. Forest habitat types of the Colville Indian Reservation. Washington State University Agriculture Research Center, Pullman, WA.

- Cooper S.V., C. Jean, and B.L. Heidel. 1999. Plant associations and related botanical inventory of the Beaverhead Mountains Section, Montana. Prepared for US Department of the Interior, Bureau of Land Management. Montana Natural Heritage Program, Helena, MT.
- Cooper S.V., K.E. Neiman, and D.W. Roberts. 1991. Forest habitat types of northern Idaho: a second approximation (revised edition). US Department of Agriculture, Forest Service, Intermountain Research Station, Ogden, UT.
- Copass C. and T.C. Ramm-Granberg. 2016a. Vancouver National Historic Reserve vegetation inventory and mapping project. US Department of the Interior, National Park Service, Fort Collins, CO.
- Crawford R.C. 2003. Riparian vegetation classification of the Columbia Basin, Washington. Prepared for Bureau of Land Management, Spokane District and The Nature Conservancy. Washington Natural Heritage Program, Department of Natural Resources, Olympia, WA.
- Crawford R.C., C.B. Chappell, C.C. Thompson, and F.J. Rocchio. 2009. Vegetation classification of Mount Rainier, North Cascades, and Olympic National Parks. US Department of the Interior, National Park Service, Fort Collins, CO. NPS/NCCN/NRTR—2009/211.
- Crowe E.A. and R.R. Clausnitzer. 1997. Mid-montane wetland plant associations of the Malheur, Umatilla and Wallowa-Whitman National Forests. US Department of Agriculture, Forest Service, Pacific Northwest Region, Wallowa-Whitman National Forest, Portland, OR.
- Crowe E.A., B.L. Kovalchik, and M.J. Kerr. 2004a. CEG001144 *Alnus incana* / *Carex* (aquatilis, lenticularis, luzulina, pellita) Wet Shrubland. US National Vegetation Classification, <https://www1.usgs.gov/csas/nvcs/nvcsGetUnitDetails?elementGlobalId=684678>. Accessed: November 12, 2020.
- Crowe E.A., B.L. Kovalchik, and M.J. Kerr. 2004b. Riparian and Wetland Vegetation of Central and Eastern Oregon. Oregon Natural Heritage Information Center, Institute for Natural Resources, Oregon State University, Portland, OR.
- Crowe E.A., B.L. Kovalchik, M.J. Kerr, J. Titus, and J.S. Kagan. 2002. Riparian and wetland plant communities of eastern Oregon (draft report). Oregon Natural Heritage Information Center, Institute for Natural Resources, Oregon State University, Portland, OR.
- Damm C. 2001. A phytosociological study of Glacier National Park, Montana, USA, with notes on the syntaxonomy of alpine vegetation in western North America. PhD Dissertation. Georg - August University, Göttingen, Germany.
- Daubenmire R.F. 1952. Forest vegetation of Northern Idaho and adjacent Washington, and its bearing on concepts of vegetation classification. *Ecological Monographs* 22(4):301–330.
- Daubenmire R.F. 1970. Steppe vegetation of Washington. Washington Agricultural Experiment Station, College of Agriculture, Washington State University, Pullman, WA.
- Daubenmire R.F. and J.B. Daubenmire. 1968. Forest Vegetation of Eastern Washington and Northern Idaho. Washington Agricultural Experiment Station, College of Agriculture, Washington State University, Pullman, WA.
- Dethier M.N. 1990. A marine and estuarine habitat classification system for Washington State. Washington Natural Heritage Program, Department of Natural Resources, Olympia, WA.

- Diaz N.M., C.T. High, T.K. Mellen, D.E. Smith, and C. Topik. 1997. Plant association and management guide for the Mountain Hemlock Zone: Gifford Pinchot and Mt. Hood National Forests. US Department of Agriculture, Forest Service, Pacific Northwest Region, Portland, OR. R6-MTH-GP-TP-08–95.
- Diaz N.M. and T.K. Mellen. 1996. Riparian ecological types: Gifford Pinchot and Mt. Hood National Forests, Columbia River Gorge National Scenic Area. US Department of Agriculture, Forest Service, Pacific Northwest Region, Portland, OR. R6-NR-TP-10–96.
- DiPaolo D.A., D.C. Odion, K.M. Rolih, P. Adamus, and D A Sarr. 2018. Vegetation classification and mapping: Crater Lake National Park. US Department of the Interior, National Park Service, Fort Collins, CO.
- Douglas G.W. 1971. An ecological survey of potential natural areas in the North Cascades National Park complex. Unpublished report prepared for Intercampus Education and Science Preserves Commission, State of Washington.
- Douglas G.W. 1972. Subalpine plant communities of the western North Cascades, Washington. *Arctic and Alpine Research* 4(2):147–166.
- Driscoll R.S., D.L. Merkel, D.L. Radloff, D.E. Snyder, and J.S. Hagihara. 1984. An ecological land classification framework for the United States. US Department of Agriculture, Forest Service, Washington, DC.
- Dufrêne M. and P. Legendre. 1997. Species assemblages and indicator species: the need for a flexible asymmetrical approach. *Ecological monographs* 67(3):345–366.
- Eilers H.P. 1974. Plants, plant communities, net production and tide levels: the ecological biogeography of the Nehalem Salt Marshes, Tillamook County, Oregon. PhD Dissertation. Oregon State University, Corvallis, OR.
- Erixson J. and D. Cogan. 2012. Vegetation inventory project: Whitman Mission National Historic Site. National Park Service, Fort Collins, CO.
- Erixson J., D. Cogan, and J.V. Loh. 2011. Vegetation inventory project report, Lake Roosevelt National Recreation Area. National Park Service, Fort Collins, CO.
- Evans S. 1989. Provisional riparian and aquatic wetland plant communities on the Columbia Plateau. Report prepared for Washington State Department of Ecology. Washington Natural Heritage Program, Department of Natural Resources, Olympia, WA.
- Evenden A.G. 1989. Ecology and distribution of riparian vegetation in the Trout Creek Mountains of southeastern Oregon. PhD Dissertation. Oregon State University, Corvallis, OR.
- Evens J.M., K. Sikes, and J. Ratchford. 2020. Vegetation classification at Lake Mead National Recreation Area, Mojave National Preserve, Castle Mountains National Monument, and Death Valley National Park: final report (revised with cost estimate). National Park Service, Fort Collins, CO.
- Faber-Langendoen D., U.S. National Vegetation Classification Ecological Society of America
- Federal Geographic Data Committee (FGDC). 1997. National Vegetation Classification Standard. Vegetation Subcommittee, Federal Geographic Data Committee, FGDC Secretariat, US Department of the Interior, US Geological Survey, Reston, VA.

- Federal Geographic Data Committee (FGDC). 2008. National Vegetation Classification Standard, Version 2. Vegetation Subcommittee, Federal Geographic Data Committee, FGDC Secretariat, US Department of the Interior, US Geological Survey, Reston, VA.
- Field J.G. and G. McFarlane. 1968. Numerical methods in marine ecology. I. A quantitative "similarity" analysis of rocky shore samples in False Bay, South Africa. *Zoologica Africana* 3:119–137.
- Fonda R.W. 1974. Forest succession in relation to river terrace development in Olympic National Park. *Ecology* 55(5):927–942.
- Franklin J.F. and C.T. Dyrness. 1973. Natural vegetation of Oregon and Washington. US Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, Portland, OR.
- Franklin J.F., W.H. Moir, M.A. Hemstrom, S.E. Greene, and B.G. Smith. 1988. The forest communities of Mount Rainier National Park. US Department of the Interior, National Park Service, Washington, DC.
- Frenkel R.E. and E.F. Heinitz. 1987. Composition and structure of Oregon Ash (*Fraxinus latifolia*) forest in William L. Finley National Wildlife Refuge, Oregon. *Northwest Science* 61(4):203–212.
- Gauch H.G. and R.H. Whittaker. 1981. Hierarchical classification of community data. *The Journal of Ecology* 69:537–557.
- Goodall D.W. 1973. Numerical classification. *Handbook of Vegetation Science* 5:575–615.
- Green R.N. and K. Klinka. 1994. *A field guide to site identification and interpretation for the Vancouver Forest Region*. British Columbia Ministry of Forests, Research Branch, Victoria, BC.
- Hall F. 1973. Plant communities of the Blue Mountains in eastern Oregon and southeastern Washington. US Department of Agriculture, Forest Service, Pacific Northwest Region, Portland, OR.
- Hall J.B. and P.L. Hansen. 1997. A preliminary riparian habitat type classification system for the Bureau of Land Management districts in southern and eastern Idaho. Prepared for the Idaho Bureau of Land Management. Riparian and Wetland Research Program, School of Forestry, University of Montana, Missoula, MT.
- Hamann M.J. 1972. Vegetation of alpine and subalpine meadows of Mount Rainier National Park, Washington. MS Thesis. Washington State University, Pullman, WA.
- Hansen P.L., R.D. Pfister, K. Boggs, B.J. Cook, J. Joy, and D.K. Hinckley. 1995. Classification and management of Montana's riparian and wetland sites. Montana Forest and Conservation Experiment Station, School of Forestry, University of Montana, Missoula, MT.
- Heinitz E.F. 1982. Vegetation ecology of *Fraxinus latifolia* communities in William L. Finley National Wildlife Refuge, Oregon. MS Thesis. Oregon State University, Corvallis, OR.
- Henderson J.A. 1973. Composition, distribution and succession of subalpine meadows in Mount Rainier National Park. PhD Dissertation. Oregon State University, Corvallis, OR.
- Henderson J.A., R.D. Leshner, D.H. Peter, and D.C. Shaw. 1992. Field guide to the forested plant associations of the Mt. Baker-Snoqualmie National Forest. US Department of Agriculture, Forest Service, Pacific Northwest Region, Portland, OR.

- Henderson J.A., R.L. Mauk, D.L. Anderson, R. Ketchie, P. Lawton, S. Simon, R.H. Sperger, R.W. Young, and A.P. Youngblood. 1976. Preliminary forest habitat-types of northwestern Utah and adjacent Idaho. A report for the Department of Forestry and Outdoor Recreation. Utah State University, Logan, UT.
- Henderson J.A. and D.H. Peter. 1982. Preliminary plant associations and habitat types of the Snoqualmie and adjacent Skykomish River drainages, Mt. Baker-Snoqualmie National Forest. US Department of Agriculture, Forest Service, Pacific Northwest Region, Olympic National Forest, Olympia, WA.
- Henderson J.A., D.H. Peter, and R. Leshner. 1986. Preliminary plant associations of the Olympic National Forest. US Department of Agriculture, Forest Service, Pacific Northwest Region, Olympic National Forest, Olympia, WA.
- Henderson J.A., D.H. Peter, R.D. Leshner, and D.C. Shaw. 1989. Forested plant associations of the Olympic National Forest. US Department of Agriculture, Forest Service, Pacific Northwest Region, Portland, OR.
- Henderson J.A., B.G. Smith, and R.L. Mauk. 1979. Plant communities of the Hoh and Dosewallips drainages, Olympic National Park, Washington. Unpublished progress report. Department of Forestry and Outdoor Recreation, Utah State University, Logan UT.
- Hill M.O. 1979a. *TWINSpan: a FORTRAN Program for Arranging Multivariate Data in an Ordered Two-way Table by Classification of Individual and Attributes*. Cornell University, Ithaca, NY.
- Hill M.O. 1979b. *DECORANA: a FORTRAN program for detrended correspondence analysis and reciprocal averaging*. Cornell University, Ithaca, NY.
- Hill M.O. and H.G. Gauch. 1980. Detrended correspondence analysis: an improved ordination technique. *Vegetatio* 42:47–58.
- Hop K., J. Dieck, S. Lubinski, M. Reid, and S. Cooper. 2007. US Geological Survey-National Park Service Vegetation Mapping Program: Waterton-Glacier International Peace Park. US Department of the Interior, US Geological Survey, Upper Midwest Environmental Sciences Center, La Crosse, WI.
- Jankovsky-Jones M. 1997. Conservation Strategy for Northern Idaho Wetlands. Idaho Department of Fish and Game, Natural Resource Policy Bureau, Boise, ID.
- Jankovsky-Jones M., C. Murphy, and C. Coulter. 2001. Riparian and wetland plant associations of southwestern Idaho with a focus on the Bureau of Land Management's Lower Snake River District. Idaho Department of Fish and Game, Conservation Data Center, Boise, ID.
- Jankovsky-Jones M., S.K. Rust, and R.K. Moseley. 1999. Riparian reference areas in Idaho: a catalog of plant associations and conservation sites. US Department of Agriculture, Forest Service, Rocky Mountain Research Station, Ogden, UT.
- Jennings M., O. Loucks, D. Glenn-Lewin, R. Peet, D. Faber-Langendoen, D. Grossman, A. Damman, M. Barbour, R. Pfister, M. Walker, S. Talbot, J. Walker, G. Hartshorn, G. Waggoner, M. Abrams, A. Hill, D. Roberts, and D. Tart. 2002. Standards for Associations and Alliances of the U. S. National Vegetation Classification. Version 1. The Ecological Society of America, Vegetation Classification Panel.
- Jennings M.D., D. Faber-Langendoen, O.L. Loucks, R.K. Peet, and D. Roberts. 2009. Standards for Associations and Alliances of the U.S. National Vegetation Classification. *Ecological Monographs* 79(2):173–199.

- John T. and D. Tart. 1986. Forested plant associations of the Yakima Drainage within the Yakima Indian Reservation. Review copy prepared for the Yakima Indian Nation. Bureau of Indian Affairs, Soil Conservation Service.
- John T., D. Tart, and R.R. Clausnitzer. 1988. Forest plant associations of the Yakima Indian Reservation. Draft Field Guide. Yakima Indian Nation, Soil and Vegetation Survey, Toppenish, WA.
- Johnson C.G. and R.R. Clausnitzer. 1992. Plant associations of the Blue and Ochoco Mountains. US Department of Agriculture, Forest Service, Pacific Northwest Region, Wallowa-Whitman National Forest, Baker City, OR.
- Johnson C.G. and S.A. Simon. 1987. Plant associations of the Wallowa-Snake Province. US Department of Agriculture, Forest Service, Pacific Northwest Region, Wallowa-Whitman National Forest, Baker City, OR.
- Johnson K.R. 1939. Plant ecology of northwestern Colorado lakes and surrounding areas. University of Colorado,
- Johnson K.R. 1941. Vegetation of some mountain lakes and shores in northwestern Colorado. *Ecology* 22(3):306–316.
- Kagan J.S., J.A. Christy, M.P. Murray, and J.A. Titus. 2004. Classification of native vegetation of Oregon. Oregon Natural Heritage Information Center, Institute for Natural Resources, Oregon State University, Portland, OR.
- Kerr M.J. 2000. Classification of active floodplain plant communities on a portion of the Twisp River, Okanogan County, Washington. MS Thesis. Washington State University, Pullman, WA.
- Kovalchik B.L. 1987. Riparian zone associations: Deschutes, Ochoco, Fremont, and Winema National Forests. US Department of Agriculture, Forest Service, Pacific Northwest Region, Portland, OR.
- Kovalchik B.L. 2001. Classification and management of aquatic, riparian and wetland sites on the national forests of eastern Washington (part 1: the series descriptions). Unpublished Draft. US Department of Agriculture, Forest Service.
- Kovalchik B.L. and R.R. Clausnitzer. 2004. Classification and management of aquatic, riparian, and wetland sites on the national forests of eastern Washington. US Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR.
- Kratz A.M. 1975. Vegetational analysis of the coastal *Picea sitchensis* forest zone in Olympic National Park, Washington. MS Thesis. Western Washington State College, Bellingham, WA.
- Kruskal J.B. and M. Wish. 1978. *Multidimensional scaling*. Sage Publications, Beverly Hills, CA.
- Kunze L.M. 1984. Puget Trough coastal wetland sanctuaries: a summary report of recommended sites. Report prepared for Washington State Department of Ecology. Washington Natural Heritage Program, Department of Natural Resources, Olympia, WA.
- Kunze L.M. 1991. Western Washington freshwater wetlands. Volume VI. Mid-montane wetlands: Whatcom and Skagit Counties, Washington. Report prepared for Washington Department of Ecology. Washington Natural Heritage Program, Department of Natural Resources, Olympia, WA.
- Kunze L.M. 1994. Preliminary classification of native, low elevation, freshwater wetland vegetation in western Washington. Washington Natural Heritage Program, Department of Natural Resources, Olympia, WA.

- Kunze L.M. and L.C. Cornelius. 1982. Baseline inventory of rare, threatened, and endangered plant species/communities along Washington's Pacific Coast. Report prepared for Washington State Department of Ecology and the National Oceanic and Atmospheric Administration. Washington Natural Heritage Program, Department of Natural Resources, Olympia, WA.
- Kuramoto R.T. and L.C. Bliss. 1970. Ecology of subalpine meadows in the Olympic Mountains, Washington. *Ecological Monographs* 40(3):317–347.
- Lance G.N. and W.T. Williams. 1967. A general theory of classification sorting strategies. I. Hierarchical systems. *Computer Journal* 9:373–380.
- Lance G.N. and W.T. Williams. 1968. A general theory of classification sorting strategies. II. Clustering systems. *Computer Journal* 10:271–277.
- Lillybridge T.R., B.L. Kovalchik, C.K. Williams, and B.G. Smith. 1995. Field guide for forested plant associations of the Wenatchee National Forest. US Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR.
- Lippert B.E. and D.L. Jameson. 1964. Plant succession in temporary ponds of the Willamette Valley, Oregon. *American Midland Naturalist*:181–197.
- MacKenzie W.H. and J.R. Moran. 2004. *Wetlands of British Columbia: a guide to identification*. British Columbia Ministry of Forests, Forest Science Program, Victoria, BC. Land Management Handbook 52.
- Mather P.M. 1976. *Computational methods of multivariate analysis in physical geography*. John Wiley & Sons, London, United Kingdom.
- McCain C. and J.A. Christy. 2005. Field guide to riparian plant communities in northwestern Oregon. US Department of Agriculture, Forest Service, Pacific Northwest Region, Portland, OR.
- McCune B., J.B. Grace, and D.L. Urban. 2002. *Analysis of ecological communities*. MjM Software Design, Gleneden Beach, OR.
- McCune B. and M.J. Mefford. 2011. PC-ORD. Multivariate Analysis of Ecological Data. Version 7. MjM Software Design, Gleneden Beach, OR.
- Meidinger D., C.B. Chappell, C. Cadrin, G. Kittel, C. McCain, K. Boggs, J. Kagan, G. Cushon, A. Banner, and T. DeMeo. 2005. International Vegetation Classification of the Pacific Northwest: International correlation of temperate coastal forest plant associations of Oregon, Washington, British Columbia and Alaska. Contributors: B.C. Ministry of Forests, USDA Forest Service, B.C. Conservation Data Centre, Alaska Natural Heritage Program, Washington Natural Heritage Program, and Oregon Natural Heritage Information Center.
- Metropolis N. and S. Ulam. 1949. The Monte Carlo method. *Journal of the American Statistical Association* 44(247):335–341.
- Mielke Jr P.W., K.J. Berry, and E.S. Johnson. 1976. Multi-response permutation procedures for a priori classifications. *Communications in Statistics-Theory and Methods* 5(14):1409–1424.
- del Moral R. 1973. The vegetation of Findley Lake basin. *American Midland Naturalist* 89(10):26–40.
- del Moral R. 1979. High elevation vegetation of the Enchantment Lakes Basin, Washington. *Canadian Journal of Botany* 57(10):1111–1130.

- Moral R.D. and J.N. Long. 1977. Classification of montane forest community types in the Cedar River drainage of western Washington, USA. *Canadian Journal of Forest Research* 7(2):217–225.
- Moseley R.K. 1998. Riparian and wetland community inventory of 14 reference areas in southwestern Idaho. Prepared for Bureau of Land Management, Lower Snake River District. Idaho Department of Fish and Game, Conservation Data Center, Boise, ID.
- Mueggler W.F. and W.L. Stewart. 1980. Grassland and shrubland habitat types of western Montana. US Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station, Ogden, UT.
- Murray M. 2000. Wetland plant associations of the Western Hemlock Zone in the central coastal and Cascade Mountains. Interim report. Oregon Natural Heritage Information Center, Institute for Natural Resources, Oregon State University, Portland, OR.
- Mycek L. 1994. A classification of riparian plant communities in three geomorphological provinces of the Cascade Mountains in western Washington State, USA. MS Thesis. University of Washington, Seattle, WA.
- Padgett W.G. 1981. Ecology of riparian plant communities in southern Malheur National Forest. MS Thesis. Oregon State University, Corvallis, OR.
- Padgett W.G., A.P. Youngblood, and A.H. Winward. 1989. Riparian community type classification of Utah and southeastern Idaho. US Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station, Ogden, UT.
- Peet R.K., T.R. Wentworth, and P.S. White. 1998. A flexible, multipurpose method for recording vegetation composition and structure. *Castanea* 63(3):262–274.
- Peter D.H. 2000. Report to Simpson Timber Company describing riparian plant communities and their relationships to Simpson lithotopo units and channel types. US Department of Agriculture, Forest Service, Olympia Forestry Sciences Lab, Olympia, WA.
- Pfister R.D., B.L. Kovalchik, S.F. Arno, and R.C. Presby. 1977. Forest habitat types of Montana. US Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station, Ogden, UT.
- R Core Team. 2017. R: a language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. Online: <http://www.r-project.org>
- Ramm-Granberg T., F.J. Rocchio, R. Brunner, and E. Nielsen. 2021. Revised vegetation classification for Mount Rainier, North Cascades, and Olympic National Parks: descriptions and identification keys for plant associations and wetland alliances. North Coast and Cascades Network, National Park Service, Port Angeles, WA.
- Rocchio F.J. and R.C. Crawford. 2009. Assessment of ecological characteristics and ecological integrity of wetlands in northern Douglas County, Washington. Prepared for the Nature Conservancy, Wenatchee, WA. Washington Natural Heritage Program, Department of Natural Resources, Olympia, WA.
- Rocchio F.J., R.C. Crawford, and C. Copass. 2012. San Juan Island National Historical Park vegetation classification and mapping project report. National Park Service, Fort Collins, CO.
- RStudio Team. 2016. RStudio: integrated development for R. RStudio, Inc, Boston, MA.

- Salstrom D.L. and R.T. Easterly. 1995. Riparian plant communities: south shore and islands of the Columbia River on the Hanford Site, Washington. The Nature Conservancy, Washington Field Office, Seattle, WA.
- Servheen G., P. Morgan, B.J. Weddell, P. Gessler, and P. McDaniel. 2002. Wetlands of the Palouse Prairie: historical extent and plant composition. Idaho Department of Fish and Game, Boise, ID.
- Smith W.P. 1985. Plant associations within the interior valleys of the Umpqua River Basin, Oregon. *Journal of Range Management* 38(6):526–530.
- Steele R., S.V. Cooper, D.M. Ondov, D.W. Roberts, and R.D. Pfister. 1983. Forest habitat types of eastern Idaho-western Wyoming. US Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station, Ogden, UT.
- Steele R., R.D. Pfister, R.A. Ryker, and J.A. Kittams. 1981. Forest habitat types of central Idaho. US Department of Agriculture, Forest Service, Intermountain Research Station.
- Thompson W.H. and P.L. Hansen. 2002. Classification and management of riparian and wetland sites of the Alberta Grassland Natural Region and adjacent subregions. Bitterroot Restoration, Inc, Lethbridge, AB.
- Tisdale E.W. 1986. Canyon grasslands and associated shrublands of west-central Idaho and adjacent areas. Forest, Wildlife and Range Experiment Station, College of Forestry, Wildlife and Range Sciences, University of Idaho, Moscow, ID.
- Titus J.H. and J.A. Christy. 1996. Vegetation of Big Marsh, Deschutes National Forest, Oregon. Report to Deschutes National Forest. Oregon Natural Heritage Program, The Nature Conservancy, Portland, Oregon.
- Titus J.H., J.A. Christy, D. VanderSchaaf, J.S. Kagan, and E.R. Alverson. 1996. Native wetland, riparian, and upland plant communities and their biota in the Willamette Valley, Oregon. Report to US Environmental Protection Agency, Region X, Seattle, Washington Willamette Basin Geographic Initiative Program. Oregon Natural Heritage Program, The Nature Conservancy, Portland, OR.
- Titus J.H., P.J. Titus, and R. del Moral. 1999. Wetland development in primary and secondary successional substrates fourteen years after the eruption of Mount St. Helens. *Northwest Science* 73(3):186–204.
- Topik C., N.M. Halverson, and T. High. 1988. Plant association and management guide for the Ponderosa Pine, Douglas-fir, and Grand Fir zones: Mt Hood National Forest. US Department of Agriculture, Forest Service, Pacific Northwest Region, Portland, OR.
- Topik C., R. Van Vickle, and N.M. Halverson. 1986. Plant association and management guide for the Western Hemlock Zone: Gifford Pinchot National Forest. US Department of Agriculture, Forest Service, Pacific Northwest Region, Portland, OR.
- Tuhy J.S. and S. Jensen. 1982. Riparian classification for the Upper Salmon and Middle Fork Salmon River drainages, Idaho. Unpublished report for the USDA Forest Service, Intermountain Region. White Horse Associates, Smithfield, UT.
- Ungar I.A. 1972. The vegetation of inland saline marshes of North America, north of Mexico. *Grundfragen und Methoden in der Pflanzensoziologie (Basic problems and Methods in Phytosociology)* (ed. by R. Tüxen and E. van der Maarel), pp. 397–411. Springer, Dordrecht, Netherlands.

- United Nations Educational Scientific and Cultural Organization (UNESCO). 1973. International classification and mapping of vegetation. Series 6. Ecology and conservation. United Nations, Paris, France.
- USNVC (United States National Vegetation Classification) Database Version 3.0. 2025. USNVC Hierarchy Explorer, Science Analytics and Synthesis (SAS) Program, US Geological Survey. (Federal Geographic Data Committee, Vegetation Subcommittee). Washington D.C. usnvc.org. Accessed: December 4, 2025.
- Viereck L.A., C.T. Dyrness, A.R. Batten, and K.J. Wenzlick. 1992. The Alaska Vegetation Classification. US Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR.
- Weaver J.E. 1917. *A study of the vegetation of southeastern Washington and adjacent Idaho*. University Studies Volume XVII, University of Nebraska, Lincoln, NE.
- Weinmann F., P.F. Zika, D.E. Giblin, and B. Legler. 2002. Checklist of the Vascular Plants of Washington State. University of Washington Herbarium. <http://biology.burke.washington.edu/herbarium/waflora/checklist.php>. Accessed: January 3, 2022.
- Wiedemann A.M. 1984. The ecology of Pacific Northwest coastal sand dunes: a community profile. US Department of the Interior, Fish and Wildlife Service, Portland, OR.
- Wilderman D.L. 1994. Plant communities of the Fitzner/Eberhardt Arid Lands Ecology Reserve and the north slope of the Hanford Site: findings of the 1994 inventory. Unpublished report. The Nature Conservancy, Washington Field Office, Seattle, Washington.
- Williams C.K., B.F. Kelley, B.G. Smith, and T.R. Lillybridge. 1995. Forested plant associations of the Colville National Forest. US Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR.
- Williams C.K. and T.R. Lillybridge. 1983. Forested plant associations of the Okanogan National Forest. US Department of Agriculture, Forest Service, Pacific Northwest Region, Portland, OR.
- Williams W.T., J.M. Lambert, and G.N. Lance. 1966. Multivariate methods in plant ecology. V. Similarity analysis and information-analysis. *Journal of Ecology* 54:427–445.
- Wilson B.L., R. Brainerd, D. Lytjen, B. Newhouse, and N. Otting. 2014. *Field guide to the sedges of the Pacific Northwest, Second Edition*. Oregon State University Press, Corvallis, OR.
- Wilson M.V., K.P. Connelly, and L.E. Lantz. 1993. Plant species, habitat, and site information for Fern Ridge Reservoir: a component of the project to develop management guidelines for native wetland communities. Report to Army Corps of Engineers and Soil Conservation Service. Oregon State University, Corvallis, OR.
- Wooten G. and P. Morrison. 1995. Classification of vascular plant communities of the North Cascades using discrete space boundary analysis. Unpublished report. Floradora Farms, Twisp, WA.
- Youngblood A.P., W.G. Padgett, and A.H. Winward. 1985. Riparian community type classification of eastern Idaho-western Wyoming. US Department of Agriculture, Forest Service, Intermountain Region, Ogden, UT.