Keys to wetland and riparian plant associations in Oregon

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These keys help identify the many wetland and riparian plant assocations documented to occur in Oregon. Links to documentary source materials are given for each plant association where they are listed under the 15 generalized headings in "Major Wetland and Riparian Types." See "Preface to 2017 Update of Wetland and Riparian Plant Associations in Oregon" for more information.

Sources of Information. These keys use as a benchmark five comprehensive guides to wetland and riparian vegetation (Murray 2000, Christy 2004, Crowe et al. 2004, McCain 2004, McCain et al. 2014) that compiled and reinterpreted 40 years of published and unpublished plot-based work, as well as describing new plant associations. Older and newer works also are referenced in the keys. Gaps in information remain, particularly for southwestern and parts of southeastern Oregon. Most of the field work was completed or funded by the USDA Forest Service, USDI Bureau of Land Management, the Environmental Protection Agency, The Nature Conservancy, the Oregon Biodiversity Information Center, the Oregon Department of State Lands, the Oregon Watershed Enhancement Board, the US Fish and Wildlife Service, The Wetlands Conservancy, and Portland Metro.

Whenever possible, plant associations in these keys conform to the International Vegetation Classification System (IVCS). However, not all associations documented from Oregon are included in IVCS, so references are provided to the source material. "NS" indicates those types that are included in IVCS listings on the NatureServe Explorer website.

Keys to the plant associations are grouped in four vegetation classes used in the IVCS: forest, shrubland, herbaceous, and nonvascular. The IVCS distinguishes "Forest" from "Woodland" based on crown density (overlapping in forests, usually not touching in woodland) or canopy cover (60-100 % in forest, 25-66% in woodland), but because these are not always evident from plot data I chose to lump both types as "Forest and Woodland." The IVCS also divides shrub associations into two physiognomic classes: "Shrubland" (shrubs > 0.5 m tall) and "Dwarf-shrubland" (shrubs < 0.5 m tall). However, the height potential of an unfamiliar shrub is not always obvious in the field, and tall shrub species may be dwarfed in certain habitats for a variety of reasons. For this reason, in this guide I lumped all shrubs together under one physiognomic class. For convenience, I also placed *Betula occidentalis* and *Salix lasiandra* associations with their shrubby congeners in the shrub class, despite the fact that under favorable conditions these species can reach tree height of 30 or 40 feet.

The keys identify each association and most follow standard couplet formatting except in cases where using couplets would add greatly to the length of the keys. In the latter case I chose to simply list dominant species instead of running each through a series of couplets. In many cases the keys also provide multiple access points for cases where more than one species may be present in the leading vegetation layer.

Names of associations in square brackets ([...]) indicate associations dominated by exotic or ruderal species that have been recognized in the IVCS.

1a. Combined tree cover usually at least 25 %..... Key to **Forest and Woodland Associations**
1b. Combined tree cover usually < 25 %..... 2

2a. Combined shrub cover usually at least 25 %..... Key to **Shrubland Associations**
2b. Combined shrub cover usually < 25 %..... 3

3a. Graminoid, forb, or fern cover usually at least 25 %, or highest cover available in layer; bryophyte, lichen, or algal cover various..... Key to **Herbaceous Associations**
3b. Graminoid, forb, or fern cover usually < 25%; bryophyte, lichen, or algal cover usually > 25%, or highest cover available in layer..... Key to **Nonvascular Associations**

I. FOREST AND WOODLAND ASSOCIATIONS

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

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

Tree layer with one or more of the following species, either mature or reproducing, with highest frequency or cover, usually at least 20%, or highest cover available in layer:

Abies amabilis ..... A
Abies grandis ..... B
Abies lasiocarpa C
Acer macrophyllum ..... D
Alnus rhombifolia ..... E
Alnus rubra ..... F
Betula occidentalis ..... Key to **Shrubland Associations**
Callitropsis nootkatensis ..... ***Callitropsis nootkatensis / Oplopanax horridus*** (NS)
Celtis reticulata ..... Key to **Shrubland Associations**
Chamaecyparis lawsoniana ..... ***Chamaecyparis lawsoniana / Rhododendron occidentale / Carex*** (NS)
Crataegus douglasii ..... Key to **Shrubland Associations**
Fraxinus latifolia ..... G
Picea engelmannii ..... H
Picea sitchensis I
Pinus contorta var. *contorta* [shore pine] ..... ***Pinus contorta* var. *contorta* / *Carex obnupta*** (Christy 2004: 31; NS)
Pinus contorta var. *latifolia* [lodgepole pine] ..... J
Pinus monticola ..... ***Pinus monticola / Deschampsia cespitosa*** (Crowe et al. 2004: 372)
Pinus ponderosa ..... K
Populus tremuloides L
Populus trichocarpa ..... M
Pseudotsuga menziesii ..... N
Quercus garryana ..... ***Quercus garryana - (Fraxinus latifolia) / Symphoricarpos albus*** (McCain 2004: 274, 283; Buechling et al. 2008: 9; NS)
Salix lasiandra ..... Key to **Shrubland Associations**
Thuja plicata ..... O
Tsuga heterophylla ..... P

A. *Abies amabilis*:

1a. Shrub layer mostly *Vaccinium ovalifolium* ..... ***Abies amabilis / Vaccinium ovalifolium*** (Murray 2000: 40; McCain 2004: 176)
1b. Shrub layer mostly *Oplopanax horridus* ..... ***Abies amabilis / Oplopanax horridus*** (NS)

B. *Abies grandis*:

1a. Shrub layer mainly *Acer glabrum*, with *Philadelphus lewisii, Rosa gymnocarpa* and *Symphoricarpos albus* often conspicuous ..... ***Abies grandis / Acer glabrum*** (Crowe et al. 2004: 304; Wells 2006: 54; NS)
1b. Shrub layer otherwise 2

2a. Shrub layer mainly *Symphoricarpos albus*, with *Amelanchier alnifolia* often conspicuous ..... ***Abies grandis / Symphoricarpos albus*** (Crowe et al. 2004: 307; NS)
2b. Shrub layer otherwise 3

3a. Shrub layer mainly *Taxus brevifolia* ..... ***Abies grandis / Taxus brevifolia*** (Wells 2006: 49; NS)

3b. Shrub layer otherwise 4

4a. *Populus trichocarpa* often conspicuous in tree layer; shrub layer mainly *Crataegus douglasii* and *Symphoricarpos albus*..... ***Abies grandis / Crataegus douglasii / Carex leptopoda*** (Wells 2006: 51)
4b. Tree and shrub layers otherwise 5

3. Herb layer mainly one of the following species, usually with at least 20% cover:
Athyrium filix-femina..... ***Abies grandis / Athyrium filix-femina*** (Crowe et al. 2004: 363; NS)
Gymnocarpium disjunctum..... ***Abies grandis / Gymnocarpium disjunctum*** (Crowe et al. 2004: 366)
Senecio triangularis..... ***Abies grandis / Senecio triangularis*** (NS)
Trautvetteria caroliniensis ..... ***Abies grandis / Trautvetteria caroliniensis*** (Crowe et al. 2004: 369; NS)

C. *Abies lasiocarpa* (often with *Picea engelmannii*):

1a. Shrub layer a mix of *Vaccinium uliginosum* and *Vaccinium scoparium* ..... ***Picea engelmannii / Vaccinium uliginosum*** (Crowe et al. 2004: 410; Wells 2006: 38; NS)
1b. Shrub layer otherwise 2

2a. Shrub layer a mix of *Rhododendron columbianum* and various species of *Vaccinium*..... ***Abies lasiocarpa / Rhododendron columbianum*** (Crowe et al. 2004: 408, 412, 414; NS)
2b. Shrub layer otherwise 3

3a. Shrub layer *Ribes lacustre, Ribes hudsonianum,* or *Alnus viridis* ssp. *sinuata* 4
3b. Shrub layer otherwise 6

4a. Herb layer mostly *Athyrium filix-femina* ..... ***Abies lasiocarpa / Athyrium filix-femina*** (Crowe et al. 2004: 416)
4b. Herb layer otherwise 5

5a. Herb layer mostly *Calamagrostis canadensis*..... ***Abies lasiocarpa - Picea engelmannii / Calamagrostis canadensis*** (Crowe et al. 2004: 421; NS)
5b. Herb layer mostly *Senecio triangularis* and *Micranthes odontoloma* ..... ***Abies lasiocarpa / Senecio triangularis - Micranthes odontoloma*** (Crowe et al. 2004: 419)

6a. Shrub layer well developed 7
6b. Shrub layer scant ..... ***Abies lasiocarpa / Carex aquatilis* var. *aquatilis*** (NS)

7a. Shrub layer mainly *Menziesia ferruginea* and *Vaccinium scoparium*..... ***Abies lasiocarpa - Picea engelmannii / Menziesia ferruginea - Vaccinium scoparium*** (Wells 2006: 40; NS)
7b. Shrub layer mainly *Vaccinium membranaceum*..... ***Abies lasiocarpa / Vaccinium membranaceum / Valeriana sitchensis*** (Wells 2006: 42; NS)

D. *Acer macrophyllum*:

Tree layer highly variable, with a mix of *Abies grandis Alnus rubra, Calocedrus decurrens, Fraxinus latifolia, Populus trichocarpa, Pseudotsuga menziesii, Thuja plicata,* and *Tsuga heterophylla.* Most of these associations are based on McCain (2004) and differ from those on NatureServe Explorer, which are excluded here because of inadequate documentation.

1a. Herb layer mostly *Tolmeia menziesii* and *Athyrium filix-femina*..... ***Acer macrophyllum / Rubus spectabilis*** (McCain 2004: 80, 90; NS)
1b. Herb layer otherwise 2

2a. Herb layer mostly *Polystichum munitum*, often with *Oxalis trilliifolia or O. oregana* 3
2b. Herb layer otherwise 5

3a. Shrub layer mostly *Corylus cornuta* and *Rubus spectabilis* ..... ***Acer macrophyllum / Corylus cornuta - Rubus spectabilis*** (McCain 2004: 242)
3b. Shrub layer mostly *Acer circinatum* or mixed *Acer circinatum* - Corylus cornuta 4

4a. Shrub layer mostly *Acer circinatum* ..... ***Acer macrophyllum / Acer circinatum*** (McCain 2004: 119, 137)
4b. Shrub layer mixed *Acer circinatum* and *Corylus cornuta* ..... ***Acer macrophyllum / Acer circinatum - Corylus cornuta*** (McCain 2004: 141, 143, 146)

5a. Herb layer mostly *Hydrophyllum tenuipes* 6
5b. Herb layer otherwise 7

6a. Shrub layer mostly *Corylus cornuta* ..... **(*Fraxinus latifolia - Populus trichocarpa*) / *Corylus cornuta / Hydrophyllum tenuipes*** (McCain 2004: 257)
6b. Shrub layer mostly *Rubus spectabilis,* or *Rubus* conspicuous ..... **(*Alnus rubra - Populus trichocarpa*) / *Rubus spectabilis / Hydrophyllum tenuipes*** (McCain 2004: 269)

7a. Herb layer mostly *Maianthemum stellatum* ..... (***Acer macrophyllum - Fraxinus latifolia*) / *Symphoricarpos albus / Maianthemum stellatum*** (McCain 2004: 281)
7b. Herb layer mostly *Carex leptopoda*, *Hydrophyllum tenuipes*, and *Urtica dioica* ssp. *gracilis* ..... ***Acer macrophyllum / Symphoricarpos albus / Urtica dioica* ssp. *gracilis*** (McCain 2004: 254, 261, 263, 279; NS)

E. *Alnus rhombifolia*:

1a. Herb layer sparse and often weedy, with no species exceeding 10 % cover ..... ***Alnus rhombifolia* alluvial bar** (Crowe et al. 2004: 351)
1b. Herb layer otherwise 2

2a. Tree layer usually mixed with *Acer macrophyllum* or *Pseudotsuga menziesii*; shrub layer mainly *Acer circinatum* and *Philadelphus lewisii* ..... ***Alnus rhombifolia / Acer circinatum*** (Crowe et al. 2004: 361)
2b. Tree layer monotypic *Alnus rhombifolia* or mixed with *Populus trichocarpa*; *Acer circinatum* absent 3

3a. *Populus trichocarpa* codominant or conspicuous ..... ***Populus trichocarpa - Alnus rhombifolia*** (Crowe et al. 2004: 331; NS)
3b. *Populus trichocarpa* scant or absent 4

4a. Herb layer mostly *Carex nudata* ..... ***Alnus rhombifolia / Carex nudata*** (Crowe et al. 2004: 353)
4b. Herb layer otherwise 5

5. Shrub layer mainly one of the following species, usually with at least 20% cover:
Betula occidentalis ..... ***Alnus rhombifolia / Betula occidentalis*** (Crowe et al. 2004: 359; NS)
Celtis reticulata ..... ***Alnus rhombifolia / Celtis reticulata*** (Crowe et al. 2004: 356; NS)
Cornus sericea ..... ***Alnus rhombifolia / Cornus sericea*** (Crowe et al. 2004: 357; Wells 2006: 72, 74)
Crataegus douglasii ..... ***Alnus rhombifolia / Crataegus douglasii*** (Crowe et al. 2004: 360; Wells 2006: 72, 74)
Philadelphus lewisii ..... ***Alnus rhombifolia / Philadelphus lewisii*** (Crowe et al. 2004: 354; Wells 2006: 72, 74; NS)

F. *Alnus rubra*:
1a. Tree layer a mix of various combinations of *Abies grandis, Acer macrophyllum, Fraxinus latifolia, Populus trichocarpa, Pseudotsuga menziesii*, and *Thuja plicata* 2
1b. Tree layer otherwise 6

2a. Shrub layer mostly *Corylus cornuta* ..... ***Hardwood / Corylus cornuta / Polystichum munitum*** (McCain 2004: 141, 146)
2b. Shrub layer otherwise 3

3a. Shrub layer mixed *Symphoricarpos albus* and *Rubus spectabilis* ..... ***Alnus rubra / Symphoricarpos albus - Rubus spectabilis*** (McCain 2004: 134)
3b. Shrub layer otherwise 4

4a. Shrub layer mostly *Rubus spectabilis*, or *Rubus* conspicuous ..... **(*Alnus rubra - Populus trichocarpa*) / *Rubus spectabilis* / *Hydrophyllum tenuipes*** (McCain 2004: 269)
4b. Shrub layer mostly *Symphoricarpos albus*, with *Rubus* inconspicuous or absent 5

5a. Herb layer mostly *Maianthemum stellatum* ..... **Forested *Symphoricarpos albus / Maianthemum stellatum*** (McCain 2004: 281)
5b. Herb layer mostly *Carex leptopoda*, *Hydrophyllum tenuipes*, and *Urtica dioica* ssp. *gracilis* ..... **(*Acer macrophyllum - Populus trichocarpa*) / *Symphoricarpos albus* / *Urtica dioica*** (McCain 2004: 254, 261, 263, 279)

6a. Tree layer mostly *Alnus rubra* or mixed with *Acer macrophyllum, Thuja plicata,* or *Tsuga heterophylla* 7
6b. Tree layer mainly *Alnus rubra* 9

7a. Shrub layer mostly *Acer circinatum* ..... ***Alnus rubra - Acer macrophyllum / Oxalis*** (McCain 2004: 119, 138)
7b. Shrub layer mostly *Ribes bracteosum* and/or *Rubus spectabilis* 8

8a. *Vaccinium ovalifolium* conspicuous in shrub layer; herb layer mostly *Lysichiton americanus* ..... ***Rubus spectabilis - Vaccinium ovalifolium / Lysichiton americanus*** (McCain 2004: 170).
8b. *Vaccinium ovalifolium* scant or absent 9

9a. Shrub layer consistently *Rubus spectabilis*; herb layer mainly one or more of the following species:
Athyrium filix-femina and/or *Lysichiton americanus* ..... ***Alnus rubra / Athyrium filix-femina - Lysichiton americanus*** (Murray 2000: 41; Christy 2004: 21; NS)
Athyrium filix-femina, Equisetum hyemale, Galium trifidum, Lysichiton americanum, Tiarella trifoliata, and *Tolmiea menziesii* ..... ***Alnus rubra / Rubus spectabilis*** (NS)
Carex obnupta, usually dominant or codominant with *Lysichiton americanus* ..... ***Alnus rubra / Rubus spectabilis / Carex obnupta - Lysichiton americanus*** (Christy 2004: 22; NS)
Elymus glaucus; *Lysichiton americanus* scant or absent ..... ***Alnus rubra / Elymus glaucus*** (McCain 2004: 74)
Oxalis trilliifolia or *O. oregana* and *Athyrium filix-femina* ..... ***Alnus rubra / Oxalis (oregana, trilliifolia)*** (McCain 2004: 105, 129; NS)
Petasites frigidus var. *palmatus* ..... ***Alnus rubra / Petasites frigidus* var. *palmatus*** (Crowe et al. 2004: 379)
Tolmiea menziesii ..... ***Alnus rubra - Acer macrophyllum / Ribes bracteosum - Rubus spectabilis / Tolmiea menziesii*** (Murray 2000: 42; McCain 2004: 78, 80, 90)
9b. Shrub layer otherwise 10

10a. Shrub layer mostly *Oplopanax horridus* and *Rubus spectabilis* ..... ***Alnus rubra / Oplopanax horridus - Rubus spectabilis*** (Murray 2000: 43; McCain 2004: 161)
10b. *Oplopanax horridus* scant or absent 11

11a. Shrub layer mostly *Symphoricarpos albus* and *Rubus spectabilis* ..... ***Alnus rubra / Symphoricarpos albus - Rubus spectabilis*** (McCain 2004: 134)
11b. *Rubus spectabilis* scant or absent 12

12a. Shrub layer mostly *Cornus sericea* and *Rubus parviflorus* ..... ***Alnus rubra / Cornus sericea*** (Crowe et al. 2004: 381)
12b. Shrub layer mixed *Philadelphus lewisii*, *Physocarpus capitatus,* and *Symphoricarpos albus* 13

13a. *Physocarpus capitatus* more prominent 14
13b. *Symphoricarpos albus* more prominent 15

14a. Herb layer with *Athyrium filix-femina* and *Asarum caudatum* prominent ..... ***Alnus rubra / Athyrium filix-femina - Asarum caudatum*** (Crowe et al. 2004: 377; NS)
14b. Herb layer with *Geum macrophyllum, Prosartes hookeri* and *Tiarella trifoliata* prominent ..... ***Alnus rubra / Physocarpus capitatus*** (Crowe et al. 2004: 375)

15a. Tree layer often with *Betula papyrifera*; herb layer mostly *Carex leptopoda*..... ***Alnus rubra / Symphoricarpos albus / Carex leptopoda*** (Wells 2006: 69)
15b. *Betula papyrifera* absent; herb layer mostly *Athyrium filix-femina*, *Geum macrophyllum, Polystichum munitum*..... ***Alnus rubra / Symphoricarpos albus*** *(Crowe et al. 2004: 382*

G. *Fraxinus latifolia*:

1a. Tree layer with *Quercus garryana* codominant or conspicuous 2
1b. Tree layer otherwise 3

2a. *Polystichum munitum* and *Carex leptopoda* conspicuous in herb layer ..... **(*Fraxinus latifolia - Quercus garryana*) /*Symphoricarpos albus*** (McCain 2004: 274)
2b. *Camassia quamash* conspicuous in herb layer ..... ***Fraxinus latifolia /Symphoricarpos albus / Camassia quamash*** (McCain 2004: 283)

3a. Tree layer mostly *Fraxinus latifolia*, with one of the following species in the shrub or herb layer usually with at least 20% cover, but sometimes less in stands with heavily shaded or seasonally flooded understories:
Callitriche heterophylla ..... Key to **Herbaceous Associations**
Carex aquatilis var. *aquatilis*..... ***Fraxinus latifolia / Carex aquatilis* var. *aquatilis*** (Christy 2004: 23)
Carex leptopoda, sometimes with as little as 1% cover in stands with depauperate understory ..... ***Fraxinus latifolia / Carex leptopoda - Urtica dioica* ssp. *gracilis*** (Christy 2004: 24)
Carex obnupta..... ***Fraxinus latifolia / Carex obnupta*** (Murray 2000: 44; Christy 2004: 25)
Corylus cornuta ..... ***Fraxinus latifolia / Carex obnupta*** (Murray 2000: 44; Christy 2004: 25; NS)
Juncus patens ..... ***Fraxinus latifolia / Juncus patens*** (NS)
Spiraea douglasii..... ***Fraxinus latifolia / Spiraea douglasii*** (Christy 2004: 26; NS)
Symphoricarpos albus..... ***Fraxinus latifolia / Symphoricarpos albus*** (Christy 2004: 27)
3b. Tree layer with various combinations of *Abies grandis, Acer macrophyllum, Alnus rubra, Populus trichocarpa, Pseudotsuga menziesii,* and *Thuja plicata* 4

4a. Shrub layer mostly *Corylus cornuta* or *Corylus* frequent to codominant..... 5
3b. *Corylus cornuta* subordinate, scant, or absent 6

5a. Herb layer mostly *Polystichum munitum* ..... ***Hardwood / Corylus cornuta / Polystichum munitum*** (McCain 2004: 141, 146)
5b. Herb layer mostly *Hydrophyllum tenuipes*..... **(*Fraxinus latifolia - Populus trichocarpa*) / *Corylus cornuta / Hydrophyllum tenuipes*** (McCain 2004: 257)

6a. Shrub layer mostly *Rubus spectabilis*, or *Rubus* conspicuous 7
6b. Shrub layer otherwise 8

7a. Herb layer mostly *Urtica dioica* ssp. *gracilis*.....

.....***Fraxinus latifolia - Populus trichocarpa / Rubus spectabilis*** (McCain 2004: 271; NS)

7b. Herb layer mostly *Carex leptopoda*, *Hydrophyllum tenuipes*, and *Urtica dioica* ssp. *gracilis* .... **(*Alnus rubra - Populus trichocarpa*) / *Rubus spectabilis / Hydrophyllum tenuipes*** (McCain 2004: 269)

8a. Shrub layer mostly *Cornus sericea* .....***Fraxinus latifolia - (Populus trichocarpa) / Cornus sericea*** (NS)
8b. Shrub layer mostly *Symphoricarpos albus* 9

9a. Herb layer mostly *Maianthemum stellatum*..... .....**(*Acer macrophyllum - Fraxinus latifolia*) / *Symphoricarpos albus / Maianthemum stellatum*** (McCain 2004: 281)

9b. Herb layer mostly *Carex leptopoda*, *Hydrophyllum tenuipes*, and *Urtica dioica* ssp. *gracilis*..... ..... ***Acer macrophyllum / Symphoricarpos albus / Urtica dioica* ssp. *gracilis*** (McCain 2004: 254, 261, 263, 279)

H. *Picea engelmannii* (often with *Abies lasiocarpa*):

1a. Shrub layer mainly *Vaccinium membranaceum*..... 2
1b. Shrub layer otherwise..... 3

2a. Herb somewhat sparse, mostly *Achlys triphylla* and *Clintonia uniflora* ....***Picea engelmannii / Vaccinium membranaceum*** (McCain 2004: 168)
2b. Herb layer mostly *Trautvetteria caroliniensis* ..... ***Abies lasiocarpa / Trautvetteria caroliniensis*** (NS)

3a. Shrub layer mostly *Acer glabrum* ..... ***Abies grandis / Acer glabrum*** (Crowe et al. 2004: 304; NS)
3b. Shrub layer otherwise..... 4

4a. Shrub layer mostly *Alnus incana* or *Alnus* codominant with other species..... 5
4b. Shrub layer otherwise..... 8

5a. Shrub layer mostly *Alnus incana* and *Ribes hudsonianum*..... 6
5b. *Alnus incana* codominant with *Ribes lacustre* and other species 7

6a. Herb layer mostly *Carex disperma*.....***Picea engelmannii / Carex disperma*** (Crowe et al. 2004: 431)
6b. Herb layer mostly *Senecio triangularis* .... ***Picea engelmannii / Senecio triangularis*** (Crowe et al. 2004: 425; Wells 2006: 46; NS)

7a. Shrub layer with *Alnus viridis* ssp. *sinuata* conspicuous; herb layer mostly *Athyrium filix-femina*..... .....***Abies grandis / Athyrium filix-femina*** (Crowe et al. 2004: 363)
7b. Shrub layer with *Cornus sericea* conspicuous; *Athyrium filix-femina* absent..... ..... ***Picea engelmannii / Cornus sericea*** (Crowe et al. 2004: 438; NS)

8a. *Abies lasiocarpa* codominant in tree layer; shrub layer mostly *Rhododendron columbianum* 9
8b. Shrub layer otherwise..... 10

9a. Graminoids mostly *Carex laeviculmis* and *Calamagrostis canadensis* ....***Abies lasiocarpa / Rhododendron columbianum*** (Crowe et al. 2004: 408, 412; NS)
9b. Graminoids mostly *Carex scopulorum* and *Carex utriculata*..... .....***Abies lasiocarpa / Rhododendron columbianum*** (Crowe et al. 2004: 408, 412, 414; NS)

10a. Shrub layer mostly *Ribes lacustre*; herb layer mostly *Bromus vulgaris* and *Arnica cordifolia* ....***Picea engelmannii / Bromus vulgaris*** (Crowe et al. 2004: 436)
10b. Shrub and herb layer otherwise 11

11a. Shrub layer mostly *Symphoricarpos albus* or *Symphoricarpos* codominant with *Ribes lacustre* 12
11b. Shrub layer, when present, mostly *Vaccinium uliginosum*..... 14

12a. Shrub layer mostly *Symphoricarpos albus* ..... ***Abies grandis / Symphoricarpos albus*** (Crowe et al. 2004: 307)
12b. *Symphoricarpos albus* codominant with *Ribes lacustre* 13

13a. Herb layer mostly *Gymnocarpium disjunctum* ..... ***Abies grandis / Gymnocarpium disjunctum*** (Crowe et al. 2004: 366)
13b. Herb layer mostly *Trautvetteria caroliniensis* ..... ***Abies grandis / Trautvetteria caroliniensis*** (Crowe et al. 2004: 369; NS)

14a. *Pinus contorta* var. *latifolia* scant or absent ..... ***Picea engelmannii / Vaccinium uliginosum*** (Crowe et al. 2004: 410; NS)
14b. *Pinus contorta* var. *latifolia* codominant or conspicuous in tree layer 15

15. Herb layer mainly one of the following species, usually with at least 20% cover:
Athyrium filix-femina ..... ***Picea engelmannii / Athyrium filix-femina*** (Crowe et al. 2004: 423)
Carex angustata ..... ***Picea engelmannii / Carex angustata*** (Crowe et al. 2004: 433)
Calamagrostis canadensis ..... ***Abies lasiocarpa - Picea engelmannii / Calamagrostis canadensis*** (Crowe et al. 2004: 421)
Carex angustata ..... ***Picea engelmannii / Carex angustata*** (Crowe et al. 2004: 442; NS)
Carex disperma ..... ***Picea engelmannii / Carex disperma*** (NS)
Carex scopulorum ..... ***Picea engelmannii / Vaccinium uliginosum*** (Wells 2006: 44; NS)
Cinna latifolia ..... ***Picea engelmannii / Cinna latifolia*** (Crowe et al. 2004: 435)
Eleocharis quinqueflora ..... ***Picea engelmannii / Eleocharis quinqueflora*** (NS)
Equisetum arvense ..... ***Picea engelmannii / Equisetum arvense*** (Crowe et al. 2004: 428; NS)
Forbs diverse, graminoids scant or absent ..... ***Picea engelmannii / Vaccinium uliginosum*** (Crowe et al. 2004: 440; NS)

I. *Picea sitchensis*:
1a. *Cornus sericea* present ..... ***Picea sitchensis / Cornus sericea / Lysichiton americanus*** (Christy 2004: 29; NS)
1b. *Cornus sericea* absent 2

2a. *Lonicera involucrata* and *Malus fusca* present, brackish marsh species codominant in herb layer ..... ***Picea sitchensis / Lonicera involucrata - Malus fusca*** (Brophy et al. 2011)
2b. *Lonicera involucrata, Malus fusca,* and brackish marsh species absent 3

3a. *Oplopanax horridus* present ..... ***Picea sitchensis / Oplopanax horridus*** (NS)
3b. *Oplopanax horridus* absent ..... ***Picea sitchensis / Carex obnupta - Lysichiton americanus*** (Christy 2004: 28; NS)

J. *Pinus contorta* var. *latifolia* [lodgepole pine]:
1a. *Abies grandis* conspicuous; herb layer mostly *Carex pellita* ..... ***Abies grandis / Carex pellita*** (Crowe et al. 2004: 371)
1b. Tree and herb layer otherwise 2

2a. *Abies lasiocarpa* conspicuous; shrub layer mostly Ribes hudsonianum; herb layer mostly *Calamagrostis canadensis* ..... ***Abies lasiocarpa / Calamagrostis canadensis*** (Crowe et al. 2004: 421)
2b. Tree, shrub, and herb layers otherwise 3

3a. *Picea engelmannii* conspicuous 4
3b. Tree layer otherwise 7

4a. Shrub layer sparse; graminoids mostly *Carex angustata* ..... ***Picea engelmannii / Carex angustata*** (Crowe et al. 2004: 433)
4b. Shrub layer mostly *Vaccinium uliginosum*; graminoids various *5*

5a. Graminoids conspicuous 6
5b. Graminoids sparse to absent ..... ***Picea engelmannii / Vaccinium uliginosum*** (Crowe et al. 2004: 440)

6a. Graminoids mostly *Carex angustata* ..... ***Picea engelmannii / Vaccinium uliginosum / Carex angustata*** (Crowe et al. 2004: 442)
6b. Graminoids mostly *Eleocharis quinqueflora* ..... ***Picea engelmannii / Eleocharis quinqueflora*** (Crowe et al. 2004: 444; NS)

7a. *Populus tremuloides* conspicuous ..... ***Populus tremuloides - Pinus contorta* var. *latifolia / Spiraea douglasii*** (Crowe et al. 2004: 392, 454; NS)
7b. Tree layer otherwise 8

8a. *Larix occidentalis* and *Pinus ponderosa* conspicuous; shrub layer with *Spiraea douglasii* ..... ***Pinus ponderosa - Pinus contorta var. latifolia / Spiraea douglasii - Symphoricarpos albus*** (Crowe et al. 2004: 373)
8b. Tree layer mainly *Pinus contorta* 9

9a. Shrub layer mostly *Spiraea douglasii* ..... ***Pinus contorta var. latifolia / Spiraea douglasii*** (Crowe et al. 2004: 451; NS)
9b. Shrub layer otherwise 10

10a. Shrub layer mixed *Vaccinium uliginosum* and *Spiraea douglasii* ..... ***Pinus contorta* var. *latifolia / Vaccinium uliginosum*** (Crowe et al. 2004: 447; NS)
10b. Shrub layer otherwise 11

11a. Shrub layer mostly *Vaccinium uliginosum, g*raminoids mostly *Carex angustata* ..... ***Pinus contorta var. latifolia / Vaccinium uliginosum / Carex angustata*** (Crowe et al. 2004: 449)
11b. Shrub and herb layers otherwise 12

12a. Shrub layer mostly *Betula glandulosa*; herb layer mostly *Calamagrostis canadensis* and *Sanguisorba stipulata* ..... ***Pinus contorta* var. *latifolia / Calamagrostis canadensis*** (Crowe et al. 2004: 462; NS)
12b. Shrub and herb layers otherwise 13

13a. Shrub layer mostly *Arctostaphylos uva-ursi* and *Ribes montigenum* ..... ***Pinus contorta* var. *latifolia / Arctostaphylos uva-ursi - Ribes montigenum*** (Crowe et al. 2004: 465)
13b. Shrub layer scant or absent 14

14. Herb layer mainly one of the following species, usually with at least 20% cover:
Carex angustata ..... ***Pinus contorta* var. *latifolia / Carex (aquatilis* var. *aquatilis, angustata)*** (Crowe et al. 2004: 457)
Carex aquatilis ..... ***Pinus contorta* var. *latifolia / Carex* (*aquatilis* var. *aquatilis, angustata*)** (Crowe et al. 2004: 459)
Deschampsia cespitosa ..... ***Pinus contorta* var. *latifolia / Deschampsia cespitosa*** (Crowe et al. 2004: 463; NS)

K. *Pinus ponderosa*:

1a. *Picea engelmannii conspicuous* ..... ***Abies grandis / Symphoricarpos albus*** (Crowe et al. 2004: 307)
1b. Tree layer otherwise 2

2a. *Larix occidentalis* and *Pinus ponderosa* conspicuous; shrub layer with *Spiraea douglasii* ..... ***Pinus ponderosa - Pinus contorta var. latifolia / Spiraea douglasii - Symphoricarpos albus*** (Crowe et al. 2004: 373)
2b. Tree layer mainly *Pinus ponderosa* 3

3a. Shrub layer with *Crataegus douglasii and Symphoricarpos albus* .....
Pinus ponderosa / Crataegus douglasii - Symphoricarpos albus (Crowe et al. 2004: 324; Wells 2006: 60)
3b. *Crataegus douglasii* absent ..... ***Pinus ponderosa / Symphoricarpos albus*** (Crowe et al. 2004: 321)

L. *Populus tremuloides*:

1a. *Pinus contorta* conspicuous.....2
1b. *Pinus contorta* scant or absent .....

2a. Shrub layer mostly *Spiraea douglasii*.....3
2b. *Spiraea douglasii* scant or absent.....4
..... ***Populus tremuloides / Geum macrophyllum - Maianthemum stellatum*** (Crowe et al. 2004: 406)

3a. Graminoids mostly *Carex angustata* ..... ***Populus tremuloides - Pinus contorta var. latifolia / Spiraea douglasii / Carex angustata*** (Crowe et al. 2004: 392, 454)
3b. Graminoids and forbs scant.....
..... ***Populus tremuloides - Pinus contorta var. latifolia / Spiraea douglasii*** (Crowe et al. 2004: 390)

4a. Shrub layer mostly *Symphoricarpos albus*.....5
4b. Shrub layer otherwise 6

5a. Graminoids mostly *Poa pratensis* and *Elymus glaucus* .....
..... ***Populus tremuloides / Symphoricarpos albus*** (Crowe et al. 2004: 401)
5b. Graminoids mostly *Carex obnupta*..... ***Populus tremuloides / Carex obnupta*** (Christy 2004: 33)

6a. Shrub layer mostly lacking 7
6b. Shrub layer present.....10

7a. Graminoids mostly *Carex pellita*..... ***Populus tremuloides / Carex pellita*** (Crowe et al. 2004: 385)
7b. Graminoids otherwise 8

8a. Graminoids mostly *Calamagrostis canadensis*.....
..... ***Populus tremuloides / Calamagrostis canadensis*** (Crowe et al. 2004: 388; NS)
8b. Graminoids otherwise 9

9a. Graminoids mostly *Elymus glaucus*..... ***Populus tremuloides / Elymus glaucus*** (Crowe et al. 2004: 404)
9b. Graminoids a mix of *Carex aquatilis* var. *aquatilis*, *Calamagrostis canadensis, Agrostis exarata*, and *Elymus glaucus* ..... **Populus *tremuloides / Carex aquatilis var. aquatilis*** (Crowe et al. 2004: 384)

10. Shrub layer mainly one of the following species, usually with at least 20% cover:
Alnus incana..... ***Populus tremuloides / Alnus incana*** (Crowe et al. 2004: 395)
Betula occidentalis..... ***Populus tremuloides / Betula occidentalis*** (Crowe et al. 2004: 398)
Cornus sericea ..... ***Populus tremuloides / Cornus sericea*** (Crowe et al. 2004: 396)
Prunus virginiana and *Salix scouleriana*.....
..... ***Populus tremuloides / Prunus virginiana*** (Crowe et al. 2004: 399)
Salix lemmonii ..... ***Populus tremuloides / Salix lemmonii*** (Crowe et al. 2004: 397)

M. *Populus trichocarpa*:
1a. Tree layer mixed with *Alnus rhombifolia* .....
..... ***Populus trichocarpa - Alnus rhombifolia*** (Crowe et al. 2004: 331; NS)
1b. Tree layer otherwise.....2

2a. Tree layer mixed with *Pseudotsuga menziesii*; shrub layer a mix of *Acer circinatum, Corylus cornuta, Physocarpus capitatus, Prunus virginiana,* and *Symphoricarpos albus*.....

..... ***Populus trichocarpa / Acer circinatum*** (Crowe et al. 2004: 342)
2b. Tree and shrub layer otherwise 3

3a. Tree layer with various combinations of *Abies grandis*, *Alnus rhombifolia*, and *Pinus ponderosa* .....
.....***Populus trichocarpa / Philadelphus lewisii*** (Crowe et al. 2004: 333)
3b. Tree layer otherwise 4

4a. Tree layer mixed with *Abies grandis*; shrub layer mostly *Crataegus douglasii* and *Symphoricarpos albus*...
..... ***Abies grandis / Crataegus douglasii / Carex leptopoda*** (Wells 2006: 51)
4b. Tree and shrub layers otherwise 5

5a. Tree layer a mix of various combinations of *Abies grandis, Acer macrophyllum, Alnus rubra, Fraxinus latifolia, Pseudotsuga menziesii,* and *Thuja plicata* 6
5b. Tree layer mostly *Populus trichocarpa* 12

6a. Shrub layer mostly *Corylus cornuta* or *Corylus* frequent to codominant 7
6b. *Corylus cornuta* subordinate, scant, or absent 8

7a. Herb layer mostly *Polystichum munitum*.....
..... ***Hardwood / Corylus cornuta / Polystichum munitum*** (McCain 2004: 141, 146)
7b. Herb layer mostly *Hydrophyllum tenuipes* .....
(*Fraxinus latifolia - Populus trichocarpa*) / *Corylus cornuta / Hydrophyllum tenuipes* (McCain 2004: 257)

8a. Shrub layer mostly *Rubus spectabilis* or *Rubus* frequent to codominant 9
8b. Shrub layer mostly *Symphoricarpos albus* 10

9a. *Symphoricarpos albus* codominant or conspicuous in shrub layer .....
.....**(*Fraxinus latifolia - Populus trichocarpa*) / *Symphoricarpos albus - Rubus spectabilis*** (McCain 2004: 271)
9b. *Symphoricarpos albus* scant or absent .....
.....**(*Alnus rubra - Populus trichocarpa*) / *Rubus spectabilis / Hydrophyllum tenuipes*** (McCain 2004: 269)

10a. Herb layer mostly *Equisetum hyemale* .....
.....***Populus trichocarpa / Equisetum hyemale*** (McCain 2004: 256)
10b. Herb layer otherwise 11

11a. Herb layer mostly *Maianthemum stellatum*.....
..... **Forested *Symphoricarpos albus / Maianthemum stellatum*** (McCain 2004: 281)
11b. Herb layer with *Carex leptopoda*, *Hydrophyllum tenuipes*, and *Urtica dioica* ssp. *gracilis* frequent to codominant.....
(*Acer macrophyllum - Populus trichocarpa*) / *Symphoricarpos albus / Urtica dioica* (McCain 2004: 254, 261, 263, 279)

12a. Shrub layer mostly *Acer glabrum* and *Symphoricarpos albus* .....
..... ***Populus trichocarpa / Acer glabrum*** (Crowe et al. 2004: 343)
12b. Shrub layer otherwise 13

13a. Shrub layer mostly *Alnus incana* or mixed with *Cornus sericea* .....
.....***Populus trichocarpa / Alnus incana*** (Crowe et al. 2004: 339, 349, 350; Wells 2006:64; NS)
13b. Shrub layer otherwise 14

14a. Shrub layer mostly *Cornus sericea*; herb layer scant, with *Athyrium filix-femina*, *Carex leptopoda*, *Lysichiton americanus*.....
..... ***Populus trichocarpa / Cornus sericea / Lysichiton americanus*** (Christy 2004: 32; NS)
14b. Shrub and herb layer otherwise 15

15a. Shrub layer mostly *Philadelphus lewisii* or mixed with *Betula occidentalis* or *Crataegus douglasii* 16
15b. Shrub layer otherwise 18

16a. Shrub layer mostly *Philadelphus lewisii* ..... ***Populus trichocarpa* alluvial bar** (Crowe et al. 2004: 325)
16b. Shrub layer mixed with *Betula occidentalis* or *Crataegus douglasii* 17

17a. *Crataegus douglasii* absent ..... ***Populus trichocarpa / Betula occidentalis*** (Crowe et al. 2004: 335)
17b. *Betula occidentalis* absent ..... ***Populus trichocarpa / Crataegus douglasii*** (Crowe et al. 2004: 337; NS)

18. Shrub layer mainly one of the following species, usually with at least 20% cover:
Salix lasiandra ..... ***Populus trichocarpa / Salix lasiandra* var. *caudata*** (Crowe et al. 2004: 328; NS)
Salix lasiolepis ..... ***Populus trichocarpa / Salix lasiolepis*** (Crowe et al. 2004: 327)
Symphoricarpos albus ..... ***Populus trichocarpa / Symphoricarpos albus*** (Murray 2000: 44; Crowe et al. 2004: 346; Wells 2006: 66)

N. *Pseudotsuga menziesii*:
1a. Tree layer mixed with *Acer macrophyllum* ..... ***Acer macrophyllum / Corylus cornuta / Polystichum munitum*** (McCain 2004: 242)
1b. Tree layer otherwise 2

2a. Tree layer with various combinations of *Abies grandis, Alnus rubra, Fraxinus latifolia, Populus trichocarpa,* and *Thuja plicata* 3
2b. Tree layer mainly *Pseudotsuga menziesii* 4

3a. Shrub layer mainly *Corylus cornuta* and *Acer circinatum* ..... ***Hardwood / Corylus cornuta / Polystichum munitum*** (McCain 2004: 141, 146)
3b. Shrub layer mainly *Symphoricarpos albus* and *Oemleria cerasiformis* ..... ***Forested Symphoricarpos albus / Maianthemum stellatum*** (McCain 2004: 281)

4a. Shrub layer a mix of *Acer glabrum, Physocarpus malvaceus,* and *Symphoricarpos albus* ..... ***Pseudotsuga menziesii / Acer glabrum*** (Crowe et al. 2004: 309; Wells 2006: 56; NS)
4b. Shrub layer otherwise 5

5a. Shrub layer mainly *Physocarpus malvaceus*; herb layer mainly *Trautvetteria caroliniensis* ..... ***Pseudotsuga menziesii / Trautvetteria caroliniensis*** (Crowe et al. 2004: 320)
5b. Shrub and herb layers otherwise 6

6a. Shrub layer scant ..... ***Pseudotsuga menziesii / Pteridium aquilinum*** (Crowe et al. 2004: 319)
6b. Shrub layer mainly *Symphoricarpos albus*, or mixed with other species 7

7a. Shrub layer mixed with one of the following species, usually with at least 20% cover:
Betula occidentalis ..... ***Pseudotsuga menziesii / Betula occidentalis*** (Crowe et al. 2004: 313)
Crataegus douglasii ..... ***Pseudotsuga menziesii / Crataegus douglasii - Symphoricarpos albus*** (Crowe et al. 2004: 315)
Holodiscus discolor ..... ***Pseudotsuga menziesii / Holodiscus discolor*** (Crowe et al. 2004: 312)
7b. Shrub layer mainly *Symphoricarpos albus* ..... ***Pseudotsuga menziesii / Symphoricarpos albus*** (Crowe et al. 2004: 317; Wells 2006: 58)

O. *Thuja plicata*:
1a. Tree layer mostly *Thuja plicata* or mixed with *Alnus rubra* 2
1b. Tree layer with various combinations of *Abies amabilis, Abies grandis, Alnus rubra, Fraxinus latifolia, Picea engelmannii, Populus trichocarpa, Pseudotsuga menziesii,* and *Tsuga heterophylla* 6

2a. Shrub layer mostly *Oplopanax horridus* and *Rubus spectabilis* ..... ***Thuja plicata / Oplopanax horridus - Rubus spectabilis*** (McCain 2004: 165)

2b. Shrub layer mostly *Rubus spectabilis*; *Oplopanax horridus* scant or absent 3

3a. *Maianthemum stellatum* conspicuous in herb layer .....
..... ***Thuja plicata / Maianthemum stellatum*** (McCain 2004: 285)
3b. Herb layer otherwise 4

4a. *Lysichiton americanus* scant or absent in herb layer .....
..... ***Thuja plicata / Rubus spectabilis / Oxalis*** (McCain 2004: 131)
4b. *Lysichiton americanus* conspicuous in herb layer 5

5a. *Oxalis* scant or absent in herb layer .....
..... ***Thuja plicata / Lysichiton americanus*** (Christy 2004: 34)
5b. *Oxalis trilliifolia* (or *O. oregana*) abundant in herb layer .....
..... ***Thuja plicata / Rubus spectabilis / Lysichiton americanus - Oxalis*** (McCain 2004: 173)

6a. Shrub layer mainly *Symphoricarpos albus* and *Oemleria cerasiformis* .....
..... ***Forested Symphoricarpos albus / Maianthemum stellatum*** (McCain 2004: 281)
6b. Shrub layer otherwise 7

7a. Tree and shrub layer scant ..... ***Thuja plicata / (Lysichiton americanus)*** (Murray 2000: 45)
7b. Tree and shrub layer otherwise 8

8a. Shrub layer mostly *Rubus spectabilis*, often with *Ribes bracteosum* 9
7b. Shrub layer otherwise 10

9a. Shrub layer with *Corylus cornuta* ..... ***Acer macrophyllum / Corylus cornuta / Polystichum munitum*** (McCain 2004: 242)
9b. *Corylus cornuta* scant or absent 10

10a *Oxalis trilliifolia* (or *O. oregana*) conspicuous in herb layer.....
..... ***Alnus rubra / Ribes bracteosum - Rubus spectabilis / Oxalis*** (McCain 2004: 105)
10b. *Tolmiea menziesii* conspicuous in herb layer .....
... ***Alnus rubra - Acer macrophyllum / Ribes bracteosum - Rubus spectabilis / Tolmiea menziesii*** (McCain 2004: 80)

P. *Tsuga heterophylla*:
1a. Shrub layer with *Rhododendron columbianum* .....
Tsuga heterophylla / Rhododendron columbianum / Carex obnupta - Lysichiton americanus (Christy 2004: 35; NS)
1b. *Rhododendron columbianum* absent.....
..... ***Tsuga heterophylla / Acer circinatum - Corylus cornuta / Polystichum munitum / Oxalis*** (McCain 2004: 143)

II. SHRUBLAND ASSOCIATIONS

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

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

Shrub layer with one of the following species with highest frequency or cover, usually at least 20%, or highest cover available in layer:

Acer circinatum ..... A
Acer glabrum ..... B
Allenrolfea occidentalis ..... ***Allenrolfea occidentalis*** (NS)
Alnus incana C
Alnus viridis ssp. *sinuata* ..... D
Artemisia cana ssp. *bolanderi* ..... E
Artemisia tridentata ssp. *vaseyana* ..... ***Artemisia tridentata ssp. vaseyana / Poa cusickii*** (Crowe et al. 2004: 236)
Betula glandulosa ..... F
Betula occidentalis ..... G
Celtis reticulata ..... ***Celtis reticulata - Philadelphus lewisii*** (Crowe et al. 2004: 187; Wells 2006: 116, 118)
Cornus sericea ..... H
Corylus cornuta ..... ***Acer circinatum - Corylus cornuta / Oxalis*** (McCain 2004: 231)
Crataegus douglasii I
Dasiphora fruticosa ..... J
Gaultheria shallon ..... K
Kalmia microphylla L
Lonicera caerulea ..... Key to **Herbaceous Associations**
Lonicera involucrata ..... ***Lonicera involucrata / Potentilla anserina*** (Brophy 2007)
Malus fusca ..... M
Myrica gale ..... N
Oplopanax horridus ..... O
Philadelphus lewisii ..... ***Philadelphus lewisii*** (Crowe et al. 2004: 186)
Phyllodoce empetriformis ..... P
Rhamnus alnifolia ..... ***Rhamnus alnifolia / Mertensia paniculata*** (Crowe et al. 2004: 225)
Rhododendron columbianum ..... Q
Rhododendron occidentale ..... ***Rhododendron occidentale*** (Titus 1996-1998)
Ribes bracteosum ..... R
Ribes hudsonianum ..... [see *Ribes lacustre*]
Ribes lacustre ..... S
Rosa gymnocarpa ..... Key to **Herbaceous Associations**
Rosa nutkana ..... ***Rosa nutkana / Deschampsia cespitosa*** (Pendergrass 1989)
Rosa pisocarpa ..... Key to **Herbaceous Associations**
[*Rubus bifrons*] ..... **[*Rubus bifrons*]** (Wells 2006: 124)
Rubus parviflorus ..... ***Rubus parviflorus / Achlys triphylla*** (McCain 2004: 76)
Rubus spectabilis ..... T
Salix boothii ..... U
Salix commutata V
Salix drummondiana ..... ***Salix drummondiana / Senecio triangularis*** (Wells 2006: 90)
Salix eastwoodiae ..... W
Salix exigua X
Salix farriae ..... Y
Salix geyeriana ..... Z
Salix hookeriana ..... AA
Salix lasiandra ..... AB
Salix lasiolepis ..... ***Salix lasiolepis - Rosa woodsii - Cornus sericea*** (Crowe et al. 2004: 301)
Salix lemmonii ..... AC
Salix melanopsis ..... ***Salix melanopsis*** (Crowe et al. 2004: 247)
Salix pedicellaris ..... ***Salix pedicellaris / (Carex aquatilis* var. *dives*)** (Murray 2000: 35)
Salix petrophila ..... AD
Salix planifolia var. *planifolia* ..... ***Salix planifolia* var. *planifolia* / (*Carex aquatilis* var. *dives*)** (Murray 2000: 36)
Salix prolixa ..... ***Salix prolixa - Rosa woodsii*** (Crowe et al. 2004: 296)
Salix scouleriana ..... ***Salix scouleriana*** (Crowe et al. 2004: 300)
Salix sitchensis ..... AE

Sambucus racemosa..... ***Chrysosplenium glechomifolium*** (McCain 2004: 188)
Sarcobatus vermiculatus ..... AF
Spiraea douglasii..... AG
Vaccinium caespitosum..... AH
Vaccinium macrocarpon ..... ***Vaccinium uliginosum / Carex obnpta*** (Christy 2004: 63)
Vaccinium ovalifolium ..... AI
Vaccinium oxycoccos .....
..... ***Vaccinium uliginosum / Dodecatheon jeffreyi - Caltha leptosepala*** (Christy 2004: 65)
Vaccinium uliginosum..... AJ

A. *Acer circinatum*:

1a. Codominant with *Corylus cornuta* ..... ***Acer circinatum - Corylus cornuta / Oxalis*** (McCain 2004: 231)
1b. Codominant with *Oplopanax horridus* ..... ***Acer circinatum - Oplopanax horridus*** (Murray 2000: 23)

B. *Acer glabrum*:

1a. *Philadelphus lewisii* and *Symphoricarpos albus* conspicuous in shrub layer; *Amelanchier alnifolia* and *Prunus virginiana* absent..... ***Acer glabrum*** (Wells 2006: 114)
1b. *Amelanchier alnifolia and Prunus virginiana* conspicuous in shrub layer; *Philadelphus lewisii* absent, ... *Symphoricarpos albus* present but with lower cover .....
..... ***Acer glabrum - Amelanchier alnifolia - Prunus virginiana*** (Crowe et al. 2004: 184)

C. *Alnus incana*:

1a. Shrub layer mostly *Alnus incana* 2
1b. *Alnus incana* codominant or other shrub species conspicuous 3

2a. Herb layer with one of the following species dominant, usually with at least 20% cover, but sometimes less in heavily shaded or seasonally flooded stands:
Athyrium filix-femina..... ***Alnus incana / Athyrium filix-femina*** (Crowe et al. 2004: 201)
Calamagrostis canadensis ..... ***Alnus incana / Calamagrostis canadensis*** (Crowe et al. 2004: 198)
Carex amplifolia .....
.... ***Alnus incana - Betula occidentalis / Carex amplifolia*** (Crowe et al. 2004: 193; Wells 2006: 120)
Carex pellita.....
***Alnus incana / Carex* (*aquatilis, lenticularis, luzulina, pellita*) Wet Shrubland** (Crowe et al. 2004: 197)
Carex utriculata..... ***Alnus incana / Carex (aquatilis, lenticularis, luzulina, pellita)* Wet Shrubland** (Crowe et al. 2004: 199; NS)
Equisetum arvense ..... ***Alnus incana / Equisetum arvense*** (Crowe et al. 2004: 204; Wells 2006: 104)
Glyceria striata..... ***Alnus incana / Glyceria striata*** (Crowe et al. 2004: 206; McCain et al. 2014: 62; Wells 2006: 104)
Gymnocarpium disjunctum.. ***Alnus incana* / Mesic Forbs Wet Shrubland** (Crowe et al. 2004: 209; NS)
Heracleum maximum..... ***Alnus incana* / Mesic Forbs Wet Shrubland** (Crowe et al. 2004: 210; NS)
Lysichiton americanus.... ***Alnus incana* / Mesic Forbs Wet Shrubland** (Murray 2000: 30; Christy 2004: 36; NS)
Scirpus microcarpus ..... ***Alnus incana* / Mesic Forbs Wet Shrubland** (Crowe et al. 2004: 195; NS)
Senecio triangularis ..... ***Alnus incana* / Mesic Forbs Wet Shrubland** (Murray 2000: 30; NS)

3a. Shrub layer with *Cornus sericea* codominant or conspicuous 4
3b. Shrub layer with one or more of the following species codominant or conspicuous, usually with at least 20% cover:
Betula occidentalis..... ***Alnus incana - Betula occidentalis*** (Crowe et al. 2004: 223; NS)
Physocarpus capitatus..... ***Alnus incana - Physocarpus capitatus / Equisetum arvense - Elymus glaucus*** (Crowe et al. 2004: 219)
Ribes hudsonianum .....
..... ***Alnus incana - Ribes lacustre - Ribes hudsonianum*** (Crowe et al. 2004: 214)
Ribes lacustre..... ***Alnus incana - Ribes lacustre - Ribes hudsonianum*** (Crowe et al. 2004: 214)
Spiraea douglasii ..... ***Alnus incana - Spiraea douglasii*** (Crowe et al. 2004: 212)

Symphoricarpos albus ..... ***Alnus incana - Symphoricarpos albus*** (Crowe et al. 2004: 220; Wells 2006: 105)

4a. *Philadelphus lewisii* codominant or conspicuous..... ***Alnus incana - Cornus sericea - Philadelphus lewisii*** (Crowe et al. 2004: 224)

4b. *Philadelphus lewisii* absent..... ***Alnus incana - Cornus sericea* ssp. *sericea*** (Crowe et al. 2004: 217; Wells 2006: 100, 102, 105; NS)

D. *Alnus viridis* ssp. *sinuata*:

1a. *Rubus spectabilis* conspicuous in shrub layer..... ***Alnus viridis* ssp. *sinuata* / *Rubus spectabilis*** (Murray 2000: 32; McCain 2004: 108)

1b. *Rubus spectabilis* scant or absent 2

2a. Herb layer with one or more of the following species codominant or conspicuous, usually with at least 20% cover:

Athyrium filix-femina ..... ***Alnus viridis* ssp. *sinuata* / *Athyrium filix-femina*** (Crowe et al. 2004: 241; Wells 2006: 99)

Cinna latifolia..... ***Alnus viridis* ssp. *sinuata* / *Cinna latifolia*** (Crowe et al. 2004: 244; Wells 2006: 99)

Heracleum maximum..... ***Alnus viridis* ssp. *sinuata* / *Heracleum maximum*** (Crowe et al. 2004: 239; Wells 2006: 97)

Lysichiton americanus..... ***Alnus viridis* ssp. *sinuata* / *Lysichiton americanus*** (Christy 2004: 37)

Scirpus microcarpus..... ***Alnus viridis* ssp. *sinuata* / *Scirpus microcarpus*** (Christy 2004: 38)

2b. Herb layer sparse..... ***Alnus viridis* ssp. *sinuata*** (McCain et al. 2014: 66)

E. *Artemisia cana* ssp. *bolanderi*:

Herb layer with one or more of the following species codominant or conspicuous:

Deschampsia cespitosa ..... ***Artemisia cana* ssp. *bolanderi* / *Deschampsia cespitosa*** (Crowe et al. 2004: 232; NS)

Eleocharis palustris ..... ***Artemisia cana* ssp. *bolanderi* / *Eleocharis palustris*** (NS)

Leymus cinereus ..... ***Artemisia cana* ssp. *bolanderi* / *Leymus cinereus*** (NS)

Muhlenbergia richardsonis ..... ***Artemisia cana* ssp. *bolanderi* / *Muhlenbergia richardsonis*** (NS)

Poa secunda ..... ***Artemisia cana ssp. bolanderi* / *Poa secunda*** (NS)

[*Poa pratensis*] ..... **[*Artemisia cana* ssp. *bolanderi* / *Poa pratensis*]** (NS)

F. *Betula glandulosa*:

1a. *Dasiphora fruticosa* present ..... ***Betula glandulosa - Dasiphora fruticosa* / *Kobresia simpliciuscula*** (Crowe et al. 2004: 271)

1b. *Dasiphora fruticosa* absent..... 2

2a. *Vaccinium uliginosum* with at least 20% cover ..... ***Vaccinium uliginosum* / *Dodecatheon jeffreyi - Caltha leptosepala*** (Christy 2004: 65)

2b. *Vaccinium uliginosum* with < 20% cover or absent ..... ***Betula glandulosa* / *Carex aquatilis* var. *dives*** (Murray 2000: 44; Christy 2004: 39)

G. *Betula occidentalis*:

1a. Mixed with *Alnus incana*; herb layer mainly *Carex amplifolia*; associated with springs..... ***Alnus incana - Betula occidentalis* / *Carex amplifolia*** (Crowe et al. 2004: 193; Wells 2006: 120)

1b. *Alnus incana* and *Carex amplifolia* absent; associated with streams 2

2a. *Philadelphus lewisii* primary codominant shrub; herb layer sparse ..... ***Betula occidentalis - Philadelphus lewisii*** (Crowe et al. 2004: 174; NS)

2b. Additional shrub species conspicuous with combined cover of at least 20%: *Acer glabrum, Amelanchier*

alnifolia, Crataegus douglasii, Holodiscus discolor, Physocarpus malvaceus, Sambucus nigra ssp. *caerulea, Symphoricarpos albus*; herb layer diverse..... ***Betula occidentalis - Philadelphus lewisii - Symphoricarpos albus*** (Crowe et al. 2004: 175; Wells 2006: 106; NS)

H. *Cornus sericea*:

1a. Herb layer mostly *Lysichiton americanus* ..... ***Cornus sericea / Lysichiton americanus*** (Murray 2000: 33; Christy 2004: 40)

1b. *Lysichiton americanus* absent..... ***Cornus sericea*** (Crowe et al. 2004: 165, 167, 169, 171, 172, 226; Wells 2006: 108; NS)

I. *Crataegus douglasii*:

1a. Shrub layer with one of the following species usually with at least 20% cover, but sometimes less in heavily shaded or seasonally flooded stands:

Rhamnus alnifolia ..... ***Crataegus douglasii - Rhamnus alnifolia*** (Crowe et al. 2004: 177)

Rosa woodsii .....***Crataegus douglasii - Rosa woodsii*** (Crowe et al. 2004: 179)

Symphoricarpos albus ..... ***Crataegus douglasii - Symphoricarpos albus*** (Crowe et al. 2004: 180; Wells 2006: 110, 113)

1b. Additional shrub species conspicuous with combined cover of at least 20%: *Acer glabrum, Holodiscus discolor, Philadelphus lewisii, Physocarpus malvaceus, Prunus virginiana, Symphoricarpos albus, Toxicodendron rydbergii*..... ***Crataegus douglasii - Philadelphus lewisii - Physocarpus malvaceus - Acer glabrum - Prunus virginiana*** (Crowe et al. 2004: 182)

J. *Dasiphora fruticosa*:

1a. Shrub layer monotypic *Dasiphora fruticosa*..... ***Dasiphora fruticosa*** (Crowe et al. 2004: 229)

1b. Shrub layer mixed with *Betula glandulosa*..... ***Dasiphora fruticosa - Betula glandulosa*** (Wells 2006: 96)

K. *Gaultheria shallon*:

1a. *Vaccinium uliginosum* and *Deschampsia cespitosa* present..... ***Vaccinium uliginosum / Deschampsia cespitosa - Carex obnupta*** (Christy 2004: 64)

1b. *Vaccinium uliginosum* and *Deschampsia cespitosa* absent..... ***Rhododendron columbianum - Gaultheria shallon / Carex obnupta*** (Christy 2004: 42)

L. *Kalmia microphylla*:

1a. *Vaccinium uliginosum* with at least 20% cover..... ***Vaccinium uliginosum / Dodecatheon jeffreyi - Caltha leptosepala*** (Christy 2004: 65)

1b. *Vaccinium uliginosum* with < 20% cover or absent..... 2

2a. Graminoids scant, usually *Carex aquatilis* var. *dives* and *Carex echinata*..... ***Kalmia microphylla / Carex aquatilis* var. *dives*** (Christy 2004: 41)

2b. Graminoids conspicuous, usually *Carex* spp..... 3

3a. Graminoids dominated by *Carex nigricans*..... ***Kalmia microphylla / Carex nigricans*** (Crowe et al. 2004: 264; Wells 2006: 92)

3b. Graminoids dominated by *Carex scopulorum*..... ***Kalmia microphylla / Carex scopulorum*** (NS)

M. *Malus fusca*:

1a. *Salix hookeriana* conspicuous in plot or evident adjacent to plot; coastal..... ***Salix hookeriana - Malus fusca / Carex obnupta - Lysichiton americanus*** (Christy 2004: 54)

1b. *Salix hookeriana* absent; not coastal .....***Malus fusca / Carex obnupta*** (Christy 2004: 49)

N. *Myrica gale*:

1a. *Rhododendron columbianum* usually with at least 20% cover..... ***Rhododendron columbianum - Myrica gale*** (Christy 2004: 47)

1b. *Rhododendron columbianum usually* with < 20% cover or absent.....

.....***Myrica gale* / *Carex aquatilis* var. *dives*** (Murray 2000: 33; Christy 2004: 50; NS)

O. *Oplopanax horridus*:

1a. *Rubus spectabilis* or *Ribes bracteosum* conspicuous..... 2
1b. *Rubus spectabilis* or *Ribes bracteosum* absent .....***Acer circinatum - Oplopanax horridus*** ..... (Murray 2000: 23)

2a. *Rubus spectabilis* codominant.....***Oplopanax horridus - Rubus spectabilis*** (McCain 2004: 158)
2b. *Ribes bracteosum* codominant..... ***Oplopanax horridus - Ribes bracteosum*** (McCain 2004: 214)

P. *Phyllodoce empetriformis*:

1a. Shrub layer mixed with *Vaccinium deliciosum*; herb layer mainly *Juncus drummondii*.....
..... ***Phyllodoce empetriformis / Juncus drummondii*** (Crowe et al. 2004: 265)
1b. Shrub layer mainly *Phyllodoce empetriformis*..... 2

2a. Herb layer mainly *Luetkea pectinata*..... ***Phyllodoce empetriformis*** (McCain et al. 2014: 206)
2b. Herb layer mainly *Potentilla flabellifolia, Carex spectabilis,* and *Lupinus latifolia*.....
.....***Phyllodoce empetriformis / Potentilla flabellifolia*** (Wells 2006: 94; McCain et al. 2014: 215)

Q. *Rhododendron columbianum*:

1a. Shrub layer sometimes with *Kalmia microphylla* and *Phyllodoce empetriformis*; graminoids dominated by *Carex scopulorum* and *Calamagrostis canadensis*.....
.....***Rhododendron columbianum / Carex scopulorum*** (Crowe et al. 2004: 267; Wells 2006: 96)
1b. Shrub layer and graminoids otherwise.....*2*

2a. *Gaultheria shallon* with at least 20% cover .....
.....***Rhododendron columbianum - Gaultheria shallon / Carex obnupta*** (Murray 2000: 33; Christy 2004: 42; NS)
2b. *Gaultheria shallon* with < 20% cover or absent.....*3*

3a. *Myrica gale* with at least 20% cover.....
..... ***Rhododendron columbianum - Myrica gale / Sphagnum*** (Christy 2004: 47; NS)
3b. *Myrica gale* with < 20% cover or absent.....*4*

4a. *Carex obnupta* most conspicuous species in herb layer or evident adjacent to plot .....
.....***Rhododendron columbianum / Carex obnupta / Sphagnum*** (Christy 2004: 43; NS)
4b. *Carex obnupta* not most conspicuous species in herb layer *5*

5a. *Darlingtonia californica* present or evident adjacent to plot; *Sanguisorba officinalis* absent.....
.....***Rhododendron columbianum / Darlingtonia californica / Sphagnum*** (Christy 2004: 45; NS)
5b. *Darlingtonia californica* absent; *Sanguisorba officinalis* present.....
.....***Rhododendron columbianum / Sanguisorba officinalis*** (Christy 2004: 48)

R. *Ribes bracteosum*:

1a. *Oplopanax horridus* and *Rubus spectabilis* with > 10% cover.....
.....***Oplopanax horridus - Rubus spectabilis*** (McCain 2004: 158)
1b. *Oplopanax horridus* scant or absent..... 2

2a. Herb layer mostly *Petasites frigidus*.....***Ribes bracteosum / Petasites frigidus*** (McCain 2004: 68)
2b. *Petasites frigidus* scant or absent..... 3

3a. Herb layer mostly *Oxalis trilliifolia* (or *O. oregana*), *Polystichum munitum*, and *Tolmiea menziesii*.....
..... ***Ribes bracteosum - Rubus spectabilis / Tiarella trifolia*** (McCain 2004: 211)
3b. Herb layer otherwise 4

4a. Herb layer mostly *Athyrium filix-femina* and *Tiarella trifoliata*.....
..... ***Ribes bracteosum - Rubus spectabilis / Tiarella trifoliata - Mitella ovalis*** (McCain 2004: 94)

4b. Herb layer otherwise.....5

5a. Herb layer mostly *Oxalis trilliifolia* (or *O. oregana*) and *Athyrium filix-femina*.....
.....***Ribes bracteosum - Rubus spectabilis / Oxalis*** (Murray 2000: 34; McCain 2004: 102)
5b. Herb layer otherwise.....6

6a. Chrysosplenium glechomifolium conspicuous in herb layer.....
.....***Ribes bracteosum - Rubus spectabilis / Chrysosplenium glechomifolium*** (McCain 2004: 200)
6b. *Stachys* conspicuous in herb layer.....
.....***Ribes bracteosum - Rubus spectabilis / Stachys*** (McCain 2004: 207)

S. *Ribes lacustre*:
1a. Herb layer mostly *Cinna latifolia*.....
.....***Ribes lacustre - Ribes hudsonianum / Cinna latifolia*** (Crowe et al. 2004: 189)
1b. Herb layer mostly *Glyceria striata* .....
..... ***Ribes lacustre - Ribes hudsonianum / Glyceria striata*** (Crowe et al. 2004: 191)

T. *Rubus spectabilis*:
1a. Usually codominant with *Vaccinium ovalifolium*.....2
1b. *Vaccinium ovalifolium* scant or absent 3

2a. Herb layer mostly *Lysichiton americanus* .....
..... ***Rubus spectabilis - Vaccinium ovalifolium / Lysichiton americanus*** (McCain 2004: 170).
2b. Herb layer mostly *Polystichum munitum and Blechnum spicant* .....
..... ***Rubus spectabilis - Vaccinium ovalifolium / Polystichum munitum*** (McCain 2004: 239).

3a. *Oplopanax horridus* and *Ribes bracteosum* with > 10% cover.....
..... ***Oplopanax horridus - Rubus spectabilis*** (McCain 2004: 158)
3b. *Oplopanax horridus* scant or absent, *Ribes bracteosum* often present 4

4a. Herb layer mostly *Athyrium filix-femina* and *Tiarella trifoliata*.....
.....***Ribes bracteosum - Rubus spectabilis / Tiarella trifoliata - Mitella ovalis*** (McCain 2004: 94)
4b. Herb layer otherwise.....5

5a. *Oxalis trilliifolia* (or *O. oregana*) and *Athyrium filix-femina* conspicuous.....6
5b. *Oxalis* not conspicuous.....***Rubus spectabilis / Tolmiea menziesii*** (McCain 2004: 86)

6a. *Ribes bracteosum* codominant.....7
6b. *Ribes bracteosum* scant or absent.....8

7a. *Chrysosplenium glechomifolium* conspicuous .....
.....***Ribes bracteosum - Rubus spectabilis / Chrysosplenium glechomifolium*** (McCain 2004: 200)
7b. *Chrysosplenium glechomifolium* scant or absent.....
.....***Ribes bracteosum - Rubus spectabilis / Oxalis*** (McCain 2004: 102)

8a. *Athyrium filix-femina* and *Tolmeia menziesii* conspicuous .....
.....***Rubus spectabilis / Tolmeia menziesii - Oxalis*** (McCain 2004: 221, 225)
8a. *Polystichum munitum* conspicuous 9

9a. *Tsuga heterophylla* present or peripheral.....***Rubus spectabilis / Oxalis*** (McCain 2004: 126)
9b. *Tsuga heterophylla* absent.....10

10a. *Alnus rubra* and *Pseudotsuga menziesii* present or peripheral .....
.....***Rubus spectabilis - Acer circinatum*** (McCain 2004: 244)
10b. *Acer macrophyllum* and *Alnus rubra present or peripheral* .....
..... ***Rubus spectabilis / Polystichum munitum*** (McCain 2004: 234)

U. *Salix boothii*:

1b. Shrub layer monotypic *Salix boothii* 2
1a. Shrub layer otherwise 3

2a. Graminoids mostly *Carex scopulorum*, sometimes with *Carex utriculata* or *Eleocharis quinqueflora*; *Deschampsia cespitosa* scant or absent ..... ***Salix boothii / Carex scopulorum*** (Crowe et al. 2004: 253; Wells 2006: 78)
2b. Graminoids mostly *Deschampsia cespitosa,* usually with at least traces of *Muhlenbergia filiformis* and *Phleum alpinum; Carex scopulorum* scant ..... ***Salix boothii / Deschampsia cespitosa*** (Crowe et al. 2004: 257)

3a. *Salix commutata* codominant 4
3b. Shrub layer otherwise 5

4a. Primary graminoid *Calamagrostis canadensis* ..... ***Salix boothii - Salix commutata / Calamagrostis canadensis*** (Crowe et al. 2004: 256; Wells 2006: 84)
4b. Primary graminoids *Deschampsia cespitosa* and *Carex scopulorum*..... **Salix/ mesic forb** (Wells 2006: 82)

5a. *Salix lemmonii* codominant or conspicuous; primary graminoid *Glyceria striata*..... ***Salix boothii - Salix lemmonii / mesic forb*** (Crowe et al. 2004: 289)
5b. Shrub layer otherwise 6

6a. *Salix farriae* conspicuous 7
6b. *Salix farriae* sparse or absent 8

7a. Herb layer dominated by *Allium validum*, *Carex scopulorum*, and *Deschampsia cespitosa* ..... ***Salix farriae / Allium validum - Carex scopulorum*** (Crowe et al. 2004: 271; Wells 2006: 89)
7b. Herb layer dominated by *Carex aquatilis* ..... ***Salix farriae / Carex aquatilis*** (Crowe et al. 2004: 270; Wells 2006: 88)

8. *Salix geyeriana* codominant; primary graminoids one of the following, with at least 20% cover:
Carex angustata ..... ***Salix boothii - Salix geyeriana / Carex angustata*** (Crowe et al. 2004: 282)
Carex aquatilis var. *aquatilis* ..... ***Salix* (*boothii, geyeriana*) / *Carex aquatilis* var. *aquatilis*** (Crowe et al. 2004: 279)
Carex pellita ..... ***Salix boothii - Salix geyeriana / Carex pellita*** (Crowe et al. 2004: 284)
Carex utriculata ..... ***Salix boothii - Salix geyeriana / Carex utriculata*** (Crowe et al. 2004: 273)

V. *Salix commutata*:

1a. Sedges mostly *Carex aquatilis* var. *dives, Carex exsiccata*, or *Carex utriculata*..... ***Salix commutata*** (Murray 2000: 35)
1b. Sedges mostly *Carex nigricans* or *Carex scopulorum* 2

2a. Shrub layer may contain *Cassiope mertensiana*, *Kalmia microphylla*, or *Spiraea splendens*; graminoids mostly *Carex nigricans* ..... ***Salix commutata / Carex nigricans*** (Christy 2004: 51)
2b. Shrub layer may contain *Salix drummondiana, Salix eastwoodiae*, or *Salix sitchensis*; graminoids mostly *Carex scopulorum* ..... ***Salix commutata / Carex scopulorum*** (Crowe et al. 2004: 251; Wells 2006: 80)

W. *Salix eastwoodiae*:

1a. *Salix commutata* codominant or conspicuous; graminoids mostly *Carex utriculata* ..... ***Salix eastwoodiae - Salix commutata / Carex utriculata*** (Crowe et al. 2004: 255)
1b. *Salix boothii* codominant or conspicuous; graminoids otherwise 2

2a. Shrub layer may contain *Phyllodoce empetriformis* and *Kalmia microphylla*; graminoids mostly *Carex nigricans* ..... ***Salix eastwoodiae - Salix boothii / Carex nigricans*** (Crowe et al. 2004: 258)
2b. Shrub layer lacking *Phyllodoce empetriformis* and *Kalmia microphylla*; graminoids mostly *Carex aquatilis* and *Carex jonesii*..... ***Salix eastwoodiae - Salix boothii / Carex aquatilis*** (Crowe et al. 2004: 254)

X. *Salix exigua*:

1a. *Salix lasiandra* var. *lasiandra* sometimes codominant, *Cornus sericea* conspicuous; *Salix prolixa* absent .... ***Salix exigua - Salix lasiandra* var. *lasiandra* - *Cornus sericea*** (Crowe et al. 2004: 294)
1b. *Salix lasiandra* var. *lasiandra* and *Cornus sericea* sparse or absent; *Salix prolixa* often present 2

2a. Herb layer sparse and often weedy, with few or no species exceeding 10 % cover .... ***Salix exigua* dry alluvial bar** (Crowe et al. 2004: 291; Wells 2006: 86)
2b. Herb layer more robust, with most species exceeding 10 % cover.....3

3a. Graminoids nearly monotypic *Carex sheldonii*..... .....***Salix exigua / Carex sheldonii*** (Crowe et al. 2004: 303)
3b. Graminoids mainly *Eleocharis palustris* and *Schoenoplectus americanus* .... ***Salix exigua / Eleocharis palustris - Schoenoplectus americanus*** (Crowe et al. 2004: 293)

Y. *Salix farriae*:
1a. Herb layer dominated by *Allium validum*, *Carex scopulorum*, and *Deschampsia cespitosa*..... .....***Salix farriae / Allium validum - Carex scopulorum*** (Crowe et al. 2004: 271; Wells 2006: 89)
1b. Herb layer dominated by *Carex aquatilis*..... ..... ***Salix farriae / Carex aquatilis*** (Crowe et al. 2004: 270; Wells 2006: 88)

Z. *Salix geyeriana*:
1a. Herb layer dominated by *Calamagrostis canadensis*..... ..... ***Salix geyeriana / Calamagrostis canadensis*** (Crowe et al. 2004: 272)
1b. Herb layer otherwise.....2

2a. Shrub layer mostly *Salix geyeriana* 3
2b. Shrub layer with other species of *Salix codominant*.....5

3a. *Spiraea douglasii* may average of 20% cover; sedges include *Carex aquatilis* var. *dives, Carex obnupta,* or *Carex utriculata*..... .....***Salix geyeriana* - (*Spiraea douglasii*) / *Carex aquatilis* var. *dives*** (Murray 2000: 35)
3b. *Spiraea douglasii* scant or absent; sedges various.....4

4a. Graminoids at least 20 % *Carex aquatilis* var. *aquatilis, Carex aquatilis* var. *dives, Carex scopulorum, Carex nigricans, Carex utriculata,* or *Scirpus microcarpus* ....***Salix geyeriana* complex** (Christy 2004: 52)
4b. Graminoids at least 20 % *Carex nebrascensis* and *Deschampsia cespitosa*..... .....***Salix geyeriana / Deschampsia cespitosa - Carex nebrascensis*** (Crowe et al. 2004: 287)

5a. *Salix lemmonii* codominant or conspicuous.....6
5b. *Salix lemmonii* scant or absent 8

6a. Graminoids mostly *Carex aquatilis* var. *dives* and *Carex utriculata* ....***Salix geyeriana - Salix lemmonii / Carex aquatilis* var. *dives*** (Crowe et al. 2004: 276)
6b. Graminoids otherwise 7

7a. Graminoids mostly *Carex pellita* ....***Salix boothii - Salix geyeriana / Carex pellita*** (Crowe et al. 2004: 284)
7b. Graminoids mostly *Juncus balticus* ....***Salix geyeriana - Salix lemmonii / Juncus balticus*** (Crowe et al. 2004: 288)

8. Primary graminoid one of the following, with at least 20% cover:
Carex angustata ..... ***Salix boothii - Salix geyeriana / Carex angustata*** (Crowe et al. 2004: 282)
Carex aquatilis var. *aquatilis* ....***Salix boothii - Salix geyeriana / Carex aquatilis* var. *aquatilis*** (Crowe et al. 2004: 279)

Carex utriculata ..... ***Salix boothii - Salix geyeriana / Carex utriculata*** (Crowe et al. 2004: 273)

AA. *Salix hookeriana*:

1a. *Malus fusca* conspicuous in plot or evident adjacent to plot ..... ***Salix hookeriana - Malus fusca / Carex obnupta - Lysichiton americanus*** (Christy 2004: 54)

1b. *Malus fusca* absent 2

2a. Both *Carex obnupta* and *Lysichiton americanus* usually present in plot, or evident adjacent to plot; coastal ..... ***Salix hookeriana - Malus fusca / Carex obnupta - Lysichiton americanus*** (Christy 2004: 54)

2b. *Carex obnupta* usually present, *Lysichiton americanus* absent 3

3a. *Potentilla anserina* ssp. *pacifica* conspicuous; coastal ..... ***Salix hookeriana / Potentilla anserina* ssp. *pacifica* - *Carex obnupta*** (Christy et al. 1998)

3b. *Potentilla anserina* ssp. *pacifica* absent; not coastal ..... ***Salix hookeriana* - (*Salix sitchensis*)** (Christy 2004: 53)

AB. *Salix lasiandra*:

1a. *Salix sitchensis* present in plot or evident adjacent to plot 2

1b. *Salix sitchensis* absent 3

2a. *Salix sitchensis* usually with > 20% cover ..... ***Salix lasiandra* var. *lasiandra* - *Salix sitchensis* / *Lysichiton americanus*** (Christy 2004: 56)

2b. *Salix sitchensis* with < 20% cover or absent ..... ***Salix lasiandra* var. *lasiandra* / *Urtica dioica* ssp. *gracilis*** (Christy 2004: 55)

3a. *Salix prolixa* and *Cornus sericea* conspicuous; graminoids present but sparse, with cover of each < 10 % ..... ***Salix lasiandra* var. *lasiandra*** (Crowe et al. 2004: 297)

3b. *Salix prolixa* and *Cornus sericea* absent; wetland graminoids such as *Carex nebrascensis, Carex pellita, Eleocharis palustris, Juncus balticus*, and *Scirpus microcarpus* each with cover > 10 % ..... ***Salix lasiandra* var. *lasiandra* / wet graminoid** (Crowe et al. 2004: 299)

AC. *Salix lemmonii*:

1a. Shrub layer often with *Philadelphus lewisii, Ribes aureum*, or *Rosa woodsii*; primary graminoids, when present, *Poa pratensis* and *Hordeum brachyantherum* ..... ***Salix lemmonii - Rosa woodsii*** (Crowe et al. 2004: 302)

1b. Shrub layer otherwise; primary graminoid one of the following:

Carex aquatilis var. *dives* ..... ***Salix geyeriana - Salix lemmonii / Carex aquatilis* var. *dives*** (Crowe et al. 2004: 276)

Carex pellita ..... ***Salix boothii - Salix geyeriana / Carex pellita*** (Crowe et al. 2004: 284)

Glyceria striata ..... ***Salix boothii - Salix lemmonii / mesic forb*** (Crowe et al. 2004: 289)

Juncus balticus ..... ***Salix geyeriana - Salix lemmonii / Juncus balticus*** (Crowe et al. 2004: 288)

AD. *Salix petrophila*:

1a. Shrub layer mostly *Salix petrophila*; graminoids mostly *Carex subnigricans* and *Carex scopulorum* ..... ***Salix petrophila / Carex subnigricans*** (Crowe et al. 2004: 268)

1b. Shrub layer mixed *Salix petrophila, Salix boothii*, and *Salix farriae*; graminoids mostly *Eleocharis quinqueflora* ..... ***Salix petrophila - Salix boothii / Eleocharis quinqueflora*** (Crowe et al. 2004: 269; Wells 2006: 76)

AE. *Salix sitchensis*:

1a. Herb layer mostly *Petasites frigidus* ..... ***Salix sitchensis / Petasites frigidus*** (McCain 2004: 50)

1b. *Petasites frigidus* scant or absent 2

2a. Herb layer mostly *Equisetum*, though sometimes sparse ..... ***Salix sitchensis / Equisetum* (*arvense, telmateia*)** (Murray 2000: 36, 37)

2b. *Equisetum* usually absent 3

3a. *Salix sitchensis* usually with > 20% cover.....
Salix lasiandra* var. *lasiandra* - *Salix sitchensis* / *Lysichiton americanus (Murray 2000: 36; Christy 2004: 56)
3b. *Salix sitchensis* with < 20% cover or absent.....
..... ***Salix lasiandra* var. *lasiandra* / *Urtica dioica* ssp. *gracilis*** (Christy 2004: 55)

AF. *Sarcobatus vermiculatus*:

1a. Shrub layer mostly *Sarcobatus vermiculatus*.....*2*
1b. Shrub layer with *Atriplex confertifolia* .....
... ***Sarcobatus vermiculatus* / *Atriplex confertifolia* - (*Picrothamnus desertorum, Suaeda nigra*)** (NS)

2a. One the following grasses with highest frequency or cover:
Achnatherum hymenoides..... ***Sarcobatus vermiculatus* / *Achnatherum hymenoides*** (NS)
Distichlis spicata ..... ***Sarcobatus vermiculatus* / *Distichlis spicata*** (NS)
Leymus cinereus..... ***Sarcobatus vermiculatus* / *Leymus cinereus*** (NS)

2b. Herb layer with short shrub-like or often blackened forbs 3

3a. Herb layer mixed *Nitrophila occidentalis* and *Suaeda nigra* .....
..... ***Sarcobatus vermiculatus* / *Nitrophila occidentalis* - *Suaeda nigra*** (NS)
3b. Herb layer mostly *Suaeda nigra*, often sparse.....
..... ***Sarcobatus vermiculatus* / *Suaeda nigra*** (NS)

AG. *Spiraea douglasii*:

1a. *Vaccinium uliginosum, Deschampsia cespitosa*, or *Sphagnum* usually present or evident adjacent to plot.2
1b. *Vaccinium uliginosum* and *Deschampsia cespitosa* absent 4

2a. *Carex obnupta* conspicuous .....
..... ***Spiraea douglasii* - *Vaccinium uliginosum* / *Carex obnupta* - *Deschampsia cespitosa*** (Christy 2004: 59)
2b. *Carex obnupta* absent 3

3a. *Carex cusickii* and *Sphagnum* conspicuous or evident adjacent to plot.....
..... ***Spiraea douglasii* / *Sphagnum*** (Christy 2004: 60; NS)
3b. *Carex exsiccata* or *Carex aquatilis* var. *dives* conspicuous.....
..... ***Spiraea douglasii*** (in and W of Cascade Range) (Murray 2000: 37, 38; McCain et al. 2014: 120)

4a. *Salix hookeriana* conspicuous in plot or evident adjacent to plot .....
..... ***Salix hookeriana* - *Malus fusca* / *Carex obnupta* - *Lysichiton americanus*** (Christy 2004: 54)
4b. *Salix hookeriana* scant or absent..... 5

5a. *Calamagrostis canadensis, Glyceria striata, Rosa woodsii,* and *Scirpus microcarpus* conspicuous in herb layer..... ***Spiraea douglasii*** (E of Cascade Range) (Crowe et al. 2004: 228)
5b. Herb layer otherwise, usually depauperate 6

6a. *Viburnum edule* present in shrub layer.....
..... ***Spiraea douglasii* - *Viburnum edule* / *Viola palustris*** (Murray 2000: 38)
6b. *Viburnum edule* absent..... ***Spiraea douglasii*** (Christy 2004: 58)

AH. *Vaccinium caespitosum*:

1a. *Xerophyllum tenax* present or evident adjacent to plot, flooded openings absent.....
..... ***Vaccinium caespitosum* / *Xerophyllum tenax* - *Sanguisorba officinalis*** (Christy 2004: 62)
1b. *Xerophyllum tenax* absent, flooded openings present .....
..... ***Vaccinium caespitosum* / *Sanguisorba officinalis*** (Christy 2004: 61; NS)

AI. *Vaccinium ovalifolium*:

1a. *Alnus rubra* and *Abies amabilis* sometimes present; herb layer mostly *Lysichiton americanus*.....

.....***Rubus spectabilis - Vaccinium ovalifolium / Lysichiton americanus*** (McCain 2004: 170).
1b. Tree layer otherwise.....2

2a. Abies amabilis, Thuja plicata, or *Tsuga heterophylla* often present; moss layer sometimes with *Sphagnum* and *Polytrichum commune* conspicuous.....***Vaccinium ovalifolium*** (Murray 2000: 39)
2b. Tree layer absent or in seedling stage only.....3

3a. Herb layer usually with *Achlys triphylla* and *Cornus unalaschkensis* ..... ***Vaccinium ovalifolium*** (McCain 2004: 110)
3b. Herb layer mostly *Polystichum munitum and Blechnum spicant*.....
.....***Rubus spectabilis - Vaccinium ovalifolium / Polystichum munitum*** (McCain 2004: 239).

AJ. *Vaccinium uliginosum*:
1a. *Carex obnupta* conspicuous in herb layer.....2
1b. *Carex obnupta* scant or absent.....4

2a. *Spiraea douglasii* codominant or evident adjacent to plot.....
.....***Spiraea douglasii - Vaccinium uliginosum / Carex obnupta - Deschampsia cespitosa*** (Christy 2004: 59)
2b. *Spiraea douglasii* scant or absent.....3

3a. *Salix hookeriana* present or conspicuous adjacent to plot .....
..... ***Vaccinium uliginosum / Carex obnupta*** (Christy 2004: 63)
3b. *Salix hookeriana* absent .....
..... ***Vaccinium uliginosum / Deschampsia cespitosa*** (Christy 2004: 64; NS)

4a. Herb layer mixed forbs and graminoids, including *Dodecatheon jeffreyi, Caltha leptosepala, Triantha glutinosa, Carex aquatilis* var*. dives, Platanthera dilatata,* and *Deschampsia cesitosa*.....
Vaccinium uliginosum / Dodecatheon jeffreyi - Caltha leptosepala
(Christy 2004: 65; McCain et al. 2014: 125)
4b. Herb layer dominated by graminoids.....5

5a. Herb layer usually dominated by *Eleocharis quinqueflora* .....
.....***Vaccinium uliginosum / Eleocharis quinqueflora*** (Crowe et al. 2004: 259)
5b. Herb layer usually dominated by *Carex aquatilis* var. *dives*.....
... ***Vaccinium uliginosum / Carex aquatilis* var. *dives*** (Murray 2000: 39; Crowe et al. 2004: 262; NS)

III. HERBACEOUS ASSOCIATIONS

Graminoid, forb, or fern cover usually > 25 %; tree and shrub cover usually < 25%.

Herb layer with one the following species with highest frequency or cover, usually at least 20% or highest cover available in more depauperate stands, or one of 2-3 most abundant species in herb layer:

Adiantum aleuticum ..... ***Adiantum aleuticum*** (McCain 2004: 150; Crowe et al. 2004: 152)
Agrostis pallens ..... ***Agrostis pallens*** (Crowe et al. 2004: 137)
Allium validum ..... A
Alopecurus aequalis ..... ***Alopecurus aequalis*** (Christy 2016: 12)
[*Alopecurus pratensis*] ..... **[*Alopecurus pratensis*]** (Christy 2014: 16)
Alopecurus saccatus ..... ***Alopecurus saccatus - Plagiobothrys bracteatus*** (Titus 1996-98)
Artemisia ludoviciana ..... ***Artemisia ludoviciana*** (Crowe et al. 2004: 157; Wells 2006: 159)
Athyrium filix-femina ..... B
Azolla filiculoides or *A. microphylla* ..... ***Azolla* (*filiculoides, microphylla*)** (Christy 2004: 68; NS)
Bidens cernua ..... ***Bidens cernua*** (Murray 2000: 12; Christy 2004: 69)
Bidens frondosa ..... ***Bidens frondosa*** (Christy 2004: 70)
Bolboschoenus maritimus C
Boykinia major ..... ***Boykinia major*** (Murray 2000: 13; Christy 2004: 71)
Boykinia occidentalis ..... ***Boykinia occidentalis-Mitella ovalis*** (McCain 2004: 61)
Brasenia schreberi ..... ***Brasenia schreberi*** (Christy 2004: 72; NS)
[*Bromus inermis*] ..... **[*Bromus inermis*]** (Christy 2014: 18)
Calamagrostis canadensis ..... ***Calamagrostis canadensis*** (Murray 2000: 13; Christy 2004: 73; Crowe et al. 2004: 138; Wells 2006: 146; NS)
Calamagrostis nutkaensis ..... ***Calamagrostis nutkaensis - Carex* spp. - *Juncus* spp.** (Christy 2004: 74)
Calliscirpus criniger ..... ***Calliscirpus criniger - Eleocharis quinqueflora*** (Titus 1996-1998)
Callitriche heterophylla ..... ***Callitriche heterophylla*** (Christy 2004: 75)
Callitriche verna ..... ***Callitriche verna*** (Crowe et al. 2004: 69)
Caltha leptosepala ..... D
Camassia cusickii ..... ***Camassia cusickii*** (Crowe et al. 2004: 158)
Camassia quamash ..... E
Carex amplifolia ..... ***Carex amplifolia*** .....(Murray 2000: 14; Christy 2004: 79; Crowe et al. 2004: 77; Wells 2006: 137)
Carex angustata ..... ***Carex angustata*** (Christy 2004: 80; Crowe et al. 2004: 79; Wells 2006: 135)
Carex aperta ..... ***Carex aperta*** (Murray 2000: 14; Christy 2004: 81)
Carex aquatilis var. *aquatilis* ..... ***Carex aquatilis* var. *aquatilis*** (Christy 2004: 82; Crowe et al. 2004: 81; Wells 2006: 125; Christy 2014: 20; NS)
Carex aquatilis var. *dives* ..... F
Carex breweri ..... ***Carex breweri*** (Crowe et al. 2004: 87)
Carex buxbaumii ..... ***Carex buxbaumii*** (Christy 2004: 85; Crowe et al. 2004: 89; NS)
Carex canescens ..... ***Carex canescens*** (Crowe et al. 2004: 90)
Carex cusickii ..... ***Carex cusickii*** (Murray 2000: 15; Christy 2004: 86; Crowe et al. 2004: 91; NS)
Carex densa ..... ***Carex densa*** (correction to Christy 2004: 87)
Carex echinata ..... ***Carex echinata*** (Crowe et al. 2004: 93; Wells 2006: 149)
Carex exsiccata ..... ***Carex exsiccata*** (Murray 2000: 15; Christy 2004: 88; McCain et al. 2014: 83)
Carex feta ..... ***Carex feta*** (Christy 2004: 89)
Carex interrupta ..... ***Carex interrupta*** (Crowe et al. 2004: 94)
Carex laeviculmis ..... ***Carex laeviculmis*** (Crowe et al. 2004: 95)
Carex lasiocarpa ..... ***Carex lasiocarpa*** (Christy 2004: 90; Crowe et al. 2004: 96; NS)
Carex lenticularis ..... ***Carex lenticularis*** (Murray 2000: 16; Christy 2004: 91; Crowe et al. 2004: 98; Wells 2006: 136; McCain et al. 2014: 87)
Carex leporinella ..... ***Carex leporinella*** (Crowe et al. 2004: 100; Wells 2006: 136)
Carex limosa ..... ***Carex limosa*** (Christy 2004: 92; Wells 2006: 135; NS)
Carex luzulina ..... ***Carex luzulina*** (Christy 2004: 93; Crowe et al. 2004: 101; Wells 2006: 142)
Carex lyngbyei ..... G

Carex mendocinensis ..... ***Carex mendocinensis*** (Titus 1996-1998; Tolman 2006)
Carex nebrascensis ..... ***Carex nebrascensis*** (Christy 2004: 94; Crowe et al. 2004: 103; Wells 2006: 150; Christy 2014: 22; NS)
Carex nigricans ..... ***Carex nigricans*** (Christy 2004: 95; Crowe et al. 2004: 106; McCain et al. 2014: 174)
Carex nudata ..... ***Carex nudata*** (Crowe et al. 2004: 108)
Carex obnupta ..... H
Carex pachystachya ..... ***Carex pachystachya*** (Christy 2004: 97)
Carex pellita ..... ***Carex pellita*** (Crowe et al. 2004: 109; Christy 2014: 24)
Carex praegracilis ..... ***Carex praegracilis*** (Christy 2014: 26)
Carex scirpoidea ..... ***Carex scirpoidea - Micranthes odontoloma*** (Wells 2006: 140)
Carex scopulorum I
Carex sheldonii ..... ***Carex sheldonii*** (Crowe et al. 2004: 116; Christy 2014: 29)
Carex simulata ..... ***Carex simulata*** (Christy 2004: 99; Crowe et al. 2004: 117)
Carex spectabilis ..... ***Carex spectabilis - Lupinus latifolius* var. *subalpinus*** (Crowe et al. 2004: 119; McCain et al. 2014: 202)
Carex stipata ..... ***Carex stipata*** (Crowe et al. 2004: 119)
Carex unilateralis ..... J
Carex utriculata ..... ***Carex utriculata*** (Murray 2000: 16; Christy 2004: 100; Crowe et al. 2004: 120; Wells 2006: 127; McCain et al. 2014: 91)
Carex vesicaria ..... ***Carex vesicaria*** (Crowe et al. 2004: 123; Wells 2006: 129)
Ceratophyllum demersum ..... ***Ceratophyllum demersum*** (Christy 2004: 101; Crowe et al. 2004: 69; NS)
Chrysosplenium glechomifolium ..... ***Chrysosplenium glechomifolium*** (McCain 2004: 188)
Corydalis aquae-gelidae ..... ***Corydalis aquae-gelidae*** (McCain 2004: 46)
Danthonia californica ..... ***Danthonia californica*** (Titus 1996c)
Danthonia unispicata ..... ***Danthonia unispicata - Poa secunda*** (Björk 2011: 25)
Deschampsia cespitosa ..... K
Deschampsia danthonioides L
Distichlis spicata ..... M
Downingia elegans ..... ***Downingia elegans*** (Titus 1996-98)
Downingia yina ..... ***Downingia yina - Plagiobothrys bracteatus*** (Titus 1996)
Dulichium arundinaceum ..... ***Dulichium arundinaceum*** (Christy 2004: 110; Crowe et al. 2004: 76; NS)
Eleocharis acicularis ..... N
Eleocharis bella ..... ***Eleocharis bella*** (Crowe et al. 2004: 75)
Eleocharis obtusa ..... ***Eleocharis obtusa*** (Christy 2004: 112)
Eleocharis palustris ..... O
Eleocharis quinqueflora ..... P
Eleocharis rostellata ..... ***Eleocharis rostellata*** (Christy 2016: 28; NS)
Elodea canadensis ..... ***Elodea canadensis*** (Christy 2004: 116; Crowe et al. 2004: 70; NS)
Elymus glaucus ..... ***Elymus glaucus*** (Crowe et al. 2004: 146; McCain et al. 2014: 45)
Equisetum sp. ..... ***Equisetum*** (McCain 2004: 185)
Equisetum arvense ..... ***Equisetum arvense*** (Murray 2000: 18; Christy 2004: 117; Crowe et al. 2004: 159)
Equisetum fluviatile ..... ***Equisetum fluviatile*** (NS)
Equisetum telmateia ..... ***Equisetum telmateia*** (Murray 2000: 19)
Eragrostis hypnoides ..... ***Eragrostis hypnoides - Gnaphalium palustre*** (Christy 2004: 118)
Eriophorum angustifolium ..... ***Eriophorum angustifolium*** (Murray 2000: 19)
Eryngium petiolatum ..... Q
Erythranthe lewisii ..... ***Erythranthe tilingii - Erythranthe lewisii*** (McCain et al. 2014: 266)
Erythranthe tilingii ..... ***Erythranthe tilingii - Erythranthe lewisii*** (McCain et al. 2014: 266)
Euthamia occidentalis ..... ***Euthamia occidentalis*** (Christy 2004: 119)
Glyceria borealis ..... ***Glyceria borealis*** (Crowe et al. 2004: 64)
Glyceria elata ..... R
Glyceria grandis ..... ***Glyceria grandis*** (NS)
Glyceria striata ..... ***Glyceria striata*** (Christy 2004: 120; Crowe et al. 2004: 147)
Gnaphalium palustre ..... ***Eragrostis hypnoides - Gnaphalium palustre*** (Christy 2004: 125)
Gratiola ebracteata ..... ***Gratiola ebracteata - Plagiobothrys bracteatus*** (Titus 1996-98)
Hastingsia bracteosa ..... ***Hastingsia bracteosa*** (Titus 1996-1998)
Hippuris vulgaris ..... ***Hippuris vulgaris*** (Christy 2004: 121)

Hydrocotyle ranunculoides ..... ***Hydrocotyle ranunculoides*** (Christy 2004: 122)
Hydrophyllum tenuipes ..... ***Oxalis - Hydrophyllum tenuipes*** (McCain 2004: 116)
Hypericum anagalloides ..... ***Hypericum anagalloides*** (Murray 2000: 20)
Isoetes bolanderi ..... ***Isoetes bolanderi*** (Titus 1996-1998)
Isoetes nuttallii ..... S
Juncus balticus ..... T
Juncus drummondii ..... ***Juncus drummondii - Micranthes tolmiei*** (McCain et al. 2014: 263)
Juncus effusus ..... ***Juncus effusus*** (Titus 1996-1998; Murray 2000: 21; Christy 2004: 125)
Juncus ensifolius ..... ***Juncus ensifolius*** (Titus 1996-1998)
Juncus nevadensis ..... ***Juncus nevadensis*** (Christy 2004: 126; Crowe et al. 2004: 131)
Lasthenia californica ..... ***Lasthenia californica*** (Titus 1996-1998)
Lemna minor ..... ***Lemna minor*** (Murray 2000: 22; Christy 2004: 127; NS)
Lepidium davisii ..... ***Lepidium davisii*** (ODA report)
Leymus cinereus ..... U
Leymus triticoides V
Lilaeopsis occidentalis ..... ***Lilaeopsis occidentalis*** (Christy 2004: 128)
Ludwigia palustris ..... ***Ludwigia palustris - Persicaria hydropiperoides*** (Christy 2004: 129)
Lysichiton americanus ..... ***Lysichiton americanus - (Athyrium filix-femina)*** (Diaz & Mellen 1996: 167; Murray 2000: 22)
Lysimachia maritima ..... ***Lysimachia maritima - Poa secunda*** (Christy 2016: 32; NS)
Marsilea oligospora ..... ***Marsilea oligospora - Eleocharis acicularis*** (Björk 2011: 26)
Menyanthes trifoliata ..... ***Menyanthes trifoliata*** (Murray 2000: 23; Christy 2004: 130; Crowe et al. 2004: 61; NS)
Micranthes odontoloma ..... ***Micranthes odontoloma*** (Crowe et al. 2004: 161)
Micranthes tolmiei ..... ***Juncus drummondii - Micranthes tolmiei*** (McCain et al. 2014: 263)
Mimulus guttatus ..... ***Mimulus guttatus*** (McCain 2004: 44)
Montia parvifolia ..... ***Montia parvifolia*** (McCain 2004: 43)
Muhlenbergia asperifolia ..... ***Muhlenbergia asperifolia*** (Christy 2014: 39)
Myriophyllum hippuroides ..... ***Myriophyllum hippuroides*** Christy & Putera 1993: 39; Kunze 1994: 47, 57 (WA).)
Myriophyllum sibiricum ..... ***Myriophyllum sibiricum*** (NS)
[*Nasturtium officinale*] ..... **[*Nasturtium officinale*]** (Crowe et al. 2004: 74)
Navarretia intertexta ..... ***Navarretia intertexta - Polygonum polygaloides* ssp. *kelloggii***
Navarretia leucocephala ssp. *minima* ..... W
Nephrophyllidium crista-galli ..... ***Nephrophyllidium crista-galli*** (Murray 2000: 19; Christy 2004: 131)
Nuphar polysepala ..... ***Nuphar polysepala*** (Murray 2000: 23; Christy 2004: 132; Crowe et al. 2004: 62; Wells 2006: 156)
Oenanthe sarmentosa ..... ***Oenanthe sarmentosa*** (Murray 2000: 23; Christy 2004: 133; McCain 2004: 192)
Oxalis trilliifolia or *O. oregana* X
Persicaria amphibia ..... ***Persicaria amphibia*** (Christy 2004: 135)
Persicaria lapathifolia ..... ***Persicaria lapathifolia*** (Christy 2014: 41; link to lit)
Paspalum distichum ..... ***Paspalum distichum*** (Christy 2004: 134; link to lit)
Petasites frigidus ..... Y
[*Phalaris arundinacea*] ..... **[*Phalaris arundinacea*]** (Murray 2000: 24; Christy 2014: 43)
Plagiobothrys bracteatus ..... Z
Plagiobothrys figuratus ..... ***Plagiobothrys figuratus***
Plagiobothrys leptocladus ..... AA
Poa cusickii ..... ***Poa cusickii*** (Crowe et al. 2004: 149)
Poa secunda ..... AB
Polygonum polygaloides ssp. *confertiflorum* ..... ***Navarretia leucocephala ssp. minima - Polygonum polygaloides* ssp. *confertiflorum*** (Björk 2011: 25)
Polygonum polygaloides ssp. *kelloggii* ..... ***Navarretia intertexta - Polygonum polygaloides* ssp. *kelloggii***
Polygonum hydropiperoides ..... ***Ludwigia palustris - Polygonum hydropiperoides*** (Christy 2004: 129)
Potamogeton diversifolius ..... ***Potamogeton diversifolius*** (Crowe et al. 2004: 72; NS)
Potamogeton gramineus ..... ***Potamogeton gramineus*** (Crowe et al. 2004: 72)
Potamogeton natans ..... ***Potamogeton natans*** (Murray 2000: 24; Christy 2004: 136; Crowe et al. 2004: 73; NS)

Potentilla anserina ssp. *pacifica* ..... AC
Potentilla rivalis ..... ***Potentilla rivalis*** (Christy 2014: 45)
Psilocarphus brevissimus ..... ***Psilocarphus brevissimus*** (Titus 1996-1998)
Pteridium aquilinum ..... ***Pteridium aquilinum*** (Murray 2000: 25)
Puccinellia lemmonii ..... ***Puccinellia lemmonii - Poa secunda*** (NS)
Ranunculus aquatilis ..... ***Ranunculus aquatilis - Callitriche verna*** (Christy 2004: 137; Crowe et al. 2004: 60; NS)
Ranunculus flammula ..... ***Ranunculus flammula*** (Christy 2004: 138)
Ranunculus lobbii ..... ***Ranunculus lobbii*** (Titus 1996-1998)
Rudbeckia occidentalis ..... ***Rudbeckia occidentalis*** (McCain et al. 2014: 49; Wells 2006: 158)
Ruppia maritima ..... ***Ruppia maritima*** (NS)
Sagittaria latifolia ..... ***Sagittaria latifolia*** (Christy 2004: 139)
Sanguisorba officinalis ..... AD
Sarcocornia perennis ..... AE
Saussurea americana ..... ***Saussurea americana - Heracleum maximum*** (Murray 2001; NS)
Schoenoplectus acutus ..... ***Schoenoplectus acutus*** (Christy 2004: 141; Crowe et al. 2004: 70)
Schoenoplectus americanus ..... ***Schoenoplectus americanus*** (Crowe et al. 2004: 133; NS)
Schoenoplectus pungens ..... AF
Schoenoplectus subterminalis ..... ***Schoenoplectus subterminalis*** (Kunze 1994: 24 (WA).
Schoenoplectus tabernaemontani ..... ***Schoenoplectus tabernaemontani*** (Crowe et al. 2004: 70)
Scirpus microcarpus ..... ***Scirpus microcarpus*** (Murray 2000: 25; Christy 2004: 142; Crowe et al. 2004: 134; Wells 2006: 133)
Senecio triangularis ..... AG
Sparganium angustifolium ..... ***Sparganium angustifolium*** (Murray 2000: 26; Christy 2004: 144; Crowe et al. 2004: 58; Wells 2006: 156)
Sparganium eurycarpum ..... ***Sparganium eurycarpum*** (Christy 2004: 145; Christy 2014: 47)
Spartina gracilis ..... ***Spartina gracilis*** (NS)
Spartina pectinata ..... ***Spartina pectinata*** (NS)
Sporobolus airoides ..... ***Sporobolus airoides - Distichlis spicata*** (NS)
Tiarella trifoliata ..... ***Tiarella trifoliata*** (McCain 2004: 116)
Torreyochloa pallida var. *pauciflora* ..... ***Torreyochloa pallida* var. *pauciflora*** (Murray 2000: 27; Christy 2004: 146; Crowe et al. 2004: 65)
Trautvetteria caroliniensis ..... ***Trautvetteria caroliniensis*** (Murray 2000: 27, 28)
Trichophorum caespitosum ..... ***Trichophorum caespitosum*** (Murray 2000: 28; Christy 2004: 147)
Triglochin maritima ..... ***Triglochin maritima* - (*Sarcocornia perennis*)** (NS)
Triteleia hyacinthina ..... AH
Typha latifolia ..... ***Typha* (*latifolia, angustifolia*)** (Murray 2000: 29; Christy 2004: 149; Crowe et al. 2004: 56; Wells 2006: 157)
Utricularia macrorhiza ..... ***Utricularia macrorhiza*** (Christy 2004: 150)
Veratrum californicum ..... ***Veratrum californicum*** ..... (Murray 2000: 39; Crowe et al. 2004: 164; Wells 2006: 158; McCain et al. 2014: 57)
Veronica americana ..... ***Veronica americana*** (Crowe et al. 2004: 63)
Veronica peregrina ..... AI
Xerophyllum tenax ..... ***Xerophyllum tenax*** (Frenkel et al. 1986: 30; Murray 2000: 29)
Zostera marina ..... **Zostera marina** (NS)

A. *Allium validum*:

1a. *Allium validum* dominant ..... ***Allium validum*** (Crowe et al. 2004: 153)
1b. *Allium validum* codominant with *Carex scopulorum* ..... ***Allium validum - Carex scopulorum*** (Crowe et al. 2004: 155; Wells 2006: 152)

B. *Athyrium filix-femina*:

1a. Upland or peripheral vegetation includes *Picea sitchensis* and *Lonicera involucrata* ..... ***Athyrium filix-femina*** (Christy 2004: 67)
1b. *Picea sitchensis* and *Lonicera involucrata* absent 2

2a. Shrubs with > 5% cover ..... **(*Rubus spectabilis*) / *Athyrium filix-femina*** (Murray 2000: 34)
2b. Shrubs with < 5% cover or absent 3

3a. *Lysichiton americanus* dominant or conspicuous..... ;
..... ***Lysichiton americanus* - (*Athyrium filix-femina*)** (Murray 2000: 22)
3b. *Lysichiton americanus* absent..... ***Athyrium filix-femina*** (Crowe et al. 2004: 156)

C. *Bolboschoenus maritimus*:
1a. Interior alkaline sites, E of Cascade Range .....
..... ***Bolboschoenus maritimus*** (interior alkaline) (NS)
1b. Estuarine tidal sites within influence of marine salinity.....
..... ***Bolboschoenus maritimus*** (estuarine) (Eilers 1975)

D. *Caltha leptosepala*:
1a. Herb layer mostly *Sanguisorba officinalis,* with *Carex obnupta* and/or *Carex cusickii* conspicuous in plot or evident adjacent to plot ..... ***Caltha leptosepala* - *Carex obnupta*** (Christy 2004: 77)
1b. *Sanguisorba officinalis, Carex obnupta, Carex cusickii* scant or absent.....
..... ***Caltha leptosepala*** (Murray 2000: 13; Christy 2004: 76; McCain et al. 2014: 70; NS)

E. *Camassia quamash*:
1a. Herb layer usually with *Micranthes oregana* or *Ranunculus occidentalis* conspicuous .....
..... ***Camassia quamash*** (Christy 2004: 78)
1b. Herb layer otherwise..... 2

2a. Herb layer usually with *Triteleia hyacinthina* conspicuous..... ***Triteleia hyacinthina*** (Christy 2004: 148)
2b. Herb layer with *Micranthes ferruginea* codominant or conspicuous.....
..... ***Micranthes ferruginea* - *Camassia quamash*** (Glavich 2016: _____)

F. *Carex aquatilis* var. *dives*:
1a. *Nuphar polysepala* present..... ***Carex aquatilis* var. *dives* - *Comarum palustre*** (Christy 2004: 84; (NS)
1b. *Nuphar polysepala* absent 2

2a. *Sanguisorba officinalis* codominant or conspicuous.....
..... ***Sanguisorba officinalis* - *Carex aquatilis* var. *dives*** (Murray 2000: 25; Christy 2004: 140)
2b. *Sanguisorba officinalis* absent 3

3a. *Eleocharis quinqueflora* conspicuous..... ***Carex aquatilis* var. *dives* - *Eleocharis quinqueflora*** (Murray 2000:15)
3b. *Eleocharis quinqueflora* scant or absent..... ***Carex aquatilis* var. *dives***
..... (Murray 2000: 14; Christy 2004: 83; Crowe et al. 2004: 84; McCain et al. 2014: 74, 79; NS)

G. *Carex lyngbyei*:
1a. *Distichlis spicata* and *Triglochin maritima* conspicuous, but entire herb layer may be sparse .....
..... ***Carex lyngbyei* - (*Distichlis spicata* - *Triglochin maritima*)** (NS)
1b. Herb layer otherwise..... 2

2a. *Potentilla anserina* ssp. *pacifica* conspicuous..... ***Carex lyngbyei* - *Potentilla anserina* ssp. *pacifica*** (NS)
2b. Herb layer mostly *Carex lyngbyei*..... ***Carex lyngbyei*** (NS)

H. *Carex obnupta*:
1a. Stands mainly all *Carex obnupta*..... ***Carex obnupta*** (Murray 2000: 16; Christy 2004: 96; NS)
1b. Composition otherwise 2

2a. *Potentilla anserina* ssp. *pacifica* conspicuous, often with scattered *Salix hookeriana* .....
..... ***Carex obnupta* - *Potentilla anserina* ssp. *pacifica*** (Christy et al. 1998; NS)
2b. *Juncus balticus* codominant or conspicuous, *Potentilla anserina* ssp. *pacifica* scant.....
..... ***Juncus balticus* - *Carex obnupta*** (Taylor & Frenkel 1979: 60; Taylor 1980: 57; Kunze 1994: 22)

I. *Carex scopulorum*:

1a. Herb layer mainly *Carex scopulorum* ..... ***Carex scopulorum*** (Christy 2004: 98; Crowe et al. 2004: 112; McCain et al. 2014: 223)

1b. Herb layer otherwise 2

2a. *Carex nigricans* and *Deschampsia cespitosa* conspicuous or codominant ..... ***Carex scopulorum - Carex nigricans - Deschampsia cespitosa*** (Crowe et al. 2004: 114)

2b. *Eleocharis quinqueflora* conspicuous or codominant ..... ***Carex scopulorum - Eleocharis quinqueflora*** (Wells 2006: 138; McCain et al. 2014: 228)

J. *Carex unilateralis*:

1a. *Hordeum brachyantherum* codominant or conspicuous .. ***Carex unilateralis - Hordeum brachyantherum***

1b. *Eleocharis palustris* codominant or conspicuous..... ***Eleocharis palustris - Carex unilateralis***

K. *Deschampsia cespitosa*:

1a. *Deschampsia cespitosa* dominant ..... ***Deschampsia cespitosa*** (Titus 1996c; Murray 2000: 17; Crowe et al. 2004: 139)

1b. *Deschampsia cespitosa* codominant 2

2a. *Juncus balticus* codominant 3

2b. With one of the following species in the herb or moss layer, usually with at least 20% cover:

Acmispon americanus ..... ***Deschampsia cespitosa - Acmispon americanus*** (Titus 1996c)

Artemisia lindleyana ..... ***Deschampsia cespitosa - Artemisia lindleyana*** (Christy 2004: 107)

Carex aquatilis var. *aquatilis* ..... ***Deschampsia cespitosa - Carex aquatilis var. aquatilis*** (Crowe et al. 2004: 142)

Carex exsiccata..... (Christy 2004: 103; McCain et al. 2014: 96)

Carex nebrascensis..... ***Carex nebrascensis*** (Crowe et al. 2004: 143; NS)

Carex scopulorum ..... ***Carex scopulorum - Carex nigricans - Deschampsia cespitosa*** (Kovalchik 1987: 130; Wells 2006: 148)

Carex unilateralis ..... ***Deschampsia cespitosa - Danthonia californica*** (Christy 2004: 108; NS)

Danthonia californica..... ***Deschampsia cespitosa - Danthonia californica*** (Christy 2004: 108; NS)

Danthonia intermedia ..... ***Deschampsia cespitosa - Danthonia intermedia*** (Crowe et al. 2004: 144)

Potentilla anserina ssp. *pacifica*..... ***Deschampsia cespitosa - Potentilla anserina* ssp. *pacifica*** (NS)

Rudbeckia glaucescens..... ***Deschampsia cespitosa - Danthonia californica - Rudbeckia glaucescens*** (Titus 1996-98)

Sphagnum spp. ..... (McCain et al. 2014: 106)

Trifolium longipes ..... (Christy 2004: 106; McCain et al. 2014: 101)

Other combinations of species..... ***Deschampsia cespitosa* montane "wet meadow" complex** (Christy 2004: 102)

3a. Coastal salt and brackish marsh..... ***Deschampsia cespitosa - Juncus balticus*** (Taylor 1980: 71)

3b. Montane meadows and fens ..... ***Juncus balticus*** (Christy 2004: 109; Crowe et al. 2004: 145; NS)

L. *Deschampsia danthonioides*:

1a. Stands mostly *Deschampsia danthonioides*..... ***Deschampsia danthonioides*** (Titus 1996-98)

1b. Stands otherwise 2

2a. *Danthonia unispicata* codominant or conspicuous ..... ***Deschampsia danthonioides - Danthonia unispicata*** (Johnson & Simon 1987)

2b. Stands otherwise 3

3a. *Plagiobothrys leptocladus* codominant or conspicuous .....

.....***Deschampsia danthonioides - Plagiobothrys leptocladus*** (Meinke & Magee 1986: 34.)

3b. *Triteleia hyacinthina* codominant or conspicuous ..... ***Triteleia hyacinthina - Deschampsia danthonioides*** (Titus 1996-98)

M. *Distichlis spicata*:

One the following graminoids with highest frequency or cover, or codominant:

Amphiscirpus nevadensis..... ***Distichlis spicata - (Amphiscirpus nevadensis)*** (NS)

Distichlis spicata .....***Distichlis spicata*** (Christy 2014: 31; NS)

Leymus cinereus..... ***Leymus cinereus - Distichlis spicata*** (NS)

Potentilla anserina ssp. *pacifica* ..... ***Distichlis spicata - Potentilla anserina* ssp. *pacifica***

Sarcocornia perennis .....***Distichlis spicata - (Sarcocornia perennis)*** (NS)

Sporobolus airoides ..... ***Sporobolus airoides - Distichlis spicata*** (NS)

N. *Eleocharis acicularis:*

1a. *Elodea canadensis* conspicuous or codominant.....***Eleocharis acicularis*** (Christy 2004: 111; Crowe et al. 2004: 74)

1b. *Marsilea oligospora* conspicuous or codominant .....***Marsilea oligospora - Eleocharis acicularis*** (Björk 2011: 26)

O. *Eleocharis palustris*:

1a. Stands mostly *Eleocharis palustris*..... ***Eleocharis palustris*** (Murray 2000: 17; Christy 2004: 113; Crowe et al. 2004: 66; Christy 2014: 33)

1b. Carex unilateralis codominant or conspicuous ..... ***Eleocharis palustris - Carex unilateralis***

P. *Eleocharis quinqueflora*:

One or more of the following graminoids dominant or conspicuous:

Carex aquatilis and *Carex limosa* conspicuous.....***Eleocharis quinqueflora*** (Murray 2000: 18; Christy 2004: 114; Crowe et al. 2004: 126; Wells 2006: 131; McCain et al. 2014: 110; NS)

Carex scopulorum conspicuous.....***Eleocharis quinqueflora - Carex scopulorum*** (NS)

Calliscirpus criniger conspicuous.....***Calliscirpus criniger - Eleocharis quinqueflora*** (Titus 1996-1998)

Q. *Eryngium petiolatum*:

1a. *Grindelia nana* codominant or conspicuous.....***Eryngium petiolatum - Grindelia nana***

1b. *Lasthenia glaberrima* codominant or conspicuous.....***Eryngium petiolatum - Lasthenia glaberrima***

R. *Glyceria elata*:

1a. *Caltha leptosepala* conspicuous, with at least 20% cover.....***Glyceria elata - Caltha leptosepala*** .....(Murray 2000: 19)

1b. *Caltha leptosepala* absent .....***Glyceria elata*** (Crowe et al. 2004: 147)

S. *Isoetes nuttallii*:

1a. Stand mostly *Isoetes nuttallii*.....***Isoetes nuttallii*** (Christy 2004: 123; NS)

1b. *Plagiobothrys bracteatus* codominant or conspicuous
.....***Isoetes nuttallii - Plagiobothrys bracteatus*** (Titus 1996-1998)

T. *Juncus balticus*:

1a. Adjacent vegetation seasonally wet alkaline grassland, *Artemisia cana,* or *Sarcobatus vermiculatus*..... ..... ***Juncus balticus*** (Christy 2014: 35)

1b. Adjacent vegetation forested, soil not alkaline..... 2

2a. *Abies grandis, Juniperus occidentalis, Pinus ponderosa, Pseudotsuga menziesii,* or *Artemisia* spp. usually present ..... ***Juncus balticus*** (Crowe et al. 2004: 129; Wells 2006: 151)

2b. *Abies lasiocarpa* or *Picea engelmannii* usually present .... ***Juncus balticus - Bistorta bistortoides*** (Murray 2000: 21; Christy 2004: 124)

U. *Leymus cinereus*:

1a. Graminoids mostly *Leymus cinereus* ..... ***Leymus cinereus*** (Crowe et al. 2004: 151; Wells 2006: 148; NS)
1b. *Distichlis spicata* conspicuous or codominant ..... ***Leymus cinereus - Distichlis spicata*** (NS)

V. *Leymus triticoides*:
1a. Graminoids mostly *Leymus triticoides*..... ***Leymus triticoides*** (Christy 2014: 37)
1b. *Poa secunda* codominant or conspicuous..... ***Leymus triticoides - Poa secunda*** **(**NS)

W. *Navarretia leucocephala*:
1a. *Plagiobothrys bracteatus* codominant or conspicuous..... ***Navarretia leucocephala - Plagiobothrys bracteatus*** (Huddleston 1999)
1b. *Polygonum polygaloides* ssp. *confertiflorum* codominant or conspicuous..... ***Navarretia leucocephala* ssp. *minima* - *Polygonum polygaloides* ssp. *confertiflorum*** (Björk 2011: 25)

X. *Oxalis trilliifolia* or *O. oregana*:
1a. *Hydrophyllum tenuipes* codominant..... ***Oxalis - Hydrophyllum tenuipes*** (McCain 2004: 116)
1b. *Tolmiea menziesii* codominant ..... ***Oxalis - Tolmiea menziesii*** (McCain 2004: 196)

Y. *Petasites frigidus*:
1a. *Equisetum arvense* second most abundant associate..... ***Equisetum arvense*** phase of ***Petasites frigidus*** association (McCain 2004: 53)
1b. *Stachys cooleyae* second most abundant associate ..... ***Petasites frigidus - Stachys cooleyae*** (McCain 2004: 56)

Z. *Plagiobothrys bracteatus*:
One the following species with highest frequency or cover, or codominant:
Alopecurus saccatus..... ***Alopecurus saccatus - Plagiobothrys bracteatus*** (Titus 1996-98)
Downingia yina ..... ***Downingia yina - Plagiobothrys bracteatus*** (Titus 1996-98)
Gratiola ebracteata..... ***Gratiola ebracteata - Plagiobothrys bracteatus*** (Titus 1996-98)
Isoetes nuttallii..... ***Isoetes nuttallii - Plagiobothrys bracteatus***
Navarretia leucocephala ..... ***Navarretia leucocephala - Plagiobothrys bracteatus***
Veronica peregrina ..... ***Plagiobothrys bracteatus - Veronica peregrina*** (Huddleston 1999)

AA. *Plagiobothrys leptocladus*:
1a. *Deschampsia danthonioides* codominant or conspicuous ..... ***Deschampsia danthonioides - Plagiobothrys leptocladus***
1b. *Veronica peregrina* codominant or conspicuous ..... ***Plagiobothrys leptocladus - Veronica peregrina***

AB. *Poa secunda*:
One the following graminoids with highest frequency or cover, or codominant:
Danthonia unispicata ..... ***Danthonia unispicata - Poa secunda*** (Björk 2011: 25)
Leymus triticoides..... ***Leymus triticoides - Poa secunda*** (NS)
Lysimachia maritima..... ***Lysimachia maritima - Poa secunda*** (Christy 2016: 32; NS)
Puccinellia lemmonii ..... ***Puccinellia lemmonii - Poa secunda*** (NS)

AC. *Potentilla anserina* ssp. *pacifica*:
1a. *Juncus balticus* and *Distichlis spicata* conspicuous..... ***Potentilla anserina* ssp. *pacifica* - *Juncus balticus***
1b. *Symphyotrichum subspicatum* conspicuous ..... ***Potentilla anserina ssp. pacifica - Symphyotrichum subspicatum***

AD. *Sanguisorba officinalis*:
1a. *Carex aquatilis* var*. dives* conspicuous in plot or evident adjacent to plot; *Carex obnupta* and *Carex cusickii* absent; Cascade Range ..... ***Sanguisorba officinalis - Carex aquatilis* var*. dives*** ..... (Murray 2000: 25; Christy 2004: 140)
1b. *Carex aquatilis* var*. dives* absent, *Carex obnupta* and/or *Carex cusickii* conspicuous in plot or evident

adjacent to plot; Coast Range ..... ***Caltha leptosepala - Carex obnupta*** (Christy 2004: 77)

AE. *Sarcocornia perennis*:

1a. Codominant with *Distichlis spicata* and *Triglochin maritima, Jaumea carnosa* often present ..... ***Sarcocornia perennis - Distichlis spicata - Triglochin maritima* (*Jaumea carnosa*)** (NS)

1b. Composition otherwise 2

2a. Herb layer mostly *Triglochin maritima, Sarcocornia* often present ..... ***Triglochin maritima* - (*Sarcocornia perennis*)** (NS)

2b. Herb layer mostly *Distichlis spicata, Sarcocornia often present* ..... ***Distichlis spicata* - (*Sarcocornia perennis*)** (NS)

AF. *Schoenoplectus pungens*:

1a. Interior alkaline sites, E of Cascade Range ..... ***Schoenoplectus pungens*** (interior alkaline) (NS)

1b. Estuarine tidal sites within influence of marine salinity ..... ***Schoenoplectus pungens*** (estuarine) (Christy et al. 1998)

AG. *Senecio triangularis*:

Herb layer with 1-3 of the following species most abundant:

Aconitum columbianum, Ligusticum grayi, Trifolium longipes ..... ***Senecio triangularis*** ..... (Murray 2000: 26; Christy 2004: 143; Crowe et al. 2004: 162; McCain et al. 2014: 116, 219)

Boykinia major, Caltha leptosepala, Erythranthe guttata ..... ***Senecio triangularis - Caltha leptosepala*** (McCain 2004: 154)

Canadanthus modestus, Erythranthe lewisii, Heracleum maximum, Mertensia spp*., Micranthes odontoloma, Polemonium occidentale* ..... ***Senecio triangularis - Canadanthus modestus*** (McCain 2004: 72; Crowe et al. 2004: 160; Wells 2006: 154)

Saussurea americana ..... ***Saussurea americana - Heracleum maximum*** (Murray 2001; NS)

Veratrum (*californicum, viride*), *Valeriana sitchensis, Lupinus latifolius, Sorbus sitchensis* ..... ***Senecio triangularis - Veratrum - Valeriana sitchensis*** (McCain et al. 2014: 219)

AH. *Triteleia hyacinthina*:

1a. *Triteleia hyacinthina* monotypic or with *Camassia quamash* and/or *Danthonia californica* conspicuous ..... ***Triteleia hyacinthina*** (Christy 2004: 148)

1b. *Deschampsia danthonioides* codominant or conspicuous ..... ***Triteleia hyacinthina - Deschampsia danthonioides*** (Titus 1996-98)

AI. *Veronica peregrina*:

1a. *Plagiobothrys bracteatus* codominant or conspicuous ..... ***Plagiobothrys bracteatus - Veronica peregrina***

1b. *Plagiobothrys leptocladus* codominant or conspicuous ..... ***Plagiobothrys leptocladus - Veronica peregrina***

IV. NONVASCULAR ASSOCIATIONS

Bryophyte, lichen, or algal cover usually > 25%;
graminoid, forb, fern, tree, or shrub cover usually < 25%

Moss layer with highest frequency or cover, usually at least 30% of the following species; herbs and woody plants usually present but with less cover:

Fontinalis ..... ***Fontinalis* (*antipyretica, neomexicana*)** (Christy 2004: 152; NS)
Polytrichum commune ..... ***Polytrichum commune*** (Christy 2004: 152)
Sphagnum ..... A

A. *Sphagnum*:

1a. Herb and shrub layer sparse ..... ***Sphagnum*** (Murray 2000: 11)
1b. Herb or shrub layer up to 20%.....2

2a. Shrub layer *Vaccinium uliginosum*.....***Vaccinium uliginosum / Sphagnum*** (Murray 2000: 12)
2b. Shrub layer scant or absent.....3

3a. Herb layer mostly *Carex aquatilis* var. *dives* .....
.....***Carex aquatilis* var. dives / *Sphagnum*** (Murray 2000: 11)
3b. Herb layer mostly Menyanthes trifoliata.....***Menyanthes trifoliata / Sphagnum*** (Murray 2000: 12)