

Detection and Bryological Inventory of Rich Fens  
on Gifford Pinchot National Forest



ENE across 8860-721 wetland complex, near sunset, 8/17/2010

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## Introduction

Fens, while typically very small in surface area and accounting collectively for only a very small percentage of total plant community overall in the northern and northwestern states of the U.S., contribute disproportionately to local and regional levels of plant diversity (Bedford and Godwin, 2003). Fens, along with bogs, are a type of peatland, which in turn, along with dry meadows and wet meadows can be included as types of meadows (Cooper and Wolf, 2006). Fens can be identified and described by a combination of edaphic, hydrological and chemical features, as well as by vegetative structure and species composition. Most simply described, fens are typically persistently wet, groundwater-fed wetlands with a relatively thick organic soil (peat) layer. As defined by the USDA, fens must have an organic soil/peat layer that comprises at least 40 cm of the upper 80 cm of the soil profile. Fens are often dominated by herbaceous vegetation (hence, their inclusion with meadows), but they may also be dominated by shrubs or even occasionally, trees.

The habitats of the eight subject mosses in this study appear to be strongly associated with fens occurring at high latitudes or mid-montane elevations. Five of the eight subject species in this study (*Calliergon trifarium*, *Helodium blandowii*, *Meesia uliginosa*, *Splachnum ampullaceum* and *Tomentypnum nitens*) currently have Oregon S1 or S2 ranks and USFS R6 Sensitive status in that state. A recent (2007) detection of *Calliergon richardsonii* on Ochoco NF (OR) represents a first record for this species in either Oregon or Washington. This species was added to the Oregon Biodiversity Information Center's (OBIC) October 2010 rare plant list with a state rank of S1. A first verified collection of *Campylium stellatum* in Oregon was made on Malheur NF in 2010. This species is likely to be given a state rank of S1 in the next update of the OBIC rare plant list. *Meesia triquetra* is the only species among this study's eight subject species that lacks a current or prospective OBIC state rank of S1 or S2.

None of this study's eight subject mosses currently has USFS R6 Sensitive species status in Washington. Contributing to this situation is the paucity of site data upon which to base ranking decisions. This paucity of data is linked, at least in part, to the fact that none of the eight subject species in this study – likely due to their strong association with fens – ever had Survey and Manage status. Lack of Survey and Manage status generally meant that these species were not targets in either local project-level surveys or regional “strategic” surveys on USFS or BLM managed lands. While in Oregon, OBIC has independently collected site information for potentially rare and uncommon non-Survey and Manage bryophytes, the Washington Natural Heritage Program (WANHP) has been unable to make a comparable effort. Additional site information for suspected rare mosses in Washington was acquired by WANHP in 2010, and additional site information for bryophytes, especially liverworts, needs to be acquired from literature and herbarium searches as well as from new field work. A 2010 update of the WANHP Working List of Mosses gives Washington state ranks of S1 to *Helodium blandowii*, *Meesia triquetra* and *M. uliginosa*. Three other subject taxa, *Calliergon trifarium*, *Campylium stellatum* and *Tomentypnum nitens*, are listed as “SNR” (not yet ranked). The remaining two subject taxa, *Calliergon richardsonii* and *Splachnum ampullaceum*, are not currently documented

in Washington, and accordingly, do not have status in the WANHP. Detection and inventory of montane fens in Washington is an important means of increasing our information concerning the presence, abundance and distribution of a potentially sizeable subset of the rare bryophytes of Washington. Additionally, without a better understanding of the nature, abundance and distribution of montane fens in Washington, these very special biophysical landscape features are less likely to receive management (including, but not limited to livestock grazing management) that will promote their health and persistence.

Objectives

The intent of this study was to identify a large group of candidate fens on Gifford Pinchot NF and select a subset of candidate fens to be visited and examined. Examination was to include development of a list of on-site bryophytes and vascular plants, and a cursory description of vegetative structure and pattern of wetness. Soil probes would be made at many sites, especially those exhibiting persistent groundwater-fed wetness. Soil probes are a proxy for describing soil profile via a soil pit, and allow an indirect assessment of soil profile to a depth of as much as four or more feet, depending on length of the probe and resistance of the soil. It was hoped that this examination would allow at least a tentative recognition of sites as fens or fen systems vs. some other type of meadow, shrubland or lightly forested area, and perhaps some ability to rank and/or classify within the set of tentatively identified fens.

Methods

A large set of candidate fen sites were initially identified using the Gifford Pinchot NF (GIP) Ecoclass GIS layer. This layer includes a large number of polygons within the categories of “MW” (Meadow Wet) and “MWCO” (Meadow Wet with Conifers). Experience with the MW classification on other forests (Deschutes, Ochoco, Malheur and Fremont-Winema NFs) has shown that, if of sufficient size, fens are likely to be mapped as the MW vegetation type. Notably, however, numerous meadow types that are not fens are also typically included in the MW vegetation type.

Ecoclass Code	Ecoclass Definition
MW	Meadow Wet
SWCO	Wet shrubland/shrub meadows with scattered conifers
MWCO	Meadow Wet with Conifers
MSCO	Subalpine to alpine meadows with scattered conifers
CF	Fir: silver, noble
WL	Lake, pond, impoundment, non-moving water

In an effort to reduce bias in the fen candidate (MW poly) selection, a systematic selection process using PLSS townships, was developed. Overlying the GIP PLSS and PNV GIS layers showed the presence of at least one MW poly in 42 townships occurring partly or wholly within the borders of GIP. Three trials, where every third MW township was selected, were conducted (starting on the count of one, two or three). From these three groups, one was subjectively selected based largely on the average number of MW polys

included per township. As the selected group included more townships than likely could be visited during the project, a pool of alternate townships was identified within this group.

Shortly subsequent to this selection, GIP soil scientist Aldo Aguilar suggested utilizing the GIP Soils Resources Inventory GIS layer in the fen candidate identification process. Specifically, Aguilar recommended use of Soil Map Unit (SMU) 3 (= “meadows and marshland”). It was apparent upon adding this layer to Arc Map data view that SMU 3 polys often coincided with MW polys, but also were extensively distributed, independent of the MW polys.

Soil Map Unit Code	Soil Map Unit Definition
SMU 3	Meadows and marshland
SMU 11	Broad outwash plains with <i>Pseudotsuga menziesii</i> , <i>Tsuga mertensiana</i> and <i>Abies amabilis</i>
SMU 17	Valley bottoms and toe slopes with <i>Pseudotsuga menziesii</i> , <i>Tsuga mertensiana</i> and <i>Abies amabilis</i>
SMU W	Water

Within the selected group of townships, each MW and MWCO poly within individual townships was examined using NAIP imagery. The most promising MW/MWCO polys, displayed over the NAIP layer, were then printed in color in 8.5”x11” format at scales generally ranging from 1:3000 – 1: 10:000. These color images also included a display of SMU 3 polys in the general vicinity of the target MW/MWCO polys, as well as labeled forest roads. Selected townships included between 2-8 MW/MWCO polys for which color images were printed.

Field visits to promising fen candidate sites usually involved driving, parking and some amount of cross-country hiking. Upon arrival at a site, an effort was made to identify and walk through structurally differentiable plant communities within the site. Typically, the time spent in particular communities and at sites in general, was directly related to spatial extent and extent to which that community or site exhibited fen features. Types of information collected at sites included plant species list, plant collections, brief written description of site character (vegetation structure, wetness), soil probes, photographs and GPS coordinates of selected features.

## Results

A total of 49 fen candidate sites were visited during 16 field days in the period of 8/17/2010 to 9/24/2010. A complete set of data collected at each site is presented in Appendix A. The distribution of these 49 sites across GIP NF largely reflects the density/distribution of MW polys across the Forest with larger numbers in Mt. Adams RD (23) and Cowlitz Valley RD (22) and relatively few in St. Helens RD (4) (Map 1). These 49 sites include primarily MW (27) and MWCO (11) ecoclass types, with a minor representation of other ecoclass types such as SWCO (5), MSCO (1), CF (1) and WL (1). Among these 49 sites, most are mapped as SRI SMU 3 (43) with minor presence of other soil types such as SMU 11 (2), SMU 17 (1), and SMU W (1). Some sites were not specifically mapped in the

either the ecoclass or SRI SMU systems. Site elevations range from 2800 to 5000 feet. Soil probes were undertaken at 28 sites. At another 13 sites, probes were not made because soil moisture at time of visit, vegetation, or presence of a mineral soil surface layer, provided little evidence of the presence of persistent groundwater and/or peat in the upper soil layer. At eight sites, vegetation or soil moisture at the time of visit warranted soil probes, but probes, inadvertently, were not conducted.

Among the 41 sites for which an assessment of peat presence and depth was made, at least 14 include areas with apparent peat layers in excess of 40 cm (Appendix B). Each of these sites exhibited groundwater-fed wetness at the soil surface at the time of visit, and for the purposes of this study, are recognized as fens.

A total of 82 plant taxa were detected among the 49 fen candidate sites visited during this project (Appendix C). Following completion of project fieldwork, a subset of 38 of these plant taxa were selected as "fen reference taxa" (FRT). FRT were selected on the basis of taxa either being commonly present in sites identified as fens, or taxa being uncommon, but detected only in sites identified as fens. Presence of detected FRT among the 49 fen candidate taxa is presented in Appendix D. A very notable similarity exists between this GIP NF FRT and those developed in a similar fashion for fens on the Deschutes NF and on the Chemult District of the Fremont-Winema NF (Appendix E). Virtually all of these taxa have NRCS Wetland Indicator status of FACW, FACW+ or OBL (Appendix F). Fen candidate sites can be compared to one another and ranked based on the number of FRT detected at each site. Incidence of detected FRT and soil probe data per site is presented in Appendix G. As seen in Appendix G, there appears to be a significant correlation between a site's incidence of FRT and its status as a fen. The sites with the highest incidence of FRT ( $\geq 16$ ) account for eight of the fourteen sites appearing to qualify as fens. Of the remaining six sites appearing to qualify as fens, only two are included among those 27 sites with  $< 10$  FRT.

Of the eight target species sought in this project, three were detected among the 49 sites visited. *Messia triquetra* (METR70) was detected at six sites while *Helodium blandowii* (HEBL2) and *Campyllum stellatum* (CAST51) were detected at four sites each. Other taxa "of interest" detected among the 49 sites visited include *Carex lasiocarpa* var. *americana* (CALAA, 2 sites), *Scheuchzeria palustris* ssp. *americana* (SCPAA3, 4 sites), *Utricularia* spp. (UTRIC, 7 sites) and *Drosera* spp. (DROSE, 15 sites). As used here, the phrase "of interest" derives from the understanding of the project lead that these taxa are either rare or generally uncommon in Oregon and strongly associated with fens. In total, 42 occurrences of target species and taxa of interest were detected among 18 of the 49 sites visited. Thirty-five of these occurrences were within sites (or portions thereof) herein identified as fens. Of the remaining 7 occurrences, 4 were detected at sites where soil probes, inadvertently, were not conducted. The remaining 3 occurrences were detected at sites that, while apparently lacking 40 cm of peat, exhibited persistent groundwater-fed wetness. Collection sites for these detected target species and taxa of interest are presented in Appendix D, and for convenience or viewing, are extracted into Appendix H.

Site forms for all new records of METR70, HEBL2 and CAST51 have been submitted to

the Washington Natural Heritage Program. These same data, along with all project survey data have been entered into NRIS TESP. Vouchers of specimens representing these new records will be sent to the ISSSSP Inventory Coordinator Assistant at the USFS R6 office in Portland, Oregon to be submitted to the University of Washington Herbarium at the Burke Museum.

### Discussion

This project is part of a continuing, informal effort to better describe the distribution and nature of fens in USFS Region 6. Coincidentally, it is hoped that this effort may also result in heightened local awareness of these special biophysical landscape features and, as appropriate, promote assessment of the adequacy of current management practices that may be affecting local fens. Prior to this project, fen fieldwork by the project lead was restricted to a few of the drier, "eastside" forests in Oregon, including Deschutes, Ochoco, Fremont-Winema and Malheur NFs. There are a number of excellent classifications of wetland plant associations in Oregon and Washington including those of Kovachik (1987), Crowe and Clausnitzer (1997), Crowe, Kovalchik and Kerr (2004), Wells (2006), Kovalchik and Clausnitzer (2004) and Christy (2004). And while fen plant associations are described in these treatments, none actually describe the abundance, distribution or biophysical variances associated with the fens within the geographical area treated. Due to the apparent paucity of literature regarding the fens of Oregon and Washington, the project lead's knowledge of fens in the OR-WA geographic area was essentially limited to his geographically limited field experience as noted above. This project was quite exciting in that it offered the opportunity to inventory for fens in a part of Region 6 where climate, geology, latitude, topography and upland plant communities are largely distinct from those of forests previous explored. Given the results presented above, several notes appear appropriate.

- 1) Pending soil core collection and analysis, it is currently apparent that a moderate number of fens occur on GIP NF, with perhaps the majority of these existing at mid-montane elevations (3000-4500 ft.) on the Mt. Adams District.
- 2) Most of the fens tentatively identified in this project are parts of wetland complexes that include both fen and wet meadow elements, and sometimes, dry meadow elements as well. Accordingly, actually mapping the fen elements within these complexes would be much more time consuming than simply detecting their presence (as has been done here).
- 3) It was initially proposed that this project be an inventory for "rich fens". While this type of fen is generally defined based on water chemistry, the project lead, through early review of fen literature, had come to understand that this type of fen is also one that has a high cover of "brown mosses" and relatively high species richness (Vitt and Horton, 1990; Bedford and Godwin, 2003; Hajek, Horsak, Hajkova and Dite, 2006). "Brown mosses" refers to mosses included in the family Amblystegiaceae and, to a lesser degree, the family Brachytheciaceae. The former family includes the common fen genera *Drepanocladus*, *Calliergon* and *Calliergonella*, while the latter family includes the important fen species *Tomentypnum nitens*. Brown moss fens are common components of fen-wetland complexes in eastside Oregon, especially on Deschutes NF and the Chemult Ranger

District of Fremont-Winema NF. In the experience of the project lead, brown moss fens have a characteristic vegetative composition and structure. These fens are typically a species rich mix of mosses, sedge and sedge-like plants, and forbs, with often a minor presence of ericaceous shrubs and sub-shrubs. Minor amounts of bog birch and willow may also be present. Because of the typical high cover of mosses and sedges, these fens may also be referred to as "moss-sedge" fens. Structurally, brown moss fens are striking in the typical short stature of their vegetation. The sedge and sedge-like species in these fens are short, usually no more than 12-18", even if some plants, such as *Carex aquatilis*, bog birch or willow, may be much taller in wetland communities adjacent to the brown moss fen. Accordingly, the project lead commonly refers to these brown moss/moss-sedge fens as "short-statured" fens. Fieldwork in the "eastside" fens of Oregon indicates that it is this type of fen in which the target species of this project are most likely to be found. This rich/brown moss/moss-sedge/short-statured fen type is present in each of the GIP NF fen complexes tentatively identified in this project. This fen type seems to best agree with the *Eleocharis pauciflora* plant association as described in both Kovalchik (1987) and Kovalchik and Clausnitzer (2004).

4) It is apparent that the short-statured fen is not the only type of fen occurring within GIP NF wetland complexes. At least two other structurally distinguishable fen types are often found, either along or together, in wetland complexes including the short-statured fen type. This pattern holds in eastside Oregon groundwater wetland complexes as well. One of these two fen types is shrub-dominated. Bog huckleberry (*Vaccinium uliginosum*) is probably the most frequent dominant in this fen type, but the proportions of it and other common shrubs such as bog birch (*Betula glandulosa*), alpine laurel (*Kalmia microphylla*), rose spiraea (*Spiraea douglasii*) and, on GIP, bog willow (*Salix pedicellaris*), are quite variable. This fen type frequently intergrades with the short-statured fen type. The diversity and cover of graminoids, forbs and mosses is consistently lower in shrub fens than in short-statured fens. The other common structural fen type is a "tall sedge" fen (name assigned by project lead). This fen type features a tall (3-4'), dense cover of sedges (often a mix of *Carex aquatilis* and *C. utriculata*). There may be a minor component of shrubs and most notably, often little to no cover by forbs or mosses. Species diversity is always very low. These fen types may be no less wet or only slightly less wet than adjacent or typical short-statured fens and soil probes indicate that a substantial peat layer is often present. Soil core sampling and analysis is necessary to confirm that these shrub and tall sedge fens actually qualify as fens. It is interesting that Cooper and Wolf (2006) recognize a rather similar set of fens types in the Sierra Nevada of California. Using TWINSPAN analysis, and after removing basin fens and extremely rich fens, they recognize three basic fen types: 1) tall and dense sedge stands with low diversity, 2) shrub/sphagnum moss fens and 3) sedge/moss fens that they split out into a few-flowered spikerush (ELQU2)/moss fen and a fen type with larger and smaller sedges and forbs such as TOGL2, HYAN2 and MIPR. The often close proximity of two or all three of these structurally distinct plant communities occupying very wet portions of GIP NF groundwater wetlands, begs the question of what evidently subtle physical or chemical differences underlie this differentiation in vegetation.

5) The documented distribution within Washington of several rare or potentially rare mosses may be notably expanded by new sites located during this project. The Washington Natural Heritage Information System (WANHIS) currently (10/6/2010) documents 4 state records of *Meesia triquetra*, all in Okanogan County. This project has documented 6 new records of this species in Skamania County. Likewise, WANHIS currently documents 4 state records of *Helodium blandowii*, all in Okanogan County. This project has documented 3 new records of this species in Skamania County and one new record in Lewis County. As of 3/31/2009, 9 Washington collections of *Campylium stellatum* were known (Harpel, pers. comm.) from either Whatcom or Clallam Counties. At that time, none of these collections had received expert verification. This study has documented 3 new records of this species in Skamania County and one new record in Lewis County. For at least two reasons, it is very notable that the target moss *Tomentypnum nitens* (TONI70) was not detected in the course of this project. First, among eastside Oregon fens, there is a strong positive correlation between the presence of *Helodium blandowii* (HEBL2) and TONI70. At 18 HEBL2 Oregon sites documented in NRIS TESP, TONI70 co-occurs at at least 13 of these. The positive correlation between the co-occurrence of TONI70 and *Meesia triquetra* (not R6 sensitive in Oregon) may be higher than that between TONI70 and HEBL2. Second, fieldwork by the project lead has led to his current understanding that, among plants, TONI70 is the single best indicator of rich fens in eastside Oregon.

6) Several types of follow-up to the work initiated in this project are apparent. a) Soil core sampling and analysis at the 15 or so sites herein tentatively identified as fens should be conducted. This would not only provide an opportunity to verify the presence of USDA qualifying peat layers at these sites, but would help in interpreting the several types of plant communities often comprising these wetland complexes. b) Verification and extension of species lists generated at these sites is also needed. Proper identification of several vascular plants included in these lists is needed (e.g., *Eriophorum* sp., *Utricularia* spp., *Salix* spp., *Carex jonesii*, and *Kalmia microphylla*). Further identification work with the plants here identified as *Eleocharis quinqueflora* is particularly needed. As known to the project lead, this taxon in eastside Oregon tends towards a rhizomatous habit and its leaf sheaths are absolutely truncated, with no presence of even a reduced blade. This form was found in GIP NF wetlands, but more often occurring is a form with a pronounced caespitose habit and leaf sheaths that terminate in a highly reduced, rudiment of a blade. In Hitchcock and Cronquist (1973), this form keys to *E. pauciflora* (= *E. quinqueflora*) as well. c) Continue on some regular basis, as resources allow, further fen inventory on GIP NF.

7) Kovalchik and Clausnitzer (2004) note that many of the graminoids used to define their Meadow plant community series (fens, meadows and bogs) are characteristic of northern latitudes. That this observation very much applies to the short-statured fen communities here described for GIP NF is apparent when lists of plant species occurring in western Canadian fens (and to a lesser but still notably extent, at high latitude locations in Europe), are examined. And, as already noted here, species representative of the short-statured fens of GIP NF are very largely the same species that are representative of short-statured fens in the central Oregon Cascades. Indeed, many of the FRT recognized in the fens of GIP and the central Oregon Cascades are also found in fens of the Sierra

Nevada of California (Weixelman and Cooper, 2009). This similarity of fen flora over such a pronounced range of latitude strongly suggests that there is a rather faithful replication of the western Canadian physical fen habitat down through the Cascade and Sierran ranges. This phenomenon of climates at lower elevations at higher latitudes mimicking climates at higher elevations at lower latitudes is very well documented in the Northern Hemisphere. Of particular relevance here is that to a notable degree, the plants species of the fens extending from western Canada to California represent a circumboreal flora whose elements become increasingly disjunct with distance down the Cascade-Sierra axis. This, and the dispersed and generally very small patches of fen habitat along this axis, would appear to largely explain the proportionally high incidence of rare and uncommon plant species associated with these habitats. There would appear to be every reason for state natural heritage programs, and in turn, USFS field units along the Cascade-Sierra axis, to inventory and catalog these habitats, and regard them as a special biophysical resource.

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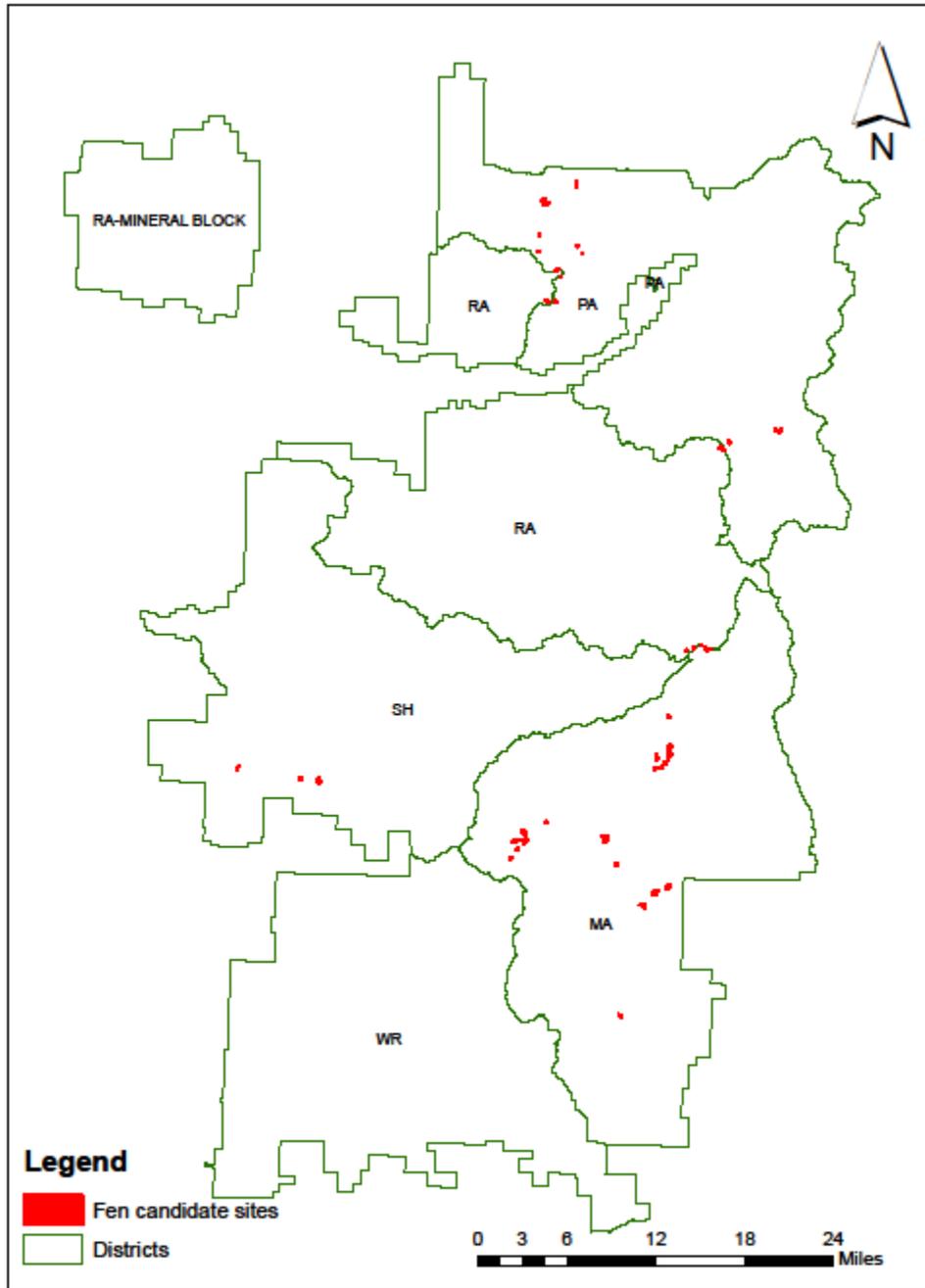
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Map 1

GIP NF Fen-Bryo Inventory Project, 2010



## Appendix A

### Full Data Set for GIP Fen-Bryophyte Inventory

#### St. Helens

1. 81(n)

Elevation: 3000 feet

Ecoclass: MW

SRI SMU: 11

TRS: 8N, 5E, S30

Date: 8/18/2010

Plants: Graminoids - CAUT

Shrubs - SALIX

Mosses - POLYT5

Notes: This is seasonally wet (dry at date of visit) sedge-dominated meadow with little to no organic layer at soil surface. Probe: none.

2. 81(s)

Elevation: 3000 feet

Ecoclass: MW

SRI SMU: 11

TRS: 8N, 5E, S31

Date: 8/18/2010

Plants: Graminoids – SCIRP, CAUT

Forbs – EQUIS, ATHYR

Shrubs – SALIX, RUBUS

Mosses – AUPA70, BRPS70, DREPA3, RHSQ70

Notes: This site was very wet with much tall sedge, either in standing water or on +/- bare muck. Forbs and mosses scant and generally inconspicuous. Probe: none.

3. 83-250

Elevation: 2800 feet

Ecoclass: MWCO and CH

SRI SMU: mostly 3 (meadows and marshlands)

TRS: 8N, 5E, S35

Date: 8/18/2010

Plants: Graminoids – CAUT, ERIOP, SCIRP, JUBA, ELQU2, CAEC

Forbs – LYAM3, TOGL2, ASFO, DROSE, HYAN2, METR3, EQUIS, PEGR2

Shrubs – VAUL, ALNUS, VAOX

Mosses – SPSQ70, PHFO6, CALLI10

Notes: Physically, this site has excellent groundwater expression and a presence of numerous species typically associated with rich fens. Botanical survey of the larger meadow immediately adjacent to the east is highly recommended. Probe: none.

4. 83-380

Elevation: 2850 feet

Ecoclass: MW

SRI SMU: 3 (meadows and marshlands)

TRS: 8N, 5E, S36

Date: 8/18/2010

Plants: Graminoids – ELQU2, CAAQ, ERIOP, JUEN, CAEC

Forbs - TOGL2, DROSE, METR3, ASFO, UTRIC

Shrubs – VAUL, SALIX, SPIRA, VAOX, KAMI

Mosses – AUPA70, SPSQ70

Notes: This system consists of an eastern arm, central lobe and western arm. The latter two portions, which are very wet, are dominated by tall sedges with scant cover of forb and moss species. Habitat most closely approaching that suitable for a short-statured, rich fen community, is restricted to rather local portions of the eastern lobe of this system. Probe: none.

Mt. Adams

5. Swampy Meadows(s)

Elevation: 3900 feet

Ecoclass: MWCO

SRI SMU: 3 (meadows and marshland)

TRS: 8N, 9E, S23

Date: 8/17/10

Plants: Graminoids - CAEC, CAJO, CALAA, ERIOP, ELQU2, JUNE,

Forbs - DODEC, DROSE, HADI7, PEGR2, TOGL2, UTRIC

Shrubs - BEGL, VAUL

Mosses - CACU18, CALLI10, METR70, SPHAG2

Notes: Topography, soil and flora support interpreting (portions of) this site as a GIP version of a rich fen. Probe: firm organic to 60cm, then inorganic to firm base at 120cm.

6. 8860-721

Elevation: 4100 feet

Ecoclass: SWCO

SRI SMU: 3 (meadows and marshland)

TRS: 8N, 9E, S27

Date: 8/17/2010

Plants: Graminoids – ELQU2, ERIOP, JUEN

Forbs - HADI7, METR3, PEGR2, TOGL2, UTRIC

Shrubs - BEGL, VAUL

Mosses: - CAST51

Notes: Surveyed portion of meadow with a high density of low soil pedestals, making walking awkward. Probe (in central wet zone): obvious thin inorganic at 35-40cm, then +/- easy, neither clearly inorganic nor organic to 130+cm.

7. 8810

Elevation: 4000 feet

Ecoclass: SWCO

SRI SMU: 3 (meadows and marshlands)

TRS: 8N, 9E, S26

Date: 8/18/2010

Plants: Graminoids - CAEC, ELQU2, ERIOP

Forbs – DODEC, DROSE, HADI7, PEGR2, TOGL2

Shrubs – VAOX, VAUL

Mosses – CALLI10, CAST51, METR70

Notes: High-low wetness gradient is from topographically higher SE end to lower NW end. Probe (at METR70 site): first obvious inorganic at 75cm, then hard to interpret with varying density to 130+cm.

8. Meadow Creek Meadow (32 road)

Elevation: 3300 feet

Ecoclass: MWCO

SRI SMU: 3 (meadows and marshland)

TRS: 7N, 71/2E, S25; 7N, 8E, S20&30

Date: 8/19/2010

Plants: Graminoids – CAAQ, CAEC, ELQU2, ERIOP, JUEN

Forbs – DROSE, HADI7, HYAN2, TOGL2  
Shrubs – BEGL, SAPE2, VAUL  
Mosses – CALLI10, CAST51, SPHAG2

Notes: This 3-mile long system includes a meandering creek and primarily +/- dense graminoid or shrub-sedge communities with very low moss diversity. The community with the closest resemblance to a short-statured, rich fen community occurs in the SW corner (adjacent to 32 road) of this meadow system. Probe (in northern portion): easy, no obvious inorganic to 130cm.

9. 32-716

Elevation: 3400 feet

Ecoclass: MWCO

SRI SMU: 3 (meadows and marshland)

TRS: 7N, 8E, S19

Date: 8/19/2010

Plants: Graminoids – CAAQ, ELQU2, ERIOP, JUNE

Forbs – DROSE, METR3, PEGR2, SPRO, TOGL2, UTRIC, HYAN2

Shrubs – BEGL, SAPE2, VAOX, VAUL

Mosses – SPHAG2, WAEX

Notes: There are two local squishy-wet areas with a fair presence of rich fen-associated plant species, but overall, this system does not show evidence of a strong/persistent groundwater influence. Probe (one of the two soppy wet areas): first obvious inorganic at 120cm, easy, then +/- resistant to 130+cm.

10. 32/3011

Elevation: 3300 feet

Ecoclass: MWCO

SRI SMU: 3 (meadows and marshland)

TRS: 7N, 8E, S20

Date: 8/19/2010

Plants: Graminoids – ELQU2, ERIOP, JUEN

Forbs: HADI7, TOGL2

Shrubs: BEGL, VAUL

Notes: A tall sedge or tall sedge/VAUL community with +/- low biodiversity. Probe: none.

11. 3011-020

Elevation: 3650 feet

Ecoclass: Mostly MW and MWCO

SRI SMU: 3 (meadows and marshland)

TRS: 7N, 8E, S16

Date: 8/20/2010

Plants: Graminoids – CAUT, ERIOP

Forbs – DROSE, METR3, PEGR2

Shrubs – SAPE2, VAOX, VAUL

Mosses – SPHAG2, AUPA70, PHFO6

Notes: Overall, low biodiversity in a system with little expression of strong groundwater influence except for a very small, compositionally simple short-statured fen community in northern portion of meadow. Probe (in short-statured fen): no obvious inorganic to 130cm, +/- easy, clean.

12. 8860-722

Elevation: 4100 feet

Ecoclass: MWCO

SRI SMU: 3 (meadows and marshland)

TRS: 8N, 9E, S22

Date: 8/20/2010

Plants: Graminoids – CAAQ, ELQU2, ERIOP, JUEN

Forbs – DODEC, HADI7, PEGR2, TOGL2, UTRIC

Shrubs: SAPE2, VAUL  
Mosses: SPHAG2, BRPS70, PHFO6

Notes: This system consists of NW and SE lobes connected by narrow corridor. Soil in each lobe mostly ranging from dry to damp, but nowhere wet. NW lobe is largely a hip-high shrub/sedge community. SE lobe is a mix of sedge and shrub/sedge community. Groundwater-fed wetness and closest approximation of short-statured fen flora found within connecting corridor. Probe: first obvious inorganic at 30cm; stopped due to resistance at 90cm.

13. 23-717

Elevation: 3900 feet  
Ecoclass: MW  
SRI SMU: 3 (meadows and marshland)  
TRS: 8N, 9E, S11  
Date: 8/20/2010  
Plants: Graminoids – ELQU2, ERIOP, CAUT  
Forbs – DODEC, HADI7, PEGR2  
Shrubs – SAPE2, VAUL

Notes: Soil moisture ranged from dry to damp, but nowhere wet. This is mostly a low biodiversity, SPDO-SALIX/CAUT community with extremely low moss cover. Probe: first obvious inorganic at 18cm, then +/- inorganic to 130+cm.

14. 8860-061

Elevation: 4100 feet  
Ecoclass: CF  
SRI SMU: 3 (meadows and marshland)  
TRS: 8N, 9E, S26  
Date: 8/20/2010  
Plants: Graminoids – CAEC, CAJO, JUEN  
Forbs - HADI7, PEGR2, TOGL2  
Shrubs - SAPE2, VAOX  
Mosses – AUPA70

Notes: A challenging site to interpret. Very sappy wet but hardly a typical short-statured GIP fen community in the dominance of PHFO6 (among mosses) and the apparent absence of fen regulars such as VAUL, CALLI10, insectivorous species, Sphagnum and the very low presence of TOGL2. Probe: resistant inorganic to firm base at 118cm.

15. Swampy Meadows(n)

Elevation: 3900 feet  
Ecoclass: MWCO  
SRI SMU: 3 (meadows and marshland)  
TRS: 8N, 9E, S23  
Date: 8/30/2010  
Plants: Graminoids – CAAQ, CAEC, CAJO, CALI7, ELQU2, ERIOP, JUEN  
Forbs - DODEC, DROSE, SCPAA3, HADI7, HYAN2, METR3, PEGR2, SPRO, TOGL2, UTRIC, HYAN2  
Shrubs - BEGL, KAMI, SAPE2, VAOX, VAUL  
Mosses – CALLI10, DRAD2, HEBL2, METR70, SPHAG2

Notes: This site is particularly notable for its combination of groundwater-fed wetness and high biodiversity. This is likely one of the best representatives of a short-statured/rich fen meadow complex on GIP NF. Probe: resistant organic, especially in upper 30cm; +/- organic to 130cm; clean.

16. 23-335

Elevation: 4500 feet  
Ecoclass: MW

SRI SMU: 3 (meadows and marshland)

TRS: 9N, 10E, S18

Date: 9/2/2010

Plants: Graminoids – CAEC, CAJO, CASCB, ELQU2, ERIOP

Forbs – DODEC, HADI7, HYAN2, SPRO, TOGL2

Mosses – SPHAG2, AUPA70

Notes: Very slight gradient, S to N (long axis) and W to E (cross axis); a +/- headwaters topographic setting. Small channel along E edge of meadow presumably active drainage at time of high surface flow. Greatest wetness at lower (N) end. Existing flora with mix of Wetland Indicator Status values, suggesting that groundwater influence at this site is not persistent. Low moss cover and absence of VAUL support this assessment. Probe: resistant inorganic to +/- firm base at 120cm.

17. 23/2329(s)

Elevation: 4100 feet

Ecoclass: Not mapped.

SRI SMU: Not mapped.

TRS: 9N, 10E, S7

Date: 9/2/2010

Plants: Graminoids – CAJO, CASCB, ELQU2

Forbs: DROSE, HADI7, PEGR2, TOGL2

Shrubs: KAMI

Mosses: WAEX, AUPA70, BRPS70, PHFO6

Notes: This is a small, roadside wetland with its groundwater source along the tree line on its upper eastern margin. Given the small size of this meadow, it includes a +/- large contingent of short-statured fen plants. Site is mostly sappy-wet and on a steep gradient; excess surface water is collected in a roadside drainage ditch. SAPE2, ELQU2 and CASCB are very abundant. Probe: resistant inorganic until stopped due to resistance at 95cm.

18. Takhtakh Meadow (2329 road)

Elevation: 4600 feet

Ecoclass: MWCO

SRI SMU: 3 (meadows and marshland)

TRS: 9N, 10E, S17

Date: 9/2/2010

Plants: Graminoids – CAEC, CASCB, ELQU2, ERIOP, JUEN

Forbs – HADI7, PEGR2, TOGL2

Shrubs – SAPE2, VAUL

Mosses – CACU18, DIPA20, SPHAG2, WAEX

Notes: Survey in meadow was restricted to a very narrow corridor immediately adjacent to the meadow edge along the 2329 road. This limited exploration suggests that the persistently dampest portion of this meadow is its western end (adjacent to 2329 road), and that the primary source of this water is groundwater expression along the meadow's SW edge. The 2329 road appears to have been constructed on top of this near-surface aquifer. Probe: resistant inorganic to a firm base at 70cm.

19. Takhtakh Meadow Trail (#134)

Elevation: 4600 feet

Ecoclass: MW

SRI SMU: 3 (meadows and marshland)

TRS: 9N, 10E, S17

Date: 9/2/2010

Plants: Graminoids – CAEC, CASCB, ELQU2, JUEN

Forbs - DODEC, HYAN2, PEGR2, SPRO, TOGL2

Shrubs – KAMI, SAPE2, VAUL

Mosses – SPHAG2, AUPA70, BRPS70, PHFO6

Notes: Squishy-wet and lower NE end meadow, sappy-wet at upper SW end of meadow. Probe: mixed resistance inorganic to firm base at 125cm.

20. Divide Camp Trailhead (2329 road)

Elevation: 4700 feet

Ecoclass: MW

SRI SMU: 3 (meadows and marshland)

TRS: 9N, 10E, S16

Date: 9/2/2010

Plants: Graminoids – CAREX

Forbs: POTEN

Notes: This is at best a spring-wet, late summer moist-dry meadow with little or no organic surface layer. Probe: none.

21. 24/8821

Elevation: 3700 feet

Ecoclass: SWCO

SRI SMU: 3 (meadows and marshland)

TRS: 6N, 9E, S10

Date: 9/21/2010

Plants: Graminoids – CAUT, JUBA

Forbs: POTAM

Shrubs: SALIX, SPDO

Mosses: DREPA3, AUPA70

Notes: Meadow is squishy wet with apparent deep peat layer, yet no part of system with more than minor presence of forbs or mosses. Open area at far S end is grassy, moist meadow on higher ground with an inorganic soil surface. Main meadow is very flat, lacking an obvious drainage direction (perhaps SSE?). Probe: no obvious inorganic layer, rather, an apparent +/- uniform mix of organic with minor inorganic component to point of stoppage due to resistance at 125cm.

22. 24/8821(w)

Elevation: 3700 feet

Ecoclass: MW

SRI SMU: Not mapped

TRS: 6N, 9E, S10

Date: 9/21/2010

Plants: Graminoids – CAUT

Forbs: NULUP

Shrubs: SPDO

Notes: N 1/2 of mdw is <3' SPDO; S 1/2 is CAUT on bare muck surrounding a largish pond with NULUP. Probe: none.

23. 8821(s)

Elevation: 3550 feet

Ecoclass: SWCO

SRI SMU: 3 (meadows and marshland)

TRS: 3550 feet

Date: 9/21/2010

Plants: Graminoids – CAAQ, CAEC, ELQU, ERIOP, JUEN, JUNE

Forbs – DODEC, PEGR2, HYAN2, SPARG

Shrubs – VAUL

Mosses – SPHAG2, AUPA70, BRPS70, PHFO6

Notes: Far SW end of meadow is very sappy with much standing water including a large ponding area and many large, long-dead shrubs (SALIX?). SPARG = 99% of live plant biomass in this area. Moving NE, pass through mosaic of communities featuring SALIX, SPDO and CAREX. Scant cover of forbs and mosses over most of this portion of meadow. Closest approximation of

groundwater-fed short-statured fen community is along W edge of NE end of meadow. Weakly developed channels are evident along the length of this remarkably flat, low gradient system. Geomorphological origin of this meadow is good question. Was this once a small lake? Probe: first obvious inorganic at 50cm and very resistant at 63-70cm, then very easy to 130+cm; fairly clean.

24. 8821(n)

Elevation: 3600 feet

Ecoclass: MWCO

SRI SMU: 3 (meadows and marshland)

TRS: 6N, 9E, S1 and 2

Date: 9/22/2010

Plants: Graminoids – CAAQ, CAEC, ELQU2, ERIOP, JUEN, JUNE

Forbs – DODEC, DROSE, SCPAA3, HADI7, HYAN2, METR3, PEGR2, SAOR2, SPRO, TOGL2

Shrubs – KAMI, SAPE2, VAOX, VAUL

Mosses – CALLI10, CACU18, DRAD2, HAVE70, HEBL2, METR70, SPHAG2, WAEX

Notes: This meadow includes a remarkable diversity of both plant association mosaics and species. Overall this is a very wet system with primary groundwater source/influence along the full length of the long southern edge. More short-statured/rich fen reference species were detected at this meadow complex than at any of the other 48 sites visited during the 2010\_fen\_bryo project. Probe: perhaps one or two exceedingly thin inorganic layers en route to an easy 130+cm; clean.

25. 8831-020

Elevation: 3500 feet

Ecoclass: MW

SRI SMU: 3 (meadows and marshland)

TRS: 7N, 9E, S32

Date: 9/23/2010

Plants: Graminoids – CAAQ, CAEC, ELQU2, ERIOP, JUEN, CAUT

Shrubs – SAPE2, VAUL, SPDO

Mosses – AUPA70, BRPS70, POLYT5

Notes: This site is evidently a seasonally wet meadow. Organic upper layer, which is mostly bare of mosses and forbs, is firm and nowhere more than damp. Probe: +/- inorganic to first obvious inorganic at 50cm; stopped due to resistance at 60cm.

26. 88-091

Elevation: 3500 feet

Ecoclass: MWCO

SRI SMU: 3 (meadows and marshlands)

TRS: 7N, 9E, S19

Date: 9/23/2010

Plants: Graminoids – CAAQ, CAEC, CALI7, ELQU2, ERIOP, JUEN, JUNE, CAUT

Forbs – DODEC, DROSE, METR3, SCPAA3, PEGR2, SAOR2, ASFO, NULUP

Shrubs – KAMI, SAPE2, VAOX, VAUL, SPDO

Mosses – CALLI10, DREPA3, SPHAG2, AUPA70, PHFO6

Notes: Two systems visited during this walkabout: 1) smaller system with SW-NE long axis (this system is +/- adjacent to 88-091 road) and 2) a more northern, larger, 2-part system on an E-W long axis. 1) SW lobe of this system occupied by a +/- uniformly 3-4' tall VALU-SALIX-SPDO/CAAQ community with no moss/forb presence. NE lobe similar but with greater presence of CAAQ. Good-sized creek (often 12' wide and 18-24" deep) flowing N then E along W side of mdw; took 20 minutes to find safe point to cross en route to system #2. Probe: none. 2) Overall a very wet, low-gradient system. Main body of E 1/2 is a dense shrub/sedge community with very low plant diversity. NE lobe is mosaic of large, shrub-less depressions, including a NUPHA pool with adjacent SCPAA3, and equally large, gently raised shrubby areas. W 1/2 of system is very wet, very flat, with mix of a low, sappy wet VAUL-SALIX/CAAQ community and a shrub-less version of

this community, much of which is too wet for entry with 12" tall rubber boots. There is little moss or forb cover in this W 1/2 of system. The most biodiverse portion of this system is the S edge of the E 1/2, particularly at the E end of the E-W corridor between the small forested "island" and the forested meadow edge to its S. Greatest extent of moss cover (mostly Sphagnum) within system occurs here. Identifying the groundwater sources in this system would be challenging but rewarding. Get sense that much of the wetness in this system is emergent groundwater that is slowly moving E in shallow sheet and channel flow. Probe (SCPAA site): +/- easy to 130+cm; little evidence of inorganic; clean.

27. South Prairie (66/6610)

Elevation: 3000 feet

Ecoclass: WL (lake, pond, impoundment, non-moving water)

SRI SMU: 3 (meadows and marshland)

TRS: 5N, 9E, S20

Date: 9/24/2010

Plants: Graminoids – CAAQ, CAEC, ELQU2, ERIOP, JUEN, CAUT

Forbs – DROSE, SCPAA3, HADI7, HYAN2, METR3, PEGR2, SAOR2, SPRO, TOGL2

Shrubs – KAMI, SAPE2, VAOX, VAUL, SALIX

Mosses – CALL10, CACU18, HEBL2, METR70, SPHAG2, AUPA70, BRPS70, PHFO6

Notes: Although referred to as a "bog" on a local interpretive sign, this wet meadow is clearly a very biodiverse fen with good size and a strong groundwater supply (apparently feeding from the NW flank of the Monte Cristo Range) along its SE edge. Within the set of 49 wetlands visited in the gip\_fen\_bryo\_2010 project, the richness of short-statured/rich fen reference plant species detected in this meadow system was exceeded only by that of the Swampy Meadows(n) and 8821(n) systems. Probe: +/- resistant but uniform organic to 130+cm.

#### Cowlitz Valley

28. 21, trl#7(s)

Elevation: 5000 feet

Ecoclass: MW

SRI SMU: 3 (meadows and marshland)

TRS: 11N, 10E, S28

Date: 8/31/2010

Plants: Forbs – CABI2, SETR, VERAT, POBI6

Notes: Evidently a seasonally wet meadow without persistent groundwater influence; little moss cover. Probe: none.

29. 21, trl#7(n)

Elevation: 4900 feet

Ecoclass: MW

SRI SMU: 3 (meadows and marshlands)

TRS: 11N, 10E, S4

Date: 8/31/2010

Plants: Graminoids – CAEC, CAJO, CASCB, ELQU2, ERIOP

Forbs – DODEC, HADI7, PEGR2, TOGL2, POBI6

Shrubs – SAPE2

Mosses – DIPA20, WAEX, PHFO6

Notes: System consists of an E lobe and a W lobe. Wettest portions of system (soppy wet) are the W portion of the E lobe and most of the W lobe. Very high moss cover in very wet portions, with robust WAEX dominant and PHFO6 abundant as well. Probe: +/- all inorganic to 130+cm; resistant early then easier.

30. 2150-405, trl#96(s)

Elevation: 4600 feet

Ecoclass: MW

SRI SMU: 3 (meadows and marshland)

TRS: 12N, 11E, S31

Date: 9/1/2010

Plants: Graminoids – CAAQ, CAEC, CASCB, ERIOP, JUEN

Forbs - DODEC, HADI7, HYAN2, TOGL2

Shrubs – SAPE2, VAUL

Mosses – SPHAG2, WAEX, BRPS70, PHFO6, SPSQ70

Notes: Most of this system is sappy wet. Numerous small channels move water across system to S. Most biodiverse part of system is the upper NE corner, where numerous spring brooks originate and drain SW into the main body of the system. Surface flow from this NE corner, rather than groundwater per se, may be the main cause of the general sappy-wetness of the main body of the meadow. Probe: none.

31. 2150-405, trl#96(ne)

Elevation: 4600 feet

Ecoclass: MSCO (alpine/subalpine moist meadow with some conifers)

SRI SMU: 3 (60-70%) and 15

TRS: 12N, 11E, S31

Date: 0/1/2010

Plants: Graminoids – JUEN

Forbs – HADI7, HYAN2, TOGL2, LUPIN

Mosses – SPHAG2, DREPA3, PHFO6, RHSQ70

Notes: With presence of a large lupine species, get impression that this is a seasonally wet meadow, yet surface water (standing or in shallow channels) is abundant. All day rain of 8/31 an important contributor to current wetness of this system? Meadow is within a +/- well-defined topographic drainage. Probe: none.

32. 2150-405, trl#96(nw)

Elevation: 4600 feet

Ecoclass: MWCO

SRI SMU: 3 (meadows and marshland)

TRS: 12N, 11E, S31

Date: 9/1/2010

Plants: Graminoids – CAEC, CAJO, CASCB, ELQU2, JUEN

Forbs – DODEC, HADI7, HYAN2, TOGL2

Mosses – CAST51, DREPA3, SPHAG2, BRFR70, PHFO6

Notes: Most of this meadow system has firm soil and little evidence of persistent groundwater influence. However, there are persistent seepage zones in the N and SE lobes of the N portion of this system. ELQU2 and PHFO6 are the dominant species in their respective veg classes in this meadow system. Probe: none.

33. 21-130

Elevation: 3900 feet

Ecoclass: MW

SRI SMU: 3 (meadows and marshland)

TRS: 11N, 10E, S3

Date: 9/1/2010

Plants: Graminoids – CAREX, SCIRP

Shrubs – Salix

Notes: Site is situated in an active drainage with a high volume of surface water in pools and in a complex of meandering channels. Mapped MW poly is essentially a Salix/Scirpus-Carex swamp. Probe: none.

34. 5130, mdw#1

Elevation: 4300 feet

Ecoclass: MW

SRI SMU: 3 (meadows and marshland)

TRS: 14N, 8E, S10

Date: 9/13/2010

Plants: Graminoids – CAJO, CASCB

Forbs – DODEC, HADI7, HYAN2, PEGR2, TOGL2

Mosses – DREPA3, SPHAG2

Notes: Most notable presence of short-statured/rich fen reference species restricted to very small area in seepage zone below a large pool in W half of meadow. Otherwise, this meadow is largely a willow/forb community with cover of grasses apparently exceeding that of sedges. Mosses are a minor component in meadow, overall. Probed: first obvious inorganic at 15cm and firm base at 38cm.

35. 5130, mdw#2

Elevation: 4750 feet

Ecoclass: MW

SRI SMU: 3 (meadows and marshland)

TRS: 14N, 8E, S10

Date: 9/13/2010

Plants: Forbs – PEGR2, LUPIN, POBI6, SETR, VERAT

Notes: This site clearly appears to be mis-mapped as a MW plant association. Site is forb-dominated over a damp, hard inorganic soil. Site could well be a former logging landing.

Probe: none.

36. 5222-016, mdw#1

Elevation: 3100 feet

Ecoclass: MW

SRI SMU: 3 (meadows and marshland)

TRS: 14N, 8E, S17

Date: 9/14/2010

Plants: Graminoids – CAEC, CAUT

Forbs – DODEC, HADI7, PEGR2, ASFO, CABI2

Shrubs – SALIX

Mosses – CALLI10

Notes: This is a very small mdw (20x40m) with adjacent Tsuga, Abies, Alnus, Oplopanax and SETR. A modest expression of groundwater influence and GW flora. VAUL and ELQU2 notably absent. Probe: first obvious inorganic at 30cm, then weakly evident inorganic to 130+cm.

37. 5222-016, mdw#2

Elevation: 3050 feet

Ecoclass: MWCO

SRI SMU: 3 (meadows and marshland)

TRS: 14N, 8E, S17

Date: 9/14/2010

Plants: Graminoids – CAEC, ELQU2, ERIOP, JUEN

Forbs – DODEC, DROSE, HADI7, HYAN2, METR3, PEGR2, TOGL2

Shrubs – KAMI, SAPE2

Mosses – DREPA3, HEBL2, SPHAG2

Notes: Overall, this site is very wet with a persistent groundwater supply. This is a remarkably flat, low-gradient meadow with numerous shallow, diffuse channels which are +/- confluent at the N edge of meadow and generating a very low volume (pint per minute) flow from meadow through border of cedar, alder skunk cabbage and lady fern. Probe (N edge): bit of obvious inorganic at 55cm, otherwise +/- easy organic to 130+cm.

38. 5222-016, mdw#3

Elevation: 3000 feet

Ecoclass: MW

SRI SMU: 3 (meadows and marshland)

TRS: 14N, 8E, S17

Date: 9/14/2010

Plants: Graminoids – CAEC, ERIOP, JUEN

Forbs – DODEC, DROSE, HADI7, METR3, PEGR2, TOGL2

Shrubs: -SAPE2

Mosses – CALLI10, SPHAG2, AUPA70, SCAPA, MAPO16

Notes: Site overall is quite wet with groundwater. This meadow is included within a low-gradient, +/- first order drainage system surrounded by only slightly higher terrain. Probe (W end): first obvious inorganic at 30cm, then mixed densities and interpretation of organic vs. inorganic to 130+cm.

39. 5222-016, mdw#4

Elevation: 3000 feet

Ecoclass: MW

SRI SMU: 3 (meadows and marshland)

TRS: 14N, 8E, S17

Date: 9/14/2010

Plants: Graminoids – CAEC, CALAA, JUEN, CAUT

Forbs – DODEC, DROSE, HYAN2, PEGR2, TOGL2, UTRIC

Mosses – CALLI10, AUPA70, BRPS70, PHFO6

Notes: Site overall is quite wet with groundwater. Beaver activity evident locally. This meadow is included within a low-gradient, +/- first order drainage system surrounded by only slightly higher terrain. Probe: +/- easy until abruptly stopped due to resistance at 120cm.

40. 5222-016, mdw#5

Elevation: 3200 feet

Ecoclass: MW

SRI SMU: W (water-covered area)

TRS: 14N, 8E, S17

Date: 9/15/2010

Plants: Forbs – LYAM3

Shrubs – SPDO

Mosses – FONTI

Notes: This site, which is largely a 3-4' tall SPDO thicket, is apparently very wet early in the season, due perhaps to a combination of both surface flow and groundwater discharge. This wetness is not sustained. Probe: none.

41. 8460

Elevation: 4100 feet

Ecoclass: MW

SRI SMU: 17

TRS: 14N, 8E, S30

Date: 9/15/2010

Plants: Forbs – ASFO, SETR

Shrubs – VACCI

Mosses – DREPA3, BRACH10, BRYUM2

Notes: This site is apparently a spring (season)-wet, late summer-moist/dry meadow. It is dominated by forbs and grasses with some VACCI. Surface organic layer is thin or absent. Probe: none.

42. 84-122

Elevation: 4100 feet

Ecoclass: MW

SRI SMU: 3 (meadows and marshland)

TRS: 13N, 8E, S5

Date: 9/15/2010

Plants: Graminoids – BROMU, POA  
Forbs – ASTER, VERAT, LUPIN  
Shrubs – SPIRA, VACCI  
Mosses – POLYT5, RACOM

Notes: This is a grass-forb-dominated meadow which is apparently spring (season)-wet and late summer moist/dry. Moss cover is slight. Surface organic layer thin or absent. Probe: none.

43. 84/47

Elevation: 3200 feet

Ecoclass: MW

SRI SMU: 3 (meadows and marshland)

TRS: 13N, 8E, S9

Date: 9/15/2010

Notes: Did not enter this meadow, but observed from road edges above. This site is immediately W of the topographic divide between the Silver Ck. drainage (W) and the Willame Ck. drainage (E). This is a shrub-dominated meadow that is likely predominantly influenced by surface water rather than groundwater. Three small perennial creeks flow out of the steep slopes NE of the meadow, under the 84 road via culverts, and into the NE corner of the meadow. Probe: none.

44. 4740

Elevation: 3800 feet

Ecoclass: MW

SRI SMU: 3 (meadows and marshland)

TRS: 13N, 8E, S9

Date: 9/15/2010

Notes: This site not entered on foot, but simply observed from adjacent roadside. This site is a small willow/sedge mudflat on the E end of a long pond. Wetness at this site appears to be directly influenced by the water level of the pond. Probe: none.

45. 4730, mdw#1

Elevation: 3900 feet

Ecoclass: SWCO (shrub wetland, shrub meadow with some conifers)

SRI SMU: 3 (meadows and marshland)

TRS: 13N, 8E, S21

Date: 9/15/2010

Plants: Graminoids – BROMU, POA  
Forbs – ASTER, VERAT, SETR

Notes: This is a spring (season)-wet. late summer-dry meadow dominated by grasses and forbs. Organic surface layer either thin or absent. Probe: none.

46. 4730, mdw#2

Elevation: 3900 feet

Ecoclass: MW

SRI SMU: 3 (meadows and marshland)

TRS: 13N, 8E, S21

Date: 9/15/2010

Plants: Forbs – PTAQ, SETR, VERAT  
Shrubs – VACCI

Notes: This is a spring (season)-wet, late summer-moist/dry meadow with little or no persistent groundwater influence. Probe: none.

47. 4772, mdw#1

Elevation: 3900 feet

Ecoclass: MW

SRI SMU: 3 (meadows and marshland)

TRS: 13N, 8E, S20

Notes: Other than two short in-and-out transects, this system was not entered, but observed from higher ground to the N. This meadow exists within a topographically well-developed drainage with intermittent surface flow. Vegetation appears to be principally tall (10-12') SALIX thicket with little understory and thicket gaps occupied by a +/- monoculture of tall CAREX. Probe: none.

48.4720, mdw#1

Elevation: 4000 feet

Ecoclass: MW

SRI SMU: 3 (meadows and marshland)

TRS: 14N, 8E, S34

Date: 9/15/2010

Plants: Graminoids – CAAQ, CAJO, ERIOP, JUEN, SCIRP

Forbs –PEGR2, ASFO, CABI2, EQUIS

Shrubs – SAPE2

Bryophytes – DIPA20, SPHAG2, WAEX, BRPS70, DIPA20, PHFO6, PELLI, RHMA12,

SPSQ70

Notes: Much of this meadow is soppy wet or with shallow standing water. Slope is very gentle and drainage is to the E or ENE. At least two small surface flows enter from wooded slope to W, but each channel soon disappears within meadow. Dominant vascular plants = SALIX/CAAQ. Dominant mosses = DREPA3 and PHFO6. Probe: very resistant inorganic to 60cm, then easier until stopped due to resistance at 120cm.

49.4720, mdw#2

Elevation: 4150 feet

Ecoclass: MW

SRI SMU: 3 (meadows and marshland)

TRS: 13N, 8E, S2

Date: 9/16/2010

Plants: Forbs – ATHYR, CABI2, DELPH, EQUIS, GALIU, SETR, VERAT

Shrubs – SALIX, VACCI

Bryophytes – BRWE70, COCO38, PLAGI7, RHMA12, RHSQ70

Notes: Meadow sits on +/- bench in otherwise topographically well-defined, steep-walled valley bottom which is high in drainage system. Major past logging above meadow, both within valley and on slope to SW. Meadow has two major plant communities: 1) in S portion a +/- balance of shrubs and forbs, 2) in N portion, tall (6-10') Salix with and understory of CABI2 and a branched EQUIS. Two channels drain this meadow; one, now dry, appears to carry the higher volume early season runoff and a smaller second channel, which carries very low volume perennial groundwater seepage. Probe: none.

## Appendix B

Project sites with included area(s) that tentatively qualify as fen (peat layer  $\geq$  40 cm as determined by soil probe)

<b>Mt. Adams RD</b>	<b>Site</b>	<b>Peat thickness</b>
	8821(n)	130+
	Swampy(n)	130+
	S. Prairie	130+
	88-091	130+
	Swampy(s)	60
	32-716	120
	32 (Meadow Ck)	130+
	8810	75
	8860-721	35-40
	8821(s)	50
	3011-020	130+
	24-8821	125
<b>Cowlitz Valley RD</b>	5222-016, mdw 2	130+
	5222-016, mdw 4	120

## Appendix C

Plants observed within GIP fen candidate sites

	<b>Species</b>	<b>Code</b>
<b>Graminioids</b>	Bromus sp.	BROMU
	Carex aquatilis	CAAQ
	Carex echinata	CAEC
	Carex jonesii	CAJO
	Carex lasiocarpa var. americana	CALAA
	Carex limosa	CALI7
	Carex scopulorum var. bracteosa	CASCB
	Carex utriculata	CAUT
	Eleocharis quinqueflora	ELQU2
	Eriophorum sp.	ERiop
	Juncus balticus	JUBA
	Juncus ensifolius	JUEN
	Juncus nevadensis	JUNE
	Poa sp.	POA
	Scirpus sp.	SCIRP
<b>Forbs</b>	Aster foliaceus	ASFO
	Athyrium sp.	ATHYR
	Caltha biflora	CABI2
	Delphinium sp.	DELPH
	Dodecatheon sp.	DODEC
	Drosera sp. (D. anglica and/or D. rotundifolia)	DROSE
	Equisetum sp.	EQUIS
	Galium sp.	GALIU
	Habenaria dilitata (= Platanthera dilata)	HADI7
	Hypericum anagalloides	HYAN2
	Lupinus sp.	LUPIN
	Lysichiton americanus	LYAM3
	Menyanthes trifoliata	METR3
	Nuphar lutea ssp. polysepala	NULUP
	Pedicularis groenlandica	PEGR2
	Polygonum bistortoides	POBI6
	Potamogeton sp.	POTAM
	Potentilla sp.	POTEN
	Pteridium aquilinum	PTAQ
	Saxifraga oregana	SAOR2
	Scheuchzeria palustris ssp. americana	SCPAA3
	Senecio triangularis	SETR
	Sparganium sp.	SPARG
	Spiranthes romanzoffiana	SPRO
	Tofieldia glutinosa (= Triantha glutinosa)	TOGL2
	Utricularia sp.	UTRIC
	Veratrum sp.	VERAT

**Shrubs**

Alnus sp.	ALNUS
Betula glandulosa	BEGL
Kalmia microphylla	KAMI
Rubus sp.	RUBUS
Salix sp.	SALIX
Salix pedicellaris	SAPE2
Spiraea douglasii	SPDO
Spiraea sp.	SPIRA
Vaccinium sp.	VACCI
Vaccinium oxycoccos	VAOX
Vaccinium uliginosa	VAUL

**Bryophytes**

Aulacomnium palustre	AUPA70
Brachythecium sp.	BRACH10
Bryum pseudotriquetrum	BRPS70
Bryum weigeli	BRWE70
Bryum sp.	BRYUM2
Calliergonella cuspidata	CACU18
Calliergon sp.	CALLI10
Campylium stellatum	CAST51
Conocephalum conicum	COCO38
Dicranella palustris	DIPA20
Drepanocladus aduncus	DRAD2
Drepanocladus sp.	DREPA3
Fontinalis sp.	FONTI
Hamatocaulis vernicosus	HAVE70
Helodium blandowii	HEBL2
Marchantia polymorpha	MAPO16
Meesia triquetra	METR70
Pellia sp.	PELLI
Philonotis fontana	PHFO6
Plagiomnium sp.	PLAGI7
Polytrichum sp.	POLYT5
Racomitrium sp.	RACOM
Rhizomnium magnifolium	RHMA12
Rhytidiadelphus squarrosus	RHSQ70
Scapania sp.	SCAPA
Sphagnum sp.	SPHAG2
Sphagnum squarrosum	SPSQ70
Warnstorfia exannulata	WAEX

## Appendix D

### Fen reference taxa by site

Graminoids		Swampy(s)	8860-721	8810	8100(n)	8100(s)
	CAAQ					
	CAEC	X		X		
	CAJO	X				
	CALAA	X				
	CALI7					
	CASCB					
	ELQU2	X	X	X		
	ERIOP	X	X	X		
	JUEN		X			
	JUNE	X				
Forbs						
	DODEC	X		X		
	DROSE	X		X		
	HADI7	X	X	X		
	HYAN2					
	METR3		X			
	MIPR					
	PEGR2	X	X	X		
	SAOR2					
	SCPAA3					
	SPRO					
	TOGL2	X	X	X		
	UTRIC	X	X			
Shrubs						
	B EGL	X	X			
	KAMI					
	SAPE2					
	VAOX			X		
	VAUL	X	X	X		
Mosses						
	CALLI10	X		X		
	CACU18					
	CAST51		X	X		
	DIPA20					
	DRAD2					
	DREPA3					
	HAVE					
	HEBL2					
	METR70	X	X	X		
	SPHAG2	X				
	WAEX					
TOTAL		17	11	13	0	0

Appendix D (cont)

	83-250	83-380	32 (Mdw Ck)	32-716	32/3011	3011-020
CAAQ			X	X		
CAEC	X	X	X			
CAJO						
CALAA						
CALI7						
CASCB						
ELQU2	X		X	X	X	
ERIOP	X		X	X	X	X
JUEN	X	X	X		X	
JUNE				X		
DODEC						
DROSE	X	X	X	X		X
HADI7		X	X		X	
HYAN2	X		X	X		
METR3	X	X		X		X
MIPR						
PEGR2	X			X		X
SAOR2						
SCPAA3						
SPRO				X		
TOGL2	X		X	X	X	
UTRIC		X		X		
BEGL			X	X	X	
KAMI		X				
SAPE2			X	X		X
VAOX	X	X		X		X
VAUL	X	X	X	X	X	X
CALLI10	X		X			
CACU18						
CAST51			X			
DIPA20	X					
DRAD2						
DREPA3		X	X			
HAVE						
HEBL2						
METR70						
SPHAG2	X		X	X		X
WAEX	X			X		
	15	10	16	17	7	8

Appendix D (cont)

	8860-722	23-717	8860-061	Swampy(n)	21-trl#7(s)	21-trl#7(n)
CAAQ	X			X		
CAEC			X	X		X
CAJO			X	X		X
CALAA						
CALI7				X		
CASCB						X
ELQU2	X	X		X		X
ERIOP	X	X		X		X
JUEN	X		X	X		
JUNE						
DODEC	X	X		X		X
DROSE				X		
HADI7	X	X	X	X		X
HYAN2				X		
METR3				X		
MIPR						
PEGR2	X	X	X	X		X
SAOR2						
SCPA3				X		
SPRO				X		
TOGL2	X		X	X		X
UTRIC	X			X		
BEGL				X		
KAMI				X		
SAPE2	X	X	X	X		X
VAOX			X	X		
VAUL	X	X		X		
CALLI10				X		
CACU18						
CAST51						
DIPA20						X
DRAD2				X		
DREPA3						
HAVE						
HEBL2				X		
METR70				X		
SPHAG2	X			X		
WAEX						X
	12	7	8	27	0	12

Appendix D (cont)

	2150-405 trl#96(s)	2150-405 trl#96(ne)	2150-405 trl#96(nw)	21	23-335	23/2329(S)
CAAQ	X					
CAEC	X		X		X	
CAJO			X		X	X
CALAA						
CALI7						
CASCB	X		X		X	X
ELQU2			X		X	X
ERIOP	X				X	
JUEN	X	X	X			
JUNE						
DODEC	X		X		X	
DROSE						X
HADI7	X	X	X		X	X
HYAN2	X	X	X		X	
METR3						
MIPR						
PEGR2						X
SAOR2						
SCPAA3						
SPRO					X	
TOGL2	X	X	X		X	X
UTRIC						
BEGL						
KAMI						X
SAPE2	X					
VAOX						
VAUL	X					
CALLI10						
CACU18						
CAST51			X			
DIPA20						
DRAD2						
DREPA3						
HAVE						
HEBL2						
METR70						
SPHAG2	X	X	X		X	
WAEX	X					X
	13	5	11	0	11	9

Appendix D (cont)

	2329-Takh takh Mdw	2329-Takh takh trl#134	2329-Divide Camp	5230-mdw 1	5230-mdw 2	5222-016 mdw 1
CAAQ						
CAEC	X	X				X
CAJO				X		
CALAA						
CALI7						
CASCB	X	X		X		
ELQU2	X	X				
ERIOP	X					
JUEN	X	X				
JUNE						
DODEC		X		X		X
DROSE						
HADI7	X			X		X
HYAN2		X		X		
METR3						
MIPR						
PEGR2	X	X		X	X	X
SAOR2						
SCPAA3						
SPRO		X				
TOGL2	X	X		X		
UTRIC						
BEGL						
KAMI		X				
SAPE2	X	X				
VAOX						
VAUL	X	X				
CALLI10						X
CACU18	X					
CAST51						
DIPA20	X					
DRAD2						
DREPA3				X		
HAVE						
HEBL2						
METR70						
SPHAG2	X	X		X		
WAEX	X					
	14	13	0	9	1	5

Appendix D (cont)

	5222-016 mdw 2	5222-016 mdw 3	5222-016 mdw 4	5222-016 mdw 5	8460	84-122
CAAQ						
CAEC	X	X	X			
CAJO						
CALAA			X			
CALI7						
CASCB						
ELQU2	X					
ERIOP	X	X				
JUEN	X	X	X			
JUNE						
DODEC	X	X	X			
DROSE	X	X	X			
HADI7	X	X				
HYAN2	X		X			
METR3	X	X				
MIPR						
PEGR2	X	X	X			
SAOR2						
SCPAA3						
SPRO						
TOGL2	X	X	X			
UTRIC			X			
BEGL						
KAMI	X					
SAPE2	X	X				
VAOX						
VAUL						
CALLI10	X	X	X			
CACU18						
CAST51						
DIPA20						
DRAD2						
DREPA3	X				X	
HAVE						
HEBL2	X					
METR70						
SPHAG2	X	X				
WAEX						
	17	12	10	0	1	0

Appendix D (cont)

	84/47	4740	4730 mdw 1	4730 mdw 2	4730 mdw 3	4720 mdw 1
CAAQ						X
CAEC						
CAJO						X
CALAA						
CALI7						
CASCB						
ELQU2						
ERIOP						X
JUEN						X
JUNE						
DODEC						
DROSE						
HADI7						
HYAN2						
METR3						
MIPR						
PEGR2						X
SAOR2						
SCPAA3						
SPRO						
TOGL2						
UTRIC						
BEGL						
KAMI						
SAPE2						X
VAOX						
VAUL						
CALLI10						
CACU18						
CAST51						
DIPA20						X
DRAD2						
DREPA3						
HAVE						
HEBL2						
METR70						
SPHAG2						X
WAEX						X
	0(?)	0(?)	0	0	0	9

Appendix D (cont)

	4720 mdw 2	24/8821	24-8821 (w)	8821(s)	8821(n)	8831-020
CAAQ				X	X	X
CAEC				X	X	X
CAJO						
CALAA						
CALI7						
CASCB						
ELQU2				X	X	X
ERIOP				X	X	X
JUEN				X	X	X
JUNE				X	X	
DODEC				X	X	
DROSE					X	
HADI7					X	
HYAN2				X	X	
METR3					X	
MIPR						
PEGR2				X	X	
SAOR2					X	
SCPAA3					X	
SPRO					X	
TOGL2					X	
UTRIC						
BEGL						
KAMI					X	
SAPE2					X	X
VAOX					X	
VAUL				X	X	X
CALLI10					X	
CACU18					X	
CAST51						
DIPA20						
DRAD2					X	
DREPA3		X				
HAVE					X	
HEBL2					X	
METR70					X	
SPHAG2				X	X	
WAEX					X	
	0	1	0	11	28	7

Appendix D (cont)

	88-091	S. Prairie
CAAQ	X	X
CAEC	X	X
CAJO		
CALAA		
CALI7	X	
CASCB		
ELQU2	X	X
ERIOP	X	X
JUEN	X	X
JUNE	X	
DODEC	X	
DROSE	X	X
HADI7		X
HYAN2		X
METR3	X	X
MIPR		
PEGR2	X	X
SAOR2	X	X
SCPAA3	X	X
SPRO		X
TOGL2		X
UTRIC		
BEGL		
KAMI	X	X
SAPE2	X	X
VAOX	X	X
VAUL	X	X
CALLI10	X	X
CACU18		X
CAST51		
DIPA20		
DRAD2		
DREPA3	X	
HAVE		
HEBL2		X
METR70		X
SPHAG2	X	X
WAEX		
	20	23

## Appendix E

Working list of fen reference taxa for Deschutes, Fremont-Winema and Gifford Pinchot National Forests.

<b>Deschutes NF Graminoids</b>	<b>Chemult RD, FWI NF Graminoids</b>	<b>Gifford Pinchot NF Graminoids</b>
CAAQ	CAAQ	CAAQ
CACA13	CACA13	CAEC
CAEC	CAEC	CAJO
CAJO	CAJO	CALAA
CALAA	CALAA	CALI7
CALI7	CASI2	CASCB
CASI2	ELQU2	ELQU2
ELQU2	ERGR8	ERIOP
ERGR8	JUEN	JUEN
JUEN	JUNE	JUNE
JUNE		
JUOR		
<b>Forbs</b>	<b>Forbs</b>	<b>Forbs</b>
DODEC	DODEC	DODEC
DROSE	DROSE	DROSE
HADI7	HADI7	HADI7
HYAN2	HYAN2	HYAN2
METR3	METR3	METR3
MIPR	MIPR	MIPR
PEGR2	PEGR2	PEGR2
SAOR2	SAOR2	SAOR2
SCPAA3	SPRO	SCPAA3
SPRO	UTRIC	SPRO
TOGL2		TOGL2
UTRIC		UTRIC
<b>Shrubs</b>	<b>Shrubs</b>	<b>Shrubs</b>
B EGL	B EGL	B EGL
KAMI	VAUL	KAMI
VAUL		SAPE2
VAOX		VAOX
<b>Mosses</b>	<b>Mosses</b>	<b>Mosses</b>
CALLI10	CACU18	CALLI10
CACU18	CATR27	CACU18
DRAD2	DREPA3	CAST51
HAVE70	HEBL2	DIPA20
HEBL2	METR70	DRAD2
METR70	SPAM5	HAVE70
PLEL2	SPHAG2	HEBL2
SPHAG2	TONI70	METR70
TONI70		SPHAG2
		WAEX
<b>TOTAL</b>	<b>TOTAL</b>	<b>TOTAL</b>
37	30	37

## Appendix F

### Wetland Indicator Status of fen reference taxa

	Code	Scientific Name	NRCS-WIS, R9
<b>Graminoids</b>			
	CAAQ	Carex aquatilis	OBL
	CACA13	Carex capitata	FAC
	CAEC	Carex echinata	NI
	CAJO	Carex jonesii	FACW+
	CALAA	Carex lasiocarpa var. americana	OBL
	CALI7	Carex limosa	OBL
	CASCB	Carex scopulorum var. bracteosa	FACW
	CASI2	Carex simulata	OBL
	ELQU2	Eleocharis quinqueflora	OBL
	ERGR8	Eriophorum gracile	OBL
	ERIOP	Eriophorum sp.	OBL
	JUEN	Juncus ensifolius	FACW
	JUNE	Juncus nevadensis	FACW
	JUOR	Juncus orthophyllus	FACW
<b>Forbs</b>			
	DODEC	Dodecatheon	
	DOJE	Dodecatheon jeffreyi	FACW+
	DROSE	Drosera	OBL
	HADI7	Habenaria dilatata	FACW+
	HYAN2	Hypericum anagalloides	OBL
	METR3	Menyanthes trifoliata	OBL
	MIPR	Mimulus primuloides	FACW+
	PEGR2	Pedicularis groenlandica	OBL
	SAOR2	Saxifraga oregana	FACW+
	SCPAA3	Scheuchzeria palustris ssp. americana	OBL
	SPRO	Spiranthes romanzoffiana	FACW
	TOGL2	Tofieldia glutinosa	OBL
	UTRIC	Utricularia	OBL
<b>Shrubs</b>			
	B EGL	Betula glandulosa	OBL
	KAMI	Kalmia microphylla	FACW+
	SAPE2	Salix pedicellaris	OBL
	VAOX	Vaccinium oxycoccos	OBL
	VAUL	Vaccinium uliginosum	FACW+
<b>Mosses*</b>			

Mosses are not currently assigned NRCS WIS values.

**Appendix G** (next page)

Fen reference taxon incidence, soil probe data and fen status by site.

Site	FRT	Soil Probe (cm)	Fen (?)
8821(n)	28	130+	Yes
Swampy(n)	27	130+	Yes
S. Prairie	23	130+	Yes
88-091	20	130+	Yes
Swampy(s)	17	60	Yes
32-716	17	120	Yes
5222-016, mdw 2	17	130+	Yes
32 (Meadow Ck)	16	130+	Yes
83-250	15	~~	Probable
2329 (Takhtakh Mdw)	14	0	No**
8810	13	75	Yes
2150-404, trl#96(s)	13	~~	?
2329 (Takhtakh trl#134)	13	0	No
8860-722	12	30	No
21, trl#7(n)	12	0	No*
5222-016, mdw 3	12	30	No*
8860-721	11	35-40	Yes
2150-405, trl#96(nw)	11	~~	?
23-335	11	0	No
8821(s)	11	50	Yes
83-380	10	~~	?
5222-016, mdw 4	10	120	Yes
23/2329(s)	9	0	No**
5230, mdw 1	9	15	No
4720 mdw 1	9	0	No**
3011-020	8	130+	Yes
8860-061	8	0	No
32/3011	7	~~	?
23-717	7	18	No
8831-020	7	0	No
2150-405, trl#96(ne)	5	~~	?
5222-016, mdw 1	5	30	No*
5230, mdw 2	1	***	No
8460	1	***	No
24/8821	1	125	Yes
8100(n)	0	0	No
8100(s)	0	~~	?
21, trl#7(s)	0	***	No
21-130	0	***	No
2329, Divide Camp	0	***	No
5222-016, mdw 5	0	***	No
84-122	0	***	No
84/47	0*	***	No
4740	0*	***	No
4730, mdw 1	0	***	No
4730, mdw2	0	***	No
4730, mdw 3	0	***	No
4720, mdw	0	***	No
24-8821(w)	0	~~	?

## Appendix G (cont)

### Notes:

- 1) \*\*\* = no soil probe because little or no evidence of either peat or persistent groundwater presence at or near soil surface.
- 2) ~~ = presence of groundwater-fed surface wetness or vegetation indicating strong groundwater influence but soil probe inadvertently not conducted.
- 3) "0\*" = site not actually entered, but observed from edge.
- 4) "No\*" = site apparently without portions qualifying as fen (due to lack of sufficient peat thickness) but nevertheless, site with surface persistently wet and peaty.
- 5) "No\*\*" = site with portions persistently wet near surface and fen-like vegetative character, but apparently lacking an organic soil layer.
- 6) "?" = Site with possibility that some portions may qualify as fen but soil probes inadvertently not conducted.

## Appendix H

Moss target species and other plants of interest detected at project sites

Site / Fen?	CAST51	HEBL2	METR70	CALAA	SCPAA3	UTRIC	DROSE
8821(n) / <b>Yes</b>		<b>x</b>	<b>x</b>		<b>x</b>		<b>x</b>
Swampy(n) / <b>Yes</b>		<b>x</b>	<b>x</b>		<b>x</b>	<b>x</b>	<b>x</b>
S. Prairie / <b>Yes</b>		<b>x</b>	<b>x</b>		<b>x</b>		<b>x</b>
88-091 / <b>Yes</b>					<b>x</b>		<b>x</b>
Swampy(s) / <b>Yes</b>			<b>x</b>	<b>x</b>		<b>x</b>	<b>x</b>
32-716 / <b>Yes</b>						<b>x</b>	<b>x</b>
5222-016, mdw 2 / <b>Yes</b>		<b>x</b>					<b>x</b>
32, Meadow Ck / <b>Yes</b>	<b>x</b>						<b>x</b>
83-250 / Probable							<b>x</b>
8810 / <b>Yes</b>	<b>x</b>		<b>x</b>				<b>x</b>
8860-722 / No						<b>x</b>	
5222-016, mdw 3 / No							<b>x</b>
8860/721 / <b>Yes</b>	<b>x</b>		<b>x</b>			<b>x</b>	
2150-405, trl#96(nw) / ?	<b>x</b>						
83-380 / ?						<b>x</b>	<b>x</b>
5222-016, mdw 4 / <b>Yes</b>				<b>x</b>		<b>x</b>	<b>x</b>
23/2329(s) / No							<b>x</b>
3011-020 / <b>Yes</b>							<b>x</b>