STUDY PLAN
SAMPLING OF THE POLYGONS PHOTOINTERPRETED FOR POSSIBLE FENS ON THE GRAND MESA-UNCOMPAHGRE-GUNNISON NATIONAL FOREST, COLORADO

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A fen in upper Middle Beaver Creek, on the Norwood Ranger District

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A. Introduction

As part of on-going resource management and forest planning activities, the Grand Mesa-Uncompahgre-Gunnison National Forests (GMUG) began an effort in 2008 to better understand the abundance and distribution of fens on lands managed by the GMUG. To complete this effort, the forest assembled a multi-disciplinary team composed of specialists in soil science, geology/hydrogeology, hydrology, botany and range management. This group, called the Fen Technical Working Group was directed by forest leadership via a Steering Committee to provide information in three areas:

- Distribution and Inventory of Fens and Associated Wetlands
- Evaluation of the Condition of Fens and Associated Wetlands
- Management Implications and Best Management Practices for Fens and Wetlands

With respect to distribution and inventory of fens, an estimate of the number and size of fens on the GMUG is a desired outcome. With respect to condition of fens, the desired outcome includes what effects have management and use had on fens.

The GMUG covers about 3.2 million acres in Western Colorado in a large range of elevations, ecosystems, topographic terrain, and geologic and hydrologic settings. The size of the forest along with variability in the natural settings make it so that not every fen could be physically visited, and therefore required developing a systematic approach to address the distribution and condition of fens.

To effectively approach the project, the Fen Technical Working Group began by compiling data from current and ongoing fen monitoring and research projects, and continued by using photointerpretation methods to identify potential fens, applying stratification techniques to establish a field verification sample size, amassing existing field verification protocols to develop a site-specific field protocol, and finally conduct field verification work. Details on this approach are discussed in the following sections.

B. Data from Current and Ongoing Fen Monitoring and Research

Several monitoring and research projects have been conducted on GMUG fens in the past decade. These studies have resulted in knowledge about some fens on the Grand Mesa, the Northern San Juan mountains near Telluride, portions of the La Garita mountains, and the Taylor Park area (see Figure 1). Data collected to date from recent fen inventories is shown in Table 1. Where applicable, references to these studies are listed in the bibliography.

Table 1. Fens of the Grand Mesa-Uncompahgre-Gunnison National Forest. Areas are shown in Figure 1 by different colored outlines. No fens have yet been detected in the Cochetopa-Gunnison, Uncompahgre Plateau, and West Elks Areas.

	All GMUG		Grand Mesa		La Garita		San Juans		Taylor Park	
Wetland Type	Poly-gons	Acres	Poly-gons	Acres	Poly-gons	Acres	Poly-gons	Acres	Poly-gons	Acres
Fen	199	1,070	73	498			113	531	13	41
Fen Complex	49	3,215					27	1,961	22	1,254
Former Fen - Modified Fen	14	426	12	393	1	31	1	1		
	262	4,711	85	891	1	31	141	2,493	35	1,295

Known fens and fen complexes comprise about 0.15% of the land mass in the Grand Mesa-Uncompahgre-Gunnison National Forest (shown on Figure 1). This amounts to about one acre of fen in approximately every 670 acres. These data are maintained in a relational data base contained within a Personal Geodatabase in ArcGIS.

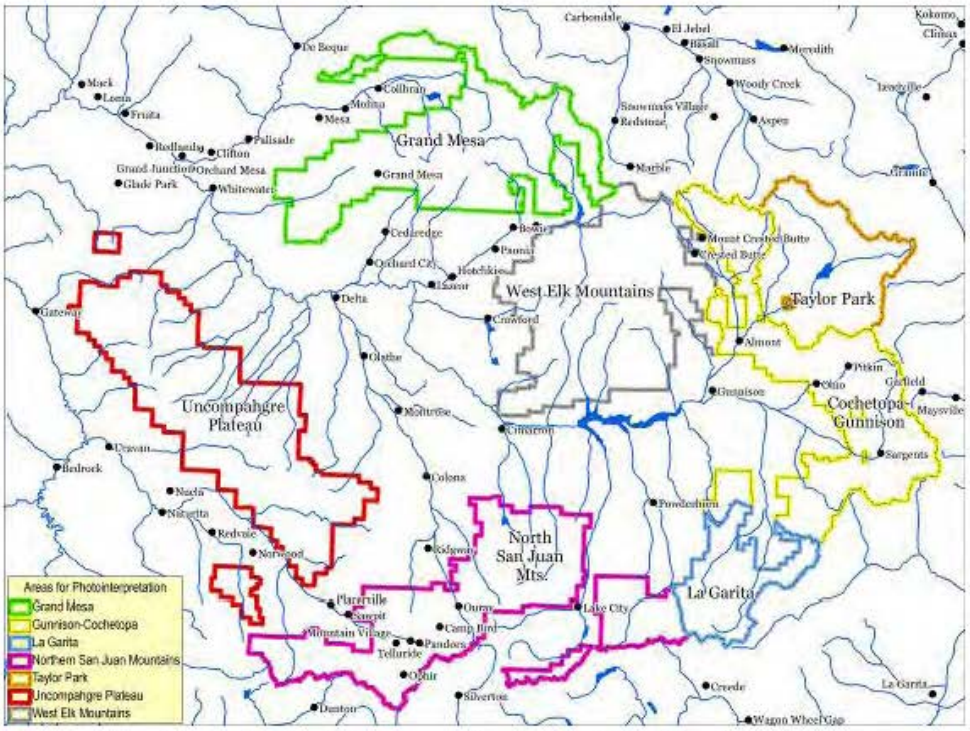

Figure 1. Areas of the Grand Mesa-Uncompahgre-Gunnison National Forest where fens exist, and the geographic divisions used for photointerpretation.

C. Photointerpretation

To begin understanding the distribution of potential fens across the forest and to begin estimating the acreage of these features, we completed a forest-wide photointerpretation project in October 2008. We used adaptations of the method used by Mark Roper on the San Juan National Forest (Roper 2008), with some modifications based on similar work in Wyoming by Bonnie Heidel in Wyoming (Heidel and Jones 2006-Heidel and Rodemaker 2008). For photointerpretation purposes, we divided the National Forest into seven broad geographic areas, shown in Figure 1. These seven areas used for photointerpretation were chosen for manageability of data and convenience rather than based on ecological landscapes.

The photointerpretation was done during August-October 2008 using 5,982 natural-color aerial photos at a scale of 1:15,840, taken in 2005. The same individual completed the photointerpretation to ensure consistent results. When a potential fen feature was identified on a photo, the area was examined using a stereoscope, and verified on-screen (with NAIP 2005 photography from the Arc Image Server). If a polygon was considered to be a potential fen, it was digitized on-screen as a polygon in a GIS Geodatabase. These data are shown on Figure 2. Potential fens identified on photos were combined with data from previous studies and inventories described in the previous section (included in Figure 2).

Table 2 displays the acreage of each geographic area, the number of photos for a particular area, the number of potential fen polygons and the estimated acreage as calculated in GIS. The results of the photointerpretation identified 3,341 potential fen polygons, covering an estimated 17, 195 acres, about 0.6 % of the land under GMUG administration. The photointerpretation results suggest a concentration of fens in Taylor Park and the Grand Mesa geographic areas (Figure 1), followed by the Northern San Juan Mountains and West Elk Mountains areas.

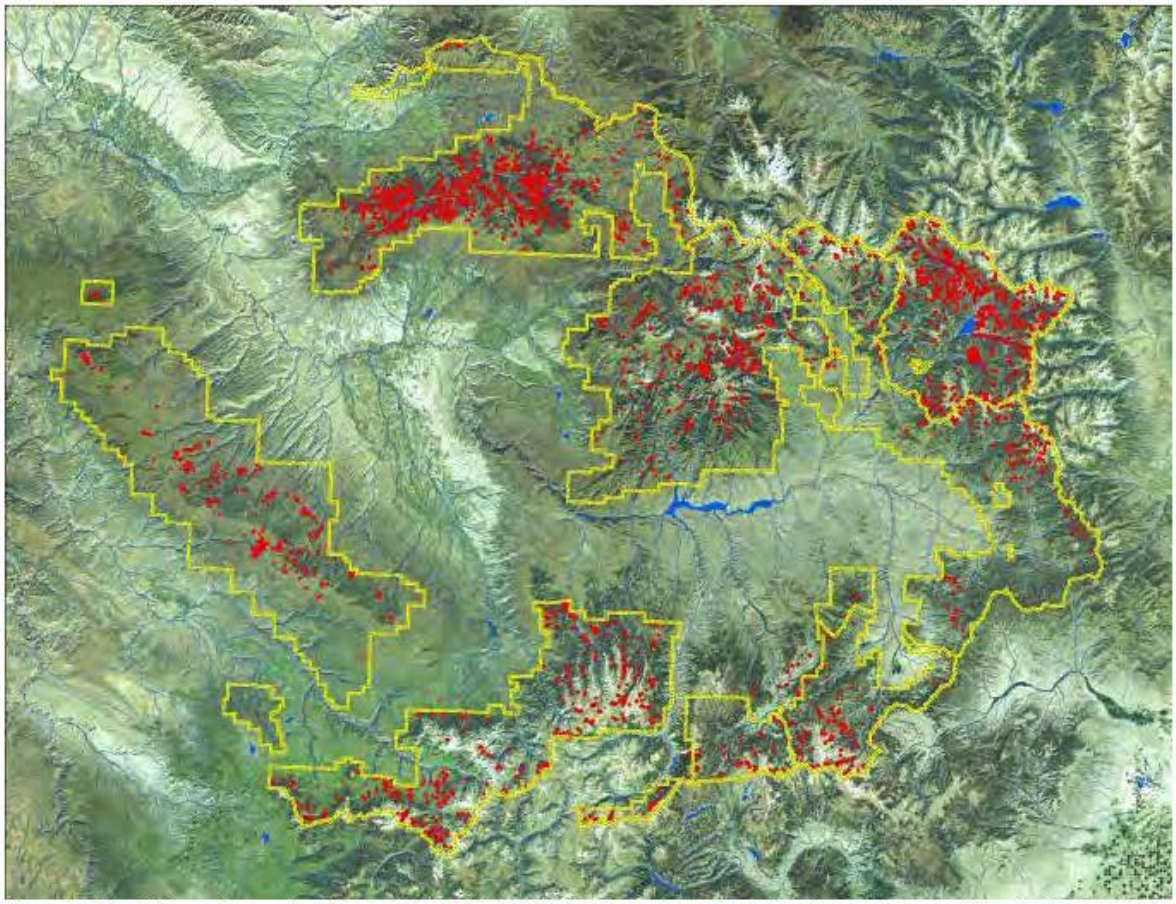

Figure 2. Potential fen polygons photointerpreted in 2008. Individual dots are shown larger than they are because otherwise they would not be visible at this scale. Delineations were also incorporated from several other studies of fens (Bathke 2000-2001-2003, Austin 2008, Chimner and others 2008).

Table 2. Time taken to photointerpret the study areas (Figure 1).

Photointerpretation Area	Total Acres	Photointerpreted Photos	Polygons	Acres	Percent Photointerpreted	Time (hours)	Time (8 hr days)	Hours/ 100,000 ac	Photos/ Hour
Grand Mesa	522,907	537	783	6,000	1.15%	21.5	2.7	7.8	25.0
Gunnison-Cochetopa	498,069	313	263	869	0.17%	7.5	0.9	3.5	41.7
La Garita	152,645	1,041	89	698	0.46%	18.5	2.3	3.5	56.3
Northern San Juan Mountains	537,433	1,072	702	5,770	1.07%	14.0	1.8	2.6	76.6
Taylor Park	274,936	949	706	4,293	1.56%	12.8	1.6	2.3	74.1
Uncompahgre Plateau	614,994	1,034	380	556	0.09%	11.8	1.5	1.9	87.6
West Elk Mountains	548,549	1,036	504	2,175	0.40%	11.0	1.4	2.2	94.2
	3,149,533	5,982	3,427	20,361	0.65%	97.1	12.1	3.0	61.6

These data were then overlaid with elevations across the forest. Most of the documented fens (those with current monitoring or research) are above 9,200 ft elevation, and all of them are above 8,800 ft. Comparatively, ninety percent (90%) of the photointerpreted polygons are above 8,400 ft, and 81% above 9,000 ft. From past experience (Austin 2008, Chimner and others 2008) in the Rocky Mountains, few fens are found below 9,000 ft, as shown on Figure 3.

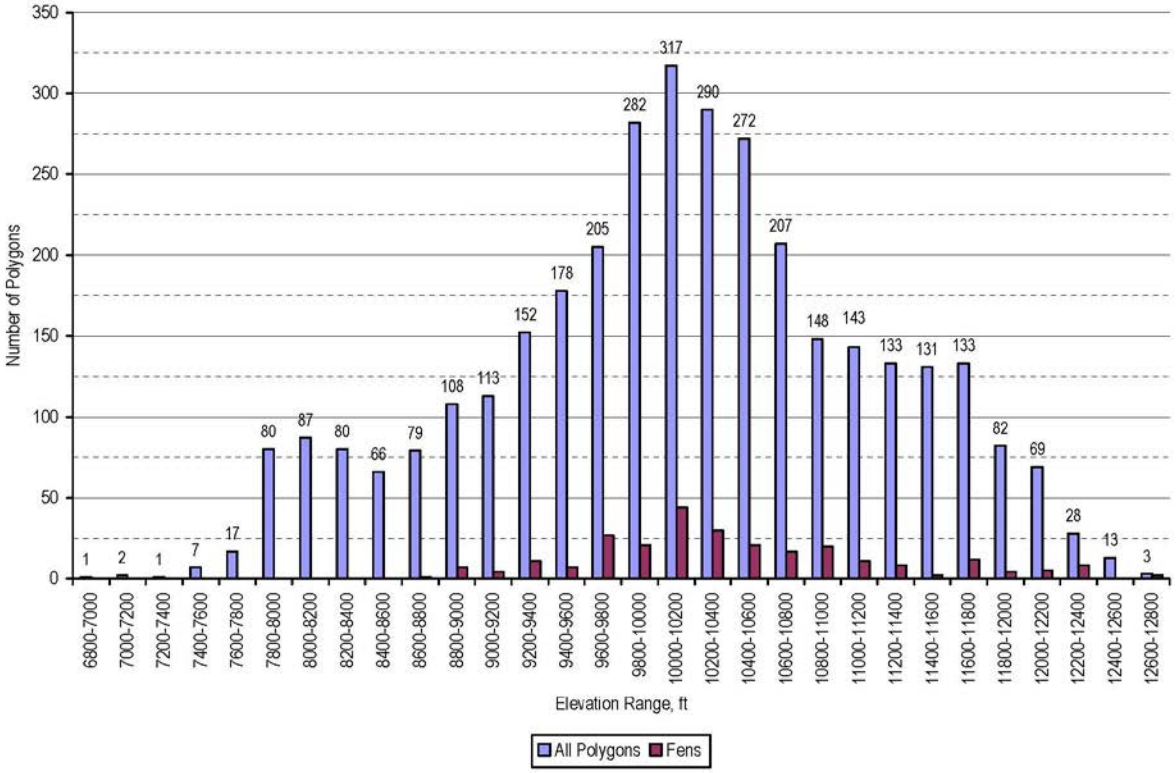

Figure 3. Variation in elevation of the polygons photointerpreted as potential fens, and for documented fens.

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Lastly, the photointerpretation results were used to estimate the frequency distribution of by size. About half of the fens are less than five acres in size (Figure 4).

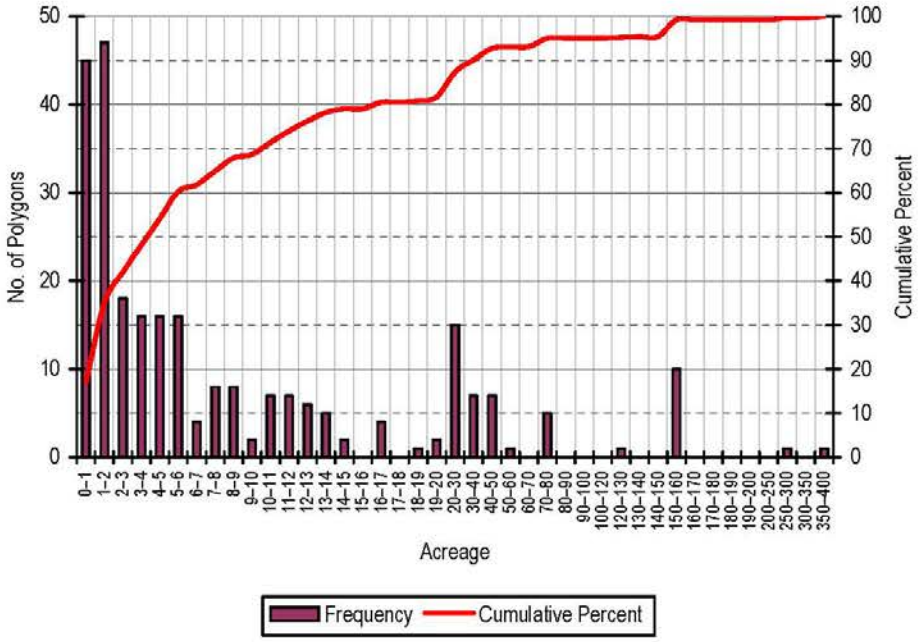

Figure 4. Frequency distribution of acreage of known fens on the Grand Mesa-Uncompahgre-Gunnison National Forest. Note unequal classes.

This in turn led to furthering the study to include efforts to field verify the presence of fens in the polygons identified during photointerpretation. The methodologies for stratification and field protocol are discussed below.

D. Problem Statement and Objectives

Forest leadership has asked us to provide estimates of the number and size of fens on the National Forest, and an estimate of their condition. We do not have the time or resources to do a complete fen inventory, except in small areas where intense management is planned.

Results of photointerpretation led to additional questions, including:

1. Did the photointerpretation for potential fens identify all the fens that actually occur on the National Forest?
2. What percentage of photointerpreted polygons are actually fens?
3. What are the general classes of fens on this National Forest? Classification of a fen usually includes vegetation community, landform, water chemistry (at least pH), and general hydrology (Vitt 2000, Lemly 2007, Cooper 2008, Austin 2008).
4. What is the condition of the fens we have?
5. What disturbances can be identified from aerial photographs and what effects are they having on fen condition?
6. What effects have management and use had on these fens?
7. What are the confidence limits on our estimates of fen occurrence and condition?

E. Methods

1. Stratification

We understand that polygons identified in the photointerpretation effort might contain a type of wetland other than a fen. Also, field verifying over 3,000 locations on the ground was not feasible. Thus the forest undertook an effort to select polygons for a field sampling program. The goals were to have a statistically viable sample size, and one that was represented apparent distribution and abundance of fens on the forest. Therefore stratification for sampling was conducted.

Based on conversations with various research scientists, we designed a strategy for stratification based on geology, climate, ecological landscape units, and glaciation. We also looked at information on hydrogeologic setting, however these data did not prove to be useful in this effort. We further incorporated suggestions from statisticians to concentrate sampling effort in areas where fens are known to be present, and concentrate less effort in areas where fens are not known to be present. For the purposes of stratification and based on these data sets, the Forest was divided into twelve landscape areas (Table 3, Figure 4).

Figures 4 to 6 show the general geology, ecological units and glaciated areas on the GMUG. From Figure 4, the Grand and Battlement Mesas, the West Elk Mountains, the eastern San Juans, and the Cochetopa Area are predominantly Tertiary volcanics; the Grand Mesa has been extensively subjected to landslides and glaciation (Day and others 1999, Yeend 1969). The Sawatch Mountains are predominantly Precambrian crystalline rocks. The Elk Mountains Area has a mixture of lithologies, with Cretaceous sedimentary rocks in the high mountains – a unique situation on our Forest; the northern West Elk Mountains are somewhat similar. The Cones Area and the Southern Plateau Area are almost all Cretaceous to Jurassic sedimentary rocks.

Table 3. The twelve areas of the Forest used to stratify sampling (see Figure 3).

			Photointerpreted*		
Area Name	Acres	Hectares	Polygons	Areas	Hectares
Battlement Mesa	47,252.6	19,122.5	8	68.9	27.9
Cochetopa	294,975.0	119,372.1	41	118.9	48.1
Cones	59,219.4	23,965.3	68	356.5	144.3
Eastern San Juans	369,611.3	149,576.4	388	3,001.1	1,214.5
Elk Mountains	290,761.5	117,667.0	268	1,355.1	548.4
Grand Mesa	354,194.2	143,337.3	694	5,633.1	2,279.6
Middle San Juans	187,834.8	76,014.0	291	1,511.6	611.7
Muddy	121,460.0	49,153.1	91	389.2	157.5
Northern Plateau	285,317.1	115,463.7	158	251.4	101.7
Sawatch Mountains	419,515.1	169,771.7	860	5,203.9	2,106.0
Southern Plateau	329,677.3	133,415.7	223	307.9	124.6
West Elks	389,987.3	157,822.3	331	1,187.3	480.5
TOTALS	3,149,805.6	1,274,681.1	3,421	19,385.0	7,844.8

*. Numbers are somewhat larger than in Table 2 due to additional fens and other polygons reported after the photointerpretation had been completed.

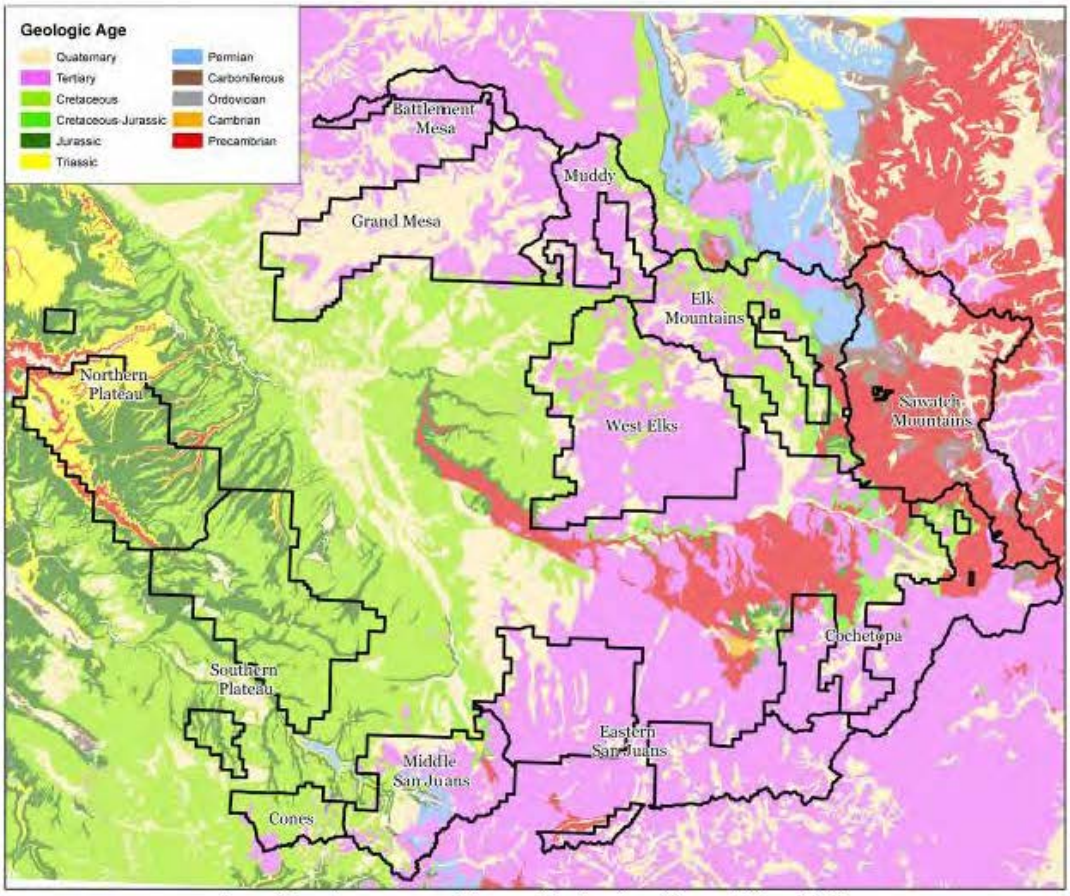

Figure 4. Landscape areas with generalized geology (Day and others 1999).

We divided each of the twelve landscape areas (Table 3) into a series of regular grid cells (1 Km × 1 Km), and superimposed the photointerpreted polygons (Figure 7). Based on recommendations from statisticians, we then chose two groups for sampling, those grid cells with potential fen polygons from the photointerpretation (green cells in Figure 7), and those grid cells without potential fen polygons.

The result of these exercises is 24 strata, derived from the twelve landscape areas (Figure 4) each divided into two strata: cells with polygons and those without polygons. This is summarized in Table 4 and Figure 7.

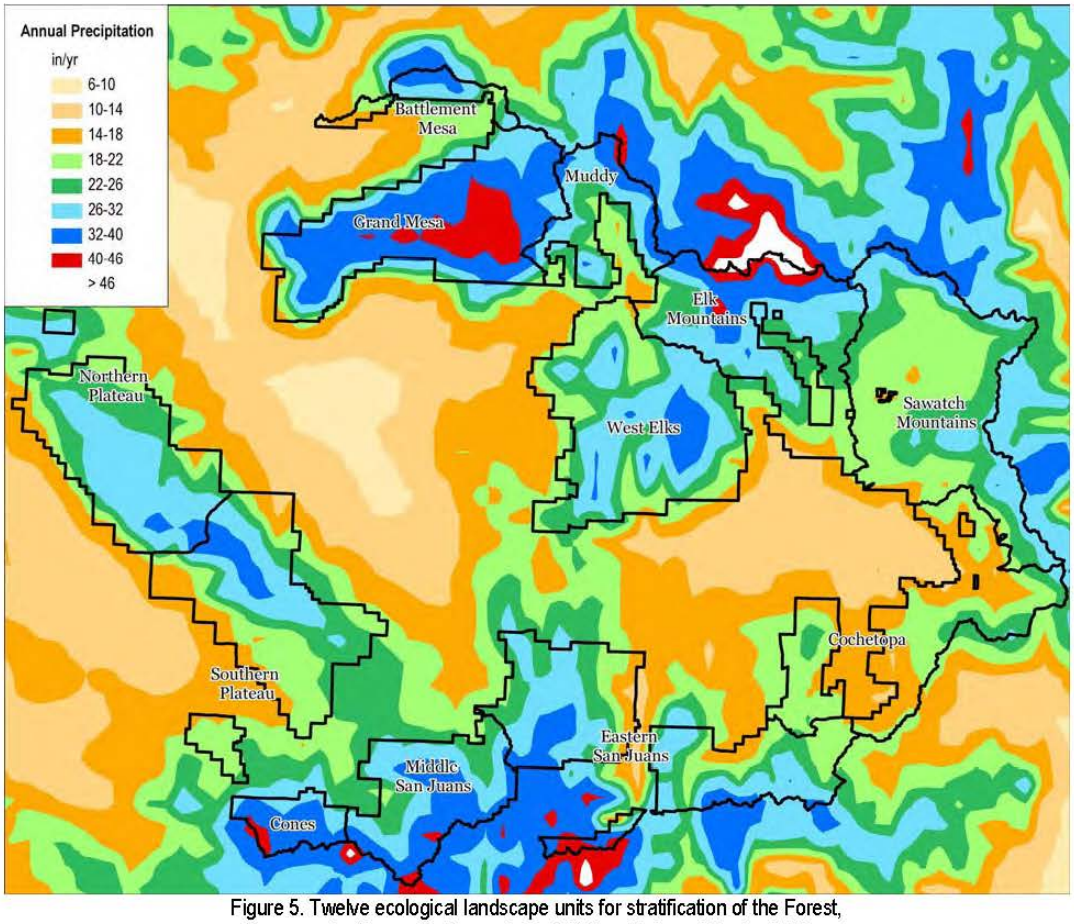

Figure 5. Twelve ecological landscape units for stratification of the Forest, compared with zones of annual precipitation (Daly and Taylor 1998).

Table 4. Summary of the twelve Areas, each divided into strata based on whether the 1 Km × 1 Km cells have polygons.

	All Cells		With Polygons		Without Polygons	
Area Name	Cells	Acres	Cells	Acres	Cells	Acres
Battlement Mesa	264	47,292	8	1,685	256	45,607
Cochetopa	1,417	294,756	40	9,380	1,377	285,375
Cones	281	59,240	42	9,194	239	50,046
Eastern San Juans	1,714	369,595	307	72,877	1,407	296,718
Elk Mountains	1,373	290,780	199	47,676	1,174	243,103
Grand Mesa	1,566	354,199	507	124,789	1,059	229,411
Middle San Juans	859	187,862	145	33,833	714	154,029
Muddy	606	121,463	81	18,529	525	102,934
Northern Plateau	1,305	292,470	99	23,554	1,206	268,915
Sawatch Mountains	1,868	419,725	573	139,218	1,295	280,507
Southern Plateau	1,454	322,432	110	26,884	1,344	295,548
West Elks	1,712	389,969	216	53,153	1,496	336,816
	14,419	3,149,783	2,327	560,773	12,092	2,589,010

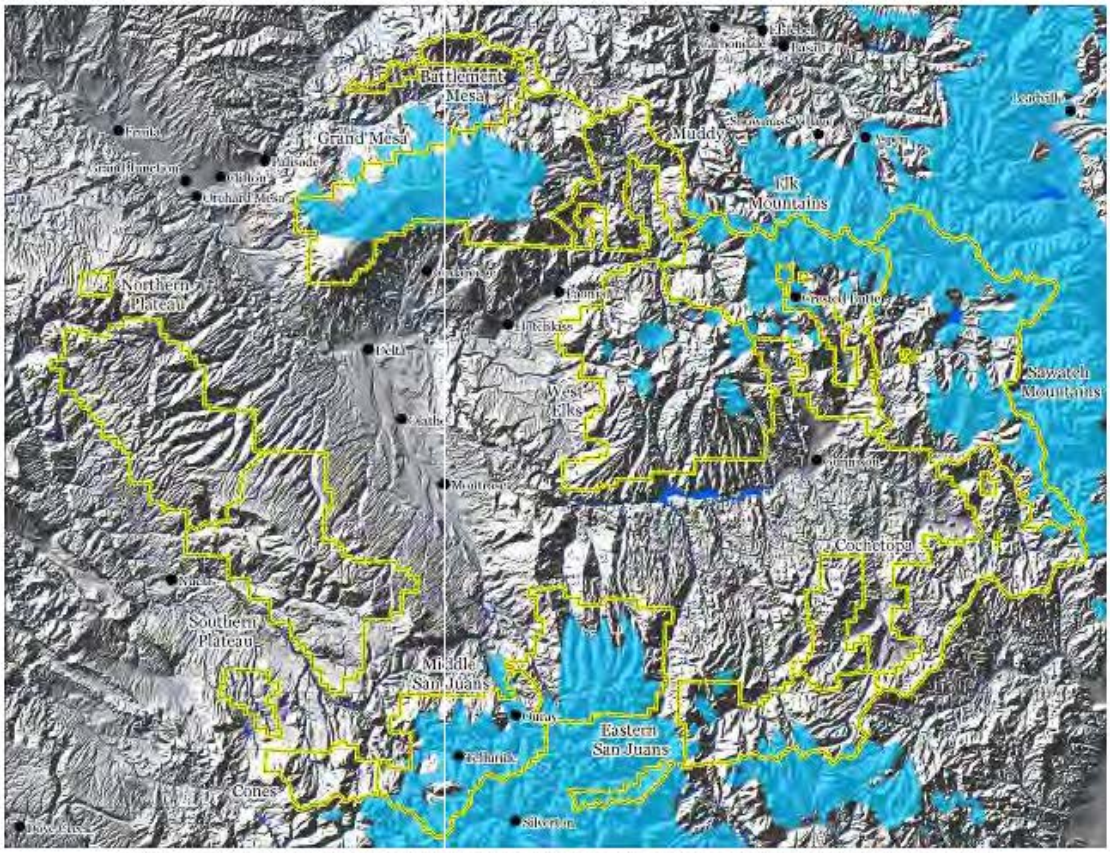

Figure 6. Landscape areas with recent glaciation shown in blue (adapted from Matthews and others 2003).
Compare Figure 3 – the greatest concentration of fens is in glaciated areas, but there are candidate fens outside glaciated areas.

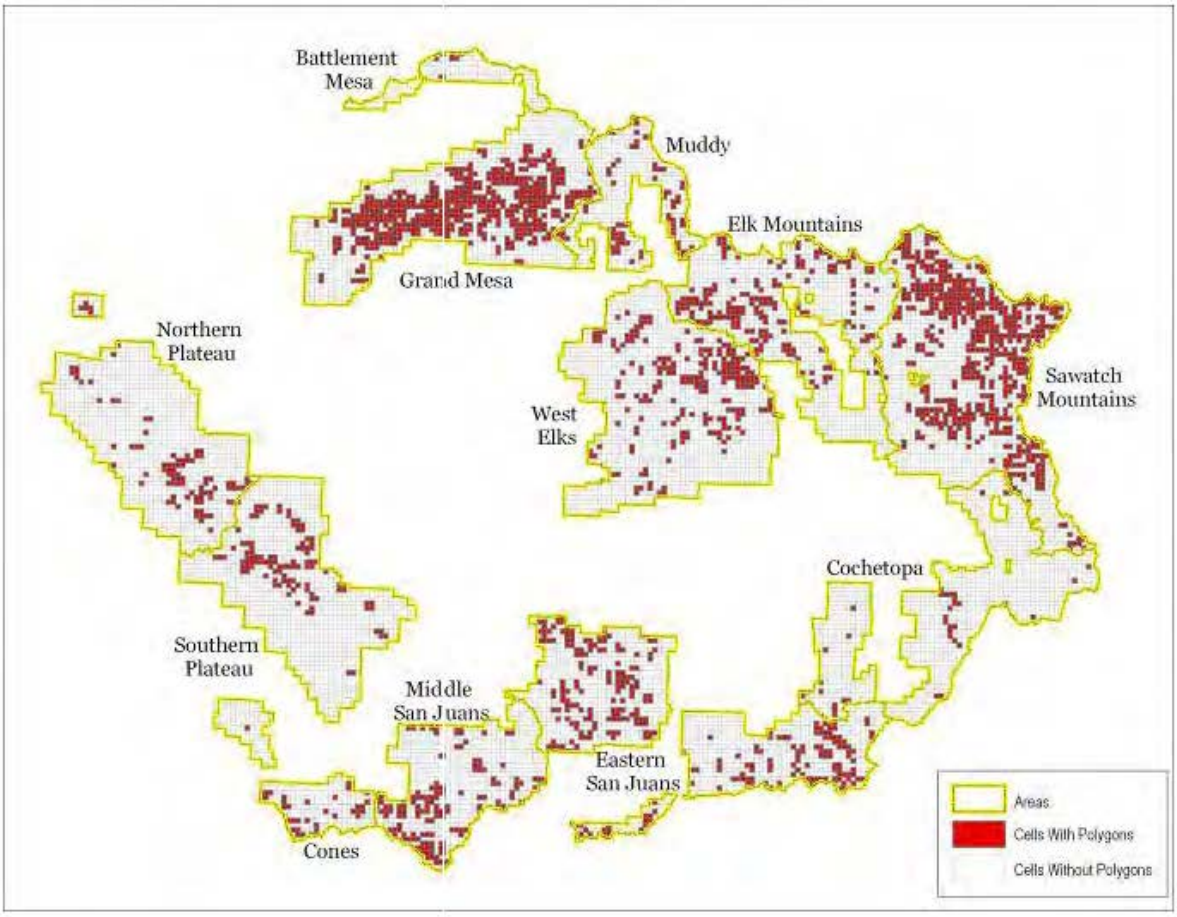

Figure 7. 1 Km ×1 Km grid cells classed as to whether they contain polygons from the photointerpretation (Figure 2).

The cells having potential fen polygons (Figure 7, Table 4) were randomly selected for sampling using a spatially balanced method (Stevens and Olsen 2003-2004, Stevens and Jensen 2007), using the centroids of the polygons as points. The specific method used is called the Generalized Random Tessellation Stratified (GRTS) method, as commonly used for aquatic resources by the U. S. Environmental Protection Agency (Olsen 2005, U. S. Environmental Protection Agency 2008).

The GRTS method divides the study area into successively smaller 2 × 2 squares, until each feature (in this case, the centroid of a cell) belongs in just one square. Then the addresses of the squares are converted from the two-dimensional grid to a one-dimensional line (Figures 8-9).

Generalized Random-tessellation Stratified (GRTS) Design

- Design is based on a random function that maps the unit square into the unit interval.
- The random function is constructed so that it is 1→1 and preserves some 2-dimensional proximity relationships in the 1-dimensional image.
- Accommodates variable sample point density, sample augmentation, and spatially-structured temporal samples.

Figure 8. Basics of the GRTS method (Stevens and Olsen 2004, Olsen 2005).

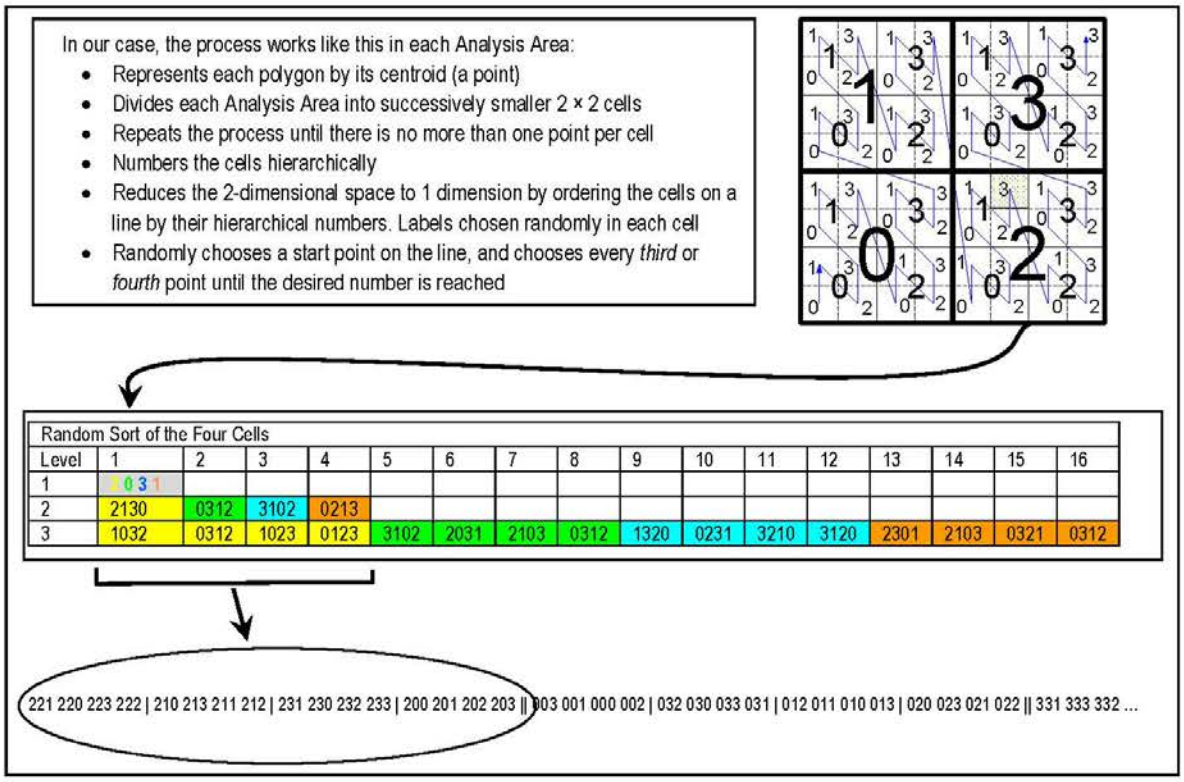

Figure 9. GRTS spatial-based conversion of the 2-dimensional unit square to the 1-dimensional line (after Olsen 2005).

After the two-dimensional unit square is converted to the one-dimensional line (Figure 9), then points are chosen along the line starting at a random point and proceeding systematically until the desired goals are reached.

In our case, we asked for four sets of points for each analysis area (100, 50, 25, 25), to total 200 points for the whole Forest. We calculated that with two crews of two people each, the practical limit on our ability to sample cells is about 200.

GRTS calls these sets of points "panels." One of the attractive features of GRTS is that it puts the sample cells in sequential order, so if we finish the first panel, the order in which we should visit the cells in panel 2 is determined before we start.

Figure 10 shows the results of the first four panels of cells chosen by GRTS, and Table 5 shows that they were assigned in proportion to the number of cells containing polygons in each area. Two examples of cells to be field-sampled are shown in Figures 11 and 12.

Our approach will be to field verify all the potential fen polygons that occur within a cell selected by GRTS.

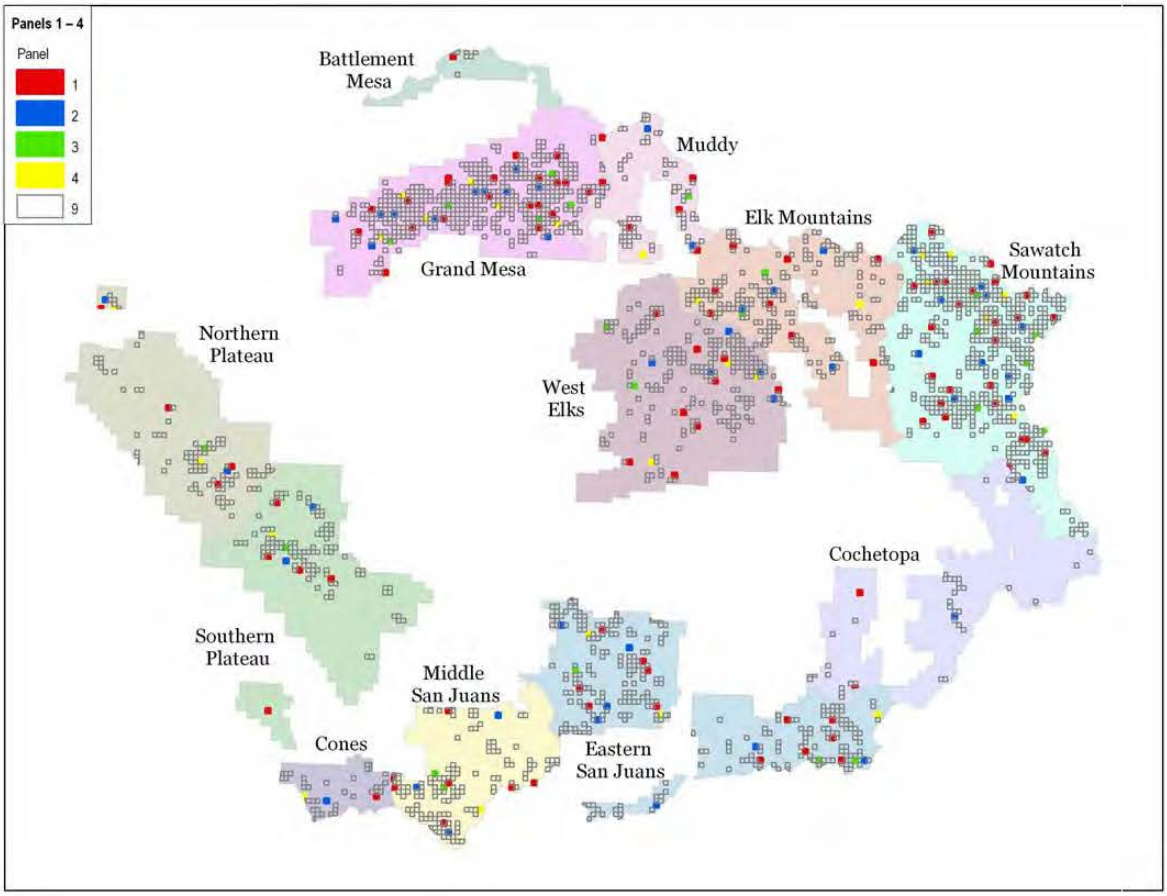

Figure 10. The colored cells show the first four panels (sets of cells) chosen by GRTS; the gray-outlined cells are the "overflow," that is, the cells (with polygons) remaining after the first four panels had been chosen.

Table 5. Results by area of the first four panels chosen by GRTS. Acreage shown is that of the cells.

	Cells With Polygons		Panels 1-4		Panel 1		Panel 2		Panel 3		Panel 4		Overflow	
Area Name	Cells	Acres	Cells	Acres	Cells	Acres	Cells	Acres	Cells	Acres	Cells	Acres	Cells	Acres
Battlement Mesa	8	1,684.7	1	247.1	1	247.1							7	1,437.6
Cochetopa	40	9,380.2	3	546.4	2	299.3	1	247.1					37	8,833.8
Cones	42	9,194.2	4	712.8	2	326.9	1	247.1			1	138.8	38	8,481.4
Eastern San Juans	306	72,830.2	26	6,187.6	13	2,975.2	7	1,729.7	3	741.3	3	741.3	280	66,642.7
Elk Mountains	199	47,676.4	17	4,188.2	9	2,211.4	4	988.4	2	494.2	2	494.2	182	43,488.2
Grand Mesa	507	124,788.7	44	10,833.0	22	5,396.7	11	2,718.2	5	1,235.5	6	1,482.6	463	113,955.7
Middle San Juans	145	33,833.4	12	2,914.2	6	1,431.6	3	741.3	2	494.2	1	247.1	133	30,919.2
Muddy	80	18,424.3	7	1,729.7	3	741.3	2	494.2	1	247.1	1	247.1	73	16,694.6
Northern Plateau	99	23,554.3	9	1,899.9	4	808.8	2	494.2	1	247.1	2	349.7	90	21,654.4
Sawatch Mountains	573	139,218.3	48	11,439.8	25	5,990.9	11	2,715.8	6	1,250.5	6	1,482.6	525	127,778.4
Southern Plateau	110	26,883.9	9	2,223.9	5	1,235.5	2	494.2	1	247.1	1	247.1	101	24,660.0
West Elks	216	53,152.6	19	4,695.0	9	2,223.9	5	1,235.5	2	494.2	3	741.3	197	48,457.6
Totals	2,325	560,621.3	199	47,617.7	101	23,888.7	49	12,105.8	23	5,451.3	26	6,171.9	2,126	513,003.5
Percentages			8.6%	8.5%	4.3%	4.3%	2.1%	2.2%	1.0%	1.0%	1.1%	1.1%	91.4%	91.5%

Table 6. Number of polygons for each panel. Acreage in this table is total acreage of the polygons.

	Panel 1			Panel 2			Panel 3			Panel 4			Overflow		
Area Name	Cells	Acres	Poly-gons	Cells	Acres	Poly-gons	Cells	Acres	Poly-gons	Cells	Acres	Poly-gons	Cells	Acres	Poly-gons
Battlement Mesa	1	247.1	1										7	1,437.6	10
Cochetopa	2	299.3	4	1	247.1	2							37	8,833.8	45
Cones	2	326.9	2	1	247.1	1				1	138.8	7	38	8,481.4	72
Eastern San Juans	13	2,975.2	23	7	1,729.7	15	3	741.3	4	3	741.3	7	280	66,642.7	495
Elk Mountains	9	2,211.4	12	4	988.4	7	2	494.2	6	2	494.2	2	182	43,488.2	317
Grand Mesa	22	5,396.7	35	11	2,718.2	21	5	1,235.5	14	6	1,482.6	11	463	113,955.7	976
Middle San Juans	6	1,431.6	20	3	741.3	10	2	494.2	2	1	247.1	2	133	30,919.2	336
Muddy	3	741.3	3	2	494.2	2	1	247.1	1	1	247.1	1	73	16,694.6	113
Northern Plateau	4	808.8	5	2	494.2	5	1	247.1	1	2	349.7	2	90	21,654.4	180
Sawatch Mountains	25	5,990.9	45	11	2,715.8	17	6	1,250.5	10	6	1,482.6	14	525	127,778.4	1,089
Southern Plateau	5	1,235.5	14	2	494.2	4	1	247.1	5	1	247.1	1	101	24,660.0	242
West Elks	9	2,223.9	16	5	1,235.5	11	2	494.2	6	3	741.3	3	197	48,457.6	367
Totals	101	23,888.7	180	49	12,105.8	95	23	5,451.3	49	26	6,171.9	50	2,126	513,003.5	4,242
Percentages	4.3%	4.3%	3.9%	2.1%	2.2%	2.1%	1.0%	1.0%	1.1%	1.1%	1.1%	1.1%	91.4%	91.5%	91.9%

	Total Cells With Polygons			Panels 1-4		
Area Name	Cells	Acres	Poly-gons	Cells	Acres	Poly-gons
Battlement Mesa	8	1,684.7	11	1	247.1	1
Cochetopa	40	9,380.2	51	3	546.4	6
Cones	42	9,194.2	82	4	712.8	10
Eastern San Juans	306	72,830.2	544	26	6,187.6	49
Elk Mountains	199	47,676.4	344	17	4,188.2	27
Grand Mesa	507	124,788.7	1,057	44	10,833.0	81
Middle San Juans	145	33,833.4	370	12	2,914.2	34
Muddy	80	18,424.3	120	7	1,729.7	7
Northern Plateau	99	23,554.3	193	9	1,899.9	13
Sawatch Mountains	573	139,218.3	1,175	48	11,439.8	86
Southern Plateau	110	26,883.9	266	9	2,223.9	24
West Elks	216	53,152.6	403	19	4,695.0	36
Totals	2,325	560,621.3	4,616	199	47,617.7	374
Percentages				8.6%	8.5%	8.1%

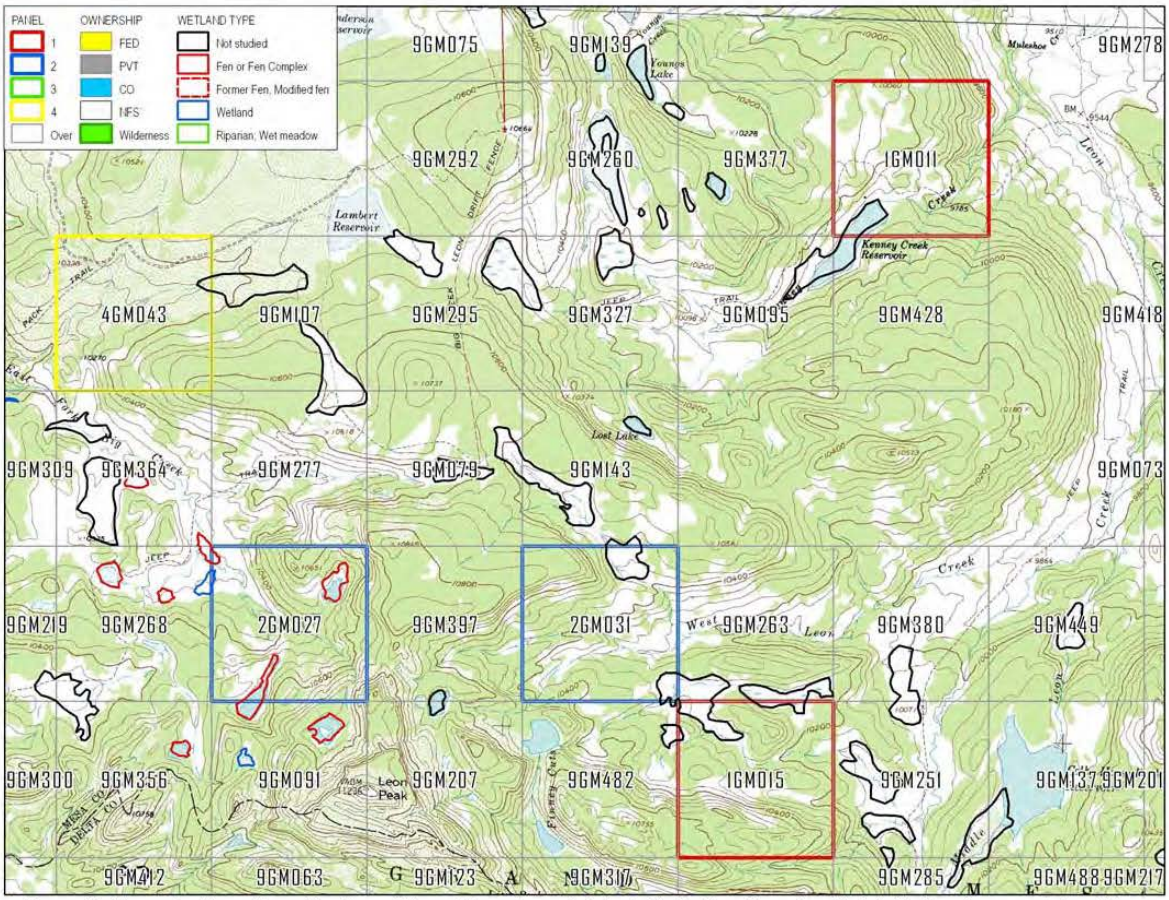

Figure 11. Example of a portion of the Grand Mesa. The cells are labeled with the Panel number (first digit), then the area abbreviation (GM for Grand Mesa), then the GRTS sequence within that area. There are two Panel 1 cells (red outline) that would have to be sampled first. However if the team decides that Panel 1 will surely get finished, then the Panel 1 cells (blue) or the Panel 4 cell (yellow) could be sampled.

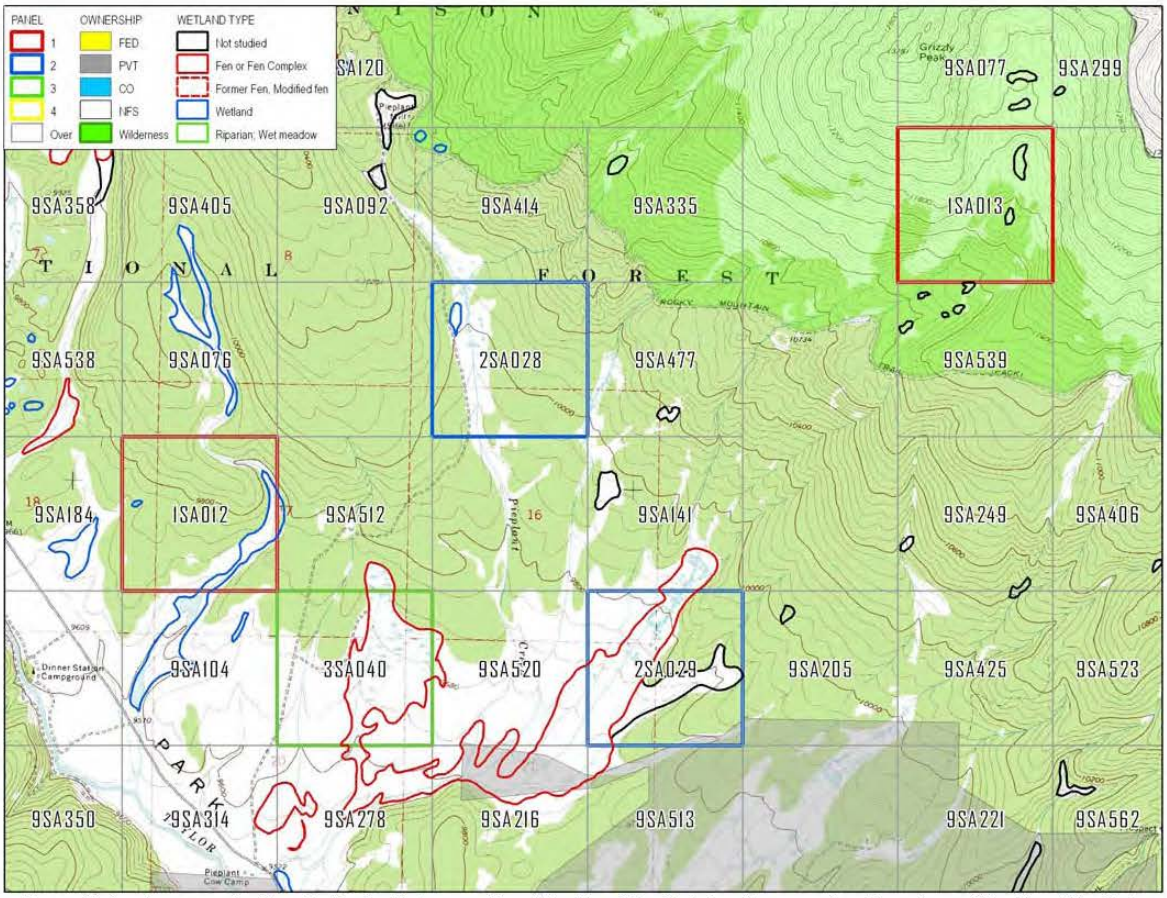

Figure 12. Another example, from the Taylor Park area. One of the Panel 1 cells is in wilderness. A portion of one of the Panel 2 cells is private land, but the polygons to be sampled in that cell are not. As before, the two red cells would be sampled first, but the blue cells (Panel 2) or the green cell (Panel 3) could be sampled later if all the Panel 1 cells had been finished.

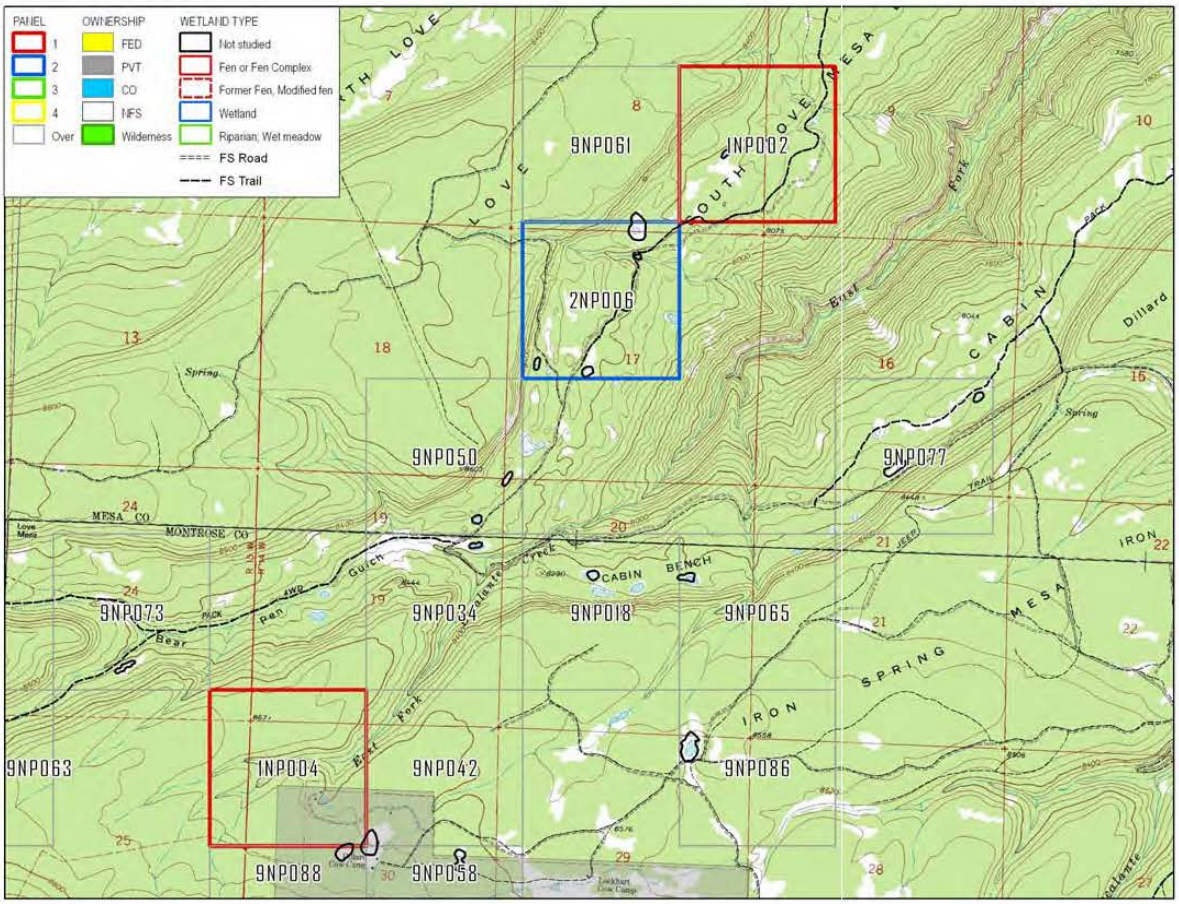

Figure 13. Another example, from the Northern Plateau. One of the Panel 1 cells is partly private land; unfortunately both of the polygons to be sampled are on private. We may reject this cell and substitute a cell from the overflow in its place.

In addition to the cells containing polygons that will be sampled, we planned to re-examine a small percentage of those cells that do not have polygons, to confirm that these do not have potential fen polygons. We have chosen 2% (about the same percentage of cells that were selected by GRTS) of these cells without polygons for each area, by simple stratified random sampling (Figure 14, Elzinga and others 1998, Elzinga and others 2001). Thus, random sampling of 2% of the cells without polygons resulted in 242 cells being selected, as shown in Table 7 and Figure 14.

Warren Young, Forest Soil Scientist, independently verified the 242 cells randomly chosen by scanning the aerial photos and examining each candidate fen polygon under a stereoscope and on-screen with NAIP 2005 photography as a background. This procedure was the same as was followed for photointerpretation of the whole National Forest, described above. He found five polygons that would be likely fens, in four cells, 1.7% of the cells without polygons.

We believe this indicates that we captured almost all of the potential fen polygons in the initial photointerpretation, so there is no need to photointerpret the National Forest again.

Table 7. Stratified-random sampling of 2% of the cells without polygons.

Area Name	All Cells		Cells Without Polygons		Without Polygons 2% Select		Potential Fen Polygons Found		
	Cells	Acres	Cells	Acres	Cells	Acres	Cells	Polygons	Acres
Battlement Mesa	264	47,292	256	45,607	5	1,176			
Cochetopa	1,417	294,756	1,377	285,375	28	5,523			
Cones	281	59,240	239	50,046	5	993			
Eastern San Juans	1,714	369,595	1,407	296,718	28	5,495	1	1	0.196
Elk Mountains	1,373	290,780	1,174	243,103	23	4,757			
Grand Mesa	1,566	354,199	1,059	229,411	21	4,221	1	2	0.257
Middle San Juans	859	187,862	714	154,029	14	2,388			
Muddy	606	121,463	525	102,934	11	2,494			
Northern Plateau	1,305	292,470	1,206	268,915	24	5,736			
Sawatch Mountains	1,868	419,725	1,295	280,507	26	5,937	2	2	2.017
Southern Plateau	1,454	322,432	1,344	295,548	27	6,062			
West Elks	1,712	389,969	1,496	336,816	30	6,481			
Totals	14,419	3,149,783	12,092	2,589,010	242	51,262	4	5	2.470
Percentages			83.9%		2.00%	1.98%	1.7%		0.005%

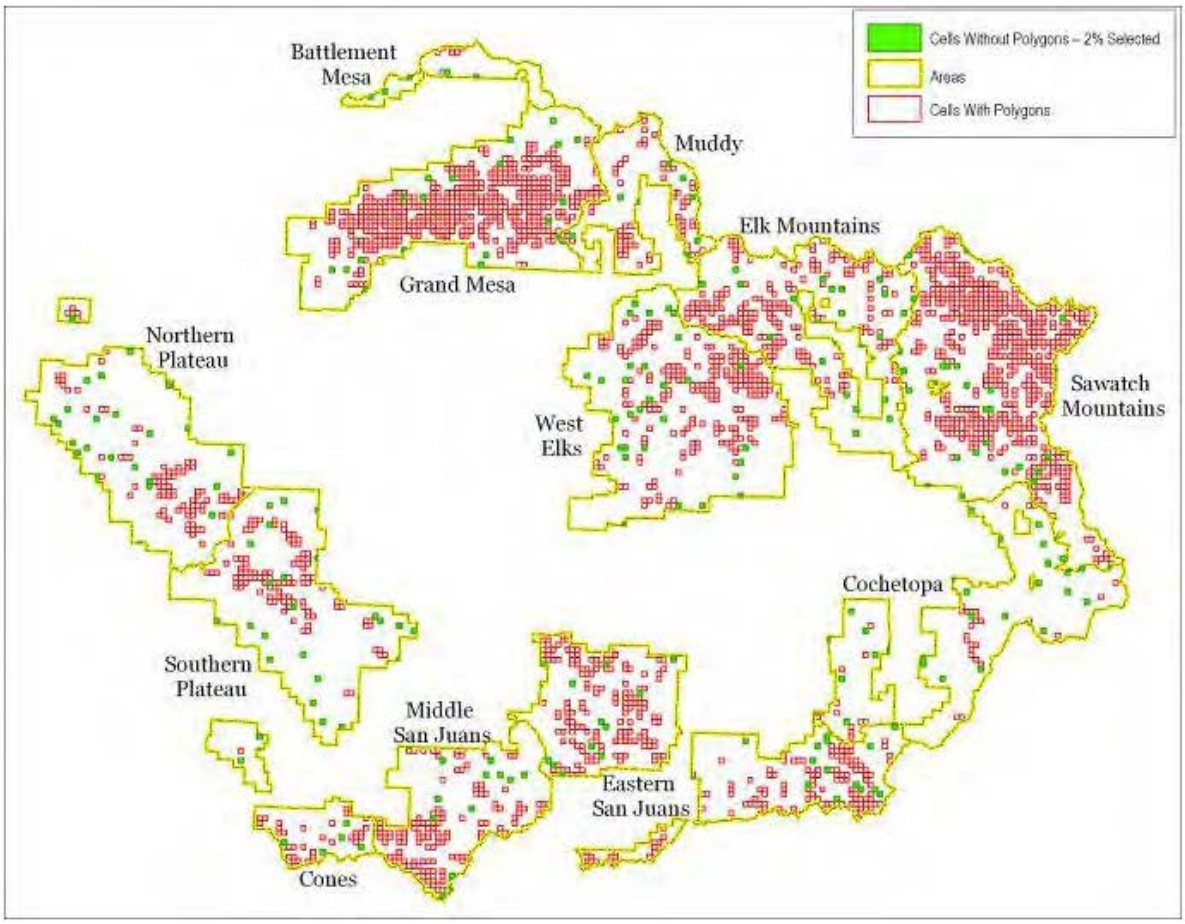

Figure 14. Showing the 2% of cells without polygons selected for checking (green)..

2. Field Inventory

During the summer of 2009, the forest will begin an effort to field inventory fens. Every potential fen polygon contained or partly contained within the 1 Km × 1 Km cell selected in the GRTS stratification would be sampled using a consistent established protocol. Field inventory will be performed by field crews staffed by Forest Service temporary or seasonal employees, interns, volunteers, or contractors. The field crews will be trained and monitored by members of the Fen Technical Working Group.

The GMUG researched and amassed numerous general wetland and/or fen-specific field inventory protocols to assist us in developing a protocol suited for our specific situation. The field protocol will include collecting data on whether the feature identified in the photointerpretation is in fact a fen or other type of wetland using parameters of soil saturation, rock cover and presence of peat, among other items. If it is a fen, then additional data collection including depth to water, pH and conductance of water, peat thickness, slope, fen landform, geologic and hydrologic setting, and plant community will occur. The protocol to be followed is given in Appendix A, and will be used with the Walkthrough Form in Appendix B, and the fen-specific forms in Appendix C (General Form), and the Data and Evaluation Form (Appendix D).

Other protocols used to craft the GMUG include those used by the Montana Department of Transportation (Montana Wetland Assessment Method), Colorado Natural Heritage Program, Colorado State University (in Yellowstone National Park and the San Juan National Forest), Grand Mesa method (Austin 2008), US Army Corps of Engineers, Canadian Wetland Classification System and the Environmental Protection Agency.

Our estimate is that a crew of two to three trained persons will average two cells per work day. This means we could finish Panel 1 in a little over ten crew weeks, or five weeks if we have two crews (Table 6). We could finish Panels 1–4 in eleven weeks with two crews.

Table 6. Time estimates for sampling 1 Km × 1 Km grid cells.

	Cells to Sample				Days to Complete				
Area Name Panel	1	2	3	4	1	2	3	4	Totals
Battlement Mesa	1	0	0	0	0.5	0.0	0.0	0.0	0.5
Cochetopa	2	1	0	0	1.0	0.5	0.0	0.0	1.5
Cones	2	1	0	0	1.0	0.5	0.0	0.0	1.5
Eastern San Juans	13	7	3	4	6.5	3.5	1.5	2.0	13.5
Elk Mountains	9	4	2	2	4.5	2.0	1.0	1.0	8.5
Grand Mesa	21	10	5	6	10.5	5.0	2.5	3.0	21.0
Middle San Juans	6	3	2	1	3.0	1.5	1.0	0.5	6.0
Muddy	3	2	1	1	1.5	1.0	0.5	0.5	3.5
Northern Plateau	4	2	1	2	2.0	1.0	0.5	1.0	4.5
Sawatch Mountains	25	12	6	6	12.5	6.0	3.0	3.0	24.5
Southern Plateau	5	2	1	1	2.5	1.0	0.5	0.5	4.5
West Elks	9	5	2	3	4.5	2.5	1.0	1.5	9.5
Totals	100	49	23	26	51.0	26.5	14.5	17.0	109.0
Cumulative	100	149	172	198	51.0	77.5	92.0	109.0	

3. Assessment

Condition assessments of locations confirmed or suspected to be fens in the field inventory will also be performed as a part of the field work. [**Methodology under construction, to be added later**]

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Appendix B. Protocol for Collecting Soil Samples

Soil Sample Collection, Preparation, and Analysis

Warren Young, GMUG Soil Scientist & Rod Chimner, Wetland Ecologist, Michigan Tech

5/13/09

1. Field Sampling

A 500 cc sample will be obtained from the small soil pit dug at each fen or potential fen. Samples should be obtained from a depth of 40 to 45 cm below the surface. Where a mineral soil horizon occurs within 30 to 40 cm of the surface, the sample should be taken from the 5 cm immediately above the contact. After sampling, the hole will be filled back in with the vegetation placed on top.

2. Field Preparation

Place the sample in a plastic bag and label with the sampling depth, collection date, cell and polygon number, and GPS location. As soon as possible, begin air drying the sample. Retain the original sample tag, remove all live roots and leaves, spread on non-colored newspaper and break open to facilitate drying. When the sample has air dried, transfer it and all sample site information to a clean paper bag. Retain the original sample bag and place it in the paper bag.

3. Lab Preparation

Record all sample collection information in master spreadsheet. If possible, oven dry the sample overnight at 110°C. Allow samples to cool, split the original 500 cc sample into two separate samples of approximately 250 cc, place them in paper bags, and label with all sample information. One sample would be sent to a soil laboratory for analysis and one retained on the Forest.

4. Lab Analysis

At the soil laboratory all samples would be analyzed for % Organic Matter as loss on ignition and a sub-sample analyzed for % organic C. Residual ash for each sample will be retained for future analysis or returned to the Forest.

Appendix C. Instructions For Completing Forms

1. Description of Crew Procedures

The protocol was designed to be conducted by crews of two people each. In general, the procedures for each crew can be summarized by the following steps:

1. Preliminary work, mostly done each day. For example, calibrating the pH and EC meters, gathering equipment and forms needed for the day's work, charging batteries for GPS unit and camera, or strategizing which cells to attack next.
2. Migrate to the next cell. Sometimes these were close to travel routes, and sometimes farther away. Maps had been prepared before field work began, general maps (1:24,000) and smaller maps (1:10,000) of each cell showing topography and aerial imagery backgrounds overlayed with the inventory cell boundary and PFS.
3. Visit each photointerpreted potential fen site, and each additional site deemed by the crew to possibly contain a fen. Certain basic information was collected for each photointerpreted potential fen site, including whether the site is a fen, wetland, riparian area, or none of these; and results of peat depth measurements.

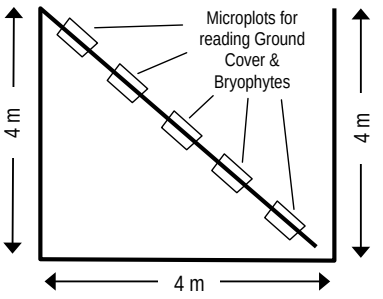


Figure L-1. Layout of relevé and ground cover measurements.

4. If a site was determined to be a fen (usually on the basis of a wetland with peat depth ≥ 40 cm), or the crew was uncertain (peat depth 30 – 40 cm), then a more complete inventory of the site and surrounding area was necessary. The crew selected a point for sampling, in the community most likely to be a fen. At that point they did the following:
   a. A soil pit, as deep as possible under the circumstances, but at least 40 cm deep
   b. A 4 × 4 m relevé (vegetation sampling plot) laid out with a measuring tape, including a diagonal on which Daubenmire microplots were placed for ground cover estimates (Figure L-1)
   c. Photographs of the soil pit (or plug from it, if it is full of water) and of the relevé
   d. Soil sample using standard protocol, for laboratory analysis of carbon content (Appendix B)
   e. Sketch map of the whole site, showing plant communities
   f. Photographs of the whole site from a photo point, or as much of the site as possible

The parameters measured and estimated are shown in Table L-1.

5. Post-field activities, such as uploading PDR files, cleaning equipment, drying and packing soil samples.

Table L-1. Parameters measured and estimated in fen inventory.

Parameter	How and where measured	Recorded	For
Cell Code		PDR	All PFS*
PFS Code		PDR	All PFS*
Wetland	Whether Wetland, Riparian, or Upland	PDR	All PFS*
New PFS	Whether Photointerpreted or New	PDR	All PFS*
Beaver	Present, Dominant, or Absent	PDR	All PFS*
Ownership	By code	PDR	All PFS*
Location	GPS coordinates	PDR	All PFS*
Peat Depth	Informal soil pits, supplemented by tile probe	PDR	All PFS*
Fen	Whether Fen, Not Fen, or Uncertain	PDR	All PFS*
Personnel	List	PDR	All PFS*
Date	Specify	PDR	All PFS*
PFS Correct	Whether photointerpreted PFS was delineated correctly	PDR	Fens or Uncertain
Open Water	Yes or No	PDR	Fens or Uncertain
Floating Mat	Yes or No	PDR	Fens or Uncertain
Water Development	Yes or No	PDR	Fens or Uncertain
Gully Frequency	None, Low, Moderate, High	PDR	Fens or Uncertain
Gully Size	Small, Large	PDR	Fens or Uncertain
Hydrologic Alteration	None, Low, Moderate, High	PDR	Fens or Uncertain
Groundwater Flow	Choose from six diagrams (Fetter 2001)	PDR	Fens or Uncertain
Amphibian Observed	Record any observed from list of rare amphibians	PDR	Fens or Uncertain
Disturbance in Wetland	Recorded by Type, Intensity, and Extent (Appendix H)	PDR	Fens or Uncertain
Disturbance in Buffer	Same but in 100 m buffer around wetland	PDR	Fens or Uncertain
Fen Landform	In community where pit is located	PDR	Fens or Uncertain
Aspect and Slope	In community where pit is located	PDR	Fens or Uncertain

Parameter	How and where measured	Recorded	For
Rock Fragment Cover	In community where pit is located	PDR	Fens or Uncertain
Bare Soil Cover	In community where pit is located	PDR	Fens or Uncertain
Recent Sediment Cover	In community where pit is located	PDR	Fens or Uncertain
Location of Soil Pit	GPS Coordinates	PDR	Fens or Uncertain
Pit Depth	Measured with tape	PDR	Fens or Uncertain
Water Depth	Measured with tape, usually after ½ - 1 hour	PDR	Fens or Uncertain
Peat Depth	Measured with tape, supplemented with tile probe measurements	PDR	Fens or Uncertain
Soil Gleying	Yes or No, in upper 40 cm	PDR	Fens or Uncertain
Von Post Value	Sample from 30-40 cm, values in Appendix C	PDR	Fens or Uncertain
pH and Depth	pH meter, tape; measured in water accumulating in pit	PDR	Fens or Uncertain
EC and Depth	EC meter, tape; measured in water accumulating in pit	PDR	Fens or Uncertain
Depth of First Mineral	Tape	PDR	Fens or Uncertain
Canopy cover by species	Over 4 × 4 m relevé	Form	Fens or Uncertain
Ground cover	On five Daubenmire microplots across relevé diagonal	Form	Fens or Uncertain
Total Bryophyte Cover	On five Daubenmire microplots across relevé diagonal	Form	Fens or Uncertain
Sketch Map of PFS	Showing all communities, groundwater flow, channels, etc.	Form	Fens or Uncertain
Communities	Brief description of each community	Form	Fens or Uncertain
Photo Frame Numbers	For photos of relevé, soil pit, and panoramic view of PFS	Form	Fens or Uncertain

*. Potential fen sites.

2. Instructions For Completing Forms

Version 2b **INSTRUCTIONS FOR COMPLETING FORMS** June 16, 2009

Five forms:

Form Name	Completed For	Current Version	Data Entry
Wetland Walkthrough Form	All Polygons in Cell	5d	Trimble PDR
Soil and Disturbances (Fens)	Fens or Suspected Fens	2009m	Trimble PDR
Fen Data	Fens or Suspected Fens	5f	Paper → Paradox DB
Sketch Maps	Fens or Suspected Fens	5f	Paper → Paradox DB
Photo Card	Fens or Suspected Fens (General Photo of Site)	May 2009	Paper → Paradox DB
Photo Point Card	Fens or Suspected Fens (Photos of Sample Point)	May 2009	Paper → Paradox DB

Supplementary documents and aids:

Document Name	Used For	Current Version
Protocol for Fen Verification of Photointerpreted Potential Fens	Determining whether Wetland, Fen, Riparian, or Upland	5b
Disturbance Factors and Intensities for use in Fens	Interpreting intensity for various disturbances	2a
Photograph protocol for Fen Inventory (Fens or Uncertain Sites Only)	Instructions about how and when to take photographs	1a
Soil Sample Collection, Preparation, and Analysis	Instructions for collecting and handling the soil sample	5/13/09
List of plant species of Colorado and their codes	Used for determining codes of plant species that are identified in the field	May 20, 2009
Weber and Wittmann 2001a	Identifying vascular plant species	Ed. 3 (2001)
Carter 2006	Identifying shrubs and trees	Revised Ed. 2006
Weber and Wittmann 2007	Identifying bryophytes	First ed. 2007
Johnston 2001	Identifying sedges (*Carex*)	2001
Hermann 1975	Identifying rushes (*Juncus*)	1975
Johnston 2009a	Identifying willows (*Salix*)	June 3, 2009
Johnston 2009b	Identifying cottongrasses (*Eriophorum*)	June 2, 2009

For each cell, complete one Wetland Walkthrough Form.

WETLAND WALKTHROUGH FORM (Blue)

The Wetland Walkthrough Form is entirely recorded in the Trimble PDR.

1. **Start and End Dates**. Start date is **Required**. End date is optional, entered only if inventory of this cell extends over two or more days. Format: MM / DD / YYYY, all integers.

2. **Cell Number**. **Required**. The code from an appropriate map for the 1 × 1 Km cell designated for inventory. Format: I, A2, I3. The first integer indicates the GRTS panel (see table below), the two-place alpha codifies the small area containing the cell (table below), and the last three digits is a sequential number in GRTS selection order.

GRTS Panel	Inven-tory?	No. of Cells
1	Y	101
2	Y	49
3	Y	23
4	Y	26
9	N	2,126

Code	Area Name
BM	Battlement Mesa
CO	Cochetopa
CN	Cones
ES	Eastern San Juans
EM	Elk Mountains
GM	Grand Mesa
MS	Middle San Juans
MU	Muddy
NP	Northern Plateau
SA	Sawatch Mountains
SP	Southern Plateau
WE	West Elks

Photointerp. Area Code	Photointerpretation Area Name
G	Grand Mesa
C	Gunnison-Cochetopa
L	La Garita
N	Northern San Juan
T	Taylor Park
U	Uncompahgre Plateau
W	West Elk Mountains

3. **Personnel**. **Required**. On this form, just initials. Selected from full names on dropdown list in Trimble PDR.

4. **Area**. **Required**. Check boxes on forms. Selected from names on dropdown list in Trimble PDR.

5. **Polygon Code**. **Required**. The code for the polygon. If the polygon was previously photointerpreted, then its Format: A2, A1, I3. The first two places are always "WF", the next alpha is code for the photointerpreted area (table above), and the last three digits are a sequential number in the order in which it was photointerpreted.

   If the polygon was delineated by the crew, the its format: A1, A2, I3. The first character is always "F", the following two alpha is the code for the Area the polygon is in (Code and Area Name in table above), and the last three digits are a sequential number assigned by the field crew; for example FGM007.

6. **Wetland, Riparian, or Upland**. **Required**. Check one box, based on field crew's determination of the nature of the polygon. Use the key, flow diagram, and definitions in the supplementary Protocol. Definitions follow (from the protocol).

   Riparian Ecosystem. An ecosystem dominated by distinctive water-loving (hydrophytic) vegetation; it is not always found in "riparian" (that is, streamside) situations, but sometimes may be found adjacent to wetlands, lakes, or other bodies of water (Brinson and others 2002).

   Upland. An ecosystem dominated by plants other than water-loving (hydrophyte) plants, neither riparian nor wetland plants. Soil is usually not saturated except for a few days during the growing season, and could be colluvial, residual, or alluvial.

   Wetland. "Wetlands have the presence of shallow water or flooded soils for part of the growing season, have organisms adapted to this wet environment, and have soil indicators of this flooding such as hydric soils" (U. S. Army Corps of Engineers 1987, Mitsch and Gosselink 2000). "Lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. Wetlands must have one or more of the following three attributes: (1) at least periodically, the land supports predominantly hydrophytes; (2) the substrate is predominantly undrained hydric soil; [or] (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year" (Cowardin and others 1979). "Those areas that are inundated by surface or ground water with a frequency sufficient to support and that, under normal circumstances, do or would support a prevalence of vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction." Wetlands generally include swamps, marshes, fens, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds (USDA Forest Service 2006a).

7. **New Polygon**. **Required**. Check one box, based on whether polygon was previously photointerpreted, or newly delineated.

8. **Beaver**. **Required** for all polygons. Check one box, depending on whether beaver are

   a. Dominant across most of the polygon.

   b. Present, but there are some areas where beaver activity is not evident.

   c. Absent

9. **Ownership**. **Required**. Check one box, depending on surface ownership.

   a. NFS – National Forest System
   b. PVT – Private
   c. BLM – Public Lands managed by the Bureau of Land Management
   d. STA – State Lands
   e. NPS – National Park System
   f. OTH – Other (Specify)

10. **GPS Location**. **Required**. Projection and UTM Zone must be specified.

11. **Photo Series, From, To. Optional**. Complete these fields only in case polygon is definitely not a fen and the crew has taken some optional photos of the site.

12. **Depth of Peat to Rocks or Mineral Contact**. **Required** either here or on the Soil and Disturbances Form**.** Enter readings from three points in different Communities in the wetland on Walkthrough Form only if the crew is uncertain which Community in the wetland is a fen. If the crew is certain that one Community is a fen, then these data are entered on the Soil and Disturbance Form, for one point in the fen Community.

13. **Fen, Not Fen, Uncertain**. **Required**. Enter estimates from three points in different Communities in the wetland on Walkthrough Form only if the crew is uncertain which Community in the wetland is a fen. Check Not Fen if the criteria have definitely not been met. Check Uncertain if the crew is uncertain whether there is a fen community in the polygon. If Fen or Uncertain is checked for one CT, then that CT becomes CT A and the crew must complete Soil and Disturbances Form and Fen Data Form.

SOIL AND DISTURBANCES FORM (Green)

The Soil and Disturbances Form is entirely recorded in the Trimble PDR.

General Data

1. **Polygon Code. Required**. Same as on the Walkthrough Form, no. 5.

2. **Year. To Be Assigned Later**. The last two digits of the year the first reading was taken. For the three fen inventories already completed on the Forest, these are

Inventory	Field Person	Area Covered	Year(s) Inventoried	Site Coding System
Bathke 2000-2001-2003	David Bathke	Taylor Park and Vicinity	2000, 2001, 2003	W001 – W231
Austin 2008	Gay Austin	Top of Grand Mesa	2007	Short name of feature, e. g., Cars2 for Carson Reservoir No. 2
Chimner and others 2008	Joanna Lemly	San Juan Mountains	2008	Code for watershed, then sequential, e. g., UUR231 for Upper Uncompahgre River No. 231

3. **Reading. Required**. The number of times this community has been sampled, including this sample. In this inventory, will usually be either 1 or 2.

4. **Old Polygon ID.** If this polygon was given a code in a previous inventory, enter it here. **Required** if the polygon was given a code previously.

5. **Personnel Present. Required**. Enter the last and first names of all people present at this site on this date, even if they didn't participate in reading the sample or completing the forms. Middle initials are at the option of the individual being named. Pick from a dropdown list in Trimble PDR.

6. **Cell Number. Required**. Same as on the Walkthrough Form, no. 2.

7. **Start Date and End Date. Required.** Same as on the Walkthrough Form, no. 1.

8. **Owners. Required.** Same as on the Walkthrough Form, no. 10.

9. **Photo Series, Start, End. Optional**. In most cases the photo frames used will be written on the Point and Photo Cards, rather than in the Trimble PDR. The photo series is the prefix assigned by the camera, usually specific to the camera's manufacturer. Start and End are the beginning and ending frame numbers as assigned by the camera. See Photograph Protocol.

Polygon Characterization Data

10. **Polygon Delineated Correctly. Required**. After having walked through the polygon, decide whether the polygon was delineated correctly. Note whether uplands were included in the polygon, and re-delineate the polygon on the topographic map to exclude uplands. Also note whether adjacent wetlands, part of the same wetland complex, were not included; re-delineate the polygon on the topographic map to include adjacent wetlands. If the polygon was drawn by the crew (a new polygon), check New Polygon and draw it on the topographic map.

11. **Open Water. Required**. Check whether there is a pond or small lake within the polygon. Include only perennial water features.

12. **Floating Mat. Required**. Check whether there is a floating mat included within the polygon.

13. **Water Development In or Adjacent. Required**. Record whether there is a dam, weir, floodgate, or other water development in the polygon or adjacent to it.

14. **Channels Through Site. Required**. Record whether perennial water-courses are apparent that cross through the polygon from one side to another.

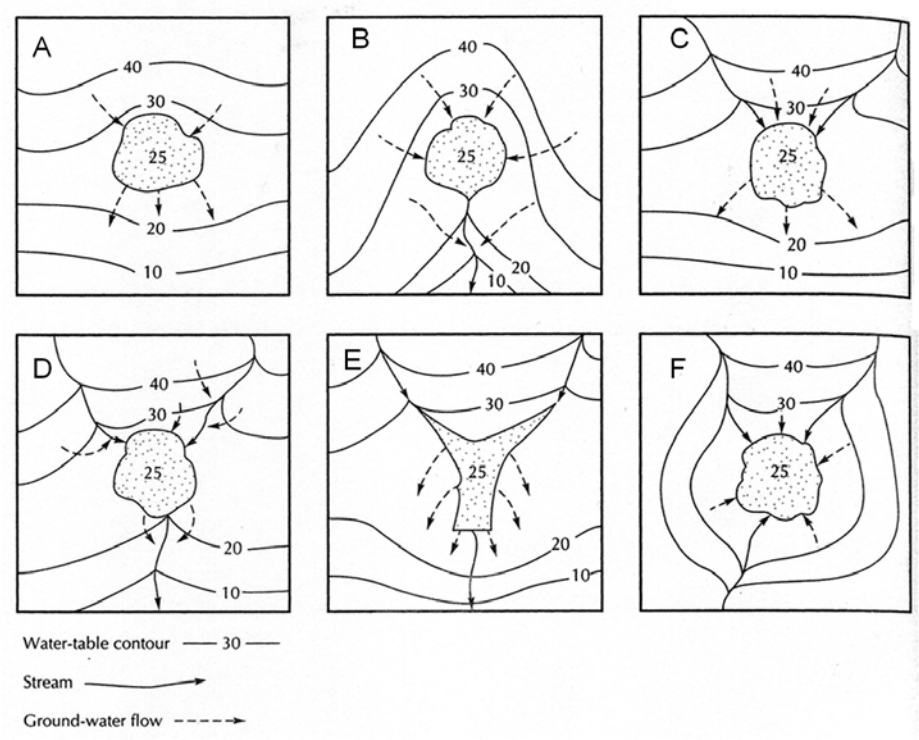
15. **Gully Frequency and Gully Size. Required**. Record gully frequency and size using the classes on the form. If Gully Frequency is None, then Gully Size is not recorded.

GULLY FREQUENCY
1 NONE
2 LOW. ONE SINGLE THREAD
3 MODERATE. UP TO SEVERAL SEPARATE FEATURES, OR ONE THREAD WITH BRANCHING LATERALS.
4 HIGH. NUMEROUS GULLIES AND/OR VERY WELL-DEVELOPED NETWORK.
GULLY SIZE
SMALL – 1 METER WIDE AND/ OR < 50 CM DEEP
LARGE – FEATURES LARGE > 1 METER WIDE AND/OR > 50 CM DEEP.

16. **Hydrological Alteration. Required**. Record the degree of hydrological alteration evident within the polygon (Rocchio 2006a).

A. NONE – NO ALTERATIONS. NO DIKES, DIVERSIONS, DITCHES, FLOW ADDITIONS, OR FILL PRESENT IN WETLAND THAT RESTRICTS OR REDIRECTS FLOW
B. LOW – LOW INTENSITY ALTERATION SUCH AS ROADS AT/NEAR GRADE, SMALL DIVERSION OR DITCHES (< 30 CM DEEP) OR SMALL AMOUNT OF FLOW ADDITIONS
C. MODERATE – MODERATE INTENSITY ALTERATION SUCH AS 2-LANE ROAD, LOW DIKES, ROADS W/CULVERTS ADEQUATE FOR STREAM FLOW, MEDIUM DIVERSION OR DITCHES (30–100 CM DEEP) OR MODERATE FLOW ADDITIONS.
D. HIGH – HIGH INTENSITY ALTERATION SUCH AS 4-LANE HWY., LARGE DIKES, DIVERSIONS, OR DITCHES (>1 M DEEP) CAPABLE OF LOWERING WATER TABLE, LARGE AMOUNT OF FILL, OR ARTIFICIAL GROUNDWATER PUMPING OR HIGH AMOUNTS OF FLOW ADDITIONS

17. **Water Flow Pattern (Fetter Diagrams). Required**. Circle the letter beside the diagram that best represents the water flow pattern into and from the polygon (Fetter 2001).



18. **Amphibian Observed. Required**. Record if any boreal toads or leopard frogs are seen.

Disturbances in Polygon and in Buffer

Record all the disturbances observed within the polygon, and within the buffer. The buffer is the area within the watershed contributing to the wetland, within 100 m of the wetland edge.

19. **Disturbance in Polygon. Required** if present. If there is no disturbance evident in the polygon, check No Disturbance in Polygon. Most of the disturbance types are listed below:

BROWSING	DITCHES	DEPOSITION (SEDIMENTATION)	EROSION
GRAZING	DE-WATERING	EXOTIC PLANT INVASION	GROUND DISTURBANCE (GENERAL)
TRAMPLING	FLOODING	TREE CUTTING	OTHER (DESCRIBE)
TRACKS	DRAINAGE FROM ABOVE	POWER LINES	
TRAILS	FIRE	BURIED UTILITY CORRIDORS	
ROADS (CONSTRUCTED)	SOIL REMOVAL (PEAT MINING)	BEAVER ACTIVITY	

20. **Agent. Optional**. Record the agent(s) causing the disturbance only if known. Some of the known agents are listed below:

ATV	FOUR-WHEEL-DRIVE VEHICLE	SNOWMOBILE
BEAVER	HUMANS	STATE ROADS DEPARTMENT
CATTLE	MOOSE	WIND
COUNTY ROADS DEPARTMENT	MOTORCYCLE	WATER
DEER	NATURAL	
ELK	SHEEP	

21. **Intensity. Required** if Disturbance is recorded. Record the number corresponding to the intensity level. See Disturbance Factors document.

(0 – NONE – NOT USED)
1 – LOW INTENSITY
2 – MODERATE INTENSITY
3 – HIGH INTENSITY
4 – VERY HIGH INTENSITY

22. **Extent Within Polygon. Required** if Disturbance is recorded. Record number corresponding to extent class:

1 COVERS < 10%
2 COVERS ¼
3 COVERS ½
4 COVERS ¾
5 COVERS ALL

23. **Discussion. Optional**. Record any notes about the disturbance not otherwise recorded here or on the sketch map.
24. **Disturbance in Buffer. Required** if present. If there is no disturbance evident in the polygon, check No Disturbance in Polygon. Disturbance types are listed above.
25. **Agent. Optional**. Record the agent(s) causing the disturbance only if known. Known agents are listed above.
26. **Intensity. Required** if Disturbance is recorded. Record the number corresponding to the intensity level. See Disturbance Factors document.
27. **Extent Within Buffer. Required** if Disturbance is recorded. Record number corresponding to extent class, shown above.
28. **Discussion. Optional**. Record any notes about the disturbance not otherwise recorded here or on the sketch map.

Characteristics of the Fen Community (CT A)

29. **Fen Landform. Required**. Check the box corresponding to the appropriate landform class of the polygon.

a. Basin – Large wide open area or depression between mountains or hillslopes; may have peat "strings" or peat sloping formations; often has natural barriers on the edges
b. Slope – Side-slope of mountain or hill, but not at toeslope
c. Toeslope – base of mountain or hillslope
d. Valley Slope – slope within a wide valley, not at a toeslope
e. Small Depression – small concave area bounded by natural barriers on all sides
f. Spring Mound – round or narrow mound of peat that has been pushed up by vertical groundwater flow
g. Other – Describe it!

30. **Aspect. Required**. Record the average aspect of the polygon, to the nearest degree. To record aspect and slope, mark your eye's height on a tape or rod and have another person stand with the tape or rod about 30-35 m away. Stand uphill from the rod, so there is a straight line between you, the rod or tape, and the lowest point in the polygon. For aspect, sight on the rod using an uncorrected compass; record the azimuth in degrees magnetic.
31. **Slope. Required**. From the same position as the aspect reading above, use a clinometer and sight on the eye-mark you made on the tape or rod. Record to the nearest half-percent slope.
32. **Rock Cover. Required**. Record the cover of rock fragments >2 cm diameter in the Community in which the pit is located.
33. **Average Bare Soil Cover. Required**. Estimate the approximate cover of bare soil in the Community where the pit is located, after you have finished the Ground Cover portion of the Fen Data Form. Check one of the boxes corresponding to your estimate.
34. **Average Recent Sediment Cover. Required**. Estimate the approximate cover of recent sediment visible on the surface. Check one of the boxes corresponding to your estimate.

Soil Pit Data

Dig one pit in a typical location within the Community (A) most likely to qualify as a fen (see Protocol). Digging a second or third soil pit in other Communities is Optional. Calibrate pH and EC meters the first day in the week and every other day.

35. **Location of Pit. Required**. Cite which Community contains the soil pit (almost always A in this inventory).
36. **Pit Depth. Required**. Record the maximum depth of the pit, centimeters.
37. **Nature of Pit Bottom. Required**. Check one box, depending on what is in the bottom of the pit:
    a. Peat >40 cm – If peat continues beyond the bottom of the pit.
    b. Rock <40 cm – If a rock was hit before reaching 40 cm.
    c. Mineral Soil <40cm – If mineral soil (without peat below) was encountered before 40 cm.
38. **Water Depth. Required**. Allow water to flow into the pit for about one hour. After that time, record depth of water level from the soil surface. Depths below the soil surface are negative, depths above the soil surface are positive. Water level at the surface is recorded as zero.
39. **Peat Depth. Required**. If a mineral horizon (without peat below) is encountered in the soil pit, then record the depth to the top of that mineral horizon. Otherwise, use average of three readings with the tile probe. Depths below the soil surface are positive.
40. **Soil Gleying. Required**. Record whether gleying is seen in the upper40 cm of the soil pit.
41. **Von Post Value. Required**. Take a sample of peat from the soil pit, squeeze it gently in your hand, and record the results as the numeric Von Post Value, from the table below (Soil Classification Working Group 1998).

    1. Undecomposed; plant structure unaltered; yields only clear water colored light yellow brown.
    2. Almost undecomposed; plant structure distinct; yields only clear water colored light yellow brown.
    3. Very weakly decomposed; plant structure distinct; yields distinctly turbid brown water, no peat substance passes between the fingers, residue not mushy.
    4. Weakly decomposed; plant structure distinct; yields strongly turbid water, no peat substance escapes between the fingers, residue rather mushy.
    5. Moderately decomposed; plant structure clear but becoming indistinct; yields much turbid brown water, some peat escapes between the fingers, residue very mushy.
    6. Strongly decomposed; plant structure somewhat indistinct but clearer in the squeezed residue than in the undisturbed peat; about one third of the peat escapes between the fingers, residue strongly mushy.
    7. Strongly decomposed; plant structure indistinct but recognizable; about half the peat escapes between the fingers.
    8. Very strongly decomposed; plant structure very indistinct; about two thirds of the peat escapes between the fingers, residue almost entirely resistant remnants such as root fibers and wood.
    9. Almost completely decomposed; plant structure almost unrecognizable; nearly all the peat escapes between the fingers.
    10. Completely decomposed; plant structure unrecognizable; all the peat escapes between the fingers.

42. **pH and Depth. Required**. Put the probe from the pH meter in the water that is standing in the soil pit. Record the pH value after the meter reading has stabilized, and the depth of the probe when the reading was taken.

43. **EC and Temperature. Required**. Put the probe from the Electrical Conductivity (EC) meter in the same place as the pH meter. Record the EC value after the meter has stabilized, and the temperature of the water at the same place.

44. **Depth of First Mineral Layer. Required**. Record the depth from the soil surface to the first mineral layer encountered, either in the soil pit or using the tile probe. If no mineral layer was encountered, check the None box.

45. **Soil Sample Taken From Depth**. **Required**. Take a soil sample from peat at the depth specified in the Soil Sampling Protocol. Record the depth at which the soil sample was taken.

FEN DATA FORM (Pink)

The Fen Data Form is entirely recorded on paper.

General Data

1. **Cell Number. Required**. Same as on the Walkthrough Form, no. 2.

2. **Polygon Code. Required**. Same as on the Walkthrough Form, no. 5.

3. **Personnel Present. Required**. Enter the initials of the personnel listed on the Soil and Disturbances Form.

4. **Start Date and End Date. Required.** Same as on the Walkthrough Form, no. 1.

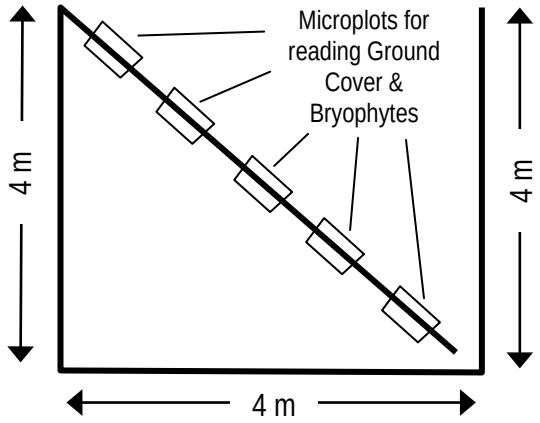
5. **Area Name. Optional**. Write the code for the area name, as on the Walkthrough Form, no. 2.

   Lay out a plot or relevé in a typical, characteristic portion of the Community (usually CT A). In most cases in this inventory, this will be a 4 × 4 m square relevé.

6. **Plot / Relevé Size and Shape. Required**. Write the width and height of the plot or relevé used to estimate vegetation cover. In most cases in this inventory, this will be a 4 × 4 m square relevé. For shape, write SQU or draw a small square.

Vegetation and Ground Cover Data

Lay out the relevé using tape and spikes, in the following configuration.



7. **Cover of Tree Species, Shrub Species, Graminoid Species, and Forb Species. Required** for CT A for all vascular plant species present within the plot or relevé. Record species code and canopy cover class for all vascular plant species present. Species and codes identified using Weber and Wittmann (2001) or Johnston (2001), codes as in Plant List of Colorado. Canopy cover classes as shown on form and below. Columns B and C are usually not used.

CANOPY COVER CLASSES					
CD	RANGE	MID	CD	RANGE	MID
T	0-1%	0.5%	5	45-55%	50%
0	1-5%	3%	6	55-65%	60%
1	5-15%	10%	7	65-75%	70%
2	15-25%	20%	8	75-85%	80%
3	25-35%	30%	9	85-95%	90%
4	35-45%	40%	A	95-99%	97%
			X	99-100%	99.5%

8. Cover of Bryophytes. Required. Record total (aggregate) cover class of all bryophytes (mosses and liverworts). This is probably better done by microplots, at the same time as the Ground Cover (below). Cover classes for individual bryophyte species can also be recorded in addition to the total (aggregate) cover.

Place five Daubenmire microplots at 1 m intervals on the tape laid out for the relevé, according to the diagram above.

9. Ground Cover. Required for all ground cover classes present in the relevé in CT A. Record all ground cover present in the five microplots (see diagram above), including animal droppings. The following ground cover classes should add to approximately 100%:

.BARE	BARE MINERAL
.LITT	DEAD ON GROUND
.FIGR	2 – 5 MM
.MEGR	5 – 20 MM
.COGR	20 – 75 MM
.COBB	7.5 – 25 CM
.STON	25 – 60 CM
.BOUL	> 60 CM
.BEDR	BEDROCK
.BAVE	LIVE PLANT BASES

Usually bare soil is recorded in any case (use dash [–] if bare soil is none). This form can also be used to estimate bryophyte cover (recommended). Ground cover blocks for Communities B and C are optional. Total live cover and Total cover by wetland plants and invaders will be calculated later by the data entry program.

SKETCH MAPS FORM (Yellow)

Sketch maps are only on paper form.

1. Sketch Map of Site. Required. Sketch the polygon, noting the North arrow at the top of the page. Usually the outline of the polygon can be copied (but larger) from the 8½ × 11 in map provided; draw the polygon large enough to fill the space allotted with about one inch margins. Sketch all the apparent Communities that can be distinguished based on dominant vegetation, water table, and landform. A Community may be in several parts (may not be contiguous). Include any ponds or lakes as a Community. Label the Communities with capital letters, with A reserved for the Community that best qualifies for fen.

Also show on the sketch map any channels within the polygon or adjacent to it (dashed lines, with directional arrows). Show water flow directions outside the polygon (dotted lines with directional arrows). Show ditches that are observed within or adjacent to the polygon (double line, labeled Ditch). Show tracks, trails, and roads in the polygon or adjacent to it.

It is not necessary to sketch the Buffer, which is defined as the area within the contributing watershed, up to 100 m from the edge of the polygon.

2. **Communities. Required**. List all Communities labeled on the sketch map. For each Community, describe:

a. Dominant Plant Species. List the first two or three dominant species. Show species codes, separated by dashes, for example "CAUT-CACA4", making sure to use the correct codes. If the CT is water without any vegetation, then leave this field blank.

b. Water Table With Respect to Surface. Describe the water characteristics that enable you to distinguish this CT. Some examples:

> At surface, saturated thru season
> 10-15 cm above surface, fluctuates, saturated
> Pond

c. Landform / Soils. Describe the landforms and soils that allow you to distinguish this CT. Some examples:

> Floating peat mat
> 15-20 cm below CT A
> 5-10 cm below CT B, mineral soil

d. Average Bare Soil Cover. Estimate the cover (%) of bare soil within this CT, using the same concept of Bare Soil as in Ground Cover measurements above. Estimate as closely as you can quickly, to the nearest 5-10%. For CT A, this is best recorded after it has been more accurately estimated using the Fen Data Form (above).

e. Average Mineral Sediment Cover. Estimate the cover (%) of recent mineral sediment deposits within this CT. Estimate as closely as you can quickly, to the nearest 5-10%.

f. Soil Wetness Scalar. Record the number corresponding to the description in the table below, that best fits that community.

1. Dry-moist surface, water table below surface most of summer, except early spring. Soil mottling or gleying. Rock on wetland surface
2. Occasional saturated organic soils with high water table part of the year.
3. Consistently saturated surface conditions with high water table throughout year.
4. Wide-leaved sedges present with 8 – 20 cm standing water, high water table with evidence of fluctuations.
5. Artificial flooding/very high water table. Mostly plants that can tolerate flooding and fluctuating water levels.
6. Aquatic plants, 20 cm or more standing water above soil surface throughout year, lack of sedges, likely water table fluctuations.

3. **Sketch of Soil Profile. Optional**. Sketch the generalized layers in the soil, to distinguish organic and mineral layers and layers with gleying. Give approximate thicknesses of each layer in centimeters, to the depth that the pit was dug.

PHOTO POINT CARD (Green)

Place the card in the first photo taken at the Photo Point (see photograph protocol), usually a photo of the cairn, rock, or other point from which subsequent photos will be taken. The large blocks on the card are filled using a wide chisel-tip marker. For the smaller blocks at the bottom, use pencil.

1. **Polygon Number. Required**. Record the four-digit polygon number from the maps, for example, T561 or G013. If the polygon has been defined in the field by the crew (an F-polygon), then record F plus the 3-digit sequential number, for example F019.
2. **Date. Required**. Record the date of the photos, in the format MM | DD | YY. Leading zeroes can be omitted in the month and day block, but not the year block. For example, __ 7 | __ 9 | 0 9 is acceptable, but _ 7 | _ 9 | _ 9 is not.
3. **Start Azimuth. Required**. Record the azimuth of the first photo (usually a photo of the cairn, rock, or other point from which subsequent photos will be taken). Use an uncorrected compass, that reads in magnetic degrees.
4. **Panorama Start Azimuth. Optional**. If these photos are taken out of sequence or on another day than the Start Photo, then place the card in the first photo of the panorama set, with the azimuth from the photographer to the card recorded in this block.
5. **Monumentation of Photo Point. Required**. Record the nature and size of the object marking the place from which the panorama photos are taken. For example, 2' Rock Cairn or ½" Re-bar.
6. **Photo Series, Start, and End. Required.** Record the series assigned by the camera (examples might be DCIM or 101 or NPIM), and the start and frame numbers, for all the photos taken of and from this photo point.
7. **UTM Coordinates, Datum, Zone, and Elevation**. **Optional**. Usually these data will be stored in the GPS unit.

PHOTO CARD (Yellow)

Place the card in the first photo taken at the sample site (see photograph protocol), usually a photo of the tile probe marking the spot where the GPS point was taken in Community A. The large blocks on the card are filled using a wide chisel-tip marker. For the smaller blocks at the bottom, use pencil.

1. **Polygon Number. Required**. Record the four-digit polygon number from the maps, for example, T561 or G013. If the polygon has been defined in the field by the crew (an F-polygon), then record F plus the 3-digit sequential number, for example F019.
2. **Date. Required**. Record the date of the photos, in the format MM | DD | YY. Leading zeroes can be omitted in the month and day block, but not the year block. For example, __ 7 | __ 9 | 0 9 is acceptable, but _ 7 | _ 9 | _ 9 is not.
3. **Start Azimuth. Required**. Record the azimuth of the first photo (usually a photo of the tile probe at the point where the GPS point was taken). Use an uncorrected compass, that reads in magnetic degrees.
4. **Soil Pit Azimuth. Optional**. This should be recorded only if the photo of the soil pit was taken out of sequence or on a different day from the Start Photo.
5. **Relevé Azimuth. Optional**. This should be recorded only if the photos of the relevé were taken out of sequence or on a different day from the Start Photo.
6. **Photo Series, Start, and End. Required.** Record the series assigned by the camera (examples might be DCIM or 101 or NPIM), and the start and frame numbers, for all the photos taken at this point – the Start, Soil Pit, and Relevé Photos, plus any other photos you might have taken at or near this point in CT A.

Appendix D. Forms

WETLAND WALKTHROUGH FORM COMPLETE ONE FORM FOR EACH 1 Km × 1 Km CELL ★ FRONT OF SHEET NO. ___ OF ___

(★REQUIRED FIELDS)

★START ___/___/___ ____ END ___/___/___ ____	★PERSONNEL:	___ ___ ___ ___ ___ ___ ★CELL NUMBER

AREA: ☐Battlement Mesa ☐Cones ☐Elk Mountains ☐Middle San Juans ☐Northern Plateau ☐Southern Plateau
☐Cochetopa ☐Eastern San Juans ☐Grand Mesa ☐Muddy ☐Sawatch Mountains ☐West Elks

① ★ POLYGON CODE: ___ ___ ___ ___ ___ ___

★NEW POLYGON? ☐ NEW ☐ PHOTOINTERP.

★OWNERS ☐NFS ☐PVT ☐BLM ☐STA ☐NPS ☐OTH

★. Required for all Polygons.
O. Complete up to three readings in different CTs, if needed to determine wetland and fen.

COMMENTS.

★ ☐ WETLAND ☐ RIPARIAN ☐ UPLAND

O DEPTH PEAT TO ROCKS OR MINERAL CONTACT (NO PEAT BELOW)

CM	CM	CM
O ☐ FEN ☐ NOT FEN ☐ UNCERTAIN	O ☐ FEN ☐ NOT FEN ☐ UNCERTAIN	O ☐ FEN ☐ NOT FEN ☐ UNCERTAIN
O CT ___	O CT ___	O CT ___

★BEAVER: ☐ DOMINANT ☐ PRESENT ☐ NO BEAVER ACTIVITY

POINT LOCATION:
★UTM EAST ___ ___, ___ ___ ___, ___ ___ ___.___
★UTM NORTH ___ ___, ___ ___ ___, ___ ___ ___.___
★GPS DATUM: ___ ___ ___ ___ ___ UTM ZONE ___ ___ ___
★GPS ELEVATION:

PHOTO SERIES	FROM	TO

② ★ POLYGON CODE: ___ ___ ___ ___ ___ ___

★NEW POLYGON? ☐ NEW ☐ PHOTOINTERP.

★OWNERS ☐NFS ☐PVT ☐BLM ☐STA ☐NPS ☐OTH

★. Required for all Polygons.
O. Complete up to three readings in different CTs, if needed to determine wetland and fen.

COMMENTS.

★ ☐ WETLAND ☐ RIPARIAN ☐ UPLAND

O DEPTH PEAT TO ROCKS OR MINERAL CONTACT (NO PEAT BELOW)

CM	CM	CM
O ☐ FEN ☐ NOT FEN ☐ UNCERTAIN	O ☐ FEN ☐ NOT FEN ☐ UNCERTAIN	O ☐ FEN ☐ NOT FEN ☐ UNCERTAIN
O CT ___	O CT ___	O CT ___

★BEAVER: ☐ DOMINANT ☐ PRESENT ☐ NO BEAVER ACTIVITY

POINT LOCATION:
★UTM EAST ___ ___, ___ ___ ___, ___ ___ ___.___
★UTM NORTH ___ ___, ___ ___ ___, ___ ___ ___.___
★GPS DATUM: ___ ___ ___ ___ ___ UTM ZONE ___ ___ ___
★GPS ELEVATION:

PHOTO SERIES	FROM	TO

③ ★ POLYGON CODE: ___ ___ ___ ___ ___ ___

★NEW POLYGON? ☐ NEW ☐ PHOTOINTERP.

★OWNERS ☐NFS ☐PVT ☐BLM ☐STA ☐NPS ☐OTH

★. Required for all Polygons.
O. Complete up to three readings in different CTs, if needed to determine wetland and fen.

COMMENTS.

★ ☐ WETLAND ☐ RIPARIAN ☐ UPLAND

O DEPTH PEAT TO ROCKS OR MINERAL CONTACT (NO PEAT BELOW)

CM	CM	CM
O ☐ FEN ☐ NOT FEN ☐ UNCERTAIN	O ☐ FEN ☐ NOT FEN ☐ UNCERTAIN	O ☐ FEN ☐ NOT FEN ☐ UNCERTAIN
O CT ___	O CT ___	O CT ___

★BEAVER: ☐ DOMINANT ☐ PRESENT ☐ NO BEAVER ACTIVITY

POINT LOCATION:
★UTM EAST ___ ___, ___ ___ ___, ___ ___ ___.___
★UTM NORTH ___ ___, ___ ___ ___, ___ ___ ___.___
★GPS DATUM: ___ ___ ___ ___ ___ UTM ZONE ___ ___ ___
★GPS ELEVATION:

PHOTO SERIES	FROM	TO

④ ★ POLYGON CODE: ___ ___ ___ ___ ___ ___

★NEW POLYGON? ☐ NEW ☐ PHOTOINTERP.

★OWNERS ☐NFS ☐PVT ☐BLM ☐STA ☐NPS ☐OTH

★. Required for all Polygons.
O. Complete up to three readings in different CTs, if needed to determine wetland and fen.

COMMENTS.

★ ☐ WETLAND ☐ RIPARIAN ☐ UPLAND

O DEPTH PEAT TO ROCKS OR MINERAL CONTACT (NO PEAT BELOW)

CM	CM	CM
O ☐ FEN ☐ NOT FEN ☐ UNCERTAIN	O ☐ FEN ☐ NOT FEN ☐ UNCERTAIN	O ☐ FEN ☐ NOT FEN ☐ UNCERTAIN
O CT ___	O CT ___	O CT ___

★BEAVER: ☐ DOMINANT ☐ PRESENT ☐ NO BEAVER ACTIVITY

POINT LOCATION:
★UTM EAST ___ ___, ___ ___ ___, ___ ___ ___.___
★UTM NORTH ___ ___, ___ ___ ___, ___ ___ ___.___
★GPS DATUM: ___ ___ ___ ___ ___ UTM ZONE ___ ___ ___
★GPS ELEVATION:

PHOTO SERIES	FROM	TO

★ BACK OF SHEET NO. ___ OF ___

★START ___/___/_____ END ___/___/_____	_____ ★CELL NUMBER

⑤

★ POLYGON CODE: _____	★ ☐ WETLAND ☐ RIPARIAN ☐ UPLAND			★BEAVER: ☐ DOMINANT ☐PRESENT ☐ NO BEAVER ACTIVITY
	O DEPTH PEAT TO ROCKS OR MINERAL CONTACT (NO PEAT BELOW)			
	CM	CM	CM	POINT LOCATION:
★NEW POLYGON? ☐ NEW ☐ PHOTOINTERP.	O ☐ FEN ☐ NOT FEN ☐ UNCERTAIN	O ☐ FEN ☐ NOT FEN ☐ UNCERTAIN	O ☐ FEN ☐ NOT FEN ☐ UNCERTAIN	★UTM EAST __ __, __ __ __, __ __ __•__ __
★OWNERS ☐NFS ☐PVT ☐BLM ☐STA ☐NPS ☐OTH	O CT ___	O CT ___	O CT ___	★UTM NORTH __ __, __ __ __, __ __ __•__ __
				★GPS DATUM: _____UTM ZONE _____
				★GPS ELEVATION:

PHOTO SERIES	FROM	TO

★. Required for all Polygons.
O. Complete up to three readings in different CTs, if needed to determine wetland and fen.

COMMENTS.

⑥

★ POLYGON CODE: _____	★ ☐ WETLAND ☐ RIPARIAN ☐ UPLAND			★BEAVER: ☐ DOMINANT ☐PRESENT ☐ NO BEAVER ACTIVITY
	O DEPTH PEAT TO ROCKS OR MINERAL CONTACT (NO PEAT BELOW)			
	CM	CM	CM	POINT LOCATION:
★NEW POLYGON? ☐ NEW ☐ PHOTOINTERP.	O ☐ FEN ☐ NOT FEN ☐ UNCERTAIN	O ☐ FEN ☐ NOT FEN ☐ UNCERTAIN	O ☐ FEN ☐ NOT FEN ☐ UNCERTAIN	★UTM EAST __ __, __ __ __, __ __ __•__ __
★OWNERS ☐NFS ☐PVT ☐BLM ☐STA ☐NPS ☐OTH	O CT ___	O CT ___	O CT ___	★UTM NORTH __ __, __ __ __, __ __ __•__ __
				★GPS DATUM: _____UTM ZONE _____
				★GPS ELEVATION:

PHOTO SERIES	FROM	TO

★. Required for all Polygons.
O. Complete up to three readings in different CTs, if needed to determine wetland and fen.

COMMENTS.

⑦

★ POLYGON CODE: _____	★ ☐ WETLAND ☐ RIPARIAN ☐ UPLAND			★BEAVER: ☐ DOMINANT ☐PRESENT ☐ NO BEAVER ACTIVITY
	O DEPTH PEAT TO ROCKS OR MINERAL CONTACT (NO PEAT BELOW)			
	CM	CM	CM	POINT LOCATION:
★NEW POLYGON? ☐ NEW ☐ PHOTOINTERP.	O ☐ FEN ☐ NOT FEN ☐ UNCERTAIN	O ☐ FEN ☐ NOT FEN ☐ UNCERTAIN	O ☐ FEN ☐ NOT FEN ☐ UNCERTAIN	★UTM EAST __ __, __ __ __, __ __ __•__ __
★OWNERS ☐NFS ☐PVT ☐BLM ☐STA ☐NPS ☐OTH	O CT ___	O CT ___	O CT ___	★UTM NORTH __ __, __ __ __, __ __ __•__ __
				★GPS DATUM: _____UTM ZONE _____
				★GPS ELEVATION:

PHOTO SERIES	FROM	TO

★. Required for all Polygons.
O. Complete up to three readings in different CTs, if needed to determine wetland and fen.

COMMENTS.

⑧

★ POLYGON CODE: _____	★ ☐ WETLAND ☐ RIPARIAN ☐ UPLAND			★BEAVER: ☐ DOMINANT ☐PRESENT ☐ NO BEAVER ACTIVITY
	O DEPTH PEAT TO ROCKS OR MINERAL CONTACT (NO PEAT BELOW)			
	CM	CM	CM	POINT LOCATION:
★NEW POLYGON? ☐ NEW ☐ PHOTOINTERP.	O ☐ FEN ☐ NOT FEN ☐ UNCERTAIN	O ☐ FEN ☐ NOT FEN ☐ UNCERTAIN	O ☐ FEN ☐ NOT FEN ☐ UNCERTAIN	★UTM EAST __ __, __ __ __, __ __ __•__ __
★OWNERS ☐NFS ☐PVT ☐BLM ☐STA ☐NPS ☐OTH	O CT ___	O CT ___	O CT ___	★UTM NORTH __ __, __ __ __, __ __ __•__ __
				★GPS DATUM: _____UTM ZONE _____
				★GPS ELEVATION:

PHOTO SERIES	FROM	TO

★. Required for all Polygons.
O. Complete up to three readings in different CTs, if needed to determine wetland and fen.

COMMENTS.

Version 5f • June 16, 2009

FEN DATA AND SKETCH (Version 5g) June 16, 2009

★CELL NUMBER: ___ ___ ___ ___ ___	★ ___ ___ ___ ___ ___ | ___ - ___ POLYGON CODE YR READ	AREA NAME:
PERSONNEL INITIALS:	PLOT/RELEVÉ SIZE ___ x ___ SHAPE ___	★DATE START: ___/___/______ DATE END: ___/___/______

TREES	WFO*	INV†	CANOPY COVER CLASS		
CODE			A	B	C

SHRUBS	WFO*	INV†	CANOPY COVER CLASS		
CODE			A	B	C

GRAMINOIDS	WFO*	INV†	CANOPY COVER CLASS		
CODE			A	B	C

*, Plant species listed as Obligate or Facultative Wetland. †, Invader (exotic) species.

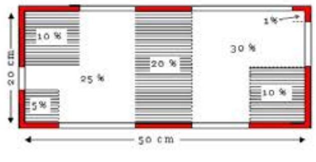
FORBS	WFO*	INV†	CANOPY COVER CLASS		
CODE			A	B	C

	CANOPY COVER, %		
	A	B	C
TOT LIVE COVER			
TOT WET O/F			
TOT INVADER			

BRYOPHYTES (TOTAL OR BY SPECIES CODE)	CANOPY COVER CLASS		
	A	B	C
TOTAL BRY COVER			

CANOPY COVER CLASSES

CD	RANGE	MID	CD	RANGE	MID
T	0-1%	0.5%	5	45-55%	50%
0	1-5%	3%	6	55-65%	60%
1	5-15%	10%	7	65-75%	70%
2	15-25%	20%	8	75-85%	80%
3	25-35%	30%	9	85-95%	90%
4	35-45%	40%	A	95-99%	97%
			X	99-100%	99.5%

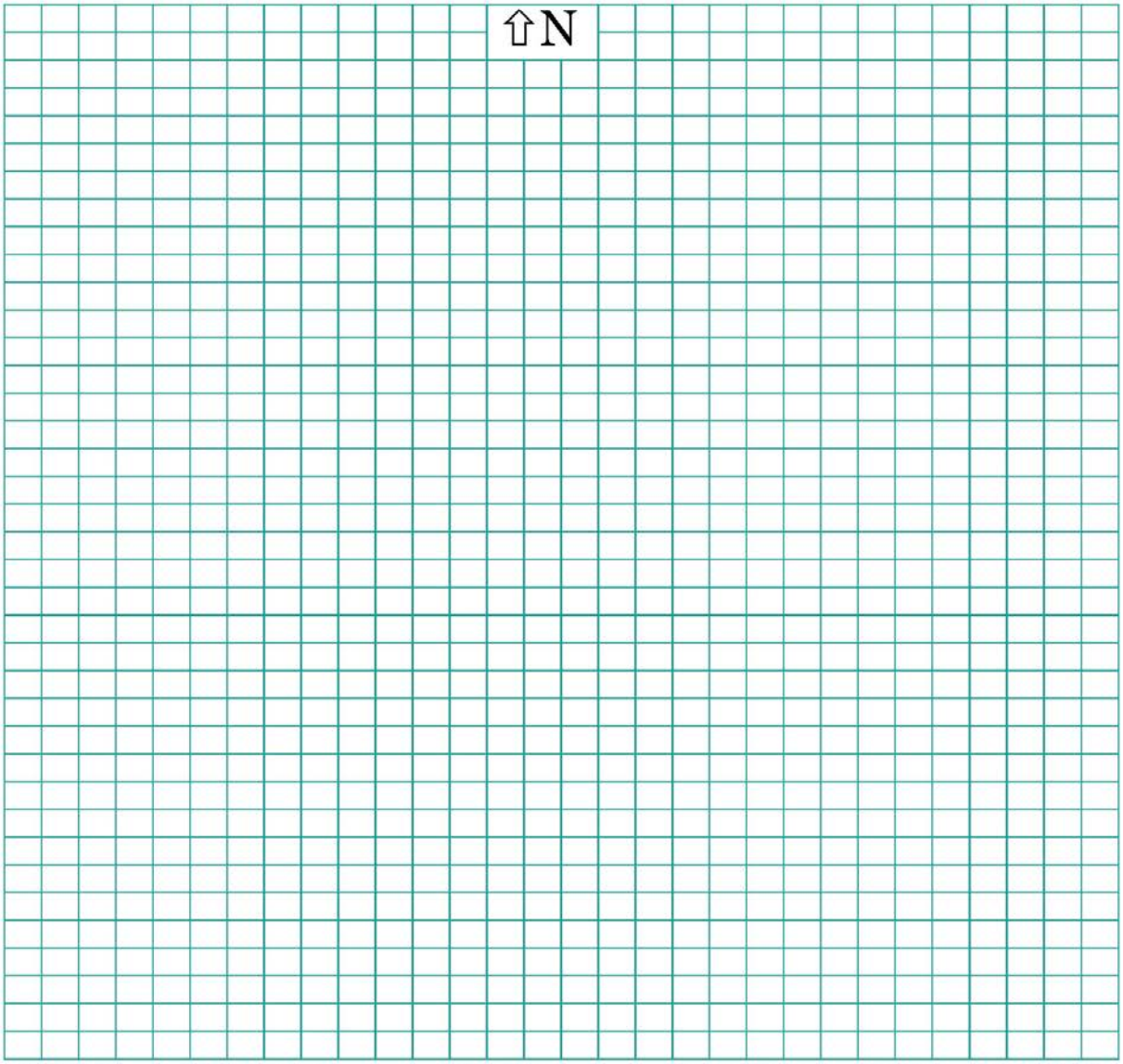


	GROUND COVER – CT A		COVER CLASS					AVG COVER, %
	CODE	MEANING	1	2	3	4	5	
SHOULD ADD TO 100%	.BARE	BARE MINERAL						
	.LITT	DEAD ON GROUND						
	.FIGR	2 – 5 MM						
	.MEGR	5 – 20 MM						
	.COGR	20 – 75 MM						
	.COBB	7.5 – 25 CM						
	.STON	25 – 60 CM						
	.BOUL	> 60 CM						
	.BEDR	BEDROCK						
	.BAVE	LIVE PLANT BASES						
ALL PRESENT	.WATER							
	.COWPIE							
	.DEERPE							
	.ELKPEL							
	BRYOPHYTES							

	GROUND COVER – CT B		COVER CLASS					AVG COVER, %
	CODE	MEANING	1	2	3	4	5	
SHOULD ADD TO 100%	.BARE	BARE MINERAL						
	.LITT	DEAD ON GROUND						
	.FIGR	2 – 5 MM						
	.MEGR	5 – 20 MM						
	.COGR	20 – 75 MM						
	.COBB	7.5 – 25 CM						
	.STON	25 – 60 CM						
	.BOUL	> 60 CM						
	.BEDR	BEDROCK						
	.BAVE	LIVE PLANT BASES						
ALL PRESENT	.WATER							
	.COWPIE							
	.DEERPE							
	.ELKPEL							
	BRYOPHYTES							

	GROUND COVER – CT C		COVER CLASS					AVG COVER, %
	CODE	MEANING	1	2	3	4	5	
SHOULD ADD TO 100%	.BARE	BARE MINERAL						
	.LITT	DEAD ON GROUND						
	.FIGR	2 – 5 MM						
	.MEGR	5 – 20 MM						
	.COGR	20 – 75 MM						
	.COBB	7.5 – 25 CM						
	.STON	25 – 60 CM						
	.BOUL	> 60 CM						
	.BEDR	BEDROCK						
	.BAVE	LIVE PLANT BASES						
ALL PRESENT	.WATER							
	.COWPIE							
	.DEERPE							
	.ELKPEL							
	BRYOPHYTES							

★SKETCH MAP OF POLYGON, SHOWING COMMUNITIES | ★POLYGON CODE: __ __ __ __ __ __ __ | ★DATE: ___/__ __/__ __ __ __



★COM	★%	★DOMINANT SPECIES	★WATER TABLE	★LANDFORM / SOILS	★BARE SOIL	★SEDIMENT	★SWS*
A							
B							
C							
D							
E							
F							
G							
H							

***Soil Wetness Scalar**

1. Dry-moist surface, water table below surface most of summer, except early spring. Soil mottling or gleying. Rock on wetland surface
2. Occasional saturated organic soils with high water table part of the year.
3. Consistently saturated surface conditions with high water table throughout year.
4. Wide-leaved sedges present with >10 cm standing water, high water table with evidence of fluctuations.
5. Artificial flooding/very high water table. Mostly plants that can tolerate flooding and fluctuating water levels.
6. Aquatic plants, 20 cm or more standing water above soil surface throughout year, lack of sedges, likely water table fluctuations.

GENERAL FORM – FENS

SITE ID: _ _ _ . _ _ _ _ – _ _ _ . _ _ _ _ | W F I M –
WATERBODY CODE (LONG–LAT) (A13) PURPOSE CODE (A6)

★_ _ _ _ _ _ _ | _ _ - _
POLYGON CODE (A6) YEAR (N2) READ (N1)

AREA NAME:

★LAST	★FIRST	MI

PERSONNEL PRESENT

★CELL NUMBER: _ _ _ _ _ _

★OWNERS: _ _ _ FOR | DIS: _ _ _ | _ _

★PHOTO SERIES	★START	★END	COMMENTS

★START _ _ | _ _ | _ _ _ _

★END _ _ | _ _ | _ _ _ _
MONTH DAY YEAR

★☐ WETLAND ↓

★☐ FEN† ☐ NOT FEN ☐ UNCERTAIN†

★SURFACE SOIL MOISTURE: ☐ SATURATED ☐ MOIST ☐ DRY

★COVER SURFACE ROCKS (> 2 CM): _ _ %

★SOIL GLEYING IN UPPER 40 CM ☐ YES ☐ NO

★BEAVER ACTIVITY: ☐ DOMINANT ☐ PRESENT ☐ NONE

★DEPTH OF PEAT TO ROCKS OR MINERAL CONTACT (TILE PROBE)

CM | CM | CM

RECENT SEDIMENT COVER (WHOLE POLYGON) %

★☐ NOT WETLAND ↓

★☐ RIPARIAN ECOSYSTEM ☐ UPLAND

POINT LOCATION:

★UTM EAST _ _ , _ _ _ , _ _ _ • _ _

★UTM NORTH _ _ , _ _ _ , _ _ _ • _ _

★GPS DATUM: _ _ _ _ _ UTM ZONE _ _ _

★GPS ELEVATION:

★OPEN WATER ☐ YES ☐ NO

★FLOATING MAT ☐ YES ☐ NO

†. COMPLETE THE REST OF THIS FORM. OTHERWISE, GO TO NEXT POLYGON.

★POLYGON DELINEATED CORRECTLY? ☐ YES ☐ NO (CORRECT MAP)

★WATER DEVELOPMENT IN OR ADJACENT? ☐ YES ☐ NO (IF YES, ALSO INCLUDE AS DISTURBANCE BELOW)

★ASPECT _ _ _ _ °MAG. ★SLOPE _ _ _ • _ %

★DISTURBANCE IN POLYGON*	AGENT (IF KNOWN)	★DISTURB. TO	★INTENSITY	★EXTENT WITHIN POLYGON	DISCUSSION

★DISTURBANCE IN BUFFER†*	AGENT (IF KNOWN)	★DISTURB. TO	★INTENSITY	★EXTENT WITHIN BUFFER	DISCUSSION

†BUFFER IS THE AREA WITHIN THE CONTRIBUTING WATERSHED, UP TO 100 M FROM THE EDGE OF THE WETLAND COMPLEX.

*DISTURBANCE (FILL IN OTHER DISTURBANCE)			DISTURB. TO	INTENSITY	EXTENT
TRAMPLING	BROWSING		V VEGETATION	0 – SLIGHT INTENSITY	1 COVERS < 10%
COMPACTION	GRAZING		H HYDROLOGY	1 – LOW INTENSITY	2 COVERS ¼
SEDIMENT DEPOSITION	DITCHING		S SOILS	2 – MODERATE INTENSITY	3 COVERS ½
RUTTING	FIRE			3 – HIGH INTENSITY	4 COVERS ¾
FLOODING	TIMBER HARVEST			4 – VERY HIGH INTENSITY	5 COVERS ALL
DE-WATERING					

Soil Wetness Scalar

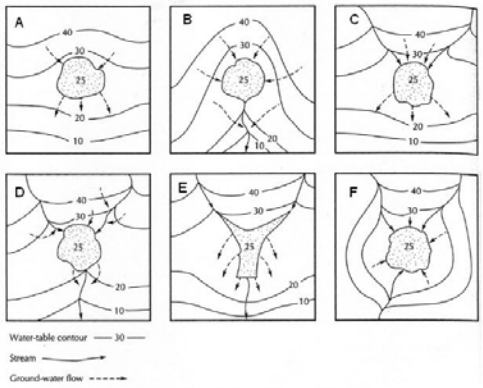
☐ 1. Dry to moist soil surface, water table below soil surface most of the summer, except in the early spring. Soil has mottling or gleying. Rock sometimes present on surface of wetlands.
☐ 2. Occasional saturated organic soils with high water table part of the year.
☐ 3. Consistently saturated surface conditions with high water table throughout year.
☐ 4. Wide-leaved sedges present with 8 – 20 cm standing water, high water table with evidence of fluctuations.
☐ 5. Artificial flooding/very high water table. Mostly plants that can tolerate flooding and fluctuating water levels.
☐ 6. Aquatic plants, 20 cm or more standing water above soil surface throughout year, lack of sedges, likely water table fluctuations.

Version 2009h (May 2009)

★FEN LANDFORM:
☐ BASIN
☐ SLOPE
☐ SMALL DEPRESSION
☐ SPRING MOUND
☐ TOESLOPE
☐ VALLEY SLOPE
☐ OTHER – SPECIFY:

★CHANNEL(S) THROUGH SITE? ☐ YES ☐ NO

★PONDS ON SITE? ☐ YES ☐ NO



★Circle One Letter (Fetter 2001)
(Or draw water flow arrows on sketch, back of form)

GENERAL GEOLOGY OF WATERSHED:

MAP SOURCE

GEOLOGY MAP UNIT:

FORMATION:

LITHOLOGY:

CONTRIBUTING WATERSHED:
☐ < 10 AC
☐ 10 – 50 AC
☐ 50 – 100 AC
☐ 100 – 500 AC
☐ 500 – 1,000 AC
☐ 1,000 – 5,000 AC
☐ > 5,000 AC

A. Groundwater dominated, both inflow and outflow are subsurface. No evidence of surface channels into or out of the wetland.
B. Groundwater inflow dominant. No surface channel inflow to wetland, but a surface channel outflow exists. Outflow may be perennial or intermittent.
C. Surface water inflow. No evidence of an outflow channel.
D. Surface water dominated. Evidence of both surface water inflow and outflow. (Note: these are likely not fens)
E. Impoundment, either man-made reservoir or natural fill associated with slumping or landslide. Similar to D. Reservoirs can not create a fen, but they may have inundated one.
F. Topographically a closed basin. Surface inflow, but no outflow. Do not confuse with A or C. Wetland surface is obviously lower than surrounding perimeter area.

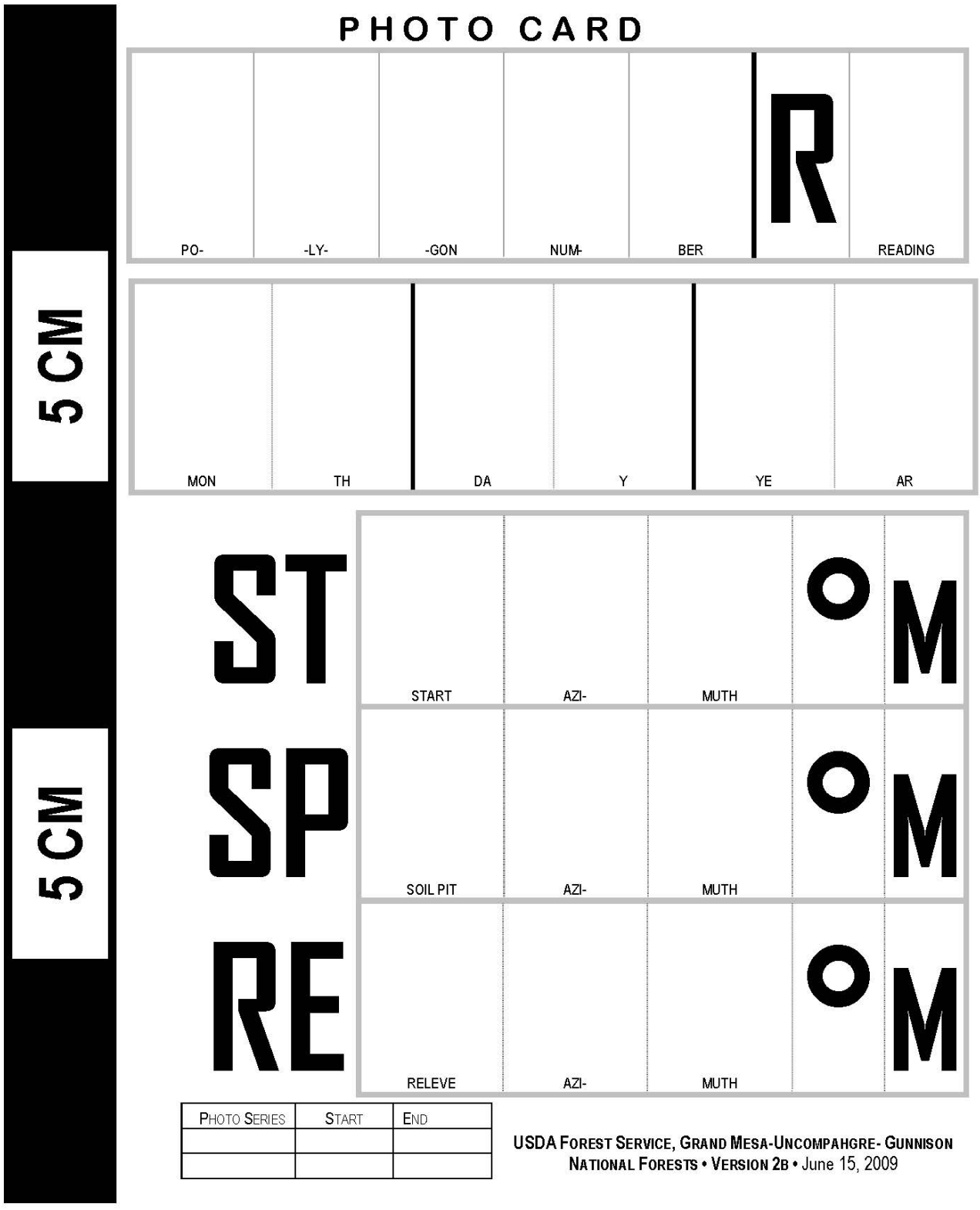
AMPHIBIAN OBSERVED	ABUNDANCE	DISCUSSION

★SOIL PIT DATA

FACTOR	★PIT 1	PIT 2	PIT 3
★PIT DEPTH	___ CM	___ CM	___ CM
★NATURE OF PIT BOTTOM	☐ PEAT > 40 CM ☐ ROCK < 30 CM ☐ MINERAL SOIL < 30 CM	☐ PEAT > 40 CM ☐ ROCK < 30 CM ☐ MINERAL SOIL < 30 CM	☐ PEAT > 40 CM ☐ ROCK < 30 CM ☐ MINERAL SOIL < 30 CM
★WATER TABLE DEPTH (NEGATIVE ABOVE SURFACE)	___ CM	___ CM	___ CM
★VON POST VALUE (1 – 10)*	___	___	___
★PH AT ± 40 CM	___ . ___	___ . ___	___ . ___
★EC AND TEMPERATURE	___ . ___ µS/CM @ ___ . ___ °C	___ . ___ µS/CM @ ___ . ___ °C	___ . ___ µS/CM @ ___ . ___ °C
★DEPTH OF FIRST MINERAL LAYER	___ CM	___ CM	___ CM
★SOIL SAMPLE TAKEN FROM DEPTH	___ CM	___ CM	___ CM

*VON POST SCALE (National Wetlands Working Group 1997)
1-Undecomposed; plant structure unaltered; yields only clear water colored light yellow-brown.
2-Almost undecomposed; plant structure distinct; yields only clear water colored light yellow-brown.
3-Very weakly decomposed; plant structure distinct; yields distinctly turbid brown water, no peat substance passes between the fingers, residue not mushy.
4-Weakly decomposed; plant structure distinct; yields strongly turbid water, no peat substance escapes between the fingers, residue rather mushy.
5-Moderately decomposed; plant structure clear but becoming indistinct; yields much turbid brown water, some peat escapes between the fingers, residue very mushy.
6-Strongly decomposed; plant structure somewhat indistinct but clearer in the squeezed residue than in the undisturbed peat; about one-third of the peat escapes between the fingers, residue strongly mushy.
7-Strongly decomposed; plant structure indistinct but recognizable; about half the peat escapes between the fingers.
8-Very strongly decomposed; plant structure very indistinct; about two-thirds of the peat escapes between the fingers, residue almost entirely resistant remnants such as root fibers and wood.
9-Almost completely decomposed; plant structure almost unrecognizable; nearly all the peat escapes between the fingers.
10-Completely decomposed; plant structure unrecognizable; all the peat escapes between the fingers.

(★ REQUIRED COMPLETION IN FIELD)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START
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USDA FOREST SERVICE, GRAND MESA-UNCOMPAHGRE- GUNNISON
NATIONAL FORESTS • VERSION 2B • June 15, 2009

PHOTO POINT

PP	POLY-	-GON	NUM-	-BER	R	READING

MON	TH	DA	Y	YE	AR

S	START	AZI-	MUTH	O	M
P	PANORAMA	START AZI-	MUTH	O	M

5 CM

5 CM

MONUMENTATION OF PHOTO POINT:			★UTM EAST __ __, __ __ __, __ __ __.__ __
PHOTO SERIES	START	END	★UTM NORTH __ __, __ __ __, __ __ __.__ __
			★GPS DATUM: __ __ __ __ __ UTM ZONE __ __ __
			★GPS ELEVATION:

USDA FOREST SERVICE, GRAND MESA-UNCOMPAHGRE- GUNNISON NATIONAL FORESTS • VERSION 2B • June 15, 2009

Appendix E. Correlation Results

Standard Pearson correlation coefficients (Sokal and Rohlf 1969) were calculated between pairs of a wide variety of variables (listed in Appendix E3 below). Use of 99 different factors (selected from vegetation species, environmental variables, pit data, and disturbances) resulted in over 4,400 different correlation coefficients, of which only 667 (<15%) are significant (Table E-1). Results of correlation between selected plant species and selected environmental variables are shown below.

Table E-1. Significant correlations among 99 variables (full listing below).

Significance	r^2*	Positive	Negative	Total
Highly Significant	>0.400	55	15	70
Significant at 0.01	>0.210	256	90	346
Significant at 0.05	>0.161	166	85	251
Not Significant	<0.161	1,328	2,467	3,795
Totals		1,805	2,657	4,462

*. Rohlf and Sokal 1969.

1. Significant Correlation Coefficients

+++Highly Significant (>0.400) ++Significant at 0.01 (>0.210) +Significant at 0.05 (>0.161).
NS = Number of samples with a value. NZ = Number of samples with non-zero values.

Factor	Correlated With	
UTM X-coordinate (Calc)– UTMXX NS=147, NZ=147	UTM Y-coordinated (Calc)	0.2545++
	Size of fen-wetland complex (Calc)	0.1622+
	Elevation scalar (Calc)	0.1740+
	Aspect x-coordinate (Calc)	–0.2437++
	Slope angle, % (Meas)	0.2057+
	Channels (Y/N)	0.2973++
	Gully Frequency	–0.2092+
	Hydrologic Alteration presence	–0.3504++
	Open Water presence/absence	–0.3892++
	Water development (s) presence	–0.2779++
	Betula glandulosa cover	0.2050+
	Dasiphora floribunda cover	0.2702++
	Salix planifolia cover	0.3663++
	Salix wolfii cover	0.3164++
	Carex canescens cover	0.1824+
	Carex leptalea cover	0.2215++
	Carex simulata cover	–0.1831+
	Carex utriculata cover	–0.3399++
	Carex vesicaria cover	0.2205++
	Eleocharis acicularis cover	–0.1612+
	Eleocharis quinqueflora cover	0.3089++
	Bistorta vivipara cover	0.1985+
	Comarum palustre cover	–0.1911+
	Swertia perennis cover	0.2890++
	Thalictrum alpinum cover	0.2921++
	Total Bryophyte Cover (microplots) (Calc)	0.3310++
	Depth of peat (up to 150 cm) (Meas)	–0.2722++
	Electrical conductivity, uS/cm (Meas)	–0.2097+
	Floristic Quality Index (Calc)	0.3243++
	Number of species in sample (Calc)	0.3269++
	Total live vascular plant cover (Calc)	0.2669++
	Total live cover, including bryophytes (Calc)	0.3300++
	Species richness index (Calc)	–0.2802++
	Score according to Table 4-26 (Calc)	0.1759+
UTM Y-coordinate (Calc)– UTMYX NS=147, NZ=147	UTM X-coordinate (Calc)	0.2545++
	Size of fen-wetland complex (Calc)	0.1679+
	Elevation scalar (Calc)	–0.3069++
	Slope angle, % (Meas)	–0.1885+
	Floating mat presence/absence	0.2264++
	Salix monticola cover	–0.2027+
	Carex capitata cover	–0.1811+
	Carex nigricans cover	–0.1680+
	Depth of peat (up to 150 cm) (Meas)	–0.2371++
	Depth of water table in pit (Meas)	0.2052+
	Electrical conductivity, uS/cm (Meas)	–0.2352++
	Percent Organic Matter (Lab)	0.1679+
	Percent of Wetland Plants (Calc)	0.2160++

Factor	Correlated With	
Size of fen-wetland complex (Calc)– ACRES NS=147, NZ=147	UTM X-coordinate (Calc)	0.1622+
	UTM Y-coordinated (Calc)	0.1679+
	Elevation scalar (Calc)	–0.2522++
	Disturbance Intensity in wetland (Calc)	0.2045+
	Disturbance intensity in buffer (Calc)	0.2149++
	Beaver use in complex Scalar	0.1946+
	Water development (s) presence	0.1763+
	Betula glandulosa cover	0.2801++
	Dasiphora floribunda cover	0.2809++
	Salix planifolia cover	0.1828+
	Salix wolfii cover	0.4680+++
	Bistorta bistortoides cover	0.3177++
	Comarum palustre cover	0.1950+
	Thalictrum alpinum cover	0.3003++
	Total Bryophyte Cover (microplots) (Calc)	0.1831+
	Depth of soil pit (Meas)	0.2017+
	Total live vascular plant cover (Calc)	0.2639++
	Total live cover, including bryophytes (Calc)	0.2780++
Elevation scalar (Calc)– ELEVX NS=147, NZ=147	UTM X-coordinate (Calc)	0.1740+
	UTM Y-coordinated (Calc)	–0.3069++
	Size of fen-wetland complex (Calc)	–0.2522++
	Aspect y-coordinate (Calc)	0.1683+
	Slope angle, % (Meas)	0.2469++
	Disturbance intensity in buffer (Calc)	–0.2716++
	Beaver use in complex Scalar	–0.2350++
	Floating mat presence/absence	–0.1658+
	Hydrologic Alteration presence	–0.2002+
	Open Water presence/absence	–0.1968+
	Maximum peat depth by tile probe (Calc)	–0.1729+
	Water development (s) presence	–0.2287++
	Betula glandulosa cover	–0.1623+
	Dasiphora floribunda cover	–0.2483++
	Salix monticola cover	–0.1794+
	Salix wolfii cover	–0.2117++
	Agrostis scabra cover	0.2263++
	Carex capitata cover	0.1905+
	Carex scopulorum cover	0.2720++
	Carex utriculata cover	–0.3628++
	Eleocharis quinqueflora cover	0.2567++
	Clementsia rhodantha cover	0.2465++
	Pedicularis groenlandica cover	0.3169++
	Psychrophila leptosepala cover	0.2800++
	Thalictrum alpinum cover	–0.2047+
	Total Bryophyte Cover (microplots) (Calc)	0.1822+
	Electrical conductivity, uS/cm (Meas)	–0.2155++
	Floristic Quality Index (Calc)	0.2865++

Factor	Correlated With	
Aspect x-coordinate (Calc)– ASPXX NS=147, NZ=141	UTM X-coordinate (Calc)	–0.2437++
	Carex jonesii cover	0.1804+
	Equisetum arvense cover	0.1631+
	Limnorchis dilatata cover	0.2227++
	Senecio triangularis cover	0.2103++
	Electrical conductivity, uS/cm (Meas)	0.2756++
Aspect y-coordinate (Calc)– ASPYX NS=147, NZ=142	Elevation scalar (Calc)	0.1683+
	Open Water presence/absence	–0.1626+
	Bare Soil Cover (microplots) (Calc)	0.2288++
	Litter and Duff (Calc)	–0.1903+
	Salix wolfii cover	–0.1752+
	Agrostis scabra cover	0.2161++
	Phleum commutatum cover	–0.2090+
Slope angle, % (Meas)– SLOPE NS=145, NZ=113	UTM X-coordinate (Calc)	0.2057+
	UTM Y-coordinated (Calc)	–0.1885+
	Elevation scalar (Calc)	0.2469++
	Landform fen classification	0.2359++
	Channels (Y/N)	0.1723+
	Floating mat presence/absence	–0.1779+
	Water development (s) presence	–0.1743+
	Salix brachycarpa cover	0.1778+
	Carex interior cover	0.2587++
	Carex jonesii cover	0.1975+
	Carex utriculata cover	–0.2295++
	Limnorchis dilatata cover	0.2131++
	Senecio triangularis cover	0.3095++
	Swertia perennis cover	0.1845+
	Viola macloskeyi cover	0.1874+
	Total Bryophyte Cover (microplots) (Calc)	0.2942++
	Depth of soil pit (Meas)	0.2586++
	Depth of water table in pit (Meas)	–0.2581++
	Electrical conductivity, uS/cm (Meas)	0.2292++
	Floristic Quality Index (Calc)	0.2765++
	Number of species in sample (Calc)	0.2500++
	Total live vascular plant cover (Calc)	0.2153++
	Total live cover, including bryophytes (Calc)	0.2753++
	Species richness index (Calc)	–0.1739+
	Percent of Peat-Forming Species (Calc)	–0.2425++
	Percent of Wetland Plants (Calc)	–0.2531++
Fetter Ground-water Types– GWX NS=145, NZ=145	Disturbance Intensity in wetland (Calc)	0.3432++
	Disturbance intensity in buffer (Calc)	0.2517++
	Channels (Y/N)	0.1612+
	Gully Frequency	0.2910++
	Hydrologic Alteration presence	0.2972++
	Open Water presence/absence	0.1969+
	Water development (s) presence	0.2299++
	Bare Soil Cover (microplots) (Calc)	0.2199++
	Litter and Duff (Calc)	–0.2390++
	Sediment Cover	0.2444++
	Salix monticola cover	0.1839+
	pH (Meas)	0.2228++
	Percent Organic Matter (Lab)	–0.1780+
	Percent Organic Carbon (Lab)	–0.1968+
	Score according to Table 4-26 (Calc)	–0.2443++

Factor	Correlated With	
Landform fen classification– FENTYPEX NS=147, NZ=147	Slope angle, % (Meas)	0.2359++
	Beaver use in complex Scalar	0.2072+
	Channels (Y/N)	0.2009+
	Floating mat presence/absence	–0.3129++
	Open Water presence/absence	–0.1613+
	Basal Live Vegetation (microplots) (Calc)	–0.1987+
	Water cover (microplots) (Meas)	–0.3085++
	Betula glandulosa cover	0.2037+
	Carex buxbaumii cover	–0.1642+
	Carex simulata cover	0.1770+
	Bistorta bistortoides cover	0.1757+
	Bistorta vivipara cover	0.1673+
	Clementsia rhodantha cover	0.1644+
	Pedicularis groenlandica cover	0.1732+
	Swertia perennis cover	0.1830+
	Thalictrum alpinum cover	0.1952+
	Total Bryophyte Cover (microplots) (Calc)	0.3294++
	Depth of water table in pit (Meas)	–0.1827+
	Von Post scalar value, 1-10	0.1721+
	Number of species in sample (Calc)	0.2930++
	Total live vascular plant cover (Calc)	0.2935++
	Total live cover, including bryophytes (Calc)	0.3513++
	Species richness index (Calc)	–0.2246++
	Percent of Peat-Forming Species (Calc)	–0.1863+
	Score according to Table 4-26 (Calc)	–0.1655+
Disturbance Intensity in wetland (Calc)– TEXI NS=147, NZ=142	Size of fen-wetland complex (Calc)	0.2045+
	Fetter Ground-water Types	0.3432++
	Disturbance intensity in buffer (Calc)	0.5908+++
	Beaver use in complex Scalar	0.1801+
	Floating mat presence/absence	0.1646+
	Gully Frequency	0.2882++
	Hydrologic Alteration presence	0.3988++
	Water development (s) presence	0.3841++
	Bare Soil Cover (microplots) (Calc)	0.5016+++
	Bare Soil Cover (estimate) (Calc)	0.2519++
	Litter and Duff (Calc)	–0.3777++
	Sediment Cover	0.2741++
	Carex limosa cover	0.1949+
	Comarum palustre cover	0.4385+++
	Viola macloskeyi cover	0.1872+
	Depth of peat (up to 150 cm) (Meas)	0.1690+
	Score according to Table 4-26 (Calc)	–0.5605+++
Disturbance intensity in buffer (Calc)– TEXIB NS=147, NZ=132	Size of fen-wetland complex (Calc)	0.2149++
	Elevation scalar (Calc)	–0.2716++
	Fetter Ground-water Types	0.2517++
	Disturbance Intensity in wetland (Calc)	0.5908+++
	Gully Frequency	0.2647++
	Hydrologic Alteration presence	0.2401++
	Water development (s) presence	0.2056+
	Bare Soil Cover (microplots) (Calc)	0.2646++
	Bare Soil Cover (estimate) (Calc)	0.2252++
	Litter and Duff (Calc)	–0.1878+
	Sediment Cover	0.2244++
	Comarum palustre cover	0.4141+++
	Viola macloskeyi cover	0.2061+
	Depth of soil pit (Meas)	0.1884+
	Depth of water table in pit (Meas)	–0.2030+
	Score according to Table 4-26 (Calc)	–0.2987++
Beaver use in complex Scalar– BEAVX NS=146, NZ=24	Size of fen-wetland complex (Calc)	0.1946+
	Elevation scalar (Calc)	–0.2350++
	Landform fen classification	0.2072+
	Disturbance Intensity in wetland (Calc)	0.1801+
	Hydrologic Alteration presence	0.2771++
	Open Water presence/absence	0.1632+
	Betula glandulosa cover	0.3761++
	Bistorta vivipara cover	0.1900+
	Equisetum arvense cover	0.2655++
	Swertia perennis cover	0.1797+
	Thalictrum alpinum cover	0.1990+
	Viola macloskeyi cover	0.2602++
	Percent Organic Matter (Lab)	0.1778+

Factor	Correlated With	
Channels (Y/N)– CHANX NS=147, NZ=147	UTM X-coordinate (Calc)	0.2973++
	Slope angle, % (Meas)	0.1723+
	Fetter Ground-water Types	0.1612+
	Landform fen classification	0.2009+
	Floating mat presence/absence	–0.2810++
	Gully Frequency	–0.1853+
	Open Water presence/absence	–0.1993+
	Water cover (microplots) (Meas)	–0.3342++
	Salix planifolia cover	0.2259++
	Carex limosa cover	–0.2013+
	Eleocharis acicularis cover	–0.2255++
	Total Bryophyte Cover (microplots) (Calc)	0.1809+
	pH (Meas)	0.2071+
	Floristic Quality Index (Calc)	0.2420++
	Number of species in sample (Calc)	0.3211++
	Total live vascular plant cover (Calc)	0.2843++
	Total live cover, including bryophytes (Calc)	0.2940++
	Species richness index (Calc)	–0.2739++
	Percent of Wetland Plants (Calc)	–0.2439++
Floating mat presence/absence – FLOATX NS=147, NZ=147	UTM Y-coordinated (Calc)	0.2264++
	Elevation scalar (Calc)	–0.1658+
	Slope angle, % (Meas)	–0.1779+
	Landform fen classification	–0.3129++
	Disturbance Intensity in wetland (Calc)	0.1646+
	Channels (Y/N)	–0.2810++
	Gully Frequency	0.1908+
	Hydrologic Alteration presence	0.1890+
	Open Water presence/absence	0.2566++
	Average peat depth by tile probe (Calc)	0.1804+
	Maximum peat depth by tile probe (Calc)	0.1624+
	Sediment Cover	0.2429++
	Water cover (microplots) (Meas)	0.3055++
	Carex aquatilis cover	–0.1618+
	Carex buxbaumii cover	0.2948++
	Carex limosa cover	0.2649++
	Comarum palustre cover	0.5272+++
	Depth of peat (up to 150 cm) (Meas)	0.2281++
	Depth of water table in pit (Meas)	0.1942+
	pH (Meas)	–0.2116++
	Von Post scalar value, 1-10	–0.3729++
	Percent Organic Matter (Lab)	0.3238++
	Percent Organic Carbon (Lab)	0.3198++
	Total live vascular plant cover (Calc)	–0.1837+
	Total live cover, including bryophytes (Calc)	–0.1750+
	Percent of Wetland Plants (Calc)	0.2009+
Gully Frequency– GULLYFX NS=146, NZ=17	UTM X-coordinate (Calc)	–0.2092+
	Fetter Ground-water Types	0.2910++
	Disturbance Intensity in wetland (Calc)	0.2882++
	Disturbance intensity in buffer (Calc)	0.2647++
	Channels (Y/N)	–0.1853+
	Floating mat presence/absence	0.1908+
	Hydrologic Alteration presence	0.5502+++
	Open Water presence/absence	0.2487++
	Water development (s) presence	0.4099+++
	Bare Soil Cover (estimate) (Calc)	0.3757++
	Sediment Cover	0.4100+++
	Water cover (microplots) (Meas)	0.2206++
	Carex phaeocephala cover	0.3843++
	Comarum palustre cover	0.4388+++
	Depth of peat (up to 150 cm) (Meas)	0.2846++
	Total live cover, including bryophytes (Calc)	–0.1688+
	Score according to Table 4-26 (Calc)	–0.2817++

Factor	Correlated With	
Hydrologic Alteration presence– HALTERX NS=145, NZ=30	UTM X-coordinate (Calc)	–0.3504++
	Elevation scalar (Calc)	–0.2002+
	Fetter Ground-water Types	0.2972++
	Disturbance Intensity in wetland (Calc)	0.3988++
	Disturbance intensity in buffer (Calc)	0.2401++
	Beaver use in complex Scalar	0.2771++
	Floating mat presence/absence	0.1890+
	Gully Frequency	0.5502+++
	Open Water presence/absence	0.3489++
	Water development (s) presence	0.8140+++
	Cattle droppings	0.1665+
	Sediment Cover	0.1842+
	Carex limosa cover	0.1701+
	Carex nigricans cover	0.2267++
	Carex phaeocephala cover	0.2064+
	Bistorta bistortoides cover	0.1920+
	Comarum palustre cover	0.3288++
	Depth of peat (up to 150 cm) (Meas)	0.1938+
	Score according to Table 4-26 (Calc)	–0.5888+++
Open Water presence/absence – OPENWX NS=147, NZ=147	UTM X-coordinate (Calc)	–0.3892++
	Elevation scalar (Calc)	–0.1968+
	Aspect y-coordinate (Calc)	–0.1626+
	Fetter Ground-water Types	0.1969+
	Landform fen classification	–0.1613+
	Beaver use in complex Scalar	0.1632+
	Channels (Y/N)	–0.1993+
	Floating mat presence/absence	0.2566++
	Gully Frequency	0.2487++
	Hydrologic Alteration presence	0.3489++
	Water development (s) presence	0.2747++
	Bare Soil Cover (estimate) (Calc)	0.1968+
	Sediment Cover	0.2448++
	Water cover (microplots) (Meas)	0.3498++
	Salix planifolia cover	–0.2874++
	Agrostis scabra cover	–0.1706+
	Carex leptalea cover	–0.1834+
	Carex utriculata cover	0.1817+
	Deschampsia cespitosa cover	–0.3165++
	Limnorchis dilatata cover	0.1677+
	Total Bryophyte Cover (microplots) (Calc)	–0.2190++
	Depth of peat (up to 150 cm) (Meas)	0.3331++
	Electrical conductivity, uS/cm (Meas)	0.2270++
	Number of species in sample (Calc)	–0.2307++
	Total live vascular plant cover (Calc)	–0.2258++
	Total live cover, including bryophytes (Calc)	–0.2587++
	Species richness index (Calc)	0.3230++
Average peat depth by tile probe (Calc)– PROBEAX NS=147, NZ=147	Floating mat presence/absence	0.1804+
	Maximum peat depth by tile probe (Calc)	0.8626+++
	Sediment Cover (Calc)	0.2372++
	Sediment Cover	–0.1983+
	Dasiphora floribunda cover	0.1644+
	Carex simulata cover	0.1804+
	Comarum palustre cover	0.2059+
	Depth of soil pit (Meas)	0.2045+
	Percent Organic Matter (Lab)	0.2353++
	Percent Organic Carbon (Lab)	0.2119++
	Total live vascular plant cover (Calc)	0.1810+
Maximum peat depth by tile probe (Calc)– PROBEMX NS=147, NZ=147	Elevation scalar (Calc)	–0.1729+
	Floating mat presence/absence	0.1624+
	Average peat depth by tile probe (Calc)	0.8626+++
	Sediment Cover (Calc)	0.1860+
	Sediment Cover	–0.1838+
	Dasiphora floribunda cover	0.1656+
	Carex simulata cover	0.2202++
	Percent Organic Matter (Lab)	0.1942+
	Number of species in sample (Calc)	0.1753+
	Total live vascular plant cover (Calc)	0.1828+

Factor	Correlated With	
Water development (s) presence– WATDEVX NS=147, NZ=147	UTM X-coordinate (Calc)	–0.2779++
	Size of fen-wetland complex (Calc)	0.1763+
	Elevation scalar (Calc)	–0.2287++
	Slope angle, % (Meas)	–0.1743+
	Fetter Ground-water Types	0.2299++
	Disturbance Intensity in wetland (Calc)	0.3841++
	Disturbance intensity in buffer (Calc)	0.2056+
	Gully Frequency	0.4099+++
	Hydrologic Alteration presence	0.8140+++
	Open Water presence/absence	0.2747++
	Bare Soil Cover (microplots) (Calc)	0.1662+
	Cattle droppings	0.2188++
	Comarum palustre cover	0.3014++
	Score according to Table 4-26 (Calc)	–0.5245+++
Bare Soil Cover (microplots) (Calc)– BARE NS=146, NZ=50	Aspect y-coordinate (Calc)	0.2288++
	Fetter Ground-water Types	0.2199++
	Disturbance Intensity in wetland (Calc)	0.5016+++
	Disturbance intensity in buffer (Calc)	0.2646++
	Water development (s) presence	0.1662+
	Bare Soil Cover (estimate) (Calc)	0.3811++
	Litter and Duff (Calc)	–0.8035+++
	Sediment Cover (Calc)	0.3274++
	Sediment Cover	0.2564++
	Salix geyeriana cover	0.2007+
	Comarum palustre cover	0.3427++
	Ligusticum tenuifolium cover	0.1846+
	Score according to Table 4-26 (Calc)	–0.3914++
Bare Soil Cover (estimate) (Calc)– BAREX NS=147, NZ=147	Disturbance Intensity in wetland (Calc)	0.2519++
	Disturbance intensity in buffer (Calc)	0.2252++
	Gully Frequency	0.3757++
	Open Water presence/absence	0.1968+
	Bare Soil Cover (microplots) (Calc)	0.3811++
	Basal Live Vegetation (microplots) (Calc)	0.4156+++
	Litter and Duff (Calc)	–0.5323+++
	Sediment Cover (Calc)	0.3533++
	Sediment Cover	0.5186+++
	Water cover (microplots) (Meas)	0.2212++
	Salix planifolia cover	–0.1847+
	Carex aquatilis cover	–0.1642+
	Eleocharis quinqueflora cover	0.1826+
	Comarum palustre cover	0.2834++
	Depth of peat (up to 150 cm) (Meas)	0.1623+
	Number of species in sample (Calc)	–0.1627+
	Total live vascular plant cover (Calc)	–0.2618++
	Total live cover, including bryophytes (Calc)	–0.2610++
Basal Live Vegetation (microplots) (Calc)– BAVE NS=147, NZ=144	Landform fen classification	–0.1987+
	Bare Soil Cover (estimate) (Calc)	0.4156+++
	Litter and Duff (Calc)	–0.6050+++
	Sediment Cover	0.2727++
	Carex nigricans cover	0.2338++
	Carex phaeocephala cover	0.3822++
	Percent Organic Matter (Lab)	–0.1983+
	Percent Organic Carbon (Lab)	–0.1806+
	Floristic Quality Index (Calc)	0.1855+
Cattle droppings– COWPIE NS=147, NZ=5	Hydrologic Alteration presence	0.1665+
	Water development (s) presence	0.2188++
	Thalictrum alpinum cover	0.2045+
Litter and Duff (Calc)– LITT NS=147, NZ=147	Aspect y-coordinate (Calc)	–0.1903+
	Fetter Ground-water Types	–0.2390++
	Disturbance Intensity in wetland (Calc)	–0.3777++
	Disturbance intensity in buffer (Calc)	–0.1878+
	Bare Soil Cover (microplots) (Calc)	–0.8035+++
	Bare Soil Cover (estimate) (Calc)	–0.5323+++
	Basal Live Vegetation (microplots) (Calc)	–0.6050+++
	Sediment Cover (Calc)	–0.2351++
	Sediment Cover	–0.3570++
	Salix geyeriana cover	–0.1957+
	Carex phaeocephala cover	–0.1869+
	Comarum palustre cover	–0.2856++
	Ligusticum tenuifolium cover	–0.1951+
	Total Bryophyte Cover (microplots) (Calc)	0.1649+
	Score according to Table 4-26 (Calc)	0.3489++

Factor	Correlated With	
Sediment Cover (Calc)– SED NS=147, NZ=4	Average peat depth by tile probe (Calc)	0.2372++
	Maximum peat depth by tile probe (Calc)	0.1860+
	Bare Soil Cover (microplots) (Calc)	0.3274++
	Bare Soil Cover (estimate) (Calc)	0.3533++
	Litter and Duff (Calc)	–0.2351++
	Eleocharis quinqueflora cover	0.3050++
Sediment Cover– SEDX NS=146, NZ=41	Fetter Ground-water Types	0.2444++
	Disturbance Intensity in wetland (Calc)	0.2741++
	Disturbance intensity in buffer (Calc)	0.2244++
	Floating mat presence/absence	0.2429++
	Gully Frequency	0.4100+++
	Hydrologic Alteration presence	0.1842+
	Open Water presence/absence	0.2448++
	Average peat depth by tile probe (Calc)	–0.1983+
	Maximum peat depth by tile probe (Calc)	–0.1838+
	Bare Soil Cover (microplots) (Calc)	0.2564++
	Bare Soil Cover (estimate) (Calc)	0.5186+++
	Basal Live Vegetation (microplots) (Calc)	0.2727++
	Litter and Duff (Calc)	–0.3570++
	Eleocharis macrostachya cover	0.1742+
	Comarum palustre cover	0.3314++
	Depth of peat (up to 150 cm) (Meas)	0.3450++
	Von Post scalar value, 1-10	–0.1810+
	Total live vascular plant cover (Calc)	–0.2340++
	Total live cover, including bryophytes (Calc)	–0.2271++
Water cover (microplots) (Meas)– WATER NS=147, NZ=50	Landform fen classification	–0.3085++
	Channels (Y/N)	–0.3342++
	Floating mat presence/absence	0.3055++
	Gully Frequency	0.2206++
	Open Water presence/absence	0.3498++
	Bare Soil Cover (estimate) (Calc)	0.2212++
	Carex pellita cover	0.2930++
	Carex phaeocephala cover	0.1764+
	Pedicularis groenlandica cover	–0.1793+
	Psychrophila leptosepala cover	–0.1730+
	Total Bryophyte Cover (microplots) (Calc)	–0.3417++
	Depth of peat (up to 150 cm) (Meas)	0.1708+
	Depth of water table in pit (Meas)	0.2195++
	Number of species in sample (Calc)	–0.2822++
	Total live vascular plant cover (Calc)	–0.2227++
	Total live cover, including bryophytes (Calc)	–0.2973++
	Species richness index (Calc)	0.3324++
	Percent of Peat-Forming Species (Calc)	0.2177++
	Percent of Wetland Plants (Calc)	0.1879+
	Score according to Table 4-26 (Calc)	0.1890+
Betula glandulosa cover– BEGL NS=147, NZ=5	UTM X-coordinate (Calc)	0.2050+
	Size of fen-wetland complex (Calc)	0.2801++
	Elevation scalar (Calc)	–0.1623+
	Landform fen classification	0.2037+
	Beaver use in complex Scalar	0.3761++
	Dasiphora floribunda cover	0.5624+++
	Salix planifolia cover	0.2272++
	Salix wolfii cover	0.3219++
	Carex aurea cover	0.2198++
	Carex dioica cover	0.2438++
	Carex leptalea cover	0.3177++
	Equisetum arvense cover	0.7357+++
	Swertia perennis cover	0.2680++
	Thalictrum alpinum cover	0.3446++
	Viola macloskeyi cover	0.3151++
	Total Bryophyte Cover (microplots) (Calc)	0.2171++
	Percent Organic Matter (Lab)	0.2018+
	Number of species in sample (Calc)	0.3024++
	Total live vascular plant cover (Calc)	0.3017++
	Total live cover, including bryophytes (Calc)	0.3203++

Factor	Correlated With	
Dasiphora floribunda cover– DAFL3 NS=147, NZ=13	UTM X-coordinate (Calc)	0.2702++
	Size of fen-wetland complex (Calc)	0.2809++
	Elevation scalar (Calc)	–0.2483++
	Average peat depth by tile probe (Calc)	0.1644+
	Maximum peat depth by tile probe (Calc)	0.1656+
	Betula glandulosa cover	0.5624+++
	Salix wolfii cover	0.3737++
	Carex aurea cover	0.3055++
	Carex buxbaumii cover	0.1962+
	Carex canescens cover	0.1745+
	Carex dioica cover	0.3772++
	Carex vesicaria cover	0.2576++
	Bistorta vivipara cover	0.2426++
	Equisetum arvense cover	0.2768++
	Swertia perennis cover	0.3578++
	Thalictrum alpinum cover	0.7109+++
	Total Bryophyte Cover (microplots) (Calc)	0.2326++
	Percent Organic Matter (Lab)	0.2132++
	Percent Organic Carbon (Lab)	0.1983+
	Number of species in sample (Calc)	0.3841++
	Total live vascular plant cover (Calc)	0.3984++
	Total live cover, including bryophytes (Calc)	0.4049+++
	Species richness index (Calc)	–0.1617+
	Percent of Peat-Forming Species (Calc)	–0.1861+
	Percent of Wetland Plants (Calc)	–0.1824+
Salix brachycarpa cover– SABR NS=147, NZ=4	Slope angle, % (Meas)	0.1778+
	Calamagrostis canadensis cover	0.2033+
	Carex scopulorum cover	0.3081++
	Bistorta vivipara cover	0.6578+++
	Swertia perennis cover	0.3688++
	Thalictrum alpinum cover	0.2380++
	Total Bryophyte Cover (microplots) (Calc)	0.1781+
	pH (Meas)	0.2749++
	Electrical conductivity, uS/cm (Meas)	0.3396++
	Number of species in sample (Calc)	0.2588++
	Total live vascular plant cover (Calc)	0.2654++
	Total live cover, including bryophytes (Calc)	0.2775++
	Percent of Peat-Forming Species (Calc)	–0.2314++
	Percent of Wetland Plants (Calc)	–0.2090+
Salix geyeriana cover– SAGE2 NS=147, NZ=3	Bare Soil Cover (microplots) (Calc)	0.2007+
	Litter and Duff (Calc)	–0.1957+
	Carex canescens cover	0.2090+
	Carex vesicaria cover	0.5555+++
	Ligusticum tenuifolium cover	0.4843+++
	Swertia perennis cover	0.3884++
Salix monticola cover– SAMO2 NS=147, NZ=5	UTM Y-coordinated (Calc)	–0.2027+
	Elevation scalar (Calc)	–0.1794+
	Fetter Ground-water Types	0.1839+
	Carex scopulorum cover	0.2814++
	Electrical conductivity, uS/cm (Meas)	0.2291++
Salix planifolia cover– SAPL2 NS=147, NZ=58	UTM X-coordinate (Calc)	0.3663++
	Size of fen-wetland complex (Calc)	0.1828+
	Channels (Y/N)	0.2259++
	Open Water presence/absence	–0.2874++
	Bare Soil Cover (estimate) (Calc)	–0.1847+
	Betula glandulosa cover	0.2272++
	Salix wolfii cover	0.3273++
	Carex aquatilis cover	0.2299++
	Carex illota cover	0.2447++
	Carex vesicaria cover	0.2008+
	Bistorta bistortoides cover	0.2293++
	Equisetum arvense cover	0.2384++
	Thalictrum alpinum cover	0.1950+
	Total Bryophyte Cover (microplots) (Calc)	0.3248++
	Floristic Quality Index (Calc)	0.2028+
	Number of species in sample (Calc)	0.3080++
	Total live vascular plant cover (Calc)	0.4593+++
	Total live cover, including bryophytes (Calc)	0.4858+++
	Species richness index (Calc)	–0.1739+

Factor	Correlated With	
Salix wolfii cover– SAWO NS=147, NZ=14	UTM X-coordinate (Calc)	0.3164++
	Size of fen-wetland complex (Calc)	0.4680+++
	Elevation scalar (Calc)	–0.2117++
	Aspect y-coordinate (Calc)	–0.1752+
	Betula glandulosa cover	0.3219++
	Dasiphora floribunda cover	0.3737++
	Salix planifolia cover	0.3273++
	Carex leptalea cover	0.3908++
	Carex vesicaria cover	0.1865+
	Bistorta bistortoides cover	0.3916++
	Equisetum arvense cover	0.4017+++
	Thalictrum alpinum cover	0.5067+++
	Total Bryophyte Cover (microplots) (Calc)	0.2757++
	Depth of soil pit (Meas)	0.4039+++
	Percent Organic Matter (Lab)	0.1774+
	Percent Organic Carbon (Lab)	0.1623+
	Floristic Quality Index (Calc)	0.1746+
	Number of species in sample (Calc)	0.3054++
	Total live vascular plant cover (Calc)	0.3668++
	Total live cover, including bryophytes (Calc)	0.3934++
	Percent of Peat-Forming Species (Calc)	–0.2141++
	Percent of Wetland Plants (Calc)	–0.2472++
Agrostis scabra cover– AGSC5 NS=147, NZ=6	Elevation scalar (Calc)	0.2263++
	Aspect y-coordinate (Calc)	0.2161++
	Open Water presence/absence	–0.1706+
	Carex capitata cover	0.5478+++
	Carex interior cover	0.5813+++
	Carex leptalea cover	0.1697+
	Galium trifidum cover	0.1643+
	Pedicularis groenlandica cover	0.3140++
	Number of species in sample (Calc)	0.1912+
	Percent of Wetland Plants (Calc)	–0.2696++
	Score according to Table 4-26 (Calc)	–0.1642+
Carex aquatilis cover– CAAQ NS=147, NZ=107	Floating mat presence/absence	–0.1618+
	Bare Soil Cover (estimate) (Calc)	–0.1642+
	Salix planifolia cover	0.2299++
	Carex scopulorum cover	–0.3237++
	Carex simulata cover	0.2356++
	Carex utriculata cover	–0.2866++
	Percent of Peat-Forming Species (Calc)	0.2141++
	Percent of Wetland Plants (Calc)	0.2526++
Carex aurea cover– CAAU3 NS=147, NZ=3	*Betula glandulosa* cover	0.2198++
	Dasiphora floribunda cover	0.3055++
	Carex capillaris cover	0.2455++
	Carex dioica cover	0.4485+++
	Swertia perennis cover	0.2461++
	Thalictrum alpinum cover	0.2139++
	Number of species in sample (Calc)	0.1795+
Carex buxbaumii cover– CABU6 NS=147, NZ=3	Landform fen classification	–0.1642+
	Floating mat presence/absence	0.2948++
	Dasiphora floribunda cover	0.1962+
	Carex utriculata cover	0.2181++
Carex canescens cover– CACA11 NS=147, NZ=22	UTM X-coordinate (Calc)	0.1824+
	Dasiphora floribunda cover	0.1745+
	Salix geyeriana cover	0.2090+
	Carex capitata cover	0.2968++
	Swertia perennis cover	0.2610++
	Floristic Quality Index (Calc)	0.2163++
	Total live vascular plant cover (Calc)	0.2163++
	Total live cover, including bryophytes (Calc)	0.2146++
Carex capillaris cover– CACA12 NS=147, NZ=4	*Carex aurea* cover	0.2455++
	Carex dioica cover	0.2255++
	Eleocharis acicularis cover	0.2185++
	Eleocharis macrostachya cover	0.3426++
	pH (Meas)	0.2985++
	Percent Organic Matter (Lab)	0.1684+
	Percent Organic Carbon (Lab)	0.2029+
Carex capitata cover– CACA13 NS=147, NZ=3	UTM Y-coordinated (Calc)	–0.1811+
	Elevation scalar (Calc)	0.1905+
	Agrostis scabra cover	0.5478+++
	Carex canescens cover	0.2968++
	Carex dioica cover	0.2203++
	Carex microglochin cover	0.3097++
	Pedicularis groenlandica cover	0.3717++

Factor	Correlated With	
Calamagrostis canadensis cover– CACA4 NS=147, NZ=22	*Salix brachycarpa* cover	0.2033+
	Electrical conductivity, uS/cm (Meas)	0.1872+
Carex dioica cover– CADIG NS=147, NZ=4	*Betula glandulosa* cover	0.2438++
	Dasiphora floribunda cover	0.3772++
	Carex aurea cover	0.4485+++
	Carex capillaris cover	0.2255++
	Carex capitata cover	0.2203++
	Carex microglochin cover	0.7327+++
	Carex scopulorum cover	0.1960+
	Bistorta vivipara cover	0.2399++
	Swertia perennis cover	0.2978++
	Thalictrum alpinum cover	0.2578++
	Floristic Quality Index (Calc)	0.2701++
	Number of species in sample (Calc)	0.1991+
	Total live vascular plant cover (Calc)	0.1648+
	Total live cover, including bryophytes (Calc)	0.1836+
Carex illota cover– CAIL NS=147, NZ=8	*Salix planifolia* cover	0.2447++
	Phleum commutatum cover	0.4305+++
	Clementsia rhodantha cover	0.3203++
	Pedicularis groenlandica cover	0.2985++
	Total Bryophyte Cover (microplots) (Calc)	0.1810+
	Floristic Quality Index (Calc)	0.2053+
	Total live vascular plant cover (Calc)	0.2267++
	Total live cover, including bryophytes (Calc)	0.2467++
Carex interior cover– CAIN11 NS=147, NZ=3	Slope angle, % (Meas)	0.2587++
	Agrostis scabra cover	0.5813+++
	Score according to Table 4-26 (Calc)	–0.1631+
Carex jonesii cover– CAJO NS=147, NZ=10	Aspect x-coordinate (Calc)	0.1804+
	Slope angle, % (Meas)	0.1975+
	Limnorchis dilatata cover	0.3278++
	Ligusticum tenuifolium cover	0.2091+
	Psychrophila leptosepala cover	0.2616++
	Senecio triangularis cover	0.2559++
	Depth of water table in pit (Meas)	–0.3454++
	Floristic Quality Index (Calc)	0.1640+
	Score according to Table 4-26 (Calc)	–0.1914+
Carex leptalea cover– CALE10 NS=147, NZ=4	UTM X-coordinate (Calc)	0.2215++
	Open Water presence/absence	–0.1834+
	Betula glandulosa cover	0.3177++
	Salix wolfii cover	0.3908++
	Agrostis scabra cover	0.1697+
	Carex scopulorum cover	0.2945++
	Clementsia rhodantha cover	0.2475++
	Equisetum arvense cover	0.4477+++
	Veronica americana cover	0.4620+++
	Viola macloskeyi cover	0.2256++
	Number of species in sample (Calc)	0.2637++
	Total live vascular plant cover (Calc)	0.1996+
	Total live cover, including bryophytes (Calc)	0.1963+
	Percent of Wetland Plants (Calc)	–0.2307++
Carex limosa cover– CALI7 NS=147, NZ=3	Disturbance Intensity in wetland (Calc)	0.1949+
	Channels (Y/N)	–0.2013+
	Floating mat presence/absence	0.2649++
	Hydrologic Alteration presence	0.1701+
	Carex phaeocephala cover	0.1618+
	Carex saxatilis cover	0.3203++
	Eleocharis acicularis cover	0.3005++
Carex microglochin cover– CAMI6 NS=147, NZ=3	*Carex capitata* cover	0.3097++
	Carex dioica cover	0.7327+++
	Carex scopulorum cover	0.2567++
	Percent Organic Matter (Lab)	–0.1770+
	Percent Organic Carbon (Lab)	–0.1736+
	Floristic Quality Index (Calc)	0.2369++
Carex nigricans cover– CANI2 NS=147, NZ=5	UTM Y-coordinated (Calc)	–0.1680+
	Hydrologic Alteration presence	0.2267++
	Basal Live Vegetation (microplots) (Calc)	0.2338++
	Phleum commutatum cover	0.1828+
	Bistorta bistortoides cover	0.3844++
	Depth of water table in pit (Meas)	–0.1726+
	pH (Meas)	–0.2788++
	Percent of Peat-Forming Species (Calc)	–0.2803++
	Percent of Wetland Plants (Calc)	–0.3524++
	Score according to Table 4-26 (Calc)	–0.2685++

Factor	Correlated With	
Carex pellita cover– CAPE42 NS=147, NZ=5	Water cover (microplots) (Meas)	0.2930++
	Depth of water table in pit (Meas)	0.1788+
Carex phaeocephala cover– CAPH2 NS=147, NZ=4	Gully Frequency	0.3843++
	Hydrologic Alteration presence	0.2064+
	Basal Live Vegetation (microplots) (Calc)	0.3822++
	Litter and Duff (Calc)	–0.1869+
	Water cover (microplots) (Meas)	0.1764+
	Carex limosa cover	0.1618+
	Depth of peat (up to 150 cm) (Meas)	0.1626+
	Percent Organic Matter (Lab)	–0.1862+
	Percent Organic Carbon (Lab)	–0.1742+
	Floristic Quality Index (Calc)	0.2069+
	Percent of Peat-Forming Species (Calc)	–0.1748+
	Percent of Wetland Plants (Calc)	–0.2296++
	Score according to Table 4-26 (Calc)	–0.1717+
Carex saxatilis cover– CASA10 NS=147, NZ=5	*Carex limosa* cover	0.3203++
	Eleocharis acicularis cover	0.2296++
	Number of species in sample (Calc)	0.2336++
	Species richness index (Calc)	–0.1725+
Carex scopulorum cover– CASC12 NS=147, NZ=14	Elevation scalar (Calc)	0.2720++
	Salix brachycarpa cover	0.3081++
	Salix monticola cover	0.2814++
	Carex aquatilis cover	–0.3237++
	Carex dioica cover	0.1960+
	Carex leptalea cover	0.2945++
	Carex microglochin cover	0.2567++
	Bistorta vivipara cover	0.4609+++
	Clementsia rhodantha cover	0.2449++
	Pedicularis groenlandica cover	0.1956+
	Swertia perennis cover	0.2593++
	Veronica americana cover	0.2861++
	Floristic Quality Index (Calc)	0.2463++
	Number of species in sample (Calc)	0.2549++
	Species richness index (Calc)	–0.1823+
	Percent of Peat-Forming Species (Calc)	–0.2138++
	Percent of Wetland Plants (Calc)	–0.5125+++
Carex simulata cover– CASI2 NS=147, NZ=15	UTM X-coordinate (Calc)	–0.1831+
	Landform fen classification	0.1770+
	Average peat depth by tile probe (Calc)	0.1804+
	Maximum peat depth by tile probe (Calc)	0.2202++
	Carex aquatilis cover	0.2356++
	Comarum palustre cover	0.2126++
	Depth of peat (up to 150 cm) (Meas)	0.2551++
	Depth of water table in pit (Meas)	0.1638+
	Von Post scalar value, 1-10	–0.2060+
Carex utriculata cover– CAUT NS=147, NZ=67	UTM X-coordinate (Calc)	–0.3399++
	Elevation scalar (Calc)	–0.3628++
	Slope angle, % (Meas)	–0.2295++
	Open Water presence/absence	0.1817+
	Carex aquatilis cover	–0.2866++
	Carex buxbaumii cover	0.2181++
	Eleocharis quinqueflora cover	–0.2042+
	Clementsia rhodantha cover	–0.1718+
	Pedicularis groenlandica cover	–0.2657++
	Psychrophila leptosepala cover	–0.2376++
	Total Bryophyte Cover (microplots) (Calc)	–0.4066+++
	Depth of water table in pit (Meas)	0.1845+
	Floristic Quality Index (Calc)	–0.6361+++
	Number of species in sample (Calc)	–0.3792++
	Total live vascular plant cover (Calc)	–0.2882++
	Total live cover, including bryophytes (Calc)	–0.3727++
	Species richness index (Calc)	0.2811++
	Percent of Peat-Forming Species (Calc)	0.3020++
	Percent of Wetland Plants (Calc)	0.2867++

Factor	Correlated With	
Carex vesicaria cover– CAVE6 NS=147, NZ=9	UTM X-coordinate (Calc)	0.2205++
	Dasiphora floribunda cover	0.2576++
	Salix geyeriana cover	0.5555+++
	Salix planifolia cover	0.2008+
	Salix wolfii cover	0.1865+
	Equisetum arvense cover	0.1846+
	Ligusticum tenuifolium cover	0.2585++
	Swertia perennis cover	0.1943+
	Thalictrum alpinum cover	0.2456++
	Number of species in sample (Calc)	0.1755+
	Total live vascular plant cover (Calc)	0.2981++
	Total live cover, including bryophytes (Calc)	0.2792++
Deschampsia cespitosa cover– DECE NS=147, NZ=40	Open Water presence/absence	–0.3165++
	Depth of water table in pit (Meas)	–0.1633+
	Number of species in sample (Calc)	0.2279++
	Total live vascular plant cover (Calc)	0.1831+
	Total live cover, including bryophytes (Calc)	0.1670+
	Species richness index (Calc)	–0.2062+
	Percent of Peat-Forming Species (Calc)	–0.2976++
	Percent of Wetland Plants (Calc)	–0.2244++
Eleocharis acicularis cover– ELAC NS=147, NZ=9	UTM X-coordinate (Calc)	–0.1612+
	Channels (Y/N)	–0.2255++
	Carex capillaris cover	0.2185++
	Carex limosa cover	0.3005++
	Carex saxatilis cover	0.2296++
	Galium trifidum cover	0.3136++
	Percent of Peat-Forming Species (Calc)	–0.3532++
Eleocharis macrostachya cover– ELMA5 NS=147, NZ=6	Sediment Cover	0.1742+
	Carex capillaris cover	0.3426++
	Clementsia rhodantha cover	0.2433++
	pH (Meas)	0.1935+
	Floristic Quality Index (Calc)	–0.2991++
Eleocharis quinqueflora cover– ELQU2 NS=147, NZ=14	UTM X-coordinate (Calc)	0.3089++
	Elevation scalar (Calc)	0.2567++
	Bare Soil Cover (estimate) (Calc)	0.1826+
	Sediment Cover (Calc)	0.3050++
	Carex utriculata cover	–0.2042+
	Veronica americana cover	0.2751++
	Electrical conductivity, uS/cm (Meas)	–0.1717+
	Floristic Quality Index (Calc)	0.3441++
Phleum commutatum cover– PHCO9 NS=147, NZ=4	Aspect y-coordinate (Calc)	–0.2090+
	Carex illota cover	0.4305+++
	Carex nigricans cover	0.1828+
	Epilobium hornemannii cover	0.3270++
	Number of species in sample (Calc)	0.1643+
	Total live cover, including bryophytes (Calc)	0.1787+
	Percent of Peat-Forming Species (Calc)	–0.1704+
Bistorta bistortoides cover– BIBI5 NS=147, NZ=5	Size of fen-wetland complex (Calc)	0.3177++
	Landform fen classification	0.1757+
	Hydrologic Alteration presence	0.1920+
	Salix planifolia cover	0.2293++
	Salix wolfii cover	0.3916++
	Carex nigricans cover	0.3844++
	Thalictrum alpinum cover	0.2337++
	Total live vascular plant cover (Calc)	0.2049+
	Total live cover, including bryophytes (Calc)	0.2203++
	Percent of Peat-Forming Species (Calc)	–0.2019+
	Percent of Wetland Plants (Calc)	–0.2507++
	Score according to Table 4-26 (Calc)	–0.1717+

Factor	Correlated With	
Bistorta vivipara cover– BIVI2 NS=147, NZ=16	UTM X-coordinate (Calc)	0.1985+
	Landform fen classification	0.1673+
	Beaver use in complex Scalar	0.1900+
	Dasiphora floribunda cover	0.2426++
	Salix brachycarpa cover	0.6578+++
	Carex dioica cover	0.2399++
	Carex scopulorum cover	0.4609+++
	Swertia perennis cover	0.6360+++
	Thalictrum alpinum cover	0.4021+++
	Total Bryophyte Cover (microplots) (Calc)	0.1768+
	pH (Meas)	0.1659+
	Percent Organic Matter (Lab)	0.1708+
	Floristic Quality Index (Calc)	0.2284++
	Number of species in sample (Calc)	0.2985++
	Total live vascular plant cover (Calc)	0.3202++
	Total live cover, including bryophytes (Calc)	0.3220++
	Percent of Peat-Forming Species (Calc)	–0.2406++
	Percent of Wetland Plants (Calc)	–0.2863++
Clementsia rhodantha cover– CLRH2 NS=147, NZ=37	Elevation scalar (Calc)	0.2465++
	Landform fen classification	0.1644+
	Carex illota cover	0.3203++
	Carex leptalea cover	0.2475++
	Carex scopulorum cover	0.2449++
	Carex utriculata cover	–0.1718+
	Eleocharis macrostachya cover	0.2433++
	Pedicularis groenlandica cover	0.4947+++
	Psychrophila leptosepala cover	0.3167++
	Veronica americana cover	0.3778++
	Total Bryophyte Cover (microplots) (Calc)	0.1654+
	Number of species in sample (Calc)	0.2518++
	Total live vascular plant cover (Calc)	0.3661++
	Total live cover, including bryophytes (Calc)	0.3559++
	Percent of Peat-Forming Species (Calc)	–0.2233++
Comarum palustre cover– COPA28 NS=147, NZ=6	UTM X-coordinate (Calc)	–0.1911+
	Size of fen-wetland complex (Calc)	0.1950+
	Disturbance Intensity in wetland (Calc)	0.4385+++
	Disturbance intensity in buffer (Calc)	0.4141+++
	Floating mat presence/absence	0.5272+++
	Gully Frequency	0.4388+++
	Hydrologic Alteration presence	0.3288++
	Average peat depth by tile probe (Calc)	0.2059+
	Water development (s) presence	0.3014++
	Bare Soil Cover (microplots) (Calc)	0.3427++
	Bare Soil Cover (estimate) (Calc)	0.2834++
	Litter and Duff (Calc)	–0.2856++
	Sediment Cover	0.3314++
	Carex simulata cover	0.2126++
	Depth of peat (up to 150 cm) (Meas)	0.2378++
	Von Post scalar value, 1-10	–0.2727++
	Percent Organic Matter (Lab)	0.2045+
	Percent Organic Carbon (Lab)	0.1921+
	Score according to Table 4-26 (Calc)	–0.2255++
Epilobium hornemannii cover– EPHO NS=147, NZ=27	*Phleum commutatum* cover	0.3270++
	Psychrophila leptosepala cover	0.1905+
Equisetum arvense cover– EQAR NS=147, NZ=4	Aspect x-coordinate (Calc)	0.1631+
	Beaver use in complex Scalar	0.2655++
	Betula glandulosa cover	0.7357+++
	Dasiphora floribunda cover	0.2768++
	Salix planifolia cover	0.2384++
	Salix wolfii cover	0.4017+++
	Carex leptalea cover	0.4477+++
	Carex vesicaria cover	0.1846+
	Pedicularis groenlandica cover	0.1680+
	Thalictrum alpinum cover	0.3100++
	Viola macloskeyi cover	0.4422+++
	Total Bryophyte Cover (microplots) (Calc)	0.1696+
	Number of species in sample (Calc)	0.2438++
	Total live vascular plant cover (Calc)	0.2790++
	Total live cover, including bryophytes (Calc)	0.2858++
	Percent of Wetland Plants (Calc)	–0.1819+

Factor	Correlated With	
Galium trifidum cover– GATR2 NS=147, NZ=19	*Agrostis scabra* cover	0.1643+
	Eleocharis acicularis cover	0.3136++
	Percent of Peat-Forming Species (Calc)	–0.2212++
	Percent of Wetland Plants (Calc)	–0.1622+
Geum macrophyllum cover– GEMA4 NS=147, NZ=7		
Limnorchis dilatata cover– LIDI5 NS=147, NZ=4	Aspect x-coordinate (Calc)	0.2227++
	Slope angle, % (Meas)	0.2131++
	Open Water presence/absence	0.1677+
	Carex jonesii cover	0.3278++
	Psychrophila leptosepala cover	0.2471++
	Senecio triangularis cover	0.1777+
	Electrical conductivity, uS/cm (Meas)	0.4820+++
	Percent Organic Matter (Lab)	–0.2255++
	Percent Organic Carbon (Lab)	–0.1850+
Ligusticum tenuifolium cover– LITE2 NS=147, NZ=10	Bare Soil Cover (microplots) (Calc)	0.1846+
	Litter and Duff (Calc)	–0.1951+
	Salix geyeriana cover	0.4843+++
	Carex jonesii cover	0.2091+
	Carex vesicaria cover	0.2585++
	Psychrophila leptosepala cover	0.1698+
	Senecio triangularis cover	0.3690++
	Electrical conductivity, uS/cm (Meas)	0.1653+
	Percent Organic Matter (Lab)	–0.1811+
	Percent Organic Carbon (Lab)	–0.1694+
	Percent of Peat-Forming Species (Calc)	–0.2035+
	Percent of Wetland Plants (Calc)	–0.1641+
	Score according to Table 4-26 (Calc)	–0.1653+
Pedicularis groenlandica cover– PEGR2 NS=147, NZ=63	Elevation scalar (Calc)	0.3169++
	Landform fen classification	0.1732+
	Water cover (microplots) (Meas)	–0.1793+
	Agrostis scabra cover	0.3140++
	Carex capitata cover	0.3717++
	Carex illota cover	0.2985++
	Carex scopulorum cover	0.1956+
	Carex utriculata cover	–0.2657++
	Clementsia rhodantha cover	0.4947+++
	Equisetum arvense cover	0.1680+
	Psychrophila leptosepala cover	0.4598+++
	Thalictrum alpinum cover	0.2041+
	Total Bryophyte Cover (microplots) (Calc)	0.3021++
	Depth of peat (up to 150 cm) (Meas)	–0.1790+
	Depth of water table in pit (Meas)	–0.1724+
	Floristic Quality Index (Calc)	0.3218++
	Number of species in sample (Calc)	0.3818++
	Total live vascular plant cover (Calc)	0.5497+++
	Total live cover, including bryophytes (Calc)	0.5523+++
	Species richness index (Calc)	–0.2178++
	Percent of Peat-Forming Species (Calc)	–0.3284++
	Percent of Wetland Plants (Calc)	–0.2405++
Psychrophila leptosepala cover– PSLE NS=147, NZ=63	Elevation scalar (Calc)	0.2800++
	Water cover (microplots) (Meas)	–0.1730+
	Carex jonesii cover	0.2616++
	Carex utriculata cover	–0.2376++
	Clementsia rhodantha cover	0.3167++
	Epilobium hornemannii cover	0.1905+
	Limnorchis dilatata cover	0.2471++
	Ligusticum tenuifolium cover	0.1698+
	Pedicularis groenlandica cover	0.4598+++
	Total Bryophyte Cover (microplots) (Calc)	0.1745+
	Depth of peat (up to 150 cm) (Meas)	–0.1694+
	Floristic Quality Index (Calc)	0.2796++
	Number of species in sample (Calc)	0.3940++
	Total live vascular plant cover (Calc)	0.4740+++
	Total live cover, including bryophytes (Calc)	0.4475+++
	Species richness index (Calc)	–0.2642++
	Percent of Peat-Forming Species (Calc)	–0.5644+++
	Score according to Table 4-26 (Calc)	–0.3335++

Factor	Correlated With	
Senecio triangularis cover– SETR NS=147, NZ=5	Aspect x-coordinate (Calc)	0.2103++
	Slope angle, % (Meas)	0.3095++
	Carex jonesii cover	0.2559++
	Limnorchis dilatata cover	0.1777+
	Ligusticum tenuifolium cover	0.3690++
	Electrical conductivity, uS/cm (Meas)	0.3950++
	Percent of Peat-Forming Species (Calc)	–0.1775+
Swertia perennis cover– SWPE NS=147, NZ=27	UTM X-coordinate (Calc)	0.2890++
	Slope angle, % (Meas)	0.1845+
	Landform fen classification	0.1830+
	Beaver use in complex Scalar	0.1797+
	Betula glandulosa cover	0.2680++
	Dasiphora floribunda cover	0.3578++
	Salix brachycarpa cover	0.3688++
	Salix geyeriana cover	0.3884++
	Carex aurea cover	0.2461++
	Carex canescens cover	0.2610++
	Carex dioica cover	0.2978++
	Carex scopulorum cover	0.2593++
	Carex vesicaria cover	0.1943+
	Bistorta vivipara cover	0.6360+++
	Thalictrum alpinum cover	0.3718++
	Total Bryophyte Cover (microplots) (Calc)	0.1652+
	Floristic Quality Index (Calc)	0.2397++
	Number of species in sample (Calc)	0.3027++
	Total live vascular plant cover (Calc)	0.3867++
	Total live cover, including bryophytes (Calc)	0.3727++
	Percent of Wetland Plants (Calc)	–0.1933+
Thalictrum alpinum cover– THAL NS=147, NZ=10	UTM X-coordinate (Calc)	0.2921++
	Size of fen-wetland complex (Calc)	0.3003++
	Elevation scalar (Calc)	–0.2047+
	Landform fen classification	0.1952+
	Beaver use in complex Scalar	0.1990+
	Cattle droppings	0.2045+
	Betula glandulosa cover	0.3446++
	Dasiphora floribunda cover	0.7109+++
	Salix brachycarpa cover	0.2380++
	Salix planifolia cover	0.1950+
	Salix wolfii cover	0.5067+++
	Carex aurea cover	0.2139++
	Carex dioica cover	0.2578++
	Carex vesicaria cover	0.2456++
	Bistorta bistortoides cover	0.2337++
	Bistorta vivipara cover	0.4021+++
	Equisetum arvense cover	0.3100++
	Pedicularis groenlandica cover	0.2041+
	Swertia perennis cover	0.3718++
	Total Bryophyte Cover (microplots) (Calc)	0.3146++
	Percent Organic Matter (Lab)	0.2084+
	Percent Organic Carbon (Lab)	0.1732+
	Floristic Quality Index (Calc)	0.2177++
	Number of species in sample (Calc)	0.3746++
	Total live vascular plant cover (Calc)	0.4916+++
	Total live cover, including bryophytes (Calc)	0.5088+++
	Percent of Peat-Forming Species (Calc)	–0.2433++
	Percent of Wetland Plants (Calc)	–0.2786++
Veronica americana cover– VEAM2 NS=147, NZ=5	*Carex leptalea* cover	0.4620+++
	Carex scopulorum cover	0.2861++
	Eleocharis quinqueflora cover	0.2751++
	Clementsia rhodantha cover	0.3778++
	Number of species in sample (Calc)	0.1829+
	Total live vascular plant cover (Calc)	0.1661+
Viola macloskeyi cover– VIMA2 NS=147, NZ=7	Slope angle, % (Meas)	0.1874+
	Disturbance Intensity in wetland (Calc)	0.1872+
	Disturbance intensity in buffer (Calc)	0.2061+
	Beaver use in complex Scalar	0.2602++
	Betula glandulosa cover	0.3151++
	Carex leptalea cover	0.2256++
	Equisetum arvense cover	0.4422+++
	Number of species in sample (Calc)	0.1685+
	Total live cover, including bryophytes (Calc)	0.1648+
	Percent of Peat-Forming Species (Calc)	–0.1964+
	Score according to Table 4-26 (Calc)	–0.1809+

Factor	Correlated With	
Total Bryophyte Cover (microplots) (Calc)– BRY NS=147, NZ=122	UTM X-coordinate (Calc)	0.3310++
	Size of fen-wetland complex (Calc)	0.1831+
	Elevation scalar (Calc)	0.1822+
	Slope angle, % (Meas)	0.2942++
	Landform fen classification	0.3294++
	Channels (Y/N)	0.1809+
	Open Water presence/absence	–0.2190++
	Litter and Duff (Calc)	0.1649+
	Water cover (microplots) (Meas)	–0.3417++
	Betula glandulosa cover	0.2171++
	Dasiphora floribunda cover	0.2326++
	Salix brachycarpa cover	0.1781+
	Salix planifolia cover	0.3248++
	Salix wolfii cover	0.2757++
	Carex illota cover	0.1810+
	Carex utriculata cover	–0.4066+++
	Bistorta vivipara cover	0.1768+
	Clementsia rhodantha cover	0.1654+
	Equisetum arvense cover	0.1696+
	Pedicularis groenlandica cover	0.3021++
	Psychrophila leptosepala cover	0.1745+
	Swertia perennis cover	0.1652+
	Thalictrum alpinum cover	0.3146++
	Floristic Quality Index (Calc)	0.3776++
	Number of species in sample (Calc)	0.4425+++
	Total live vascular plant cover (Calc)	0.3894++
	Total live cover, including bryophytes (Calc)	0.6547+++
	Species richness index (Calc)	–0.3362++
	Percent of Peat-Forming Species (Calc)	–0.3292++
	Percent of Wetland Plants (Calc)	–0.1793+
Depth of soil pit (Meas)– PITDEP NS=145, NZ=145	Size of fen-wetland complex (Calc)	0.2017+
	Slope angle, % (Meas)	0.2586++
	Disturbance intensity in buffer (Calc)	0.1884+
	Average peat depth by tile probe (Calc)	0.2045+
	Salix wolfii cover	0.4039+++
	Depth of peat (up to 150 cm) (Meas)	0.1817+
	Depth of water table in pit (Meas)	–0.2557++
	Electrical conductivity, uS/cm (Meas)	0.2094+
	Number of species in sample (Calc)	0.1844+
Depth of peat (up to 150 cm) (Meas)– PEATDEP NS=147, NZ=147	UTM X-coordinate (Calc)	–0.2722++
	UTM Y-coordinated (Calc)	–0.2371++
	Disturbance Intensity in wetland (Calc)	0.1690+
	Floating mat presence/absence	0.2281++
	Gully Frequency	0.2846++
	Hydrologic Alteration presence	0.1938+
	Open Water presence/absence	0.3331++
	Bare Soil Cover (estimate) (Calc)	0.1623+
	Sediment Cover	0.3450++
	Water cover (microplots) (Meas)	0.1708+
	Carex phaeocephala cover	0.1626+
	Carex simulata cover	0.2551++
	Comarum palustre cover	0.2378++
	Pedicularis groenlandica cover	–0.1790+
	Psychrophila leptosepala cover	–0.1694+
	Depth of soil pit (Meas)	0.1817+
	Electrical conductivity, uS/cm (Meas)	0.1716+
	Von Post scalar value, 1-10	–0.3167++
	Percent Organic Matter (Lab)	0.2080+
	Percent Organic Carbon (Lab)	0.1966+
	Species richness index (Calc)	0.2553++

Factor	Correlated With	
Depth of water table in pit (Meas)– WATDEPX NS=147, NZ=147	UTM Y-coordinated (Calc)	0.2052+
	Slope angle, % (Meas)	–0.2581++
	Landform fen classification	–0.1827+
	Disturbance intensity in buffer (Calc)	–0.2030+
	Floating mat presence/absence	0.1942+
	Water cover (microplots) (Meas)	0.2195++
	Carex jonesii cover	–0.3454++
	Carex nigricans cover	–0.1726+
	Carex pellita cover	0.1788+
	Carex simulata cover	0.1638+
	Carex utriculata cover	0.1845+
	Deschampsia cespitosa cover	–0.1633+
	Pedicularis groenlandica cover	–0.1724+
	Depth of soil pit (Meas)	–0.2557++
	Floristic Quality Index (Calc)	–0.2548++
	Number of species in sample (Calc)	–0.1759+
	Percent of Peat-Forming Species (Calc)	0.1656+
	Percent of Wetland Plants (Calc)	0.3057++
	Score according to Table 4-26 (Calc)	0.3271++
pH (Meas)– PH NS=147, NZ=147	Fetter Ground-water Types	0.2228++
	Channels (Y/N)	0.2071+
	Floating mat presence/absence	–0.2116++
	Salix brachycarpa cover	0.2749++
	Carex capillaris cover	0.2985++
	Carex nigricans cover	–0.2788++
	Eleocharis macrostachya cover	0.1935+
	Bistorta vivipara cover	0.1659+
	Electrical conductivity, uS/cm (Meas)	0.3351++
	Von Post scalar value, 1-10	0.2513++
	Number of species in sample (Calc)	0.1721+
	Total live vascular plant cover (Calc)	0.1655+
	Total live cover, including bryophytes (Calc)	0.1826+
Electrical conductivity, uS/cm (Meas)– EC NS=145, NZ=145	UTM X-coordinate (Calc)	–0.2097+
	UTM Y-coordinated (Calc)	–0.2352++
	Elevation scalar (Calc)	–0.2155++
	Aspect x-coordinate (Calc)	0.2756++
	Slope angle, % (Meas)	0.2292++
	Open Water presence/absence	0.2270++
	Salix brachycarpa cover	0.3396++
	Salix monticola cover	0.2291++
	Calamagrostis canadensis cover	0.1872+
	Eleocharis quinqueflora cover	–0.1717+
	Limnorchis dilatata cover	0.4820+++
	Ligusticum tenuifolium cover	0.1653+
	Senecio triangularis cover	0.3950++
	Depth of soil pit (Meas)	0.2094+
	Depth of peat (up to 150 cm) (Meas)	0.1716+
	pH (Meas)	0.3351++
	Von Post scalar value, 1-10	0.1645+
Von Post scalar value, 1-10– VONPOST NS=146, NZ=146	Landform fen classification	0.1721+
	Floating mat presence/absence	–0.3729++
	Sediment Cover	–0.1810+
	Carex simulata cover	–0.2060+
	Comarum palustre cover	–0.2727++
	Depth of peat (up to 150 cm) (Meas)	–0.3167++
	pH (Meas)	0.2513++
	Electrical conductivity, uS/cm (Meas)	0.1645+
	Percent Organic Matter (Lab)	–0.4231+++
	Percent Organic Carbon (Lab)	–0.4359+++

Factor	Correlated With	
Percent Organic Matter (Lab)– OM NS=146, NZ=146	UTM Y-coordinated (Calc)	0.1679+
	Fetter Ground-water Types	–0.1780+
	Beaver use in complex Scalar	0.1778+
	Floating mat presence/absence	0.3238++
	Average peat depth by tile probe (Calc)	0.2353++
	Maximum peat depth by tile probe (Calc)	0.1942+
	Basal Live Vegetation (microplots) (Calc)	–0.1983+
	Betula glandulosa cover	0.2018+
	Dasiphora floribunda cover	0.2132++
	Salix wolfii cover	0.1774+
	Carex capillaris cover	0.1684+
	Carex microglochin cover	–0.1770+
	Carex phaeocephala cover	–0.1862+
	Bistorta vivipara cover	0.1708+
	Comarum palustre cover	0.2045+
	Limnorchis dilatata cover	–0.2255++
	Ligusticum tenuifolium cover	–0.1811+
	Thalictrum alpinum cover	0.2084+
	Depth of peat (up to 150 cm) (Meas)	0.2080+
	Von Post scalar value, 1-10	–0.4231+++
	Percent Organic Carbon (Lab)	0.9533+++
Percent Organic Carbon (Lab)– C NS=146, NZ=146	Fetter Ground-water Types	–0.1968+
	Floating mat presence/absence	0.3198++
	Average peat depth by tile probe (Calc)	0.2119++
	Basal Live Vegetation (microplots) (Calc)	–0.1806+
	Dasiphora floribunda cover	0.1983+
	Salix wolfii cover	0.1623+
	Carex capillaris cover	0.2029+
	Carex microglochin cover	–0.1736+
	Carex phaeocephala cover	–0.1742+
	Comarum palustre cover	0.1921+
	Limnorchis dilatata cover	–0.1850+
	Ligusticum tenuifolium cover	–0.1694+
	Thalictrum alpinum cover	0.1732+
	Depth of peat (up to 150 cm) (Meas)	0.1966+
	Von Post scalar value, 1-10	–0.4359+++
	Percent Organic Matter (Lab)	0.9533+++
Floristic Quality Index (Calc)– FQI NS=147, NZ=147	UTM X-coordinate (Calc)	0.3243++
	Elevation scalar (Calc)	0.2865++
	Slope angle, % (Meas)	0.2765++
	Channels (Y/N)	0.2420++
	Basal Live Vegetation (microplots) (Calc)	0.1855+
	Salix planifolia cover	0.2028+
	Salix wolfii cover	0.1746+
	Carex canescens cover	0.2163++
	Carex dioica cover	0.2701++
	Carex illota cover	0.2053+
	Carex jonesii cover	0.1640+
	Carex microglochin cover	0.2369++
	Carex phaeocephala cover	0.2069+
	Carex scopulorum cover	0.2463++
	Carex utriculata cover	–0.6361+++
	Eleocharis macrostachya cover	–0.2991++
	Eleocharis quinqueflora cover	0.3441++
	Bistorta vivipara cover	0.2284++
	Pedicularis groenlandica cover	0.3218++
	Psychrophila leptosepala cover	0.2796++
	Swertia perennis cover	0.2397++
	Thalictrum alpinum cover	0.2177++
	Total Bryophyte Cover (microplots) (Calc)	0.3776++
	Depth of water table in pit (Meas)	–0.2548++
	Number of species in sample (Calc)	0.4467+++
	Total live vascular plant cover (Calc)	0.4217+++
	Total live cover, including bryophytes (Calc)	0.4726+++
	Species richness index (Calc)	–0.3323++
	Percent of Peat-Forming Species (Calc)	–0.3059++
	Percent of Wetland Plants (Calc)	–0.3604++
	Score according to Table 4-26 (Calc)	–0.1730+

Factor	Correlated With	
Number of species in sample (Calc)– NSP NS=147, NZ=147	UTM X-coordinate (Calc)	0.3269++
	Slope angle, % (Meas)	0.2500++
	Landform fen classification	0.2930++
	Channels (Y/N)	0.3211++
	Open Water presence/absence	–0.2307++
	Maximum peat depth by tile probe (Calc)	0.1753+
	Bare Soil Cover (estimate) (Calc)	–0.1627+
	Water cover (microplots) (Meas)	–0.2822++
	Betula glandulosa cover	0.3024++
	Dasiphora floribunda cover	0.3841++
	Salix brachycarpa cover	0.2588++
	Salix planifolia cover	0.3080++
	Salix wolfii cover	0.3054++
	Agrostis scabra cover	0.1912+
	Carex aurea cover	0.1795+
	Carex dioica cover	0.1991+
	Carex leptalea cover	0.2637++
	Carex saxatilis cover	0.2336++
	Carex scopulorum cover	0.2549++
	Carex utriculata cover	–0.3792++
	Carex vesicaria cover	0.1755+
	Deschampsia cespitosa cover	0.2279++
	Phleum commutatum cover	0.1643+
	Bistorta vivipara cover	0.2985++
	Clementsia rhodantha cover	0.2518++
	Equisetum arvense cover	0.2438++
	Pedicularis groenlandica cover	0.3818++
	Psychrophila leptosepala cover	0.3940++
	Swertia perennis cover	0.3027++
	Thalictrum alpinum cover	0.3746++
	Veronica americana cover	0.1829+
	Viola macloskeyi cover	0.1685+
	Total Bryophyte Cover (microplots) (Calc)	0.4425+++
	Depth of soil pit (Meas)	0.1844+
	Depth of water table in pit (Meas)	–0.1759+
	pH (Meas)	0.1721+
	Floristic Quality Index (Calc)	0.4467+++
	Total live vascular plant cover (Calc)	0.7593+++
	Total live cover, including bryophytes (Calc)	0.7714+++
	Species richness index (Calc)	–0.7239+++
	Percent of Peat-Forming Species (Calc)	–0.6149+++
	Percent of Wetland Plants (Calc)	–0.5337+++
	Score according to Table 4-26 (Calc)	–0.2940++

Factor	Correlated With	
Total live vascular plant cover (Calc)– TLC NS=147, NZ=147	UTM X-coordinate (Calc)	0.2669++
	Size of fen-wetland complex (Calc)	0.2639++
	Slope angle, % (Meas)	0.2153++
	Landform fen classification	0.2935++
	Channels (Y/N)	0.2843++
	Floating mat presence/absence	–0.1837+
	Open Water presence/absence	–0.2258++
	Average peat depth by tile probe (Calc)	0.1810+
	Maximum peat depth by tile probe (Calc)	0.1828+
	Bare Soil Cover (estimate) (Calc)	–0.2618++
	Sediment Cover	–0.2340++
	Water cover (microplots) (Meas)	–0.2227++
	Betula glandulosa cover	0.3017++
	Dasiphora floribunda cover	0.3984++
	Salix brachycarpa cover	0.2654++
	Salix planifolia cover	0.4593+++
	Salix wolfii cover	0.3668++
	Carex canescens cover	0.2163++
	Carex dioica cover	0.1648+
	Carex illota cover	0.2267++
	Carex leptalea cover	0.1996+
	Carex utriculata cover	–0.2882++
	Carex vesicaria cover	0.2981++
	Deschampsia cespitosa cover	0.1831+
	Bistorta bistortoides cover	0.2049+
	Bistorta vivipara cover	0.3202++
	Clementsia rhodantha cover	0.3661++
	Equisetum arvense cover	0.2790++
	Pedicularis groenlandica cover	0.5497+++
	Psychrophila leptosepala cover	0.4740+++
	Swertia perennis cover	0.3867++
	Thalictrum alpinum cover	0.4916+++
	Veronica americana cover	0.1661+
	Total Bryophyte Cover (microplots) (Calc)	0.3894++
	pH (Meas)	0.1655+
	Floristic Quality Index (Calc)	0.4217+++
	Number of species in sample (Calc)	0.7593+++
	Total live cover, including bryophytes (Calc)	0.9512+++
	Species richness index (Calc)	–0.3702++
	Percent of Peat-Forming Species (Calc)	–0.5390+++
	Percent of Wetland Plants (Calc)	–0.3940++
	Score according to Table 4-26 (Calc)	–0.2352++

Factor	Correlated With	
Total live cover, including bryophytes (Calc)– TLCB NS=147, NZ=147	UTM X-coordinate (Calc)	0.3300++
	Size of fen-wetland complex (Calc)	0.2780++
	Slope angle, % (Meas)	0.2753++
	Landform fen classification	0.3513++
	Channels (Y/N)	0.2940++
	Floating mat presence/absence	–0.1750+
	Gully Frequency	–0.1688+
	Open Water presence/absence	–0.2587++
	Bare Soil Cover (estimate) (Calc)	–0.2610++
	Sediment Cover	–0.2271++
	Water cover (microplots) (Meas)	–0.2973++
	Betula glandulosa cover	0.3203++
	Dasiphora floribunda cover	0.4049+++
	Salix brachycarpa cover	0.2775++
	Salix planifolia cover	0.4858+++
	Salix wolfii cover	0.3934++
	Carex canescens cover	0.2146++
	Carex dioica cover	0.1836+
	Carex illota cover	0.2467++
	Carex leptalea cover	0.1963+
	Carex utriculata cover	–0.3727++
	Carex vesicaria cover	0.2792++
	Deschampsia cespitosa cover	0.1670+
	Phleum commutatum cover	0.1787+
	Bistorta bistortoides cover	0.2203++
	Bistorta vivipara cover	0.3220++
	Clementsia rhodantha cover	0.3559++
	Equisetum arvense cover	0.2858++
	Pedicularis groenlandica cover	0.5523+++
	Psychrophila leptosepala cover	0.4475+++
	Swertia perennis cover	0.3727++
	Thalictrum alpinum cover	0.5088+++
	Viola macloskeyi cover	0.1648+
	Total Bryophyte Cover (microplots) (Calc)	0.6547+++
	pH (Meas)	0.1826+
	Floristic Quality Index (Calc)	0.4726+++
	Number of species in sample (Calc)	0.7714+++
	Total live vascular plant cover (Calc)	0.9512+++
	Species richness index (Calc)	–0.4165+++
	Percent of Peat-Forming Species (Calc)	–0.5526+++
	Percent of Wetland Plants (Calc)	–0.3834++
	Score according to Table 4-26 (Calc)	–0.2036+
Species richness index (Calc)– TLX NS=147, NZ=147	UTM X-coordinate (Calc)	–0.2802++
	Slope angle, % (Meas)	–0.1739+
	Landform fen classification	–0.2246++
	Channels (Y/N)	–0.2739++
	Open Water presence/absence	0.3230++
	Water cover (microplots) (Meas)	0.3324++
	Dasiphora floribunda cover	–0.1617+
	Salix planifolia cover	–0.1739+
	Carex saxatilis cover	–0.1725+
	Carex scopulorum cover	–0.1823+
	Carex utriculata cover	0.2811++
	Deschampsia cespitosa cover	–0.2062+
	Pedicularis groenlandica cover	–0.2178++
	Psychrophila leptosepala cover	–0.2642++
	Total Bryophyte Cover (microplots) (Calc)	–0.3362++
	Depth of peat (up to 150 cm) (Meas)	0.2553++
	Floristic Quality Index (Calc)	–0.3323++
	Number of species in sample (Calc)	–0.7239+++
	Total live vascular plant cover (Calc)	–0.3702++
	Total live cover, including bryophytes (Calc)	–0.4165+++
	Percent of Peat-Forming Species (Calc)	0.4524+++
	Percent of Wetland Plants (Calc)	0.3787++
	Score according to Table 4-26 (Calc)	0.2647++

Factor	Correlated With	
Percent of Peat-Forming Species (Calc)– PEATFOX NS=147, NZ=147	Slope angle, % (Meas)	–0.2425++
	Landform fen classification	–0.1863+
	Water cover (microplots) (Meas)	0.2177++
	Dasiphora floribunda cover	–0.1861+
	Salix brachycarpa cover	–0.2314++
	Salix wolfii cover	–0.2141++
	Carex aquatilis cover	0.2141++
	Carex nigricans cover	–0.2803++
	Carex phaeocephala cover	–0.1748+
	Carex scopulorum cover	–0.2138++
	Carex utriculata cover	0.3020++
	Deschampsia cespitosa cover	–0.2976++
	Eleocharis acicularis cover	–0.3532++
	Phleum commutatum cover	–0.1704+
	Bistorta bistortoides cover	–0.2019+
	Bistorta vivipara cover	–0.2406++
	Clementsia rhodantha cover	–0.2233++
	Galium trifidum cover	–0.2212++
	Ligusticum tenuifolium cover	–0.2035+
	Pedicularis groenlandica cover	–0.3284++
	Psychrophila leptosepala cover	–0.5644+++
	Senecio triangularis cover	–0.1775+
	Thalictrum alpinum cover	–0.2433++
	Viola macloskeyi cover	–0.1964+
	Total Bryophyte Cover (microplots) (Calc)	–0.3292++
	Depth of water table in pit (Meas)	0.1656+
	Floristic Quality Index (Calc)	–0.3059++
	Number of species in sample (Calc)	–0.6149+++
	Total live vascular plant cover (Calc)	–0.5390+++
	Total live cover, including bryophytes (Calc)	–0.5526+++
	Species richness index (Calc)	0.4524+++
	Percent of Wetland Plants (Calc)	0.6814+++
	Score according to Table 4-26 (Calc)	0.5933+++

Factor	Correlated With	
Percent of Wetland Plants (Calc)– WETPLX NS=147, NZ=147	UTM Y-coordinated (Calc)	0.2160++
	Slope angle, % (Meas)	–0.2531++
	Channels (Y/N)	–0.2439++
	Floating mat presence/absence	0.2009+
	Water cover (microplots) (Meas)	0.1879+
	Dasiphora floribunda cover	–0.1824+
	Salix brachycarpa cover	–0.2090+
	Salix wolfii cover	–0.2472++
	Agrostis scabra cover	–0.2696++
	Carex aquatilis cover	0.2526++
	Carex leptalea cover	–0.2307++
	Carex nigricans cover	–0.3524++
	Carex phaeocephala cover	–0.2296++
	Carex scopulorum cover	–0.5125+++
	Carex utriculata cover	0.2867++
	Deschampsia cespitosa cover	–0.2244++
	Bistorta bistortoides cover	–0.2507++
	Bistorta vivipara cover	–0.2863++
	Equisetum arvense cover	–0.1819+
	Galium trifidum cover	–0.1622+
	Ligusticum tenuifolium cover	–0.1641+
	Pedicularis groenlandica cover	–0.2405++
	Swertia perennis cover	–0.1933+
	Thalictrum alpinum cover	–0.2786++
	Total Bryophyte Cover (microplots) (Calc)	–0.1793+
	Depth of water table in pit (Meas)	0.3057++
	Floristic Quality Index (Calc)	–0.3604++
	Number of species in sample (Calc)	–0.5337+++
	Total live vascular plant cover (Calc)	–0.3940++
	Total live cover, including bryophytes (Calc)	–0.3834++
	Species richness index (Calc)	0.3787++
	Percent of Peat-Forming Species (Calc)	0.6814+++
	Score according to Table 4-26 (Calc)	0.4214+++
Score according to Table 4-26 (Calc)– SCORE NS=145, NZ=145	UTM X-coordinate (Calc)	0.1759+
	Fetter Ground-water Types	–0.2443++
	Landform fen classification	–0.1655+
	Disturbance Intensity in wetland (Calc)	–0.5605+++
	Disturbance intensity in buffer (Calc)	–0.2987++
	Gully Frequency	–0.2817++
	Hydrologic Alteration presence	–0.5888+++
	Water development (s) presence	–0.5245+++
	Bare Soil Cover (microplots) (Calc)	–0.3914++
	Litter and Duff (Calc)	0.3489++
	Water cover (microplots) (Meas)	0.1890+
	Agrostis scabra cover	–0.1642+
	Carex interior cover	–0.1631+
	Carex jonesii cover	–0.1914+
	Carex nigricans cover	–0.2685++
	Carex phaeocephala cover	–0.1717+
	Bistorta bistortoides cover	–0.1717+
	Comarum palustre cover	–0.2255++
	Ligusticum tenuifolium cover	–0.1653+
	Psychrophila leptosepala cover	–0.3335++
	Viola macloskeyi cover	–0.1809+
	Depth of water table in pit (Meas)	0.3271++
	Floristic Quality Index (Calc)	–0.1730+
	Number of species in sample (Calc)	–0.2940++
	Total live vascular plant cover (Calc)	–0.2352++
	Total live cover, including bryophytes (Calc)	–0.2036+
	Species richness index (Calc)	0.2647++
	Percent of Peat-Forming Species (Calc)	0.5933+++
	Percent of Wetland Plants (Calc)	0.4214+++

2. Leading Indicators As Inferred From Total Correlation

Factor	Total Correlation	Non-zero
TLC	17.571	147
NSP	17.567	147
TLCB	17.170	147
UTMX	13.386	147
FQI	13.360	147
BRY	13.232	122
PEATFOX	12.653	147
WETPLX	12.271	147
THAL	12.227	10
ELEVX	11.922	147
PEGR2	11.895	63
CAUT	11.745	67
OPENWX	11.471	147
SAWO	11.121	14
DAFL3	11.051	13
CHANX	11.024	147
TLX	10.933	147
SLOPE	10.824	113
FLOATX	10.796	147
FENTYPEX	10.519	147
PSLE	10.486	63
SAPL2	10.423	58
SWPE	10.418	27
PEATDEP	10.296	147
HALTERX	10.239	30
WATER	10.206	44
OM	9.925	146
BEGL	9.809	6
BAREX	9.732	147
GULLYFX	9.703	17
BIVI2	9.688	16
CASC12	9.617	16
C	9.598	146
TEXI	9.449	141
SEDX	9.393	41
GWX	9.325	145
COPA28	9.248	7
LITT	9.228	147
UTMY	9.008	147
EC	8.920	145
ACRES	8.854	147
CLRH2	8.518	37
WATDEVX	8.496	147
PROBEMX	8.468	147
EQAR	8.415	4
WATDEPX	8.400	147
PITDEP	8.334	145
PROBEAX	8.217	147
BARE	8.171	50
PH	8.122	147
BEAVX	8.000	24
TEXIB	7.885	132
CALE10	7.740	4
VONPOST	7.693	146
SABR	7.572	4
CAAQ	7.542	107
CAVE6	7.381	9
DECE	7.227	40
CADIG	7.190	4
ELQU2	7.103	14
AGSC5	7.061	6
BIBI5	6.940	5
ASPYX	6.846	142
VIMA2	6.756	7
BAVE	6.723	145
ASPXX	6.696	141
LITE2	6.666	10
CASI2	6.613	15
CACA11	6.611	22
LIDI5	6.605	4
CAIL	6.567	8
ELAC	6.404	9
CAPH2	6.293	4
CAJO	5.982	10
PHCO9	5.868	4
CAAU3	5.819	3
CACA12	5.778	4
CACA13	5.766	3
CANI2	5.702	5
SAGE2	5.698	3
EPHO	5.668	27
SETR	5.565	5
VEAM2	5.510	5
CALI7	5.480	4
ELMA5	5.422	6
CACA4	5.370	22
SAMO2	5.350	5
CAMI6	5.248	3
CASA10	5.196	5
SED	4.928	4
CABU6	4.777	3
GATR2	4.487	19
COWPIE	4.293	5
CAPE42	4.276	6
CAIN11	4.061	3
GEMA4	3.863	7

3. Explanation of Codes

Species were chosen for statistics if they occurred in two or more samples. All species cover was measured in the 4 × 4 m relevé

Factor	Name	GF	Family Code	Common Name	NZ*	NB†
AGSC5	*Agrostis scabra*	G	POA	rough bentgrass	6	147
BEGL	*Betula glandulosa*	S	BET	bog birch	5	147
BIBI5	*Bistorta bistortoides*	F	PLG	American bistort	5	147
BIVI2	*Bistorta vivipara*	F	PLG	viviparous bistort	16	147
CAAQ	*Carex aquatilis*	G	CYP	water sedge	107	147
CAAU3	*Carex aurea*	G	CYP	golden sedge, golden-fruited sedge	3	147
CACA11	*Carex canescens*	G	CYP	pale sedge, gray sedge, silvery sedge	22	147
CACA12	*Carex capillaris*	G	CYP	hair sedge, hairlike sedge	4	147
CACA13	*Carex capitata*	G	CYP	capitate sedge	3	147
CACA4	*Calamagrostis canadensis*	G	POA	bluejoint reedgrass, bluejoint	22	147
CADIG	*Carex dioica* ssp. *gynocrates*	G	CYP	northern bog sedge	4	147
CAIL	*Carex illota*	G	CYP	sheep sedge	8	147
CAJO	*Carex jonesii*	G	CYP	Jones's sedge	10	147
CALE10	*Carex leptalea*	G	CYP	bristlystalked sedge	4	147
CALI7	*Carex limosa*	G	CYP	mud sedge	3	147
CAMI6	*Carex microglochin*	G	CYP	microglochin sedge, fewseeded bog sedge	3	147
CANI2	*Carex nigricans*	G	CYP	black alpine sedge	5	147
CANO3	*Carex nova*	G	CYP	new sedge, black sedge	2	147
CAPE42	*Carex pellita*	G	CYP	woolly sedge	5	147
CAPH2	*Carex phaeocephala*	G	CYP	dunhead sedge, mountain hare sedge	4	147
CASA10	*Carex saxatilis*	G	CYP	rock sedge, russet sedge	5	147
CASC	*Calamagrostis scopulorum*	G	POA	ditch reedgrass	3	147
CASC12	*Carex scopulorum*	G	CYP	cliff sedge	14	147
CASI2	*Carex simulata*	G	CYP	short-beaked sedge	15	147
CAUT	*Carex utriculata*	G	CYP	beaked sedge, Northwest Territory sedge	67	147

Factor	Name	GF	Family Code	Common Name	NZ*	NB†
CAVE6	*Carex vesicaria*	G	CYP	blister sedge	9	147
CLRH2	*Clementsia rhodantha*	F	CRA	rose crown, redpod stonecrop	37	147
COPA28	*Comarum palustre*	F	ROS	purple cinquefoil	6	147
DAFL3	*Dasiphora floribunda*	S	ROS	shrubby cinquefoil, bush cinquefoil	13	147
DECE	*Deschampsia cespitosa*	G	POA	tufted hairgrass	40	147
ELAC	*Eleocharis acicularis*	G	CYP	needle spike-rush	9	147
ELMA5	*Eleocharis macrostachya*	G	CYP	pale spikerush	6	147
ELQU2	*Eleocharis quinqueflora*	G	CYP	few-flowered spike-rush	14	147
EPHO	*Epilobium hornemannii*	F	ONA	Hornemann willow-herb	27	147
EQAR	*Equisetum arvense*	E	EQU	field horsetail	4	147
GATR2	*Galium trifidum*	F	RUB	small bedstraw, small cleavers, threepetal bedstraw	19	147
GEMA4	*Geum macrophyllum*	F	ROS	large-leaved avens	7	147
JUAR2	*Juncus arcticus*	G	JUN	arctic rush, Baltic rush, wire-grass	2	147
LIDI5	*Limnorchis dilatata*	F	ORC	scentbottle	4	147
LITE2	*Ligusticum tenuifolium*	F	API	fern-leaf lovage, fern-leaf ligusticum, Idaho liquoriceroot	10	147
METR3	*Menyanthes trifoliata*	F	MNY	common buckbean	2	147
OXFE	*Oxypolis fendleri*	F	BRA	Fendler cowbane	2	147
PEGR2	*Pedicularis groenlandica*	F	SCR	elephantella, elephant-head pedicularis, elephanthead	63	147
PHCO9	*Phleum commutatum*	G	POA	alpine timothy	4	147
PSLE	*Psychrophila leptosepala*	F	HEL	elkslip marsh-marigold, elkslip, white marsh-marigold	63	147
SABR	*Salix brachycarpa*	S	SAL	barrenground willow, short-fruited willow	4	147
SAGE2	*Salix geyeriana*	S	SAL	Geyer willow, silver willow	3	147
SAMO2	*Salix monticola*	S	SAL	serviceberry willow, mountain willow, park willow	5	147
SAPL2	*Salix planifolia*	S	SAL	planeleaf willow, tea-leaved willow, diamondleaf willow	58	147
SAWO	*Salix wolfii*	S	SAL	Wolf's willow	14	147
SETR	*Senecio triangularis*	F	AST	Arrowleaf groundsel	5	147
SWPE	*Swertia perennis*	F	GEN	star gentian, alpine bog swertia	27	147
THAL	*Thalictrum alpinum*	F	THA	alpine meadow-rue	10	147
VEAM2	*Veronica americana*	F	SCR	American brooklime, American speedwell	5	147
VIMA2	*Viola macloskeyi*	F	VIO	small white violet, smooth white violet	7	147

*. Number of non-zero samples. †. Number of non-blank samples.

Factor	Explanation	Derivation	NZ*	NB†
ACRES	Size of polygon	Calculated in ArcGIS	147	147
ASPXX	Aspect x-coordinate	Calculated, ranges 0-20	141	147
ASPYX	Aspect y-coordinate	Calculated, ranges 0-20	142	147
BARE	Bare Soil Cover	Canopy Cover average of 5 20×50 cm microplots	50	146
BAREX	Bare Soil Cover	Estimated by Class across community	147	147
BAVE	Basal Live Vegetation	Canopy Cover average of 5 20×50 cm microplots	144	147
BEAVX	Beaver use in polygon	Categories, transformed to scalar[a]	24	146
BRY	Total Bryophyte Cover	Canopy Cover average of 5 20×50 cm microplots	122	147
C	Percent Organic Carbon	Laboratory Measurement from Soil Sample	146	146
CHANX	Channel presence/absence	Categories, transformed to scalar[a]	147	147
EC	Electrical conductivity, □S/cm	As measured in field	145	145
ELEVX	Elevation scalar	Calculated, = (Elevation – 6,000) / 100	147	147
FENTYPEX	Landform fen classification	Categories, transformed to scalar[a]	147	147
FLOATX	Floating mat presence/absence	Categories, transformed to scalar[a]	147	147
FQI	Floristic Quality Index	Calculated as below	147	147
GULLYFX	Gully Frequency	0 = None, 1 = Low, 2 = Moderate, 3 = High	17	146
GWX	Fetter Ground-water Types	Categories, transformed to scalar[a]	145	145
HALTERX	Hydrologic Alteration presence	0 = None, 1 = Low, 2 = Moderate, 3 = High	30	145
LITT	Litter and Duff	Canopy Cover average of 5 20×50 cm microplots	147	147
NSP	Number* of species in sample	Calculated, simple sum	147	147
OM	Percent Organic Matter	Laboratory Measurement from Soil Sample	146	146
OPENWX	Open Water presence/absence	Categories, transformed to scalar[a]	147	147
PEATDEP	Depth of peat (up to 150 cm)	As measured in field	147	147
PEATFOX	Percent of Peat-Forming Species*†	Calculated	147	147
PH	pH	As measured in field	147	147
PITDEP	Depth of soil pit	As measured in field	145	145
PROBEAX	Average peat depth by tile probe	Average of field measurements	147	147
PROBEMX	Maximum peat depth by tile probe	Maximum of field measurements	147	147
SED	Sediment Cover	Canopy Cover average of 5 20×50 cm microplots	4	147
SEDX	Sediment Cover	Estimated by Class across community	41	146
SLOPE	Slope angle, %	As measured in field	113	145
SURFROCK	Cover of Rock Fragments > 2 cm	Estimated cover across community	31	110
TEXI	Disturbance Intensity in wetland	Each disturbance weighted by extent, then totaled[a]	142	147

Factor	Explanation	Derivation	NZ*	NB†
TEXIB	Disturbance intensity in buffer	Each disturbance weighted by extent, then totaled[a]	132	147
TLC	Total live vascular plant cover	Calculated, simple sum of cover	147	147
TLCB	Total live cover, including bryophytes	Total live cover + Total bryophyte cover	147	147
TLX	Species richness index	Calculated as below	147	147
UTMXX	UTM X-coordinate	(UTMX – 150,000) / 1000	147	147
UTMYX	UTM Y-coordinated	(UTMY – 4,000,000) / 1000	147	147
VONPOST	Von Post scalar value, 1-10	As estimated in field	146	146
WATDEPX	Depth of water table in pit	As measured in field	147	147
WATDEVX	Water development(s) presence	Categories, transformed to scalar[a]	147	147
WETPLX	Percent of Wetland Plants*‡	Calculated	147	147

*. Number of non-zero samples. †. Number of non-blank samples.

Appendix F. Calculation of Factors Used in Analysis

1. Calculation of FQI, Percent Peat-forming Plants, and Percent Wetland Plants

These quantities were calculated for vascular plants and bryophytes.

1. Floristic Quality Index. Colorado Natural Heritage Program supplied FQAs for the species on the list (Rocchio and others 2007). The FQI for each sample was calculated using

$$FQI = \frac{1}{TLC}\sum_{i=1}^{ns} f_i \times c_i \times 100$$

where FQI = Floristic Quality Index for the polygon, TLC = Total live cover of vascular plants in %, fi = FQI for species i, ci = canopy cover for species i, and ns = number of vascular plant species.

2. Percent Peat-forming Plants. Estimated after Weixelman and Cooper (2009),species known to be peat-forming (Yes or No). The PPF for each sample was calculated using

$$PEATFOX = \frac{1}{TLCB}\sum_{i=1}^{ns} p_i \times c_i \times 100$$

where PEATFOX = Percent Peat-forming Plants for the polygon, TLC = Total live cover of plants (including bryophytes) in %, $\boldsymbol{p}_i$ = 1 if species $\boldsymbol{i}$ is peat-forming or zero if not, $\boldsymbol{c}_i$ = canopy cover for species $\boldsymbol{i}$, and $\boldsymbol{ns}$ = number of plant species.

3. Percent Wetland Plants. The wetland status of each species was derived from the *PLANTS* data base (plants.usda.gov). The percent wetland plants for each sample was calculated using:

$$WETPLX = \frac{1}{TLC}\sum_{i=1}^{ns} w_i \times c_i \times 100$$

Where WETPLX = Percent wetland plants, $\boldsymbol{TLC}$ = Total live cover of vascular plants in %, $\boldsymbol{w}_i$ is a coefficient for species $\boldsymbol{i}$ (according to the following table), and $\boldsymbol{c}_i$ = canopy cover for species $\boldsymbol{i}$.

Table 1. Coefficients for PWP equation.

Wetland Status	w_i
FAC, FAC**,FAC+,FAC-	0.0
FACU,FACU**,FACU+,FACU-	0.0
FACW.FACW**,FACW,FACW?	0.5
OBL,OBL**	1.0
UPL	0.0

Table 2. Values for Floristic Quality (Rocchio and others 2007) and Peat-Forming (after Weixelman and Cooper 1009).

Code	Name	Wetland Status	FQA C-value	Peat-forming	Disturb. Indic.	Code	Name	Wetland Status	FQA C-value	Peat-forming	Disturb. Indic.
	SHRUBS					CADI6	*Carex disperma*	FACW	9	Yes	No
BEFO2	*Betula fontinalis*	FACW	8	No	No	CAEB	*Carex ebenea*	FACW?	4	No	No
BEGL	*Betula glandulosa*	OBL	9	Yes	No	CAIL	*Carex illota*	OBL	9	Yes	No
DAFL3	*Dasiphora floribunda*	FACW	4	No	No	CAIN11	*Carex interior*	FACW	7	Yes	No
SABE2	*Salix bebbiana*	FACW-	6	No	No	CAJO	*Carex jonesii*	FACW	9	Yes	No
SABR	*Salix brachycarpa*	FACW-	8	No	No	CALA10	*Carex lachenalii*	OBL	10	Yes	No
SAGE2	*Salix geyeriana*	FACW	6	No	No	CALA11	*Carex lasiocarpa*	OBL	8	Yes	No
SAMO2	*Salix monticola*	FACW	6	No	No	CALE8	*Carex lenticularis*	OBL	9	Yes	No
SAPL2	*Salix planifolia*	OBL	7	Yes	No	CALE9	*Carex leporinella*	FACW?	8	Yes	No
SAWO	*Salix wolfii*	FACW	8	No	No	CALE10	*Carex leptalea*	OBL	10	Yes	No
	GRAMINOIDS					CALI7	*Carex limosa*	OBL	9	Yes	No
AGSC5	*Agrostis scabra*	FAC	4	No	No	CAMA12	*Carex magellanica*	OBL	9	Yes	No
CACA4	*Calamagrostis canadensis*	OBL	6	Yes	No	CAMI6	*Carex microglochin*	OBL	9	Yes	No
CAST36	*Calamagrostis stricta*	FACW	7	No	No	CANI2	*Carex nigricans*	FACW	8	No	No
CAAN23	*Carex angustior*	OBL	9	Yes	No	CANO2	*Carex norvegica*	FACW	8	No	No
CAAQ	*Carex aquatilis*	OBL	6	Yes	No	CANO3	*Carex nova*	FAC	10	Yes	No
CAAU3	*Carex aurea*	OBL	7	Yes	No	CAPA18	*Carex parryana*	OBL	9	Yes	No
CABU6	*Carex buxbaumii*	OBL	9	Yes	No	CAPE42	*Carex pellita*	OBL	6	Yes	No
CACA11	*Carex canescens*	OBL	8	Yes	No	CAPH2	*Carex phaeocephala*	UPL	9	No	No
CACA12	*Carex capillaris*	FACW	9	Yes	No	CASA10	*Carex saxatilis*	OBL	8	Yes	No
CACA13	*Carex capitata*	FACW	10	Yes	No	CASC10	*Carex scirpoidea*	FACW	9	Yes	No
CADIG	*Carex dioica* ssp. *Gynocrates*	OBL	10	Yes	No	CASC12	*Carex scopulorum*	FACW	7	Yes	No

Code	Name	Wetland Status	FQA C-value	Peat-forming	Disturb. Indic.
CASI2	*Carex simulata*	OBL	6	Yes	No
CAUT	*Carex utriculata*	OBL	5	Yes	No
CAVE6	*Carex vesicaria*	OBL	0	Yes	No
CRBR12	*Critesion brachyantherum*	FACW-	NA	No	Yes
DAIN	*Danthonia intermedia*	FACU	8	No	No
DAPA2	*Danthonia parryi*	FACU	8	No	No
DECE	*Deschampsia cespitosa*	FACW	4	No	No
DRRO	*Drosera rotundifolia*	OBL	10	Yes	No
ELAC	*Eleocharis acicularis*	OBL	5	No	Yes
ELMA5	*Eleocharis macrostachya*	OBL	3	Yes	Yes
ELQU2	*Eleocharis quinqueflora*	OBL	8	Yes	No
ERAL7	*Eriophorum altaicum*	OBL	10	Yes	No
ERAN6	*Eriophorum angustifolium*	OBL	9	Yes	No
ERCH7	*Eriophorum chamissonis*	OBL	10	Yes	No
ERGR8	*Eriophorum gracile*	OBL	10	Yes	No
GLST	*Glyceria striata*	OBL	NA	Yes	No
HIHIA	*Hierochloe hirta* ssp. *arctica*	FACW	9	No	No
JUAR2	*Juncus arcticus*	FACW	4	Yes	Yes
JUCA6	*Juncus castaneus*	FACW	9	Yes	No
JUME3	*Juncus mertensianus*	FACW	7	Yes	No
JUSA	*Juncus saximontanus*	FACW	6	Yes	No
KOMY	*Kobresia myosuroides*	FACU	9	Yes	No
KOSI2	*Kobresia simpliciuscula*	FACW	10	Yes	No
LUPA4	*Luzula parviflora*	FAC	7	No	No
LUSU9	*Luzula subcapitata*	OBL	8	Yes	No
MUFI2	*Muhlenbergia filiformis*	FACW	8	No	No
PACA6	*Panicum capillare*	FACU	0	No	Yes
PHAR15	*Phalaroides arundinacea*	FACW	0	No	Yes
PHCO9	*Phleum commutatum*	FAC	6	No	No
POLE2	*Poa leptocoma*	FACW	8	Yes	No
POPA2	*Poa palustris*	FACW	6	Yes	No
POPR	*Poa pratensis*	FACU	0	No	Yes
POHU	*Podagrostis humilis*	FACW	10	Yes	No
	FORBS				
FACU	*Achillea lanulosa*	FACU	4	No	Yes
ALAC4	*Allium acuminatum*	NA	8	No	No
ALGE	*Allium geyeri*	FACW	5	No	No
ANAN2	*Antennaria anaphaloides*	NA	NA	No	No
ANCO	*Antennaria corymbosa*	FACW	5	No	No
ANRO2	*Antennaria rosea*	NA	5	No	No
ANSE2	*Arenaria serpyllifolia*	FACU	0	No	No
ARAN7	*Argentina anserina*	OBL	3	No	No
BIBI5	*Bistorta bistortoides*	FAC+	7	No	No
BIVI2	*Bistorta vivipara*	FAC+	8	No	No
BRAR20	*Breea arvense*	FACU	0	No	Yes
CACO6	*Cardamine cordifolia*	FACW	8	No	No
CARH4	*Castilleja rhexifolia*	FACU	8	No	No
CEFO2	*Cerastium fontanum*	FACU	0	No	No
CLRH2	*Clementsia rhodantha*	FACW	8	No	No
COVI6	*Coeloglossum viride*	FAC	7	Yes	No
COPA28	*Comarum palustre*	OBL	9	Yes	No
EPHO	*Epilobium hornemannii*	FACW	6	No	No
EPSA	*Epilobium saximontanum*	FAC???	6	No	No
EREMO11	*Eremogone*				
ERPE3	*Erigeron peregrinus*	FACW	7	No	No
FRVI	*Fragaria virginiana*	FACU	5	No	No
GATRS2	*Galium trifidum*	OBL	7	Yes	No
GAHU	*Gaultheria humifusa*	FACU	8	Yes	No
GEHE4	*Gentianella heterosepala*	FAC	8	No	No
GEAL6	*Gentianodes algida*	FAC	9	No	No
GETH	*Gentianopsis thermalis*	OBL	8	No	No
GERI	*Geranium richardsonii*	FACU	6	No	No
GEMA4	*Geum macrophyllum*	OBL	6	No	No
GETR	*Geum triflorum*	UPL	NA	No	No
GNUL	*Gnaphalium uliginosum*	FACW	5	No	Yes
HESP6	*Heracleum sphondylium*	FACW-	6	No	No
HIVU2	*Hippuris vulgaris*	OBL	6	Yes	No
HIPR5	*Hirculus prorepens*	OBL	9	Yes	No
ISBO	*Isoetes bolanderi*	OBL	10	Yes	No

Code	Name	Wetland Status	FQA C-value	Peat-forming	Disturb. Indic.
KAMI	*Kalmia microphylla*	OBL	9	Yes	No
LEMI3	*Lemna minor*	OBL	2	No	No
LITE2	*Ligusticum tenuifolium*	FAC	8	No	No
LIDIA	*Limnorchis dilatata* ssp. *albiflora*	FACW	8	No	No
MELU	*Medicago lupulina*	FAC	0	No	Yes
METR3	*Menyanthes trifoliata*	OBL	9	Yes	No
MIOR2	*Micranthes oregana*	OBL	8	No	No
MIGU	*Mimulus guttatus*	OBL	8	No	No
NULUP	*Nuphar lutea*	OBL	7	Yes	No
OSCH	*Osmorhiza chilensis*	FACU-	5	No	No
OXFE	*Oxypolis fendleri*	OBL	7	Yes	No
PAPS5	*Packera pseudaurea*	FACW	7	No	No
PAPA9	*Parnassia parviflora*	OBL	7	No	No
PAMY	*Paxistima myrsinites*	NA	7	No	No
PEGR2	*Pedicularis groenlandica*	OBL	8	Yes	No
PEPA3	*Pedicularis parryi*	FACU-	9	Yes	No
PEAM8	*Persicaria amphibia*	OBL	4	No	No
PESA5	*Petasites sagittatus*	OBL	8	Yes	No
PLSCP2	*Plagiogothrys scouleri*	OBL	3	No	No
PNAF	*Pneumonanthe affinis*	FACU	8	No	No
POCAA4?	*Polemonium caeruleum*	FACW	8	No	No
POFO	*Polemonium foliosissimum*	FACU	7	No	No
POPU3	*Polemonium pulcherrimum*	NA	8	No	No
POAR11	*Polygonum arenastrum*	FACU	0	No	Yes
POFO3	*Potamogeton foliosus*	OBL	4	Yes	No
PODI2	*Potentilla diversifolia*	FACU	6	No	No
POGR9	*Potentilla gracilis*	FAC-	5	No	No
POPU9	*Potentilla pulcherrima*	NA	5	No	No
PSLE	*Psychrophila leptosepala*	OBL	7	No	No
RAMA	*Ranunculus macauleyi*	FACW	10	No	No
RARE3	*Ranunculus repens*	FACW-	0	No	Yes
ROCUC?	*Rorippa curvipes*	OBL	5	No	No
ROTE5	*Rorippa teres*	OBL	5	No	Yes
RUDE2	*Rumex densiflorus*	FACW	5	No	No
SARI8	*Saxifraga rivularis*	FACW	NA	No	No
SEIN2	*Senecio integerrimus*	FAC	5	No	No
SETR	*Senecio triangularis*	OBL	7	No	No
SPAN2	*Sparganium angustifolium*	OBL	7	Yes	No
SPMI	*Sparganium minimum*	OBL	8	Yes	No
SPRO	*Spiranthes romanzoffiana*	FACW	7	Yes	No
STLO2	*Stellaria longipes*	FACW	8	No	No
SUAQ	*Subularia aquatica*	OBL	NA	Yes	No
SWPE	*Swertia perennis*	FACW	8	Yes	No
TAOF	*Taraxacum officinale*	FACU+	0	No	Yes
THAL	*Thalictrum alpinum*	FACW	8	No	No
TRHY	*Trifolium hybridum*	FACU	0	No	Yes
TRPA28	*Triglochin palustris*	OBL	7	Yes	No
UTMA	*Utricularia macrorhiza*	OBL	7	Yes	No
UTMI	*Utricularia minor*	OBL	9	Yes	No
VAOC2	*Valeriana occidentalis*	FAC-	7	No	No
VEAM2	*Veronica americana*	OBL	6	No	No
VESEH3	*Veronica serpyllifolium*	FACW	6	No	No
VILA10	*Viola labradorica*	NA	9	No	No
VIMA2	*Viola macloskeyi*	FACW		No	No
	FERNS AND FERN-ALLIES				
EQAR	*Equisetum arvense*	FAC+	4	No	No
	BRYOPHYTES				
AULAC2	*Aulacomnium*	FACW**	8	Yes	No
AUPA70	*Aulacomnium palustre*	FACW**	7	Yes	No
BRNE4	*Brachythecium nelsonii*	FACW**	8	Yes	No
BRYUM2	*Bryum*	FACU**	1	Yes	No
CLDE70	*Climacium dendroides*	FAC**	5	Yes	No
DIPO70	*Dicranum polysetum*	FACW**	9	Yes	No
DREPA3	*Drepanocladus*	OBL**	8	Yes	No
DRAD2	*Drepanocladus aduncus*	OBL**	7	Yes	No
DRLO?	*Drepanocladus longifolius*	OBL**	9	Yes	No
HEBL2	*Helodium blandowii*	FACW**	5	Yes	No
MAPO16	*Marchantia polymorpha*	FACW**	3	Yes	No
PHFO6	*Philonotis fontana*	FACW**	6	Yes	No

Code	Name	Wetland Status	FQA C-value	Peat-forming	Disturb. Indic.
PLSC70	*Pleurozium schreberi*	FACW**	7	Yes	No
PTPA70	*Ptychostomum pallescens*	FACW**	7	Yes	No
SCCO16	*Scorpidium cossonii*	OBL**	8	Yes	No
SPHAG2	*Sphagnum*	OBL**	9	Yes	No
SPAN11	*Sphagnum angustifolium*	OBL**	10	Yes	No
SPFI4	*Sphagnum fimbriatum*	OBL**	8	Yes	No
SPRU6	*Sphagnum russowii*	OBL**	7	Yes	No
SPSQ70	*Sphagnum squarrosum*	OBL**	8	Yes	No

Code	Name	Wetland Status	FQA C-value	Peat-forming	Disturb. Indic.
SPTE71	*Sphagnum teres*	OBL**	9	Yes	No
SPWA70	*Sphagnum warnstorfia*	OBL**	8	Yes	No
TOMEN	*Tomenthypnum*	FACW**	6	Yes	No
TONI70	*Tomentypnum nitens*	FACW**	6	Yes	No
WAFL2	*Warnstorfia fluitans*	OBL**	8	Yes	No

2. Conversion of Categorical Factors to Scalars

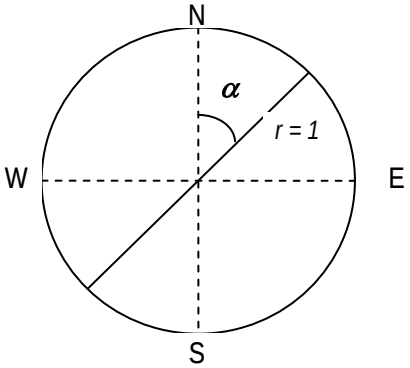
a. Beaver Activity

Value	BEAVX
No Beaver Activity	0
Beaver Present	1
Beaver Dominant	2

b. Fen Type

Value	FENTYPEX
Basin	1
Small Depression	2
Slope	3
Toeslope	4
Valley Slope	5
Other	6

c. Aspect Coordinates



$$\boldsymbol{ASPX} = sin\ \alpha \times 10$$
$$\boldsymbol{ASPY} = cos\ \alpha \times 10$$

d. Bare Soil Categories

Value	BAREX
<1%	0.5
1-2%	1.5
2-5	3.5
5-10%	7.5
>10%	15

e. Sediment Categories

Value	SEDX
0%	0.0
0-2%	1.0
2-5%	3.5
5-15%	10.0
>15%	20.0

f. Elevation

$$ELEVX = \frac{Elev - 6000}{100}$$

g. UTM Coordinates (NAD83, Zone 13)

$$UTMX = \frac{CentroidUTMX - 150{,}000}{1{,}000}$$

$$UTMY = \frac{CentroidUTMX - 4 \times 10^6}{1{,}000}$$

h. Weighted Disturbance Intensities

$$TEXI = \frac{1}{10}\sum_{i=1}^{n} IW_i \times EX_i$$

Where IW_i = Intensity for disturbance ***i*** in the wetland, EX_i = Extent for disturbance ***i*** in the wetland, and ***n*** = number of disturbances.

$$TEXIB = \frac{1}{10}\sum_{i=1}^{n} IB_i \times EXB_i$$

Where IB_i = Intensity for disturbance ***i*** in the buffer, EXB_i = Extent for disturbance ***i*** in the buffer, and ***n*** = number of disturbances.

Recorded Extent	Value (*IW* or *IB*)
<10%	5.0
10-25%	17.5
25-50%	37.5
50-75%	62.5
75-100%	87.5

i. Fetter Flow Diagrams

Fetter Diagram	GWX
A	1
B	2
C	3
D	4
E	5
F	6

j. Hydrologic Alteration

Value	HALTERX
None	0
Low	1
Moderate	2
High	3

k. Gully Frequency

Value	GULLYFX
None	0
Low	1
Moderate	2
High	3

l. Open Water, Water Development, Floating Mat, Channels

Value	Statistic
No	1
Yes	2

m. Nature of Pit Bottom

Value	BOTTOMX
Peat >= 40cm	1
Rock < 40cm	2
Min Soil < 40cm	3

n. Tile Probe Measurements of Peat Depth

$$PROBEX = \frac{1}{n}\sum_{i=1}^{n} D_i$$

$$PROBEMX = max\ (D_1, D_2, \ldots, D_n),$$

Where n = number of tile probe samples,
And D_i = depth at point i.

o. Calculation of Species Richness Index (TLX)

$$TLX = \frac{TLC}{NS}$$

Where *TLC* = Total Live Vascular Plant Cover,
And *NS* = Number of Vascular Species.

p. Calculation of Date Scalar (DATX)

$$DATX = D_m - 39{,}000$$

Where D_m = Microsoft date integer
(for example, 40003 = July 9, 2009)
39,000 was chosen because all
dates in this inventory are after that (10/10/2006)

Appendix G. Ecological Associations

2. Species and Physical Attributes

Cluster	Polygon	Association	Cover	NS	ELEV	ASPX	ASPY	SLOPE	pH	EC
A1		CAUT		5	8,287–9,384–9,900	0.1–6.5–20.0	0.3–9.0–11.6	0–0.3–1	5.20–5.62–6.10	24–68.0–160
	NPJS01	CAUT	100		8,287	12.4	0.3	0.5	6.10	45
	WFG747	CAUT	30		9,496	0.1	11.6	0.0	5.60	24
	WFS148	CAUT	97		9,900	0.1	11.6	0.0	5.20	37
	WFS150	CAUT	100		9,877	0.1	11.6	0.0	5.50	73
	WFW078	CAUT	100		9,358	20.0	10.0	1.0	5.70	160
A2		CAUT-FORBS		2	8,876–9,160–9,443	2.1–6.0–10.0	3.8–6.9–10.0	0–0.0–0	5.80–5.85–5.90	210–245.0–280
	WFS322	CAUT-DECE-GATR2	100-30-30		9,443	10.0	10.0	0.0	5.90	210
	WFW354	CAUT-CACA4-BRY	97-20-20		8,876	2.1	3.8	0.0	5.80	280
A3		CAAQ		3	11,053–11,238–11,373	0.1–9.8–19.4	0.0–6.1–11.6	0–2.5–5	5.40–5.63–5.90	30–56.7–80
	WFC012	CAAQ	97		11,373	0.1	11.6	0.0	5.40	30
	WFS222	CAAQ-PSLE-BRY	97-97-26		11,289	10.0	0.0	2.5	5.60	60
	WFS223	CAAQ	100		11,053	19.4	6.6	5.0	5.90	80
A4		CAUT-CAAQ		10	9,913–10,281–11,058	0.0–9.5–19.1	0.2–7.3–20.0	0–1.5–4	4.80–5.47–6.20	30–143.6–652
	FGM005	CAUT-CAAQ	90-60		10,163	0.0	10.0	2.0	4.90	30
	WFG053	CAAQ-CAUT	50-20		10,610	10.0	10.0	0.0	4.80	90
	WFG149	CAUT-CAAQ	97-90		10,158	10.0	20.0	0.0	5.70	40
	WFG260	CAUT-CAAQ	97-80		9,943	3.6	2.3	3.0	5.80	100
	WFG262	CAUT-CAAQ-CACA4	97-60-30		9,913	19.1	5.8	3.0	6.10	120
	WFG263	CAUT-CAAQ	90-70		10,049	11.7	0.2	2.0	6.00	0
	WFG542	CAUT-CAAQ	97-90		10,206	3.6	2.3	1.0	6.20	130
	WFG632	CAUT-CACA4-CAAQ-PSLE	97-90-50-20		10,513	10.0	10.0	0.0	5.10	90
	WFS135	CAUT-CACA4-CAAQ	90-90-60		10,194	16.7	2.6	4.0	4.90	652
	WFS496	CAUT	100		11,058	10.0	10.0	0.0	5.20	40
A5		CAUT-CAAQ-CAVE6		1	10,824	3.6	17.7	1	6.00	80
	WFT014	CAUT-CAVE6-CAAQ	80-70-50		10,824	3.6	17.7	1.0	6.00	80
A6		CAUT-CAAQ-ELAC		1	9,752	1.3	15.0	1	5.60	100
	FGM002	CACA4-CAUT-CAAQ	90-70-40		9,752	1.3	15.0	1.0	5.60	100
A7		CAPE42-CAAQ		2	9,487–10,615–11,743	0.1–6.8–13.4	5.0–15.5–19.4	0–2.5–5	5.80–5.90–6.00	51–105.6–160
	FMU103	CAPE42-CAAQ	80-20		9,487	0.1	11.6	0.0	5.80	51
	WFS527	CAPE42-CAAQ	100-20		11,743	13.4	19.4	5.0	6.00	160
A8		CAAQ-CAPH2		1	10,156	16.7	2.6	2	5.70	95
	WFS134	CAAQ-CAPH2	97-97		10,156	16.7	2.6	2.0	5.70	95
A9		CAAQ-CAPR22		1	11,014	10.0	20.0	2	6.50	230
	WFS217	CAAQ-CAPR22	100-20		11,014	10.0	20.0	2.0	6.50	230
B1		CAUT-BRY		4	7,927–10,029–12,031	0.1–6.8–15.7	5.0–13.7–18.2	0–2.0–8	5.10–5.55–5.90	20–77.5–120
	WFG003	CAUT-BRY	100-87		10,164	10.0	10.0	0.0	5.10	20
	WFG046	CAUT-COPA28-BRY-PSLE	80-70-22-20		9,994	0.1	11.6	0.0	5.40	90
	WFS376	CAUT-BRY	97-61		12,031	1.3	15.0	8.0	5.90	80
	WFW109	CAUT-BRY	100-87		7,927	15.7	18.2	0.0	5.80	120
B2		CAAQ-CAUT-BRY-FORBS		4	10,297–10,930–11,853	3.6–12.1–19.5	0.6–11.6–17.7	1–2.5–4	5.30–5.60–5.90	30–202.5–620
	FES006	CAUT-PSLE-BRY-EPHO	97-90-90-20		11,853	3.6	17.7	3.0	5.90	80
	WFG611	CAAQ-BRY-CAUT	100-60-20		10,487	6.6	0.6	1.0	5.60	80
	WFG614	BRY-CAAQ-PSLE-OXFE-PEGR2	90-80-80-40-20		10,297	18.7	15.0	2.0	5.60	620
	WFS363	JUNCU-CAUT-BRY-CAAN23	80-80-30-20		11,081	19.5	13.1	4.0	5.30	30
B4		CAAQ-BRY		4	10,482–11,539–11,991	0.0–11.1–19.5	1.3–8.6–13.1	0–2.8–8	4.10–5.42–7.00	30–122.5–260
	WFC078	CAAQ-BRY	97-46		11,928	15.0	1.3	1.0	7.00	260
	WFG440	CAAQ-BRY	97-40		10,482	10.0	10.0	0.0	5.20	30
	WFS234	CAAQ-BRY	97-84		11,755	0.0	10.0	8.0	4.10	130
	WFT420	CAAQ-BRY	90-83		11,991	19.5	13.1	2.0	5.40	70

Cluster	Polygon	Association	Cover	NS	ELEV	ASPX	ASPY	SLOPE	pH	EC
B5		CAAQ-BRY-DECE-PSLE		2	10,480–10,988–11,496	5.0–11.1–11.6	0.1–10.1–20.0	2–7.5–13	5.90–6.00–6.10	24–46.8–70
	FSA204	BRY-CAAQ-PSLE-VIMA2-DECE	89-80-70-50-30		10,480	11.6	0.1	13.0	6.10	24
	WFL092	CAAQ-PSLE-BRY-DECE	97-60-44-20		11,496	10.5	20.0	2.0	5.90	70
C1		CAJO-FORBS		1	10,033	19.1	5.8	15	5.50	470
	FWE102	CAJO-PSLE-SETR-OXFE-LITE2	100-60-30-30-20		10,033	19.1	5.8	15.0	5.50	470
C2		CAJO-CAAQ-CAUT-BRY		2	10,183–10,187–10,190	5.0–13.6–19.8	0.3–4.3–8.3	2–2.0–2	4.80–5.30–5.80	80–95.0–110
	WFG554	CAAQ-PSLE-DECE-CAJO-PEGR2	70-70-60-60-40		10,190	19.8	8.3	2.0	5.80	110
	WFS303	DECE-CAUT-CAAQ-CAJO	97-40-40-20		10,183	7.4	0.3	2.0	4.80	80
C3		CAJO-CAAQ-CACA4-BRY		1	10,548	0.1	11.6	0	5.60	70
	WFW218	BRY-CACA4-PEGR2-PSLE-LITE2	71-70-60-60-40		10,548	0.1	11.6	0.0	5.60	70
D1		CABU6-CAUT		1	9,810	0.2	12.1	0	5.70	70
	JSA009	CAUT	100		9,810	0.2	12.1	0.0	5.70	70
D2		CABU6-CAUT-CAAQ		1	10,231	10.0	10.0	0	5.20	50
	WFG412	CAAQ-CAUT	90-90		10,231	10.0	10.0	0.0	5.20	50
E1		CASI2-CAAQ		2	10,803–10,837–10,871	5.0–18.2–19.3	5.0–11.7–17.1	1–1.5–2	5.10–5.25–5.40	30–40.0–50
	WFS005	CAAQ-CASI2	97-80		10,871	17.1	17.1	1.0	5.10	30
	WFS021	CAAQ-CASI2-BRY	100-97-50		10,803	19.3	6.3	2.0	5.40	50
E2		CASI2-CAAQ-BRY-FORBS		2	10,404–10,440–10,475	5.0–16.6–19.8	0.6–4.5–8.3	1–2.0–3	5.80–5.95–6.10	90–95.0–100
	WFG550	CAAQ-PSLE-BRY-PEGR2-CASI2	97-80-60-40-20		10,475	13.4	0.6	1.0	6.10	90
	WFG555	CAAQ-CASI2-PSLE-BRY-PEGR2	90-70-70-30-20		10,404	19.8	8.3	3.0	5.80	100
E3		CASI2-CAAQ-CAUT		2	9,352–9,728–10,103	1.4–4.0–6.6	0.6–2.7–4.8	1–1.8–3	6.20–6.25–6.30	80–92.5–105
	WFG043	CAAQ-CASI2-PSLE-CAUT-COPA28	100-97-70-20-20		10,103	6.6	0.6	1.0	6.20	80
	WFT761	BRY-CASI2-CAAQ-CAUT	94-70-70-20		9,352	1.4	4.8	2.5	6.30	105
E4		CASI2-CAAQ-CAUT-ELAC		2	10,012–10,265–10,518	5.0–14.9–19.9	5.0–9.2–10.0	0–0.0–0	5.40–5.60–5.80	80–80.0–80
	WFG045	CASI2-BRY-CAAQ-CAUT-ELEOC	97-96-90-80-70		10,012	19.9	8.4	0.0	5.40	0
	WFG552	CAAQ-ELAC-PSLE-CASI2-BRY	97-50-40-30-30		10,518	10.0	10.0	0.0	5.80	80
F1		CASC12		1	10,750	10.0	10.0	0	5.20	50
	WFG528	CASC12	100		10,750	10.0	10.0	0.0	5.20	50
F2		CASC12-ELQU2		1	11,260	1.8	4.3	12	5.10	30
	FSA008	ELQU2-CASC12	97-20		11,260	1.8	4.3	12.0	5.10	30
F3		CASC12-ELQU2-CAAQ-FORBS		1	11,480	8.1	0.2	5	5.10	50
	WFC240	ELQU2-CASC12-CAAQ-BRY-PSLE	90-80-60-44-40		11,480	8.1	0.2	5.0	5.10	50
F4		CASC12-CAUT-CANI2-FORBS		1	11,225	10.0	0.0	2	4.40	50
	WFS220	BRY-PSLE-ERPE3-PHCO9-CASC12	69-50-40-30-30		11,225	10.0	0.0	2.0	4.40	50
F5		CASC12-CADIG-BRY-FORBS		1	11,917	17.7	3.6	2	5.50	50
	WFS331	BRY-CADIG-CASC-PSLE	98-90-70-30		11,917	17.7	3.6	2.0	5.50	50
F6		CASC12-DECE-CACA4-FORBS		1	11,835	6.1	19.2	4	6.30	30
	WFT598	CASC12-BRY-AGSC5-PEGR2-CLRH2	90-44-40-30-30		11,835	6.1	19.2	4.0	6.30	30
G1		ELMA5-CAAQ		2	10,066–10,353–10,640	0.1–2.0–4.0	2.0–6.8–11.6	0–0.5–1	4.70–6.15–7.60	20–55.0–90
	FGM001	CAAQ-CAUT-ELMA5-LEMI3	80-40-40-40		10,066	4.0	2.0	1.0	7.60	90
	WFW262	ELMA5-CAAQ	97-30		10,640	0.1	11.6	0.0	4.70	20
G2		ELQU2-CASA10-DECE-BRY		1	11,258	10.0	10.0	1	5.20	50
	WFT217	ELQU2-BRY-DECE-CASA10	97-77-20-20		11,258	10.0	10.0	1.0	5.20	50
G3		ELQU2-CAPH2-CANI2		1	11,180	0.1	11.6	0	5.30	50
	WFW417	ELQU2-CAPH2-CANI2-PEGR2-PSLE	60-40-20-20-20		11,180	0.1	11.6	0.0	5.30	50
G4		ELQU2-CAAQ-BRY		3	11,180–11,492–11,760	2.3–8.4–12.1	0.0–12.1–19.8	1–3.0–7	5.00–5.20–5.50	20–36.7–50
	WFC229	ELQU2-CAAQ-BRY	90-80-21		11,536	12.1	19.8	1.0	5.50	40
	WFC236	ELQU2-BRY-CAAQ	97-79-60		11,760	10.7	0.0	1.0	5.00	20
	WFT218	ELQU2-BRY-CAAQ	90-52-30		11,180	2.3	16.4	7.0	5.10	50
G5		ELMA5-BRY-FORBS		1	11,609	9.5	20.0	6	6.80	40
	JSA010	ELMA5-BRY-PSLE-DECE-CLRH2	97-90-40-30-20		11,609	9.5	20.0	6.0	6.80	40
G6		ELMA5		1	9,964	10.0	20.0		5.40	50
	WFG164	ELMA5	70		9,964	10.0	20.0	0.0	5.40	50
G7		ELMS5-CAAQ-BRY-FORBS		1	10,552	19.4	6.6	2	5.20	20

Cluster	Polygon	Association	Cover	NS	ELEV	ASPX	ASPY	SLOPE	pH	EC
	WFG011	ELMA5-BRY-PSLE-CLRH2-CAAQ	100-80-60-50-40		10,552	19.4	6.6	2.0	5.20	20
G8		ELMA5-CASA10-CACA12-BRY		1	11,728	8.1	19.8	5	8.00	60
	JSA012	ELMA5-BRY-CACA12-CASC12-ASTER	97-65-60-40-40		11,728	8.1	19.8	5.0	8.00	60
H1		ELAC-CAAQ-CACA4-BRY		3	10,098–10,232–10,314	5.0–13.6–17.7	0.6–2.2–3.6	1–2.0–3	5.00–5.57–6.00	40–93.3–140
	WFG044	ELAC-CACA4-BRY-COPA28-CAAQ	80-70-60-30-20		10,098	16.4	2.3	1.0	5.00	40
	WFG087	ELAC-BRY-CAREX-PSLE-CACA4	97-80-40-30-20		10,285	6.6	0.6	3.0	5.70	100
	WFG561	ELAC-BRY-CAREX-PEGR2	97-93-40-20		10,314	17.7	3.6	0.0	6.00	140
H2		ELAC-CACA12-BRY		1	10,486	19.4	6.6	2	6.00	120
	WFG551	ELAC-BRY-CACA12	97-80-40		10,486	19.4	6.6	2.0	6.00	120
I1		CACA11-CAIL-CAAQ-BRY-PEGR2		2	11,345–11,402–11,459	5.0–12.5–13.3	0.5–10.2–19.8	2–3.5–5	5.10–5.40–5.70	30–45.0–60
	FMS104	BRY-PEGR2-PSLE-CAAQ-CAIL	93-80-80-70-70		11,345	11.7	19.8	2.0	5.70	60
	WFT122	CACA11-CAAQ-CAIL-BRY-PEGR2	70-60-50-47-40		11,459	13.3	0.5	5.0	5.10	30
I2		CACA11-CASA10-CAJO-CASI2		1	10,480	10.0	10.0	0	5.00	7
	WFG091	CASA10-CACA11-BRY-PEGR2-CAJO	80-70-62-40-30		10,480	10.0	10.0	0.0	5.00	7
I3		CACA11-CAAQ-LUSU9-BRY		1	11,452	5.0	18.7	6	5.10	140
	WFS237	CAAQ-LUSU9	97-20		11,452	5.0	18.7	6.0	5.10	140
I4		CACA11-CAAQ-CASA10-DECE-BRY		2	10,789–11,391–11,993	1.7–2.6–3.6	4.4–11.1–17.7	1–1.5–2	5.00–5.10–5.20	50–55.0–60
	WFS448	CACA11-PEGR2-CAAQ-AGSC5-BRY	80-80-70-60-60		11,993	3.6	17.7	2.0	5.00	60
	WFT019	CAAQ-CASA10-CACA11-VIOLA-BRY	90-60-40-40-23		10,789	1.7	4.4	1.0	5.20	50
I5		CACA11-BRY-FORBS		1	10,515	17.1	2.9	4	5.30	370
	FMS105	CACA11-JUME3-DECE-EPHO	80-40-30-20		10,515	17.1	2.9	4.0	5.30	370
I6		CACA11-CAAQ-CACA13		1	10,033	0.1	11.6	0	6.80	35
	FWE101	CAAQ-CACA11-CAEX5-VIOLA	80-60-40-40		10,033	0.1	11.6	0.0	6.80	35
I7		CACA11-CAUT-BRY		1	10,525	15.0	18.7	1	5.00	50
	WFG099	CAUT-BRY-CACA11	90-26-20		10,525	15.0	18.7	1.0	5.00	50
I8		CACA11-CAUT-CAAQ		1	10,511	9.8	0.0	2	4.60	20
	WFT706	CACA11-CAUT-CAAQ	90-70-40		10,511	9.8	0.0	2.0	4.60	20
J1		CALI7-CAA1-COPA28-BRY		1	10,155	0.1	11.6	0	4.90	30
	WFG041	CALI7-CAAQ	70-60		10,155	0.1	11.6	0.0	4.90	30
J2		CASI2-CALI7-CAAQ-BRY		1	10,120	10.0	10.0	0	5.70	100
	WFG042	CASI2-BRY-CAAQ-COPA28	100-100-40-30		10,120	10.0	10.0	0.0	5.70	100
J3		CALI7-CASA10-CAPH2-ELAC-BRY		1	11,159	1.3	15.0	1	5.40	40
	WFS386	ELAC-BRY-PSLE-CALI7-PEGR2	97-80-70-60-50		11,159	1.3	15.0	1.0	5.40	40
K1		SAPL2-CAAQ-BRY		5	10,648–10,978–11,360	0.6–8.3–14.7	1.2–11.1–20.0	1–3.0–10	4.80–5.60–6.70	20–42.0–70
	FSA004	CAAQ-BRY	97-26		10,668	0.6	13.4	1.0	4.80	50
	WFC122	CACA4-CAAQ-BRY	97-80-59		10,648	11.9	19.8	1.0	6.30	70
	WFS436	CAAQ-SAPL2-CACA4-BRY	100-70-60-27		11,148	9.1	20.0	2.0	5.40	50
	WFT600	CAAQ-BRY-PSLE-SAPL2	90-57-30-20		11,068	5.0	1.3	1.0	4.80	20
	WFT614	CAAQ-BRY-SAPL2	97-83-60		11,360	14.7	1.2	10.0	6.70	20
K2		SAPL2-SAWO-CAAQ-BRY		1	9,683	12.9	0.4	6	5.80	60
	FSA001	BRY-SAPL2-CAAQ-SAWO-PEPA3	98-80-80-40-30		9,683	12.9	0.4	6.0	5.80	60
K3		SAPL2-SAWO-CAAQ-CAUT-BRY		5	9,726–10,246–11,233	0.0–1.1–3.2	3.8–10.5–17.3	0–4.3–10	5.30–5.94–7.10	50–162.0–260
	FSA002	CAAQ-BRY-SAWO-SAPL2-CAUT	97-83-80-40-20		9,802	0.0	9.7	8.0	5.30	50
	FSA003	BRY-CAAQ-SAWO-SAPL2-THAL	99-97-80-70-60		9,726	2.1	3.8	0.5	5.50	50
	JSA007	SAPL2-BRY-CAAQ-CAUT	97-89-40-30		9,839	0.3	12.4	0.0	5.80	200
	WFT923	BRY-CAAQ-CAUT-SAPL2-DECE	99-90-70-40-40		11,233	3.2	17.3	3.0	6.00	260
	WFW490	SAPL2-CAAQ-BRY-CAUT-PSLE	97-90-50-30-30		10,631	0.0	9.1	10.0	7.10	250
K4		SAPL2-CAAQ-CAUT-BRY		1	10,476	10.0	20.0	3	6.20	130
	FGM003	CAAQ-BRY-SAPL2-CAUT	100-40-30-20		10,476	10.0	20.0	3.0	6.20	130
K5		SAPL2-CAUT-BRY-FORBS		1	11,081	19.8	11.7	11	6.60	570
	WFS204	CAUT-BRY-SETR-CACO6-SAPL2	90-84-70-60-30		11,081	19.8	11.7	11.0	6.60	570
K6		SAPL2-CAUT-DECE		1	10,975	1.3	15.0	1	4.90	30
	WFS420	DECE-CAUT-SAPL2	100-70-40		10,975	1.3	15.0	1.0	4.90	30
K7		SAPL2-CAAQ-CAUT		4	9,915–10,259–10,679	3.6–11.2–17.7	0.6–7.3–16.4	0–1.8–3	5.00–5.88–6.40	30–180.5–390

Cluster	Polygon	Association	Cover	NS	ELEV	ASPX	ASPY	SLOPE	pH	EC
	FGM006	CAUT-CAAQ-SAPL2-POTEN	90-90-80-80		10,165	10.0	10.0	0.0	5.00	30
	WFG564	CACA4-CAAQ-PSLE-SAPL2-CAUT	90-70-40-30-20		10,278	17.7	16.4	2.0	6.30	230
	WFS039	CAUT-CAAQ-SAPL2	97-80-20		10,679	13.4	0.6	2.0	6.40	390
	WFW377	CAUT-CAAQ-SAPL2	60-20-20		9,915	3.6	2.3	3.0	5.80	72
L1		SAGE2-SAPL2-SAWO-CACA11-CAAQ		1	9,644	16.9	17.2	12	5.60	70
	WFT694	CAVE6-BRY-CACA11-CAAQ-SAGE2	90-84-80-60-60		9,644	16.9	17.2	12.0	5.60	70
L2		SAGE2-CAVE6-CAAQ		1	10,190	0.1	11.6	0	5.40	110
	WFW225	CAVE6-SAGE2-LITE2-CAAQ-PSLE	97-60-50-40-40		10,190	0.1	11.6	0.0	5.40	110
M1		SAMO2-CAUT		1	8,984	10.0	10.0	0	5.90	240
	WFS345	CAUT-SAMO2	100-20		8,984	10.0	10.0	0.0	5.90	240
M2		SAMO2-CASC12-CAUT-BRY		1	10,200	8.3	19.8	1	6.40	355
	WFS132	CASC12-SAMO2-BRY-CAUT	100-30-24-20		10,200	8.3	19.8	1.0	6.40	355
M3		SAMO2-CAUT-CAAQ		1	8,959	16.4	17.7	1	6.20	340
	WFS344	CAUT-CAAQ-BRY	100-90-22		8,959	16.4	17.7	1.0	6.20	340
O1		VACE-CANI2-CAEL3-CAAQ		1	11,626	5.0	18.7	9	4.00	40
	WFS236	VACE-CANI2-CAAQ-CAEL3-BRY	90-90-80-70-42		11,626	5.0	18.7	9.0	4.00	40
P1		SAPL2-ELQU2-DECE-SPLE-BRY		2	10,890–10,946–11,002	5.0–10.1–11.4	0.1–10.0–19.9	4–4.8–6	5.60–5.80–6.00	39–39.3–40
	WFC138	CAAQ-ELQU2-BRY-PSLE-SAPL2	80-80-38-30-20		10,890	11.4	0.1	3.5	6.00	39
P1	WFT094	ELQU2-CAAQ-BRY-PSLE	97-60-47-20		11,002	8.8	19.9	6.0	5.60	40
		SAPL2-CACA11-ELQU2-CAAQ-BRY		1	11,192	2.5	16.6	9	5.60	40
	WFT093	BRY-ELQU2-CACA11-CAAQ-SAPL2	91-90-70-60-30		11,192	2.5	16.6	9.0	5.60	40
P3		SAPL2-CACA11-ELQU2-CAVE6-DECE		1	11,066	1.2	5.3	4	5.60	20
	WFT924	BRY-ELQU2-PSLE-CACA11-SAPL2	95-80-70-50-30		11,066	1.2	5.3	4.0	5.60	20
P4		SAPL2-CACA11-CAAQ-BRY-FORBS		2	10,345–11,154–11,962	1.6–3.2–4.8	1.4–3.0–4.6	1–2.0–3	5.40–5.65–5.90	80–90.0–100
	WFT235	CAAQ-BRY-SAPL2-CACA11-JUNCU	90-87-70-30-30		10,345	4.8	1.4	1.0	5.40	80
	WFT422	CAAQ-CACA11-BRY-SAPL2-POHU	90-80-79-60-20		11,962	1.6	4.6	3.0	5.90	100
P5		SAPL2-CACA11-CAAQ-CASC12		1	12,007	3.7	17.8	0	5.00	40
	WFT717	CACA11-CAAQ-CASC12-PEGR2-CLRH2	70-70-50-50-50		12,007	3.7	17.8	0.0	5.00	40
Q1		SAPL2-CAVE6-CAAQ-BRY		1	10,637	10.3	0.0	5	5.30	50
	WFT634	BRY-SAPL2-CAVE6-CAAQ-PEGR2	99-90-90-40-30		10,637	10.3	0.0	5.0	5.30	50
Q2		SAPL2-SAWO-CAAQ-CAVE6-BRY		1	10,030	0.0	10.9	2	5.60	90
	WFT627	SAPL2-CAVE6-CAAQ-PSLE-PESA5	97-90-70-70-70		10,030	0.0	10.9	2.0	5.60	90
R1		BEGL-SAPL2-CAAQ-CAUT-BRY		2	9,837–10,307–10,776	0.1–1.0–1.8	5.0–12.1–15.7	1–1.8–3	5.50–5.55–5.60	21–75.4–130
	JSA008	BRY-CAAQ-SAPL2-BEFO2-CAUT	97-70-60-50-30		9,837	0.1	8.6	1.0	5.50	130
	WFT310	CAAQ-SAPL2-BRY-BEGL-DECE	90-80-80-40-30		10,776	1.8	15.7	2.5	5.60	21
R2		BEGL-DAFL3-SAPL2-CAAQ-CADIG		2	9,368–9,700–10,031	0.3–8.8–17.3	5.0–14.6–16.8	1–1.0–1	5.60–5.70–5.80	80–85.0–90
	FSA010	BRY-CACA11-DAFL3-DECE-BEGL	89-80-50-40-30		10,031	17.3	16.8	1.0	5.60	90
	WFT721	CAAQ-CADIG-BRY-THAL-BEGL	97-80-66-50-40		9,368	0.3	12.4	1.0	5.80	80
R3		BEGL-SAPL2-SAWO-DAFL3-CAVE6		1	9,576	12.8	0.4	4	5.90	130
	FSA005	BRY-CAVE6-BEGL-SAWO-DAFL3	91-80-50-50-40		9,576	12.8	0.4	4.0	5.90	130
R4		BEGL-SAPL2-SAWO-DAFL3-CAAQ		1	10,384	19.6	7.1	2	6.00	140
	WFT909	BRY-SAPL2-BEGL-CAAQ-SAWO	98-90-80-70-50		10,384	19.6	7.1	2.0	6.00	140
S1		SAPL2-CAIL-CAAQ-BRY		3	11,058–11,437–11,768	4.6–8.2–13.3	0.5–6.5–18.4	2–2.7–3	5.60–5.80–6.00	50–60.0–70
	WFS387	CAAQ-BRY-SAPL2-EPHO-CAIL	90-87-80-60-30		11,058	6.7	0.5	2.0	6.00	70
	WFT362	BRY-CAAQ-CAIL-SAPL2-DECE	94-90-90-60-40		11,768	13.3	0.5	3.0	5.60	60
	WFT532	BRY-CAIL-SAPL2-THAL-PEGR2	98-97-80-20-20		11,484	4.6	18.4	3.0	5.80	50
S2		SAPL2-SAWO-CAIL-CAAQ-CAUT		1	9,810	0.0	10.2	2	6.30	51
	FSA201	CAAQ-CAIL-SAPL2-CAUT-SAWO	97-40-30-30-20		9,810	0.0	10.2	1.5	6.30	51
T1		SAPL2-CAAQ-ELAC		1	10,592	12.4	19.7	4	5.50	90
	WFW444	CAAQ-SAPL2-ELAC-AGSC5-BRY	90-70-40-40-28		10,592	12.4	19.7	4.0	5.50	90
T2		SAPL2-CAAQ-CALE8-ELQU2-BRY		1	11,034	19.1	5.8	2	5.80	67
	WFW447	CAAQ-CALE8-BRY-ELQU2-CASA10	50-50-38-30-20		11,034	19.1	5.8	2.0	5.80	67
T3		DAFL3-SAWO-CABU6-CAUT-CALA11		1	9,814	13.6	0.7	1	5.70	70
	WFT453	CAUT-PEAM8-CABU6-BRY-DAFL3	97-80-40-34-20		9,814	13.6	0.7	1.0	5.70	70

Clus-ter	Polygon	Association	Cover	NS	ELEV	ASPX	ASPY	SLOPE	pH	EC
T4		SAPL2-SAWO-SABE2-CAAQ-CACA12		1	10,228	2.8	3.1	1	6.40	260
	WFC193	BRY-CAAQ-SAPL2-PSLE-BIBI5	100-90-80-30-30		10,228	2.8	3.1	1.0	6.40	260
T5		SAPL2-CAAQ-CANO3-BRY		1	11,969	10.0	20.0	6	5.80	140
	WFS375	BRY-CAAQ-PSLE-POLE2-PEGR2	91-90-60-40-40		11,969	10.0	20.0	6.0	5.80	140
T6		SAPL2-CAAQ-CAIN11		1	11,734	13.4	19.4	13	4.90	40
	WFL081	CAAQ-AGSC5-CAIN11-PSLE-BRY	60-60-50-50-22		11,734	13.4	19.4	13.0	4.90	40
T7		SAPL2-CAAQ-CALA11		1	10,800	3.8	2.1	1	5.00	60
	WFT467	CAAQ-CALA11-BRY-GEMA4	80-80-28-20		10,800	3.8	2.1	1.0	5.00	60
T8		SAPL2-CAJO-CAAQ-CAUT		1	10,210	13.4	19.4	3	5.60	100
	WFS302	CAJO-CAAQ-PSLE-SAPL2-CAUT	80-70-60-40-20		10,210	13.4	19.4	3.0	5.60	100
T9		SAPL2-SAWO-DAFL3-CAVE6-CAREX		1	10,412	10.2	20.0	11	6.00	100
	WFT391	BRY-CAVE6-POCA2-THAL-SAPL2	100-97-80-70-40		10,412	10.2	20.0	11.0	6.00	100
U1		SAPL2-CASC12-BRY		1	10,537	0.4	7.2	10	7.10	440
	FSA006	BRY-SABR-CASC12-PEGR2-THAL	99-97-90-50-50		10,537	0.4	7.2	10.0	7.10	440
U2		SAPL2-CAAQ-CASC12-BRY-FORBS		1	11,260	15.0	1.3	2	6.50	230
	WFS525	SABR-PSLE-CACA4-BRY-SAPL2	90-90-80-76-40		11,260	15.0	1.3	2.0	6.50	230
U3		SAPL2-SABE2-CAAQ-CASI2-BRY		1	9,656	16.4	2.3	10	6.90	635
	WFS087	BRY-CAAQ-SABR-CASI2-CACA4	99-80-50-30-30		9,656	16.4	2.3	10.0	6.90	635
V1		SAPL2-CASI2-CAAQ		1	10,953	13.6	19.3	2	5.70	60
	WFS025	CAAQ-CASI2-BRY-SAPL2-PEGR2	97-97-21-20-20		10,953	13.6	19.3	2.0	5.70	60
V2		SAPL2-SAWO-CASI2-CAAQ-BRY		1	9,381	11.7	0.2	4	6.00	110
	WFT762	CAAQ-BRY-CASI2-THAL-SAWO	97-95-80-70-40		9,381	11.7	0.2	4.0	6.00	110
W1		SAPL2-CASC12-CAUT-FORBS		1	12,184	3.6	17.7	10	6.20	90
	WFS398	PSLE-CAUT-CASC-PEGR2-BRY	80-70-70-50-49		12,184	3.6	17.7	10.0	6.20	90
W2		SAWO-CASC12-FORBS		1	11,677	6.6	0.6	1	5.30	30
	WFT415	CASC12-PSLE-BRY-SAWO-BIVI2	90-50-43-40-20		11,677	6.6	0.6	1.0	5.30	30

Clus ter	Polygon	Association	FENTYPE	PROBEX	PEATDEP	VONPOST	TEXI	TEXIB	BRY	BARE
A1		CAUT	BA SD SD SD VS	40–46–60	40–78.0–150	2–4.4–6	0–14.0–30	0–10.1–30	0–.0–0	0–12.0–54
	NPJS01	CAUT	Basin	40	40	6	13	30	0	0.0
	WFG747	CAUT	Small Depression	40	80	5	30	0	0	0.0
	WFS148	CAUT	Small Depression	60	150	3	0	3	0	0.0
	WFS150	CAUT	Small Depression	50	60	6	0	2	0	6.2
	WFW078	CAUT	Valley Slope	40	60	2	28	16	0	54.0
A2		CAUT-FORBS	SL BA	45–98–150	40–42.5–45	4–5.5–7	1–5.8–11	1–8.8–17	18–18.9–20	0–0.0–0
	WFS322	CAUT-DECE-GATR2	Slope	45	45	7	11	1	18	0.0
	WFW354	CAUT-CACA4-BRY	Basin	150	40	4	1	17	20	0.0
A3		CAAQ	SD SD BA	35–42–50	70–91.7–120	4–4.7–5	2–6.8–11	0–6.8–20	1–.5–1	0–6.0–14
	WFC012	CAAQ	Small Depression	40	70	5	2	1	1	0.0
	WFS222	CAAQ-PSLE-BRY	Small Depression	50	85	4	8	0	1	4.1
	WFS223	CAAQ	Basin	35	120	5	11	20	1	14.0
A4		CAUT-CAAQ	BA SD TS TS TS SL TS SL SD SD	30–77–150	30–61.0–150	2–3.7–6	1–11.5–47	0–5.1–12	0–2.5–10	0–1.2–7
	FGM005	CAUT-CAAQ	Basin	150	40	2	3	7	3	0.0
	WFG053	CAAQ-CAUT	Small Depression	30	30	3	47	11	8	6.7
	WFG149	CAUT-CAAQ	Toeslope	40	40	4	11	12	0	0.0
	WFG260	CAUT-CAAQ	Toeslope	120	120	3	3	2	0	1.5
	WFG262	CAUT-CAAQ-CACA4	Toeslope	150	40	4	9	3	0	0.0
	WFG263	CAUT-CAAQ	Slope	60	60	5	7	2	10	3.5
	WFG542	CAUT-CAAQ	Toeslope	45	40	6	8	3	0	0.5
	WFG632	CAUT-CACA4-CAAQ-PSLE	Slope	50	50	4	19	1	0	0.0
	WFS135	CAUT-CACA4-CAAQ	Small Depression	85	150	4	9	11	0	0.0
	WFS496	CAUT	Small Depression	40	40	2	1	0	4	0.0

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A5		CAUT-CAAQ-CAVE6	SL	49	41	5	24	25	0	0
	WFT014	CAUT-CAVE6-CAAQ	Slope	49	41	5	24	25	0	0.0
A6		CAUT-CAAQ-ELAC	TS	150	40	5	16	11	0	2
	FGM002	CACA4-CAUT-CAAQ	Toeslope	150	40	5	16	11	0	1.5
A7		CAPE42-CAAQ	SD SL	40–40–40	40–75.0–110	4–4.0–4	6–27.0–48	0–11.4–23	0–3.0–6	0–1.0–2
	FMU103	CAPE42-CAAQ	Small Depression	40	110	4	6	0	0	0.0
	WFS527	CAPE42-CAAQ	Slope	40	40	4	48	23	6	2.0
A8		CAAQ-CAPH2	TS	40	150	5	11	4	14	1
	WFS134	CAAQ-CAPH2	Toeslope	40	150	5	11	4	14	0.6
A9		CAAQ-CAPR22	BA	45	150	3	23	11	1	8
	WFS217	CAAQ-CAPR22	Basin	45	150	3	23	11	1	8.0
B1		CAUT-BRY	SD BA VS VS	45–46–50	45–72.5–150	1–3.3–4	2–32.8–107	2–29.3–78	40–68.8–87	0–15.7–63
	WFG003	CAUT-BRY	Small Depression	50	50	4	13	17	87	0.0
	WFG046	CAUT-COPA28-BRY-PSLE	Basin	45	150	1	107	78	40	62.6
	WFS376	CAUT-BRY	Valley Slope	45	45	4	2	2	61	0.0
	WFW109	CAUT-BRY	Valley Slope	45	45	4	9	21	87	0.1
B2		CAAQ-CAUT-BRY-FORBS	TS SL TS VS	45–75–150	45–48.8–55	2–2.8–3	3–5.2–9	3–5.3–11	30–67.4–90	0–1.0–4
	FES006	CAUT-PSLE-BRY-EPHO	Toeslope	50	50	2	3	4	90	0.0
	WFG611	CAAQ-BRY-CAUT	Slope	55	55	3	4	3	60	0.0
	WFG614	BRY-CAAQ-PSLE-OXFE-PEGR2	Toeslope	45	45	3	9	11	90	0.5
	WFS363	JUNCU-CAUT-BRY-CAAN23	Valley Slope	150	45	3	5	4	30	3.5
B4		CAAQ-BRY	BA BA VS SL	40–83–150	40–88.0–135	3–3.8–5	0–5.6–12	1–2.6–5	40–63.0–84	0–0.9–2
	WFC078	CAAQ-BRY	Basin	50	135	3	4	1	46	0.0
	WFG440	CAAQ-BRY	Basin	150	40	5	0	1	40	1.5
	WFS234	CAAQ-BRY	Valley Slope	40	135	3	12	5	84	2.1
	WFT420	CAAQ-BRY	Slope	93	42	4	7	4	83	0.0
B5		CAAQ-BRY-DECE-PSLE	SL SL	45–71–97	45–71.0–97	3–4.0–5	32–44.0–56	1–19.9–39	44–66.7–89	1–23.4–46
	FSA204	BRY-CAAQ-PSLE-VIMA2-DECE	Slope	97	97	3	56	39	89	0.8
	WFL092	CAAQ-PSLE-BRY-DECE	Slope	45	45	5	32	1	44	46.0
C1		CAJO-FORBS	SL	40	40	5	1	2	6	1
	FWE102	CAJO-PSLE-SETR-OXFE-LITE2	Slope	40	40	5	1	2	6	0.5
C2		CAJO-CAAQ-CAUT-BRY	TS VS	60–70–80	45–52.5–60	3–4.0–5	21–24.3–28	3–12.0–22	4–12.2–20	0–0.0–0
	WFG554	CAAQ-PSLE-DECE-CAJO-PEGR2	Toeslope	60	60	3	28	22	20	0.0
	WFS303	DECE-CAUT-CAAQ-CAJO	Valley Slope	80	45	5	21	3	4	0.0
C3		CAJO-CAAQ-CACA4-BRY	SD	40	40	5	30	0	71	0
	WFW218	BRY-CACA4-PEGR2-PSLE-LITE2	Small Depression	40	40	5	30	0	71	0.0
D1		CABU6-CAUT	VS	40	40	5	18	13	0	3
	JSA009	CAUT	Valley Slope	40	40	5	18	13	0	3.0
D2		CABU6-CAUT-CAAQ	BA	50	50	3	2	0	0	0
	WFG412	CAAQ-CAUT	Basin	50	50	3	2	0	0	0.0
E1		CASI2-CAAQ	TS TS	45–98–150	150–150.0–150	1–1.5–2	16–17.7–19	2–10.3–19	8–29.1–50	0–0.0–0
	WFS005	CAAQ-CASI2	Toeslope	45	150	1	16	2	8	0.0
	WFS021	CAAQ-CASI2-BRY	Toeslope	150	150	2	19	19	50	0.0
E2		CASI2-CAAQ-BRY-FORBS	TS TS	40–40–40	40–42.5–45	3–4.0–5	24–23.9–24	5–5.1–5	30–45.0–60	0–0.0–0
	WFG550	CAAQ-PSLE-BRY-PEGR2-CASI2	Toeslope	40	40	5	24	5	60	0.0
	WFG555	CAAQ-CASI2-PSLE-BRY-PEGR2	Toeslope	40	45	3	24	5	30	0.0
E3		CASI2-CAAQ-CAUT	TS VS	30–90–150	30–37.5–45	3–4.0–5	2–10.9–20	1–17.4–34	0–47.1–94	0–2.1–4
	WFG043	CAAQ-CASI2-PSLE-CAUT-COPA28	Toeslope	150	45	5	2	1	0	0.0
	WFT761	BRY-CASI2-CAAQ-CAUT	Valley Slope	30	30	3	20	34	94	4.3
E4		CASI2-CAAQ-CAUT-ELAC	BA TS	40–95–150	40–40.0–40	5–5.5–6	3–13.4–24	10–12.8–16	30–63.0–96	0–0.0–0
	WFG045	CASI2-BRY-CAAQ-CAUT-ELEOC	Basin	150	40	5	3	10	96	0.0
	WFG552	CAAQ-ELAC-PSLE-CASI2-BRY	Toeslope	40	40	6	24	16	30	0.0
F1		CASC12	SL	40	40	4	11	5	0	0
	WFG528	CASC12	Slope	40	40	4	11	5	0	0.0

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F2		CASC12-ELQU2	TS	40	40	4	12	3	0	0
	FSA008	ELQU2-CASC12	Toeslope	40	40	4	12	3	0	0.0
F3		CASC12-ELQU2-CAAQ-FORBS	TS	91	54	4	11	2	44	0
	WFC240	ELQU2-CASC12-CAAQ-BRY-PSLE	Toeslope	91	54	4	11	2	44	0.0
F4		CASC12-CAUT-CANI2-FORBS	SD	45	75	3	5	4	69	0
	WFS220	BRY-PSLE-ERPE3-PHCO9-CASC12	Small Depression	45	75	3	5	4	69	0.1
F5		CASC12-CADIG-BRY-FORBS	BA	40	40	4	4	1	98	0
	WFS331	BRY-CADIG-CASC-PSLE	Basin	40	40	4	4	1	98	0.0
F6		CASC12-DECE-CACA4-FORBS	TS	45	50	4	2	4	44	8
	WFT598	CASC12-BRY-AGSC5-PEGR2-CLRH2	Toeslope	45	50	4	2	4	44	8.0
G1		ELMA5-CAAQ	BA SD	50–100–150	55–102.5–150	1–3.5–6	0–.3–1	0–.0–0	0–.0–0	0–0.0–0
	FGM001	CAAQ-CAUT-ELMA5-LEMI3	Basin	150	55	6	1	0	0	0.0
	WFW262	ELMA5-CAAQ	Small Depression	50	150	1	0	0	0	0.0
G2		ELQU2-CASA10-DECE-BRY	SL	42	42	3	11	4	77	0
	WFT217	ELQU2-BRY-DECE-CASA10	Slope	42	42	3	11	4	77	0.0
G3		ELQU2-CAPH2-CANI2	BA	40	60	6	6	2	12	0
	WFW417	ELQU2-CAPH2-CANI2-PEGR2-PSLE	Basin	40	60	6	6	2	12	0.0
G4		ELQU2-CAAQ-BRY	TS SL SL	48–95–150	35–49.0–64	3–4.3–5	17–24.9–34	4–7.2–10	21–50.5–79	0–16.0–48
	WFC229	ELQU2-CAAQ-BRY	Toeslope	150	64	5	34	4	21	48.0
	WFC236	ELQU2-BRY-CAAQ	Slope	86	35	5	24	10	79	0.0
	WFT218	ELQU2-BRY-CAAQ	Slope	48	48	3	17	8	52	0.0
G5		ELMA5-BRY-FORBS	TS	120	55	4	7	2	90	0
	JSA010	ELMA5-BRY-PSLE-DECE-CLRH2	Toeslope	120	55	4	7	2	90	0.0
G6		ELMA5	BA	40	40	6	2	1	0	0
	WFG164	ELMA5	Basin	40	40	6	2	1	0	0.0
G7		ELMS5-CAAQ-BRY-FORBS	TS	100	100	6	27	5	80	0
	WFG011	ELMA5-BRY-PSLE-CLRH2-CAAQ	Toeslope	100	100	6	27	5	80	0.0
G8		ELMA5-CASA10-CACA12-BRY	TS	40	40	3	14	2	65	18
	JSA012	ELMA5-BRY-CACA12-CASC12-ASTER	Toeslope	40	40	3	14	2	65	18.0
H1		ELAC-CAAQ-CACA4-BRY	TS TS BA	45–115–150	45–46.7–50	2–2.7–4	1–10.8–30	0–5.3–16	60–77.7–93	0–1.0–3
	WFG044	ELAC-CACA4-BRY-COPA28-CAAQ	Toeslope	150	45	2	2	0	60	3.0
	WFG087	ELAC-BRY-CAREX-PSLE-CACA4	Toeslope	45	45	4	30	16	80	0.0
	WFG561	ELAC-BRY-CAREX-PEGR2	Basin	150	50	2	1	0	93	0.0
H2		ELAC-CACA12-BRY	TS	40	40	3	13	13	80	0
	WFG551	ELAC-BRY-CACA12	Toeslope	40	40	3	13	13	80	0.0
I1		CACA11-CAIL-CAAQ-BRY-PEGR2	VS VS	38–41–43	40–41.5–43	3–3.5–4	2–11.2–21	0–7.0–14	47–69.8–93	0–4.3–9
	FMS104	BRY-PEGR2-PSLE-CAAQ-CAIL	Valley Slope	38	40	4	2	0	93	0.0
	WFT122	CACA11-CAAQ-CAIL-BRY-PEGR2	Valley Slope	43	43	3	21	14	47	8.6
I2		CACA11-CASA10-CAJO-CASI2	BA	45	45		31	8	62	0
	WFG091	CASA10-CACA11-BRY-PEGR2-CAJO	Basin	45	45	0	31	8	62	0.0
I3		CACA11-CAAQ-LUSU9-BRY	VS	40	55	5	12	30	100	0
	WFS237	CAAQ-LUSU9	Valley Slope	40	55	5	12	30	100	0.0
I4		CACA11-CAAQ-CASA10-DECE-BRY	SL TS	40–95–150	40–47.0–54	3–3.5–4	4–10.0–16	2–5.3–9	23–41.4–60	0–0.0–0
	WFS448	CACA11-PEGR2-CAAQ-AGSC5-BRY	Slope	40	40	4	16	9	60	0.0
	WFT019	CAAQ-CASA10-CACA11-VIOLA-BRY	Toeslope	150	54	3	4	2	23	0.0
I5		CACA11-BRY-FORBS	VS	45	50	4	38	5	97	0
	FMS105	CACA11-JUME3-DECE-EPHO	Valley Slope	45	50	4	38	5	97	0.2
I6		CACA11-CAAQ-CACA13	SD	65	100	3	2	19	6	0
	FWE101	CAAQ-CACA11-CAEX5-VIOLA	Small Depression	65	100	3	2	19	6	0.0
I7		CACA11-CAUT-BRY	VS	55	65	5	36	29	26	62
	WFG099	CAUT-BRY-CACA11	Valley Slope	55	65	5	36	29	26	62.3
I8		CACA11-CAUT-CAAQ	BA	50	61	2	1	5	0	0
	WFT706	CACA11-CAUT-CAAQ	Basin	50	61	2	1	5	0	0.0
J1		CALI7-CAA1-COPA28-BRY	BA	40	150	1	69	10	90	9

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	WFG041	CALI7-CAAQ	Basin	40	150	1	69	10	90	8.7
J2		CASI2-CALI7-CAAQ-BRY	TS	150	150	1	0	1	100	0
	WFG042	CASI2-BRY-CAAQ-COPA28	Toeslope	150	150	1	0	1	100	0.0
J3		CALI7-CASA10-CAPH2-ELAC-BRY	VS	100	40	5	5	6	80	1
	WFS386	ELAC-BRY-PSLE-CALI7-PEGR2	Valley Slope	100	40	5	5	6	80	0.5
K1		SAPL2-CAAQ-BRY	TS BA SL SL VS	35–46–50	35–45.6–50	4–4.4–5	2–9.1–18	0–9.1–26	26–50.3–83	0–2.0–10
	FSA004	CAAQ-BRY	Toeslope	45	45	4	18	5	26	0.0
	WFC122	CACA4-CAAQ-BRY	Basin	35	35	5	7	13	59	0.0
	WFS436	CAAQ-SAPL2-CACA4-BRY	Slope	50	50	4	2	0	27	10.0
	WFT600	CAAQ-BRY-PSLE-SAPL2	Slope	48	48	4	13	26	57	0.0
	WFT614	CAAQ-BRY-SAPL2	Valley Slope	50	50	5	6	2	83	0.0
K2		SAPL2-SAWO-CAAQ-BRY	BA	70	70	4	24	32	98	0
	FSA001	BRY-SAPL2-CAAQ-SAWO-PEPA3	Basin	70	70	4	24	32	98	0.0
K3		SAPL2-SAWO-CAAQ-CAUT-BRY	SL VS VS SL TS	35–63–88	35–60.4–92	2–4.6–7	10–17.7–38	0–2.1–6	50–84.0–99	0–7.6–37
	FSA002	CAAQ-BRY-SAWO-SAPL2-CAUT	Slope	88	92	2	10	6	83	0.0
	FSA003	BRY-CAAQ-SAWO-SAPL2-THAL	Valley Slope	85	55	7	15	1	99	0.0
	JSA007	SAPL2-BRY-CAAQ-CAUT	Valley Slope	40	40	5	13	1	89	0.0
	WFT923	BRY-CAAQ-CAUT-SAPL2-DECE	Slope	35	35	5	14	3	99	1.5
	WFW490	SAPL2-CAAQ-BRY-CAUT-PSLE	Toeslope	65	80	4	38	0	50	36.6
K4		SAPL2-CAAQ-CAUT-BRY	SL	45	45	4	13	8	40	0
	FGM003	CAAQ-BRY-SAPL2-CAUT	Slope	45	45	4	13	8	40	0.0
K5		SAPL2-CAUT-BRY-FORBS	VS	55	96	6	14	17	84	2
	WFS204	CAUT-BRY-SETR-CACO6-SAPL2	Valley Slope	55	96	6	14	17	84	2.0
K6		SAPL2-CAUT-DECE	VS	120	45	4	9	11	10	0
	WFS420	DECE-CAUT-SAPL2	Valley Slope	120	45	4	9	11	10	0.0
K7		SAPL2-CAAQ-CAUT	BA SL SL SL	40–68–120	40–65.0–110	2–4.3–8	0–10.6–36	0–7.9–19	0–3.0–12	0–0.0–0
	FGM006	CAUT-CAAQ-SAPL2-POTEN	Basin	120	40	3	2	8	0	0.0
	WFG564	CACA4-CAAQ-PSLE-SAPL2-CAUT	Slope	40	40	4	0	0	0	0.0
	WFS039	CAUT-CAAQ-SAPL2	Slope	70	70	8	5	5	12	0.0
	WFW377	CAUT-CAAQ-SAPL2	Slope	40	110	2	36	19	0	0.0
L1		SAGE2-SAPL2-SAWO-CACA11-CAAQ	VS	40	42	5	8	12	84	0
	WFT694	CAVE6-BRY-CACA11-CAAQ-SAGE2	Valley Slope	40	42	5	8	12	84	0.0
L2		SAGE2-CAVE6-CAAQ	SD	40	100	3	37	5	2	46
	WFW225	CAVE6-SAGE2-LITE2-CAAQ-PSLE	Small Depression	40	100	3	37	5	2	46.0
M1		SAMO2-CAUT	VS	90	70	5	25	16	3	6
	WFS345	CAUT-SAMO2	Valley Slope	90	70	5	25	16	3	6.0
M2		SAMO2-CASC12-CAUT-BRY	SL	55	150	3	8	0	40	7
	WFS132	CASC12-SAMO2-BRY-CAUT	Slope	55	150	3	8	0	40	6.7
M3		SAMO2-CAUT-CAAQ	VS	100	50	6	16	14	22	0
	WFS344	CAUT-CAAQ-BRY	Valley Slope	100	50	6	16	14	22	0.0
O1		VACE-CANI2-CAEL3-CAAQ	VS	45	120	4	8	16	42	0
	WFS236	VACE-CANI2-CAAQ-CAEL3-BRY	Valley Slope	45	120	4	8	16	42	0.3
P1		SAPL2-ELQU2-DECE-SPLE-BRY	SL SL	76–84–92	48–70.0–92	3–3.5–4	31–33.4–36	2–10.3–19	38–42.3–47	0–3.2–6
	WFC138	CAAQ-ELQU2-BRY-PSLE-SAPL2	Slope	92	92	3	36	19	38	6.4
P1	WFT094	ELQU2-CAAQ-BRY-PSLE	Slope	76	48	4	31	2	47	0.0
		SAPL2-CACA11-ELQU2-CAAQ-BRY	SL	53	48	4	19	28	91	0
	WFT093	BRY-ELQU2-CACA11-CAAQ-SAPL2	Slope	53	48	4	19	28	91	0.0
P3		SAPL2-CACA11-ELQU2-CAVE6-DECE	SL	88	88	4	13	4	95	0
	WFT924	BRY-ELQU2-PSLE-CACA11-SAPL2	Slope	88	88	4	13	4	95	0.0
P4		SAPL2-CACA11-CAAQ-BRY-FORBS	VS TS	40–48–55	30–36.0–42	5–5.5–6	4–8.5–13	7–7.6–8	79–82.9–87	0–0.0–0
	WFT235	CAAQ-BRY-SAPL2-CACA11-JUNCU	Valley Slope	55	42	6	4	8	87	0.0
	WFT422	CAAQ-CACA11-BRY-SAPL2-POHU	Toeslope	40	30	5	13	7	79	0.0
P5		SAPL2-CACA11-CAAQ-CASC12	TS	82	48	2	8	6	23	0
	WFT717	CACA11-CAAQ-CASC12-PEGR2-CLRH2	Toeslope	82	48	2	8	6	23	0.0

Cluster	Polygon	Association	FENTYPE	PROBEX	PEATDEP	VONPOST	TEXI	TEXIB	BRY	BARE
Q1		SAPL2-CAVE6-CAAQ-BRY	SL	89	89	4	7	1	99	0
	WFT634	BRY-SAPL2-CAVE6-CAAQ-PEGR2	Slope	89	89	4	7	1	99	0.0
Q2		SAPL2-SAWO-CAAQ-CAVE6-BRY	BA	91	40	4	19	20	46	0
	WFT627	SAPL2-CAVE6-CAAQ-PSLE-PESA5	Basin	91	40	4	19	20	46	0.0
R1		BEGL-SAPL2-CAAQ-CAUT-BRY	VS SL	44–97–150	44–97.0–150	4–4.0–4	25–28.3–32	8–20.6–34	80–88.3–97	0–0.1–0
	JSA008	BRY-CAAQ-SAPL2-BEFO2-CAUT	Valley Slope	44	44	4	25	8	97	0.0
	WFT310	CAAQ-SAPL2-BRY-BEGL-DECE	Slope	150	150	4	32	34	80	0.2
R2		BEGL-DAFL3-SAPL2-CAAQ-CADIG	TS VS	40–95–150	40–95.0–150	3–3.0–3	2–6.7–11	2–3.0–4	66–77.3–89	0–4.0–8
	FSA010	BRY-CACA11-DAFL3-DECE-BEGL	Toeslope	150	150	3	2	2	89	0.0
	WFT721	CAAQ-CADIG-BRY-THAL-BEGL	Valley Slope	40	40	3	11	4	66	8.0
R3		BEGL-SAPL2-SAWO-DAFL3-CAVE6	VS	65	64	3	14	15	91	0
	FSA005	BRY-CAVE6-BEGL-SAWO-DAFL3	Valley Slope	65	64	3	14	15	91	0.0
R4		BEGL-SAPL2-SAWO-DAFL3-CAAQ	VS	80	55	3	6	14	98	0
	WFT909	BRY-SAPL2-BEGL-CAAQ-SAWO	Valley Slope	80	55	3	6	14	98	0.0
S1		SAPL2-CAIL-CAAQ-BRY	VS TS TS	35–76–140	32–41.3–47	2–4.0–7	1–5.7–9	2–3.4–4	87–92.8–98	0–0.0–0
	WFS387	CAAQ-BRY-SAPL2-EPHO-CAIL	Valley Slope	35	32	7	1	4	87	0.0
	WFT362	BRY-CAAQ-CAIL-SAPL2-DECE	Toeslope	52	45	2	8	2	94	0.0
	WFT532	BRY-CAIL-SAPL2-THAL-PEGR2	Toeslope	140	47	3	9	4	98	0.0
S2		SAPL2-SAWO-CAIL-CAAQ-CAUT	VS	90	92	6	56	56	10	0
	FSA201	CAAQ-CAIL-SAPL2-CAUT-SAWO	Valley Slope	90	92	6	56	56	10	0.0
T1		SAPL2-CAAQ-ELAC	SL	44	44	3	8	12	28	8
	WFW444	CAAQ-SAPL2-ELAC-AGSC5-BRY	Slope	44	44	3	8	12	28	8.0
T2		SAPL2-CAAQ-CALE8-ELQU2-BRY	VS	45	105	5	21	3	70	0
	WFW447	CAAQ-CALE8-BRY-ELQU2-CASA10	Valley Slope	45	105	5	21	3	70	0.0
T3		DAFL3-SAWO-CABU6-CAUT-CALA11	BA	150	52	3	2	19	34	0
	WFT453	CAUT-PEAM8-CABU6-BRY-DAFL3	Basin	150	52	3	2	19	34	0.0
T4		SAPL2-SAWO-SABE2-CAAQ-CACA12	VS	150	52	3	9	22	100	0
	WFC193	BRY-CAAQ-SAPL2-PSLE-BIBI5	Valley Slope	150	52	3	9	22	100	0.0
T5		SAPL2-CAAQ-CANO3-BRY	TS	85	85	2	1	2	91	0
	WFS375	BRY-CAAQ-PSLE-POLE2-PEGR2	Toeslope	85	85	2	1	2	91	0.0
T6		SAPL2-CAAQ-CAIN11	SL	55	55	3	34	11	22	8
	WFL081	CAAQ-AGSC5-CAIN11-PSLE-BRY	Slope	55	55	3	34	11	22	8.3
T7		SAPL2-CAAQ-CALA11	SL	40	40	3	4	2	28	2
	WFT467	CAAQ-CALA11-BRY-GEMA4	Slope	40	40	3	4	2	28	2.0
T8		SAPL2-CAJO-CAAQ-CAUT	VS	150	55	5	38	4	6	6
	WFS302	CAJO-CAAQ-PSLE-SAPL2-CAUT	Valley Slope	150	55	5	38	4	6	6.1
T9		SAPL2-SAWO-DAFL3-CAVE6-CAREX	SL	64	64	4	6	10	100	0
	WFT391	BRY-CAVE6-POCA2-THAL-SAPL2	Slope	64	64	4	6	10	100	0.0
U1		SABR-CASC12-BRY	VS	76	76	3	7	6	99	0
	FSA006	BRY-SABR-CASC12-PEGR2-THAL	Valley Slope	76	76	3	7	6	99	0.0
U2		SABR-SAPL2-BRY	TS	55	55	7	9	6	76	0
	WFS525	SABR-PSLE-CACA4-BRY-SAPL2	Toeslope	55	55	7	9	6	76	0.0
U3		SABR-CAAQ-BRY	VS	70	150	4	17	15	99	0
	WFS087	BRY-CAAQ-SABR-CASI2-CACA4	Valley Slope	70	150	4	17	15	99	0.0
V1		SAPL2-CASI2-CAAQ	TS	125	125	2	9	4	21	0
	WFS025	CAAQ-CASI2-BRY-SAPL2-PEGR2	Toeslope	125	125	2	9	4	21	0.0
V2		SAPL2-SAWO-CASI2-CAAQ-BRY	VS	150	150	3	9	22	95	0
	WFT762	CAAQ-BRY-CASI2-THAL-SAWO	Valley Slope	150	150	3	9	22	95	0.0
W1		SAPL2-CASC12-CAUT-FORBS	VS	50	50	5	2	2	49	20
	WFS398	PSLE-CAUT-CASC-PEGR2-BRY	Valley Slope	50	50	5	2	2	49	20.0
W2		SAWO-CASC12-FORBS	TS	67	55	2	20	4	43	3
	WFT415	CASC12-PSLE-BRY-SAWO-BIVI2	Toeslope	67	55	2	20	4	43	3.4

Cluster	Polygon	Association	NSPECIES	TLC	Floating Mat	Chan-Nels	Gully Freq.	Hydrologic Alteration	Ground Water Diagram	Peat-forming Plants	Wetland Plants	Floristic Quality
A1		CAUT	1–1.2–2	30–85–100	01000	00000	00000	0L000	BBAAB	100–100–100	100–100–100	5.0–5.0–5.0
	NPJS01	CAUT	1	99.5	No	No	None	None	B	100.0	100.0	5.0
	WFG747	CAUT	1	30.0	Yes	No	None	Low	B	100.0	100.0	5.0
	WFS148	CAUT	1	97.0	No	No	None	None	A	100.0	100.0	5.0
	WFS150	CAUT	2	100.0	No	No	None	None	A	100.0	100.0	5.0
	WFW078	CAUT	1	99.5	No	No	None	None	B	100.0	100.0	5.0
A2		CAUT-FORBS	5–6.5–8	121–140–160	00	01	00	00	AA	62–75–88	72–82–92	4.8–5.1–5.4
	WFS322	CAUT-DECE-GATR2	5	160.0	No	No	None	None	A	62.0	71.7	5.4
	WFW354	CAUT-CACA4-BRY	8	120.5	No	Yes	None	None	A	87.6	92.0	4.8
A3		CAAQ	1–1.7–3	97–134–204	000	011	00L	000	ADB	53–84–100	100–100–100	6.0–6.2–6.6
	WFC012	CAAQ	1	97.0	No	No	None	None	A	100.0	100.0	6.0
	WFS222	CAAQ-PSLE-BRY	3	204.0	No	Yes	None	None	D	52.5	100.0	6.6
	WFS223	CAAQ	1	99.5	No	Yes	Low	None	B	100.0	100.0	6.0
A4		CAUT-CAAQ	2–3.1–5	91–175–257	1000000000	0011111011	000M000000	0MMLMM0000	ABAEDDBADA	78–97–100	89–99–100	5.1–5.5–5.7
	FGM005	CAUT-CAAQ	2	150.0	Yes	No	None	None	A	100.0	100.0	5.4
	WFG053	CAAQ-CAUT	5	90.5	No	No	None	Moderate	B	77.9	89.0	5.6
	WFG149	CAUT-CAAQ	2	187.0	No	Yes	None	Moderate	A	100.0	100.0	5.5
	WFG260	CAUT-CAAQ	3	180.0	No	Yes	Moderate	Low	E	100.0	100.0	5.5
	WFG262	CAUT-CAAQ-CACA4	3	187.0	No	Yes	None	Moderate	D	100.0	100.0	5.5
	WFG263	CAUT-CAAQ	2	160.0	No	Yes	None	Moderate	D	100.0	100.0	5.4
	WFG542	CAUT-CAAQ	4	188.0	No	Yes	None	None	B	99.7	99.9	5.5
	WFG632	CAUT-CACA4-CAAQ-PSLE	4	257.0	No	No	None	None	A	92.2	100.0	5.7
	WFS135	CAUT-CACA4-CAAQ	4	240.5	No	Yes	None	None	D	99.8	100.0	5.6
	WFS496	CAUT	2	109.5	No	Yes	None	None	A	100.0	100.0	5.1
A5		CAUT-CAAQ-CAVE6	3	200	0	1	0	0	B	100	100	5.6
	WFT014	CAUT-CAVE6-CAAQ	3	200.0	No	Yes	None	None	B	100.0	100.0	5.6
A6		CAUT-CAAQ-ELAC	9	221	0	1	0	L	B	87	95	5.7
	FGM002	CACA4-CAUT-CAAQ	9	220.5	No	Yes	None	Low	B	86.6	95.3	5.7
A7		CAPE42-CAAQ	2–2.5–3	100–110–120	00	01	00	00	BB	100–100–100	100–100–100	7.6–7.6–7.6
	FMU103	CAPE42-CAAQ	2	100.0	No	No	None	None	B	100.0	100.0	7.6
	WFS527	CAPE42-CAAQ	3	120.0	No	Yes	None	None	B	99.6	99.8	7.6
A8		CAAQ-CAPH2	7	205	0	1	H	H	B	47	50	7.5
	WFS134	CAAQ-CAPH2	7	205.0	No	Yes	High	High	B	47.1	49.8	7.5
A9		CAAQ-CAPR22	2	100	0	1	L	M	B	100	83	6.5
	WFS217	CAAQ-CAPR22	2	99.5	No	Yes	Low	Moderate	B	100.0	83.3	6.5
B1		CAUT-BRY	1–2.3–3	98–117–170	0100	0111	0H00	0H00	AEAA	88–97–100	100–100–100	5.0–5.5–6.9
	WFG003	CAUT-BRY	1	99.5	No	No	None	None	A	100.0	100.0	5.0
	WFG046	CAUT-COPA28-BRY-PSLE	3	170.0	Yes	Yes	High	High	E	88.2	100.0	6.9
	WFS376	CAUT-BRY	2	97.5	No	Yes	None	None	A	99.5	99.7	5.0
	WFW109	CAUT-BRY	3	100.0	No	Yes	None	None	A	99.5	99.5	5.0
B2		CAAQ-CAUT-BRY-FORBS	6–7.0–9	150–185–209	0000	1011	0000	0000	BBDA	47–72–95	58–84–95	5.1–6.0–6.7
	FES006	CAUT-PSLE-BRY-EPHO	6	208.5	No	Yes	None	None	B	47.2	95.1	6.0
	WFG611	CAAQ-BRY-CAUT	9	149.5	No	No	None	None	B	89.3	93.5	6.1
	WFG614	BRY-CAAQ-PSLE-OXFE-PEGR2	7	200.5	No	Yes	None	None	D	58.2	91.5	6.7
	WFS363	JUNCU-CAUT-BRY-CAAN23	6	180.5	No	Yes	None	None	A	95.0	57.6	5.1
B4		CAAQ-BRY	1–1.3–2	90–95–98	0100	1001	0000	0000	DBBD	100–100–100	100–100–100	6.0–6.0–6.0
	WFC078	CAAQ-BRY	1	97.0	No	Yes	None	None	D	100.0	100.0	6.0
	WFG440	CAAQ-BRY	2	97.5	Yes	No	None	None	B	100.0	100.0	6.0
	WFS234	CAAQ-BRY	1	97.0	No	No	None	None	B	100.0	100.0	6.0
	WFT420	CAAQ-BRY	1	90.0	No	Yes	None	None	D	100.0	100.0	6.0
B5		CAAQ-BRY-DECE-PSLE	6–8.5–11	181–221–261	00	11	00	00	BB	39–47–55	82–88–94	6.1–6.4–6.7
	FSA204	BRY-CAAQ-PSLE-VIMA2-DECE	11	261.0	No	Yes	None	None	B	38.8	81.9	6.7
	WFL092	CAAQ-PSLE-BRY-DECE	6	181.0	No	Yes	None	None	B	55.2	94.3	6.1
C1		CAJO-FORBS	12	211	0	1	0	0	B	54	70	7.9

Cluster	Polygon	Association	NSPECIES	TLC	Floating Mat	Chan-Nels	Gully Freq.	Hydrologic Alteration	Ground Water Diagram	Peat-forming Plants	Wetland Plants	Floristic Quality
	FWE102	CAJO-PSLE-SETR-OXFE-LITE2	12	210.5	No	Yes	None	None	B	53.5	70.3	7.9
C2		CAJO-CAAQ-CAUT-BRY	9–9.0–9	200–261–322	00	11	00	00	CA	50–55–59	70–76–81	5.1–5.8–6.6
	WFG554	CAAQ-PSLE-DECE-CAJO-PEGR2	9	321.5	No	Yes	None	None	C	59.3	80.9	6.6
	WFS303	DECE-CAUT-CAAQ-CAJO	9	199.5	No	Yes	None	None	A	50.4	70.2	5.1
C3		CAJO-CAAQ-CACA4-BRY	8	271	0	1	L	0	D	63	83	7.1
	WFW218	BRY-CACA4-PEGR2-PSLE-LITE2	8	271.0	No	Yes	Low	None	D	62.7	83.2	7.1
D1		CABU6-CAUT	2	110	0	1	0	0	D	100	100	5.4
	JSA009	CAUT	2	109.5	No	Yes	None	None	D	100.0	100.0	5.4
D2		CABU6-CAUT-CAAQ	7	191	0	1	0	0	C	100	100	5.5
	WFG412	CAAQ-CAUT	7	191.0	No	Yes	None	None	C	100.0	99.6	5.5
E1		CASI2-CAAQ	2–2.0–2	177–187–197	00	01	00	00	AA	100–100–100	100–100–100	6.0–6.0–6.0
	WFS005	CAAQ-CASI2	2	177.0	No	No	None	None	A	100.0	100.0	6.0
	WFS021	CAAQ-CASI2-BRY	2	196.5	No	Yes	None	None	A	100.0	100.0	6.0
E2		CASI2-CAAQ-BRY-FORBS	7–8.0–9	239–255–271	00	11	L0	M0	DB	66–66–67	96–98–100	6.4–6.6–6.7
	WFG550	CAAQ-PSLE-BRY-PEGR2-CASI2	9	239.0	No	Yes	Low	Moderate	D	66.0	99.5	6.7
	WFG555	CAAQ-CASI2-PSLE-BRY-PEGR2	7	270.5	No	Yes	None	None	B	66.6	96.1	6.4
E3		CASI2-CAAQ-CAUT	4–5.5–7	161–234–308	00	11	L0	M0	ED	77–88–100	100–100–100	5.9–6.2–6.4
	WFG043	CAAQ-CASI2-PSLE-CAUT-COPA28	7	307.5	No	Yes	Low	Moderate	E	77.2	99.9	6.4
	WFT761	BRY-CASI2-CAAQ-CAUT	4	160.5	No	Yes	None	None	D	99.7	99.8	5.9
E4		CASI2-CAAQ-CAUT-ELAC	6–7.5–9	238–269–301	00	01	00	LM	AB	62–70–78	80–90–100	5.6–5.8–5.9
	WFG045	CASI2-BRY-CAAQ-CAUT-ELEOC	9	301.0	No	No	None	Low	A	78.2	79.6	5.6
	WFG552	CAAQ-ELAC-PSLE-CASI2-BRY	6	237.5	No	Yes	None	Moderate	B	62.1	100.0	5.9
F1		CASC12	2	100	0	1	0	0	B	100	50	7.0
	WFG528	CASC12	2	100.0	No	Yes	None	None	B	100.0	50.0	7.0
F2		CASC12-ELQU2	2	117	0	0	0	0	A	100	92	7.8
	FSA008	ELQU2-CASC12	2	117.0	No	No	None	None	A	100.0	91.5	7.8
F3		CASC12-ELQU2-CAAQ-FORBS	14	356	0	1	0	0	B	70	78	7.1
	WFC240	ELQU2-CASC12-CAAQ-BRY-PSLE	14	355.5	No	Yes	None	None	B	69.6	78.4	7.1
F4		CASC12-CAUT-CANI2-FORBS	14	213	0	0	0	0	A	29	62	6.1
	WFS220	BRY-PSLE-ERPE3-PHCO9-CASC12	14	212.5	No	No	None	None	A	28.7	61.6	6.1
F5		CASC12-CADIG-BRY-FORBS	10	212	0	1	0	0	D	52	64	8.7
	WFS331	BRY-CADIG-CASC-PSLE	10	212.0	No	Yes	None	None	D	52.2	64.2	8.7
F6		CASC12-DECE-CACA4-FORBS	16	252	0	1	0	0	A	47	44	6.4
	WFT598	CASC12-BRY-AGSC5-PEGR2-CLRH2	16	252.0	No	Yes	None	None	A	47.1	43.9	6.4
G1		ELMA5-CAAQ	3–3.5–4	127–144–160	01	10	00	L0	EB	80–90–100	100–100–100	3.7–4.1–4.4
	FGM001	CAAQ-CAUT-ELMA5-LEMI3	4	160.0	No	Yes	None	Low	E	80.0	100.0	4.4
	WFW262	ELMA5-CAAQ	3	127.0	Yes	No	None	None	B	100.0	100.0	3.7
G2		ELQU2-CASA10-DECE-BRY	10	162	0	1	0	0	B	79	92	7.4
	WFT217	ELQU2-BRY-DECE-CASA10	10	162.0	No	Yes	None	None	B	79.0	92.0	7.4
G3		ELQU2-CAPH2-CANI2	5	160	0	1	0	0	D	50	69	8.1
	WFW417	ELQU2-CAPH2-CANI2-PEGR2-PSLE	5	160.0	No	Yes	None	None	D	50.0	68.8	8.1
G4		ELQU2-CAAQ-BRY	2–3.3–6	125–151–170	000	101	000	000	BAA	99–100–100	98–99–100	7.1–7.3–7.5
	WFC229	ELQU2-CAAQ-BRY	2	170.0	No	Yes	None	None	B	100.0	100.0	7.1
	WFC236	ELQU2-BRY-CAAQ	2	157.0	No	No	None	None	A	100.0	100.0	7.2
	WFT218	ELQU2-BRY-CAAQ	6	124.5	No	Yes	None	None	A	98.8	97.8	7.5
G5		ELMA5-BRY-FORBS	8	208	0	0	0	0	B	52	80	4.9
	JSA010	ELMA5-BRY-PSLE-DECE-CLRH2	8	208.0	No	No	None	None	B	51.8	80.0	4.9
G6		ELMA5	1	70	0	1	0	0	B	100	100	3.0
	WFG164	ELMA5	1	70.0	No	Yes	None	None	B	100.0	100.0	3.0
G7		ELMS5-CAAQ-BRY-FORBS	6	290	0	0	0	H	B	59	90	5.8
	WFG011	ELMA5-BRY-PSLE-CLRH2-CAAQ	6	289.5	No	No	None	High	B	58.5	89.6	5.8
G8		ELMA5-CASA10-CACA12-BRY	12	258	0	1	0	0	D	73	68	5.8
	JSA012	ELMA5-BRY-CACA12-CASC12-ASTER	12	258.0	No	Yes	None	None	D	72.6	67.7	5.8
H1		ELAC-CAAQ-CACA4-BRY	7–7.3–8	188–199–208	100	001	L00	M00	AAD	10–31–61	71–82–99	5.8–6.0–6.2

Cluster	Polygon	Association	NSPECIES	TLC	Floating Mat	Chan-Nels	Gully Freq.	Hydrologic Alteration	Ground Water Diagram	Peat-forming Plants	Wetland Plants	Floristic Quality
	WFG044	ELAC-CACA4-BRY-COPA28-CAAQ	8	201.0	Yes	No	Low	Moderate	A	61.2	98.6	6.2
	WFG087	ELAC-BRY-CAREX-PSLE-CACA4	7	207.5	No	No	None	None	A	9.9	71.0	5.9
	WFG561	ELAC-BRY-CAREX-PEGR2	7	187.5	No	Yes	None	None	D	21.6	75.9	5.8
H2		ELAC-CACA12-BRY	2	137	0	1	L	0	B	29	85	6.2
	WFG551	ELAC-BRY-CACA12	2	137.0	No	Yes	Low	None	B	29.2	85.4	6.2
I1		CACA11-CAIL-CAAQ-BRY-PEGR2	8–12.0–16	345–363–381	00	11	00	0	DA	61–68–75	84–87–91	7.6–7.7–7.8
	FMS104	BRY-PEGR2-PSLE-CAAQ-CAIL	8	381.0	No	Yes	None	None	D	60.5	90.7	7.6
	WFT122	CACA11-CAAQ-CAIL-BRY-PEGR2	16	344.5	No	Yes	None		A	74.5	83.6	7.8
I2		CACA11-CASA10-CAJO-CASI2	8	281	0	0	0	0		93	88	7.8
	WFG091	CASA10-CACA11-BRY-PEGR2-CAJO	8	280.5	No	No	None	None		92.7	87.5	7.8
I3		CACA11-CAAQ-LUSU9-BRY	7	138	0	1	L	L	D	92	92	6.5
	WFS237	CAAQ-LUSU9	7	137.5	No	Yes	Low	Low	D	92.1	92.2	6.5
I4		CACA11-CAAQ-CASA10-DECE-BRY	11–12.5–14	252–297–342	00	11	00	00	BB	76–76–76	76–77–78	6.7–6.8–6.9
	WFS448	CACA11-PEGR2-CAAQ-AGSC5-BRY	11	342.0	No	Yes	None	None	B	76.2	76.2	6.7
	WFT019	CAAQ-CASA10-CACA11-VIOLA-BRY	14	251.5	No	Yes	None	None	B	76.2	78.3	6.9
I5		CACA11-BRY-FORBS	10	173	0	1	L	M	D	70	73	6.8
	FMS105	CACA11-JUME3-DECE-EPHO	10	173.0	No	Yes	Low	Moderate	D	69.9	73.1	6.8
I6		CACA11-CAAQ-CACA13	5	180	0	1	0	0	D	82	64	7.5
	FWE101	CAAQ-CACA11-CAEX5-VIOLA	5	180.0	No	Yes	None	None	D	81.8	63.6	7.5
I7		CACA11-CAUT-BRY	2	110	0	1	0	M	E	100	100	5.5
	WFG099	CAUT-BRY-CACA11	2	110.0	No	Yes	None	Moderate	E	100.0	100.0	5.5
I8		CACA11-CAUT-CAAQ	3	200	1	1	L	0	C	100	100	6.6
	WFT706	CACA11-CAUT-CAAQ	3	200.0	Yes	Yes	Low	None	C	100.0	100.0	6.6
J1		CALI7-CAA1-COPA28-BRY	3	140	1	0	0	H	E	93	93	7.5
	WFG041	CALI7-CAAQ	3	140.0	Yes	No	None	High	E	92.9	92.9	7.5
J2		CASI2-CALI7-CAAQ-BRY	6	180	1	0	0	0	A	100	100	6.7
	WFG042	CASI2-BRY-CAAQ-COPA28	6	180.0	Yes	No	None	None	A	100.0	100.0	6.7
J3		CALI7-CASA10-CAPH2-ELAC-BRY	15	360	0	0	0	0	A	45	90	7.3
	WFS386	ELAC-BRY-PSLE-CALI7-PEGR2	15	360.0	No	No	None	None	A	44.7	89.6	7.3
K1		SAPL2-CAAQ-BRY	3–5.0–9	117–172–233	00000	10111	L0000	00000	BAADD	79–95–100	93–98–100	6.0–6.3–6.4
	FSA004	CAAQ-BRY	3	117.0	No	Yes	Low	None	B	100.0	100.0	6.0
	WFC122	CACA4-CAAQ-BRY	5	207.0	No	No	None	None	A	95.2	92.8	6.2
	WFS436	CAAQ-SAPL2-CACA4-BRY	9	232.5	No	Yes	None	None	A	99.1	99.5	6.3
	WFT600	CAAQ-BRY-PSLE-SAPL2	4	143.0	No	Yes	None	None	D	79.0	100.0	6.4
	WFT614	CAAQ-BRY-SAPL2	4	158.0	No	Yes	None	None	D	99.7	99.8	6.4
K2		SAPL2-SAWO-CAAQ-BRY	6	241	0	1	0	0	B	79	77	7.1
	FSA001	BRY-SAPL2-CAAQ-SAWO-PEPA3	6	240.5	No	Yes	None	None	B	79.0	76.9	7.1
K3		SAPL2-SAWO-CAAQ-CAUT-BRY	3–7.8–13	167–278–478	00000	11111	00000	00000	BBBBD	48–76–100	72–89–100	5.5–6.4–6.8
	FSA002	CAAQ-BRY-SAWO-SAPL2-CAUT	7	241.0	No	Yes	None	None	B	65.4	82.7	6.8
	FSA003	BRY-CAAQ-SAWO-SAPL2-THAL	13	477.5	No	Yes	None	None	B	47.6	71.8	6.8
	JSA007	SAPL2-BRY-CAAQ-CAUT	3	167.0	No	Yes	None	None	B	100.0	100.0	6.4
	WFT923	BRY-CAAQ-CAUT-SAPL2-DECE	5	240.5	No	Yes	None	None	B	83.2	91.6	5.5
	WFW490	SAPL2-CAAQ-BRY-CAUT-PSLE	11	261.5	No	Yes	None	None	D	85.8	97.9	6.5
K4		SAPL2-CAAQ-CAUT-BRY	3	150	0	1	0	0	D	100	100	6.1
	FGM003	CAAQ-BRY-SAPL2-CAUT	3	149.5	No	Yes	None	None	D	100.0	100.0	6.1
K5		SAPL2-CAUT-BRY-FORBS	6	230	0	1	0	0	B	41	72	6.7
	WFS204	CAUT-BRY-SETR-CACO6-SAPL2	6	230.0	No	Yes	None	None	B	41.4	72.4	6.7
K6		SAPL2-CAUT-DECE	4	210	0	1	0	0	C	52	76	4.9
	WFS420	DECE-CAUT-SAPL2	4	210.0	No	Yes	None	None	C	52.4	76.3	4.9
K7		SAPL2-CAAQ-CAUT	3–4.0–5	101–202–260	0000	0001	000H	000H	AAAE	77–90–100	77–94–100	5.6–5.8–6.2
	FGM006	CAUT-CAAQ-SAPL2-POTEN	4	260.0	No	No	None	None	A	76.5	76.5	5.7
	WFG564	CACA4-CAAQ-PSLE-SAPL2-CAUT	5	250.0	No	No	None	None	A	84.0	100.0	6.2
	WFS039	CAUT-CAAQ-SAPL2	3	197.0	No	No	None	None	A	100.0	100.0	5.6
	WFW377	CAUT-CAAQ-SAPL2	4	100.5	No	Yes	High	High	E	99.5	99.8	5.6

Cluster	Polygon	Association	NSPECIES	TLC	Floating Mat	Chan-Nels	Gully Freq.	Hydrologic Alteration	Ground Water Diagram	Peat-forming Plants	Wetland Plants	Floristic Quality
L1		SAGE2-SAPL2-SAWO-CACA11-CAAQ	12	372	0	1	0	0	A	77	85	6.9
	WFT694	CAVE6-BRY-CACA11-CAAQ-SAGE2	12	371.5	No	Yes	None	None	A	77.2	84.7	6.9
L2		SAGE2-CAVE6-CAAQ	8	289	0	1	0	0	D	48	72	6.5
	WFW225	CAVE6-SAGE2-LITE2-CAAQ-PSLE	8	288.5	No	Yes	None	None	D	47.8	72.1	6.5
M1		SAMO2-CAUT	3	120	0	1	0	M	D	83	91	5.1
	WFS345	CAUT-SAMO2	3	119.5	No	Yes	None	Moderate	D	82.9	91.2	5.1
M2		SAMO2-CASC12-CAUT-BRY	6	151	0	1	0	0	D	80	57	6.5
	WFS132	CASC12-SAMO2-BRY-CAUT	6	151.0	No	Yes	None	None	D	79.5	56.8	6.5
M3		SAMO2-CAUT-CAAQ	7	201	0	1	0	M	D	93	96	5.5
	WFS344	CAUT-CAAQ-BRY	7	201.0	No	Yes	None	Moderate	D	92.9	95.7	5.5
O1		VACE-CANI2-CAEL3-CAAQ	6	191	0	1	L	H	B	23	36	7.2
	WFS236	VACE-CANI2-CAAQ-CAEL3-BRY	6	190.5	No	Yes	Low	High	B	23.0	35.8	7.2
P1		SAPL2-ELQU2-DECE-SPLE-BRY	8–9.5–11	221–233–246	00	11	L0	00	B	74–78–81	93–94–94	6.8–6.9–7.1
	WFC138	CAAQ-ELQU2-BRY-PSLE-SAPL2	8	246.0	No	Yes	Low	None	d	74.4	93.3	6.8
P1	WFT094	ELQU2-CAAQ-BRY-PSLE	11	220.5	No	Yes	None	None	B	80.6	94.0	7.1
		SAPL2-CACA11-ELQU2-CAAQ-BRY	5	251	0	1	0	0	B	100	100	7.4
	WFT093	BRY-ELQU2-CACA11-CAAQ-SAPL2	5	250.5	No	Yes	None	None	B	99.8	99.9	7.4
P3		SAPL2-CACA11-ELQU2-CAVE6-DECE	13	351	0	1	0	0	A	50	86	7.0
	WFT924	BRY-ELQU2-PSLE-CACA11-SAPL2	13	350.5	No	Yes	None	None	A	50.1	86.1	7.0
P4		SAPL2-CACA11-CAAQ-BRY-FORBS	8–13.5–19	296–321–345	00	01	00	00	AA	68–79–91	72–83–95	6.7–7.0–7.2
	WFT235	CAAQ-BRY-SAPL2-CACA11-JUNCU	19	345.0	No	No	None	None	A	67.5	71.5	6.7
	WFT422	CAAQ-CACA11-BRY-SAPL2-POHU	8	296.0	No	Yes	None	None	A	91.2	95.1	7.2
P5		SAPL2-CACA11-CAAQ-CASC12	9	363	0	1	0	0	B	81	85	7.3
	WFT717	CACA11-CAAQ-CASC12-PEGR2-CLRH2	9	363.0	No	Yes	None	None	B	80.7	84.8	7.3
Q1		SAPL2-CAVE6-CAAQ-BRY	6	261	0	1	0	0	B	100	96	6.5
	WFT634	BRY-SAPL2-CAVE6-CAAQ-PEGR2	6	260.5	No	Yes	None	None	B	99.8	96.0	6.5
Q2		SAPL2-SAWO-CAAQ-CAVE6-BRY	13	388	0	1	0	0	B	76	93	6.8
	WFT627	SAPL2-CAVE6-CAAQ-PSLE-PESA5	13	388.0	No	Yes	None	None	B	75.8	93.2	6.8
R1		BEGL-SAPL2-CAAQ-CAUT-BRY	7–7.5–8	231–257–283	00	11	00	0	DB	89–94–99	95–97–100	6.2–6.5–6.7
	JSA008	BRY-CAAQ-SAPL2-BEFO2-CAUT	8	231.0	No	Yes	None	None	D	99.4	99.6	6.2
	WFT310	CAAQ-SAPL2-BRY-BEGL-DECE	7	283.0	No	Yes	None	Yes	B	89.4	94.7	6.7
R2		BEGL-DAFL3-SAPL2-CAAQ-CADIG	14–15.0–16	353–390–426	00	11	00	00	AB	60–67–74	79–79–79	6.8–7.2–7.5
	FSA010	BRY-CACA11-DAFL3-DECE-BEGL	14	353.0	No	Yes	None	None	A	60.3	78.6	6.8
	WFT721	CAAQ-CADIG-BRY-THAL-BEGL	16	426.0	No	Yes	None	None	B	73.5	78.8	7.5
R3		BEGL-SAPL2-SAWO-DAFL3-CAVE6	14	347	0	1	0	L	B	59	72	6.7
	FSA005	BRY-CAVE6-BEGL-SAWO-DAFL3	14	347.0	No	Yes	None	Low	B	58.8	71.5	6.7
R4		BEGL-SAPL2-SAWO-DAFL3-CAAQ	16	431	0	1	0	M	B	55	67	7.2
	WFT909	BRY-SAPL2-BEGL-CAAQ-SAWO	16	430.5	No	Yes	None	Moderate	B	54.9	66.7	7.2
S1		SAPL2-CAIL-CAAQ-BRY	10–11.0–13	262–331–392	000	111	000	000	DAB	59–70–79	81–86–91	6.6–7.1–7.8
	WFS387	CAAQ-BRY-SAPL2-EPHO-CAIL	10	341.0	No	Yes	None	None	D	58.8	80.8	6.6
	WFT362	BRY-CAAQ-CAIL-SAPL2-DECE	10	391.5	No	Yes	None	None	A	71.6	87.0	7.0
	WFT532	BRY-CAIL-SAPL2-THAL-PEGR2	13	261.5	No	Yes	None	None	B	79.2	90.9	7.8
S2		SAPL2-SAWO-CAIL-CAAQ-CAUT	9	236	0	0	0	0	F	89	92	6.8
	FSA201	CAAQ-CAIL-SAPL2-CAUT-SAWO	9	236.0	No	No	None	None	F	89.0	92.4	6.8
T1		SAPL2-CAAQ-ELAC	12	311	0	1	0	0	B	51	70	6.3
	WFW444	CAAQ-SAPL2-ELAC-AGSC5-BRY	12	311.0	No	Yes	None	None	B	51.4	69.5	6.3
T2		SAPL2-CAAQ-CALE8-ELQU2-BRY	10	121	0	1	0	0	D	94	94	7.7
	WFW447	CAAQ-CALE8-BRY-ELQU2-CASA10	10	121.0	No	Yes	None	None	D	93.6	93.5	7.7
T3		DAFL3-SAWO-CABU6-CAUT-CALA11	10	177	1	1	0	0	C	58	93	5.5
	WFT453	CAUT-PEAM8-CABU6-BRY-DAFL3	10	176.5	Yes	Yes	None	None	C	57.9	92.8	5.5
T4		SAPL2-SAWO-SABE2-CAAQ-CACA12	13	304	0	1	0	M	A	64	71	7.0
	WFC193	BRY-CAAQ-SAPL2-PSLE-BIBI5	13	303.5	No	Yes	None	Moderate	A	64.1	71.2	7.0
T5		SAPL2-CAAQ-CANO3-BRY	10	221	0	1	0	0	A	71	82	7.1
	WFS375	BRY-CAAQ-PSLE-POLE2-PEGR2	10	221.0	No	Yes	None	None	A	71.4	81.9	7.1

Cluster	Polygon	Association	NSPECIES	TLC	Floating Mat	Chan-Nels	Gully Freq.	Hydrologic Alteration	Ground Water Diagram	Peat-forming Plants	Wetland Plants	Floristic Quality
T6		SAPL2-CAAQ-CAIN11	8	261	0	1	0	L	B	58	67	6.2
	WFL081	CAAQ-AGSC5-CAIN11-PSLE-BRY	8	261.0	No	Yes	None	Low	B	57.5	67.2	6.2
T7		SAPL2-CAAQ-CALA11	7	114	0	1	0	0	A	88	98	6.9
	WFT467	CAAQ-CALA11-BRY-GEMA4	7	114.0	No	Yes	None	None	A	87.6	97.9	6.9
T8		SAPL2-CAJO-CAAQ-CAUT	7	271	0	1	0	L	C	78	85	7.2
	WFS302	CAJO-CAAQ-PSLE-SAPL2-CAUT	7	271.0	No	Yes	None	Low	C	77.7	85.1	7.2
T9		SAPL2-SAWO-DAFL3-CAVE6-CAREX	12	414	0	0	0	0	A	49	61	7.0
	WFT391	BRY-CAVE6-POCA2-THAL-SAPL2	12	413.5	No	No	None	None	A	48.5	61.4	7.0
U1		SAPL2-CASC12-BRY	10	408	0	1	0	0	B	44	60	7.7
	FSA006	BRY-SABR-CASC12-PEGR2-THAL	10	407.5	No	Yes	None	None	B	44.2	59.8	7.7
U2		SAPL2-CAAQ-CASC12-BRY-FORBS	18	433	0	1	0	0	A	31	67	6.6
	WFS525	SABR-PSLE-CACA4-BRY-SAPL2	18	432.5	No	Yes	None	None	A	31.3	66.5	6.6
U3		SAPL2-SABE2-CAAQ-CASI2-BRY	15	213	0	1	0	0	B	63	81	6.3
	WFS087	BRY-CAAQ-SABR-CASI2-CACA4	15	213.0	No	Yes	None	None	B	63.3	80.8	6.3
V1		SAPL2-CASI2-CAAQ	5	237	0	0		0	A	99	100	6.3
	WFS025	CAAQ-CASI2-BRY-SAPL2-PEGR2	5	237.0	No	No		None	A	98.7	100.0	6.3
V2		SAPL2-SAWO-CASI2-CAAQ-BRY	14	360	0	1	0	0	B	55	74	6.8
	WFT762	CAAQ-BRY-CASI2-THAL-SAWO	14	359.5	No	Yes	None	None	B	54.6	74.1	6.8
W1		SAPL2-CASC12-CAUT-FORBS	12	371	0	1	0	0	B	49	74	7.0
	WFS398	PSLE-CAUT-CASC-PEGR2-BRY	12	370.5	No	Yes	None	None	B	48.5	74.2	7.0
W2		SAWO-CASC12-FORBS	13	235	0	1	0	0	A	44	55	7.2
	WFT415	CASC12-PSLE-BRY-SAWO-BIVI2	13	235.0	No	Yes	None	None	A	43.7	55.3	7.2

Appendix H. Disturbance Factors and Intensities

Note that there is an implied Intensity Class 0 (zero), meaning "none" or "absent," that is usually not recorded.

			Intensity Class				
Disturbance Factor	Possible Agents	Impact Area*	1 Low	2 Moderate	3 High	4 Very High	Comments
Browsing	Elk, Deer, Moose, Cattle, Sheep	Wetland, Buffer	Clipping noticeable on up to half the shrubs, averaging light clipping (<¼ CYG); no shrub clipped >½ CYG; no reduction in natural height	More than half the shrubs moderately clipped (¼ -½ CYG), or all shrubs lightly to moderately clipped (¼-½ CYG); height reduction on a few shrubs	Most to all shrubs hedged (>½ CYG), or half the shrubs heavy hedged (>¾ CYG); height reduction noticeable on most shrubs	Most to all shrubs clubbed (growth turned inward), or all shrubs heavily hedged. Mostly >¾ CYG; height reduction obvious on most to all shrubs	CYG = Current Year's Growth; height reduction estimated as compared with mature unbrowsed shrubs
Grazing	Elk, Deer, Moose, Cattle, Sheep	Wetland, Buffer	Clipping noticeable on some graminoids and forbs, averaging light clipping (<¼ CYG); all herbaceous plants of normal vigor and height	Clipping obvious on more than half the graminoids and forbs, average ¼-½ CYG; some plants show reduction in vigor and height	Clipping obvious on most graminoids and forbs, average >½ CYG; most plants show reduction in vigor in height, average height up to ½ of normal	Most graminoid individuals grazed >¾ CYG; vigor noticeably reduced; average height ½ - ¾ of normal	CYG = Current Year's Growth; height reduction estimated as compared with mature unbrowsed plants
Trampling	Elk, Deer, Moose, Cattle, Sheep	Wetland	Soil compaction noticeable in a few spots, water table near or somewhat below normal levels; a few post-holes or a few animal trails, occurring occasionally; no bare soil or hummocks apparent	Soil compaction noticeable in several large areas (or many small areas), covering ¼-½ of the area; water table somewhat below normal levels; a moderate amount of post-holing or animal trailing, occurring often; bare soil and hummocks visible	Soil compaction obvious in large areas, covering >½ of the area; water table below normal levels; post-holing and animal trails throughout the area, use occurring every year or two; bare soil and hummocks common, some trailing in hollows between hummocks	Soil compaction obvious, especially in hollows between hummocks; water table well below normal levels; post-holing common, occurring annually, animal trailing & bare soil common in hollows	Discussion of hummocks in Sanderson and March 1996, Cooper and MacDonald 2000, Lesica and Kannowski 1998
		Buffer	Soil mostly soft in rangelands and duff mostly intact in forests except for a few places; bare soil within to slightly above normal limits; a few pedestalled plants in rangelands	Soil hard in large areas of rangelands, duff missing in large areas of forests; bare soil above normal limits (>20% rangelands, >10% forests); pedestalled plants obvious	Soil hard in most rangelands, duff missing in most forests; bare soil well above normal limits (>30% rangelands, >15% forests); pedestalled plants common	Soil hard and unyielding in all rangelands, duff up to ½ missing in forests; bare soil much greater than normal (>40% rangelands, >20% forests); pedestalling of plants common or everywhere	
Tracks	ATV, Motorcycle, Snowmobile, 4WD	Wetland, Buffer	A few passes by vehicle evident in the past in 1-2 places, healing and becoming invisible; bare soil within to slightly above normal limits	Vehicle passes occurring every 3-5 years in 2-5 places, getting deeper and wider each time, not healing; bare soil somewhat above normal limits across whole area	Vehicle passes occurring every 1-2 years in >5 places, getting deeper and wider each time, not healing; bare soil well above normal limits across whole area	Vehicle passes occurring annually or several times each year in >10 places, getting deeper and wider each time, not healing; bare soil well above normal limits across whole area	
Trails	Elk, Deer, Moose, Cattle, Sheep, Humans	Wetland, Buffer	A few trails by animals or humans in past in 1-2 places, healing and becoming invisible; bare soil within to slightly above normal limits	Animal or human trails used nearly every year in a few places, getting deeper and wider each year; bare soil above normal limits across whole area	Animal or human trails used yearly or several times a year in several to many places, getting deeper and wider each year; bare soil well above normal limits across whole area	Animal or human trails common across whole area, used many times a year in several to many places, getting deeper and wider each year; bare soil well above normal limits across whole area	

			Intensity Class				
Disturbance Factor	Possible Agents	Impact Area*	1 Low	2 Moderate	3 High	4 Very High	Comments
Roads (constructed)	State, County, USFS	Buffer	One or two temporary natural-surface roads in past that were closed and revegetated, now restoring naturally, >10 m from wetland edge	One to several natural-surface or all-weather roads open and used several times a year, >10 m from wetland edge	Several natural-surface or all-weather roads open and used weekly; or one road <10 m from wetland edge	Several natural-surface or all-weather roads open and used several to many times a week; or one or more roads <10 m from wetland edge	All-weather road usually means gravel surface
Roads (constructed)	State, County, USFS	Wetland	No constructed roads	No constructed roads	Paved road with rock fill and gravel embankments crossing wetland, minimal erosion into wetland, somewhat disrupting water flow and dividing wetland into two parts	Gravel or fine-textured soil surface with fine-textured fill and embankments that erode regularly into wetland, disrupting water flow and dividing wetland into two parts	
Ditches	Humans	Wetland	One or two shallow (<20 cm) ditches dug once in past, now beginning to restore naturally, water table at or slightly below normal levels (considering other factors, such as flooding)	One to several shallow ditches dug and maintained, still functional and draining water from wetland (or part of wetland), water table noticeably below normal levels, a few upland plants or weeds appearing in community being drained	One to several deeper (>20 cm) ditches dug and maintained, still functional and draining water from wetland (or part of wetland), water table noticeably below normal levels, upland plants or weeds obvious and beginning to share dominance with hydrophytes	One to several deeper (>20 cm) ditches dug and maintained, still functional and draining water from wetland (or part of wetland), water table well below normal levels, vegetation in community being drained very much drier – hydrophytes losing dominance to upland plants and weeds	
De-watering	Humans	Wetland	Dam or other structure has been breached in past, water is draining from wetland, but vegetation seems to be retaining water successfully and system appears stable, water table in wetland at or slightly below normal levels	Dam or floodgate has been lowered or bypassed or breached, water is draining from wetland, water table noticeably below normal levels, a few upland plants or weeds appearing in community being drained, community losing stability	Dam or floodgate has been lowered or bypassed or breached, water is draining from wetland, water table noticeably below normal levels, upland plants or weeds obvious and beginning to share dominance with hydrophytes, community obviously unstable, changing every year	Dam or floodgate has been lowered or bypassed or breached, water is draining from wetland, water table well below normal levels, upland plants or weeds obvious and dominant with hydrophytes, community obviously unstable, changing every year	
Flooding	Humans	Wetland	Floodgate, dam, or other structure has been permanently raised, or is being raised seasonally, water table 5-10 cm above normal levels, but vegetation seems to be stable and unchanged from normal	Floodgate, dam, or other structure has been permanently raised, or is being raised seasonally, water table 10-20 cm above normal levels, vegetation is changing to species characteristic of higher water tables	Floodgate, dam, or other structure permanently raised, water table >20 cm above normal levels, vascular plants drowned and dying, small pieces of peat dislodged and floating to surface	Floodgate, dam, or other structure permanently raised, water table >50 cm above normal levels, vascular plants drowned and dying, large pieces of peat dislodged and floating to surface	

			Intensity Class				
Disturbance Factor	Possible Agents	Impact Area*	1 Low	2 Moderate	3 High	4 Very High	Comments
Drainage from Above	Humans	Wetland	One or two small drainage channels from road culverts or other drainage structures, most of water entering groundwater before reaching wetland, causing no apparent erosion into wetland, no apparent changes in wetland water table or vegetation	One to several small drainage channels, some surface water reaching wetland, some apparent erosion from these channels reaching wetland margins, water table near normal levels, changes in vegetation only along margins	One to several moderate to large drainage channels, surface water flowing into wetland, apparent erosion from these channels reaching wetland margins and beyond margins in a few places, water table above normal level, changes in vegetation along margins	One to several moderate to large drainage channels, surface water flowing into wetland, apparent erosion from these channels reaching wetland margins and into center of wetland, water table well above normal level, changes in vegetation along margins and in wetland center	
Fire	Natural, Humans	Buffer	One or a few burned spots >10 m from wetland edge, naturally revegetating	Several burned spots or one large burned area, >10 m from wetland edge, mostly revegetating naturally	Many burned spots or several large burned areas, some <10 m from wetland edge, some areas of bare soil and evident erosion	Many burned spots or several large burned areas, many <10 m from wetland edge, many areas of bare soil and evident erosion	See Kratz and others 2007
Beaver Activity	Beaver	Wetland	One or a few small beaver dams in the past, now unused and the area behind the dams naturally revegetated; no side channels	One or a few small beaver dams currently being used with full ponds; or one medium-sized older dam now unused and the area behind the dam naturally revegetated; possibly a few old side channels	Many small (or one medium- to large-sized) beaver dams currently being used with full dams, or some of them breached and the ponds bare; a few side channels being built or used	Several medium- to large-sized beaver dams currently being used, some with full dams, and some of them breached and the ponds bare; side channels being built or used	
		Buffer	Few trees or shrubs cut and dragged from buffer in past; draglines revegetated with no erosion	Few trees or shrubs cut and dragged from buffer recently, draglines mostly revegetated but a little erosion into the wetland	Several to many trees or shrubs cut and dragged from buffer recently, some draglines revegetating but a few eroding into the wetland	Many shrubs or trees being cut and dragged from buffer currently or recently, most draglines not revegetating and eroding into the wetland	
Camp Sites	Humans	Buffer	One or a few camp sites, used a few times a year, naturally revegetating, all sites and roads >10 m from wetland edge	One or a few camp sites, used every few weeks in season, some areas revegetating, some bare and eroding, most sites and roads >10 m from wetland edge but small areas <10 m	Several camp sites, used weekly in season, some areas revegetating, some bare and eroding, most sites and roads >10 m from wetland edge but small areas <10 m	Many camp sites, used weekly in season, most areas bare and eroding, large areas <10 m from wetland edge	
Soil Removal (Peat Mining)	Humans	Wetland	Removal of upper soil horizons (including peat) in one or a few places in the past, now beginning to recover slowly	Peat mining of <10% of wetland, remainder of peat intact and functioning normally	Peat mining of >½ of wetland, remainder of peat intact and functioning normally, not floating or breaking loose from substrate	Peat mining of >¾ of wetland, remainder of peat dead or floating, no normally functioning peat remaining	See Kratz and others 2007
		Buffer	Removal of upper soil horizons in one or a few places, revegetated and beginning to naturally recover	Removal of upper soil horizons in one or a few places, leaving lower horizons bare and eroding	Removal of upper soil horizons in several to many places, leaving lower horizons bare and eroding	Removal of upper soil horizons common, leaving lower horizons bare and eroding	
Deposition (Sedimentation)		Wetland	Up to 2% of wetland covered by recent sediment deposit up to 1 cm thick	2 – 5% of wetland covered by recent sediment deposit 1 – 3 cm thick	5 – 15% of wetland covered by recent sediment deposit 3 – 5 cm thick	More than 15% of wetland covered by recent sediment deposit >5 cm thick	See Chimner and others 2008, Rocchio 2006a

			Intensity Class				
Disturbance Factor	Possible Agents	Impact Area*	1 Low	2 Moderate	3 High	4 Very High	Comments
		Buffer	Soil in rangelands mostly not moving from year to year and duff mostly intact in forests except for a few places; bare soil within to slightly above normal limits (<15% rangelands, <5% forests); a few pedestalled plants in rangelands, slight sediment margins around wetland in a few places	Soil in rangelands moving during large storms and runoff, duff missing in large areas of forests; bare soil above normal limits (>20% rangelands, >10% forests); pedestalled plants obvious, sediment margins around wetland obvious in several to many places	Soil in rangelands moving during large storms and runoff, duff missing in most forests; bare soil well above normal limits (>30% rangelands, >15% forests); pedestalled plants common; sediment margins around wetland obvious throughout	Soil in rangelands moving during storms of any size and during runoff, duff up to ½ missing in forests; bare soil much greater than normal (>40% rangelands, >20% forests); pedestalling of plants common or everywhere; sediment margins around wetland obvious throughout	
Exotic Plant Invasion		Wetland, Buffer	Some exotic plants evident, 2-10% total canopy cover of exotic plants	Exotic plants obvious, 10-20% total canopy cover of exotic plants	Exotic plants obvious, >20% total canopy cover of exotic plants	Exotic plants dominant or subdominant, >30% total canopy cover of exotic plants	See Kratz and others 2007
Tree Cutting	Humans	Wetland	Most trees cut by hand in past, reduction in shade causing some increases in vascular plant and bryophyte cover, water table at or near natural levels	Trees cut by machinery, disruption of peat body and some erosion in a few small areas, water table at or near normal levels	Trees cut by machinery, disruption of peat body and evident erosion in one large area or a many small areas, water table changed from normal levels	Trees cut by machinery, disruption of peat body and evident erosion across much of wetland, water table very much changed from normal levels	If beaver have cut trees, use Disturbance 'Beaver Activity'
		Buffer	A few trees cut in a few patches >10 m from wetland margin, disturbance revegetating, no erosion into wetland	Large areas of buffer cut, a small area <10 m from wetland margin, disturbance mostly revegetating but some erosion into wetland	Large areas of buffer cut, a moderately large area <10 m from wetland margin, erosion into wetland obvious	Large areas of buffer cut, including most of area <10 m from wetland margin, erosion into wetland obvious and increasing	
Power Lines	Humans	Wetland	Power line over wetland, no structures in wetland, slight amount of human or ATV trailing from maintenance activities	Power line over wetland, no structures in wetland, moderate amount of human or ATV trailing from maintenance activities, some clearing activities in wetland	Power line over wetland, no structures in wetland, 4WD road in wetland from maintenance activities	Power line over wetland, structure in wetland	
		Buffer	Power line over buffer, no structures in buffer, slight amount of human or ATV trailing from maintenance activities, right-of-way not cleared in wetland	Power line over buffer, structure in buffer but >10 m from wetland, moderate amount of human or ATV trailing from maintenance activities, some clearing activities in buffer but >10 m from wetland	Power live over buffer, structure in buffer <10 m from wetland, 4WD road in buffer for maintenance, right-of-way intensively cleared to 10 m from wetland	Power line over buffer, structure in buffer at wetland edge, 4WD road in buffer right up to wetland edge, right-of-way intensively cleared right up to wetland edge	
Buried Utility Corridors		Wetland	No buried utility lines in wetland, right-of-way covers part of wetland partially cleared, slight amount of human or ATV trailing in wetland from maintenance activities	Buried utility line across corner of wetland, trench for utility covered and revegetated and mostly healed, slight amount of human or ATV trailing in wetland from maintenance activities	Buried utility line across middle of wetland, trench for utility covered and partly revegetated but mostly not healed and some erosion, moderate amount of human or ATV trailing from maintenance activities in right-of-way in wetland	Buried utility line across middle of wetland, trench for utility partly covered but not revegetated, erosion is apparent, right-of-way continually used for maintenance	

			Intensity Class				
Disturbance Factor	Possible Agents	Impact Area*	1 Low	2 Moderate	3 High	4 Very High	Comments
		Buffer	Buried utility line crosses part of buffer, utility line and right-of-way all >10 m from wetland, right-of-way not cleared, slight amount of vehicle tracks or trails in buffer from maintenance activities	Buried utility line crosses buffer, utility line >10 m from wetland but part of right-of way <10 m from wetland, right-of-way partially cleared in buffer but > 10 m from wetland, moderate amount of vehicle tracks-trails-roads from maintenance activities in buffer	Buried utility line crosses buffer. utility line in part < 10 m from wetland and part of right-of-way <10 m from wetland, right-of-way cleared in buffer someplace <10 m from wetland, right-of-way with some bare soil and eroding, tracks-trails-roads from maintenance activities used often	Buried utility line crosses buffer, part of utility line and buffer <10 m from wetland, right-of-way cleared to wetland edge, right-of-way roads and trails actively eroding, tracks-trails-roads used often as part of maintenance	
Erosion	Vehicles, Elk, Deer, Moose, Humans	Wetland	A few small eroding spots evident (trampling, trailing, tracks, etc.), beginning to revegetate, any channel < 20 cm wide and <5 cm deep	Several eroding spots obvious (trampling, wallows, trailing, tracks, etc.), some remaining exposed and eroding, any channel < 50 cm wide and <10 cm deep	Eroding spots large or common, or a gully or two 50-100 cm wide and 10-50 cm deep	Several gullies, some with headcuts, gullies > 1 m wide and > 50 cm deep	See Chimner and others 2008. Use this Disturbance Factor ('Erosion') only if above factors are not used
Erosion	Vehicles, Elk, Deer, Moose, Humans	Buffer	A few rills >10 m from wetland, soil mostly covered in rangelands and duff mostly intact in forests except for a few places; bare soil within to slightly above normal limits (<15% rangelands, <5% forests); a few pedestalled plants in rangelands	A few to several apparent rills, a few <10 m from wetland, bare soil exposed in large areas of rangelands, duff missing in large areas of forests; bare soil above normal limits (>20% rangelands, >10% forests); pedestalled plants obvious	Many rills, often <10 m from wetland, possibly a headcut >10 m from wetland; soil hard in most rangelands, duff missing in most forests; bare soil well above normal limits (>30% rangelands, >15% forests); pedestalled plants common	Rills common, often < 10 m from wetland, or headcut eroding into wetland; soil hard and unyielding in all rangelands, duff up to ½ missing in forests; bare soil much greater than normal (>40% rangelands, >20% forests); pedestalling of plants common or everywhere	Use this Disturbance Factor ('Erosion') only if above factors are not used
Ground Disturbance (General)	Unknown	Wetland, Buffer	Low level of ground disturbance, <5% of the area	Moderate amount of ground disturbance, 5-15% of the area	High degree of ground disturbance, 15-25% of the area	Very High degree of ground disturbance, >25% of the area	

*. *Wetland* is the delineated fen or potential-fen polygon, composed of one to several community types, also called *wetland complex* or *fen complex*.
Buffer is the area within the contributing watershed within 100 m of the edge of the wetland

Appendix I. USDA Criteria for Organic Soils

Table J-1. Definitions of Organic Soil Material, Histosol, and Histic Epipedon in the USDA Soil System (Soil Survey Staff 2010).

Definition of Organic Soil Material	Definition of Histic Epipedon
Mineral Soil Material Mineral soil material (less than 2.0 mm in diameter) *either*: 1. Is saturated with water for less than 30 days (cumulative) per year in normal years and contains less than 20 percent (by weight) organic carbon; *or* 2. Is saturated with water for 30 days or more (cumulative) in normal years (or is artificially drained) and, excluding live roots, has an organic carbon content (by weight) of: a. Less than 18 percent if the mineral fraction contains 60 percent or more clay; *or* b. Less than 12 percent if the mineral fraction contains no clay; *or* c. Less than 12 + (clay percentage multiplied by 0.1) percent if the mineral fraction contains less than 60 percent clay. **Organic Soil Material** Soil material that contains more than the amounts of organic carbon described above for mineral soil material is considered organic soil material. In the definition of mineral soil material above, material that has more organic carbon than in item 1 is intended to include what has been called litter or an O horizon. Material that has more organic carbon than in item 2 has been called peat or muck. Not all organic soil material accumulates in or under water. Leaf litter may rest on a lithic contact and support forest vegetation. The soil in this situation is organic only in the sense that the mineral fraction is appreciably less than half the weight and is only a small percentage of the volume of the soil. (Soil Survey Staff 2010, p. 3)	**Histic Epipedon** **Required Characteristics** The histic epipedon is a layer (one or more horizons) that is characterized by saturation (for 30 days or more, cumulative) and reduction for some time during normal years (or is artificially drained) and *either*: 1. Consists of organic soil material that: a. Is 20 to 60 cm thick and either contains 75 percent or more (by volume) *Sphagnum* fibers or has a bulk density, moist, of less than 0.1; *or* b. Is 20 to 40 cm thick; *or* 2. Is an Ap horizon that, when mixed to a depth of 25 cm, has an organic-carbon content (by weight) of: a. 16 percent or more if the mineral fraction contains 60 percent or more clay; or b. 8 percent or more if the mineral fraction contains no clay; or c. 8 + (clay percentage divided by 7.5) percent or more if the mineral fraction contains less than 60 percent clay. Most histic epipedons consist of organic soil material (defined [at left]). Item 2 provides for a histic epipedon that is an Ap horizon consisting of mineral soil material. A histic epipedon consisting of mineral soil material can also be part of a mollic or umbric epipedon. (Soil Survey Staff 2010, pp. 6-7)
Histosols Other soils that: 1. Do not have andic soil properties in 60 percent or more of the thickness between the soil surface and either a depth of 60 cm or a densic, lithic, or paralithic contact or duripan if shallower; *and* 2. Have organic soil materials that meet *one or more* of the following: a. Overlie cindery, fragmental, or pumiceous materials and/or fill their interstices *and* directly below these materials, have a densic, lithic, or paralithic contact; *or* b. When added with the underlying cindery, fragmental, or pumiceous materials, total 40 cm or more between the soil surface and a depth of 50 cm; *or* c. Constitute two-thirds or more of the total thickness of the soil to a densic, lithic, or paralithic contact *and* have no mineral horizons or have mineral horizons with a total thickness of 10 cm or less; *or* d. Are saturated with water for 30 days or more per year in normal years (or are artificially drained), have an upper boundary within 40 cm of the soil surface, and have a total thickness of *either*: (1) 60 cm or more if three-fourths or more of their volume consists of moss fibers or if their bulk density, moist, is less than 0.1 g/cm3; *or* (2) 40 cm or more if they consist either of sapric or hemic materials, or of fibric materials with less than three-fourths (by volume) moss fibers and a bulk density, moist, of 0.1 g/cm3 or more. (Soil Survey Staff 2010, pp. 31-32)	

Appendix J. Summary of Vegetation and Ground Cover For All Known Fens

1. Association Table, for species > 0.5% average

Code	Area* / No. Samples† / Species	BA 1 Cvr	CH 1 Cvr	CN 6 Cvr	EL 9 Cvr	ES 21 Cvr	GM 346 Cvr	MS 71 Cvr	MU 2 Cvr	NP 1 Cvr	SA 53 Cvr	SP 1 Cvr	WE 8 Cvr	Avg	Common Name
	TREES														
PIEN	Picea engelmannii	–	–	0.1	2.2	–	0.2	1.8	–	–	–	–	–	0.4	Engelmann spruce
	SHRUBS														
BEGL	Betula glandulosa	–	–	–	2.2	–	–	0.9	–	–	5.5	–	–	0.7	bog birch
DAFL3	Dasiphora floribunda	–	–	0.8	–	–	–	1.0	–	–	4.4	–	–	0.6	shrubby cinquefoil
SABR	Salix brachycarpa	–	–	–	–	4.3	–	0.7	–	–	2.0	–	–	0.5	barrenground willow
SAGE2	Salix geyeriana	–	–	–	–	–	0.2	0.4	–	–	1.1	–	7.5	0.4	Geyer willow
SAMO2	Salix monticola	–	–	–	–	1.4	–	5.0	–	–	–	–	0.1	0.7	serviceberry willow
SAPL2	Salix planifolia	–	10.0	6.8	19.7	15.7	4.0	9.1	–	–	28.4	–	2.5	7.8	planeleaf willow
SAWO	Salix wolfii	–	–	5.0	–	–	0.0	2.3	–	–	8.9	–	–	1.3	Wolf's willow
VACE	Vaccinium cespitosum	–	–	–	0.1	–	–	1.3	–	–	–	–	–	0.2	dwarf bilberry
	GRAMINOIDS														
AGSC5	Agrostis scabra	–	–	–	4.4	5.7	0.1	0.3	–	–	1.0	–	–	0.5	rough bentgrass
CACA4	Calamagrostis canadensis	–	97.0	1.7	2.2	6.7	6.6	4.2	–	–	2.0	–	8.8	5.7	bluejoint reedgrass
CAREX	Carex	–	–	–	–	–	0.2	–	–	–	0.4	–	–	0.2	sedge
CAAQ	Carex aquatilis	97.0	80.0	72.3	56.0	35.1	29.9	28.4	10.0	–	54.5	–	25.0	32.8	water sedge
CABU6	Carex buxbaumii	–	–	–	–	–	0.0	–	–	–	0.9	–	–	0.1	Buxbaum's sedge
CACA11	Carex canescens	–	–	–	2.2	4.0	1.9	3.5	–	–	12.6	–	7.5	3.3	pale sedge
CACA12	Carex capillaris	–	–	–	–	–	0.1	0.2	–	–	2.1	–	–	0.3	hair sedge
CADIG	Carex dioica ssp. gynocrates	–	–	–	–	4.3	–	–	–	–	2.1	–	–	0.4	northern bog sedge
CAEL3	Carex elynoides	–	–	–	–	–	–	1.0	–	–	–	–	–	0.1	blackroot sedge
CAIL	Carex illota	–	–	–	0.1	1.4	2.2	3.2	–	–	5.3	–	–	2.5	sheep sedge
CAJO	Carex jonesii	–	–	–	–	5.3	1.1	–	–	–	–	–	13.7	1.2	Jones's sedge
CALA11	Carex lasiocarpa	–	–	–	–	–	–	–	–	–	1.9	–	–	0.2	woollyfruit sedge
CALE8	Carex lenticularis	–	–	–	5.6	–	0.0	–	–	–	–	–	–	0.1	lakeshore sedge
CALI7	Carex limosa	–	–	–	–	2.9	4.0	0.1	–	–	–	–	–	2.8	mud sedge
CAMA12	Carex magellanica	–	–	–	–	–	–	2.7	–	–	0.2	–	–	0.4	boreal bog sedge
CANI2	Carex nigricans	–	–	–	5.6	–	0.1	2.1	–	–	0.9	–	–	0.6	black alpine sedge
CAPE42	Carex pellita	–	–	–	–	4.7	0.0	–	40.0	–	–	–	–	0.4	woolly sedge
CAPH2	Carex phaeocephala	–	–	–	5.6	1.4	–	1.4	–	–	–	–	–	0.3	dunhead sedge
CASA10	Carex saxatilis	–	–	–	2.3	1.9	17.8	3.7	–	–	1.5	–	–	12.4	rock sedge
CASC12	Carex scopulorum	–	–	–	7.8	8.6	0.3	2.0	–	–	10.6	–	–	2.0	cliff sedge
CASI2	Carex simulata	–	–	45.7	–	–	8.4	0.6	–	–	3.5	–	–	6.5	short-beaked sedge
CAUT	Carex utriculata	–	–	17.8	14.1	43.0	14.6	13.7	15.0	99.5	13.0	60.0	32.4	15.7	beaked sedge
CAVE6	Carex vesicaria	–	–	–	–	–	6.7	0.0	–	–	10.1	–	12.1	5.6	blister sedge
DECE	Deschampsia cespitosa	–	–	0.3	0.1	15.6	1.9	1.6	–	–	7.3	–	–	2.8	tufted hairgrass
ELEOC	Eleocharis	–	–	–	–	–	0.2	–	–	–	–	–	–	0.1	spike-rush
ELAC	Eleocharis acicularis	–	–	–	12.2	4.6	1.5	–	–	–	–	–	–	1.4	needle spike-rush
ELMA5	Eleocharis macrostachya	–	–	–	–	–	3.5	–	–	–	3.7	–	12.1	2.9	pale spikerush
ELQU2	Eleocharis quinqueflora	–	–	–	10.0	0.5	7.3	0.8	–	–	17.1	–	–	6.8	few-flowered spike-rush
JUNCU	Juncus	–	–	–	–	3.8	–	–	–	–	1.1	–	–	0.3	rush
JUAR2	Juncus arcticus	–	–	0.8	0.1	–	–	0.8	–	–	0.1	–	–	0.1	arctic rush
PHCO9	Phleum commutatum	–	–	–	–	1.0	0.0	0.6	–	–	0.6	–	–	0.2	alpine timothy
	FORBS														
ASTER	Aster	–	–	–	–	–	–	–	–	–	1.1	–	–	0.1	aster
BIBI5	Bistorta bistortoides	–	–	–	–	0.0	0.0	0.3	–	–	1.1	–	–	0.2	American bistort
BIVI2	Bistorta vivipara	–	–	–	–	0.5	–	0.0	–	–	1.6	–	–	0.2	viviparous bistort
CACO6	Cardamine cordifolia	–	–	–	–	–	0.0	1.3	–	–	–	–	–	0.2	heartleaf bittercress
CLRH2	Clementsia rhodantha	–	–	–	2.3	2.5	0.3	1.8	–	–	4.6	–	–	1.0	rose crown
COPA28	Comarum palustre	–	–	–	–	–	1.8	–	–	–	0.2	–	–	1.2	purple cinquefoil
COSC2	Conioselinum scopulorum	–	–	0.5	–	–	–	1.4	–	–	–	–	–	0.2	hemlock-parsley
DRLO	Draba lonchocarpa	–	–	–	–	–	1.1	–	–	–	–	–	–	0.7	lancepod draba
EPILO	Epilobium	–	–	–	0.1	–	0.2	–	–	–	0.0	–	–	0.1	willow herb
EPHO	Epilobium hornemannii	–	–	–	0.3	4.9	0.1	1.4	–	–	0.4	–	0.1	0.5	Hornemann willow-herb
ERPE3	Erigeron peregrinus	–	–	–	–	–	0.0	0.9	–	–	0.0	–	–	0.1	peregrine fleabane
GATR2	Galium trifidum	–	–	–	2.3	1.5	0.1	0.2	–	–	0.1	–	0.1	0.2	small bedstraw
GEMA4	Geum macrophyllum	–	–	0.2	0.3	0.0	0.0	0.3	–	–	0.6	–	–	0.1	large-leaved avens
LITE2	Ligusticum tenuifolium	–	–	–	–	–	–	0.6	–	–	0.4	–	13.8	0.3	fern-leaf lovage
METR3	Menyanthes trifoliata	–	–	–	–	–	4.0	0.7	–	–	–	–	0.1	2.7	common buckbean
NULU	Nuphar lutea	–	–	–	–	–	2.3	–	–	–	–	–	–	1.5	yellow pond-lily
OXFE	Oxypolis fendleri	–	–	–	–	–	0.1	0.2	–	–	–	–	3.8	0.2	Fendler cowbane
PEGR2	Pedicularis groenlandica	–	–	3.7	4.6	12.9	1.8	4.2	–	–	10.1	–	7.7	3.5	elephantella
PEAM8	Persicaria amphibia	–	–	–	0.3	–	–	–	–	–	1.5	–	–	0.2	water smartweed
PESA5	Petasites sagittatus	–	–	–	–	–	–	–	–	–	1.3	–	–	0.1	arrowleaf sweet coltsfoot
POCA2	Polemonium caeruleum	–	–	0.8	–	–	0.0	0.5	–	–	2.6	–	–	0.3	sky pilot
POFO3	Potamogeton foliosus	–	–	–	–	–	0.4	–	–	–	–	–	–	0.3	close-leaved pondweed
POTEN	Potentilla	–	–	–	–	–	0.2	–	–	–	0.0	–	–	0.2	cinquefoil
PSLE	Psychrophila leptosepala	–	–	3.8	10.0	30.1	4.6	9.3	–	–	13.9	–	20.0	7.4	elkslip marsh-marigold

Code	Area / No. Samples / Species	BA 1 Cvr	CH 1 Cvr	CN 6 Cvr	EL 9 Cvr	ES 21 Cvr	GM 346 Cvr	MS 71 Cvr	MU 2 Cvr	NP 1 Cvr	SA 53 Cvr	SP 1 Cvr	WE 8 Cvr	Avg	Common Name
SETR	Senecio triangularis	–	–	0.1	–	0.0	0.1	1.8	–	–	0.2	–	3.8	0.4	arrowleaf groundsel
SPMI	Sparganium minimum	–	–	–	–	–	0.2	–	–	–	–	–	–	0.1	small bur-reed
SWPE	Swertia perennis	–	10.0	0.3	0.1	0.1	0.0	0.4	–	–	3.0	–	0.1	0.4	star gentian
THAL	Thalictrum alpinum	–	–	–	–	–	–	0.1	–	–	7.9	–	–	0.8	alpine meadow-rue
VIOLA	Viola	–	10.0	–	2.2	0.0	–	0.0	–	–	1.9	–	5.0	0.3	violet
VILA10	Viola labradorica	–	–	–	–	–	0.2	–	–	–	0.4	–	–	0.2	Labrador violet
VIMA2	Viola macloskeyi	–	–	0.2	–	–	0.1	0.6	–	–	1.7	–	–	0.3	small white violet
	FERNS AND FERN-ALLIES														
EQAR	Equisetum arvense	–	–	–	–	–	0.0	1.3	–	–	0.3	–	–	0.2	field horsetail
	BRYOPHYTES														
AULAC2	Aulacomnium	–	–	–	–	7.1	0.0	4.8	–	–	3.4	–	–	1.3	aulacomnium moss
AUPA70	Aulacomnium palustre	–	–	5.0	–	1.0	2.0	6.0	–	–	0.4	–	–	2.3	aulacomnium moss
BRY	Bryophytes	–	–	–	–	–	–	–	–	–	1.1	–	8.8	0.2	Total bryophyte cover
BRYUM2	Bryum	–	–	–	–	0.1	0.3	–	–	–	–	–	–	0.2	bryum moss
CACO70	Calliergon cordifolium	–	–	–	–	–	1.5	0.6	–	–	–	–	–	1.1	calliergon moss
CARI70	Calliergon richardsonii	–	–	–	–	–	–	1.3	–	–	–	–	–	0.2	Richardson's calliergon moss
CAST70	Calliergon stramineum	–	–	–	–	–	1.0	–	–	–	–	–	–	0.7	calliergon moss
CHPA50	Chiloscyphus pallescens	–	–	–	–	–	–	1.1	–	–	–	–	–	0.2	fireweed
CLDE70	Climacium dendroides	–	–	1.7	–	–	0.7	2.1	–	–	1.3	–	–	0.9	tree climacium moss
CRFI70	Cratoneuron filicinum	–	–	0.3	–	–	–	2.2	–	–	–	–	–	0.3	cratoneuron moss
DREPA3	Drepanocladus	–	–	5.0	7.8	14.6	1.3	3.2	–	–	3.5	–	11.3	2.6	drepanocladus moss
DRAD2	Drepanocladus aduncus	–	–	1.7	–	–	15.2	1.1	–	–	–	–	–	10.1	drepanocladus moss
HAVE70	Hamatocaulis vernicosus	–	–	0.8	–	–	–	0.8	–	–	–	–	–	0.1	hamatocaulis moss
HEBL2	Helodium blandowii	–	–	–	–	–	0.1	0.2	–	–	–	–	–	0.1	Blandow's helodium moss
PAFA20	Palustriella falcata	–	–	–	–	–	–	1.6	–	–	–	–	–	0.2	splitleaf groundsel
PHFO6	Philonotis fontana	–	–	1.7	–	0.5	0.2	1.2	–	–	–	–	–	0.3	philonotis moss
PLEL2	Plagiomnium ellipticum	–	–	5.8	–	–	0.0	2.0	–	–	–	–	–	0.3	elliptic plagiomnium moss
POJE	Polytrichum jensenii	–	–	–	–	–	–	1.1	–	–	–	–	–	0.2	Jensen's polytrichum moss
PTPA	Ptychostomum pallescens	–	–	–	–	–	0.2	–	–	–	–	–	–	0.1	
PTPS	Ptychostomum pseudotriquetrum	–	–	0.8	–	–	0.6	3.9	–	–	–	–	–	0.9	
SCAPA	Scapania	–	–	–	–	–	–	1.3	–	–	–	–	–	0.2	scapania
SPHAG2	Sphagnum	–	–	–	12.2	–	0.1	3.7	–	–	2.6	–	–	1.1	sphagnum
SPCA70	Sphagnum capillifolium	–	–	–	–	–	–	0.8	–	–	–	–	–	0.1	sphagnum
SPSQ70	Sphagnum squarrosum	–	–	–	–	–	0.1	0.1	–	–	–	–	–	0.1	sphagnum
SPTE71	Sphagnum teres	–	–	–	–	–	1.3	–	–	–	–	–	–	0.9	sphagnum
TOMEN	Tomenthypnum	–	–	3.3	5.6	6.2	–	–	–	–	4.5	–	–	0.8	tomentypnum moss
TONI70	Tomentypnum nitens	–	–	8.3	–	–	–	1.7	–	–	–	–	–	0.3	tomentypnum moss
WAFL2	Warnstorfia fluitans	–	–	–	–	–	0.0	2.1	–	–	–	–	–	0.3	warnstorfia moss
	GROUND COVER														
.ALGAE	algae on soil	–	–	–	–	1.0	0.1	–	–	–	–	–	5.8	0.2	algae on soil
.BARE	bare soil or bare peat	0.0	0.0	0.0	13.3	4.9	1.1	0.9	0.0	0.0	2.1	58.0	12.6	1.8	bare soil or bare peat
.BRY	bryophytes	0.0	58.6	15.2	37.0	42.3	3.7	15.1	0.0	0.0	64.8	–	21.5	13.9	bryophytes
.LITT	litter and duff	94.7	97.0	65.9	74.2	92.2	10.3	24.8	96.2	97.0	95.7	40.0	81.7	27.6	duff litter
.BAVE	live basal vegetation	5.3	3.0	0.8	14.3	2.8	0.3	2.6	8.6	3.0	1.7	2.0	7.0	1.3	live plant bases
.SED	sediment cover	–	–	0.0	0.0	–	0.0	0.0	–	–	0.9	–	–	0.1	sediment cover
.WATER	water cover	–	0.0	8.0	16.2	1.0	1.1	5.1	49.8	99.5	8.8	97.6	20.5	3.6	open water

*. Area Codes:

BA	Battlement Mesa
CH	Cochetopa
CN	Cones
EL	Elk Mountains
ES	Eastern San Juans
GM	Grand Mesa
MS	Middle San Juans
MU	Muddy
NP	Northern Plateau
SA	Sawatch Mountains
SP	Southern Plateau
WE	West Elks

†. Note this is number of *samples*, not number of *fens*. In several inventories, there could be several vegetation samples in each fen.

2. Summary By Large Cluster

Area Code	Cluster Name	No. Fens	Acres	Elevation	Bryophyte Cover
BA	VII. Beaked sedge–water sedge, BRY < 25, often < 10	1	4.9	10,478	0
CH	II. Planeleaf willow–water sedge–beaked sedge, BRY < 60, usually < 30	1	0.4	10,647	0
CN	II. Planeleaf willow–water sedge–beaked sedge, BRY < 60, usually < 30	2	1.8	8,962–9,820–10,678	50–80–80
CN	IV. Planeleaf willow–short sedges or spike-rushes, BRY > 50	1	2.5	10,952	0
CN	VIII. Beaked sedge–water sedge, BRY > 35, often > 50	1	0.2	10,343	77
CN	IX. Short sedges	2	7.4	10,804–10,838–10,871	0
EL	II. Planeleaf willow–water sedge–beaked sedge, BRY < 60, usually < 30	2	5.4	10,591–10,611–10,631	0
EL	IV. Planeleaf willow–short sedges or spike-rushes, BRY > 50	1	10.1	11,034	50
EL	VII. Beaked sedge–water sedge, BRY < 25, often < 10	2	6.7	8,877–10,125–11,373	0–1–1
EL	VIII. Beaked sedge–water sedge, BRY > 35, often > 50	2	7.2	11,217–11,573–11,928	50
EL	IX. Short sedges	1	3.0	9,552	60
EL	X. Spike-rushes	1	2.7	11,180	20
ES	I. Tall willows-large sedges	2	65.0	8,959–8,972–8,984	0–5–10
ES	II. Planeleaf willow–water sedge–beaked sedge, BRY < 60, usually < 30	4	37.8	10,211–11,017–11,735	0–20–20
ES	III. Planeleaf willow–water sedge–beaked sedge, BRY > 60, often > 80	1	3.9	11,970	0
ES	IV. Planeleaf willow–short sedges or spike-rushes, BRY > 50	2	12.1	11,059–11,618–12,177	71–90–90
ES	VI. Barrenground willow	1	3.1	11,257	0
ES	VII. Beaked sedge–water sedge, BRY < 25, often < 10	3	7.5	9,443–10,747–11,740	0–20–20
ES	VIII. Beaked sedge–water sedge, BRY > 35, often > 50	4	29.6	11,081–11,615–12,031	0–90–90
ES	IX. Short sedges	4	67.2	10,184–11,313–11,993	0–73–97
GM	I. Tall willows-large sedges	1	29.5	9,652	11
GM	II. Planeleaf willow–water sedge–beaked sedge, BRY < 60, usually < 30	23	153.8	9,678–10,358–10,855	0–57–71
GM	III. Planeleaf willow–water sedge–beaked sedge, BRY > 60, often > 80	3	19.0	10,282–10,642–10,833	76–81–91
GM	VII. Beaked sedge–water sedge, BRY < 25, often < 10	97	1,067.1	9,652–10,341–10,869	0–12–21
GM	VIII. Beaked sedge–water sedge, BRY > 35, often > 50	27	246.1	9,994–10,417–10,864	0–98–101
GM	IX. Short sedges	145	1,731.6	9,912–10,382–10,869	0–98–106
GM	X. Spike-rushes	29	798.1	9,913–10,282–10,867	0–78–102
GM	XI. Semi-Aquatic	21	145.7	10,015–10,450–10,869	0–1–2
MS	I. Tall willows-large sedges	6	26.9	9,181–9,698–10,570	0–70–70
MS	II. Planeleaf willow–water sedge–beaked sedge, BRY < 60, usually < 30	6	71.5	9,237–10,024–10,574	12–48–70
MS	III. Planeleaf willow–water sedge–beaked sedge, BRY > 60, often > 80	18	76.3	9,181–10,595–11,735	0–85–130
MS	V. Bog birch–planeleaf willow	2	9.6	9,693–9,764–9,834	60–85–85
MS	VI. Barrenground willow	1	2.4	9,656	100
MS	VII. Beaked sedge–water sedge, BRY < 25, often < 10	10	36.3	9,877–10,499–11,289	0–7–20
MS	VIII. Beaked sedge–water sedge, BRY > 35, often > 50	13	80.3	10,031–10,977–11,755	10–74–108
MS	IX. Short sedges	14	27.9	9,419–11,075–11,626	0–91–120
MS	X. Spike-rushes	1	25.0	11,735	91
MU	VII. Beaked sedge–water sedge, BRY < 25, often < 10	2	0.9	9,487–9,492–9,496	0
NP	VII. Beaked sedge–water sedge, BRY < 25, often < 10	1	1.9	8,288	0
SA	I. Tall willows-large sedges	1	47.7	9,644	0
SA	II. Planeleaf willow–water sedge–beaked sedge, BRY < 60, usually < 30	5	62.8	9,814–10,477–11,068	0
SA	III. Planeleaf willow–water sedge–beaked sedge, BRY > 60, often > 80	9	271.3	9,683–10,325–11,359	0–167–250
SA	IV. Planeleaf willow–short sedges or spike-rushes, BRY > 50	12	72.8	9,381–11,049–12,009	0–7–40
SA	V. Bog birch–planeleaf willow	6	225.3	9,368–9,996–10,777	0–67–101
SA	VI. Barrenground willow	1	9.6	10,540	0
SA	VII. Beaked sedge–water sedge, BRY < 25, often < 10	3	12.5	9,724–10,120–10,826	0
SA	VIII. Beaked sedge–water sedge, BRY > 35, often > 50	2	0.5	10,487–11,241–11,994	0
SA	IX. Short sedges	8	108.5	9,352–11,067–11,847	0–19–155
SA	X. Spike-rushes	6	12.5	11,181–11,512–11,760	0–90–90
SP	VII. Beaked sedge–water sedge, BRY < 25, often < 10	1	0.2	7,999	0
WE	I. Tall willows-large sedges	1	2.6	10,190	0
WE	II. Planeleaf willow–water sedge–beaked sedge, BRY < 60, usually < 30	1	4.3	9,915	0
WE	VII. Beaked sedge–water sedge, BRY < 25, often < 10	1	1.8	9,358	0
WE	VIII. Beaked sedge–water sedge, BRY > 35, often > 50	1	3.3	7,926	90
WE	IX. Short sedges	3	2.8	10,033–10,205–10,548	0–23–70
WE	X. Spike-rushes	1	0.8	10,640	0

3. Association Tables For All Fens in 2009-2010 Inventory

Cluster I. SALIX-CAREX (*Salix–Carex* – Tall willows-large sedges). N = 5

	Subgroup	L1	L1	M1	M2	M3		
	Poly-	WFT	WFW	WFS	WFS	WFS		
	gon	694	225	345	132	344		
	Landscape Area	SA	WE	ES	MS	ES		
	Date	7/7	8/17	8/4	6/29	8/4		
	Year	2009	2010	2009	2010	2009		
	Elevation, ft	9644	10190	8984	10200	8959		
	Fen Landform	VS	SD	VS	SL	VS		
	Slope, %	12.0	0.0	0.0	1.0	1.0	Avg	
Code	Species	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Common Name
	TREES							
	SHRUBS							
DAFL3	Dasiphora floribunda	10.0	–	–	–	–	2.0	shrubby cinquefoil
SAGE2	Salix geyeriana	60.0	60.0	–	–	–	24.0	Geyer willow
SAMO2	Salix monticola	–	–	20.0	30.0	10.0	12.0	serviceberry willow
SAPL2	Salix planifolia	20.0	–	–	–	–	4.0	planeleaf willow
SAWO	Salix wolfii	20.0	–	–	–	–	4.0	Wolf's willow
	GRAMINOIDS							
CAAQ	Carex aquatilis	60.0	40.0	–	–	90.0	38.0	water sedge
CACA11	Carex canescens	80.0	–	–	–	–	16.0	pale sedge
CALA10	Carex lachenalii	30.0	–	–	–	–	6.0	twolipped sedge
CASC12	Carex scopulorum	–	–	–	99.5	–	19.9	cliff sedge
CAUT	Carex utriculata	–	–	99.5	20.0	99.5	43.8	beaked sedge
CAVE6	Carex vesicaria	90.0	97.0	–	–	–	37.4	blister sedge
DECE	Deschampsia cespitosa	–	–	–	–	0.5	0.1	tufted hairgrass
	FORBS							
CLRH2	Clementsia rhodantha	0.5	–	–	–	–	0.1	rose crown
EPILO	Epilobium	0.5	–	–	–	–	0.1	willow herb
EPHO	Epilobium hornemannii	–	0.5	–	–	–	0.1	Hornemann willow-herb
GATR2	Galium trifidum	–	–	–	–	0.5	0.1	small bedstraw
GEMA4	Geum macrophyllum	–	–	–	–	0.5	0.1	large-leaved avens
LITE2	Ligusticum tenuifolium	–	50.0	–	0.5	–	10.1	fern-leaf lovage
MELU	Medicago lupulina	–	–	0.5	–	–	0.1	black medic
PEGR2	Pedicularis groenlandica	–	0.5	–	0.5	–	0.2	elephantella
POPU3	Polemonium pulcherrimum	–	–	–	–	3.0	0.6	sky pilot
PSLE	Psychrophila leptosepala	–	40.0	–	0.5	–	8.1	elkslip marsh-marigold
SWPE	Swertia perennis	30.0	0.5	–	–	–	6.1	star gentian
VIOLA	Viola	0.5	–	–	–	–	0.1	violet
	BRYOPHYTES							
AULAC2	Aulacomnium	–	–	10.0	–	–	2.0	aulacomnium moss
	GROUND COVER							
.BARE	bare soil or bare peat	0.0	46.0	6.0	6.7	0.0	11.7	bare soil or bare peat
.LITT	litter and duff	97.5	40.0	91.6	95.1	97.0	84.2	duff litter
.BAVE	live basal vegetation	2.5	14.0	3.0	1.5	3.0	4.8	live plant bases
.WATER	water cover	–	34.1	–	12.0	–	9.2	open water
.BRY	bryophytes	83.9	2.0	3.2	40.0	22.0	30.2	bryophytes
.COWPIE	cowpies	–	–	–	–	4.0	0.8	cattle droppings
.ALGAE	algae on soil	–	–	20.0	–	–	4.0	algae on soil
							Avg	Range
	No. Species	12	8	3	6	7	7.2	3 - 12
	Total Live Cover	371.5	288.5	119.5	151.0	201.0	226.3	119.5 - 371.5
	TLC / NS	31.0	36.1	39.8	25.2	28.7	32.1	25.2 - 39.8
	Floristic Quality Index	7	7	5	7	6	6.1	5 - 7
	Peat-Forming Species %	77	48	83	80	93	76.1	48 - 93
	Wetland Plants %	85	72	91	57	96	80.1	57 - 96
	Water Depth	-12	0	-40	-30	-20	-20.4	-40 - 0
	Peat Depth	42	100	70	150	50	82.4	42 - 150
	pH	5.65	5.41	5.93	6.45	6.23	5.9	5.41 - 6.45
	EC, µS/cm	70	110	240	355	340	223.0	70 - 355
	Organic Matter, %	41.7	41.0	43.4	72.0	65.0	52.6	41.0 - 72.0
	Carbon, %	19.6	21.2	20.0	37.1	33.5	26.3	19.6 - 37.1

Cluster II. SAPL2-CAAQ-CAUT (*Salix planifolia–Carex aquatilis–Carex utriculata* – Planeleaf willow–water sedge–beaked sedge, BRY < 60, usually < 30). N = 18

	Subgroup	K1	K1	K1	K1	K3	K4	K6	K7	K7	K7	K7	Q1	Q2	T1	T3	T6	T7	T8		
	Poly-	FSA	WFC	WFS	WFT	WFW	FGM	WFS	FGM	WFG	WFS	WFW	WFT	WFT	WFW	WFT	WFL	WFT	WFS		
	gon	004	122	436	600	490	003	420	006	564	039	377	634	627	444	453	081	467	302		
	Landscape Area	SA	CH	ES	SA	EL	GM	ES	GM	GM	CN	WE	SA	SA	EL	SA	ES	SA	ES		
	Date	7/13	9/2	8/7	7/31	6/16	7/24	8/2	7/8	8/19	9/29	7/6	7/21	7/9	7/23	7/30	9/16	9/21	8/4		
	Year	2009	2009	2009	2009	2010	2009	2009	2009	2009	2009	2010	2009	2009	2009	2009	2009	2009	2009		
	Elevation, ft	10668	10648	11148	11068	10631	10476	10975	10165	10278	10679	9915	10637	10030	10592	9814	11734	10800	10210		
	Fen Landform	TS	BA	SL	SL	TS	SL	VS	BA	SL	SL	SL	SL	BA	SL	BA	SL	SL	VS		
	Slope, %	1.0	1.0	2.0	1.0	10.0	3.0	1.0	0.0	2.0	2.0	3.0	5.0	2.0	4.0	1.0	13.0	1.0	3.0	Avg	
Code	Species	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Common Name
	TREES																				
	SHRUBS																				
DAFL3	Dasiphora floribunda	–	–	–	–	–	–	–	–	–	–	–	–	–	–	20.0	–	–	–	1.1	shrubby cinquefoil
SAMO2	Salix monticola	–	–	–	–	–	–	–	–	–	–	0.5	–	–	–	–	–	–	–	0.0	serviceberry willow
SAPL2	Salix planifolia	10.0	10.0	70.0	20.0	97.0	30.0	40.0	80.0	30.0	20.0	20.0	90.0	97.0	70.0	–	20.0	10.0	40.0	41.9	planeleaf willow
SAWO	Salix wolfii	–	–	–	–	–	–	–	–	–	–	–	–	10.0	–	3.0	–	–	–	0.7	Wolf's willow
	GRAMINOIDS																				
AGSC5	Agrostis scabra	–	–	–	–	–	–	–	–	–	–	–	–	–	40.0	–	60.0	0.5	–	5.6	rough bentgrass
CACA4	Calamagrostis canadensis	–	97.0	60.0	–	–	–	–	–	90.0	–	–	–	10.0	–	–	–	–	–	14.3	bluejoint reedgrass
CAAQ	Carex aquatilis	97.0	80.0	99.5	90.0	90.0	99.5	–	90.0	70.0	80.0	20.0	40.0	70.0	90.0	–	60.0	80.0	70.0	68.1	water sedge
CABU6	Carex buxbaumii	–	–	–	–	–	–	–	–	–	–	–	–	–	–	40.0	–	–	–	2.2	Buxbaum's sedge
CAIN11	Carex interior	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	50.0	–	–	2.8	inland sedge
CAJO	Carex jonesii	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	80.0	4.4	Jones's sedge
CALA11	Carex lasiocarpa	–	–	–	–	–	–	–	–	–	–	–	–	–	–	20.0	–	80.0	–	5.6	woollyfruit sedge
CAUT	Carex utriculata	10.0	–	0.5	–	30.0	20.0	70.0	90.0	20.0	97.0	60.0	–	–	–	97.0	–	–	20.0	28.6	beaked sedge
CAVE6	Carex vesicaria	–	–	–	–	–	–	–	–	–	–	–	90.0	90.0	–	–	–	–	–	10.0	blister sedge
DECE	Deschampsia cespitosa	–	–	–	–	–	–	99.5	–	–	–	–	–	10.0	–	10.0	–	–	–	6.6	tufted hairgrass
ELAC	Eleocharis acicularis	–	–	–	–	–	–	–	–	–	–	–	–	–	40.0	–	–	–	–	2.2	needle spike-rush
JUNCU	Juncus	–	–	–	–	–	–	–	–	–	–	–	10.0	–	–	–	–	–	–	0.6	rush
	FORBS																				
CLRH2	Clementsia rhodantha	–	–	0.5	–	0.5	–	–	–	–	–	–	–	–	20.0	3.0	0.5	–	0.5	1.4	rose crown
EPILO	Epilobium	–	–	–	–	–	–	–	–	–	–	–	–	0.5	0.5	–	–	–	–	0.1	willow herb
EPHO	Epilobium hornemannii	–	–	0.5	–	3.0	–	–	–	–	–	–	–	–	–	–	0.5	–	–	0.2	Hornemann willow-herb
FORB	Forb	–	–	–	–	–	–	–	–	–	–	–	–	–	0.5	–	–	–	–	0.0	unknown forb
GATR2	Galium trifidum	–	–	–	–	–	–	–	–	–	–	–	0.5	0.5	20.0	0.5	–	0.5	–	1.2	small bedstraw
GEMA4	Geum macrophyllum	–	–	–	–	–	–	–	–	–	–	–	–	10.0	–	–	–	20.0	–	1.7	large-leaved avens
LIGUS	Ligusticum	–	–	–	–	–	–	–	–	–	–	–	–	–	20.0	–	–	–	–	1.1	ligusticum
MIPE	Mitella pentandra	–	–	–	–	3.0	–	–	–	–	–	–	–	–	–	–	–	–	–	0.2	five-stamen miterwort
PEGR2	Pedicularis groenlandica	–	–	–	3.0	10.0	–	–	–	–	–	–	30.0	–	10.0	–	20.0	–	0.5	4.1	elephantella
PEPA3	Pedicularis parryi	–	–	–	–	–	–	–	–	–	–	–	–	10.0	–	–	–	–	–	0.6	Parry's lousewort
PEGA3	Perideridia gairdneri	–	–	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.0	Gardner's yampah
PEAM8	Persicaria amphibia	–	–	–	–	–	–	–	–	–	–	–	–	–	–	80.0	–	–	–	4.4	water smartweed
PESA5	Petasites sagittatus	–	–	–	–	–	–	–	–	–	–	–	–	70.0	–	–	–	–	–	3.9	arrowleaf sweet coltsfoot
POCA2	Polemonium caeruleum	–	–	–	–	–	–	–	–	–	–	–	–	10.0	–	–	–	–	–	0.6	sky pilot
POTEN	Potentilla	–	–	–	–	–	–	–	80.0	–	–	–	–	–	–	–	–	–	–	4.4	cinquefoil
PSLE	Psychrophila leptosepala	–	–	0.5	30.0	30.0	–	0.5	–	40.0	–	–	–	70.0	10.0	–	50.0	–	60.0	16.2	elkslip marsh-marigold
SWPE	Swertia perennis	–	10.0	0.5	–	0.5	–	–	–	–	–	–	–	–	–	3.0	–	–	–	0.8	star gentian
TRAL8	Trollius albiflorus	–	–	–	–	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–	0.0	American globe flower
VEAM2	Veronica americana	–	–	–	–	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–	0.0	American brooklime
VIOLA	Viola	–	10.0	–	–	–	–	–	–	–	–	–	–	–	10.0	–	–	3.0	–	1.3	violet
	BRYOPHYTES																				
AULAC2	Aulacomnium	–	–	–	–	–	–	10.0	–	–	–	–	78.2	–	–	–	–	–	–	4.9	aulacomnium moss
BRYUM2	Bryum	–	–	–	–	–	–	–	–	30.0	–	–	–	–	–	–	–	–	0.1	1.7	bryum moss
DREPA3	Drepanocladus	–	–	–	–	–	20.0	–	–	–	30.0	–	4.0	–	–	–	20.0	–	–	4.1	drepanocladus moss
SPHAG2	Sphagnum	–	–	–	–	–	20.0	–	–	–	–	–	–	–	–	–	–	–	–	1.1	sphagnum
TOMEN	Tomenthypnum	–	–	–	–	–	–	–	–	–	20.0	–	–	–	–	–	–	–	–	1.1	tomentypnum moss

Code	Subgroup Poly- gon Species	K1 FSA 004 Cvr	K1 WFC 122 Cvr	K1 WFS 436 Cvr	K1 WFT 600 Cvr	K3 WFW 490 Cvr	K4 FGM 003 Cvr	K6 WFS 420 Cvr	K7 FGM 006 Cvr	K7 WFG 564 Cvr	K7 WFS 039 Cvr	K7 WFW 377 Cvr	Q1 WFT 634 Cvr	Q2 WFT 627 Cvr	T1 WFW 444 Cvr	T3 WFT 453 Cvr	T6 WFL 081 Cvr	T7 WFT 467 Cvr	T8 WFS 302 Cvr	Cvr	Common Name
	GROUND COVER																				
.BARE	bare soil or bare peat	0.0	0.0	10.0	0.0	36.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	0.0	8.3	2.0	6.1	3.9	bare soil or bare peat
.LITT	litter and duff	99.5	97.0	88.7	99.5	61.3	97.0	97.0	97.0	97.0	97.0	95.7	98.0	97.0	98.5	99.0	87.0	99.0	92.2	94.3	duff litter
.SED	sediment cover	–	–	–	–	–	–	–	–	–	–	–	–	–	0.0	–	–	–	–	0.0	sediment cover
.COGR	coarse gravel	–	–	–	–	–	–	–	–	10.0	–	–	–	–	–	–	–	–	–	0.6	coarse gravel
.BAVE	live basal vegetation	0.5	3.0	2.5	0.5	1.5	3.0	3.0	3.0	2.5	3.0	4.0	2.0	3.0	1.5	1.0	2.0	0.5	3.0	2.2	live plant bases
.WATER	water cover	–	0.0	–	8.0	22.0	–	–	99.5	–	48.0	61.7	–	–	–	60.8	–	–	–	16.7	open water
.BRY	bryophytes	26.1	58.6	26.6	57.4	50.0	40.0	10.0	0.0	0.0	12.0	0.0	98.5	46.0	28.1	34.0	22.0	28.0	6.1	30.2	bryophytes
.ELKPEL	elk pellets	–	–	2.0	–	–	–	–	–	–	–	–	0.1	–	–	–	–	2.0	–	0.2	elk droppings
																				Avg	Range
	No. Species	3	5	9	4	11	3	4	4	5	3	4	6	13	12	10	8	7	7	6.6	3 - 13
	Total Live Cover	117.0	207.0	232.5	143.0	261.5	149.5	210.0	260.0	250.0	197.0	100.5	260.5	388.0	311.0	176.5	261.0	114.0	271.0	217.2	100.5 - 388.0
	TLC / NS	39.0	41.4	25.8	35.8	23.8	49.8	52.5	65.0	50.0	65.7	25.1	43.4	29.8	25.9	17.6	32.6	16.3	38.7	37.7	16.3 - 65.7
	Floristic Quality Index	6	6	6	6	7	6	5	6	6	6	6	7	7	6	6	6	7	7	6.2	5 - 7
	Peat-Forming Species %	100	95	99	79	86	100	52	77	84	100	100	100	76	51	58	58	88	78	82.2	51 - 100
	Wetland Plants %	100	93	100	100	98	100	76	77	100	100	100	96	93	70	93	67	98	85	91.4	67 - 100
	Water Depth	-29	-20	-2	-4	-1	0	-15	5	0	2	0	-43	-10	-37	-11	0	-15	-45	-12.5	-45 - 5
	Peat Depth	45	35	50	48	80	45	45	40	40	70	110	89	40	44	52	55	40	55	54.6	35 - 110
	pH	4.77	6.29	5.37	4.81	7.14	6.21	4.87	5.02	6.30	6.37	5.75	5.33	5.61	5.52	5.67	4.94	4.97	5.62	5.6	4.77 - 7.14
	EC, µS/cm	50	70	50	20	250	130	30	30	230	390	72	50	90	90	70	40	60	100	101.2	20 - 390
	Organic Matter, %	64.8	44.9	65.8	46.8	57.0	65.1	37.6	70.1	49.2	71.1	68.0	70.5	56.6	44.0	78.5	69.9	79.3	70.8	61.7	37.6 - 79.3
	Carbon, %	25.5	21.3	31.4	22.6	29.6	31.9	17.7	36.3	25.3	37.8	35.4	38.4	30.4	21.7	43.5	36.8	42.9	35.6	31.3	17.7 - 43.5

Cluster III. SAPL2-CAAQ-CAUT-BRY (*Salix planifolia–Carex aquatilis–Carex utriculata*-Bryophytes – Planeleaf willow–water sedge–beaked sedge, BRY > 60, often > 80). N = 10

	Subgroup	K1	K2	K3	K3	K3	K3	K5	T4	T5	T9		
	Poly-	WFT	FSA	FSA	FSA	JSA	WFT	WFS	WFC	WFS	WFT		
	gon	614	001	002	003	007	923	204	193	375	391		
	Landscape Area	SA	SA	SA	SA	SA	SA	MS	SA	ES	SA		
	Date	9/22	6/25	6/25	6/25	9/21	9/22	7/14	7/8	8/9	8/12		
	Year	2009	2009	2009	2009	2009	2009	2010	2009	2009	2009		
	Elevation, ft	11360	9683	9802	9726	9839	11233	11081	10228	11969	10412		
	Fen Landform	VS	BA	SL	VS	VS	SL	VS	VS	TS	SL		
	Slope, %	10.0	6.0	8.0	0.5	0.0	3.0	11.0	1.0	6.0	11.0	Avg	
Code	Species	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Common Name
	TREES												
	SHRUBS												
DAFL3	Dasiphora floribunda	–	–	–	20.0	–	–	–	–	–	20.0	4.0	shrubby cinquefoil
SABE2	Salix bebbiana	–	–	–	–	–	–	–	10.0	–	–	1.0	Bebb willow
SAGE2	Salix geyeriana	–	–	0.5	–	–	–	–	–	–	–	0.1	Geyer willow
SAPL2	Salix planifolia	60.0	80.0	40.0	70.0	97.0	40.0	30.0	80.0	10.0	40.0	54.7	planeleaf willow
SAWO	Salix wolfii	–	40.0	80.0	80.0	–	–	–	20.0	–	20.0	24.0	Wolf's willow
	GRAMINOIDS												
CACA4	Calamagrostis canadensis	0.5	–	–	–	–	–	–	–	–	30.0	3.0	bluejoint reedgrass
CAREX	Carex	–	–	–	–	–	–	–	–	–	20.0	2.0	sedge
CAAQ	Carex aquatilis	97.0	80.0	97.0	97.0	40.0	90.0	–	90.0	90.0	–	68.1	water sedge
CACA12	Carex capillaris	–	–	–	–	–	–	–	20.0	–	–	2.0	hair sedge
CALE10	Carex leptalea	–	–	0.5	–	–	–	–	–	–	–	0.1	bristlystalked sedge
CANO3	Carex nova	–	–	–	–	–	–	–	–	20.0	–	2.0	new sedge
CAUT	Carex utriculata	–	–	20.0	30.0	30.0	70.0	90.0	–	–	–	24.0	beaked sedge
CAVE6	Carex vesicaria	–	–	–	–	–	–	–	–	–	97.0	9.7	blister sedge
DECE	Deschampsia cespitosa	–	–	–	–	–	40.0	–	–	10.0	–	5.0	tufted hairgrass
POLE2	Poa leptocoma	–	–	–	–	–	–	–	–	40.0	–	4.0	bog bluegrass
POHU	Podagrostis humilis	–	–	–	–	–	–	–	–	–	0.5	0.1	alpine bentgrass
	FORBS												
BIBI5	Bistorta bistortoides	–	0.5	–	30.0	–	–	–	30.0	–	–	6.0	American bistort
BIVI2	Bistorta vivipara	–	–	–	–	–	–	–	3.0	0.5	–	0.3	viviparous bistort
CACO6	Cardamine cordifolia	–	–	–	–	–	–	60.0	–	–	–	6.0	heartleaf bittercress
CLRH2	Clementsia rhodantha	0.5	–	–	20.0	–	–	–	–	10.0	–	3.0	rose crown
COVI6	Coeloglossum viride	–	–	–	–	–	–	–	3.0	–	–	0.3	green bog orchid
EPHO	Epilobium hornemannii	–	–	3.0	–	–	0.5	–	–	–	–	0.3	Hornemann willow-herb
EQAR	Equisetum arvense	–	–	–	–	–	–	–	–	–	3.0	0.3	field horsetail
GEMA4	Geum macrophyllum	–	–	–	–	–	–	–	0.5	–	–	0.1	large-leaved avens
LITE2	Ligusticum tenuifolium	–	–	–	–	–	–	20.0	10.0	–	–	3.0	fern-leaf lovage
PEGR2	Pedicularis groenlandica	–	–	–	40.0	–	–	–	–	40.0	30.0	11.0	elephantella
PEPA3	Pedicularis parryi	–	30.0	–	–	–	–	–	10.0	–	–	4.0	Parry's lousewort
POCA2	Polemonium caeruleum	–	–	–	–	–	–	–	10.0	–	80.0	9.0	sky pilot
PODI2	Potentilla diversifolia	–	–	–	10.0	–	–	–	–	–	–	1.0	varileaf cinquefoil
PSLE	Psychrophila leptosepala	–	–	–	30.0	–	–	20.0	30.0	60.0	–	14.0	elkslip marsh-marigold
SETR	Senecio triangularis	–	–	–	–	–	–	70.0	–	–	–	7.0	arrowleaf groundsel
SWPE	Swertia perennis	–	–	–	–	–	–	–	–	0.5	3.0	0.3	star gentian
THAL	Thalictrum alpinum	–	10.0	–	60.0	–	–	–	–	–	70.0	14.0	alpine meadow-rue
TRHY	Trifolium hybridum	–	–	–	10.0	–	–	–	–	–	–	1.0	Alsike clover
VIMA2	Viola macloskeyi	–	–	–	0.5	–	–	–	–	–	–	0.1	small white violet
	BRYOPHYTES												
AULAC2	Aulacomnium	–	–	–	–	70.0	–	–	–	–	–	7.0	aulacomnium moss
AUPA70	Aulacomnium palustre	20.0	–	–	–	–	–	–	–	–	–	2.0	aulacomnium moss
CLDE70	Climacium dendroides	–	–	–	–	70.0	–	–	–	–	–	7.0	tree climacium moss
DREPA3	Drepanocladus	20.0	–	–	–	10.0	–	20.0	–	–	–	5.0	drepanocladus moss
SCAPA	Scapania	–	–	–	–	–	–	90.0	–	–	–	9.0	scapania
SPHAG2	Sphagnum	–	–	–	–	80.0	–	–	–	–	–	8.0	sphagnum
THUID	Thuidium	–	–	–	–	–	–	20.0	–	–	–	2.0	thuidium moss
TOMEN	Tomenthypnum	60.0	–	–	–	20.0	–	–	–	–	–	8.0	tomentypnum moss
	GROUND COVER												
.BARE	bare soil or bare peat	0.0	0.0	0.0	0.0	0.0	1.5	2.0	0.0	0.0	0.0	0.3	bare soil or bare peat
.LITT	litter and duff	98.5	97.5	97.0	97.5	99.5	99.0	97.1	97.0	97.0	97.5	97.8	duff litter
.BAVE	live basal vegetation	1.5	2.5	3.0	2.5	0.5	1.0	2.4	3.0	3.0	2.5	2.2	live plant bases
.WATER	water cover	6.0	–	–	–	–	–	10.0	–	–	–	1.6	open water
.BRY	bryophytes	82.8	98.0	82.8	99.0	89.2	99.0	83.6	99.5	90.8	99.5	92.4	bryophytes
												Avg	Range
	No. Species	4	6	7	13	3	5	6	13	10	12	7.9	3 - 13
	Total Live Cover	158.0	240.5	241.0	477.5	167.0	240.5	230.0	303.5	221.0	413.5	269.3	158.0 - 477.5
	TLC / NS	39.5	40.1	34.4	36.7	55.7	48.1	38.3	23.3	22.1	34.5	37.3	22.1 - 55.7
	Floristic Quality Index	6	7	7	7	6	6	7	7	7	7	6.7	6 - 7
	Peat-Forming Species %	100	79	65	48	100	83	41	64	71	49	70.0	41 - 100
	Wetland Plants %	100	77	83	72	100	92	72	71	82	61	81.0	61 - 100
	Water Depth	-13	-29	-18	-3	-27	-5	0	-18	-32	-33	-17.8	-33 - 0
	Peat Depth	50	70	92	55	40	35	96	52	85	64	63.9	35 - 96
	pH	6.73	5.82	5.28	5.46	5.83	6.05	6.60	6.37	5.80	6.01	6.0	5.28 - 6.73
	EC, µS/cm	20	60	50	50	200	260	570	260	140	100	171.0	20 - 570
	Organic Matter, %	56.9	52.7	80.7	64.1	73.4	61.0	48.0	64.7	65.6	63.2	63.0	48.0 - 80.7
	Carbon, %	28.1	26.5	43.9	34.9	38.9	28.8	25.0	31.7	32.8	27.3	31.8	25.0 - 43.9

Cluster IV. SAPL2-CAIL-CASI2-CACA11-CASC12-ELQU2-ELAC-BRY (*Salix planifolia–Carex illota–Carex simulata–Carex canescens–Carex scopulorum–Eleocharis quinqueflora–Eleocharis acicularis*-Bryophytes – Planeleaf willow–short sedges or spike-rushes, BRY > 50). N = 16

	Subgroup	P1	P1	P2	P3	P4	P4	P5	S1	S1	S1	S2	T2	V1	V2	W1	W2		
	Poly-	WFC	WFT	WFT	WFT	WFT	WFT	WFT	WFS	WFT	WFT	FSA	WFW	WFS	WFT	WFS	WFT		
	gon	138	094	093	924	235	422	717	387	362	532	201	447	025	762	398	415		
	Landscape Area	SA	SA	SA	SA	SA	SA	SA	ES	SA	SA	SA	EL	CN	SA	ES	SA		
	Date	9/2	8/31	8/31	8/11	7/15	9/23	7/30	8/1	7/14	9/17	8/27	7/20	6/28	6/23	8/9	8/27		
	Year	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2010	2009	2009	2009	2009		
	Elevation, ft	10890	11002	11192	11066	10345	11962	12007	11058	11768	11484	9810	11034	10953	9381	12184	11677		
	Fen Landform	SL	SL	SL	SL	VS	TS	TS	VS	TS	TS	VS	VS	TS	VS	VS	TS		
	Slope, %	3.5	6.0	9.0	4.0	1.0	3.0	0.0	2.0	3.0	3.0	1.5	2.0	2.0	4.0	10.0	1.0	Avg	
Code	Species	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Common Name
	TREES																		
	SHRUBS																		
DAFL3	Dasiphora floribunda	–	–	–	–	–	–	–	–	–	–	–	–	–	20.0	–	–	1.3	shrubby cinquefoil
SABR	Salix brachycarpa	–	–	–	–	–	–	–	–	–	–	–	–	–	10.0	–	–	0.6	barrenground willow
SAPL2	Salix planifolia	20.0	10.0	30.0	30.0	70.0	60.0	40.0	80.0	60.0	80.0	30.0	10.0	20.0	30.0	30.0	–	37.5	planeleaf willow
SAWO	Salix wolfii	–	–	–	–	–	–	–	–	–	–	20.0	–	–	40.0	–	40.0	6.3	Wolf's willow
	GRAMINOIDS																		
AGSC5	Agrostis scabra	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10.0	0.6	rough bentgrass
CACA4	Calamagrostis canadensis	–	–	–	–	3.0	–	–	–	–	–	–	–	–	–	–	0.5	0.2	bluejoint reedgrass
CAAQ	Carex aquatilis	80.0	60.0	60.0	–	90.0	90.0	70.0	90.0	90.0	10.0	97.0	50.0	97.0	97.0	–	–	61.3	water sedge
CACA11	Carex canescens	–	–	70.0	50.0	30.0	80.0	70.0	0.5	–	–	3.0	–	–	–	–	–	19.0	pale sedge
CAIL	Carex illota	–	–	–	–	–	–	3.0	30.0	90.0	97.0	40.0	–	–	–	–	–	16.3	sheep sedge
CALE8	Carex lenticularis	–	–	–	–	–	–	–	–	–	–	–	50.0	–	–	–	–	3.1	lakeshore sedge
CANO2	Carex norvegica	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.5	–	0.0	Norway sedge
CAPE12	Carex perglobosa	–	–	–	–	–	–	–	–	–	–	–	0.5	–	–	–	–	0.0	globe sedge
CAPH2	Carex phaeocephala	–	–	–	–	–	–	–	–	–	–	–	10.0	–	–	–	–	0.6	dunhead sedge
CASA10	Carex saxatilis	–	–	–	–	–	–	–	–	–	–	–	20.0	–	–	–	–	1.3	rock sedge
CASC12	Carex scopulorum	–	–	–	–	–	–	50.0	–	–	–	–	–	–	–	10.0	90.0	9.4	cliff sedge
CASI2	Carex simulata	–	–	–	–	–	–	–	–	–	–	–	–	97.0	80.0	–	–	11.1	short-beaked sedge
CAUT	Carex utriculata	–	–	–	–	–	–	–	–	–	–	30.0	–	–	–	70.0	–	6.3	beaked sedge
CAVE6	Carex vesicaria	–	–	–	20.0	–	–	–	–	–	–	–	–	–	–	–	–	1.3	blister sedge
DECE	Deschampsia cespitosa	20.0	10.0	–	30.0	–	3.0	–	10.0	40.0	10.0	–	0.5	–	3.0	–	–	7.9	tufted hairgrass
ELQU2	Eleocharis quinqueflora	80.0	97.0	90.0	80.0	–	–	–	–	–	0.5	–	30.0	–	–	10.0	–	24.2	few-flowered spike-rush
ERAL7	Eriophorum altaicum	–	3.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.2	Altai cottongrass
HIHIA	Hierochloe hirta ssp. arctica	–	–	–	–	10.0	–	–	–	–	–	–	–	–	–	–	–	0.6	northern sweetgrass
JUNCU	Juncus	–	–	–	–	30.0	–	–	–	–	–	–	–	–	–	–	0.5	1.9	rush
LUPA4	Luzula parviflora	–	–	–	–	20.0	–	–	–	–	–	–	–	–	–	–	–	1.3	millet woodrush
LUSU9	Luzula subcapitata	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10.0	10.0	1.3	Colorado woodrush
PHCO9	Phleum commutatum	–	–	–	–	–	–	–	20.0	30.0	–	–	–	–	–	–	–	3.1	alpine timothy
POHU	Podagrostis humilis	–	–	–	10.0	–	20.0	–	–	–	–	–	–	–	–	–	0.5	1.9	alpine bentgrass
	FORBS																		
ANCO	Antennaria corymbosa	–	–	–	20.0	–	–	–	–	–	–	–	–	–	–	–	–	1.3	plains pussytoes
BIVI2	Bistorta vivipara	–	–	–	–	0.5	3.0	–	–	0.5	3.0	–	–	–	3.0	0.5	20.0	1.9	viviparous bistort
CEFO2	Cerastium fontanum	–	–	–	–	–	–	–	–	–	–	–	–	–	0.5	–	–	0.0	mouse-ear
CLRH2	Clementsia rhodantha	3.0	10.0	–	20.0	10.0	–	50.0	20.0	0.5	10.0	3.0	–	–	–	20.0	–	9.2	rose crown
EPHO	Epilobium hornemannii	–	0.5	0.5	10.0	0.5	–	–	60.0	–	0.5	3.0	–	–	–	20.0	0.5	6.0	Hornemann willow-herb
ERIGE2	Erigeron	–	–	–	–	–	–	–	–	–	0.5	–	–	–	–	–	–	0.0	fleabane
FORB	Forb	–	–	–	–	0.5	–	–	–	–	–	–	–	–	–	–	–	0.0	unknown forb
GATR2	Galium trifidum	–	–	–	–	0.5	–	–	–	–	–	–	–	–	–	–	–	0.0	small bedstraw
GETH	Gentianopsis thermalis	–	–	–	20.0	–	–	–	–	–	0.5	–	–	–	–	–	–	1.3	Rocky Mountain fringed gentian
MIOR2	Micranthes oregana	–	–	–	–	10.0	–	–	–	–	–	–	–	–	–	–	–	0.6	Oregon saxifrage
PAPS5	Packera pseudaurea	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	20.0	1.3	golden groundsel
PEGR2	Pedicularis groenlandica	3.0	10.0	–	0.5	20.0	20.0	50.0	–	40.0	20.0	–	0.5	20.0	–	50.0	–	14.6	elephantella
POEA	Podistera eastwoodiae	–	–	–	–	–	–	–	–	–	–	–	0.5	–	–	–	–	0.0	Eastwood's podistera
POCA2	Polemonium caeruleum	–	–	–	–	10.0	–	–	–	–	–	–	–	–	3.0	–	–	0.8	sky pilot
POPU9	Potentilla pulcherrima	–	–	–	–	10.0	–	–	–	–	–	–	–	–	–	–	–	0.6	beauty cinquefoil
PSLE	Psychrophila leptosepala	30.0	20.0	–	70.0	30.0	20.0	20.0	30.0	40.0	10.0	–	–	3.0	3.0	80.0	50.0	25.4	elkslip marsh-marigold
SPRO	Spiranthes romanzoffiana	–	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.0	continental lady's tresses
SWPE	Swertia perennis	–	–	–	–	10.0	–	10.0	–	0.5	–	10.0	–	–	0.5	–	10.0	2.6	star gentian
THAL	Thalictrum alpinum	–	–	–	–	–	–	–	–	–	20.0	–	–	–	70.0	–	–	5.6	alpine meadow-rue

	Subgroup	P1	P1	P2	P3	P4	P4	P5	S1	S1	S1	S2	T2	V1	V2	W1	W2		
	Poly-	WFC	WFT	WFT	WFT	WFT	WFT	WFT	WFS	WFT	WFT	FSA	WFW	WFS	WFT	WFS	WFT		
	gon	138	094	093	924	235	422	717	387	362	532	201	447	025	762	398	415		
	Landscape Area	SA	SA	SA	SA	SA	SA	SA	ES	SA	SA	SA	EL	CN	SA	ES	SA		
	Date	9/2	8/31	8/31	8/11	7/15	9/23	7/30	8/1	7/14	9/17	8/27	7/20	6/28	6/23	8/9	8/27		
	Year	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2010	2009	2009	2009	2009		
	Elevation, ft	10890	11002	11192	11066	10345	11962	12007	11058	11768	11484	9810	11034	10953	9381	12184	11677		
	Fen Landform	SL	SL	SL	SL	VS	TS	TS	VS	TS	TS	VS	VS	TS	VS	VS	TS		
	Slope, %	3.5	6.0	9.0	4.0	1.0	3.0	0.0	2.0	3.0	3.0	1.5	2.0	2.0	4.0	10.0	1.0	Avg	
Code	Species	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Common Name
VIOLA	Viola	–	3.0	–	10.0	20.0	–	–	0.5	–	–	–	–	–	–	–	3.0	2.3	violet
VILA10	Viola labradorica	–	–	–	–	–	–	–	–	–	–	–	–	–	20.0	–	–	1.3	Labrador violet
VIMA2	Viola macloskeyi	10.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.6	small white violet
	BRYOPHYTES																		
AULAC2	Aulacomnium	–	–	–	–	–	–	–	50.0	–	–	–	–	–	29.9	40.0	–	7.5	aulacomnium moss
DREPA3	Drepanocladus	–	–	–	–	–	–	–	40.0	–	–	–	50.0	–	10.0	30.0	–	8.1	drepanocladus moss
TOMEN	Tomenthypnum	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.5	–	0.0	tomentypnum moss
	GROUND COVER																		
.BARE	bare soil or bare peat	6.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	3.4	1.9	bare soil or bare peat
.LITT	litter and duff	89.4	98.5	96.1	98.5	98.0	94.2	99.0	97.5	98.5	97.0	97.5	95.6	99.5	98.5	79.8	95.6	95.8	duff litter
.SED	sediment cover	–	–	–	0.0	–	–	–	–	–	–	–	–	0.0	–	–	–	0.0	sediment cover
.BAVE	live basal vegetation	2.0	1.5	2.0	1.5	2.0	2.0	1.0	2.5	1.5	3.0	2.5	4.4	0.5	1.5	3.0	1.0	2.0	live plant bases
.WATER	water cover	–	55.8	–	–	–	–	–	–	–	0.1	–	–	–	–	–	–	3.5	open water
.BRY	bryophytes	38.0	46.6	91.4	94.6	86.7	79.1	23.2	86.7	94.1	97.5	10.0	70.0	21.2	95.2	49.4	43.2	64.2	bryophytes
.COWPIE	cowpies	10.0	–	–	–	–	–	–	–	–	–	–	–	–	6.0	–	–	1.0	cattle droppings
.ELKPEL	elk pellets	–	–	0.6	–	2.0	–	–	–	–	–	–	–	–	–	–	–	0.2	elk droppings
																		Avg	Range
	No. Species	8	11	5	13	19	8	9	10	10	13	9	10	5	14	12	13	10.6	5 - 19
	Total Live Cover	246.0	220.5	250.5	350.5	345.0	296.0	363.0	341.0	391.5	261.5	236.0	121.0	237.0	359.5	370.5	235.0	289.0	121.0 - 391.5
	TLC / NS	30.8	20.0	50.1	27.0	18.2	37.0	40.3	34.1	39.1	20.1	26.2	12.1	47.4	25.7	30.9	18.1	29.8	12.1 - 50.1
	Floristic Quality Index	7	7	7	7	7	7	7	7	7	8	7	8	6	7	7	7	7.0	6 - 8
	Peat-Forming Species %	74	81	100	50	68	91	81	59	72	79	89	94	99	55	49	44	73.9	44 - 100
	Wetland Plants %	93	94	100	86	72	95	85	81	87	91	92	94	100	74	74	55	85.8	55 - 100
	Water Depth	-22	-4	-4	0	-1	-16	-3	0	-45	-21	-48	-5	3	-10	-10	-12	-12.4	-48 - 3
	Peat Depth	92	48	48	88	42	30	48	32	45	47	92	105	125	150	50	55	68.6	30 - 150
	pH	6.00	5.61	5.61	5.59	5.36	5.90	5.02	6.02	5.55	5.84	6.30	5.82	5.66	6.04	6.22	5.31	5.7	5.02 - 6.30
	EC, µS/cm	39	40	40	20	80	100	40	70	60	50	51	67	60	110	90	30	59.2	20 - 110
	Organic Matter, %	70.0	61.4	85.6	76.7	19.4	33.5	86.2	37.2	48.4	52.9	52.3	54.0	58.0	82.3	43.3	75.8	58.6	19.4 - 86.2
	Carbon, %	38.7	32.3	46.5	45.1	10.0	17.9	43.0	21.7	25.7	23.8	19.2	28.1	31.0	43.6	17.9	40.4	30.3	10.0 - 46.5

Cluster V. BEGL-SAPL2 (*Betula glandulosa–Salix planifolia* – Bog birch–planeleaf willow). N = 6 of 6

	Subgroup	R1	R1	R2	R2	R3	R4		
	Poly-	JSA	WFT	FSA	WFT	FSA	WFT		
	gon	008	310	010	721	005	909		
	Landscape Area	SA	SA	SA	SA	SA	SA		
	Date	9/21	8/27	9/29	6/23	7/20	7/9		
	Year	2009	2009	2009	2009	2009	2009		
	Elevation, ft	9837	10776	10031	9368	9576	10384		
	Fen Landform	VS	SL	TS	VS	VS	VS		
	Slope, %	1.0	2.5	1.0	1.0	4.0	2.0	Avg	
Code	Species	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Common Name
	TREES								
	SHRUBS								
BEGL	Betula glandulosa	50.0	40.0	30.0	40.0	50.0	80.0	48.3	bog birch
DAFL3	Dasiphora floribunda	0.5	–	50.0	40.0	40.0	10.0	23.4	shrubby cinquefoil
SAPL2	Salix planifolia	60.0	80.0	30.0	10.0	10.0	90.0	46.7	planeleaf willow
SAWO	Salix wolfii	–	–	–	–	50.0	50.0	16.7	Wolf's willow
	GRAMINOIDS								
CACA4	Calamagrostis canadensis	20.0	–	20.0	–	–	–	6.7	bluejoint reedgrass
CAAQ	Carex aquatilis	70.0	90.0	20.0	97.0	30.0	70.0	62.8	water sedge
CAAU3	Carex aurea	–	–	–	3.0	–	–	0.5	golden sedge
CACA11	Carex canescens	–	3.0	80.0	–	–	–	13.8	pale sedge
CACA12	Carex capillaris	–	–	–	30.0	–	–	5.0	hair sedge
CADIG	Carex dioica ssp. gynocrates	–	–	20.0	80.0	–	–	16.7	northern bog sedge
CALE10	Carex leptalea	–	–	–	–	–	0.5	0.1	bristlystalked sedge
CASI2	Carex simulata	–	–	3.0	30.0	–	–	5.5	short-beaked sedge
CAUT	Carex utriculata	30.0	10.0	–	3.0	–	–	7.2	beaked sedge
CAVE6	Carex vesicaria	–	–	–	–	80.0	–	13.3	blister sedge
DECE	Deschampsia cespitosa	–	30.0	40.0	–	–	–	11.7	tufted hairgrass
ERAN6	Eriophorum angustifolium	–	–	–	0.5	–	–	0.1	many-spiked cottongrass
JUNCU	Juncus	–	–	–	–	20.0	–	3.3	rush
KOMY	Kobresia myosuroides	–	–	–	0.5	–	–	0.1	Bellardi bog sedge
	FORBS								
ANAN2	Antennaria anaphaloides	–	–	–	–	10.0	–	1.7	pearly pussytoes
BIVI2	Bistorta vivipara	–	–	10.0	10.0	0.5	–	3.4	viviparous bistort
CLRH2	Clementsia rhodantha	–	–	–	–	0.5	–	0.1	rose crown
EQAR	Equisetum arvense	–	–	–	–	3.0	10.0	2.2	field horsetail
FRVI	Fragaria virginiana	0.5	–	–	–	–	40.0	6.8	Virginia strawberry
LITE2	Ligusticum tenuifolium	–	–	–	–	–	10.0	1.7	fern-leaf lovage
PEGR2	Pedicularis groenlandica	0.5	30.0	–	–	20.0	30.0	13.4	elephantella
POCA2	Polemonium caeruleum	–	–	–	10.0	3.0	10.0	3.8	sky pilot
PSLE	Psychrophila leptosepala	–	–	10.0	3.0	–	–	2.2	elkslip marsh-marigold
SETR	Senecio triangularis	–	–	–	–	–	10.0	1.7	arrowleaf groundsel
SWPE	Swertia perennis	–	–	10.0	20.0	–	10.0	6.7	star gentian
TAOF	Taraxacum officinale	–	–	0.5	–	–	–	0.1	common dandelion
THAL	Thalictrum alpinum	–	–	30.0	50.0	40.0	20.0	23.3	alpine meadow-rue
VAOC2	Valeriana occidentalis	–	–	–	–	–	40.0	6.7	western valerian
VIMA2	Viola macloskeyi	–	–	–	–	–	30.0	5.0	small white violet
	BRYOPHYTES								
CLSU64	Cladonia sulphurina	0.5	–	–	–	–	–	0.1	sulphur cup lichen
DREPA3	Drepanocladus	10.0	–	–	–	–	–	1.7	drepanocladus moss
TOMEN	Tomenthypnum	90.0	–	–	–	–	–	15.0	tomentypnum moss
	GROUND COVER								
.BARE	bare soil or bare peat	0.0	0.2	0.0	8.0	0.0	0.0	1.4	bare soil or bare peat
.LITT	litter and duff	99.5	97.0	94.2	86.7	98.5	97.0	95.5	duff litter
.SED	sediment cover	–	–	–	0.1	–	–	0.0	sediment cover
.BAVE	live basal vegetation	0.5	3.0	5.3	3.4	1.5	3.0	2.8	live plant bases
.WATER	water cover	–	0.0	–	–	4.0	–	0.7	open water
.BRY	bryophytes	96.6	80.0	88.8	65.9	91.3	97.5	86.7	bryophytes
								Avg	Range
	No. Species	8	7	14	16	14	16	12.5	7 - 16
	Total Live Cover	231.0	283.0	353.0	426.0	347.0	430.5	345.1	231.0 - 430.5
	TLC / NS	28.9	40.4	25.2	26.6	24.8	26.9	28.8	24.8 - 40.4
	Floristic Quality Index	6	7	7	8	7	7	6.9	6 - 8
	Peat-Forming Species %	99	89	60	74	59	55	72.7	55 - 99
	Wetland Plants %	100	95	79	79	72	67	81.6	67 - 100
	Water Depth	-3	-29	-15	-10	-14	-20	-15.2	-29 - 0
	Peat Depth	44	150	150	40	64	55	83.8	40 - 150
	pH	5.54	5.60	5.57	5.82	5.87	6.00	5.7	5.54 - 6.00
	EC, µS/cm	130	21	90	80	130	140	98.5	21 - 140
	Organic Matter, %	73.4	75.5	75.7	77.6	79.8	77.4	76.6	73.4 - 79.8
	Carbon, %	26.9	39.7	40.5	41.0	39.2	40.5	38.0	26.9 - 41.0

Cluster VI. SABR (*Salix brachycarpa* – Barrenground willow). N = 3 of 3

	Subgroup	U1	U2	U3		
	Poly-	FSA	WFS	WFS		
	gon	006	525	087		
	Landscape Area	SA	ES	MS		
	Date	8/10	8/8	6/30		
	Year	2009	2009	2010		
	Elevation, ft	10537	11260	9656		
	Fen Landform	VS	TS	VS		
	Slope, %	10.0	2.0	10.0	Avg	
Code	Species	Cvr	Cvr	Cvr	Cvr	Common Name
	TREES					
	SHRUBS					
DAFL3	Dasiphora floribunda	–	–	0.5	0.2	shrubby cinquefoil
SABE2	Salix bebbiana	–	–	10.0	3.3	Bebb willow
SABR	Salix brachycarpa	97.0	90.0	50.0	79.0	barrenground willow
SAPL2	Salix planifolia	–	40.0	–	13.3	planeleaf willow
	GRAMINOIDS					
CACA4	Calamagrostis canadensis	–	80.0	30.0	36.7	bluejoint reedgrass
CAAQ	Carex aquatilis	–	–	80.0	26.7	water sedge
CADIG	Carex dioica ssp. gynocrates	10.0	–	–	3.3	northern bog sedge
CANO2	Carex norvegica	–	20.0	–	6.7	Norway sedge
CAPE7	Carex petasata	–	–	0.5	0.2	Liddon sedge
CASC12	Carex scopulorum	90.0	40.0	–	43.3	cliff sedge
CASI2	Carex simulata	–	–	30.0	10.0	short-beaked sedge
CAUT	Carex utriculata	–	30.0	0.5	10.2	beaked sedge
DECE	Deschampsia cespitosa	0.5	40.0	–	13.5	tufted hairgrass
ELAC	Eleocharis acicularis	–	0.5	–	0.2	needle spike-rush
JUCA6	Juncus castaneus	–	–	0.5	0.2	chestnut rush
	FORBS					
ALGE	Allium geyeri	–	30.0	–	10.0	Geyer onion
BIVI2	Bistorta vivipara	30.0	10.0	–	13.3	viviparous bistort
CLRH2	Clementsia rhodantha	–	0.5	–	0.2	rose crown
ERPE3	Erigeron peregrinus	–	–	20.0	6.7	peregrine fleabane
GETH	Gentianopsis thermalis	20.0	–	–	6.7	Rocky Mountain fringed gentian
LITE2	Ligusticum tenuifolium	–	–	0.5	0.2	fern-leaf lovage
LIDI5	Limnorchis dilatata	–	–	0.5	0.2	scentbottle
PEGR2	Pedicularis groenlandica	50.0	10.0	0.5	20.2	elephantella
POLEM	Polemonium	–	–	0.5	0.2	Jacob's ladder
POLYG4	Polygonum	–	0.5	–	0.2	knotweed
POGR9	Potentilla gracilis	–	30.0	–	10.0	northwest cinquefoil
PSLE	Psychrophila leptosepala	30.0	90.0	–	40.0	elkslip marsh-marigold
SEIN2	Senecio integerrimus	–	0.5	–	0.2	lambs-tongue groundsel
SWPE	Swertia perennis	30.0	0.5	–	10.2	star gentian
THAL	Thalictrum alpinum	50.0	–	–	16.7	alpine meadow-rue
VIOLA	Viola	–	–	0.5	0.2	violet
	BRYOPHYTES					
DREPA3	Drepanocladus	–	–	99.5	33.2	drepanocladus moss
	GROUND COVER					
.BARE	bare soil or bare peat	0.0	0.0	0.0	0.0	bare soil or bare peat
.LITT	litter and duff	98.5	97.0	95.6	97.0	duff litter
.BAVE	live basal vegetation	2.5	3.0	5.8	3.8	live plant bases
.BRY	bryophytes	98.5	76.0	98.5	91.0	bryophytes

					Avg	Range
	No. Species	10	18	15	14.3	10 - 18
	Total Live Cover	407.5	432.5	213.0	351.0	213.0 - 432.5
	TLC / NS	40.8	24.0	14.2	26.3	14.2 - 40.8
	Floristic Quality Index	8	7	6	6.9	6 - 8
	Peat-Forming Species %	44	31	63	46.3	31 - 63
	Wetland Plants %	60	67	81	69.0	60 - 81
	Water Depth	-28	-2	-48	-26.0	-48 - 0
	Peat Depth	76	55	150	93.7	55 - 150
	pH	7.09	6.51	6.93	6.8	6.51 - 7.09
	EC, µS/cm	440	230	635	435.0	230 - 635
	Organic Matter, %	81.2	60.0	29.0	56.7	29.0 - 81.2
	Carbon, %	41.5	29.3	14.9	28.6	14.9 - 41.5

Cluster VII. CAUT-CAAQ (*Carex utriculata–Carex aquatilis* – Beaked sedge–water sedge, BRY < 25, often < 10). Page 1 of 2. N = 20 of 26

Code	Species																					
	Subgroup	A1	A1	A1	A1	A1	A2	A2	A3	A3	A3	A4	A4	A4	A4	A4	A4	A4	A4	A4	A4	
	Poly-	NPJ	WFG	WFS	WFS	WFW	WFS	WFW	WFC	WFS	WFS	FGM	WFG	WFG	WFG	WFG	WFG	WFG	WFG	WFS	WFS	
	gon	S01	747	148	150	078	322	354	012	222	223	005	053	149	260	262	263	542	632	135	496	
	Landscape Area	NP	MU	MS	MS	WE	ES	EL	EL	MS	MS	GM	GM	GM	GM	GM	GM	GM	GM	MS	ES	
	Date	9/25	6/23	6/29	6/29	8/4	8/5	7/23	7/22	8/9	7/15	7/8	9/17	7/6	7/9	7/9	7/9	7/20	8/19	6/29	8/22	
	Year	2009	2010	2010	2010	2010	2009	2009	2010	2010	2010	2009	2009	2009	2009	2009	2009	2009	2009	2010	2009	
	Elevation, ft	8287	9496	9900	9877	9358	9443	8876	11373	11289	11053	10163	10610	10158	9943	9913	10049	10206	10513	10194	11058	
	Fen Landform	BA	SD	SD	SD	VS	SL	BA	SD	SD	BA	BA	SD	TS	TS	TS	SL	TS	SL	SD	SD	
	Slope, %	0.5	0.0	0.0	0.0	1.0	0.0	0.0	0.0	2.5	5.0	2.0	0.0	0.0	3.0	3.0	2.0	1.0	0.0	4.0	0.0	
		Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Common Name
	TREES																					
	SHRUBS																					
SALIX	Salix	–	–	–	–	–	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	willow
SAPL2	Salix planifolia	–	–	–	–	–	–	–	–	–	–	–	–	–	3.0	–	–	–	–	–	–	planeleaf willow
	GRAMINOIDS																					
CACA4	Calamagrostis canadensis	–	–	–	–	–	–	20.0	–	–	–	–	–	–	–	30.0	–	–	90.0	90.0	–	bluejoint reedgrass
CAAQ	Carex aquatilis	–	–	–	–	–	–	–	97.0	97.0	99.5	60.0	50.0	90.0	80.0	60.0	70.0	90.0	50.0	60.0	10.0	water sedge
CAPE42	Carex pellita	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.5	–	–	–	woolly sedge
CAPH2	Carex phaeocephala	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	dunhead sedge
CAPR22	Carex praeceptorum	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	teachers' sedge
CAUT	Carex utriculata	99.5	30.0	97.0	99.5	99.5	99.5	97.0	–	–	–	90.0	20.0	97.0	97.0	97.0	90.0	97.0	97.0	90.0	99.5	beaked sedge
CAVE6	Carex vesicaria	–	–	–	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	blister sedge
DECE	Deschampsia cespitosa	–	–	–	–	–	30.0	–	–	–	–	–	10.0	–	–	–	–	0.5	–	–	–	tufted hairgrass
ELAC	Eleocharis acicularis	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	needle spike-rush
GLST	Glyceria striata	–	–	–	–	–	–	3.0	–	–	–	–	–	–	–	–	–	–	–	–	–	fowl mannagrass
PACA6	Panicum capillare	–	–	–	–	–	–	10.0	–	–	–	–	–	–	–	–	–	–	–	–	–	witchgrass
	FORBS																					
CIRSI	Cirsium	–	–	–	–	–	–	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–	thistle
EPHO	Epilobium hornemannii	–	–	–	–	–	–	–	–	–	–	–	10.0	–	–	–	–	–	–	–	–	Hornemann willow-herb
GATR2	Galium trifidum	–	–	–	–	–	30.0	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–	small bedstraw
GEUM	Geum	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	avens
GEMA4	Geum macrophyllum	–	–	–	–	–	0.5	3.0	–	–	–	–	–	–	–	–	–	–	–	–	–	large-leaved avens
HESP6	Heracleum sphondylium	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	common cow-parsnip
PEGR2	Pedicularis groenlandica	–	–	–	–	–	–	–	–	10.0	–	–	0.5	–	–	–	–	–	–	–	–	elephantella
PEAM8	Persicaria amphibia	–	–	–	–	–	–	3.0	–	–	–	–	–	–	–	–	–	–	–	–	–	water smartweed
POLEM	Polemonium	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Jacob's ladder
PSLE	Psychrophila leptosepala	–	–	–	–	–	–	–	–	97.0	–	–	–	–	–	–	–	–	20.0	–	–	elkslip marsh-marigold
SETR	Senecio triangularis	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.5	–	arrowleaf groundsel
STLO2	Stellaria longipes	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	long-stalked stitchwort
VENU2	Veronica nutans	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	American alpine speedwell
VIMA2	Viola macloskeyi	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	small white violet
	BRYOPHYTES																					
AULAC2	Aulacomnium	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	aulacomnium moss
DREPA3	Drepanocladus	–	–	–	–	–	–	–	0.5	0.5	0.5	–	2.0	–	–	–	–	–	–	–	–	drepanocladus moss
MAPO16	Marchantia polymorpha	–	–	–	–	–	20.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	liverwort
	GROUND COVER																					
.BARE	bare soil or bare peat	0.0	0.0	0.0	6.2	54.0	0.0	0.0	0.0	4.1	14.0	0.0	6.7	0.0	1.5	0.0	3.5	0.5	0.0	0.0	0.0	bare soil or bare peat
.LITT	litter and duff	97.0	92.8	99.5	89.4	38.0	97.0	99.5	98.5	90.2	72.0	97.0	92.6	97.0	99.5	97.0	97.0	97.5	97.0	98.5	99.5	duff litter
.SED	sediment cover	–	–	–	–	–	–	0.0	–	–	–	–	–	–	–	–	–	–	–	–	–	sediment cover
.BAVE	live basal vegetation	3.0	7.2	3.0	6.6	8.6	3.0	0.5	1.5	5.8	8.6	3.0	1.5	10.0	0.0	3.0	3.0	2.0	3.0	1.5	3.0	live plant bases
.WATER	water cover	99.5	–	34.0	46.0	24.0	–	0.0	99.5	18.0	99.5	99.5	0.0	10.0	3.0	0.0	–	–	–	–	–	open water
.BRY	bryophytes	0.0	0.0	0.0	0.0	0.0	17.8	20.0	0.5	0.5	0.5	3.0	8.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	4.0	bryophytes
.LICHEN	lichen on soil	–	–	–	–	–	–	–	–	22.0	–	–	–	–	–	–	–	–	–	–	–	on soil lichen
.COWPIE	cowpies	–	–	–	–	–	–	–	–	–	–	–	10.0	–	–	–	–	–	–	–	–	cattle droppings
.ELKPEL	elk pellets	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	elk droppings
.ALGAE	algae on soil	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	20.0	–	–	–	–	algae on soil

Code	Species	Subgroup	Poly-gon																				Common Name
		A1	A1	A1	A1	A1	A2	A2	A3	A3	A3	A4	A4	A4	A4	A4	A4	A4	A4	A4	A4	A4	
		NPJ	WFG	WFS	WFS	WFW	WFS	WFW	WFC	WFS	WFS	FGM	WFG	WFG	WFG	WFG	WFG	WFG	WFG	WFG	WFS	WFS	
		S01	747	148	150	078	322	354	012	222	223	005	053	149	260	262	263	542	632	135	496		
		Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr		
	No. Species	1	1	1	2	1	5	8	1	3	1	2	5	2	3	3	2	4	4	4	2		
	Total Live Cover	99.5	30.0	97.0	100.0	99.5	160.0	120.5	97.0	204.0	99.5	150.0	90.5	187.0	180.0	187.0	160.0	188.0	257.0	240.5	109.5		
	TLC / NS	99.5	30.0	97.0	50.0	99.5	32.0	15.1	97.0	68.0	99.5	75.0	18.1	93.5	60.0	62.3	80.0	47.0	64.3	60.1	54.8		
	Floristic Quality Index	5	5	5	5	5	5	5	6	7	6	5	6	6	6	6	5	6	6	6	5		
	Peat-Forming Species %	100	100	100	100	100	62	88	100	53	100	100	78	100	100	100	100	100	92	100	100		
	Wetland Plants %	100	100	100	100	100	72	92	100	100	100	100	89	100	100	100	100	100	100	100	100		
	Water Depth	10	50	-5	15	-40	-5	-25	-30	-40	-10	4	0	1	0	-1	3	0	-36	0	-2		
	Peat Depth	40	80	150	60	60	45	40	70	85	120	40	30	40	120	40	60	40	50	150	40		
	pH	6.10	5.55	5.21	5.53	5.71	5.90	5.77	5.37	5.56	5.93	4.90	4.80	5.70	5.83	6.06	6.00	6.19	5.10	4.91	5.24		
	EC, µS/cm	45	24	37	73	160	210	280	30	60	80	30	90	40	100	120	–	130	90	652	40		
	Organic Matter, %	48.6	52.0	66.0	61.0	79.0	79.4	68.9	58.0	77.0	41.0	68.6	27.1	62.4	41.8	50.7	29.3	58.1	50.5	42.0	42.2		
	Carbon, %	23.8	27.1	33.9	31.7	40.6	43.3	36.1	30.2	40.1	21.4	34.6	12.2	33.8	23.8	25.4	15.2	32.9	24.4	22.0	39.2		

	Subgroup	A5	A6	A7	A7	A8	A9		
	Poly-	WFT	FGM	FMU	WFS	WFS	WFS		
	gon	014	002	103	527	134	217		
	Landscape Area	SA	GM	MU	ES	MS	MS		
	Date	8/12	7/11	6/23	8/22	6/30	7/15		
	Year	2009	2009	2010	2009	2010	2010		
	Elevation, ft	10824	9752	9487	11743	10156	11014		
	Fen Landform	SL	TS	SD	SL	TS	BA		
	Slope, %	1.0	1.0	0.0	5.0	2.0	2.0	Avg	
Code	Species	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Common Name
	TREES								
	SHRUBS								
SALIX	Salix	–	–	–	–	–	–	0.0	willow
SAPL2	Salix planifolia	–	–	–	–	–	–	0.1	planeleaf willow
	GRAMINOIDS								
CACA4	Calamagrostis canadensis	–	90.0	–	–	–	–	12.3	bluejoint reedgrass
CAAQ	Carex aquatilis	50.0	40.0	20.0	20.0	97.0	99.5	47.7	water sedge
CAPE42	Carex pellita	–	–	80.0	99.5	–	–	6.9	woolly sedge
CAPH2	Carex phaeocephala	–	–	–	–	97.0	–	3.7	dunhead sedge
CAPR22	Carex praeceptorum	–	–	–	–	–	20.0	0.8	teachers' sedge
CAUT	Carex utriculata	80.0	70.0	–	–	–	–	63.3	beaked sedge
CAVE6	Carex vesicaria	70.0	–	–	–	–	–	2.7	blister sedge
DECE	Deschampsia cespitosa	–	–	–	0.5	–	–	1.6	tufted hairgrass
ELAC	Eleocharis acicularis	–	10.0	–	–	–	–	0.4	needle spike-rush
GLST	Glyceria striata	–	–	–	–	–	–	0.1	fowl mannagrass
PACA6	Panicum capillare	–	–	–	–	–	–	0.4	witchgrass
	FORBS								
CIRSI	Cirsium	–	–	–	–	–	–	0.0	thistle
EPHO	Epilobium hornemannii	–	–	–	–	–	–	0.4	Hornemann willow-herb
GATR2	Galium trifidum	–	0.5	–	–	0.5	–	1.2	small bedstraw
GEUM	Geum	–	0.5	–	–	–	–	0.0	avens
GEMA4	Geum macrophyllum	–	–	–	–	0.5	–	0.2	large-leaved avens
HESP6	Heracleum sphondylium	–	10.0	–	–	–	–	0.4	common cow-parsnip
PEGR2	Pedicularis groenlandica	–	–	–	–	–	–	0.4	elephantella
PEAM8	Persicaria amphibia	–	–	–	–	–	–	0.1	water smartweed
POLEM	Polemonium	–	–	–	–	0.5	–	0.0	Jacob's ladder
PSLE	Psychrophila leptosepala	–	–	–	–	–	–	4.5	elkslip marsh-marigold
SETR	Senecio triangularis	–	–	–	–	–	–	0.0	arrowleaf groundsel
STLO2	Stellaria longipes	–	0.5	–	–	–	–	0.0	long-stalked stitchwort
VENU2	Veronica nutans	–	–	–	–	0.5	–	0.0	American alpine speedwell
VIMA2	Viola macloskeyi	–	10.0	–	–	10.0	–	0.8	small white violet
	BRYOPHYTES								
AULAC2	Aulacomnium	–	–	–	–	–	20.0	0.8	aulacomnium moss
DREPA3	Drepanocladus	–	–	–	–	–	–	0.1	drepanocladus moss
MAPO16	Marchantia polymorpha	–	–	–	–	–	–	0.8	liverwort
	GROUND COVER								
.BARE	bare soil or bare peat	0.0	1.5	0.0	2.0	0.6	8.0	3.9	bare soil or bare peat
.LITT	litter and duff	99.5	97.0	99.5	99.0	92.2	90.2	93.2	duff litter
.SED	sediment cover	–	–	–	–	–	–	0.0	sediment cover
.BAVE	live basal vegetation	0.5	3.0	10.0	3.0	7.2	2.0	4.0	live plant bases
.WATER	water cover	99.5	–	99.5	–	77.4	–	31.1	open water
.BRY	bryophytes	0.0	0.0	0.0	6.0	14.0	0.5	3.3	bryophytes
.LICHEN	lichen on soil	–	–	–	–	–	–	0.8	on soil lichen
.COWPIE	cowpies	–	–	–	–	–	–	0.4	cattle droppings
.ELKPEL	elk pellets	–	–	–	2.0	–	–	0.1	elk droppings
.ALGAE	algae on soil	–	–	–	–	–	–	0.8	algae on soil

								Avg	Range
	No. Species	3	9	2	3	7	2	3.1	1 - 9
	Total Live Cover	200.0	220.5	100.0	120.0	205.0	99.5	146.2	30.0 - 257.0
	TLC / NS	66.7	24.5	50.0	40.0	29.3	49.8	60.1	15.1 - 99.5
	Floristic Quality Index	6	6	8	8	8	7	5.7	5 - 8
	Peat-Forming Species %	100	87	100	100	47	100	92.5	47 - 100
	Wetland Plants %	100	95	100	100	50	83	95.4	50 - 100
	Water Depth	2	0	22	-10	-30	-30	-6.0	-40 - 50
	Peat Depth	41	40	110	40	150	150	72.7	30 - 150
	pH	6.05	5.65	5.78	6.02	5.74	6.47	5.7	4.80 - 6.47
	EC, µS/cm	80	100	51	160	95	230	120.3	24 - 652
	Organic Matter, %	55.6	70.0	69.0	–	41.0	59.0	55.9	27.1 - 79.4
	Carbon, %	28.1	35.1	35.9	–	21.2	30.4	29.7	12.2 - 43.3

Cluster VIII. CAUT-CAAQ-BRY (*Carex utriculata–Carex aquatilis*-Bryophytes – Beaked sedge–water sedge, BRY > 35, often > 50). N = 16

	Subgroup	B1	B1	B1	B1	B2	B2	B3	B3	B4	B4	B4	B4	B5	B5	D1	D2		
	Poly-	WFG	WFG	WFS	WFW	FES	WFG	WFG	WFS	WFC	WFG	WFS	WFT	FSA	WFL	JSA	WFG		
	gon	003	046	376	109	006	614	611	363	078	440	234	420	204	092	009	412		
	Landscape Area	GM	GM	ES	WE	ES	GM	GM	ES	EL	GM	MS	SA	SA	ES	SA	GM		
	Date	9/17	8/24	8/9	9/24	8/9	7/24	7/24	8/2	7/19	7/18	7/14	7/16	9/2	9/10	9/21	7/12		
	Year	2009	2010	2009	2009	2009	2009	2009	2009	2010	2009	2010	2009	2009	2009	2009	2009		
	Elevation, ft	10164	9994	12031	7927	11853	10297	10487	11081	11928	10482	11755	11991	10480	11496	9810	10231		
	Fen Landform	SD	BA	VS	VS	TS	TS	SL	VS	BA	BA	VS	SL	SL	SL	VS	BA		
	Slope, %	0.0	0.0	8.0	0.0	3.0	2.0	1.0	4.0	1.0	0.0	8.0	2.0	13.0	2.0	0.0	0.0	Avg	
Code	Species	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Common Name
	SHRUBS																		
DAFL3	Dasiphora floribunda	–	–	–	–	–	–	–	–	–	–	–	–	0.5	–	–	–	0.0	shrubby cinquefoil
SAPL2	Salix planifolia	–	–	–	–	–	–	–	–	–	–	–	–	0.5	–	–	–	0.0	planeleaf willow
SAWO	Salix wolfii	–	–	–	–	–	–	3.0	–	–	–	–	–	–	–	–	–	0.2	Wolf's willow
	GRAMINOIDS																		
CAAN23	Carex angustior	–	–	–	–	–	–	–	20.0	–	–	–	–	–	–	–	–	1.3	star sedge
CAAQ	Carex aquatilis	–	–	–	–	0.5	80.0	99.5	–	97.0	97.0	97.0	90.0	80.0	97.0	–	90.0	51.8	water sedge
CAAU3	Carex aurea	–	–	–	–	–	–	3.0	–	–	–	–	–	–	–	–	–	0.2	golden sedge
CABU6	Carex buxbaumii	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10.0	10.0	1.3	Buxbaum's sedge
CACA11	Carex canescens	–	–	–	–	–	–	–	–	–	–	–	–	–	3.0	–	–	0.2	pale sedge
CAIN11	Carex interior	–	–	–	–	–	–	0.5	–	–	–	–	–	–	–	–	–	0.0	inland sedge
CAJO	Carex jonesii	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.5	0.0	Jones's sedge
CALE9	Carex leporinella	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.5	0.0	Sierra hare sedge
CALI7	Carex limosa	–	–	–	–	–	–	–	0.5	–	–	–	–	–	–	–	–	0.0	mud sedge
CAPE42	Carex pellita	–	–	–	–	–	–	10.0	–	–	–	–	–	–	–	–	0.5	0.7	woolly sedge
CASC10	Carex scirpoidea	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.5	0.0	northern singlespike sedge
CAUT	Carex utriculata	99.5	80.0	97.0	99.5	97.0	–	20.0	80.0	–	0.5	–	–	–	–	99.5	90.0	47.7	beaked sedge
DECE	Deschampsia cespitosa	–	–	0.5	–	–	–	–	10.0	–	–	–	–	30.0	20.0	–	–	3.8	tufted hairgrass
JUNCU	Juncus	–	–	–	–	–	–	–	80.0	–	–	–	–	–	–	–	–	5.0	rush
JUAR2	Juncus arcticus	–	–	–	–	–	–	–	–	–	–	–	–	3.0	–	–	–	0.2	arctic rush
LUSU9	Luzula subcapitata	–	–	–	–	0.5	–	–	–	–	–	–	–	–	–	–	–	0.0	Colorado woodrush
	FORBS																		
CLRH2	Clementsia rhodantha	–	–	–	–	–	–	–	–	–	–	–	–	10.0	–	–	–	0.6	rose crown
COPA28	Comarum palustre	–	70.0	–	–	–	–	–	–	–	–	–	–	10.0	–	–	–	5.0	purple cinquefoil
EPHO	Epilobium hornemannii	–	–	–	–	20.0	–	10.0	–	–	–	–	–	–	0.5	–	–	1.9	Hornemann willow-herb
GATR2	Galium trifidum	–	–	–	–	–	–	3.0	–	–	–	–	–	–	–	–	–	0.2	small bedstraw
LIDI5	Limnorchis dilatata	–	–	–	–	–	0.5	–	–	–	–	–	–	–	–	–	–	0.0	scentbottle
OSCH	Osmorhiza chilensis	–	–	–	0.5	–	–	–	–	–	–	–	–	–	–	–	–	0.0	sweet cicely
OXFE	Oxypolis fendleri	–	–	–	–	–	40.0	–	–	–	–	–	–	–	–	–	–	2.5	Fendler cowbane
PAPS5	Packera pseudaurea	–	–	–	–	–	–	–	–	–	–	–	–	3.0	–	–	–	0.2	golden groundsel
PEGR2	Pedicularis groenlandica	–	–	–	0.5	–	20.0	0.5	10.0	–	–	–	–	10.0	–	–	–	2.6	elephantella
POCA2	Polemonium caeruleum	–	–	–	–	–	10.0	–	–	–	–	–	–	–	–	–	–	0.6	sky pilot
PSLE	Psychrophila leptosepala	–	20.0	–	–	90.0	80.0	–	–	–	–	–	–	70.0	60.0	–	–	20.0	elkslip marsh-marigold
SEIN2	Senecio integerrimus	–	–	–	–	–	10.0	–	–	–	–	–	–	–	–	–	–	0.6	lambs-tongue groundsel
SETR	Senecio triangularis	–	–	–	–	–	–	–	–	–	–	–	–	–	0.5	–	–	0.0	arrowleaf groundsel
SWPE	Swertia perennis	–	–	–	–	0.5	–	–	–	–	–	–	–	–	–	–	–	0.0	star gentian
VIMA2	Viola macloskeyi	–	–	–	–	–	–	–	–	–	–	–	–	50.0	–	–	–	3.1	small white violet
	BRYOPHYTES																		
AULAC2	Aulacomnium	–	–	–	–	–	–	–	–	–	–	97.0	–	–	–	–	–	6.1	aulacomnium moss
BRYUM2	Bryum	–	–	–	–	–	70.0	–	–	–	–	–	–	–	0.5	–	–	4.4	bryum moss
DREPA3	Drepanocladus	90.0	–	–	90.0	–	20.0	60.0	30.0	–	–	0.5	–	–	40.0	–	–	20.7	drepanocladus moss
PHFO6	Philonotis fontana	–	–	–	–	–	–	–	–	–	–	–	–	–	10.0	–	–	0.6	philonotis moss
SPHAG2	Sphagnum	–	–	–	–	–	–	–	–	–	–	10.0	–	–	–	–	–	0.6	sphagnum
TOMEN	Tomenthypnum	–	–	–	–	90.0	–	–	–	50.0	–	–	–	–	–	–	–	8.8	tomentypnum moss
	GROUND COVER																		
.BARE	bare soil or bare peat	0.0	62.6	0.0	0.1	0.0	0.5	0.0	3.5	0.0	1.5	2.1	0.0	0.8	46.0	3.0	0.0	7.5	bare soil or bare peat
.LITT	litter and duff	97.0	27.4	78.7	99.0	97.0	97.0	98.0	97.5	97.1	97.0	92.2	83.3	98.0	52.0	99.5	97.0	88.0	duff litter
.FIGR	fine gravel	–	–	–	–	–	–	–	–	–	–	–	10.2	–	–	–	–	0.6	fine gravel
.BAVE	live basal vegetation	3.0	10.1	3.0	0.5	3.0	–	2.0	3.0	5.8	3.0	7.2	0.5	2.0	2.5	0.5	3.0	3.1	live plant bases
.WATER	water cover	–	–	21.3	–	–	–	–	–	20.2	–	–	10.7	–	–	–	0.0	3.3	open water
.BRY	bryophytes	87.2	40.0	61.3	86.8	89.6	90.0	60.0	30.0	46.0	40.0	83.5	82.7	89.3	44.0	0.0	0.0	58.1	bryophytes

Subgroup	B1	B1	B1	B1	B2	B2	B3	B3	B4	B4	B4	B4	B5	B5	D1	D2		
Poly-gon	WFG 003	WFG 046	WFS 376	WFW 109	FES 006	WFG 614	WFG 611	WFS 363	WFC 078	WFG 440	WFS 234	WFT 420	FSA 204	WFL 092	JSA 009	WFG 412		
																	Avg	Range
No. Species	1	3	2	3	6	7	9	6	1	2	1	1	11	6	2	7	4.3	1 - 11
Total Live Cover	99.5	170.0	97.5	100.0	208.5	200.5	149.5	180.5	97.0	97.5	97.0	90.0	261.0	181.0	109.5	191.0	145.6	90.0 - 261.0
TLC / NS	99.5	56.7	48.8	33.3	34.8	28.6	16.6	30.1	97.0	48.8	97.0	90.0	23.7	30.2	54.8	27.3	51.1	16.6 - 99.5
Floristic Quality Index	5	7	5	5	6	7	6	5	6	6	6	6	7	6	5	6	5.8	5 - 7
Peat-Forming Species %	100	88	100	100	47	58	89	95	100	100	100	100	39	55	100	100	85.7	39 - 100
Wetland Plants %	100	100	100	100	95	92	94	58	100	100	100	100	82	94	100	100	94.5	58 - 100
Water Depth	0	-30	-10	0	-5	-16	0	0	0	2	-50	-1	-17	0	-23	-5	-9.7	-50 - 2
Peat Depth	50	150	45	45	50	45	55	45	135	40	135	42	97	45	40	50	66.8	40 - 150
pH	5.10	5.44	5.88	5.76	5.90	5.60	5.57	5.34	7.03	5.18	4.14	5.41	6.10	5.93	5.70	5.16	5.6	4.14 - 7.03
EC, µS/cm	20	90	80	120	80	620	80	30	260	30	130	70	24	70	70	50	114.0	20 - 620
Organic Matter, %	53.1	88.0	46.3	61.7	69.2	69.8	74.9	56.3	57.0	65.9	69.0	49.6	62.0	31.6	54.4	65.0	60.9	31.6 - 88.0
Carbon, %	28.6	45.5	21.2	32.4	35.7	36.2	36.4	28.1	29.5	36.1	35.6	23.9	31.5	14.9	29.9	39.3	31.6	14.9 - 45.5

Cluster IX. CASA10-CAJO-CASC12-ELQU2-CASI2-CACA11-CAIL-CALI7 (Short sedges). Page 1 of 2. N = 20 of 31

	Subgroup	C1	C2	C2	C3	E1	E1	E2	E2	E3	E3	E4	E4	F1	F2	F3	F4	F5	F6	I1	I1	
	Poly-	FWE	WFG	WFS	WFW	WFS	WFS	WFG	WFG	WFG	WFT	WFG	WFG	WFG	FSA	WFC	WFS	WFS	WFT	FMS	WFT	
	gon	102	554	303	218	005	021	550	555	043	761	045	552	528	008	240	220	331	598	104	122	
	Landscape Area	WE	GM	ES	WE	CN	CN	GM	GM	GM	SA	GM	GM	GM	SA	SA	MS	ES	SA	MS	SA	
	Date	7/8	7/20	8/4	8/3	6/28	6/27	7/20	7/20	7/17	6/10	6/19	7/20	8/17	9/16	8/24	8/9	8/8	9/22	8/9	7/21	
	Year	2010	2009	2009	2010	2009	2009	2009	2009	2009	2010	2009	2009	2009	2009	2009	2010	2009	2009	2010	2009	
	Elevation, ft	10033	10190	10183	10548	10871	10803	10475	10404	10103	9352	10012	10518	10750	11260	11480	11225	11917	11835	11345	11459	
	Fen Landform	SL	TS	VS	SD	TS	TS	TS	TS	TS	VS	BA	TS	SL	TS	TS	SD	BA	TS	VS	VS	
	Slope, %	15.0	2.0	2.0	0.0	1.0	2.0	1.0	3.0	1.0	2.5	0.0	0.0	0.0	12.0	5.0	2.0	2.0	4.0	2.0	5.0	
Code	Species	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Common Name
	SHRUBS																					
DAFL3	Dasiphora floribunda	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	shrubby cinquefoil
SAMO2	Salix monticola	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	serviceberry willow
SAPL2	Salix planifolia	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3.0	–	–	0.5	–	3.0	planeleaf willow
	GRAMINOIDS																					
AGSC5	Agrostis scabra	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	40.0	–	–	rough bentgrass
CACA4	Calamagrostis canadensis	–	–	–	70.0	–	–	–	–	–	–	–	–	–	–	–	–	–	20.0	–	–	bluejoint reedgrass
CAAQ	Carex aquatilis	–	70.0	40.0	30.0	97.0	99.5	97.0	90.0	99.5	70.0	90.0	97.0	–	–	60.0	–	–	–	70.0	60.0	water sedge
CAAU3	Carex aurea	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	golden sedge
CACA11	Carex canescens	–	–	–	–	–	–	0.5	–	–	–	–	–	–	–	–	–	–	–	10.0	70.0	pale sedge
CACA13	Carex capitata	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10.0	–	–	–	capitate sedge
CADIG	Carex dioica ssp. gynocrates	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	90.0	–	–	–	northern bog sedge
CAEB	Carex ebenea	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.5	–	–	–	ebony sedge
CAEX5	Carex exsiccata	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	western inflated sedge
CAIL	Carex illota	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3.0	–	–	–	70.0	50.0	sheep sedge
CAIN11	Carex interior	–	–	–	–	–	–	–	–	0.5	–	–	–	–	–	–	–	–	–	–	–	inland sedge
CAJO	Carex jonesii	99.5	60.0	20.0	10.0	–	–	–	–	–	–	–	–	0.5	–	–	–	0.5	–	–	–	Jones's sedge
CALE8	Carex lenticularis	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	lakeshore sedge
CALE10	Carex leptalea	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.5	–	–	0.5	–	–	bristlystalked sedge
CALI7	Carex limosa	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	mud sedge
CAMA9	Carex macloviana	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3.0	–	–	–	–	–	thickhead sedge
CAMA12	Carex magellanica	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10.0	boreal bog sedge
CAMI6	Carex microglochin	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.5	–	–	0.5	microglochin sedge
CANI2	Carex nigricans	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	30.0	–	–	–	30.0	black alpine sedge
CANO3	Carex nova	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10.0	–	–	new sedge
CAPA18	Carex parryana	–	–	–	–	–	–	–	0.5	–	–	–	–	–	–	–	–	–	–	–	–	Parry sedge
CAPH2	Carex phaeocephala	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	dunhead sedge
CAPR22	Carex praeceptorum	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.5	–	–	–	–	teachers' sedge
CASA10	Carex saxatilis	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	rock sedge
CASC12	Carex scopulorum	–	0.5	–	–	–	–	–	–	–	–	–	–	99.5	20.0	80.0	30.0	70.0	90.0	–	10.0	cliff sedge
CASI2	Carex simulata	–	–	–	–	80.0	97.0	20.0	70.0	97.0	70.0	97.0	30.0	–	–	–	–	–	–	–	–	short-beaked sedge
CAUT	Carex utriculata	–	20.0	40.0	–	–	–	0.5	–	20.0	20.0	80.0	20.0	–	–	–	30.0	–	–	–	–	beaked sedge
DECE	Deschampsia cespitosa	–	60.0	97.0	–	–	–	–	–	–	–	–	–	–	–	20.0	0.5	–	20.0	–	–	tufted hairgrass
ELEOC	Eleocharis	–	–	–	–	–	–	–	–	–	–	70.0	–	–	–	–	–	–	–	–	–	spike-rush
ELAC	Eleocharis acicularis	–	–	–	–	–	–	–	–	–	–	–	50.0	–	–	–	–	–	–	–	–	needle spike-rush
ELQU2	Eleocharis quinqueflora	–	–	–	–	–	–	–	–	–	–	–	–	–	97.0	90.0	–	–	–	–	–	few-flowered spike-rush
ERAN6	Eriophorum angustifolium	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	many-spiked cottongrass
JUAR2	Juncus arcticus	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	arctic rush
JUCA6	Juncus castaneus	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.5	–	–	chestnut rush
JUME3	Juncus mertensianus	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.5	0.5	–	blackheaded rush
LUPA4	Luzula parviflora	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	millet woodrush
LUSU9	Luzula subcapitata	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Colorado woodrush
PHCO9	Phleum commutatum	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	30.0	–	–	–	–	alpine timothy
POPA2	Poa palustris	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.5	–	–	–	–	swamp bluegrass
POHU	Podagrostis humilis	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	20.0	alpine bentgrass
TOPA3	Torreyochloa pauciflora	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.5	–	–	–	–	pale false mannagrass
	FORBS																					
BIBI5	Bistorta bistortoides	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	American bistort
BIVI2	Bistorta vivipara	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3.0	–	–	–	–	–	viviparous bistort
CARH4	Castilleja rhexiifolia	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	splitleaf paintbrush
CLRH2	Clementsia rhodantha	–	–	0.5	–	–	–	–	–	–	0.5	–	–	–	–	40.0	–	0.5	30.0	70.0	10.0	rose crown

Code	Subgroup Poly- gon Species	C1 FWE 102 Cvr	C2 WFG 554 Cvr	C2 WFS 303 Cvr	C3 WFW 218 Cvr	E1 WFS 005 Cvr	E1 WFS 021 Cvr	E2 WFG 550 Cvr	E2 WFG 555 Cvr	E3 WFG 043 Cvr	E3 WFT 761 Cvr	E4 WFG 045 Cvr	E4 WFG 552 Cvr	F1 WFG 528 Cvr	F2 FSA 008 Cvr	F3 WFC 240 Cvr	F4 WFS 220 Cvr	F5 WFS 331 Cvr	F6 WFT 598 Cvr	I1 FMS 104 Cvr	I1 WFT 122 Cvr	Common Name
COPA28	Comarum palustre	–	–	–	–	–	–	–	–	20.0	–	20.0	–	–	–	–	–	–	–	–	–	purple cinquefoil
DEBA2	Delphinium barbeyi	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Barbey larkspur
EPHO	Epilobium hornemannii	–	–	0.5	–	–	–	–	20.0	–	–	10.0	–	–	–	–	0.5	0.5	–	–	–	Hornemann willow-herb
EQAR	Equisetum arvense	–	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	field horsetail
EREMO11	Eremogone	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	20.0	–	–	sandwort
ERPE3	Erigeron peregrinus	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	40.0	–	–	–	0.5	peregrine fleabane
FORB	Forb	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.5	unknown forb
GATR2	Galium trifidum	–	0.5	–	0.5	–	–	–	0.5	–	–	0.5	–	–	–	–	–	–	–	–	–	small bedstraw
GAHU	Gaultheria humifusa	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3.0	creeping wintergreen
GEAC2	Gentianella acuta	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	little gentian
GERI	Geranium richardsonii	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	20.0	–	–	Richardson geranium
GEUM	Geum	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	avens
LIGUS	Ligusticum	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	ligusticum
LITE2	Ligusticum tenuifolium	20.0	–	–	40.0	–	–	–	–	–	–	–	–	–	–	–	0.5	–	–	–	–	fern-leaf lovage
LIDI5	Limnorchis dilatata	0.5	–	–	–	–	–	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–	scentbottle
MIOR2	Micranthes oregana	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Oregon saxifrage
OXFE	Oxypolis fendleri	30.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Fendler cowbane
PAMY	Paxistima myrsinites	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	20.0	–	–	mountain-lover
PEGR2	Pedicularis groenlandica	0.5	40.0	0.5	60.0	–	–	40.0	20.0	0.5	–	3.0	0.5	–	–	10.0	0.5	10.0	30.0	80.0	40.0	elephantella
PEGA3	Perideridia gairdneri	–	–	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.5	–	–	Gardner's yampah
PNAF	Pneumonanthe affinis	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	bottle gentian
PSLE	Psychrophila leptosepala	60.0	70.0	0.5	60.0	–	–	80.0	70.0	70.0	–	0.5	40.0	–	–	40.0	50.0	30.0	20.0	80.0	30.0	elkslip marsh-marigold
SARI8	Saxifraga rivularis	–	–	–	–	–	–	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–	weak saxifrage
SEIN2	Senecio integerrimus	–	–	–	–	–	–	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–	lambs-tongue groundsel
SETR	Senecio triangularis	30.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	arrowleaf groundsel
STLO2	Stellaria longipes	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	long-stalked stitchwort
SWPE	Swertia perennis	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3.0	–	–	–	–	–	star gentian
VETE4	Veratrum tenuipetalum	0.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Colorado false-hellebore
VEAM2	Veronica americana	–	–	–	0.5	–	–	–	–	–	–	–	–	–	–	3.0	0.5	–	–	0.5	–	American brooklime
VIOLA	Viola	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	20.0	violet
	BRYOPHYTES																					
AULAC2	Aulacomnium	–	–	–	–	–	–	–	–	–	–	16.0	–	–	–	–	97.0	–	–	–	–	aulacomnium moss
AUPA70	Aulacomnium palustre	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	aulacomnium moss
BRYUM2	Bryum	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	bryum moss
DREPA3	Drepanocladus	–	20.0	–	–	–	–	60.0	–	–	60.0	61.4	–	–	–	–	–	97.0	–	97.0	–	drepanocladus moss
SPHAG2	Sphagnum	–	–	–	–	–	–	–	–	–	–	–	30.0	–	–	–	0.5	–	–	–	–	sphagnum
TOMEN	Tomenthypnum	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	tomentypnum moss
LICHEN	lichen	–	–	–	–	–	–	–	–	–	0.5	–	–	–	–	–	–	–	–	–	–	lichen
	GROUND COVER																					
.BARE	bare soil or bare peat	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0	8.0	0.0	8.6	bare soil or bare peat
.LITT	litter and duff	90.0	98.0	97.0	95.6	99.5	99.5	97.5	98.0	97.0	93.6	97.0	99.0	97.0	99.5	99.0	91.4	97.0	84.8	92.8	81.1	duff litter
.SED	sediment cover	–	–	–	–	0.0	–	–	–	–	–	0.0	–	–	–	–	–	–	–	0.5	–	sediment cover
.BAVE	live basal vegetation	10.0	2.0	3.0	7.2	0.5	0.5	2.0	2.0	3.0	3.0	3.0	1.0	3.0	0.5	1.0	8.6	3.0	3.0	7.2	0.5	live plant bases
.WATER	water cover	18.0	–	–	–	–	–	–	–	50.0	–	–	–	–	3.9	–	–	–	4.0	12.1	12.1	open water
.BRY	bryophytes	6.0	20.0	4.4	71.4	8.0	50.1	60.0	30.0	0.0	94.2	96.1	30.0	0.0	0.1	44.1	69.4	98.0	44.0	92.7	46.8	bryophytes
.LICHEN	lichen on soil	–	–	–	–	–	–	–	–	–	2.1	–	–	–	–	–	–	–	–	–	–	on soil lichen
.COWPIE	cowpies	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	cattle droppings
.ELKPEL	elk pellets	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2.0	elk droppings
	No. Species	12	9	9	8	2	2	9	7	7	4	9	6	2	2	14	14	10	16	8	16	
	Total Live Cover	210.5	321.5	199.5	271.0	177.0	196.5	239.0	270.5	307.5	160.5	301.0	237.5	100.0	117.0	355.5	212.5	212.0	252.0	381.0	344.5	
	TLC / NS	17.5	35.7	22.2	33.9	88.5	98.3	26.6	38.6	43.9	40.1	33.4	39.6	50.0	58.5	25.4	15.2	21.2	15.8	47.6	21.5	
	Floristic Quality Index	8	7	5	7	6	6	7	6	6	6	6	6	7	8	7	6	9	6	8	8	
	Peat-Forming Species %	54	59	50	63	100	100	66	67	77	100	78	62	100	100	70	29	52	47	61	75	
	Wetland Plants %	70	81	70	83	100	100	100	96	100	100	80	100	50	92	78	62	64	44	91	84	
	Water Depth	-65	-60	-40	-35	1	0	2	0	0	0	0	1	-15	-30	-36	-40	-2	-14	-28	0	
	Peat Depth	40	60	45	40	150	150	40	45	45	30	40	40	40	40	54	75	40	50	40	43	
	pH	5.49	5.78	4.80	5.59	5.07	5.44	6.09	5.79	6.16	6.30	5.36	5.79	5.20	5.08	5.06	4.41	5.54	6.26	5.74	5.07	
	EC, µS/cm	470	110	80	70	30	50	90	100	80	105	–	80	50	30	50	50	50	30	60	30	
	Organic Matter, %	24.0	66.4	52.6	43.0	69.1	64.8	35.0	46.2	35.4	32.5	61.0	60.1	60.6	54.0	42.9	86.0	27.5	65.4	59.0	56.7	
	Carbon, %	12.6	35.8	27.2	22.0	37.1	33.8	22.6	25.9	19.0	16.8	33.4	32.4	30.8	30.4	19.9	44.4	13.2	33.8	30.7	28.3	

	Subgroup	I2	I3	I4	I4	I5	I6	I7	I8	J1	J2	J3		
	Poly-	WFG	WFS	WFS	WFT	FMS	FWE	WFG	WFT	WFG	WFG	WFS		
	gon	091	237	448	019	105	101	099	706	041	042	386		
	Landscape Area	GM	MS	ES	SA	MS	WE	GM	SA	GM	GM	ES		
	Date	7/18	7/14	9/8	8/10	8/10	7/6	8/24	7/15	9/13	7/17	8/2		
	Year	2009	2010	2009	2009	2010	2010	2010	2009	2010	2009	2009		
	Elevation, ft	10480	11452	11993	10789	10515	10033	10525	10511	10155	10120	11159		
	Fen Landform	BA	VS	SL	TS	VS	SD	VS	BA	BA	TS	VS		
	Slope, %	0.0	6.0	2.0	1.0	4.0	0.0	1.0	2.0	0.0	0.0	1.0	Avg	
Code	Species	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Common Name
	TREES													
	SHRUBS													
DAFL3	Dasiphora floribunda	–	–	–	0.5	–	–	–	–	–	–	–	0.0	shrubby cinquefoil
SAMO2	Salix monticola	–	–	–	–	0.5	–	–	–	–	–	–	0.0	serviceberry willow
SAPL2	Salix planifolia	–	–	–	–	0.5	–	–	–	–	–	0.5	0.2	planeleaf willow
	GRAMINOIDS													
AGSC5	Agrostis scabra	–	–	60.0	–	–	–	–	–	–	–	–	3.2	rough bentgrass
CACA4	Calamagrostis canadensis	–	–	–	0.5	–	–	–	–	–	–	–	2.9	bluejoint reedgrass
CAAQ	Carex aquatilis	20.0	97.0	70.0	90.0	–	80.0	–	40.0	60.0	40.0	–	50.5	water sedge
CAAU3	Carex aurea	–	–	–	0.5	–	–	–	–	–	–	–	0.0	golden sedge
CACA11	Carex canescens	70.0	10.0	80.0	40.0	80.0	60.0	20.0	90.0	–	–	–	17.1	pale sedge
CACA13	Carex capitata	–	–	30.0	–	–	–	–	–	–	–	–	1.3	capitate sedge
CADIG	Carex dioica ssp. gynocrates	–	–	–	–	–	–	–	–	–	–	–	2.9	northern bog sedge
CAEB	Carex ebenea	–	–	–	–	–	–	–	–	–	–	–	0.0	ebony sedge
CAEX5	Carex exsiccata	–	–	–	–	–	40.0	–	–	–	–	–	1.3	western inflated sedge
CAIL	Carex illota	–	–	–	–	–	–	–	–	–	–	–	4.0	sheep sedge
CAIN11	Carex interior	–	–	–	–	–	–	–	–	–	–	–	0.0	inland sedge
CAJO	Carex jonesii	30.0	–	–	–	–	–	–	–	–	–	10.0	7.4	Jones's sedge
CALE8	Carex lenticularis	–	–	–	–	–	–	–	–	–	10.0	–	0.3	lakeshore sedge
CALE10	Carex leptalea	–	–	–	–	–	–	–	–	–	–	–	0.0	bristlystalked sedge
CALI7	Carex limosa	–	–	–	–	–	–	–	–	70.0	10.0	60.0	4.5	mud sedge
CAMA9	Carex macloviana	–	–	–	–	–	–	–	–	–	–	–	0.1	thickhead sedge
CAMA12	Carex magellanica	–	–	–	–	–	–	–	–	–	–	–	0.3	boreal bog sedge
CAMI6	Carex microglochin	–	–	–	–	–	–	–	–	–	–	–	0.0	microglochin sedge
CANI2	Carex nigricans	–	0.5	–	–	–	–	–	–	–	–	–	2.0	black alpine sedge
CANO3	Carex nova	–	–	–	–	–	–	–	–	–	–	–	0.3	new sedge
CAPA18	Carex parryana	–	–	–	–	–	–	–	–	–	–	–	0.0	Parry sedge
CAPH2	Carex phaeocephala	–	–	–	–	–	–	–	–	–	–	30.0	1.0	dunhead sedge
CAPR22	Carex praeceptorum	–	–	–	–	–	–	–	–	–	–	–	0.0	teachers' sedge
CASA10	Carex saxatilis	80.0	–	–	60.0	–	–	–	–	–	–	40.0	5.8	rock sedge
CASC12	Carex scopulorum	–	–	–	–	–	–	–	–	–	–	–	12.9	cliff sedge
CASI2	Carex simulata	20.0	–	–	–	–	–	–	–	–	99.5	–	22.0	short-beaked sedge
CAUT	Carex utriculata	–	–	–	–	0.5	–	90.0	70.0	–	–	–	12.6	beaked sedge
DECE	Deschampsia cespitosa	–	–	10.0	10.0	30.0	–	–	–	–	–	0.5	8.0	tufted hairgrass
ELEOC	Eleocharis	–	–	–	–	–	–	–	–	–	–	–	2.3	spike-rush
ELAC	Eleocharis acicularis	–	–	–	–	–	–	–	–	–	–	97.0	4.7	needle spike-rush
ELQU2	Eleocharis quinqueflora	–	–	–	–	–	–	–	–	–	–	–	6.0	few-flowered spike-rush
ERAN6	Eriophorum angustifolium	–	–	–	–	–	–	–	–	–	–	0.5	0.0	many-spiked cottongrass
JUAR2	Juncus arcticus	–	0.5	–	–	–	–	–	–	–	–	–	0.0	arctic rush
JUCA6	Juncus castaneus	–	–	–	–	–	–	–	–	–	–	–	0.0	chestnut rush
JUME3	Juncus mertensianus	–	–	–	–	40.0	–	–	–	–	–	–	1.3	blackheaded rush
LUPA4	Luzula parviflora	–	10.0	–	3.0	–	–	–	–	–	–	–	0.4	millet woodrush
LUSU9	Luzula subcapitata	–	20.0	–	–	–	–	–	–	–	–	–	0.6	Colorado woodrush
PHCO9	Phleum commutatum	–	–	–	–	–	–	–	–	–	–	0.5	1.0	alpine timothy
POPA2	Poa palustris	–	–	–	–	–	–	–	–	–	–	–	0.0	swamp bluegrass
POHU	Podagrostis humilis	–	–	–	–	–	–	–	–	–	–	–	0.6	alpine bentgrass
TOPA3	Torreyochloa pauciflora	–	–	–	–	–	–	–	–	–	–	–	0.0	pale false mannagrass
	FORBS													
BIBI5	Bistorta bistortoides	–	–	–	–	–	–	–	–	–	–	0.5	0.0	American bistort
BIVI2	Bistorta vivipara	–	–	–	–	–	–	–	–	–	–	–	0.1	viviparous bistort
CARH4	Castilleja rhexiifolia	–	–	–	–	–	–	–	–	–	–	–	0.0	splitleaf paintbrush
CLRH2	Clementsia rhodantha	–	–	0.5	–	0.5	–	–	–	–	–	–	4.9	rose crown

Code	Subgroup Poly- gon Species	I2 WFG 091 Cvr	I3 WFS 237 Cvr	I4 WFS 448 Cvr	I4 WFT 019 Cvr	I5 FMS 105 Cvr	I6 FWE 101 Cvr	I7 WFG 099 Cvr	I8 WFT 706 Cvr	J1 WFG 041 Cvr	J2 WFG 042 Cvr	J3 WFS 386 Cvr	Avg Cvr	Common Name
COPA28	Comarum palustre	–	–	–	–	–	–	–	–	10.0	30.0	–	2.6	purple cinquefoil
DEBA2	Delphinium barbeyi	–	–	–	–	–	–	–	–	–	–	–	0.0	Barbey larkspur
EPHO	Epilobium hornemannii	–	–	0.5	3.0	20.0	–	–	–	–	–	–	1.8	Hornemann willow-herb
EQAR	Equisetum arvense	–	–	–	–	–	–	–	–	–	–	–	0.0	field horsetail
EREMO11	Eremogone	–	–	–	–	–	–	–	–	–	–	–	0.6	sandwort
ERPE3	Erigeron peregrinus	–	–	–	–	–	–	–	–	–	–	–	1.3	peregrine fleabane
FORB	Forb	–	–	–	0.5	–	–	–	–	–	–	–	0.0	unknown forb
GATR2	Galium trifidum	20.0	–	–	0.5	–	–	–	–	–	–	–	0.7	small bedstraw
GAHU	Gaultheria humifusa	–	–	–	–	–	–	–	–	–	–	–	0.1	creeping wintergreen
GEAC2	Gentianella acuta	–	–	–	–	–	–	–	–	–	–	–	0.0	little gentian
GERI	Geranium richardsonii	–	–	–	–	–	–	–	–	–	–	–	0.6	Richardson geranium
GEUM	Geum	–	–	–	–	–	0.5	–	–	–	–	–	0.0	avens
LIGUS	Ligusticum	–	–	–	3.0	–	–	–	–	–	–	–	0.1	ligusticum
LITE2	Ligusticum tenuifolium	–	–	–	–	0.5	–	–	–	–	–	–	2.0	fern-leaf lovage
LIDI5	Limnorchis dilatata	–	–	–	–	–	–	–	–	–	–	–	0.0	scentbottle
MIOR2	Micranthes oregana	–	–	–	–	–	–	–	–	–	–	–	0.0	Oregon saxifrage
OXFE	Oxypolis fendleri	–	–	–	–	–	–	–	–	–	–	–	1.0	Fendler cowbane
PAMY	Paxistima myrsinites	–	–	–	–	–	–	–	–	–	–	–	0.6	mountain-lover
PEGR2	Pedicularis groenlandica	40.0	–	80.0	–	–	–	–	–	–	0.5	50.0	16.3	elephantella
PEGA3	Perideridia gairdneri	–	–	–	–	–	–	–	–	–	–	–	0.0	Gardner's yampah
PNAF	Pneumonanthe affinis	–	–	–	–	–	–	–	–	–	–	0.5	0.0	bottle gentian
PSLE	Psychrophila leptosepala	0.5	–	10.0	–	–	–	–	–	–	–	70.0	25.2	elkslip marsh-marigold
SARI8	Saxifraga rivularis	–	–	–	–	–	–	–	–	–	–	–	0.0	weak saxifrage
SEIN2	Senecio integerrimus	–	–	–	–	–	–	–	–	–	–	0.5	0.0	lambs-tongue groundsel
SETR	Senecio triangularis	–	–	–	–	–	–	–	–	–	–	–	1.0	arrowleaf groundsel
STLO2	Stellaria longipes	–	0.5	–	–	–	–	–	–	–	–	–	0.0	long-stalked stitchwort
SWPE	Swertia perennis	–	–	0.5	3.0	–	–	–	–	–	–	0.5	0.2	star gentian
VETE4	Veratrum tenuipetalum	–	–	–	–	–	–	–	–	–	–	–	0.0	Colorado false-hellebore
VEAM2	Veronica americana	–	–	–	–	–	–	–	–	–	–	–	0.1	American brooklime
VIOLA	Viola	–	–	0.5	40.0	0.5	40.0	–	–	–	–	–	3.3	violet
	BRYOPHYTES													
AULAC2	Aulacomnium	–	30.0	–	–	–	–	–	–	–	–	40.0	5.9	aulacomnium moss
AUPA70	Aulacomnium palustre	–	–	20.0	–	–	–	–	–	–	–	–	0.6	aulacomnium moss
BRYUM2	Bryum	–	–	0.5	–	–	–	–	–	–	–	–	0.0	bryum moss
DREPA3	Drepanocladus	–	–	10.0	–	–	–	50.0	–	–	–	40.0	16.0	drepanocladus moss
SPHAG2	Sphagnum	–	70.0	–	–	–	–	–	–	–	–	–	3.2	sphagnum
TOMEN	Tomenthypnum	–	–	40.0	–	–	–	–	–	–	–	–	1.3	tomentypnum moss
LICHEN	lichen	–	–	–	–	–	–	–	–	–	–	–	0.0	lichen
	GROUND COVER													
.BARE	bare soil or bare peat	0.0	0.0	0.0	0.0	0.2	0.0	62.3	0.0	8.7	0.0	0.5	3.0	bare soil or bare peat
.LITT	litter and duff	50.0	99.0	99.5	99.5	96.6	97.0	33.7	99.5	91.3	97.0	97.0	92.4	duff litter
.SED	sediment cover	–	–	–	–	–	–	–	–	–	–	–	0.0	sediment cover
.BAVE	live basal vegetation	10.0	1.0	0.5	0.5	1.5	10.0	2.9	0.5	2.0	3.0	3.0	3.2	live plant bases
.WATER	water cover	–	–	–	–	10.0	–	–	58.0	–	90.0	–	8.3	open water
.BRY	bryophytes	62.0	99.5	60.0	22.7	97.0	6.0	26.1	0.0	90.0	99.5	80.0	48.6	bryophytes
.LICHEN	lichen on soil	–	–	–	–	–	–	–	–	–	–	–	0.1	on soil lichen
.COWPIE	cowpies	10.0	–	–	–	–	–	–	–	–	–	–	0.3	cattle droppings
.ELKPEL	elk pellets	–	–	–	–	–	–	–	–	–	–	–	0.1	elk droppings
													Avg	Range
	No. Species	8	7	11	14	10	5	2	3	3	6	15	8.1	2 - 16
	Total Live Cover	280.5	137.5	342.0	251.5	173.0	180.0	110.0	200.0	140.0	180.0	360.0	232.9	100.0 - 381.0
	TLC / NS	35.1	19.6	31.1	18.0	17.3	36.0	55.0	66.7	46.7	30.0	24.0	37.2	15.2 - 98.3
	Floristic Quality Index	8	7	7	7	7	8	6	7	8	7	7	6.8	5 - 9
	Peat-Forming Species %	93	92	76	76	70	82	100	100	93	100	45	75.3	29 - 100
	Wetland Plants %	88	92	76	78	73	64	100	100	93	100	90	83.8	44 - 100
	Water Depth	-5	-40	-38	-9	-35	-75	-55	-19	-4	-1	0	-20.7	-75 - 2
	Peat Depth	45	55	40	54	50	100	65	61	150	150	40	61.8	30 - 150
	pH	5.00	5.08	5.00	5.17	5.30	6.81	4.95	4.56	4.93	5.72	5.37	5.4	4.41 - 6.81
	EC, µS/cm	7	140	60	50	370	35	50	20	30	100	40	83.9	7 - 470
	Organic Matter, %	62.0	20.0	39.8	81.5	69.0	55.0	50.9	84.8	86.5	83.3	44.2	55.5	20.0 - 86.5
	Carbon, %	34.6	10.2	20.4	44.8	35.7	28.3	26.3	47.0	44.8	41.7	21.8	29.2	10.2 - 47.0

Cluster X. ELAC-ELQU2-ELMA5 (*Eleocharis acicularis–Eleocharis quinqueflora–Eleocharis macrostachya* – Spike-rushes). N = 15

	Subgroup	G1	G1	G2	G3	G4	G4	G4	G5	G6	G7	G8	H1	H1	H1	H2		
	Poly-	FGM	WFW	WFT	WFW	WFC	WFC	WFT	JSA	WFG	WFG	JSA	WFG	WFG	WFG	WFG		
	gon	001	262	217	417	229	236	218	010	164	011	012	044	087	561	551		
	Landscape Area	GM	WE	SA	EL	SA	SA	SA	SA	GM	GM	SA	GM	GM	GM	GM		
	Date	7/8	7/8	9/16	7/21	8/24	8/15	9/16	9/23	7/7	7/11	9/23	7/17	7/18	8/19	7/20		
	Year	2009	2010	2009	2010	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009		
	Elevation, ft	10066	10640	11258	11180	11536	11760	11180	11609	9964	10552	11728	10098	10285	10314	10486		
	Fen Landform	BA	SD	SL	BA	TS	SL	SL	TS	BA	TS	TS	TS	TS	BA	TS		
	Slope, %	1.0	0.0	1.0	0.0	1.0	1.0	7.0	6.0	–	2.0	5.0	1.0	3.0	–	2.0	Avg	
Code	Species	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Cvr	Common Name
	SHRUBS																	
SAPL2	Salix planifolia	–	–	–	–	–	–	–	–	–	–	0.5	–	–	–	–	0.0	planeleaf willow
	GRAMINOIDS																	
CACA4	Calamagrostis canadensis	–	–	–	–	–	–	–	–	–	–	–	70.0	20.0	–	–	6.0	bluejoint reedgrass
CAREX	Carex	–	–	0.5	–	–	–	–	–	–	–	–	–	40.0	40.0	–	5.4	sedge
CAAQ	Carex aquatilis	80.0	30.0	–	–	80.0	60.0	30.0	–	–	40.0	–	20.0	–	10.0	–	23.3	water sedge
CACA12	Carex capillaris	–	–	–	–	–	–	–	–	–	–	60.0	–	–	–	40.0	6.7	hair sedge
CACA13	Carex capitata	–	–	–	–	–	–	–	0.5	–	–	–	–	–	–	–	0.0	capitate sedge
CAMI6	Carex microglochin	–	–	–	–	–	–	–	–	–	–	–	–	–	10.0	–	0.7	microglochin sedge
CANI2	Carex nigricans	–	–	–	20.0	–	–	–	–	–	–	–	–	–	–	–	1.3	black alpine sedge
CAPE42	Carex pellita	–	–	–	–	–	–	–	–	–	–	–	0.5	–	–	–	0.0	woolly sedge
CAPH2	Carex phaeocephala	–	–	–	40.0	–	–	–	–	–	–	–	–	–	–	–	2.7	dunhead sedge
CASA10	Carex saxatilis	–	–	20.0	–	–	–	–	–	–	–	–	–	–	–	–	1.3	rock sedge
CASC12	Carex scopulorum	–	–	–	–	–	–	–	0.5	–	–	40.0	–	–	–	–	2.7	cliff sedge
CAUT	Carex utriculata	40.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2.7	beaked sedge
DAIN	Danthonia intermedia	–	–	–	–	–	–	–	–	–	–	0.5	–	–	–	–	0.0	timber oatgrass
DECE	Deschampsia cespitosa	–	–	20.0	–	–	–	–	30.0	–	–	10.0	–	–	10.0	–	4.7	tufted hairgrass
ELAC	Eleocharis acicularis	–	–	–	–	–	–	–	–	–	–	–	80.0	97.0	97.0	97.0	24.7	needle spike-rush
ELMA5	Eleocharis macrostachya	40.0	97.0	–	–	–	–	–	97.0	70.0	99.5	97.0	–	–	–	–	33.4	pale spikerush
ELQU2	Eleocharis quinqueflora	–	–	97.0	60.0	90.0	97.0	90.0	–	–	–	–	–	–	–	–	28.9	few-flowered spike-rush
POHU	Podagrostis humilis	–	–	0.5	–	–	–	–	–	–	–	–	–	–	–	–	0.0	alpine bentgrass
	FORBS																	
ASTER	Aster	–	–	–	–	–	–	–	20.0	–	–	40.0	–	–	–	–	4.0	aster
BIVI2	Bistorta vivipara	–	–	–	–	–	–	0.5	–	–	–	–	–	–	–	–	0.0	viviparous bistort
CLRH2	Clementsia rhodantha	–	–	3.0	–	–	–	0.5	20.0	–	50.0	0.5	–	–	–	–	4.9	rose crown
COPA28	Comarum palustre	–	–	–	–	–	–	–	–	–	–	–	30.0	–	–	–	2.0	purple cinquefoil
GATR2	Galium trifidum	–	–	–	–	–	–	–	–	–	–	–	–	20.0	–	–	1.3	small bedstraw
GERI	Geranium richardsonii	–	–	–	–	–	–	–	–	–	–	0.5	–	–	–	–	0.0	Richardson geranium
LEMI3	Lemna minor	40.0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2.7	common duckweed
METR3	Menyanthes trifoliata	–	0.5	–	–	–	–	–	–	–	–	–	10.0	–	–	–	0.7	common buckbean
PAPA9	Parnassia parviflora	–	–	–	–	–	–	–	–	–	–	–	3.0	–	–	–	0.2	smallflower grass of Parnassus
PEGR2	Pedicularis groenlandica	–	–	10.0	20.0	–	–	–	20.0	–	30.0	20.0	0.5	0.5	20.0	–	8.1	elephantella
POTEN	Potentilla	–	–	–	–	–	–	–	–	–	–	0.5	–	–	–	–	0.0	cinquefoil
PSLE	Psychrophila leptosepala	–	–	10.0	20.0	–	–	–	40.0	–	60.0	30.0	–	30.0	–	–	12.7	elkslip marsh-marigold
SARI8	Saxifraga rivularis	–	–	–	–	–	–	–	–	–	–	–	–	0.5	–	–	0.0	weak saxifrage
SWPE	Swertia perennis	–	–	0.5	–	–	–	3.0	–	–	–	–	–	–	0.5	–	0.3	star gentian
VIOLA	Viola	–	–	0.5	–	–	–	0.5	–	–	–	–	–	–	–	–	0.1	violet
VIMA2	Viola macloskeyi	–	–	–	–	–	–	–	–	–	10.0	–	–	–	–	–	0.7	small white violet
	BRYOPHYTES																	
CLADI3	Cladina	–	–	–	–	–	–	–	–	–	–	0.5	–	–	–	–	0.0	reindeer lichen
DREPA3	Drepanocladus	–	–	–	20.0	–	–	52.0	20.0	–	–	–	60.0	–	–	–	10.1	drepanocladus moss
SPHAG2	Sphagnum	–	–	–	–	–	–	–	40.0	–	–	20.0	–	–	–	–	4.0	sphagnum
TOMEN	Tomenthypnum	–	–	–	–	–	–	–	30.0	–	–	40.0	–	–	–	–	4.7	tomentypnum moss
	GROUND COVER																	
.BARE	bare soil or bare peat	0.0	0.0	0.0	0.0	48.0	0.0	0.0	0.0	0.0	0.0	18.0	3.0	0.0	0.0	0.0	4.6	bare soil or bare peat
.LITT	litter and duff	98.5	98.0	99.5	1.5	52.0	99.5	99.5	94.2	97.5	97.0	87.6	97.0	97.5	88.2	97.5	87.0	duff litter
.SED	sediment cover	–	–	–	–	48.0	–	0.0	–	–	–	–	–	–	8.0	–	3.7	sediment cover
.BAVE	live basal vegetation	1.5	2.0	0.5	98.5	0.5	0.5	0.5	5.3	2.0	3.0	0.5	3.0	2.0	3.0	2.0	8.3	live plant bases
.WATER	water cover	–	26.0	–	4.2	52.0	–	2.1	–	–	–	–	30.0	–	2.0	–	7.8	open water
.BRY	bryophytes	0.0	0.0	77.4	12.1	20.6	78.8	52.0	90.0	0.0	80.0	65.4	60.0	80.0	93.1	80.0	52.6	bryophytes
.ALGAE	algae on soil	–	46.0	–	–	–	–	–	–	–	–	–	–	–	–	–	3.1	algae on soil

Subgroup	G1	G1	G2	G3	G4	G4	G4	G5	G6	G7	G8	H1	H1	H1	H2		
Poly-gon	FGM 001	WFW 262	WFT 217	WFW 417	WFC 229	WFC 236	WFT 218	JSA 010	WFG 164	WFG 011	JSA 012	WFG 044	WFG 087	WFG 561	WFG 551	Avg	Range
No. Species	4	3	10	5	2	2	6	8	1	6	12	8	7	7	2	5.5	1 - 12
Total Live Cover	160.0	127.0	162.0	160.0	170.0	157.0	124.5	208.0	70.0	289.5	258.0	201.0	207.5	187.5	137.0	174.6	70.0 - 289.5
TLC / NS	40.0	42.3	16.2	32.0	85.0	78.5	20.8	26.0	70.0	48.3	21.5	25.1	29.6	26.8	68.5	42.0	16.2 - 85.0
Floristic Quality Index	4	4	7	8	7	7	8	5	3	6	6	6	6	6	6	5.9	3 - 8
Peat-Forming Species %	80	100	79	50	100	100	99	52	100	59	73	61	10	22	29	67.5	10 - 100
Wetland Plants %	100	100	92	69	100	100	98	80	100	90	68	99	71	76	85	88.5	68 - 100
Water Depth	5	0	-28	0	1	-28	-40	-43	-5	-5	-25	-1	-14	-30	0	-14.2	-43 - 5
Peat Depth	55	150	42	60	64	35	48	55	40	100	40	45	45	50	40	57.9	35 - 150
pH	7.61	4.66	5.22	5.31	5.49	5.04	5.13	6.82	5.45	5.21	7.95	4.99	5.71	6.01	5.95	5.8	4.66 - 7.95
EC, µS/cm	90	20	50	50	40	20	50	40	50	20	60	40	100	140	120	59.3	20 - 140
Organic Matter, %	52.4	86.0	64.8	26.0	64.5	52.7	73.3	70.5	50.9	55.2	75.9	82.2	40.0	68.3	81.1	62.9	26.0 - 86.0
Carbon, %	23.4	44.5	35.2	13.6	33.7	27.0	39.1	36.4	27.5	28.2	44.6	44.3	16.4	34.9	43.7	32.8	13.6 - 44.6