Bull Creek Vegetation Monitoring Report

Sampling Period 2010, 2011, and 2012

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Executive Summary

Bull Creek Reservoir #4 has increased its water storage capacity for purposes of irrigation water. The reservoir has operated under normal procedures for the last two years. The area of interest is the newly inundated zone between the restricted water level and the new high water line. Nine transects were placed and data collected at 5-meter increments for species and percent cover. Quadrats were broken into zone (above new high water line, newly inundated, and below restricted level) and wetland type (non-wetland, wetland, and fen). Data collected at each quadrat was used to calculate the Prevalence Index (PI), percent cover, and community type. The reservoir was filled and drained early in the growing season in 2010. In 2011, the reservoir was filled and remained full into late July, approximately 2 months into the growing season. In 2012 the reservoir dropped below the restricted water level in early July, 3 weeks earlier than in 2011. Precipitation accumulations in 2012 were 63% of the precipitation accumulations of 2011 and 80% of 2010 (NRCS 2012).

Data analysis reveals that there has been an increase in vascular herbaceous cover between 2011 and 2012. Carex and graminoid species have increased in both the newly inundated zone and the above new high water line. The presence of *Carex aquatilus, Carex utriculata,* and *Eleocharis palustris* have contributed to this increase. Shrub cover has increased but only above new high water line, within the newly inundated zone percent cover has remained relatively constant. The influencing shrub species are *Salix monticola, Salix geyeriana,* and *Salix planifolia.*

The Prevalence Index (PI) is a weighted average wetland indicator status of all plant species in the sampling plot. Hydrophytic status of the community is represented rather than one based on a few dominant species. The average PI for each year indicates whether the vegetation community is hydrophytic within the different zones. In general the vegetation within the newly inundated zone has a lower PI in 2011 and 2012 than in 2010, indicating these communities are becoming more hydrophytic. The area above the new high water level has an increased PI in 2011and 2012 from 2010 although still within the hydrophytic vegetation range.

The functional assessment total wetland index value decreased in 2012 from 2011 based on the 2009 delineation. The total wetland index value for 2012 equaled the total wetland index value for 2010 (2.91). Key indices to the scoring decrease from 2011 to 2012 are the hydrogeomorphic index, vegetation index, and the Threatened, Endangered, and Sensitive Species (TESS) index.

Within the newly inundated zone, wetland hydrology is now present, as determined by pool elevations and duration, and hydrophytic vegetation is present as well, determined by the PI values for 44 quadrats. WestWater Biologists no longer consider 3.38 acres of wetland to be accurate. Approximately 4.28 acres of additional areas with wetland characteristics are believed to now be present, totaling 7.77 acres of wetland. The GMM assessment takes into account total

acreage when determining the total wetland index value (the total weighted index value per acre multiplied by total acres). With the additional wetland acres the revised total wetland index value would increase to 5.67.

Introduction

Pursuant to special conditions stated in the Bull Creek Reservoir #4 permit modification, (Reference SPK-2008-00722), this report contains data collected August 2, 2012 and August 8 and 9, 2011 compared to baseline assessment data collected at Bull Creek Reservoir #4 August 8 and 9, 2010 (Bull Creek 2011, Bull Creek 2010). The Grand Mesa Assessment Method (GMM) was completed during the August, 2012 and 2011, sampling period and is compared to the functional assessment conducted in August of 2010.

The reservoir was filled briefly in 2010 and then drained; however, the reservoir operated under normal procedures in 2011 and 2012. Normal operations consist of filling the reservoir to the high water mark until late spring and then releasing a portion of its water for irrigation throughout the summer. Monitoring was conducted as per the 2011 Bull Creek Reservoir Wetland Monitoring Vegetation Sampling Protocol, Revised Field Season 2011 (Bull Creek 2011a). As per the 2011 Bull Creek Reservoir Wetland Monitoring Vegetation Sampling Protocol, Revised Field Season 2011, additional transects were added in 2011 to improve assessment quality and the quantity of data collected in the inundation zone. Transect data were broken down into zones reflecting changing in high water levels (Figure 1).

The area of interest is the newly inundated zone between the restricted water level and the new high water mark. The newly inundated zone consists of 3.38 acres of wetland existing between the restricted water (9,857.5 ft msl) line and the new high water line (9,864 ft msl) of the reservoir. This area has now had two consecutive years of normal fill and drawdown operations. Additional transects were installed in 2011 to offset the initial transect plots from 2010 that were inundated during the survey period in 2011 because of the reservoir no longer needing to be drained completely with dam improvements. The same transects were used in 2012 as in 2011 at Bull Creek Reservoir #4 and compared to the same transects at the control site, Bull Creek Reservoir #5.

Precipitation accumulations from the Mesa Lakes SNOTEL site indicate 2012 had a lower total precipitation accumulation than in the previous 10 years (NRCS 2012). The ten year average of precipitation accumulation is 35.06 inches. 2012 totaled 28.5 inches. 2011 had an unusually high accumulation of 44.8 inches and 2010 was average at 35.7 inches. Daily snow depth measurements are also taken at this site and the peak snow depth was 68 inches in 2010, 77 inches in 2011, and 57 inches in 2012. Snow melt also happened much earlier in 2012, reaching zero inches on May 5th as compared to June 15th in 2011 and May 28th in 2010. 2012 was a drier than average year.

Vegetation Data

Vegetation data was collected utilizing Daubenmire plots at 5-meter increments along 9 transects at Bull Creek #4 and 2 transects at Bull Creek #5, which serves as a control. A plant identification biologist and a recorder were assigned to each transect. Data is broken down by

species, plot, transects, cover, and structure. Summary of collected data is presented in Tables 1 through 5. Data was then further broken down by zone (above new high water line and newly inundated) and by wetland type (fen, wetland, non-wetland) within the zones based on the 2009 delineation that was never verified by the COE. Wetland indicator status was assigned to each species and the Prevalence Index (PI) was performed for each plot. The PI was then categorized by zone and wetland type.

Control Site Bull Creek #5

Total vegetation cover at Bull Creek Reservoir #5 for transect 5 declined in 2011 from 2010 but increased in 2012. It appears that Carex species as well as shrub species experienced a decline in total cover in August 2011. These communities rebounded in 2012 and nearly all the communities have a greater average cover than in 2010. Total species never varied from year to year (Table 1). Transect 5A was added in 2011 and when compared to 2012 vegetation cover there was an overall increase in 2012 in every community except shrub where there was a decrease in average cover (Table 2). When both transect 5 and 5A are combined and the average vegetation cover calculated; average percent coverage increased from 111.6% in 2011 to 134.5% in 2012. Species diversity increased from 8.5 to 11 (Table 3). Shrub cover declined from 2011 to 2012 (39.9% vs. 28.9%) but carex cover have drastically increased (67.7% vs. 97.7%).

Table 1. Average Cover Bull Creek Reservoir #5 Transect 5 by Vegetation Cover by Community for 2010, 2011, and 2012.

2010 August Bull Creek #5 Transect Cover by Community										
Carex	**Gram**	**All Gram**	**Forb**	**Shrub**	**Tree**	**Bryophyte**	**VascHerb**	**Total**	**Species**	**Transect**
91.7	5.6	97.3	0.0	9.4	0.0	0.0	97.3	106.7	5	BC #5
2011 August Bull Creek #5 Transect Cover by Community										
Carex	**Gram**	**All Gram**	**Forb**	**Shrub**	**Tree**	**Bryophyte**	**VascHerb**	**Total**	**Species**	**Transect**
67.3	2.5	69.8	0.0	5.0	0.0	0.0	69.8	74.8	5	BC #5
2012 August Bull Creek #5 Transect Cover by Community										
Carex	**Gram**	**All Gram**	**Forb**	**Shrub**	**Tree**	**Bryophyte**	**VascHerb**	**Total**	**Species**	**Transect**
98.4	5.3	103.8	0.0	8.4	0.0	0.0	103.8	112.2	5	BC #5

Table 2. Average Coverage and Community Data for the Newly Installed Transect 5A at Bull Creek Reservoir #5 for 2011 and 2012.

2011 August Bull Creek #5A Transect Cover by Community										
Carex	**Gram**	**All Gram**	**Forb**	**Shrub**	**Tree**	**Bryophyte**	**VascHerb**	**Total**	**Species**	**Transect**
68.0	0.5	68.5	7.0	67.9	5.0	0.0	75.5	148.4	12	BC #5A
2012 August Bull Creek #5A Transect Cover by Community										
Carex	**Gram**	**All Gram**	**Forb**	**Shrub**	**Tree**	**Bryophyte**	**VascHerb**	**Total**	**Species**	**Transect**
97.1	2.0	99.0	3.5	44.4	5.0	4.8	102.5	156.7	17	BC #5A

Table 3. Average Coverage and Community Data for both Transects 5 and 5A for 2011 and 2012.

2011 August Bull Creek #5 Cover by Community Transect 5 and 5A										
Carex	**Gram**	**All Gram**	**Forb**	**Shrub**	**Tree**	**Bryophyte**	**VascHerb**	**Total**	**Species**	**Transect**
67.7	1.4	69.1	3.9	39.9	2.8	0.0	73.0	115.6	15	BC #5 and 5A
2012 August Bull Creek #5 Cover by Community Transect 5 and 5A										
Carex	**Gram**	**All Gram**	**Forb**	**Shrub**	**Tree**	**Bryophyte**	**VascHerb**	**Total**	**Species**	**Transect**
97.7	3.4	101.1	2.0	28.9	2.8	2.7	103.1	137.5	18.0	BC #5 and 5A

Bull Creek Reservoir #4

The reservoir was filled to the new high water line (9,864 ft msl) which peaked on June 8, 2012. In 2011 the reservoir reached the high water mark on July 8, a full month later than in 2012. (Table 4). The water level dropped below the restricted water line (9857.5 ft msl) between July 7 and July 14, 2012. This is three weeks earlier than in 2011 in which the water level dropped below the restricted water line between July 29 and August 5. The newly inundated zone between 9857.7 and 9864 ft msl was inundated with water for 3 weeks longer in 2011 than in 2012

Table 4. Bull Creek Reservoir #4 pool elevation for 2011 and 2012 provided by John Groo. New high water line is 9864 ft msl and the restricted water line is 9857.5 ft msl.

Date	Pool Elevation (ft msl)	Date	Pool Elevation (ft msl)
7/8/11	9,864.00	6/8/12	9,864.00
7/15/11	9,863.00	6/16/12	9861.81
7/22/11	9860.75	6/23/12	9861.61
7/29/11	9858.03	6/30/12	9859.52
8/5/11	9854.5	7/7/12	9857.9
8/12/11	9850.73	7/14/12	9856.7
8/20/11	9847.79	7/21/12	9854.4
8/27/11	9845.07	7/28/12	9851.9
9/2/11	9840.00	8/4/12	9852.6

Photos were taken at each plot for 2011 and 2012. Each plot placement will vary slightly from year to year because each individual plot was not pinned for permanent placement. It was determined that permanent placement of each plot was not necessary to show trends in vegetation establishment or deterioration. Photo comparisons are depicted in Appendix C.

Individual Transect Trends at Bull Creek Reservoir #4

Over the three years of this monitoring study, the vegetation along each transect at Reservoir 4 displayed unique dynamics in total vegetation cover. Transect 4, in particular, exhibited dramatic year to year variation. The overall vegetation cover was steady from 2010 to 2011, but then increased an average of 36% from 2011 to 2012.

Transect 1 has had a steady increase in vegetation cover due to the increase in forb cover despite a loss in *Carex aquatilus* cover. Increases in forbs are mainly from an increase in *Danthonia intermedia, Plagiobathrys scouleri,* and *Rorippa curvipes* that replaced *Potentilla pulcherrima, Taraxacum offininale,* and *Fragaria virginiana.* There was a slight decrease in *carex* cover in transect 1A in 2012 with a decrease in *Carex aquatilus* but an increase in *Carex utriculata.* There was a large increase in forbs driven by *Plagiobathrys scouleri* and *Rorippa curvipes.*

Forb cover dropped nearly 50% while shrub cover remained nearly steady in transect 2 between 2011 and 2012. Increase in forbs are from *Dugaldia hoopesii, Mertensia ciliate, Streptopus fassettii, Viola adunca,* while *Pyrola minor* has been added to the *Salix monticola* and *Salix geyeriana* shrub cover. Transect 2A had an increase in forbs with an increase in *Rorippa curvipes, Ranunculus reptans,* and *Equisetum arvense. Salix monticola* decreased in 2012 in the shrub community for this transect.

Transect 3 more than doubled its forb cover and shrub cover increased by 50% between 2011 and 2012. Forb cover increases were driven by *Aconitum columbianum, Distegia involucrata, Psychrophila leptosepala,* and *Viola adunca.* Shrub cover increased 13 fold in *Salix monticola* and 3 fold in *Pentaphylloides floribunda* which more than compensated for declines in *Pyrola minor* and *Salix planifolia. Picea engelmannii* was identified in transect 3A along with an increase in *Salix monticola*. Graminoids increased four times with the presence of *Calamogrostis canadensis.* There was a decrease in carex in 2012 in transect 3A; changing from a *Carex aquatilus* dominated community to a *Carex saxatilis* and *Carex utriculata* dominated community. Change in composition in the shrub community with the addition of *Salix geyeriana* to *Salix planifolia* and *Salix monticola* occurred in 2012 in transect 3B.

Doubling in both forbs, primarily *Ranunculus reptans,* and carex species, mainly *Carex utriculata and Carex aquatilus* was the driving force in the recovery in vegetation in transect 4 in 2012. *Picea engelmannii* was also observed in two plots this year. Carex species tripled between 2011 and 2012 in transect 4A driven mostly by *Carex aquatilus,* but there was also an increase in *Carex utriculata.* Forbs increased significantly with the addition of several species in small quantities.

Comparing Vegetation Cover in the Different Zones

Total average cover increased from 2011 to 2012 in both the above new high water line and newly inundated zone. There was a decrease in average cover in 2011 from 2010. Average cover nearly rebounded in 2012 to 2010 levels in the above new high water zone, but not so in the newly inundated zone. Above new high water line carex cover doubled in 2012 from 2011, graminoids quadrupled and shrubs increased slightly. Within the newly inundated zone the

largest increase in vegetation community was in forbs. Carex and graminoids increased in the newly inundated zone as well in 2012 from 2011. Data is depicted in Table 5.

Table 5. Total Average Cover Vegetation Cover by Community and Zone for 2010, 2011, and 2012.

2010 August Bull Creek #4 Transect 1- 4 Average Cover by Community and Zone										
Carex	**Gram**	**All Gram**	**Forb**	**Shrub**	**Tree**	**Bryophyte**	**VascHerb**	**Total**	**Species**	**ZONE**
15.0	14.1	29.1	30.6	44.1	5.9	6.1	59.8	118.2	38	Above High Water
49.6	9.5	59.2	30.5	46.6	4.5	11.5	89.6	152.3	54	Newly Inundated
14.9	15.7	30.5	15.7	0.0	0.0	1.3	46.2	47.5	28	Below Restricted Level
2011 August Bull Creek #4 All Transects Average Cover by Community and Zone										
Carex	**Gram**	**All Gram**	**Forb**	**Shrub**	**Tree**	**Bryophyte**	**VascHerb**	**Total**	**Species**	**ZONE**
9.1	3.9	13.0	42.9	25.0	8.0	3.2	56.0	92.1	62	Above High Water
39.9	2.3	42.2	3.0	23.3	0.5	3.6	45.3	72.5	39	Newly Inundated
29.0	6.5	35.5	6.0	1.5	0.0	18.1	41.5	61.2	16	Below Restricted Level
2012 August Bull Creek #4 All Transects Average Cover by Community and Zone										
Carex	**Gram**	**All Gram**	**Forb**	**Shrub**	**Tree**	**Bryophyte**	**VascHerb**	**Total**	**Species**	**ZONE**
18.1	11.9	30.0	38.8	31.6	8.0	6.1	68.8	114.6	63	Above High Water
45.4	7.9	53.3	17.7	22.8	0.0	5.8	71.0	99.6	50	Newly Inundated
39.1	20.4	59.6	23.5	12.9	0.0	10.2	83.0	106.1	21	Below Restricted Level

Species Richness at Bull Creek Reservoir #4

In 2012 there were 63 species above new high water line and 50 species in the newly inundated zone. 2011 also exhibited the same pattern with 62 species in the above new high water line zone and 39 species within the newly inundated zone. This is in contrast to 2010 where the newly inundated zone hosted 54 species compared to the above new high water line zone which had 38 species. Data is found in Table 5.

Vegetation Cover by Wetland Type and Zone per Transect

In 2009 a wetland delineation was performed by WestWater Engineering biologists. The wetland delineation was withdrawn and never verified by the COE. However; in order to more accurately explain the changes in species composition and diversity throughout the newly inundated zone and above the new high water line the wetland boundaries of 2009 are being

used. Changes in species composition and diversity in the wetland and fen areas over time, as well as previously non-wetland areas as the water level is increased will determine whether wetlands and fens are being affected and whether wetland areas are increasing. Data has been broken down into wetland type, zone, and transect. Transects 1 and 1A represent an area of Bull Creek Reservoir #4 where in 2009 no wetland or fen areas were identified. Transects 2 and 2A are within an identified wetland area. Transects 3, 3A, and 3B run through fen, wetland, and non-wetland areas and the same is true for transects 4 and 4A. Species information by transect, community, and wetland type can be found in Table 6.

In transect 1 in the above new high water line non-wetland zone, shrub cover was dominant in 2010 (99.5%), then virtually disappeared in 2011 (0%) with the loss of *Salix geyeriana*, and began to reappear in 2012 (9.3%) replaced by *Pentaphylloides floribunda*. Forb cover has steadily increased over the monitoring period (38.8% in 2010, 69.7% in 2011, and 80.7% in 2012). In the non-wetland within the newly inundated zone total graminoids didn't vary much from year to year however; species composition changed from graminoid dominated in 2010 to carex dominated, driven by the replacement of *Deschampsia caespitosa* and *Poa fendeleri* with *Cares aquatilus* and *Carex utriculata*. *Eleocharis palustris* began to appear in 2012 as well. The largest difference between 2010 and 2011 was the loss of all shrub, tree, and bryophyte communities. That trend continued in 2012.

Transect 1A is completely within the newly inundated/non-wetland area. There was very little change between 2011 and 2012. There was a slight decrease in carex cover and an increase in forb cover in 2012.

Above the new high water line in an identified wetland, there was a complete loss of graminoid cover (*Poa fenderleri*) from 2010 (24.9%) to 2011 (0%) along transect 2. There was a slight recovery in 2012 (2%). Graminoid cover was replaced by carex cover in 2011 (10%) with the presence of *Carex illota*, but carex species disappeared completely in 2012 (0%). Forb cover increased in the second year of monitoring then dropped to original levels in the third year (22.5% in 2010, 41.4% in 2011, and 23% in 2012). Shrubs remained relatively constant during the three years of monitoring with the presence of *Salix geyeriana* and tree species (not observed in 2010) increased in 2011 then dropped in 2012. Within the wetland/newly inundated zone carex species (*Carex aquatilus* and *Carex utriculata*) have begun to appear. Forb cover has dropped significantly from the 2010 observations. Shrubs remained consistent in 2010 and 2011 but decreased slightly in 2012, changing from *Salix geyeriana* to *Salix monticola* dominated. Tree species and bryophytes that were observed in 2010 were not observed in both 2011 and 2012. Placement of the quadrats and observer error could be a factor.

Transect 2A, which is found completely within the wetland/newly inundated zone, had an increase in forb cover (2.4% in 2011 and 19.1% in 2012) driven by *Rorippa curvipes*, *Ranunculus reptans*, and *Equisetum arvense.* This was the only major change in community cover; although *Eleocharis palustris* has begun to appear in 2012.

Transect 3 runs through wetland, fen, and non-wetland areas. In the non-wetland area found above the new high water line carex cover decreased in 2011 then increased in 2012 (11.5% in 2010, 3.3% in 2011, and 15% in 2012). Forb cover doubled in 2012 from 2010 and 2011 (42% vs. 82.7%) and shrub cover nearly disappeared (99.5% in 2010, 4.3 % in 2011, and 0.7% in

2012). Wetland areas found above the new high water line also saw a decrease in shrub cover with the loss of *Salix planifolia* and an increase in forbs in 2012. Carex species (*Carex utriculata*) were not observed at all in 2012 in the wetland area above the new high water line. Carex cover decreased from 2010 (55%) to 2011 (15%) and increased slightly in 2012 (20%) in the fen area above the new high water line, but increased slightly in the fen within the newly inundated zone over the monitoring period, driven by *Carex utriculata*. Shrub cover decreased in the fen in both zones from 2010 to 2011, but increased in 2012. Forbs increased in the fen in both zones in 2012 after a decrease was observed in 2011. More obligate and facultative wet forb species were observed in 2012.

Non-wetland areas contain the majority of the quadrats for transect 3A. Non-wetland areas above the new high water line had an increase in carex cover (0.1% vs. 17.5%) and an increase in shrub cover (4.8% vs. 27%) with the increase in cover being *Salix monticola*. The major change in the non-wetland area within the newly inundated zone was an increase in graminoid cover *Calamogrostis canadensis* and *Eleocharis palustris* (6.9% vs. 30.5%). The wetland area above the new high water line had an increase in shrub cover also driven by *Salix monticola*.

In transect 3B the majority of the quadrats are found in fen. The fen within the newly inundated zone decreased in carex cover (51.9% vs. 28.3%) with the loss of *Carex aquatilus* and *Carex illota* to *Carex saxatilis* and *Carex utriculata,* and increased in forb (4.7% vs. 23.3%) and shrub cover (18.1% vs. 42.8%) driven by *Salix planifolia*. In the non-wetland area above the new high water line carex and graminoid cover increased and changed to the dominant community type with the appearance of *Eleocharis palustris* and *Calamogrostis canadensis* and the increase of *Carex utriculata*. Forbs, shrubs, and tree species were not observed at all in 2012. This is the same trend for the wetland area within the newly inundated zone.

The largest change in the wetland area above the new high water line in transect 4 was the increase in graminoid cover in 2012. The non-wetland area above the new high water line had the greatest change in 2011 from 2010 in forb and bryophyte cover which decreased dramatically. Cover in all community types remained relatively consistent in 2011 and 2012. There was an increase in carex and graminoid cover in 2012 within the fen above the new high water line driven by increases in *Carex aquatilus* and the appearance of *Calamogrostis canadensis*. All graminoid cover had a significant increase. The fen within the newly inundated zone had an increase in carex cover from 2011 to 2012, but 2012 observations were relatively close to 2010.

Transect 4A is found completely within the newly inundated zone and has wetland, fen, and non-wetland areas. Within the non-wetland area the largest change from 2011 to 2012 is the increase in carex, graminoid, and shrub cover. Both the wetland and fen quadrats had an increase in carex and forb cover between the two years.

Table 6. Average Percent Cover by Vegetation Community, Zone, Wetland Type and Transect.

Transect	Wetland Type/Zone	Year	Carex	Gram	All Gram	Forb	Shrub	Tree	Bryophyte	VascHerb	Ttl Veg	Species
T 1	Non-Wetland Above New High Water Line	**2010**	0.0	16.6	16.6	38.8	99.5	0.0	0.0	55.4	154.9	8
		2011	1.4	17.4	18.9	69.7	0.0	0.0	0.0	88.6	88.6	20
		2012	2.9	7.9	10.7	80.7	9.3	0.0	0.0	91.4	100.7	23
	Non- Wetland Newly Inundated Zone	**2010**	2.9	25.7	28.6	49.6	14.6	7.1	13.3	78.2	113.3	20
		2011	34.3	0.9	35.2	2.7	0.0	0.0	0.0	37.9	37.9	7
		2012	24.9	3.6	28.4	32.3	0.0	0.0	0.0	60.7	60.7	13
T 1A	Non- Wetland Newly Inundated Zone	**2011**	73.3	0.8	74.1	2.9	0.5	0.0	0.0	77.0	77.5	9
		2012	65.3	0.4	65.7	19.0	0.0	0.0	0.0	84.6	84.6	10
T 2	Wetland Above New High Water Line	**2010**	0.0	24.9	24.9	22.5	74.6	0.0	0.0	47.4	122.0	7
		2011	10.0	0.0	10.0	41.4	71.7	40.0	2.0	51.4	165.1	12
		2012	0.0	2.0	2.0	23.0	82.0	18.0	1.0	25.0	126.0	12
	Wetland/Newly Inundated Zone	**2010**	0.0	0.0	0.0	93.3	99.5	16.7	26.7	93.3	236.2	6
		2011	1.0	0.0	1.0	3.3	99.5	0.0	0.0	4.3	103.8	4
		2012	3.3	0.0	3.3	11.7	63.3	0.0	0.0	15.0	78.3	4
T 2A	Wetland/Newly Inundated Zone	**2011**	17.0	0.3	17.3	2.4	36.9	0.0	6.0	19.7	62.6	9
		2012	17.3	5.5	22.7	19.1	33.6	0.0	9.5	41.8	85.0	12
T 3	Non-Wetland Above New High Water Line	**2010**	11.5	0.0	11.5	42.0	99.5	0.0	0.0	53.5	153.0	7
		2011	3.3	0.0	3.3	43.0	4.3	0.0	6.7	46.3	57.3	16
		2012	15.0	0.0	15.0	82.7	0.7	0.0	23.3	97.7	121.7	18
	Wetland Above New High Water Line	**2010**	11.5	0.0	11.5	12.5	81.5	0.0	0.0	24.0	105.5	9
		2011	1.5	0.0	1.5	31.8	5.3	0.0	10.0	33.3	48.5	13
		2012	0.0	0.0	0.0	37.5	10.0	0.0	11.0	37.5	58.5	10
	Fen/Above New High Water Line	**2010**	55.0	5.0	60.0	20.3	85.0	0.0	0.0	80.3	165.3	9
		2011	15.0	0.0	15.0	19.3	16.5	0.0	0.0	34.3	50.8	10
		2012	20.0	2.5	22.5	60.0	61.5	0.0	12.5	82.5	156.5	15
	Fen/Newly Inundated Zone	**2010**	34.0	2.1	36.1	25.1	68.8	0.1	5.3	61.1	135.2	25
		2011	35.9	7.0	42.9	5.1	13.3	0.0	3.0	48.0	64.3	15
		2012	41.0	4.0	45.0	23.6	13.5	0.0	6.7	68.6	88.8	20

Transect	Wetland Type/Zone	Year	Carex	Gram	All Gram	Forb	Shrub	Tree	Bryophyte	VascHerb	Ttl Veg	Species
T 3A	Non-Wetland Above New High Water Line	2011	0.1	3.3	3.4	26.8	4.8	0.0	0.8	30.1	35.6	17
		2012	17.5	0.0	17.5	26.8	27.0	0.0	3.8	44.3	75.0	15
	Non- Wetland Newly Inundated Zone	2011	21.2	6.9	28.1	0.8	74.2	0.0	0.0	28.9	103.1	10
		2012	11.9	30.5	42.5	2.9	65.5	9.1	0.0	45.4	119.9	16
	Wetland/Above New High Water Line	2011	0.0	0.8	0.8	45.0	1.6	0.0	7.5	45.8	54.9	14
		2012	7.8	0.8	8.5	52.3	68.3	0.0	16.3	60.8	145.3	15
T 3B	Non-Wetland Above New High Water Line	2011	15.0	0.0	15.0	62.7	63.2	17.1	0.0	77.7	157.9	20
		2012	35.8	19.2	55.0	0.0	0.0	0.0	0.0	55.0	55.0	4
	Wetland/Newly Inundated Zone	2011	10.0	0.0	10.0	3.5	20.0	0.0	0.0	13.5	33.5	4
		2012	30.0	20.0	50.0	0.0	0.0	0.0	0.0	50.0	50.0	2
	Fen/Newly Inundated Zone	2011	51.9	2.6	54.4	4.7	18.1	0.0	9.2	59.1	86.4	11
		2012	28.3	2.2	30.6	23.3	42.8	0.0	7.8	53.9	104.4	12
T 4	Wetland/Above New High Water Line	2010	99.5	0.0	99.5	0.0	0.0	0.0	0.0	99.5	99.5	1
		2011	80.0	10.0	90.0	0.5	0.0	0.0	0.0	90.5	90.5	3
		2012	115.0	85.0	200.0	0.0	0.0	0.0	0.0	200.0	200.0	3
	Non-Wetland Above New High Water Line	2010	50.0	0.0	50.0	160.0	0.0	0.0	80.0	210.0	290.0	6
		2011	30.0	0.0	30.0	16.8	0.0	0.0	15.0	46.8	61.8	6
		2012	42.5	0.0	42.5	13.5	0.0	50.0	15.0	56.0	121.0	9
	Fen/Above New High Water Line	2010	20.0	0.0	20.0	23.0	99.5	99.5	40.0	43.0	282.0	4
		2011	10.0	0.0	10.0	3.5	10.0	0.0	10.0	13.5	33.5	5
		2012	65.0	95.0	160.0	10.0	90.0	15.0	0.0	170.0	275.0	6
	Fen/Newly Inundated Zone	2010	95.6	14.8	110.4	24.2	39.9	0.0	19.2	134.7	193.8	17
		2011	60.0	0.1	60.1	0.8	22.2	0.0	15.6	60.8	98.6	11
		2012	105.6	3.6	109.1	0.7	24.3	0.0	11.7	109.8	145.8	11

Transect	Wetland Type/Zone	Year	Carex	Gram	All Gram	Forb	Shrub	Tree	Bryophyte	VascHerb	Ttl Veg	Species
T 4A	Wetland/Newly Inundated Zone	**2011**	32.9	0.0	32.9	0.5	0.0	2.3	0.0	33.4	35.6	5
		2012	58.6	0.7	59.3	30.4	1.4	0.0	13.6	89.7	104.7	15
	Fen/Newly Inundated Zone	**2011**	21.6	0.4	22.1	2.5	12.9	3.8	11.3	24.6	52.4	10
		2012	72.5	12.5	85.0	22.6	6.9	0.0	25.8	107.6	140.3	17
	Non- Wetland Newly Inundated Zone	**2011**	18.3	5.0	23.3	10.0	51.6	0.0	0.0	33.3	84.9	9
		2012	42.0	45.0	87.0	5.6	57.0	0.0	0.0	92.6	149.6	12

Prevalence Index

The Prevalence Index (PI) is a weighted average wetland indicator status of all plant species in the sampling plot. Hydrophytic status of the community is represented rather than one based on a few dominant species. Calculating the PI for the vegetation community will in general indicate if the vegetation is becoming more or less hydrophytic. Values equal to or less than 3.0 are hydrophytic and values greater than 3.0 are non-hydrophytic.

Comparing Prevalence Index in the Different Zones

PI was calculated for each year for the different zones and is depicted in Table 7. The average PI for each year indicates the vegetation community is hydrophytic within the different zones. In general the vegetation within the newly inundated zone has a lower PI in 2011 and 2012 than in 2010, indicating these communities are becoming more hydrophytic. The area above the new high water level has an increased PI in 2011and 2012 from 2010, although still within the hydrophytic vegetation range.

Table 7. Prevalence Index Average in the Different Zones

Year	Prevalence Index Average Above New High Water Zone	Prevalence Index Average Newly Inundated Zone
2010	2	2.1
2011	2.7	1.4
2012	2.4	1.6

Prevalence Index by Wetland Type and Zone

The quadrats were then further divided into wetland type within those zones found in Table 8. In 2010 the average PI was 3.2 in the non-wetland newly inundated zone and would therefore not have been considered hydrophytic vegetation. In 2011 and 2012 the average PI had dropped to 1.2 and 1.4. This is a significant change toward hydrophytic vegetation. This appears to be from the increase in *Carex aquatilus* and *Carex utriculata.* In the fen area above the new high water line the average PI has steadily increased over the three years, however; within the fen in the newly inundated zone the average PI has remained consistent. There didn't appear to be a trend in any of the other wetland type/zone regarding the average PI other than the average PI is within the hydrophytic vegetation range in all years.

Table 8. Prevalence Index Average by Wetland Type and Zone.

Year	Prevalence Index Average Above New High Water Zone Fen	Prevalence Index Average Above New High Water Zone Wetland	Prevalence Index Average Above New High Water Zone No Wetland
2010	**1.2**	**2**	**2.1**
2011	**2**	**2.5**	**2.9**
2012	**2.2**	**2.5**	**2.4**

Year	Prevalence Index Average Newly Inundated Zone Fen	Prevalence Index Average Newly Inundated Zone Wetland	Prevalence Index Average Newly Inundated Zone No Wetland
2010	**1.6**	**2.6**	**3.2**
2011	**1.6**	**1.6**	**1.2**
2012	**1.7**	**2**	**1.4**

Prevalence Index by Wetland Type and Zone per Transect

Quadrats divided by wetland type and zone were separated by transect to look at individual areas around Bull Creek Reservoir #4 and the average PI value (Table 9). Most of the average PI values varied slightly between years but remained relatively consistent, but there were PI values that changed from non-hydrophytic to hydrophytic or vice versa over time.

In transect 1 above the new high water line the average PI has changed from 2.3 in 2010 (hydrophytic vegetation) to 3.7 in 2011 and 3.4 in 2012, which is non-hydrophytic and appears to be driven by the loss of shrubs species mainly *Salix geyeriana*. The opposite was found in the same transect in the newly inundated zone. The average PI was 3.2 in 2010 (non-hydrophytic) to 1.3 in 2011 and 1.6 in 2012 (hydrophytic) led by the increase of *Carex aquatilus, Carex utriculata,* and *Eleocharis palustris*.

There was a dramatic change in transect 3 in the wetland area above the new high water line. The average PI in the wetland above the new high water line went from 1.4 in 2010 to 2.5 in 2011 and 3.1 in 2012, changing from hydrophytic to non-hydrophytic. There are only two quadrats in this zone/wetland type and appears to stem from the loss of carex and shrub species and the increase in forbs.

Table 9. Average Prevalence Index by Wetland Type and Zone per Transect.

Transect	Year	Non-Wetland Above New High Water Line	Non-Wetland Newly Inundated Zone	Wetland Above New High Water Line	Wetland Newly Inundated Zone	Fen Above New High Water Line	Fen Newly Inundated Zone
T 1	**2010**	2.3	3.2				
	2011	3.7	1.3				
	2012	3.4	1.6				
T 1A	**2011**		1				
	2012		1.3				
T 2	**2010**			2.4	2.6		
	2011			2.6	1.4		
	2012			2.8	1.4		
T 2A	**2011**				1.9		
	2012				2		

Transect	Year	Non-Wetland Above New High Water Line	Non-Wetland Newly Inundated Zone	Wetland Above New High Water Line	Wetland Newly Inundated Zone	Fen Above New High Water Line	Fen Newly Inundated Zone
T 3	2010	1.3		1.4		1.2	1.8
	2011	2.5		2.5		2.2	1.4
	2012	2.8		3.1		2	1.6
T 3A	2011	2.9	1.1	2.7			
	2012	2.5	1.4	2.1			
T 3B	2011	2.3			1.1		1.3
	2012	1.1			1.4		1.5
T 4	2010	2.5		1		2.3	1.4
	2011	2.2		1.2		2.1	1.5
	2012	2.5		1.4		1.5	1.3
T 4A	2011		1.5		1.4		2.5
	2012		1.5		2.4		2.3

Functional Assessment

The GMM was used to assess the functional attributes of wetlands that have reestablished in the interim of fill restrictions imposed on the dam. The GMM is a wetland assessment method specifically designed to assess function and value of wetlands on the Grand Mesa between the elevations of 9,000 and 11,000 feet above sea level (GMM 2009).

The purpose of the 2010 functional assessment is to establish baseline data for existing conditions at Bull Creek Reservoir #4. As the reservoir is filled and drawn down during the growing season each year, the assessment will document functional changes in wetlands as a result of the periodic inundation. The 2012 assessment was conducted on August 2, 2012 after two consecutive years of normal fill and drawdown operations were completed. GMM assessment forms were completed by two Army Corp of Engineers (COE) representatives and six WestWater (WWE) biologists.

The survey area around Bull Creek Reservoir had a total weighted index score of 0.86 per acre, or a total wetland index value of 2.91 (0.86 per acre multiplied by 3.38 acres) for 2012. This is the index value determined using the 2009 wetland delineation acres. The 3.38 acres of wetland within the newly inundated zone consists of a 3-ft fringe wetland around most of the reservoir with adjacent wetland and fen areas. Fens in the newly inundated zone make up approximately 1.14 acres (34%) of the total 3.38 acres of wetland.

Within the newly inundated zone, wetland hydrology is now present, as determined by pool elevations and duration, and hydrophytic vegetation is present as well, determined by the PI values. WestWater Biologists no longer consider 3.38 acres of wetland to be accurate. Approximately 4.28 additional acres of areas with wetland characteristics are believed to now be

present (Figure 2). There are 44 quadrats within the newly inundated zone in previous non-wetland areas along 4 different transects. The individual PI values for each quadrat indicate hydrophytic vegetation. The area within the newly inundated zone, connecting the previously identified wetlands, and encompassing the quadrats with hydrophytic vegetation was used to approximate the additional acres with wetland characteristics.

The GMM assessment takes into account total acreage when determining the total wetland index value (the total weighted index value per acre multiplied by total acres). With the additional wetland acres the revised wetland index value per acre for 2012 would change to .73 and the revised total wetland index value would increase to 5.67. 15% of the revised total wetland would consist of fen (1.14 acres). A revised page 1 of the GMM assessment for 2012 is included in Appendix A with the 2012 GMM assessment.

The functional assessment completed in 2011 scored a 0.94 total weighted index per acre for the Bull Creek wetlands and a 3.17 total weighted index value. 2010 scored the Bull Creek wetlands with a total weighted index score per acre of 0.86 and a total weighted index value of 2.91 for the functional assessment.

Key indices with a scoring decrease from 2011 to 2012 are the hydrogeomophic index (0.67 in 2012, 0.78 in 2011), vegetation index (0.74 in 2012, 0.80 in 2011), and the Threatened, Endangered, and Sensitive Species (TESS) index (0.54 in 2012, 0.64 in 2011). The major difference between 2012 and 2010 was the decrease in hydrogeomorphology condition index (0.67 in 2012 and 0.74 in 2010), recreation index (0.49 in 2012 and 0.38 in 2010), and buffer condition index (0.44 in 2012 and 0.37 in 2010). Individual index values for each year are depicted in Table 10.

Table 10. Index Value Comparisons for 2010, 2011, and 2012.

Scoring Indices	**Index Value 2010**	**Index Value 2011**	**Index Value 2012**
1.0 Hydrogeomorphology Condition Index	0.74	0.78	0.67
2.0 Vegetation Index	0.77	0.80	0.75
3.0 Water Quality Index	1.0	1.0	0.90
4.0 Wildlife Habitat Index	0.62	0.72	0.60
5.0 TESS Index	0.55	0.64	0.54
6.0 Recreation Index	0.38	0.70	0.49
7.0 Buffer Condition Index	0.37	0.40	0.44
Total Wetland Index Value	**2.91**	**3.17**	**5.67**

The hydrogeomorphology condition index score increased in nearly every area from 2010 to 2011. However, in 2012 the index score dropped below 2010 in every area of the scoring criteria. The hydrogeomorphic index was heavily influence by the completion of construction to the dam prior to the 2010 season and to normal operating procedures that were returned in 2011. Detrimental effects from inundation to a larger area were not apparent during the first year of observation (2011), but effects during the second year have decreased the functional assessment score in 2012.

Changes to the hydrogeomorphology condition index were the largest between 2011 and 2012 and is worth 25% of the functional assessment. The amount of wetland surface area that has been negatively impacted by altered surface or subsurface flow patterns increased from 0% to 5% to 15% in 2012. This value score is based on the percentage of the entire wetland that is impacted from surface or subsurface flow disturbances indicated as moderate to slightly severe in both 2011 and 2012. The condition of the wetland habitat that has been negatively impacted by altered surface or subsurface flow patterns changed from excellent to very good in 2012. It was determined the flow regime is mildly impaired and is close to its potential. This is slightly more impaired than in 2011 when it was determined there had been no disruption to the hydrologic regime and the condition of habitat is at or very near its potential. Scoring criteria is related to the condition of the negatively impacted area as wetland habitat and should be averaged for its total habitat value for potential use by aquatic species, reptiles, herbivores, birds, and predators that are common to the undisturbed portions of the same wetland. The rates of the negative effects of altered surface and subsurface flow patterns on soil condition increased from non-occurring to slight in 2012. Rates were determined based on whether impacted areas have altered flow patterns that increase soil compaction, reduce infiltration capability, induce surface crust, or cause erosion.

The vegetation index decreased slightly from 2011 and 2010 to 2012 and is 25% of the function assessment score. Percent bare soil decreased in 2012 from 5% to 15% in 2011 to 0% to 5%. The number of species with greater than 10% projected cover decreased in 2012. It was estimated the number of species present to be greater than 18 in all three years but the number of dominant species decreased from 5 (or more) to 4 in 2012. The wetland area impacted by disturbances, the intensity of the disturbances, and the frequency of the disturbances were all at a greater percentage in 2012 than in 2011 and in 2010. The wetland area impacted by disturbance increased from 5% to 15% in 2011 and 2010 to 15% to 25% in 2012. The intensity of the impacts of the disturbed area increased from slight to slightly moderate and the frequency of disturbance increased slightly. Vegetation cover and structure in general increased in both 2011 and 2012 from 2010.

The decrease in TESS index score mainly was in species structure and diversity. The fen area impacted by disturbance increased from 5% to 15% in 2011 and 2010 to 15% to 25% in 2012. The intensity of the disturbance did not change and was rated as minimal; used little by livestock or wildlife (<35%) on current year growth, less desirable species are found in trace amounts, and <5% in aggregate for total cover. The overall habitat value decreased for most of the species groups (Canada lynx, BOCC and FSS birds, Raptors, Boreal toad, and the Colorado River Cutthroat Trout) and contributed to the decrease in TESS score for 2012 functional assessment worth 20% of the overall score. However in 2010 the habitat value for fish in general and the

Colorado River Cutthroat Trout was rated as none and this value increased in both 2011 and 2012.

There are several factors that could have potentially contributed to the decrease value of the functional assessment in 2012. Only two biologists were present in both 2011 and 2012, and only one of those biologists was present in 2010. The two biologists present in both 2011 and 2012 increased their assessment scores in nearly every category in 2012. The number of observers increased from 3 in 2010 to 5 in 2011 and 8 in 2012. There is a need for utilizing the same observers from year to year.

The reservoir was filled and drained early in the growing season in 2010. In 2011, the reservoir was filled and remained full into late July, approximately 2 months into the growing season. In 2012 the reservoir dropped below the restricted water level in early July, 3 weeks earlier than in 2011.

U.S. Army Corps of Engineers (COE) Data Sheet Comparisons

Four upland points used in 2009 were revisited in 2012 and the data compared (Figure 1). Data points from the 2009 wetland delineation were withdrawn and never verified by the COE. As an observation, in general, there appeared to be an expanding herbaceous layer with hydrophytic vegetation. At data point T1U *Salix monticola* had appeared to be developing along the new high water line and was very linear. The *Carex utriculata* appeared to be spreading above the new high water line, 10 to 20 feet in some places. *Salix planifolia* and *Salix monticola* had appeared to be developing at data point T2U in 2012 where it had not been present in 2009. Corresponding COE data sheets are depicted in Appendix B.

Conclusion

It was determined that permanent placement of each plot was not necessary to show trends in vegetation establishment or deterioration. Data analysis reveals that there has been an increase in vascular herbaceous cover between 2011 and 2012. Carex and graminoid species have increased in both the newly inundated zone and the above new high water line. The presence of *Carex aquatilus*, *Carex utriculata*, and *Eleocharis palustris* have contributed to this increase. Shrub cover has increased but only above new high water line, within the newly inundated zone percent shrub cover has remained relatively constant. The influencing shrub species are *Salix monticola*, *Salix geyeriana*, and *Salix planifolia.*

In general the PI values have not changed dramatically over the three monitoring years, becoming slightly more hydrophytic in the newly inundated zone and slightly less hydrophytic above the new high water line. All the wetland types by zone fall under the PI threshold for being hydrophytic for the last two years. When broken out by transect, two transects experienced a change from hydrophytic to non-hydrophytic vegetation above the new high water line driven by loss of shrub species in these quadrats. However one of those transects only had two quadrats for comparison and placement of those quadrats from year to year vary. Overall shrub loss has not occurred, remaining relatively consistent in the newly inundated zone but has increased above the new high water line from 2011 to 2012.

There was a change from non-hydrophytic to hydrophytic vegetation in the newly inundated zone in a non-wetland location driven by the appearance of *Carex aquatilus, Carex utriculata,* and *Eleocharis palustris*. This is significant as the change to vegetation in the newly inundated zone is of concern. This is the only area of non-wetland that did not have hydrophytic vegetation in 2010 but now displays hydrophytic vegetation in both 2011 and 2012 after being inundated.

The functional assessment total wetland index value decreased in 2012 from 2011. The total wetland index value for 2012 equaled the total wetland index value for 2010 (2.91 in 2012, 3.17 in 2011, and 2.91 in 2010). Key indices to the scoring decrease from 2011 to 2012 are the hydrogeomorphic index, vegetation index, and the Threatened, Endangered, and Sensitive Species (TESS) index.

The total wetland index value is based on the original 3.38 acres of wetland and fen delineated in 2009. Within the newly inundated zone, wetland hydrology is now present, as determined by pool elevations and duration, and hydrophytic vegetation is present as well, determined by the PI values for 44 quadrats. WestWater Biologists no longer consider 3.38 acres of wetland to be accurate. Approximately 4.39 acres of additional areas with wetland characteristics are believed to now be present. The GMM assessment takes into account total acreage when determining the total wetland index value (the total weighted index value per acre multiplied by total acres). With the additional wetland acres the revised total wetland index value would increase to 5.67.

Changes to the hydrogeomorphology condition index were the largest between 2011 and 2012. The amount of wetland surface that has been negatively impacted by altered surface or subsurface flow patterns increased in 2012. Wetland area impacted by disturbances, the intensity of those disturbances, and the frequency of the disturbances were all at a greater percentage in 2012 and lowered the vegetation index. Species structure and diversity decreased in the TESS index. The lowered index values in these areas are most likely due to observer perception. The number of observers has changed from year to year and individual observers have also changed. There is a need for consistency in utilizing the same observers.

Overall hydrophytic vegetation continues to persist within the newly inundated zone and is expanding. Vascular herbaceous cover has increased within the newly inundated zone and above the new high water line, and shrub cover in increasing above the new high water line. Areas with wetland hydrology and hydrophytic vegetation are expanding from the 2009 delineation within the newly inundated zone. These areas with wetland characteristics increase the wetland acres from 3.38 to approximately 7.77 acres.

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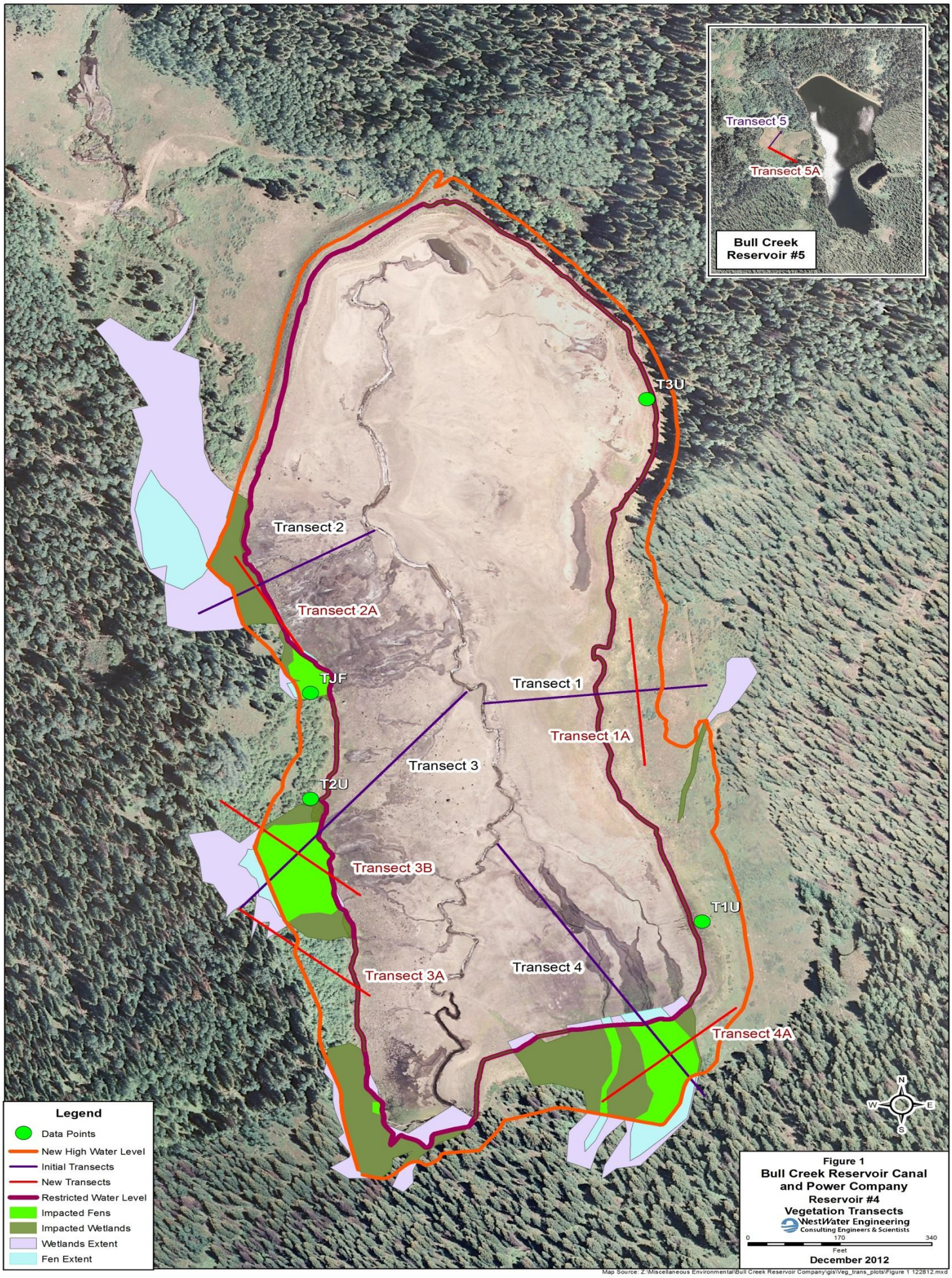

Transect 5
Transect 5A
Bull Creek Reservoir #5
T3U
Transect 2
Transect 2A
TJF
Transect 1
Transect 1A
Transect 3
T2U
Transect 3B
T1U
Transect 3A
Transect 4
Transect 4A
N
W
E
S
Legend
Data Points
New High Water Level
Initial Transects
New Transects
Restricted Water Level
Impacted Fens
Impacted Wetlands
Wetlands Extent
Fen Extent
Figure 1
Bull Creek Reservoir Canal and Power Company
Reservoir #4
Vegetation Transects
WestWater Engineering
Consulting Engineers & Scientists
0
170
340
Feet
December 2012
Map Source: Z:\Miscellaneous Environmental\Bull Creek Reservoir Company\gis\Veg_trans_plots\Figure 1 122812.mxd

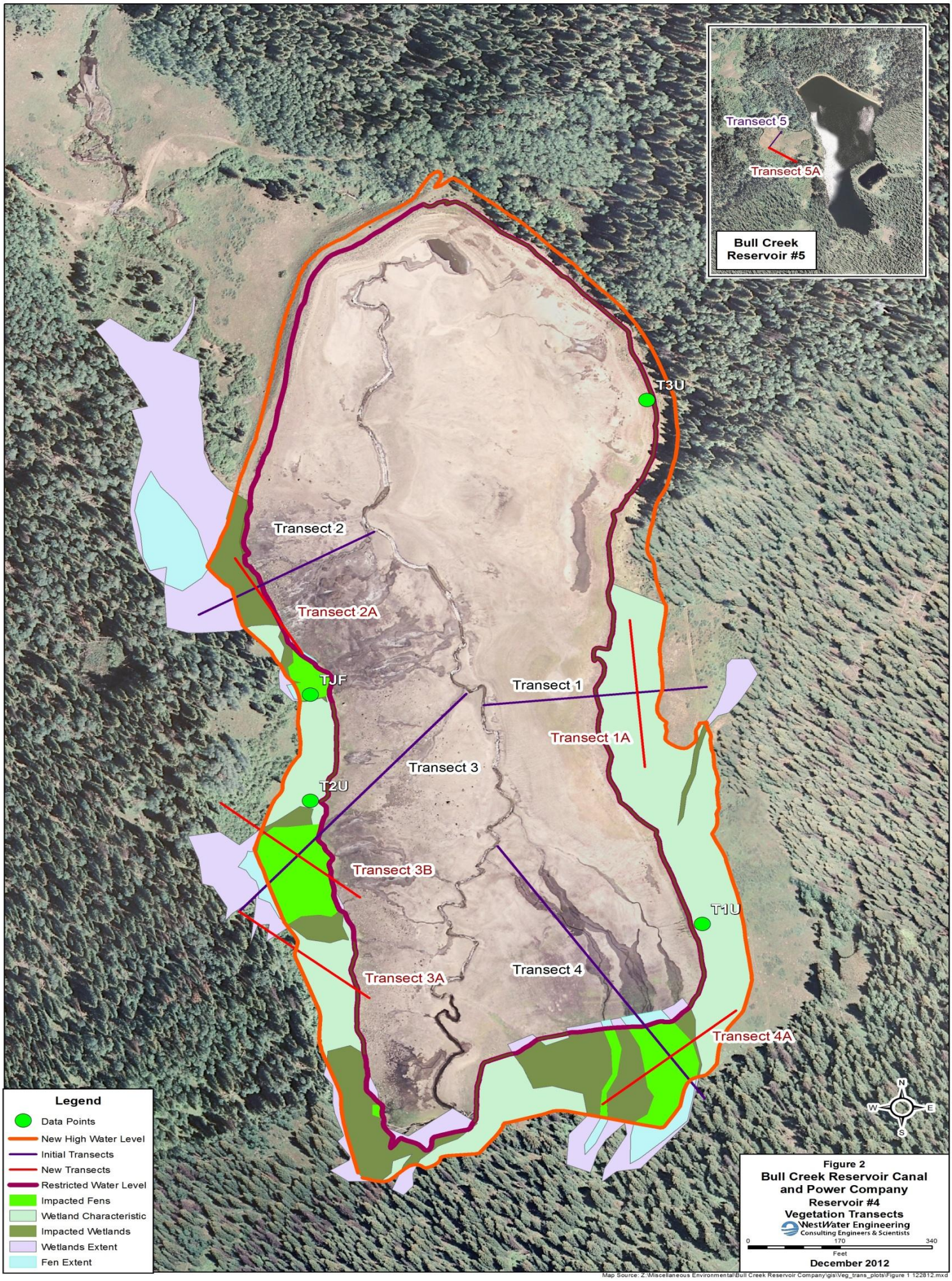


Figure 2
Bull Creek Reservoir Canal and Power Company
Reservoir #4
Vegetation Transects
NestWater Engineering
Consulting Engineers & Scientists
December 2012

Map Source: Z:\Miscellaneous Environmental\Bull Creek Reservoir Company\gis\Veg_trans_plots\Figure 1 122812.mxd

APPENDIX A

Grand Mesa Function and Value Assessment Form (GMM) 2012

Grand Mesa 9,000 to 11,000 ft Elevation Wetland Function and Value Assessment Form WestWater Engineering June 2011	
Date: 08/02/12	Observer(s) Initials: BFF, LR, PL, KJ, BRS, LW
Job Number:	GPS Datum: Nad 83
Site Name: Bull Creek Reservoir #4 (BCR)	Elevation: 9449 ft. msl
Land Ownership: Forest Service	Site Area: 8.9 Acres
Water Rights: 1891 BCR	Open water Area: 25.7 Acres
Reservoir: Yes / No If Yes Indicate Storage Function: Municipal, Industrial, Agricultural, or combination	
Indicate percentage of usage rights if combination: %M___ %I___ %Ag___	
*Obtain aerial and topographic map of subject area before beginning the assessment.	
Wetland Type: Riparian (Fringe), Wet Meadow, Peatland	
HGM Class: Slope, Depressional, Riverine, Fringe	
Total Acreage: Wetland 6.63 Riverine <0.001 Fen 1.14	

Comments: The reservoir has been under filling restrictions until maintenance could be performed. Now that maintenance has been completed, the reservoir has been filled for the third consecutive year. The purpose of this GMM assessment is to compare baseline data to the current existing conditions at Bull Creek Reservoir #4.
Additional observers from the ACOE Grand Junction Field Office included Nathan Green and Carrie Sheata. WestWater Biologists no longer consider the original 3.38 acres of wetland to be accurate. See monitoring report for further explanation.

Summary of Index Ratings				
	Index Value	Weight Factor[1]		Weighted Index Value
		Surface Water Present	No Surface Water	
1.0 Hydrogeomorphology Condition Index	.67	0.25	0.30	.17
2.0 Vegetation Index	.75	0.25	0.25	.19
3.0 Water Quality Index	.9	0.05	0.0	.05
4.0 Wildlife Habitat Index	.6	0.05	0.05	.03
5.0 TESS Index	.54	0.20	0.20	.11
6.0 Recreation Index	.49	0.05	0.05	.02
7.0 Buffer Condition Index	.44	0.15	0.15	.07
			Sum of Weighted Index scores	**.63**

Indicate the percentage of the area that is Wetland, Riverine, or Fen. Multiply the sum of the weighted index scores by the percentage of area for each wetland categorical multiplier. Area indicated as wetland (non-Riverine or Fen) is multiplied by a factor of 1, the percent of the area depicted as Riverine Wetland is multiplied by a factor of 1.5 and the percent of the survey area that is fen Wetland is multiplied by a factor of 2.	Percent Wetland 0.85 x1xSWI	.54
	Percent Riverine x1.5x SWI	
	Percent Fen .15 x2.0xSWI	.19
	Total Weighted Index	**.73**

Total Wetland Value: Calculate total wetland value by multiplying total weighted index value by the wetland acreage

Acres	Total Weighted Index	Total Wetland Index Value
7.77	**.73**	**5.67**

Grand Mesa 9,000 to 11,000 ft Elevation Wetland Function and Value Assessment Form WestWater Engineering June 2011	
Date: 08/02/12	Observer(s) Initials: BFF, LR, PL, KJ, BRS, LW
Job Number:	GPS Datum: Nad 83
Site Name: Bull Creek Reservoir #4 (BCR)	Elevation: 9449 ft. msl
Land Ownership: Forest Service	Site Area: 8.9 Acres
Water Rights: 1891 BCR	Open water Area: 25.7 Acres
Reservoir: Yes / No If Yes Indicate Storage Function: Municipal, Industrial, Agricultural, or combination	
Indicate percentage of usage rights if combination: %M___ %I___ %Ag___	
*Obtain aerial and topographic map of subject area before beginning the assessment.	
Wetland Type: Riparian (Fringe), Wet Meadow, Peatland	
HGM Class: Slope, Depressional, Riverine, Fringe	
Total Acreage: Wetland 2.24 Riverine <0.001 Fen 1.14	

Comments: The reservoir has been under filling restrictions until maintenance could be performed. Now that maintenance has been completed, the reservoir has been filled for the third consecutive year. The purpose of this GMM assessment is to compare baseline data to the current existing conditions at Bull Creek Reservoir #4.
Additional observers from the ACOE Grand Junction Field Office included Nathan Green and Carrie Sheata.

Summary of Index Ratings

	Index Value	Weight Factor[1]		Weighted Index Value
		Surface Water Present	No Surface Water	
1.0 Hydrogeomorphology Condition Index	.67	0.25	0.30	.17
2.0 Vegetation Index	.75	0.25	0.25	.19
3.0 Water Quality Index	.9	0.05	0.0	.05
4.0 Wildlife Habitat Index	.6	0.05	0.05	.03
5.0 TESS Index	.54	0.20	0.20	.11
6.0 Recreation Index	.49	0.05	0.05	.02
7.0 Buffer Condition Index	.44	0.15	0.15	.07
			Sum of Weighted Index scores	**.63**

Indicate the percentage of the area that is Wetland, Riverine, or Fen. Multiply the sum of the weighted index scores by the percentage of area for each wetland categorical multiplier. Area indicated as wetland (non-Riverine or Fen) is multiplied by a factor of 1, the percent of the area depicted as Riverine Wetland is multiplied by a factor of 1.5 and the percent of the survey area that is fen Wetland is multiplied by a factor of 2.	Percent Wetland 0.66 x1xSWI	.42
	Percent Riverine x1.5x SWI	
	Percent Fen x2.0xSWI	.44
	Total Weighted Index	**.86**

Total Wetland Value: Calculate total wetland value by multiplying total weighted index value by the wetland acreage

Acres	Total Weighted Index	Total Wetland Index Value
3.38	**.86**	**2.91**

1.0 Hydrogeomorphology Condition Index: (For all wetland types, includes adjacent Riverine Wetlands)
Circle one value in each number item

1.1 Degree of hydrologic disturbance	Non Occurring →					Slight →			Moderate →	Severe
1.1.1 Have surface or subsurface flows been altered or impacted at the hydrological source or outlet of the wetland (consider impoundments, diversions, and ditches contributing to or draining the wetland).	10	9	8	7	6	5	**4**	3	2	1	0

1.1.2 Amount of wetland surface area that has been **negatively** impacted by altered surface or subsurface flow patterns (consider abnormal fluctuating water levels caused by roads, bridges, dams, rip rap)	0	>0-5%	>5-15%	>15-25%	>25%
	10 9 8 7 **6** 5 4 3 2 1 0				

1.1.3 Indicate the condition of the wetland habitat that has been **negatively** impacted by altered surface or subsurface flow patterns.	Excellent →			Very Good →			Fair →		Poor
	10	9	8	7	**6**	5	4	3	2	1	0

1.1.4 Rate the **negative** effects of altered surface and subsurface flow patterns on soil condition (compaction, reduced infiltration capability, surface crust, and erosion).	Non Occurring →					Slight →			Moderate →	Severe
	10	9	8	7	**6**	5	4	3	2	1	0

Circle the percent of wetland area that has been **negatively** affected by pugging or hummucking from animal hooves.	<25%	25-75%	>75%
1.1.5 Circle the score indicating the degree of impact in the percent column indicated above.	None 10 Slight 9 Moderate 7 Severe **5**	Slight 6 Moderate 3 Severe 1	Slight 4 Moderate 2 Severe 0

Slight – Pugging is minimal / Vegetation and bank stability are intact or recovering.

Moderate – Pugging is common/ Hummucks have developed/ Vegetation is drying but could recover if disturbance is removed.

Severe – Pugging is common/ Hummucks are prominent/ Soils are compact/ Vegetation is dead or absent and is unlikely to recover without assistance.

Pugging – Patches of bare ground where extreme trampling has stomped out all vegetation.

Hummucks – Large humps in the soil where vegetation has begun to dry out and soils begin to erode.

1.1.6 Long term protection potential: rate potential for long-term protection. Such as, existing rights that may threaten wetland (Development, construction, or maintenance) **(Determined in Office)**	SIA	No Existing Rights	Existing Rights	Proposed Action	Current Activity
	10	**8**	5	2	0

Hydrogeomorphology Condition Index: add scores from rows 1.1.1 through 1.1.6 and divide by 100 (for sites without riverine systems this is the Total Hydrogeomorphology Index)

4 + 6 + 6 + 6 + 6 +(5x 8)= 67/100 = *.67

For Sites with Riverine systems fill out Riverine Addendum 1.2.0 and add Riverine Index (Section 1.2) to **Hydrogeomorphology Index** and divide by 2 for Total Hydrogeomorphology Index

(*0.67+ **N/A)/2 = 0.67

Comments:

Riverine wetlands were not calculated as a wetland class because their area was less than 0.01 acres and acreage totaled less than 1% of the area being assessed.

Addendum 1.2.0: Hydrogeomorphology – Riverine Wetlands Index											
1.2.1 Floodplain Characterization											
1.2.1.1 Overall floodplain condition (e.g. sediment deposition, erosion, capability to dissipate channel energy). Consider entire reach.	Excellent	→	Very Good	→	Fair	→	Poor				
	10	9	8	7	6	5	4	3	2	1	0
1.2.1.2 Floodplain shows signs of inundation from runoff events (debris, water marks).	Occurring	→	Moderate	→	Slight	→	Not Occurring				
	10	9	8	7	6	5	4	3	2	1	0
1.2.1.3 Portion or area of the floodplain that show signs of excessive scour, deposition or erosion. (Percentage of area relative to the entire reach).	0		>0-5%		>5-15%		>15-25%		>25%		
	10	9	8	7	6	5	4	3	2	1	0
1.2.1.4 Degree of degradation in the portion or area of the floodplain that is in non-functioning or poorly functioning condition.	Non Occurring	→	Slight	→	Moderate	→	Severe				
	10	9	8	7	6	5	4	3	2	1	0
1.2.1.5 Stream corridor shows signs of entrenchment (Floodplain width not proportional to bankfull width for stream type and setting).	Non Occurring	→	Slight	→	Moderate	→	Severe				
	10	9	8	7	6	5	4	3	2	1	0
1.2.2 Channel Bank Characterization											
1.2.2.1 Banks are stable and indicate ability to handle variable flow velocities (sustain vegetation, armored with boulders, show little evidence of erosion).	Excellent	→	Very Good	→	Fair	→	Poor				
	10	9	8	7	6	5	4	3	2	1	0
1.2.2.2 Percent or portion of the bank area, relative to entire reach, that shows signs of erosion, excessive lateral movement, or evidence of stream widening.	0		>0-5%		>5-15%		>15-25%		>25%		
	10	9	8	7	6	5	4	3	2	1	0
1.2.2.3 Degree of degradation in portion or area of bank that is not in balance with the stream.	Non Occurring	→	Slight	→	Moderate	→	Severe				
	10	9	8	7	6	5	4	3	2	1	0
1.2.3 Channel Characterization											
1.2.3.1 Evidence of excessive sediment removal or deposition, or that the stream is getting wider.	Non Occurring	→	Slight	→	Moderate	→	Severe				
	10	9	8	7	6	5	4	3	2	1	0
1.2.3.2 Evidence of head-cutting	Non Occurring	→	Slight	→	Moderate	→	Severe				
	10	9	8	7	6	5	4	3	2	1	0
1.2.3.3 Channel is incising. Channel width to depth ratio appears to be **inappropriate** for the stream type, or geomorphic setting (downcutting, lowering of groundwater).	Non Occurring	→	Slight	→	Moderate	→	Severe				
	10	9	8	7	6	5	4	3	2	1	0
1.2.4 Disturbance at Riverine Crossings (roads, trails, or livestock)											
1.2.4.1 Portion or area of the reach where crossing(s) have had a negative effect on the channel.	Non Occurring	→	Slight	→	Moderate	→	Severe				
	10	9	8	7	6	5	4	3	2	1	0
1.2.4.2 Degree of in channel degradation from crossings.	None	→	Low	→	Moderate	→	High	→	Very High		
	10	9	8	7	6	5	4	3	2	1	0
1.2.4.3 Channel has been effectively hardened (armored) or diverted (culvert) to minimize in channel impact at crossings. (If it is not a vehicle crossing(s), circle 10)	Excellent	→	Very Good	→	Fair	→	Poor				
	10	9	8	7	6	5	4	3	2	1	0
1.2.4.4 Road grades have been minimized on both sides of a riverine crossing to minimize stream impact. (If it is not a vehicle crossing(s), circle 10)	Excellent	→	Very Good	→	Fair	→	Poor				
	10	9	8	7	6	5	4	3	2	1	0
Riverine Index: Sum of the actual scores and divide by the sum of maximum possible (150) ____+____+____+____+____+____+____+____+____+____+____+____+____+____+____+____ = ____ /150											
Total Riverine Index score =**____											

2.0 Vegetation Index: Vegetation is assessed within the boundary of the wetland area											
2.1 Vegetation Cover - % Cover											
2.1.1 % Bare Ground (Exposed Soil)	0		>0-5%		>5-15%		>15-25%		>25%		
	10	9	8	**7**	6	5	4	3	2	1	0
2.1.2 % Projected Cover of Wetland Plants that are FacWet and Obligate	100% - 90%		90% - 75%		75% - 50%		<50%				
	10	**9**	8	7	6	5	4	3	2	1	0
2.1.3 % Projected Cover of Non-native Invasive Species including noxious weeds	0		>0-5%		>5-15%		>15-25%		>25%		
	10	**9**	8	7	6	5	4	3	2	1	0
2.2 Structure											
How many vegetation strata (present over >10 % of the area) are represented? Submerged aquatic, emergent aquatic, bryophytes, terrestrial herbaceous, sub-shrub (<.2m high) shrub (.2-1m high), tall shrub (>1m high), tree (>3" DBH), and woody vine.	7 or more Strata		6 Strata		5 Strata		4 Strata		3 or less Strata		
	10		**9**		8		7		5		
2.3 Diversity											
2.3.1 Estimate of number of species present.	>18		9-18		7-9		4-6		1-3		
	10		8		6		4		2		
2.3.2 Number of Species with > 10% projected cover (Dominant Species).	5 (or more)		4		3		2		1		
	10		**8**		6		4		2		
2.4 Disturbance											
2.4.1 How much of the wetland area is impacted by disturbances?	0		>0-5%		>5-15%		>15-25%		>25%		
	10	9	8	7	6	5	**4**	3	2	1	0
2.4.2 Indicate the intensity of impacts in the disturbed area.	None to minimal		→		Slight		→		Moderate	→	Severe
	10	9	8	7	6	**5**	4	3	2	1	0
2.4.3 Estimate the frequency of the disturbance.	Seldom		→		Periodic		→		Frequent	→	Continuous
	10	9	8	7	**6**	5	4	3	2	1	0
Vegetation Index Sum all scores and divide by the total possible (90)	7 + 9 + 9 + 9 + 10 + 8 + 4 + 5 + 6 = 67 /90 = .74										
Comments:											

3.0 Water Quality Index: If No Surface Water Leave Blank					
3.1 Algal Growth - consider entire reach if it riverine (lotic systems) or entire surface area of still water (lentic systems)	Algae growth is minimal <20%	Algae growth in small patches 20-50%	Algae growth in large patches > 50%	High level of algae growth >50% and continuous mats with odor from rotting vegetation	
	10	8	4	0	
3.2 Turbidity	None →	Low →	Moderate →	High →	Very High
3.2.1 Is the Water Turbid?	< 5 ntu	~10 ntu	~20 ntu	~30 ntu	~50 ntu
	10	8	4	2	0
Water Quality Index: Sum the scores of 3.1 through 3.2.3 and divide by 2				10 + 8 = 18 /20 = . 9	

4.0 Wildlife Index: Relative value as compared to other areas of the Grand Mesa.											
Habitat Value assessed as:	Very High →			High →		Moderate →			Low →		None
4.1 Habitat value for predators	10	9	8	7	6	5	4	3	2	1	0
4.2 Habitat value for herbivores	10	9	8	7	6	5	4	3	2	1	0
4.3 Habitat values for birds	10	9	8	7	6	5	4	3	2	1	0
4.4 Habitat value for reptiles	10	9	8	7	6	5	4	3	2	1	0
4.5 Habitat value for amphibians	10	9	8	7	6	5	4	3	2	1	0
4.6 Habitat value for fish	10	9	8	7	6	5	4	3	2	1	0
Wildlife Index Sum scores and divide by 60 (total possible)	6 + 8 + 7 + 4 + 8 + 4 = 36/60 = .60										

5.0 Threatened, Endangered, Sensitive Species and Unique Vegetation Associations (TESS) Index: Relative value as compared to other areas of the Grand Mesa											
5.1 Habitat Value assessed as:	Very High →			High →		Moderate →			Low →		None
5.1.1 Habitat value for Lynx	10	9	8	7	6	5	4	3	2	1	0
5.1.2 Habitat value for BOCC and FSS birds	10	9	8	7	6	5	4	3	2	1	0
5.1.3 Habitat value for Raptors	10	9	8	7	6	5	4	3	2	1	0
5.1.4 Habitat value for Boreal toad	10	9	8	7	6	5	4	3	2	1	0
5.1.5 Habitat value for Colorado River Cutthroat Trout	10	9	8	7	6	5	4	3	2	1	0
TESS Condition Index Sum scores and divide by 50 (total possible)	5 + 5 + 6 + 7 + 2 = 25/50 = *.5										
Comments:											

5.2 Unique Vegetation Associations (Fen or Peatlands)	Yes / No if Yes complete questions 5.2.1 – 5.2.11 if No enter score from 5.1 as Total TESS Index Score				
Vegetation Cover- % Cover in the Fen /Peatland					
5.2.1 Number of Species with > 10% projected cover	5 (or more)	4	3	2	1
	10	8	6	4	2
Structure					
5.2.2 How many vegetation strata (present over >10 % of the area) are represented? Submerged aquatic, emergent aquatic, bryophytes, terrestrial herbaceous, woody shrub, and tree.	5 or more Strata	4 Strata	3 Strata	2 Strata	1 Strata
	10	8	6	4	2
5.2.3 Site displays unique Fen/ Peatland structures (floating mat, peat depth >4')	Very High → High → Moderate → Low → None				
	10 9 8 7 6 5 4 3 2 1 0				
Diversity					
5.2.4 Estimate the number of species present	>25	21-25	16-20	11-15	1-10
	10	8	6	4	2
5.2.5 Site has a concentration of rare species, FS sensitive and CNHP designated	Very High → High → Moderate → Low → None				
	10 9 8 7 6 5 4 3 2 1 0				
Disturbance					
5.2.6 How much fen area is impacted by a disturbance.	0	>0-5%	>5-15%	>15-25%	>25%
	10 9 8 7 6 5 4 3 2 1 0				
5.2.7 Indicate the intensity of impacts in the disturbed area.	None to minimal → Slight → Moderate → Severe				
	10 9 8 7 6 5 4 3 2 1 0				
5.2.8 Estimate the frequency of the disturbance.	Seldom → Periodic → Frequent → Continuous				
	10 9 8 7 6 5 4 3 2 1 0				
5.2.9 Site has a probability to persist over a long period of time (remote from potential disturbances to hydrology source, i.e., oil and gas development, domestic wells, roads, heavily grazed areas).	Very High → High → Moderate → Low → None				
	10 9 8 7 6 5 4 3 2 1 0				
Education					
5.2.10 Site has research and/or educational value.	Very High → High → Moderate → Low → None				
	10 9 8 7 6 5 4 3 2 1 0				
5.2.11 Site is available for educational purposes. (within 1/2 mile of improved road)	Excellent → Very Good → Fair → Poor				
	10 9 8 7 6 5 4 3 2 1 0				

Unique Vegetation Sub-Index

8 + 8 + 6 + 6 + 2 + 4 + 7 + 6 + 9 + 6 + 2 = 63 /110 =**.57

Sum scores and divide by 110 (total possible)

Total TESS Condition Index Score

TESS Index + Unique Vegetation Index / 2 (* .5 +** .57) /2 = .54

Comments:

CNHP and FS species lists were cross referenced to transect spreadsheets and no species were identified during the survey. However, the entire suitable habitat that exists at the site was not thoroughly surveyed with vegetation plots, therefore, a zero was not scored.

6.0 Recreation Index: Suitability for appropriate recreational use											
Value for activity assessed as:	Very High	→	High	→	Moderate	→	Low	→	None		
6.1 Fishing	10	9	8	7	6	5	4	3	2	1	0
6.2 Hunting	10	9	8	7	6	5	4	3	2	1	0
6.3 Hiking	10	9	8	7	6	5	4	3	2	1	0
6.4 Nature Viewing	10	9	8	7	6	5	4	3	2	1	0
Recreation Index Sum all scores and divide by 40						3 + 5 + 5 + 7 = 20/40 = .5					
Comments:											

7.0 Buffer Condition Index 10ft buffer and 30ft buffer											
7.1 10ft Buffer											
Determine dominant slope – **circle one** (1) **Flat** = <2%,, (2) : **Moderate** = 2-10%, (3) **Steep** = >10%											
Estimate slopes that positive slopes into the wetland area											
Within 10ft buffer of assessed area. (Circle Percentage)	**0%**		**>0-5%**		**>5-15%**		**>15-25%**		**>25%**		
7.1.1 Amount of Exposed Soil showing erosion	10	9	8	7	6	5	4	3	2	1	0
7.1.2 Non-native invasive plants	**0%**		**>0-5%**		**>5-15%**		**>15-25%**		**>25%**		
	10	9	8	7	6	5	4	3	2	1	0
Percent of 10ft Buffer Affecting Wetland	**0%**		**>0-10%**		**>10-25%**		**>25-50%**		**>50%**		
7.1.3 Grazing Area in 10ft buffer	10	9	8	7	6	5	4	3	2	1	0
7.1.4 Roads, Trails, Camping Areas	10	9	8	7	6	5	4	3	2	1	0
Level of Disturbance in 10ft Buffer Affecting Wetland	**None**	→	**Low**	→	**Moderate**	→	**High**	→	**Very High**		
7.1.5 Grazing Intensity	10	9	8	7	6	5	4	3	2	1	0
7.1.6 Roads, Trails, Dams, Camping Areas	10	9	8	7	6	5	4	3	2	1	0
7.2 30ft Buffer (20ft outside of 10ft Buffer)											
Determine dominant slope – **circle one** (1) **Flat** = <2%, (2) : **Moderate** = 2-10%, (3) **Steep** = >10%											
Estimate slopes that could affect the wetland with overland flow and sediment deposition											
Within 30ft buffer of assessed area (Circle Percentage)	**0%**		**>0-5%**		**>5-15%**		**>15-25%**		**>25%**		
7.2.1 Amount of Exposed Soil showing erosion	10	9	8	7	6	5	4	3	2	1	0
7.2.2 Non-native invasive plants	**0%**		**>0-5%**		**>5-15%**		**>15-25%**		**>25%**		
	10	9	8	7	6	5	4	3	2	1	0
Percent of 30ft Buffer Affecting Wetland	**0%**		**>0-10%**		**>10-25%**		**>25-50%**		**>50%**		
7.2.3 Grazing Area in 30ft buffer	10	9	8	7	6	5	4	3	2	1	0
7.2.4 Roads, Trails, Camping Areas	10	9	8	7	6	5	4	3	2	1	0

Level of Disturbance in 30ft Buffer Affecting Wetland	None →			Low →		Moderate →		High →		Very High	
7.2.5 Grazing Intensity	10	9	8	7	6	5	4	3	2	1	0
7.2.6 Roads, Trails, Dams, Camping Areas	10	9	8	7	6	5	4	3	2	1	0

Buffer Impact Index: Sum of the 3 lowest scores of 7.1 and divide by 30 (total possible) then multiply by the slope factor (10ft SF), from table 1, for dominating slope in 10ft buffer. Next, take sum of 3 lowest scores from 7.2 divide by 30 (total possible) then multiply by slope factor (30ft SF) for dominating slope in 30ft buffer. Sums of {[(7.1x 0.5) x (10ft SF)] + [(7.2) x (30ft SF)]} are divided by 2 for buffer condition score.

{[(5 + 6 + 7 = 18/30)(.5) x(.9)] + [(5 + 7 + 7 = 19/30)x (.95)]} / 2 = .44
7.1(3 lowest) 7.2 (3 lowest)

Table 1. Slope Factor

Determined by the percentage of bare ground on the dominant slope that slopes into the wetland. First, select the steepness of the dominant slope. Then, select the percentage of bare ground from 7.1.1 for 10ft buffer and 7.1.2 for the 30ft buffer on the dominant slope. The intersecting cell is the slope factor to be used in the Buffer Impact Index equation.

10ft Buffer	Percent Bare Ground in 10ft Buffer				
	0	>0-5%	>5-15%	>15-25%	>25%
Shallow <2%	1.00	0.95	0.80	0.65	0.50
Moderate 2-10%	1.00	0.90	0.70	0.50	0.30
Steep >10%	1.00	0.85	0.60	0.35	0.10
30ft Buffer	**Percent Bare Ground in 30ft Buffer**				
	0	>0-5%	>5-15%	>15-25%	>25%
Shallow <2%	1.00	1.00	0.90	0.80	0.70
Moderate 2-10%	1.00	0.95	0.80	0.65	0.50
Steep >10%	1.00	0.90	0.70	0.50	0.30

Comments:

Photo Points			
UTM Location		**Direction**	**Comments:**

APPENDIX B

COE Data Sheets 2009 and 2012

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys and Coast Region

Project/Site: Bull Creek Res. No. 4 City/County: Mesa Sampling Date: 8/2/12

Applicant/Owner: Bull Creek Ditch and Res. State: CO Sampling Point: T1U

Investigator(s): BRS/LHW Section, Township, Range: Sec. 20 & 29, T11S, R95W

Landform (hillslope, terrace, etc.): Reservoir shoreline Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR): E - RM Forests & Rangeland Lat: 39.072042 N Long: -108.035563 W Datum: NAD 83/ Z12

Soil Map Unit Name: 105 - Booneville, warm_Doughspon complex NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ( )	No (●)	
Hydric Soil Present?	Yes ( )	No (●)	**Is the Sampled Area within a Wetland?** Yes ( ) No ( )
Wetland Hydrology Present?	Yes ( )	No (●)	

Remarks:

VEGETATION

Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot Size:)			
1. *Salix monticola*	15	Yes	OBL
2.			
3.			
4.			
5.			
	15 = Total Cover		
Herb Stratum (Plot Size:)			
1. *Carex utriculata*	80	Yes	OBL
2. *Eleocharis pulustis*	10	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
	90 = Total Cover		
Woody Vine Stratum (Plot Size:)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____ %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals:	(A) (B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- [X] Dominance Test is >50%
- Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ( ) No ( )

Remarks:

SOIL

Sampling Point: T1U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0-2	10 YR 3/1	100					loam	
2-16	7.5 YR 3/3	100					clay loam	
16 +								clay with heavy gley and redox
								saturated

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:[4]

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distrubed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B6)
- ☐ Iron Deposits (B6)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (no MLRA 1,2,4 A&B
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (LRR A)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Stained Leaves (B9) (MLRA 1,2, 4 A&B
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost- Heave Hummucks (D7)

Field Observations:

Surface Water Present? Yes ○ No ○ Depth (inches):

Water Table Present? Yes ○ No ○ Depth (inches):

Saturation Present? Yes ◉ No ○ Depth (inches): 16

(includes capillary fringe)

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys and Coast Region

Project/Site: Bull Creek Res. No. 4 City/County: Mesa Sampling Date: 8/2/12

Applicant/Owner: Bull Creek Ditch and Res. State: CO Sampling Point: T2U

Investigator(s): BRS/LHW Section, Township, Range: Sec. 20 & 29, T11S, R95W

Landform (hillslope, terrace, etc.): Reservoir shoreline Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR): E - RM Forests & Rangeland Lat: °39.072852 N Long: °108.038085 W Datum: NAD 83/ Z12

Soil Map Unit Name: 105 - Booneville, warm_Doughspon complex NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●)	No ( )	
Hydric Soil Present?	Yes (●)	No ( )	**Is the Sampled Area within a Wetland?** Yes ( ) No (●)
Wetland Hydrology Present?	Yes ( )	No (●)	

Remarks:

VEGETATION

Tree Stratum (Plot Size)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot Size)			
1. *Salix planifolia*	50	Yes	OBL
2. *Salix montivola*	20	Yes	OBL
3.			
4.			
5.			
	70 = Total Cover		
Herb Stratum (Plot Size)			
1. *Carex utriculata*	40	Yes	OBL
2. *Equisetum arvense*	10	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	50 = Total Cover		
Woody Vine Stratum (Plot Size)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____ %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- [X] Dominance Test is >50%
- Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks:

SOIL

Sampling Point: T2U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-12	10 YR 2/1	75	7.5 YR 4/4	25			clay loam	
12-18	10 YR 2/1	60	7.5 YR 4/4	40			clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:[4]

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distrubed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B6)
- ☐ Iron Deposits (B6)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (no MLRA 1,2,4 A&B
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (LRR A)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Stained Leaves (B9) (MLRA 1,2, 4 A&B
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost- Heave Hummucks (D7)

Field Observations:

Surface Water Present? Yes ○ No ○ Depth (inches): _____

Water Table Present? Yes ○ No ○ Depth (inches): _____

Saturation Present? Yes ○ No ○ Depth (inches): _____

(includes capillary fringe)

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys and Coast Region

Project/Site: Bull Creek Res. No. 4 City/County: Mesa Sampling Date: 8/2/12

Applicant/Owner: Bull Creek Ditch and Res. State: CO Sampling Point: T3U

Investigator(s): BRS/LHW Section, Township, Range: Sec. 20 & 29, T11S, R95W

Landform (hillslope, terrace, etc.): Reservoir shoreline Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR): E - RM Forests & Rangeland Lat: °39-07522 N Long: -108.035791 W Datum: NAD 83/ Z12

Soil Map Unit Name: 105 - Booneville, warm_Doughspon complex NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ (If no, explain in Remarks.)

Are Vegetation ☐ Soil ☐ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ◉ No ○

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ○	No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:

VEGETATION

Tree Stratum (Plot Size)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot Size)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot Size)			
1. *Carex Utriculata*	60	Yes	OBL
2. *Eleocharis palustris*	15		OBL
3.			
4.			
5.			
6.			
7.			
8.			
	75 = Total Cover		
Woody Vine Stratum (Plot Size)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 20 %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☒ Dominance Test is >50%

Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:

SOIL

Sampling Point: T3U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0-14	10 YR 3/1						loam	
14-18	10 YR 3/4	98					Sandy clay loam	small redox nodules

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[4]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distrubed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B6)
- ☐ Iron Deposits (B6)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (no MLRA 1,2,4 A&B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (LRR A)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Stained Leaves (B9) (MLRA 1,2, 4 A&B
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost- Heave Hummucks (D7)

Field Observations:

Surface Water Present? Yes ○ No ○ Depth (inches):

Water Table Present? Yes ○ No ○ Depth (inches):

Saturation Present? Yes ○ No ○ Depth (inches):
(includes capillary fringe)

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Hydrology dependent on reservoir filling

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys and Coast Region

Project/Site: Bull Creek Res. No. 4 City/County: Mesa Sampling Date: 8/2/12

Applicant/Owner: Bull Creek Ditch and Res. State: CO Sampling Point: TJF

Investigator(s): BRS/LHW Section, Township, Range: Sec. 20 & 29, T11S, R95W

Landform (hillslope, terrace, etc.): Reservoir shoreline Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR): E - RM Forests & Rangeland Lat: °39.073494 N Long: °-108.038057 W Datum: NAD 83/ Z12

Soil Map Unit Name: 105 - Booneville, warm_Doughspon complex NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●)	No ( )	
Hydric Soil Present?	Yes (●)	No ( )	**Is the Sampled Area within a Wetland?** Yes (●) No ( )
Wetland Hydrology Present?	Yes (●)	No ( )	

Remarks:

VEGETATION

Tree Stratum (Plot Size)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot Size)			
1. *Salix monticola*	50	Yes	OBL
2. *Salix planifolia*	30	Yes	OBL
3.			
4.			
5.			
	80 = Total Cover		
Herb Stratum (Plot Size)			
1. *Carex utriculata*	50	Yes	OBL
2. *Carex microptera*	15		FACU
3. *Pedicularis groenlandica*	15		OBL
4. *Equisetum arvense*	15		FACW
5.			
6.			
7.			
8.			
	95 = Total Cover		
Woody Vine Stratum (Plot Size)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- [X] Dominance Test is >50%
- Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks:

SOIL

Sampling Point: TJF

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0-24	10 YR 2/1	100					peat	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- [x] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Loamy Mucky Mineral (F1) (except MLRA 1)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils[4]:

- [ ] 2 cm Muck (A10)
- [ ] Red Parent Material (TF2)
- [ ] Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distrubed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes (●) No ( )

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- [x] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B6)
- [ ] Iron Deposits (B6)
- [ ] Surface Soil Cracks (B6)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9) (no MLRA 1,2,4 A&B
- [ ] Salt Crust (B11)
- [ ] Aquatic Invertebrates (B13)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Stunted or Stressed Plants (D1) (LRR A)
- [ ] Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- [ ] Water Stained Leaves (B9) (MLRA 1,2, 4 A&B
- [ ] Drainage Patterns (B10)
- [ ] Dry-Season Water Table (C2)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Raised Ant Mounds (D6) (LRR A)
- [ ] Frost- Heave Hummucks (D7)

Field Observations:

Surface Water Present? Yes ( ) No (●) Depth (inches):

Water Table Present? Yes ( ) No (●) Depth (inches):

Saturation Present? Yes ( ) No (●) Depth (inches):
(includes capillary fringe)

Wetland Hydrology Present? Yes (●) No ( )

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Surface water within 1 meter of the site

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys and Coast Region

Project/Site: Bull Creek Res. No. 4 City/County: Mesa Sampling Date: 7/30/09

Applicant/Owner: Bull Creek Ditch and Res. State: CO Sampling Point: T1U

Investigator(s): Fuchs/Renner Section, Township, Range: Sec. 20 & 29, T11S, R95W

Landform (hillslope, terrace, etc.): Reservoir shoreline Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR): E - RM Forests & Rangeland Lat: °39.072042n Long: °108.035563w Datum: NAD 83/Z12

Soil Map Unit Name: 105-Booneville, warm-Doughspon complex NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ○ No ○ (If no, explain in Remarks.)

Are Vegetation ☐ Soil ☐ or Hydrology ☒ significantly disturbed? Are "Normal Circumstances" present? Yes ◉ No ○

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ○	No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks: Water levels of the reservoir have been dropped for maintenance on the dam.

VEGETATION

Tree Stratum (Plot size:_____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size:_____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size:_____)			
1. *Carex utriculata*	70	Yes	OBL
2. *Deschampsia cespitosa*	20	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
	90 = Total Cover		
Woody Vine Stratum (Plot size:_____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____ %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☒ Dominance Test is >50%

Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:

SOIL

Sampling Point: T1U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
6	10 YR 3/2	90					Clay loam	
12	10 YR 3/2	90					Clay loam	
18	10 YR 3/2	80					Clay loam	
24	10 YR 5/4	90					Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[4]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distrubed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B6)
- ☐ Iron Deposits (B6)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (no MLRA 1,2,4 A&B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (LRR A)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Stained Leaves (B9) (MLRA 1,2, 4 A&B
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost- Heave Hummucks (D7)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: High-water shoreline of reservoir. Reservoir dry during 2009.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys and Coast Region

Project/Site: Bull Creek Res. No. 4 City/County: Mesa Sampling Date: 7/31/09

Applicant/Owner: Bull Creek Ditch and Res. State: CO Sampling Point: T2U

Investigator(s): Fuchs/Renner Section, Township, Range: Sec. 20 & 29, T11S, R95W

Landform (hillslope, terrace, etc.): Reservoir shoreline Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR): E - RM Forests & Rangeland Lat: °39.072852n Long: °108.038085n Datum: NAD 83/Z12

Soil Map Unit Name: 105-Booneville, warm-Doughspon complex NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ○ No ○ (If no, explain in Remarks.)

Are Vegetation ☐ Soil ☐ or Hydrology ☒ significantly disturbed? Are "Normal Circumstances" present? Yes ◉ No ○

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks: Water levels of the reservoir have been dropped for maintenance on the dam.

VEGETATION

Tree Stratum (Plot size:_____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size:_____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size:_____)			
1. *Carex utriculata*	60	Yes	OBL
2. *Deschampsia cespitosa*	15	Yes	FACW
3. *Eleocharis palustris*	15	Yes	OBL
4. *Epilobium saximontanum*	5		UPL
5.			
6.			
7.			
8.			
	95 = Total Cover		
Woody Vine Stratum (Plot size:_____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____ %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☒ Dominance Test is >50%

Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:

SOIL

Sampling Point: T2U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
6	10 YR 2/1	60	7.5 YR 4/4	30			Clay loam	
12	10 YR 3/2	50	7.5 YR 4/4	40			Clay loam	
18	10 YR 4/4	50	7.5 YR 4/4	40			Clay loam	
24	10 YR 4/4	90					Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:[4]

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distrubed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ◉ No ○

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B6)
- ☐ Iron Deposits (B6)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (no MLRA 1,2,4 A&B
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (LRR A)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Stained Leaves (B9) (MLRA 1,2, 4 A&B
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost- Heave Hummucks (D7)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? Yes ○ No ◉ Depth (inches):

(includes capillary fringe)

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: High-water shoreline of reservoir. Reservoir dry during 2009 survey.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys and Coast Region

Project/Site: Bull Creek Res. No. 4 City/County: Mesa Sampling Date: 8/01/09

Applicant/Owner: Bull Creek Ditch and Res. State: CO Sampling Point: T3U

Investigator(s): Fuchs/Renner Section, Township, Range: Sec. 20 & 29, T11S, R95W

Landform (hillslope, terrace, etc.): Reservoir shoreline Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR): E - RM Forests & Rangeland Lat: °39.07522n Long: °108.035791w Datum: NAD 83/Z12

Soil Map Unit Name: 105-Booneville, warm-Doughspon complex NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ (If no, explain in Remarks.)

Are Vegetation ☐ Soil ☐ or Hydrology ☒ significantly disturbed? Are "Normal Circumstances" present? Yes ◉ No ○

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	
Hydric Soil Present?	Yes ○	No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks: Water levels of the reservoir have been dropped for maintenance on the dam.

VEGETATION

Tree Stratum (Plot size:_____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size:_____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size:_____)			
1. *Carex utriculata*	60	Yes	OBL
2. *Deschampsia cespitosa*	20	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
	80 = Total Cover		
Woody Vine Stratum (Plot size:_____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____ %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

☒ Dominance Test is >50%

Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:

SOIL

Sampling Point: T3U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
6	10 YR 3/3	90					Clay loam	
12	10 YR 3/3	90					Clay loam	
18	10 YR 3/3	80					Clay loam	
24	10 YR 3/3	80					Clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils:[4]

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distrubed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B6)
- ☐ Iron Deposits (B6)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (no MLRA 1,2,4 A&B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (LRR A)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Stained Leaves (B9) (MLRA 1,2, 4 A&B
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost- Heave Hummucks (D7)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches): _____

Water Table Present? Yes ○ No ◉ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches): _____

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: High-water shoreline of reservoir. Reservoir dry during 2009 survey.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys and Coast Region

Project/Site: Bull Creek Res. No. 4 City/County: Mesa Sampling Date: 8/02/09

Applicant/Owner: Bull Creek Ditch and Res. State: CO Sampling Point: TJF (Fen)

Investigator(s): Fuchs/Renner Section, Township, Range: Sec. 20 & 29, T11S, R95W

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 1

Subregion (LRR): E - RM Forests & Rangeland Lat: 39.073494n Long: 108.038057w Datum: NAD 83/Z12

Soil Map Unit Name: 105-Booneville, warm-Doughspon complex NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [ ] Soil [ ] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●)	No ( )	
Hydric Soil Present?	Yes (●)	No ( )	**Is the Sampled Area within a Wetland?** Yes (●) No ( )
Wetland Hydrology Present?	Yes (●)	No ( )	

Remarks: Fen based upon at least 16 inches of peat in upper 30 inches.

VEGETATION

Tree Stratum (Plot size:_____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size:_____)			
1. *Salix monticola*	50	Yes	OBL
2. *Salix planifolia*	30	Yes	FACW
3.			
4.			
5.			
	80 = Total Cover		
Herb Stratum (Plot size:_____)			
1. *Carex utriculata*	50	Yes	OBL
2. *Carex microptera*	15	Yes	FAC
3. *Pedicularis groenlandica*	15	Yes	OBL
4. *Equisetum arvense*	15	Yes	FACW
5.			
6.			
7.			
8.			
	95 = Total Cover		
Woody Vine Stratum (Plot size:_____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____ %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- [X] Dominance Test is >50%
- Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks:

SOIL

Sampling Point: TJF (Fen)

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
6	10 YR 2/2	95					Peat	
12	10 YR 2/2	95					Peat	
18	10 YR 2/2	95					Peat	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- [x] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Loamy Mucky Mineral (F1) (except MLRA 1)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils:[4]

- [ ] 2 cm Muck (A10)
- [ ] Red Parent Material (TF2)
- [ ] Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distrubed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes (•) No ( )

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [x] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B6)
- [ ] Iron Deposits (B6)
- [ ] Surface Soil Cracks (B6)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9) (no MLRA 1,2,4 A&B
- [ ] Salt Crust (B11)
- [ ] Aquatic Invertebrates (B13)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Stunted or Stressed Plants (D1) (LRR A)
- [ ] Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- [ ] Water Stained Leaves (B9) (MLRA 1,2, 4 A&B
- [ ] Drainage Patterns (B10)
- [ ] Dry-Season Water Table (C2)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Raised Ant Mounds (D6) (LRR A)
- [ ] Frost- Heave Hummucks (D7)

Field Observations:

Surface Water Present?	Yes ( )	No (•)	Depth (inches):	
Water Table Present?	Yes ( )	No (•)	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes (•)	No ( )	Depth (inches): 1	

Wetland Hydrology Present? Yes (•) No ( )

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

APPENDIX C

Photo Comparisons for 2011 and 2012

	
2011 – Above New High Water Level	2012 - Above New High Water Level
	
2011- New Inundated	2012- New Inundated
	
2011- New Inundated	2012- New Inundated

2011- New Inundated

2012- New Inundated

2011- New Inundated

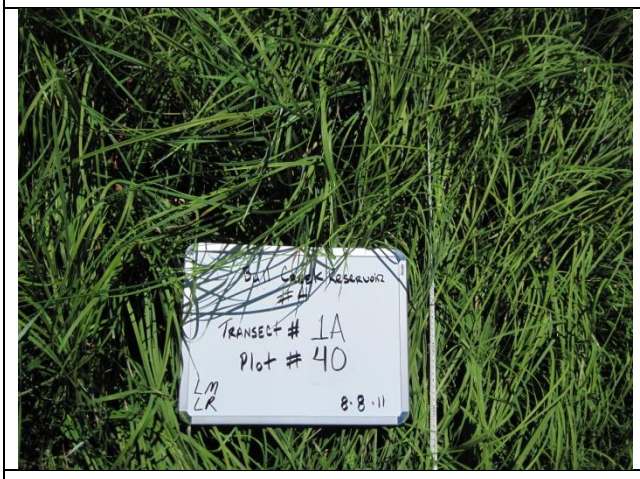
2012- New Inundated

2011- New Inundated

2012- New Inundated

2011- New Inundated

2012- New Inundated

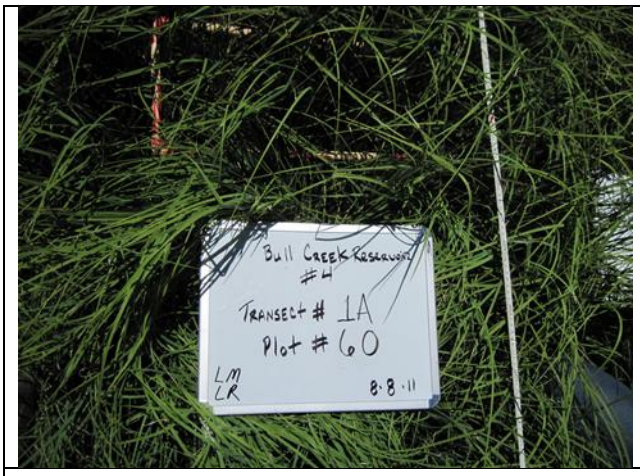


2011- New Inundated

2012- New Inundated

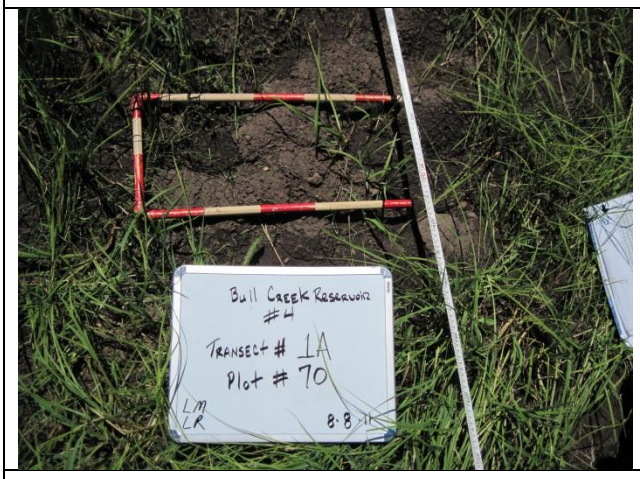
2011- New Inundated

2012- New Inundated



2011- New Inundated

2012- New Inundated



2011- New Inundated

2012- New Inundated

2011- New Inundated

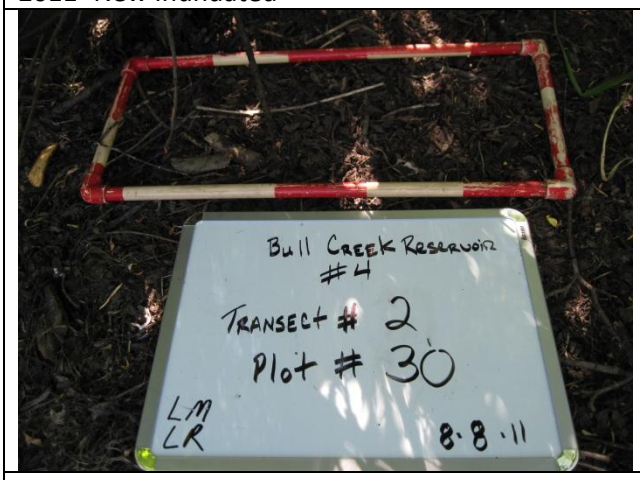
2012- New Inundated

2011- New Inundated

2012- New Inundated

2011- New Inundated

2012- New Inundated



2011- New Inundated

2012- New Inundated

2011- New Inundated

2012- New Inundated

2011- Below Restricted Water Level

2012- Below Restricted Water Level

2011- Newly Inundated

2012- Newly Inundated

2011- Newly Inundated

2012- Newly Inundated

2011- Newly Inundated

2012- Newly Inundated

2011- Newly Inundated

2012- Newly Inundated

2011- Newly Inundated

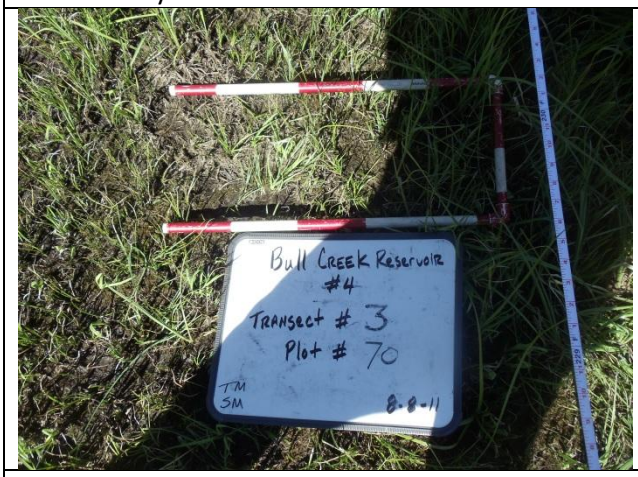
2012- Newly Inundated

2011- Newly Inundated

2012- Newly Inundated

2011- Newly Inundated

2012- Newly Inundated

	
2011- Newly Inundated	2012- Newly Inundated
	
2011- Newly Inundated	2012- Newly Inundated
	
2011-Above New High Water Level	2012-Above New High Water Level

2011-Newly Inundated

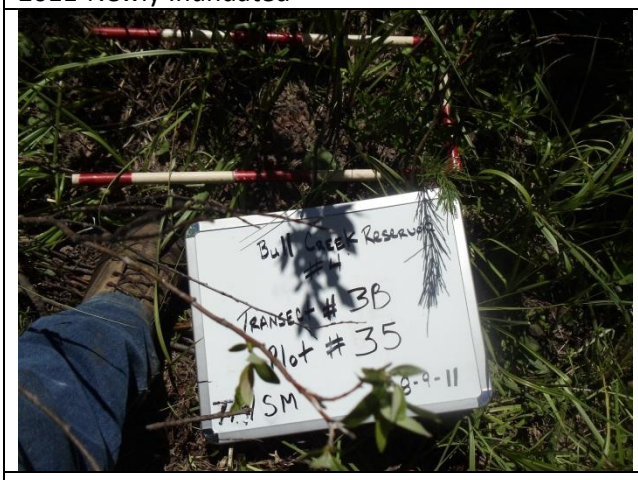
2012-Newly Inundated

2011-Newly Inundated

2012-Newly Inundated

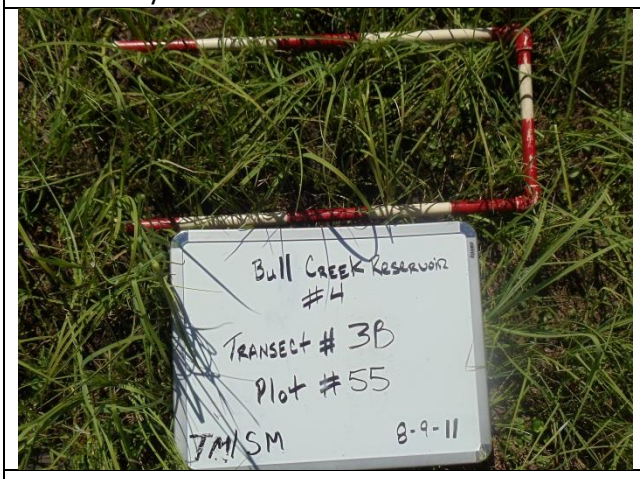
2011-Newly Inundated

2012-Newly Inundated

	
2011-Newly Inundated	2012-Newly Inundated
	
2011-Newly Inundated	2011-Newly Inundated
	
2011-Newly Inundated	2012-Newly Inundated

2011-Newly Inundated

2012-Newly Inundated

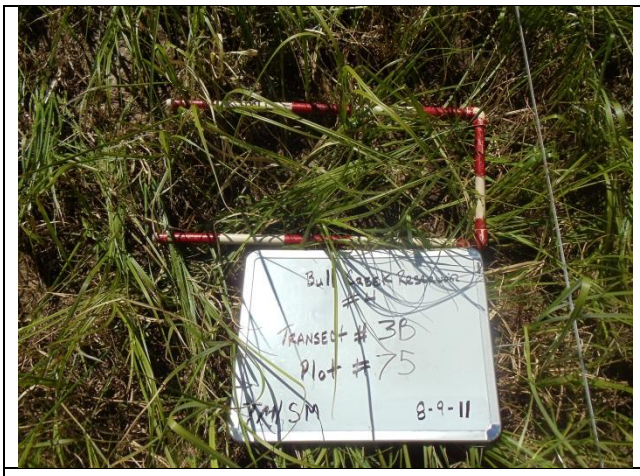


2011-Newly Inundated

2012-Newly Inundated

2011-Newly Inundated

2012-Newly Inundated

	
2011-Newly Inundated	2012-Newly Inundated
	
2011- Newly Inundated	2012- Newly Inundated
	
2011- Newly Inundated	2012- Newly Inundated

	
2011- Newly Inundated	2012- Newly Inundated
	
2011- Newly Inundated	2012- Newly Inundated
	
2011- Newly Inundated	2012- Newly Inundated

2011- Newly Inundated

2012- Newly Inundated

2011- Newly Inundated

2012- Newly Inundated

2011- Newly Inundated

2012- Newly Inundated

	
2011- Newly Inundated	2012- Newly Inundated
	
2011- Newly Inundated	2012- Newly Inundated
	
2011- Newly Inundated	2012- Newly Inundated

	
2011- Newly Inundated	2012- Newly Inundated