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
		201	2 August	Bull Cree	k #5 Tr	ansect Cove	r by Comm	unity		
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	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	2 August B	Bull Creek	# 5A T	ransect Cov	er by Comn	nunity		
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

	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 Au	igust Bull	Creek #5	Cover k	oy Commun	ity Transect	t 5 and 5A	1	
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

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

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.

	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	2 August B	ull Creek	: #4 All Tr	ansect	ts Average (Cover by Co	ommunity	and Zone	2		
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		

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

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.

Transect	Wetland Type/Zone	Year	Carex	Gram	All Gram	Forb	Shrub	Tree	Bryophyte	VascHerb	Ttl Veg	Species
	Non-Wetland	2010	0.0	16.6	16.6	38.8	99.5	0.0	0.0	55.4	154.9	8
	Above New	2011	1.4	17.4	18.9	69.7	0.0	0.0	0.0	88.6	88.6	20
T 1	High Water Line	2012	2.9	7.9	10.7	80.7	9.3	0.0	0.0	91.4	100.7	23
11	Non- Wetland	2010	2.9	25.7	28.6	49.6	14.6	7.1	13.3	78.2	113.3	20
	Newly	2011	34.3	0.9	35.2	2.7	0.0	0.0	0.0	37.9	37.9	7
	Inundated Zone	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	2011	73.3	0.8	74.1	2.9	0.5	0.0	0.0	77.0	77.5	9
IIA	Inundated Zone	2012	65.3	0.4	65.7	19.0	0.0	0.0	0.0	84.6	84.6	10
	Wetland	2010	0.0	24.9	24.9	22.5	74.6	0.0	0.0	47.4	122.0	7
	Above New	2011	10.0	0.0	10.0	41.4	71.7	40.0	2.0	51.4	165.1	12
Т 2	High Water Line	2012	0.0	2.0	2.0	23.0	82.0	18.0	1.0	25.0	126.0	12
1 4	Wetland/Newly	2010	0.0	0.0	0.0	93.3	99.5	16.7	26.7	93.3	236.2	6
	Inundated Zone	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
Т 2А	Wetland/Newly	2011	17.0	0.3	17.3	2.4	36.9	0.0	6.0	19.7	62.6	9
1 21	Inundated Zone	2012	17.3	5.5	22.7	19.1	33.6	0.0	9.5	41.8	85.0	12
	Non-Wetland	2010	11.5	0.0	11.5	42.0	99.5	0.0	0.0	53.5	153.0	7
	Above New	2011	3.3	0.0	3.3	43.0	4.3	0.0	6.7	46.3	57.3	16
	High Water Line	2012	15.0	0.0	15.0	82.7	0.7	0.0	23.3	97.7	121.7	18
	Wetland	2010	11.5	0.0	11.5	12.5	81.5	0.0	0.0	24.0	105.5	9
	Above New	2011	1.5	0.0	1.5	31.8	5.3	0.0	10.0	33.3	48.5	13
Т 3	High Water Line	2012	0.0	0.0	0.0	37.5	10.0	0.0	11.0	37.5	58.5	10
15	Fen/Above New	2010	55.0	5.0	60.0	20.3	85.0	0.0	0.0	80.3	165.3	9
	High Water Line	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	2010	34.0	2.1	36.1	25.1	68.8	0.1	5.3	61.1	135.2	25
	Inundated Zone	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

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
	Non-Wetland	2011	0.1	3.3	3.4	26.8	4.8	0.0	0.8	30.1	35.6	17
	Above New High Water Line Non- Wetland	2012	17.5	0.0	17.5	26.8	27.0	0.0	3.8	44.3	75.0	15
T 24		2011	21.2	6.9	28.1	0.8	74.2	0.0	0.0	28.9	103.1	10
Т ЗА	Newly Inundated Zone	2012	11.9	30.5	42.5	2.9	65.5	9.1	0.0	45.4	119.9	16
	Wetland/Above	2011	0.0	0.8	0.8	45.0	1.6	0.0	7.5	45.8	54.9	14
	New High Water Line	2012	7.8	0.8	8.5	52.3	68.3	0.0	16.3	60.8	145.3	15
	Non-Wetland Above New	2011	15.0	0.0	15.0	62.7	63.2	17.1	0.0	77.7	157.9	20
	High Water Line	2012	35.8	19.2	55.0	0.0	0.0	0.0	0.0	55.0	55.0	4
T 2D	Wetland/Newly	2011	10.0	0.0	10.0	3.5	20.0	0.0	0.0	13.5	33.5	4
Т ЗВ	Inundated Zone	2012	30.0	20.0	50.0	0.0	0.0	0.0	0.0	50.0	50.0	2
	Fen/Newly	2011	51.9	2.6	54.4	4.7	18.1	0.0	9.2	59.1	86.4	11
	Inundated Zone	2012	28.3	2.2	30.6	23.3	42.8	0.0	7.8	53.9	104.4	12
	Wetland/Above	2010	99.5	0.0	99.5	0.0	0.0	0.0	0.0	99.5	99.5	1
	New High	2011	80.0	10.0	90.0	0.5	0.0	0.0	0.0	90.5	90.5	3
	Water Line	2012	115.0	85.0	200.0	0.0	0.0	0.0	0.0	200.0	200.0	3
	Non-Wetland	2010	50.0	0.0	50.0	160.0	0.0	0.0	80.0	210.0	290.0	6
	Above New	2011	30.0	0.0	30.0	16.8	0.0	0.0	15.0	46.8	61.8	6
T 4	High Water Line	2012	42.5	0.0	42.5	13.5	0.0	50.0	15.0	56.0	121.0	9
Т4		2010	20.0	0.0	20.0	23.0	99.5	99.5	40.0	43.0	282.0	4
	Fen/Above New High Water Line	2011	10.0	0.0	10.0	3.5	10.0	0.0	10.0	13.5	33.5	5
	riigii watei Lille	2012	65.0	95.0	160.0	10.0	90.0	15.0	0.0	170.0	275.0	6
		2010	95.6	14.8	110.4	24.2	39.9	0.0	19.2	134.7	193.8	17
	Fen/Newly Inundated Zone	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
	Wetland/Newly	2011	32.9	0.0	32.9	0.5	0.0	2.3	0.0	33.4	35.6	5
	Inundated Zone	2012	58.6	0.7	59.3	30.4	1.4	0.0	13.6	89.7	104.7	15
	Fen/Newly	2011	21.6	0.4	22.1	2.5	12.9	3.8	11.3	24.6	52.4	10
T 4A	Inundated Zone	2012	72.5	12.5	85.0	22.6	6.9	0.0	25.8	107.6	140.3	17
	Non- Wetland	2011	18.3	5.0	23.3	10.0	51.6	0.0	0.0	33.3	84.9	9
	Newly Inundated Zone	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.

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

Table 7. Prevalence	Index Average	in the Different Zones
I dole // I I e de d	inden in ei age	m the Difference Bolles

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.
I dole of I i e , dienee	mach m, er age øj	Wedding Type and Bonet

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.

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
	2010	2.3	3.2				
T 1	2011	3.7	1.3				
	2012	3.4	1.6				
T 1A	2011		1				
IIA	2012		1.3				
	2010			2.4	2.6		
Т 2	2011			2.6	1.4		
	2012			2.8	1.4		
Т 2А	2011				1.9		
1 2/1	2012				2		

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
	2010	1.3		1.4		1.2	1.8
Т 3	2011	2.5		2.5		2.2	1.4
	2012	2.8		3.1		2	1.6
т за	2011	2.9	1.1	2.7			
I JA	2012	2.5	1.4	2.1			
Т 3В	2011	2.3			1.1		1.3
1 30	2012	1.1			1.4		1.5
	2010	2.5		1		2.3	1.4
T 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
1 4 A	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 nonwetland 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.

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

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

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.

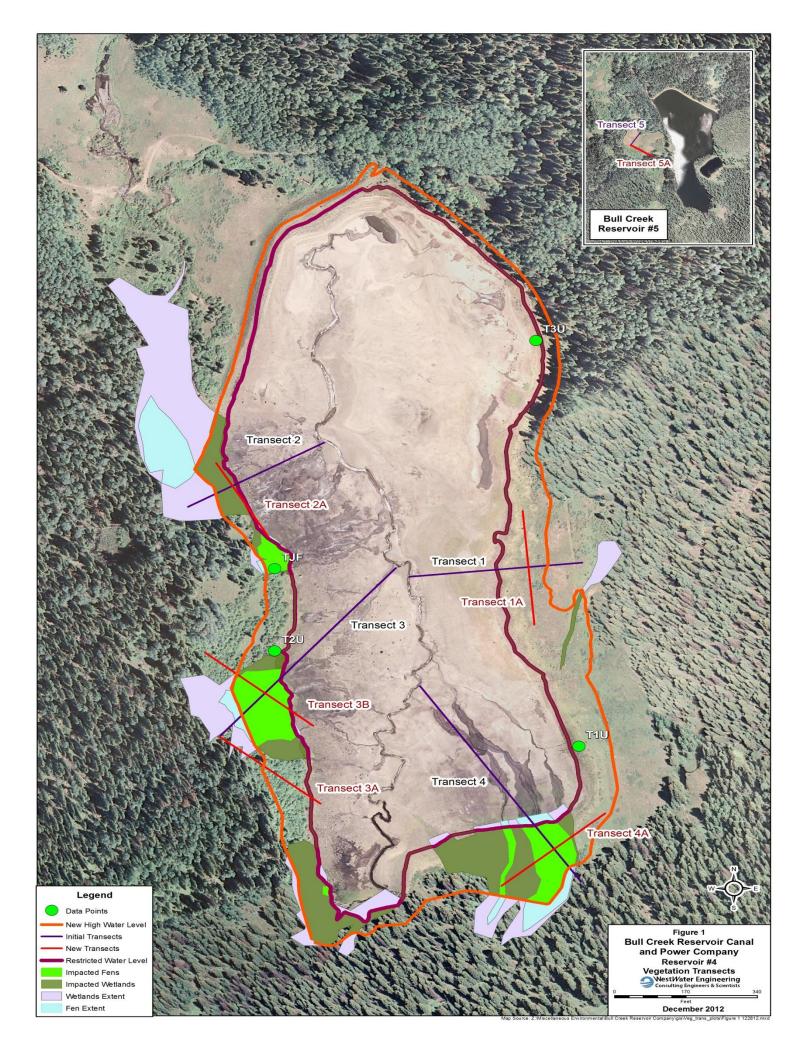
The total wetland index value is based on the original 3.38 acres of wetland and fen delineated in 2009. Within the newly inundated zone, wetland hydrology is now present, as determined by pool elevations and duration, and hydrophytic vegetation is present as well, determined by the PI values for 44 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.

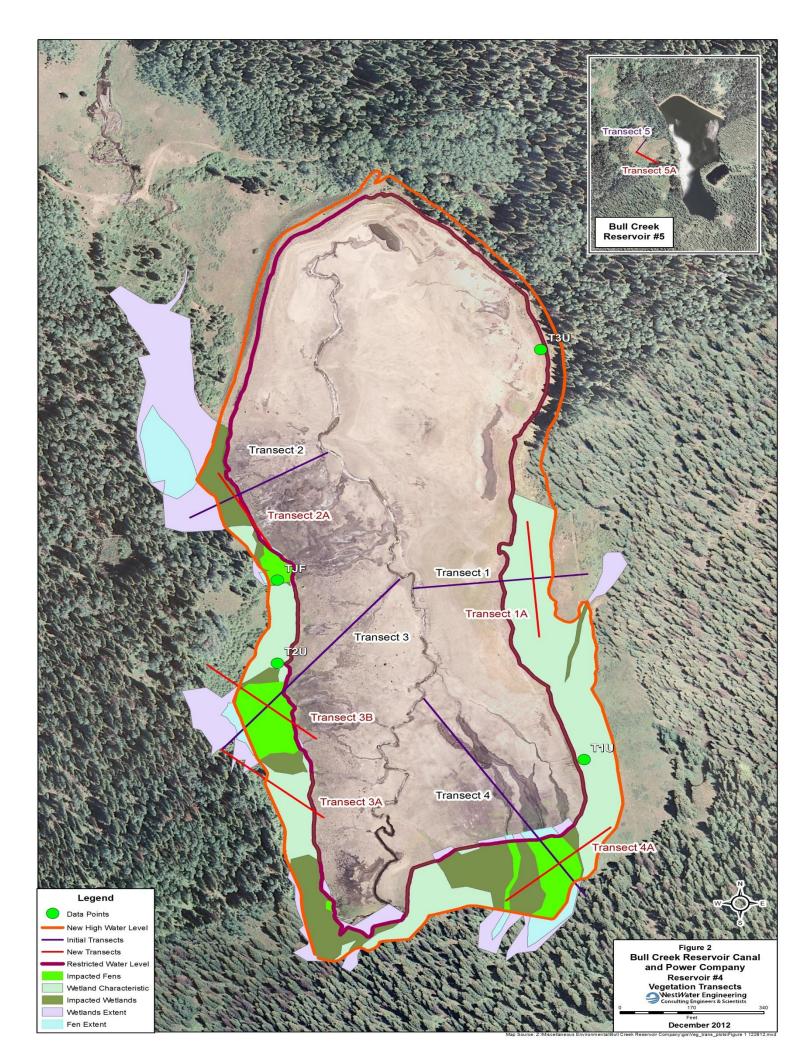
Changes to the hydrogeomorphology condition index were the largest between 2011 and 2012. The amount of wetland surface that has been negatively impacted by altered surface or subsurface flow patterns increased in 2012. Wetland area impacted by disturbances, the intensity of those disturbances, and the 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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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	[%]%Ag							
*Obtain aerial and topographic map of subject area before	ore 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 1.1	4							

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	, , , , , , , , , , , , , , , , , , ,	t Factor ¹	Weighted In Value	dex				
		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	R				
3.0 Water Quality Index	.9	0.05	0.0	.05					
4.0 Wildlife Habitat Index	.6	0.05	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 Weig	nted Index scores	<mark>.63</mark>					
Indicate the percentage of the area t Multiply the sum of the weighted i			Percent Wetlan r x1xSWI	nd 0.85	.54				
each wetland categorical multipl Riverine or Fen) is multiplied by	ier. Area indicated as v	wetland (non-	Percent Riveri SWI	ne x1.5x					
depicted as Riverine Wetland is n of the survey area that is fen Wet			nt Percent Fen .1	5 x2.0xSWI	.19				
			Total W	eighted Index	.73				
Total Wetland Value: Calculate to	tal wetland value by mul	tiplying total wei	ghted index value b	y the wetland ac	reage				
Acres	Total Weigh	ted Index	Total Wetl	and Index Valu	e				
7.77	.73		5.67						

WestW	n Wetland Function and Value Assessment Form ater 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 Functi	on: 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, Peatlan	<mark>d</mark>							
HGM Class: Slope, Depressional, Riverine, Fringe								
Total Acreage: Wetland 2.24 Riverine < 0.001 Fen	1.14							

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	Weigh	it Factor ¹	Weighted In Value	dex		
		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 Weig	hted Index scores	<mark>.63</mark>			
Indicate the percentage of the are Multiply the sum of the weighte			Percent Wetlan r x1xSWI	nd 0.66	<mark>.42</mark>		
each wetland categorical multi Riverine or Fen) is multiplied	plier. Area indicated as	wetland (non-	Percent Riveri SWI	ne x1.5x			
depicted as Riverine Wetland is of the survey area that is fen W			nt Percent Fen	x2.0xSWI	<mark>.44</mark>		
			Total W	eighted Index	<mark>.86</mark>		
Total Wetland Value: Calculate	total wetland value by mu	ltiplying total wei	ghted index value b	y the wetland ac	reage		
Acres	Total Weig	hted Index	Total Wetl	and Index Valu	e		
3.38	3.38 .86 2.91						

1.1 Degree of hydrologic disturbance	Non Oc	curr	ing -	\rightarrow	Sligh	t →	- N	loder	ate -	→ \$	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	0		>0-5	5%	>	5-15%	ó	>15	-25%	>	25%
fluctuating water levels caused by roads, bridges, dams, rip rap)	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	Excelle	ent	\rightarrow	V	ery G	ood	\rightarrow	Fa	air ·	\rightarrow	Poor
or subsurface flow patterns.	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	Non O	ecui	ring	\rightarrow	Slig	nt —	> N	Aodei	ate –	→ S	evere
(compaction, reduced infiltration capability, surface crust, and erosion).	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%	Ó			25-759	%		6	>75%	Ď
1.1.5 Circle the score indicating the degree of impact in the percent column indicated above.	None Slight Moderat Severe	te	10 9 7 5		Slight Mode Sever	rate	6 3 1		Slight Mode Sever	rate 2	4 2 0
Slight – Pugging is minimal / Vegetation and bank stabil Moderate – Pugging is common/ Hummucks have devel removed. Severe – Pugging is common/ Hummucks are prominent	loped/ Ve	geta	tion is	dry	ing bu						ce is
unlikely to recover without assistance. Pugging – Patches of bare ground where extreme trampl											
Hummucks – Large humps in the soil where vegetation	has begur	1 to	drv out	t an	d soils	begin	to e	erode			
1.1.6 Long term protection potential: rate potential for long-term protection. Such as, existing rights that may threaten wetland (Development,	SIA	N	o Exis Right	ting s	g H	Existing Rights		Proj Ac	posed tion	Ci Ac	urrent tivity
construction, or maintenance) (Determined in Office)	10		8			5			2		0
Hydrogeomorphology Condition Index: add scores fro without riverine systems this is the Total Hydrogeom	orpholog	y In	throug dex) 6 + 6					•		ites	
For Sites with Riverine systems fill out Riverine Adde Hydrogeomorphology Index and divide by 2 for Total 1							,		on 1.2) /A)/2 =		
Comments:											

		ugust 20										
Adden	dum 1.2.0: Hydrogeomorphology – Riverine V	Vetlands 1	Ind	ex								
274 TT 202 VD	loodplain Characterization Overall floodplain condition (e.g. sediment	Excelle	ent	\rightarrow	Ve	ry Goo	d.	\rightarrow	Fair	\rightarrow	12	Poor
1.2.1.1	deposition, erosion, capability to dissipate channel energy). Consider entire reach.	10	лп 9	→ 8	7	6	5	→ 4	3	$\frac{\rightarrow}{2}$	1	0
	anomiale almost the second to see the second s	Occurri	ng	\rightarrow	Mode	erate ·	→ S	lioh	t →	Not (Deer	urring
1.2.1.2	Floodplain shows signs of inundation from runoff events (debris, water marks).	10	9	8	7	6	5	4	3	2	1	0
1.2.1.3	Portion or area of the floodplain that show	0		>0-	5%	>5-	15%	18	>15-25	%	>;	25%
	signs of excessive scour, deposition or erosion. (Percentage of area relative to the entire reach).	10	9	8	7	6	5	4	3	2	1	0
1.2.1.4	Degree of degradation in the portion or area	Non Oc	curr	ring	\rightarrow	Slight	\rightarrow	Mo	oderate	\rightarrow	S	evere
	of the floodplain that is in non-functioning or poorly functioning condition.	10	9	8	7	6	5	4	3	2	1	0
1.2.1.5	Stream corridor shows signs of entrenchment	Non Oc	cur	ring	\rightarrow	Slight	\rightarrow	Mo	oderate	\rightarrow	S	evere
	(Floodplain width not proportional to bankfull width for stream type and setting).	10	9	8	7	6	5	4	3	2	1	0
	Channel Bank Characterization											
1.2.2.1	Banks are stable and indicate ability to handle variable flow velocities (sustain vegetation,	Excelle	ent	\rightarrow	Ve	ry Goo	od	\rightarrow	Fair	\rightarrow	3 5	Poor
	armored with boulders, show little evidence of erosion).	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,	0		>0-	5%	>5-	15%		>15-25	5%	>	25%
	excessive lateral movement, or evidence of stream widening.	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 Oc 10	eurr 9	ring 8	\rightarrow 7	<u>Slight</u> 6	\rightarrow 5	<u>Mo</u> 4	oderate 3	\rightarrow 2	<u>S</u> 1	evere 0
and the state of the state of the	Channel Characterization											
1.2.3.1	Evidence of excessive sediment removal or deposition, or that the stream is getting wider.	Non Oc 10	eurr 9	ring 8	\rightarrow 7	Slight 6	\rightarrow 5	<u>Мо</u> 4	oderate 3	\rightarrow 2	5 1	evere 0
AL 612 125 125		Non Oc	cur	ring	\rightarrow	Slight	\rightarrow	Mo	oderate	\rightarrow	S	evere
1.2.3.2	Evidence of head-cutting	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	Non Oc	curr	ring	\rightarrow	Slight	\rightarrow	Mo	oderate	\rightarrow	S	evere
	stream type, or geomorphic setting (downcutting, lowering of groundwater).	10	9	8	7	6	5	4	3	2	1	0
1.2.4 D	isturbance at Riverine Crossings (roads, trail	ls, or lives	tocl	k)								
1.2.4.1	Portion or area of the reach where crossing(s)	Non Oc	curi	ring	\rightarrow	Slight	\rightarrow	Mo	oderate	\rightarrow	S	evere
	have had a negative effect on the channel.	10	9	8	7	6	5	4	3	2	1	0
1.2.4.2	Degree of in channel degradation from	None	\rightarrow	Low	\rightarrow	Moder	ate	\rightarrow	High	\rightarrow V	ery	High
	crossings.	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	Excelle	ent	\rightarrow	Ve	ry Goo	od	\rightarrow	Fair	\rightarrow	12	Poor
10.11	in channel impact at crossings. (If it is not a vehicle crossing(s), circle 10)	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	Excelle	ent	\rightarrow	Ve	ery Goo	od	\rightarrow	Fair	\rightarrow	9 2	Poor
	stream impact. (If it is not a vehicle crossing(s), circle 10)	10	9	8	7	6	5	4	3	2	1	0
Riveri	ine Index: Sum of the actual scores and divide 1					possible_+		0) =	1	150		
Total R	iverine Index score =**											

2.1 Vegetation Cover - % Cover				20					20	0	0.000
2.1.1 % Bare Ground (Exposed	0		>0-59	%	>5-	15%	>	>15-25%	6	>	25%
Soil)	10	9	8	7	6	5	4	3	2	1	0
2.1.2 % Projected Cover of Wetland Plants that are	100%	- 90%	9	0% - 7	'5%	75	5% - 5	% - 50%		<50	%
FacWet and Obligate	10	9	8	7	6	5	4	3	2	1	0
2.1.3 % Projected Cover of Non-native Invasive	0		>0-59	%	>5-	15%	>	>15-25%	6	>	25%
Species including noxious weeds	10	9	8	7	6	5	4	3	2	1	0
2.2 Structure		W					1001				
How many vegetation strata (present over >10 % of the area) are represented? Submerged aquatic, emergent aquatic, bryophytes, terrestrial herbaceous, sub-shrub (<.2m		7 or more Strata		a		5 rata		4 Strata		3 or less Strata	
high) shrub (.2-1m high), tall shrub (>1m high), tree (>3" DBH), and woody vine.	10		2		8		7		5		5
2.3 Diversity											
2.3.1 Estimate of number of	>18		9-18	:	7	-9		4-6		2	1-3
species present.	10		8			6		4			2
2.3.2 Number of Species with > 10% projected cover	5 (or mor	e)	4		1	3		2			1
(Dominant Species).	10		8			6		4			2
2.4 Disturbance	-						T			97 Q	
2.4.1 How much of the wetland	0		>0-59	0	>5-	15%		>15-25%	0	>	25%
area is impacted by disturbances?	10	9	8	7	6	5	4	3	2	1	0
2.4.2 Indicate the intensity of impacts in the disturbed	None to :	minima	$1 \rightarrow$	S	light	\rightarrow	Moo	lerate	\rightarrow	é	Severe
area.	10	9	8	7	6	5	4	3	2	1	0
2.4.3 Estimate the frequency of	Seldo	m -	\rightarrow Pe	eriodie	\rightarrow	Free	equent \rightarrow		С	Continuous	
the disturbance.	10	9	8	7	6	5	4	3	2	1	0
Vegetation Index Sum all scores and divide by the	total possib	le (90)	7 + 9 + 9	+ 9 + 1	10 + 8	+ 4 + 5 -	+ 6 =	67/90	= 74		

	Aı	1gust 2012								
3.0 Water Quality Index: If No Surface	Water Leave	Blank	N							
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						
(Tontie Systems)	10	8	4	C)					
3.2 Turbidity	None —	\rightarrow Low \rightarrow	Moderate \rightarrow	High \rightarrow	Very High					
3.2.1 Is the Water Turbid?	< 5 ntu	$\sim \! 10 \text{ ntu}$	~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 + 9 = 10 / 7	$\alpha - \alpha$					

Habitat Value assessed as:	Very H	igh	\rightarrow	High	\rightarrow	Mode	rate	\rightarrow	Low	\rightarrow	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 H	igh	\rightarrow	High	\rightarrow	Mode	rate	\rightarrow	Low	\rightarrow	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:

	August 20	12			
5.2 Unique Vegetation Associations (Fen or Peatlands)			<mark>Yes</mark> tions 5.2.1 – n 5.1 as Tota	No 5.2.11 1 TESS Index	Score
Vegetation Cover- % Cover in the Fen /Peatland					
5.2.1 Number of Species with > 10% projected	5 (or more)	4	3	2	1
cover	10	8	6	4	2
Structure					
5.2.2 How many vegetation strata (present over >10 % of the area) are represented?	5 or more Strata	4 Strata	3 Strata	2 Strata	1 Strata
Submerged aquatic, emergent aquatic, bryophytes, terrestrial herbaceous, woody shrub, and tree.	10	8	6	4	2
5.2.3 Site displays unique Fen/ Peatland structures (floating mat, peat depth >4')	Very H 10	$\frac{1}{9} + \frac{1}{8}$	$\frac{\text{ligh} \rightarrow \text{Mo}}{7 6 5}$	19 17 18 17 18 18 18 18 18 18 18 18 18 18 18 18 18	$\frac{\text{ow} \rightarrow \text{None}}{2 1 0}$
Diversity		14.15 Vice		A 87311 3444	(153 ¹ ¹ 152 ¹ 50 ¹ 08
•	>25	21-25	16-20	11-15	1-10
5.2.4 Estimate the number of species present	10	8	6	4	2
5.2.5 Site has a concentration of rare species, FS	C HITWOHN	$igh \rightarrow H$	ligh → Mo		$ow \rightarrow None$
sensitive and CNHP designated	10	98	7 6 5	4 3	2 1 0
Disturbance	r r		Ť	ľ	
5.2.6 How much fen area is impacted by a disturbance.	0	>0-5%	>5-15%	>15-25%	>25%
distui bance.	10	9 8	7 6 5	<mark>4</mark> 3	2 1 0
5.2.7 Indicate the intensity of impacts in the	None	to minima	al \rightarrow Slight	\rightarrow Moderat	$e \rightarrow Severe$
disturbed area.	10	98	<mark>7</mark> 6 5	4 3	2 1 0
5.2.8 Estimate the frequency of the disturbance.	Seldo		$riodic \rightarrow 1$	377.7	Continuous
	10	9 8	7 <mark>6</mark> 5	4 3	2 1 0
5.2.9 Site has a probability to persist over a long period of time (remote from potential	Very H	$igh \rightarrow H$	ligh \rightarrow Mo	derate \rightarrow L	$ow \rightarrow None$
disturbances to hydrology source, i.e., oil and gas development, domestic wells, roads, heavily grazed areas).	10	9 8	7 6 5	4 3	2 1 0
Education					
5.2.10 Site has research and/or educational value.	Very H	$igh \rightarrow E$	ligh \rightarrow Mo	derate \rightarrow L	$row \rightarrow None$
5.2.10 She has research and or educational value.	10	98	7 <mark>6</mark> 5	4 3	2 1 0
5.2.11 Site is available for educational purposes.	Excell	ent \rightarrow	Very Good	$l \rightarrow Fair$	\rightarrow Poor
(within 1/2 mile of improved road)	10	98	7 6 5	4 3	2 1 0
Unique Vegetation Sub-Index <u>8+8+6+6+2+4</u>	+7+6+0	+6+2	= 63/110 = 8	** 57	
Sum scores and divide by 110 (total possible)		1012	05/110 -		
Total TESS Condition Index Score TESS Index + Unique Vegetation Index / 2				(*.5 +**.	(57)/2 = .54
Comments:				8	
CNHP and FS species lists were cross referenced to t survey. However, the entire suitable habitat that exis therefore, a zero was not scored.					

6.0 Recreation Index: Suitability: Value for activity assessed as:	Very I			High	\rightarrow	Mode	rate	\rightarrow	Low	\rightarrow	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 Comments:						3 + 5	+ 5 +	7 = 2	20/40 =	.5	

7.0 Buffer Condition Index 10ft buffe	er and 3	0ft buff	er								
7.1 10ft Buffer	<u></u>		-0-0-								
Determine dominant slope - circle one	(1) Fla	t = < 2%	,, (2) :	Moderat	<mark>e</mark> = 2-	-10%, (3)	Ste	ep = >109	%		
Estimate slopes that positive slopes into	the we	tland are	a			67 SAME 10					
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	%	×)-5%	:	>5-15%		>15-25	%	>259	%
	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 →		\rightarrow Low \rightarrow		Мос	Moderate —		High →		Very Hig	<u></u> gh
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 E	uffer)										
Determine dominant slope - circle one	(1) Fla	t = < 2%	, (2) : 🚺	Aoderat	<mark>e</mark> = 2-	10%, (3)	Stee	p = > 10%	6		
Estimate slopes that could affect the we	tland w	ith overl	and flo	w and se	edime	nt deposi	tion				
Within 30ft buffer of assessed area (Circle Percentage)	0	%	×)-5%		>5-15%	6	>15-25	%	>259	%
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	%	×)-5%	1	>5-15%		>15-25	%	>259	%
7.2.2 Non-native invasive plants	10	9	8	7	6	5	4	3	2	1	0
Percent of 30ft Buffer Affecting Wetland	0	%	>0	-10%	>	×10-25%	(j	>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

	A	ugust 2	012							
No	ne →	Low	\rightarrow	Mod	erate	\rightarrow	High	\rightarrow	Very Hig	gh
10	9	8	7	6	5	4	3	2	1	0
10	9	8	7	6	5	4	3	2	1	0
	10	None → 10 9	$\frac{\text{None}}{10} \rightarrow \frac{\text{Low}}{8}$	10 9 8 7	None \rightarrow Low \rightarrow Mod 10 9 8 7 6	None \rightarrow Low \rightarrow Moderate1098765	None \rightarrow Low \rightarrow Moderate \rightarrow 10987654	None \rightarrow Low \rightarrow Moderate \rightarrow High109876543	None \rightarrow Low \rightarrow Moderate \rightarrow High \rightarrow 1098765432	None \rightarrow Low \rightarrow Moderate \rightarrow High \rightarrow Very High10987654321

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		Percen	t Bare Ground in 1	0ft Buffer	
Ton Buller	0	<mark>≥0-5%</mark>	>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		Percen	t Bare Ground in 3	Oft Buffer	
Soft Buller	0	<mark>>0-5%</mark>	>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 Point	ts		
UTM L	ocation	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:	fesa		Sampling Date: 8/2/12				
Applicant/Owner: Bull Creek Ditch and	d Res.				State:CO	Sampling	Point: T1U			
Investigator(s): BRS/LHW			Section, Towr	ship, Range: S	Sec. 20 & 29, T	11S, R95W				
Landform (hillslope, terrace, etc.): Reser	voir shorelin	e	Local relief (c	oncave, conve	x, none):Concav	Slope (%):1				
Subregion (LRR): E - RM Forests & R	angeland	Lat: 39.	072042 N	Long	g:-108.035563 V	N	Datum:NAD 83/Z12			
Soil Map Unit Name: 105 - Booneville	, warm_Dou	ghspon compl	ex		NWI classi	fication: <u>N/A</u>				
Are climatic / hydrologic conditions on th	e site typical fo	or this time of ye	ear?Yes 🖲	No	(If no, explain in	Remarks.)				
Are Vegetation Soil or Hy	drology	significantly	disturbed?	Are "Norma	al Circumstances	'present? Y	′es 🖲 🛛 No 🔿			
Are Vegetation Soil or Hy	drology	naturally pro	oblematic?	(If needed,	explain any ansv	vers in Rema	rks.)			
SUMMARY OF FINDINGS - Att	tach site m	ap showing	sampling	ooint locati	ons, transect	s, importa	nt features, etc.			
Hydrophytic Vegetation Present?	Yes 🌘	No 🌀								
Hydric Soil Present?	Yes 🔘	No 🖲	Is the	Sampled Area						
Wetland Hydrology Present?	Yes 🔘	No 🔘	within	a Wetland?	Yes (No 🤇	\supset			
Remarks:										

VEGETATION

	Absolute		t Indicator	Dominance Test worksheet:		
Tree Stratum Plot Size	<u>% Cover</u>	<u>Species</u>	? <u>Status</u>	Number of Dominant Species That Are OBL, FACW, or FAC:	2 (A)	
2				Total Number of Dominant		
3				Species Across All Strata:	2 (B)	
4.	10 10			 Percent of Dominant Species 		
Sapling/Shrub Stratum Plot Size		_ = Total C	over	That Are OBL, FACW, or FAC:	100.0 % (A/B)	ł
1.Salix monticola	15	Yes	OBL	Prevalence Index worksheet:		
2.	10 			Total % Cover of:	Multiply by:	
3.			-0	OBL species x 1	=	
4.				FACW species x 2	<u>i</u>	
5.				FAC species x 3	. =	
	15	= Total Co	ver	FACU species x 4	=	
Herb Stratum Plot Size				UPL species x 5	č=	
1.Carex utriculata	80	Yes	OBL	Column Totals: (A)	(B	3)
2.Eleocharis pulustis	10	No	OBL			
3.				Prevalence Index = B/A =		
4.			14	Hydrophytic Vegetation Indicate	ors:	
5.				Dominance Test is >50%		
6.				Prevalence Index is ≤3.0 ¹		
7.				Morphological Adaptations ¹ (F	Provide supporting	
8.			-0	data in Remarks or on a se		
	90	= Total Co	over	Problematic Hydrophytic Veg	etation (Explain)	
Woody Vine Stratum Plot Size	A CONTRACTOR OF			1		
1	10	595	4	¹ Indicators of hydric soil and weth be present.	and hydrology must	ŝ
2		2.0				_
% Bare Ground in Herb Stratum%	2 -25 - 11 - 5	= Total Co	over	Hydrophytic Vegetation Present? Yes 〇	No 🔿	
Remarks:				-		

SOIL

Profile Des	cription: (Describe	to the depth	needed to docu	ment the indicat	or or confirm	the absence of	indicators.)
Depth	Matrix			x Features		2	
(inches)	Color (moist)		Color (moist)	%Туре	e ¹ Loc ²	Texture ³	Remarks
0-2	10 YR 3/1	100				loam	er <u></u>
2-16	7.5 YR 3/3	100				clay loam	
16+							clay with heavy gley and redox
						15	saturated
3e	_					2	
<u>9</u>		· · · · · · · · · · · · · · · · · · ·			17. <u>0</u>		
8							195 - SI
8				-	105	d .	
1				2			
and the state of t	Concentration, D=Dep	an a				C=Root Channel, m. Silty Clay Loan	M=Matrix. n, Silt Loam, Silt, Loamy Sand, Sand.
	Indicators: (Applicab				uni, oluy cou		Problematic Hydric Soils
Histoso	Service Physics Service Service Construction and the service of th		Sandy Rec			2 cm Muc	The second s
Histic E	Epipedon (A2)		Stripped M	2022 Concellan		Red Pare	nt Material (TF2)
25.02 62	listic (A3)		Loamy Mud	cky Mineral (F1) (except MLRA	. 1) 🗍 Other (Ex	plain in Remarks)
	en Sulfide (A4)		Loamy Gle	yed Matrix (F2)			
	ed Below Dark Surfac	e (A11)	Depleted M	1atrix (F3)		3 m diastava of b	hydrophytic vegetation and
	Dark Surface (A12)			k Surface (F6)			blogy must be present,
	Mucky Mineral (S1) Gleyed Matrix (S4)			oark Surface (F7) Pressions (F8)			ed or problematic.
	Cicyca Matrix (04)					Ĩ	
	Layer (if present):						
Type:	1973 • 1005 1083 • 5					Hydric Soil Pr	esent? Yes 🔿 No 🖲
Depth (ii	nches):		<u>1</u> 2			Hyunc Soli Fi	
Remarks:							
HYDROLO	DGY						
Wetland H	drology Indicators:						
Primary Ind	icators (any one indic	ator is sufficie	ent)			Seconda	ry Indicators (2 or more required)
Surface	e Water (A1)		Water-Sta	ined Leaves (B9)) (no MLRA 1,:	2,4 A&B Wate	er Stained Leaves (B9) (MLRA 1,2, 4
High W	ater Table (A2)		Salt Crust	t (B11)		A&B	
X Satura	tion (A3)		Aquatic In	vertebrates (B13)	Drain	nage Patterns (B10)
	Marks (B1)		Hydrogen	Sulfide Odor (C	1)		Season Water Table (C2)
	ent Deposits (B2)			Rhizospheres alo		· ·	ration Visible on Aerial Imagery (C9)
	eposits (B3)			of Reduced Iron	an and a second states and and and a second states and a second states and a second states and a second states		morphic Position (D2)
	fat or Crust (B6)		1000 DV 107	on Reduction in T r Stressed Plants	avana as as prophilis was		low Aquitard (D3)
=	eposits (B6) e Soil Cracks (B6)			plain in Remarks	a dia di		-Neutral Test (D5) ed Ant Mounds (D6) (LRR A)
	tion Visible on Aerial I	magery (B7)			/		t- Heave Hummucks (D7)
	ly Vegetated Concave)				
Eield Obce	ruations:						
Field Obse	valions.	(2442)-12					
	ter Present? Ye		- · ·	252			
Water Table Saturation I			 O Depth (in O Depth (in 	- T 2	Wetla	and Hydrology P	resent? Yes 🔿 No 💿
	apillary fringe)		o () Depth (ir	icnes): 10			
	ecorded Data (stream	gauge, moni	oring 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:Me	esa		Sampling	Date:8/2/12
Applicant/Owner: Bull Creek Ditch a	nd Res.			Sta	ate:CO	Sampling	Point: T2U
Investigator(s): BRS/LHW			Section, Towns	hip, Range: Sec.	20 & 29, T11	IS, R95W	Autor Tra
Landform (hillslope, terrace, etc.): Rese	ervoir shorelin	ie	Local relief (co	ncave, convex, n	one):Concave		Slope (%):1
Subregion (LRR) E - RM Forests & I	Rangeland	Lat: °39	9.072852 N	Long:°1	08.038085 W	7	Datum:NAD 83/ Z12
Soil Map Unit Name: 105 - Boonevill	e, warm_Dou	ghspon compl	ex		NWI classific	ation:N/A	
Are climatic / hydrologic conditions on f	he site typical fo	or this time of ye	ar?Yes 🖲	No 🔿 (lf	no, explain in R	emarks.)	2
Are Vegetation Soil or H	Hydrology	significantly	disturbed?	Are "Normal C	ircumstances" p	oresent? Y	es 🕘 🛛 No 🔿
Are Vegetation Soil or H	Hydrology	naturally pro	oblematic?	(If needed, exp	blain any answe	rs in Rema	ˈks.)
SUMMARY OF FINDINGS - A	ttach site m	ap showing	sampling p	oint locations	s, transects	, importa	nt features, etc.
Hydrophytic Vegetation Present?	Yes 🜘	No 🌀					
Hydric Soil Present?	Yes 🖲	No 🌘	Is the S	ampled Area			
Wetland Hydrology Present?	Yes 🔘	No 💿	within a	Wetland?	Yes ()	No 🤇	
Remarks:							

VEGETATION

÷	Absolute	Dominant	Indicator	Dominance Test worksheet:
Tree Stratum Plot Size	% Cover	_Species?	_Status_	Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)
2.		101		
	-0		0	Total Number of Dominant
3		10	8	_ Species Across All Strata: 4 (B)
4				 Percent of Dominant Species
Sapling/Shrub Stratum Plot Size		= Total Co	over	That Are OBL, FACW, or FAC: 100.0 % (A/B)
1.Salix planifolia	50	Yes	OBL	Prevalence Index worksheet:
2.Salix montivola	20	Yes	OBL	Total % Cover of: Multiply by:
3.				OBL species x 1 =
4.				FACW species x 2 =
5.				FAC species x 3 =
	70	= Total Cov	ver	FACU species x 4 =
Herb Stratum Plot Size				UPL species x 5 =
1.Carex utriculata	40	Yes	OBL	Column Totals: (A) (B)
2. Equisetum arvense	10	Yes	FAC	
3.		n, n		Prevalence Index = B/A =
4.	-0	96.9		Hydrophytic Vegetation Indicators:
5.	C			X Dominance Test is >50%
6.		708		Prevalence Index is ≤3.0 ¹
7				 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
8				 Problematic Hydrophytic Vegetation¹ (Explain)
Woody Vine Stratum Plot Size	50	= Total Co	ver	
1.				¹ Indicators of hydric soil and wetland hydrology must
2.				be present.
% Bare Ground in Herb Stratum%		= Total Co	ver	Hydrophytic Vegetation Present? Yes No ()
Remarks:				

SOIL

(inches)	Matrix Color (moist)	%	Color (moist)	x Features % Type	¹ Loc ²	Texture ³	Remarks
0-12	10 YR 2/1		7.5 YR 4/4	25		clay loam	
12-18	10 YR 2/1	- 10	7.5 YR 4/4	40		clay loam	
Soil Textur Hydric Soil Histoso Histic E Black H Hydrog Deplete Thick D Sandy	Indicators: (Applicab	Sandy Clay, le to all LRF	Loam, Sandy Clay Rs, unless otherwis Sandy Rec Stripped M Loamy Mu Loamy Gle Depleted M Redox Dar Depleted D	y Loam, Sandy Lo e noted.) dox (S5) latrix (S6) cky Mineral (F1) (eyed Matrix (F2)	am, Clay Loar	Indicators for Pr 2 cm Muck (Red Parent 1) Other (Expla ³ Indicators of hyd	Silt Loam, Silt, Loamy Sand, Sand oblematic Hydric Soils ⁴ A10) Material (TF2) in in Remarks) drophytic vegetation and gy must be present,
Restrictive Type: Depth (ir Remarks:	Layer (if present):					Hydric Soil Pres	ent? Yes 🖲 No 🔿
YDROLC	DGY						
	DGY ydrology Indicators:	8					
Netland Hy Primary Indi	ydrology Indicators: icators (any one indic		cient)			<u>Secondary</u>	Indicators (2 or more required)
Wetland Hy Primary Indi Surface High W Saturat Water I Sedime Drift De Algal M Iron De Surface Inundat	ydrology Indicators:	ator is suffi Imagery (B7	Water-Sta Salt Crus Aquatic Ir Hydrogen Oxidized Presence Recent Ir Stunted c Other (Ex	ained Leaves (B9) t (B11) nvertebrates (B13 n Sulfide Odor (C1 Rhizospheres alo of Reduced Iron on Reduction in T or Stressed Plants cplain in Remarks) ng Living Roo (C4) illed Soils (C6 (D1) (LRR A)	2,4 A&B Water : A&B Drainay Dry-Se ts (C3) Satural Geomo Shallow FAC-N Raised	Indicators (2 or more required) Stained Leaves (B9) (MLRA 1,2, 4 ge Patterns (B10) ason Water Table (C2) tion Visible on Aerial Imagery (C9) orphic Position (D2) v Aquitard (D3) eutral Test (D5) Ant Mounds (D6) (LRR A) Heave Hummucks (D7)
Wetland Hy Primary Indi Surface High W Saturat Water I Sedime Drift De Algal M Iron De Surface Inundat Sparse	ydrology Indicators: icators (any one indic e Water (A1) /ater Table (A2) tion (A3) Marks (B1) ent Deposits (B2) eposits (B3) Mat or Crust (B6) eposits (B6) e Soil Cracks (B6) tion Visible on Aerial ely Vegetated Concavo	ator is suffi Imagery (B7	Water-Sta Salt Crus Aquatic Ir Hydrogen Oxidized Presence Recent Ir Stunted c Other (Ex	t (B11) overtebrates (B13 o Sulfide Odor (C1 Rhizospheres alo o of Reduced Iron on Reduction in T or Stressed Plants) ng Living Roo (C4) illed Soils (C6 (D1) (LRR A)	2,4 A&B Water : A&B Drainay Dry-Se ts (C3) Satural Geomo Shallow FAC-N Raised	Stained Leaves (B9) (MLRA 1,2, 4 ge Patterns (B10) ason Water Table (C2) tion Visible on Aerial Imagery (C9) orphic Position (D2) v Aquitard (D3) eutral Test (D5) Ant Mounds (D6) (LRR A)
Wetland Hy Primary Indi Surface High W Saturat Vater N Sedime Drift De Algal M Iron De Surface Inundat Field Obser Surface Wal Nater Table Saturation F (includes ca	ydrology Indicators: icators (any one indic water (A1) /ater Table (A2) tion (A3) Marks (B1) ent Deposits (B2) eposits (B3) Mat or Crust (B6) eposits (B6) e Soil Cracks (B6) tion Visible on Aerial by Vegetated Concave rvations: ter Present? Present? Ye Present? Ye apillary fringe)	Imagery (B7 e Surface (E es) es) ies)	Water-Sta Salt Crus Aquatic Ir Hydrogen Oxidized Presence Recent Im Stunted c Other (Ex 38)	t (B11) hvertebrates (B13 in Sulfide Odor (C1 Rhizospheres alo e of Reduced Iron on Reduction in T or Stressed Plants (plain in Remarks) (nches): (nches): (nches):) ng Living Roo (C4) illed Soils (C6 (D1) (LRR A)) Wetla	2,4 A&B Water 3 A&B Draina Dry-Se ts (C3) Satural Geomo Shallow FAC-N Raised Frost- I	Stained Leaves (B9) (MLRA 1,2, 4 ge Patterns (B10) ason Water Table (C2) tion Visible on Aerial Imagery (C9) orphic Position (D2) v Aquitard (D3) eutral Test (D5) Ant Mounds (D6) (LRR A) Heave Hummucks (D7)
Primary Indi Surface High W Saturat Vater I Sedime Drift De Algal M Iron De Surface Surface Field Obser Surface Wa Water Table Saturation F (includes ca	ydrology Indicators: icators (any one indic water (A1) /ater Table (A2) tion (A3) Marks (B1) ent Deposits (B2) eposits (B3) Mat or Crust (B6) eposits (B6) e Soil Cracks (B6) tion Visible on Aerial ely Vegetated Concave rvations: ter Present? Present? Ye	Imagery (B7 e Surface (E es) es) ies)	Water-Sta Salt Crus Aquatic Ir Hydrogen Oxidized Presence Recent Im Stunted c Other (Ex 38)	t (B11) hvertebrates (B13 in Sulfide Odor (C1 Rhizospheres alo e of Reduced Iron on Reduction in T or Stressed Plants (plain in Remarks) (nches): (nches): (nches):) ng Living Roo (C4) illed Soils (C6 (D1) (LRR A)) Wetla	2,4 A&B Water 3 A&B Draina Dry-Se ts (C3) Satural Geomo Shallow FAC-N Raised Frost- I	Stained Leaves (B9) (MLRA 1,2, 4 ge Patterns (B10) ason Water Table (C2) tion Visible on Aerial Imagery (C9) orphic Position (D2) v Aquitard (D3) eutral Test (D5) Ant Mounds (D6) (LRR A) Heave Hummucks (D7)

Project/Site: Bull Creek Res. No. 4	City/County:Me	sa	Sampling Date: 8/2/12				
Applicant/Owner:Bull Creek Ditch and Res.		State:CO	Sampling Poi	int: T3U			
Investigator(s): BRS/LHW	Section, Townsh	Section, Township, Range: Sec. 20 & 29, T11S, R95W					
Landform (hillslope, terrace, etc.): Reservoir shoreline	Local relief (con	cave, convex, none):Concave	3	Slope (%):1			
Subregion (LRR): E - RM Forests & Rangeland Lat:	°39-07522 N	Long:-108.035791 V	V c	Datum:NAD 83/ Z12			
Soil Map Unit Name: 105 - Booneville, warm_Doughspon cor	nplex	NWI classif	ication:N/A				
Are climatic / hydrologic conditions on the site typical for this time of	ofyear? Yes 🛈	No 🔿 (If no, explain in	Remarks.)				
Are Vegetation Soil or Hydrology significa	ntly disturbed?	Are "Normal Circumstances"	present? Yes	• No ()			
Are Vegetation Soil or Hydrology naturally	/ problematic?	(If needed, explain any answ	ers in Remarks	.)			
SUMMARY OF SINDINGS Attach site man should	na complina na	int locations, transact	important	footures etc			

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				
Wetland Hydrology Present?	Yes 🔘	No 🜘	within a Wetland?	Yes ()	No 🖲	
Remarks:							

	Absolute		t Indicator	Dominance Test worksheet	:	
Tree Stratum Plot Size	% Cover	Species	<u>? Status</u>	Number of Dominant Species	6	
1.				That Are OBL, FACW, or FAC	C: 1	(A)
2.						
3.		e()	-0	 Total Number of Dominant Species Across All Strata: 	1	(B)
	8		8		1	(0)
4	-			Percent of Dominant Species		
Sapling/Shrub Stratum Plot Size	. <u>. 19 - 19</u>	= Total Co	over	That Are OBL, FACW, or FAC	C: 100.0%	(A/B)
				Prevalence Index workshee		
1			8			
2		10		Total % Cover of:	Multiply by:	
3.			20 °	OBL species	x 1 =	
4.				FACW species	x 2 =	
5.				FAC species	x 3 =	
		= Total Co	ver	FACU species	x 4 =	
Herb Stratum Plot Size				UPL species	x 5 =	
1.Carex Utriculata	60	Yes	OBL	Column Totals:	(A)	(B)
2.Eleocharis palustris	15		OBL			65 55
3.				Prevalence Index = B/A	<i>۹</i> =	
4.			-0	Hydrophytic Vegetation Ind	licators:	
5.		29 M		Dominance Test is >50%	ó	
6.		5.8	-0	Prevalence Index is ≤3.0	1	
7.			-0	Morphological Adaptation		
8.		***	-0	data in Remarks or or		
	75	T-1-1-0	8	Problematic Hydrophytic	Vegetation ¹ (Expla	ain)
Woody Vine Stratum Plot Size		= Total Co	over			
1				¹ Indicators of hydric soil and	wetland hydrolog	y must
2.				be present.		04
		= Total Co		Hydrophytic		
	0 -00-0-0	- Total CC		Vegetation		
% Bare Ground in Herb Stratum 20 %				Present? Yes 🖲	No 🔿	
Remarks:						

Profile Des	cription: (Describe	to the dept	n needed to docu	ment the i	ndicator	or confirm	n the absence of	indicators.)
Depth	Matrix			x Features				
(inches)	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture ³	Remarks
0-14	10 YR 3/1				30		loam	19 <u>12</u>
14-18	10 YR 3/4	98				· · · · · · · · · · · · · · · · · · ·	Sandy clay loam	small redox nodules
*					;			10 8 1
<u>8</u>							1 7.	
	Concentration, D=Dep es: Clay, Silty Clay,	a la de la companya d					 C=Root Channel, m, Silty Clay Loan	M=Matrix. n, Silt Loam, Silt, Loamy Sand, Sand.
Hydric Soil	Indicators: (Applicat	ble to all LRR	s, unless otherwise	e noted.)			Indicators for	Problematic Hydric Soils:
Histosc	l (A1)		Sandy Rec	lox (S5)			2 cm Muc	k (A10)
12112204204204204	pipedon (A2)		Stripped M	atrix (S6)			Red Pare	nt Material (TF2)
54.65 85	listic (A3) en Sulfide (A4)		Loamy Mu			ept MLRA	(1) Other (Ex	plain in Remarks)
	ed Below Dark Surfa	ce (A11)	Loamy Gle	5 m 0 m 0 m 0 m 0 m 0 m 0 m 0 m 0 m 0 m	(F2)			
	ark Surface (A12)		Depleted M Redox Dar				³ Indicators of h	hydrophytic vegetation and
	Mucky Mineral (S1)						wetland hydro	plogy must be present,
	Gleyed Matrix (S4)		Redox Dep		Contraction of		unless distrub	ed or problematic.
Restrictive	Layer (if present):							
Type:	121 (22) 1) 21							
Depth (ir							Hydric Soil Pr	esent? Yes 🔿 No 🖲
Remarks:								
Itemarks.								
HYDROLO								
2	drology Indicators		(Casaada	- Indicators (2 or many required)
	icators (any one indic	cator is sumic						ry Indicators (2 or more required)
	e Water (A1) ′ater Table (A2)		Salt Crust	ined Leave	es (B9) (no	MLRA 1,	2,4 A&B VVate A&B	er Stained Leaves (B9) (MLRA 1,2, 4
	ion (A3)			vertebrate	s (B13)			nage Patterns (B10)
	Marks (B1)		and a second second	Sulfide Or				Season Water Table (C2)
	ent Deposits (B2)		<u> </u>	Rhizosphe		Living Roo		ration Visible on Aerial Imagery (C9)
Drift De	eposits (B3)		Presence	of Reduce	d Iron (C4)	Geor	morphic Position (D2)
Algal N	lat or Crust (B6)		Recent Iro	on Reducti	on in Tilleo	d Soils (Ce	5) 🗌 Shal	low Aquitard (D3)
Iron De	eposits (B6)		Stunted o	r Stressed	Plants (D	1) (LRR A) 🗌 FAC	-Neutral Test (D5)
	e Soil Cracks (B6)			plain in Re	marks)			ed Ant Mounds (D6) (LRR A)
	tion Visible on Aerial						Fros	t- Heave Hummucks (D7)
Sparse	ly Vegetated Concav	/e Surface (B	8)					
Field Obser	rvations:							
Surface Wa	ter Present? Y	′es 🔿	No 🔿 Depth (ir	nches):				
Water Table			No 🚫 Depth (in	19458		Wetl	and Hydrology P	resent? Yes 🔿 No 🔎
Saturation F		′es ()	No 🔿 Depth (ir	nches):				
	ipillary fringe) ecorded Data (strean	n daude, mor	itoring well, aerial	photos, pr	evious ins	pections)	if available:	

Remarks: Hydrology dependent on reservoir filling

Project/Site: Bull Creek Res. No. 4 City/County:Mesa						Sampling Date: 8/2/12		
Applicant/Owner: Bull Creek Ditch an	d Res.			S	State:CO	Samplir	ng Point:T	 F
Investigator(s): BRS/LHW			Section, Town	ship, Range: Se	c. 20 & 29, T	11S, R95	W	
Landform (hillslope, terrace, etc.): Rese	rvoir shorelin	e	Local relief (co	ve	e Slope (%):1			
Subregion (LRR): E - RM Forests & F	angeland	Lat: °39	0.0 73 494 N	Long:	-108.038057	W	Datum	n:NAD 83/Z12
Soil Map Unit Name: 105 - Booneville	, warm_Doug	ghspon compl	ex		NWI classi	ification:N/	A	
	ne site typical fo ydrology ydrology	r this time of ye significantly naturally pro	disturbed?	Are "Normal	lf no, explain in Circumstances xplain any ansv	" present?	Yes 🖲	No 🔿
SUMMARY OF FINDINGS - A1		<u></u>	sampling p	oint location	ns, transect	ts, impol	rtant fea	tures, etc.
Hydrophytic Vegetation Present? Hydric Soil Present?	Yes le Yes le	No 🦳 No 🦳	1 - 41 - 6					
Wetland Hydrology Present?	Yes (No C		ampled Area Wetland?	Yes (No	0	
Remarks:								

Tree Stratum Plot Size	Absolute	Dominant Species?	Indicator	Dominance Test worksheet:		
	-76 COVEL	_opecies :	Status	Number of Dominant Species That Are OBL, FACW, or FAC:	3	(A)
2.			÷		5	
3.		o		- Total Number of Dominant	2	
3.	8		3	Species Across All Strata:	3	(B)
4	-			Percent of Dominant Species		
Sapling/Shrub Stratum Plot Size	3 	= Total Co	over	That Are OBL, FACW, or FAC:	100.0%	(A/B)
1.Salix monticola	50	Yes	OBL	Prevalence Index worksheet:		
2.Salix planifolia	30	Yes	OBL	Total % Cover of:	Multiply by:	
3.				OBL species	x 1 =	
4.	-0	Q		FACW species	x 2 =	
5.				FAC species	x 3 =	
	80	= Total Co	/er	FACU species	x 4 =	
Herb Stratum Plot Size				UPL species	x 5 =	
1.Carex utriculata	50	Yes	OBL	Column Totals:	(A)	(B)
2.Carex microptera	15	105 	FACU	~	1 15	27 B
³ .Pedicularis groenlandica	15		OBL	Prevalence Index = B/A	1	
4. Equisetum arvense	15		FACW	Hydrophytic Vegetation Indic	ators:	
5.				X Dominance Test is >50%		
6.				Prevalence Index is ≤3.0 ¹		
7.				Morphological Adaptations		
8.				- Problematic Hydrophytic V		10 - CO
Woody Vine Stratum Plot Size	95	= Total Co	ver		egetation (Expla	
				¹ Indicators of hydric soil and v	vetland hydrology	/ must
2.			2	be present.		
		= Total Co	ver	Hydrophytic Vegetation		
				Present? Yes 🖲	No 🔿	
Remarks:						

Depth	cription: (Descril Matrix		miccut		k Feature				indicators.)	
(inches)	Color (moist)	%	Color	(moist)	%	Type ¹	Loc ²	Texture ³	Rema	arks
0-24	10 YR 2/1	100						peat		
									-/	
ý.						3		Q	192	
.						0		1 5	- Alt	
-					· · · <u> </u>	9		-	-0	
<u>.</u>						9 <u></u>			-33	
9		100 000				2		<i></i>		
		2010 200			8. S			Ċ.	105	
¹ Type: C=0	Concentration, D=D	enletion RM=	Reduce	d Matrix		n: PI =Pore	Lining R	C=Root Channel,	M=Matrix	
		가 성지 않는 아내는 지방 가지 않는 것을 다 가지?					a completion consideration		n, Silt Loam, Silt, Loa	my Sand, Sand.
Hydric Soil	Indicators: (Applic	able to all LRF	ls, unles	s otherwise	noted.)			Indicators for	Problematic Hydric So	pils:
X Histoso	al (A1)			Sandy Red	ox (S5)			2 cm Muc	k (A10)	
Histic E	Epipedon (A2)			Stripped Ma				Red Pare	nt Material (TF2)	
59.63 63	listic (A3)			Loamy Muc	ky Minera	al (F1) (exc	ept MLRA	A 1) 🗍 Other (Ex	plain in Remarks)	
Hydrog	ien Sulfide (A4)			Loamy Gley	ed Matrix	(F2)				
	ed Below Dark Sur	face (A11)		Depleted M	atrix (F3)			3.		1070427 1
	Dark Surface (A12)			Redox Dark					nydrophytic vegetation plogy must be present	
_	Mucky Mineral (S1			Depleted D		10220422022020			ed or problematic.	,
Sandy	Gleyed Matrix (S4)			Redox Dep	ressions	(F8)			74	
Restrictive	Layer (if present)	:								
Туре:	9984 Cax 40 5									
Depth (ir	nches):							Hydric Soil Pr	esent? Yes 🖲	No 🔿
Remarks:										
rtomanto.										
YDROLO	OGY									
	drology Indicato		: 1 3					0		
	icators (any one in	dicator is suffic		atomo at marine or				10 A	ry Indicators (2 or mo	
	e Water (A1)			Water-Stai		res (B9) (n	o MLRA 1		er Stained Leaves (B9) (MLRA 1,2, 4
	ater Table (A2)			Salt Crust		1955 - P.275		A&B		
UNIVERSITY OF A	tion (A3)			Aquatic In		ar 1950 your (in)			nage Patterns (B10)	200
2 10	Marks (B1)			Hydrogen		020 50			Season Water Table (10 E
	ent Deposits (B2)			Oxidized I				=	ration Visible on Aeria	
	eposits (B3)			Presence		2 2601 26216429		NO2	morphic Position (D2)	
100	Mat or Crust (B6)					ion in Tille	101 102 102/102/10 102/		low Aquitard (D3)	
	eposits (B6)			Stunted or Other (Exp		12	I) (LKK A		-Neutral Test (D5) ed Ant Mounds (D6) (
	e Soil Cracks (B6) tion Visible on Aeri	ol Imagon (Pi				entaiks			t- Heave Hummucks (eoderte el dont else 🥳
	ly Vegetated Conc		and a second						t- neave nummucks (U7)
	ity vegetated conc		50)				1			
Field Obse	rvations:						15			
Surface Wa	ter Present?	Yes	No 🜘	Depth (in	ches):					
Water Table		Yes O	No 🖲		1950		Wot	land Hydrology P	rocont? Voc	
Saturation F	Present?	Yes 🔿	No 🔘		C2124		vvel		resent?Yes (•)	No 🔿
	apillary fringe)	(140 ⁴ -		~ ~	2240					
Describe Re	ecorded Data (strea	am gauge, mo	nitoring	well, aerial	photos, p	revious ins	pections),	if available:		
Remarks: S	urface water wit	hin 1 meter o	of the si	te						

Project/Site: Bull Creek Res. No. 4	City/County:	City/County:Mesa			Sampling Date:7/30/09		
Applicant/Owner:Bull Creek Ditch and Res.			State:CO	Sampling I	Point: T1	U	
Investigator(s):Fuchs/Renner	Section, Town	Section, Township, Range: Sec. 20 & 29, T11S, R95W					
Landform (hillslope, terrace, etc.): Reservoir shoreline	Local relief (c	oncave, conve	x, none):Concave		Slope	(%):1	
Subregion (LRR): E - RM Forests & Rangeland Lat:°3	9.072042n	Lon	g:°108.035563w		Datum:	NAD 83/Z12	
Soil Map Unit Name: 105-Booneville, warm-Doughspon compl	lex		NWI classific	ation:N/A			
Are climatic / hydrologic conditions on the site typical for this time of	year?Yes 🔿	No	(If no, explain in R	(emarks.)			
Are Vegetation Soil or Hydrology 🗙 significan	tly disturbed?	Are "Norm	al Circumstances"	present? Y	es 🖲	No 🔿	
Are Vegetation Soil or Hydrology naturally	problematic?	(If needed	, explain any answe	ers in Remar	ks.)		
SUMMARY OF FINDINGS - Attach site map showin	ng sampling p	point locati	ons, transects	, importa	nt featu	ures, etc.	

Hydrophytic Vegetation Present? Hydric Soil Present?	Yes 🌘 Yes 🌘	No 🌘 No 💽	Is the Sampled Area			
Wetland Hydrology Present?	Yes 🔘	No 🜘	within a Wetland?	Yes 🔿	No 🖲	
Remarks:Water levels of the reser	voir have been	n dropped for r	naintenance on the dam.			

	Absolute	Domina	nt Indicator	Dominance Test worksheet:	1	63
Tree Stratum (Plot size:)	% Cover	Species	<u>s? Status</u>	Number of Dominant Species		
1.				That Are OBL, FACW, or FAC	2	(A)
2.				Total Number of Dominant		
3.				Species Across All Strata:	2.	(B)
4.	0		24		in the	x - 2
·	-	= Total C		Percent of Dominant Species	100.0	
Sapling/Shrub Stratum (Plot size:)			Jover	That Are OBL, FACW, or FAC	2: 100.0%	(A/B)
1.				Prevalence Index worksheet	t:	
2.	8		3	Total % Cover of:	Multiply by:	_
3.				OBL species	x 1 =	
4.				FACW species	x 2 =	
5.		2012 		FAC species	x 3 =	
		= Total C	over	FACU species	x 4 =	
Herb Stratum (Plot size:)				UPL species	x 5 =	
1.Carex utriculata	7 0	Yes	OBL	Column Totals:	(A)	(B)
² .Deschampsia cespitosa	20	Yes	FACW			65 85
3.			,	Prevalence Index = B/A	- 11 - 11 - 11 - 11 - 11 - 11 - 11 - 1	
4.				Hydrophytic Vegetation Indi	icators:	
5.				Dominance Test is >50%		
6.			-	Prevalence Index is ≤3.0 ¹		
7.	<u> </u>			Morphological Adaptation data in Remarks or on	s ¹ (Provide suppor	rting
8.						15
	90	= Total C	Cover	Problematic Hydrophytic	vegetation (Expla	in)
Woody Vine Stratum (Plot size:)				1		
1		595		¹ Indicators of hydric soil and be present.	wetland hydrology	/ must
2						
		= Total C	over	Hydrophytic		
% Bare Ground in Herb Stratum%				Vegetation Present? Yes •	No 🔿	
Remarks:						

Depth (inches)	<u>Matrix</u> Color (moist)	%	Color (mois	Redox Fea	tures % Type ¹	Loc ²	Texture ³	Remarks
(inches) 6	10 YR 3/2	<u></u> 90		<u>1) 3</u>	M Type	LOC	Clay loam	Remarks
10.0	$-\frac{10 \text{ I K } 3/2}{10 \text{ Y R } 3/2}$							<u>.</u>
12		90					Clay loam	2
18	$-\frac{10 \text{ YR } 3/2}{10 \text{ YR } 5/4}$	80					Clay loam	
24	10 YR 5/4	90						
Soil Textu		Sandy Clay	, Loam, Sandy	Clay Loam	n, Sandy Loam			, Silt Loam, Silt, Loamy Sand, Sand
Histos Histic Black Hydrog Deplet Thick I Sandy	Indicators: (Applicab ol (A1) Epipedon (A2) Histic (A3) gen Sulfide (A4) ted Below Dark Surfac Dark Surface (A12) Mucky Mineral (S1) Gleyed Matrix (S4)		Sandy Stripp Loamy Loamy Deple Redox Deple	/ Redox (S ed Matrix (/ Mucky Mi / Gleyed M ted Matrix (< Dark Surf	5) S6) neral (F1) (exi latrix (F2) (F3) ace (F6) urface (F7)	cept MLR/	2 cm Muck Red Parent Other (Expl ³ Indicators of hy wetland hydrology	roblematic Hydric Soils: (A10) Material (TF2) ain in Remarks) /drophytic vegetation and ogy must be present, id or problematic.
Туре:	a Layer (if present):			_1			Hydric Soil Pres	sent? Yes 🔿 No 🖲
YDROL	OGY							
Vetland H	ydrology Indicators:							
Surfac High V Satura Water Sedim Drift D Algal N Iron D Surfac Inunda	dicators (any one indic e Water (A1) Vater Table (A2) tion (A3) Marks (B1) ent Deposits (B2) eposits (B3) Mat or Crust (B6) eposits (B6) es Soil Cracks (B6) ation Visible on Aerial I ely Vegetated Concave	magery (B	Wate Wate Salt Aqua Hydr Oxid Pres Rece Stun Othe	Crust (B11) ogen Sulfic ized Rhizos ence of Re ent Iron Rec ted or Stree	eaves (B9) (n) orates (B13) de Odor (C1) spheres along duced Iron (C duction in Tille ssed Plants (E n Remarks)	Living Ro I) d Soils (C	,2,4 A&B Water A&B Draina Dry-Si ots (C3) Satura Geom 6) Shallo A) FAC-N Raise	 <u>Indicators (2 or more required)</u> Stained Leaves (B9) (MLRA 1,2, 4 age Patterns (B10) eason Water Table (C2) ation Visible on Aerial Imagery (C9) orphic Position (D2) w Aquitard (D3) Neutral Test (D5) d Ant Mounds (D6) (LRR A) Heave Hummucks (D7)
Vater Tabl Saturation	ater Present? Ye e Present? Ye		No 💽 Dep	oth (inches) oth (inches) oth (inches)	:	Wet	land Hydrology Pre	esent? Yes 🔿 No 🖲
	ecorded Data (stream	gauge, mo	nitoring well, a	erial photo	s, previous ins	pections),	if available:	
≀emarks: I	High-water shorelin	e of reserv	oir. Reserve	oir dry dur	ring 2009.			

City/County:M	lesa	Sampling	Sampling Date:7/31/09			
	State:CO	Sampling	Point:T2U			
Section, Town	Section, Township, Range: Sec. 20 & 29, T11S, R95W					
Local relief (c	Local relief (concave, convex, none):Concave Slo					
at:°39.072852n	Long:°108.03803	85n	Datum:NAD 83/Z12			
mplex	NWI cl	assification:N/A				
e of year?Yes 🔿	No 🔿 (If no, explai	n in Remarks.)				
icantly disturbed?	Are "Normal Circumstan	ces" present?	Yes 💿 No 🔿			
ally problematic?	(If needed, explain any a	answers in Rema	arks.)			
wing sampling p	point locations, trans	ects, import	ant features, etc.			
1						
Is the \$	Sampled Area					
e		O No (•			
	Section, Town Local relief (c it:°39.072852n mplex e of year? Yes () cantly disturbed? ally problematic? wing sampling p Is the s within	Section, Township, Range: Sec. 20 & 29 Local relief (concave, convex, none): Con it:°39.072852n Long:°108.0380 mplex NWI cl e of year? Yes No (If no, explai cantly disturbed? Are "Normal Circumstan ally problematic? (If needed, explain any a wing sampling point locations, trans-	State: CO Sampling Section, Township, Range: Sec. 20 & 29, T11S, R95W Local relief (concave, convex, none): Concave tt: 39.072852n Long: °108.038085n mplex NWI classification: N/A e of year? Yes No Are "Normal Circumstances" present? ally problematic? (If needed, explain any answers in Remarks.) wing sampling point locations, transects, importances Is the Sampled Area within a Wetland? Yes			

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

	Absolute		ant Indicator	Dominance Test worksheet:		
Tree Stratum (Plot size:)	% Cover	Specie	s? Status	Number of Dominant Species		
1				That Are OBL, FACW, or FAC	: 3	(A)
2.				 Total Number of Dominant 		
3.		-9.2		Species Across All Strata:	3	(B)
4.	8	2162		The second second second is a second se		10.000
		= Total	Cover	 Percent of Dominant Species That Are OBL, FACW, or FAC 	: 100.0%	(A/B)
Sapling/Shrub Stratum (Plot size:)					100.0%	(-7,12)
1.				Prevalence Index worksheet		
2.	8	200		Total % Cover of:	Multiply by:	
3.				OBL species	x 1 =	
4.	0			FACW species	x 2 =	
5.				FAC species	x 3 =	
		= Total C	Cover	FACU species	x 4 =	
Herb Stratum (Plot size:)				UPL species	x 5 =	
1.Carex utriculata	60	Yes	OBL	Column Totals:	(A)	(B)
2. Deschampsia cespitosa	15	Yes	FACW		a a	2 N
3. Eleocharis palustris	15	Yes	OBL	Prevalence Index = B/A	=	
4. Epilobium saximontanum	5		UPL	Hydrophytic Vegetation India	cators:	
5.	°			X Dominance Test is >50%		
6.				Prevalence Index is ≤3.0 ¹		
7.				Morphological Adaptations		
8.			0	data in Remarks or on		ан 1971 - Эл
	95	= Total (Cover	Problematic Hydrophytic \	/egetation (Expla	ain)
Woody Vine Stratum (Plot size:)						
1		59 S		Indicators of hydric soil and y be present.	wetland hydrolog	y must
2		2				
	0 -00-0-0-0	= Total C	Cover	Hydrophytic		
% Bare Ground in Herb Stratum %				Vegetation Present? Yes •	No 🔿	
Remarks:						
Nomuna.						

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (in aboa)	Matrix	0/		C Features		12	Texture ³ Remarks	
(inches)	Color (moist) 10 YR 2/1		Color (moist) 7.5 YR 4/4	20	Type ¹	Loc ²		
6	-	60		30			Clay loam	
12	10 YR 3/2	50	7.5 YR 4/4	40			Clay loam	
18	<u>10 YR 4/4</u>		7.5 YR 4/4	40			Clay loam	
24	10 YR 4/4	90	0	<u> </u>			Clay	
<u>18</u>			29 <u></u>					
**								
		s 	101					
15								
A CANADA MARK	Concentration, D=Depleters: Clay Silty Clay S	A NEW CONSTRUCTION OF THE OWNER O					RC=Root Channel, M=Matrix. am, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand	
	Indicators: (Applicable	1.0			nay Loann,	0149 200	Indicators for Problematic Hydric Soils	
Histoso	no one many experience of the second state of the second second		Sandy Red				2 cm Muck (A10)	
	Epipedon (A2)		Stripped Ma	atrix (S6)			Red Parent Material (TF2)	
29.03	Histic (A3)		Loamy Muc	5 	2	ept MLRA	A 1) 🗌 Other (Explain in Remarks)	
	jen Sulfide (A4) ad Balass Dark Confron	(644)	Loamy Gley		(F2)			
	ed Below Dark Surface Dark Surface (A12)	e (ATT)	X Depleted M				³ Indicators of hydrophytic vegetation and	
	Mucky Mineral (S1)		Redox Dark	A MANAGANA CONDUCTION OF A MANAGAN	and the second sec		wetland hydrology must be present,	
	Gleyed Matrix (S4)		Redox Dep		Charles and an		unless distrubed or problematic.	
Bastriatius	l aver (if precept):		76	100				
Type:	Layer (if present):							
Depth (ii	nches):						Hydric Soil Present? Yes 💿 No 🔿	
Remarks:	·							
Remarks.								
HYDROLO	OGY							
	ydrology Indicators:							
	licators (any one indica	tor is su	ficient)				Secondary Indicators (2 or more required)	
	e Water (A1)		Water-Stai	nedlesv	as (B9) (no			
	/ater Table (A2)		Salt Crust		63 (D3) (NO		A&B	
	tion (A3)		Aquatic In	10	s (B13)		Drainage Patterns (B10)	
Water	Marks (B1)		Hydrogen	Sulfide O	dor (C1)		Dry-Season Water Table (C2)	
Sedime	ent Deposits (B2)		Oxidized F	Rhizosphe	res along L	iving Ro	oots (C3) 🗌 Saturation Visible on Aerial Imagery (C9)	
Drift De	eposits (B3)		Presence	of Reduce	ed Iron (C4)	Geomorphic Position (D2)	
	Nat or Crust (B6)		1000 10 17		on in Tilled	a a manual sa		
	eposits (B6)				Plants (D1) (LRR A		
	e Soil Cracks (B6)		Other (Exp	plain in Re	marks)		Raised Ant Mounds (D6) (LRR A)	
	tion Visible on Aerial Ir Iy Vegetated Concave		and a second second				Frost- Heave Hummucks (D7)	
	10-	Ganado	(80)					
Field Obse	i valions.	1000 ⁻⁰⁰⁰	17-1010 -					
	ter Present? Ye		No 💿 Depth (in	2304 <u></u>				
Water Table Saturation I		-	No 💿 Depth (in			Wetl	land Hydrology Present? Yes 🔿 No 💿	
	apillary fringe)		No 💽 Depth (in	cnes):		-		
	ecorded Data (stream)	gauge, m	nonitoring well, aerial	ohotos, pr	evious insp	ections),	, if available:	
Remarks: I	ligh-water shoreline	of rese	rvoir. Reservoir dr	y during	2009 surv	/ey.		

Project/Site: Bull Creek Res. No. 4	City/County:M	lesa	Sampling Date:8/01/09
Applicant/Owner:Bull Creek Ditch and Res.		State:CO	Sampling Point:T3U
Investigator(s):Fuchs/Renner	Section, Town	ship, Range: Sec. 20 & 29,	T11S, R95W
Landform (hillslope, terrace, etc.): Reservoir shoreline	Local relief (co	oncave, convex, none):Conc	save Slope (%):1
Subregion (LRR) E - RM Forests & Rangeland	Lat:°39.07522n	Long:°108.03579	1w Datum:NAD 83/Z12
Soil Map Unit Name: 105-Booneville, warm-Doughspon c	complex	NWI cla	ssification:N/A
Are climatic / hydrologic conditions on the site typical for this til	me of year? Yes 🖲	No 🔿 (If no, explain	in Remarks.)
Are Vegetation Soil or Hydrology 🗙 sign	ificantly disturbed?	Are "Normal Circumstand	es" present? Yes 💿 🛛 No 🔿
Are Vegetation Soil or Hydrology natu	rally problematic?	(If needed, explain any ar	swers in Remarks.)
SUMMARY OF FINDINGS - Attach site map sh	owing sampling p	ooint locations, transe	cts, important features, etc.
Hydrophytic Vegetation Present? Yes 💿 No	0		
Hydric Soil Present? Yes 🕥 No	Is the S	Sampled Area	
Wetland Hydrology Present? Yes No	within :	a Wetland? Yes	C No 🖲

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

	Absolute		nt Indicator	Dominance Test worksheet:		
Tree Stratum (Plot size:)	% Cover	Species	<u>Status</u>	Number of Dominant Species		
1				That Are OBL, FACW, or FAC:	: 2	(A)
2.				Tatal Number of Deminent		
3.	0			 Total Number of Dominant Species Across All Strata: 	2	(B)
4.	N.	10	8		4	
ч	-			Percent of Dominant Species		
Sapling/Shrub Stratum (Plot size:)		_ = Total C	Cover	That Are OBL, FACW, or FAC:	: 100.0%	(A/B)
1.				Prevalence Index worksheet		
	8	1995		Total % Cover of:	Multiply by:	
2				-	10 10 10 10	
3				_	x 1 =	
4				_	x 2 =	
5				FAC species	x 3 =	
		= Total C	over	FACU species	x 4 =	
Herb Stratum (Plot size:)				UPL species	x 5 =	
1.Carex utriculata	60	Yes	OBL	Column Totals:	(A)	(B)
² .Deschampsia cespitosa	20	Yes	FACW			
3.				Prevalence Index = B/A	=	
4.				Hydrophytic Vegetation India	cators:	
5.		5975		Dominance Test is >50%		
6.			2	Prevalence Index is ≤3.0 ¹		
7.				Morphological Adaptations	s ¹ (Provide suppo	orting
8.				data in Remarks or on	0*0 *0 MB (20+0*50) 17	
-	80	= Total C	`over	Problematic Hydrophytic V	/egetation ' (Expla	ain)
Woody Vine Stratum (Plot size:)	0	rotar c				
1				¹ Indicators of hydric soil and v	wetland hydrolog	y must
2.				be present.		
		= Total C	over	Hydrophytic		
0/ Dave Oracia dia Usah Stratura	a a cara a c			Vegetation		
% Bare Ground in Herb Stratum%				Present? Yes 🖲	No ()	
Remarks:						

Profile Des	scription: (Describe t	o the depth i	needed to docun	nent the indi	icator or	confirm	n the absence of indicators.)
Depth	Matrix	<u>%</u>		Features	r	1 = = 2	Texture ³ Remarks
<u>(inches)</u> 6	Color (moist) 10 YR 3/3	<u> </u>	Color (moist)	<u> % 1</u>	Гуре ¹	Loc ²	<u>Texture</u> ³ Remarks Clay loam
12	$-\frac{10 \text{ I K } 3/3}{10 \text{ YR } 3/3}$	90					Clay loam
12	tor the state of the state of the state of the state	80			100		202
	$-\frac{10 \text{ YR } 3/3}{10 \text{ YR } 2/2}$			10			Clay loam
24	10 YR 3/3	80					Clay loam
³ Soil Textur Hydric Soil Histosu Histic I Black I Hydrog Deplet Thick I Sandy Sandy	Indicators: (Applicabl ol (A1) Epipedon (A2) Histic (A3) gen Sulfide (A4) red Below Dark Surface Dark Surface (A12) Mucky Mineral (S1) Gleyed Matrix (S4) E Layer (if present):	andy Clay, Lo	Dam, Sandy Clay unless otherwise Sandy Rede Stripped Ma Loamy Muc Loamy Gley Depleted Ma Redox Dark Depleted Da	Loam, Sandy noted.) x (S5) trix (S6) (y Mineral (F ed Matrix (F2	y Loam, (-1) (excep 2)) F7)	Clay Loa	C=Root Channel, M=Matrix. m, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand. Indicators for Problematic Hydric Soils ⁴ : 2 cm Muck (A10) Red Parent Material (TF2) 1) Other (Explain in Remarks) ³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless distrubed or problematic. Hydric Soil Present? Yes No •
HYDROL	DGY						
Wetland H	ydrology Indicators:						
Surfac High V Satura Vater Sedim Drift D Algal N Iron D Surfac Inunda Sparse	licators (any one indica e Water (A1) Vater Table (A2) tion (A3) Marks (B1) ent Deposits (B2) eposits (B3) Mat or Crust (B6) eposits (B6) e Soil Cracks (B6) tion Visible on Aerial In ely Vegetated Concave	magery (B7)	Water-Stai	ned Leaves ((B11) vertebrates (I Sulfide Odor thizospheres of Reduced Ir n Reduction i Stressed Pla vlain in Rema	B13) (C1) along Li ron (C4) in Tilled S ants (D1)	ving Roc Soils (C6	A&B Drainage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (C9) Geomorphic Position (D2) Shallow Aquitard (D3)
Field Obse	rvations:					15	
Water Table Saturation		s Ö N	Depth (ind Depth (ind Depth (ind Depth (ind	ches):		Wetl	and Hydrology Present? Yes 🔿 No 💿
Describe R	ecorded Data (stream	gauge, monit	oring well, aerial p	hotos, previo	ous inspe	ections),	if available:
Remarks: I	ligh-water shoreline	e of reservoi	r. Reservoir dr	y during 20	09 surve	ey.	

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, T1	1S, R95W	
Landform (hillslope, terrace, etc.): Hillslope	Local relief (concav	ve, convex, none):Convex	Slope (%):1	
Subregion (LRR): E - RM Forests & Rangeland Lat:	239.073494n	Long:°108.038057w	Datum:NAD 83/Z12	
Soil Map Unit Name: 105-Booneville, warm-Doughspon comp	plex	NWI classifi	ication:N/A	
	ntly disturbed? A / problematic? (I	o (If no, explain in I vre "Normal Circumstances" f needed, explain any answ t locations, transects	present? Yes No No	
Hydrophytic Vegetation Present? Yes No Hydric Soil Present? Yes No Wetland Hydrology Present? Yes No Remarks:Fen based upon at least 16 inches of peat in upper	Is the Samp within a We r 30 inches.	-	No Ó	

	Absolute		t Indicator	Dominance Test worksheet:		
Tree Stratum (Plot size:)	<u>% Cover</u>	Species?	Status	Number of Dominant Species		
1			_ <u>~</u>	That Are OBL, FACW, or FAC:	6	(A)
2				 Total Number of Dominant 		
3.	·••	94 JO		Species Across All Strata:	6 ((B)
4.				 Percent of Dominant Species 		
		= Total Co	over	That Are OBL, FACW, or FAC:	100.0%	(A/B)
Sapling/Shrub Stratum (Plot size:)						,· · - /
1.Salix monticola	50	Yes	OBL	Prevalence Index worksheet:		
2.Salix planifolia	30	Yes	FACW	Total % Cover of:	Multiply by:	
3				OBL species >	x 1 =	
4.		10. p		FACW species	x 2 =	
5.				FAC species	x 3 =	
		= Total Co	ver	FACU species	x 4 =	
Herb Stratum (Plot size:)				UPL species	x 5 =	
1.Carex utriculata	50	Yes	OBL	Column Totals: (A)	(B)
2.Carex microptera	15	Yes	FAC		**	
³ .Pedicularis groenlandica	15	Yes	OBL	Prevalence Index = B/A =		
4. Equisetum arvense	15	Yes	FACW	Hydrophytic Vegetation Indic	ators:	
5.		2		X Dominance Test is >50%		
6.	-0		2	Prevalence Index is ≤3.0 ¹		
7.		kon.	-0	Morphological Adaptations		ng
8.	0					
	95	= Total Co	ver	Problematic Hydrophytic V	egetation (Explain))
Woody Vine Stratum (Plot size:)				1		
1			-	¹ Indicators of hydric soil and w be present.	etland hydrology n	nust
2						
	. <u> </u>	= Total Co	ver	Hydrophytic		
% Bare Ground in Herb Stratum%				Vegetation Present? Yes 🖲	No 🔿	
Remarks:						

Profile Des	scription: (Describe	to the dept	h needed to docur	nent the i	ndicator	or confirm	n the absence of indica	tors.)
Depth	Matrix			Features		<u> </u>	3	-
(inches)	Color (moist)		Color (moist)		Type ¹	Loc ²	Texture ³	Remarks
6	10 YR 2/2	95					Peat	
12	10 YR 2/2	95		a <u> </u>		2	Peat	s
18	10 YR 2/2	95					Peat	
							() <u> </u>	
5.		- 2620				8 13		3
15		- 100				8 C	1 (f 10)	
¹ Type: C=(_ Concentration, D=Dep	pletion RM=	Reduced Matrix	² Location	· PI =Pore	Lining F	RC=Root Channel, M=Mat	rix
								.oam, Silt, Loamy Sand, Sand.
Hydric Soil	Indicators: (Applicat	ole to all LRF	Rs, unless otherwise	noted.)			Indicators for Problem	matic Hydric Soilsً:
X Histoso	and the second second		Sandy Red	ox (S5)			2 cm Muck (A10)
101566555.872(0.572(0.5	Epipedon (A2)		Stripped Ma				Red Parent Mate	
100 00 100 00	Histic (A3) gen Sulfide (A4)		Loamy Muc	1.00	 Storate 	ept MLR/	A 1) 🔄 Other (Explain in	Remarks)
	ed Below Dark Surfa	ce (A11)	Loamy Gley		(F2)			
	Dark Surface (A12)		Redox Dark	All and a set of the s	E6)		³ Indicators of hydroph	
	Mucky Mineral (S1)		Depleted Da	000000000000000000000000000000000000000			wetland hydrology m	
Sandy	Gleyed Matrix (S4)		Redox Depi	essions (I	=8)		unless distrubed or p	problematic.
Restrictive	a Layer (if present):							
Type:								
Depth (i	nches):						Hydric Soil Present?	Yes 🖲 🛛 No 🔿
Remarks:							2 21	
Komarka.								
HYDROLO	OGY							
	ydrology Indicators							
	dicators (any one indic		cient)				Secondary India	ators (2 or more required)
	e Water (A1)		Water-Stai	ned Leave	e (B9) (no	MIRA 1		ned Leaves (B9) (MLRA 1,2, 4
	vater Table (A2)		Salt Crust		/3 (B0) (ne		A&B	100 LOUVOS (100) (MILIA (1,2, 4
X Satura	tion (A3)		Aquatic In	10 m 10 m	s (B13)		Drainage P	atterns (B10)
Water	Marks (B1)		Hydrogen	Sulfide Oc	dor (C1)		Dry-Seasor	n Water Table (C2)
Sedime	ent Deposits (B2)		Oxidized F	Rhizosphe	res along l	iving Ro	ots (C3) Saturation	visible on Aerial Imagery (C9)
	eposits (B3)		Presence		and an and a second second	•		c Position (D2)
	/lat or Crust (B6)		Recent Iro			er insention en		
	eposits (B6)		Stunted or Other (Exp		12	1) (LRR A		222 12
	e Soil Cracks (B6) ition Visible on Aerial	Imagen/ (B7		nain in Re	marks)			Mounds (D6) (LRR A) /e Hummucks (D7)
	ely Vegetated Concav							
	20	(ter Annone⊈ ent					
Field Obse	rvations:					ſ		
Surface Wa	ater Present? Y	es 🔿	No 💿 Depth (in-	ches):				
Water Table	- F	es O	No (Depth (in-	19499 		_		

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

Remarks:

(includes capillary fringe)

APPENDIX C

Photo Comparisons for 2011 and 2012

