MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2011

Murphy Ox Yoke Ranch
Park County, Montana



Prepared for:

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December 2011

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MDT Project Number STPX-BR 34(16)
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CCI Project No: MDT.004

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1. INTRODUCTION

The 2011 Monitoring Report presents the results of the second year of monitoring at the Murphy Ox Yoke Wetland Mitigation site. The 12.6-acre Murphy Ox Yoke Ranch mitigation site is located east of US Highway 89 and south of Murphy Lane in Emigrant, Montana. The site is located west of the Yellowstone River, bordered by the Park Branch Canal to the east and US 89 to the west. The property is legally described as Sections 28 and 33, Township 5 South, Range 8 East, Park County (Figure 1). Figures 2 and 3 in Appendix A show the Monitoring Activity Locations and Mapped Site Features, respectively. The Montana Department of Transportation (MDT) Wetland Mitigation Site Monitoring Forms, the US Army Corps of Engineers (USACE) Wetland Determination Data Forms for Western Mountains, Valleys, and Coast Region, and the MDT Montana Wetland Assessment Forms are included in Appendix B. Appendix C contains project site photographs and Appendix D shows the project plan sheet.

The site was developed to mitigate for wetland impacts associated with the East River Road and Yellowstone River Bridge (northeast of Livingston) MDT transportation projects. Remaining wetland credits were to be held in reserve for application against future MDT highway projects in Watershed 13, the Upper Yellowstone River. The purpose of the mitigation project was to restore, create, enhance, and preserve wetlands within a 12-acre tract on the Murphy Ox Yoke Ranch. The 12-acre parcel is under a protective conservation easement between MDT, the landowners, and the Gallatin Valley Land Trust. The project site encompasses upland, wet meadow, riparian, emergent, and scrub/shrub wetland habitats. Historic wetlands located within the project area had been drained for agricultural purposes. The Park Branch irrigation canal raises the groundwater elevation throughout the project area. Murphy Swamp, located across Highway 89, provides the surface water source for Murphy Creek via culvert under the highway. The creek is a perennial stream that parallels the east property boundary, ultimately discharging to the Yellowstone River located east of the project site and the Park Branch Canal. An artesian well located outside the northwest corner of the site supplies an additional source of water.

Goals of the mitigation project were to:

- Maximize emergent wetland development by excavating 4.1 acres to expose shallow groundwater in order to improve wildlife habitat, nutrient/toxicant removal functions, surface water storage functions, and production export/food chain support on the site;
- Restore/rehabilitate approximately 2.0 acres of existing degraded wetlands by plugging a drainage ditch, removing spoil piles, augmenting vegetation through planting and seeding, implementing a weed

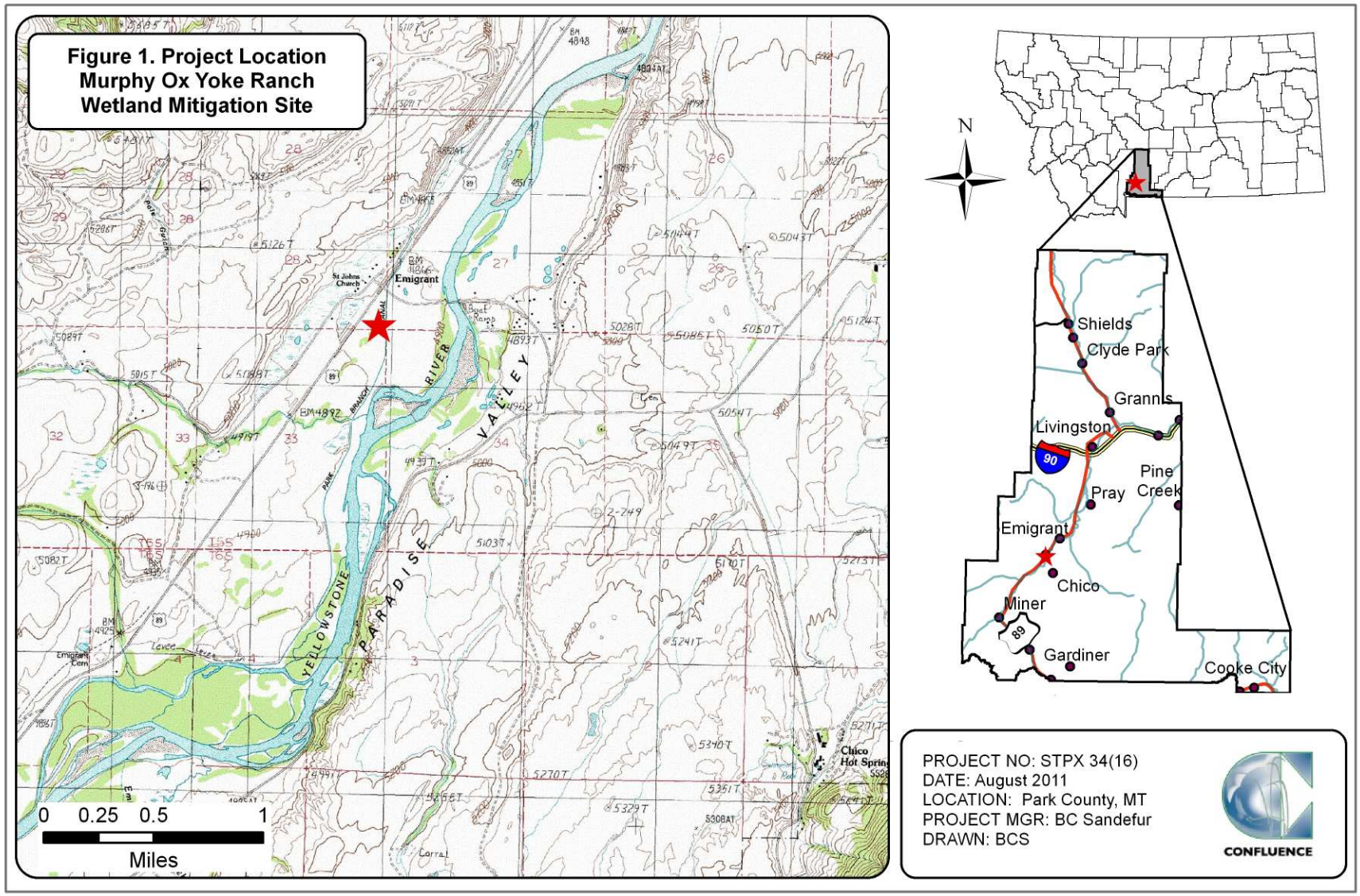


Figure 1. Project Location Murphy Ox Yoke Ranch.

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management plan, removing grazing, installing fencing to exclude livestock, and establishing a perpetual conservation easement.

- Create a scrub-shrub component within and around the periphery of created wetlands and increase the scrub-shrub component in existing wetlands; and
- Enhance and protect uplands and preserve existing wetlands within the project area by implementing a weed management plan, installing fencing and removing grazing from the site.

Crediting details for the project (Table 1) were compiled from credit ratios and acreages approved by the USACE in a letter to MDT dated September 17, 2008.

Table 1. Wetland Crediting Summary.

Proposed Mitigation Features	Compensatory Mitigation Type	COE Mitigation Ratios	Acres	Final Credit Estimate (Acres)
Creation of palustrine emergent and scrub/shrub wetlands through shallow excavation to groundwater in Cell 1.	Creation	1:1	2.70	2.70
Creation of palustrine emergent and scrub/shrub wetlands through shallow excavation to groundwater in Cell 2.	Creation	1:1	1.40	1.40
Rehabilitation of wetlands in NW corner of site west of the Park Branch Canal.	Restoration (Rehabilitation)	1.5:1	2.00	1.33
Preservation of existing scrub/shrub and emergent wetlands not included in restoration/rehabilitation.	Preservation	4:1	1.89	0.47
Upland buffer included in the conservation easement area to protect aquatic resources within project limits.	Upland Buffer	5:1	3.00	0.60
Total				6.50

The approved success/performance standards are listed below. The baseline delineation was completed using the 1987 Corps of Engineers Wetland Delineation Manual (Environmental Laboratory 1987). The 2010 Regional Supplement: Western Valleys, Mountains and Coast Regions (USACE 2010) was used to delineate wetlands for subsequent monitoring.

1. **Wetland Hydrology Success** will be achieved where wetland hydrology is present as specified in the technical guidelines in the 1987 Manual. Wetland hydrology will be confirmed through continued monitoring of an existing piezometer that was left undisturbed during

and following construction as well as through the periodic observations of surface water across the site and saturated soil conditions during the annual mid-season monitoring event.

2. **Hydric Soil Success** will be achieved where hydric soil conditions are present (provided through the most recent Natural Rescoure Conservation Service (NRCS) definitions for hydric soil) or appear to be forming, the soil is sufficiently stable to prevent erosion, and the soil is able to support plant cover. Since typical hydric soil indicators may require long periods to form, a lack of distinctive hydric soil features will not be considered a failure if hydrologic and vegetation success is achieved.
3. **Hydrophytic Vegetation Success** will be achieved where wetland vegetation is dominant as specified in the technical guidelines established in the 1987 Manual and 2010 Regional Supplement and noxious weeds do not exceed 5% cover. The following concept of "dominance", as defined in the 1987 Manual, will be applied during routine wetland determinations in created/restored wetlands: "*Subjectively determine the dominant species by estimating those having the largest relative basal area (woody overstory), greatest height (woody understory), greatest percentage of aerial cover (herbaceous understory), and/or greatest number of stems (woody vines)* (Environmental Laboratory 1987).

   Additionally, as provided in guidance from the USACE, hydrophytic vegetation success will include achieving a minimal overall vegetation cover of 80% in created wetland areas within 5 years following site construction. For areas within and around the periphery of Cells 1 and 2, successful creation of scrub/shrub wetland will be achieved when 550 (50% of total plantings) or more live wetland shrubs are present in these areas (cumulatively within 5 years following site construction.)
4. **Restoration/Rehabilitation Success** will be achieved when the site is fenced, grazing is removed from existing wetlands, and the drain ditch is plugged.
5. **Upland Buffer Success** will be achieved when the site is fenced and noxious weeds do not exceed 5% cover within the buffer.
6. **Site Protection** will be achieved when MDT and the landowner have successfully agreed upon, signed, and filed a perpetual conservation easement for the project area.

2. METHODS

The first year of monitoring was initiated on July 30, 2010. The second year of monitoring was completed on July 8, 2011. Information for the Mitigation Monitoring Form and Wetland Data Form (USACE 2010) was entered electronically on a personal digital assistant (PDA) palmtop computer during the field investigation. Monitoring activity locations were located using global positioning system (GPS) as shown on Figure 2 (Appendix A). Information collected included a wetland delineation, vegetation community mapping, vegetation transect monitoring, weed assessment, planted woody species

survival assessment, soil data collection, hydrology data collection, bird and wildlife use documentation, photographs, and a non-engineering examination of the infrastructure established within the mitigation project area (Appendix B).

2.1. Hydrology

Technical criteria for wetland hydrology guidelines have been established as "permanent or periodic inundation, or soil saturation within 12 inches of the ground surface for a significant period (usually 14 days or more or 12.5 percent) during the growing season" (Environmental Laboratory 1987). Systems with continuous inundation or saturation for greater than 12.5 percent of the growing season are considered jurisdictional wetlands. The growing season is defined for purposes of this report as the number of days where there is a 50 percent probability that the minimum daily temperature is greater than or equal to 28 degrees Fahrenheit (Environmental Laboratory 1987). The growing season recorded for the meteorological station at Livingston FAA airport, Montana (245080) extends from May 6 through September 24 for a total of 141 days (USDA 2010). Areas defined as wetlands would require 18 days of inundation or saturation within 12 inches of the ground surface to meet the hydrology criteria.

Hydrological indicators, as outlined on the Wetland Data Form, were documented at six points established within the project area. Hydrologic assessments allow evaluation of mitigation goals addressing inundation and saturation requirements. The hydrologic indicators were evaluated according to features observed during the site visit. The data were recorded on electronic field data sheets (Appendix B). Areas of surface inundation were delineated during the growing season via aerial photography, staff gage pool elevation measurements, general observations, or GPS measurements of the wetted perimeter during field visits. Water depths in the constructed depression wetlands were measured and recorded.

Five shallow groundwater wells were installed onsite in November 2002 and two additional wells were installed in April 2008. Only one well (W-1) remained following construction. Water levels were measured in W-1 (Well 1, Figure 2, Appendix) with a Solinst water level meter during the monitoring event. The water surface level was recorded electronically on the Mitigation Monitoring Form (Appendix B). Soil pits excavated during the wetland delineation were used to evaluate groundwater levels within 18 inches of the ground surface. The observed groundwater data were recorded electronically on the delineation data form (Appendix B).

2.2. Vegetation

The boundaries of dominant species-based vegetation communities were determined in the field during the active growing season and subsequently delineated on the 2011 aerial photograph. The percent cover of dominant species within a community type was estimated and recorded using the following ranges listed on the monitoring form: 0 (less than 1 percent), 1 (1 to 5 percent), 2 (6 to 10), 3 (11 to 20 percent), 4 (21 to 50 percent), and 5 (greater than 50 percent) (Appendix B). Community types were named based on the predominant

vegetation species that characterized each mapped polygon (Figure 3, Appendix).

Temporal changes in vegetation will be evaluated through annual assessments of static belt transects established in summer 2010 (Figure 2, Appendix A). Vegetation composition was assessed and recorded along two vegetation belt transects approximately 10 feet wide and 450 and 610 feet long (Transect 1 and Transect 2, respectively). The transect locations were recorded with a GPS unit. Spatial changes in the dominant vegetation communities were recorded along the stationed transect. The percent aerial cover of each vegetation species within the belt transect was estimated using the same values and cover ranges listed for the community type polygons (Appendix B). A comprehensive plant species list has been included in this monitoring report (Table 2, Appendix B). Photographs were taken at the endpoints of each transect during the monitoring event (Appendix C).

The revegetation design specified the seeding of disturbed upland areas and the seeding and planting of willow cuttings and containerized trees and shrubs in the constructed wetlands. Survival of the woody species will be evaluated annually although the final location and quantity of individual species is unknown. The number and condition of individual woody plants observed during monitoring was recorded on the Mitigation Monitoring Forms (Appendix B).

The location of noxious weeds was noted in the field and mapped on the aerial photo (Figure 3, Appendix A). The noxious weed species identified are color-coded. The locations are denoted with the symbol "**X**", "▲", or "■" representing 0 to 0.1 acre, 0.1 to 1.0 acre, or greater than 1.0 acre in extent, respectively. Cover classes are represented on Figure 3 by T, L, M, or H, for less than 1 percent, 1 to 5 percent, 2 to 25 percent, and 25 to 100 percent, respectively.

2.3. Soil

Soil information was obtained from the *Soil Survey for Park County Area* and *in situ* soil descriptions (USDA 2010). Soil cores were excavated using a hand auger and evaluated according to procedures outlined in the 1987 Manual and 2010 Regional Supplement. A description of the soil profile, including hydric indicators when present, was recorded on the Wetland Data Form for each profile (Appendix B).

2.4. Wetland Delineation

Waters of the US, including jurisdictional wetlands and special aquatic sites were delineated throughout the project area in accordance with criteria established in the 1987 Wetland Manual and the 2010 Regional Supplement.

In order to delineate a representative area as jurisdictional, the technical criteria for hydrophytic vegetation, hydric soil, and wetland hydrology, as described in the 1987 Manual and 2010 Regional Supplement must be satisfied. The indicator status of vegetation was derived from the National List of Plant Species that Occur in Wetlands: Northwest Region 9 (Reed 1988). A Routine Level-2 On-site

Determination Method (Environmental Laboratory 1987) was used to delineate waters of the US within the project boundaries. The information was recorded electronically on the Wetland Data Form (Appendix B).

The wetland boundary was determined in the field based on changes in plant communities and/or hydrology, and changes in soil characteristics. Topographic relief boundaries within the project area were also examined and cross referenced with soil and vegetation communities as supportive information for the delineation. Vegetation composition, soil characteristics, and hydrology were assessed at likely wetland and upland boundaries. If all three parameters met the criteria, the area was designated as wetland and mapped by vegetation community type. When any one of the parameters did not exhibit positive wetland indicators, the area was determined to be upland unless the site exhibited problematic vegetation, soil (i.e. recently developed), and/or hydrological indicators based on the guidance in the Regional Supplement. The wetland boundary was delineated on aerial imagery and digitized into Geographic Information System (GIS) format. Wetland acreages were estimated using GIS methodology.

2.5. Wildlife

Observations and other positive indicators of use by mammal, reptile, amphibian, and bird species were recorded on the Mitigation Monitoring Form during the site visit. Indirect use indicators, including tracks, scat, burrow, eggshells, skins, and bones, were also recorded. Direct sampling methods, such as snap traps, live traps, and pitfall traps, were not used. Each monitoring report contains a comprehensive list of wildlife species identified during the current year and past years.

2.6. Functional Assessment

The 2008 MDT Montana Wetland Assessment Method (Berglund and McEldowney 2008) was used to evaluate functions and values on the site in 2010 and 2011. This method provides an objective means of assigning wetlands an overall rating and provides regulators a means of assessing mitigation success based on wetland functions. Functions are self-sustaining properties of a wetland ecosystem that exist in the absence of society and relate to ecological significance without regard to subjective human values (Berglund and McEldowney 2008).

Field data for this assessment were collected during the site visit. The functional assessment forms were completed at a later date in the office. A Montana Wetland Assessment Form was completed for each wetland assessment area (Appendix B).

2.7. Photo Documentation

Monitoring at photo points provided supplemental information documenting wetland and upland conditions, trends, current land use surrounding the site, the area monitored, and the vegetation transects. Photographs were taken at five established photo points throughout the mitigation site during the site visit.

Photographs of the photo points, transect end points, and wetland data points are included in Appendix C. Photo point locations were recorded with a sub-meter grade GPS unit (Figure 2, Appendix A).

2.8. GPS Data

Site features and survey points were collected with a resource grade Thales Pro Mark III GPS unit during the 2011 monitoring season. Points were collected using WAAS-enabled differential correction satellites, typically improving resolution to sub-meter accuracy. The collected data were then transferred to a personal computer, imported into GIS, and drawn in Montana State Plane Single Zone NAD 83 meters. In addition to GPS, some site features within the site were hand-mapped onto an aerial photograph, then digitized. Site features and survey points that were mapped included fence boundaries, photograph points, transect beginning and ending points, wetland boundaries, and non-wetland plant community boundaries.

2.9. Maintenance Needs

Cursory examinations and inspections not constituting an engineering level inspection were conducted of all man-made structures within the site, including: outlets, berms, water control features, fences, etc. to determine if any maintenance was required. Details of observed maintenance requirements were recorded on data forms (Appendix B).

3. RESULTS

3.1. Hydrology

Climate data from the Livingston 12 S (245082) station, recorded an average annual precipitation rate of 16.21 inches from June 1951 to December 2010 (WRCC 2011). The annual precipitation rate recorded was 12.11 and 14.95 inches in 2009 and 2010, repsecitvely. Total precipitation from January to June was 7.01, 6.12, and 6.85 inches in 2009, 2010, and 2011 (NCDC), respectively.

The Yellowstone River is located east of the project site and the Park Branch Canal. Murphy Creek is a perennial stream that originates at the outlet of Murphy Swamp, a spring-fed pond located west of US Highway 89 and the project area. Average flow rates for Murphy Creek measured east of the Park Branch Canal during 2003 and 2004 were 0.75 cubic feet per second (cfs). The Park Branch Canal that parallels the east boundary of the project area is in operation from April 15 to October 30.

The mitigation goal was to create shallow water, emergent wetlands within two excavated cells (Cell 1, north; Cell 2, south) by intercepting the groundwater table. Elevated groundwater levels and seepage from the Park Branch Canal were expected to contribute to long-term wetland hydrology, particularly in Cell 2. Murphy Creek and an artesian spring located in the northwest corner of the site were expected to provide additional surface water to the adjacent pre-existing wetlands and Cell 1. The east end of the abandoned drainage ditch north of Cell 1 was plugged to prevent future groundwater depletion of wetlands in NW corner of the site and to capture surface runoff.

Inundation levels were higher across the site in 2011 versus 2010, likely the result of high precipitation rates in spring 2011 and of completing the field investigation three weeks earlier in the growing season. The average depth of inundation site wide was 0.8 feet and the range was 0.1 to 2.0 feet. Surface water levels were deepest in the plugged drain ditch located northwest of Cell 1 and in the north half of Cell 1 (Community 16). Approximately 24 percent of the site was inundated during the site visit. The north half of Cell 2 and portions of Communties 7, 9, 10, 12, 13, and 14 were inundated with 0.1 to 0.3 feet of surface water (Figure 3, Appendix A). Other evidence of hydrology within areas designated as wetlands included saturation within 12 inches of the ground surface, a high groundwater table, drainage patterns, surface soil cracks, and unvegetated concave surfaces. The groundwater depth measured in Well 1 (originally Piezometer 6) was 0.31 feet bgs (Figure 2, Appendix A). Murphy Creek was flowing during the site visit.

3.2. Vegetation

Vegetation plant communities were identified by plant composition, topography, and hydrology. There were twenty-five new and eighty-eight total plant species observed site wide in 2011 (Table 2). The site encompassed nine wetland communities and three upland communities. Vegetation community types named for the dominant species, based on percent cover, were Type 1 – *Festuca pratensis*/*Agropyron repens* Upland; Type 4 – *Salix exigua/Salix lasiandra* Wetland; Type 5 – *Agropyron repens/Agropyron smithii* Upland; Type 7 – *Alopecurus pratensis*/*Carex* species *(spp.).* Wetland; Type 9 – *Carex nebrascensis*/*Carex utriculata* Wetland; Type 10 – *Salix exigua/Salix drummondiana* Wetland; Type 11 – *Bromus inermis/Agropyron repens* Upland*;* Type 12 – *Typha latifolia* Wetland; *Glyceria grandis*/*Festuca pratensis* Wetland; Type 14 – *Typha latifolia*/*Glyceria grandis* Wetland; Type 15 – *Deschampsia cespitosa* Wetland; and Aquatic Macrophytes – Wetland (Figure 3, Appendix A). The nine wetland communities are detailed below followed by a discussion of the three upland communities.

Community Type 4 – *Salix exigua/Salix lasiandra* formed the pre-existing shrub/scrub, riparian corridor that encompassed Murphy Creek at the entrance to the site. The species were dominated by sandbar willow (*Salix exigua*), Pacific willow (*Salix lasiandra*), red-osier dogwood (*Cornus stolonifera*), prickly currant (*Ribes lacustre*), smooth brome (*Bromus inermis*), American mannagrass (*Glyceria grandis*), and broad leaf cattail (*Typha latifolia*).

Vegetation community Type 7 – *Alopecurus pratensis*/*Carex spp.* was identified in the pre-existing palustrine emergent wetland located north of Cell 1. The vegetation was dominated by meadow foxtail, Nebraska sedge (*Carex nebrascensis*), beaked sedge (*Carex utriculata*), water sedge (*Carex aquatilis*), and Baltic rush (*Juncus balticus*). The area characterized by community 7 was targeted for rehabilitation. The area was saturated to the surface throughout the community and inundated in several locations in 2011.

Community Type 9 – *Carex nebrascensis*/*Carex utriculata* was found in the pre-existing palustrine emergent wetland located between Cell 2 and the Murphy Creek riparian corridor (Community 10). The creek flows through the west edge of the community. The predominant species were Nebraska sedge (*Carex nebrascensis)*, beaked sedge, meadow foxtail, small-fruited bulrush (*Scirpus microcarpus*), red top (*Agrostis alba*), American mannagrass, common mint (*Mentha arvensis*), and Nuttal's sunflower (*Helianthus nuttallii*). The community was inundated in 2011.

The second *Salix* community, Type 10 – *Salix exigua/Salix drummondiana,* was identified in the pre-existing shrub/scrub wetland that encompasses Murphy Creek and parallels the east property boundary. The dominant species were sandbar willow, Drummond willow (*Salix drummondiana*), Pacific willow, Lemmon's willow (*Salix lemmonii*), diamond-leaf willow (*Salix planifolia*), and Bebb willow (*Salix bebbiana*) with minor cover contributed by beaked sedge, broad leaf cattail, redtop, Nebraska sedge, small-fruited bulrush, meadow foxtail, common mint, and Wood's rose (*Rosa woodsii*).

Community Type 12 – *Typha* formed a pre-existing, palustrine emergent depression within the Murphy Creek corridor. The inundated community was dominated by broad leaf cattail, beaked sedge, Nebraska sedge, creeping spikerush (*Eleocharis palustris*), Baltic rush, and Nuttal's sunflower.

Community Type 13 – *Glyceria grandis*/*Festuca pratensis* was a new vegetation type in 2011. It developed in the south half of Cell 2 where a majority of upland community Type 2 – *Festuca pratensis* transitioned to a wetland community dominated by American mannagrass, meadow fescue (*Festuca pratensis*), broad leaf cattail, tufted hairgrass (*Deschampsia cespitosa*), white sweet clover (*Melitotus alba*), white clover (*Trifolium repens*), creeping spikerush, Baltic rush, and common timothy (*Phleum pratense*). The community was either inundated or saturated to the surface. Bare ground encompassed between 6 and 10 percent of total cover.

Wetland community Type 14 – *Typha latifolia*/*Glyceria grandis* developed in 2011 from Type 3 – *Typha latifolia*/bare ground. The species diversity and cover increased notably in 2011. Broad leaf cattail, American mannagrass, creeping spikerush, bristly stalked sedge (*Carex leptalea*), Baltic rush, slender rush (*Juncus tenuis*), beaked sedge, foxtail barley (*Hordeum jubatum*), hardstem bulrush (*Scirpus acutus*), and white clover dominated the species. The community was inundated with 0.2 to 0.75 inches of water in 2011.

Community Type 15 – *Deschampsia cespitosa* developed in 2011 from upland community 6 in the south half of Cell 1. The predominant species were tufted hairgrass, meadow fescue, Western wheatgrass (*Agropyron smithii*), and meadow foxtail.

Community Type 16 – Aquatic Macrophytes populated the aquatic bed wetland that has developed in the inundated areas of Cells 1 and 2 and in the abandoned ditch. The aquatic bed was defined by open water with surface water depths at or greater than 0.5 meters (1.625 feet) "dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years" (Cowardin et al. 1979). The dominant aquatic plants included parrotfeather species (*Myriophyllum spp*). Green algae (a protist) was also observed on the water surface.

Community Type 1 – *Festuca pratensis*/*Agropyron repens* was identified in the upland area at the south edge of the mitigation project and Cell 2. The community contained meadow fescue, quackgrass (*Agropyron repens*), smooth brome, Kentucky bluegrass (*Poa pratensis*), white clover, meadow foxtail, Nebraska sedge, and common horsetail (*Equisetum arvense*).

Upland community Type 5 – *Agropyron repens/Agropyron smithii* was located on the west boundary of the project adjacent to US Highway 89. The plant species were dominated by quackgrass, Western wheatgrass, meadow fescue, smooth brome, and prickly lettuce (*Lactuca serriola*).

Community Type 11 – *Bromus inermis/Agropyron repens* located on the southeast edge of the project along the east boundary contained predominantly upland vegetation. Smooth brome, quackgrass, and meadow fescue dominated the herbaceous cover.

Table 2. Vegetation species observed in 2011 at the Murphy Ox Yoke Wetland Mitigation Site.

SCIENTIFIC NAME	COMMON NAME	REGION 9 INDICATOR STATUS[1]
Agropyron repens	quackgrass	FACU
Agropyron smithii	wheatgrass,Western	FACU
Agropyron spp.		NL
Agropyron trachycaulum	wheatgrass,slender	FAC
Agrostis alba	redtop	FACW
Agrostis stolonifera	bentgrass,spreading	FAC+
Algae, green	algae, green	NL
Alopecurus arundinaceus	foxtail,creeping	NI
Alopecurus pratensis	foxtail,meadow	FACW
Bromus inermis	smooth brome	NL
Bromus japonicus	brome, Japanese	FACU
Bromus vulgaris	brome,Columbia	FACU-
Carex aquatilis	sedge,water	OBL
Carex leptalea	**sedge,bristly-stalk**	**OBL**
Carex nebrascensis	sedge,Nebraska	OBL
Carex praegracilis	**sedge,clustered field**	**FACW**
Carex rostrata	sedge,beaked	OBL
Carex utriculata*	**beaked sedge**	**OBL**
Chenopodium album	goosefoot,white	FAC
Chenopodium leptophyllum	goosefoot,narrow-leaf	FACU
Chenopodium sp.		**NL**
Cicuta douglasii	water-hemlock,Western	OBL
Cirsium arvense	thistle,creeping	FACU+
Cornus stolonifera	**dogwood,red-osier**	**FACW**
Cynoglossum officinale	gypsy-flower	NL
Dactylis glomerata	**grass,orchard**	**FACU**
Deschampsia cespitosa	**hairgrass,tufted**	**FACW**
Descurainia sophia	common tansy mustard	NL
Elaeagnus angustifolia	**olive,Russian**	**FAC**
Eleocharis palustris	spikerush,creeping	OBL
Elymus cinereus	**wild-rye,basin**	**NI**
Epilobium ciliatum	willow-herb,hairy	FACW-
Equisetum arvense	**horsetail,field**	**FAC**
Equisetum hyemale	horsetail,rough	FACW
Festuca pratensis	fescue,meadow	FACU+
Galium palustre	**bedstraw,marsh**	**NI**
Glyceria grandis	mannagrass, American	NL
Glyceria striata	mannagrass, fowl	OBL
Glycyrrhiza lepidota	licorice, American	FAC+
Helianthus annuus	sunflower,common	FACU+
Helianthus nuttallii	**sunflower,Nuttall's**	**FACW-**
Hordeum jubatum	barley,fox-tail	FAC+
Iva axillaris	sumpweed,small-flower	FAC
Juncus articulatus	**rush,jointed**	**OBL**

[1]Region 9 (Northwest) (Reed 1988).
New species identified in 2011 are listed in bold type.
*Commonly accepted name not included in the 1988 list.

Table 2 (continued). Vegetation species observed in 2011 at the Murphy Ox Yoke Wetland Mitigation Site.

SCIENTIFIC NAME	COMMON NAME	REGION 9 INDICATOR STATUS[1]
Juncus balticus	rush,Baltic	OBL
Juncus effusus	rush,soft	FACW+
Juncus longistylis	**rush,long-style**	**FACW**
Juncus tenuis	**rush,slender**	**FAC**
Lactuca serriola	lettuce,prickly	FAC-
Medicago sativa	alfalfa	NL
Melilotus alba	sweetclover,white	FACU
Melilotus officinalis	sweetclover,yellow	FACU
Mentha arvensis	mint,field	FAC
Monarda fistulosa	**bergamot,wild**	**FACU**
Myriophyllum sp.		NL
Phalaris arundinacea	grass,reed canary	FACW
Phleum pratense	timothy	FACU
Plantago major	plantain,common	FAC+
Poa pratensis	**bluegrass, Kentucky**	**FACU+**
Polygonum persicaria	thumb,lady's	FACW
Polypogon monspeliensis	grass,annual rabbit-foot	FACW+
Potentilla anserina	silverweed	OBL
Potentilla gracilis	**cinquefoil,northwest**	**FAC**
Ranunculus acris	**butter-cup,tall**	**FACW-**
Ribes lacustre	**currant,prickly**	**FAC+**
Rosa multiflora	rose,multiflora	NO
Rosa woodsii	**rose, Woods**	**FACU**
Salix bebbiana	**willow, Bebb**	**FACW**
Salix drummondiana	willow,Drummond	FACW
Salix exigua	willow,sandbar	OBL
Salix lasiandra	willow,Pacific	FACW+
Salix lemmonii	willow, Lemmon's	FACW+
Salix planifolia	willow,diamond-leaf	OBL
Scirpus acutus	**bulrush,hard-stem**	**OBL**
Scirpus microcarpus	bulrush,small-fruit	OBL
Solanum dulcamara	**nightshade,climbing**	**FAC**
Solidago canadensis	golden-rod,Canada	FACU
Sonchus arvensis	sowthistle,field	FACU+
Sparganium androcladum	**burreed,branching**	**OBL**
Taraxacum officinale	dandelion,common	FACU
Thlaspi arvense	penny-cress,field	NI
Trifolium hybridum	**clover,alsike**	**FACU+**
Trifolium pratense	clover,red	FACU
Trifolium repens	clover,white	FACU+
Triglochin maritimum	arrow-grass,seaside	OBL
Triglochin palustre	**arrow-grass,marsh**	**OBL**
Typha latifolia	cattail,broad-leaf	OBL
Urtica dioica	nettle,stinging	FAC+

[1]Region 9 (Northwest) (Reed 1988).
New species identified in 2011 are listed in bold type.
*Commonly accepted name not included in the 1988 list.

Infestations of Canada thistle (*Cirsium arvense*) and houndstongue (*Cynoglossum officinale*), Priority 2B noxious weeds, were identified in the upland at the entrance to the site and on the east side of the Murphy Creek riparian corridor near the east property boundary (Figure 3, Appendix A). All of the infestations were less than 0.1 acre in extent and less than 1 percent of the total cover of the infestation. Isolated plants of houndstongue and/or Canada thistle were recorded within communities 1, 4, and 11. The thistle and tansy infestations were sprayed by MDT in 2011 after the July site visit.

Two vegetation transects were monitored at the Murphy Ox Yoke Wetland Mitigation Site in 2011 (Figure 2, Appendix A). The data recorded on Transect 1 (Monitoring Form, Appendix B) are summarized in tabular and graphical formats (Table 3 and Chart 1 and Chart 2, respectively). Photographs of the transect ends are presented in Appendix C.

Transect 1 traverses Cell 2 (south cell), southwest to northeast. Wetland communities Types 13 and 14 and upland communities Types 1 and 5 were identified on the transect (Table 3, Charts 1 and 2). The total cover of hydrophytic species and species diversity increased notably from 2010 to 2011 as reflected in the transition from Type 3 – *Typha*/bare ground to Type 14 – *Typha*/*Glyceria* and Type 2 – *Festuca* to Type 13 – *Glyceria/Festuca*. Seventy-five percent of the transect was dominated by hydrophytic species, a two-fold increase from thirty-seven percent in 2010.

Table 3. Data summary for Transect 1 in 2011 at the Murphy Ox Yoke Ranch Wetland Mitigation Site.

Monitoring Year	**2010**	**2011**
Transect Length (feet)	**450**	**450**
Vegetation Community Transitions along Transect	3	4
Vegetation Communities along Transect	3	4
Hydrophytic Vegetation Communities along Transect	1	2
Total Vegetative Species	39	31
Total Hydrophytic Species	9	16
Total Upland Species	30	15
% Transect Length Comprised of Hydrophytic Vegetation Communities	37	75
% Transect Length Comprised of Upland Vegetation Communities	63	25
% Transect Length Comprised of Unvegetated Open Water	0	0
% Transect Length Comprised of Bare Substrate	0	0

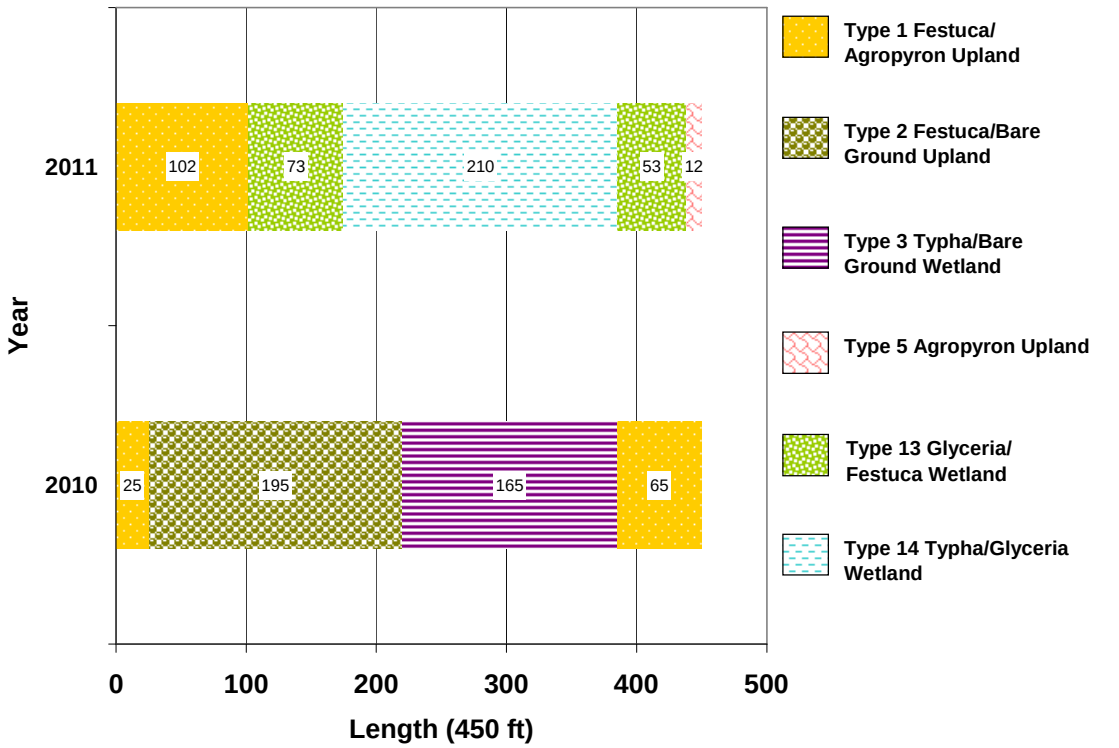


Chart 1. Transect map showing community types on Transect 1 in 2011 from start (0 feet) to end (450 feet).

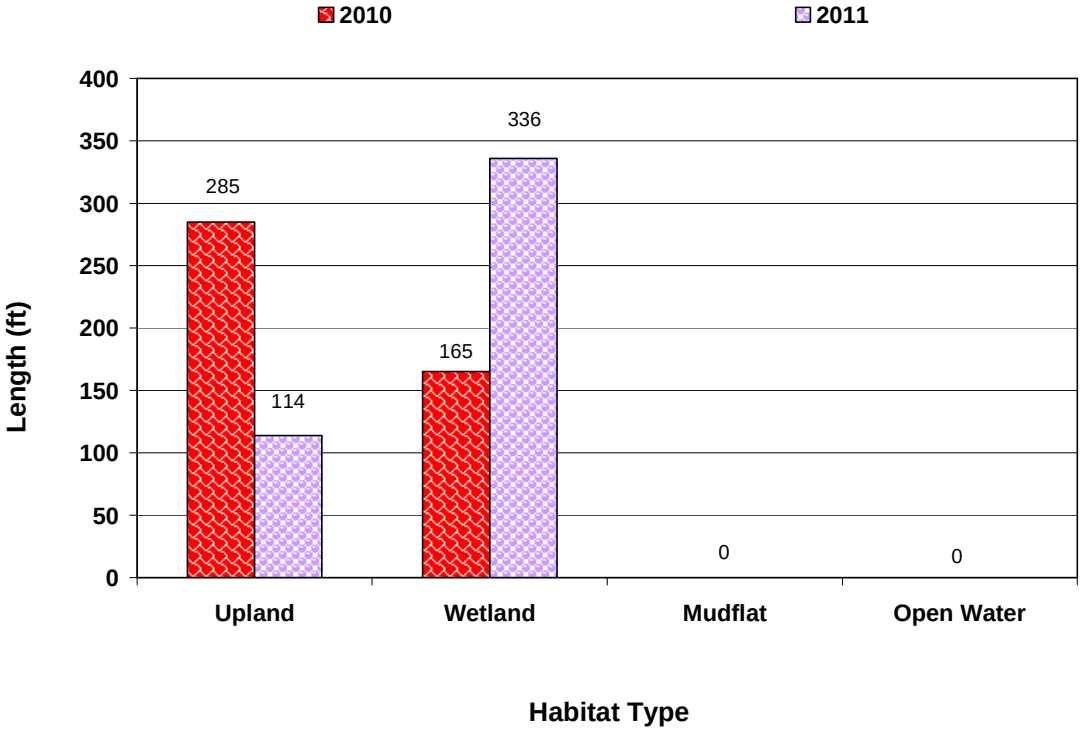


Chart 2. Length of habitat types within Transect 1 in 2011.

Data collected on Transect 2 (Mitigation Monitoring Form, Appendix B) were summarized in tabular and graphic formats (Table 4, Chart 3 and 4, respectively). Photographs of the start and end of Transect 2 are included in Appendix C.

Table 4. Data summary for Transect 2 in 2011 at the Murphy Ox Yoke Wetland Mitigation Site.

Monitoring Year	2010	2011
Transect Length (feet)	**610**	**610**
Vegetation Community Transitions along Transect	5	5
Vegetation Communities along Transect	4	5
Hydrophytic Vegetation Communities along Transect	2	4
Total Vegetative Species	40	34
Total Hydrophytic Species	23	21
Total Upland Species	17	13
% Transect Length Comprised of Hydrophytic Vegetation Communities	78	95
% Transect Length Comprised of Upland Vegetation Communities	21	5
% Transect Length Comprised of Unvegetated Open Water	2	0
% Transect Length Comprised of Bare Substrate	0	0

Transect 2 traverses the west half of Cell 1 (N), north to south. Four wetland vegetation communities, Types 7, 14, 15, and 16, and one upland communitiy, Type 5, were identified on this transect. Type 3 – *Typha*/bare ground transitioned to Type 14 – *Typha/Glyceria* and Type 6 – *Agrostis/Chenopodium* to Type 15 – *Deschampsia* in 2011. Hydrophytic vegetation communities dominated 95 percent of the transect in 2011, up from 78 percent in 2010.

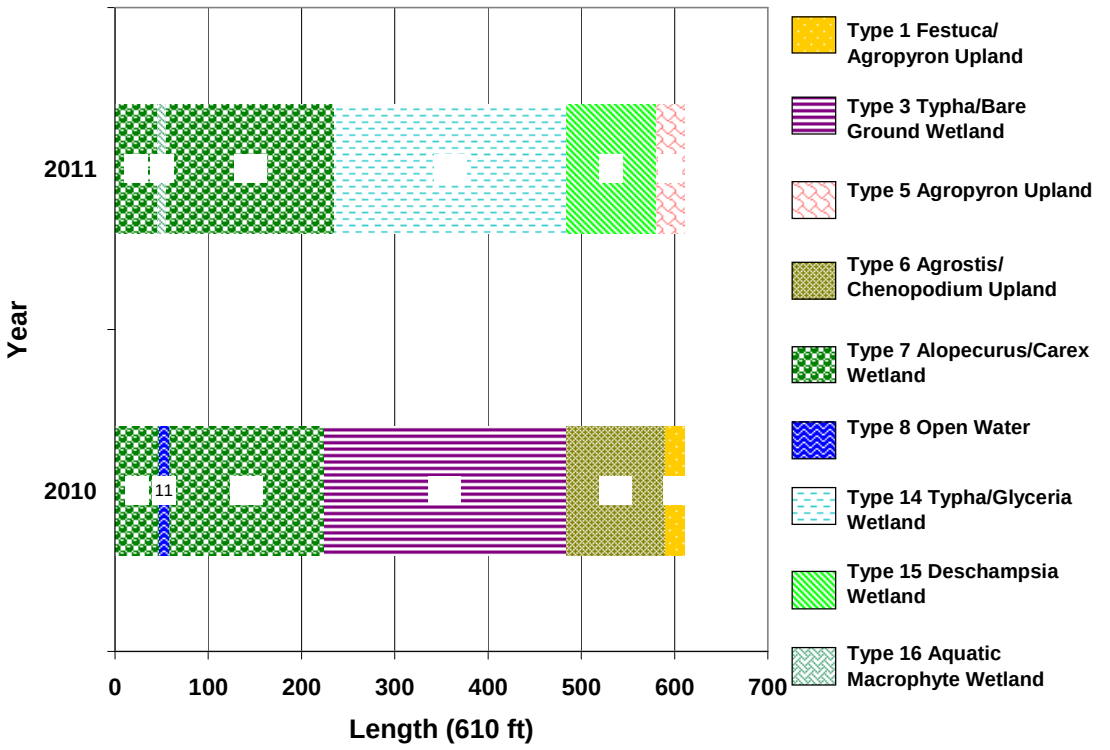


Chart 3. Transect maps showing community types on Transect 2 from transect start (0 feet) to end (610) feet).

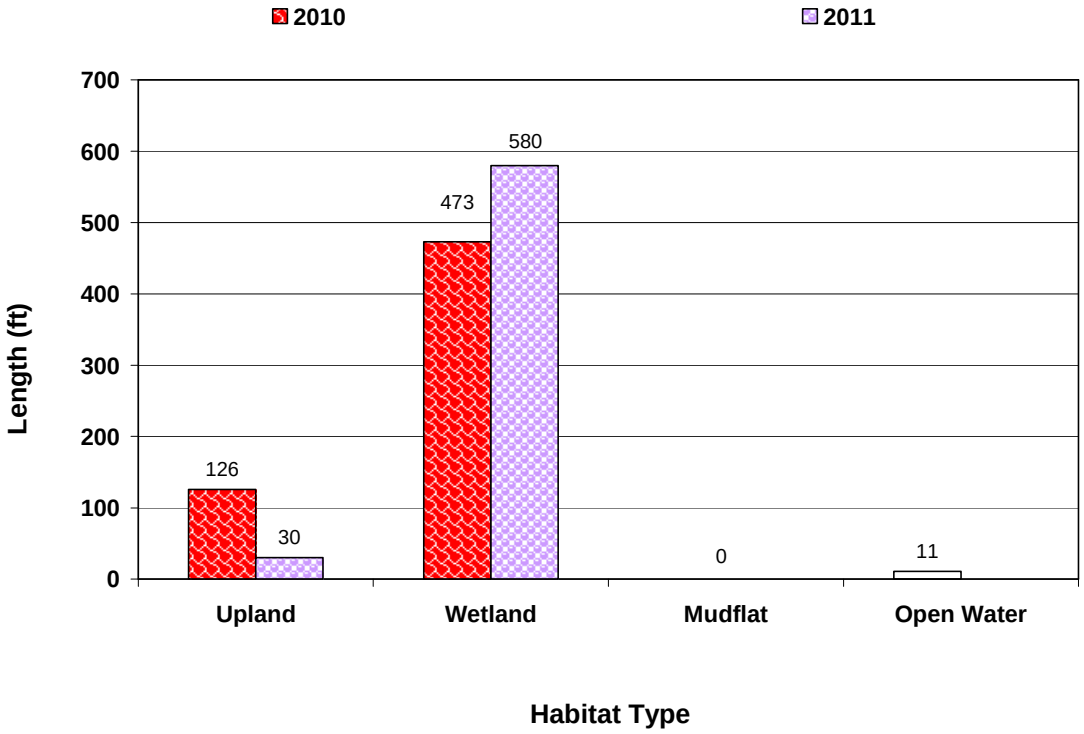


Chart 4. Length of habitat types within Transect 2 in 2011.

The 2009 Mitigation Plan specified planting 100 1-gallon willow and black cottonwood species and 1,000 willow cuttings. A majority of the woody plant materials were installed on the edges of Cells 1 and 2. Fifty willow saplings in excellent condition were noted on Cell 1 and 15 willow saplings in good condition were observed in Cell 2 in 2010. In spring 2011, 250 additional willow cuttings were planted. Ten live willow cuttings were observed in 2011. None of the containerized species observed planted on the berms appeared to be alive in 2011. Survival of willow cuttings appeared to be highest among well-trimmed cuttings. The lack of above-ground green growth on newly planted willow cuttings may have been the result of increased energy into adventitious rooting and decreased stem growth as the cuttings establish.

3.3. Soil

The project site was mapped in the Park County Soil Survey (USDA 2010) as the Vendome Meadowcreek Complex found on 0 to 4 percent slopes. The Vendome series consists of very deep, well drained sandy loams located on alluvial fans, stream terraces, knolls, and plains. They are considered non-hydric and taxonomically classified as Aridic Haplustolls. The Meadowcreek series are poorly drained soils formed in alluvium. The fine-sandy loam soil unit is hydric and taxonomically classified as a Fluvaquentic Haplustolls. The map units did not generally correspond to the soil profile identified in the test pits. Site soils have been disturbed by construction activities.

Soil test pits were excavated at six locations (M-1 through M-6, Figure 2**,** Appendix A). Data points M-1 and M-2 were located near the boundary of communities 7 and 5. Data point M-3 was located between Cells 1 and 2 and M-4 was located at the south edge of Cell 1. Data points M-5 and M6 were located within Cell 2. The profile at M-1 revealed a silt loam (10 YR 2/2) with redoximorphic concentrations (10 YR 4/3) in the soil matrix providing a positive indicator for redox dark surface (F6). The soil at M-2 was a silt loam (10 YR 2/2) with redoximorphic depletions (10 YR 4/1), which did not meet the hydric soil criteria. Data point M-3 revealed a silt loam (10 YR 3/4) with redox depletions (10 YR 2/2). The chroma did not meet the criteria for a hydric soil. The profile at M-4 was a clay loam (10 YR/4/2) with redox concentrations (10 YR 4/4) in the matrix providing a positive indication of a depleted matrix (F3). The soil pit at M-5 was problematic. The soil matrix of the silt loam soil had a low chroma (10 YR 4/2) with redox depletions (10 YR 2/2). The hydric soil criteria requires redox concentrations. It was assumed that hydric soil characteristics were still developing based on the recent construction. The vegetation was dominated by hydrophytic species and the data point was inundated with one inch of water. Data point M-6 was considered a non-wetland. The soil was a fine silt loam (2.5YR 3/2) with redox concentrations (7.5YR 5/6) in the matrix. The soil met the hydric criteria for redox dark surface. The vegetation at the M-6 did not meet the wetland criteria. The cover of hydrophytic species is expected to increase over time based on the presence of wetland hydrology (seasonal saturation).

3.4. Wetland Delineation

Six data points were used to define the vegetation, soil, and hydrology of site (Figure 2; Wetland Data Forms, Appendix B). The July 8, 2011, delineation identified and mapped 4.09 acres of created emergent wetland within the constructed cells (Figure 3, Appendix A) and 3.89 acres of pre-existing palustrine emergent and scrub-shrub wetlands within the 12.59 acre site. Increased groundwater levels within the restoration wetland area and along the perimeter of the excavated cells promoted the development of an additional 1.31 acres of wetlands in areas identified as upland during the 2003 delineation. Increased wetland development is anticipated within the south cell as hydrophytic vegetation continues to develop. The entire footprint of the north cell was delineated as wetland in 2011 and exhibited a range of inundation and saturation levels.

Table 5. Total wetland acres delineated in July 2011.

Habitat	2003 [1] (acres)	2010 (acres)	2011 (acres)
Existing Wetland Area (Preservation)	3.89*	5.18*	1.89
Existing Wetland Area (Restoration)			2.00
Created Wetland Area - North Cell	---	2.15*	2.92
Created Wetland Area - South Cell	---		1.17
Created Wetlands Outside of Excavated Cells and Existing Restoration Area.	---	---	1.31
Created Open Water Area		0.02	**
Total Wetland Habitat	**3.89**	**7.35**	**9.29**

[1]Baseline delineation.

*Not differentiated in 2003 or 2010.

**Open water classified as aquatic bed wetland habitat in 2011.

3.5. Wildlife

A comprehensive list of bird and other wildlife species observed directly or indirectly during the 2011 monitoring visit is presented in Table 6**.** Nine bird species were observed by Confluence staff in 2011 including an American tree sparrow, American white pelican, black-billed magpie, Brewer's blackbird, mallard, red-tailed hawk, red-winged blackbird, yellow-headed blackbird, and yellow-rumped warbler. Elk scat, white-tailed deer, and raccoon tracks were noted onsite. Reptile and amphibians observed included a brief glimpse of a frog species that could not be identified.

Table 6. Comprehensive list of bird and other wildlife species observed directly or indirectly in 2011 at the Murphy Ox Yoke Mitigation Site.

Common Name	Scientific Name
BIRDS	
American Avocet	*Recurvirostra americana*
American Goldfinch	*Spinus tristus*
American Robin*	***Turdus migratorius***
American Tree Sparrow	***Spizella arborea***
American White Pelican	***Pelecanus erythrorhynchos***
American Wigeon*	***Anas americana***
Bank Swallow*	***Riparia riparia***
Barn Swallow	*Hirundo rustica*
Black-billed Magpie*	***Pica hudsonia***
Brewer's Blackbird	***Euphagus cyanocephalus***
Canada Goose*	***Branta canadensis***
Cliff Swallow	*Petrochelidon pyrrhonota*
Common Raven	*Corvus corax*
Cooper's Hawk	*Accipiter cooperii*
Double-crested Cormorant	*Phalacrocorax auritus*
Eastern Kingbird	*Tyrannus tyrannus*
Green-winged Teal	*Anas crecca*
Killdeer**	***Charadrius vociferus***
Mallard	***Anas platyrhynchos***
Marsh Wren*	***Cistothorus palustris***
Red-tailed Hawk	***Buteo jamaicensis***
Red-winged Blackbird	***Agelaius phoeniceus***
Sandhill Crane	*Grus canadensis*
Semipalmated Sandpiper	*Calidris pusilla*
Sora*	***Porzana carolina***
Spotted Sandpiper	*Actitis macularius*
Starling*	***Sturnus vulgaris***
Tree Swallow	*Tachycineta bicolor*
Trumpeter Swan*	***Cygnus buccinator***
Yellow Warbler*	***Dendroica petechia***
Willet*	***Tringa semipalmata***
Wilson's Phalarope	*Phalaropus tricolor*
Wilson's Snipe*	***Gallinago delicata***
Yellow-headed Blackbird	***Xanthocephalus xanthocephalus***
Yellow-rumped Warbler	***Dendroica coronata***
MAMMALS	
Beaver*	***Castor canadensis***
Coyote	*Canis latrans*
Deer Mouse	*Peromyscus maniculatus*
Elk or Wapiti	***Cervus canadensis***
Meadow Vole*	***Microtus pennsylvanicus***
Merriam's Shrew	*Sorex merriami*
Moose	*Alces americanus*
Mule Deer	*Odocoileus hemionus*
Muskrat*	***Ondatra zibethicus***

Species identified in 2011 are listed in bold type.

*Denotes species identified by MDT in 2011.

Table 6 (continued). Comprehensive list of bird and other wildlife species observed directly or indirectly in 2011 at the Murphy Ox Yoke Mitigation Site.

Common Name	Scientific Name
MAMMALS	
Raccoon	***Procyon lotor***
White-footed Mouse	*Peromyscus leucopus*
White-tailed Deer	***Odocoileus virginianus***
REPTILES	
Painted Turtle	*Chrysemys picta*
Plains Gartersnake	*Thamnophis radix*
AMPHIBIANS	
Columbia Spotted Frog*	***Rana luteiventris***
Frog sp.	
Western Toad	*Bufo boreas*
Woodhouse's Toad	*Bufo woodhousii*

Species identified in 2011 are listed in bold type.
*Denotes species identified by MDT in 2011.

3.6. Functional Assessment

A baseline functional assessment using the 1999 MDT wetland assessment method (Berglund 1999) was completed in 2003 for the wet meadow habitat located in the northwest corner of the site (2.00 acres, Community Type 7) and the remaining wetlands located west of the Park Branch Canal (1.89 acres, Communities 4, 9, 10, 12). The two assessment areas were rated as Category III wetlands in 2003 partly as a result of moderate to high level disturbances site wide. Historic forms of disturbance included grazing, haying, ditching, channel straightening, and road building.

Functional assessment forms (Berglund and McEldowney 2008) for three AAs were completed in 2011, the created wetland cells (Creation – 4.09 acres), the newly developed 1.31 acres and the adjacent existing wet meadow (Restoration – 3.31 acres), and the existing shrub-scrub and emergent wetlands west of the canal (Preservation – 1.89 acres). The functional assessment results are summarized in Table 7.

The constructed cells (Creation) were rated as Category III wetlands with 63 percent of the possible functional points. Ratings were high in short and long term surface water storage and groundwater discharge and recharge. Ratings improved from 2010 to 2011 in the functions of MTNHP species habitat, general wildlife habitat, sediment/nutrient/toxicant removal, sediment/shoreline stabilization, production export/food chain support, and uniqueness, primarily the result of increased inundation levels and vegetation cover development. The functional units increased from 7.53 in 2010 to 25.77 in 2011 as a result of the increase in wetland acreage and vegetation cover. The wet meadow northwest of Cell 1 North (Restoration) was rated as a Category II wetland with 66 percent of the total possible points. The ratings were high for sediment/nutrient/toxicant

Table 7. Functions and Values of Murphy Ox Yoke wetlands.

Function and Value Parameters from the MDT Montana Wetland Assessment Method	2003 Baseline[1] Wet Meadow	2003 Baseline West of Canal	2010 Created Wetland Cells[2]	2010 Wet Meadow	2010 West of Canal	2011 Created Wetland Cells[2]	2011 Wet Meadow Restoration	2011 West of Canal Preservation
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.3)	Low (0.1)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)
MTNHP Species Habitat	Low (0.1)	Low (0.1)	Low (0.0)	Mod (0.6)	Mod (0.6)	Mod (0.6)	Mod (0.6)	Mod (0.6)
General Wildlife Habitat	Mod (0.5)	Mod (0.7)	Low (0.3)	Mod (0.7)	High (0.9)	Mod (0.7)	Mod (0.7)	High (0.9)
General Fish/Aquatic Habitat	--	--	NA	NA	NA	NA	NA	NA
Flood Attenuation	Low (0.1)	Mod (0.6)	Mod (0.6)	Low (0.1)	Mod (0.7)	Mod (0.6)	Mod (0.6)	High (0.9)
Short and Long Term Surface Water Storage	Mod (.5)	High (0.8)	Mod (0.5)	Mod (.5)	High (0.8)	High (0.8)	Mod (0.6)	High (0.8)
Sediment/Nutrient/Toxicant Removal	Mod (0.7)	High (0.9)	Mod (0.5)	Mod (0.7)	High (0.9)	Mod (0.7)	High (1.0)	High (1.0)
Sediment/Shoreline Stabilization	--	High (1.0)	Low (0.2)	High (0.9)	High (1.0)	Mod (0.7)	High (1.0)	High (1.0)
Production Export/ Food Chain Support	Mod (0.6)	High (0.9)	Low (0.3)	Mod (0.7)	Exc (1.0)	Mod (0.5)	Mod (0.7)	Exc. (1.0)
Groundwater Discharge/Recharge	High (1.0)	Low (0.1)	Mod (0.7)	Mod (0.7)	High (1.0)	High (1.0)	Mod (0.7)	High 1.0)
Uniqueness	Low (0.3)	Mod (0.5)	Low (0.2)	Low (0.2)	Mod (0.4)	Low (0.3)	Low (0.3)	Mod (0.4)
Recreation/Education Potential (bonus points)	Low (0.3)	Low (0.3)	Low (0.05)	Low (0.05)	Low (0.05)	Mod (0.1)	Mod (0.1)	Mod (0.1)
Actual Points / Possible Points	**4.4 / 10**	**6.2 / 10**	**3.5 / 10**	**5.45 / 10**	**7.65 / 10**	**6.3 / 10**	**6.6 / 10**	**10-Aug**
% of Possible Score Achieved	**44%**	**56%**	**34.5%**	**54.5%**	**76.5%**	**63.0%**	**66.0%**	**80.0%**
Overall Category	**III**	**III**	**III**	**III**	**II**	**III**	**II**	**II**
Acreage of Assessed Aquatic Habitats within Easement (ac)	**2.00**	**1.89**	**2.15**	**2.04**	**1.89**	**4.09**	**3.31**	**1.89**
Functional Units (acreage x actual points) **(f^1-)**			**7.53**	**11.12**	**14.46**	**25.77**	**21.85**	**15.12**

[1]Berglund 1999 MDT MWAM.

[2]Berglund and McEldowney 2008 MDT MWAM.

removal and sediment/shoreline stabilization. The existing wetlands west of the canal (Preservation) were rated as a Category II system with 80 percent of the total possible points based on an excellent rating for production export/food chain support and high ratings for general wildlife habitat, flood attenuation, short and long term surface water storage, sediment/nutrient/toxicant removal, sediment/shoreline stabilization, and groundwater discharge and recharge. The ratings increased slightly in 2011 based on the sediment/nutrient/toxicant removal rating and the AA documented as a known recreation site. The functional units increased for preservation AA from 14.46 in 2010 to 15.12 in 2011.

3.7. Photo Documentation

Photographs taken of photo points one through five (PP1 through PP5, Figure 2, Appendix A) are shown on pages C-1 to C-3 of Appendix C. Transect end points are shown on pages C-2 and C-4 and photos of data points M-1 through M-6 are included on pages C-5 and C-6.

3.8. Maintenance Needs

Four infestations of Canada thistle (*Cirsium arvense*) and two infestations of houndstongue (*Cynoglossum officinale*), Priority 2B noxious weeds, were identified in the mitigation site (Figure 3, Appendix A). A trace amount of houndstongue was noted near the gate enterance and near the pre-existing willow community boundary in the uplands. Both houndstongue populations were less than 0.1 acre in size. Canada thistle was recorded within communities 1, 4, and 11. Four infestations were mapped to the east of the existing riparian wetlands recording the weed at trace cover at less than 0.1 acre in aerial extent. The thistle and houndstongue infestations were sprayed by MDT in 2011 after the site visit.

Two wood duck boxes, one floating nest, and eight bluebird boxes were installed around the site between 2010 and 2011. Four of the bluebird boxes appeared to be in use. All of the nest structures were in excellent condition and did not require maintenance. No water control structures were installed on the property.

3.9. Current Credit Summary

Table 8 presents the 2011 summary of wetland credits. Credit ratios were taken from the *Wetland Compensatory Mitigation Ratios, Montana Regulatory Program* (USACE 2005) and the approved wetland mitigation plan. The total area of projected wetland within the constructed cells was estimated at 4.10 acres in 2008 (2008 credit acres). The 2010 survey measured the designed post-construction footprint of the cells at 4.50 acres. The actual wetland area developed to date within the cells was measured at 4.09 acres in 2011. Preservation of the existing scrub/shrub and emergent wetlands within the swale to the west of the canal accounts for 1.89 acres of the project site. Wetland development outside of the excavated cells has resulted from increased water levels within the site. The plugged ditch that previously had a draining effect on the wet meadow within the NW corner of the site has effectively increased the

water table within the restored wetlands. A total of 1.31 acres of additional wetlands have developed within the project area outside of the constructed cells. This additional wetland development was unanticipated and USACE credit approval should be sought as this acreage was not acknowledged in the approved crediting strategy. The upland buffer was 3.0 acres in size yielding 0.6 acre credit. The 2011 calculated credits shown in Table 8 yielded 7.81 credit acres. This exceeds the 2008 credit target of 6.5 by 1.31 credit acres. This value is expected to increase again in 2012 as wetlands continue to develop within cell 2 of the migitaion area.

Based on the success criteria presented in Section 1, the site has met the criteria for wetland hydrology, soil, and vegetation in the areas of the constructed cells delineated as wetlands. The vegetation in Community 14 exhibits an overall hydrophytic vegetation cover of 80 percent. The herbaceous vegetation cover in Communities 13 and 15 and the woody vegetation cover are still developing. The weed cover in the upland buffer does not currently exceed 5 percent. The site is fenced, grazing has been removed, the drain ditch is plugged, and the site is protected in a conservation easement.

Table 8. 2011 Summary of Estimated Wetland Credits.

PROPOSED FEATURE	COMPENSATORY MITIGATION TYPE	USACE CREDIT RATIO	2008 PROPOSED CREDIT ACRES	2008 USACE CREDIT TARGET	2010 DELINEATED ACRES	2010 CALCULATED CREDITS	2011 DELINEATED ACRES	2011 CALCULATED CREDITS
Creation of palustrine emergent and scrub/shrub wetlands through shallow excavation of groundwater in Cell 1.	Creation	1:1	2.70	2.70	1.59	1.59	2.92	2.92
Creation of palustrine emergent and scrub/shrub wetlands through shallow excavation of groundwater in Cell 2.	Creation	1:1	1.40	1.40	0.56	0.56	1.17	1.17
Rehabilitation of wetlands in NW corner of site west of the Park Branch Canal.	Restoration (Rehabilitation)	1.5:1	2.00	1.33	2.00	1.33	2.00	1.33
Preservation of existing scrub/shrub and emergent wetlands not included in restoration/rehabilitation.	Preservation	4:1	1.89	0.47	1.89	0.47	1.89	0.47
Creation of wetlands outside of excavated cells and existing restoration and preservation areas	Creation	1:1	---	---	*ND	*ND	1.31	1.31
Upland buffer included in the conservation easement area to protect aquatic resources within project limits.	Upland Buffer	5:1	3.00	0.60	3.00	0.60	3.00	0.60
		Totals	**10.99**	**6.50**	**9.04**	**4.56**	**12.29**	**7.81**

*Area not differentiated in 2010

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Appendix A

Figure 2 – Monitoring Activity Locations
Figure 3 – Mapped Site Features

MDT Wetland Mitigation Monitoring
Murphy Ox Yoke Ranch
Park County, Montana

Figure 2: 2011 Monitoring Activity Locations

Park Branch Canal

Well 1

PP5

PP4

PP3

PP1

PP2

T2 Start

T1&2 End

T1 Start

M-1

M-2

M-3

M-4

M-5

M-6

VegTran2

VegTran1

US HWY 89

Murphy Swamp

Legend

- Monitoring Limits
- Vegetation Transect
- Well Location
- Data Points
- Photo Points

Base Photography Date: August 17, 2011

N E S W

100 0 100 200

Feet

GRAPHICAL REPRESENTATION MAY OR MAY NOT DEPICT THE LEGAL DESCRIPTION OF ANY PARCEL HEREIN. THIS FIGURE IS A VISUAL AID ONLY; BOUNDARY RESTORATION MUST BE MADE BY A LICENSED LAND SURVEYOR. THIS FIGURE IS INTENDED TO DISPLAY INFORMATION RELEVANT TO THE REFERENCED REPORT. CONFLUENCE MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND REGARDING THIS DRAWING FOR ANY USE OTHER THAN THE ORIGINAL. ANY OTHER USE IS AT THE USER'S SOLE RISK.

LOCATION: Park Co., MT

PROJECT NO: STPX-BR 34(16)

FILE: Murphy/Monitor2011.mxd

Project Name
Murphy Ox Yoke Ranch
Wetland Mitigation

Drawing Title
2011 Monitoring Activity Locations

DRAWN	CHECKED	APPROVED
BV	BCS	JJ

SCALE: Noted

Drawn: September 1, 2011

PROJ MGR: B Sandefur

CONFLUENCE
consulting Incorporated

Figure 2

REV -

Figure 3: 2011 Mapped Site Features

Park Branch Canal

Vegetation Community Types

1 - Festuca pratensis/Agropyron repens
4 - Salix exigua/Salix lasiandra
5 - Agropyron repens/Agropyron smithii
7 - Alopecurus pratensis/Carex spp.
9 - Carex nebrascensis/Carex utriculata
10 - Salix exigua/Salix drummondiana
11 - Bromus inermis/Agropyron repens
12 - Typha latifolia
13 - Glyceria grandis/Festuca pratensis
14 - Typha latifolia/Glyceria grandis
15 - Deschampsia cespitosa
16 - Aquatic macrophytes

Noxious Weeds
Cirsium arvense
Cynoglossum officinale
Infestation Size
X = <0.1 acre
▲ = 0.1 to 1 acre
■ = 1 to 5 acre
Cover Class
T = Trace (<1% cover)
L = Low (1-5% cover)
M = Moderate (5-25% cover)
H = High (25-100% cover)

Legend

Monitoring Limits
Wetland Limits
Vegetation Communities

Base Photography Date: August 17, 2011

Acreages

Project Area	12.59 acres
Total Wetlands	9.29 acres
Existing Wetlands	5.20 acres
Net Wetlands	4.09 acres
Uplands	3.30 acres

US HWY 89

Murphy Swamp

N E S W

100 50 0 100 200

Feet

GRAPHICAL REPRESENTATION MAY OR MAY NOT DEPICT THE LEGAL DESCRIPTION OF ANY PARCEL HEREIN. THIS FIGURE IS A VISUAL AID ONLY. BOUNDARY RESTORATION MUST BE MADE BY A LICENSED LAND SURVEYOR. THIS FIGURE IS INTENDED TO DISPLAY INFORMATION RELEVANT TO THE REFERENCED REPORT. CONFLUENCE MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND REGARDING THIS DRAWING FOR ANY USE OTHER THAN THE ORIGINAL. ANY OTHER USE IS AT THE USER'S SOLE RISK.

LOCATION: Park Co., MT
PROJECT NO: STPX-BR 34(16)
FILE: Murphy/Veg2011.mxd

Project Name: MURPHY OX YOKE RANCH WETLAND MITIGATION
Drawing Title: 2011 MAPPED SITE FEATURES

DRAWN	CHECKED	APPROVED
BCS	BV	JJ

SCALE: Noted
Drawn: September 6, 2011
PROJ MGR: B Sandefur

CONFLUENCE consulting incorporated

Figure 3

REV -

Appendix B

2011 MDT Wetland Mitigation Site Monitoring Form
2011 USACE Wetland Determination Data Forms
2011 MDT Montana Wetland Assessment Forms

MDT Wetland Mitigation Monitoring
Murphy Ox Yoke Ranch
Park County, Montana

MDT WETLAND MITIGATION SITE MONITORING FORM

Project Site: Murphy Ox Yoke Assessment Date/Time 7/8/2011

Person(s) conducting the assessment: B Vaughn, L Soderquist

Weather: Sunny with pm thunderstorms. Location: S of Murphy Lane in Emigrant, MT

MDT District: Butte Milepost:

Legal Description: T 5S R 8E Section(s) 28 and 33

Initial Evaluation Date: 7/30/2010 Monitoring Year: 2 #Visits in Year: 1

Size of Evaluation Area: 12.6 (acres)

Land use surrounding wetland:

Agricultural, Hwy 89 on west boundary

HYDROLOGY

Surface Water Source: GW from Park Branch and Murphy Swamp; Murphy Creek flows thru site.

Inundation: ☑ Average Depth: 0.8 **(ft)** Range of Depths: 0.1-2.0 **(ft)**

Percent of assessment area under inundation: 24 %

Depth at emergent vegetation-open water boundary: 1.5 **(ft)**

If assessment area is not inundated then are the soils saturated within 12 inches of surface: Yes

Other evidence of hydrology on the site (ex. – drift lines, erosion, stained vegetation, etc**:**

Evidence of inundation, saturation, high groundwater table, drainage patterns, surface soil cracks, and unvegetated concave surface.

Groundwater Monitoring Wells

Record depth of water surface below ground surface, in feet.

Well ID	Water Surface Depth (ft)
W-1	0.31

Additional Activities Checklist:

☑ Map emergent vegetation-open water boundary on aerial photograph.

☑ Observe extent of surface water during each site visit and look for evidence of past surface water elevations (drift lines, erosion, vegetation staining, etc.)

☑ Use GPS to survey groundwater monitoring well locations, if present.

Hydrology Notes:

Recent rains increased area of inundation. Murphy Creek was flowing in 2011. Existing wetland swale (NW of Cell 1) contained 2' surface water. North halves of cells 1 and 2 were inundated. Saturation to ground surface within exisiting emergent wetland and riparian community 10.

VEGETATION COMMUNITIES

Site Murphy Ox Yoke

(Cover Class Codes **0** = < 1%, **1** = 1-5%, **2** = 6-10%, **3** = 11-20%, **4** = 21-50% , **5** = >50%)

* Indicates accepted spp name not on '88 list.

Community # 1 **Community Type:** Festuca pratensis / Agropyron repens **Acres:** 1.74

Species	Cover class	Species	Cover class
Agropyron repens	3	Alopecurus pratensis	2
Bromus inermis	2	Carex nebrascensis	2
Carex utriculata*	0	Cirsium arvense	0
Dactylis glomerata	1	Equisetum arvense	2
Festuca pratensis	5	Juncus balticus	0
Medicago sativa	1	Melilotus alba	1
Melilotus officinalis	1	Phleum pratense	0
Poa pratensis	2	Ranunculus acris	0
Salix exigua	1	Sonchus arvensis	1
Taraxacum officinale	1	Trifolium hybridum	1
Trifolium repens	2		

Comments:

The north edge of community 1 within the footprint of cell 2 transitioned from upland to wetland in 2011.

Community # 4 **Community Type:** Salix exigua / Salix lasiandra **Acres:** 0.26

Species	Cover class	Species	Cover class
Bromus inermis	2	Carex utriculata*	1
Cirsium arvense	1	Cornus stolonifera	3
Cynoglossum officinale	0	Galium palustre	0
Glyceria grandis	2	Glycyrrhiza lepidota	1
Monarda fistulosa	1	Ribes lacustre	2
Rosa woodsii	1	Salix exigua	5
Salix lasiandra	3	Solanum dulcamara	1
Typha latifolia	2		

Comments:

Murphy Creek was flowing through community 4.

Community # 5 **Community Type:** Agropyron repens / Agropyron smithii **Acres:** 0.41

Species	Cover class	Species	Cover class
Agropyron repens	4	Agropyron smithii	4
Alopecurus pratensis	1	Bromus inermis	3
Carex utriculata*	1	Chenopodium album	1
Cicuta douglasii	0	Elaeagnus angustifolia	0
Equisetum arvense	1	Equisetum hyemale	1
Festuca pratensis	4	Glyceria grandis	1
Glycyrrhiza lepidota	0	Hordeum jubatum	0
Lactuca serriola	2	Medicago sativa	1
Melilotus officinalis	1	Mentha arvensis	1
Phleum pratense	1	Plantago major	0
Poa pratensis	1	Taraxacum officinale	0
Triglochin palustre	0		

Comments:

Community # 7 **Community Type:** Alopecurus pratensis / Carex spp. **Acres:** 2.04

Species	Cover class	Species	Cover class
Alopecurus pratensis	4	Carex aquatilis	1
Carex nebrascensis	4	Carex utriculata*	3
Equisetum arvense	0	Festuca pratensis	1
Helianthus nuttallii	0	Juncus balticus	2
Medicago sativa	1	Mentha arvensis	0
Poa pratensis	1	Potentilla gracilis	0
Rosa woodsii	0	Salix exigua	0
Solidago canadensis	0	Sonchus arvensis	0
Taraxacum officinale	0		

Comments:

Saturated to surface in most areas. Inundated ponds in serveral areas.

Community # 9 **Community Type:** Carex nebrascensis / Carex utriculata **Acres:** 0.23

Species	Cover class	Species	Cover class
Agrostis alba	1	Alopecurus pratensis	2
Carex nebrascensis	4	Carex utriculata*	3
Glyceria grandis	1	Helianthus nuttallii	1
Mentha arvensis	1	Scirpus microcarpus	2
Typha latifolia	0		

Comments:

Area was inundated in 2011.

Community # 10 **Community Type:** Salix exigua / Salix drummondiana **Acres:** 2.12

Species	Cover class	Species	Cover class
Agrostis alba	1	Alopecurus pratensis	1
Carex nebrascensis	1	Carex utriculata*	2
Glyceria grandis	1	Mentha arvensis	1
Ribes lacustre	0	Rosa woodsii	1
Salix bebbiana	2	Salix drummondiana	3
Salix exigua	3	Salix lasiandra	2
Salix lemmonii	2	Salix planifolia	2
Scirpus microcarpus	1	Typha latifolia	2

Comments:

4" to 8" of ponded water in community 10 in 2011.

Community # 11 **Community Type:** Bromus inermis / Agropyron repens **Acres:** 1.15

Species	Cover class	Species	Cover class
Agropyron repens	3	Agropyron trachycaulum	1
Bromus inermis	4	Chenopodium leptophyllum	1
Cirsium arvense	0	Cynoglossum officinale	0
Elymus cinereus	1	Equisetum hyemale	1
Festuca pratensis	3	Thlaspi arvense	1

Comments:

Community # 12 **Community Type:** Typha latifolia / **Acres:** 0.52

Species	Cover class	Species	Cover class
Carex nebrascensis	1	Carex utriculata*	3
Eleocharis palustris	1	Helianthus nuttallii	1
Juncus balticus	1	Typha latifolia	5

Comments:

Community # 13 **Community Type:** Glyceria grandis / Festuca pratensis **Acres:** 0.43

Species	Cover class	Species	Cover class
Bare ground	2	Carex praegracilis	0
Deschampsia cespitosa	1	Eleocharis palustris	1
Festuca pratensis	3	Glyceria grandis	4
Juncus articulatus	0	Juncus balticus	1
Juncus longistylis	0	Juncus tenuis	0
Melilotus alba	1	Phleum pratense	1
Trifolium repens	1	Typha latifolia	2

Comments:

Community 2 transitioned to community 13. Comm. Inundated from interval 102' to 145', otherwise saturated to surface.

Community # 14 Community Type: Typha latifolia / Glyceria grandis **Acres:** 2.32

Species	Cover class	Species	Cover class
Carex leptalea	1	Carex nebrascensis	0
Carex praegracilis	0	Carex utriculata*	1
Deschampsia cespitosa	0	Eleocharis palustris	2
Festuca pratensis	1	Glyceria grandis	3
Glycyrrhiza lepidota	0	Hordeum jubatum	1
Juncus balticus	1	Juncus effusus	0
Juncus tenuis	1	Melilotus officinalis	0
Poa pratensis	0	Ranunculus acris	0
Salix drummondiana	0	Scirpus acutus	1
Sparganium androcladum	0	Trifolium repens	1
Triglochin palustre	0	Typha latifolia	5

Comments:

Community 3 transitioned to community 14. Comm inundated w/ 2" to 8" of water.

Community # 15 Community Type: Deschampsia cespitosa / **Acres:** 0.73

Species	Cover class	Species	Cover class
Agropyron repens	1	Agropyron smithii	3
Alopecurus pratensis	2	Chenopodium spp.	1
Deschampsia cespitosa	5	Eleocharis palustris	1
Festuca pratensis	3	Hordeum jubatum	0
Juncus balticus	0	Ranunculus acris	0
Sonchus arvensis	0	Typha latifolia	1

Comments:

Community # 16 Community Type: Aquatic Macrophytes / **Acres:** 0.64

Species	Cover class	Species	Cover class
Algae, green	1	Myriophyllum sp.	2
Open water	5		

Comments:

Total Vegetation Community Acreage **12.59**

(Note: some area within the project bounds may be open water or other non-vegetative ground cover.)

VEGETATION TRANSECTS

Site: Murphy Ox Yoke Date: 7/8/2011

Transect Number: 1 **Compass Direction from Start:** 40

Interval Data:

Ending Station 102 **Community Type:** Festuca pratensis / Agropyron repens

Species	Cover class	Species	Cover class
Agropyron repens	2	Alopecurus pratensis	2
Cirsium arvense	0	Dactylis glomerata	1
Festuca pratensis	5	Melilotus alba	1
Melilotus officinalis	1	Phleum pratense	0
Poa pratensis	2	Ranunculus acris	0
Salix exigua	1	Sonchus arvensis	1
Taraxacum officinale	1	Trifolium hybridum	1
Trifolium repens	1		

Ending Station 175 **Community Type:** Glyceria grandis / Festuca pratensis

Species	Cover class	Species	Cover class
Carex praegracilis	1	Deschampsia cespitosa	1
Eleocharis palustris	2	Festuca pratensis	3
Glyceria grandis	3	Melilotus alba	2
Phleum pratense	0	Trifolium repens	2
Typha latifolia	3		

Ending Station 385 **Community Type:** Typha latifolia / Glyceria grandis

Species	Cover class	Species	Cover class
Carex utriculata*	0	Eleocharis palustris	4
Glyceria grandis	2	Juncus tenuis	1
Scirpus acutus	1	Typha latifolia	5

Ending Station 438 **Community Type:** Glyceria grandis / Festuca pratensis

Species	Cover class	Species	Cover class
Agropyron repens	1	Agropyron smithii	1
Alopecurus pratensis	4	Bromus inermis	1
Carex utriculata*	3	Cicuta douglasii	1
Equisetum arvense	0	Glyceria grandis	3
Mentha arvensis	1	Plantago major	1

Ending Station 450 **Community Type:** Agropyron repens / Agropyron smithii

Species	Cover class	Species	Cover class
Agropyron repens	2	Agropyron smithii	2
Alopecurus pratensis	2	Bromus inermis	5
Cicuta douglasii	2	Equisetum arvense	2
Equisetum hyemale	2	Glycyrrhiza lepidota	1
Phleum pratense	1		

Transect Notes:

Transect Number: 2 **Compass Direction from Start:** 190

Interval Data:

Ending Station 45 **Community Type:** Alopecurus pratensis / Carex spp.

Species	Cover class	Species	Cover class
Alopecurus pratensis	5	Carex aquatilis	1
Carex utriculata*	2	Helianthus nuttallii	1
Mentha arvensis	1		

Ending Station 55 **Community Type:** Aquatic Macrophytes /

Species	Cover class	Species	Cover class
Algae, green	3	Myriophyllum sp	2
Open water	5		

Ending Station 235 **Community Type:** Alopecurus pratensis / Carex spp.

Species	Cover class	Species	Cover class
Alopecurus pratensis	5	Carex aquatilis	1
Carex utriculata*	1	Festuca pratensis	2
Juncus balticus	2	Medicago sativa	1
Mentha arvensis	1	Potentilla gracilis	0
Sonchus arvensis	1		

Ending Station 484 **Community Type:** Typha latifolia / Glyceria grandis

Species	Cover class	Species	Cover class
Carex nebrascensis	1	Carex praegracilis	1
Glyceria grandis	2	Glycyrrhiza lepidota	1
Hordeum jubatum	0	Juncus effusus	1
Melilotus officinalis	2	Ranunculus acris	0
Salix drummondiana	0	Trifolium repens	1
Triglochin palustre	0	Typha latifolia	5

Ending Station 580 **Community Type:** Deschampsia cespitosa /

Species	Cover class	Species	Cover class
Agropyron repens	1	Agropyron smithii	1
Chenopodium spp.	0	Deschampsia cespitosa	4
Eleocharis palustris	2	Hordeum jubatum	1
Ranunculus acris	0	Sonchus arvensis	1
Typha latifolia	2		

Ending Station 610 **Community Type:** Agropyron repens / Agropyron smithii

Species	Cover class	Species	Cover class
Agropyron repens	4	Agropyron smithii	4
Bromus inermis	4	Chenopodium album	1
Cicuta douglasii	1	Equisetum hyemale	1
Festuca pratensis	4	Melilotus officinalis	2
Taraxacum officinale	1		

Transect Notes:

PLANTED WOODY VEGETATION SURVIVAL

Murphy Ox Yoke

Planting Type	#Planted	#Alive	Notes
Populus trichocarpa	20		1-gal
Salix drummondiana	20		1-gal
Salix exigua	20		1-gal
Salix geyeriana	20		1-gal
Salix lutea	20		1-gal
Salix spp.	250	10	250 additional cuttings installed in 2011.
Salix spp.		50	2010
Salix spp.	1000		cuttings installed in 2010

Comments

Numerous willow cuttings were installed along the boundary of both excavated cells. Best survival rate observed on larger diameter, well-pruned cuttings. Lowest survival rate on smaller cuttings without top trimmed. Containerized plantings exhibited a high mortality rate. No live containerized observed in 2011.

Murphy Ox Yoke

WILDLIFE

Birds

Were man-made nesting structures installed? Yes

If yes, type of structure: Bluebird boxes, wood-duck boxes

How many? 11

Are the nesting structures being used? Yes

Do the nesting structures need repairs? No

Nesting Structure Comments:
2 wood-duck boxes, 1 floating nest, and 8 bluebird boxes. All nests recently installed.

Species	#Observed	Behavior	Habitat
American Tree Sparrow	3	FO, L	SS
American White Pelican	6	FO	MA, OW
Black-billed Magpie	1	FO	MA, SS, WM
Brewer's Blackbird	5	FO, L	MA, OW, UP
Mallard	1	BP, L	AB, MA, OW
Red-tailed Hawk	1	FO	SS, UP, WM
Red-winged Blackbird	8	FO, L	MA, OW, UP, WM
Yellow-headed Blackbird	1	L	MA, SS
Yellow-rumped Warbler	1	L	MA, SS

Bird Comments

BEHAVIOR CODES

BP = One of a breeding pair **BD** = Breeding display **F** = Foraging **FO** = Flyover **L** = Loafing **N** = Nesting

HABITAT CODES

AB = Aquatic bed **SS** = Scrub/Shrub **FO** = Forested **UP** = Upland buffer **I** = Island

WM = Wet meadow **MA** = Marsh **US** = Unconsolidated shore **MF** = Mud Flat **OW** = Open Water

Mammals and Herptiles

Species	# Observed	Tracks	Scat	Burrows	Comments
Elk or Wapiti		No	Yes	No	
Frog spp	2	No	No	No	could not postively ID to spp.
Raccoon		Yes	No	No	
White-tailed Deer	1	Yes	No	No	

Wildlife Comments:

Murphy Ox Yoke

PHOTOGRAPHS

Take photographs of the following permanent reference points listed in the check list below. Record the direction of the photograph using a compass. When at the site for the first time, establish a permanent reference point by setting a ½ inch rebar or fencepost extending 2-3 feet above ground. Survey the location with a resource grade GPS and mark the location on the aerial photograph.

Photograph Checklist:

☐ One photograph for each of the four cardinal directions surrounding the wetland.

☐ At least one photograph showing upland use surrounding the wetland. If more than one upland exists then take additional photographs.

☐ At least one photograph showing the buffer surrounding the wetland.

☐ One photograph from each end of the vegetation transect, showing the transect.

Photo #	Latitude	Longitude	Bearing	Description
8011			160	Data point M-1
8012	45.366856	-110.734901	185	Data point M-2
8013	45.365849	-110.735779	170	PP-1, pano 8013-8017
8021			200	T2, start
8022			180	PP-5
8023			140	PP-4
8025			280	T1, end
8026			30	T2, end
8027			270	Data point M-3
8028			50	PP-3, pano 8028-8032
8033			10	Data point M-5
8034			210	Data point M-6
8035			350	PP-2, pano 8035-8039
8040			70	T1, start

Comments:

Murphy Ox Yoke

ADDITIONAL ITEMS CHECKLIST

Hydrology

☐ Map emergent vegetation/open water boundary on aerial photos.
☐ Observe extent of surface water. Look for evidence of past surface water elevations (e.g. drift lines, vegetation staining, erosion, etc).

Photos

☐ One photo from the wetland toward each of the four cardinal directions
☐ One photo showing upland use surrounding the wetland.
☐ One photo showing the buffer around the wetland
☐ One photo from each end of each vegetation transect, toward the transect

Vegetation

☑ Map vegetation community boundaries

☑ Complete Vegetation Transects

Soils

☑ Assess soils

Wetland Delineations

☑ Delineate wetlands according to applicable USACE protocol (1987 form or Supplement)
☑ Delineate wetland – upland boundary onto aerial photograph.

Wetland Delineation Comments

Functional Assessments

☑ Complete and attach full MDT Montana Wetland Assessment Method field forms.

Functional Assessment Comments:

Functional assessment completed in office.

Maintenance

Were man-made nesting structure installed at this site? Yes

If yes, do they need to be repaired? No

If yes, describe the problems below and indicate if any actions were taken to remedy the problems

Were man-made structures built or installed to impound water or control water flow into or out of the wetland? No

If yes, are the structures in need of repair?

If yes, describe the problems below.

No water control structures on site.

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

Project/Site: Murphy Ox-Yoke | City/County: Park | Sampling Date: 7/8/2011

Applicant/Owner: MDT | State: MT | Sampling Point: M-1

Investigator(s): B Vaughn, L Soderquist | Section, Township, Range: S 33 T 5S R 8E

Landform (hillslope, terrace, etc.): Alluvial Fan | Local relief (concave, convex, none): flat | Slope (%): 0

Subregion (LRR): LRR E | Lat: 45.3668483333333 | Long: -110.734823333333 | Datum: WGS 84

Soil Map Unit Name: Vendome-Meadow Creek complex | NWI classification:

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

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☑ No ☐

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

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

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

Remarks:
On the boundary of veg comm 7 and comm 5. Comm 7 is an existing/restored wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	0 = Total Cover		
Herb Stratum (Plot size: 5ft radius)			
1. Alopecurus pratensis	60	☑	FACW
2. Carex nebrascensis	15	☐	OBL
3. Carex utriculata	5	☐	OBL
4. Festuca pratensis	10	☐	FACU-
5. Sonchus arvensis	5	☐	FAC-
6. Equisetum arvense	10	☐	FAC
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
11.	0	☐	
	105 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	60	x 2 =	120
FAC species	15	x 3 =	45
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	105 (A)		225 (B)

Prevalence Index = B/A = 2.1429

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☑ No ☐

Remarks:

SOIL

Sampling Point: M-1

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/4	100					Silt Loam	
2-10	10YR 2/2	100					Silt Loam	
10-16	10YR 2/2	95	10YR 4/3	5	C	M	Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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

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

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☑ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

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

Field Observations:

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

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

Saturation Present? (includes capillary fringe) Yes ☑ No ☐ Depth (inches): 12

Wetland Hydrology Present? Yes ☑ No ☐

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

Remarks:

No other hydrology indicators identified

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

Project/Site: Murphy Ox-Yoke City/County: Park Sampling Date: 7/8/2011

Applicant/Owner: MDT State: MT Sampling Point: M-2

Investigator(s): B Vaughn, L Soderquist Section, Township, Range: S 33 T 5S R 8E

Landform (hillslope, terrace, etc.): Alluvial Fan Local relief (concave, convex, none): flat Slope (%): 0

Subregion (LRR): LRR E Lat: 45.3666533333333 Long: -110.735063333333 Datum: WGS 84

Soil Map Unit Name: Vendome-Meadow Creek complex NWI classification:

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

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☑ No ☐

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

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

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

Remarks:
Point within veg com 5

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	0 = Total Cover		
Herb Stratum (Plot size: 5ft radius)			
1. Festuca pratensis	70	☑	FACU-
2. Lactuca serriola	20	☑	FAC-
3. Glycyrrhiza lepidota	5	☐	FAC+
4. Equisetum arvense	3	☐	FAC
5.	0	☐	
6.	0	☐	
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
11.	0	☐	
	98 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.5 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	28	x 3 =	84
FACU species	70	x 4 =	280
UPL species	0	x 5 =	0
Column Totals:	98 (A)		364 (B)

Prevalence Index = B/A = 3.71429

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☑

Remarks:

SOIL

Sampling Point: M-2

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 4/3	100					Silt Loam	Abundant roots
2-14	10YR 2/2	100					Silt Loam	
14-17	10YR 2/2	95	10YR 4/1	5	D	M	Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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

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

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☑

Remarks:

Criteria requires redox concentrations within upper 12 inches of soil profile.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

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

Field Observations:

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

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

Saturation Present? (includes capillary fringe) Yes ☐ No ☑ Depth (inches): _____

Wetland Hydrology Present? Yes ☐ No ☑

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

Remarks:

No hydro indicators

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

Project/Site: Murphy Ox-Yoke City/County: Park Sampling Date: 7/8/2011

Applicant/Owner: MDT State: MT Sampling Point: M-3

Investigator(s): B Vaughn, L Soderquist Section, Township, Range: S 33 T 5S R 8E

Landform (hillslope, terrace, etc.): Alluvial Fan Local relief (concave, convex, none): flat Slope (%): 0

Subregion (LRR): LRR E Lat: 45.365645 Long: -110.73504 Datum: WGS 84

Soil Map Unit Name: Vendome-Meadow Creek complex NWI classification:

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

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☑ No ☐

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

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

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

Remarks:
Near end of veg transect in community 5 on upland nob between constructed cells and existing wetlands. Near south edge of Cell 1.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft radius)			
1. Bromus inermis	70	☑	NL
2. Phleum pratense	10	☐	FACU
3. Poa pratensis	10	☐	FACU+
4. Cicuta douglasii	1	☐	OBL
5. Festuca pratensis	10	☐	FACU-
6. Chenopodium album	5	☐	FAC
7. Equisetum hyemale	3	☐	FACW
8.	0	☐	
9.	0	☐	
10.	0	☐	
11.	0	☐	
	109 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	1	x 1 =	1
FACW species	3	x 2 =	6
FAC species	5	x 3 =	15
FACU species	30	x 4 =	120
UPL species	0	x 5 =	0
Column Totals:	39 (A)		142 (B)

Prevalence Index = B/A = 3.64103

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☑

Remarks:
Bromus inermis was considered a non-wetland (upland) plant.

SOIL

Sampling Point: M-3

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/2	100					Silt Loam	
3-14	10YR 3/4	95	10YR 2/2	5	D	M	Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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

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

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☑

Remarks:

Chroma not less than 2 below the A horizon.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

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

Field Observations:

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

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

Saturation Present? (includes capillary fringe) Yes ☐ No ☑ Depth (inches): _____

Wetland Hydrology Present? Yes ☐ No ☑

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

Remarks:

No hydro indicators

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

Project/Site: Murphy Ox-Yoke City/County: Park Sampling Date: 7/8/2011

Applicant/Owner: MDT State: MT Sampling Point: M-4

Investigator(s): B Vaughn, L Soderquist Section, Township, Range: S 33 T 5S R 8E

Landform (hillslope, terrace, etc.): Alluvial Fan Local relief (concave, convex, none): flat Slope (%): 0

Subregion (LRR): LRR E Lat: 45.3658316666667 Long: -110.73495 Datum: WGS 84

Soil Map Unit Name: Vendome Meadow-Creek NWI classification:

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

Are Vegetation ☐, Soil ☑, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☑

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

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

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

Remarks:
Located within cell 1 in community 15. Wetland cell constructed within last two years.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft radius)			
1. Deschampsia cespitosa	80	☑	FACW
2. Juncus balticus	3	☐	OBL
3. Agropyron smithii	35	☑	FACU
4. Sonchus arvensis	5	☐	FACU+
5. Chenopodium spp.	5	☐	NO
6.	0	☐	
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
11.	0	☐	
	128 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.5 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	3	x 1 =	
FACW species	80	x 2 =	160
FAC species	0	x 3 =	0
FACU species	40	x 4 =	160
UPL species	0	x 5 =	0
Column Totals:	123 (A)		323 (B)

Prevalence Index = B/A = 2.62602

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☑ No ☐

Remarks:
Community is hydrophytic by prevalence index.

SOIL

Sampling Point: M-4

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4/2	85	10YR 4/4	5	C	M	Clay Loam	Additional mottling 10yr 2 2

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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

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

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☑ No ☐

Remarks:

Hydric soil although data point was located within recently constructed cell. Likely relic soil layer below the excavated horizons.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☑ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ☑ No ☐ Depth (inches): 2

Water Table Present? Yes ☑ No ☐ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ☑ No ☐ Depth (inches): 0

Wetland Hydrology Present? Yes ☑ No ☐

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

Remarks:

Point within veg com 15 within excavated depression of cell 1. Area transitioned to wetland in 2011.

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

Project/Site: Murphy Ox-Yoke City/County: Park Sampling Date: 7/8/2011

Applicant/Owner: MDT State: MT Sampling Point: M-5

Investigator(s): B Vaughn, L Soderquist Section, Township, Range: S 33 T 5S R 8E

Landform (hillslope, terrace, etc.): Alluvial Fan Local relief (concave, convex, none): flat Slope (%): 0

Subregion (LRR): LRR E Lat: 45.3652166666667 Long: -110.735845 Datum: WGS 84

Soil Map Unit Name: Vendome-Meadow Creek Complex NWI classification:

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

Are Vegetation ☐, Soil ☑, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☑

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

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

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

Remarks:
Point within community 13. DataPoint classified as wetland. Hydric soils developing. Wetland cell constructed two years ago.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	0 = Total Cover		
Herb Stratum (Plot size: 5ft radius)			
1. Glyceria grandis	80	☑	NL
2. Phleum pratense	5	☐	FACU
3. Trifolium repens	10	☐	FACU+
4. Juncus balticus	1	☐	OBL
5. Typha latifolia	5	☐	OBL
6.	0	☐	
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
11.	0	☐	
	101 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 5

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	6	x 1 =	
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	15	x 4 =	60
UPL species	0	x 5 =	0
Column Totals:	21 (A)		66 (B)

Prevalence Index = B/A = 3.14286

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☑ No ☐

Remarks:
Glyceria grandis is not listed on the 1988 National list. All Glyceria species listed are FACW or OBL. The vegetation was classified overall as hydrophytic based on professional judgement.

SOIL

Sampling Point: +

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4/2	95	10YR 2/2	5	D	M	Silt Loam	Sat to surface. Recently disturbed soil.

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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

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

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☑ No ☐

Remarks:

Soils considered disturbed due to wetland construction within two years. Hydric soil developing. Criteria for depleted matrix (F3) (matrix color=4/2) requires redox concentrations.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ☑ No ☐ Depth (inches): 1

Water Table Present? Yes ☑ No ☐ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ☑ No ☐ Depth (inches): 0

Wetland Hydrology Present? Yes ☑ No ☐

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

Remarks:

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

Project/Site: Murphy Ox-Yoke | City/County: Park | Sampling Date: 7/8/2011

Applicant/Owner: MDT | State: MT | Sampling Point: M-6

Investigator(s): B Vaughn, L Soderquist | Section, Township, Range: S 33 T 5S R 8E

Landform (hillslope, terrace, etc.): Alluvial Fan | Local relief (concave, convex, none): flat | Slope (%): 0

Subregion (LRR): LRR E | Lat: 45.3650633333333 | Long: -110.735851666667 | Datum: WGS 84

Soil Map Unit Name: Vendome-Meadow Creek Complex | NWI classification:

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

Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☑ No ☐

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

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

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

Remarks:
Data point located in community 1 near edge of Community 13. Point not considered wetland based on lack of hydrophytic plant community. Area appears to be transitioning to wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft radius)			
1. Trifolium repens	5	☐	FACU+
2. Festuca pratensis	90	☑	FACU+
3. Medicago sativa	5	☐	NO
4. Alopecurus pratensis	10	☐	FACW
5. Melilotus alba	2	☐	FACU
6.	0	☐	
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
11.	0	☐	
	112 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	0	x 3 =	0
FACU species	97	x 4 =	388
UPL species	0	x 5 =	0
Column Totals:	107 (A)		408 (B)

Prevalence Index = B/A = 3.81308

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☑

Remarks:

SOIL

Sampling Point: M-6

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	95					Sandy Loam	
6-12	2.5Y 3/2	80	7.5YR 5/6	20	C	M	Fine Silty Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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

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

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☑ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ☑ No ☐ Depth (inches): 1

Water Table Present? Yes ☑ No ☐ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ☑ No ☐ Depth (inches): 0

Wetland Hydrology Present? Yes ☑ No ☐

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

Remarks:

Rain before and during site visit increased surface water hydrology @ data point.

MDT Montana Wetland Assessment Form (revised March 2008)

1. Project name Murphy Ox Yoke Ranch **2. MDT project#** STPX 34/(16) **Control#** 5228

3. Evaluation Date 7/8/2011 **4. Evaluators** B.Vaughn, L. Soderquis **5. Wetland/Site# (s)** Wetland Creation

6. Wetland Location(s): **T** 5S **R** 8E **Sec1** 28 **T** **R** **Sec2**

Approx Stationing or Mileposts

Watershed 10070002 **Watershed/County** Upper Yellowstone Watershed/Park County

7. Evaluating Agency Confluence for MDT

8. Wetland size acres 4.09

Purpose of Evaluation

How assessed: Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

9. Assesssment area (AA) size (acres) 4.09

☐ **Mitigation Wetlands: pre-construction**

How assessed: Measured e.g. by GPS

☑ **Mitigation Wetlands: post construction**

☐ **Other**

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
Depressional	Emergent Wetland	Excavated	Seasonal/Intermittant	75
Depressional	Aquatic Bed	Excavated	Permanent/Perennial	25

11. Estimated Relative Abundance Common

12. General Condition of AA

i. Disturbance: (use matrix below to determine [circle] appropriate response – see instructions for Montana-listed noxious weed and aquatic nuisance vegetation species (**ANVS**) lists)

Conditions within AA	*Predominant conditions adjacent to (within 500 feet of) AA*		
	Managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings; and noxious weed or ANVS cover is <=15%.	Land not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to minor clearing; contains few roads or buildings; noxious weed or ANVS cover is <=30%.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >=30%.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings; and noxious weed or ANVS cover is <=15%.	low disturbance	low disturbance	moderate disturbance
AA not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads or buildings; noxious weed or ANVS cover is <=30%.	moderate	moderate disturbance	high disturbance
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >=30%.	high disturbance	high disturbance	high disturbance

Comments: (types of disturbance, intensity, season, etc)

AA condition based on excavation of wetland two years ago and improving emergence of native plant cover and decreasing bare ground. Rated high disturbance in 2010. Site previously grazed. Grazing was discontinued and site is currently managed in a natural state within conservation easement.

ii. Prominent noxious, aquatic nuisance, other exotic species:

None

iii. Provide brief descriptive summary of AA and surrounding land use/habitat

AA includes two wetland cells (Cell 1 and Cell 2) constructed in 2009 within basin adjacent to Hwy 89 and to predominantly undisturbed, existing emergent and scrub-shrub riparian corridor.

13. Structural Diversity: (based on number of "Cowardin" ***vegetated*** classes present [do not include unvegetated classes], see #10 above)

Existing # of "Cowardin" Vegetated Classes in AA	Initial Rating	Is current management preventing (passive) existence of additional vegetated classes?		Modified Rating
>=3 (or 2 if 1 is forested) classes	H	NA	NA	NA
2 (or 1 if forested) classes	M	NA	NA	NA
1 class, but not a monoculture	M	<NO	YES>	L
1 class, monoculture (1 species comprises>=90% of total cover)	L	NA	NA	NA

Comments: Emergent vegetation, aquatic bed class greater than 50% cover on open water of Cell 1.

SECTION PERTAINING to FUNCTIONS VALUES ASSESSMENT

14A. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals:

i. AA is Documented (D) or Suspected (S) to contain (check one based on definitions contained in instructions):

Primary or critical habitat (list species)	○ D ○ S	
Secondary habitat (list Species)	○ D ○ S	
Incidental habitat (list species)	◉ D ○ S	Grizzly bear
No usable habitat	☐ S	

ii. Rating (use the conclusions from i above and the matrix below to arrive at [check] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
Functional Points and Rating	1H	.9H	.8H	.7M	.3L	.1L	0L

Sources for documented use USF&WS, based on MDT and landowner input

14B. Habitat for plant or animals rated S1, S2, or S3 by the Montana Natural Heritage Program: (not including species listed in14A above)

i. AA is Documented (D) or Suspected (S) to contain (check one based on definitions contained in instructions):

Primary or critical habitat (list species)	○ D ○ S	
Secondary habitat (list Species)	◉ D ○ S	Western toad (S2), Great Blue Heron (S3), Trumpeter Swan (S3)
Incidental habitat (list species)	◉ D ○ S	Bald Eagle (S3)
No usable habitat	☐ S	

ii. Rating (use the conclusions from i above and the matrix below to arrive at [check] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
S1 Species: *Functional Points and Rating*	1H	.8H	.7M	.6M	.2L	.1L	0L
S2 and S3 Species: *Functional Points and Rating*	.9H	.7M	.6M	.5M	.2L	.1L	0L

Sources for documented use MTNHP list for Park County, pair of Trumpeter Swan observed by landowner.

14C. General Wildlife Habitat Rating:

i. Evidence of overall wildlife use in the AA (check substantial, moderate, or low based on supporting evidence): Moderate

Substantial (based on any of the following [check]):

- ☐ observations of abundant wildlife #s or high species diversity (during any period)
- ☐ abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ☐ presence of extremely limiting habitat features not available in the surrounding area
- ☐ interviews with local biologists with knowledge of the AA

Minimal (based on any of the following [check]):

- ☐ few or no wildlife observations during peak use periods
- ☐ little to no wildlife sign
- ☐ sparse adjacent upland food sources
- ☐ interviews with local biologists with knowledge of the AA

Moderate (based on any of the following [check]):

- ☐ observations of scattered wildlife groups or individuals or relatively few species during peak periods
- ☑ common occurrence of wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ☐ adequate adjacent upland food sources
- ☐ interviews with local biologists with knowledge of the AA

ii. Wildlife habitat features (Working from top to bottom, check appropriate AA attributes in matrix to arrive at rating. Structural diversity is from #13. For class cover to be considered evenly distributed, the most and least prevalent **vegetated** classes must be within 20% of each other in terms of their percent composition of the AA (see #10). Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; and A = absent [see instructions for further definitions of these terms])

Structural diversity (see #13)	High								Moderate								Low			
Class cover distribution (all vegetated classes)	Even				Uneven				Even				Uneven				Even			
Duration of surface water in ≥ 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12i)	E	E	E	H	E	E	H	H	E	H	H	M	E	H	M	M	E	H	M	M
Moderate disturbance at AA (see #12i)	H	H	H	H	H	H	H	M	H	H	M	M	H	M	M	L	H	M	L	L
High disturbance at AA (see #12i)	M	M	M	L	M	M	L	L	M	M	L	L	M	L	L	L	L	L	L	L

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [check] the functional points and rating)

Evidence of wildlife use (i)	*Wildlife habitat features rating (ii)*			
	Exceptional	High	Moderate	Low
Substantial	1E	.9H	.8H	.7M
Moderate	.9H	.7M	.5M	.3L
Minimal	.6M	.4M	.2L	.1L

Comments Increase in general habitat rating primarily the result of change in water regime to P/P and decrease in disturbance rating.

14D. General Fish Habitat Rating: (Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not used by fish, fish use is not restorable due to habitat constraints, or is not desired from a management perspective [such as fish entrapped in a canal], then check ☑ **NA** here and proceed to 14E.)

i. Habitat Quality and Known / Suspected Fish Species in AA (use matrix to arrive at [check the functional points and rating)

Duration of surface water in AA	Permanent / Perennial						Seasonal / Intermittent						Temporary / Ephemeral					
Aquatic hiding / resting / escape cover	Optimal		Adequate		Poor		Optimal		Adequate		Poor		Optimal		Adequate		Poor	
Thermal cover optimal / suboptimal	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S
FWP Tier I fish species	1E	.9H	.8H	.7M	.6M	.5M	.9H	.8H	.7M	.6M	.5M	.4M	.7M	.6M	.5M	.4M	.3L	.3L
FWP Tier II or Native Game fish species	.9H	.8H	.7M	.6M	.5M	.5M	.8H	.7M	.6M	.5M	.4M	.4M	.6M	.5M	.4M	.3L	.2L	.2L
FWP Tier III or Introduced Game fish	.8H	.7M	.6M	.5M	.5M	.4M	.7M	.6M	.5M	.4M	.4M	.3L	.5M	.4M	.3L	.2L	.2L	.1L
FWP Non-Game Tier IV or No fish species	.5M	.5M	.5M	.4M	.4M	.3L	.4M	.4M	.4M	.3L	.3L	.2L	.2L	.2L	.2L	.1L	.1L	.1L

Sources used for identifying fish sp. potentially found in AA:

ii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1)
a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity ***or*** *is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support,* ***or*** *do aquatic nuisance plant or animal species (see* ***Appendix E****) occur in fish habitat?* **Y** ◯ **N** ◉ *If yes, reduce score in* ***i*** *above by 0.1:* **Modified Rating**

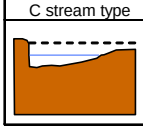
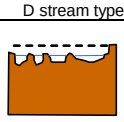
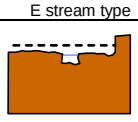
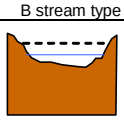
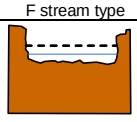
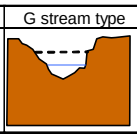
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ◯ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

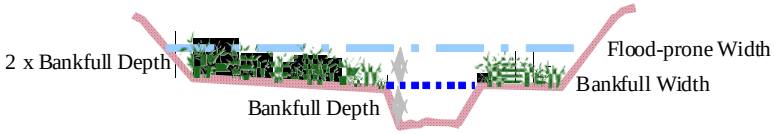
iii. Final Score and Rating: 0 NA **Comments:**

14E. Flood Attenuation: (Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA are not flooded from in-channel or overbank flow, click ☐ **NA** here and proceed to 14F.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	Slightly entrenched - C, D, E stream types			Moderately entrenched – B stream type			Entrenched-A, F, G stream types		
% of flooded wetland classified as forested and/or scrub/shrub	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains **no outlet or restricted outlet**	1H	.9H	.6M	.8H	.7M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.8H	.5M	.7M	.6M	.4M	.3L	.2L	.1L

Slightly Entrenched ER = >2.2			**Moderately Entrenched ER = 1.41 – 2.2**	**Entrenched ER = 1.0 – 1.4**		
C stream type	D stream type	E stream type	B stream type	A stream type	F stream type	G stream type
						



Floodrpone width / **Bankfull width** = **Entrenchment ratio**

ii. Are ≥10 acres of wetland in the AA subject to flooding **AND** are man-made features which may be significantly damaged by floods located within 0.5 mile downstream of the AA (check)? **Y** ◯ **N** ◉

Comments: Cells subject to flooding from Murphy Creek (slightly entrenched). AA contains no outlet.

14F. Short and Long Term Surface Water Storage: (Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow. If no wetlands in the AA are subject to flooding or ponding, click ☐ **NA** here and proceed to 14G.)

i. Rating (Working from top to bottom, use the matrix below to arrive at [check] the functional points and rating. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see instructions for further definitions of these terms].)

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding	>5 acre feet			1.1 to 5 acre feet			≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond **≥ 5 out of 10 years**	1H	.9H	.8H	.8H	.6M	.5M	.4M	.3L	.2L
Wetlands in AA flood or pond **< 5 out of 10 years**	.9H	.8H	.7M	.7M	.5M	.4M	.3L	.2L	.1L

Comments: Increase in rating as a result of increased inundation in 2011. Assumes flooding of 4.1 acres to a depth of 1.0 ft of water.

14G. Sediment/Nutrient/Toxicant Retention and Removal: (Applies to wetlands with potential to receive sediments, nutrients, or toxicants through influx of surface or ground water or direct input. If no wetlands in the AA are subject to such input, click ☐ **NA** here and proceed to 14H.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating [H = high, M = moderate, or L = low])

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver levels of sediments, nutrients, or compounds at levels such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	≥ 70%		< 70%		≥ 70%		< 70%	
Evidence of flooding / ponding in AA	Yes	No	Yes	No	Yes	No	Yes	No
AA contains **no or restricted outlet**	1H	.8H	.7M	.5M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.7M	.6M	.4M	.4M	.3L	.2L	.1L

Comments: Cells were flooded in 2011.

14H Sediment/Shoreline Stabilization: (Applies only if AA occurs on or within the banks or a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action. If 14H does not apply, click ☐ **NA** here and proceed to 14I.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

*% Cover of **wetland** streambank or shoreline by species with stability ratings of ≥6 (see **Appendix F**).*	*Duration of surface water adjacent to rooted vegetation*		
	Permanent / Perennial	Seasonal / Intermittent	Temporary / Ephemeral
≥ 65%	1H	.9H	.7M
35-64%	.7M	.6M	.5M
< 35%	.3L	.2L	.1L

Comments: Beaked sedge, Nebraska sedge, Baltic rush, and cattail cover on cell shoreline increased to 35% to 64% in 2011.

14I. Production Export/Food Chain Support:

i. Level of Biological Activity (synthesis of wildlife and fish habitat ratings [check])

General Fish Habitat Rating (14D.iii.)	**General Wildlife Habitat Rating (14C.iii.)**		
	E/H	M	L
E/H	H	H	M
M	H	M	M
L	M	M	L
N/A	H	M	L

ii. Rating (Working from top to bottom, use the matrix below to arrive at [check] the functional points and rating. Factor A = acreage of vegetated wetland component in the AA; Factor B = level of biological activity rating from above (14I.i.); Factor C = whether or not the AA contains a surface or subsurface outlet; the final three rows pertain to duration of surface water in the AA, where P/P, S/I, and T/E are as previously defined, and A = "absent" [see instructions for further definitions of these terms].)

A	Vegetated component >5 acres						Vegetated component 1-5 acres						Vegetated component <1 acre					
B	High		Moderate		Low		High		Moderate		Low		High		Moderate		Low	
C	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P	1E	.7H	.8H	.5M	.6M	.4M	.9H	.6M	.7H	.4M	.5M	.3L	.8H	.6M	.6M	.4M	.3L	.2L
S/I	.9	.6M	.7H	.4	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.5M	.5M	.3L	.3L	.2L
T/E/A	.8	.5M	.6M	.3L	.4M	.2L	.7H	.4M	.5M	.2L	.3L	.1L	.6M	.4M	.4M	.2L	.2L	.1L

iii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1.) **Vegetated Upland Buffer (VUB)**: Area with ≥ 30% plant cover, ≤ 15% noxious weed or ANVS cover, and that is not subjected to periodic mechanical mowing or clearing (unless for weed control).

a) Is there an average ≥ 50 foot-wide vegetated upland buffer around ≥ 75% of the AA circumference? **Y** ◉ **N** ○ *If yes, add 0.1 to the score in **ii** above and adjust rating accordingly:* **Modified Rating** .5M

Comments:

14J. Groundwater Discharge/Recharge: (check the appropriate indicators in i & ii below)

i. Discharge Indicators

- ☐ The AA is a slope wetland
- ☐ Springs or seeps are known or observed
- ☐ Vegetation growing during dormant season/drought
- ☐ Wetland occurs at the toe of a natural slope
- ☐ Seeps are present at the wetland edge
- ☐ AA permanently flooded during drought periods
- ☐ Wetland contains an outlet, but no inlet
- ☑ Shallow water table and the site is saturated to the surface
- ☐ Other:

ii. Recharge Indicators

- ☐ Permeable substrate present without underlying impeding layer
- ☐ Wetland contains inlet but no outlet
- ☐ Stream is a known 'losing' stream; discharge volume decreases
- ☐ Other:

iii. Rating (use the information from i and ii above and the table below to arrive at [check] the functional points and rating)

	Duration of saturation at AA Wetlands *FROM GROUNDWATER DISCHARGE OR WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM*			
Criteria	P/P	S/I	T	None
Groundwater Discharge or Recharge	1H	.7M	.4M	.1L
Insufficient Data/Information	NA			

Comments:

14K. Uniqueness:

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

Replacement potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland **or** plant association listed as "S1" by the MTNHP			AA does not contain previously cited rare types **and** structural diversity (#13) is high **or** contains plant association listed as "S2" by the MTNHP			AA does not contain previously cited rare types or associations **and** structural diversity (#13) is low-moderate		
Estimated relative abundance (#11)	rare	common	abundant	rare	common	abundant	rare	common	abundant
Low disturbance at AA (#12i)	1H	.9H	.8H	.8H	.6M	.5M	.5M	.4M	.3L
Moderate disturbance at AA (#12i)	.9H	.8H	.7M	.7M	.5M	.4M	.4M	.3L	.2L
High disturbance at AA (#12i)	.8H	.7H	.6M	.6M	.4M	.3L	.3L	.2L	.1L

Comments:

14L. Recreation/Education Potential: (affords "bonus" points if AA provides recreation or education opportunity)

i. Is the AA a known or potential rec./ed. site: (check) **Y** ◉ **N** ○ (if 'Yes' continue with the evaluation; if 'No' then click ☐ **NA** here and proceed to the overall summary and rating page)

ii. Check categories that apply to the AA: ☐ Educational/scientific study; ☐ Consumptive rec.; ☑ Non-consumptive rec.; ☐ Other

iii. Rating (use the matrix below to arrive at [check] the functional points and rating)

Known or Potential Recreation or Education Area	Known	Potential
Public ownership or public easement with general public access (no permission required)	.2H	.15H
Private ownership with general public access (no permission required)	.15H	.1M
Private or public ownership without general public access, or requiring permission for public access	.1M	.05L

Comments:

General Site Notes

Increase in ratings the result of shift in water regime from T/E to P/P and corresponding increase in vegetation cover and reducted disturbance rating.

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR WETLAND/SITE #(S): Wetland Creation

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)	Indicate the four most prominent functions with an asterisk (*)
A. Listed/Proposed T&E Species Habitat	L	.3	1	1.227	☐
B. MT Natural Heritage Program Species Habitat	M	.6	1	2.454	☐
C. General Wildlife Habitat	M	.7	1	2.863	☑
D. General Fish Habitat	NA	0	0	0	☐
E. Flood Attenuation	M	.6	1	2.454	☑
F. Short and Long Term Surface Water Storage	H	.8	1	3.272	☑
G. Sediment/Nutrient/Toxicant Removal	M	.7	1	2.863	☑
H. Sediment/Shoreline Stabilization	M	.7	1	2.863	☐
I. Production Export/Food Chain Support	M	.5	1	2.045	☐
J. Groundwater Discharge/Recharge	H	1	1	4.09	☐
K. Uniqueness	L	.3	1	1.227	☐
L. Recreation/Education Potential (bonus points)	M	.1	NA	0.409	☐
Totals:		6.3	10	25.767	
Percent of Possible Score			**63** %		

Category I Wetland: (must satisfy **one** of the following criteria; otherwise go to Category II)
- ☐ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; **or**
- ☐ Score of 1 functional point for Uniqueness; **or**
- ☐ Score of 1 functional point for Flood Attenuation **and** answer to Question 14E.ii is "yes"; **or**
- ☐ Percent of possible score > 80% (round to nearest whole #).

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following criteria; otherwise go to Category IV)
- ☐ Score of 1 functional point for MT Natural Heritage Program Species Habitat; **or**
- ☐ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
- ☐ Score of .9 or 1 functional point for General Fish Habitat; **or**
- ☐ "High" to "Exceptional" ratings for **both** General Wildlife Habitat **and** General Fish/Aquatic Habitat; **or**
- ☐ Score of .9 functional point for Uniqueness; **or**
- ☐ Percent of possible score > 65% (round to nearest whole #).

Category III Wetland: (Criteria for Categories I, II, or IV not satisfied)

☑

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; otherwise go to Category III)
- ☐ "Low" rating for Uniqueness; **and**
- ☐ Vegetated wetland component < 1 acre (do not include upland vegetated buffer); **and**
- ☐ Percent of possible score < 35% (round to nearest whole #).

OVERALL ANALYSIS AREA RATING:
(check appropriate category based on the criteria outlined

I	II	III	IV

MDT Montana Wetland Assessment Form (revised March 2008)

1. Project name Murphy Ox Yoke Ranch **2. MDT project#** STPX 34(16) **Control#** 5228

3. Evaluation Date 7/8/2011 **4. Evaluators** B.Vaughn, L. Soderquis **5. Wetland/Site# (s)** Wetland Preservation

6. Wetland Location(s): **T** 5S **R** 8E **Sec1** 28 **T** **R** **Sec2**

Approx Stationing or Mileposts

Watershed 10070002 **Watershed/County** Upper Yellowstone Watershed/Park County

7. Evaluating Agency Confluence for MDT

8. Wetland size acres 1.89

Purpose of Evaluation

How assessed: Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

9. Assesssment area (AA) size (acres) 1.89

☐ **Mitigation Wetlands: pre-construction**

How assessed: Measured e.g. by GPS

☑ **Mitigation Wetlands: post construction**

☐ **Other**

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
Riverine	Emergent Wetland		Permanent/Perennial	50
Riverine	Scrub-Shrub Wetland		Permanent/Perennial	50

11. Estimated Relative Abundance Common

12. General Condition of AA

i. Disturbance: (use matrix below to determine [circle] appropriate response – see instructions for Montana-listed noxious weed and aquatic nuisance vegetation species (**ANVS**) lists)

Conditions within AA	*Predominant conditions adjacent to (within 500 feet of) AA*		
	Managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings; and noxious weed or ANVS cover is <=15%.	Land not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to minor clearing; contains few roads or buildings; noxious weed or ANVS cover is <=30%.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >=30%.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings; and noxious weed or ANVS cover is <=15%.	low disturbance	low disturbance	moderate disturbance
AA not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads or buildings; noxious weed or ANVS cover is <=30%.	moderate	moderate disturbance	high disturbance
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >=30%.	high disturbance	high disturbance	high disturbance

Comments: (types of disturbance, intensity, season, etc)

Existing riparian corridor associated with Murphy Creek located on the east half of the site that was moderately grazed historically. No longer grazed or hayed AA managed in a natural state protected by conservation easement. Noxious weed cover well less than 15%.

ii. Prominent noxious, aquatic nuisance, other exotic species:

Canada thistle (Cirsium arvense), Cynoglossum officinale (hounds's tongue

iii. Provide brief descriptive summary of AA and surrounding land use/habitat

AA encompasses 3.13 acres of existing wetland identified during original delineation. Targeted for preservation in mitigation plan. Scrub/shrub corridor between Park Branch Canal and created wetland cells. AA and adjacent land not currently grazed. Hwy 89 located west of site. Inundation levels in AA higher in 2011 than in 2010. Murphy Creek flowing during investigation.

13. Structural Diversity: (based on number of "Cowardin" ***vegetated*** classes present [do not include unvegetated classes], see #10 above)

Existing # of "Cowardin" Vegetated Classes in AA	Initial Rating	Is current management preventing (passive) existence of additional vegetated classes?		Modified Rating
>=3 (or 2 if 1 is forested) classes	H	NA	NA	NA
2 (or 1 if forested) classes	M	NA	NA	NA
1 class, but not a monoculture	M	<NO	YES>	L
1 class, monoculture (1 species comprises>=90% of total cover)	L	NA	NA	NA

Comments: scrub-shrub and emergent

SECTION PERTAINING to FUNCTIONS VALUES ASSESSMENT

14A. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals:

i. AA is Documented (D) or Suspected (S) to contain (check one based on definitions contained in instructions):

Primary or critical habitat (list species)	○ D ○ S	
Secondary habitat (list Species)	○ D ○ S	
Incidental habitat (list species)	◉ D ○ S	Grizzly bear
No usable habitat	☐ S	

ii. Rating (use the conclusions from i above and the matrix below to arrive at [check] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
Functional Points and Rating	1H	.9H	.8H	.7M	.3L	.1L	0L

Sources for documented use: listed on USF&WS for T&R, MDT-landowner observed.

14B. Habitat for plant or animals rated S1, S2, or S3 by the Montana Natural Heritage Program: (not including species listed in14A above)

i. AA is Documented (D) or Suspected (S) to contain (check one based on definitions contained in instructions):

Primary or critical habitat (list species)	○ D ○ S	
Secondary habitat (list Species)	◉ D ○ S	Western toad (S2), Great Blue Heron (S3), Trumpeter Swan (S3)
Incidental habitat (list species)	◉ D ○ S	Bald Eagle (S3)
No usable habitat	☐ S	

ii. Rating (use the conclusions from i above and the matrix below to arrive at [check] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
S1 Species: *Functional Points and Rating*	1H	.8H	.7M	.6M	.2L	.1L	0L
S2 and S3 Species: *Functional Points and Rating*	.9H	.7M	.6M	.5M	.2L	.1L	0L

Sources for documented use: MTNHP, toad listed for Park C, Other spp.by T&R.

14C. General Wildlife Habitat Rating:

i. Evidence of overall wildlife use in the AA (check substantial, moderate, or low based on supporting evidence):

Moderate

Substantial (based on any of the following [check]):

- ☐ observations of abundant wildlife #s or high species diversity (during any period)
- ☐ abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ☐ presence of extremely limiting habitat features not available in the surrounding area
- ☐ interviews with local biologists with knowledge of the AA

Minimal (based on any of the following [check]):

- ☐ few or no wildlife observations during peak use periods
- ☐ little to no wildlife sign
- ☐ sparse adjacent upland food sources
- ☐ interviews with local biologists with knowledge of the AA

Moderate (based on any of the following [check]):

- ☐ observations of scattered wildlife groups or individuals or relatively few species during peak periods
- ☑ common occurrence of wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ☑ adequate adjacent upland food sources
- ☐ interviews with local biologists with knowledge of the AA

ii. Wildlife habitat features (Working from top to bottom, check appropriate AA attributes in matrix to arrive at rating. Structural diversity is from #13. For class cover to be considered evenly distributed, the most and least prevalent **vegetated** classes must be within 20% of each other in terms of their percent composition of the AA (see #10). Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; and A = absent [see instructions for further definitions of these terms])

Structural diversity (see #13)	High								Moderate								Low			
Class cover distribution (all vegetated classes)	Even				Uneven				Even				Uneven				Even			
Duration of surface water in ≥ 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12i)	E	E	E	H	E	E	H	H	E	H	H	M	E	H	M	M	E	H	M	M
Moderate disturbance at AA (see #12i)	H	H	H	H	H	H	H	M	H	H	M	M	H	M	M	L	H	M	L	L
High disturbance at AA (see #12i)	M	M	M	L	M	M	L	L	M	M	L	L	M	L	L	L	L	L	L	L

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [check] the functional points and rating)

Evidence of wildlife use (i)	*Wildlife habitat features rating (ii)*			
	Exceptional	High	Moderate	Low
Substantial	1E	.9H	.8H	.7M
Moderate	.9H	.7M	.5M	.3L
Minimal	.6M	.4M	.2L	.1L

Comments

14D. General Fish Habitat Rating: (Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not used by fish, fish use is not restorable due to habitat constraints, or is not desired from a management perspective [such as fish entrapped in a canal], then check ☑ **NA** here and proceed to 14E.)

i. Habitat Quality and Known / Suspected Fish Species in AA (use matrix to arrive at [check the functional points and rating)

Duration of surface water in AA	Permanent / Perennial						Seasonal / Intermittent						Temporary / Ephemeral					
Aquatic hiding / resting / escape cover	Optimal		Adequate		Poor		Optimal		Adequate		Poor		Optimal		Adequate		Poor	
Thermal cover optimal / suboptimal	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S
FWP Tier I fish species	1E	.9H	.8H	.7M	.6M	.5M	.9H	.8H	.7M	.6M	.5M	.4M	.7M	.6M	.5M	.4M	.3L	.3L
FWP Tier II or Native Game fish species	.9H	.8H	.7M	.6M	.5M	.5M	.8H	.7M	.6M	.5M	.4M	.4M	.6M	.5M	.4M	.3L	.2L	.2L
FWP Tier III or Introduced Game fish	.8H	.7M	.6M	.5M	.5M	.4M	.7M	.6M	.5M	.4M	.4M	.3L	.5M	.4M	.3L	.2L	.2L	.1L
FWP Non-Game Tier IV or No fish species	.5M	.5M	.5M	.4M	.4M	.3L	.4M	.4M	.4M	.3L	.3L	.2L	.2L	.2L	.2L	.1L	.1L	.1L

Sources used for identifying fish sp. potentially found in AA:

ii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1)
a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity ***or*** *is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support,* ***or*** *do aquatic nuisance plant or animal species (see* ***Appendix E****) occur in fish habitat?* **Y** ◯ **N** ◉ *If yes, reduce score in* ***i*** *above by 0.1:* **Modified Rating**

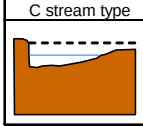
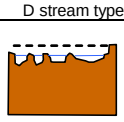
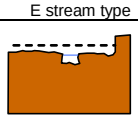
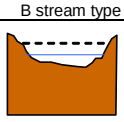
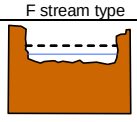
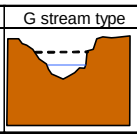
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ◯ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

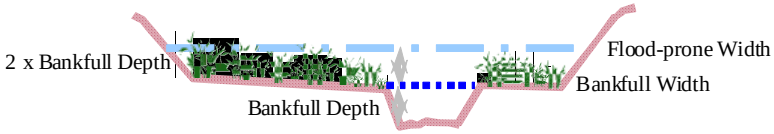
iii. Final Score and Rating: 0 NA **Comments:** No known fishery. The source of Murphy Creek is via culvert from Murphy Swamp, located across from Hwy 89. The channel is very narrow (less than 1 foot) and shallow (less than 2 inches) in segments.

14E. Flood Attenuation: (Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA are not flooded from in-channel or overbank flow, click ☐ **NA** here and proceed to 14F.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	Slightly entrenched - C, D, E stream types			Moderately entrenched – B stream type			Entrenched-A, F, G stream types		
% of flooded wetland classified as forested and/or scrub/shrub	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains **no outlet or restricted outlet**	1H	.9H	.6M	.8H	.7M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.8H	.5M	.7M	.6M	.4M	.3L	.2L	.1L

Slightly Entrenched ER = >2.2			**Moderately Entrenched ER = 1.41 – 2.2**	**Entrenched ER = 1.0 – 1.4**		
C stream type	D stream type	E stream type	B stream type	A stream type	F stream type	G stream type
						



Floodrpone width 8 **/** **Bankfull width** 2 **=** **Entrenchment ratio** 4

ii. Are ≥10 acres of wetland in the AA subject to flooding **AND** are man-made features which may be significantly damaged by floods located within 0.5 mile downstream of the AA (check)? **Y** ◯ **N** ◉

Comments: AA receives overbank flow from Murphy Creek. Creek runs under Park Canal via culvert then discharges to the Yellowstone. E stream type.

14F. Short and Long Term Surface Water Storage: (Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow. If no wetlands in the AA are subject to flooding or ponding, click ☐ **NA** here and proceed to 14G.)

i. Rating (Working from top to bottom, use the matrix below to arrive at [check] the functional points and rating. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see instructions for further definitions of these terms].)

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding	>5 acre feet			1.1 to 5 acre feet			≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond **≥ 5 out of 10 years**	1H	.9H	.8H	.8H	.6M	.5M	.4M	.3L	.2L
Wetlands in AA flood or pond **< 5 out of 10 years**	.9H	.8H	.7M	.7M	.5M	.4M	.3L	.2L	.1L

Comments: Assumes the entire AA (3.13A) is subject to flooding approx. one foot deep.

14G. Sediment/Nutrient/Toxicant Retention and Removal: (Applies to wetlands with potential to receive sediments, nutrients, or toxicants through influx of surface or ground water or direct input. If no wetlands in the AA are subject to such input, click ☐ **NA** here and proceed to 14H.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating [H = high, M = moderate, or L = low])

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver levels of sediments, nutrients, or compounds at levels such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	≥ 70%		< 70%		≥ 70%		< 70%	
Evidence of flooding / ponding in AA	Yes	No	Yes	No	Yes	No	Yes	No
AA contains **no or restricted outlet**	1H	.8H	.7M	.5M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.7M	.6M	.4M	.4M	.3L	.2L	.1L

Comments: Murphy Creek ultimately discharges to Yellowstone River via culvert under Park Branch Canal.

14H Sediment/Shoreline Stabilization: (Applies only if AA occurs on or within the banks or a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action. If 14H does not apply, click ☐ **NA** here and proceed to 14I.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

*% Cover of **wetland** streambank or shoreline by species with stability ratings of ≥6 (see **Appendix F**).*	*Duration of surface water adjacent to rooted vegetation*		
	Permanent / Perennial	Seasonal / Intermittent	Temporary / Ephemeral
≥ 65%	1H	.9H	.7M
35-64%	.7M	.6M	.5M
< 35%	.3L	.2L	.1L

Comments: Riparian corridor well-vegetated with sandbar, Pacific, Lemmon, Drummond, and diamond-leaf willow, cattail, beaked and Nebraska sedge, and mannagrass.

14I. Production Export/Food Chain Support:

i. Level of Biological Activity (synthesis of wildlife and fish habitat ratings [check])

General Fish Habitat Rating (14D.iii.)	**General Wildlife Habitat Rating (14C.iii.)**		
	E/H	M	L
E/H	H	H	M
M	H	M	M
L	M	M	L
N/A	H	M	L

ii. Rating (Working from top to bottom, use the matrix below to arrive at [check] the functional points and rating. Factor A = acreage of vegetated wetland component in the AA; Factor B = level of biological activity rating from above (14I.i.); Factor C = whether or not the AA contains a surface or subsurface outlet; the final three rows pertain to duration of surface water in the AA, where P/P, S/I, and T/E are as previously defined, and A = "absent" [see instructions for further definitions of these terms].)

A	Vegetated component >5 acres						Vegetated component 1-5 acres						Vegetated component <1 acre					
B	High		Moderate		Low		High		Moderate		Low		High		Moderate		Low	
C	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P	1E	.7H	.8H	.5M	.6M	.4M	.9H	.6M	.7H	.4M	.5M	.3L	.8H	.6M	.6M	.4M	.3L	.2L
S/I	.9	.6M	.7H	.4	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.5M	.5M	.3L	.3L	.2L
T/E/A	.8	.5M	.6M	.3L	.4M	.2L	.7H	.4M	.5M	.2L	.3L	.1L	.6M	.4M	.4M	.2L	.2L	.1L

iii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1.) **Vegetated Upland Buffer (VUB)**: Area with ≥ 30% plant cover, ≤ 15% noxious weed or ANVS cover, and that is not subjected to periodic mechanical mowing or clearing (unless for weed control).

a) Is there an average ≥ 50 foot-wide vegetated upland buffer around ≥ 75% of the AA circumference? **Y** ◉ **N** ○ *If yes, add 0.1 to the score in **ii** above and adjust rating accordingly:* **Modified Rating** 1 E

Comments: Surrounded by undisturbed upland buffer w/ >30% cover and <15% noxious weeds.

14J. Groundwater Discharge/Recharge: (check the appropriate indicators in i & ii below)

i. Discharge Indicators

- ☐ The AA is a slope wetland
- ☐ Springs or seeps are known or observed
- ☑ Vegetation growing during dormant season/drought
- ☐ Wetland occurs at the toe of a natural slope
- ☐ Seeps are present at the wetland edge
- ☐ AA permanently flooded during drought periods
- ☐ Wetland contains an outlet, but no inlet
- ☑ Shallow water table and the site is saturated to the surface
- ☐ Other:

ii. Recharge Indicators

- ☐ Permeable substrate present without underlying impeding layer
- ☐ Wetland contains inlet but no outlet
- ☐ Stream is a known 'losing' stream; discharge volume decreases
- ☐ Other:

iii. Rating (use the information from i and ii above and the table below to arrive at [check] the functional points and rating)

	Duration of saturation at AA Wetlands *FROM GROUNDWATER DISCHARGE OR WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM*			
Criteria	P/P	S/I	T	None
Groundwater Discharge or Recharge	1H	.7M	.4M	.1L
Insufficient Data/Information		NA		

Comments:

14K. Uniqueness:

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

Replacement potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland **or** plant association listed as "S1" by the MTNHP			AA does not contain previously cited rare types **and** structural diversity (#13) is high **or** contains plant association listed as "S2" by the MTNHP			AA does not contain previously cited rare types or associations **and** structural diversity (#13) is low-moderate		
Estimated relative abundance (#11)	rare	common	abundant	rare	common	abundant	rare	common	abundant
Low disturbance at AA (#12i)	1H	.9H	.8H	.8H	.6M	.5M	.5M	.4M	.3L
Moderate disturbance at AA (#12i)	.9H	.8H	.7M	.7M	.5M	.4M	.4M	.3L	.2L
High disturbance at AA (#12i)	.8H	.7H	.6M	.6M	.4M	.3L	.3L	.2L	.1L

Comments:

14L. Recreation/Education Potential: (affords "bonus" points if AA provides recreation or education opportunity)

i. Is the AA a known or potential rec./ed. site: (check) **Y** ◉ **N** ○ (if 'Yes' continue with the evaluation; if 'No' then click ☐ **NA** here and proceed to the overall summary and rating page)

ii. Check categories that apply to the AA: ☐ Educational/scientific study; ☐ Consumptive rec.; ☑ Non-consumptive rec.; ☐ Other

iii. Rating (use the matrix below to arrive at [check] the functional points and rating)

Known or Potential Recreation or Education Area	Known	Potential
Public ownership or public easement with general public access (no permission required)	.2H	.15H
Private ownership with general public access (no permission required)	.15H	.1M
Private or public ownership without general public access, or requiring permission for public access	.1M	.05L

Comments:

General Site Notes

No notable change in this AA from 2010 to 2011 except for increase in water levels. Slight increase in number of isolated plants of Canada thistle and Hound's tongue in upland buffer east of AA.

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR WETLAND/SITE #(S): Wetland Preservation

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)	Indicate the four most prominent functions with an asterisk (*)
A. Listed/Proposed T&E Species Habitat	L	.3	1	0.567	☐
B. MT Natural Heritage Program Species Habitat	M	.6	1	1.134	☐
C. General Wildlife Habitat	H	.9	1	1.701	☑
D. General Fish Habitat	NA	0	0	0	☐
E. Flood Attenuation	H	.9	1	1.701	☐
F. Short and Long Term Surface Water Storage	H	.8	1	1.512	☐
G. Sediment/Nutrient/Toxicant Removal	H	1	1	1.89	☑
H. Sediment/Shoreline Stabilization	H	1	1	1.89	☐
I. Production Export/Food Chain Support	E	1	1	1.89	☑
J. Groundwater Discharge/Recharge	H	1	1	1.89	☑
K. Uniqueness	M	.4	1	0.756	☐
L. Recreation/Education Potential (bonus points)	M	.1	NA	0.189	☐
Totals:		8	10	15.12	
Percent of Possible Score			**80** %		

Category I Wetland: (must satisfy **one** of the following criteria; otherwise go to Category II)
- ☐ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; **or**
- ☐ Score of 1 functional point for Uniqueness; **or**
- ☐ Score of 1 functional point for Flood Attenuation **and** answer to Question 14E.ii is "yes"; **or**
- ☐ Percent of possible score > 80% (round to nearest whole #).

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following criteria; otherwise go to Category IV)
- ☐ Score of 1 functional point for MT Natural Heritage Program Species Habitat; **or**
- ☑ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
- ☐ Score of .9 or 1 functional point for General Fish Habitat; **or**
- ☐ "High" to "Exceptional" ratings for **both** General Wildlife Habitat **and** General Fish/Aquatic Habitat; **or**
- ☐ Score of .9 functional point for Uniqueness; **or**
- ☑ Percent of possible score > 65% (round to nearest whole #).

Category III Wetland: (Criteria for Categories I, II, or IV not satisfied)

☐

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; otherwise go to Category III)
- ☐ "Low" rating for Uniqueness; **and**
- ☐ Vegetated wetland component < 1 acre (do not include upland vegetated buffer); **and**
- ☐ Percent of possible score < 35% (round to nearest whole #).

OVERALL ANALYSIS AREA RATING:
(check appropriate category based on the criteria outlined

I	II	III	IV

MDT Montana Wetland Assessment Form (revised March 2008)

1. Project name Murphy Ox Yoke Ranch **2. MDT project#** STPX 34(16) **Control#** 5228

3. Evaluation Date 7/8/2011 **4. Evaluators** B Vaughn, L Soderquist **5. Wetland/Site# (s)** Wetland Restoration

6. Wetland Location(s): **T** 5S **R** 8E **Sec1** 28 **T** **R** **Sec2**

Approx Stationing or Mileposts

Watershed 10070002 **Watershed/County** Upper Yellowstone Watershed/Park County

7. Evaluating Agency Confluence for MDT

8. Wetland size acres 3.31

Purpose of Evaluation

How assessed: Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

9. Assesssment area (AA) size (acres) 3.31

☐ **Mitigation Wetlands: pre-construction**

How assessed: Measured e.g. by GPS

☑ **Mitigation Wetlands: post construction**

☐ **Other**

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
Depressional	Emergent Wetland		Seasonal/Intermittant	100

11. Estimated Relative Abundance Abundant

12. General Condition of AA

i. Disturbance: (use matrix below to determine [circle] appropriate response – see instructions for Montana-listed noxious weed and aquatic nuisance vegetation species (**ANVS**) lists)

Conditions within AA	*Predominant conditions adjacent to (within 500 feet of) AA*		
	Managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings; and noxious weed or ANVS cover is <=15%.	Land not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to minor clearing; contains few roads or buildings; noxious weed or ANVS cover is <=30%.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >=30%.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings; and noxious weed or ANVS cover is <=15%.	low disturbance	low disturbance	moderate disturbance
AA not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads or buildings; noxious weed or ANVS cover is <=30%.	moderate	moderate disturbance	high disturbance
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >=30%.	high disturbance	high disturbance	high disturbance

Comments: (types of disturbance, intensity, season, etc)

Previously used for agricultural purposes and currently managed in a natural state under a conservation easement.

ii. Prominent noxious, aquatic nuisance, other exotic species:

No Priority 2B weeds observed in AA.

iii. Provide brief descriptive summary of AA and surrounding land use/habitat

AA in NW corner of project area delineated as wet meadow and included in mitigation plan as restoration. Prior baseline documented in 2003. Area adjacent to Hwy 89 on west, created wetland to south. Characterized by Comm.7. Drain ditch was plugged and area reseeded. East half of AA lies west of Murphy Creek. Some areas in AA ponded and sat to surface in 2011.

13. Structural Diversity: (based on number of "Cowardin" ***vegetated*** classes present [do not include unvegetated classes], see #10 above)

Existing # of "Cowardin" Vegetated Classes in AA	Initial Rating	Is current management preventing (passive) existence of additional vegetated classes?		Modified Rating
>=3 (or 2 if 1 is forested) classes	H	NA	NA	NA
2 (or 1 if forested) classes	M	NA	NA	NA
1 class, but not a monoculture	M	<NO	YES>	L
1 class, monoculture (1 species comprises>=90% of total cover)	L	NA	NA	NA

Comments: emergent

SECTION PERTAINING to FUNCTIONS VALUES ASSESSMENT

14A. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals:

i. AA is Documented (D) or Suspected (S) to contain (check one based on definitions contained in instructions):

Primary or critical habitat (list species)	○ D ○ S	
Secondary habitat (list Species)	○ D ○ S	
Incidental habitat (list species)	◉ D ○ S	Grizzly bear
No usable habitat	☐ S	

ii. Rating (use the conclusions from i above and the matrix below to arrive at [check] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
Functional Points and Rating	1H	.9H	.8H	.7M	.3L	.1L	0L

Sources for documented use USF&WS listed, observed by previous landowner.

14B. Habitat for plant or animals rated S1, S2, or S3 by the Montana Natural Heritage Program: (not including species listed in14A above)

i. AA is Documented (D) or Suspected (S) to contain (check one based on definitions contained in instructions):

Primary or critical habitat (list species)	○ D ○ S	
Secondary habitat (list Species)	◉ D ○ S	Western toad (S2), Great Blue Heron (S3), Trumpeter Swan (S3)
Incidental habitat (list species)	◉ D ○ S	Bald Eagle (S3)
No usable habitat	☐ S	

ii. Rating (use the conclusions from i above and the matrix below to arrive at [check] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
S1 Species: *Functional Points and Rating*	1H	.8H	.7M	.6M	.2L	.1L	0L
S2 and S3 Species: *Functional Points and Rating*	.9H	.7M	.6M	.5M	.2L	.1L	0L

Sources for documented use MTNHP list,W. toad noted for Park County; frogs observed in 2011, not positively ID.

14C. General Wildlife Habitat Rating:

i. Evidence of overall wildlife use in the AA (check substantial, moderate, or low based on supporting evidence):

Moderate

Substantial (based on any of the following [check]):

- ☐ observations of abundant wildlife #s or high species diversity (during any period)
- ☐ abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ☐ presence of extremely limiting habitat features not available in the surrounding area
- ☐ interviews with local biologists with knowledge of the AA

Minimal (based on any of the following [check]):

- ☐ few or no wildlife observations during peak use periods
- ☐ little to no wildlife sign
- ☐ sparse adjacent upland food sources
- ☐ interviews with local biologists with knowledge of the AA

Moderate (based on any of the following [check]):

- ☐ observations of scattered wildlife groups or individuals or relatively few species during peak periods
- ☑ common occurrence of wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ☑ adequate adjacent upland food sources
- ☐ interviews with local biologists with knowledge of the AA

ii. Wildlife habitat features (Working from top to bottom, check appropriate AA attributes in matrix to arrive at rating. Structural diversity is from #13. For class cover to be considered evenly distributed, the most and least prevalent **vegetated** classes must be within 20% of each other in terms of their percent composition of the AA (see #10). Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; and A = absent [see instructions for further definitions of these terms])

Structural diversity (see #13)	High								Moderate								Low			
Class cover distribution (all vegetated classes)	Even				Uneven				Even				Uneven				Even			
Duration of surface water in ≥ 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12i)	E	E	E	H	E	E	H	H	E	H	H	M	E	H	M	M	E	H	M	M
Moderate disturbance at AA (see #12i)	H	H	H	H	H	H	H	M	H	H	M	M	H	M	M	L	H	M	L	L
High disturbance at AA (see #12i)	M	M	M	L	M	M	L	L	M	M	L	L	M	L	L	L	L	L	L	L

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [check] the functional points and rating)

Evidence of wildlife use (i)	*Wildlife habitat features rating (ii)*			
	Exceptional	High	Moderate	Low
Substantial	1E	.9H	.8H	.7M
Moderate	.9H	.7M	.5M	.3L
Minimal	.6M	.4M	.2L	.1L

Comments Presence of deer,birds, elk scat, and raccoon tracks noted during investigation.

14D. General Fish Habitat Rating: (Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not used by fish, fish use is not restorable due to habitat constraints, or is not desired from a management perspective [such as fish entrapped in a canal], then check ☑ **NA** here and proceed to 14E.)

i. Habitat Quality and Known / Suspected Fish Species in AA (use matrix to arrive at [check the functional points and rating)

Duration of surface water in AA	Permanent / Perennial						Seasonal / Intermittent						Temporary / Ephemeral					
Aquatic hiding / resting / escape cover	Optimal		Adequate		Poor		Optimal		Adequate		Poor		Optimal		Adequate		Poor	
Thermal cover optimal / suboptimal	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S
FWP Tier I fish species	1E	.9H	.8H	.7M	.6M	.5M	.9H	.8H	.7M	.6M	.5M	.4M	.7M	.6M	.5M	.4M	.3L	.3L
FWP Tier II or Native Game fish species	.9H	.8H	.7M	.6M	.5M	.5M	.8H	.7M	.6M	.5M	.4M	.4M	.6M	.5M	.4M	.3L	.2L	.2L
FWP Tier III or Introduced Game fish	.8H	.7M	.6M	.5M	.5M	.4M	.7M	.6M	.5M	.4M	.4M	.3L	.5M	.4M	.3L	.2L	.2L	.1L
FWP Non-Game Tier IV or No fish species	.5M	.5M	.5M	.4M	.4M	.3L	.4M	.4M	.4M	.3L	.3L	.2L	.2L	.2L	.2L	.1L	.1L	.1L

Sources used for identifying fish sp. potentially found in AA:

ii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1)
a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity ***or*** *is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support,* ***or*** *do aquatic nuisance plant or animal species (see* ***Appendix E****) occur in fish habitat?* **Y** ◯ **N** ◉ *If yes, reduce score in* ***i*** *above by 0.1:* **Modified Rating**

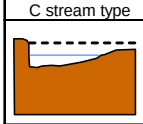
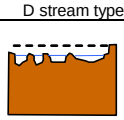
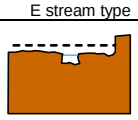
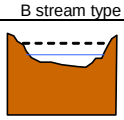
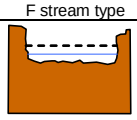
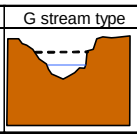
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ◯ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

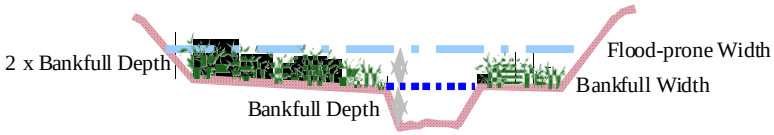
iii. Final Score and Rating: 0 NA **Comments:**

14E. Flood Attenuation: (Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA are not flooded from in-channel or overbank flow, click ☐ **NA** here and proceed to 14F.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	Slightly entrenched - C, D, E stream types			Moderately entrenched – B stream type			Entrenched-A, F, G stream types		
% of flooded wetland classified as forested and/or scrub/shrub	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains **no outlet or restricted outlet**	1H	.9H	.6M	.8H	.7M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.8H	.5M	.7M	.6M	.4M	.3L	.2L	.1L

Slightly Entrenched ER = >2.2			**Moderately Entrenched ER = 1.41 – 2.2**	**Entrenched ER = 1.0 – 1.4**		
C stream type	D stream type	E stream type	B stream type	A stream type	F stream type	G stream type
						



Floodrpone width / **Bankfull width** = **Entrenchment ratio**

ii. Are ≥10 acres of wetland in the AA subject to flooding **AND** are man-made features which may be significantly damaged by floods located within 0.5 mile downstream of the AA (check)? **Y** ◯ **N** ◉

Comments: East side of AA subject to overbank flow from Murphy Creek, which is not entrenched and is culverted upgradient and downgradient. AA also encompasses man-made entrenched ditch that was filled with groundwater in 2011.

14F. Short and Long Term Surface Water Storage: (Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow. If no wetlands in the AA are subject to flooding or ponding, click ☐ **NA** here and proceed to 14G.)

i. Rating (Working from top to bottom, use the matrix below to arrive at [check] the functional points and rating. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see instructions for further definitions of these terms].)

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding	>5 acre feet			1.1 to 5 acre feet			≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond **≥ 5 out of 10 years**	1H	.9H	.8H	.8H	.6M	.5M	.4M	.3L	.2L
Wetlands in AA flood or pond **< 5 out of 10 years**	.9H	.8H	.7M	.7M	.5M	.4M	.3L	.2L	.1L

Comments: Assumes AA size of approx. 2.04 A with 0.5 acre-feet of water. Areas of inundation observed in AA during 2011 investigation, which was an above average year for precip.

14G. Sediment/Nutrient/Toxicant Retention and Removal: (Applies to wetlands with potential to receive sediments, nutrients, or toxicants through influx of surface or ground water or direct input. If no wetlands in the AA are subject to such input, click ☐ **NA** here and proceed to 14H.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating [H = high, M = moderate, or L = low])

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver levels of sediments, nutrients, or compounds at levels such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	≥ 70%		< 70%		≥ 70%		< 70%	
Evidence of flooding / ponding in AA	Yes	No	Yes	No	Yes	No	Yes	No
AA contains **no or restricted outlet**	1H	.8H	.7M	.5M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.7M	.6M	.4M	.4M	.3L	.2L	.1L

Comments: Evidence of flooding in this AA during 2011 investigation. Several inundated area throughout AA.

14H Sediment/Shoreline Stabilization: (Applies only if AA occurs on or within the banks or a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action. If 14H does not apply, click ☐ **NA** here and proceed to 14I.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

*% Cover of **wetland** streambank or shoreline by species with stability ratings of ≥6 (see **Appendix F**).*	*Duration of surface water adjacent to rooted vegetation*		
	Permanent / Perennial	Seasonal / Intermittent	Temporary / Ephemeral
≥ 65%	1H	.9H	.7M
35-64%	.7M	.6M	.5M
< 35%	.3L	.2L	.1L

Comments: The AA encompasses the plugged ditch that was inundated during the investigation. Species include cattail and Carex species.

14I. Production Export/Food Chain Support:

i. Level of Biological Activity (synthesis of wildlife and fish habitat ratings [check])

General Fish Habitat Rating (14D.iii.)	**General Wildlife Habitat Rating (14C.iii.)**		
	E/H	M	L
E/H	H	H	M
M	H	M	M
L	M	M	L
N/A	H	M	L

ii. Rating (Working from top to bottom, use the matrix below to arrive at [check] the functional points and rating. Factor A = acreage of vegetated wetland component in the AA; Factor B = level of biological activity rating from above (14I.i.); Factor C = whether or not the AA contains a surface or subsurface outlet; the final three rows pertain to duration of surface water in the AA, where P/P, S/I, and T/E are as previously defined, and A = "absent" [see instructions for further definitions of these terms].)

A	Vegetated component >5 acres						Vegetated component 1-5 acres						Vegetated component <1 acre					
B	High		Moderate		Low		High		Moderate		Low		High		Moderate		Low	
C	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P	1E	.7H	.8H	.5M	.6M	.4M	.9H	.6M	.7H	.4M	.5M	.3L	.8H	.6M	.6M	.4M	.3L	.2L
S/I	.9	.6M	.7H	.4	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.5M	.5M	.3L	.3L	.2L
T/E/A	.8	.5M	.6M	.3L	.4M	.2L	.7H	.4M	.5M	.2L	.3L	.1L	.6M	.4M	.4M	.2L	.2L	.1L

iii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1.) **Vegetated Upland Buffer (VUB)**: Area with ≥ 30% plant cover, ≤ 15% noxious weed or ANVS cover, and that is not subjected to periodic mechanical mowing or clearing (unless for weed control).

a) Is there an average ≥ 50 foot-wide vegetated upland buffer around ≥ 75% of the AA circumference? **Y** ◉ **N** ○ *If yes, add 0.1 to the score in **ii** above and adjust rating accordingly:* **Modified Rating** .7M

Comments: Surface outlet assumed to be Murphy Creek on east edge of AA.

14J. Groundwater Discharge/Recharge: (check the appropriate indicators in i & ii below)

i. Discharge Indicators

- ☐ The AA is a slope wetland
- ☐ Springs or seeps are known or observed
- ☑ Vegetation growing during dormant season/drought
- ☐ Wetland occurs at the toe of a natural slope
- ☐ Seeps are present at the wetland edge
- ☐ AA permanently flooded during drought periods
- ☐ Wetland contains an outlet, but no inlet
- ☑ Shallow water table and the site is saturated to the surface
- ☐ Other: AA sat to surface in isolated areas.

ii. Recharge Indicators

- ☐ Permeable substrate present without underlying impeding layer
- ☐ Wetland contains inlet but no outlet
- ☐ Stream is a known 'losing' stream; discharge volume decreases
- ☐ Other:

iii. Rating (use the information from i and ii above and the table below to arrive at [check] the functional points and rating)

	Duration of saturation at AA Wetlands *FROM GROUNDWATER DISCHARGE OR WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM*			
Criteria	P/P	S/I	T	None
Groundwater Discharge or Recharge	1H	.7M	.4M	.1L
Insufficient Data/Information		NA		

Comments:

14K. Uniqueness:

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

Replacement potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland **or** plant association listed as "S1" by the MTNHP			AA does not contain previously cited rare types **and** structural diversity (#13) is high **or** contains plant association listed as "S2" by the MTNHP			AA does not contain previously cited rare types or associations **and** structural diversity (#13) is low-moderate		
Estimated relative abundance (#11)	rare	common	abundant	rare	common	abundant	rare	common	abundant
Low disturbance at AA (#12i)	1H	.9H	.8H	.8H	.6M	.5M	.5M	.4M	.3L
Moderate disturbance at AA (#12i)	.9H	.8H	.7M	.7M	.5M	.4M	.4M	.3L	.2L
High disturbance at AA (#12i)	.8H	.7H	.6M	.6M	.4M	.3L	.3L	.2L	.1L

Comments: AA characterized by wet meadow considered abundant in area.

14L. Recreation/Education Potential: (affords "bonus" points if AA provides recreation or education opportunity)

i. Is the AA a known or potential rec./ed. site: (check) **Y** ◉ **N** ○ (if 'Yes' continue with the evaluation; if 'No' then click ☐ **NA** here and proceed to the overall summary and rating page)

ii. Check categories that apply to the AA: ☐ Educational/scientific study; ☐ Consumptive rec.; ☑ Non-consumptive rec.; ☐ Other

iii. Rating (use the matrix below to arrive at [check] the functional points and rating)

Known or Potential Recreation or Education Area	Known	Potential
Public ownership or public easement with general public access (no permission required)	.2H	.15H
Private ownership with general public access (no permission required)	.15H	.1M
Private or public ownership without general public access, or requiring permission for public access	.1M	.05L

Comments:

MDT Mitigation Monitoring Site. Access limited.

General Site Notes

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR WETLAND/SITE #(S): Wetland Restoration

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)	Indicate the four most prominent functions with an asterisk (*)
A. Listed/Proposed T&E Species Habitat	L	.3	1	0.993	☐
B. MT Natural Heritage Program Species Habitat	M	.6	1	1.986	☐
C. General Wildlife Habitat	M	.7	1	2.317	☑
D. General Fish Habitat	NA	0	0	0	☐
E. Flood Attenuation	M	.6	1	1.986	☐
F. Short and Long Term Surface Water Storage	M	.6	1	1.986	☐
G. Sediment/Nutrient/Toxicant Removal	H	1	1	3.31	☑
H. Sediment/Shoreline Stabilization	H	1	1	3.31	☑
I. Production Export/Food Chain Support	M	.7	1	2.317	☑
J. Groundwater Discharge/Recharge	M	.7	1	2.317	☐
K. Uniqueness	L	.3	1	0.993	☐
L. Recreation/Education Potential (bonus points)	M	.1	NA	0.331	☐
Totals:		6.6	10	21.846	
Percent of Possible Score			**66** %		

Category I Wetland: (must satisfy **one** of the following criteria; otherwise go to Category II)
- ☐ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; **or**
- ☐ Score of 1 functional point for Uniqueness; **or**
- ☐ Score of 1 functional point for Flood Attenuation **and** answer to Question 14E.ii is "yes"; **or**
- ☐ Percent of possible score > 80% (round to nearest whole #).

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following criteria; otherwise go to Category IV)
- ☐ Score of 1 functional point for MT Natural Heritage Program Species Habitat; **or**
- ☐ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
- ☐ Score of .9 or 1 functional point for General Fish Habitat; **or**
- ☐ "High" to "Exceptional" ratings for **both** General Wildlife Habitat **and** General Fish/Aquatic Habitat; **or**
- ☐ Score of .9 functional point for Uniqueness; **or**
- ☑ Percent of possible score > 65% (round to nearest whole #).

Category III Wetland: (Criteria for Categories I, II, or IV not satisfied)

☐

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; otherwise go to Category III)
- ☐ "Low" rating for Uniqueness; **and**
- ☐ Vegetated wetland component < 1 acre (do not include upland vegetated buffer); **and**
- ☐ Percent of possible score < 35% (round to nearest whole #).

OVERALL ANALYSIS AREA RATING:
(check appropriate category based on the criteria outlined

I	II	III	IV

Appendix C

2011 Project Site Photographs

MDT Wetland Mitigation Monitoring
Murphy Ox Yoke Ranch
Park County, Montana



Photo Point 1
Compass Bearing: 170 degrees

Location: West boundary near Hwy 89, NW Cell 2
Taken in 2010



Photo Point 1
Compass Bearing: 170 degrees

Location: West boundary near Hwy 89, NW Cell 2
Taken in 2011



Photo Point 2
Compass Bearing: 350 degrees

Location: SE corner of Cell 2
Taken in 2010



Photo Point 2
Compass Bearing: 350 degrees

Location: SE corner of Cell 2
Taken in 2011



Photo Point 3
Compass Bearing: 50 degrees

Location: SW corner of Cell 1
Taken in 2010



Photo Point 3
Compass Bearing: 50 degrees

Location: SW corner of Cell 1
Taken in 2011



Photo Point 4 – *Photo 1* **Location:** Ditch inlet
Compass Bearing: 140 Degrees **Taken in 2010**



Photo Point 4 – *Photo 1* **Location:** Ditch inlet
Compass Bearing: 140 Degrees **Taken in 2011**



Photo Point 5 – *Photo 1* **Location:** North side Cell 1
Compass Bearing: 180 Deg **Taken in 2010**



Photo Point 5 – *Photo 1* **Location:** North side Cell 1
Compass Bearing: 180 Deg **Taken in 2011**



Transect 1 - Start – *Photo 1* **Location:** SW Cell 2
Compass Bearing: 70 Degrees **Taken in 2010**



Transect 1 - Start – *Photo 1* **Location:** SW Cell 2
Compass Bearing: 70 Degrees **Taken in 2011**



Transect 1 - End – *Photo 1*
Compass Bearing: 280 Degrees

Location: NE Cell 2
Taken in 2010



Transect 1 - End – *Photo 1*
Compass Bearing: 280 Degrees

Location: NE Cell 2
Taken in 2011



Transect 2 - Start – *Photo 1*
Compass Bearing: 200 Degrees

Location: NW Cell 1
Taken in 2010



Transect 2 - Start – *Photo 1*
Compass Bearing: 200 Degrees

Location: NW Cell 1
Taken in 2011



Transect 2 - End – *Photo 1*
Compass Bearing: 30 Degrees

Location: SE Cell 1
Taken in 2010



Transect 2 - End – *Photo 1*
Compass Bearing: 30 Degrees

Location: SE Cell 1
Taken in 2011



Wetland Data Point 1, Veg Com 1 **Location:** M-1
Compass Bearing: 90 Degrees **Taken in 2011**



Wetland Data Point 2, Veg Com 2 **Location:** M-2
Compass Bearing: 40 Degrees **Taken in 2011**



Wetland Data Point 3, Veg Com 3 **Location:** M-3
Compass Bearing: 210 Degrees **Taken in 2011**

Wetland Data Point 4, Veg Com 7 **Location:** M-4
Compass Bearing: 165 Degrees **Taken in 2011**



Wetland Data Point 5, Veg Com 3 **Location:** M-5
Compass Bearing: 350 Degrees **Taken in 2011**

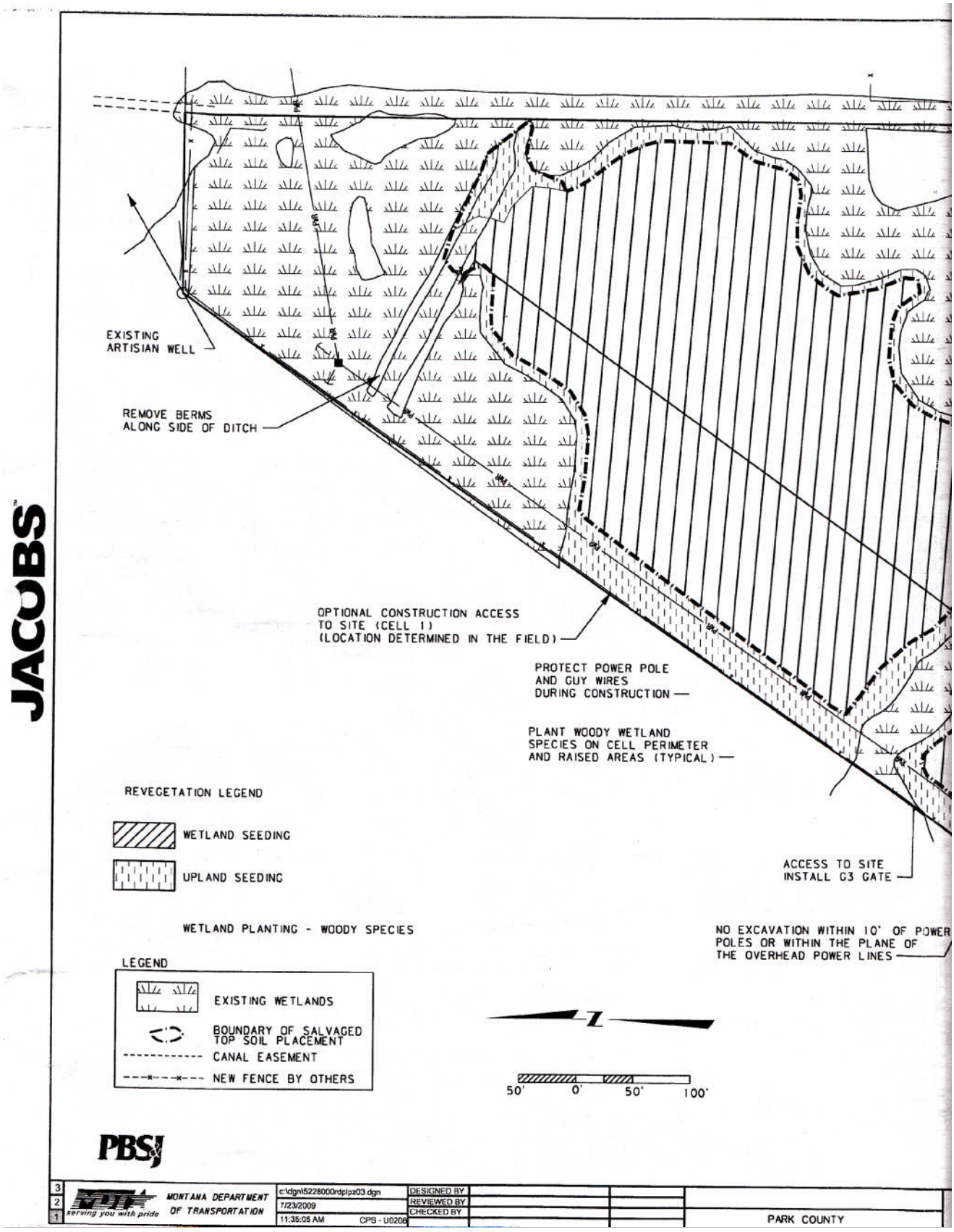


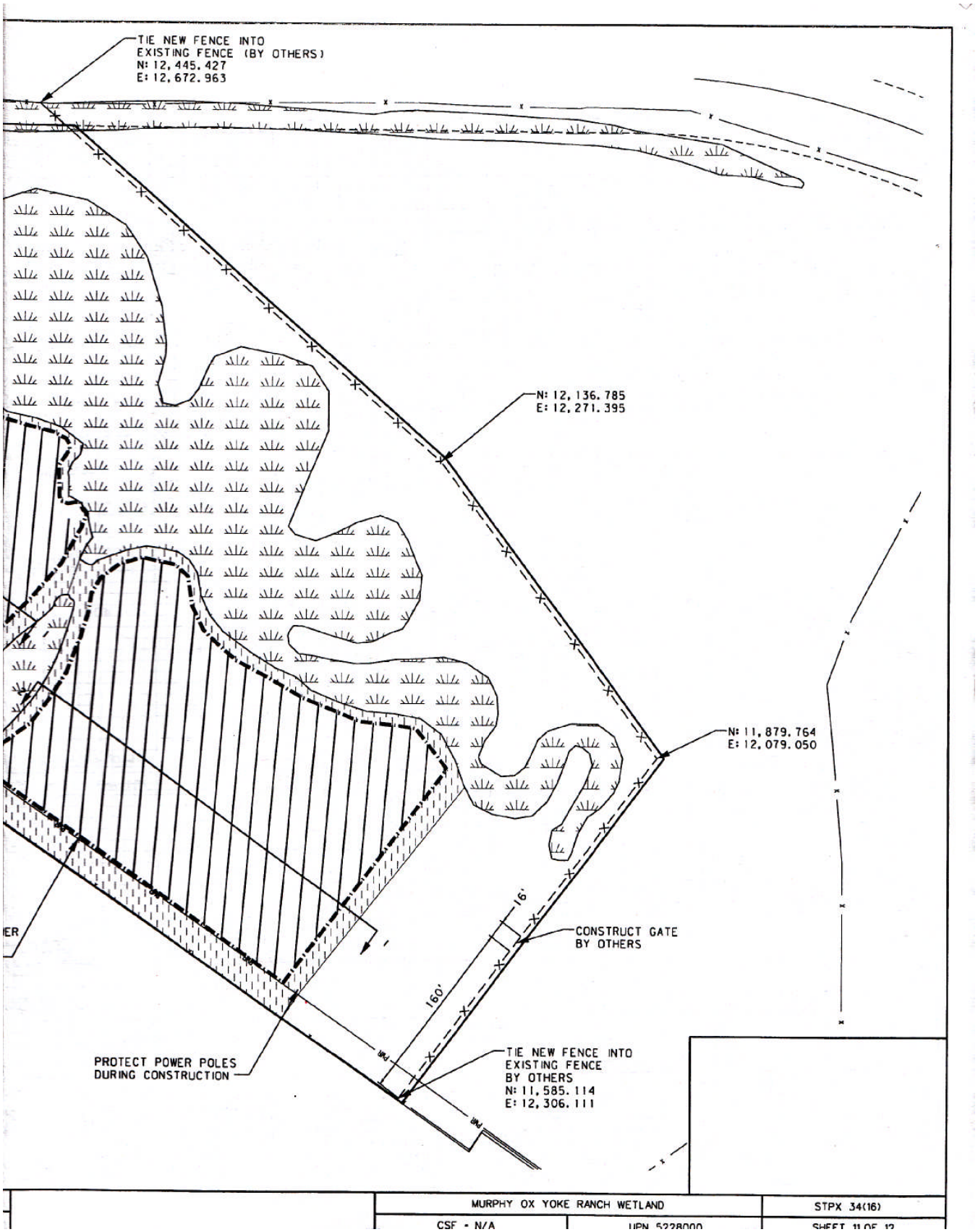
Boundary Veg Com 1 & 4 **Location:** M-6
Compass Bearing: 210 Degrees **Taken in 2011**

Appendix D

Project Plan Sheet

MDT Wetland Mitigation Monitoring
Murphy Ox Yoke Ranch
Park County, Montana


EXISTING
ARTISIAN WELL
REMOVE BERMS
ALONG SIDE OF DITCH
OPTIONAL CONSTRUCTION ACCESS
TO SITE (CELL 1)
(LOCATION DETERMINED IN THE FIELD)
PROTECT POWER POLE
AND GUY WIRES
DURING CONSTRUCTION
PLANT WOODY WETLAND
SPECIES ON CELL PERIMETER
AND RAISED AREAS (TYPICAL)
REVEGETATION LEGEND
WETLAND SEEDING
UPLAND SEEDING
ACCESS TO SITE
INSTALL G3 GATE
WETLAND PLANTING - WOODY SPECIES
NO EXCAVATION WITHIN 10' OF POWER
POLES OR WITHIN THE PLANE OF
THE OVERHEAD POWER LINES
LEGEND
EXISTING WETLANDS
BOUNDARY OF SALVAGED
TOP SOIL PLACEMENT
CANAL EASEMENT
NEW FENCE BY OTHERS
50' 0' 50' 100'
JACOBS
PBSJ
MONTANA DEPARTMENT
OF TRANSPORTATION
serving you with pride
c:\dgn\5228000rdplpx03.dgn
7/23/2009
11:35:05 AM
CPS - U0208
DESIGNED BY
REVIEWED BY
CHECKED BY
PARK COUNTY


TIE NEW FENCE INTO
EXISTING FENCE (BY OTHERS)
N: 12, 445. 427
E: 12, 672. 963
N: 12, 136. 785
E: 12, 271. 395
N: 11, 879. 764
E: 12, 079. 050
16'
CONSTRUCT GATE
BY OTHERS
160'
PROTECT POWER POLES
DURING CONSTRUCTION
TIE NEW FENCE INTO
EXISTING FENCE
BY OTHERS
N: 11, 585. 114
E: 12, 306. 111
MURPHY OX YOKE RANCH WETLAND
STPX 34(16)
CSF - N/A
UPN 5228000