MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2013

Murphy Ox Yoke Ranch
Park County, Montana

Prepared for:

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December 2013

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MDT Project Number STPX-BR 34(16)
Control Number 5228

SPA # MDT-R3-83-2008
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Cover: View of south cell (Cell 2) at Murphy Ox Yoke Mitigation Site facing southeast toward Emigrant Peak

1. INTRODUCTION

This 2013 Monitoring Report presents the results of the fourth year of monitoring at the Murphy Ox Yoke Ranch Wetland Mitigation Site. The site was developed to mitigate for wetland impacts associated with the Montana Department of Transportation (MDT) East River Road and Yellowstone River Bridge (northeast of Livingston) 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. Figures 2 and 3 in Appendix A show the Monitoring Activity Locations and Mapped Site Features, respectively. The MDT Wetland Mitigation Site Monitoring Form, the US Army Corps of Engineers (USACE) Wetland Determination Data Forms for Western Mountains, Valleys, and Coast Region (USACE 2010), and the MDT Montana Wetland Assessment Forms (MWAM) (Berglund and McEldowney 2008) are included in Appendix B. Appendix C contains project site photographs and Appendix D shows the project plan sheet.

The 12.6-acre Murphy Ox Yoke mitigation site is located east of US Highway 89 and south of Murphy Lane in Emigrant, Montana. The site lies 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 portions of Sections 28 and 33, Township 5 South, Range 8 East, Park County (Figure 1).

The purpose of the mitigation project was to restore, create, enhance, and preserve wetlands within a 12.6 acre tract on the Murphy Ox Yoke Ranch. The parcel is under a protective conservation easement between MDT, the landowners, and 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. Mitigation efforts have sought to create wetland areas and increase hydrology throughout the site.

Goals of the Murphy Ox Yoke mitigation project are to:

- Maximize emergent wetland development by excavating 4.1 acres to expose shallow groundwater 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 management plan, removing grazing, installing fencing to exclude livestock, and establishing a perpetual conservation easement.

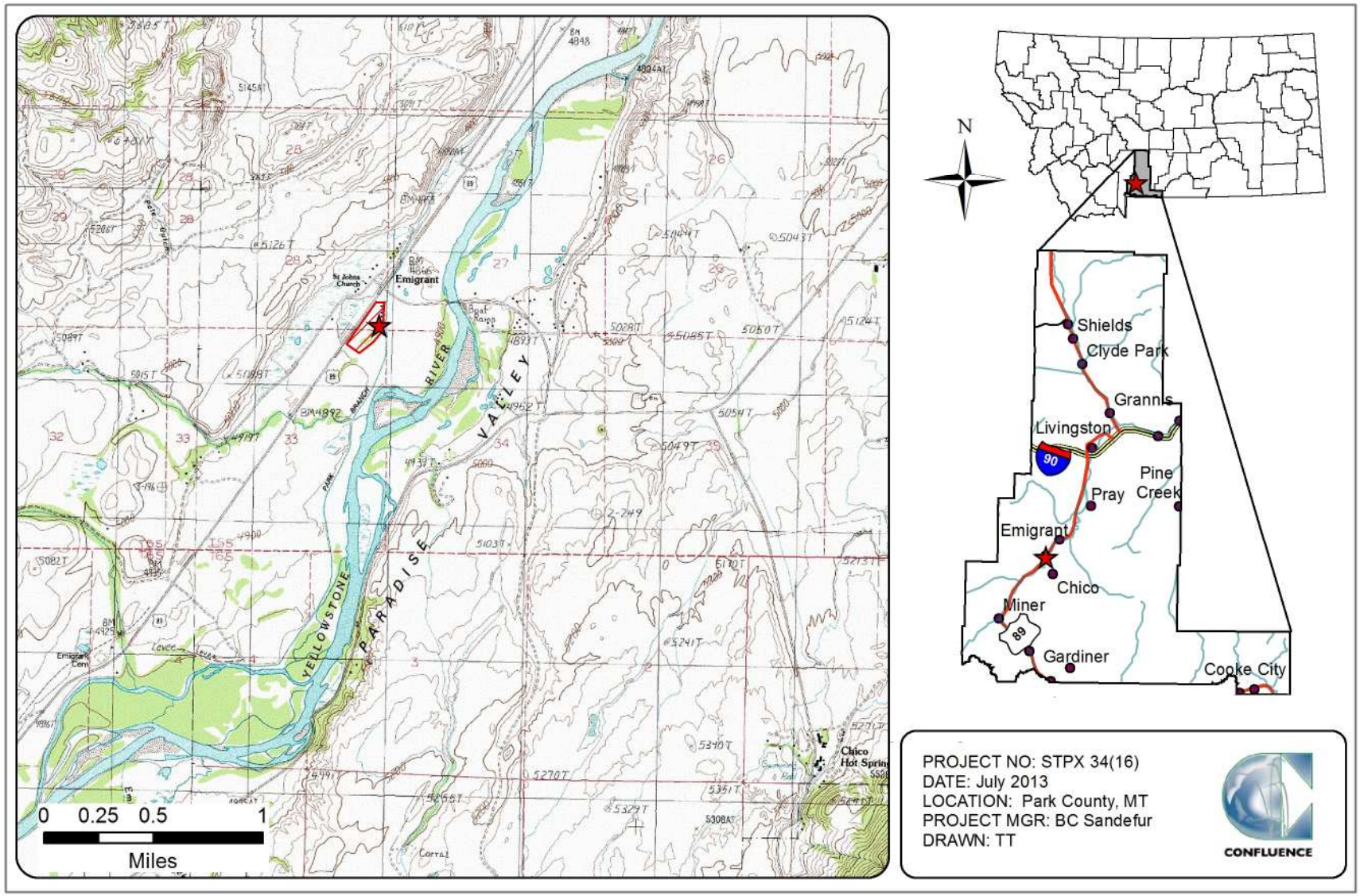

Figure 1. Project Location of the Murphy Ox Yoke Ranch Wetland Mitigation Site.

- 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.

The Park Branch irrigation canal raises groundwater elevations throughout the project area. A culvert under Highway 89 diverts the outflow from Murphy Swamp to Murphy Creek, a perennial stream that parallels the east property boundary, and ultimately discharges to the Yellowstone River east of the project site. An artesian well northwest of the mitigation site provides an additional source of water to support the wetland system.

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	Proposed 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 USACE 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 by the most recent Natural Resource 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 percent 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 percent 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 percent 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 percent 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 conducted in July 2010. The fourth year of monitoring was completed on August 28, 2013. Information for the Mitigation Monitoring Form and Wetland Determination Data Form was entered electronically on a 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 wetland delineation, vegetation community mapping, vegetation transect monitoring, weed assessment, planted woody species survival assessment, soil data, hydrology, bird and wildlife use documentation, photographic documentation, 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 12.5 percent or more 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 28.5 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.

Hydrologic indicators, as outlined on the Wetland Determination Data Form, were documented at four points within the project area. Hydrologic assessments allow evaluation of mitigation criteria 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, and GPS measurements of the wetted perimeter during site investigation.

Five shallow groundwater wells were installed onsite in November 2002 and two additional wells were installed in April 2008 (Figure 2, Appendix A). Only one well (Well-1) remained following construction. Water levels were measured in Well 1 with an electronic water level meter during the annual 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 Wetland Determination 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 2013 aerial photograph. Community types were named based on the predominant vegetation species that characterized each mapped polygon (Figure 3, Appendix A). The percent cover of identified 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).

Temporal changes in vegetation were evaluated through annual assessment of two vegetation belt transects approximately 10 feet wide and 450 and 610 feet long (transect T-1 and transect T-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 vegetation communities (Appendix B). A comprehensive list of plant species observed from 2010 through 2013 has been included in this monitoring report (Table 2 and 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 are evaluated annually to the extent possible. The number and condition of individual woody plants observed during monitoring was recorded on the Mitigation Monitoring Form (Appendix B).

The Montana State Noxious Weed List (September 2010), prepared by the Montana Department of Agriculture, was used to categorize weeds identified within the site. The location of noxious weeds was noted in the field and mapped on the 2013 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, 6 to 25 percent, and 26 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 USACE Manual and 2010 Regional Supplement. A description of the soil profile, including hydric indicators when present, was recorded on a Wetland Determination 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 USACE 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 USACE Manual and 2010 Regional Supplement must be satisfied. The name and indicator status of plant species was derived from the Draft 2012 National Wetland Plant List (NWPL) (Lichvar and Kartesz. 2009). 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 Determination 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 GPS surveyed, imported into Geographic Information System (GIS) format, and is shown on the 2013 aerial imagery (Appendix A). Wetland acreages were calculated using GIS methods.

2.5. Wildlife

Observations 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. A comprehensive list of wildlife observed from 2010 through 2013 during the annual monitoring events has been compiled.

2.6. Functional Assessment

The 2008 MDT MWAM was used to evaluate functions and values on the site from 2010 to 2013. 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. An MWAM was completed for each of the three wetland assessment

areas (AA) and include a Creation AA, a Restoration AA, and a Preservation AA (Appendix B).

2.7. Photo Documentation

Monitoring at photo points provided supplemental information documenting wetland and upland conditions, trends, current land uses surrounding the site, and vegetation transect changes. Photographs were taken at five established photo points throughout the mitigation site during the site visit. Photo point locations were recorded with a resource grade GPS unit (Figure 2, Appendix A). Appendix C includes photographs from the photo points, transect end points, and wetland data points.

2.8. GPS Data

Site features and survey points were collected with a resource grade Thales Pro Mark III GPS unit during the 2013 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 presented in Montana State Plane Single Zone NAD 83 meters (Figure 2, Appendix A). Site features and survey points that were located with GPS included wetland boundaries, fence boundaries, photograph points, transect endpoints, and wetland data points.

2.9. Maintenance Needs

A non-engineering level, cursory examination was 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 the Mitigation Monitoring Form (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 March 2013 (Western Region Climate Center [WRCC] 2013). Annual precipitation rates recorded in 2010, 2011, and 2012 were 14.95 inches, 13.42 inches, and 10.40 inches, respectively. The monthly precipitation total from January through August is 11.86 inches (long-term average), 10.12 inches (2010), 10.43 inches (2011), 7.8 inches (2012), and 7.70 inches (2013). These data indicate precipitation during the previous four growing seasons has been below average, significantly so the last two years.

The Yellowstone River flows 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 discharges 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 typically operates from April 15 to October 30.

One mitigation goal included creating shallow water, emergent wetlands within two excavated cells (Cell 1, north; Cell 2, south) by excavating the soil surface to intercept the groundwater table. Elevated groundwater levels and seepage from the Park Branch Canal were expected to contribute 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 the northwest corner of the site and to capture surface runoff.

Site-wide inundation levels in 2013 were generally lower than those observed in 2012 and 2011 (Mitigation Monitoring Form, Appendix B). Inundation levels were likely lower due to the late August sampling date and decreased precipitation. The average depth of inundation in 2013 was 0.5 feet with a range of 0.0 to 2.0 feet. Surface water levels were deepest in the plugged drainage ditch northwest of Cell 1 and in the north half of Cell 1. Approximately 25 percent of the site was inundated during the site visit. Four data points were sampled in 2013 to assist in determining the wetland and upland boundaries (Figure 2, Appendix A and Monitoring Form, Appendix B). Data points M-1, M-2, and M-4 were located in areas that met the wetland criteria. No wetland hydrology indicators were recorded at data point M-3. Wetland hydrology indicators at M-1, M-2, and M-4 included geomorphic position and FAC-Neutral test. Surface soil cracks and saturation were also documented at data point M-4, located near the south end of community Type 13 in Cell 2. The groundwater depth measured in Well 1 (Figure 2, Appendix A) was 0.7 feet bgs, 0.3 feet lower than in 2012 and approximately average for the 4 years of monitoring. Murphy Creek was flowing during the site visit.

Table 2. Recorded groundwater elevations within well MW-1 at Murphy Ox Yoke.

	Year			
	2010	**2011**	**2012**	**2013**
MW-1 (ft below ground surface)	1.50	0.31	0.40	0.70

3.2. Vegetation

Monitoring year 2013 marked the fourth year of monitoring on the Murphy Ox Yoke wetland mitigation site. One hundred and three plant species have been observed site-wide from 2010 to 2013 (Table 3). Vegetation communities were mapped and named according to plant composition and dominance. The composition of each community is listed on the Mitigation Monitoring Form (Appendix B). The community boundaries are shown on Figure 3 in Appendix A.

Table 3. Vegetation species observed from 2010 to 2013 at the Murphy Ox Yoke Wetland Mitigation Site.

Scientific Names	Common Names	WMVC Indicator Status[1]
Agropyron sp.	Wheatgrass	NL
Agrostis gigantea	Black Bent	FAC
Agrostis stolonifera	Spreading Bent	FAC
Algae, green	Algae, green	NL
Alopecurus arundinaceus	Creeping Meadow-Foxtail	FAC
Alopecurus pratensis	Field Meadow-Foxtail	FAC
Aquatic macrophytes	Aquatic macrophytes	NL
Argentina anserina	Common Silverweed	OBL
Bromus arvensis	Japanese Brome	UPL
Bromus inermis	Smooth Brome	FAC
Bromus vulgaris	Colombian Brome	FACU
Carex aquatilis	Leafy Tussock Sedge	OBL
Carex leptalea	Bristly-Stalk Sedge	OBL
Carex nebrascensis	Nebraska Sedge	OBL
Carex praegracilis	Clustered Field Sedge	FACW
Carex rostrata	Swollen Beaked Sedge	OBL
Carex utriculata	Northwest Territory Sedge	OBL
Chenopodium album	Lamb's-Quarters	FACU
Chenopodium leptophyllum	Narrow-Leaf Goosefoot	FACU
Chenopodium sp.	Goosefoot	NL
Cicuta douglasii	Western Water-Hemlock	OBL
Cirsium arvense	Canadian Thistle	FAC
Cornus alba	Red Osier	FACW
Cynoglossum officinale	Gypsy-Flower	FACU
Dactylis glomerata	Orchard Grass	FACU
Deschampsia cespitosa	Tufted Hairgrass	FACW
Descurainia sophia	Herb Sophia	UPL
Elaeagnus angustifolia	Russian-Olive	FAC
Eleocharis palustris	Common Spike-Rush	OBL
Elymus repens	Creeping Wild Rye	FAC
Elymus trachycaulus	Slender Wild Rye	FAC
Epilobium ciliatum	Fringed Willowherb	FACW
Equisetum arvense	Field Horsetail	FAC
Equisetum hyemale	Tall Scouring-Rush	FACW
Festuca pratensis	Meadow Fescue	FACU
Galium palustre	Common Marsh Bedstraw	OBL
Glyceria grandis	American Manna Grass	OBL
Glyceria striata	Fowl Manna Grass	OBL
Glycyrrhiza lepidota	American Licorice	FAC
Helianthus annuus	Common Sunflower	FACU
Helianthus nuttallii	Nuttall's Sunflower	FACW
Hordeum jubatum	Fox-Tail Barley	FAC

[1]Draft 2012 NWPL (Lichvar and Kartesz 2009).

New species identified in 2013 are bolded.

Table 3 (continued). Vegetation species observed from 2010 to 2013 at the Murphy Ox Yoke Wetland Mitigation Site.

Scientific Names	Common Names	WMVC Indicator Status[1]
Iva axillaris	Deer-Root	FAC
Juncus arcticus	Arctic Rush	FACW
Juncus articulatus	Joint-Leaf Rush	OBL
Juncus compressus	**Round-Fruit Rush**	**OBL**
Juncus effusus	Lamp Rush	FACW
Juncus longistylis	Long-Style Rush	FACW
Juncus tenuis	Lesser Poverty Rush	FAC
Juncus torreyi	Torrey's Rush	FACW
Lactuca serriola	Prickly Lettuce	FACU
Lemna minor	Common Duckweed	OBL
Leymus cinereus	Great Basin Lyme Grass	FAC
Marrubium vulgare	**White Horehound**	**FACU**
Medicago sativa	Alfalfa	UPL
Melilotus albus	**White Sweet-Clover**	**UPL**
Melilotus officinalis	Yellow Sweet-Clover	FACU
Mentha arvensis	American Wild Mint	FACW
Mimulus glabratus	**Round-Leaf Monkey-Flower**	**OBL**
Monarda fistulosa	Oswego-Tea	FACU
Myriophyllum sp.	Water-Milfoil	NL
Pascopyrum smithii	Western-Wheat Grass	FACU
Persicaria maculosa	Lady's-Thumb	FACW
Phalaris arundinacea	Reed Canary Grass	FACW
Phleum pratense	Common Timothy	FAC
Plantago major	Great Plantain	FAC
Poa palustris	**Fowl Blue Grass**	**FAC**
Poa pratensis	Kentucky Blue Grass	FAC
Polypogon monspeliensis	Annual Rabbit's-Foot Grass	FACW
Populus angustifolia	**Narrow-Leaf Cottonwood**	**FACW**
Potentilla gracilis	Graceful Cinquefoil	FAC
Ranunculus acris	Tall Buttercup	FAC
Ribes lacustre	Bristly Black Gooseberry	FAC
Rosa multiflora	Rambler Rose	FACU
Rosa woodsii	Woods' Rose	FACU
Ruppia maritima	Beaked Ditch-Grass	OBL
Salix bebbiana	Gray Willow	FACW
Salix drummondiana	Drummond's Willow	FACW
Salix exigua	Narrow-Leaf Willow	FACW
Salix lasiandra	Pacific willow	FACW
Salix lemmonii	Lemmon's Willow	FACW
Salix planifolia	Tea-Leaf Willow	OBL
Schoenoplectus acutus	Hard-Stem Club-Rush	OBL

[1]Draft 2012 NWPL (Lichvar and Kartesz 2009).

New species identified in 2013 are bolded.

Table 3 (continued). Vegetation species observed from 2010 to 2013 at the Murphy Ox Yoke Wetland Mitigation Site.

Scientific Names	Common Names	WMVC Indicator Status[1]
Scirpus microcarpus	Red-Tinge Bulrush	OBL
Sisymbrium altissimum	Tall Hedge-Mustard	FACU
Solanum dulcamara	Climbing Nightshade	FAC
Solidago canadensis	Canadian Goldenrod	FACU
Sonchus arvensis	Field Sow-Thistle	FACU
Sparganium androcladum	Branched Burr-Reed	OBL
Sparganium emersum	European Burr-Reed	OBL
Taraxacum officinale	Common Dandelion	FACU
Thlaspi arvense	Field Penny-Cress	UPL
Tragopogon dubius	Yellow Salsify	UPL
Trifolium hybridum	Alsike Clover	FAC
Trifolium pratense	Red Clover	FACU
Trifolium repens	White Clover	FAC
Triglochin maritima	Seaside Arrow-Grass	OBL
Triglochin palustris	Marsh Arrow-Grass	OBL
Typha latifolia	Broad-Leaf Cat-Tail	OBL
Urtica dioica	Stinging Nettle	FAC
Vitis riparia	**River-Bank Grape**	**FACU**

[1]Draft 2012 NWPL (Lichvar and Kartesz 2009).

New species identified in 2013 are bolded.

Plant communities have remained comparatively consistent between 2011 and 2013. Nine wetland and three upland community types were observed on site in 2013. The wetland communities were Type 4 - *Salix exigua/Salix lasiandra,* Type 7 - *Alopecurus pratensis/Carex spp.,* Type 9 - *Carex nebrascensis/Carex utriculata,* Type 10 - *Salix exigua/Salix drummondiana,* Type 12 - *Typha latifolia,* Type 13 - *Glyceria grandis/Festuca pratensis,* Type 14 - *Typha latifolia/Glyceria grandis,* Type 15 - *Deschampsia cespitosa, and* Type 16 - Aquatic Macrophytes. Upland communities included Type 1 - *Festuca pratensis/Elymus repens,* Type 5 - *Elymus repens/Pascopyrum smithii,* and Type 11 - *Bromus inermis/Elymus repens.* These communities are discussed below.

Wetland community Type 4 – *Salix exigua/Salix lasiandra* formed the 0.26 acre pre-existing shrub/scrub, riparian corridor that encompassed Murphy Creek at the west entrance to the site. The community was dominated by narrow-leaf willow (*Salix exigua*), Pacific willow (*Salix lasiandra*), red-osier dogwood (*Cornus alba*), American mannagrass (*Glyceria grandis),* American licorice *(Glycyrrhiza lepidota*), Wood's rose (*Rosa woodsii*), and broad-leaf cat-tail (*Typha latifolia*).

Wetland community Type 7 – *Alopecurus pratensis*/*Carex spp.* was identified as 2.04 acres of pre-existing, palustrine emergent wetland located north of Cell 1 that was targeted for restoration. The vegetation was dominated by field meadow-foxtail (*Alopecurus pratensis*), Nebraska sedge (*Carex nebrascensis*), Northwest Territory sedge (*Carex utriculata*), and Arctic rush (*Juncus arcticus)*.

Twenty other species were identified at five percent or less cover in this community. The area characterized by community 7 was saturated to the ground surface at several locations in 2013.

Wetland community Type 9 – *Carex nebrascensis*/*Carex utriculata* was found in the 0.23 acre pre-existing, palustrine emergent wetland located between Cell 2 and the Murphy Creek riparian corridor (Community 10). Murphy Creek flows through the west edge of the community. The predominant species were Nebraska sedge, Northwest Territory sedge, Canadian thistle (*Cirsium arvense*), and field meadow foxtail.

The second *Salix* community, Type 10 – *Salix exigua/Salix drummondiana,* was identified in 2.16 acres of the pre-existing shrub/scrub wetland that encompassed Murphy Creek and paralleled the east property boundary. The dominant species were narrow-leaf willow, Drummond willow (*Salix drummondiana*), Pacific willow, Lemmon's willow (*Salix lemmonii*), diamond-leaf willow (*Salix planifolia*), gray willow (*Salix bebbiana*), broad-leaf cat-tail, and Northwest Territory sedge. Twelve other speceis were also identified with a trace to five percent cover in this community.

Wetland community Type 12 – *Typha latifolia* was identified in a 0.52 acre pre-existing, palustrine emergent depression within the Murphy Creek corridor. The inundated community was dominated by broad-leaf cat-tail, Northwest Territory sedge, and Arctic rush. Other species observed included common spike-rush (*Eleocharis palustris*), Nebraska sedge, and lamp rush (*Juncus effusus*).

Wetland community Type 13 – *Glyceria grandis*/*Festuca pratensis* was first identified as a vegetation type at the Murphy Ox Yoke site in 2011. It has increased in size by 0.43 acres since 2012 as wetlands continued to develop within upland community Type 1 – *Festuca pratensis/Elymus repens.* American mannagrass, meadow fescue (*Festuca pratensis*), broad-leaf cat-tail, common spike-rush, smooth brome (*Bromus inermis),* Arctic rush, and tufted hairgrass (*Deschampsia cespitosa*) dominated the plant community. Bare ground encompassed one to five percent of the total surface area in this community.

Wetland community Type 14 – *Typha latifolia*/*Glyceria grandis* developed from Type 3 – *Typha latifolia*/bare ground in 2011. This community encompassed 1.93 acres in 2013. Broad-leaf cat-tail, American mannagrass, common spike-rush, Arctic rush and 22 other species dominated the plant community. The community had an average inundation depth of 0.25 feet of water in 2013.

Wetland community Type 15 – *Deschampsia cespitosa* developed in 2011 on 0.72 acres from upland community 6 in the south half of Cell 1. The predominant species in 2013 were tufted hairgrass, meadow fescue, field meadow-foxtail, Arctic rush, and western-wheatgrass. Fourteen other species were observed with a trace to five percent cover.

Wetland community Type 16 – Aquatic Macrophytes covered 1.16 acres of the aquatic bed wetland that has developed in the perennially inundated area of Cells 1. The aquatic bed was defined by open water with surface water depths at or greater than 0.5 meters (1.63 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 beaked ditch-grass (*Ruppia maritima*), common duckweed (*Lemna minor*), and other unidentified aquatic macrophytes. Green algae (a protist) was also observed on the water surface.

Upland community Type 1 – *Festuca pratensis*/*Elymus repens* was identified on 1.43 acres in the upland area at the south edge of Cell 2 and the mitigation project. This community decreased by 0.31 acres in 2013 due to the expanding wetland area. This community included meadow fescue, creeping wild rye, field meadow-foxtail, smooth brome, and white clover (*Trifolium repens*).

Upland community Type 5 – *Elymus repens/Pascopyrum smithii* was located on 0.41 acres in the west boundary of the project, adjacent to US Highway 89. The plant species were dominated by creeping wild rye, western-wheatgrass, smooth brome, meadow fescue, and yellow sweet-clover (*Melilotus officinalis*).

Upland community Type 11 – *Bromus inermis/Elymus repens* was located on 1.15 acres along the east boundary of the project. Smooth brome, meadow fescue, and creeping wildrye dominated the herbaceous cover.

Infestations of Canadian thistle (*Cirsium arvense*) and gypsy-flower (houndstongue-*Cynoglossum officinale*), priority 2B noxious weeds, were identified at nine locations on site (Figure 3, Appendix A). Infestations were less than 0.1 acre in extent and less than 1 percent of the total cover of the infestation, with the exception of Commmunity 9. This infestation was 0.1 to 1.0 acre in size and total infestation cover was high (26-100 percent). Isolated plants of gypsy-flower and/or Canadian thistle were recorded within communities 1, 4, 5, 10, and 11.

Two vegetation transects were monitored at the Murphy Ox Yoke Wetland Mitigation Site in 2013 (Figure 2, Appendix A). The data recorded on transect T-1 (Mitigation Monitoring Form, Appendix B) were summarized in tabular and graphical formats (Table 4, Chart 1 and Chart 2, respectively). Photographs of the transect endpoints are presented in Appendix C.

Transect T-1 traverses Cell 2 (south cell), southwest to northeast. Wetland community Types 13 and 14 and upland community Types 1 and 5 were identified on the transect. The total cover of hydrophytic species and species diversity increased notably from 2010 to 2011 as reflected in the transition from Type 3 – *Typh*a/bare ground to Type 14 – *Typha*/*Glyceria* and Type 2 – *Festuca* to Type 13 – *Glyceria/Festuca* and remained consistent between 2012 and 2013. Eighty-eight percent of the transect contained hydrophytic vegetation

communities in 2013, a twelve percent increase from 2012. The interval length of wetland community Type 13 – *Glyceria/Festuca* increased in 2013 with a corresponding decrease in upland community Type 1 - *Festuca/Elymus.*

Table 4. Data summary for transect T-1 from 2010 to 2013 at the Murphy Ox Yoke Ranch Wetland Mitigation Site.

Monitoring Year	2010	2011	2012	2013
Transect Length (feet)	450	450	450	450
Vegetation Community Transitions along Transect	3	4	4	4
Vegetation Communities along Transect	3	4	4	4
Hydrophytic Vegetation Communities along Transect	1	2	2	2
Total Vegetative Species	39	31	27	23
Total Hydrophytic Species	9	16	20	19
Total Upland Species	30	15	7	4
Estimated % Total Vegetative Cover	70	85	95	95
% Transect Length Comprising Hydrophytic Vegetation Communities	37	75	75.6	87.8
% Transect Length Comprising Upland Vegetation Communities	63	25	24.4	12.2
% Transect Length Comprising Unvegetated Open Water	0	0	0.0	0.0
% Transect Length Comprising Bare Substrate	0	0	0.0	5

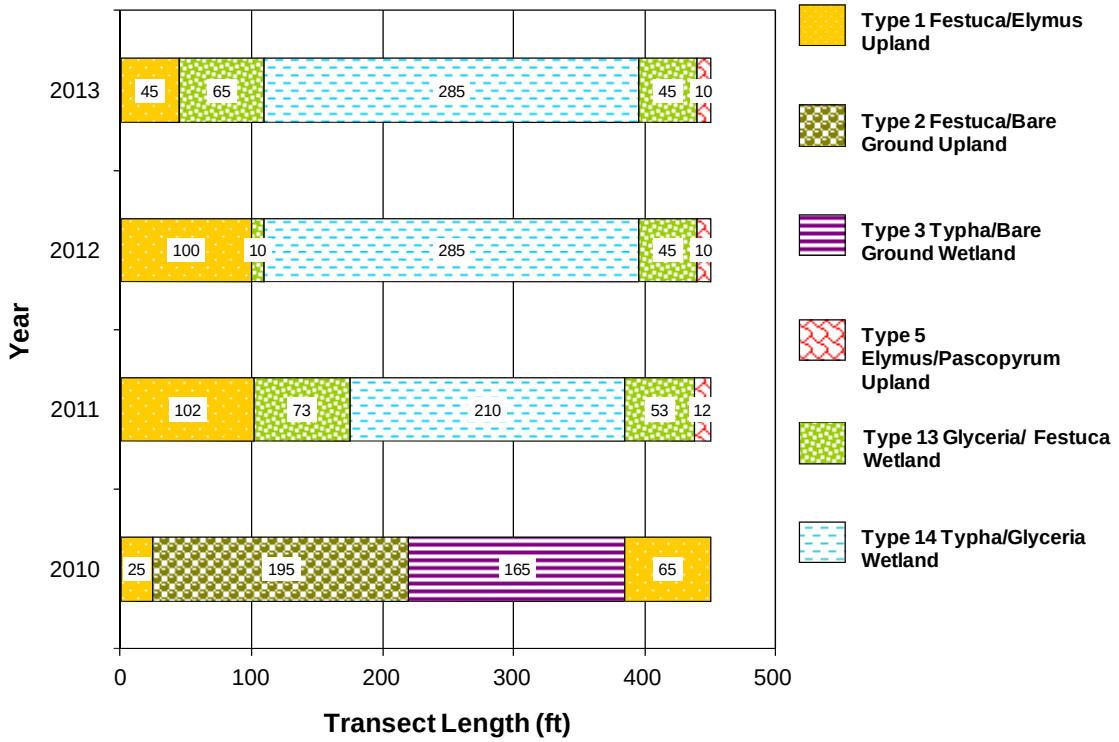

Chart 1. Transect map showing community types from 2010 to 2013 on transect T-1 from start (0 feet) to finish (450 feet) at the Murphy Ox Yoke Wetland Mitigation Site.

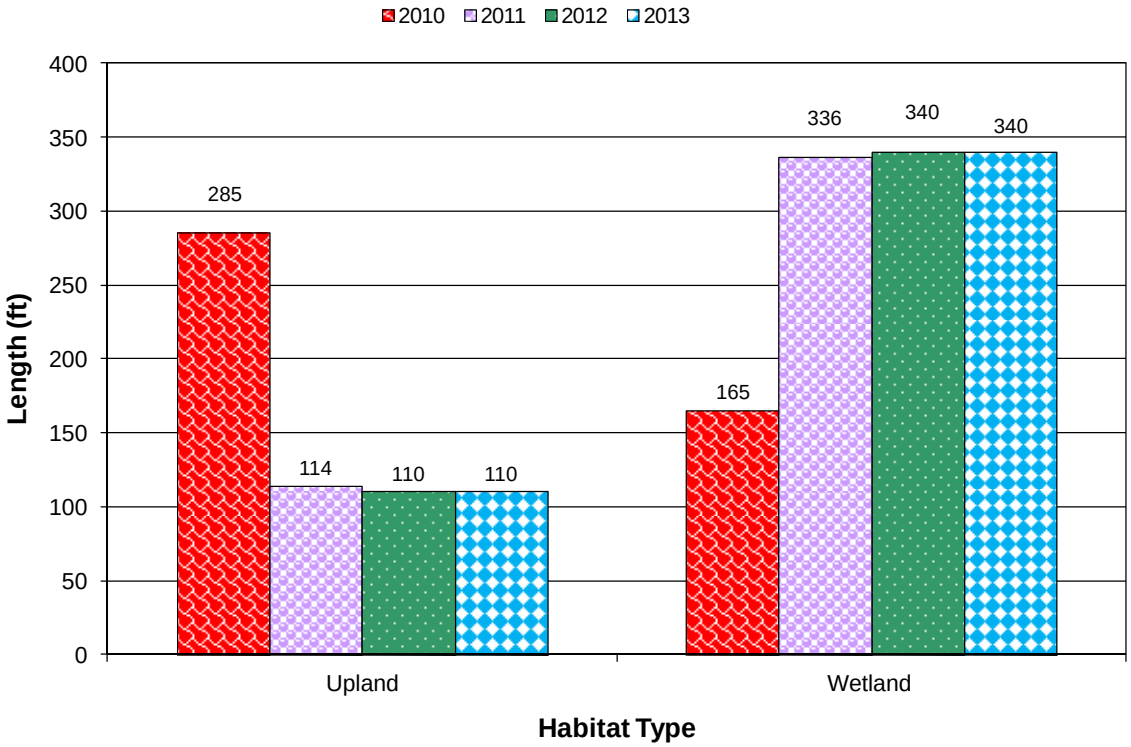

Chart 2. Length of habitat types on transect T-1 from 2010 to 2013 at the Murphy Ox Yoke Wetland Mitigation Site.

Data collected on transect T-2 (Monitoring Form, Appendix B) were summarized in tabular and graphic formats (Table 5, Charts 3 and 4, respectively). Photographs of the start and finish of Transect 2 are included in Appendix C. Transect T-2 traverses the west half of Cell 1, north to southeast. Four wetland vegetation communities, Types 7, 14, 15, and 16, and one upland community, Type 5, were identified on this transect. Few changes within the transect intervals were recorded from 2012 to 2013. There was a slight increase in length of wetland Type 16 - *Aquatic Macrophytes* and a decrease in wetland Type 14- *Typha/Glyceria* and Type 15 – *Deschampsia*. Hydrophytic vegetation communities comprised 95.1 percent of the transect in 2013.

Table 5. Data summary for Transect 2 from 2010 to 2013 at the Murphy Ox Yoke Wetland Mitigation Site.

Monitoring Year	**2010**	**2011**	**2012**	**2013**
Transect Length (feet)	**610**	**610**	**610**	**610**
Vegetation Community Transitions along Transect	5	5	5	6
Vegetation Communities along Transect	4	5	5	5
Hydrophytic Vegetation Communities along Transect	2	4	4	4
Total Vegetative Species	40	34	34	34
Total Hydrophytic Species	23	21	22	20
Total Upland Species	17	13	12	14
Estimated % Total Vegetative Cover	75	80	85	90
% Transect Length Comprising Hydrophytic Vegetation Communities	78	95	95.1	96.7
% Transect Length Comprising Upland Vegetation Communities	21	5	4.9	3.3
% Transect Length Comprising Unvegetated Open Water	2	0	0.0	0.0
% Transect Length Comprising Bare Substrate	0	0	0.0	3.3

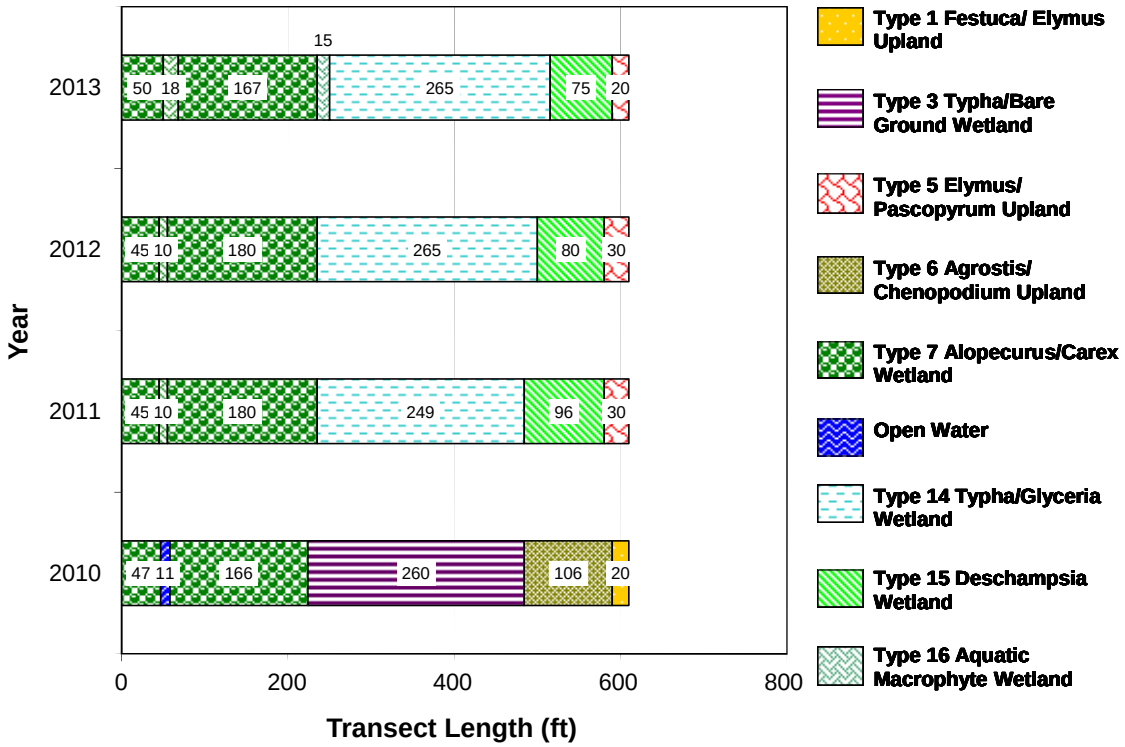

Chart 3. Transect maps showing community types from 2010 to 2013 on transect T-2 from transect start (0 feet) to finish (610) feet) at the Murphy Ox Yoke Wetland Mitigation Site.

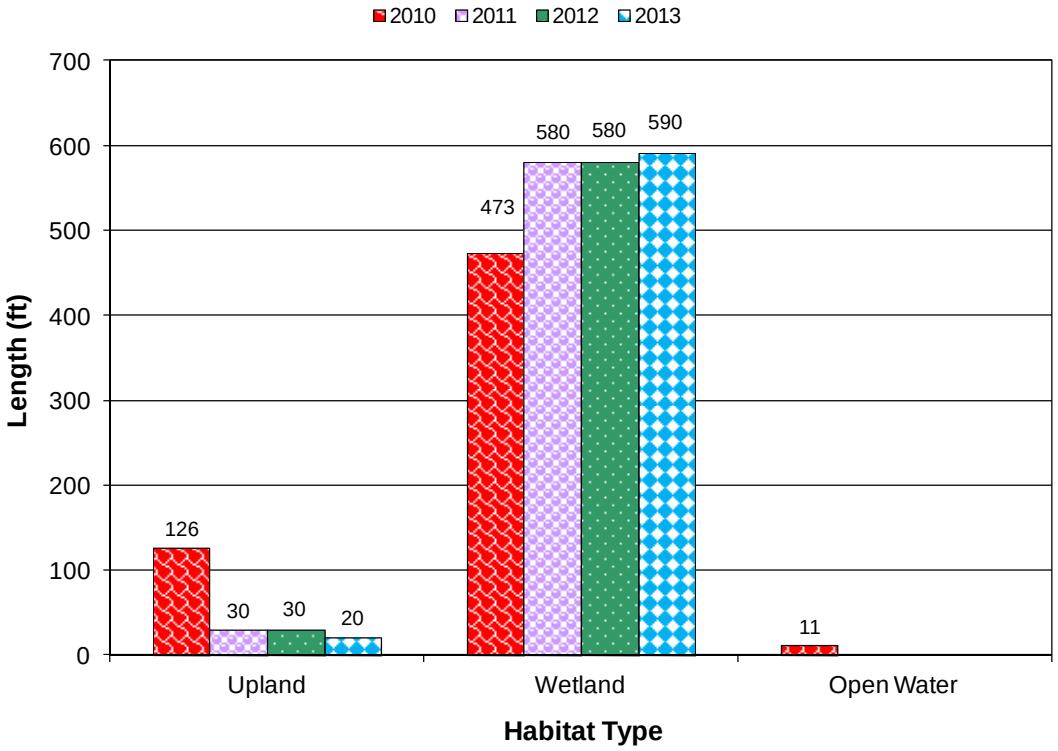

Chart 4. Length of habitat types within transect T-2 from 2010 to 2013 at the Murphy Ox Yoke Wetland Mitigation Site.

The 2009 Mitigation Plan specified planting 120 one-gallon willow and black cottonwood species and 1,000 willow cuttings. An additional 250 willow cutting were installed in 2011, totaling 1,250. A majority of the woody plant materials were installed around the edges of Cells 1 and 2. Eighty containerized willows in excellent condition were noted in 2013. Approximately 75 live willow saplings propagated from cuttings were observed in 2013. The healthiest cuttings were larger in diameter and had been well-pruned at time of installation. All of the containerized cottonwood plants failed to survive.

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 loam soils 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, which may explain the discrepancy between mapped soil units and test pit results.

Soil test pits were excavated at four locations (M-1 through M-4, Figure 2**,** Appendix A). Data points M-1 and M-3 were located near the boundary of upland community Type 1 and wetland community Type 10. Data point M-2 and M-4 were located at the southern edge of Cell 2 in wetland community Type 13. The profile at M-1 revealed a black (10 YR 2/1) silt loam with light yellowish brown (10 YR 6/4) concentrations in the soil matrix, which met the criteria for redox dark surface and hydric soils. Data point M-2 revealed a very dark brown (10 YR 2/2) silt loam with ten percent dark brown (7.5 YR 3/4) redox concentrations, meeting the criteria for a redox dark surface and hydric soils. The soil at M-3 was a dark brown (10 YR 3/3) silt loam, which did not meet the hydric soil criteria. The profile at M-4 revealed a dark gray (10 YR 4/1) sandy clay loam, with 40 percent dark yellowish brown (10 YR 5/6) redox concentrations. The depleted matrix was a positive hydric soil indicator.

3.4. Wetland Delineation

Four data points were used to help define the wetland boundaries in 2013 (Figure 2; Wetland Determination Data Forms, Appendix B). All data points were located in the southern portion of the mitigation site because the wetland boundary appeared to have changed significantly in this area.. Data point M-1 was located in the preservation credit area along the boundary of community Types 10 and 1. Data points M-2 and M-4 were situated within wetland community Type 13 - *Glyceria grandis/Festuca pratensis* located in the footprint of the excavated depression. Data points M-1, M-2 and M-4 satisfied all three wetland criteria. Point M-3 was located in upland community Type 1 - *Festuca pratensis/Elymus repens* and satisfied only one (hydrophytic vegetation) of the three wetland criteria. The August 28, 2013, delineation identified and mapped 5.71 acres of created, emergent wetland within and around the constructed cells

and 3.89 acres of pre-existing palustrine emergent and scrub-shrub wetlands (Table 6). There was an increase of 0.31 acres of wetland acreage between 2012 and 2013. The increase in wetland acreage is due to continued inundation/saturation and hydrophytic plant establishment in wetland Cell 2 and expansion of wetlands outside of excavated cells.

Table 6. Total wetland acres delineated in 2003 and from 2010 through 2013 at the Murphy Ox Yoke Wetland Mitigation Site.

Habitat	2003 [1] (acres)	2010 (acres)	2011 (acres)	2012 (acres)	2013 (acres)
Existing Wetland Area (Preservation)	3.89*	5.18*	1.89	1.89	1.89
Existing Wetland Area (Restoration)			2.00	2.00	2.00
Created Wetland Area - North Cell	---	2.15*	2.92	2.92	2.92
Created Wetland Area - South Cell	---		1.17	1.17	1.44
Created Wetlands Outside of Excavated Cells and Existing Restoration Area.	---	---	1.31	1.31	1.35
Created Open Water Area		0.02	**	**	**
Total Wetland Habitat	**3.89**	**7.35**	**9.29**	**9.29**	**9.60**

[1]Baseline delineation.
*Not differentiated in 2003 or 2010.
**Open water classified as aquatic bed wetland habitat in 2011 through 2013.

3.5. Wildlife

A comprehensive list of bird and other wildlife species observed directly or indirectly from 2010 to 2013 is presented in Table 7**.** Seven bird species were observed during the 2013 site visit including a great blue heron (*Ardea herodias*), mallard (*Anas platyrhynchos*), red-tailed hawk (*Buteo jamaicensis*), red-winged blackbird (*Agelaius phoeniceus*), song sparrow (*Melospiza melodia*), tree swallow (*Tachycineta bicolor*), and trumpeter swan (*Cygnus buccinator*). Two white tailed deer (*Odocoileus virginianus*) were also observed on site.

Table 7. Comprehensive list of bird and other wildlife species observed directly or indirectly from 2010 to 2013 at the Murphy Ox Yoke Wetland Mitigation Site.

COMMON NAME	SCIENTIFIC NAME
AMPHIBIANS	
Columbia Spotted Frog	*Rana luteiventris*
Frog spp	
Western Toad	*Bufo boreas*
Woodhouse's Toad	*Bufo woodhousii*
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*

Species observed in 2013 are bolded.

Table 7. (continued). Comprehensive list of bird and other wildlife species observed directly or indirectly from 2010 to 2013 at the Murphy Ox Yoke Mitigation Site.

COMMON NAME	SCIENTIFIC NAME
BIRDS	
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*
Great Blue Heron	***Ardea herodias***
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*
Song Sparrow	***Melospiza melodia***
Sora	*Porzana carolina*
Spotted Sandpiper	*Actitis macularius*
Starling	*Sturnus vulgaris*
Tree Swallow	***Tachycineta bicolor***
Trumpeter Swan	***Cygnus buccinator***
Willet	*Tringa semipalmata*
Wilson's Phalarope	*Phalaropus tricolor*
Wilson's Snipe	*Gallinago delicata*
Yellow Warbler	*Dendroica petechia*
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*
Yellow-rumped Warbler	*Dendroica coronata*
MAMMALS	
Beaver	*Castor canadensis*
Coyote	*Canis latrans*
Deer Mouse	*Peromyscus maniculatus*
Deer Sp.	
Elk or Wapiti	*Cervus canadensis*
Meadow Vole	*Microtus pennsylvanicus*
Merriam's Shrew	*Sorex merriami*

Species observed in 2013 are bolded.

Table 7. (continued). Comprehensive list of bird and other wildlife species observed directly or indirectly from 2010 to 2013 at the Murphy Ox Yoke Mitigation Site.

MAMMALS	
Moose	*Alces americanus*
Mule Deer	*Odocoileus hemionus*
Muskrat	*Ondatra zibethicus*
Raccoon	*Procyon lotor*
White-footed Mouse	*Peromyscus leucopus*
White-tailed Deer	***Odocoileus virginianus***
REPTILES	
Painted Turtle	*Chrysemys picta*
Plains Gartersnake	*Thamnophis radix*

Species observed in 2013 are bolded.

3.6. Functional Assessment

A baseline functional assessment using the 1999 MDT MWAM (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 of disturbance site-wide. Historic forms of disturbance included grazing, haying, ditching, channel straightening, and road building.

The 2008 MWAM was used from 2010 to 2013 to assess functional values for three AAs, including the Created Wetland Cells, the Wet Meadow Restoration area, and Preservation area west of the Park Branch Canal. The Created AA encompasses 4.36 acres within the excavated footprint of the constructed wetland cells. The Restoration AA includes 2.00 acres of existing wet meadow located in the northwest portion of the mitigation site and 1.35 acres of wetland developed adjacent to the restoration wetland area outside the cells. The Preservation AA encompasses the 1.89 acres of the pre-existing shrub-scrub and emergent wetlands located west of the canal. The functional assessment results from 2010 to 2013 are summarized in Table 8 and the 2013 completed MWAM forms are included in Appendix B.

The Created Wetland Cells AA rated as Category II wetlands in 2013 with 76 percent of the possible functional points. This AA achieved a total of 33.14 functional units. Ratings were high for general wildlife habitat, short and long term surface water storage, sediment/nutrient/toxicant removal, sediment/shoreline stabilization, and groundwater discharge and recharge.

Table 8. Functions and Values of the Murphy Ox Yoke Wetland Mitigation Site in 2003 and 2010 to 2013.

Function and Value Parameters from the MDT Montana Wetland Assessment Method	2003 Baseline[1] Wet Meadow	2010 Wet Meadow	2011 Wet Meadow Restoration	2012 Wet Meadow Restoration	2013 Wet Meadow Restoration[3]
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)
MTNHP Species Habitat	Low (0.1)	Mod (0.6)	Mod (0.6)	Mod (0.6)	Mod (0.6)
General Wildlife Habitat	Mod (0.5)	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)
General Fish/Aquatic Habitat	--	NA	NA	NA	NA
Flood Attenuation	Low (0.1)	Low (0.1)	Mod (0.6)	Mod (0.6)	Mod (0.5)
Short and Long Term Surface Water Storage	Mod (.5)	Mod (.5)	Mod (0.6)	Mod (0.6)	Mod (0.6)
Sediment/Nutrient/Toxicant Removal	Mod (0.7)	Mod (0.7)	High (1.0)	High (1.0)	High (0.9)
Sediment/Shoreline Stabilization	--	High (0.9)	High (1.0)	High (0.9)	High (0.9)
Production Export/ Food Chain Support	Mod (0.6)	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)
Groundwater Discharge/Recharge	High (1.0)	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)
Uniqueness	Low (0.3)	Low (0.2)	Low (0.3)	Low (0.3)	Low (0.3)
Recreation/Education Potential (bonus points)	Low (0.3)	Low (0.05)	Mod (0.1)	Mod (0.1)	Mod (0.1)
Actual Points / Possible Points	**4.4 / 10**	**5.45 / 10**	**6.6 / 10**	**6.5 / 10**	**6.3 / 10**
% of Possible Score Achieved	**44%**	**54.5%**	**66.0%**	**65.0%**	**63.0%**
Overall Category	**III**	**III**	**II**	**II**	**II**
Acreage of Assessed Aquatic Habitats within Easement (ac)	**2.00**	**2.04**	**3.31**	**3.31**	**3.35**
Functional Units (acreage x actual points) **(f^1-)**		**11.12**	**21.85**	**21.52**	**21.11**

[1]Berglund 1999 MDT MWAM.

[2]Berglund and McEldowney 2008 MDT MWAM.

[3]Additional wetlands created adjacent to restoration area included in this AA.

Table 8 (continued). Functions and Values of the Murphy Ox Yoke Wetland Mitigation Site in 2003 and 2010 to 2013.

Function and Value Parameters from the MDT Montana Wetland Assessment Method	2003 Baseline West of Canal	2010 West of Canal	2011 West of Canal Preservation	2012 West of Canal Preservation	2013 West of Canal Preservation
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)
MTNHP Species Habitat	Low (0.1)	Mod (0.6)	Mod (0.6)	Mod (0.6)	Mod (0.6)
General Wildlife Habitat	Mod (0.7)	High (0.9)	High (0.9)	High (0.9)	High (0.9)
General Fish/Aquatic Habitat	--	NA	NA	NA	NA
Flood Attenuation	Mod (0.6)	Mod (0.7)	High (0.9)	High (0.9)	High (0.8)
Short and Long Term Surface Water Storage	High (0.8)	High (0.8)	High (0.8)	High (0.8)	High (0.8)
Sediment/Nutrient/Toxicant Removal	High (0.9)	High (0.9)	High (1.0)	High (1.0)	High (0.9)
Sediment/Shoreline Stabilization	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Production Export/ Food Chain Support	High (0.9)	Exc (1.0)	Exc. (1.0)	Exc. (1.0)	Exc. (1.0)
Groundwater Discharge/Recharge	Low (0.1)	High (1.0)	High 1.0)	High (1.0)	High (1.0)
Uniqueness	Mod (0.5)	Mod (0.4)	Mod (0.4)	Mod (0.4)	Mod (0.4)
Recreation/Education Potential (bonus points)	Low (0.3)	Low (0.05)	Mod (0.1)	Mod (0.1)	Mod (0.1)
Actual Points / Possible Points	**6.2 / 10**	**7.65 / 10**	**8.0/10**	**8.0/10**	**7.8/10**
% of Possible Score Achieved	**56%**	**76.5%**	**80.0%**	**80.0%**	**78.0%**
Overall Category	**III**	**II**	**II**	**II**	**II**
Acreage of Assessed Aquatic Habitats within Easement (ac)	**1.89**	**1.89**	**1.89**	**1.89**	**1.89**
Functional Units (acreage x actual points) **(f^1-)**		**14.46**	**15.12**	**15.12**	**14.74**

[1]Berglund 1999 MDT MWAM.

[2]Berglund and McEldowney 2008 MDT MWAM.

Table 8 (continued). Functions and Values of the Murphy Ox Yoke Wetland Mitigation Site in 2003 and 2010 to 2013.

Function and Value Parameters from the MDT Montana Wetland Assessment Method	2010 Created Wetland Cells[2]	2011 Created Wetland Cells[2]	2012 Created Wetland Cells[2]	2013 Created Wetland Cells[2]
Listed/Proposed T&E Species Habitat	Low (0.1)	Low (0.3)	Low (0.3)	Low (0.3)
MTNHP Species Habitat	Low (0.0)	Mod (0.6)	Mod (0.6)	Mod (0.6)
General Wildlife Habitat	Low (0.3)	Mod (0.7)	High (0.9)	High (0.9)
General Fish/Aquatic Habitat	NA	NA	NA	NA
Flood Attenuation	Mod (0.6)	Mod (0.6)	Mod (0.6)	Mod (0.6)
Short and Long Term Surface Water Storage	Mod (0.5)	High (0.8)	High (1.0)	High (1.0)
Sediment/Nutrient/Toxicant Removal	Mod (0.5)	Mod (0.7)	High (1.0)	High (1.0)
Sediment/Shoreline Stabilization	Low (0.2)	Mod (0.7)	High (1.0)	High (1.0)
Production Export/ Food Chain Support	Low (0.3)	Mod (0.5)	Mod (0.7)	Mod (0.7)
Groundwater Discharge/Recharge	Mod (0.7)	High (1.0)	High (1.0)	High (1.0)
Uniqueness	Low (0.2)	Low (0.3)	Mod (0.4)	Mod (0.4)
Recreation/Education Potential (bonus points)	Low (0.05)	Mod (0.1)	Mod (0.1)	Mod (0.1)
Actual Points / Possible Points	**3.5 / 10**	**6.3 / 10**	**7.6/ 10**	**7.6/ 10**
% of Possible Score Achieved	**34.5%**	**63.0%**	**76.0%**	**76.0%**
Overall Category	**III**	**III**	**II**	**II**
Acreage of Assessed Aquatic Habitats within Easement (ac)	**2.15**	**4.09**	**4.09**	**4.36**
Functional Units (acreage x actual points) **(f^1-)**	**7.53**	**25.77**	**31.08**	**33.14**

[1]Berglund 1999 MDT MWAM.

[2]Berglund and McEldowney 2008 MDT MWAM.

The Wetland Restoration AA included the 2.0 acres identified as restoration within the mitigation plan and also an additional 1.35 acres of wetlands that have formed in the undisturbed areas adjacent to the restoration area and between the constructed cells. This 3.35-acre AA was classified as a Category II Wetland with 63 percent of the total points possible in 2013. A 2 pecent decrease of possible score from the 2012 score occurred as a result of modified ratings for the sediment removal and flood attenuation functions to reflect unrestricted outlet. Ratings were high for sediment/nutrient/toxicant removal and sediment/shoreline stabilization.

The 1.89 acre Preservation AA was rated as a Category II system with 78 percent of the total possible points in 2013. The overall rating was 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. Similar to the restoration AA, the sediment removal and flood attenuation functions were modified to reflect an unrestricted outlet. The functional units for 2013 totaled 14.74 in 2013.

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-4 of Appendix C. Transect end points are shown on pages C-5 and C-6 and photos of data points M-1 through M-4 are included on page C-7.

3.8. Maintenance Needs

Infestations of Canadian thistle and gypsy-flower (houndstongue), both Priority 2B noxious weeds, were identified near the west entrance to the site, on the east side of the Murphy Creek riparian corridor near the east property boundary, along the southern property boundary and in community Type - 9 (Figure 3, Appendix A). Infestations were less than 0.1 acre in extent and less than 1 percent of the total cover of the infestation, with the exception of Type - 9, which was 0.1 to 1 acre in size and total infestation cover was high (26-100 percent). Isolated plants of gypsy-flower and/or Canadian thistle were recorded within communities 1, 4, 5, 10, and 11. The MDT has an ongoing weed management program for their mitigation sites that includes an annual assessment of weed conditions and subsequent implementation of weed control measures. Two wood duck boxes, one floating nest, and six bluebird boxes were installed at the site between 2010 and 2013. Three of the bluebird boxes appeared to be in use in 2013. 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 9 presents the summary of wetland credits estimated for the Murphy Ox Yoke wetland mitigation site from 2010 to 2013. 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. The actual wetland area mapped within the footprint of the cells in 2013 was measured at 4.36 acres, an increase of 0.31 acres since 2012. An additional 1.35 acres of wetland have developed outside the excavated cells as a result of increased water levels within the mitigation site. The ditch in the northwest corner of the site was plugged during construction, raising groundwater elevations in the adjacent palustrine wetland. This additional wetland development was not anticipated or accounted for in the USACE approved crediting strategy. A request for acknowledgement and approval of the additional 1.31 credit acres should be made to the USACE. Preservation of 1.89 acres of the existing scrub/shrub and emergent wetlands within the creek corridor west of the canal accounted for 0.47 credit acres at a 4:1 impact to credit ratio. The 2.99 acre upland buffer provided 0.60 credit acres at a 5:1 ratio.

The 2013 estimated credits shown in Table 9 yielded 8.11 credit acres. This exceeds the 2008 credit target of 6.5 acres and is likely to increase if wetlands continue to develop within the mitigation area. Based on the success criteria presented in Section 1, the constructed cells delineated as wetlands have successfully met the three wetland criteria. The vegetation in wetland communities across the site exhibited an overall hydrophytic vegetation cover exceeding 80 percent. The herbaceous vegetation cover in wetland communities 13 and 15 and the planted woody vegetation cover are still developing and exhibiting a good survival rate. The weed cover in the wetlands and upland buffer does not currently exceed 5 percent. The site is fenced, grazing has been removed, the drainage ditch is plugged, and the site is protected in a conservation easement.

Table 9. Summary of Estimated Wetland Credits from 2010 to 2013 at the Murphy Ox Yoke Wetland Mitigation Site.

PROPOSED FEATURE	COMPENSATORY MITIGATION TYPE	USACE CREDIT RATIO	2008 PROPOSED CREDIT ACRES	2008 USACE CREDIT TARGET	2010 DELINEATED ACRES	2010 ESTIMATED CREDITS	2011 DELINEATED ACRES	2011 ESTIMATED CREDITS	2012 DELINEATED ACRES	2012 ESTIMATED CREDITS	2013 DELINEATED ACRES	2013 ESTIMATED 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	2.92	2.92	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	1.17	1.17	1.44	1.44
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	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	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	1.31	1.31	1.35	1.35
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	3.30	0.66	2.99	0.60
		Totals	**10.99**	**6.50**	**9.04**	**4.56**	**12.29**	**7.81**	**12.59**	**7.87**	**12.59**	**8.11**

*Area not differentiated in 2010

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Appendix A

Project Area Maps – Figure 2 & Figure 3

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

Figure 2: 2013 Monitoring Activity Locations

Park Branch Canal

Well 1

PP5

T2 Start

PP4

VegTran2

T1&2 End

PP3

PP1

VegTran1

US HWY 89

Murphy Swamp

M-3

M-2

M-1

PP2

M-4

T1 Start

Legend

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

Base Photography Date: July 14, 2013

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/Monitor2013.mxd

Project Name: Murphy Ox Yoke Ranch Wetland Mitigation Site

Drawing Title: 2013 Monitoring Activity Locations

DRAWN	CHECKED	APPROVED
BCS	Brie	LU

SCALE: Noted

Drawn: September 25, 2013

PROJ MGR: B Sandefur

CONFLUENCE consulting incorporated

Figure 2

REV -

Figure 3: 2013 Mapped Site Features

Park Branch Canal

US HWY 89

Murphy Swamp

Vegetation Community Types

1. Festuca pratensis/Elymus repens
4. Salix exigua/Salix lasiandra
5. Elymus repens/Pascopyrum smithii
7. Alopecurus pratensis/Carex spp.
9. Carex nebrascensis/Carex utriculata
10. Salix exigua/Salix drummondiana
11. Bromus inermis/Elymus 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 (6-25% cover)
- H = High (26-100% cover)

Legend

- Monitoring Limits
- Wetland Limits
- Vegetation Communities

Base Photography Date: July 14, 2013

Acreages

Project Area	12.59 acres
Total Wetlands	9.60 acres
Existing Wetlands	5.20 acres
Net Wetlands	4.40 acres
Uplands	2.99 acres

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/Veg2013.mxd

Project Name: Murphy Ox Yoke Ranch Wetland Mitigation Site

Drawing Title: 2013 Mapped Site Features

DRAWN BCS | CHECKED Brie | APPROVED LU

SCALE: Noted

Drawn: September 30, 2013

PROJ MGR: B Sandefur

CONFLUENCE consulting incorporated

Figure 3

REV -

Appendix B

2013 MDT Wetland Mitigation Site Monitoring Form
2013 USACE Wetland Determination Data Forms
2013 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 Assessment Date/Time 8/28/2013 8:24:14 AM

Person(s) conducting the assessment: B Schultz

Weather: Sunny, warm, windy Location: S of Murphy Lane in Emigrant, MT

MDT District: Butte Milepost:

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

Initial Evaluation Date: 7/30/2010 Monitoring Year: 4 #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 & Murphy Swamp; Murphy Creek flows thru site.

Inundation: ☑ Average Depth: 0.5 **(ft)** Range of Depths: 0-2.0 **(ft)**

Percent of assessment area under inundation: 25 %

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**:**

Inundation on aerial, surface soil cracks, high water table, saturation, drainage patterns, and FAC-neutral test.

Groundwater Monitoring Wells

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

Well ID	Water Surface Depth (ft)
Well 1	0.7

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:

The constructed cells were inundated during the site visit.

VEGETATION COMMUNITIES

Site Murphy

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

Community # 1 **Community Type:** Festuca pratensis / Elymus repens **Acres** 1.43

Species	Cover class	Species	Cover class
Alopecurus pratensis	2	Bromus inermis	3
Chenopodium album	1	Cirsium arvense	1
Dactylis glomerata	0	Elymus cinereus	1
Elymus repens	3	Equisetum arvense	1
Festuca pratensis	4	Medicago sativa	0
Pascopyrum smithii	0	Phleum pratense	1
Poa pratensis	0	Populus angustifolia	1
Salix exigua	1	Sisymbrium altissimum	1
Sonchus arvensis	1	Taraxacum officinale	1
Tragopogon dubius	0	Trifolium repens	2

Comments:

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

Species	Cover class	Species	Cover class
Cirsium arvense	0	Cornus alba	2
Cynoglossum officinale	0	Glyceria grandis	2
Glycyrrhiza lepidota	2	Ribes lacustre	1
Rosa woodsii	2	Salix exigua	5
Salix lasiandra	3	Solanum dulcamara	2
Typha latifolia	1	Vitis riparia	1

Comments:

Community # 5 Community Type: Elymus repens / Pascopyrum smithii **Acres** 0.41

Species	Cover class	Species	Cover class
Alopecurus pratensis	1	Bare Ground	1
Bromus inermis	2	Carex utriculata	1
Chenopodium album	0	Cicuta douglasii	1
Cirsium arvense	0	Cynoglossum officinale	0
Elymus repens	4	Equisetum arvense	1
Equisetum hyemale	1	Festuca pratensis	3
Glycyrrhiza lepidota	0	Hordeum jubatum	0
Lactuca serriola	0	Medicago sativa	1
Melilotus officinalis	2	Pascopyrum smithii	3
Phleum pratense	1	Plantago major	0
Sonchus arvensis	1	Taraxacum officinale	1

Comments:

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

Species	Cover class	Species	Cover class
Alopecurus pratensis	4	Carex aquatilis	0
Carex nebrascensis	4	Carex utriculata	3
Chenopodium album	0	Equisetum arvense	1
Festuca pratensis	1	Glycyrrhiza lepidota	1
Helianthus annuus	1	Juncus arcticus	3
Medicago sativa	1	Melilotus albus	0
Mentha arvensis	1	Mimulus glabratus	0
Poa palustris	0	Poa pratensis	1
Rosa woodsii	1	Salix drummondiana	0
Salix exigua	1	Solidago canadensis	1
Sonchus arvensis	1	Taraxacum officinale	0
Trifolium pratense	0	Trifolium repens	0

Comments:

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

Species	Cover class	Species	Cover class
Agrostis gigantea	1	Alopecurus pratensis	2
Carex nebrascensis	4	Carex utriculata	3
Cirsium arvense	3	Glyceria grandis	1
Helianthus nuttallii	1	Mentha arvensis	1
Typha latifolia	1		

Comments:

Community # 10 Community Type: Salix exigua / Salix drummondiana **Acres** 2.16

Species	Cover class	Species	Cover class
Agrostis gigantea	1	Alopecurus pratensis	1
Bromus inermis	1	Carex nebrascensis	1
Carex utriculata	2	Cirsium arvense	1
Glyceria grandis	1	Marrubium vulgare	1
Phalaris arundinacea	3	Poa palustris	1
Ribes lacustre	1	Rosa woodsii	1
Salix bebbiana	2	Salix drummondiana	3
Salix exigua	3	Salix lasiandra	2
Salix lemmonii	2	Salix planifolia	2
Scirpus microcarpus	1	Thlaspi arvense	0
Typha latifolia	2		

Comments:

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

Species	Cover class	Species	Cover class
Bromus inermis	4	Cirsium arvense	1
Cynoglossum officinale	0	Elymus cinereus	1
Elymus repens	3	Festuca pratensis	3
Lactuca serriola	0	Rosa woodsii	1
Sisymbrium altissimum	1	Solidago canadensis	1
Taraxacum officinale	1	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
Deschampsia cespitosa	0	Eleocharis palustris	1
Juncus arcticus	2	Juncus effusus	1
Salix bebbiana	0	Typha latifolia	5

Comments:

Community # 13 Community Type: Glyceria grandis / Festuca pratensis **Acres** 0.58

Species	Cover class	Species	Cover class
Alopecurus arundinaceus	1	Alopecurus pratensis	1
Bare Ground	1	Bromus inermis	2
Carex nebrascensis	1	Carex utriculata	2
Dactylis glomerata	0	Deschampsia cespitosa	2
Eleocharis palustris	2	Equisetum arvense	0
Festuca pratensis	2	Glyceria grandis	4
Juncus arcticus	2	Juncus compressus	1
Mentha arvensis	1	Mentha arvensis	1
Pascopyrum smithii	0	Phalaris arundinacea	0
Phleum pratense	1	Poa palustris	1
Polypogon monspeliensis	1	Sonchus arvensis	0
Trifolium repens	1	Typha latifolia	2

Comments:

Community # 14 Community Type: Typha latifolia / Glyceria grandis **Acres** 1.93

Species	Cover class	Species	Cover class
Algae, green	0	Alopecurus pratensis	0
Carex aquatilis	0	Carex nebrascensis	1
Carex utriculata	1	Cirsium arvense	0
Deschampsia cespitosa	1	Eleocharis palustris	2
Equisetum arvense	0	Equisetum hyemale	0
Festuca pratensis	1	Glyceria grandis	2
Glycyrrhiza lepidota	0	Hordeum jubatum	1
Juncus arcticus	2	Juncus compressus	0
Juncus effusus	0	Lemna minor	1
Melilotus officinalis	1	Poa pratensis	0
Polypogon monspeliensis	1	Salix drummondiana	0
Schoenoplectus acutus	1	Scirpus microcarpus	0
Trifolium repens	1	Typha latifolia	5

Comments:

Community # 15 **Community Type:** Deschampsia cespitosa / **Acres** 0.72

Species	Cover class	Species	Cover class
Alopecurus pratensis	2	Bare Ground	1
Chenopodium album	0	Cirsium arvense	0
Dactylis glomerata	1	Deschampsia cespitosa	5
Eleocharis palustris	1	Elymus repens	1
Equisetum arvense	1	Equisetum hyemale	1
Festuca pratensis	3	Glyceria grandis	1
Helianthus annuus	1	Hordeum jubatum	0
Juncus arcticus	2	Pascopyrum smithii	2
Poa pratensis	0	Sonchus arvensis	1
Typha latifolia	0		

Comments:

Community # 16 **Community Type:** Aquatic macrophytes / **Acres** 1.16

Species	Cover class	Species	Cover class
Algae, green	3	Aquatic macrophytes	1
Lemna minor	2	Open Water	5
Ruppia maritima	2		

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 Date: 8/28/2013 8:24:14 AM

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

Interval Data:

Ending Station 45 **Community Type:** Festuca pratensis / Elymus repens

Species	Cover class	Species	Cover class
Cirsium arvense	0	Elymus repens	4
Festuca pratensis	4	Pascopyrum smithii	2
Phleum pratense	1	Poa pratensis	3
Sonchus arvensis	1	Taraxacum officinale	1
Trifolium repens	1		

Ending Station 110 **Community Type:** Glyceria grandis / Festuca pratensis

Species	Cover class	Species	Cover class
Eleocharis palustris	1	Festuca pratensis	4
Glyceria grandis	3	Juncus arcticus	2
Sonchus arvensis	1	Trifolium repens	2
Typha latifolia	2		

Ending Station 395 **Community Type:** Typha latifolia / Glyceria grandis

Species	Cover class	Species	Cover class
Alopecurus pratensis	2	Carex nebrascensis	1
Carex utriculata	1	Cirsium arvense	0
Eleocharis palustris	3	Equisetum hyemale	1
Glyceria grandis	3	Juncus arcticus	2
Juncus compressus	2	Juncus effusus	0
Scirpus microcarpus	1	Trifolium repens	1
Typha latifolia	5		

Ending Station 440 **Community Type:** Glyceria grandis / Festuca pratensis

Species	Cover class	Species	Cover class
Alopecurus pratensis	4	Carex nebrascensis	2
Carex utriculata	2	Festuca pratensis	0
Glyceria grandis	2	Poa palustris	1
Typha latifolia	1		

Ending Station 450 **Community Type:** Elymus repens / Pascopyrum smithii

Species	Cover class	Species	Cover class
Alopecurus pratensis	1	Bromus inermis	4
Cirsium arvense	0	Elymus repens	0
Glycyrrhiza lepidota	2	Pascopyrum smithii	2
Sonchus arvensis	0		

Transect Notes:

Transect Number: 2 **Compass Direction from Start:** 200

Interval Data:

Ending Station 50 **Community Type:** Alopecurus pratensis / Carex sp.

Species	Cover class	Species	Cover class
Alopecurus pratensis	5	Carex aquatilis	1
Carex utriculata	2	Juncus arcticus	2
Mentha arvensis	0	Poa palustris	1

Ending Station 68 **Community Type:** Aquatic macrophytes /

Species	Cover class	Species	Cover class
Algae, green	4	Aquatic macrophytes	3
Lemna minor	3	Open Water	5

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

Species	Cover class	Species	Cover class
Alopecurus pratensis	5	Carex utriculata	1
Festuca pratensis	1	Glycyrrhiza lepidota	1
Helianthus annuus	1	Juncus arcticus	2
Melilotus albus	1	Mentha arvensis	1
Salix drummondiana	1	Sonchus arvensis	1
Trifolium pratense	1	Trifolium repens	1

Ending Station 250 **Community Type:** Aquatic macrophytes /

Species	Cover class	Species	Cover class
Algae, green	4	Aquatic macrophytes	3
Lemna minor	3	Open Water	5

Ending Station 515 **Community Type:** Typha latifolia / Glyceria grandis

Species	Cover class	Species	Cover class
Carex aquatilis	1	Carex nebrascensis	1
Glyceria grandis	2	Juncus arcticus	2
Juncus effusus	1	Melilotus officinalis	1
Trifolium repens	1	Typha latifolia	5

Ending Station 590 **Community Type:** Deschampsia cespitosa /

Species	Cover class	Species	Cover class
Bare Ground	3	Chenopodium album	1
Cirsium arvense	0	Deschampsia cespitosa	2
Eleocharis palustris	3	Glyceria grandis	2
Pascopyrum smithii		Poa pratensis	1
Sonchus arvensis	1	Typha latifolia	2

Ending Station 610 **Community Type:** Elymus repens / Pascopyrum smithii

Species	Cover class	Species	Cover class
Bromus inermis	4	Cirsium arvense	1
Cynoglossum officinale	0	Elymus repens	4
Pascopyrum smithii	2	Taraxacum officinale	1

Transect Notes:

PLANTED WOODY VEGETATION SURVIVAL

Murphy

Planting Type	#Planted	#Alive	Notes
Populus trichocarpa	20	0	1-gal
Salix drummondiana	20	20	1-gal
Salix exigua	20	20	1-gal
Salix geyeriana	30	20	1-gal
Salix lutea	30	20	1-gal
Salix spp.	1000	50	cuttings installed in 2010
Salix spp.	250	25	250 additional cuttings installed in 2011

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 cottonwoods exhibited a high mortaility rate. Remaining plantings appeared to be thriving during 2013 site visit.

Murphy

WILDLIFE

Birds

Were man-made nesting structures installed? Yes

If yes, type of structure: Bluebird, Wood Duck

How many? 9

Are the nesting structures being used? Yes

Do the nesting structures need repairs? No

Nesting Structure Comments:

Species	#Observed	Behavior	Habitat
Great Blue Heron	1	FO	MF, OW
Mallard	20	F, FO, L	OW
Red-tailed Hawk	2	F, FO	UP
Red-winged Blackbird	3	L	MA, WM
Song Sparrow	2	FO	SS, WM
Tree Swallow	11	FO	OW, SS
Trumpeter Swan	2	FO	OW

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
White-tailed Deer	2	No	No	No	

Wildlife Comments:

Murphy

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
035-039	45.365997	-110.735809	170	PP-1
041	45.365665	-110.735046	220	T1, end
047	45.36718	-110.734581	140	PP-4 ditch inlet
048	45.367077	-110.734108	180	PP-5
050	45.367241	-110.73436	200	T2, start
051	45.365654	-110.735252	20	T2, end
052	45.365513	-110.735092		cirsium
053	45.365208	-110.736603	40	T1, start
054-057	45.364815	-110.735794	350	PP-2
059				MOY-1
060				MOY-2
061				MOY-3
062				MOY-4
063	45.366199	-110.735619	50	PP-3

Comments:

Murphy

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:

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.

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

Project/Site: Murphy Ox Yoke | City/County: Park | Sampling Date: 8/28/2013

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

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

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

Subregion (LRR): LRR E | Lat: 45.36478 | Long: -110.735743333333 | Datum: WGS 84

Soil Map Unit Name: Vendome-Meadowcreek complex | NWI classification: PEM

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:

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)			
1. Phalaris arundinacea	65	☑	FACW
2. Poa palustris	10	☐	FAC
3. Alopecurus pratensis	15	☐	FAC
4. Agrostis gigantea	10	☐	FAC
5.	0	☐	
6.	0	☐	
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
11.	0	☐	
	100 = 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: 100.00% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	65	x 2 =	130
FAC species	35	x 3 =	105
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		235 (B)

Prevalence Index = B/A = 2.35

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
0-6	10YR 2/1	100					Silt Loam	
6-8	10YR 2/1	80	10YR 6/4	10	C	M	Silt Loam	
8-10	10YR 2/1	80	7.5YR 3/4	10	C	M	Silty Loam	
10-16	10YR 4/1	80	7.5YR 3/2	20	C	M	Silty Clay 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): _____

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: 8/28/2013

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

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

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

Subregion (LRR): LRR E | Lat: 45.3648616666667 | Long: -110.735856666667 | Datum: WGS 84

Soil Map Unit Name: Vendome-Meadowcreek complex | NWI classification: PEM

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:

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)			
1. Poa palustris	60	☑	FAC
2. Alopecurus arundinaceus	20	☐	FAC
3. Dactylis glomerata	3	☐	FACU
4. Equisetum arvense	5	☐	FAC
5. Bromus inermis	7	☐	FAC
6. Phalaris arundinacea	10	☐	FACW
7. Juncus arcticus	5	☐	FACW
8.	0	☐	
9.	0	☐	
10.	0	☐	
11.	0	☐	
	110 = 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: 100.00% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	15	x 2 =	30
FAC species	92	x 3 =	276
FACU species	3	x 4 =	12
UPL species	0	x 5 =	0
Column Totals:	110 (A)		318 (B)

Prevalence Index = B/A = 2.89

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
0-10	10YR 2/2	90	7.5YR 3/4	10	C	M	Silt Loam	
10-16	10YR 2/1	90	10YR 4/1	10	C	M	Silty Clay Loam	dark black clayey

[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): _____

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: 8/28/2013

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

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

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

Subregion (LRR): LRR E | Lat: 45.3647366666667 | Long: -110.73567 | Datum: WGS 84

Soil Map Unit Name: Vendome-Meadowcreek complex | NWI classification: PSS

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:
Upland fringe berm area.

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)			
1. Bromus inermis	75	☑	FAC
2. Equisetum arvense	10	☐	FAC
3. Dactylis glomerata	15	☐	FACU
4.	0	☐	
5.	0	☐	
6.	0	☐	
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
11.	0	☐	
	100 = 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: 100.00% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	85	x 3 =	255
FACU species	15	x 4 =	60
UPL species	0	x 5 =	0
Column Totals:	100 (A)		315 (B)

Prevalence Index = B/A = 3.15

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-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
0-6	10YR 3/3						Silt Loam	
6-14	10YR 4/2						Silt Loam	very friable

[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): _____

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: 8/28/2013

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

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

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

Subregion (LRR): LRR E | Lat: 45.3651166666667 | Long: -110.735956666667 | Datum: WGS 84

Soil Map Unit Name: Venome-Meadowcreek complex | NWI classification: PEM

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:

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)			
1. Juncus arcticus	30	☑	FACW
2. Carex nebrascensis	10	☐	OBL
3. Carex utriculata	10	☐	OBL
4. Poa palustris	15	☑	FAC
5. Eleocharis palustris	15	☑	OBL
6. Festuca pratensis	10	☐	FACU
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
11.	0	☐	
	90 = 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: 3 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	35	x 1 =	35
FACW species	30	x 2 =	60
FAC species	15	x 3 =	45
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	90 (A)		180 (B)

Prevalence Index = B/A = 2

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-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
0-6	10YR 2/1						Silty Clay Loam	
6-16	10YR 4/1	60	10YR 5/6	40	C	M	Sandy Clay Loam	soil is saturated at 4 inches

[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): 4

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: 8/28/2013

Applicant/Owner: MDT | State: MT | Sampling Point: MOY_2

Investigator(s): B Schultz | Section, Township, Range: S 33 T 5s R 8e

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

Subregion (LRR): | Lat: 45.36478 | Long: -110.735743333333 | Datum:

Soil Map Unit Name: | 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:
This Record can be deleted…

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:)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
6.	0	☐	
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
11.	0	☐	
	0 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = 0

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: MOY_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

[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): _____

Wetland Hydrology Present? Yes ☐ No ☑

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

Remarks:

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 8/28/2013 **4. Evaluators** B Schultz **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/Park County

7. Evaluating Agency Confluence for MDT

8. Wetland size acres 4.4

Purpose of Evaluation

How assessed: Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

9. Assesssment area (AA) size (acres) 4.4

☐ **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/Intermittent	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 disturbance	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 was an excavated wetland four years ago. This area exhibits continued improving emergence of native plant cover with little bare ground. Rated high disturbance in 2010 and moderate in 2011. Site was previously grazed. Grazing was discontinued and site is currently managed in a natural state within the conservation easement.

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

Cirsium arvense

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 Highway 89 and a 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 and aquatic bed class

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 USFWS, based on landowner observation

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	
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 swans observed by landowner, and during 2013 site visit.

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**

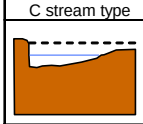
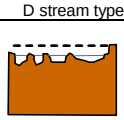
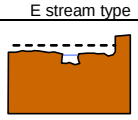
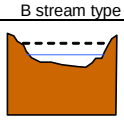
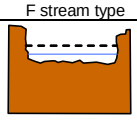
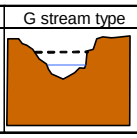
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ◯ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

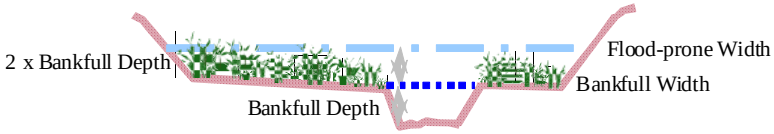
iii. Final Score and Rating: 0 NA **Comments:**

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
						



Floodprone 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: Storage estimated at 4.4 acres flooded to a depth great than 1.25 feet.

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: Vegetation continues to develop within excavated basins.

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: Shoreline vegetation cover continues to increase in the AA. Mannagrass, Typha, and Juncus occupied this site.

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	.9H	.6M	.7H	.4M	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.5M	.5M	.3L	.3L	.2L
T/E/A	.8H	.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:

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: A shallow water table is present on site with inundation in the north cell.

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:

Private property, access to the site is limited.

General Site Notes

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	1.32	☐
B. MT Natural Heritage Program Species Habitat	M	.6	1	2.64	☐
C. General Wildlife Habitat	H	.9	1	3.96	☐
D. General Fish Habitat	NA	0	0	0	☐
E. Flood Attenuation	M	.6	1	2.64	☐
F. Short and Long Term Surface Water Storage	H	1	1	4.4	☑
G. Sediment/Nutrient/Toxicant Removal	H	1	1	4.4	☑
H. Sediment/Shoreline Stabilization	H	1	1	4.4	☑
I. Production Export/Food Chain Support	M	.7	1	3.08	☐
J. Groundwater Discharge/Recharge	H	1	1	4.4	☑
K. Uniqueness	M	.4	1	1.76	☐
L. Recreation/Education Potential (bonus points)	M	.1	NA	0.44	☐
Totals:		7.6	10	33.44	
Percent of Possible Score			**76** %		

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 above)

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 8/28/2013 **4. Evaluators** B Schultz **5. Wetland/Site# (s)** Wetland Preservation

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

Approx Stationing or Mileposts

Watershed 1007002 **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 disturbance	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 historically grazed. The AA is no longer grazed or hayed and managed in a natural state protected by a conservation easement. Noxious weed coverage is less than 15%.

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

Cirsium arvense, Cynoglossum officinale

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

AA encompasses 1.89 acres of existing wetland identified during original delineation and 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. Murphy Creek was flowing during the site visit.

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 USFWS T&E, 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	
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 and field observations. Trumpeter Swans were observed in 2013.

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 Trumpeter swans were observed in 2013.

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**

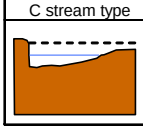
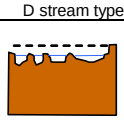
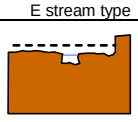
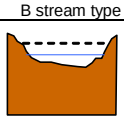
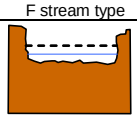
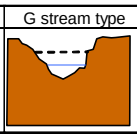
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ◯ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

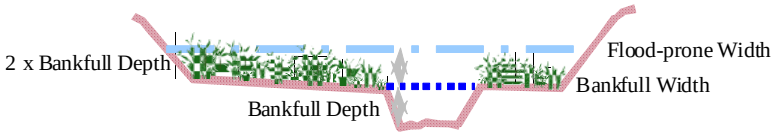
iii. Final Score and Rating: 0 NA **Comments:** Not a known fishery.

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
						



Floodprone 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 flows from Murphy Creek. Creek runs under Park Canal via culvert, then discharges to the Yellowstone River. E type stream channel.

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 (1.89 acres) is subject to flooding approximately 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 discharges to the Yellowstone River via culvert under the 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 willows, cattail, Northwest Territory 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	.9H	.6M	.7H	.4M	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.5M	.5M	.3L	.3L	.2L
T/E/A	.8H	.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 that contains greater than 30% cover and less than 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: Shallow ground water was observed throughout the site with inundation in the north cell.

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:

Site access is limited.

General Site Notes

There has been notable change (decrease in bare ground and increase in wetland species) on site from 2010 to 2013.

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 above)

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 8/28/2013 **4. Evaluators** B Schultz **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/Intermittent	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 disturbance	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 conservation easement.

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

Cirsium arvense

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 south. Drainage ditch was plugged and area reseeded. East half of AA lies west of Murphy Creek. High ground water in AA.

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.

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 USFWS listed, 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 Sawn (S3)
Incidental habitat (list species)	◉ D ◉ S	
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 listed, Western toad observed in 2011, not positively Ided. Swans observed in 2013.

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 Several mammals and birds have been documented within the AA.

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**

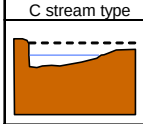
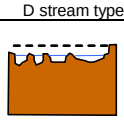
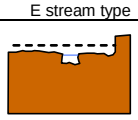
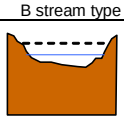
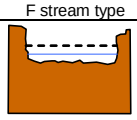
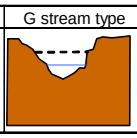
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ◯ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

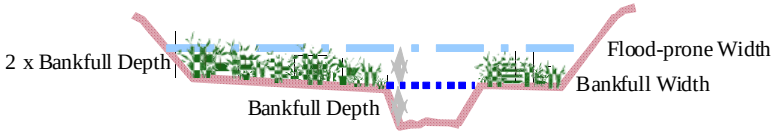
iii. Final Score and Rating: 0 NA **Comments:**

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
						



Floodprone 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 has culvert up and down gradient. AA encompasses man-made ditch that was filled with groundwater during site visit.

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 approximately 3.31 acres with 0.5 acre feet of water. High groundwater was observed in AA during investigation.

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: Area subject to flooding during wet seasons.

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 contains a plugged ditch that was inundated during the 2013 site visit. Mannagrass, Juncus, Typha and horsetail occupied this site.

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	.9H	.6M	.7H	.4M	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.5M	.5M	.3L	.3L	.2L
T/E/A	.8H	.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 boundary 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:

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:

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	.9	1	2.979	☑
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:		6.5	10	21.515	
Percent of Possible Score			**65** %		

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 above)

I	II	III	IV

Appendix C

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 2012

Photo Point 1
Compass Bearing: 170 degrees

Location: West boundary near Hwy 89, NW Cell 2
Taken in 2013

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 2012

Photo Point 2
Compass Bearing: 350 degrees

Location: SE corner of Cell 2
Taken in 2013

Photo Point 3 **Location:** SW corner of Cell 1
Compass Bearing: 50 degrees **Taken in 2010**

Photo Point 3 **Location:** SW corner of Cell 1
Compass Bearing: 50 degrees **Taken in 2012**

Photo Point 3 **Location:** SW corner of Cell 1
Compass Bearing: 50 degrees **Taken in 2013**

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

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

Photo Point 4 – *Photo 1* **Location:** Ditch inlet
Compass Bearing: 140 Degrees **Taken in 2012**

Photo Point 5 – *Photo 1* **Location:** North side Cell 1
Compass Bearing: 180 Deg **Taken in 2012**

Photo Point 4 – *Photo 1* **Location:** Ditch inlet
Compass Bearing: 140 Degrees **Taken in 2013**

Photo Point 5 – *Photo 1* **Location:** North side Cell 1
Compass Bearing: 180 Deg **Taken in 2013**

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

Transect 1 - End – *Photo 1*
Compass Bearing: 280 Degrees
Location: NE Cell 2
Taken in 2010

Transect 1 - Start – *Photo 1*
Compass Bearing: 70 Degrees
Location: SW Cell 2
Taken in 2012

Transect 1 - End – *Photo 1*
Compass Bearing: 280 Degrees
Location: NE Cell 2
Taken in 2012

Transect 1 - Start – *Photo 1*
Compass Bearing: 70 Degrees
Location: SW Cell 2
Taken in 2013

Transect 1 - End – *Photo 1*
Compass Bearing: 280 Degrees
Location: NE Cell 2
Taken in 2013

Transect 2 - Start – *Photo 1*
Compass Bearing: 200 Degrees
Location: NW Cell 1
Taken in 2010

Transect 2 - End – *Photo 1*
Compass Bearing: 30 Degrees
Location: SE Cell 1
Taken in 2010

Transect 2 - Start – *Photo 1*
Compass Bearing: 200 Degrees
Location: NW Cell 1
Taken in 2012

Transect 2 - End – *Photo 1*
Compass Bearing: 30 Degrees
Location: SE Cell 1
Taken in 2012

Transect 2 - Start – *Photo 1*
Compass Bearing: 200 Degrees
Location: NW Cell 1
Taken in 2013

Transect 2 - End – *Photo 1*
Compass Bearing: 30 Degrees
Location: SE Cell 1
Taken in 2013

Wetland Data Point 1 **Location:** M-1
Compass Bearing: n/a **Taken in 2013**

Wetland Data Point 2 **Location:** M-2
Compass Bearing: n/a **Taken in 2013**

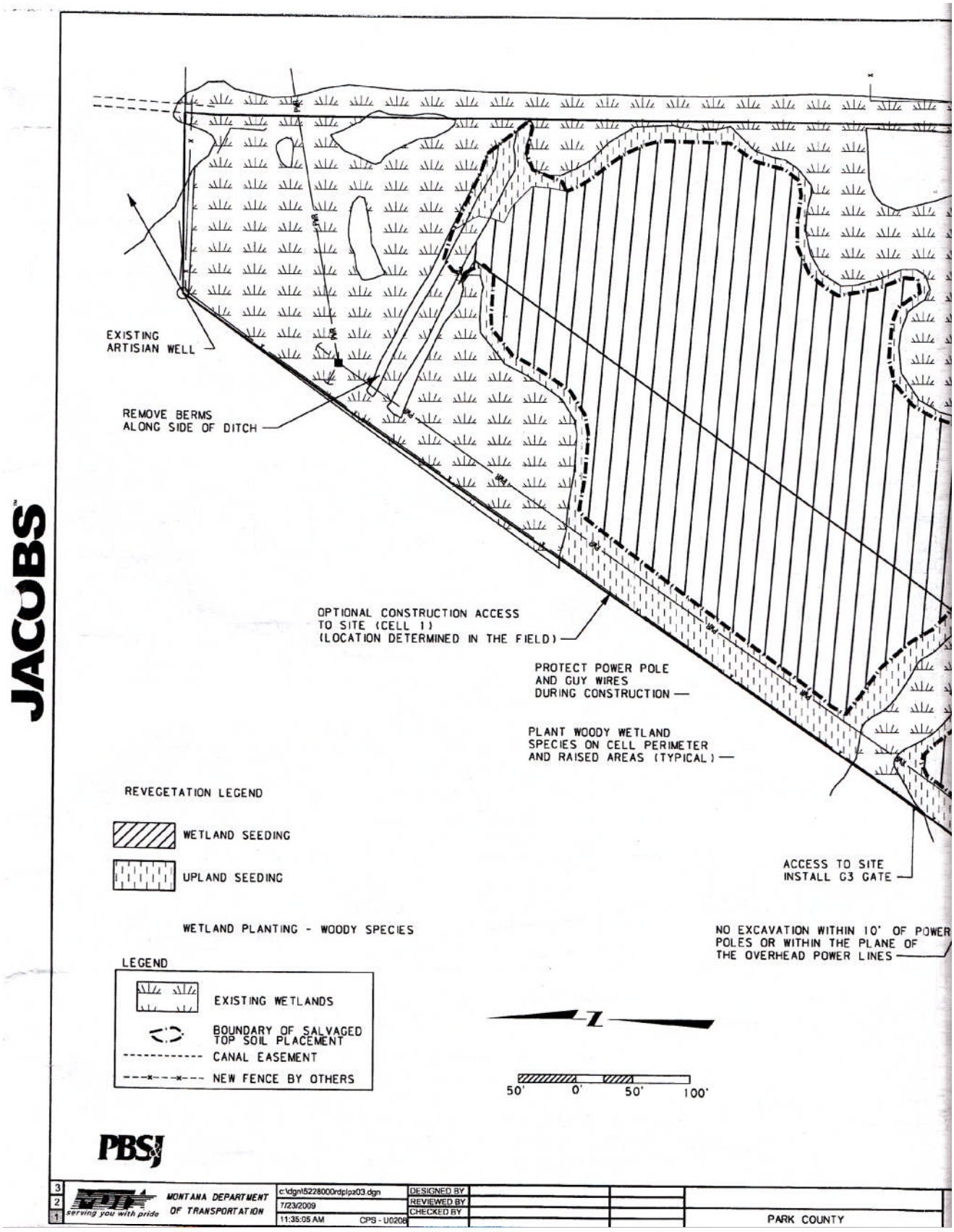
Wetland Data Point 3 **Location:** M-3
Compass Bearing: n/a **Taken in 2013**

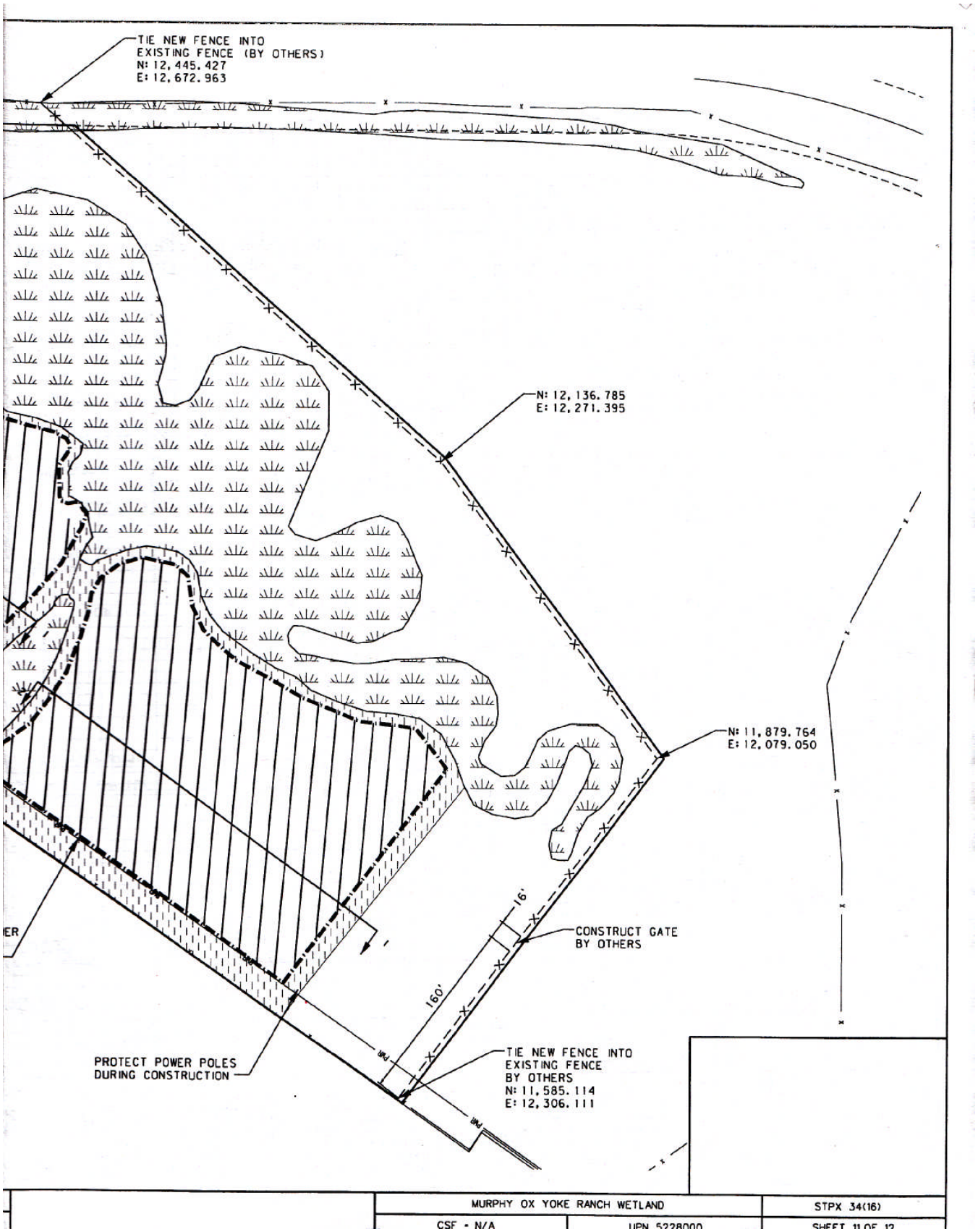
Wetland Data Point 4 **Location:** M-4
Compass Bearing: n/a **Taken in 2013**

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