# MONTANA DEPARTMENT OF TRANSPORTATION
# WETLAND MITIGATION MONITORING REPORT: YEAR 2012

*Murphy Ox Yoke Ranch*
*Park County, Montana*



Prepared for:

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December 2012

# MONTANA DEPARTMENT OF TRANSPORTATION

## WETLAND MITIGATION MONITORING REPORT:

## YEAR 2012

*Murphy Ox Yoke Ranch*
*Park County, Montana*

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

SPA # MDT-R3-83-2008
Corps #: NWO-2004-90445-MTB

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CCI Project No: MDT.004

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# 1. INTRODUCTION

The 2012 Monitoring Report presents the results of the third year of monitoring at the Murphy Ox Yoke Ranch Wetland Mitigation Site. 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). Figures 2 and 3 in Appendix A show the Monitoring Activity Locations and Mapped Site Features, respectively. The Montana Department of Transportation (MDT) Wetland Mitigation Site Monitoring 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 site was developed to mitigate for wetland impacts associated with the 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. 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 the Gallatin Valley Land Trust. The project site encompasses upland, wet meadow, riparian, emergent, and scrub/shrub wetland habitats. Historic wetlands located within the project area had been drained for agricultural purposes. The Park Branch irrigation canal raises 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.

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

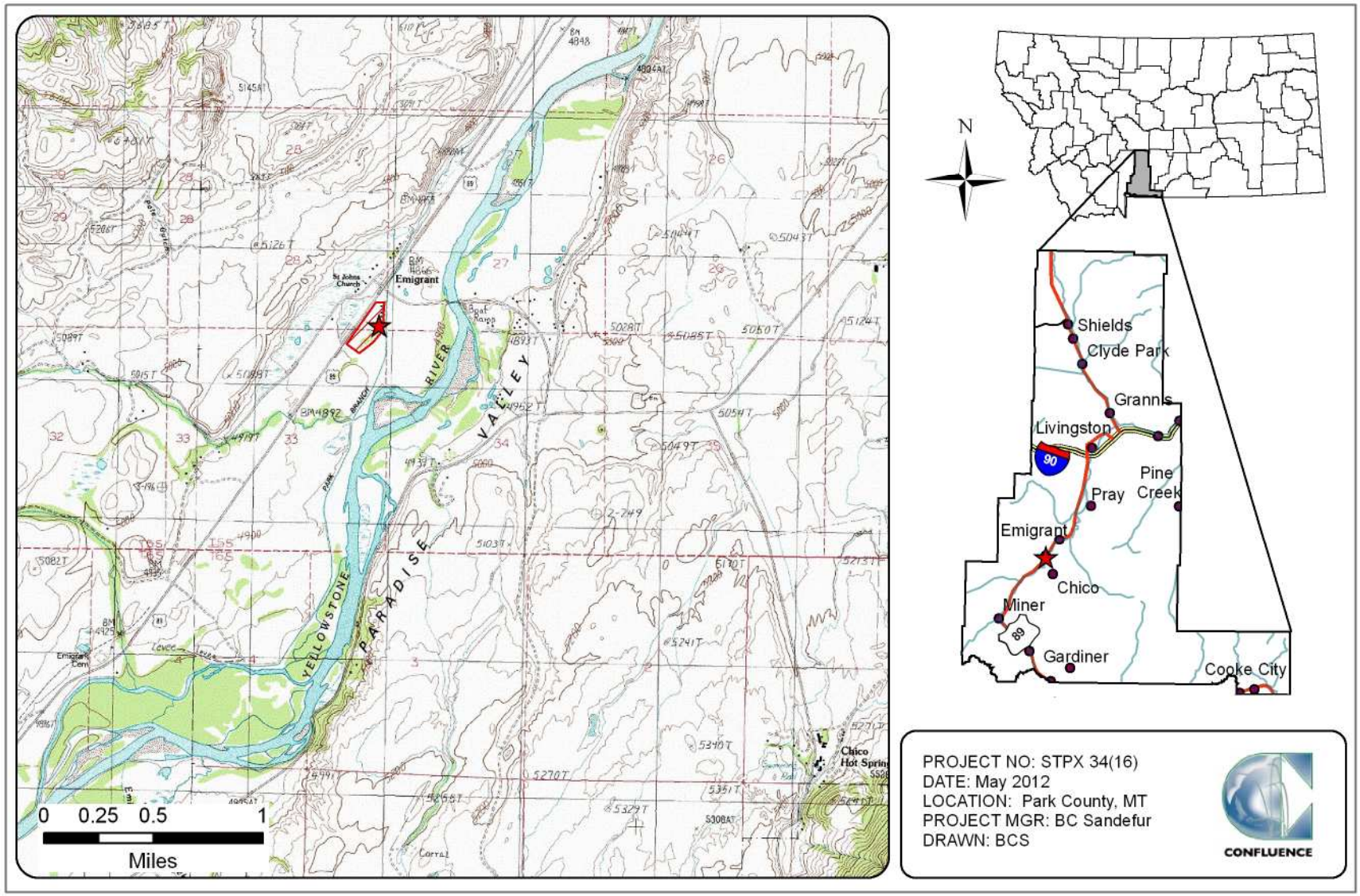



**Figure 1. Project Location of the Murphy Ox Yoke Ranch Wetland Mitigation Site.**



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

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

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

**Table 1. Wetland Crediting Summary.**

| Proposed Mitigation Features | Compensatory Mitigation Type | COE Mitigation Ratios | 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 Corps of Engineers Wetland Delineation Manual (Environmental Laboratory 1987). The 2010 Regional Supplement: Western Valleys, Mountains and Coast Regions (USACE 2010) was used to delineate wetlands for subsequent monitoring.

1. **Wetland Hydrology Success** will be achieved where wetland hydrology is present as specified in the technical guidelines in the 1987 Manual. Wetland hydrology will be confirmed through continued

monitoring of an existing piezometer that was left undisturbed during and following construction as well as through the periodic observations of surface water across the site and saturated soil conditions during the annual mid-season monitoring event.

2. **Hydric Soil Success** will be achieved where hydric soil conditions are present (provided 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 third year of monitoring was completed on August 20, 2012. 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 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 three 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, or GPS measurements of the wetted perimeter during field visits. Water depths in the constructed depression wetlands were measured and recorded.

Five shallow groundwater wells were installed onsite in November, 2002 and two additional wells were installed in April, 2008 (Figure 2, Appendix A). Only one well (Well-1) remained following construction. Water levels were measured in Well 1 with a Solinst water level meter during the monitoring event. The water surface level was recorded electronically on the Mitigation Monitoring Form (Appendix B). Soil pits excavated during the wetland delineation were used to evaluate groundwater levels within 18 inches of the ground surface. The observed groundwater data were recorded electronically on the 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 2012 aerial photograph. The percent cover of dominant species within a community type was estimated and recorded using the following ranges listed on the monitoring form: 0 (less than 1 percent), 1 (1 to 5 percent), 2

(6 to 10), 3 (11 to 20 percent), 4 (21 to 50 percent), and 5 (greater than 50 percent) (Appendix B). Community types were named based on the predominant vegetation species that characterized each mapped polygon (Figure 3, Appendix A).

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 community type polygons (Appendix B). A comprehensive plant species list 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 will be evaluated annually to the extent possible. The final location and quantity of individual species is unknown. The number and condition of individual woody plants observed during monitoring was recorded on the Mitigation Monitoring Form (Appendix B).

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

### 2.3. Soil

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

In order to delineate a representative area as jurisdictional, the technical criteria for hydrophytic vegetation, hydric soil, and wetland hydrology, as described in the 1987 Manual and 2010 Regional Supplement must be satisfied. The name and indicator status of plant species was derived from the Draft 2012 National Wetland Plant List (NWPL) (Lichvar and Kartesz. 2009). Previous years' reports

used the 1988 National List of Plant Species that Occur in Wetlands: Northwest Region 9 (Reed 1988). The 2012 NWPL scientific plant names were used in this report. Many common names used in the 2012 NWPL appear incomplete or erroneous. When used in this report, 2012 NWPL common names that appear to be incomplete or erroneous are provided with parenthetical clarification. For example, the common given name for the plant *Agrostis exarata* in the 2012 NWPL is "spiked bent". As this is likely an error, this species' common name would be reported here as "spiked bent (grass)". 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 delineated on aerial imagery and digitized into Geographic Information System (GIS) format. Wetland acreages were estimated 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. Each monitoring report contains a comprehensive list of wildlife species identified during the current year and past years.

### 2.6. Functional Assessment

The 2008 MDT MWAM was used to evaluate functions and values on the site from 2010 to 2012. 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 wetland assessment area (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. Photographs of the photo points, transect end points, and wetland data points are included in Appendix C. Photo point locations were recorded with a sub-meter grade GPS unit (Figure 2, Appendix A).

### 2.8. GPS Data

Site features and survey points were collected with a resource grade Thales Pro Mark III GPS unit during the 2012 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. Site features and survey points that were located with GPS included fence boundaries, photograph points, transect endpoints, and wetland data points.

### 2.9. Maintenance Needs

Non-engineering level, cursory examinations were conducted of all man-made structures within the site including: outlets, berms, water control features, fences, etc. to determine if any maintenance was required. Details of observed maintenance requirements were recorded on 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 16.15 inches from June, 1951 to December, 2011 (Western Region Climate Center [WRCC] 2011). Annual precipitation rates recorded in 2010 and 2011 were 14.95 inches and 13.42 inches, respectively. The long-term monthly precipitation total from January through August is 11.85 inches. This value for 2010, 2011, and 2012 is 10.12 inches, 10.43 inches, and 7.39 inches, respectively. These data indicate precipitation between the period of January through August in 2012 was below average.

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 includes creating shallow water, emergent wetlands within two excavated cells (Cell 1, north; Cell 2, south) by intercepting the groundwater

table. Elevated groundwater levels and seepage from the Park Branch Canal were expected to contribute 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.

Inundation levels in 2012 were similar to those observed in 2011 (Mitigation Monitoring Form, Appendix B). The average depth of inundation site wide was 0.8 feet and the range was 0.0 to 2.2 feet. Surface water levels were deepest in the plugged drain 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. Three data points were sampled in 2012 to assist in determining the wetland and upland boundaries (Figure 2, Appendix A and Monitoring Form, Appendix B). Data points M-2 and M-3 were located in areas tha met the wetland criteria. Wetland hydrology indicators at M-2 included high water table, saturation, surface soil cracks, inundated on aerials, sparsely vegetated concave surface, algal mat/crust, Fe deposit, and FAC-Neutral test. A high water table and saturation were documented at data point M-3, located near the edge of the north excavated depression. Other evidence of wetland hydrology identified in other areas of wetland on site included saturation within 12 inches of the ground surface, a high groundwater table, surface soil cracks, algal mats, iron deposits, sparsely concave surfaces, and a positive FAC-neutral test. The groundwater depth measured in Well 1 was 0.4 feet bgs, 0.09 foot lower than in 2011 (Figure 2, Appendix A). Murphy Creek was flowing during the site visit.

### 3.2. Vegetation

Vegetation communities were named according to plant dominance, which was affected by topography, soil, and hydrology. There were 93 total plant species observed site-wide from 2010 to 2012 (Table 2). The site included nine wetland communities and three upland communities in 2012 and are detailed below. In general, the vegetation communities identified within the Murphy Ox Yoke mitigation site in 2012 were very similar in both composition and aerial extent as those found on the site in 2011.

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 entrance to the site. The community was dominated by narrow-leaf willow (*Salix exigua*), Pacific willow (*Salix lasiandra*), red-osier dogwood (*Cornus alba,* called *C. stolonifera* on the 1988 list), bristly black gooseberry (*Ribes lacustre*), smooth brome (*Bromus inermis*), American mannagrass (*Glyceria grandis*), and broad-leaf cat-tail (*Typha latifolia*).

**Table 2. Vegetation species observed from 2010 to 2012 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 |
| *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 |
| *Iva axillaris* | Deer-Root | FAC |

[1]Draft 2012 NWPL (Lichvar and Kartesz 2009).
New species identified in 2012 are bolded.

**Table 2. (continued). Vegetation species observed from 2010 to 2012 at the Murphy Ox Yoke Wetland Mitigation Site.**

| Scientific Names | Common Names | WMVC Indicator Status[1] |
|---|---|---|
| *Juncus arcticus* | Arctic Rush | FACW |
| *Juncus articulatus* | Joint-Leaf 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 |
| *Medicago sativa* | Alfalfa | UPL |
| *Melilotus officinalis* | Yellow Sweet-Clover | FACU |
| *Mentha arvensis* | American Wild Mint | FACW |
| *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 pratensis* | Kentucky Blue Grass | FAC |
| *Polypogon monspeliensis* | Annual Rabbit's-Foot Grass | 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 |
| *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 |

[1]Draft 2012 NWPL (Lichvar and Kartesz 2009).
New species identified in 2012 are bolded.

**Table 2. (continued). Vegetation species observed from 2010 to 2012 at the Murphy Ox Yoke Wetland Mitigation Site.**

| Scientific Names | Common Names | WMVC Indicator Status[1] |
|---|---|---|
| *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 |

[1]Draft 2012 NWPL (Lichvar and Kartesz 2009).
New species identified in 2012 are bolded.

Wetland community Type 7 – *Alopecurus pratensis*/*Carex spp.* was identified in the 2.04 acre 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*), leafy tussock sedge (*Carex aquatilis*), and arctic rush (*Juncus arcticus,* called *Juncus balticus* on 1988 list). The area characterized by community 7 was saturated to the ground surface at several locations in 2012.

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, field meadow foxtail, and red-tinge bulrush (*Scirpus microcarpus*).

The second *Salix* community, Type 10 – *Salix exigua/Salix drummondiana,* was identified in 2.12 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*), and gray willow (Bebb willow, *Salix bebbiana*) with less than five percent cover of Northwest Territory sedge, broad-leaf cat-tail, redtop, Nebraska sedge, red-tinge bulrush, field meadow-foxtail, and Wood's rose (*Rosa woodsii*).

Wetland Community Type 12 – *Typha* 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, Nebraska sedge, common spike-rush (*Eleocharis palustris*), and arctic rush.

Wetland Community Type 13 – *Glyceria grandis*/*Festuca pratensis* was first identified as a vegetation type at the Murphy Ox Yoke site in 2011. It developed

on 0.15 acres in the south half of Cell 2 where a majority of upland community Type 2 – *Festuca pratensis* transitioned to a wetland community dominated by American mannagrass, meadow fescue (*Festuca pratensis*), broad-leaf cat-tail, and tufted hairgrass (*Deschampsia cespitosa*). The community was either inundated or saturated to the surface. Bare ground encompassed between 6 and 10 percent of the total surface area.

Wetland community Type 14 – *Typha latifolia*/*Glyceria grandis* developed from Type 3 – *Typha latifolia*/bare ground on 2.33 acres in 2011. The species diversity and cover increased notably in 2011. Broad-leaf cat-tail, American mannagrass, common spikerush, and 14 other hydrophytic species dominated the plant species. The community was inundated with 0.6 foot of water in 2012.

Wetland Community Type 15 – *Deschampsia cespitosa* developed in 2011 on 0.73 acres from upland community 6 in the south half of Cell 1. The predominant species in 2012 were tufted hairgrass, meadow fescue, field meadow-foxtail, and western-wheatgrass (*Pascopyrum smithii*).

Wetland Community Type 16 – Aquatic Macrophytes populated 0.91 acres of the aquatic bed wetland that has developed in the inundated areas of Cells 1 and 2 and in the abandoned ditch. The aquatic bed was defined by open water with surface water depths at or greater than 0.5 meters (1.63 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 1.74 acres in the upland area at the south edge of Cell 2 and the mitigation project. The community contained meadow fescue, creeping wild rye, field meadow-foxtail, smooth brome, Kentucky bluegrass (*Poa pratensis*), and white clover (*Trifolium repens*).

Upland Community Type 5 – *Elymus repens/Agropyron 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, smooth brome, meadow fescue, and western-wheatgrass.

Upland Community Type 11 – *Bromus inermis/Elymus repens* located on 1.15 acres in the southeast edge of the project along the east boundary contained predominantly upland vegetation. Smooth brome, creeping wild rye, and meadow fescue dominated the herbaceous cover.

Infestations of Canadian thistle (*Cirsium arvense*) and gypsy-flower (houndstongue - *Cynoglossum officinale*), both priority 2B noxious weeds, were identified in the upland at the entrance to the site and on the east side of the

Murphy Creek riparian corridor near the east property boundary (Figure 3, Appendix A). The infestations were less than 0.1 acre in extent and less than 1 percent of the total cover of the infestation. Isolated plants of houndstongue and/or Canadian thistle were recorded within communities 1, 4, 10, and 11. The Canadian thistle and houndstongue infestations were sprayed by MDT in 2011 after the July site visit.

Two vegetation transects were monitored at the Murphy Ox Yoke Wetland Mitigation Site in 2012 (Figure 2, Appendix A). The data recorded on transect T-1 (Mitigation Monitoring Form, Appendix B) were summarized in tabular and graphical formats (Table 3 and 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 (Table 3, Charts 1 and 2). The total cover of hydrophytic species and species diversity increased notably from 2010 to 2011 as reflected in the transition from Type 3 – *Typha*/bare ground to Type 14 – *Typha*/*Glyceria* and Type 2 – *Festuca* to Type 13 – *Glyceria/Festuca*. Seventy-six percent of the transect contained hydrophytic species in 2012, a two-fold increase from thirty-seven percent in 2010. The interval length of community Type 14 – *Typha/Glyceria* increased in 2012 with a corresponding decrease in community Type 13 – *Glyceria/Festuca*.

**Table 3. Data summary for transect T-1 from 2010 to 2012 at the Murphy Ox Yoke Ranch Wetland Mitigation Site.**

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

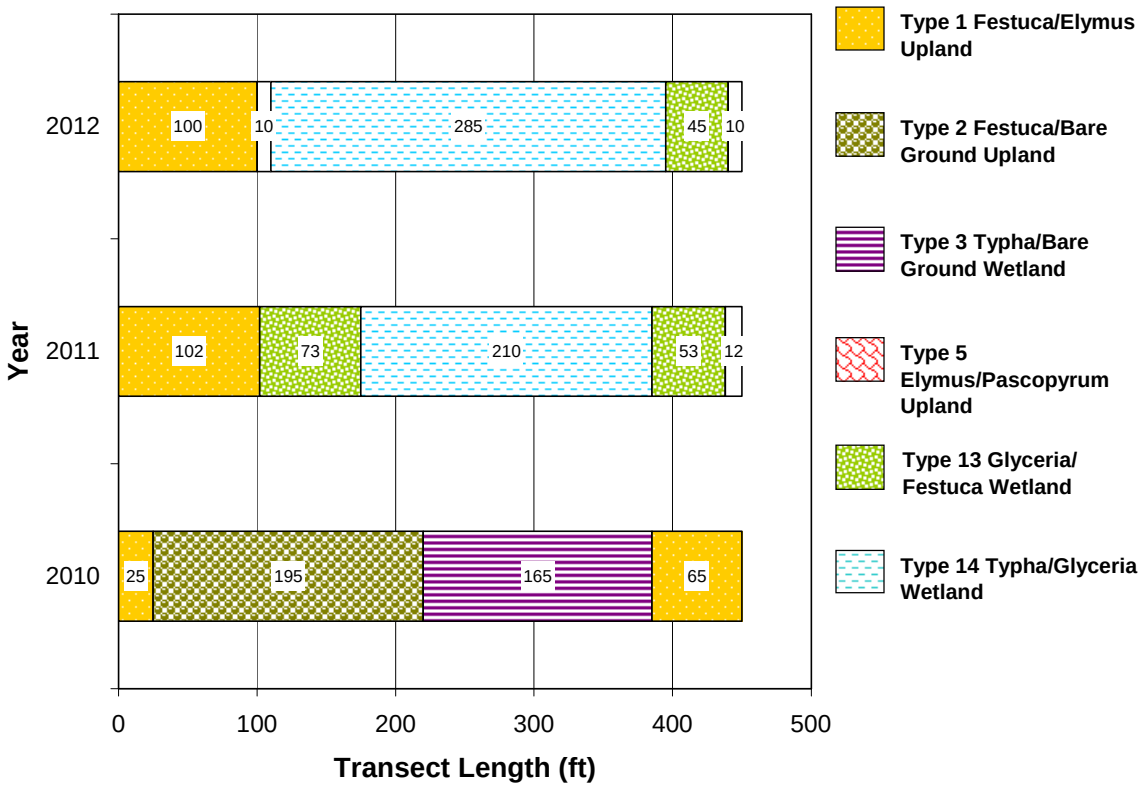



**Chart 1. Transect map showing community types from 2010 to 2012 on transect T-1 from start (0 feet) to finish (450 feet) at the Murphy Ox Yoke Wetland Mitigation Site.**

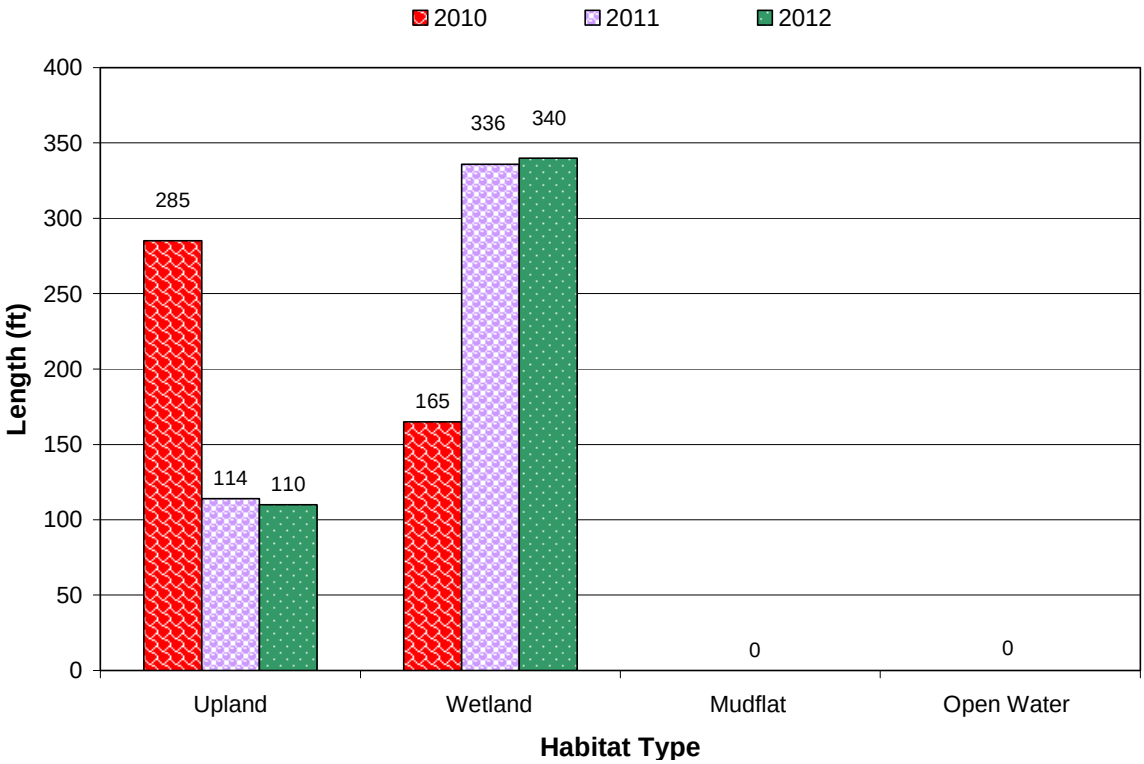



**Chart 2. Length of habitat types on transect T-1 from 2010 to 2012 at the Murphy Ox Yoke Wetland Mitigation Site.**

Data collected on transect T-2 (Monitoring Form, Appendix B) were summarized in tabular and graphic formats (Table 4, Charts 3 and 4, respectively). Photographs of the start and finish of Transect 2 are included in Appendix C.

**Table 4. Data summary for Transect 2 from 2010 to 2012 at the Murphy Ox Yoke Wetland Mitigation Site.**

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

Transect T-2 traverses the west half of Cell 1, north to south. Four wetland vegetation communities, Types 7, 14, 15, and 16, and one upland communitiy, Type 5, were identified on this transect. Few changes within the transect intervals were recorded from 2011 to 2012. There was a slight increase in the length of wetland Type 14 – *Typha/Glyceria* and a corresponding decrease in wetland Type 15 – *Deschampsia*. Hydrophytic vegetation communities comprised 95.1 percent of the transect in 2012.

The 2009 Mitigation Plan specified planting 100 one-gallon willow and black cottonwood species and 1,000 willow cuttings. A majority of the woody plant materials were installed on the edges of Cells 1 and 2. Eighty containerized willows in excellent condition were noted in 2012. Approximately 75 willow saplings propagated from cuttings were observed in 2012. The healthiest cuttings were larger in diameter and well-pruned. The containerized cottonwood plants exhibited the highest mortality rates.

### 3.3. Soil

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

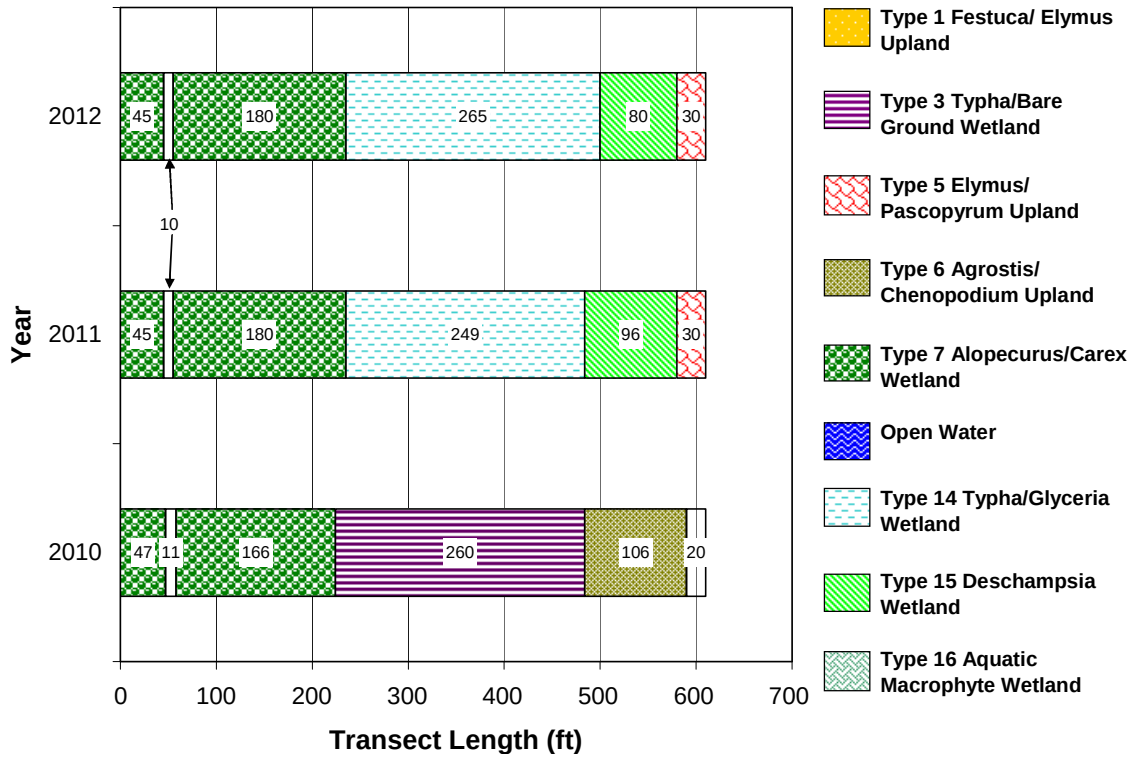



**Chart 3. Transect maps showing community types from 2010 to 2012 on transect T-2 from transect start (0 feet) to finish (610) feet) at the Murphy Ox Yoke Wetland Mitigation Site.**

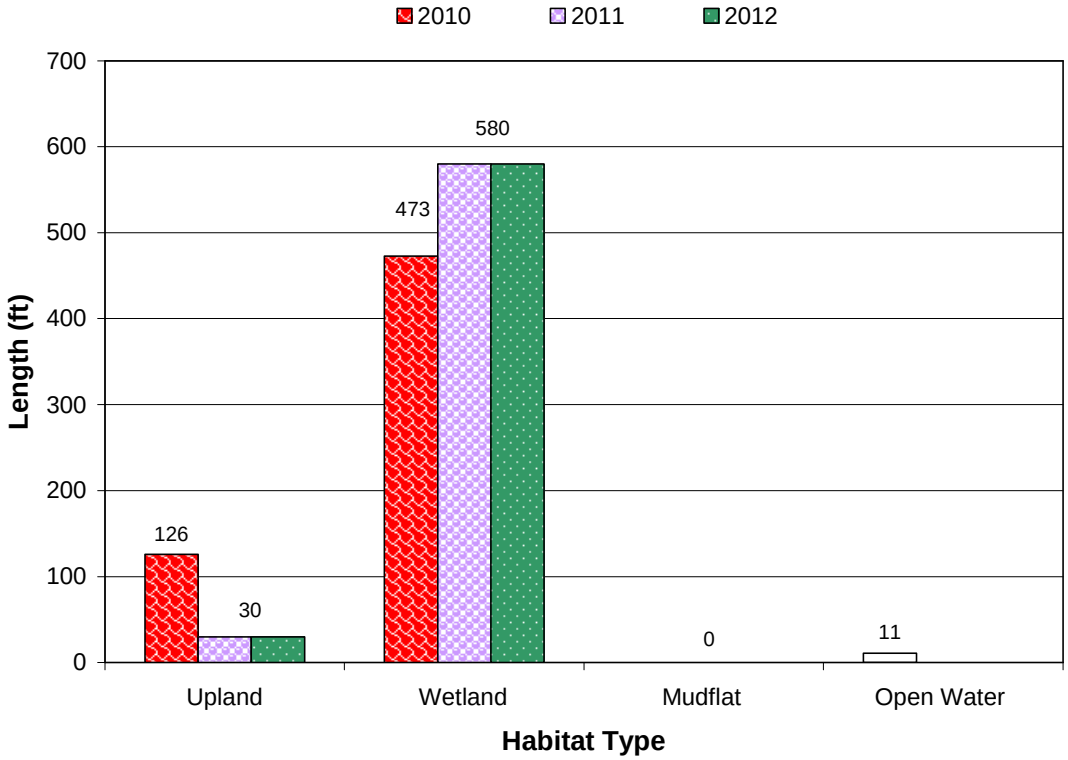



**Chart 4. Length of habitat types within transect T-2 from 2010 to 2012 at the Murphy Ox Yoke Wetland Mitigation Site.**

Soil test pits were excavated at three locations (M-1 through M-3, Figure 2**,** Appendix A). Data points M-1 and M-2 were located near the boundary of upland community 1 and wetland community 13. Data point M-3 was located at the south edge of Cell 1 in wetland community 15. The profile at M-1 revealed a very dark gray, clay loam (10 YR 3/1) with grayish brown (10 YR 5/2) depletions in the soil matrix, which did not meet the hydric soil criteria. The soil at M-2 was a black clay loam (10 YR 2/1) with dark yellowish brown (10 YR 4/6), redoximorphic concentrations. This redox dark surface was a positive hydric soil indicator. Data point M-3 revealed a dark gray, clay loam (10 YR 4/1) with five percent redox concentrations (10 YR 4/6), meeting the criteria for a depleted matrix and hydric soils.

### 3.4. Wetland Delineation

Three data points were used to help define the vegetation, soil, and hydrology of site (Figure 2; Wetland Determination Data Forms, Appendix B). Data point M-1 was located along the margin of the southern excavated depression and was characterized as an upland. Although the vegetation at this data point classified as hydrophytic, based on indicators from the 2012 NWPL, the dominant plant species were very similar to the vegetation in the adjacent, undisturbed uplands. Data points M-2 and M-3 were located within the footprint of the excavated depressions and both points satisified the three wetland criteria. Data point M-2 was situated in wetland community Type 13 – *Glyceria grandis*/*Festuca pratensis* with two obligate species, American mannagrass and broad-leaf cat-tail, dominant at this data point. Data point M-3 was located in community Type 15 – *Deschampsia cespitosa*. The August 20, 2012, delineation identified and mapped 4.09 acres of created, emergent wetland within the constructed cells and 5.2 acres of pre-existing palustrine emergent and scrub-shrub wetlands within the 12.59-acre site (Table 5). There was no change in wetland acreage between 2011 and 2012. The hydrophytic vegetation cover in the south cell is expected to increase based on continued inundation and saturation observed from 2010 to 2012. The entire footprint of the north cell was delineated as wetland in 2011 and 2012. The cell exhibited a range of inundation and saturation levels.

**Table 5. Total wetland acres delineated in 2003 and from 2010 to 2012 at the Murphy Ox Yoke Wetland Mitigation Site.**

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

[1]Baseline delineation.

*Not differentiated in 2003 or 2010.

**Open water classified as aquatic bed wetland habitat in 2011 and 2012.

### 3.5. Wildlife

A comprehensive list of bird and other wildlife species observed directly or indirectly from 2010 to 2012 is presented in Table 6**.** Eight bird species were observed by Confluence staff in 2012 including an American goldfinch (*Spinus tristus*), American robin (*Turdus migratorius*), bank swallow (*Riparia riparia*), Eastern kingbird (*Tyrannus tyrannus*), mallard (*Anas platyrhynchos*), red-tailed hawk (*Buteo jamaicensis*), red-winged blackbird (*Agelaius phoeniceus*), and yellow-headed blackbird (*Xanthocephalus xanthocephalus*). Tracks of elk (*Cervus canadensis*), coyote (*Canis latrans*), and deer (*Odocoileus* sp.) were noted onsite.

**Table 6. Comprehensive list of bird and other wildlife species observed directly or indirectly from 2010 to 2012 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* |
| Black-billed Magpie | *Pica hudsonia* |
| Brewer's Blackbird | *Euphagus cyanocephalus* |
| Canada Goose | *Branta canadensis* |
| Cliff Swallow | *Petrochelidon pyrrhonota* |
| Common Raven | *Corvus corax* |
| Cooper's Hawk | *Accipiter cooperii* |
| Double-crested Cormorant | *Phalacrocorax auritus* |
| **Eastern Kingbird** | ***Tyrannus tyrannus*** |
| Green-winged Teal | *Anas crecca* |
| Killdeer | *Charadrius vociferus* |
| **Mallard** | ***Anas platyrhynchos*** |
| Marsh Wren | *Cistothorus palustris* |
| **Red-tailed Hawk** | ***Buteo jamaicensis*** |
| **Red-winged Blackbird** | ***Agelaius phoeniceus*** |
| Sandhill Crane | *Grus canadensis* |
| Semipalmated Sandpiper | *Calidris pusilla* |
| Sora | *Porzana carolina* |
| Spotted Sandpiper | *Actitis macularius* |
| Starling | *Sturnus vulgaris* |
| Tree Swallow | *Tachycineta bicolor* |

Species observed in 2012 are bolded.

**Table 6. (continued). Comprehensive list of bird and other wildlife species observed directly or indirectly from 2010 to 2012 at the Murphy Ox Yoke Mitigation Site.**

| COMMON NAME | SCIENTIFIC NAME |
|---|---|
| **BIRDS** | |
| 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* |
| 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 2012 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 2012 to assess functional values for three AAs, including the Created Wetland Cells, the Wet Meadow Restoration area, and the area West of Canal Preservation. The AA for the created wetland cells encompasses 4.09 acres. The Restoration AA includes 1.31 acres of wetland that have developed outside the cells and 2.00 acres of existing wet meadow located in the northwest portion of the mitigation site. 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 2012 are summarized in Table 7 and the 2012 MWAMs are included in Appendix B.

The Created Wetland Cells AA rated in 2012 as Category II wetlands with 76 percent of the possible functional points. This represented an improvement in the category rating and an increase of 13 percent since 2011. The change in the disturbance rating from moderate to low and the continued development of the wetland vegetation cover resulted in higher ratings for general wildlife habitat, sediment/nutrient/toxicant removal, sediment/shoreline stabilization, production export/food chain support, and uniqueness. Ratings were high in general wildlife habitat, short and long term surface water storage, sediment/nutrient/toxicant removal, sediment/shoreline stabilization, and groundwater discharge and recharge.

There was a slight change documented between 2011 to 2012 in the functions and values assessed for the 3.31 acre Restoration AA. This change included the adjustment of Sediment/Shoreline Stabilization rating as a result of the 2011 MWAM incorrectly classifying the duration of surface water as permanent/perennial. This correction bumbed the AA from a Category II to a Category III rating with 65 percent of the total points possible. The 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 80 percent of the total possible points in 2011 and 2012. 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. The functional units increased for the Preservation AA from 14.46 in 2010 to 15.12 in 2011 and 2012.

### 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-3 are included on page C-7.

### 3.8. Maintenance Needs

Infestations of Canadian thistle (*Cirsium arvense*) and gypsy-flower (houndstongue - *Cynoglossum officinale*), both Priority 2B noxious weeds, were identified in the upland at the entrance to the site and on the east side of the Murphy Creek riparian corridor near the east property boundary (Figure 3, Appendix A). The infestations were less than 0.1 acre in extent and less than 1 percent of the total cover of the infestation. Isolated plants of houndstongue and/or Canadian thistle were recorded within communities 1, 4, 10, and 11. The Canadian thistle and gypsy-flower (houndstongue) infestations were sprayed by MDT in 2011 after the July site visit. The MDT has an ongoing weed

## Table 7. Functions and Values of the Murphy Ox Yoke Wetland Mitigation Site in 2003 and 2010 to 2012.

| Function and Value Parameters from the MDT Montana Wetland Assessment Method | 2003 Baseline[1] Wet Meadow | 2003 Baseline West of Canal | 2010 Created Wetland Cells[2] | 2010 Wet Meadow | 2010 West of Canal | 2011 Created Wetland Cells[2] | 2011 Wet Meadow Restoration | 2011 West of Canal Preservation | 2012 Created Wetland Cells[2] | 2012 Wet Meadow Restoration | 2012 West of Canal Preservation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Listed/Proposed T&E Species Habitat | Low (0.3) | Low (0.3) | Low (0.1) | Low (0.3) | Low (0.3) | Low (0.3) | Low (0.3) | Low (0.3) | Low (0.3) | Low (0.3) | Low (0.3) |
| MTNHP Species Habitat | Low ( 0.1) | Low ( 0.1) | Low (0.0) | Mod (0.6) | Mod ( 0.6) | Mod (0.6) | Mod (0.6) | Mod (0.6) | Mod (0.6) | Mod (0.6) | Mod (0.6) |
| General Wildlife Habitat | Mod (0.5) | Mod (0.7) | Low (0.3) | Mod (0.7) | High (0.9) | Mod (0.7) | Mod (0.7) | High (0.9) | High (0.9) | Mod (0.7) | High (0.9) |
| General Fish/Aquatic Habitat | -- | -- | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Flood Attenuation | Low (0.1) | Mod (0.6) | Mod (0.6) | Low (0.1) | Mod (0.7) | Mod (0.6) | Mod (0.6) | High (0.9) | Mod (0.6) | Mod (0.6) | High (0.9) |
| Short and Long Term Surface Water Storage | Mod (.5) | High (0.8) | Mod (0.5) | Mod (.5) | High (0.8) | High (0.8) | Mod (0.6) | High (0.8) | High (1.0) | Mod (0.6) | High (0.8) |
| Sediment/Nutrient/Toxicant Removal | Mod (0.7) | High (0.9) | Mod (0.5) | Mod (0.7) | High (0.9) | Mod (0.7) | High (1.0) | High (1.0) | High (1.0) | High (1.0) | High (1.0) |
| Sediment/Shoreline Stabilization | -- | High (1.0) | Low (0.2) | High (0.9) | High (1.0) | Mod (0.7) | High (1.0) | High (1.0) | High (1.0) | High (0.9) | High (1.0) |
| Production Export/ Food Chain Support | Mod (0.6) | High (0.9) | Low (0.3) | Mod (0.7) | Exc (1.0) | Mod (0.5) | Mod (0.7) | Exc. (1.0) | Mod (0.7) | Mod (0.7) | Exc. (1.0) |
| Groundwater Discharge/Recharge | High (1.0) | Low (0.1) | Mod (0.7) | Mod (0.7) | High (1.0) | High (1.0) | Mod (0.7) | High 1.0) | High (1.0) | Mod (0.7) | High 1.0) |
| Uniqueness | Low (0.3) | Mod (0.5) | Low (0.2) | Low (0.2) | Mod (0.4) | Low (0.3) | Low (0.3) | Mod (0.4) | Mod (0.4) | Low (0.3) | Mod (0.4) |
| Recreation/Education Potential (bonus points) | Low (0.3) | Low (0.3) | Low (0.05) | Low (0.05) | Low (0.05) | Mod (0.1) | Mod (0.1) | Mod (0.1) | Mod (0.1) | Mod (0.1) | Mod (0.1) |
| **Actual Points / Possible Points** | **4.4 / 10** | **6.2 / 10** | **3.5 / 10** | **5.45 / 10** | **7.65 / 10** | **6.3 / 10** | **6.6 / 10** | **8.0/10** | **7.6/ 10** | **6.5 / 10** | **8.0/10** |
| **% of Possible Score Achieved** | **44%** | **56%** | **34.5%** | **54.5%** | **76.5%** | **63.0%** | **66.0%** | **80.0%** | **76.0%** | **65.0%** | **80.0%** |
| **Overall Category** | **III** | **III** | **III** | **III** | **II** | **III** | **II** | **II** | **II** | **II** | **II** |
| **Acreage of Assessed Aquatic Habitats within Easement** (ac) | **2.00** | **1.89** | **2.15** | **2.04** | **1.89** | **4.09** | **3.31** | **1.89** | **4.09** | **3.31** | **1.89** |
| **Functional Units** (acreage x actual points) **($f^1$-)** | | | **7.53** | **11.12** | **14.46** | **25.77** | **21.85** | **15.12** | **31.08** | **21.52** | **15.12** |

[1]Berglund 1999 MDT MWAM.

[2]Berglund and McEldowney 2008 MDT MWAM.

management program for their mitigation sites that includes an annual assessment of weed conditions.

Two wood duck boxes, one floating nest, and eight bluebird boxes were installed at the site between 2010 and 2011. Four of the bluebird boxes appeared to be in use in 2012. All of the nest structures were in excellent condition and did not require maintenance. No water control structures were installed on the property.

### 3.9. Current Credit Summary

Table 8 presents the summary of wetland credits from 2010 to 2012. 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 2010 survey measured the designed post-construction footprint of the cells at 4.50 acres. The actual wetland area developed to date within the cells was measured at 4.09 acres in 2011 and 2012.

An additional 1.31 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 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 3.3-acre upland buffer provided 0.66 credit acres at a 5:1 ratio. The 2012 calculated credits shown in Table 8 yielded 7.87 credit acres. This exceeds the 2008 credit target of 6.5 by 1.31 credit acres. This value is expected to increase as wetlands continue to develop within cell 2 of the migitation area.

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

**Table 8. Summary of Estimated Wetland Credits from 2010 to 2012 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 CALCULATED CREDITS | 2011 DELINEATED ACRES | 2011 CALCULATED CREDITS | 2012 DELINEATED ACRES | 2012 CALCULATED CREDITS |
|---|---|---|---|---|---|---|---|---|---|---|
| Creation of palustrine emergent and scrub/shrub wetlands through shallow excavation of groundwater in Cell 1. | Creation | 1:1 | 2.70 | 2.70 | 1.59 | 1.59 | 2.92 | 2.92 | 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| | | **Totals** | **10.99** | **6.50** | **9.04** | **4.56** | **12.29** | **7.81** | **12.59** | **7.87** |

*Area not differentiated in 2010

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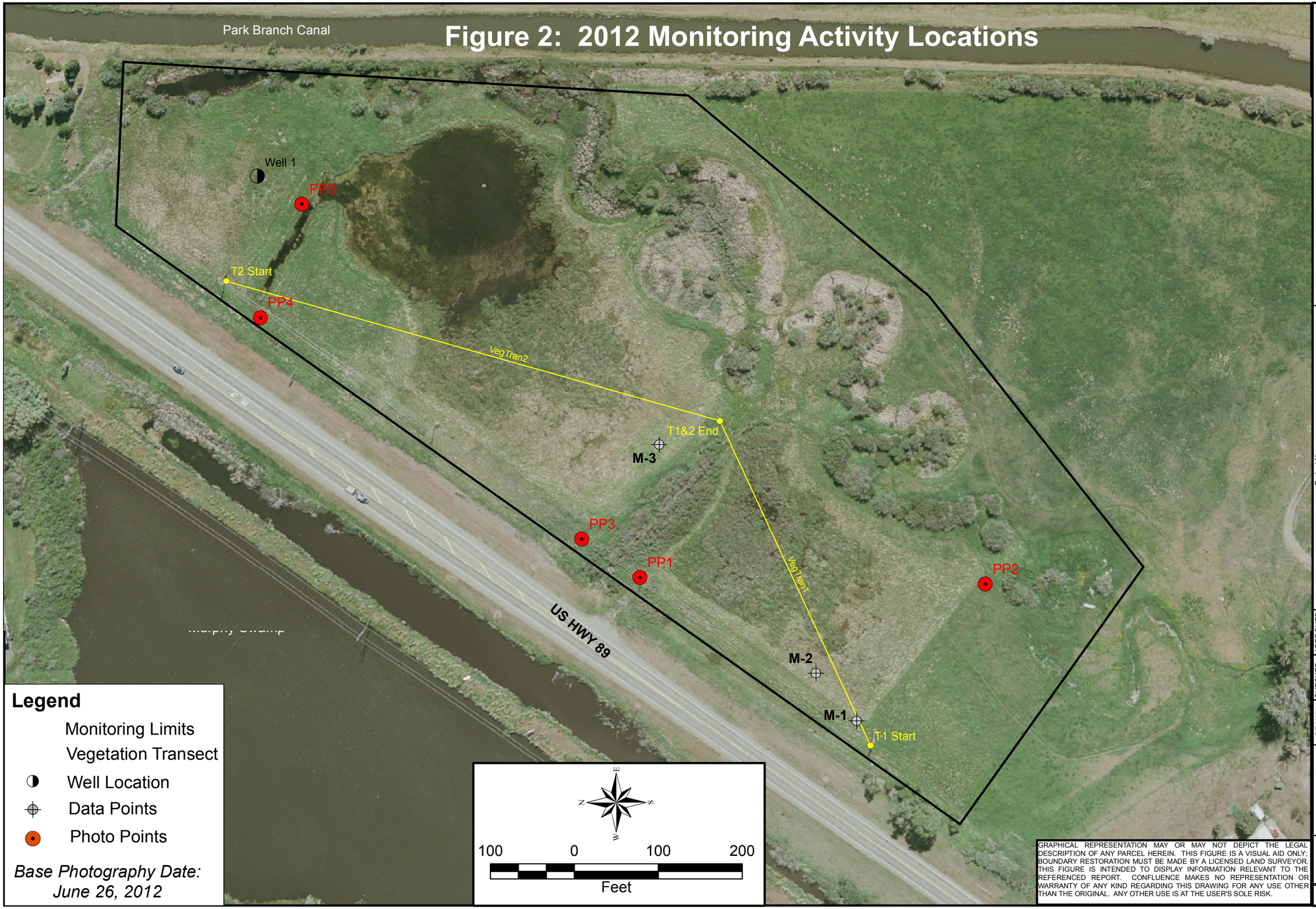
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# Appendix A

Project Area Maps – Figure 2 & Figure 3

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

# Figure 2: 2012 Monitoring Activity Locations




## Legend

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

*Base Photography Date: June 26, 2012*

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/Monitor2012.mxd

Project Name: Murphy Ox Yoke Ranch Wetland Mitigation Site

Drawing Title: 2012 Monitoring Activity Locations

| DRAWN | CHECKED | APPROVED |
|---|---|---|
| BV | BCS | JJ |

SCALE: Noted

Drawn: August 30, 2012

PROJ MGR: B Sandefur

CONFLUENCE consulting Incorporated

Figure 2

REV -

# Figure 3: 2012 Mapped Site Features

Park Branch Canal

## 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 (5-25% cover)
H = High (25-100% cover)

## Legend

Monitoring Limits
Wetland Limits
Vegetation Communities

*Base Photography Date: June 26, 2012*

## Acreages

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

US HWY 89

Murphy Swamp

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/Veg2012.mxd

Project Name: MURPHY OX YOKE RANCH WETLAND MITIGATION SITE
Drawing Title: 2012 MAPPED SITE FEATURES

| DRAWN | CHECKED | APPROVED |
|---|---|---|
| BCS | BV | JJ |

SCALE: Noted
Drawn: August 30, 2012
PROJ MGR: B Sandefur

CONFLUENCE consulting incorporated

Figure 3

REV -

# Appendix B

2012 MDT Wetland Mitigation Site Monitoring Form
2012 USACE Wetland Determination Data Forms
2012 MDT Montana Wetland Assessment Forms

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

## MDT WETLAND MITIGATION SITE MONITORING FORM

Project Site: Murphy Ox Yoke Assessment Date/Time 8/20/2012 12:01:24 PM

Person(s) conducting the assessment: B Sandefur

Weather: Sunny, warm & smokey 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: 3 #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: 0.8 **(ft)** Range of Depths: 0-2.2 **(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, FAC-Neutral test, algal mat, iron deposits, and sparsely vegetated concave surface..

#### Groundwater Monitoring Wells

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

| Well ID | Water Surface Depth (ft) |
|---|---|
| Well 1 | 0.4 |

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:**

Both constructed cells inundated

## VEGETATION COMMUNITIES

**Site** Murphy Ox Yoke

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

* Indicates accepted spp name not on '88 list.

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

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Alopecurus pratensis | 2 | Bromus inermis | 2 |
| Cirsium arvense | 0 | Dactylis glomerata | 1 |
| Elymus repens | 3 | Epilobium ciliatum | 0 |
| Equisetum arvense | 1 | Festuca pratensis | 5 |
| Juncus arcticus | 1 | Medicago sativa | 1 |
| Melilotus officinalis | 1 | Phleum pratense | 1 |
| Poa pratensis | 2 | Sisymbrium altissimum | 0 |
| 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 |
|---|---|---|---|
| Bromus inermis | 2 | Carex utriculata | 1 |
| Cirsium arvense | 0 | Cornus alba | 2 |
| Cynoglossum officinale | 0 | Galium palustre | 0 |
| Glyceria grandis | 2 | Glycyrrhiza lepidota | 1 |
| Monarda fistulosa | 1 | Ribes lacustre | 2 |
| Rosa woodsii | 1 | Salix exigua | 5 |
| Salix lasiandra | 3 | Solanum dulcamara | 1 |
| Typha latifolia | 2 | | |

**Comments:**

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

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

**Comments:**

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

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Alopecurus pratensis | 4 | Carex aquatilis | 1 |
| Carex nebrascensis | 4 | Carex utriculata | 3 |
| Chenopodium album | 1 | Equisetum arvense | 0 |
| Festuca pratensis | 1 | Glycyrrhiza lepidota | 0 |
| Helianthus annuus | 0 | Helianthus nuttallii | 0 |
| Juncus arcticus | 2 | Medicago sativa | 1 |
| Mentha arvensis | 0 | Poa pratensis | 1 |
| Potentilla gracilis | 0 | Rosa woodsii | 0 |
| Salix exigua | 0 | Solidago canadensis | 0 |
| Sonchus arvensis | 0 | Taraxacum officinale | 0 |

**Comments:**

**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 |
| Glyceria grandis | 1 | Helianthus nuttallii | 1 |
| Mentha arvensis | 1 | Scirpus microcarpus | 2 |
| Typha latifolia | 0 | | |

**Comments:**

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

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Agrostis gigantea | 1 | Alopecurus pratensis | 1 |
| Carex nebrascensis | 1 | Carex utriculata | 2 |
| Cirsium arvense | 0 | Glyceria grandis | 1 |
| Ribes lacustre | 0 | Rosa woodsii | 1 |
| Salix bebbiana | 2 | Salix drummondiana | 3 |
| Salix exigua | 3 | Salix lasiandra | 2 |
| Salix lemmonii | 2 | Salix planifolia | 2 |
| Scirpus microcarpus | 1 | 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 | 0 |
| Cynoglossum officinale | 0 | Elymus cinereus | 1 |
| Elymus repens | 3 | Elymus trachycaulus | 1 |
| Festuca pratensis | 3 | Lactuca serriola | 0 |
| Plantago major | 0 | Taraxacum officinale | 0 |
| 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 | 1 | Juncus effusus | 0 |
| Sparganium emersum | 0 | Typha latifolia | 5 |

**Comments:**

**Community #** 13 **Community Type:** Glyceria grandis / Festuca pratensis **Acres:** 0.15

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Alopecurus pratensis | 1 | Bare Ground | 2 |
| Carex nebrascensis | 0 | Carex praegracilis | 0 |
| Deschampsia cespitosa | 2 | Eleocharis palustris | 1 |
| Elymus repens | 0 | Festuca pratensis | 2 |
| Glyceria grandis | 4 | Juncus arcticus | 1 |
| Juncus articulatus | 0 | Juncus longistylis | 0 |
| Juncus torreyi | 0 | Mentha arvensis | 0 |
| Pascopyrum smithii | 0 | Phleum pratense | 0 |
| Trifolium repens | 1 | Typha latifolia | 2 |

**Comments:**

**Community #** 14 **Community Type:** Typha latifolia / Glyceria grandis **Acres:** 2.33

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Carex nebrascensis | 0 | Carex praegracilis | 0 |
| Carex utriculata | 1 | Deschampsia cespitosa | 1 |
| Eleocharis palustris | 2 | Festuca pratensis | 1 |
| Glyceria grandis | 2 | Glycyrrhiza lepidota | 0 |
| Hordeum jubatum | 1 | Juncus arcticus | 1 |
| Juncus effusus | 0 | Juncus tenuis | 1 |
| Juncus torreyi | 0 | Melilotus officinalis | 0 |
| Poa pratensis | 0 | Polypogon monspeliensis | 0 |
| Salix drummondiana | 0 | Schoenoplectus acutus | 1 |
| Sparganium androcladum | 0 | Trifolium repens | 0 |
| Triglochin palustris | 0 | Typha latifolia | 5 |

**Comments:**

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

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Alopecurus pratensis | 2 | Chenopodium album | 0 |
| Dactylis glomerata | 0 | Deschampsia cespitosa | 5 |
| Eleocharis palustris | 1 | Elymus repens | 1 |
| Festuca pratensis | 3 | Glyceria grandis | 0 |
| Hordeum jubatum | 0 | Juncus arcticus | 1 |
| Pascopyrum smithii | 2 | Poa pratensis | 0 |
| Sonchus arvensis | 0 | Typha latifolia | 1 |

**Comments:**

**Community #** 16 **Community Type:** Aquatic macrophytes / **Acres:** 0.91

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Algae, green | 3 | Aquatic macrophytes | 2 |
| 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 Ox Yoke Date: 8/20/2012 12:01:24 PM

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

**Interval Data:**

**Ending Station** 100 **Community Type:** Festuca pratensis / Elymus repens

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Alopecurus pratensis | 2 | Cirsium arvense | 0 |
| Dactylis glomerata | 1 | Elymus repens | 4 |
| Epilobium ciliatum | 0 | Festuca pratensis | 4 |
| Phleum pratense | 1 | Poa pratensis | 2 |
| Sisymbrium altissimum | 1 | Taraxacum officinale | 1 |
| Tragopogon dubius | 1 | Trifolium repens | 1 |

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

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Carex praegracilis | 0 | Deschampsia cespitosa | 1 |
| Eleocharis palustris | 1 | Festuca pratensis | 3 |
| Glyceria grandis | 4 | Phleum pratense | 1 |
| Poa pratensis | 1 | Trifolium repens | 2 |
| Typha latifolia | 2 | | |

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

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Eleocharis palustris | 3 | Glyceria grandis | 3 |
| Polypogon monspeliensis | 1 | Sparganium androcladum | 0 |
| Typha latifolia | 5 | | |

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

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Alopecurus pratensis | 4 | Carex nebrascensis | 1 |
| Carex utriculata | 3 | Elymus repens | 1 |
| Glyceria grandis | 2 | Mentha arvensis | 1 |
| Pascopyrum smithii | 1 | | |

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

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Alopecurus pratensis | 2 | Bromus inermis | 4 |
| Cicuta douglasii | 2 | Elymus repens | 2 |
| Equisetum hyemale | 1 | Glycyrrhiza lepidota | 2 |
| Pascopyrum smithii | 2 | Phleum pratense | 2 |

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

**Interval Data:**

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

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Alopecurus pratensis | 5 | Carex aquatilis | 1 |
| Carex utriculata | 2 | Equisetum hyemale | 1 |
| Helianthus annuus | 1 | | |

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

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Algae, green | 4 | Aquatic macrophytes | 3 |
| Open Water | 5 | | |

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

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Alopecurus pratensis | 5 | Carex aquatilis | 1 |
| Carex utriculata | 1 | Festuca pratensis | 1 |
| Glycyrrhiza lepidota | 1 | Juncus arcticus | 2 |
| Mentha arvensis | 1 | Poa pratensis | 1 |
| Potentilla gracilis | 0 | Sonchus arvensis | 1 |

**Ending Station** 500 **Community Type:** Typha latifolia / Glyceria grandis

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

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

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Chenopodium album | 1 | Dactylis glomerata | 0 |
| Deschampsia cespitosa | 3 | Eleocharis palustris | 2 |
| Elymus repens | 1 | Glyceria grandis | 1 |
| Hordeum jubatum | 1 | Pascopyrum smithii | 1 |
| 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 | Chenopodium album | 1 |
| Cicuta douglasii | 1 | Elymus repens | 4 |
| Equisetum hyemale | 1 | Pascopyrum smithii | 2 |
| Taraxacum officinale | 1 | | |

Transect Notes:

## PLANTED WOODY VEGETATION SURVIVAL

Murphy Ox Yoke

| 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 | 20 | 20 | 1-gal |
| Salix lutea | 20 | 20 | 1-gal |
| Salix spp. | 250 | 25 | 250 additional cuttings installed in 2011 |
| Salix spp. | 1000 | 50 | cuttings installed in 2010 |

### Comments

Numerous willow cuttings were installed along the boundary of both excavated cells. Best survival rate observed on larger diameter, well-pruned cuttings. Lowest survival rate on smaller cuttings without top trimmed. Containerized cottonwoods exhibited a high mortality rate.

Murphy Ox Yoke

## WILDLIFE

### Birds

Were man-made nesting structures installed? Yes

If yes, type of structure: _____

How many? _____

Are the nesting structures being used? Yes

Do the nesting structures need repairs? No

Nesting Structure Comments:

| Species | #Observed | Behavior | Habitat |
|---|---|---|---|
| American Goldfinch | 2 | F | SS |
| American Robin | 1 | F | UP, WM |
| Bank Swallow | 5 | F, FO | OW, SS, UP, WM |
| Eastern Kingbird | 1 | L | SS |
| Mallard | 2 | F | OW |
| Red-tailed Hawk | 1 | FO | |
| Red-winged Blackbird | 3 | F, L | MA, WM |
| Yellow-headed Blackbird | 1 | FO | |

**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 |
|---|---|---|---|---|---|
| Coyote | | Yes | No | No | |
| Deer Sp. | | Yes | No | No | |
| Elk or Wapiti | | Yes | No | No | |

**Wildlife Comments:**

Murphy Ox Yoke

## PHOTOGRAPHS

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

**Photograph Checklist:**

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

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

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

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

| Photo # | Latitude | Longitude | Bearing | Description |
|---|---|---|---|---|
| 0004 | 45.367142 | -110.734474 | 140 | PP-4 |
| 0005 | 45.367462 | -110.734375 | 200 | T-2, start |
| 0007 | 45.36705 | -110.734055 | 180 | PP-5 |
| 0010-13 | 45.364841 | -110.735764 | 350 | PP-2 |
| 0014 | 45.365211666 | -110.736445 | | M-1 |
| 0014 | 45.365211666667 | -110.736445 | | M-1 |
| 0015 | 45.365358333333 | -110.7362066667 | | M-2 |
| 0015 | 45.365358333 | -110.73620666 | | M-2 |
| 0016 | 45.365871666667 | -110.7351766667 | | M-3 |
| 0016 | 45.3658716666 | -110.735176666 | | M-3 |
| 9984-87 | 45.36586 | -110.735779 | 170 | PP-1 |
| 9988 | 45.365097 | -110.736519 | 70 | T-1, start |
| 9994 | 45.365627 | -110.735062 | 200 | T-1, end |
| 9995 | 45.365627 | -110.735062 | 30 | T-2, end |
| 9997-0001 | 45.366062 | -110.735672 | 50 | PP-3 |

**Comments:**

Murphy Ox Yoke

## ADDITIONAL ITEMS CHECKLIST

### Hydrology

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

### Photos

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

### Vegetation

☑ Map vegetation community boundaries

☑ Complete Vegetation Transects

### Soils

☑ Assess soils

### Wetland Delineations

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

Wetland Delineation Comments

### Functional Assessments

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

Functional Assessment Comments:

## 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: 7/24/2012

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

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

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

Subregion (LRR): LRR E | Lat: 45.3652116666667 | Long: -110.736445 | Datum: WGS84

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

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:
Veg similar to distinct uplands adjacent to data point, hydro marginal but may develop over time. DP in excavated depression.

### VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ____) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | 0 | ☐ | |
| 2. | 0 | ☐ | |
| 3. | 0 | ☐ | |
| 4. | 0 | ☐ | |
| | 0 = Total Cover | | |
| **Sapling/Shrub Stratum** (Plot size: ____) | | | |
| 1. | 0 | ☐ | |
| 2. | 0 | ☐ | |
| 3. | 0 | ☐ | |
| 4. | 0 | ☐ | |
| 5. | 0 | ☐ | |
| | 0 = Total Cover | | |
| **Herb Stratum** (Plot size: 5ft) | | | |
| 1. Festuca pratensis | 20 | ☑ | FACU |
| 2. Poa pratensis | 30 | ☑ | FAC |
| 3. Bromus inermis | 30 | ☑ | FAC |
| 4. Elymus repens | 20 | ☑ | 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: 3 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.75 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 0 | x 1 = | |
| FACW species | 0 | x 2 = | 0 |
| FAC species | 80 | x 3 = | 240 |
| FACU species | 20 | x 4 = | 80 |
| UPL species | 0 | x 5 = | 0 |
| Column Totals: | 100 (A) | | 320 (B) |

Prevalence Index = B/A = 3.2

**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:
Vegetation classified as hydrophytic based on the reassigned indicator status for smooth brome and KY bluegrass as FAC in 2012.

## 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 |
|---|---|---|---|---|---|---|---|---|
| 0-10 | 10YR 2/1 | 100 | | | | | Clay Loam | |
| 10-16 | 10YR 3/1 | 95 | 10YR 5/2 | 3 | D | M | 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:

Area periodically endo-saturated, likely insufficient duration of water w/in 12 inches for wetland hydro.

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

Project/Site: Murphy Ox Yoke | City/County: Park | Sampling Date: 7/24/2012

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

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

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

Subregion (LRR): LRR E | Lat: 45.3653583333333 | Long: -110.736206666667 | Datum: WGS84

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

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:
DP in excavated depression, area periodically inundated.

### VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | 0 | ☐ | |
| 2. | 0 | ☐ | |
| 3. | 0 | ☐ | |
| 4. | 0 | ☐ | |
| | 0 = Total Cover | | |
| **Sapling/Shrub Stratum** (Plot size: ) | | | |
| 1. | 0 | ☐ | |
| 2. | 0 | ☐ | |
| 3. | 0 | ☐ | |
| 4. | 0 | ☐ | |
| 5. | 0 | ☐ | |
| | 0 = Total Cover | | |
| **Herb Stratum** (Plot size: 5ft) | | | |
| 1. Glyceria grandis | 20 | ☑ | OBL |
| 2. Typha latifolia | 20 | ☑ | OBL |
| 3. Epilobium ciliatum | 10 | ☐ | FACW |
| 4. Phleum pratense | 10 | ☐ | FAC |
| 5. | 0 | ☐ | |
| 6. | 0 | ☐ | |
| 7. | 0 | ☐ | |
| 8. | 0 | ☐ | |
| 9. | 0 | ☐ | |
| 10. | 0 | ☐ | |
| 11. | 0 | ☐ | |
| | 60 = Total Cover | | |
| **Woody Vine Stratum** (Plot size: ) | | | |
| 1. | 0 | ☐ | |
| 2. | 0 | ☐ | |
| | 0 = Total Cover | | |

% Bare Ground in Herb Stratum 40

**Dominance Test worksheet:**

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 40 | x 1 = | |
| FACW species | 10 | x 2 = | 20 |
| FAC species | 10 | x 3 = | 30 |
| FACU species | 0 | x 4 = | 0 |
| UPL species | 0 | x 5 = | 0 |
| Column Totals: | 60 (A) | | 90 (B) |

Prevalence Index = B/A = 1.5

**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 2/1 | 95 | 10YR 4/6 | 5 | C | PL | 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): 10

Saturation Present? (includes capillary fringe) Yes ☐ No ☑ Depth (inches): 5

**Wetland Hydrology Present?** Yes ☑ No ☐

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

Remarks:

Area seasonally inundated

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

Project/Site: Murphy Ox Yoke | City/County: Park | Sampling Date: 7/24/2012

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

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

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

Subregion (LRR): LRR E | Lat: 45.3658716666667 | Long: -110.735176666667 | Datum: WGS84

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

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:
DP near edge of excavated depression and periodically inundated.

## VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | 0 | ☐ | |
| 2. | 0 | ☐ | |
| 3. | 0 | ☐ | |
| 4. | 0 | ☐ | |
| | 0 = Total Cover | | |
| **Sapling/Shrub Stratum** (Plot size: ) | | | |
| 1. | 0 | ☐ | |
| 2. | 0 | ☐ | |
| 3. | 0 | ☐ | |
| 4. | 0 | ☐ | |
| 5. | 0 | ☐ | |
| | 0 = Total Cover | | |
| **Herb Stratum** (Plot size: 5ft) | | | |
| 1. Festuca pratensis | 20 | ☑ | FACU |
| 2. Lactuca serriola | 10 | ☑ | FACU |
| 3. Tragopogon dubius | 5 | ☐ | UPL |
| 4. Trifolium repens | 5 | ☐ | FAC |
| 5. Glyceria grandis | 25 | ☑ | OBL |
| 6. Glycyrrhiza lepidota | 10 | ☑ | FAC |
| 7. Epilobium ciliatum | 5 | ☐ | FACW |
| 8. Juncus arcticus | 10 | ☑ | FACW |
| 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 10

**Dominance Test worksheet:**

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

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.6 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | | Multiply by: | |
|---|---|---|---|
| OBL species | 25 | x 1 = | |
| FACW species | 15 | x 2 = | 30 |
| FAC species | 15 | x 3 = | 45 |
| FACU species | 30 | x 4 = | 120 |
| UPL species | 5 | x 5 = | 25 |
| Column Totals: | 90 (A) | | 245 (B) |

Prevalence Index = B/A = 2.72222

**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 2/1 | 100 | | | | | Clay Loam | |
| 6-14 | 10YR 4/1 | 95 | 10YR 4/6 | 5 | C | M | 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): 12

Saturation Present? (includes capillary fringe) Yes ☑ No ☐ Depth (inches): 8

**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** 8/20/2012 **4. Evaluators** B Sandefur **5. Wetland/Site# (s)** Wetland Creation

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

**Approx Stationing or Mileposts**

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

**7. Evaluating Agency** Confluence for MDT

**8. Wetland size acres** 4.09

**Purpose of Evaluation**

**How assessed:** Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

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

☐ **Mitigation Wetlands: pre-construction**

**How assessed:** Measured e.g. by GPS

☑ **Mitigation Wetlands: post construction**

☐ **Other**

**10. Classification of Wetland and Aquatic Habitats in AA**

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

**11. Estimated Relative Abundance** Common

**12. General Condition of AA**

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

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

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

AA excavated wetland three years ago. Exhibits continued improving emergence of native plant cover and decreasing bare ground. Rated high disturbance in 2010 and moderate in 2011. Site previously grazed. Grazing was discontinued and site is currently managed in a natural state within conservation easement.

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

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 Hwy 89 and to predominantly undisturbed, existing emergent and scrub-shrub riparian corridor.

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

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

**Comments:** Emergent vegetation, aquatic bed class

## SECTION PERTAINING to FUNCTIONS VALUES ASSESSMENT

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

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

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

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

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

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

**14C. General Wildlife Habitat Rating:**

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

Moderate

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

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

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

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

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

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

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

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

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

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

**Comments** Increase in general habitat rating primarily the result of change in disturbance rating.

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**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**

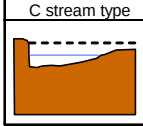
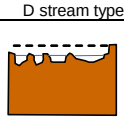
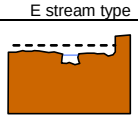
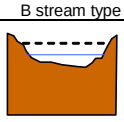
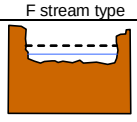
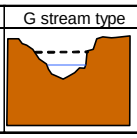
**iii. Final Score and Rating:** 0 NA **Comments:**

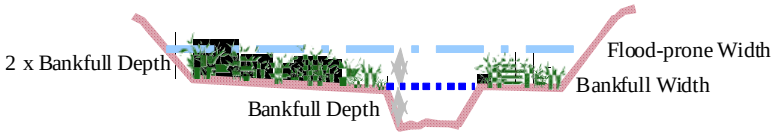
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**14E. Flood Attenuation:** (Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA are not flooded from in-channel or overbank flow, click ☐ **NA** here and proceed to 14F.)

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

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

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




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

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

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

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**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 4.09 acres flooded to a depth >1.25ft.

**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:** Increased vegetation development (beaked sedge, Nebraska sedge, Baltic rush, and cattail) 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 has continued to increase since construction.

**14I. Production Export/Food Chain Support:**

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

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

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

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

**14K. Uniqueness:**

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

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

**Comments:**

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

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

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

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

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

**Comments:**

**General Site Notes**

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

| Function & Value Variables | Rating | Actual Functional Points | Possible Functional Points | Functional Units: (Actual Points x Estimated AA Acreage) | Indicate the four most prominent functions with an asterisk (*) |
|---|---|---|---|---|---|
| A. Listed/Proposed T&E Species Habitat | L | .3 | 1 | 1.227 | ☐ |
| B. MT Natural Heritage Program Species Habitat | M | .6 | 1 | 2.454 | ☐ |
| C. General Wildlife Habitat | H | .9 | 1 | 3.681 | ☑ |
| D. General Fish Habitat | NA | 0 | 0 | 0 | ☐ |
| E. Flood Attenuation | M | .6 | 1 | 2.454 | ☐ |
| F. Short and Long Term Surface Water Storage | H | 1 | 1 | 4.09 | ☐ |
| G. Sediment/Nutrient/Toxicant Removal | H | 1 | 1 | 4.09 | ☑ |
| H. Sediment/Shoreline Stabilization | H | 1 | 1 | 4.09 | ☑ |
| I. Production Export/Food Chain Support | M | .7 | 1 | 2.863 | ☐ |
| J. Groundwater Discharge/Recharge | H | 1 | 1 | 4.09 | ☑ |
| K. Uniqueness | M | .4 | 1 | 1.636 | ☐ |
| L. Recreation/Education Potential (bonus points) | M | .1 | NA | 0.409 | ☐ |
| Totals: | | 7.6 | 10 | 31.084 | |
| 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

| 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** 8/20/2012 **4. Evaluators** B Sandefur **5. Wetland/Site# (s)** Wetland Preservation

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

**Approx Stationing or Mileposts**

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

**7. Evaluating Agency** Confluence for MDT

**8. Wetland size acres** 1.89

**Purpose of Evaluation**

**How assessed:** Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

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

☐ **Mitigation Wetlands: pre-construction**

**How assessed:** Measured e.g. by GPS

☑ **Mitigation Wetlands: post construction**

☐ **Other**

**10. Classification of Wetland and Aquatic Habitats in AA**

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

**11. Estimated Relative Abundance** Common

**12. General Condition of AA**

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

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

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

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

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

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

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

AA encompasses 1.89 acres of existing wetland identified during original delineation. Targeted for preservation in mitigation plan. Scrub/shrub corridor between Park Branch Canal and created wetland cells. AA and adjacent land not currently grazed. Hwy 89 located west of site. Murphy Creek flowing during investigation.

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

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

**Comments:** Scrub-shrub and emergent

## SECTION PERTAINING to FUNCTIONS VALUES ASSESSMENT

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

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

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

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

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

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

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

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

| | | |
|---|---|---|
| **Primary or critical habitat (list species)** | ○ D ○ S | |
| **Secondary habitat (list Species)** | ◉ D ○ S | Western toad (S2), Great Blue Heron (S3), Trumpeter Swan (S3) |
| **Incidental habitat (list species)** | ○ D ○ S | |
| **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

**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**

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

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

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

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

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

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

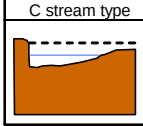
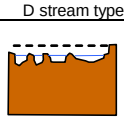
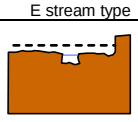
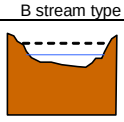
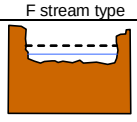
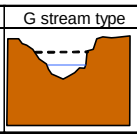
**iii. Final Score and Rating:** 0 NA **Comments:** No known fishery. The source of Murphy Creek is via culvert from Murphy Swamp, located across from Hwy 89. The channel is very narrow (less than 1 foot) and shallow (less than 2 inches) in segments.

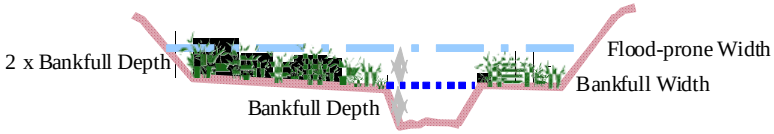
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**14E. Flood Attenuation:** (Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA are not flooded from in-channel or overbank flow, click ☐ **NA** here and proceed to 14F.)

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

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

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




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

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

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

---

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

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

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

**Comments:** Assumes the entire AA (1.89A) is subject to flooding approx. one foot deep.

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

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

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

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

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

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

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

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

**14I. Production Export/Food Chain Support:**

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

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

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

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

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

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

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

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

**i. Discharge Indicators**

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

**ii. Recharge Indicators**

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

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

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

**Comments:**

**14K. Uniqueness:**

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

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

**Comments:**

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

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

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

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

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

**Comments:**

**General Site Notes**

No notable change in this AA between 2010 and 2012.

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

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

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

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

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

☐

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

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

| I | II | III | IV |
|---|---|---|---|

# MDT Montana Wetland Assessment Form (revised March 2008)

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

**3. Evaluation Date** 8/20/2012 **4. Evaluators** B Sandefur **5. Wetland/Site# (s)** Wetland Restoration

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

**Approx Stationing or Mileposts**

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

**7. Evaluating Agency** Confluence for MDT

**8. Wetland size acres** 3.31

**Purpose of Evaluation**

**How assessed:** Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

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

☐ **Mitigation Wetlands: pre-construction**

**How assessed:** Measured e.g. by GPS

☑ **Mitigation Wetlands: post construction**

☐ **Other**

**10. Classification of Wetland and Aquatic Habitats in AA**

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

**11. Estimated Relative Abundance** Abundant

**12. General Condition of AA**

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

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

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

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

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

none

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

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

## SECTION PERTAINING to FUNCTIONS VALUES ASSESSMENT

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

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

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

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

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

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

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

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

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

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

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

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

**14C. General Wildlife Habitat Rating:**

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

***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 documented within AA.

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

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

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

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

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

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

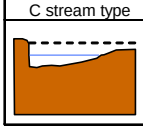
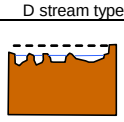
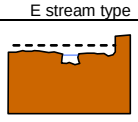
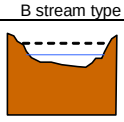
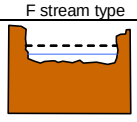
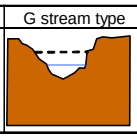
**iii. Final Score and Rating:** 0 NA **Comments:**

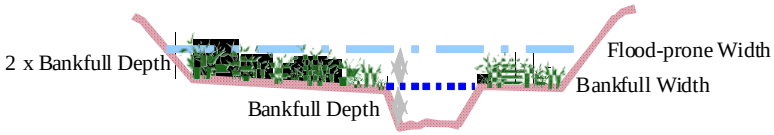
---

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

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

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

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




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

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

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

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

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

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

**Comments:** Assumes AA size of approx. 3.31 A with 0.5 acre-feet of water. High groundwater 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 season.

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

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

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

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

---

**14I. Production Export/Food Chain Support:**

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

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

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

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

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

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

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

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

**i. Discharge Indicators**

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

**ii. Recharge Indicators**

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

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

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

**Comments:**

**14K. Uniqueness:**

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

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

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

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

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

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

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

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

**Comments:**

MDT Mitigation Monitoring Site. Access limited.

**General Site Notes**

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

| Function & Value Variables | Rating | Actual Functional Points | Possible Functional Points | Functional Units: (Actual Points x Estimated AA Acreage) | Indicate the four most prominent functions with an asterisk (*) |
|---|---|---|---|---|---|
| A. Listed/Proposed T&E Species Habitat | L | .3 | 1 | 0.993 | ☐ |
| B. MT Natural Heritage Program Species Habitat | M | .6 | 1 | 1.986 | ☐ |
| C. General Wildlife Habitat | M | .7 | 1 | 2.317 | ☑ |
| D. General Fish Habitat | NA | 0 | 0 | 0 | ☐ |
| E. Flood Attenuation | M | .6 | 1 | 1.986 | ☐ |
| F. Short and Long Term Surface Water Storage | M | .6 | 1 | 1.986 | ☐ |
| G. Sediment/Nutrient/Toxicant Removal | H | 1 | 1 | 3.31 | ☑ |
| H. Sediment/Shoreline Stabilization | H | .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

| I | II | III | IV |
|---|---|---|---|

# Appendix C

Project Site Photographs

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



**Photo Point 1** **Location:** West boundary near Hwy 89, NW Cell 2
**Compass Bearing:** 170 degrees **Taken in 2010**



**Photo Point 1** **Location:** West boundary near Hwy 89, NW Cell 2
**Compass Bearing:** 170 degrees **Taken in 2011**



**Photo Point 1** **Location:** West boundary near Hwy 89, NW Cell 2
**Compass Bearing:** 170 degrees **Taken in 2012**



**Photo Point 2**
**Compass Bearing:** 350 degrees

**Location:** SE corner of Cell 2
**Taken in 2010**



**Photo Point 2**
**Compass Bearing:** 350 degrees

**Location:** SE corner of Cell 2
**Taken in 2011**



**Photo Point 2**
**Compass Bearing:** 350 degrees

**Location:** SE corner of Cell 2
**Taken in 2012**



**Photo Point 3**
**Compass Bearing:** 50 degrees

**Location:** SW corner of Cell 1
**Taken in 2010**



**Photo Point 3**
**Compass Bearing:** 50 degrees

**Location:** SW corner of Cell 1
**Taken in 2011**



**Photo Point 3**
**Compass Bearing:** 50 degrees

**Location:** SW corner of Cell 1
**Taken in 2012**



**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 2011**



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



**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**



**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 2011**



**Transect 1 - End –** *Photo 1*
**Compass Bearing:** 280 Degrees
**Location:** NE Cell 2
**Taken in 2011**



**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 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 2011**



**Transect 2 - End –** *Photo 1*
**Compass Bearing:** 30 Degrees
**Location:** SE Cell 1
**Taken in 2011**



**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**



**Wetland Data Point 1** **Location:** M-1
**Compass Bearing:** **Taken in 2012**



**Wetland Data Point 2** **Location:** M-2
**Compass Bearing:** **Taken in 2012**

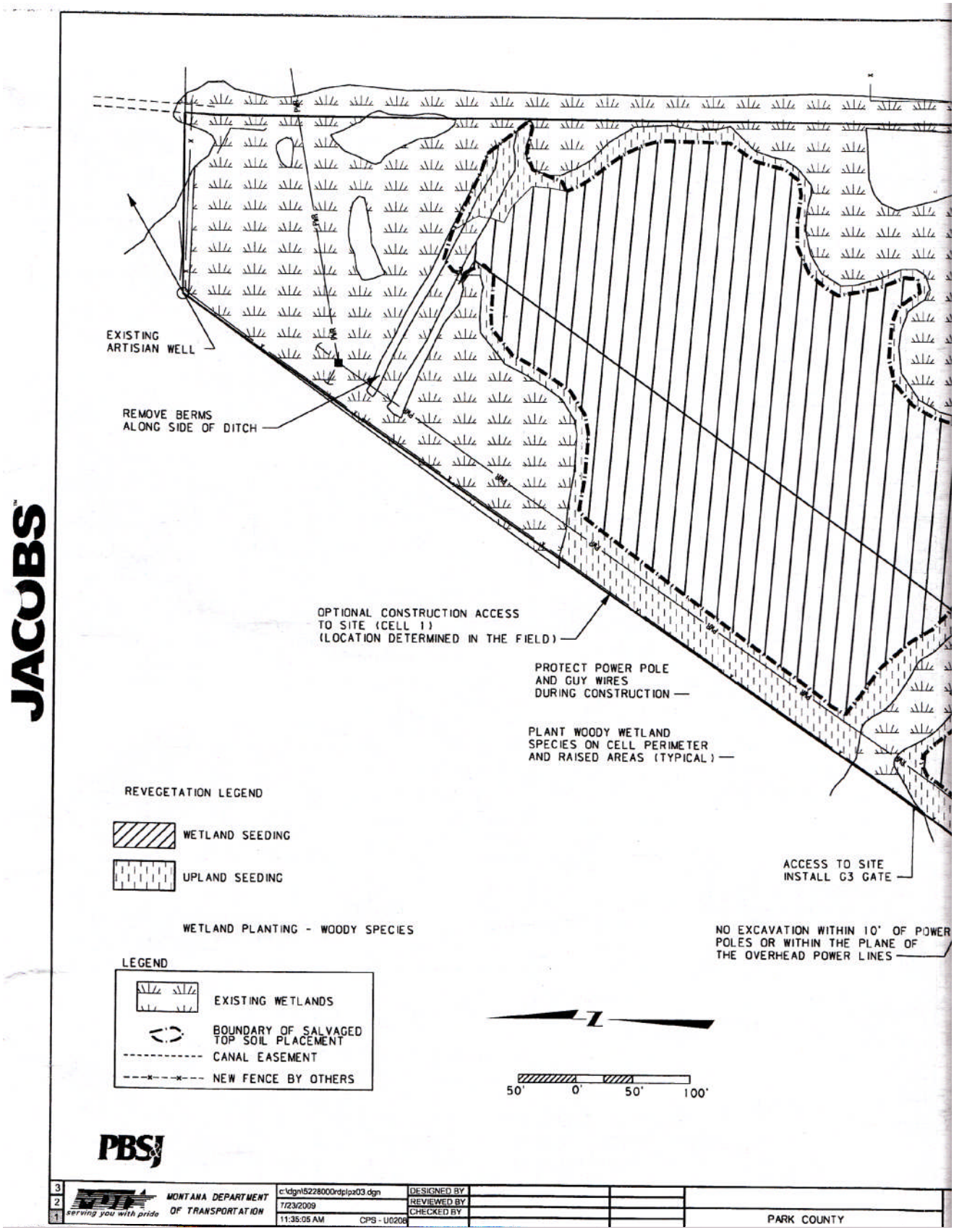


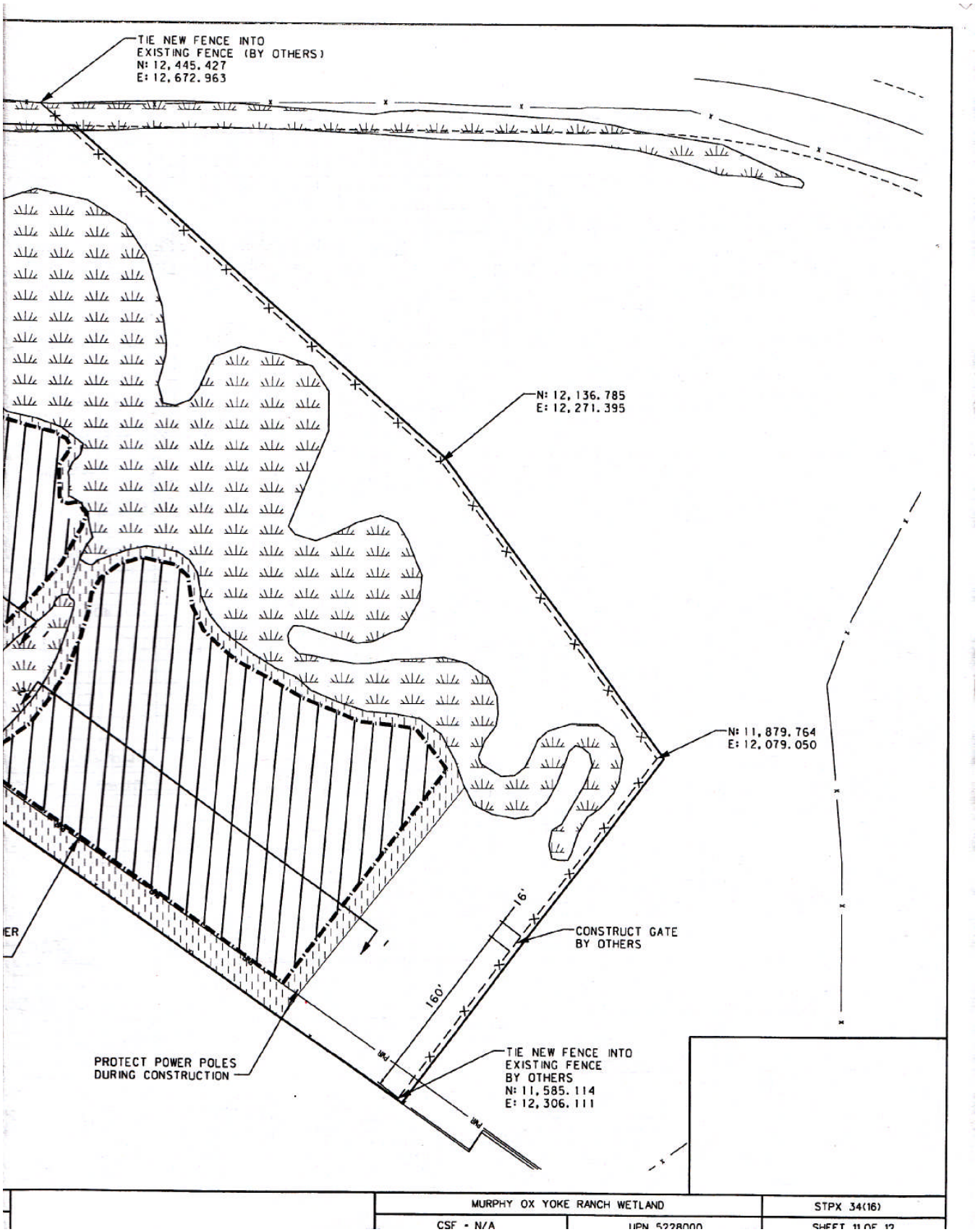
**Wetland Data Point 3** **Location:** M-3
**Compass Bearing:** **Taken in 2012**

# 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