# MONTANA DEPARTMENT OF TRANSPORTATION
# WETLAND MITIGATION MONITORING REPORT: YEAR 2010

*Roundup Wetland*
*Musselshell County, Montana*



Prepared for:

MONTANA DEPARTMENT OF TRANSPORTATION
2701 Prospect Ave
Helena, MT 59620-1001

December 2010

Prepared by:

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PO Box 1133
Bozeman, MT 59771-1133

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MORRISON MAIERLE, INC.
An Employee-Owned Company

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December 2010

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# 1. INTRODUCTION

The Roundup Wetland Mitigation 2010 Monitoring Report presents the results of the ninth year of wetland monitoring at the Montana Department of Transportation (MDT) Roundup mitigation site. The Roundup wetland site was created to provide wetland mitigation credits for MDT's reconstruction of US Highway 12 in Watershed 10 located in District 5, the Billings District. The site is located in Musselshell County, Montana, immediately south of US Highway 12 and approximately one mile east of the town of Roundup in Section 18, Township 8 North, Range 26 East, (Figure 1). Elevations range from approximately 3,169 feet to 3,175 feet above mean sea level.

The mitigation site is located at the site of the former wastewater lagoons for the city of Roundup (Figure 2, Appendix A). The former two-celled treatment facility, covering approximately 26 acres, contained sludge of varying depths and nitrate concentrations. Portions of the lagoons were capped during construction modification. The organic sludge was left at the west end of the south half of the wetland bed and capped with one foot of soil to prevent potential biohazard risks. Five monitoring wells were installed around the lagoon to monitor potential groundwater contamination from the sludge. The dike between cells was breached to allow water to access both cells (Figure 2, Appendix A). Figures 2 and 3 (Appendix A) show the mapped site features and monitoring activity locations, respectively. Appendix B contains the MDT Wetland Mitigation Site Monitoring Form, the US Army Corps of Engineers (USACE) Routine Wetland Determination Data Forms (Environmental Laboratory 1987), and the MDT Montana Wetland Assessment Forms. Appendix C contains relevant site photographs and Appendix D includes the project plan sheet.

Construction was completed in April 2000 with the goal of creating at least 24 acres of wetlands that exhibit a diverse vegetative community. The site was designed to develop an emergent wetland system with standing water depths no greater than three feet. Water depths vary within the wetland as a result of the natural topography behind the dike.

Water was designed to enter the wetland mitigation system through two methods (Appendix D). One source of hydrology was a channel that funnels storm water runoff from the northeast section of Roundup and US Highway 12 into the southwest end of the wetland. The estimated runoff volume for the channel system was 12,700 cubic meters ($m^3$) and 17,825 $m^3$ for the 5- and 25-year events, respectively (PBS&J). The second source of hydrology was treated wastewater from the new Roundup sewage treatment facility, which is discharged into the wetland to maintain the design water surface elevation. Water exits the system solely through evaporation and evapotranspiration. The site has been filling with wastewater and stormwater since July 2001.

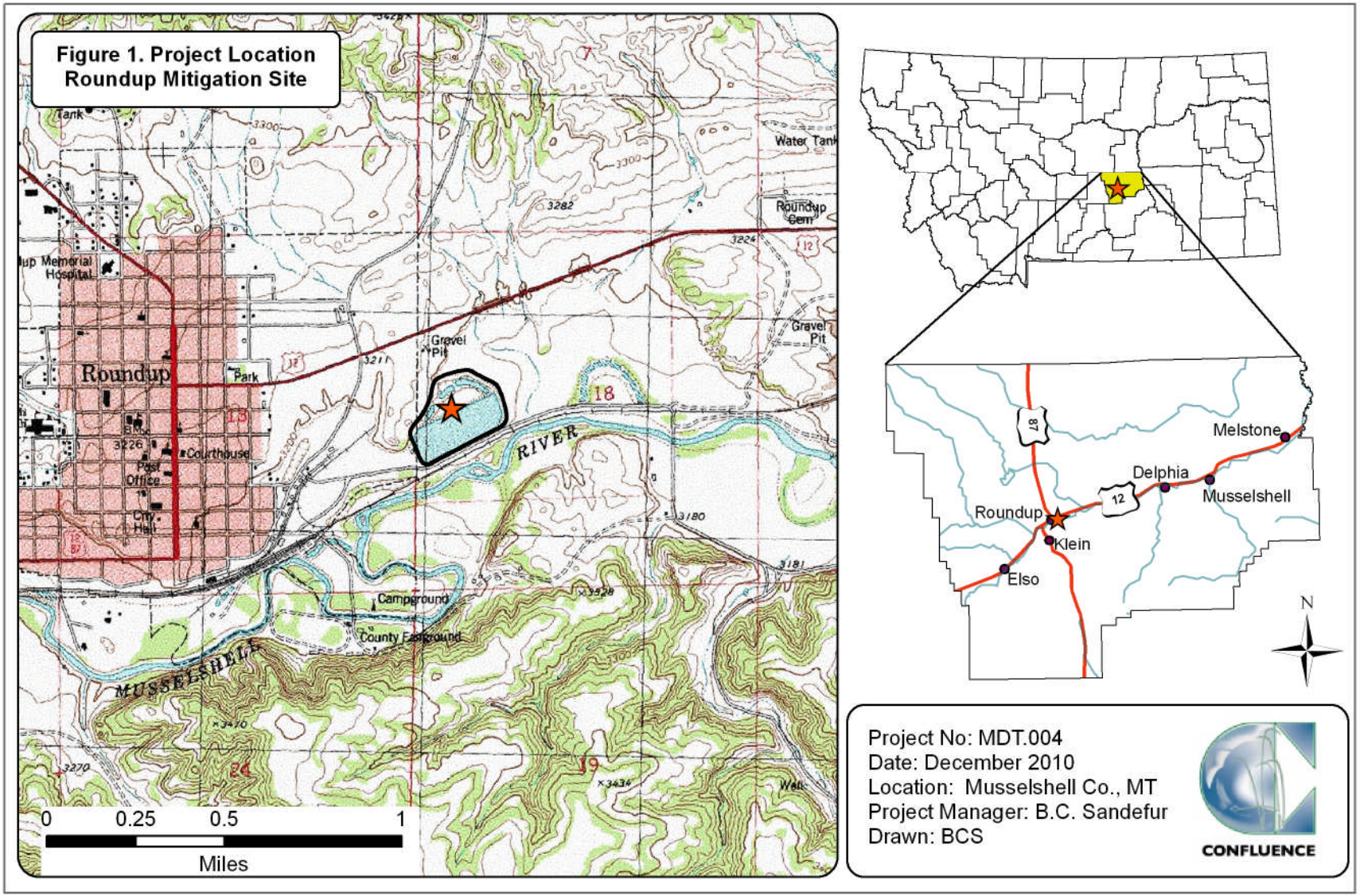



**Figure 1. Project Location Roundup Mitigation Site.**

# 2. METHODS

The site was monitored on August 6, 2010. Information contained on the Mitigation Monitoring Form and Wetland Data Form was entered electronically in the field on a personal digital assistant (PDA) palmtop computer during the field investigation (Appendix B). Monitoring activity locations were mapped using a global positioning system (GPS) (Figure 2, Appendix A). Information collected included wetland delineation, wetland/open water/aquatic habitat boundary mapping, vegetation community mapping, vegetation transect monitoring, soil data, hydrology data, bird and wildlife use documentation, photographs, functional assessment, and a non-engineering examination of the infrastructure established within the mitigation project area.

## 2.1. Hydrology

Technical criteria for wetland hydrology guidelines have been established as "permanent or periodic inundation, or soil saturation within 12 inches of the ground surface for a significant period (usually 14 days or more or 12.5 percent) during the growing season" (Environmental Laboratory 1987). 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).

Hydrological indicators as outlined on the Wetland Data Form were documented at five data points established within the project area. Hydrologic indicators were evaluated according to features observed during the site visit. The data were recorded on electronic field data sheets (Appendix B). Hydrologic assessments allow evaluation of mitigation goals addressing inundation/saturation requirements. Water quality parameters and groundwater monitoring wells were not measured in 2010.

Soil pits excavated during the wetland delineation were used to evaluate groundwater levels within 18 inches of the ground surface. The data was recorded electronically on the Wetland Data Form (Appendix B).

## 2.2. Vegetation

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

Temporal changes in vegetation were evaluated through annual assessments of a static belt transect (Figure 2, Appendix A). The original transect was

relocated and lengthened during the 2002 field visit to a site within the center of the constructed wetland (Figure 2, Appendix A). Vegetation composition was assessed and recorded on one vegetation belt transect approximately 10 feet wide and 196 feet long (Figure 2, Appendix A). The transect location was recorded with a GPS unit. Spatial changes in the dominant vegetation communities were recorded along the stationed transect. The percent cover of each vegetation species was estimated using the same cover ranges listed in the above paragraph (Appendix B). Photographs were taken at the endpoints of the transect during the monitoring event (Appendix C).

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 "+", "▲", or "■" representing 0 to 0.1 acre, 0.1 to 1.0 acre, or greater than 1.0 acre in extent, respectively. Cover classes listed on Figure 3 (Appendix A) are represented by T, L, M, or H, corresponding to less than 1 percent, 1 to 5 percent, 2 to 25 percent, and 25 to 100 percent, respectively.

A limited number of woody plants were installed at the site by the Conservation District. Approximately 250 willow sprigs were planted around the island and dike face on the western end during spring 2004 by MDT.

### 2.3. Soil

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

### 2.4. Wetland Delineation

Waters of the US including jurisdictional wetlands and special aquatic sites were delineated throughout the project area in accordance with criteria established in the 1987 Wetland Manual. In order to delineate a representative area as wetland, the technical criteria for hydrophytic vegetation, hydric soil, and wetland hydrology, as described in the 1987 Manual, must be satisfied. The indicator status of vegetation was derived from the National List of Plant Species that Occur in Wetlands: Northwest Region 9 (Reed 1988). A Routine Level-2 On-site Determination Method was used to delineate wetland areas within the project boundaries. The information was recorded electronically on the Wetland Data Form (Appendix B).

Consultation with the USACE determined that the 1987 manual should continue to be used at this site where baseline wetland conditions had been established prior to 2008. The use of the 2010 *Regional Supplement to the*

*Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (USACE 2010) was not required.

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 this delineation. Vegetation composition, soil characteristics, and hydrology were assessed at likely wetland and adjacent upland locations. 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 was classified as an atypical situation, potential problem area, or special aquatic site, i.e. mud flat. The wetland boundary was identified on aerial photography. Wetland areas reported were estimated using geographic information system (GIS) methodology.

### 2.5. Wildlife

Observations and other positive indicators of use of mammal, reptile, amphibian, and bird species were recorded on the wetland monitoring form during the site visit. Indirect use indicators, including tracks, scat, burrow, eggshells, skins, and bones, were also recorded (Appendix B). These signs were recorded while traversing the site for other required activities. Direct sampling methods, such as snap traps, live traps, and pitfall traps, were not used. A list of wildlife species observed directly and indirectly from 2001 to 2010 was compiled.

### 2.6. Functional Assessment

The baseline functional assessment was completed using the 1997 form (Berglund 1997). Functional assessments since 2001 were conducted using the 1999 MDT Montana Wetland Assessment Method (Berglund 1999). The 2008 MDT Montana Wetland Assessment Method (Berglund and McEldowney 2008) was used in 2008 and 2010 (Appendix B). Field data for this assessment were collected during the site visit. A Functional Assessment Form was completed for each wetland or group of wetlands (Assessment Areas - AA) (Appendix B).

### 2.7. Photo Documentation

Monitoring at photo points provided supplemental information documenting wetland condition, trends, current land use surrounding the site, the upland buffer, the monitored area, and the vegetation transects. Photographs were taken at established photo points and of the transect end points during the site visit (Appendix C). Photo point locations were recorded with a resource 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 (Global Positioning System) unit during the 2010 monitoring season. Points were collected using WAAS-enabled differential corrected satellites, typically improving resolution to sub-meter accuracy. The collected data were then transferred to a personal computer, exported into GIS, and drawn in Montana State Plane Single Zone NAD 83 meters. In addition to GPS, some site features within the site were hand-mapped onto an aerial photograph and then digitized. Site features and survey points that were mapped included fence boundaries, photograph points, transect beginnings and endings, wetland boundaries, and vegetation community boundaries.

### 2.9. Maintenance Needs

Channels, engineered structures, fencing, and other features were examined during the site visit for obvious signs of breaching, damage, or other problems. This was a cursory examination that did not constitute an engineering-level structural inspection.

## 3. RESULTS

### 3.1. Hydrology

Water for the mitigation wetland was to be provided by two sources, a drainage channel that conveyed storm water runoff from Roundup and US 12 and treated wastewater effluent from the Roundup sewage treatment facility. The wetland was originally designed with a flow-through system that would direct the treated effluent through the wetland and dispersing it in the Musselshell River. This design feature was eliminated by the Montana Department of Environmental Quality (MDEQ) and the Environmental Protection Agency (EPA) based on the potential for heavy metals and contaminants in the remaining sewage system sludge to enter surface waters of the nearby Musselshell River.

The north lagoon receives hydrological input from the treatment plant and is permanently inundated. The south lagoon receives overflow from the north lagoon via an excavated channel and is intermittently inundated. Fluctuating water levels in the south lagoon appear to maintain an extensive mudflat through the historically inundated cell. Wetlands between the lagoons are rarely flooded and intermittently saturated via high groundwater table. The average surface water depth across the site was roughly 3.5 feet with a range of depths from 0.0 to 6.0 feet. Approximately 20 percent of the assessment area was inundated during the August site evaluation. The water depth at the emergent vegetation and open water boundary was 1 foot. A majority of the soil on the remainder of the site was saturated within 12 inches of the ground surface.

The mean annual precipitation recorded from June 1914 to December 2008 at the Roundup station (247214) is 12.48 inches (WRCC 2010). Average

annual precipitation rates measured between 2000 and 2008 range from 8.29 inches in 2003 to 17.98 inches in 2005. The precipitation rate recorded in Roundup from January to June 2010 was 6.89 inches. The rate for the same time period in 2008 was 5.78 inches. The total annual rate in 2008 was 13.29 inches.

Five data points, RL-1 through RL-5, were assessed to determine the upland/wetland boundaries (Wetland Data Forms, Appendix B). Data points RL-1 through RL-4 were located within areas that met the three wetland criteria. Data point RL-1 exhibited saturation at 6 inches below the ground surface (bgs) and a water table (free water in the test pit) at 12 inches bgs, both positive indicators of wetland hydrology. Saturation at 3 inches bgs, a water table at 10 inches bgs, and drainage patterns in wetlands were primary indicators of wetland hydrology at RL-2. Saturation at 12 inches bgs was a primary indicator of wetland hydrology at RL-3 and RL-4. Locations RL-2 and RL-4 also had a positive FAC-neutral test, a secondary indicator of wetland hydrology. Data point RL-5 did not have any positive indicators of wetland hydrology and was not classified as a wetland.

### 3.2. Vegetation

The 42 plant species identified at the Roundup site from 2001 to 2008 and 2010 are listed in Table 2 and the Monitoring Forms (Appendix B). The twelve vegetation community types identified in 2010 are mapped on Figure 3 (Appendix B). The eight wetland and four upland communities were Type 1 – *Kochia scoparia/Chenopodium leptophyllum* Wetland, Type 3 –*Alopecurus arundinaceus* Wetland, Type 5 – *Agropyron crsitatum/Kochia scoparia* Upland, Type 6 – *Scirpus* spp. Wetland, Type 7 – *Chenopodium leptophyllum* Upland, Type 16 – *Chenopodium leptophyllum* Wetland, Type 17 – *Chenopodium leptophyllum/Descuriana Sophia* Upland, Type 19 – *Phalaris arundinacea* Wetland, Type 20 – *Scirpus maritimus/Hordeum jubatum* Wetland, Type 22 – *Agropyron* spp. Upland, and Type 23 – *Agropyron* spp./*Hordeum jubatum* Wetland. Open water polygons are identified by the number 24 and mud flats are identified by the number 25 on Figure 3 (Appendix A). Dominant species within each community type are included on the Monitoring Form (Appendix B) and listed below by type in descending order of abundance.

Wetland community Type 1 – *Kochia scoparia/Chenopodium leptophyllum* was located on the periphery of the mud flats. The community was dominated by kochia (*Kochia scoparia)*, narrow-leaf goosefoot (*Chenopodium leptophyllum*), tall wheatgrass (*Agropyron elongatum*), and slender wheatgrass (*Agropyron trachycaulum*). Several other grasses and forbs were present at less than one percent cover.

Wetland Type 3 – *Alopecurus arundinaceus* was located at the upland and wetland border and in isolated areas throughout the site. The vegetation was dominated by a monoculture of creeping foxtail *(Alopecurus* arundinaceus)

with 1 to 5 percent cover of reed canary grass (*Phalaris* arundinacea), goose foot (*Chenopodium* spp. ), and foxtail barley (*Hordeum* jubatum).

Upland community Type 5 – *Agropyron cristatum/Kochia scoparia* was identified in the upland perimeter of the mitigation site. Crested wheatgrass (*Agropyron cristatum*), kochia, goosefoot and Japanese brome (*Bromus japonicas*) dominated the vegetation cover.

Type 6 – *Scirpus* spp. was located in wetlands adjacent to the open water located in the northeast corner of the site. Hard-stem Scirpus acutus, three-square (*Scirpus pungens*), and saltmarsh bulrush (*Scirpus maritimus*) dominated the community.

Type 7 – *Chenopodium* spp./*Rumex crispus* was defined in an isolated wetland located in the southwest corner of the site. Oak leaf goosefoot (*Chenopodium glaucum*), narrow-leaf goosefoot, curly dock (*Rumex crispus*), creeping foxtail, and Canada thistle (*Cirsium arvense*) dominated the vegetation species.

Upland community Type 12 – Cirsium arvense/Chenopodium leptophyllum was found in a narrow upland strip near the north property boundary. Canada thistle and narrow-leaf goosefoot dominated the cover. Several grasses and forbs each contributed 1 to 5 percent.

The Type 16 – *Chenopodium leptophyllum* community characterized the marginal wetland area located at the south edge of the site and west of the mud flat. Bare ground and narrow-leaf goosefoot dominated the community. The areas identified as mud flat (25) were devoid of vegetation.

Upland community Type 17 – *Chenopodium leptophyllum/Descuraina sophia* was found at the southwest edge of the mitigation site. Narrow-leaf goosefoot and common tansy mustard dominate the community.

Community Type 19 – *Phalaris arundinacea* dominated the irrigation ditch located on the southwest boundary of the site.

Vegetation community Type 20 - *Scirpus maritimus*/*Hordeum jubatum* was identified in a small wetland located at the north boundary. Saltmarsh bulrush, foxtail barley, Canada thistle, and creeping spikerush (*Eleocharis palustris*) dominated the vegetation.

Upland community Type 22 – *Agropyron* spp, formed in isolated islands within the delineated wetland area. Slender wheatgrass, tall wheatgrass, foxtail barley, and Japanese brome dominated the vegetation cover.

Wetland community Type 23 – *Agropyron* spp./*Hordeum jubatum* covered a large area in the center of the site. The dominant species were tall wheatgrass, slender wheatgrass, foxtail barley, creeping foxtail, Canada thistle, and tall tumble mustard (*Sisymbrium altissimum*).

The open water (24) and mud flat (25) were devoid of vegetation. Islands of Type 1 – *Kochia scoparia/Chenopodium leptophyllum* formed patchy plant cover within the mud flat. Mud flat is considered a special aquatic site.

**Table 1. Comprehensive list of vegetation species identified at the Roundup Mitigation Site from 2001 to 2008 and 2010.**

| | | |
|---|---|---|
| *Agropyron cristatum* | crested wheatgrass | NL |
| *Agropyron elongatum* | tall wheatgrass | NL |
| ***Agropyron smithii*** | **wheatgrass,Western** | FACU |
| *Agropyron trachycaulum* | wheatgrass,slender | FAC |
| *Alopecurus arundinaceus* | foxtail,creeping | NI[2] |
| ***Asclepias speciosa*** | **milkweed,showy** | FAC+ |
| *Asclepias spp.* | | NL |
| *Aster brachyactis* | aster,rayless alkali | FACW |
| ***Bromus japonicus*** | **brome,Japanese** | FACU |
| ***Chenopodium glaucum*** | **goosefoot,oakleaf** | FAC |
| *Chenopodium hybridum* | mapleleaf goosefoot | NL |
| *Chenopodium leptophyllum* | goosefoot,narrow-leaf | FACU |
| ***Chenopodium spp.*** | | NL |
| *Cirsium arvense* | thistle,creeping | FACU+ |
| *Conium maculatum* | poison-hemlock | FACW- |
| *Conyza canadensis* | horseweed,Canada | FACU |
| *Descurainia sophia* | mustard, common tansy | NL |
| *Elaeagnus angustifolia* | olive,Russian | FAC |
| *Eleocharis palustris* | spikerush,creeping | OBL |
| *Elymus cinereus* | wild-rye,basin | NI |
| *Grindelia squarrosa* | gumweed,curly-cup | FACU |
| *Helianthus annuus* | sunflower,common | FACU+ |
| *Hordeum jubatum* | barley,fox-tail | FAC+ |
| ***Iva axillaris*** | **sumpweed,small-flower** | FAC |
| *Kochia scoparia* | summer-cypress,Mexican | FAC |
| *Lemna minor* | duckweed,lesser | OBL |
| *Melilotus officinalis* | sweetclover,yellow | FACU |
| *Phalaris arundinacea* | grass,reed canary | FACW |
| *Polygonum spp.* | | NL |
| ***Polypogon monspeliensis*** | **grass,annual rabbit-foot** | FACW+ |
| ***Puccinellia nuttalliana*** | **grass,Nuttall's alkali** | OBL |
| *Rhus trilobata* | sumac,smooth | NI |
| *Ribes aureum* | currant,golden | FAC+ |
| *Rumex crispus* | dock,curly | FACW |
| *Rumex maritimus* | dock,golden | FACW+ |
| ***Rumex spp.*** | | NL |
| *Scirpus acutus* | bulrush,hard-stem | OBL |
| *Scirpus maritimus* | bulrush,saltmarsh | OBL |
| *Scirpus pungens* | bulrush,three-square | OBL |
| ***Sisymbrium altissimum*** | **mustard,tall tumble** | FACU- |
| ***Sonchus arvensis*** | **sowthistle,field** | FACU+ |
| *Tamarix ramosissima* | saltcedar | FACW |

Species identified in 2010 are listed in **bold** type.
[1]Region 9 Great Plains (Reed 1988).
[2]NI – No indicator. Listed as FACW? on National list – not confirmed by regional review.

Vegetation transect results are summarized on Table 3 and Charts 1 and 2 and detailed on the Monitoring Forms (Appendix B). The transect intersected two communities, upland Type 22 and wetland Type 23. Approximately 81 percent of the transect was dominated by hydrophytic species. The cover of Types 2 and 17 identified in 2008 (dominated by goosefoot and common tansy mustard) was replaced by tall wheatgrass, slender wheatgrass, Western wheatgrass (*Agropyron smithii*), common tansy mustard, and foxtail barley in 2010. The cover of desirable species along the transect increased in 2010.

Infestations of Canada thistle were identified in four areas (Figure 3, Appendix A). The size of the infestations ranged from less than 0.1 acre to between 0.1 and 1.0 acre. The cover class ranged from low, 1 to 5 percent cover, to moderate, 5 to 25 percent cover. Canada thistle was also identified in communities 5, 7, 12, 17, 20, and 23 at less than 10 percent cover. The average site wide areal cover of Canada thistle is well below 10 percent.

**Table 2. Transect 1 data summary from 2001 to 2008 and 2010 for the Roundup Wetland Mitigation Site.**

| Monitoring Year | 2001 [1] | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2010 |
|---|---|---|---|---|---|---|---|---|---|
| **Transect Length (feet)** | **100** | **196** | **196** | **196** | **196** | **196** | **196** | **196** | **196** |
| Vegetation Community Transitions on Transect | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 2 |
| Vegetation Communities along Transect | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 2 |
| Hydrophytic Vegetation Communities onTransect | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 |
| Total Vegetative Species | 4 | 2 | 2 | 2 | 2 | 2 | 5 | 9 | 11 |
| Total Hydrophytic Species | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 5 | 3 |
| Total Upland Species | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 4 | 8 |
| Estimated % Total Vegetative Cover Sitewide | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| % Transect Length Comprising Hydrophytic Vegetation Communities | 60 | 90 | 90 | 90 | 90 | 90 | 81 | 81 | 81 |
| % Transect Length Comprising Upland Vegetation Communities | 40 | 10 | 10 | 10 | 10 | 10 | 19 | 19 | 19 |
| % Transect Length Comprising Unvegetated Open Water | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| % Transect Length Comprising Bare Substrate | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

[1]Transect lengthened in 2002.

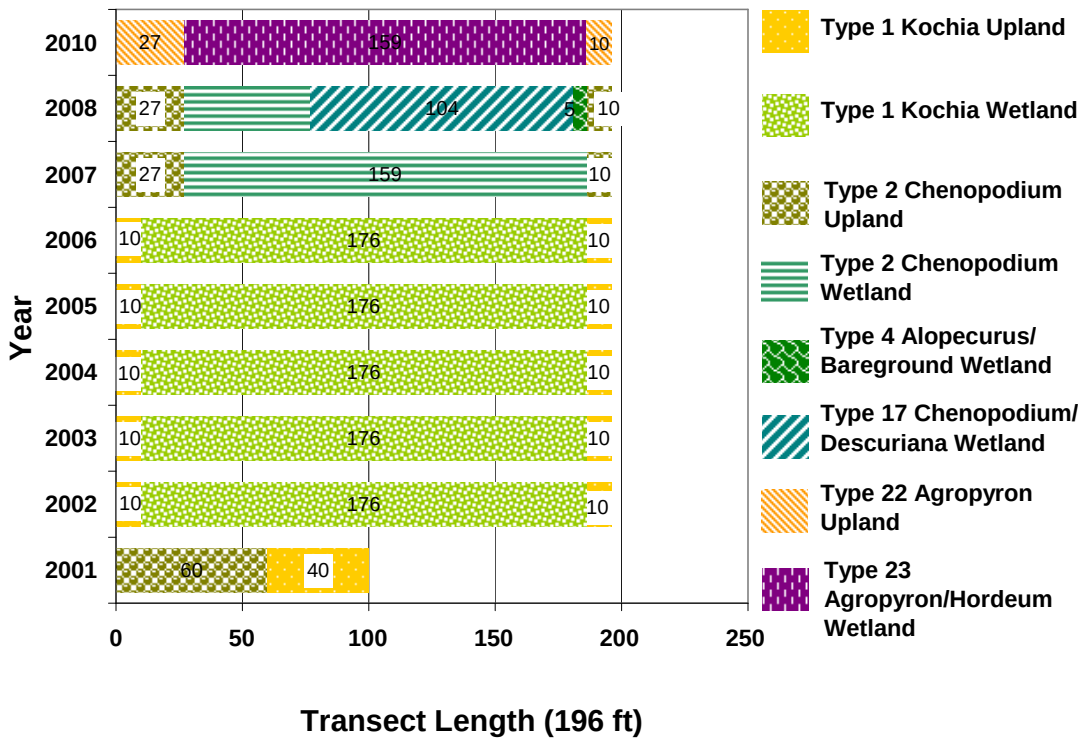



**Chart 1. Length of vegetation communities along Transect 1 from 2002 to 2008 and 2010.**

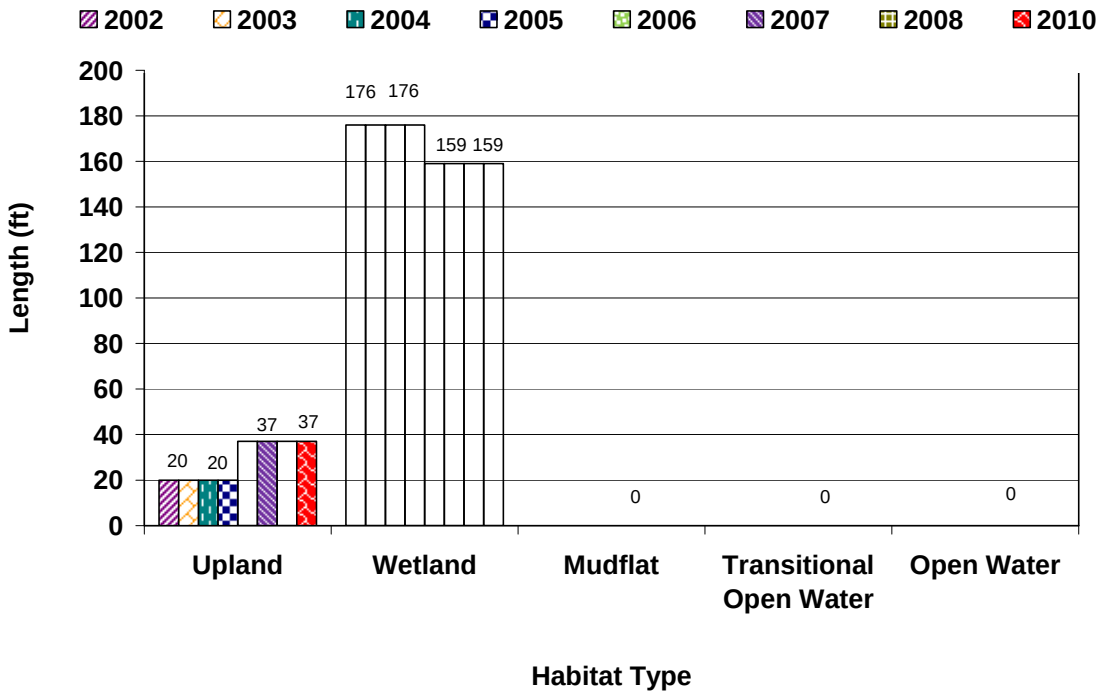



**Chart 2. Transect 1 maps showing vegetation types from start (0 feet) to end (100 feet in 2001 and 196 feet in 2002 to 2008 and 2010).**

### 3.3. Soil

The project site was mapped as part of the Musselshell County Soil Survey. The majority of the site and all the wetland area were mapped as water consociation. The Havre-Glendive Complex (11A) bounds the greater part of the water along the uplands. The soil is well drained, tyical of floodplains, alluvial fans and stream terraces, and taxonomically classified as an Aridic Ustifluvent. The Havre component is a loam soil and Glendive component is a fine, sandy loam. A small area of Cabbart-Crago-Delpoint complex is located along the northwest boundary of the site an in the location of the waste recovery site.

The soil test pits at RL-1 through RL-4 were located in areas delineated as wetlands. The soil profile at RL-1 revealed a clay loam (10 YR 4/1) with redoximorphic features (10YR 2/1) in the matrix. The low chroma and redox features provide a positive indication of hydric soil. The soil at RL-2 was a clay loam (10YR 4/1) with redox concentrations (10YR 4/6) in the matrix. The low chroma and redox features provided evidence of a hydric soil. The soil at RL-3 was a loam (10YR 4/1) with redox concentration (10YR 4/6) in the matrix. The soil at RL-4 was dark greenish gray muck (5G 4/1) with redox concentration (10YR 4/6) in the matrix. The gleyed soil provided evidence of a hydric soil. The soil at test pit RL-5 was very dark greenish gray muck (5G 3/1) with light, yellowish brown redoximorphic concentrations (10YR 6/4). Soil test pit RL-5 met the hydric soil criteria yet failed the wetland vegetation and hydrology criteria. The vegetation recorded at the RL-5 data point is representative of an annual upland community. RL-5 was located along the upland/wetland transition and will trend toward wetland conditions with a slight increase in water table. In general, the soils sampled within the mitigation monitoring boundary have been subjected to prolonged saturation and inundation, elevated organic matter deposition from wastewater particulates, and increased plant growth associated with eutrophic environments.

### 3.4. Wetland Delineation

The extent of wetland development has varied over the nine years of monitoring as a result of water availability, water table flucuations and the subsequent effect on open water and mud flat acreage in the south lagoon. Table 4 summarizes the delineated wetland, open water, and mud flat acreages from 2001 to 2008 and 2010. Water levels decreased in 2010 resulting in an increase of 4.84 acres in mudflat and a corresponding decrease in open water and wetland habitat. The area of open water decreased from 8.85 acres in 2008 to 5.56 acres in 2010. The net wetland area decreased from 12.03 acres in 2008 to 9.76 acres in 2010. The total wetland, open water, and mud flat aquatic habitat acreage was 20.16 acres in 2010.

**Table 3. The wetland acreage summary from 2008 and 2010 for the Roundup Wetland Mitigation Site.**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| Open Water | 1.40 | 5.32 | 5.42 | 9.99 | 14.74 | 6.04 | 8.271 | 8.85 | 5.56 |
| Net Wetland | 17.08 | 9.20 | 11.09 | 9.52 | 7.33 | 16.03 | 12.71 | 12.03 | 9.76 |
| Mudflat | --- | 7.48 | 5.49 | 2.51 | 0 | --* | --* | --* | 4.84 |
| **Gross Wetland** | **18.48** | **22.00** | **22.00** | **22.02** | **22.07** | **22.07** | **21.07** | **20.88** | **20.16** |

*Not identified in 2006, 2007, and 2008.

## 3.5. Wildlife

Wildlife species observed directly and indirectly from 2001 to 2008 are listed in Table 5. No new species were identified during the 2010 monitoring, nor were observed wildlife noted in field notes. A total of 75 avian species have been observed at the Roundup mitigation wetland to date. The four wood boxes located onsite showed evidence of use during 2010 monitoring (Figure 2, Appendix B).

**Table 4. Wildlife species observed from 2001 through 2010 on the Roundup Wetland Mitigation Site.**

| | |
|---|---|
| **AMPHIBIAN** | |
| Frog spp | |
| Woodhouse's Toad | *Bufo woodhousii* |
| **MAMMAL** | |
| Feral cat | |
| Mule Deer | *Odocoileus hemionus* |
| Muskrat | *Ondatra zibethicus* |
| Red Fox | *Vulpes vulpes* |
| **REPTILE** | |
| Gophersnake | *Pituophis catenifer* |
| Painted Turtle | *Chrysemys picta* |
| **BIRD** | |
| American Avocet | *Recurvirostra americana* |
| American Coot | *Fulica americana* |
| American Kestrel | *Falco sparverius* |
| American Robin | *Turdus migratorius* |
| American Wigeon | *Anas americana* |
| Bank Swallow | *Riparia riparia* |
| Barn Swallow | *Hirundo rustica* |
| Black-billed Magpie | *Pica hudsonia* |
| Black-necked Stilt | *Himantopus mexicanus* |
| Blue-winged Teal | *Anas discors* |
| Brewer's Blackbird | *Euphagus cyanocephalus* |
| Bufflehead | *Bucephala albeola* |

**Table 5 (Continued). Wildlife species observed from 2001 through 2010 on the Roundup Wetland Mitigation Site.**

| | |
|---|---|
| **BIRD** | |
| California Gull | *Larus californicus* |
| Canada Goose | *Branta canadensis* |
| Canvasback | *Aythya valisineria* |
| Cedar Waxwing | *Bombycilla cedrorum* |
| Cinnamon Teal | *Anas cyanoptera* |
| Cliff Swallow | *Petrochelidon pyrrhonota* |
| Common Merganser | *Mergus merganser* |
| Common Yellowthroat | *Geothlypis trichas* |
| Cooper's Hawk | *Accipiter cooperii* |
| Double-crested Cormorant | *Phalacrocorax auritus* |
| Eared Grebe | *Podiceps nigricollis* |
| Eastern Kingbird | *Tyrannus tyrannus* |
| European Starling | *Sturnus vulgaris* |
| Franklin's Gull | *Leucophaeus pipixcan* |
| Gadwall | *Anas strepera* |
| Great Blue Heron | *Ardea herodias* |
| Greater Yellowlegs | *Tringa melanoleuca* |
| Green-winged Teal | *Anas crecca* |
| Hooded Merganser | *Lophodytes cucullatus* |
| House Sparrow | *Passer domesticus* |
| Killdeer | *Charadrius vociferus* |
| Lazuli Bunting | *Passerina amoena* |
| Least Sandpiper | *Calidris minutilla* |
| Lesser Scaup | *Aythya affinis* |
| Yellow Warbler | *Dendroica petechia* |
| Lesser Yellowlegs | *Tringa flavipes* |
| Long-billed Dowitcher | *Limnodromus scolopaceus* |
| Mallard | *Anas platyrhynchos* |
| Marbled Godwit | *Limosa fedoa* |
| Marsh Wren | *Cistothorus palustris* |
| Mourning Dove | *Zenaida macroura* |
| Northern Harrier | *Circus cyaneus* |
| Northern Pintail | *Anas acuta* |
| Northern Rough-winged Swallow | *Stelgidopteryx serripennis* |
| Northern Shoveler | *Anas clypeata* |
| Pied-billed Grebe | *Podilymbus podiceps* |
| Redhead | *Aythya americana* |
| Red-necked Phalarope | *Phalaropus lobatus* |
| Red-winged Blackbird | *Agelaius phoeniceus* |
| Ring-billed Gull | *Larus delawarensis* |
| Ring-necked Duck | *Aythya collaris* |
| Ring-necked Pheasant | *Phasianus colchicus* |
| Rock Pigeon | *Columba livia* |
| Ross's Goose | *Chen rossii* |
| Ruddy Duck | *Oxyura jamaicensis* |
| Sandhill Crane | *Grus canadensis* |
| Sandpiper Spp. | |

**Table 5 (Continued). Wildlife species observed from 2001 through 2010 on the Roundup Wetland Mitigation Site.**

| | |
|---|---|
| **BIRD** | |
| Semipalmated Sandpiper | *Calidris pusilla* |
| Short-billed Dowitcher | *Limnodromus griseus* |
| Solitary Sandpiper | *Tringa solitaria* |
| Song Sparrow | *Melospiza melodia* |
| Spotted Sandpiper | *Actitis macularius* |
| Tree Swallow | *Tachycineta bicolor* |
| Violet-green Swallow | *Tachycineta thalassina* |
| Western Grebe | *Aechmophorus occidentalis* |
| Western Meadowlark | *Sturnella neglecta* |
| Western Sandpiper | *Calidris mauri* |
| Whimbrel | *Numenius phaeopus* |
| White-crowned Sparrow | *Zonotrichia leucophrys* |
| Willet | *Tringa semipalmata* |
| Wilson's Phalarope | *Phalaropus tricolor* |
| Wilson's Snipe | *Gallinago delicata* |
| Wood Duck | *Aix sponsa* |
| Yellow-headed Blackbird | *Xanthocephalus xanthocephalus* |
| Yellow-rumped Warbler | *Dendroica coronata* |

### 3.6. Functional Assessment

Pre-construction conditions were assessed using the 1997 MDT Montana Wetland Assessment Method (MWAM) (PBS&J ). Wetland functions in 2002 through 2007 were assessed using the 1999 MDT assessment method (Berglund 1999) and the 2008 and 2010 wetland conditions were assessed using the 2008 MDT assessment method (Berglund and McEldowney 2008).

Table 6 summarizes the wetland function and value ratings for the Roundup mitigation site from 2001 to 2008 and 2010. The AA received a Category II rating based on the high rating in the general wildlife habitat function and 59 percent of the total possible points. Ratings were also high for short and long term surface water storage, production export/food chain support, groundwater discharge/recharge, and recreation/education potential bonus points. The Category rating and point score did not change from 2008 to 2010. The total aquatic habitat acreage dropped from 20.88 acres in 2008 to 20.16 acres in 2010 as a result of a decrease in inundation in the south lagoon.

**Table 5. Summary of 2001 to 2008 and 2010 wetland function/value ratings and functional points at the Roundup Wetland Mitigation Site.**

| Function and Value Parameters - MDT Montana Wetland Assessment Method | 2001[1] | 2002 [2] | 2003 [2] | 2004 [2] | 2005 [2] | 2006 [2] | 2007 [2] | 2008 [3] | 2010 [3] |
|---|---|---|---|---|---|---|---|---|---|
| Listed/Proposed T&E Species Habitat | Low (0.0) | Low (0.0) | Low (0.0) | Low (0.0) | Low (0.0) | Low (0.0) | Low (0.0) | Low (0.0) | Low (0.0) |
| MNHP Species Habitat | Low (0.0) | High (0.8) | High (0.8) | High (0.8) | High (0.8) | High (0.8) | High (0.8) | Low (0.2) | Low (0.2) |
| General Wildlife Habitat | Low (0.3) | Mod. (0.7) | High (0.9) | High (0.9) | High (0.9) | High (0.9) | High (0.9) | High (0.9) | High (0.9) |
| General Fish/Aquatic Habitat | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Flood Attenuation | High (1.0) | Mod. (0.6) | Mod. (0.6) | Mod. (0.6) | Mod. (0.6) | Mod. (0.6) | Mod. (0.6) | Mod (0.5) | Mod (0.5) |
| Short and Long Term Surface Water Storage | High (0.8) | High (1.0) | High (1.0) | High (1.0) | High (1.0) | High (1.0) | High (1.0) | High (1.0) | High (1.0) |
| Sediment/Nutrient/Toxicant Removal | Mod. (0.7) | Mod. (0.7) | Mod. (0.7) | Mod. (0.7) | Mod. (0.7) | Mod. (0.7) | Mod. (0.7) | Mod. (0.7) | Mod (0.7) |
| Sediment/Shoreline Stabilization | NA | High (1.0) | High (1.0) | High (1.0) | High (1.0) | High (1.0) | Low (0.3) | Low (0.3) | Low (0.3) |
| Production Export/Food Chain Support | Mod. (0.6) | Mod. (0.6) | Mod. (0.6) | High (0.8) | High (0.8) | High (0.8) | High (0.8) | High (0.8) | High (0.8) |
| Groundwater Discharge/Recharge | Low (0.1) | Low (0.1) | Low (0.1) | Low (0.1) | Low (0.1) | Low (0.1) | Low (0.1) | High (1.0) | High (1.0) |
| Uniqueness | Low (0.2) | Low (0.3) | Low (0.3) | Low (0.3) | Low (0.3) | Low (0.3) | Low (0.3) | Low (0.3) | Low (0.3) |
| Recreation/Education Potential (Bonus) | Low (0.2) | High (1.0) | High (1.0) | High (1.0) | High (1.0) | High (1.0) | High (1.0) | High (0.2) | High (0.2) |
| Actual Points / Possible Points | 3.9 / 10 | 6.8 / 11 | 7.0 / 11 | 7.2 / 11 | 7.2 / 11 | 7.2 / 11 | 6.5 / 11 | 5.9 / 10 | 5.9 / 10 |
| % of Possible Score Achieved | 39% | 61% | 64% | 65% | 65% | 65% | 59% | 59% | 59% |
| Overall Category | III | III | II | II | II | II | II | II | II |
| **Total Acreage of Assessed Wetlands / Open Water within Easement** | **18.51** | **22.00** | **22.00** | **22.0** | **22.07** | **22.07** | **21.07** | **20.88** | **20.16** |
| **Functional Units (acreage x actual points)** | **72.21** | **149.60** | **154.00** | **158.40** | **158.90** | **158.90** | **137.00** | **123.19** | **118.94** |
| **Net Acreage Gain** | **18.51** | **22.00** | **22.00** | **22.00** | **22.07** | **22.07** | **21.07** | **20.88** | **20.16** |
| **Functional Unit "Gain"** | **72.21** | **149.60** | **154.00** | **158.40** | **158.90** | **158.90** | **137.00** | **123.19** | **118.94** |

[1](Berglund 1997)
[2](Berglund 1999)
[3](Berglund and McEldowney 2008)

### 3.7. Photo Documentation

Representative photos taken from established photo points and vegetation transect ends are included in Appendix C. Photo points PP1 to PP5 (Figure 2, Appendix A) are shown on pages C-1 to C-3 of Appendix C. The endpoints of transect one are shown on page C-3. Data points RL-1 through RL-5 are shown on page C-4 of Appendix C.

### 3.8. Maintenance Needs

All dikes and inlet structures appeared to be functioning satisfactorily in 2010. Accumulation of sediment at the mouth of the excavated channel connecting the south cell to the north cell may be impending the movement of surface water into the cell may be impeding the movement of surface water into the south cell and partially responsible for the decreased areas of inundation observed in 2010. One of the duck boxes was tilted and may be undesirable for continued nesting. Infestations of Canada thistle were identified in four areas (Figure 3, Appendix A). The size of the infestations ranged from less than 0.1 acre to between 0.1 and 1.0 acre. The cover class ranged from low to moderate. Canada thistle was also identified in communities 5, 7, 12, 17, 20, and 23 at less than 10 percent cover. It is critical that the weed management plan continue to be implemented to prevent the encroachment of Canada thistle into infested areas.

### 3.9. Current Credit Summary

The delineation identified a total of 20.16 acres of aquatic habitat, a decrease of 0.72 acres since 2008. Surface water levels in the south lagoon decreased in 2010 resulting in an increase of 4.84 acres in mudflat and a corresponding decrease in open water and wetland habitat. The area of open water decreased from 8.85 acres in 2008 to 5.56 acres in 2010. The vegetated wetland area decreased from 12.03 acres in 2008 to 9.76 acres in 2010. An overall total of 20.16 acres of wetland/aquatic habitat was present during the 2010 survey. The site was rated as an overall Category II wetland with 119 Functional Units. The ratings were high for general wildlife habitat, short and long term surface water storage, production export/food chain support, and groundwater discharge/groundwater discharge. Up to 77 bird species have been observed at the Roundup wetland site.

## 4. REFERENCES

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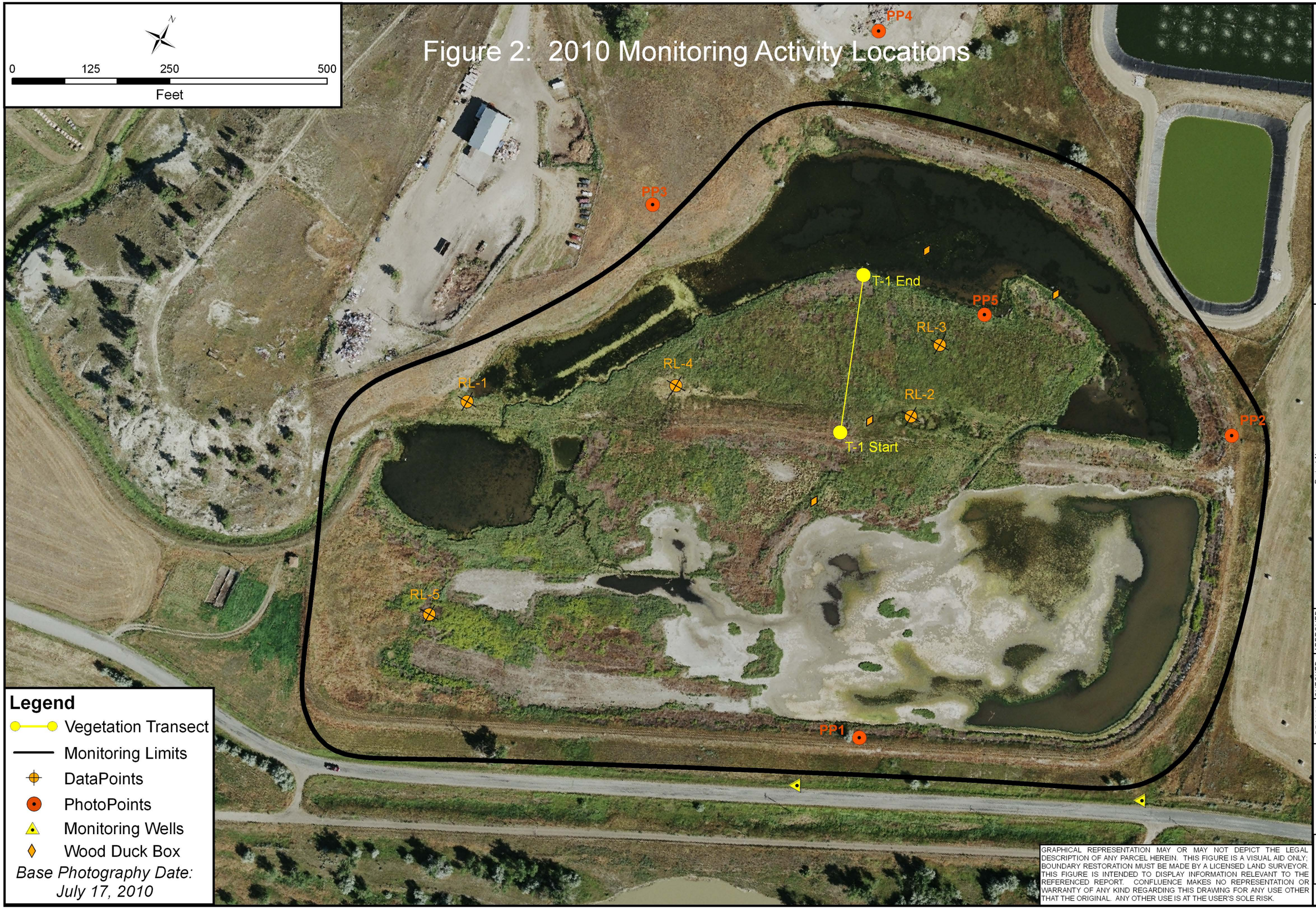
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## Appendix A

Figures 2 and 3

MDT Wetland Mitigation Monitoring
Roundup Wetland
Musselshell County, Montana

# Figure 2: 2010 Monitoring Activity Locations




LOCATION: Musselshell Co., MT

PROJECT NO: MDT.004

FILE: Roundup/Monitor2010.mxd

*Project Name*

MDT Roundup Lagoon Mitigation Site

*Drawing Title*

2010 Monitoring Activity Locations

| DRAWN | CHECKED | APPROVED |
|---|---|---|
| BCS | BV | JL |

SCALE: Noted

Drawn: October 21, 2010

PROJ MGR: B Sandefur

CONFLUENCE
consulting incorporated

Figure
2

REV -

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 THAT THE ORIGINAL. ANY OTHER USE IS AT THE USER'S SOLE RISK.

# Figure 3: 2010 Mapped Site Features

## Vegetation Community Types

1 Kochia scoparia/Chenopodium leptophyllum
3 Alopecurus arundinaceus
5 Agropyron cristatum/Kochia scoparia
6 Scirpus spp
7 Chenopodium spp/Rumex crispus
12 Cirsium arvense/Chenopodium leptophyllum
16 Chenopodium leptophyllum
17 Chenopodium leptophyllum/Descuraina sophia
19 Phalaris arundinacea
20 Scirpus maritimus/Hordeum jubatum
22 Agropyron spp.
23 Agropyron spp/Hordeum jubatum

## Acreages

| | |
|---|---|
| Project Area | 28.95 acres |
| Gross Wetlands | 20.16 acres |
| Open Water (24) | 5.56 acres |
| Mud Flat (25) | 4.84 acres |
| Net Wetland | 9.76 acres |

Noxious Weeds
Cirsium arvense
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
Open Water Boundary
*Base Photography Date: July 17, 2010*

N
0 125 250 500
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 THAT THE ORIGINAL. ANY OTHER USE IS AT THE USER'S SOLE RISK.

LOCATION: Musselshell Co., MT
PROJECT NO: MDT.004
FILE: Roundup/Veg2010.mxd

Project Name: MDT Roundup Lagoon Mitigation Site
Drawing Title: 2010 Mapped Site Features

| DRAWN | CHECKED | APPROVED |
|---|---|---|
| BCS | BV | JL |

SCALE: Noted
Drawn: October 21, 2010
PROJ MGR: B Sandefur

CONFLUENCE consulting incorporated

Figure 3

REV -

## Appendix B

2010 MDT Wetland Mitigation Site Monitoring Form
2010 USACE Wetland Determination Data Form
2010 MDT Wetland Assessment Form

MDT Wetland Mitigation Monitoring
Roundup Wetland
Musselshell County, Montana

## MDT WETLAND MITIGATION SITE MONITORING FORM

Project Site: Roundup Assessment Date/Time 8/6/2010 8:48:33 AM

Person(s) conducting the assessment: B. Sandefur

Weather: Clear & sunny, warm, 90 degrees Location: Roundup, MT

MDT District: 5 Milepost: 49

Legal Description: T 8N R 26E Section(s) 18

Initial Evaluation Date: 8/14/2001 Monitoring Year: 9 #Visits in Year: 1

Size of Evaluation Area: 22 (acres)

Land use surrounding wetland:

Sewer plant; waste recovery site; hayfields

### HYDROLOGY

Surface Water Source: Stormwater and treated water from treatment plant

Inundation: ☑ Average Depth: 3.5 **(ft)** Range of Depths: 0-6 **(ft)**

Percent of assessment area under inundation: 20 %

Depth at emergent vegetation-open water boundary: 1 **(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**:**

**Groundwater Monitoring Wells**

Record depth of water surface below ground

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:**

North lagoon receives direct hydro input from treatment plant and perennially inundated. South lagoon receives overflow from north and is intermittently inundated. Wetlands between the lagoons intermittently saturated but does not inundate.

## VEGETATION COMMUNITIES

**Site** Roundup

(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:** Kochia scoparia / Chenopodium leptophyllum

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Agropyron elongatum | 1 | Agropyron trachycaulum | 1 |
| Alopecurus arundinaceus | 0 | Asclepias spp. | 0 |
| Aster brachyactis | 0 | Chenopodium leptophyllum | 5 |
| Descurainia sophia | 0 | Elaeagnus angustifolia | 0 |
| Elymus cinereus | 0 | Hordeum jubatum | 0 |
| Kochia scoparia | 4 | Rumex spp. | 0 |
| Scirpus maritimus | 0 | | |

**Comments:**

**Community #** 3 **Community Type:** Alopecurus arundinaceus /

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Agropyron trachycaulum | 0 | Alopecurus arundinaceus | 4 |
| Aster brachyactis | 0 | Chenopodium spp. | 1 |
| Elaeagnus angustifolia | 0 | Hordeum jubatum | 1 |
| Phalaris arundinacea | 1 | Rumex spp. | 0 |
| Scirpus acutus | 0 | Scirpus maritimus | 0 |

**Comments:**

**Community #** 5 **Community Type:** Agropyron cristatum / Kochia scoparia

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Agropyron cristatum | 4 | Agropyron trachycaulum | 1 |
| Bromus japonicus | 2 | Chenopodium spp. | 4 |
| Cirsium arvense | 1 | Descurainia sophia | 1 |
| Elymus cinereus | 1 | Grindelia squarrosa | 1 |
| Helianthus annuus | 1 | Iva axillaris | 0 |
| Kochia scoparia | 4 | Melilotus officinalis | 1 |
| Rhus trilobata | 0 | Ribes aureum | 0 |
| Sisymbrium altissimum | 1 | | |

**Comments:**

**Community # 6 Community Type:** Scirpus spp. /

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Chenopodium spp. | 0 | Lemna minor | 1 |
| Scirpus acutus | 5 | Scirpus maritimus | 5 |
| Scirpus pungens | 5 | | |

**Comments:**

**Community # 7 Community Type:** Chenopodium spp. / Rumex crispus

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Alopecurus arundinaceus | 2 | Aster brachyactis | 0 |
| Chenopodium glaucum | 2 | Chenopodium leptophyllum | 4 |
| Cirsium arvense | 2 | Eleocharis palustris | 1 |
| Hordeum jubatum | 1 | Rumex crispus | 4 |
| Scirpus maritimus | 1 | | |

**Comments:**

**Community # 12 Community Type:** Cirsium arvense / Chenopodium leptophyllum

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Alopecurus arundinaceus | 1 | Asclepias speciosa | 1 |
| Aster brachyactis | 0 | Chenopodium leptophyllum | 3 |
| Cirsium arvense | 5 | Descurainia sophia | 1 |
| Hordeum jubatum | 1 | Polypogon monspeliensis | 1 |
| Sisymbrium altissimum | 1 | | |

**Comments:**

**Community # 16 Community Type:** Chenopodium leptophyllum /

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Bare Ground | 5 | Chenopodium leptophyllum | 3 |
| Kochia scoparia | 1 | | |

**Comments:**

**Community # 17 Community Type:** Chenopodium leptophyllum / Descuraina sophia

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Agropyron trachycaulum | 1 | Chenopodium leptophyllum | 4 |
| Cirsium arvense | 1 | Descurainia sophia | 4 |

**Comments:**

**Community # 19 Community Type:** Phalaris arundinacea /

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Phalaris arundinacea | 5 | | |

**Comments:**

**Community # 20 Community Type:** Scirpus maritimus / Hordeum jubatum

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Chenopodium leptophyllum | 1 | Cirsium arvense | 3 |
| Eleocharis palustris | 2 | Hordeum jubatum | 4 |
| Polypogon monspeliensis | 0 | Scirpus maritimus | 4 |
| Sisymbrium altissimum | 1 | Sonchus arvensis | 1 |

**Comments:**

**Community # 22 Community Type:** Agropyron spp. /

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Agropyron cristatum | 1 | Agropyron elongatum | 4 |
| Agropyron trachycaulum | 5 | Bromus japonicus | 2 |
| Hordeum jubatum | 3 | Kochia scoparia | 1 |

**Comments:**

**Community # 23 Community Type:** Agropyron spp. / Hordeum jubatum

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Agropyron elongatum | 3 | Agropyron trachycaulum | 3 |
| Alopecurus arundinaceus | 1 | Chenopodium leptophyllum | 0 |
| Cirsium arvense | 1 | Hordeum jubatum | 2 |
| Rumex crispus | 0 | Sisymbrium altissimum | 1 |

**Comments:**

## VEGETATION TRANSECTS

**Site:** Roundup Date: 3/6/2010 8:48:33 AM

**Transect Number:** 1 **Compass Direction from Start:** 14

**Interval Data:**

**Ending Station** 27 **Community Type:** Agropyron spp. /

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Agropyron elongatum | 3 | Agropyron trachycaulum | 4 |
| Elymus cinereus | 2 | Helianthus annuus | 0 |
| Kochia scoparia | 1 | | |

**Ending Station** 186 **Community Type:** Agropyron spp. / Hordeum jubatum

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Agropyron elongatum | 3 | Agropyron smithii | 1 |
| Agropyron trachycaulum | 3 | Cirsium arvense | 1 |
| Descurainia sophia | 4 | Hordeum jubatum | 2 |
| Kochia scoparia | 1 | | |

**Ending Station** 196 **Community Type:** Agropyron spp. /

| Species | Cover class | Species | Cover class |
|---|---|---|---|
| Agropyron elongatum | 2 | Agropyron trachycaulum | 1 |
| Bromus japonicus | 1 | Chenopodium hybridum | 4 |
| Cirsium arvense | 2 | Descurainia sophia | 4 |
| Hordeum jubatum | 1 | | |

Transect Notes:

## PLANTED WOODY VEGETATION SURVIVAL

Roundup

| Planting Type | #Planted | #Alive | Notes |
|---|---|---|---|
| willows | | | unknown planted, none observed alive |

**Comments**

Roundup

## WILDLIFE

### Birds

Were man-made nesting structures installed? Yes

If yes, type of structure: wood duck box

How many? 4

Are the nesting structures being used? Yes

Do the nesting structures need repairs? Yes

Nesting Structure Comments:

One of the existing wood duck structures leaning and unusable for nesting. Recommend setting post for nest boxes below frost line to prevent heaving. Two nest boxes with evidence of use.

| Species | #Observed | Behavior | Habitat |
|---|---|---|---|
| American Coot | 1 | | |
| Canada Goose | 2 | | |
| Killdeer | 12 | | |
| Mallard | 3 | | |
| Spotted Sandpiper | 4 | | |

**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 |
|---|---|---|---|---|---|
| No species recorded | | No | No | No | |

**Wildlife Comments:**

Roundup

## 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 |
|---|---|---|---|---|
| 5741 | | | 180 | pp3 |
| 5742 | | | 90 | pp4 |
| 5757 | | | 270 | pp2 |
| 5762 | | | 180 | pano 5762-5767 |
| 5775 | 46.448311 | -108.525558 | 0 | veg tran 1, end |
| 5776 | 46.4478 | -108.52523 | 350 | veg tran 1, start |
| 5826 | | | 0 | pp1 |
| 5828 | | | 90 | pp1 |
| 5831 | | | 180 | pp1 |

**Comments:**

## 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? Yes

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? Yes

If yes, are the structures working properly and in good working order? Yes

If no, describe the problems below.

## WETLAND DETERMINATION DATA FORM – Routine Weltand Delineation, 1987 COE Protocol

Project/Site: Roundup Lagoon | City/County: Musselshell | Sampling Date: 8/6/2010

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

Investigator(s): B. Sandefur | Section, Township, Range: S 18 T 8N R 26E

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

Subregion (LRR): LRR G | Lat: 46.4470833333333 | Long: -108.527426666667 | Datum:

Soil Map Unit Name: Water consociation

Do Normal Circumstances Exist on this site? Yes ☑

Is the site significantly disturbed (Atypical Situation)? Yes ☐

Is the area a potential Problem Area? Yes ☐

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

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

Remarks:

### VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | 0 | ☐ | 0 |
| 2. | 0 | ☐ | 0 |
| 3. | 0 | ☐ | 0 |
| 4. | 0 | ☐ | 0 |
| | 0 = Total Cover | | |
| **Sapling/Shrub Stratum** (Plot size: ) | | | |
| 1. | 0 | ☐ | 0 |
| 2. | 0 | ☐ | 0 |
| 3. | 0 | ☐ | 0 |
| 4. | 0 | ☐ | 0 |
| 5. | 0 | ☐ | 0 |
| | 0 = Total Cover | | |
| **Herb Stratum** (Plot size: 5ft) | | | |
| 1. Alopecurus arundinaceus | 100 | ☑ | FACW? |
| 2. Medicago sativa | 3 | ☐ | 0 |
| 3. | 0 | ☐ | 0 |
| 4. | 0 | ☐ | 0 |
| 5. | 0 | ☐ | 0 |
| 6. | 0 | ☐ | 0 |
| 7. | 0 | ☐ | 0 |
| 8. | 0 | ☐ | 0 |
| 9. | 0 | ☐ | 0 |
| 10. | 0 | ☐ | 0 |
| 11. | 0 | ☐ | 0 |
| | 103 = Total Cover | | |
| **Woody Vine Stratum** (Plot size: ) | | | |
| 1. | 0 | ☐ | 0 |
| 2. | 0 | ☐ | 0 |
| | 0 = Total Cover | | |

% Bare Ground in Herb Stratum 0

**Dominance Test worksheet:**

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

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

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

Dominance Test is >50% ☑

**Hydrophytic Vegetation Present?** Yes ☑ No ☐

Remarks:

*The indicator status for Alopecurus arundinaceus in Region 4 and Region 9 listed as NI on 1988 list. The "FACW?" indicator status was assigned to this plant on the National Indicator. Community considered hydrophytic.

## SOIL

Sampling Point: RL-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 |
|---|---|---|---|---|---|---|---|---|
| 0-5 | 10YR 5/2 | 95 | | | | | Clay Loam | OM inclusions, 10YR 2/1 |
| 5-12 | 10YR 4/1 | 90 | 10YR 2/1 | 3 | | 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:**

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☑ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Soils List
- ☐ Listed on National Soils List
- ☐ Other (explain in remarks)

Taxonomy Subgroup: NA

Confirm Mapped Type?: ☐

**Hydric Soil Present?** Yes ☑ No ☐

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators

- ☐ Innundated
- ☑ Saturated in upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage patterns in wetlands

Secondary Indicators (2 or more required)

- ☐ Oxidized Rhizospheres along Living Roots
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

**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): | 6 |

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

Remarks:

## WETLAND DETERMINATION DATA FORM – Routine Weltand Delineation, 1987 COE Protocol

Project/Site: Roundup Lagoon | City/County: Musselshell | Sampling Date: 8/6/2010

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

Investigator(s): B. Sandefur | Section, Township, Range: S 18 T 8N R 26E

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

Subregion (LRR): LRR G | Lat: 46.4479716666667 | Long: -108.52495 | Datum:

Soil Map Unit Name: Water consociation

Do Normal Circumstances Exist on this site? Yes ☑

Is the site significantly disturbed (Atypical Situation)? Yes ☐

Is the area a potential Problem Area? Yes ☐

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

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

Remarks:

### VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | 0 | ☐ | 0 |
| 2. | 0 | ☐ | 0 |
| 3. | 0 | ☐ | 0 |
| 4. | 0 | ☐ | 0 |
| | 0 = Total Cover | | |
| **Sapling/Shrub Stratum** (Plot size: ) | | | |
| 1. | 0 | ☐ | 0 |
| 2. | 0 | ☐ | 0 |
| 3. | 0 | ☐ | 0 |
| 4. | 0 | ☐ | 0 |
| 5. | 0 | ☐ | 0 |
| | 0 = Total Cover | | |
| **Herb Stratum** (Plot size: 5ft) | | | |
| 1. Scirpus acutus | 100 | ☑ | OBL |
| 2. | 0 | ☐ | 0 |
| 3. | 0 | ☐ | 0 |
| 4. | 0 | ☐ | 0 |
| 5. | 0 | ☐ | 0 |
| 6. | 0 | ☐ | 0 |
| 7. | 0 | ☐ | 0 |
| 8. | 0 | ☐ | 0 |
| 9. | 0 | ☐ | 0 |
| 10. | 0 | ☐ | 0 |
| 11. | 0 | ☐ | 0 |
| | 100 = Total Cover | | |
| **Woody Vine Stratum** (Plot size: ) | | | |
| 1. | 0 | ☐ | 0 |
| 2. | 0 | ☐ | 0 |
| | 0 = Total Cover | | |

% Bare Ground in Herb Stratum 0

**Dominance Test worksheet:**

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

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

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

Dominance Test is >50% ☑

**Hydrophytic Vegetation Present?** Yes ☑ No ☐

Remarks:

## SOIL

Sampling Point: RL-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 |
|---|---|---|---|---|---|---|---|---|
| 0-3 | 10YR 4/2 | 95 | 10YR 4/6 | 3 | C | M | Silt Loam | |
| 3-13 | 10YR 4/1 | 90 | 10YR 4/6 | 10 | 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:**

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☑ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Soils List
- ☐ Listed on National Soils List
- ☐ Other (explain in remarks)

Taxonomy Subgroup: NA

Confirm Mapped Type?: ☐

**Hydric Soil Present?** Yes ☑ No ☐

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators

- ☐ Innundated
- ☑ Saturated in upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☑ Drainage patterns in wetlands

Secondary Indicators (2 or more required)

- ☐ Oxidized Rhizospheres along Living Roots
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☑ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

**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): 3

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

Remarks:

## WETLAND DETERMINATION DATA FORM – Routine Weltand Delineation, 1987 COE Protocol

Project/Site: Roundup Lagoon | City/County: Musselshell | Sampling Date: 8/6/2010

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

Investigator(s): B. Sandefur | Section, Township, Range: S 18 T 8N R 26E

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

Subregion (LRR): LRR G | Lat: 46.4483066666667 | Long: -108.524963333333 | Datum:

Soil Map Unit Name: Water consociation

Do Normal Circumstances Exist on this site? Yes ☑

Is the site significantly disturbed (Atypical Situation)? Yes ☐

Is the area a potential Problem Area? Yes ☐

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

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

Remarks:

### VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | 0 | ☐ | 0 |
| 2. | 0 | ☐ | 0 |
| 3. | 0 | ☐ | 0 |
| 4. | 0 | ☐ | 0 |
| | 0 = Total Cover | | |
| **Sapling/Shrub Stratum** (Plot size: ) | | | |
| 1. | 0 | ☐ | 0 |
| 2. | 0 | ☐ | 0 |
| 3. | 0 | ☐ | 0 |
| 4. | 0 | ☐ | 0 |
| 5. | 0 | ☐ | 0 |
| | 0 = Total Cover | | |
| **Herb Stratum** (Plot size: 5ft) | | | |
| 1. Agropyron trachycaulum | 35 | ☑ | FAC |
| 2. Lactuca serriola | 5 | ☐ | FACU |
| 3. Agropyron elongatum | 45 | ☑ | FAC |
| 4. Rumex crispus | 5 | ☐ | FACW |
| 5. Sisymbrium altissimum | 5 | ☐ | UPL |
| 6. Descurainia sophia | 5 | ☐ | 0 |
| 7. | 0 | ☐ | 0 |
| 8. | 0 | ☐ | 0 |
| 9. | 0 | ☐ | 0 |
| 10. | 0 | ☐ | 0 |
| 11. | 0 | ☐ | 0 |
| | 100 = Total Cover | | |
| **Woody Vine Stratum** (Plot size: ) | | | |
| 1. | 0 | ☐ | 0 |
| 2. | 0 | ☐ | 0 |
| | 0 = Total Cover | | |

% Bare Ground in Herb Stratum 0

**Dominance Test worksheet:**

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

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

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

Dominance Test is >50% ☑

**Hydrophytic Vegetation Present?** Yes ☑ No ☐

Remarks:

## SOIL

Sampling Point: RL-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 4/6 | 60 | 10YR 4/1 | 40 | D | M | Loam | |
| 6-13 | 10YR 4/1 | 65 | 10YR 4/6 | 35 | C | M | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[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:**

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☑ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Soils List
- ☐ Listed on National Soils List
- ☐ Other (explain in remarks)

Taxonomy Subgroup: NA

Confirm Mapped Type?: ☐

**Hydric Soil Present?** Yes ☑ No ☐

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators

- ☐ Innundated
- ☑ Saturated in upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage patterns in wetlands

Secondary Indicators (2 or more required)

- ☐ Oxidized Rhizospheres along Living Roots
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

**Field Observations:**

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

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

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

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

Remarks:

## WETLAND DETERMINATION DATA FORM – Routine Weltand Delineation, 1987 COE Protocol

Project/Site: Roundup Lagoon | City/County: Musselshell | Sampling Date: 8/6/2010

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

Investigator(s): B. Sandefur | Section, Township, Range: S 18 T 8N R 26E

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

Subregion (LRR): LRR G | Lat: 46.447605 | Long: -108.526306666667 | Datum:

Soil Map Unit Name: Water consociation

Do Normal Circumstances Exist on this site? Yes ☑

Is the site significantly disturbed (Atypical Situation)? Yes ☐

Is the area a potential Problem Area? Yes ☐

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

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

Remarks:

### VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | 0 | ☐ | 0 |
| 2. | 0 | ☐ | 0 |
| 3. | 0 | ☐ | 0 |
| 4. | 0 | ☐ | 0 |
| | 0 = Total Cover | | |
| **Sapling/Shrub Stratum** (Plot size: ) | | | |
| 1. | 0 | ☐ | 0 |
| 2. | 0 | ☐ | 0 |
| 3. | 0 | ☐ | 0 |
| 4. | 0 | ☐ | 0 |
| 5. | 0 | ☐ | 0 |
| | 0 = Total Cover | | |
| **Herb Stratum** (Plot size: 5ft) | | | |
| 1. Hordeum jubatum | 50 | ☑ | FACW |
| 2. Puccinellia nuttalliana | 40 | ☑ | OBL |
| 3. Scirpus maritimus | 15 | ☐ | NI |
| 4. Alopecurus arundinaceus | 15 | ☐ | NI |
| 5. | 0 | ☐ | 0 |
| 6. | 0 | ☐ | 0 |
| 7. | 0 | ☐ | 0 |
| 8. | 0 | ☐ | 0 |
| 9. | 0 | ☐ | 0 |
| 10. | 0 | ☐ | 0 |
| 11. | 0 | ☐ | 0 |
| | 120 = Total Cover | | |
| **Woody Vine Stratum** (Plot size: ) | | | |
| 1. | 0 | ☐ | 0 |
| 2. | 0 | ☐ | 0 |
| | 0 = Total Cover | | |

% Bare Ground in Herb Stratum 0

**Dominance Test worksheet:**

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

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

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

Dominance Test is >50% ☑

**Hydrophytic Vegetation Present?** Yes ☑ No ☐

Remarks:

## SOIL

Sampling Point: RL-4

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

| Depth (inches) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-16 | 5G 4/1 | 95 | 10YR 4/6 | 3 | C | M | Muck | |

[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:**

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☑ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Soils List
- ☐ Listed on National Soils List
- ☐ Other (explain in remarks)

Taxonomy Subgroup: NA

Confirm Mapped Type?: ☐

**Hydric Soil Present?** Yes ☑ No ☐

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators

- ☐ Innundated
- ☑ Saturated in upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage patterns in wetlands

Secondary Indicators (2 or more required)

- ☐ Oxidized Rhizospheres along Living Roots
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☑ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

**Field Observations:**

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

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

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

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

Remarks:

## WETLAND DETERMINATION DATA FORM – Routine Weltand Delineation, 1987 COE Protocol

Project/Site: Roundup Lagoon | City/County: Musselshell | Sampling Date: 8/6/2010

Applicant/Owner: MDT | State: MT | Sampling Point: RL-5

Investigator(s): B. Sandefur | Section, Township, Range: S 18 T 8N R 26E

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

Subregion (LRR): LRR G | Lat: 46.4461416666667 | Long: -108.526995 | Datum:

Soil Map Unit Name: Water consociation

Do Normal Circumstances Exist on this site? Yes ☑

Is the site significantly disturbed (Atypical Situation)? Yes ☐

Is the area a potential Problem Area? Yes ☐

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

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

Remarks:

### VEGETATION – Use scientific names of plants.

| Tree Stratum (Plot size: ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | 0 | ☐ | 0 |
| 2. | 0 | ☐ | 0 |
| 3. | 0 | ☐ | 0 |
| 4. | 0 | ☐ | 0 |
| | 0 = Total Cover | | |
| **Sapling/Shrub Stratum** (Plot size: ) | | | |
| 1. | 0 | ☐ | 0 |
| 2. | 0 | ☐ | 0 |
| 3. | 0 | ☐ | 0 |
| 4. | 0 | ☐ | 0 |
| 5. | 0 | ☐ | 0 |
| | 0 = Total Cover | | |
| **Herb Stratum** (Plot size: 5ft) | | | |
| 1. Descurainia sophia | 40 | ☑ | NL |
| 2. Chenopodium leptophyllum | 30 | ☑ | UPL |
| 3. Bromus japonicus | 15 | ☐ | FACU |
| 4. | 0 | ☐ | 0 |
| 5. | 0 | ☐ | 0 |
| 6. | 0 | ☐ | 0 |
| 7. | 0 | ☐ | 0 |
| 8. | 0 | ☐ | 0 |
| 9. | 0 | ☐ | 0 |
| 10. | 0 | ☐ | 0 |
| 11. | 0 | ☐ | 0 |
| | 85 = Total Cover | | |
| **Woody Vine Stratum** (Plot size: ) | | | |
| 1. | 0 | ☐ | 0 |
| 2. | 0 | ☐ | 0 |
| | 0 = Total Cover | | |

% Bare Ground in Herb Stratum 0

**Dominance Test worksheet:**

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

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

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

Dominance Test is >50% ☐

**Hydrophytic Vegetation Present?** Yes ☐ No ☑

Remarks:

## SOIL

Sampling Point: RL-5

**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 | 5G 3/1 | 90 | 10YR 6/4 | 10 | C | M | Muck | |

[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:**

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions
- ☑ Gleyed or Low-Chroma Colors
- ☐ Concretions
- ☐ High Organic Content in Surface Layer in Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on Local Soils List
- ☐ Listed on National Soils List
- ☐ Other (explain in remarks)

Taxonomy Subgroup: NA

Confirm Mapped Type?: ☐

**Hydric Soil Present?** Yes ☑ No ☐

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators

- ☐ Innundated
- ☐ Saturated in upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage patterns in wetlands

Secondary Indicators (2 or more required)

- ☐ Oxidized Rhizospheres along Living Roots
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

**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 ☑

Remarks: No soil sat within 12in

# MDT Montana Wetland Assessment Form (revised March 2008)

**1. Project name** Roundup Wetlands **2. MDT project#** **Control#**

**3. Evaluation Date** 8/6/2010 **4. Evaluators** B. Sandefur **5. Wetland/Site# (s)** Roundup Wetlands

**6. Wetland Location(s):** **T** 8N **R** 26E **Sec1** 18 **T** **R** **Sec2**

**Approx Stationing or Mileposts**

**Watershed** 10-Musselshell **County** Musselshell

**7. Evaluating Agency** Confluence for MDT

**8. Wetland size acres** 20.16

**Purpose of Evaluation**

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

☐ **Wetlands potentially affected by MDT project**

**9. Assesssment area (AA) size (acres)** 20.16

☐ **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 | Diked | Seasonal/Intermittant | 60 |
| Depressional | Unconsolidated Bottom | Impounded | Permanent/Perennial | 15 |
| Depressional | Aquatic Bed | Diked | 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)**

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

Cirsium arvense

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

Sewage treatment plant, garbage transfer station, stockpile for roadwork refuse (concrete, etc.)

**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:**

## 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

**No usable habitat** ☑ S

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

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

**Sources for documented use** USFWS

**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

**Incidental habitat (list species)** ◉ D ◯ S Rana sp., likely Northern Leopard (S2) observed during prior site visit

**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** MDT biologist, MTNHP

**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]):

- [x] 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** A total of 77 avian species have been observed within the Roundup wetland. Abundant waterfowl and shorebird usage observed throughout open water and mudflat habitat during site visit in 2010.

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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 [x] **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**

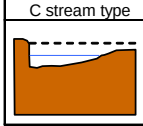
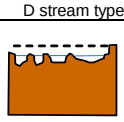
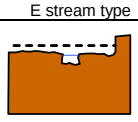
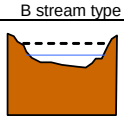
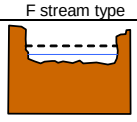
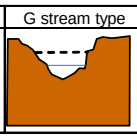
**iii. Final Score and Rating:** _____ **Comments:**

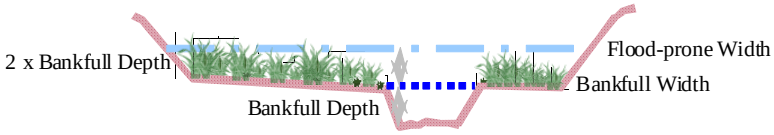
---

**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:**

---

**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:**

**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* | 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:** Stormwater from the city of Roundup enters the wetland site, it is one of the two major sources of hydrology, the other being tre

**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:**

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

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

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

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

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

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

*a) Is there an average ≥ 50 foot-wide vegetated upland buffer around ≥ 75% of the AA circumference?* **Y** ◉ **N** ○ *If yes, add 0.1 to the score in **ii** above and adjust rating accordingly:* **Modified Rating** .8H

**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):** Roundup Wetlands

| 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 | 0 | 1 | 0 | ☐ |
| B. MT Natural Heritage Program Species Habitat | L | .2 | 1 | 4.032 | ☐ |
| C. General Wildlife Habitat | H | .9 | 1 | 18.144 | ☑ |
| D. General Fish Habitat | NA | 0 | 0 | 0 | ☐ |
| E. Flood Attenuation | M | .5 | 1 | 10.08 | ☐ |
| F. Short and Long Term Surface Water Storage | H | 1 | 1 | 20.16 | ☐ |
| G. Sediment/Nutrient/Toxicant Removal | M | .7 | 1 | 14.112 | ☑ |
| H. Sediment/Shoreline Stabilization | L | .3 | 1 | 6.048 | ☐ |
| I. Production Export/Food Chain Support | H | .8 | 1 | 16.128 | ☑ |
| J. Groundwater Discharge/Recharge | H | 1 | 1 | 20.16 | ☑ |
| K. Uniqueness | L | .3 | 1 | 6.048 | ☐ |
| L. Recreation/Education Potential (bonus points) | H | .2 | NA | 4.032 | ☐ |
| Totals: | | 5.9 | 10 | 118.944 | |
| Percent of Possible Score | | | **59** % | | |

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

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

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

☐

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

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

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

# Appendix C

2010 Project Area Photographs

MDT Wetland Mitigation Monitoring
Roundup Wetland
Musselshell County, Montana



**Photo Point 1**
**Bearing:** North

**Location:** Southern project area
**Taken in 2008**



**Photo Point 1**
**Bearing:** North

**Location:** Southern project area
**Taken in 2010**



**Photo Point 1**
**Bearing:** South

**Location:** South boundary
**Taken in 2008**



**Photo Point 1**
**Bearing:** South

**Location:** South boundary
**Taken in 2010**



**Photo Point 1**
**Bearing:** East

**Location:** Along dike
**Taken in 2008**



**Photo Point 1**
**Bearing:** East

**Location:** Along dike
**Taken in 2010**



**Photo Point 2**
**Bearing:** West

**Location:** East edge of project
**Taken in 2008**



**Photo Point 2**
**Bearing:** West

**Location:** East edge of project
**Taken in 2010**



**Photo Point 3**
**Bearing:** South

**Location:** Northern cell
**Taken in 2008**



**Photo Point 3**
**Bearing:** South

**Location:** Northern cell
**Taken in 2010**



**Photo Point 4**
area

**Location:** Northern project



**Photo Point 4**
area

**Location:** Northern project



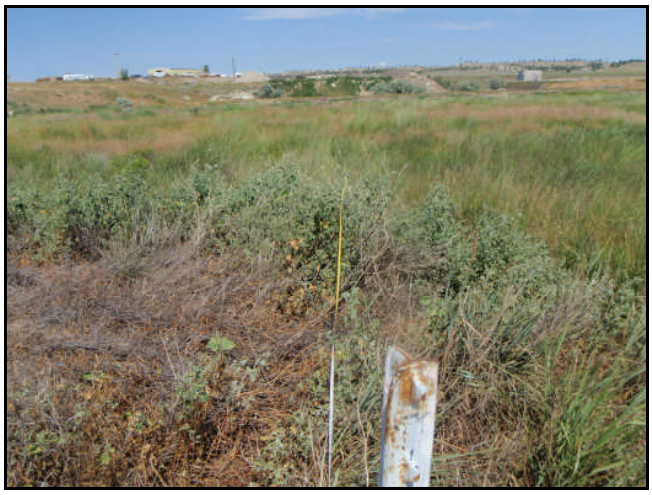
**Photo Point 5**
**Bearing:** North

**Location:** South side of north cell
**Taken in 2010**



**T-1 Start**
**Bearing:** North

**Location:** NA
**Taken in 2008**



**T-1 Start**
**Bearing:** North

**Location:** Veg Com 22
**Taken in 2010**



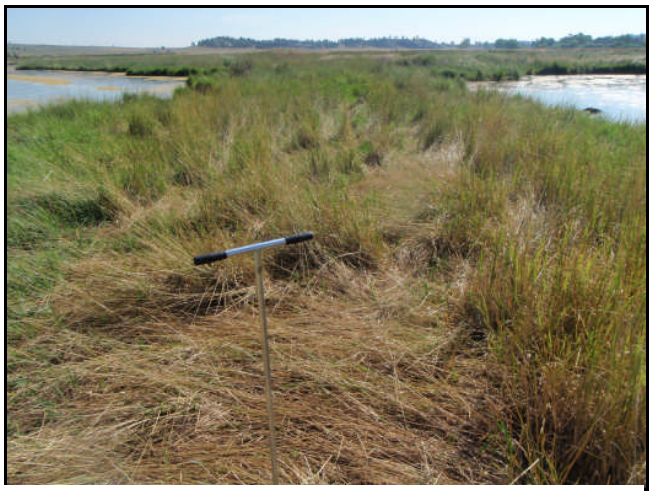
**T-1 End**
**Bearing:** South

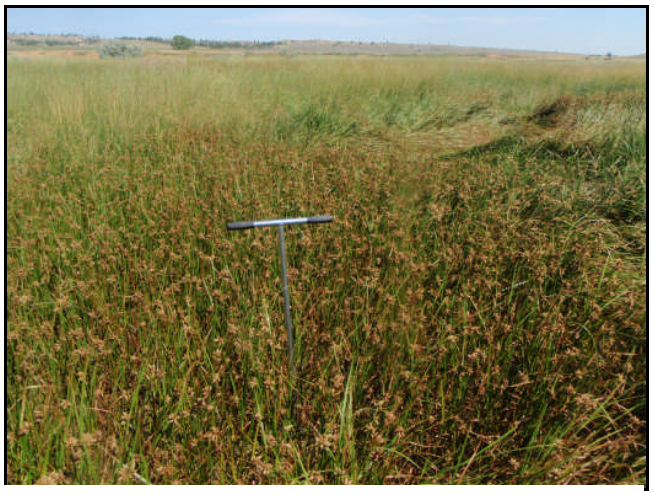
**Location:** NA
**Taken in 2008**



**T-1 End**
**Bearing:** South

**Location:** Veg Com 22
**Taken in 2010**





**Data Point 1** **Location:** RL-1
**Bearing:** East **Taken in 2010**



**Data Point 3** **Location:** RL-3
**Bearing:** North **Taken in 2010**



**Data Point 4** **Location:** RL-4
**Bearing:** Southeast **Taken in 2010**



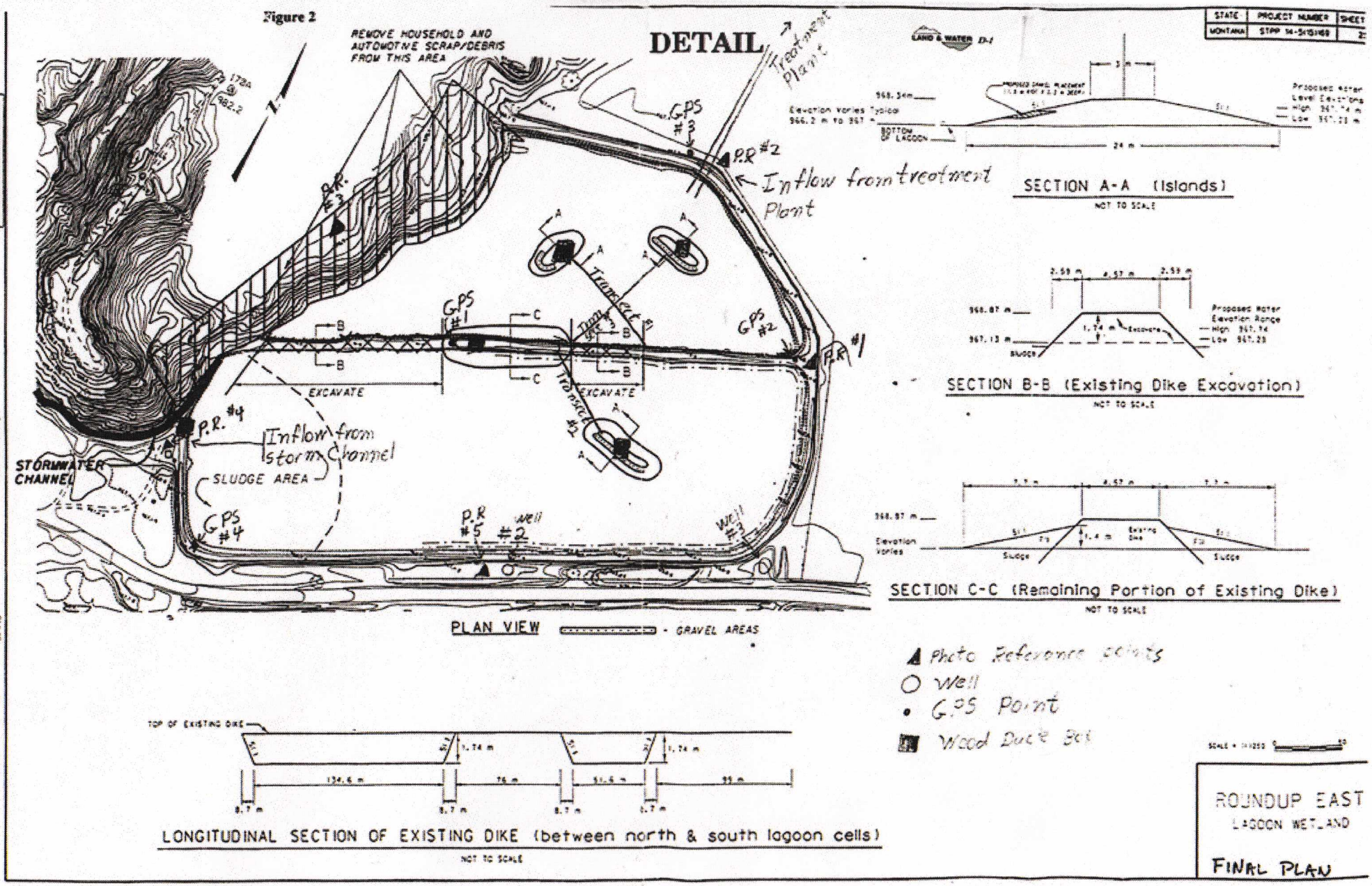
**Data Point 5** **Location:** RL-5
**Bearing:** East **Taken in 2010**

## Appendix D

Project Plan Sheet

MDT Wetland Mitigation Monitoring
Roundup Wetland
Musselshell County, Montana

Figure 2


DETAIL
REMOVE HOUSEHOLD AND AUTOMOTIVE SCRAP/DEBRIS FROM THIS AREA
Treatment Plant
GPS #3
P.R #2
Inflow from treatment Plant
P.R #3
GPS #1
GPS #2
P.R #1
Transect #1
Transect #2
EXCAVATE
EXCAVATE
P.R #4
Inflow from storm Channel
STORMWATER CHANNEL
SLUDGE AREA
GPS #4
P.R #5
well #2
well #3
PLAN VIEW
- GRAVEL AREAS
Photo Reference points
Well
GPS Point
Wood Duck Box
SECTION A-A (Islands)
NOT TO SCALE
SECTION B-B (Existing Dike Excavation)
NOT TO SCALE
SECTION C-C (Remaining Portion of Existing Dike)
NOT TO SCALE
TOP OF EXISTING DIKE
LONGITUDINAL SECTION OF EXISTING DIKE (between north & south lagoon cells)
NOT TO SCALE
ROUNDUP EAST
LAGOON WETLAND
FINAL PLAN

D-1