MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2007

Selkirk Wetland Mitigation Reserve
Two Dot, Montana

Prepared for:

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

Prepared by:

POST, BUCKLEY, SCHUH, AND JERNIGAN
801 North Last Chance Gulch, Suite 101
Helena, MT 59601-3360

December 2007

PBS&J Project No: B43088.00 - 0512

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1.0 INTRODUCTION

This annual report summarizes methods and results from the first year of monitoring at the Selkirk Wetland Mitigation Reserve. The wetland mitigation site is located in Wheatland County, Montana, near the community of Two Dot, northeast quarter of Section 9, Township 8 North, Range 12 East (**Figure 1**). Elevation is approximately 4,640 feet above sea level.

The Selkirk mitigation site was constructed by a private party on private land during the winter of 2006/2007, with the intent of providing the Montana Department of Transportation (MDT) wetland mitigation credits (via a credit purchase agreement) prior to Highway 12 road construction in Wheatland County (Watershed #10). The wetland site is intended to provide 60.4 acres of mitigation credit (after subtracting 0.4 acre of wetland fill) and a total of 71.5 wetland acres comprised of herbaceous wet meadow (60.1 acres), scrub/shrub (10.0 acres) and open water (1.4 acres). Upland buffer (2.9 acres) along portions of the wetland circumference, when added to the wetland acreage, comprise a 74.4-acre wetland reserve easement (Oasis Environmental 2006a and 2006b; Romig 2007). An as-built planview is provided in **Appendix D**.

Four different crediting areas were developed, each with their own specific performance standards and mitigation ratios. Credit ratios vary from 1:1 to 5:1 for the four types of mitigation: rehabilitation, 1.5:1; re-establishment and creation, 1:1; enhancement, 3:1; and, upland buffer, 5:1. Final ratios will be determined by the US Army Corps of Engineers (COE) and will be based on the achievement of performance standards.

2.0 METHODS

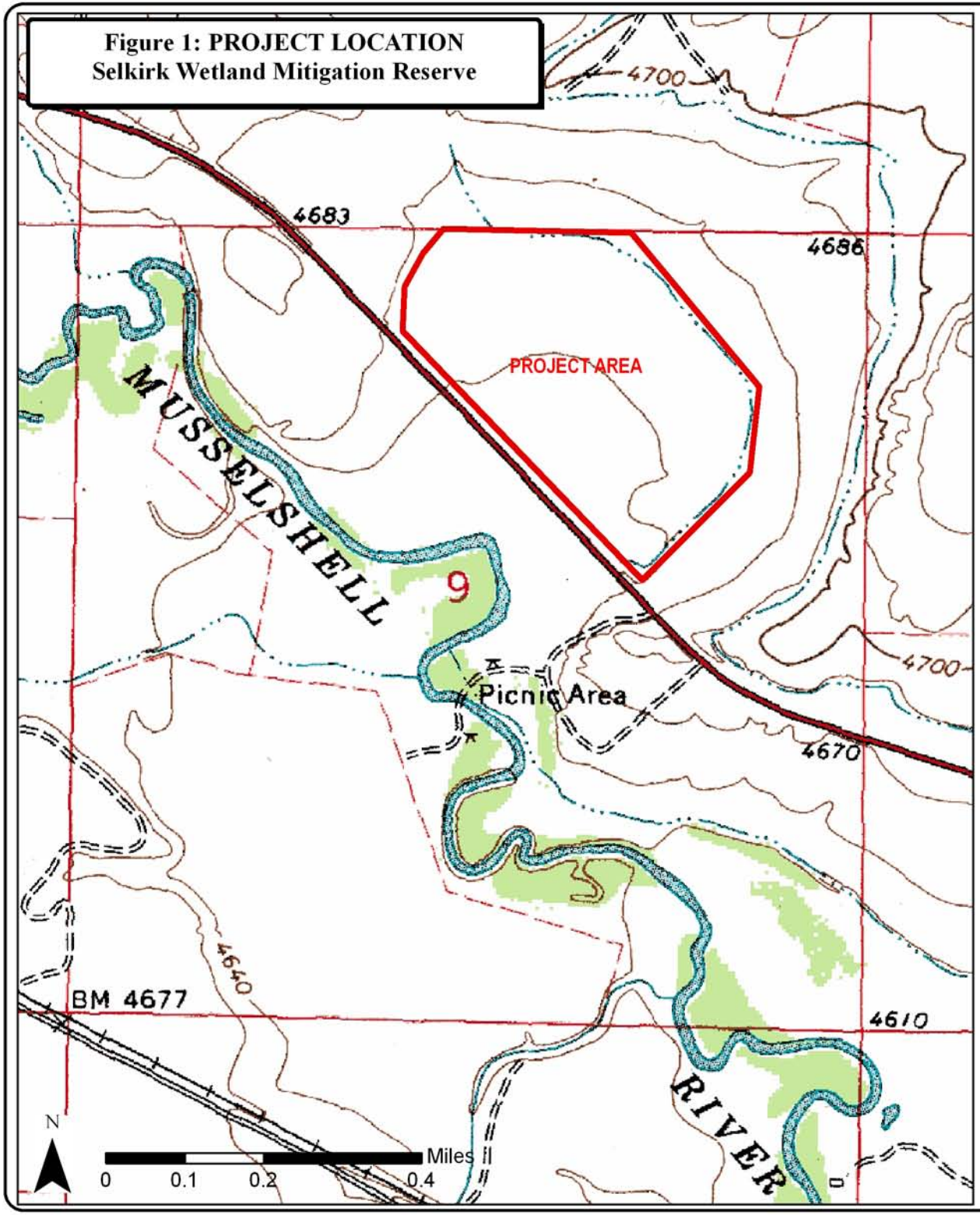
2.1 Monitoring Dates and Activities

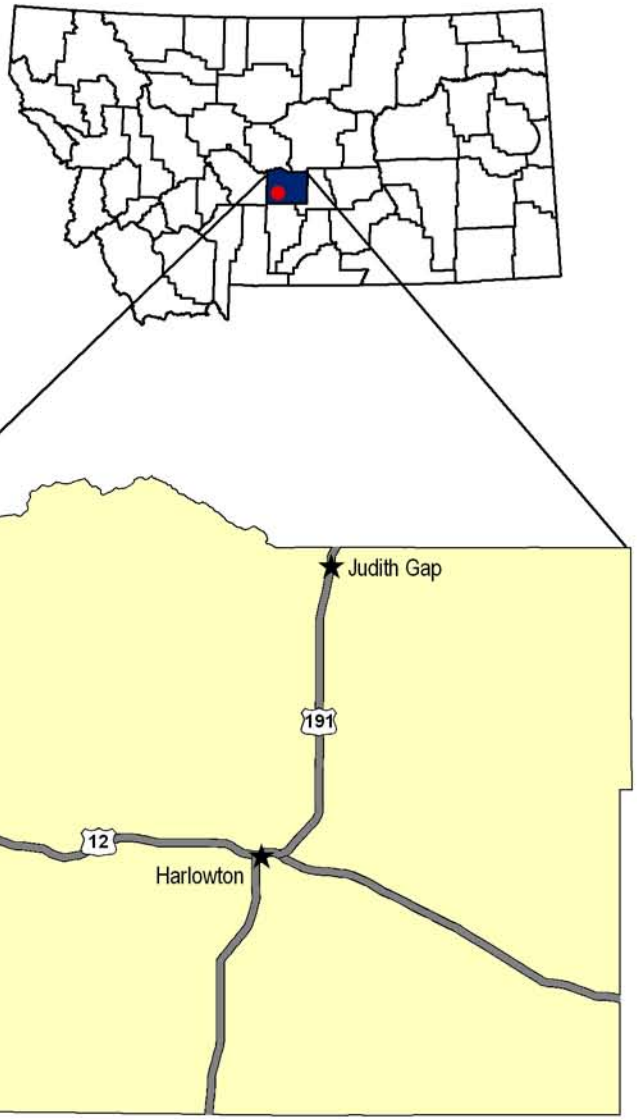
The Selkirk Wetland Mitigation Reserve was monitored on August 22nd and 31st of 2007. All information within the Wetland Mitigation Site Monitoring Form (**Appendix B**) was collected at this time. Activities and information conducted/collected included: wetland delineation; wetland/open water boundary mapping; vegetation community mapping; vegetation transects; soils data; hydrology data; bird and general wildlife use; photograph points; GPS data points; functional assessment; and maintenance assessment of any inflow/outflow structures (non-engineering).

2.2 Hydrology

Wetland hydrology indicators were recorded using procedures outlined in the COE 1987 Wetland Delineation Manual (Environmental Laboratory 1987). Hydrology data were recorded on the Routine Wetland Delineation Data Form (**Appendix B**) at each wetland determination point. Precipitation data for January through July, 2007 were compared to the January through July 1948 - 2007 average (WRCC 2007).

Figure 1: PROJECT LOCATION
Selkirk Wetland Mitigation Reserve





Project No: B43088.00 0512
Date: November 2007
Location: T8N, R12E, section 9
Project Manager: Jeff Berglund
Drawn: R. Schreiner

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All additional hydrologic data were recorded on the Wetland Mitigation Site Monitoring Form (**Appendix B**). The boundary between emergent vegetation and open water was mapped on the aerial photograph (**Figure 3** in **Appendix A**). There are several groundwater monitoring wells at this site; however, the project developer is performing the well monitoring tasks.

2.3 Vegetation

General vegetation types were delineated on an aerial photograph during the site visit (**Figure 3** in **Appendix A**). Coverage of the dominant species in each community type is listed on the Wetland Mitigation Site Monitoring Form (**Appendix B**). A comprehensive plant species list for the entire site was compiled.

A 10-foot wide belt transect was established in an area that would illustrate the progression of community development over time (**Figure 2** in **Appendix A**). Within the belt transect percent cover was estimated for each vegetative species for each vegetation community encountered using the following values: + (<1%); 1 (1-5%); 2 (6-10%); 3 (11-20%); 4 (21-50%); and 5 (>50%). The location of the transect is shown on **Figure 2** in **Appendix A**. Percent cover for each species was recorded on the vegetation transect form (**Appendix B**). Transect ends were marked with wooden stakes and their locations recorded on the vegetation map. Photos of the transect were taken from both ends during the site visit.

2.4 Soils

Soils were evaluated during the site visit according to the procedure outlined in the COE 1987 Wetland Delineation Manual. Soil data were recorded for each wetland determination point on the COE Routine Wetland Delineation Data Form (**Appendix B**). The most current terminology used by NRCS was used to describe hydric soils (USDA 2007).

2.5 Wetland Delineation

A wetland delineation was conducted within the monitoring area according to the 1987 COE Wetland Delineation Manual. Wetland and upland areas within the monitoring area were investigated for the presence of wetland hydrology, hydrophytic vegetation and hydric soils. The indicator status of vegetation was derived from the National List of Plant Species that Occur in Wetlands: Northwest (Region 9) (Reed 1988). The information was recorded on the COE Routine Wetland Delineation Forms (**Appendix B**). The wetland, upland and open water boundaries were used to calculate the wetland area. The wetland credit area map was superimposed on the 2007 wetland delineation map to assess the acres of creditable wetland that had developed up to the date of investigation.

2.6 Mammals, Reptiles, and Amphibians

Mammal, reptile, and amphibian species observations were recorded on the Wetland Mitigation Site Monitoring Form during the site visit (**Appendix B**). Indirect use indicators were also recorded including tracks, scat and burrows. A comprehensive wildlife species list for the entire site was compiled and will be updated as new species are encountered.

2.7 Birds

Bird observations were recorded during the site visit according to the established bird survey protocol (**Appendix E**). A general, qualitative bird list has been compiled using these observations.

2.8 Macroinvertebrates

One macroinvertebrate sample was collected on the site during the monitoring event. The approximate sampling location is indicated on **Figure 2** in **Appendix A**.

2.9 Functional Assessment

A functional assessment form was completed in 2007 for the Selkirk Wetland Mitigation Reserve using the 1999 MDT Montana Wetland Assessment Method (Berglund 1999). Field data necessary for this assessment were collected on a condensed data sheet. The remainder of the assessment was completed in the office (**Appendix B**).

2.10 Photographs

Photographs were taken showing the current land use surrounding the mitigation site, the wetland buffer, the monitored area, and the vegetation transect (**Appendix C**). A description and direction for each photograph were recorded on the wetland monitoring form. During the 2007 monitoring season, each photo-point was recorded with a GPS. The approximate locations are shown on **Figure 2** in **Appendix A**. All photographs were taken using a digital camera.

2.11 GPS Data

During the 2007 initial monitoring season, survey points were collected using a resource grade Magellan Mobilemapper hand-held GPS unit (**Appendix E**). Points collected included: the vegetation transect beginning and ending locations; photograph locations; and the delineated wetland boundary. In addition, survey points were collected at several landmarks recognizable on the air photo for purposes of line fitting to the topography. No additional GPS data were collected in 2007.

2.12 Maintenance Needs

Four Wood Duck and eight Mountain Bluebird boxes are located within the mitigation site; these boxes were checked for repair needs. The outflow structures were checked for obstructions and other problems.

3.0 RESULTS

3.1 Hydrology

The source of hydrology for the wetland mitigation site is primarily groundwater. The site was historically ditched to convey runoff and seepage from adjacent irrigation ditches and to lower the groundwater table. The 8-Foot Ditch wrapped around the north and east edges of the current site boundary, and the 4-Foot Ditch in the southeast quarter branched toward the north and northeast. The 8- and 4-Foot Ditches flowed south under Highway 12 and through the Montana Fish, Wildlife and Parks Selkirk Fishing Access area. The Coulee Ditch entered the northwest edge of the site and conveyed surface water into the site where it crossed several small ditches; water was further conveyed into the roadside ditch to the southwest (Oasis 2006b).

A primary objective of the wetland design was to fill the 8-Foot, 4-Foot and shallow Coulee ditch system, and to reconstruct three shallow, meandering, berm-checked swales to spread and slow the flow of water. In addition, three shallow ponds were constructed. Each of the swales intersect in one additional open water area that was already partially vegetated with emergent species at the time of the investigation. Lateral grade checks were constructed in the northwest area of the site to collect and spread water from the coulee. Approximately 50% of the area between the lateral grade checks was inundated with shallow water (<4 inches). The area north of the northern-most grade check was excavated to create a shallow water and emergent vegetation area, which was also 50% inundated at the time of the investigation.

From January through July, the historic average precipitation was 8.93 inches (WRCC 2007). During 2007, precipitation during this period was 8.94 inches or 100% of the average.

3.2 Vegetation

Vegetation species identified at the site are presented in **Table 1** and in the Wetland Mitigation Site Monitoring Form (**Appendix B**). Transect data trends over time are summarized in tabular format (**Table 2**) and illustrated graphically (**Charts 1** and **2**). The communities include: Type 1-*Typha latifolia/Alopecurus arundinaceus*, Type 2-*Hordeum jubatum/Alopecurus arundinaceus*, Type 3-*Carex nebrascensis/Juncus balticus*, Type 4-*Eleocharis palustris*/Mud, Type 5-*Bromus inermis*, Type 6-*Puccinellia* sp., Type 7-*Festuca arundinacea/Poa juncifolia*, Type 8-*Distichlis stricta/Suaeda calcioliformis*, Type 9-*Alopecurus arundinaceus/Juncus balticus*, Type 10-*Eleocharis palustris/Typha latifolia/Hordeum jubatum*, Type 11-*Alopecurus arundinaceus/Juncus balticus/Festuca arundinacea*, Type 12-*Juncus hallii*, and Type 13-*Salix exigua*. Dominant species within each community are listed on the monitoring form (**Appendix B**).

Several species of wetland emergent, shrub and trees were planted throughout the site, in addition to several seed mixes. Quantities of emergent species ranged from 50 to over 10,000 individuals (Oasis 2006b, Romig 2007). Woody species totaled 4,750 stems, planted within a netted browse guard and weed mat (Oasis 2006a). Typical of the first season, many of the woody plants had lost their leaves, therefore survivorship was indeterminate. It appeared as though at least 60% of the woody species were alive at the time of the investigation.

Table 1: ***2007 Selkirk Wetland Mitigation Reserve vegetation species list.***

Scientific Name[1]	Region 9 North West Wetland Indicator Status[1]
Agropyron repens	FACU
Agrostis alba	FACW
Alopecurus arundinacea	No Listing
Aster subspicatus	FACW
Atriplex patula	FACW
Bromus inermis	No Listing
Carex nebrascensis	OBL
Carex praegracilis	FACW
Chenopodium sp.	(FAC-FACW)
Cirsium arvense	FACU+
Cornus sericea (planted)	FACW
Distichlis stricta	FAC+
Eleocharis palustris	OBL
Festuca arundinacea	FACU-
Glycyrrhiza lepitdota	FAC+
Haplopappus lancceolatus	FAC
Hordeum jubatum	FAC+
Juncus balticus	OBL
Juncus hallii (planted)	FAC
Juncus tenuis	FAC
Mentha spp.	(FACW)
Plantago major	FAC+
Poa juncifolia	FACU+
Populus deltoides[2]	FACW
Puccinellia spp.	(FACW)
Ranunculus gmelinii	FACW
Ranunculus spp.	(FACU-FACW)
Salicornia rubra	OBL
Salix exigua[2]	OBL
Scirpus acutus	OBL
Scirpus maritimus	OBL
Scirpus validus/pallidus	OBL
Sonchus arvensis	FACU+
Spartina pectinata	OBL
Suaeda calceoliformis (S. *depressa*)	FACW-
Taraxacum officinalis	FACU
Trifolium spp.	(FACU)
Triglochin spp.	(OBL)
Typha latifolia	OBL

[1] Reed 1988. The status of plants, which were not identified to species, are in parentheses and are based only on the biologist's experience.
[2] Planted and historically present.

The transect was located within the central area of the wetland to illustrate community composition change over time (**Table 2, Charts 1** and **2**). The three community types observed along the transect were wetland, two of which (Types 6 and 8) were comprised of salt-tolerant species, including pursh seepweed (*Suaeda calcioliformis*), saltgrass (*Distichlis spicata*), alkali grass (*Puccinellia* sp.), and halberd-leaf saltbrush (*Atriplex patua*).

Table 2: ***2007 transect data summary***.

Monitoring Year	2007
Transect Length (feet)	445
# Vegetation Community Transitions along Transect	3
# Vegetation Communities along Transect	3
# Hydrophytic Vegetation Communities along Transect	3
Total Vegetative Species	12
Total Hydrophytic Species	10
Total Upland Species	2
Estimated % Total Vegetative Cover	100
% Transect Length Comprised of Hydrophytic Vegetation Communities	100
% Transect Length Comprised of Upland Vegetation Communities	0
% Transect Length Comprised of Unvegetated Open Water	0
% Transect Length Comprised of Bare Substrate	0

Chart 1: ***Length of vegetation communities within Transect 1 during 2007***.

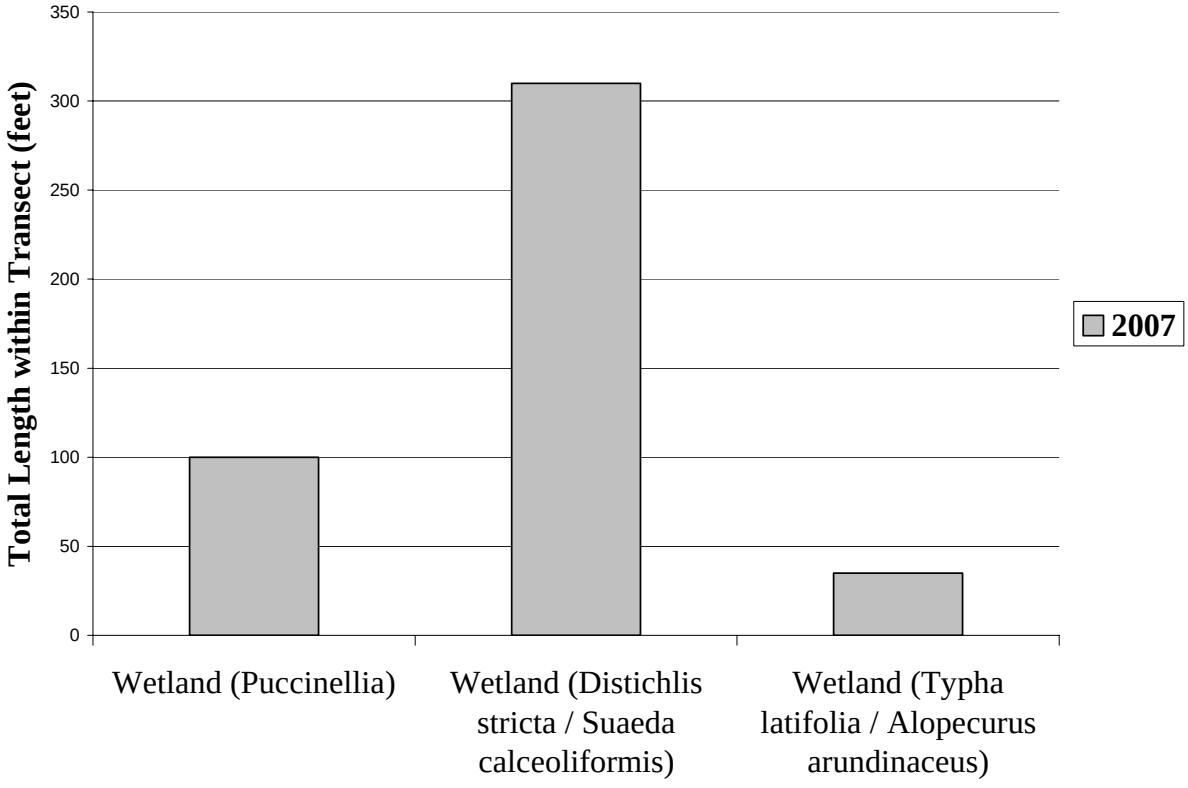
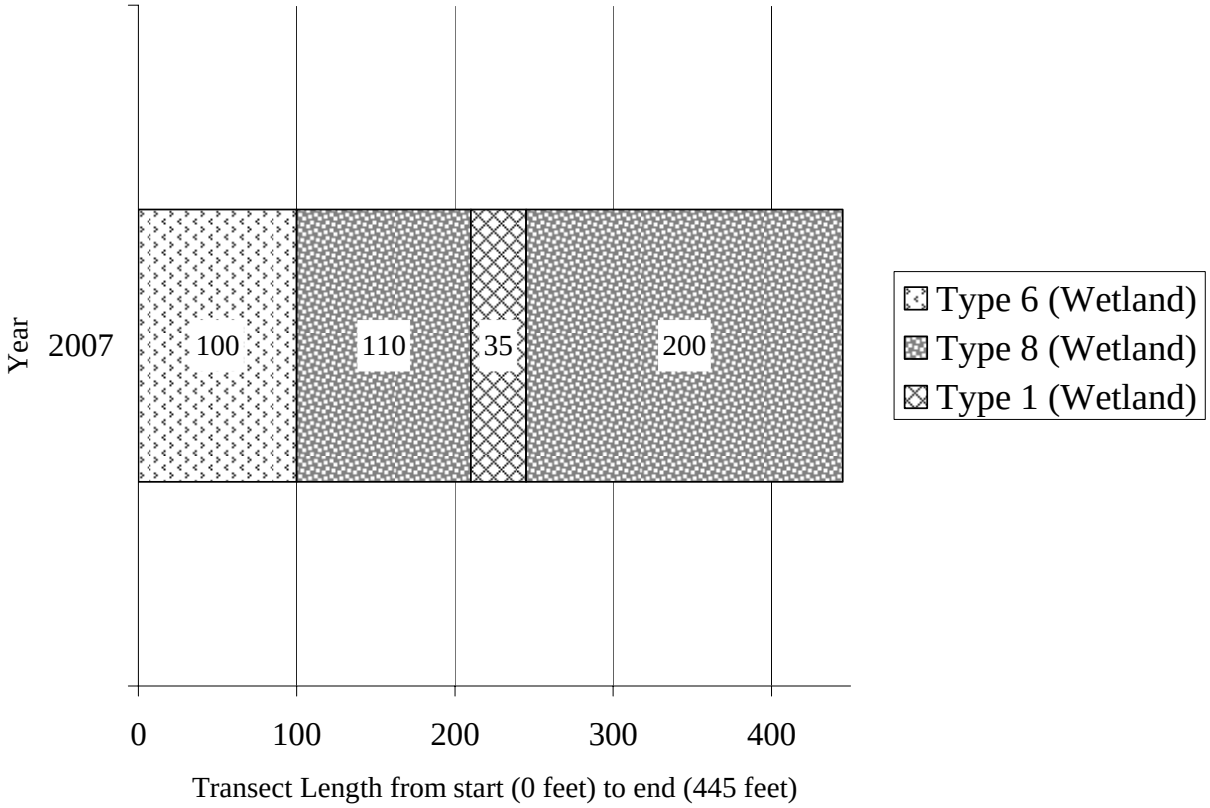


Chart 2: ***Transect maps showing vegetation types from the start (0 feet) to the end of transect (445 feet) in 2007.***



3.3 Soils

The site was mapped as part of the Wheatland County Soil Survey (USDA 2007). The soil series mapped by the Natural Resources Conservation Service (NRCS) within the vegetation transect is the somewhat poorly drained Fairway Loam (135) with the hydric Swampcreek component. One wetland soil pit was excavated along the transect. From 0 to 1 inch the soil was a very dark grayish brown (10 YR 3/2) loam with organic material, 1 to 5 inches was dark gray (10YR 2/1) silty clay and from 5 to 10 inches a dark grayish brown (10YR 4/2) silty clay. The ground surface was saturated along 100% of the transect.

3.4 Wetland Delineation

The Selkirk Wetland Mitigation Reserve was constructed during the winter of 2006/2007. The delineated 2007 wetland boundary included 65.8 total wetland acres, of which 64.8 acres is comprised of herbaceous wet meadow and 1.0 acre of open water (**Figure 3, Appendix A**). Woody species planted in the spring of 2007 had no discernible percent coverage at the time of the investigation. The northeast point within the monitoring boundary was in advertently omitted from the investigation in 2007; this area will be investigated in 2008. The COE wetland data form is included in **Appendix B**. Crediting is discussed in Section 3.10.

3.5 Wildlife

Wildlife species are listed in **Table 3**. Ungulate tracks were noted throughout the wetland and raccoon tracks were also observed; muskrat dens were observed in the fall (Urban 2007). The avian species list includes 26 species; however, it is likely that many more species use the site during migration. The habitat is ideal for shorebirds and waterfowl, and several passerines were also noted.

Table 3: ***2007 wildlife species observed at the Selkirk Wetland Mitigation Reserve.***[1]

AMPHIBIAN, REPTILE, AND FISH	
Western Chorus Frog (*Pseudacris triseriata*)[2]	
BIRD	
American Goldfinch (*Carduelis tristis*)	Northern Harrier (*Circus cyaneus*)
Barn Swallow (*Hirundo rustica*)	Pine Siskin (*Carduelis pinus*)
Blue-winged Teal (*Anas discors*)	Red Crossbill (*Loxia curvirostra*)
California Gull (*Larus californicus*)	Red-winged Blackbird (*Agelaius phoeniceus*)
Canada Goose (*Branta canadensis*)	Sandhill Crane (*Grus canadensis*)
Common Snipe (*Gallinago gallinago*)	Savannah Sparrow (*Passerculus sandwichensis*)
Greater Yellowlegs (*Tringa melanoleuca*)	Snow Goose (*Chen caerulescens*)
Green-winged Teal (*Anas crecca*)	Solitary Sandpiper (*Tringa solitaria*)
Killdeer (*Charadrius vociferous*)	Sora (*Porzana Carolina*)
Lesser Yellowlegs (*Tringa flavipes*)	Spotted Sandpiper (*Actitis macularia*)
Long-billed Curlew (*Numenius americanus*)	Stilt Sandpiper (*Calidris himantopus*)
Mallard (*Anas platyrhynchos*)	White-faced Ibis (*Plegadis chihi*)
Marbled Godwit (*Limosa fedoa*)	Wilson's Phalarope (*Phalaropus tricolor*)
MAMMAL	
Deer tracks (*Odocoileus* sp.)	Muskrat (*Ondatra zibethicus*)
Raccoon tracks (*Procyon lotor*)	

[1] Contributors to this species list: Anderson and Widdicombe (2007), Romig (2007), Urban (2007), and the PBS&J Biologist.
[2] Heard by MDT (Urban 2007).

3.6 Macroinvertebrates

Macroinvertebrate sampling results are provided in **Appendix F** and were summarized by Rhithron Associates, Inc. in the italicized section below (Bollman 2007).

Aquatic habitats at this site appear to be limited to the open-water environs and hypoxic benthic substrates. Evidence for the presence of filamentous algae can be discerned by the presence of the midges Cricotopus *(*Isocladius*) spp. Macrophyte-associated taxa are not well-represented. Sub-optimal biotic condition is indicated by the bioassessement scores.*

The macroinvertebrate results are typical of recently constructed sites. It is anticipated that species diversity and abundance will improve over time.

3.7 Functional Assessment

Completed functional assessment forms are presented in **Appendix B** and are summarized in **Table 4**. For comparative purposes, the functional assessment results for baseline conditions prepared by Oasis Environmental in 2006 are also included in **Table 4**.

The re-established and created mitigation wetlands at the Selkirk Wetland Mitigation Reserve were ranked as Category II in 2007; this area was upland prior to construction. The rehabilitated mitigation area classified as Category II in 2007 and was rated as Category III wetland in 2006. The enhanced wetland rated as Category III in 2006 and 2007. Functional unit gain in 2007 was 406.3 units. Most functions in 2007 increased over the 2006 baseline conditions, with the largest gained in sensitive and general wildlife habitat, uniqueness and recreational potential.

3.8 Photographs

Representative photos taken from photo points and transect ends are included in **Appendix C**.

3.9 Maintenance Needs/Recommendations

Non-preferred grass species, namely *Alopecurus arundinaceus* may require flood or chemical control to reduce cover below the COE-required threshold of 10% within each mitigation credit area. Monitoring should occur for exotic, but not noxious, weed species of the genera *Chenopodium* and *Sonchus* (sowthistle); it is likely that prolonged saturation will discourage expansion and reproduction of these species.

3.10 Current Credit Summary

The Selkirk Wetland Mitigation Reserve is ultimately intended to provide 60.4 acres of mitigation credit. This credit is to be derived from an eventual total of 71.5 aquatic acres comprised of herbaceous wet meadow wetland (60.1 acres), scrub/shrub wetland (10.0 acres) and open water (1.4 acres) (after subtracting 0.4 acre wetland fill). Upland buffer (2.9 acres) and the proposed wetland acreage comprise a 74.4-acre wetland reserve easement. The delineated 2007 wetland boundary included 65.8 total wetland acres, of which 64.8 acres is comprised of herbaceous wet meadow and 1.0 acre of open water (**Figure 3, Appendix A**). Woody species planted in the spring of 2007 had no discernible percent coverage at the time of the investigation.

Four different crediting areas were developed, each with their own specific performance standards and mitigation ratios. Credit ratios vary from 1:1 to 5:1 for the four types of mitigation: rehabilitation, 1.5:1; re-establishment and creation, 1:1; enhancement, 3:1; and, upland buffer, 5:1. Final ratios will be determined by the COE and will be based on the achievement of the performance standards. For each mitigation credit area, a detailed summary of the intended acreage, 2007 delineated acreage, success criteria, and monitoring year observations are included in **Table 6**. A mitigation credit acreage summary is included in **Table 7**.

Table 4: ***Summary of 2006 [1] and 2007 wetland function/value ratings and functional points at the Selkirk Wetland Mitigation Reserve.*** [2]

Function and Value Parameters from the 1999 MDT Montana Wetland Assessment Method	Re-Establishment & Creation[3]	Rehabilitation		Enhancement	
	2007	2006	2007	2006	2007
Listed/Proposed T&E Species Habitat	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)
MNHP Species Habitat	Mod (0.7)	Low (0.0)	Mod (0.7)	Low (0.0)	Low (0.7)
General Wildlife Habitat	High (0.9)	Low (0.3)	High (0.9)	Mod (0.5)	Mod (0.7)
General Fish/Aquatic Habitat	NA	NA	NA	NA	NA
Flood Attenuation	Mod (0.5)	NA	Mod (0.5)	NA	Low (0.2)
Short and Long Term Surface Water Storage	High (0.9)	Low (0.3)	High (0.9)	Low (0.2)	Low (0.3)
Sediment, Nutrient, Toxicant Removal	High (1.0)	Mod (0.6)	High (1.0)	High (0.9)	High (1.0)
Sediment/Shoreline Stabilization	Mod (0.6)	NA	High (0.9)	NA	High (0.9)
Production Export/Food Chain Support	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.6)	Mod (0.7)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Uniqueness	Mod (0.6)	Low (0.1)	Mod (0.6)	Low (0.3)	Mod (0.6)
Recreation/Education Potential	Mod (0.7)	Low (0.1)	Mod (0.7)	Low (0.1)	Mod (0.7)
Actual Points/Possible Points	7.6/11	3.1 / 9	7.9 / 11	3.6 / 9	6.8/11
% of Possible Score Achieved	69%	34%	72%	43%	62%
Overall Category	II	III	II	III	III
Total Acreage of Assessed Aquatic Habitat within AA Boundaries	**32.90**	**31.90**	**31.90**	**1.00**	**1.00**
Functional Units (acreage x actual points)	**250.00**	**98.90**	**252.00**	**3.60**	**6.80**
Net Acreage Gain	**32.90**	NA	**0.00**	NA	**0**
Net Functional Unit Gain	**250.00**	NA	**153.10**	NA	**3.20**

[1] Baseline data provided by Oasis (2006a).
[2] See completed MDT functional assessment forms in **Appendix B** for further detail.
[3] Area was upland prior to construction; therefore, no functional assessment was performed in 2006.

Table 5: ***Success criteria summary for four mitigation credit areas at the Selkirk Wetland Mitigation Reserve*.**

CREDIT AREA	PLANNED ACREAGE	2007 ACREAGE	SUCCESS CRITERIA[1]	MONITORING YEAR 1COMMENTS
Re-establishment & Creation	38.6	32.9[2]	1. To meet all three wetland criteria. 2. Aerial coverage of all plant species must equal 80% and requires a 2-year survival period; bare ground shall not exceed 20%. 3. Non-preferred species (e.g. *Alopecurus arundinaceus*) must not exceed 10% of the combined aerial coverage. 4. Maximum noxious weed coverage is not to exceed 5% and monitoring must confirm a declining trend at the end of the monitoring period if coverage equals 5%. 5. The S/S aerial coverage within each planting zone must equal or exceed 30% to be considered a S/S community and target stem density must be at a density of 500 stems/acre. Stems must survive two years before they are included in the stem count. 6. Open water will be less than 15% of the total wetland project area and no single body is to exceed 3 acres. 7. Supplemental water from irrigation rights may be used during the establishment of this wetland credit area, however areas influenced by this supplemental water must meet the hydrology criteria without supplementation for two growing seasons.	1. All 2007 acreage meets all three wetland criteria. 2. These aerial coverage criteria have not been met. 3. *A. arundinaceus* comprises > 10% in community types 1, 2, and 6. 4. Noxious weed aerial coverage >5% was not observed. 5. Stems were not counted in 2007; approximately 60% survival was observed based on stem condition (most leaves had fallen off due to 1st-year planting stress). Stem densities for each pod are based on a 500 stem count/acre (Romig 2007). 6. There is no deep (>5 feet) surface water in this credit area; the range of surface water depths is 0 to 12 inches. 7. Irrigation water was not directly used to supplement the 2007 hydrology, although indirect runoff from adjacent fields may have incidentally supplemented hydrology.
Rehabilitation	31.9	31.9 (includes 1 acre of open water)	1. To meet all three wetland criteria. 2. Aerial coverage of all plant species must equal 80% and requires a 2-year survival period; bare ground shall not exceed 20%. 3. Non-preferred species (e.g. *Alopecurus arundinaceus*) must not exceed 10% of the combined aerial coverage. 4. Maximum noxious weed coverage is not to exceed 5% and monitoring must confirm a declining trend at the end of the monitoring period if coverage equals 5%. 5. The S/S aerial coverage within each planting zone must equal or exceed 30% to be considered a S/S community and target stem density must be at a density of 500 stems/acre. Stems must survive two years before they are included in the stem count. 6. Open water will be less than 15% of the total wetland project area and no single body is to exceed 3 acres.	1. All of this credit area meets the wetland criteria. 2. These aerial coverage criteria have not been met. 3. *A. arundinaceus* comprises > 10% in community types: 3, 4, 6, 9, and 11. 4. Noxious weed aerial coverage >5% was not observed. 5. Stems were not counted in 2007; approximately 60% survival was observed based on stem condition (most leaves had fallen off due to 1st-year planting stress). Stem densities for each pod are based on a 500 stem count/acre (Romig 2007). Open water is <3% of the total acreage and all ponds are <0.5 surface acre.
Enhancement	1.0	1.0	1. To meet all three wetland criteria. 2. Achieve a functional lift from a Category III to a Category II wetland. 3. Aerial coverage of all plant species must equal 80% and requires a 2-year survival period. 4. Non-preferred species (e.g. *Alopecurus arundinaceus*) must not exceed 10% of the combined aerial coverage. 5. Maximum noxious weed coverage is not to exceed 5% and monitoring must confirm a declining trend at the end of the monitoring period. 6. If the existing S/S component expands to 30% or greater aerial coverage the area will be considered a S/S community. Woody planting zones must equal or exceed 30% aerial coverage to be considered a S/S community and target stem density must be at a density of 500 stems/acre. Stems must survive two years before they are included in the stem count. 7. Open water will be less than 15% of the total wetland project area and no single body is to exceed 3 acres.	1. All area meet all three wetland criteria. 2. A functional lift from a Category III to a Category II wetland was not documented in 2007. 3. The aerial coverage criteria have not been met (in the area adjacent to the *Juncus hallii* planting). 4. *A. arundinaceus* comprises > 10% in community types: 1, and 11. 5. Noxious weed aerial coverage >5% was not observed. 6. No woody species were planted in this credit area; there is an historic shrub community on the southeast end of the area of unknown aerial coverage. There is no open water in this credit area.
Upland Buffer	2.9	1.7[3]	1. The creditable width of the buffer shall not exceed 50 feet. 2. Maximum noxious weed coverage is not to exceed 5% and monitoring must confirm a declining trend at the end of the monitoring period.	1. The buffer width does not exceed 50 feet. 2. Noxious weed aerial coverage >5% was not observed.

1. By the end of the 5-year monitoring period for all criteria.
2. Acreage of available wetland in the Re-establishment credit areas does not precisely match the intended proposed acreage as a result of the combination of two different types of maps (i.e. note that the wetland delineation line does not match the south berm line on **Figure 4**, see disclaimer on **Figure 4**). The intended acreage maps may need to be rectified to the landscape.
3. GPS mapping has identified only 2.6 acres of available buffer acreage. Of this 2.6 acres, upland buffer totaled 1.76 acres, and 0.8 acre qualified as wetland. There may be errors in acreage calculations as a result of the combination of two different types of maps (see disclaimer on **Figure 4**). The intended acreage maps may need to be rectified to the landscape and in addition the easement boundary may need to be adjusted.

Table 6: ***2007 mitigation credit acreage summary for the Selkirk Wetland Mitigation Reserve***.

CREDIT AREA	CREDIT CATEGORY	ACREAGE		ASSUMED CREDIT RATIO[1]	CREDIT ACREAGE	
		Target	2007		Max. 2007	Ultimate[2]
1	Re-establishment & Creation	38.6	32.9	1:1	32.90	0.00
2	Rehabilitation	31.9	31.9	1.5:1	21.30	0.00
3	Enhancement	1.0	1.0	3:1	0.30	0.00
4	Upland Buffer	2.9	1.7	5:1	0.34	0.34
	TOTAL	**74.4**	**67.5**		**54.84**	**0.34**

[1] The Corps of Engineers is the regulatory authority and will determine the actual mitigation ratios.
[2] Though much of the wetland reserve site qualified as wetland at the time of the investigation, all of the success criteria had not been met. Credits are ultimately to be applied as the site meets the success criteria; final crediting is at discretion of COE and MDT.

Overall the site has improved considerably over pre-construction conditions and appears to be functioning very well; especially considering that it was constructed in early 2007. However, there are specific performance criteria that ultimately need to be satisfied in order to achieve credit. Under the strictest interpretation, only the upland buffer satisfied those performance criteria in 2007. Partial credit may be possible for some of the other areas upon negotiation between MDT and the COE.

As shown in **Table 7**, the maximum amount of credit in 2007, applying the credit ratios in the absence of the ultimate performance standards, is approximately 54.84 acres. Applying the credit ratios and ultimate performance standards, the maximum available would be 0.34 acre. Thus, the currently available credit ranges between 0.34 and 54.84 acres and is subject to Corps/MDT discussion.

The re-established and created mitigation wetlands at the Selkirk Wetland Mitigation Reserve were ranked as Category II in 2007; this area was upland prior to construction. The rehabilitated mitigation area classified as Category II in 2007 and was rated as Category III wetland in 2006. The enhanced wetland rated as Category III in 2006 and 2007. Functional unit gain in 2007 was 406.3 units.

4.0 REFERENCES

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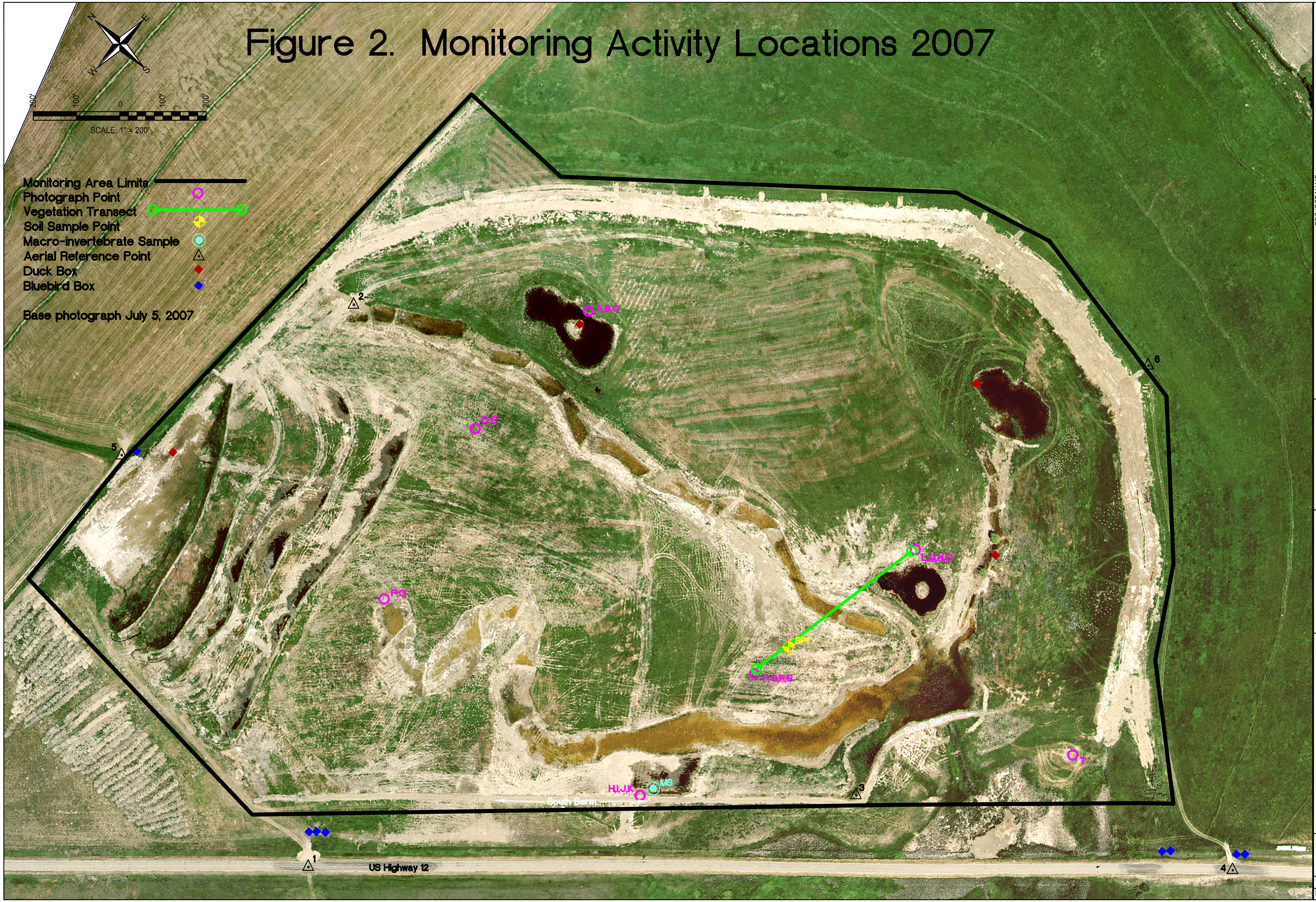
Appendix A

FIGURES 2, 3, & 4

MDT Wetland Mitigation Monitoring
Selkirk Wetland Mitigation Reserve
Two Dot, Montana

Figure 2. Monitoring Activity Locations 2007



PROJECT NAME
MDT SELKIRK WETLAND MITIGATION RESERVE

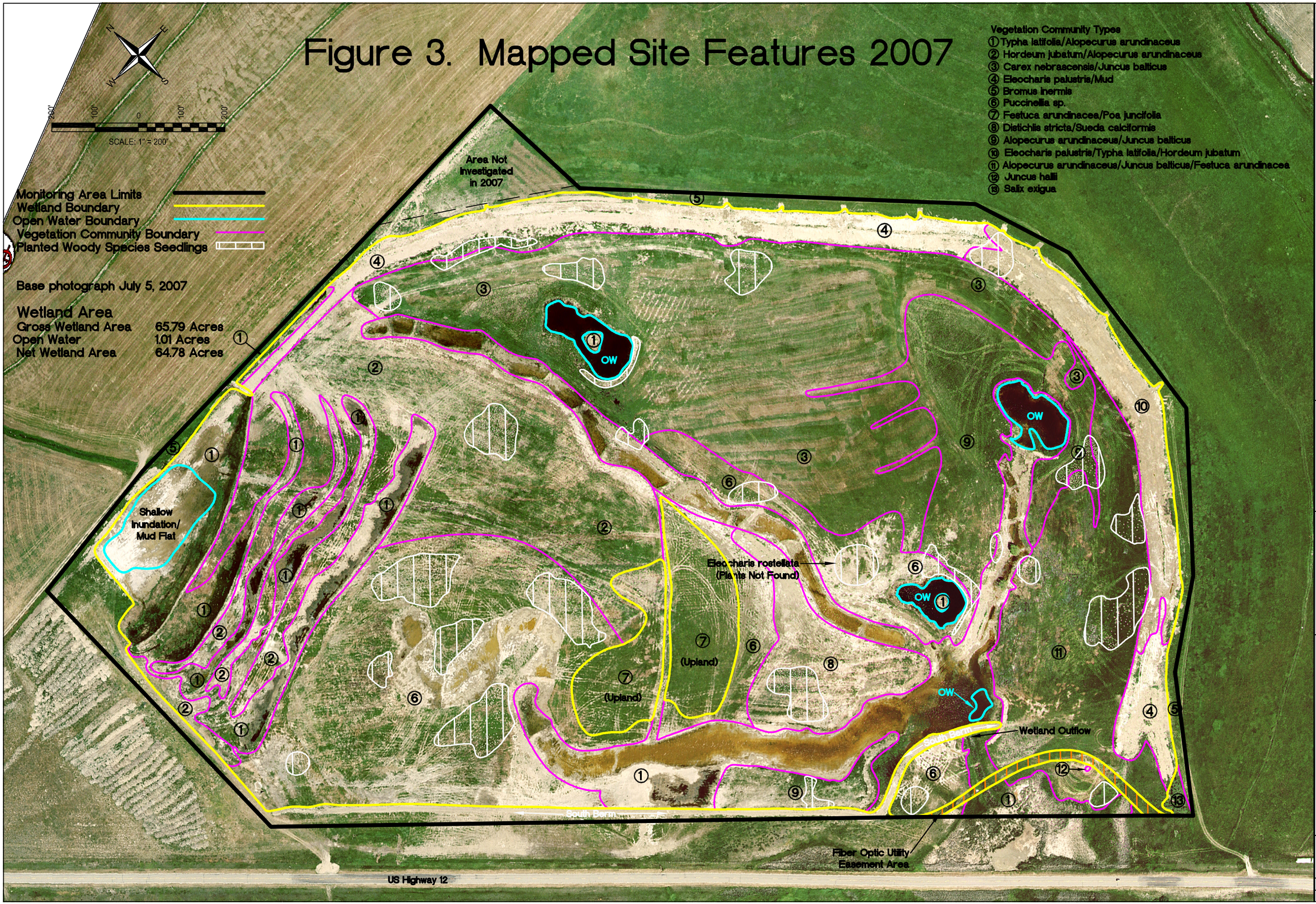
DRAWING TITLE
MONITORING ACTIVITY LOCATIONS 2007

DRAWN: JR	PROJ NO: B43088.00 0512
PROJ MGR: J. BERGLUND	LOCATION: SELKIRK
CHECKED: LB / APPVD: JB	SCALE: 1" = 200'
	FILE NAME: 2007 BASE.dwg

PBSJ
3810 Valley Commons Drive
Suite 4
Bozeman, MT 59718

FIGURE 2 OF -
REV -
Dec/10/2007

Figure 3. Mapped Site Features 2007



PROJECT NAME
MDT SELKIRK WETLAND MITIGATION RESERVE
DRAWING TITLE
MAPPED SITE FEATURES 2007

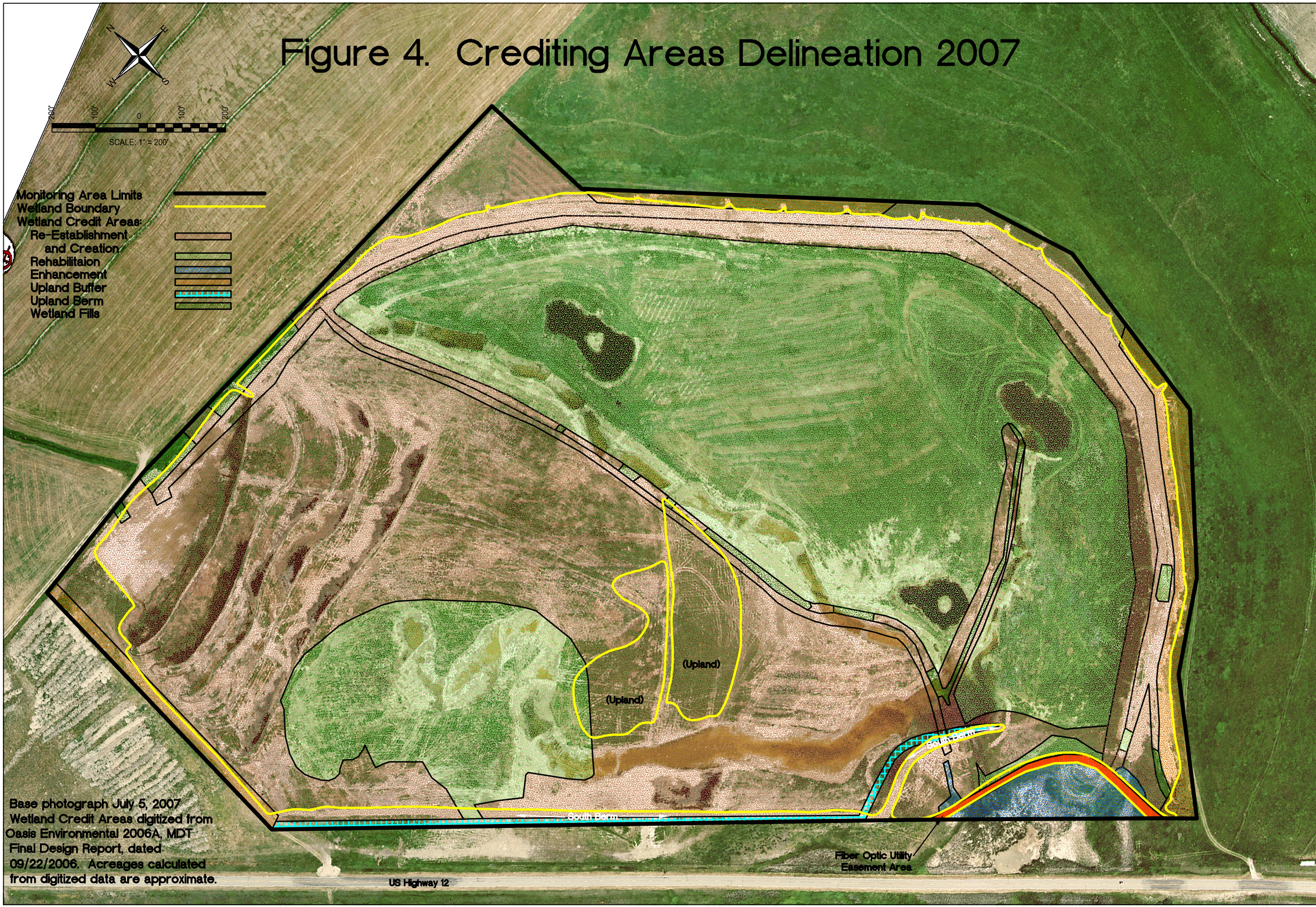
DRAWN: JR
PROJ MGR: J. BERGLUND
CHECKED: LB
APPVD: JB

PROJ NO: B43088.00 0512
LOCATION: SELKIRK
SCALE: 1" = 200'
FILE NAME: 2007 BASE.dwg

PBSJ
3810 Valley Commons Drive
Suite 4
Bozeman, MT 59718

FIGURE 3 OF -
REV -
Dec/10/2007

Figure 4. Crediting Areas Delineation 2007



PROJECT NAME
MDT SELKIRK WETLAND MITIGATION RESERVE

DRAWING TITLE
CREDITING AREAS DELINEATION 2007

PROJ NO: B43088.00 0512	DRAWN: JR		
LOCATION: SELKIRK	PROJ MGR: J. BERGLUND		
SCALE: 1" = 200'	CHECKED: LB	APPVD: JB	
FILE NAME: 2007 BASE.dwg			

PBSJ
3810 Valley Commons Drive
Suite 4
Bozeman, MT 59718

FIGURE
4 OF -

REV -
Dec/10/2007

Appendix B

2007 WETLAND MITIGATION SITE MONITORING FORM
2007 BIRD SURVEY FORM
2007 COE WETLAND DELINEATION FORM
2007 FUNCTIONAL ASSESSMENT FORMS

MDT Wetland Mitigation Monitoring
Selkirk Wetland Mitigation Reserve
Two Dot, Montana

PBS&J / MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: **Selkirk** Project Number: **B43088.00 0512**
Assessment Date: **August 22, 2007** Person(s) conducting the assessment: **LBacon**
Location: **Two Dot, MT** MDT District: **Billings** Milepost: ____
Legal Description: T **8N** R **12E** Section **NE1/4 Sec 9**
Weather Conditions: **partly sunny, 70-80** Time of Day: **9-5**
Initial Evaluation Date: **8/22&31/07** Monitoring Year: **1** # Visits in Year: 1
Size of evaluation area: **75 acres** Land use surrounding wetland: **agriculture**

HYDROLOGY

Surface Water Source: **98%**
Inundation: **Present** Average Depth: **1 ft** Range of Depths: **1-4**
Percent of assessment area under inundation: **2%**
Depth at emergent vegetation-open water boundary: **0-12 feet**
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.):
90% of site is saturated to the surface or has surface water.

Groundwater Monitoring Wells: **Present**
Record depth of water below ground surface (in feet): **Not assessed by PBSJ**

Well Number	Depth	Well Number	Depth	Well Number	Depth

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.

COMMENTS / PROBLEMS:

VEGETATION COMMUNITIES

Community Number: **1** Community Title (main spp): **Typha latifolia/Alopecurus arundinaceus**

Dominant Species	% Cover	Dominant Species	% Cover
TYPLAT	3 = 11-20%	Puccinellia sp.	1 = 1-5%
ALOARU	5 = > 50%	JUNBAL	1 = 1-5%
SCIACU	1 = 1-5%	Mentha sp.	1 = 1-5%
HORJUB	1 = 1-5%	SCIVAL/PAL	+ = < 1%
Triglochin sp.	1 = 1-5%	SCIMAR	+ = < 1%
POAJUN	1 = 1-5%		

Comments / Problems: _____

Community Number: **2** Community Title (main spp): **Hordeum jubatum/Alopecurus arunidaceus**

Dominant Species	% Cover	Dominant Species	% Cover
HORJUB	4 = 21-50%	Trifolium sp.	2 = 6-10%
Puccinellia sp.	2 = 6-10%	TAXOFF	2 = 6-10%
ALOARU	4 = 21-50%	Aster sp.	1 = 1-5%
Triglochin sp.	2 = 6-10%	Ranunculus sp.	1 = 1-5%
JUNBAL	4 = 21-50%		
RANGME	1 = 1-5%		

Comments / Problems: **Ranunculus sp. is an OBL species, low-growing, not a significant population.**

Community Number: **3** Community Title (main spp): **Carex nebrascensis/Juncus balticus**

Dominant Species	% Cover	Dominant Species	% Cover
CARNEB	5 = > 50%		
Triglochin sp.	1 = 1-5%		
JUNBAL	4 = 21-50%		
ELEPAL	3 = 11-20%		
ALOARU	4 = 21-50%		

Comments / Problems: _____

Community Number: **4** Community Title (main spp): **Eleocharis palustris/mud**

Dominant Species	% Cover	Dominant Species	% Cover
SONARV	2 = 6-10%	CIRARV	2 = 6-10%
ELEPAL	4 = 21-50%	Aster sp.	1 = 1-5%
mud	4 = 21-50%	HORJUB	2 = 6-10%
JUNBAL	3 = 11-20%	Puccinellia sp.	2 = 6-10%
ALOARUN	3 = 11-20%		
ATIPAT	3 = 11-20%		

Comments / Problems: _____

VEGETATION COMMUNITIES (continued)

Community Number: **5** Community Title (main spp): **Bromus inermis**

Dominant Species	% Cover	Dominant Species	% Cover
BROINE	5 = > 50%		
PLAMAJ	4 = 21-50%		
AGRREP	3 = 11-20%		

Comments / Problems: _____

Community Number: **6** Community Title (main spp): **Puccinellia sp.**

Dominant Species	% Cover	Dominant Species	% Cover
Puccinellia sp.	5 = > 50%	SUACAL	2 = 6-10%
HORJUB	3 = 11-20%	HAPLAN	1 = 1-5%
SONARV	2 = 6-10%	(Indeterminate planted woody species)	+ = < 1%
SCIACU	2 = 6-10%		
ALOARU	4 = 21-50%		
CARPRA	1 = 1-5%		

Comments / Problems: _____

Community Number: **7** Community Title (main spp): **Festuca arundinacea/Poa juncifolia**

Dominant Species	% Cover	Dominant Species	% Cover
SONARV	2 = 6-10%		
JUNBAL	3 = 11-20%		
POAJUN	4 = 21-50%		
FESARU	4 = 21-50%		
ATRPAT	1 = 1-5%		
SUACAL	+ = < 1%		

Comments / Problems: _____

Community Number: **8** Community Title (main spp): **Distichlis stricta/Suaeda calcioliformis**

Dominant Species	% Cover	Dominant Species	% Cover
Puccinellia sp.	3 = 11-20%	POAJUN	2 = 6-10%
DISSTR	4 = 21-50%	SUACAL	4 = 21-50%
HAPLAN	2 = 6-10%	ATRPAT	+ = < 1%
SPAPEC	1 = 1-5%	GLYLEP	+ = < 1%
HORJUB	1 = 1-5%	(Indeterminate planted woody species)	+ = < 1%
ALOARU	1 = 1-5%		

Comments / Problems: _____

VEGETATION COMMUNITIES (continued)

Community Number: **9** Community Title (main spp): **Alopecurus arundinaceus/Juncus balticus**

Dominant Species	% Cover	Dominant Species	% Cover
ALOARU	5 = > 50%	RANGME	1 = 1-5%
Puccinellia sp.	2 = 6-10%	HORJUB	2 = 6-10%
JUNBAL	3 = 11-20%		
JUNTEN	1 = 1-5%		
SONARV	1 = 1-5%		
AGRALB	3 = 11-20%		

Comments / Problems: _____

Community Number: **10** Community Title (main spp): **Eleocharis palustris/Typha latifolia/Hordeum jubatum**

Dominant Species	% Cover	Dominant Species	% Cover
mud	4 = 21-50%		
TYPLAT	3 = 11-20%		
SCIACU	2 = 6-10%		
HORJUB	3 = 11-20%		
ELEPAL	4 = 21-50%		

Comments / Problems: _____

Community Number: **11** Community Title (main spp): **Alopecurus arundinacea/Juncus balticus/Festuca arundinacea**

Dominant Species	% Cover	Dominant Species	% Cover
HORJUB	2 = 6-10%	JUNHAL	+ = < 1%
ALOARU	4 = 21-50%		
JUNBAL	4 = 21-50%		
FESARU	4 = 21-50%		
SONARV	1 = 1-5%		
TYPLAT	1 = 1-5%		

Comments / Problems: _____

Community Number: **12** Community Title (main spp): **Juncus hallii**

Dominant Species	% Cover	Dominant Species	% Cover
JUNHAL	3 = 11-20%		

Comments / Problems: **planted community, an area ~20'x20'**

Additional Activities Checklist:

☐ Record and map vegetative communities on aerial photograph.

VEGETATION COMMUNITIES (continued)

Community Number: **13** Community Title (main spp): **Salix exigua**

Dominant Species	% Cover	Dominant Species	% Cover
SALEXI	4 = 21-50%		
BROINE	4 = 21-50%		
JUNBAL	2 = 6-10%		

Comments / Problems: **Not a wetland community, the understory is primarily BROINE.**

COMPREHENSIVE VEGETATION LIST

Plant Species	Vegetation Community Number (s)	Plant Species	Vegetation Community Number (s)
Agropyron repens	5		
Agrostis alba	9		
Alopecurus arundinacea	1,2,3,4,6,8,9,11		
Aster subspicatus	2,4		
Atriplex patula	4,7,8		
Bromus inermis	5		
Carex nebrascensis	3		
Carex praegracilis	6		
Chenopodium sp.	4		
Cirsium arvense	4		
Cornus sericea	2,3,4,5,6,9,10,11		
Distichlis stricta	8		
Eleocharis palustris	3,4,10		
Festuca arundinacea	7,11		
Glycyrrhiza lepitdota	8		
Haplopappus lancceolatus	6,8		
Hordeum jubatum	1,2,4,6,8,9,10,11		
Juncus balticus	1,2,3,4,7,9,11		
Juncus hallii	12		
Juncus tenuis	9		
*Mentha sp.**	1		
Plantago major	5		
Populus deltoides	2,3,4,5,6,9,10,11		
Poa juncifolia	1,7,8		
*Puccinellia sp.**	1,2,4,6,8,9		
Ranunculus gmelinii	2,9		
*Ranunculus sp.**	2		
Salicornia rubra	8		
Salix exigua	2,3,4,5,6,9,10,11,13		
Scirpus acutus	1,10		
Scirpus maritimus	1		
Scirpus validus/palidus	1		
Sonchus arvensis	4,6,7,9,11		
Spartina pectinata	8		
Suaeda calceoliformis	6,7,8		
Taraxacum officinalis	2		
Trifolium sp.	2		
*Triglochin sp.**	1,2,3		
Typha latifolia	1,10,11		

Comments / Problems: *Plants not IDed to species were shattered out or collection not made, will collect in 2008. Only planted identified during the site visit were included in this list.

PLANTED WOODY VEGETATION SURVIVAL

Plant Species	Number Originally Planted	Number Observed	Mortality Causes
Sandbar Willow (cuttings)	1908	*NOTE	*NOTE
Sandbar Willow (bare root)	400		
Plains Cottonwood (bare root)	100		
Planeleaf Willow (bare root)	400		
Red-osier Dogwood (10 cu in)	392		
Yellow Willow (bare root)	400		
Pacific Willow (bare root)	200		
Red-osier Dogwood (Bare root)	950		
TOTAL	4,750		

Comments / Problems: **There are 24 woody species pods within the entire site and a total of 4,750 stems; each pod was planted with 100, 364 or 500 stems depending on pod size, to meet the 500 stem ct/acre criteria. Each plant was not counted during the investigation. For survivorship estimates, each pod was observed and survivorship estimated based on viability of the stem. In most cases the stems were without leaves because of the first-year planting stress. Survivorship for the first planting season appeared to be approximately 60%.**

WILDLIFE

Birds

Were man-made nesting structures installed? **Yes**
If yes, type of structure: **boxes** How many? **see below**
Are the nesting structures being used? *NOTE
Do the nesting structures need repairs? **no**

Mammals and Herptiles

Mammal and Herptile Species	Number Observed	Indirect Indication of Use			
		Tracks	Scat	Burrows	Other
Racoon		☒	☐	☐	
Deer		☒	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	

Additional Activities Checklist:
Yes Macroinvertebrate Sampling (if required)

Comments / Problems: Bluebird - 8, Wood Duck -4; *NOTE: no nest material was observed overhanging the box entrance, boxes appeared newly installed (June) and are more likely to be occupied in 2008.

PHOTOGRAPHS

Using a camera with a 50mm lens and color film 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.

Location	Photograph Description	Compass Reading (°)
A	NE pond, Rehab Credit Area	NW
B	NE pond, Rehab Credit Area	W
C	NE pond, Rehab Credit Area	SW
D	Shrub pod, north end Re-Estab/Creation Credit Area	NE
E	Shrub pod, north end Re-Estab/Creation Credit Area	SW
F	West end of swale, Re-Estab/Creation Credit Area	SW
G	West end of swale, Re-Estab/Creation Credit Area	NE
H	Central south berm, Re-Estab/Creation Credit Area	NW
I	Central south berm, Re-Estab/Creation Credit Area	NE
J	Central south berm, Re-Estab/Creation Credit Area	SE
K	Central south berm, Re-Estab/Creation Credit Area	SW
L	East transect end, Rehabilitation Credit Area	NW
M	East transect end, Rehabilitation Credit Area	SW
N	East transect end, Rehabilitation Credit Area	E
O	East transect end, Rehabilitation Credit Area	NE
P	West transect end, Re-Estab/Creation Credit Area	SE
Q	West transect end, Re-Estab/Creation Credit Area	NE
R	West transect end, Re-Estab/Creation Credit Area	S
S	West transect end, Re-Estab/Creation Credit Area	W
T	*Juncus hallii* planting	NW

Comments / Problems: _____

GPS SURVEYING

Using a resource grade GPS survey the items on the checklist below. Collect at least 3 location points set at a 5 second recording rate. Record file numbers for site in designated GPS field notebook.

GPS Checklist:

- ☒ Jurisdictional wetland boundary.
- ☒ 4-6 landmarks that are recognizable on the aerial photograph.
- ☒ Start and End points of vegetation transect(s).
- ☒ Photograph reference points.
- ☐ Groundwater monitoring well locations.

Comments / Problems: _____

WETLAND DELINEATION

(attach COE delineation forms)

At each site conduct these checklist items:

- ☒ Delineate wetlands according to the 1987 Army COE manual.
- ☒ Delineate wetland – upland boundary onto aerial photograph.

Yes Survey wetland – upland boundary with a resource grade GPS survey.

Comments / Problems: _____

FUNCTIONAL ASSESSMENT

(Complete and attach full MDT Montana Wetland Assessment Method field forms.)
(Also attach any completed abbreviated field forms, if used)

Comments / Problems: _____

MAINTENANCE

Were man-made nesting structure installed at this site? **Yes**
If yes, do they need to be repaired? **No**
If yes, describe the problems below and indicate if any actions were taken to remedy the problems.

Were man-made structures built or installed to impound water or control water flow into or out of the wetland? **Yes**
If yes, are the structures working properly and in good working order? **Yes**
If no, describe the problems below.

Comments / Problems: _____

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Selkirk** Date: **August 22, 2007** Examiner: **LBacon-PBSJ**
Transect Number: **1** Approximate Transect Length: **445 feet** Compass Direction from Start: **t˚** Note: _____

Vegetation Type A: **CT 6**	
Length of transect in this type: 100 feet	
Plant Species	**Cover**
PUC sp.	2 = 6-10%
HAPLAN	1 = 1-5%
JUNBAL	1 = 1-5%
ALOARU	1 = 1-5%
SUACAL	5 = > 50%
(Indeterminate planted woody species)	+ = < 1%
Total Vegetative Cover:	100%

Vegetation Type B: **CT 8**	
Length of transect in this type: 110 feet	
Plant Species	**Cover**
PUC sp.	3 = 11-20%
HAPLAN	2 = 6-10%
DISSPI	4 = 21-50%
ALOARU	1 = 1-5%
SUACAL	5 = > 50%
Total Vegetative Cover:	100%

Vegetation Type C: **CT 1**	
Length of transect in this type: 35 feet	
Plant Species	**Cover**
TYPLAT	3 = 11-20%
SCIMAR	1 = 1-5%
SCIVAL/PAL	1 = 1-5%
Shallow inundation	5 = > 50%
SCIACU	1 = 1-5%
Total Vegetative Cover:	100%

Vegetation Type D: **CT 8**	
Length of transect in this type: 200 feet	
Plant Species	**Cover**
DISSPI	5 = > 50%
HAPLAN	2 = 6-10%
POAJUN	1 = 1-5%
SUACAL	1 = 1-5%
ALOARU	1 = 1-5%
GLYLEP	+ = < 1%
(Indeterminate planted woody species)	+ = < 1%
Total Vegetative Cover:	100%

MDT WETLAND MONITORING – VEGETATION TRANSECT

Cover Estimate		Indicator Class	Source
+ = < 1%	3 = 11-10%	+ = Obligate	P = Planted
1 = 1-5%	4 = 21-50%	- = Facultative/Wet	V = Volunteer
2 = 6-10%	5 = > 50%	0 = Facultative	

Percent of perimeter developing wetland vegetation (excluding dam/berm structures): **100% -*NOTE**

Establish transects perpendicular to the shoreline (or saturated perimeter). The transect should begin in the upland area. Permanently mark this location with a standard metal fencepost. Extend the imaginary transect line towards the center of the wetland, ending at the 3 foot depth (in open water), or at the point where water depths or saturation are maximized. Mark this location with another metal fencepost.

Estimate cover within a 10 foot wide "belt" along the transect length. At a minimum, establish a transect at the windward and leeward sides of the wetland. Remember that the purpose of this sampling is to monitor, not inventory, representative portions of the wetland site.

Comments: **The northern triangle was not investigated in 2007; it will be included in the investigation in 2008.**

BIRD SURVEY – FIELD DATA SHEET

Site: **Selkirk** Date: **8/22/07**
Survey Time: **8 AM** to **5 PM**

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
American Goldfinch	20+	F	OW MA				
Barn Swallow	20+	F	OW MA				
Blue-winged Teal	8	F	OW				
Canada Goose	10	F	OW				
Common Snipe	7	F	MA				
Greater Yellowleg	1	F	MA OW				
Green-winged Teal	20+	F	OW				
Killdeer	3	F	MA				
Lesser Yellowleg	2	F	MA OW				
Mallard	20+	F	OW				
Northern Harrier	1	F	MA				
Pine Siskin	20+	F	MA				
Red Crossbill	1	F	MA				
Red-winged Blackbird	20+	F	MA				
Sandhill Crane	7	F	MA				
Savannah Sparrow	20+	F	MA				
Solitary Sandpiper	1	F	OW				
Sora	1	BD	MA				
Spotted Sandpiper	5	F	OW				
Stilt Sandpiper	1	F	OW				
Wilson's Phalarope	1	F	OW				

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

HABITAT CODES
AB = Aquatic bed
FO = Forested
I = Island
MA = Marsh
MF = Mud Flat
OW = Open Water
SS = Scrub/Shrub
UP = Upland buffer
WM = Wet meadow
US = Unconsolidated shore

Weather: **partly cloudy**

Notes: **Kathleen Anderson, Birder and Conservationist from Massachuesetts, and Nancy Widdicombe from Harlow (632-5679), were present during survey and assisted with this bird list.**

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project / Site: **Selkirk Wetland**	Date: **August 22, 2007**
Applicant / Owner: **MDT**	County: **Wheatland**
Investigator: **LBacon/PBSJ**	State: **MT**

Do Normal Circumstances exist on the site? **Yes** Is the site significantly disturbed (Atypical Situation)? **No** Is the area a potential Problem Area? **No** (If needed, explain on reverse side)	Community ID: **CT-9** Transect ID: **Wetland** Plot ID: **SP-1**

VEGETATION

Dominant Species	Stratum	Indicator	Dominant Species	Stratum	Indicator
1. *DISSTR*	Herb	FAC+	11.		
2. *HAPLAN*	Herb	FACW	12.		
3. *SUECAL*	Herb	FACW	13.		
4. *ALOARU*	Herb	NI	14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): **0** / **3** = **0**%	FAC Neutral: **3** / **4** = **75**%

Remarks: **Entire transect is in a wetland area. ALOARU a no listing, however it colonizes wetland areas and is considered a wetland species.**

HYDROLOGY

Yes Recorded Data (Describe in Remarks): **N/A** Stream, Lake, or Tide Gauge **Yes** Aerial Photographs **N/A** Other **No** No Recorded Data	Wetland Hydrology Indicators Primary Indicators: **NO** Inundated **YES** Saturated in Upper 12 Inches **NO** Water Marks **NO** Drift Lines **NO** Sediment Deposits **NO** Drainage Patterns in Wetland
Field Observations: Depth of Surface Water **N/A** ____ (in.) Depth to Free Water in Pit **N/A** ____ (in.) Depth to Saturated Soil **N/A** **0** (in.)	Secondary Indicators (2 or more required): **NO** Oxidized Root Channels in Upper 12 inches **NO** Water-Stained Leaves **NO** Local Soil Survey Data **NO** FAC-Neutral Test **NO** Other (Explain in Remarks)

Remarks: **Surface is saturated all along entire transect.**

PBSJ

SOILS

Map Unit Name (Series and Phase): **Fairway Loam, Swampcreek Component**
Map Symbol: **135** Drainage Class: **well** Mapped Hydric Inclusion? _
Taxonomy (Subgroup): **Aridic Ustorthents** Field Observations confirm Mapped Type? **Yes**

Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color(s) (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-1	Organic	10 YR 3//2	/ /	N/A N/A	 organic loam
1-5	A	10 YR 4/1	/ /	N/A N/A	 silty clay
5-10	B	10 YR 4/2	/ /	N/A N/A	 silty clay
		/	/ /	N/A N/A	
		/	/ /	N/A N/A	

Hydric Soil Indicators:

NO Histosol	**NO** Concretions
NO Histic Epipedon	**NO** High Organic Content in Surface Layer in Sandy Soils
NO Sulfidic Odor	**NO** Organic Streaking in Sandy Soils
NO Aquic Moisture Regime	**NO** Listed on Local Hydric Soils List
NO Reducing Conditions	**NO** Listed on National Hydric Soils List
YES Gleyed or Low-Chroma Colors	**NO** Other (Explain in Remarks)

Remarks: **No mottles noted, however soil has low-chroma.**

WETLAND DETERMINATION

Hydrophytic Vegetation Present? **YES** Wetland Hydrology Present? **YES** Hydric Soils Present? **YES**	Is this Sampling Point within a Wetland? **YES**

Remarks: **The transect was placed in this location to study the development of the wetland comunities given almost the entire site qualifies as a wetland. The transect data and the COE vegetation data will be most instructive regarding the desirable wetland plant development.**

MDT MONTANA WETLAND ASSESSMENT FORM (revised May 25, 1999)

1. Project Name: Selkirk Wetland Mitigation Reserve **2. Project #:** NH-STPP-TPX 54(31) **Control #:** 6161

3. Evaluation Date: 8/22/2007 **4. Evaluator(s):** LB/PBSJ **5. Wetland / Site #(s):** RE-ESTAB & CREATION (Brown Area-Figure 4,APP. A)

6. Wetland Location(s) i. T: 8 N **R:** 12 E **S:** N1/2NE1/4 Sec 9 **T:** __ N **R:** __ E **S:** _____

ii. Approx. Stationing / Mileposts: _____

iii. Watershed: 10 - Musselshell **GPS Reference No. (if applies):** _____

Other Location Information: North of HWY 112, north of Selkirk FWP fishing access

7. A. Evaluating Agency PBSJ **8. Wetland Size (total acres):** _____ (visually estimated)
65.8 (measured, e.g. GPS)

B. Purpose of Evaluation:
☐ Wetlands potentially affected by MDT project **9. Assessment Area (total acres):** _____ (visually estimated)
☐ Mitigation wetlands; pre-construction 31.9 (measured, e.g. GPS)
☒ Mitigation wetlands; post-construction **Comments**: This credit area is located in most of the west half of the reserve and around the reserve circumference.
☐ Other

10. CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA

HGM CLASS [1]	SYSTEM [2]	SUBSYSTEM [2]	CLASS [2]	WATER REGIME [2]	MODIFIER [2]	% OF AA
Slope	Palustrine	None	Emergent Wetland	Saturated	Impounded	90
Depression	Palustrine	None	Emergent Wetland	Intermittently Flooded	Impounded	5
Depression	Palustrine	None	Emergent Wetland	Permanently Flooded	Impounded	5
---	---	---	---	---	---	

[1] = Smith et al. 1995. [2] = Cowardin et al. 1979.

Comments: This credit area includes a swale and lateral grade checks which collect shallow surface water. Many shrub seedlings planted in this area.

11. ESTIMATED RELATIVE ABUNDANCE (of similarly classified sites within the same Major Montana Watershed Basin)
Common Comments: _____

12. GENERAL CONDITION OF AA

i. Regarding Disturbance: (Use matrix below to select appropriate response.)

Conditions Within AA	Predominant Conditions Adjacent (within 500 Feet) To AA		
	Land managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings.	Land not cultivated, but moderately grazed or hayed or selectively logged or has been subject to minor clearing; contains few roads or buildings.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density.
AA occurs and is managed in predominantly a natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings.	---	low disturbance	---
AA not cultivated, but moderately grazed or hayed or selectively logged or has been subject to relatively minor clearing, or fill placement, or hydrological alteration; contains few roads or buildings.	---	---	---
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density.	---	---	---

Comments: (types of disturbance, intensity, season, etc.) **Lateral grade checks have been placed in NW area to spread natural and irrigation run-off.**

ii. Prominent weedy, alien, & introduced species: Perennial sowthistle was noted along lateral grade check berms, and several Chenopodium species, though a few are likely wetland species.

iii. Briefly describe AA and surrounding land use / habitat: Hayland production, grazing, hwy 12.

13. STRUCTURAL DIVERSITY (Based on 'Class' column of #10 above.)

Number of 'Cowardin' Vegetated Classes Present in AA	≥3 Vegetated Classes or ≥ 2 if one class is forested	2 Vegetated Classes or 1 if forested	≤ 1 Vegetated Class
Select Rating	---	---	Low

Comments: Woody species seedlings were planted in this area in late spring of 2007.

14A. HABITAT FOR FEDERALLY LISTED OR PROPOSED THREATENED OR ENDANGERED PLANTS AND ANIMALS

i. AA is Documented (D) or Suspected (S) to contain (check box):

Primary or Critical habitat **(list species)**	☐ D ☐ S	_____
Secondary habitat **(list species)**	☐ D ☐ S	_____
Incidental habitat **(list species)**	☐ D ☐ S	_____
No usable habitat	☐ D ☒ S	_____

ii. Rating (Based on the strongest habitat chosen in 14A(i) above, find the corresponding rating of High (H), Moderate (M), or Low (L) for this function.

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point & Rating	---	---	---	---	---	---	0 (L)

If documented, list the source (e.g., observations, records, etc.)**:** _____

14B. HABITAT FOR PLANTS AND ANIMALS RATED AS S1, S2, OR S3 BY THE MONTANA NATURAL HERITAGE PROGRAM.
Do not include species listed in 14A(i).

i. AA is Documented (D) or Suspected (S) to contain (check box):

Primary or Critical habitat **(list species)**	☐ D ☐ S	_____
Secondary habitat **(list species)**	☒ D ☐ S	White-faced Ibis (S1B); Long-billed Curlew (S2B)
Incidental habitat **(list species)**	☐ D ☐ S	_____
No usable habitat	☐ D ☐ S	_____

ii. Rating: Based on the strongest habitat chosen in 14B(i) above, find the corresponding rating of High (H), Moderate (M), or Low (L) for this function.

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point & Rating	---	---	.7 (M)	---	---	---	---

If documented, list the source (e.g., observations, records, etc.)**:** These species were observed by OASIS staff; curlews observed over entire site; it is unknown exactly where ibis were seen within the whole wetland easement, but likely they would utilize the Rehab or Re-established Areas equally.

14C. GENERAL WILDLIFE HABITAT RATING

i. Evidence of overall wildlife use in the AA: Check either substantial, moderate, or low.

☒ **Substantial** (based on any of the following)
- ☒ 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

☐ **Low** (based on any of the following)
- ☐ 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 AA

☐ **Moderate** (based on any of the following)
- ☐ 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, select the AA attribute to determine the exceptional (E), high (H), moderate (M), or low (L) rating. Structural diversity is from 13. For class cover to be considered evenly distributed, vegetated classes must be within 20% of each other in terms of their percent composition in the AA (see 10). Duration of Surface Water: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; A= absent.

Structural Diversity (from 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 12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	H	--	--
Moderate disturbance at AA (see 12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
High disturbance at AA (see 12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

iii. Rating: Use 14C(i) and 14C(ii) above and the matrix below to arrive at the functional point and rating of exceptional (E), high (H), moderate (M), or low (L) for this function.

Evidence of Wildlife Use from 14C(i)	**Wildlife Habitat Features Rating** from 14C(ii)			
	☐ **Exceptional**	☒ **High**	☐ **Moderate**	☐ **Low**
Substantial	--	.9 (H)	--	--
Moderate	--	--	--	--
Low	--	--	--	--

Comments: Avian species list thus far is over 30 species; the potential for this site to become a major migration stopover is very high. Perennial water is <10% of this credit area.

14D. GENERAL FISH / AQUATIC HABITAT RATING ☒ **NA** (proceed to 14E)

If the AA is not or was not historically used by fish due to lack of habitat or excessive gradient, then check the NA box above.
Assess if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [*e.g.* fish use is precluded by perched culvert or other barrier, etc.]. If fish use occurs in the AA but is not desired from a resource management perspective (*e.g.* fish use within an irrigation canal], then Habitat Quality [14D(i)] below should be marked as "Low", applied accordingly in 14D(ii) below, and noted in the comments.

i. Habitat Quality: Pick the appropriate AA attributes in matrix to determine the quality rating of exceptional (E), high (H), moderate (M), or low (L).

Duration of Surface Water in AA	☐ **Permanent/Perennial**			☐ **Seasonal / Intermittent**			☐ **Temporary / Ephemeral**		
Cover - % of waterbody in AA containing cover objects (*e.g.* submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation)	**>25%**	**10-25%**	**<10%**	**>25%**	**10-25%**	**<10%**	**>25%**	**10-25%**	**<10%**
Shading - >75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities	--	--	--	--	--	--	--	--	--
Shading – 50 to 75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities.	--	--	--	--	--	--	--	--	--
Shading - < 50% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities.	--	--	--	--	--	--	--	--	--

ii. Modified Habitat Quality: Is fish use of the AA precluded or significantly reduced by a culvert, dike, other man-made structure or activity **or** is the waterbody included on the 'MDEQ list of waterbodies in need of TMDL development' with 'Probable Impaired Uses' listed as cold or warm water fishery or aquatic life support**?**
☐ **Y** ☐ **N** If yes, reduce the rating from 14D(i) by one level and check the modified habitat quality rating: ☐ E ☐ H ☐ M ☐ L

iii. Rating: Use the conclusions from 14D(i) and 14D(ii) above and the matrix below to arrive at the functional point and rating of exceptional (E), high (H), moderate (M), or low (L).

Types of Fish Known or Suspected within AA	**Modified Habitat Quality** from 14D(ii)			
	☐ **Exceptional**	☐ **High**	☐ **Moderate**	☐ **Low**
Native game fish	--	--	--	--
Introduced game fish	--	--	--	--
Non-game fish	--	--	--	--
No fish	--	--	--	--

Comments: _____

14E. FLOOD ATTENUATION ☐ **NA** (proceed to 14F)

Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA do not flood from in-channel or overbank flow, then check NA.

i. Rating: Working from top to bottom, mark the appropriate attributes to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.

Estimated wetland area in AA subject to periodic flooding	☐ **≥ 10 acres**			☒ **<10, >2 acres**			☐ **≤2 acres**		
% of flooded wetland classified as forested, scrub/shrub, or both	**75%**	**25-75%**	**<25%**	**75%**	**25-75%**	**<25%**	**75%**	**25-75%**	**<25%**
AA contains **no outlet or restricted outlet**	--	--	--	--	--	.5 (M)	--	--	--
AA contains **unrestricted outlet**	--	--	--	--	--	--	--	--	--

ii. Are residences, businesses, or other features which may be significantly damaged by floods located within 0.5 miles downstream of the AA? (check)
☐**Y** ☒**N** **Comments:** The meandering swales and lateralgrade checks established in this credit area have the potential to collect water and flood into the created wetland. Though the acreage of this credit area is >10 acres, it is unknown if flooding has occurred to this extent. It is likely that at least 2 to 10 acres ihave flooded within the first 6 months of construction.

14F. SHORT AND LONG TERM SURFACE WATER STORAGE ☐ **NA** (proceed to 14G)

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, then check NA above.

i. Rating: Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.
P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral.

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding**.**	☒ **>5 acre feet**			☐ **<5, >1 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**	--	.9 (H)	--	--	--	--	--	--	--
Wetlands in AA flood or pond **< 5 out of 10 years**	--	--	--	--	--	--	--	--	--

Comments: In the NW corner the upslope side of the lateralgrade checks and excavated area and the meandering swales had several inches of water in late summer; it is likely that during winter runoff and early growing season these areas have the potential to store several ACFT of water.

14G. SEDIMENT/NUTRIENT/TOXICANT RETENTION AND REMOVAL ☐ **NA** (proceed to 14H)

Applies to wetlands with the potential to receive excess 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, check NA above.

i. Rating Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.

Sediment, Nutrient, and Toxicant Input Levels Within AA	AA receives or surrounding land use has potential to deliver low to moderate levels of sediments, nutrients, or compounds 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 has 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 or ponding in AA	☒ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**
AA contains **no or restricted outlet**	1 (H)	--	--	--	--	--	--	--
AA contains **unrestricted outlet**	--	--	--	--	--	--	--	--

Comments: _____

14H. SEDIMENT/SHORELINE STABILIZATION ☐ **NA** (proceed to 14I)

Applies only if AA occurs on or within the banks of a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body that is subject to wave action. If this does not apply, then check NA above.

i. Rating: Working from top to bottom, use the matrix below to arrive at the functional point and rating exceptional (E), high (H), moderate (M), or low (L) for this function.

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses.	**Duration of Surface Water Adjacent to Rooted Vegetation**		
	☐**Permanent / Perennial**	☒**Seasonal / Intermittent**	☐**Temporary / Ephemeral**
≥ 65 %	--	--	--
35-64 %	--	.6 (M)	--
< 35 %	--	--	--

Comments: Likely half of the areas adjacent to the swales are vegetated with deep-rooted species.

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

i. Rating: Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function. **A** = acreage of vegetated component in the AA. **B** = structural diversity rating from #13. **C** = Yes (Y) or No (N) as to whether or not the AA contains a surface or subsurface outlet. **P/P** = permanent/perennial; **S/I** = seasonal/intermittent; **T/E/A**= temporary/ephemeral/absent.

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	☐**Y**	☐**N**	☐**Y**	☐**N**	☒**Y**	☐**N**	☐**Y**	☐**N**	☐**Y**	☐**N**	☐**Y**	☐**N**	☐**Y**	☐**N**	☐**Y**	☐**N**	☐**Y**	☐**N**
P/P	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S/I	--	--	--	--	.7M	--	--	--	--	--	--	--	--	--	--	--	--	--
T/E/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Comments: _____

14J. GROUNDWATER DISCHARGE / RECHARGE (DR) (Check the indicators in i & ii below that apply to the AA.)

i. ☒ **Discharge Indicators**
- ☐ Springs 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.
- ☐ Other _____

ii. ☒ **Recharge Indicators**
- ☐ Permeable substrate presents without underlying impeding layer.
- ☐ Wetland contains inlet but not outlet.
- ☒ Other see NOTE*

iii. Rating: Use information from 14J(i) and 14J(ii) above and the table below to arrive at the functional point and rating of high (H) or low (L) for this function.

Criteria	**Functional Point and Rating**
AA has known Discharge/Recharge area or one or more indicators of D/R present	1 (H)
No Discharge/Recharge indicators present	--
Available Discharge/Recharge information inadequate to rate AA D/R potential	--

Comments: NOTE*: Wetland receives groundwater from slope to north and east and it is liekly that water flows through the soil layers toward the Mussellshell River.

14K. UNIQUENESS

i. Rating: Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.

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 from 11	☐rare	☐common	☐abundant	☐rare	☒common	☐abundant	☐rare	☐common	☐abundant
Low disturbance at AA (12i)	--	--	--	--	.6M	--	--	--	--
Moderate disturbance at AA (12i)	--	--	--	--	--	--	--	--	--
High disturbance at AA (12i)	--	--	--	--	--	--	--	--	--

Comments: _____

14L. RECREATION / EDUCATION POTENTIAL

i. Is the AA a known recreational or educational site? ☐ **Yes** [**Rate** ☐ **High (1.0)**, then proceed to 14L(ii) only] ☒ **No** [Proceed to 14L(iii)]

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

iii. Based on the location, diversity, size, and other site attributes, is there a strong potential for recreational or educational use?

☒ **Yes** [Proceed to 14L (ii) and then 14L(iv)] ☐ **No** [Rate as Low (0.1) in 14L(iv)]

iv. Rating Use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.

Ownership	**Disturbance at AA from 12(i)**		
	☒ Low	☐ Moderate	☐ High
Public ownership	--	--	--
Private ownership	.7(M)	--	--

Comments: Wildlife viewing.

FUNCTION, VALUE SUMMARY, AND OVERALL RATING

Function and Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage)
A. Listed/Proposed T&E Species Habitat	low	0.00	1	
B. MT Natural Heritage Program Species Habitat	moderate	0.70	1	
C. General Wildlife Habitat	high	0.90	1	
D. General Fish/Aquatic Habitat	N/A	-	--	
E. Flood Attenuation	moderate	0.50	1	
F. Short and Long Term Surface Water Storage	high	0.90	1	
G. Sediment/Nutrient/Toxicant Removal	high	1.00	1	
H. Sediment/Shoreline Stabilization	moderate	0.60	1	
I. Production Export/Food Chain Support	moderate	0.70	1	
J. Groundwater Discharge/Recharge	high	1.00	1	
K. Uniqueness	moderate	0.60	1	
L. Recreation/Education Potential	moderate	0.70	1	
	Total:	**7.60**	**11.00**	**250.0**
	Percent of Total Possible Points:		**69%** (Actual / Possible) x 100 [rd to nearest whole #]	

Category I Wetland: (Must satisfy **one** of the following criteria. If not satisfied, proceed 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 total Possible Points is > 80%.

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following Category II criteria. If not satisfied, proceed to Category IV.)
- ☐ Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; **or**
- ☒ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
- ☐ Score of .9 or 1 functional point for General Fish/Aquatic 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 total possible points is > 65%.

☐ **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; If not satisfied, return to Category III.)
- ☐ "Low" rating for Uniqueness; **and**
- ☐ "Low" rating for Production Export / Food Chain Support; **and**
- ☐ Percent of total possible points is < 30%.

OVERALL ANALYSIS AREA (AA) RATING: (Check appropriate category based on the criteria outlined above.)

☐ **I** ☒ **II** ☐ **III** ☐ **IV**

MDT MONTANA WETLAND ASSESSMENT FORM (revised May 25, 1999)

1. Project Name: Selkirk Wetland Mitigation Reserve **2. Project #:** NH-STPP-TPX 54(31) **Control #:** 6161

3. Evaluation Date: 8/22/2007 **4. Evaluator(s):** LB/PBSJ **5. Wetland / Site #(s):** REHABILITATION (Green Area-Figure 4,APP. A)

6. Wetland Location(s) i. T: 8 N **R:** 12 E **S:** N1/2NE1/4 Sec 9 **T:** __ N **R:** __ E **S:** _____

ii. Approx. Stationing / Mileposts: _____

iii. Watershed: 10 - Musselshell **GPS Reference No. (if applies):** _____

Other Location Information: North of HWY 112, north of Selkirk FWP fishing access

7. A. Evaluating Agency PBSJ

8. Wetland Size (total acres): _____ (visually estimated)
Approx 65.8 acres (measured, e.g. GPS)

B. Purpose of Evaluation:

☐ Wetlands potentially affected by MDT project
☐ Mitigation wetlands; pre-construction
☒ Mitigation wetlands; post-construction
☐ Other

9. Assessment Area (total acres): _____ (visually estimated)
31.85 (measured, e.g. GPS)

Comments: This credit area includes the NE & SE half of the Reserve and an additional segment in the NW; acreage includes 1 acre of open water.

10. CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA

HGM CLASS [1]	SYSTEM [2]	SUBSYSTEM [2]	CLASS [2]	WATER REGIME [2]	MODIFIER [2]	% OF AA
Slope	Palustrine	None	Emergent Wetland	Seasonally Flooded	Impounded	98%
Depression	Palustrine	None	Unconsolidated Bottom	Permanently Flooded	Impounded	1%
Depression	Palustrine	None	Unconsolidated Bottom	Intermittently Exposed	Impounded	1%
---	---	---	---	---	---	

[1] = Smith et al. 1995. [2] = Cowardin et al. 1979.

Comments: This credit area includes 3 ponds and 2 swales and the confluence of the 3 reserve swales. Many shrub seedlings planted in this area.

11. ESTIMATED RELATIVE ABUNDANCE (of similarly classified sites within the same Major Montana Watershed Basin)
Common **Comments:** _____

12. GENERAL CONDITION OF AA

i. Regarding Disturbance: (Use matrix below to select appropriate response.)

Conditions Within AA	Predominant Conditions Adjacent (within 500 Feet) To AA		
	Land managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings.	Land not cultivated, but moderately grazed or hayed or selectively logged or has been subject to minor clearing; contains few roads or buildings.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density.
AA occurs and is managed in predominantly a natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings.	---	low disturbance	---
AA not cultivated, but moderately grazed or hayed or selectively logged or has been subject to relatively minor clearing, or fill placement, or hydrological alteration; contains few roads or buildings.	---	---	---
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density.	---	---	---

Comments: (types of disturbance, intensity, season, etc.) **Lateral grade checks have been placed in NW area to spread natural and irrigation run-off.**

ii. Prominent weedy, alien, & introduced species: Perennial sowthistle was noted along the 8-foot ditch fill area and in the NW half of the area.

iii. Briefly describe AA and surrounding land use / habitat: Hayland production, grazing, hwy 12.

13. STRUCTURAL DIVERSITY (Based on 'Class' column of #10 above.)

Number of 'Cowardin' Vegetated Classes Present in AA	≥3 Vegetated Classes or ≥ 2 if one class is forested	2 Vegetated Classes or 1 if forested	≤ 1 Vegetated Class
Select Rating	---	---	Low

Comments: Woody species seedlings were planted in this area in late spring of 2007; there are 3-5 mature cottonwoods in the south end of the area. The NE-SE segment of this credit area has deep-rooted species, whereas the NW segment has more shallow-rooted grasses.

14A. HABITAT FOR FEDERALLY LISTED OR PROPOSED THREATENED OR ENDANGERED PLANTS AND ANIMALS

i. AA is Documented (D) or Suspected (S) to contain (check box):

Primary or Critical habitat **(list species)**	☐ D ☐ S	_____
Secondary habitat **(list species)**	☐ D ☐ S	_____
Incidental habitat **(list species)**	☐ D ☐ S	_____
No usable habitat	☐ D ☒ S	_____

ii. Rating (Based on the strongest habitat chosen in 14A(i) above, find the corresponding rating of High (H), Moderate (M), or Low (L) for this function.

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point & Rating	---	---	---	---	---	---	0 (L)

If documented, list the source (e.g., observations, records, etc.)**:** _____

14B. HABITAT FOR PLANTS AND ANIMALS RATED AS S1, S2, OR S3 BY THE MONTANA NATURAL HERITAGE PROGRAM.
Do not include species listed in 14A(i).

i. AA is Documented (D) or Suspected (S) to contain (check box):

Primary or Critical habitat **(list species)**	☐ D ☐ S	_____
Secondary habitat **(list species)**	☒ D ☐ S	White-faced Ibis (S1B); Long-billed Curlew (S2B)
Incidental habitat **(list species)**	☐ D ☐ S	_____
No usable habitat	☐ D ☐ S	_____

ii. Rating: Based on the strongest habitat chosen in 14B(i) above, find the corresponding rating of High (H), Moderate (M), or Low (L) for this function.

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point & Rating	---	---	.7 (M)	---	---	---	---

If documented, list the source (e.g., observations, records, etc.)**:** The avian species were observed within the easement area, likely they utilize the Rehab and Re-Established areas equally. Eleocharis rostellata was planted near the south pond, however these plants could not be located.

14C. GENERAL WILDLIFE HABITAT RATING

i. Evidence of overall wildlife use in the AA: Check either substantial, moderate, or low.

☒ **Substantial** (based on any of the following)
- ☒ 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

☐ **Low** (based on any of the following)
- ☐ 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 AA

☐ **Moderate** (based on any of the following)
- ☐ 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, select the AA attribute to determine the exceptional (E), high (H), moderate (M), or low (L) rating. Structural diversity is from 13. For class cover to be considered evenly distributed, vegetated classes must be within 20% of each other in terms of their percent composition in the AA (see 10). Duration of Surface Water: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; A= absent.

Structural Diversity (from 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 12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	H	--	--
Moderate disturbance at AA (see 12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
High disturbance at AA (see 12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

iii. Rating: Use 14C(i) and 14C(ii) above and the matrix below to arrive at the functional point and rating of exceptional (E), high (H), moderate (M), or low (L) for this function.

Evidence of Wildlife Use from 14C(i)	**Wildlife Habitat Features Rating** from 14C(ii)			
	☐ **Exceptional**	☒ **High**	☐ **Moderate**	☐ **Low**
Substantial	--	.9 (H)	--	--
Moderate	--	--	--	--
Low	--	--	--	--

Comments: Avian species list thus far is nearly 30 species; the potential for this site to become a major migration stopover is very high.

14D. GENERAL FISH / AQUATIC HABITAT RATING ☒ **NA** (proceed to 14E)

If the AA is not or was not historically used by fish due to lack of habitat or excessive gradient, then check the NA box above.
Assess if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [*e.g.* fish use is precluded by perched culvert or other barrier, etc.]. If fish use occurs in the AA but is not desired from a resource management perspective (*e.g.* fish use within an irrigation canal], then Habitat Quality [14D(i)] below should be marked as "Low", applied accordingly in 14D(ii) below, and noted in the comments.

i. Habitat Quality: Pick the appropriate AA attributes in matrix to determine the quality rating of exceptional (E), high (H), moderate (M), or low (L).

Duration of Surface Water in AA	☐ **Permanent/Perennial**			☐ **Seasonal / Intermittent**			☐ **Temporary / Ephemeral**		
Cover - % of waterbody in AA containing cover objects (*e.g.* submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation)	**>25%**	**10-25%**	**<10%**	**>25%**	**10-25%**	**<10%**	**>25%**	**10-25%**	**<10%**
Shading - >75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities	--	--	--	--	--	--	--	--	--
Shading – 50 to 75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities.	--	--	--	--	--	--	--	--	--
Shading - < 50% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities.	--	--	--	--	--	--	--	--	--

ii. Modified Habitat Quality: Is fish use of the AA precluded or significantly reduced by a culvert, dike, other man-made structure or activity **or** is the waterbody included on the 'MDEQ list of waterbodies in need of TMDL development' with 'Probable Impaired Uses' listed as cold or warm water fishery or aquatic life support**?**
☐ **Y** ☐ **N** If yes, reduce the rating from 14D(i) by one level and check the modified habitat quality rating: ☐ E ☐ H ☐ M ☐ L

iii. Rating: Use the conclusions from 14D(i) and 14D(ii) above and the matrix below to arrive at the functional point and rating of exceptional (E), high (H), moderate (M), or low (L).

Types of Fish Known or Suspected within AA	**Modified Habitat Quality** from 14D(ii)			
	☐ **Exceptional**	☐ **High**	☐ **Moderate**	☐ **Low**
Native game fish	--	--	--	--
Introduced game fish	--	--	--	--
Non-game fish	--	--	--	--
No fish	--	--	--	--

Comments: _____

14E. FLOOD ATTENUATION ☐ **NA** (proceed to 14F)

Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA do not flood from in-channel or overbank flow, then check NA.

i. Rating: Working from top to bottom, mark the appropriate attributes to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.

Estimated wetland area in AA subject to periodic flooding	☐ **≥ 10 acres**			☒ **<10, >2 acres**			☐ **≤2 acres**		
% of flooded wetland classified as forested, scrub/shrub, or both	**75%**	**25-75%**	**<25%**	**75%**	**25-75%**	**<25%**	**75%**	**25-75%**	**<25%**
AA contains **no outlet or restricted outlet**	--	--	--	--	--	.5 (M)	--	--	--
AA contains **unrestricted outlet**	--	--	--	--	--	--	--	--	--

ii. Are residences, businesses, or other features which may be significantly damaged by floods located within 0.5 miles downstream of the AA? (check)
☐**Y** ☒**N** **Comments:** The meandering swales established in this credit area have the potential to collect water and flood into the wetland. Though the acreage of this credit area is >10 acres, it is unknown if flooding has occurred to this extent. It is likely that the swales and ponds have caused the flooding of 2-10 acres. At the time of the investigation, CT 3 and 9 and large portions of 11 were inudanted with 1-2 inches of water.

14F. SHORT AND LONG TERM SURFACE WATER STORAGE ☐ **NA** (proceed to 14G)

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, then check NA above.

i. Rating: Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.
P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral.

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding**.**	☒ **>5 acre feet**			☐ **<5, >1 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**	--	.9 (H)	--	--	--	--	--	--	--
Wetlands in AA flood or pond **< 5 out of 10 years**	--	--	--	--	--	--	--	--	--

Comments: In late August this credit area, nearly 100% was saturated to the surface, and 30% of the area had very shallow surface water. The swale in the NW segment was saturated and puddled in areas.

14G. SEDIMENT/NUTRIENT/TOXICANT RETENTION AND REMOVAL ☐ **NA** (proceed to 14H)

Applies to wetlands with the potential to receive excess 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, check NA above.

i. Rating Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.

Sediment, Nutrient, and Toxicant Input Levels Within AA	AA receives or surrounding land use has potential to deliver low to moderate levels of sediments, nutrients, or compounds 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 has 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 or ponding in AA	☒ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**
AA contains **no or restricted outlet**	1 (H)	--	--	--	--	--	--	--
AA contains **unrestricted outlet**	--	--	--	--	--	--	--	--

Comments: Water was flowing out of the reserve through the south berm. Approximately 80% of the swales were inundated and all of the ponds were at full pond.

14H. SEDIMENT/SHORELINE STABILIZATION ☐ **NA** (proceed to 14I)

Applies only if AA occurs on or within the banks of a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body that is subject to wave action. If this does not apply, then check NA above.

i. Rating: Working from top to bottom, use the matrix below to arrive at the functional point and rating exceptional (E), high (H), moderate (M), or low (L) for this function.

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses.	**Duration of Surface Water Adjacent to Rooted Vegetation**		
	☐**Permanent / Perennial**	☒**Seasonal / Intermittent**	☐**Temporary / Ephemeral**
≥ 65 %	--	.9 (H)	--
35-64 %	--	--	--
< 35 %	--	--	--

Comments: Water in the ponds and the swales appeared to be perennial as all of these features had some surface water, range 0-2 feet in the swale and likely 3-5 feet in the ponds; the NW end of the south swale was not inundated. Areas adjacent to the swales and ponds are vegetated with deep-rooted species, although in general CT 3, 9 and 11 are comprised of >10% *Alopecurus arundinaceus*, a non-preferred species.

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

i. Rating: Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.

A = acreage of vegetated component in the AA. **B** = structural diversity rating from #13. **C** = Yes (Y) or No (N) as to whether or not the AA contains a surface or subsurface outlet. **P/P** = permanent/perennial; **S/I** = seasonal/intermittent; **T/E/A**= temporary/ephemeral/absent.

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	☐**Y**	☐**N**	☐**Y**	☐**N**	☒**Y**	☐**N**	☐**Y**	☐**N**	☐**Y**	☐**N**	☐**Y**	☐**N**	☐**Y**	☐**N**	☐**Y**	☐**N**	☐**Y**	☐**N**
P/P	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S/I	--	--	--	--	.7M	--	--	--	--	--	--	--	--	--	--	--	--	--
T/E/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Comments: Perennial surface water areas (swales and ponds) is <1% of this credit area).

14J. GROUNDWATER DISCHARGE / RECHARGE (DR) (Check the indicators in i & ii below that apply to the AA.)

i. ☒ **Discharge Indicators**
- ☐ Springs 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.
- ☐ Other _____

ii. ☒ **Recharge Indicators**
- ☐ Permeable substrate presents without underlying impeding layer.
- ☐ Wetland contains inlet but not outlet.
- ☒ Other see NOTE*

iii. Rating: Use information from 14J(i) and 14J(ii) above and the table below to arrive at the functional point and rating of high (H) or low (L) for this function.

Criteria	**Functional Point and Rating**
AA has known Discharge/Recharge area or one or more indicators of D/R present	1 (H)
No Discharge/Recharge indicators present	--
Available Discharge/Recharge information inadequate to rate AA D/R potential	--

Comments: NOTE*: Wetland receives groundwater from slope to north and east and it is likely that water flows through the soil layers toward the Mussellshell River.

14K. UNIQUENESS

i. Rating: Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.

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 from 11	☐rare	☐common	☐abundant	☐rare	☒common	☐abundant	☐rare	☐common	☐abundant
Low disturbance at AA (12i)	--	--	--	--	.6M	--	--	--	--
Moderate disturbance at AA (12i)	--	--	--	--	--	--	--	--	--
High disturbance at AA (12i)	--	--	--	--	--	--	--	--	--

Comments: _____

14L. RECREATION / EDUCATION POTENTIAL

i. Is the AA a known recreational or educational site? ☐ **Yes** [**Rate** ☐ **High (1.0)**, then proceed to 14L(ii) only] ☒ **No** [Proceed to 14L(iii)]

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

iii. Based on the location, diversity, size, and other site attributes, is there a strong potential for recreational or educational use?

☒ **Yes** [Proceed to 14L (ii) and then 14L(iv)] ☐ **No** [Rate as Low (0.1) in 14L(iv)]

iv. Rating Use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.

Ownership	**Disturbance at AA from 12(i)**		
	☒ Low	☐ Moderate	☐ High
Public ownership	--	--	--
Private ownership	.7(M)	--	--

Comments: Wildlife viewing.

FUNCTION, VALUE SUMMARY, AND OVERALL RATING

Function and Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage)
A. Listed/Proposed T&E Species Habitat	low	0.00	1	
B. MT Natural Heritage Program Species Habitat	moderate	0.70	1	
C. General Wildlife Habitat	high	0.90	1	
D. General Fish/Aquatic Habitat	N/A	-	--	
E. Flood Attenuation	moderate	0.50	1	
F. Short and Long Term Surface Water Storage	high	0.90	1	
G. Sediment/Nutrient/Toxicant Removal	high	1.00	1	
H. Sediment/Shoreline Stabilization	high	0.90	1	
I. Production Export/Food Chain Support	moderate	0.70	1	
J. Groundwater Discharge/Recharge	high	1.00	1	
K. Uniqueness	moderate	0.6	1	
L. Recreation/Education Potential	moderate	0.70	1	
	Total:	**7.90**	**11.00**	**252.0**
	Percent of Total Possible Points:		**72%** (Actual / Possible) x 100 [rd to nearest whole #]	

Category I Wetland: (Must satisfy **one** of the following criteria. If not satisfied, proceed 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 total Possible Points is > 80%.

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following Category II criteria. If not satisfied, proceed to Category IV.)
- ☐ Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; **or**
- ☒ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
- ☐ Score of .9 or 1 functional point for General Fish/Aquatic 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 total possible points is > 65%.

☐ **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; If not satisfied, return to Category III.)
- ☐ "Low" rating for Uniqueness; **and**
- ☐ "Low" rating for Production Export / Food Chain Support; **and**
- ☐ Percent of total possible points is < 30%.

OVERALL ANALYSIS AREA (AA) RATING: (Check appropriate category based on the criteria outlined above.)

☐ **I** ☒ **II** ☐ **III** ☐ **IV**

MDT MONTANA WETLAND ASSESSMENT FORM (revised May 25, 1999)

1. Project Name: Selkirk Wetland Mitigation Reserve **2. Project #:** NH-STPP-TPX 54(31) **Control #:** 6161

3. Evaluation Date: 8/22/2007 **4. Evaluator(s):** LB/PBSJ **5. Wetland / Site #(s):** ENHANCEMENT (Purple-Figure 4, APP. A)

6. Wetland Location(s) i. T: 8 N **R:** 12 E **S:** N1/2NE1/4 Sec 9 **T:** __ N **R:** __ E **S:** _____

ii. Approx. Stationing / Mileposts: _____

iii. Watershed: 10 - Musselshell **GPS Reference No. (if applies):** _____

Other Location Information: North of HWY 112, north of Selkirk FWP fishing access

7. A. Evaluating Agency PBSJ

8. Wetland Size (total acres): _____ (visually estimated)
1.0 (measured, e.g. GPS)

B. Purpose of Evaluation:

- ☐ Wetlands potentially affected by MDT project
- ☐ Mitigation wetlands; pre-construction
- ☒ Mitigation wetlands; post-construction
- ☐ Other

9. Assessment Area (total acres): _____ (visually estimated)
1.0 (measured, e.g. GPS)

Comments: This credit area is in the south corner of the reserve site.

10. CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA

HGM CLASS [1]	SYSTEM [2]	SUBSYSTEM [2]	CLASS [2]	WATER REGIME [2]	MODIFIER [2]	% OF AA
Depression	Palustrine	None	Emergent Wetland	Permanently Flooded	Impounded	5
Depression	Palustrine	None	Emergent Wetland	Saturated	Impounded	85
Depression	Palustrine	None	Scrub-Shrub Wetland	Saturated	Impounded	5
---	---	---	---	---	---	

[1] = Smith et al. 1995. [2] = Cowardin et al. 1979.

Comments: Area is adjacent to HWY 12, mostly cattails and grass species with a small shrub community. Outflow of all reserve site occurs within this credit area.

11. ESTIMATED RELATIVE ABUNDANCE (of similarly classified sites within the same Major Montana Watershed Basin)
Common Comments: _____

12. GENERAL CONDITION OF AA

i. Regarding Disturbance: (Use matrix below to select appropriate response.)

Conditions Within AA	Predominant Conditions Adjacent (within 500 Feet) To AA		
	Land managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings.	Land not cultivated, but moderately grazed or hayed or selectively logged or has been subject to minor clearing; contains few roads or buildings.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density.
AA occurs and is managed in predominantly a natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings.	---	low disturbance	---
AA not cultivated, but moderately grazed or hayed or selectively logged or has been subject to relatively minor clearing, or fill placement, or hydrological alteration; contains few roads or buildings.	---	---	---
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density.	---	---	---

Comments: (types of disturbance, intensity, season, etc.) Culverts conveying water from wetland sites to the north flow throgh this area.

ii. Prominent weedy, alien, & introduced species: There is some knapweed west of the enhancement area, on the bank adjacent to the installed south side berm outside of the project berm.

iii. Briefly describe AA and surrounding land use / habitat: Hayland production, grazing, hwy 12.

13. STRUCTURAL DIVERSITY (Based on 'Class' column of #10 above.)

Number of 'Cowardin' Vegetated Classes Present in AA	≥3 Vegetated Classes or ≥ 2 if one class is forested	2 Vegetated Classes or 1 if forested	≤ 1 Vegetated Class
Select Rating	---	Moderate	---

Comments: This credit area includes a small native mature willow community.

14A. HABITAT FOR FEDERALLY LISTED OR PROPOSED THREATENED OR ENDANGERED PLANTS AND ANIMALS

i. AA is Documented (D) or Suspected (S) to contain (check box):

Primary or Critical habitat **(list species)**	☐ D ☐ S	_____
Secondary habitat **(list species)**	☐ D ☐ S	_____
Incidental habitat **(list species)**	☐ D ☐ S	_____
No usable habitat	☐ D ☒ S	_____

ii. Rating (Based on the strongest habitat chosen in 14A(i) above, find the corresponding rating of High (H), Moderate (M), or Low (L) for this function.

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point & Rating	---	---	---	---	---	---	---

If documented, list the source (e.g., observations, records, etc.)**:** _____

14B. HABITAT FOR PLANTS AND ANIMALS RATED AS S1, S2, OR S3 BY THE MONTANA NATURAL HERITAGE PROGRAM.
Do not include species listed in 14A(i).

i. AA is Documented (D) or Suspected (S) to contain (check box):

Primary or Critical habitat **(list species)**	☐ D ☐ S	_____
Secondary habitat **(list species)**	☒ D ☐ S	Juncus hallii (S2)
Incidental habitat **(list species)**	☐ D ☐ S	_____
No usable habitat	☐ D ☐ S	_____

ii. Rating: Based on the strongest habitat chosen in 14B(i) above, find the corresponding rating of High (H), Moderate (M), or Low (L) for this function.

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point & Rating	---	---	.7 (M)	---	---	---	---

If documented, list the source (e.g., observations, records, etc.)**:** Juncus hallii was planted in the Enhancement area during late spring 2007.

14C. GENERAL WILDLIFE HABITAT RATING

i. Evidence of overall wildlife use in the AA: Check either substantial, moderate, or low.

☐ **Substantial** (based on any of the following)
- ☐ 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

☐ **Low** (based on any of the following)
- ☐ 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 AA

☒ **Moderate** (based on any of the following)
- ☒ 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, select the AA attribute to determine the exceptional (E), high (H), moderate (M), or low (L) rating. Structural diversity is from 13. For class cover to be considered evenly distributed, vegetated classes must be within 20% of each other in terms of their percent composition in the AA (see 10). Duration of Surface Water: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; A= absent.

Structural Diversity (from 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 12)	--	--	--	--	--	--	--	--	--	H	--	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (see 12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
High disturbance at AA (see 12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

iii. Rating: Use 14C(i) and 14C(ii) above and the matrix below to arrive at the functional point and rating of exceptional (E), high (H), moderate (M), or low (L) for this function.

Evidence of Wildlife Use from 14C(i)	**Wildlife Habitat Features Rating** from 14C(ii)			
	☐ **Exceptional**	☒ **High**	☐ **Moderate**	☐ **Low**
Substantial	--	--	--	--
Moderate	--	.7 (M)	--	--
Low	--	--	--	--

Comments: Wilson's Phalarope were observed feeding in the pipe inlet area; the pipe conveys water from most of the reserve site into the enhancement area.

14D. GENERAL FISH / AQUATIC HABITAT RATING ☒ **NA** (proceed to 14E)

If the AA is not or was not historically used by fish due to lack of habitat or excessive gradient, then check the NA box above.
Assess if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [*e.g.* fish use is precluded by perched culvert or other barrier, etc.]. If fish use occurs in the AA but is not desired from a resource management perspective (*e.g.* fish use within an irrigation canal], then Habitat Quality [14D(i)] below should be marked as "Low", applied accordingly in 14D(ii) below, and noted in the comments.

i. Habitat Quality: Pick the appropriate AA attributes in matrix to determine the quality rating of exceptional (E), high (H), moderate (M), or low (L).

Duration of Surface Water in AA	☐ **Permanent/Perennial**			☐ **Seasonal / Intermittent**			☐ **Temporary / Ephemeral**		
Cover - % of waterbody in AA containing cover objects (*e.g.* submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation)	**>25%**	**10-25%**	**<10%**	**>25%**	**10-25%**	**<10%**	**>25%**	**10-25%**	**<10%**
Shading - >75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities	--	--	--	--	--	--	--	--	--
Shading – 50 to 75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities.	--	--	--	--	--	--	--	--	--
Shading - < 50% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities.	--	--	--	--	--	--	--	--	--

ii. Modified Habitat Quality: Is fish use of the AA precluded or significantly reduced by a culvert, dike, other man-made structure or activity **or** is the waterbody included on the 'MDEQ list of waterbodies in need of TMDL development' with 'Probable Impaired Uses' listed as cold or warm water fishery or aquatic life support**?**
☐ **Y** ☐ **N** If yes, reduce the rating from 14D(i) by one level and check the modified habitat quality rating: ☐ E ☐ H ☐ M ☐ L

iii. Rating: Use the conclusions from 14D(i) and 14D(ii) above and the matrix below to arrive at the functional point and rating of exceptional (E), high (H), moderate (M), or low (L).

Types of Fish Known or Suspected within AA	**Modified Habitat Quality** from 14D(ii)			
	☐ **Exceptional**	☐ **High**	☐ **Moderate**	☐ **Low**
Native game fish	--	--	--	--
Introduced game fish	--	--	--	--
Non-game fish	--	--	--	--
No fish	--	--	--	--

Comments: _____

14E. FLOOD ATTENUATION ☐ **NA** (proceed to 14F)

Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA do not flood from in-channel or overbank flow, then check NA.

i. Rating: Working from top to bottom, mark the appropriate attributes to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.

Estimated wetland area in AA subject to periodic flooding	☐ **≥ 10 acres**			☐ **<10, >2 acres**			☒ **≤2 acres**		
% of flooded wetland classified as forested, scrub/shrub, or both	**75%**	**25-75%**	**<25%**	**75%**	**25-75%**	**<25%**	**75%**	**25-75%**	**<25%**
AA contains **no outlet or restricted outlet**	--	--	--	--	--	--	--	--	.2 (L)
AA contains **unrestricted outlet**	--	--	--	--	--	--	--	--	--

ii. Are residences, businesses, or other features which may be significantly damaged by floods located within 0.5 miles downstream of the AA? (check)
☐**Y** ☒**N** **Comments:** Outlet from wetlands to the north of the berm flow through this wetland area, and a channel has formed.

14F. SHORT AND LONG TERM SURFACE WATER STORAGE ☐ **NA** (proceed to 14G)

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, then check NA above.

i. Rating: Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.
P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral.

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding**.**	☐ **>5 acre feet**			☐ **<5, >1 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**	--	--	--	--	--	--	--	.3 (L)	--
Wetlands in AA flood or pond **< 5 out of 10 years**	--	--	--	--	--	--	--	--	--

Comments: _____

14G. SEDIMENT/NUTRIENT/TOXICANT RETENTION AND REMOVAL ☐ **NA** (proceed to 14H)

Applies to wetlands with the potential to receive excess 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, check NA above.

i. Rating Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.

Sediment, Nutrient, and Toxicant Input Levels Within AA	AA receives or surrounding land use has potential to deliver low to moderate levels of sediments, nutrients, or compounds 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 has 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 or ponding in AA	☒ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**
AA contains **no or restricted outlet**	1 (H)	--	--	--	--	--	--	--
AA contains **unrestricted outlet**	--	--	--	--	--	--	--	--

Comments: _____

14H. SEDIMENT/SHORELINE STABILIZATION ☐ **NA** (proceed to 14I)

Applies only if AA occurs on or within the banks of a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body that is subject to wave action. If this does not apply, then check NA above.

i. Rating: Working from top to bottom, use the matrix below to arrive at the functional point and rating exceptional (E), high (H), moderate (M), or low (L) for this function.

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses.	Duration of Surface Water Adjacent to Rooted Vegetation		
	☐ Permanent / Perennial	☒ Seasonal / Intermittent	☐ Temporary / Ephemeral
≥ 65 %	--	.9 (H)	--
35-64 %	--	--	--
< 35 %	--	--	--

Comments: ALong outflow channel the vegetation community is comprised of deep-rooted species such as cattail,

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

i. Rating: Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function. **A** = acreage of vegetated component in the AA. **B** = structural diversity rating from #13. **C** = Yes (Y) or No (N) as to whether or not the AA contains a surface or subsurface outlet. **P/P** = permanent/perennial; **S/I** = seasonal/intermittent; **T/E/A**= temporary/ephemeral/absent.

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	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☒Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N
P/P	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S/I	--	--	--	--	--	--	--	--	.7M	--	--	--	--	--	--	--	--	--
T/E/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Comments: _____

14J. GROUNDWATER DISCHARGE / RECHARGE (DR) (Check the indicators in i & ii below that apply to the AA.)

i. ☒ Discharge Indicators

- ☐ Springs 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.
- ☐ Other _____

ii. ☒ Recharge Indicators

- ☐ Permeable substrate presents without underlying impeding layer.
- ☐ Wetland contains inlet but not outlet.
- ☒ Other see NOTE*

iii. Rating: Use information from 14J(i) and 14J(ii) above and the table below to arrive at the functional point and rating of high (H) or low (L) for this function.

Criteria	Functional Point and Rating
AA has known Discharge/Recharge area or one or more indicators of D/R present	1 (H)
No Discharge/Recharge indicators present	--
Available Discharge/Recharge information inadequate to rate AA D/R potential	--

Comments: NOTE*: HWY 12 forms a berm at the toe of the wetland, likely water seeps under road in addition to flowing through the cuvlert.

14K. UNIQUENESS

i. Rating: Working from top to bottom, use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.

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 from 11	☐rare	☐common	☐abundant	☐rare	☒common	☐abundant	☐rare	☐common	☐abundant
Low disturbance at AA (12i)	--	--	--	--	.6M	--	--	--	--
Moderate disturbance at AA (12i)	--	--	--	--	--	--	--	--	--
High disturbance at AA (12i)	--	--	--	--	--	--	--	--	--

Comments: sensitive species = Juncus hallii.

14L. RECREATION / EDUCATION POTENTIAL

i. Is the AA a known recreational or educational site? ☐ **Yes** [**Rate** ☐ **High (1.0)**, then proceed to 14L(ii) only] ☒ **No** [Proceed to 14L(iii)]

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

iii. Based on the location, diversity, size, and other site attributes, is there a strong potential for recreational or educational use?

☒ **Yes** [Proceed to 14L (ii) and then 14L(iv)] ☐ **No** [Rate as Low (0.1) in 14L(iv)]

iv. Rating Use the matrix below to arrive at the functional point and rating of high (H), moderate (M), or low (L) for this function.

Ownership	Disturbance at AA from 12(i)		
	☒ Low	☐ Moderate	☐ High
Public ownership	--	--	--
Private ownership	.7(M)	--	--

Comments: Wildlife viewing.

FUNCTION, VALUE SUMMARY, AND OVERALL RATING

Function and Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage)
A. Listed/Proposed T&E Species Habitat	low	0.00	1	
B. MT Natural Heritage Program Species Habitat	moderate	0.70	1	
C. General Wildlife Habitat	moderate	0.70	1	
D. General Fish/Aquatic Habitat	N/A	-	--	
E. Flood Attenuation	low	0.20	1	
F. Short and Long Term Surface Water Storage	low	0.30	1	
G. Sediment/Nutrient/Toxicant Removal	high	1.00	1	
H. Sediment/Shoreline Stabilization	high	0.90	1	
I. Production Export/Food Chain Support	moderate	0.70	1	
J. Groundwater Discharge/Recharge	high	1.00	1	
K. Uniqueness	moderate	0.60	1	
L. Recreation/Education Potential	moderate	0.70	1	
	Total:	**6.80**	**11.00**	6.80
		Percent of Total Possible Points:	**62%** (Actual / Possible) x 100 [rd to nearest whole #]	

Category I Wetland: (Must satisfy **one** of the following criteria. If not satisfied, proceed 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 total Possible Points is > 80%.

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following Category II criteria. If not satisfied, proceed to Category IV.)
- ☐ Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; **or**
- ☐ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
- ☐ Score of .9 or 1 functional point for General Fish/Aquatic 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 total possible points is > 65%.

☒ **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; If not satisfied, return to Category III.)
- ☐ "Low" rating for Uniqueness; **and**
- ☐ "Low" rating for Production Export / Food Chain Support; **and**
- ☐ Percent of total possible points is < 30%.

OVERALL ANALYSIS AREA (AA) RATING: (Check appropriate category based on the criteria outlined above.)

☐ **I** ☐ **II** ☒ **III** ☐ **IV**

Appendix C

2007 REPRESENTATIVE PHOTOGRAPHS

MDT Wetland Mitigation Monitoring
Selkirk Wetland Mitigation Reserve
Two Dot, Montana

2007 SELKIRK WETLAND MITIGATION RESERVE

Location: A **Description:** NE pond, Rehabilitation credit area. **View: NW**

Location: B **Description:** NE pond, Rehabilitation credit area. **View: W**

Location: C **Description:** NE pond, Rehabilitation credit area. **View: SW**

Location: D **Description:** Shrub pod north end Re-establishment/Creation credit area. **View: NE**

Location: E **Description:** Shrub pod north end Re-establishment/Creation credit area. **View: SW**

Location: F **Description:** West end of swale Re-establishment/Creation credit area. **View: SW**

2007 SELKIRK WETLAND MITIGATION RESERVE

Location: G **Description:** West end of swale Re-establishment/Creation credit area. **View: NE**

Location: H **Description:** Central south berm Re-establishment/Creation credit area. **View: NW**

Location: I **Description:** Central south berm Re-establishment/Creation credit area. **View: NE**

Location: J **Description:** Central south berm Re-establishment/Creation credit area. **View: SE**

Location: K **Description:** Central south berm Re-establishment/Creation credit area. **View: SW**

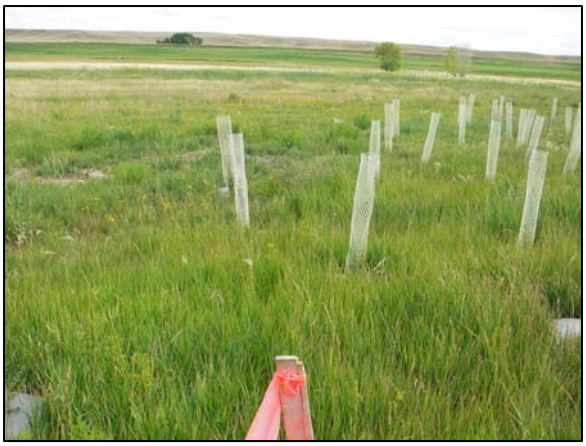
Location: L **Description:** East transect end Rehabilitation credit area. **View: NW**

2007 SELKIRK WETLAND MITIGATION RESERVE

Location: M **Description:** East transect end Rehabilitation credit area. **View: SSW**

Location: N **Description:** East transect end Rehabilitation credit area. **View: E**

Location: O **Description:** East transect end Rehabilitation credit area. **View: NE**



Location: P **Description:** West transect end Re-establishment/Creation credit area. **View: SE**

Location: Q **Description:** West transect end Re-establishment/Creation credit area. **View: NE**

Location: R **Description:** West transect end Re-establishment/Creation credit area. **View: S**

2007 SELKIRK WETLAND MITIGATION RESERVE

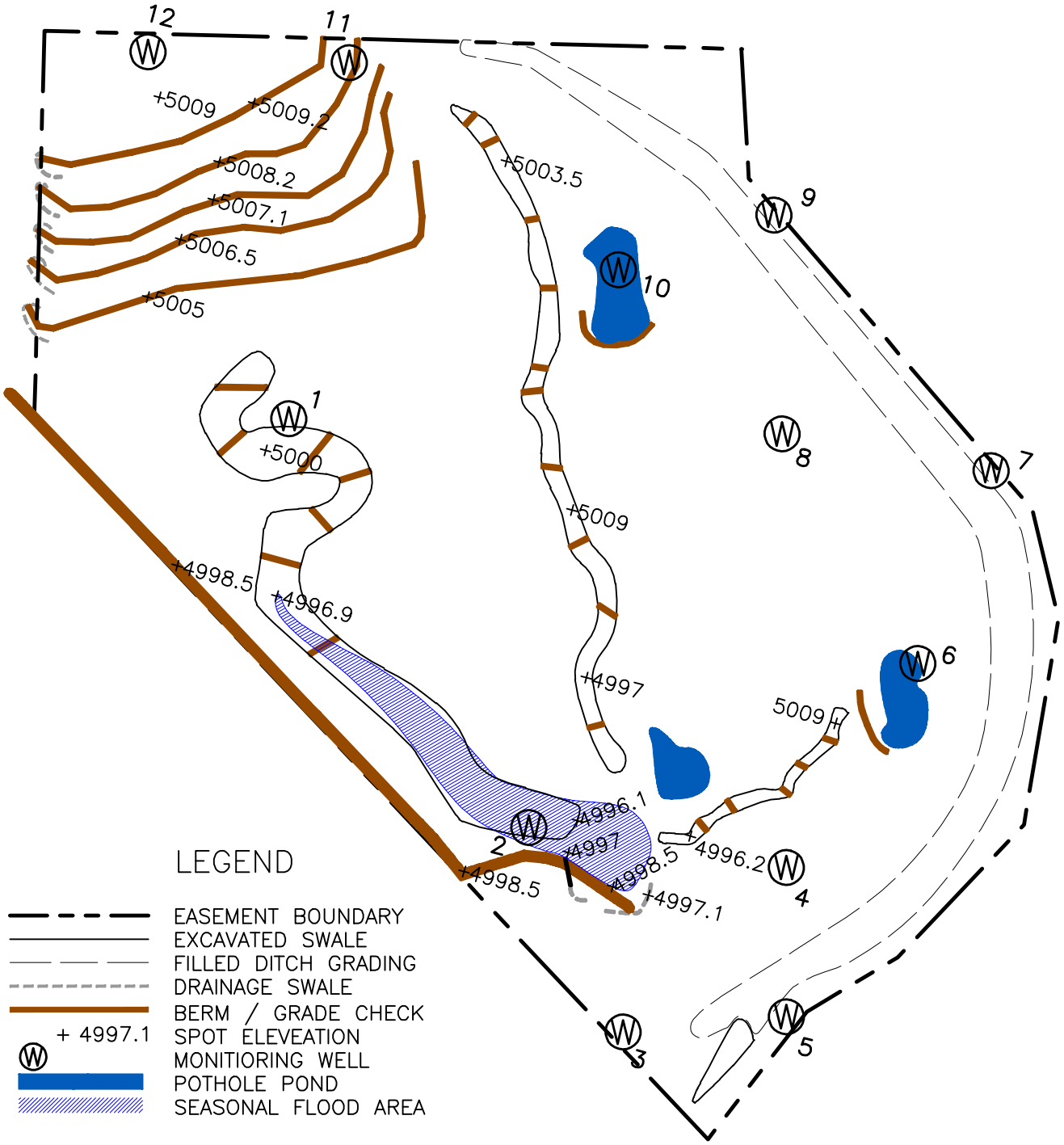
Location: S **Description:** West transect end Re-establishment/Creation credit area. **View: W**

Location: T **Description:** *Juncus hallii* planting. **View: NW**

Appendix D

AS-BUILT PLANVIEW

MDT Wetland Mitigation Monitoring
Selkirk Wetland Mitigation Reserve
Two Dot, Montana



NOTE:
MONITORING WELL #10 REMOVED DURING CONSTRUCTION

oasis ENVIRONMENTAL

DATE: 05/01/07
CHKD: J.R.
DRAWN: bz
PROJ. No.: 321-001

PO Box 582 Livingston, MT 59047 (406) 222 7600

AS BUILT SITE PLAN

SELKIRK MITIGATION
TWO DOT, MT

FIGURE

1

PATH: 321-001/cad files/as built.dwg

Appendix E

BIRD SURVEY PROTOCOL
GPS PROTOCOL

MDT Wetland Mitigation Monitoring
Selkirk Wetland Mitigation Reserve
Two Dot, Montana

BIRD SURVEY PROTOCOL

This protocol was developed by the Montana Department of Transportation (MDT) to monitor bird use within their Wetland Mitigation Sites. Though each wetland mitigation site is vastly different, the bird survey data collection methods were standardized to order to increase repeatability. The protocol uses an "area search within a restricted time frame" to collect data on bird species, density, behavior, and habitat-type use.

Survey Area

Sites that can be entirely walked: Sites where the entire perimeter or area can be walked include, but are not limited to: small ponds, enhanced historic river channels, and wet meadows. If the wetland is not uncomfortably inundated, walk several meandering transects to sufficiently cover the wetland. Meandering transects can be used, even if a small portion of the area is inaccessible (e.g. cannot cross due to inundation). Use binoculars to identify the bird species, to count the number of individuals, and to identify their behavior and habitat type. Data can be recorded directly onto the bird survey form or into a field notebook. The number of meandering transects and their direction (or location) should be recorded in the field notebook and/or drawn onto the aerial photograph or topographic map. Meandering transects are not formal and should not be staked. Each site should be walked and surveyed to the fullest extent within the set time limit.

Sites than cannot be entirely walked: Sites where the entire perimeter or area cannot be walked include, but are not limited to: very large sites (i.e. perimeter of 2-3 miles), and large-bodied waters (i.e. reservoirs), where deep water habitat (> 6 feet) is close to shore. For large-bodied waters where only one area was graded to create or enhance the development of wetland, bird surveys should be walked along meandering transects within or around the graded area (see above.). For sites that cannot be walked, bird surveys should be conducted from many lookout posts, established at key vantage points. The general location of lookout posts should be recorded in the field notebook or drawn onto the aerial photograph or topographic map. Lookout post locations do not need to be staked. Both binoculars and spotting scopes may be used in order to accurately identify and count the birds. Depending upon the size of the open water, more time may be spent viewing the mitigation area from lookout posts than is spent traveling between posts.

Survey Time

Ideally, bird surveys should be conducted in the morning hours when bird activity is often greatest (i.e. sunrise to no later than 11:00 am). Surveys can be completed before 11am if all transects have been walked or all lookout posts have been viewed with no new bird activity observed. For some sites bird surveys may need to be performed in the late afternoon or evening due to traveling constraints or weather. The overall limiting time factor will be the number of budgeted hours for the project.

Data Recording

Bird Species List: Record each bird species observed onto the Bird Survey-Field Data Sheet (or field notebook). Record the bird's common name using the appropriate 4-letter code. The 4-letter code uses the first two letters of the first two word's of the bird's common name or if one name, the first four letters. For example, Mourning Dove is coded as MODO while Mallard is coded as MALL. If an unknown individual is observed, use the 4-letter protocol, but define your

abbreviation at the bottom of the field data sheet. For example, unknown shorebird is UNSB; unknown brown bird is UNBR; unknown warbler is UNWA; and unknown waterfowl is UNWF. For a flyover of a flock of unknown species, use a term that describes the birds' general characteristics and include the approximate flock size in parenthesis; do not fill in the habitat column. For example, a flock of black, medium-sized birds could be coded as UNBB / FO (25).

Bird Density: For each observation record the actual or estimated number of individuals observed per species and per behavior. Totals can be tallied in the office and entered onto the Bird Survey-Field Data Sheet.

Bird Behavior: Bird behavior must be identified by what is known. When a species is observed, the behavior that is immediately exhibited is recorded. Only behaviors that have discreet descriptive terms should be used. The following terms are recommended: breeding pair (BP); foraging (F); flyover (FO); loafing (L), which is defined as sleeping, roosting, or floating with head tucked under wing; and nesting (N). If other behaviors that have a specific descriptive word are observed then it can be used and should later be added to the protocol. Descriptive words or phrases such as "migrating" or "living on site" are unknown behaviors.

Bird Species Habitat Use: When a species is observed, the habitat is also recorded. The following broad habitat categories are used:

- aquatic bed (AB), defined as rooted-floating, floating-leaved, or submergent vegetation.
- marsh (MA), defined as emergent (e.g. cattail, bulrush) vegetation with surface water.
- wet meadow (WM), defined as grasses, sedges, or rushes with little to no surface water.
- scrub-shrub (SS), defined as shrub covered wetland.
- forested (FO), defined as tree covered wetland.
- open water (OW), defined as unvegetated surface water.
- upland (UP), defined as the upland buffer.

Other categories can be used and defined on the data sheet and should later be added to the protocol.

Other Fields

Bird Visit: Each bird survey (i.e. spring, fall, and mid-season) should be completed on separate Bird Survey-Field Data Sheets.

Time: Record the start time and end time on the Bird Survey-Field Data Sheet.

Date: Record the date of the bird survey.

Weather: Record the weather conditions (i.e. temperature, wind, condition).

Notes: Note if a particular individual bird is using a constructed nest box and note the condition of constructed nest box(es). Also record any comments about the site, wildlife, wetland conditions, etc.

GPS MAPPING AND AERIAL PHOTO REFERENCING PROCEDURE

From 2001 through 2006, PBS&J mapped the vegetation community boundaries, photograph points, and other sampling locations in the field using the resource-grade Trimble GEO III GPS (Global Positioning System) unit. The data were collected with a minimum of three positions per feature using Course/Acquisition code. The collected data were then transferred to a personal computer (PC) and differentially corrected to the nearest operating Community Base Station. The corrected data were then exported to ACAD drawings in Montana State Plain Coordinates NAD 83 international feet.

The collected and processed Trimble Geo III GPS positions had a 68% accuracy of 7 feet except in isolated areas where accuracy fell to 12 feet. This is within the 1 to 5 meter range listed as the expected accuracy of the mapping grade Trimble GPS.

In 2007, some sites continued to be mapped using the Trimble GEO III GPS unit while most sites were mapped using the resource-grade Magellan MobileMapper Office GPS unit. The Magellan GPS unit has a comparable accuracy level to the Trimble Geo III unit.

Each year, MDT photographs each mitigation site from the air. These aerial photographs are not geo-referenced, but serve as a visual aid to map wetland development and vegetation communities, and to show approximate locations for various monitoring activities (i.e. photograph points, transects, or macroinvertebrate sampling). Reference points that are observable on the aerial photo (i.e. road, stream channel, or fence) were also marked with the GPS unit in order to better position the aerial photograph. This positioning did not remove any of the distortion inherent to all photos. All mapped features and community boundaries were reviewed by the wetland biologist, to increase the figure's accuracy.

Any relationship of features located to easement or property lines are not to be construed from these figures. These relationships can only be determined with a survey by a licensed surveyor.

Appendix F

2007 MACROINVERTEBRATE SAMPLING PROTOCOL & DATA

MDT Wetland Mitigation Monitoring
Selkirk Wetland Mitigation Reserve
Two Dot, Montana

AQUATIC INVERTEBRATE SAMPLING PROTOCOL

Equipment List

- D-frame sampling net with 1 mm mesh.
- 1-liter, wide-mouth, plastic sample jars provided by Rhithron Associates, Inc. (Quart sized, wide-mouthed canning jars can be substituted.)
- 95% ethanol (alternatively isopropyl alcohol).
- Pre-printed sample labels (printed on rite-in-the-rain paper); two labels per sample.
- Pencil.
- Clear packaging tape.
- 3-5 gallon plastic pail.
- Large tea strainer or framed screen.
- Cooler with ice for storing sample.

Site Selection

Select a site that is accessible with hip waders or rubber boots. If the substrate is too soft, place a wide board down to walk on. Choose a site that is representative of the overall condition of the wetland. Annual sampling should occur at the same site within the wetland.

Sampling Procedure

Wetland invertebrates (macroinvertebrates) inhabit the substrate, the water column, the stems and leaves of aquatic vegetation, and the water surface. At the given location, each habitat type is sampled and combined into a single 1-liter sample jar. Pre-cautions are made to minimize disturbing the sample site in order to maximize the number of animals collected.

Fill the pail with approximately 1 gallon of wetland water. Ideally, sample the water column from near-shore outward to a depth of 3 feet. Sample the water column using a long sweep of the net, keeping the net at about half the depth of the water. Sample the water surface with a long sweep of the net. Aquatic vegetation is sampled by pulling the net beneath the water surface, for at least a meter in distance. The substrate is sampled by pulling the net along the bottom, bumping it against the substrate several times as you pull. Be sure to place some muck, mud, and/or vegetation into the jar. After sampling a habitat, rinse the net in the bucket and look for insects, crustaceans, and other aquatic invertebrates. It is not necessary to sample habitats in any specific order, but all habitats, if present, are to be sampled. Habitats can be sampled more than once.

Fill about 1 cup of ethanol into the sample jar. Sieve the contents of the bucket through the straining device and pour or carefully scrape the contents of the strainer into the sample jar. Top off the jar with enough ethanol to cover all the material and leave as little headroom as possible. Alternatively, sampled materials can be lifted out of the net and put directly into the jar. Be sure to include some muck, mud, and/or vegetation into the jar. Each macroinvertebrate sampling site should have only one sampling jar.

Using pencil, complete two labels with the required information: project name, project number, date, collector's name, and habitats sampled. Do not complete the label with ink as it will dissolve in ethanol. For wetlands with at least two macroinvertebrate sampling sites, number the site consecutively followed by the total number of sites (e.g. Sample 2 of 3 sites). Place one label into the jar and seal the jar. Dry the jar off, if necessary, and tape the second label to the outside of the jar.

Photograph each macroinvertebrate sampling site.

Sample Handling/Delivery

In the field, keep sample jars cool by placing in a cooler with a small amount of ice.
Deliver samples to the PBS&J office in Missoula, where they will be inventoried and delivered to Rhithron Associates, Inc.

MDT Mitigated Wetland Monitoring Project: Aquatic Invertebrate Monitoring
Summary 2001 – 2007

Prepared for Post, Buckley, Schuh, and Jernigan (PBS&J)
Prepared by W.Bollman, Rhithron Associates, Inc.

INTRODUCTION

Aquatic invertebrate assemblages were collected at a number of mitigated wetlands throughout Montana. This report summarizes data generated from seven years of collection. Over all years of sampling, a total of 182 invertebrate samples were collected. Table 1 lists the currently monitored sites at which aquatic invertebrates were collected in 2007, and summarizes the sampling history of each.

METHODS

Sample processing

Aquatic invertebrate samples were collected at mitigated wetland sites in the summer months of 2001, 2002, 2003, 2004, 2005, 2006 and 2007 by personnel of PBS&J. Sampling procedures utilized were based on the protocols developed by the Montana Department of Environmental Quality (MT DEQ) for wetland sampling. Sampling consisted of D-frame net sweeps through emergent vegetation (when present), the water column, and over the water surface, and included disturbing and scraping substrates at each sampled site. These sample components were composited and preserved in ethanol at each wetland site. Samples were delivered to Rhithron Associates, Inc. for processing, taxonomic determinations, and data analysis.

Standard sorting protocols were applied to achieve representative subsamples of a minimum of 100 organisms. Caton sub-sampling devices (Caton 1991), divided into 30 grids, each approximately 5 cm by 6 cm, were used. Grid contents were examined under stereoscopic microscopes using 10x-30x magnification. All aquatic invertebrates from each selected grid were sorted from the substrate, and placed in 95% ethanol for subsequent identification. Grid selection, examination, and sorting continued until at least 100 organisms were sorted. A large/rare search was conducted to collect any taxa not found in the subsampling procedure.

Organisms were individually examined using 10x – 80x stereoscopic dissecting scopes (Leica S8E and S6E) and identified to the lowest practical taxonomic levels using appropriate published taxonomic references. Identification, counts, life stages, and information about the condition of specimens were recorded on bench sheets. To obtain accuracy in richness measures, organisms that could not be identified to the target level specified in MDEQ protocols were designated as “not unique” if other specimens from the same group could be taken to target levels. Organisms designated as “unique” were those that could be definitively distinguished from other organisms in the sample. Identified organisms were preserved in 95% ethanol in labeled vials, and archived at the Rhithron laboratory. Midges were morphotyped using 10x – 80x stereoscopic dissecting microscopes (Leica S8E and S6E) and representative specimens were slide mounted and examined at 200x – 1000x magnification using an Olympus BX 51 compound microscope. Slide mounted organisms were also archived at the Rhithron laboratory.

Quality assurance systems

Quality control procedures for initial sample processing and subsampling involved checking sorting efficiency. These checks were conducted on 96% of the samples by independent observers who microscopically re-examined 20% of sorted substrate from each sample. All organisms that were missed were counted and this number was added to the total number obtained in the original sort. Sorting efficiency was evaluated by applying the following calculation:

$$SE = \frac{n_1}{n_{1+2}} \times 100$$

where: SE is the sorting efficiency, expressed as a percentage, n_1 is the total number of specimens in the first sort, and n_{1+2} is the total number of specimens in the first and second sorts combined.

Quality control procedures for taxonomic determinations of invertebrates involved checking accuracy, precision and enumeration. At least 10% of samples are targeted for quality assurance procedures. For this project, three samples were randomly selected and all organisms re-identified and counted by an independent taxonomist. Taxa lists and enumerations were compared by calculating a Bray-Curtis similarity statistic (Bray and Curtis 1957) for each

selected sample. Routinely, discrepancies between the original identifications and the QC identifications are discussed among the taxonomists, and necessary rectifications to the data are made. Discrepancies that cannot be rectified by discussions are routinely sent out to taxonomic specialists for identification. However, taxonomic certainty for identifications in this project was high, and no external verifications were necessary.

Assessment

The method employed to assess these wetlands is based on an index incorporating a battery of 12 bioassessment metrics or attributes (Table 1) tested and recommended by Stribling et al. (1995) in a report to the Montana Department of Health and Environmental Science. In that study, it was determined that some of the metrics were of limited use in some geographic regions, and for some wetland types. Despite that finding, all 12 metrics are used in this evaluation of mitigated wetlands, since detailed geographic information and wetland classifications were unavailable. Scoring criteria for the 12 metrics were developed specifically for this project, since mitigated wetlands were not included in original criteria development.

Scoring criteria for wetland metrics were developed by generally following the tactic used by Stribling et al. (1995). Boxplots were generated using a statistical software package (Statistica™), and distributions, median values, ranges, and quartiles for each metric were examined. For the wetland sites, "optimal" scores were generally those that fell above the 75th percentile (for those metrics that decrease in value in response to stress) or below the 25th percentile (for metrics that respond to stress by an increase in value) of all scores. Additional scoring ranges were established by bisecting the range below the 75th percentile for decreasing scores (or above the 25th percentile for increasing scores) into "sub-optimal" and "poor" assessment categories. A score of 5, 3, or 1 was assigned to optimal, sub-optimal, and poor metric performance, respectively. In this way, metric values were translated into normalized metric scores, and scores for all metrics were summed to produce a total bioassessment score, which is expressed as a percentage of the maximum possible score (60). Total bioassessment scores were classified according to a similar process, using the ranges and distributions of total scores for all sites studied in all years. Data from a total of 167 samples were used to develop criteria.

Several sites in this study supported aquatic fauna characteristic of lotic habitats rather than lentic wetland habitats; these sites were excluded from mitigated wetland scoring criteria development, and were evaluated with a metric battery specific to flowing water habitats. In 2007, the lotic sites were Camp Creek (2 sites), Cloud Ranch stream, Kleinschmidt stream, Jack Creek, and Woodson Creek-Ringling stream. Invertebrate assemblages at these sites were generally characteristic of montane or foothill stream conditions and were assessed using the tested metric battery developed for montane streams of Western Montana (Bollman 1998).

The purpose of constructing an index from biological attributes or metrics is to provide a means of integrating information to facilitate the determination of whether management action is needed. However, the nature of the action needed is not determined solely by the index score or impairment classification, but by consideration of an analysis of the component metrics, the taxonomic composition of the assemblages, and other issues. The diagnostic functions of the metrics and taxonomic data need more study since our understanding of the interrelationships of natural environmental factors and anthropogenic disturbances is tentative. Thus, the further interpretive remarks accompanying the raw taxonomic and metric data in this summary are offered cautiously. Year-to-year comparisons depend on an assumption that specific sites were revisited in each year, and that equivalent sampling methods were utilized at each site revisit.

Bioassessment metrics - wetlands

An index based on the performance of 12 metrics was constructed, as described above. Table 2 lists those metrics, describes their calculation and the expected response of each to increased degradation or impairment of the wetland.

In addition to the summed scores of each metric and the associated impairment classification described above, each individual metric informs the bioassessment to some degree. The four richness metrics (Total taxa, POET, Chironomidae taxa, and Crustacea taxa + Mollusca taxa) can be interpreted to express habitat complexity as well as water quality. Complex, diverse habitats consist of variable substrates, emergent vegetation, variable water depths and other factors, and are potential features of long-established stable wetlands with minimal human disturbance. In the study conducted by Stribling et al. (1995), all four richness metrics were found to be significantly associated with water quality parameters including conductance, salinity, and total dissolved solids.

Four composition metrics (%Chironomidae, %Orthocladiinae of Chironomidae, %Crustacea + %Mollusca, and %Amphipoda) measure the relative contributions of certain taxonomic groups that may have significant responses to habitat and/or water quality impacts. For example, amphipods have been demonstrated to increase in abundance in

alkaline conditions. Short-lived, relatively mobile taxa such as chironomids dominate ephemeral environments; many are hemoglobin-bearers capable of tolerating de-oxygenated conditions.

Two tolerance metrics (the Hilsenhoff Biotic Index and %Dominant taxon) were included in the bioassessment battery. The HBI indicates the overall invertebrate assemblage tolerance to nutrient enrichment, warm water, and/or low dissolved oxygen conditions. The percent abundance of the dominant taxon has been demonstrated to be strongly associated with pH, conductance, salinity, total organic carbon, and total dissolved solids.

Two trophic measures (%Collector-gatherers and %Filterers) may be helpful in expressing functional integrity of the invertebrate assemblage, which can be impacted by poor water quality or habitat degradation. High proportions of filtering organisms suggest nutrient and/or organic enrichment, while abundant collectors suggest more positive functional conditions and well-developed wetland morphology. These organisms graze periphyton growing on stable surfaces such as macrophytes.

Summary metric values and scores for the 2007 samples are given in Tables 4a-4c and 5.

In 2007, thermal preference of the invertebrate assemblages was calculated when possible, using the tool developed by Brandt 2001.

Bioassessment metrics – lotic habitats

For sites supporting rheophilic invertebrate assemblages, bioassessment was based on a metric battery and scoring criteria developed for montane regions of Montana (MVFP index: Bollman 1998). The six metrics constituting the bioassessment index used for MVFP sites in this study were selected because, both individually and as an integrated metric battery, they are robust at distinguishing impaired sites from relatively unimpaired sites (Bollman 1998). They have been demonstrated to be more variable with anthropogenic disturbance than with natural environmental gradients (Bollman 1998). Each of the six metrics, and their expected responses to various stressors is described below.

1. Ephemeroptera (mayfly) taxa richness. The number of mayfly taxa declines as water quality diminishes. Impairments to water quality which have been demonstrated to adversely affect the ability of mayflies to flourish include elevated water temperatures, heavy metal contamination, increased turbidity, low or high pH, elevated specific conductance and toxic chemicals. Few mayfly species are able to tolerate certain disturbances to instream habitat, such as excessive sediment deposition.
2. Plecoptera (stonefly) taxa richness. Stoneflies are particularly susceptible to impairments that affect a stream on a reach-level scale, such as loss of riparian canopy, streambank instability, channelization, and alteration of morphological features such as pool frequency and function, riffle development and sinuosity. Just as all benthic organisms, they are also susceptible to smaller scale habitat loss, such as by sediment deposition, loss of interstitial spaces between substrate particles, or unstable substrate.
3. Trichoptera (caddisfly) taxa richness. Caddisfly taxa richness has been shown to decline when sediment deposition affects habitat. In addition, the presence of certain case-building caddisflies can indicate good retention of woody debris and lack of scouring flow conditions.
4. Number of sensitive taxa. Sensitive taxa are generally the first to disappear as anthropogenic disturbances increase. The list of sensitive taxa used here includes organisms sensitive to a wide range of disturbances, including warmer water temperatures, organic or nutrient pollution, toxic pollution, sediment deposition, substrate instability and others. Unimpaired streams of western Montana typically support at least four sensitive taxa (Bollman 1998).
5. Percent filter feeders. Filter-feeding organisms are a diverse group; they capture small particles of organic matter, or organically enriched sediment material, from the water column by means of a variety of adaptations, such as silken nets or hairy appendages. In forested montane streams, filterers are expected to occur in insignificant numbers. Their abundance increases when canopy cover is lost and when water temperatures increase and the accompanying growth of filamentous algae occurs. Some filtering organisms, specifically the Arctopsychid caddisflies (*Arctopsyche* spp. and *Parapsyche* spp.) build silken nets with large mesh sizes that capture small organisms such as chironomids and early-instar mayflies. Here they are considered predators, and, in this study, their abundance does not contribute to the percent filter feeders metric.
6. Percent tolerant taxa. Tolerant taxa are ubiquitous in stream sites, but when disturbance increases, their abundance increases proportionately. The list of taxa used here includes organisms tolerant of a wide range of disturbances, including warmer water temperatures, organic or nutrient pollution, toxic pollution, sediment deposition, substrate instability and others.

Table 1. Montana Department of Transportation Mitigated Wetlands Monitoring Project sites: sampling history. Only those sites monitored in 2007 are included. An asterisk (*) indicates lotic sites.

Site Identifier	2001	2002	2003	2004	2005	2006	2007
Roundup	+	+	+	+	+	+	+
Ridgeway	+	+	+	+	+	+	+
Hoskins Landing MS-1		+	+	+	+		+
Hoskins Landing MS-2							+
Peterson Ranch pond 1		+	+	+	+	+	+
Peterson Ranch pond 2		+		+	+	+	+
Peterson Ranch pond 4		+	+	+	+	+	+
Peterson Ranch pond 5		+	+	+	+	+	+
Camp Creek MS-1*		+	+	+	+	+	+
Camp Creek MS-2*						+	+
Kleinschmidt		+	+	+	+	+	+
Kleinschmidt – stream*			+	+	+	+	+
Cloud Ranch Pond				+	+		+
Cloud Ranch Stream*				+			+
Jack Creek – pond				+	+		+
Jack Creek – McKee*							+
Norem				+	+	+	+
Rock Creek Ranch					+	+	+
Wagner Marsh					+	+	+
Alkali Lake 1						+	+
Charley Creek							+
Woodson pond MI 1							+
Woodson stream MI 2*							+
Little Muddy Creek							+
Selkirk Ranch							+
DH Ranch							+

Table 2. Aquatic invertebrate metrics employed for wetland (lentic) invertebrate assemblages in the MDT mitigated wetlands study, 2001 – 2007.

Metric	Metric calculation	Expected response to degradation or impairment
Total taxa	Count of unique taxa identified to lowest recommended taxonomic level	Decrease
POET	Count of unique Plecoptera, Trichoptera, Ephemeroptera, and Odonata taxa identified to lowest recommended taxonomic level	Decrease
Chironomidae taxa	Count of unique midge taxa identified to lowest recommended taxonomic level	Decrease
Crustacea taxa + Mollusca taxa	Count of unique Crustacea taxa and Mollusca taxa identified to lowest recommended taxonomic level	Decrease
% Chironomidae	Percent abundance of midges in the subsample	Increase
Orthocladiinae / Chironomidae	Number of individual midges in the sub-family Orthocladiinae / total number of midges in the subsample.	Decrease
%Amphipoda	Percent abundance of amphipods in the subsample	Increase
% Crustacea + % Mollusca	Percent abundance of crustaceans in the subsample plus percent abundance of molluscs in the subsample	Increase
HBI	Relative abundance of each taxon multiplied by that taxon's modified Hilsenhoff Biotic Index (tolerance) value. These numbers are summed over all taxa in the subsample.	Increase
% Dominant taxon	Percent abundance of the most abundant taxon in the subsample	Increase
% Collector-Gatherers	Percent abundance of organisms in the collector-gatherer functional group	Decrease
% Filterers	Percent abundance of organisms in the filterer functional group	Increase

RESULTS

(Note: Individual site discussions were removed from this report by PBS&J and are included in the macroinvertebrate section of individual project monitoring reports. Summary tables for lentic (4a – 4c) and lotic (5) sites and project specific taxa listings and metrics reports are provided on the following pages.)

Quality Assurance

Table 3 gives the results of quality assurance procedures for sample sorting efficiency (SE) and Bray-Curtis similarity statistics for comparisons of taxonomic determinations and enumeration. Sorting efficiency averaged 97.54% for the project, and taxonomic similarity averaged 97.44%.

Table 3. Results of quality control procedures for subsampling and taxonomic and enumeration similarity.

Site name	SE	Bray-Curtis similarity
Roundup	100.00%	
Ridgeway	100.00%	
Hoskins Landing MS-1	100.00%	
Hoskins Landing MS-2	93.40%	
Peterson Ranch pond 1	100.0%	95.38%
Peterson Ranch pond 2	96.64%	
Peterson Ranch pond 4	91.66%	
Peterson Ranch pond 5	96.64%	
Camp Creek MS-1	100.00%	
Camp Creek MS-2	100.00%	96.94%
Kleinschmidt – pond	100.00%	
Kleinschmidt – stream	99.10%	
Cloud Ranch Pond	95.65%	
Cloud Ranch Stream	91.61%	
Jack Creek – pond	n.a.	
Jack Creek - McKee	96.49%	
Norem	100.00%	100.00%
Rock Creek Ranch	100.00%	
Wagner Marsh	100.00%	
Alkali Lake 1	98.04%	
Charley Creek	100.00%	
Woodson pond	91.37%	
Woodson stream	100.00%	
Little Muddy Creek	92.31%	
Selkirk Ranch	95.56%	
DH Ranch	100.00%	

Table 4a. Metric values and scores for wetland (lentic) sites in the MDT mitigated wetland study – 2007 sampling.

	ROUNDUP	RIDGEWAY	HOSKINS LANDING MS-1	HOSKINS LANDING MS-2	PETERSON RANCH 1	PETERSON RANCH 2	PETERSON RANCH 4	PETERSON RANCH 5
Total taxa	7	13	18	21	17	18	26	18
POET	0	2	3	5	2	0	6	4
Chironomidae taxa	5	5	2	8	8	12	12	6
Crustacea + Mollusca	1	2	5	4	4	5	4	4
% Chironomidae	7.62%	30.00%	18.75%	52.68%	36.45%	51.79%	42.59%	14.78%
Orthocladiinae/Chir	0.38	0.17	0.00	0.03	0.08	0.16	0.09	0.12
%Amphipoda	0.00%	10.00%	0.00%	0.00%	0.93%	0.00%	21.30%	1.74%
%Crustacea + %Mollusca	89.52%	15.00%	26.79%	8.04%	10.28%	43.75%	28.70%	37.39%
HBI	8.02	7.11	7.23	6.55	7.42	7.76	6.53	7.23
%Dominant taxon	89.52%	30.00%	17.86%	35.71%	39.25%	23.21%	17.59%	30.43%
%Collector-Gatherers	92.38%	70.00%	78.57%	82.14%	49.53%	71.43%	38.89%	26.96%
%Filterers	0.00%	0.00%	0.89%	6.25%	9.35%	3.57%	1.85%	5.22%
Total taxa	1	1	3	5	3	3	5	3
POET	1	1	3	5	1	1	5	5
Chironomidae taxa	3	3	1	5	5	5	3	3
Crustacea + Mollusca	1	1	3	3	3	3	1	3
% Chironomidae	5	3	3	1	3	1	1	5
Orthocladiinae/Chir	3	1	1	1	1	1	3	1
%Amphipoda	5	3	5	5	5	5	5	5
%Crustacea + %Mollusca	1	5	5	5	5	3	5	3
HBI	1	3	3	5	3	1	5	3
%Dominant taxon	1	5	5	3	3	5	1	5
%Collector-Gatherers	5	3	3	5	3	3	3	1
%Filterers	3	3	3	1	1	3	5	3
Total score	**30**	**32**	**38**	**44**	**36**	**34**	**42**	**40**
Percent of maximum score	**50.00%**	**53.33%**	**63.33%**	**73.33%**	**60.00%**	**56.67%**	**70.00%**	**66.67%**
Impairment classification	**poor**	**sub-optimal**	**optimal**	**optimal**	**sub-optimal**	**sub-optimal**	**optimal**	**optimal**

Table 4b. Metric values and scores for wetland (lentic) sites in the MDT mitigated wetland study – 2007 sampling.

	KLEIN-SCHMIDT POND	CLOUD RANCH POND	JACK CREEK POND	NOREM	ROCK CREEK RANCH	WAGNER MARSH	ALKALI LAKE 1	CHARLEY CREEK
Total taxa	25	13	9	6	18	11	9	13
POET	5	2	0	1	2	2	0	0
Chironomidae taxa	8	11	5	2	4	4	2	3
Crustacea + Mollusca	8	1	4	1	4	0	2	3
% Chironomidae	18.63%	81.54%	92.79%	31.58%	4.76%	11.39%	1.96%	27.17%
Orthocladiinae/Chir	0.53	0.38	0.03	0.00	0.60	0.44	0.50	0.68
%Amphipoda	10.78%	3.08%	0.00%	0.00%	17.14%	0.00%	0.00%	22.83%
%Crustacea + %Mollusca	36.27%	3.08%	7.21%	21.05%	23.81%	0.00%	61.76%	53.26%
HBI	7.35	7.22	9.73	6.63	6.33	7.28	8.07	6.88
%Dominant taxon	13.73%	18.46%	62.16%	26.32%	29.52%	45.57%	60.78%	29.35%
%Collector-Gatherers	53.92%	84.62%	70.27%	57.89%	29.52%	15.19%	70.59%	32.61%
%Filterers	11.76%	9.23%	0.90%	0.00%	0.95%	0.00%	0.00%	0.00%
Total taxa	5	1	1	1	3	1	1	1
POET	5	1	1	1	1	1	1	1
Chironomidae taxa	5	5	3	1	3	3	1	3
Crustacea + Mollusca	5	1	3	1	3	1	1	1
% Chironomidae	3	1	1	3	5	5	5	3
Orthocladiinae/Chir	5	3	1	1	5	3	5	5
%Amphipoda	3	5	5	5	3	5	5	3
%Crustacea + %Mollusca	3	5	5	5	5	5	3	3
HBI	3	3	1	5	5	3	1	5
%Dominant taxon	5	5	1	5	5	3	1	5
%Collector-Gatherers	3	5	3	3	1	1	3	1
%Filterers	1	1	3	3	3	3	3	3
Total score	**46**	**36**	**28**	**34**	**42**	**34**	**30**	**34**
Percent of maximum score	**76.67%**	**60.00%**	**46.67%**	**56.67%**	**70.00%**	**56.67%**	**50.00%**	**56.67%**
Impairment classification	**optimal**	**sub-optimal**	**poor**	**sub-optimal**	**poor**	**sub-optimal**	**poor**	**sub-optimal**

Table 4c. Metric values and scores for wetland (lentic) sites in the MDT mitigated wetland study – 2007 sampling.

	WOODSON POND	LITTLE MUDDY CREEK	SELKIRK RANCH	DH RANCH
Total taxa	12	2	16	8
POET	0	0	2	1
Chironomidae taxa	9	0	8	4
Crustacea + Mollusca	1	1	2	2
% Chironomidae	85.71%	0.00%	77.27%	27.50%
Orthocladiinae/Chir	0.32	0.00	0.61	0.00
%Amphipoda	0.00%	0.00%	0.00%	0.00%
%Crustacea + %Mollusca	2.86%	75.00%	8.18%	64.17%
HBI	9.34	8.50	7.82	7.38
%Dominant taxon	33.33%	75.00%	46.36%	39.17%
%Collector-Gatherers	55.24%	75.00%	32.73%	27.50%
%Filterers	0.00%	0.00%	8.18%	17.50%
Total taxa	1	1	3	1
POET	1	1	1	1
Chironomidae taxa	5	1	5	3
Crustacea + Mollusca	1	1	1	1
% Chironomidae	1	5	1	3
Orthocladiinae/Chir	3	1	5	1
%Amphipoda	5	5	5	5
%Crustacea + %Mollusca	5	1	5	1
HBI	1	1	1	3
%Dominant taxon	5	1	3	3
%Collector-Gatherers	3	3	1	1
%Filterers	3	3	1	1
Total score	**34**	**24**	**32**	**24**
Percent of maximum score	**56.67%**	**40.00%**	**53.33%**	**40.00%**
Impairment classification	**sub-optimal**	**poor**	**sub-optimal**	**poor**

Table 5. Metric values and scores for stream (lotic) sites in the MDT mitigated wetland study – 2007 sampling.

	CAMP CREEK MS-1	CAMP CREEK MS-2	KLEIN-SCHMIDT STREAM	CLOUD RANCH STREAM	JACK CREEK - MCKEE	WOODSON STREAM
E Richness	6	6	0	2	1	1
P Richness	0	0	0	2	0	0
T Richness	4	6	2	4	4	0
Pollution Sensitive Richness	3	4	0	1	0	0
Filterer Percent	4.85%	5.56%	7.14%	3.57%	2.83%	16.67%
Pollution Tolerant Percent	32.04%	34.26%	9.82%	14.29%	58.49%	8.33%
E Richness	3	3	0	1	0	0
P Richness	0	0	0	2	0	0
T Richness	2	3	1	2	2	0
Pollution Sensitive Richness	2	3	0	1	0	0
Filterer Percent	3	2	2	3	3	1
Pollution Tolerant Percent	1	1	2	1	0	2
Total score	**11**	**12**	**5**	**10**	**5**	**3**
Percent of maximum score	**61.11%**	**66.67%**	**27.78%**	**55.56%**	**27.78%**	**16.67%**
Impairment classification	**slight**	**slight**	**moderate**	**slight**	**moderate**	**severe**

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Stribling, J.B., J. Lathrop-Davis, M.T. Barbour, J.S. White, and E.W. Leppo. 1995. Evaluation of environmental indicators for the wetlands of Montana: the multimetric approach using benthic macroinvertebrates. Report to the Montana Department of Health and Environmental Science. Helena, Montana.

Taxa Listing

Project ID: MDT07PBSJ
RAI No.: MDT07PBSJ025

RAI No.: MDT07PBSJ025 **Sta. Name:** Selkirk Ranch-Two Dot
Client ID:
Date Coll.: 8/22/2007 **No. Jars:** 1 **STORET ID:**

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Non-Insect							
Cladocera	8	7.27%	Yes	Unknown		8	CF
Lymnaeidae							
Stagnicola sp.	1	0.91%	Yes	Unknown		6	SC
Odonata							
Libellulidae							
Libellulidae	1	0.91%	Yes	Larva	Damaged	9	PR
Ephemeroptera							
Baetidae							
Callibaetis sp.	6	5.45%	Yes	Larva		9	CG
Heteroptera							
Corixidae							
Corixidae	1	0.91%	Yes	Larva		10	PH
Coleoptera							
Dytiscidae							
Dytiscidae	1	0.91%	Yes	Larva		5	PR
Diptera							
Ceratopogonidae							
Ceratopogoninae	1	0.91%	No	Pupa		6	PR
Ceratopogoninae	1	0.91%	Yes	Larva		6	PR
Dolichopodidae							
Dolichopodidae	4	3.64%	Yes	Larva		4	PR
Ephydridae							
Ephydridae	1	0.91%	Yes	Larva		6	CG
Chironomidae							
Chironomidae							
Chironomidae	7	6.36%	No	Pupa		10	CG
Chironomus sp.	8	7.27%	Yes	Larva		10	CG
Cladotanytarsus sp.	4	3.64%	Yes	Larva		7	CG
Corynoneura sp.	1	0.91%	Yes	Larva		7	CG
Cricotopus (Isocladius) sp.	51	46.36%	Yes	Larva		7	SH
Glyptotendipes sp.	12	10.91%	Yes	Larva		10	SH
Tanypus sp.	1	0.91%	Yes	Larva		10	PR
Tanytarsus sp.	1	0.91%	Yes	Larva		6	CF
Sample Count	**110**						

Metrics Report

Project ID: MDT07PBSJ
RAI No.: MDT07PBSJ025
Sta. Name: Selkirk Ranch-Two Dot
Client ID:
STORET ID:
Coll. Date: 8/22/2007

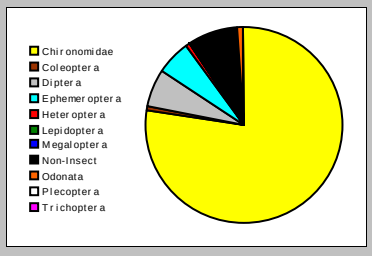
Abundance Measures

Sample Count: 110
Sample Abundance: 440.00 25.00% of sample used

Coll. Procedure:
Sample Notes:

Taxonomic Composition

Category	R	A	PRA
Non-Insect	2	9	8.18%
Odonata	1	1	0.91%
Ephemeroptera	1	6	5.45%
Plecoptera			
Heteroptera	1	1	0.91%
Megaloptera			
Trichoptera			
Lepidoptera			
Coleoptera	1	1	0.91%
Diptera	3	7	6.36%
Chironomidae	7	85	77.27%

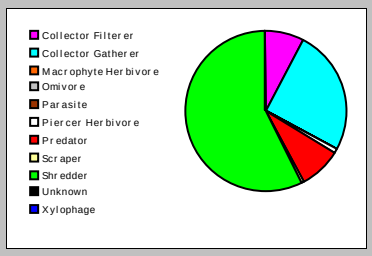


Dominant Taxa

Category	A	PRA
Cricotopus (Isocladius)	51	46.36%
Glyptotendipes	12	10.91%
Cladocera	8	7.27%
Chironomus	8	7.27%
Chironomidae	7	6.36%
Callibaetis	6	5.45%
Dolichopodidae	4	3.64%
Cladotanytarsus	4	3.64%
Ceratopogoninae	2	1.82%
Tanytarsus	1	0.91%
Tanypus	1	0.91%
Stagnicola	1	0.91%
Libellulidae	1	0.91%
Ephydridae	1	0.91%
Dytiscidae	1	0.91%

Functional Composition

Category	R	A	PRA
Predator	5	9	8.18%
Parasite			
Collector Gatherer	5	27	24.55%
Collector Filterer	2	9	8.18%
Macrophyte Herbivore			
Piercer Herbivore	1	1	0.91%
Xylophage			
Scraper	1	1	0.91%
Shredder	2	63	57.27%
Omivore			
Unknown			



Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
Composition					
Taxa Richness	16	1	1		0
Non-Insect Percent	8.18%				
E Richness	1	1		0	
P Richness	0	1		0	
T Richness	0	1		0	
EPT Richness	1		0		0
EPT Percent	5.45%		0		0
Oligochaeta+Hirudinea Percent					
Baetidae/Ephemeroptera	1.000				
Hydropsychidae/Trichoptera	0.000				
Dominance					
Dominant Taxon Percent	46.36%		1		0
Dominant Taxa (2) Percent	57.27%				
Dominant Taxa (3) Percent	64.55%	3			
Dominant Taxa (10) Percent	93.64%				
Diversity					
Shannon H (loge)	1.826				
Shannon H (log2)	2.635		2		
Margalef D	3.243				
Simpson D	0.276				
Evenness	0.093				
Function					
Predator Richness	5		2		
Predator Percent	8.18%	1			
Filterer Richness	2				
Filterer Percent	8.18%			2	
Collector Percent	32.73%		3		3
Scraper+Shredder Percent	58.18%		3		3
Scraper/Filterer	0.111				
Scraper/Scraper+Filterer	0.100				
Habit					
Burrower Richness	3				
Burrower Percent	20.00%				
Swimmer Richness	2				
Swimmer Percent	6.36%				
Clinger Richness	2	1			
Clinger Percent	47.27%				
Characteristics					
Cold Stenotherm Richness	0				
Cold Stenotherm Percent	0.00%				
Hemoglobin Bearer Richness	3				
Hemoglobin Bearer Percent	19.09%				
Air Breather Richness	2				
Air Breather Percent	4.55%				
Voltinism					
Univoltine Richness	5				
Semivoltine Richness	2	1			
Multivoltine Percent	90.00%		0		
Tolerance					
Sediment Tolerant Richness	1				
Sediment Tolerant Percent	0.91%				
Sediment Sensitive Richness	0				
Sediment Sensitive Percent	0.00%				
Metals Tolerance Index	3.310				
Pollution Sensitive Richness	0	1		0	
Pollution Tolerant Percent	23.64%	3		1	
Hilsenhoff Biotic Index	7.818		0		0
Intolerant Percent	0.00%				
Supertolerant Percent	40.00%				
CTQa	101.455				

Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	14	28.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	12	40.00%	Moderate
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	3	16.67%	Severe
MTM	Montana DEQ Mountains (Bukantis 1998)	6	28.57%	Moderate