
MONTANA DEPARTMENT OF TRANSPORTATION WETLAND MITIGATION MONITORING REPORT: YEAR 2008

*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 2008

PBS&J Project No: 0B4308801.06.06



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1.0 INTRODUCTION

This annual report summarizes methods and results from the second 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. The mitigation reserve totals 74.4 acres. The reserve acreage is intended to result in approximately 71.5 acres of herbaceous wet meadow wetland, scrub/shrub wetland, and open water, along with 2.9 acres of upland buffer (Oasis Environmental 2006a and 2006b; Romig 2007). An as-built site plan is provided in **Appendix D**. The intent of the mitigation site is to provide the Montana Department of Transportation (MDT) 50 acres of wetland mitigation credit prior to Highway 12 road construction in Watershed #10. Overall, the mitigation site was designed to provide a total net of approximately 60.4 acres of wetland credit, after application of various credit ratios to designed features and subtracting 0.4 acre of wetland fill associated with the project.

Prior to initiating mitigation construction, the reserve mitigation site was primarily comprised of upland communities and included approximately 25 acres of impaired wetland community (Oasis 2006a).

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/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

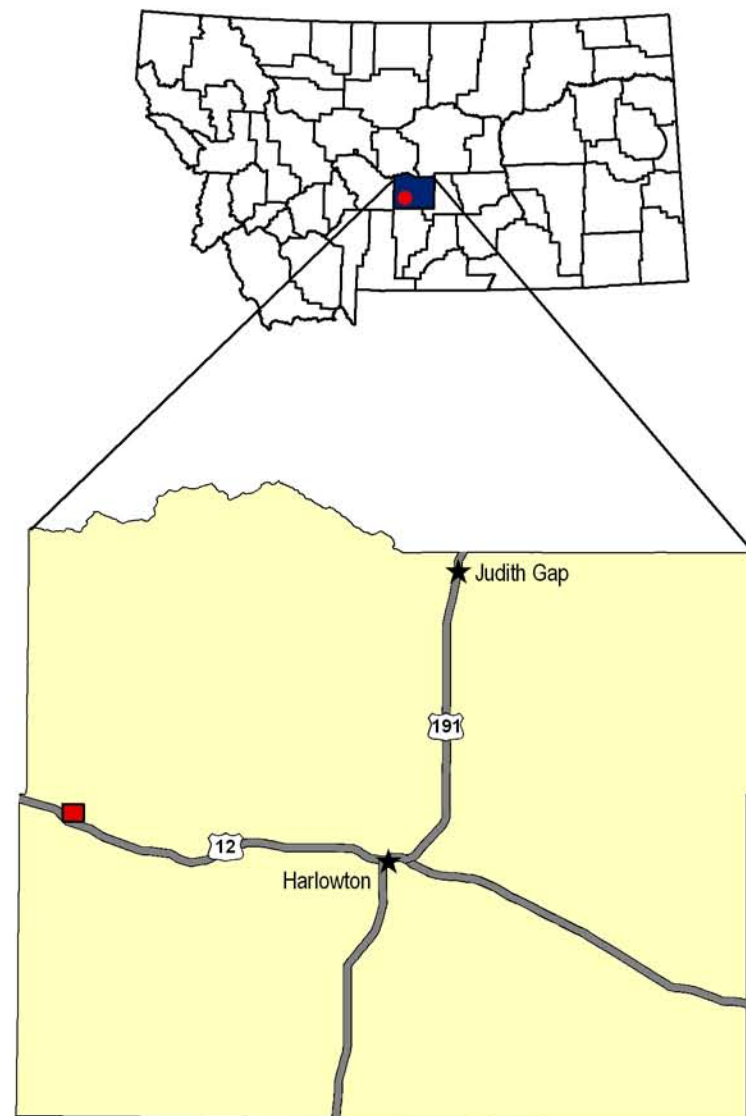
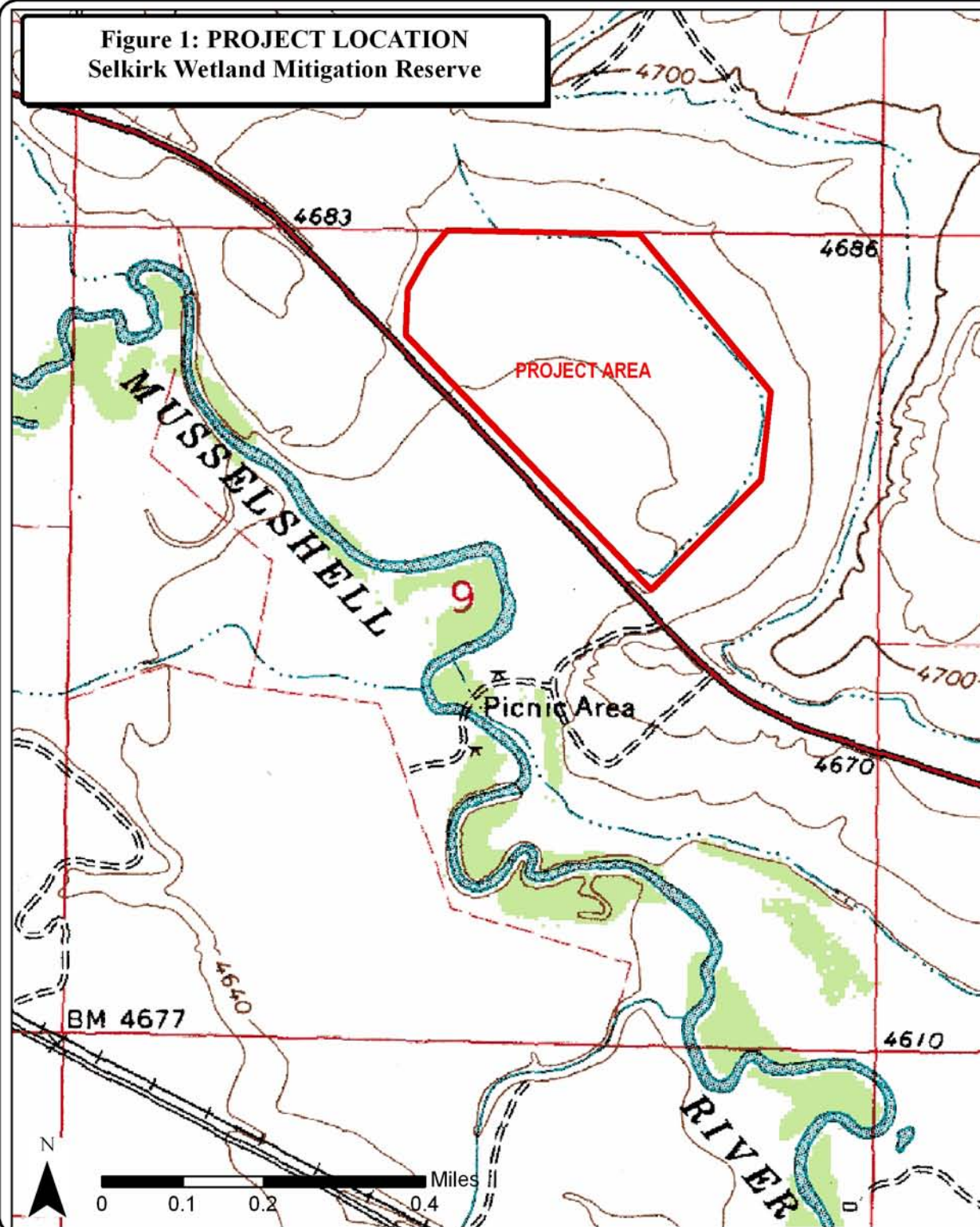
2.1 Monitoring Dates and Activities

The Selkirk Wetland Mitigation Reserve was monitored on May 6 and July 16, 2008. 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

Hydrologic indicators were evaluated during all site visits. During the mid-season visit wetland hydrology indicators were recorded using procedures outlined in the COE 1987 Wetland

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

PBS&J

801 N. Last Chance Gulch, Suite 101
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Delineation Manual (Environmental Laboratory 1987). Hydrology data were recorded on the COE Routine Wetland Delineation Data Form at each wetland determination point (**Appendix B**). Precipitation data was obtained from the Western Regional Climate Center website. Precipitation data for January through July, 2008 were compared to the January through July 1993 - 2008 average. 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. There are several groundwater monitoring wells at this site; however, the project developer is performing the well monitoring tasks.

2.3 Vegetation

General dominant species-based vegetation community types were delineated in the field during the mid-summer field visit. Standardized community mapping was not employed as many of these systems are geared towards climax vegetation. Estimated percent cover of the dominant species in each community type was recorded on the Wetland Mitigation Site Monitoring Form (**Appendix B**). A comprehensive plant species list has been maintained for the entire site.

Annual changes in vegetation, especially the establishment and density of hydrophytic plants, were evaluated through the use of a belt transect. The 10-foot wide belt transect was established in an area that would illustrate the progression of community development. Within the transect, percent cover was estimated for each vegetative species in each vegetation community encountered using the following values: + (<1%); 1 (1-5%); 2 (6-10%); 3 (11-20%); 4 (21-50%); and 5 (>50%). Percent cover for each species was recorded on the monitoring 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

Wetland delineation was conducted during the mid-season visit in accordance with the 1987 COE Wetland Delineation Manual. In July 2008, consultation with the COE (Steinle pers. comm.) confirmed that, where the 1987 manual was used to establish baseline wetland conditions at MDT wetland mitigation sites, it should continue to be applied at such sites for the duration of the monitoring period. Consequently, application of the new *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (COE 2008) was not required or undertaken at this site in 2008.

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 onto the 2008 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 all site visits (**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. Four Wood Duck (*Aix sponsa*) and nine Mountain Bluebird (*Sialia currucoides*) boxes were installed on the site and checked for occupancy.

2.8 Macroinvertebrates

One macroinvertebrate sample was collected during the mid-season visit. The samples were collected and preserved according to the Macroinvertebrate Sampling Protocol (**Appendix F**). The macroinvertebrate sampling location was mapped onto the 2008 aerial photograph.

2.9 Functional Assessment

A functional assessment form was completed in 2008 for the Selkirk Wetland Mitigation Reserve using the 1999 MDT Montana Wetland Assessment Method (Berglund 1999). Field data for this assessment were collected during the mid-season visit.

2.10 Photographs

Photographs were taken showing the current land use surrounding the mitigation site, the upland buffer, the monitored area, and the vegetation transect. A description and direction for each photograph were recorded onto the Wetland Mitigation Site Monitoring Form (**Appendix B**). During the initial 2007 monitoring season, each photo-point was mapped using a global positioning system (GPS) (**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. In 2008 the wetland delineation boundary was hand-corrected using the aerial photograph.

2.12 Maintenance Needs

The outflow structures were checked for obstructions and other problems. This did not constitute an engineering-level structural inspection, but rather a cursory examination. The condition of the thirteen bird boxes were also inspected.

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. 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). There are eleven monitoring wells within the project site. The water levels were measured on May 16th; water was 1.45 to 2.64 feet below ground surface in four wells and at ground surface in the remaining seven wells (Romig 2008).

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 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.

During the 2008 monitoring visit, approximately 50% of the area between the lateral grade checks was inundated with shallow water (<six inches). The area north of the northern-most grade check was excavated to create a shallow water and emergent vegetation area, which was 60% inundated at the time of the 2007 investigation and was saturated to the surface during the 2008 monitoring site visit. Approximately 95% of the area within the 2008 wetland boundary was saturated to the surface during the mid-July monitoring.

From January through July, the historic average precipitation was 9.28 inches (WRCC 2008). During 2008, precipitation during this period was 8.47 inches or 91% of the average. Given the slightly lower than average yearly precipitation, the presence of shallow inundation within the grade check area and site-wide saturation to the surface during mid-summer is likely not a function of precipitation, but the result of constant high groundwater. Flood irrigation was not

intentionally used to supplement site hydrology in 2008, however some irrigation runoff does enter the mitigation site.

3.2 Vegetation

A list of vegetation species identified at the site has been compiled since 2007 (**Table 1**). 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*, Type 7-*Festuca arundinacea*/*Poa juncifolia*, Type 8-*Distichlis stricta*/*Suaeda calicioliformis*, 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* (planted), and Type 13-*Salix exigua*. Dominant species within each community are listed on the monitoring form (**Appendix B**).

Several species of wetland emergent, shrubs and trees were planted or seeded throughout the site. 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). Percent woody stems with leaves was recorded for approximately 95% of the shrub pods and ranged from 0% with leaves (5 pods) to 10-20% (2 pods); within most pods, 1 to 5% of the stems had leaves.

The woody stems were also checked twice during 2008 for green, live tissue and approximately 50% of the stems were green (Romig 2008), indicating the root was alive and that the plant may produce leaves or new growth in 2009. The southeast pod of mature sandbar appeared to have 100% cover and has improved since cattle were removed from the site (Romig 2008).

One transect was located within the central area of the wetland (**Figure 2 in Appendix A**). The transect was used to illustrate community composition changes over time. Transect data trends since 2007 were summarized in tabular format (**Table 2**) and illustrated graphically (**Charts 1 and 2**). In 2008 community type (CT) 6 (*Puccinellia*) has expanded and CT 8 (*Distichlis stricta*/*Suaeda calicioliformis*) has decreased along the transect, indicating a change from more salt-tolerant/transitional species to a more stable wetland community (**Charts 1 and 2**).

Table 1: 2007-2008 Selkirk Wetland Mitigation Reserve vegetation species list.

Scientific Name ¹	Region 9 North West Wetland Indicator Status ¹
<i>Agropyron repens</i>	FACU
<i>Agrostis alba</i>	FACW
<i>Alopecurus arundinacea</i>	No Listing
<i>Aster subspicatus</i>	FACW
<i>Atriplex patula</i>	FACW
<i>Bromus inermis</i>	No Listing
<i>Carex nebrascensis</i>	OBL
<i>Carex praeegracilis</i>	FACW
<i>Chenopodium</i> spp.	(FAC-FACW)
<i>Cirsium arvense</i>	FACU+
<i>Cornus sericea</i> ²	FACW
<i>Distichlis stricta</i>	FAC+
<i>Eleocharis palustris</i>	OBL
<i>Eleocharis rostellata</i> ³	OBL
<i>Festuca arundinacea</i>	FACU-
<i>Glycyrrhiza lepidota</i>	FAC+
<i>Haplopappus lanceolatus</i>	FAC
<i>Hordeum jubatum</i>	FAC+
<i>Juncus balticus</i>	OBL
<i>Juncus hallii</i> ²	FAC
<i>Juncus tenuis</i>	FAC
<i>Mentha</i> spp.	(FACW)
<i>Plantago major</i>	FAC+
<i>Poa juncifolia</i>	FACU+
<i>Populus deltoides</i> ²	FACW
<i>Puccinellia</i> spp.	(FACW)
<i>Ranunculus gmelinii</i>	FACW
<i>Ranunculus</i> spp.	(FACU-FACW)
<i>Salicornia rubra</i>	OBL
<i>Salix exigua</i> ²	OBL
<i>Salix lutea</i> ²	OBL
<i>Salix lasiandra</i> ²	FACW+
<i>Salix planifolia</i> ²	OBL
<i>Scirpus acutus</i>	OBL
<i>Scirpus maritimus</i>	OBL
<i>Scirpus validus/pallidus</i>	OBL
<i>Sonchus arvensis</i>	FACU+
<i>Spartina pectinata</i>	OBL
<i>Suaeda calceoliformis</i> (S. depressa)	FACW-
<i>Taraxacum officinalis</i>	FACU
<i>Trifolium</i> spp.	(FACU)
<i>Triglochin</i> spp.	(OBL)
<i>Typha latifolia</i>	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 species; leaves were noted on plains cottonwood, sandbar willow and red-osier dogwood in 2008.

³ Planted species, although not observed onsite.

Table 2: 2007-2008 transect data summary.

Monitoring Year	2007	2008
Transect Length (feet)	445	445
# Vegetation Community Transitions along Transect	3	3
# Vegetation Communities along Transect	3	3
# Hydrophytic Vegetation Communities along Transect	3	3
Total Vegetative Species	12	12
Total Hydrophytic Species	10	11
Total Upland Species	2	1
Estimated % Total Vegetative Cover	100	100
% Transect Length Comprised of Hydrophytic Vegetation Communities	100	100
% Transect Length Comprised of Upland Vegetation Communities	0	0
% Transect Length Comprised of Unvegetated Open Water	0	0
% Transect Length Comprised of Bare Substrate	0	0

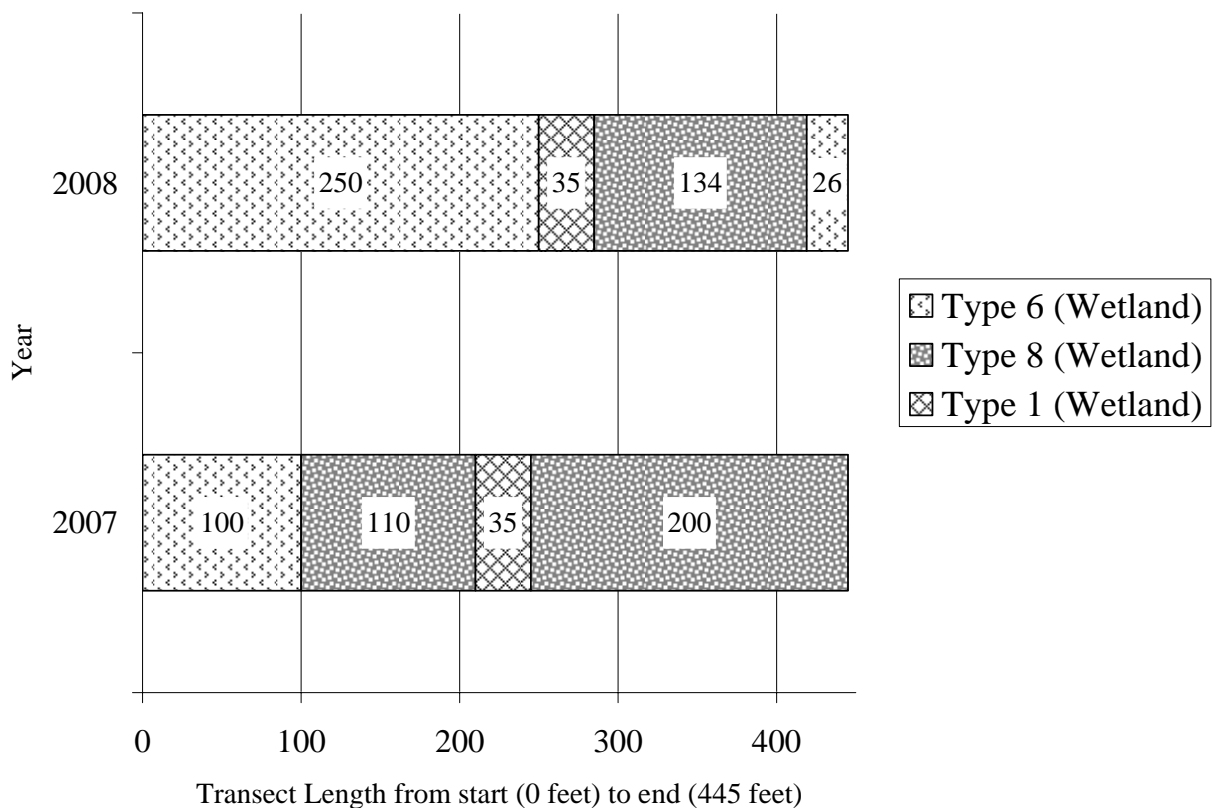
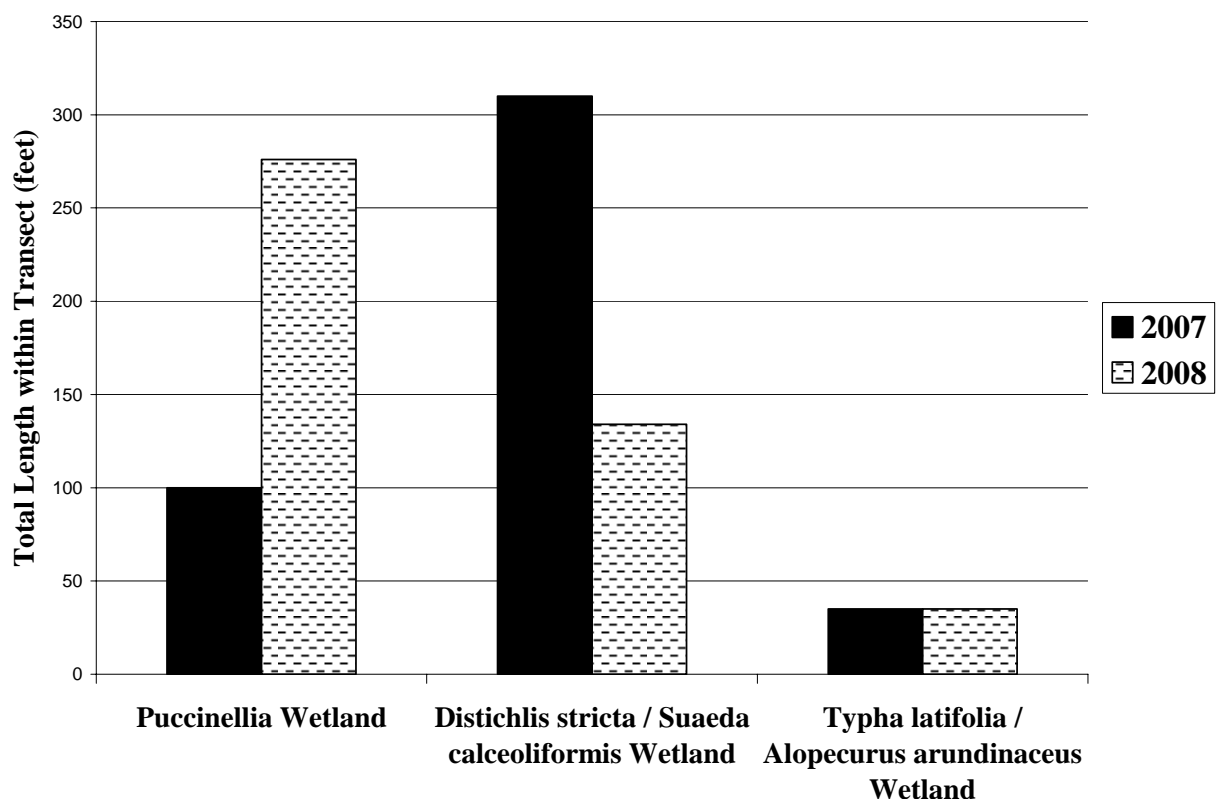
Chart 1: Transect maps showing vegetation types from the start (0 feet) to the end of transect (445 feet) in 2008.

Chart 2: Length of vegetation communities within Transect 1 during 2007-2008.

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 8 inches the soil was a dark gray (10 YR 4/1) silty clay, and from 8 to 10 inches deep was a light olive brown and olive brown (2.5Y 5/4, 4/4) silty clay matrix. The ground surface was saturated along 100% of the transect.

3.4 Wetland Delineation

The 2008 delineation boundary includes 67.22 total wetland acres, of which 66.21 acres is comprised of herbaceous wet meadow and 1.01 acres of open water (**Figure 3 in Appendix A**). For comparison, in 2007 the Selkirk Wetland Reserve had 65.9 acres of developing wetlands. The COE wetland data form are included in **Appendix B**.

Approximate wetland acreages within the various mitigation credit zones have been estimated using digitized site plans and the 2008 wetland delineation boundary. These include 1.0 acre in the enhancement credit zone, 34.23 acres in the re-establishment/creation credit zone, and 31.99 acres in the rehabilitation credit zone. Within the rehabilitation credit zone, 0.86 acre of planned upland buffer has converted to wetland. The open water acreage is located within the

rehabilitation credit zone, however shallow inundation (<12 inches) does occur within the re-establishment/creation credit zone. Crediting is discussed in Section 3.10.

3.5 Wildlife

Deer, muskrat, mink, and raccoon tracks were noted within the wetland in 2008 (**Table 3**). A total of 43 avian species have been observed since June of 2007. A spring birding event was added to the monitoring protocol in 2008 and 34 species were observed.

Table 3: 2007-2008 wildlife species observed at the Selkirk Wetland Mitigation Reserve.¹

AMPHIBIAN, REPTILE, AND FISH	
Western Chorus Frog (<i>Pseudacris triseriata</i>)	
BIRD	
American Coot (<i>Fulica americana</i>)	Mourning Dove (<i>Zenaida macroura</i>)
American Goldfinch (<i>Carduelis tristis</i>)	Northern Harrier (<i>Circus cyaneus</i>)
American Robin (<i>Turdus migratorius</i>)	Northern Pintail (<i>Anas acuta</i>)
American Wigeon (<i>Anas americana</i>)	Northern Shoveler (<i>Anas clypeata</i>)
Barn Swallow (<i>Hirundo rustica</i>)	Pine Siskin (<i>Carduelis pinus</i>)
Blue-winged Teal (<i>Anas discors</i>)	Red Crossbill (<i>Loxia curvirostra</i>)
California Gull (<i>Larus californicus</i>)	Red-winged Blackbird (<i>Agelaius phoeniceus</i>)
Canada Goose (<i>Branta canadensis</i>)	Ring-necked Duck (<i>Aythya collaris</i>)
Cinnamon Teal (<i>Anas cyanoptera</i>)	Sandhill Crane (<i>Grus canadensis</i>)
Common Raven (<i>Corvus corax</i>)	Savannah Sparrow (<i>Passerculus sandwichensis</i>)
Common Yellowthroat (<i>Geothlypis trichas</i>)	Snow Goose (<i>Chen caerulescens</i>)
Eared Grebe (<i>Podiceps nigricollis</i>)	Solitary Sandpiper (<i>Tringa solitaria</i>)
Franklin's Gull (<i>Larus pipixcan</i>)	Sora (<i>Porzana Carolina</i>)
Gadwall (<i>Anas strepera</i>)	Spotted Sandpiper (<i>Actitis macularia</i>)
Greater Yellowlegs (<i>Tringa melanoleuca</i>)	Stilt Sandpiper (<i>Calidris himantopus</i>)
Green-winged Teal (<i>Anas crecca</i>)	Tree Swallow (<i>Tachycineta bicolor</i>)
Killdeer (<i>Charadrius vociferous</i>)	Western Meadowlark (<i>Sturnella neglecta</i>)
Lesser Yellowlegs (<i>Tringa flavipes</i>)	White-faced Ibis (<i>Plegadis chihi</i>)
Long-billed Curlew (<i>Numenius americanus</i>)	Wilson's Phalarope (<i>Phalaropus tricolor</i>)
Mallard (<i>Anas platyrhynchos</i>)	Wilson's Snipe (<i>Gallinago gallinago</i>)
Marbled Godwit (<i>Limosa fedoa</i>)	Yellow-headed Blackbird (<i>Xanthocephalus xanthocephalus</i>)
Marsh Wren (<i>Cistothorus palustris</i>)	
MAMMAL	
Deer (<i>Odocoileus</i> sp.)	Muskrat (<i>Ondatra zibethicus</i>)
Raccoon (<i>Procyon lotor</i>)	Mink (<i>Mustela vison</i>)

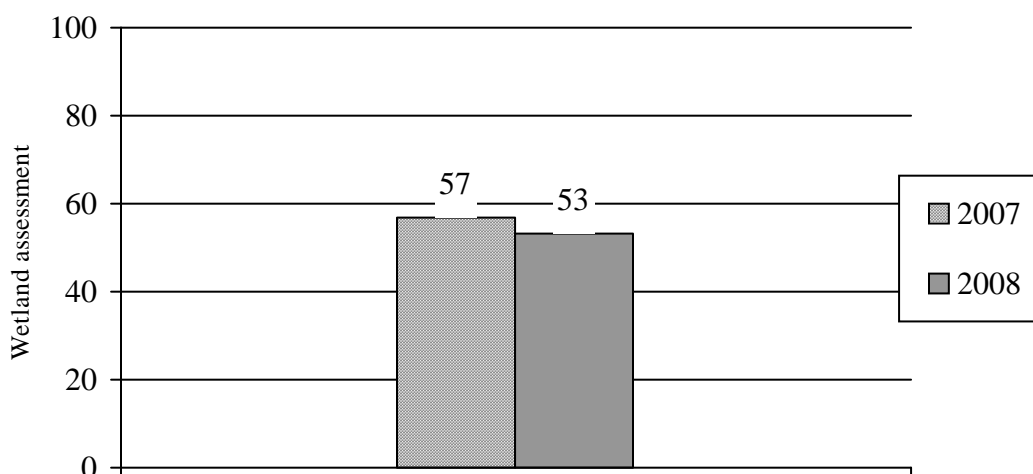
¹ Species observed by Anderson and Widdicombe (2007), Romig (2007, 2008), Urban (2007, 2008), and the PBS&J Biologist.

3.6 Macroinvertebrates

Macroinvertebrate sampling results are provided in **Appendix F** and were summarized by Rhithron Associates, Inc. in the italicized section below and in **Chart 3** (Bollman 2008).

Aquatic invertebrates were much less abundant at this site in 2008 compared to 2007. Microcrustaceans (especially Cladocera) replaced midges as the dominant fauna at this site this year. As a result, the functional composition of the invertebrate assemblage shifted from dominance by chironomid shredders to dominance by cladoceran filterers, suggesting nutrient enrichment. There is evidence that filamentous algae contributed to habitat complexity, since midges in the Cricotopus (Isocladius) group were present. Thermal preference for the assemblage was calculated to be 17.6°C, which is near the historic median for mitigated wetlands studied by MDT.

Chart 3: Bioassessment scores using the wetland index at the Selkirk Wetland Mitigation Site from 2007 to 2008.



3.7 Functional Assessment

All mitigation credit areas, excluding upland buffer, are classified as Category II wetlands (**Table 4**). The re-establishment/creation mitigation credit area ranked as Category II in 2008; this area was upland prior to construction. The rehabilitation mitigation area classified as Category II in 2007 and 2008 and was rated as a Category III wetland in 2006 (**Table 4**). The enhanced wetland classified as a Category II wetland in 2008, but rated as Category III in 2006 and 2007 (**Table 4**). The complete 2008 functional assessments forms are in **Appendix B**.

Total functional unit gain for all credit areas in 2008 was 446 units. Percent possible scores increased for all mitigation credit areas and the re-establishment/creation and rehabilitation credit areas nearly rated as Category I wetlands. The most important functions for the re-establishment/creation and rehabilitation credit areas are general wildlife habitat, short and long

Table 4: Summary of the 2006 to 2008 wetland function/value ratings and functional points at the Selkirk Wetland Mitigation Reserve.

Function and Value Parameters from the MDT Montana Wetland Assessment Method ²	Re-Establishment/Creation ³		Rehabilitation			Enhancement		
	2007	2008	2006 ¹	2007	2008	2006 ¹	2007	2008
Listed/Proposed T&E Species Habitat	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)
MNHP Species Habitat	Mod (0.7)	Mod (0.7)	Low (0.0)	Mod (0.7)	Mod (0.7)	Low (0.0)	Mod (0.7)	Mod (0.7)
General Wildlife Habitat	High (0.9)	Exc. (1.0)	Low (0.3)	High (0.9)	Exc. (1.0)	Mod (0.5)	Mod (0.7)	High (0.9)
General Fish/Aquatic Habitat	NA	NA	NA	NA	NA	NA	NA	NA
Flood Attenuation	Mod (0.5)	Mod. (0.5)	NA	Mod (0.5)	Mod (0.5)	NA	Low (0.2)	Low (0.2)
Short and Long Term Surface Water Storage	High (0.9)	High (1.0)	Low (0.3)	High (0.9)	High (1.0)	Low (0.2)	Low (0.3)	Mod (0.4)
Sediment/Nutrient/Toxicant Removal	High (1.0)	High (1.0)	Mod (0.6)	High (1.0)	High (1.0)	High (0.9)	High (1.0)	High (1.0)
Sediment/Shoreline Stabilization	Mod (0.6)	High (1.0)	NA	High (0.9)	High (1.0)	NA	High (0.9)	High (1.0)
Production Export/Food Chain Support	Mod (0.7)	High (0.8)	Mod (0.7)	Mod (0.7)	High (0.8)	Mod (0.6)	Mod (0.7)	High (0.8)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Uniqueness	Mod (0.6)	Mod (0.4)	Low (0.1)	Mod (0.4)	Mod (0.4)	Low (0.3)	Mod (0.4)	Mod (0.4)
Recreation/Education Potential (Bonus)	Mod (0.7)	High (1.0)	Low (0.1)	Mod (0.7)	High (1.0)	Low (0.1)	Mod (0.7)	High (1.0)
Actual Points / Possible Points	7.6 / 11	8.4 / 11	3.1 / 9	7.7 / 11	8.4 / 11	3.6 / 9	6.6 / 11	7.4 / 11
% of Possible Score Achieved	69%	76%	34%	70%	76%	43%	60%	67%
Overall Category	II	II	III	II	II	III	III	II
Total Acreage of Assessed Aquatic Habitat within AA Boundaries	32.90	34.23	31.90	31.90	31.99	1.00	1.00	1.00
Functional Units (acreage x actual points)	250.00	272.41	98.90	245.63	268.72	3.60	6.60	7.4
Net Acreage Gain	32.90	34.23	NA	NA	NA	NA	0	0
Net Functional Unit Gain	250.00	272.41	NA	146.73	169.82	NA	3.0	3.8

¹ Baseline data provided by Oasis (2006a).
² Assessed using the 1999 MDT Wetland Assessment Method. The completed 2008 forms are in **Appendix B**.
³ Area was upland prior to construction; therefore, no functional assessment was conducted in 2006.

term surface water storage, sediment/nutrient/toxicant removal, and production export/food chain support. The enhancement credit area is a 1-acre wetland with slightly different prominent functions as a result of its small size, function, and location within the wetland complex, which includes: sediment/shoreline stabilization, sediment/nutrient/toxicant removal, production export/food chain support, and groundwater discharge/recharge. The enhancement credit area receives most of the water flowing out of the wetland complex.

3.8 Photographs

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

3.9 Maintenance Needs/Recommendations

The property owner sprayed creeping foxtail (*Alopecurus arundinaceus*) within the southern portion of the wetland and adjacent to the small ponds on the east side. Weeds along the berms and drier areas were also sprayed. The spraying program will continue each year.

3.10 Current Credit Summary

The intent of the 74.4-acre Selkirk Mitigation Reserve is to provide MDT 50 acres of wetland mitigation credit prior to Highway 12 road construction in Watershed #10. The reserve is intended to contain approximately 71.5 acres of herbaceous wet meadow wetland, scrub/shrub wetland, and open water, along with 2.9 acres of upland buffer. Overall, the mitigation site was designed to provide a total net of approximately 60.4 acres of wetland credit, after application of various credit ratios to designed features and subtracting 0.4 acre of wetland fill associated with the project.

In 2008, the wetland delineation boundary includes 67.22 wetland acres, of which 66.21 acres is comprised of herbaceous wet meadow and 1.01 acres of open water. Approximate wetland acreages within the various mitigation credit zones have been estimated using digitized site plans and the 2008 wetland delineation boundary. These include 1.0 acre in the enhancement credit zone, 34.23 acres in the re-establishment/creation credit zone, and 31.99 acres in the rehabilitation credit zone.

In addition to developed wetland acreage, specific credit area criteria are specified for each mitigation credit category (**Table 5**). Credit ratios vary from 1:1 to 5:1 for the four types of mitigation: rehabilitation, 1.5:1; re-establishment/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.

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

CREDIT ZONE	PLANNED ACREAGE	2008 ACREAGE	SUCCESS CRITERIA ¹ (Gray shading indicates criteria that have not been met.)	MONITORING YEAR 2 COMMENTS (Gray shading indicates criteria that have not been met.)
Re-establishment/ Creation	38.6	34.23 ²	<div>1. To meet all three wetland criteria.</div> <div>2. Aerial coverage of all plant species must equal 80% and requires a 2-year survival period; bare ground shall not exceed 20%.</div> <div>3. Non-preferred species (e.g. <i>Alopecurus arundinaceus</i>) must not exceed 10% of the combined aerial coverage.</div> <div>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%.</div> <div>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.</div> <div>6. Saturation within the upper 12 inches of the soil profile for at least 12.5% of the growing season. 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.</div> <div>7. Open water will be less than 15% of the total wetland project area and no single body is to exceed 3 acres.</div>	<div>1. In 2008, >95% of the intended wetland areas meets all three wetland criteria; upland CT 7 has decreased since 2007 and a narrow band of upland remains in the NE corner of the credit area.</div> <div>2. These aerial coverage criteria have been met.</div> <div>3. <i>A. arundinaceus</i> comprises > 10% of the credit area and is dominant in community types 1, 2, 6, and 9.</div> <div>4. Noxious weed aerial coverage <5%.</div> <div>5. Approximately 1-5% of the planted woody stems had leaves in 2008, however 50% of the stems were green, which indicates that the roots of these green stems were alive and the plant may produce leaves and/or sprouts in 2009.</div> <div>6. The entire credit area is saturated for >12.5% of the growing season. Irrigation water was not directly used to supplement the 2008 hydrology, although indirect runoff from adjacent fields may have incidentally supplemented hydrology.</div> <div>7. There is no deep (>5 feet) surface water in this credit area; the range of surface water depths is 0 to 12 inches. Shallow intermittent/ephemeral surface water (<6 inches) comprises <10% of the total project wetland area.</div> <div>NOTE: The 2008 34.23 acres do not meet the planned 38.6 acres for this credit area.</div>
Rehabilitation	31.9	31.99 (includes 1.01 acres open water)	<div>1. To meet all three wetland criteria.</div> <div>2. Functional lift from a Category III to a II based on MDT functional assessment.</div> <div>3. Aerial coverage of all plant species must equal 80% and requires a 2-year survival period; bare ground shall not exceed 20%.</div> <div>4. Non-preferred species (e.g. <i>Alopecurus arundinaceus</i>) must not exceed 10% of the combined aerial coverage.</div> <div>5. 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%.</div> <div>6. Saturation within the upper 12 inches of the soil profile for at least 12.5% of the growing season.</div> <div>7. 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.</div> <div>8. Open water will be less than 15% of the total wetland project area and no single body is to exceed 3 acres.</div>	<div>1. All of this credit area meets the wetland criteria.</div> <div>2. A functional lift from a Category III to a Category II wetland was documented in 2007 and 2008.</div> <div>3. These aerial coverage criteria have been met.</div> <div>4. <i>A. arundinaceus</i> comprises > 10% in community types 3, 4, 6, 9, and 11.</div> <div>5. Noxious weed aerial coverage is <5%.</div> <div>6. The entire credit area is saturated for >12.5% of the growing season.</div> <div>7. Approximately 1-5% of the planted woody stems had leaves in 2008, however 50% of the stems were green, which indicates that the roots of these green stems were alive and the plant may produce leaves and/or sprouts in 2009.</div> <div>8. Open water is <2% of the total project wetland acreage and all ponds are <0.5 acre; water depth is estimated to be <3 feet deep.</div> <div>NOTE: The 2008 31.99 acres exceeds the planned 31.9 acres for this credit area.</div>
Enhancement	1.0	1.0	<div>1. To meet all three wetland criteria.</div> <div>2. Achieve a functional lift from a Category III to a Category II wetland.</div> <div>3. Aerial coverage of all plant species must equal 80% and requires a 2-year survival period.</div> <div>4. Non-preferred species (e.g. <i>Alopecurus arundinaceus</i>) must not exceed 10% of the combined aerial coverage.</div> <div>5. Maximum noxious weed coverage is not to exceed 5% and monitoring must confirm a declining trend at the end of the monitoring period.</div> <div>6. Saturation within the upper 12 inches of the soil profile for at least 12.5% of the growing season.</div> <div>7. Open water will be less than 15% of the total wetland project area and no single body is to exceed 3 acres.</div> <div>8. If the existing scrub-shrub (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.</div>	<div>1. All of this area meets all three wetland criteria.</div> <div>2. A functional lift from a Category III to a Category II wetland was documented in 2008.</div> <div>3. The aerial coverage criteria have been met.</div> <div>4. <i>A. arundinaceus</i> comprises > 10% in community types 1 and 11.</div> <div>5. Noxious weed aerial coverage is <5%.</div> <div>6. The entire credit area is saturated for >12.5% of the growing season.</div> <div>7. Open water from the pondlet adjacent to the highway berm does extend into this credit area and comprises <1% of the credit area acreage.</div> <div>8. A willow shrub community was transplanted into this area and coverage was >30%, however number of stems is unknown.</div> <div>NOTE: The 2008 1.0 acre meets the planned 1.0 acre for this credit area.</div>
Upland Buffer ³	2.9	1.7	<div>1. The creditable width of the buffer shall not exceed 50 feet.</div> <div>2. Maximum noxious weed coverage is not to exceed 5% and monitoring must confirm a declining trend at the end of the monitoring period.</div>	<div>1. The buffer width does not exceed 50 feet.</div> <div>2. Noxious weed aerial coverage >5% was not observed.</div> <div>NOTE: The 2008 1.70 acres does not meet the planned 2.9 acres for this credit area.</div>

¹ By the end of the 5-year monitoring period for all criteria.

² Acreage of available wetland in the Re-establishment/Creation 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. In 2008, of this 2.56 acres, upland buffer totaled 1.7 acres, and 0.86 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.

For each mitigation credit area, a detailed summary of the intended acreage, 2008 delineated acreage, success criteria, and monitoring year observations are included in **Table 5**. Re-establishment and creation areas have been trending upward since 2007 (**Table 6**). In general, most of the wetland performance criteria have been met for each mitigation credit area, with two major exceptions:

- 1) *Alopecurus arundinaceus* comprises > 10% aerial coverage within all credit areas, and
- 2) planted woody plant survival in the re-establishment/creation and rehabilitation credit areas was likely less than 50% in 2008. A mitigation credit acreage summary is included in **Table 6**.

Table 6: 2007-2008 developing wetland and upland mitigation acreage for the Selkirk Wetland Mitigation Reserve.

CREDIT ZONE	CREDIT CATEGORY	DEVELOPED ACREAGE			CREDIT RATIO ^a	INTERIM MAXIMUM CREDIT ACREAGE ^{a,b}
		Maximum Target	2007	2008		
1	Re-establishment / Creation	38.6	32.9	34.23	1:1	34.23
2	Rehabilitation	31.9	31.9	31.99	1.5:1	21.32
3	Enhancement	1.0	1.0	1.0	3:1	0.33
Total Wetland Acreage		71.5	65.8	67.22	--	55.88
4	Upland Buffer	2.9	1.7	1.74	5:1	0.35
TOTAL ACREAGE		74.4	67.5	68.96	--	56.23

^a The Corps of Engineers is the regulatory authority and will determine the actual mitigation ratios and interim and/or final credits as they pertain to the success criteria.

^b Not all conditions in the success criteria have been fulfilled, therefore final credits have not been calculated. Crediting is at discretion of COE and MDT.

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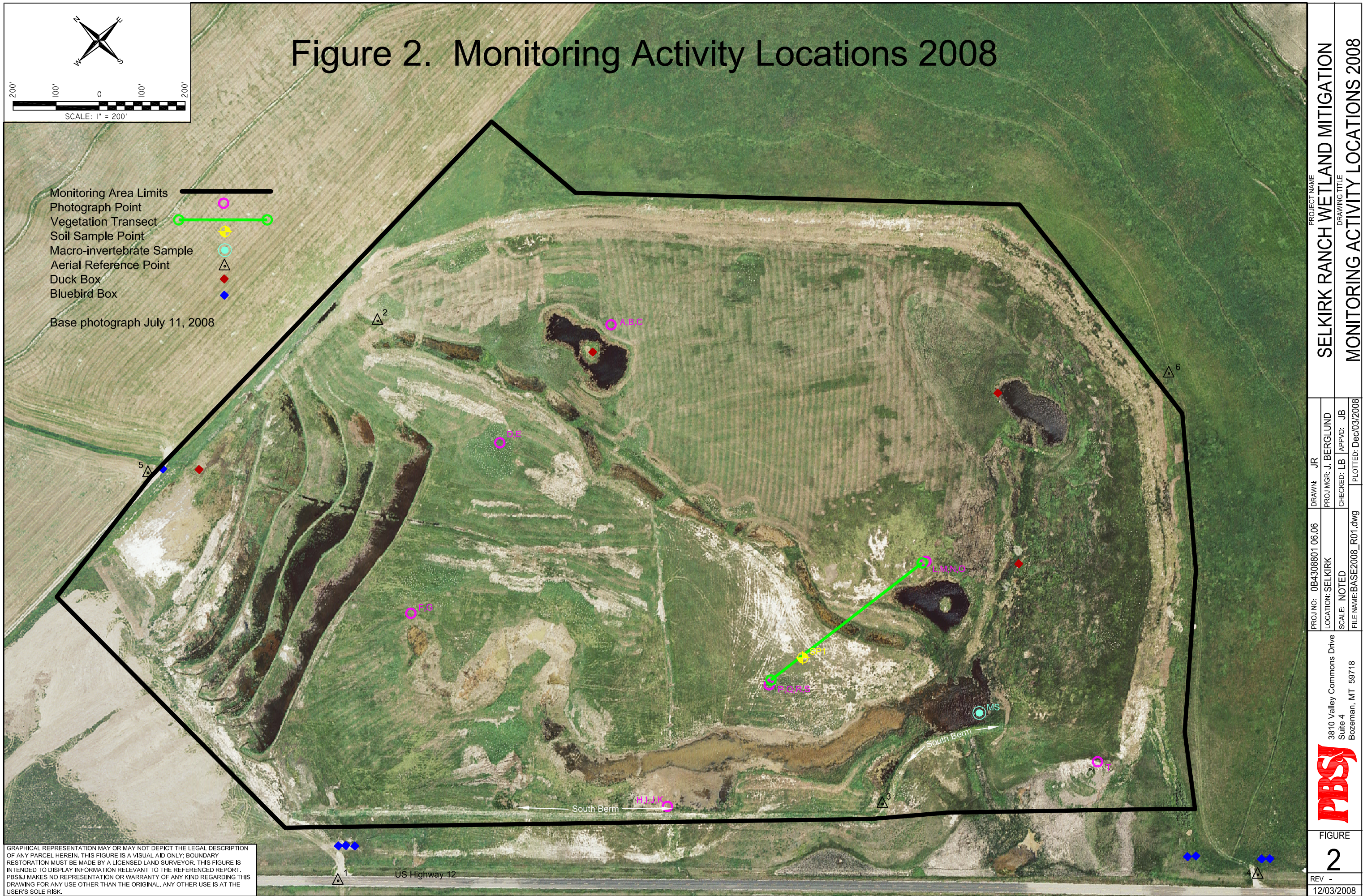
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Appendix A

FIGURES 2, 3, & 4

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



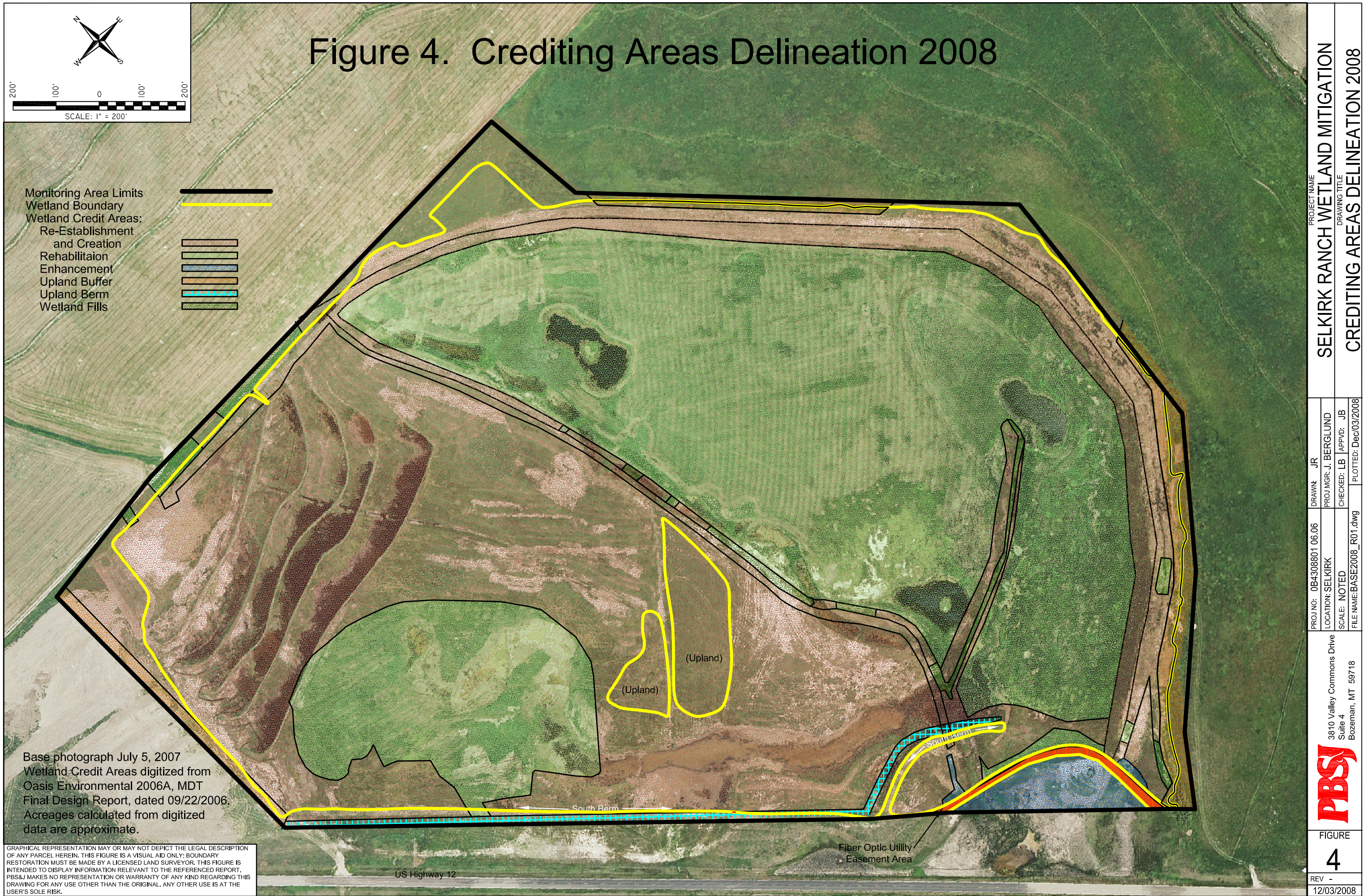
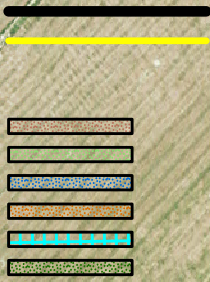


Figure 4. Crediting Areas Delineation 2008

Monitoring Area Limits
Wetland Boundary
Wetland Credit Areas:
Re-Establishment
and Creation
Rehabilitaion
Enhancement
Upland Buffer
Upland Berm
Wetland Fills



Base photograph July 5, 2007
Wetland Credit Areas digitized from
Oasis Environmental 2006A, MDT
Final Design Report, dated 09/22/2006.
Acreages calculated from digitized
data are approximate.

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

3810 Valley Commons Drive Suite 4 Bozeman, MT 59718	PROJECT NAME		SELKIRK RANCH WETLAND MITIGATION	
	DRAWING TITLE		CREDITING AREAS DELINEATION 2008	
	PROJ NO: 0B4308801	06.06	DRAWN: JR	
FIGURE 4	LOCATION: SELKIRK		PROJ MGR: J. BERGLUND	
	SCALE: NOTED		CHECKED: LB	APPVD: JB
	FILE NAME: BASE2008_R01.dwg			PLOTTED: Dec/03/2008
REV - 12/03/2008				

Appendix B

2008 WETLAND MITIGATION SITE MONITORING FORM

2008 BIRD SURVEY FORM

2008 COE WETLAND DELINEATION FORM

2008 FUNCTIONAL ASSESSMENT FORM

MDT Wetland Mitigation Monitoring

Selkirk Wetland Mitigation Reserve

Two Dot, Montana

PBS&J / MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: Selkirk Project Number: 0B4308801.06.06
Assessment Date: July 16, 2008 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: 2 # Visits in Year: 1
Size of evaluation area: 75 acres Land use surrounding wetland: agriculture

HYDROLOGY

Surface Water Source: groundwater
Inundation: Present Average Depth: 2feet 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:

Some well data discussed in report.

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%	OW	1 = 1-5%

Comments / Problems: **other spp: SCIPUN**

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

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%	CARPRA	1 = 1-5%
RANGME	1 = 1-5%	SONARV	1 = 1-5%

Comments / Problems: **Ranunculus sp. is an OBL species, low-growing, not a significant population. Also: Indeterminate planted woody species <1%.**

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

Dominant Species	% Cover	Dominant Species	% Cover
CARNEB	5 = > 50%	(Indeterminate planted woody species)	+ = < 1%
Triglochin sp.	1 = 1-5%	Scirpus pungens	3 = 11-20%
JUNBAL	4 = 21-50%		
ELEPAL	3 = 11-20%		
ALOARU	4 = 21-50%		
CARPRA	3 = 11-20%		

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%		
ATRPAT	3 = 11-20%		

Comments / Problems: **Other spp.: SCIACU, SCIMAR**

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%		
SONARV	3 = 11-20%		
Chenopodium sp.	3 = 11-20%		
HORJUB	1 = 1-5%		

Comments / Problems: **The berm between wetland and highway is comprised primarily of SONARV, CHENO, HORJUB in addition to other CT 5 spp.**

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%	Triglochin sp.	1 = 1-5%
ALOARU	4 = 21-50%	ELEPAL	2 = 6-10%
CARPRA	1 = 1-5%		

Comments / Problems: **Also: JUNBAL**

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

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

Comments / Problems: **Planted community, an area ~20'x20'. In 2008 one non-flowering carex and no juncus was observed growing through the mat. Otherwise it appears as if most of the mat has been perforated by primarily Alopecurus.**

.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.**

Additional Activities Checklist:

- ☐ Record and map vegetative communities on aerial photograph

COMPREHENSIVE VEGETATION LIST

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

Comments / Problems:

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		Also called Diamond-leafed Willow
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:

2007:

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 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%.

2008:

As of July 2008, approximately 1-5% of the planted woody stems had leaves. Oasis (2008) found that 50% of the stems were green during two 2008 site visits and thus leaf growth and/or new growth may occur in 2009. Any mortality that has occurred does not appear to be animal-caused as most of the screening around each plant seems to be in place, unless rodents are chewing the stems, which was not obvious to the author. Mortality of some stems may have resulted from the high water table around the root zones. A willow area in the south east corner of the wetland (see Figure 3) was not counted in the planted pod count (24) or assessed during the leafy-stem estimate; this willow pod was approximately 100% cover. It is possible that a later leaf-out occurred due to colder than normal temperatures in May/June.

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
Raccoon		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Deer		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Garter Snake	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
White-tailed Deer*	many	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Muskrat*	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Mink*		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Raccoon*		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Fox^					
Coyote or Fox*		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

*Observed by MDT biologist, Larry Urban, last week of August, 2008.

^Oasis sighting, no specific species.

Additional Activities Checklist:

Yes Macroinvertebrate Sampling (if required)

Comments / Problems: Bluebird -9, Wood Duck -4; *NOTE. One blue bird box was occupied by tree swallows.

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	North pond, Rehab Credit Area	N
B	North pond, Rehab Credit Area	W
C	North pond, Rehab Credit Area	S
D	Shrub pod, north end Re-Estab/Creation Credit Area	N
E	Shrub pod, north end Re-Estab/Creation Credit Area	W
F	North end of swale, Re-Estab/Creation Credit Area	W
G	West end of swale, Re-Estab/Creation Credit Area	NE
H	Central south berm, Re-Estab/Creation Credit Area	N
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	W
M	East transect end, Rehabilitation Credit Area	S
N	East transect end, Rehabilitation Credit Area	SE
O	East transect end, Rehabilitation Credit Area	N
P	West transect end, Re-Estab/Creation Credit Area	NE
Q	West transect end, Re-Estab/Creation Credit Area	N
R	West transect end, Re-Estab/Creation Credit Area	S
S	West transect end, Re-Estab/Creation Credit Area	S
T1,T2	<i>Juncus hallii</i> planting (none found in 2008)	-

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. **IN 2007**

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: **July 16, 2008** Examiner: **LBacon-PBSJ**

Transect Number: **1** Approximate Transect Length: **445 feet** Compass Direction from Start: **NE-SW** Note: _____

Vegetation Type A: CT 6	
Length of transect in this type: 250 feet	
Plant Species	Cover
PUC sp.	5 = > 50%
HAPLAN	+ = < 1%
JUNBAL	1 = 1-5%
ALOARU	1 = 1-5%
SUACAL	1 = 1-5%
(Indeterminate planted woody species)	+ = < 1%
HORJUB	2 = 6-10%
Total Vegetative Cover:	100%

Vegetation Type B: CT 1	
Length of transect in this type: 35 feet	
Plant Species	Cover
TYPLAT	5 = > 50%
SCIMAR	2 = 6-10%
SCIVAL/PAL	2 = 6-10%
Shallow inundation	2 = 6-10%
SCIACU	2 = 6-10%
Total Vegetative Cover:	100%

Vegetation Type C: CT 8	
Length of transect in this type: 134 feet	
Plant Species	Cover
DISSPI	5 = > 50%
HAPLAN	3 = 11-20%
POAJUN	1 = 1-5%
SUACAL	2 = 6-10%
ALOARU	1 = 1-5%
Total Vegetative Cover:	100%

Vegetation Type D: CT 6	
Length of transect in this type: 26 feet	
Plant Species	Cover
ALOARU	5 = > 50%
HAPLAN	2 = 6-10%
HORJUB	+ = < 1%
(Indeterminate planted woody species)	+ = < 1%
Total Vegetative Cover:	100%

MDT WETLAND MONITORING – VEGETATION TRANSECT

Cover Estimate

+ = < 1% 3 = 11-10%
1 = 1-5% 4 = 21-50%
2 = 6-10% 5 = > 50%

Indicator Class

+ = Obligate
- = Facultative/Wet
0 = Facultative

Source

P = Planted
V = Volunteer

Percent of perimeter developing wetland vegetation (excluding dam/berm structures): **95% -*Comments**

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: Corner in north that was omitted from investigation in 2007 was assessed in 2008; approximately 80% of this corner has developed into wetland.

BIRD SURVEY – FIELD DATA SHEET

Site: **Selkirk** Date: **dates vary**

Weather/Times: **Spring: 8 -10AM, clear, 50 degrees, 10 mph winds; Summer: 70, cloudy**

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
<u>SPRING: (5/6/08)</u>				<u>MID-SEASON (7/17/08)</u>			
American Coot	<10	F	OW	Blue-winged Teal	7	F	MA/OW
American Robin	1	L	UP	Canada Goose	6	F/LO	OW/MA
American Wigeon	<10	F	OW	Common Yellowthroat	3	BR	MA
Black-necked Stilt*	-						
Canada Goose	30-40	N/F	WM/OW	Killdeer	5	BR/F	MA
Cinnamon Teal	<10			Mallard	5	F	OW
Common Raven	1	V.Low FO	WM	Marsh Wren	1	BR	MA
Eared Grebe	<10	F	OW	Mourning Dove	2	FO	MA
Franklin's Gull	3	FO	WM/OW	Red-winged Blackbird	10	F/FO	MA/OW/UP L
Gadwall	10-20	F	OW	Savannah Sparrow	10	BR	MA
Greater Yellowlegs	1	?Song Heard	Wm	Sora	2	(Song)	MA
Green-winged Teal	<10	F	OW	Spotted Sandpiper	1	F	MA
Killdeer	4	BR	WM	Tree Swallow	1	N (box)	UPL
Lesser Yellowlegs*	-						
Long-billed Curlew	2						
Mallard	100	F	OW	Wilson's Phalarope	6	D/F	OW
American Pintail	<10	F	OW	Wilson's Snipe	5	BR	MA
Northern Shoveler	<10	F	OW	Yellow-headed Blackbird	1	BR	MA
Red-winged Blackbird	10	BR	WM	<u>Last Week of August, 2008 (MDT biologist)</u>			
Ring-necked Duck	<10	F	OW	American Coot	-		
Sandhill Crane	30-40	F	WM	Blue-winged Teal	-		
Savannah Sparrow	3	BR	WM	Canada Goose	-		
Solitary Sandpiper	2	F	WM	Cinnamon Teal	-		
Spotted Sandpiper	7	F/FO	WM	Green-winged Teal	-		
Tree Swallow	<20	F	OW/WM	Mallard	-		
Unidentified Gull	40	FO	OW/WM	Northern Shoveler	-		
Western Meadowlark	1	BR	UP	Sandhill Crane	10-15		
Wilson's Phalarope	20-30	F	OW	Tree Swallow	-		
Wilson's snipe	1	Flushed	WM	Wilson's Snipe	-		

*Oasis spring sightings. ^Moe early year sighting.

BEHAVIOR CODES

BP = One of a breeding pair

BD = Breeding display

F = Foraging

FO = Flyover

D = Defensive

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

Notes: Challenging birding because of high visibility of observer and backlighting issues. Birds sensitive to movement and difficult to get close enough to accurately estimate quantity, therefore quantities such as "<10" were used to indicate more than one were seen within an obvious raft of that species, but likely less than ten. Bald Eagle flew low (<300 feet) over adjacent upland (<500 feet from boundary). In Spring a flock of 100-200 waterfowl flushed before species were identified.

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

Project / Site: <u>Selkirk Wetland</u> Applicant / Owner: <u>MDT</u> Investigator: <u>LBacon/PBSJ</u>	Date: <u>July 16, 2008</u> County: <u>Wheatland</u> State: <u>MT</u>
--	---

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

VEGETATION

Dominant Species	Stratum	Indicator	Dominant Species	Stratum	Indicator
1. <i>DISSTR</i>	Herb	FAC+	11.		
2. <i>HAPLAN</i>	Herb	FACW	12.		
3. <i>SUECAL</i>	Herb	FACW	13.		
4.			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 / 3 = 100%		
Remarks: Entire transect is in a wetland area.					

HYDROLOGY

<u>Yes</u> Recorded Data (Describe in Remarks): <u>N/A</u> Stream, Lake, or Tide Gauge <u>Yes</u> Aerial Photographs <u>N/A</u> Other <u>No</u> No Recorded Data	Wetland Hydrology Indicators Primary Indicators: <u>NO</u> Inundated <u>YES</u> Saturated in Upper 12 Inches <u>NO</u> Water Marks <u>NO</u> Drift Lines <u>NO</u> Sediment Deposits <u>NO</u> Drainage Patterns in Wetland Secondary Indicators (2 or more required): <u>NO</u> Oxidized Root Channels in Upper 12 inches <u>NO</u> Water-Stained Leaves <u>NO</u> Local Soil Survey Data <u>NO</u> FAC-Neutral Test <u>NO</u> Other (Explain in Remarks)
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.)	
Remarks: Surface is saturated all along entire transect.	

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.
0-8	A	10 YR 4/1	/ /	N/A N/A	Silty Clay
8-10	A	2.5 YR 5/4,4/4	/ /	N/A N/A	Silty Clay
		/	/ /	N/A N/A	
		/	/ /	N/A N/A	
		/	/ /	N/A N/A	
Hydric Soil Indicators:					
<u>NO</u> Histosol		<u>NO</u> Concretions			
<u>NO</u> Histic Epipedon		<u>NO</u> High Organic Content in Surface Layer in Sandy Soils			
<u>NO</u> Sulfidic Odor		<u>NO</u> Organic Streaking in Sandy Soils			
<u>NO</u> Aquic Moisture Regime		<u>NO</u> Listed on Local Hydric Soils List			
<u>NO</u> Reducing Conditions		<u>NO</u> Listed on National Hydric Soils List			
<u>YES</u> Gleyed or Low-Chroma Colors		<u>NO</u> Other (Explain in Remarks)			
Remarks: No mottles noted, however soil has low-chroma.					

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <u>YES</u>	Is this Sampling Point within a Wetland? <u>YES</u>
Wetland Hydrology Present? <u>YES</u>	
Hydric Soils Present? <u>YES</u>	
Remarks: General percent cover of entire site has increased. Often new sites have a cover of 90-100% the first year and greater than 100% in the second, as was observed for Selkirk in general in 2008. However, some areas of 2007 inundation along the north side of the south berm were not inundated in 2008.	

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: 7/16/08

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)
67.22 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)
31.99 (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; 1-5% of stems had leaves as of July, 2008 and Oasis reported that 50% of the stems were green. 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)	<input type="checkbox"/> High								<input type="checkbox"/> Moderate								<input checked="" type="checkbox"/> Low			
	<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input checked="" type="checkbox"/> Even			
	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)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	E	--	--	--
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)			
	<input checked="" type="checkbox"/> Exceptional	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
Substantial	1 (E)	--	--	--
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. Ponds have perennial water, though <10% of mitigation credit area, they provide valuable wildlife habitat.

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	<input type="checkbox"/> Permanent/Perennial			<input type="checkbox"/> Seasonal / Intermittent			<input type="checkbox"/> Temporary / Ephemeral		
	>25%	10-25%	<10%	>25%	10-25%	<10%	>25%	10-25%	<10%
Cover - % of waterbody in AA containing cover objects (e.g. submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation)									
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)			
	<input type="checkbox"/> Exceptional	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> 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	<input type="checkbox"/> ≥ 10 acres			<input checked="" type="checkbox"/> <10, >2 acres			<input type="checkbox"/> ≤2 acres		
	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
% of flooded wetland classified as forested, scrub/shrub, or both									
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 inundated 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.	<input checked="" type="checkbox"/> >5 acre feet			<input type="checkbox"/> <5, >1 acre feet			<input type="checkbox"/> ≤1 acre foot		
	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Duration of surface water at wetlands within the AA									
Wetlands in AA flood or pond ≥ 5 out of 10 years	1 (H)	--	--	--	--	--	--	--	--
Wetlands in AA flood or pond < 5 out of 10 years	--	--	--	--	--	--	--	--	--

Comments: In mid-July 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. Surface water in ponds is perennial.

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.			
	<input checked="" type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%		<input type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%	
% cover of wetland vegetation in AA	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Evidence of flooding or ponding in AA								
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 maximum depth.

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		
	<input checked="" type="checkbox"/> Permanent / Perennial	<input type="checkbox"/> Seasonal / Intermittent	<input type="checkbox"/> Temporary / Ephemeral
≥ 65 %	1 (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	<input checked="" type="checkbox"/> Vegetated component >5 acres						<input type="checkbox"/> Vegetated component 1-5 acres						<input type="checkbox"/> Vegetated component <1 acre					
B	<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input checked="" type="checkbox"/> Low		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low	
C	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N
P/P	--	--	--	--	.8H	--	--	--	--	--	--	--	--	--	--	--	--	--
S/I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input checked="" type="checkbox"/> common	<input type="checkbox"/> abundant
Low disturbance at AA (12i)	--	--	--	--	--	--	--	.4M	--
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)		
	<input type="checkbox"/> Low	<input type="checkbox"/> Moderate	<input type="checkbox"/> High
Public ownership	--	--	--
Private ownership	--	--	--

Comments: Wildlife viewing; observed out-of-state birders onsite in 2007.

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	exceptional	1.0	1	
D. General Fish/Aquatic Habitat	N/A	-	--	
E. Flood Attenuation	moderate	0.50	1	
F. Short and Long Term Surface Water Storage	high	1.00	1	
G. Sediment/Nutrient/Toxicant Removal	high	1.00	1	
H. Sediment/Shoreline Stabilization	high	1.00	1	
I. Production Export/Food Chain Support	high	0.80	1	
J. Groundwater Discharge/Recharge	high	1.00	1	
K. Uniqueness	moderate	0.40	1	
L. Recreation/Education Potential	high	1.00	1	
Total:		<u>8.40</u>	<u>11.00</u>	<u>275.1</u>
Percent of Total Possible Points:		<u>76%</u> (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: 7/16/2008 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)
67.22 (measured, e.g. GPS)
- B. Purpose of Evaluation:
- ☐ Wetlands potentially affected by MDT project 9. Assessment Area (total acres): (visually estimated)
34.23 (measured, e.g. GPS)
- ☐ Mitigation wetlands; pre-construction
- ☒ 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; 1-5% of stems had leaves as of July, 2008 and Oasis reported that 50% of the stems were green.

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)	<input type="checkbox"/> High								<input type="checkbox"/> Moderate								<input checked="" type="checkbox"/> Low			
	<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input checked="" type="checkbox"/> Even			
	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)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	E	--	--	--
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)			
	<input checked="" type="checkbox"/> Exceptional	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
Substantial	1 (E)	--	--	--
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. Lateral grade checks hold water for most of the year it appears.

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	<input type="checkbox"/> Permanent/Perennial			<input type="checkbox"/> Seasonal / Intermittent			<input type="checkbox"/> Temporary / Ephemeral		
	>25%	10-25%	<10%	>25%	10-25%	<10%	>25%	10-25%	<10%
Cover - % of waterbody in AA containing cover objects (e.g. submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation)									
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)			
	<input type="checkbox"/> Exceptional	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> 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	<input type="checkbox"/> ≥ 10 acres			<input checked="" type="checkbox"/> <10, >2 acres			<input type="checkbox"/> ≤2 acres		
	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
% of flooded wetland classified as forested, scrub/shrub, or both									
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 have 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.	<input checked="" type="checkbox"/> >5 acre feet			<input type="checkbox"/> <5, >1 acre feet			<input type="checkbox"/> ≤1 acre foot		
	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Duration of surface water at wetlands within the AA									
Wetlands in AA flood or pond ≥ 5 out of 10 years	1 (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.			
	<input checked="" type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%		<input type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%	
% cover of wetland vegetation in AA	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Evidence of flooding or ponding in AA								
AA contains no or restricted outlet	1 (H)	--	--	--	--	--	--	--
AA contains unrestricted outlet	--	--	--	--	--	--	--	--

Comments: Outlet restricted by berm on south side of wetland edge and waer flowing from swales is culverted beneath south berm.

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		
	<input checked="" type="checkbox"/> Permanent / Perennial	<input type="checkbox"/> Seasonal / Intermittent	<input type="checkbox"/> Temporary / Ephemeral
≥ 65 %	1 (H)	--	--
35-64 %	--	--	--
< 35 %	--	--	--

Comments: Sedge, cattail and rush comprise most of the vegetation adjacent to swales and grade checks.

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	<input checked="" type="checkbox"/> Vegetated component >5 acres						<input type="checkbox"/> Vegetated component 1-5 acres						<input type="checkbox"/> Vegetated component <1 acre					
	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input checked="" type="checkbox"/> Low	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
B	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N
C	--	--	--	--	.8H	--	--	--	--	--	--	--	--	--	--	--	--	--
P/P	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S/I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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 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	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input checked="" type="checkbox"/> common	<input type="checkbox"/> abundant
Low disturbance at AA (12i)	--	--	--	--	--	--	--	.4M	--
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)		
	<input type="checkbox"/> Low	<input type="checkbox"/> Moderate	<input type="checkbox"/> High
Public ownership	--	--	--
Private ownership	--	--	--

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	exceptional	1.00	1	
D. General Fish/Aquatic Habitat	N/A	-	--	
E. Flood Attenuation	moderate	0.50	1	
F. Short and Long Term Surface Water Storage	high	1.00	1	
G. Sediment/Nutrient/Toxicant Removal	high	1.00	1	
H. Sediment/Shoreline Stabilization	high	1.00	1	
I. Production Export/Food Chain Support	high	0.80	1	
J. Groundwater Discharge/Recharge	high	1.00	1	
K. Uniqueness	moderate	0.4	1	
L. Recreation/Education Potential	high	1.00	1	
Total:		<u>8.40</u>	<u>11.00</u>	<u>294.4</u>
Percent of Total Possible Points:		<u>76%</u> (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: 7/16/2008

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)
67.22 (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 through this area.

ii. Prominent weedy, alien, & introduced species: There was knapweed west of the enhancement area in 2007; not investigated in 2008.

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	---	---	---	---	---	---	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 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; Oasis observed in 2008; not yet reproducing.

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)	<input type="checkbox"/> High								<input checked="" type="checkbox"/> Moderate								<input type="checkbox"/> Low			
	<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input type="checkbox"/> Even				<input checked="" type="checkbox"/> Uneven				<input type="checkbox"/> Even			
	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)	--	--	--	--	--	--	--	--	--	--	--	--	E	--	--	--	--	--	--	--
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)			
	<input checked="" type="checkbox"/> Exceptional	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
Substantial	--	--	--	--
Moderate	.9 (H)	--	--	--
Low	--	--	--	--

Comments: Wilson's Phalarope were observed feeding in the pipe inlet area in 2007; 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	<input type="checkbox"/> Permanent/Perennial			<input type="checkbox"/> Seasonal / Intermittent			<input type="checkbox"/> Temporary / Ephemeral		
	>25%	10-25%	<10%	>25%	10-25%	<10%	>25%	10-25%	<10%
Cover - % of waterbody in AA containing cover objects (e.g. submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation)									
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)			
	<input type="checkbox"/> Exceptional	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> 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	<input type="checkbox"/> ≥ 10 acres			<input type="checkbox"/> <10, >2 acres			<input checked="" type="checkbox"/> ≤2 acres		
	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
% of flooded wetland classified as forested, scrub/shrub, or both									
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.	<input type="checkbox"/> >5 acre feet			<input type="checkbox"/> <5, >1 acre feet			<input checked="" type="checkbox"/> ≤1 acre foot		
	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Duration of surface water at wetlands within the AA									
Wetlands in AA flood or pond ≥ 5 out of 10 years	--	--	--	--	--	--	.4 (M)	--	--
Wetlands in AA flood or pond < 5 out of 10 years	--	--	--	--	--	--	--	--	--

Comments: Water appears to flow from site year-round, though quantity likely varies.

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.			
	<input checked="" type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%		<input type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%	
% cover of wetland vegetation in AA	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Evidence of flooding or ponding in AA								
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		
	<input checked="" type="checkbox"/> Permanent / Perennial	<input type="checkbox"/> Seasonal / Intermittent	<input type="checkbox"/> Temporary / Ephemeral
≥ 65 %	1 (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	<input type="checkbox"/> Vegetated component >5 acres						<input checked="" type="checkbox"/> Vegetated component 1-5 acres						<input type="checkbox"/> Vegetated component <1 acre					
B	<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input checked="" type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low	
C	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N
P/P	--	--	--	--	--	--	--	--	.8H	--	--	--	--	--	--	--	--	--
S/I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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 culvert.

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	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input checked="" type="checkbox"/> common	<input type="checkbox"/> abundant
Low disturbance at AA (12i)	--	--	--	--	--	--	--	.4M	--
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)		
	<input type="checkbox"/> Low	<input type="checkbox"/> Moderate	<input type="checkbox"/> High
Public ownership	--	--	--
Private ownership	--	--	--

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	low	0.20	1	
F. Short and Long Term Surface Water Storage	moderate	0.4	1	
G. Sediment/Nutrient/Toxicant Removal	high	1.00	1	
H. Sediment/Shoreline Stabilization	high	1.00	1	
I. Production Export/Food Chain Support	high	0.80	1	
J. Groundwater Discharge/Recharge	high	1.00	1	
K. Uniqueness	moderate	0.4	1	0.00
L. Recreation/Education Potential	high	1.00	1	
Total:		<u>7.40</u>	<u>11.00</u>	<u>7.60</u>
Percent of Total Possible Points:		<u>67%</u> (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

2008 REPRESENTATIVE PHOTOGRAPHS

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

2008 SELKIRK WETLAND MITIGATION RESERVE



Location: A **Description:** North pond, Rehabilitation credit area. **View: N**



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



Location: C **Description:** North pond, Rehabilitation credit area. **View: S**



Location: D **Description:** Shrub pod east end, Re-establishment/Creation credit area. **View: N**



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



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

2008 SELKIRK WETLAND MITIGATION RESERVE



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



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



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: W**

2008 SELKIRK WETLAND MITIGATION RESERVE



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



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



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



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



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



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

2008 SELKIRK WETLAND MITIGATION RESERVE



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



Location: T1 **Description:** *Juncus hallii*
planting; no *Juncus* in photo.



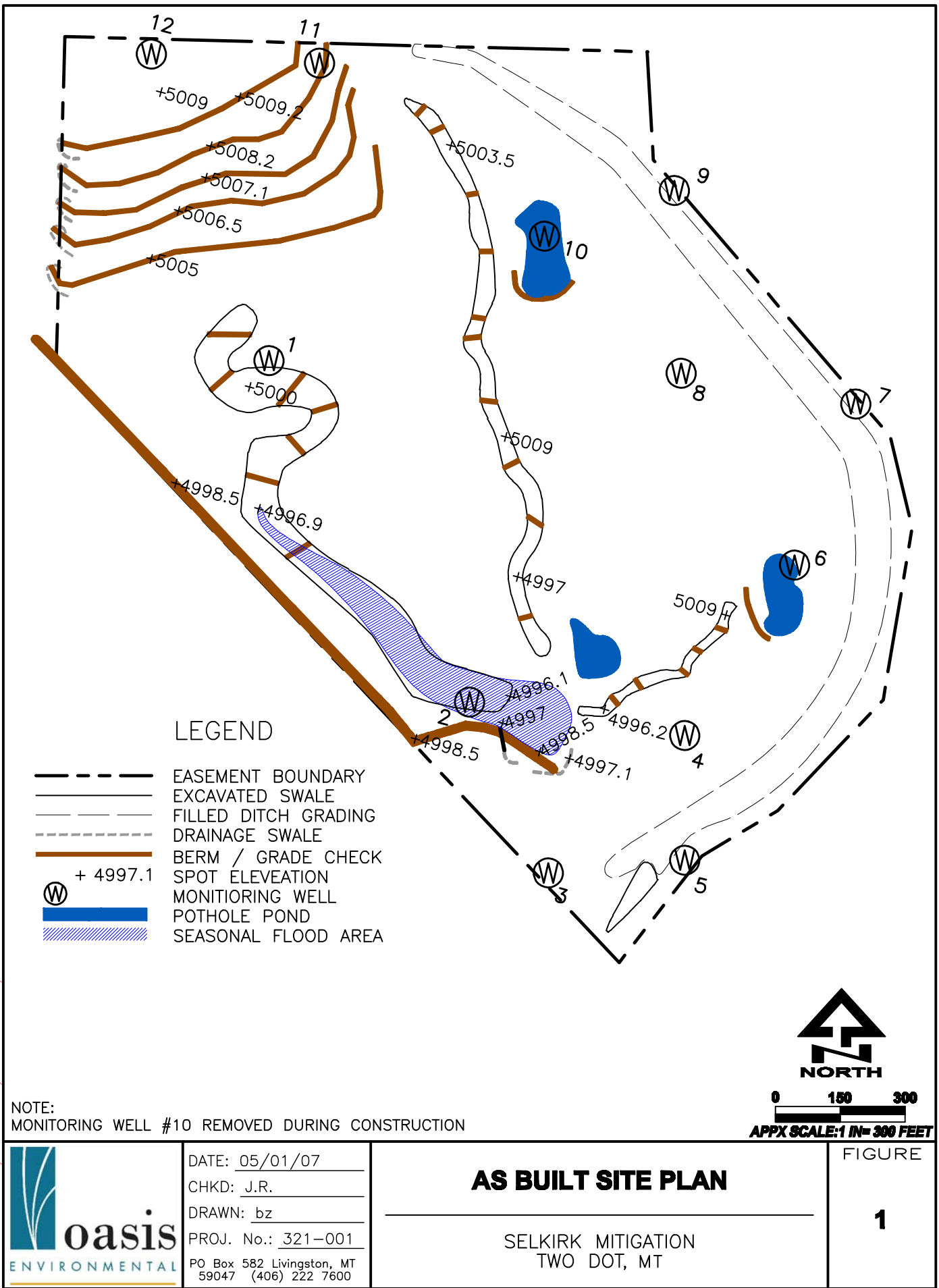
Location: T2 **Description:** *Juncus hallii* planting; species
observed by Oasis, however photo depicts mostly sedge and
creeping foxtail.

Appendix D

SITE PLAN

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

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

BIRD SURVEY PROTOCOL (continued)

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 Plane Coordinates NAD 83 international feet. The Trimble GEO III GPS unit was also used for some sites in 2007.

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 and 2008 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

2008 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 – 2008**

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

INTRODUCTION

This report summarizes data generated from eight years of mitigated wetland monitoring from sites throughout the State of Montana. Over all years of sampling, a total of 210 invertebrate samples have been collected. Table 1 lists the currently monitored sites at which aquatic invertebrates were collected in 2008, 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, 2007, and 2008 by personnel of PBS&J (Table 1). Sampling procedures were based on the protocols developed by the Montana Department of Environmental Quality (MDEQ) 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.

Assessment

The method employed to assess these wetlands is based on an index incorporating a battery of 12 bioassessment metrics or attributes (Table 2) 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, “good” 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 good, 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.

Six 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 2008, the lotic sites were Camp Creek (2 sites), Cloud Ranch stream, Jack Creek – McKee Spring, and Jocko Spring Creek (2 sites). 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 (MVFP index: 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 (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 2008 samples are given in Tables 4a-4c and 5. Thermal preference of invertebrate assemblages was calculated using 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 Arctopsyche 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 sampled in 2008 are included. An asterisk indicates lotic sites.

Site Identifier	2001	2002	2003	2004	2005	2006	2007	2008
Roundup	+	+	+	+	+	+	+	+
Hoskins Landing MS-1		+	+	+	+	+	+	+
Peterson Ranch Pond 2		+		+	+	+	+	+
Peterson Ranch Pond 4		+	+	+	+	+	+	+
Perry Ranch		+			+			+
Camp Creek MS-1*		+	+	+	+	+	+	+
Camp Creek MS-2*						+	+	+
Cloud Ranch Pond				+	+		+	+
Cloud Ranch Stream*				+			+	+
Jack Creek – Pond				+	+	+	+	+
Jack Creek – McKee*							+	+
Norem				+	+	+	+	+
Rock Creek Ranch					+	+	+	+
Wagner Marsh					+	+	+	+
Alkali Lake 1						+	+	+
West Fork of Charley Creek							+	+
Woodson Pond MI 1							+	+
Woodson Stream MI 2*							+	+
Little Muddy Creek							+	+
Selkirk Ranch							+	+
DH Ranch							+	+
Jocko Spring Creek MS-1								+
Jocko Spring Creek MS-2								+
Sportsman's Campground Site #1								+
Sportsman's Campground Site #2								+
Sportsman's Campground Site #3								+
Lonepine #1								+
Lonepine #2								+

Table 2. Aquatic invertebrate metrics employed for wetland (lentic) invertebrate assemblages in the MDT mitigated wetlands study, 2001 – 2008.

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 sections of individual monitoring reports. Summary tables for lentic (4a – 4c) and lotic (5) sites and project specific taxa listing(s) and metrics report(s) are provided on the following pages.)

Table 4a. Metric values and scores for wetland (lentic) sites in the MDT mitigated wetland study – 2008 sampling.

METRIC	Roundup	Hoskins Landing MS 1	Peterson Ranch Pond 2	Peterson Ranch Pond 4	Perry Ranch	Cloud Ranch Pond	Jack Creek Pond	Norem
Total taxa	9	18	13	25	11	27	21	14
POET	0	2	1	3	0	5	2	0
Chironomidae taxa	4	5	3	6	5	14	7	6
Crustacea + Mollusca	3	6	3	5	2	4	6	2
% Chironomidae	80.37%	17.00%	3.70%	13.21%	88.79%	49.53%	42.86%	34.69%
Orthocladinae/Chir	0.63	0.18	1.50	0.21	0.82	0.66	0.40	0.53
% Amphipoda	0.00%	8.00%	0.00%	0.00%	0.00%	6.54%	15.24%	0.00%
% Crustacea + % Mollusca	15.89%	48.00%	86.11%	43.40%	6.54%	10.28%	30.48%	26.53%
HBI	8.01	7.62	7.85	7.40	7.37	5.94	8.17	7.61
% Dominant taxon	50.47%	27.00%	84.26%	25.47%	62.62%	13.08%	19.05%	26.53%
% Collector-Gatherers	31.78%	54.00%	87.96%	20.75%	20.56%	56.07%	65.71%	44.90%
% Filterers	2.80%	10.00%	0.00%	1.89%	0.00%	3.74%	1.90%	0.00%
Total taxa	1	3	1	5	1	5	5	1
POET	1	1	1	3	1	5	1	1
Chironomidae taxa	3	3	3	3	3	5	5	3
Crustacea + Mollusca	1	5	1	3	1	3	5	1
% Chironomidae	1	5	5	5	1	1	1	3
Orthocladinae/Chir	5	1	5	3	5	5	3	5
% Amphipoda	5	3	5	5	5	3	3	5
% Crustacea + % Mollusca	5	3	1	3	5	5	5	5
HBI	1	1	1	3	3	5	1	1
% Dominant taxon	1	5	1	5	1	5	5	5
% Collector-Gatherers	1	3	5	1	1	3	3	1
% Filterers	3	1	3	3	3	3	3	3
Total Score	28	34	32	42	30	48	40	34
Percent of Maximum Score	46.67%	56.67%	53.33%	70.00%	50.00%	80.00%	66.67%	56.67%
Impairment Classification	poor	sub-optimal	sub-optimal	good	poor	good	sub-optimal	sub-optimal

Table 4b. Metric values and scores for wetland (lentic) sites in the MDT mitigated wetland study – 2008 sampling.

METRIC	Rock Creek Ranch	Wagner Marsh	Alkali Lake	West Fork of Charley Creek	Woodson Pond	Woodson Stream	Little Muddy Creek	Selkirk Ranch
Total taxa	23	11	10	9	13	7	14	17
POET	1	4	0	0	1	3	1	1
Chironomidae taxa	5	2	2	1	7	0	2	8
Crustacea + Mollusca	5	2	3	3	2	2	3	5
% Chironomidae	28.97%	2.83%	5.41%	0.91%	60.00%	0.00%	55.00%	23.38%
Orthoclaadiinae/Chir	0.97	0.00	0.00	0.00	0.52	0	0.64	0.33
% Amphipoda	0.00%	0.00%	0.00%	67.27%	0.00%	7.69%	0.00%	5.19%
% Crustacea + % Mollusca	28.97%	39.62%	32.43%	70.91%	25.45%	15.38%	17.00%	48.05%
HBI	6.91	7.45	8.57	8.19	8.14	4.62	6.97	7.76
% Dominant taxon	22.43%	48.11%	48.65%	67.27%	25.45%	30.77%	35.00%	32.47%
% Collector-Gatherers	30.84%	52.83%	21.62%	68.18%	86.36%	23.08%	29.00%	16.88%
% Filterers	1.87%	0.00%	0.00%	0.00%	0.00%	30.77%	0.00%	32.47%
Total taxa	5	1	1	1	1	1	1	3
POET	1	5	1	1	1	3	1	1
Chironomidae taxa	3	1	1	1	5	1	1	5
Crustacea + Mollusca	3	1	1	1	1	1	1	3
% Chironomidae	3	5	5	5	1	5	1	3
Orthoclaadiinae/Chir	5	1	1	1	5	Not Scored	5	3
% Amphipoda	5	5	5	1	5	3	5	3
% Crustacea + % Mollusca	5	3	5	1	5	5	5	3
HBI	3	3	1	1	1	5	3	1
% Dominant taxon	5	3	3	1	5	5	3	5
% Collector-Gatherers	1	3	1	3	5	1	1	1
% Filterers	3	3	3	3	3	1	3	1
Total Score	42	34	28	20	38	31	30	32
Percent of Maximum Score	70.00%	56.67%	46.67%	33.33%	63.33%	56.36%	50.00%	53.33%
Impairment Classification	good	sub-optimal	poor	poor	sub-optimal	sub-optimal	poor	sub-optimal

Table 4c. Metric values and scores for wetland (lentic) sites in the MDT mitigated wetland study – 2008 sampling.

METRIC	DH Ranch	Sportsman's Campground Site # 1	Sportsman's Campground Site # 2	Sportsman's Campground Site # 3	Lonepine # 1	Lonepine # 2
Total taxa	15	16	9	12	18	4
POET	1	1	0	0	2	0
Chironomidae taxa	6	6	3	7	12	3
Crustacea + Mollusca	2	5	3	4	1	1
% Chironomidae	52.29%	10.91%	41.18%	69.09%	81.82%	57.14%
Orthocladiinae/Chir	0.09	0.17	0.00	0.25	0.13	0.00
% Amphipoda	0.00%	24.55%	5.88%	27.27%	0.00%	0.00%
% Crustacea + % Mollusca	30.28%	83.64%	23.53%	29.09%	7.27%	42.86%
HBI	7.33	7.55	8.76	7.55	7.60	8.14
% Dominant taxon	33.03%	56.36%	29.41%	25.45%	25.45%	42.86%
% Collector-Gatherers	49.54%	20.91%	11.76%	57.27%	55.45%	28.57%
% Filterers	0.92%	63.64%	11.76%	25.45%	22.73%	42.86%
Total taxa	3	3	1	1	3	1
POET	1	1	1	1	1	1
Chironomidae taxa	3	3	3	5	5	3
Crustacea + Mollusca	1	3	1	3	1	1
% Chironomidae	1	5	3	1	1	1
Orthocladiinae/Chir	1	1	1	3	1	1
% Amphipoda	5	1	3	1	5	5
% Crustacea + % Mollusca	5	1	5	5	5	3
HBI	3	3	1	3	3	1
% Dominant taxon	5	1	5	5	5	3
% Collector-Gatherers	3	1	1	3	3	1
% Filterers	3	1	1	1	1	1
Total Score	34	24	26	32	34	22
Percent of Maximum Score	56.67%	40.00%	43.33%	53.33%	56.67%	36.67%
Impairment Classification	sub-optimal	poor	poor	sub-optimal	sub-optimal	poor

Table 5. Metric values and scores for stream (lotic) sites in the MDT mitigated wetland study – 2008 sampling.

METRIC	Camp Creek MS-1	Camp Creek MS-2	Cloud Ranch Stream	Jack Creek – McKee Spring	Jocko Spring Creek MS-1	Jocko Spring Creek MS-2
E Richness	7	5	4	1	0	1
P Richness	2	2	0	0	0	1
T Richness	4	6	5	3	2	5
Pollution Sensitive Richness	0	1	0	0	0	0
Filterer Percent	29.00%	37.00%	5.00%	40.00%	15.00%	11.00%
Pollution Tolerant Percent	5.00%	3.00%	28.00%	1.00%	62.00%	15.00%
E Richness	3	2	2	0	0	0
P Richness	2	2	0	0	0	1
T Richness	2	3	3	2	1	3
Pollution Sensitive Richness	0	1	0	0	0	0
Filterer Percent	1	0	3	0	1	1
Pollution Tolerant Percent	3	3	0	3	0	1
Total score	11	11	8	5	2	6
Percent of maximum score	61%	61%	44%	28%	11%	33%
Impairment classification	slight	slight	moderate	moderate	severe	moderate

LITERATURE CITED

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Taxa Listing

Project ID: MDT08PBSJ
RAI No.: MDT08PBSJ015

RAI No.: MDT08PBSJ015

Sta. Name: Selkirk 2008

Client ID:

Date Coll.:

No. Jars: 1

STORET ID:

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Non-Insect							
Cladocera	25	32.47%	Yes	Unknown		8	CF
Copepoda	1	1.30%	Yes	Unknown		8	CG
Hyalellidae							
<i>Hyalella</i> sp.	4	5.19%	Yes	Unknown		8	CG
Lymnaeidae							
<i>Stagnicola</i> sp.	5	6.49%	Yes	Unknown		6	SC
Physidae							
Physidae	2	2.60%	Yes	Unknown		8	SC
Odonata							
Lestidae							
<i>Lestes</i> sp.	1	1.30%	Yes	Larva		9	PR
Heteroptera							
Corixidae							
Corixidae	12	15.58%	No	Larva		10	PH
<i>Sigara</i> sp.	6	7.79%	Yes	Adult		5	PH
Notonectidae							
Notonectidae	1	1.30%	Yes	Larva		10	PR
Coleoptera							
Dytiscidae							
Dytiscidae	1	1.30%	No	Larva		5	PR
<i>Rhantus</i> sp.	1	1.30%	Yes	Adult		5	PR
Chironomidae							
Chironomidae							
<i>Apedilum</i> sp.	1	1.30%	Yes	Larva		11	CG
<i>Chironomus</i> sp.	1	1.30%	Yes	Larva		10	CG
<i>Cladotanytarsus</i> sp.	5	6.49%	Yes	Larva		7	CG
<i>Cricotopus (Isocladius)</i> sp.	6	7.79%	Yes	Larva		7	SH
<i>Cryptochironomus</i> sp.	2	2.60%	Yes	Larva		8	PR
<i>Glyptotendipes</i> sp.	1	1.30%	Yes	Larva		10	SH
<i>Paratanytarsus</i> sp.	1	1.30%	Yes	Larva		6	CG
<i>Polypedilum</i> sp.	1	1.30%	Yes	Larva		6	SH
Sample Count	77						

Metrics Report

Project ID: MDT08PBSJ
RAI No.: MDT08PBSJ015
Sta. Name: Selkirk 2008
Client ID:
STORET ID:
Coll. Date:

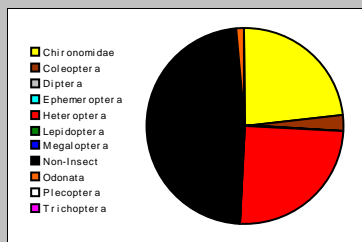
Abundance Measures

Sample Count: 77
Sample Abundance: 77.00 100.00% of sample used

Coll. Procedure:
Sample Notes:

Taxonomic Composition

Category	R	A	PRA
Non-Insect	5	37	48.05%
Odonata	1	1	1.30%
Ephemeroptera			
Plecoptera			
Heteroptera	2	19	24.68%
Megaloptera			
Trichoptera			
Lepidoptera			
Coleoptera	1	2	2.60%
Diptera			
Chironomidae	8	18	23.38%

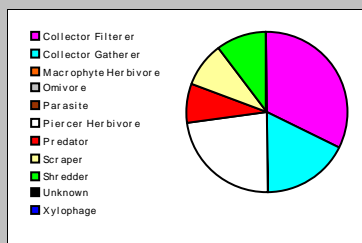


Dominant Taxa

Category	A	PRA
Cladocera	25	32.47%
Corixidae	12	15.58%
Sigara	6	7.79%
Cricotopus (Isocladius)	6	7.79%
Staenicola	5	6.49%
Cladotanytarsus	5	6.49%
Hyalella	4	5.19%
Physidae	2	2.60%
Cryptochironomus	2	2.60%
Paratanytarsus	1	1.30%
Notonectidae	1	1.30%
Glyptotendipes	1	1.30%
Dytiscidae	1	1.30%
Copepoda	1	1.30%
Apedilum	1	1.30%

Functional Composition

Category	R	A	PRA
Predator	4	6	7.79%
Parasite			
Collector Gatherer	6	13	16.88%
Collector Filterer	1	25	32.47%
Macrophyte Herbivore			
Piercer Herbivore	1	18	23.38%
Xylophage			
Scraper	2	7	9.09%
Shredder	3	8	10.39%
Omnivore			
Unknown			



Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
<i>Composition</i>					
Taxa Richness	17	1	1		0
Non-Insect Percent	48.05%				
E Richness	0	1		0	
P Richness	0	1		0	
T Richness	0	1		0	
EPT Richness	0		0		0
EPT Percent	0.00%		0		0
Oligochaeta+Hirudinea Percent					
Baetidae/Ephemeroptera	0.000				
Hydropsychidae/Trichoptera	0.000				
<i>Dominance</i>					
Dominant Taxon Percent	32.47%		2		2
Dominant Taxa (2) Percent	48.05%				
Dominant Taxa (3) Percent	55.84%	3			
Dominant Taxa (10) Percent	88.31%				
<i>Diversity</i>					
Shannon H (loge)	2.184				
Shannon H (log2)	3.151		3		
Margalef D	3.847				
Simpson D	0.178				
Evenness	0.086				
<i>Function</i>					
Predator Richness	4		2		
Predator Percent	7.79%	1			
Filterer Richness	1				
Filterer Percent	32.47%			0	
Collector Percent	49.35%		3		3
Scraper+Shredder Percent	19.48%		2		0
Scraper/Filterer	0.280				
Scraper/Scraper+Filterer	0.219				
<i>Habit</i>					
Burrower Richness	2				
Burrower Percent	2.60%				
Swimmer Richness	3				
Swimmer Percent	25.97%				
Clinger Richness	2	1			
Clinger Percent	9.09%				
<i>Characteristics</i>					
Cold Stenotherm Richness	0				
Cold Stenotherm Percent	0.00%				
Hemoglobin Bearer Richness	6				
Hemoglobin Bearer Percent	9.09%				
Air Breather Richness	1				
Air Breather Percent	2.60%				
<i>Voltinism</i>					
Univoltine Richness	6				
Semivoltine Richness	1	1			
Multivoltine Percent	57.14%		2		
<i>Tolerance</i>					
Sediment Tolerant Richness	1				
Sediment Tolerant Percent	6.49%				
Sediment Sensitive Richness	0				
Sediment Sensitive Percent	0.00%				
Metals Tolerance Index	3.825				
Pollution Sensitive Richness	0				
Pollution Tolerant Percent	20.78%	1		0	
Hilsenhoff Biotic Index	7.763		0		0
Intolerant Percent	0.00%				
Supertolerant Percent	64.94%				
CTQa	108.000				

Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	14	28.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	15	50.00%	Moderate
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	1	5.56%	Severe
MTM	Montana DEQ Mountains (Bukantis 1998)	5	23.81%	Moderate

