MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2009

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
820 North Montana Avenue, Suite A
Helena, MT 59601

December 2009

PBS&J Project No: 0B4308802.06.06

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MDT Project NH-STPP-STPX 54(31)
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1.0 INTRODUCTION

This annual report summarizes methods and results from the third 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. It occurs at approximately 4,640 feet above sea level in the northeast quarter of Section 9 of Township 8 North and Range 12 East (**Figure 1**).

The Selkirk mitigation site was constructed by a private party on private land during the winter of 2006 to 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).

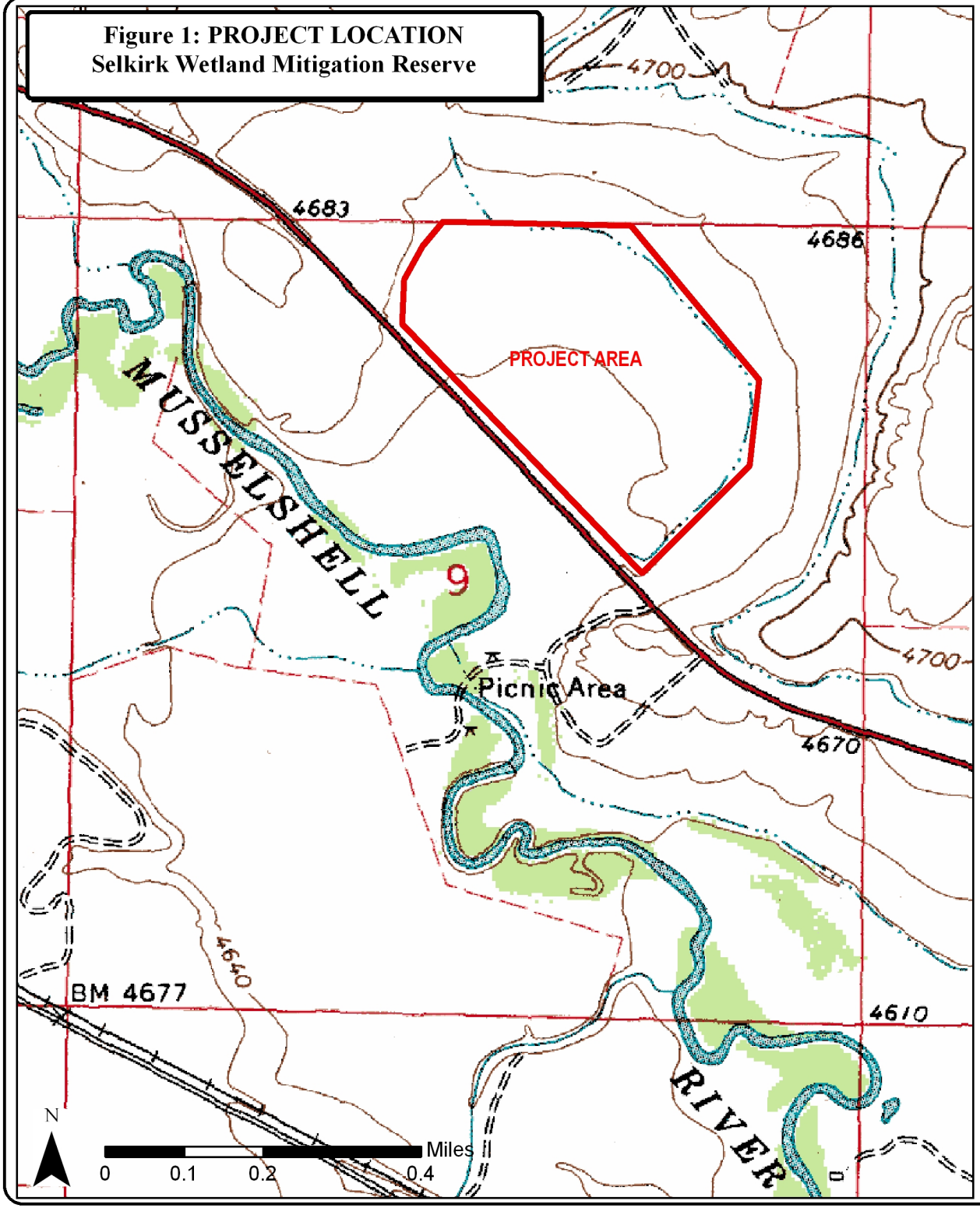
Four different crediting areas were developed, each with their own specific performance standards and mitigation ratios. Credit ratios vary from 1:1 to 5:1 for the four types of mitigation: rehabilitation, 1.5:1; re-establishment/creation, 1:1; enhancement, 3:1; and, upland buffer, 5:1. The US Army Corps of Engineers (COE) will determine the final credits based on these ratios and the achievement of performance standards. It should be noted that the current performance standards are under revision, pending Corps review and approval, and the revised standards will be applied during 2010 monitoring.

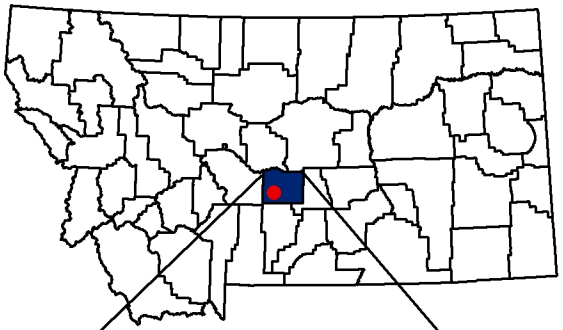
2.0 METHODS

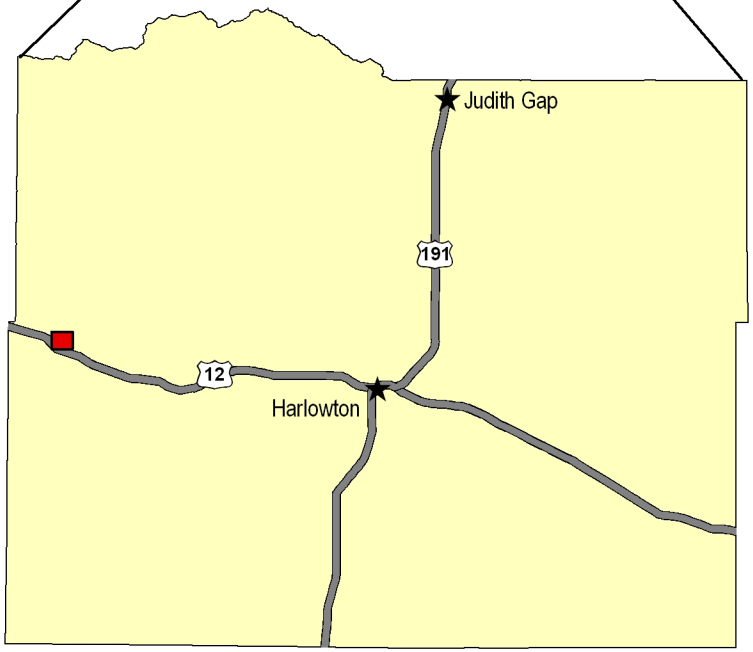
2.1 Monitoring Dates and Activities

The Selkirk Wetland Mitigation Reserve was monitored on July 28th and October 20th of 2009. 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; functional assessment; and maintenance assessment of any inflow/outflow structures.

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
Helena, Montana 59601-3360

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 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 (WRCC) website. Precipitation data for January through July, 2009 were compared to the January through July 1893 - 2009 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 to the aerial photograph. There are several groundwater monitoring wells at this site, which are monitored by the the project developer.

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.

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 2009.

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 2009 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 visits 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 2009 aerial photograph.

2.9 Functional Assessment

A functional assessment form was completed for each credit area in 2009 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 beginning and end of 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 mapping 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 2009 the wetland delineation boundary was hand-corrected using the 2008 and 2009 aerial photographs.

2.12 Maintenance Needs

The outflow structures were checked for obstructions and other problems. This maintenance check did not constitute an engineering-level structural inspection, but rather a cursory examination. The condition of the thirteen bird boxes was 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. Wells were measured on June 16, 2009 (Blank 2009). Flood irrigation was in full swing and the groundwater table was within 12 inches of the ground surface at wells 5, 7, and 9. At wells 1, 2, 3, 4, 6, 8, and 11 groundwater was 1 to 3 inches above ground surface or inundated (well 10 was destroyed when one of the ponds was constructed).

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 slowly spread the flow of water. In addition, three shallow ponds were constructed. Each of the swales intersect in a shallow water area; this area was partially vegetated with emergent plants 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 2009 monitoring visit, approximately 25 to 50% of the area between the lateral grade checks was inundated with shallow water (<6 inches). The area north of the northern-most grade check was excavated to create a shallow water and emergent vegetation area, which included very shallow water (<6 inches) at the time of the 2009 monitoring. Approximately 100% of the area within the 2009 wetland boundary was saturated to the surface during the mid-July

monitoring visit and 95% of the wetland had >1 inch or more of surface water. The driest area is the north corner of the project boundary, which is higher than the surrounding topography.

From January through July, the historic (1893-2009) average precipitation was 9.23 inches (WRCC 2009). During 2009 precipitation during this period was 8.1 inches or 88% of the average. Given the slightly lower than average yearly precipitation, the presence of shallow inundation (>1 inch) in 95% of the wetland reserve, and 100% saturation during the summer and fall months, it suggests a naturally high groundwater table. Flood irrigation was not intentionally used to supplement site hydrology in 2009, but it may overflow into the site and may recharge groundwater levels. The site was visited in early October of 2009 and at that time the outflow pipe and overflow spillway were both operating at near maximum levels, indicating that the site appears to naturally collect ground and surface water after the irrigation season (Blank 2009).

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-*Alopecurus arundinaceus/Juncus balticus*, Type 3-*Carex nebrascensis/Juncus balticus*, Type 4-*Scirpus maritimus/Juncus balticus/Alopecurus arundinaceus*, Type 5-*Bromus inermis*, Type 6-*Puccinellia*, Type 7-*Festuca arundinacea/Poa juncifolia*, Type 8-*Distichlis stricta/Suaeda calcioliformis*, Type 9-*Alopecurus arundinaceus/Juncus balticus*, *Type 10-Eleocharis palustris/Typha latifolia/Hordeum jubatum*, Type 11-*Juncus balticus/Carex nebrascensis*, Type 12-*Juncus hallii* (planted, no survival), Type 13-*Salix exigua/Bromus inermis*, Type 14-*Hordeum jubatum/Juncus balticus*, Type 15-Shallow Water/*Typha latifolia*,Type 16-*Alopecurus arundinaceus/Juncus balticus*, and Type 17-*Alopecurus arundinaceus/Juncus balticus/Carex nebrascensis.* Dominant species within each community are listed on the **Monitoring Form** (**Appendix B**).

Several species of wetland emergents, 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). Installed woody species totaled 4,750 stems, planted within a netted browse guard and weed mat (Oasis 2006a). Approximately 150 leaf-bearing woody seedlings were observed within the mitigation site during the 2009 mitigation monitoring.

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 from 2007 to 2009 are summarized in tabular format (**Table 2**) and illustrated graphically (**Charts 1** and **2**). In 2009, the length of community types along the transect remained static. However, the composition of the community within the inundated swale (and all shallow water features site wide) has changed since 2008 because *A. arundinaceus* decreased. In 2009, this species decreased to 1-5% within and adjacent to all shallow water areas and thus a new CT (15) was developed to reflect this change (**Charts 1** and **2**).

In general, community types that occur within or adjacent to ponds and swales inundated with less than six inches of surface water (CT 3, 6, 8, 11, 14 and 15) have decreased in *A. arundincaceus* cover. Communities adjacent to swales and ponds have also been persistently inundated with a range of 1 to 3 inches of surface water since the wetland was created.

Table 1: ***Vegetation species observed from 2007 to 2009 at the Selkirk Wetland Mitigation Reserve vegetation.***

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

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

[2] Planted species; leaves were noted on plains cottonwood, sandbar willow and red-osier dogwood in 2009.

Bolded species were added to the list in 2009.

The northwest wetland area with lateral berms did not follow this tendency in 2009, except in areas immediately upslope of the berms where water has been most persistent since 2007. Surface water has laterally spread and increased in depth on all sides of the lateral berms during each year; it is expected that *A. arundinaceus* will decrease in CT 1 by the 2010 monitoring season. If the tendency for *A. arundinaceus* to decline in percentage where it is consistently inundated with one to three inches of water continues then it may be useful to promote a shallow surface inundation across the entire site.

Table 2: ***Data summary for Transect 1 at the Selkirk Wetland Mitigation Reserve.***

Monitoring Year	2007	2008	2009
Transect Length (feet)	445	445	445
# Vegetation Community Transitions along Transect	3	3	3
# Vegetation Communities along Transect	3	3	3
# Hydrophytic Vegetation Communities along Transect	3	3	3
Total Vegetative Species	12	12	12
Total Hydrophytic Species	10	11	11
Total Upland Species	2	1	1
Estimated % Total Vegetative Cover	100	100	100
% Transect Length Comprised of Hydrophytic Vegetation Communities	100	100	100
% Transect Length Comprised of Upland Vegetation Communities	0	0	0
% Transect Length Comprised of Unvegetated Open Water	0	0	0
% Transect Length Comprised of Bare Substrate	0	0	0

Chart 1: ***Transect maps showing vegetation types from the start (0 feet) to the end of transect (445 feet) from 2007 to 2009.***

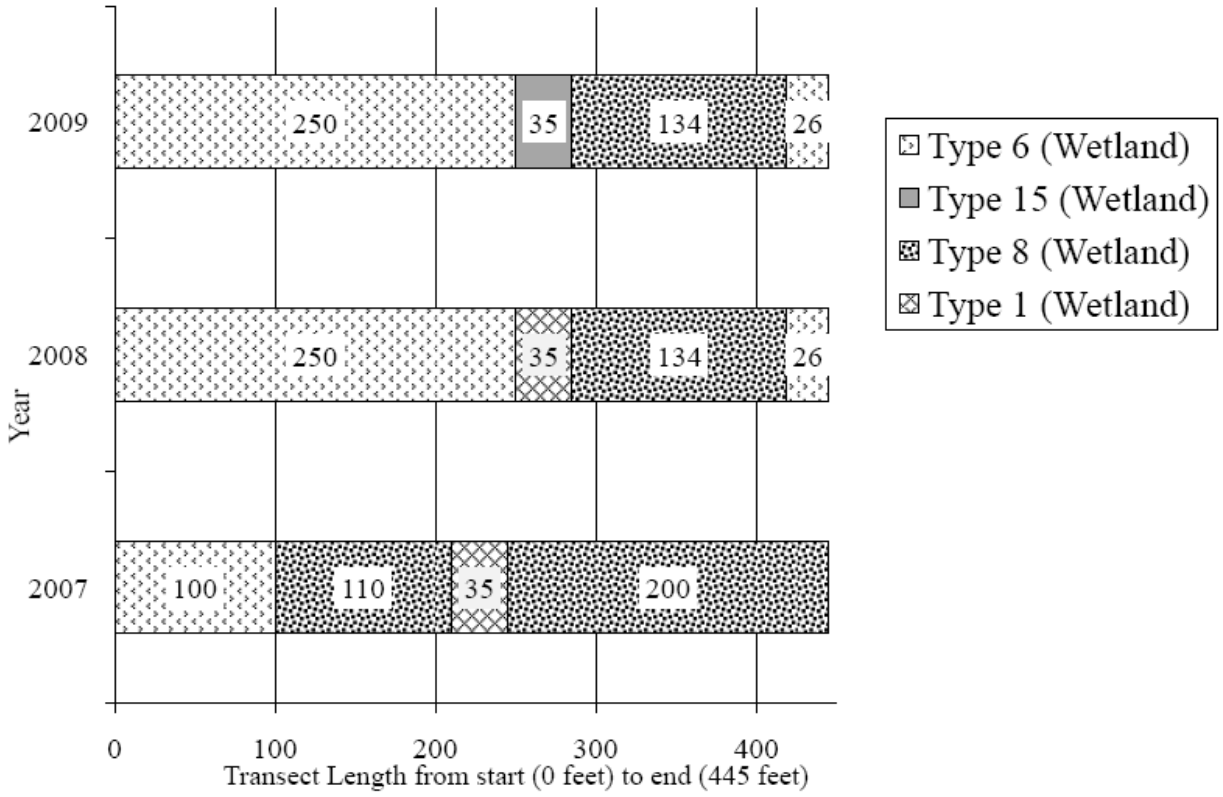
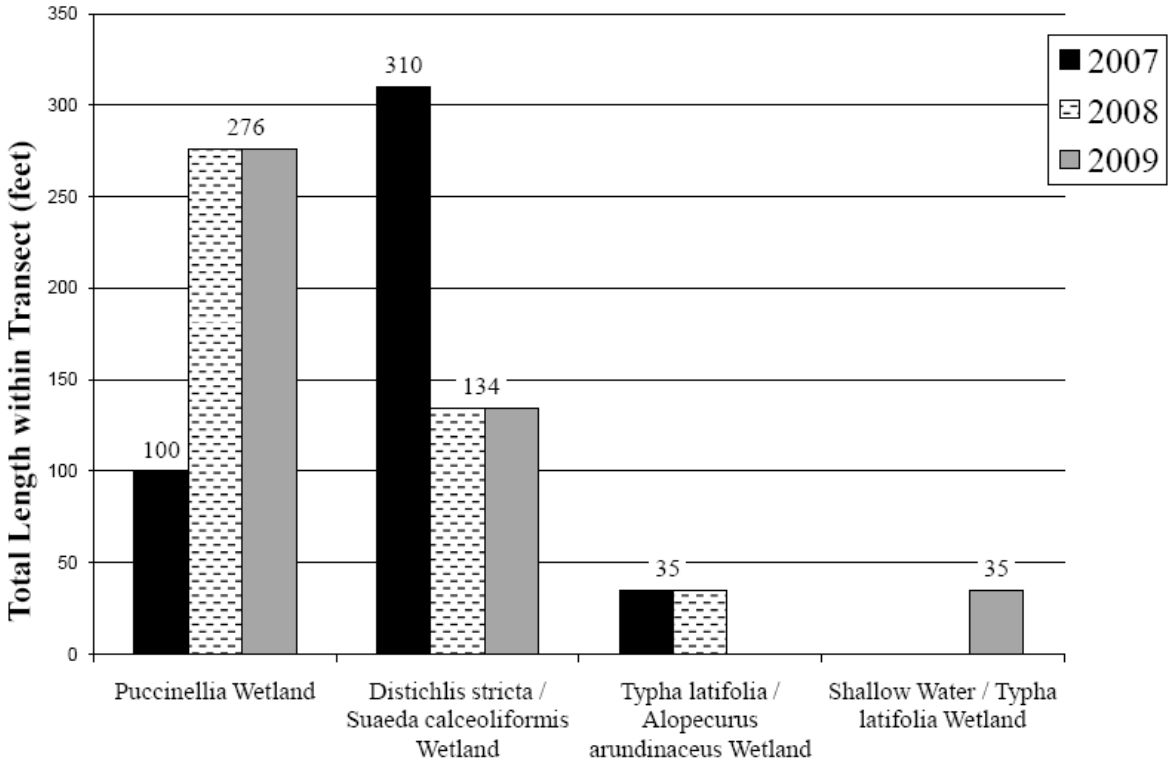


Chart 2: ***Length of vegetation communities within Transect 1 from 2007 to 2009.***



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 4 inches the soil was a dark gray (10 YR 4/1) silty clay with dark yellowish brown (10YR 4/6) mottles, and from 4 to 10 inches deep was a dark grayish brown (10YR 4/2) with similar mottling. The ground surface was saturated along 100% of the transect.

3.4 Wetland Delineation

The 2009 delineation boundary includes 69.5 total wetland acres; shallow water (<20 inches deep) that is colonized with aquatics or emergent vegetation is included in this acreage (**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 is included in **Appendix B**.

Approximate wetland acreages within the various mitigation credit zones have been estimated using digitized site plans and the 2009 wetland delineation boundary. The wetland boundary includes 1.0 acre in the enhancement credit zone, 36.51 acres in the re-establishment/creation credit zone, and 31.99 acres in the rehabilitation credit zone. Only 0.3 acre of upland remains within the interior of the wetland (CT 7). The north corner of the project boundary is much

higher than surrounding topography, and if additional wetland acreage is required the area could be excavated. Mitigation crediting is discussed in Section 3.10.

3.5 Wildlife

Raccoon tracks, deer, and three muskrat lodges were observed within the wetland in 2009 (**Table 3**). A total of 44 avian species have been observed since June of 2007.

Table 3: ***Fish and wildlife species observed at the Selkirk Wetland Mitigation Reserve from 2007 to 2009***[1].

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

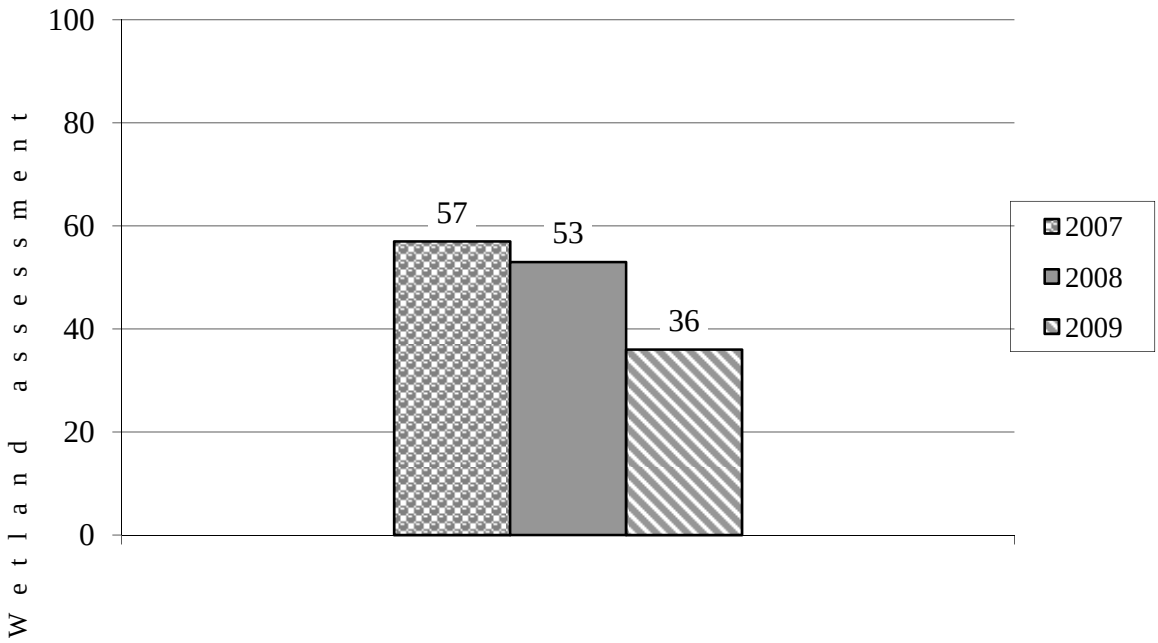
[1] Species were observed by Anderson and Widdicombe (2007), Romig (2007, 2008), Urban (2007, 2008), or the PBS&J Biologist (2007-2009).
Bolded species were observed in 2009.

3.6 Macroinvertebrates

The 2009 macroinvertebrate sampling results are provided in **Appendix F** and were summarized by Rhithron Associates, Inc. in the italicized section below.

> *Microcrustaceans, especially benthic ostracods, dominated the taxonomic composition of the sample collected at the Selkirk Ranch wetland in 2009. This finding suggests a shift in habitat use. In 2008, cladocerans and microcrustaceans associated with the water column, were the dominant animals. The importance of filter-feeding may have diminished since the previous sampling event, since gatherers dominated the functional mix in 2009. Increased nutrient availability may have diminished since 2008. There is evidence that substrates and the water column were hypoxic, since hemoglobin-bearers and air-breathers were abundant. Thermal preference for the assemblage was calculated at 17.0ºC. The bioassessment index indicated "sub-optimal" biologic conditions (**Chart 3**).*

Chart 3: ***Bioassessment scores using the wetland index at the Selkirk Wetland Mitigation Site from 2007 to 2009.***



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 2009; this area was upland prior to construction. The rehabilitation mitigation area classified as a Category III wetland in 2006 and was increased to a Category II in 2007 to 2009 (**Table 4**). The enhanced wetland classified as a Category III in 2006 and 2007 and in 2008-2009 was classified as a Category II wetland (**Table 4**). The complete 2009 functional assessment forms are included in **Appendix B**.

Table 4: ***Summary of the 2006 to 2009 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	2009	2006[1]	2007	2008	2009	2006[1]	2007	2008	2009
Listed/Proposed T&E Species Habitat	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)
MTNHP Species Habitat	Mod (0.7)	Mod (0.7)	Mod (0.7)	Low (0.0)	Mod (0.7)	Mod (0.7)	Mod (0.7)	Low (0.0)	Mod (0.7)	Mod (0.7)	Low (0.0)
General Wildlife Habitat	High (0.9)	Exc. (1.0)	Exc. (1.0)	Low (0.3)	High (0.9)	Exc. (1.0)	Exc. (1.0)	Mod (0.5)	Mod (0.7)	High (0.9)	High (0.9)
General Fish/Aquatic Habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Flood Attenuation	Mod (0.5)	Mod. (0.5)	Mod. (0.6)	NA	Mod (0.5)	Mod (0.5)	Mod (0.6)	NA	Low (0.2)	Low (0.2)	Low (0.2)
Short and Long Term Surface Water Storage	High (0.9)	High (1.0)	High (1.0)	Low (0.3)	High (0.9)	High (1.0)	High (1.0)	Low (0.2)	Low (0.3)	Mod (0.4)	Mod (0.4)
Sediment/Nutrient/Toxicant Removal	High (1.0)	High (1.0)	High (1.0)	Mod (0.6)	High (1.0)	High (1.0)	High (1.0)	High (0.9)	High (1.0)	High (1.0)	High (1.0)
Sediment/Shoreline Stabilization	Mod (0.6)	High (1.0)	High (1.0)	NA	High (0.9)	High (1.0)	High (1.0)	NA	High (0.9)	High (1.0)	High (1.0)
Production Export/Food Chain Support	Mod (0.7)	High (0.8)	High (0.8)	Mod (0.7)	Mod (0.7)	High (0.8)	High (0.8)	Mod (0.6)	Mod (0.7)	High (0.8)	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)	High (1.0)	High (1.0)	High (1.0)
Uniqueness	Mod (0.6)	Mod (0.4)	Mod (0.4)	Low (0.1)	Mod (0.4)	Mod (0.4)	Mod (0.4)	Low (0.3)	Mod (0.4)	Mod (0.4)	Mod (0.4)
Recreation/Education Potential (Bonus)	Mod (0.7)	High (1.0)	High (1.0)	Low (0.1)	Mod (0.7)	High (1.0)	High (1.0)	Low (0.1)	Mod (0.7)	High (1.0)	High (1.0)
Actual Points / Possible Points	**7.6 / 11**	**8.4 / 11**	**8.5 / 11**	**3.1 / 9**	**7.7 / 11**	**8.4 / 11**	**8.5 / 11**	**3.6 / 9**	**6.6 / 11**	**7.4 / 11**	**6.7 / 11**
% of Possible Score Achieved	**69%**	**76%**	**77%**	**34%**	**70%**	**76%**	**77%**	**43%**	**60%**	**67%**	**61%**
Overall Category	**II**	**II**	**II**	**III**	**II**	**II**	**II**	**III**	**III**	**II**	**II**
Total Acreage of Assessed Aquatic Habitat within AA Boundaries	**32.90**	**34.23**	**36.51**	**31.90**	**31.90**	**31.99**	**31.9**	**1.00**	**1.00**	**1.00**	**1.00**
Functional Units (acreage x actual points)	**250.00**	**272.41**	**310.3**	**98.90**	**245.63**	**268.72**	**271.2**	**3.6**	**6.6**	**7.4**	**6.7**
Net Acreage Gain	**32.90**	**34.23**	**36.51**	NA	NA	NA	NA	NA	**0**	**0**	**0**
Net Functional Unit Gain	**250.00**	**272.41**	**310.3**	NA	**146.73**	**169.82**	**172.3**	NA	**3.0**	**3.8**	**3.1**
GRAND TOTAL Net Functional Unit Gain								**2006: 102.5**	**2007: 272.4**	**2008: 446.0**	**2009: 485.7**

[1] Baseline data provided by Oasis (2006a).
[2] Assessed using the 1999 MDT Wetland Assessment Method. The completed 2009 forms are in **Appendix B**.
[3] Area was upland prior to construction; therefore, no functional assessment was conducted in 2006.

Total functional unit gain for all credit areas in 2009 was 485.7 units, a 374% increase since 2006. In 2009, percent possible scores increased for the rehabilitation and re-establishment / creation credit areas, but decreased in the enhancement credit area because the planted S2 species, *Juncus hallii*, did not survive. The most important functions for the re-establishment / creation and rehabilitation credit areas are: general wildlife habitat, short and long 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. Its prominent functions were: 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

No weed spraying occurred within the wetland in 2009. In previous years, the property owner has 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 have also been sprayed.

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 2009, the wetland delineation boundary includes 69.5 wetland acres; shallow surface water is <20 inches deep and is vegetated with aquatics and emergent vegetation (edges) (**Table 5**). In 2009, acreage of the shallow surface water features is included in the total wetland acreage. Only 0.31 acre of upland (CT 7) persists within the wetland boundary. Approximate wetland acreages within the various mitigation credit zones have been estimated using digitized site plans and the 2009 wetland delineation boundary. Mitigation credit zones include 1.0 acre in the enhancement credit zone, 36.51 acres in the re-establishment/creation credit zone, 31.99 acres in the rehabilitation credit zone, and 4.59 acres of upland around portions of the wetland circumference.

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

CREDIT ZONE	PLANNED ACREAGE	2009 ACREAGE	SUCCESS CRITERIA[1] (Gray shading indicates criteria that have not been met.)	MONITORING YEAR 3 COMMENTS (Gray shading indicates criteria that have not been met.)
Re-establishment/ Creation	38.6	36.51	1. To meet all three wetland criteria. 2. Aerial coverage of all plant species must equal 80% and requires a 2-year survival period; bare ground shall not exceed 20%. 3. Non-preferred species (e.g. *Alopecurus arundinaceus*) must not exceed 10% of the combined aerial coverage. 4. Maximum noxious weed coverage is not to exceed 5% and monitoring must confirm a declining trend at the end of the monitoring period if coverage equals 5%. 5. The S/S aerial coverage within each planting zone must equal or exceed 30% to be considered a S/S community and target stem density must be at a density of 500 stems/acre. Stems must survive two years before they are included in the stem count. 6. 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. 7. Open water will be less than 15% of the total wetland project area and no single body is to exceed 3 acres.	1. In 2008, >95% of the intended wetland areas meets all three wetland criteria; upland CT 7 has decreased since 2007 and upland (CT 5) remains in the northern corner of the wetland. 2. These aerial coverage criteria have been met. 3. *A. arundinaceus* comprises > 10% of the credit area and represents >25% in community types 1, 2, 4, and 9 (Figure 3). 4. Noxious weed aerial coverage <5%. 5. Approximately 150 leaf-bearing planted woody seedlings were observed within the entire mitigation site in 2009; percent cover cannot be viably assessed at this time. 6. The entire credit area is saturated for >12.5% of the growing season. Irrigation water was not directly used to supplement the 2009 hydrology, although indirect runoff from adjacent fields may have incidentally supplemented hydrology. 7. There is no deep (>5 feet) surface water in this credit area. Ponds and swales are likely < 20 inches deep and support aquatic and emergent vegetation; as a result, 'open water' acreage is included in the overall wetland acreage. **NOTE: The 2009 36.51 acres does not meet the planned 38.6 acres for this credit area, but has increased each year since 2007.**
Rehabilitation	31.9	31.99	1. To meet all three wetland criteria. 2. Functional lift from a Category III to a II based on MDT functional assessment. 3. Aerial coverage of all plant species must equal 80% and requires a 2-year survival period; bare ground shall not exceed 20%. 4. Non-preferred species (e.g. *A. arundinaceus*) must not exceed 10% of the combined aerial coverage. 5. Maximum noxious weed coverage is not to exceed 5% and monitoring must confirm a declining trend at the end of the monitoring period if coverage equals 5%. 6. Saturation within the upper 12 inches of the soil profile for at least 12.5% of the growing season. 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. 8. Open water will be less than 15% of the total wetland project area and no single body is to exceed 3 acres.	1. All of this credit area meets the wetland criteria. 2. A functional lift from a Category III to a Category II wetland was documented in 2007, 2008, and 2009. 3. These aerial coverage criteria have been met. 4. *A. arundinaceus* comprises > 10% of the credit area and represents >25% in community types 2, 4, 16, and 17 (Figure 3). 5. Noxious weed aerial coverage is <5%. 6. The entire credit area is saturated for >12.5% of the growing season. 7. Approximately 150 leaf-bearing planted woody seedlings were observed within the entire mitigation site in 2009; percent cover cannot be viably assessed at this time. 8. There is no deep (>5 feet) surface water in this credit area. Ponds and swales are likely < 20 inches deep and support aquatic and emergent vegetation; as a result, 'open water' acreage is included in the overall wetland acreage. Shallow surface water (1-3 inches) occurs in approximately 95% of the total project wetland area. **NOTE: The 2009 31.99 acres exceeds the planned 31.9 acres for this credit area.**
Enhancement	1.0	1.0	1. To meet all three wetland criteria. 2. Achieve a functional lift from a Category III to a Category II wetland. 3. Aerial coverage of all plant species must equal 80% and requires a 2-year survival period. 4. Non-preferred species (e.g. *Alopecurus arundinaceus*) must not exceed 10% of the combined aerial coverage. 5. Maximum noxious weed coverage is not to exceed 5% and monitoring must confirm a declining trend at the end of the monitoring period. 6. Saturation within the upper 12 inches of the soil profile for at least 12.5% of the growing season. 7. Open water will be less than 15% of the total wetland project area and no single body is to exceed 3 acres. 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.	1. All of this area meets all three wetland criteria. 2. A functional lift from a Category III to a Category II wetland was documented in 2008. 3. The aerial coverage criteria have been met. 4. *A. arundinaceus* comprises < 10% of the aerial coverage. 5. Noxious weed aerial coverage is <5%. 6. The entire credit area is saturated for >12.5% of the growing season. 7. Open water comprises <15% of the enhancement credit area. 8. The willow shrub community occurs on the boundary line, and thus approximately 1% to 5% of the credit area is comprised of 30% S/S cover. **NOTE: The 2009 1.0 acre meets the planned 1.0 acre for this credit area.**
Upland Buffer[2]	2.9	4.59	1. The creditable width of the buffer shall not exceed 50 feet. 2. Maximum noxious weed coverage is not to exceed 5% and monitoring must confirm a declining trend at the end of the monitoring period.	1. The buffer width does exceed 50 feet in some areas, but decreases each year as the area converts to wetland. 2. Noxious weed aerial coverage >5% was not observed.

[1] By the end of the 5-year monitoring period for all criteria.
[2] See Table 2 footnote "C" for Upland acreage explanation.

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 credits will be determined by the COE and will be based on these ratios and the achievement of the performance standards. As of 2009, 59.1 acres of credit (98% of the intended credit acreage) have been calculated; the COE will determine the final credits achieved at the Selkirk Wetland Reserve. Again, it should be noted that the current performance standards are under revision, pending Corps review and approval, and the revised standards will be applied during 2010 monitoring.

For each mitigation credit area, a detailed summary of the intended acreage, 2009 delineated acreage, success criteria, and monitoring year observations are included in **Table 5**. Interim credit areas are summarized in **Table 6**. Re-establishment and creation areas have been trending upward since 2007. In general, most of the wetland performance criteria have been met for each mitigation credit area, with two major exceptions:

1) Non-preferred species (e.g. *A. arundinaceus*) must not exceed 10% of the combined aerial coverage.
   - *Alopecurus arundinaceus* comprises > 10% aerial coverage within the re-establishment /creation and rehabilitation credit areas.

2) 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.
   - Approximately 150 leaf-bearing planted woody stems were counted site wide during the monitoring visit; percent cover cannot be viably assessed at this time.

Table 6: ***2009 developing wetland and upland mitigation acreage for the Selkirk Wetland Mitigation Reserve***.

CREDIT ZONE	CREDIT CATEGORY	DEVELOPED ACREAGE Maximum Target	DEVELOPED ACREAGE 2009	CREDIT RATIO[a]	INTERIM MAXIMUM CREDIT ACREAGE[a,b]	NUMBER OF PERFORMANCE STANDARDS MET AS OF 2009
1	Re-establishment / Creation	38.6	36.51	1:1	36.51	5/7
2	Rehabilitation	31.9	31.99	1.5:1	21.32	6/8
3	Enhancement	1.0	1.0	3:1	0.33	8/8
Total Wetland Acreage		**71.5**	**69.5**	**--**	**58.16**	
4	Upland Buffer[c]	2.9	4.59 [d]	5:1	0.92	
TOTAL ACREAGE[c]		**74.4**	**74.4**	**--**	**59.1**	

[a] The Corps of Engineers is the regulatory authority, has approved mitigation ratios, and will determine 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.

[c] As a result of map fit issues, the total project acreage within the black boundary line on Figures 2, 3, and 4 was less than 74.4 acres. With improved clarity of the 2009 aerial photo, project boundary acreage has been adjusted to more accurately fit the aerial photo. Subsequently, upland buffer area (that area on the map between the wetland and project boundary lines) has been adjusted to compensate for these adjustments.

[d] Acreage does not include upland community (CT 7) inside the wetland boundary (2009: 0.31 acre).

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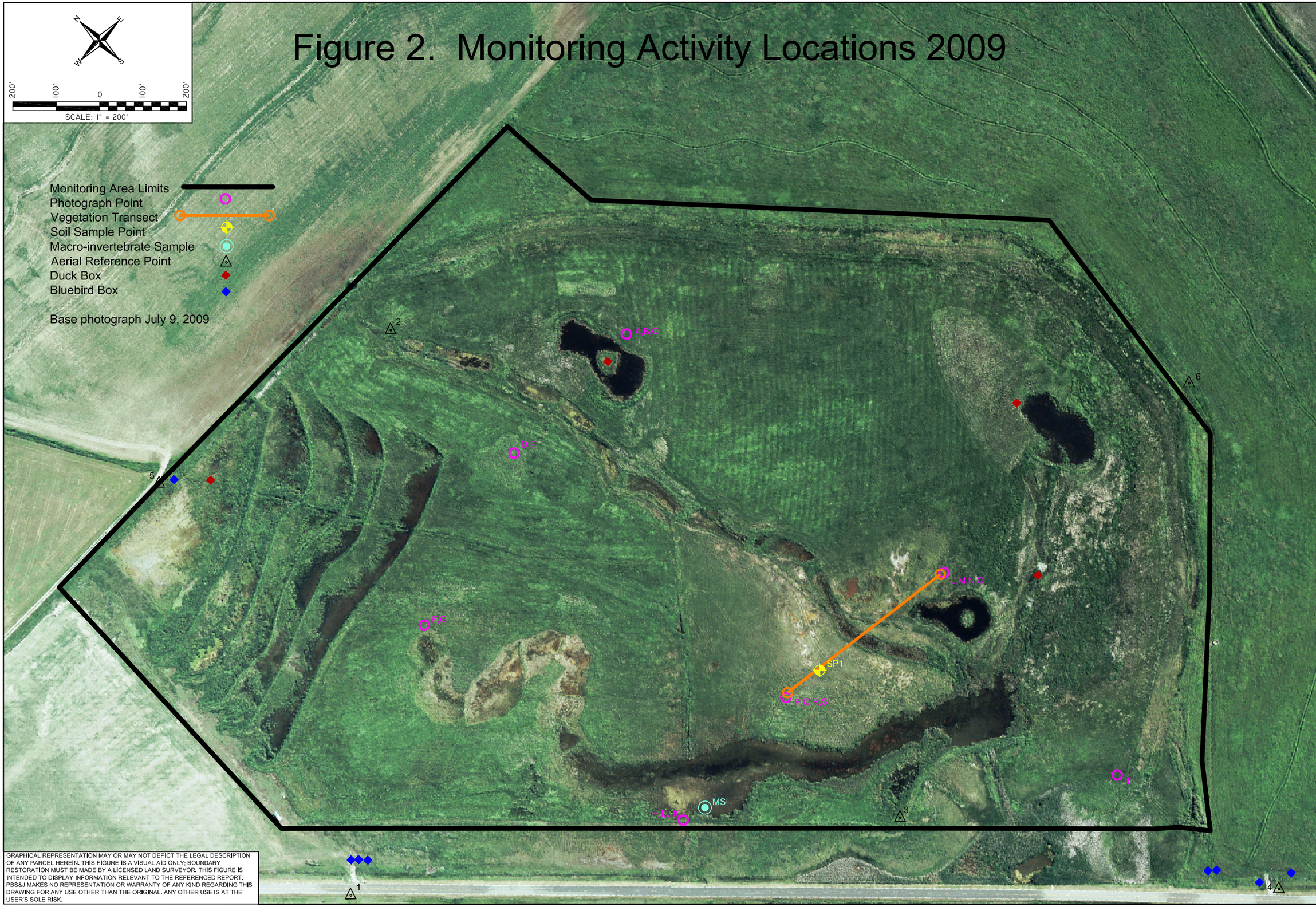
Appendix A

FIGURES 2, 3, & 4

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

Figure 2. Monitoring Activity Locations 2009



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.

PROJECT NAME
SELKIRK RANCH WETLAND MITIGATION

DRAWING TITLE
MONITORING ACTIVITY LOCATIONS 2009

DRAWN: JR
PROJ MGR: J. BERGLUND
CHECKED: LB
APPV'D: JB
PLOTTED: Nov/18/2009

PROJ NO: 0B4308802 06.06
LOCATION: SELKIRK
SCALE: NOTED
FILE NAME: BASE2009.dwg

PBSJ
3810 Valley Commons Drive
Suite 4
Bozeman, MT 59718

FIGURE
2

REV -
10/21/2009

Figure 3. Mapped Site Features 2009

N E S W

200' 100' 0 100' 200'

SCALE: 1" = 200'

Monitoring Area Limits
Wetland Boundary
Vegetation Community Boundary
Planted Woody Species Seedlings

Base photograph July 9, 2009

Wetland Area

Gross Wetland Area	69.50 Acres
Open Water	0.0 Acres
Net Wetland Area	69.50 Acres

Vegetation Community Types
① Typha latifolia/Alopecurus arundinaceus
② Alopecurus arundinaceus/Juncus balticus
③ Carex nebrascensis/Juncus balticus
④ Scirpus maritimus/Juncus balticus/Alopecurus arundinaceus/Bromus inermis
⑤ Bromus inermis
⑥ Puccinellia
⑦ Festuca arundinacea/Poa juncifolia
⑧ Distichlis stricta/Suaeda calcioliformis
⑨ Alopecurus arundinaceus/Juncus balticus
⑩ Eleocharis palustris/Typha latifolia/Hordeum jubatum
⑪ Juncus balticus/Carex nebrascensis
⑫ Juncus hallii (planted, no survival)
⑬ Salix exigua/Bromus inermis
⑭ Hordeum jubatus/Juncus balticus
⑮ Shallow Water/Typha latifolia
⑯ Alopecurus arundinaceus/Juncus balticus
⑰ Alopecurus arundinaceus/Juncus balticus/Carex nebrascensis

Noxious Weeds
Cirsium arvense
Infestation Size
✖ = < 0.1 acre
Cover Class
M = Moderate (5-25% cover)
H = High (25-100% cover)

(Upland)

South Berm

South Berm

Wetland Outflow

Fiber Optic Utility Easement Area

US Highway 12

PROJECT NAME
SELKIRK RANCH WETLAND MITIGATION

DRAWING TITLE
MAPPED SITE FEATURES 2009

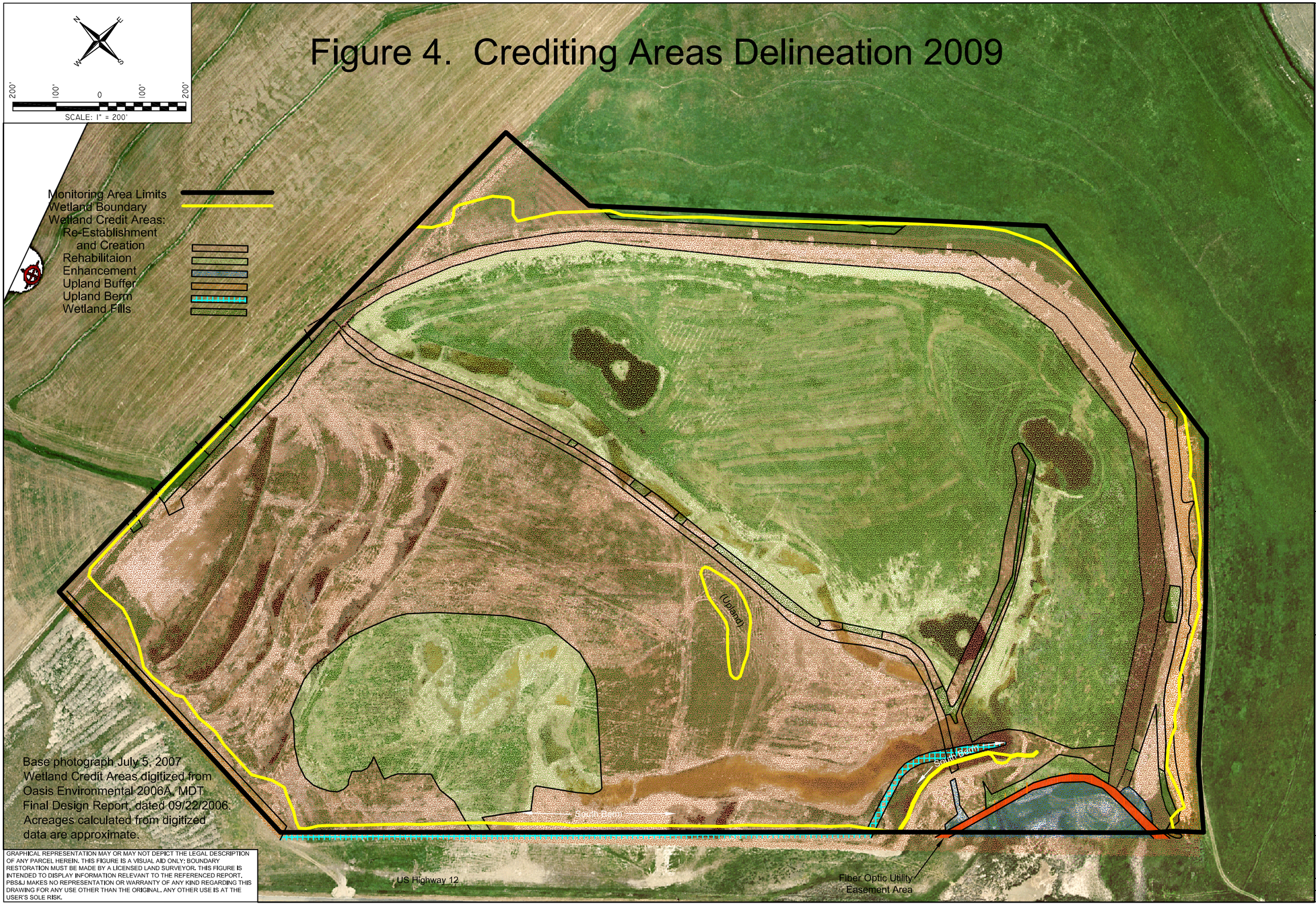
DRAWN: JR
PROJ MGR: J. BERGLUND
CHECKED: LB
APPVD: JB
PLOTTED: Oct/27/2009

PROJ NO: 0B43088802 06.06
LOCATION: SELKIRK
SCALE: NOTED
FILE NAME: BASE2009.dwg

PBSJ
3810 Valley Commons Drive
Suite 4
Bozeman, MT 59718

FIGURE
3
REV -
10/14/2009

Figure 4. Crediting Areas Delineation 2009



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.

PROJECT NAME
SELKIRK RANCH WETLAND MITIGATION

DRAWING TITLE
CREDITING AREAS DELINEATION 2009

DRAWN: JR
PROJ MGR: J. BERGLUND
CHECKED: LB
APPVD: JB
PLOTTED: Oct/22/2009

PROJ NO: 0B4308802 06.06
LOCATION: SELKIRK
SCALE: NOTED
FILE NAME: BASE2009.dwg

3810 Valley Commons Drive
Suite 4
Bozeman, MT 59718
PBSJ

FIGURE
4
REV -
10/21/2009

Appendix B

2009 WETLAND MITIGATION SITE MONITORING FORM
2009 BIRD SURVEY FORM
2009 COE WETLAND DELINEATION FORM
2009 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 29, 2009** 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: **cloudy** Time of Day: **9-5**
Initial Evaluation Date: **8/22** Monitoring Year: **3** # Visits in Year: **2**
Size of evaluation area: **75 acres** Land use surrounding wetland: **agriculture**

HYDROLOGY

Surface Water Source: **groundwater**
Inundation: **Present** Average Depth of ponds: **1feet** Range of Depths: **1" – 24"**
Percent of assessment area under shallow (1" – 6") inundation: **95%**
Depth at emergent vegetation-open water boundary: **1feet**
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.):
The entire wetland site is 100% saturated to the surface, 95% of which has 1" or more surface water.
Groundwater Monitoring Wells: **Present**
Record depth of water below ground surface (in feet): **Not assessed by PBSJ; see Monitoring Report**

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:
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	4 = 21-50%	JUNBAL	1 = 1-5%
SCIACU	3 = 11-20%	Mentha sp.	1 = 1-5%
HORJUB	1 = 1-5%	SCIVAL/PAL	1 = 1-5%
ELOPAL	3 = 11-20%	SCIMAR	1 = 1-5%
POAJUN	1 = 1-5%	Shallow Water w/ aquatics	1 = 1-5%

Comments / Problems: **other spp: SCIPUN (<1%); DESCES (1-5%)**

Community Number: **2** Community Title (main spp): **Alopecurus arunidaceus/Juncus balticus**

Dominant Species	% Cover	Dominant Species	% Cover
HORJUB	1 = 1-5%	Trifolium sp.	+ = < 1%
Puccinellia sp.	1 = 1-5%	TAXOFF	+ = < 1%
ALOARU	5 = > 50%	ASTSUB	+ = < 1%
Triglochin sp.	1 = 1-5%	Ranunculus sp.	+ = < 1%
JUNBAL	4 = 21-50%	CARPRA	+ = < 1%
RANGME	+ = < 1%	SONARV	+ = < 1%

Comments / Problems: **Ranunculus sp. is an OBL species, low-growing, not a significant population. Cicuta douglasii observed around north pond. (Also: Indeterminate planted woody species 5-10% within planted pod.**

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

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

Comments / Problems: _____

Community Number: **4** Community Title (main spp): **Scirpus maritimus/Juncus balticus/Alopecurus arundinaceus**

Dominant Species	% Cover	Dominant Species	% Cover
SONARV	+ = < 1%	CIRARV	+ = < 1%
ELEPAL	3 = 11-20%	SCIPUN	3 = 11-20%
SCIMAR	4 = 21-50%	HORJUB	3 = 11-20%
JUNBAL	4 = 21-50%	Puccinellia sp.	2 = 6-10%
ALOARUN	4 = 21-50%		

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

VEGETATION COMMUNITIES (continued)

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

Dominant Species	% Cover	Dominant Species	% Cover
BROINE	5 = > 50%	CT also includes crop species to	
PLAMAJ	4 = 21-50%	east, west and north of	
AGRREP	3 = 11-20%	project boundary.	
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. and is increasingly vegetated with ALOARU.**

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

Dominant Species	% Cover	Dominant Species	% Cover
Puccinellia sp.	5 = > 50%	SUACAL	+ = < 1%
HORJUB	3 = 11-20%	HAPLAN	1 = 1-5%
SONARV	+ = < 1%	(Indeterminate planted woody species)	+ = < 1%
SCIMAR	1 = 1-5%	Triglochin sp.	1 = 1-5%
ALOARU	1 = 1-5%	ELEPAL	1 = 1-5%
CARPRA	+ = < 1%	JUNBAL	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.	1 = 1-5%
JUNBAL	3 = 11-20%	CARPRA	3 = 11-20%
POAJUN	4 = 21-50%	ALOARU	1 = 1-5%
FESARU	4 = 21-50%		
AGRTRA	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): **Juncus balticus/Carex nebrascensis**

Dominant Species	% Cover	Dominant Species	% Cover
HORJUB	1 = 1-5%	Triglochin sp.	2 = 6-10%
ALOARU	1 = 1-5%	Carex nebrascensis	3 = 11-20%
JUNBAL	5 = > 50%		
FESARU	+ = < 1%		
SONARV	+ = < 1%		
TYPLAT	+ = < 1%		

Comments / Problems: _____

Community Number: **12** Community Title (main spp): **Juncus hallii-community did not survive**

Dominant Species	% Cover	Dominant Species	% Cover
(ALOARU	5 = > 50%)		
JUNHAL	0		

Comments / Problems: **ALOARUN grew into the mat and surrounding area.**

VEGETATION COMMUNITIES (continued)

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

Dominant Species	% Cover	Dominant Species	% Cover
SALEXI	5 = > 50%		
BROINE	5 = > 50%		
JUNBAL	2 = 6-10%		

Comments / Problems: **Not a wetland community, the dominant vegetation is BROINE.**

Community Number: **14** Community Title (main spp): **Hordeum jubatum/Juncus balticus**

Dominant Species	% Cover	Dominant Species	% Cover
HORJUB	5 = > 50%	POAJUN	1 = 1-5%
JUNBAL	3 = 11-20%	ALOARU	1 = 1-5%
Puccinellia sp.	3 = 11-20%	CARPRA	1 = 1-5%
SONARV	1 = 1-5%		
TRIsp.	1 = 1-5%		
AGRTRA	1 = 1-5%		

Comments / Problems: _____

Community Number: **15** Community Title (main spp): **Shallow Water/Typha latifolia**

Dominant Species	% Cover	Dominant Species	% Cover
TYPLAT	5 = > 50%	SCIPUN	+ = < 1%
Shallow Water (<12")/Aquatics	5 = > 50%	SCIACU	+ = < 1%
ELEPAL	1 = 1-5%	SCIPAL/VAL	2 = 6-10%
ALOARU	1 = 1-5%	JUNBAL	2 = 6-10%
MENARV	1 = 1-5%		
CICDOU	1 = 1-5%		

Comments / Problems: _____

Community Number: **16** Community Title (main spp): **Alopecurus arundinaceus/Juncus balticus**

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

Comments / Problems: _____

VEGETATION COMMUNITIES (continued)

Community Number: **17** Community Title (main spp): **Alopecurus arundinaceus/Juncus balticus/Carex nebrascensis**

Dominant Species	% Cover	Dominant Species	% Cover
ALOARU	5 = > 50%		
CARNEB	3 = 11-20%		
JUNBAL	3 = 11-20%		
Triglochin sp.	2 = 6-10%		
ELEPAL	2 = 6-10%		
CICDOU	+ = < 1%		

Comments / Problems: _____

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)
Agropyron repens	5		
Agropyron trachycaulum	7, 14		
Agrostis alba	9		
Alopecurus arundinacea	1,2,3,4,6,8,9,11,12,14,15, 16,17		
Aster subspicatus	2,4		
Atriplex patula	4,7,8		
Bromus inermis	5,13		
Carex nebrascensis	3, 17		
Carex praegracilis	2,3,6,7,11,14		
Chenopodium sp.	4,5		
Cicuta douglasii	3,15,17		
Cirsium arvense	4		
Cornus sericea	2,3,4,5,6,9,10,11		
Deschampsia cespitosa	1		
Distichlis stricta	8		
Eleocharis palustris	3,4,6,10, 15,16,17		
Festuca arundinacea	7,11		
Glycyrrhiza lepitdota	8		
Haplopappus lanceolatus	6,8		
Hordeum jubatum	1,2,4,5,6,8,9,10,11, 14, 16, 17		
Juncus balticus	1,2,3,4,7,9,11,13		
Juncus hallii	(12-no survival)		
Juncus tenuis	9. 15		
Mentha sp.	1		
Plantago major	5		
Populus deltoides	2,3,4,5,6,9,10,11, 14		
Poa juncifolia	1,7,8		
Puccinellia sp.	1,2,3,4,6,7,8,9,14		
Ranunculus gmelinii	2,9, 16		
Ranunculus sp.	2		
Salicornia rubra	8		
Salix exigua	2,3,4,5,6,9,10,11,13		
Scirpus acutus	1,6,10, 15		
Scirpus maritimus	1		
Scirpus pungens	1, 3, 4, 15		
Scirpus validus/palidus	1		
Sonchus arvensis	2,4,5,6,7,9,11,14		
Spartina pectinata	8		
Suaeda calceoliformis	6,7,8		
Taraxacum officinalis	2		
Trifolium sp.	2		
Triglochin sp.	1,2,3,6, 14, 16, 17		
Typha latifolia	1,10,11,15		

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.

2009:

At least 50% of the pods had no live woody plants, one had approximately 20% stems with live leaves, three had <1%, one had 1-5%, one had 5-10%, the remaining pods were not observed. A total of approximately 150 live planted woody species have survived 2 years.

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? **No activity noted.**
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		☒	☐	☐	
Mule Deer	2 fawn	☒	☐	☐	
White-tailed Deer	1- 4 pt buck	☒	☐	☐	
Muskrat	3 lodges	☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	

Additional Activities Checklist:
Yes Macroinvertebrate Sampling (if required)

Comments / Problems: Bluebird -9, Wood Duck -4

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

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? **NO**
If no, describe the problems below.

Comments / Problems: **Outflow pipe was clogged with aquatics, removed screen and cleaned, stuck screen wire ends into mud and informed Jeanette (Oasis) of procedure. The inlet of the pipe is likely occluded to a large extent with Typha vegetation and other aquatic plant debris.**

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Selkirk** Date: **July 29, 2009** 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	3 = 11-20%
SUACAL	1 = 1-5%
(Indeterminate planted woody species)	+ = < 1%
HORJUB	3 = 11-20%
Total Vegetative Cover:	100%

Vegetation Type B: **CT 15**	
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%
PUCsp.	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	3 = 11-20%
HORJUB	
(Indeterminate planted woody species)	0
Total Vegetative Cover:	100%

MDT WETLAND MONITORING – VEGETATION TRANSECT

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

Percent of perimeter developing wetland vegetation (excluding dam/berm structures): **99% -*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 2009; approximately 30% of this corner has developed into wetland (in 2008 it was stated incorrectly that 80% of this corner had developed into wetland.

BIRD SURVEY – FIELD DATA SHEET

Site: **Selkirk** Date: **dates vary**
Weather/Times: **Partly Cloudy**

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
7/29/09				**10/20/09**			
American Coot	1	F	MA/OW	American Coot	1	F	OW
Blue-winged Teal	1	F	MA/OW	Black-billed Magpie	1	F	MA
Canada Goose	10	F/LO	OW/MA	Canada Goose	100	FO	WM/OW
Common Yellowthroat	3	BR	MA	Common Raven	2	V.Low FO	WM
Mallard	25 (15 young)	F	OW	Gadwall	40	F	OW
Northern Shoveler	5 (+young)	F	OW	Green-winged Teal	10	F	OW
Red-winged Blackbird	200	F/FO	MA/OW/ UPL	Mallard	30	F	OW
Savannah Sparrow	15	BR	MA	Northern Harrier	1	F	MA
Sora	3	BR	MA	Northern Shoveler	4	F	OW
Tree Swallow	10	F	UPL/MA				
Wilson's Snipe	1	Flush	MA				
Yellow-headed Blackbird	20	BR	MA				

*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:

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

Project / Site: **Selkirk Wetland**	Date: **July 29, 2009**
Applicant / Owner: **MDT**	County: **Wheatland**
Investigator: **LBacon/PBSJ**	State: **MT**

Do Normal Circumstances exist on the site? **Yes**	Community ID: **CT-8**
Is the site significantly disturbed (Atypical Situation)? **No**	Transect ID: **Wetland**
Is the area a potential Problem Area? **No**	Plot ID: **SP-1**
(If needed, explain on reverse side)	

VEGETATION

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

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-): **6** / **6** = **0**%	FAC Neutral: **6** / **6** = **100**%

Remarks: **Entire transect is within a wetland area.**

HYDROLOGY

Yes Recorded Data (Describe in Remarks): **N/A** Stream, Lake, or Tide Gauge **Yes** Aerial Photographs **N/A** Other **No** No Recorded Data	Wetland Hydrology Indicators Primary Indicators: **YES** Inundated **YES** Saturated in Upper 12 Inches **NO** Water Marks **NO** Drift Lines **YES** Sediment Deposits **YES** Drainage Patterns in Wetland
Field Observations: Depth of Surface Water = **1** (in.) Depth to Free Water in Pit = **1** (in.) Depth to Saturated Soil **N/A** **0** (in.)	Secondary Indicators (2 or more required): **NO** Oxidized Root Channels in Upper 12 inches **NO** Water-Stained Leaves **NO** Local Soil Survey Data **NO** FAC-Neutral Test **NO** Other (Explain in Remarks)

Remarks: **Surface is saturated or inundated 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.
0-4	A	10 YR 4/1	10 YR 4/6 /	Few N/A	Silty Clay
4-10	A	10 YR 4/2	10 YR 4/6 /	Few N/A	Silty Clay
		/ 	/ /	N/A N/A	
		/ 	/ /	N/A N/A	
		/ 	/ /	N/A N/A	

Hydric Soil Indicators:

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

Remarks: **Mottles noted at 2% concentration.**

WETLAND DETERMINATION

Hydrophytic Vegetation Present? **YES**
Wetland Hydrology Present? **YES**
Hydric Soils Present? **YES**

Is this Sampling Point within a Wetland? **YES**

Remarks: **Area along transect has more saturation and surface water than previous years. Vegetation diversifying on north end of transect.**

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: 7/28/2009 **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)
69.5 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; approximately 150 leaf-bearing seedlings were observed during the monitoring. There are 3-5 mature cottonwoods in the south end of the area. The NE-SE segment of this credit area has deep-rooted species, whereas the NW segment has more shallow-rooted grasses.

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

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

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

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

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

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

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

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

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

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

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

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

14C. GENERAL WILDLIFE HABITAT RATING

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

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

☐ **Low** (based on any of the following)
- ☐ few or no wildlife observations during peak use periods
- ☐ little to no wildlife sign
- ☐ sparse adjacent upland food sources
- ☐ interviews with local biologists with knowledge of AA

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

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

Structural Diversity (from 13)	☐**High**								☐**Moderate**								☒**Low**			
Class Cover Distribution (all vegetated classes)	☐**Even**				☐**Uneven**				☐**Even**				☐**Uneven**				☒**Even**			
Duration of Surface Water in ≥ 10% of AA	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**
Low disturbance at AA (see 12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	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)			
	☒ **Exceptional**	☐ **High**	☐ **Moderate**	☐ **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	☐ **Permanent/Perennial**			☐ **Seasonal / Intermittent**			☐ **Temporary / Ephemeral**		
Cover - % of waterbody in AA containing cover objects (*e.g.* submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation)	**>25%**	**10-25%**	**<10%**	**>25%**	**10-25%**	**<10%**	**>25%**	**10-25%**	**<10%**
Shading - >75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities	--	--	--	--	--	--	--	--	--
Shading – 50 to 75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities.	--	--	--	--	--	--	--	--	--
Shading - < 50% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities.	--	--	--	--	--	--	--	--	--

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

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

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

Comments: _____

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

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

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

Estimated wetland area in AA subject to periodic flooding	☒ **≥ 10 acres**			☐ **<10, >2 acres**			☐ **≤2 acres**		
% of flooded wetland classified as forested, scrub/shrub, or both	**75%**	**25-75%**	**<25%**	**75%**	**25-75%**	**<25%**	**75%**	**25-75%**	**<25%**
AA contains **no outlet or restricted outlet**	--	--	.6 (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. Most of this credit area had 0-1 inch of surface water during the monitoring, and ponds/swales had 1~20 inches of water.

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

Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.
If no wetlands in the AA are subject to flooding or ponding, then check NA above.

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

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding**.**	☒ **>5 acre feet**			☐ **<5, >1 acre feet**			☐ **≤1 acre foot**		
Duration of surface water at wetlands within the AA	**P/P**	**S/I**	**T/E**	**P/P**	**S/I**	**T/E**	**P/P**	**S/I**	**T/E**
Wetlands in AA flood or pond **≥ 5 out of 10 years**	1 (H)	--	--	--	--	--	--	--	--
Wetlands in AA flood or pond **< 5 out of 10 years**	--	--	--	--	--	--	--	--	--

Comments: This credit area is saturated to surface orfor apparently most of the year.

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

Applies to wetlands with the potential to receive excess sediments, nutrients, or toxicants through influx of surface or ground water or direct input.
If no wetlands in the AA are subject to such input, check NA above.

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

Sediment, Nutrient, and Toxicant Input Levels Within AA	AA receives or surrounding land use has potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	☒ **≥ 70%**		☐ **< 70%**		☐ **≥ 70%**		☐ **< 70%**	
Evidence of flooding or ponding in AA	☒ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**
AA contains **no or restricted outlet**	1 (H)	--	--	--	--	--	--	--
AA contains **unrestricted outlet**	--	--	--	--	--	--	--	--

Comments: Water was flowing out of the reserve through the south berm. Approximately 80% of the swales were inundated and all of the ponds were at 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		
	☒ Permanent / Perennial	☐ Seasonal / Intermittent	☐ 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	☒ Vegetated component >5 acres						☐ Vegetated component 1-5 acres						☐ Vegetated component <1 acre					
B	☐ High		☐ Moderate		☒ Low		☐ High		☐ Moderate		☐ Low		☐ High		☐ Moderate		☐ Low	
C	☐Y	☐N	☐Y	☐N	☒Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N
P/P	--	--	--	--	.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	☐rare	☐common	☐abundant	☐rare	☐common	☐abundant	☐rare	☒common	☐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)		
	☐ Low	☐ Moderate	☐ High
Public ownership	--	--	--
Private ownership	--	--	--

Comments: Wildlife viewing; observed out-of-state birders on site 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	0.6	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:	**8.50**	**11.00**	
	Percent of Total Possible Points:		**77%** (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: 7/28/2009 **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)
69.5 (measured, e.g. GPS)

B. Purpose of Evaluation:
☐ Wetlands potentially affected by MDT project **9. Assessment Area (total acres):** _____ (visually estimated)
☐ Mitigation wetlands; pre-construction 36.51 (measured, e.g. GPS)
☒ Mitigation wetlands; post-construction **Comments**: This credit area is located in most of the west half of the reserve and around the reserve circumference.
☐ Other

10. CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA

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

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

Comments: This credit area includes a swale and lateral grade checks which collect shallow surface water. Many shrub seedlings planted in this area, however as of 2009, approximately 150 had survived.

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: Hay land 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; approximately 150 leaf-bearing seedlings were counted during the monitoring.

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 (S3B); Long-billed Curlew (S3B)
Incidental habitat **(list species)**	☐ D ☐ S	_____
No usable habitat	☐ D ☐ S	_____

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

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

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

14C. GENERAL WILDLIFE HABITAT RATING

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

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

☐ **Low** (based on any of the following)
- ☐ few or no wildlife observations during peak use periods
- ☐ little to no wildlife sign
- ☐ sparse adjacent upland food sources
- ☐ interviews with local biologists with knowledge of AA

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

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

Structural Diversity (from 13)	☐**High**								☐**Moderate**								☒**Low**			
Class Cover Distribution (all vegetated classes)	☐**Even**				☐**Uneven**				☐**Even**				☐**Uneven**				☒**Even**			
Duration of Surface Water in ≥ 10% of AA	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**
Low disturbance at AA (see 12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	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)			
	☒ **Exceptional**	☐ **High**	☐ **Moderate**	☐ **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 likely hold water for most of the year.

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

If the AA is not or was not historically used by fish due to lack of habitat or excessive gradient, then check the NA box above.

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

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

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

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

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

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

Comments: _____

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

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

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

Estimated wetland area in AA subject to periodic flooding	☒ **≥ 10 acres**			☐ **<10, >2 acres**			☐ **≤2 acres**		
% of flooded wetland classified as forested, scrub/shrub, or both	**75%**	**25-75%**	**<25%**	**75%**	**25-75%**	**<25%**	**75%**	**25-75%**	**<25%**
AA contains **no outlet or restricted outlet**	--	--	.6 (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. Most of the created wetland was inundated with at least very shallow surface water (0-1 inch) during the July site visit,and the lateral berm areas had 1-6 inches of surface water.

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

Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.
If no wetlands in the AA are subject to flooding or ponding, then check NA above.

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

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding**.**	☒ **>5 acre feet**			☐ **<5, >1 acre feet**			☐ **≤1 acre foot**		
Duration of surface water at wetlands within the AA	**P/P**	**S/I**	**T/E**	**P/P**	**S/I**	**T/E**	**P/P**	**S/I**	**T/E**
Wetlands in AA flood or pond **≥ 5 out of 10 years**	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.			
% cover of wetland vegetation in AA	☒ **≥ 70%**		☐ **< 70%**		☐ **≥ 70%**		☐ **< 70%**	
Evidence of flooding or ponding in AA	☒ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**
AA contains **no or restricted outlet**	1 (H)	--	--	--	--	--	--	--
AA contains **unrestricted outlet**	--	--	--	--	--	--	--	--

Comments: Outlet restricted by berm on south side of wetland edge and water 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**		
	☒**Permanent / Perennial**	☐**Seasonal / Intermittent**	☐**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	☒ **Vegetated component >5 acres**						☐ **Vegetated component 1-5 acres**						☐ **Vegetated component <1 acre**					
B	☐ **High**		☐ **Moderate**		☒ **Low**		☐ **High**		☐ **Moderate**		☐ **Low**		☐ **High**		☐ **Moderate**		☐ **Low**	
C	☐**Y**	☐**N**	☐**Y**	☐**N**	☒**Y**	☐**N**	☐**Y**	☐**N**	☐**Y**	☐**N**	☐**Y**	☐**N**	☐**Y**	☐**N**	☐**Y**	☐**N**	☐**Y**	☐**N**
P/P	--	--	--	--	.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*: Wetland receives groundwater from slope to north and east and it is likely that water flows through the soil layers toward the Mussellshell River.

14K. UNIQUENESS

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

Replacement Potential	**AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland or plant association listed as "S1" by the MTNHP.**			**AA does not contain previously cited rare types and structural diversity (#13) is high or contains plant association listed as "S2" by the MTNHP.**			**AA does not contain previously cited rare types or associations and structural diversity (#13) is low-moderate.**		
Estimated Relative Abundance from 11	☐rare	☐common	☐abundant	☐rare	☐common	☐abundant	☐rare	☒common	☐abundant
Low disturbance at AA (12i)	--	--	--	--	--	--	--	.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)**		
	☐ Low	☐ Moderate	☐ 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	0.60	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:	**8.5**	**11.00**	____
	Percent of Total Possible Points:		**77%** (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: 7/28/2009 **4. Evaluator(s):** LB/PBSJ **5. Wetland / Site #(s):** ENHANCEMENT (Blue-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)
69.5 (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	20
Depression	Palustrine	None	Emergent Wetland	Saturated	Impounded	70
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: Areas of Canada thistle occur primarily around periphery, see Figure 3.
iii. Briefly describe AA and surrounding land use / habitat: Hay 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	_____
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	---	---	---	---	---	---	0 (L)

If documented, list the source (e.g., observations, records, etc.)**:** Juncus hallii was planted in the Enhancement area during late spring 2007. Oasis observed species in 2008, none found in 2009, survival unlikely.

14C. GENERAL WILDLIFE HABITAT RATING

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

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

☐ **Low** (based on any of the following)
- ☐ few or no wildlife observations during peak use periods
- ☐ little to no wildlife sign
- ☐ sparse adjacent upland food sources
- ☐ interviews with local biologists with knowledge of AA

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

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

Structural Diversity (from 13)	☐**High**								☒**Moderate**								☐**Low**			
Class Cover Distribution (all vegetated classes)	☐**Even**				☐**Uneven**				☐**Even**				☒**Uneven**				☐**Even**			
Duration of Surface Water in ≥ 10% of AA	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**	**P/P**	**S/I**	**T/E**	**A**
Low disturbance at AA (see 12)	--	--	--	--	--	--	--	--	--	--	--	--	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)			
	☒ **Exceptional**	☐ **High**	☐ **Moderate**	☐ **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	☐ **Permanent/Perennial**			☐ **Seasonal / Intermittent**			☐ **Temporary / Ephemeral**		
Cover - % of waterbody in AA containing cover objects (*e.g.* submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation)	**>25%**	**10-25%**	**<10%**	**>25%**	**10-25%**	**<10%**	**>25%**	**10-25%**	**<10%**
Shading - >75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities	--	--	--	--	--	--	--	--	--
Shading – 50 to 75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities.	--	--	--	--	--	--	--	--	--
Shading - < 50% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities.	--	--	--	--	--	--	--	--	--

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

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

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

Comments: _____

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

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

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

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

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

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

Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.
If no wetlands in the AA are subject to flooding or ponding, then check NA above.

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

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding**.**	☐ **>5 acre feet**			☐ **<5, >1 acre feet**			☒ **≤1 acre foot**		
Duration of surface water at wetlands within the AA	**P/P**	**S/I**	**T/E**	**P/P**	**S/I**	**T/E**	**P/P**	**S/I**	**T/E**
Wetlands in AA flood or pond **≥ 5 out of 10 years**	--	--	--	--	--	--	.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.			
% cover of wetland vegetation in AA	☒ **≥ 70%**		☐ **< 70%**		☐ **≥ 70%**		☐ **< 70%**	
Evidence of flooding or ponding in AA	☒ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**	☐ **Yes**	☐ **No**
AA contains **no or restricted outlet**	1 (H)	--	--	--	--	--	--	--
AA contains **unrestricted outlet**	--	--	--	--	--	--	--	--

Comments: _____

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

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

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

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses.	Duration of Surface Water Adjacent to Rooted Vegetation		
	☒Permanent / Perennial	☐Seasonal / Intermittent	☐Temporary / Ephemeral
≥ 65 %	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	☐ Vegetated component >5 acres						☒ Vegetated component 1-5 acres						☐ Vegetated component <1 acre					
B	☐ High		☐ Moderate		☐ Low		☐ High		☒ Moderate		☐ Low		☐ High		☐ Moderate		☐ Low	
C	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☒Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N
P/P	--	--	--	--	--	--	--	--	.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 cuvlert.

14K. UNIQUENESS

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

Replacement Potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland or plant association listed as "S1" by the MTNHP.			AA does not contain previously cited rare types and structural diversity (#13) is high or contains plant association listed as "S2" by the MTNHP.			AA does not contain previously cited rare types or associations and structural diversity (#13) is low-moderate.		
Estimated Relative Abundance from 11	☐rare	☐common	☐abundant	☐rare	☐common	☐abundant	☐rare	☒common	☐abundant
Low disturbance at AA (12i)	--	--	--	--	--	--	--	.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)		
	☐ Low	☐ Moderate	☐ 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	low	0.00	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	
L. Recreation/Education Potential	high	1.00	1	
	Total:	**6.7**	**11.00**	____
		Percent of Total Possible Points:	**61%** (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

2009 REPRESENTATIVE PHOTOGRAPHS

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

2009 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**

2009 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**

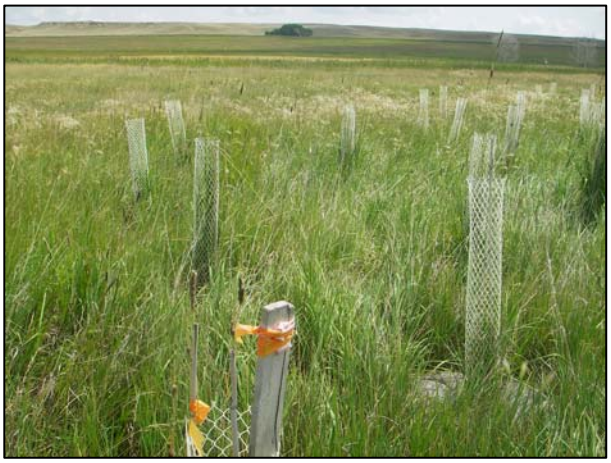
Location: L **Description:** East transect end Rehabilitation credit area. **View: W**

2009 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**

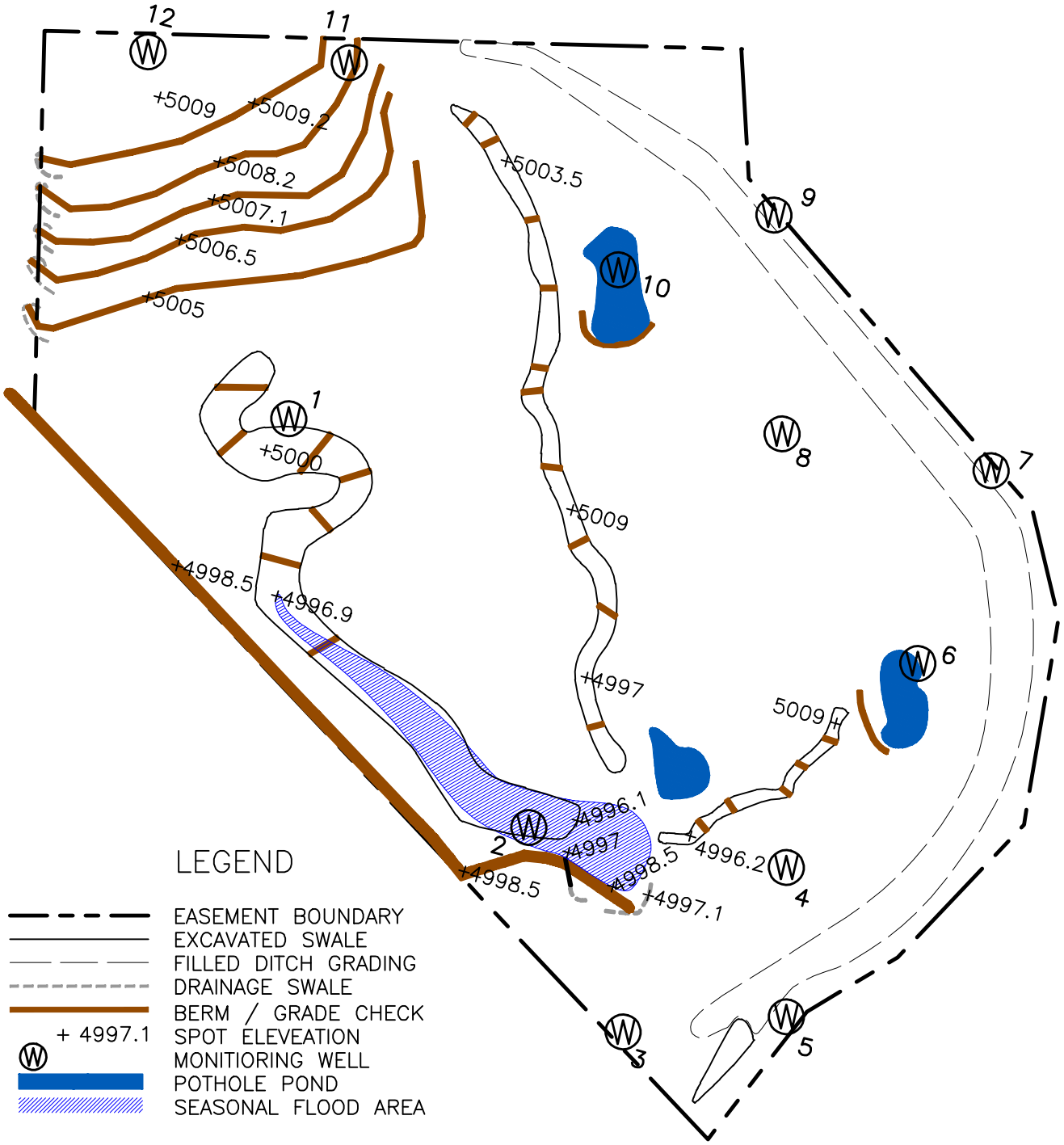
2009 SELKIRK WETLAND MITIGATION RESERVE

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

Appendix D

SITE PLAN

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



NOTE:
MONITORING WELL #10 REMOVED DURING CONSTRUCTION

oasis ENVIRONMENTAL

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

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

AS BUILT SITE PLAN

SELKIRK MITIGATION
TWO DOT, MT

FIGURE

1

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

Appendix E

BIRD SURVEY PROTOCOL
GPS PROTOCOL

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

BIRD SURVEY PROTOCOL

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

Survey Area

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

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

Survey Time

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

Data Recording

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

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

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

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

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

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

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

Other Fields

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

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

Date: Record the date of the bird survey.

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

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

GPS MAPPING AND AERIAL PHOTO REFERENCING PROCEDURE

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

2009 MACROINVERTEBRATE SAMPLING PROTOCOL AND 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 – 2009

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. A total of 229 invertebrate samples have been collected over the study period. Table 1 lists the currently monitored sites at which aquatic invertebrates were collected in 2009, and summarizes the sampling history of each.

METHODS

Sampling and Sample Processing

Aquatic invertebrate samples were collected at mitigated wetland sites in the summer months of 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, and 2009 by personnel of PBS&J. 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 1) tested and recommended by Stribling et al. (1995) in a report to the Montana Department of Health and Environmental Science. In that study, it was determined that some of the metrics were of limited use in some geographic regions, and for some wetland types. Despite that finding, all 12 metrics are used in this evaluation of mitigated wetlands, since detailed geographic information and wetland classifications were unavailable for this report. 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 between 2001 and 2007. Data from a total of 167 sites 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 bioassessment index used in this report may not be universally applicable to all wetland types, and in particular, to constructed wetlands. Scores and impairment classifications derived from the index may not be valid indications of impairment or non-impairment. In addition, 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 [HBI] 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 2009 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 are described below.

1. Ephemeroptera (mayfly) taxa richness. The number of mayfly taxa declines as water quality diminishes. Impairments to water quality which have been demonstrated to adversely affect the ability of mayflies to flourish include elevated water temperatures, heavy metal contamination, increased turbidity, low or high pH, elevated specific conductance and toxic chemicals. Few mayfly species are able to tolerate certain disturbances to instream habitat, such as excessive sediment deposition.

2. Plecoptera (stonefly) taxa richness. Stoneflies are particularly susceptible to impairments that affect a stream on a reach-level scale, such as loss of riparian canopy, streambank instability, channelization, and alteration of morphological features such as pool frequency and function, riffle development and sinuosity. Just as all benthic organisms, they are also susceptible to smaller scale habitat loss, such as by sediment deposition, loss of interstitial spaces between substrate particles, or unstable substrate.

3. Trichoptera (caddisfly) taxa richness. Caddisfly taxa richness has been shown to decline when sediment deposition affects habitat. In addition, the presence of certain case-building caddisflies can indicate good retention of woody debris and lack of scouring flow conditions.

4. Number of sensitive taxa. Sensitive taxa are generally the first to disappear as anthropogenic disturbances increase. The list of sensitive taxa used here includes organisms sensitive to a wide range of disturbances, including warmer water temperatures, organic or nutrient pollution, toxic pollution, sediment deposition, substrate instability and others. Unimpaired streams of western Montana typically support at least four sensitive taxa (Bollman 1998).

5. Percent filter feeders. Filter-feeding organisms are a diverse group; they capture small particles of organic matter, or organically enriched sediment material, from the water column by means of a variety of adaptations, such as silken nets or hairy appendages. In forested montane streams, filterers are expected to occur in insignificant numbers. Their abundance increases when canopy cover is lost and when water temperatures increase and the accompanying growth of filamentous algae occurs. Some filtering organisms, specifically the Arctopsychid caddisflies (*Arctopsyche* spp. and *Parapsyche* spp.) build silken nets with large mesh sizes that capture small organisms such as chironomids and early-instar mayflies. Here they are considered predators, and, in this study, their abundance does not contribute to the percent filter feeders metric.

6. Percent tolerant taxa. Tolerant taxa are ubiquitous in stream sites, but when disturbance increases, their abundance increases proportionately. The list of taxa used here includes organisms tolerant of a wide range of disturbances, including warmer water temperatures, organic or nutrient pollution, toxic pollution, sediment deposition, substrate instability and others.

Table 1. Montana Department of Transportation Mitigated Wetlands Monitoring Project sites: sampling history. Only sites sampled in 2009 are included. An asterisk indicates lotic sites.

Site identifier	2002	2003	2004	2005	2006	2007	2008	2009
Camp Creek MS-1*	+	+	+	+	+	+	+	+
Camp Creek MS-2*					+	+	+	+
Cloud Ranch Pond			+	+	+	+	+	+
Cloud Ranch Stream (Big Timber)*			+			+	+	+
Jack Creek – McKee Spring Creek*					+	+	+	+
Jack Creek – pond			+	+	+	+	+	+
Rock Creek Ranch				+	+	+	+	+
Wagner Marsh				+	+	+	+	+
Alkali Lake 1					+	+	+	+
West Fork of Charley Creek						+	+	+
Little Muddy Creek						+	+	+
Selkirk Ranch						+	+	+
Jocko Spring Creek MS1							+	+
Jocko Spring Creek MS2							+	+
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 – 2009.

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 – 2009 sampling.

METRIC	Cloud Ranch Pond	Jack Creek Pond	Rock Creek Ranch	Wagner Marsh	Alkali Lake	West Fork of Charley Creek	Little Muddy Creek
Total taxa	15	11	20	18	17	7	18
POET	2	0	2	3	1	0	1
Chironomidae taxa	6	3	3	5	10	2	6
Crustacea + Mollusca	0	5	6	7	1	1	6
% Chironomidae	14.47%	66.67%	43.75%	16.07%	61.00%	2.73%	42.40%
Orthocladiinae/Chir	45.45%	20.00%	57.14%	22.22%	52.46%	0.00%	86.79%
%Amphipoda	0.00%	3.33%	0.00%	1.79%	0.00%	91.82%	4.80%
%Crustacea + %Mollusca	0.00%	23.33%	32.14%	34.82%	1.00%	91.82%	34.40%
HBI	6.026666	9	7.045045	7.981652	6	7.90909	7.448
%Dominant taxon	40.79%	53.33%	23.21%	23.21%	30.00%	91.82%	36.00%
%Collector-Gatherers	21.05%	73.33%	61.61%	43.75%	51.00%	91.82%	37.60%
%Filterers	0.00%	0.00%	7.14%	4.46%	0.00%	0.00%	4.80%
Total taxa	3	1	3	3	3	1	3
POET	1	1	1	3	1	1	1
Chironomidae taxa	3	3	3	3	5	1	3
Crustacea + Mollusca	1	3	5	5	1	1	5
% Chironomidae	5	1	1	5	1	5	1
Orthocladiinae/Chir	5	3	5	3	5	1	5
%Amphipoda	5	5	5	5	5	1	3
%Crustacea + %Mollusca	5	5	5	3	5	1	3
HBI	5	1	3	1	5	1	3
%Dominant taxon	3	1	5	5	5	1	3
%Collector-Gatherers	1	3	3	1	3	5	1
%Filterers	3	3	1	3	3	3	3
Total score	**40**	**30**	**40**	**40**	**42**	**22**	**34**
Percent of maximum score	**66.67%**	**50.00%**	**66.67%**	**66.67%**	**70.00%**	**36.67%**	**56.67%**
Impairment classification	**optimal**	**sub-optimal**	**optimal**	**optimal**	**optimal**	**poor**	**sub-optimal**

Table 4b. Metric values and scores for wetland (lentic) sites in the MDT mitigated wetland study – 2009 sampling.

METRIC	Selkirk Ranch	Sportsman's Campground Site #1	Sportsman's Campground Site #2	Sportsman's Campground Site #3	Lonepine #1	Lonepine #2
Total taxa	17	19	11	23	22	19
POET	1	1	0	2	2	3
Chironomidae taxa	6	10	8	11	11	8
Crustacea + Mollusca	6	4	2	4	4	2
% Chironomidae	27.27%	38.46%	90.00%	41.82%	67.83%	25.86%
Orthocladiinae/Chir	43.33%	37.50%	3.33%	23.91%	7.69%	16.67%
%Amphipoda	5.45%	25.96%	2.00%	4.55%	0.00%	0.00%
%Crustacea + %Mollusca	62.73%	51.92%	5.00%	50.00%	6.96%	18.10%
HBI	8.245455	6.942309	6.9	7.345455	7.196427	7.191304
%Dominant taxon	30.00%	24.04%	45.00%	27.27%	51.30%	15.52%
%Collector-Gatherers	57.27%	50.00%	91.00%	83.64%	86.09%	63.79%
%Filterers	3.64%	25.96%	18.00%	29.09%	1.74%	6.03%
Total taxa	3	3	1	5	5	3
POET	1	1	1	1	1	3
Chironomidae taxa	3	5	5	5	5	5
Crustacea + Mollusca	5	3	1	3	3	1
% Chironomidae	3	3	1	1	1	3
Orthocladiinae/Chir	3	3	1	3	1	1
%Amphipoda	3	1	5	3	5	5
%Crustacea + %Mollusca	3	3	5	3	5	5
HBI	1	3	3	3	3	3
%Dominant taxon	5	5	3	5	1	5
%Collector-Gatherers	3	3	5	5	5	3
%Filterers	3	1	1	1	3	1
Total score	**36**	**34**	**32**	**38**	**38**	**38**
Percent of maximum score	**60.00%**	**56.67%**	**53.33%**	**63.33%**	**63.33%**	**63.33%**
Impairment classification	**sub-optimal**	**sub-optimal**	**sub-optimal**	**sub-optimal**	**sub-optimal**	**sub-optimal**

Table 5. Metric values and scores for stream (lotic) sites in the MDT mitigated wetland study – 2009 sampling.

METRIC	Camp Creek MS-1	Camp Creek MS-2	Cloud Ranch Stream	Jack Creek McKee	Jocko Spring Creek MS-1	Jocko Spring Creek MS-2
E Richness	2	4	1	1	2	1
P Richness	1	0	0	0	0	0
T Richness	2	4	4	1	3	2
Pollution Sensitive Richness	1	1	0	0	1	0
Filterer Percent	11.88%	22.02%	18.18%	25.23%	27.36%	10.91%
Pollution Tolerant Percent	13.86%	12.84%	15.15%	8.41%	12.26%	32.73%
E Richness	1	2	0	0	1	0
P Richness	1	0	0	0	0	0
T Richness	1	2	2	0	2	1
Pollution Sensitive Richness	1	1	0	0	1	0
Filterer Percent	1	1	1	0	0	1
Pollution Tolerant Percent	1	1	1	2	1	1
Total score	**6**	**7**	**4**	**2**	**5**	**3**
Percent of maximum score	**33.33%**	**38.89%**	**22.22%**	**11.11%**	**27.78%**	**16.67%**
Impairment classification	**moderate**	**moderate**	**moderate**	**severe**	**moderate**	**severe**

LITERATURE CITED

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Brandt, D. 2001. Temperature Preferences and Tolerances for 137 Common Idaho Macroinvertebrate Taxa. Report to the Idaho Department of Environmental Quality, Coeur d' Alene, Idaho.

Caton, L. W. 1991. Improving subsampling methods for the EPA's "Rapid Bioassessment" benthic protocols. Bulletin of the North American Benthological Society. 8(3): 317-319.

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

Taxa Listing

Project ID: MDT09PBSJ
RAI No.: MDT09PBSJ007

RAI No.: MDT09PBSJ007 **Sta. Name:** Selkirk Ranch
Client ID:
Date Coll.: 7/28/2009 **No. Jars:** 1 **STORET ID:**

Taxonomic Name	Count	PRA	Unique	Stage	Qualifier	BI	Function
Non-Insect							
Cladocera	4	3.64%	Yes	Unknown		8	CF
Copepoda	3	2.73%	Yes	Unknown		8	CG
Ostracoda	33	30.00%	Yes	Unknown		8	CG
Hyalellidae							
Hyalella sp.	6	5.45%	Yes	Unknown		8	CG
Lymnaeidae							
Stagnicola sp.	7	6.36%	Yes	Unknown		6	SC
Naididae							
Nais sp.	3	2.73%	Yes	Unknown		8	CG
Physidae							
Physa sp.	16	14.55%	Yes	Unknown		8	SC
Odonata							
Libellulidae							
Sympetrum sp.	3	2.73%	Yes	Larva		9	PR
Coleoptera							
Dytiscidae							
Hygrotus sp.	1	0.91%	Yes	Larva		5	PR
Haliplidae							
Peltodytes sp.	1	0.91%	Yes	Larva		5	SH
Diptera							
Ceratopogonidae							
Ceratopogoninae	3	2.73%	Yes	Larva		6	PR
Chironomidae							
Chironomidae							
Acricotopus sp.	10	9.09%	Yes	Larva		10	CG
Acricotopus sp.	1	0.91%	No	Pupa		10	CG
Chironomus sp.	1	0.91%	Yes	Larva		10	CG
Cladotanytarsus sp.	1	0.91%	Yes	Larva		7	CG
Cricotopus (Isocladius) sp.	1	0.91%	Yes	Larva		7	SH
Glyptotendipes sp.	15	13.64%	Yes	Larva		10	SH
Orthocladius sp.	1	0.91%	Yes	Larva		6	CG
Sample Count	**110**						

Metrics Report

Project ID: MDT09PBSJ
RAI No.: MDT09PBSJ007
Sta. Name: Selkirk Ranch
Client ID:
STORET ID:
Coll. Date: 7/28/2009

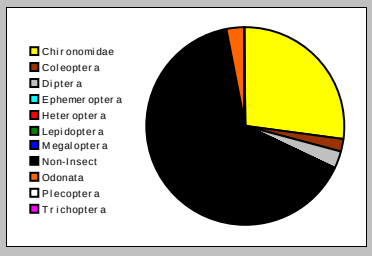
Abundance Measures

Sample Count: 110
Sample Abundance: 3,300.00 3.33% of sample used

Coll. Procedure:
Sample Notes:

Taxonomic Composition

Category	R	A	PRA
Non-Insect	7	72	65.45%
Odonata	1	3	2.73%
Ephemeroptera			
Plecoptera			
Heteroptera			
Megaloptera			
Trichoptera			
Lepidoptera			
Coleoptera	2	2	1.82%
Diptera	1	3	2.73%
Chironomidae	6	30	27.27%

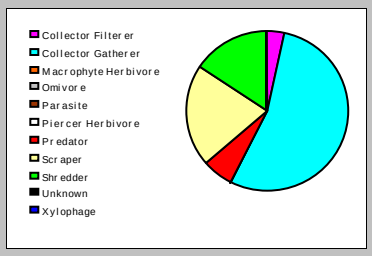


Dominant Taxa

Category	A	PRA
Ostracoda	33	30.00%
Physa	16	14.55%
Glyptotendipes	15	13.64%
Acricotopus	11	10.00%
Stagnicola	7	6.36%
Hyalella	6	5.45%
Cladocera	4	3.64%
Sympetrum	3	2.73%
Nais	3	2.73%
Copepoda	3	2.73%
Ceratopogoninae	3	2.73%
Peltodytes	1	0.91%
Orthocladius	1	0.91%
Hygrotus	1	0.91%
Cricotopus (Isocladius)	1	0.91%

Functional Composition

Category	R	A	PRA
Predator	3	7	6.36%
Parasite			
Collector Gatherer	8	59	53.64%
Collector Filterer	1	4	3.64%
Macrophyte Herbivore			
Piercer Herbivore			
Xylophage			
Scraper	2	23	20.91%
Shredder	3	17	15.45%
Omivore			
Unknown			



Metric Values and Scores

Metric	Value	BIBI	MTP	MTV	MTM
Composition					
Taxa Richness	17	1	1		0
Non-Insect Percent	65.45%				
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	2.73%				
Baetidae/Ephemeroptera	0.000				
Hydropsychidae/Trichoptera	0.000				
Dominance					
Dominant Taxon Percent	30.00%		2		2
Dominant Taxa (2) Percent	44.55%				
Dominant Taxa (3) Percent	58.18%	3			
Dominant Taxa (10) Percent	91.82%				
Diversity					
Shannon H (loge)	2.246				
Shannon H (log2)	3.241		3		
Margalef D	3.411				
Simpson D	0.145				
Evenness	0.087				
Function					
Predator Richness	3		1		
Predator Percent	6.36%	1			
Filterer Richness	1				
Filterer Percent	3.64%			3	
Collector Percent	57.27%		3		3
Scraper+Shredder Percent	36.36%		3		1
Scraper/Filterer	5.750				
Scraper/Scraper+Filterer	0.852				
Habit					
Burrower Richness	3				
Burrower Percent	17.27%				
Swimmer Richness	2				
Swimmer Percent	1.82%				
Clinger Richness	1	1			
Clinger Percent	0.91%				
Characteristics					
Cold Stenotherm Richness	0				
Cold Stenotherm Percent	0.00%				
Hemoglobin Bearer Richness	2				
Hemoglobin Bearer Percent	14.55%				
Air Breather Richness	1				
Air Breather Percent	0.91%				
Voltinism					
Univoltine Richness	5				
Semivoltine Richness	3	3			
Multivoltine Percent	63.64%		1		
Tolerance					
Sediment Tolerant Richness	1				
Sediment Tolerant Percent	6.36%				
Sediment Sensitive Richness	0				
Sediment Sensitive Percent	0.00%				
Metals Tolerance Index	3.316				
Pollution Sensitive Richness	0	1		0	
Pollution Tolerant Percent	26.36%	3		1	
Hilsenhoff Biotic Index	8.245		0		0
Intolerant Percent	0.00%				
Supertolerant Percent	86.36%				
CTQa	108.000				

Bioassessment Indices

BioIndex	Description	Score	Pct	Rating
BIBI	B-IBI (Karr et al.)	16	32.00%	
MTP	Montana DEQ Plains (Bukantis 1998)	14	46.67%	Moderate
MTV	Montana Revised Valleys/Foothills (Bollman 1998)	4	22.22%	Moderate
MTM	Montana DEQ Mountains (Bukantis 1998)	6	28.57%	Moderate