
**MONTANA DEPARTMENT OF TRANSPORTATION WETLAND
MITIGATION MONITORING REPORT: 2003**
FINAL MONITORING YEAR

*Johnson-Valier
Valier, Montana*



Prepared for:
MONTANA DEPARTMENT OF TRANSPORTATION
2701 Prospect Avenue
Helena, MT 59620-1001

Prepared by:
LAND & WATER CONSULTING, INC.
P.O. Box 8254
Missoula, MT 59807

March 2004

Project No: 130091.018



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1.0 INTRODUCTION

The Johnson-Valier wetland mitigation site was constructed in 1994 to mitigate wetland impacts associated with Montana Department of Transportation (MDT) projects F 44-1(3)14 (Valier-East), F 44-1(7)0 (Valier-West), and other projects in Watershed #8 (Marias). The Valier-East and Valier-West projects resulted in a combined wetland loss of approximately 17 acres. Constructed within the MDT Great Falls District, the mitigation site is located approximately 2 miles northwest of Valier (**Figure 1**). The entire site occurs in Pondera County.

The intent of the project was to create three impoundments: a main impoundment, which would hold approximately 19.9 acres of surface water at capacity (3-foot depth), and two smaller impoundments ranging in (cumulative total) size between 4.1 and 4.8 acres at maximum capacity (2-foot depth) (Van Hook 1994; Diagram 1 in **Appendix D**).

Exact area of wetlands to be created was left to be determined during future monitoring, although “approximately 28 acres” of created wetlands were specified in the 1994 Wetland Development Agreement. The total projected surface water area at the site was 28.8 acres (Van Hook 1994); however, the diagram referenced in calculating this 28.8 acres (Diagram 1 in **Appendix D**) actually totals 25.4 surface water acres.

An approximate 2.5-acre remnant wetland pothole occurred in the area of the main impoundment prior to project construction. This area was to be subtracted from total wetland acreage credit unless determined that its wetland functions have been improved.

The project was designed to support waterfowl and wetland communities while also focusing on providing habitat for upland game birds, ungulates, furbearers, predators, amphibians, songbirds, and small mammals. It was also expected that an increasing diversity of invertebrates would benefit from shallow impoundments over time. No performance standards or success criteria were required by the U.S. Army Corps of Engineers (COE), MDT, or other agencies.

MDT personnel visited the site intermittently over the past several years. Photographs were taken during several visits and vegetation species were recorded. These materials were not incorporated into a report format, but are available in the MDT project files. Land & Water Consulting monitored the site in 2001, 2002, and again in 2003. The monitoring area is illustrated in **Figure 2, Appendix A**. The 2003 monitoring effort was intended to be the final formal monitoring to be conducted at the site. This report documents the final monitoring results at the Johnson-Valier mitigation site.

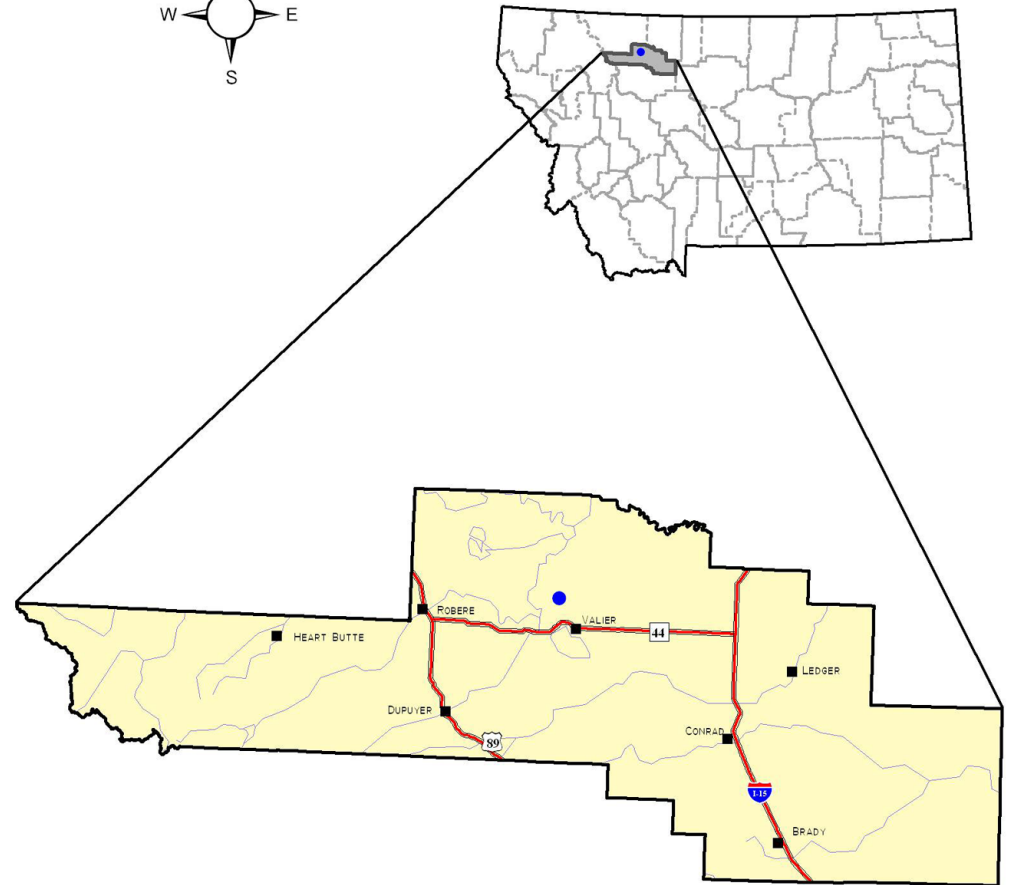
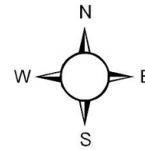
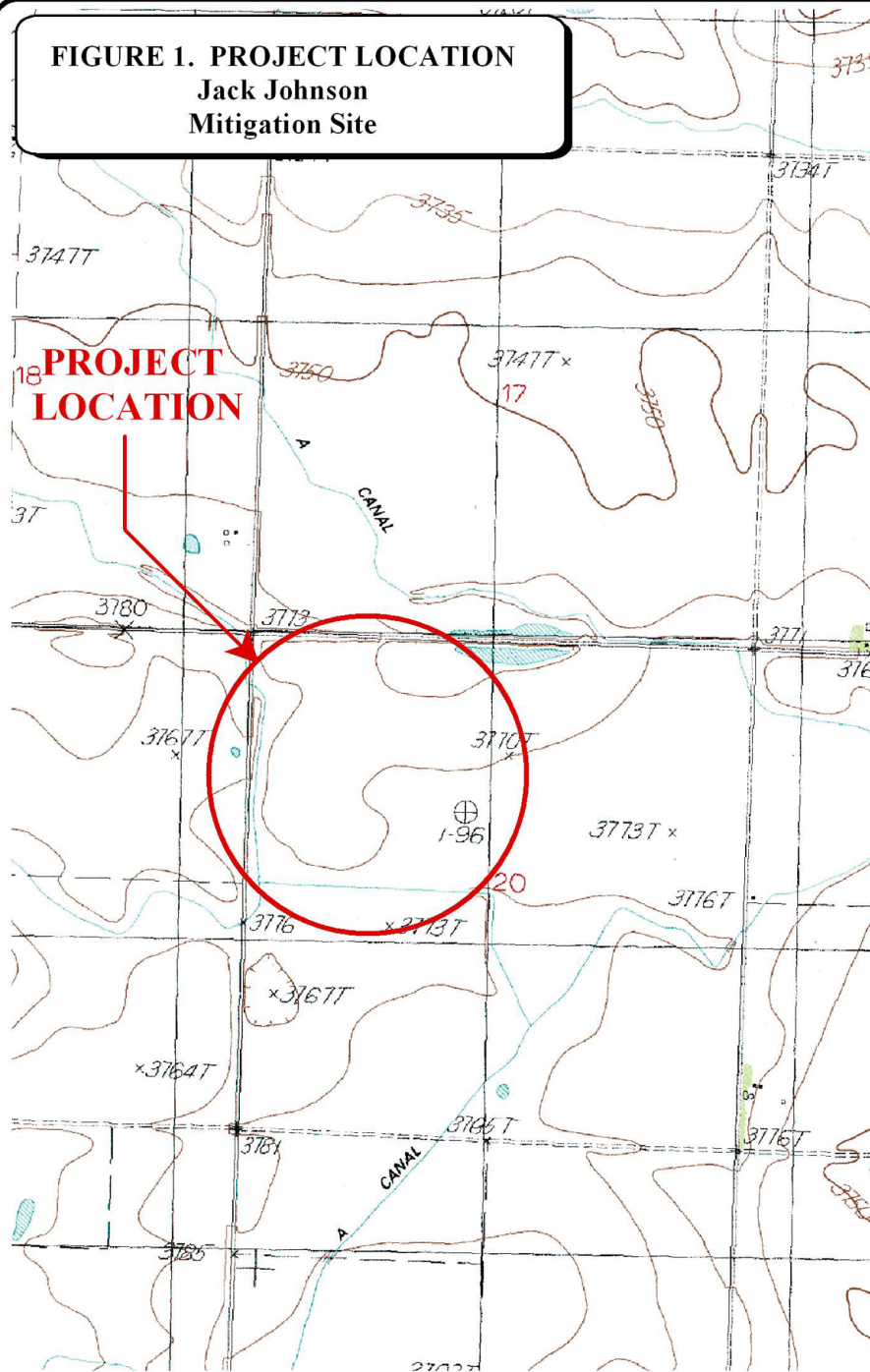
2.0 METHODS

2.1 Monitoring Dates and Activities

The site was visited on May 22 (spring), July 28 (mid-season), and October 7 (fall) 2003. The primary purpose of the spring and fall visits was to conduct a bird/general wildlife reconnaissance.

FIGURE 1. PROJECT LOCATION

**Jack Johnson
Mitigation Site**



800 0 800 1600 FEET
1: 24,000

PROJECT #: 130091.018
DATE: MAY 2001
LOCATION:
PROJECT MANAGER: J. BERGLUND
DRAWN BY: B. NOECKER

LAND & WATER CONSULTING, INC.

1120 CEDAR PO BOX 8254 MISSOULA, MT 59807

The mid-season visit was conducted in late July to document vegetation, soil, and hydrologic conditions used to map jurisdictional wetlands. All information contained on the Wetland Mitigation Site Monitoring Form (Appendix B) was collected at this time. Activities and information conducted/collected included: wetland delineation; wetland/open water aquatic habitat boundary mapping; vegetation community mapping; vegetation transect; soils data; hydrology data; bird and general wildlife use; photograph points; macroinvertebrate sampling; functional assessment; and (non-engineering) examination of dike structures.

2.2 Hydrology

According to the mitigation plan, spring refill is not normally accomplished until June 15th or until completion of the waterfowl nesting season in order to avoid nest flooding (Van Hook 1994). Primary flooding to capacity is accomplished during September-October. This was observed during the October 2003 field visit.

Impoundment areas are indicated on Diagram 1 in **Appendix D**. Hydrologic indicators were primarily evaluated 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 COE Routine Wetland Delineation Data Forms (**Appendix B**).

All additional hydrologic data were recorded on the mitigation site monitoring form (**Appendix B**). The boundary between wetlands and open water aquatic habitats (no rooted vegetation) was mapped on an aerial photograph and an estimate of the average water depth at this boundary was recorded.

No groundwater monitoring wells were installed at the site. If located within 18 inches of the ground surface (soil pit depth for purposes of delineation), groundwater depths were documented on the routine wetland delineation data form at each data point.

2.3 Vegetation

General dominant species-based vegetation community types were delineated on an aerial photograph during the mid-season visit. Standardized community mapping was not employed as many of these systems are geared towards climax vegetation and may not reflect yearly changes. Estimated percent cover of the dominant species in each community type was recorded on the site monitoring form (**Appendix B**).

A single 10-foot wide belt transect was sampled during the mid-season monitoring event to represent the range of current vegetation conditions. Percent cover was estimated for each vegetative species encountered within the “belt” for each vegetation community type using the following values: + (<1%); 1 (1-5%); 2 (6-10%); 3 (11-20%); 4 (21-50%); and 5 (>50%). The transect location is depicted on **Figure 2 (Appendix A)**. All data were recorded on the mitigation site monitoring form. Photos of the transect were taken from both ends during the mid-season visit.

A few woody species were planted at the site over time; however, locations of these plantings were not mapped or otherwise documented. A list of plants used or proposed for use in the design specifications (Van Hook 1994) was provided in the 2001 monitoring report. Shrubs, primarily snowberry (*Symphoricarpos occidentalis*) and rose (*Rosa* sp.), were generally planted over the years in the vicinity of current birdhouse locations (Urban pers. comm.). The site was searched for evidence of planted woody species during the mid-season visit.

2.4 Soils

Soils were evaluated during the mid-season visit according to procedures 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 NRCS terminology was used to describe hydric soils (USDA 1998).

A published soil survey does not exist for Pondera County. However, the soils mapping is complete, and the local Natural Resources Conservation Service (NRCS) office was consulted relative to unpublished mapped soil units at the site.

2.5 Wetland Delineation

Wetland delineation was conducted during the mid-season visit according to the 1987 COE Wetland Delineation Manual. Wetland and upland areas within the monitoring area were investigated for the presence of wetland hydrology, hydrophytic vegetation and hydric soils. The indicator status of vegetation was derived from the National List of Plant Species that Occur in Wetlands: Northwest Region 9 (Reed 1988). The information was recorded on COE Routine Wetland Delineation Data Forms (**Appendix B**). The wetland/upland boundary originally delineated in 2001 using a GPS unit was confirmed and adjusted using an aerial photograph in 2002 and 2003. The wetland/upland boundary in combination with any wetland/open water habitat boundary was used to calculate the wetland area developed on the site.

MDT estimated that approximately 2.5 acres of wetland originally existed at the site. Wetland delineation data collected during 2003 were compared to this pre-construction estimate in an effort to calculate additional wetland development since project construction.

2.6 Mammals, Reptiles, and Amphibians

Mammal, reptile, and amphibian species observations and other positive indicators of use, such as vocalizations, were recorded on the wetland monitoring form during each site visit. Indirect use indicators, including tracks; scat; burrows; eggshells; skins; bones; etc., were also recorded. These observations were recorded as the observer traversed the site while conducting other required activities. Direct sampling methods such as snap traps, live traps, and pitfall traps, were not implemented. A comprehensive list of wildlife species observed during 2003 monitoring was compiled.

2.7 Birds

Bird observations were recorded during all three visits. No formal census plots, spot mapping, point counts, or strip transects were conducted. During the spring and fall visits, observations were recorded in compliance with the bird survey protocol in **Appendix E**. During the mid-season visit, bird observations were recorded incidental to other monitoring activities. During all visits, observations were categorized by species, activity code, and general habitat association (see field data forms in **Appendix B**). A comprehensive 2003 bird list was compiled using these observations.

Nine birdhouses are currently located on the site. These structures were examined for general condition and bird use.

2.8 Macroinvertebrates

Two separate macroinvertebrate samples were collected during the mid-season site visit. These samples were collected at the southwest and main impoundments. Data were recorded on the wetland mitigation monitoring form. Macroinvertebrate sampling and analysis procedures are provided in **Appendix F**. The sampling locations are shown on **Figure 2 (Appendix A)**. The samples were preserved as outlined in the sampling procedure and sent to Rhithron Associates, Inc. for analysis.

2.9 Functional Assessment

A functional assessment was completed using the 1999 MDT Montana Wetland Assessment Method. Field data necessary for this assessment were collected during the mid-season site visit. The remainder of the functional assessment was completed in the office.

2.10 Photographs

Photographs were taken showing the current land use surrounding the site, the upland buffer, the monitored area, and the vegetation transect. Four photograph points established and shot during 2001 were also shot during 2002 and 2003. The approximate locations of these photo points are shown on **Figure 2 (Appendix A)**. All photographs were taken using a 50 mm lens. A description and compass direction for each photograph was recorded on the wetland monitoring form.

2.11 GPS Data

No survey points were collected with a GPS unit during the 2003 monitoring season as most site features were recorded during 2001. These included vegetation transect beginning and ending locations, birdhouse locations, all photograph locations and the wetland boundaries. Minor wetland boundary changes observed in 2003 were documented by hand on the aerial photograph.

2.12 Maintenance Needs

The dikes at each impoundment were examined during the 2003 site visits for obvious signs of breaching, damage, or other problems. This did not constitute an engineering-level structural inspection, but rather a cursory examination. Current or future potential problems were documented. Birdhouses were examined for signs of wear and structural integrity.

3.0 RESULTS

3.1 Hydrology

According to the Western Regional Climate Center, Valier yearly precipitation totals for 2001 (8.61 inches), 2002 (14.76 inches), and 2003 (10.4 inches) were 69%, 120%, and 83% of the total annual mean precipitation (12.49 inches) in this area. In 2003, the approximate precipitation total at Valier was about 7.22 inches from January through July, which is below the yearly mean of 8.6 inches for this period. Thus, precipitation was likely slightly below average at the site during 2003 monitoring activities.

All impoundments and depressions were inundated during the spring (May) visit, with 100% inundation observed at the main impoundment.

During the mid-season (July) visit, the 80-acre site as a whole was estimated to be approximately 40 percent inundated, with an average depth of 0.5 feet and a range of depths from zero to an estimated three feet. Virtually all of the wetlands delineated in the main impoundment were inundated; approximately 20% to 60% inundation was observed at wetlands delineated at the large northeast and southwest impoundments, respectively. The small west depression was saturated, while the northwest depression was dry. An approximate 0.7-acre open water area was mapped along the dike face of the main impoundment. Specific water values recorded during the mid-season visit are provided on the attached data forms.

During the fall (October) visit, virtually all wetlands in the main, northeast, and southwest impoundments were inundated, as were some uplands adjacent to the northeast impoundment. Vegetated areas in the center of the main impoundment were flooded and functioning as open water areas. The small west depression was saturated, but the small northwest depression was dry. Surface water may simply have not yet reached this small depression by the fall visit. Water was being diverted into the site from the canal during the fall visit.

No groundwater component appears to contribute to this site, which is charged by irrigation water, precipitation, and runoff. The exhibited inundation was largely the result of irrigation water being turned into the site by the landowner.

3.2 Vegetation

Vegetation species identified on the site are presented in **Table 1** and on the attached data form. Five wetland community types were identified and mapped on the mitigation area (**Figure 3**,

Table 1: 2001 - 2003 Johnson - Valier Vegetation Species List

Species ¹	Region 9 (Northwest) Wetland Indicator Status
<i>Agropyron cristatum</i>	--
<i>Agropyron intermedium</i>	--
<i>Agropyron repens</i>	FACU
<i>Agropyron spicatum</i>	FACU-
<i>Agrostis alba</i>	FACW
<i>Alisma gramineum</i>	OBL
<i>Alopecurus pratensis</i>	FACW
<i>Avena fatua</i>	--
<i>Beckmannia syzigachne</i>	OBL
<i>Bromus inermis</i>	--
<i>Carex lanuginosa</i>	OBL
<i>Carex vesicaria</i>	OBL
<i>Chenopodium album</i>	FAC
<i>Chenopodium berlandieri</i>	--
<i>Chenopodium chenopodiodes</i>	--
<i>Cirsium arvense</i>	FAC-
<i>Convolvulus arvensis</i>	--
<i>Dactylis glomerata</i>	FACU
<i>Eleocharis acicularis</i>	OBL
<i>Eleocharis palustris</i>	OBL
<i>Euphorbia esula</i>	--
<i>Glyceria grandis</i>	OBL
<i>Helianthus annuus</i>	FACU+
<i>Hordeum jubatum</i>	FAC-
<i>Juncus balticus</i>	OBL
<i>Juncus torreyi</i>	FACW
<i>Koeleria cristata</i>	--
<i>Lactuca serriola</i>	FACU
<i>Medicago sativa</i>	--
<i>Melilotus officinalis</i>	FACU
<i>Myriophyllum spicatum</i>	OBL
<i>Phleum pretense</i>	FAC-
<i>Poa palustris</i>	FAC
<i>Polygonum amphibium</i>	OBL
<i>Polygonum hydropiperoides</i>	OBL
<i>Populus deltoides</i>	FAC
<i>Potamogeton pectinatus</i>	OBL
<i>Ranunculus aquatilis</i>	OBL
<i>Rorippa curvisiliqua</i>	FACW+
<i>Rosa woodsii</i>	FACU
<i>Rumex crispus</i>	FACW
<i>Salix amygdaloides</i>	FACW
<i>Salix exigua</i>	OBL
<i>Salsola iberica</i>	--
<i>Scirpus acutus</i>	OBL
<i>Scirpus maritimus</i>	OBL
<i>Scirpus microcarpus</i>	OBL
<i>Scirpus validus</i>	OBL
<i>Solidago Canadensis</i>	FACU
<i>Sonchus arvensis</i>	FACU+
<i>Stipa viridula</i>	--
<i>Taraxacum officinale</i>	FACU
<i>Thlaspi arvense</i>	--
<i>Tragopogon dubius</i>	--
<i>Typha angustifolia</i>	OBL
<i>Typha latifolia</i>	OBL

¹ **Bolded** species indicate those documented in the analysis area for the first time in 2003.

Appendix A) during 2003. These included Type 1: *Typha latifolia*/*Scirpus acutus*, Type 2: *Alopecurus pratensis*/*Carex lanuginosa*, Type 3: *Typha latifolia*/*Hordeum jubatum*, Type 4: *Polygonum*/*Alisma gramineum*, and Type 8: *Potamogeton*/*Myriophyllum*.

The *Potamogeton/Myriophyllum* type had replaced Type 5: *Hordeum jubatum/Chenopodium*, and Type 7: *Chenopodium*, in the main impoundment due to the increased inundation period in late 2002 and throughout 2003. Type 6: exposed mudflats, was mapped during 2001, but these areas were inundated and had reverted to Type 1 in 2002 and 2003. Dominant species within each of these communities are listed on the attached data form (**Appendix B**).

Type 1 occurs primarily in the center and along the west portion of the main impoundment and in the deepest portion of the southwest impoundment. This community expanded in 2002 and 2003 in the main impoundment with the addition of surface water, eliminating mudflat and *Hordeum jubatum* communities mapped during 2001 and 2002. Small pockets of open water are interspersed within this community, but were not mapped separately. Type 2 occurs mainly as an interface between wetland and upland areas. Type 3 was replaced by Type 1 in 2003 along the north-central portion of the main impoundment, but still comprised the majority of the northeast impoundment in 2003. Type 4 occurs mainly as a centralized patch within the deepest portion of the main impoundment, apparently within the pre-existing pothole. Type 5 formerly occurred within the central portion of the main impoundment, but was replaced entirely by the *Potamogeton/Myriophyllum* type (Type 8) with two consecutive “normal” water years. Type 7 formerly occurred as a small monotype in the west-central portion of the main impoundment, but was also replaced by Type 8 in 2003.

Adjacent upland communities are comprised of rangeland habitats. Common species include smooth brome (*Bromus inermis*), quackgrass (*Agropyron repens*), timothy (*Phleum pratense*), crested wheatgrass (*Agropyron cristatum*), intermediate wheatgrass (*Agropyron intermedium*), yellow sweet clover (*Melilotus officinalis*), Russian thistle (*Salsola iberica*), prickly lettuce (*Lactuca serriola*), and goosefoot (*Chenopodium* sp.). Much of the upland area had been hayed prior to the fall 2003 visit.

Vegetation transect results are detailed in the attached data form (**Appendix B**), and are summarized in the transect maps; **Table 2**; and **Chart 1** below. Results were similar to 2001 and 2002 results for most communities. However, Type 8 completely replaced Type 5 in 2003 due to an increased inundation period. This is represented on the comparative graphs below. Additionally, the number of hydrophytic species along the transect increased between 2001 and 2003, while the number of upland species decreased (**Table 2**).

2001 Transect Map

Start (nw)	Up. (50')	Type 2 (42')	Type 1 (111')	Type 5 (495')	Type 1 (84')	Type 2 (40')	Up. (110')	Total: 932'	End (se)
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2002 Transect Map

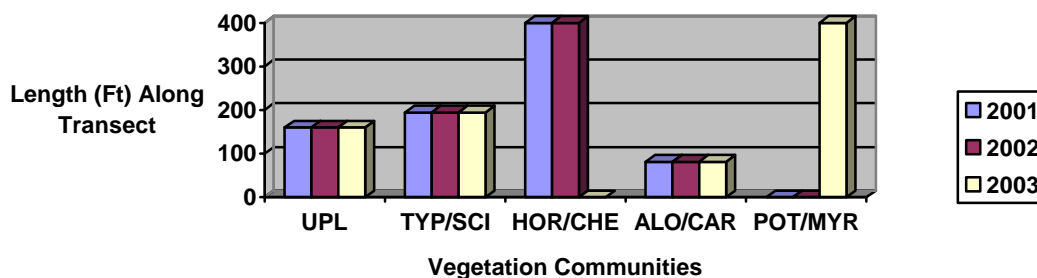
Start (nw)	Up. (50')	Type 2 (42')	Type 1 (111')	Type 5 (495')	Type 1 (84')	Type 2 (40')	Up. (110')	Total: 932'	End (se)
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2003 Transect Map

Start (nw)	Up. (50')	Type 2 (42')	Type 1 (111')	Type 8 (495')	Type 1 (84')	Type 2 (40')	Up. (110')	Total: 932'	End (se)
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Table 2: Vegetation Transect Data Summary

Monitoring Year	2001	2002	2003
Transect Length	932 feet	932 feet	932 feet
# Vegetation Community Transitions along Transect	7	7	7
# Vegetation Communities along Transect	4	4	4
# Hydrophytic Vegetation Communities along Transect	3	3	3
Total Vegetative Species	16	19	21
Total Hydrophytic Species	9	10	16
Total Upland Species	7	9	5
Estimated % Total Vegetative Cover	90%	90%	90%
% Transect Length Comprised of Hydrophytic Vegetation Communities	83%	83%	83%
% Transect Length Comprised of Upland Vegetation Communities	17%	17%	17%
% Transect Length Comprised of Unvegetated Open Water	0%	0%	0%
% Transect Length Comprised of Bare Substrate	0%	0%	0%

Chart 1: Length of Vegetation Communities along Transect 1

A few woody species were planted at the site over time; however, the locations of these plantings were not mapped or otherwise documented. According to MDT, some shrubs were planted in the vicinity of current birdhouse locations (Urban pers. comm.). The site was searched for evidence of “original” planted woody species during the mid-season visit in 2003. However, as in 2001 and 2002, no evidence of such plantings was observed. Consequently, 100% mortality of any original plantings was assumed, likely due to drought conditions.

However, three recently planted peachleaf willow (*Salix amygdaloides*) seedlings, all in good health, were observed north of the main impoundment during the mid-season visit. Thirteen additional peach willow seedlings, one sandbar willow (*Salix exigua*) seedling, and one plains cottonwood (*Populus deltoides*) seedling were observed during the fall visit. These were also all in good health, and had apparently been recently planted by the landowner.

3.3 Soils

A published soil survey does not exist for Pondera County. However, the soils mapping is complete, and the local Natural Resources Conservation Service (NRCS) office was consulted relative to unpublished mapped soil units at the site. Soils on the vast majority of the site are mapped as Nunemaker silty clay loam, 0-4 percent slopes. This well drained soil typically

occurs on glaciated till plains between 3,300 and 4,000 feet elevation. This soil is generally considered as non-hydric by the NRCS.

Consistent with past observations, B Horizon soils in wetland portions of the site consisted of silty clay loam with a matrix color ranging from 2.5Y4/2 to 2.5Y4/1 to 10YR5/1. Faint mottles at 2.5Y5/8 were observed in the northeast impoundment area, indicating periodic inundation. Generally, hydric soils appeared to be developing within proposed wetland areas.

During 2001, soils on the site were not saturated within 18 inches of the surface at the time of the mid-season survey, with the exception of two small 200 square foot pools in the southwest impoundment. In contrast, most wetland area soils at the site were either saturated or inundated during the 2002 mid-season visit, with the exception of the northeast depression, which exhibited water marks from earlier in the spring. In 2003, inundation was observed at virtually all wetland soils during the spring or mid-season visits.

3.4 Wetland Delineation

Delineated wetland boundaries are illustrated on **Figure 3 (Appendix A)**. Completed wetland delineation forms are included in **Appendix B**. Soils, vegetation, and hydrology are discussed in preceding sections. Delineation results are as follows:

Johnson-Valier Mitigation Area:	21.97 wetland acres (emergent, aquatic bed)
	<u>0.66 acre open water</u>
	22.63 acres total aquatic habitats

Approximately 22 acres of wetlands presently occur on the site, and approximately 0.66 acre of open water occurs immediately adjacent to the dike at the main impoundment (**Figure 2, Appendix A**). Smaller open water pockets were also interspersed through vegetated areas, but were too small to map separately.

An approximate 2.5-acre remnant wetland pothole occurred in the area of the main impoundment prior to project construction. This area was to be subtracted from total wetland acreage credit unless determined that its wetland functions have been improved. Although no baseline functional assessment was performed, it is assumed that because this impoundment now achieves a Category II rating due to wildlife habitat (and is now protected by a conservation easement), functions at this pre-existing site have likely improved over baseline conditions. Therefore, the pre-existing 2.5 acres was not subtracted from the post-project 22.63-acre total.

3.5 Wildlife

Wildlife species, or evidence of wildlife, observed on the site during 2001, 2002, and 2003 monitoring efforts are listed in **Table 3**. Specific evidence observed, as well as activity codes pertaining to birds, are provided on the completed monitoring forms in **Appendix B**. The site provides habitat for several wildlife species, particularly waterfowl and amphibians. Four mammal, one amphibian, and 33 bird species were noted using the mitigation site during the course of 2003 monitoring activities. Limited use of birdhouses was observed during 2003.

Table 3: Fish and Wildlife Species Observed on the Johnson - Valier Mitigation Site 2001 – 2003

FISH	
None	
AMPHIBIANS	
Northern Leopard Frog (<i>Rana pipiens</i>) Tiger Salamander (<i>Ambystoma tigrinum</i>) Western Chorus Frog (<i>Pseudacris triseriata</i>)	
REPTILES	
None	
BIRDS	
American Avocet (<i>Recurvirostra americana</i>) American Coot (<i>Fulica americana</i>) American Kestrel (<i>Falco sparverius</i>) American Robin (<i>Turdus migratorius</i>) American Wigeon (<i>Anas americana</i>) Barn Swallow (<i>Hirundo rustica</i>) Blue-winged Teal (<i>Anas discors</i>) Brewer's Blackbird (<i>Euphagus cyanocephalus</i>) Brown-headed Cowbird (<i>Molothrus ater</i>) Canada Goose (<i>Branta Canadensis</i>) Cliff Swallow (<i>Petrochelidon pyrrhonota</i>) Common Snipe (<i>Gallinago gallinago</i>) Common Yellowthroat (<i>Geothlypis trichas</i>) Eared Grebe (<i>Podiceps nigricollis</i>) Gadwall (<i>Anas strepera</i>) Great Blue Heron (<i>Ardea herodias</i>) Herring Gull (<i>Larus argentatus</i>) Horned Lark (<i>Eremophila alpestris</i>) Grasshopper Sparrow (<i>Ammodramus savannarum</i>) Gray Partridge (<i>Perdix perdix</i>) Killdeer (<i>Charadrius vociferous</i>) Lesser Scaup (<i>Aythya affinis</i>) Long-billed Dowitcher (<i>Limnodromus scolopaceus</i>) Mallard (<i>Anas platyrhynchos</i>) Marbled Godwit (<i>Limosa fedoa</i>)	Marsh Wren (<i>Cistothorus palustris</i>) Mourning Dove (<i>Zenaida macroura</i>) Northern Harrier (<i>Circus cyaneus</i>) Northern Pintail (<i>Anas acuta</i>) Northern Rough-winged Swallow (<i>Stelgidopteryx serripennis</i>) Northern Shoveler (<i>Anas clypeata</i>) Redhead (<i>Aythya americana</i>) Red-winged Blackbird (<i>Agelaius phoeniceus</i>) Ring-billed Gull (<i>Larus delawarensis</i>) Ring-necked Pheasant (<i>Phasianus colchicus</i>) Rock Dove (<i>Columba livia</i>) Ruddy Duck (<i>Oxyura jamaicensis</i>) Sandhill Crane (<i>Grus Canadensis</i>) Savannah Sparrow (<i>Passerculus sandwichensis</i>) Sharp-tailed Grouse (<i>Tympanuchus phasianellus</i>) Song Sparrow (<i>Melospiza melodia</i>) Sora (<i>Porzana Carolina</i>) Spotted Sandpiper (<i>Actitis macularia</i>) Tree Swallow (<i>Tachycineta bicolor</i>) Vesper Sparrow (<i>Pooecetes gramineus</i>) Western Meadowlark (<i>Sturnella neglecta</i>) Willet (<i>Catoptrophorus semipalmatus</i>) Wilson's Phalarope (<i>Phalaropus tricolor</i>) Yellow-headed Blackbird (<i>Xanthocephalus xanthocephalus</i>)
MAMMALS	
Coyote (<i>Canis latrans</i>) Muskrat (<i>Ondatra zibethicus</i>) Raccoon (<i>Procyon lotor</i>) Richardson's Ground Squirrel (<i>Spermophilus richardsonii</i>) Striped Skunk (<i>Mephitis mephitis</i>) White-tailed Deer (<i>Odocoileus virginianus</i>)	
Bolded species were observed during 2003 monitoring. All other species were observed during one or more of the previous monitoring years, but not during 2003.	

Northern leopard frogs (*Rana pipiens*), observed during 2001, were not observed during 2002 or 2003, but were assumed present due to the greater amounts of surface water available in 2002 and 2003. Leopard frogs are considered “species of special concern” by the Montana Natural Heritage Program (MNHP) due largely to their apparent extirpation from the portion of their

historic distribution west of the Continental Divide. This species has been assigned a rank of S1 west of the Continental Divide and S3 east of the Divide by the MNHP.

Several tiger salamanders (*Ambystoma tigrinum*) were observed during the 2002 October visit in the outlet structure of the main impoundment. No tiger salamanders were observed during 2003. However, several hundred western chorus frogs (*Pseudacris triseriata*) were observed in the main impoundment and other areas of inundation during the 2003 spring visit.

3.6 Macroinvertebrates

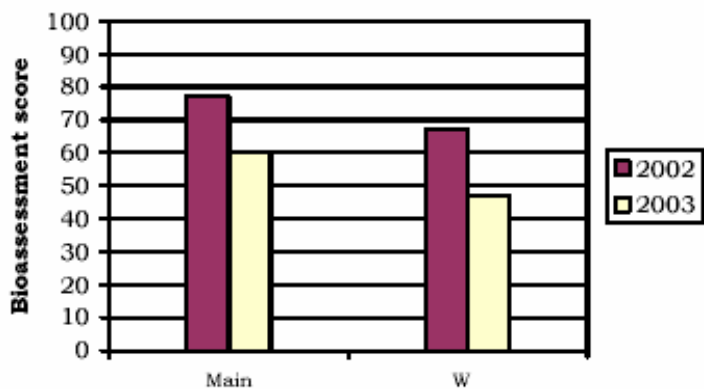
Macroinvertebrate sampling results are provided in **Appendix F** and were summarized by Rhithron Associates (Bollman 2003) in the italicized sections below.

Main Impoundment. Optimal conditions in 2002 apparently deteriorated to suboptimal conditions in 2003. Although the biotic index value did not change much between the 2 years, indicating little change in water quality, faunal diversity fell off significantly. Whereas the sample collected in 2002 produced 26 taxa, only 18 taxa were collected in 2003. Macrophytes apparently provided the most habitat space in 2003, whereas the water column and benthic substrates were the better colonized habitats in 2002. The possibility that this could represent a sampling bias cannot be ruled out.

*Southwest Impoundment. Biotic conditions may have worsened at this site between 2002 and 2003. Biotic index values do not indicate changing water quality, instead, shifting habitat availability could explain the faunal changes. At this site, water column inhabitants increased in importance in 2003, and the hemoglobin-bearing midge *Chironomus* sp. increased in abundance in benthic substrates. In contrast, better oxygenation of the substrate-water interface was indicated in 2002 by large numbers of ostracods. Poor biotic conditions are suggested by scores in 2003.*

Ambient air temperatures during the sample event were extremely high (near 100 degrees F), and had been high for at least a week prior to sampling. This may have negatively influenced macroinvertebrate communities in 2003.

Chart 2: Bioassessment Scores at the Johnson-Valier Site: 2002 and 2003



3.7 Functional Assessment

Completed functional assessment forms are presented in **Appendix B**. Functional assessment results are summarized in **Table 4**. Year 2003 scores and ratings increased slightly over those calculated in 2001 and 2002. This was primarily due to increased inundation throughout the site, which improved ratings for wildlife habitat and other functions.

The main impoundment of the mitigation site again rated as a Category II site, primarily due to high ratings for wildlife habitat, MHNP species habitat (northern leopard frog), surface water storage, nutrient/toxicant removal, food chain support, and uniqueness. Due to increased inundation, a *Potamogeton pectinatus*/*Myriophyllum spicatum* community, which is rated as a possibly “critically imperiled” wetland community type by the MNHP, appeared at the site, increasing the uniqueness rating.

The southwest and northeast impoundments again rated as Category III sites, although the scores at the northeast impoundment greatly improved in 2003 due to increased inundation. The small depressions outside of the main cells again rated as Category IV (low value) sites. This was primarily due to low vegetative diversity and low acreage of actual wetlands present.

Based on functional assessment results (**Table 4**), approximately 127 functional units have been gained thus far at the Johnson-Valier mitigation site, a gain of 20 functional units over 2002.

3.8 Photographs

Representative photographs taken from photo-points in 2003 are provided in **Appendix C**. A series of aerial photographs, from pre-project through 2003, are also provided in **Appendix C**. The 2001 aerial photograph serves as the basemap for **Figures 2 and 3** in **Appendix A**.

3.9 Maintenance Needs/Recommendations

The dikes and all nine birdhouses were in good condition during the mid-season visit. No significant problems were observed, although a minor muskrat burrow attempt was noted in the dike of the main impoundment.

Canada thistle (*Cirsium arvense*), a state-listed noxious weed, has established a substantial presence in upland areas on the site. Leafy Spurge (*Euphorbia esula*), another listed noxious weed, is also present. Treatment of these weeds may be necessary in future years.

The benefits of increased water delivery to the site from 2001 to 2003 were substantial. Continued MDT monitoring of water delivery to the site should be undertaken to insure that it occurs consistently.

Table 4: Summary of 2003 Wetland Function/Value Ratings and Functional Points ¹ at the Johnson - Valier Mitigation Project

Function and Value Parameters from the 1999 MDT Montana Wetland Assessment Method	Wetland Sites		
	Main Impoundment	Southwest and Northeast Impoundments	Two Small Depressions Outside of Main and SW Impoundments
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.0)	Low (0.0)
MNHP Species Habitat	High (0.8)	High (0.8)	Low (0.1)
General Wildlife Habitat	High (0.9)	Mod (0.5)	Low (0.2)
General Fish/Aquatic Habitat	NA	NA	NA
Flood Attenuation	Mod (0.6)	Mod (0.5)	NA
Short and Long Term Surface Water Storage	High (0.9)	Low (0.3)	Low (0.2)
Sediment, Nutrient, Toxicant Removal	High (1)	High (1.0)	NA
Sediment/Shoreline Stabilization	Mod (0.6)	NA	NA
Production Export/Food Chain Support	High (0.8)	Mod (0.7)	Low (0.3)
Groundwater Discharge/Recharge	Low (0.1)	Low (0.1)	Low (0.1)
Uniqueness	High (0.8)	Low (0.3)	Low (0.3)
Recreation/Education Potential	Low (0.3)	Low (0.3)	Low (0.1)
Actual Points/Possible Points	7.1 / 11	4.5 / 10	1.3 / 8
% of Possible Score Achieved	65%	45%	16%
Overall Category	II	III	IV
Total Acreage of Assessed Wetlands and Other Aquatic Habitats within Site Boundaries	16.99 ac	5.05 ac	0.59 ac
Functional Units (acreage x actual points)	121 fu	23 fu	1 fu
Net Acreage Gain	16.99 – 2.5 = 14.49 ac	5.05 ac	0.59 ac
Net Functional Unit Gain	103 fu	23 fu	1 fu
Total Functional Unit “Gain”	127 Total Functional Units		

¹ See completed MDT functional assessment forms in Appendix B for further detail.

3.10 Current Credit Summary

No specific performance criteria were required to be met at this site in order to document its success. However, the overall goal was to provide “approximately 28” wetland acres, based on a projected surface water total of 28.8 acres (Van Hook 1994); however, the diagram referenced in calculating this 28.8 acres (Diagram 1 in **Appendix D**) actually totals 25.4 surface water acres.

The project was designed to support waterfowl and wetland communities while also focusing on providing habitat for upland game birds, ungulates, furbearers, predators, amphibians, songbirds, and small mammals. It was also expected that an increasing diversity of invertebrates would benefit from shallow impoundments over time. Based on 2001, 2002, and 2003 monitoring results, most of these goals have been achieved. Wetland hydrology was improved in 2002 over 2001, and in 2003 over 2002, increasing the overall habitat value at the site.

As the project stands, approximately 22.63 acres of wetlands and open water presently occur on the site (**Figure 2, Appendix A**). This figure has not changed between 2001 and 2003, indicating that the site has more or less stabilized from a wetland development standpoint.

Consequently, 22.63 acres is presently the maximum assignable credit at this site as of 2003. Approximately 127 functional units have been gained at this site since it was constructed.

4.0 REFERENCES

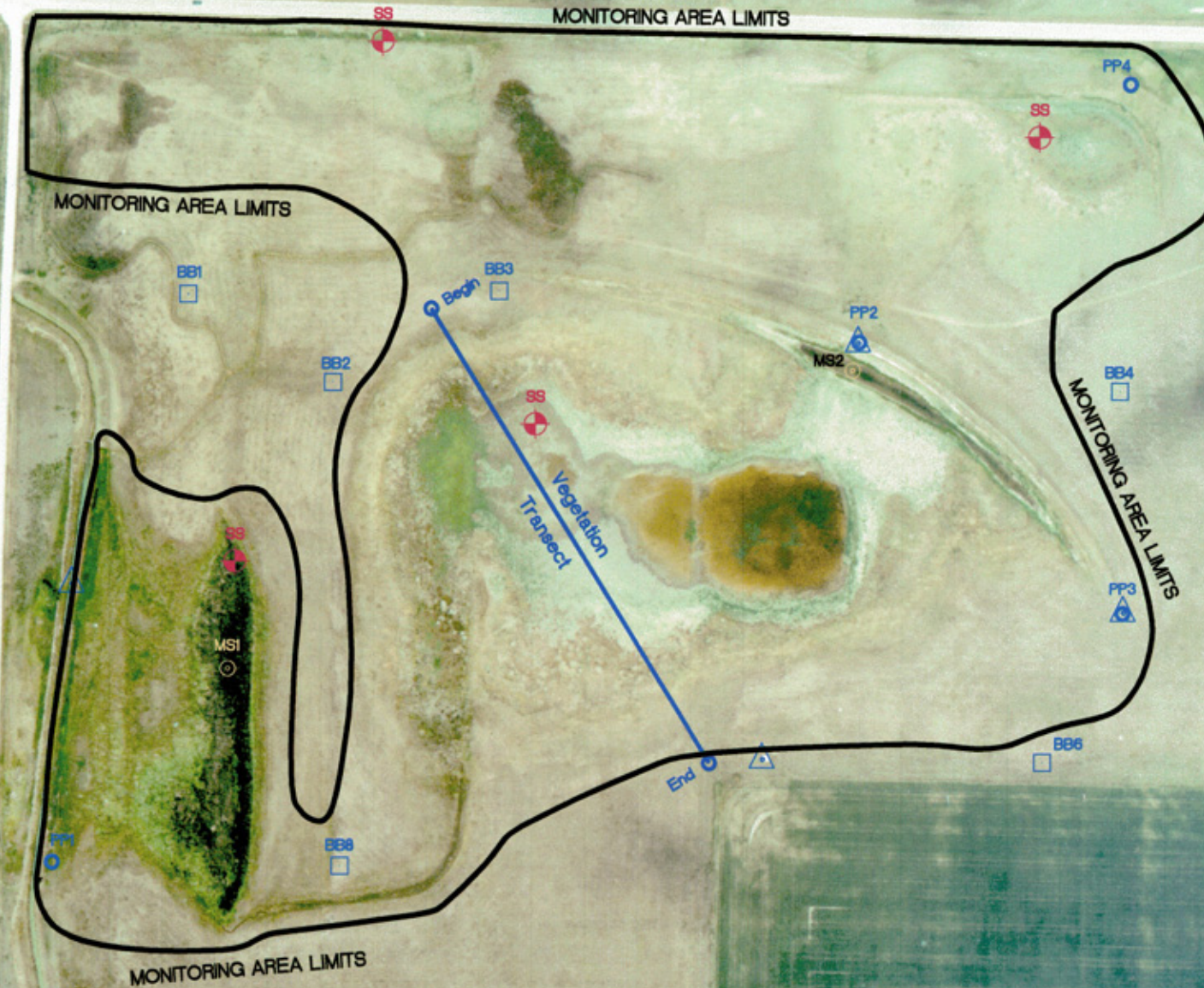
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Appendix A

FIGURES 2 - 3

MDT Wetland Mitigation Monitoring
Johnson-Valier
Valier, Montana

Figure 2 - Monitoring Activity Locations 2003



SCALE 1"= 200ft

LEGEND

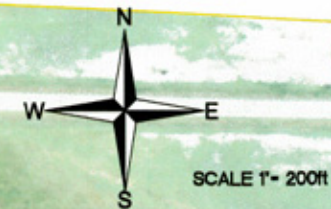
- Monitoring Area Limits
- Photograph Point
- Aerial Reference Point
- Bird Box
- Soil Sample
- Macro-invertebrate Sample Point

PROJECT NAME		MDT Jack Johnson Wetland Mitigation	
DRAWN BY		JB	
CHECKED BY		JB	
APPROVED BY		JB	
PROJECT WORK BY		JB	
PROJECT NO. 130001.018		LOCATION: Jack Johnson	
FILE NAME: TASK18BASE.dwg		SCALE: 1"= 200ft	
SHEET NUMBER		2 of 2	
REV		DATE: 1-27-04	



NOT TO SCALE

Figure 3 - Mapped Site Features 2003



LEGEND

- Monitoring Area Limits
- Wetland-Upland Boundary
- Vegetation Community Boundary
- Open Water Boundary

Wetland Area 2003 2197 Acres
 Open Water Area 2003 0.66 Acres
 Total 2003 22.63 Acres

Vegetation Types:

- ① Typha/Scirpus
- ② Alopecurus/Carex
- ③ Typha/Hordeum
- ④ Polygonum/Alisma
- ⑤ Hordeum/Chenopodium (None in 2003)
- ⑥ Mud Flat (None in 2003)
- ⑦ Chenopodium (None in 2003)
- ⑧ Potamogeton/Myriophyllum

NOT TO SCALE

Appendix B

**COMPLETED 2003 WETLAND MITIGATION SITE MONITORING
FORM**

COMPLETED 2003 BIRD SURVEY FORMS

COMPLETED 2003 WETLAND DELINEATION FORMS

COMPLETED 2003 FUNCTIONAL ASSESSMENT FORMS

MDT Wetland Mitigation Monitoring

Johnson-Valier

Valier, Montana



LWC / MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: Johnson - Valier Project Number: F 44-1(3)14 Assessment Date: 7 / 28 / 03
Location: 4 mi. north of Valier MDT District: Great Falls Milepost: 5 of Hwy. 358
Legal description: T_30N R_5W_ Section_20_ Time of Day: 16:30-18:30
Weather Conditions: dry, windy Person(s) conducting the assessment: Berglund
Initial Evaluation Date: 8 / 26 / 01 Visit #: 3 Monitoring Year: 2003 (year 3)
Size of evaluation area: 80+ acres Land use surrounding wetland: croplands

HYDROLOGY

Surface Water Source: irrigation and runoff
Inundation: Present X Absent Average depths: .5ft Range of depths: 0 - 3 ft
Assessment area under inundation: 40%
Depth at emergent vegetation-open water boundary: 2 ft
If assessment area is not inundated are the soils saturated w/in 12" of surface: Yes X No
Other evidence of hydrology on site (drift lines, erosion, stained vegetation etc.): stained vegetation, water marks

Groundwater

Monitoring wells: Present Absent X
Record depth of water below ground surface

Well #	Depth	Well #	Depth	Well #	Depth

Additional Activities Checklist:

- X Map emergent vegetation-open water boundary on air photo
X Observe extent of surface water during each site visit and look for evidence of past surface water elevations (drift lines, erosion, vegetation staining etc.)
 NA GPS survey groundwater monitoring wells locations if present

COMMENTS/PROBLEMS: Most of the main impoundment was inundated (about 80-90%), with some inundation at the northeast (20%) and southwest (50%) impoundments as well. The northwest wetland depression was dry, with no surface water. The approximate west half of the main impoundment had shifted from a foxtail barley-dominated area to a floating pondweed and spikerush -dominated community due to increased inundation over 2002.



VEGETATION COMMUNITIES

Community No.: 1 Community Title (main species): TYP LAT / SCI ACU

Dominant Species	% Cover	Dominant Species	% Cover
TYP LAT	70	BEC SYZ	<3
SCI ACU	20	POL AMP	5
ALO PRA	5		
SCI MIC	5		
ELE PAL	20		

COMMENTS/PROBLEMS: POL AMP increased throughout site

Community No.: 2 Community Title (main species): ALO PRA / CAR LAN

Dominant Species	% Cover	Dominant Species	% Cover
ALO PRA	70	JUN BAL	5
CAR LAN	25	POA PAL	< 5
AGR ALB	15		
HOR JUB	5		
RUM CRI	5		

COMMENTS/PROBLEMS: ALO PRA increased over previous years

Community No.: 3 Community Title (main species): TYP LAT / HOR JUB

Dominant Species	% Cover	Dominant Species	% Cover
TYP LAT	40	AGR REP	5-10
TYP ANG	10	BEC SYZ	1-2
HOR JUB	45		
RUM CRI	2-3		
ELE PAL	10		

COMMENTS/PROBLEMS: This community was absent in from the main impoundment in 2003, and had reverted to Type 1 (TYP LAT / SCI ACU) due to increased inundation

Additional Activities Checklist:

X Record and map vegetative communities on air photo

VEGETATION COMMUNITIES (continued)

Community No.: 4 Community Title (main species): POL Sp. / ALI GRA

Dominant Species	% Cover	Dominant Species	% Cover
POL AMP	80		
POL HYD	20		
ALI GRA	15		
RAN AQU	10		

COMMENTS/PROBLEMS: POL AMP increased in 2003, as did the extent of this overall community.

Community No.: 5 Community Title (main species): HOR JUB / CHE CHE

Dominant Species	% Cover	Dominant Species	% Cover
See comments			

COMMENTS/PROBLEMS: This community was absent in 2003 due to increased inundation.

Community No.: 7 Community Title (main species): CHE CHE

Dominant Species	% Cover	Dominant Species	% Cover
See comments			

COMMENTS/PROBLEMS: This community was absent in 2003 due to increased inundation.

VEGETATION COMMUNITIES (continued)

Community No.: 8 Community Title (main species): POT PEC / MYR SPI

Dominant Species	% Cover	Dominant Species	% Cover
POT FOL	>50	SCI MAR	1-5
MYR SPI	>50	ELE PAL	11-20
ALI GRA	11-20	POL AMP	6-10
TYP LAT	1-5		
RAN AQU	1-5		

COMMENTS/PROBLEMS: New community on 2003 that developed in large portion of inundated main impoundment – virtually replaced former Hordeum / Chenopodium community.

Community No.: Community Title (main species):

Dominant Species	% Cover	Dominant Species	% Cover

COMMENTS/PROBLEMS:

Community No.: Community Title (main species):

Dominant Species	% Cover	Dominant Species	% Cover

COMMENTS/PROBLEMS:

COMPREHENSIVE VEGETATION LIST

Species	Vegetation Community Number(s)	Species	Vegetation Community Number(s)
<i>Agropyron cristatum</i>	upland	<i>Ranunculus aquatilis</i>	4,8
<i>Agropyron intermedium</i>	upland	<i>Rosa woodsii</i>	upland
<i>Agropyron repens</i>	3, upland	<i>Rumex crispus</i>	2, 3
<i>Agropyron spicatum</i>	upland	<i>Salix amygdaloides (3 plants)</i>	upland
<i>Agrostis alba</i>	1, 2	<i>Salsola iberica</i>	upland
<i>Alisma gramineum</i>	4,8	<i>Scirpus acutus</i>	1,8
<i>Alopecurus pratensis</i>	1, 2	<i>Scirpus maritimus</i>	1,8
<i>Avena fatua</i>	upland	<i>Scirpus microcarpus</i>	1
<i>Beckmannia syzigachne</i>	1, 3	<i>Scirpus validus</i>	1
<i>Bromus inermis</i>	2, 3, upland	<i>Solidago canadensis</i>	2, upland
<i>Carex lanuginosa</i>	2,8	<i>Sonchus arvensis</i>	3, upland
<i>Carex vesicaria</i>	8	<i>Stipa viridula</i>	upland
<i>Chenopodium album</i>	upland	<i>Taraxacum officinale</i>	upland
<i>Chenopodium berlandieri</i>	upland	<i>Thlaspi arvense</i>	upland
<i>Cirsium arvense</i>	1, 2, 3, upland	<i>Tragopogon dubius</i>	upland
<i>Dactylis glomerata</i>	upland	<i>Typha angustifolia</i>	1, 3
<i>Eleocharis acicularis</i>	1	<i>Typha latifolia</i>	1, 3
<i>Eleocharis palustris</i>	1, 3, 8		
<i>Euphorbia esula</i>	upland		
<i>Glyceria grandis</i>	1		
<i>Helianthus annuus</i>	upland		
<i>Hordeum jubatum</i>	2, 3		
<i>Juncus balticus</i>	2		
<i>Juncus torreyi</i>	2		
<i>Koeleria cristata</i>	upland		
<i>Lactuca serriola</i>	3, upland		
<i>Medicago sativa</i>	upland		
<i>Melilotus officinalis</i>	upland		
<i>Myriophyllum spicatum</i>	8		
<i>Phleum pratense</i>	2, upland		
<i>Poa palustris</i>	2		
<i>Polygonum amphibium</i>	1, 4, 8		
<i>Polygonum hydropiperoides</i>	1, 4, 8		
<i>Potamogeton pectinatus</i>	8		

COMMENTS/PROBLEMS: __ Canada thistle is establishing a substantial presence in upland areas. Leafy spurge is present also. _Three recently planted peachleaf willows were noted north of the main impoundment.

PLANTED WOODY VEGETATION SURVIVAL

[illegible]

COMMENTS/PROBLEMS: __Three willows appeared to be recently planted on the site north of the main impoundment.

[illegible]

WILDLIFE

BIRDS

(Attach Bird Survey Field Forms)

Were man made nesting structures installed? Yes__x__ No____Type:_____ How many?_9____ Are the nesting structures being utilized? Yes_x__ No____ Do the nesting structures need repairs? Yes_x__ No_x__

MAMMALS AND HERPTILES

Species	Number Observed	Indirect indication of use			
		Tracks	Scat	Burrows	Other
white-tailed deer	1	yes	yes		
Richardson's ground squirrels	0			yes	
coyote	0		yes		
raccoon	0	yes			
western chorus frogs	100's				calls

Additional Activities Checklist:

__X__ Macroinvertebrate sampling (if required)

COMMENTS/PROBLEMS: __ Hundreds of western chorus frogs were observed and heard during the 2003 spring visit. Bird houses appear functional, but several may need to be replaced within the next year or two.

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

PHOTOGRAPHS

Using a camera with a 50 mm lenses and color film take photographs of the following permanent reference points listed in the checklist below. Record the direction of the photograph using a compass. (The first time at each site establish a permanent reference point by setting a ½ inch rebar or fencepost extending 2-3' above ground, survey the location with a resource grade GPS and mark the location on the air photo.)

Checklist:

- ☒ One photo for each of the 4 cardinal directions surrounding wetland
- ☒ At least one photo showing upland use surrounding wetland – if more than one upland use exists, take additional photos
- ☒ At least one photo showing buffer surrounding wetland
- ☒ One photo from each end of vegetation transect showing transect

Location	Photo Frame #	Photograph Description	Compass Reading
A		See photo sheets and field notes	
B			
C			
D			
E			
F			
G			
H			

COMMENTS/PROBLEMS: _____

GPS SURVEYING

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

Checklist:

- _____ Jurisdictional wetland boundary
- _____ 4-6 landmarks recognizable on the air photo
- _____ Start and end points of vegetation transect(s)
- _____ Photo reference points
- _____ Groundwater monitoring well locations

COMMENTS/PROBLEMS: _____GPS not used during 2003; minor changes in wetland borders were hand-adjusted using aerial photograph and 2002 delineation.

WETLAND DELINEATION

(Attach Corps of Engineers delineation forms)

At each site conduct the items on the checklist below:

- ☒ Delineate wetlands according to the 1987 Army Corps manual.
- ☒ Delineate wetland-upland boundary on the air photo
- ☐ Survey wetland-upland boundary with a resource grade GPS survey

COMMENTS/PROBLEMS: See attached completed delineation forms. _____

FUNCTIONAL ASSESSMENT

(Complete and attach full MDT Montana Wetland Assessment Method field forms; also attach abbreviated field forms, if used)

COMMENTS/PROBLEMS: See attached completed functional assessment forms. _____

MAINTENANCE

Were man-made nesting structures installed at this site? YES ☒ NO ☐

If yes, do they need to be repaired? YES ☒ NO ☒

If yes, describe problems below and indicate if any actions were taken to remedy the problems.

All bird houses appear functional, but several may need to be replaced in the next few years as they are beginning to weather severely. No action taken in 2003.

Were man-made structures build or installed to impound water or control water flow into or out of the wetland? YES ☒ NO ☐

If yes, are the structures working properly and in good working order? YES ☒ NO ☐

If no, describe the problems below.

COMMENTS/PROBLEMS:

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: Johnson-Valier Date: 7/28/03 Examiner: Berglund Transect # 1

Approx. transect length: 932 ft Compass Direction from Start (Upland): 153 degrees

Vegetation type A:	Upland	
Length of transect in this type:	50	feet
Species:		Cover:
CIR ARV		21-50
BRO INE		21-50
AGR REP		1-5
TAR OFF		6-10
MED SAT		11-20
Total Vegetative Cover:		80%

Vegetation type B:	ALO PRA (veg type 2)	
Length of transect in this type:	42	feet
Species:		Cover:
ALO PRA		100
AGR ALB		1-5
Total Vegetative Cover:		100

Vegetation type C:	TYP LAT / SCI ACU (veg type 1)	
Length of transect in this type:	111	feet
Species:		Cover:
TYP LAT / TYP ANG		>50
SCI ACU		11-20
BEC SYZ		1-5
ELE PAL		<1
ALO PRA		1-5
Total Vegetative Cover:		100%

Vegetation type D:	POT PEC / MYR SPI (veg type 8)	
Length of transect in this type:	495	feet
Species:		Cover:
POT PEC		>50
MYR SPI		>50
TYP LAT		1-5
ALI GRA		11-20
POL AMP		6-10
ELE PAL		11-20
RUM CRI		1-5
SCI MAR		1-5
	Total Vegetative Cover:	75%

MDT WETLAND MONITORING – VEGETATION TRANSECT (continued)

Site: Johnson Date: 7/28/03 Examiner: Berglund Transect # 1 (cont.)

Approx. transect length: 932 ft Compass Direction from Start (Upland): 153 deg.

Vegetation type E: TYP LAT / SCI ACU (veg type 1)		
Length of transect in this type:	84	feet
Species:	Cover:	
TYP LAT / TYP ANG	21-50	
RAN AQU	<1	
ELE PAL	11-20	
BEC SYZ	1-5	
SCI ACU	21-50	
ALO PRA	11-20	
Total Vegetative Cover:	100%	

Vegetation type F: ALO PRA (veg type 2)		
Length of transect in this type:	40	feet
Species:	Cover:	
ALO PRA	>50	
AGR ALB	21-50	
TYP LAT	1-5	
CAR VES	1-5	
Total Vegetative Cover:	100%	

Vegetation type G: Upland		
Length of transect in this type:	110	feet
Species:	Cover:	
CIR ARV	21-50	
BRO INE	6-10	
AGR REP	21-50	
TAR OFF	6-10	
AGR ALB	<5	
HOR JUB	1-5	
Total Vegetative Cover:	90%	

Vegetation type H:		
Length of transect in this type:		feet
Species:	Cover:	
Total Vegetative Cover:		



MDT WETLAND MONITORING – VEGETATION TRANSECT (back of form)

Cover Estimate

+ = <1% 3 = 11-20%
1 = 1-5% 4 = 21-50%
2 = 6-10% 5 = >50%

Indicator Class:

+ = Obligate
- = Facultative/Wet
0 = Facultative

Source:

P = Planted
V = Volunteer

Percent of perimeter _____ % developing wetland vegetation – excluding dam/berm structures.

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 a point where water depths or saturation are maximized. Mark this location with another metal fencepost.

Estimate cover within a 10 ft 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.

Notes:

BIRD SURVEY – FIELD DATA SHEET

Page__1_of__1_

Date: 5/22/03

SITE: Jack Johnson - Valier

Survey Time: 0900-1100

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
American coot	20	F	OW, MA				
American robin	2	F	UP				
barn swallow	6	F	OW, MA				
blue-winged teal	10	F	OW, MA				
Canada goose	2	BP	MA, OW				
common snipe	5	F	MA				
common yellowthroat	1	F	MA				
gadwall	3	F	OW, MA				
herring gull	1	FO	UP				
horned lark	2	F	UP				
killdeer	30	F	MF, UP				
lesser scaup	3	F	OW, MA				
long-billed dowitcher	22	F	MA				
mallard	20	F	OW, MA				
northern harrier	1	F	UP				
northern pintail	12	F	OW, MA				
northern rough-winged swallow	10	F	OW, MA				
northern shoveler	10	F	OW, MA				
red head	12	F	OW, MA				
red-winged blackbird	40	N, L	MA				
ring-necked pheasant	1	F	UP				
ruddy duck	10	F	OW, MA				
sora	1	F	MA				
tree swallow	4	N	UP				
western meadowlark	5	L	UP				
Wilson's phalarope	20	F	OW, MA				
yellow-headed blackbird	40	N, L	MA				

Notes:

Main impoundment completely inundated, surf water at all other impoundments

Numerous western chorus frogs vocalizing at main, ne, and sw impoundments – no salamanders obs.

Deer scat on main dike, coyote scat, raccoon tracks in mud flats, muskrat trails – minor burrow in main dike

Dry, sunny, and windy conditions

Bird houses being used by tree swallows.

Behavior: BP – one of a breeding pair; BD – breeding display; F – foraging; FO – flyover; L – loafing; N – nesting

Habitat: 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 shoreline

SITE: Jack Johnson - Valier

Date: 7/28/03

Survey Time: 1630-1830

Notes:
Main impoundment completely inundated, surf water at all other impoundments except NW.
Several BW teal and mallard broods present.
WT deer observed, coyote scat, raccoon tracks in mud flats, muskrat trails – minor burrow in main dike
Hot, dry, sunny, and calm conditions
Some bird houses being used by tree swallows.

Habitat: 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 shoreline

SITE: Jack Johnson - Valier

Date: 10/07/03

Survey Time: 11:00-13:00

Notes:
Main impoundment completely inundated, surf water at all other impoundments except NW.
Portion of site was hayed (uplands only)
Irrigation water is on – diversion dam functional and holding water, screw gate open
Recently planted SAL AMY (16), SAL EXI (1), POP DEL (2), all alive, present at site
Overcast, windy, and dry conditions

Habitat: 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 shoreline

Project/Site:	Jack Johnson Mitigation Site	Project No:	Task 18	Date:	28-Jul-2003
Applicant/Owner:	Montana Department of Transportation			County:	Pondera
Investigators:	Berglund			State:	Montana
				Plot ID:	1

Do Normal Circumstances exist on the site?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Community ID: EM / AB
Is the site significantly disturbed (Atypical Situation)?	<input type="radio"/> Yes <input checked="" type="radio"/> No	Transect ID: SW-1
Is the area a potential Problem Area?	<input type="radio"/> Yes <input checked="" type="radio"/> No	Field Location:
(If needed, explain on the reverse side)		SW Impoundment

[illegible]

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 5/5 = 100.00%	FAC Neutral: 5/5 = 100.00% Numeric Index: 6/5 = 1.20
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Remarks:
Species listed are dominants - little change from previous years.

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

Remarks:
Saturated to surface throughout, with small pockets of surface water

Project/Site:	Jack Johnson Mitigation Site	Project No:	Task 18	Date:	28-Jul-2003
Applicant/Owner:	Montana Department of Transportation			County:	Pondera
Investigators:	Berglund			State:	Montana
				Pilot ID:	1

Map Unit Name (Series and Phase):	Nunemaker silty clay loam 0-4 percent	Mapped Hydric Inclusion?	
Map Symbol:	250b	Drainage Class:	wd
Taxonomy (Subgroup):	fine montmorillonitic ustochrepts	Field Observations Confirm Mapped Type?	Yes No

Profile Description						
Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
10	B	10YR5/1	N/A	N/A	N/A	Clay loam

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

Remarks:

Hydrophytic Vegetation Present?	<input checked="" type="radio"/> Yes	No	Is the Sampling Point within the Wetland?	<input checked="" type="radio"/> Yes	No
Wetland Hydrology Present?	<input checked="" type="radio"/> Yes	No			
Hydric Soils Present?	<input checked="" type="radio"/> Yes	No			

Plot taken at SW impoundment. Site is vestly dominated by Typha. Appeared to receive slightly increased water in 2003 vs. 2002.



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

Project/Site: Jack Johnson Mitigation Site	Project No: Task 18	Date: 28-Jul-2003
Applicant/Owner: Montana Department of Transportation	County: Pondera	
Investigators: Berglund	State: Montana	
	Plot ID: 2	

Do Normal Circumstances exist on the site? Is the site significantly disturbed (Atypical Situation)? Is the area a potential Problem Area? (If needed, explain on the reverse side)	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Yes <input checked="" type="radio"/> No	Community ID: EM/ AB Transect ID: Main-1 Field Location: Main Impdment., midway through transect
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VEGETATION (USFWS Region No. 9)					
Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
<i>Beckmannia syzigachne</i>	Herb	OBL	<i>Myriophyllum spicatum</i>	Herb	OBL
Sloughgrass, American			Water-Milfoil, Eurasian		
<i>Polygonum hydropiperoides</i>	Herb	OBL	<i>Typha latifolia</i>	Herb	OBL
Smartweed, Swamp			Cattail Broad-Leaf		
<i>Eleocharis palustris</i>	Herb	OBL	<i>Alisma gramineum</i>	Herb	OBL
Spikerush, Creeping			Water-Plantain, Narrow-Leaf		
<i>Rumex crispus</i>	Herb	FACW	<i>Polygonum amphibium</i>	Herb	OBL
Dock, Curly			Smartweed, Water		
<i>Potamogeton pectinatus</i>	Herb	OBL	<i>Scirpus maritimus</i>	Herb	OBL
Pondweed, Sago			Bulrush, Saltmarsh		

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 10/10 = 100.00%	FAC Neutral: 10/10 = 100.00% Numeric Index: 11/10 = 1.10
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Remarks:
Species are indicative of west portion of main impoundment, where the plot was taken. This area is much wetter than observed during previous years, with a corresponding shift in plant composition.

HYDROLOGY

YES Recorded Data(Describe in Remarks): <input type="checkbox"/> Stream, Lake or Tide Gauge <input checked="" type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data	Field Observations Depth of Surface Water: = 6 (in.) Depth to Free Water in Pit: N/A (in.) Depth to Saturated Soil: N/A (in.)	Wetland Hydrology Indicators Primary Indicators <input checked="" type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 inches <input type="checkbox"/> Water Marks <input type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators <input type="checkbox"/> Oxidized Root Channels in Upper 12 inches <input type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input checked="" type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other(Explain in Remarks)
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Remarks:
West portion of main impoundment was inundated to 6-8" throughout.

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

Project/Site: Jack Johnson Mitigation Site	Project No: Task 18	Date: 28-Jul-2003
Applicant/Owner: Montana Department of Transportation	County: Pondera	
Investigators: Berglund	State: Montana	
	Plot ID: 2	

SOILS	
Map Unit Name (Series and Phase): Nunemaker pilty clay loam 0-4 percent	Mapped Hydric Inclusion?
Map Symbol: 250b Drainage Class: wd	Field Observations Confirm Mapped Type? Yes <input checked="" type="radio"/> No
Taxonomy (Subgroup): fine montmorillonitic ustochrepts	
Profile Description	

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc
10	B	2.5Y4/1	N/A	N/A	Clay

Hydric Soil Indicators:

<input type="checkbox"/> NO Histosol	<input type="checkbox"/> NO Concretions
<input type="checkbox"/> NO Histic Epipedon	<input type="checkbox"/> NO High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> NO Sulfidic Odor	<input type="checkbox"/> NO Organic Streaking in Sandy Soils
<input type="checkbox"/> NO Aquic Moisture Regime	<input type="checkbox"/> NO Listed on Local Hydric Soils List
<input type="checkbox"/> NO Reducing Conditions	<input type="checkbox"/> NO Listed on National Hydric Soils List
<input checked="" type="checkbox"/> YES Gleyed or Low Chroma Colors	<input type="checkbox"/> NO Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No	Is the Sampling Point within the Wetland? <input checked="" type="radio"/> Yes <input type="radio"/> No
Wetland Hydrology Present? <input checked="" type="radio"/> Yes <input type="radio"/> No	
Hydric Soils Present? <input checked="" type="radio"/> Yes <input type="radio"/> No	

Remarks:
This plot was taken midway through the transect in the west portion of the main impoundment. Site appears much "wetter" than in previous years - inundation has been prolonged and apparently retained since 2002. Hardtail communities have shifted to potamogeton and eleocharis communities.



Project/Site:	Jack Johnson Mitigation Site	Project No:	Task 18	Date:	28-Jul-2003
Applicant/Owner:	Montana Department of Transportation	County:	Pondera	State:	Montana
Investigators:	Berglund	Plot ID:	3		

Do Normal Circumstances exist on the site?	Yes <input checked="" type="radio"/> No <input type="radio"/>	Community ID: EM
Is the site significantly disturbed (Atypical Situation)?	Yes <input type="radio"/> No <input checked="" type="radio"/>	Transect ID: NW-1
Is the area a potential Problem Area?	Yes <input type="radio"/> No <input checked="" type="radio"/>	Field Location:
(If needed, explain on the reverse side)		Northwest depression

(USFWS Region No. 9)

[illegible]

FAC Neutral:	4/6	= 66.67%
Numeric Index:	16/7	= 2.29

HYDROLOGY

Depth of Surface Water: N/A (in.)
Depth to Free Water in Pit: N/A (in.)
Depth to Saturated Soil: N/A (in.)

NO Oxidized Root Channels in Upper 12 Inches
NO Water-Stained Leaves
NO Local Soil Survey Data
YES FAC-Neutral Test
NO Other(Explain in Remarks)

Water marks ~~evident~~, perhaps from snowmelt or recent pat.

Project/Site:	Jack Johnson Mitigation Site	Project No:	Task 18	Date:	28-Jul-2003
Applicant/Owner:	Montana Department of Transportation			County:	Pondera
Investigators:	Berglund			State:	Montana
				Plot ID:	3

Map Unit Name (Series and Phase):	Nunemaker silty clay loam 0-4 percent
Map Symbol: 250b	Drainage Class: wd
Taxonomy (Subgroup): fine montmorillonitic ustochrepts	Mapped Hydric Inclusion?
Profile Description	Field Observations Confirm Mapped Type? <input checked="" type="radio"/> Yes <input type="radio"/> No

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle		Texture, Concretions, Structure, etc
				Abundance/Contrast		
10	B	2.5Y4/2	N/A	N/A	N/A	Clay loam

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

Many obligate species occur at this site, which appears to receive at least minimal wetland hydrology. Soils development may be lagging due to brief periods of inundation.

Hydrophytic Vegetation Present?	<input checked="" type="radio"/> Yes	No	Is the Sampling Point within the Wetland?	<input checked="" type="radio"/> Yes	No
Wetland Hydrology Present?	<input checked="" type="radio"/> Yes	No			
Hydric Soils Present?	<input checked="" type="radio"/> Yes	No			

[This plot was taken at the small depression in the NW corner of the site. Many obligate species occur here, but the site continues to appear as if it is drying out. Addition of surfacewater would greatly rejuvenate this site.]

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

Project/Site: Jack Johnson Mitigation Site	Project No/Task: 18	Date: 28-Jul-2003
Applicant/Owner: Montana Department of Transportation	County: Pondera	State: Montana
Investigator: Berglund	Plot ID: 4	

Do Normal Circumstances exist on the site? is the site significantly disturbed (Atypical Situation)? is the area a potential Problem Area? (If needed, explain on the reverse side)	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Yes <input checked="" type="radio"/> No	Community ID: EM Transect ID: NE-1 Field Location: Northeast Impoundment
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VEGETATION (USFWS Region No. 3)					
Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
<i>Hordeum jubatum</i>	Herb	FAC+	<i>Typha latifolia</i>	Herb	OBL
<i>Barley, Fox-Tail</i>			<i>Cattail Broad-Leaf</i>		
<i>Alopecurus pratensis</i>	Herb	FACW	<i>Scirpus acutus</i>	Herb	OBL
<i>Forst. Meadow</i>			<i>Burnt Hard-Stem</i>		
<i>Echinochloa polystachya</i>	Herb	OBL	<i>Rumex crispus</i>	Herb	FACW
<i>Spike-rush, Creeping</i>			<i>Dock, Curly</i>		
<i>Beckmannia syzigachne</i>	Herb	OBL			
<i>Soughgrass, American</i>					

Percent of Dominant Species that are OBL, FACW or FAC: FAC Neutral: 6/6 = 100.00%
 (excluding FAC-) 7/7 = 100.00% Numeric Index: 11/7 = 1.57

Remarks:

HYDROLOGY	
YES Recorded Data(Describe in Remarks): <u>NO</u> Stream, Lake or Tide Gauge <u>YES</u> Aerial Photographs <u>NO</u> Other <u>NO</u> No Recorded Data	Wetland Hydrology Indicators Primary Indicators <u>YES</u> Inundated <u>YES</u> Saturated in Upper 12 inches <u>YES</u> Water Marks <u>NO</u> Drift Lines <u>NO</u> Sediment Deposits <u>NO</u> Drainage Patterns in Wetlands Secondary Indicators <u>NO</u> Oxidized Root Channels in Upper 12 inches <u>NO</u> Water-Stained Leaves <u>NO</u> Local Soil Survey Data <u>YES</u> FAC-Neutral Tent <u>NO</u> Other(Explain in Remarks)
Field Observations Depth of Surface Water: = 3 (in.) Depth to Free Water in Pit: NA (in.) Depth to Saturated Soil: NA (in.)	
Remarks: The northwest 1/4 of the area was inundated during the July delineation, with the remainder excluded.	

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

Project/Site: Jack Johnson Mitigation Site	Project No/Task: 18	Date: 28-Jul-2003
Applicant/Owner: Montana Department of Transportation	County: Pondera	State: Montana
Investigator: Berglund	Plot ID: 4	

SOILS

Map Unit Name (Series and Phase): Hummer silt clay loam 0-4 percent	Mapped Hydric Inclusion?
Map Symbol: 250b Drainage Class: wd	Field Observations Confirm Mapped Type? Yes <input checked="" type="radio"/> No
Taxonomy (Subgroup): fine montmorillonitic ustochrepts	
Profile Description	

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc
10	S	2.5Y4/2	2.5YR5/6	Few Faint	Clay

Hydric Soil Indicators: <u>NO</u> Histosol <u>NO</u> Histic Epipedon <u>NO</u> Sulfidic Odor <u>NO</u> Aquic Moisture Regime <u>NO</u> Reducing Conditions <u>YES</u> Gleyed or Low Chroma Colors	NO Concretions <u>NO</u> High Organic Content in Surface Layer in Sandy Soils <u>NO</u> Organic Swelling in Sandy Soils <u>NO</u> Listed on Local Hydric Soils List <u>NO</u> Listed on National Hydric Soils List <u>NO</u> Other (Explain in Remarks)
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Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No	Is the Sampling Point within the Wetland? <input checked="" type="radio"/> Yes <input type="radio"/> No
Wetland Hydrology Present? <input checked="" type="radio"/> Yes <input type="radio"/> No	
Hydric Soils Present? <input checked="" type="radio"/> Yes <input type="radio"/> No	

Remarks:
 (This plot was taken in the northeast impoundment. About 1/4 of the area was inundated during the delineation. Aquatic soil communities may re-establish at this site with the improved hydrology.)



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

1. Project Name: Johnson-Valier Wetland Mitigation Site 2. Project #: F-44(3)14 Control #: NA

3. Evaluation Date: 7/28/2003 4. Evaluator(s): Berglund 5. Wetland / Site #(s): Main Impoundment

6. Wetland Location(s) i. T: 30 N R: 5 W S: 20 T: N R: E S:

ii. Approx. Stationing / Mileposts: MP 5, Highway 358, 4 miles north of Valier

iii. Watershed: 10030201 GPS Reference No. (if applies): NA

Other Location Information: Marias Watershed (#8)

7. A. Evaluating Agency MDT 8. Wetland Size (total acres): (visually estimated)
16.92 (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)
16.92 (measured, e.g. GPS)

Comments: Main Impoundment at mitigation 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	Seasonally Flooded	Impounded	50
Depression	Palustrine	None	Aquatic Bed	Semipermanently Flooded	Impounded	50
---	---	---	---	---	---	---
---	---	---	---	---	---	---

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

Comments:

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.	---	---	moderate 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.) adjacent wheat production

ii. Prominent weedy, alien, & introduced species: CIR ARV, LAC SER, SAL IBE, DAC GLO, AGR CRI, PHL PRA, EUR ESU

iii. Briefly describe AA and surrounding land use / habitat: Large marsh surrounded by upland grassland and agricultural lands.

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:

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 Bald Eagle
 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 and Rating	---	---	---	---	---	.3 (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 Northern Leopard Frog
 Secondary habitat (list species) ☐ D ☐ S _____
 Incidental habitat (list species) ☐ D ☐ S _____
 No usable habitat ☐ D ☐ S _____

iii. 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 and Rating	---	---	---	---	---	---	---

If documented, list the source (e.g., observations, records, etc.): Leopard frogs observed during 2001, but not 2002 or 2003. 100's of chorus frogs observed 2003, suspect leopard frogs present.

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 appropriate AA attributes to determine the exceptional (E), high (H), moderate (M), or low (L)

rating. Structural diversity is from #13. For class cover to be considered evenly distributed, vegetated classes must be within 20% of each other in terms of

their percent composition in the AA (see #10). Duration of Surface Water: P/P = permanent/perennial; S/I = seasonal/intermittent;

T/E = temporary/ephemeral; A = absent.

Structural Diversity (from #13)	<input type="checkbox"/> High								<input checked="" type="checkbox"/> Moderate								<input type="checkbox"/> Low			
Class Cover Distribution (all vegetated classes)	<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input checked="" type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input type="checkbox"/> 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)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	H	--	--	--	--	--	--	--	--	--	--
High disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

Evidence of Wildlife Use from 14C(i)	Wildlife Habitat Features Rating from 14C(ii)			
	<input type="checkbox"/> Exceptional	<input checked="" type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
Substantial	--	.9 (H)	--	--
Moderate	--	--	--	--
Low	--	--	--	--

Comments: 100's of chorus frogs, numerous waterfowl and shorebirds.

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, 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 pick the exceptional (E), high (H), moderate (M), or low (L) quality rating.

Duration of Surface Water in AA	<input type="checkbox"/> Permanent/Perennial			<input type="checkbox"/> Seasonal / Intermittent			<input type="checkbox"/> 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 pick the functional point and rating of exceptional (E), high (H), moderate (M), or low (L).)

Types of Fish Known or Suspected Within AA	Modified Habitat Quality from 14D(ii)			
	<input type="checkbox"/> Exceptional	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
Native game fish	--	--	--	--
Introduced game fish	--	--	--	--
Non-game fish	--	--	--	--
No fish	--	--	--	--

Comments: _____

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

Applies only to wetlands subject to flooding via in-channel or overbank flow.

If wetlands in AA do not flooded from in-channel or overbank flow, check NA above.

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

Estimated wetland area in AA subject to periodic flooding	<input checked="" type="checkbox"/> ≥ 10 acres			<input type="checkbox"/> <10, >2 acres			<input type="checkbox"/> ≤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: Floods via canal - somewhat "artificial".**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, 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.)

Abbreviations: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral.

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding.	<input checked="" type="checkbox"/> >5 acre feet			<input type="checkbox"/> <5, >1 acre feet			<input type="checkbox"/> ≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond ≥ 5 out of 10 years	--	.9 (H)	--	--	--	--	--	--	--
Wetlands in AA flood or pond < 5 out of 10 years	--	--	--	--	--	--	--	--	--

Comments: _____

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

Applies to wetlands with 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	<input checked="" type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%		<input type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%	
Evidence of flooding or ponding in AA	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
AA contains no or restricted outlet	1 (H)	--	--	--	--	--	--	--
AA contains unrestricted outlet	--	--	--	--	--	--	--	--

Comments: Agricultural runoff.

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, check NA above.

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

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses.	Duration of Surface Water Adjacent to Rooted Vegetation		
	<input type="checkbox"/> Permanent / Perennial	<input checked="" type="checkbox"/> Seasonal / Intermittent	<input type="checkbox"/> Temporary / Ephemeral
≥ 65 %	--	--	--
35-64 %	--	.6 (M)	--
< 35 %	--	--	--

Comments: Wave action applies.

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

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

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

A	<input checked="" type="checkbox"/> Vegetated component >5 acres						<input type="checkbox"/> Vegetated component 1-5 acres						<input type="checkbox"/> Vegetated component <1 acre					
B	<input type="checkbox"/> High		<input checked="" type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low	
C	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N
P/P	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S/I	--	--	.8H	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T/E/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Comments: _____

14J. GROUNDWATER DISCHARGE/RECHARGE (D/R) (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 _____

iii. **Rating:** Use the 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	--
No Discharge/Recharge indicators present	0.1 (L)
Available Discharge/Recharge information inadequate to rate AA D/R potential	--

Comments: _____

14K. UNIQUENESS

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

Replacement Potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland or plant association listed as "S1" by the MTNHP.			AA does not contain previously cited rare types and structural diversity (#13) is high or contains plant association listed as "S2" by the MTNHP.			AA does not contain previously cited rare types or associations and structural diversity (#13) is low-moderate.		
Estimated Relative Abundance from #11	<input type="checkbox"/> rare	<input checked="" type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant
Low disturbance at AA (#12i)	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (#12i)	--	.8H	--	--	--	--	--	--	--
High disturbance at AA (#12i)	--	--	--	--	--	--	--	--	--

Comments: POT PEC / MYR SPI community present - designated "S1Q" by MNHP.

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 in 14L(iv)]

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

Ownership	Disturbance at AA from #12(i)		
	<input type="checkbox"/> Low	<input checked="" type="checkbox"/> Moderate	<input type="checkbox"/> High
Public ownership	--	--	--
Private ownership	--	.3(L)	--

Comments: Possible education value - close to Valier, but private land.

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	0.30	1	
B. MT Natural Heritage Program Species Habitat	High	0.80	1	
C. General Wildlife Habitat	High	0.90	1	
D. General Fish/Aquatic Habitat	NA	0.00	--	
E. Flood Attenuation	Mod	0.60	1	
F. Short and Long Term Surface Water Storage	High	0.90	1	
G. Sediment/Nutrient/Toxicant Removal	High	1.00	1	
H. Sediment/Shoreline Stabilization	Mod	0.60	1	
I. Production Export/Food Chain Support	High	0.80	1	
J. Groundwater Discharge/Recharge	Low	0.10	1	
K. Uniqueness	High	0.80	1	
L. Recreation/Education Potential	Low	0.30	1	
Totals:		7.10	11	
Percent of Total Possible Points:		65% (Actual / Possible) x 100 [rd to nearest whole #]		

Category I Wetland: (Must satisfy one of the following criteria. If not proceed to Category II.) <input type="checkbox"/> Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; or <input type="checkbox"/> Score of 1 functional point for Uniqueness; or <input type="checkbox"/> Score of 1 functional point for Flood Attenuation and answer to Question 14E(ii) is "yes"; or <input type="checkbox"/> 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.) <input type="checkbox"/> Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; or <input checked="" type="checkbox"/> Score of .9 or 1 functional point for General Wildlife Habitat; or <input type="checkbox"/> Score of .9 or 1 functional point for General Fish/Aquatic Habitat; or <input type="checkbox"/> "High" to "Exceptional" ratings for both General Wildlife Habitat and General Fish / Aquatic Habitat; or <input type="checkbox"/> Score of .9 functional point for Uniqueness; or <input checked="" type="checkbox"/> Percent of total possible points is > 65%.
<input type="checkbox"/> 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 <u>all</u> of the following criteria are met; If not satisfied, proceed to Category III.) <input type="checkbox"/> "Low" rating for Uniqueness; and <input type="checkbox"/> "Low" rating for Production Export / Food Chain Support; and <input type="checkbox"/> 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**

1. Project Name: Johnson-Valier Wetland Mitigation Site 2. Project #: F-44(3)14 Control #: NA

3. Evaluation Date: 7/28/2003 4. Evaluator(s): Berglund 5. Wetland / Site #(s): SW & NE impounds.

6. Wetland Location(s) i. T: 30 N R: 5 W S: 20 T: __ N R: __ E S: _____

ii. Approx. Stationing / Mileposts: MP 5, Highway 358, 4 miles north of Valier, at southwest and northeast impoundments on site.

iii. Watershed: 10030201 GPS Reference No. (if applies): NA

Other Location Information: Marias Watershed (#8)

7. A. Evaluating Agency MDT

8. Wetland Size (total acres): 2.5 (visually estimated)
(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): 2.5 (visually estimated)
 _____ (measured, e.g. GPS)
 Comments: Each impoundment about 2.5 acres.

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	Seasonally Flooded	Impounded	95
Depression	Palustrine	None	Aquatic Bed	Semipermanently Flooded	Impounded	5
---	---	---	---	---	---	
---	---	---	---	---	---	

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

Comments: _____

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.	---	---	moderate 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.) adjacent wheat production

ii. **Prominent weedy, alien, & introduced species:** CIR ARV, LAC SER, SAL IBE, DAC GLO, AGR CRI, PHL PRA, EUR ESU

iii. Briefly describe AA and surrounding land use / habitat: Large marshes in SW and NE corners of site surrounded by upland grassland and agricultural lands.

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:



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

iv. 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 _____

v. 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 and 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).

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

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

vi. 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 and Rating	---	---	---	---	---	---	---

If documented, list the source (e.g., observations, records, etc.): Leopard frogs observed during 2001, but not 2002 or 2003. Suspect leopard frogs present.

14C. General Wildlife Habitat Rating

ii. 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 appropriate AA attributes to determine the exceptional (E), high (H), moderate (M), or low (L)

rating. Structural diversity is from #13. For class cover to be considered evenly distributed, vegetated classes must be within 20% of each other in terms of

their percent composition in the AA (see #10). Duration of Surface Water: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; A = absent.

Structural Diversity (from #13)	<input type="checkbox"/> High								<input checked="" type="checkbox"/> Moderate								<input type="checkbox"/> Low			
Class Cover Distribution (all vegetated classes)	<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input type="checkbox"/> Even				<input checked="" type="checkbox"/> Uneven				<input type="checkbox"/> 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)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	M	--	--	--	--	--	--
High disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

Evidence of Wildlife Use from 14C(i)	Wildlife Habitat Features Rating from 14C(ii)			
	<input type="checkbox"/> Exceptional	<input type="checkbox"/> High	<input checked="" type="checkbox"/> Moderate	<input type="checkbox"/> Low
Substantial	--	--	--	--
Moderate	--	--	.5 (M)	--
Low	--	--	--	--

Comments: Numerous red-winged and yellow-headed blackbirds, scattered shorebirds.



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, 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 pick the exceptional (E), high (H), moderate (M), or low (L) quality rating.)

Duration of Surface Water in AA	<input type="checkbox"/> Permanent/Perennial			<input type="checkbox"/> Seasonal / Intermittent			<input type="checkbox"/> 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 pick the functional point and rating of exceptional (E), high (H), moderate (M), or low (L).)

Types of Fish Known or Suspected Within AA	Modified Habitat Quality from 14D(ii)			
	<input type="checkbox"/> Exceptional	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
Native game fish	--	--	--	--
Introduced game fish	--	--	--	--
Non-game fish	--	--	--	--
No fish	--	--	--	--

Comments: _____

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

Applies only to wetlands subject to flooding via in-channel or overbank flow.

If wetlands in AA do not flooded from in-channel or overbank flow, check NA above.

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

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

ii. **Are residences, businesses, or other features which may be significantly damaged by floods located within 0.5 miles downstream of the AA?** (check)☐ **Y** ☐ **N** Comments: Floods via canal - somewhat "artificial".**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, 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.)

Abbreviations: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral.

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding.	<input type="checkbox"/> >5 acre feet			<input type="checkbox"/> <5, >1 acre feet			<input checked="" type="checkbox"/> ≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond ≥ 5 out of 10 years	--	--	--	--	--	--	--	.3 (L)	--
Wetlands in AA flood or pond < 5 out of 10 years	--	--	--	--	--	--	--	--	--

Comments: _____

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

Applies to wetlands with 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	<input checked="" type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%		<input type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%	
Evidence of flooding or ponding in AA	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
AA contains no or restricted outlet	1 (H)	--	--	--	--	--	--	--
AA contains unrestricted outlet	--	--	--	--	--	--	--	--

Comments: Agricultural runoff.

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, check NA above.

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

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses.	Duration of Surface Water Adjacent to Rooted Vegetation		
	<input type="checkbox"/> Permanent / Perennial	<input type="checkbox"/> Seasonal / Intermittent	<input type="checkbox"/> Temporary / Ephemeral
≥ 65 %	--	--	--
35-64 %	--	--	--
< 35 %	--	--	--

Comments: _____

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

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

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

A	<input type="checkbox"/> Vegetated component >5 acres						<input checked="" type="checkbox"/> Vegetated component 1-5 acres						<input type="checkbox"/> Vegetated component <1 acre					
B	<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input checked="" type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low	
C	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N
P/P	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S/I	--	--	--	--	--	--	--	--	.7M	--	--	--	--	--	--	--	--	--
T/E/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Comments: _____

14J. GROUNDWATER DISCHARGE/RECHARGE (D/R) (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 _____

iii. **Rating:** Use the 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	--
No Discharge/Recharge indicators present	0.1 (L)
Available Discharge/Recharge information inadequate to rate AA D/R potential	--

Comments: _____

14K. UNIQUENESS

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

Replacement Potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland or plant association listed as "S1" by the MTNHP.			AA does not contain previously cited rare types and structural diversity (#13) is high or contains plant association listed as "S2" by the MTNHP.			AA does not contain previously cited rare types or associations and structural diversity (#13) is low-moderate.		
Estimated Relative Abundance from #11	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input checked="" type="checkbox"/> common	<input type="checkbox"/> abundant
Low disturbance at AA (#12i)	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (#12i)	--	--	--	--	--	--	--	.3L	--
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 in 14L(iv)]

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

Ownership	Disturbance at AA from #12(i)		
	<input type="checkbox"/> Low	<input checked="" type="checkbox"/> Moderate	<input type="checkbox"/> High
Public ownership	--	--	--
Private ownership	--	.3(L)	--

Comments: Possible education value - close to Valier, but private land.

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	High	0.80	1	
C. General Wildlife Habitat	Mod	0.50	1	
D. General Fish/Aquatic Habitat	NA	0.00	--	
E. Flood Attenuation	Mod	0.50	1	
F. Short and Long Term Surface Water Storage	Low	0.30	1	
G. Sediment/Nutrient/Toxicant Removal	High	1.00	1	
H. Sediment/Shoreline Stabilization	NA	0.00	--	
I. Production Export/Food Chain Support	Mod	0.70	1	
J. Groundwater Discharge/Recharge	Low	0.10	1	
K. Uniqueness	Low	0.30	1	
L. Recreation/Education Potential	Low	0.30	1	
Totals:		4.5	10.00	
Percent of Total Possible Points:		45% (Actual / Possible) x 100 [rd to nearest whole #]		

Category I Wetland: (Must satisfy one of the following criteria. If not proceed to Category II.) <input type="checkbox"/> Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; or <input type="checkbox"/> Score of 1 functional point for Uniqueness; or <input type="checkbox"/> Score of 1 functional point for Flood Attenuation and answer to Question 14E(ii) is "yes"; or <input type="checkbox"/> 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.) <input type="checkbox"/> Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; or <input type="checkbox"/> Score of .9 or 1 functional point for General Wildlife Habitat; or <input type="checkbox"/> Score of .9 or 1 functional point for General Fish/Aquatic Habitat; or <input type="checkbox"/> "High" to "Exceptional" ratings for both General Wildlife Habitat and General Fish / Aquatic Habitat; or <input type="checkbox"/> Score of .9 functional point for Uniqueness; or <input type="checkbox"/> Percent of total possible points is > 65%.
<input checked="" type="checkbox"/> 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 <u>all</u> of the following criteria are met; If not satisfied, proceed to Category III.) <input type="checkbox"/> "Low" rating for Uniqueness; and <input type="checkbox"/> "Low" rating for Production Export / Food Chain Support; and <input type="checkbox"/> 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**

1. Project Name: Johnson-Valier Wetland Mitigation Site 2. Project #: F-44(3)14 Control #: NA

3. Evaluation Date: 7/28/2003 4. Evaluator(s): Berglund 5. Wetland / Site #(s): small depressions

6. Wetland Location(s) i. T: 30 N R: 5 W S: 20 T: __ N R: __ E S: _____

ii. Approx. Stationing / Mileposts: MP 5, Highway 358, 4 miles north of Valie.

iii. Watershed: 10030201 GPS Reference No. (if applies): NA

Other Location Information: Marias Watershed (#8), at 2 small depressions in w/sw and nw portions of site - each <0.5 acre.

8. Wetland Size (total acres): 0.5 (visually estimated)
 _____ (measured, e.g. GPS)

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

9. Assessment Area (total acres): 0.5 (visually estimated)
 _____ (measured, e.g. GPS)

Comments: Each depression < 0.5 acres.

HGM CLASS ¹	SYSTEM ²	SUBSYSTEM ²	CLASS ²	WATER REGIME ²	MODIFIER ²	% OF AA
Depression	Palustrine	None	Emergent Wetland	Seasonally Flooded	Impounded	100
---	---	---	---	---	---	
---	---	---	---	---	---	
---	---	---	---	---	---	

Comments: _____

Common **Comments:** _____

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.	---	---	moderate 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.	---	---	---

ii. **Prominent weedy, alien, & introduced species:** CIR ARV, LAC SER, SAL IBE, DAC GLO, AGR CRI, PHL PRA, EUR ESU

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

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:

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

vii. 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 _____

viii. 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 and 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).

iii. 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 Northern Leopard Frog
 No usable habitat ☐ D ☐ S _____

ix. 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 and Rating	---	---	---	---	---	---	---

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

14C. General Wildlife Habitat Rating

iii. 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 appropriate AA attributes to determine the exceptional (E), high (H), moderate (M), or low (L)

rating. Structural diversity is from #13. For class cover to be considered evenly distributed, vegetated classes must be within 20% of each other in terms of

their percent composition in the AA (see #10). Duration of Surface Water: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; A = absent.

Structural Diversity (from #13)	<input type="checkbox"/> High								<input type="checkbox"/> Moderate								<input checked="" type="checkbox"/> Low			
Class Cover Distribution (all vegetated classes)	<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input checked="" type="checkbox"/> 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)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	M	--	--
High disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

Evidence of Wildlife Use from 14C(i)	Wildlife Habitat Features Rating from 14C(ii)			
	<input type="checkbox"/> Exceptional	<input type="checkbox"/> High	<input checked="" type="checkbox"/> Moderate	<input type="checkbox"/> Low
Substantial	--	--	--	--
Moderate	--	--	--	--
Low	--	--	.2 (L)	--

Comments: _____

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, 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 pick the exceptional (E), high (H), moderate (M), or low (L) quality rating.

Duration of Surface Water in AA	<input type="checkbox"/> Permanent/Perennial			<input type="checkbox"/> Seasonal / Intermittent			<input type="checkbox"/> 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 pick the functional point and rating of exceptional (E), high (H), moderate (M), or low (L).)

Types of Fish Known or Suspected Within AA	Modified Habitat Quality from 14D(ii)			
	<input type="checkbox"/> Exceptional	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
Native game fish	--	--	--	--
Introduced game fish	--	--	--	--
Non-game fish	--	--	--	--
No fish	--	--	--	--

Comments: _____

14E. FLOOD ATTENUATION☒ **NA** (proceed to 14G)

Applies only to wetlands subject to flooding via in-channel or overbank flow.

If wetlands in AA do not flooded from in-channel or overbank flow, check NA above.

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

Estimated wetland area in AA subject to periodic flooding	<input type="checkbox"/> ≥ 10 acres			<input type="checkbox"/> <10, >2 acres			<input type="checkbox"/> ≤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	--	--	--	--	--	--	--	--	--
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: _____**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, 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.)

Abbreviations: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral.

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding.	<input type="checkbox"/> >5 acre feet			<input type="checkbox"/> <5, >1 acre feet			<input checked="" type="checkbox"/> ≤1 acre foot		
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	--	--	--	--	--	--	--	--	--
Wetlands in AA flood or pond < 5 out of 10 years	--	--	--	--	--	--	--	.2 (L)	--

Comments: _____

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

Applies to wetlands with 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	<input type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%		<input type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%	
Evidence of flooding or ponding in AA	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
AA contains no or restricted outlet	--	--	--	--	--	--	--	--
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, check NA above.

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

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses.	Duration of Surface Water Adjacent to Rooted Vegetation		
	<input type="checkbox"/> Permanent / Perennial	<input type="checkbox"/> Seasonal / Intermittent	<input type="checkbox"/> Temporary / Ephemeral
≥ 65 %	--	--	--
35-64 %	--	--	--
< 35 %	--	--	--

Comments: _____

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

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

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

A	<input type="checkbox"/> Vegetated component >5 acres						<input checked="" type="checkbox"/> Vegetated component 1-5 acres						<input checked="" type="checkbox"/> Vegetated component <1 acre					
B	<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input checked="" type="checkbox"/> Low	
C	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N
P/P	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S/I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.3L	--
T/E/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Comments: _____

14J. GROUNDWATER DISCHARGE/RECHARGE (D/R) (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 _____

iii. **Rating:** Use the 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	--
No Discharge/Recharge indicators present	0.1 (L)
Available Discharge/Recharge information inadequate to rate AA D/R potential	--

Comments: _____

14K. UNIQUENESS

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

Replacement Potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland or plant association listed as "S1" by the MTNHP.			AA does not contain previously cited rare types and structural diversity (#13) is high or contains plant association listed as "S2" by the MTNHP.			AA does not contain previously cited rare types or associations and structural diversity (#13) is low-moderate.		
Estimated Relative Abundance from #11	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input checked="" type="checkbox"/> common	<input type="checkbox"/> abundant
Low disturbance at AA (#12i)	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (#12i)	--	--	--	--	--	--	--	.3L	--
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 in 14L(iv)]

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

Ownership	Disturbance at AA from #12(i)		
	<input type="checkbox"/> Low	<input checked="" type="checkbox"/> Moderate	<input type="checkbox"/> High
Public ownership	--	--	--
Private ownership	--	--	.1(L)

Comments: _____

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	0.10	1	
C. General Wildlife Habitat	Low	0.20	1	
D. General Fish/Aquatic Habitat	NA	0.00	--	
E. Flood Attenuation	NA	0.00	--	
F. Short and Long Term Surface Water Storage	Low	0.20	1	
G. Sediment/Nutrient/Toxicant Removal	NA	0.00	--	
H. Sediment/Shoreline Stabilization	NA	0.00	--	
I. Production Export/Food Chain Support	Low	0.30	1	
J. Groundwater Discharge/Recharge	Low	0.10	1	
K. Uniqueness	Low	0.30	1	
L. Recreation/Education Potential	Low	0.10	1	
Totals:		<u>1.30</u>	<u>8.00</u>	
Percent of Total Possible Points:		<u>16%</u> (Actual / Possible) x 100 [rd to nearest whole #]		

Category I Wetland: (Must satisfy one of the following criteria. If not proceed to Category II.) <input type="checkbox"/> Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; or <input type="checkbox"/> Score of 1 functional point for Uniqueness; or <input type="checkbox"/> Score of 1 functional point for Flood Attenuation and answer to Question 14E(ii) is "yes"; or <input type="checkbox"/> 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.) <input type="checkbox"/> Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; or <input type="checkbox"/> Score of .9 or 1 functional point for General Wildlife Habitat; or <input type="checkbox"/> Score of .9 or 1 functional point for General Fish/Aquatic Habitat; or <input type="checkbox"/> "High" to "Exceptional" ratings for both General Wildlife Habitat and General Fish / Aquatic Habitat; or <input type="checkbox"/> Score of .9 functional point for Uniqueness; or <input type="checkbox"/> Percent of total possible points is > 65%.
<input type="checkbox"/> 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 <u>all</u> of the following criteria are met; If not satisfied, proceed to Category III.) <input checked="" type="checkbox"/> "Low" rating for Uniqueness; and <input checked="" type="checkbox"/> "Low" rating for Production Export / Food Chain Support; and <input checked="" type="checkbox"/> 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

REPRESENTATIVE PHOTOGRAPHS PRE-PROJECT THROUGH 2003 AERIAL PHOTOGRAPHS

MDT Wetland Mitigation Monitoring
Johnson-Valier
Valier, Montana

	
<p>Photo point 1, SW impoundment, facing 95 degrees E.</p>	<p>Photo point 2, main impoundment, facing 130 degrees SE.</p>
	
<p>Photo point 3, main impoundment, facing 286 degrees W/NW.</p>	<p>Photo point 4, northeast impoundment, facing 242 degrees SW.</p>
	
<p>Transect Start, facing down-transect 153 degrees SE.</p>	<p>Transect End, facing up-transect 333 degrees NW.</p>



Photo 1: Pre-Construction (undated).



Photo 2: July 11, 2000
"Normal" condition.



Photo 3: July 16, 2001
Drought condition.



Photo 4: July 23, 2002
Recovering from drought condition.

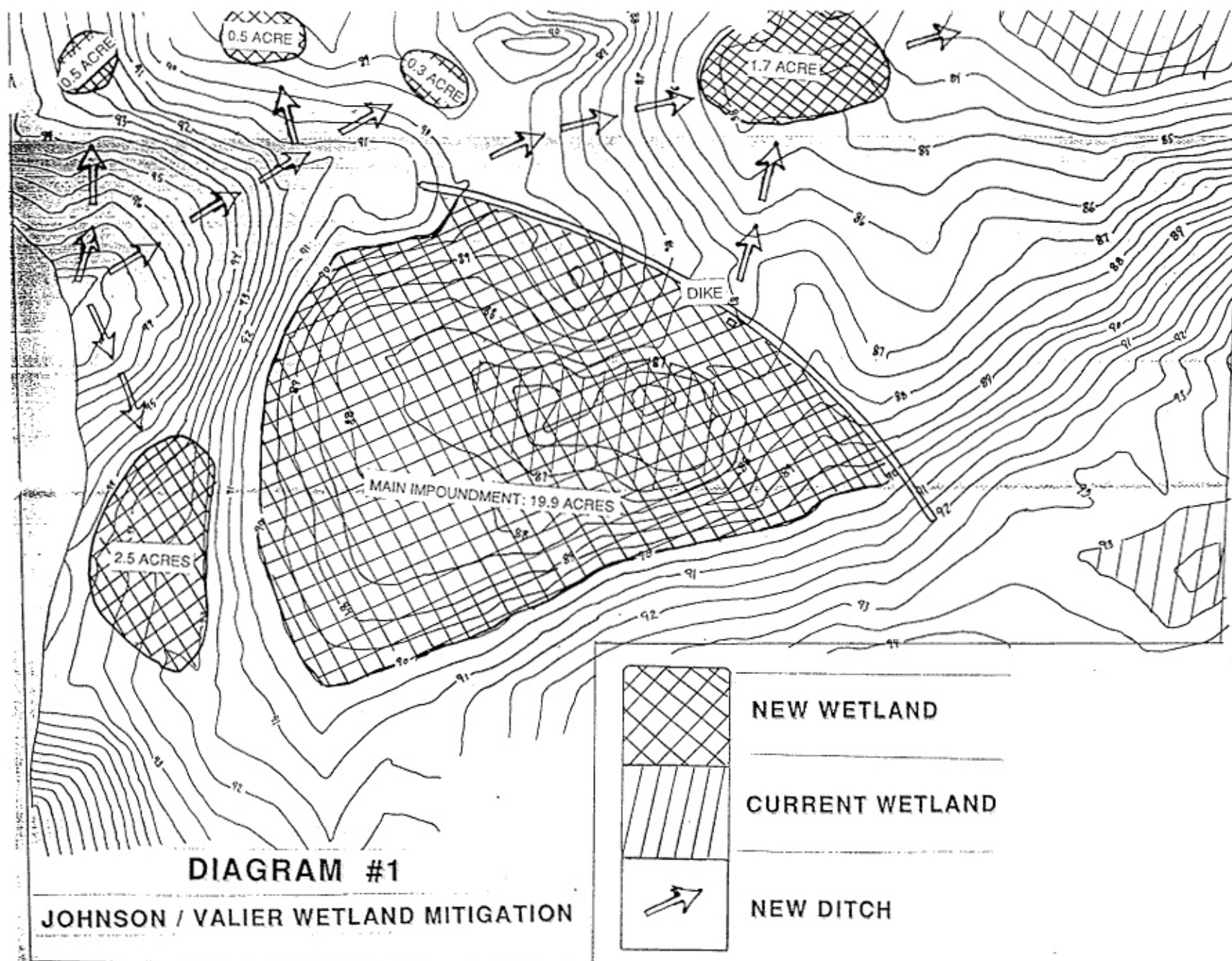


Photo 5: July 27, 2003
"Normal" condition.

Appendix D

MAP OF PROPOSED IMPOUNDMENT AREAS FROM VAN HOOK (1994)

MDT Wetland Mitigation Monitoring
Johnson-Valier
Valier, Montana



Appendix E

BIRD SURVEY PROTOCOL GPS PROTOCOL

*MDT Wetland Mitigation Monitoring
Johnson-Valier
Valier, Montana*

BIRD SURVEY PROTOCOL

The following is an outline of the MDT Wetland Mitigation Site Monitoring Bird Survey Protocol. Though each site is vastly different, the bird survey data collection methods must be standardized to a certain degree to increase repeatability. An Area Search within a restricted time frame will be used to collect the following data: a bird species list, density, behavior, and habitat-type use. There will be some decisions that team members must make to fit the protocol to their particular site. Each of the following sections and the desired result describes the protocol established to reflect bird species use over time.

Species Use within the Mitigation Wetland: Survey Method

Result: To conduct a bird survey of the wetland mitigation site within a restricted period of time and the budget allotment.

Sites that can be circumambulated or walked throughout.

These types of sites will include ponds, enhanced historic river channels, wet meadows, and any area that can be surveyed from the entirety of its perimeter or walked throughout. If the wetland is not uncomfortably inundated, conduct several “meandering” transects through the site in an orderly fashion (record the number and approximate location/direction of the transects in the field notebook; they do not have to be formalized or staked). If a very small portion of the site cannot be crossed due to inundation, this method will also apply. Though the sizes of the site vary, each site will require surveying to the fullest extent possible within a set time limit. The optimum times to conduct the survey are in the morning hours. Conduct the survey from sunrise to no later than 11:00 AM. (Note: some sites may have to be surveyed in the late afternoon or evening due to time constraints or weather; if this is the case, record the time of day and include this information in your report discussion.) If the survey is completed before 11:00 AM and no additions are being made to the list, then the task is complete. The overall limiting factor regarding the number of hours that are spent conducting this survey is the number of budgeted hours; this determination must be made by site by each individual.

In many cases, binoculars will be the only instrument that is needed to identify and count the birds using the wetland. If the wetland includes deep water habitat that can not be assessed with binoculars, then a scope and tripod are necessary. If this is the case, establish as many lookout posts as necessary from key vantage points to collect the data. Depending on the size of the open water, more time may be spent viewing the mitigation area from these vantage points than is spent walking the peripheries of more shallow-water wetlands.

Sites that cannot be circumambulated.

These types of sites will include large-bodied waters, such as reservoirs, particularly those with deep water habitat (>6 ft) close to the shore and no wetland development in that area of the shoreline. If one area of the reservoir was graded in such a way to create or enhance the development of a wetland, then that will be the area in which the ambulatory bird survey is conducted. The team member must then determine the length of the shoreline that will be surveyed during each visit.

As stated above in the ambulatory site section, these large sites most likely will have to be surveyed from established vantage points.

Species Use within the Mitigation Wetland: Data Recording

Result: A complete list of bird species using the site, an estimate of bird densities and associated behaviors, and identification of habitat use.

1. Bird Species List

Record the bird species on the Bird Survey - Field Data Sheet using the appropriate 4-letter code of the common name. The coding uses the first two letters of the first two words of the birds' common name or if one name, the first four (4) letters. For example, mourning dove is coded MODO and mallard is MALL. If an unknown individual is observed, use the following protocol and define your abbreviation at the bottom of the field data sheet: unknown shorebird: UNSB; unknown brown bird (UNBR); unknown warbler (UNWA); unknown waterfowl (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 parentheses; do not fill in the habitat column. For example, a flock of black, medium-sized birds could be coded: UNBB / FO (25). You may also note on the data sheet if that particular individual is using a constructed nest box.

2. Bird Density

In the office, sum the Bird Survey – Field Data Sheet data by species and by behavior. Record this data in the Bird Summary Table.

3. Bird Behavior

Bird behavior must be identified by what is known. When a species is simply observed, the behavior that it is immediately exhibiting is what is recorded. Only behaviors that have discreet descriptive terms should be used. The following terms are recommended: breeding pair individual (BP); foraging (F); flyover (FO); loafing (L; e.g. sleeping, roosting, floating with head tucked under wing are loafing behaviors); and, nesting (N). If more behaviors are observed that do have a specific descriptive word, use them and we will add it to the protocol; descriptive words or phrases such as “migrating” or “living on site” are unknown behaviors.

4. Bird Species Habitat Use

We are interested in what bird species are using which particular habitat within the mitigation wetlands. This data is easily collected by simply recording what habitat the species was initially observed. Use the following broad category habitat classifications: aquatic bed (AB - rooted floating, floating-leaved, or submergent vegetation); forested (FO); marsh (MA – cattail, bulrush, emergent vegetation, etc. with surface water); open water (OW – primarily unvegetated); scrub-shrub (SS); and upland buffer (UP); wet meadow (WM – sedges, rushes, grasses with little to no surface water). If other categories are observed onsite that are not suggested here, we will make a new category next year.

GPS Mapping and Aerial Photo Referencing Procedure

The wetland boundaries, photograph location points and sampling locations were field located with mapping grade Trimble Geo III GPS units. The data was collected with a minimum of three positions per feature using Course/Acquisition code. The collected data was then transferred to a PC and differentially corrected to the nearest operating Community Base Station. The corrected data was then exported to ACAD drawings in Montana State Plain Coordinates NAD 83 international feet.

The GPS positions collected and processed had a 68% accuracy of 7 feet except in isolated areas of Tasks .008 and .011, where it went to 12 feet. This is within the 1 to 5 meter range listed as the expected accuracy of the mapping grade Trimble GPS.

Aerial reference points were used to position the aerial photographs. This positioning did not remove the distortion inherent in all photos; this imagery is to be used as a visual aide only. The located wetland boundaries were given a final review by the wetland biologist and adjustments were made if necessary.

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

MACROINVERTEBRATE SAMPLING PROTOCOL AND DATA

MDT Wetland Mitigation Monitoring

Johnson-Valier

Valier, Montana

AQUATIC INVERTEBRATE SAMPLING PROTOCOL

Equipment List

- D-frame sampling net with 1 mm mesh. Wildco is a good source of these.
- Spare net.
- 1-liter plastic sample jars, wide-mouth. VWR has these: catalog #36319-707.
- 95% ethanol: Northwest Scientific in Billings carries this.

All these other things are generally available at hardware or sporting goods stores. Make the labels on an ink jet printer preferably.

- hip waders.
- pre-printed sample labels (printed on Rite-in-the-Rain or other coated paper, two labels per sample).
- pencil.
- plastic pail (3 or 5 gallon).
- large tea strainer or framed screen.
- towel.
- tape for affixing label to jar.
- cooler with ice for sample storage.

Site Selection

Select the sampling site with these considerations in mind:

- Select a site accessible with hip waders. If substrates are too soft, lay a wide board down to walk on.
- Determine a location that is representative of the overall condition of the wetland.

Sampling

Wetland invertebrates inhabit the substrate, the water column, the stems and leaves of aquatic vegetation, and the water surface. Your goal is to sweep the collecting net through each of these habitat types, and then to combine the resulting samples into the 1-liter sample jar.

Dip out about a gallon of water into the pail. Pour about a cup of ethanol into the sample jar. Fill out the top half of the sample labels, using pencil, since ink will dissolve in the ethanol.

Ideally, you can sample a swath of water column from near-shore outward to a depth of approximately 3 feet with a long sweep of the net, keeping the net at about half the depth of the water throughout the sweep. Sweep the water surface as well. Pull the net through a vegetated area, beneath the water surface, for at least a meter of distance.

Sample the substrate by pulling the net along the bottom, bumping it against the substrate several times as you pull.

This step is optional, but it gives you a chance to see that you've collected some invertebrates. Rinse the net out into the bucket, and look for insects, crustaceans, etc. If necessary, repeat the sampling process in a nearby location, and add the net contents to the bucket. Remember to sample all four environments.

Sieve the contents of the bucket through the straining device and pour or carefully scrape the contents of the strainer into the sample jar.

If you skip the bucket-and-sieve steps, simply lift handfuls of material out of the sampling net into the jars. In either case, please include some muck or mud and some vegetation in the jar. Often, you will have collected a large amount of vegetable material. If this is the case, lift out handfuls of material from the sieve into the jar, until the jar is about half full. Please limit material you include in the sample, so that there is only a single jar for each sample.

Top off the sample jar with enough ethanol to cover all the material in the jar. Leave as little headroom as possible.

It is not necessary to sample habitats in any specified order. Keep in mind that disturbing the habitats prior to sampling will chase off the animals you are trying to capture.

Complete the sample labels. Place one label inside the sample jar and tape the other label securely to the outside of the jar. Dry the jar before attaching the outer label if necessary. In some situations, it may be necessary to collect more than one sample at a site. If you take multiple samples from the same site, clearly indicate this by using individual sample numbers, along with the total number of samples collected at the site (e.g. Sample #3 of 5 total samples).

Photograph the sampled site.

Sample Handling/Shipping

- In the field, keep collected samples cool by storing them in a cooler. Only a small amount of ice is necessary.
- Inventory all samples, preparing a list of all sites and enumerating all samples, before shipping or delivering to the laboratory.
- Deliver samples to Rhithron.

MDT WETLAND MITIGATION MONITORING PROJECT
Aquatic Invertebrate Monitoring
Summary 2001, 2002, 2003

METHODS

Among other monitoring activities, aquatic invertebrate assemblages were collected at a number of mitigation wetlands throughout Montana. This report summarizes data generated from three years of collection.

The method employed to assess these wetlands is based on constructing an index using a battery of 12 bioassessment metrics or attributes (**Table 1**) tested and recommended by Stribling et al. (1995) in a report to the Montana Department of Health and Environmental Science. In that study, it was determined that some of the metrics were of limited use in some geographic regions, and for some wetland types. Despite that finding, all 12 metrics are used in this evaluation of mitigated wetlands, since detailed geographic information and wetland classifications were unavailable.

Scoring criteria for metrics were developed by generally following the tactic used by Stribling et al. Boxplots were generated and distributions, ranges, and quartiles for each metric were examined. All sites were used except Camp Creek, which was sampled in 2002 and 2003. The fauna at that site was different from that of the other sites, and suggested montane stream conditions rather than wetland conditions. The Camp Creek site was assessed using the tested metric battery developed for montane streams of Western Montana (Bollman 1998). For the wetlands, “optimal” scores were generally those that fell above the 75th percentile (for those metrics that decrease in value in response to stress) or below the 25th percentile (for metrics that respond to stress by an increase in value) of all scores. Additional scoring ranges were established by bisecting the range below the 75th percentile for decreasing scores (or above the 25th percentile for increasing scores) into “sub-optimal” and “poor” assessment categories. A score of 5, 3, or 1 was assigned to optimal, sub-optimal, and poor metric performance, respectively. In this way, metric values were translated into normalized metric scores, and scores for all metrics were summed to produce a total bioassessment score. Total bioassessment scores were classified according to a similar process, using the ranges and distributions of total scores for all sites studied.

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. The nature of the action needed is not determined solely by the index score, however, 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; our understanding of the interrelationships of natural environmental factors and anthropogenic disturbances are tentative. Thus, the further interpretive remarks accompanying the raw taxonomic and metric data are offered cautiously.

Sample Processing

Aquatic invertebrate samples were collected at mitigation wetland sites in the summer months of 2001, 2002, and 2003 by personnel of Wetlands West, Inc. and/or Land & Water Consulting, Inc. Sampling procedures utilized were based on the protocols developed by the Montana Department of Environmental Quality (MDEQ).

Sampling consisted of D-frame net sweeps through emergent vegetation (when present), the water column, over the water surface, and included disturbing and scraping substrates at each sampled sites. Samples were preserved in ethanol at each wetland site and subsequently delivered to Rhithron Associates, Inc. for processing, taxonomic determinations, and data analysis.

At Rhithron’s laboratory, Caton subsamplers and stereomicroscopes with 10X magnification were used to randomly select a minimum of 200 organisms, when possible, from each sample. In some cases, the entire sample contained fewer than 200 organisms; in these cases, all organisms from the sample were taken. Taxa were identified in general accordance with the taxonomic resolution standards set out in the MDEQ Standard Operating Procedures for Sampling and Sample Analysis (Bukantis 1998). Ten percent of samples were re-identified by a second taxonomist

for quality assurance purposes. The identified samples have been archived at Rhithron's laboratory. Taxonomic data and organism counts were entered into an Excel 2000 spreadsheet, and metrics were calculated and scored using spreadsheet formulae.

Bioassessment Metrics

An index based on the performance of 12 metrics was constructed, as described above. **Table 1** 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; any are hemoglobin-bearers capable of tolerating de-oxygenated conditions.

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

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

RESULTS

In 2001, 29 sites were sampled statewide. Nineteen of these sites were revisited in 2002, and 13 new sites were sampled. In 2003, 17 sites that had been visited in both 2001 and 2002 were re-sampled, and 11 sites sampled for the first time in 2001 were re-visited. In addition, 2 new sites were sampled. Thus, the 2003 database contains records for 90 sampling events at 44 unique sites. **Table 2** summarizes sites and sampling dates.

Metric scoring criteria were re-developed each year as new data was added. For 2003, 88 records were utilized. Because of the addition of data, scoring criteria changed for several metrics in 2003; thus, biotic condition classifications assigned in 2002 for some sites also changed. However, ranges of individual metrics, as well as median metric values remained remarkably consistent in each of the three years.

Table 1. Aquatic invertebrate metrics employed in the MTDT mitigation wetland monitoring study, 2001- 2003.

Metric	Metric Calculation	Expected Response to Degradation or Impairment
Total taxa	Count of unique taxa identified to lowest recommended taxonomic level	Decrease
POET	Count unique Plecoptera, Trichoptera, Ephemeroptera, and Odonata taxa identified to lowest recommended taxonomic level	Decrease
Chironomidae taxa	Count unique midge taxa identified to lowest recommended taxonomic level	Decrease
Crustacea taxa + Mollusca taxa	Count unique Crustacea taxa and Mollusca taxa identified to lowest recommended taxonomic level	Decrease
% Chironomidae	Percent abundance of midges in the subsample	Increase
Orthoclaadiinae/Chironomidae	Number of individual midges in the sub-family Orthoclaadiinae / 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 times that taxon's modified Hilsenhoff Biotic Index 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

LITERATURE CITED

- Bollman, W. 1998. Montana Valleys and Foothill Prairies Ecoregion. Master's Thesis. (M.S.) University of Montana. Missoula, Montana.
- Bukantis, R. 1998. Rapid bioassessment macroinvertebrate protocols: Sampling and sample analysis SOP's. Working draft. Montana Department of Environmental Quality. Planning Prevention and Assistance Division. Helena, Montana.
- 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.

Table 2. Sampled MDT Mitigation Sites by Year

2001	2002	2003
Beaverhead 1	Beaverhead 1	Beaverhead 1
Beaverhead 2	Beaverhead 2	
Beaverhead 3	Beaverhead 3	
Beaverhead 4	Beaverhead 4	Beaverhead 4
Beaverhead 5	Beaverhead 5	Beaverhead 5
Beaverhead 6	Beaverhead 6	Beaverhead 6
Big Sandy 1		
Big Sandy 2		
Big Sandy 3		
Big Sandy 4		
Johnson-Valier		
VIDA		
Cow Coulee	Cow Coulee	Cow Coulee
Fourchette - Puffin	Fourchette - Puffin	Fourchette - Puffin
Fourchette - Flashlight	Fourchette - Flashlight	Fourchette - Flashlight
Fourchette - Penguin	Fourchette - Penguin	Fourchette - Penguin
Fourchette - Albatross	Fourchette - Albatross	Fourchette - Albatross
Big Spring	Big Spring	Big Spring
Vince Ames		
Ryegate		
Lavinia		
Stillwater	Stillwater	Stillwater
Roundup	Roundup	Roundup
Wigeon	Wigeon	Wigeon
Ridgeway	Ridgeway	Ridgeway
Musgrave - Rest. 1	Musgrave - Rest. 1	Musgrave - Rest. 1
Musgrave - Rest. 2	Musgrave - Rest. 2	Musgrave - Rest. 2
Musgrave - Enh. 1	Musgrave - Enh. 1	Musgrave - Enh. 1
Musgrave - Enh. 2		
	Hoskins Landing	Hoskins Landing
	Peterson - 1	Peterson - 1
	Peterson - 2	
	Peterson - 4	Peterson - 4
	Peterson - 5	Peterson - 5
	Jack Johnson - main	Jack Johnson - main
	Jack Johnson - SW	Jack Johnson - SW
	Creston	Creston
	Lawrence Park	
	Perry Ranch	
	SF Smith River	SF Smith River
	Camp Creek	Camp Creek
	Kleinschmidt	Kleinschmidt - pond
		Kleinschmidt - stream
		Ringling - Galt

Aquatic Invertebrate Taxonomic Data
Site Name JACK JOHNSON MAIN IMPOUNDMENT

Date Collected 7/28/2003

Order	Family	Taxon	Count	Percent	Unique	BI	FFG
Arhynchobdellida		Ostracoda	4	3.33%	Yes	8	CG
	Erpobdellidae						
Basommatophora		<i>Mooreobdella</i>	1	0.83%	Yes	8	PR
	Lymnaeidae						
		Lymnaeidae	1	0.83%	No	6	SC
		<i>Stagnicola</i>	1	0.83%	Yes	6	SC
Coleoptera	Planorbidae						
		<i>Gyraulus</i>	66	55.00%	Yes	8	SC
	Dytiscidae						
Diptera		<i>Liodessus</i>	1	0.83%	Yes	5	PR
	Halipidae						
		<i>Halipus</i>	6	5.00%	Yes	5	PH
	Ceratopogonidae						
		Ceratopogoninae	16	13.33%	Yes	6	PR
	Chironomidae						
Ephemeroptera		<i>Ablabesmyia</i>	2	1.67%	Yes	8	CG
		<i>Acricotopus</i>	6	5.00%	Yes	10	CG
		<i>Psectrocladius</i>	4	3.33%	Yes	8	CG
	Baetidae						
		<i>Callibaetis</i>	1	0.83%	Yes	9	CG
	Caenidae						
		<i>Caenis</i>	1	0.83%	Yes	7	CG
Haplotaxida	Naididae						
Heteroptera		<i>Nais</i>	2	1.67%	Yes	8	CG
	Corixidae						
		Corixidae	2	1.67%	No	10	PH
		<i>Hesperocorixa</i>	4	3.33%	Yes	10	PH
	Notonectidae						
Odonata		<i>Notonecta</i>	1	0.83%	Yes	5	PR
	Coenagrionidae						
		Coenagrionidae	1	0.83%	Yes	7	PR
Grand Total			120				

Aquatic Invertebrate Taxonomic Data
Site Name JACK JOHNSON WEST IMPOUNDMENT

Date Collected 7/28/2003

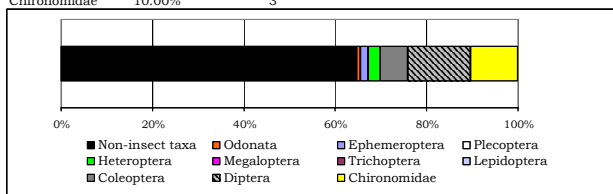
Order	Family	Taxon	Count	Percent	Unique	BI	FFG
Diplostraca		Nematoda	3	2.34%	Yes	5	PA
Diptera		Cladocera	80	62.50%	Yes	8	CF
	Chironomidae						
		<i>Ablabesmyia</i>	1	0.78%	Yes	8	CG
		<i>Chironomus</i>	24	18.75%	Yes	10	CG
		<i>Psectrocladius</i>	7	5.47%	Yes	8	CG
		<i>Psectrotanypus</i>	4	3.13%	Yes	10	PR
Ephemeroptera	Baetidae						
		<i>Callibaetis</i>	1	0.78%	Yes	9	CG
Haplotaxida	Naididae						
		<i>Nais</i>	1	0.78%	Yes	8	CG
Heteroptera	Corixidae						
		<i>Callicorixa audeni</i>	2	1.56%	Yes	11	PR
		Corixidae	1	0.78%	No	10	PH
		<i>Sigara</i>	1	0.78%	Yes	5	PH
	Notonectidae						
		Notonectidae	1	0.78%	Yes	10	PR
Odonata	Lestidae						
		<i>Lestes</i>	1	0.78%	Yes	9	PR
Veneroida	Pisidiidae						
		Pisidiidae	1	0.78%	Yes	8	CG
Grand Total			128				

Aquatic Invertebrate Data Summary**Project ID:** MDT03LW**STORET Station ID:****Station Name:** JACK JOHNSON MAIN IMPOUNDMENT

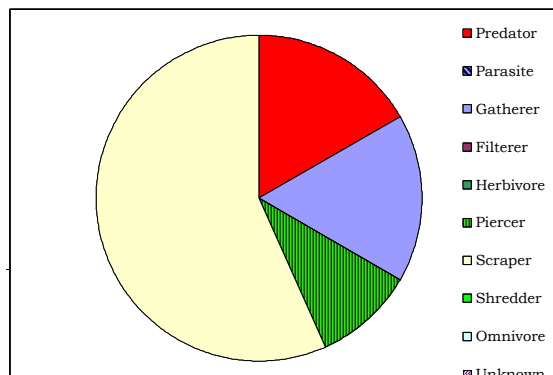
Sample type	
SUBSAMPLE TOTAL ORGANISMS	120
Portion of sample used	13.33%
Estimated number in total sample	900
Sampling effort	
Time	
Distance	
Jabs	
Habitat type	
EPT abundance	2
Taxa richness	16
Number EPT taxa	2
Percent EPT	1.67%

TAXONOMIC COMPOSITION

GROUP	PERCENT	#TAXA
Non-insect taxa	62.50%	6
Odonata	0.83%	1
Ephemeroptera	1.67%	2
Plecoptera	0.00%	0
Heteroptera	2.50%	3
Megaloptera	0.00%	0
Trichoptera	0.00%	0
Lepidoptera	0.00%	0
Coleoptera	5.83%	2
Diptera	13.33%	1
Chironomidae	10.00%	3

**FUNCTIONAL COMPOSITION**

GROUP	PERCENT	#TAXA
Predator	16.67%	5
Parasite	0.00%	0
Gatherer	16.67%	7
Filterer	0.00%	0
Herbivore	0.00%	0
Piercer	10.00%	3
Scraper	56.67%	3
Shredder	0.00%	0
Omnivore	0.00%	0
Unknown	0.00%	0

**COMMUNITY TOLERANCES**

Sediment tolerant taxa	2
Percent sediment tolerant	56.67%
Sediment sensitive taxa	0
Metals tolerance index (McGuire)	4.47
Cold stenotherm taxa	0
Percent cold stenotherms	0.00%

HABITUS MEASURES

Hemoglobin bearer richness	2
Percent hemoglobin bearers	55.83%
Air-breather richness	1
Percent air-breathers	0.83%
Burrower richness	1
Percent burrowers	13.33%
Swimmer richness	4
Percent swimmers	10.83%

Activity ID:**Sample Date:** 7/28/2003**DOMINANCE**

TAXON	ABUNDANCE	PERCENT
Gyraultus	66	55.00%
Ceratopogoninae	16	13.33%
Haliphus	6	5.00%
Acricotopus	6	5.00%
Ostracoda	4	3.33%
SUBTOTAL 5 DOMINANTS	98	81.67%
Hesperocorixa	4	3.33%
Psectrocladius	4	3.33%
Nais	2	1.67%
Corixidae	2	1.67%
Ablabesmyia	2	1.67%
TOTAL DOMINANTS	112	93.33%

SAPROBITY

Hilsenhoff Biotic Index 7.38

DIVERSITY

Shannon H (loge)	2.31
Shannon H (log2)	1.60
Margalef D	3.55
Simpson D	0.32
Evenness	0.09

VOLTINISM

TYPE	# TAXA	PERCENT
Multivoltine	5	14.17%
Univoltine	9	80.00%
Semivoltine	2	5.83%

TAXA CHARACTERS

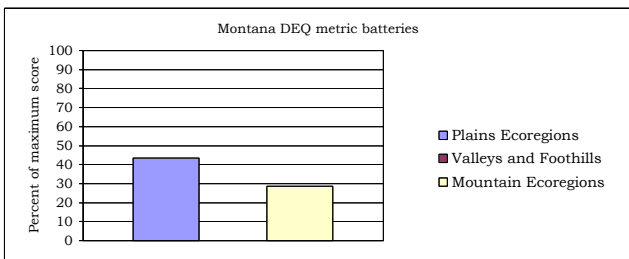
	#TAXA	PERCENT
Tolerant	9	69.17%
Intolerant	0	0.00%
Clinger	0	0.00%

BIOASSESSMENT INDICES**B-IBI (Karr et al.)**

METRIC	VALUE	SCORE
Taxa richness	16	1
E richness	2	1
P richness	0	1
T richness	0	1
Long-lived	2	1
Sensitive richness	0	1
%tolerant	69.17%	1
%predators	16.67%	3
Clinger richness	0	1
%dominance (3)	73.33%	3
TOTAL SCORE		14
		28%

MONTANA DEQ METRICS (Bukantis 1998)

METRIC	VALUE	Plains Ecoregions	Valleys and Foothills	Mountain Ecoregions
Taxa richness	16	1	1	0
EPT richness	2	0	0	0
Biotic Index	7.38	0	0	0
%Dominant taxon	55.00%	1	0	0
%Collectors	16.67%	3	3	3
%EPT	1.67%	0	0	0
Shannon Diversity	1.60	0		
%Scrapers +Shredders	56.67%	3	3	3
Predator taxa	5	2		
%Multivoltine	14.17%	3		
%H of T	#DIV/0!	#DIV/0!		
TOTAL SCORES	13	#DIV/0!		6
PERCENT OF MAXIMUM	43.33	#DIV/0!		28.57
IMPAIRMENT CLASS	MODERATE	#DIV/0!		MODERATE

**Montana Plains ecoregions metrics (Bramblett and Johnson)**

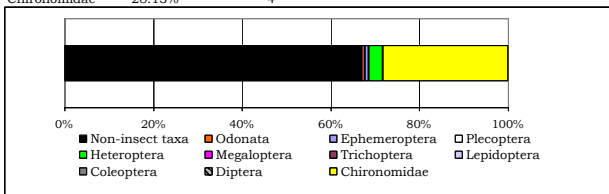
Riffle	Pool
EPT richness	2 E richness
Percent EPT	1.67% T richness
Percent Oligochaetes and Leeches	2.50% Percent EPT
Percent 2 dominants	68.33% Percent non-insect
Filterer richness	0 Filterer richness
Percent intolerant	0.00% Univoltine richness
Univoltine richness	9 Percent supertolerant
Percent clingers	0.00%
Swimmer richness	4

Aquatic Invertebrate Data Summary**Project ID:** MDT03LW**STORET Station ID:****Station Name:** JACK JOHNSON WEST IMPOUNDMENT

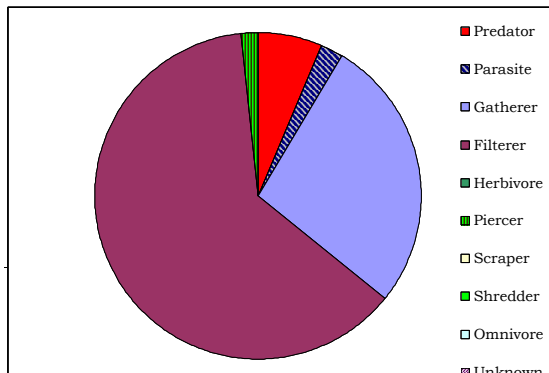
Sample type	
SUBSAMPLE TOTAL ORGANISMS	128
Portion of sample used	14.17%
Estimated number in total sample	904
Sampling effort	
Time	
Distance	
Jabs	
Habitat type	
EPT abundance	1
Taxa richness	13
Number EPT taxa	1
Percent EPT	0.78%

TAXONOMIC COMPOSITION

GROUP	PERCENT	#TAXA
Non-insect taxa	66.41%	4
Odonata	0.78%	1
Ephemeroptera	0.78%	1
Plecoptera	0.00%	0
Heteroptera	3.13%	4
Megaloptera	0.00%	0
Trichoptera	0.00%	0
Lepidoptera	0.00%	0
Coleoptera	0.00%	0
Diptera	0.00%	0
Chironomidae	28.13%	4

**FUNCTIONAL COMPOSITION**

GROUP	PERCENT	#TAXA
Predator	6.25%	4
Parasite	2.34%	1
Gatherer	27.34%	6
Filterer	62.50%	1
Herbivore	0.00%	0
Piercer	1.56%	2
Scraper	0.00%	0
Shredder	0.00%	0
Omnivore	0.00%	0
Unknown	0.00%	0

**COMMUNITY TOLERANCES**

Sediment tolerant taxa	0
Percent sediment tolerant	0.00%
Sediment sensitive taxa	0
Metals tolerance index (McGuire)	9.21
Cold stenotherm taxa	0
Percent cold stenotherms	0.00%

HABITUS MEASURES

Hemoglobin bearer richness	3
Percent hemoglobin bearers	22.66%
Air-breather richness	0
Percent air-breathers	0.00%
Burrower richness	1
Percent burrowers	18.75%
Swimmer richness	5
Percent swimmers	10.16%

Activity ID:**Sample Date:** 7/28/2003**DOMINANCE**

TAXON	ABUNDANCE	PERCENT
Cladocera	80	62.50%
Chironomus	24	18.75%
Psectrocladius	7	5.47%
Psectrotanypus	4	3.13%
Nematoda	3	2.34%
SUBTOTAL 5 DOMINANTS	118	92.19%
Callicorixa audeni	2	1.56%
Nais	1	0.78%
Pisidiidae	1	0.78%
Lestes	1	0.78%
Callibaetis	1	0.78%
TOTAL DOMINANTS	124	96.88%

SAPROBITY

Hilsenhoff Biotic Index 8.17

DIVERSITY

Shannon H (loge)	1.58
Shannon H (log2)	1.10
Margalef D	2.67
Simpson D	0.43
Evenness	0.08

VOLTINISM

TYPE	# TAXA	PERCENT
Multivoltine	7	93.75%
Univoltine	6	6.25%
Semivoltine	0	0.00%

TAXA CHARACTERS

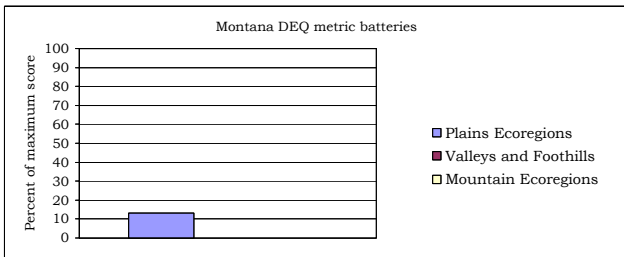
	#TAXA	PERCENT
Tolerant	5	28.91%
Intolerant	0	0.00%
Clinger	0	0.00%

BIOASSESSMENT INDICES**B-IBI (Karr et al.)**

METRIC	VALUE	SCORE
Taxa richness	13	1
E richness	1	1
P richness	0	1
T richness	0	1
Long-lived	0	1
Sensitive richness	0	1
%tolerant	28.91%	3
%predators	6.25%	1
Clinger richness	0	1
%dominance (3)	86.72%	1
TOTAL SCORE		12
		24%

MONTANA DEQ METRICS (Bukantis 1998)

METRIC	VALUE	Plains Ecoregions	Valleys and Foothills	Mountain Ecoregions
Taxa richness	13	1	0	0
EPT richness	1	0	0	0
Biotic Index	8.17	0	0	0
%Dominant taxon	62.50%	0	0	0
%Collectors	89.84%	1	1	0
%EPT	0.78%	0	0	0
Shannon Diversity	1.10	0	0	0
%Scrapers +Shredders	0.00%	0	0	0
Predator taxa	4	2		
%Multivoltine	93.75%	0		
%H of T	#DIV/0!		#DIV/0!	
TOTAL SCORES		4	#DIV/0!	0
PERCENT OF MAXIMUM		13.33	#DIV/0!	0.00
IMPAIRMENT CLASS		SEVERE	#DIV/0!	SEVERE

**Montana Plains ecoregions metrics (Bramblett and Johnson)**

Riffle	Pool
EPT richness	1 E richness
Percent EPT	0.78% T richness
Percent Oligochaetes and Leeches	0.78% Percent EPT
Percent 2 dominants	81.25% Percent non-insect
Filterer richness	1 Filterer richness
Percent intolerant	0.00% Univoltine richness
Univoltine richness	6 Percent supertolerant
Percent clingers	0.00%
Swimmer richness	5