
MONTANA DEPARTMENT OF TRANSPORTATION WETLAND MITIGATION MONITORING REPORT: YEAR 2001

Big Sandy
Big Sandy, 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

July 2002

Project No: 130091.017



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1.0 INTRODUCTION

The Big Sandy wetland mitigation site was constructed in 1991 (Ryan pers. comm.) to mitigate wetland impacts associated with Montana Department of Transportation (MDT) project F 10-2(13)73, Big Sandy North & South. Constructed in Watershed #11 (Milk) within the MDT Great Falls District, the site is located approximately 5 miles northeast of Big Sandy immediately east of Milepost (MP) 85 along U.S. Highway 87 (**Figure 1**) in Choteau County.

Expansion of existing wetlands at a former railroad sand/gravel pit was completed with the goal of compensating for 9.44 acres of wetland loss that occurred in association with the Big Sandy North & South project. Although the original gravel pit was mentioned in the 1987 wetlands report for the highway project, no delineation of pre-construction wetlands at the site was provided in the report (Neil Consultants 1987). In 1991, MDT estimated that approximately 8.2 acres of “new” wetlands had been created at the site (Ryan 1991).

The site includes four excavated ponds constructed to retain storm water and groundwater. The wetland complex was designed to retain semi-permanent standing water. Design features included nesting islands for waterfowl, irregular shoreline with flattened slopes to allow for the development of edge cover, revegetation, and protection from grazing. According to the 1987 wetlands report prepared relative to the Big Sandy North & South project, primary wetland sites impacted by the highway project consisted of emergent and open water areas that provided habitat for waterfowl, songbirds, muskrat, and various small mammals (Neil Consultants 1987).

MDT personnel visited the site intermittently over the past several years, most recently in 1999. However, no formal monitoring reports were produced. This site required a one-time (one year) final monitoring effort to document wetland attributes. No performance standards or success criteria were required by the U.S. Army Corps of Engineers (COE) or other agencies. The monitoring area is illustrated in **Figure 2 (Appendix A)**.

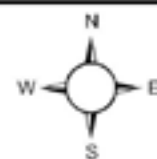
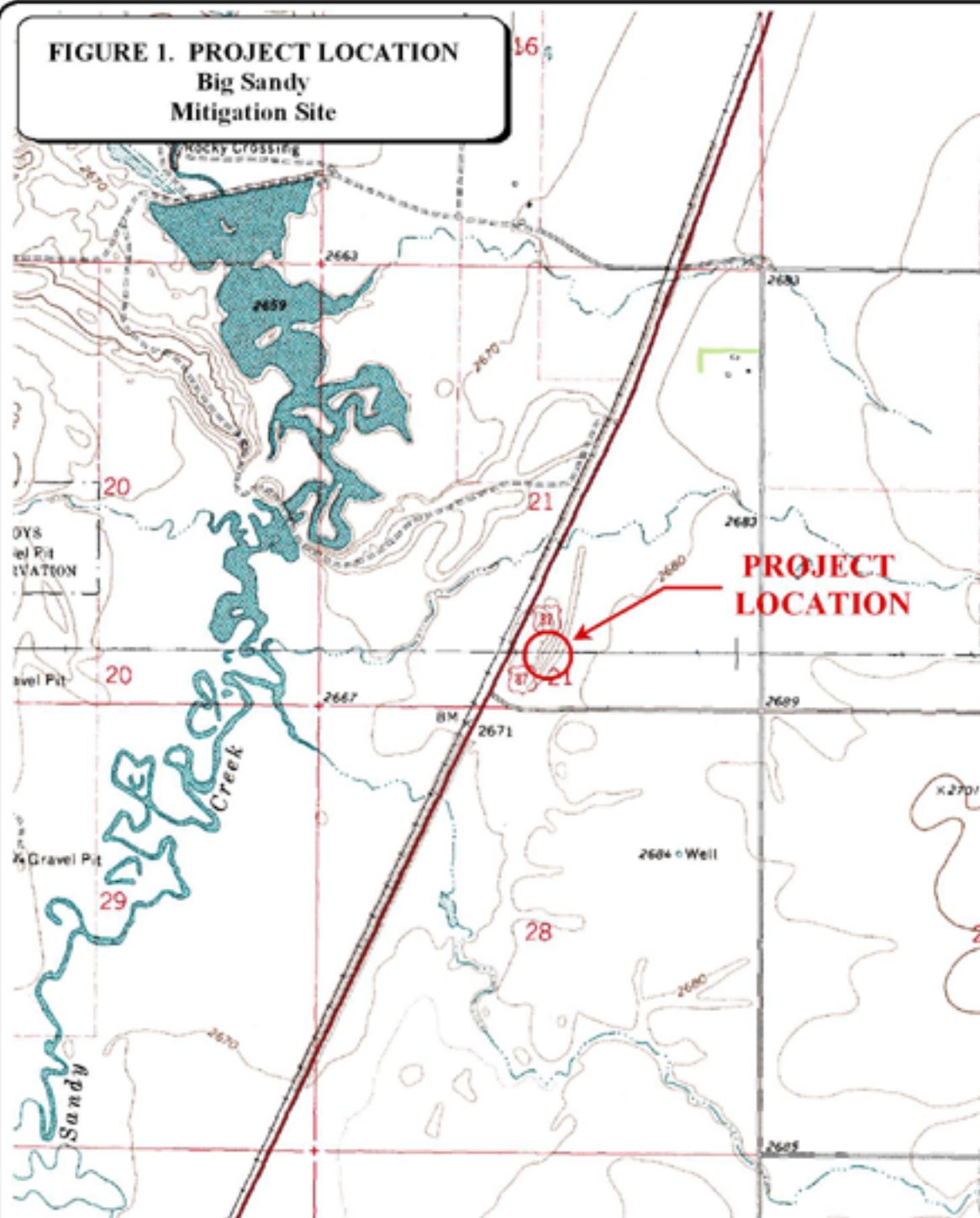
2.0 METHODS

2.1 Monitoring Dates and Activities

The site was visited on May 16 (spring) and July 15 (mid-season), 2001. The primary purpose of the spring visit was to conduct a bird/general wildlife reconnaissance. The mid-May period was selected for the spring visit because monitoring between mid-May and early June is likely to detect migrant as well as early nesting activities for a variety of avian species (Carlson pers. comm.), as well as maximizing the potential for amphibian detection. In Montana, most amphibian larval stages are present by early June (Werner pers. comm.).

The mid-season visit was conducted between late June and 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.

FIGURE 1. PROJECT LOCATION
Big Sandy
Mitigation Site



800 0 800 1600 FEET
 1" = 24,000'

PROJECT #: 130091.017
 DATE: APRIL 2001
 LOCATION:
 PROJECT MANAGER: B. DUTTON
 DRAWN BY: B. NOECKER

LAND & WATER CONSULTING, INC.

1120 CEDAR PO BOX 6256 HISSOKLA, MT 59607

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; GPS data points; functional assessment; and (non-engineering) examination of dike structures.

2.2 Hydrology

Hydrologic indicators were 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 was recorded on COE Routine Wetland Delineation Data Forms (**Appendix B**).

All additional hydrologic data was 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.

There are no groundwater monitoring wells 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 (e.g., *Typha latifolia*/*Scirpus acutus*) 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. 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 established 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” using the following values: + (<1%); 1 (1-5%); 2 (6-10%); 3 (11-20%); 4 (21-50%); and 5 (>50%). Wetland indicator status was recorded for each species. MDT collected some vegetation data along a rough transect during 1997, but the location was not permanently marked on the ground. The new transect was located in the vicinity of this earlier effort.

The transect location, depicted on **Figure 2 (Appendix A)**, was marked on an aerial photograph and all data recorded on the mitigation site monitoring form. Transect endpoint locations were recorded with a GPS unit. Photos of the transect were taken from both ends during the mid-season visit. No woody species were planted at the site. Consequently, no monitoring relative to the survival of such species was conducted.

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).

2.5 Wetland Delineation

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

In a post-construction inspection report dated May 29, 1991, it was estimated that approximately 8.2 acres of newly created wetland existed at the site.

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 wildlife species list for the entire site was compiled.

2.7 Birds

Bird observations were recorded during both visits. No formal census plots, spot mapping, point counts, or strip transects were conducted. During the spring visit, 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 both visits, observations were categorized by species, activity code, and general habitat association (see field and office data forms in **Appendix B**). A comprehensive bird list was compiled using these observations.

2.8 Macroinvertebrates

Four separate macroinvertebrate samples were collected during the mid-season site visit and data recorded on the wetland mitigation monitoring form. Macroinvertebrate sampling procedures are provided in **Appendix E**. Sampling locations are shown on **Figure 2 (Appendix A)**.

Samples were preserved as outlined in the sampling procedure and sent to a laboratory 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. An abbreviated field data sheet for the 1999 MDT Montana Wetland Assessment Method was compiled to facilitate rapid collection of field information (**Appendix B**). 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. Six photograph points were established and shot during 2001. Each photograph point location was recorded with a resource grade GPS. 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

During the 2001 monitoring season, survey points were collected with a resource grade GPS unit at the vegetation transect beginning and ending locations, macroinvertebrate sampling locations, and all photograph locations. The wetland boundary was also surveyed with a resource grade GPS unit.

2.12 Maintenance Needs

The dike near the north end of the site was examined during the 2001 site visit 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.

3.0 RESULTS

3.1 Hydrology

Inundation was present at each of the four main cells on the site. Water depth at open water/rooted vegetation interfaces was approximately 1.5 feet. Open water areas are shown on **Figure 3 (Appendix A)**. Specific recorded values are provided on the attached data forms.

The main body of the site was approximately 70 percent inundated, with an average depth of two to three feet and a range of depths from one inch to an estimated five feet. Deepest areas were located near the centers of each cell, which were as yet unvegetated. A groundwater component

contributes to this site, as does precipitation and runoff. Surface runoff appears to enter the site primarily through an ephemeral drainage flowing from the east.

Excellent saturation and inundation were observed throughout the site, despite the sub-normal precipitation year. According to the Western Regional Climate Center, Big Sandy yearly precipitation totals for 2000 (5.6 inches) and 2001 (7.19 inches) were 44 and 56 percent, respectively, of the total annual mean precipitation (12.87 inches) in this area.

The small wetland depression north of the main cells was not inundated or saturated during the mid-season visit; however, soils were extensively cracked, indicating previous saturation and drying. Additionally, watermarks and drainage patterns were observed in the depression.

3.2 Vegetation

Vegetation species identified on the site are presented in **Table 1** and on the attached data form. Three wetland community types were identified and mapped on the mitigation area (**Figure 3, Appendix A**). These included Type 1: *Typha latifolia*, Type 2: *Hordeum jubatum*/*Scirpus americanus*, and Type 3: *Potamogeton*/*Myriophyllum*. Dominant species within each of these communities are listed on the attached data form (**Appendix B**).

Type 1 occurs commonly throughout the main body of the site at all cells, and is a co-dominant wetland community type along with Type 3. Type 3 consists of aquatic bed communities, which occur at all four cells, and occur in greatest proportion at the center cell and the northernmost cell. Type 2 occurs mainly in the dike vicinity, along the northern fringe of the main cells, and at the small wetland depression north of the main cells. In general, wetland community interspersions are excellent across the site. According to MDT, a willow (*Salix* sp.) community previously occurred in the center of the site, but died off in 1997 (Urban pers. comm.). Scattered individual willows were observed during 2001.

Adjacent upland communities are comprised of rangeland habitats. Common species include silver sage (*Artemisia cana*), fringed sage (*Artemisia frigida*), curlycup gumweed (*Grindelia squarrosa*), prickly pear cactus (*Opuntia* sp.), yellow sweet clover (*Melilotus officinalis*), white sweet clover (*Melilotus alba*), Russian thistle (*Salsola iberica*), crested wheatgrass (*Agropyron cristatum*), cheatgrass (*Bromus tectorum*), smooth brome (*Bromus inermis*), quackgrass (*Agropyron repens*), and western wheatgrass (*Agropyron smithii*).

Vegetation transect results are detailed in the attached data form, summarized graphically below.

Transect Start (west)	Upland (10')	Type 2 (42')	Type 1 (182')	Type 2 (90')	Upland (30')	Type 1 (18')	Type 3 (2')	Total: 374'	Transect End (east)
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3.3 Soils

A published soil survey does not exist for Choteau County. However, as soils were excavated across the site during construction of the mitigation project, previously-mapped units would be of limited use. Generally, wetland soils at the site include sand, sandy loam, and silty clay.

Table 1: 2001 Big Sandy Vegetation Species List

Species	Region 9 (Northwest) Wetland Indicator
<i>Agropyron cristatum</i>	--
<i>Agropyron intermedium</i>	--
<i>Agropyron repens</i>	FACU
<i>Agropyron smithii</i>	--
<i>Agrostis alba</i>	FACW
<i>Alopecurus pratensis</i>	FACW
<i>Artemisia cana</i>	FACU
<i>Beckmannia syzigachne</i>	OBL
<i>Bromus inermis</i>	--
<i>Bromus tectorum</i>	--
<i>Carex aquatilis</i>	OBL
<i>Carex lanuginose</i>	OBL
<i>Chenopodium album</i>	FAC
<i>Cirsium arvense</i>	FAC-
<i>Distichlis spicata</i>	FAC+
<i>Eleocharis acicularis</i>	OBL
<i>Eleocharis palustris</i>	OBL
<i>Grindelia squarrosa</i>	--
<i>Hordeum jubatum</i>	FAC-
<i>Kochia scoparia</i>	FAC
<i>Lemna minor</i>	OBL
<i>Melilotus alba</i>	FACU
<i>Melilotus officinalis</i>	FACU
<i>Myriophyllum spicatum</i>	OBL
<i>Opuntia sp.</i>	--
<i>Phalaris arundinacea</i>	FACW
<i>Phleum pratense</i>	FAC-
<i>Poa compressa</i>	FACU+
<i>Poa pratensis</i>	FAC
<i>Polypogon monspeliensis</i>	FACW
<i>Potamogeton foliosus</i>	OBL
<i>Prunus Americana</i>	FACU
<i>Puccinellia sp.</i>	?
<i>Rumex crispus</i>	FACW
<i>Salix amygdaloides</i>	FACW
<i>Salix exigua</i>	OBL
<i>Salix lutea</i>	OBL
<i>Salsola iberica</i>	--
<i>Sarcobatus vermiculatus</i>	FACU+
<i>Scirpus acutus</i>	OBL
<i>Scirpus americanus</i>	OBL
<i>Scirpus maritimus</i>	OBL
<i>Sonchus arvensis</i>	FACU+
<i>Thlaspi arvense</i>	--
<i>Tragopogon dubius</i>	--
<i>Typha latifolia</i>	OBL

B Horizon soils in wetland portions of various cells consisted of sand with a matrix color ranging from 2.5Y4/3 to 2.5Y4/2. As the site formerly was used as a sand pit, these soils were not unexpected. These sandy soils were saturated to the surface and contained heavy black (2.5Y3/1) organic streaking throughout, which is an indicator of hydric soils (Environmental Laboratory 1987). Organic material is moved downward through sand as the water table fluctuates, streaking the sand with darker areas. Soils along some wetland cell margins, also saturated to the surface, consisted of silty clays with a matrix color of 2.5Y4/2 and distinct mottles at 10YR5/8, indicating a fluctuating water table.

Soils at the small wetland depression north of the main cells consisted of sandy loam with a matrix color of 2.5Y4/2 and mottles at 10YR5/6, indicating a fluctuating water table in this area as well. Soils here were not saturated within 18 inches of the surface at the time of the survey.

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:

Big Sandy Mitigation Area: 11.43 wetland acres (emergent, aquatic bed)
2.36 acres open water

Approximately 11.43 acres of “wetlands” have been created, inclusive of a small mudflat area in the north cell (**Figure 2, Appendix A**). The mudflat is interspersed with vegetated wetland and open water areas and is used extensively by shorebirds. Mudflats are considered “special aquatic sites” under COE regulations. As defined in 40 CFR (230.3[q-1]), “special aquatic sites” are areas possessing special characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values. Special aquatic sites include sanctuaries and refuges, wetlands, mud flats, vegetated shallows, coral reefs, and riffle/pool complexes.

Inclusive of interspersed open water areas, approximately 13.79 acres of aquatic habitat currently exist on the Big Sandy wetland mitigation site.

No information with respect to pre-existing wetlands on the site was found or referenced in the MDT project files. However, the site was formerly a railroad sand pit, and a black and white July 1971 aerial photograph shows an approximate 2.4-acre excavated pit with apparent standing water (**Appendix D**). Signs of ground disturbance are evident around the pit, suggesting that it was an active operation. Whether or not this pit constituted a pre-existing wetland is not possible to determine. Since no references are made to pre-existing wetlands in MDT project file materials, it is assumed that the pit did not satisfy wetland criteria.

3.5 Wildlife

Wildlife species, or evidence of wildlife, observed on the site during 2001 monitoring efforts are listed in **Table 2**. Specific evidence observed, as well as activity codes pertaining to birds, are provided on the completed monitoring form in **Appendix B**. The site provides habitat for numerous wildlife species. Five mammal, one amphibian, two reptile, and numerous bird species, particularly shorebirds and waterfowl, were noted using the mitigation site.

Of special interest were observations of a pair of black-necked stilts (*Himantopus mexicanus*) at the site during the May 2001 survey. Black-necked stilts are considered a “species on review” by the Montana Natural Heritage Program (MNHP). Breeding could not be confirmed, but is suspected on the site.

Table 2: Fish and Wildlife Species Observed on the Big Sandy Mitigation Site

FISH	
Western Mosquitofish (<i>Gambusia affinis</i>)**	
AMPHIBIANS	
Northern Leopard Frog (<i>Rana pipiens</i>)**	
Western Chorus Frog (<i>Pseudacris triseriata</i>)**	
REPTILES	
Painted Turtle (<i>Chrysemys picta</i>)	
Plains Garter Snake (<i>Thamnophis radix</i>)	
Western Rattlesnake (<i>Crotalus viridis</i>)**	
BIRDS	
American Avocet (<i>Recurvirostra americana</i>)	Mallard (<i>Anas platyrhynchos</i>)
American Coot (<i>Fulica americana</i>)	Marbled Godwit (<i>Limosa fedoa</i>)
American Wigeon (<i>Anas americana</i>)	Marsh Wren (<i>Cistothorus palustris</i>)
Black-necked Stilt (<i>Himantopus mexicanus</i>)	Mourning Dove (<i>Zenaida macroura</i>)
Brewer's Blackbird (<i>Euphagus cyanocephalus</i>)	Northern Harrier (<i>Circus cyaneus</i>)**
Canada Goose (<i>Branta Canadensis</i>)	Northern Pintail (<i>Anas acuta</i>)
Canvasback (<i>Aythya valisineria</i>)	Northern Shoveler (<i>Anas clypeata</i>)
Cinnamon Teal (<i>Anas cyanoptera</i>)	Pied-billed Grebe (<i>Podilymbus podiceps</i>)**
Cliff Swallow (<i>Petrochelidon pyrrhonota</i>)	Red-winged Blackbird (<i>Agelaius phoeniceus</i>)
Common Snipe (<i>Gallinago gallinago</i>)	Rock Dove (<i>Columba livia</i>)
Common Yellowthroat (<i>Geothlypis trichas</i>)	Song Sparrow (<i>Melospiza melodia</i>)**
Eastern Kingbird (<i>Tyrannus tyrannus</i>)	Swainson's Hawk (<i>Buteo swainsoni</i>)
Gadwall (<i>Anas strepera</i>)	Tree Swallow (<i>Tachycineta bicolor</i>)
Golden Eagle (<i>Aquila chrysaetos</i>)**	Vesper Sparrow (<i>Poocetes gramineus</i>)**
Grasshopper Sparrow (<i>Ammodramus savannarum</i>)**	Western Grebe (<i>Aechmophorus occidentalis</i>)**
Horned Lark (<i>Eremophila alpestris</i>)**	Western Meadowlark (<i>Sturnella neglecta</i>)
Killdeer (<i>Charadrius vociferous</i>)	Willet (<i>Catoptrophorus semipalmatus</i>)
Lesser Scaup (<i>Aythya affinis</i>)	Wilson's Phalarope (<i>Phalaropus tricolor</i>)
	Yellow-headed Blackbird (<i>Xanthocephalus xanthocephalus</i>)
MAMMALS	
Mule Deer (<i>Odocoileus hemionus</i>)	
Muskrat (<i>Ondatra zibethicus</i>)	
Pronghorn (<i>Antilocapra americana</i>)	
Raccoon (<i>Procyon lotor</i>)	
Richardson's Ground Squirrel (<i>Spermophilus richardsonii</i>)	
** Observed by MDT during prior visits; not observed during formal 2001 monitoring activities.	

Also of special interest were past MDT-recorded observations of northern leopard frogs (*Rana pipiens*) at the site (Urban pers. comm.). Leopard frogs are considered “species of special concern” by the 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 S3 east of the Divide by the MNHP, but was not observed during 2001 monitoring efforts. Consequently, the site was not automatically classified as a Category II wetland (using the 1999 MDT Wetland Assessment Method) based solely on sensitive species habitat.

3.6 Macroinvertebrates

Macroinvertebrate sampling results are provided in **Appendix B** and summarized below. Drought conditions may have affected sampling results due to concentration of sediments and other constituents, as well as elevated water temperatures.

Big Sandy Cell #1 (southernmost cell): Poor biologic conditions were implied here. Taxa richness was among the lowest of any site studied, and only 2 midge taxa were collected. These findings suggest monotonous habitats. The sample was overwhelmed by ceratopogonids, which implies that soft sediments provided the main available habitat.

Big Sandy Cell #2 (west-center cell): Biotic conditions were apparently sub-optimal at this site. Taxa richness was just about average for the mitigated sites studied, implying moderately abundant habitats. Water quality appears to be impaired by warm temperatures and/or nutrients, since the biotic index was much higher than expected. Among the midges, the dominant taxon was *Chironomus* sp., highly tolerant to low oxygen conditions in the substrates.

Big Sandy Cell #3 (northernmost cell): Low taxa richness and poor representation of midge taxa imply poor biotic condition at this location. Habitat availability appears to be limited. The sample was overwhelmed by the tolerant amphipod *Hyalalella azteca*, and the biotic index value also suggested water quality impairment by elevated temperature, or nutrients, or both.

Big Sandy Cell #4 (east-central cell): Sub-optimal biologic conditions are implied by metric performance at this site. The high biotic index value suggests water quality impairment, as does the taxonomic composition of the Chironomid fauna. Three of the four midge taxa present are hemoglobin-bearers, preferring anoxic sediments. Ample taxa richness suggests abundant habitats at this site.

3.7 Functional Assessment

Completed functional assessment forms are presented in **Appendix B**. Functional assessment results are summarized in **Table 3**. The main body of the mitigation site rated as a Category II (high value) site, primarily due to exceptional wildlife habitat, surface water storage, food chain support, groundwater discharge, and recreation/education potential ratings. The site received a moderate sediment/nutrient/toxicant removal rating due to apparent impaired water quality, as illustrated by macroinvertebrate sampling results. Causes for such impairment are unknown, but may relate to drought, “upstream” agricultural practices, adjacent highway runoff, or other factors.

The small depression north of the main cells rated as a Category IV (low value) site. This was primarily due to low vegetative diversity and low acreage of actual wetlands present. Groundwater discharge is a prominent function at this site.

Based on functional assessment results (**Table 3**), approximately 106.85 functional units have been provided thus far at the Big Sandy mitigation site.

Table 3: Summary of 2001 Wetland Function/Value Ratings and Functional Points ¹ at the Big Sandy Mitigation Project

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	Wetland Sites	
	Main Body of Mitigation Site: Cells 1 - 4	Small Depression North of Main Cells
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0)
MNHP Species Habitat	Mod (0.6)	Low (0)
General Wildlife Habitat	Exceptional (1.0)	Low (0.2)
General Fish/Aquatic Habitat	NA	NA
Flood Attenuation	Mod (0.5)	NA
Short and Long Term Surface Water Storage	High (0.9)	Low (0.2)
Sediment, Nutrient, Toxicant Removal	High (1.0)	NA
Sediment/Shoreline Stabilization	Mod (0.7)	NA
Production Export/Food Chain Support	High (0.9)	Low (0.2)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)
Uniqueness	Mod (0.4)	Mod (0.4)
Recreation/Education Potential	High (1.0)	Low (0.1)
Actual Points/Possible Points	7.8 / 11	2.1 / 8
% of Possible Score Achieved	71 %	26%
Overall Category	II	IV
Total Acreage of Assessed Wetlands and Other Aquatic Habitats within Site Boundaries	13.67 ac	0.12 ac
Functional Units (acreage x actual points)	106.6 fu	0.25 fu
Net Acreage Gain	13.67 ac	0.12 ac
Net Functional Unit Gain	106.6 fu	0.25 fu
Total Functional Unit “Gain”	106.85 Total Functional Units	

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

3.8 Photographs

Representative photographs taken from photo-points are provided in **Appendix C**.

3.9 Maintenance Needs/Recommendations

The center dike was in good condition during the mid-season visit, and is starting to be colonized by wetland vegetation, most likely due to sub-irrigation from adjacent cells.

An erosion problem was noted at the mouth of a small ephemeral drainage that enters the site from the east, near the northern end of the north cell. The outermost section of concrete culvert through which surface water enters the site has collapsed due to erosion. Another erosion problem, an excessively eroding bank, was noted on the side slope just north and east of the east dike end. Photographs of both areas are provided in **Appendix C**. It is recommended that MDT permanently stabilize these areas in order to avoid addition of sediments into the wetland system and to avoid encroachment of these problems onto adjacent lands to the east. Filling eroded areas, placement of jute mats, seeding or planting upland grasses, or similar measures may be

desirable in these areas. These areas should be inspected by an engineer and site-specific measures proposed and implemented.

Due to its designation as a species of concern, it is recommended that MDT attempt to further ascertain leopard frog activity on the site. Due to the site's visibility and apparent success, it is also recommended that MDT consider placement of an interpretive sign identifying this site as a wetland mitigation site.

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 intent of the project was to replace emergent and open water areas that provided habitat for waterfowl, songbirds, muskrat, and various small mammals (Neil Consultants 1987). Based on monitoring results, these goals have been achieved. Functional assessment resulted in an "exceptional" rating for wildlife habitat at the site.

As the project stands, approximately 13.79 acres of aquatic habitats have been created, inclusive of all open water components. Open water areas were a designed habitat feature and are effectively interspersed with wetland communities. Approximately 11.43 acres of "wetlands" have been created, inclusive of a small mudflat area in the north cell. The mudflat, possibly brought about by 2000/2001 drought conditions, is also interspersed with vegetated wetland and open water areas and used extensively by shorebirds. Mudflats are considered "special aquatic sites" under COE regulations. Approximately 107 functional units have been created at the site to date.

The maximum assignable credit at this site as of 2001, inclusive of all open water areas, is approximately 13.79 acres. This exceeds the 9.44 acres of wetland loss that occurred in association with the Big Sandy North & South highway project by 4.35 acres.

4.0 REFERENCES

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- Reed, P.B. 1988. National list of plant species that occur in wetlands: North West (Region 9). Biological Report 88(26.9), May 1988. U.S. Fish and Wildlife Service. Washington, D.C.

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Appendix A

FIGURES 2 - 3

MDT Wetland Mitigation Monitoring
Big Sandy
Big Sandy, Montana

Figure 2 - Monitoring Activity Locations



LEGEND

- Monitoring Area Limits
- Photograph Point
- Aerial Reference Points
- Macro-Invertebrate Sample Point

MONITORING AREA LIMITS

MONITORING AREA LIMITS

Begin
Vegetation Transect
End

MONITORING AREA LIMITS

NOT TO SCALE

PROJECT NAME
MDT Big Sandy Wetland Mitigation

DRAWING TITLE
Monitoring Activity Locations

PROJ NO: 130091117
FILE NAME: TASK17BASE.dwg
SCALE: 1" = 200ft
LOCATION: Big Sandy

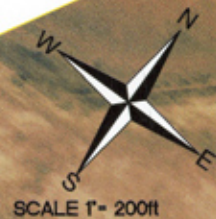
DRAWN: RA
CHECKED: JB
APPROVED: PROJ MGR: BD

LAND & WATER CONSULTING, INC.
P.O. BOX 824
MINNEAPOLIS, MN 55401

SHEET NUMBER
2

REV: -
DATE: 12-04-01

Figure 3 - Mapped Site Features



LEGEND

Monitoring Area Limits
Wetland-Upland Boundary
Wetland- Open Water Boundary
Gross Wetland Area 13,790 Acres
Open Water Area 2,361 Acres
Net Wetland Area 11,429 Acres
Vegetation Community Boundary
Vegetation Types:

- ① Typha latifolia
- ② Hordeum jubatum/Scirpus americanus
- ③ Potamogeton/Myriophyllum
- ④ Mudflat

MONITORING AREA LIMITS

MONITORING AREA LIMITS

MONITORING AREA LIMITS

NOT TO SCALE

PROJECT NAME MDT Big Sandy Wetland Mitigation		DRAWING TITLE Mapped Site Features	
PROJ NO: 130091TASK17	DRAWN: RA	SHEET NUMBER 3	
FILE NAME: TASK17BASE.dwg	CHECKED: BO	REV: .	
SCALE: 1" = 200'	APP'D: BO	DATE:	
LOCATION: Big Sandy	PROJ MGR: BO		

Appendix B

**COMPLETED 2001 WETLAND MITIGATION SITE MONITORING
FORM**

COMPLETED 2001 BIRD SURVEY FORMS

COMPLETED 2001 WETLAND DELINEATION FORMS

**COMPLETED 2001 FIELD AND FULL FUNCTIONAL
ASSESSMENT FORMS**

MACROINVERTEBRATE DATA

MDT Wetland Mitigation Monitoring

Big Sandy

Big Sandy, Montana



DRAFT - MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: Big Sandy Project Number: Task 17 Assessment Date: 7/15/01
 Location: Highway 87 MDT District: Great Falls Milepost: 85
 Legal description: T 29N R 3E Section 21 Time of Day: 2pm - 7pm
 Weather Conditions: PC, calm to windy Person(s) conducting the assessment: JB, RH
 Initial Evaluation Date: 5/16/01 Visit #: 2 Monitoring Year: 2001
 Size of evaluation area: 210 acres Land use surrounding wetland: Range + Highway

HYDROLOGY

Surface Water

Inundation: Present ☒ Absent ☐ Average depths: 2-3 ft Range of depths: 1" - 5 ft
 Assessment area under inundation: 70 %
 Depth at emergent vegetation-open water boundary: 1.5 ft At rooted veg/open water boundary
 If assessment area is not inundated are the soils saturated w/in 12" of surface: Yes ☒ No ☐
 Other evidence of hydrology on site (drift lines, erosion, stained vegetation etc.): Water marks, sediment deposits, drift lines around all impoundments.

Groundwater

Monitoring wells: Present ☐ Absent ☒

Record depth of water below ground surface

Well #	Depth	Well #	Depth	Well #	Depth

Additional Activities Checklist:

- ☒ Map emergent vegetation-open water boundary on air photo
☒ 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: Good inundation & saturation, despite poor water year.

COMPREHENSIVE VEGETATION LIST

Species	Vegetation Community Number(s)	Species	Vegetation Community Number(s)
TYP LAT	1	ART CAN	UP
SCI ACU	1, 3	TRA DUB	UP
SCI AME	1, 2	AGR INT	UP
CAR LAN	1, 2	BRO TEC	UP
ELE PAL	1	MEL OFF	UP
PHA ARU	1, 2	SAL TBE Russian Thistle	UP
HOR SUB	1, 2, UP	BEL SYZ	1
ALO PRA	1, 2	CAR AQU	1
ELE ALI	1, 2	LEM MIN	3
MYR SPI	3		
POT FOL	3		
SAL LUT	1		
SAL AMY	1		
SALEXI	1		
PRU AME	UP		
SCI MAR	1, 2		
AGR ALB	1, 2		
DIS SPI	2		
RUM CRI	2, UP		
POL MRN	1, 2		
POA PRA	2, UP		
BRO JNE	UP, 2		
AGR REP	2, UP		
KOC SCO	2, UP		
CIR ARV	2, UP		
SON ARV	2, UP		
CHE ALB	2, UP		
MEL ALB	UP		
AGR CRI	UP		
OPU sp. prickly pear	UP		
SAR VER	UP		
GRI SQU	UP		
THL ARV	UP		
PUC sp. ?	2		
POA COM	UP		

COMMENTS/PROBLEMS: _____

VEGETATION COMMUNITIES



Community No.: 1 Community Title (main species): Typha Latifolia

Dominant Species	% Cover	Dominant Species	% Cover
TYP LAT	70		
SCI ACU	30		
CAR LAN	20		
SON ARV	10		

COMMENTS/PROBLEMS: _____

Community No.: 2 Community Title (main species): Hordeum jubatum / Scirpus Americanus

Dominant Species	% Cover	Dominant Species	% Cover
HOR SUB	50	CAR LAN	20
SCI AME	40		
DIS SPI	20		
ALO PRA	10		
SON ARV	20		

COMMENTS/PROBLEMS: _____

Community No.: 3 Community Title (main species): Potamogeton / Magniophyllum

Dominant Species	% Cover	Dominant Species	% Cover
POT FOL	60		
MYR SPI	60		

COMMENTS/PROBLEMS: _____

Additional Activities Checklist:

☒ Record and map vegetative communities on air photo

MDT WETLAND MONITORING - VEGETATION TRANSECT

Site: Big Sandy Date: 7-15-01 Examiner: JB/RH Transect # 1 (pg 1)
 Approx. transect length: 374 feet Compass Direction from Start (Upland): 84° E/NE

Vegetation type 1: <u>Upland Grassland</u>	
Length of transect in this type: <u>10</u>	feet
POA PRA	>50%
AGR CRI	11-20%
AGR REP	6-10%
Total Vegetative Cover:	<u>100%</u>

Vegetation type 3: <u>TYPLAT</u>	
Length of transect in this type: <u>182</u>	feet
TYPLAT	>50%
CHE ALB	1-5%
SLZ ACU	11-20%
SLI AME	6-10%
SON ARV	1-5%
CIR ARV	1-5%
CAR LAN	1-5%
Total Vegetative Cover:	<u>100%</u>

Vegetation type 2: <u>HOR SUB/SLI AME</u>	
Length of transect in this type: <u>42</u>	feet
ALO PRA	30%
SLI AME	40%
SON ARV	10%
HOR SUB	10%
Total Vegetative Cover:	

Vegetation type 4: <u>HOR SUB/SLI AME</u>	
Length of transect in this type: <u>90</u>	feet
SON ARV	21-50%
HOR SUB	6-10%
SLI AME	11-20%
TYPLAT	6-10%
CIR ARV	1-5%
CAR LAN	6-10%
SLI MAR	1-5%
AGR REP	1-5%
Total Vegetative Cover:	<u>100</u>

MDT WETLAND MONITORING - VEGETATION TRANSECT

Site: Big Sandy continued Date: _____ Examiner: _____ Transect # 1 (pg 2)

Approx. transect length: _____ Compass Direction from Start (Upland): _____

Vegetation type #5: <u>Upland Grassland</u>	
Length of transect in this type:	<u>30</u> feet
AGR REP	75%
POA PRA	11-20%
MEL ALB	6-10%
CIR ARV	1-5%
SON ARV	1-5%
Total Vegetative Cover:	<u>100</u>

Vegetation type #6: <u>TYP LAT</u>	
Length of transect in this type:	<u>18</u> feet
TYP LAT	75%
SON ARV	11-20%
SLI ACN	6-10%
HOR SUB	1-5%
CIR ARV	1-5%
ELK PAL	1-5%
MEL ALB	1-5%
Total Vegetative Cover:	<u>100</u>

Vegetation type #7: <u>Potamogeton/Myriophyllum</u>	
Length of transect in this type:	<u>2</u> feet
POT FOL	72-50
MYR SPI	22-50
Total Vegetative Cover:	<u>80%</u>

Vegetation type 4:	
Length of transect in this type:	feet
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 100 % 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:

[illegible]

N/A

LAND & WATER B-7

[illegible]

COMMENTS/PROBLEMS: No vegetation planted.

[illegible]

WETLAND DELINEATION



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 forms.

FUNCTIONAL ASSESSMENT

Collect information to complete MDT Function and Values Assessment in the office.

Jeff is completing this section

COMMENTS/PROBLEMS:

See attached forms.

MAINTENANCE

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

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

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

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:

No muskrat problems w/ dike. Dike beginning to show wetland characteristics (subbing). Erosion noted at drainage entering site from east. Section of concrete pipe has fallen off due to this erosion (see photo sheets).

LAND & WATER B-9

[illegible]

Were man made nesting structures installed? Yes ☐ No ☒ Type: How many? Are the nesting structures being utilized? Yes ☐ No ☒ Do the nesting structures need repairs? Yes ☐ No ☒

Species	Number Observed	Indirect indication of use			
		Tracks	Scat	Burrows	Other
Muskrat	1			2-3	
Painted turtle	~10				shell
Raccoon	7-15-01	X			
Striped skunk					skull
Deer		X			
Deer		X	X		
Antelope	5-16-01				
ground squirrel				X	
Muskrat		1			
Painted turtle's		~10			
Garter Snake	1				

~~X~~ Macroinvertebrate sampling (if required)

COMMENTS/PROBLEMS: MDT records indicate numerous northern leopard frogs, but none observed at site during either 2001 visit.

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
P6 A	1		N 26°
P6 B	2		S 192°
P5 C	3/4	Composite	SW 220°
P5 D	5		W 288°
P5 E	6/7/8	Composite	NW 348°
P5 F	9	Upland	E 104°
P4 G	10		N 24°
P4 H	11		S 200°

COMMENTS/PROBLEMS: P1, #12, N23° / P1, #13, S 203° / P2, #14, NE 37° /
P2, #15, SE 194° / P3, #16, N23° / P3, #17, S 197° /
Transect Start, #18, ENE 84° / Transect End, #22, WSW 264° /
Cell 1 Bug Sample, #19 / Cell 2 Bug Sample #20 / Cell 3 Bug Sample #23 /
Cell 4 Bug Sample, #21



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: _____

LAND & WATER B-11

Date: 7-15-01

Survey Time: 2:00-7:00 pm
7:00 am-11:00 am

5-16-01

[illegible][illegible]

NOTES:

NOTES: * Pair of black-necked stilts observed during May - this is a NMHP species of concern

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

Field Data Sheet for 1999 MDT Wetland Assessment Form

Site: Big SandyDate: 7-15-01By: JCRHEstimated AA Size (Circle Ac.): <1 1-5 >5Brief Description: Marsh Complex - Main Section

HGM Class (CIRCLE)	Cowardin Class	Est. % of AA	Predominant Water Regime (CIRCLE)						
Mineral Soil Flats	<u>Emergent</u>	<u>60</u>	Perm Flood	Int Exp	Sem Perm Flood	<u>Seas Flood</u>	Sat	Tem Flood	Int Flood
Organic Soil Flats	<u>Aquatic Bed</u>	<u>25</u>	Perm Flood	Int Exp	<u>Sem Perm Flood</u>	Seas Flood	Sat	Tem Flood	Int Flood
Riverine (nonperennial)	<u>Moss-Lichen</u>		Perm Flood	Int Exp	Sem Perm Flood	Seas Flood	Sat	Tem Flood	Int Flood
Riverine (upper perennial)	<u>Scrub-Shrub</u>		Perm Flood	Int Exp	Sem Perm Flood	Seas Flood	Sat	Tem Flood	Int Flood
Riverine (lower perennial)	<u>Forested</u>		Perm Flood	Int Exp	Sem Perm Flood	Seas Flood	Sat	Tem Flood	Int Flood
Lacustrine Fringe	<u>Unconsolidated Bottom</u>	<u>15</u>	Perm Flood	<u>Int Exp</u>	Sem Perm Flood	Seas Flood	Sat	Tem Flood	Int Flood
Depression (closed)	<u>Other:</u>		Perm Flood	Int Exp	Sem Perm Flood	Seas Flood	Sat	Tem Flood	Int Flood
Depression (open, groundwater)			Perm Flood	Int Exp	Sem Perm Flood	Seas Flood	Sat	Tem Flood	Int Flood
Depression (open, surface water)			Perm Flood	Int Exp	Sem Perm Flood	Seas Flood	Sat	Tem Flood	Int Flood
Slope			Perm Flood	Int Exp	Sem Perm Flood	Seas Flood	Sat	Tem Flood	Int Flood
Organic Soil Flats			Perm Flood	Int Exp	Sem Perm Flood	Seas Flood	Sat	Tem Flood	Int Flood
Total Estimated % Vegetated		<u>85</u>							

RELATIVE ABUNDANCE: rare com abun. DISTURBANCE is: High Moderate LowHYDROLOGY: Max. acre-ft surf. water at wetlands in AA subject to inundation: <1 1-5 >5 (if no flooding/ponding, go to groundwater* section)Does AA contain surface or subsurface outlet? Y N If outlet present, is it restricted (subsurface will always be "yes")? Y N

Longest duration of surface water:		Surface Water Duration and other attributes (circle)		
at any wetlands within AA		Perm / Peren	<u>Seas / Intermit</u>	Temp / Ephem
in at least 10% of AA (both wetlands and nonwetlands [deepwater, streambed...])		<u>Perm / Peren</u>	Seas / Intermit	Temp / Ephem
Where fish are or historically were present (circle NA if not applicable)		Perm / Peren	Seas / Intermit	Temp / Ephem
% of waterbody containing cover objects		>25%	10-25%	<10%
% bank or shore with riparian or wetland shrub or forested communities		>75%	50-74%	<50%
adjacent to rooted wetland vegetation along a defined watercourse or shoreline subject to wave action (circle NA if not applicable)		<u>Perm / Peren</u>	Seas / Intermit	Temp / Ephem
% cover of wetland bank or shore by sp. with binding rootmasses		>65%	<u>35-64%</u>	<35%

Flood Attenuation: Do any wetlands on site flood as a result of in-channel or overbank flow? Y N (if no, go to groundwater* section below)Estimated wetland area subject to periodic flooding (acres): ≥10 2-10 <2Estimated % of flooded wetland classified SS, FO or both: ≥75 25-74 <25*Evidence of groundwater discharge or recharge? Y N List: _____

HABITAT

Habitat for Listed or Proposed Threatened, Endangered, or Montana Natural Heritage Program S1, S2, or S3 Plants or Animals:

AA is Documented (D) or Suspected (S) to contain (circle based on definitions contained in instructions):

Primary or critical habitat (list species)	D S	T/E: _____	D(S) MNHP: <u>Black-necked stilt, No. leopard frog</u>
Secondary habitat (list species)	D S	T/E: _____	D S MNHP: _____
Incidental habitat (list species)	D(S)	T/E: <u>Bald Eagle</u>	D S MNHP: _____
No usable habitat	D S	T/E: _____	D S MNHP: _____

Wildlife observations? See form

Fish observations? _____

OTHERS

Do wetlands have potential to receive excess sediments, nutrients, or toxicants? Y N From: Adjacent drainage + highwayPotential to receive: low to moderate levels high levels On TMDL List? Y NDoes site contain bog, fen, warm springs, >80 year-old forested wetland, or MNHP "S1" or "S2" plant association? Y NList: Potamogeton pectinatus - Myriophyllum spicatumIs AA a known recreation / education site? Y N Type: _____Does AA offer strong potential for use as recreation / education site? Y N Type: Hunting (waterfowl)

Field Data Sheet for 1999 MDT Wetland Assessment Form

Site:

Big Sandy

Date:

7-15-01

By:

SB/RA

Estimated AA Size (Circle Ac.): <1 1-5 >5

Brief Description:

Northern-most isolated depression

HGM Class (CIRCLE)	Cowardin Class	Est. % of AA	Predominant Water Regime (CIRCLE)						
Mineral Soil Flats	Emergent	100	Perm Flood	Int Exp	Sem Perm Flood	Seas Flood	Sat	Tem Flood	Int Flood
Organic Soil Flats	Aquatic Bed		Perm Flood	Int Exp	Sem Perm Flood	Seas Flood	Sat	Tem Flood	Int Flood
Riverine (nonperennial)	Moss-Lichen		Perm Flood	Int Exp	Sem Perm Flood	Seas Flood	Sat	Tem Flood	Int Flood
Riverine (upper perennial)	Scrub-Shrub		Perm Flood	Int Exp	Sem Perm Flood	Seas Flood	Sat	Tem Flood	Int Flood
Riverine (lower perennial)	Forested		Perm Flood	Int Exp	Sem Perm Flood	Seas Flood	Sat	Tem Flood	Int Flood
Lacustrine Fringe	Unconsolidated Bottom		Perm Flood	Int Exp	Sem Perm Flood	Seas Flood	Sat	Tem Flood	Int Flood
Depression (closed)	Other:		Perm Flood	Int Exp	Sem Perm Flood	Seas Flood	Sat	Tem Flood	Int Flood
Depression (open, groundwater)			Perm Flood	Int Exp	Sem Perm Flood	Seas Flood	Sat	Tem Flood	Int Flood
Depression (open, surface water)			Perm Flood	Int Exp	Sem Perm Flood	Seas Flood	Sat	Tem Flood	Int Flood
Slope			Perm Flood	Int Exp	Sem Perm Flood	Seas Flood	Sat	Tem Flood	Int Flood
Organic Soil Flats	Total Estimated % Vegetated	100							

RELATIVE ABUNDANCE: rare com abun.

DISTURBANCE is:

High

Moderate

Low

HYDROLOGY: Max. acre-ft surf. water at wetlands in AA subject to inundation: <1 1-5 >5 (if no flooding/ponding, go to groundwater* section)

Does AA contain surface or subsurface outlet?

Y

N

If outlet present, is it restricted (subsurface will always be "yes")? Y N

Longest duration of surface water:		Surface Water Duration and other attributes (circle)		
at any wetlands within AA		Perm / Peren	Seas / Intermit	<u>Temp / Ephem</u>
in at least 10% of AA (both wetlands and nonwetlands [deepwater, streambed...])		Perm / Peren	Seas / Intermit	<u>Temp / Ephem</u>
Where fish are or historically were present (circle NA if not applicable)		Perm / Peren	Seas / Intermit	Temp / Ephem
% of waterbody containing cover objects		>25%	10-25%	<10%
% bank or shore with riparian or wetland shrub or forested communities		>75%	50-74%	<50%
adjacent to rooted wetland vegetation along a defined watercourse or shoreline subject to wave action (circle NA if not applicable)		Perm / Peren	Seas / Intermit	Temp / Ephem
% cover of wetland bank or shore by sp. with binding rootmasses		>65%	35-64%	<35%

Flood Attenuation: Do any wetlands on site flood as a result of in-channel or overbank flow? Y N (if no, go to groundwater* section below)

Estimated wetland area subject to periodic flooding (acres):

≥10

2-10

<2

Estimated % of flooded wetland classified SS, FO or both:

≥75

25-74

<25

*Evidence of groundwater discharge or recharge? Y NList: Discharge

HABITAT

Habitat for Listed or Proposed Threatened, Endangered, or Montana Natural Heritage Program S1, S2, or S3 Plants or Animals:

AA is Documented (D) or Suspected (S) to contain (circle based on definitions contained in instructions):

Primary or critical habitat (list species)

D S

T/E:

D S MNHP:

Secondary habitat (list species)

D S

T/E:

D S MNHP:

Incidental habitat (list species)

D S

T/E:

D S MNHP:

No usable habitat

D ST/E: NoneD S MNHP: NoneWildlife observations? None

Fish observations?

OTHERS

Do wetlands have potential to receive excess sediments, nutrients, or toxicants? Y N From:

Potential to receive: low to moderate levels

high levels

On TMDL List?

Y

NDoes site contain bog, fen, warm springs, >80 year-old forested wetland, or MNHP "S1" or "S2" plant association? Y N

List:

Is AA a known recreation / education site? Y N Type:Does AA offer strong potential for use as recreation / education site? Y N Type:

Abundant: An estimated 50% or more of wetlands in the same Major Montana Watershed Basin are similar in composition to the AA.

Aquatic wetland bed class: Any areas of open water dominated by plants that grow principally on or below the water surface for most of the growing season. Vegetation is non-persistent and includes submerged or floating-leaved rooted vascular plants, free-floating vascular plants, submergent mosses, and algae.

Bog: A peat-accumulating wetland that has no significant inflows or outflows and supports acidophilic mosses, particularly sphagnum (Mitch and Gosselink 1993).

Common: An estimated 10-50% of wetlands in the same Major Montana Watershed Basin are similar in composition to the AA.

Emergent wetland class: Vegetated wetland characterized by erect, herbaceous hydrophytes (e.g., sedges, rushes, grasses, bulrush, cattail), excluding mosses and lichens.

Fen: A peat-accumulating wetland that receives some drainage from surrounding mineral soil and usually supports marsh-like vegetation (Mitch and Gosselink 1993).

Forested wetland class: Vegetated wetland characterized by woody vegetation that is 6m (20 ft) tall or taller.

Functional unit: A figure derived by multiplying functional points for a given AA by its estimated acreage.

Functional point: A numerical rating, ranging from 0 to 1, assigned to a particular function/value based on given criteria.

Game fish: As listed in the Montana Code Annotated (1997), "game fish" means all species of the family *Salmonidae* (charrs, trout, salmon, grayling, and whitefish); all species of the genus *Stizostedion* (sandpike or sauger and walleyed pike or yellowpike perch); all species of the genus *Esox* (northern pike, pickerel, and muskellunge); all species of the genus *Micropterus* (bass); all species of the genus *Polyodon* (paddlefish); all species of the family *Acipenseridae* (sturgeon); all species of the genus *Lota* (burbot or ling); and the species *Ictalurus punctatus* (channel catfish).

Incidental habitat: Habitat that receives chance, inconsequential use by a given species or habitat conditions or the known distribution of the species would indicate this level of use. This term implies that, while it may be conceivable that a given species may occur at an AA at a given point in time, the chance is remote and the use is not likely to be repeated.

Incidental use: AA receives chance, inconsequential use by a given species or habitat conditions or the known distribution of the species would indicate this level of use. This term implies that, while it may be conceivable that a given species may occur at an AA at a given point in time, the chance is remote and the use is not likely to be repeated.

Little to No use: AA is regularly, infrequently, or sporadically used by extremely small numbers relative to local populations, or receives chance, inconsequential use in any numbers relative to local or transient populations.

Moderate use: AA is regularly used in small numbers relative to local populations, or infrequently or sporadically used in any numbers relative to local or transient populations.

Moss-lichen wetland class: Wetland where mosses or lichens cover substrates other than rock and where emergents, shrubs, or trees make up less than 30% of areal cover.

Native fish species: Implies a species indigenous to Montana; not necessarily to a given drainage or water body.

Open water: Any area of standing or flowing water without emergent (not including pioneer species), scrub-shrub, or forested vegetation (e.g., in most cases, a flooded wet meadow would not be considered to contain open water).

Permanent/perennial: Surface water is present throughout the year except during years of extreme drought.

Primary Habitat: Habitat essential to the short or long-term viability of individuals or populations. The presence of traditional breeding, spawning, nesting, denning, or critical migratory habitat, large seasonal congregations (including communal roosts, staging habitat, traditional foraging congregations, etc.), or USFWS-designated critical habitat or core areas in the AA indicates primary habitat, as does any occurrence of a T&E plant.

Rare: An estimated < 10% of wetlands in the same Major Montana Watershed Basin are similar in composition to the AA.

Regular use: AA is consistently, normally used by a given species or habitat conditions and the known distribution of the species would indicate this level of use. The presence of traditional breeding, nesting, denning, foraging, or seasonal habitat in the AA constitutes regular use, as does any occurrence of a T&E plant.

Scrub-shrub class: Vegetated wetland dominated by woody vegetation less than 6m (20 ft) tall. Species include shrubs, young trees, and stunted trees and shrubs.

Seasonal/intermittent: Surface water is present for extended periods, especially early in the growing season, or may persist throughout the growing season, but may be absent at the end of the growing season; or surface water does not flow continuously, as when water losses from evaporation or seepage exceed the available streamflow.

Secondary Habitat: Habitat that is occasionally or semi-regularly used by a given species, but that is not necessarily essential to the short or long-term viability of individuals or populations. Examples would include non-specific migration areas and occasional forage or perch sites. Primary habitat, as defined above, may occur in the general vicinity (e.g., within the project area, section, drainage, watershed, etc.), but not in the AA.

Substantial use: AA is regularly used in significant numbers relative to local or transient populations; includes regular seasonal use, such as migration stopovers and wintering.

Temporary/ephemeral: Surface water is present for brief periods during the growing season, but the water table is well below the surface most of the year; or surface water flows briefly in direct response to precipitation in the immediate vicinity and the channel is above the water table.

MDT Montana Wetland Assessment Form (revised 5/25/1999)

1. Project Name: Big Sandy Mitigation Area 2. Project #: _____ Control #: _____3. Evaluation Date: Mo 07 Day 15 Yr. 01 4. Evaluator(s): JB/RH 5. Wetlands/Site #(s): Main cells6. Wetland Location(s): I. Legal: T 29N or S; R 13E or W; S 21 : T _____ N or S; R _____ E or W; S _____II. Approx. Stationing or Mileposts: 26 miles north of Big Sandy, east of Highway 87.III. Watershed: 10050005 GPS Reference No. (if applies): NAOther Location Information: Chouteau County7. a. Evaluating Agency: MDT 8. Wetland size: (total acres) _____ (visually estimated)b. Purpose of Evaluation: 15+ (measured, e.g. by GPS [if applies])

1. _____ Wetlands potentially affected by MDT project

2. _____ Mitigation wetlands; pre-construction

3. ☒ Mitigation wetlands; post-construction

4. _____ Other

9. Assessment area: (AA, tot., ac., _____ (visually estimated)

see instructions on determining AA) 13+ (measured, e.g. by GPS [if applies])

10. Classification of Wetland and Aquatic Habitats in AA (HGM according to Brinson, first col.; USFWS according to Cowardin [1979], remaining cols.)

HGM Class	System	Subsystem	Class	Water Regime	Modifier	% of AA
Depress. (GW)	Palustrine	—	EM	SF	E	60
II	II	—	AB	SPF	E	25
II	II	—	UB	IE	E	15

(Abbreviations: System: Palustrine (P)/ Subsystem: none/ Classes: Rock Bottom (RB), Unconsolidated bottom (UB), Aquatic Bed (AB), Unconsolidated Shore (US), Moss-lichen Wetland (ML), Emergent Wetland (EM), Scrub-Shrub Wetland (SS), Forested Wetland (FO)/ System: Lacustrine (L), Subsystem: Limnetic (2)/ Classes: RB, UB, AB/ Subsystem: Littoral (4)/ Classes: RB, UB, AB, US, EM/ System: Riverine (R)/ Subsystem: Lower Perennial (2)/ Classes: RB, UB, AB, US, EM/ Subsystem: Upper Perennial (3)/ Classes: RB, UB, AB, US/ Water Regimes: Permanently Flooded (H), Intermittently Exposed (G), Semipermanently Flooded (F), Seasonally Flooded (C), Saturated (B), Temporarily Flooded (A), Intermittently Flooded (J) Modifiers: Excavated (E), Impounded (I), Diked (D), Partly Drained (PD), Farmed (F), Artificial (A) HGM Classes: Riverine, Depressional, Slope, Mineral Soil Flats, Organic Soil Flats, Lacustrine Fringe

11. Estimated relative abundance: (of similarly classified sites within the same Major Montana Watershed Basin, see definitions)

(Circle one) Unknown Rare Common Abundant

Comments: _____

12. General condition of AA:

I. Regarding disturbance: (use matrix below to determine [circle] appropriate response)

Conditions within AA	Predominant conditions adjacent to (within 500 feet of) 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 natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings.	low disturbance	low disturbance	moderate disturbance
AA not cultivated, but moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads or buildings.	moderate disturbance	moderate disturbance	high disturbance
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density.	high disturbance	high disturbance	high disturbance

Comments: (types of disturbance, intensity, season, etc.) Adjacent highway; low traffic (2-lane)II. Prominent woody, alien, & introduced species (including those not domesticated, feral): (list) CIR ARV, SDN ASP, KOL SCO

III. Provide brief descriptive summary of AA and surrounding land use/habitat:

Large marsh/open water complex with good habitat interspersed; surrounded by rangeland, adjacent to 2-lane highway.

13. Structural Diversity: (based on number of "Cowardin" vegetated classes present [do not include unvegetated classes], see #10 above)

# of "Cowardin" vegetated classes present in AA (see #10)	> 3 vegetated classes (or > 2 if one is forested)	2 vegetated classes (or 1 if forested)	≤ 1 vegetated class
Rating (circle)	High	Moderate	Low

Comments: _____

SECTION PERTAINING TO FUNCTIONS & VALUES ASSESSMENT

14A. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals:

I. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions):

Primary or critical habitat (list species)

D S

Secondary habitat (list species)

D S

Incidental habitat (list species)

D S

No usable habitat

D S

Bald eagle, piping plover

II. Rating (use the conclusions from I above and the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function)

Highest Habitat Level	doc./primary	sus./primary	doc./secondary	sus./secondary	doc./incidental	sus./incidental	None
Functional Points and Rating	1 (H)	.9 (H)	.8 (M)	.7 (M)	.5 (L)	<u>.3 (L)</u>	0 (L)

Sources for documented use (e.g. observations, records, etc):

14B. Habitat for plant or animals rated S1, S2, or S3 by the Montana Natural Heritage Program: (not including species listed in 14A above)

I. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions):

Primary or critical habitat (list species)

D S

Secondary habitat (list species)

D S

Incidental habitat (list species)

D S

No usable habitat

D S

Montana leopard frog

II. Rating (use the conclusions from I above and the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function)

Highest Habitat Level	doc./primary	sus./primary	doc./secondary	sus./secondary	doc./incidental	sus./incidental	None
Functional Points and Rating	1 (H)	.8 (H)	.7 (M)	<u>.6 (M)</u>	.2 (L)	.1 (L)	0 (L)

Sources for documented use (e.g. observations, records, etc.):

Black-necked st. it's observed on the site but nesting unconfirmed. Leopard frogs
 14C. General Wildlife Habitat Rating: (black-necked st. it's "water species")
 I. Evidence of overall wildlife use in the AA (circle substantial, moderate, or low based on supporting evidence): Observed in 1977 + '98, but not during 2001.

Substantial (based on any of the following [check]):

- ☒ 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 [check]):

- ☐ few or no wildlife observations during peak use periods
☐ little to no wildlife sign
☐ sparse adjacent upland food sources
☐ interviews with local biologists with knowledge of the AA

Moderate (based on any of the following [check]):

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

II. Wildlife habitat features (working from top to bottom, circle appropriate AA attributes in matrix to arrive at 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 of the AA (see #10). Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; and A = absent [see instructions for further definitions of these terms].)

Structural diversity (see #13)	High								Moderate								Low			
	Even				Uneven				Even				Uneven				Even			
Class cover distribution (all vegetated classes)	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
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	<u>P/P</u>	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12i)	E	E	E	H	E	E	H	H	E	H	H	M	<u>E</u>	H	M	M	E	H	M	M
Moderate disturbance at AA (see #12i)	H	H	H	H	H	H	H	M	H	H	M	M	H	M	M	L	H	M	L	L
High disturbance at AA (see #12i)	M	M	M	L	M	M	L	L	M	M	L	L	M	L	L	L	L	L	L	L

III. Rating (use the conclusions from I and II above and the matrix below to arrive at [circle] the functional points and rating [E = exceptional, H = high, M = moderate, or L = low] for this function)

Evidence of wildlife use (i)	Wildlife habitat features rating (ii)			
	Exceptional	High	Moderate	Low
<u>Substantial</u>	<u>1 (E)</u>	.9 (H)	.8 (H)	.7 (M)
Moderate	.9 (H)	.7 (M)	.5 (M)	.3 (L)
Minimal	.6 (M)	.4 (M)	.2 (L)	.1 (L)

Comments: High amounts of wildlife use.

Main

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

i. Habitat Quality (circle appropriate AA attributes in matrix to arrive at exceptional (E), high (H), moderate (M), or low (L) quality rating.)

Duration of surface water in AA	Permanent / Perennial			Seasonal / Intermittent			Temporary / Ephemeral		
Cover - % of waterbody in AA containing cover objects such as submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation, etc.	>25%	10-25%	<10%	>25%	10-25%	<10%	>25%	10-25%	<10%
Shading - >75% of streambank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	E	E	H	H	H	M	M	M	M
Shading - 50 to 75% of streambank or shoreline within AA contains rip. or wetland scrub-shrub or forested communities	H	H	M	M	M	M	M	L	L
Shading - < 50% of streambank or shoreline within AA contains rip. or wetland scrub-shrub or forested communities	H	M	M	M	L	L	L	L	L

ii. Modified Habitat Quality (Circle the appropriate response to the following question. If answer is Y, then reduce rating in i above by one level [E = H, H = M, M = L, L = L]). Is fish use of the AA precluded or significantly reduced by a culvert, dike, or other man-made structure or activity or is the waterbody included on the MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support? Y N Modified habitat quality rating = (circle) E H M L

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [circle] the functional points and rating [E = exceptional, H = high, M = moderate, or L = low] for this function)

Types of fish known or suspected within AA	Modified Habitat Quality (ii)			
	Exceptional	High	Moderate	Low
Native game fish	1 (E)	9 (H)	7 (M)	5 (M)
Introduced game fish	9 (H)	8 (H)	6 (M)	4 (M)
Non-game fish	7 (M)	6 (M)	5 (M)	3 (L)
No fish	5 (M)	3 (L)	2 (L)	1 (L)

Comments:

14E. Flood Attenuation: (applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA are not flooded from in-channel or overbank flow, circle NA here and proceed to next function.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function)

Estimated wetland area in AA subject to periodic flooding	> 10 acres			<10, >2 acres			<2 acres		
% of flooded wetland classified as forested, scrub/shrub, or both	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains no outlet or restricted outlet	1(H)	9(H)	6(M)	8(H)	7(H)	5(M)	4(M)	3(L)	2(L)
AA contains unrestricted outlet	9(H)	8(H)	5(M)	7(H)	6(M)	4(M)	3(L)	2(L)	1(L)

ii. Are residences, businesses, or other features which may be significantly damaged by floods located within 0.5 miles downstream of the AA (circle)? Y N

Comments:

Small drainage contributes to site, but hydrology mostly groundwater.

14F. Short and Long Term Surface Water Storage: (Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow. If no wetlands in the AA are subject to flooding or ponding, circle NA here and proceed with the evaluation.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see instructions for further definitions of these terms].)

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding	>5 acre feet			<5, >1 acre feet			≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond ≥ 5 out of 10 years	1(H)	9(H)	8(H)	8(H)	6(M)	5(M)	4(M)	3(L)	2(L)
Wetlands in AA flood or pond < 5 out of 10 years	9(H)	8(H)	7(M)	7(M)	5(M)	4(M)	3(L)	2(L)	1(L)

Comments:

14G. Sediment/Nutrient/Toxicant Retention and Removal: (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, circle NA here and proceed with the evaluation.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function.)

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with 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 with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	≥ 70%		< 70%		≥ 70%		< 70%	
Evidence of flooding or ponding in AA	Yes	No	Yes	No	Yes	No	Yes	No
AA contains no or restricted outlet	1 (H)	8 (H)	7 (M)	5 (M)	5 (M)	4 (M)	3 (L)	2 (L)
AA contains unrestricted outlet	9 (H)	7 (M)	6 (M)	4 (M)	4 (M)	3 (L)	2 (L)	1 (L)

Comments: Macro-invertebrate sampling indicates impaired water quality.

14H Sediment/Shoreline Stabilization: (applies only if AA occurs on or within the banks or a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action). If does not apply, circle NA here and proceed to next function)

I. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [E = exceptional, H = high, M = moderate, or L = low] for this function.

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses	Duration of surface water adjacent to rooted vegetation		
	permanent / perennial	seasonal / intermittent	Temporary / ephemeral
> 65%	1 (H)	9 (H)	7 (M)
35-64%	7 (M)	6 (M)	5 (M)
< 35%	3 (L)	2 (L)	1 (L)

Comments:

14I. Production Export/Food Chain Support:

I. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function. Factor A = acreage of vegetated component in the AA; Factor B = structural diversity rating from #13; Factor C = whether or not the AA contains a surface or subsurface outlet; the final three rows pertain to duration of surface water in the AA, where P/P = permanent/perennial; S/I = seasonal/intermittent; T/E/A = temporary/ephemeral or absent (see instructions for further definitions of these terms).

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

Comments:

14J. Groundwater Discharge/Recharge: (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 portions
☐ Wetland contains an outlet, but no inlet
☐ Other

ii. Recharge Indicators

- ☐ Permeable substrate present without underlying impeding layer
☐ Wetland contains inlet but no outlet
☐ Other

III. Rating: Use the information from i and ii above and the table below to arrive at [circle] the functional points and rating [H = high, L = low] for this function.

Criteria	Functional Points and Rating
AA is known Discharge/Recharge area or one or more indicators of D/R present	1 (H)
No Discharge/Recharge indicators present	.1 (L)
Available Discharge/Recharge information inadequate to rate AA D/R potential	N/A (Unknown)

Comments:

14K. Uniqueness:

I. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] 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 MNHP			AA does not contain previously cited rare types and structural diversity (#13) is high or contains plant association listed as "S2" by the MNHP			AA does not contain previously cited rare types or associations and structural diversity (#13) is low-moderate		
Estimated relative abundance (#11)	rare	common	abundant	rare	common	abundant	rare	common	abundant
Low disturbance at AA (#12i)	1 (H)	.9 (H)	.8 (H)	.8 (H)	.6 (M)	.5 (M)	.5 (M)	.4 (M)	.3 (L)
Moderate disturbance at AA (#12i)	.9 (H)	.8 (H)	.7 (M)	.7 (M)	.5 (M)	.4 (M)	.4 (M)	.3 (L)	.2 (L)
High disturbance at AA (#12i)	.8 (H)	.7 (M)	.6 (M)	.6 (M)	.4 (M)	.3 (L)	.3 (L)	.2 (L)	.1 (L)

Comments:

14L. Recreation/Education Potential: i. Is the AA a known rec./ed. site: (circle) Y N (if yes, rate as [circle] High [1] and go to ii; if no go to 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 strong potential for rec./ed. use? Y N

(If yes, go to ii, then proceed to iv; if no, then rate as [circle] Low [0.1])

iv. Rating (use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function.

Ownership	Disturbance at AA (#12)		
	low	moderate	high
public ownership	1 (H)	.5 (M)	.2 (L)
private ownership	.7 (M)	.3 (L)	.1 (L)

Comments: Easy access, publically owned, close to Havre + Big Sandy.

FUNCTION & VALUE SUMMARY & OVERALL RATING

Function & 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	0.3	1	
B. MT Natural Heritage Program Species Habitat	MOD	0.6	1	
C. General Wildlife Habitat	EXCEP.	1.0	1	
D. General Fish/Aquatic Habitat	NA	—	—	
E. Flood Attenuation	MOD	0.5	1	
F. Short and Long Term Surface Water Storage	HIGH	0.9	1	
G. Sediment/Nutrient/Toxicant Removal	MOD	0.5	1	
H. Sediment/Shoreline Stabilization	MOD	0.7	1	
I. Production Export/Food Chain Support	HIGH	0.9	1	
J. Groundwater Discharge/Recharge	HIGH	1.0	1	
K. Uniqueness	MOD	0.4	1	
L. Recreation/Education Potential	HIGH	1.0	1	
Totals:		7.8	11	

71%

OVERALL ANALYSIS AREA (AA) RATING: (Circle appropriate category based on the criteria outlined below) I II III IV**Category I Wetland:** (Must satisfy one of the following criteria; if does not meet criteria, go to Category II)

- ___ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; or
- ___ Score of 1 functional point for Uniqueness; or
- ___ Score of 1 functional point for Flood Attenuation and answer to Question 14E.ii is "yes"; or
- ___ Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; if not satisfied, go to Category IV)

- ☒ Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; or
- ☒ Score of .9 or 1 functional point for General Wildlife Habitat; or
- ___ Score of .9 or 1 functional point for General Fish/Aquatic Habitat; or
- ___ "High" to "Exceptional" ratings for both General Wildlife Habitat and General Fish/Aquatic Habitat; or
- ___ Score of .9 functional point for Uniqueness; or
- ☒ Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

Category III Wetland: (Criteria for Categories I, II or IV not satisfied)**Category IV Wetland:** (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if does not satisfy criteria go to Category III)

- ___ "Low" rating for Uniqueness; and
- ___ "Low" rating for Production Export/Food Chain Support; and
- ___ Total actual functional points < 30% (round to nearest whole #) of total possible functional points

MDT Montana Wetland Assessment Form (revised 5/25/1999)

1. Project Name: Big Sandy Mitigation Area 2. Project #: _____ Control #: _____3. Evaluation Date: Mo 07 Day 15 Yr. 01 4. Evaluator(s): JB/RH 5. Wetlands/Site #(s): North Depression6. Wetland Location(s): I. Legal: T 29N S: R 13E W: S 21 : T N S: R E W: S SII. Approx. Stationing or Mileposts: 26 miles north of Big Sandy, east of Highway 87.III. Watershed: 10050005 GPS Reference No. (if applies): N/AOther Location Information: Chouteau County7. a. Evaluating Agency: MDT 8. Wetland size: (total acres) 21 (visually estimated)b. Purpose of Evaluation: 21 (measured, e.g. by GPS (if applies))1. Wetlands potentially affected by MDT project2. Mitigation wetlands; pre-construction3. XX Mitigation wetlands; post-construction4. Other9. Assessment area: (AA, tot., ac., 21 (visually estimated)see instructions on determining AA) 21 (measured, e.g. by GPS (if applies))

10. Classification of Wetland and Aquatic Habitats in AA (HGM according to Brinson, first col.; USFWS according to Cowardin [1979], remaining cols.)

HGM Class	System	Subsystem	Class	Water Regime	Modifier	% of AA
<u>Depress. (closed)</u>	<u>Palustrine</u>	<u>—</u>	<u>EM</u>	<u>TF</u>	<u>E</u>	<u>100</u>

(Abbreviations: System: Palustrine (P)/ Subsystem: none/ Classes: Rock Bottom (RB), Unconsolidated bottom (UB), Aquatic Bed (AB), Unconsolidated Shore (US), Moss-lichen Wetland (ML), Emergent Wetland (EM), Scrub-Shrub Wetland (SS), Forested Wetland (FO)/ System: Lacustrine (L)/ Subsystem: Littoral (2)/ Classes: RB, UB, AB/ Subsystem: Littoral (4)/ Classes: RB, UB, AB, US, EM/ System: Riverine (R)/ Subsystem: Lower Perennial (2)/ Classes: RB, UB, AB, US, EM/ Subsystem: Upper Perennial (3)/ Classes: RB, UB, AB, US/ Water Regimes: Permanently Flooded (H), Intermittently Exposed (G), Semipermanently Flooded (F), Seasonally Flooded (C), Saturated (B), Temporarily Flooded (A), Intermittently Flooded (J) Modifiers: Excavated (E), Impounded (I), Diked (D), Partly Drained (PD), Farmed (F), Artificial (A) HGM Classes: Riverine, Depressional, Slope, Mineral Soil Flats, Organic Soil Flats, Lacustrine Fringe

11. Estimated relative abundance: (of similarly classified sites within the same Major Montana Watershed Basin, see definitions)

(Circle one) Unknown Rare Common Abundant

Comments: _____

12. General condition of AA:

I. Regarding disturbance: (use matrix below to determine (circle) appropriate response)

Conditions within AA	Predominant conditions adjacent to (within 500 feet of) 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 natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings	low disturbance	<u>low disturbance</u>	moderate disturbance
AA not cultivated, but moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads or buildings	moderate disturbance	moderate disturbance	high disturbance
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density	high disturbance	high disturbance	high disturbance

Comments: (types of disturbance, intensity, season, etc.) Adjacent highway; low traffic (2-lane)II. Prominent weedy, alien, & introduced species (including those not domesticated, feral): (list) CIR ARV, SON ASP, COL SLO

III. Provide brief descriptive summary of AA and surrounding land use/habitat:

Small depression north of main cells, adjacent to rangeland.

13. Structural Diversity: (based on number of "Cowardin" vegetated classes present (do not include unvegetated classes), see #10 above)

# of "Cowardin" vegetated classes present in AA (see #10)	≥ 3 vegetated classes (or ≥ 2 if one is forested)	2 vegetated classes (or 1 if forested)	≤ 1 vegetated class
Rating (circle)	High	Moderate	<u>Low</u>

Comments: _____

SECTION PERTAINING to FUNCTIONS & VALUES ASSESSMENT

14A. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals:

I. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions):

Primary or critical habitat (list species) D S _____
 Secondary habitat (list species) D S _____
 Incidental habitat (list species) D S _____
 No usable habitat D S None

II. Rating (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function)

Highest Habitat Level	doc./primary	sus./primary	doc./secondary	sus./secondary	doc./incidental	sus./incidental	None
Functional Points and Rating	1 (H)	.9 (H)	.8 (M)	.7 (M)	.5 (L)	.3 (L)	<u>0 (L)</u>

Sources for documented use (e.g. observations, records, etc.):

14B. Habitat for plant or animals rated S1, S2, or S3 by the Montana Natural Heritage Program: (not including species listed in 14A above)

I. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions):

Primary or critical habitat (list species) D S _____
 Secondary habitat (list species) D S _____
 Incidental habitat (list species) D S _____
 No usable habitat D S None

II. Rating (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function)

Highest Habitat Level	doc./primary	sus./primary	doc./secondary	sus./secondary	doc./incidental	sus./incidental	None
Functional Points and Rating	1 (H)	.8 (H)	.7 (M)	.6 (M)	.2 (L)	.1 (L)	<u>0 (L)</u>

Sources for documented use (e.g. observations, records, etc.):

14C. General Wildlife Habitat Rating:

I. Evidence of overall wildlife use in the AA (circle substantial, moderate, or low based on supporting evidence):

Substantial (based on any of the following [check]):

- ☐ 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 [check]):

- ☒ few or no wildlife observations during peak use periods
- ☒ little to no wildlife sign
- ☐ sparse adjacent upland food sources
- ☐ interviews with local biologists with knowledge of the AA

Moderate (based on any of the following [check]):

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

II. Wildlife habitat features (working from top to bottom, circle appropriate AA attributes in matrix to arrive at 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 of the AA (see #10). Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; and A = absent [see instructions for further definitions of these terms].)

Structural diversity (see #13)	High								Moderate								Low			
	Even				Uneven				Even				Uneven				Even			
Class cover distribution (all vegetated classes)	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
Duration of surface water in ≥ 10% of AA																				
Low disturbance at AA (see #12i)	E	E	E	H	E	E	H	H	E	H	H	M	E	H	M	M	E	H	<u>M</u>	M
Moderate disturbance at AA (see #12i)	H	H	H	H	H	H	H	M	H	H	M	M	H	M	M	L	H	M	L	L
High disturbance at AA (see #12i)	M	M	M	L	M	M	L	L	M	M	L	L	M	L	L	L	L	L	L	L

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [circle] the functional points and rating [E = exceptional, H = high, M = moderate, or L = low] for this function)

Evidence of wildlife use (i)	Wildlife habitat features rating (ii)			
	Exceptional	High	Moderate	Low
Substantial	1 (E)	.9 (H)	.8 (H)	.7 (M)
Moderate	.9 (H)	.7 (M)	.5 (M)	.3 (L)
Minimal	.6 (M)	.4 (M)	<u>.2 (L)</u>	.1 (L)

Comments:

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

i. Habitat Quality (circle appropriate AA attributes in matrix to arrive at exceptional (E), high (H), moderate (M), or low (L) quality rating.)

Duration of surface water in AA	Permanent / Perennial			Seasonal / Intermittent			Temporary / Ephemeral		
Cover - % of waterbody in AA containing cover objects such as submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation, etc.	>25%	10-25%	<10%	>25%	10-25%	<10%	>25%	10-25%	<10%
Shading - >75% of streambank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	E	E	H	H	H	M	M	M	M
Shading - 50 to 75% of streambank or shoreline within AA contains rip. or wetland scrub-shrub or forested communities	H	H	M	M	M	M	M	L	L
Shading - < 50% of streambank or shoreline within AA contains rip. or wetland scrub-shrub or forested communities	H	M	M	M	L	L	L	L	L

ii. Modified Habitat Quality (Circle the appropriate response to the following question. If answer is Y, then reduce rating in i above by one level [E = H, H = M, M = L, L = L]). Is fish use of the AA precluded or significantly reduced by a culvert, dike, or other man-made structure or activity or is the waterbody included on the MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support? Y N Modified habitat quality rating = (circle) E H M L

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [circle] the functional points and rating [E = exceptional, H = high, M = moderate, or L = low] for this function)

Types of fish known or suspected within AA	Modified Habitat Quality (i)			
	Exceptional	High	Moderate	Low
Native game fish	1 (E)	.9 (H)	.7 (M)	.5 (M)
Introduced game fish	.9 (H)	.8 (H)	.6 (M)	.4 (M)
Non-game fish	.7 (M)	.6 (M)	.5 (M)	.3 (L)
No fish	.5 (M)	.3 (L)	.2 (L)	.1 (L)

Comments:

14E. Flood Attenuation: (applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA are not flooded from in-channel or overbank flow, circle NA here and proceed to next function.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function)

Estimated wetland area in AA subject to periodic flooding	> 10 acres			<10, >2 acres			<2 acres		
% of flooded wetland classified as forested, scrub/shrub, or both	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains no outlet or restricted outlet	1(H)	.9(H)	.8(M)	.8(H)	.7(H)	.5(M)	.4(M)	.3(L)	.2(L)
AA contains unrestricted outlet	.9(H)	.8(H)	.5(M)	.7(H)	.6(M)	.4(M)	.3(L)	.2(L)	.1(L)

ii. Are residences, businesses, or other features which may be significantly damaged by floods located within 0.5 miles downstream of the AA (circle)? Y N
Comments:

14F. Short and Long Term Surface Water Storage: (Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow. If no wetlands in the AA are subject to flooding or ponding, circle NA here and proceed with the evaluation.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see instructions for further definitions of these terms].)

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding	>5 acre feet			<5, >1 acre feet			≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond ≥ 5 out of 10 years	1(H)	.9(H)	.8(H)	.8(H)	.6(M)	.5(M)	.4(M)	.3(L)	.2(L)
Wetlands in AA flood or pond < 5 out of 10 years	.9(H)	.8(H)	.7(M)	.7(M)	.5(M)	.4(M)	.3(L)	.2(L)	.1(L)

Comments:

14G. Sediment/Nutrient/Toxicant Retention and Removal: (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, circle NA here and proceed with the evaluation.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function.)

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with 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 with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	≥ 70%		< 70%		≥ 70%		< 70%	
Evidence of flooding or ponding in AA	Yes	No	Yes	No	Yes	No	Yes	No
AA contains no or restricted outlet	1 (H)	.8 (H)	.7 (M)	.5 (M)	.5 (M)	.4 (M)	.3 (L)	.2 (L)
AA contains unrestricted outlet	.9 (H)	.7 (M)	.6 (M)	.4 (M)	.4 (M)	.3 (L)	.2 (L)	.1 (L)

Comments:

14H Sediment/Shoreline Stabilization: (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 which is subject to wave action. If does not apply, circle NA here and proceed to next function)

I. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [E = exceptional, H = high, M = moderate, or L = low] for this function.

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses	Duration of surface water adjacent to rooted vegetation		
	permanent / perennial	seasonal / intermittent	Temporary / ephemeral
> 65%	1 (H)	.9 (H)	.7 (M)
35-64%	.7 (M)	.6 (M)	.5 (M)
< 35%	.3 (L)	.2 (L)	.1 (L)

Comments:

14I. Production Export/Food Chain Support:

I. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function. Factor A = acreage of vegetated component in the AA; Factor B = structural diversity rating from #13; Factor C = whether or not the AA contains a surface or subsurface outlet; the final three rows pertain to duration of surface water in the AA, where P/P = permanent/perennial; S/I = seasonal/intermittent; T/E/A = temporary/ephemeral or absent [see instructions for further definitions of these terms].

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

Comments:

14J. Groundwater Discharge/Recharge: (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 present without underlying impeding layer
☐ Wetland contains inlet but no outlet
☐ Other

III. Rating: Use the information from i and ii above and the table below to arrive at [circle] the functional points and rating [H = high, L = low] for this function.

Criteria	Functional Points and Rating
AA is known Discharge/Recharge area or one or more indicators of D/R present	1 (H)
No Discharge/Recharge indicators present	.1 (L)
Available Discharge/Recharge information inadequate to rate AA D/R potential	N/A (Unknown)

Comments:

14K. Uniqueness:

I. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] 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 MNHP			AA does not contain previously cited rare types and structural diversity (#13) is high or contains plant association listed as "S2" by the MNHP			AA does not contain previously cited rare types or associations and structural diversity (#13) is low-moderate		
Estimated relative abundance (#11)	rare	common	abundant	rare	common	abundant	rare	common	abundant
Low disturbance at AA (#12i)	1 (H)	.9 (H)	.8 (H)	.8 (H)	.6 (M)	.5 (M)	.5 (M)	.4 (M)	.3 (L)
Moderate disturbance at AA (#12i)	.9 (H)	.8 (H)	.7 (M)	.7 (M)	.5 (M)	.4 (M)	.4 (M)	.3 (L)	.2 (L)
High disturbance at AA (#12i)	.8 (H)	.7 (M)	.6 (M)	.6 (M)	.4 (M)	.3 (L)	.3 (L)	.2 (L)	.1 (L)

Comments:

14L. Recreation/Education Potential: I. Is the AA a known rec./ed. site: (circle) Y N (If yes, rate as [circle] High [1] and go to ii; if no go to 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 strong potential for rec./ed. use? Y N

(If yes, go to ii, then proceed to iv; if no, then rate as [circle] Low [0.1])

IV. Rating (use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low] for this function.

Ownership	Disturbance at AA (#12j)		
	low	moderate	high
public ownership	1 (H)	.5 (M)	.2 (L)
private ownership	.7 (M)	.3 (L)	.1 (L)

Comments:

FUNCTION & VALUE SUMMARY & OVERALL RATING

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units; (Actual Points x Estimated AA Acreage)
A. Listed/Proposed T&E Species Habitat	None	0	1	
B. MT Natural Heritage Program Species Habitat	None	0	1	
C. General Wildlife Habitat	Low	0.2	1	
D. General Fish/Aquatic Habitat	NA	—	—	
E. Flood Attenuation	NA	—	—	
F. Short and Long Term Surface Water Storage	Low	0.2	1	
G. Sediment/Nutrient/Toxicant Removal	NA	—	—	
H. Sediment/Shoreline Stabilization	NA	—	—	
I. Production Export/Food Chain Support	Low	0.2	1	
J. Groundwater Discharge/Recharge	High	1	1	
K. Uniqueness	MOD	0.4	1	
L. Recreation/Education Potential	Low	0.1	1	
Totals:		2.1	8	

26%

OVERALL ANALYSIS AREA (AA) RATING: (Circle appropriate category based on the criteria outlined below)

I

II

III

IV

Category I Wetland: (Must satisfy one of the following criteria; if does not meet criteria, go to Category II)

- ___ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; or
- ___ Score of 1 functional point for Uniqueness; or
- ___ Score of 1 functional point for Flood Attenuation and answer to Question 14E.ii is "yes"; or
- ___ Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; if not satisfied, go to Category IV)

- ___ Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; or
- ___ Score of .9 or 1 functional point for General Wildlife Habitat; or
- ___ Score of .9 or 1 functional point for General Fish/Aquatic Habitat; or
- ___ "High" to "Exceptional" ratings for both General Wildlife Habitat and General Fish/Aquatic Habitat; or
- ___ Score of .9 functional point for Uniqueness; or
- ___ Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

Category III Wetland: (Criteria for Categories I, II or IV not satisfied)**Category IV Wetland:** (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if does not satisfy criteria go to Category III)

- ☒ "Low" rating for Uniqueness; and
- ☒ "Low" rating for Production Export/Food Chain Support; and
- ☒ Total actual functional points < 30% (round to nearest whole #) of total possible functional points

DATA FORM
ROUTINE WETLAND
(1987 COE Wetlands Delineation Manual)

Project/Site:	Big Sandy Wetland Mitigation Site	Project No:	Task 017	Date:	15-JUL-2001
Applicant/Owner:	Montana Department of Transportation			County:	Chouteau
Investigators:	Berglund / Harris			State:	Montana
				Plot ID:	2

Do Normal Circumstances exist on the site?	Yes <input checked="" type="radio"/> No <input type="radio"/>	Community ID: Emergent / Aquatic Bed
Is the site significantly disturbed (Atypical Situation)?	Yes <input type="radio"/> No <input checked="" type="radio"/>	Transect ID: NA
Is the area a potential Problem Area? (If needed, explain on the reverse side)	Yes <input type="radio"/> No <input checked="" type="radio"/>	Field Location: Cell#2 (SE "crescent" cell)

VEGETATION (USFWS Region No. 9)

[illegible]

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 8/8 = 100.00%	FAC Neutral: 7/7 = 100.00% Numeric Index: 12/8 = 1.50
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Remarks:

HYDROLOGY

<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: = 36 (in.)</p> <p>Depth to Free Water in PH: 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>YES</u> Water Marks</p> <p><u>YES</u> Drift Lines</p> <p><u>YES</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:
Wet signature on aerial photos. Soils saturated outside of inundated areas; likely groundwater connection.

DATA FORM
ROUTINE WETLAND
(1987 COE Wetlands Delineation Manual)

Project/Site:	Big Sandy Wetland Mitigation Site	Project No:	Task 017	Date:	15-Jul-2001
Applicant/Owner:	Montana Department of Transportation			County:	Chouteau
Investigators:	Berglund / Harris			State:	Montana
				Plot ID:	2

SOILS

Map Unit Name (Series and Phase):	Unknown	Mapped Hydraulic Inclusion?	
Map Symbol: NA	Drainage Class: Unknown	Field Observations Confirm Mapped Type?	Yes <input type="radio"/> No <input checked="" type="radio"/>
Taxonomy (Subgroup):	Unknown		
Profile Description			

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc
10	A/B	2.5Y4/3	N/A	N/A N/A	Sand

Hydric Soil Indicators:	
<u>NO</u> Histosol	<u>NO</u> Concretions
<u>NO</u> Histic Epipedon	<u>YES</u> High Organic Content in Surface Layer in Sandy Soils
<u>NO</u> Sulfidic Odor	<u>YES</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	<u>NO</u> Other (Explain in Remarks)

Remarks: Heavy black streaking present (2.5Y3/1). Site was formerly sand pit for railroad; soils mainly sand in the B horizon. Soils excavated, so units mapped by SCS/NRCS would be of little use.

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:
Sample in Cell #3, SE corner of site. Sample is representative of entire site. Marsh / open water complex.

DATA FORM
ROUTINE WETLAND

(1987 COE Wetlands Delineation Manual)

Project/Site:	Big Sandy Wetland Mitigation Site	Project No:	Task 017	Date:	15-Jul-2001
Applicant/Owner:	Montana Department of Transportation			County:	Chouteau
Investigators:	Berglund / Harris			State:	Montana
				Plot ID:	1

Do Normal Circumstances exist on the site?	Yes <input checked="" type="radio"/> No <input type="radio"/>	Community ID: Emergent
Is the site significantly disturbed (Atypical Situation)?	Yes <input type="radio"/> No <input checked="" type="radio"/>	Transect ID: NA
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)		SE corner of N cell

VEGETATION

(USFWS Region No. 9)

[illegible]

Percent of Dominant Species that are OBL, FACW or FAC:
(excluding FAC-) 8/9 = 88.89%

FAC Neutral:	6/6	= 100.00%
Numeric Index:	16/9	= 1.78

Remarks:

HYDROLOGY

<p><u>YES</u> Recorded Data(Describe in Remarks): <u>NO</u> Stream, Lake or Tide Gauge <u>YES</u> Aerial Photographs <u>NO</u> Other</p> <p><u>NO</u> No Recorded Data</p>	<p>Wetland Hydrology Indicators</p> <p>Primary Indicators</p> <p><u>YES</u> Inundated <u>YES</u> Saturated in Upper 12 Inches <u>YES</u> Water Marks <u>YES</u> Drift Lines <u>NO</u> Sediment Deposits <u>NO</u> Drainage Patterns in Wetlands</p> <p>Secondary Indicators</p> <p><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 Test <u>NO</u> Other(Explain in Remarks)</p>
<p>Field Observations</p> <p>Depth of Surface Water: = 10 (in.)</p> <p>Depth to Free Water in Pit: N/A (in.)</p> <p>Depth to Saturated Soil: N/A (in.)</p>	
<p>Remarks:</p> <p>Wet signature on aerial photos. Non-inundated soils are saturated to surface. Likely groundwater connection.</p>	

DATA FORM
ROUTINE WETLAND

(1987 COE Wetlands Delineation Manual)

Project/Site:	Big Sandy Wetland Mitigation Site	Project No:	Task 017	Date:	15-Jul-2001
Applicant/Owner:	Montana Department of Transportation			County:	Chouteau
Investigators:	Berglund / Harris			State:	Montana
				Plot ID:	1

SOILS

Map Unit Name (Series and Phase):	Unknown	Mapped Hydric Inclusion?	
Map Symbol: NA	Drainage Class: Unknown	Field Observations Confirm Mapped Type?	Yes <input type="radio"/> No <input checked="" type="radio"/>
Taxonomy (Subgroup):	Unknown		
Profile Description			

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
10	A/8	2.5Y4/2	N/A	N/A	N/A	Sand

Hydric Soil Indicators:

<u>NO</u> Histosol	<u>NO</u> Concretions
<u>NO</u> Histic Epipedon	<u>YES</u> High Organic Content in Surface Layer in Sandy Soils
<u>NO</u> Sulfidic Odor	<u>YES</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	<u>NO</u> Other (Explain in Remarks)

Remarks:

Heavy black streaking present (2.5Y3/1). Site was formerly sand pit for railroad; soils mainly sand in the B horizon. Soils excavated, so units mapped by SCS/NRCS would be of little use.

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:

Sample point within large marsh complex; representative of much of the mitigation site.

Do Normal Circumstances exist on the site?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Community ID: Emergent
Is the site significantly disturbed (Atypical Situation)?	<input type="radio"/> Yes <input checked="" type="radio"/> No	Transect ID: NA
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)		small depression N. of main cells

VEGETATION (USFWS Region No. 9)

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 5/7 = 71.43%	FAC Neutral: 4/5 = 80.00% Numeric Index: 15/7 = 2.14
Remarks:	

HYDROLOGY

DATA FORM
ROUTINE WETLAND

(1987 COE Wetlands Delineation Manual)

SOILS

Map Unit Name (Series and Phase):	Unknown	Mapped Hydric Inclusion?	
Map Symbol: NA	Drainage Class: Unknown	Field Observations Confirm Mapped Type?	Yes <input type="radio"/> No <input checked="" type="radio"/>
Taxonomy (Subgroup):	Unknown		
Profile Description			

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

Remarks:

Site was formerly sand pit for railroad. Soils excavated, so units mapped by SCS/NRCS would be of little use.

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:

Remarks:
Sample at small depression north of main cells

DATA FORM
ROUTINE WETLAND
(1987 COE Wetlands Delineation Manual)

Project/Site:	Big Sandy Wetland Mitigation Site	Project No:	Task 017	Date:	15-JUL-2001
Applicant/Owner:	Montana Department of Transportation			County:	Chouteau
Investigators:	Berglund / Harris			State:	Montana
				Pilot ID:	5

Do Normal Circumstances exist on the site?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Community ID:	Upland
Is the site significantly disturbed (Atypical Situation)?	<input type="radio"/> Yes <input checked="" type="radio"/> No	Transect ID:	NA
Is the area a potential Problem Area?	<input type="radio"/> Yes <input checked="" type="radio"/> No	Field Location:	depression @ extreme N. end of site
(If needed, explain on the reverse side)			

VEGETATION (USFWS Region No. 9)

[illegible]

Percent of Dominant Species that are OBL, FACW or FAC:
(excluding FAC-) 1/4 = 25.00%

FAC Neutral:	0/2	= 0.00%
Numeric Index:	14/4	= 3.50

Remarks:

HYDROLOGY

<p><u>NO</u> Recorded Data(Describe in Remarks): <u>N/A</u> Stream, Lake or Tide Gauge <u>N/A</u> Aerial Photographs <u>N/A</u> Other</p> <p><u>YES</u> No Recorded Data</p>	<p>Wetland Hydrology Indicators</p> <p>Primary Indicators</p> <p><u>NO</u> Inundated <u>NO</u> Saturated in Upper 12 inches <u>NO</u> Water Marks <u>NO</u> Drift Lines <u>NO</u> Sediment Deposits <u>NO</u> Drainage Patterns in Wetlands</p> <p>Secondary Indicators</p> <p><u>NO</u> Oxidized Root Channels in Upper 12 inches <u>NO</u> Water-Stained Leaves <u>NO</u> Local Soil Survey Data <u>NO</u> FAC-Neutral Test <u>NO</u> Other(Explain in Remarks)</p>
<p>Field Observations</p>	
<p>Depth of Surface Water: <i>N/A (n.)</i></p> <p>Depth to Free Water in Pit: <i>> 14 (n.)</i></p> <p>Depth to Saturated Soil: <i>> 14 (n.)</i></p>	
<p>Remarks:</p> <p>May get moisture in early spring; dry currently.</p>	

DATA FORM
ROUTINE WETLAND
(1987 COE Wetlands Delineation Manual)

Project/Site:	Big Sandy Wetland Mitigation Site	Project No:	Task 017	Date:	15-JUL-2001
Applicant/Owner:	Montana Department of Transportation			County:	Chouteau
Investigators:	Berglund / Harris			State:	Montana
				Plot ID:	5

SOILS

Map Unit Name (Series and Phase): Unknown
 Map Symbol: NA Drainage Class: Unknown
 Taxonomy (Subgroup): Unknown
 Profile Description

Mapped Hydraulic Inclusion?
 Field Observations Confirm Mapped Type? Yes ☐ No ☒

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc
10	B	10YR4/2	N/A	N/A N/A	Clay loam

Hydric Soil Indicators:

<u>NO</u> Histosol	<u>NO</u> Concretions
<u>NO</u> Histic Epipedon	<u>NO</u> High Organic Content in Surface Layer in Sandy Soils
<u>NO</u> Sufficilic 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	<u>NO</u> Other (Explain in Remarks)

Remarks:

Non-hydric soils.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	No	Is the Sampling Point within the Wetland?	Yes	No
Wetland Hydrology Present?	Yes	No			
Hydric Soils Present?	Yes	No			

Remarks:

Non-wetland depression at north end of mitigation area.

Montana Department of Transportation Wetland Mitigation Monitoring Project for Land and Water Consulting		Project Name Project/task number Date Field Personnel Note	Big Sandy 017 Cell #1 7/15/2001	Big Sandy 017 Cell #2 7/15/2001	Big Sandy 017 Cell #3 7/15/2001	Big Sandy 017 Cell #4 7/15/2001
2001		Rhithron Sample Identification	10	17	11	12
Coelenterata		<i>Hydra</i>				
Oligochaeta	Enchytraeidae	Enchytraeidae				
	Naididae	<i>Chaetogaster</i>				
		<i>Nais elinguis</i>				
		<i>Nais variabilis</i>				
		<i>Ophidonais serpentina</i>				
	Tubificidae	Tubificidae - immature				17
		<i>Limnodrilus hoffmeisteri</i>				
Hirudinea	Erpobdellidae	<i>Mooreobdella microstoma</i>				
		<i>Nepheleopsis</i>				
	Glossiphoniidae	<i>Helobdella stagnalis</i>				
		<i>Helobdella</i>				
		<i>Glossiphonia</i>				1
Bivalvia	Sphaeriidae	<i>Sphaerium</i>				
Gastropoda	Lymnaeidae	<i>Fossaria</i>				
	Physidae	<i>Physa</i>		3		1
	Planorbidae	<i>Gyraulus</i>		4		1
		<i>Helisoma</i>		1		
Crustacea	Cladocera	Cladocera		1		
	Copepoda	Calanoida				
		Cyclopoida		2		1
	Ostracoda	Ostracoda		15		1
	Amphipoda	<i>Gammarus</i>				
		<i>Hyalella azteca</i>	1	8	217	9
	Decapoda	<i>Oreconectes</i>				
Acarina		Acari				
Odonata	Aeshnidae	<i>Anax</i>				
	Libellulidae	Libellulidae-early instar				
		<i>Sympetrum</i>				
	Coenagrionidae	Coenagrionidae-early instar				1
		<i>Enallagma</i>				
	Lestidae	<i>Lestes</i>				
Ephemeroptera	Baetidae	<i>Callibaetis</i>				
	Caenidae	<i>Caenis</i>		1		
Hemiptera	Corixidae	Corixidae - immature	28	3	6	
		<i>Hesperocorixa</i>				
		<i>Sigara</i>				2
		<i>Trichocorixa</i>				
	Nepidae	<i>Ranatra</i>				
	Notonectidae	<i>Notonecta</i>			3	
Trichoptera	Hydroptilidae	Hydroptilidae - pupa				
	Leptoceridae	Leptoceridae - early instar				
		<i>Mytacidus</i>				
		<i>Ylodes</i>				1
Coleoptera	Chrysomelidae	Chrysomelidae				2
	Curculionidae	<i>Bagous</i>				
	Dytiscidae	<i>Acilius</i>				
		Hydroporinae - early instar larvae		1		
		<i>Hygrotus</i>	1	1		
		<i>Liodessus</i>				
		<i>Laccophilus</i>				
		<i>Neoporus</i>				
	Elmidae	<i>Heterlimnius</i>				
	Halipidae	<i>Halipus</i>		1	1	1
		<i>Peltodytes</i>				
	Hydrophilidae	<i>Berosus</i>	3	2		1
		<i>Helophorus</i>				
		<i>Hydrobius</i>				1
		<i>Hydrochara</i>				
		<i>Laccobius</i>				
		<i>Tropisternus</i>				
Diptera	Ceratopogoninae	<i>Bezzia/Palpomya</i>	189	3		7
		<i>Dasyhelea</i>				
	Chaoboridae	<i>Chaoborus</i>				
	Culicidae	<i>Anopheles</i>				
		<i>Culex</i>				
	Ephydriidae	Ephydriidae				
	Simuliidae	<i>Simulium</i>				
	Sciomyzidae	Sciomyzidae				
	Stratiomyidae	<i>Odontomyia</i>				
	Chironomidae	<i>Acricotopus</i>				
		<i>Chironomus</i>		89	3	164
		<i>Cladotanytarsus</i>	2			
		<i>Corynoneura</i>				
		<i>Cryptotendipes</i>		5		
		<i>Dicrotendipes</i>				
		<i>Einfeldia</i>				3
		<i>Endochironomus</i>				
		<i>Labrundinia</i>				
		<i>Microtendipes</i>				
		<i>Orthocladius annectens</i>				2
		<i>Parachironomus</i>				

<i>Paramerina</i>				
<i>Paratanytarsus</i>				
<i>Phaenopsectra</i>				
<i>Polypedilum</i>				
<i>Procladius</i>				
<i>Psectrocladius</i>			2	
<i>Psectrotanypus</i>	8			43
<i>Pseudochironomus</i>				
<i>Tanypus</i>		83		
<i>Tanytarsus</i>				

	TOTAL	232	223	235	256
grids		30	30	30	10

Total taxa	7	17	8	17
POET	1	2	2	2
Chironomidae taxa	2	3	2	4
Crustacea taxa + Mollusca taxa	1	4	1	3
% Chironomidae	4.31034483	79.3721973	2.12765957	82.8125
Orthoclaadiinae/Chironomidae	0	0	40	0.94339623
%Amphipoda	0.43103448	3.58744395	92.3404255	3.515625
%Crustacea + %Mollusca	0.43103448	7.17488789	92.3404255	4.296875
HBI	6.32758621	9.0044843	8	9.41796875
%Dominant taxon	81.4655172	39.9103139	92.3404255	64.0625
%Collector-Gatherers	0.43103448	55.1569507	94.4680851	77.734375
%Filterers	0.86206897	0.44843049	0	0

Total taxa	1	3	1	3
POET	1	3	3	3
Chironomidae taxa	3	3	3	3
Crustacea taxa + Mollusca taxa	1	5	1	5
% Chironomidae	3	1	3	1
Orthoclaadiinae/Chironomidae	1	1	3	1
%Amphipoda	3	3	1	3
%Crustacea + %Mollusca	3	3	1	3
HBI	3	1	1	1
%Dominant taxon	1	3	1	1
%Collector-Gatherers	1	3	5	3
%Filterers	3	3	3	3
site score	24	32	26	30

Appendix C

REPRESENTATIVE PHOTOGRAPHS

MDT Wetland Mitigation Monitoring
Big Sandy
Big Sandy, Montana



Photo point 1, 203 degrees S



Photo point 2, 194 degrees SE



Photo point 3, 23 degrees N



Photo point 3, 197 degrees S



Photo point 4, 200 degrees S



Photo point 5, 210 degrees SW



Photo point 5, 104 degrees E, Adjacent Uplands



Photo point 6, 26 degrees N



Transect Start, 84 degrees E/NE



Transect End, 264 degrees W/SW



Erosion problem adjacent to north cell where ephemeral drainage enters from the east. Note separated culvert.



Erosion problem adjacent to north cell, east bank, just north of dike.

Appendix D

1971 AERIAL PHOTOGRAPH

MDT Wetland Mitigation Monitoring
Big Sandy
Big Sandy, Montana



1/20/71

Appendix E

BIRD SURVEY PROTOCOL MACROINVERTEBRATE SAMPLING PROTOCOL GPS PROTOCOL

*MDT Wetland Mitigation Monitoring
Big Sandy
Big Sandy, 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.

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.

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.