MONTANA DEPARTMENT OF TRANSPORTATION WETLAND MITIGATION MONITORING REPORT: YEAR 2003

Big Spring Creek
Lewistown, Montana

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

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

March 2004

Project No: 130091.029

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1.0 INTRODUCTION

In 1996, the Montana Fish, Wildlife & Parks (FWP) approached the Montana Department of Transportation (MDT) with a partnership proposal to restore approximately 0.5 mile of Big Spring Creek, at the FWP Brewery Flats Fishing Access site, 1 mile SE of Lewistown in Fergus County **(Figure 1)**. Big Spring Creek was straightened through the Brewery Flats area around 1907 by the Milwaukee Railroad to facilitate the construction of a freight yard to the west of the creek. FWP proposed, through their Future Fisheries Improvement Program (FFIP), to restore that section of Big Spring Creek that traversed Brewery Flats to a more natural condition for the purpose of improving fisheries habitat. In addition to increasing total stream length from 2,300 feet to 4,000 feet, the design also included the establishment of a functional floodplain and associated wetland habitat.

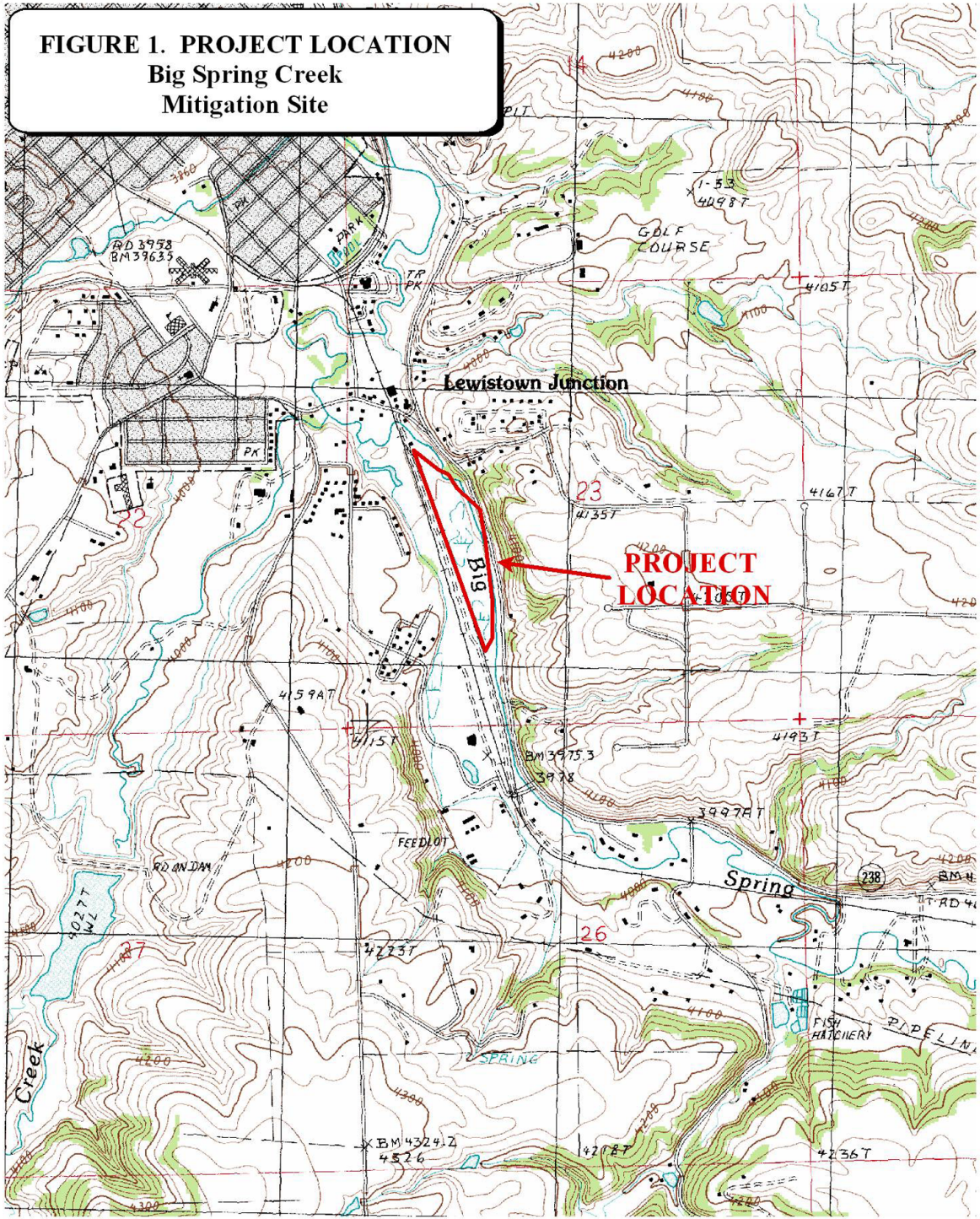
In 1998, an MOA between MDT and FWP was signed by the agencies, thus formalizing a cooperative agreement to restore Big Spring Creek. In return for a cash contribution to the project, MDT would receive 7.21 acres of Corps of Engineers (COE)-approved wetland mitigation credit to provide mitigation for projected wetland impacts resulting from MDT projects in Watershed #9 (Middle Missouri River).

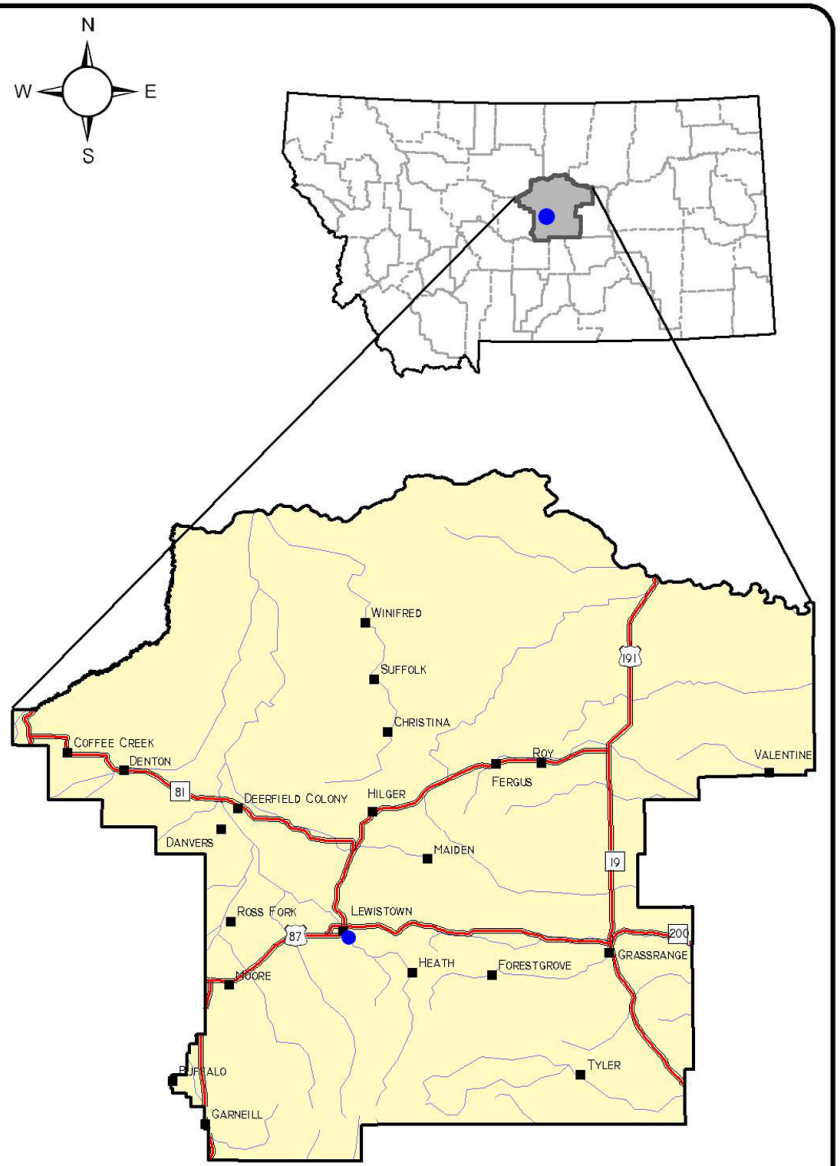
The proposed channel restoration was completed over two construction seasons (1998 & 1999), providing a newly created meandering channel with numerous pool, riffle, and run sections. The project incorporated the use of root wads, boulders, footer logs, sod mats, willow clumps and cuttings, coir fabric and seeding of both upland and wetland areas. Sections of floodplain were lowered 1-2 feet to provide areas for wetland development.

According to baseline wetland delineation maps (Barnum and Hoffer 1997) and aerial photographs provided in the environmental assessment prepared for the project by FWP, approximately 7.86 acres of shrub/scrub and emergent wetland occurred within the current monitoring area prior to project implementation (note: reference to a FWS/NRCS delineation resulting in over 14 acres of pre-existing wetlands was found in the project files, but no evidence of such a delineation was found in MDT, NRCS, or FWP project files, and pre-project aerial photographs do not support a 14-acre delineation within the current monitoring area). Hydrology for many of the existing wetlands was thought to be provided by leaking water pipes, with little or no connection to the incised Big Spring Creek channel. The proposed stream restoration was intended to create approximately 1.5 acres of additional wetland habitat, and restore and enhance existing wetlands by reconnecting them with Big Spring Creek.

Target wetland communities to be produced at the site included shallow marsh/wet meadow and wet meadow/scrub-shrub (Inter-Fluve, Inc. 1998). Target wetland functions to be provided at the site included habitat diversity, flood control & storage, threatened/endangered species habitat, general wildlife habitat, sediment filtration, shoreline stabilization, food chain support, nutrient cycling, and uniqueness (Inter-Fluve, Inc. 1998).

FIGURE 1. PROJECT LOCATION
Big Spring Creek Mitigation Site





PROJECT #: 130091.029
DATE: MAY 2001
LOCATION:
PROJECT MANAGER: B. DUTTON
DRAWN BY: B. NOECKER

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As originally proposed by FWP, the newly created channel was not immediately activated following construction, but was given approximately one year to establish streamside vegetation for stabilization purposes. Water was turned into the new channel in the fall of 2000. This site was first monitored in 2001, and is scheduled to be monitored two times per year over the 3-year contract period to document wetland and other biological attributes. The monitoring area is illustrated in **Figure 2 (Appendix A)**.

No performance standards or success criteria were required by the COE or other agencies. The COE determined that the maximum allowable credit at the site is 7.21 acres (Rabbe 1998). This conclusion was subjectively based on acreages of existing and developed wetlands, changes in functions and values, re-creation of a functioning floodplain, and modifications to supporting hydrology (Rabbe 1998). It was the Corps' opinion that the proposed project, while improving the existing setting, would not result in doubling of actual wetland acreage but could essentially double wetland values while establishing "natural" supporting hydrology for the whole complex (Rabbe 1998).

2.0 METHODS

2.1 Monitoring Dates and Activities

The site was visited on May 23rd (spring) and August 8th (mid-season) 2003. The primary purpose of the spring visit was to conduct a bird/general wildlife reconnaissance. The late-May to early-June 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 to document vegetation, soil, and hydrologic conditions used to map jurisdictional wetlands. All information contained on the Wetland Mitigation Site Monitoring Form (**Appendix B**) was collected at this time. Activities and information conducted/collected included: wetland delineation; wetland/open water boundary mapping; vegetation community mapping; vegetation transects; soils data; hydrology data; bird and general wildlife use; photograph points; macroinvertebrate sampling; functional assessment; and examination of stream habitat conditions including bank stability, fisheries habitat and survival of planted woody vegetation.

2.2 Hydrology

Hydrologic indicators were evaluated at the site during the mid-season visit. Information found in project files indicate that the leaking water pipes on or near the property have been fixed and are no longer contributing to wetland hydrology at the site. The approximate designed channel location is shown on the conceptual restoration plan in **Appendix D**. Wetland hydrology indicators were recorded using procedures outlined in the COE 1987 Wetland Delineation Manual (Environmental Laboratory 1987). Hydrology data were recorded on COE Routine Wetland Delineation Data Forms (**Appendix B**).

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

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

2.3 Vegetation

General dominant species-based vegetation community types (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 and may not reflect yearly changes. Estimated percent cover of the dominant species in each community type was listed on the site monitoring form (**Appendix B**).

The 10-foot wide belt transect that was established in 2001 was evaluated for the third time **Figure 2 (Appendix A)**. Percent cover was estimated for each vegetative species for each vegetation community encountered within the "belt" using the following values: + (<1%); 1 (1-5%); 2 (6-10%); 3 (11-20%); 4 (21-50%); and 5 (>50%).

The purpose of the transect is to evaluate changes over time, especially the establishment and increase of hydrophytic vegetation. The transect location was marked on the air photo and all data recorded on the mitigation site monitoring form. Transect endpoint locations were recorded with the GPS unit in 2001. Wooden stakes were installed in 2001 to physically mark the transect ends. Photos of the transect were taken from both ends during the mid-season visit.

A comprehensive plant species list for the site was first compiled in 2001 and was updated as new species were encountered. Ultimately, observations from past years will be compared with new data to document vegetation changes over time.

Fourteen woody species were planted at this mitigation site. Planting lists are provided in **Appendix D**. No planting map was available; consequently, not all planting locations were known, and it was not possible for observers to inventory all planted species. Rather, observers recorded the number of dead planted species observed and compared them to known planting numbers.

2.4 Soils

Soils were evaluated during the mid-season visit according to hydric soils determination procedures outlined in the COE 1987 Wetland Delineation Manual. Soil data was recorded for each wetland determination point on the COE Routine Wetland Delineation Data Form (**Appendix B**). The most current terminology used by NRCS was used to describe hydric soils (USDA 1998).

2.5 Wetland Delineation

A wetland delineation of the mitigation site was conducted during the 2001 mid-season visit according to the 1987 COE of Engineers Wetland Delineation Manual. The delineated boundaries were verified and changes made if necessary during the 2002 and 2003 monitoring. Wetland and upland areas within the monitoring area were investigated for the presence of wetland hydrology, hydrophytic vegetation and hydric soils. The indicator status of vegetation was derived from the National List of Plant Species that occur in Wetlands: Northwest (Region 9) (Reed 1997).

The information was recorded on COE Routine Wetland Delineation Data Forms (**Appendix B**). The wetland/upland boundary was delineated on the air photo and recorded with a resource grade GPS unit in 2001. Minor changes in wetland boundaries were noted in 2003 and drawn onto project maps. These changes were not surveyed with GPS during the 2003 monitoring. The wetland/upland boundary in combination with the wetland/open water habitat boundary was used to calculate the wetland area developed within the monitoring area.

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 visit. Indirect use indicators, including tracks; scat; burrows; eggshells; skins; bones; etc., were also recorded. Observations were recorded as the observer traversed the site while conducting other required activities. Direct sampling methods, such as snap traps, live traps, and pitfall traps, were not implemented. A comprehensive list of observed species was compiled. Observations from past years will ultimately be compared with new data.

2.7 Birds

Bird observations were recorded during each visit. 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 data forms in **Appendix B**). Observations from past years will be compared with new data.

2.8 Macroinvertebrates

One macroinvertebrate sample was collected during the mid-season site visit and data recorded on the wetland mitigation monitoring form. Macroinvertebrate sampling procedures and analysis are included in **Appendix F**. The approximate location of this sample point, within emergent marsh habitat in the north portion of the site, is shown on **Figure 2**, **Appendix A**. The sample was preserved as outlined in the sampling procedure and sent to a laboratory for analysis.

2.9 Functional Assessment

Functional assessment forms were completed for various assessment areas within the monitoring area using the 1999 MDT Montana Wetland Assessment Method. Field data necessary for this assessment were generally collected during the mid-season site visit. The remainder of the functional assessment was completed in the office.

The pre-project functional assessment of the mitigation site was completed using the 1997 MDT wetland assessment method. Thus, while pre- and post-project functional assessment results are not directly comparable, general trends can be discussed.

2.10 Photographs

Photographs were taken during the mid-season visit showing the current land use surrounding the site, the upland buffer, the monitored area, macroinvertebrate sampling location, and the vegetation transect. Each photograph point location was recorded with a resource grade GPS during the 2001 monitoring. The approximate location of photo points is 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, data were collected with a resource grade GPS unit at the vegetation transect beginning and ending locations, at all photograph locations, and at the macroinvertebrate sampling location. Wetland boundaries were also mapped with a resource grade GPS unit. No new GPS data were collected in 2003.

2.12 Maintenance Needs

The newly constructed channel was examined for signs of erosion and channel migration. Where encountered, current or future potential problems were documented, photographed and conveyed to MDT.

3.0 RESULTS

3.1 Hydrology

According to the Western Regional Climate Center, Lewistown yearly precipitation totals for 2001 (12.37 inches) and 2002 (15.94 inches) were 68 and 87 percent, respectively, of the total annual mean precipitation (18.30 inches) in this area. Precipitation levels in the project area through September of 2003 are substantially below the long-term average.

Inundation was present, to some extent, at all wetlands within the monitoring area during the mid-season visit despite the sub-normal precipitation year. Big Spring Creek contained the only "open water" on the site. Water depths at open water/rooted vegetation interfaces along the

creek ranged between approximately one to two feet. Open water areas are shown on **Figure 3** (**Appendix A**). Specific recorded values are provided on the attached data forms.

Overall, the site was approximately 40 percent inundated, with an average depth of two to four inches and a range of depths from 0 to an estimated four feet. Deepest areas were located at stream pools.

A groundwater component contributes strongly to this site, likely resulting at least partially from alluvial flow. Groundwater was encountered within about 1 foot of the ground surface at most wetlands. Several groundwater discharge sites occur along the toe of the highway fill between the parking area and the northeast corner of the monitoring area. This area is developing very strong wetland characteristics despite early attempts to drain this area with small hand dug ditches. According to MDT, wetlands are not necessarily desirable in this area, as they may be in conflict with future highway expansion (Urban pers. comm.).

Big Spring Creek experienced overbank flood flows in mid-March 2003 in the project area. Silt and sand deposits were highly visible during the spring visit across the floodplain, along with substantial vegetative debris that hung up on various objects. This is the first substantial flood event sustained by the new Big Spring Creek channel since water was turned into the channel in the fall of 2000. It appears as though the new channel and its banks withstood the flooding with only minor bank erosion noted.

3.2 Vegetation

Vegetation species identified on the site are presented in **Table 1** and on the attached data form. No new species were encountered during the 2003 monitoring. Three primary wetland community types were identified and mapped on the mitigation area (**Figure 3**, **Appendix A**). These included Type 1: *Agrostis alba*, Type 2: *Typha latifolia*, and Type 3: *Salix*. Dominant species within each of these communities are listed on the attached data form (**Appendix B**). Type 1 occurs commonly and intermittently as narrow fringes along the immediate stream channel. Type 2 occurs within emergent marsh communities throughout the site, and Type 3 occurs primarily in association with streamside areas in the south portion of the site.

Upland communities are primarily dominated by seeded and/or weedy herbaceous species including quackgrass (*Agropyron repens*), bearded wheatgrass (*Agropyron caninum*), intermediate wheatgrass (*Agropyron intermedium*), sowthistle (*Sonchus arvensis*), ragweed (*Ambrosia trifida*), field pennycress (*Thlaspi arvense*) and white sweetclover (*Melilotus alba*). A large “transitional upland” area first identified in 2001 occurs west of the creek, and south of the parking lot. This area continues to exhibit signs of transitioning from upland to wetland (**Figure 2** in **Appendix A**). Transitional upland areas identified in 2002 in the old creek location parallel to the highway and south of the parking area continue to exhibit signs of transitioning from upland to wetland.

Table 1: ***2001 - 2003 Big Spring Creek Vegetation Species List***

Species	Region 9 (Northwest) Wetland Indicator
Achillea millefolium	FACU
Agropyron caninum	FAC-
Agropyron intermedium	--
Agropyron repens	FACU
Agrostis alba	FACW
Alopecurus pratensis	FACW
Ambrosia trifida	--
Arctium minus	--
Aster spp.	--
Avena fatua	--
Beckmannia syzigachne	OBL
Betula occidentalis	FACW
Bidens cernua	FACW+
Bromus inermis	--
Calamagrostis inexpansa	FACW
Carex aquatilis	OBL
Carex nebrascensis	OBL
Carex utriculata	OBL
Cirsium arvense	FAC-
Cornus stolonifera	FACW
Crataegus douglasii	FAC
Dactylis glomerata	--
Echinochloa crusgalli	FACW
Eleocharis palustris	OBL
Elodea canadensis	OBL
Epilobium ciliatum	FACW-
Equisetum arvense	FAC
Fraxinus pensylvanica	FAC
Galium aparine	--
Glyceria elata	FACW+
Glycyrrhiza lepidota	FAC+
Hordeum jubatum	FAC-
Iva xanthifolia	FAC
Juncus bufonius	FACW+
Juncus ensifolius	FACW
Juncus nodosus	OBL
Juncus torreyi	FACW
Lactuca serriola	FACU
Lemna minor	OBL
Linaria vulgaris	--
Lycopus americanus	OBL
Medicago lupulina	FAC
Melilotus alba	FACU
Melilotus officinalis	FACU
Mentha arvensis	FAC
Muhlenbergia minutissima	FAC
Nasturtium officinale	OBL
Phalaris arundinacea	FACW
Phleum pratense	FAC-
Plantago major	FAC+
Poa pratensis	FAC
Polygonum lapathifolium	FACW
Polypogon monspeliensis	FACW
Populus angustifolia	FACW
Populus deltoides	FAC
Populus tremuloides	FAC+
Populus trichocarpa	FAC
Prunus virginiana	FACU
Ribes aureum	FAC+
Ranunculus aquatilis	OBL
Rosa woodsii	FACU

Table 1: ***2001 - 2003 Big Spring Creek Vegetation Species List (continued)***

Species[1]	Region 9 (Northwest) Wetland Indicator
Rumex crispus	FACW
Sagittaria cuneata	OBL
Salix amygdaloides	FACW
Salix exigua	OBL
Salix lutea	OBL
Scirpus acutus	OBL
Scirpus microcarpus	OBL
Scirpus pungens	OBL
Shepherdia canadensis	--
Sisymbrium altissimum	FACU-
Sium suave	OBL
Solidago canadensis	FACU
Sonchus arvensis	FACU+
Taraxacum officinale	FACU
Thlaspi arvense	--
Trifolium fragiferum	FACU
Trifolium repens	--
Typha latifolia	OBL
Verbascum thapsus	--

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

Vegetation transect results in 2003 were similar to the 2002 results except near the middle of the transect, where Type 2 habitat is encroaching into a previously identified upland area. Vegetation transect results are detailed in the attached data form, and are summarized in the transect maps, **Table 2**, and **Chart 1** below.

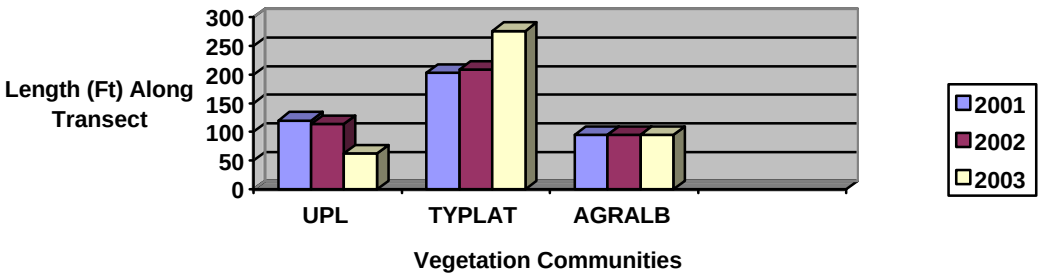
Transect Maps

2001	**VT Start**	***Upland (17')***	***Type 2 (155')***	***Type 1 (95')***	***Upland (87')***	***Type 2 (40')***	***Upland (8')***	***Type 2 (8')***	***Upland (8')***	**Total: 418'**	**VT End**
2002	**VT Start**	***Upland (15')***	***Type 2 (157')***	***Type 1 (95')***	***Upland (87')***	***Type 2 (40')***	***Upland (8')***	***Type 2 (12')***	***Upland (4')***	**Total: 418'**	**VT End**
2003	**VT Start**	***Upland (15')***	***Type 2 (157')***	***Type 1 (95')***	***Upland (20')***	***Type 2 (107')***	***Upland (8')***	***Type 2 (12')***	***Upland (4')***	**Total: 418'**	**VT End**

Table 2: ***Vegetation Transect Data Summary***

Monitoring Year	2001	2002	2003
Transect Length	418 feet	418 feet	418 feet
# Vegetation Community Transitions along Transect	8	8	8
# Vegetation Communities along Transect	3	3	3
# Hydrophytic Vegetation Communities along Transect	2	2	2
Total Vegetative Species	31	31	31
Total Hydrophytic Species	23	23	23
Total Upland Species	8	8	8
Estimated % Total Vegetative Cover	95%	95%	95%
% Transect Length Comprised of Hydrophytic Vegetation Communities	71%	73%	89%
% Transect Length Comprised of Upland Vegetation Communities	29%	27%	11%
% Transect Length Comprised of Unvegetated Open Water	0%	0%	0%
% Transect Length Comprised of Bare Substrate	0%	0%	0%

Chart 1: Length of Vegetation Communities along Transect 1



Numerous willow cuttings and other woody species were planted as part of the overall revegetation plan for the project. Additionally, the NRCS and American Foresters Society sponsored a community project at the site that resulted in additional plantings. Observed mortality of planted woody vegetation species is summarized below in **Table 3**. As specific planting locations were unknown, only observations of dead, obviously planted individuals were recorded in order to avoid spending available monitoring time searching the site for possible planting areas.

Table 3: ***2003 Observed Mortality of Planted Woody Species***

Species	Estimated # Originally Planted	# Dead Observed	Comments
Salix exigua *Salix amygdaloides*	up to 3,500 cuttings; not distinguished by species	see comments	Willows planted below the ordinary high water mark were generally dead, presumably due to drowning. Willows planted above the OHWM were generally alive. Estimated overall survival rate of 50 – 60%.
Populus deltoides	21	10	Mortality likely due to drier or wetter than anticipated conditions at individual planting locations.
Populus trichocarpa	24	11	Mortality likely due to drier or wetter than anticipated conditions at individual planting locations.
Populus angustifolia	30	0	Doing well; many observed.
Populus tremuloides	50	0	No dead observed, but estimated <50 live observed. Assume some mortality.
Betula occidentalis	31	5	Few dead observed, but estimated <10 live observed. Mortality likely due to drought.
Rosa woodsii	10	0	No dead observed, but estimated <5 live observed. Mortality likely due to drought / competition with upland grasses.
Cornus stolonifera	130	0	No dead observed, but estimated <50 live observed. Mortality likely due to drought / competition with upland grasses, and possibly deer.
Prunus virginiana	150	10	Doing well; numerous observations.
Shepherdia canadensis	30	0	No dead observed, but estimated <20 live observed. Assume some mortality.
Fraxinus pensylvanica	30	0	Doing well; several observed.
Ribes aureum	35	0	No dead observed, but estimated <10 live observed.
Crataegus douglasii	10	2	Few live or dead observed.

3.3 Soils

According to the Fergus County soil survey (Soil Conservation Service 1988), pre-existing soils at the site were mapped as Fluvaquentic Haplaquolls and Enbar-Nesda loams. Fluvaquentic Haplaquolls are poorly drained soils on flood plains that formed in alluvium. Enbar-Nesda loams are well drained to somewhat poorly drained soils that occur on floodplains and terraces. Oddly, soils descriptions provided in the survey for these two map units seem to apply in the reverse on the ground. The survey describes the upland portions of the site as supporting the

wetter Fluvaquentic Haplaquolls , and the wetland portions as supporting drier Enbar-Nesda loams. On the ground, just the opposite seems true. Both of these soils types exhibit a seasonal high water table. Fluvaquentic Haplaquolls are included on the Fergus County hydric soils list (floodplains), while Enbar-Nesda loams are not considered hydric.

Soils sampled in wetland areas were generally comprised of silty clay loams or silt loams with a matrix color of 10YR3/1 without mottles, or 10YR3/2 with distinct mottles in the range of 10YR 4/6, indicating a fluctuating water table. Wetland soils were saturated or inundated at the time of the survey.

3.4 Wetland Delineation

Delineated wetland boundaries are illustrated on **Figure 3**. Completed wetland delineation forms are included in **Appendix B**. Soils, vegetation, and hydrology are discussed in preceding sections. The wetland area north of the parking area and east of the creek expanded in 2003 as shown on **Figure 3**. Delineation results including the expanded areas are as follows:

Big Spring Creek: 9.71 wetland acres
2.41 acres open water (non-wetland perennial stream channel)

Based on maps provided in the project EA, approximately 7.86 wetland acres and 1.3 acres of non-wetland perennial stream channel occurred within the monitoring area prior to project implementation. Currently, the site has gained 1.85 wetland acres and 1.11 acres of non-wetland perennial stream channel.

3.5 Wildlife and Fish

Wildlife species, or evidence of wildlife, observed on the site during 2003 monitoring efforts are listed in **Table 4** in bold, with the remaining listed species having been seen during previous years monitoring. Specific evidence observed, as well as activity codes pertaining to birds, are provided on the completed monitoring form in **Appendix B**. Six mammal, one reptile, one amphibian, and 26 bird species were noted using portions of the mitigation site during 2003 monitoring. Rainbow trout *(Oncorhynchus mykiss)* were also observed. The wetland and stream habitat provided on the site, particularly large streamside wetland complexes in the north and south portions of the site, provide quality wildlife habitat for several species. This habitat value is expected to increase as vegetation establishes and diversifies, and as additional wetlands are restored/created. The lone wood duck nesting box located on the site **(see Figure 2, Appendix A)** appeared to be inactive during the 2003 nesting season.

Preliminary fish shocking data for the restored reach are encouraging. In 2001, the reach of Big Spring Creek including the restored channel was shocked, and yielded 710 rainbow and brown *(Salmo trutta)* trout over 10 inches in length (MFWP 2002). This compares with pre-project (1995 – 2000) shocking results that averaged 434 trout over 10 inches in length (MFWP 2002) through reaches including the project area.

Table 4: ***Fish and Wildlife Species Observed on the Big Spring Creek Mitigation Site 2001-2003***

FISH	
Rainbow Trout *(Oncorhynchus mykiss)*	
AMPHIBIANS	
Western Chorus Frog (*Pseudacris triseriata*)	
REPTILES	
Western Terrestrial Garter Snake (*Thamnophis elegans*)	
BIRDS	
American Robin (*Turdus migratorius*)	**Mallard (*Anas platyrhynchos*)**
Black-headed Grosbeak (*Pheucticus melanocephalus*)	Northern Flicker (*Colaptes auratus*)
Belted Kingfisher (*Ceryle alcyon)*	**Mourning Dove (*Zenaida macroura*)**
Black-billed Magpie (*Pica pica*)	Northern Harrier (*Circus cyaneus*)
Blue-winged Teal (*Anas discors*)	Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)
Canada Goose (*Branta Canadensis*)	Red-tailed Hawk (*Buteo jamaicensis)*
Cedar Waxwing (*Bombycilla cedrorum*)	**Red-winged Blackbird (*Agelaius phoeniceus)***
Cinnamon Teal (*Anas cyanoptera*)	**Ring-necked Pheasant (*Phasianus colchicus*)**
Cliff Swallow (*Petrochelidon pyrrhonota*)	Sandhill Crane (*Grus Canadensis*)
Common Merganser (*Mergus merganser*)	**Song Sparrow (*Melospiza melodia*)**
Common Snipe (*Gallinago gallinago*)	Sora (*Porzana Carolina*)
Common Yellowthroat (*Geothlypis trichas)*	**Spotted Sandpiper (*Actitis macularia*)**
Downy Woodpecker (*Picoides pubescens*)	Tree Swallow (*Tachycineta bicolor*)
Eastern Kingbird (*Tyrannus tyrannus*)	Willow Flycatcher (*Empidonax traillii*)
European Starling (*Sturnus vulgaris*)	**Yellow Warbler (*Dendroica petechia*)**
Gray Catbird (*Dumetella carolinensis*)	Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*)
Killdeer (*Charadrius vociferous*)	
MAMMALS	
White-tailed Deer (*Odocoileus virginianus*)	
American Beaver (*Castor Canadensis*)	
Eastern Cottontail (*Sylvilagus floridanus*)	
Meadow Vole (*Microtus pennsylvanicus*)	
Muskrat (*Ondatra zibethicus*)	
Raccoon *(Procyon lotor)*	
Bolded species were seen during the 2003 monitoring. All other species have been seen during one or more of the previous monitoring seasons.	

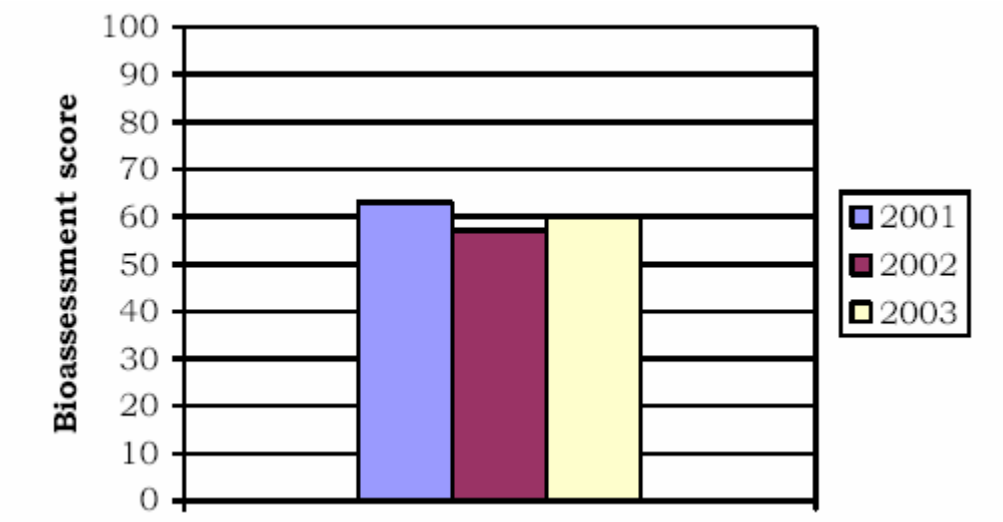
3.6 Macroinvertebrates

Macroinvertebrates were sampled within the emergent marsh complex east of the creek in the north portion of the site (see **Figure 2**). The same location was sampled during each of the three monitoring seasons. Macroinvertebrate sampling results are provided in **Appendix F** and were summarized by Rhithron Associates in the italicized sections below (Bollman 2003).

Scores indicate that sub-optimal conditions existed in all 3 years of sampling at the Big Spring Creek site. In 2003, taxa richness fell off significantly, but the overall sensitivity of the assemblage remained relatively high, suggesting that water quality was not impaired by excessive nutrient enrichment or high temperatures. Macrophytes apparently contributed to

habitat diversity here. The mayfly Callibaetis sp., which was absent from the collection of 2002, re-appeared at the site in 2003.

Chart 2: Macroinvertebrate Bioassessment Scores 2001 - 20003



3.7 Functional Assessment

Completed functional assessment forms are presented in **Appendix B**. Functional assessment results in 2003 were virtually unchanged from the 2001 and 2002 assessments, and are summarized in **Table 5**. For comparative purposes, the functional assessment results for baseline conditions prepared by Inter-Fluve are also included in **Table 5**. However, the baseline assessment was performed using a modified 1997 MDT assessment method. Several parameters of this method were substantially revised during development of the 1999 MDT assessment method, which was applied during 2003 monitoring.

For example, baseline fish habitat scored a 1.0 using the 1997 method, and scored a 0.9 post project using the 1999 method due to the addition of several variables for consideration in the updated method. Fish habitat increased dramatically with addition of channel length, substrate improvement, and other features; however, this was not reflected in the comparative functional assessments. Thus, direct comparison of pre- and post-project functions is not possible, although some general trends can be noted. Also, as the baseline assessment was performed using a modified 1997 MDT method, it resulted in an incorrect overall category designation (Category IV). This was corrected to a Category III on **Table 5**.

Large wetland polygons bisected by the stream rated as Category II sites, primarily due to high wildlife and fish habitat, flood attenuation, sediment removal, production export, and recreation/education ratings. Narrow fringes along the creek rated as Category III sites, rating high for groundwater discharge and recreation/education. Isolated depressions rated as Category III sites and scored high for sediment/nutrient removal and groundwater discharge.

Generally speaking, functions that increased substantially over baseline conditions include wildlife and fish habitat, flood attenuation, sediment/nutrient/toxicant removal, production export, and groundwater discharge. The pre-project site provided about 29 functional units within the monitoring area (using the 1997 method), and the post-project site provides about 75 functional units (using the 1999 method), for a conservative gain of at least 46 functional units.

Table 5: ***Summary of 2003 Wetland Function/Value Ratings and Functional Points [1] at the Big Spring Creek Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	Wetland Sites			
	2003: large Wetland Polygons Bisected by Creek Near North, East and South Ends of Site	2003: Isolated Wetland Depressions West of Creek	2003: Narrow Wetland Fringe Segments along Creek	1998 Baseline Assessment[2]
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.0)	Low (0.3)	Low (0.2)
MNHP Species Habitat	Mod (0.6)	Low (0.1)	Low (0.1)	Low (0.0)
General Wildlife Habitat	High (0.9)	Mod (0.5)	Mod (0.7)	Mod (0.5)
General Fish/Aquatic Habitat	High (0.9)	NA	Mod (0.7)	High (1.0)
Flood Attenuation	High (0.7)	Low (0.2)	Low (0.2)	Low (0.3)
Short and Long Term Surface Water Storage	Mod (0.6)	Low (0.3)	Low (0.3)	--
Sediment, Nutrient, Toxicant Removal	High (1.0)	High (1.0)	Mod (0.6)	Low (0.1)
Sediment/Shoreline Stabilization	Mod (0.7)	NA	Mod (0.7)	NA
Production Export/Food Chain Support	High (0.9)	Low (0.3)	Mod (0.4)	Low (0.4)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	High (1.0)	NA
Uniqueness	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.2)
Recreation/Education Potential	High (1.0)	Mod (0.5)	High (1.0)	High (1.0)
Actual Points/Possible Points	8.9 / 12	4.2 / 10	5.3 / 12	3.7 / 10
% of Possible Score Achieved	74%	42%	44%	37%
Overall Category	II	III	III	III[3]
Total Acreage of Assessed Wetlands within AA Boundaries (note: non-wetland stream channel is not included in these totals) * Pre-project (baseline) wetland areas within the current monitoring area boundaries were measured via digital planimeter from delineation maps provided in project EA.	9.11 wetland ac	0.54 wetland ac	0.06 wetland ac	7.86 wetland ac.
Functional Units (acreage x actual points)	81.1 fu	2.3 fu	0.3 fu	29.1 fu
Net Acreage Gain	Site currently supports 9.71 acres of wetlands and 2.4 acres of non-wetland perennial stream channel. Baseline conditions within the current monitoring area boundaries included 7.86 wetland acres and 1.3 acres of non-wetland perennial stream channel. **Net gain is approximately 1.85 wetland acres and 1.1 acres of non-wetland perennial stream channel.**			
Net Functional Unit Gain[2]	Approximately 55 Functional Units[2]			

[1] See completed MDT functional assessment forms in Appendix B for further detail.
[2] The baseline assessment was performed by Inter-Fluve using a modified 1997 MDT assessment method, several parameters which were substantially revised during development of the 1999 MDT assessment method, which was applied during 2003 monitoring. Thus, direct comparison of pre- and post-project functions is not possible, although some general trends can be noted.
[3] The baseline assessment was performed using a modified 1997 MDT method, which resulted in an incorrect overall category designation (Category IV). This was corrected to a Category III.

3.8 Photographs

Representative photographs taken from photo-points and transect ends are provided in **Appendix C**. A 2003 aerial photograph is also provided in **Appendix C**.

3.9 Maintenance Needs/Recommendations

All stream banks were in good condition during the spring and mid-season visits. The one Wood Duck box on the site was hanging upside down on the tree that it is attached to. This problem should be corrected to encourage use of the box by cavity nesting species.

3.10 Current Credit Summary

Approximately 9.71 wetland acres and 2.4 acres of non-wetland perennial stream channel occur within the monitoring area. Based on maps provided in the project EA, approximately 7.86 wetland acres and 1.3 acres of non-wetland perennial stream channel occurred within the monitoring area prior to project implementation. Currently, the site has gained 1.85 wetland acres and 1.11 acres of non-wetland perennial stream channel, substantially improving fish habitat.

The pre-project site provided about 29 functional units within the monitoring area (using the 1997 method), and the post-project site provides about 84 functional units (using the 1999 method), for a conservative gain of at least 55 functional units.

The COE determined that the maximum allowable credit at the site is 7.21 acres (Rabbe 1998). This conclusion was subjectively based on acreages of existing and developed wetlands, changes in functions and values, re-creation of a functioning floodplain, and modifications to supporting hydrology (Rabbe 1998). No performance standards were required by the COE, although the site appears to be well on its way to functioning as anticipated.

4.0 REFERENCES

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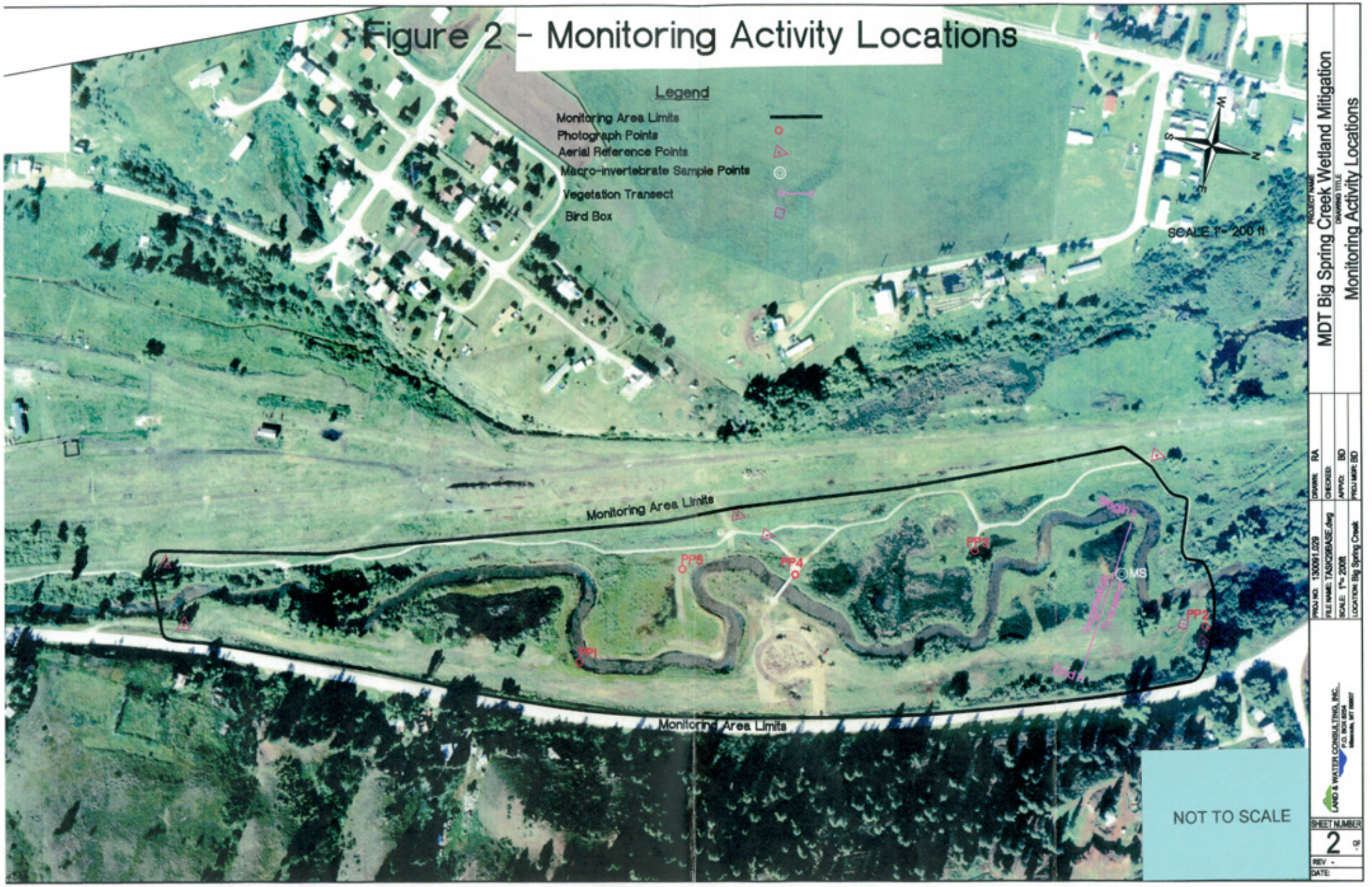
Appendix A

FIGURES 2 & 3

MDT Wetland Mitigation Monitoring
Big Spring Creek
Lewistown, Montana

LAND & WATER

Figure 2 - Monitoring Activity Locations



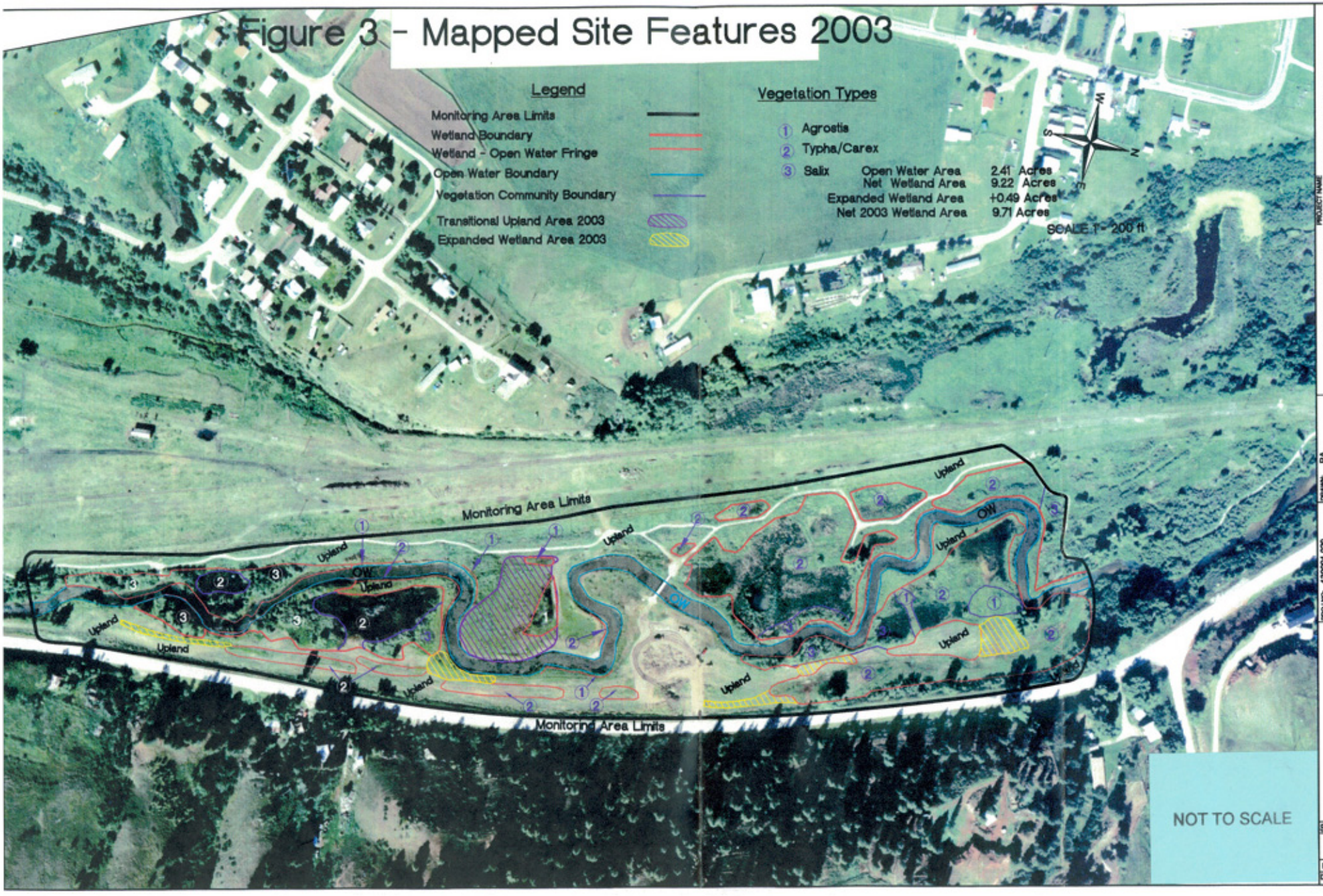
PROJECT NAME: MDT Big Spring Creek Wetland Mitigation
DRAWING TITLE: Monitoring Activity Locations

PROJ NO: 130091.029
DRAWN: RA
FILE NAME: TASK02BASE.dwg
CHECKED:
SCALE: 1" = 200ft
APPVD: BD
LOCATION: Big Spring Creek
PROJ MGR: BD

LAND & WATER CONSULTING, INC.
P.O. BOX 6504
Missoula, MT 59807

SHEET NUMBER: 2
REV: -
DATE:

Figure 3 - Mapped Site Features 2003



PROJECT NAME: MDT Big Spring Creek Wetland Mitigation
DRAWING TITLE: Mapped Site Features 2003
DRAWN: RA
CHECKED:
APPVD: BD
PROJ MGR: BD
PROJ NO: 130091.029
FILE NAME: TASK09BASE.dwg
SCALE: 1"= 200ft
LOCATION: Big Spring Creek
LAND & WATER CONSULTING, INC.
P.O. BOX 8254
Missoula, MT 59807
SHEET NUMBER 3 of 12
REV -
DATE: 1-26-04

Appendix B

COMPLETED 2003 WETLAND MITIGATION SITE MONITORING FORM
COMPLETED 2003 BIRD SURVEY FORMS
COMPLETED 2003 WETLAND DELINEATION FORMS
COMPLETED 2003 FUNCTIONAL ASSESSMENT FORMS

MDT Wetland Mitigation Monitoring
Big Spring Creek
Lewistown, Montana

LAND & WATER

LWC / MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: **Big Spring Creek** Project Number:____ Assessment Date: **8/8/03**
Location: **Lewistown** MDT District: **Billings** Milepost: _____
Legal description: T**15N** R**18E** Section **23** Time of Day: **0800-1100**
Weather Conditions: **Partly cloudy & warm approx. 70 degrees** Person(s) conducting the assessment: **Traxler**
Initial Evaluation Date: **8 / 29 / 01** Visit #: **2** Monitoring Year: **2003 (year 3)**
Size of evaluation area: **15 acres** Land use surrounding wetland: **Park, Residential, industrial**

HYDROLOGY

Surface Water Source: **Big Spring Creek, groundwater**
Inundation**:** Present **X** Absent____ Average depths: **.25ft** Range of depths: **0 - 4** ft
Assessment area under inundation: **40%**
Depth at emergent vegetation-open water boundary: **1-2 ft**
If assessment area is not inundated are the soils saturated w/in 12" of surface**:** Yes **X** No_____
Other evidence of hydrology on site (drift lines, erosion, stained vegetation etc.): **Most of the wetlands on site were either inundated or saturated to the surface. Spring flow from east side of highway is influencing wetland development in the northeast corner of the site.**

Groundwater
Monitoring wells: Present_____ Absent **X**
Record depth of water below ground surface

Well #	Depth	Well #	Depth	Well #	Depth

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

COMMENTS/PROBLEMS: Area adjacent to toe of road fill north and south of the main parking area is inundated and developing strong wetland characteristics. These areas are groundwater driven and receive surface spring flows from underneath the highway.

VEGETATION COMMUNITIES

Community No.: **1** Community Title (main species): **AGR ALB**

Dominant Species	% Cover	Dominant Species	% Cover
AGR ALB	>50	CAR AQU	11-20
MEN ARV	11-20		
BID CER	1-5		
EQU ARV	11-20		
JUN NOD	11-20		

COMMENTS/PROBLEMS:

Community No.: **2** Community Title (main species): **TYP LAT**

Dominant Species	% Cover	Dominant Species	% Cover
TYP LAT	>50	SCI PUN	1-5
SCI ACU	6-10	CAR NEB	6-10
AGR ALB	6-10	CAR AQU	6-10
ALO PRA	6-10		
PHA ARU	11-20		

COMMENTS/PROBLEMS: ALO PRA WAS NOTED IN 2003.

Community No.: **3** Community Title (main species): **SALIX**

Dominant Species	% Cover	Dominant Species	% Cover
SAL LUT	>50	AGR ALB	6-10
SAL AMY	21-50		
SAL EXI	21-50		
CAL INE	6-10		
MEN ARV	6-10		

COMMENTS/PROBLEMS: Similar to 2002.

Additional Activities Checklist:

X Record and map vegetative communities on air photo

VEGETATION COMMUNITIES (continued)

Community No.: **4** Community Title (main species): **Upland**

Dominant Species	% Cover	Dominant Species	% Cover
AGR CAN	21-50	THL ARV	21-50
AGR REP	21-50	MEL ALB	6-10
SON ARV	21-50		
CIR ARV	11-20		
AMB TRI	21-50		

COMMENTS/PROBLEMS:

Community No.: **5** Community Title (main species): **Transitional upland**

Dominant Species	% Cover	Dominant Species	% Cover
AGR ALB	21-50	MED LUP	21-50
POL LAP	1-5		
SON ARV	21-50		
THL ARV	21-50		
TRI FRA	21-50		

COMMENTS/PROBLEMS: No definitive changes in species composition from 2002.

Community No.:___ Community Title (main species):_____

Dominant Species	% Cover	Dominant Species	% Cover

COMMENTS/PROBLEMS: ___

COMPREHENSIVE VEGETATION LIST

Species	Vegetation Community Number(s)	Species	Vegetation Community Number(s)
Achillea millefolium	4	*Lycopus americanus*	1,2
Agropyron caninum	4	*Medicago lupulina*	4,5
Agropyron intermedium	4	*Melilotus alba*	4,5
Agropyron repens	4	*Melilotus officinalis*	4
Agrostis alba	1,2,3,5	*Mentha arvensis*	1,3,5
Alopecurus pratensis	2,5	*Muhlenbergia minutissima*	4
Ambrosia trifida	4	*Nasturtium officinale*	1,2
Arctium minus	4,5	*Phalaris arundinacea*	1,2,3
Aster spp.	4	*Phleum pratense*	4
Avena fatua	4	*Plantago major*	4
Beckmannia syzigachne	1	*Poa pratensis*	4
Betula occidentalis	3	*Polygonum lapathifolium*	5
Bidens cernua	1,5	*Polypogon monspeliensis*	5
Bromus inermis	4	*Populus angustifolia*	3,4
Calamagrostis inexpansa	1,3	*Populus deltoides*	3,4
Carex aquatilis	1,2	*Populus tremuloides*	3,4
Carex nebrascensis	2	*Populus trichocarpa*	3,4
Carex utriculata	1,2	*Prunus virginiana*	3
Cirsium arvense	4	*Ribes aureum*	4
Cornus stolonifera	3	*Ranunculus aquatilis*	1,2
Crataegus douglasii	4,5	*Rosa woodsii*	4
Dactylis glomerata	4	*Rumex crispus*	1,5
Echinochloa crusgalli	5	*Sagittaria cuneata*	1,2
Eleocharis palustris	1,2	*Salix amygdaloides*	3
Elodea canadensis	2	*Salix exigua*	3
Epilobium ciliatum	1,2	*Salix lutea*	3
Equisetum arvense	1,5	*Scirpus acutus*	1,2
Fraxinus pensylvanica	4	*Scirpus microcarpus*	2
Galium aparine	4,5	*Scirpus pungens*	1
Glyceria elata	1,5	*Shepherdia canadensis*	4
Glycyrrhiza lepidota	4,5	*Sisymbrium altissimum*	4
Hordeum jubatum	1,5	*Sium suave*	1
Iva xanthifolia	4,5	*Solidago canadensis*	4,5
Juncus bufonius	1	*Sonchus arvensis*	4
Juncus ensifolius	1	*Taraxacum officinale*	4
Juncus nodosus	1,2	*Thlaspi arvense*	4
Juncus torreyi	1	*Trifolium fragiferum*	4
Lactuca serriola	4,5	*Trifolium repens*	4
Lemna minor	1,2	*Typha latifolia*	2
Linaria vulgaris	4	*Verbascum thapsus*	4

COMMENTS/PROBLEMS: _____

PLANTED WOODY VEGETATION SURVIVAL

Species	Number Originally Planted	Number Observed	Mortality Causes
Salix exigua *Salix amygdaloides*	up to 3,500 cuttings; not distinguished by species	see comments	Willows planted below the ordinary high water mark were generally dead, presumably due to drowning. Willows planted above the OHWM were generally alive. Estimated overall survival rate of 50 – 60%.
Populus deltoides	21	10	Mortality likely due to drier or wetter than anticipated conditions at individual planting locations.
Populus trichocarpa	24	11	Mortality likely due to drier or wetter than anticipated conditions at individual planting locations.
Populus angustifolia	30	>20	Doing well; many observed.
Populus tremuloides	50	>40	No dead observed, but estimated <50 live observed.
Betula occidentalis	31	10 – 15	Few dead observed, but estimated <10 live observed. Mortality likely due to drought.
Rosa woodsii	10	5	No dead observed, but estimated <5 live observed. Mortality likely due to drought / competition with upland grasses.
Cornus stolonifera	130	<50	No dead observed, but estimated <50 live observed. Mortality likely due to drought / competition with upland grasses, and possibly deer.
Prunus virginiana	150	Numerous	Doing well; numerous observations.
Shepherdia canadensis	30	20	No dead observed, but estimated <20 live observed.
Fraxinus pensylvanica	30	22	Doing well; several observed.
Ribes aureum	35	10	No dead observed, but estimated <10 live observed.
Crataegus douglasii	10	2	Few live or dead observed.

COMMENTS/PROBLEMS: Overall survival in year three was not significantly changed from year 2.

WILDLIFE

BIRDS

(Attach Bird Survey Field Forms)

Were man made nesting structures installed? Yes __x__ No____Type:_____ How many? __1____ Are the nesting structures being utilized? Yes ___ No __x__ Do the nesting structures need repairs? Yes __x__ No___

MAMMALS AND HERPTILES

Species	Number Observed	Indirect indication of use			
		Tracks	Scat	Burrows	Other
white-tailed deer	0	yes	yes		
beaver	0				Tree gnaws
muskrat	2			yes	
raccoon	0	yes			
meadow vole	2				
western terrestrial garter snake	1				
western chorus frogs	0				vocalizing
cottontail	1				

Additional Activities Checklist:

__X__Macroinvertebrate sampling (if required)

COMMENTS/PROBLEMS: Wood duck nesting box needs to be re-secured to the tree – was hanging upside down during summer 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:

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

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

COMMENTS/PROBLEMS: _____

GPS SURVEYING

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

Checklist:

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

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

WETLAND DELINEATION

(Attach Corps of Engineers delineation forms)

At each site conduct the items on the checklist below:
__X___Delineate wetlands according to the 1987 Army Corps manual.
__X__ Delineate wetland-upland boundary on the air photo
__NA_ Survey wetland-upland boundary with a resource grade GPS survey

COMMENTS/PROBLEMS: _See attached completed delineation forms._____

FUNCTIONAL ASSESSMENT

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

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

MAINTENANCE

Were man-made nesting structures installed at this site? YES_X_ NO____
If yes, do they need to be repaired? YES __X___ NO___
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__X__
If yes, are the structures working properly and in good working order? YES___ NO___
If no, describe the problems below.

COMMENTS/PROBLEMS:

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: Big Spring Creek Date: 8/8/03 Examiner: Traxler Transect # 1

Approx. transect length: 418 ft Compass Direction from Start (Upland): 94 degrees

Vegetation type A:	Upland	
Length of transect in this type:	15	feet
Species:		Cover:
CIR ARV		1-5
SON ARV		6-10
AGR CAN		>50
MEN ARV		1-5
POA PRA		1-5
AGR ALB		6-10
TRI FRA		1-5
TYP LAT		1-5
Total Vegetative Cover:		100%

Vegetation type B:	TYP LAT (veg type 2)	
Length of transect in this type:	157	feet
Species:		Cover:
TYP LAT		>50
AGR ALB		1-5
ELE PAL		>50
MEN ARV		1-5
JUN NOD		6-10
CER DEM		1-5
SAG CUN		1-5
CAR NEB		6-10
ALO PRA		6-10
LEM MIN		11-20
CAR AQU		1-5
Total Vegetative Cover:		90

Vegetation type C:	AGR ALB (veg type 1)	
Length of transect in this type:	95	feet
Species:		Cover:
AGR ALB (21-50)		11-20
CAL INE		1-5
EPI CIL		1-5
MEN ARV		11-20
BID CER		1-5
AGR CAN		1-5
CON MAC		<1
RUM CRI		<1
TYP LAT		1-5
CAR NEB		11-20
ALO PRA		1-5
Total Vegetative Cover:		100%

Vegetation type D:	Upland	
Length of transect in this type:	20	feet
Species:		Cover:
SON ARV		6-10
POL LAP		1-5
AGR CAN		>50
AMB TRI		1-5
THL ARV		6-10
HOR JUB		<1
CIR ARV		1-5
TRI FRA		1-5
Total Vegetative Cover:		90%

MDT WETLAND MONITORING – VEGETATION TRANSECT (continued)

Site: Big Spring Creek Date: 8/8/03 Examiner: Traxler Transect # 1 (cont.)

Approx. transect length: 418 ft Compass Direction from Start (Upland): 94 deg.

Vegetation type E:	TYP LAT (veg type 2)	
Length of transect in this type:	107	feet
Species:		Cover:
TYP LAT		>50
ALO PRA		1-5
AGR ALB		1-5
EPI CIL		1-5
JUN NOD		11-20
JUN TOR		1-5
GLY ELA		1-5
ELE PAL		21-50
RUM CRI		1-5
CAR NEB		6-10
	Total Vegetative Cover:	100%

Vegetation type F:	Upland	
Length of transect in this type:	8	feet
Species:		Cover:
TRI FRA		6-10
IVA XAN		6-10
CIR ARV		6-10
THL ARV		21-50
AGR INT		1-5
	Total Vegetative Cover:	100%

Vegetation type G:	TYP LAT	
Length of transect in this type:	12	feet
Species:		Cover:
TYP LAT		21-50
JUN BUF		21-50
EPI CIL		1-5
POL LAP		1-5
CIR ARV		<1
AGR ALB		<1
TRI FRA		1-5
	Total Vegetative Cover:	100

Vegetation type H:	Upland	
Length of transect in this type:	4	feet
Species:		Cover:
SON ARV		21-50
HOR JUB		<1
AGR INT		11-20
THL ARV		11-20
PLA MAJ		1-5
POL LAP		1-5
TRI FRA		1-5
AMB TRI		<1
CIR ARV		1-5
MEN ARV		1-5
	Total Vegetative Cover:	100

MDT WETLAND MONITORING – VEGETATION TRANSECT (back of form)

Cover Estimate

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

Indicator Class:

+ = Obligate
- = Facultative/Wet
0 = Facultative

Source:

P = Planted
V = Volunteer

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

Establish transects perpendicular to the shoreline (or saturated perimeter). The transect should begin in the upland area. Permanently mark this location with a standard metal fencepost. Extend the imaginary transect line towards the center of the wetland, ending at the 3 food 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:

Bolded species are new additions in 2003. Changes in species cover percentages are indicated by *italics*, with the 2002 percentages included in parentheses

BIRD SURVEY – FIELD DATA SHEET

Page 1 of 1
Date: 5/23/03

SITE: Big Spring Creek

Survey Time: 0800

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
American Robin	2	F	UP				
Black-billed Magpie	2	FO,L					
Black-headed Grosbeak	3	F	FO				
Canada Goose	2	N	MA				
Cliff Swallow	>30	F					
Common Merganser	2	FO					
Common Snipe	2	F,BD	MA				
Downy Woodpecker	1	F	FO				
Eastern Kingbird	4	FO,F	SS				
European Starling	1	FO					
Gray Catbird	1	F,BD	SS				
Killdeer	1	F	US				
Mallard	9	L,N,F	OW,MA				
Morning Dove	1	FO					
Red-winged Blackbird	>20	N,BP	MA				
Ring-necked Pheasant	1	L	UP				
Song Sparrow	3	L,BD	SS				
Spotted Sandpiper	3	F	US				
Yellow Warbler	6	FO,L,BP	SS				

Notes: Conditions: Partly Cloudy and windy, approximately 65 degrees.

Sediment deposits were common across the site in the form of silt, sand, grass, and tree branches
Some bank erosion noted from early spring flood flows.
Ground water elevations appeared higher than in past years.
Many Chorus Frogs vocalizing.
Numerous deer tracks on site.

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

Habitat: AB – aquatic bed; FO – forested; I – island; MA – marsh; MF – mud flat; OW – open water; SS – scrub/shrub; UP – upland buffer; WM – wet meadow, US – unconsolidated shoreline

LAND & WATER

BIRD SURVEY – FIELD DATA SHEET

Page 1 of 1
Date: 8/8/03

SITE: Big Spring Creek

Survey Time: 0800 - 1200

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
American Robin	2	L	UP				
Common Snipe	1	F	MA				
Eastern Kingbird	5	F	SS				
Mallard	2	L	OW				
Morning Dove	1	FO					
Red-tailed Hawk	2	FO					
Red-winged Blackbird	1	F	MA				
Song Sparrow	2	L	SS				

Notes: 2 white-tailed deer

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

Habitat: AB – aquatic bed; FO – forested; I – island; MA – marsh; MF – mud flat; OW – open water; SS – scrub/shrub; UP – upland buffer; WM – wet meadow, US – unconsolidated shoreline

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

Project/Site: Big Spring Creek — Project No: Task 29
Applicant/Owner: Montana Department of Transportation
Investigators: Traxler
Date: 6-Aug-2003
County: Fergus
State: Montana
Plot ID: 1

Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation:)? Yes (No)
Is the area a potential Problem Area? Yes (No)
(If needed, explain on the reverse side)

Community ID: EM/SS
Transect ID: NA
Field Location:
E. of stream S. portion (pre-exist)

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Salix amygdaloides Willow,Peach-Leaf	Shrub	FACW	*Rumex crispus* Dock,Curly	Herb	FACW
Salix exigua Willow,Sandbar	Shrub	OBL	*Beckmannia syzigachne* Sloughgrass,American	Herb	OBL
Agrostis alba Redtop	Herb	FACW	*Glycyrrhiza lepidota* Licorice,American	Herb	FAC+
Mentha arvensis Mint,Field	Herb	FAC	*Cirsium arvense* Thistle,Creeping	Herb	FACU+
Typha latifolia Cattail,Broad-Leaf	Herb	OBL	*Juncus ensifolius* Rush,Three-Stamen	Herb	FACW
Calamagrostis inexpansa Small-Reedgrass,Narrow-Spike	Herb	FACW			

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 10/11 = 90.91%
FAC Neutral: 8/9 = 88.89%
Numeric Index: 23/11 = 2.09

Remarks:

HYDROLOGY

YES Recorded Data(Describe in Remarks):
NO Stream, Lake or Tide Gauge
YES Aerial Photographs
NO Other
NO No Recorded Data

Field Observations
Depth of Surface Water: N/A (in.)
Depth to Free Water in Pit: = 0 (in.)
Depth to Saturated Soil: N/A (in.)

Wetland Hydrology Indicators
Primary Indicators
NO Inundated
YES Saturated in Upper 12 Inches
NO Water Marks
NO Drift Lines
NO Sediment Deposits
YES Drainage Patterns in Wetlands
Secondary Indicators
YES Oxidized Root Channels in Upper 12 Inches
NO Water-Stained Leaves
NO Local Soil Survey Data
YES FAC-Neutral Test
NO Other(Explain in Remarks)

Remarks:

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

Project/Site: Big Spring Creek — Project No: Task 29
Applicant/Owner: Montana Department of Transportation
Investigators: Traxler
Date: 6-Aug-2003
County: Fergus
State: Montana
Plot ID: 1

SOILS

Map Unit Name (Series and Phase): Ember-Nesda loams, 0-2% slopes
Map Symbol: 83 Drainage Class: SPD
Taxonomy (Subgroup): Cumulic Haploborolls
Mapped Hydric Inclusion?
Field Observations Confirm Mapped Type? (Yes) No
Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
0	0	10YR3/1	N/A	N/A	N/A	Silt loam
0	9	10YR3/2	10YR4/6	Common	Distinct	Silt loam

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

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is the Sampling Point within the Wetland? (Yes) No

Remarks:
This plot was taken in apparent pre-existing wetland, east of the stream and in the south portion of the site.

LAND & WATER

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

Project/Site: Big Spring Creek	Project No: Task 29	Date: 8-Aug-2003
Applicant/Owner: Montana Department of Transportation		County: Fergus
Investigators: Traxler		State: Montana
		Plot ID: 2

Do Normal Circumstances exist on the site?	(Yes) No	Community ID: EM
Is the site significantly disturbed (Atypical Situation:)?	Yes (No)	Transect ID: NA
Is the area a potential Problem Area?	Yes (No)	Field Location:
(If needed, explain on the reverse side)		hgwy slope toe, NE portion of site

VEGETATION (USFWS Region No. 9)

Dominant Plant Species(Latin/Common)	Stratum	Indicator	Plant Species(Latin/Common)	Stratum	Indicator
Typha latifolia	Herb	OBL	*Polygonum lapathifolium*	Herb	FACW+
Cattail, Broad-Leaf			Willow-Weed		
Agrostis alba	Herb	FACW	*Juncus articulatus*	Herb	OBL
Redtop			Rush, Jointed		
Alopecurus pratensis	Herb	FACW	*Juncus ensifolius*	Herb	FACW
Foxtail, Meadow			Rush, Three-Stamen		
Bidens cernua	Herb	FACW+	*Echinochloa crusgalli*	Herb	FACW
Beggar-Ticks, Nodding			Grass, Barnyard		
Epilobium ciliatum	Herb	FACW-	*Glyceria sata*	Herb	FACW+
Willow-Herb, Hairy			Grass, Tall Manna		
Eleocharis palustris	Herb	OBL	*Juncus torreyi*	Herb	FACW
Spikerush, Creeping			Rush, Torrey's		
Rumex crispus	Herb	FACW	*Plantago major*	Herb	FAC+
Dock, Curly			Plantain, Common		
Carex aquatilis	Herb	OBL	*Salix exigua*	Shrub	OBL
Sedge, Water			Willow, Sandbar		

Percent of Dominant Species that are OBL, FACW or FAC: (excluding FAC-) 16/16 = 100.00%
FAC Neutral: 16/16 = 100.00%
Numeric Index: 29/16 = 1.75

Remarks:
Salix scattered.

HYDROLOGY

YES Recorded Data(Describe in Remarks):
- NO Stream, Lake or Tide Gauge
- YES Aerial Photographs
- NO Other

NO No Recorded Data

Field Observations
- Depth of Surface Water: = 2 (in.)
- Depth to Free Water in Pit: N/A (in.)
- Depth to Saturated Soil: N/A (in.)

Wetland Hydrology Indicators
Primary Indicators
- YES Inundated
- YES Saturated in Upper 12 Inches
- NO Water Marks
- NO Drift Lines
- NO Sediment Deposits
- YES Drainage Patterns in Wetlands

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

Remarks:
Spring-fed; obvious groundwater connection.

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

Project/Site: Big Spring Creek	Project No: Task 29	Date: 8-Aug-2003
Applicant/Owner: Montana Department of Transportation		County: Fergus
Investigators: Traxler		State: Montana
		Plot ID: 2

SOILS

Map Unit Name (Series and Phase): Fluvaquentic Haplaquolls, nearly level
Map Symbol: 106 Drainage Class: PD Mapped Hydric Inclusion?
Taxonomy (Subgroup): Fluvaquentic Haplaquolls Field Observations Confirm Mapped Type? (Yes) No

Profile Description

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle Abundance/Contrast		Texture, Concretions, Structure, etc
10	B	10YR3/1	N/A	N/A	N/A	Silty clay loam

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

Remarks:

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:
Plot taken along toe of highway fill slope in NE corner of site. This area is developing rapidly into a functional wetland.

LAND & WATER

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

1. Project Name: Big Spring Creek **2. Project #:** 130091.029 **Control #:** _____

3. Evaluation Date: 8/8/2003 **4. Evaluator(s):** Berglund/Traxler **5. Wetland / Site #(s):** Narrow bank fringe

6. Wetland Location(s) i. T: 15 N **R:** 18 E **S:** 23 **T:** __ N **R:** __ E **S:** _____

ii. Approx. Stationing / Mileposts: Just south of Lewistown along Big Spring Creek

iii. Watershed: 10040103 **GPS Reference No. (if applies):** n/a

Other Location Information: Brewery Flats

7. A. Evaluating Agency MDT

B. Purpose of Evaluation:

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

8. Wetland Size (total acres): -- (visually estimated)
<1 (measured, e.g. GPS)

9. Assessment Area (total acres): -- (visually estimated)
<1 (measured, e.g. GPS)

Comments: _____

10. CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA

HGM CLASS [1]	SYSTEM [2]	SUBSYSTEM [2]	CLASS [2]	WATER REGIME [2]	*MODIFIER* [2]	% OF AA
Riverine	Palustrine	None	Emergent Wetland	Semipermanently Flooded	Excavated	10
---	Riverine	Upper Perennial	Rock Bottom	Permanently Flooded	Excavated	90
---	---	---	---	---	---	
---	---	---	---	---	---	

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

Comments: Willows planted but still considered within herbaceans layer due to height (< 3' tall)

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

12. GENERAL CONDITION OF AA

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

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

Comments: (types of disturbance, intensity, season, etc.) **Residential, recreational -- moderate to low disturbance.**

ii. Prominent weedy, alien, & introduced species: Smooth brome, ragweed.

iii. Briefly describe AA and surrounding land use / habitat: Narrow wetland fringes along portions of Big Spring Creek. Creek included in AA where adjacent to wetlands. Surrouning use = Residential development + 2-lane highway.

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

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

Comments: Willows included in herbaceous layer. This will likely change over time.

LAND & WATER

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

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

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

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

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point and Rating	---	---	---	---	---	.3 (L)	---

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

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

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

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

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

Highest Habitat Level:	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point and Rating	---	---	---	---	---	.1 (L)	---

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

14C. General Wildlife Habitat Rating

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

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

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

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

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

Structural Diversity (from #13)	☐High								☐Moderate								☒Low			
Class Cover Distribution (all vegetated classes)	☐Even				☐Uneven				☐Even				☐Uneven				☒Even			
Duration of Surface Water in = 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	H	--	--	--
High disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

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

Comments: _____

LAND & WATER

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

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

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

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

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

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

Types of Fish Known or Suspected Within AA	**Modified Habitat Quality** from 14D(ii)			
	☐ Exceptional	☐ High	☒ Moderate	☐ Low
Native game fish	--	--	.7 (M)	--
Introduced game fish	--	--	--	--
Non-game fish	--	--	--	--
No fish	--	--	--	--

Comments: **Sauger, Mnt. Whitefish present (MRIS 2002)**

14E. FLOOD ATTENUATION ☐ **NA** (proceed to 14G)
Applies only to wetlands subject to flooding via in-channel or overbank flow.
If wetlands in AA do not flooded from in-channel or overbank flow, check NA above.

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

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

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

14F. SHORT AND LONG TERM SURFACE WATER STORAGE ☐ **NA** (proceed to 14G)
Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.
If no wetlands in the AA are subject to flooding or ponding, check NA above.

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

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

Comments: ____

14G. SEDIMENT/NUTRIENT/TOXICANT RETENTION AND REMOVAL ☐ **NA** (proceed to 14H)
Applies to wetlands with potential to receive excess sediments, nutrients, or toxicants through influx of surface or ground water or direct input.
If no wetlands in the AA are subject to such input, check NA above.

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

Sediment, Nutrient, and Toxicant Input Levels Within AA	AA receives or surrounding land use has potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	☐ ≥ 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**	--	--	--	--	--	--	--	--
AA contains **unrestricted outlet**	--	--	.6 (M)	--	--	--	--	--

Comments: ____

LAND & WATER

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

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 that is subject to wave action. If this does not apply, check NA above.

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

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses.	***Duration of Surface Water Adjacent to Rooted Vegetation***		
	☒Permanent / Perennial	☐Seasonal / Intermittent	☐Temporary / Ephemeral
[3] **65 %**	--	--	--
35-64 %	.7 (M)	--	--
< 35 %	--	--	--

Comments: **Planted shrubs will improve this rating once better established.**

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

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

A	☐ Vegetated component >5 acres						☐ Vegetated component 1-5 acres						☒ Vegetated component <1 acre					
B	☐ High		☐ Moderate		☐ Low		☐ High		☐ Moderate		☐ Low		☐ High		☐ Moderate		☒ Low	
C	☐Y	☒N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☒Y	☐N
P/P	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.4M	--
S/I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T/E/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Comments:

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

i. ☒ **Discharge Indicators**
- ☐ Springs are known or observed.
- ☐ Vegetation growing during dormant season/drought.
- ☐ Wetland occurs at the toe of a natural slopes.
- ☒ Seeps are present at the wetland edge.
- ☐ AA permanently flooded during drought periods.
- ☐ Wetland contains an outlet, but no inlet.
- ☒ Other Alluvial flow.

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

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

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

Comments: _____

14K. UNIQUENESS

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

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

Comments: _____

14L. RECREATION / EDUCATION POTENTIAL

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

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

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

☐ **Yes** [Proceed to 14L (ii) and then 14L(iv).] ☐ **No** [Rate as low in 14L(iv)]

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

Ownership	Disturbance at AA from #12(i)		
	☒ Low	☐ Moderate	☐ High
Public ownership	1(H)	--	--
Private ownership	--	--	--

Comments: **Fishing, established Park, school nearby.**

FUNCTION, VALUE SUMMARY, AND OVERALL RATING

Function and Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage)
A. Listed/Proposed T&E Species Habitat	Low	0.30	1	
B. MT Natural Heritage Program Species Habitat	Low	0.10	1	
C. General Wildlife Habitat	Mod	0.70	1	
D. General Fish/Aquatic Habitat	Mod	0.70	1	
E. Flood Attenuation	Low	0.20	1	
F. Short and Long Term Surface Water Storage	Low	0.30	1	
G. Sediment/Nutrient/Toxicant Removal	Mod	0.60	1	
H. Sediment/Shoreline Stabilization	Mod	0.70	1	
I. Production Export/Food Chain Support	Mod	0.40	1	
J. Groundwater Discharge/Recharge	High	1.00	1	
K. Uniqueness	Low	0.30	1	
L. Recreation/Education Potential	High	1.00	1	
	Totals:	5.30	12.00	
	Percent of Total Possible Points:		**44%** (Actual / Possible) x 100 [rd to nearest whole #]	

Category I Wetland: (Must satisfy **one** of the following criteria. If not proceed to Category II.)
- ☐ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; **or**
- ☐ Score of 1 functional point for Uniqueness; **or**
- ☐ Score of 1 functional point for Flood Attenuation **and** answer to Question 14E(ii) is "yes"; **or**
- ☐ Percent of total Possible Points is > 80%.

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

☒ **Category III Wetland:** (Criteria for Categories I, II, or IV not satisfied.)

Category IV Wetland: (Criteria for Categories I or II are not satisfied **and** all of the following criteria are met; If not satisfied, proceed to Category III.)
- ☒ "Low" rating for Uniqueness; **and**
- ☐ "Low" rating for Production Export / Food Chain Support; **and**
- ☐ Percent of total possible points is < 30%.

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

☐ **I** ☐ **II** ☒ **III** ☐ **IV**

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

1. Project Name: Big Spring Creek **2. Project #:** 130091.029 **Control #:** _____

3. Evaluation Date: 8/8/2003 **4. Evaluator(s):** Berglund/Traxler **5. Wetland / Site #(s):** Isolated Depressions

6. Wetland Location(s) i. T: 15 N **R:** 18 E **S:** 23 **T:** __ N **R:** __ E **S:** _____

ii. Approx. Stationing / Mileposts: Just south of Lewistown along Big Spring Creek -- 5 "isolated" depressions w of creek

iii. Watershed: 10040103 **GPS Reference No. (if applies):** n/a

Other Location Information: Brewery Flats

7. A. Evaluating Agency MDT

B. Purpose of Evaluation:

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

8. Wetland Size (total acres): -- (visually estimated)
<1 ac (measured, e.g. GPS)

9. Assessment Area (total acres): -- (visually estimated)
<1 ac (measured, e.g. GPS)

Comments: _____

10. CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA

HGM CLASS [1]	SYSTEM [2]	SUBSYSTEM [2]	CLASS [2]	WATER REGIME [2]	*MODIFIER* [2]	% OF AA
Riverine	Palustrine	None	Emergent Wetland	Seasonally Flooded	---	100
---	---	---	---	---	---	
---	---	---	---	---	---	
---	---	---	---	---	---	

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

Comments: _____

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

12. GENERAL CONDITION OF AA

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

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

Comments: (types of disturbance, intensity, season, etc.) **Residential, recreational -- moderate to low disturbance.**

ii. Prominent weedy, alien, & introduced species: **Smooth brome, ragweed.**

iii. Briefly describe AA and surrounding land use / habitat: **5 small depressions west of creek. 2 are in new bend area east of sidewalk; 3 are west of sidewalks in north portion of site. Surrounding use = residential development + 2-lane highway.**

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

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

Comments: _____

LAND & WATER

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

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

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

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

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

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

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

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

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

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

Highest Habitat Level:	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point and Rating	---	---	---	---	---	.1 (L)	---

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

14C. General Wildlife Habitat Rating

ii. **Evidence of overall wildlife use in the AA:** (Check either substantial, moderate, or low)

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

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

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

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

Structural Diversity (from #13)	☐High								☐Moderate								☒Low			
Class Cover Distribution (all vegetated classes)	☐Even				☐Uneven				☐Even				☐Uneven				☒Even			
Duration of Surface Water in = 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	M	--	--
High disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

Evidence of Wildlife Use from 14C(i)	**Wildlife Habitat Features Rating** from 14C(ii)			
	☐ Exceptional	☐ High	☒ Moderate	☐ Low
Substantial	--	--	--	--
Moderate	--	--	.5 (M)	--
Low	--	--	--	--

Comments: _____

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

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

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

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

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

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

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

Comments: _____

14E. FLOOD ATTENUATION ☐ **NA** (proceed to 14G)
Applies only to wetlands subject to flooding via in-channel or overbank flow.
If wetlands in AA do not flooded from in-channel or overbank flow, check NA above.

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

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

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

14F. SHORT AND LONG TERM SURFACE WATER STORAGE ☐ **NA** (proceed to 14G)
Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.
If no wetlands in the AA are subject to flooding or ponding, check NA above.

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

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

Comments: _____

14G. SEDIMENT/NUTRIENT/TOXICANT RETENTION AND REMOVAL ☐ **NA** (proceed to 14H)
Applies to wetlands with potential to receive excess sediments, nutrients, or toxicants through influx of surface or ground water or direct input.
If no wetlands in the AA are subject to such input, check NA above.

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

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

Comments: _____

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

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

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

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses.	***Duration of Surface Water Adjacent to Rooted Vegetation***		
	☐Permanent / Perennial	☐Seasonal / Intermittent	☐Temporary / Ephemeral
[3] **65 %**	--	--	--
35-64 %	--	--	--
< 35 %	--	--	--

Comments: _____

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

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

A	☐ Vegetated component >5 acres						☐ Vegetated component 1-5 acres						☒ Vegetated component <1 acre					
B	☐ High		☐ Moderate		☐ Low		☐ High		☐ Moderate		☐ Low		☐ High		☐ Moderate		☒ Low	
C	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☒Y	☐N
P/P	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S/I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.3L	--
T/E/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Comments: Subsurface.

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

i. ☐ **Discharge Indicators**
- ☐ Springs are known or observed.
- ☐ Vegetation growing during dormant season/drought.
- ☐ Wetland occurs at the toe of a natural slopes.
- ☐ Seeps are present at the wetland edge.
- ☐ AA permanently flooded during drought periods.
- ☐ Wetland contains an outlet, but no inlet.
- ☒ Other Alluvial flow.

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

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

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

Comments: _____

14K. UNIQUENESS

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

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

Comments: _____

14L. RECREATION / EDUCATION POTENTIAL

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

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

iii. Based on the location, diversity, size, and other site attributes, is there a strong potential for recreational or educational use?
☒ **Yes** [Proceed to 14L (ii) and then 14L(iv).] ☐ **No** [Rate as low in 14L(iv)]

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

Ownership	Disturbance at AA from #12(i)		
	☐ Low	☒ Moderate	☐ High
Public ownership	--	.5(M)	--
Private ownership	--	--	--

Comments: **School nearby, public site, moderate potential for study of wetland development.**

FUNCTION, VALUE SUMMARY, AND OVERALL RATING

Function and Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage)
A. Listed/Proposed T&E Species Habitat	Low	0.00	1	
B. MT Natural Heritage Program Species Habitat	Low	0.10	1	
C. General Wildlife Habitat	Mod	0.50	1	
D. General Fish/Aquatic Habitat	N/A	0.00	--	
E. Flood Attenuation	Low	0.20	1	
F. Short and Long Term Surface Water Storage	Low	0.30	1	
G. Sediment/Nutrient/Toxicant Removal	High	1.00	1	
H. Sediment/Shoreline Stabilization	N/A	0.00	--	
I. Production Export/Food Chain Support	Low	0.3	1	
J. Groundwater Discharge/Recharge	High	1.00	1	
K. Uniqueness	Low	0.30	1	
L. Recreation/Education Potential	Mod	0.50	1	
	Totals:	4.20	10.00	
	Percent of Total Possible Points:		**42%** (Actual / Possible) x 100 [rd to nearest whole #]	

Category I Wetland: (Must satisfy **one** of the following criteria. If not proceed to Category II.)
- ☐ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; **or**
- ☐ Score of 1 functional point for Uniqueness; **or**
- ☐ Score of 1 functional point for Flood Attenuation **and** answer to Question 14E(ii) is "yes"; **or**
- ☐ Percent of total Possible Points is > 80%.

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

☒ **Category III Wetland:** (Criteria for Categories I, II, or IV not satisfied.)

Category IV Wetland: (Criteria for Categories I or II are not satisfied **and** all of the following criteria are met; If not satisfied, proceed to Category III.)
- ☒ "Low" rating for Uniqueness; **and**
- ☒ "Low" rating for Production Export / Food Chain Support; **and**
- ☐ Percent of total possible points is < 30%.

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

☐ **I** ☐ **II** ☒ **III** ☐ **IV**

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

1. Project Name: Big Spring Creek **2. Project #:** 130091.029 **Control #:** _____

3. Evaluation Date: 8/8/2003 **4. Evaluator(s):** Bergland/Traxler **5. Wetland / Site #(s):** Large polygons

6. Wetland Location(s) i. T: 15 N **R:** 18 E **S:** 23 **T:** __ N **R:** __ E **S:** _____

ii. Approx. Stationing / Mileposts: Just south of Lewistown along Big Spring Creek

iii. Watershed: 10040103 **GPS Reference No. (if applies):** n/a

Other Location Information: Brewery Flats

7. A. Evaluating Agency MDT

B. Purpose of Evaluation:

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

8. Wetland Size (total acres): 10+ (visually estimated)
-- (measured, e.g. GPS)

9. Assessment Area (total acres): -- (visually estimated)
~2 to 6.5 (measured, e.g. GPS)

Comment: _____

10. CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA

HGM CLASS [1]	SYSTEM [2]	SUBSYSTEM [2]	CLASS [2]	WATER REGIME [2]	*MODIFIER* [2]	% OF AA
Riverine	Riverine	Upper Perennial	Rock Bottom	Permanently Flooded	Excavated	20
Riverine	Palustrine	---	Emergent Wetland	Seasonally Flooded	---	40
Riverine	Palustrine	---	Scrub-Shrub Wetland	Seasonally Flooded	---	40
---	---	---	---	---	---	

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

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

12. GENERAL CONDITION OF AA

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

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

Comments: (types of disturbance, intensity, season, etc.) Residential, recreational -- moderate to low disturbance

ii. Prominent weedy, alien, & introduced species: Smooth brome, ragweed

iii. Briefly describe AA and surrounding land use / habitat: Large pre-existing wetland polygons near north and south ends of mitigation area and newly developed wetlands adjacent to highway. Surrounding use = residential development + 2-lane highway.

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

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

Comments: _____

LAND & WATER

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

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

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

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

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point and Rating	---	---	---	---	---	.3 (L)	---

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

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

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

Primary or Critical habitat **(list species)**	☐ D ☐ S	_____
Secondary habitat **(list species)**	☐ D ☒ S	N. leopard frog, possible ws cutthroat
Incidental habitat **(list species)**	☐ D ☐ S	_____
No usable habitat	☐ D ☐ S	_____

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

Highest Habitat Level:	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	none
Functional Point and Rating	---	---	---	.6 (M)	---	---	---

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

14C. General Wildlife Habitat Rating

iii. **Evidence of overall wildlife use in the AA:** (Check either substantial, moderate, or low)

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

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

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

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

Structural Diversity (from #13)	☐High								☒Moderate								☐Low			
Class Cover Distribution (all vegetated classes)	☐Even				☐Uneven				☒Even				☐Uneven				☐Even			
Duration of Surface Water in = 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (see #12)	--	--	--	--	--	--	--	--	H	--	--	--	--	--	--	--	--	--	--	--
High disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

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

Comments: _____

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

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

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

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

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

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

Types of Fish Known or Suspected Within AA	**Modified Habitat Quality** from 14D(ii)			
	☐ Exceptional	☒ High	☐ Moderate	☐ Low
Native game fish	--	.9 (H)	--	--
Introduced game fish	--	--	--	--
Non-game fish	--	--	--	--
No fish	--	--	--	--

Comments: Mtn. Whitefish, Sauger present (MRIS 2002)

14E. FLOOD ATTENUATION ☐ **NA** (proceed to 14G)
Applies only to wetlands subject to flooding via in-channel or overbank flow.
If wetlands in AA do not flooded from in-channel or overbank flow, check NA above.

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

Estimated wetland area in AA subject to periodic flooding	☐ ≥ 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**	--	--	--	--	.7 (H)	--	--	--	--
AA contains **unrestricted outlet**	--	--	--	--	--	--	--	--	--

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

14F. SHORT AND LONG TERM SURFACE WATER STORAGE ☐ **NA** (proceed to 14G)
Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.
If no wetlands in the AA are subject to flooding or ponding, check NA above.

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

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding.	☐ >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 [3] **5 out of 10 years**	--	--	--	--	.6 (M)	--	--	--	--
Wetlands in AA flood or pond **< 5 out of 10 years**	--	--	--	--	--	--	--	--	--

Comments: _____

14G. SEDIMENT/NUTRIENT/TOXICANT RETENTION AND REMOVAL ☐ **NA** (proceed to 14H)
Applies to wetlands with potential to receive excess sediments, nutrients, or toxicants through influx of surface or ground water or direct input.
If no wetlands in the AA are subject to such input, check NA above.

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

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

Comments: _____

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

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

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

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses.	***Duration of Surface Water Adjacent to Rooted Vegetation***		
	☒Permanent / Perennial	☐Seasonal / Intermittent	☐Temporary / Ephemeral
[3] **65 %**	--	--	--
35-64 %	.7 (M)	--	--
< 35 %	--	--	--

Comments: May increase with plantings.

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

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

A	☒ Vegetated component >5 acres						☐ Vegetated component 1-5 acres						☐ Vegetated component <1 acre					
B	☐ High		☒ Moderate		☐ Low		☐ High		☐ Moderate		☐ Low		☐ High		☐ Moderate		☐ Low	
C	☐Y	☐N	☒Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N	☐Y	☐N
P/P	--	--	.9H	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
S/I	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T/E/A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Comments:

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

i. ☒ **Discharge Indicators**
- ☒ Springs are known or observed.
- ☐ Vegetation growing during dormant season/drought.
- ☐ Wetland occurs at the toe of a natural slopes.
- ☒ Seeps are present at the wetland edge.
- ☐ AA permanently flooded during drought periods.
- ☐ Wetland contains an outlet, but no inlet.
- ☒ Other

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

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

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

Comments:

14K. UNIQUENESS

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

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

Comments:

14L. RECREATION / EDUCATION POTENTIAL

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

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

iii. Based on the location, diversity, size, and other site attributes, is there a strong potential for recreational or educational use?
☒ **Yes** [Proceed to 14L (ii) and then 14L(iv).] ☐ **No** [Rate as low in 14L(iv)]

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

Ownership	Disturbance at AA from #12(i)		
	☒ Low	☐ Moderate	☐ High
Public ownership	1(H)	--	--
Private ownership	--	--	--

Comments: _____

FUNCTION, VALUE SUMMARY, AND OVERALL RATING

Function and Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage)
A. Listed/Proposed T&E Species Habitat	Low	0.30	1	
B. MT Natural Heritage Program Species Habitat	Mod	0.60	1	
C. General Wildlife Habitat	High	0.90	1	
D. General Fish/Aquatic Habitat	High	0.90	1	
E. Flood Attenuation	High	0.70	1	
F. Short and Long Term Surface Water Storage	Mod	0.60	1	
G. Sediment/Nutrient/Toxicant Removal	High	1.00	1	
H. Sediment/Shoreline Stabilization	Mod	0.70	1	
I. Production Export/Food Chain Support	High	0.90	1	
J. Groundwater Discharge/Recharge	High	1.00	1	
K. Uniqueness	Low	0.30	1	
L. Recreation/Education Potential	High	1.00	1	
	Totals:	8.90	12.00	
	Percent of Total Possible Points:		**74%** (Actual / Possible) x 100 [rd to nearest whole #]	

Category I Wetland: (Must satisfy **one** of the following criteria. If not proceed to Category II.)
- ☐ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; **or**
- ☐ Score of 1 functional point for Uniqueness; **or**
- ☐ Score of 1 functional point for Flood Attenuation **and** answer to Question 14E(ii) is "yes"; **or**
- ☐ Percent of total Possible Points is > 80%.

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

☐ **Category III Wetland:** (Criteria for Categories I, II, or IV not satisfied.)

Category IV Wetland: (Criteria for Categories I or II are not satisfied **and** all of the following criteria are met; If not satisfied, proceed to Category III.)
- ☐ "Low" rating for Uniqueness; **and**
- ☐ "Low" rating for Production Export / Food Chain Support; **and**
- ☐ Percent of total possible points is < 30%.

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

☐ **I** ☒ **II** ☐ **III** ☐ **IV**

Appendix C

REPRESENTATIVE PHOTOGRAPHS
2003 AERIAL PHOTOGRAPH

MDT Wetland Mitigation Monitoring
Big Spring Creek
Lewistown, Montana

LAND & WATER

Photo Point 1: 346 degrees North
New Big Spring Creek channel

Photo Point 1: 300 degrees NW

Photo Point 1: 260 degrees West
New Big Spring Creek channel

Photo Point 2: 155 degrees SE
Location of old creek channel parallel to highway

Photo Point 3: 190 degrees SW

Photo Point 3: 340 Degrees North

2003 Big Spring Creek Photographs, Sheet 1

LAND & WATER

Photo Point 4: 15 degrees NE
From center of walkway – 6 feet from west bridge end

Photo Point 4: 200 degrees SW
From center of walkway – 6 feet from west bridge end

Photo Point 5: 10 Degrees North
Photo looking North towards foot bridge

Photo Point 5: 100 degrees East

Vegetation Transect start: 94 degrees East

Vegetation Transect End: 274 degrees West

2003 Big Spring Creek Photographs, Sheet 2

LAND & WATER


0017
7-28-03 Big Spring Creek
1:6000 Horizons, Inc.
Wetland

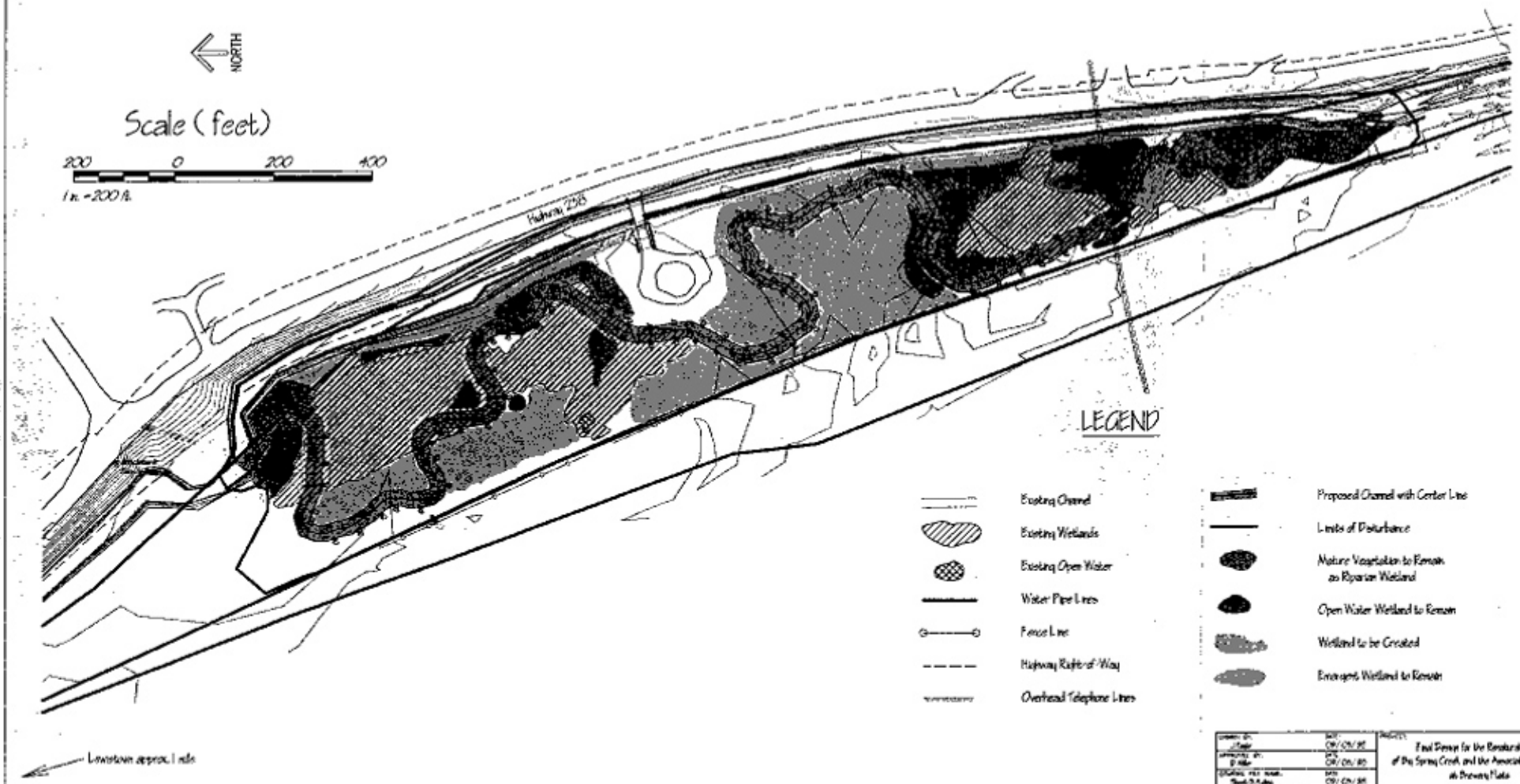
Appendix D

CONCEPTUAL SITE LAYOUT

MDT Wetland Mitigation Monitoring
Big Spring Creek
Lewistown, Montana

LAND & WATER

LAND & WATER D-1



Final Design for the Restoration of Big Spring Creek and the Associated Floodplain at Brewery Flats

WETLAND PLAN

INTER-FLUVE, INC.

5.4

Appendix E

BIRD SURVEY PROTOCOL
GPS PROTOCOL

MDT Wetland Mitigation Monitoring
Big Spring Creek
Lewistown, Montana

LAND & WATER

BIRD SURVEY PROTOCOL

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

Species Use within the Mitigation Wetland: Survey Method

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

Sites that can be circumambulated or walked throughout.

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

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

Sites that cannot be circumambulated.

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

conducted. The team member must then determine the length of the shoreline that will be surveyed during each visit.
As stated above in the ambulatory site section, these large sites most likely will have to be surveyed from established vantage points.

Species Use within the Mitigation Wetland: Data Recording
Result: A complete list of bird species using the site, an estimate of bird densities and associated behaviors, and identification of habitat use.

1. Bird Species List

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

2. Bird Density

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

3. Bird Behavior

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

4. Bird Species Habitat Use

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

GPS Mapping and Aerial Photo Referencing Procedure

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

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

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

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

Appendix F

MACROINVERTEBRATE SAMPLING PROTOCOL AND DATA

MDT Wetland Mitigation Monitoring
Big Spring Creek
Lewistown, Montana

LAND & WATER

AQUATIC INVERTEBRATE SAMPLING PROTOCOL

Equipment List

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

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

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

Site Selection

Select the sampling site with these considerations in mind:

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

Sampling

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

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

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

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

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

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

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

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

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

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

Photograph the sampled site.

Sample Handling/Shipping

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

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

METHODS

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

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

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

The purpose of constructing an index from biological attributes or metrics is to provide a means of integrating information to facilitate the determination of whether management action is needed. The nature of the action needed is not determined solely by the index score, however, but by consideration of an analysis of the component metrics, the taxonomic composition of the assemblages and other issues. The diagnostic functions of the metrics and taxonomic data need more study; our understanding of the interrelationships of natural environmental factors and anthropogenic disturbances are tentative. Thus, the further interpretive remarks accompanying the raw taxonomic and metric data are offered cautiously.

Sample Processing

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

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

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

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

Bioassessment Metrics

An index based on the performance of 12 metrics was constructed, as described above. **Table 1** lists those metrics, describes their calculation and the expected response of each to increased degradation or impairment of the wetland.

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

Four composition metrics (%Chironomidae, %Orthocladiinae of Chironomidae, %Crustacea + %Mollusca, and Amphipoda) measure the relative contributions of certain taxonomic groups that may have significant responses to habitat and/or water quality impacts. For example, amphipods have been demonstrated to increase in abundance in alkaline conditions. Short-lived, relatively mobile taxa such as chironomids dominate ephemeral environments; any are hemoglobin-bearers capable of tolerating de-oxygenated conditions.

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

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

RESULTS

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

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

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

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

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Bukantis, R. 1998. Rapid bioassessment macroinvertebrate protocols: Sampling and sample analysis SOP's. Working draft. Montana Department of Environmental Quality. Planning Prevention and Assistance Division. Helena, Montana.

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

Table 2. Sampled MDT Mitigation Sites by Year

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

Aquatic Invertebrate Taxonomic Data

Site Name BIG SPRING CREEK **Date Collected** 8/ 8/2003

Order	Family	Taxon	Count	Percent	Unique	BI	FFG
Amphipoda							
	Gammaridae						
		Gammarus	2	1.38%	Yes	4	SH
	Talitridae						
		Hyalella	20	13.79%	Yes	8	CG
Basommatophora							
	Lymnaeidae						
		Stagnicola	1	0.69%	Yes	6	SC
	Physidae						
		Physidae	10	6.90%	Yes	8	SC
Diplostraca							
		Cladocera	5	3.45%	Yes	8	CF
Diptera							
	Chironomidae						
		Orthocladius annectens	2	1.38%	Yes	6	CG
		Paratanytarsus	2	1.38%	Yes	6	CG
		Pseudochironomus	1	0.69%	Yes	5	CG
Ephemeroptera							
	Baetidae						
		Callibaetis	64	44.14%	Yes	9	CG
Heteroptera							
	Corixidae						
		Hesperocorixa	2	1.38%	Yes	10	PH
Odonata							
	Coenagrionidae						
		Enallagma	36	24.83%	Yes	7	PR
Grand Total			**145**				

Aquatic Invertebrate Data Summary

Project ID: MDT03LW
STORET Station ID:
Station Name: BIG SPRING CREEK

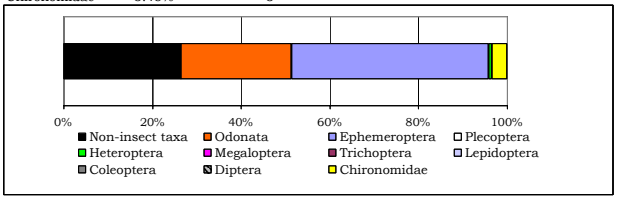
Activity ID:

Sample Date: 8/8/2003

Sample type	
SUBSAMPLE TOTAL ORGANISMS	145
Portion of sample used	66.67%
Estimated number in total sample	218
Sampling effort	
Time	
Distance	
Jabs	
Habitat type	
EPT abundance	64
Taxa richness	11
Number EPT taxa	1
Percent EPT	44.14%

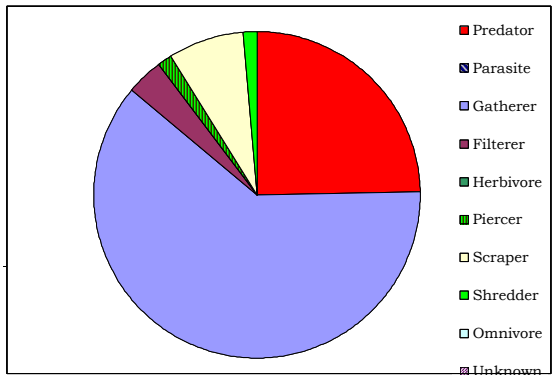
TAXONOMIC COMPOSITION

GROUP	PERCENT	#TAXA
Non-insect taxa	26.21%	5
Odonata	24.83%	1
Ephemeroptera	44.14%	1
Plecoptera	0.00%	0
Heteroptera	0.69%	1
Megaloptera	0.00%	0
Trichoptera	0.00%	0
Lepidoptera	0.00%	0
Coleoptera	0.00%	0
Diptera	0.00%	0
Chironomidae	3.45%	3



FUNCTIONAL COMPOSITION

GROUP	PERCENT	#TAXA
Predator	24.83%	1
Parasite	0.00%	0
Gatherer	61.38%	5
Filterer	3.45%	1
Herbivore	0.00%	0
Piercer	1.38%	1
Scraper	7.59%	2
Shredder	1.38%	1
Omnivore	0.00%	0
Unknown	0.00%	0



COMMUNITY TOLERANCES

Sediment tolerant taxa	1
Percent sediment tolerant	0.69%
Sediment sensitive taxa	0
Metals tolerance index (McGuire)	2.01
Cold stenotherm taxa	0
Percent cold stenotherms	0.00%

HABITUS MEASURES

Hemoglobin bearer richness	1
Percent hemoglobin bearers	0.69%
Air-breather richness	0
Percent air-breathers	0.00%
Burrower richness	1
Percent burrowers	0.69%
Swimmer richness	2
Percent swimmers	2.76%

DOMINANCE

TAXON	ABUNDANCE	PERCENT
Callibaetis	64	44.14%
Enallagma	36	24.83%
Hyalella	20	13.79%
Physidae	10	6.90%
Cladocera	5	3.45%
SUBTOTAL 5 DOMINANTS	135	93.10%
Gammarus	2	1.38%
Hesperocorixa	2	1.38%
Orthocladius annectens	2	1.38%
Paratanytarsus	2	1.38%
Stagnicola	1	0.69%
TOTAL DOMINANTS	144	99.31%

SAPROBITY

Hilsenhoff Biotic Index	7.00

DIVERSITY

Shannon H (loge)	1.87
Shannon H (log2)	1.30
Margalef D	2.00
Simpson D	0.28
Evenness	0.12

VOLTINISM

TYPE	# TAXA	PERCENT
Multivoltine	4	50.34%
Univoltine	7	49.66%
Semivoltine	0	0.00%

TAXA CHARACTERS

	#TAXA	PERCENT
Tolerant	4	53.10%
Intolerant	0	0.00%
Clinger	0	0.00%

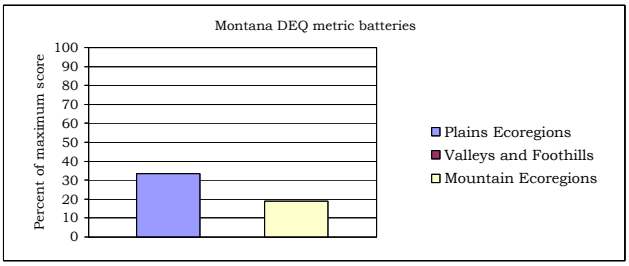
BIOASSESSMENT INDICES

B-IBI (Karr et al.)

METRIC	VALUE	SCORE	
Taxa richness	11	1	
E richness	1	1	
P richness	0	1	
T richness	0	1	
Long-lived	0	1	
Sensitive richness	0	1	
%tolerant	53.10%	1	
%predators	24.83%	3	
Clinger richness	0	1	
%dominance (3)	82.76%	1	
	TOTAL SCORE	12	24%

MONTANA DEQ METRICS (Bukantis 1998)

METRIC	VALUE	Plains Ecoregions	Valleys and Foothills	Mountain Ecoregions
Taxa richness	11	0	0	0
EPT richness	1	0	0	0
Biotic Index	7.00	1	0	0
%Dominant taxon	44.14%	2	1	1
%Collectors	64.83%	2	2	2
%EPT	44.14%	2	1	1
Shannon Diversity	1.30	0		
%Scrapers +Shredders	8.97%	1	0	0
Predator taxa	1	0		
%Multivoltine	50.34%	2		
%H of T	#DIV/0!		#DIV/0!	
TOTAL SCORES		10	#DIV/0!	4
PERCENT OF MAXIMUM		33.33	#DIV/0!	19.05
IMPAIRMENT CLASS		MODERATE	#DIV/0!	SEVERE



Montana Plains ecoregions metrics (Bramblett and Johnson)

Riffle		*Pool*	
EPT richness	1	E richness	1
Percent EPT	44.14%	T richness	0
Percent Oligochaetes and Leeches	0.00%	Percent EPT	44.14%
Percent 2 dominants	68.97%	Percent non-insect	26.21%
Filterer richness	1	Filterer richness	1
Percent intolerant	0.00%	Univoltine richness	7
Univoltine richness	7	Percent supertolerant	69.66%
Percent clingers	0.00%		
Swimmer richness	2		