
**MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2004**

*Peterson Ranch
Hall, Montana*



Prepared for:

MONTANA DEPARTMENT OF TRANSPORTATION
2701 Prospect Ave
Helena, MT 59620-1001

June 2005

Project No: B43054.00 - 0118

Prepared by:

LAND & WATER CONSULTING
~ A DIVISION OF **PBS&J**
P.O. Box 239
Helena, MT 59624



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TABLE OF CONTENTS

1.0 INTRODUCTION.....	1
2.0 METHODS	3
2.1 Monitoring Dates and Activities.....	3
2.2 Hydrology	3
2.3 Vegetation.....	3
2.4 Soils.....	4
2.5 Wetland Delineation	4
2.6 Mammals, Reptiles, and Amphibians	4
2.7 Birds.....	4
2.8 Macroinvertebrates	5
2.9 Functional Assessment.....	5
2.10 Photographs.....	5
2.11 GPS Data.....	5
2.12 Maintenance Needs.....	5
3.0 RESULTS	5
3.1 Hydrology	5
3.2 Vegetation.....	6
3.3 Soils.....	12
3.4 Wetland Delineation	12
3.5 Wildlife	13
3.6 Macroinvertebrates	14
3.7 Functional Assessment.....	15
3.8 Photographs.....	17
3.9 Revegetation Efforts	17
3.10 Maintenance Needs/Recommendations	17
3.11 Current Credit Summary.....	18
4.0 REFERENCES.....	18

TABLES

Table 1	<i>Approximate percentage of open water (OW)/ponds observed in 2004.</i>
Table 2	<i>2002, 2003, and 2004 Peterson Ranch vegetation species list.</i>
Table 3	<i>Transect 1 data summary.</i>
Table 4	<i>Transect 2 data summary.</i>
Table 5	<i>Conditions found during monitoring from 2002 to 2004.</i>
Table 6	<i>Wildlife species observed at the Peterson Ranch mitigation site during 2002, 2003, and 2004 Monitoring.</i>
Table 7	<i>Summary of 1998 (baseline), 2002, 2003, and 2004 wetland function/value ratings and functional points¹ at the Peterson Ranch Mitigation Project.</i>

FIGURES

Figure 1	<i>Project Site Location Map</i>
Figure 2	<i>Monitoring Activity Locations 2004</i>
Figure 3	<i>Mapped Site Features 2004</i>
Figure 4	<i>Pre-Developed Wetland 1998</i>

CHARTS

Chart 1	<i>Transect maps showing vegetation type from the start (0 feet) to the end of transect (222 feet) for each year monitored.</i>
Chart 2	<i>Length of vegetation communities along Transect 1.</i>
Chart 3	<i>Transect maps showing vegetation type from the start (0 feet) to the end of transect (195 feet) for each year monitored.</i>
Chart 4	<i>Length of vegetation communities along Transect 2.</i>
Chart 5	<i>Bioassessment scores for the Peterson Ranch.</i>

APPENDICES

Appendix A	<i>Figures 2, 3 and 4</i>
Appendix B	<i>Completed 2004 Wetland Mitigation Site Monitoring Form</i>
	<i>Completed 2004 Bird Survey Form</i>
	<i>Completed 2004 Wetland Delineation Forms</i>
	<i>Completed 2004 Functional Assessment Forms</i>

APPENDICES (continued)

Appendix C *Representative Photographs*

Appendix D *Original Site Plan*

Appendix E *Bird Survey Protocol*

GPS Protocol

Appendix F *Macroinvertebrate Sampling Protocol and Data*

Appendix G *Revegetation*

1.0 INTRODUCTION

The Peterson Ranch Wetland Mitigation Site was developed to mitigate wetland impacts associated with the Montana Department of Transportation (MDT) reconstruction of Highway 1 between Maxville and Drummond and as a potential reserve for future highway projects in Watershed # 2. The Peterson Ranch is located in Granite County, Watershed # 2, in the Upper Clark Fork region. The mitigation site is located south and east of Hall, Montana (**Figure 1**). Elevation is approximately 4,200 feet with slight topographic variation throughout the project site. Turnstone Biological conducted the original wetland delineation for the Peterson Ranch proposed mitigation site in 1998.

The approximate mitigation boundary is illustrated on **Figure 2 (Appendix A)**, and the original site plans are included in **Appendix D**. The mitigation site boundary starts along the southern edge of Montana Highway 512. Fence lines are located on both the west and east sides of the mitigation site, running south. On the west side of the site, an older fence line is still in place, preventing livestock from grazing within the project boundary. On the east side, the fence line follows the parcel boundary that is adjacent to an active timber mill. The fence lines form a distinct perimeter, encompassing the newly created/enhanced wetlands. Electric fence is used to close off the southern most boundary of the mitigation site near the southern end of pond #1.

Seasonal flooding of Flint Creek and an irrigation- influenced shallow groundwater table provide the primary wetland hydrology. The local groundwater systems are also influenced by the adjacent Flint Creek and the movement of subsurface flow through the highly permeable alluvium substrate located within the floodplain of the Flint Creek Valley.

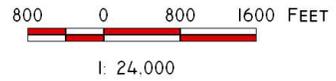
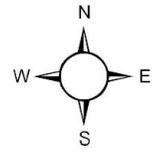
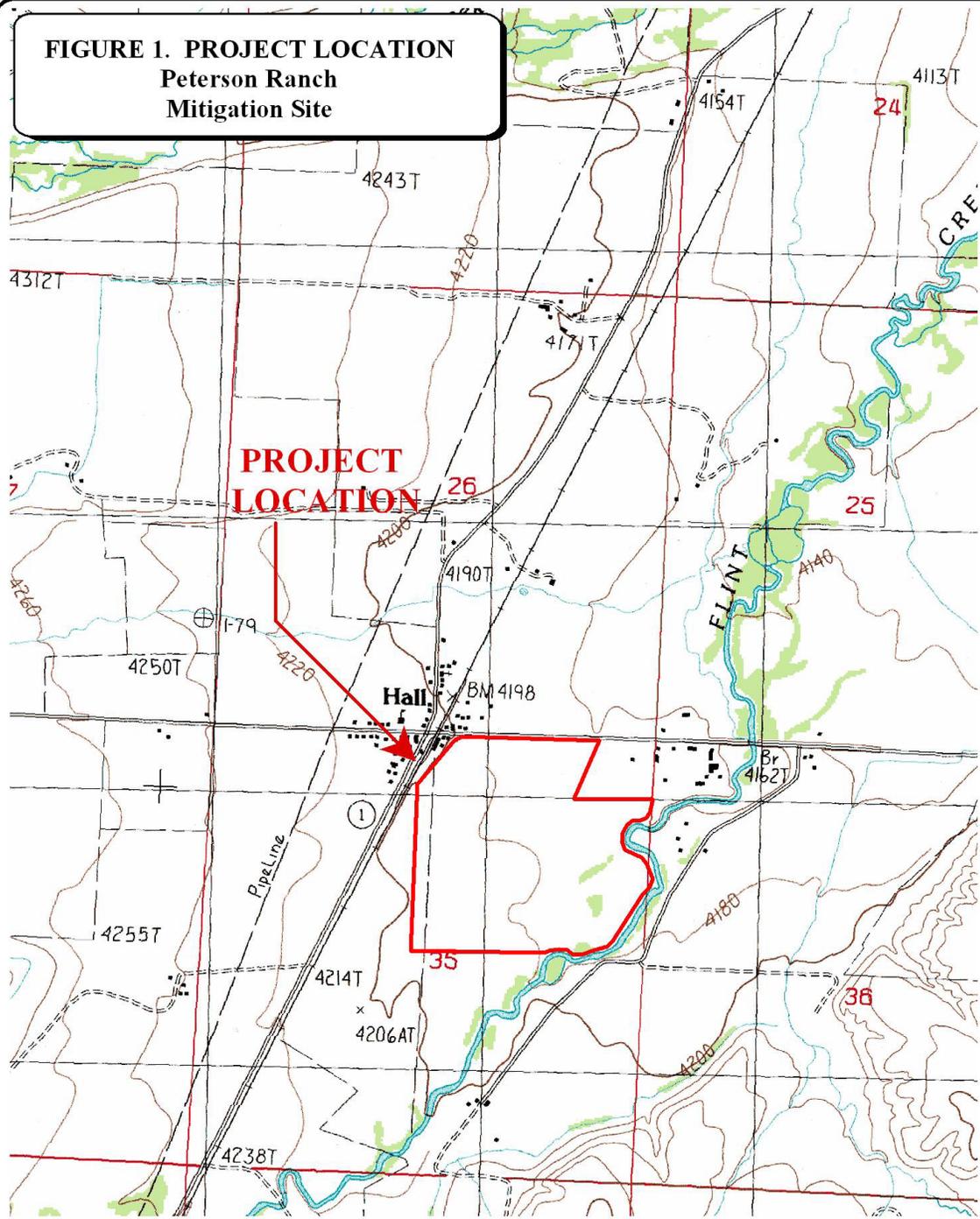
Project goals for the Peterson Ranch wetland mitigation site include the following:

- Creation of a protective easement.
- Creation of 17.5 acres of wetlands.
- Grazing management plan developed to enhance 80.6 acres.
- Enhancement of riparian vegetation through plantings and seeding.
- Creation of new wetlands with open water habitat.
- Improved functions and values ratings.

Construction was completed in the spring of 2002; diagrams are presented in **Appendix D**. Revegetation work was also completed in the spring of 2002; planting specifications are presented in **Appendix E**. The primary components of construction include:

- Construction of existing uplands into 8.2 acres of four shallow water pools and adjoining emergent wetlands.
- Construction of degraded wet meadow into 9.4 acres of shallow open water and emergent/scrub-shrub wetlands.

FIGURE 1. PROJECT LOCATION
Peterson Ranch
Mitigation Site



<p>PROJECT #: 130091.010 DATE: Dec 2002 LOCATION: HALL, MT PROJECT MANAGER: B. DUTTON DRAWN BY: B. STEINEBACH</p>	 <p>LAND & WATER CONSULTING, INC. 1120 CEDAR PO BOX 8254 MISSOULA, MT 59807</p>
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Peterson Ranch Wetland Mitigation 2004 Monitoring Report

The site was designed to mitigate for specific wetland functions and values impacted by MDT roadway projects. These include riparian, wet meadow, emergent and open water wetland areas lost to MDT construction. Impacted functions include sediment and nutrient retention, water quality, groundwater recharge, and waterfowl/wildlife habitat.

The Peterson Ranch site will be monitored yearly over the 3-year contract period to document wetland and other biological attributes. The monitoring area is illustrated in **Figure 2 (Appendix A)**.

2.0 METHODS

2.1 Monitoring Dates and Activities

The site was visited on May 29th (spring season), August 12th (mid-season), and October 7th (fall season), 2004. The spring and fall visits were conducted to sample seasonal bird and other wildlife use. 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 aquatic habitat boundary mapping; vegetation community mapping; vegetation transect; soils data; hydrology data; bird and general wildlife use; photograph points; macroinvertebrate sampling; GPS data points; functional assessment; and (non-engineering) examination of topographic features.

2.2 Hydrology

Wetland hydrology indicators were recorded during the mid-season visit 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**). Additional hydrologic data were recorded on the mitigation site monitoring form (**Appendix B**). No groundwater monitoring wells were installed at the site.

2.3 Vegetation

General dominant species-based vegetation community types (e.g., *Eleocharis/Carex*) 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 do not reflect yearly changes. Estimated percent cover of the dominant species in each community type was listed on the site monitoring form (**Appendix B**).

Two 10-foot wide belt transects were established during the mid-season monitoring event to represent the range of current vegetation conditions. Percent cover was estimated for each vegetative species within each successive vegetative community encountered within the “belt” using the following values: T (few plants); P (1-5%); 1 (5-15%); 2 (15-25%); 3 (25-35%); 4 (35-45%); 5 (45-55%) and so on to 9 (85-95%). The transect locations are illustrated on **Figure 2**

(**Appendix A**). The transects will be used to evaluate changes over time, especially the establishment and increase of hydrophytic vegetation. The transect locations were marked on the air photo and all data were recorded on the mitigation site monitoring form. Transect endpoint locations were recorded with the GPS unit in 2002. A photograph was taken from both ends of each transect looking along the transect path.

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

2.4 Soils

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

2.5 Wetland Delineation

Wetland delineation was conducted during the mid-season visit according to the 1987 COE Wetland Delineation Manual. Wetland and upland areas within the monitoring area were investigated for the presence of wetland hydrology, hydrophytic vegetation and hydric soils. The information was recorded on COE Routine Wetland Delineation Data Forms (**Appendix B**). The wetland/upland boundary was originally delineated on the air photo and recorded with a resource grade GPS unit using the procedures outlined in **Appendix E**. Modifications to these boundaries in 2004 were accomplished by hand-mapping onto the 2002 aerial photograph. The wetland/upland boundary in combination with the wetland/open water boundary was used to calculate the final wetland acreage.

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 site visits. 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 used.

2.7 Birds

Bird observations were also recorded during all three-site visits. No formal census plots, spot mapping, point counts, or strip transects were conducted. Observations were generally recorded incidental to other monitoring activities and were categorized by species, activity code, and general habitat association.

2.8 Macroinvertebrates

Macroinvertebrate samples were collected during the mid-season site visit at four separate locations (**Figure 2**). Macroinvertebrate sampling procedures are provided in **Appendix F**. Samples were preserved as outlined in the sampling procedure and sent to Rhithron Associates for analysis.

2.9 Functional Assessment

Functional assessment forms were completed using the 1999 MDT Montana Wetland Assessment Method (**Appendix B**). Field data necessary for this assessment were collected during the mid-season visit. Turnstone Biological completed baseline functional assessment during the initial wetland delineation using the 1996 MDT Montana Wetland Field Evaluation Form.

2.10 Photographs

Photographs were taken illustrating current land uses surrounding the site, the upland buffer, the monitored area and the vegetation transects. Each photograph point location was recorded with a resource grade GPS in 2002. The location of photo points is shown on **Figure 2, Appendix A**. All photographs were taken using a digital camera.

2.11 GPS Data

During the 2002 monitoring season, point data were collected with a resource grade GPS unit at the vegetation transect beginning and ending locations and at all photograph locations. Wetland boundaries were also recorded with a resource grade GPS unit in 2002, but were modified via hand mapping onto aerial photographs in 2004. The method used to collect these points is described in the GPS protocol in **Appendix E**.

2.12 Maintenance Needs

Observations were made of existing structures and of erosion/sediment problems to identify maintenance needs. This did not constitute an engineering-level structural inspection, but rather a cursory examination. Current/future potential problems were documented on the monitoring form.

3.0 RESULTS

3.1 Hydrology

The main source of hydrology is seasonal flooding by Flint Creek. This mitigation site occurs in Flint Creek Valley floodplain consisting of areas of low topography, small side channels (irrigation ditches) and ponds. Another primary source of hydrology is the high groundwater

table influenced by irrigation ditches and persistent upwelling and lateral movement of groundwater through the alluvial materials located throughout the floodplain.

Open water (OW) occurred across approximately 0.61 acre or 1% of the 48-acre mitigation site during the mid-season visit (**Figure 3**). Shallow OW/ponds # 1, 2, 3, 4 and 5 (**Figure 3**) were constructed to depths of less than 6.6 feet. During the 2004 monitoring a decrease in open water was observed at the mitigation site. Shallow OW/ponds # 1 and 2 were mapped as wetland areas instead of open water during the 2004 mapping. Water levels within the OW/ponds # 1 and 2 have decreased to a level suitable for emergent and aquatic vegetation to dominate throughout the entire ponds. The outer fringes of OW/ponds # 3, 4, and 5 were inundated and surrounded by more extensive emergent vegetation. The outer pond fringes are developing into emergent vegetation types. Open water habitat was dominated by non-rooted aquatic vegetation and algae.

Approximate percentages of inundation at OW/ponds 1-5 were observed during spring / summer and fall visits (**Table 1**).

Table 1: Approximate percentage of open water (OW)/ponds observed in 2004.

Visit	OW/Pond #1	OW/Pond#2	OW/Pond#3	OW/Pond#4	OW/Pond#5
Spring / Summer	40%	40%	60%	50%	50%
Fall	90%	100%	100%	100%	100%

Large excavated (proposed) wetland cells west of the main ditch bisecting the property do not appear to be receiving water as originally intended. With the exception of the small ponds, most of these areas were completely dry during all three site visits. This is apparently due to the unavailability of directly applied irrigation water as originally proposed. The use of irrigation water for these sites was denied by the DNRC as a result of the water rights permitting process. The landowners are attempting to address this issue.

3.2 Vegetation

Seventy-three plant species were identified at the site and are listed in **Table 2**. The majority of these species are herbaceous. Two general wetland types were identified; these include emergent and scrub-shrub/emergent wetlands. A few small shrub communities exist along an active side channel/irrigation ditch. Several mature black cottonwood (*Populus trichocarpa*) and aspen (*Populus tremuloides*) were also observed along the same side channel and its associated wet fringes. Most the site consists of open wet meadows and emergent wetland vegetation.

Ten wetland types and one upland community type were identified at the mitigation site (**Figure 3, Appendix A**). The ten wetland community types include Type 1: *Agrostis*, Type 3: *Salix*, Type 4: *Eleocharis/Carex*, Type 5: *Carex/Typha*, Type 6: *Agrostis/Juncus*, Type 7: *Carex/Alopecurus*, Type 8: *Phleum/Agrostis*, Type 9: *Typha/Eleocharis*, Type 10: *Agrostis/Veronica* and Type 11: *Veronica/Myriophyllum*. The one upland community observed, Type 2: *Agropyron* covers a vast majority of the mitigation site. Plant species observed within each of these communities are listed on the attached data form (**Appendix B**).

Type 4, 9, 10 and 11 are the wettest communities and occurred as aquatic bed/emergent wetlands in the shallow waters of the created wetlands ponds # 1, 2, 3, 4 and 5 (**Figure 3**).

Peterson Ranch Wetland Mitigation 2004 Monitoring Report

Table 2: 2002, 2003, and 2004 Peterson Ranch vegetation species list.

Scientific Name	Common Name	Region 9 (Northwest) Wetland Indicator
<i>Achillea millefolium</i>	common yarrow	FACU
<i>Agropyron repens</i>	quack grass	FACU
<i>Agropyron smithii</i>	western wheatgrass	FACU
<i>Agropyron trachycaulum</i>	slender wheatgrass	FAC
<i>Agrostis alba</i>	Redtop	FAC+
<i>Alopecurus pratensis</i>	meadow foxtail	FACW
<i>Amaranthus retroflexus</i>	red-root amaranth	FACU+
<i>Beckmannia syzigachne</i>	American sloughgrass	OBL
<i>Betula occidentalis</i>	birch	FACW
<i>Bidens cernua</i>	Nodding beggar-ticks	FACW+
<i>Bromus inermis</i>	smooth brome	--
<i>Bromus tectorum</i>	cheatgrass	--
<i>Carduus nutans</i>	musk thistle	--
<i>Carex microptera</i>	small winged sedge	FAC
<i>Carex nebrascensis</i>	Nebraska sedge	OBL
<i>Carex utriculata</i>	beaked sedge	OBL
<i>Centaurea maculosa</i>	spotted knapweed	--
<i>Chenopodium album</i>	white goosefoot	FAC
<i>Cirsium arvense</i>	Canada thistle	FACU+
<i>Cornus stolonifera</i>	red-osier dogwood	FACW
<i>Crataegus douglasii</i>	Douglas hawthorn	FAC
<i>Cynoglossum officinale</i>	hounds tongue	FACU
<i>Dactylis glomerata</i>	orchardgrass	FACU
<i>Descurainia sophia</i>	tansy mustard	--
<i>Elaeagnus commutata</i>	silverberry	NI
<i>Eleocharis palustris</i>	creeping spike rush	OBL
<i>Elymus cinereus</i>	big basin wildrye	FACU
<i>Elymus triticoides</i>	creeping wildrye	FAC
<i>Epilobium ciliatum</i>	Hairy willow-herb	FACW-
<i>Equisetum arvense</i>	field horsetail	FAC
<i>Festuca pratensis</i>	meadow fescue	FACU+
<i>Glyceria striata</i>	fowl mannagrass	OBL
<i>Helianthus annuus</i>	common sunflower	FACU+
<i>Hordeum jubatum</i>	barley fox-tail	FAC+
<i>Iris missouriensis</i>	rocky mountain iris	OBL
<i>Juncus balticus</i>	Baltic rush	FACW+
<i>Juncus confusus</i>	Colorado rush	FAC
<i>Juncus ensifolius</i>	three-stamen rush	FACW
<i>Juncus mertensianus</i>	Mertens's rush	OBL
<i>Juncus nodosus</i>	knotted rush	OBL
<i>Kochia scoparia</i>	summer-cypress	FAC
<i>Lepidium perfoliatum</i>	clasping pepper-grass	FACU+
<i>Lomatium spp.</i>	biscuit root	--
<i>Lychnis alba</i>	white campion	--
<i>Malva neglecta</i>	mallow	--
<i>Medicago sativa</i>	alfalfa	--
<i>Mentha arvensis</i>	mint	FAC
<i>Myriophyllum spicatum</i>	Eurasian water-milfoil	OBL
<i>Phalaris arundinaceae</i>	canary reed grass	FACW
<i>Phleum pratense</i>	Timothy	FAC-
<i>Plantago major</i>	common plantain	FAC+

Table 2 (continued): 2002, 2003, and 2004 Peterson Ranch vegetation species list.

Scientific Name	Common Name	Region 9 (Northwest) Wetland Indicator
<i>Poa ampla</i>	big bluegrass	--
<i>Polygonum amphibium</i>	water smartweed	OBL
<i>Polygonum aviculare</i>	prostrate knotweed	FACW+
<i>Populus tremuloides</i>	aspen	FAC+
<i>Populus trichocarpa</i>	black cottonwood	FAC
<i>Potentilla anserina</i>	silverweed	OBL
<i>Potentilla gracilis</i>	northwest cinquefoil	FAC
<i>Prunus virginiana</i>	serviceberry	FACU
<i>Ribes aureum</i>	swamp current	FAC+
<i>Rosa woodsii</i>	woods rose	FACU
<i>Rumex crispus</i>	curly dock	FACW
<i>Salix bebbiana</i>	Bebbs willow	FACW
<i>Salix exigua</i>	sandbar willow	OBL
<i>Salix geyeriana</i>	Geyer willow	FACW+
<i>Scirpus acutus</i>	hard stem bulrush	OBL
<i>Sisymbrium altissimum</i>	tall tumble mustard	FACU-
<i>Solidago missouriensis</i>	Missouri goldenrod	--
<i>Taraxacum officinale</i>	common dandelion	FACU
<i>Thlaspi arvensis</i>	pennycress	NI
<i>Triglochin maritimum</i>	seaside arrowgrass	OBL
<i>Trifolium pratense</i>	red clover	FACU
<i>Typha latifolia</i>	common cattail	OBL
<i>Veronica americana</i>	American speedwell	OBL

¹ **Bolded** species indicate those documented in the analysis area for the first time in 2004.

Type 4 is dominated by creeping spike rush (*Eleocharis palustris*), Nebraska sedge (*Carex nebrascensis*) and common cattail (*Typha latifolia*). Type 9 is also dominated by cattail, creeping spike rush and American sloughgrass (*Beckmannia syzigachne*). Type 10 is dominated by redtop (*Agrostis alba*) and American speedwell (*Veronica americana*). Type 11 is a new community for the 2004 monitoring. During previous monitoring the Type 11 areas were recorded as open water within the constructed ponds # 1 and 2. During the 2004 monitoring, Type 11 was dominated by American speedwell and Eurasian milfoil (*Myriophyllum spicatum*). Water levels in the constructed ponds # 1 and 2 decreased to a level suitable for emergent and aquatic vegetation to flourish. Type 5 and 7 are the next wettest areas, consisting of emergent vegetation occurring in depressions and side channels throughout the wet meadow complexes. Type 5 and 7 are dominated by Nebraska sedge, broad-leaf cattail, and meadow foxtail (*Alopecurus pratensis*).

Type 3 is the next wettest wetland type and is classified as scrub-shrub wetland. This area has mature shrub communities growing adjacent to the active side channel (irrigation ditch). Type 3 vegetation is dominated by Bebb's willow (*Salix bebbiana*), black cottonwood, Geyer willow (*Salix geyeriana*), and swamp current (*Ribes aureum*). The remaining Types 1, 6, and 8 are the least wet areas. These areas function as the transitional zone between the wettest areas and drier upland vegetation boundary. These types are dominated by mostly wetter species, but also include a minor component of upland species. Types 1, 6, and 8 combined make up most of the wet meadows located within the mitigation site.

Peterson Ranch Wetland Mitigation 2004 Monitoring Report

At this site only one upland type is present. The Type 2 upland area is dominated by slender wheatgrass (*Agropyron trachycaulum*), and quackgrass (*Agropyron repens*). The Type 2 community was mapped in areas of degraded pasture, as well as on upland slopes created around the pond excavations and spoil piles.

Several noxious weeds were observed throughout the Peterson Ranch site including spotted knapweed (*Centaurea maculosa*), Canada thistle (*Cirsium arvense*), and hound’s-tongue (*Cynoglossum officinale*). Other weedy species associated with disturbance include common dandelion (*Taraxacum officinalis*), lambs quarters (*Chenopodium album*), pepper-grass (*Lepidium perfoliatum*), tumbleweed (*Sisymbrium altissimum*), quackgrass and pennycress (*Thlaspi arvensis*).

Vegetation transect results are detailed in the attached data forms (**Appendix B**) and are summarized in **Tables 3 to 4** and in **Charts 1 to 4**. Vegetation transect results show no change in vegetation types for both transect # 1 and 2. Wetland areas for transect # 1 remained similar to the 2003 monitoring results. Transect # 2 during 2002 monitoring was mapped as exclusively upland vegetation; wetland vegetation was first noted in 2003. Transect # 2 remained similar to 2003 wetland composition during the 2004 monitoring.

Table 3: Transect 1 data summary.

Monitoring Year	2002	2003	2004
Transect Length (feet)	222	222	222
# Vegetation Community Transitions along Transect	1	1	1
# Vegetation Communities along Transect	2	2	2
# Hydrophytic Vegetation Communities along Transect	1	1	1
Total Vegetative Species	14	15	15
Total Hydrophytic Species	9	11	10
Total Upland Species	4	3	3
Estimated % Total Vegetative Cover	85%	95%	67.5
% Transect Length Comprised of Hydrophytic Vegetation Communities	49%	38%	38%
% Transect Length Comprised of Upland Vegetation Communities	51%	62%	62%
% Transect Length Comprised of Unvegetated Open Water	0%	0%	0%
% Transect Length Comprised of Bare Substrate	0%	0%	0%

Table 4: Transect 2 data summary.

Monitoring Year	2002	2003	2004
Transect Length (feet)	195	195	195
# Vegetation Community Transitions along Transect	0	1	1
# Vegetation Communities along Transect	1	2	2
# Hydrophytic Vegetation Communities along Transect	0	1	1
Total Vegetative Species	15	13	13
Total Hydrophytic Species	6	6	7
Total Upland Species	6	7	5
Estimated % Total Vegetative Cover	85%	95%	85%
% Transect Length Comprised of Hydrophytic Vegetation Communities	0%	10%	10%
% Transect Length Comprised of Upland Vegetation Communities	100%	90%	90%
% Transect Length Comprised of Unvegetated Open Water	0%	0%	0%
% Transect Length Comprised of Bare Substrate	0%	0%	0%

Peterson Ranch Wetland Mitigation 2004 Monitoring Report

Chart 1: *Transect maps showing vegetation type from the start (0 feet) to the end of transect (222 feet) for each year monitored.*

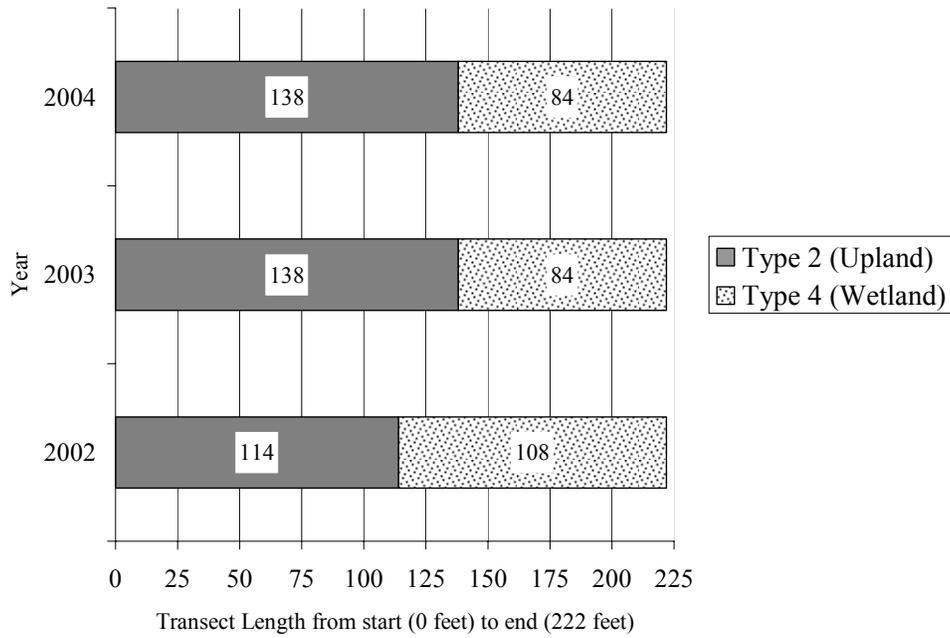


Chart 2: *Length of vegetation communities along Transect 1.*

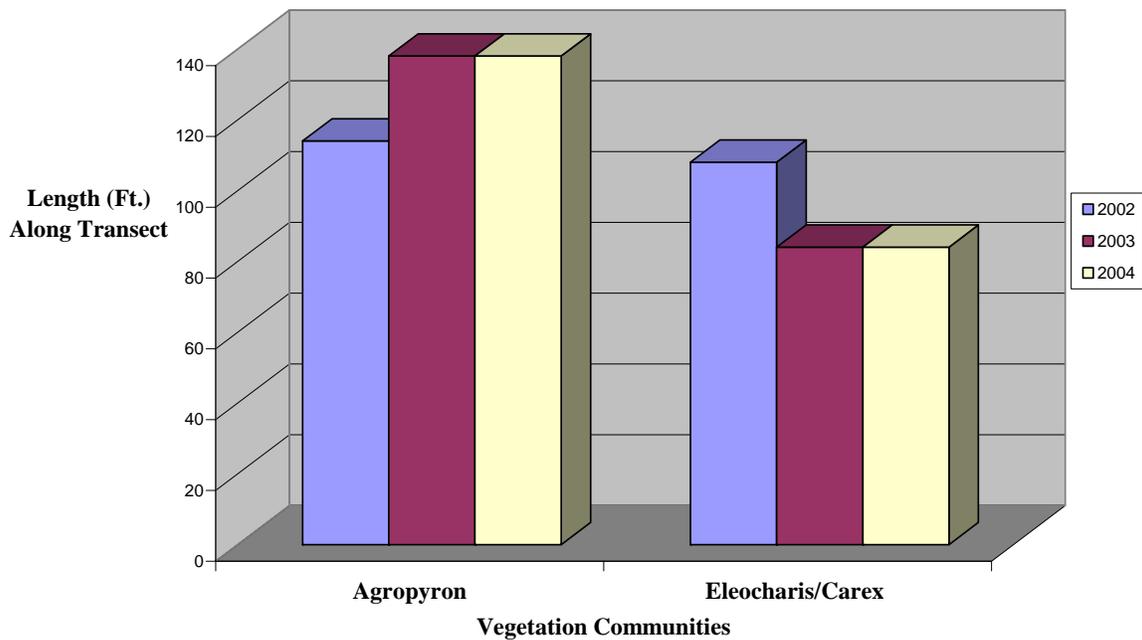


Chart 3: Transect maps showing vegetation type from the start (0 feet) to the end of transect (195 feet) for each year monitored.

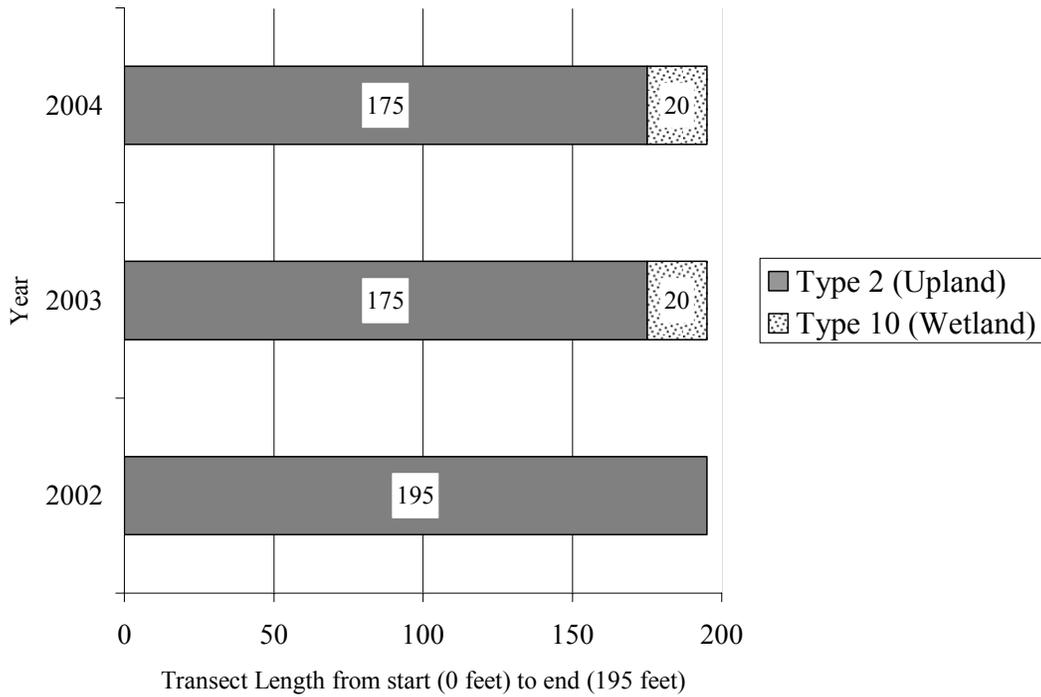
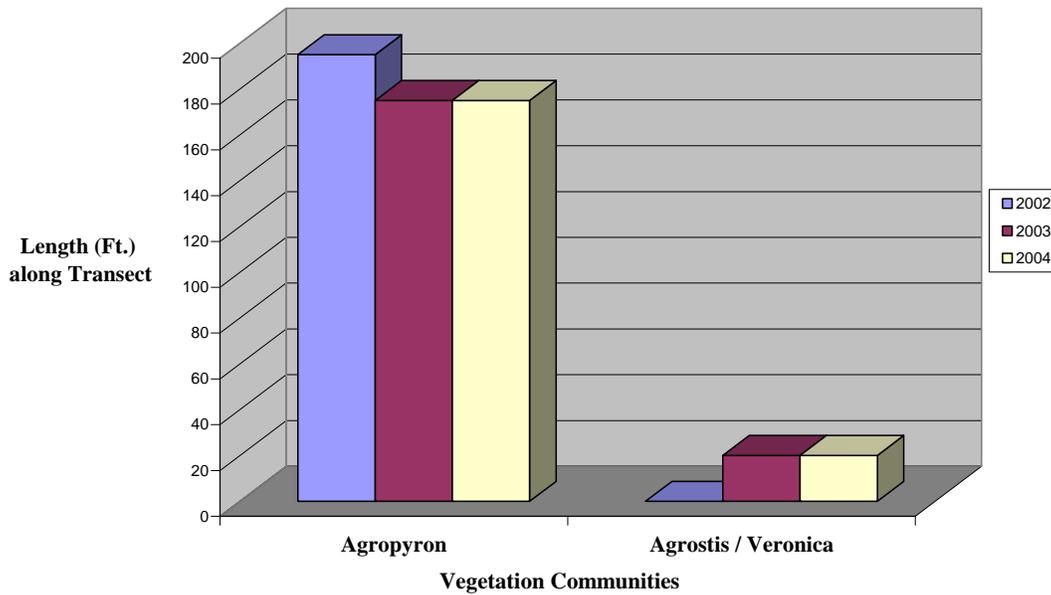


Chart 4: Length of vegetation communities along Transect 2.



3.3 Soils

Soils are mapped in the Granite County Soil Survey as Nirling cobbly loam, Blossberg loam and Nythar-Flintcreek Complex. Blossberg loam and Nythar-Flintcreek Complex are both listed as hydric soils for Granite County (NRCS 2003). Wetland soils observed during monitoring and documented on the Routine Wetland Determination form were mostly sandy clay, clay loams, sandy clay loams and minor components of peat with very low chromas (1 or 2) within 6 inches of the surface. Mottles (redoximorphic features) were present in one profile sampled along transect # 2. Several soil profiles described on the Routine Wetland Determination forms were mapped as upland sampling points, having no soil moisture or distinct hydric characteristics within 18 inches of the surface.

3.4 Wetland Delineation

Delineated wetland boundaries are illustrated on **Figure 3** in **Appendix A**. Completed wetland delineation forms are included in **Appendix B**. Soils, vegetation, and hydrology are discussed in preceding sections. Wetland conditions during the 2004 monitoring are identified in **Table 5**.

Table 5: Wetland conditions found during monitoring from 2002 to 2004 (acres).

Condition	Monitoring Area 2002	Monitoring Area 2003	Monitoring Area 2004
Gross Wetland Area	25.98	26.23	26.23
Open Water Area	(1.90)	(1.90)	(0.61)
Upland "Islands"	(1.63)	(2.72)	(2.85)
Net Wetland Area	22.45	21.61	22.77

Approximately 22.77 wetland acres and 0.61 open water acres are currently within the monitoring area (**Figure 3**), for a total of 23.38 acres of aquatic habitat. The pre-construction wetland delineation reported 90 acres of wetland and no open water acres throughout the entire 135-acre conservation easement. The mitigation site encompasses only 48 acres of this larger total. Turnstone Biological mapped 22.6 acres of wetlands within the current mitigation site boundary. A pre-project delineation map is provided in **Appendix A, Figure 4**. The net increase in aquatic habitat to date is $23.38 - 22.6 = 0.78$ acre.

Pre-project and post-project delineation boundaries were observed to be fairly consistent. However, during the 2002, 2003 and 2004 monitoring some differences were observed between pre-project and post-project wetland boundaries. A few such areas of note occur northeast of OW/Pond #2, where mapped pre-project wetlands were apparently disturbed by construction and did not exhibit wetland characteristics during the 2002, 2003 and 2004 monitoring efforts. Given adequate hydrology, these areas may revert back to wetlands over time. The general timing of site visits and different evaluators also had a minor influence on wetland boundaries.

Minor changes in aquatic habitat were observed between 2003 and 2004 monitoring. An increase in wetland area was observed within the previously-mapped OW/ponds # 1 and 2. OW/ponds # 1 and 2 during the 2004 monitoring were recorded as wetland areas. Water levels in ponds # 1 and 2 have decreased to a level suitable for aquatic and emergent vegetation to dominate the site. The open water areas for ponds # 1 and 2 were removed from the mapping, as

Peterson Ranch Wetland Mitigation 2004 Monitoring Report

these areas are now considered wetland areas. The decreased hydrology in these areas likely contributed to the wetland conversion from open water observed at this site. This increase in wetlands acres was slightly offset by a small increase in area of upland islands near OW/pond # 4.

3.5 Wildlife

Wildlife species, or evidence of wildlife, observed on the site during 2002, 2003 and 2004 monitoring efforts is listed in **Table 6**. Specific evidence observed, as well as activity codes pertaining to birds, is provided on the completed monitoring form in **Appendix B**.

This site provides habitat for a variety of wildlife species. Two mammal and eighteen bird species were noted at the mitigation site during the 2004 site visits.

Table 6: Wildlife species observed at the Peterson Ranch mitigation site during 2002, 2003, and 2004 Monitoring.

FISH	
None	
AMPHIBIANS	
None	
REPTILES	
None	
BIRDS	
American coot (<i>Fulica americana</i>) American crow (<i>Corvus brachyrhynchos</i>) American Robin (<i>Turdus migratorius</i>) Bald Eagle (<i>Haliaeetus leucocephalus</i>) Brewer’s blackbird (<i>Euphagus cyanocephalus</i>) Brown-headed cowbird (<i>Molothrus ater</i>) Cedar waxwing (<i>Bombycilla cedrorum</i>) Cliff swallow (<i>Petrochelidon pyrrhonota</i>) Common merganser (<i>Mergus merganser</i>) Common raven (<i>Corvus corax</i>) Common snipe (<i>Capella gallinago</i>) Eastern kingbird (<i>Tyrannus tyrannus</i>) Golden eagle (<i>Aquila chrysaetos</i>) Great Blue Heron (<i>Ardea herodias</i>)	Lesser scaup (<i>Aythya affinis</i>) Killdeer (<i>Charadrius vociferous</i>) Mallard (<i>Anas platyrhynchos</i>) Northern Flicker (<i>Colaptes auratus</i>) Red-winged blackbird (<i>Agelaius phoeniceus</i>) Spotted sandpiper (<i>Actitis macularia</i>) Tree swallow (<i>Iridoprocne bicolor</i>) Vesper sparrow (<i>Pooecetes gramineus</i>) Western meadowlark (<i>Sturnella neglecta</i>) Willow flycatcher (<i>Empidonax traillii</i>) Wilson’s phalarope (<i>Steganopus tricolor</i>) Yellow-headed blackbird (<i>Xanthocephalus xanthocephalus</i>)
MAMMALS	
Coyote (<i>Canis latrans</i>) Deer (<i>Odocoileus spp.</i>) Red Fox (<i>Vulpes vulpes</i>)	

Bolded species were observed during 2004 monitoring. All other species were observed during one or more of the previous monitoring years, but not during 2004.

3.6 Macroinvertebrates

Complete results from the macroinvertebrate sampling locations (**Figure 2**) are presented in **Appendix F**. Sampling points for the Peterson Ranch were located at OW/ponds # 4, 5 and previously mapped OW/pond # 1 and 2. Four locations were sampled during the 2004 monitoring. The following analysis was provided by Rhithron Associates (Bollman 2004).

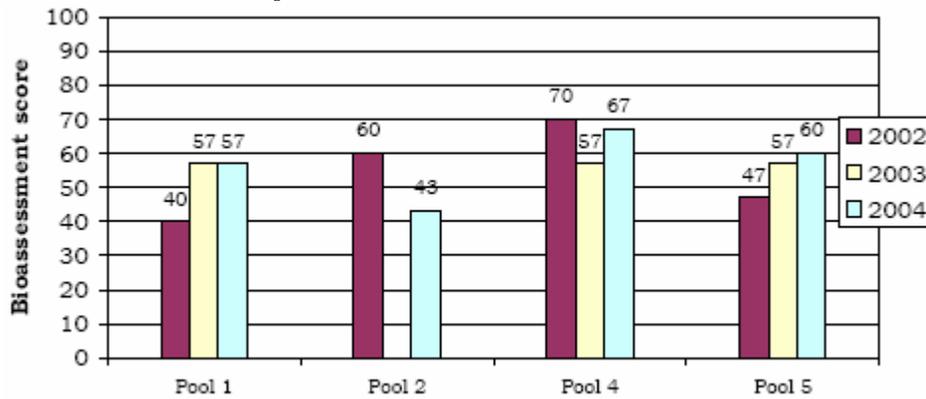
OW/Pool # 1. *Biotic conditions remained sub-optimal at this site in 2004. The faunal pattern of cladocerans and copepods apparent in the 2003 sample shifted to a worm and damselfly dominated fauna. Thus filter-feeders made up a smaller proportion and collectors a larger proportion of the functional mix in the later year. This suggests that macrophyte surfaces were either more important habitats or that sampling favored macrophyte beds over the water column in 2004. More benthic organisms appeared in the 2004 sample as well, suggesting some improvement over the anoxic conditions hypothesized in the previous report. The biotic index value remained stable between years; this water quality indicator was very near the median value for all sites studied in all years.*

OW/Pool # 2. *This site was last sampled in 2002, when sub-optimal conditions were indicated by bioassessment scores. In 2004, conditions score poorly. The fauna reported in 2002 was midge-dominated, but in 2004, the scud-and-snail pattern noted for several wetland sites in the study is noted; not a single midge was collected in the latter year. This suggests that the dominant available habitat shifted from benthic substrates to macrophyte surfaces, and can indicate an improvement in habitat complexity. However, the shift could also be an artifact of altered sampling method. The resulting biotic index value was higher in 2004 than in 2002.*

OW/Pool # 4. *Scores and sample composition indicated an improvement in biotic conditions at this site in 2004. An increase in taxa richness, largely attributable to the addition of midge taxa and several relatively sensitive taxa to the taxonomic mix suggested increased habitat diversity. The functional composition also increased in general diversity. Naiad worms were collected in 2004, suggesting that bacteria were a prolific energy source. The dominance of snails and damselflies, noted in 2003, persisted in 2004, suggesting that macrophytes remained an important habitat. The biotic index value was near the median for all sites in all years, suggesting that water quality was probably good here. Sub-optimal conditions are indicated.*

OW/Pool # 5. *Biotic conditions apparently continued to improve at this site in 2004. A richer fauna was collected at this site in 2004 than in 2003. Coenagrionid damselflies, including *Enallagma* sp., remained dominant in the latter year indicating that macrophytes provided the major habitat for invertebrates. As in 2003, the functional composition remained skewed. Predators made up 70% of the mix, but there was increased diversity in function in 2004. Relatively sensitive taxa made up a larger number of collected taxa. Conditions were sub-optimal. .*

Chart 5: Bioassessment scores for the Peterson Ranch.



3.7 Functional Assessment

Completed 2004 functional assessment forms are included in **Appendix B**. The Peterson Ranch was separated into three assessment areas (AAs) for purposes of functional assessment. These areas included the created wetland OW/pond # 1, 2 and associated emergent wet meadow west of the irrigation ditch (AA 1), scrub-shrub emergent wetlands along the irrigation ditch (AA 2), and the created wetland OW/ponds #3, 4 and 5 with associated emergent vegetation east of the irrigation ditch (AA 3). OW/pond #2 was not included during 2002 assessment of these areas, but was included in the 2003 assessment due to the development of emergent vegetation class around the pond fringe. During the 2004 monitoring areas mapped as OW/ponds # 1 and 2 were mapped as wetlands and were included in the assessment. A complete breakdown of ratings for each assessment area and pre-project assessment areas is presented in **Table 3**.

The wetlands on the Peterson Ranch mitigation site are currently all rated as Category III (moderate value), primarily due to moderate ratings for general wildlife, flood attenuation and sediment/nutrient removal variables. Other factors contributing to this score were low ratings for TE species/MNHP species habitat and recreation/education ratings. These areas received a high rating for surface water storage due to the potential acre-feet of water contained within the wetlands during seasonal high flows. The variable for production export/food chain support rated high due to the overall vegetated acres, outlet presence, and perennial water regime.

The AA's received a low to moderate flood attenuation rating due to the presence of an inflow channel into the wetland and restricted nature of the outlet. The AA's also received a low recreation/education rating since the site is moderately disturbed and is privately owned. AA's 1 and 3 received a low to moderate ratings for sediment/shoreline stability due to a lack of plants with deep binding roots. AA 2 received a higher rating for sediment/shoreline stability due to the presence of mature shrubs with deep binding root systems.

Based on functional assessment results (**Table 7**), approximately 141.14 functional units occur at the Peterson Ranch mitigation site. Baseline functional assessment results are also provided in **Table 7** for general comparative purposes. However, it should be noted that direct comparison between the baseline and 2004 functional assessments are not possible, as they were completed using different versions of the MDT functional assessment method. However, assessments can

Table 7: Summary of 1998 (baseline), 2002, 2003, and 2004 wetland function/value ratings and functional points¹ at the Peterson Ranch Mitigation Project.

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	1998 ¹ Baseline	2002 AA 1 ¹	2002 AA 2 ¹	2002 AA 3 ¹	2003 AA 1 ¹	2003 AA 2 ¹	2003 AA 3 ^{1,2}	2004 AA 1 ^{1,2}	2004 AA 2 ^{1,2}	2004 AA 3 ^{1,2}
Listed/Proposed T&E Species Habitat	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)
MNHP Species Habitat	Low (0.1)	None (0.0)	Low (0.1)	None (0.0)	None (0.0)	Low (0.1)	None (0.0)	None (0.0)	Low (0.1)	None (0.0)
General Wildlife Habitat	Low (0.1)	Mod (0.5)	Mod (0.7)	Mod (0.7)	Mod (0.5)	Mod (0.7)	Mod (0.7)	Mod (0.5)	Mod (0.7)	Mod (0.7)
General Fish/Aquatic Habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Flood Attenuation	NA	Mod (0.5)	Low (0.2)	Mod (0.5)	Mod (0.5)	Low (0.2)	Mod (0.5)	Mod (0.5)	Low (0.2)	Mod (0.5)
Short and Long Term Surface Water Storage	High (1.0)	High (0.8)	High (0.8)	High (0.8)	High (0.8)	High (0.8)	High (0.8)	High (0.8)	High (0.8)	High (0.8)
Sediment, Nutrient, Toxicant Removal	Mod (0.5)	Mod (0.7)	High (0.9)	Mod (0.7)	Mod (0.7)	High (0.9)	Mod (0.7)	Mod (0.7)	High (0.9)	Mod (0.7)
Sediment/Shoreline Stabilization	NA	Low (0.3)	High (1.0)	Mod (0.7)	Low (0.3)	High (1.0)	Mod (0.7)	Low (0.3)	High (1.0)	Mod (0.7)
Production Export/Food Chain Support	Mod (0.7)	High (0.8)	High (0.8)	High (0.8)	High (0.9)	High (0.8)	High (0.9)	High (0.9)	High (0.8)	High (0.9)
Groundwater Discharge/ Recharge	UNK	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Uniqueness	Low (0.2)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)
Recreation/Education Potential	Low (0.1)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)
Actual Points/ Possible Points	3.0 / 8	5.5 / 11	6.4 / 11	6.1 / 11	5.6 / 11	6.4 / 11	6.2 / 11	5.6 / 11	6.4 / 11	6.2 / 11
% Of Possible Score Achieved	38%	50%	58%	55%	51%	58%	56%	51%	58%	56%
Overall Category	III (borderline IV)	III	III	III	III	III	III	III	III	III
Total Acreage of Assessed Wetlands and Open Water within Easement by AA	22.60	7.00	3.00	13.80	7.35	3.00	13.16	7.35	3.00	13.03
Functional Units (acreage x actual points) by AA	67.80	38.50	19.20	84.18	41.16	19.20	81.59	41.16	19.20	80.78
Total Acreage of Assessed Wetlands and Open Water on Site (acre)	22.60	24.35 total – 0.55 Pond #2 = 23.8			23.51			23.38		
Total Functional Units on Site	67.80	141.88			141.95			141.14		
Net Acreage Gain (assessed wetlands and open water only) (acre)	NA	1.20			0.91			0.78		
Net Functional Unit Gain	NA	74.08			74.15			73.34		

¹The baseline assessment was performed using the 1996 MDT Assessment Method. The 2002 to 2004 assessments used the 1999 MDT Assessment Method. Several parameters were substantially revised in the 1999 MDT assessment method, therefore direct comparison of pre- and post-project functions is not possible, but some general trends can be noted.

² See completed 2004 MDT functional assessment forms **Appendix B** for further detail.

still compare qualitatively. The baseline assessment was completed using the 1996 version, while the 2002, 2003 and 2004 assessment was conducted using the most current (1999) version.

3.8 Photographs

Representative photographs taken from photo-points and transect ends are presented in **Appendix C**. A copy of the 2004 aerial photograph is also provided in **Appendix C**.

3.9 Revegetation Efforts

Upon completion of the project construction, revegetation efforts were conducted to enhance riparian and wetland habitat surrounding the created ponds. Riparian shrub cuttings collected from surrounding Flint Creek areas were sprigged along the margins of created ponds. Further enhancement included plantings of containerized stock of several native shrubs found within the area. These species included woods rose (*Rosa woodsii*), golden current (*Ribes aureum*), chokecherry (*Prunus virginiana*), silverberry (*Elaeagnus commutata*), and red-osier dogwood (*Cornus stolonifera*). The adjacent wetland slopes of the created wetland ponds were seeded with a wet mix consisting of slender wheatgrass (*Agropyron trachycaulum*), western wheatgrass (*Agropyron smithii*), creeping wildrye (*Elymus triticoides*), American sloughgrass (*Beckmannia syzigachne*), western mannagrass (*Glyceria occidentalis*), Baltic rush (*Juncus balticus*), and bluejoint reedgrass (*Calamagrostis canadensis*). Drier upland slopes disturbed during construction efforts were seeded with a dry mix consisting of slender wheatgrass (*Agropyron trachycaulum*), western wheatgrass (*Agropyron smithii*), big basin wildrye (*Elymus cinereus*), green needlegrass (*Stipa viridula*), and big bluegrass (*Poa ampla*). Planting specifications are presented in **Appendix G**.

Woody species survival data were collected for the Peterson Ranch. Plantings were difficult to find during the 2003 and 2004 monitoring due to extensive herbaceous cover of upland grass species. In general, species survival was good except for two species, silverberry and red osier dogwood, which exhibited low survival rates. The following species had higher survival rates: woods rose, golden current, and chokecherry. The number of willow sprigs were approximated, but not accurately counted due to high numbers of cuttings. In general most of the observed sprigs were alive and exhibited good survival. The plantings that were located had evidence of heavy browse from wildlife and livestock grazing. The high mortality of red osier dogwood likely can attributed to heavy browse. Survival data are presented in **Appendix B**.

3.10 Maintenance Needs/Recommendations

Weed control and revegetation of disturbed sites is needed to prevent further weed spread, reduce the risk of new weeds invading, reduce wind and water erosion, and reduce sediment input to surface waters. Several noxious weeds are present including Canada thistle, hound's tongue and spotted knapweed.

The general lack of water at the majority of this site continues preclude wetland development in many areas.

3.11 Current Credit Summary

At this time approximately 22.77 acres of wetland and 0.61 acres of open water occur on the mitigation site, for a total of 23.38 acres of aquatic habitat. Subtracting the original 22.6 acres of pre-project wetlands from this total yields a current net of approximately 0.78 wetland/open water acres. It is likely that additional acreage will form with additional time and more normal precipitation, and if the irrigation issue is rectified. The site has gained approximately 73 functional units to date.

4.0 REFERENCES

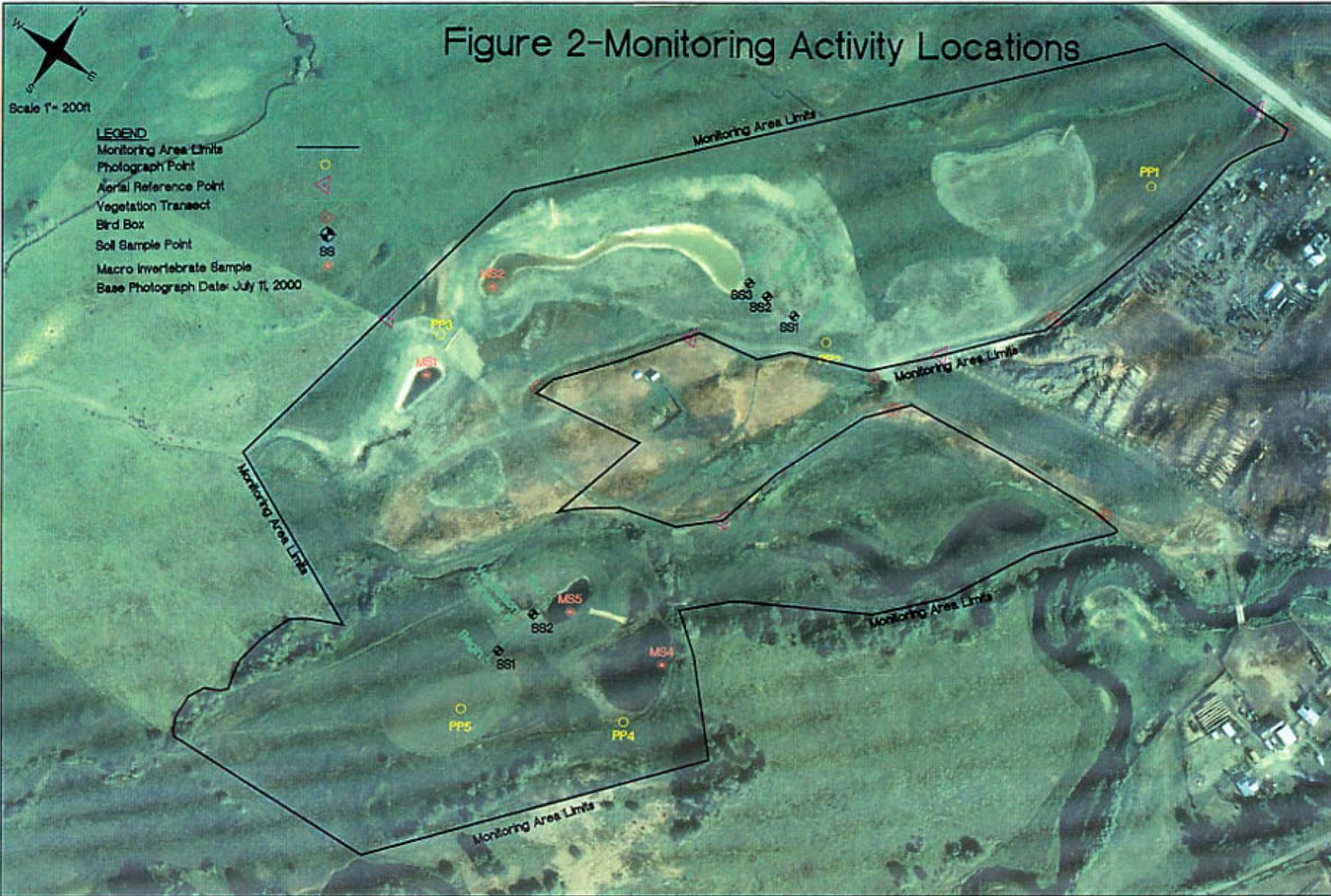
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Appendix A

FIGURES 2, 3, AND 4

*MDT Wetland Mitigation Monitoring
Peterson Ranch
Hall, Montana*

Figure 2-Monitoring Activity Locations



Scale 1" = 200ft

LEGEND

- Monitoring Area Limits
- Photograph Point
- Aerial Reference Point
- Vegetation Transect
- Bird Box
- Soil Sample Point
- Macro Invertebrate Sample
- Base Photograph Date: July 11, 2000

PROJECT NAME		MDT Peterson Ranch Wetland Mitigation	
LOCATION		Peterson Ranch	
PROJECT NO.	1300PT 010	ISSUE	RA
FILE NAME	DESCRIPTION.dwg	PREPARED BY	CH
SCALE	1" = 75'	DATE	07/11/00
LOCATION	MDT Peterson Ranch	DRAWN BY	JD
		CHECKED BY	JD
		DATE	07/11/00
SHEET NUMBER		F-2	
REV		0	
DATE		12/17/00	

LAND & WATER CONSULTING, INC.
A Division of HOKI

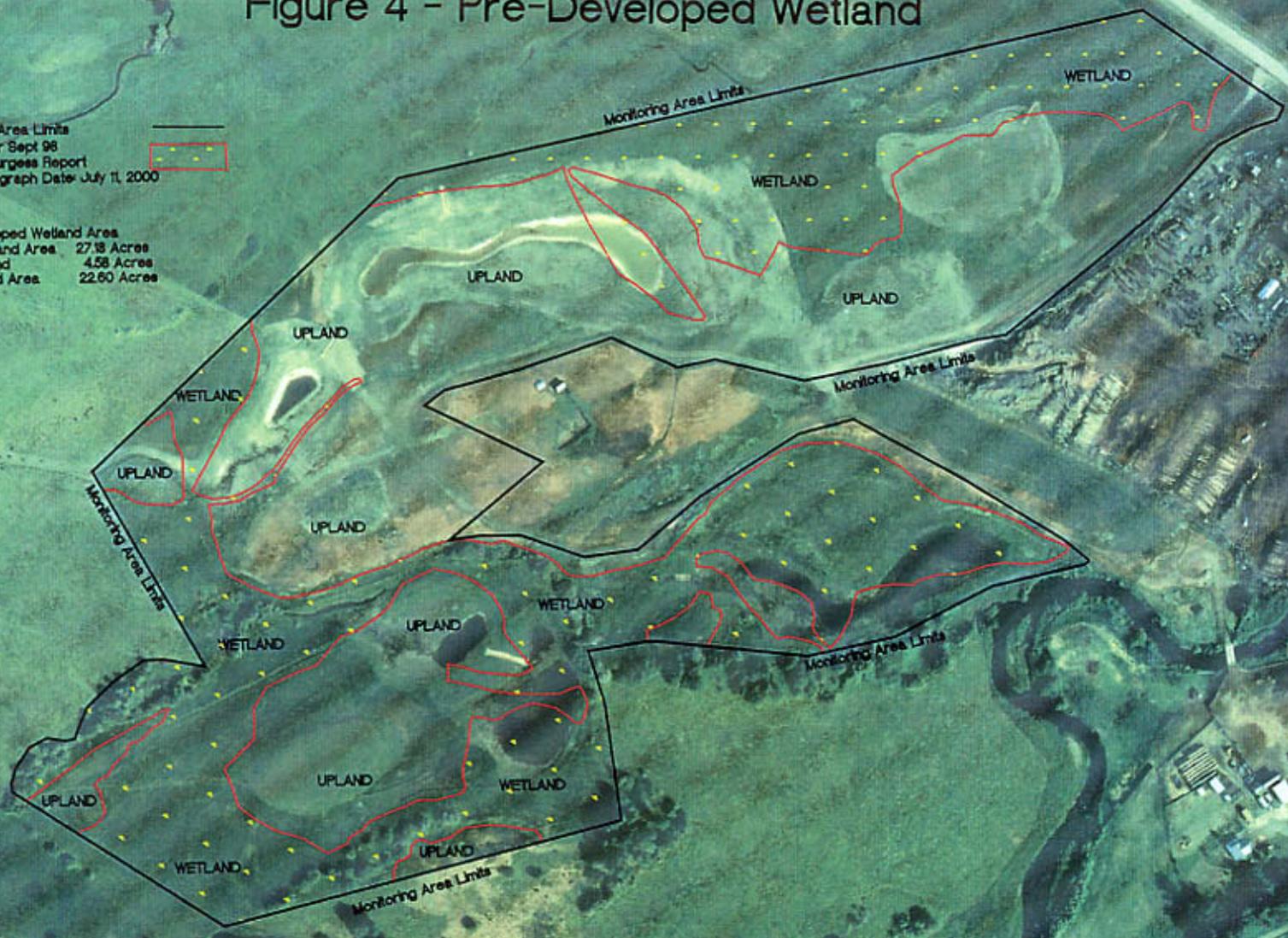
Figure 4 - Pre-Developed Wetland



Scale 1" = 200ft

LEGEND
 Monitoring Area Limits
 Wetland per Sept 98
 Carter - Burgess Report
 Base Photograph Date: July 11, 2000

Pre-Developed Wetland Area
 Gross Wetland Area 27.18 Acres
 Upland Island 4.58 Acres
 Net Wetland Area 22.60 Acres



PROJECT TITLE		Scale: RA
MDT Peterson Ranch Wetland Mitigation		Drawn: CH
PROJECT NO.		APP'D: BD
DRAWING TITLE		PROJECT NO.
Pre-Developed Wetland		
PROJECT NO.	300064.11B	
FILE NAME	TASGNBSE2004.dwg	
SCALE	1" = 200'	
LOCATION	MDT Peterson Ranch	

SHEET NUMBER	
F-4	
REV	
DATE	0-24-05



Appendix B

2004 WETLAND MITIGATION SITE MONITORING FORM

2004 BIRD SURVEY FORM

2004 WETLAND DELINEATION FORMS

2004 FUNCTIONAL ASSESSMENT FORM

MDT Wetland Mitigation Monitoring

Peterson Ranch

Hall, Montana

LWC / MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: Peterson Ranch Project Number: 330054.118 Assessment Date: 8/12/04
 Location: E. of Hall MDT District: Upper Clark Fork Milepost:
 Legal description: T 10 N R 13 W Section 35 Time of Day: Morning to Afternoon
 Weather Conditions: Clear & sunny Person(s) conducting the assessment: Greg Howard
 Initial Evaluation Date: 7/31/02 Visit #: 1 Monitoring Year: 3
 Size of evaluation area: 93 acres Land use surrounding wetland: Agriculture & forestry products

HYDROLOGY

Surface Water

Source: _____
 Inundation: Present Absent Average depths: 1 ft Range of depths: 0-2 ft
 Assessment area under inundation: 20-25 %
 Depth at emergent vegetation-open water boundary: 0.5 ft
 If assessment area is not inundated are the soils saturated w/in 12" of surface: Yes No
 Other evidence of hydrology on site (drift lines, erosion, stained vegetation etc.): Additional hydrology source from irrigation ditch to the E. of pond # 3. Standing water backing up along ditch and draining into C.T. 9.

Groundwater

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

Well #	Depth	Well #	Depth	Well #	Depth

Additional Activities Checklist:

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

COMMENTS/PROBLEMS: Third year of monitoring at this mitigation site. Water levels in the ponds # 1 and 2 are higher than in past visits. Emergent / aquatic vegetation is becoming established throughout the ponds # 1 and 2. Open water areas # 1 & 2 mapped during 2002 and 2003 monitoring has been changed to Community Type 11.



VEGETATION COMMUNITIES

Community No.: 1 Community Title (main species): Agrostis

Dominant Species	% Cover	Dominant Species	% Cover
<i>Agrostis alba</i>	50	<i>Typha latifolia</i>	T
<i>Carex nebrascensis</i>	10	<i>Scirpus acutus</i>	T
<i>Agropyron trachycaulum</i>	P	<i>Hordeum jubatum</i>	P
<i>Potentilla anserina</i>	P	<i>Festuca pratensis</i>	10
<i>Trifolium pratense</i>	P	<i>Juncus balticus</i>	P

COMMENTS/PROBLEMS: Emergent vegetation type dominated by grasses and sedges.

Community No.: 2 Community Title (main species): Agropyron

Dominant Species	% Cover	Dominant Species	% Cover
<i>Agropyron trachycaulum</i>	70	<i>Malva neglecta</i>	P
<i>Agrostis alba</i>	T	<i>Thlaspi arvensis</i>	T
<i>Potentilla anserina</i>	P	<i>Chenopodium album</i>	T
<i>Helianthus annuus</i>	T	<i>Alopecurus pratensis</i>	T
<i>Cirsium arvense</i>	T	<i>Taraxacum officinale</i>	P

COMMENTS/PROBLEMS: Dry slopes surrounding created ponds. Area dominated by upland grasses and invasive species.

Community No.: 3 Community Title (main species): Salix

Dominant Species	% Cover	Dominant Species	% Cover
<i>Salix bebbiana</i>	50	<i>Geum macrophyllum</i>	T
<i>Crataegus douglasii</i>	50	<i>Cornus stolonifera</i>	P
<i>Ribes americanum</i>	P	<i>Salix geeyeriana</i>	10
<i>Salix exigua</i>	10	<i>Agrostis alba</i>	10
<i>Carex utriculata</i>	20	<i>Populus trichocarpa</i>	10

COMMENTS/PROBLEMS: Scrub-shrub vegetation type located along exiting side channel or irrigation ditch.

Additional Activities Checklist:

X Record and map vegetative communities on air photo

VEGETATION COMMUNITIES (continued)

Community No.: 4 Community Title (main species): Eleocharis/Carex

Dominant Species	% Cover	Dominant Species	% Cover
<i>Eleocharis palustris</i>	40	<i>Agrostis alba</i>	20
<i>Carex nebrascensis</i>	P	<i>Juncus ensifolius</i>	T
<i>Typha latifolia</i>	20	<i>Potentilla anserina</i>	T
<i>Alopecurus pratensis</i>	10	<i>Beckmannia syzigachne</i>	P
<i>Polygonum amphibium</i>	T	<i>Glyceria striata</i>	T
<i>Juncus confusus</i>	P	<i>Juncus nodosus</i>	P

COMMENTS/PROBLEMS: Emergent vegetation type surrounding created ponds # 4 & 5.

Community No.: 5 Community Title (main species): Carex/Typha

Dominant Species	% Cover	Dominant Species	% Cover
<i>Carex nebrascensis</i>	40		
<i>Typha latifolia</i>	20		
<i>Alopecurus pratensis</i>	30		

COMMENTS/PROBLEMS: Depressional wetlands found within areas of lower topography, running across northwest corner of mitigation site. Hydrology source is groundwater & irrigation ditches.

Community No.: 6 Community Title (main species): Agrostis/Juncus

Dominant Species	% Cover	Dominant Species	% Cover
<i>Agrostis alba</i>	30	<i>Alopecurus pratensis</i>	P
<i>Juncus balticus</i>	40	<i>Carex nebrascensis</i>	P
<i>Phleum pratense</i>	10	<i>Rumex crispus</i>	T
<i>Trifolium pratense</i>	P		
<i>Agropyron repens</i>	P		

COMMENTS/PROBLEMS: Wetland meadow complex, located between drier upland slopes and emergent wetlands listed in Community Type 5. Vegetation fringe between upland and wetland areas, community type considered wetland.

VEGETATION COMMUNITIES (continued)

Community No.: 7 Community Title (main species): Carex/Alopecurus

Dominant Species	% Cover	Dominant Species	% Cover
<i>Carex utriculata</i>	50	<i>Juncus balticus</i>	P
<i>Alopecurus pratensis</i>	20	<i>Poa</i> spp.	T
<i>Veronica americana</i>	P		

COMMENTS/PROBLEMS: Vegetation along irrigation ditch, emergent wetlands with no shrub coverage. Ditch and surrounding bottoms inundated, low flow present.

Community No.: 8 Community Title (main species): Phleum/Agrostis

Dominant Species	% Cover	Dominant Species	% Cover
<i>Phleum pratense</i>	10	<i>Typha latifolia</i>	T
<i>Agrostis alba</i>	30	<i>Scirpus acutus</i>	T
<i>Veronica americana</i>	P	<i>Hordeum jubatum</i>	P
<i>Alopecurus pratensis</i>	20	<i>Glyceria striata</i>	10
<i>Juncus balticus</i>	T	<i>Willow sprigs</i>	P
<i>Carex nebrascensis</i>	P	<i>Juncus mertensianus</i>	P
<i>Beckmannia syzigachne</i>	T	<i>Eleocharis palustris</i>	40

COMMENTS/PROBLEMS: Upper basin of created wetland pond # 1. Surface water present, flowing down gradient into pond. Hydrology source comes from irrigation ditch. Low vegetation cover, few drier species mixed with mostly wetland species. Area sprigged with willow cuttings, heavy planting along areas of standing water.

Community No.: 9 Community Title (main species): Typha / Eleocharis

Dominant Species	% Cover	Dominant Species	% Cover
<i>Typha latifolia</i>	70	<i>Potentilla anserina</i>	P
<i>Eleocharis palustris</i>	30	<i>Carex nebrascensis</i>	10
<i>Beckmannia syzigachne</i>	10	<i>Alopecurus pratensis</i>	P
<i>Agrostis alba</i>	P	<i>Glyceria striata</i>	P
<i>Veronica americana</i>	T	<i>Scirpus acutus</i>	P

COMMENTS/PROBLEMS: Emergent vegetation type located along the fringe of pond # 3's open water.

Community No.: 10 Community Title (main species): Agrostis / Veronica

Dominant Species	% Cover	Dominant Species	% Cover
<i>Juncus mertensianus</i>	T	<i>Potentilla anserina</i>	T
<i>Agrostis alba</i>	20	<i>Phleum pratense</i>	T
<i>Veronica americana</i>	10	<i>Epilobium ciliatum</i>	T
<i>Agropyron trachycaulum</i>	10		

COMMENTS/PROBLEMS: Emergent wetland type located along the fringe of pond # 2's open water.

VEGETATION COMMUNITIES (continued)

Community No.: 11 Community Title (main species): Veronica / Myriophyllum spicatum

Dominant Species	% Cover	Dominant Species	% Cover
<i>Veronica americana</i>	30		
<i>Typha latifolia</i>	10		
<i>Myriophyllum spicatum</i>	80		
<i>Eleocharis palustris</i>	T		

COMMENTS/PROBLEMS: Area mapped as open water during 2003 is now dominated by emergent vegetation .

Community No.: Community Title (main species):

Dominant Species	% Cover	Dominant Species	% Cover

COMMENTS/PROBLEMS:

Community No.: Community Title (main species):

Dominant Species	% Cover	Dominant Species	% Cover

COMMENTS/PROBLEMS:

Comprehensive Vegetation List

Species	Vegetation Community Number(s)	Species	Vegetation Community Number(s)
<i>Achillea millefolium</i>	2	<i>Juncus ensifolius</i>	4
<i>Agropyron repens</i>	2,6	<i>Juncus mertensianus</i>	10
<i>Agropyron smithii</i>	2	<i>Juncus nodosus</i>	4
<i>Agropyron trachycaulum</i>	2,6,10	<i>Kochia scoparia</i>	2
<i>Agrostis alba</i>	1,2,3,4,6,8,9,10	<i>Lepidium perfoliatum</i>	2
<i>Alopecurus pratensis</i>	2,4,5,7,8,9	<i>Lomatium spp.</i>	2
<i>Amaranthus retroflexus</i>	2	<i>Lychnis alba</i>	2
<i>Beckmannia syzigachne</i>	5,7,9	<i>Malva neglecta</i>	2
<i>Betula occidentalis</i>	3	<i>Medicago sativa</i>	2
<i>Bidens cernua</i>	4,6,8	<i>Mentha arvensis</i>	4,7
<i>Bromus inermis</i>	2	<i>Myriophyllum spicatum</i>	OW
<i>Bromus tectorum</i>	2	<i>Phalaris arundinaceae</i>	6,7,8
<i>Carduus nutans</i>	2	<i>Phleum pratense</i>	6,8,10
<i>Carex microptera</i>	6	<i>Plantago major</i>	2
<i>Carex nebrascensis</i>	1,4,5,8,9	<i>Poa ampla</i>	2
<i>Carex utriculata</i>	1,3,7	<i>Polygonum amphibium</i>	4
<i>Centaurea maculosa</i>	2	<i>Polygonum aviculare</i>	4
<i>Chenopodium album</i>	2	<i>Populus tremuloides</i>	3
<i>Cirsium arvense</i>	2	<i>Populus trichocarpa</i>	3
<i>Cornus stolonifera</i>	3	<i>Potentilla anserina</i>	4,9,10
<i>Crataegus douglasii</i>	3	<i>Potentilla gracilis</i>	2
<i>Cynoglossum officinale</i>	2	<i>Prunus virginiana</i>	2
<i>Dactylis glomerata</i>	2	<i>Ribes aureum</i>	2
<i>Descurainia sophia</i>	2	<i>Rosa woodsii</i>	2,3
<i>Elaeagnus commutata</i>	2	<i>Rumex crispus</i>	2
<i>Eleocharis palustris</i>	4,9	<i>Salix bebbiana</i>	3
<i>Elymus cinereus</i>	2	<i>Salix exigua</i>	3
<i>Elymus triticoides</i>	2	<i>Salix geyeriana</i>	3
<i>Epilobium ciliatum</i>	10	<i>Scirpus acutus</i>	1
<i>Equisetum arvense</i>	2,4	<i>Sisymbrium altissimum</i>	2
<i>Festuca pratensis</i>	2	<i>Solidago missouriensis</i>	2
<i>Glyceria striata</i>	7,9	<i>Taraxacum officinale</i>	2,6
<i>Helianthus annuus</i>	2	<i>Thlaspi arvensis</i>	2
<i>Hordeum jubatum</i>	2	<i>Triglochin maritimum</i>	1,6,7
<i>Iris missouriensis</i>	4,7	<i>Trifolium pratense</i>	2
<i>Juncus balticus</i>	6,7	<i>Typha latifolia</i>	1,4,5,9,10
<i>Juncus confusus</i>	4	<i>Veronica americana</i>	

COMMENTS/PROBLEMS: Two new species observed during the 2003 monitoring (*Juncus confusus* and *Juncus nodosus*).

WILDLIFE / BIRDS

(Attach Bird Survey Field Forms)

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

MAMMALS AND HERPTILES

Species	Number Observed	Indirect indication of use			
		Tracks	Scat	Burrows	Other
Deer		X			
Coyote			X		

Additional Activities Checklist:

X Macroinvertebrate sampling (if required)

COMMENTS/PROBLEMS: Four macro invertebrate samples were collected.

PHOTOGRAPHS

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

Checklist:

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

Location	Photo Frame #	Photograph Description	Compass Reading
1	1-3	Panoramic looking from south to north across the western half of the site.	180° – 0°
1	5	Looking northeast towards parcel boundary, lumber mill in background	90°
2	6	Looking southwest along vegetation transect no. 2.	225°
3	7 – 8	Looking north at the southern end of created wetland pond no.2.	0°
3	9 - 10	Looking west at emergent wetlands along fence line and beyond.	270°
3	11 - 12	Looking southeast at created wetland pond no. 1.	135°
4	13	Looking south across created wetland pond no 4.	180°
5	14	Looking north along vegetation transect no. 2 and created wetland no. 5.	0°
5	15	Looking north along vegetation transect no. 2 and created wetland no. 5.	0°
5	16	Looking northeast at created wetland no. 4	45°
5	17	Looking south at the top of upland spoil pile, view opposite of transect..	0°

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:



WETLAND DELINEATION

(Attach Corps of Engineers delineation forms)

At each site conduct the items on the checklist below:

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

COMMENTS/PROBLEMS:

FUNCTIONAL ASSESSMENT

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

COMMENTS/PROBLEMS: Three distinct areas were evaluated separately, these assessment areas include ponds no. 1 & 2, scrub-shrub emergent and ponds no. 4 & 5.

MAINTENANCE

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

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

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

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

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

If no, describe the problems below.

COMMENTS/PROBLEMS:



MDT WETLAND MONITORING – VEGETATION TRANSECT (continued)

Site: Ponds no. 4 Date: 8/12/04 Examiner: Greg Howard Transect # 1

Approx. transect length: 222 ft. Compass Direction from Start (Upland): North (0°)

Vegetation type 1:		Agropyron (Community No. 2)
Length of transect in this type:	138 ft.	feet
Species:		Cover:
Agropyron trachycaulum		30
Bromus inermis		10
Alopecurus pratensis		T
Trifolium pratense		T
Agrostis alba		P
Agropyron repens		10
Taraxacum officinale		P
Juncus balticus		10
Total Vegetative Cover:		65%

Vegetation type 2:		Eleocharis/Carex (Community No. 4)
Length of transect in this type:	84 ft.	feet
Species:		Cover:
Carex nebrascensis		P
Eleocharis palustris		40
Potentilla anserina		T
Alopecurus pratensis		10
Polygonum amphibium		T
Agrostis alba		T
Glyceria striata		T
Beckmannia syzigachne		10
Typha latifolia		P
Total Vegetative Cover:		70%

Vegetation type 3:		
Length of transect in this type:		feet
Species:		Cover:
Total Vegetative Cover:		

Vegetation type 4:		
Length of transect in this type:		feet
Species:		Cover:
Total Vegetative Cover:		



MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: Pond no. 2 Date: 8/12/04 Examiner: Greg Howard Transect # 2

Approx. transect length: 195 ft. Compass Direction from Start (Upland): 270

Vegetation type 1:		Agropyron (Community No. 2)
Length of transect in this type:	175 ft.	feet
Species:		Cover:
Agropyron trachycaulum		40
Agropyron repens		30
Agrostis alba		10
Potentilla anserina		P
Festuca pratensis		T
Malva neglecta		T
Taraxacum officinale		T
Cirsium arvense		T
Phleum pratense		T
Plantago major		P
Total Vegetative Cover:		85%

Vegetation type 2:		Agrostis / Veronica (Community No. 10)
Length of transect in this type:	20 ft.	feet
Species:		Cover:
Agrostis alba		P
Veronica americana		T
Potentilla anserina		T
Plantago major		T
Agropyron trachycaulum		T
Hordeum jubatum		T
Polygonum aviculare		T
Total Vegetative Cover:		10%

Vegetation type 3:		
Length of transect in this type:		feet
Species:		Cover:
Total Vegetative Cover:		

Vegetation type 4:		
Length of transect in this type:		feet
Species:		Cover:
Total Vegetative Cover:		



MDT WETLAND MONITORING – VEGETATION TRANSECT (back of form)

Cover Estimate

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

Indicator Class:

+ = Obligate
- = Facultative/Wet
0 = Facultative

Source:

P = Planted
V = Volunteer

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

Establish transects perpendicular to the shoreline (or saturated perimeter). The transect should begin in the upland area. Permanently mark this location with a standard metal fencepost. Extend the imaginary transect line towards the center of the wetland, ending at the 3 foot depth (in open water), or at a point where water depths or saturation are maximized. Mark this location with another metal fencepost.

Estimate cover within a 10 ft wide “belt” along the transect length. At a minimum, establish a transect at the windward and leeward sides of the wetland. Remember that the purpose of this sampling is to monitor, not inventory, representative portions of the wetland site.

Notes:



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

Project/Site: <u>Peterson Ranch</u>	Date: <u>8/12/04</u>
Applicant/Owner: <u>MDT</u>	County: <u>Granite</u>
Investigator: <u>Greg Howard</u>	State: <u>MT</u>
Do Normal Circumstances exist on the site: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: <u>Upland</u>
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input type="checkbox"/> No	Transect ID: <u>1 - Pool 4</u>
Is the area a potential Problem Area?: <input type="checkbox"/> Yes <input type="checkbox"/> No	Plot ID: <u>1</u>
(If needed, explain on reverse.)	

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 <i>Agropyron trachycaulum</i>	H	FAC	9		
2 <i>Agropyron repens</i>	H	FACU	10		
3 <i>Trifolium pratense</i>	H	FACU	11		
4 <i>Taraxacum officinale</i>	H	FACU	12		
5 <i>Bromus inermis</i>	H	--	13		
6 <i>Agrostis alba</i>	H	FAC+	14		
7 <i>Potentilla anserina</i>	H	OBL	15		
8			16		
Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-).			<u>3/7 = 43%</u>		
Area dominated by upland vegetation.					

HYDROLOGY

<p>Recorded Data (Describe in Remarks):</p> <p><input type="checkbox"/> Stream, Lake, or Tide Gauge</p> <p><input type="checkbox"/> Aerial Photographs</p> <p><input type="checkbox"/> Other</p> <p><input checked="" type="checkbox"/> No Recorded Data Available</p> <hr/> <p>Field Observations:</p> <p>Depth of Surface Water: <u> - </u> (in.)</p> <p>Depth to Free Water in Pit: <u> - </u> (in.)</p> <p>Depth to Saturated Soil: <u> - </u> (in.)</p>	<p>Wetland Hydrology Indicators:</p> <p>Primary Indicators:</p> <p><input type="checkbox"/> Inundated</p> <p><input type="checkbox"/> Saturated in Upper 12 Inches</p> <p><input type="checkbox"/> Water Marks</p> <p><input type="checkbox"/> Drift Lines</p> <p><input type="checkbox"/> Sediment Deposits</p> <p><input type="checkbox"/> Drainage Patterns in Wetlands</p> <p>Secondary Indicators (2 or more required):</p> <p><input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches</p> <p><input type="checkbox"/> Water-Stained Leaves</p> <p><input type="checkbox"/> Local Soil Survey Data</p> <p><input type="checkbox"/> FAC-Neutral Test</p> <p><input type="checkbox"/> Other (Explain in Remarks)</p>
No hydrology indicators present at this sampling point.	

SOILS

Map Unit Name		Blossberg loam, 0 to 4 percent slopes		Drainage Class:	Poorly drained
(Series and Phase):				Field Observations	
Taxonomy (Subgroup):				Confirm Mapped Type?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0 - 8+	A	10 YR 2/1	--	--	Sandy clay, fine to medium gravels, large cobbles
Hydric Soil Indicators:					
<input type="checkbox"/> Histosol		<input type="checkbox"/> Concretions			
<input type="checkbox"/> Histic Epipedon		<input type="checkbox"/> High Organic Content in surface Layer in Sandy Soils			
<input type="checkbox"/> Sulfidic Odor		<input type="checkbox"/> Organic Streaking in Sandy Soils			
<input type="checkbox"/> Aquic Moisture Regime		<input type="checkbox"/> Listed on Local Hydric Soils List			
<input type="checkbox"/> Reducing Conditions		<input type="checkbox"/> Listed on National Hydric Soils List			
<input checked="" type="checkbox"/> Gleyed or Low-Chroma Colors		<input type="checkbox"/> Other (Explain in Remarks)			
Low-chroma color is present, but not considered wetland soils.					

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Hydric Soils Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Is this Sampling Point Within a Wetland? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Remarks: Sampling point is located on the slope of spoil pile and is considered upland. Area planted with upland shrubs and seeded with upland grass mix.	

Approved by HQUSACE 2/92



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

Project/Site: <u>Peterson Ranch</u>	Date: <u>8/12/04</u>
Applicant/Owner: <u>MDT</u>	County: <u>Granite</u>
Investigator: <u>Greg Howard</u>	State: <u>MT</u>
Do Normal Circumstances exist on the site: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: _____
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input type="checkbox"/> No	Transect ID: <u>1- Pool 4</u>
Is the area a potential Problem Area?: <input type="checkbox"/> Yes <input type="checkbox"/> No (If needed, explain on reverse.)	Plot ID: <u>2</u>

VEGETATION

	Dominant Plant Species	Stratum	Indicator
1 <u>Carex nebrascensis</u>	<u>H</u>	<u>OBL</u>	<u>9</u>
2 <u>Eleocharis palustris</u>	<u>H</u>	<u>OBL</u>	<u>10</u>
3 <u>Typha latifolia</u>	<u>H</u>	<u>OBL</u>	<u>11</u>
4 <u>Potentilla anserina</u>	<u>H</u>	<u>OBL</u>	<u>12</u>
5 <u>Alopecurus pratensis</u>	<u>H</u>	<u>FACW</u>	<u>13</u>
6 <u>Polygonum amphibium</u>	<u>H</u>	<u>OBL</u>	<u>14</u>
7 <u>Agrostis alba</u>	<u>H</u>	<u>FAC+</u>	<u>15</u>
8 <u>Beckmannia syzigachne</u>	<u>H</u>	<u>OBL</u>	<u>16</u>
Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). <u>8/8 = 100%</u>			
Area dominated by hydrophytic vegetation.			

HYDROLOGY

<p>Recorded Data (Describe in Remarks):</p> <p><input type="checkbox"/> Stream, Lake, or Tide Gauge</p> <p><input type="checkbox"/> Aerial Photographs</p> <p><input type="checkbox"/> Other</p> <p><input checked="" type="checkbox"/> No Recorded Data Available</p> <hr/> <p>Field Observations:</p> <p>Depth of Surface Water: <u> - </u> (in.)</p> <p>Depth to Free Water in Pit: <u> 10 </u> (in.)</p> <p>Depth to Saturated Soil: <u> - </u> (in.)</p>	<p>Wetland Hydrology Indicators:</p> <p>Primary Indicators:</p> <p><input type="checkbox"/> Inundated</p> <p><input checked="" type="checkbox"/> Saturated in Upper 12 Inches</p> <p><input type="checkbox"/> Water Marks</p> <p><input type="checkbox"/> Drift Lines</p> <p><input type="checkbox"/> Sediment Deposits</p> <p><input type="checkbox"/> Drainage Patterns in Wetlands</p> <p>Secondary Indicators (2 or more required):</p> <p><input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches</p> <p><input type="checkbox"/> Water-Stained Leaves</p> <p><input type="checkbox"/> Local Soil Survey Data</p> <p><input type="checkbox"/> FAC-Neutral Test</p> <p><input type="checkbox"/> Other (Explain in Remarks)</p>
<p>Remarks:</p> <p>Hydrologic indicator present with free water in pit and saturated soils.</p>	

SOILS

Map Unit Name		Blossberg loam, 0 to 4 percent slopes		Drainage Class:	Poorly drained
(Series and Phase):				Field Observations	
Taxonomy (Subgroup):				Confirm Mapped Type?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0 – 6	A1	10 YR 2/1	-	-	Clay loam
6 – 12+	A2	10 YR 2/1	2.5 YR 3/6-	Few / Faint-	Clay
Hydric Soil Indicators:					
<input type="checkbox"/> Histosol		<input type="checkbox"/> Concretions			
<input type="checkbox"/> Histic Epipedon		<input type="checkbox"/> High Organic Content in surface Layer in Sandy Soils			
<input type="checkbox"/> Sulfidic Odor		<input type="checkbox"/> Organic Streaking in Sandy Soils			
<input type="checkbox"/> Aquic Moisture Regime		<input checked="" type="checkbox"/> Listed on Local Hydric Soils List			
<input type="checkbox"/> Reducing Conditions		<input type="checkbox"/> Listed on National Hydric Soils List			
<input checked="" type="checkbox"/> Gleyed or Low-Chroma Colors		<input type="checkbox"/> Other (Explain in Remarks)			
Hydric soil indicators present with low-chroma colors and mottles. Mapped soils listed as hydric in Granite County Soil survey.					

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Is this Sampling Point Within a Wetland? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Wetland Hydrology Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Remarks: Sampling point considered within a wetland.	

Approved by HQUSACE 2/92



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

Project/Site: <u>Peterson Ranch</u>	Date: <u>8/12/04</u>
Applicant/Owner: <u>MDT</u>	County: <u>Granite</u>
Investigator: <u>Greg Howard</u>	State: <u>MT</u>
Do Normal Circumstances exist on the site: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Community ID: _____
Is the site significantly disturbed (Atypical Situation)? <input type="checkbox"/> Yes <input type="checkbox"/> No	Transect ID: <u>2 - Pool 2</u>
Is the area a potential Problem Area?: <input type="checkbox"/> Yes <input type="checkbox"/> No	Plot ID: <u>1</u>
(If needed, explain on reverse.)	

VEGETATION

Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1 <i>Agropyron trachycaulum</i>	H	FAC		9 <i>Festuca pratensis</i>	H	FACU+
2 <i>Agrostis alba</i>	H	FAC+		10		
3 <i>Potentilla anserina</i>	H	OBL		11		
4 <i>Malva neglecta</i>	H	--		12		
5 <i>Agropyron repens</i>	H	FACU		13		
6 <i>Phleum pratense</i>	H	FAC-		14		
7 <i>Plantago major</i>	H	FAC+		15		
8 <i>Cirsium arvense</i>	H	FACU+		16		
Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-).				<u>4/9 = 44%</u>		
Area dominated by mostly upland grasses and a few invasive species.						

HYDROLOGY

<p>Recorded Data (Describe in Remarks):</p> <p><input type="checkbox"/> Stream, Lake, or Tide Gauge</p> <p><input type="checkbox"/> Aerial Photographs</p> <p><input type="checkbox"/> Other</p> <p><input checked="" type="checkbox"/> No Recorded Data Available</p> <hr/> <p>Field Observations:</p> <p>Depth of Surface Water: <u> -- </u> (in.)</p> <p>Depth to Free Water in Pit: <u> -- </u> (in.)</p> <p>Depth to Saturated Soil: <u> -- </u> (in.)</p>	<p>Wetland Hydrology Indicators:</p> <p>Primary Indicators:</p> <p><input type="checkbox"/> Inundated</p> <p><input type="checkbox"/> Saturated in Upper 12 Inches</p> <p><input type="checkbox"/> Water Marks</p> <p><input type="checkbox"/> Drift Lines</p> <p><input type="checkbox"/> Sediment Deposits</p> <p><input type="checkbox"/> Drainage Patterns in Wetlands</p> <p>Secondary Indicators (2 or more required):</p> <p><input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches</p> <p><input type="checkbox"/> Water-Stained Leaves</p> <p><input type="checkbox"/> Local Soil Survey Data</p> <p><input type="checkbox"/> FAC-Neutral Test</p> <p><input type="checkbox"/> Other (Explain in Remarks)</p>
<p>Remarks:</p> <p>No hydrology indicator present.</p>	

SOILS

Map Unit Name	Nythar-Flintcreek Complex, 0 to 4 percent slopes	Drainage Class:	Very poorly drained		
(Series and Phase):	_____	Field Observations	_____		
Taxonomy (Subgroup):	_____	Confirm Mapped Type?	_____ Yes <u> x </u> No		
Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0 – 2.5	O	10 YR 3/2	-	-	Roots & organic w/loam
2.5 – 10+	A	10 YR 3/1	-	-	Clay
Large cobbles 4-6 inches in wide.					
Hydric Soil Indicators:					
_____	Histosol	_____	Concretions		
_____	Histic Epipedon	_____	High Organic Content in surface Layer in Sandy Soils		
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils		
_____	Aquic Moisture Regime	<u> x </u>	Listed on Local Hydric Soils List		
_____	Reducing Conditions	_____	Listed on National Hydric Soils List		
<u> x </u>	Gleyed or Low-Chroma Colors	_____	Other (Explain in Remarks)		
Low chroma-colors present, no other evidence of hydric soils. Soils for this area listed as hydric, but characteristics in sampling pit do not reflect mapped type. Likely, alteration due to construction efforts.					

WETLAND DETERMINATION

Hydrophytic Vegetation Present? _____ Yes <u> x </u> No Wetland Hydrology Present? _____ Yes <u> x </u> No Hydric Soils Present? _____ Yes <u> x </u> No	Is this Sampling Point Within a Wetland? _____ Yes <u> x </u> No
Remarks: Sampling point considered within an upland area.	

Approved by HQUSACE 2/92



SOILS

Map Unit Name		Nythar-Flintcreek Complex, 0 to 4 percent slopes		Drainage Class:	Very poorly drained
(Series and Phase):		_____		Field Observations	_____
Taxonomy (Subgroup):		_____		Confirm Mapped Type?	_____ Yes <input checked="" type="checkbox"/> No
Profile Description:					
Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0 – 6	A	10 YR 3/2	-	-	Clay loam
6 – 12+	B	10 YR 4/2	-	-	Sandy clay
Hydric Soil Indicators:					
_____ Histosol		_____ Concretions		_____ High Organic Content in surface Layer in Sandy Soils	
_____ Histic Epipedon		_____ Organic Streaking in Sandy Soils		_____ Listed on Local Hydric Soils List	
_____ Sulfidic Odor		<input checked="" type="checkbox"/> Listed on National Hydric Soils List		_____ Other (Explain in Remarks)	
_____ Aquic Moisture Regime		_____		_____	
_____ Reducing Conditions		_____		_____	
<input checked="" type="checkbox"/> Gleyed or Low-Chroma Colors		_____		_____	
Some evidence of hydric soil conditions with low-chroma colors. Soils listed as hydric on the local NRCS Soil survey.					

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Wetland Hydrology Present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Hydric Soils Present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Is this Sampling Point Within a Wetland? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Remarks: Sampling point considered within a wetland area. The sampling area is located along the fringe between open water and shoreline.	

Approved by HQUSACE 2/92



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 _____
- 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	---	---	---	---	---	---	0 (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)	<input type="checkbox"/> High								<input checked="" type="checkbox"/> Moderate								<input type="checkbox"/> Low			
	<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input checked="" type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input type="checkbox"/> Even			
Class Cover Distribution (all vegetated classes)																				
Duration of Surface Water in ≥ 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (see #12)	--	--	--	--	--	--	--	--	H	--	--	--	--	--	--	--	--	--	--	--
High disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

Evidence of Wildlife Use from 14C(i)	Wildlife Habitat Features Rating from 14C(ii)			
	<input type="checkbox"/> Exceptional	<input type="checkbox"/> High	<input checked="" type="checkbox"/> Moderate	<input type="checkbox"/> 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	<input type="checkbox"/> Permanent/Perennial			<input type="checkbox"/> Seasonal / Intermittent			<input type="checkbox"/> Temporary / Ephemeral		
Cover - % of waterbody in AA containing cover objects (e.g. submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation)	>25%	10-25%	<10%	>25%	10-25%	<10%	>25%	10-25%	<10%
Shading - >75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities	--	--	--	--	--	--	--	--	--
Shading - 50 to 75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities.	--	--	--	--	--	--	--	--	--
Shading - < 50% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities.	--	--	--	--	--	--	--	--	--

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

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

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

Comments: No useable fish habitat.

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

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

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

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

ii. **Are residences, businesses, or other features which may be significantly damaged by floods located within 0.5 miles downstream of the AA?** (check)
 Y N Comments: Low % scrub-scrub class in this AA, AA does contain restricted outlet.

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

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

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

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding.	<input type="checkbox"/> >5 acre feet			<input checked="" type="checkbox"/> <5, >1 acre feet			<input type="checkbox"/> ≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond ≥ 5 out of 10 years	--	--	--	.8 (H)	--	--	--	--	--
Wetlands in AA flood or pond < 5 out of 10 years	--	--	--	--	--	--	--	--	--

Comments: Ponds with a high capacity to contain flood waters during seasonal flooding of Flint Creek.

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

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

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

Sediment, Nutrient, and Toxicant Input Levels Within AA	AA receives or surrounding land use has potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants or AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	<input type="checkbox"/> ≥ 70%		<input checked="" type="checkbox"/> < 70%		<input type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%	
Evidence of flooding or ponding in AA	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
AA contains no or restricted outlet	--	--	.7 (M)	--	--	--	--	--
AA contains unrestricted outlet	--	--	--	--	--	--	--	--

Comments: Low % vegetation cover around ponds.

14H. SEDIMENT/ShORELINE STABILIZATION

NA (proceed to 14I)

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

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

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses.	Duration of Surface Water Adjacent to Rooted Vegetation		
	<input checked="" type="checkbox"/> Permanent / Perennial	<input type="checkbox"/> Seasonal / Intermittent	<input type="checkbox"/> Temporary / Ephemeral
≥ 65 %	--	--	--
35-64 %	--	--	--
< 35 %	.3 (L)	--	--

Comments: Low vegetation cover along shore-line.

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

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

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

A	<input type="checkbox"/> Vegetated component >5 acres						<input type="checkbox"/> Vegetated component 1-5 acres						<input type="checkbox"/> Vegetated component <1 acre					
B	<input type="checkbox"/> High		<input checked="" type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low	
C	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N
P/P	--	--	.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: High groundwater table, irrigation influenced and subsurface flow through alluvial materials.

14K. UNIQUENESS

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

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

Comments:

14L. RECREATION / EDUCATION POTENTIAL

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

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

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

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

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

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

Comments: _____



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	None	0.00	1	
C. General Wildlife Habitat	Moderate	0.50	1	
D. General Fish/Aquatic Habitat	NA	0.00	--	
E. Flood Attenuation	Moderate	0.50	1	
F. Short and Long Term Surface Water Storage	High	0.80	1	
G. Sediment/Nutrient/Toxicant Removal	Moderate	0.70	1	
H. Sediment/Shoreline Stabilization	Low	0.30	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	Low	0.3	1	
Totals:		5.60	11.00	
Percent of Total Possible Points:			51% (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**



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 Bald Eagle
- 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	---	---	---	---	---	.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).

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 Olive-sided flycatcher
- 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)	<input type="checkbox"/> High								<input checked="" type="checkbox"/> Moderate								<input type="checkbox"/> Low			
Class Cover Distribution (all vegetated classes)	<input type="checkbox"/> Even				<input type="checkbox"/> Uneven				<input type="checkbox"/> Even				<input checked="" type="checkbox"/> Uneven				<input type="checkbox"/> Even			
Duration of Surface Water in ≥ 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	H	--	--	--	--	--	--	--
High disturbance at AA (see #12)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

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

Evidence of Wildlife Use from 14C(i)	Wildlife Habitat Features Rating from 14C(ii)			
	<input type="checkbox"/> Exceptional	<input checked="" type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
	Substantial	--	--	--
	Moderate	--	.7 (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	<input type="checkbox"/> Permanent/Perennial			<input type="checkbox"/> Seasonal / Intermittent			<input type="checkbox"/> Temporary / Ephemeral		
	>25%	10-25%	<10%	>25%	10-25%	<10%	>25%	10-25%	<10%
Cover - % of waterbody in AA containing cover objects (e.g. submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation)	>25%	10-25%	<10%	>25%	10-25%	<10%	>25%	10-25%	<10%
Shading - >75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities	--	--	--	--	--	--	--	--	--
Shading - 50 to 75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities.	--	--	--	--	--	--	--	--	--
Shading - < 50% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities.	--	--	--	--	--	--	--	--	--

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

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

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

Comments: No useable fish habitat.

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

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

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

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

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:** Irrigation ditch with outlet into Flint Creek.

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

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

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

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding.	<input type="checkbox"/> >5 acre feet			<input checked="" type="checkbox"/> <5, >1 acre feet			<input type="checkbox"/> ≤1 acre foot		
	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond ≥ 5 out of 10 years	--	--	--	.8 (H)	--	--	--	--	--
Wetlands in AA flood or pond < 5 out of 10 years	--	--	--	--	--	--	--	--	--

Comments: .

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

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

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

Sediment, Nutrient, and Toxicant Input Levels Within AA	AA receives or surrounding land use has potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants or AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
	<input checked="" type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%		<input type="checkbox"/> ≥ 70%		<input type="checkbox"/> < 70%	
% cover of wetland vegetation in AA	<input checked="" type="checkbox"/> Yes		<input type="checkbox"/> No		<input type="checkbox"/> Yes		<input type="checkbox"/> No	
Evidence of flooding or ponding in AA	<input checked="" type="checkbox"/> Yes		<input type="checkbox"/> No		<input type="checkbox"/> Yes		<input type="checkbox"/> No	
AA contains no or restricted outlet	--	--	--	--	--	--	--	--
AA contains unrestricted outlet	.9 (H)	--	--	--	--	--	--	--

Comments: High % vegetation cover from mature willows community.



14H. SEDIMENT/Shoreline Stabilization NA (proceed to 14I)

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

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

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses.	Duration of Surface Water Adjacent to Rooted Vegetation		
	<input checked="" type="checkbox"/> Permanent / Perennial	<input type="checkbox"/> Seasonal / Intermittent	<input type="checkbox"/> Temporary / Ephemeral
≥ 65 %	1 (H)	--	--
35-64 %	--	--	--
< 35 %	--	--	--

Comments: Mature willows with deep binding roots systems along irrigation ditch.

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

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

A	<input type="checkbox"/> Vegetated component >5 acres				<input checked="" type="checkbox"/> Vegetated component 1-5 acres				<input type="checkbox"/> Vegetated component <1 acre					
B	<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> High		<input checked="" type="checkbox"/> Moderate		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low	
C	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N
P/P	--	--	--	--	--	--	.8H	--	--	--	--	--	--	--
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: High groundwater table, irrigation influenced and subsurface flow through alluvial materials.

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.		
	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input checked="" type="checkbox"/> common	<input type="checkbox"/> abundant
Estimated Relative Abundance from #11	--	--	--	--	--	--	--	--	--
Low disturbance at AA (#12i)	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (#12i)	--	--	--	--	--	--	--	.3L	--
High disturbance at AA (#12i)	--	--	--	--	--	--	--	--	--

Comments:

14L. RECREATION / EDUCATION POTENTIAL

- i. Is the AA a known recreational or educational site? Yes (Rate High (1.0), then proceed to 14L(ii) only] No [Proceed to 14L(iii)]
- ii. Check categories that apply to the AA: Educational / scientific study Consumptive rec. Non-consumptive rec. Other
- iii. Based on the location, diversity, size, and other site attributes, is there a strong potential for recreational or educational use?
 Yes [Proceed to 14L (ii) and then 14L(iv).] No [Rate as low in 14L(iv)]

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

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

Comments: _____



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	Moderate	0.7	1	
D. General Fish/Aquatic Habitat	NA	NA	--	
E. Flood Attenuation	Low	0.20	1	
F. Short and Long Term Surface Water Storage	High	0.80	1	
G. Sediment/Nutrient/Toxicant Removal	High	0.90	1	
H. Sediment/Shoreline Stabilization	High	1.00	1	
I. Production Export/Food Chain Support	High	0.80	1	
J. Groundwater Discharge/Recharge	High	1.00	1	
K. Uniqueness	Low	0.30	1	
L. Recreation/Education Potential	Low	0.30	1	
Totals:		6.40	11.00	
Percent of Total Possible Points:			58% (Actual / Possible) x 100 [rd to nearest whole #]	

<p>Category I Wetland: (Must satisfy one of the following criteria. If not proceed to Category II.)</p> <p><input type="checkbox"/> Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; or</p> <p><input type="checkbox"/> Score of 1 functional point for Uniqueness; or</p> <p><input type="checkbox"/> Score of 1 functional point for Flood Attenuation and answer to Question 14E(ii) is "yes"; or</p> <p><input type="checkbox"/> Percent of total Possible Points is > 80%.</p>
<p>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.)</p> <p><input type="checkbox"/> Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; or</p> <p><input type="checkbox"/> Score of .9 or 1 functional point for General Wildlife Habitat; or</p> <p><input type="checkbox"/> Score of .9 or 1 functional point for General Fish/Aquatic Habitat; or</p> <p><input type="checkbox"/> "High" to "Exceptional" ratings for both General Wildlife Habitat and General Fish / Aquatic Habitat; or</p> <p><input type="checkbox"/> Score of .9 functional point for Uniqueness; or</p> <p><input type="checkbox"/> Percent of total possible points is > 65%.</p>
<p><input checked="" type="checkbox"/> Category III Wetland: (Criteria for Categories I, II, or IV not satisfied.)</p>
<p>Category IV Wetland: (Criteria for Categories I or II are not satisfied and <u>all</u> of the following criteria are met; If not satisfied, proceed to Category III.)</p> <p><input type="checkbox"/> "Low" rating for Uniqueness; and</p> <p><input type="checkbox"/> "Low" rating for Production Export / Food Chain Support; and</p> <p><input type="checkbox"/> Percent of total possible points is < 30%.</p>

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

I
 II
 III
 IV



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 _____
- 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	---	---	---	---	---	---	0 (L)

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

14C. General Wildlife Habitat Rating

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

Substantial (based on any of the following)

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

Low (based on any of the following)

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

Moderate (based on any of the following)

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

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

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

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

Evidence of Wildlife Use from 14C(i)	Wildlife Habitat Features Rating from 14C(ii)			
	<input type="checkbox"/> Exceptional	<input checked="" type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
Substantial	--	--	--	--
Moderate	--	.7 (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	<input type="checkbox"/> Permanent/Perennial			<input type="checkbox"/> Seasonal / Intermittent			<input type="checkbox"/> Temporary / Ephemeral		
Cover - % of waterbody in AA containing cover objects (e.g. submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation)	>25%	10-25%	<10%	>25%	10-25%	<10%	>25%	10-25%	<10%
Shading - >75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities	--	--	--	--	--	--	--	--	--
Shading - 50 to 75% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities.	--	--	--	--	--	--	--	--	--
Shading - < 50% of streambank or shoreline of AA contains riparian or wetland scrub-shrub or forested communities.	--	--	--	--	--	--	--	--	--

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

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

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

Comments: No useable fish habitat.

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

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

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

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

ii. **Are residences, businesses, or other features which may be significantly damaged by floods located within 0.5 miles downstream of the AA?** (check)
 Y N **Comments:** Irrigation ditch with outlet into Flint Creek & lack of scrub-shrub / forested vegetation communities.

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

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

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

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding.	<input type="checkbox"/> >5 acre feet			<input checked="" type="checkbox"/> <5, >1 acre feet			<input type="checkbox"/> ≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond ≥ 5 out of 10 years	--	--	--	.8 (H)	--	--	--	--	--
Wetlands in AA flood or pond < 5 out of 10 years	--	--	--	--	--	--	--	--	--

Comments: Moderate capacity to contain waters within the wetland areas.

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

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

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

Sediment, Nutrient, and Toxicant Input Levels Within AA	AA receives or surrounding land use has potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.						Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants or AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.					
% cover of wetland vegetation in AA	<input type="checkbox"/> ≥ 70%			<input checked="" type="checkbox"/> < 70%			<input type="checkbox"/> ≥ 70%			<input type="checkbox"/> < 70%		
Evidence of flooding or ponding in AA	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No		
AA contains no or restricted outlet	--	--	.7 (M)	--	--	--	--	--	--	--		
AA contains unrestricted outlet	--	--	--	--	--	--	--	--	--	--		

Comments: Moderate % vegetation cover.

14H. SEDIMENT/Shoreline Stabilization NA (proceed to 14I)

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

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

% Cover of wetland streambank or shoreline by species with deep, binding rootmasses.	Duration of Surface Water Adjacent to Rooted Vegetation		
	<input checked="" type="checkbox"/> Permanent / Perennial	<input type="checkbox"/> Seasonal / Intermittent	<input type="checkbox"/> Temporary / Ephemeral
≥ 65 %	--	--	--
35-64 %	.7 (M)	--	--
< 35 %	--	--	--

Comments: Area dominated by emergent vegetation.

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

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

A	<input type="checkbox"/> Vegetated component >5 acres				<input type="checkbox"/> Vegetated component 1-5 acres				<input type="checkbox"/> Vegetated component <1 acre					
B	<input type="checkbox"/> High		<input checked="" type="checkbox"/> Moderate		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> High		<input type="checkbox"/> Moderate		<input type="checkbox"/> Low	
C	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N
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: Groundwater subsurface flow, highly permeable alluvial substrate.

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.		
	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input type="checkbox"/> common	<input type="checkbox"/> abundant	<input type="checkbox"/> rare	<input checked="" type="checkbox"/> common	<input type="checkbox"/> abundant
Estimated Relative Abundance from #11	--	--	--	--	--	--	--	--	--
Low disturbance at AA (#12i)	--	--	--	--	--	--	--	--	--
Moderate disturbance at AA (#12i)	--	--	--	--	--	--	--	.3L	--
High disturbance at AA (#12i)	--	--	--	--	--	--	--	--	--

Comments:

14L. RECREATION / EDUCATION POTENTIAL

- i. Is the AA a known recreational or educational site? Yes (Rate High (1.0), then proceed to 14L(ii) only] No [Proceed to 14L(iii)]
- ii. Check categories that apply to the AA: Educational / scientific study Consumptive rec. Non-consumptive rec. Other
- iii. Based on the location, diversity, size, and other site attributes, is there a strong potential for recreational or educational use?
 Yes [Proceed to 14L (ii) and then 14L(iv).] No [Rate as low in 14L(iv)]

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

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

Comments: _____



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	None	0.00	1	
C. General Wildlife Habitat	Moderate	0.70	1	
D. General Fish/Aquatic Habitat	NA	0.00	--	
E. Flood Attenuation	Moderate	0.50	1	
F. Short and Long Term Surface Water Storage	High	0.80	1	
G. Sediment/Nutrient/Toxicant Removal	Moderate	0.70	1	
H. Sediment/Shoreline Stabilization	Moderate	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	Low	0.30	1	
Totals:		6.20	11.00	
Percent of Total Possible Points:			56% (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 **2004 AERIAL PHOTOGRAPH**

MDT Wetland Mitigation Monitoring
Peterson Ranch
Hall, Montana



Photo Point No. 1: View looking west across mitigation site. Upland vegetation in foreground.



Photo Point No. 2: View looking west along vegetation transect No. 2. Upland community type in foreground, created wetland pond No. 2 in background.



Photo Point No. 3: View looking north at southern end of created wetland pond No.2. Side slopes transitioning down towards the standing water, area dominated by wetland species.



Photo Point No. 4: View looking southwest across pond No. 4. Emergent wetlands observed around pond fringes.



Photo Point No. 5: View looking north toward pond No. 4. Emergent vegetation type surrounding the pond fringes and scrub-shrub vegetation type in the background.

Peterson Ranch – 2004 Aerial Photography



Appendix D

ORIGINAL SITE PLAN

*MDT Wetland Mitigation Monitoring
Peterson Ranch
Hall, Montana*

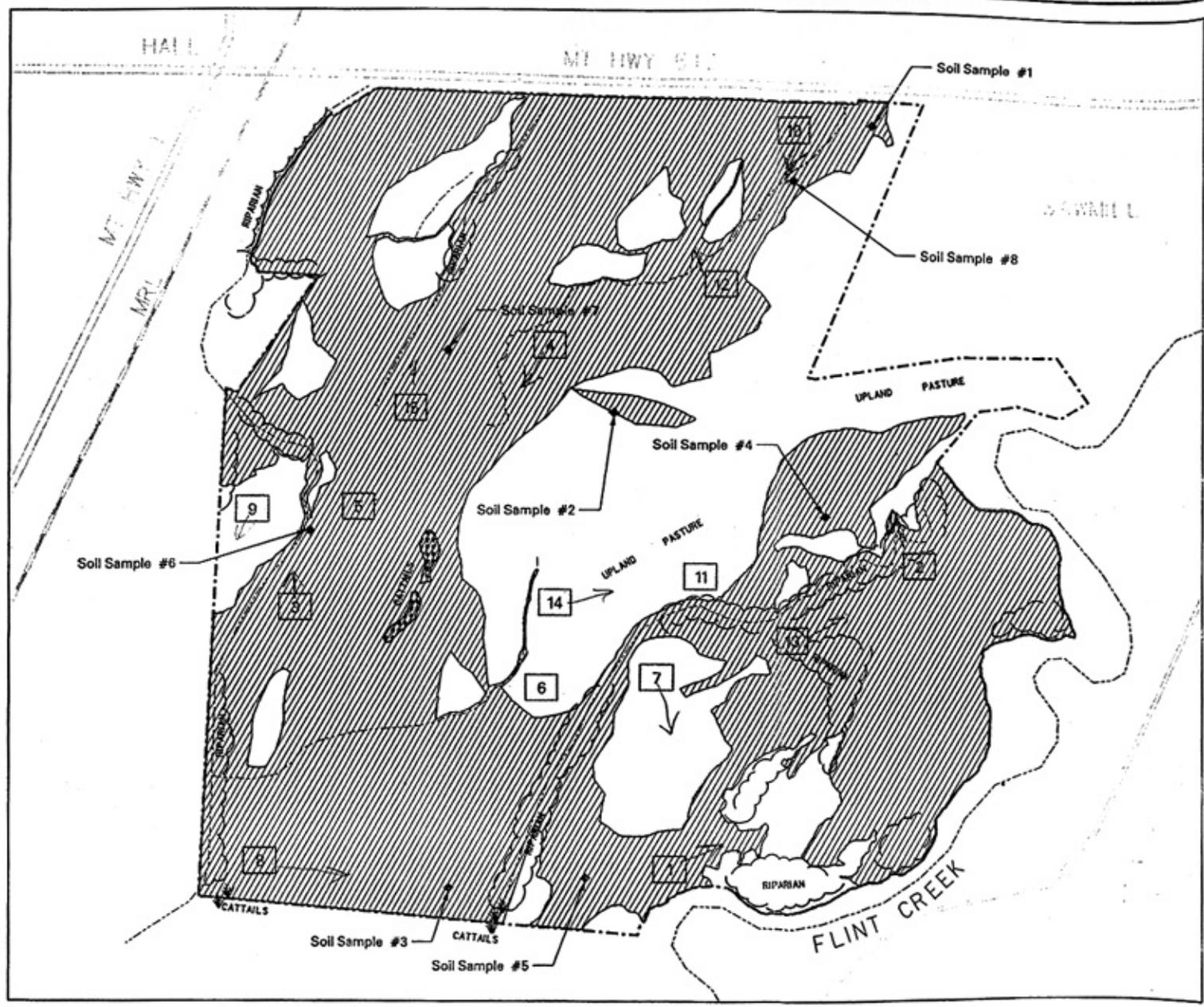


LEGEND

- PROPOSED EASEMENT
- EXISTING WETLAND BOUNDARY
- CREEK / IRRIGATION DITCH
- HIGHWAY
- ROAD
- SOIL SAMPLE
- PHOTO LOCATION

MAXVILLE-DRUMMOND
PETERSON RANCH
WETLAND MITIGATION
 EXISTING WETLANDS

MAP SOURCE:
 GPS FIELD SURVEY DATA OBTAINED 7/10/08,
 AND USGS TIGERLINE DATA OBTAINED FROM
 THE MONTANA MRS WEB SITE.



MONTANA DEPARTMENT OF TRANSPORTATION

MONTANA CADD

MONTANA DEPARTMENT OF TRANSPORTATION

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	STPX 20 (19)	1

LAND & WATER D-2

FEDERAL AID PROJECT NO. STPX 20 (19) PETERSON WETLAND MITIGATION PLAN GRANITE COUNTY

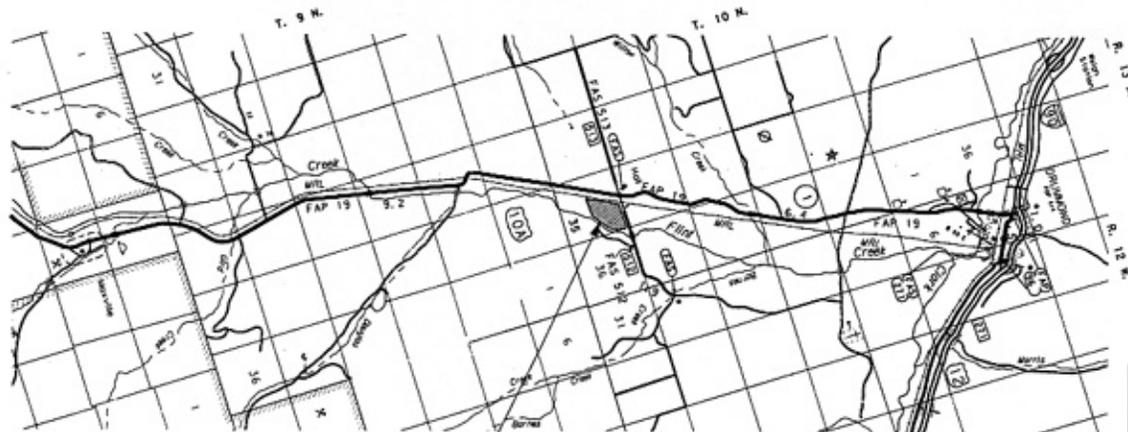
RECEIVED
MAY 17 2001
ENVIRONMENTAL



THIS PROJECT

SCALES AS NOTED ON PLANS
REDUCED PRINTS APPROXIMATELY 1/2 ORIGINAL SCALE

RECEIVED
JUN 10 2002
ENVIRONMENTAL



THIS CONTRACT

PLANS PREPARED BY

Carter-Burgess
103 W. FRONT ST. SUITE 103
MISSOULA, MONTANA 59802
(406) 721-1471

WGM Group, Inc.
3021 PALMER
P.O. BOX 18627
MISSOULA, MONTANA 59808-0227
(406) 728-6011

RELATED PROJECTS

MAXVILLE-DRUMMOND
STPP 30-226148

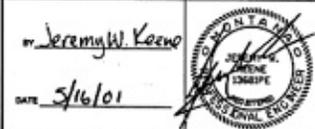
ASSOCIATED PROJECT
AGREEMENT NUMBERS

R/W & SC	
P.L.	

WGM Group, Inc.

by Jeremy W. Keewo

DATE 5/16/01



MONTANA
DEPARTMENT OF TRANSPORTATION

RECEIVED:
by Carl A. Pal May 17, 2001
PRECONSTRUCTION ENGINEER DATE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED:
DIVISION ADMINISTRATOR DATE

WGM Group, Inc.

DESIGNED BY: J. PALMER
DRAWN BY: J. PALMER
CHECKED BY: J. PALMER
DATE: 05/16/01

TABLE OF CONTENTS

<u>PLANS</u>	<u>SHEET NO.</u>
TITLE SHEET	1
TABLE OF CONTENTS	2
NOTES	2
LINEAR & LEVEL DATA	3
CONTROL TRAVERSE DIAGRAM	4-5
<u>SUMMARIES</u>	<u>6</u>
GRADING	
FENCING	
TOPSOIL & SEEDING	
PLANTING MATERIAL	
IRRIGATION DIVISION BOX	
CULVERTS	
BANK PROTECTION	
STOCK WATER LINE	
<u>DETAILS</u>	<u>7-18</u>
TYPICAL WETLAND SECTION	7
TYPICAL DITCH SECTION	7
IRRIGATION DIVISION BOX	8
BANK PROTECTION	9
STOCK WATER LINE DETAILS	10
SITE PLAN	11
GRADING PLAN - POOL 1	12
GRADING PLAN - POOL 2	13
GRADING PLAN - POOL 3	14
GRADING PLAN - POOL 4/5	15
GRADING PLAN - POOL 6	16-17
PLANTING PLAN	18
<u>CROSS SECTIONS</u>	<u>1-72</u>

NOTES

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	STPX 20 (19)	2



PROTECTION OF EXISTING WETLANDS

ENCLOSE DESIGNATED CONSTRUCTION AREAS WITH TEMPORARY FENCING. CONSTRUCTION VEHICLES ARE NOT PERMITTED OUTSIDE OF THE CONSTRUCTION AREAS, EXCEPT ON DESIGNATED CONSTRUCTION ACCESS ROADS. MAINTAIN ALL FENCING UNTIL THE COMPLETION OF CONSTRUCTION.

CONSTRUCTION ACCESS AND STAGING

AN EXISTING APPROACH ON HIGHWAY 512 MAY BE USED TO ACCESS THE MAIN IRRIGATION DITCH ON THE WEST SIDE OF THE PROPERTY. A TEMPORARY APPROACH MAY BE CONSTRUCTED TO GAIN ACCESS TO THE SITE FROM HIGHWAY 512 AT THE NORTHEAST CORNER OF THE PROPERTY, ADJACENT TO THE SAWMILL. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING THE APPROACH FOLLOWING COMPLETION OF CONSTRUCTION.

STORE ALL EQUIPMENT AND MATERIALS WITHIN THE DESIGNATED STAGING AREA PROVIDED SOUTH OF THE CORRAL. CONSTRUCTION ACCESS TO THE STAGING AREA IS SHOWN ON THE PLANS. THE CONTRACTOR IS RESPONSIBLE FOR REVEGETATING ALL DISTURBED ACCESS AND STAGING AREAS.

WETLAND TOPSOIL

EXCAVATE WETLAND TOPSOIL FROM WITHIN CONSTRUCTION LIMIT AREAS AND STOCKPILE TOPSOIL IN THE AREAS DESIGNATED ON THE PLANS. PLACE TOPSOIL TO A MINIMUM DEPTH OF 100mm ON BERMS AND SPDS, PILES, AND AT VARIABLE DEPTHS RANGING FROM 100mm TO 400mm WITHIN "SHALLOW WATER AREAS" TO CREATE AN UNEVEN NATURAL BOTTOM. DO NOT PLACE TOPSOIL IN "DEEP WATER AREAS". FINISHED GRADE ELEVATIONS DO NOT INCLUDE TOPSOIL.

GRADING

PERFORM ALL EXCAVATION AND EMBANKMENT BY THE METHODS DESCRIBED IN SECTION 203 OF THE STANDARD SPECIFICATIONS. ALL EXCAVATION, INCLUDING MUCK EXCAVATION, AND DITCH EXCAVATION WILL BE PAID FOR AS "UNCLASSIFIED EXCAVATION". EXCAVATION OF SATURATED AND UNSTABLE MATERIAL IS ANTICIPATED IN SOME AREAS, HOWEVER, NO PAYMENT WILL BE MADE FOR "MUCK EXCAVATION". TOPSOIL EXCAVATION IS DEDUCTED FROM THE GRADING QUANTITY.

SEEDING

SEED AREAS SHOWN ON THE PLANS AND OTHER AREAS DISTURBED DURING CONSTRUCTION. SEEDING AREA NO. 1 IS A NATIVE SEED MIX TO BE USED IN ALL NON-WETLAND (CRY) AREAS. SEEDING AREA NO. 2 IS A TRANSITIONAL SEED MIX TO BE USED IN WET AND SEMI-WET AREAS. SEE SPECIAL PROVISIONS.

PLANTING

COLLECT AND PLANT LIVE CUTTINGS FROM SUITABLE WILLOW SPECIES RESIDENT WITHIN THE FLINT CREEK FLOODPLAIN. OBTAIN BAREROOT STOCK FROM A QUALIFIED NURSERY. SUPPLIER OR INSTALLATION CONTRACTOR IS TO HAVE NOT LESS THAN THREE (3) YEARS OF EXPERIENCE IN SUCCESSFULLY COLLECTING AND PLANTING WETLAND PLANT MATERIAL. SEE SPECIAL PROVISIONS.

PLANT WILLOW CUTTINGS AND BAREROOT STOCK AS DIRECTED BY THE ENGINEER IN THE APPROXIMATE LOCATIONS SHOWN ON THE PLANTING PLAN.

FENCING

PERMETER FENCING IS STANDARD NOT BARBED 5-WIRE FENCE WITH WOODEN POSTS (TYPE F5W). PLACE PERMETER FENCING ON THE EASEMENT BOUNDARY DEFINED BY THE CERTIFICATE OF SURVEY (C.O.S. 581). INTERIOR FENCING IS STANDARD NOT BARBED 4-WIRE FENCE WITH WOODEN POSTS (TYPE F4W). FINAL PLACEMENT OF INTERIOR FENCING IS SUBJECT TO REVIEW BY THE LANDOWNER.

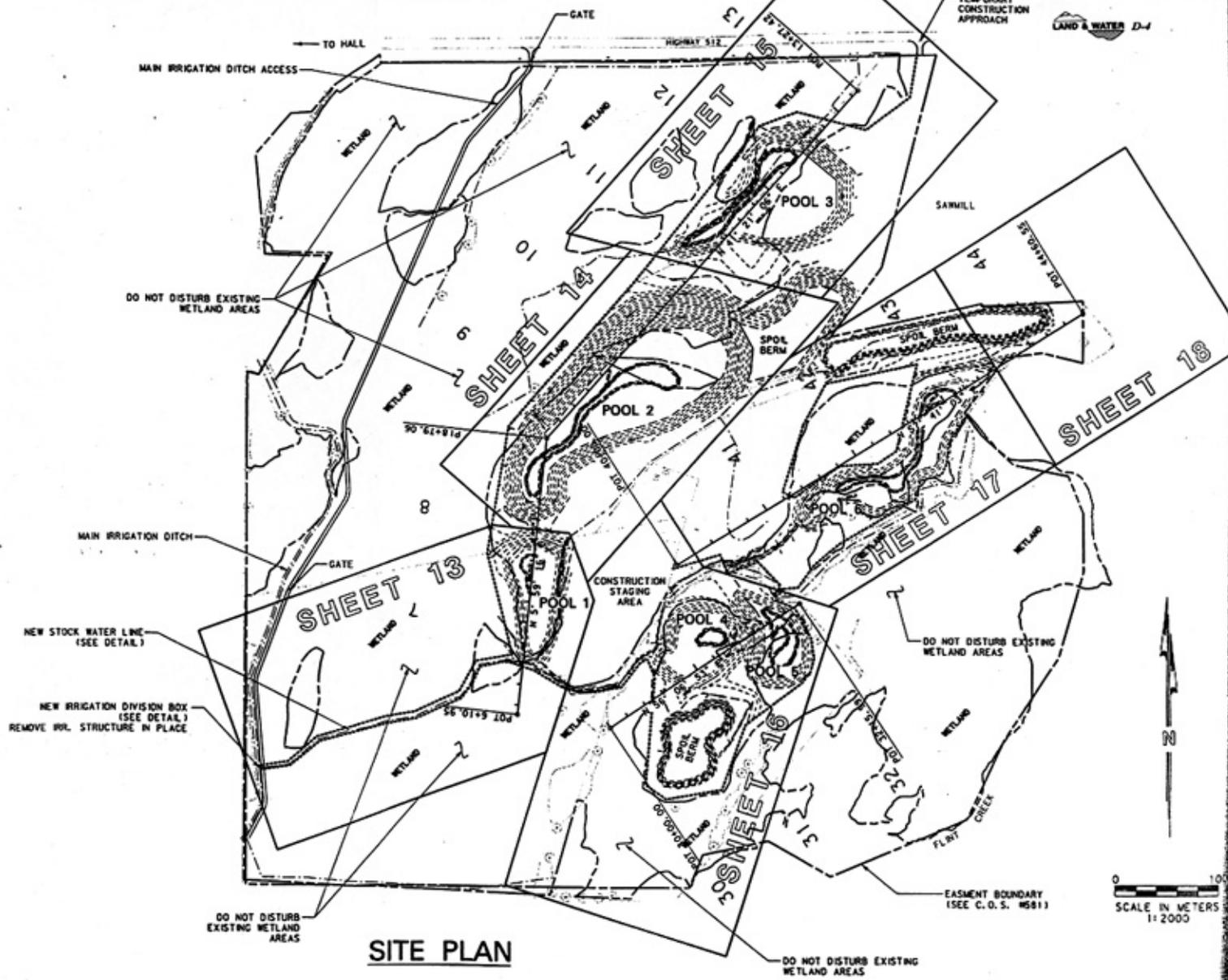
DETAIL

STATE	PROJECT NUMBER	SHEET
MONTANA	STPX 20 (18)	11

LAND & WATER D-4

LEGEND

-  EASEMENT BOUNDARY
-  EXISTING TREES AND SHRUBS
-  EXISTING TREE
-  EXISTING FENCE
-  EXISTING IRRIGATION DITCH
-  EXISTING 0.25m CONTOUR
-  EXISTING 1.0m CONTOUR
-  CONTROL LINE
-  TEMPORARY CONSTRUCTION FENCING
-  PROPOSED BERM
-  PROPOSED BANK PROTECTION
-  PROPOSED 0.25m CONTOUR
-  PROPOSED 1.0m CONTOUR
-  REMOVE FENCE
-  PROPOSED FENCE



SITE PLAN



MONTANA DEPARTMENT OF TRANSPORTATION

WGM Group, Inc.

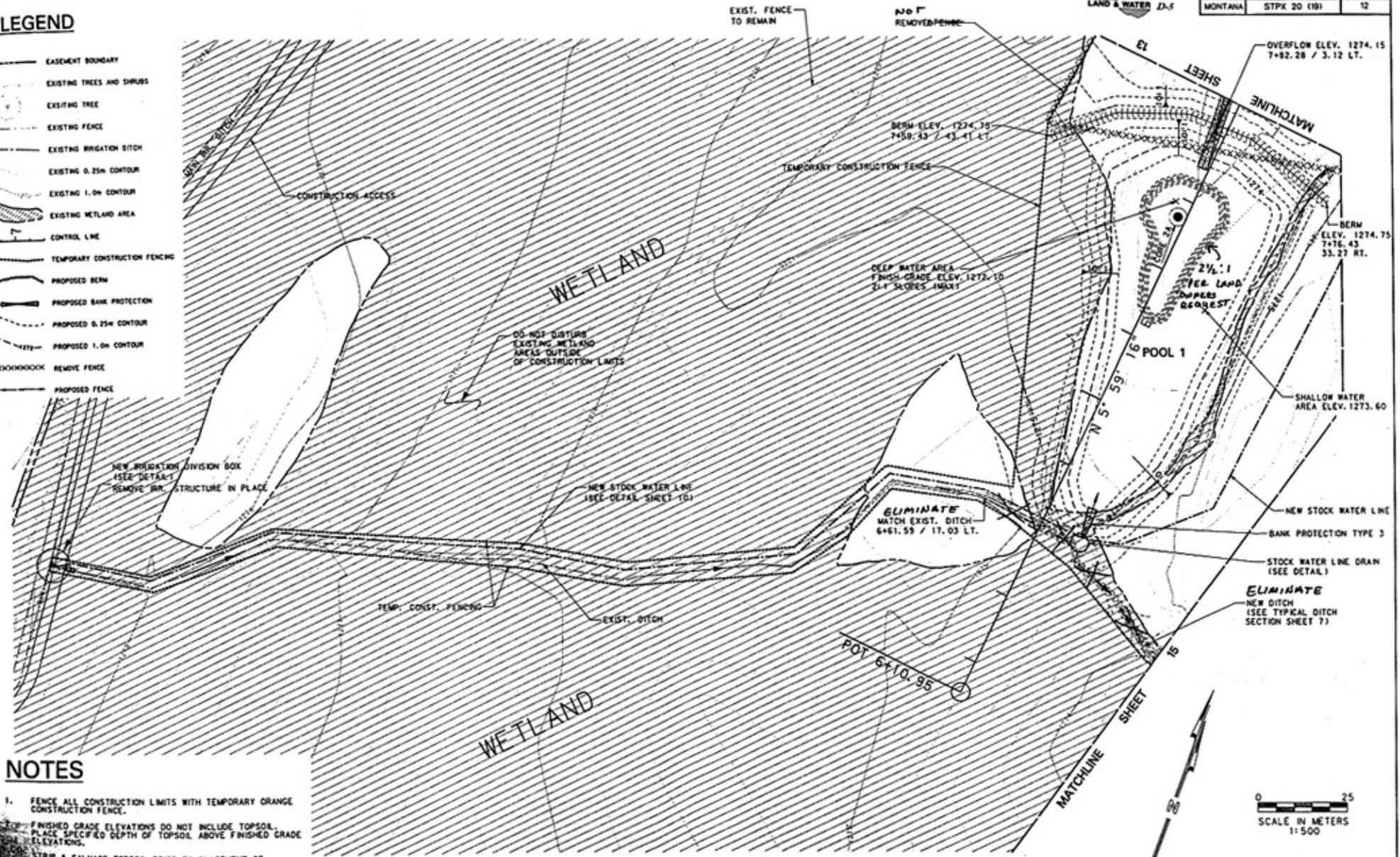
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05/16/2001		WGM
05/16/2001		WGM
05/16/2001		WGM

DRAWN BY: [unclear] CHECKED BY: [unclear]
 DATE: 6-7-02
 PROJECT: [unclear]

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	STPX 20 (19)	12

LEGEND

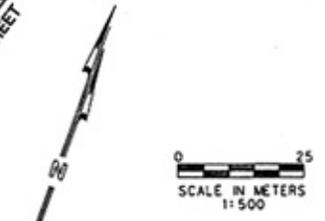
- EASEMENT BOUNDARY
- EXISTING TREES AND SHRUBS
- EXISTING TREE
- EXISTING FENCE
- EXISTING IRRIGATION DITCH
- EXISTING 0.25M CONTOUR
- EXISTING 1.0M CONTOUR
- EXISTING WETLAND AREA
- CONTROL LINE
- TEMPORARY CONSTRUCTION FENCING
- PROPOSED BERM
- PROPOSED BANK PROTECTION
- PROPOSED 0.25M CONTOUR
- PROPOSED 1.0M CONTOUR
- REMOVE FENCE
- PROPOSED FENCE



NOTES

1. FENCE ALL CONSTRUCTION LIMITS WITH TEMPORARY ORANGE CONSTRUCTION FENCE.
2. FINISHED GRADE ELEVATIONS DO NOT INCLUDE TOPSOIL. PLACE SPECIFIED DEPTH OF TOPSOIL ABOVE FINISHED GRADE ELEVATIONS.
3. STRIP & SALVAGE TOPSOIL PRIOR TO PLACEMENT OF SPDS MATERIAL.
4. PLACEMENT OF INTERIOR FENCING SUBJECT TO REVIEW BY [unclear]

GRADING PLAN - POOL 1



Randy Catter 6-7-02

Appendix E

BIRD SURVEY PROTOCOL GPS PROTOCOL

*MDT Wetland Mitigation Monitoring
Peterson Ranch
Hall, Montana*

BIRD SURVEY PROTOCOL

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

Species Use within the Mitigation Wetland: Survey Method

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

Sites that can be circumambulated or walked throughout.

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

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

Sites that cannot be circumambulated.

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

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

Species Use within the Mitigation Wetland: Data Recording

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

1. Bird Species List

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

2. Bird Density

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

3. Bird Behavior

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

4. Bird Species Habitat Use

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

GPS Mapping and Aerial Photo Referencing Procedure

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

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

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

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

Appendix F

MACROINVERTEBRATE SAMPLING PROTOCOL AND DATA

*MDT Wetland Mitigation Monitoring
Peterson Ranch
Hall, Montana*

AQUATIC INVERTEBRATE SAMPLING PROTOCOL

Equipment List

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

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

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

Site Selection

Select the sampling site with these considerations in mind:

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

Sampling

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

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

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

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



This step is optional, but it gives you a chance to see that you've collected some invertebrates. Rinse the net 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 - 2004

METHODS

Among other monitoring activities, aquatic invertebrate assemblages were collected at a number of mitigation wetlands throughout Montana. This report summarizes data generated from four 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 using a statistical software package, and distributions, median values, ranges, and quartiles for each metric were examined. All sites in all years of sampling were used. Camp Creek, which was sampled in 2002, 2003, and 2004, was assessed using the tested metric battery developed for montane streams of Western Montana (Bollman 1998). The fauna at the Camp Creek site was different from that of the other sites, and suggested montane stream conditions rather than wetland conditions. 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 in all years.

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, 2003, and 2004 by personnel of Land and Water Consulting, Inc. Sampling procedures utilized were based on the protocols developed by the Montana Department of Environmental Quality (MT DEQ). 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 100 organisms, when possible, from each sample. In some cases, the entire sample contained fewer than 100 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 MT DEQ Standard Operating Procedures for Sampling and Sample Analysis (Bukantis 1998). All 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, %Orthoclaadiinae of Chironomidae, %Crustacea + %Mollusca, and %Amphipoda) measure the relative contributions of certain taxonomic groups that may have significant responses to habitat and/or water quality impacts. For example, amphipods have been demonstrated to increase in abundance in alkaline conditions. Short-lived, relatively mobile taxa such as chironomids dominate ephemeral environments; many are hemoglobin-bearers capable of tolerating de-oxygenated conditions.

Two tolerance metrics (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. In 2004, 25 sites were re-visited, and 6 new sites were sampled. Thus, the 2004 database contains data for 122 sampling events at 50 unique sites. Table 2 summarizes sites and sampling years.

Metric scoring criteria were re-developed each year as new data was added. For 2004, all 122 records were utilized. Ranges of individual metrics, as well as median metric values remained remarkably consistent in each of the 4 years; minimal changes resulted from the addition of new data in 2004. The summary metric values and scores for the 2004 samples are given in Tables 3a-3d.

Literature cited

Bollman, W. 1998. Montana Valleys and Foothill Prairies Ecoregion. Master's Thesis. (M.S.) University of Montana. Missoula, Montana.

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

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

Table 1. Aquatic invertebrate metrics employed in the MTDT mitigation wetland monitoring study, 2001- 2004.

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

Table 2. Montana Department of Transportation Mitigated Wetlands Monitoring Project sites. 2001 – 2004.

2001	2002	2003	2004
Beaverhead 1	Beaverhead 1	Beaverhead 1	Beaverhead 1
Beaverhead 2	Beaverhead 2		
Beaverhead 3	Beaverhead 3		Beaverhead 3
Beaverhead 4	Beaverhead 4	Beaverhead 4	
Beaverhead 5	Beaverhead 5	Beaverhead 5	Beaverhead 5
Beaverhead 6	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 - Puffin
Fourchette - Flashlight	Fourchette - Flashlight	Fourchette - Flashlight	Fourchette - Flashlight
Fourchette - Penguin	Fourchette - Penguin	Fourchette - Penguin	Fourchette - Penguin
Fourchette - Albatross	Fourchette - Albatross	Fourchette - Albatross	Fourchette - Albatross
Big Spring	Big Spring	Big Spring	Big Spring
Vince Ames			
Ryegate			
Lavinia			
Stillwater	Stillwater	Stillwater	Stillwater
Roundup	Roundup	Roundup	Roundup
Wigeon	Wigeon	Wigeon	Wigeon
Ridgeway	Ridgeway	Ridgeway	Ridgeway
Musgrave - Rest. 1			
Musgrave - Rest. 2			
Musgrave - Enh. 1			
Musgrave - Enh. 2			
	Hoskins Landing	Hoskins Landing	Hoskins Landing
	Peterson - 1	Peterson - 1	Peterson - 1
	Peterson - 2		Peterson - 2
	Peterson - 4	Peterson - 4	Peterson - 4
	Peterson - 5	Peterson - 5	Peterson - 5
	Jack Johnson - main	Jack Johnson - main	
	Jack Johnson - SW	Jack Johnson - SW	
	Creston	Creston	Creston
	Lawrence Park		
	Perry Ranch		
	SF Smith River	SF Smith River	SF Smith River
	Camp Creek	Camp Creek	Camp Creek
	Kleinschmidt	Kleinschmidt - pond	Kleinschmidt - pond
		Kleinschmidt - stream	Kleinschmidt - stream
		Ringling - Galt	
			Circle
			Cloud Ranch Pond
			Cloud Ranch Stream
			Colloid
			Jack Creek
			Norem

Table 3a.

	BEAVER HEAD #1	BEAVER HEAD #3	BEAVER HEAD #5	BEAVER HEAD #6	BIG SPRING CREEK	CIRCLE	CLOUD RANCH POND	CLOUD RANCH STREAM	COLLOID	CRESTON
Total taxa	27	12	21	18	25	16	16	20	8	18
POET	3	0	2	3	4	2	2	4	2	3
Chironomidae taxa	7	5	5	5	8	5	6	11	1	2
Crustacea + Mollusca	7	3	4	6	7	1	6	1	1	7
% Chironomidae	0.33636	0.18888	0.39285	0.57547	0.44329	0.55855	0.41666	0.84	0.09090	0.06087
Orthoclaadiinae/Chir	0.05405	0.35294	0.06818	0.36065	0.27907	0.69354	0.4	0.16666	0	0
%Amphipoda	0.03636	0	0.01785	0.05660	0.05154	0	0.00925	0	0	0
%Crustacea + %Mollusca	0.31818	0.73333	0.05357	0.12264	0.18556	0.03603	0.36111	0.01	0.09090	0.73913
HBI	7.97169	7.88888	8.36363	8.15789	7.61855	7.19090	7.32291	4.84	6	6.92173
%Dominant taxon	0.2	0.57777	0.23214	0.25471	0.23711	0.38738	0.13888	0.38	0.27272	0.37391
%Collector-Gatherers	0.40909	0.75555	0.51785	0.62264	0.78350	0.05405	0.67592	0.74	0.18181	0.29565
%Filterers	0.12727	0	0	0	0.01030	0.15315	0.09259	0.17	0	0.06087
Total taxa	5	1	5	3	5	3	3	3	1	3
POET	3	1	1	3	5	1	1	5	1	3
Chironomidae taxa	5	3	3	3	5	3	3	5	1	1
Crustacea + Mollusca	5	1	3	5	5	1	5	1	1	5
% Chironomidae	3	3	3	1	1	1	1	1	5	5
Orthoclaadiinae/Chir	1	3	1	3	3	5	3	1	1	1
%Amphipoda	5	5	5	3	3	5	5	5	5	5
%Crustacea + %Mollusca	5	1	5	5	5	5	3	5	5	1
HBI	1	1	1	1	1	3	3	5	5	3
%Dominant taxon	5	1	5	5	5	3	5	3	5	3
%Collector-Gatherers	1	3	3	3	3	1	3	3	1	1
%Filterers	1	3	3	3	3	1	1	1	3	1
	40	26	38	38	44	32	36	38	34	32
	0.666667	0.433333	0.633333	0.633333	0.733333	0.533333	0.6	0.633333	0.566667	0.533333
	sub-optimal	poor	sub-optimal	sub-optimal	optimal	sub-optimal	sub-optimal	sub-optimal	sub-optimal	sub-optimal

Table 3b.

	FOURCHETTE CREEK ALBATROSS RESERVOIR	FOURCHETTE CREEK FLASHLIGHT RESERVOIR	FOURCHETTE CREEK PENGUIN RESERVOIR	FOURCHETTE CREEK PUFFIN RESERVOIR	JACK CREEK	MDT CAMP CREEK	MDT HOSKINS LANDING	MDT KLEINSCHMIDT CREEK	MDT KLEINSCHMIDT POND
Total taxa	18	23	19	22	23	35	25	19	19
POET	3	5	4	3	5	12	4	4	6
Chironomidae taxa	6	9	6	4	8	14	4	6	4
Crustacea + Mollusca	3	4	5	8	7	1	6	2	4
% Chironomidae	0.135135	0.265306	0.066116	0.247934	0.352113	0.37963	0.036697	0.438776	0.047619
Orthoclaadiinae/Chir	0.2	0.346154	0.625	0.3	0.52	0.585366	0.5	0.627907	0.8
%Amphipoda	0.126126	0.336735	0.578512	0.041322	0.028169	0	0.018349	0.010204	0.009524
%Crustacea + %Mollusca	0.684685	0.387755	0.77686	0.371901	0.380282	0.111111	0.541284	0.061224	0.190476
HBI	7.972973	7.216495	7.7	6.950413	7.647059	4.570093	6.59633	6.561224	6.67619
%Dominant taxon	0.495495	0.336735	0.561983	0.140496	0.15493	0.111111	0.366972	0.316327	0.552381
%Collector-Gatherers	0.873874	0.816327	0.702479	0.38843	0.394366	0.416667	0.091743	0.683673	0.114286
%Filterers	0	0.010204	0.132231	0.008264	0.042254	0.12037	0.018349	0.153061	0.047619
Total taxa									
POET	3	5	3	5	5	5	5	3	3
Chironomidae taxa	3	5	5	3	5	5	5	5	5
Crustacea + Mollusca	3	5	3	3	5	5	3	3	3
% Chironomidae	1	3	3	5	5	1	5	1	3
Orthoclaadiinae/Chir	5	3	5	3	3	3	5	1	5
%Amphipoda	3	3	5	3	5	5	5	5	5
%Crustacea + %Mollusca	3	1	1	3	5	5	5	5	5
HBI	1	3	1	3	3	5	3	5	5
%Dominant taxon	1	3	1	3	1	5	5	5	5
%Collector-Gatherers	1	5	1	5	5	5	3	5	1
%Filterers	5	5	3	1	1	1	1	3	1
	3	3	1	3	3	1	3	1	3
	32	44	32	40	46	46	48	42	44
	0.533333	0.733333	0.533333	0.666667	0.766667	0.766667	0.8	0.7	0.733333
	sub-optimal	optimal	sub-optimal	optimal	optimal	optimal	optimal	optimal	optimal

Table 3d.

	ROUNDUP	SOUTH FORK SMITH RIVER	STILLWATER	WIGEON
Total taxa	9	20	23	16
POET	0	5	4	3
Chironomidae taxa	4	7	9	5
Crustacea + Mollusca	3	3	4	3
% Chironomidae	0.55	0.482143	0.466667	0.314815
Orthoclaadiinae/Chir	0.072727	0.055556	0.244898	0.647059
%Amphipoda	0	0.071429	0.12381	0.481481
%Crustacea + %Mollusca	0.42	0.116071	0.180952	0.574074
HBI	8.89	6.589286	6.47619	7.534653
%Dominant taxon	0.28	0.294643	0.133333	0.481481
%Collector-Gatherers	0.56	0.839286	0.628571	0.657407
%Filterers	0.14	0	0	0.083333
Total taxa				
POET	1	3	5	3
Chironomidae taxa	1	5	5	3
Crustacea + Mollusca	3	5	5	3
% Chironomidae	1	1	3	1
Orthoclaadiinae/Chir	1	1	1	3
%Amphipoda	1	1	3	5
%Crustacea + %Mollusca	5	3	3	1
HBI	3	5	5	3
%Dominant taxon	1	5	5	3
%Collector-Gatherers	5	5	5	3
%Filterers	3	5	3	3
	1	3	3	1
	26	42	46	32
	0.433333	0.7	0.766667	0.533333
	poor	optimal	optimal	Sub-optimal

Aquatic Invertebrate Taxonomic Data

Site Name PETERSON RANCH MS1

Date Collected 8 /12/2004

Order	Family	Taxon	Count	Percent	Unique	BI	FFG
Amphipoda	Gammaridae						
		<i>Gammarus</i>	2	1.89%	Yes	4	SH
	Talitridae						
		<i>Hyaella</i>	4	3.77%	Yes	8	CG
Basommatophora	Lymnaeidae						
		Lymnaeidae	3	2.83%	Yes	6	SC
Coleoptera	Haliplidae						
		<i>Feltodytes</i>	1	0.94%	Yes	5	SH
Diptera	Ceratopogonidae						
		Ceratopogonidae	1	0.94%	Yes	6	PR
	Chironomidae						
		<i>Acricotopus</i>	2	1.89%	Yes	10	CG
		<i>Apedilum</i>	1	0.94%	Yes	11	CG
		<i>Psectrocladius</i>	1	0.94%	Yes	8	CG
		<i>Tanytarsus</i>	10	9.43%	Yes	6	CF
	Tipulidae						
		<i>Tipula</i>	1	0.94%	Yes	4	SH
Haplotaaxida	Naididae						
		<i>Nais</i>	54	50.94%	Yes	8	CG
Heteroptera	Notonectidae						
		<i>Notonecta</i>	1	0.94%	Yes	5	PR
Odonata							
		Zygoptera	1	0.94%	Yes		
	Coenagrionidae						
		Coenagrionidae	16	15.09%	Yes	7	PR
	Libellulidae						
		Libellulidae	8	7.55%	Yes	9	PR
Grand Total			106				

Aquatic Invertebrate Data Summary

Project ID: MDT04LW
STORET Station ID:
Station Name: PETERSON RANCH MS1

Activity ID:
Sample Date: 8/12/2004

Sample type	
SUBSAMPLE TOTAL ORGANISMS	106
Portion of sample used	5.00%
Estimated number in total sample	2120
Conversion factor	26,900
Estimated number in 1 square meter	2851
Sampling effort	
Habitat type	
EPT abundance	0
Taxa richness	15
Number EPT taxa	0
Percent EPT	0.00%

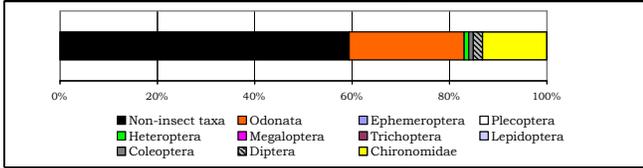
DOMINANCE		
TAXON	ABUNDANCE	PERCENT
Nais	54	50.94%
Coenagrionidae	16	15.09%
Tanytarsus	10	9.43%
Libellulidae	8	7.55%
Hyalinella	4	3.77%
SUBTOTAL 5 DOMINANTS		
	92	86.79%
Lymnaeidae	3	2.83%
Gammarus	2	1.89%
Acricotopus	2	1.89%
Zygoptera	1	0.94%
Notonecta	1	0.94%
TOTAL DOMINANTS	101	95.28%

TAXONOMIC COMPOSITION				TAXONOMIC RATIOS			
GROUP	PERCENT	ABUNDANCE	#TAXA	METRIC	VALUE		
Non-insect taxa	59.43%	63	4	EPT/Chironomidae	0.00		
Odonata	23.58%	25	3	Baetidae/Ephemeroptera	#DIV/0!		
Ephemeroptera	0.00%	0	0	Hydropsychidae/Trichopt	#DIV/0!		
Plecoptera	0.00%	0	0				
Heteroptera	0.94%	1	1				
Megaloptera	0.00%	0	0				
Trichoptera	0.00%	0	0				
Lepidoptera	0.00%	0	0				
Coleoptera	0.94%	1	1				
Diptera	1.89%	2	2				
Chironomidae	13.21%	14	4				

TOLERANCE/CONDITION INDICES	
Community Tolerance Quotient (CTQa)	100.80
Hilsenhoff Biotic Index	7.45

DIVERSITY	
Shannon H (log)	2.21
Shannon H (log2)	1.53
Margalef D	3.00
Simpson D	0.29
Pevenness	0.10

VOLUNTINISM			
TYPE	ABUNDANCE	# TAXA	PERCENT
Multivoltine	14	4	13.21%
Univoltine	82	8	77.36%
Semivoltine	9	2	8.49%

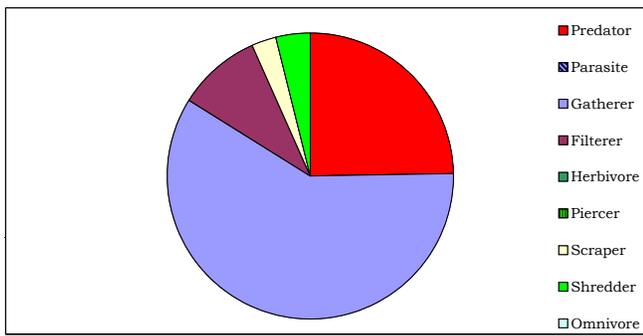


TAXA CHARACTERS		
#TAXA	PERCENT	
Tolerant	6	29.25%
Sensitive	0	0.00%
Clinger	1	9.43%

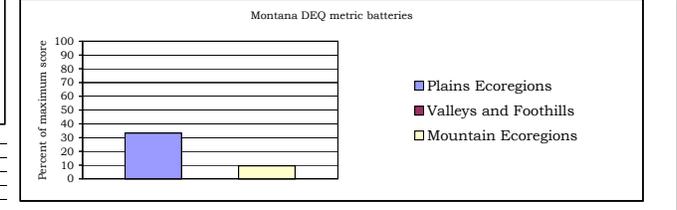
BIOASSESSMENT INDICES

FUNCTIONAL COMPOSITION				FUNCTIONAL RATIOS			
GROUP	PERCENT	ABUNDANCE	#TAXA	METRIC	VALUE		
Predator	24.53%	26	4	Scraper/Filterer	0.30		
Parasite	0.00%	0	0	Scraper/Scraper + Filtere	0.23		
Gatherer	58.49%	62	5				
Filterer	9.43%	10	1				
Herbivore	0.00%	0	0				
Piercer	0.00%	0	0				
Scraper	2.83%	3	1				
Shredder	3.77%	4	3				
Omnivore	0.00%	0	0				
Unknown	0.00%	0	0				

B-IBI (Karr et al.)		
METRIC	VALUE	SCORE
Taxa richness	15	1
E richness	0	1
P richness	0	1
T richness	0	1
Long-lived	2	4
Sensitive richness	0	1
%tolerant	29.25%	3
%predators	24.53%	5
Clinger richness	1	1
%dominance (3)	75.47%	16
TOTAL SCORE		32%



MONTANA DEQ INDICES (Bukantis 1998)				
METRIC	VALUE	Plains Ecoregions	Valleys and Foothills Ecoregions	Mountain Ecoregions
Taxa richness	15	1	0	0
EPT richness	0	0	0	0
Biotic Index	7.45	0	0	0
%Dominant taxon	50.94%	1	0	0
%Collectors	67.92%	2	2	2
%EPT	0.00%	0	0	0
Shannon Diversity	1.53	0	0	0
%Scrapers + Shredder	6.60%	1	0	0
Predator taxa	4	2		
%Multivoltine	13.21%	3		
%H of T	#DIV/0!		#DIV/0!	
TOTAL SCORES	10	#DIV/0!	2	
PERCENT OF MAXIMUM	33.33	#DIV/0!	9.52	
IMPAIRMENT CLASS		MODERATE	#DIV/0!	SEVERE



COMMUNITY TOLERANCES	
Sediment tolerant taxa	2
Percent Sediment tolerant	3.77%
Sediment sensitive taxa	0
Percent sediment sensitive	0.00%
Metals tolerance index (McGuire)	2.97
Cold stenotherm taxa	0
Percent cold stenotherms	0.00%

Montana Valleys and Foothills revised index (Bollman 1998)		
Percent max.	16.67%	Impairment class SEVERE

HABITUS MEASURES	
Hemoglobin bearer richness	1
Percent hemoglobin bearers	0.94%
Air-breather richness	1
Percent air-breathers	0.94%
Burrower richness	1
Percent burrowers	0.94%
Swimmer richness	2
Percent swimmers	1.89%

Montana Plains ecoregions metrics (Bramblett and Johnson 2002)			
Riffle	Pool		
EPT richness	0	E richness	0
Percent EPT	0.00%	T richness	0
Percent Oligochaetes and Leeches	50.94%	Percent EPT	0.00%
Percent 2 dominants	66.04%	Percent non-insect	59.43%
Filterer richness	1	Filterer richness	1
Percent intolerant	0.94%	Univoltine richness	8
Univoltine richness	8	Percent supertolerant	66.04%
Percent clingers	9.43%		
Swimmer richness	2		

Aquatic Invertebrate Taxonomic Data

Site Name PETERSON RANCH MS2

Date Collected 8 /12/2004

Order	Family	Taxon	Count	Percent	Unique	BI	FFG
		Ostracoda	3	2.63%	Yes	8	CG
Amphipoda		Copepoda	6	5.26%	Yes	8	CG
	Gammaridae	<i>Gammarus</i>	1	0.88%	Yes	4	SH
	Talitridae	<i>Hyaletta</i>	25	21.93%	Yes	8	CG
Arhynchobdellida	Erpobdellidae	<i>Erpobdella</i>	1	0.88%	Yes	8	PR
Basommatophora	Physidae	Physidae	58	50.88%	Yes	8	SC
Coleoptera	Dytiscidae	<i>Agabus</i>	1	0.88%	Yes	5	PR
		Dytiscidae	1	0.88%	Yes	5	PR
	Hydrophilidae	Hydrophilidae	1	0.88%	Yes	5	PR
		<i>Tropisternus</i>	1	0.88%	Yes	5	PR
Diplostraca		Cladocera	10	8.77%	Yes	8	CF
Diptera	Sciomyzidae	Sciomyzidae	1	0.88%	Yes	6	PR
Heteroptera	Corixidae	<i>Sigara</i>	1	0.88%	Yes	5	PH
Odonata	Coenagrionidae	Coenagrionidae	1	0.88%	Yes	7	PR
	Libellulidae	<i>Leucorrhinia</i>	1	0.88%	Yes	9	PR
		Libellulidae	1	0.88%	Yes	9	PR
Trombidiformes		Acari	1	0.88%	Yes	5	PR
Grand Total			114				

Aquatic Invertebrate Data Summary

Project ID: MDT04LW
STORET Station ID:
Station Name: PETERSON RANCH MS2

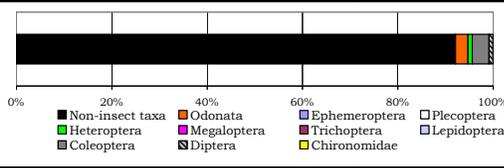
Activity ID:
Sample Date: 8/12/2004

Sample type	
SUBSAMPLE TOTAL ORGANISMS	114
Portion of sample used	15.83%
Estimated number in total sample	720
Conversion factor	8.495
Estimated number in 1 square meter	968
Sampling effort	
Habitat type	
EPT abundance	0
Taxa richness	17
Number EPT taxa	0
Percent EPT	0.00%

DOMINANCE		
TAXON	ABUNDANCE	PERCENT
Physidae	58	50.88%
Hyaella	25	21.93%
Cladocera	10	8.77%
Copepoda	6	5.26%
Ostracoda	3	2.63%
SUBTOTAL 5 DOMINANTS		
	102	89.47%
Erpobdella	1	0.88%
Gammarus	1	0.88%
Acari	1	0.88%
Coenagrionidae	1	0.88%
Leucorrhinia	1	0.88%
TOTAL DOMINANTS	107	93.86%

TAXONOMIC COMPOSITION				TAXONOMIC RATIOS			
GROUP	PERCENT	ABUNDANCE	#TAXA	METRIC	VALUE		
Non-insect taxa	92.11%	105	8	EPT/Chironomidae	#DIV/0!		
Odonata	2.63%	3	3	Baetidae/Ephemeroptera	#DIV/0!		
Ephemeroptera	0.00%	0	0	Hydropsychidae/Trichopt	#DIV/0!		
Plecoptera	0.00%	0	0				
Heteroptera	0.88%	1	1				
Megaloptera	0.00%	0	0				
Trichoptera	0.00%	0	0				
Lepidoptera	0.00%	0	0				
Coleoptera	3.51%	4	4				
Diptera	0.88%	1	1				
Chironomidae	0.00%	0	0				

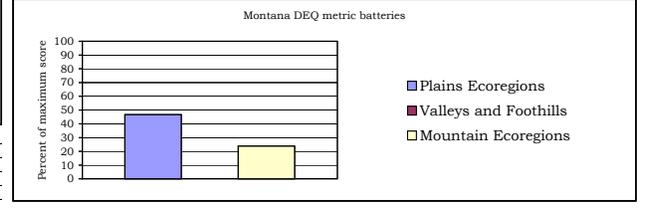
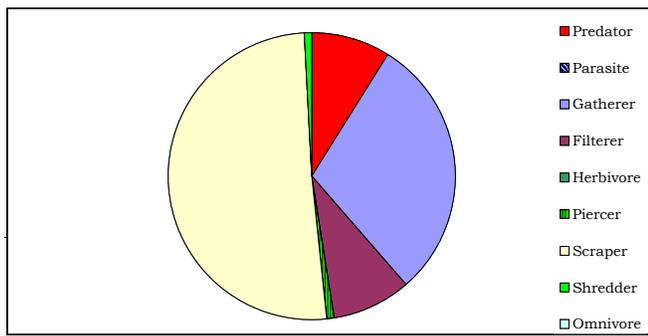
TOLERANCE/CONDITION INDICES			
Community Tolerance Quotient (CTQa)			94.75
Hilsenhoff Biotic Index			7.80
DIVERSITY			
Shannon H (log)			2.01
Shannon H (log2)			1.39
Margalef D			3.37
Simpson D			0.31
Evenness			0.08
VOLUNTINISM			
TYPE	ABUNDANCE	# TAXA	PERCENT
Multivoltine	20	4	17.54%
Univoltine	89	8	78.07%
Semivoltine	5	5	4.39%



TAXA CHARACTERS		
	#TAXA	PERCENT
Tolerant	5	54.39%
Sensitive	0	0.00%
Clinger	0	0.00%
BIOASSESSMENT INDICES		
B-IBI (Karr et al.)		
METRIC	VALUE	SCORE
Taxa richness	17	1
E richness	0	1
P richness	5.80	1
T richness	0	1
Long-lived	5	5
Sensitive richness	0	1
%tolerant	54.39%	1
%predators	8.77%	1
Clinger richness	0	1
%dominance (3)	81.58%	1
TOTAL SCORE	14	28%

FUNCTIONAL COMPOSITION				FUNCTIONAL RATIOS			
GROUP	PERCENT	ABUNDANCE	#TAXA	METRIC	VALUE		
Predator	8.77%	10	10	Scraper/Filterer			
Parasite	0.00%	0	0	Scraper/Scraper + Filtere	0.85		
Gatherer	29.82%	34	3				
Filterer	8.77%	10	1				
Herbivore	0.00%	0	0				
Piercer	0.88%	1	1				
Scraper	50.88%	58	1				
Shredder	0.88%	1	1				
Omnivore	0.00%	0	0				
Unknown	0.00%	0	0				

MONTANA DEQ INDICES (Bukantis 1998)				
METRIC	VALUE	Plains Ecoregions	Valleys and Foothills Ecoregions	Mountain Ecoregions
Taxa richness	17	1	0	0
EPT richness	0	0	0	0
Biotic Index	7.80	0	0	0
%Dominant taxon	50.88%	1	0	0
%Collectors	38.60%	3	3	3
%EPT	0.00%	0	0	0
Shannon Diversity	1.39	0		
%Scrapers +Shredder	51.75%	3	3	2
Predator taxa	10	3		
%Multivoltine	17.54%	3		
%H of T	#DIV/0!		#DIV/0!	
TOTAL SCORES	14	#DIV/0!	5	
PERCENT OF MAXIMUM	46.67	#DIV/0!	23.81	
IMPAIRMENT CLASS	MODERATE	#DIV/0!	MODERATE	



COMMUNITY TOLERANCES	
Sediment tolerant taxa	0
Percent sediment tolerant	0.00%
Sediment sensitive taxa	0
Percent sediment sensitive	0.00%
Metals tolerance index (McGuire)	3.13
Cold stenotherm taxa	0
Percent cold stenotherms	0.00%

Montana Valleys and Foothills revised index (Bollman 1998)		
Percent max.	11.11%	Impairment class SEVERE

HABITUS MEASURES	
Hemoglobin bearer richness	0
Percent hemoglobin bearers	0.00%
Air-breather richness	4
Percent air-breathers	3.51%
Burrower richness	0
Percent burrowers	0.00%
Swimmer richness	3
Percent swimmers	2.63%

Montana Plains ecoregions metrics (Bramblett and Johnson 2002)			
Riffle		Pool	
EPT richness	0	E richness	0
Percent EPT	0.00%	T richness	0
Percent Oligochaetes and Leeches	0.88%	Percent EPT	0.00%
Percent 2 dominants	72.81%	Percent non-insect	92.11%
Filterer richness	1	Filterer richness	1
Percent intolerant	0.00%	Univoltine richness	8
Univoltine richness	8	Percent supertolerant	92.11%
Percent clingers	0.00%		
Swimmer richness	3		

Aquatic Invertebrate Taxonomic Data

Site Name PETERSON RANCH MS4

Date Collected 8 /12/2004

Order	Family	Taxon	Count	Percent	Unique	BI	FFG
Amphipoda	Talitridae	<i>Hyalella</i>	7	6.67%	Yes	8	CG
Basommatophora	Lymnaeidae	<i>Stagnicola</i>	2	1.90%	Yes	6	SC
	Physidae	Physidae	1	0.95%	Yes	8	SC
	Planorbidae	<i>Gyraulus</i>	12	11.43%	Yes	8	SC
Coleoptera	Halipidae	<i>Halipus</i>	4	3.81%	Yes	5	PH
		<i>Peltodytes</i>	1	0.95%	Yes	5	SH
Diplostraca		Cladocera	13	12.38%	Yes	8	CF
Diptera	Chironomidae	<i>Ablabesmyia</i>	2	1.90%	Yes	8	CG
		<i>Cricotopus (Isocladius)</i>	3	2.86%	Yes	7	SH
		<i>Psectrocladius</i>	1	0.95%	Yes	8	CG
		<i>Pseudochironomus</i>	2	1.90%	Yes	5	CG
		<i>Tanytarsus</i>	9	8.57%	Yes	6	CF
Ephemeroptera	Baetidae	<i>Callibaetis</i>	1	0.95%	Yes	9	CG
	Caenidae	<i>Caenis</i>	3	2.86%	Yes	7	CG
Haplotaxida	Naididae	<i>Nais</i>	18	17.14%	Yes	8	CG
Heteroptera	Corixidae	Corixidae	1	0.95%	No	10	PH
		<i>Hesperocorixa</i>	6	5.71%	Yes	10	PH
	Notonectidae	<i>Notonecta</i>	1	0.95%	Yes	5	PR
Odonata	Coenagrionidae	Coenagrionidae	14	13.33%	Yes	7	PR
		<i>Enallagma</i>	1	0.95%	Yes	7	PR
Rhynchobdellida	Glossiphoniidae	<i>Glossiphonia</i>	1	0.95%	Yes	9	PR
Trichoptera	Leptoceridae	<i>Mystacides</i>	1	0.95%	Yes	4	CG
Trombidiformes		Acari	1	0.95%	Yes	5	PR
Grand Total			105				

Aquatic Invertebrate Data Summary

Project ID: MDT04LW
STOREF Station ID:
Station Name: PETERSON RANCH MS4

Activity ID:
Sample Date: 8/12/2004

Sample type	
SUBSAMPLE TOTAL ORGANISMS	105
Portion of sample used	8.33%
Estimated number in total sample	1260
Conversion factor	16.140
Estimated number in 1 square meter	1695
Sampling effort	
Habitat type	
EPT abundance	5
Taxa richness	22
Number EPT taxa	3
Percent EPT	4.76%

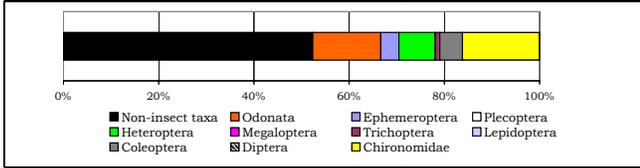
DOMINANCE		
TAXON	ABUNDANCE	PERCENT
Nais	18	17.14%
Coenagrionidae	14	13.33%
Cladocera	13	12.38%
Gvraulus	12	11.43%
Tanytarsus	9	8.57%
SUBTOTAL 5 DOMINANTS	66	62.86%
Hyaella	7	6.67%
Hesperocorixa	6	5.71%
Haliplus	4	3.81%
Caenis	3	2.86%
Cricotopus (Isocladius)	3	2.86%
TOTAL DOMINANTS	89	84.76%

TAXONOMIC COMPOSITION				TAXONOMIC RATIOS		
GROUP	PERCENT	ABUNDANCE	#TAXA	METRIC	VALUE	
Non-insect taxa	52.38%	55	8	EPT/Chironomidae	0.29	
Odonata	14.29%	15	2	Baetidae/Ephemeroptera	0.25	
Ephemeroptera	3.81%	4	2	Hydropsychidae/Trichopt	0.00	
Plecoptera	0.00%	0	0			
Heteroptera	7.62%	8	3			
Megaloptera	0.00%	0	0			
Trichoptera	0.95%	1	1			
Lepidoptera	0.00%	0	0			
Coleoptera	4.76%	5	2			
Diptera	0.00%	0	0			
Chironomidae	16.19%	17	5			

TOLERANCE/CONDITION INDICES	
METRIC	VALUE
Community Tolerance Quotient (CTQa)	94.15
Hilsenhoff Biotic Index	7.45

DIVERSITY			
METRIC	VALUE		
Shannon H (loge)			4.07
Shannon H (log2)			2.82
Margalef D			4.72
Simpson D			0.09
Evenness			0.12

VOLTINISM			
TYPE	ABUNDANCE	# TAXA	PERCENT
Multivoltine	32	8	30.48%
Univoltine	68	13	64.76%
Semivoltine	5	2	4.76%



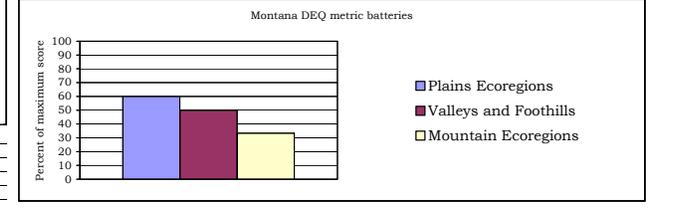
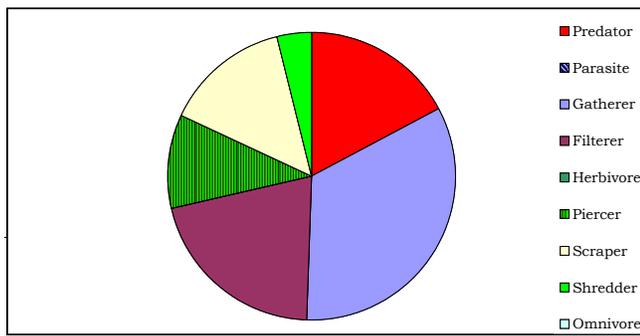
TAXA CHARACTERS		
	#TAXA	PERCENT
Tolerant	10	39.05%
Sensitive	0	0.00%
Clinger	2	11.43%

BIOASSESSMENT INDICES
B-IBI (Karr et al.)

FUNCTIONAL COMPOSITION				FUNCTIONAL RATIOS		
GROUP	PERCENT	ABUNDANCE	#TAXA	METRIC	VALUE	
Predator	17.14%	18	5	Scraper/Filterer	0.68	
Parasite	0.00%	0	0	Scraper/Scraper + Filtere	0.41	
Gatherer	33.33%	35	8			
Filterer	20.95%	22	2			
Herbivore	0.00%	0	0			
Piercer	10.48%	11	3			
Scraper	14.29%	15	3			
Shredder	3.81%	4	2			
Omnivore	0.00%	0	0			
Unknown	0.00%	0	0			

METRIC	VALUE	SCORE
Taxa richness	22	3
E richness	2	1
P richness	0	1
T richness	1	1
Long-lived	2	1
Sensitive richness	0	1
%tolerant	39.05%	3
%predators	17.14%	3
Clinger richness	2	1
%dominance (3)	42.86%	5
TOTAL SCORE	20	40%

MONTANA DEQ INDICES (Bukantis 1998)				
METRIC	VALUE	Plains Ecoregions	Valleys and Foothills Ecoregions	Mountain Ecoregions
Taxa richness	22	2	2	1
EPT richness	3	1	0	0
Biotic Index	7.45	0	0	0
%Dominant taxon	17.14%	3	3	3
%Collectors	54.29%	3	3	3
%EPT	4.76%	0	0	0
Shannon Diversity	2.82	2		
%Scrapers + Shredder	18.10%	2	1	0
Predator taxa	5	2		
%Multivoltine	30.48%	3		
%H of T	0.00%		3	
TOTAL SCORES	18	12		7
PERCENT OF MAXIMUM	60.00	50.00		33.33
IMPAIRMENT CLASS		SLIGHT	MODERATE	MODERATE



COMMUNITY TOLERANCES	
Sediment tolerant taxa	2
Percent sediment tolerant	13.33%
Sediment sensitive taxa	0
Percent sediment sensitive	0.00%
Metals tolerance index (McGuire)	3.08
Cold stenotherm taxa	0
Percent cold stenotherms	0.00%

Montana Valleys and Foothills revised index (Bollman 1998)		
Percent max.	Impairment class	SEVERE
11.11%		

HABITUS MEASURES	
Hemoglobin bearer richness	3
Percent hemoglobin bearers	14.29%
Air-breather richness	0
Percent air-breathers	0.00%
Burrower richness	1
Percent burrowers	1.90%
Swimmer richness	6
Percent swimmers	13.33%

Montana Plains ecoregions metrics (Bramblett and Johnson 2002)			
Riffle	Pool		
EPT richness	3	E richness	2
Percent EPT	4.76%	T richness	1
Percent Oligochaetes and Leeches	18.10%	Percent EPT	4.76%
Percent 2 dominants	30.48%	Percent non-insect	52.38%
Filterer richness	2	Filterer richness	2
Percent intolerant	0.00%	Univoltine richness	13
Univoltine richness	13	Percent supertolerant	60.00%
Percent clingers	11.43%		
Swimmer richness	6		

Aquatic Invertebrate Taxonomic Data

Site Name PETERSON RANCH MS5

Date Collected 8 /12/2004

Order	Family	Taxon	Count	Percent	Unique	BI	FFG
Amphipoda	Gammaridae	<i>Gammarus</i>	5	4.24%	Yes	4	SH
	Talitridae	<i>Hyaletta</i>	7	5.93%	Yes	8	CG
Basommatophora	Lymnaeidae	Lymnaeidae	2	1.69%	No	6	SC
		<i>Stagnicola</i>	1	0.85%	Yes	6	SC
	Physidae	Physidae	1	0.85%	Yes	8	SC
	Planorbidae	<i>Gyraulus</i>	17	14.41%	Yes	8	SC
Coleoptera	Dytiscidae	<i>Rhantus</i>	1	0.85%	Yes	5	PR
	Hydrophilidae	<i>Tropisternus</i>	1	0.85%	Yes	5	PR
Diplostraca		Cladocera	13	11.02%	Yes	8	CF
Diptera	Chironomidae	<i>Pseudochironomus</i>	4	3.39%	Yes	5	CG
		<i>Tanytarsus</i>	2	1.69%	Yes	6	CF
Ephemeroptera	Baetidae	<i>Callibaetis</i>	2	1.69%	Yes	9	CG
	Caenidae	<i>Caenis</i>	1	0.85%	Yes	7	CG
Haplotaxida	Tubificidae	Tubificidae	2	1.69%	Yes	10	CG
Heteroptera	Corixidae	<i>Hesperocorixa</i>	1	0.85%	Yes	10	PH
	Notonectidae	<i>Notonecta</i>	1	0.85%	Yes	5	PR
Odonata	Coenagrionidae	Coenagrionidae	34	28.81%	No	7	PR
		<i>Enallagma</i>	17	14.41%	Yes	7	PR
	Libellulidae	Libellulidae	6	5.08%	Yes	9	PR
Grand Total			118				

Aquatic Invertebrate Data Summary

Project ID: MDT04LW
STORE Station ID:
Station Name: PETERSON RANCH MSS

Activity ID:
Sample Date: 8/12/2004

Sample type	
SUBSAMPLE TOTAL ORGANISMS	118
Portion of sample used	50.00%
Estimated number in total sample	236
Conversion factor	2,690
Estimated number in 1 square meter	317
Sampling effort	
Habitat type	
EPT abundance	3
Taxa richness	17
Number EPT taxa	2
Percent EPT	2.54%

DOMINANCE		
TAXON	ABUNDANCE	PERCENT
Coenagrionidae	34	28.81%
Gvraulius	17	14.41%
Enallagma	17	14.41%
Cladocera	13	11.02%
Hyalidella	7	5.93%
SUBTOTAL 5 DOMINANTS		
	88	74.58%
Libellulidae	6	5.08%
Gammarus	5	4.24%
Pseudochironomus	4	3.39%
Tubificidae	2	1.69%
Lymanaeidae	2	1.69%
TOTAL DOMINANTS		
	107	90.68%

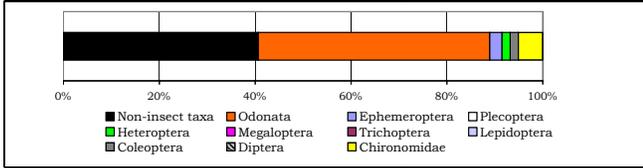
TAXONOMIC COMPOSITION				TAXONOMIC RATIOS			
GROUP	PERCENT	ABUNDANCE	#TAXA	METRIC	VALUE		
Non-insect taxa	40.68%	48	8	EPT/Chironomidae	0.50		
Odonata	48.31%	57	3	Baetidae/Ephemeroptera	0.67		
Ephemeroptera	2.54%	3	2	Hydrovsvchidae/Trichopt	#DIV/0!		
Plecoptera	0.00%	0	0				
Heteroptera	1.69%	2	2				
Megaloptera	0.00%	0	0				
Trichoptera	0.00%	0	0				
Lepidoptera	0.00%	0	0				
Coleoptera	1.69%	2	2				
Diptera	0.00%	0	0				
Chironomidae	5.08%	6	2				

TOLERANCE/CONDITION INDICES		
METRIC	VALUE	SCORE
Community Tolerance Quotient (CTQa)		98.18
Hilsenhoff Biotic Index		7.25

DIVERSITY			
METRIC	VALUE		
Shannon H (log)			3.23
Shannon H (log2)			2.24
Margalef D			3.77
Simpson D			0.14
Evenness			0.12

VOLUNTINISM			
TYPE	ABUNDANCE	# TAXA	PERCENT
Multivoltine	21	4	17.80%
Univoltine	89	12	75.42%
Semivoltine	8	3	6.78%

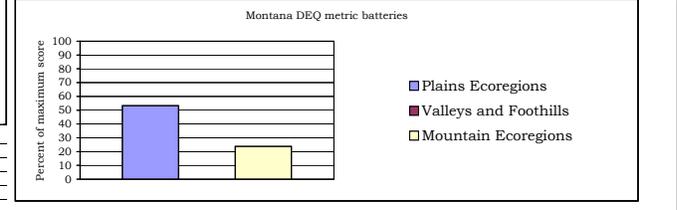
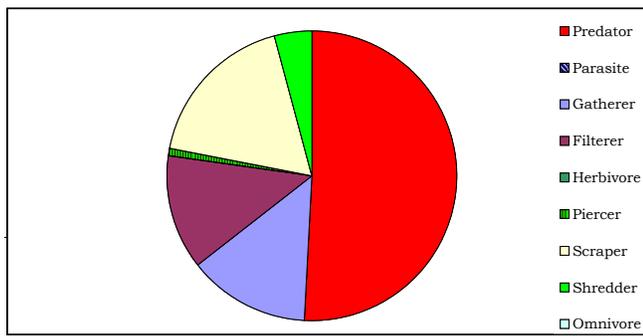
TAXA CHARACTERS		
#TAXA	PERCENT	
Tolerant	10	60.17%
Sensitive	0	0.00%
Clinger	1	1.69%



BIOASSESSMENT INDICES		
B-IBI (Karr et al.)		
METRIC	VALUE	SCORE
Taxa richness	17	1
E richness	2	1
P richness	0	1
T richness	0	0
Long-lived	3	3
Sensitive richness	0	1
%tolerant	60.17%	1
%predators	50.85%	5
Clinger richness	1	1
%dominance (3)	57.63%	3
TOTAL SCORE		18
MONTANA DEQ INDICES (Bukantis 1998)		36%

FUNCTIONAL COMPOSITION				FUNCTIONAL RATIOS			
GROUP	PERCENT	ABUNDANCE	#TAXA	METRIC	VALUE		
Predator	50.85%	60	6	Scraper/Filterer	1.40		
Parasite	0.00%	0	0	Scraper/Scraper + Filterer	0.58		
Gatherer	13.56%	16	5				
Filterer	12.71%	15	2				
Herbivore	0.00%	0	0				
Piercer	0.85%	1	1				
Scraper	17.80%	21	4				
Shredder	4.24%	5	1				
Omnivore	0.00%	0	0				
Unknown	0.00%	0	0				

MONTANA DEQ INDICES (Bukantis 1998)				
METRIC	VALUE	Plains Ecoregions	Valleys and Foothills Ecoregions	Mountain Ecoregions
Taxa richness	17	1	1	0
EPT richness	2	0	0	0
Biotic Index	7.25	0	0	0
%Dominant taxon	28.81%	3	3	2
%Collectors	26.27%	3	3	3
%EPT	2.54%	0	0	0
Shannon Diversity	2.24	1		
%Scrapers +Shredder	22.03%	2	2	0
Predator taxa	6	3		
%Multivoltine	17.80%	3		
%H of T	#DIV/0!		#DIV/0!	
TOTAL SCORES	16	#DIV/0!	5	
PERCENT OF MAXIMUM	53.33	#DIV/0!	23.81	
IMPAIRMENT CLASS	SLIGHT	#DIV/0!	MODERATE	



COMMUNITY TOLERANCES	
Sediment tolerant taxa	4
Percent sediment tolerant	18.64%
Sediment sensitive taxa	0
Percent sediment sensitive	0.00%
Metals tolerance index (McGuire)	2.96
Cold stenotherm taxa	0
Percent cold stenotherms	0.00%

Montana Valleys and Foothills revised index (Bollman 1998)			
Percent max.	11.11%	Impairment class	SEVERE
Montana Plains ecoregions metrics (Bramblett and Johnson 2002)			
Riffle		Pool	
EPT richness	2	E richness	2
Percent EPT	2.54%	T richness	0
Percent Oligochaetes and Leeches	1.69%	Percent EPT	2.54%
Percent 2 dominants	43.22%	Percent non-insect	40.68%
Filterer richness	2	Filterer richness	2
Percent intolerant	0.00%	Univoltine richness	12
Univoltine richness	12	Percent supertolerant	41.53%
Percent clingers	1.69%		
Swimmer richness	5		

HABITUS MEASURES	
Hemoglobin bearer richness	4
Percent hemoglobin bearers	20.34%
Air-breather richness	2
Percent air-breathers	1.69%
Burrower richness	1
Percent burrowers	3.39%
Swimmer richness	5
Percent swimmers	5.08%

Appendix G

REVEGETATION

*MDT Wetland Mitigation Monitoring
Peterson Ranch
Hall, Montana*

24. SEEDING



A. Description

This work consists of revegetating areas shown on the plans and other areas disturbed during construction. Seeding Area No. 1 is a native seed mix to be used in all non-wetland (dry) areas. Seeding Area No. 2 is a transitional seed mix to be used in wet and semi-wet areas. All work is to be conducted in accordance with Section 610 of the Standard Specifications.

B. Construction Requirements

1. Schedule. Drill seed only between October 1 and May 15. Broadcast seeding is acceptable between April 1 and May 15. Double seeding rate for broadcast seeding.

C. Materials

1. Seeding Area No. 1

<u>Species</u>	<u>Kgs(lbs) per Hectare (Acre)</u>
Revenue slender wheatgrass	1.0 (1.0)
Rosana western wheatgrass	6.5 (6.0)
Lodorm green needlegrass	3.5 (3.0)
Sherman big bluegrass	2.0 (2.0)
Magnar Great Basin wildrye	4.5 (4.0)

2. Seeding Area No. 2

<u>Species</u>	<u>Kgs(lbs) per Hectare (Acre)</u>
Revenue slender wheatgrass	1.0 (1.0)
Rosana western wheatgrass	7.5 (7.0)

January 1999

Shoshone creeping wildrye	4.5 (4.0)
Western mannagrass	1.0 (1.0)
American sloughgrass	1.0 (1.0)
Blatic rush	0.1 (0.1)
Bluejoint reedgrass	0.1 (0.1)

25. PLANTING

A. Description

This work includes collecting, preparing, and planting live cuttings from suitable willow species resident within the Flint Creek floodplain.

B. Construction Requirements

1. Schedule

Collect and plant cuttings when the ground is ice-free and while the whole plants are dormant. This will typically be in late fall after leaf-drop (October-November), or early spring before bud-break (March-May).

2. Quality Assurance

Supplier or installation contractor is to have not less than three years of experience in successfully collecting and installing wetland plant material.

3. Selection

Select cuttings from the list of suitable species provided below. Identification of willow species is to be made by a qualified agronomist or biologist supervising the project. Select young, green wood (1-3 years). Do not use suckers (<1 year). Choose branches that are 13-25 millimeters (0.5-1.0 inches) in diameter and 900-1800 millimeters (3-6 feet) in length. Select branches that will not overly affect the health and appearance of the parent plant when removed. Do not remove more than 25% of the branches from any given individual.

4. Preparation

Trim all side branches of the cutting to a single stem. Cut the tip where the cutting becomes less than 13 millimeters (0.5 inches). Cut the bottom of the cutting at a 45 degree angle to assist in planting and identification of the bottom end. Label each cutting with color-coded flagging or paint to identify species. Soak cuttings in water for at least 24 hours prior to planting.

5. Storage

Cuttings may be stored up to two weeks wrapped in burlap and bailing twine and soaked in water. Store vertically and soak the lower 450-600 millimeters (18-24 inches) of the stems. Do not submerge the entire cutting. If it is necessary to store cuttings for longer periods, store vertically in a dry, well ventilated, dark, and cool (35-50 deg. F) without freezing. Keep cuttings in moist (not soaked), fungus-free sawdust. At no time should the cuttings be spread out on the ground or exposed to sun and/or wind.

6. Planting

Plant cuttings in small colonies of 8-10 plants each in the locations shown on the plans. Space colonies at 8-10 meters (26-33 feet) apart. Space individual cuttings at 300-900 millimeters (1-3 feet) apart.

Insert cuttings in the ground so that the bottom is between 50 and 150 millimeters (2-6 inches) below the water table throughout the growing season. Insert cuttings by hand or with a rubber mallet where possible. If the soil is rocky or gravelly, use a rod or rebar stake to create a hole. The use of a shovel or other large tools should be avoided. If shoveling is necessary, the soil should be well tamped to insure good contact between the cutting and the soil.

Cleanly clip the top of the cutting so that at least 3/4 of the length of the stem is below ground, and 3-4 healthy buds are above ground. A minimum of 200 millimeters (8 inches) should remain above ground. Clip any portion of the top end that is deformed by installation with a rubber mallet.

C. Materials

The following species are suitable for cuttings and can be found within the project site. Obtain cuttings on-site or from other off-site locations within the Flint Creek floodplain. Obtain permission from landowners prior to collecting cuttings on private property.

Suitable Cutting Species

Peach-Leaved Willow	<i>Salix amygdaloides</i>
Sandbar Willow	<i>Salix exigua</i>
Bebb's Willow	<i>Salix bebbiana</i>
Drummond Willow	<i>Salix drummondiana</i>
Yellow Willow	<i>Salix lutea</i>

Other willow species native to the Flint Creek floodplain may be substituted upon approval.

D. Method of Measurement

Willow cuttings will be measured as each, including collection, storage, planting, and installation in place.

E. Basis of Payment

Payment for the completed and accepted quantities will be made under the following:

<u>Pay Item</u>	<u>Pay Unit</u>
Bareroot Stock	Each
Willow Cuttings	Each

Such price and payment constitutes full compensation for all labor, equipment, tools, materials and incidentals necessary to complete the item.