MONTANA DEPARTMENT OF TRANSPORTATION WETLAND MITIGATION MONITORING REPORT: YEAR 2001

Lawrence Park
Kalispell, Montana

Prepared for:

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

Prepared by:

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

July 2002

Project No: 130091.008

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1.0 INTRODUCTION

The Lawrence Park mitigation site was constructed in 1998 to mitigate wetland impacts associated with Montana Department of Transportation (MDT) roadway projects in the Kalispell area including Ashley Creek Road and several bridges. The site is located in Lawrence Park, which is one mile north of downtown Kalispell and adjacent to the Stillwater River (**Figure 1**). The site consists of a pond that was excavated below the depth of the water table within an abandoned oxbow of the Stillwater River floodplain. Water is provided by both surface and groundwater. Prior to construction, the pond site was used as a refuse site adjacent to a reclaimed gravel quarry.

The site was designed to mitigate for function and value of wetlands impacted by MDT roadway projects and to replace wetland acreage at a 1:1 ratio. A function and value assessment was not conducted prior to construction as no wetlands existed on the site. The project goal was to create up to two acres of wetland (Worrall pers. comm.).

2.0 METHODS

2.1 Monitoring Dates and Activities

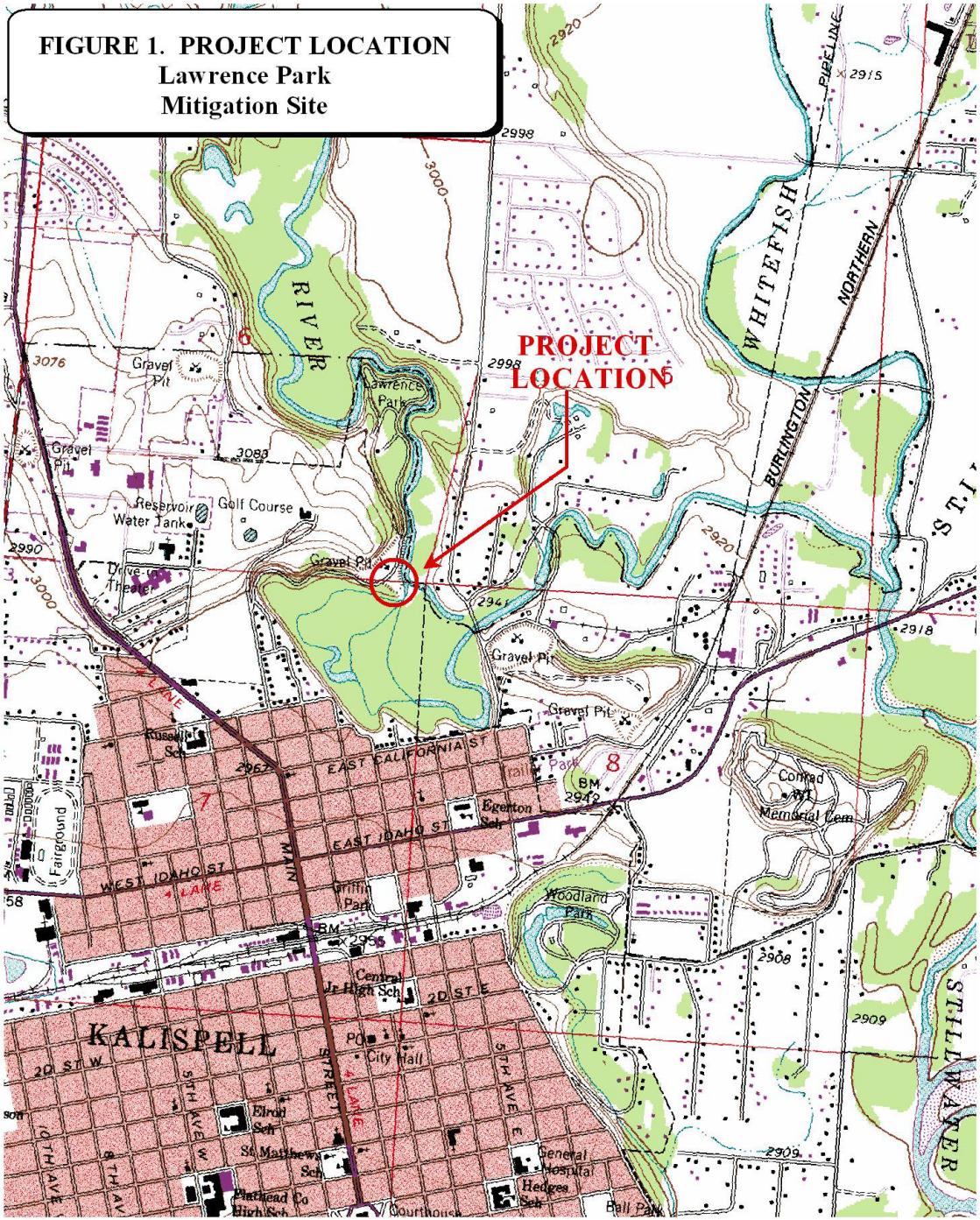
The site was visited on May 8th (spring) and July 25th and August 25th (mid-season) 2001. The primary purpose of the spring visit was to conduct a bird/general wildlife reconnaissance. The May period was selected for the spring visit because monitoring between mid-May and early June is likely to detect migrant as well as early nesting activities for a variety of avian species, as well as maximizing the potential for amphibian detection. In Montana, most amphibian larval stages are present by early June.

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

2.2 Hydrology

Hydrologic indicators were evaluated at the site during the mid-season visit. Wetland hydrology indicators were recorded using procedures outlined in the Army Corps 1987 Wetland Delineation Manual. Hydrology data was recorded on COE Routine Wetland Delineation Data Forms (**Appendix B**).

FIGURE 1. PROJECT LOCATION
Lawrence Park
Mitigation Site



PROJECT #: 130091.008
DATE: MAY 2001
LOCATION:
PROJECT MANAGER: B. DUTTON
DRAWN BY: B. NOECKER

LAND & WATER CONSULTING, INC.

1120 CEDAR PO BOX 8254 MISSOULA, MT 59807

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

2.3 Vegetation

General dominant species-based vegetation community types (e.g., *Typha latifolia/Eleocharis palustris*) were delineated on an aerial photograph during the mid-season visit. Standardized community mapping was not employed as many of these systems are geared towards climax vegetation and may not reflect yearly changes. Estimated percent cover of the dominant species in each community type was listed on the site monitoring form (**Appendix B**). A vegetation transect was not established at this site. A comprehensive plant species list for the site was compiled. Woody species were not planted at this mitigation site. Consequently, no monitoring relative to the survival of such species was conducted.

2.4 Soils

Soils were evaluated during the mid-season visit according to 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 Form (**Appendix B**). The most current terminology used by NRCS was used to describe hydric soils (USDA 1998).

2.5 Wetland Delineation

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

2.6 Mammals and Herptiles

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

2.7 Birds

Bird observations were recorded during each visit. No formal census plots, spot mapping, point counts, or strip transects were conducted. During the spring visit, observations were recorded and are shown in **Appendix B**. During the mid-season visit, bird observations were recorded according to the established protocol while conducting the other monitoring activities. During the second visit, observations were categorized by species, activity code, and general habitat association (see field and office data forms in **Appendix B**).

2.8 Macroinvertebrates

Macroinvertebrate sampling was not conducted during the 2001 monitoring year due to the lack of sampling equipment. Sampling will be conducted during the spring and summer of 2002 and an addendum prepared. Sampling will be conducted according to the established protocol provided in **Appendix D**.

2.9 Functional Assessment

A functional assessment form was completed for the site using the 1999 MDT Montana Wetland Assessment Method. Field data necessary for this assessment were generally collected during each mid-season site visit. An abbreviated field data sheet for the 1999 MDT Montana Wetland Assessment Method was compiled to facilitate rapid collection of field information (**Appendix B**). The remainder of the functional assessment was completed in the office.

2.10 Photographs

Photographs were taken during the mid-season visit showing the current land use surrounding the site and the monitored area. Each photograph point location was recorded with a resource grade GPS. The approximate location of photo points is shown on **Figure 2**, **Appendix A**. All photographs were taken using a 50 mm lens. A description and compass direction for each photograph was recorded on the wetland monitoring form.

2.11 GPS Data

During the 2001 season, survey points were collected with a resource grade GPS unit at all photograph locations. Wetland boundaries were also surveyed with a resource grade GPS unit.

2.12 Maintenance Needs

Bird boxes were inspected and appeared to be in good condition.

3.0 RESULTS

3.1 Hydrology

Inundation was present in the pond and was estimated to be 70 % of the mitigation site (see **Figure 3**, **Appendix A**). Emergent vegetation was observed throughout the inundated areas. The water table was depressed relative to previous years due to droughty conditions. According to the Western Regional Climate Center, Kalispell yearly precipitation totals for 2000 (10.5 inches) and 2001 (12.47 inches) were 66 and 79 percent, respectively, of the total annual mean precipitation (15.81 inches) in this area. Groundwater wells are not located on the site.

3.2 Vegetation

Vegetation species identified on the site are presented in **Table 1** and on the attached data form. Three community types were identified and mapped on the mitigation area (**Figure 3**, **Appendix A**). These included Type 1: *Tanacetum vulgare/Artemesia absinthium/Elymus repens*, Type 2: *Typha latifolia/Eleocharis palustris*, Type 3: *Acer negundo/Cornus sericea* overstory with *Agrostis stolonifera/Elymus repens* understory. Dominant species within each of these communities are listed on the attached data form (**Appendix B**).

Type 1 occurs in the upland and consists primarily of *Tanacetum vulgare* with an even distribution of *Artemesia absinthium* and *Elymus repens*. This community type is weedy and included seven noxious weeds including *Arctium minus* (common burdock), *Artemesia absinthium* (common wormwood), *Carduus nutans* (musk thistle), *Centaurea maculosa* (spotted knapweed), *Chrysanthemum leucanthemum* (oxeye daisy), *Cirsium arvense* (Canada thistle), and *Convolvulus arvensis* (field morning glory). Native grasses, which were planted at the time of construction are present, but are not dominant. Type 2 is present in the inundated area and is dominated by *Typha latifolia*. Type 3 is present on the upland "berm" and is composed of a distinct overstory of *Acer negundo* with *Cornus sericea* and an understory composed of *Agrostis stolonifera* with *Elymus repens.*

Table 1: ***2001 Lawrence Park Vegetation Species List***

Species	Region 9 (Northwest) Wetland Indicator
Acer glabrum	FAC
Acer negundo	FAC+
Achillea millefolium	FACU
Agrostis stolonifera	FAC+
Alyssum alyssoides	UPL
Alnus incana	FACW
Arabis glabra	UPL
Arctium minus	UPL Noxious common burdock
Artemesia absinthium	UPL Noxious common wormwood
Betula papyrifera	FACU
Bromus inermis	UPL
Carduus nutans	UPL Noxious musk thistle
Carex flava	OBL
Carex stipata	
Carex utriculata	OBL
Centaurea maculosa	UPL Noxious spotted knapweed
Chenopodium album	FAC
Chrysanthemum leucanthemum	UPL Noxious oxeye daisy
Cirsium arvense	FAC- Noxious Canada thistle
Clematis occidentalis	

Table 1: ***2001 Lawrence Park Vegetation Species List, continued***

Conium maculatum	FACW-
Convolvulus arvensis	UPL Noxious field morning-glory
Cornus sericea (stolonifera)	FACW
Cynoglossum officinale	FACU
Dactylis glomerata	FACU
Deschampsia cespitosa	FACW
Eleocharis palustris	OBL
Elymus repens	FACU
Elymus trachycaulus	FAC-
Epilobium ciliatum	FACW-
Equisetum arvense	FAC
Festuca idahoensis	FACU
Galium aparine	FACU
Glyceria elata	FACW+
Juncus nevadensis	FACW
Lemna minor	OBL
Medicago lupulina	FAC
Melilotus alba	FACU
Melilotus officinale	FACU
Nuphar lutea	OBL
Phalaris arundinacea	FACW
Phleum pratense	FAC-
Poa compressa	FACU+
Poa palustris	FAC
Populus balsamifera	FAC
Potentilla anserina	OBL
Pseudoroegneria spicata	
Ranunculus aquatilis	OBL
Robinia pseudo-acacia	FACU-
Rosa woodsii	FACU
Rubus idaeus	FACU
Rumex crispus	FACW
Salix alba	FACW
Salix bebbiana	FACW
Salix drummondiana	FACW
Salix spp. (too young to key)	
Scirpus acutus	OBL
Silene latifolia	
Solanum dulcamara	FAC
Sparganium emersum	OBL
Symphoricarpos albus	FACU
Tanacetum vulgare	NI
Taraxacum officinale	FACU
Thlaspi arvense	NI
Tragopogon dubius	UPL
Trifolium hybridum	FACU+
Trifolium repens	FACU+
Typha latifolia	OBL
Verbascum thapsus	UPL

3.3 Soils

According to the Upper Flathead Valley Area soil survey (Soil Conservation Service 1960), soils in the mitigation site are classified as poorly drained alluvial land (Aa). This soil type has poor surface and internal drainage, mottling in the subsurface and typically consists of loam or silty loam. This soil type is not necessarily indicative of soil at the mitigation site, since the site is a reclaimed gravel quarry and repository.

Two test pits were described using the ACE routine wetland monitoring form. TP1, located adjacent to the pond, consisted of 2-inches of organic detritus overlying a mottled loam. Hydric

soil characteristics are fairly well developed with distinct gleying. TP2 was located on the upland slope and consisted of a loam from 0 to 5-inches (7.5 YR 2.5/2) and a gravelly loam below 5-inches (7.5 YR 3/2). Hydric soil characteristics were not observed in TP2.

3.4 Wetland Delineation

Delineated wetland boundaries are illustrated on **Figure 3**. Completed wetland delineation forms are included in **Appendix B**. Soils, vegetation, and hydrology are discussed in preceding sections. Approximately 1.44 acres of wetland were delineated within the defined monitoring area. However, 0.397 acre ("Wetland B" on **Figure 3, Appendix A**) was pre-existing. The project has resulted in a net gain of 1.036 wetland acres on the mitigation site.

The original mitigation goal was to create up to two acres of wetland. There is the likelihood that some additional wetland acreage will be gained with normal precipitation and groundwater conditions; however, based on the configuration of the current monitoring limits the wetland area is not likely to expand beyond two acres.

3.5 Wildlife

Wildlife species, or evidence of wildlife, observed on the site during 2001 and previous monitoring efforts are listed in **Table 2**. Specific evidence observed, as well as activity codes pertaining to birds are provided on the completed monitoring form in **Appendix B**. Two mammal and numerous bird species were noted at the mitigation site.

Table 2: ***Fish and Wildlife Species Observed at the Lawrence Park Mitigation Site***

FISH none	
AMPHIBIANS none	
REPTILES Painted Turtle (*Chrysemys picta*)	
BIRDS American goldfinch (*Spinus tristis*) American robin (*Turdus migratorius*) Bank swallow (*Riparia riparia*) Chestnut-sided warbler (*Dendroica pensylvanica*) Cliff swallow (*Petrochelidon pyrrhonota*) Common goldeneye (*Bucephala clangula*) *Eared grebe (*Podiceps caspicus*)	Great blue heron (*Ardea herodias*) *Mallard (*Anas platyrhynchos*) Pine siskin (*Spinus pinus)* *Red-winged Blackbird (*Agelaius phoeniceus)* Solitary sandpiper (*Tringa solitaria*) Song sparrows (*Melospiza melodia*) Wood Duck (*Aix sponsa*) Yellow-headed blackbird (*Xanthocephalus xanthocephalus*)
MAMMALS *Beaver (*Castor Canadensis*) Raccoon (*Procyon lotor*) Muskrat (*Ondatra zibethicus*)	Deer (*Odocoileus* sp.)

* asterisk indicates animals observed during the 2001 monitoring season; additional species were historically observed by MDT staff.

3.6 Macroinvertebrates

Macroinvertebrate sampling was not conducted due to lack of sampling equipment. Macroinvertebrate sampling will be conducted in July of 2002 and an addendum prepared.

3.7 Functional Assessment

Completed functional assessment forms are presented in **Appendix B**. Functional assessment results are summarized in **Table 3**. The site was evaluated as a single assessment area and rated as a Category II wetland due to a high wildlife habitat rating. Wildlife habitat, water storage, production export, groundwater recharge/discharge and recreation / education potential are the primary functions of the site. New wetland at the site provides a total of 6.63 functional units.

3.8 Photographs

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

3.9 Maintenance Needs/Recommendations

The site was generally in good condition during the spring and mid-season visits. However, MDT may wish to implement weed control measures in vegetation Type 1, which contained several noxious weed species.

It may be possible to gain additional wetland acreage via excavation in adjacent "finger" upland areas along the southeast and southwest wetland borders. However, upland shrub communities are already established in these areas and provide a measure of wildlife habitat. Additionally, such excavation could be extremely costly and not result in substantial gain (estimated at less than 0.2 acre).

3.10 Current Credit Summary

Approximately 1.44 acres of wetland are currently present within the defined monitoring area. However, 0.397 acre ("Wetland B" on **Figure 3, Appendix A**) was pre-existing. The project has resulted in a net gain of 1.036 wetland acres on the mitigation site. Based on pre-construction goals, up to two acres of wetland were to be created. The new wetland provides approximately 6.63 wetland functional units.

Table 3: ***Summary of 2001 Wetland Function/Value Ratings and Functional Points [1] at the Lawrence Park Mitigation Project***

Function and Value Parameters From the 1999 MDT Montana Wetland Assessment Method	Wetland Numbers
Listed/Proposed T&E Species Habitat	Low (0.3)
MNHP Species Habitat	Low (0.1)
General Wildlife Habitat	High (0.9)
General Fish/Aquatic Habitat	NA
Flood Attenuation	Low (0.1)
Short and Long Term Surface Water Storage	High (0.8)
Sediment, Nutrient, Toxicant Removal	High (1.0)
Sediment/Shoreline Stabilization	NA
Production Export/Food Chain Support	High (0.8)
Groundwater Discharge/ Recharge	High (1.0)
Uniqueness	Mod (0.4)
Recreation/Education Potential	High (1)
Actual Points/Possible Points	6.4 / 10
% of Possible Score Achieved	64%
Overall Category	II
Total Acreage of Assessed Wetlands within Easement	1.44 ac (0.397 pre-existing in monitoring area)
Functional Units in Monitoring Area (total acreage x actual points)	9.2 fu
Net Acreage Gain	1.036
Net Functional Unit Gain	6.63
Total Functional Unit "Gain"	6.63

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

4.0 REFERENCES

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USDA, NRCS Fort Worth, TX.

Werner, K. Herpetologist, Salish-Kootenai Community College. Pablo, MT. May 1998 instructional presentation (per Jeff Berglund).

Worrall, M. Engineer, Carter & Burgess, Inc. Salt Lake City, Utah. July 23, 2002 telephone conversation.

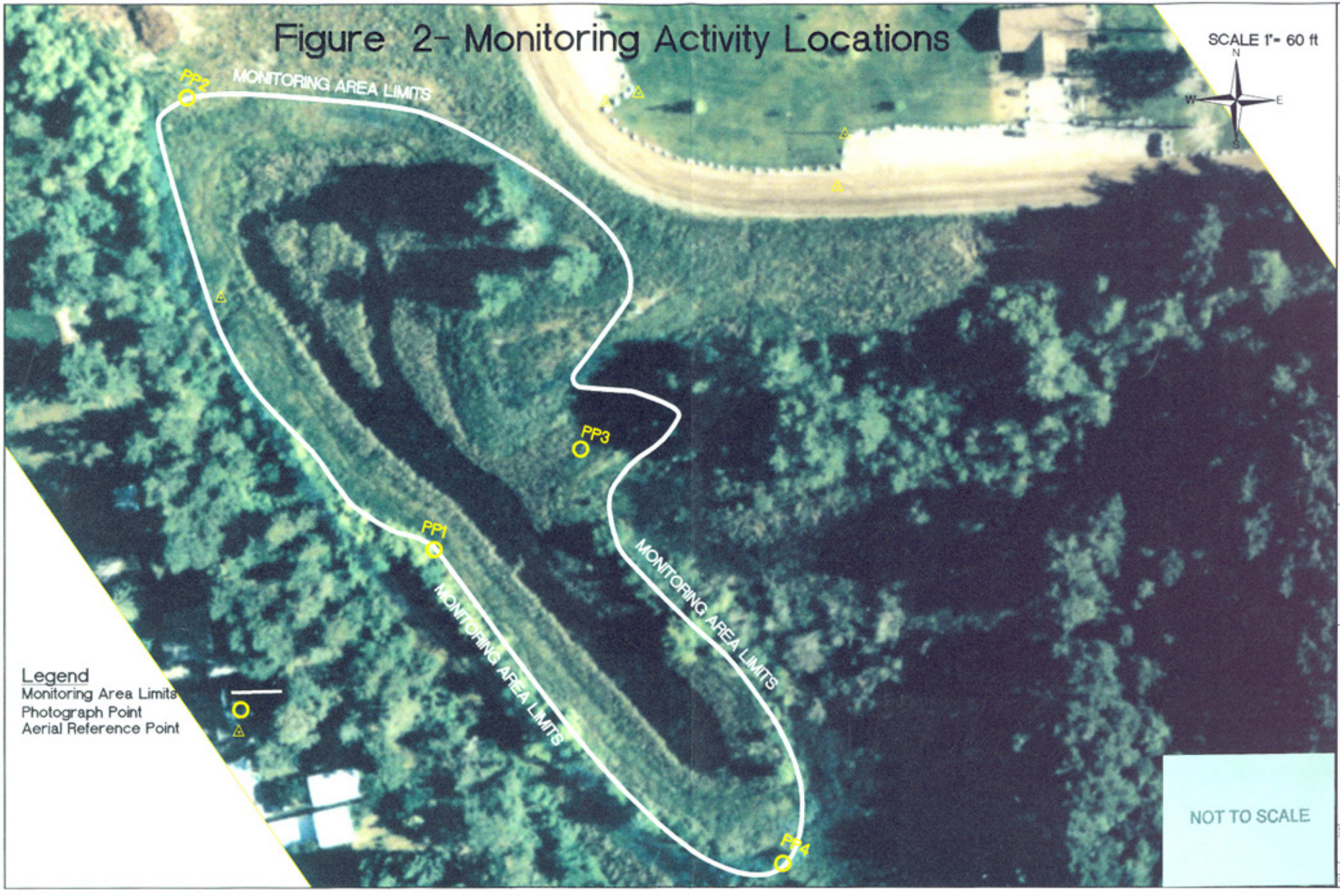
Appendix A

FIGURES 2 - 3

MDT Wetland Mitigation Monitoring
Lawrence Park
Kalispell, Montana

LAND & WATER

Figure 2- Monitoring Activity Locations



PROJECT NAME
MDT Lawrence Park Wetland Mitigation
DRAWING TITLE
Monitoring Activity Locations

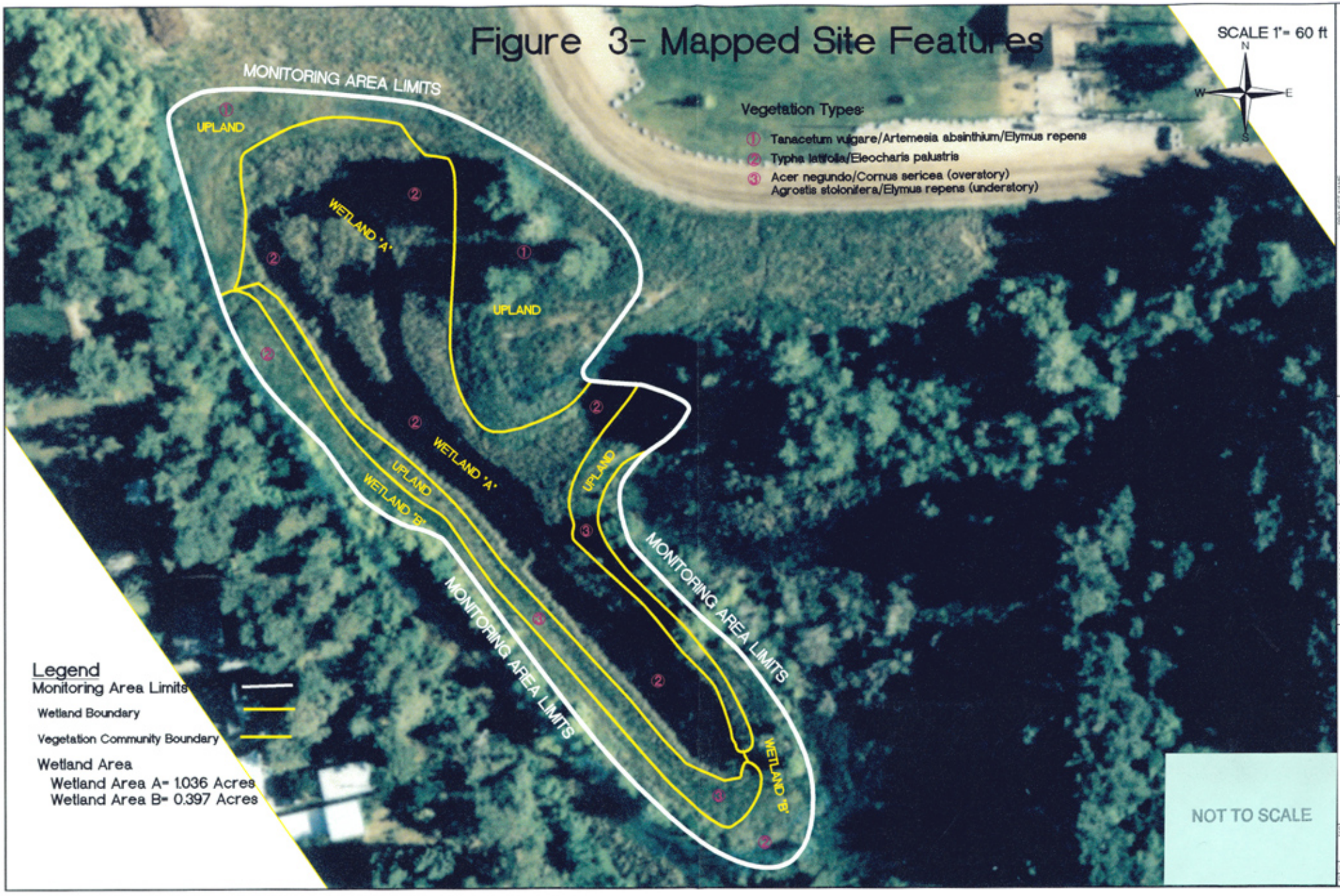
PROJ. NO. 130091.008
FILE NAME TASK8BASE.dwg
SCALE 1"= ?ft
LOCATION Lawrence Park

DRAWN RA
CHECKED
APPV'D BD
PROJ. MGR BD

LAND & WATER CONSULTING, INC.
P.O. BOX 4294
Missoula, MT 59807

SHEET NUMBER
2 OF
REV -
DATE

Figure 3- Mapped Site Features



PROJECT NAME: MDT Lawrence Park Wetland Mitigation

DRAWING TITLE: Mapped Site Features

DRAWN: RA
CHECKED:
APPV'D: BD
PROJ MGR: BD

PROJ NO: 130091.008
FILE NAME: TASK6BASE.dwg
SCALE: 1"= 7ft.
LOCATION: Lawrence Park

LAND & WATER CONSULTING, INC.
P.O. BOX 8204
Missoula, MT 59807

SHEET NUMBER
3 of

REV: -
DATE:

Appendix B

COMPLETED 2001 WETLAND MITIGATION SITE MONITORING FORM
COMPLETED 2001 BIRD SURVEY FORMS
COMPLETED 2001 WETLAND DELINEATION FORMS
COMPLETED 2001 FIELD AND FULL FUNCTIONAL ASSESSMENT FORMS

MDT Wetland Mitigation Monitoring
Lawrence Park
Kalispell, Montana

LAND & WATER

DRAFT - MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: Lawrence Park Project Number: B0091.008 Assessment Date: 8/24/01
Location: Lawrence Park MDT District: _____ Milepost: _____
Legal description: T____ R____ Section____ Time of Day: afternoon
Weather Conditions: Sunny, 80° Person(s) conducting the assessment: A. Kuhle
Initial Evaluation Date: 5/25/01 Visit #: 2 Monitoring Year: 2001 (1st yr)
Size of assessment area: _____ acres Land use surrounding wetland: Park and residential

HYDROLOGY

Surface Water

Inundation: Present X Absent____ Average depths: (est 4') ____ ft Range of depths: 0 - 6 ft
Assessment area under inundation: 70 %
Depth at emergent vegetation-open water boundary: ____ ft - all emergent
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.): _____

Groundwater

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

Well #	Depth	Well #	Depth	Well #	Depth

Additional Activities Checklist:

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

COMMENTS/PROBLEMS: _____

VEGETATION COMMUNITIES – LAWRENCE PARK

- uplan

Community No.: 1 Community Title (main species): Tanacetum vulgare/Artemesia absinthium/Elymus repens

Dominant Species	% Cover	Dominant Species	% Cover
Tanacetum vulgare	30%	Centaurea maculosa	5%
Artemesia absinthium	20%	Melilotus alba & Melilotus officinale	3% & 2%
Elymus repens	20%	Cirsium arvense	3%
Populus balsamifera	10%	Elymus trachycaulus	3%
Festuca idahoensis	10%	Pseudoroegneria spicata	3%
		Agrostis stolonifera	2%

COMMENTS/PROBLEMS: very weedy but appears to have been seeded with some native grasses

Community No.: 2 Community Title (main species): Typha latifolia/Eleocharis palustris

Dominant Species	% Cover	Dominant Species	% Cover
Typha latifolia	60%	Lemna minor	5%
Eleocharis palustris	30%	Equisetum arvense	5%
Nuphar lutea	10%	Scirpus acutus	5%
Glyceria elata	10%	Phalaris arundinacea	2%
Carex utriculata	8%	Carex stipata	2%
		Deschampsia cespitosa	2%
		Cirsium arvense	2%

COMMENTS/PROBLEMS: Cattail dominates community; rest of community is very patchy with certain species dominating particular areas of open water

Community No.: 3 Community Title (main species): Berm: Acer negundo/Cornus sericea overstory with Agrostis stolonifera/Elymus repens understory

Dominant Species	% Cover	Dominant Species	% Cover
Agrostis stolonifera	30%	Acer negundo	20%
Elymus repens	30%	Cornus sericea	15%
Tanacetum vulgare	10%	Betula occidentalis	10%
Cirsium arvense	10%	Betula papyrifera	8%
Centaurea maculosa	10%	Alnus incana	5%
Phalaris arundinacea	10%	Salix alba	5%

COMMENTS/PROBLEMS:

Additional Activities Checklist:

____Record and map vegetative communities on air photo

COMPREHENSIVE VEGETATION LIST – LAWRENCE PARK

Species	Vegetation Community Number(s)	Species	Vegetation Community Number(s)
Artemesia absinthium	1,3	Carex utriculata	2
Tanacetum vulgare	1,3	Equisetum arvense	2
Elymus repens	1,3	Deschampsia cespitosa	2,3
Cynoglossum officinale	1,3	Sparganium emersum	2
Taraxacum officinale	1,3	Salix bebbiana	2,3
Centaurea maculosa	1,3	Salix alba	2,3
Festuca idahoensis	1	Glyceria elata	2
Melilotus officinalis	1,3	Arabis glabra	3
Cirsium arvense	1,2,3	Eleocharis palustris	2
Agrostis stolonifera	1,2,3	Conium maculatum	2,3
Verbascum thapsus	1,3	Lemna minor	2
Rumex crispus	1,2	Ranunculus aquatilis	2
Carduus nutans	1,3	Nuphar lutea	2
Chenopodium album	1	Symphoricarpos albus	3
Galium aparine	1,3	Rosa woodsii	3
Thlaspi arvense	1,2	Solanum dulcamara	3
Robinia pseudo-acacia	1	Trifolium hybridum	3
Tragopogon dubius	1,3	Poa palustris	2
Populus balsamifera	1,2,3	Carex flava	2
Melilotus alba	1	Juncus nevadensis	2
Achillea millefolium	1	Bromus inermis	1,3
Medicago lupulina	1,3	Pseudoroegneria spicata	1
Alyssum alyssoides	1	Convolvulus arvensis	1
Trifolium repens	1	Elymus trachycaulus	1
Phleum pratense	1	Dactylis glomerata	3
Chrysanthemum leucanthemum	1,3	Clematis occidentalis	3
Silene latifolia	1	Acer glabrum	3
Typha latifolia	2	Betula occidentalis	3
Phalaris arundinacea	2,3	Linaria vulgaris	3
Salix drummondiana	2	Betula papyrifera	3
Potentilla anserina	2,3	Alnus incana	3
Scirpus acutus	2	Acer negundo	3
Epilobium ciliatum	2	Arctium minus	3
Carex stipata	2	Poa compressa	3
Cornus sericea	2,3	Rubus idaeus	3

Salix spp. (too young to key) 2

COMMENTS/PROBLEMS:

PLANTED WOODY VEGETATION SURVIVAL

Species	Number Originally Planted	Number Observed	Mortality Causes
N/A			

COMMENTS/PROBLEMS: _____

WILDLIFE

LAND & WATER B-5

BIRDS

Scientific Name	Common Name	Number Observed	Nesting or Breeding	Living on site	Feeding	Migrating
See revised form						

Were man made nesting structures installed: Yes____ No X Type:_____ How many?_____ Are the nesting structures being utilized: Yes____ No____ Do the nesting structures need repairs: Yes____ No____

MAMMALS AND HERPTILES

Species	Number Observed	Indirect indication of use			
		Tracks	Scat	Burrows	Other
Beaver - dam					X
Dog (probably domestic)		X			

Additional Activities Checklist:

_____Macroinvertebrate sampling (if required)

COMMENTS/PROBLEMS: _____

BIRD SURVEY - FIELD DATA SHEET

Page 1 of 1
Date: 5/8/01
Survey Time: afternoon

SITE:

Bird Species	Behavior	Habitat Type
eared grieb	L	OW
mallard	L	OW
Red winged blackbirds	F	UP

Bird Species	Behavior	Habitat Type

NOTES:

Behavior: BP - one of a breeding pair; BD-breeding display; F - foraging; FO - flyover; L - loafing; N - nesting
Habitat: AB - aquatic Bed; FO - forested; I - Island; MA - marsh; MF: Mud Flat; OW - open water;
SS - scrub-shrub; UP - upland buffer; WM - wet meadow

F:/clients/215/data/birddatasheets

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

Project/Site: Lawrence Park	Date: 8/25/01
Applicant/Owner: MDT Mitigation Site	County: Flathead
Investigator: A. Kuhle	State: MT
Do Normal Circumstances exist on the site: X Yes ___ No	Community ID: 2
Is the site significantly disturbed (Atypical Situation)? ___ Yes X No	Transect ID: N/A
Is the area a potential Problem Area?: ___ Yes X No	Plot ID: TP1 Wetland Pit
(If needed, explain on reverse.)	

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	Typha latifolia	H	OBL	9			
2				10			
3				11			
4				12			
5				13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 100%

Remarks: According to Mark Traxler, Typha latifolia was not dominant after construction and has grown in recently.

HYDROLOGY

Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 6 (in.)

Depth to Saturated Soil: 4 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- X Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- X FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks: Wetland hydrology

SOILS

Map Unit Name (Series and Phase): _____

Taxonomy (Subgroup): _____

Drainage Class: _____

Field Observations Confirm Mapped Type? ____ Yes ____ No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-2-4	A	7.5YR 2.5/2	N/A	N/A	loam
4>18	B	10YR 5/1	10YR 6/3	Distinct	loam
0-2	O		N/A	N/A	organic material

Hydric Soil Indicators:

- ____ Histosol
- ____ Histic Epipedon
- ____ Sulfidic Odor
- ____ Aquic Moisture Regime
- X Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ____ Concretions
- ____ High Organic Content in surface Layer in Sandy Soils
- ____ Organic Streaking in Sandy Soils
- ____ Listed on Local Hydric Soils List
- ____ Listed on National Hydric Soils List
- ____ Other (Explain in Remarks)

Remarks:

Wetland hydrology

WETLAND DETERMINATION

Hydrophytic Vegetation Present? X Yes ____ No

Wetland Hydrology Present? X Yes ____ No

Hydric Soils Present? X Yes ____ No

Is this Sampling Point Within a Wetland? X Yes ____ No

Remarks:

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

Project/Site: Lawrence Park	Date: 8/25/01
Applicant/Owner: MDT Mitigation Site	County: Flathead
Investigator: A Kuhle	State: MT
Do Normal Circumstances exist on the site: X Yes ___ No	Community ID: 1
Is the site significantly disturbed (Atypical Situation)? ___ Yes X No	Transect ID: N/A
Is the area a potential Problem Area?: ___ Yes X No	Plot ID: TP2 Upland Pit
(If needed, explain on reverse.)	

VEGETATION

	Dominant Plant Species	Stratum	Indicator		Dominant Plant Species	Stratum	Indicator
1	Tanacetum vulgare	H	NI	9			
2	Artemesia absinthium	H	UPL	10			
3	Elymus repens	H	FACU	11			
4				12			
5				13			
6				14			
7				15			
8				16			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-). 0%

Remarks: Upland; fairly weedy

HYDROLOGY

Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- ___ Aerial Photographs
- ___ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: >18 (in.)

Depth to Saturated Soil: >18 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 Inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- ___ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 Inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

No wetland hydrology

SOILS

Map Unit Name
(Series and Phase): _____
Taxonomy (Subgroup): _____

Drainage Class: _____
Field Observations
Confirm Mapped Type? ____ Yes ____ No

Profile Description:

Depth inches	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-5	A		7.5YR 2.5/2	NA	loam
5-8	B		7.5YR 3/2	NA	gravelly loam

Hydric Soil Indicators:

- ____ Histosol
- ____ Histic Epipedon
- ____ Sulfidic Odor
- ____ Aquic Moisture Regime
- ____ Reducing Conditions
- ____ Gleyed or Low-Chroma Colors
- ____ Concretions
- ____ High Organic Content in surface Layer in Sandy Soils
- ____ Organic Streaking in Sandy Soils
- ____ Listed on Local Hydric Soils List
- ____ Listed on National Hydric Soils List
- ____ Other (Explain in Remarks)

Remarks:

Not a hydric soil ~~[illegible]~~

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	* Yes	____ No	
Wetland Hydrology Present?	____ Yes	X No	
Hydric Soils Present?	____ Yes	X No	Is this Sampling Point Within a Wetland? ____ Yes X No

Remarks:

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

Location	Photo Frame #	Photograph Description	Compass Reading
A	# 1	From berm	
B	# 2		
C	# 3		
D	# 4		
E			
F			
G			
H			

COMMENTS/PROBLEMS: _____

GPS SURVEYING

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

Checklist:

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

COMMENTS/PROBLEMS: _____

WETLAND DELINEATION

At each site conduct the items on the checklist below:

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

COMMENTS/PROBLEMS: _____

FUNCTIONAL ASSESSMENT

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

See forms

COMMENTS/PROBLEMS: _____

MAINTENANCE

Were man-made nesting structures installed at this site? YES___ NO_X_
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_X_ NO____ (berm near outlet)
If yes, are the structures working properly and in good working order? YES_X_ NO___
If no, describe the problems below.

COMMENTS/PROBLEMS: _____

MDT WETLAND MONITORING – VEGETATION TRANSECT

LAND & WATER B-13

Site: N/A Date: _____ Examiner: _____ Transect # _____

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

Vegetation type 1:		
Length of transect in this type:		feet
Total Vegetative Cover:		

Vegetation type 2:		
Length of transect in this type:		feet
Total Vegetative Cover:		

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

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

LAND & WATER B-14

MDT WETLAND MONITORING – VEGETATION TRANSECT (back of form)

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

Indicator Class:
+ = Obligate
- = Facultative/Wet
0 = Facultative

Source:
P = Planted
V = Volunteer

N/A

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

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

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

Notes:

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

1. Project Name: Lawrence Park 2. Project #: 13009.008 Control #:

3. Evaluation Date: Mo. 8 Day 24 Yr. 01 4. Evaluator(s): A Kuhle 5. Wetlands/Site #(s) Lawrence Park

6. Wetland Location(s): i. Legal: T ____ N or S; R ____ E or W; S _____; T ____ N or S; R ____ E or W; S _____;
ii. Approx. Stationing or Mileposts: _____

iii. Watershed: 17010210 GPS Reference No. (if applies): _____
Other Location Information: N. end of Kalispell, W. of Stillwater River, Lawrence Park

7. a. Evaluating Agency: MDT;
b. Purpose of Evaluation:
1. ____ Wetlands potentially affected by MDT project
2. ____ Mitigation wetlands; pre-construction
3. X Mitigation wetlands; post-construction
4. ____ Other

8. Wetland size: (total acres) 1-2 (visually estimated) _____ (measured, e.g. by GPS [if applies])

9. Assessment area: (AA, tot., ac., see instructions on determining AA) 1-2 (visually estimated) _____ (measured, e.g. by GPS [if applies])

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

HGM Class	System	Subsystem	Class	Water Regime	Modifier	% of AA
Riverine	Palustrine	–	EM	H	Ex	65
Riverine	Palustrine	–	SS	C	Ex	35

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

11. Estimated relative abundance: (of similarly classified sites within the same Major Montana Watershed Basin, see definitions)
(Circle one) Unknown Rare Common Abundant
Comments:

12. General condition of AA:
i. Regarding disturbance: (use matrix below to determine [circle] appropriate response)

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

Comments: (types of disturbance, intensity, season, etc.): _____
ii. Prominent weedy, alien, & introduced species (including those not domesticated, feral): (list) _____

iii. Provide brief descriptive summary of AA and surrounding land use/habitat: Excavated wetland construction site adjacent to the Stillwater River within Lawrence Park, Kalispell.

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

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

Comments:

SECTION PERTAINING to FUNCTIONS & VALUES ASSESSMENT

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

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

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

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

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

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

14B. Habitat for plant or animals rated S1, S2, or S3 by the Montana Natural Heritage Program: (not including species listed in14A above)

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

Primary or critical habitat (**list species**)	D S	
Secondary habitat (**list species**)	D S	
Incidental habitat (**list species**)	D (S)	Peregrine falcon, Western toad ...
No usable habitat	D S	

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

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

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

14C. General Wildlife Habitat Rating:

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

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

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

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

ii. Wildlife habitat features (working from top to bottom, circle appropriate AA attributes in matrix to arrive at exceptional (E), high (H), moderate (M), or low (L) rating. Structural diversity is from #13. For class cover to be considered evenly distributed, vegetated classes must be within 20% of each other in terms of their percent composition of the AA (see #10). Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; and A = absent [see instructions for further definitions of these terms].)

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

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

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

Comments:

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

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

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

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

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

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

Comments: NA

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

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

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

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

Comments: Homes, Roads

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

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

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

Comments:

14G. Sediment/Nutrient/Toxicant Retention and Removal: (Applies to wetlands with potential to receive excess sediments, nutrients, or toxicants through influx of surface or ground water or direct input. If no wetlands in the AA are subject to such input, circle **NA** here and proceed with the evaluation.)

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

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants or AA receives or surrounding land use with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	≥ 70%		< 70%		≥ 70%		< 70%	
Evidence of flooding or ponding in AA	Yes	No	Yes	No	Yes	No	Yes	No
AA contains **no or restricted outlet**	1 (H)	.8 (H)	.7 (M)	.5 (M)	.5 (M)	.4 (M)	.3 (L)	.2 (L)
AA contains **unrestricted outlet**	.9 (H)	.7 (M)	.6 (M)	.4 (M)	.4 (M)	.3 (L)	.2 (L)	.1 (L)

Comments:

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

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

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

Comments:

14I. Production Export/Food Chain Support:

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

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

Comments:

14J. Groundwater Discharge/Recharge: (Check the indicators in i & ii below that apply to the AA)

i. Discharge Indicators

___Springs are known or observed
_X_Vegetation growing during dormant season/drought
_X_Wetland occurs at the toe of a natural slope
___Seeps are present at the wetland edge
___AA permanently flooded during drought periods
___Wetland contains an outlet, but no inlet
___Other

ii. Recharge Indicators

_X_Permeable substrate present without underlying impeding layer
___Wetland contains inlet but no outlet
___Other

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

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

Comments:

14K. Uniqueness:

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

Replacement potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland **or** plant association listed as "S1" by the MNHP			AA does not contain previously cited rare types **and** structural diversity (#13) is high **or** contains plant association listed as "S2" by the MNHP			AA does not contain previously cited rare types or associations **and** structural diversity (#13) is low-moderate		
Estimated relative abundance (#11)	rare	common	abundant	rare	common	abundant	rare	common	abundant
Low disturbance at AA (#12i)	1 (H)	.9 (H)	.8 (H)	.8 (H)	.6 (M)	.5 (M)	.5 (M)	.4 (M)	.3 (L)
Moderate disturbance at AA (#12i)	.9 (H)	.8 (H)	.7 (M)	.7 (M)	.5 (M)	.4 (M)	.4 (M)	.3 (L)	.2 (L)
High disturbance at AA (#12i)	.8 (H)	.7 (M)	.6 (M)	6 (M)	.4 (M)	.3 (L)	.3 (L)	.2 (L)	.1 (L)

Comments:

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

ii. Check categories that apply to the AA: ___ Educational/scientific study; ___ Consumptive rec.; _X_ Non-consumptive rec.; ___Other

iii. Based on the location, diversity, size, and other site attributes, is there strong potential for rec./ed. use? Y N

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

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

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

Comments:

FUNCTION & VALUE SUMMARY & OVERALL RATING

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units; (Actual Points x Estimated AA Acreage)
A. Listed/Proposed T&E Species Habitat	Low	0.3	1	
B. MT Natural Heritage Program Species Habitat	Low	0.1	1	
C. General Wildlife Habitat	High	0.9	1	
D. General Fish/Aquatic Habitat	NA	—	—	
E. Flood Attenuation	Low	0.1	1	
F. Short and Long Term Surface Water Storage	HIGH	0.8	1	
G. Sediment/Nutrient/Toxicant Removal	HIGH	1	1	
H. Sediment/Shoreline Stabilization	NA	—	—	
I. Production Export/Food Chain Support	HIGH	0.8	1	
J. Groundwater Discharge/Recharge	HIGH	1	1	
K. Uniqueness	MOD	0.4	1	
L. Recreation/Education Potential	HIGH	1	1	
Totals:		6.4	10	

64%

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

Category I Wetland: (Must satisfy **one** of the following criteria; if does not meet criteria, go to Category II)
___ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; **or**
___ Score of 1 functional point for Uniqueness; **or**
___ Score of 1 functional point for Flood Attenuation **and** answer to Question 14E.ii is "yes"; **or**
___ Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following criteria; if not satisfied, go to Category IV)
___ Score of 1 functional point for Species Rated S1, S2, or S3 by the MT Natural Heritage Program; **or**
✓ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
___ Score of .9 or 1 functional point for General Fish/Aquatic Habitat; **or**
___ "High" to "Exceptional" ratings for **both** General Wildlife Habitat **and** General Fish/Aquatic Habitat; **or**
___ Score of .9 functional point for Uniqueness; **or**
___ Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

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

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if does not satisfy criteria go to Category III)
___ "Low" rating for Uniqueness; **and**
___ "Low" rating for Production Export/Food Chain Support; **and**
___ Total actual functional points < 30% (round to nearest whole #) of total possible functional points

Field Data Sheet for 1999 MDT Wetland Assessment Form Site: Lawrence Park Date: 8/24/02 By: A. Kuhle

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

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

RELATIVE ABUNDANCE: rare com. abun. **DISTURBANCE** is: High Moderate Low _____

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

Does AA contain surface or subsurface outlet? Y N If outlet present, is it restricted (subsurface will always be "yes")? Y N

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

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

Estimated wetland area subject to periodic flooding (acres):	≥10	2-10	<2
Estimated % of flooded wetland classified SS, FO or both:	≥75	25-74	<25

*Evidence of groundwater discharge or recharge? Y N List: Water elevation is linked to Stillwater River via groundwater.

HABITAT

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

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

Primary or critical habitat (**list species**) D S T/E:_____ D S MNHP:_____

Secondary habitat (**list species**) D S T/E:_____ D S MNHP:_____

Incidental habitat (**list species**) D S T/E:_____ D S MNHP:_____

No usable habitat D S T/E:_____ D S MNHP:_____

Wildlife observations?_____

Fish observations?_____

OTHERS

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

Potential to receive: low to moderate levels high levels On TMDL List? Y N

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

List:_____

Is AA a known recreation / education site? Y N Type:_____

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Appendix C

REPRESENTATIVE PHOTOGRAPHS

MDT Wetland Mitigation Monitoring
Lawrence Park
Kalispell, Montana

LAND & WATER

Photopoint No. 2: Looking northwest away from the wetland site.	Photopoint No. 2: Looking southeast into the wetland site.

Appendix D

BIRD SURVEY PROTOCOL
MACROINVERTEBRATE SAMPLING PROTOCOL
GPS PROCEDURE

MDT Wetland Mitigation Monitoring
Lawrence Park
Kalispell, Montana

LAND & WATER

BIRD SURVEY PROTOCOL

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

Species Use within the Mitigation Wetland: Survey Method

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

Sites that can be circumambulated or walked throughout.

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

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

Sites that cannot be circumambulated.

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

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

Species Use within the Mitigation Wetland: Data Recording

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

1. Bird Species List

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

2. Bird Density

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

3. Bird Behavior

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

4. Bird Species Habitat Use

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

AQUATIC INVERTEBRATE SAMPLING PROTOCOL

Equipment List

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

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

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

Site Selection

Select the sampling site with these considerations in mind:

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

Sampling

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

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

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

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

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

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

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

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

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

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

Photograph the sampled site.

Sample Handling/Shipping

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

GPS Mapping and Aerial Photo Referencing Procedure

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

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

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

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