MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2011

Wagner Marsh
Billings, Yellowstone County, Montana



Prepared for:

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December 2011

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MDT Project Number STPX 56(50)
Control Number 4645

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CCI Project No: MDT.004

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Cover: View of inundated wetland cell with abundant waterfowl use.

1. INTRODUCTION

The 2011 Wagner Marsh Mitigation Monitoring Report presents the results of the seventh and final year of monitoring at the Wagner Marsh wetland mitigation project. The mitigation site was constructed in the east portion of the Upper Yellowstone River Watershed 13 during spring 2005 to mitigate for wetland impacts resulting from Montana Department of Transportation (MDT) highway and bridge construction projects in the watershed. Wagner Marsh was constructed on MDT property originally purchased in 1954 and used as a borrow area (gravel mining) for construction of the Interstate 90 (I-90) corridor. The goal of the project was to develop wetland hydrology at the site, ultimately providing 21.59 acres of palustrine emergent and scrub-shrub wetland within the confines of the 39-acre site. Approximately 2.12 acres of palustrine emergent and scrub-shrub wetland, and 1.75 acres of open water were created incidentally by MDT in 2003 where the borrow pit was excavated to a depth that intercepted ground water.

The site occurs at an elevation of approximately 3,240 feet above mean sea level. It is located on the west edge of Billings, Montana, north and east of the intersection of Danford Road and 56th Street in the southwest quarter of Section 28, Township 1 South, Range 25 East, Yellowstone County (Figure 1). The approximate universal transverse mercator (UTM) coordinates for the central portion of the site are in Zone 12N at 5,065,220 Northing and 682,385 Easting. Figures 2 and 3 (Appendix A) of the monitoring report show the Monitoring Activity Locations and Mapped Site Features, respectively. Appendix B contains the MDT Mitigation Site Monitoring Form, the US Army Corps of Engineers (USACE) Routine Wetland Determination Data Forms (Environmental Laboratory 1987), and the MDT Montana Wetland Assessment Forms. Appendix C contains relevant site photographs and Appendix D includes the Project Plan Sheet.

The project encompasses two previously created wetland and open water areas totaling 3.87 acres and seven constructed wetland cells projected to total 17.72 acres. The wetland hydrology was supplied historically by a high groundwater table with minimal contribution from precipitation. Groundwater is currently being pumped from the Knife River gravel pit located on the west side of 56th Street into Wagner Marsh after the dewatering activities for the pit affected MDT groundwater within the site. The MDT previously secured groundwater rights to ensure that there was a sufficient long-term water source for the wetland cells. No surface water outlet exists at the site. An upland buffer was included in the mitigation credits for the project. No performance standards were established for the site.

Wetland credits for the site were determined using the following ratios.

- Credit of 1:1 for wetland establishment/re-establishment for in-kind mitigation conducted prior to wetland impacts.

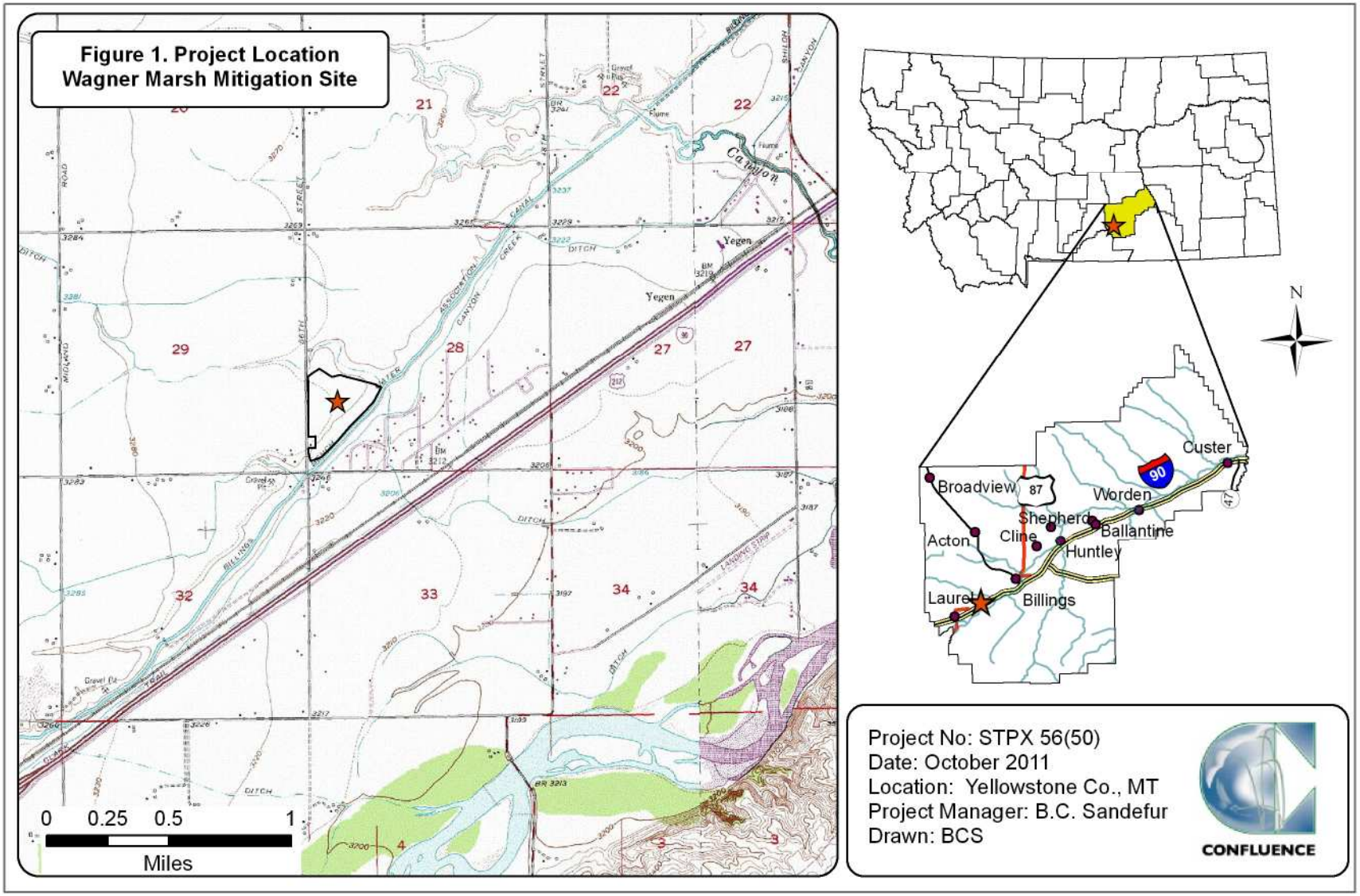


Figure 1. Project location Wagner Marsh Mitigation Site.

- Credit of 1.5:1 for out-of-kind wetland mitigation, or if wetland impacts occurred prior to the reserve's establishment.
- Credit for open water is limited to no more than 20 percent of the amount of actual wetland acreage that develops onsite.
- Upland buffers are limited to a maximum width of 50 feet and are credited at a ratio of 4:1.

2. METHODS

The site was monitored on August 11, 2011. Information contained on the Mitigation Monitoring Form and Wetland Data Form was entered electronically in the field on a personal digital assistant (PDA) palmtop computer during the field investigation (Appendix B). Monitoring activity locations were mapped using a global positioning system (GPS) (Figure 2, Appendix A). Information collected included wetland delineation, vegetation community mapping, vegetation transect monitoring, soils and hydrology data, bird and wildlife use documentation, photographic documentation, and a non-engineering examination of the infrastructure established within the mitigation project area.

2.1. Hydrology

Technical criteria for wetland hydrology guidelines have been established as "permanent or periodic inundation, or soil saturation within 12 inches of the ground surface for a significant period (usually 14 days or more or 12.5 percent) during the growing season" (Environmental Laboratory 1987). Systems with continuous inundation or saturation for greater than 12.5 percent of the growing season are considered wetlands. The growing season is defined for purposes of this report as the number of days where there is a 50 percent probability that the minimum daily temperature is greater than or equal to 28 degrees Fahrenheit (Environmental Laboratory 1987). The frost-free period defined for the region characterized by the dominant soil map unit at the Wagner Marsh Site, the Larim gravelly loam, is 120 to 135 days (USDA 2010). Based on USDA information, areas defined as wetlands would require 15 to 17 days of inundation or saturation within 12 inches of the ground surface to meet the hydrology criteria.

Hydrological indicators as outlined on the Wetland Data Form were documented at three data points established within the project area. Hydrologic indicators were evaluated according to features observed during the site visit. The information was recorded on electronic Wetland Data Form (Appendix B). Hydrologic assessments allow evaluation of mitigation goals addressing inundation/saturation requirements.

Three soil pits excavated during wetland delineations were used to evaluate groundwater levels within 18 inches of the ground surface. The data were recorded electronically on the Wetland Data Form (Appendix B). Water levels were also measured in two wells, MW-1 and MW-3, during the 2011 investigation. The cap on MW-2 was locked and managed by the USGS.

2.2. Vegetation

The boundaries of dominant species-based vegetation communities were determined in the field during the active growing season and subsequently delineated on the 2011 aerial photograph. The percent cover of dominant species within a community type was estimated and recorded using the following values: 0 (less than 1 percent) 1 (1 to 5 percent) 2 (6 to 10 percent), 3 (11 to 20 percent), 4 (21 to 50 percent), and 5 (greater than 50 percent) (Appendix B).

Temporal changes in vegetation were evaluated through annual assessments of a static belt transect (Figure 2, Appendix A). Vegetation composition was assessed and recorded along a single belt transect approximately 10 feet wide and 530 feet long (Figure 2, Appendix A). The transect location was recorded with a GPS unit. The percent cover of each vegetation species within the transect was estimated using the same ranges and values used for the polygon data (Appendix B). Photographs were taken at the endpoints of the transect during the monitoring event (Appendix C).

The location of noxious weeds was noted in the field and mapped on the aerial photo (Figure 3, Appendix A). The noxious weed species identified are color-coded. The locations are denoted with the symbol "**x**", "▲", or "■" representing 0 to 0.1 acre, 0.1 to 1.0 acre, or greater than 1.0 acre in extent, respectively. Cover classes listed on Figure 3 (Appendix A) are represented by T, L, M, or H, corresponding to less than 1 percent, 1 to 5 percent, 2 to 25 percent, and 25 to 100 percent, respectively.

A total of 550 woody plants comprised of seven species were planted at the mitigation site after construction. Survival was assessed annually.

2.3. Soil

Soil information was obtained from the *Soil Survey for Yellowstone County* and *in situ* soil descriptions (USDA 2010). Soil cores were excavated using a hand auger and evaluated according to procedures outlined in the USACE 1987 *Corps of Engineers Wetland Delineation Manua*l (Environmental Laboratory 1987). A description of the soil profile, including hydric soil indicators when present, was recorded on the Wetland Data Form for each profile (Appendix B).

2.4. Wetland Delineation

Waters of the U.S. including jurisdictional wetlands and special aquatic sites were delineated throughout the project area in accordance with criteria established in the 1987 Wetland Manual. In order to delineate a representative area as wetland, the technical criteria for hydrophytic vegetation, hydric soil, and wetland hydrology, as described in the 1987 Wetland Manual, must be satisfied. The indicator status of vegetation was derived from the National List of Plant Species that Occur in Wetlands: Northwest Region 9 (Reed 1988). A Routine Level-2 On-site Determination Method (Environmental Laboratory 1987) was used to delineate wetland areas within the project boundaries. The information was recorded electronically on the Wetland Data Form (Appendix B).

Consultation with the USACE determined that the 1987 Wetland Manual should continue to be used at MDT mitigation sites where baseline wetland conditions had been established prior to 2010. Consequently, the use of the 2010 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (USACE 2010) was not required.

The wetland boundary was determined in the field based on changes in plant communities and/or hydrology, and changes in soil characteristics. Topographic relief boundaries within the project area were also examined and cross referenced with soil and vegetation communities as supportive information for this delineation. Vegetation composition, soil characteristics, and hydrology were assessed at likely wetland and adjacent upland locations. If all three parameters met the criteria, the area was designated as wetland and mapped by vegetation community type. When any one of the parameters did not exhibit positive wetland indicators, the area is determined to be upland unless the site was classified as an atypical situation, potential problem area, or special aquatic site, i.e. mud flat. The wetland boundary was identified on the 2011 aerial photograph. Wetland areas reported were estimated using geographic information system (GIS) methodology.

2.5. Wildlife

Direct observations and other positive indicators of use of mammal, reptile, amphibian, and bird species were recorded on the wetland monitoring form during the site visit. Indirect use indicators, including tracks, scat, burrow, eggshells, skins, and bones, were also recorded. These signs were recorded while traversing the site for other required activities. Direct sampling methods, such as snap traps, live traps, and pitfall traps, were not used. A comprehensive wildlife species list for the entire period of monitoring was compiled.

2.6. Functional Assessment

Functional assessments for each wetland or group of wetlands [Assessment Areas (AA)] were completed in 2001 (baseline) and from 2005 to 2007 using the 1999 MDT Montana Wetland Assessment Method (MWAM) (Berglund 1999). The 2008 MDT MWAM (Berglund and McEldowney 2008) was used in 2008 through 2011. The functional assessment provides an objective means of assigning wetlands an overall rating and of assessing mitigation success based on wetland functions. Functions are self-sustaining properties of a wetland ecosystem that exist in the absence of society and relate to ecological significance without regard to subjective human values (Berglund and McEldowney 2008). Field data for this assessment were collected during the site visit on August 11, 2011. A single MWAM was completed for the entire Wagner Marsh mitigation site (Appendix B).

2.7. Photo Documentation

Monitoring at photo points provides supplemental information documenting wetland and upland conditions, current land uses surrounding the site, and vegetation transects trends. Photographs were taken at established photo points throughout the mitigation site during the site visit and at the end points of the

transect (Appendix C). Photo point locations were recorded with a resource grade GPS unit (Figure 2, Appendix A).

2.8. GPS Data

Site features and survey points were collected with a resource grade Thales Pro Mark III GPS unit during the 2011 monitoring season. Points were collected using WAAS-enabled differential correction satellites, typically improving resolution to sub-meter accuracy. The collected data were then transferred to a personal computer, subsequently exported into GIS, and drawn in Montana State Plane Single Zone NAD 83 meters. In addition to GPS, some site features within the site were hand-mapped onto the 2011 aerial photograph, then digitized. Site features and survey points that were mapped included fence boundaries, photograph points, transect beginnings and endings, wetland boundaries, and vegetation community boundaries.

2.9. Maintenance Needs

Outflow structures were checked for obstructions and other problems. Channels, structures, fencing, and other features were also examined during the site visit for obvious signs of breaching, damage, or other problems. This was a cursory examination and did not constitute an engineering-level structural inspection.

3. RESULTS

3.1. Hydrology

Groundwater was historically the primary hydrologic source at Wagner Marsh with minimal input from precipitation. The 2007 excavation of a gravel pit located west of South 56th Street diverted groundwater flows from the mitigation site causing a decrease in water levels. The MDT subsequently developed an agreement with the gravel mining company to pump water from the gravel pits to the mitigation site, resulting in an overall increase in water levels. High water levels were observed during the 2011 site visit as a result of the groundwater contributed to the site from the adjacent Knife River gravel mine. The increase of water levels led to a subsequent increase in both open water and wetland acreage.

The closest weather station to the site was Laurel, Montana, station (244894), which closed in 1994. The mean annual precipitation rate recorded from August 1951 to February 1994 was 14.3 inches (WRCC 2011). The closest active weather station is the Billings WSO, Montana (240807). The average annual precipitation recorded from July 1948 through December 2010, was 14.31 inches (WRCC 2011). The 2010 annual precipitation was 18.75 inches. The precipitation total for January to June 2011 was 13.37 inches (NCDC 2011).

Annual evaporation pan rates were estimated to be approximately 41.27 inches at the Huntley Experiment Station (244345), located northeast of the Billings WSO station. The evaporation rate is almost three times the annual precipitation rate.

MDT contracted with the USGS after 1998 to monitor the groundwater wells at Wagner Marsh. Groundwater levels were highest in August and September and lowest during the spring months, likely the result of irrigation influences. This hydroperiod is the opposite of a majority of wetlands in Montana that experience spring recharge and subsequent summer draw-down. Groundwater levels in two monitoring wells, MW-1 and MW-3, were measured with a Solinst water level meter in 2011. The well locations are shown on Figure 2 (Appendix A). The groundwater level measured in MW-1, located in an upland near the center of the west property boundary, was 2.5 feet below the ground surface (bgs). The groundwater level in MW-3 located in the center of the north boundary near a wetland was 1.3 feet bgs. Both of these wells exhibited higher groundwater elevations from those recorded on the same day in 2010, 3.5 feet bgs in MW-1 and 1.6 feet bgs in MW-3. Well MW-2 is operated by the USGS as a continually monitored well. Data for this well from April 13, 2011 to December 5, 2011 is shown in Chart 1.

Table 1. Groundwater levels measured in Wagner Marsh wells in 2010 and 2011.

Well ID	Year	
	2010	2011
MW-1	3.5	2.5
MW-2	2.38*	----*
MW-3	1.6	1.3

*Well monitored by USGS

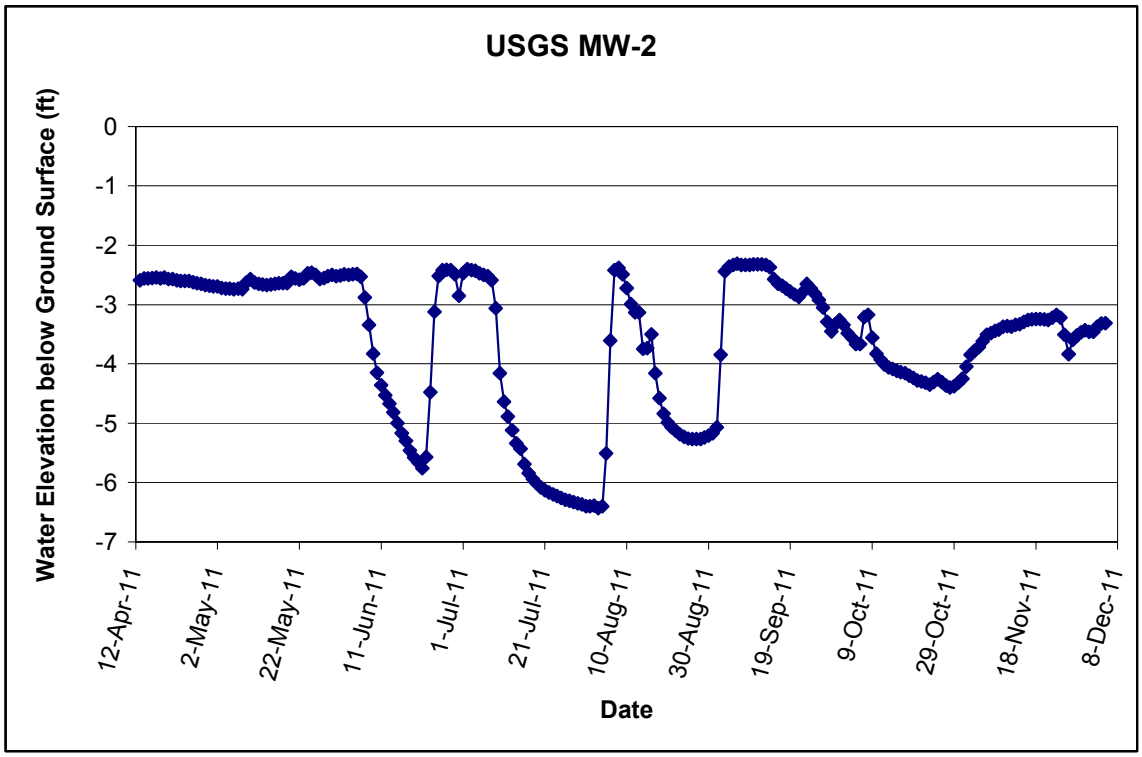


Chart 1. USGS groundwater data for MW-2.

Approximately 40 percent of the 40 acres in the monitoring area was inundated (Figure 3 in Appendix A), with an average depth of 1.5 feet and a range of depths from 0.0 to an estimated 2.2 feet. Consistent with previous years, the pond located immediately south of the crescent-shaped pond on the west side of the site appeared to have the greatest maximum depths. The water depth at the emergent vegetation-open water boundary was approximately 1.0 foot. Saturation was present within the perimeter of each of the inundated cells.

Four data points, WM-1, WM-2, WM-3u, and WM-3w were assessed to determine the upland and wetland boundaries (Wetland Data Forms, Appendix B). Three data points were located in areas that met the wetland criteria. Watermarks and the FAC-Neutral Test were positive indicators of wetland hydrology at WM-1. Soil saturation at 2 inches bgs, a water table at 4 inches bgs, and water marks were positive indicators at WM-2. Four inches of surface water, saturated soils, and water marks were present at WM-3w. A positive FAC-Neutral test provided a secondary indicator of wetland hydrology. Data point WM-3u exhibited no wetland hydrology indicator.

3.2. Vegetation

A list of 92 vegetation species identified from 2005 to 2011 is presented in Table 2 and on the Mitigation Monitoring Form (Appendix B). A total of nine community types, seven wetland and two upland, were identified at the site in 2011. The community polygons are shown on Figure 3 (Appendix A) and the species composition is detailed on the Mitigation Monitoring Form (Appendix B). The 2011 vegetation community types corresponded to the 2010 communities, with the exception of the Aquatic Macrophytes community that replaced the Open Water/Aquatic Bed community as a result of increased vegetation cover within the open water areas. The 2011 vegetation community types are wetland Type 1 – Aquatic Macrophytes, wetland Type 3 – *Typha latifolia*/*Eleocharis palustris*, upland Type 6 – Upland grasses, upland Type 7 – *Agropyron* spp./*Festuca* spp., wetland Type 10 – *Carex* spp./*Scirpus* spp., wetland Type 11 – *Phalaris arundinacea*, wetland Type 12 - *Scirpus acutus*, Type 14 – *Elaeagnus angustifolia*/*Populus deltoides*, and wetland Type 15 – *Hordeum jubatum*/*Typha latifolia*.

Table 2. Plant species observed from 2005 to 2011 at the Wagner Marsh Mitigation Site.

Scientific Name	Common Name	Region 9 Indicator Status[1]
Agropyron cristatum	crested wheatgrass	NL
Agropyron repens	quackgrass	FACU
Agropyron smithii	wheatgrass,western	FACU
Agrostis alba	redtop	FACW
Algae, green	algae, green	NL
Alopecurus arundinaceus	foxtail,creeping	NI
Alyssum alyssoides	pale madwort	NL
Apocynum cannabinum	**dogbane,clasping-leaf**	**FAC+**
Asclepias speciosa	milkweed,showy	FAC+
Asclepias spp.		NL
Aster brachyactis	aster,rayless alkali	FACW
Aster sp. (white)	white aster spp.	NL
Beckmannia syzigachne	sloughgrass,American	OBL
Bromus inermis	smooth brome	NL
Bromus japonicus	brome,Japanese	FACU
Bromus tectorum	cheatgrass	NL
Carduus nutans	**musk thistle**	**NL**
Carex lanuginosa	sedge,wooly	OBL
Carex nebrascensis	sedge,Nebraska	OBL
Carex sp.		NL
Centaurea maculosa	spotted knapweed	NL
Chenopodium album	goosefoot,white	FAC
Cirsium arvense	thistle,creeping	FACU+
Convulvus arvensis	field bindweed	NL
Conyza canadensis	horseweed,Canada	FACU
Cynoglossum officinale	**gypsy-flower**	**NL**
Deschampsia cespitosa	**hairgrass,tufted**	**FACW**

[1]Region 9 Great Plains (Reed 1988).

New species identified in 2011 are shown in **bold** type.

Table 2. (Continued). Plant species observed from 2005 to 2011 at the Wagner Marsh Mitigation Site.

Scientific Name	Common Name	Region 9 Wetland Indicator Status[1]
Echinochloa muricata	grass,rough barnyard	FACW
Elaeagnus angustifolia	olive,Russian	FAC
Elaeagnus commutata	silver-berry,American	NI
Eleocharis palustris	spikerush,creeping	OBL
Eleocharis pauciflora	**spikerush,few-flower**	**OBL**
Elymus cinereus	wild-rye,basin	NI
Epilobium ciliatum	willow-herb,hairy	FACW-
Festuca idahoensis	fescue,bluebunch	NL
Festuca pratensis	fescue,meadow	FACU+
Glyceria grandis	**American mannagrass**	**NL**
Glyceria striata	grass,fowl manna	OBL
Grindelia squarrosa	gumweed,curly-cup	FACU
Helianthus annuus	sunflower,common	FACU+
Hordeum jubatum	barley,fox-tail	FAC+
Juncus balticus	rush,baltic	OBL
Juncus torreyi	rush,torrey's	FACW
Juniperus scopulorum	Rocky Mountain juniper	NI
Kochia scoparia	summer-cypress,Mexican	FAC
Lactuca serriola	lettuce,prickly	FAC-
Lepidium perfoliatum	**pepper-grass,clasping**	**FACU+**
Leptochloa fascicularis	sprangle-top,bearded	FACW
lotus unifoliolatus	American bird's-foot trefoil	NL
Medicago lupulina	medic,black	FAC
Medicago sativa	alfalfa	NL
Melilotus officinalis	sweetclover,yellow	FACU
Nepeta cataria	catnip	FAC
Oenothera biennis	evening-primrose,common	FACU
Panicum capillare	witchgrass	FAC
Phalaris arundinacea	grass,reed canary	FACW
Phleum pratense	timothy	FACU
Plantago major	plantain,common	FAC+
Poa pratensis	bluegrass,Kentucky	FACU+
Polygonum aviculare	knotweed,prostrate	FACW-
Polygonum lapathifolium	willow-weed	FACW+
Polygonum pensylvanicum	smartweed,Pennsylvania	FACW
Polygonum persicaria	thumb,lady's	FACW
Polypogon monspeliensis	grass,annual rabbit-foot	FACW+
Populus deltoides	cotton-wood,eastern	FAC
Potamogeton filiformis	pondweed,fine-leaf	OBL
Potamogeton sp.	**pondweed**	**NL**
Potentilla anserina	silverweed	OBL
Prunus virginiana	cherry,choke	FACU
Ratibida columnifera	**prairie coneflower**	**NL**

[1]Region 9 Great Plains (Reed 1988).

New species identified in 2011 are shown in **bold** type.

Table 2. (Continued). Plant species observed from 2005 to 2011 at the Wagner Marsh Mitigation Site.

Scientific Name	Common Name	Region 9 Wetland Indicator Status[1]
Ribes aureum	currant,golden	FAC+
Rosa woodsii	rose,woods	FACU
Rumex crispus	dock,curly	FACW
Rumex maritimus	dock,golden	FACW+
Salix amygdaloides	willow,peach-leaf	FACW
Salix exigua	willow,sandbar	OBL
Salsola kali	thistle,Russian	FACU
Scirpus acutus	bulrush,hard-stem	OBL
Scirpus cyperinus	**wool-grass**	**NI**
Scirpus maritimus	bulrush,saltmarsh	OBL
Scirpus microcarpus	bulrush,small-fruit	OBL
Scirpus pungens	bulrush,three-square	OBL
Sisymbrium altissimum	mustard,tall tumble	FACU-
Solidago canadensis	golden-rod,Canada	FACU
Sonchus arvensis	sowthistle,field	FACU+
Tamarix ramosissima	saltcedar	FACW
Taraxacum officinale	dandelion,common	FACU
Thlaspi arvense	penny-cress,field	NI
Tragopogon dubius	yellow salsify	NL
Typha angustifolia	cattail,narrow-leaf	OBL
Typha latifolia	cattail,broad-leaf	OBL
Verbena bracteata	vervain,prostrate	FACU+

[1]Region 9 Great Plains (Reed 1988).
New species identified in 2011 are shown in **bold** type.

Wetland community Type 1 – Aquatic Macrophytes replaced the areas defined by open water polygons in 2010. Perennial inundation in these cells has promoted the growth and establishment of green algae and pondweed (*Potamogeton* sp.). Several waterfowl were observed foraging within these areas.

Wetland community Type 3 – *Typha latifolia*/*Eleocharis palustris* was identified in several wetland areas across the mitigation site. Dominant species were broad-leaf cattail (*Typha latifolia*), creeping spikerush (*Eleocharis palustris*), hard-stem bulrush (*Scirpus acutus*), sedge (*Carex* sp.), and green algae in areas with surface water. Nebraska sedge (*Carex nebrascensis*), wooly sedge (*Carex lanuginosa*), tufted hairgrass (*Deschampsia cespitosa*), Baltic rush (*Juncus balticus*), three-square bulrush (*Scirpus pungens*), small-fruit bulrush (*Scirpus maritimus*), and six other species were observed within this community at low percent cover.

Community Type 6 – Upland grasses was located along the north and west site boundaries. The community was primarily dominated by seeded and/or weedy herbaceous species including crested wheatgrass (*Agropyron cristatum*),

Japanese brome (*Bromus japonicas*), Idaho fescue (*Festuca idahoensis*), western wheatgrass (*Agropyron smithii*), meadow fescue (*Festuca pratensis*), basin wild rye (*Elymus cinereus*), and fox-tail barley (*Hordeum jubatum*). This community included nineteen other species with trace to low cover classes.

Upland Type 7 – *Agropyron* spp./*Festuca* spp. was identified along the east site boundary and had been drill-seeded following site construction. The community was dominated by crested wheatgrass, western wheatgrass, Japanese brome (*Bromus japonicas*), meadow fescue, basin wild rye, and quackgrass (*Agropyron repens*). This community was similar to upland community Type 6 and primarily differed by supporting a higher cover of field bindweed (*Convulvus arvensis*).

Wetland community Type 10 – *Carex* spp./*Scirpus* spp. was located in a small, isolated wetland located near the center of the project site. The community included wooly sedge, small-fruited bulrush (*Scirpus microcarpus*), hard-stem bulrush, creeping spikerush, Nebraska sedge (*Carex nebrascensis*), Torrey's rush (*Juncus torreyi*), and seven other hydrophytes. A trace amount of salt cedar (*Tamarix ramosissima*) was documented in this community.

Wetland community Type 11 – *Phalaris arundinacea* was found in two narrow strips of land located near the west boundary. Reed canary grass (*Phalaris arundinacea*) dominated the community. Fox-tail barley and Japanese brome contributed between 6 to 10 percent cover in the Type 11 community. A trace amount of sandbar willow (*Salix exigua*) was noted, suggesting natural woody recruitment along the edge of the open water that bounds this community.

Wetland community Type 12 - *Scirpus acutus* was identified in three isolated wetland areas. The largest patch observed was located near the beginning of the transect and extended along the shoreline of the northeast cell. Hard-stem bulrush dominated the community. Three-square bulrush, creeping spikerush, Baltic rush, broad-leaf cattail, and a trace amount of peach-leaf willow (*Salix amygdaloides*) were also documented within this inundated/saturated community.

Wetland community Type 14 – *Elaeagnus angustifolia*/*Populus deltoides* dominated the woody overstory in an isolated forested and scrub/shrub community located in the northwest portion of the project. Russian olive (*Elaeagnus angustifolia*), eastern cottonwood (*Populus deltoides*), and sandbar willow dominated the cover. Creeping spikerush, reed canary grass, Nebraska sedge, wool-grass (*Scirpus cyperinus*), annual rabbit-foot grass (*Polypogon monspeliensis*), catnip (*Nepta cataria*), broad-leaf cattail, and five other species were recorded in the understory of this community.

Wetland community Type 15 – *Hordeum jubatum*/*Typha latifolia*, located in several areas adjacent to open water, was dominated by foxtail barley, broad-leaf cattail, creeping spikerush, and witchgrass (*Panicum capillare*). Pennsylvania

smartweed (*Polygonum pensylvanicum*), small-fruit bulrush, and seedlings of eastern cottonwood contributed 6 to 10 percent cover to this community. Six species were documented at trace amounts within community Type 15.

Vegetation community data were collected on a single 530-foot transect in 2011 (Monitoring Forms, Appendix B). The data is summarized in Table 3 and Charts 2 and 3. The transect began in the Type – 3 *Typha*/*Eleocharis* community in the southwest corner of the northeast cell. The transect transitioned into Type 12 – *Scirpus acutus* community for 102 feet then crossed the Type 1- Aquatic Macrophyte community for 370 feet before ending back in the Type 3 community that forms a continuous border around this cell. This transect skirted the Type 2 – *Scirpus acutus community* identified between 238 feet and 360 feet indentified in 2010. This community was still present in 2011. Similar to 2010, nearly the entire length of the transect was inundated in 2011. Hydrophytic species dominated 100 percent of the transect intervals.

Table 3. Data summary for Transect 1 at the Wagner Marsh Wetland Mitigation Site.

Monitoring Year	2005	2006	2007	2008	2009	2010	2011
Transect Length (feet)	530	530	530	530	530	530	530
Vegetation Community Transitions along Transect	5	5	5	4	5	5	3
Vegetation Communities along Transect	4	3	3	2	2	2	3
Hydrophytic Vegetation Communities along Transect	2	2	1	1	2	2	3
Total Vegetative Species	31	31	31	19	20	17	10
Total Hydrophytic Species	13	15	15	16	14	15	8
Total Upland Species	18	16	16	3	6	2	2
Estimated % Total Vegetative Cover	30	45	55	30	21	56	60
% Transect Length Comprising Hydrophytic Vegetation Communities	67	62	65	70	66	55	100
% Transect Length Comprising Upland Vegetation Communities	7	6	5	0	0	0	0
% Transect Length Comprising Unvegetated Open Water	4	31	30	30	34	45	0
% Transect Length Comprising Bare Substrate	22	0	0	0	0	0	0

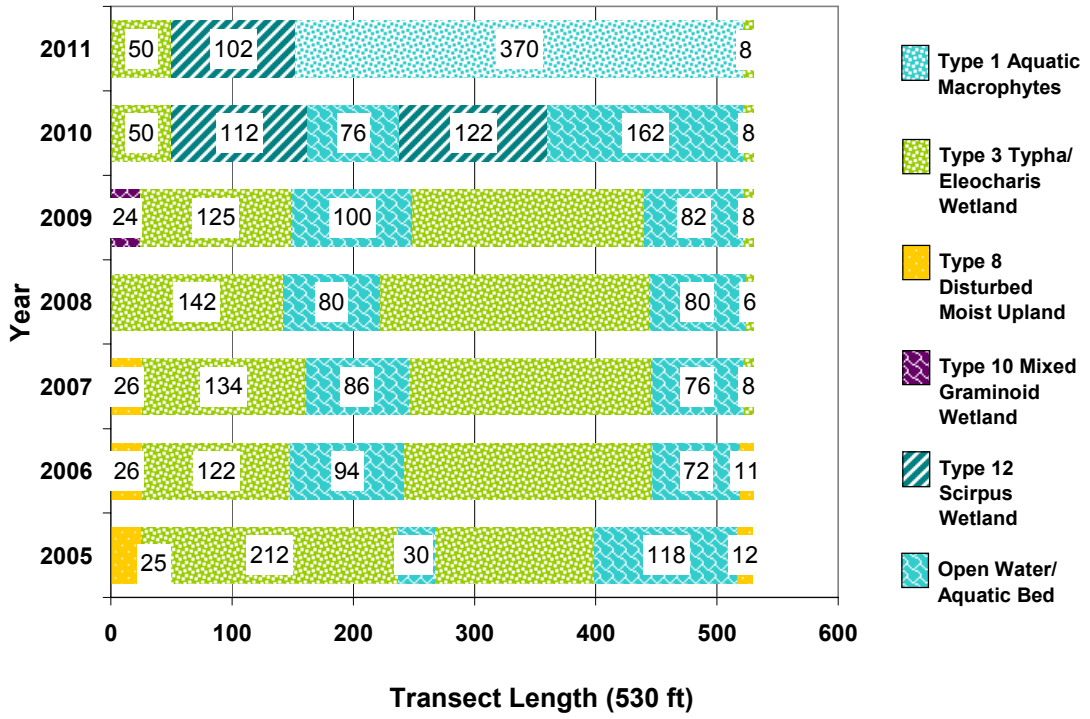


Chart 2.Transect maps showing vegetation types on Transect 1 from start (0 feet) to finish (530 feet) from 2005 to 2011.

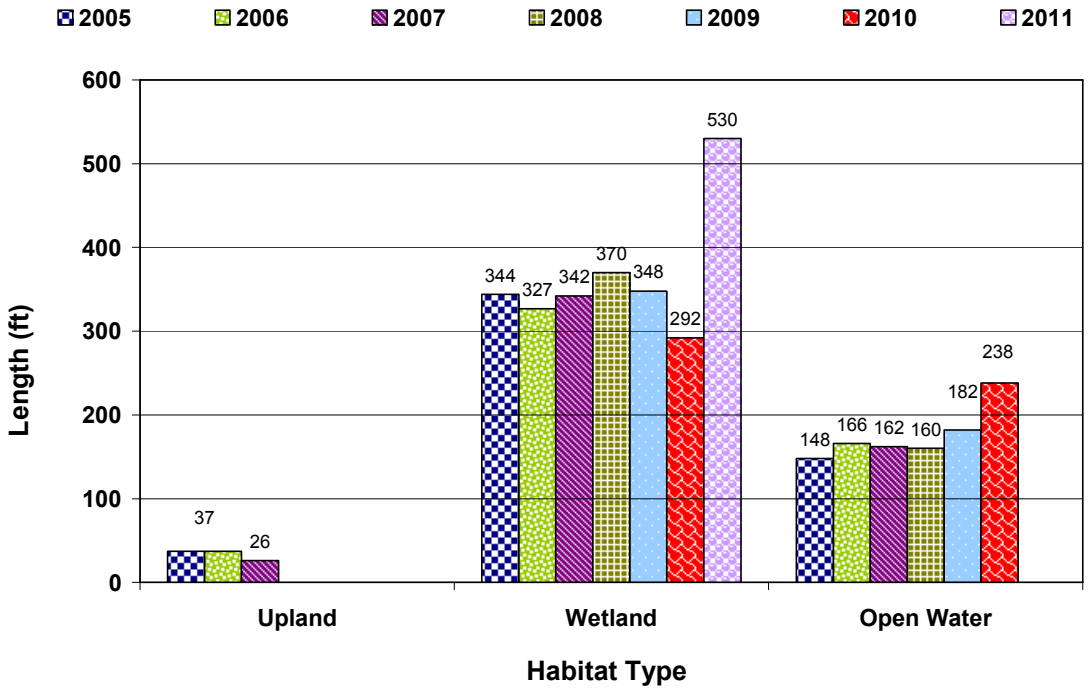


Chart 3. Length of vegetation communities within Transect 1 from 2005 to 2011.

The location of Priority 2B noxious weed infestations of spotted knapweed (*Centaurea maculosa*), Canada thistle (*Cirsium arvense*), field bindweed, and saltcedar were mapped on Figure 3 (Appendix A). Spotted knapweed was observed in a single area, less than 0.1 acres in size, in the upland between the northern wetland cells. The cover class was moderate. Canada thistle was present in one infestation at less than 0.1 acres in size and at 1 to 5 percent cover (low cover class). Infestations of field bindweed were noted along the berm on the east edge of the site at 0.1 to 1.0 acres in size and a low cover class. Field bindweed was also mapped in a location along the western boundary of the site. Saltcedar was observed near the center of the site at less than 0.1 acres and 1 to 5 percent cover. Weed spraying occurred at the Wagner Marsh site in 2010 and 2011 and included control for field bindweed, spotted knapweed, thistle, and salt cedar. Comparison of weed infestation data between monitoring years indicate that weed control efforts have exhibited a positive response within this mitigation site.

Approximately 550 woody plants were installed on site as part of the revegetation plan. The condition of 435, or 79 percent, of the plantings was monitored in 2009. The overall survival rate in August 2009 was estimated at 37 percent. The high mortality rate was likely the result of desiccation. Approximately 150 plants, or 33 percent of the original number planted, were identified in 2010. Half of the Rocky Mountain juniper (*Juniperus scopulorum*), Eastern cottonwood, and common chokecherry (*Prunus virginiana*) were alive in 2010. Twenty percent of the golden currant (*Ribes aureum*) and Wood's rose (*Rosa woodsii*) were also alive in 2010. Ten percent of the American silverberry (*Eleagnus commutata*) and none of the silver leaf buffaloberry (*Shepherdia argentea*) survived to 2010. Similar rates of survival for woody vegetation were noted between 2010 and 2011. It appeared the ten American silverberry that survived to 2010 persisted in 2011. Just under 50 percent of the Rocky Mountain juniper and common chokecherry planted were surviving in 2011. Golden currant, Wood's rose, and silver leaf buffaloberry each exhibited approximately 20 percent survival in 2011. Willow and cottonwood recruits were noted vegetation in communities 10, 11, 14, and 15 at cover classes ranging from traces in communities 10 and 11 and up to 20% in community 14.

3.3. Soil

The project site was mapped as urban land, Keiser silty clay loam, Larim loam, and Toluca clay loam found on 0 to 1 percent slopes. Keiser series soils are well drained, non-hyrdic mesic Aridic Haplustalfs. Larim series soils are well-drained and classified as mesic Ustic Calciargids. Toluca series soils are well-drained and categorized as mesic Aridic Haplustalfs. Although the monitoring area included these NRCS map units, the site was altered by material removal while operating as a gravel mine and by construction of the mitigation complex. The soils profiled in test pits did not confirm the NRCS mapped soil series.

Test pits at WM-1, WM-2, and W-3w were located in areas defined as wetlands. The soil profile at WM-1 revealed a dark gray (7.5YR 4/1) silt loam with brown

(10YR 4/3) redoximorphic concentrations in the matrix. The low-chroma color and redox features provided a positive indication of hydric soil. The soil at WM-2 was a dark grayish brown (10YR4/2) silt loam with dark yellowish brown (10YR 4/6) redoximorphic concentrations in the matrix, which is evidence of a hydric soil. The soil was very gravelly and saturated at 2 inches bgs. The soil profile at WM-3w revealed a very dark gray (10YR 3/1) coarse loamy sand with dark yellowish brown (10YR 4/6) redox concentrations in the matrix. Soils at WM-3u were inundated with four inches of surface water. Data point WM-3u was located in an area delineated as upland. The soil profile at WM-3u was a very cobbly brown (10YR 5/3) silt loam with very dark grayish brown (10YR 3/2) depletions.

3.4. Wetland Delineation

The delineated wetland boundaries are illustrated on Figure 3 (Appendix A) and the Wetland Data Forms are included in Appendix B. Approximately 18.77 acres of wetland were delineated in 2011. The open water areas were reclassified as wetlands dominated by aquatic macrophytes as a result of the increase algae and floating and submerged vegetation growing within the inundated cells. A slight decrease in wetland acreage in 2011 resulted from a decrease in the size of the small, isolated reed canary grass wetland that displayed wetter conditions in 2010. The totals include 0.18 acres of wetlands that existed prior to 2001, 1.94 acres of wetlands previously created by MDT, and 1.75 acres of pre-existing open water. The total upland habitat encompassed 22.06 acres.

Table 4. Summary of aquatic habitat acreages from 2005 to 2011.

	2001 Pre-mitigation	2005 Post-Construction	2006	2007	2008	2009	2010	2011
OPEN WATER (acres)	1.75	7.88	4.96	5.80	8.81	8.26	8.80	0.00
WETLAND (acres)	2.12	3.96	6.53	7.50	7.38	8.32	10.04	18.77
TOTAL (acres)	3.87	11.84	11.49	13.30	16.19	16.58	18.84	18.77

3.5. Wildlife

A list of wildlife species observed directly and indirectly from 2005 to 2011 is presented in Table 5. Eleven bird species were identified in 2011 (Monitoring Form, Appendix B). Deer tracks, raccoon tracks, and muskrat tracks and burrows were observed in 2011. Numerous northern leopard frogs were observed along the water margin of several of the inundated cells.

Table 5. Wildlife species observed at the Wagner Marsh Wetland Mitigation Site from 2005 to 2011.

COMMON NAME	SCIENTIFIC NAME
AMPHIBIAN	
Boreal Chorus Frog	*Pseudacris maculata*
Northern Leopard Frog*	***Rana pipiens***
Woodhouse's Toad*	*Bufo woodhousii*
COMMON NAME	**SCIENTIFIC NAME**
BIRD	
American Black Duck	*Anas rubripes*
American Coot*	***Fulica americana***
American Crow*	*Corvus brachyrhynchos*
American Goldfinch	*Spinus tristus*
American Robin*	*Turdus migratorius*
American Kestrel*	*Falco sparverius*
American Wigeon*	*Anas americana*
Barn Swallow	***Hirundo rustica***
Black-billed Magpie*	*Pica hudsonia*
Blue-winged Teal*	***Anas discors***
Brewer's Blackbird*	*Euphagus cyanocephalus*
California Gull	*Larus californicus*
Canada Goose*	***Branta canadensis***
Cinnamon Teal*	*Anas cyanoptera*
Cliff Swallow	*Petrochelidon pyrrhonota*
Eastern Kingbird	*Tyrannus tyrannus*
Gadwall*	*Anas strepera*
Grasshopper Sparrow	*Ammodramus savannarum*
Gray Catbird	***Dumetella carolinensis***
Great Blue Heron	***Ardea herodias***
Greater Yellowlegs	*Tringa melanoleuca*
Green-winged Teal	*Anas crecca*
Killdeer*	***Charadrius vociferus***
Lesser Scaup	*Aythya affinis*
Lesser Yellowlegs	*Tringa flavipes*
Mallard*	***Anas platyrhynchos***
Marsh Wren*	*Cistothorus palustris*
Mourning Dove	***Zenaida macroura***
Northern Flicker	*Colaptes auratus*
Northern Harrier*	*Circus cyaneus*
Northern Pintail*	*Anas acuta*
Northern Shoveler*	*Anas clypeata*
Pied-billed Grebe	*Podilymbus podiceps*

Species identified in 2011 are listed in **bold** type.

*Species identitfied in 2011 by MDT.

Table 5. (Continued). Wildlife species observed at the Wagner Marsh Wetland Mitigation Site from 2005 to 2011.

COMMON NAME	SCIENTIFIC NAME
Redhead	*Aythya americana*
Red-tailed Hawk	***Buteo jamaicensis***
Red-winged Blackbird*	*Agelaius phoeniceus*
Ring-necked Pheasant*	*Phasianus colchicus*
Rock Pigeon	*Columba livia*
Ruddy Duck*	*Oxyura jamaicensis*
Sandhill Crane*	***Grus canadensis***
Song Sparrow*	*Melospiza melodia*
Sora*	*Porzana carolina*
Spotted Sandpiper*	*Actitis macularius*
Starling*	
Tree Swallow	*Tachycineta bicolor*
Vesper Sparrow	*Pooecetes gramineus*
Western Meadowlark*	*Sturnella neglecta*
Wilson's Phalarope	*Phalaropus tricolor*
Wilson's Snipe*	*Gallinago delicata*
Yellow Warbler	*Dendroica petechia*
Yellow-headed Blackbird*	*Xanthocephalus xanthocephalus*
Yellow-Rumped Warbler	*Dendroica coronata*
MAMMAL	
Black-tailed Jack Rabbit	*Lepus californicus*
Coyote*	*Canis latrans*
Deer sp.*	
Domestic Cat*	
Eastern Cottontail	*Sylvilagus floridanus*
Meadow Vole*	*Microtus pennsylvanicus*
Mule Deer*	*Odocoileus hemionus*
Muskrat*	***Ondatra zibethicus***
Raccoon*	***Procyon lotor***
Richardson's Ground Squirrel*	*Urocitellus richardsonii*
Red Fox*	*Vulpes vulpes*
Striped Skunk*	*Mephitis mephitis*
White-tailed Jack Rabbit*	*Lepus townsendii*
INVERTEBRATE	
Crayfish	*Crayfish spp.*

Species identified in 2011 are listed in **bold** type.

*Species identitfied in 2011 by MDT.

Table 5. (Continued). Wildlife species observed at the Wagner Marsh Wetland Mitigation Site from 2005 to 2011.

COMMON NAME	SCIENTIFIC NAME
REPTILE	
Common Gartersnake	*Thamnophis sirtalis*
Plains Gartersnake	*Thamnophis radix*
Unidentified turtle*	

Species identified in 2011 are listed in **bold** type.
*Species identitfied in2011 by MDT.

3.6. Functional Assessment

The baseline assessment completed in 2001 and the 2006 and 2007 post-construction wetland functions and values were assessed using the 1999 MWAM. Functional assessments from 2008 to 2010 were evaluated using the 2008 MWAM. The completed 2011 Wetland Assessment Form is presented in Appendix B. The functional assessment results from 2001 to 2011 are summarized in Table 6.

The created wetlands at Wagner Marsh were ranked as Category I wetland in 2011, a significant improvement over the Category IV rating in 2001. The number of functional points has shown a steady increase since the 2001 baseline assessment. The AA received 81.11 percent of the total possible points in 2011. Ratings were excellent for production export/food chain support and high for the functions of general wildlife habitat, short and long term surface water storage, sediment/nutrient/toxicant removal, sediment/shoreline stabilization, groundwater discharge/recharge, and recreation/education potential.

3.7. Photo Documentation

Representative photographs taken at photo points PP1 through PP4 from 2009 to 2011 are shown on pages C-1 through C-9 of Appendix C. The photo point locations are shown on Figure 3 (Appendix A). Photos of the beginning and end of the transect are included on page C-10 of Appendix C. Photographs of the data points are shown on C-11.

3.8. Maintenance Needs

The location of Priority 2B noxious weed infestations of spotted knapweed, Canada thistle, field bindweed, and saltcedar were mapped on Figure 3 (Appendix A). Spotted knapweed was observed in a single area, less than 0.1 acres in size, in the upland between the northern wetland cells. The cover class was moderate. Canada thistle was present in one infestation at less than 0.1 acres in size and at 1 to 5 percent cover (low cover class). Infestations of field bindweed were noted along the berm on the east edge of the site at 0.1 to 1.0 acres in size and a low cover class. Field bindweed was also mapped in a location along the western boundary of the site. Saltcedar was observed near the center of the site at less than 0.1 acres and 1 to 5 percent cover. A comprehensive weed spraying program was implemented at the site in 2007 and

Table 6. Summary of the 2001 and 2005 through 2011 wetland function/value ratings and functional points at the Wagner Marsh Wetland Mitigation Site.

Function and Value Parameters from the MDT Montana Wetland Assessment Method	2001[1] Baseline Assessment	2005 [1]	2006 [1]	2007 [1]	2008 [2]	2009 [2]	2010 [2]	2011 [2]
Listed/Proposed T&E Species	Low (0.5)	Low (0.5)	Low (0.5)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.1)
MTNHP Species Habitat	Low (0.2)	Low (0.2)	Low (0.2)	Low (0.2)	Mod (0.6)	Mod (0.7)	High (0.9)	Mod (0.6)
General Wildlife Habitat	Low (0.3)	Mod (0.7)	Mod (0.7)	Mod (0.7)	High (0.9)	High (0.9)	High (0.9)	High (0.9)
General Fish/Aquatic Habitat	N/A	N/A	N/A	N/A	N/A	N/A	NA	NA
Flood Attenuation	N/A	N/A	N/A	N/A	N/A	N/A	NA	NA
Short and Long Term Surface Water Storage	Mod (0.6)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Sediment/Nutrient/Toxicant Removal	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)	High (1.0)
Sediment/Shoreline Stabilization	N/A	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (1.0)	High (1.0)	High (1.0)
Production Export/Food Chain	Mod (0.6)	High (0.8)	High (0.9)	High (0.9)	High (0.8)	High (0.8)	High (0.8)	Exc (1.0)
Groundwater Discharge/Recharge	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)	Mod (0.5)	Mod (0.5)	Mod (0.5)	Mod (0.5)	Mod (0.5)	Mod (0.5)	Mod (0.5)
Recreation/Education Potential (bonus points*)	Low (0.2)	Low (0.1)	Mod (0.5)	High (1.0)	Mod (0.1)	Mod (0.1)	Mod (0.1)	High (0.2)
Actual Points / Possible Points	4.3 / 9	5.8 / 10	6.7 / 10	6.7 / 10	6.3 / 9	6.7 / 9	6.9 / 9	7.3/9
% of Possible Score Achieved	48%	58%	67%	67%	70%	74%	77%	81%
Overall Category	IV	III	II	II	II	II	II	I
Total Acreage of Assessed Aquatic Habitat within AA Boundaries	**3.87**	**11.84**	**11.49**	**13.30**	**16.19**	**16.58**	**18.84**	**18.77**
Functional Units (acreage x actual points)	**16.64**	**68.70**	**77.00**	**89.11**	**102.00**	**111.1**	**130.0**	**137.0**
Net Acreage Gain	N/A	**7.84**	**7.62**	**9.43**	**12.32**	**12.71**	**14.97**	**14.90**
Net Functional Unit Gain	N/A	**52.1**	**60.36**	**72.47**	**85.36**	**94.46**	**113.36**	**120.38**

[1]Berglund 1999.
[2]Berglund and McEldowney 2008.
*Assessed as bonus points on 2008 form.

2008. The site was sprayed in 2009, July 20, 2010, and again in the summer of 2011. These efforts have been especially noticeable by the decreaseing cover of noxious weeds within the site. Following the 2011 mid-summer site visit, herbicide was applied to control field bindweed, spotted knapweed, salt cedar, and Canada thistle. The comprehensive weed spraying program has proved effective at controlling noxious weed species by the continued decrease in cover observed during each subsequent monitoring event. Continued, occasional spraying may still be needed to prevent future weed issues.

Two inlet pipes were discharging clean groundwater pumped from the gravel mining pit to the west of the site into the Wagner Marsh mitigation project area during the August site visit. Aside from these pipes, there are no water control structures within site. All fences were intact.

3.9. Current Credit Summary

The Wagner Marsh site will provide mitigation credits for two previously created wetland and open water areas totaling 3.87 acres and seven constructed wetland cells. The pre-existing wetlands were originally created in association with the 2000 to 2001 Shiloh Road interchange project and subsequently protected from disturbance by MDT. An upland buffer was included in the mitigation credits for the project. A 50-foot wide buffer established around the created wetland cells was estimated at 5.19 acres in 2009. The credit ratios and estimated credit acreages for 2011 is presented in Table 7.

Approximately 18.77 acres of wetland were delineated in 2011. The open water was reclassified as Aquatic Macrophyte habitat in 2011 as a result of the increase of algae, submerged, and floating vegetation within these inundated cells. Aquatic bed habitats are generally defined as a wetland vegetation class dominated by plants “that grow principally on or below the surface of the water for most of the growing season in almost all years (Cowardin et al. 1979).” The Montana Natural Heritage Program (MTNHP) website further defines the Palustrine Aquatic Bed Class (PAB) as having aquatic plants at greater than 30 percent cover and water depths of greater than 0.5 m (and less than 2 meters) (MTNHP 2011). The mitigation site encompasses 22.06 acres of upland. The credit estimate for the upland buffer presented in Table 6 was based on the 2009 estimate of 5.19 acres representing a 50-foot buffer around the wetland cells.

The Wagner Marsh site has been monitored for seven years post construction. This site has exhibited positive trends toward wetland development throughout this period and appears to have fully developed to its potential. Based on the results of the 2011 field survey, a total of 20.07 acres of credit have been developed at this site to date. We recommend seeking the release of this site from further monitoring requirements from the USACE.

Table 7. Estimated credit summary for 2011.

Credit Category	2010 Habitat Acreages	2011 Habitat Acreages	Credit Ratio	2010 Estimated Credit Acreages	2011 Credit Acreages
Total aquatic habitat	10.04	18.77	1:1	10.04	18.77
Total Open water	8.80	0.00	20% of wetland acreage**	3.77	0.00
50-foot wide upland buffer*	5.19	5.19	4:1	1.30	1.30
TOTAL	**24.03**	**23.96**		**15.11**	**20.07**

*Acreage based on 2009 estimate of a 50-foot buffer.
**Credit for open water will be limited to no more than 20 percent of the amount of actual wetland that develops at the site.

4. REFERENCES

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Appendix A

Figures 2 and 3

MDT Wetland Mitigation Monitoring
Wagner Marsh
Yellowstone County, Montana

Figure 2: 2011 Monitoring Activity Locations

T-1 finish
PP4
MW3
MW2
PP1
T-1 start
PP3
WM-2
WM-1
WM-3u
WM-3w
MW1
PP2

GRAPHICAL REPRESENTATION MAY OR MAY NOT DEPICT THE LEGAL DESCRIPTION OF ANY PARCEL HEREIN. THIS FIGURE IS A VISUAL AID ONLY; BOUNDARY RESTORATION MUST BE MADE BY A LICENSED LAND SURVEYOR. THIS FIGURE IS INTENDED TO DISPLAY INFORMATION RELEVANT TO THE REFERENCED REPORT. CONFLUENCE MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND REGARDING THIS DRAWING FOR ANY USE OTHER THAN THE ORIGINAL. ANY OTHER USE IS AT THE USER'S SOLE RISK.

LOCATION: Yellowstone Co., MT

PROJECT NO: STPX 56(50)

FILE: Wagner/Monitor2011.mxd

Project Name
Wagner Marsh Mitigation Site

Drawing Title
2011 Monitoring Activity Locations

DRAWN	CHECKED	APPROVED
BCS	BV	JJ

SCALE: Noted

Drawn: September 6, 2011

PROJ MGR: B Sandefur

CONFLUENCE
consulting incorporated

Figure
2

REV -

Figure 3: 2011 Mapped Site Features

Legend

Monitoring Limits
Wetland Limits
Vegetation Communities

Base Photography Date: August 17, 2011

Noxious Weeds
- Centaurea maculosa
- Cirsium arvense
- Convolvulus arvensis
- Tamarisk
  - Infestation SIze
    - X = <0.1 acre
    - ▲ = 0.1 to 1 acre
    - ■ = 1 to 5 acre
  - Cover Class
    - T = Trace (<1% cover)
    - L = Low (1-5% cover)
    - M = Moderate (5-25% cover)

Vegetation Community Types

1 Aquatic Macrophytes
3 Typha latifolia/Eleocharis palustris
6 Upland Grasses
7 Agropyron spp./Festuca spp.
10 Carex spp./Scirpus spp.
11 Phalaris arundinacea
12 Scirpus acutus
14 Elaeagnus angustifolia/Populus deltoides
15 Hordeum jubatum/Typha latifolia

Acreages

Project Area	40.83 acres
Wetlands	18.77 acres
Uplands	22.06 acres

GRAPHICAL REPRESENTATION MAY OR MAY NOT DEPICT THE LEGAL DESCRIPTION OF ANY PARCEL HEREIN. THIS FIGURE IS A VISUAL AID ONLY; BOUNDARY RESTORATION MUST BE MADE BY A LICENSED LAND SURVEYOR. THIS FIGURE IS INTENDED TO DISPLAY INFORMATION RELEVANT TO THE REFERENCED REPORT. CONFLUENCE MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND REGARDING THIS DRAWING FOR ANY USE OTHER THAN THE ORIGINAL. ANY OTHER USE IS AT THE USER'S SOLE RISK.

Feet

LOCATION: Yellowstone Co., MT
PROJECT NO: STPX 56(50)
FILE: Wagner/Veg2011.mxd

Project Name: Wagner Marsh Mitigation Site
Drawing Title: 2011 Mapped Site Features

DRAWN	CHECKED	APPROVED
BCS	BV	JU

SCALE: Noted
Drawn: September 7, 2011
PROJ MGR: B Sandefur

CONFLUENCE consulting incorporated

Figure 3

REV -

Appendix B

2011 MDT Wetland Mitigation Site Monitoring Form
2011 USACE Wetland Determination Data Form
2011 MDT Montana Wetland Assessment Form

MDT Wetland Mitigation Monitoring
Wagner Marsh
Yellowstone County, Montana

MDT WETLAND MITIGATION SITE MONITORING FORM

Project Site: Wagner Marsh Assessment Date/Time 8/11/2011 7:39:00 AM

Person(s) conducting the assessment: B. Sandefur, L. Soderquist

Weather: Clear in a.m., cloudy afternoon, c Location:

MDT District: Billings Milepost: NA

Legal Description: T 1S R 25E Section(s) 28

Initial Evaluation Date: 8/1/2005 Monitoring Year: 7 #Visits in Year: 1

Size of Evaluation Area: 40 (acres)

Land use surrounding wetland:

Residential and ag, active gravel pit due west across 56th St., WJH Bird Resources-Waterfowl facility to north.

HYDROLOGY

Surface Water Source: Groundwater, overland flow, evacuation of groundwater from gravel pit

Inundation: ☑ Average Depth: 1.5 **(ft)** Range of Depths: 0-2.2 **(ft)**

Percent of assessment area under inundation: 40 %

Depth at emergent vegetation-open water boundary: 0.8 **(ft)**

If assessment area is not inundated then are the soils saturated within 12 inches of surface: Yes

Other evidence of hydrology on the site (ex. – drift lines, erosion, stained vegetation, etc**:**

Dried algal mats, surface soil cracks, water marks.

Groundwater Monitoring Wells

Record depth of water surface below ground surface, in feet.

Well ID	Water Surface Depth (ft)
MW-3	1.3
MW-1	2.5

Additional Activities Checklist:

☑ Map emergent vegetation-open water boundary on aerial photograph.

☑ Observe extent of surface water during each site visit and look for evidence of past surface water elevations (drift lines, erosion, vegetation staining, etc.)

☑ Use GPS to survey groundwater monitoring well locations, if present.

Hydrology Notes:

VEGETATION COMMUNITIES

Site Wagner Marsh

(Cover Class Codes **0** = < 1%, **1** = 1-5%, **2** = 6-10%, **3** = 11-20%, **4** = 21-50% , **5** = >50%)

* Indicates accepted spp name not on '88 list.

Community # 1 **Community Type:** Aquatic Macrophytes / **Acres:** 8.65

Species	Cover class	Species	Cover class
Algae, green	5	Open water	5
Potamogeton sp.	2		

Comments:

Community # 3 **Community Type:** Typha latifolia / Eleocharis palustris **Acres:** 4.38

Species	Cover class	Species	Cover class
Algae, green	2	Carduus nutans	0
Carex lanuginosa	0	Carex nebrascensis	1
Carex sp.	2	Cirsium arvense	0
Deschampsia cespitosa	0	Elaeagnus commutata	0
Eleocharis palustris	2	Glyceria grandis	0
Juncus balticus	1	Salix amygdaloides	0
Scirpus acutus	2	Scirpus maritimus	0
Scirpus pungens	0	Tamarix ramosissima	0
Typha latifolia	5		

Comments:

Community # 6 **Community Type:** Upland Grasses / **Acres:** 10.9

Species	Cover class	Species	Cover class
Agropyron cristatum	4	Agropyron smithii	3
Alopecurus arundinaceus	0	Asclepias speciosa	0
Bromus japonicus	4	Centaurea maculosa	0
Convulvus arvensis	0	Elaeagnus angustifolia	1
Elaeagnus commutata	0	Elymus cinereus	2
Festuca idahoensis	3	Festuca pratensis	3
Grindelia squarrosa	0	Hordeum jubatum	2
Juniperus scopulorum	0	Lactuca serriola	0
Lepidium perfoliatum	0	Medicago lupulina	0
Medicago sativa	1	Melilotus officinalis	0
Oenothera biennis	0	Phleum pratense	0
Ratibida columnifera	0	Salsola kali	0
Sisymbrium altissimum	0	Verbena bracteata	0

Comments:

Community # 7 Community Type: Agropyron spp. / Festuca spp. **Acres:** 11.16

Species	Cover class	Species	Cover class
Agropyron cristatum	3	Agropyron repens	2
Agropyron smithii	3	Bromus inermis	1
Bromus japonicus	2	Convulvus arvensis	1
Elymus cinereus	2	Festuca idahoensis	1
Festuca pratensis	2	Melilotus officinalis	0
Phleum pratense	1	Sonchus arvensis	0

Comments:

Community # 10 Community Type: Carex spp. / Scirpus spp. **Acres:** 0.25

Species	Cover class	Species	Cover class
Carex lanuginosa	3	Carex nebrascensis	1
Deschampsia cespitosa	1	Eleocharis palustris	1
Juncus balticus	1	Juncus torreyi	1
Panicum capillare	1	Phalaris arundinacea	0
Populus deltoides	0	Scirpus acutus	1
Scirpus maritimus	1	Scirpus microcarpus	2
Tamarix ramosissima	0		

Comments:

Community # 11 Community Type: Phalaris arundinacea / **Acres:** 0.33

Species	Cover class	Species	Cover class
Bromus japonicus	2	Hordeum jubatum	2
Phalaris arundinacea	5	Salix exigua	0

Comments:

Community # 12 Community Type: Scirpus acutus / **Acres:** 1.16

Species	Cover class	Species	Cover class
Algae, green	1	Eleocharis palustris	1
Juncus balticus	1	Salix amygdaloides	0
Scirpus acutus	4	Scirpus pungens	2
Typha latifolia	1		

Comments:

Community # 14 **Community Type:** Elaeagnus angustifolia / Populus deltoides **Acres:** 1.19

Species	Cover class	Species	Cover class
Apocynum cannabinum	1	Carex nebrascensis	1
Cynoglossum officinale	0	Elaeagnus angustifolia	4
Eleocharis palustris	2	Eleocharis pauciflora	0
Nepeta cataria	1	Phalaris arundinacea	1
Polypogon monspeliensis	0	Populus deltoides	3
Salix exigua	3	Scirpus acutus	3
Scirpus cyperinus	1	Solidago canadensis	0
Typha latifolia	1		

Comments:

Community # 15 **Community Type:** Hordeum jubatum / Typha latifolia **Acres:** 2.81

Species	Cover class	Species	Cover class
Convolvulus arvensis	0	Eleocharis palustris	2
Helianthus annuus	0	Hordeum jubatum	3
Juncus torreyi	0	Lotus unifoliolatus	0
Panicum capillare	2	Plantago major	0
Polygonum pensylvanicum	1	Populus deltoides	1
Rumex maritimus	0	Scirpus maritimus	1
Typha latifolia	2		

Comments:

Total Vegetation Community Acreage **40.83**

(Note: some area within the project bounds may be open water or other non-vegetative ground cover.)

VEGETATION TRANSECTS

Site: Wagner Marsh Date: 8/11/2011 7:39:00 AM

Transect Number: 1 **Compass Direction from Start:** 70

Interval Data:

Ending Station 50 **Community Type:** Typha latifolia / Eleocharis palustris

Species	Cover class	Species	Cover class
Carex lanuginosa	1	Carex nebrascensis	1
Eleocharis palustris	2	Juncus balticus	3
Salix amygdaloides	1	Scirpus acutus	1
Scirpus pungens	2	Typha latifolia	4

Ending Station 152 **Community Type:** Scirpus acutus /

Species	Cover class	Species	Cover class
Algae, green	2	Eleocharis palustris	2
Juncus balticus	1	Salix amygdaloides	1
Scirpus acutus	4	Typha latifolia	2

Ending Station 522 **Community Type:** Aquatic Macrophytes /

Species	Cover class	Species	Cover class
Algae, green	3	Open water	5
Potamogeton sp.	3		

Ending Station 530 **Community Type:** Typha latifolia / Eleocharis palustris

Species	Cover class	Species	Cover class
Algae, green	3	Eleocharis palustris	2
Scirpus acutus	3	Typha latifolia	5

Transect Notes:

PLANTED WOODY VEGETATION SURVIVAL

Wagner Marsh

Planting Type	#Planted	#Alive	Notes
Eleagnus commutata	50	10	
Juniperus scopulorum	50	22	
Populus deltoides	50	50	Cottonwood recruitment in several areas noted
Prunus virginica	100	45	
Ribes aureum	100	18	
Rosa woodsii	100	20	
Sheperdia argentea	100	20	Some stems that appeared dead in 2010 with new shoots

Comments

Wagner Marsh

WILDLIFE

Birds

Were man-made nesting structures installed? No

If yes, type of structure: _____

How many? _____

Are the nesting structures being used? No

Do the nesting structures need repairs? No

Nesting Structure Comments:

Species	#Observed	Behavior	Habitat
American Coot	3	L	OW
Barn Swallow	12	FO, L	SS
Blue-winged Teal	12	F, L	AB, OW
Canada Goose	22	FO, L	AB, OW, UP
Gray Catbird	4	F	SS, WM
Great Blue Heron	1	F, L	AB, OW
Killdeer	8	F, L	AB, US
Mallard	16	F, L	AB, OW
Mourning Dove	4	FO	SS, UP, WM
Red-tailed Hawk	2	F, FO	UP, WM
Sandhill Crane	4	F, L	AB, MF, OW

Bird Comments

BEHAVIOR CODES

BP = One of a breeding pair **BD** = Breeding display **F** = Foraging **FO** = Flyover **L** = Loafing **N** = Nesting

HABITAT CODES

AB = Aquatic bed **SS** = Scrub/Shrub **FO** = Forested **UP** = Upland buffer **I** = Island

WM = Wet meadow **MA** = Marsh **US** = Unconsolidated shore **MF** = Mud Flat **OW** = Open Water

Mammals and Herptiles

Species	# Observed	Tracks	Scat	Burrows	Comments
Deer sp.		Yes	No	No	
Muskrat		Yes	No	Yes	
Northern Leopard Frog	18	No	No	No	
Raccoon		Yes	Yes	No	

Wildlife Comments:

Wagner Marsh

PHOTOGRAPHS

Take photographs of the following permanent reference points listed in the check list below. Record the direction of the photograph using a compass. When at the site for the first time, establish a permanent reference point by setting a ½ inch rebar or fencepost extending 2-3 feet above ground. Survey the location with a resource grade GPS and mark the location on the aerial photograph.

Photograph Checklist:

☑ One photograph for each of the four cardinal directions surrounding the wetland.

☑ At least one photograph showing upland use surrounding the wetland. If more than one upland exists then take additional photographs.

☑ At least one photograph showing the buffer surrounding the wetland.

☑ One photograph from each end of the vegetation transect, showing the transect.

Photo #	Latitude	Longitude	Bearing	Description
8617	45.716457	-108.656464	22	PP1
8619	45.716457	-108.656464	105	PP1
8622	45.716457	-108.656464	162	PP1
8623	45.716457	-108.656464	214	PP1
8624	45.716457	-108.656464	205	PP1
8625	45.716457	-108.656464	310	PP1
8626	45.716457	-108.656464	335	PP1
8639	45.715481	-108.656464	70	T1 start
8642	45.715828	-108.654549	250	T1 end
8644	45.715458	-108.654457	241	PP4
8645	45.715458	-108.654457	293	PP4
8646	45.715458	-108.654457	324	PP4
8647	45.715458	-108.654457	356	PP4
8648	45.714359	-108.65609	24	PP3
8649	45.714359	-108.65609	243	PP3
8650	45.714359	-108.65609	294	PP3
8651	45.714359	-108.65609	343	PP3
8655	45.7145	-108.658363	1	PP2
8656	45.7145	-108.658363	74	PP2
8657	45.7145	-108.658363	153	PP2
8660	45.713753	-108.656952	75	WM1
8664	45.714962	-108.656967	310	WM2
8665	45.715611	-108.657532	110	WM3-W
8666	45.715698	-108.657433	180	WM3-U

Comments:

Wagner Marsh

ADDITIONAL ITEMS CHECKLIST

Hydrology

☐ Map emergent vegetation/open water boundary on aerial photos.
☐ Observe extent of surface water. Look for evidence of past surface water elevations (e.g. drift lines, vegetation staining, erosion, etc).

Photos

☐ One photo from the wetland toward each of the four cardinal directions
☐ One photo showing upland use surrounding the wetland.
☐ One photo showing the buffer around the wetland
☐ One photo from each end of each vegetation transect, toward the transect

Vegetation

☑ Map vegetation community boundaries

☑ Complete Vegetation Transects

Soils

☑ Assess soils

Wetland Delineations

☑ Delineate wetlands according to applicable USACE protocol (1987 form or Supplement)
☑ Delineate wetland – upland boundary onto aerial photograph.

Wetland Delineation Comments

Functional Assessments

☑ Complete and attach full MDT Montana Wetland Assessment Method field forms.

Functional Assessment Comments:

Maintenance

Were man-made nesting structure installed at this site? No

If yes, do they need to be repaired?

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

Were man-made structures built or installed to impound water or control water flow into or out of the wetland? Yes

If yes, are the structures in need of repair? No

If yes, describe the problems below.

All inlets appeared to be in good working order, no outlet.

WETLAND DETERMINATION DATA FORM – Routine Weltand Delineation, 1987 COE Protocol

Project/Site: Wagner Marsh Mitigation Site City/County: Yellowstone Sampling Date: 8/11/2011

Applicant/Owner: MDT State: MT Sampling Point: WM-1

Investigator(s): B. Sandefur Section, Township, Range: S 28 T 1S R 252

Landform (hillslope, terrace, etc.): Shoreline Local relief (concave, convex, none): flat Slope (%): _____

Subregion (LRR): LRR G Lat: 45.713753 Long: -108.656952 Datum: WGS 84

Soil Map Unit Name: Larim gravelly loam

Do Normal Circumstances Exist on this site? Yes ☐

Is the site significantly disturbed (Atypical Situation)? Yes ☐

Is the area a potential Problem Area? Yes ☐

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☐	**Is the Sampled Area within a Wetland?** Yes ☐ No ☐
Hydric Soil Present?	Yes ☐	No ☐	
Wetland Hydrology Present?	Yes ☐	No ☐	

Remarks:
Point along high water mark of inundated cell.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	0 = Total Cover		
Herb Stratum (Plot size: _____)			
1. Chenopodium album	3	☐	FAC
2. Panicum capillare	2	☐	FAC
3. Polygonum pensylvanicum	2	☐	FACW
4.	0	☐	
5.	0	☐	
6.	0	☐	
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
11.	0	☐	
	7 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 93

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Dominance Test is >50% ☐

Hydrophytic Vegetation Present? Yes ☐ No ☐

Remarks:

SOIL

Sampling Point: WM-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	7.5YR 4/3	95	7.5YR 4/1	5	D	M	Silt Loam	
2-5	7.5YR 4/1	95	10YR 4/3	5	C	M	Silt Loam	
5-12	10YR 3/1	90	10YR 5/1	10	D	M	Silt Loam	gravelly

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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 Soils List
- ☐ Listed on National Soils List
- ☐ Other (explain in remarks)

Taxonomy Subgroup: mesic Ustic Calciargids

Confirm Mapped Type?: ☐

Hydric Soil Present? Yes ☐ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators

- ☐ Innundated
- ☐ Saturated in upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage patterns in wetlands

Secondary Indicators (2 or more required)

- ☐ Oxidized Rhizospheres along Living Roots
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Field Observations:

Surface Water Present? Yes ☐ No ☐ Depth (inches): _____

Water Table Present? Yes ☐ No ☐ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☐ Depth (inches): _____

Wetland Hydrology Present? Yes ☐ No ☐

Remarks:

WETLAND DETERMINATION DATA FORM – Routine Weltand Delineation, 1987 COE Protocol

Project/Site: Wagner Marsh Mitigation Site City/County: Yellowstone Sampling Date: 8/11/2011

Applicant/Owner: MDT State: MT Sampling Point: WM-2

Investigator(s): B. Sandefur Section, Township, Range: S 28 T 1S R 252

Landform (hillslope, terrace, etc.): Shoreline Local relief (concave, convex, none): flat Slope (%): 0

Subregion (LRR): LRR G Lat: 45.714495 Long: -108.657045 Datum: WGS 84

Soil Map Unit Name: Lambert silt loam

Do Normal Circumstances Exist on this site? Yes ☐

Is the site significantly disturbed (Atypical Situation)? Yes ☑

Is the area a potential Problem Area? Yes ☐

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☑	No ☐	**Is the Sampled Area within a Wetland?** Yes ☑ No ☐
Hydric Soil Present?	Yes ☑	No ☐	
Wetland Hydrology Present?	Yes ☑	No ☐	

Remarks:
Point along rocky bottom of excavated basin.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	0 = Total Cover		
Herb Stratum (Plot size: 5ft)			
1. Polygonum pensylvanicum	5	☐	FACW
2. Chenopodium album	10	☑	FAC
3. Chenopodium spp.	10	☑	NL
4. Panicum capillare	10	☑	FAC
5. Polypogon monspeliensis	5	☐	OBL
6. Populus deltoides	5	☐	FAC
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
11.	0	☐	
	45 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 45

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66 (A/B)

Dominance Test is >50% ☑

Hydrophytic Vegetation Present? Yes ☑ No ☐

Remarks:

SOIL

Sampling Point: WM-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 4/2	90	10YR 4/6	10	C	M	Sandy Loam	very gravelly

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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 Soils List
- ☐ Listed on National Soils List
- ☐ Other (explain in remarks)

Taxonomy Subgroup: frigid Typic Ustorthents

Confirm Mapped Type?: ☐

Hydric Soil Present? Yes ☐ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators

- ☐ Innundated
- ☐ Saturated in upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage patterns in wetlands

Secondary Indicators (2 or more required)

- ☐ Oxidized Rhizospheres along Living Roots
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Field Observations:

Surface Water Present? Yes ☐ No ☐ Depth (inches): _____

Water Table Present? Yes ☐ No ☐ Depth (inches): 4

Saturation Present? (includes capillary fringe) Yes ☐ No ☐ Depth (inches): 2

Wetland Hydrology Present? Yes ☐ No ☐

Remarks:

WETLAND DETERMINATION DATA FORM – Routine Weltand Delineation, 1987 COE Protocol

Project/Site: Wagner Marsh Mitigation Site City/County: Yellowstone Sampling Date: 8/11/2011

Applicant/Owner: MDT State: MT Sampling Point: WM-3u

Investigator(s): B. Sandefur Section, Township, Range: S 28 T 1S R 252

Landform (hillslope, terrace, etc.): Levee Local relief (concave, convex, none): convex Slope (%): 0

Subregion (LRR): LRR G Lat: 45.7154516666667 Long: -108.657483333333 Datum: WGS 84

Soil Map Unit Name: Keiser silty cloay loam

Do Normal Circumstances Exist on this site? Yes ☐

Is the site significantly disturbed (Atypical Situation)? Yes ☐

Is the area a potential Problem Area? Yes ☐

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☐	**Is the Sampled Area within a Wetland?** Yes ☐ No ☐
Hydric Soil Present?	Yes ☐	No ☐	
Wetland Hydrology Present?	Yes ☐	No ☐	

Remarks:
Point along berm in veg comm 6

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	0 = Total Cover		
Herb Stratum (Plot size:)			
1. Agropyron repens	50	☐	FAC
2. Medicago lupulina	5	☐	FACU
3. Tragopogon dubius	5	☐	NL
4.	0	☐	
5.	0	☐	
6.	0	☐	
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
11.	0	☐	
	60 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 20

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Dominance Test is >50% ☐

Hydrophytic Vegetation Present? Yes ☐ No ☐

Remarks:

SOIL

Sampling Point: WM-3u

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 4/3	100					Silt Loam	
5-12	10YR 5/3	95	10YR 3/2	5			Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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 Soils List
- ☐ Listed on National Soils List
- ☐ Other (explain in remarks)

Taxonomy Subgroup: mesic Aridic Haplustalfs

Confirm Mapped Type?: ☐

Hydric Soil Present? Yes ☐ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators

- ☐ Innundated
- ☐ Saturated in upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage patterns in wetlands

Secondary Indicators (2 or more required)

- ☐ Oxidized Rhizospheres along Living Roots
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Field Observations:

Surface Water Present? Yes ☐ No ☐ Depth (inches): _____

Water Table Present? Yes ☐ No ☐ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☐ Depth (inches): _____

Wetland Hydrology Present? Yes ☐ No ☐

Remarks: No hydro indicators

WETLAND DETERMINATION DATA FORM – Routine Weltand Delineation, 1987 COE Protocol

Project/Site: Wagner Marsh Mitigation Site City/County: Yellowstone Sampling Date: 8/11/2011

Applicant/Owner: MDT State: MT Sampling Point: WM-3w

Investigator(s): B. Sandefur Section, Township, Range: S 28 T 1S R 252

Landform (hillslope, terrace, etc.): Lowland Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): LRR G Lat: 45.7156916666667 Long: -108.657571666667 Datum: WGS 84

Soil Map Unit Name: Keiser silty cloay loam

Do Normal Circumstances Exist on this site? Yes ☐

Is the site significantly disturbed (Atypical Situation)? Yes ☐

Is the area a potential Problem Area? Yes ☐

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☐	**Is the Sampled Area within a Wetland?** Yes ☐ No ☐
Hydric Soil Present?	Yes ☐	No ☐	
Wetland Hydrology Present?	Yes ☐	No ☐	

Remarks:
Point in veg comm 10

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	0 = Total Cover		
Herb Stratum (Plot size:)			
1. Scirpus maritimus	20	☐	NI
2. Carex lanuginosa	50	☐	OBL
3. Eleocharis palustris	10	☐	OBL
4. Carex nebrascensis	20	☐	OBL
5.	0	☐	
6.	0	☐	
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
11.	0	☐	
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66 (A/B)

Dominance Test is >50% ☐

Hydrophytic Vegetation Present? Yes ☐ No ☐

Remarks:

SOIL

Sampling Point: WM-3w

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/1	95	10YR 4/6	5	C	M	oarse Loamy Sar	Very gravelly

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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 Soils List
- ☐ Listed on National Soils List
- ☐ Other (explain in remarks)

Taxonomy Subgroup: mesic Aridic Haplustalfs

Confirm Mapped Type?: ☐

Hydric Soil Present? Yes ☐ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators

- ☐ Innundated
- ☐ Saturated in upper 12 inches
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage patterns in wetlands

Secondary Indicators (2 or more required)

- ☐ Oxidized Rhizospheres along Living Roots
- ☐ Water-Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC-Neutral Test
- ☐ Other (Explain in Remarks)

Field Observations:

Surface Water Present? Yes ☐ No ☐ Depth (inches): 4

Water Table Present? Yes ☐ No ☐ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☐ Depth (inches): _____

Wetland Hydrology Present? Yes ☐ No ☐

Remarks:

MDT Montana Wetland Assessment Form (revised March 2008)

1. Project name Wagner Marsh **2. MDT project#** STPX 56(50) **Control#**

3. Evaluation Date 8/11/2011 **4. Evaluators** B. Sandefur **5. Wetland/Site# (s)** Wagner Marsh

6. Wetland Location(s): **T** 1S **R** 25E **Sec1** 28 **T** **R** **Sec2**

Approx Stationing or Mileposts NA

Watershed 13-Upper Yellowstone **Watershed/County** Yellowstone Co., MT

7. Evaluating Agency Confluence for MDT

8. Wetland size acres 18.77

Purpose of Evaluation

- ☐ **Wetlands potentially affected by MDT project**
- ☐ **Mitigation Wetlands: pre-construction**
- ☑ **Mitigation Wetlands: post construction**
- ☐ **Other**

How assessed: Measured e.g. by GPS

9. Assesssment area (AA) size (acres) 18.77

How assessed: Measured e.g. by GPS

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
Depressional	Emergent Wetland	Excavated	Seasonal/Intermittant	35
Depressional	Aquatic Bed	Excavated	Permanent/Perennial	40
Depressional	Scrub-Shrub Wetland	Excavated	Seasonal/Intermittant	10
Depressional	Unconsolidated Bottom	Excavated	Permanent/Perennial	10
Depressional	Forested Wetland	Excavated	Seasonal/Intermittant	5

11. Estimated Relative Abundance Common

12. General Condition of AA

i. Disturbance: (use matrix below to determine [circle] appropriate response – see instructions for Montana-listed noxious weed and aquatic nuisance vegetation species (**ANVS**) lists)

Conditions within AA	*Predominant conditions adjacent to (within 500 feet of) AA*		
	Managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings; and noxious weed or ANVS cover is <=15%.	Land not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to minor clearing; contains few roads or buildings; noxious weed or ANVS cover is <=30%.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >=30%.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings; and noxious weed or ANVS cover is <=15%.	low disturbance	low disturbance	moderate disturbance
AA not cultivated, but may be 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; noxious weed or ANVS cover is <=30%.	moderate	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; or noxious weed or ANVS cover is >=30%.	high disturbance	high disturbance	high disturbance

Comments: (types of disturbance, intensity, season, etc)

Mitigation site created in an old MDT gravel pit in 2005. Disturbance within the AA has ceased since construction was completed and desirable vegetation has established through much of the site.

ii. Prominent noxious, aquatic nuisance, other exotic species:

Cirsium arvense, Convolvulus arvenis, Centaurea maculosa, Tamarisk

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

AA is an old gravel pit converted into a wetland complex. Hydrology for ths site is augmented by pumping water from the gravel pit on the west side of S. 56th St. W. onto the site at two locations. Both pipes appeared to be discharging clean water into the mitigation site during the field investigation. AA is directly adjacent to S. 56th St. W. Surrounding land has rolling topography with agricultural (hay & livestock) and residential landuse.

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

Existing # of "Cowardin" Vegetated Classes in AA	Initial Rating	Is current management preventing (passive) existence of additional vegetated classes?		Modified Rating
>=3 (or 2 if 1 is forested) classes	H	NA	NA	NA
2 (or 1 if forested) classes	M	NA	NA	NA
1 class, but not a monoculture	M	<NO	YES>	L
1 class, monoculture (1 species comprises>=90% of total cover)	L	NA	NA	NA

Comments: PSS, PEM, PAB, and some scattered cottonwoods.

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 (check 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	Whooping crane
No usable habitat	☑ S	

ii. Rating (use the conclusions from i above and the matrix below to arrive at [check] the functional points and rating)

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

Sources for documented use: Only the black footed ferret and whooping crane are listed by USFWS (8/2011) as potentially occurring in Yellowstone County.

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 (check one based on definitions contained in instructions):

Primary or critical habitat (list species)	○ D ○ S	
Secondary habitat (list Species)	◉ D ○ S	Great blue heron (S3)
Incidental habitat (list species)	○ D ◉ S	Western hognose snake (S2), Bald eagle (S3B)
No usable habitat	☐ S	

ii. Rating (use the conclusions from i above and the matrix below to arrive at [check] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
S1 Species: *Functional Points and Rating*	1H	.8H	.7M	.6M	.2L	.1L	0L
S2 and S3 Species: *Functional Points and Rating*	.9H	.7M	.6M	.5M	.2L	.1L	0L

Sources for documented use: Observed onsite by Confluence personnel

14C. General Wildlife Habitat Rating:

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

Substantial

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

- [x] observations of abundant wildlife #s or high species diversity (during any period)
- [x] 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

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

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

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

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

ii. Wildlife habitat features (Working from top to bottom, check appropriate AA attributes in matrix to arrive at rating. Structural diversity is from #13. For class cover to be considered evenly distributed, the most and least prevalent **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 [check] the functional points and rating)

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

Comments Site continues to be well used by migrating waterfowl, upland game birds, deer, and moderate to small-sized mammals.

14D. General Fish 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 used by fish, fish use is not restorable due to habitat constraints, or is not desired from a management perspective [such as fish entrapped in a canal], then check [x] **NA** here and proceed to 14E.)

i. Habitat Quality and Known / Suspected Fish Species in AA (use matrix to arrive at [check the functional points and rating)

Duration of surface water in AA	Permanent / Perennial						Seasonal / Intermittent						Temporary / Ephemeral					
Aquatic hiding / resting / escape cover	Optimal		Adequate		Poor		Optimal		Adequate		Poor		Optimal		Adequate		Poor	
Thermal cover optimal / suboptimal	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S
FWP Tier I fish species	1E	.9H	.8H	.7M	.6M	.5M	.9H	.8H	.7M	.6M	.5M	.4M	.7M	.6M	.5M	.4M	.3L	.3L
FWP Tier II or Native Game fish species	.9H	.8H	.7M	.6M	.5M	.5M	.8H	.7M	.6M	.5M	.4M	.4M	.6M	.5M	.4M	.3L	.2L	.2L
FWP Tier III or Introduced Game fish	.8H	.7M	.6M	.5M	.5M	.4M	.7M	.6M	.5M	.4M	.4M	.3L	.5M	.4M	.3L	.2L	.2L	.1L
FWP Non-Game Tier IV or No fish species	.5M	.5M	.5M	.4M	.4M	.3L	.4M	.4M	.4M	.3L	.3L	.2L	.2L	.2L	.2L	.1L	.1L	.1L

Sources used for identifying fish sp. potentially found in AA:

ii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1)
a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity ***or*** *is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support,* ***or*** *do aquatic nuisance plant or animal species (see* ***Appendix E****) occur in fish habitat?* **Y** ◯ **N** ◉ *If yes, reduce score in* ***i*** *above by 0.1:* **Modified Rating**

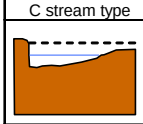
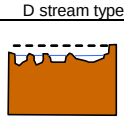
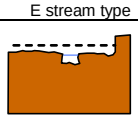
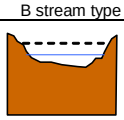
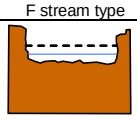
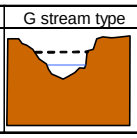
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ◯ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

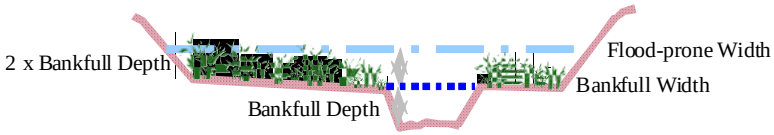
iii. Final Score and Rating: 0 NA **Comments:**

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

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	Slightly entrenched - C, D, E stream types			Moderately entrenched – B stream type			Entrenched-A, F, G stream types		
% of flooded wetland classified as forested and/or scrub/shrub	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains **no outlet or restricted outlet**	1H	.9H	.6M	.8H	.7M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.8H	.5M	.7M	.6M	.4M	.3L	.2L	.1L

Slightly Entrenched ER = >2.2			**Moderately Entrenched ER = 1.41 – 2.2**	**Entrenched ER = 1.0 – 1.4**		
C stream type	D stream type	E stream type	B stream type	A stream type	F stream type	G stream type
						



Floodrpone width / **Bankfull width** = **Entrenchment ratio**

ii. Are ≥10 acres of wetland in the AA subject to flooding **AND** are man-made features which may be significantly damaged by floods located within 0.5 mile downstream of the AA (check)? **Y** ◯ **N** ◉

Comments:

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

i. Rating (Working from top to bottom, use the matrix below to arrive at [check] the functional points and rating. 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			1.1 to 5 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**	1H	.9H	.8H	.8H	.6M	.5M	.4M	.3L	.2L
Wetlands in AA flood or pond **< 5 out of 10 years**	.9H	.8H	.7M	.7M	.5M	.4M	.3L	.2L	.1L

Comments: Excavated wetland cells and aquatic beds with potential to store large amounts of surface water, much greater than 5 acre feet.

14G. Sediment/Nutrient/Toxicant Retention and Removal: (Applies to wetlands with potential to receive 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, click ☐ **NA** here and proceed to 14H.)

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

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver levels of sediments, nutrients, or compounds at levels 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 / ponding in AA	Yes	No	Yes	No	Yes	No	Yes	No
AA contains **no or restricted outlet**	1H	.8H	.7M	.5M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.7M	.6M	.4M	.4M	.3L	.2L	.1L

Comments: AA with emergency spillway (restricted outlet), well vegetated upland buffer.

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 14H does not apply, click ☐ **NA** here and proceed to 14I.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

*% Cover of **wetland** streambank or shoreline by species with stability ratings of ≥6 (see **Appendix F**).*	*Duration of surface water adjacent to rooted vegetation*		
	Permanent / Perennial	Seasonal / Intermittent	Temporary / Ephemeral
≥ 65%	1H	.9H	.7M
35-64%	.7M	.6M	.5M
< 35%	.3L	.2L	.1L

Comments: Shoreline of aquatic macrophyte community subject to periodic wave action, generally well-vegetated with deep rooting hydrophytes depending on depth.

14I. Production Export/Food Chain Support:

i. Level of Biological Activity (synthesis of wildlife and fish habitat ratings [check])

General Fish Habitat Rating (14D.iii.)	**General Wildlife Habitat Rating (14C.iii.)**		
	E/H	M	L
E/H	H	H	M
M	H	M	M
L	M	M	L
N/A	H	M	L

ii. Rating (Working from top to bottom, use the matrix below to arrive at [check] the functional points and rating. Factor A = acreage of vegetated wetland component in the AA; Factor B = level of biological activity rating from above (14I.i.); 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, S/I, and T/E are as previously defined, and A = "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	1E	.7H	.8H	.5M	.6M	.4M	.9H	.6M	.7H	.4M	.5M	.3L	.8H	.6M	.6M	.4M	.3L	.2L
S/I	.9	.6M	.7H	.4	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.5M	.5M	.3L	.3L	.2L
T/E/A	.8	.5M	.6M	.3L	.4M	.2L	.7H	.4M	.5M	.2L	.3L	.1L	.6M	.4M	.4M	.2L	.2L	.1L

iii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1.) **Vegetated Upland Buffer (VUB)**: Area with ≥ 30% plant cover, ≤ 15% noxious weed or ANVS cover, and that is not subjected to periodic mechanical mowing or clearing (unless for weed control).

a) Is there an average ≥ 50 foot-wide vegetated upland buffer around ≥ 75% of the AA circumference? **Y** ◉ **N** ○ *If yes, add 0.1 to the score in **ii** above and adjust rating accordingly:* **Modified Rating** 1 E

Comments: Well vegetated upland buffer with much less than 15% cover of noxious weeds.

14J. Groundwater Discharge/Recharge: (check the appropriate indicators in i & ii below)

i. Discharge Indicators

- ☐ The AA is a slope wetland
- ☐ Springs or seeps are known or observed
- ☑ Vegetation growing during dormant season/drought
- ☐ Wetland occurs at the toe of a natural slope
- ☐ Seeps are present at the wetland edge
- ☑ AA permanently flooded during drought periods
- ☐ Wetland contains an outlet, but no inlet
- ☐ Shallow water table and the site is saturated to the surface
- ☐ Other:

ii. Recharge Indicators

- ☐ Permeable substrate present without underlying impeding layer
- ☐ Wetland contains inlet but no outlet
- ☐ Stream is a known 'losing' stream; discharge volume decreases
- ☑ Other: Groundwater currently being supplemented

iii. Rating (use the information from i and ii above and the table below to arrive at [check] the functional points and rating)

	Duration of saturation at AA Wetlands *FROM GROUNDWATER DISCHARGE OR WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM*			
Criteria	P/P	S/I	T	None
Groundwater Discharge or Recharge	1H	.7M	.4M	.1L
Insufficient Data/Information	NA			

Comments:

14K. Uniqueness:

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

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 (#11)	rare	common	abundant	rare	common	abundant	rare	common	abundant
Low disturbance at AA (#12i)	1H	.9H	.8H	.8H	.6M	.5M	.5M	.4M	.3L
Moderate disturbance at AA (#12i)	.9H	.8H	.7M	.7M	.5M	.4M	.4M	.3L	.2L
High disturbance at AA (#12i)	.8H	.7H	.6M	.6M	.4M	.3L	.3L	.2L	.1L

Comments:

14L. Recreation/Education Potential: (affords "bonus" points if AA provides recreation or education opportunity)

i. Is the AA a known or potential rec./ed. site: (check) **Y** ◉ **N** ○ (if 'Yes' continue with the evaluation; if 'No' then click ☐ **NA** here and proceed to the overall summary and rating page)

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

iii. Rating (use the matrix below to arrive at [check] the functional points and rating)

Known or Potential Recreation or Education Area	Known	Potential
Public ownership or public easement with general public access (no permission required)	.2H	.15H
Private ownership with general public access (no permission required)	.15H	.1M
Private or public ownership without general public access, or requiring permission for public access	.1M	.05L

Comments:

The site receives educational use through the WJH Bird Facility that is north-adjacent to the mitigation area. Site is also used by Audubon Society for bird counts.

General Site Notes

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR WETLAND/SITE #(S): Wagner Marsh

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)	Indicate the four most prominent functions with an asterisk (*)
A. Listed/Proposed T&E Species Habitat	L	.1	1	1.877	☐
B. MT Natural Heritage Program Species Habitat	M	.6	1	11.262	☐
C. General Wildlife Habitat	H	.9	1	16.893	☑
D. General Fish Habitat	NA	0	0	0	☐
E. Flood Attenuation	NA	0	0	0	☐
F. Short and Long Term Surface Water Storage	H	1	1	18.77	☑
G. Sediment/Nutrient/Toxicant Removal	H	1	1	18.77	☐
H. Sediment/Shoreline Stabilization	H	1	1	18.77	☑
I. Production Export/Food Chain Support	E	1	1	18.77	☐
J. Groundwater Discharge/Recharge	H	1	1	18.77	☑
K. Uniqueness	M	.5	1	9.385	☐
L. Recreation/Education Potential (bonus points)	H	.2	NA	3.754	☐
Totals:		7.3	9	137.021	
Percent of Possible Score			**81.11** %		

Category I Wetland: (must satisfy **one** of the following criteria; otherwise 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**
- ☑ Percent of possible score > 80% (round to nearest whole #).

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following criteria; otherwise go to Category IV)
- ☐ Score of 1 functional point for MT Natural Heritage Program Species Habitat; **or**
- ☑ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
- ☐ Score of .9 or 1 functional point for General Fish 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 possible score > 65% (round to nearest whole #).

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; otherwise go to Category III)
- ☐ "Low" rating for Uniqueness; **and**
- ☐ Vegetated wetland component < 1 acre (do not include upland vegetated buffer); **and**
- ☐ Percent of possible score < 35% (round to nearest whole #).

OVERALL ANALYSIS AREA RATING:
(check appropriate category based on the criteria outlined

I	II	III	IV

Appendix C

Project Area Photographs

MDT Wetland Mitigation Monitoring
Wagner Marsh
Yellowstone County, Montana



Photo Point 1 – *Photo 1* **Location:** North Side
Bearing: 22 Degrees **Taken in 2009**



Photo Point 1 – *Photo 2* **Location:** North Side
Bearing: 105 Degrees **Taken in 2009**



Photo Point 1 – *Photo 1* **Location:** North Side
Bearing: 22 Degrees **Taken in 2010**



Photo Point 1 – *Photo 2* **Location:** North Side
Bearing: 105 Degrees **Taken in 2010**



Photo Point 1 – *Photo 1* **Location:** North Side
Bearing: 22 Degrees **Taken in 2011**



Photo Point 1 – *Photo 2* **Location:** North Side
Bearing: 105 Degrees **Taken in 2011**



Photo Point 1 – *Photo 3* **Location:** North Side
Bearing: 162 Degrees **Taken in 2009**



Photo Point 1 – *Photo 4* **Location:** North Side
Bearing: 214 Degrees **Taken in 2009**



Photo Point 1 – *Photo 3* **Location:** North Side
Bearing: 162 Degrees **Taken in 2010**



Photo Point 1 – *Photo 4* **Location:** North Side
Bearing: 214 Degrees **Taken in 2010**



Photo Point 1 – *Photo 3* **Location:** North Side
Bearing: 162 Degrees **Taken in 2011**



Photo Point 1 – *Photo 4* **Location:** North Side
Bearing: 214 Degrees **Taken in 2011**



Photo Point 1 – *Photo 5* **Location:** North Side
Bearing: 250 Degrees **Taken in 2009**



Photo Point 1 – *Photo 6* **Location:** North Side
Bearing: 310 Degrees **Taken in 2009**



Photo Point 1 – *Photo 5* **Location:** North Side
Bearing: 205 Degrees **Taken in 2010**



Photo Point 1 – *Photo 6* **Location:** North Side
Bearing: 310 Degrees **Taken in 2010**



Photo Point 1 – *Photo 5* **Location:** North Side
Bearing: 205 Degrees **Taken in 2011**



Photo Point 1 – *Photo 6* **Location:** North Side
Bearing: 310 Degrees **Taken in 2011**



Photo Point 1 – *Photo 7* **Location:** North Side
Bearing: 335 Degrees **Taken in 2009**



Photo Point 2 – *Photo 1* **Location:** West Side
Bearing: 1 Degree **Taken in 2009**



Photo Point 1 – *Photo 7* **Location:** North Side
Bearing: 335 Degrees **Taken in 2010**



Photo Point 2 – *Photo 1* **Location:** West Side
Bearing: 1 Degree **Taken in 2010**



Photo Point 1 – *Photo 7* **Location:** North Side
Bearing: 335 Degrees **Taken in 2011**



Photo Point 2 – *Photo 1* **Location:** West Side
Bearing: 1 Degree **Taken in 2011**



Photo Point 2 – *Photo 2* **Location:** West Side
Bearing: 74 Degrees **Taken in 2009**



Photo Point 2 – *Photo 3* **Location:** West Side
Bearing: 153 Degrees **Taken in 2009**



Photo Point 2 – *Photo 2* **Location:** West Side
Bearing: 74 Degrees **Taken in 2010**



Photo Point 2 – *Photo 3* **Location:** West Side
Bearing: 153 Degrees **Taken in 2010**



Photo Point 2 – *Photo 2* **Location:** West Side
Bearing: 74 Degrees **Taken in 2011**



Photo Point 2 – *Photo 3* **Location:** West Side
Bearing: 153 Degrees **Taken in 2011**



Photo Point 3 – *Photo 1* **Location:** South Side
Bearing: 24 Degrees **Taken in 2009**



Photo Point 3 – *Photo 2* **Location:** South Side
Bearing: 243 Degrees **Taken in 2009**



Photo Point 3 – *Photo 1* **Location:** South Side
Bearing: 24 Degrees **Taken in 2010**



Photo Point 3 – *Photo 2* **Location:** South Side
Bearing: 243 Degrees **Taken in 2010**



Photo Point 3 – *Photo 1* **Location:** South Side
Bearing: 24 Degrees **Taken in 2011**



Photo Point 3 – *Photo 2* **Location:** South Side
Bearing: 243 Degrees **Taken in 2011**



Photo Point 3 – *Photo 3* **Location:** South Side
Bearing: 294 Degrees **Taken in 2009**



Photo Point 3 – *Photo 4* **Location:** South Side
Bearing: 343 Degrees **Taken in 2009**



Photo Point 3 – *Photo 3* **Location:** South Side
Bearing: 294 Degrees **Taken in 2010**



Photo Point 3 – *Photo 4* **Location:** South Side
Bearing: 343 Degrees **Taken in 2010**



Photo Point 3 – *Photo 3* **Location:** South Side
Bearing: 294 Degrees **Taken in 2011**



Photo Point 3 – *Photo 4* **Location:** South Side
Bearing: 343 Degrees **Taken in 2011**



Photo Point 4 – *Photo 1* **Location:** East Side
Bearing: 241 Degrees **Taken in 2009**



Photo Point 4 – *Photo 2* **Location:** East Side
Bearing: 293 Degrees **Taken in 2009**



Photo Point 4 – *Photo 1* **Location:** East Side
Bearing: 241 Degrees **Taken in 2010**



Photo Point 4 – *Photo 2* **Location:** East Side
Bearing: 293 Degrees **Taken in 2010**



Photo Point 4 – *Photo 1* **Location:** East Side
Bearing: 241 Degrees **Taken in 2011**



Photo Point 4 – *Photo 2* **Location:** East Side
Bearing: 293 Degrees **Taken in 2011**



Photo Point 4 – *Photo 3* **Location:** East Side
Bearing: 324 Degrees **Taken in 2009**



Photo Point 4 – *Photo 4* **Location:** East Side
Bearing: 356 Degrees **Taken in 2009**



Photo Point 4 – *Photo 3* **Location:** East Side
Bearing: 324 Degrees **Taken in 2010**



Photo Point 4 – *Photo 4* **Location:** East Side
Bearing: 356 Degrees **Taken in 2010**



Photo Point 4 – *Photo 3* **Location:** East Side
Bearing: 324 Degrees **Taken in 2011**



Photo Point 4 – *Photo 4* **Location:** East Side
Bearing: 356 Degrees **Taken in 2011**



Transect 1 – *West End* **Location:** T-1 start
Bearing: 70 Degrees **Taken in 2009**



Transect 1 – *East End* **Location:** T-1 end
Bearing: 250 Degrees **Taken in 2009**



Transect 1 – *East End* **Location:** T-1 start
Bearing: 70 Degrees **Taken in 2010**



Transect 1 – *East End* **Location:** T-1 end
Bearing: 250 Degrees **Taken in 2010**



Transect 1 – *East End* **Location:** T-1 start
Bearing: 70 Degrees **Taken in 2011**



Transect 1 – *East End* **Location:** T-1 end
Bearing: 250 Degrees **Taken in 2011**



Data Point 1 **Location:** WM-1
Bearing: 75 Degrees **Taken in 2011**



Data Point 2 **Location:** WM-2
Bearing: 310 Degrees **Taken in 2011**



Data Point 3 **Location:** WM-3w
Bearing: 110 Degrees **Taken in 2011**

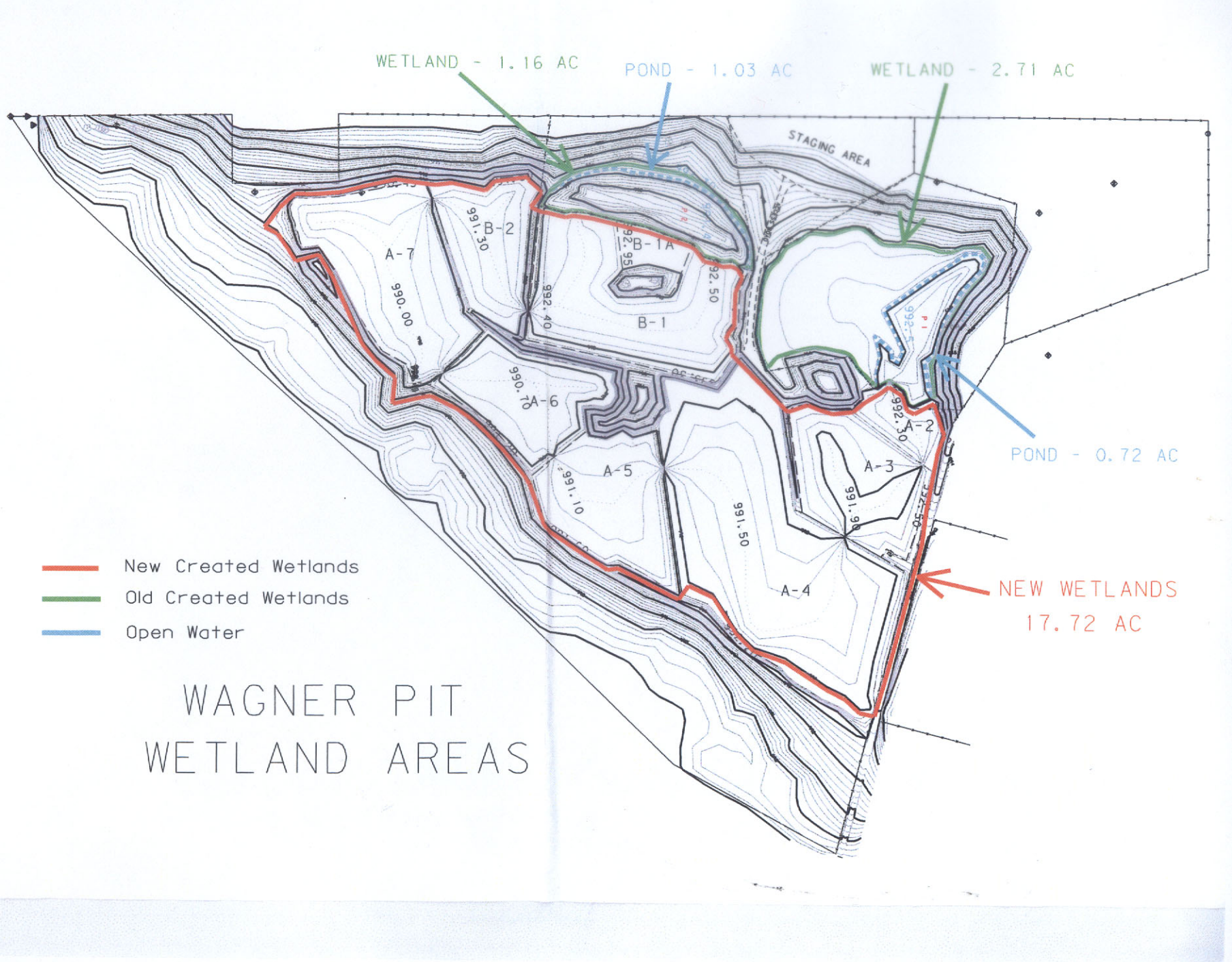


Data Point 4 **Location:** WM-3u
Bearing: 180 Degrees **Taken in 2011**

Appendix D

Project Plan Sheet

MDT Wetland Mitigation Monitoring
Wagner Marsh
Yellowstone County, Montana


WETLAND - 1.16 AC
POND - 1.03 AC
WETLAND - 2.71 AC
STAGING AREA
A-7
B-2
B-1A
B-1
A-6
A-5
A-4
A-3
A-2
POND - 0.72 AC
NEW WETLANDS
17.72 AC
New Created Wetlands
Old Created Wetlands
Open Water
WAGNER PIT
WETLAND AREAS