JTX – TUNNICLIFF RANCH MITIGATION SITE

Project Overview

Watershed: Watershed #14 – Middle Yellowstone

Monitoring Year: 2019

Years Monitored: 4th year of monitoring

Corps Permit Number: NWO-2010-01938-MTH

Monitoring Conducted By: RESPEC/HDR

Dates Monitoring Was Conducted: July 10, 2019

Purpose of the Approved Project:

The site was constructed to provide 29.63 acres of compensatory wetland mitigation credits for wetland impacts associated with future transportation project-related wetland impacts in Watershed #14 – Middle Yellowstone. Construction consisted of excavating a series of 13 cells ranging in size from 0.33 to 1.50 acres. Eight woody plant enclosures, with 1,650 containerized woody plantings, were constructed around the periphery of excavated cells to establish scrub/shrub wetland and riparian habitat.

Site Location:

Latitude: 45.83953 **Longitude:** –107.59887

County: Big Horn **Nearest Town:** Hardin, MT

Map Included: Yes

Mitigation Site Construction Started: Fall/2015 **Construction Ended:** Winter/2016

Dates of Any Recent Corrective or Maintenance Activities (since previous report):

Activity: Weed Spraying **Date:** July 3, 2019 **Specific recommendations for any additional corrective actions:** Weed treatment will continue in 2020. Montana Department of Transportation (MDT) is considering a second round of woody plantings in 2020. Enclosure fences labeled PE-04, PE-05, PE-06, and PE-07 in Figure A-3 in Appendix A have short segments of fence that are sagging from the top and are in need of repair.

Anticipated Wetland Credit Acres: 29.63

Wetland Credit Acres Generated to Date: 11.04

Previous Monitoring Reports:
https://www.mdt.mt.gov/publications/brochures/wetland_mitigation.shtml

Requirements (from approved mitigation plan, banking instrument, or Department of Army (DA) permit conditions)

Monitoring Period: 5 years from construction completion or until concurrence by the US Army Corps of Engineers (USACE).

Performance Standards: A summary of performance standards established for the JTX – Tunnicliff Ranch site and whether or not they are being achieved is provided in Table 1.

Table 1. Summary of Performance Standards

Performance Standards	Success Criteria	Criteria Achieved Y/N	Discussion
Wetland Characteristics	The three parameter criteria for hydrology, vegetation, and soils are met as outlined in the 1987 Wetland Manual and 2010 GP Regional Supplement.	Y	Nine of the 13 excavated cells have developed a dominant wetland community with the other 4 cells transitioning to wetland. 8.35 acres of wetland and transitional wetland had developed at the site at the time of the 2019 monitoring event.
Wetland Hydrology	Soil saturation is present for at least 12.5 percent of the growing season.	Y	All 13 excavated cells were flooded or saturated near the surface during the 2019 monitoring event and soil saturation was present. This metric was met in 2019.
Hydric Soil	Hydric soil conditions are present or appear to be forming.	Y	Excavated cells within the recently constructed mitigation site are beginning to exhibit some hydric soil development (e.g., sulfidic odor and faint mottles).
	Soil is sufficiently stable to prevent erosion.	Y	Disturbed soil is stable and does not exhibit signs of erosion.
	Soil is able to support plant cover.	Y	Plant cover has continued to develop across disturbed soils. Vegetative cover is estimated to be 95% across disturbed upland areas and 50% across wetland areas in 2019.
Hydrophytic Vegetation	Wetlands are delineated as hydrophytic by using technical guidelines.	Y	Nine of the 13 excavated cells had developed wetlands as of the 2019 monitoring event. A very small wetland area is also developing in Cell 1. The remaining cells were showing signs of a declining upland vegetation cover because of a high-water table.
	Noxious weeds do not exceed 5 percent cover.	Y	Noxious weeds were identified in four locations in 2019 across the site but do not exceed 5 percent cover in the excavation areas or the surrounding undisturbed habitat in 2019.
	Hydrophytic vegetation success will include achieving a minimum overall vegetation cover of 80 percent in created wetland areas within 5 years after site construction.	N	A dominant wetland community Type 9 has developed in excavated Cells 4, 5, 6, 7, 8, 9, 11, 12, and 13. A very small wetland area (<100 square feet) has developed in Cell 1.Vegetative cover within developing wetlands ranged from 10 to 90 percent in 2019. This performance measure is trending in a positive direction.
Woody Plants	Plantings exceed 50 percent survival after 5 years.	N	Approximately 27 percent of the woody plantings observed appeared alive in 2016; that percentage dropped to 15 percent in 2017 and 2 percent in 2018 and 2019, which does not meet the 50 percent survival criteria. Woody plants were water-stressed following planting in the spring of 2016.
Upland Buffer	Noxious weeds do not exceed 5 percent cover within the buffer areas on the site.	Y	Noxious weed cover did not exceed 5 percent cover in the upland buffer in 2019. MDT has implemented a weed-control program and has a contractor who sprayed the site on July 3, 2019.
	Any disturbed area within the creditable buffer zone must have at least 50 percent aerial cover of non-weed species by the end of the monitoring period.	Y	Upland buffers that surround the developing wetland areas within the site exhibited greater than 50 percent aerial cover of non-weed species.
Fencing	Wildlife-friendly fencing is installed along the easement boundaries.	Y	Wildlife-friendly fencing has been installed around three sides of the easement boundary and is in good condition. The western boundary has standard barbed wire fencing and is in good condition.

Summary Data

Wetland Delineation – All the excavated wetland cells and graded areas that connect the cells were surveyed for developing wetland habitat. In 2019, a total of 5.49 acres of emergent wetland was

delineated within wetland Cells 4, 5, 6, 7, 8, 9, 11, 12, and 13. Wetland Cells 1, 2, 3, and 10 were saturated in 2019 and contained primarily dead and dying upland vegetation with a few scattered wetland plants that are beginning to be established. In 2018, these transitional wetland areas contained standing open water during the field survey but no open water was documented in 2019. However, these areas were still saturated in 2019 and vegetation was still transitioning from upland grasses to wetland species across each cell. Like the other wetland cells that now have a dominance of wetland vegetation, these transitioning cells meet the wetland criteria for hydrology and plants and have soils that will likely develop hydric indicators over time. The cells transitioning to wetland accounted for 2.86 acres at the site in 2019. Aquatic habitat, including emergent wetland and transitional wetland areas, totaled 8.35 acres, which is a 0.04-acre increase since 2018. Additional wetland habitat is expected to develop in low-lying areas between the cells but largely depends on seasonally high groundwater.

Before construction, MDT identified two small palustrine emergent wetlands in the southeastern corner of the site and a smaller palustrine emergent wetland along the eastern boundary, which altogether totaled 0.03 acre. These small wetlands were identified and mapped during the 2019 monitoring event, and no changes noted from previous years (Figure A-3, Appendix A).

Functional Assessment – The 2019 results of the functional assessments are summarized in Table 2. Completed Montana Wetland Assessment Method (MWAM) forms for the JTX – Tunnicliff Ranch site are provided in Appendix B. Overall, the site rates as a Category III wetland and has generated 49.4 Functional Units.

Table 2. Montana Wetland Assessment Method Summary for the JTX – Tunnicliff Ranch Site

Function and Value Parameters From the 2008 Montana Wetland Assessment Method	2017	2018	2019
Listed/Proposed Threatened & Endangered (T&E) Species Habitat	Low (0.0)	Low (0.0)	Low (0.0)
Montana Natural Heritage Program (MTNHP) Species Habitat	Low (0.1)	Mod (0.6)	Mod (0.6)
General Wildlife Habitat	Mod (0.4)	Mod (0.7)	Mod (0.7)
General Fish/Aquatic Habitat	N/A	N/A	N/A
Flood Attenuation	Mod (0.5)	Mod (0.6)	Mod (0.6)
Short- and Long-Term, Surface-Water Storage	Mod (0.6)	High (0.9)	High (0.9)
Sediment/Nutrient/Toxicant Removal	Mod (0.7)	Mod (0.7)	Mod (0.7)
Sediment/Shoreline Stabilization	N/A	Mod (0.6)	Mod (0.6)
Production Export/Food Chain Support	Mod (0.4)	Mod (0.5)	Mod (0.5)
Groundwater Discharge/Recharge	Mod (0.7)	Mod (0.7)	Mod (0.7)
Uniqueness	Mod (0.4)	Mod (0.4)	Mod (0.4)
Recreation/Education Potential (bonus points)	High (0.2)	High (0.2)	High (0.2)
Actual Points/Possible Points	**4.0/9**	**5.9/10**	**5.9/10**
% of Possible Score Achieved	**44%**	**59%**	**59%**
Overall Category	**III**	**III**	**III**
Total Acreage of Assessed Wetlands Within Site Boundaries	**3.86**	**8.31**	**8.38**
Functional Units (acreage × actual points)	**15.3**	**49.1**	**49.4**

Vegetation – A total of 57 plant species have been identified at the site in the 4 years of monitoring. Four areas containing state-listed Priority 2B noxious weeds were mapped at the JTX – Tunnicliff Ranch site (Figure A-3, Appendix A). Four upland community types and two wetland community types were identified and mapped at the site in 2019 (Figure A-3, Appendix A). Three very small wetlands were

identified within the monitoring area before site development but are not described below as their own community type because of their small size (total 0.03 acre). Wetland species associated with these small wetland pockets include creeping meadow foxtail (*Alopecurus arundinaceus*), Baltic rush (*Juncus balticus*), and sedge (*Carex sp.*). Dominant plant species that were observed within each community are listed on the Wetland Mitigation Site Monitoring form (Appendix B). Species beginning to establish within Wetland Type 13 include foxtail barley (*Hordeum jubatum*), broad-leaf cattail (*Typha latifolia*), and saltmarsh club-rush (*Schoenoplectus maritimus*). The vegetation community types identified on the site in 2019 include the following:

- Upland Type 6 – *Pascopyrum smithii/Poa pratensis*
- Upland Type 7 – *Schedonorus pratensis*
- Upland Type 8 – *Thinopyrum intermedium*
- Wetland Type 9 – *Schoenoplectus spp./Typha latifolia*
- Upland Type 12 – *Elaeagnus angustifolia/Thinopyrum intermedium*
- Wetland Type 13 –Transitional wetland.

Vegetation cover was measured along two transects (T-1 and T-2) in 2019 (Figure A-2, Appendix A). Photographs of the transect end points are provided in Appendix C. Table 3 summarizes the data for T-1. T-1 is 792 feet long and intersected upland vegetation community Type 8 – *Thinopyrum intermedium* and wetland community Type 9 – *Schoenoplectus* spp.; 56 percent of the transect crossed wetland habitat, which is a 3 percent increase since 2018. Total vegetative cover increased from 75 percent in 2018 to 95 percent in 2019.

Table 3. Data Summary for T-1 From 2016 Through 2019 at the JTX – Tunnicliff Ranch Site

Monitoring Year	2016	2017	2018	2019
Transect Length (feet)	**792**	**792**	**792**	**792**
Vegetation Community Transitions Along Transect	1	6	6	5
Vegetation Communities Along Transect	2	2	2	2
Hydrophytic Vegetation Communities Along Transect	0	1	1	1
Total Vegetative Species	10	21	21	21
Total Hydrophytic Species	2	8	9	9
Total Upland Species	8	13	12	12
Estimated % Total Vegetative Cover	75	60	75	95
Estimated % Unvegetated	25	40	25	5
% Transect Length Comprising Hydrophytic Vegetation Communities	0	47	53	56
% Transect Length Comprising Upland Vegetation Communities	100	53	47	44
% Transect Length Comprising Unvegetated Open Water	0	0	0	0

Data collected on T-2 (Wetland Mitigation Site Monitoring form, Appendix B) are summarized in Table 4. T-2 is 900 feet long and intersects upland community Type 8 and wetland community Type 9 and 13; 14 percent of the transect crossed wetland habitat in 2019, while 53 percent crossed transitional wetland habitat (CT 13). The transitional wetland consists of dead and dying upland vegetation and scattered individual wetland plants. The transitional wetlands did not contain open water in 2019 as they did in 2018.

Eight woody plant enclosures (PE-1 through PE-8) are shown on Figure A-3 (Appendix A) and were monitored for woody plant survival in 2019 while walking and recording live woody stems. A total of

1,650 containerized woody plants were installed in the eight plant enclosures in 2016. Woody species planted at the site include silver buffalo-berry (*Sheperdia argentea*), Douglas hawthorne (*Crataegus douglasii*), silverberry (*Elaeaganus commutata*), common chokecherry (*Prunus virginiana*), plains cottonwood (*Populus deltoids*), box elder (*Acer negundo*), and bur oak (*Quercus macrocarpa*). A total of 34 live stems were counted, and the overall survival is estimated at 2 percent. Wildlife fencing around each enclosure was effective in keeping wildlife away from plantings as no signs of browse were noted. Despite the weed fabric that was installed around each woody plant, grasses and forbs were outcompeting most of the plantings. The largest number of live plants was observed in PE-6 (20) where a small clump of ten cottonwoods had taken hold. In addition to cottonwood, individual silver buffalo-berry, silverberry, and chokecherry plants were identified in the various enclosures. A lack of supplemental watering in Year 1 and competition from grasses are the likely causes of mortality at the site. In 2019, several Russian olive (*Elaeagnus angustifolia*) plants were noted to be volunteering across the site.

Table 4. Data Summary for T-2 From 2016 Through 2019 at the JTX – Tunnicliff Ranch Site

Monitoring Year	2016	2017	2018	2019
Transect Length (feet)	**900**	**900**	**900**	**900**
Vegetation Community Transitions Along Transect	1	6	5	5
Vegetation Communities Along Transect	2	3	3	3
Hydrophytic Vegetation Communities Along Transect	0	1	2	2
Total Vegetative Species	12	11	11	11
Total Hydrophytic Species	0	5	6	6
Total Upland Species	12	6	5	5
Estimated % Total Vegetative Cover	60	60	65	85
Estimated % Unvegetated	40	40	35	15
% Transect Length Comprising Hydrophytic Vegetation Communities	0	12	14	14
% Transect Length Comprising Upland Vegetation Communities	100	88	33	33
% Transect Length Comprising Transitional Wetland	0	0	53	53

Hydrology – Groundwater is expected to be the primary hydrologic source for wetland development, with precipitation and periodic overbank flooding from the nearby Bighorn River supplementing hydrology at the site. Groundwater monitoring that was completed by the US Geological Survey (USGS) in 2019 shows groundwater levels at or above the design wetland cell elevation of 2,832 feet from March through July, as was the case in 2017 and 2018. Surface water was documented in wetland Cells 4, 5, 6, 7, 8, 11, 12, and 13 during the site visit, and Cells 1, 2, 3, and 10 lacked standing water. Those cells lacking standing water during the site visit were typically saturated to near the surface, which indicated that wetland hydrology was present in these cells.

Photographs – Photographs were taken at photo points 1–4 (PP1 to PP4), transect endpoints, and data points and are provided in Appendix C with comparisons between 2019 and the first year of monitoring. Please refer to previous years' monitoring reports for all previous annual photographs (https://www.mdt.mt.gov/publications/brochures/wetland_mitigation.shtml).

Soils – Soil test pits were excavated at four locations (Figure A-2 – Appendix A). DP-1U and DP-1W were located adjacent to and within excavated Cell 4, respectively. Cell 4 is located in an area mapped in the Kyle Clay, saline (Kw) series. The soil profile at DP-1W, which is located in Cell 4, revealed a dark gray (10YR 4/1) clay/loam down to 10 inches. The soil in this area was saturated to the surface during the July monitoring event. Wetland vegetation has developed in Cell 4. The soil profile at DP-1U revealed a

brown (10YR 4/2) silty clay loam to a depth of 10 inches and a layer of 10YR5/2 sand from 10 to 14 inches. Hardpan conditions were encountered at 14 inches. No hydric soil indicators were observed for DP 1U.

DP-2U and DP-2W were located adjacent to and within excavated Cell 11, respectively. Cell 11 is located in an area mapped in the Kyle Clay, saline (Kw) series. The soil profile at DP-2W, which is located in Cell 11, revealed a dark brown (10YR 3/2) clay/loam with faint yellowish-brown (10YR 5/6) mottles from the surface to a depth of approximately 10 inches. Loamy sand conditions were encountered from 10 to 16 inches and hardpan conditions at 16 inches. The soil in this area was saturated to the surface during the July monitoring event. Wetland vegetation has developed in Cell 11. The soil profile at DP-2U revealed a brown (10YR 4/2) silt loam to a depth of 3 inches, sandy/clay/loam from 3 to 9 inches, and loamy sand from 9 to 14 inches. Hardpan conditions were encountered at 14 inches. No hydric soil indicators were observed for DP 2U.

Credit Summary – Total credits for the site in 2019 are 11.04 acres, which is a 0.04-acre increase from 2018. As of July 2019, the JTX – Tunnicliff Ranch site had developed 5.49 acres of emergent wetland within 9 of the 13 excavated cells and 2.86 acres of transitional wetland within 4 excavated cells for a total of 8.35 acres of aquatic habitat. Credited at 1:1, the site is currently receiving 8.35 acres of credit for wetland development. Wetlands are expected to continue to develop across the site. Planted woody species survival is estimated at 2 percent in the 8 PEs across the site as of the July 2019 monitoring event. The original mitigation credit strategy called for the eight woody plant enclosures to be credited at 5:1 if the enclosures were successful in producing scrub/shrub habitat across the site. With just 2 percent of the woody plants surviving in 2019, this metric is not being met and credits at this time are zero. Additional credits from the site include 0.03 acre for preservation of existing wetlands on the site before construction and 2.66 acres of upland buffer credit. Table 5 summarizes the current estimated wetland credits based on the USACE-approved credit ratios [USACE, 2005] and the wetland delineation that was completed in July 2019.

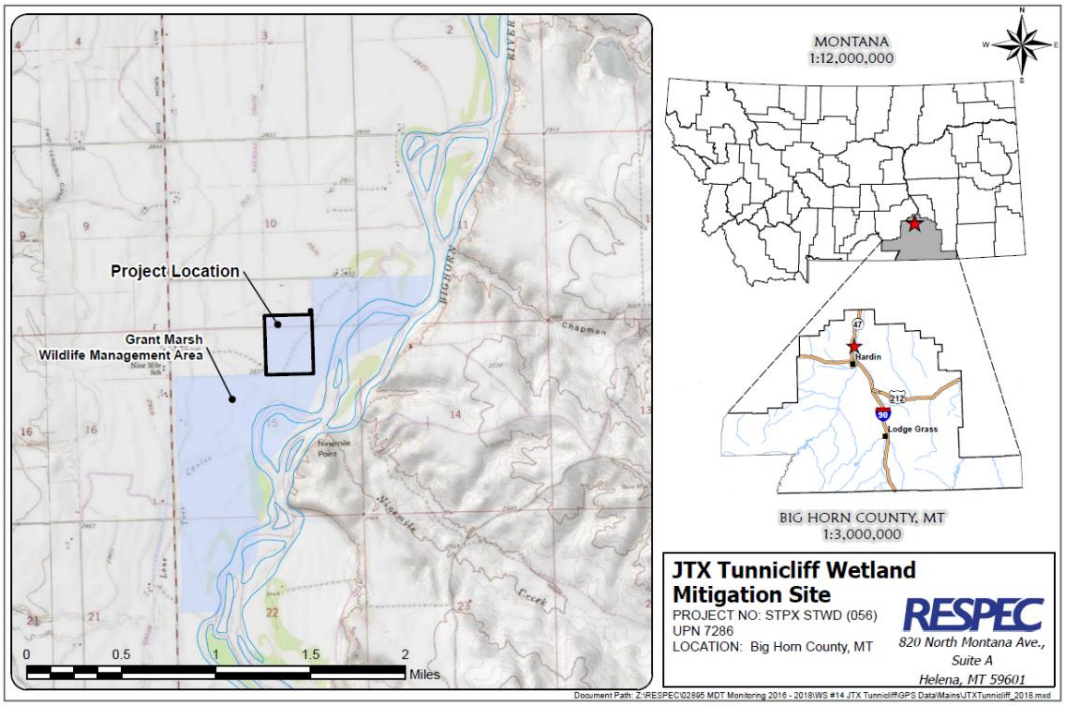
Table 5. Wetland Mitigation Credits Estimated for the JTX – Tunnicliff Ranch Site (2016–2019)

Compensatory Mitigation Type	Mitigation Area Description	Wetland Type[(a)]	Anticipated Mitigation Surface Area (acres)	USACE-Approved Mitigation Ratios	Anticipated Mitigation Credit (acres)	2016 Mitigation Credit (acres)	2017 Mitigation Credit (acres)	2018 Mitigation Credit (acres)	2019 Mitigation Credit (acres)
Creation (Establishment)	Depressional wetlands	Palustrine emergent and palustrine scrub/shrub	26.85	1:1	26.85	0.0	3.86	8.31	8.35
Creation (Reestablishment)	Woody plant enclosures	Palustrine scrub/shrub	2.73	5:1	0.55	0.5	0.47	0	0
Preservation	Pre-project Wetlands	Palustrine Emergent	0.03	1:1	0.03	0.03	0.03	0.03	0.03
Upland Buffer	100-foot wide upland perimeter	N/A	10.98	5:1	2.2	0.0	2.66	2.66	2.66
Totals			**40.6**		**29.63**	**0.5**	**7.02**	**11.00**	**11.04**

Wildlife – Twenty-three bird species were identified in 2019. Six of the seven bird boxes installed at the site are functional and all appeared to be used in 2019 by a variety of species including tree swallows (*Tachycineta bicolor*) and house wrens (*Troglodytes aedon*). In addition to the 23 bird species, northern leopard frogs (*Lithobates pipiens*) were also observed within many of the excavated wetland cells (Appendix B). Few deer tracks and one white-tailed deer (*Odocoileus virginianus*) were noted across the site.

Maps, Plans, Photos

Site Location Map



Project Area Maps/Figures: See Appendix A

Data Forms: See Appendix B (Site Monitoring form, plant list, USACE data forms, and MWAM forms)

Photos: See Appendix C

Plans: See Appendix D of 2016 Monitoring Report
https://www.mdt.mt.gov/other/webdata/external/planning/wetlands/2016_REPORTS/JTX_Tunnicliff.PDF

Conclusions

Based on the results of the third year of monitoring, the mitigation site is continuing to develop into a wetland ecosystem. The site is meeting all performance standards except for the following:

1. Hydrophytic vegetation achieving a minimum overall vegetation cover of 80 percent in monitored wetland areas within 5 years after site construction
   a. Hydrophytic vegetative cover development continues to trend positively toward meeting this performance standard. No remedial actions are recommended at this time.
2. Woody plants exceed 50 percent survival after 5 years.

Woody plantings survival is not trending toward meeting this performance standard. MDT's staff botanist will be consulted to determine if remedial action is necessary. Remedial action may include replanting woody species before the end of the 5-year monitoring period.

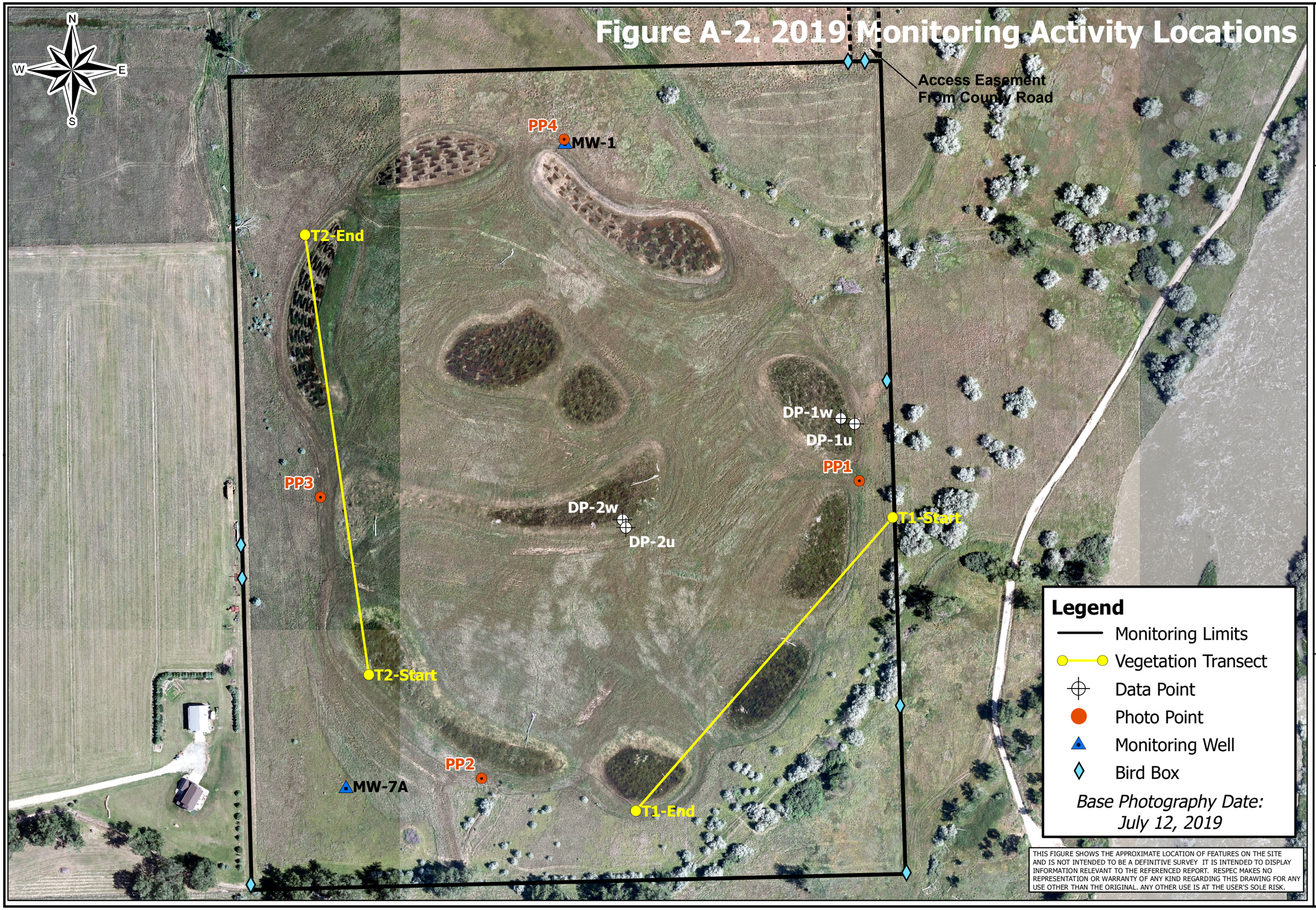
References

US Army Corps of Engineers, 2005. "Montana Mitigation Information," *army.mil*, retrieved October 10, 2016 from *http://www.nwo.usace.army.mil/Missions/Regulatory-Program/Montana/Mitigation/*

APPENDIX A
PROJECT AREA MAPS

MDT Wetland Mitigation Monitoring
JTX – Tunnicliff Ranch
Big Horn County, Montana

Figure A-2. 2019 Monitoring Activity Locations



Legend

- Monitoring Limits
- Vegetation Transect
- Data Point
- Photo Point
- Monitoring Well
- Bird Box

Base Photography Date: July 12, 2019

THIS FIGURE SHOWS THE APPROXIMATE LOCATION OF FEATURES ON THE SITE AND IS NOT INTENDED TO BE A DEFINITIVE SURVEY IT IS INTENDED TO DISPLAY INFORMATION RELEVANT TO THE REFERENCED REPORT. RESPEC 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.

RESPEC
815 E. Front Street
Suite 3
Missoula, MT 59802

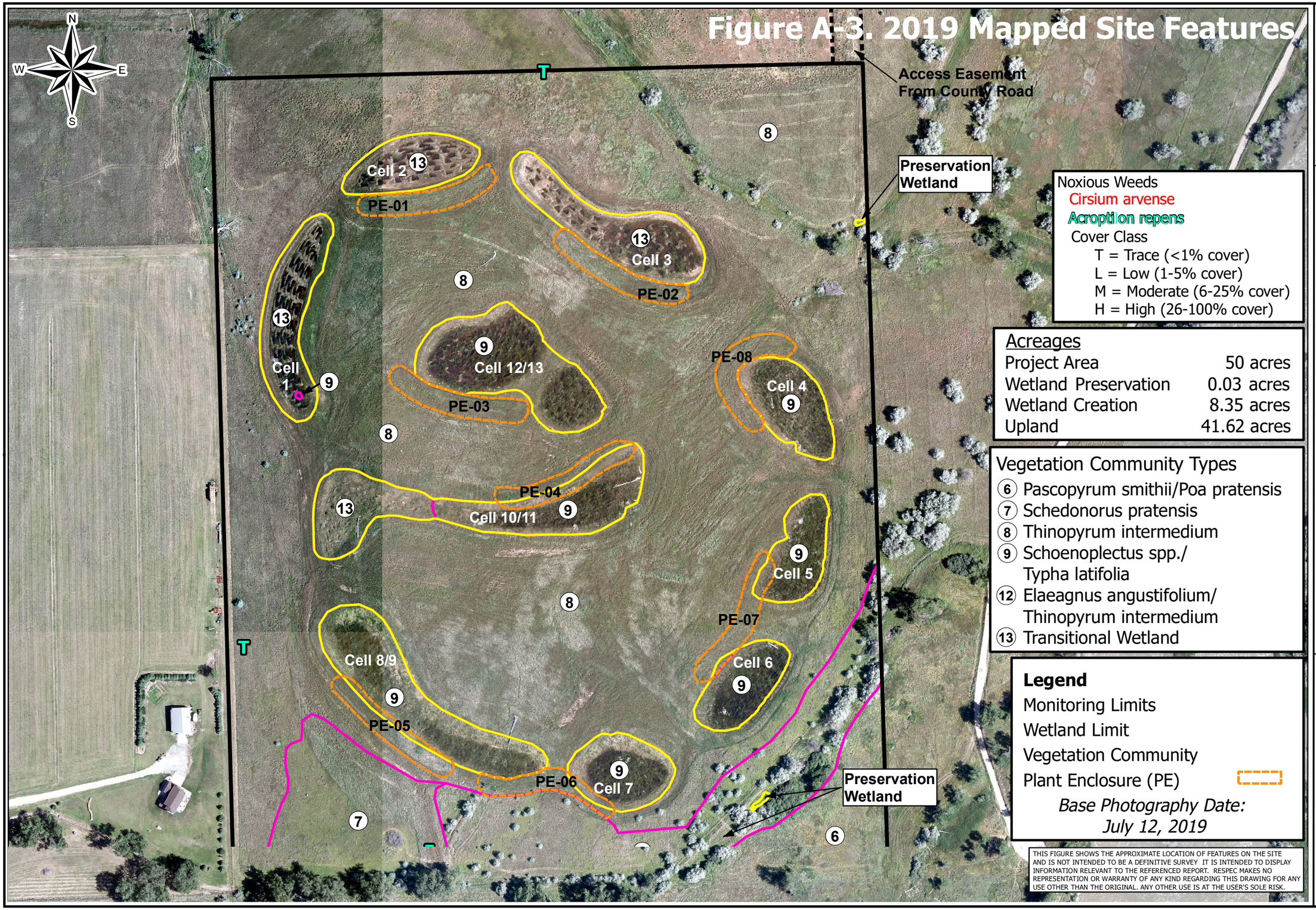
JTX Tunnicliff Wetland Mitigation Site
2019 Monitoring Activity Locations

0 80 160 320 480 640 800 Feet

Project:	STPX STWD(056) UPN7286
Location:	Big Horn Co., Montana
Date:	October 2019
Project Manager:	M. Traxler
Drawn By:	JR/MP

File: R:\Projects\02895 MDT Monitoring 2016-2019\WS #14 JTX Tunnicliff\GPS Data\Mains\Monitor2019.mxd

Figure A-3. 2019 Mapped Site Features



Noxious Weeds
- Cirsium arvense
- Acroptilon repens

Cover Class
- T = Trace (<1% cover)
- L = Low (1-5% cover)
- M = Moderate (6-25% cover)
- H = High (26-100% cover)

Acreages	
Project Area	50 acres
Wetland Preservation	0.03 acres
Wetland Creation	8.35 acres
Upland	41.62 acres

Vegetation Community Types
- (6) Pascopyrum smithii/Poa pratensis
- (7) Schedonorus pratensis
- (8) Thinopyrum intermedium
- (9) Schoenoplectus spp./ Typha latifolia
- (12) Elaeagnus angustifolium/ Thinopyrum intermedium
- (13) Transitional Wetland

Legend
- Monitoring Limits
- Wetland Limit
- Vegetation Community
- Plant Enclosure (PE)

Base Photography Date: July 12, 2019

THIS FIGURE SHOWS THE APPROXIMATE LOCATION OF FEATURES ON THE SITE AND IS NOT INTENDED TO BE A DEFINITIVE SURVEY IT IS INTENDED TO DISPLAY INFORMATION RELEVANT TO THE REFERENCED REPORT. RESPEC 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.

RESPEC
815 E. Front Street
Suite 3
Missoula, MT 59802

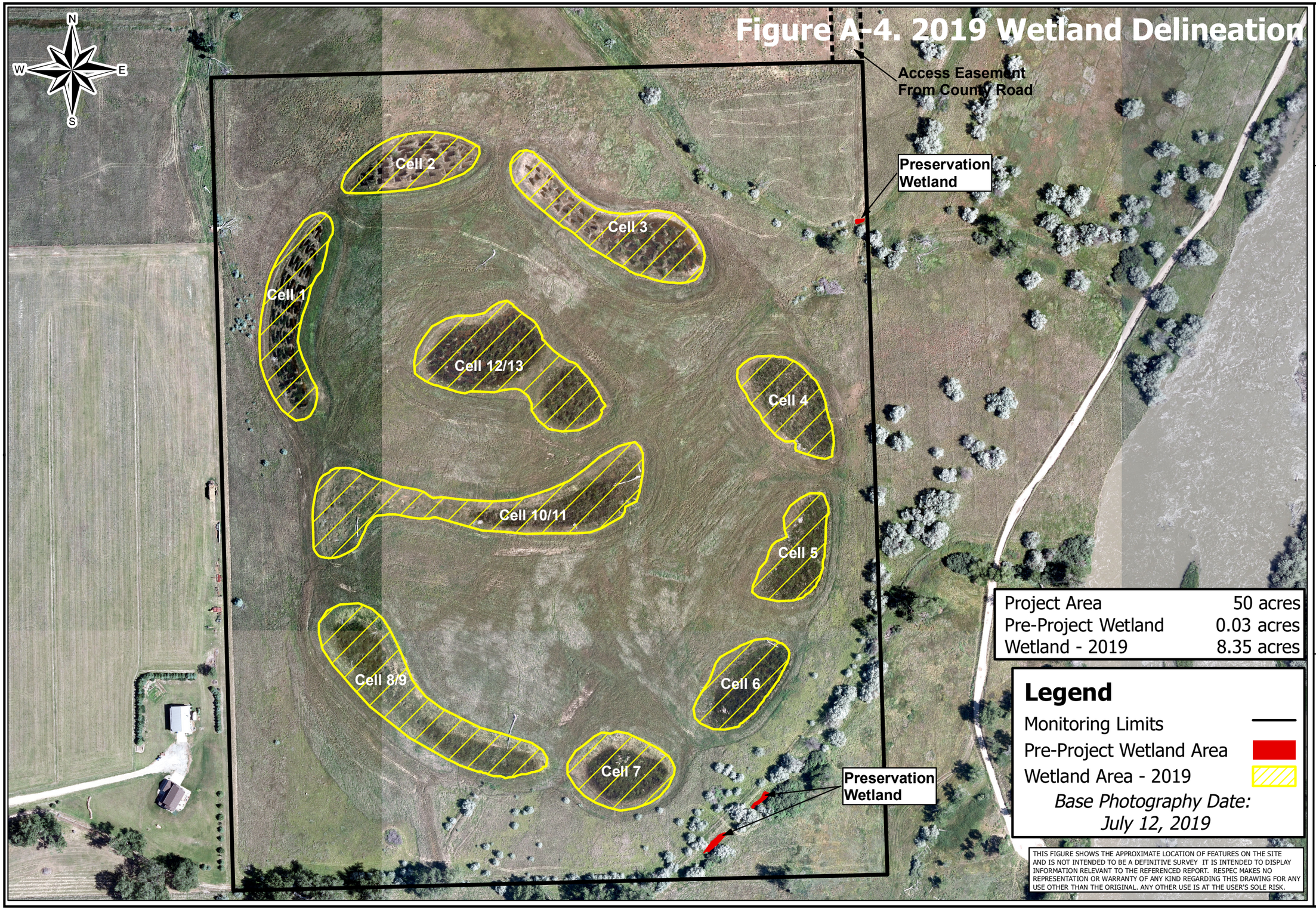
JTX Tunnicliff Wetland Mitigation Site
2019 Mapped Site Features

0 80 160 320 480 640 800 Feet

Project: STPX STWD(056) UPN7286
Location: Big Horn Co., Montana
Date: October 2019
Project Manager: M. Traxler
Drawn By: JR/MP

File: R:\Projects\02895 MDT Monitoring 2016-2019\WS #14 JTX Tunnicliff\GPS Data\Mains\Veg2019.mxd

Figure A-4. 2019 Wetland Delineation



Project Area	50 acres
Pre-Project Wetland	0.03 acres
Wetland - 2019	8.35 acres

Legend

- Monitoring Limits
- Pre-Project Wetland Area
- Wetland Area - 2019

Base Photography Date: July 12, 2019

THIS FIGURE SHOWS THE APPROXIMATE LOCATION OF FEATURES ON THE SITE AND IS NOT INTENDED TO BE A DEFINITIVE SURVEY IT IS INTENDED TO DISPLAY INFORMATION RELEVANT TO THE REFERENCED REPORT. RESPEC 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.

RESPEC
815 E. Front Street
Suite 3
Missoula, MT 59802

JTX Tunnicliff Wetland Mitigation Site
2019 Wetland Delineation

0 80 160 320 480 640 800 Feet

Project: STPX STWD(056) UPN7286
Location: Big Horn Co., Montana
Date: October 2019
Project Manager: M. Traxler
Drawn By: JR/MP

File: R:\Projects\02895 MDT Monitoring 2016-2019\WS #14 JTX Tunnicliff\GPS Data\Mains\Delin2019.mxd

APPENDIX B
MONITORING FORMS

MDT Wetland Mitigation Monitoring
JTX – Tunnicliff Ranch
Big Horn County, Montana

RESPEC/MDT WETLAND MITIGATION SITE MONITORING FORM

Project Name: **JTX-Tunnicliff** Project Number: **STPX STWD (056)**
Assessment Date: **July 10, 2019** Person(s) conducting the assessment: **M. Traxler,T. Traxler**
Location: **Hardin** MDT District: **Billings** Milepost: ____
Legal Description: T **1N** R **33E** Section **10** **T** **1N** **R** **33E** Section **15**
Weather Conditions: **90 degrees, sunny** Time of Day: **1:00 PM-5:30 PM**
Initial Evaluation Date: **June 15, 2016** Monitoring Year: **4** # Visits in Year: **1**
Size of evaluation area: **50 acres** Land use surrounding wetland: **Rural agricultural and Big Horn River Floodplain.**

HYDROLOGY

Surface Water Source: **Groundwater**
Inundation: **Present** Average Depth: **0.5 feet** Range of Depths: **0.5-1 ft.**
Percent of assessment area under inundation: **10%**
Depth at emergent vegetation-open water boundary: **0.5 feet**
If assessment area is not inundated then are the soils saturated within 12 inches of surface: _
Other evidence of hydrology on the site (ex. – drift lines, erosion, stained vegetation, etc.):

_____

Groundwater Monitoring Wells: **Present**
Record depth of water below ground surface (in feet):

Well Number	Depth	Well Number	Depth	Well Number	Depth
1	**4.61**				
7A	**5.25**				

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.

COMMENTS / PROBLEMS:
Well readings listed above are from USGS readings on 7/18 which was one week after the monitoring event. Both depths are Below Land Surface (BLS). This groundwater level equated to shallow standing water in a majority of the excavated wetland cells and saturation to near the surface in cells that lacked standing surface water.

VEGETATION COMMUNITIES

Community Number: **6** Community Title (main spp): **Pascopyrum smithii/Poa pratensis**

Dominant Species	% Cover	Dominant Species	% Cover
Poa pratensis	4 = 21-50%		
Thinopyrum intermedium	1 = 1-5%		
Bromus arvense	3 = 11-20%		
Acroptilon repens	2 = 6-10%		
Pascopyrum smithii	4 = 21-50%		

Comments / Problems: _____

Community Number: **7** Community Title (main spp): **Schedonorus pratensis**

Dominant Species	% Cover	Dominant Species	% Cover
Schedonorus pratensis	5 = > 50%	Bromus inermis	+ = < 1%
Dactylis glomerata	1 = 1-5%	Medicago sativa	+ = < 1%
Thinopyrum intermedium	+ = < 1%	Melilotis officinalis	+ = < 1%
Poa pratensis	1 = 1-5%	Glycerrhiza lepidota	+ = < 1%
Bromus arvensis	+ = < 1%	Trifolium fragiferum	+ = < 1%
Elaeagnus angustifolia	+ = < 1%	Arctium lappa	+ = < 1%

Comments / Problems: _____

Community Number: **8** Community Title (main spp): **Thinopyrum intermedium**

Dominant Species	% Cover	Dominant Species	% Cover
Thinopyrum intermedium	5 = > 50%	Glycerrhiza lepidota	1 = 1-5%
Iva axillaris	1 = 1-5%	Sporobolus airoides	1 = 1-5%
Acroptilon repens	1 = 1-5%	Lepidium perfoliatum	1 = 1-5%
Bromus arvensis	1 = 1-5%	Melilotus officinale	1 = 1-5%
Elymus repens	1 = 1-5%	Melilotus albus	1 = 1-5%
Schedonorus pratensis	1 = 1-5%	Asclepias speciosa	+ = < 1%

Comments / Problems: **Distichlis spicata-<1; Poa pratensis-1; Hordeum jubatum-<1**

Community Number: **9** Community Title (main spp): **Schoenoplectus spp./Typha latifolia**

Dominant Species	% Cover	Dominant Species	% Cover
Schoenoplectus maritimus	2 = 6-10%	Schoenoplectus pungens	+ = < 1%
Thinopyrum intermedium	+ = < 1%	Beckmannia syzigachne	+ = < 1%
Juncus balticus	1 = 1-5%	Schoenoplectus americanus	2 = 6-10%
Thinopyrum intermedium	+ = < 1%	Open Water	3 = 11-20%
Chenopodium album	+ = < 1%	Typha latifolia	5 = > 50%
Hordeum jubatum	+ = < 1%		

Comments / Problems: **CT-9 is a PEM wetland community.**

VEGETATION COMMUNITIES (continued)

Community Number: **12** Community Title (main spp): **Elaeagnus angustifolium/Thinopyrum intermedium**

Dominant Species	% Cover	Dominant Species	% Cover
Thinopyrum intermedium	5 = > 50%	Carex sp.	1 = 1-5%
Elaeagnus angustifolia	3 = 11-20%	Alopecurus arundinaceus	1 = 1-5%
Shepherdia argentea	2 = 6-10%	Salix fragilis	1 = 1-5%
Bromus inermis	1 = 1-5%	Echinocystis lobata	1 = 1-5%
Symphoricarpos albus	1 = 1-5%	Acroptilon repens	1 = 1-5%
Fraxinus pennsylvanica	1 = 1-5%	Cynoglossum officinale	+ = < 1%

Comments / Problems: _____

Community Number: **13** Community Title (main spp): **Transitional Wetland**

Dominant Species	% Cover	Dominant Species	% Cover
Open Water	5 = > 50%		
Hordeum jubatum	1 = 1-5%		
Schoenoplectus maritimus	+ = < 1%		
Elymus repens	+ = < 1%		
Distichlis spicata	+ = < 1%		
Typha latifolia	+ = < 1%		

Comments / Problems: **Standing dead THIINT >50% (drown-out).**

Community Number: ___ Community Title (main spp): _____

Dominant Species	% Cover	Dominant Species	% Cover

Comments / Problems: _____

Community Number: ___ Community Title (main spp): _____

Dominant Species	% Cover	Dominant Species	% Cover

Comments / Problems: _____

PLANTED WOODY VEGETATION SURVIVAL

Plant Species	Number Originally Planted	Number LIVE Observed	Number Volunteer Observed	Comments
PA-1		0		All PA: grass and weedy forb competition and lack of
PA-2		0		irrigation
PA-3		0		
PA-4		4	3	1 planted woody, 3 volunteer Russian olive
PA-5		0		
PA-6		20	10	10 cottonwood, 10 volunteer Russian olive
PA-7		2	2	2 volunteer russian olive
PA-8		8	6	2 planted woody, 6 volunteer Russian olive
TOTAL LIVE		34		2% Survival (of original 1650 stems planted)

Plant Species	Number Originally Planted
Sheperdia argentea	400
Crataegus douglasii	400
Elaeaganus commutate	400
Prunus virginiana	400
Populus deltoids	25
Acer negundo	10
Quercus macrocarpa	15

Comments / Problems: 1,650 containerized woody plants were installed in the 8 planting areas. All planting were in 1 gallon containers except for cottonwood which were in 5 gallon containers. Grasses out-competed virtually all plantings (2% remain). Volunteer Russian olives are showing up across the site, including several in PE-6. Protective fencing was starting to sag in PE-4, PE-5, PE-6, and PE-7, but was otherwise in good condition.

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Tunnicliff** Date: **July 10, 2019** Examiner: **Mark Traxler**
Transect Number: **1** Approximate Transect Length: **792 feet** Compass Direction from Start: **200˚** Note: _____

Transect Interval Length: **155 feet (Station 0-155)**	
Vegetation Community Type: 8 - Thinopyrum intermedium	
Plant Species	**Cover**
Thinopyrum intermedium	5 = > 50%
Schedonorus pratensis	+ = < 1%
Taraxacum officinale	+ = < 1%
Equisetum arvense	+ = < 1%
Bare Ground	+ = < 1%
Melilotus albus	1 = 1-5%
Poa pratensis	2 = 6-10%
Bromus inermis	1 = 1-5%
Melilotus officinalis	2 = 6-10%
Convulvulus arvensis	+ = < 1%
Total Vegetative Cover:	90%

Transect Interval Length: **72 feet (Station 155-227)**	
Vegetation Community Type: 9 – Schoenoplectus spp./Typha latifolia	
Plant Species	**Cover**
Juncus balticus	1 = 1-5%
Schoenoplectus maritimus	1 = 1-5%
Typha latifolia	5 = > 50%
Bare Ground (mud and standing dead THIINT)	1 = 1-5%
Hordeum jubatum	1 = 1-5%
Total Vegetative Cover:	90%

Transect Interval Length: **103 feet (Station 227-330)**	
Vegetation Community Type: 8 - Thinopyrum intermedium	
Plant Species	**Cover**
Thinopyrum intermedium	5 = > 50%
Medicago sativa	+ = < 1%
Bromus arvense	+ = < 1%
Schedonorous pratensis	+ = < 1%
Poa pratensis	1 = 1-5%
Melilotus albus	1 = 1-5%
Total Vegetative Cover:	100%

Transect Interval Length: **219 feet (Station 330-549)**	
Vegetation Community Type: 9 – Schoenoplectus spp./Typha latifolia	
Plant Species	**Cover**
Schoenoplectus maritimus	3 = 11-20%
Typha latifolia	4 = 21-50%
Rumex crispus	+ = < 1%
Thinopyrum intermedium	+ = < 1%
Schoenoplectus acutus	3 = 11-20%
Hordeum jubatum	1 = 1-5%
Beckmannia syzigachne	+ = < 1%
Bare Ground (mud)	1 = 1-5%
Total Vegetative Cover:	90%

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Tunnicliff** Date: **July 10, 2019** Examiner: **Mark Traxler**
Transect Number: **1** Approximate Transect Length: **792 feet** Compass Direction from Start: **200˚** Note: _____

Transect Interval Length: **89 feet (Station 549-638)**	
Vegetation Community Type: 8 - Thinopyrum intermedium	
Plant Species	**Cover**
Thinopyrum intermedium	5 = > 50%
Schedonorus pratensis	+ = < 1%
Taraxacum officinale	+ = < 1%
Medicago lupulina	+ = < 1%
Bare Ground	1 = 1-5%
Melilotus albus	1 = 1-5%
Poa pratensis	+ = < 1%
Bromus inermis	+ = < 1%
Melilotus officinalis	+ = < 1%
Hordeum jubatum	1 = 1-5%
Trifolium repens	1 = 1-5%
Total Vegetative Cover:	95%

Transect Interval Length: **154 feet (Station 638-792)**	
Vegetation Community Type: 9 – Schoenoplectus spp./Typha latifolia	
Plant Species	**Cover**
Juncus balticus	1 = 1-5%
Schoenoplectus maritimus	5 = > 50%
Typha latifolia	1 = 1-5%
Hordeum jubatum	3 = 11-20%
Schoenoplectus acutus	1 = 1-5%
Bare Ground	1 = 1-5%
Total Vegetative Cover:	90%

Transect Interval Length:	
Vegetation Community Type:	
Plant Species	**Cover**
Total Vegetative Cover:	%

Transect Interval Length:	
Vegetation Community Type:	
Plant Species	**Cover**
Total Vegetative Cover:	%

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Tunnicliff** Date: **July 10, 2019** Examiner: **Mark Traxler**
Transect Number: **2** Approximate Transect Length: **900 feet** Compass Direction from Start: **330˚** Note: _____

Transect Interval Length: **130 feet (Station 0-130)**	
Vegetation Community Type: 9 – Schoenoplectus spp./Typha latifolia	
Plant Species	**Cover**
Schoenoplectus maritimus	5 = > 50%
Rumex crispus	+ = < 1%
Open Water	+ = < 1%
Alopecurus arundinaceus	+ = < 1%
Typha latifolia	3 = 11-20%
Schoenoplectus acutus	1 = 1-5%
Hordeum jubatum	3 = 11-20%
Total Vegetative Cover:	90%

Transect Interval Length: **125 feet (Station 130-255)**	
Vegetation Community Type: 8 - Thinopyrum intermedium	
Plant Species	**Cover**
Thinopyrum intermedium	5 = > 50%
Hordeum jubatum	2 = 6-10%
Trifolium sp.	1 = 1-5%
Bare Ground	1 = 1-5%
Total Vegetative Cover:	90%

Transect Interval Length: **145 feet (Station 255-400)**	
Vegetation Community Type: 13 - Transitional	
Plant Species	**Cover**
Hordeum jubatum	1 = 1-5%
Schoenoplectus maritimus	+ = < 1%
Open Water	+ = < 1%
Elymus Repens	3 = 11-20%
Alopecurus arundinaceus	1 = 1-5%
Total Vegetative Cover:	60%

Transect Interval Length: **140 feet (Station 400-540)**	
Vegetation Community Type: 8 - Thinopyrum/Schedonorus	
Plant Species	**Cover**
Thinopyrum intermedium	5 = > 50%
Chenopodium album	2 = 6-10%
Bare Ground	1 = 1-5%
Total Vegetative Cover:	95%

MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Tunnicliff** Date: **July 12, 2018** Examiner: **Mark Traxler**
Transect Number: **2** Approximate Transect Length: **900 feet** Compass Direction from Start: **330˚** Note: _____

Transect Interval Length: **335 feet (Station 540-875)**	
Vegetation Community Type: 13 - Transitional	
Plant Species	**Cover**
Chenopodium album	+ = < 1%
Hordeum jubatum	2 = 6-10%
Schoenoplectus maritimus	3 = 11-20%
Open Water (Dead Veg)	3 = 11-20%
Typha latifolia	3 = 11-20%
Rumex crispus	1 = 1-5%
Total Vegetative Cover:	60%

Transect Interval Length: **25 feet (Station 875-900)**	
Vegetation Community Type: 8 - Thinopyrum intermedium	
Plant Species	**Cover**
Bromus arvense	1 = 1-5%
Lepidium perfoliatum	+ = < 1%
Thinopyrum intermedium	5 = > 50%
Chenopodium album	+ = < 1%
Melilotus albus	+ = < 1%
Bare Ground (litter)	1 = 1-5%
Total Vegetative Cover:	90%

Transect Interval Length:	
Vegetation Community Type:	
Plant Species	**Cover**
Total Vegetative Cover:	%

Transect Interval Length:	
Vegetation Community Type:	
Plant Species	**Cover**
Total Vegetative Cover:	%

MDT WETLAND MONITORING – VEGETATION TRANSECT

Cover Estimate		Indicator Class	Source
+ = < 1%	3 = 11-10%	+ = Obligate	P = Planted
1 = 1-5%	4 = 21-50%	- = Facultative/Wet	V = Volunteer
2 = 6-10%	5 = > 50%	0 = Facultative	

Percent of perimeter developing wetland vegetation (excluding dam/berm structures): ___**%**

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

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

Comments:

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.

Location	Photograph Frame #	Photograph Description & Lat/Long	Compass Reading (°)
PP-1		Photo Point 1, Photo 1: 45.83945617/-107.5966157	320
PP-1		Photo Point 1, Photo 2: 45.83945617/-107.5966157	270
PP-1		Photo Point 1, Photo 3: 45.83945617/-107.5966157	220
PP-2		Photo Point 2, Photo 1: 45.83785325/-107.5996803	315
PP-2		Photo Point 2, Photo 2: 45.83785325/-107.5996803	0
PP-2		Photo Point 2, Photo 3: 45.83785325/-107.5996803	45
PP-3		Photo Point 3, Photo 1: 45.83943906/-107.6009084	140
PP-3		Photo Point 3, Photo 2: 45.83943906/-107.6009084	100
PP-3		Photo Point 3, Photo 3: 45.83943906/-107.6009084	45
PP-4		Photo Point 4, Photo 1: 45.84139478/-107.5988983	105
PP-4		Photo Point 4, Photo 2: 45.84139478/-107.5988983	160
PP-4		Photo Point 4, Photo 3: 45.84139478/-107.5988983	240
T-1 start		Transect 1 start: 45.8392488/-107.5963573	200
T-1 end		Transect 1 end: 45.83765226/-107.5984577	50
T-2 start		Transect 2 start: 45.83844422/-107.6005579	330
T-2 end		Transect 2 end: 45.84089981/-107.6009804	160
DP-1W		Wetland soil pit #1: 45.839807/-107.569752	
DP-1U		Upland soil pit #1: 45.839775/-107.596643	
DP-2W		Wetland soil pit #2: 45.839274/-107.598507	
DP-2U		Upland soil pit #2: 45.83923/-107.598482	

Comments / Problems: _____

GPS SURVEYING

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

GPS Checklist:

- ☒ Upland/wetland boundary.
- ☐ 4-6 landmarks that are recognizable on the aerial photograph.
- ☐ Start and End points of vegetation transect(s).
- ☐ Photograph reference points.
- ☐ Groundwater monitoring well locations.
- ☒ Bird nest boxes.

Comments / Problems: **Transect ends, photo points, and wells are monumented and not GPS'd every year unless needed.**

WETLAND DELINEATION

(attach COE delineation forms)

At each site conduct these checklist items:

- ☒ Delineate wetlands according to the 1987 Army COE manual and regional supplement.
- ☒ Delineate wetland – upland boundary onto aerial photograph.

Comments / Problems: _____

FUNCTIONAL ASSESSMENT

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

Comments / Problems: _____

MAINTENANCE

Were man-made nesting structure installed at this site? **Yes**
If yes, do they need to be repaired? **Yes**
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? **NA**
If yes, are the structures working properly and in good working order? **NA**
If no, describe the problems below.

Comments / Problems: **One bird box on west fence line was on the ground and destroyed. May want to install new box to replace destroyed box.**

WILDLIFE

Birds

Were man-made nesting structures installed? **Yes**
If yes, type of structure: **box** How many? **8**
Are the nesting structures being used? **Yes**
Do the nesting structures need repairs? **Yes - see comments**

Mammals and Herptiles

Mammal and Herptile Species	Number Observed	Indirect Indication of Use			
		Tracks	Scat	Burrows	Other
Deer sp.	2	☒	☐	☐	fawns
Raccoon		☒	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	
		☐	☐	☐	

Additional Activities Checklist:
NA Macroinvertebrate Sampling (if required)

Comments / Problems: Two boxes in use by tree swallows and 4 used by house wrens in 2019. Some boxes appeared full of nesting material from previous years. One box on the west fenceline was damaged and laying on the ground. House wren observations by MDT staff on 7/10/2019.

BIRD SURVEY – FIELD DATA SHEET

Site: **Tunnicliff** Date: **7/10/19**
Survey Time: **1:00 pm** to **5:30 pm**

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
Tree Swallow	4	FO N					
Wilson's Snipe	2	F FO					
Red-winged Blackbird	20	F FO BP					
House Wren							
Common Yellowthroat							
American Robin							
Eastern Kingbird							
European Starling							
Western Meadowlark							
Yellow-rumped Warbler							
American Crow							
Savannah Sparrow							
Vesper Sparrow							
Yellow Warbler							
Bullock's Oriole							
Bluebird sp.							
American Kestrel							
Northern Flicker							
Tree Swallow							
Bank Swallow							
Gray Catbird							
Mallard							
Ring-necked Pheasant							

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

HABITAT CODES
AB = Aquatic bed
FO = Forested
I = Island
MA = Marsh
MF = Mud Flat
OW = Open Water
SS = Scrub/Shrub
UP = Upland buffer
WM = Wet meadow
US = Unconsolidated shore

Weather: **90 degrees, sunny**

Notes: **List includes species observed by MDT staff on the same day as field monitoring.**

Tunnicliff Plant List (2016-2019)

Scientific Names	Common Names	GP Indicator Status[a]
Acer negundo	Box Elder	FAC
Acroptilon repens	Russian Knapweed	NL
Agropyron cristatum	Crested Wheatgrass	NL
Alopecurus arundinaceus	Creeping Meadow-Foxtail	FACW
Arctium lappa	Greater Burdock	NL
Asclepias speciosa	Showy Milkweed	FAC
Bassia scoparia	Mexican-Fireweed	FACU
Brassica sp.	Mustard sp.	(UPL)
Bromus arvensis (japonicus)	Field Brome	FACU
Bromus inermis	Smooth Brome	UPL
Carex sp.	Sedge	
Chenopodium album	Lamb's-Quarters	FACU
Cirsium arvense	Canadian Thistle	FACU
Convolvulus arvensis	Field Bindweed	NL
Crataegus douglasii	Douglas Hawthorne	FAC
Cynoglossum officinale	Gypsy-Flower	FACU
Dactylis glomerata	Orchardgrass	FACU
Distichlis spicata	Coastal Salt Grass	FACW
Echinocystis lobata	Wild Cucumber	FAC
Elaeagnus angustifolia	Russian-Olive	FACU
Elaeagnus commutata	Silverberry	UPL
Eleocharis palustris	Common Spike-Rush	OBL
Elymus repens	Creeping Wild Rye	FACU
Elymus trachycaulus	Slender Wild Rye	FACU
Equisetum arvense	Field Horsetail	FAC
Fraxinus pennsylvanica	Green Ash	FAC
Glycyrrhiza lepidota	American Licorice	FACU
Hordeum jubatum	Fox-Tail Barley	FACW
Iva axillaris	Deer-root	FAC
Juncus balticus	Baltic rush	FACW
Lepidium perfoliatum	Clasping Pepperwort	FAC
Leymus cinereus	Great Basin Lyme Grass	UPL
Medicago lupulina	Black Medick	FACU
Medicago sativa	Alfalfa	UPL
Melilotis albus	White Sweet-Clover	NL
Melilotis officinalis	Yellow Sweet-Clover	FACU
Pascopyrum smithii	Western Wheatgrass	FACU
Poa secunda	Curly Blue Grass	FACU
Populus deltoides	Eastern Cottonwood	FAC

Scientific Names	Common Names	GP Indicator Status[(a)]
Prunus virginiana	Common Chokecherry	FACU
Puccinellia nuttaliana	Nutall's Alkali Grass	OBL
Quercus macrocarpa	Bur Oak	FACU
Rosa woodsii	Wood's Rose	FACU
Rumex crispus	Curly Dock	FAC
Schedonorus pratensis	False Meadow Rye	FACU
Schoenoplectus acutus	Hard-Stem Club-Rush	OBL
Schoenoplectus americanus	Chairmaker's Club-rush	OBL
Schoenoplectus maritimus	Saltmarsh Club-rush	OBL
Schoenoplectus pungens	Three-Square	OBL
Shepherdia argentea	Silver Buffalo-Berry	UPL
Sporobolus airoides	Alkali-sacaton	FAC
Symphoricarpos albus	Common Snowberry	UPL
Taraxacum officinale	Common Dandelion	FACU
Thinopyrum intermedium	Intermediate Wheatgrass	NL
Tragopogon dubius	Meadow Goat's-beard	NL
Trifolium fragiferum	Strawberry-head Clover	FAC
Trifolium repens	White Clover	FACU
Typha latifolia	Broad-leaf Cat-tail	OBL

[(a)] 2016 NWPL (Lichvar et al., 2016).

New species identified in 2019 are **bolded**.

Lichvar, R. W., D. L. Banks, W. N. Kirchner, and N. C. Melvin, 2016. "The National Wetland Plant List: 2016 Wetland Ratings," *Phytoneuron*, Vol. 2016-30, No. 1–17.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: JTX - Tunnicliff **City/County:** Hardin/Big Horn **Sampling Date:** 10-Jul-19

Applicant/Owner: MDT **State:** MT **Sampling Point:** **DP-1U**

Investigator(s): Mark Traxler, Tanner Traxler **Section, Township, Range:** S 34 T 7N R 39E

Landform (hillslope, terrace, etc.): Depression **Local relief (concave, convex, none):** concave **Slope:** 0.5 % / 0.3 °

Subregion (LRR): LRR G **Lat.:** 45.839775 **Long.:** -107.596643 **Datum:** WGS84

Soil Map Unit Name: Kye clay, saline (Kw) **NWI classification:** Not Mapped

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ○ No ◉

Hydric Soil Present? Yes ○ No ◉

Wetland Hydrology Present? Yes ○ No ◉

Is the Sampled Area within a Wetland? Yes ○ No ◉

Remarks:
DP-1U on slope above wetland Cell 4. Data point has prevalence of upland grasses and forbs. Soil was moist at surface from recent precipitation but no other hydric soil or hydrology indicators noted.

VEGETATION - Use scientific names of plants

FWS Region: GP

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30 Foot Radius)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Foot Radius)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
5.	0	☐		
	0	= Total Cover		
Herb Stratum (Plot size: 5 Foot Radius)				
1. Agropyron intermedium	25	☑	58.1%	UPL
2. Bromus arvensis	10	☑	23.3%	FACU
3. Melilotus officinale	5	☐	11.6%	FACU
4. Bromus ciliatus	3	☐	7.0%	FAC
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	43	= Total Cover		
Woody Vine Stratum (Plot size: 30 Foot Radius)				
1.	0	☐		
2.	0	☐		
	0	= Total Cover		

% Bare Ground in Herb Stratum 57

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	3	x 3 =	9
FACU species	15	x 4 =	60
UPL species	25	x 5 =	125
Column Totals:	43 (A)		194 (B)

Prevalence Index = B/A = 4.512

Hydrophytic Vegetation Indicators:

- ☐ **1 - Rapid Test for Hydrophytic Vegetation**
- ☐ **2 - Dominance Test is > 50%**
- ☐ **3 - Prevalence Index is ≤3.0**[1]
- ☐ **4 - Morphological Adaptations**[1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation**[1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present.**

Hydrophytic Vegetation Present? Yes ○ No ◉

Remarks:
No wetland vegetation dominance on slopes around excavated areas.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: DP-1U

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	100					Silty Clay Loam	
10-14	10YR	5/2	100					Fine Sand	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR F)
- ☐ 1 cm Muck (A9) (LRR F,G,H)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ☐ Sandy Gleyed Matrix S4
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 and 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR I, J)
- ☐ Coastal Prairie Redox (A16) (LRR F, G, H)
- ☐ Dark Surface (S7) (LRR G)
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 and 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

No hydric soil indicators present to 14". Hardpan-like conditions encountered at 14". No hydrology at this height above excavated area.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-neutral Test (D5)
- ☐ Frost Heave Hummocks (D7) (LRR F)

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 ◉

Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available:

Remarks:

No hydrology indicators present.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: JTX - Tunnicliff **City/County:** Hardin/Big Horn **Sampling Date:** 10-Jul-19

Applicant/Owner: MDT **State:** MT **Sampling Point:** **DP-1W**

Investigator(s): Mark Traxler, Tanner Traxler **Section, Township, Range:** **S** 34 **T** 7N **R** 39E

Landform (hillslope, terrace, etc.): Depression **Local relief (concave, convex, none):** concave **Slope:** 0.0 **% /** 0.0 **°**

Subregion (LRR): LRR G **Lat.:** 45.839807 **Long.:** -107.569752 **Datum:** WGS84

Soil Map Unit Name: Kye clay, saline (Kw) **NWI classification:** Not Mapped

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ◉ No ○

Hydric Soil Present? Yes ◉ No ○

Wetland Hydrology Present? Yes ◉ No ○

Is the Sampled Area within a Wetland? Yes ◉ No ○

Remarks:
DP-1W located in Cell 4, qualifies as wetland as cell has a dominant hydrophytic vegetation community and saturated soils. Hydric soils remain problematic due to new construction, as expected and as is normal for new sites.

VEGETATION - Use scientific names of plants

FWS Region: GP

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30 Foot Radius)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Foot Radius)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
5.	0	☐		
	0	= Total Cover		
Herb Stratum (Plot size: 5 Foot Radius)				
1. Typha latifolia	25	☑	59.5%	OBL
2. Schoenoplectus maritimus	10	☑	23.8%	OBL
3. Agropyron intermedium	5	☐	11.9%	UPL
4. Hordeum jubatum	2	☐	4.8%	FACW
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	42	= Total Cover		
Woody Vine Stratum (Plot size: 30 Foot Radius)				
1.	0	☐		
2.	0	☐		
	0	= Total Cover		

% Bare Ground in Herb Stratum 58

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	35	x 1 =	35
FACW species	2	x 2 =	4
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	5	x 5 =	25
Column Totals:	42 (A)		64 (B)

Prevalence Index = B/A = 1.524

Hydrophytic Vegetation Indicators:

- ☑ **1 - Rapid Test for Hydrophytic Vegetation**
- ☑ **2 - Dominance Test is > 50%**
- ☑ **3 - Prevalence Index is ≤3.0**[1]
- ☐ **4 - Morphological Adaptations**[1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation**[1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:

Wetland cell quickly developing a prominance of wetland species.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: DP-1W

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	10YR	3/1	100					Clay Loam	
2-10	10YR	4/1	100					Clay Loam	
10+	rocks								

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR F)
- ☐ 1 cm Muck (A9) (LRR F,G,H)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ☐ Sandy Gleyed Matrix S4
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 and 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR I, J)
- ☐ Coastal Prairie Redox (A16) (LRR F, G, H)
- ☐ Dark Surface (S7) (LRR G)
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 and 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☑ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

New construction, do not expect to see any hydric soil indicators for several years; soil saturated to surface and dominant hydrophytic vegetation in excavated area. Rocks encountered at 10".

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-neutral Test (D5)
- ☐ Frost Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present?	Yes ◉	No ○	Depth (inches):	3
Water Table Present?	Yes ◉	No ○	Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches):	0

Wetland Hydrology Present? Yes ◉ No ○

Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available:

Remarks:

Wetland cell had 3 inches of standing water because of elevated groundwater levels across site in the summer of 2019.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: JTX - Tunnicliff **City/County:** Hardin/Big Horn **Sampling Date:** 10-Jul-19

Applicant/Owner: MDT **State:** MT **Sampling Point:** **DP-2U**

Investigator(s): Mark Traxler, Tanner Traxler **Section, Township, Range:** **S** 34 **T** 7N **R** 39E

Landform (hillslope, terrace, etc.): Depression **Local relief (concave, convex, none):** concave **Slope:** 0.5 **% /** 0.3 **°**

Subregion (LRR): LRR G **Lat.:** 45.83923 **Long.:** -107.598482 **Datum:** WGS84

Soil Map Unit Name: Kye clay, saline (Kw) **NWI classification:** Not Mapped

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ○ No ◉

Hydric Soil Present? Yes ○ No ◉

Wetland Hydrology Present? Yes ○ No ◉

Is the Sampled Area within a Wetland? Yes ○ No ◉

Remarks:
Plot located upslope from wetland Cell 11. Data point has prevalence of upland grasses and forbs. Soil was moist at surface from recent precipitation but no other hydric soil or hydrology indicators noted.

VEGETATION - Use scientific names of plants

FWS Region: GP

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30 Foot Radius)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Foot Radius)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
5.	0	☐		
	0	= Total Cover		
Herb Stratum (Plot size: 5 Foot Radius)				
1. Agropyron intermedium	75	☑	88.2%	UPL
2. Melilotus officinale	10	☐	11.8%	FACU
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	85	= Total Cover		
Woody Vine Stratum (Plot size: 30 Foot Radius)				
1.	0	☐		
2.	0	☐		
	0	= Total Cover		

% Bare Ground in Herb Stratum 15

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 0 (A)

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

Percent of dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	75	x 5 =	375
Column Totals:	85 (A)		415 (B)

Prevalence Index = B/A = 4.882

Hydrophytic Vegetation Indicators:

- ☐ **1 - Rapid Test for Hydrophytic Vegetation**
- ☐ **2 - Dominance Test is > 50%**
- ☐ **3 - Prevalence Index is ≤3.0**[1]
- ☐ **4 - Morphological Adaptations**[1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation**[1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present.**

Hydrophytic Vegetation Present? Yes ○ No ◉

Remarks:

Dominance of upland grasses.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: DP-2U

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
0-3	10YR	4/2	100					Silt Loam	
3-9	10YR	4/2	100					Sandy Clay Loam	
9-14	10YR	5/2	100					Loamy Sand	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR F)
- ☐ 1 cm Muck (A9) (LRR F,G,H)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ☐ Sandy Gleyed Matrix S4
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 and 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR I, J)
- ☐ Coastal Prairie Redox (A16) (LRR F, G, H)
- ☐ Dark Surface (S7) (LRR G)
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 and 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ○ No ◉

Remarks:

No hydric soil indicators present. Hardpan conditions encountered at 14 inches.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-neutral Test (D5)
- ☐ Frost Heave Hummocks (D7) (LRR F)

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 ◉

Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available:

Remarks:

No hydrology indicators present.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: JTX - Tunnicliff **City/County:** Hardin/Big Horn **Sampling Date:** 10-Jul-19

Applicant/Owner: MDT **State:** MT **Sampling Point:** DP-2W

Investigator(s): Mark Traxler, Tanner Traxler **Section, Township, Range:** S 34 T 7N R 39E

Landform (hillslope, terrace, etc.): Depression **Local relief (concave, convex, none):** concave **Slope:** 0.0 % / 0.0 °

Subregion (LRR): LRR G **Lat.:** 45.839274 **Long.:** -107.598507 **Datum:** WGS84

Soil Map Unit Name: Kye clay, saline (Kw) **NWI classification:** Not Mapped

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ◉ No ○

Hydric Soil Present? Yes ◉ No ○

Wetland Hydrology Present? Yes ◉ No ○

Is the Sampled Area within a Wetland? Yes ◉ No ○

Remarks:
Data point located in Cell 11, and qualifies as wetland as it meets all 3 wetland criteria for vegetation, soils, and hydrology.

VEGETATION - Use scientific names of plants

FWS Region: GP

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size: 30 Foot Radius)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
	0	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 Foot Radius)				
1.	0	☐		
2.	0	☐		
3.	0	☐		
4.	0	☐		
5.	0	☐		
	0	= Total Cover		
Herb Stratum (Plot size: 5 Foot Radius)				
1. Typha latifolia	20	☑	34.5%	OBL
2. Schoenoplectus maritimus	20	☑	34.5%	OBL
3. Eleocharis palustris	5	☐	8.6%	OBL
4. Alopecurus arundinaceus	5	☐	8.6%	FACW
5. Agropyron intermedium	5	☐	8.6%	UPL
6. Hordeum jubatum	3	☐	5.2%	FACW
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	58	= Total Cover		
Woody Vine Stratum (Plot size: 30 Foot Radius)				
1.	0	☐		
2.	0	☐		
	0	= Total Cover		

% Bare Ground in Herb Stratum 42

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	45	x 1 =	45	
FACW species	8	x 2 =	16	
FAC species	0	x 3 =	0	
FACU species	0	x 4 =	0	
UPL species	5	x 5 =	25	
Column Totals:	58	(A)	86	(B)

Prevalence Index = B/A = 1.483

Hydrophytic Vegetation Indicators:

- ☑ **1 - Rapid Test for Hydrophytic Vegetation**
- ☑ **2 - Dominance Test is > 50%**
- ☑ **3 - Prevalence Index is ≤3.0**[1]
- ☐ **4 - Morphological Adaptations**[1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **Problematic Hydrophytic Vegetation**[1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:

Dead and dying upland grasses common around developing wetland cell.

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: DP-2W

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	3/2	95	10YR	5/6	5	D	M	Clay Loam	mottles
10-16	10YR	3/2	100						Loamy Sand	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (LRR F)
- ☐ 1 cm Muck (A9) (LRR F,G,H)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) (LRR G, H)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR F)
- ☐ Sandy Gleyed Matrix S4
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☑ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)
- ☐ High Plains Depressions (F16) **(MLRA 72 and 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (LRR I, J)
- ☐ Coastal Prairie Redox (A16) (LRR F, G, H)
- ☐ Dark Surface (S7) (LRR G)
- ☐ High Plains Depressions (F16) **(LRR H outside of MLRA 72 and 73)**
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ◉ No ○

Remarks:

Newly developing hydric soil.

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Dry Season Water Table (C2)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ☐ Presence of Reduced Iron (C4)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-neutral Test (D5)
- ☐ Frost Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ◉ No ○ Depth (inches): 3

Water Table Present? Yes ◉ No ○ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ◉ No ○ Depth (inches): 0

Wetland Hydrology Present? Yes ◉ No ○

Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available:

Remarks:

Wetland cell had 3 inches of standing water because of elevated groundwater levels across site in the summer of 2019.

MDT MONTANA WETLAND ASSESSMENT FORM (revised March 2008)

1. Project Name: JTX-Tunnicliff **2. MDT Project #:** STPX STWD (056) **3. Control #:** 7286

3. Evaluation Date: 7/10/2019 **4. Evaluator(s):** Mark Traxler, Tanner Traxler **5. Wetland/Site #(s):** Tunnicliff

6. Wetland Location(s): Township 1 N, Range 33 E, Section 10; Township 1 N, Range 33 E, Section 15

Approximate Stationing or Roadposts: NA

Watershed: 14 - Middle Yellowstone **County:** Big Horn

7. Evaluating Agency: RESPEC for MDT

Purpose of Evaluation:

- ☐ **Wetland potentially affected by MDT project**
- ☐ **Mitigation wetlands; pre-construction**
- ☒ **Mitigation wetlands; post-construction**
- ☐ **Other** _____

8. Wetland Size (acre): _____ (visually estimated)
8.38 (measured, e.g. GPS)

9. Assessment Area (AA) Size (acre): _____ (visually estimated)
(see manual for determining AA) 8.38 (measured, e.g. GPS)

10. CLASSIFICATION OF WETLAND AND AQUATIC HABITATS IN AA (See manual for definitions.)

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% OF AA
Depressional	Emergent Wetland	Excavated	Seasonal / Intermittent	100

Comments: _____

11. ESTIMATED RELATIVE ABUNDANCE (of similarly classified sites within the same Major Montana Watershed Basin; see manual.)
abundant

12. GENERAL CONDITION OF AA

i. Disturbance: Use matrix below to select the appropriate response; see manual for Montana listed noxious weed and aquatic nuisance vegetation species 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	---
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%.	---	---	---
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%.	---	---	---

Comments (types of disturbance, intensity, season, etc.)**:** AA vegetation recovering from construction disturbance; disturbance other than wetland construction is zero except for wildlife use and wetland monitoring.

ii. Prominent noxious, aquatic nuisance, and other exotic vegetation species: All noxious weeds have decreased: Convolvulus arvensis, Cirsium arvense, Acroptilon repens.

iii. Provide brief descriptive summary of AA and surrounding land use/habitat: FAS, large parcel homesites, ranching.

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 one is forested) classes	---	NA	NA	NA
2 (or 1 if forested) classes	---	NA	NA	NA
1 class, but not a monoculture	mod	←NO	YES→	---
1 class, monoculture (1 species comprises ≥90% of total cover)	---	NA	NA	NA

Comments: Site contains emergent wetland and transitional emergent wetland

Wetland/Site #(s): Tunnicliff

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

i. AA is Documented (D) or Suspected (S) to contain: Check box based on definitions in manual.

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

ii. Rating: Based on the strongest habitat chosen in 14A(i) above, select the corresponding functional point and rating.

Highest Habitat Level	Doc/Primary	Sus/Primary	Doc/Secondary	Sus/Secondary	Doc/Incidental	Sus/Incidental	None
Functional Point/Rating	---	---	---	---	---	---	0L

Sources for documented use (e.g. observations, records): USFWS T&E list for Big Horn County

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

i. AA is Documented (D) or Suspected (S) to contain: Check box based on definitions in manual.

Primary or critical habitat (**list species**) ☐ D ☐ S _____
Secondary habitat (**list species**) ☒ D ☒ S Bur Oak (S2) documented onsite in 2017. Great Blue Heron (S3)
Incidental habitat (**list species**) ☐ D ☐ S _____
No usable habitat ☐ S

ii. Rating: Based on the strongest habitat chosen in 14A(i) above, select the corresponding functional point and rating.

Highest Habitat Level	Doc/Primary	Sus/Primary	Doc/Secondary	Sus/Secondary	Doc/Incidental	Sus/Incidental	None
S1 Species Functional Point/Rating	---	---	---	---	---	---	---
S2 and S3 Species Functional Point/Rating	---	---	.6M	---	---	---	---

Sources for documented use (e.g. observations, records): Suitable great blue heron habitat

14C. GENERAL WILDLIFE HABITAT RATING

i. Evidence of Overall Wildlife Use in the AA: Check substantial, moderate, or low based on supporting evidence.

☐ ***Substantial:*** Based on any of the following [check].
- ☐ observations of abundant wildlife #s or high species diversity (during any period)
- ☐ abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ☐ presence of extremely limiting habitat features not available in the surrounding area
- ☐ interview with local biologist 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
- ☐ interview with local biologist with knowledge of 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
- ☐ interview with local biologist 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 manual 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)	---	---	---	---	---	---	---	---	---	H	---	---	---	---	---	---	---	---	---	---
☐ **Moderate Disturbance** at AA (see #12i)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
☐ **High Disturbance** at AA (see #12i)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

iii. Rating: Use the conclusions from i and ii above and the matrix below to select the functional point and rating.

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

Comments: White-tailed deer observed on site in 2019. Evidence of waterfowl and mammal use.

Wetland/Site #(s): Tunnicliff

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

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 the NA box and proceed to 14E.

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].

Type of Fishery: ☐ Cold Water (**CW**) ☐ Warm Water (**WW**) **Use the CW or WW guidelines in the manual to complete the matrix.**

i. Habitat Quality and Known / Suspected Fish Species in AA: Use matrix to select the functional point 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	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Tier II or **Native Game** fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Tier III or **Introduced Game** fish	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FWP Non-Game Tier IV or **No** fish species	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Sources used for identifying fish spp. potentially found in AA: No fish habitat within AA.

ii. Modified Rating: NOTE: Modified score cannot exceed 1.0 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?* ☐ **YES**, reduce score in **i** by 0.1 = __ or ☒ **N0**

b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area; specify in comments) for native fish or introduced game fish? ☐ **YES**, add to score in **i** or **iia** 0.1 = __ or ☒ **N0**

iii. Final Score and Rating: _ **Comments:** _____

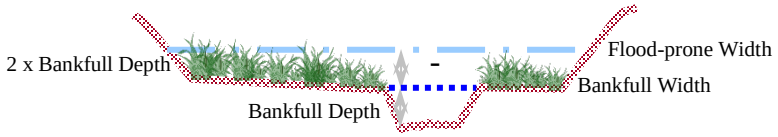
14E. FLOOD ATTENUATION ☐ **NA** (proceed to 14F)

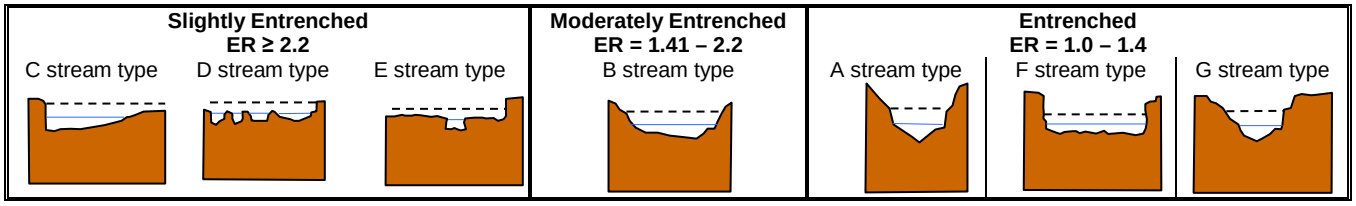
Applies only to wetlands that are subject to flooding via in-channel or overbank flow.
If wetlands in AA are not flooded from in-channel or overbank flow, check the NA box and proceed to 14F.

Entrenchment Ratio (ER) Estimation (see manual for additional guidance). Entrenchment ratio = (flood-prone width) / (bankfull width).
Flood-prone width = estimated horizontal projection of where 2 X maximum bankfull depth elevation intersects the floodplain on each side of the stream.

700 / 250 = 2.8

flood prone width / bankfull width = entrenchment ratio





i. Rating: Working from top to bottom, use the matrix below to select the functional point 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		
Percent 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**	---	---	.6M	---	---	---	---	---	---
AA contains **unrestricted outlet**	---	---	---	---	---	---	---	---	---

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? ☐ YES ☒ NO **Comments:** AA subject to periodic flooding from Bighorn River although flows in the Bighorn River are controlled by a dam. Entrenchment ratio estimated from aerial photo interpretation and not measured in field. River is C-Type.

Wetland/Site #(s): Tunnicliff

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

Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.
If no wetlands in the AA are subject to flooding or ponding, then check the NA box and proceed to 14G.

i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see manual 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**	---	.9H	---	---	---	---	---	---	---
Wetlands in AA flood or pond **< 5 out of 10 years**	---	---	---	---	---	---	---	---	---

Comments: 8.38 acres of wetlands have developed as of 2019

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

Applies to wetland 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, check the NA box and proceed to 14H.

i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating.

Sediment, Nutrient, and Toxicant Input Levels within AA	**AA receives or surrounding land use has potential to deliver 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 is on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants or AA receives or surrounding land use has potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.**			
% Cover of Wetland Vegetation in AA	**☐ ≥ 70%**		**☒ < 70%**		**☐ ≥ 70%**		**☐ < 70%**	
Evidence of Flooding / Ponding in AA	**☐ Yes**	**☐ No**	**☒ Yes**	**☐ No**	**☐ Yes**	**☐ No**	**☐ Yes**	**☐ No**
AA contains **no or restricted outlet**	---	---	.7M	---	---	---	---	---
AA contains **unrestricted outlet**	---	---	---	---	---	---	---	---

Comments: AA has potential to receive sediment/nutrients/toxicants from surface or groundwater.

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

Applies only if AA occurs on or within the banks of a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action.
If 14H does not apply, check the NA box and proceed to 14I.

% 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%	---	---	---
☐ 35-64%	---	.6M	---
☒ < 35%	---	---	---

Comments: Seasonal surface water in some cells that are developing wetlands. Those cells with cattail have higher stability rating than those with upland grasses.

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

i. Level of Biological Activity: Synthesis of wildlife and fish habitat rates (select).

General Fish Habitat Rating (14Diii)	**General Wildlife Habitat Rating (14Ciii)**		
	☐ E/H	**☒ M**	**☐ L**
☐ E/H	---	---	---
☐ M	---	---	---
☐ L	---	---	---
☒ NA	---	M	---

ii. Rating: Working from top to bottom, use the matrix below to select the functional point and rating. Factor A = acreage of vegetated wetland component in the AA; Factor B = level of biological activity rating from above (14Ii); Factor C = whether or not the AA contains a surface or subsurface outlet; the final three rows pertain to the duration of surface water in the AA, where P/P, S/I, and T/E were previously defined, and A = "absent" [see manual 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	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
S/I	---	---	---	.4M	---	---	---	---	---	---	---	---	---	---	---	---	---	---
T/E/A	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Wetland/Site #(s): Tunnicliff

14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT (continued)

iii. Modified Rating: Note: Modified score cannot exceed 1.0 or be less than 0.1.

Vegetated Upland Buffer: 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).
Is there an average ≥ 50-foot wide vegetated upland buffer around ≥ 75% of the AA's perimeter? ☒ **YES**, add 0.1 to score in **ii** = ___ ☐ **NO**

iv. Final Score and Rating: .5M **Comments:**

14J. GROUNDWATER DISCHARGE / RECHARGE
Check the appropriate indicators in i and 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: _____

iii. Rating: Use the information from i and ii above and the table below to select the functional point and rating.

Criteria	Duration of Saturation at AA Wetlands ***FROM GROUNDWATER DISCHARGE*** or ***WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM*** ☐ **P/P**	☒ **S/I**	☐ **T**	☐ **None**
☒ **Groundwater Discharge or Recharge**	---	.7M	---	---
☐ **Insufficient Data/Information**	---			

Comments: The site was designed to have shallow excavations that utilize a high groundwater table as the primary source of wetland hydrology.

14K. UNIQUENESS

i. Rating: Working from top to bottom, use the matrix below to select the functional point 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)	---	---	---	---	---	---	---	.4M	---
☐ **Moderate Disturbance** at AA (#12i)	---	---	---	---	---	---	---	---	---
☐ **High Disturbance** at AA (#12i)	---	---	---	---	---	---	---	---	---

Comments: Wetland type is common in the Bighorn River floodplain

14L. RECREATION / EDUCATION POTENTIAL ☐ NA (proceed to Overall Summary and Rating page)
Affords 'bonus' points if AA provides a recreational or educational opportunity.

i. Is the AA a known or potential recreational or educational site? ☒ **YES**, go to ii. ☐ **NO**, check the NA box.

ii. Check categories that apply to the AA: ☒ Educational/Scientific Study ☐ Consumptive Recreational ☐ Non-consumptive recreational ☐ Other: _____

iii. Rating: Use the matrix below to select the functional point and rating.

Known or Potential Recreational or Educational Area	Known	Potential
Public ownership or public easement with general public access (no permission required)	.2H	---
Private ownership with general public access (no permission required)	---	---
Private or public ownership without general public access, or requiring permission for public access	---	---

Comments: Site owned by MFWP

15. GENERAL SITE NOTES: _____

Wetland/Site #(s): Tunnicliff

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	low 0.00	1.00	0	
B. MT Natural Heritage Program Species Habitat	mod 0.60	1.00	5.0	
C. General Wildlife Habitat	mod 0.70	1.00	5.9	*
D. General Fish Habitat	NA	NA	0	
E. Flood Attenuation	mod 0.60	1.00	5.0	
F. Short and Long Term Surface Water Storage	high 0.90	1.00	7.5	*
G. Sediment / Nutrient / Toxicant Removal	mod 0.70	1.00	5.9	*
H. Sediment / Shoreline Stabilization	mod 0.60	1.00	5.0	
I. Production Export / Food Chain Support	mod 0.50	1.00	4.2	
J. Groundwater Discharge / Recharge	mod 0.70	1.00	5.9	*
K. Uniqueness	mod 0.40	1.00	3.3	
L. Recreation / Education Potential (bonus point)	high 0.20		1.7	
Total Points	**5.9**	**10**	**49.4 Total Functional Units**	
Percent of Possible Score 59% (round to nearest whole number)				

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; if not 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 (AA) RATING: Check the appropriate category based on the criteria outlined above.

☐ **I** ☐ **II** ☒ **III** ☐ **IV**

APPENDIX C
PROJECT AREA PHOTOGRAPHS

MDT Wetland Mitigation Monitoring
JTX – Tunnicliff Ranch
Big Horn County, Montana

JTX Tunnicliff: 2019 Photo Point Photographs



Photo Point: 1 Location: Looking NW at Cell 4
Bearing: 320 degrees Year: 2016



Photo Point: 1 Location: Looking NW at Cell 4
Bearing: 320 degrees Year: 2019



Photo Point: 1 Location: Looking east across property
Bearing: 270 degrees Year: 2016



Photo Point: 1 Location: Looking east across property
Bearing: 270 degrees Year: 2019



Photo Point: 1 Location: Looking SW at Cell 5
Bearing: 220 degrees Year: 2016



Photo Point: 1 Location: Looking SW at Cell 5
Bearing: 220 degrees Year: 2019

JTX Tunnicliff: 2019 Photo Point Photographs



Photo Point: 2
Bearing: 315 degrees
Location: Looking NW at Cell 9
Year: 2016



Photo Point: 2
Bearing: 315 degrees
Location: Looking NW at Cell 9
Year: 2019



Photo Point: 2
Bearing: 0 degrees
Location: Looking North at Cell 8/9
Year: 2016



Photo Point: 2
Bearing: 0 degrees
Location: Looking North at Cell 8/9
Year: 2019



Photo Point: 2
Bearing: 45 degrees
Location: Looking NE at Cell 8
Year: 2016



Photo Point: 2
Bearing: 45 degrees
Location: Looking NE at Cell 8
Year: 2019

JTX Tunnicliff: Photo Point Photographs



Photo Point: 3 Location: Looking SE at Cell 13
Bearing: 140 degrees Year: 2016



Photo Point: 3 Location: Looking SE at Cell 13
Bearing: 140 degrees Year: 2019



Photo Point: 3 Location: Looking East at Cell 13
Bearing: 100 degrees Year: 2016



Photo Point: 3 Location: Looking East at Cell 13
Bearing: 100 degrees Year: 2019



Photo Point: 3 Location: West side of property Looking NE
Bearing: 45 degrees Year: 2016



Photo Point: 3 Location: West side of property Looking NE
Bearing: 45 degrees Year: 2019

JTX Tunnicliff: 2019 Photo Point Photographs



Photo Point: 4 Location: Looking East at Cell 3
Bearing: 105 degrees Year: 2016



Photo Point: 4 Location: Looking East at Cell 3
Bearing: 105 degrees Year: 2019



Photo Point: 4 Location: Looking South at Cell 3
Bearing: 160 degrees Year: 2016



Photo Point: 4 Location: Looking South at Cell 3
Bearing: 160 degrees Year: 2019



Photo Point: 4 Location: Looking West at Cell 2
Bearing: 240 degrees Year: 2016



Photo Point: 4 Location: Looking West at Cell 2
Bearing: 240 degrees Year: 2019

JTX Tunnicliff: 2019 Transect Photographs



Transect 1: Start
Bearing: 230 degrees
Location: SE corner of property
Year: 2016



Transect 1: Start
Bearing: 230 degrees
Location: SE corner of property
Year: 2019



Transect 1: End
Bearing: 50 degrees
Location: SE corner of property
Year: 2016



Transect 1: End
Bearing: 50 degrees
Location: SE corner of property
Year: 2019



Transect 2: Start
Bearing: 350 degrees
Location: West side of property
Year: 2016



Transect 2: Start
Bearing: 350 degrees
Location: West side of property
Year: 2019

JTX Tunnicliff: 2019 Transect and Data Point Photographs



Transect 2: End
Bearing: 170 degrees
Location: West side of property
Year: 2016



Transect 2: End
Bearing: 170 degrees
Location: West side of property
Year: 2019



Data Point: DP-1W
Location: Cell 4
Year: 2019



Data Point: DP-1U
Location: Cell 4
Year: 2019



Data Point: DP-2W
Location: Cell 11
Year: 2019



Data Point: DP-2U
Location: Cell 11
Year: 2019