Aquatic Resource Delineation and Fen Search Report

November 24, 2021

Upper Turtle River Dam 9 (Larimore Dam) Rehabilitation Planning Project

Includes Parts of the following Sections in Grand Forks County, North Dakota;

Township 151 North, Range 54 West, Sections 5, 6 and 7
Township 151 North, Range 55 West, Sections 1 and 2
Township 152 North, Range 54 West, Sections 31 and 32
Township 152 North, Range 55 West, Sections 35 and 36

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Abbreviations and Acronyms

A11	Depleted Below Dark Surface hydric soil indicator
A12	Thick Dark Surface hydric soil indicator
ARD	aquatic resource delineation
CWA	Clean Water Act
F2	Loamy Gleyed Matrix hydric soil indicator
F3	Depleted Matrix hydric soil indicator
F6	Redox Dark Surface hydric soil indicator
F7	Depleted Below Dark Surface hydric soil indicator
GIS	Geographic Information System
HDR	HDR, Incorporated
HGM	hydrogeomorphic
Manual	United State Army Corps of Engineers 1987 Wetland Delineation Manual
msl	mean sea level
NDDOT	North Dakota Department Of Transportation
NDGF	North Dakota Game & Fish Department
NRCS	USDA -Natural Resources Conservation Service
NWI	National Wetland Inventory
NWPL	National Wetland Plant List
OHWM	ordinary high-water mark
OW	Other Waters of the United States
PABFh	NWI code for Palustrine, Aquatic Bed, Semi-permanently Flooded, Diked/Impounded
PABFx	NWI code for Palustrine, Aquatic Bed, Semi-permanently Flooded, excavated
PEMIA	NWI code for Palustrine, Emergent, Persistent Herbaceous Vegetation, Temporarily Flooded

PEMIAx	NWI code for Palustrine, Emergent, Persistent Herbaceous Vegetation, Temporarily Flooded, excavated
PEMIC	NWI code for Palustrine, Emergent, Persistent Herbaceous Vegetation, Seasonally Flooded
PEMICx	NWI code for Palustrine, Emergent, Persistent Herbaceous Vegetation, Seasonally Flooded, excavated
PEMIF	NWI code for Palustrine, Emergent, Persistent Herbaceous Vegetation, Semi-permanently Flooded
PEMIFx	NWI code for Palustrine, Emergent, Persistent Herbaceous Vegetation, Semi-permanently Flooded, excavated
PEMI/FO1Ad	NWI code for Palustrine, Emergent, Persistent Herbaceous Vegetation, Forested, Temporarily Flooded, drained
PEMI/FO1A	NWI code for Palustrine, Emergent, Persistent Herbaceous Vegetation, Forested, Temporarily Flooded
PEM1/FO1C	NWI code for Palustrine, Emergent, Persistent Herbaceous Vegetation, Forested, Seasonally Flooded
PEM1/FO1Cd	NWI code for Palustrine, Emergent, Persistent Herbaceous Vegetation, Forested, Seasonally Flooded, partially drained
PEMI/SSA	NWI code for Palustrine, Emergent, Persistent Herbaceous Vegetation, Scrub-Shrub, Temporarily Flooded
PEMI/SS1A	NWI code for Palustrine, Emergent, Persistent Herbaceous Vegetation, Scrub-Shrub, Temporarily Flooded
PEMI/SS1Ad	NWI code for Palustrine, Emergent, Persistent Herbaceous Vegetation, Scrub-Shrub, Temporarily Flooded, partially drained
PEMI/SS1Cd	NWI code for Palustrine, Emergent, Persistent Herbaceous Vegetation, Scrub-Shrub, seasonally Flooded, partially drained
PEM1/SS1F	NWI code for Palustrine, Emergent, Persistent Herbaceous Vegetation, Scrub-Shrub, Semi-permanently Flooded
PFOC	NWI code for Palustrine, forested, Seasonally Flooded
PLSS	Public Land Survey System
Project	Upper Turtle River Dam 9 (Larimore Dam) Rehabilitation Planning Project

PSSA	NWI code for Palustrine, Scrub-Shrub, Temporarily Flooded
R2UB5	NWI code for Riverine, Lower Perennial, Unconsolidated Bottom, Mud
R4SBC	NWI code for Riverine, Intermittent, Streambed, Seasonally Flooded
R5UBH	NWI code for Riverine, Unknown Perennial, Unconsolidated Bottom, Permanently Flooded
Regional Supplement	Regional Supplement to the United States Army Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0)
Sec. 1	Section 1, Township 151 North, Range 55 West
Sec. 2	Section 2, Township 151 North, Range 55 West
Sec. 5	Section 5, Township 151 North, Range 54 West
Sec. 6	Section 6, Township 151 North, Range 54 West
Sec. 7	Section 7, Township 151 North, Range 54 West
Sec. 31	Section 31, Township 152 North, Range 54 West
Sec. 32	Section 32, Township 152 North, Range 54 West
Sec. 35	Section 35, Township 152 North, Range 55 West
Sec. 36	Section 36, Township 152 North, Range 55 West
SP.	species
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UTV	utility terrain vehicle
WPC	Western Plains Consulting, Incorporated

Executive Summary

With some exceptions, the on-Site determinations of the presence/absence of wetlands and Other Waters of the United States (OW) in the survey area were conducted by WPC employees Mark A. Anderson, Senior Natural Resource Specialist, and David J. Breker, Professional Soil Classifier, and NRCS State Biologist Curtis Bradbury and NRCS Resource Conservationist Rita Sveen, in accordance with the USACE 1987 Wetland Delineation Manual, hereafter referred to as the Manual, and the Regional Supplement to the USACE Wetland Delineation Manual: Great Plains Region (Version 2.0), hereafter referred to as the Regional Supplement. OW were identified according to instructions provided in workshops provided by the NDDOT and the USACE.

Thirty-seven wetlands were delineated by WPC in the survey area, not including the many wetland segments abutting the South Branch of the Turtle River. WPC delineated five OWs, including three reaches of the South Branch of the Turtle River. Six wetlands and one OW reach of the South Branch of the Turtle River were delineated by the NRCS team. A total of 66.81 acres of wetland were delineated in the survey. A wide variety of Cowardin classes were assigned to the wetlands in the Project area. Most of the wetlands were undisturbed by cropping, haying or grazing. Encroachment of trees and shrubs had apparently increased in some of the wetlands during the wetter years since 1993.

Two constructed ponds were identified as OW and totaled 4.48 acres. The reach of the South Branch of the Turtle River in the Project area east of Larimore Dam was 731 feet long and was 0.45 acre in size. The length of the South Branch of the Turtle River in the Project area west of Highway 18 was measured in three contiguous reaches and totaled 30,750 feet and covered 17.22 acres.

On the downstream (east) side of the Larimore Dam, the river channel banks were fully armored with rocks and the channel bottom was partially armored with rocks. Spotty vegetation emerged between the rocks on the channel banks; the vegetation on roughly the lower half of the banks met hydrophytic community criteria. West of Highway 18, mass removal of soil and subsoil by bank erosion was extensive and active, leaving many reaches of riverbank with no vegetation. The riverbanks appeared to be mostly sandy-textured west of Highway 18, rendering the banks more vulnerable to the problem.

No fen wetlands were identified during the routine wetland delineation work. A later, cursory search for fen wetlands was conducted in the designated ARD project area and at lower elevations inside the ARD project area. Numerous sample points in wetlands having more than 8 inches of organic soil, (i.e., a fen criterion) were found. Large acreages of wetland that visually correlated to the sample points and NWI maps indicated that fen wetlands are extensive within the Larimore Dam Project area.

This report does not address cultural or historic resources.

1. Introduction

The lead contact person for the Upper Turtle River Dam 9 (Larimore Dam) Rehabilitation Planning Project is:

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The consultant contact for the project is:

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The Project sponsor is the Grand Forks County Water Management District. The Chairman is:

Richard Axvig, 3905 Simonview Court, Grand Forks, ND 58201-7620
phone 701-740-5609 richardaxvig@gmail.com

Larimore Dam was built with Federal funding from the Watershed Protection and Flood Prevention Program, also known as the PL-566 Program (Public Law 83-566). The PL-566 Program is administered by NRCS. NRCS is responsible for overseeing compliance with the applicable laws and regulations on the Small Watershed Program areas. Operation and maintenance of the Larimore Dam and its immediate watershed is achieved by a partnership of the NRCS and the Grand Forks County Water Management District. The lead NRCS contact person for the Project is:
Christi Fisher, State Conservation Engineer, Bismarck 701-530-2091 christi.fisher@usda.gov

In addition to the land surrounding the Larimore Dam reservoir that is managed by the Grand Forks County Water Management District, land belonging to many private landowners was identified as being in the Project's zone of potential impact. A list of those landowners and contact information can be requested from Kari Lavecchia, Secretary-Treasurer for the Grand Forks County Water Management District, phone 701-780-8312 kari.lavecchia@gfcounty.org

The ARD survey area comprised a rough ring around the Larimore Dam reservoir and an area upstream from the permanent pool. The ARD survey area included the following areas;

- A reach of the South Branch of the Turtle River and some adjacent forest downstream from the dam.
- The dam itself, the emergency spillway, and some adjacent area
- Land between elevations 1101' and 1108' in the Larimore Dam watershed, which is the difference between the existing permanent pool level and the highest permanent pool level that would be proposed by the Project alternatives.

The purpose of this report is to identify and describe aquatic resources and to identify known possible sensitive plant, fish, and wildlife species in the survey area. This report facilitates efforts to:

1. A void or minimize impacts to aquatic resources during the design process.
2. Document aquatic resource boundary determinations for review by regulatory authorities.
3. Provide early indications of known sensitive species within the survey area.
4. Provide background information.

The purpose of the Project is to bring Upper Turtle River Dam No. 9 (Larimore Dam) into compliance with current NRCS and ND State Water Commission (NDSWC) dam performance, design, and safety standards while maintaining the current flood protection and recreational opportunities.

The dam was constructed for the purposes of flood control, wildlife, and recreation. As documented in the 2015 Assessment Report completed by HDR|Kleinfelder JV under contract with NRCS, the auxiliary spillway and riser structure do not meet current NRCS or NDSWC dam safety standards. In terms of 100-year activation criteria, the crest elevation of the auxiliary spillway is 6.1 feet lower and the top of dam is 7.9 feet lower than would be required to meet NRCS TR60. Additionally, the principal spillway does not meet the 10-day drawdown requirement for the principal spillway hydrograph event.

At risk from a structure failure includes a maximum population of 105 individuals, 50 structures, a state highway, multiple county/township roads, recreational facilities, historic/cultural resources, and degradation of river, wetland, and riparian habitat.

Alternatives under consideration

Alternatives under consideration include the no action alternative, decommissioning the dam and a structural alternative. The structural alternative will be recommended once the alternatives analysis is completed and will involve modifying the principal spillway, modifying the auxiliary spillway and raising the top of dam.

This ARD report was a joint effort by NRCS and the Grand Forks County Water Management District's consultant, HDR, Inc. NRCS employees completed the field determinations on most of the cropland and part of the non-cropland in the Project area. See the map titled **ARD Areas Inventoried by WPC and NRCS** in **Appendix A**.

As sub-contractors for HDR, WPC staff completed field determinations on most of the non-cropland area and on some cropland. WPC developed this ARD report with the inclusion of available NRCS data. In addition to the ARD survey in designated parts of the Project area, HDR requested WPC to identify fen wetland areas within the Project boundary. In the time allotted by HDR, WPC searched for and identified four potential fen areas. Three separate fen areas were identified below the ARD survey area elevation but not delineated. The fen areas are described at the end of the Aquatic Resources section of this report. One potential fen was identified in the field in the survey area and delineated with a combination of on-site data and offsite photography.

The Project area includes substantial forest land, shrubby areas, grassland, wetlands, perennial stream, and deepwater habitat. The interspersion and extent of these habitats and the diversity within these habitat types renders the Project area as potential habitat for virtually all species of concern identified by the North Dakota Game and Fish Department that could be found in northeastern North Dakota. While conducting the ARD, Mark A. Anderson and David J. Breker flushed one sandhill crane (and possibly more) while they were walking west down the hill by the southwest corner of the Larimore Dam Recreation Area Campground on June 18, 2021. Trees obstructed the view of the bird(s), but the chattering sound of the bird was clearly at or near ground level. While he was trimming trees in Bellevue Cemetery during the last week of March 2021, Mr. Anderson heard several sandhill cranes in the river valley below the cemetery on consecutive days.

2. Location

The survey area included parts of the following PLSS Sections in Grand Forks County, North Dakota.

- Township 151 North, Range 54 West, Sections 5, 6 and 7
- Township 151 North, Range 55 West, Sections 1 and 2
- Township 152 North, Range 54 West, Sections 31 and 32
- Township 152 North, Range 55 West, Sections 35 and 36

The city of Larimore, North Dakota was about a quarter mile south of the southern edge of the survey area on ND Highway 18. See **Appendix A, Larimore Dam Rehabilitation Project Area Map,** the **Aquatic Resource Delineation Map Area Key**, and the respective **ARD Maps 1** through **9**.

Access points for various parts of the survey area are described below.

- The emergency spillway and Grand Forks County Water Management District property north of the reservoir & river on Sections 31 and 32-152-54 was accessed by obtaining permission from the Larimore Dam Recreation Area Manager to drive a UTV onto the Water Management District property from a point one mile east and 0.6 mile south of the Highway 2 & 18 intersection. Lat. 47.938847, Long. -97.602421
- The dam, reach of river below the dam and adjacent forest was accessed by driving to the Larimore Golf Course and parking at the north end of the golf cart sheds, then walking between the fence and northwest shed toward the dam. Lat. 47.936043, Long. -97.591548
- In Section 31, the survey area west of the river was accessed by walking north from the northeast corner of Bellevue Cemetery. Lat. 47.993818, Long. -97.621193
- The survey area east of the river on Section 6-151-54 was accessed on foot after driving to the southwest corner of the Larimore Dam Recreation Area campground. Lat. 47.931774, Long. -97. 614933
- Permission was obtained from Jon Folkers to drive roughly 150 yards east of his house to park near the west edge of the Project area in the Northwest Quarter of Section 35-152-55. Lat. 47.941406, Long. -97.663414
- All other Project areas were accessed on foot from the nearest public road.

3. Methods

WPC reviewed available sources that may contain evidence or indicators of wetlands and OW in the survey area. Off-site data sources reviewed included NWI maps, USGS Topographic Maps, and NRCS soil survey data. Current climatic conditions were considered while investigating aquatic resource indicators. See **Appendix B, Climate Data**. WPC checked for wetlands by driving a UTV along the survey area north of the Larimore Dam reservoir. All other parts of the survey area were walked to evaluate actual conditions, identify aquatic resource indicators, and inventory plant species. Delineations and sample points were recorded with a Trimble GPS unit that had an accuracy of 4 inches or closer.

Following advice from the USACE Bismarck Regulatory staff, WPC delineated the OW-4 reach of the South Branch of the Turtle River and its abutting wetlands as a single unit in the field. An off-site delineation of the river area was then subtracted from the combined river & abutting wetlands field delineation to differentiate (i.e., delineate) the abutting wetlands.

With some exceptions, the on-site determinations of the presence/absence of wetlands and OWs in the survey area were conducted in accordance with the Manual and the Regional Supplement. The Routine Determinations -On-site Inspection Necessary -Areas Equal To or Less Than 5 Acres in Size procedure was determined to be appropriate for all the wetlands on the Site. Although difficult for reasons cited in the next paragraph, the upper borders of wetland reaches abutting the river were field-delineated by WPC. The river sides (i.e., OW border) of the abutting wetlands were delineated off-site with aerial photography by WPC's GIS subcontractor. Field observations in the survey area were recorded on

Wetland Determination Data Forms. Vegetation, soil, and hydrology data were recorded at paired sample points, one on each side of the wetland boundary. Most of the aquatic resources were photographed and are shown in **Appendix C, Photographs**. All areas where potential wetlands were delineated by NWI were field checked, except for three PEM1A delineations by 38th Street Northeast; one each on the Northwest Quarter of Section 6, the Southwest Quarter of Section 6, and the Southwest Quarter of Section 36. See **Appendix D, Supporting Maps and Data - NWI Maps # 1** through **9**.

WPC followed instructions from a May 2014 workshop provided by USACE and North Dakota Department Of Transportation (NDDOT) employees for determining the presence or absence of OW potentially subject to the Clean Water Act. Field observations in the survey area were recorded on Other Waters Information sheets. The reach of the river east of the Larimore Dam was not delineated on-site due to unstable rocks on the sides of the rip-rapped channel, impenetrable shrubs, and slippery rocks in the partially armored channel. In the western part of the survey area, the river was not field-delineated due to the hazards of high, steep riverbanks, fissures from bank sloughing/mass removal, high potential for collapse, and unstable soil or slick, dry grass on steep areas that made falling likely.

On October 27, 2021, WPC field-reviewed an area in the East Half of Section 35-152-55 and the Southwest Quarter of 36-152-55 that was initially planned to be surveyed by NRCS. Due to time constraints, WPC did not collect soils data in the two wetlands (Wetlands 37 and 38) found in this area. WPC did not have a Trimble to delineate the wetlands or the reach of the Turtle River (OW-5) in this area. Wetlands 37 and 38 and OW-5 were delineated with office tools and recollection of field observations.

4.0 Existing Conditions

The survey area was experiencing Severe or Extreme Drought conditions at the time of the field work, according to the National Drought Monitor Website, https://droughtmonitor.unl.edu . The drought conditions are documented in **Appendix B, Climatic Data**. The data was for the Grand Forks Air Force Base area. WPC determined that the data was accurate for the survey area; the air base is about 13 miles east of the Site.

4.1 Landscape Setting

The South Branch of the Turtle River flows generally eastward through the Project area. The survey area very roughly ringed the Larimore Dam reservoir and a large area upstream from the reservoir. The survey area was in the elevation range of 1101 to 1108 feet above sea level. The valley wall is well defined on the north side of the river. The north part of the survey area "ring" was a very narrow band across the north wall of the valley, except for some of the land west of 38th St. NE. On the south side of the reservoir and river, the survey area was a very narrow band from the west side of the Larimore Golf Course to a point about one-fourth of a mile east of Highway 18. West of that point (about one-fourth of a mile east of Highway 18), the survey area south of the river was much wider, due to much flatter topography. The western end of the survey area was floodplain and ended in the river channel.

Groundwater from the Elk Valley Aquifer probably supplies most of the water to the Turtle River, except during significant precipitation and runoff events. There appeared to be substantially more flow below the Larimore Dam than there was two miles to the west of the dam; extensive slope wetlands from one-half mile east of Highway 18 to Highway 18 and south of the river west of Highway 18 were presumed to contribute substantially to the river flow. Coincidentally, irrigation in the surrounding region started roughly around the time of the prolonged above-average precipitation era that started in 1993.

The survey area (between elevation 1,101' and 1,108' above msl) was described as a rough ring that covered approximately 453 acres. The Project area, i.e., the entire acreage below elevation 1,108', was approximately 1,187 acres. See **Appendix D, USGS 7.5-Minute Quadrangle Topographic Map** and **Topographic Maps 1** through **9**.

In addition to the dam and emergency spillway, land uses in the survey area included idle grassland, deciduous forest, herbaceous and scrub-shrub wetlands, cropland and windbreaks, Larimore Dam Recreation Area and Campground, private residences, and small parts of the Larimore Golf Course and Larimore BMX Race Track. The Larimore Dam Recreation Area and Larimore Golf Course are heavily used by customers from many States and Canada.

Some of the cropland in the survey area was irrigated. Some of the grassland and volunteer shrub/tree area may have been enrolled in the Conservation Reserve Program. Much of the survey area was presumably grazed decades ago as indicated by the presence of old fences. The natural climax community on most of the eastern part the survey area was deciduous forest. The natural climax community on most of the western part of the survey area was idle grassland and wetlands; the wetlands were dominated by herbaceous vegetation with scattered scrub-shrub areas.

WPC's assigned survey area was almost entirely field-verified on foot. The exception was the narrow band of grassland north of the reservoir and river on Grand Forks County Water Management District property, which WPC checked while driving a UTV across the area.

4.2 Aquatic Resources

Forty-four wetlands delineated in the survey area met all three wetland criteria in the Manual. Most of the wetlands were classified as slope type; a few were depressional and one was a fringe around an excavated pond (OW). The abundant and mostly tiny fringe wetland reaches abutting the river were counted cumulatively as one wetland (Wetland 37) in the wetland tally. Vegetation, soil, and hydrology data collected in the field for most of the wetlands are documented in **Appendix E, Wetland Determination Data Forms**.

Five OWs were identified in the survey area. OW-1 was a borrow pit excavated for construction of the dam, OW-3 was a golf course water hazard, and OW-2, OW-4, and OW-5 were reaches of the South Branch of the Turtle River. See **Appendix E, Other Water Information** sheets for details.

Locations of the aquatic resources are shown on **Appendix A, ARD Maps 1** through **7.** See **Appendix C, Photographs**, for visual documentation of aquatic resource delineations. **Appendix D -Supporting Maps and Data -NWI Maps** show the NWI delineations and their wetland/deepwater classifications. See **Appendix D – Soil Maps** and **Hydric Soils Lists** for corresponding soil information. An inventory of plant species identified in the survey area is in **Appendix F, Plant List**.

Wetland 1 This fringe wetland surrounded OW-1, a borrow pit. NWI classified the entire borrow pit as PABFx. WPC classified the rim as PEMFx, assuming the groundwater was the major source and was relatively stable. The dominant vegetation was an unidentified *Carex* species with no spikes to enable species identification. A11, F3, and F6 hydric soil indicators were observed. Wetland hydrology indicators observed included Aquatic invertebrates, Oxidized Rhizospheres on Living Roots, Geomorphic Position, and FAC-Neutral Test. Saturation depth was not recorded; the sample point was roughly two feet or less above the adjacent OW level. The wetland is shown on **ARD Map 1**.

OW-1 This water body was apparently a borrow pit utilized for construction of the dam. It was identified as a PABFx by the NWI. WPC did see aquatic vegetation in the water near the shoreline but could not ascertain how deep the inner part was; WPC delineated the emergent vegetation surrounding the pond as a fringe wetland. The pond is probably groundwater-fed. The OW is shown on **ARD Map 2**.

Wetland 2 This slope wetland was located west of the emergency spillway. It was not on NWI; WPC classified it as PEM1A. *Juncus arcticus* was the dominant species. A11 and F3 hydric soil indicators were observed. Wetland hydrology indicators observed included Geomorphic Position and FAC-Neutral Test. This wetland is so small that the sample point and photo point symbols overlap/hide most of the wetland delineation on **ARD Map 1**.

Wetland 3 This ditch wetland was apparently excavated for the benefit of cropland adjacent to the survey area. There was non-hydrophytic vegetation at the west end of the delineation. It was not on NWI; WPC classified it as PEM1Ax. *Phalaris arundinacea* was the dominant species. A12 and F6 hydric soil indicators were observed. Wetland hydrology indicators observed included Geomorphic Position and FAC-Neutral Test. The wetland is shown on **ARD Map 1**.

Wetland 4 This slope wetland was in top end of the emergency spillway, on the north side of a small roadway or berm built across the emergency spillway. There was a drain structure by the berm trail, apparently installed to allow precipitation and snowmelt to drain into the reservoir, instead of being impounded by the roadway/berm. In addition to precipitation and run-on, this wetland might be influenced by ground water. The narrow, north part of this wetland is a shallow ditch that is contiguous with the ditch in Wetland 6. *Phalaris arundinacea* was the dominant species. A11, A12, and F6 hydric soil indicators were observed. Wetland hydrology indicators observed included Algal Mat or Crust, Geomorphic Position, and FAC-Neutral Test. It was not on NWI; WPC classified it as PEM1Ax. The wetland is shown on **ARD Map 1**.

Wetland 5 This slope wetland was a shallow ditch on the east side of the upper end of the emergency spillway. It was not on NWI; WPC classified it as PEM1Ax. In addition to precipitation and

run-on, this wetland might be influenced by ground water. *Phalaris arundinacea* was the dominant species. A11 and F6 hydric soil indicators were observed. Wetland hydrology indicators observed included Geomorphic Position and FAC-Neutral Test. The wetland is shown on **ARD Map 1**.

Wetland 6 This slope wetland was in the emergency spillway. It was not on NWI; WPC classified it as PEM1Ax. The ditch portion of this wetland was contiguous with Wetland 4. On this and other wetlands in the emergency spillway, the transitions from hydrophytic to non-hydrophytic communities were typically broad/gradual and meandering. *Calamagrostis Canadensis* and *Phalaris arundinacea* were the dominants at the sample point. A11, F3, and F6 hydric soil indicators were observed. Wetland hydrology indicators observed included Saturation (16-inch depth), Geomorphic Position and FAC-Neutral Test. There were deep wheel ruts scattered in this wetland. The wetland is shown on **ARD Map 1**.

Wetland 7 This slope wetland was in the emergency spillway. It was not on NWI; WPC classified it as PEM1Ax. In addition to precipitation and run-on, this wetland might be influenced by ground water. *Juncus arcticus* was the dominant species. A11 and F6 hydric soil indicators were observed. Wetland hydrology indicators observed included Geomorphic Position and FAC-Neutral Test. There were deep wheel ruts in this wetland. The wetland is shown on **ARD Map 1**.

Wetland 8 This slope wetland was in the emergency spillway. It was not on NWI; WPC classified it as PEM1Ax. In addition to precipitation and run-on, this wetland might be influenced by ground water. *Juncus arcticus* and *Calamagrostis Canadensis* were the dominant species. A11, F3, and F6 hydric soil indicators were observed. Wetland hydrology indicators observed included Geomorphic Position and FAC-Neutral Test. There were obvious wheel ruts in this wetland. The wetland is shown on **ARD Map 1**.

Wetland 9 This slope wetland was in the emergency spillway. It was contiguous with Wetland 10. It was not on NWI; WPC classified it as PEM1Ax. In addition to precipitation and run-on, this wetland might be influenced by ground water. *Juncus arcticus* was the dominant species. A11 and F6 hydric soil indicators were observed. Wetland hydrology indicators observed included Geomorphic Position and FAC-Neutral Test. There were obvious wheel ruts in this wetland. The wetland is shown on **ARD Map 1**.

Wetland 10 This slope wetland was in the emergency spillway. It was contiguous with Wetland 9. It was not on NWI; WPC classified it as PEM1Ax. In addition to precipitation and run-on, this wetland might be influenced by ground water. Part of this wetland was shallow ditch that ran diagonally across the emergency spillway slope. *Phalaris arundinacea* was the dominant species. A12 and F6 hydric soil indicators were observed. Wetland hydrology indicators observed included Geomorphic Position and FAC-Neutral Test. There were obvious wheel ruts in this wetland. The wetland is shown on **ARD Map 1**.

Wetland 11 This slope wetland was south of the base of the emergency spillway. A berm separated it from the emergency spillway. It was not on NWI; WPC classified it as PEM1A. In addition to precipitation and run-on, this wetland might be influenced by ground water. *Phalaris arundinacea* was the dominant species. A12 and F6 hydric soil indicators were observed. The top 8 inches of soil were

depositional. Wetland hydrology indicators observed included Geomorphic Position and FAC-Neutral Test. The wetland is shown on **ARD Map 1**.

Wetland 12 This wetland was in the ditch or diversion channel built across the base of Larimore Dam. A berm separated it from the emergency spillway. It was not on NWI; WPC classified it as PEM1A. *Phalaris arundinacea* and *Typha sp.* were the dominant species. A11, F3, and F6 hydric soil indicators were observed. Wetland hydrology indicators observed included Geomorphic Position and FAC-Neutral Test. The wetland is shown on **ARD Map 2**.

OW-2 This OW was the reach of the South Branch of the Turtle River immediately below the Larimore Dam to the east edge of the survey area. This reach of the river channel had side slopes riprapped with rocks ranging from roughly 15 inches to 30 inches in diameter. The channel bottom was partially armored with rocks. There was some water flowing in this reach. By visual comparison only, WPC concluded that the flow from the dam's outlet structure was substantially more than the flow in the west reach of river in the survey area. WPC attributes the difference to the many large slope wetlands between the two river reaches. This reach of the river was represented by two parallel delineations on the NWI map; one was labeled R5UBH and the other was labeled R4SBC. WPC classified it as R2UB2. This river reach is shown on **ARD Map 2**.

OW-3 This OW was a water hazard on the Larimore Golf Course and on the border of the survey area. Water for this OW is likely piped to it. WPC did not search find out whether the pond contains water permanently and classified it as PABFx. NWI labeled it PABFx. This OW is shown on **ARD Map 2**.

Wetland 13 This slope wetland was in a deep swale or ravine. The wetland extended above and below the delineation, and the delineation included some area above and below the ARD survey area boundaries (i.e., elevations). It was not on NWI; WPC classified it as PEM1F. Below this delineation and below the survey area, there was a gully. There was a rather inactive head-cut above the delineation. A robust, unidentified *Carex* species and *Carex aquatilus* were the dominant species. F6 and F7 hydric soil indicators were observed. Wetland hydrology indicators observed included High Water Table, Saturation (at surface), Dry Season Water Table (8-inch depth), Geomorphic Position and FAC-Neutral Test. This wetland is shown on **ARD Map 4**.

Wetland 14 This ditch wetland was located south of the Larimore Dam Recreation area. This wetland drains to the north through a pipe beneath the paved road. It was not on NWI; WPC classified it as PEM1Ax. It had been mowed and partially burned. A field drainage ditch south of the survey area outletted to Wetland 14. *Alopecurus arundinaceus* was the dominant species. A11, F3, and F6 hydric soil indicators were observed. Wetland hydrology indicators observed included Geomorphic Position and FAC-Neutral Test. This wetland is shown on **ARD Map 2**.

Wetland 15 This ditch wetland was located south of the Larimore Dam Recreation area. It was not on NWI; WPC classified it as PEM1Ax. It had been mowed. A *Typha* species was the lone dominant species. Hydric soil indicator A11 was observed. Wetland hydrology indicators observed included Geomorphic Position and FAC-Neutral Test. This wetland is shown on **ARD Map 2**.

Wetland 16 This tiny ditch wetland was located on the west side of the Larimore Golf Course road entry. There was a pipe beneath the approach. This wetland was not on NWI; WPC classified it as PEM1Ax. It had been mowed. *Eleocharis acicularis* was the lone dominant species. Hydric soil indicator A11 was observed. Wetland hydrology indicators observed included Geomorphic Position and FAC-Neutral Test. This wetland is so small that the sample point and photo point symbols overlap/hide most of the wetland delineation on **ARD Map 2**.

Wetland 17 This slope wetland was in a ravine. The wetland extended below the delineation, and the delineation included some area below the ARD survey area boundary (i.e., lower survey area elevation). NWI classified it as PFOC; WPC classified it as PEM1/SS1F. A robust, unidentified *Carex* species and *Solidago gigantea* were the dominant species at the sample point. Hydric soil indicator F6 was observed. Wetland hydrology indicators observed included High Water Table (6-inch depth), Saturation (at surface), Dry Season Water Table, Geomorphic Position and FAC-Neutral Test. This wetland is shown on **ARD Map 3**.

Wetland 18 This wetland was a combination of natural wetland and road ditch. It was not determined whether the natural portion of the wetland was originally slope class or depressional. The natural part is partially forested and partially cropped. It may have been a part of depressional Wetland 31 prior to the road and ditch construction; it probably functions as a slope wetland now. NWI only included the ditch portion of this wetland and classified it as PEM1Cx; WPC classified the non-ditch portion of the wetland as PEM1/FO1Ad and the ditch portion as PEM1Ax. An old windbreak between the cropped part and forested part was higher elevation due to tree root mass that probably had some wind drift accumulation. The road ditch partially drains this wetland. *Cornus alba, Alopecurus arundinaceus* and an *Equisetum* species were the dominant species in the sample area. A12 and F6 hydric soil indicators were observed. Wetland hydrology indicators observed included Dry Season Water Table (24 inches) Geomorphic Position, and FAC-Neutral Test. Saturation was at 18-inch depth. This wetland is shown on **ARD Map 5**.

Wetlands 19A, 19B, and 19C These road ditch segments were connected by corrugated metal pipes. Sample data was recorded for segment W19B. NWI classified most of Wetland 19C as PEM1Cx; WPC classified the rest of these wetlands as PEM1Ax. *Alopecurus arundinaceus* and an *Eleocharis* species were the dominant species. The ditch was mowed. Wetland segment 19C extended slightly wider than the road ditch. A11 and F3 hydric soil indicators were observed. Wetland hydrology indicators observed included Geomorphic Position and FAC-Neutral Test. These wetlands are shown on **ARD Map 5**.

Wetland 20 This large wetland was contiguous with Wetland 21, a ditch wetland. This wetland may have been cropped before the wet era that began in 1993. Volunteer trees and shrubs have colonized much of this wetland. This wetland appeared to be a depressional class wetland but might have been a combination of slope and depressional classes. The impact of the road ditch on this wetland was not measured. NWI classified it as PEM1C; WPC classified it as PEM1/FO1Cd. *Salix interior*, *Symphoricarpos occidentalis*, *Alopecurus arundinaceus, Potentilla anserina,* and an *Equisetum* species were the dominant species. A12 and F6 hydric soil indicators were observed. Wetland hydrology indicators observed

included Geomorphic Position and FAC-Neutral Test. Saturation was observed at a depth of 15 inches. This wetland is shown on **ARD Map 5**.

Wetlands 21A and 21B Road ditch Wetland 21A was connected to Wetland 21B by a culvert beneath a field approach. Road ditch wetland 21B was contiguous with Wetland 20. Wetland data recorded for Wetland 21A was considered applicable to Wetland 21B. NWI classified a small part of Wetland 21B as PEM1Cx. WPC concurred with the NWI delineation of PEM1Cx and considered the rest of these two wetlands to be PEM1Ax. *Typha angustifolia* and *Elymus repens* were the dominant species at the sample point. A12 and F6 hydric soil indicators were observed. Wetland hydrology indicators observed included Geomorphic Position and FAC-Neutral Test. Saturation was observed at a depth of 15 inches. These wetlands are shown on **ARD Map 5**.

Wetlands 22 and 23 These two shallow depressional, wetlands were very close together and had virtually the same plant community, soil and topographic character. Wetland data recorded for Wetland 22 was considered applicable to Wetland 23. NWI did not include either of these very small wetlands; WPC classified both as PEM1/SS1A. Dominant species included *Salix interior, Poa pratensis, Typha angustifolia*, and an *Equisetum* species. The sandbar willows were small saplings. A12 and F6 hydric soil indicators were observed. Wetland hydrology indicators observed included Geomorphic Position and FAC-Neutral Test. Saturation was observed at a depth of 15 inches. These wetlands are shown on **ARD Map 5**.

Wetland 24 This shallow, depressional wetland was not on NWI; WPC classified it as PEM1A. *Alopecuris arundinaceus* and an *Equisetum* species were the dominant species. A12 and F6 hydric soil indicators were observed. Wetland hydrology indicators observed included Geomorphic Position and FAC-Neutral Test. This wetland is shown on **ARD Map 5**.

Wetland 25 This old ditch wetland was apparently constructed to drain Wetland 26. Fill was placed in the west end of the drain to apparently create a crossing for machinery. This wetland was not on NWI; WPC classified it as PEM1Ax. *Phalaris arundinacea* was the dominant species. Hydric soil indicator A12 was observed. Wetland hydrology indicators observed included Geomorphic Position and FAC-Neutral Test. This wetland is shown on **ARD Map 9**.

Wetland 26 This was a depressional floodplain wetland with an old drainage ditch (Wetland 25) excavated to the riverbank. Fill placed in the ditch to create a machinery crossing separated Wetland 25 from Wetland 26. WPC did not survey the scope and effect of the drainage ditch or fill. This wetland extends further west than the WPC delineation, which ended slightly west of the Project boundary. NWI classified it as PSSA; WPC classified it as PEM1/SS1Ad. *Salix interior*, *Phalaris arundinacea,* and *Alopecuris arundinaceus* were the dominant species. Hydric soil indicators A12, F3, and F6 were observed. Wetland hydrology indicators observed included Geomorphic Position and FAC-Neutral Test. This wetland is shown on **ARD Map 9**.

Wetland 27 This floodplain wetland, shown on **ARD Map 8**, was outside of the Project area.

Wetland 28 This large wetland included an oxbow. NWI classified it as PSSA + PEM1C; WPC classified it as PEM1/SS1F. The east leg of the horseshoe-shaped oxbow was separated from the river by a natural levee. An old beaver dam separated the west leg of the oxbow from the gully wetland that merged with river fringe wetland area. The center strip in the bottom of the oxbow channel had organic soil greater than 8 inches thick and was covered by green cattails. [See the discussion of a questionable fen (QFen35) on a succeeding page of this report.] There was much less green growth in the cattail strips on each side of green cattail zone. Above the channel bottom, most of this wetland had a scrub-shrub stratum. At the sample point, dominant species included *Carex aquatilus* and *Carex pellita*. Hydric soil indicator F2 was observed. Hydrology indicators High Water Table (6 inches), Saturation (0 inches), Geomorphic Position, and FAC-Neutral Test were present. This wetland might pond water during wet periods. This wetland might have groundwater flow-through character. This wetland is shown on **ARD Map 8**.

Wetland 29 This floodplain wetland was in a slight depression. WPC concurred with the PEM1/SSA label on NWI. Dominants included a 14' tall *Salix* tree species not identified, *Salix eriocephala*, *Urtica dioica*, and *Mentha arvensis*. *Phalaris arundinacea,* and *Alopecuris arundinaceus* were the dominant species. Hydric soil indicator F6 was observed. Wetland hydrology indicators observed included Geomorphic Position and FAC-Neutral Test. This wetland is shown on **ARD Map 8**.

Wetland 30 This floodplain wetland was in a depression and/or swale. NWI classified two parts of the wetland as PEM1C; WPC classified it as PEM1/SSA. This wetland is contiguous with fringe wetland that abuts the South Branch of the Turtle River. *Salix interior, Urtica dioica, Solidago gigantea*, and *Phalaris arundinacea* were the dominant species. Hydric soil indicators A12 and F6 were observed. Wetland hydrology indicators observed included Geomorphic Position and FAC-Neutral Test. This wetland is shown on **ARD Map 9**.

Wetland 31 This large, depressional wetland might have been predominantly cropland prior to the wet era that began in 1993. Many shrubs and tall trees now occupy the wetland. The south end of the wetland is road right-of-way and might be natural, i.e., no ditch excavation. The north end of the wetland, north of the old east-west windbreak on the Quarter-section line, is irrigated cropland. NWI classified it as PEM1Ad; WPC classified it as PEM1/SS1Cd. *Salix interior, Solidago gigantea, and Elymus repens* were the dominant species. Hydric soil indicator A11 was observed. Wetland hydrology indicators observed included Watermarks (about 20 inches high on tree trunks in northern part), Geomorphic Position and FAC-Neutral Test. Saturation was present at 25-inch depth. This wetland is shown on **ARD Map 5**.

Wetlands 32 and 34 These shallow, depressional, floodplain wetlands were close together and had virtually the same plant community and topographic character. Wetland data recorded for Wetland 32 was considered applicable to Wetland 34. These wetlands were not shown on the NWI. WPC classified both wetlands as PEM1A. Dominant species included *Solidago gigantea* and *Poa pratensis.* Other species comprising nearly half of the plant community included an unidentified *Carex* species assumed to be FAC or wetter, *Anemone Canadensis*, and a *Typha* species. The community met the Prevalence Index Test for hydrophytic vegetation with a value of 2.81 or lower, depending on the indicator status of

the unidentified *Carex* species. The F6 hydric soil indicator was present. Wetland hydrology indicator Geomorphic Position was noted. The soil was moist to the surface and WPC concluded that it met the Saturation criteria in accordance with Supplement Section 5 – Difficult Wetland Situations in the Great Plains – Wetlands that Periodically Lack Wetland Hydrology. These wetlands are shown on **ARD Map 8**.

Wetland 33 This floodplain wetland was in a slight depression. NWI delineated a PEM1A southwest and approximately tangent to this wetland. WPC labeled it as PEM1/SSA. *Cornus alba,* and *Parthenocissus quinquefolia* were the dominant species. The vegetation met the Dominance Test for hydrophytic vegetation. Hydric soil indicator F6 was observed. Wetland hydrology indicators observed included Geomorphic Position and FAC-Neutral Test. This wetland is shown on **ARD Map 8**.

Wetland 35 This floodplain wetland was an oxbow. NWI classified it as PEM1C; WPC classified it as PEM1/SS1Ad. *Salix interior* and *Phalaris arundinacea* were the dominant species. The vegetation met the Dominance Test for hydrophytic vegetation. Hydric soil indicator A12 was observed. Wetland hydrology indicators observed included Geomorphic Position and FAC-Neutral Test. The wetland had been manipulated by excavation of drainage ditch reaches and spoil (fill). This wetland is shown on **ARD Map 8**.

Wetland 36 This small floodplain wetland was a deep depression. It might have been an old head cut with siltation at the west end blocking the outlet to the Turtle River. WPC classified it as PEM1/SSA; NWI classified a delineation close to it as PSSA. *Salix interior, Phalaris arundinacea, Solidago gigantea,* and *Bromus inermis* were the dominant species. The vegetation met the Dominance Test for hydrophytic vegetation. Hydric soil indicator F6 was observed. Wetland hydrology indicators observed included Geomorphic Position and FAC-Neutral Test. This wetland is shown on **ARD Map 9**.

OW-4 This OW was a reach of the South Branch of the Turtle River on the western end of the survey area in Section 35. There were several active and inactive beaver dams across the channel. The largest dams impounded roughly two feet of water. Two adult beavers were observed. Beaver mortality from bank den collapse is probably high. The channel and riverbanks appeared to be sandy. The riverbanks had collapsed in many places. The collapsed banks support wetland plants in few places, probably because vegetation colonization is outpaced by erosion. Many reaches of the banks are practically vertical above the water edge. Fissures of varying sizes in the riverbanks were common and foretell more mass removal/bank erosion. Some of the fissures were obscured by vegetation and made walking along the banks hazardous. Slippery, dry grass on slopes at the edge of high, vertical banks was also a walking/fall hazard. WPC labeled it as R2UB2. NWI labeled it as a combination of R4SBC, PEM1C, and R5UBH. The many small wetland areas abutting this OW were cumulatively identified as Wetland 37. The length of OW-4, measured with GIS, was 7,355 feet and its area was 4.44 acres. This OW is shown on **ARD Maps 8** and **9**.

Wetland 37 Wetland 37 was comprised of the many wetland fringe areas abutting the west reach of the South Branch of the Turtle River (OW-4) in the Project area. The wetland areas were delineated by recording the high side of the fringe wetlands and connecting OHWM reaches as one polygon with a Trimble, and then subtracting the office-delineated OW-4 area. Many of these small fringe wetland

areas were on collapsed riverbanks. Some of the fringe wetland areas were low areas that were mostly separated from the river channel by narrow natural levee reaches with non-hydrophytic vegetation. There was a variety of plant communities in these wetland reaches. At the sample point, a robust *Carex* species was the lone dominant species. Hydric soil indicators A11 and F3 were observed. Wetland hydrology indicators observed included Geomorphic Position and FAC-Neutral Test. WPC field-classified these abutting wetland areas as NWI classes PEM1A, PEM1C, and PEM1F. These wetland areas are shown on **ARD Maps 8** and **9**.

Wetland 38 WPC field-verified hydrophytic vegetation in this wetland and classified it as a PEM1/SSA. This wetland was office delineated, based on memory of field observations and review of aerial photography. It was a swale that sloped toward the South Branch of the Turtle River, reach OW-5. This wetland was classified by NWI as PEM1C, with a narrow PEM1A delineation extending upslope; the vegetation in the PEM1A area was not hydrophytic. It was mapped by NRCS as soil map unit LaMoure-Fluvaquents channeled complex, 0 to 6 percent slopes, frequently flooded, which NRCS characterizes as typically comprised of 94 percent hydric soil. **Appendix D, Topographic Map 7** did not show any indicator of wetland in this area. This wetland is shown on **ARD Map 7**.

Wetland 39 WPC field-verified hydrophytic vegetation in this wetland and classified it as a PEM1/SSA. This wetland was office delineated, based on memory of field observations and review of aerial photography. The wetland appeared to be part of an oxbow. This wetland was classified by NWI as PABFx. It was uncertain what area a nearby R5UBH label applied to. It was mapped by NRCS as soil map unit Velva sandy loam, moist, 0 to 6 percent slopes, occasionally flooded, which NRCS characterizes as typically comprised of 18 percent hydric soil. **Appendix D, Topographic Map 7** has contour lines corresponding to the river channel and nearby areas colored green to indicate forest or shrubs. This wetland is shown on **ARD Map 7**.

OW-5 This OW was a reach of the South Branch of the Turtle River. The east end of OW-5 is on the west side of 38th Street; the west end of OW-5 merges with OW-4 in the western part of the East Half of Section 35-152-55. There were at least three active beaver dams in OW-4 at the time of the field review. The largest dam impounded water about five higher than the down-stream impoundment. The channel side slopes and riverbanks were mostly steep and supported relatively few abutting wetlands. The abutting wetland areas were very narrow; it was not feasible to delineate them separately from the river. WPC labeled the river reach as R2UB2. NWI labeled it as R4SBC. The abutting wetlands within this delineation are relatively few and too narrow to delineate. This wetland is shown on **ARD Map 7**.

OW-6 This reach of the South Branch of the Turtle River was delineated by NRCS. The west end of the delineation merges with the east end of the OW-5 reach delineated by WPC. This wetland is shown on **ARD Maps 6** and **7**.

Wetland 40 NRCS staff mapped this wetland and did not assign a wetlands/deepwater habitat classification to it. This wetland was mostly overlapped by contiguous NWI delineations of PEM1C and PSSA. It was mapped by NRCS as soil map units Rauville silty clay loam, 0-1 percent slopes and Wyndmere-Tiffany fine sandy loams, 0 to 2 percent slopes. The Rauville silty clay loam soil map unit is

defined as consisting of 95 percent hydric soil. The Wyndmere-Tiffany fine sandy loams, 0 to 2 percent slopes soil map unit is defined as consisting of 40 percent hydric soil. **Appendix D, Topographic Map 6** had contour lines indicating low areas and areas colored green to indicate forest or shrubs. This wetland is shown on **ARD Map 6**.

Wetland 41 NRCS staff mapped this wetland and did not assign a wetlands/deepwater habitat classification to it. This wetland was not inventoried by NWI. It was mapped by NRCS as soil map units Wyndmere-Tiffany fine sandy loams, 0 to 2 percent slopes, and Inkster sandy loam, 0 to 2 percent slopes. NRCS defines the hydric soil composition of these soil map units as 40 percent and 6 percent, respectively. **Appendix D, Topographic Map 6** did not show any indicator of wetland in this area. This wetland is shown on **ARD Map 6**.

Wetland 42 NRCS staff mapped this wetland and did not assign a wetlands/deepwater habitat classification to it. This wetland was not inventoried by NWI. It was mapped by NRCS as soil map unit Wyndmere-Tiffany fine sandy loams, 0 to 2 percent slopes, which NRCS characterizes as typically comprised of 40 percent hydric soil. **Appendix D, Topographic Map 5** did not show any indicator of wetland in this area. This wetland is shown on **ARD Map 5**.

Wetland 43 NRCS staff mapped this wetland and did not assign a wetlands/deepwater habitat classification to it. This wetland was not inventoried by NWI. It was mapped by NRCS as soil map units Wyndmere-Tiffany fine sandy loams, 0 to 2 percent slopes, and Inkster sandy loam, 0 to 2 percent slopes. NRCS defines the hydric soil composition of these soil map units as 40 percent and 6 percent, respectively. **Appendix D, Topographic Map 5** did not show any indicator of wetland in this area. This wetland is shown on **ARD Map 5**.

Wetland 44 NRCS staff mapped this wetland and did not assign a wetlands/deepwater habitat classification to it. This wetland was classified by NWI as PEM1A. It was mapped by NRCS as soil map unit Wyndmere-Tiffany fine sandy loams, 0 to 2 percent slopes, which NRCS characterizes as typically comprised of 40 percent hydric soil. **Appendix D, Topographic Map 5** has contour lines indicating a depression in this area. This wetland is shown on **ARD Map 5**.

Wetland 45 NRCS staff mapped this wetland and did not assign a wetlands/deepwater habitat classification to it. This wetland was classified by NWI as PEM1A. . It was mapped by NRCS as soil map units Wyndmere-Tiffany fine sandy loams, 0 to 2 percent slopes, and Inkster sandy loam, 0 to 2 percent slopes. NRCS defines the hydric soil composition of these soil map units as 40 percent and 6 percent, respectively. **Appendix D, Topographic Map 5** has contour lines indicating a depression in this area. This wetland is shown on **ARD Map5**.

Appendix G, **Table 1. Aquatic Resources within the Survey Area** lists data for the wetlands and Other Waters in the survey area.

4.3 Non-wetland Points Checked

NW 1 A shallow depression in the Southwest Quarter of Section 32 and north of OW-1 had some reed canarygrass (FACW) growing in it, but the subsoil color was 10YR 3/2 with no redox features. The sample point is labeled **10YR 3/2** on **ARD Map 1**.

NW 2 The forested hillside and toe slope north of the emergency spillway in the Northeast Quarter of Section 32 had a plant community dominated by boxelder (*Acer negundo*, FAC), common buckthorn (*Rhamnus cathartica*, FACU), Canada wood nettle (*Laportea Canadensis*, FAC) and stinging nettle (*Urtica dioica*, FAC). No hydrology indicator was identified; Geomorphic Position was a potential hydrology indicator but WPC ruled it out because of the absence of a swale or ravine in the valley wall. No hydric soil indicator was found. The area is marked with a sample point labeled **Non-wetland area** on **ARD Map 1**.

NW 3 A swale or shallow ravine north of the Larimore Dam Recreation Area Campground in the Southeast Quarter of Section 31 was checked for a slope wetland, as one of the few places where a slope wetland might occur in the forested part of the survey area. The lone dominant species was *Carex sprengelii,* rated FACU. The location of this sample area is shown by a photo point labeled **PP_upl_N** on **ARD Map 3**.

NW 4 A swale in the Northwest Quarter of Section 35 on the east side of the river had a community that was dominated by *Salix interior* and *Phalaris arundinacea.* Both are rated FACW. The soil did not exhibit any hydric soil indicator. The corresponding sample point is labeled **NW_soil** on **ARD Map 9**.

Two isolated areas – one large and one small - were identified as being part of the Project area in the North Half of Section 36. Both were irrigated crop at the time of the field review. WPC saw no evidence of wetland from the highway and did not sample the soils. The small area had wetland signatures on three out of eight years of Google Earth imagery. A wetland signature was visible on about one fifth of the large area on one year of Google Earth imagery; there were no signatures in the other years. Neither area was inventoried by NWI. The small area is mapped as Walsh loam, 0 to 2 percent slopes, characterized as 7 percent hydric soil. The large area is mapped as Walsh loam, 0 to 2 percent slopes, and Inkster sandy loam, 0 to 2 percent slopes, characterized as 6 percent hydric. These two isolated areas are visible on **ARD Map 7**.

4.4 Wetland Checked Outside of Survey Area

A floodplain wetland named Wetland 27 was delineated slightly west of the survey area in the NW Quarter of Section 35. It was a scrub-shrub wetland that resembled Wetland 29 and is documented in **Appendix E, Wetland Determination Data Forms.**

4.5 Fen Search

During a telephone conversation late in the afternoon of June 17, Tina Robinson requested WPC to identify fen locations in the time available through the end of June 18. WPC did not have time to delineate the fens but did check numerous points in potential fen areas to get a rough idea of the location and extent of fens in the Project area.

There is a large contiguous area identified by NWI as wetland types PSSC and PEM1C was in the Southwest Quarter of Section 31-152-54. Three points were found with a surface horizon of organic soil that was 10 or more inches thick in the PSSC NWI delineation. See **Appendix A, ARD Map 3 and Appendix D, NWI Map 3**. Based on visual observation of the topography and vegetation covering the area, WPC speculated that the organic soil > 8 inches thick might include most of the PSSC delineation. WPC did not check the PEM1C area.

There is a large contiguous area identified by NWI as wetland types PSS/FOA, PSSC, PEM1/ABF, PEM1F, PSS/EM1C, and PEM1A in the West Half of Section 6-151-54. Seven points were found with a surface horizon of organic soil that was 8 or more inches thick in the NWI delineations labeled PSSC and PEM1F. See **Appendix A, ARD Map 4 and Appendix D, NWI Map 4**. Based on visual observation of the topography and vegetation covering the area, WPC speculated that organic soil is present and equal to or greater than 8 inches thick (i.e., meets fen criterion) on most of the area delineated by NWI as PSSC, PSSC/EM1C, PEM1F, and PEM1/ABF.

A large contiguous area consisting of wetland types PEM1C, PSSA, and PEM1A was mapped in the Northeast Quarter of Section 1-151-55 by NWI. One sample point in the area classified by NWI as PEM1C was checked and had 16 inches of sapric soil overlain by eight inches of fibric soil. See **Appendix A, ARD Map 4 and Appendix D, NWI Map 4**. Limited time did not allow for a wider search for fen indicators in the field. The complexity of the interspersed NWI wetland classes and extent of the PEM1C delineations suggest there could be a significant acreage of fen wetland in the Northwest Quarter of Section 1-151-55.

In the bottom of Wetland 28, an oxbow wetland, a surface layer of organic soil was found in sample points in the deepest part of the wetland. The sample points are shown on **Appendix D, Fen Study Points on NWI Map 8**. The organic layer exceeded 20 inches in thickness at one sample point. The narrow polygon with purple diagonal stripes is the area that WPC estimated to have organic soil thicker than 8 inches.

See **Appendix G** for **Table 2. Miscellaneous sample point data** for the fen search/study data.

5.0 Signatures of Report Developers

Services performed by the scientists of WPC for this ARD project have been conducted in a professional manner consistent with that level of care and skill ordinarily exercised by members of this profession currently practicing in this area under similar time and budget restraints. No warranty, expressed or implied, is made.

This ARD Report was completed by WPC, Inc.'s Senior Natural Resource Specialist, Mark A. Anderson, and David Breker, North Dakota-certified Professional Soil Classifier # 41.

Mark A. Anderson
Senior Natural Resource Specialist

Nov. 24, 2021
Date

David J. Breker
Professional Soil Classifier

11/24/21
Date

6.0 Credentials of Aquatic Resource Delineators

Name: Mark A. Anderson Education: North Dakota State University -Bachelor of University Studies (B.S. equivalent) with emphasis in Biology and Agriculture.

Training: US Army Corps Of Engineers -Regulatory IV Wetland Delineation US Army Corps Of Engineers -Regulatory V Hydrogeomorphic (HGM) Wetland Assessment USDA Natural Resources Conservation Service (NRCS) -Hydric Soil Indicators NRCS -Photographic Interpretation NRCS -Wetland Scope & Effect Determination NRCS ~ Wetland Identification for the Food Security Act NDDOT -Wetland and OW Delineation Workshop

Relevant Work Experience: Anderson was a certified conservation planner for USDA-NRCS with extensive experience in wetland delineation, wetland restoration, wetland creation, HGM wetland assessment, vegetation establishment and management practices, erosion control practices, wildlife habitat management, and assessment of 50+ resource concerns, i.e., soil, water, air, plants, animals, and human considerations such as economics and cultural resources. Anderson was the plant ecologist on an NRCS wetland technical team for five years and served as a trainer for wetland delineation and wetland Hydrogeomorphic functional assessment. He has completed well over a thousand off-site and on-site wetland delineations.

Name: David J. Breker:

Earned a bachelor's degree in soils from North Dakota State University at Fargo, North Dakota. Registered Professional Soil Classifier in ND.

Worked for Soil Conservation Service / NRCS in ND for about 30 years.

Was a soil scientist for SCS for 13 years on the progressive General Soil Survey of numerous counties in ND. Worked with farmers planning and installing best management practices in EPA Watershed projects for the Wild Rice and Ransom County Soil Conservation District for 11 years.

Worked for NRCS from 1993 to 1998 as a Soil Conservation Technician at Lisbon, from 1998 to 2006 as a Soil Conservationist at Forman, and from 2006 to 2008 as a District Conservationist at Forman. Assisted cooperators to conserve, improve, and maintain soil, water, air, plant, animal and cultural resources through the development of conservation plans involving various conservation programs. Assisted with implementation of the needed practices and follow-up. Implemented the Food Security Act provisions of the Farm Bill and made numerous wetland determinations following Regulatory IV Corps training in 1998. Completed numerous HGM wetland functional assessments following HGM training in 2003.

Worked for NRCS from 2008 to 2015 as a Wetland Specialist - Resource Soil Scientist. To Implement the Food Security Act provisions of the Farm Bill, made tens of thousands of wetland determinations on many different landscapes including glacial till plain, sand plain, bedrock, and lacustrine, and completed thousands of HGM assessments of wetlands. Experienced in the use of the Prairie Pothole, Sand Plain, Slope, and Riverine models. Planned and implemented about 100 mitigation plans with cooperators.

Worked for NOWCC assisting producers with wetland mitigation in conjunction with NRCS from June 2016 to July 2018.

Provided wetland consulting services to the engineering firms KLJ, Carlson McCain, Interstate Engineering, Meadowlark Engineering, Ulteig, and also to Aquatic EcoSolutions and WPC. Some of these were DOT projects.

Had training and have working knowledge of Windows, copying machines, MS Word and Excel, ArcGIS and Toolkit. Have used Garmin III, Trimble, and Yuma GPS units. Completed training courses Wetland ID for FSA Purposes Phase 1 in 2010 and Wetland Delineation – National Food Security Act On-site Methods Phase 2 in 2009.

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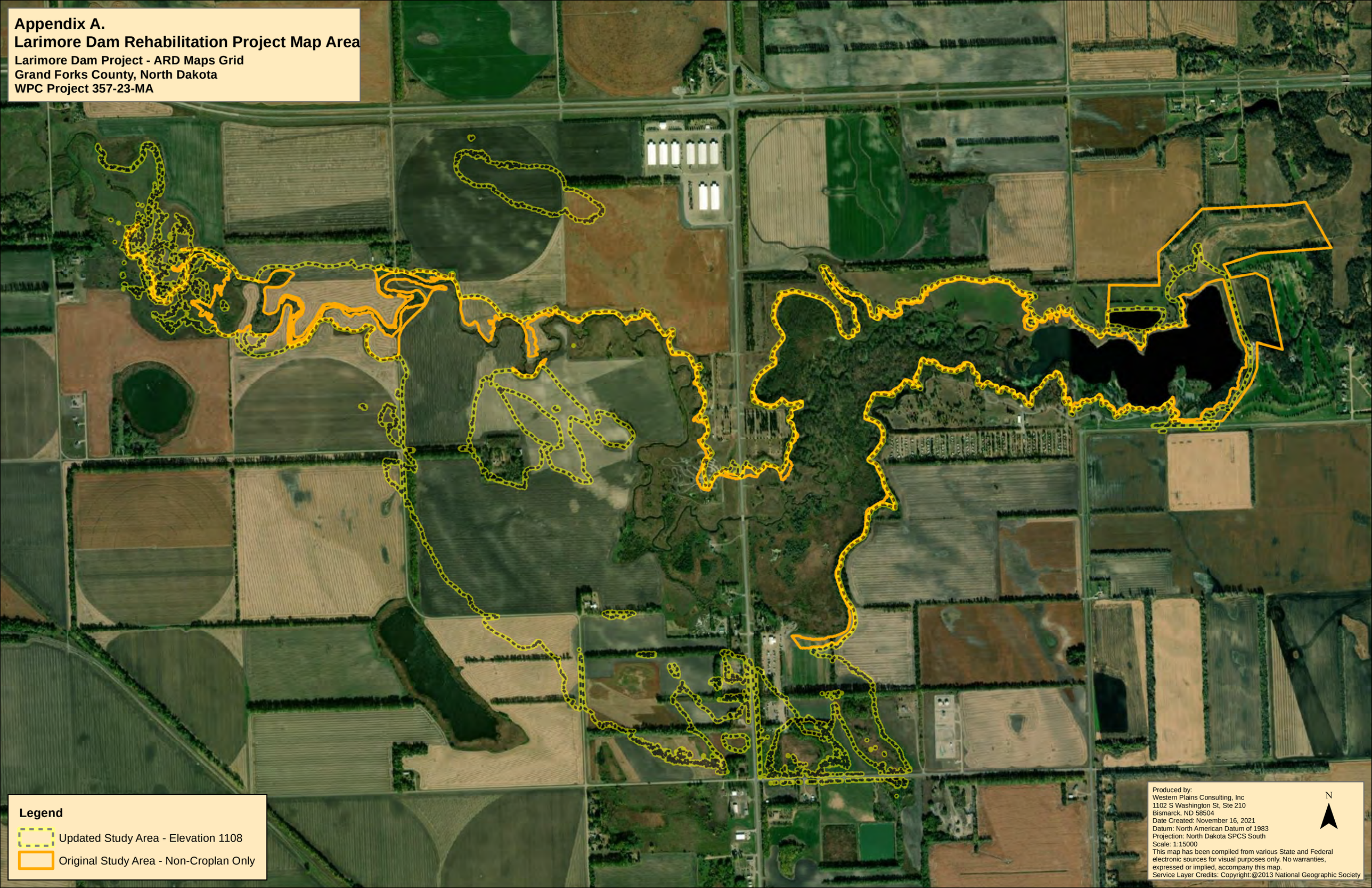
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Larimore East o47097h5 and Larimore West o47097h6

Appendix A.
Larimore Dam Rehabilitation Project Map Area
Larimore Dam Project - ARD Maps Grid
Grand Forks County, North Dakota
WPC Project 357-23-MA



Legend

- Updated Study Area - Elevation 1108
- Original Study Area - Non-Croplan Only

Produced by:
Western Plains Consulting, Inc
1102 S Washington St, Ste 210
Bismarck, ND 58504
Date Created: November 16, 2021
Datum: North American Datum of 1983
Projection: North Dakota SPCS South
Scale: 1:15000
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Appendix A.
Aquatic Resource Delineation Map Area Key
Larimore Dam Project - ARD Maps Grid
Grand Forks County, North Dakota
WPC Project 357-23-MA

Map 9
Map 8
Map 7
Map 6
Map 5
Map 4
Map 3
Map 2
Map 1

Legend

- Map Grid
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Croplan Only

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Appendix A.
Aquatic Resource Delineation Map 1

Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA

Non-wetland area

W6

W7

W8

W9

W10

W11

W12

W5

W4

W3

W2

Produced by:
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N

Legend

- Photo Point
- Wetland Sample Point
- Upland Sample Point
- Pipe
- Wetland
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Cropland Only



Appendix A.
Aquatic Resource Delineation Map 2
Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA

Produced by:
Western Plains Consulting, Inc
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Date Created:October 22, 2021
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Appendix A.
Aquatic Resource Delineation Map 3

Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA

Produced by:
Western Plains Consulting, Inc
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Date Created: November 15, 2021
Datum: North American Datum of 1983
Projection: North Dakota SPCS South
Scale: 1:4000
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N

W17
PP_NW
organic_10+
Organic 10 in plus
organic_!0+
Mineral
PP_SE
OFen2
PP_SE
Fibric_6in
Highway 18, 37th St. NE
Bellevue Cemetery
mineral
fibric6_hemic>20
Larimore Campground
PP_upl_N

Legend

- Photo Point
- Upland Sample Point
- Wetland Sample Point
- Miscellaneous Project Point
- Wetland
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Cropland Only

Produced by:
Western Plains Consulting, Inc
1102 S Washington St, Ste 210
Bismarck, ND 58504
Date Created: November 15, 2021
Datum: North American Datum of 1983
Projection: North Dakota SPCS South
Scale: 1:4000
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N

BMX Tracks

OW-6

W13

W40

W-41

mineral

fibric6_hemic>20

W_edge

16+fibric

organic_20+

Not_fen

Fen_1

organic_13in

mineral_0

organic_16in

fibric8_sapric>16

fibric>10

Highway 18, 37th St, NE

Appendix A.
Aquatic Resource Delineation Map 4

Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA

Legend

- Photo Point
- Upland Sample Point
- Wetland Sample Point
- Miscellaneous Project Point
- Wetland
- Other Water
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Cropland Only



Appendix A.
Aquatic Resource Delineation Map 5

Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA

Legend

- Photo Point
- Upland Sample Point
- Wetland Sample Point
- Pipe
- Wetland
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Cropland Only

Produced by:
Western Plains Consulting, Inc
1102 S Washington St, Ste 210
Bismarck, ND 58504
Date Created: November 15, 2021
Datum: North American Datum of 1983
Projection: North Dakota SPCS South
Scale: 1:3750
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N

BMX Tracks

OW-6

OW-6 is a reach of the South Branch of the Turtle River

W40

fibric8_sapric>16

Highway 18, 37th St NE

fibric>10

W-41

38th St NE

W40

W42

W43

Appendix A.
Aquatic Resource Delineation Map 6

Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA

Legend

- Miscellaneous Project Point
- Wetland
- Other Water
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Cropland Only

Produced by:
Western Plains Consulting, Inc
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Date Created: November 15, 2021
Datum: North American Datum of 1983
Projection: North Dakota SPCS South
Scale: 1:4750
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N

Appendix A.
Aquatic Resource Delineation Map 7

Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA

Produced by:
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1102 S Washington St, Ste 210
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Date Created: November 15, 2021
Datum: North American Datum of 1983
Projection: North Dakota SPCS South
Scale: 1:6000
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N

Non-wetland areas

38th St. NE

W38

0W-5

W39

Non-wetland hillside

0W-6

OW-6 is a reach of the South Branch of the Turtle River

Highway 18, 37th St. NE

organic_10+

Organic 10 in plus

organic_!0+

Mineral

OFen2

Fibric_6in

Bellevue Cemetery

BMX Tracks

Legend

- Photo Point
- Miscellaneous Project Point
- Wetland
- Other Water
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Cropland Only

Appendix A.
Aquatic Resource Delineation Map 8

Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA

0W-4

W27

W35

0W-4

Turtle River delineated as OW-4 west of this point and delineated as OW-5 east of this point.

W37: Wetland areas abutting OW-4 are displayed in green.

0W-4

W38

W29

0W-4

Organic 8 in

Fen35_PP

organic 3 in

Organic 20 plus

Organic 8 in

W33

W34

W28

0W-5

Organic 6 in

Organic 7 in

W32

Organic 10 plus

Legend

- Photo Point
- Upland Sample Point
- Wetland Sample Point
- Miscellaneous Project Point
- Wetland
- Other Water
- W37 - Abutting OW-4 Wetland
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Cropland Only

Produced by:
Western Plains Consulting, Inc
1102 S Washington St, Ste 210
Bismarck, ND 58504
Date Created: November 15, 2021
Datum: North American Datum of 1983
Projection: North Dakota SPCS South
Scale: 1:2225
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N

Appendix A.
Aquatic Resource Delineation Map 9

Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA

Produced by:
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Date Created: November 15, 2021
Datum: North American Datum of 1983
Projection: North Dakota SPCS South
Scale: 1:2000
This map has been compiled from various State and Federal electronic sources for visual purposes only. No warranties, expressed or implied, accompany this map.
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N

W30

W37: Wetland areas abutting OW-4 are displayed in green.

0W-4

39th St NE

W36

NW_soil

W26

W25

0W-4

W35

0W-4

W27

Legend

- Photo Point
- Upland Sample Point
- Wetland Sample Point
- Miscellaneous Project Point
- Wetland
- Other Water
- W37 - Abutting OW-4 Wetland
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Cropland Only

Appendix B. Climatic Data

The following data was copied from the U.S. Drought Monitor Website, https://droughtmonitor.unl.edu/
Data was selected for the Grand Forks Air Base location, which is about 13 miles east of the Larimore Dam project area. WPC employees Mark A. Anderson and David J. Breker agreed the rating for the Larimore Dam project area during the field study should have been Severe Drought (D2) or Extreme Drought (D3).

U.S. Drought Monitor

Data Tables

The values in this table are for places represented as areas. To see the drought status of areas represented by points, please visit this page.

Area type:
Urban
Area:
Grand Forks A
Statistics type:

USDM 7-day Change

Percent Area in U.S. Drought Monitor Categories

Week	None	D0-D4	D1-D4	D2-D4	D3-D4	D4	
2021-06-22	0.00	100.00	100.00	100.00	0.00	0.00	300
2021-06-15	0.00	100.00	100.00	100.00	0.00	0.00	300
2021-06-08	0.00	100.00	100.00	100.00	0.00	0.00	300
2021-06-01	0.00	100.00	100.00	100.00	0.00	0.00	300
2021-05-25	0.00	100.00	100.00	100.00	0.00	0.00	300
2021-05-18	0.00	100.00	100.00	100.00	0.00	0.00	300
2021-05-11	0.00	100.00	100.00	100.00	0.00	0.00	300
2021-05-04	0.00	100.00	100.00	100.00	0.00	0.00	300
2021-04-27	0.00	100.00	100.00	100.00	0.00	0.00	300
2021-04-20	0.00	100.00	100.00	100.00	0.00	0.00	300
2021-04-13	0.00	100.00	100.00	100.00	0.00	0.00	300
2021-04-06	0.00	100.00	100.00	100.00	0.00	0.00	300

Appendix B. Drought Classification by U.S. Drought Monitor

			Ranges				
Category	**Description**	**Possible Impacts**	**Palmer Drought Severity Index (PDSI)**	**CPC Soil Moisture Model (Percentiles)**	**USGS Weekly Streamflow (Percentiles)**	**Standardized Precipitation Index (SPI)**	**Objective Drought Indicator Blends (Percentiles)**
D0	Abnormally Dry	Going into drought: • short-term dryness slowing planting, growth of crops or pastures Coming out of drought: • some lingering water deficits • pastures or crops not fully recovered	-1.0 to -1.9	21 to 30	21 to 30	-0.5 to -0.7	21 to 30
D1	Moderate Drought	• Some damage to crops, pastures • Streams, reservoirs, or wells low, some water shortages developing or imminent • Voluntary water-use restrictions requested	-2.0 to -2.9	11 to 20	11 to 20	-0.8 to -1.2	11 to 20
D2	Severe Drought	• Crop or pasture losses likely • Water shortages common • Water restrictions imposed	-3.0 to -3.9	6 to 10	6 to 10	-1.3 to -1.5	6 to 10
D3	Extreme Drought	• Major crop/pasture losses • Widespread water shortages or restrictions	-4.0 to -4.9	3 to 5	3 to 5	-1.6 to -1.9	3 to 5
D4	Exceptional Drought	• Exceptional and widespread crop/pasture losses • Shortages of water in reservoirs, streams, and wells creating water emergencies	-5.0 or less	0 to 2	0 to 2	-2.0 or less	0 to 2



Photo 1. Wetland 1 is on the fringe of OW-1. June 8, 2021 view west.



Photo 2. OW-1 (Other Water of the USA). June 8, 2021 view southwest.



Photo 3. Wetland 2. June 8, 2021 view west.



Photo 4. Wetland 3. June 8, 2021 view northwest.



Photo 5. Wetland 4 was in emergency spillway. June 8, 2021 view northeast.



Photo 6. Wetland 5 was in emergency spillway. June 8, 2021 view south.



**Photo 7 above. Wetland 6 was in emergency spillway. It is contiguous with Wetland 4.
June 8, 2021 view east.**



Photo 8. Wetland 7 was in emergency spillway. June 8, 2021 view east.



Photo 9 at left. Wetland 8 was in emergency spillway. June 9, 2021 view southwest.

Photo 10 below. Wetland 9 was in emergency spillway. June 9, 2021 view west.





Photo 11 above. Wetland 10 was in emergency spillway. This delineation is contiguous with Wetland 9, which is visible behind UTV. June 9, 2021 view northwest.



Photo 12 at right Wetland 11. This slope wetland was south of the emergency spillway toe. June 9, 2021 view northeast.



Photo 13. Wetland 12. This wetland is in the diversion channel that crosses the lower downstream face of Larimore Dam. June 9, 2021 view south-southeast.

Photo 14 at right. OW-2, Turtle River and adjacent hydrophytic vegetation that emerged between rip-rap rocks. The river channel bottom was partially armored and the side slopes were fully armored.
June 19, 2021 view west.





Photo 15. OW-2, Turtle River and adjacent hydrophytic vegetation that emerged between rip-rap rocks. The river channel bottom was partially armored and the side slopes were fully armored.
June 19, 2021 view southeast.



**Photo 16 at left. OW-3. This pond was a water hazard on the Larimore Golf Course. The pond was partially within the Project boundary.
June 9, 2021 view northeast.**



Photo 17 at right. Pink flags outline Wetland 16. This small artificial wetland developed in the north ditch of 18th Ave. West, on the west side of the Larimore Golf Course entrance. June 10, 2021 view west.



Photo 18 above. Wetland 14 developed in the road ditch on the south side of 18th Ave. Northeast. June 10, 2021 view west.



Photo 19 at right. Wetland 15 developed in the road ditch on the south side of 18th Ave. Northeast. June 10, 2021 view west.



Photo 20. Wetland 17 was a slope wetland in a ravine northwest of the Turtle River in the West Half of Section 31-152-54. It did not meet fen criteria.
June 11, 2021 view northwest.



Photo 21 at right. Maximum organic soil depth was 6 inches of fibric material at this sample point north of Bellevue Cemetery in the Southwest Quarter of Section 31-152-54. No point with organic soil > 8 inches thick was found further east in the scrub-shrub wetland, but it was not crossed entirely by Breker or Anderson. June 10, 2021 view west.



Photo 22 at left. Organic soil depth was > 8 inches at this sample point named QFen2 and at points checked further east in the scrub-shrub wetland visible in background in the Southwest Quarter of 31-152-54. June 18 view southeast.



Photo 23 at right. This swale in the Southeast Quarter of Section 31-152-54 was dominated by Sprengel's (long-beak) sedge, a FACU species. It was typical of the many swales and valley floor areas that were checked but did not meet wetland criteria.
June 10, 2021 view north.



Photo 24. Wetland 13 was a slope wetland in a ravine southeast of the Turtle River in the Northwest Quarter of Section 6-151-54. It did not meet fen criteria. June 10, 2021 view north.

Photo 25 at right. Organic soil was 10 inches thick at this sample point in scrub-shrub wetland in the Northwest Quarter of 6-151-54. June 18, 2021 view west.





Photo 26. Wetland 21 was a ditch wetland that developed on the west and south sides of the Southwest Quarter of Section 6-151-54. June 15, 2021 view east.



Photo 27. Wetland 20 was a large depressional wetland in the Southwest Quarter of Section 6-151-54. It had many trees and shrubs growing in it but was likely cropped in the past. June 15, 2021 view west.

Photo 28. Wetland 22 in foreground and Wetland 23 in background (marked by dashed red line) had virtually the same soil and plant community. They were in the Southwest Quarter of Section 6-151-54. June 15, 2021 view east. The tan residue is cattails from 2020.





Photo 29 at left. Wetland 24. June 15, 2021 view east.

Photo 30 at right. Wetland 31 was in the Southwest Quarter of Section 6-151-54. June 17, 2021 view northeast.





Photo 31. Wetland 18 included both natural wetland area and some road ditch area that partially drained it. It was located in the Northwest Quarter of Section 7-151-54. June 15, 2021 view north-northwest.



Photo 32. Wetland 19A in road ditch on north edge of Northwest Quarter of Section 7-151-54. A culvert connected it to the ditch portion of Wetland 18.
June 15, 2021 view east.

Photo 33 at right. Wetland 19B was connected to Wetlands 19A to the east and Wetland 19C to the west by culverts.
June 15, 2021 view west.





Photo 34. Wetland 19C in road ditch on north edge of Northwest Quarter of Section 7-151-54. The western part of this wetland extended southward slightly wider than the road ditch.
June 15, 2021 view west.



Photo 35 at left. Wetland 30 in the Northwest Quarter of Section 35-152-55. The wetland included scrub-shrub and herbaceous communities. June 15, 2021 view southwest.

Photo 36 below. Sandbar willow, a FACW species, was common by the sample point named NWsoil and located south-southeast of Wetland 30. The soil was not hydric. June 17, 2021 view northeast.





Photo 37 above. Wetland 26 was a depressional scrub-shrub wetland with a ditch outlet. June 16, 2021 view east.



Photo 38 at right. Wetland 25 was an old ditch apparently excavated to drain Wetland 26. June 16, 2021 view south-southeast.



Photo 39. OW-4 (Turtle River) and a reach of abutting wetland in the Northwest Quarter of Section 35-152-55. The tall grass a few feet to the left of the tiling spade visible in above photo was smooth bromegrass, i.e., non-hydrophytic (non-wetland) vegetation. The shorter, green sedge vegetation around the tiling spade was within the wetland boundary. June 17, 2021 view northeast.



Photo 40. Wetland 27 was in the Turtle River floodplain in the Northwest Quarter of Section 35 -152-55 but outside of the project boundary. June 16, 2021 view west-southwest.



Photo 41. Wetland 29 was a scrub-shrub wetland in the Southwest Quarter of Section 35-152-55. June 16, 2021 view south.



Photo 42. Wetland 28 was an oxbow wetland. A natural levee cut it off from the Turtle River on the east "leg" of this horseshoe-shaped wetland. An old beaver dam embankment blocked drainage on the west "leg". June 16, 2021 view northeast.

Photo 43. The narrow strip of green cattails in the center of the oxbow wetland 28 channel roughly occupied the area with 8 inches or more of organic soil. The hydrology of this oxbow wetland is not like the hillside slope discharge character of a typical fen. In wet years and after floods, this wetland probably ponds water. June 18, 2021 view south-southeast.





Photo 44. Wetland 33 was a scrub-shrub type in the Southwest Quarter of Section 35-152-55. June 18, 2021 view southeast.

Photo 45. Wetland 32. This herbaceous wetland had approximately the same plant community and hydrology as the nearby Wetland 34. June 18, 2021 view northeast.





Photo 46. Wetland 35 was a scrub-shrub type in the Northwest Quarter of Section 35-152-55. July 16, 2021 view southeast.



Photo 47. Wetland 35. This wetland had many live, young sandbar willow saplings growing on the outer part of the wetland. Numerous older, dead stems were present and are visible in the image at right.
July 16, 2021 view northeast.



Photo 48. Wetland 36 at left. This wetland was a deep depression in the Northwest Quarter of Section 35-152-55. It looked like it might have been an old oxbow reach or possibly an excavated borrow pit.
July 18, 2021 view southwest.

Appendix D. USGS 7.5-Minute Quadrangle Topographic Map

Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA

Larimore West
o47097h6

Larimore East
o47097h5

Legend

- Assessed Stream
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Cropland Only

Produced by:
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N

Appendix D. USGS 7.5-Minute Quadrangle Topographic Map 1

Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA

Larimore East
o47097h5

32

106

South Branch Turtle River

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N

Legend

- Assessed Stream
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Cropland Only

Appendix D. USGS 7.5-Minute Quadrangle Topographic Map 2

Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA

South Branch Turtle River

South Branch Turtle River

Larimore

County

1108

Larimore East
o47097h5

Legend

- Assessed Stream
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Cropland Only

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Appendix D. USGS 7.5-Minute Quadrangle Topographic Map 3

Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA

Larimore East
o47097h5

31

18

South Branch Turtle River

Bellevue

Produced by:
Western Plains Consulting, Inc
1102 S Washington St, Ste 210
Bismarck, ND 58504
Date Created: November 18, 2021
Datum: North American Datum of 1983
Projection: North Dakota SPCS North
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N

Legend

- Assessed Stream
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Cropland Only

Appendix D. USGS 7.5-Minute Quadrangle Topographic Map 4

Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA

Gravel Pit

South Branch Turtle River

Larimore West
o47097h6

Larimore East
o47097h5

Legend

- Assessed Stream
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Cropland Only

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Bismarck, ND 58504
Date Created: November 18, 2021
Datum: North American Datum of 1983
Projection: North Dakota SPCS North
Scale: 1:4000
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N

Appendix D. USGS 7.5-Minute Quadrangle Topographic Map 5

Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA

Larimore West
o47097h6

Larimore East
o47097h5

Legend

- Assessed Stream
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Cropland Only

Produced by:
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Bismarck, ND 58504
Date Created: November 18, 2021
Datum: North American Datum of 1983
Projection: North Dakota SPCS North
Scale: 1:3750
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N

Larimore West
o47097h6

Larimore East
o47097h5

Gravel Pit

1100

1125

1103

1091

Appendix D. USGS 7.5-Minute Quadrangle Topographic Map 6
Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA

Legend

- Assessed Stream
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Cropland Only

Produced by:
Western Plains Consulting, Inc
1102 S Washington St, Ste 210
Bismarck, ND 58504
Date Created: November 18, 2021
Datum: North American Datum of 1983
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Scale: 1:4750
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N

Appendix D. USGS 7.5-Minute Quadrangle Topographic Map 7

Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA

Legend

- Assessed Stream
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Cropland Only

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Western Plains Consulting, Inc
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Date Created: November 18, 2021
Datum: North American Datum of 1983
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Scale: 1:6000
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N

Larimore West
o47097h6

Larimore East
o47097h5

South Branch Turtle River

South Branch Turtle River

1125

1105

36

1136

1100

1110

Bellevue Ce

Gravel

Appendix D. USGS 7.5-Minute Quadrangle Topographic Map 8

Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA

South Branch Turtle River

South Branch Turtle River

Larimore West
o47097h6

Legend

- Assessed Stream
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Cropland Only

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Bismarck, ND 58504
Date Created: November 18, 2021
Datum: North American Datum of 1983
Projection: North Dakota SPCS North
Scale: 1:2000
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N

Appendix D. USGS 7.5-Minute Quadrangle Topographic Map 9

Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA



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Projection: North Dakota SPCS North
Scale: 1:2250
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N

Legend

- Assessed Stream
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Cropland Only

Appendix D. NWI Map 1
NWI Features Overlain on WPC-Mapped Aquatic Resource Delineations

Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA

These data delineate the areal extent of wetlands and surface waters as defined by Cowardin et al. (1979). The National Wetlands Inventory - Version 2, Surface Waters and Wetlands Inventory was derived by retaining the wetland and deepwater polygons that compose the NWI digital wetlands spatial data layer and reintroducing any linear wetland or surface water features that were orphaned from the original NWI hard copy maps by converting them to narrow polygonal features. The NWI is a product of the U.S. Fish and Wildlife Service.



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Date Created: November 15, 2021
Datum: North American Datum of 1983
Projection: North Dakota SPCS South
Scale: 1:2000
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N

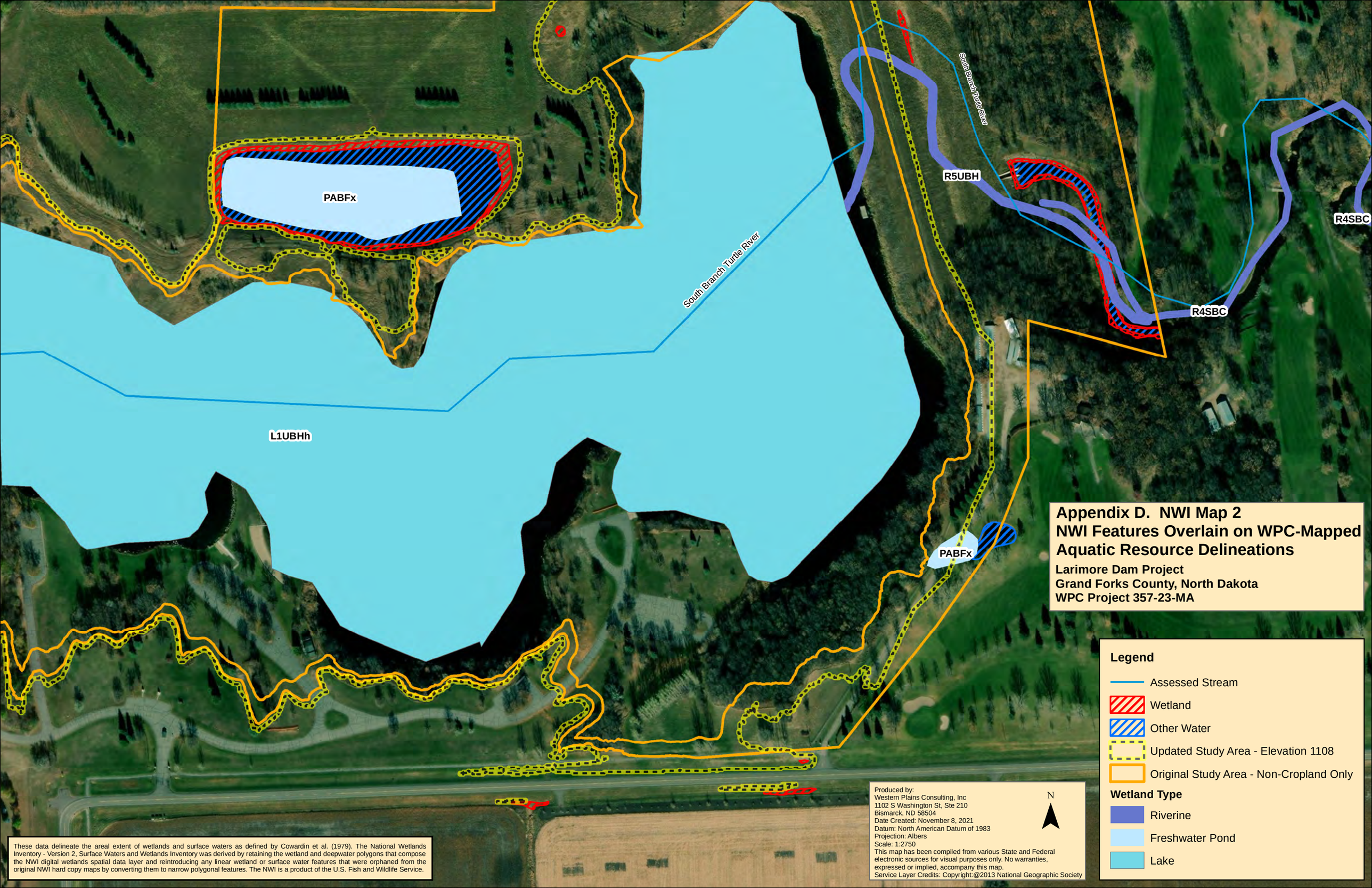
Legend

- Assessed Stream
- Wetland
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Cropland Only

ND_Wetlands

Wetland Type

- Riverine
- Lake



Appendix D. NWI Map 2
NWI Features Overlain on WPC-Mapped Aquatic Resource Delineations

Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA

Legend

- Assessed Stream
- Wetland
- Other Water
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Cropland Only

Wetland Type

- Riverine
- Freshwater Pond
- Lake

These data delineate the areal extent of wetlands and surface waters as defined by Cowardin et al. (1979). The National Wetlands Inventory - Version 2, Surface Waters and Wetlands Inventory was derived by retaining the wetland and deepwater polygons that compose the NWI digital wetlands spatial data layer and reintroducing any linear wetland or surface water features that were orphaned from the original NWI hard copy maps by converting them to narrow polygonal features. The NWI is a product of the U.S. Fish and Wildlife Service.

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N

Appendix D. NWI Map 3
NWI Features Overlain on WPC-Mapped Aquatic Resource Delineations

Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA

These data delineate the areal extent of wetlands and surface waters as defined by Cowardin et al. (1979). The National Wetlands Inventory - Version 2, Surface Waters and Wetlands Inventory was derived by retaining the wetland and deepwater polygons that compose the NWI digital wetlands spatial data layer and reintroducing any linear wetland or surface water features that were orphaned from the original NWI hard copy maps by converting them to narrow polygonal features. The NWI is a product of the U.S. Fish and Wildlife Service.

PFOC
PEM1A
PEM1A
PEM1Fh
L2UBGh
PSSCh
L1UBHh
Highway 18, 37th St. NE
PSSC
PEM1C
PEM1C
PEM1C
PEM1C
South Branch Turtle River
R4SBC
PEM1C
PEM1C
Bellevue Cemetery
PSS/FOA
Larimore Campground
PSSC
R5UBH

Legend

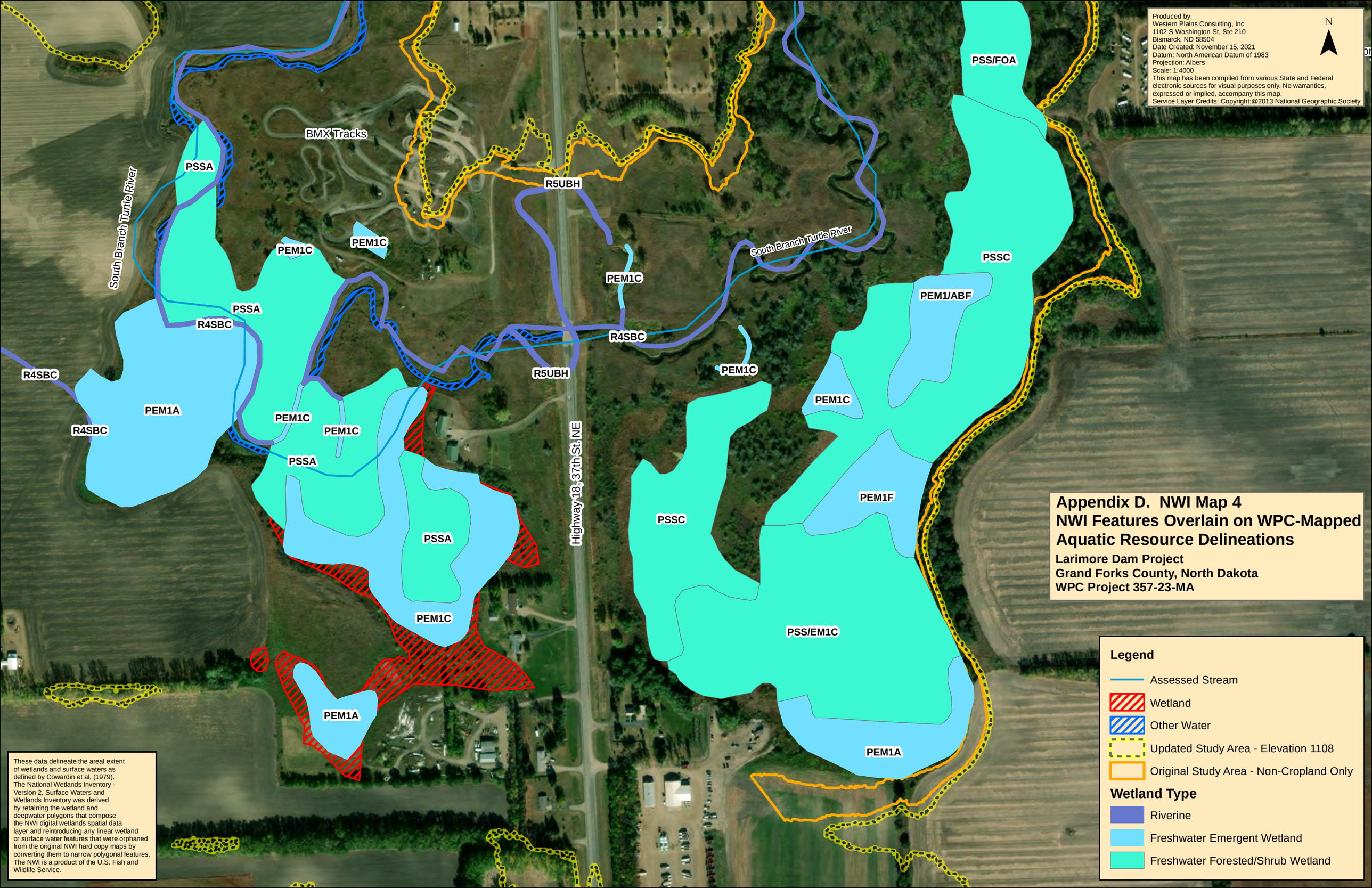
- Assessed Stream
- Wetland
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Cropland Only

Wetland Type

- Riverine
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Lake

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Projection: Albers
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N


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Projection: Albers
Scale: 1:4000
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N
BMX Tracks
PSSA
South Branch Turtle River
PEM1C
PEM1C
R5UBH
PEM1C
South Branch Turtle River
PSS/FOA
PSSC
PEM1/ABF
PSSA
R4SBC
R4SBC
R5UBH
PEM1C
R4SBC
PEM1A
PEM1C
PEM1C
PEM1C
R4SBC
PSSA
Highway 18, 37th St. NE
PSSA
PEM1C
PSSC
PEM1F
PSS/EM1C
PEM1A
PEM1A
Appendix D. NWI Map 4
NWI Features Overlain on WPC-Mapped Aquatic Resource Delineations
Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA
Legend
Assessed Stream
Wetland
Other Water
Updated Study Area - Elevation 1108
Original Study Area - Non-Cropland Only
Wetland Type
Riverine
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
These data delineate the areal extent of wetlands and surface waters as defined by Cowardin et al. (1979). The National Wetlands Inventory - Version 2, Surface Waters and Wetlands Inventory was derived by retaining the wetland and deepwater polygons that compose the NWI digital wetlands spatial data layer and reintroducing any linear wetland or surface water features that were orphaned from the original NWI hard copy maps by converting them to narrow polygonal features. The NWI is a product of the U.S. Fish and Wildlife Service.

Appendix D. NWI Map 5
NWI Features Overlain on WPC-Mapped Aquatic Resource Delineations

Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA

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Projection: Albers
Scale: 1:3750
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N

Legend

- Wetland
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Cropland Only

Wetland Type

- Freshwater Pond
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland

These data delineate the areal extent of wetlands and surface waters as defined by Cowardin et al. (1979). The National Wetlands Inventory - Version 2, Surface Waters and Wetlands Inventory was derived by retaining the wetland and deepwater polygons that compose the NWI digital wetlands spatial data layer and reintroducing any linear wetland or surface water features that were orphaned from the original NWI hard copy maps by converting them to narrow polygonal features. The NWI is a product of the U.S. Fish and Wildlife Service.

PEM1A
PSS/EM1C
PEM1A
PEM1A
PEM1A
PEM1C
PEM1Ad
W21A
PEM1Cx
PEM1Cx
PEM1Cx
W19C
W19A
PEM1A
W18
W18
PABFx
PABFx
17th Ave NE
Barrett Ave
Highway 18, 37th St NE

Appendix D. NWI Map 6
NWI Features Overlain on WPC-Mapped Aquatic Resource Delineations

Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA

Legend

- Assessed Stream
- Wetland
- Other Water
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Cropland Only

Wetland Type

- Riverine
- Freshwater Pond
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland

R4SBC
BMX Tracks
PSSA
South Branch Turtle River
R5UBH
PEM1C
PEM1C
PEM1C
PSSA
R4SBC
R4SBC
R5UBH
R4SBC
PEM1A
PEM1C
PEM1C
PSSA
PSSA
Highway 18, 37th St NE
PSSC
PEM1C
38th St NE
PEM1A
PEM1A
PEM1A
PEM1/ABFd

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Appendix D. NWI Map 7
NWI Features Overlain on WPC-Mapped Aquatic Resource Delineations

Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA

These data delineate the areal extent of wetlands and surface waters as defined by Cowardin et al. (1979). The National Wetlands Inventory - Version 2, Surface Waters and Wetlands Inventory was derived by retaining the wetland and deepwater polygons that compose the NWI digital wetlands spatial data layer and reintroducing any linear wetland or surface water features that were orphaned from the original NWI hard copy maps by converting them to narrow polygonal features. The NWI is a product of the U.S. Fish and Wildlife Service.

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N

PEM1A
PEM1C
R4SBC
R5UBH
PABFx
PFOA
South Branch Turtle River
R5UBH
PEM1A
PEM1Ad
PEM1/SSA
Highway 18, 37th St. NE
PSSC
Bellevue Cemetery
BMX Tracks
PSSA
R5UBH

Legend

- Assessed Stream
- Wetland
- Other Water
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Cropland Only

Wetland Type

- Riverine
- Freshwater Pond
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland

Appendix D. NWI Map 8
NWI Features Overlain on WPC-Mapped Aquatic Resource Delineations

Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA

PEM1C
South Branch Turtle River
PSSA
R4SBC
PEM1C
PEM1/SSA
PFOA
PFOA
PEM1A
PSSA
PEM1C
PFOA

Legend

- Assessed Stream
- Wetland
- Other Water
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Cropland Only

Wetland Type

- Riverine
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland

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Projection: Albers
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Appendix D. NWI Map 9
NWI Features Overlain on WPC-Mapped Aquatic Resource Delineations

Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA

These data delineate the areal extent of wetlands and surface waters as defined by Cowardin et al. (1979). The National Wetlands Inventory - Version 2, Surface Waters and Wetlands Inventory was derived by retaining the wetland and deepwater polygons that compose the NWI digital wetlands spatial data layer and reintroducing any linear wetland or surface water features that were orphaned from the original NWI hard copy maps by converting them to narrow polygonal features. The NWI is a product of the U.S. Fish and Wildlife Service.

PEM1C
PEM1A
R5UBH
PEM1C
PEM1C
R4SBC
R4SBC
R4SBC
South Branch Turtle River
South Branch Turtle River
PSSA
PSSA
PSSA
PEM1Cx
39th St NE
South Branch Turtle River
PFOA
PSSA
PSSA
PEM1C
PEM1C
PSSA
R4SBC
PEM1C
PEM1C
South Branch Turtle River
PSSA
R4SBC
PEM1/SSA

Legend

- Assessed Stream
- Wetland
- Other Water
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Cropland Only

Wetland Type

- Riverine
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland

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Projection: Albers
Scale: 1:2225
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N

Appendix D.
Fen Study Points on NWI Map 8

Larimore Dam Project
Grand Forks County, North Dakota
WPC Project 357-23-MA

PEM1C
PEM1C
South Branch Turtle River
PSSA
R4SBC
PEM1C
PEM1/SSA
PFOA
PFOA
Organic 8 in
Fen35_PP
Organic 20 plus
organic 3 in
Organic 8 in
PEM1A
PSSA
Organic 6 in
Organic 7 in
Organic 10 plus
PFOA
PEM1C

Legend

- Miscellaneous Project Point
- Assessed Stream
- QFEN35
- Wetland
- Other Water
- Updated Study Area - Elevation 1108
- Original Study Area - Non-Cropland Only

Wetland Type

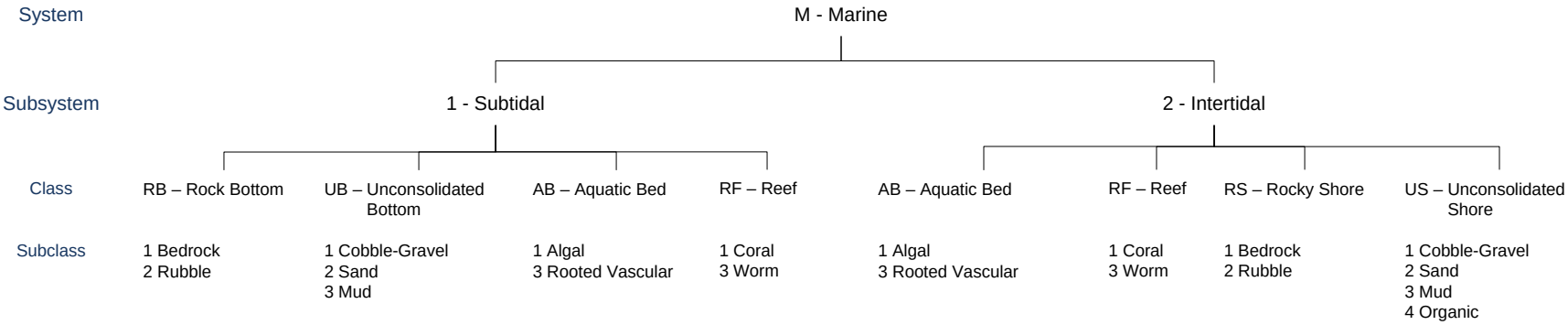
- Riverine
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland

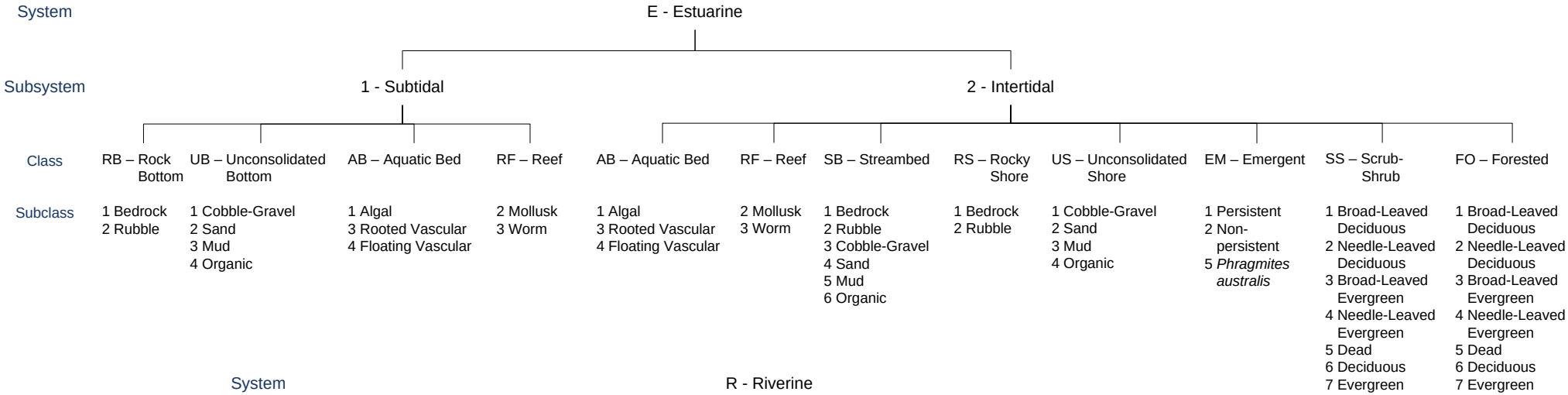
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Western Plains Consulting, Inc
1102 S Washington St, Ste 210
Bismarck, ND 58504
Date Created: November 8, 2021
Datum: North American Datum of 1983
Projection: Albers
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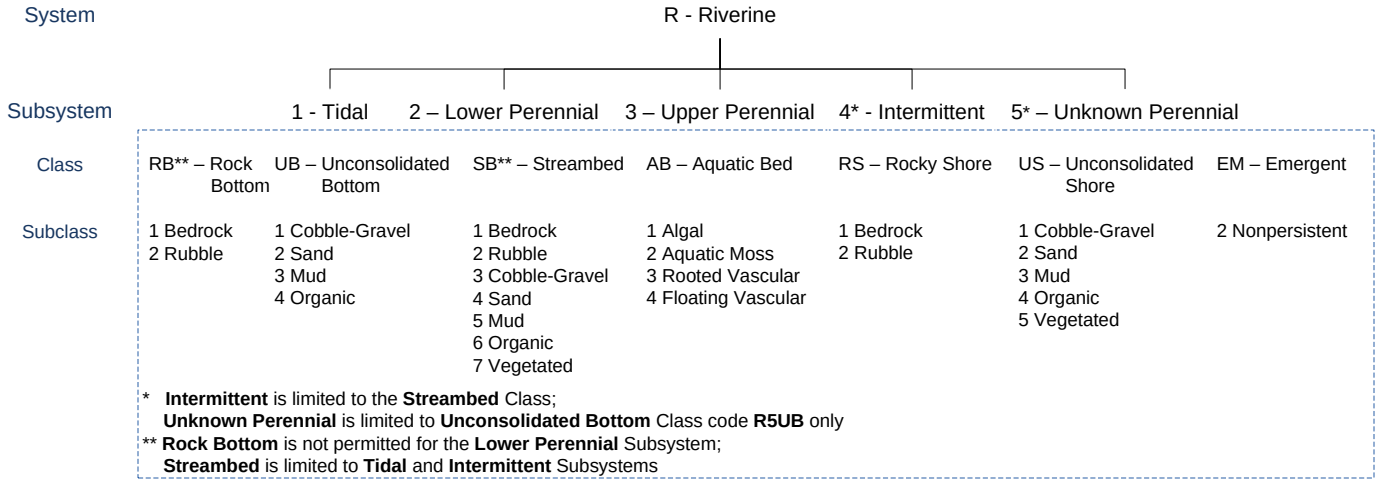
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These data delineate the areal extent of wetlands and surface waters as defined by Cowardin et al. (1979). The National Wetlands Inventory - Version 2, Surface Waters and Wetlands Inventory was derived by retaining the wetland and deepwater polygons that compose the NWI digital wetlands spatial data layer and reintroducing any linear wetland or surface water features that were orphaned from the original NWI hard copy maps by converting them to narrow polygonal features. The NWI is a product of the U.S. Fish and Wildlife Service.

Appendix D WETLANDS AND DEEPWATER HABITATS CLASSIFICATION



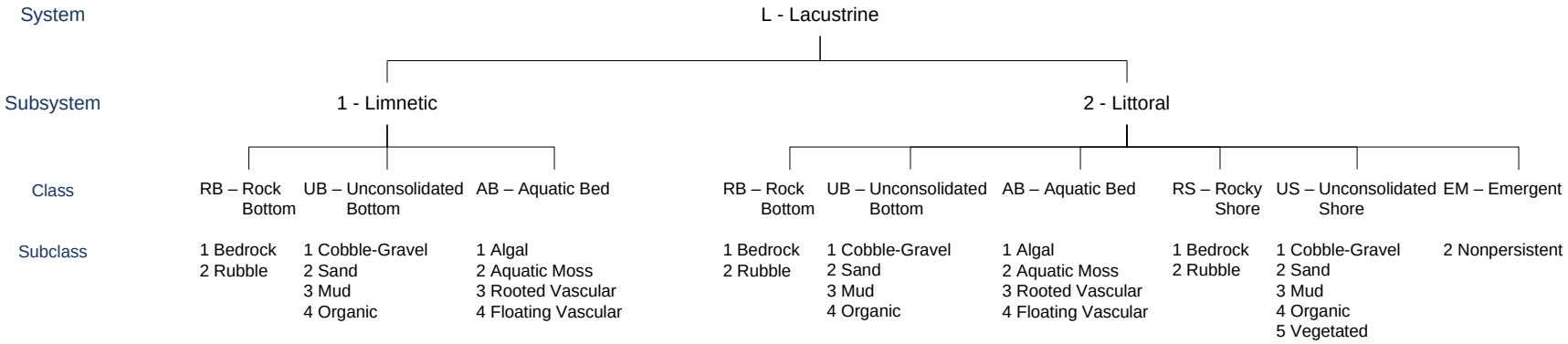


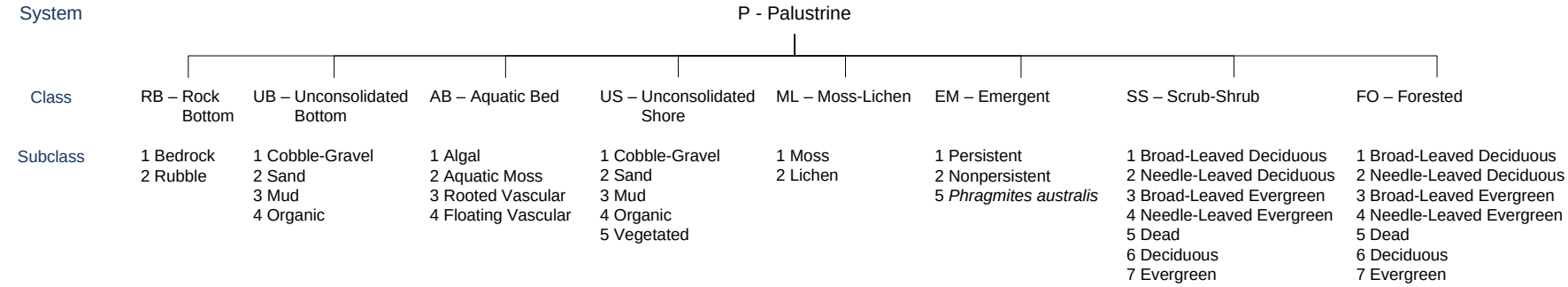


* **Intermittent** is limited to the **Streambed** Class;
Unknown Perennial is limited to **Unconsolidated Bottom** Class code **R5UB** only
** **Rock Bottom** is not permitted for the **Lower Perennial** Subsystem;
Streambed is limited to **Tidal** and **Intermittent** Subsystems

Classification of Wetlands and Deepwater Habitats of the United States, Cowardin *et al*. 1979

WETLANDS AND DEEPWATER HABITATS CLASSIFICATION





MODIFIERS

In order to more adequately describe the wetland and deepwater habitats, one or more of the water regime, water chemistry, soil, or special modifiers may be applied at the class or lower level in the hierarchy. The farmed modifier may also be applied to the ecological system.

Water Regime			Special Modifiers	Water Chemistry			Soil
Nontidal	**Saltwater Tidal**	**Freshwater Tidal**		**Coastal Halinity**	**Inland Salinity**	**pH Modifiers for all Fresh Water**	
A Temporarily Flooded	L Subtidal	S Temporarily Flooded-Tidal	b Beaver	1 Hyperhaline	7 Hypersaline	a Acid	g Organic
B Saturated	M Irregularly Exposed	R Seasonally Flooded-Tidal	d Partly Drained/Ditched	2 Euhaline	8 Eusaline	t Circumneutral	n Mineral
C Seasonally Flooded	N Regularly Flooded	T Semipermanently Flooded-Tidal	f Farmed	3 Mixohaline (Brackish)	9 Mixosaline	i Alkaline	
E Seasonally Flooded/ Saturated	P Irregularly Flooded	V Permanently Flooded-Tidal	h Diked/Impounded	4 Polyhaline	0 Fresh		
F Semipermanently Flooded			r Artificial	5 Mesohaline			
G Intermittently Exposed			s Spoil	6 Oligohaline			
H Permanently Flooded			x Excavated	0 Fresh			
J Intermittently Flooded							
K Artificially Flooded							

Soil Map—Grand Forks County, North Dakota
(Soil Map 1)



Map Scale: 1:3,400 if printed on B landscape (17" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Grand Forks County, North Dakota
Survey Area Data: Version 25, Sep 8, 2021

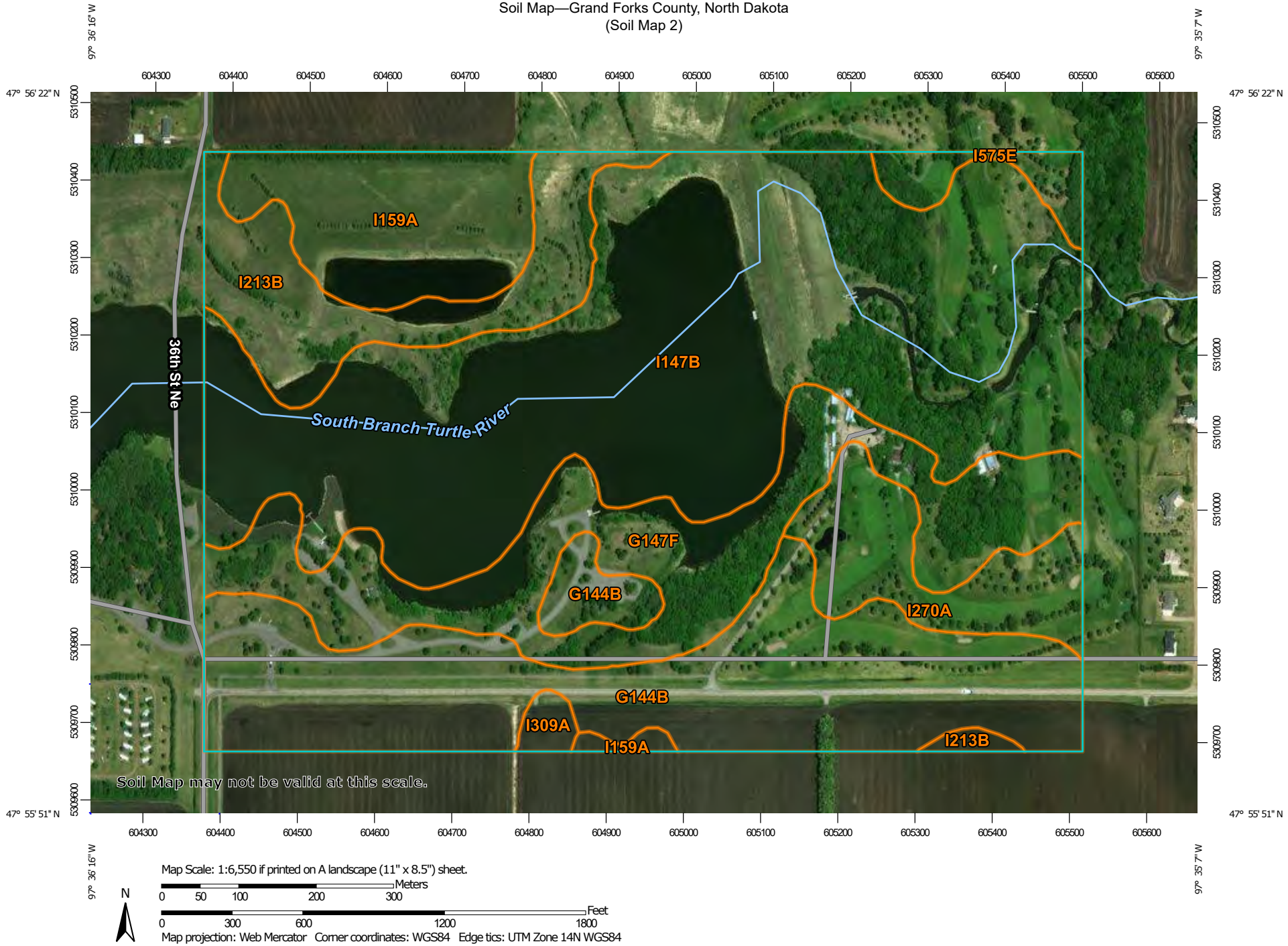
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 7, 2014—Feb 28, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
I147B	Velva sandy loam, moist, 0 to 6 percent slopes, occasionally flooded	30.3	24.3%
I159A	Wyndmere-Tiffany fine sandy loams, 0 to 2 percent slopes	24.1	19.3%
I213B	Embden fine sandy loam, 2 to 6 percent slopes	25.5	20.4%
I365B	Arvilla sandy loam, 0 to 6 percent slopes	26.0	20.8%
I575E	Maddock sandy loam, 9 to 25 percent slopes	19.0	15.2%
Totals for Area of Interest		**124.8**	**100.0%**



Map Scale: 1:6,550 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 300 600 1200 1800

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Grand Forks County, North Dakota
Survey Area Data: Version 25, Sep 8, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

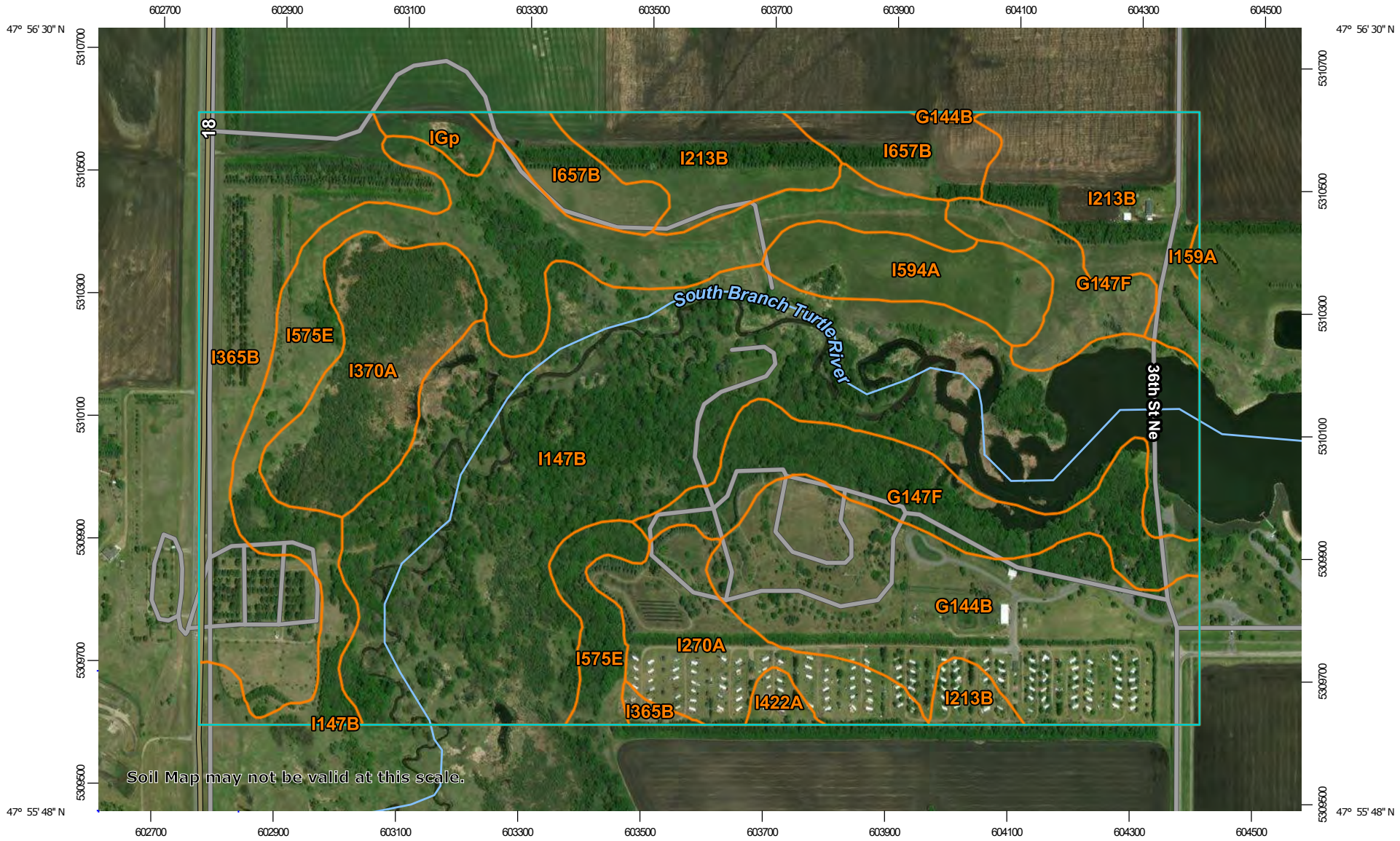
Date(s) aerial images were photographed: Apr 7, 2014—Feb 28, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
G144B	Barnes-Buse loams, 3 to 6 percent slopes	45.7	20.9%
G147F	Buse-Barnes-Darnen loams, 9 to 35 percent slopes	33.2	15.2%
I147B	Velva sandy loam, moist, 0 to 6 percent slopes, occasionally flooded	90.2	41.3%
I159A	Wyndmere-Tiffany fine sandy loams, 0 to 2 percent slopes	16.6	7.6%
I213B	Embden fine sandy loam, 2 to 6 percent slopes	16.6	7.6%
I270A	Foldahl fine sandy loam, 0 to 2 percent slopes	11.5	5.3%
I309A	Arveson loam, 0 to 1 percent slopes	1.2	0.6%
I575E	Maddock sandy loam, 9 to 25 percent slopes	3.5	1.6%
Totals for Area of Interest		**218.5**	**100.0%**

Soil Map—Grand Forks County, North Dakota
(Soil Map 3)



Map Scale: 1:8,990 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 400 800 1600 2400

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Grand Forks County, North Dakota
Survey Area Data: Version 25, Sep 8, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

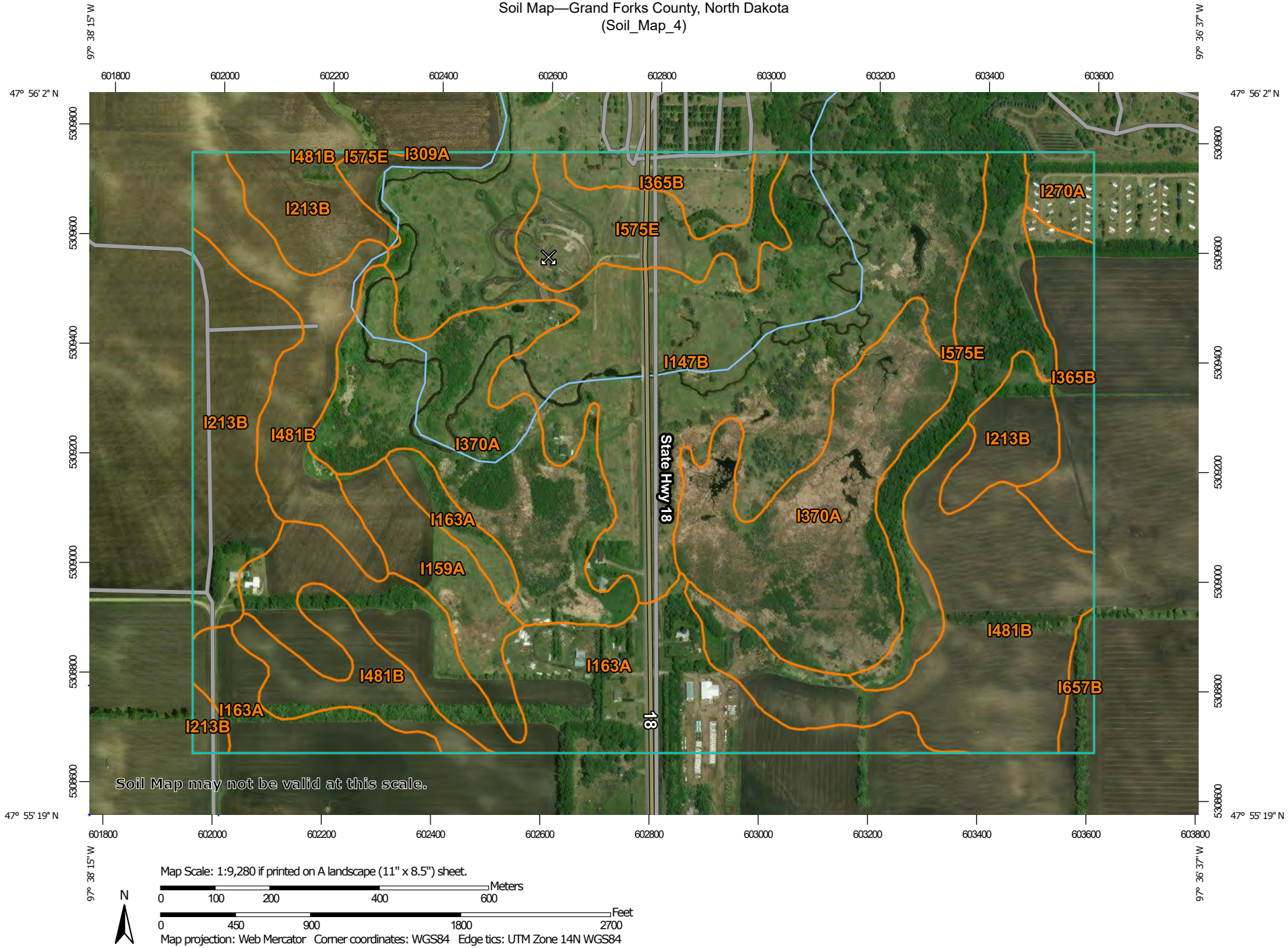
Date(s) aerial images were photographed: Apr 7, 2014—Feb 28, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
G144B	Barnes-Buse loams, 3 to 6 percent slopes	48.9	12.0%
G147F	Buse-Barnes-Darnen loams, 9 to 35 percent slopes	32.6	8.0%
I147B	Velva sandy loam, moist, 0 to 6 percent slopes, occasionally flooded	119.8	29.5%
I159A	Wyndmere-Tiffany fine sandy loams, 0 to 2 percent slopes	0.3	0.1%
I213B	Embden fine sandy loam, 2 to 6 percent slopes	38.1	9.4%
I270A	Foldahl fine sandy loam, 0 to 2 percent slopes	18.9	4.7%
I365B	Arvilla sandy loam, 0 to 6 percent slopes	40.4	10.0%
I370A	Rauville silty clay loam, 0 to 1 percent slopes, frequently flooded	22.3	5.5%
I422A	Renshaw loam, 0 to 2 percent slopes	1.8	0.4%
I575E	Maddock sandy loam, 9 to 25 percent slopes	51.6	12.7%
I594A	LaDelle silt loam, 0 to 2 percent slopes, occasionally flooded	12.9	3.2%
I657B	Hecla fine sandy loam, 2 to 6 percent slopes	15.3	3.8%
IGp	Pits, gravel and sand	2.8	0.7%
Totals for Area of Interest		**405.7**	**100.0%**

Soil Map—Grand Forks County, North Dakota
(Soil_Map_4)



Map Scale: 1:9,280 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 100 200 400 600

Feet
0 450 900 1800 2700

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Grand Forks County, North Dakota
Survey Area Data: Version 25, Sep 8, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

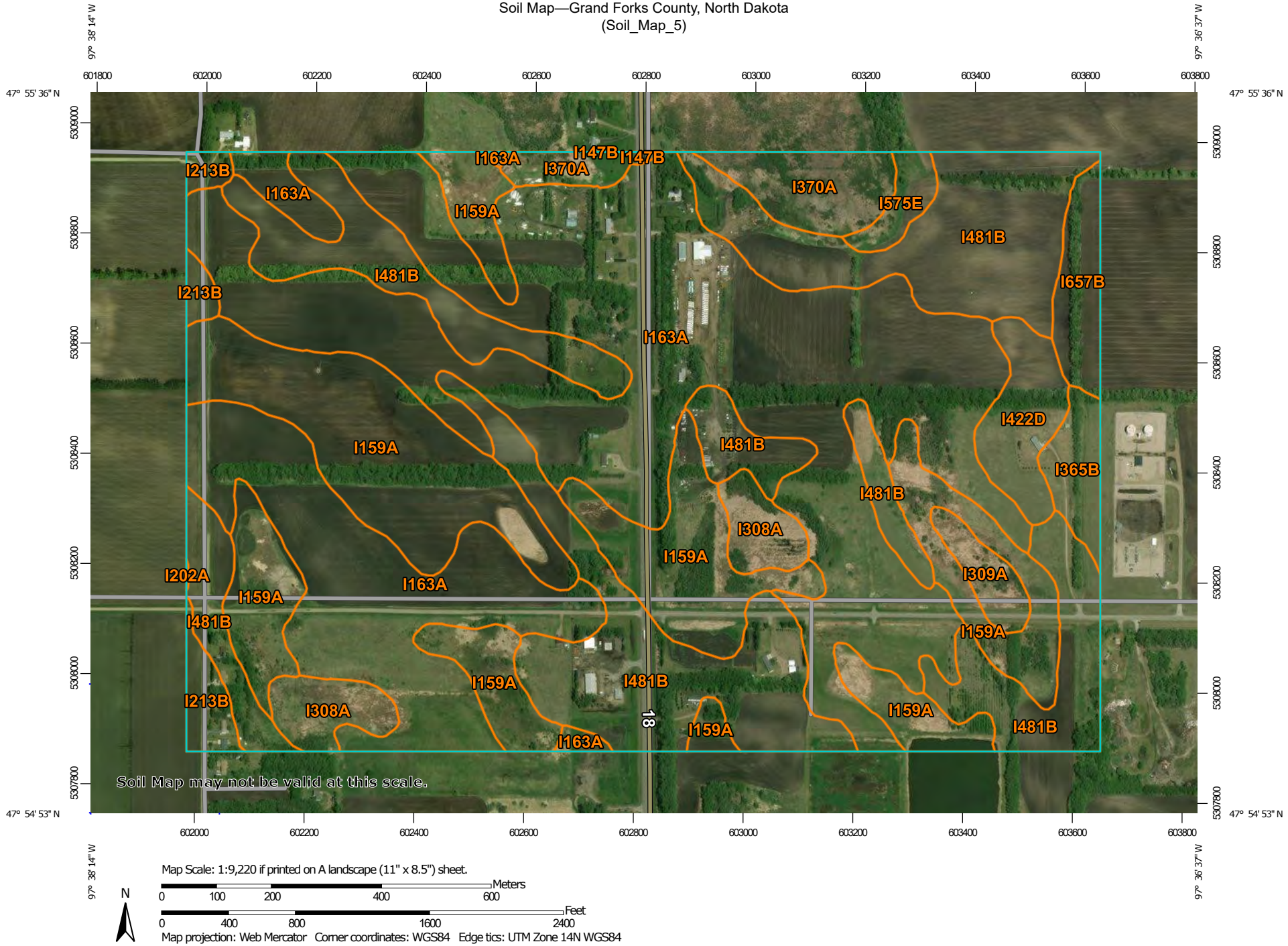
Date(s) aerial images were photographed: Apr 7, 2014—Feb 28, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
I147B	Velva sandy loam, moist, 0 to 6 percent slopes, occasionally flooded	103.6	23.1%
I159A	Wyndmere-Tiffany fine sandy loams, 0 to 2 percent slopes	13.1	2.9%
I163A	Inkster sandy loam, 0 to 2 percent slopes	62.0	13.8%
I213B	Embden fine sandy loam, 2 to 6 percent slopes	42.8	9.5%
I270A	Foldahl fine sandy loam, 0 to 2 percent slopes	4.3	1.0%
I309A	Arveson loam, 0 to 1 percent slopes	0.0	0.0%
I365B	Arvilla sandy loam, 0 to 6 percent slopes	20.8	4.6%
I370A	Rauville silty clay loam, 0 to 1 percent slopes, frequently flooded	84.0	18.7%
I481B	Hecla-Maddock fine sandy loams, 2 to 6 percent slopes	76.8	17.1%
I575E	Maddock sandy loam, 9 to 25 percent slopes	38.6	8.6%
I657B	Hecla fine sandy loam, 2 to 6 percent slopes	3.0	0.7%
Totals for Area of Interest		**449.0**	**100.0%**

Soil Map—Grand Forks County, North Dakota
(Soil_Map_5)



Map Scale: 1:9,220 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 400 800 1600 2400

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Grand Forks County, North Dakota
Survey Area Data: Version 25, Sep 8, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

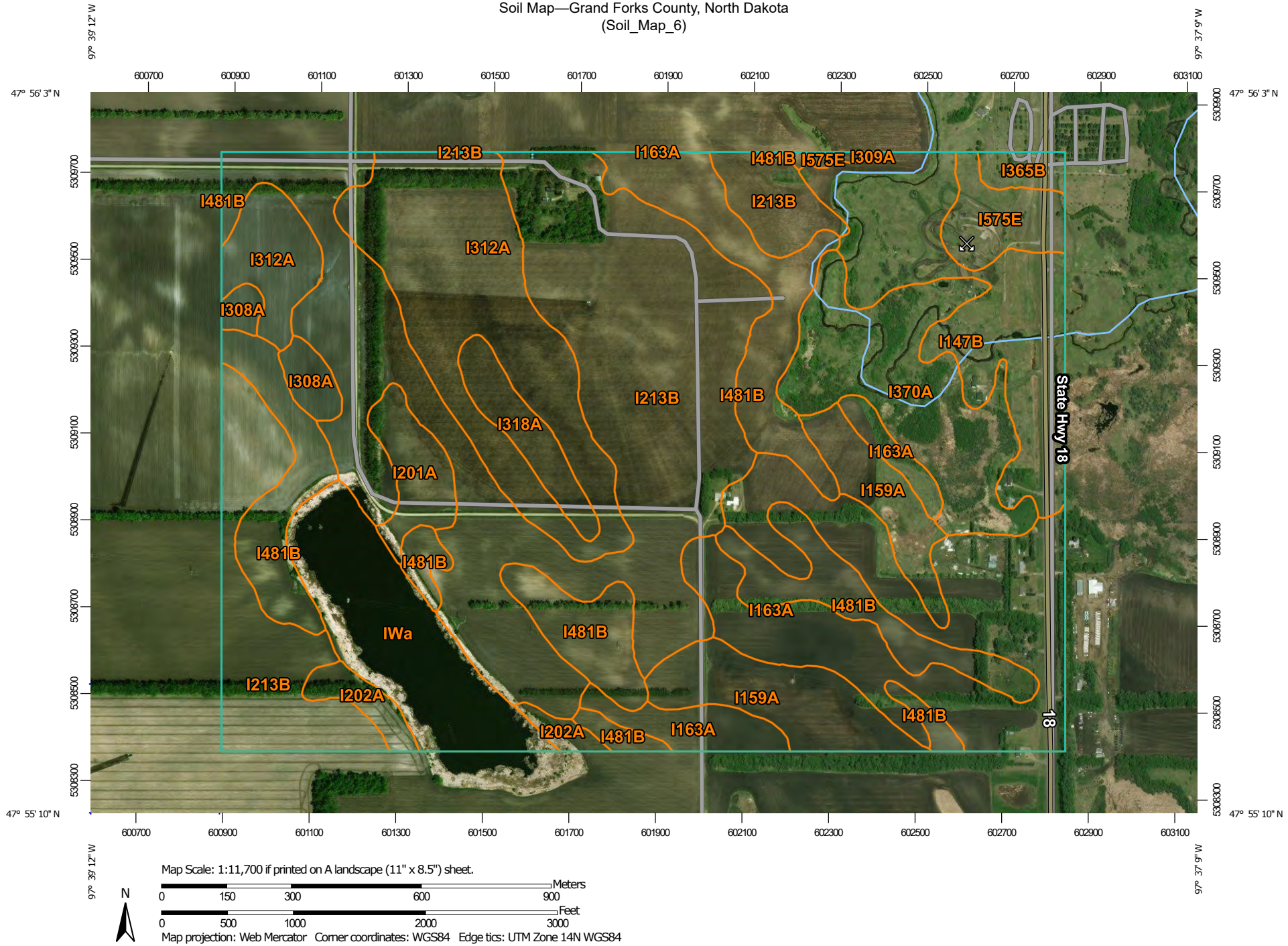
Date(s) aerial images were photographed: Apr 7, 2014—Feb 28, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
I147B	Velva sandy loam, moist, 0 to 6 percent slopes, occasionally flooded	0.2	0.1%
I159A	Wyndmere-Tiffany fine sandy loams, 0 to 2 percent slopes	91.6	20.4%
I163A	Inkster sandy loam, 0 to 2 percent slopes	184.7	41.1%
I202A	Gardena silt loam, 0 to 2 percent slopes	0.0	0.0%
I213B	Embden fine sandy loam, 2 to 6 percent slopes	6.6	1.5%
I308A	Tiffany loam, 0 to 1 percent slopes	10.8	2.4%
I309A	Arveson loam, 0 to 1 percent slopes	4.2	0.9%
I365B	Arvilla sandy loam, 0 to 6 percent slopes	5.6	1.3%
I370A	Rauville silty clay loam, 0 to 1 percent slopes, frequently flooded	12.8	2.9%
I422D	Sioux loam, 2 to 15 percent slopes	9.6	2.1%
I481B	Hecla-Maddock fine sandy loams, 2 to 6 percent slopes	113.1	25.1%
I575E	Maddock sandy loam, 9 to 25 percent slopes	3.4	0.8%
I657B	Hecla fine sandy loam, 2 to 6 percent slopes	7.1	1.6%
Totals for Area of Interest		**450.0**	**100.0%**

Soil Map—Grand Forks County, North Dakota
(Soil_Map_6)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Grand Forks County, North Dakota
Survey Area Data: Version 25, Sep 8, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

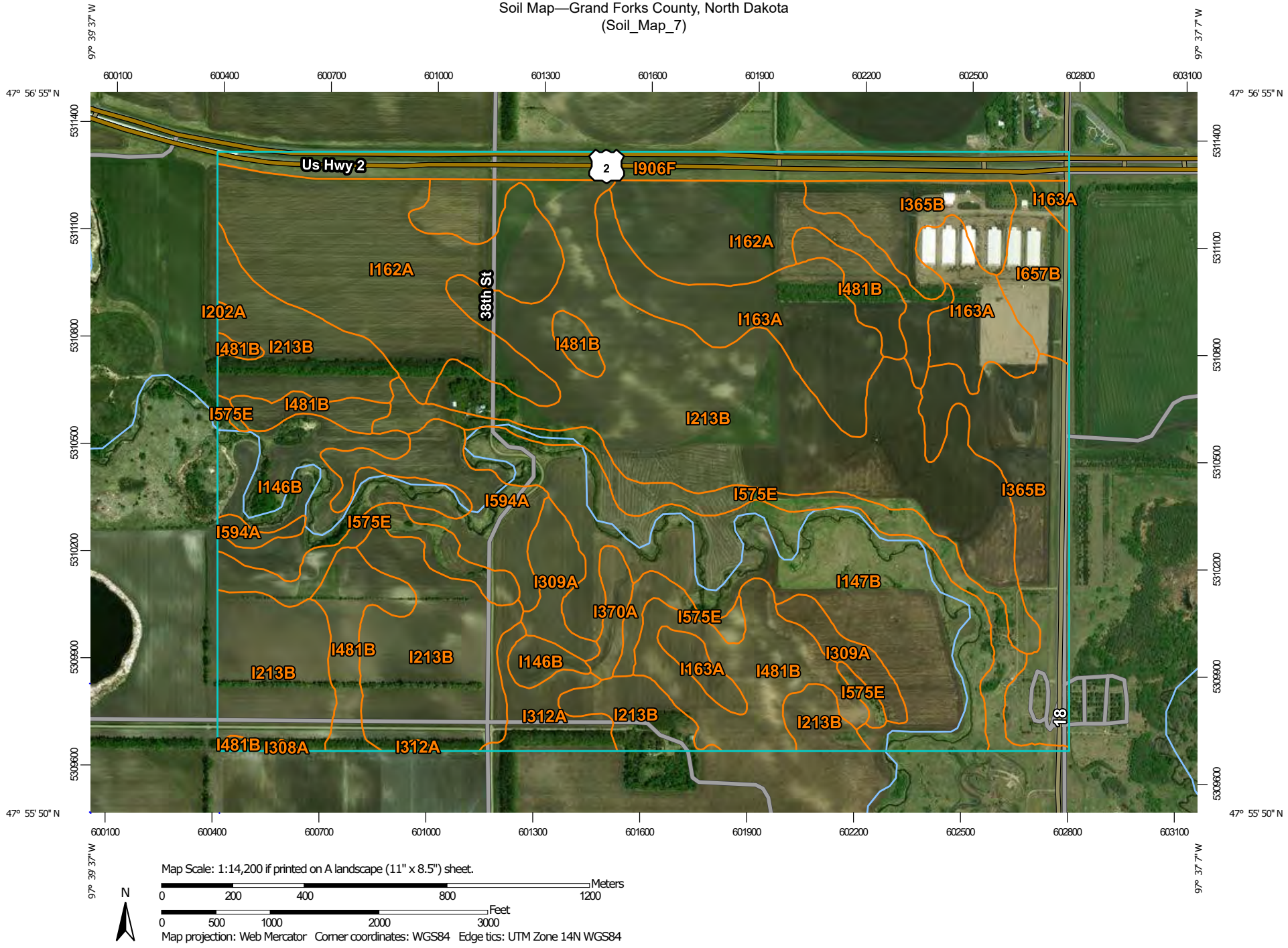
Date(s) aerial images were photographed: Apr 7, 2014—Feb 28, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
I147B	Velva sandy loam, moist, 0 to 6 percent slopes, occasionally flooded	50.5	7.6%
I159A	Wyndmere-Tiffany fine sandy loams, 0 to 2 percent slopes	34.1	5.1%
I163A	Inkster sandy loam, 0 to 2 percent slopes	85.2	12.8%
I201A	Glyndon silt loam, 0 to 2 percent slopes	10.7	1.6%
I202A	Gardena silt loam, 0 to 2 percent slopes	7.8	1.2%
I213B	Embden fine sandy loam, 2 to 6 percent slopes	204.3	30.6%
I308A	Tiffany loam, 0 to 1 percent slopes	6.6	1.0%
I309A	Arveson loam, 0 to 1 percent slopes	0.3	0.0%
I312A	Wyndmere fine sandy loam, 0 to 2 percent slopes	74.9	11.2%
I318A	Borup silt loam, 0 to 1 percent slopes	10.5	1.6%
I365B	Arvilla sandy loam, 0 to 6 percent slopes	4.2	0.6%
I370A	Rauville silty clay loam, 0 to 1 percent slopes, frequently flooded	43.1	6.4%
I481B	Hecla-Maddock fine sandy loams, 2 to 6 percent slopes	85.7	12.8%
I575E	Maddock sandy loam, 9 to 25 percent slopes	12.2	1.8%
IWa	Water	37.8	5.7%
Totals for Area of Interest		**667.7**	**100.0%**

Soil Map—Grand Forks County, North Dakota
(Soil_Map_7)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Grand Forks County, North Dakota
Survey Area Data: Version 25, Sep 8, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 7, 2014—Feb 28, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
I146B	Lamoure-Fluvaquents, channeled complex, 0 to 6 percent slopes, frequently flooded	45.3	4.6%
I147B	Velva sandy loam, moist, 0 to 6 percent slopes, occasionally flooded	108.2	10.9%
I162A	Walsh loam, 0 to 2 percent slopes	132.6	13.3%
I163A	Inkster sandy loam, 0 to 2 percent slopes	71.0	7.1%
I202A	Gardena silt loam, 0 to 2 percent slopes	0.4	0.0%
I213B	Embden fine sandy loam, 2 to 6 percent slopes	289.2	29.1%
I308A	Tiffany loam, 0 to 1 percent slopes	0.3	0.0%
I309A	Arveson loam, 0 to 1 percent slopes	20.2	2.0%
I312A	Wyndmere fine sandy loam, 0 to 2 percent slopes	14.7	1.5%
I365B	Arvilla sandy loam, 0 to 6 percent slopes	77.9	7.8%
I370A	Rauville silty clay loam, 0 to 1 percent slopes, frequently flooded	6.3	0.6%
I481B	Hecla-Maddock fine sandy loams, 2 to 6 percent slopes	76.2	7.7%
I575E	Maddock sandy loam, 9 to 25 percent slopes	59.4	6.0%
I594A	LaDelle silt loam, 0 to 2 percent slopes, occasionally flooded	29.6	3.0%
I657B	Hecla fine sandy loam, 2 to 6 percent slopes	17.0	1.7%
I906F	Orthents-Aquents-Urban Land, highway complex, 0 to 35 percent slopes	45.7	4.6%
Totals for Area of Interest		**994.1**	**100.0%**

Soil Map—Grand Forks County, North Dakota
(Soil_Map_8)



Map Scale: 1:5,550 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Grand Forks County, North Dakota
Survey Area Data: Version 25, Sep 8, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

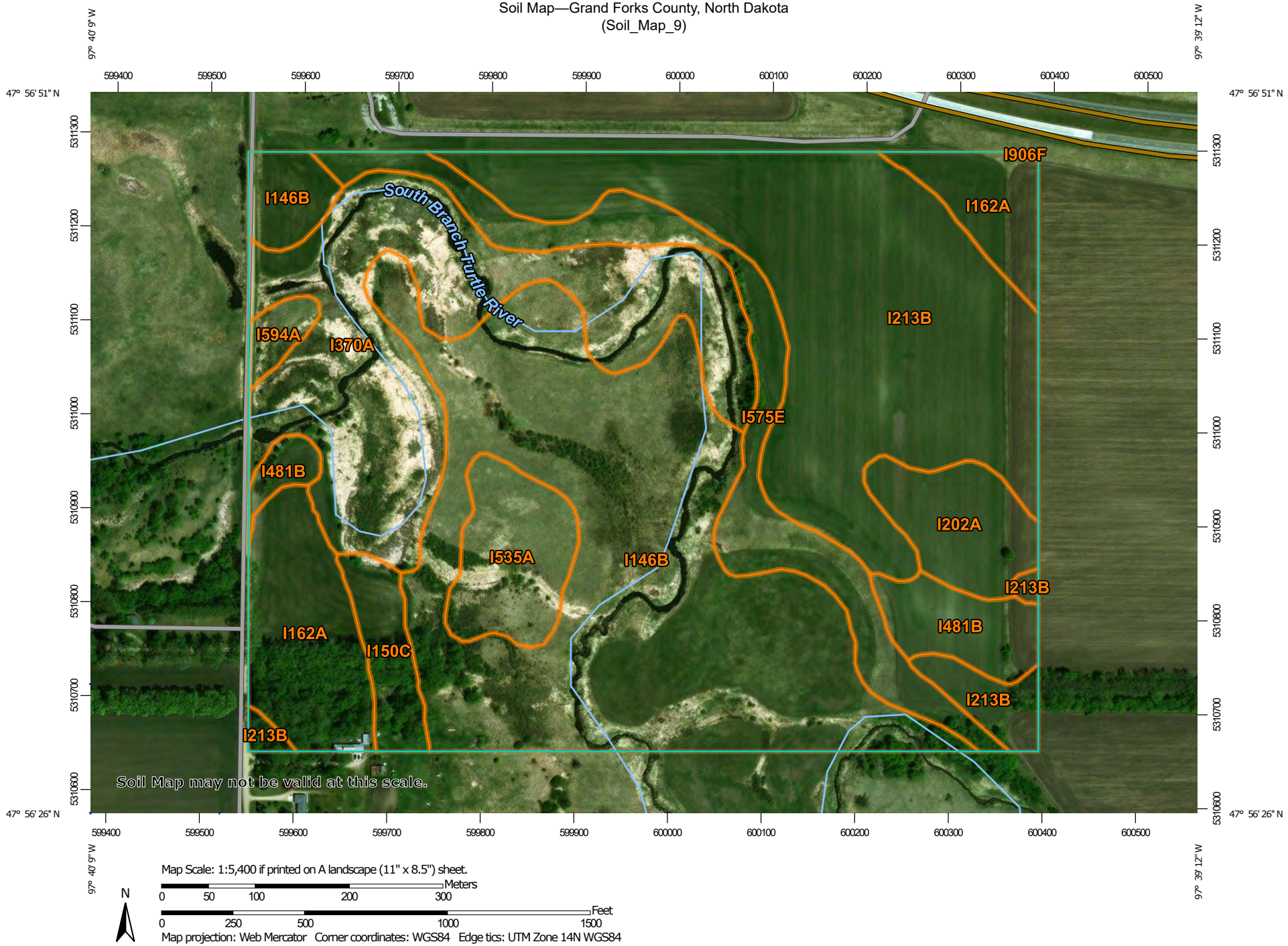
Date(s) aerial images were photographed: Apr 7, 2014—Feb 28, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
I146B	Lamoure-Fluvaquents, channeled complex, 0 to 6 percent slopes, frequently flooded	88.7	54.5%
I150C	Zell, fine-silty-LaDelle silt loams, 1 to 9 percent slopes	4.8	2.9%
I162A	Walsh loam, 0 to 2 percent slopes	3.1	1.9%
I168A	Parnell silt loam, 0 to 1 percent slopes	1.7	1.1%
I213B	Embden fine sandy loam, 2 to 6 percent slopes	34.8	21.4%
I481B	Hecla-Maddock fine sandy loams, 2 to 6 percent slopes	10.1	6.2%
I535A	Marysland loam, 0 to 1 percent slopes	0.1	0.1%
I575E	Maddock sandy loam, 9 to 25 percent slopes	15.8	9.7%
I594A	LaDelle silt loam, 0 to 2 percent slopes, occasionally flooded	3.6	2.2%
Totals for Area of Interest		**162.7**	**100.0%**

Soil Map—Grand Forks County, North Dakota
(Soil_Map_9)



Map Scale: 1:5,400 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Grand Forks County, North Dakota
Survey Area Data: Version 25, Sep 8, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 7, 2014—Feb 28, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
I146B	Lamoure-Fluvaquents, channeled complex, 0 to 6 percent slopes, frequently flooded	41.0	30.7%
I150C	Zell, fine-silty-LaDelle silt loams, 1 to 9 percent slopes	2.8	2.1%
I162A	Walsh loam, 0 to 2 percent slopes	10.5	7.8%
I202A	Gardena silt loam, 0 to 2 percent slopes	4.6	3.4%
I213B	Embden fine sandy loam, 2 to 6 percent slopes	31.2	23.4%
I370A	Rauville silty clay loam, 0 to 1 percent slopes, frequently flooded	22.9	17.1%
I481B	Hecla-Maddock fine sandy loams, 2 to 6 percent slopes	4.3	3.2%
I535A	Marysland loam, 0 to 1 percent slopes	5.2	3.9%
I575E	Maddock sandy loam, 9 to 25 percent slopes	10.2	7.6%
I594A	LaDelle silt loam, 0 to 2 percent slopes, occasionally flooded	1.1	0.8%
I906F	Orthents-Aquents-Urban Land, highway complex, 0 to 35 percent slopes	0.0	0.0%
Totals for Area of Interest		**133.7**	**100.0%**

Hydric Soil List - All Components

This table lists the map unit components and their hydric status in the survey area. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and others, 2002).

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for all of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The criteria for hydric soils are represented by codes in the table (for example, 2). Definitions for the codes are as follows:

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;
3. Soils that are frequently ponded for long or very long duration during the growing season.
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;
4. Map unit components that are frequently flooded for long duration or very long duration during the growing season that:
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;

Hydric Condition: Food Security Act information regarding the ability to grow a commodity crop without removing woody vegetation or manipulating hydrology.

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. Doc. 2012-4733 Filed 2-28-12. February, 28, 2012. Hydric soils of the United States.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

Vasilas, L.M., G.W. Hurt, and C.V. Noble, editors. Version 7.0, 2010. Field indicators of hydric soils in the United States.

Report—Hydric Soil List - All Components

Hydric Soil List - All Components–ND035-Grand Forks County, North Dakota					
Map symbol and map unit name	**Component/Local Phase**	**Comp. pct.**	**Landform**	**Hydric status**	**Hydric criteria met (code)**
G144B: Barnes-Buse loams, 3 to 6 percent slopes	Barnes	28	Ground moraines	No	—
	Buse	27	Ground moraines	No	—
	Balaton	14	Ground moraines	No	—
	Svea	14	Ground moraines	No	—
	Tonka	5	Depressions	Yes	2,3
	Langhei	4	Ground moraines	No	—
	Parnell	3	Depressions	Yes	2,3
	Cresbard	3	Ground moraines	No	—
	Renshaw	2	Terraces	No	—
G147F: Buse-Barnes-Darnen loams, 9 to 35 percent slopes	Buse	30	Moraines	No	—
	Barnes	25	Moraines	No	—
	Darnen	24	Escarpments	No	—
	Langhei-Very stony	12	Moraines	No	—
	Lanona	3	Moraines	No	—
	Sioux	3	Hillslopes on moraines	No	—
	Lowe-Occasionally flooded	3	Drainageways	Yes	2
I146B: Lamoure-Fluvaquents, channeled complex, 0 to 6 percent slopes, frequently flooded	Lamoure-Frequently flooded	45	Flood plains	Yes	2,4
	Fluvaquents-Frequently flooded, channeled	40	Swales on flood plains	Yes	2,3,4
	Rauville	9	Depressions,oxbows	Yes	2,3,4
	LaDelle	6	Flood plains,terraces	No	—
I147B: Velva sandy loam, moist, 0 to 6 percent slopes, occasionally flooded	Velva	80	Levees,terraces	No	—
	Fluvaquents-Frequently flooded, channeled	10	Swales on flood plains	Yes	2,3,4
	Lamoure	4	Flood plains	Yes	2,4
	Rauville	4	Depressions,oxbows	Yes	2,3,4
	Sioux	2	Rises	No	—

Hydric Soil List - All Components–ND035-Grand Forks County, North Dakota					
Map symbol and map unit name	**Component/Local Phase**	**Comp. pct.**	**Landform**	**Hydric status**	**Hydric criteria met (code)**
I159A: Wyndmere-Tiffany fine sandy loams, 0 to 2 percent slopes	Wyndmere	40	Flats	No	—
	Tiffany	30	Depressions	Yes	2
	Mantador	10	Flats	No	—
	Tiffany-Stratified substratum	10	Deltas	Yes	2
	Wyndmere-Slightly saline	10	Flats	No	—
I162A: Walsh loam, 0 to 2 percent slopes	Walsh	85	Flats	No	—
	Tiffany	7	Depressions	Yes	2
	Vang	5	Flats	No	—
	Inkster	3	Beaches	No	—
I163A: Inkster sandy loam, 0 to 2 percent slopes	Inkster	85	Beaches	No	—
	Tiffany	6	Depressions	Yes	2
	Divide	5	Beaches	No	—
	Sioux	4	Beaches	No	—
I201A: Glyndon silt loam, 0 to 2 percent slopes	Glyndon	80	Flats	No	—
	Tiffany	5	Depressions	Yes	2
	Borup	5	Depressions	Yes	2
	Gardena	4	Flats	No	—
	Glyndon-Moderately saline	3	Flats	No	—
	Perella	3	Depressions	Yes	2
I202A: Gardena silt loam, 0 to 2 percent slopes	Gardena	75	Flats	No	—
	Glyndon-Slightly saline, stratified substratum	10	Deltas	No	—
	Delamere-Stratified substratum	5	Deltas	No	—
	Tiffany-Stratified substratum	5	Deltas	Yes	2
	Eckman	5	Flats	No	—
I213B: Embden fine sandy loam, 2 to 6 percent slopes	Embden	65	Flats	No	—
	Egeland	10	Flats	No	—
	Maddock	10	Flats	No	—
	Hecla-Nearly level	5	Flats	No	—

Hydric Soil List - All Components–ND035-Grand Forks County, North Dakota					
Map symbol and map unit name	**Component/Local Phase**	**Comp. pct.**	**Landform**	**Hydric status**	**Hydric criteria met (code)**
	Delamere-Stratified substratum	5	Deltas	No	—
	Tiffany-Stratified substratum	5	Deltas	Yes	2
I270A: Foldahl fine sandy loam, 0 to 2 percent slopes	Foldahl	75	Flats	No	—
	Towner	10	Flats	No	—
	Kratka	10	Depressions	Yes	2,3
	Gilby	3	Flats	No	—
	Garborg-Stratified substratum	2	Deltas	No	—
I308A: Tiffany loam, 0 to 1 percent slopes	Tiffany	72	Depressions,depressions	Yes	2,3
	Wyndmere	10	Flats	No	—
	Arveson	10	Flats,depressions	Yes	2
	Delamere	5	Flats	No	—
	Hamar	2	Swales,depressions	Yes	2,3
	Venlo	1	Depressions,depressions	Yes	2,3
I309A: Arveson loam, 0 to 1 percent slopes	Arveson	80	Depressions	Yes	2
	Wyndmere	8	Flats	No	—
	Tiffany	5	Depressions	Yes	2
	Stirum	5	Depressions	Yes	2,3
	Arveson-Frequently ponded	2	Depressions	Yes	2,3
I312A: Wyndmere fine sandy loam, 0 to 2 percent slopes	Wyndmere	75	Flats	No	—
	Mantador-Slightly saline	10	Flats	No	—
	Delamere	8	Flats	No	—
	Tiffany	7	Depressions	Yes	2
I318A: Borup silt loam, 0 to 1 percent slopes	Borup	80	Depressions	Yes	2
	Glyndon	8	Flats	No	—
	Tiffany	6	Depressions	Yes	2
	Borup-Frequently ponded	3	Depressions	Yes	2,3
	Borup-Moderately saline	3	Depressions	Yes	2
I365B: Arvilla sandy loam, 0 to 6 percent slopes	Arvilla	84	Beaches	No	—
	Fordville	6	Beaches	No	—

Hydric Soil List - All Components–ND035-Grand Forks County, North Dakota					
Map symbol and map unit name	**Component/Local Phase**	**Comp. pct.**	**Landform**	**Hydric status**	**Hydric criteria met (code)**
	Embden	3	Flats	No	—
	Divide	3	Beaches	No	—
	Hecla	2	Beaches	No	—
	Sioux	2	Beaches	No	—
I370A: Rauville silty clay loam, 0 to 1 percent slopes, frequently flooded	Rauville	70	Depressions,oxbows	Yes	2,3,4
	Lamoure	10	Flood plains	Yes	2
	LaDelle	5	Flood plains,terraces	No	—
	Marysland	5	Flats	Yes	2
	Water	5	Depressions	—	—
	Lowe-Moderately saline	3	Flood plains	Yes	2
	Fluvaquents-Channeled, frequently flooded	2	Swales on flood plains	Yes	2,3,4
I422D: Sioux loam, 2 to 15 percent slopes	Sioux	80	Beaches	No	—
	Arvilla	5	Beach ridges	No	—
	Renshaw	5	Beach ridges	No	—
	Parnell	4	Depressions	Yes	2,3
	Coe	4	Beach ridges	No	—
	Vang	2	Beaches	No	—
I481B: Hecla-Maddock fine sandy loams, 2 to 6 percent slopes	Hecla	46	Flats	No	—
	Maddock	32	Flats	No	—
	Hecla-Nearly level	14	Flats	No	—
	Embden	5	Flats	No	—
	Towner	3	Flats	No	—
I535A: Marysland loam, 0 to 1 percent slopes	Marysland	70	Flats	Yes	2
	Lowe	10	Flood plains	Yes	2
	Marysland-Moderately saline	10	Flats	Yes	2
	Fordville	5	Flats	No	—
	Divide	5	Depressions	No	—
I575E: Maddock sandy loam, 9 to 25 percent slopes	Maddock	85	Beach ridges	No	—
	Serden	10	Dunes	No	—
	Hecla	5	Beaches	No	—

Hydric Soil List - All Components–ND035-Grand Forks County, North Dakota					
Map symbol and map unit name	**Component/Local Phase**	**Comp. pct.**	**Landform**	**Hydric status**	**Hydric criteria met (code)**
I594A: LaDelle silt loam, 0 to 2 percent slopes, occasionally flooded	LaDelle	90	Stream terraces	No	—
	Fairdale	5	Flood plains	No	—
	Lamoure	3	Flood plains	Yes	2,4
	Rauville	2	Flood plains	Yes	2,3,4
I657B: Hecla fine sandy loam, 2 to 6 percent slopes	Hecla	85	Flats	No	—
	Garborg	5	Flats	No	—
	Hamar	5	Depressions	Yes	2
	Maddock	5	Flats	No	—
I906F: Orthents-Aquents-Urban Land, highway complex, 0 to 35 percent slopes	Orthents	30	—	No	—
	Aquents	25	—	Yes	2,3
	Orthents	25	—	No	—
	Urban land-Highway	20	—	—	—
IGp: Pits, gravel and sand	Pits-Gravel and sand	85	Beach plains,beach ridges	No	—
	Udipsamments	5	Beach ridges	No	—
	Radium	2	Beach ridges	No	—
	Sioux	2	Beach ridges	No	—
	Maddock	2	Beach ridges on lake plains	No	—
	Sandberg	2	Beach ridges	No	—
	Renshaw	1	Beach ridges	No	—
	Water-Intermittent	1	Depressions	—	—

Data Source Information

Soil Survey Area: Grand Forks County, North Dakota
Survey Area Data: Version 25, Sep 8, 2021

Appendix E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/8/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: #REF! Sampling Point/Wetland ID: W1-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: SW Qtr 32-152-54

Landform (hillslope, terrace, etc.): depression Local Relief (concave, convex, none): concave Slope %: 0-3%

Subregion (LRR): F Lat: 47.93758541 Long: -97.59945511 Datum:

Soil Map Unit Name: Wyndmere-Tiffany fine sandy loams, 0-2 percent slopes and Embden FSL, 2-6 % slopes NWI Classification: PABFx

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil Yes ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**	
Hydric Soil Present?	**Yes**	**X**	**No**	
Wetland Hydrology Present?	**Yes**	**X**	**No**	

Is the Sampled Area within a Wetland? **Yes X No**

If yes, NWI field label: PEM1Fx

Remarks: **Severe Drought Rating. It is a fringe wetland surrounding OW1. OW1 is a borrow pit with aquatic bed veg. in the shallow (perimeter) water. NWI classified the borrow pit as PABFx.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 5' diam)			
1.	Carex praegracilis(Clustered Field Sedge)	100%	Yes	FACW
2.	Phalaris arundinacea(Reed Canary Grass)	10%	No	FACW
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
		110%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
		100%	= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **1** (A)

Total Number of Dominant Species across all Strata: **1** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0%	x 1	0
FACW species	110%	x 2	2.2
FAC species	0%	x 3	0
FACU species	0%	x 4	0
UPL species		x 5	
Column Totals:	1.1 (A)		2.2 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation — meets

2 - Dominance Test is > 50% — Meets

3 - Prevalence Index is ≤ 3.0 * — Meets

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W1-w

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*	Loc**	Texture	Remarks
0 - 9	10YR 2 / 1	95%	7.5YR 4 / 6	5%	C	M	Loam	Redox also on Pore Linings.
9 - 15	10YR 6 / 1	87%	7.5YR 4 / 6	10%	C	M		
-			5YR 5 / 8	3%	C	PL		
-								
-								
-								
-								
-								

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

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

	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**	X	Depleted Matrix (F3)		Reduced Vertic (F18)
X	Depleted Below Dark Surface (A11)	X	Redox Dark Surface (F6)		Red Parent Material (TF2)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present,
					unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks: The borrow area apparently has topsoil backfill

HYDROLOGY

Created? Yes Ditch drains only upland? _____ Ditch constructed in wetland? No

Wetland Hydrology Indicators: Wetland extends beyond project boundary? No

Primary Indicators (minimum of one required: check all that apply)			Secondary Indicators (minimum of two required)
Surface Water (A1)		Salt Crust (B11)	Surface Soil Cracks (B6)
High Water Table (A2)	X	Aquatic Invertebrates (B13)	Sparsely Vegetated Concave Surface (B8)
Saturation (A3)		Hydrogen Sulfide Odor (C1)	Drainage Patterns (B10)
Water Marks (B1)		Dry-Season Water Table (C2)	Oxidized Rhizospheres on Living Roots (C3)
Sediment Deposits (B2)	X	Oxidized Rhizospheres on Living Roots (C3)	**(where tilled)**
Drift Deposits (B3)		**(where not tilled)**	Crayfish Burrows (C8)
Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)	Saturation Visible on Aerial Imagery (C9)
Iron Deposits (B5)		Thin Muck Surface (C7)	X Geomorphic Position (D2)
Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)	X FAC-Neutral Test (D5)
Water Stained Leaves (B9)		USGS topog map symbol	Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes	No	X	Depth (inches):	
Water Table Present?	Yes	No	X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes	No	X	Depth (inches):	

Wetland Hydrology Present? **Yes** X **No** _____

Wetland type: Fringe (Ditch, depression, slope, fringe, riverine) Photo direction? W

Remarks: Wetland ring around OW excavated pond. No USGS Indicator.

Appendix E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/8/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: #REF! Sampling Point/Wetland ID: W1-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: SW Qtr 32-152-54

Landform (hillslope, terrace, etc.): Hillslope Local Relief (concave, convex, none): convex Slope %: 3-6%

Subregion (LRR): F Lat: 47.93761761 Long: -97.59947084 Datum: NAD 83

Soil Map Unit Name: Wyndmere-Tiffany fine sandy loams, 0-2 percent slopes and Embden FSL, 2-6 % slopes NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area within a Wetland?** **Yes**		**No**	**X**
Hydric Soil Present?	**Yes**		**No**	**X**	
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:**

Remarks: **Severe Drought Rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 5' diam)			
1. Poa pratensis(Kentucky Blue Grass)	40%	Yes	UPL
2. Bromus inermis	20%	No	UPL
3. Medicago sativa	50%	Yes	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	110%	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
	100%	= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **0** (A)

Total Number of Dominant Species across all Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (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	0%	x 4	0
UPL species		x 5	
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation	
2 - Dominance Test is > 50%	
3 - Prevalence Index is ≤ 3.0 *	#DIV/0!
4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).	
Problematic Hydrophytic Vegetation* (Explain)	

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W1-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 7	10YR 2 / 1	100%					Loam	
7 - 16	10YR 4 / 4	100%					Loam	
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks: Apparently back-filled topsoil on excavation.

HYDROLOGY

Created? ___ Ditch drains only upland? ___ Ditch constructed in wetland? ___

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? ___

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)

USGS topog map symbol ___

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 X Depth (inches): _____

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

Saturation Present? Yes ___ No X Depth (inches): _____

(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: ___ (Ditch, depression, slope, fringe, riverine) Photo direction? ___

Remarks: Excavated borrow pit

Appendix E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/8/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: #REF! Sampling Point/Wetland ID: W2-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: SW Qtr 32-152-54

Landform (hillslope, terrace, etc.): slope Local Relief (concave, convex, none): none Slope %: 0-3%

Subregion (LRR): F Lat: 47.9384064 Long: -97.59638764 Datum: NAD 83

Soil Map Unit Name: Embden fine sandy loam, 2-6 percent slopes NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology Yes 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**	**X**	**No**		
Hydric Soil Present?	**Yes**	**X**	**No**	**Is the Sampled Area within a Wetland?**	**Yes X No**
Wetland Hydrology Present?	**Yes**	**X**	**No**	**If yes, NWI field label:** PEM1A	

Remarks: **Not inventoried on NWI map. Severe Drought Rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)				
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum (Plot size:)				
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum (Plot size: 5' diam)				
1.	Juncus arcticus(Arctic Rush)	70%	Yes	FACW
2.	Poa pratensis(Kentucky Blue Grass)	15%	No	FACU
3.	Solidago gigantea(Late Goldenrod)	2%	No	FAC
4.	Calamagrostis stricta(Slim-Stem Reed Grass)	5%	No	FACW
5.	Phalaris arundinacea(Reed Canary Grass)	1%	No	FACW
6.	Prickly Lettuce(Lactuca serriola)	2%	No	FAC
7.				
8.				
9.				
10.				
		100%	= Total Cover	
Woody Vine Stratum (Plot size:)				
1.				
2.				
		100%	= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **1** (A)

Total Number of Dominant Species across all Strata: **1** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0%	x 1	0
FACW species	76%	x 2	1.52
FAC species	2%	x 3	0.06
FACU species	22%	x 4	0.88
UPL species		x 5	
Column Totals:	1 (A)		2.46 (B)
Prevalence Index = B/A =			2.46

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation — Meets

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks: Less than 1 % of a vetch and *Symphoricarpos* were noted.

SOIL

Sampling Point/Wetland ID: W2-w

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 6	10YR 2 / 1	100%					Loam	
6 - 12	10YR 7 / 1	75%	7.5YR 4 / 6	25%	C	M	Loam	
-								
-								
-								
-								
-								
-								

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

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

	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**	X	Depleted Matrix (F3)		Reduced Vertic (F18)
X	Depleted Below Dark Surface (A11)		Redox Dark Surface (F6)		Red Parent Material (TF2)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** X **No**

Remarks:

HYDROLOG\

Created? Uncertain Ditch drains only upland? Ditch constructed in wetland? No

Wetland Hydrology Indicators: Wetland extends beyond project boundary? No

Primary Indicators (minimum of one required: check all that apply)				Secondary Indicators (minimum of two required)	
	Surface Water (A1)		Salt Crust (B11)		Surface Soil Cracks (B6)
	High Water Table (A2)		Aquatic Invertebrates (B13)		Sparsely Vegetated Concave Surface (B8)
	Saturation (A3)		Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
	Water Marks (B1)		Dry-Season Water Table (C2)		Oxidized Rhizospheres on Living Roots (C3)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)		**(where tilled)**
	Drift Deposits (B3)		**(where not tilled)**		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Thin Muck Surface (C7)	X	Geomorphic Position (D2) Concave
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)	X	FAC-Neutral Test (D5)
	Water Stained Leaves (B9)		USGS topog map symbol		Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes No X Depth (inches):

Water Table Present? Yes No X Depth (inches):

Saturation Present? Yes No X Depth (inches):

(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No**

Wetland type: Slope (Ditch, depression, slope, fringe, riverine) Photo direction? W

Remarks: No USGS Indicator. Noted ruts and old Canada bluejoint residue below delin.

Appendix E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/8/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: #REF! Sampling Point/Wetland ID: W2-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: SW Qtr 32-152-54

Landform (hillslope, terrace, etc.): slope Local Relief (concave, convex, none): concave Slope %: 3-6%

Subregion (LRR): F Lat: 47.9384397 Long: -97.59651322 Datum: NAD 83

Soil Map Unit Name: Embden fine sandy loam, 2-6 percent slopes NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.)

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area within a Wetland?** **Yes**		**No**	**X**
Hydric Soil Present?	**Yes**	**X**	**No**		**If yes, NWI field label:**
Wetland Hydrology Present?	**Yes**		**No**	**X**	

Remarks: **Severe Drought Rating**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 5' diam)			
1.	Poa pratensis(Kentucky Blue Grass)	60%	Yes	FACU
2.	Phalaris arundinacea(Reed Canary Grass)	40%	Yes	FACW
3.	Solidago gigantea(Late Goldenrod)	3%	No	FAC
4.				
5.				
6.				
7.				
8.				
9.				
10.				
		101%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
		100%	= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **1** (A)

Total Number of Dominant Species across all Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B) 50

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	0%	x 4	0
UPL species		x 5	
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

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

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks: Seed Heads very sparse

SOIL

Sampling Point/Wetland ID: W2-upl

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*	Loc**	Texture	Remarks
0 - 6	10YR 2 / 1	100%				M	Loam	
6 - 12	10YR 7 / 2	60%	7.5YR 5 / 6	20%		M	Loam	
-	10YR 6 / 1	20%						
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

**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)**
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky 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)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Created? Yes ___ Ditch drains only upland? ___ Ditch constructed in wetland? ___

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? ___

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)

___ USGS topog map symbol

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)
- X Geomorphic Position (D2) Concave
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? Yes ___ No X Depth (inches): ___

(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** x

Wetland type: ___ (Ditch, depression, slope, fringe, riverine) Photo direction? W

Remarks:

Appendix E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/8/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: #REF! Sampling Point/Wetland ID: W3-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: W Half 32-152-54

Landform (hillslope, terrace, etc.): slope Local Relief (concave, convex, none): concave Slope %: 0-3%

Subregion (LRR): F Lat: 47.93956537 Long: -97.59656927 Datum: NAD 83

Soil Map Unit Name: Wyndmere-Tiffany fine sandy loams, 0-2 percent slopes and Embden FSL, 2-6 % slopes NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology Yes 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**	**X**	**No**	
Hydric Soil Present?	**Yes**	**X**	**No**	
Wetland Hydrology Present?	**Yes**	**X**	**No**	

Is the Sampled Area within a Wetland? **Yes X No**

If yes, NWI field label: PEM1Ax

Remarks: **Not inventoried on NWI map. Severe Drought Rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 2' x 8')			
1.	Phalaris arundinacea(Reed Canary Grass)	100%	Yes	FACW
2.	Poa pratensis(Kentucky Blue Grass)	10%	No	FACU
3.	Bromus	10%	No	UPL
4.				
5.				
6.				
7.				
8.				
9.				
10.				
			= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
		110%	= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **0** (A)

Total Number of Dominant Species across all Strata: **0** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (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	0%	x 4	0
UPL species		x 5	
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation — meets

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W3-w

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*	Loc**	Texture	Remarks
0 - 15	10YR 2 / 1	95%	7.5YR 4 / 6	5%	c	M	Loam	
15 - 21	10YR 5 / 2	95%	7.5YR 4 / 6	5%	C	M	Loam	
-								
-								
-								
-								
-								
-								

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

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

	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**		Depleted Matrix (F3)		Reduced Vertic (F18)
	Depleted Below Dark Surface (A11)	X	Redox Dark Surface (F6)		Red Parent Material (TF2)
X	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** X **No**

Remarks: Ditch Bottom

HYDROLOGY

Created? Yes Ditch drains only upland? unknown Ditch constructed in wetland? No

Wetland Hydrology Indicators: Wetland extends beyond project boundary? No

Primary Indicators (minimum of one required: check all that apply)			Secondary Indicators (minimum of two required)	
	Surface Water (A1)		Salt Crust (B11)		Surface Soil Cracks (B6)
	High Water Table (A2)		Aquatic Invertebrates (B13)		Sparsely Vegetated Concave Surface (B8)
	Saturation (A3)		Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
	Water Marks (B1)		Dry-Season Water Table (C2)		Oxidized Rhizospheres on Living Roots (C3)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)		**(where tilled)**
	Drift Deposits (B3)		**(where not tilled)**		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Thin Muck Surface (C7)	X	Geomorphic Position (D2) Concave
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)	X	FAC-Neutral Test (D5)
	Water Stained Leaves (B9)		USGS topog map symbol		Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):		
Water Table Present?	Yes	No X	Depth (inches):		
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):		**Wetland Hydrology Present?** **Yes** X **No**

Wetland type: Ditch (Ditch, depression, slope, fringe, riverine) Photo direction? NW

Remarks: The ditch extends to cropland above the project area. No USGS Indicator.

Appendix E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/8/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: #REF! Sampling Point/Wetland ID: W3-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: 32-152-54

Landform (hillslope, terrace, etc.): Flat Local Relief (concave, convex, none): concave Slope %: 0-3%

Subregion (LRR): F Lat: 47.93954471 Long: -97.59661931 Datum: NAD 83

Soil Map Unit Name: Wyndmere-Tiffany fine sandy loams, 0-2 percent slopes and Embden FSL, 2-6 % slopes NWI Classification: PABFx

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** **X**
Hydric Soil Present?	**Yes**		**No**	**X**	
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:**

Remarks: **Severe Drought Rating**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 5' diam)			
1.	Bromus Inermus	100%	Yes	UPL
2.	Phalaris arundinacea(Reed Canary Grass)	10%	No	FACW
3.	Poa pratensis(Kentucky Blue Grass)	5%	No	FACU
4.				
5.				
6.				
7.				
8.				
9.				
10.				
		115%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **0** (A)

Total Number of Dominant Species across all Strata: **1** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 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	5%	x 4	0.2
UPL species		x 5	
Column Totals:	0.05 (A)		0.2 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W3-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 32	10YR 2 / 1	100%					FSL	
32 - 36	10YR 3 / 2	100%					FSL	
36 - 40	10YR 3 / 3	100%					FSL	
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Created? ___ Ditch drains only upland? ___ Ditch constructed in wetland? ___

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? ___

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)
- ___ USGS topog map symbol

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 X Depth (inches): _____

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

Saturation Present? Yes ___ No X Depth (inches): _____

(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: _____ (Ditch, depression, slope, fringe, riverine) Photo direction? _____

Remarks:

Appendix E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/8/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: #REF! Sampling Point/Wetland ID: W4-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: W. Half 32-152-54

Landform (hillslope, terrace, etc.): Flat Local Relief (concave, convex, none): level Slope %: 0-3%

Subregion (LRR): F Lat: 47.93904814 Long: -97.59370052 Datum: NAD 83

Soil Map Unit Name: Embden FSL, 2-6 % slopes and Wyndmere-Tiffany fine sandy loams, 0-2 percent slopes NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil Yes ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology Yes 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**	**X**	**No**	
Hydric Soil Present?	**Yes**	**X**	**No**	
Wetland Hydrology Present?	**Yes**	**X**	**No**	

Is the Sampled Area within a Wetland? **Yes X No**

If yes, NWI field label: PEM1Ax

Remarks: **Not inventoried on NWI map. Severe Drought Rating**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Phalaris arundinacea(Reed Canary Grass)	100%	Yes	FACW
2. Poa pratensis(Kentucky Blue Grass)	15%	No	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	115%	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): 1 (A)

Total Number of Dominant Species across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

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	0%	x 4	0
UPL species	0	x 5	0
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation	meets
2 - Dominance Test is > 50%	Meets
3 - Prevalence Index is ≤ 3.0 *	#DIV/0!
4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).	
Problematic Hydrophytic Vegetation* (Explain)	

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W4-w

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*	Loc**	Texture	Remarks
0 - 8	10YR 2 / 1	95%	7.5YR 4 / 6	5%	C	M	FSL	
8 - 14	10YR 5 / 1	80%	7.5YR 5 / 6	20%	C	M	Loam	
-								
-								
-								
-								
-								
-								

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

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

	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**	X	Depleted Matrix (F3)		Reduced Vertic (F18)
X	Depleted Below Dark Surface (A11)	X	Redox Dark Surface (F6)		Red Parent Material (TF2)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present,
					unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

HYDROLOGY

Created? Yes _____ Ditch drains only upland? _____ Ditch constructed in wetland? No _____

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? No _____

Primary Indicators (minimum of one required: check all that apply)			Secondary Indicators (minimum of two required)
Surface Water (A1)		Salt Crust (B11)	Surface Soil Cracks (B6)
High Water Table (A2)		Aquatic Invertebrates (B13)	Sparsely Vegetated Concave Surface (B8)
Saturation (A3)		Hydrogen Sulfide Odor (C1)	Drainage Patterns (B10)
Water Marks (B1)		Dry-Season Water Table (C2)	Oxidized Rhizospheres on Living Roots (C3)
Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)	**(where tilled)**
Drift Deposits (B3)		**(where not tilled)**	Crayfish Burrows (C8)
X Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)	Saturation Visible on Aerial Imagery (C9)
Iron Deposits (B5)		Thin Muck Surface (C7)	X Geomorphic Position (D2)
Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)	X FAC-Neutral Test (D5)
Water Stained Leaves (B9)		USGS topog map symbol	Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):		
Water Table Present?	Yes	No X	Depth (inches):		
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):		**Wetland Hydrology Present?** **Yes** X **No**

Wetland type: slope (Ditch, depression, slope, fringe, riverine) Photo direction? NE

Remarks: Wetland is in emergency spillway. There is a drain structure by the berm trail across emergency spillway. Hydrology sources are probably surface plus ground water. No USGS Indicator.

Appendix E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/8/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: #REF! Sampling Point/Wetland ID: W4-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: 32-152-54

Landform (hillslope, terrace, etc.): Flat Local Relief (concave, convex, none): none Slope %: 0-3%

Subregion (LRR): F Lat: 47.93906938 Long: -97.59373809 Datum: NAD 83

Soil Map Unit Name: Embden FSL, 2-6 % slopes and Wyndmere-Tiffany fine sandy loams, 0-2 percent slopes NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil Yes ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** **X**
Hydric Soil Present?	**Yes**		**No**	**X**	
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:**

Remarks: **Severe Drought Rating**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Poa pratensis(Kentucky Blue Grass)	75%	Yes	FACU
2. Bromus inermis	10%	No	UPL
3. Phalaris arundinacea(Reed Canary Grass)	15%	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	100%	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
	0%	= Total Cover	

% Bare Ground in Herb Stratum

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **1** (A)

Total Number of Dominant Species across all Strata: **1** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

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	0%	x 4	0
UPL species		x 5	
Column Totals:	0 (A)		0 (B)
Prevalence Index = B/A =			#DIV/0!

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation
2 - Dominance Test is > 50%
3 - Prevalence Index is ≤ 3.0 * #DIV/0!
4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).
Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W4-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 8	10YR 2 / 1	100%					Loam	
8 - 16	10YR 5 / 6	80%	7.5YR 4 / 6	5%	C	M	Loam	
-	10YR 5 / 1	15%						
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

**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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Created? Yes ___ Ditch drains only upland? ___ Ditch constructed in wetland? ___

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? ___

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)
- X Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) **(where not tilled)**
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

___ USGS topog map symbol

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)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes	___	No	X	Depth (inches): ___
Water Table Present?	Yes	___	No	X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: ___ (Ditch, depression, slope, fringe, riverine) Photo direction? ___

Remarks:

Appendix E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/8/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: #REF! Sampling Point/Wetland ID: W5-W

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: 32-152-54

Landform (hillslope, terrace, etc.): Ditch Local Relief (concave, convex, none): concave Slope %: 0-3%

Subregion (LRR): F Lat: 47.93958392 Long: -97.5933489 Datum: NAD 83

Soil Map Unit Name: Wyndmere-Tiffany fine sandy loams, 0-2 percent slopes NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil Yes ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes** **X** **No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1Ax

Remarks: **Not inventoried on NWI map. Severe Drought rating. This is a shallow ditch in emergency spillway.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 5' radius)			
1.	Phalaris arundinacea(Reed Canary Grass)	110%	Yes	FACW
2.	Poa pratensis(Kentucky Blue Grass)	15%	No	FACU
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
		125%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
		125%	= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **1** (A)

Total Number of Dominant Species across all Strata: **1** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:
OBL species	0%	x 1	0
FACW species	110%	x 2	2.2
FAC species	0%	x 3	0
FACU species	15%	x 4	0.6
UPL species		x 5	
Column Totals:	1.25 (A)		2.8 (B)
Prevalence Index = B/A =			2.24

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation — meets

2 - Dominance Test is > 50% — Meets

3 - Prevalence Index is ≤ 3.0 * — Meets

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W5-W

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*	Loc**	Texture	Remarks
0 - 11	10YR 2 / 1	20%	7.5YR 5 / 6	10%	C	M	SyL	
-	10YR 3 / 1	70%						
11 - 17	10YR 5 / 2	95%	7.5YR 5 / 6	5%	C	M	Loam	
-								
-								
-								
-								
-								

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

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

	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**		Depleted Matrix (F3)		Reduced Vertic (F18)
X	Depleted Below Dark Surface (A11)	X	Redox Dark Surface (F6)		Red Parent Material (TF2)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present,
					unless disturbed or problematic.

Indicators for Problematic Hydric Soils*:**

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** X **No**

Remarks:

HYDROLOGY

Created? Yes Ditch drains only upland? Ditch constructed in wetland? No

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? No

Primary Indicators (minimum of one required: check all that apply)			Secondary Indicators (minimum of two required)
	Surface Water (A1)		Salt Crust (B11)		Surface Soil Cracks (B6)
	High Water Table (A2)		Aquatic Invertebrates (B13)		Sparsely Vegetated Concave Surface (B8)
	Saturation (A3)		Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
	Water Marks (B1)		Dry-Season Water Table (C2)		Oxidized Rhizospheres on Living Roots (C3)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)		**(where tilled)**
	Drift Deposits (B3)		**(where not tilled)**		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Thin Muck Surface (C7)	X	Geomorphic Position (D2)
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)	X	FAC-Neutral Test (D5)
	Water Stained Leaves (B9)		USGS topog map symbol		Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):	
Water Table Present?	Yes		No	X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes		No	X	Depth (inches):	

Wetland Hydrology Present? **Yes** X **No**

Wetland type: Slope (Ditch, depression, slope, fringe, riverine) Photo direction? S

Remarks: No USGS Indicator.

Appendix E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/8/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: #REF! Sampling Point/Wetland ID: W5-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: 32-152-54

Landform (hillslope, terrace, etc.): Hillslope Local Relief (concave, convex, none): plane Slope %: >9%

Subregion (LRR): F Lat: 47.93957965 Long: -97.59330042 Datum: NAD 83

Soil Map Unit Name: Wyndmere-Tiffany fine sandy loams, 0-2 percent slopes NWI Classification: PABFx

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil Yes ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area**
Hydric Soil Present?	**Yes**		**No**	**X**	**within a Wetland?** **Yes** **No** **X**
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:** PEMFx

Remarks: **Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 5' Radius)			
1.	Poa pratensis(Kentucky Blue Grass)	70%	Yes	FACU
2.	Bromus Inermis	35%	Yes	UPL
3.	Cirsium arvense(Canadian Thistle)	t	No	FACU
4.	Euphorbia esula	1%	No	UPL
5.				
6.				
7.				
8.				
9.				
10.				
		105%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
		100%	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **0** (A)

Total Number of Dominant Species across all Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (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	70%	x 4	2.8
UPL species		x 5	
Column Totals:	0.7 (A)		2.8 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W5-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 10	10YR 2 / 1	100%					Loam	
10 - 16	10YR 3 / 3	100%					Loam	
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Created? ___ Ditch drains only upland? ___ Ditch constructed in wetland? ___

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? ___

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)
- ___ USGS topog map symbol

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	X	Depth (inches): ___
Water Table Present?	Yes	___	No	X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: ___ (Ditch, depression, slope, fringe, riverine) Photo direction? ___

Remarks:

Appendix E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/8/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W6-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: 32-152-54

Landform (hillslope, terrace, etc.): flat Local Relief (concave, convex, none): none Slope %: 0-3%

Subregion (LRR): F Lat: 47.94026286 Long: -97.59424474 Datum: NAD 83

Soil Map Unit Name: Wyndmere-Tiffany fine sandy loams, 0-2 percent slopes NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil Yes ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes X No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1Ax

Remarks: **Not inventoried on NWI map. Severe Drought Rating. Veg transistions are gradual and very meandering. The edge of rough, almost hummoky surface often matched wetland edge.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 5' radius)			
1.	Calamagrostis canadensis(Bluejoint)	90%	Yes	FACW
2.	Phalaris arundinacea(Reed Canary Grass)	20%	No	FACW
3.	Juncus arcticus(Arctic Rush)	5%	No	FACW
4.				
5.				
6.				
7.				
8.				
9.				
10.				
		115%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **1** (A)

Total Number of Dominant Species across all Strata: **1** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0%	x 1	0
FACW species	115%	x 2	2.3
FAC species	0%	x 3	0
FACU species	0%	x 4	0
UPL species		x 5	
Column Totals:	1.15 (A)		2.3 (B)
Prevalence Index = B/A =			2.00

Hydrophytic Vegetation Indicators:

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

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks: Few seed heads to aid plant ID. Other veg included equisetum, Typha, Phragnites, Apocynum

SOIL

Sampling Point/Wetland ID: W6-w

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*	Loc**	Texture	Remarks
0 - 8	10YR 2 / 1	95%	5YR 4 / 6	5%	C	M+PL	Loam	
8 - 14	10YR 6 / 1	80%	7.5YR 5 / 6	20%	C	M	Loam	
-								
-								
-								
-								
-								
-								

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

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

	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**	X	Depleted Matrix (F3)		Reduced Vertic (F18)
X	Depleted Below Dark Surface (A11)	X	Redox Dark Surface (F6)		Red Parent Material (TF2)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present,
					unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** X **No**

Remarks:

HYDROLOGY

Created? Yes Ditch drains only upland? Ditch constructed in wetland? No

Wetland Hydrology Indicators: Wetland extends beyond project boundary? No

Primary Indicators (minimum of one required: check all that apply)			Secondary Indicators (minimum of two required)
	Surface Water (A1)		Salt Crust (B11)		Surface Soil Cracks (B6)
	High Water Table (A2)		Aquatic Invertebrates (B13)		Sparsely Vegetated Concave Surface (B8)
	Saturation (A3)		Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
	Water Marks (B1)		Dry-Season Water Table (C2)		Oxidized Rhizospheres on Living Roots (C3)
	Sediment Deposits (B2)	X	Oxidized Rhizospheres on Living Roots (C3)		**(where tilled)**
	Drift Deposits (B3)		**(where not tilled)**		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Thin Muck Surface (C7)	X	Geomorphic Position (D2)
	Inundation Visible on Aerial Imagery (B7)	X	Other (Explain in Remarks)	X	FAC-Neutral Test (D5)
	Water Stained Leaves (B9)		USGS topog map symbol		Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):	
Water Table Present?	Yes		No	X	Depth (inches):	>16"
Saturation Present? (includes capillary fringe)	Yes	X	No		Depth (inches):	

Wetland Hydrology Present? **Yes** X **No**

Wetland type: Slope (Ditch, depression, slope, fringe, riverine) Photo direction? E

Remarks: No USGS Indicator. Scattered ruts.

Appendix E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/8/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W6-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: 32-152-54

Landform (hillslope, terrace, etc.): Hillslope Local Relief (concave, convex, none): none Slope %: 0-3%

Subregion (LRR): F Lat: 47.94029843 Long: -97.59431319 Datum: NAD 83

Soil Map Unit Name: Wyndmere-Tiffany fine sandy loams, 0-2 percent slopes NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil Yes ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes** **No** **X**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:**

Remarks: **Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 5' radius)			
1.	Poa pratensis(Kentucky Blue Grass)	60%	Yes	FACU
2.	Melilotus officinalis(Yellow Sweet-Clover)	20%	Yes	FACU
3.	Phalaris arundinacea(Reed Canary Grass)	10%	No	FACW
4.	Juncus arcticus(Arctic Rush)	5%	no	FACW
5.	Bromus Inermis	15%	NO	UPL
6.				
7.				
8.				
9.				
10.				
		110%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
		100%	= Total Cover	

% Bare Ground in Herb Stratum

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **0** (A)

Total Number of Dominant Species across all Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **0%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0%	x 1	0
FACW species	15%	x 2	0.3
FAC species	0%	x 3	0
FACU species	80%	x 4	3.2
UPL species		x 5	
Column Totals:	0.95 (A)		3.5 (B)

Prevalence Index = B/A = 3.68

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W6-upl

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*	Loc**	Texture	Remarks
0 - 14	10YR 2 / 1	100%					FSL	
14 - 20	10YR 5 / 3	80%	10YR 5 / 6	10%	C	M	Loam	
-	10YR 5 / 1	10%						
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Apparently back-filled topsoil on excavation.

HYDROLOGY

Created? ___ Ditch drains only upland? ___ Ditch constructed in wetland? ___

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? ___

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)

___ USGS topog map symbol

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	X	Depth (inches): ___
Water Table Present?	Yes	___	No	X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: ___ (Ditch, depression, slope, fringe, riverine) Photo direction? ___

Remarks:

Appendix E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/9/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W7-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: 32-152-54

Landform (hillslope, terrace, etc.): slope Local Relief (concave, convex, none): none Slope %: 0-3%

Subregion (LRR): F Lat: 47.94012421 Long: -97.59236947 Datum: NAD 83

Soil Map Unit Name: Wyndmere-Tiffany fine sandy loams, 0-2 percent slopes NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil Yes ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology Yes 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**	**X**	**No**	
Hydric Soil Present?	**Yes**	**X**	**No**	
Wetland Hydrology Present?	**Yes**	**X**	**No**	

Is the Sampled Area within a Wetland? **Yes X No**

If yes, NWI field label: PEM1Ax

Remarks: **Not inventoried on NWI map. Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 5' radius)			
1.	Juncus arcticus(Arctic Rush)	80%	Yes	FACW
2.	Asclepias sp.	2%	No	
3.	Apocynum cannabinum(Indian-Hemp)	2%	No	FAC
4.	Poa pratensis(Kentucky Blue Grass)	10%	No	FACU
5.	Calamagrostis canadensis(Bluejoint)	10%	No	FACW
6.				
7.				
8.				
9.				
10.				
		101%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
		100%	= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): 1 (A)

Total Number of Dominant Species across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

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	0%	x 4	0
UPL species		x 5	
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation	meets
2 - Dominance Test is > 50%	Meets
3 - Prevalence Index is ≤ 3.0 *	#DIV/0!
4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).	
Problematic Hydrophytic Vegetation* (Explain)	

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W7-w

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*	Loc**	Texture	Remarks
0 - 3	10YR 2 / 1	95%	7.5YR 4 / 6	5%	C	M	Loam	
3 - 9	10YR 6 / 1	75%	5YR 4 / 6	20%	C	M	Loam	
-			5YR 5 / 8	5%	C	M		
-								
-								
-								
-								
-								

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

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

	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**	X	Depleted Matrix (F3)		Reduced Vertic (F18)
X	Depleted Below Dark Surface (A11)		Redox Dark Surface (F6)		Red Parent Material (TF2)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present,
					unless disturbed or problematic.

Indicators for Problematic Hydric Soils*:**

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** X **No**

Remarks:

HYDROLOGY

Created? Yes Ditch drains only upland? Ditch constructed in wetland? No

Wetland Hydrology Indicators: Wetland extends beyond project boundary? No

Primary Indicators (minimum of one required: check all that apply)			Secondary Indicators (minimum of two required)	
	Surface Water (A1)		Salt Crust (B11)		Surface Soil Cracks (B6)
	High Water Table (A2)		Aquatic Invertebrates (B13)		Sparsely Vegetated Concave Surface (B8)
	Saturation (A3)		Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
	Water Marks (B1)		Dry-Season Water Table (C2)		Oxidized Rhizospheres on Living Roots (C3)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)		**(where tilled)**
	Drift Deposits (B3)		**(where not tilled)**		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Thin Muck Surface (C7)	X	Geomorphic Position (D2) Concave
	Inundation Visible on Aerial Imagery (B7)	X	Other (Explain in Remarks)	X	FAC-Neutral Test (D5)
	Water Stained Leaves (B9)		USGS topog map symbol		Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes No X Depth (inches):

Water Table Present? Yes No X Depth (inches):

Saturation Present? Yes No X Depth (inches):

(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No**

Wetland type: Slope (Ditch, depression, slope, fringe, riverine) Photo direction? E

Remarks: Deep Ruts. No USGS Indicator.

Appendix E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/9/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W7-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: NW QTR 32-152-54

Landform (hillslope, terrace, etc.): slope Local Relief (concave, convex, none): plane Slope %: >9%

Subregion (LRR): F Lat: 47.94008962 Long: -97.59236873 Datum: NAD 83

Soil Map Unit Name: Wyndmere-Tiffany fine sandy loams, 0-2 percent slopes NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.)

Are Vegetation No ; Soil Yes ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** **X**
Hydric Soil Present?	**Yes**		**No**	**X**	
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:**

Remarks: **Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 5' Radius)			
1.	Poa pratensis(Kentucky Blue Grass)	80%	Yes	FACU
2.	Bromus Inermis	15%	No	UPL
3.	Medicago sativa	15%	No	UPL
4.	Phalaris arundinacea(Reed Canary Grass)	3%	No	FACW
5.				
6.				
7.				
8.				
9.				
10.				
		113%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
		100%	= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **0** (A)

Total Number of Dominant Species across all Strata: **1** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B) 50

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	0%	x 4	0
UPL species		x 5	
Column Totals:	0 (A)		0 (B)
Prevalence Index = B/A =			#DIV/0!

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** X

Remarks: Seed Heads very sparse

SOIL

Sampling Point/Wetland ID: W7-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 6	10YR 2 / 1	100%					Loam	
6 - 15	10YR 5 / 4	100%					Loam	
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

HYDROLOGY

Created? _____ Ditch drains only upland? _____ Ditch constructed in wetland? _____

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? _____

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)

_____ USGS topog map symbol

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) Concave
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

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

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

Saturation Present? Yes ___ No X Depth (inches): _____

(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** x

Wetland type: _____ (Ditch, depression, slope, fringe, riverine) Photo direction? W

Remarks:

Appendix E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/9/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W8-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: N. Half 32-152-54

Landform (hillslope, terrace, etc.): slope Local Relief (concave, convex, none): concave Slope %: 0-3%

Subregion (LRR): F Lat: 47.94091164 Long: -97.59017689 Datum: NAD 83

Soil Map Unit Name: Arvilla fine sandy loam, 0 to 6 percent slopes NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil Yes ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology Yes 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes** **X** **No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1Ax

Remarks: **Not inventoried on NWI map. Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 2' x 8')			
1.	Juncus arcticus(Arctic Rush)	50%	Yes	OBL
2.	Calamagrostis canadensis(Bluejoint)	40%	Yes	FACW
3.	Phalaris arundinacea(Reed Canary Grass)	20%	No	FACW
4.	Spartina pectinata(Freshwater Cord Grass)	5%	No	FACW
5.	Poa pratensis(Kentucky Blue Grass)	5%	No	FACU
6.				
7.				
8.				
9.				
10.				
			= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
		110%	= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **2** (A)

Total Number of Dominant Species across all Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	50%	x 1	0.5
FACW species	65%	x 2	1.3
FAC species	0%	x 3	0
FACU species	5%	x 4	0.2
UPL species		x 5	
Column Totals:	1.2 (A)		2 (B)

Prevalence Index = B/A = 1.67

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation — meets

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W8-w

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*	Loc**	Texture	Remarks
0 - 8	10YR 2 / 1	95%	7.5YR 4 / 6	5%	c	M	Loam	
8 - 14	10YR 4 / 1	90%	7.5YR 4 / 6	10%	C	M	Loam	
-								
-								
-								
-								
-								
-								

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

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

	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**	X	Depleted Matrix (F3)		Reduced Vertic (F18)
X	Depleted Below Dark Surface (A11)	X	Redox Dark Surface (F6)		Red Parent Material (TF2)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present,
					unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** X **No**

Remarks:

HYDROLOGY

Created? Yes Ditch drains only upland? Ditch constructed in wetland? No

Wetland Hydrology Indicators: Wetland extends beyond project boundary? No

Primary Indicators (minimum of one required: check all that apply)			Secondary Indicators (minimum of two required)	
	Surface Water (A1)		Salt Crust (B11)		Surface Soil Cracks (B6)
	High Water Table (A2)		Aquatic Invertebrates (B13)		Sparsely Vegetated Concave Surface (B8)
	Saturation (A3)		Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
	Water Marks (B1)		Dry-Season Water Table (C2)		Oxidized Rhizospheres on Living Roots (C3)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)		**(where tilled)**
	Drift Deposits (B3)		**(where not tilled)**		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Thin Muck Surface (C7)	X	Geomorphic Position (D2) Concave
	Inundation Visible on Aerial Imagery (B7)	X	Other (Explain in Remarks)	X	FAC-Neutral Test (D5)
	Water Stained Leaves (B9)		USGS topog map symbol		Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes No X Depth (inches):

Water Table Present? Yes No X Depth (inches):

Saturation Present? Yes No X Depth (inches):

(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No**

Wetland type: Slope (Ditch, depression, slope, fringe, riverine) Photo direction? SW

Remarks: Very Moist. No USGS Indicator. Old ruts are evident.

Appendix E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/9/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W8-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: N. Half 32-152-54

Landform (hillslope, terrace, etc.): Slope Local Relief (concave, convex, none): none Slope %: >9%

Subregion (LRR): F Lat: 47.94095451 Long: -97.5901844 Datum: NAD 83

Soil Map Unit Name: Arvilla fine sandy loam, 0 to 6 percent slopes NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil Yes ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area within a Wetland?** **Yes**		**No**	**X**
Hydric Soil Present?	**Yes**		**No**	**X**	
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:**

Remarks: **Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 5' diam)			
1. Bromus Inermus	40%	Yes	UPL
2. Poa pratensis(Kentucky Blue Grass)	60%	Yes	FACU
3. Medicago sativa	5%	No	UPL
4. Phalaris arundinacea(Reed Canary Grass)	5%	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
	110%	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **0** (A)

Total Number of Dominant Species across all Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 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	60%	x 4	2.4
UPL species		x 5	
Column Totals:	0.6 (A)		2.4 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W8-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 16	10YR 2 / 1	100%					Loam	
16 - 25	10YR 3 / 3	100%					Loam	
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

HYDROLOGY

Created? _____ Ditch drains only upland? _____ Ditch constructed in wetland? _____

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? _____

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)
- _____ USGS topog map symbol

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 X	Depth (inches):	
Water Table Present?	Yes ___	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches):	

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: _____ (Ditch, depression, slope, fringe, riverine) Photo direction? _____

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/9/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W9-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: 32-152-54

Landform (hillslope, terrace, etc.): Slope Local Relief (concave, convex, none): none Slope %: 0-3%

Subregion (LRR): F Lat: 47.94013087 Long: -97.59039547 Datum: NAD 83

Soil Map Unit Name: Embden fine sandy loam, 2-6 percent slopes NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil Yes ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes X No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1Ax

Remarks: **Not inventoried on NWI map. Severe Drought rating. This wetland actually merged with Wetland 10.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 5' radius)			
1.	Juncus arcticus(Arctic Rush)	90%	Yes	FACW
2.	Calamagrostis canadensis(Bluejoint)	5%	No	FACW
3.	Phalaris arundinacea(Reed Canary Grass)	2%	No	FACW
4.	Spartina pectinata(Freshwater Cord Grass)	1%	No	FACW
5.				
6.				
7.				
8.				
9.				
10.				
		98%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): 1 (A)

Total Number of Dominant Species across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

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	0%	x 4	0
UPL species	0	x 5	0
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation	meets
2 - Dominance Test is > 50%	Meets
3 - Prevalence Index is ≤ 3.0 *	#DIV/0!
4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).	
Problematic Hydrophytic Vegetation* (Explain)	

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W9-w

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*	Loc**	Texture	Remarks
0 - 10	10YR 2 / 1	95%	5YR 5 / 6	5%	C	M	Loam	
10 - 16	10YR 5 / 1	80%	7.5YR 5 / 6	20%	C	M	Loam	
-								
-								
-								
-								
-								
-								

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

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

	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**		Depleted Matrix (F3)		Reduced Vertic (F18)
X	Depleted Below Dark Surface (A11)	X	Redox Dark Surface (F6)		Red Parent Material (TF2)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present,
					unless disturbed or problematic.

Indicators for Problematic Hydric Soils*:**

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

HYDROLOGY

Created? Yes _____ Ditch drains only upland? _____ Ditch constructed in wetland? No _____

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? No _____

Primary Indicators (minimum of one required: check all that apply)			Secondary Indicators (minimum of two required)
Surface Water (A1)		Salt Crust (B11)	Surface Soil Cracks (B6)
High Water Table (A2)		Aquatic Invertebrates (B13)	Sparsely Vegetated Concave Surface (B8)
Saturation (A3)		Hydrogen Sulfide Odor (C1)	Drainage Patterns (B10)
Water Marks (B1)		Dry-Season Water Table (C2)	Oxidized Rhizospheres on Living Roots (C3)
Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)	**(where tilled)**
Drift Deposits (B3)		**(where not tilled)**	Crayfish Burrows (C8)
Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)	Saturation Visible on Aerial Imagery (C9)
Iron Deposits (B5)		Thin Muck Surface (C7)	X Geomorphic Position (D2)
Inundation Visible on Aerial Imagery (B7)	X	Other (Explain in Remarks)	X FAC-Neutral Test (D5)
Water Stained Leaves (B9)		USGS topog map symbol	Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):		
Water Table Present?	Yes	No X	Depth (inches):		
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):		**Wetland Hydrology Present?** **Yes** X **No**

Wetland type: Slope (Ditch, depression, slope, fringe, riverine) Photo direction? WNW

Remarks: No USGS Indicator. Old ruts are evident

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/9/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W9-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: 32-152-54

Landform (hillslope, terrace, etc.): Slope Local Relief (concave, convex, none): plane Slope %: >9%

Subregion (LRR): F Lat: 47.9400904 Long: -97.59040318 Datum: NAD 83

Soil Map Unit Name: Embden fine sandy loam, 2-6 percent slopes NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil Yes ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** **X**
Hydric Soil Present?	**Yes**		**No**	**X**	
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:**

Remarks: **Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Poa pratensis(Kentucky Blue Grass)	60%	Yes	FACU
2. Bromus inermis	50%	Yes	UPL
3.			
4.			
5.			
6.)			
7.			
8.			
9.			
10.			
	110%	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
	0%	= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **1** (A)

Total Number of Dominant Species across all Strata: **1** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

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	0%	x 4	0
UPL species		x 5	
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W9-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 15	10YR 2 / 1	100%					Loam	
15 - 25	10YR 3 / 3	100%					Loam	
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Created? ___ Ditch drains only upland? ___ Ditch constructed in wetland? ___

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? ___

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)
- ___ USGS topog map symbol

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	X	Depth (inches): ___
Water Table Present?	Yes	___	No	X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: ___ (Ditch, depression, slope, fringe, riverine) Photo direction? ___

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/9/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W10-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: 32-152-54

Landform (hillslope, terrace, etc.): Hillslope Local Relief (concave, convex, none): none Slope %: 0-3%

Subregion (LRR): F Lat: 47.94015502 Long: -97.58919957 Datum: NAD 83

Soil Map Unit Name: Arvilla fine sandy loam, 0 to 6 percent slopes NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil Yes ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**	
Hydric Soil Present?	**Yes**	**X**	**No**	
Wetland Hydrology Present?	**Yes**	**X**	**No**	

Is the Sampled Area within a Wetland? **Yes X No**

If yes, NWI field label: PEM1Ax

Remarks: **Not inventoried on NWI map. Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 5' radius)			
1.	Phalaris arundinacea(Reed Canary Grass)	80%	Yes	FACW
2.	Poa pratensis(Kentucky Blue Grass)	15%	No	FACU
3.	Solidago gigantea(Late Goldenrod)	1%	No	FAC
4.	Equisetum sp.	3%	No	FAC
5.	Typha angustifolia(Narrow-Leaf Cat-Tail)	3%	No	OBL
6.	Alopecurus arundinaceus(Creeping Meadow-Foxtail)	20%	No	FACW
7.				
8.				
9.				
10.				
		122%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **1** (A)

Total Number of Dominant Species across all Strata: **1** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

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	0%	x 4	0
UPL species	0	x 5	0
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation	meets
2 - Dominance Test is > 50%	Meets
3 - Prevalence Index is ≤ 3.0 *	#DIV/0!
4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).	
Problematic Hydrophytic Vegetation* (Explain)	

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks: Assumed Equisetum was FAC or wetter.

SOIL

Sampling Point/Wetland ID: W10-w

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*	Loc**	Texture	Remarks
0 - 13	10YR 2 / 1	95%	5YR 5 / 8	5%	C	M+PL	Loam	
13 - 19	10YR 5 / 1	85%	7.5YR 5 / 6	15%	C	M	Loam	
-								
-								
-								
-								
-								
-								

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

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

	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**		Depleted Matrix (F3)		Reduced Vertic (F18)
	Depleted Below Dark Surface (A11)	X	Redox Dark Surface (F6)		Red Parent Material (TF2)
X	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present,
					unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

HYDROLOGY

Created? Yes Ditch drains only upland? _____ Ditch constructed in wetland? No

Wetland Hydrology Indicators: Wetland extends beyond project boundary? No

Primary Indicators (minimum of one required: check all that apply)			Secondary Indicators (minimum of two required)
	Surface Water (A1)		Salt Crust (B11)		Surface Soil Cracks (B6)
	High Water Table (A2)		Aquatic Invertebrates (B13)		Sparsely Vegetated Concave Surface (B8)
	Saturation (A3)		Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
	Water Marks (B1)		Dry-Season Water Table (C2)		Oxidized Rhizospheres on Living Roots (C3)
	Sediment Deposits (B2)	X	Oxidized Rhizospheres on Living Roots (C3)		**(where tilled)**
	Drift Deposits (B3)		**(where not tilled)**		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Thin Muck Surface (C7)	X	Geomorphic Position (D2)
	Inundation Visible on Aerial Imagery (B7)	X	Other (Explain in Remarks)	X	FAC-Neutral Test (D5)
	Water Stained Leaves (B9)		USGS topog map symbol		Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

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

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

Saturation Present? Yes _____ No X Depth (inches): _____

(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No** _____

Wetland type: Slope (Ditch, depression, slope, fringe, riverine) Photo direction? NW

Remarks: No USGA Indicator. Scattered Ruts are evident.

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/9/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W10-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: 32-152-54

Landform (hillslope, terrace, etc.): Slope Local Relief (concave, convex, none): Plane Slope %: >9%

Subregion (LRR): F Lat: 47.94010407 Long: -97.58923032 Datum: NAD 83

Soil Map Unit Name: Arvilla fine sandy loam, 0 to 6 percent slopes NWI Classification:

No Dry

Are Vegetation No ; Soil Yes ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** **X**
Hydric Soil Present?	**Yes**		**No**	**X**	
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:** PEMFx

Remarks: **Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 5' Radius)			
1.	Poa pratensis(Kentucky Blue Grass)	70%	Yes	FACU
2.	Bromus Inermis	10%	No	UPL
3.	Equisetum sp.	1%	No	
4.	Phalaris arundinacea(Reed Canary Grass)	20%	Yes	FACW
5.				
6.				
7.				
8.				
9.				
10.				
		105%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
		100%	= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **1** (A)

Total Number of Dominant Species across all Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0%	x 1	0
FACW species	20%	x 2	0.4
FAC species	0%	x 3	0
FACU species	70%	x 4	2.8
UPL species		x 5	
Column Totals:	0.9 (A)		3.2 (B)

Prevalence Index = B/A = 3.56

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W10-upl

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*	Loc**	Texture	Remarks
0 - 11	10YR 2 / 1	100%					Loam	
11 - 20	10YR 4 / 4	80%					Loam	
-	10YR 3 / 2	20%						
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Created? ___ Ditch drains only upland? ___ Ditch constructed in wetland? ___

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? ___

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)

___ USGS topog map symbol

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	X	Depth (inches): ___
Water Table Present?	Yes	___	No	X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: ___ (Ditch, depression, slope, fringe, riverine) Photo direction? ___

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/9/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W11-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: NE Qtr 32-152-54

Landform (hillslope, terrace, etc.): Hillslope Local Relief (concave, convex, none): convex Slope %: 0-3%

Subregion (LRR): F Lat: 47.94020009 Long: -97.58697908 Datum: NAD 83

Soil Map Unit Name: Maddock sandy loam, 9 to 25 percent slopes NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil Yes ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present?

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes** **X** **No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1A

Remarks: **Not inventoried on NWI map. Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 5' Radius)			
1.			
2. Phalaris arundinacea(Reed Canary Grass)	130%	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
= Total Cover			
Woody Vine Stratum (Plot size:)			
1.			
2.			
100% = Total Cover			
% Bare Ground in Herb Stratum 0%			

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **1** (A)

Total Number of Dominant Species across all Strata: **1** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0%	x 1	0
FACW species	130%	x 2	2.6
FAC species	0%	x 3	0
FACU species	0%	x 4	0
UPL species		x 5	
Column Totals:	1.3 (A)		2.6 (B)
Prevalence Index = B/A =			2.00

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation: meets

2 - Dominance Test is > 50%: Meets

3 - Prevalence Index is ≤ 3.0 *: Meets

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W11-w

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*	Loc**	Texture	Remarks
0 - 21	10YR 2 / 1	95%	7.5YR 4 / 6	5%	C	M	Loam	
21 - 30	10YR 4 / 2	95%	7.5YR 4 / 6	5%	C	M	LyS	
-								
-								
-								
-								
-								
-								

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

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

	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**		Depleted Matrix (F3)		Reduced Vertic (F18)
	Depleted Below Dark Surface (A11)	X	Redox Dark Surface (F6)		Red Parent Material (TF2)
X	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** X **No**

Remarks: Surface 0-5" is depositional.

HYDROLOGY

Created? Uncertain Ditch drains only upland? Ditch constructed in wetland? No

Wetland Hydrology Indicators: Wetland extends beyond project boundary? No

Primary Indicators (minimum of one required: check all that apply)			Secondary Indicators (minimum of two required)
	Surface Water (A1)		Salt Crust (B11)		Surface Soil Cracks (B6)
	High Water Table (A2)		Aquatic Invertebrates (B13)		Sparsely Vegetated Concave Surface (B8)
	Saturation (A3)		Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
	Water Marks (B1)		Dry-Season Water Table (C2)		Oxidized Rhizospheres on Living Roots (C3)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)		**(where tilled)**
	Drift Deposits (B3)		**(where not tilled)**		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Thin Muck Surface (C7)	X	Geomorphic Position (D2)
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)	X	FAC-Neutral Test (D5)
	Water Stained Leaves (B9)		USGS topog map symbol		Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes	No	X	Depth (inches):	
Water Table Present?	Yes	No	X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes	No	X	Depth (inches):	

Wetland Hydrology Present? **Yes** X **No**

Wetland type: Slope (Ditch, depression, slope, fringe, riverine) Photo direction? NE

Remarks: No USGS Indicator.

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/9/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W11-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: NE Qtr 32-152-54

Landform (hillslope, terrace, etc.): Local Relief (concave, convex, none): concave Slope %: 3-6%

Subregion (LRR): F Lat: 47.94016478 Long: -97.58702516 Datum: NAD 83

Soil Map Unit Name: Maddock sandy loam, 9 to 25 percent slopes NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology Yes 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**		**No**	**X**	**within a Wetland?** **Yes** **No** **X**
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:**

Remarks: **Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 5' Radius)			
1.	Phalaris arundinacea(Reed Canary Grass)	75%	Yes	FACW
2.	Bromus Inermis	35%	Yes	UPL
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
		110%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
		100%	= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **1** (A)

Total Number of Dominant Species across all Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **50%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0%	x 1	0
FACW species	75%	x 2	1.5
FAC species	0%	x 3	0
FACU species	0%	x 4	0
UPL species	35%	x 5	1.75
Column Totals:	1.1 (A)		3.25 (B)
Prevalence Index = B/A =			2.95

Hydrophytic Vegetation Indicators:

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

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W11-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 26	10YR 2 / 1	100%						
26 - 36	10YR 3 / 2	100%						
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Apparently back-filled topsoil on excavation.

HYDROLOGY

Created? ___ Ditch drains only upland? ___ Ditch constructed in wetland? ___

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? ___

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)
- ___ USGS topog map symbol

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 X Depth (inches): _____

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

Saturation Present? Yes ___ No X Depth (inches): _____

(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: _____ (Ditch, depression, slope, fringe, riverine) Photo direction? _____

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/9/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W12-W

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: SW Qtr 32-152-54

Landform (hillslope, terrace, etc.): Ditch Local Relief (concave, convex, none): concave Slope %: 0-3%

Subregion (LRR): F Lat: 47.93839886 Long: -97.59246996 Datum: NAD 83

Soil Map Unit Name: Velva fine sandy loam, 0 to 6 percent slopes NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil Yes ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil Yes ; or Hydrology Yes 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes** **X** **No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1A

Remarks: **Not inventoried on NWI map. Severe Drought rating. The wetland is in a drainage ditch or diversion channel at base of dam.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 4' x 10')			
1.	Phalaris arundinacea(Reed Canary Grass)	40%	Yes	FACW
2.	Typha sp.	40%	Yes	OBL
3.	Calamagrostis canadensis(Bluejoint)	5%	No	FACW
4.	Cirsium arvense(Canadian Thistle)	5%	No	FACU
5.				
6.				
7.				
8.				
9.				
10.				
		90%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
		100%	= Total Cover	

% Bare Ground in Herb Stratum 10%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **2** (A)

Total Number of Dominant Species across all Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	40%	x 1	0.4
FACW species	0%	x 2	0
FAC species	0%	x 3	0
FACU species	0%	x 4	0
UPL species		x 5	
Column Totals:	0.4 (A)		0.4 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation: meets

2 - Dominance Test is > 50%: Meets

3 - Prevalence Index is ≤ 3.0 *: Meets

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W12-W

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*	Loc**	Texture	Remarks
0 - 9	10YR 2 / 1	95%	7.5YR 4 / 6	5%	C	M	Loam	
9 - 15	10YR 6 / 1	85%	7.5YR 5 / 6	15%	C	M	Loam	Mixed with sandy loam.
-								
-								
-								
-								
-								
-								

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

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

	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**	X	Depleted Matrix (F3)		Reduced Vertic (F18)
X	Depleted Below Dark Surface (A11)	X	Redox Dark Surface (F6)		Red Parent Material (TF2)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present,
					unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

HYDROLOGY

Created? Yes _____ Ditch drains only upland? _____ Ditch constructed in wetland? No _____

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? No _____

Primary Indicators (minimum of one required: check all that apply)			Secondary Indicators (minimum of two required)	
	Surface Water (A1)		Salt Crust (B11)		Surface Soil Cracks (B6)
	High Water Table (A2)		Aquatic Invertebrates (B13)		Sparsely Vegetated Concave Surface (B8)
	Saturation (A3)		Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
	Water Marks (B1)		Dry-Season Water Table (C2)		Oxidized Rhizospheres on Living Roots (C3)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)		**(where tilled)**
	Drift Deposits (B3)		**(where not tilled)**		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Thin Muck Surface (C7)	X	Geomorphic Position (D2) Concave
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)	X	FAC-Neutral Test (D5)
	Water Stained Leaves (B9)		USGS topog map symbol		Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

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

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

Saturation Present? Yes _____ No X Depth (inches): _____

(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No** _____

Wetland type: Slope (Ditch, depression, slope, fringe, riverine) Photo direction? SSE

Remarks: No USGS Indicator.

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/9/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W12-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: 32-152-54

Landform (hillslope, terrace, etc.): slope Local Relief (concave, convex, none): Plane Slope %: >9%

Subregion (LRR): F Lat: 47.93839256 Long: -97.59250751 Datum: NAD 83

Soil Map Unit Name: Velva fine sandy loam, 0 to 6 percent slopes NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) dry

Are Vegetation No ; Soil Yes ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil Yes ; or Hydrology No 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**	**X**	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** **X**
Hydric Soil Present?	**Yes**		**No**	**X**	
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:**

Remarks: **Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size:)			
1.	Poa pratensis(Kentucky Blue Grass)	80%	Yes	FACU
2.	Bromus Inermis	20%	Yes	UPL
3.	Medicago sativa	1%	No	UPL
4.				
5.				
6.				
7.				
8.				
9.				
10.				
		101%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
		100%	= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **0** (A)

Total Number of Dominant Species across all Strata: **1** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B) 50

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	0%	x 4	0
UPL species		x 5	
Column Totals:	0 (A)		0 (B)
Prevalence Index = B/A =			#DIV/0!

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** X

Remarks: Seed Heads very sparse

SOIL

Sampling Point/Wetland ID: W12-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 11	10YR 2 / 1	100%					Loam	
11 - 20	10YR 4 / 3	100%					Loam	
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

HYDROLOGY

Created? _____ Ditch drains only upland? _____ Ditch constructed in wetland? _____

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? _____

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)
- ___ USGS topog map symbol

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 X	Depth (inches):	
Water Table Present?	Yes ___	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches):	

Wetland Hydrology Present? **Yes** ___ **No** x

Wetland type: _____ (Ditch, depression, slope, fringe, riverine) Photo direction? W

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/10/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W13-W

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: NW Qtr 6-151-54

Landform (hillslope, terrace, etc.): Local Relief (concave, convex, none): concave Slope %: 0-3%

Subregion (LRR): F Lat: 47.92961938 Long: -97.61442996 Datum: NAD 83

Soil Map Unit Name: Maddock Sandy Loam, 9 to 25% slopes I575E (listed 0 % hydric) NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes X No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1F

Remarks: **The wetland is in a swale/ravine. Not inventoried on NWI. Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 5' radius)			
1.	Carex sp.	80%	Yes	FAC
2.	Carex aquatilis(Leafy Tussock Sedge)	40%	Yes	OBL
3.	Anemone canadensis(Round-Leaf Thimbleweed)	1%	No	FACW
4.	Solidago gigantea(Late Goldenrod)	5%	No	FAC
5.	Unidentified grass	5%	No	
6.				
7.				
8.				
9.				
10.				
			= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
		125%	= Total Cover	

% Bare Ground in Herb Stratum

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **0** (A)

Total Number of Dominant Species across all Strata: **0** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	40%	x 1	0.4
FACW species	1%	x 2	0.02
FAC species	85%	x 3	2.55
FACU species	0%	x 4	0
UPL species		x 5	
Column Totals:	1.26 (A)		2.97 (B)
Prevalence Index = B/A =			2.36

Hydrophytic Vegetation Indicators:

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

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks: No spikes to key the species of the large Carex. Assumed it is FAC or wetter.

SOIL

Sampling Point/Wetland ID: W13-W

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 14	10YR 2 / 1	80%	7.5YR 4 / 6	5%	C	M		FSL Texture
-			10YR 7 / 1	15%	D	M		
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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)
- X Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Created? No Ditch drains only upland? ___ Ditch constructed in wetland? No

Wetland Hydrology Indicators: Wetland extends beyond project boundary? Yes

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

- ___ Surface Water (A1)
- X High Water Table (A2)
- X 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)
- X 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)

___ USGS topog map symbol

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)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):		
Water Table Present?	Yes X	No ___	Depth (inches):	8"	
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches):	0	**Wetland Hydrology Present?** **Yes** X **No** ___

Wetland type: slope (Ditch, depression, slope, fringe, riverine) Photo direction? N

Remarks: There is a head cut at the upper end of the wetland that is out of the survey area and does not appear to be very active. There is a gully downstream from the wetland. No USGS Indicator.

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/10/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W13-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: NW Qtr 6-151-54

Landform (hillslope, terrace, etc.): Hillslope Local Relief (concave, convex, none): convex Slope %: 3-6%

Subregion (LRR): F Lat: 47.92962224 Long: -97.61446186 Datum: NAD 83

Soil Map Unit Name: Maddock Sandy Loam, 9 to 25% slopes I575E (listed 0 % hydric) NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** **X**
Hydric Soil Present?	**Yes**	**X**	**No**		**If yes, NWI field label:**
Wetland Hydrology Present?	**Yes**		**No**	**X**	

Remarks: **Severe Drought rating. Headcuts above and below W13 may have slightly lowered the water table.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 5' diam)			
1. Bromus Inermis	100%	Yes	UPL
2. Urtica dioica(Stinging Nettle)	20%	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
		= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
	100%	= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **0** (A)

Total Number of Dominant Species across all Strata: **1** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0%	x 1	0
FACW species	0%	x 2	0
FAC species	20%	x 3	0.6
FACU species	0%	x 4	0
UPL species		x 5	
Column Totals:	0.2 (A)		0.6 (B)
Prevalence Index = B/A =			3.00

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W13-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 16	10YR 2 / 1	100%					SiL	
16 - 22	10YR 5 / 1	85%	7.5YR 4 / 6	15%	C	M	Loam	
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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)
- X Thick Dark Surface (A12)
- ___ Sandy Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Created? ___ Ditch drains only upland? ___ Ditch constructed in wetland? ___

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? ___

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)
- ___ USGS topog map symbol

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 X	Depth (inches):	
Water Table Present?	Yes ___	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches):	

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: ___ (Ditch, depression, slope, fringe, riverine) Photo direction? ___

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/10/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W14-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: NW Qtr 5-151-54

Landform (hillslope, terrace, etc.): Ditch Local Relief (concave, convex, none): concave Slope %: 0-3%

Subregion (LRR): F Lat: 47.93241458 Long: -97.59702619 Datum: NAD 83

Soil Map Unit Name: Barnes-Buse loams, 3 to 6 percent slopes NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation Yes ; Soil Yes ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes** **X** **No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1Ax

Remarks: **Not inventoried on NWI map. Severe Drought rating. Partially burned.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 5' Radius)			
1.	Alopecurus arundinaceus(Creeping Meadow-Foxtail)	90%	Yes	FACW
2.	Eleocharis acicularis(Needle Spike-Rush)	2%	No	OBL
3.	Phalaris arundinacea(Reed Canary Grass)	5%	No	FACW
4.				
5.				
6.				
7.				
8.				
9.				
10.				
		97%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 10%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **1** (A)

Total Number of Dominant Species across all Strata: **1** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	2%	x 1	0.02
FACW species	95%	x 2	1.9
FAC species	0%	x 3	0
FACU species	0%	x 4	0
UPL species		x 5	
Column Totals:	0.97 (A)		1.92 (B)

Prevalence Index = B/A = 1.98

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50% Meets

3 - Prevalence Index is ≤ 3.0 * Meets

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks: Partially burned. Cattails in field drain to the south.

SOIL

Sampling Point/Wetland ID: W14-w

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*	Loc**	Texture	Remarks
0 - 5	10YR 2 / 1	95%	5YR 4 / 6	5%	C	PL+M	Loam	
5 - 11	10YR 7 / 1	80%	10YR 7 / 8	20%	C	M	Loam	
-								
-								
-								
-								
-								
-								

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

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

	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**	X	Depleted Matrix (F3)		Reduced Vertic (F18)
X	Depleted Below Dark Surface (A11)	X	Redox Dark Surface (F6)		Red Parent Material (TF2)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present,
					unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

HYDROLOGY

Created? Yes _____ Ditch drains only upland? _____ Ditch constructed in wetland? No _____

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? No _____

Primary Indicators (minimum of one required: check all that apply)			Secondary Indicators (minimum of two required)
	Surface Water (A1)		Salt Crust (B11)		Surface Soil Cracks (B6)
	High Water Table (A2)		Aquatic Invertebrates (B13)		Sparsely Vegetated Concave Surface (B8)
	Saturation (A3)		Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
	Water Marks (B1)		Dry-Season Water Table (C2)		Oxidized Rhizospheres on Living Roots (C3)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)		**(where tilled)**
	Drift Deposits (B3)		**(where not tilled)**		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Thin Muck Surface (C7)	X	Geomorphic Position (D2)
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)	X	FAC-Neutral Test (D5)
	Water Stained Leaves (B9)		USGS topog map symbol		Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes	_____	No	X	Depth (inches): _____
Water Table Present?	Yes	_____	No	X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes	_____	No	X	Depth (inches): _____

Wetland Hydrology Present? **Yes** X **No** _____

Wetland type: Ditch (Ditch, depression, slope, fringe, riverine) Photo direction? W

Remarks: Road ditch drains to north through pipe. No USGS Indicator

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/10/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W14-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: NW Qtr 5-151-54

Landform (hillslope, terrace, etc.): Slope Local Relief (concave, convex, none): Plane Slope %: 15%

Subregion (LRR): F Lat: 47.93245012 Long: -97.59702677 Datum: NAD 83

Soil Map Unit Name: Barnes-Buse loams, 3 to 6 percent slopes NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil Yes ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area**
Hydric Soil Present?	**Yes**		**No**	**X**	**within a Wetland?** **Yes** **No** **X**
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:**

Remarks: **Severe Drought rating. Road Side**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 5' Radius)			
1.	Poa pratensis(Kentucky Blue Grass)	90%	Yes	FACU
2.	Bromis Inermis	20%	No	UPL
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
		110%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **0** (A)

Total Number of Dominant Species across all Strata: **1** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **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	90%	x 4	3.6
UPL species		x 5	
Column Totals:	0.9 (A)		3.6 (B)
Prevalence Index = B/A =			4.00

Hydrophytic Vegetation Indicators:

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

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W14-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 8	10YR 2 / 1	100%					Loam	
8 - 16	10YR 4 / 3	100%					Loam	
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Created? ___ Ditch drains only upland? ___ Ditch constructed in wetland? ___

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? ___

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)

___ USGS topog map symbol

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	X	Depth (inches): ___
Water Table Present?	Yes	___	No	X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: ___ (Ditch, depression, slope, fringe, riverine) Photo direction? ___

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/10/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W15-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: NW Qtr 5-151-54

Landform (hillslope, terrace, etc.): Ditch Local Relief (concave, convex, none): concave Slope %: 0-3%

Subregion (LRR): F Lat: 47.93243518 Long: -97.5939258 Datum: NAD 83

Soil Map Unit Name: Barnes-Buse loams, 3 to 6 percent slopes NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil Yes ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes** **X** **No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1Ax

Remarks: **Not inventoried on NWI. Severe Drought Rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 5' x 10')			
1.	Typha sp.	50%	Yes	OBL
2.	Alopecurus arundinaceus(Creeping Meadow-Foxtail)	10%	No	FACW
3.	Hordeum jubatum(Fox-Tail Barley)	5%	No	FACW
4.	Eleocharis acicularis(Needle Spike-Rush)	5%	No	OBL
5.				
6.				
7.				
8.				
9.				
10.				
		70%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 20%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **1** (A)

Total Number of Dominant Species across all Strata: **1** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	55%	x 1	0.55
FACW species	15%	x 2	0.3
FAC species	0%	x 3	0
FACU species	0%	x 4	0
UPL species		x 5	
Column Totals:	0.7 (A)		0.85 (B)
Prevalence Index = B/A =			1.21

Hydrophytic Vegetation Indicators:

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

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W15-w

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 10	10YR 2 / 1	100%					Loam	
10 - 16	10YR 6 / 1	80%	10YR 5 / 6	20%	C	M	Loam	
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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)**
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Created? Yes Ditch drains only upland? ___ Ditch constructed in wetland? No

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? No

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)

___ USGS topog map symbol

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)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):	
Water Table Present?	Yes ___	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches):	

Wetland Hydrology Present? **Yes** X **No** ___

Wetland type: Ditch (Ditch, depression, slope, fringe, riverine) Photo direction? W

Remarks: No USGS Indicator

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/10/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W15-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: NW Qtr 5-151-54

Landform (hillslope, terrace, etc.): Slope Local Relief (concave, convex, none): Plane Slope %: 15%

Subregion (LRR): F Lat: 47.93241558 Long: -97.5939151 Datum: NAD 83

Soil Map Unit Name: Barnes-Buse loams, 3 to 6 percent slopes NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil Yes ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes**		**No**	**X**
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:**

Remarks: **Sampled ditch backslope. Severe Drought Rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 5' Radius)			
1.	Poa pratensis(Kentucky Blue Grass)	60%	Yes	FACU
2.	Bromus inermis	50%	Yes	UPL
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
		110%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **0** (A)

Total Number of Dominant Species across all Strata: **1** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **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	60%	x 4	2.4
UPL species		x 5	
Column Totals:	0.6 (A)		2.4 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W15-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 16	10YR 2 / 1	90%	7.5YR 5 / 6	10%	C	M	Loam	
-								
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Created? ___ Ditch drains only upland? ___ Ditch constructed in wetland? ___

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? ___

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)
- ___ USGS topog map symbol

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	X	Depth (inches): ___
Water Table Present?	Yes	___	No	X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: ___ (Ditch, depression, slope, fringe, riverine) Photo direction? ___

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/9/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W16-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: SW Qtr 32-152-54

Landform (hillslope, terrace, etc.): Ditch Local Relief (concave, convex, none): concave Slope %: 0-3%

Subregion (LRR): F Lat: 47.93267756 Long: -97.59387131 Datum: NAD 83

Soil Map Unit Name: Barnes-Buse loams, 3 to 6 percent slopes NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil Yes ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**	
Hydric Soil Present?	**Yes**	**X**	**No**	
Wetland Hydrology Present?	**Yes**	**X**	**No**	

Is the Sampled Area within a Wetland? **Yes X No**

If yes, NWI field label: PEM1Ax

Remarks: **Not inventoried on NWI. Severe Drought Rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: entire wetland)			
1.	Eleocharis acicularis(Needle Spike-Rush)	80%	Yes	OBL
2.	Taraxacum officinale(Common Dandelion)	1%	No	
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
			= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
		0%	= Total Cover	

% Bare Ground in Herb Stratum 20%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **0** (A)

Total Number of Dominant Species across all Strata: **0** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:
OBL species	80%	x 1	0.8
FACW species	0%	x 2	0
FAC species	0%	x 3	0
FACU species	0%	x 4	0
UPL species		x 5	
Column Totals:	0.8 (A)		0.8 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation — meets

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W16-w

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type*	Loc**	Texture	Remarks
0 - 9	10YR 2 / 1	95%	5YR 4 / 6	5%	c	M+PL	Loam	
9 - 15	10YR 6 / 1	75%	7.5YR 5 / 8	25%	C	M	Loam	
-								
-								
-								
-								
-								
-								

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

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

	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**	X	Depleted Matrix (F3)		Reduced Vertic (F18)
X	Depleted Below Dark Surface (A11)	X	Redox Dark Surface (F6)		Red Parent Material (TF2)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present,
					unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** X **No**

Remarks:

HYDROLOGY

Created? Yes Ditch drains only upland? Ditch constructed in wetland? No

Wetland Hydrology Indicators: Wetland extends beyond project boundary? No

Primary Indicators (minimum of one required: check all that apply)			Secondary Indicators (minimum of two required)	
	Surface Water (A1)		Salt Crust (B11)		Surface Soil Cracks (B6)
	High Water Table (A2)		Aquatic Invertebrates (B13)		Sparsely Vegetated Concave Surface (B8)
	Saturation (A3)		Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
	Water Marks (B1)		Dry-Season Water Table (C2)		Oxidized Rhizospheres on Living Roots (C3)
X	Sediment Deposits (B2) <-- THIN		Oxidized Rhizospheres on Living Roots (C3)		**(where tilled)**
	Drift Deposits (B3)		**(where not tilled)**		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Thin Muck Surface (C7)	X	Geomorphic Position (D2) Concave
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)	X	FAC-Neutral Test (D5)
	Water Stained Leaves (B9)		USGS topog map symbol		Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes No X Depth (inches):

Water Table Present? Yes No X Depth (inches):

Saturation Present? Yes No X Depth (inches):

(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No**

Wetland type: Ditch (Ditch, depression, slope, fringe, riverine) Photo direction? W

Remarks: CMP is 4' east of wetland. No USGS Indicator.

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/10/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W-16-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: SW Qtr 32-152-54

Landform (hillslope, terrace, etc.): Ditch side slope Local Relief (concave, convex, none): Plane Slope %: 20%

Subregion (LRR): F Lat: 47.93270251 Long: -97.59386033 Datum: NAD 83

Soil Map Unit Name: Barnes-Buse loams, 3 to 6 percent slopes NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil Yes ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area**
Hydric Soil Present?	**Yes**		**No**	**X**	**within a Wetland?** **Yes** **No** **X**
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:**

Remarks: **Severe Drought Rating**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 5' Radius)			
1.	Poa pratensis(Kentucky Blue Grass)	90%	Yes	FACU
2.	Bromus inermis	5%	No	UPL
3.	Taraxacum officinale(Common Dandelion)	5%	No	FACU
4.				
5.				
6.				
7.				
8.				
9.				
10.				
		100%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **0** (A)

Total Number of Dominant Species across all Strata: **1** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **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	95%	x 4	3.8
UPL species		x 5	
Column Totals:	0.95 (A)		3.8 (B)
Prevalence Index = B/A =			4.00

Hydrophytic Vegetation Indicators:

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

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W-16-upl

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*	Loc**	Texture	Remarks
0 - 10	10YR 2 / 1	100%					Loam	
10 - 16	10YR 6 / 3	70%					SyL	
-	10YR 5 / 6	30%						
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

HYDROLOGY

Created? _____ Ditch drains only upland? _____ Ditch constructed in wetland? _____

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? _____

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)
- ___ USGS topog map symbol

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 X Depth (inches): _____

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

Saturation Present? Yes ___ No X Depth (inches): _____

(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: _____ (Ditch, depression, slope, fringe, riverine) Photo direction? _____

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/11/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W17-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: W. Half 31-152-54

Landform (hillslope, terrace, etc.): Slope/Valley Local Relief (concave, convex, none): concave Slope %: 0-3%

Subregion (LRR): F Lat: 47.9393695 Long: -97.61784212 Datum: NAD 83

Soil Map Unit Name: Maddock sandy loam, 9 to 25 percent slopes and Pits, gravel and sand NWI Classification: PFOC

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes** **X** **No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1/SS1F

Remarks: **Severe Drought rating. A spring-like slope wetland. The wetland is a mix of herbaceous and scrub-shrub in a mostly forested ravine. The NWI delineation is north of the WPC delineation.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size:)			
1.	Carex sp.	30%	Yes	Fac or wetter
2.	Solidago gigantea(Late Goldenrod)	40%	Yes	FAC
3.	Unidentified grass species	20%	No	
4.	Ranunculus pensylvanicus(Pennsylvania Buttercup)	2%	No	FACW
5.	Verbena hastata(Simpler's-Joy)	<1%	No	FACW
6.	Persicaria amphibia(Water Smartweed)	20%	No	OBL
7.	Sium suave(Hemlock Water-Parsnip)	15%	No	OBL
8.				
9.				
10.				
		127%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **2** (A)

Total Number of Dominant Species across all Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1	
FACW species		x 2	
FAC species		x 3	
FACU species		x 4	
UPL species		x 5	
Column Totals:	(A)		(B)
Prevalence Index = B/A =			

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50% Meets

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W17-w

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 16	2.5 /	80%	7.5YR 5 / 6	5%	C	M	SiL	Matrix color value is "N"
-			10YR 6 / 1	15%	D	M		
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Created? No Ditch drains only upland? ___ Ditch constructed in wetland? No

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? No

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

- ___ Surface Water (A1)
- X High Water Table (A2)
- X 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)

___ USGS topog map symbol

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)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):		
Water Table Present?	Yes X	No ___	Depth (inches):	6"	
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches):	0"	

Wetland Hydrology Present? **Yes** X **No** ___

Wetland type: Slope (Ditch, depression, slope, fringe, riverine) Photo direction? NW

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/11/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W17-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: W. Half 31-152-54

Landform (hillslope, terrace, etc.): Slope Local Relief (concave, convex, none): concave Slope %: 5%

Subregion (LRR): F Lat: 47.93938419 Long: -97.61775572 Datum: NAD 83

Soil Map Unit Name: Maddock sandy loam, 9 to 25 percent slopes and Pits, gravel and sand NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area**
Hydric Soil Present?	**Yes**		**No**	**X**	**within a Wetland?** **Yes** **No** **X**
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:**

Remarks: **Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)				
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum (Plot size:)				
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum (Plot size:)				
1.	Bromus inermis	100%	Yes	UPL
2.	Solidago gigantea(Late Goldenrod)	3%	No	FAC
3.	Anemone canadensis(Round-Leaf Thimbleweed)	5%	No	FACW
4.	Columbine very small, abundant	30%	Yes	
5.	Cirsium arvense(Canadian Thistle)	1%	No	FACU
6.				
7.				
8.				
9.				
10.				
		139%	= Total Cover	
Woody Vine Stratum (Plot size:)				
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **1** (A)

Total Number of Dominant Species across all Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **50%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0%	x 1	0
FACW species	5%	x 2	0.1
FAC species	3%	x 3	0.09
FACU species	1%	x 4	0.04
UPL species	100%	x 5	5
Column Totals:	1.09 (A)		5.23 (B)
Prevalence Index = B/A =			4.80

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W17-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 12	10YR 2 / 1	100%					Loam	
12 - 16	10YR 3 / 2	100%					Loam	
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Created? ___ Ditch drains only upland? ___ Ditch constructed in wetland? ___

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? ___

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)
- ___ USGS topog map symbol

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 X Depth (inches): _____

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

Saturation Present? Yes ___ No X Depth (inches): _____

(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: _____ (Ditch, depression, slope, fringe, riverine) Photo direction? _____

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/15/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W18-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: NW Qtr 7-151-54

Landform (hillslope, terrace, etc.): Slope Local Relief (concave, convex, none): none Slope %: 0-1%

Subregion (LRR): F Lat: 47.91708848 Long: -97.61495393 Datum: NAD 83

Soil Map Unit Name: Wyndmere-Tiffany fine sandy loams, 0 to 2 % slopes and Arveson loam, 0 to 1 % slope NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		
Hydric Soil Present?	**Yes**	**X**	**No**	**Is the Sampled Area within a Wetland?**	**Yes X No**
Wetland Hydrology Present?	**Yes**	**X**	**No**	**If yes, NWI field label:**	**PEM1/FO1Ad**

Remarks: **NWI labeled the ditch as PEM1Cx and did not delineate area S. of ditch. Severe Drought rating. It is a combination of natural wetland and road ditch. The natural part is partially forested and partially cropped. An old windbreak between the cropped part and forested part was higher elevation due to tree root mass that probably had some wind drift accumulation. This wetland was probably contiguous with Wetland 31 prior to construction of the road between them.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1. Cornus alba(Red Osier)	5%	Yes	FACW
2.			
3.			
4.			
5.			
	5%	= Total Cover	
Herb Stratum (Plot size: 5' Radius)			
1. Alopecurus arundinaceus(Creeping Meadow-Foxtail)	35%	Yes	FACW
2. Equisetum sp.	50%	Yes	FAC or wette
3. Poa pratensis(Kentucky Blue Grass)	10%	No	FACU
4. Solidago gigantea(Late Goldenrod)	2%	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
	97%	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **3** (A)

Total Number of Dominant Species across all Strata: **3** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0%	x 1	0
FACW species	40%	x 2	0.8
FAC species	2%	x 3	0.06
FACU species	10%	x 4	0.4
UPL species		x 5	
Column Totals:	0.52 (A)		1.26 (B)

Prevalence Index = B/A = 2.42

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation — Meets

2 - Dominance Test is > 50% — Meets

3 - Prevalence Index is ≤ 3.0 * — Meets

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W18-w

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 6	10YR 2 / 1	100%					Loam	
6 - 24	10YR 2 / 1	95%	7.5YR 4 / 4	5%	C	M	Loam	
24 - 30	10YR 6 / 2	70%	7.5YR 5 / 6	10%	C	M	Loam	
-	Gley 6 /	20%						Matrix chroma is "N"
-								
-								
-								
-								

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

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

	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**		Depleted Matrix (F3)		Reduced Vertic (F18)
	Depleted Below Dark Surface (A11)	X	Redox Dark Surface (F6)		Red Parent Material (TF2)
X	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** X **No**

Remarks:

HYDROLOG

Created? No Ditch drains only upland? Ditch constructed in wetland? Yes- ditch portion

Wetland Hydrology Indicators: Wetland extends beyond project boundary? Yes

Primary Indicators (minimum of one required: check all that apply)				Secondary Indicators (minimum of two required)	
	Surface Water (A1)		Salt Crust (B11)		Surface Soil Cracks (B6)
	High Water Table (A2)		Aquatic Invertebrates (B13)		Sparsely Vegetated Concave Surface (B8)
	Saturation (A3)		Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
	Water Marks (B1)	X	Dry-Season Water Table (C2)		Oxidized Rhizospheres on Living Roots (C3)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)		**(where tilled)**
	Drift Deposits (B3)		**(where not tilled)**		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Thin Muck Surface (C7)	X	Geomorphic Position (D2)
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)	X	FAC-Neutral Test (D5)
	Water Stained Leaves (B9)		USGS topog map symbol		Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes	No	X	Depth (inches):		
Water Table Present?	Yes	X	No	Depth (inches):	24	
Saturation Present? (includes capillary fringe)	Yes	X	No	Depth (inches):	18	**Wetland Hydrology Present?** **Yes** X **No**

Wetland type: Depression, part ditch (Ditch, depression, slope, fringe, riverine) Photo direction? NNW

Remarks: The road ditch part of the wetland was a small part of it. The natural wetland portion might be acting as a slope wetland due to the road ditch.

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/15/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W18-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: NW Qtr 7-151-54

Landform (hillslope, terrace, etc.): Slope Local Relief (concave, convex, none): convex Slope %: 5%

Subregion (LRR): F Lat: 47.91708153 Long: -97.61487753 Datum: NAD 83

Soil Map Unit Name: Wyndmere-Tiffany fine sandy loams, 0 to 2 % slopes and Arveson loam, 0 to 1 % slope NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area**
Hydric Soil Present?	**Yes**		**No**	**X**	**within a Wetland?** **Yes**		**No**	**X**
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:**

Remarks: **Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 5'Radius)			
1. Rubus idaeus(Common Red Raspberry)	10%	Yes	FACU
2. Cornus alba(Red Osier)	1%	No	FACW
3.			
4.			
5.			
	11%	= Total Cover	
Herb Stratum (Plot size:)			
1. Bromus inermis	40%	Yes	UPL
2. Poa pratensis(Kentucky Blue Grass)	5%	No	FACU
3. Solidago gigantea(Late Goldenrod)	1%	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	46%	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **0** (A)

Total Number of Dominant Species across all Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **0%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0%	x 1	0
FACW species	1%	x 2	0.02
FAC species	1%	x 3	0.03
FACU species	15%	x 4	0.6
UPL species		x 5	
Column Totals:	0.17 (A)		0.65 (B)

Prevalence Index = B/A = 3.82

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W18-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 14	10YR 2 / 1	100%					FSL	
14 - 20	10YR 3 / 2	100%					FSL	
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

There is a hydric soil beneath sample point, buried by sediment (wind drifted)

HYDROLOGY

Created? _____ Ditch drains only upland? _____ Ditch constructed in wetland? _____

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? _____

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)

_____ USGS topog map symbol

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	X	Depth (inches): _____
Water Table Present?	Yes	___	No	X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: _____ (Ditch, depression, slope, fringe, riverine) Photo direction? _____

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/15/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W19B-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: NW Qtr 7-151-54

Landform (hillslope, terrace, etc.): Ditch Local Relief (concave, convex, none): concave Slope %: 0-1%

Subregion (LRR): F Lat: 47.91812676 Long: -97.62004769 Datum: NAD 83

Soil Map Unit Name: Wyndmere-Tiffany fine sandy loams, 0-2% slopes and Hecla-Maddock FSL, 2-6 % slopes NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation Yes ; Soil Yes ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		
Hydric Soil Present?	**Yes**	**X**	**No**	**Is the Sampled Area within a Wetland?**	**Yes X No**
Wetland Hydrology Present?	**Yes**	**X**	**No**	**If yes, NWI field label:** PEM1Ax	

Remarks: **NWI labeled most of Wetland 19C as PEM1Cx. Severe Drought rating. Note: Wetlands W19A, 19B and 19C are essentially the same, except that 19C includes some area adjacent to the ditch.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 5' Radius)			
1.	Alopecurus arundinaceus(Creeping Meadow-Foxtail)	40%	Yes	FACW
2.	Eleocharis acicularis(Needle Spike-Rush)	15%	Yes	OBL
3.	Rumex crispus(Curly Dock)	1%	No	FAC
4.				
5.				
6.				
7.				
8.				
9.				
10.				
		56%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 40%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **2** (A)

Total Number of Dominant Species across all Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15%	x 1	0.15
FACW species	40%	x 2	0.8
FAC species	1%	x 3	0.03
FACU species	0%	x 4	0
UPL species		x 5	
Column Totals:	0.56 (A)		0.98 (B)

Prevalence Index = B/A = 1.75

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation — Meets

2 - Dominance Test is > 50% — Meets

3 - Prevalence Index is ≤ 3.0 * — Meets

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks: Ditch was mowed. Phalaris and Typha in other areas

SOIL

Sampling Point/Wetland ID: W19B-w

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 5	10YR 2 / 1	100%					FSL	
5 - 11	10YR 6 / 1	85%	7.5YR 4 / 6	15%	C	M	FSL	
-								
-								
-								
-								
-								
-								

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

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

	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**	X	Depleted Matrix (F3)		Reduced Vertic (F18)
X	Depleted Below Dark Surface (A11)		Redox Dark Surface (F6)		Red Parent Material (TF2)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present,
					unless disturbed or problematic.

Indicators for Problematic Hydric Soils*:**

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** X **No**

Remarks:

HYDROLOGY

Created? Mostly Ditch drains only upland? Ditch constructed in wetland? No

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? No

Primary Indicators (minimum of one required: check all that apply)			Secondary Indicators (minimum of two required)	
	Surface Water (A1)		Salt Crust (B11)		Surface Soil Cracks (B6)
	High Water Table (A2)		Aquatic Invertebrates (B13)		Sparsely Vegetated Concave Surface (B8)
	Saturation (A3)		Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
	Water Marks (B1)		Dry-Season Water Table (C2)		Oxidized Rhizospheres on Living Roots (C3)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)		**(where tilled)**
	Drift Deposits (B3)		**(where not tilled)**		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Thin Muck Surface (C7)	X	Geomorphic Position (D2)
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)	X	FAC-Neutral Test (D5)
	Water Stained Leaves (B9)		USGS topog map symbol		Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes	No	X	Depth (inches):	
Water Table Present?	Yes	No	X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes	No	X	Depth (inches):	

Wetland Hydrology Present? **Yes** X **No**

Wetland type: Ditch (Ditch, depression, slope, fringe, riverine) Photo direction? W

Remarks: Wetland segments W19A, W19B and W19C are connected by CMPs.

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/15/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W19B-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: 7-151-54

Landform (hillslope, terrace, etc.): Ditch Shoulder Local Relief (concave, convex, none): convex Slope %: 8%

Subregion (LRR): F Lat: 47.91807573 Long: -97.62006407 Datum: NAD 83

Soil Map Unit Name: Wyndmere-Tiffany fine sandy loams, 0-2% slopes and Hecla-Maddock FSL, 2-6 % slopes NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area**
Hydric Soil Present?	**Yes**		**No**	**X**	**within a Wetland?** **Yes** **No** **X**
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:**

Remarks: **Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 5' Radius)			
1.	Poa pratensis(Kentucky Blue Grass)	60%	Yes	FACU
2.	Taraxacum officinale(Common Dandelion)	15%	Yes	FACU
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
		75%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 20%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **0** (A)

Total Number of Dominant Species across all Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **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	75%	x 4	3
UPL species		x 5	
Column Totals:	0.75 (A)		3 (B)
Prevalence Index = B/A =			4.00

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks: 10% Moss cover not listed above

SOIL

Sampling Point/Wetland ID: W19B-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 15	10YR 2 / 1	100%					FSL	
15 - 20	10YR 4 / 3	100%					FSL	
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Created? ___ Ditch drains only upland? ___ Ditch constructed in wetland? ___

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? ___

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)

___ USGS topog map symbol

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	X	Depth (inches): ___
Water Table Present?	Yes	___	No	X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: ___ (Ditch, depression, slope, fringe, riverine) Photo direction? ___

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/15/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W20-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: SW Qtr 6-151-54

Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): convex Slope %: 0-3%

Subregion (LRR): F Lat: 47.91881089 Long: -97.61975836 Datum: NAD 83

Soil Map Unit Name: Tiffany loam, 0-1 % slope and Wyndmere-Tiffany fine sandy loams, 0-2 percent slopes NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes X No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1/FO1Cd

Remarks: **Severe Drought rating. NWI classified it as PEM1C. The southern part of this wetland delineation might be a slope wetland. It is a large wetland with many volunteer shrubs and trees growing in it. The wetland was probably cropped in the past. Adjacent idle grass cover suggests it is enrolled in the Conservation Reserve Program.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 5' Radius)				
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum (Plot size:)				
1.	Salix interior(Sandbar Willow)	7%	yes	FACW
2.	Fraxinus pennsylvanica(Green Ash)	trace	No	FAC
3.	Symphoricarpos occidentalis	4%	Yes	Upl
4.				
5.				
		11%	= Total Cover	
Herb Stratum (Plot size: 5' radius)				
1.	Alopecurus arundinaceus(Creeping Meadow-Foxtail)	20%	Yes	FACW
2.	Poa pratensis(Kentucky Blue Grass)	5%	No	FACU
3.	Potentilla argentea(Silver-Leaf Cinquefoil)	30%	Yes	FACU
4.	Equisetum arvense(Field Horsetail)	25%	Yes	FAC
5.	Typha angustifolia(Narrow-Leaf Cat-Tail)	5%	No	OBL
6.	Eleocharis sp.		No	OBL
7.				
8.				
9.				
10.				
		95%	= Total Cover	
Woody Vine Stratum (Plot size:)				
1.				
2.				
		100%	= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **3** (A)

Total Number of Dominant Species across all Strata: **5** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **60%** (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1	
FACW species	x 2	
FAC species	x 3	
FACU species	x 4	
UPL species	x 5	
Column Totals: (A)		(B)
Prevalence Index = B/A =		

Hydrophytic Vegetation Indicators:

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

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks: Eleocharis was not obtusa; all others are OBL

SOIL

Sampling Point/Wetland ID: W20-w

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 6	10YR 2 / 1	100%'					FSL	
6 - 18	10YR 2 / 1	75%	7.5YR 4 / 6	10%	C	M	FSL	
-			10YR 7 / 2	15%	D	M		
18 - 24	10YR 7 / 1	85%	7.5YR 4 / 6	15%	C	M	FSL	
-								
-								
-								
-								

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

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

	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**		Depleted Matrix (F3)		Reduced Vertic (F18)
	Depleted Below Dark Surface (A11)	X	Redox Dark Surface (F6)		Red Parent Material (TF2)
X	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present,
					unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** X **No**

Remarks:

HYDROLOGY

Created? No Ditch drains only upland? Ditch constructed in wetland? Yes

Wetland Hydrology Indicators: Wetland extends beyond project boundary? No

Primary Indicators (minimum of one required: check all that apply)			Secondary Indicators (minimum of two required)	
	Surface Water (A1)		Salt Crust (B11)		Surface Soil Cracks (B6)
	High Water Table (A2)		Aquatic Invertebrates (B13)		Sparsely Vegetated Concave Surface (B8)
X	Saturation (A3)		Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
	Water Marks (B1)		Dry-Season Water Table (C2)		Oxidized Rhizospheres on Living Roots (C3)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)		**(where tilled)**
	Drift Deposits (B3)		**(where not tilled)**		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Thin Muck Surface (C7)	X	Geomorphic Position (D2) Concave
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)	X	FAC-Neutral Test (D5)
	Water Stained Leaves (B9)		USGS topog map symbol		Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):	
Water Table Present?	Yes		No	X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes	X	No		Depth (inches):	15

Wetland Hydrology Present? **Yes** X **No**

Wetland type: Depressional or Slope (Ditch, depression, slope, fringe, riverine) Photo direction? W

Remarks: This wetland abuts Wetland 21, which is road ditch.

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/8/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W20-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: 6-151-54

Landform (hillslope, terrace, etc.): Slope Local Relief (concave, convex, none): convex Slope %: 0-3%

Subregion (LRR): F Lat: 47.91881263 Long: -97.61962935 Datum: NAD 83

Soil Map Unit Name: Tiffany loam, 0-1 % slope and Wyndmere-Tiffany fine sandy loams, 0-2 percent slopes NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes** **No** **X**
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:**

Remarks:

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size: 5' radius)			
1.	Salix interior(Sandbar Willow)	5%	Yes	FACW
2.				
3.				
4.				
5.				
		5%	= Total Cover	
Herb Stratum	(Plot size: 5' radius)			
1.	Poa pratensis(Kentucky Blue Grass)	90%	Yes	FACU
2.	Solidago gigantea(Late Goldenrod)	5%	No	FAC
3.	Potentilla argentea(Silver-Leaf Cinquefoil)	5%	No	FACW
4.	Bromus Inermis	10%	No	UPL
5.				
6.				
7.				
8.				
9.				
10.				
		101%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
		100%	= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **1** (A)

Total Number of Dominant Species across all Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **50%** (A/B) 50

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	0%	x 4	0
UPL species		x 5	
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks: Very gradual transition in places; Marked boundary where green cattails were more evident and cinquefoil beecame a dominant.

SOIL

Sampling Point/Wetland ID: W20-upl

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*	Loc**	Texture	Remarks
0 - 17	10YR 2 / 1	100%					Loam	
17 - 25	10YR 6 / 1	90%	7.5YR 4 / 4	10%			FSL	
-								
-								
-								
-								
-								
-								

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

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

	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**		Depleted Matrix (F3)		Reduced Vertic (F18)
	Depleted Below Dark Surface (A11)		Redox Dark Surface (F6)		Red Parent Material (TF2)
X	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present,
					unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

HYDROLOGY

Created? No Ditch drains only upland? Ditch constructed in wetland?

Wetland Hydrology Indicators: Wetland extends beyond project boundary?

Primary Indicators (minimum of one required: check all that apply)			Secondary Indicators (minimum of two required)
	Surface Water (A1)	Salt Crust (B11)	Surface Soil Cracks (B6)
	High Water Table (A2)	Aquatic Invertebrates (B13)	Sparsely Vegetated Concave Surface (B8)
	Saturation (A3)	Hydrogen Sulfide Odor (C1)	Drainage Patterns (B10)
	Water Marks (B1)	Dry-Season Water Table (C2)	Oxidized Rhizospheres on Living Roots (C3)
	Sediment Deposits (B2)	Oxidized Rhizospheres on Living Roots (C3)	**(where tilled)**
	Drift Deposits (B3)	**(where not tilled)**	Crayfish Burrows (C8)
	Algal Mat or Crust (B4)	Presence of Reduced Iron (C4)	Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)	Thin Muck Surface (C7)	Geomorphic Position (D2) Concave
	Inundation Visible on Aerial Imagery (B7)	Other (Explain in Remarks)	FAC-Neutral Test (D5)
	Water Stained Leaves (B9)	USGS topog map symbol	Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):		
Water Table Present?	Yes	No X	Depth (inches):		
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):		**Wetland Hydrology Present?** **Yes** No x

Wetland type: (Ditch, depression, slope, fringe, riverine) Photo direction? W

Remarks: Nearly flat. Wide transition zone. Soil very moist at 15"

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/15/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W21-W

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: 6-151-54

Landform (hillslope, terrace, etc.): Slope Local Relief (concave, convex, none): none Slope %: 0-3%

Subregion (LRR): F Lat: 47.91834034 Long: -97.61939854 Datum: NAD 83

Soil Map Unit Name: Inkster sandy loam, 0-2 % slopes and Wyndmere-Tiffany FSL, 0-2 % slopes NWI Classification: (see Remarks)

No Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes X No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1Cx and PEM1Ax

Remarks: **Severe Drought rating. Part of this ditch wetland might have natural soil, i.e., not excavated. NWI classified a small part of Wetland 21B as PEM1Cx. It is delineated as abutting Wetland 20.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)				
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum (Plot size:)				
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum (Plot size: 5' radius)				
1.	Typha angustifolia(Narrow-Leaf Cat-Tail)	60%	Yes	OBL
2.	Elymus repens(Creeping Wild Rye)	30%	Yes	FACU
3.	Ranunculus pensylvanicus(Pennsylvania Buttercup)	2%	No	FACW
4.				
5.				
6.				
7.				
8.				
9.				
10.				
			= Total Cover	
Woody Vine Stratum (Plot size:)				
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 8%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **1** (A)

Total Number of Dominant Species across all Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **50%** (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	60%	x 1	0.6
FACW species	2%	x 2	0.04
FAC species	0%	x 3	0
FACU species	30%	x 4	1.2
UPL species		x 5	
Column Totals:	0.92 (A)		1.84 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

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

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W21-W

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 6	10YR 2 / 1	100%					Loam	
6 - 24	10YR 2 / 1	95%	7.5YR 4 / 6	5%	C	M	Loam	
24 - 30	10YR 4 / 1	15%	7.5YR 4 / 6	5%	C	M		Fine Sandy Loam
-	10YR 5 / 1	80%						
-								
-								
-								
-								

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

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

	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**		Depleted Matrix (F3)		Reduced Vertic (F18)
	Depleted Below Dark Surface (A11)	X	Redox Dark Surface (F6)		Red Parent Material (TF2)
X	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric Soils*:**

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** X **No**

Remarks:

Ditch Bottom

HYDROLOG

Created? Yes Ditch drains only upland? Ditch constructed in wetland? partially

Wetland Hydrology Indicators: Wetland extends beyond project boundary? No

Primary Indicators (minimum of one required: check all that apply)			Secondary Indicators (minimum of two required)	
	Surface Water (A1)		Salt Crust (B11)		Surface Soil Cracks (B6)
	High Water Table (A2)		Aquatic Invertebrates (B13)		Sparsely Vegetated Concave Surface (B8)
	Saturation (A3)		Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
	Water Marks (B1)	X	Dry-Season Water Table (C2)		Oxidized Rhizospheres on Living Roots (C3)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)		**(where tilled)**
	Drift Deposits (B3)		**(where not tilled)**		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Thin Muck Surface (C7)	X	Geomorphic Position (D2) Concave
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)	X	FAC-Neutral Test (D5)
	Water Stained Leaves (B9)		USGS topog map symbol		Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):	
Water Table Present?	Yes		No	X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes	X	No		Depth (inches):	15"

Wetland Hydrology Present? **Yes** X **No**

Wetland type: Ditch (Ditch, depression, slope, fringe, riverine) Photo direction? E

Remarks: Ditch might be natural level (not excavated) at the sample point.

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/15/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W21-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: SW Qtr 6-151-54

Landform (hillslope, terrace, etc.): Roadside Local Relief (concave, convex, none): Plane Slope %: >9%

Subregion (LRR): F Lat: 47.91831001 Long: -97.61939413 Datum: NAD 83

Soil Map Unit Name: Inkster sandy loam, 0-2 % slopes and Wyndmere-Tiffany FSL, 0-2 % slopes NWI Classification: PABFx

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil Yes ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** **X**
Hydric Soil Present?	**Yes**		**No**	**X**	
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:**

Remarks: **Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 5' radius)			
1.	Poa pratensis(Kentucky Blue Grass)	80%	Yes	FACU
2.	Elymus repens(Creeping Wild Rye)	50%	Yes	FACU
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
		130%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **0** (A)

Total Number of Dominant Species across all Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 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	130%	x 4	5.2
UPL species		x 5	
Column Totals:	1.3 (A)		5.2 (B)
Prevalence Index = B/A =			4.00

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W21-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 10	10YR 2 / 1	100%					Loam	
10 - 15	10YR 3 / 3	100%					SyL	
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

HYDROLOGY

Created? _____ Ditch drains only upland? _____ Ditch constructed in wetland? _____

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? _____

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)

_____ USGS topog map symbol

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? Yes ___ No ___ Depth (inches): _____

(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: _____ (Ditch, depression, slope, fringe, riverine) Photo direction? _____

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/15/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W22-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: SW Qtr 6-151-54

Landform (hillslope, terrace, etc.): depression or flat Local Relief (concave, convex, none): concave Slope %: 0-3%

Subregion (LRR): F Lat: 47.91889042 Long: -97.61822123 Datum: NAD 83

Soil Map Unit Name: Inkster sandy loam, 0-2 % slopes NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		
Hydric Soil Present?	**Yes**	**X**	**No**	**Is the Sampled Area within a Wetland?**	**Yes X No**
Wetland Hydrology Present?	**Yes**	**X**	**No**	**If yes, NWI field label:** PEM1/SS1A	

Remarks: **Severe Drought rating. NWI did not delineate Wetlands 22 or 23.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size: 5' radius)			
1.	Salix interior(Sandbar Willow)	15%	Yes	FACW
2.				
3.				
4.				
5.				
		15%	= Total Cover	
Herb Stratum	(Plot size: 5' radius)			
1.	Poa pratensis(Kentucky Blue Grass)	40%	Yes	FACU
2.	Typha angustifolia(Narrow-Leaf Cat-Tail)	20%	Yes	OBL
3.	Sonchus arvensis(Field Sow-Thistle)	1%	No	
4.	Melilotus officinalis(Yellow Sweet-Clover)	t	No	
5.	Equisetum sp.	30%	Yes	FAC
6.				
7.				
8.				
9.				
10.				
		91%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **4** (A)

Total Number of Dominant Species across all Strata: **3** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **75%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20%	x 1	0.2
FACW species	0%	x 2	0
FAC species	30%	x 3	0.9
FACU species	0%	x 4	0
UPL species	0	x 5	0
Column Totals:	0.5 (A)		1.1 (B)

Prevalence Index = B/A = 2.20

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation — meets

2 - Dominance Test is > 50% — Meets

3 - Prevalence Index is ≤ 3.0 * — Meets

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks: Delineated wetland where sweetclover thinned out and cattails appeared. Note; Wetland 23 had identical wetland soil hydrology, and plant community.

SOIL

Sampling Point/Wetland ID: W22-w

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*	Loc**	Texture	Remarks
0 - 24	10YR 2 / 1	90%	7.5YR 4 / 6	10%	C	M	Loam	
24 - 30	10YR 7 / 2	60%	7.5YR 4 / 4	20%	C	M	Loam	
-	10YR 6 / 1	20%						
-								
-								
-								
-								
-								

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

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

	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**		Depleted Matrix (F3)		Reduced Vertic (F18)
	Depleted Below Dark Surface (A11)	X	Redox Dark Surface (F6)		Red Parent Material (TF2)
X	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present,
					unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

HYDROLOGY

Created? No Ditch drains only upland? _____ Ditch constructed in wetland? No

Wetland Hydrology Indicators: Wetland extends beyond project boundary? No

Primary Indicators (minimum of one required: check all that apply)			Secondary Indicators (minimum of two required)
	Surface Water (A1)		Salt Crust (B11)		Surface Soil Cracks (B6)
	High Water Table (A2)		Aquatic Invertebrates (B13)		Sparsely Vegetated Concave Surface (B8)
	Saturation (A3)		Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
	Water Marks (B1)		Dry-Season Water Table (C2)		Oxidized Rhizospheres on Living Roots (C3)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)		**(where tilled)**
	Drift Deposits (B3)		**(where not tilled)**		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Thin Muck Surface (C7)	X	Geomorphic Position (D2)
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)	X	FAC-Neutral Test (D5)
	Water Stained Leaves (B9)		USGS topog map symbol		Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):	
Water Table Present?	Yes		No	X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes	X	No		Depth (inches):	15

Wetland Hydrology Present? **Yes** X **No** _____

Wetland type: Depressional (Ditch, depression, slope, fringe, riverine) Photo direction? E

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/15/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W22-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: SW Qtr 6-151-54

Landform (hillslope, terrace, etc.): Hillslope Local Relief (concave, convex, none): none Slope %: 0-3%

Subregion (LRR): F Lat: 47.91892209 Long: -97.61817122 Datum: NAD 83

Soil Map Unit Name: Inkster sandy loam, 0-2 % slopes NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present?

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**
Hydric Soil Present?	**Yes**		**No**	**X**
Wetland Hydrology Present?	**Yes**		**No**	**X**

Is the Sampled Area within a Wetland? **Yes** **No** **X**

If yes, NWI field label:

Remarks: **Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size: 5' radius)			
1.	Salix interior(Sandbar Willow)	2%	No	FACW
2.				
3.				
4.				
5.				
		2%	= Total Cover	
Herb Stratum	(Plot size: 5' radius)			
1.	Poa pratensis(Kentucky Blue Grass)	100%	Yes	FACU
2.	Melilotus officinalis(Yellow Sweet-Clover)	20%	No	FACU
3.	Solidago gigantea(Late Goldenrod)	2%	No	
4.				
5.				
6.				
7.				
8.				
9.				
10.				
		122%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
		0%	= Total Cover	

% Bare Ground in Herb Stratum

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **0** (A)

Total Number of Dominant Species across all Strata: **1** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **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	0%	x 4	0
UPL species		x 5	
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation	
2 - Dominance Test is > 50%	
3 - Prevalence Index is ≤ 3.0 *	#DIV/0!
4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).	
Problematic Hydrophytic Vegetation* (Explain)	

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W22-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 15	10YR 2 / 1	100%					Loam	Matrix 100%
15 - 23	10YR 2 / 1	90%	7.5YR 3 / 4	10%	C	M	Loam	
23 - 30	10YR 3 / 2	90%	7.5YR 3 / 4	10%	C	M		
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Created? ___ Ditch drains only upland? ___ Ditch constructed in wetland? ___

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? ___

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)

___ USGS topog map symbol

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	X	Depth (inches): ___
Water Table Present?	Yes	___	No	X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: ___ (Ditch, depression, slope, fringe, riverine) Photo direction? ___

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/15/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W23-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: SW Qtr 6-151-54

Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): concave Slope %: 0-3%

Subregion (LRR): F Lat: 47.9188992 Long: -97.61801742 Datum: NAD 83

Soil Map Unit Name: Inkster sandy loam, 0-2 % slopes NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes X No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1/SS1A

Remarks: **Not inventoried by NWI. Severe Drought rating. Note: This wetland was noted to have essentially the same plant, soil and hydrology as W22. W22 data is copied into this Wetland Determination Data Form.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size: 5' radius)			
1.	Salix interior(Sandbar Willow)	15%	Yes	FACW
2.				
3.				
4.				
5.				
		15%	= Total Cover	
Herb Stratum	(Plot size: 5' radius)			
1.	Poa pratensis(Kentucky Blue Grass)	40%	Yes	FACU
2.	Typha angustifolia(Narrow-Leaf Cat-Tail)	20%	Yes	OBL
3.	Sonchus arvensis(Field Sow-Thistle)	1%	No	
4.	Melilotus officinalis(Yellow Sweet-Clover)	t	No	
5.	Equisetum sp.	30%	Yes	FAC
6.				
7.				
8.				
9.				
10.				
		91%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **3** (A)

Total Number of Dominant Species across all Strata: **4** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **75%** (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50% Meets

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W23-w

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*	Loc**	Texture	Remarks
0 - 24	10YR 2 / 1	90%	7.5YR 4 / 6	10%	C	M	Loam	
24 - 30	10YR 7 / 2	60%	7.5YR 4 / 4	20%	C	M	Loam	
-	10YR 6 / 1	20%						
-								
-								
-								
-								
-								

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

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

	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**		Depleted Matrix (F3)		Reduced Vertic (F18)
	Depleted Below Dark Surface (A11)	X	Redox Dark Surface (F6)		Red Parent Material (TF2)
X	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

HYDROLOGY

Created? No Ditch drains only upland? Ditch constructed in wetland? No

Wetland Hydrology Indicators: Wetland extends beyond project boundary? No

Primary Indicators (minimum of one required: check all that apply)				Secondary Indicators (minimum of two required)	
	Surface Water (A1)		Salt Crust (B11)		Surface Soil Cracks (B6)
	High Water Table (A2)		Aquatic Invertebrates (B13)		Sparsely Vegetated Concave Surface (B8)
	Saturation (A3)		Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
	Water Marks (B1)		Dry-Season Water Table (C2)		Oxidized Rhizospheres on Living Roots (C3)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)		**(where tilled)**
	Drift Deposits (B3)		**(where not tilled)**		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Thin Muck Surface (C7)	X	Geomorphic Position (D2)
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)	X	FAC-Neutral Test (D5)
	Water Stained Leaves (B9)		USGS topog map symbol		Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):	
Water Table Present?	Yes		No	X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes	X	No		Depth (inches):	15

Wetland Hydrology Present? **Yes** X **No** _____

Wetland type: Ditch (Ditch, depression, slope, fringe, riverine) Photo direction? E

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/15/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W23-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: SW Qtr 6-151-54

Landform (hillslope, terrace, etc.): Local Relief (concave, convex, none): convex Slope %: 0-3%

Subregion (LRR): F Lat: Long: Datum: NAD 83

Soil Map Unit Name: Inkster sandy loam, 0-2 % slopes NWI Classification:

No Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**
Hydric Soil Present?	**Yes**		**No**	**X**
Wetland Hydrology Present?	**Yes**		**No**	**X**

Is the Sampled Area within a Wetland? **Yes** **No** **X**

If yes, NWI field label: PEMFx

Remarks: **Severe Drought rating. Note the following data is from W22-upl sample point.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.	Salix interior(Sandbar Willow)	2%	No	FACW
2.				
3.				
4.				
5.				
		2%	= Total Cover	
Herb Stratum	(Plot size: 5' Radius)			
1.	Poa pratensis(Kentucky Blue Grass)	100%	Yes	FACU
2.	Melilotus officinalis(Yellow Sweet-Clover)	20%	No	FACU
3.	Solidago gigantea(Late Goldenrod)	2%	No	FAC
4.				
5.				
6.				
7.				
8.				
9.				
10.				
		122%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
		100%	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **0** (A)

Total Number of Dominant Species across all Strata: **0** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W23-upl

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*	Loc**	Texture	Remarks
0 - 15	10YR 2 / 1	100%					Loam	Matrix 100%
15 - 23	10YR 2 / 1	90%	7.5YR 3 / 4	10%	C	M	Loam	
23 - 30	10YR 3 / 2	90%	7.5YR 3 / 4	10%	C	M		
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

**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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

HYDROLOGY

Created? Yes _____ Ditch drains only upland? _____ Ditch constructed in wetland? _____

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? _____

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)
- _____ USGS topog map symbol

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? Yes ___ No ___ Depth (inches): _____

(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: _____ (Ditch, depression, slope, fringe, riverine) Photo direction? _____

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/15/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W24-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: SW Qtr 6-151-54

Landform (hillslope, terrace, etc.): Plane Local Relief (concave, convex, none): none Slope %: 0-3%

Subregion (LRR): Lat: 47.91856061 Long: -97.61824048 Datum: NAD 83

Soil Map Unit Name: Inkster sandy loam, 0-2 % slopes NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		
Hydric Soil Present?	**Yes**	**X**	**No**	**Is the Sampled Area within a Wetland?**	**Yes X No**
Wetland Hydrology Present?	**Yes**	**X**	**No**	**If yes, NWI field label:** PEM1A	

Remarks: **Severe Drought rating. Not inventoried by NWI.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 5' radius)			
1.	Alopecurus arundinaceus(Creeping Meadow-Foxtail)	70%	Yes	FACW
2.	Equisetum arvense(Field Horsetail)	40%	Yes	FAC
3.	Melilotus officinalis(Yellow Sweet-Clover)	15%	No	FACU
4.	Poa pratensis(Kentucky Blue Grass)	5%	No	FACU
5.				
6.				
7.				
8.				
9.				
10.				
			= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
		130%	= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **2** (A)

Total Number of Dominant Species across all Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0%	x 1	0
FACW species	70%	x 2	1.4
FAC species	40%	x 3	1.2
FACU species	20%	x 4	0.8
UPL species		x 5	
Column Totals:	1.3 (A)		3.4 (B)
Prevalence Index = B/A =			2.62

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation: meets

2 - Dominance Test is > 50%: Meets

3 - Prevalence Index is ≤ 3.0 *: Meets

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W24-w

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type*	Loc**	Texture	Remarks
0 - 18	10YR 2 / 1	90%	5YR 4 / 6	10%	C	M		Redox in PL, too. FSL Texture.
18 - 24	10YR 5 / 1	25%	7.5YR 4 / 6	25%	C	M		
-	10YR 6 / 1	50%						
-								
-								
-								
-								
-								

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

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

	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**		Depleted Matrix (F3)		Reduced Vertic (F18)
	Depleted Below Dark Surface (A11)	X	Redox Dark Surface (F6)		Red Parent Material (TF2)
X	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present, unless disturbed or problematic.

Indicators for Problematic Hydric Soils*:**

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

HYDROLOGY

Created? no Ditch drains only upland? Ditch constructed in wetland? No

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? _____

Primary Indicators (minimum of one required: check all that apply)			Secondary Indicators (minimum of two required)		
	Surface Water (A1)		Salt Crust (B11)		Surface Soil Cracks (B6)
X	High Water Table (A2)		Aquatic Invertebrates (B13)		Sparsely Vegetated Concave Surface (B8)
X	Saturation (A3)		Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
	Water Marks (B1)		Dry-Season Water Table (C2)		Oxidized Rhizospheres on Living Roots (C3)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)		**(where tilled)**
	Drift Deposits (B3)		**(where not tilled)**		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Thin Muck Surface (C7)	X	Geomorphic Position (D2)
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)	X	FAC-Neutral Test (D5)
	Water Stained Leaves (B9)		USGS topog map symbol		Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):
Water Table Present?	Yes		No	X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes		No	X	Depth (inches):

Wetland Hydrology Present? **Yes** X **No** _____

Wetland type: Depression (Ditch, depression, slope, fringe, riverine) Photo direction? E

Remarks: Soil very moist at 25"

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/15/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W24-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: SW Qtr 6-151-54

Landform (hillslope, terrace, etc.): Local Relief (concave, convex, none): none Slope %: 0-3%

Subregion (LRR): Lat: 47.9185883 Long: -97.61830773 Datum: NAD 83

Soil Map Unit Name: Inkster sandy loam, 0-2 % slopes NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**
Hydric Soil Present?	**Yes**		**No**	**X**
Wetland Hydrology Present?	**Yes**		**No**	**X**

Is the Sampled Area within a Wetland? **Yes** **No** **X**

If yes, NWI field label:

Remarks: **Severe Drought rating. Spring. Headcuts above and below W13 may have lowered the water table**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.	Fraxinus pennsylvanica(Green Ash)	1%	No	FAC
2.				
3.				
4.				
5.				
		1%	= Total Cover	
Herb Stratum	(Plot size: 5' radius)			
1.	Poa pratensis(Kentucky Blue Grass)	70%	Yes	FACU
2.	Melilotus officinalis(Yellow Sweet-Clover)	50%	Yes	FACU
3.	Alopecurus arundinaceus(Creeping Meadow-Foxtail)	5%	No	FACW
4.	Solidago arguta(Atlantic Goldenrod)	1%	No	FACU
5.	Bromis Inermis	10%	No	UPL
6.	Phalaris arundinacea(Reed Canary Grass)	2%	No	FACW
7.				
8.				
9.				
10.				
		138%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **0** (A)

Total Number of Dominant Species across all Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **0%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0%	x 1	0
FACW species	7%	x 2	0.14
FAC species	1%	x 3	0.03
FACU species	121%	x 4	4.84
UPL species		x 5	
Column Totals:	1.29 (A)		5.01 (B)
Prevalence Index = B/A =			3.88

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W24-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 15	10YR 2 / 1	100%'						
15 - 30	10YR 3 / 3	90%	7.5YR 4 / 4	10%	C	M	Loam	
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

**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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Apparently back-filled topsoil on excavation.

HYDROLOGY

Created? ___ Ditch drains only upland? ___ Ditch constructed in wetland? ___

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? ___

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)

___ USGS topog map symbol

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	X	Depth (inches): ___
Water Table Present?	Yes	___	No	X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: ___ (Ditch, depression, slope, fringe, riverine) Photo direction? ___

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/16/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W25-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: NW Qtr 35-152-55

Landform (hillslope, terrace, etc.): Ditch Local Relief (concave, convex, none): concave Slope %: 0-3%

Subregion (LRR): F Lat: 47.94285962 Long: -97.66271927 Datum: NAD 83

Soil Map Unit Name: Marysland L, 0-1 % slope & LaMoure -Fluvaquents, channeled, 0-6%, frquently flooded NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes** **X** **No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1Ax

Remarks: **Not inventoried on NWI map. Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 5x10')			
1. Phalaris arundinacea(Reed Canary Grass)	120%	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	120%	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): 1 (A)

Total Number of Dominant Species across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0%	x 1	0
FACW species	120%	x 2	2.4
FAC species	0%	x 3	0
FACU species	0%	x 4	0
UPL species		x 5	
Column Totals:	1.2 (A)		2.4 (B)
Prevalence Index = B/A =			2.00

Hydrophytic Vegetation Indicators:

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

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W25-w

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*	Loc**	Texture	Remarks
0 - 12	10YR 2 / 1	100%					Loam	
12 - 18	10YR 6 / 1	80%	7.5YR 4 / 6	20%	C	M	FSL	
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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)
- X Thick Dark Surface (A12)
- ___ Sandy Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Created? Yes ___ Ditch drains only upland? ___ Ditch constructed in wetland? No ___

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? No ___

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)
- ___ USGS topog map symbol

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)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? Yes ___ No X Depth (inches): ___

(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No** ___

Wetland type: Ditch (Ditch, depression, slope, fringe, riverine) Photo direction? SSE

Remarks: This old drainage ditch was apparently excavted to drain W26.

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/16/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W25-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: NW Qtr 35-152-55

Landform (hillslope, terrace, etc.): Floodplain Local Relief (concave, convex, none): none Slope %: 0-1%

Subregion (LRR): F Lat: 47.94284082 Long: -97.66275094 Datum: NAD 83

Soil Map Unit Name: Marysland L, 0-1 % slope & LaMoure -Fluvaquents, channeled, 0-6%, frquently flooded NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area**
Hydric Soil Present?	**Yes**		**No**	**X**	**within a Wetland?** **Yes** **No** **X**
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:**

Remarks: **Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1. Symphoricarpos sp.	2%	No	UPL
2.			
3.			
4.			
5.			
	2%	= Total Cover	
Herb Stratum (Plot size: 5')			
1. Bromus Inermis	50%	Yes	UPL
2. Elymus repens(Creeping Wild Rye)	65%	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	115%	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **0** (A)

Total Number of Dominant Species across all Strata: **1** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **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	65%	x 4	2.6
UPL species		x 5	
Column Totals:	0.65 (A)		2.6 (B)
Prevalence Index = B/A =			4.00

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W25-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 15	10YR 2 / 1	100%					Loam	
15 - 22	10YR 2 / 1	90%	7.5YR 4 / 6	10%	C	M	Loam	
22 - 28	10YR 3 / 3	90%	7.5YR 4 / 6	10%	C	M	Loam	
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

**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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Created? ___ Ditch drains only upland? ___ Ditch constructed in wetland? ___

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? Yes ___

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)
- ___ USGS topog map symbol

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? Yes ___ No ___ Depth (inches): _____

(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: _____ (Ditch, depression, slope, fringe, riverine) Photo direction? _____

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/16/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W26-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: NW Qtr 35-152-55

Landform (hillslope, terrace, etc.): See below Local Relief (concave, convex, none): concave Slope %: 0-1%

Subregion (LRR): F Lat: 47.94299445 Long: -97.66330215 Datum: NAD 83

Soil Map Unit Name: Marysland L, 0-1 % slope & LaMoure -Fluvaquents, channeled, 0-6%, frquently flooded NWI Classification: PSSA

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes** **X** **No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1/SS1Ad

Remarks: **Severe Drought rating. Wetland west end is natural depression, east end is ditch. Fill in the ditch to make a crossing east of this wetland separates it from W25.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size: 5' x 10')			
1.	Salix interior(Sandbar Willow)	20%	Yes	FACW
2.	Symphoricarpos Sp.	1%	No	UPL
3.				
4.				
5.				
		21%	= Total Cover	
Herb Stratum	(Plot size: 5' x 10')			
1.	Phalaris arundinacea(Reed Canary Grass)	80%	Yes	FACW
2.	Alopecurus arundinaceus(Creeping Meadow-Foxtail)	40%	Yes	FACW
3.	Solidago gigantea(Late Goldenrod)	1%	No	FAC
4.	Cirsium arvense(Canadian Thistle)	Trace	No	FACU
5.				
6.				
7.				
8.				
9.				
10.				
		121%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **3** (A)

Total Number of Dominant Species across all Strata: **3** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0%	x 1	0
FACW species	140%	x 2	2.8
FAC species	1%	x 3	0.03
FACU species	0%	x 4	0
UPL species		x 5	
Column Totals:	1.41 (A)		2.83 (B)
Prevalence Index = B/A =			2.01

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation — Meets

2 - Dominance Test is > 50% — Meets

3 - Prevalence Index is ≤ 3.0 * — Meets

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W26-w

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type*	Loc**	Texture	Remarks
0 - 8	10YR 2 / 1	95%	5YR 4 / 6	5%	C	M	Loam	
8 - 14	10YR 6 / 1	85%	7.5YR 5 / 6	15%	C	M	Loam	
-								
-								
-								
-								
-								
-								

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

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

	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**	X	Depleted Matrix (F3)		Reduced Vertic (F18)
X	Depleted Below Dark Surface (A11)	X	Redox Dark Surface (F6)		Red Parent Material (TF2)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present,
					unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

HYDROLOGY

Created? No Ditch drains only upland? Ditch constructed in wetland? Yes

Wetland Hydrology Indicators: Wetland extends beyond project boundary? Yes

Primary Indicators (minimum of one required: check all that apply)			Secondary Indicators (minimum of two required)
	Surface Water (A1)		Salt Crust (B11)		Surface Soil Cracks (B6)
	High Water Table (A2)		Aquatic Invertebrates (B13)		Sparsely Vegetated Concave Surface (B8)
	Saturation (A3)		Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
	Water Marks (B1)		Dry-Season Water Table (C2)		Oxidized Rhizospheres on Living Roots (C3)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)		**(where tilled)**
	Drift Deposits (B3)		**(where not tilled)**		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Thin Muck Surface (C7)	X	Geomorphic Position (D2)
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)	X	FAC-Neutral Test (D5)
	Water Stained Leaves (B9)		USGS topog map symbol		Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):
Water Table Present?	Yes		No	X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes		No	X	Depth (inches):

Wetland Hydrology Present? **Yes** X **No** _____

Wetland type: Depression & ditch (Ditch, depression, slope, fringe, riverine) Photo direction? E

Remarks: Wetland appears to be natural on west end. Ditch to river is an old excavation. Some fill in ditch to make a crossing separates this wetland from W25 ditch wetland.

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/16/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W26-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: NW Qtr 35-152-55

Landform (hillslope, terrace, etc.): Slope Local Relief (concave, convex, none): convex Slope %: 3-6%

Subregion (LRR): F Lat: 47.94297001 Long: -97.66330199 Datum: NAD 83

Soil Map Unit Name: Marysland L, 0-1 % slope & LaMoure -Fluvaquents, channeled, 0-6%, frquently flooded NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area**
Hydric Soil Present?	**Yes**		**No**	**X**	**within a Wetland?** **Yes** **No** **X**
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:**

Remarks: **Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Bromus inermis	110%	Yes	UPL
2. Solidago gigantea(Late Goldenrod)	5%	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	115%	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **0** (A)

Total Number of Dominant Species across all Strata: **0** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **#DIV/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	5%	x 3	0.15
FACU species	0%	x 4	0
UPL species		x 5	
Column Totals:	0.05 (A)		0.15 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation	Meets
2 - Dominance Test is > 50%	#DIV/0!
3 - Prevalence Index is ≤ 3.0 *	
4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).	
Problematic Hydrophytic Vegetation* (Explain)	

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W26-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 15	10YR 2 / 1	100%					Loam	
15 - 30	10YR 2 / 1	95%	7.5YR 5 / 6	5%	C	M + PL	Loam	
30 - 36	10YR 3 / 2	80%					Loam	
-	10YR 2 / 1	20%						
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

**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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOG\

Created? ___ Ditch drains only upland? ___ Ditch constructed in wetland? ___

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? ___

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)
- ___ USGS topog map symbol

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	X	Depth (inches): ___
Water Table Present?	Yes	___	No	X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: ___ (Ditch, depression, slope, fringe, riverine) Photo direction? ___

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/16/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W27-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: NW Qtr 35-152-55

Landform (hillslope, terrace, etc.): Flat Local Relief (concave, convex, none): none Slope %: 0-1%

Subregion (LRR): F Lat: 47.94159708 Long: -97.6628534 Datum: NAD 83

Soil Map Unit Name: LaMoure-Fluvaquents, channeled complex, 0-6 percent slopes, frequently flooded NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes** **X** **No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1/SSA

Remarks: **Severe Drought rating. This Wetland was outside of the project area. It was not inventoried by NWI.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size: 15' radius)			
1.	Salix interior(Sandbar Willow)	15%	Yes	FACW
2.	Cornus alba(Red Osier)	15%	Yes	FACW
3.				
4.				
5.				
		30%	= Total Cover	
Herb Stratum	(Plot size: 5' radius)			
1.	Alopecurus arundinaceus(Creeping Meadow-Foxtail)	70%	Yes	FACW
2.	Solidago gigantea(Late Goldenrod)	5%	No	FAC
3.	Elymus repens(Creeping Wild Rye)	10%	No	FACU
4.				
5.				
6.				
7.				
8.				
9.				
10.				
		85%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 10%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **3** (A)

Total Number of Dominant Species across all Strata: **3** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:
OBL species	0%	x 1	0
FACW species	100%	x 2	2
FAC species	5%	x 3	0.15
FACU species	10%	x 4	0.4
UPL species		x 5	
Column Totals:	1.15 (A)		2.55 (B)

Prevalence Index = B/A = 2.22

Hydrophytic Vegetation Indicators:

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

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W27-w

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*	Loc**	Texture	Remarks
0 - 22	10YR 2 / 1	90%	10YR 5 / 6	10%	C	M	Loam	
22 - 32	10YR 2 / 1	90%	5YR 5 / 8	10%	C	M	Loam	
32 - 38	10YR 5 / 1	80%	5YR 4 / 6	20%	C	M	fsl	
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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)
- X Thick Dark Surface (A12)
- ___ Sandy Mucky 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)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Created? No Ditch drains only upland? ___ Ditch constructed in wetland? No

Wetland Hydrology Indicators: Wetland extends beyond project boundary? Yes

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)
- ___ USGS topog map symbol

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)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):		
Water Table Present?	Yes ___	No X	Depth (inches):		
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches):	32	

Wetland Hydrology Present? **Yes** X **No** ___

Wetland type: depression* (Ditch, depression, slope, fringe, riverine) Photo direction? WSW

Remarks: Moist to 32", Saturated 32-38, no free water @ 38". *It is a slight depression or possibly slope wetland in floodplain.

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/16/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W27-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: NW Qtr 35-152-55

Landform (hillslope, terrace, etc.): Flat Local Relief (concave, convex, none): none Slope %: 0-1%

Subregion (LRR): F Lat: 47.94161712 Long: -97.66280017 Datum: NAD 83

Soil Map Unit Name: LaMoure-Fluvaquents, channeled complex, 0-6 percent slopes, frequently flooded NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**
Hydric Soil Present?	**Yes**		**No**	**X**
Wetland Hydrology Present?	**Yes**		**No**	**X**

Is the Sampled Area within a Wetland? **Yes** **No** **X**

If yes, NWI field label:

Remarks: **Severe Drought rating. This wetland was outside of the project area.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)				
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum (Plot size:)				
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum (Plot size: 5' radius)				
1.	Bromus inermis	85%	Yes	Upl
2.	Poa pratensis(Kentucky Blue Grass)	20%	Yes	FACU
3.	Alopecurus arundinaceus(Creeping Meadow-Foxtail)	5%	No	FACW
4.				
5.				
6.				
7.				
8.				
9.				
10.				
		110%	= Total Cover	
Woody Vine Stratum (Plot size:)				
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **0** (A)

Total Number of Dominant Species across all Strata: **1** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **0%** (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	0%	x 1	0
FACW species	5%	x 2	0.1
FAC species	0%	x 3	0
FACU species	20%	x 4	0.8
UPL species		x 5	
Column Totals:	0.25 (A)		0.9 (B)

Prevalence Index = B/A = 3.60

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W27-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 18	10YR 2 / 1	100%					Loam	
18 - 35	10YR 2 / 1	95%	7.5YR 5 / 6	5%	C	M	Loam	
35 - 40	10YR 3 / 3	80%					Fsl	
-	10YR 3 / 1	20%						
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOG\

Created? ___ Ditch drains only upland? ___ Ditch constructed in wetland? ___

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? ___

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)

___ USGS topog map symbol

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 X	Depth (inches):		
Water Table Present?	Yes ___	No X	Depth (inches):		
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches):		

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: ___ (Ditch, depression, slope, fringe, riverine) Photo direction? ___

Remarks: Moist, no saturation

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/16/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W28-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: S. Half 35-152-55

Landform (hillslope, terrace, etc.): Oxbow Local Relief (concave, convex, none): concave Slope %: 0-3%

Subregion (LRR): F Lat: 47.93915787 Long: -97.65711525 Datum: NAD 83

Soil Map Unit Name: LaMoure-Fluvaquents, channeled complex, 0-6 percent slopes, frequently flooded NWI Classification: PSSA+PEM1C

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes X No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1/SS1F

Remarks: **Severe Drought rating. The bottom of the oxbow has a strip of organic soil greater than 8 inches thick. See the Wetland Determination Data Form for Fen35.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size: 5' radius)			
1.	Cornus alba(Red Osier)	1%	No	FACW
2.				
3.				
4.				
5.				
		1%	= Total Cover	
Herb Stratum	(Plot size: 5' radius)			
1.	Carex aquatilis(Leafy Tussock Sedge)	60%	Yes	OBL
2.	Typha sp.	20%	No	OBL
3.	Schoenoplectus fluviatilis(River Club-Rush)	10%	No	OBL
4.	Carex pellita(Woolly Sedge)	30%	Yes	OBL
5.	Solidago gigantea(Late Goldenrod)	1%	No	FAC
6.				
7.				
8.				
9.				
10.				
		121%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **2** (A)

Total Number of Dominant Species across all Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	120%	x 1	1.2
FACW species	1%	x 2	0.02
FAC species	1%	x 3	0.03
FACU species	0%	x 4	0
UPL species		x 5	
Column Totals:	1.22 (A)		1.25 (B)
Prevalence Index = B/A =			1.02

Hydrophytic Vegetation Indicators:

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

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W28-w

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 10	10YR 2 / 1	100%					SiL	
10 - 16	Gley 4 /	100%					SiL	Chroma is "N"
-								
-								
-								
-								
-								
-								

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

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

	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**	X	Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**		Depleted Matrix (F3)		Reduced Vertic (F18)
	Depleted Below Dark Surface (A11)		Redox Dark Surface (F6)		Red Parent Material (TF2)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present,
					unless disturbed or problematic.

Indicators for Problematic Hydric Soils*:**

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** X **No**

Remarks:

HYDROLOGY

Created? N Ditch drains only upland? Ditch constructed in wetland? No

Wetland Hydrology Indicators:

Wetland extends beyond project boundary?

Primary Indicators (minimum of one required: check all that apply)			Secondary Indicators (minimum of two required)
	Surface Water (A1)		Salt Crust (B11)		Surface Soil Cracks (B6)
X	High Water Table (A2)		Aquatic Invertebrates (B13)		Sparsely Vegetated Concave Surface (B8)
X	Saturation (A3)	e	Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
	Water Marks (B1)		Dry-Season Water Table (C2)		Oxidized Rhizospheres on Living Roots (C3)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)		**(where tilled)**
	Drift Deposits (B3)		**(where not tilled)**		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Thin Muck Surface (C7)	X	Geomorphic Position (D2)
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)	X	FAC-Neutral Test (D5)
	Water Stained Leaves (B9)		USGS topog map symbol		Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):	
Water Table Present?	Yes	X	No		Depth (inches):	6
Saturation Present? (includes capillary fringe)	Yes	X	No		Depth (inches):	0

Wetland Hydrology Present? **Yes** X **No**

Wetland type: oxbow/depression (Ditch, depression, slope, fringe, riverine) Photo direction? NE

Remarks: The oxbow is separated from the river by a sediment berm on the east "leg". An old beaver dam separates it from the gullied wetland reach that was included with the wetland fringing the river. This wetland might hold surface water during wet periods. It may have a groundwater flow-through character now.

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/16/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W28-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: S. Half 35-152-55

Landform (hillslope, terrace, etc.): Floodplain Shoulder Local Relief (concave, convex, none): concave Slope %: 0-3%

Subregion (LRR): F Lat: 47.93917592 Long: -97.65715116 Datum: NAD 83

Soil Map Unit Name: LaMoure-Fluvaquents, channeled complex, 0-6 percent slopes, frequently flooded NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** **X**
Hydric Soil Present?	**Yes**		**No**	**X**	
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:**

Remarks: **Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 5' radius)			
1. Symphoricarpos sp.	3%	No	UPL
2.			
3.			
4.			
5.			
	3%	= Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Bromus inermis	50%	Yes	UPL
2. Poa pratensis(Kentucky Blue Grass)	60%	Yes	FACU
3. Solidago gigantea(Late Goldenrod)	2%	No	FAC
4. Equisetum sp.	1%	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
	113%	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **0** (A)

Total Number of Dominant Species across all Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **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	0.09
FACU species	60%	x 4	2.4
UPL species		x 5	
Column Totals:	0.63 (A)		2.49 (B)

Prevalence Index = B/A = 3.95

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** _____ **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W28-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 14	10YR 2 / 1	100%					Loam	
14 - 20	10YR 3 / 2	100%					Loam	
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Created? ___ Ditch drains only upland? ___ Ditch constructed in wetland? ___

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? ___

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)

USGS topog map symbol ___

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 X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? Yes ___ No X Depth (inches): ___

(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: ___ (Ditch, depression, slope, fringe, riverine) Photo direction? ___

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/16/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W29-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: W. Half 35-152-55

Landform (hillslope, terrace, etc.): Local Relief (concave, convex, none): concave Slope %

Subregion (LRR): F Lat: 47.94028114 Long: -97.66284621 Datum: NAD 83

Soil Map Unit Name: LaMoure-Fluvaquents, channeled complex, 0-6 percent slopes, frequently flooded NWI Classification: PEM1/SSA

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes X No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1/SSA

Remarks: **Severe Drought rating. This floodplain wetland may be a slope wetland or a shallow depression.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

	Absolute	Dominant	Indicator
Tree Stratum (Plot size: 15' Radius)	% Cover	Species?	Status
1. Salix sp. 14' tall	30%	Yes	Fac or wetter
2.			
3.			
4.			
	30%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15' Radius)			
1. Salix eriocephala(Missouri Willow)	20%	Yes	FACW
2.			
3.			
4.			
5.			
	20%	= Total Cover	
Herb Stratum (Plot size:)			
1. Urtica dioica(Stinging Nettle)	10%	Yes	FAC
2. Mentha arvensis(American Wild Mint)	20%	Yes	FACW
3. Elymus repens(Creeping Wild Rye)	5%	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	35%	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 50%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **4** (A)

Total Number of Dominant Species across all Strata: **4** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0%	x 1	0
FACW species	40%	x 2	0.8
FAC species	10%	x 3	0.3
FACU species	5%	x 4	0.2
UPL species		x 5	
Column Totals:	0.55 (A)		1.3 (B)

Prevalence Index = B/A = 2.36

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50% Meets

3 - Prevalence Index is ≤ 3.0 * Meets

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W29-w

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 14	10YR 2 / 1	95%	5YR 5 / 6	5%	C	PL + M	SiL	
14 - 30	10YR 2 / 1	100%					SiL	
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOG'

Created? No Ditch drains only upland? Ditch constructed in wetland? No

Wetland Hydrology Indicators: Wetland extends beyond project boundary? No

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)
- ___ USGS topog map symbol

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)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? Yes ___ No X Depth (inches): ___

(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No** ___

Wetland type: slope or depression (Ditch, depression, slope, fringe, riverine) Photo direction? S

Remarks: Moist to surface

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/16/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W29-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: W. Half 35-152-55

Landform (hillslope, terrace, etc.): Slope Local Relief (concave, convex, none): convex Slope %: 0-3%

Subregion (LRR): F Lat: 47.94032446 Long: -97.66289142 Datum: NAD 83

Soil Map Unit Name: LaMoure-Fluvaquents, channeled complex, 0-6 percent slopes, frequently flooded NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes** **No** **X**
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:**

Remarks: **Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 5' Radius)			
1. Cornus alba(Red Osier)	25%	Yes	FACW
2.			
3.			
4.			
5.			
	25%	= Total Cover	
Herb Stratum (Plot size: 5' Radius)			
1. Poa pratensis(Kentucky Blue Grass)	100%	Yes	FACU
2. Bromus inermis	20%	Yes	UPL
3. Solidago gigantea(Late Goldenrod)	1%	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	121%	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **1** (A)

Total Number of Dominant Species across all Strata: **3** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **33%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0%	x 1	0
FACW species	25%	x 2	0.5
FAC species	1%	x 3	0.03
FACU species	100%	x 4	4
UPL species		x 5	
Column Totals:	1.26 (A)		4.53 (B)

Prevalence Index = B/A = 3.60

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W29-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 10	10YR 2 / 1	100%					FSL	
10 - 24	10YR 2 / 1	95%	7.5YR 4 / 6	5%	C	M	FSL	
24 - 30	10YR 6 / 2	70%	7.5YR 4 / 6	10%	C	M	FSL	
-	10YR 5 / 1	20%						
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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)
- X Thick Dark Surface (A12)
- ___ Sandy Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

HYDROLOGY

Created? _____ Ditch drains only upland? _____ Ditch constructed in wetland? _____

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? _____

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)

USGS topog map symbol _____

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	X	Depth (inches): ___
Water Table Present?	Yes	___	No	X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes	X	No	___	Depth (inches): 25"

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: _____ (Ditch, depression, slope, fringe, riverine) Photo direction? _____

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/17/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W30-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: NW Qtr 35-152-55

Landform (hillslope, terrace, etc.): Slope Local Relief (concave, convex, none): concave Slope %: 0-3%

Subregion (LRR): F Lat: 47.94618899 Long: -97.66200932 Datum: NAD 83

Soil Map Unit Name: Rauville silty clay loam, 0 to 1 percent slopes, frequently flooded NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes X No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1/SSA

Remarks: **Severe Drought rating. Floodplain wetland. NWI classified parts of it as PEM1C.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 5' Radius)			
1. Salix interior(Sandbar Willow)	85%	Yes	FACW
2.			
3.			
4.			
5.			
	85%	= Total Cover	
Herb Stratum (Plot size:)			
1. Urtica dioica(Stinging Nettle)	20%	Yes	FAC
2. Solidago gigantea(Late Goldenrod)	15%	Yes	FAC
3. Phragmites australis(Common Reed)	1%	No	FACW
4. Phalaris arundinacea(Reed Canary Grass)	10%	Yes	FACW
5.			
6.			
7.			
8.			
9.			
10.			
	46%	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 40%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **4** (A)

Total Number of Dominant Species across all Strata: **4** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0%	x 1	0
FACW species	96%	x 2	1.92
FAC species	35%	x 3	1.05
FACU species	0%	x 4	0
UPL species		x 5	
Column Totals:	1.31 (A)		2.97 (B)

Prevalence Index = B/A = 2.27

Hydrophytic Vegetation Indicators:

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

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W30-w

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type*	Loc**	Texture	Remarks
0 - 15	10YR 2 / 1	95%	5YR 5 / 8	5%	C	PL + M	SiL	
15 - 21	10YR 4 / 1	85%	5YR 5 / 8	15%	C	PL + M	SiL	
-								
-								
-								
-								
-								
-								

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

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

	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**		Depleted Matrix (F3)		Reduced Vertic (F18)
	Depleted Below Dark Surface (A11)	X	Redox Dark Surface (F6)		Red Parent Material (TF2)
X	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present,
					unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

HYDROLOGY

Created? No Ditch drains only upland? _____ Ditch constructed in wetland? No

Wetland Hydrology Indicators: Wetland extends beyond project boundary? No

Primary Indicators (minimum of one required: check all that apply)			Secondary Indicators (minimum of two required)
	Surface Water (A1)		Salt Crust (B11)		Surface Soil Cracks (B6)
	High Water Table (A2)		Aquatic Invertebrates (B13)		Sparsely Vegetated Concave Surface (B8)
	Saturation (A3)		Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
	Water Marks (B1)		Dry-Season Water Table (C2)		Oxidized Rhizospheres on Living Roots (C3)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)		**(where tilled)**
	Drift Deposits (B3)		**(where not tilled)**		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Thin Muck Surface (C7)	X	Geomorphic Position (D2)
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)	X	FAC-Neutral Test (D5)
	Water Stained Leaves (B9)		USGS topog map symbol		Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):	
Water Table Present?	Yes		No	X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes		No	X	Depth (inches):	

Wetland Hydrology Present? **Yes** X **No** _____

Wetland type: Slope or depression (Ditch, depression, slope, fringe, riverine) Photo direction? SW

Remarks: A floodplain wetland. Moist to Surface

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/17/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W30-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: NW Qtr 35-152-55

Landform (hillslope, terrace, etc.): Slope Local Relief (concave, convex, none): concave Slope %: 3-6%

Subregion (LRR): F Lat: 47.94623369 Long: -97.66201617 Datum: NAD 83

Soil Map Unit Name: Rauville silty clay loam, 0 to 1 percent slopes, frequently flooded NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area within a Wetland?** **Yes**		**No**	**X**
Hydric Soil Present?	**Yes**		**No**	**X**	
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:**

Remarks: **Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 5' Radius)			
1. Salix interior(Sandbar Willow)	10%	Yes	FACW
2.			
3.			
4.			
5.			
	10%	= Total Cover	
Herb Stratum (Plot size:)			
1. Bromus inermis	80%	yes	UPL
2. Solidago gigantea(Late Goldenrod)	25%	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	105%	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **2** (A)

Total Number of Dominant Species across all Strata: **3** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **67%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0%	x 1	0
FACW species	10%	x 2	0.2
FAC species	25%	x 3	0.75
FACU species	0%	x 4	0
UPL species		x 5	
Column Totals:	0.35 (A)		0.95 (B)
Prevalence Index = B/A =			2.71

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50% — Meets

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W30-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 14	10YR 2 / 1	100%					Loam	
14 - 28	10YR 2 / 1	90%	7.5YR 4 / 6	10%	C	M	FSL	
28 - 35	10YR 3 / 2	90%	7.5YR 4 / 6	1o%	C	M	FSL	
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

HYDROLOGY

Created? _____ Ditch drains only upland? _____ Ditch constructed in wetland? _____

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? _____

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)
- _____ USGS topog map symbol

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	X	Depth (inches): _____
Water Table Present?	Yes	___	No	X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): _____

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: _____ (Ditch, depression, slope, fringe, riverine) Photo direction? _____

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/17/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W31-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: 6-151-54

Landform (hillslope, terrace, etc.): slope Local Relief (concave, convex, none): none Slope %: 0-3%

Subregion (LRR): F Lat: 47.91858802 Long: -97.61398548 Datum: NAD 83

Soil Map Unit Name: Arveson L, 0-1 % slopes; Wyndmere-Tiffany FSL, 0-2% slopes; Inkster FSL, 0-2% slopes NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes** **X** **No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1/SS1Cd

Remarks: **Severe Drought rating. Wetland is moist in severe drought. NWI classified it PEM1Ad.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size: 5' radius)			
1.	Salix interior(Sandbar Willow)	80%	yes	FACW
2.	Cornus alba(Red Osier)	10%	No	FACW
3.				
4.				
5.				
		90%	= Total Cover	
Herb Stratum	(Plot size: 5' radius)			
1.	Solidago gigantea(Late Goldenrod)	40%	Yes	FAC
2.	Elymus repens(Creeping Wild Rye)	40%	Yes	FACU
3.	Cirsium arvense(Canadian Thistle)	1%	No	FACU
4.	Equisetum arvense(Field Horsetail)	15%	No	FAC
5.				
6.				
7.				
8.				
9.				
10.				
		101%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **2** (A)

Total Number of Dominant Species across all Strata: **3** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **67%** (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1	
FACW species	x 2	
FAC species	x 3	
FACU species	x 4	
UPL species	x 5	
Column Totals: (A)		(B)
Prevalence Index = B/A =		

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50% Meets

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W31-w

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 17	10YR 2 / 1	100%					Loam	
17 - 23	10YR 5 / 2	90%	7.5YR 4 / 6	10%	C	M	FSL	
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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)**
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Created? No Ditch drains only upland? Ditch constructed in wetland?

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? No

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- X 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)

___ USGS topog map symbol

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)
- X Geomorphic Position (D2) Concave
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes	___	No	X	Depth (inches): ___
Water Table Present?	Yes	___	No	X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes	X	No	___	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Wetland type: Depression (Ditch, depression, slope, fringe, riverine) Photo direction? NE

Remarks: Moist to surface. This wetland might be partially drained by the road ditch on south end. Watermarks about 1 foot high on trees in north part.

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/17/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W31-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: SW Qtr 6-151-54

Landform (hillslope, terrace, etc.): slope Local Relief (concave, convex, none): concave Slope %: 3-6%

Subregion (LRR): F Lat: 47.91859519 Long: -97.61387876 Datum: NAD 83

Soil Map Unit Name: Arveson L, 0-1 % slopes; Wyndmere-Tiffany FSL, 0-2% slopes; Inkster FSL, 0-2% slopes NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** **X**
Hydric Soil Present?	**Yes**		**No**	**X**	
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:**

Remarks: **Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 5' radius)			
1.			
2. Salix interior(Sandbar Willow)	40%	Yes	FACW
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Elymus repens(Creeping Wild Rye)	80%	Yes	FACU
2. Solidago gigantea(Late Goldenrod)	60%	Yes	FAC
3. Melilotus officinalis(Yellow Sweet-Clover)	1%	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	101%	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
	100%	= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **2** (A)

Total Number of Dominant Species across all Strata: **3** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **67%** (A/B) 50

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	0%	x 4	0
UPL species		x 5	
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation — meets

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W31-upl

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*	Loc**	Texture	Remarks
0 - 14	10YR 2 / 1	100%					Loam	
14 - 20	10YR 3 / 2	100%					FSL	
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Created? No Ditch drains only upland? Ditch constructed in wetland?

Wetland Hydrology Indicators: Wetland extends beyond project boundary?

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)

___ USGS topog map symbol

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) Concave
- ___ 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? Yes ___ No ___ Depth (inches): _____

(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** x

Wetland type: _____ (Ditch, depression, slope, fringe, riverine) Photo direction? _____

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/18/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W32-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: SW Qtr 35-152-55

Landform (hillslope, terrace, etc.): Flat or Slope Local Relief (concave, convex, none): none Slope %: 0-3%

Subregion (LRR): F Lat: 47.9384622 Long: -97.65805904 Datum: NAD 83

Soil Map Unit Name: LaMoure-Fluvaquents, channeled complex, 0-6 percent slopes, frequently flooded NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes** **X** **No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1A

Remarks: **Not inventoried by NWI. Severe Drought rating. NOTE: WPC determined that the indicator data for this wetland is also applicable to Wetland 34.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 5' Radius)			
1.	Carex sp.	20%	No	FAC
2.	Poa pratensis(Kentucky Blue Grass)	40%	Yes	FACU
3.	Solidago gigantea(Late Goldenrod)	30%	Yes	FAC
4.	Anemone canadensis(Round-Leaf Thimbleweed)	25%	No	FACW
5.	Typha sp.	20%	No	OBL
6.				
7.				
8.				
9.				
10.				
		135%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **1** (A)

Total Number of Dominant Species across all Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **50%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20%	x 1	0.2
FACW species	25%	x 2	0.5
FAC species	50%	x 3	1.5
FACU species	40%	x 4	1.6
UPL species		x 5	
Column Totals:	1.35 (A)		3.8 (B)

Prevalence Index = B/A = 2.81

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 * Meets

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks: Carex is assumed FAC or wetter.

SOIL

Sampling Point/Wetland ID: W32-w

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 7	10YR 2 / 1	100%					Loam	
7 - 24	10YR 2 / 1	90%	5YR 5 / 6	10%	C	PL+M	Loam	
-								
-								
-								
-								
-								
-								

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

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

	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**		Depleted Matrix (F3)		Reduced Vertic (F18)
	Depleted Below Dark Surface (A11)	X	Redox Dark Surface (F6)		Red Parent Material (TF2)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present,
					unless disturbed or problematic.

Indicators for Problematic Hydric Soils*:**

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** X **No**

Remarks:

HYDROLOGY

Created? No Ditch drains only upland? Ditch constructed in wetland?

Wetland Hydrology Indicators: Wetland extends beyond project boundary? No

Primary Indicators (minimum of one required: check all that apply)			Secondary Indicators (minimum of two required)
	Surface Water (A1)		Salt Crust (B11)		Surface Soil Cracks (B6)
	High Water Table (A2)		Aquatic Invertebrates (B13)		Sparsely Vegetated Concave Surface (B8)
	Saturation (A3)		Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
	Water Marks (B1)		Dry-Season Water Table (C2)		Oxidized Rhizospheres on Living Roots (C3)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)		**(where tilled)**
	Drift Deposits (B3)		**(where not tilled)**		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Thin Muck Surface (C7)	X	Geomorphic Position (D2)
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)	X	FAC-Neutral Test (D5)
	Water Stained Leaves (B9)		USGS topog map symbol		Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes	No	X	Depth (inches):	
Water Table Present?	Yes	No	X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes	No	X	Depth (inches):	

Wetland Hydrology Present? **Yes** X **No**

Wetland type: depression (Ditch, depression, slope, fringe, riverine) Photo direction? NE

Remarks: Floodplain wetland, shallow depression. Moist to surface.

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

v Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/18/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W32-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: SW Qtr 35-152-55

Landform (hillslope, terrace, etc.): Slope Local Relief (concave, convex, none): concave Slope %: 3-6%

Subregion (LRR): F Lat: 47.93841487 Long: -97.65817615 Datum: NAD 83

Soil Map Unit Name: LaMoure-Fluvaquents, channeled complex, 0-6 percent slopes, frequently flooded NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area**
Hydric Soil Present?	**Yes**		**No**	**X**	**within a Wetland?** **Yes** **No** **X**
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:**

Remarks: **Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 5' Radius)			
1.	Poa pratensis(Kentucky Blue Grass)	75%	Yes	FACU
2.	Anemone canadensis(Round-Leaf Thimbleweed)	10%	No	FACW
3.	Solidago gigantea(Late Goldenrod)	10%	No	FAC
4.	Melilotus officinalis(Yellow Sweet-Clover)	2%	No	FACU
5.	Bromus inermis	3%	No	UPL
6.				
7.				
8.				
9.				
10.				
		100%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **0** (A)

Total Number of Dominant Species across all Strata: **1** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **0%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0%	x 1	0
FACW species	10%	x 2	0.2
FAC species	10%	x 3	0.3
FACU species	77%	x 4	3.08
UPL species		x 5	
Column Totals:	0.97 (A)		3.58 (B)
Prevalence Index = B/A =			3.69

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W32-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 22	10YR 2 / 1	100%					Loam	
22 - 36	10YR 2 / 1	90%	7.5YR 4 / 4	10%	C	M	Loam	
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

**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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Created? ___ Ditch drains only upland? ___ Ditch constructed in wetland? ___

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? ___

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)
- ___ USGS topog map symbol

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	X	Depth (inches): ___
Water Table Present?	Yes	___	No	X	Depth (inches): 36"
Saturation Present? (includes capillary fringe)	Yes	X	No	___	Depth (inches): 26"

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: ___ (Ditch, depression, slope, fringe, riverine) Photo direction? ___

Remarks: Moist to surface. Wetter than the corresponding wetland (w) sample pt.

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/18/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W33-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: SW Qtr 35-152-55

Landform (hillslope, terrace, etc.): Swale Local Relief (concave, convex, none): concave Slope %: 0-1%

Subregion (LRR): F Lat: 47.9389867 Long: -97.65845376 Datum: NAD 83

Soil Map Unit Name: LaMoure-Fluvaquents channeled complex, 0 to 6 percent slopes, frequently flooded NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes X No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1/SSA

Remarks: **Severe Drought rating. This floodplain wetland may be slope class or a slight depression. An NWI delineation of PEM1A overlapped the west edge of the WPC delineation.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)				
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum (Plot size: 5' Radius)				
1.	Cornus alba(Red Osier)	60%	Yes	FACW
2.	Salix interior(Sandbar Willow)	60%	Yes	FACW
3.				
4.				
5.				
		120%	= Total Cover	
Herb Stratum (Plot size: 5' Radius)				
1.	Virginia Creeper	20%	Yes	FAC
2.	Bromus inermis	1%	No	UPL
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
		21%	= Total Cover	
Woody Vine Stratum (Plot size:)				
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 75%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **3** (A)

Total Number of Dominant Species across all Strata: **3** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0%	x 1	0
FACW species	120%	x 2	2.4
FAC species	20%	x 3	0.6
FACU species	0%	x 4	0
UPL species		x 5	
Column Totals:	1.4 (A)		3 (B)

Prevalence Index = B/A = 2.14

Hydrophytic Vegetation Indicators:

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

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W33-w

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 6	10YR 2 / 1	100%					SiL	
6 - 30	10YR 2 / 1	90%	5YR 4 / 6	10%	C	M	SiL	
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Created? No Ditch drains only upland? ___ Ditch constructed in wetland? No

Wetland Hydrology Indicators: Wetland extends beyond project boundary? ___

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)

USGS topog map symbol ___

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)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes	___	No	X	Depth (inches): ___
Water Table Present?	Yes	___	No	X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes	X	No	___	Depth (inches): 24

Wetland Hydrology Present? **Yes** X **No** ___

Wetland type: slope or depression. (Ditch, depression, slope, fringe, riverine) Photo direction? NE

Remarks: Moist to surface. This floodplain wetland may be slope class or a slight depression.

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/18/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W33-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: SW Qtr 35-152-55

Landform (hillslope, terrace, etc.): Flat or Slope Local Relief (concave, convex, none): none Slope %: 0-1%

Subregion (LRR): F Lat: 47.93903597 Long: -97.6584796 Datum: NAD 83

Soil Map Unit Name: LaMoure-Fluvaquents channeled complex, 0 to 6 percent slopes, frequently flooded NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes**		**No**	**X**
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:**

Remarks: **Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 5' Radius)			
1. Salix interior(Sandbar Willow)	30%	Yes	FACW
2. Symphoricarpos	10%	Yes	UPL
3.			
4.			
5.			
	40%	= Total Cover	
Herb Stratum (Plot size: 5' Radius)			
1. Bromus inermis	100%	Yes	UPL
2. Poa pratensis(Kentucky Blue Grass)	20%	Yes	FACU
3. Anemone canadensis(Round-Leaf Thimbleweed)	5%	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	125%	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **1** (A)

Total Number of Dominant Species across all Strata: **4** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **25%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0%	x 1	0
FACW species	35%	x 2	0.7
FAC species	0%	x 3	0
FACU species	20%	x 4	0.8
UPL species		x 5	
Column Totals:	0.55 (A)		1.5 (B)

Prevalence Index = B/A = 2.73

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W33-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 6	10YR 2 / 1	100%					SiL	
6 - 28	10YR 2 / 1	85%	10YR 5 / 1	10%	D	M	SiL	
-			7.5YR 4 / 6	5%	C	M		
28 - 34	10YR 4 / 1	85%	7.5YR 4 / 6	15%	C	M	FSL	
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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)
- X Thick Dark Surface (A12)
- ___ Sandy Mucky 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)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Created? ___ Ditch drains only upland? ___ Ditch constructed in wetland? ___

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? ___

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)
- ___ USGS topog map symbol

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	X	Depth (inches): ___
Water Table Present?	Yes	X	No	___	Depth (inches): 34"
Saturation Present? (includes capillary fringe)	Yes	X	No	___	Depth (inches): 28"

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: ___ (Ditch, depression, slope, fringe, riverine) Photo direction? ___

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 7/16/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W35-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: NW Qtr 35-152-55

Landform (hillslope, terrace, etc.): Swale Local Relief (concave, convex, none): concave Slope %: 0-3%

Subregion (LRR): F Lat: 47.94186009 Long: -97.66013955 Datum: NAD 83

Soil Map Unit Name: LaMoure-Fluvaquents channeled complex, 0 to 6 percent slopes, frequently flooded NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.)

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes** **X** **No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1/SS1Ad

Remarks: **NWI classified it PEM1C. Extreme Drought rating. This floodplain wetland appears to be an old oxbow that was manipulated many years ago. Due to height of shrubs and herbaceous vegetation, the effect of the constructed ditches was not apparent. No scope & effect of drainage was done. Sandbar willow occupied much of the wetland. The wetland perimeter was walked in the field but an attempt to record points on the perimeter failed; the wetland and sample point locations shown on the ARD map were office-delineated.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)				
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum (Plot size: 15' Radius)				
1.	Salix interior(Sandbar Willow)	80%	Yes	FACW
2.				
3.				
4.				
5.				
		80%	= Total Cover	
Herb Stratum (Plot size: 5' Radius)				
1.	Phalaris arundinacea(Reed Canary Grass)	85%	Yes	FACW
2.	Urtica dioica(Stinging Nettle)	10%	No	FAC
3.	Persicaria amphibia(Water Smartweed)	5%	no	OBL
4.				
5.				
6.				
7.				
8.				
9.				
10.				
		100%	= Total Cover	
Woody Vine Stratum (Plot size:)				
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **2** (A)

Total Number of Dominant Species across all Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:
OBL species	5%	x 1	0.05
FACW species	165%	x 2	3.3
FAC species	10%	x 3	0.3
FACU species	0%	x 4	0
UPL species		x 5	
Column Totals:	1.8 (A)		3.65 (B)

Prevalence Index = B/A = 2.03

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50% Meets

3 - Prevalence Index is ≤ 3.0 * Meets

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks: Many of the older sandbar willow stems were dead. There were many young sandbar willow saplings less than 2' tall.

SOIL

Sampling Point/Wetland ID: W35-w

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 15	10YR 2 / 1	100%					Loam	
15 - 20	10YR 4 / 2	30%	7.5YR 5 / 8	20%	C	M	LyS	
-	10YR 2 / 1	30%					Loam	
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

**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)
- X Thick Dark Surface (A12)
- ___ Sandy Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Created? No Ditch drains only upland? ___ Ditch constructed in wetland? Yes

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? ___

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)
- ___ USGS topog map symbol

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)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes	___	No	X	Depth (inches): ___
Water Table Present?	Yes	___	No	X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Wetland type: depression (Ditch, depression, slope, fringe, riverine) Photo direction? SE, SW

Remarks: Soil was dry.

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 7/16/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W35-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: NW Qtr 35-152-55

Landform (hillslope, terrace, etc.): Swale Local Relief (concave, convex, none): concave Slope %: 0-3%

Subregion (LRR): F Lat: 47.94193413 Long: -97.66010984 Datum: NAD 83

Soil Map Unit Name: LaMoure-Fluvaquents channeled complex, 0 to 6 percent slopes, frequently flooded NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.)

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**
Hydric Soil Present?	**Yes**		**No**	**X**
Wetland Hydrology Present?	**Yes**		**No**	**X**

Is the Sampled Area within a Wetland? **Yes** **No** **X**

If yes, NWI field label:

Remarks:

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)				
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum (Plot size: 15' Radius)				
1.	Salix interior(Sandbar Willow)	50%	Yes	FACW
2.				
3.				
4.				
5.				
		50%	= Total Cover	
Herb Stratum (Plot size: 5' Radius)				
1.	Bromus inermis	100%	Yes	UPL
2.	Cirsium arvense(Canadian Thistle)	1%	No	FACU
3.	Solidago gigantea(Late Goldenrod)	1%	No	FAC
4.	Urtica dioica(Stinging Nettle)	1%	No	FAC
5.				
6.				
7.				
8.				
9.				
10.				
		103%	= Total Cover	
Woody Vine Stratum (Plot size:)				
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **1** (A)

Total Number of Dominant Species across all Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **50%** (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species		
FACW species		
FAC species		
FACU species		
UPL species		
Column Totals:		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W35-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 25	10YR 2 / 1	100%					Loam	
25 - 30	10YR 2 / 1	85%	5YR 5 / 8	15%	C	M	SiCL	
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks: Soil might have met a hydric indicator if checked deeper.

HYDROLOGY

Created? ___ Ditch drains only upland? ___ Ditch constructed in wetland? No

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? ___

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)

___ USGS topog map symbol

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)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes	___	No	X	Depth (inches): ___
Water Table Present?	Yes	___	No	X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: ___ (Ditch, depression, slope, fringe, riverine) Photo direction? ___

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 7/16/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W36-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: NW Qtr 35-152-55

Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): concave Slope %: 0-3%

Subregion (LRR): F Lat: 47.94335046 Long: -97.6602136 Datum: NAD 83

Soil Map Unit Name: LaMoure-Fluvaquents channeled complex, 0 to 6 percent slopes, frequently flooded NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.)

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes X No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1/SSA

Remarks: **NWI classified an area close to this wetland as PSSA. Extreme Drought rating. This narrow, deep floodplain wetland might be part of an ancient oxbow or an old gully with the outlet filled in by sediment. It also looks like it could have been an old borrow pit. The wetland perimeter was walked in the field but an attempt to record points on the perimeter failed; the wetland and sample point locations shown on the ARD map were office-delineated.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size: whole wetland)			
1.	Salix interior(Sandbar Willow)	65%	Yes	FACW
2.				
3.				
4.				
5.				
		65%	= Total Cover	
Herb Stratum	(Plot size: 5' Radius)			
1.	Phalaris arundinacea(Reed Canary Grass)	30%	Yes	FACW
2.	Solidago gigantea(Late Goldenrod)	15%	Yes	FAC
3.	Bromus inermis	15%	Yes	UPL
4.	Equisetum arvense(Field Horsetail)	1%	No	FAC
5.	Cirsium arvense(Canadian Thistle)	1%	No	FACU
6.				
7.				
8.				
9.				
10.				
		62%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
		120%	= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **3** (A)

Total Number of Dominant Species across all Strata: **4** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **75%** (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	0%	x 1	0
FACW species	95%	x 2	1.9
FAC species	16%	x 3	0.48
FACU species	1%	x 4	0.04
UPL species	15%	x 5	0.75
Column Totals:	1.27 (A)		3.17 (B)
Prevalence Index = B/A =			2.50

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50% Meets

3 - Prevalence Index is ≤ 3.0 * Meets

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W36-w

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 3	10YR 2 / 1	100%					SyL	
3 - 15	10YR 4 / 2	30%	7.5YR 5 / 8	10%	C	M	LyS	LFS
-	10YR 2 / 1	60%						
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) **(MLRA 72 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Created? No Ditch drains only upland? ___ Ditch constructed in wetland? No

Wetland Hydrology Indicators: Wetland extends beyond project boundary? ___

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)
- ___ USGS topog map symbol

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)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

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

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

Saturation Present? Yes ___ No X Depth (inches): _____

(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No** ___

Wetland type: depression (Ditch, depression, slope, fringe, riverine) Photo direction? WSW

Remarks: Soil was dry.

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 7/16/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W36-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: NW Qtr 35-152-55

Landform (hillslope, terrace, etc.): Slope Local Relief (concave, convex, none): concave Slope %: 6-9%

Subregion (LRR): F Lat: 47.943327 Long: -97.66022288 Datum: NAD 83

Soil Map Unit Name: LaMoure-Fluvaquents channeled complex, 0 to 6 percent slopes, frequently flooded NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.)

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area**
Hydric Soil Present?	**Yes**		**No**		**within a Wetland?** **Yes**		**No**	**X**
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:**

Remarks: **Extreme drought.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 5' Radius)			
1. Salix interior(Sandbar Willow)	10%	Yes	FACW
2.			
3.			
4.			
5.			
	10%	= Total Cover	
Herb Stratum (Plot size: 5' Radius)			
1. Bromus inermis	90%	Yes	UPL
2. Rosa arkansana(Prairie Rose)	1%	No	FACU
3. Solidago gigantea(Late Goldenrod)	5%	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	96%	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 4%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **1** (A)

Total Number of Dominant Species across all Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **50%** (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	
FACW species	
FAC species	
FACU species	
UPL species	
Column Totals:	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks:

SOIL

Sampling Point/Wetland ID: W36-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 15	10YR 2 / 1	100%					Loam	
15 - 21	10YR 2 / 2	90%	7.5YR 4 / 6	10%	C	M	Loam	LFS
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Created? No Ditch drains only upland? ___ Ditch constructed in wetland? No

Wetland Hydrology Indicators: Wetland extends beyond project boundary? ___

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)
- ___ USGS topog map symbol

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	X	Depth (inches): ___
Water Table Present?	Yes	___	No	X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes	___	No	X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: ___ (Ditch, depression, slope, fringe, riverine) Photo direction? ___

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/16/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W37-w

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: W Half 35-152-55

Landform (hillslope, terrace, etc.): Riverbank Slope Local Relief (concave, convex, none): concave Slope %: 6-9%

Subregion (LRR): F Lat: 47.94261315 Long: -97.66183141 Datum: NAD 83

Soil Map Unit Name: LaMoure-Fluvaquents frequently flooded and Rauville SiCL, frequently flooded NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		
Hydric Soil Present?	**Yes**	**X**	**No**	**Is the Sampled Area within a Wetland?**	**Yes X No**
Wetland Hydrology Present?	**Yes**	**X**	**No**	**If yes, NWI field label:**	(see Remarks)

Remarks: **Severe Drought rating. The following data is considered representative of all the fringe wetland reaches that abut OW-4 (Turtle River). NWI included PEM1C, PSSA, and PFOA. WPC considered the wetlands to include PEM1A, PEM1C and PSSA. There were several active and several inactive beaver dams of various heights. Bank erosion is extensive and active on this reach of the river, resulting in many barren and/or steep banks.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 5' radius)			
1. Salix interior(Sandbar Willow)	2%	No	FACW
2.			
3.			
4.			
5.			
	2%	= Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Carex sp.	70%	Yes	Fac or Wette
2. Xanthium strumarium(Rough Cockleburr)	5%	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	75%	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 20%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **1** (A)

Total Number of Dominant Species across all Strata: **1** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0%	x 1	0
FACW species	2%	x 2	0.04
FAC species	5%	x 3	0.15
FACU species	0%	x 4	0
UPL species		x 5	
Column Totals:	0.07 (A)		0.19 (B)
Prevalence Index = B/A =			2.71

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50% Meets

3 - Prevalence Index is ≤ 3.0 * Meets

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W37-w

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 1	10YR 3 / 1	100%					lfs	
1 - 7	10YR 7 / 1	90%	7.5YR 4 / 6	10%	C	M	lfs	
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

**Location: PL=Pore Lining, M=Matrix

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

	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**	X	Depleted Matrix (F3)		Reduced Vertic (F18)
X	Depleted Below Dark Surface (A11)		Redox Dark Surface (F6)		Red Parent Material (TF2)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present,
					unless disturbed or problematic.

Indicators for Problematic Hydric Soils*:**

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** X **No**

Remarks:

HYDROLOGY

Created? No Ditch drains only upland? Ditch constructed in wetland? No

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? No

Primary Indicators (minimum of one required: check all that apply)			Secondary Indicators (minimum of two required)
	Surface Water (A1)		Salt Crust (B11)		Surface Soil Cracks (B6)
X	High Water Table (A2)		Aquatic Invertebrates (B13)		Sparsely Vegetated Concave Surface (B8)
X	Saturation (A3)		Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
	Water Marks (B1)		Dry-Season Water Table (C2)		Oxidized Rhizospheres on Living Roots (C3)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)		**(where tilled)**
	Drift Deposits (B3)		**(where not tilled)**		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Thin Muck Surface (C7)	X	Geomorphic Position (D2)
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)	X	FAC-Neutral Test (D5)
	Water Stained Leaves (B9)		USGS topog map symbol		Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes		No	X	Depth (inches):	
Water Table Present?	Yes	X	No		Depth (inches):	15"
Saturation Present? (includes capillary fringe)	Yes	X	No		Depth (inches):	10"

Wetland Hydrology Present? **Yes** X **No**

Wetland type: fringe (Ditch, depression, slope, fringe, riverine) Photo direction? NE

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/16/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W37-upl

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: W Half 35-152-55

Landform (hillslope, terrace, etc.): Shoulder Slope Local Relief (concave, convex, none): convex Slope %: 6-9%

Subregion (LRR): F Lat: 47.94267136 Long: -97.66184809 Datum: NAD 83

Soil Map Unit Name: LaMoure-Fluvaquents frequently flooded and Rauville SiCL, frequently flooded NWI Classification:

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**Is the Sampled Area within a Wetland?** **Yes**		**No**	**X**
Hydric Soil Present?	**Yes**		**No**	**X**	
Wetland Hydrology Present?	**Yes**		**No**	**X**	**If yes, NWI field label:**

Remarks: **Severe Drought rating.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 5' radius)			
1. Salix interior(Sandbar Willow)	Trace	No	FACW
2.			
3.			
4.			
5.			
	0%	= Total Cover	
Herb Stratum (Plot size: 5' radius)			
1. Bromus inermis	100%	Yes	UPL
2. Solidago gigantea(Late Goldenrod)	5%	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	105%	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **0** (A)

Total Number of Dominant Species across all Strata: **1** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **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	5%	x 3	0.15
FACU species	0%	x 4	0
UPL species		x 5	
Column Totals:	0.05 (A)		0.15 (B)
Prevalence Index = B/A =			3.00

Hydrophytic Vegetation Indicators:

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

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks: (Side Note for the linear drain reach north-northeast of W25 where two tiny spots are shown as being within the survey area; Kentucky bluegrass was a dominant in bottom of ditch with sandbar willow. WPC determined it to be non-wetland.)

SOIL

Sampling Point/Wetland ID: W37-upl

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 18	10YR 2 / 1	100%					Loam	
18 - 25	10YR 3 / 2	90%	7.5YR 4 / 4	10%	C	M	Fsl	
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Created? ___ Ditch drains only upland? ___ Ditch constructed in wetland? ___

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? ___

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)
- ___ USGS topog map symbol

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 X	Depth (inches):	
Water Table Present?	Yes ___	No X	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches):	

Wetland Hydrology Present? **Yes** ___ **No** X

Wetland type: ___ (Ditch, depression, slope, fringe, riverine) Photo direction? ___

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 10/27/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W38-w

Investigator(s): Mark A Anderson WPC Project 357-23-MA Section, Township, Range: West half 35-152-55

Landform (hillslope, terrace, etc.): Swale Local Relief (concave, convex, none): concave Slope %: 0-3%

Subregion (LRR): F Lat: 47.94041977 Long: -97.65280383 Datum: NAD 83

Soil Map Unit Name: LaMoure-Fluvaquents channeled complex, 0 to 6 percent slopes, frequently flooded NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? Yes (If no, explain in Remarks.)

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**		**No**		**within a Wetland?** **Yes** **X** **No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1/SSA

Remarks: **Due to time constraints, WPC did not sample soil in this wetland. The wetland was on one side (~ north half) of the swale, rather than the usual center position of a wetland in a swale. The swale was relatively flat. NWI inventoried it as a PEM1C, with a narrow PEM1A extending upslope from it; the vegetation in the PEM1A was not hydrophytic.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size: whole wetland)			
1.	Salix interior(Sandbar Willow)	20%	Yes	FACW
2.				
3.				
4.				
5.				
		20%	= Total Cover	
Herb Stratum	(Plot size: 5' Radius)			
1.	Phalaris arundinacea(Reed Canary Grass)	85%	Yes	FACW
2.	Solidago gigantea(Late Goldenrod)	5%	No	FAC
3.	Bromus inermis			
4.	Equisetum arvense(Field Horsetail)			
5.	Cirsium arvense(Canadian Thistle)			
6.				
7.				
8.				
9.				
10.				
		90%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
		120%	= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **2** (A)

Total Number of Dominant Species across all Strata: **2** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	0%	x 1	0
FACW species	105%	x 2	2.1
FAC species	5%	x 3	0.15
FACU species	0%	x 4	0
UPL species		x 5	
Column Totals:	1.1 (A)		2.25 (B)
Prevalence Index = B/A =			2.05

Hydrophytic Vegetation Indicators:

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

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W38-w

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** _____

Remarks:

HYDROLOGY

Created? No Ditch drains only upland? Ditch constructed in wetland? No

Wetland Hydrology Indicators: Wetland extends beyond project boundary?

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)

___ USGS topog map symbol

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)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

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

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

Saturation Present? Yes ___ No ___ Depth (inches): _____

(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No** _____

Wetland type: slope (Ditch, depression, slope, fringe, riverine) Photo direction?

Remarks: The area had received substantial rain prior to the field visit. Only two hydrology indicators were checked in the limited time available.

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 10/27/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: W39-w

Investigator(s): Mark A Anderson WPC Project 357-23-MA Section, Township, Range: Southwest Qtr of 36-152-55

Landform (hillslope, terrace, etc.): Depression Local Relief (concave, convex, none): concave Slope %: 0-3%

Subregion (LRR): F Lat: 47.93930564 Long: -97.64383711 Datum: NAD 83

Soil Map Unit Name: Velva sandy loam, moist, 0 to 6 percent slopes, occasionally flooded NWI Classification: (see Remarks)

Are climatic / hydrologic conditions in and around the site typical for this time of year? Yes (If no, explain in Remarks.)

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**		**No**		**within a Wetland?** **Yes** **X** **No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1/SSA

Remarks: **Due to time constraints, WPC did not sample soil in this wetland. The wetland was in a shallow oxbow. NWI classified it as PABFx.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size: whole wetland)			
1.	Salix interior(Sandbar Willow)	10%	Yes	FACW
2.	Red Osier(Cornus alba)	5%	Yes	FACW
3.				
4.				
5.				
		15%	= Total Cover	
Herb Stratum	(Plot size: 5' Radius)			
1.	Phalaris arundinacea(Reed Canary Grass)	90%	Yes	FACW
2.	Solidago gigantea(Late Goldenrod)	2%	No	FAC
3.	Bromus inermis			
4.	Equisetum arvense(Field Horsetail)			
5.	Cirsium arvense(Canadian Thistle)			
6.				
7.				
8.				
9.				
10.				
		92%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
		120%	= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **3** (A)

Total Number of Dominant Species across all Strata: **3** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	0%	x 1	0
FACW species	105%	x 2	2.1
FAC species	2%	x 3	0.06
FACU species	0%	x 4	0
UPL species		x 5	
Column Totals:	1.07 (A)		2.16 (B)
Prevalence Index = B/A =			2.02

Hydrophytic Vegetation Indicators:

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

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: W39-w

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** _____

Remarks:

Soil was not checked due to time constraints.

HYDROLOGY

Created? No Ditch drains only upland? _____ Ditch constructed in wetland? No

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? _____

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)

_____ USGS topog map symbol

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)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches):	
Water Table Present?	Yes ___	No ___	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ___	No ___	Depth (inches):	

Wetland Hydrology Present? **Yes** X **No** ___

Wetland type: depression (Ditch, depression, slope, fringe, riverine) Photo direction? _____

Remarks: The area had received substantial rain prior to the field visit. Only two hydrology indicators were checked in the limited time available.

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/17/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: Fen1

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: NW Qtr 6-151-54

Landform (hillslope, terrace, etc.): Local Relief (concave, convex, none): none Slope %: 0-3%

Subregion (LRR): Lat: Long: Datum: NAD 83

Soil Map Unit Name: Rauville silty clay loam, 0 to 1 percent slopes, frequently flooded NWI Classification: PSSC

No Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes** **X** **No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1/SSF

Remarks: **This sample area is level or nearly level. It is a fen. Severe Drought condition at time of evaluation. In the wetland area surrounding this sample area, there is a large acreage dominated by very tall cattails, with minor amounts of other herbaceous species. In the surrounding wetland area, there is also a large scrub-shrub acreage. WPC identified organic soil > 8 inches thick in both plant communities. Areas with less than 8 inches of organic soil were also observed in both plant communities. Thinner organic soil was typically found closer to the interspesed small channels or beaver runs.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size: 10' radius)			
1.	Alnus incana(Speckled Alder)	10%	Yes	FACW
2.	Salix candida(Sage Willow)	6%	Yes	OBL
3.	Diamond willow sp	1%	No	
4.				
5.				
		17%	= Total Cover	
Herb Stratum	(Plot size: 5' radius)			
1.	Carex aquatilis(Leafy Tussock Sedge)	100%	Yes	OBL
2.	Rumex occidentalis(Western Dock)	3%	No	OBL
3.	Typha angustifolia(Narrow-Leaf Cat-Tail)	5%	No	OBL
4.				
5.				
6.				
7.				
8.				
9.				
10.				
			= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 800%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **3** (A)

Total Number of Dominant Species across all Strata: **3** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	114%	x 1	1.14
FACW species	0%	x 2	0
FAC species	0%	x 3	0
FACU species	0%	x 4	0
UPL species		x 5	
Column Totals:	1.14 (A)		1.14 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation — meets

2 - Dominance Test is > 50%

3 - Prevalence Index is ≤ 3.0 *

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point/Wetland ID: Fen1

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 6	10YR 3 / 2	100%	10YR 3 / 2				Fibric	
6 - 18	Black	100%					Hemic	
-								
-								
-								
-								
-								
-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

**Location: PL=Pore Lining, M=Matrix

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

X	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
X	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
X	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**		Depleted Matrix (F3)		Reduced Vertic (F18)
	Depleted Below Dark Surface (A11)	X	Redox Dark Surface (F6)		Red Parent Material (TF2)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present,
					unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** X **No**

Remarks:

HYDROLOGY

Created? Ditch drains only upland? Ditch constructed in wetland?

Wetland Hydrology Indicators:

Wetland extends beyond project boundary?

Primary Indicators (minimum of one required: check all that apply)			Secondary Indicators (minimum of two required)	
X	Surface Water (A1)		Salt Crust (B11)		Surface Soil Cracks (B6)
X	High Water Table (A2)		Aquatic Invertebrates (B13)		Sparsely Vegetated Concave Surface (B8)
X	Saturation (A3)		Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
	Water Marks (B1)		Dry-Season Water Table (C2)		Oxidized Rhizospheres on Living Roots (C3)
	Sediment Deposits (B2)	X	Oxidized Rhizospheres on Living Roots (C3)		**(where tilled)**
	Drift Deposits (B3)		**(where not tilled)**		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Thin Muck Surface (C7)	X	Geomorphic Position (D2) Concave
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)	X	FAC-Neutral Test (D5)
	Water Stained Leaves (B9)		USGS topog map symbol		Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

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

Wetland Hydrology Present? **Yes** X **No**

Wetland type: FEN (Ditch, depression, slope, fringe, riverine) Photo direction? None

Remarks:

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/18/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: QFen2

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: SW Qtr 31-152-54

Landform (hillslope, terrace, etc.): Flat Local Relief (concave, convex, none): none Slope %: 0-1%

Subregion (LRR): F Lat: Long: Datum: NAD 83

Soil Map Unit Name: Rauville silty clay loam, 0 to 1 percent slopes, frequently flooded NWI Classification: PSSC

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes** **X** **No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1/SSF

Remarks: **Severe Drought rating. Collected 10" surface horizon soil sample and labeled it QFen2. Soil was slightly frozen at 16" depth. Although the surface was saturated, there was no free water in the top 7 inches, possibly due to the frost. In sample points checked further north, organic soil thickness changed significantly in short distances.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 5' Radius)			
1.	Carex laeviconica(Smooth-Cone Sedge)	120%	Yes	OBL
2.	Carex pellita(Woolly Sedge)	5%	No	OBL
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
		125%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **1** (A)

Total Number of Dominant Species across all Strata: **1** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	125%	x 1	1.25
FACW species	0%	x 2	0
FAC species	0%	x 3	0
FACU species	0%	x 4	0
UPL species		x 5	
Column Totals:	1.25 (A)		1.25 (B)
Prevalence Index = B/A =			1.00

Hydrophytic Vegetation Indicators:

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

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks: The Sample area was in a small area of sedge meadow with scrub-shrub wetland to the north, east, and west.

SOIL

Sampling Point/Wetland ID: QFen2

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 8	Black	60%					Fibric	
-	Dark Brown	40%						
8 - 16+	Black	100%					Hemic	
-								
-								
-								
-								
-								

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

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

- X Histosol (A1)
- X Histic Epipedon (A2)
- X Black Histic (A3)
- X 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 Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Created? No Ditch drains only upland? Ditch constructed in wetland?

Wetland Hydrology Indicators:

Wetland extends beyond project boundary?

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

- ___ Surface Water (A1)
- X High Water Table (A2)
- X 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)
- X 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)

USGS topog map symbol

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)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes	___	No	X	Depth (inches): ___
Water Table Present?	Yes	X	No	___	Depth (inches): 7"
Saturation Present? (includes capillary fringe)	Yes	X	No	___	Depth (inches): 0"

Wetland Hydrology Present? **Yes** X **No** ___

Wetland type: Fen (Ditch, depression, slope, fringe, riverine) Photo direction? SE

Remarks: Frost at 16". Questioned if it is a fen because wate table did not reach the surface.

APPENDIX E. WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam Rehabilitation Planning Project City: County: Grand Forks Sampling Date: 6/18/2021

Applicant/Owner: HDR Inc. for Grand Forks Co. Water Mgmt District State: N.Dakota Sampling Point/Wetland ID: QFen35

Investigator(s): Mark A Anderson, David J. Breker WPC Project 357-23-MA Section, Township, Range: S. Half 35-152-55

Landform (hillslope, terrace, etc.): Oxbow Flat Local Relief (concave, convex, none): none Slope %: 0-1%

Subregion (LRR): F Lat: Long: Datum: NAD 83

Soil Map Unit Name: Lamoure Fluvaquents, channeled complex, 1-6% Slope, frequently flooded NWI Classification: PEM1C

Are climatic / hydrologic conditions in and around the site typical for this time of year? No (If no, explain in Remarks.) Dry

Are Vegetation No ; Soil No ; or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes

Are Vegetation No ; Soil No ; or Hydrology No 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**	**X**	**No**		**Is the Sampled Area**
Hydric Soil Present?	**Yes**	**X**	**No**		**within a Wetland?** **Yes X No**
Wetland Hydrology Present?	**Yes**	**X**	**No**		**If yes, NWI field label:** PEM1F

Remarks: **Severe Drought rating. Fen corresponds to green cattails. Note: No organic soil by old beaver dam N of sample pts. Where organic soil was > 8" thick, the cattails were noticeably greener than adjacent areas; the adjacent areas had abundant cattail residue but not as much new, green growth. This wetland might hold surface water during wet periods. It may have flow-through wetland hydrology character.**

VEGETATION - Use scientific names of plants.

Note: Species not on the drop-down list or not identified are explained in Vegetation Remarks.

		Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
			= Total Cover	
Sapling/Shrub Stratum	(Plot size:)			
1.				
2.				
3.				
4.				
5.				
			= Total Cover	
Herb Stratum	(Plot size: 5' Radius)			
1.	Typha sp.	120%	Yes	OBL
2.	Schoenoplectus fluviatilis(River Club-Rush)	10%	No	OBL
3.	Equisetum arvense(Field Horsetail)	2%	No	OBL
4.				
5.				
6.				
7.				
8.				
9.				
10.				
		132%	= Total Cover	
Woody Vine Stratum	(Plot size:)			
1.				
2.				
			= Total Cover	

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species that are OBL, FACW, or FAC (excluding FAC -): **1** (A)

Total Number of Dominant Species across all Strata: **1** (B)

Percent of Dominant Species that are OBL, FACW, or FAC: **100%** (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	132%	x 1	1.32
FACW species	0%	x 2	0
FAC species	0%	x 3	0
FACU species	0%	x 4	0
UPL species		x 5	
Column Totals:	1.32 (A)		1.32 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is > 50% Meets

3 - Prevalence Index is ≤ 3.0 * Meets

4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet).

Problematic Hydrophytic Vegetation* (Explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks: Short shoots on fen horsetail. Very few green cattails in non-fen, but abundant cattail residue adjacent to the fen. Note: Some shorter green cattails at east end, Trimble pt. organic 10+ .

SOIL

Sampling Point/Wetland ID: QFen35

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0 - 12	Black	100%					Fibric	
12 - 20	Black	100%					Hemic	
-								
-								
-								
-								
-								
-								

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

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

X	Histosol (A1)		Sandy Gleyed Matrix (S4)		1 cm Muck (A9) **(LRR I, J)**
X	Histic Epipedon (A2)		Sandy Redox (S5)		Coast Prairie Redox (A16) **(LRR F, G, H)**
X	Black Histic (A3)		Stripped Matrix (S6)		Dark Surface (S7) **(LRR G)**
	Hydrogen Sulfide (A4)		Loamy Mucky Mineral (F1)		High Plains Depressions (F16)
	Stratified Layers (A5) **(LRR F)**		Loamy Gleyed Matrix (F2)		**(LRR H outside MLRA 72 & 73)**
	1 cm Muck (A9) **(LRR F, G, H)**		Depleted Matrix (F3)		Reduced Vertic (F18)
	Depleted Below Dark Surface (A11)		Redox Dark Surface (F6)		Red Parent Material (TF2)
	Thick Dark Surface (A12)		Depleted Dark Surface (F7)		Very Shallow Dark Surface (TF12)
	Sandy Mucky Mineral (S1)		Redox Depressions (F8)		Other (Explain in Remarks)
	2.5 cm Mucky Peat or Peat (S2) **(LRR G, H)**		High Plains Depressions (F16)		*** Indicators of hydrophytic vegetations and
	5 cm Mucky Peat or Peat (S3) **(LRR F)**		**(MLRA 72 & 73 of LRR H)**		wetland hydrology must be present,
					unless disturbed or problematic.

Indicators for Problematic Hydric Soils*:**

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** X **No**

Remarks:

HYDROLOGY

Created? N Ditch drains only upland? Ditch constructed in wetland? No

Wetland Hydrology Indicators:

Wetland extends beyond project boundary? No

Primary Indicators (minimum of one required: check all that apply)				Secondary Indicators (minimum of two required)	
X	Surface Water (A1)		Salt Crust (B11)		Surface Soil Cracks (B6)
X	High Water Table (A2)		Aquatic Invertebrates (B13)		Sparsely Vegetated Concave Surface (B8)
X	Saturation (A3)		Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
	Water Marks (B1)		Dry-Season Water Table (C2)		Oxidized Rhizospheres on Living Roots (C3)
	Sediment Deposits (B2)		Oxidized Rhizospheres on Living Roots (C3)		**(where tilled)**
	Drift Deposits (B3)		**(where not tilled)**		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Presence of Reduced Iron (C4)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Thin Muck Surface (C7)	X	Geomorphic Position (D2)
	Inundation Visible on Aerial Imagery (B7)		Other (Explain in Remarks)	X	FAC-Neutral Test (D5)
	Water Stained Leaves (B9)		USGS topog map symbol		Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes	X	No		Depth (inches):	
Water Table Present?	Yes	X	No		Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes	X	No		Depth (inches):	

Wetland Hydrology Present? **Yes** X **No**

Wetland type: Fen (Ditch, depression, slope, fringe, riverine) Photo direction? SSE

Remarks: Water is about 1" deep when standing on residue. There was no surface water at 3" thick organic soil sample point a few feet away. A natural levee separates the east leg of this oxbow from the river. An old beaver dam separates the west leg of the oxbow wetland from the gully wetland that is delineated contiguous with river fringe wetland.

WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Larimore Dam City/County: Grand Forks Sampling Date: 6/15/21
Applicant/Owner: State: ND Sampling Point: 1
Investigator(s): Bradbury Sveen Section, Township, Range: 36-152-55 1-151-55
Landform (hillslope, terrace, etc.): Riverine Local Relief (concave, convex, none): Concave Slope %: 0-2
Subregion (LRR): F Lat: Long: Datum:
Soil Map Unit Name: Velva sandy loam, Rauville silty clay loam NWI Classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes No X (If no, explain in Remarks.)
Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No
Are Vegetation No, Soil No, or Hydrology No 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	X	No		
Hydric Soil Present?	Yes	X	No	**Is the Sampled Area within a Wetland?**	Yes X No
Wetland Hydrology Present?	Yes	X	No		

Remarks: Very hot & dry for the time of year.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size:)			
1. Slough sedge			
2. Prairie Cordgrass			
3. Reed canary			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		
% Bare Ground in Herb Stratum			

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC -): (A)
Total Number of Dominant Species Across All Strata: (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A =

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

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No

Remarks:

1

SOIL

Sampling Point:

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type*	Redox Features Loc**	Texture	Remarks
0-								

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. **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)
- X Thick Dark Surface (A12)
- ___ Sandy Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils*:**

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

*** Indicators of hydrophytic vegetations and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- X Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Water Stained Leaves (B9)
- ___ Salt Crust (B11)
- X 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)
- X Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) **(where tilled)**
- X Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) **(LRR F)**

Field Observations:

Surface Water Present?	Yes	X No	___	Depth (inches):	
Water Table Present?	Yes	X No	___	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes	X No	___	Depth (inches):	

Wetland Hydrology Present? Yes X No ___

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

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Larimore Dam City/County: Grand Forks Sampling Date: 6/16/21

Applicant/Owner: State: ND Sampling Point: 2, 3, 4, 5

Investigator(s): Bradbury Section, Township, Range: 1-151-55

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): Concave Slope (%): 0-2

Subregion (LRR): F Lat: Long: Datum:

Soil Map Unit Name: Wyndmere Tiffany fsl NWI classification:

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

Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation No, Soil No, or Hydrology No 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 X No ____	**Is the Sampled Area within a Wetland?** Yes X No ____
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks:
Very hot & dry for the time of year

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. foxtail barley			
2. cattail			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	____ = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): ____ (A)

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

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

Prevalence Index worksheet:

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

Prevalence Index = B/A = ____

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, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No ____

Remarks:

SOIL

Sampling Point: 2, 3, 4, 5

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

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

Hydric Soil Indicators: (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)
- X Thick Dark Surface (A12)
- ___ Sandy Mucky 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 & 73 of LRR H)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR I, J)**
- ___ Coast Prairie Redox (A16) **(LRR F, G, H)**
- ___ Dark Surface (S7) **(LRR G)**
- ___ High Plains Depressions (F16) **(LRR H outside of MLRA 72 & 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 X No ___

Remarks:

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

Field Observations:

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

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

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

Wetland Hydrology Present? Yes X No ___

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

Remarks:

North Dakota Department of Transportation – Other Waters Information

July 8, 2014

Stream/Waterbody Name (if known):

Appendix E

Waterbody ID #: OW-1

Associated Wetland #: Wetland 1

Date: 06-10-2021	**Project Name & No.:** WPC Larimore Dam 357-23-MA	**Reference pt.:** OW-1
Investigators: M & D	**State/County:** ND Grand Forks	**Quad Name:** Larimore East

PHYSICAL ATTRIBUTES

Waterbody Type	Lake ☐	Pond ☐	Borrow Pit ☑	River ☐	Stream ☐	Other:				
Subsurface Flow?	Yes ☐	No ☐	Unknown ☑							
Flow type	Perennial (Flows year round) ☐	Intermittent (Flows <3 months) ☐	Seasonal (Continuous flow ≥ 3 months) ☐	Ephemeral (Flows only in response to rainfall) ☐						
Stream Width @ OHWM (ft.)	0 - 1 ☐	1 - 3 ☐	3 - 6 ☐	6 - 9 ☐	9+ ☐					
Water Depth - Current (ft.)	0 - 1 ☐	1 - 3 ☐	3 - 6 ☑	6 - 9 ☐	9+ ☐					
OHWM Indicator (check all applicable)	Natural Line Impress on bank ☑	Sediment Sorting ☐	Shelving ☐	Litter disturbed or washed away ☐						
	Changes in character of soil ☐	Scour ☐	Destruction of terrestrial vegetation ☐	Deposition ☐						
	Presence of litter or debris ☐	Multiple observed flow events ☐	Wracking ☐	Bed and bank ☐						
	Vegetation matted down, bent or absent ☐	Water staining ☐	Change in plant community ☑							
Channel Height (ft.) (OHWM to channel bottom looking downstream)	Left:	0 - 2 ☐	2 - 4 ☐	4+ ☐						
	Right:	0 - 2 ☐	2 – 4 ☐	4+ ☐						

QUALITATIVE ATTRIBUTES

Stream Substrate %	Silts	Cobbles	Bedrock	Sands	Gravel
	Concrete	Muck	Vegetation		
	Other - Explain:				
Aquatic Habitats	Sand Bar ☐	Gravel Riffles ☐	In-stream emergent plants ☐		
	Gravel Bar ☐	Deep Pools ☑	In-stream submerged plants ☐		
	Mud Bar ☐	Bank root systems ☐			
	Undercut Banks ☐	Overhanging trees/shrubs ☐	Fringing Wetlands ☑		
Stream is:	Natural ☑	Artificial (Man-Made) ☐	Manipulated Armored		

LAKES AND OTHER DEEPWATER HABITAT

Shoreline Type: Silts ☑ Cobbles ☐ Bedrock ☐ Concrete ☐ Muck ☐ Vegetation ☐

Other (explain):

North Dakota Department of Transportation – Other Waters Information

July 8, 2014

Stream/Waterbody Name (if known): South Branch of Turtle River

Appendix E

Waterbody ID #: OW-2

Associated Wetland #: none

Date: 06-10-2021	**Project Name & No.:** WPC Larimore Dam 357-23-MA	**Reference pt.:** OW-2
Investigators: M & D	**State/County:** ND Grand Forks	**Quad Name:** Larimore East

PHYSICAL ATTRIBUTES

Waterbody Type	Lake ☐	Pond ☐	Borrow Pit ☐	River ☑	Stream ☐	Other:				
Subsurface Flow?	Yes ☐	No ☐	Unknown ☑							
Flow type	Perennial (Flows year round) ☑	Intermittent (Flows <3 months) ☐	Seasonal (Continuous flow ≥ 3 months) ☐	Ephemeral (Flows only in response to rainfall) ☐						
Stream Width @ OHWM (ft.)	0 - 1 ☐	1 - 3 ☐	3 - 6 ☐	6 - 9 ☐	9+ ☑					
Water Depth - Current (ft.)	0 - 1 ☐	1 - 3 ☐	3 - 6 ☑	6 - 9 ☐	9+ ☐					
OHWM Indicator (check all applicable)	Natural Line Impress on bank ☐	Sediment Sorting ☐	Shelving ☐	Litter disturbed or washed away ☐						
	Changes in character of soil ☐	Scour ☐	Destruction of terrestrial vegetation ☐	Deposition ☐						
	Presence of litter or debris ☑	Multiple observed flow events ☐	Wracking ☐	Bed and bank ☐						
	Vegetation matted down, bent or absent ☐	Water staining ☑	Change in plant community ☐							
Channel Height (ft.) (OHWM to channel bottom looking downstream)	Left:	0 - 2 ☐	2 - 4 ☐	4+ ☑						
	Right:	0 - 2 ☐	2 – 4 ☐	4+ ☑						

QUALITATIVE ATTRIBUTES

Stream Substrate %	Silts 60	Cobbles	Bedrock	Sands	Gravel
	Concrete	Muck	Vegetation		
	Other - Explain: Rocks 40%				
Aquatic Habitats	Sand Bar ☐	Gravel Riffles ☐	In-stream emergent plants ☑		
	Gravel Bar ☐	Deep Pools ☐	In-stream submerged plants ☑		
	Mud Bar ☐	Bank root systems ☐			
	Undercut Banks ☐	Overhanging trees/shrubs ☑	Fringing Wetlands ☐		
Stream is:	Natural ☑	Artificial (Man-Made) ☐	Manipulated Armored		

LAKES AND OTHER DEEPWATER HABITAT

Shoreline Type: Silts ☐ Cobbles ☐ Bedrock ☐ Concrete ☐ Muck ☐ Vegetation ☐

Other (explain):

North Dakota Department of Transportation – Other Waters Information

July 8, 2014

Appendix E

Stream/Waterbody Name (if known):

Waterbody ID #: OW-3

Associated Wetland #: none

Date: 06-10-2021	**Project Name & No.:** WPC Larimore Dam 357-23-MA	**Reference pt.:** OW-3
Investigators: M & D	**State/County:** ND Grand Forks	**Quad Name:** Larimore East

PHYSICAL ATTRIBUTES

Waterbody Type	Lake ☐	Pond ☑	Borrow Pit ☐	River ☐	Stream ☐	Other:				
Subsurface Flow?	Yes ☐	No ☑	Unknown ☐							
Flow type	Perennial (Flows year round) ☐	Intermittent (Flows <3 months) ☐	Seasonal (Continuous flow ≥ 3 months) ☐	Ephemeral (Flows only in response to rainfall) ☐						
Stream Width @ OHWM (ft.)	0 - 1 ☐	1 - 3 ☐	3 - 6 ☐	6 - 9 ☐	9+ ☐					
Water Depth - Current (ft.)	0 - 1 ☐	1 - 3 ☑	3 - 6 ☐	6 - 9 ☐	9+ ☐					
OHWM Indicator (check all applicable)	Natural Line Impress on bank ☐	Sediment Sorting ☐	Shelving ☐	Litter disturbed or washed away ☐						
	Changes in character of soil ☐	Scour ☐	Destruction of terrestrial vegetation ☐	Deposition ☐						
	Presence of litter or debris ☐	Multiple observed flow events ☐	Wracking ☐	Bed and bank ☐						
	Vegetation matted down, bent or absent ☐	Water staining ☐	Change in plant community ☑							
Channel Height (ft.) (OHWM to channel bottom looking downstream)	Left:	0 - 2 ☐	2 - 4 ☐	4+ ☐						
	Right:	0 - 2 ☐	2 – 4 ☐	4+ ☐						

QUALITATIVE ATTRIBUTES

Stream Substrate %	Silts	Cobbles	Bedrock	Sands	Gravel
	Concrete	Muck	Vegetation		
	Other - Explain:				
Aquatic Habitats	Sand Bar ☐	Gravel Riffles ☐	In-stream emergent plants ☐		
	Gravel Bar ☐	Deep Pools ☐	In-stream submerged plants ☑		
	Mud Bar ☐	Bank root systems ☐			
	Undercut Banks ☐	Overhanging trees/shrubs ☐	Fringing Wetlands ☐		
Stream is:	Natural ☐	Artificial (Man-Made) ☐	Manipulated		

LAKES AND OTHER DEEPWATER HABITAT

Shoreline Type: Silts ☐ Cobbles ☐ Bedrock ☐ Concrete ☐ Muck ☐ Vegetation ☑

Other (explain):

It is a water hazard (pond) on Larimore Golf Course. It probably should be classified as a wetland instead of Other Water.

North Dakota Department of Transportation – Other Waters Information

July 8, 2014

Appendix E

Stream/Waterbody Name (if known): South Branch of Turtle River

Waterbody ID #: OW-4

Associated Wetland #: Wetland 30,37

Date: 06-10-2021	**Project Name & No.:** WPC Larimore Dam 357-23-MA	**Reference pt.:** OW-4
Investigators: M & D	**State/County:** ND Grand Forks	**Quad Name:** Larimore West

PHYSICAL ATTRIBUTES

Waterbody Type	Lake ☐	Pond ☐	Borrow Pit ☑	River ☐	Stream ☐	Other:				
Subsurface Flow?	Yes ☑	No ☐	Unknown ☐							
Flow type	Perennial (Flows year round) ☐	Intermittent (Flows <3 months) ☐	Seasonal (Continuous flow ≥ 3 months) ☑	Ephemeral (Flows only in response to rainfall) ☐						
Stream Width @ OHWM (ft.)	0 - 1 ☐	1 - 3 ☐	3 - 6 ☐	6 - 9 ☐	9+ ☑					
Water Depth - Current (ft.)	0 - 1 ☐	1 - 3 ☑	3 - 6 ☐	6 - 9 ☐	9+ ☐					
OHWM Indicator (check all applicable)	Natural Line Impress on bank ☑	Sediment Sorting ☐	Shelving ☐	Litter disturbed or washed away ☐						
	Changes in character of soil ☐	Scour ☐	Destruction of terrestrial vegetation ☐	Deposition ☐						
	Presence of litter or debris ☐	Multiple observed flow events ☐	Wracking ☐	Bed and bank ☐						
	Vegetation matted down, bent or absent ☐	Water staining ☐	Change in plant community ☐							
Channel Height (ft.) (OHWM to channel bottom looking downstream)	Left:	0 - 2 ☐	2 - 4 ☑	4+ ☐						
	Right:	0 - 2 ☐	2 – 4 ☑	4+ ☐						

QUALITATIVE ATTRIBUTES

Stream Substrate %	Silts	Cobbles	Bedrock	Sands	Gravel
	Concrete	Muck	Vegetation		
	Other - Explain:				
Aquatic Habitats	Sand Bar ☑	Gravel Riffles ☐	In-stream emergent plants ☐		
	Gravel Bar ☑	Deep Pools ☐	In-stream submerged plants ☐		
	Mud Bar ☐	Bank root systems ☐			
	Undercut Banks ☑	Overhanging trees/shrubs ☑	Fringing Wetlands ☑		
Stream is:	Natural ☑	Artificial (Man-Made) ☐	Manipulated Armored		

LAKES AND OTHER DEEPWATER HABITAT

Shoreline Type: Silts ☐ Cobbles ☐ Bedrock ☐ Concrete ☐ Muck ☐ Vegetation ☐

Other (explain):

North Dakota Department of Transportation – Other Waters Information

July 8, 2014

Stream/Waterbody Name (if known): South Branch of Turtle River

Appendix E

Waterbody ID #: OW-5

Associated Wetland #: none

Date: 10-27-2021	**Project Name & No.:** WPC Larimore Dam 357-23-MA	**Reference pt.:** OW-5
Investigators: Mark Anderson	**State/County:** ND Grand Forks	**Quad Name:** Larimore West

PHYSICAL ATTRIBUTES

Waterbody Type	Lake ☐	Pond ☐	Borrow Pit ☐	River ☑	Stream ☐	Other: (active beaver dams)				
Subsurface Flow?	Yes ☐	No ☐	Unknown ☑							
Flow type	Perennial (Flows year round) ☑	Intermittent (Flows <3 months) ☐	Seasonal (Continuous flow ≥ 3 months) ☐	Ephemeral (Flows only in response to rainfall) ☐						
Stream Width @ OHWM (ft.)	0 - 1 ☐	1 - 3 ☐	3 - 6 ☐	6 - 9 ☐	9+ ☑					
Water Depth - Current (ft.)	0 - 1 ☐	1 - 3 ☐	3 - 6 ☑	6 - 9 ☐	9+ ☐					
OHWM Indicator (check all applicable)	Natural Line Impress on bank ☐	Sediment Sorting ☐	Shelving ☐	Litter disturbed or washed away ☐						
	Changes in character of soil ☐	Scour ☐	Destruction of terrestrial vegetation ☐	Deposition ☐						
	Presence of litter or debris ☐	Multiple observed flow events ☐	Wracking ☐	Bed and bank ☑						
	Vegetation matted down, bent or absent ☐	Water staining ☐	Change in plant community ☐							
Channel Height (ft.) (OHWM to channel bottom looking downstream)	Left:	0 - 2 ☐	2 - 4 ☐	4+ ☑						
	Right:	0 - 2 ☐	2 – 4 ☐	4+ ☑						

QUALITATIVE ATTRIBUTES

Stream Substrate %	Silts 30	Cobbles	Bedrock	Sands 70	Gravel
	Concrete	Muck	Vegetation		
	Other - Explain:				
Aquatic Habitats	Sand Bar ☑	Gravel Riffles ☐	In-stream emergent plants ☐		
	Gravel Bar ☐	Deep Pools ☑	In-stream submerged plants ☑		
	Mud Bar ☐	Bank root systems ☐			
	Undercut Banks ☑	Overhanging trees/shrubs ☑	Fringing Wetlands ☑		
Stream is:	Natural ☑	Artificial (Man-Made) ☐	Manipulated		

LAKES AND OTHER DEEPWATER HABITAT

Shoreline Type: Silts ☐ Cobbles ☐ Bedrock ☐ Concrete ☐ Muck ☐ Vegetation ☐

Other (explain):

Appendix F. Plant List

Larimore Dam Project

*** Wetland Indicator Status (WIS) key:**

FAC =Facultative: plants that occur in a variety of habitats, including wetland and mesic to xeric non-wetland habitats but commonly occur in standing water or saturated soils.

FACU = Facultative Upland: plants that typically occur in xeric or mesic non-wetland habitats but may frequently occur in standing water or saturated soils.

FACW =Facultative Wet: plants that nearly always occur in areas of prolonged flooding or require standing water or saturated soils but may, on rare occasions, occur in non-wetlands.

OBL =Obligate: plants that always occur in standing water or in saturated soils.

UPL =Upland: plants that rarely occur in water or saturated soils.

·Genus	Species	Common Name	WIS*
Acer	*negundo*	boxelder (ash-leaf maple)	FAC
Achillia	*millifolium*	common yarrow	FACU
Agropyron	*cristatum*	crested wheatgrass	UPL
Alopecurus	*arundinaceus*	creeping meadow foxtail	FACW
Alnus	*incana*	speckled alder	FACW
Amaranthus	*retroflexus*	red-root pigweed	FACU
Amorpha	*canescens*	leadplant	UPL
Ambrosia	*artemisiifolia*	common ragweed	FACU
Ambrosia	*trifida*	great ragweed	FAC
Amelanchier	*alnifolia*	Saskatoon serviceberry	FACU
Andropogon	*gerardii*	big bluestem	FACU
Anemone	*canadensis*	Canadian anemone	FACW
Apocynum	*cannabinum*	Indian hemp	FAC
Aquilegia	*canadensis*	red columbine	FAC
Arcticum	*minus*	lesser burdock	FACU
Artemisia	*absinthium*	absinth wormwood	UPL
Artemisia	*biennis*	biennial wormwood	FACU
Artemisia	*frigida*	fringed sagewort	UPL
Artemisia	*ludoviciana*	white sagewort	UPL
Asclepius	*syriaca*	common milkweed	UPL
Bassia	*scoparia*	Mexican fireweed	FACU
Bolboschoenus	*fluviatilis*	river bulrush	OBL
Bouteloua	*gracilis*	blue grama	UPL
Bouteloua	*curtipendula*	sideoats grama	UPL
Bromus	*inermis*	smooth bromegrass	UPL
Calamagrostis	*canadensis*	bluejoint	FACW
Calamagrostis	*stricta*	slim-stem reed grass	FACW
Carex	*aquatilis*	water sedge	OBL
Carex	*laeveconica*	smooth-cone sedge	OBL
Carex	*pellita*	woolly sedge	OBL
Carex	*sartwellii*	Sartwell's sedge	FACW
Carex	*sprengelii*	long-beak sedge	FACU
Chenopodium	*album*	Lamb's-Quarters	FACU

Appendix F. Plant List

Larimore Dam Project

·Genus	Species	Common Name	WIS*
Cirsium	*arvense*	Canada thistle	FACU
Cirsium	*vulgare*	bull thistle	UPL
Convolvulus	*arvensis*	field bindweed	UPL
Cornus	*alba*	red osier dogwood	FACW
Crataegus	*mollis*	downy hawthorn	FAC
Distichlis	*spicata*	saltgrass	FACW
Echinochloa	*crus-galli*	large barnyard grass	FAC
Elaeagnus	*angustifolia*	Russian olive	FACU
Eleocharis	*acicularis*	needle spikerush	OBL
Eleocharis	*palustris*	common spikerush	OBL
Elymus	*canadensis*	nodding wild rye	FACU
Elymus	*repens*	creeping wild rye (quackgrass)	FACU
Equisetum	*arvense*	field horsetail	FAC
Euphorbia	*esula*	leafy spurge	UPL
Fraxinus	*pennsylvanica*	green ash	FAC
Hordeum	*jubatum*	foxtail barley	FACW
Humulus	*lupulus*	common hop	FACU
Juncus	*arcticus*	Baltic rush	FACW
Lactuca	*biennis*	wild blue lettuce	FAC
Laportea	*canadensis*	Canadian wood nettle	FAC
Medicago	*sativa*	alfalfa	UPL
Melilotus	*alba*	white sweet-clover	FACU
Melilotus	*officinalis*	yellow sweet-clover	FACU
Mentha	*arvensis*	American wild mint	FACW
Nassella	*viridula*	green needlegrass	UPL
Panicum	*virgatum*	wand panic grass (switch grass)	FAC
Parthenocissus	*inserta*	thicket creeper (Virginia creeper)	FACU
Pascopyrum	*smithii*	western wheatgrass	FACU
Persicaria	*amphibia*	water smartweed	OBL
Phalaris	*arundinacea*	reed canary grass	FACW
Phragmites	*australis*	common reed	FACW
Plantago	*major*	common plantain	FAC
Poa	*pratensis*	Kentucky bluegrass	FACU
Poa	*palustris*	fowl blue grass	FACW
Populus	*deltoides*	eastern cottonwood	FAC
Potentilla	*anserina*	silverweed	FACW
Prunus	*americana*	American plum	UPL
Prunus	*virginiana*	choke cherry	FACU
Quercus	*macrocarpa*	burr oak	FACU
Ranunculus	*pennylvanicus*	Pennsylvania buttercup	FACW
Rhamnus	*cathartica*	European buckthorn	FACU
Ribes	*missouriense*	Missouri gooseberry	NI
Rosa	*arkansana*	prairie rose	FACU

Appendix F. Plant List

Larimore Dam Project

·Genus	Species	Common Name	WIS*
Rubus	*idaeus*	common red raspberry	FACU
Rumex	*crispus*	curly dock	FAC
Rumex	*occidentalis*	western dock	OBL
Salix	*amygdaloides*	peach-leaf willow	FACW
Salix	*candida*	sage willow	OBL
Salix	*discolor*	pussy willow	FACW
Salix	*eriocephala*	Missouri willow	FACW
Salix	*interior*	sandbar willow	FACW
Schoenoplectus	*pungens*	three-square	OBL
Setaria	*pumila*	yellow bristle grass	FACU
Sicyos	*angulatus*	one-seed-burr-cucumber	FACW
Sium	*suave*	hemlock water parsnip	OBL
Solidago	*gigantea*	late goldenrod	FAC
Solidago	*rigida*	hard-leaf flat-top (stiff) goldenrod	FACU
Sonchus	*arvensis*	perennial sowthistle	FAC
Sparganium	*eurycarpum*	giant burreed	OBL
Spartina	*pectinata*	fresh water (prairie) cord grass	FACW
Symphoricarpos	*occidentalis*	western snowberry	UPL
Symphyotrichum	*ericoides*	white heath aster	FACU
Syzachyrium	*scoparium*	little bluestem	FACU
Taraxicum	*officinale*	dandelion	FACU
Tilia	*americana*	American basswood	FACU
Toxicodendron	*rydbergii*	western poison ivy	FACU
Typha	*angustifolia*	narrow-leaf cattail	OBL
Typha	*latifolia*	common cattail	OBL
Typha	*glauca*	hybrid cattail	OBL
Ulmus	*americana*	American elm	FAC
Ulmus	*pumila*	Siberian elm	UPL
Urtica	*dioica*	stinging nettle	FAC
Verbena	*hastata*	Simpler's-Joy	FACW
Vitus	*riparia*	river-bank grape	Fac
Xanthium	*strumarium*	rough cockleburr	FAC

Appendix G

TABLE 1. Larimore Dam Project - Wetland and OW data

Aquatic Resource Name	Cowardin Classification by NWI	Cowardin Classification by WPC in field	Location - Latitude	Location - Longitude	Aquatic Resource Size (acres)	Length (feet)
Wetland 1	PABFx	PEM1Fx	47.93758541	-97.59945511	0.58	NA
Wetland 2	none	PEM1A	47.93840640	-97.59638765	0.01	NA
Wetland 3	none	PEM1Ax	47.93956537	-97.59656928	0.02	NA
Wetland 4	none	PEM1Ax	47.93904814	-97.59370052	0.52	NA
Wetland 5	none	PEM1Ax	47.93958393	-97.59334890	0.05	NA
Wetland 6	none	PEM1Ax	47.94026286	-97.59424474	2.16	NA
Wetland 7	none	PEM1Ax	47.94012421	-97.59236947	0.15	NA
Wetland 8	none	PEM1Ax	47.94091164	-97.59017689	-0.04	NA
Wetland 9	none	PEM1Ax	47.94013088	-97.59039547	0.11	NA
Wetland 10	none	PEM1Ax	47.94015503	-97.58919957	0.76	NA
Wetland 11	none	PEM1A	47.94020009	-97.58697908	0.01	NA
Wetland 12	none	PEM1A	47.93839887	-97.59246997	0.03	NA
Wetland 13	none	PEM1F	47.92961939	-97.61442997	-0.12	NA
Wetland 14	none	PEM1Ax	47.93241459	-97.59702619	0.02	NA
Wetland 15	none	PEM1Ax	47.93243518	-97.59392580	0.03	NA
Wetland 16	none	PEM1Ax	47.93267757	-97.59387131	0.003	NA
Wetland 17	PFOC	PEM1/SS1F	47.93936951	-97.61784213	0.44	NA
Wetland 18	PEM1Cx ditch only	PEM1FO1Ad and PEM1Ax	47.91708848	-97.61495393	3.27	NA
Wetland 19a	none	PEM1Ax			-0.13	NA
Wetland 19b	none	PEM1Ax	47.91812676	-97.62004769	0.05	NA
Wetland 19c	PEM1Cx	PEM1Cx			-0.48	NA
Wetland 20	PEM1C	PEM1/FO1Cd	47.91881090	-97.61975837	11.63	NA
Wetland 21a	PEM1Ax	PEM1Ax			0.10	NA
Wetland 21b	PEM1Cx	PEM1Ax and PEM1Cx	47.91834035	-97.61939855	1.41	NA
Wetland 22	none	PEM1/SSA	47.91889042	-97.61822123	0.02	NA
Wetland 23	none	PEM1/SSA	47.91889920	-97.61801742	0.02	NA
Wetland 24	none	PEM1A	47.91856062	-97.61824048	0.03	NA
Wetland 25	none	PEM1Ax	47.94285962	-97.66271927	0.09	NA
Wetland 26	PSSA	PEM1/SS1Ad	47.94299446	-97.66330215	0.16	NA
Wetland 28	PSSA + PEM1C	PEM1/SS1F	47.93915788	-97.65711526	3.55	NA
Wetland 29	PEM1/SSA	PEM1/SSA	47.94028115	-97.66284622	1.00	NA
Wetland 30	PEM1C	PEM1/SSA	47.94618900	-97.66200933	0.78	NA
Wetland 31	PEM1Ad	PEM1/SS1Cd	47.91858802	-97.61398549	14.58	NA
Wetland 32	none	PEM1A	47.93846221	-97.65805904	0.07	NA
Wetland 33	PEM1A (near)	PEM1/SSA	47.93898670	-97.65845377	0.26	NA
Wetland 34	none	PEM1A	47.93872445	-97.65825641	0.02	NA
Wetland 35	PEM1C	PEM1/SSAd	47.94186009	-97.66013955	0.66	NA

Appendix G

TABLE 1. Larimore Dam Project - Wetland and OW data

Aquatic Resource Name	Cowardin Classification by NWI	Cowardin Classification by WPC in field	Location - Latitude	Location - Longitude	Aquatic Resource Size (acres)	Length (feet)
Wetland 36	none	PEM1/SSA	47.94335047	-97.66021361	0.02	NA
Wetland 37		PEM1A, PEM1C, and PEM1F	47.94261316	-97.66183141	0.77	NA
Wetland 38	PEM1C	PEM1/SSA	47.94041977	-97.65280383	0.30	NA
Wetland 39	PABFx	PEM1/SSA	47.93930564	-97.64383711	0.10	NA
Wetland 40	PEM1C, PSSA, and PEM1A	(no NRCS field label)	47.92671810	-97.62695609	17.39	NA
Wetland 41	none	(no NRCS field label)	47.92583059	-97.62936613	0.13	NA
Wetland 42	none	(no NRCS field label)	47.92217546	-97.63344204	1.77	NA
Wetland 43	none	(no NRCS field label)	47.92231975	-97.63132543	3.46	NA
Wetland 44	PEM1A	(no NRCS field label)	47.91955044	-97.62689380	2.20	NA
Wetland 45	PEM1A	(no NRCS field label)	47.91985392	-97.62488768	1.61	NA
OW 1	PABFx	PABFx	47.93757509	-97.59966482	4.31	pond
OW 2	R4SBC and R5UBH	R5UB2	47.93716339	-97.59089278	0.45	731
OW 3	PABFx	PABFx	47.93429961	-97.59152000	0.17	pond
OW 4	R4SBC, PEM1C, and R5UBH	R5UB2	47.94092530	-97.65657599	4.44	7,355
OW 5	R4SBC and R5UBH	R5UB2	47.93908519	-97.64909568	6.25	7,251
OW 6	R4SBC and R5UBH	R5UB2	47.93678821	-97.63526137	6.52	16,145

Appendix G

TABLE 2. Larimore Dam Project - Fen Study Point data

Point label	Location - legal description	Map number	Location - Latitude	Location - Longitude
organic_10+	Southwest Quarter of 31-152-54	3	47.93766415730	-97.62094685640
Organic 10inplus	Southwest Quarter of 31-152-55	3	47.93680504250	-97.62060484220
organic _10+	Southwest Quarter of 31-152-56	3	47.93766415730	-97.62094685640
Mineral	Southwest Quarter of 31-152-57	3	47.93673673580	-97.62046155570
QFen2	Southwest Quarter of 31-152-58	3	47.93640686190	-97.62093406260
Fibric_6in	Southwest Quarter of 31-152-59	3	47.93550494160	-97.62136919650
mineral	Northwest Quarter of 6-151-54	4	47.93252406770	-97.61643670610
fibric6_hemic>20	Northwest Quarter of 6-151-54	4	47.93141101390	-97.61619095150
16+fibric	Northwest Quarter of 6-151-54	4	47.92888658740	-97.61789931240
organic_20+	Northwest Quarter of 6-151-54	4	47.92839818360	-97.61827008750
Not fen	Northwest Quarter of 6-151-54	4	47.92850518130	-97.61798759350
Fen 1	Northwest Quarter of 6-151-54	4	47.92835913890	-97.61801850150
organic_13in	Northwest Quarter of 6-151-54	4	47.92837361160	-97.61818527110
mineral_0	Northwest Quarter of 6-151-54	4	47.92802510320	-97.61774173560
organic_16in	Northwest Quarter of 6-151-54	4	47.92805896380	-97.61796163400
fibric>10	Northwest Quarter of 6-151-54	4	47.92669289140	-97.62319206840
fibric8_sapric>16	Northeast Quarter of 1-151-55	4	47.92727287220	-97.62515673710
Organic 8 in	Southwest Quarter of 35-152-55	8	47.93948524350	-97.65657681030
organic 3 in	Southwest Quarter of 35-152-55	8	47.93920720880	-97.65706510260
Organic 20 plus	Southwest Quarter of 35-152-55	8	47.93919795420	-97.65703776360
Organic 8 in	Southwest Quarter of 35-152-55	8	47.93916660480	-97.65696836460
Organic 10 plus	Southeast Quarter of 35-152-55	8	47.93856144920	-97.65536433430
Organic 7 in	Southeast Quarter of 35-152-55	8	47.93868726550	-97.65523051230
Organic 6 in	Southeast Quarter of 35-152-55	8	47.93876412490	-97.65518191230

NRCS ADDENDUM TO AQUATIC RESOURCE DELINEATION AND FEN REPORT

November 20, 2024

Larimore Dam Watershed Rehabilitation Plan

Summary

This document serves as an addendum to the Aquatic Resource Delineation and Fen Search Report conducted by Western Plains Consulting (WPC), Inc on November 24, 2021. An addendum was deemed necessary by NRCS to include additional areas of potential impact in elevations below 1108 feet and to verify the presence of fens. The total acreage of wetlands (largely palustrine) is 161.66 acres – this includes 70.42 acres of wetlands meeting fen criteria. The total acreage of Other Waters is 78.82 acres. ***The combined Wetland Delineation Maps are depicted in Exhibit A which incorporate both inventories relevant to the project.***

Twenty-nine wetlands (Wetlands #46, #'s 49-76) were added in the previously un-inventoried zone just upstream of the Larimore Dam in sections 31-152-54 and 6-151-54 of Grand Forks County. A wetland previously delineated by NRCS and identified as Wetland #40, was divided into 4 separate wetlands (W71 – W74) to distinguish the fen wetland from the other contiguous wetlands. Wetland #28, previously delineated by WPC, was verified to have met fen criteria. W#28 would be newly affected by alternatives that raise the dam and impound water higher in that elevation. Four other wetlands were identified as meeting fen criteria (Wetlands 55, 64, 67 and 71). These four wetlands are currently impacted by the existing dam hydrology. Artificial wetlands delineated in the auxiliary spillway were also field reviewed and found to meet wetland criteria.

Several wetlands previously inventoried by WPC were determined to be outside of the potentially impacted elevation of 1108 feet, including wetlands 14, 15, 16, 18, 19A-19C, 21A & 21B, 24, 25, 26, 27, 29, 30, 36, 45 and OW-3. Wetland 37 also includes some wetlands that are outside of the potentially affected area. These changes were incorporated into revised Aquatic Resource Maps Ad1 – Ad8 (Exhibit A).

Field work was conducted by NRCS staff including Curt Bradbury- State Biologist, Jordaan Thompson Larson – Resource Soil Scientist, John Bauer – Designated Conservationist, Paul Bjorg – Engineering Technician, and Rita Sveen – Watershed Planner. Work was conducted the months of August and October of 2022. The hydrology was found to be during "normal" precipitation periods utilizing WETS data and precipitation records from the Petersburg, ND gauge data. Hydrologic data was calculated by Jonathan Petersen, NRCS State Hydrologist. Wetland acres and features from all of the delineations within the 1108 elevation are summarized in Tables 2 and 3.

Methods

NRCS reviewed available Off-site data including NWI maps, aerial photography, NRCS soil survey and LiDAR imagery. Climate conditions were determined using NRCS Climate Analysis for Wetlands Tables (WETS). During the field visits climate conditions were normal (Table 1). The delineation was conducted in accordance with the 1987 corps of Engineers Wetland Delineation Manual (USACE 1987), and the Great Plains Regional Supplement (USACE 2010), and guidelines for other waters determinations (USACE 2020). Aquatic boundaries within the project boundary were determined by paired tests holes observing the presence of hydric soil, vegetation and hydrology, and were recorded on USACE Wetland Determination Data Forms. The wetland boundaries were marked using GPS Trimble units. Determination of drainages and delineation of streams and rivers followed guidance from USACE (2020). The delineation report was written following the minimum standards for acceptance of aquatic resources delineation reports of USACE (2019).

Table 1 WETS Data

		Long-Term rainfall records (1971 - 2020)								
WETS Station Petersburg 2N, ND Lat 48.0353, Long -98.0103	**Month**	**<30%**	**Mean**	**>30%**	**Actual**	**Condition**	**Condition Value**	**Weighted Avg**	**Month Wt. Value**	**CV x WA**
3rd Month Prior	July	1.93	3.12	3.77	4.15	Wet	3	3	w	3
2nd Month Prior	August	2.03	2.77	3.25	3.07	Normal	2	2	2	4
1st Month Prior	Sept	1.14	2.18	2.67	0.36	Dry	1	1	3	3
								Sum		**10**
							Conditions Onsite:			**Normal**

If Sum is		**Condition Values**
6 to 9	Then prior period has been drier than normal	(1) Dry
10 to 14	Then prior period has been normal	(2) Normal
15 to 18	Then prior period has been wetter than normal	(3) Wet

Classifications

Executive Order 11990 was codified into law on May 24, 1977; the order is for protection of wetlands. Therefore, designations and boundaries of wetlands and other waters is important. Wetland delineation methods are described previously in this addendum as well as Aquatic Resource Delineation and Fen Search Report completed on November 24, 2021. Other waters at this site include lacustrine deepwater habitat and riverine unconsolidated bottom and aquatic bed areas. Classification details are adopted from *Classification of Wetlands and Deepwater Habitats of the United Stated* (Federal Geographic Data Committee, 2013), which is an update from similar Cowardin papers published in 1976 and 1979 and validated using NRCS identification descriptions (USDA-NRCS, 2021).

Deepwater habitat upper boundary starts 8.2 feet below low water or normal pool elevation (Federal Geographic Data Committee, 2013). The normal pool is 1068.4, resulting in upper boundary of deepwater habitat (OW-8) and lower boundary of reservoir fringe wetland (W75) to be 1060.2. The historic quad map, from prior to dam installation, was used to delineate the boundary deepwater and wetland. The upper boundary for wetland around the reservoir follows average wetland boundary where wet and upland points were investigated and documented in 2021 report; the wetland boundary is 1074'. The borrow site (OW-1) normal water level is 1102.5, therefore boundary of deepwater habitat and lower boundary of wetland is 1094.3. Since the borrow area average slope of 5H:1V, the boundary is drawn 40 feet inward of normal water level. The wetland upper boundary was not changed from 2021 report. Riverine unconsolidated bottom and aquatic bed are semi permanently flooded in a running water habitat (Federal Geographic Data Committee, 2013), which is the description used to delineate the outer boundary for other waters (OW) 2, 4, 5, 6, 7, and 9.

Part 650 Engineering Field Handbook, Chapter 19 Hydrology Tools for Wetland Identification and Analysis (USDA-NRCS, 2021) describes the aforementioned wetlands HGM class as RIVERINE,

LACUSTRINE FRINGE, or DEPRESSIONAL; due to the dam these wetlands are also artificial. Wetlands W75 & W76 are LACUSTRINE FRINGE class, which exists along a lake shore where hydrodynamics are bi-directional. Wetland W1 is DEPRESSIONAL due to the deepwater adjacent only ~4 acres in area, which is not considered a lacustrine system (Federal Geographic Data Committee, 2013). The remainder of wetlands within the active floodplain of South Branch Turtle River upstream of reservoir influence are classified as RIVERINE, which are palustrine and formed by fluvial processes. They meet the description within Chapter 19, which includes abandoned oxbows and scours. The remaining wetlands in the addendum and 2021 report do not coincide with Other Waters lacustrine or riverine features, therefore wetland classification is not completed at this time, but could be depending on the preferred alternative details.

Revised or Removed Wetlands:

Wetlands 14,15,16,18,19A-19C, 21A & 21B, 24,25,26,27,29,30,36,45
These wetlands are not depicted on the Exhibit A as they were determined to be outside of the potentially impacted elevation of 1108 feet.

Wetland 28: Wetland 28 was delineated by WPC, Inc. WPC had identified organic horizons in the soil as a fen indicator. NRCS staff visited the site and confirmed the organic soil as well as determining the hydrology of this wetland was fed by groundwater in addition to surface water hydrology. Vegetation was dominated by cattails (Typha) and sedge (Carex sp.). Native hydric vegetation – arrowhead (Sagittaria sp.) was also observed. The average elevations of the verified fen points was used to estimate the fen elevation boundary of 1104.4 feet. This wetland is shown in ExhA, AR Map Ad8. The confirmation of this wetland as a fen was considered sufficient evidence to concur with the other WPC. Inc. fen determinations in wetlands 55, 64, 67 and 71.

Wetland 37
Wetland 37 was described in the 2021 Aquatic Delineation Report as being comprised of the many fringe areas abutting the west reach of the South Branch of the Turtle River (OW-4) in the Project aera. This addendum reduced the extent of W37 as some of the fringe wetlands were outside of the potentially impacted elevation of 1108 feet. See ExhA AR Map Ad8.

Wetland 40
Wetland 40 was mapped as one wetland in the 2021 Aquatic Delineation Report and located in the SE1/4, NE1/4 section 1-151-55. This wetland was found to include a portion considered to be a fen. Wetland number 40 has been retired and is now split into 4 separate wetlands including the fen: W71, and the 3 non-fen wetlands W72, W73 & W74. See ExhA AR Map Ad5.

Added Wetlands:

Wetland #46 NRCS field verified wetland located within a depression in the upper floodplain and is classified by NWI as PEMA. NRCS soil map unit is I594A, LaDelle silt loam occasionally flooded. Hydrophytic vegetation was dominated by Reed Canary grass (Phalaris arundinacea) and met the dominance test. Hydric soils met A12, thick dark surface and hydrology was met with C4 – presence of reduced iron. This wetland is shown on Exhibit A, Aquatic Resource (AR) Map Ad2.

Wetland #49 This wetland is a depression in the lower floodplain. NRCS soil map unit is G147F Barnes-Buse-Darrins loam, 9-35% slopes. This wetland was not on the NWI, NRCS classified it as PEMA. Vegetation was dominated by sedge (Carex sp.) and met the rapid test for hydric vegetation. Hydric soils met A 12, thick dark surface and hydrology was met with A3 with saturation. This wetland is shown on Exh A, AR Map Ad2.

Wetland #50 This wetland is a depression within an old oxbow in the lower floodplain. NRCS soil map unit is I147B Velva sandy loam, 0-6% slopes, occasionally flooded. This wetland was not on the NWI, NRCS classified it as PEMA. Vegetation was dominated by Reed Canary grass (Phalaris aruninacea) species and met the dominance test for hydric vegetation. Hydric soils met A 12, thick dark surface and hydrology was met with A3 with saturation. This wetland is shown on Exh A, AR Map Ad2.

Wetland #51 This wetland is in the lowest reach of a natural drainage into the river. NRCS soil map unit is I147B Velva sandy loam, 0-6% slopes, occasionally flooded. This wetland was not on the NWI, NRCS classified it as PEMA. Vegetation was dominated by Reed canary grass (Phalaris aruninacea) and Prairie cordgrass (Spartina pectinate) species and met the dominance test for hydric vegetation. Hydric soils met A 12, thick dark surface and hydrology was met with C4, presence of reduced iron. This wetland is shown on Exh A, AR Map Ad2.

Wetland #52 This wetland is a depression within an old oxbow in the lower floodplain. NRCS soil map unit is I147B Velva sandy loam, 0-6% slopes, occasionally flooded. This wetland was not on the NWI, NRCS classified it as PEMA. Vegetation was dominated by cattails (Typha sp) species and met the rapid test for hydric vegetation. Hydric soils met A 12, thick dark surface and hydrology was met with A3 with saturation. This wetland is shown on Exh A, AR Map Ad2.

Wetland #53 This wetland is classified on the NWI as PEMC. The wetland is adjacent to other wetlands in a large depression. NRCS soil map unit is I147B Velva sandy loam, 0-6% slopes, occasionally flooded. Hydrophytic vegetation was dominated by cattails (Typha sp) and met the rapid test. Hydric soils met A12, thick dark surface and hydrology was met with A3 saturation and portions of this wetland had open water. This wetland is shown on Exh A, AR Map Ad2.

Wetland #54 This wetland is classified on the NWI as PSSC. The wetland is adjacent to other wetlands in a large depression. NRCS soil map unit is I370A Rauville silty clay loam, 0-1% slope, frequently flooded. Hydrophytic vegetation, dominated by redosior dogwood (Cornus stolonifera) and sandbar willow (Salix exigua), met the dominance test. Hydric soils met A12, thick dark surface and hydrology was met with A3 saturation; portions of this wetland had open water. This wetland is shown on Exh A, AR Map Ad2.

Wetland #55 This wetland is classified on the NWI as PSSC. This wetland meets fen criteria. The wetland is adjacent to other wetlands in a large depression. NRCS soil map unit is I370A Rauville silty clay loam, 0-1% slope, frequently flooded. Hydrophytic vegetation was dominated by redosior dogwood (Cornus stolonifera), and sandbar willow (Salix exigua) met the dominance test. WPC had identified multiple points with organic horizons and meeting hydric indicators A1 or A2 – histosol or histic epipedon. Hydrology was met by A2 and A3 – highwater table and saturation. This wetland is shown on Exh A, AR Map Ad2.

Wetland #56 This wetland is a depression within an old oxbow in the lower floodplain. NRCS soil map unit is I147B Velva sandy loam, 0-6% slopes, occasionally flooded. This wetland was not on the NWI, NRCS classified it as PEMA. Vegetation was dominated by reed canary grass (Phalaris arundinacea) and

sedge (Carex sp.), which met the dominance test for hydric vegetation. Hydric soils met A 12, thick dark surface and hydrology was met with A1, surface water present. This wetland is shown on ExhA, AR Map Ad2.

Wetlands #57 and #58 These wetlands are located in depressions within the floodplain. NRCS soil map unit is I147B Velva sandy loam, 0-6% slopes, occasionally flooded. This wetland was not on the NWI, NRCS classified as PEMA. Vegetation was dominated by reed canary grass (Phalaris arundinacea) and sedge (Carex sp.), which met the dominance test for hydric vegetation. Hydric soils met A 12, thick dark surface and hydrology was met with A1, surface water present. This wetland is shown on Exh A, AR Map Ad2.

Wetland #59 This wetland is a depression within an old oxbow in the lower floodplain. NRCS soil map unit is I147B Velva sandy loam, 0-6% slopes, occasionally flooded. This wetland was not on the NWI, NRCS classified it as PEMC. Vegetation was dominated by cattails (Typha sp.), reed canary grass (Phalaris arundinacea), and sedge (Carex sp.), which met the dominance test for hydric vegetation. Hydric soils met A 12, thick dark surface and hydrology was met with A1, surface water present. This wetland is shown on Exh A, AR Map Ad2.

Wetland #60 This wetland is a depression within an old oxbow in the lower floodplain. This wetland was not on the NWI, NRCS classified it as PEMC. This wetland meets fen criteria. NRCS soil map unit is I147B Velva sandy loam, 0-6% slopes, occasionally flooded. Hydrophytic vegetation was dominated by sedge (Carex sp.) and met the rapid test. Soils met A1 histosol. Hydrology was met by A3 – saturation. This wetland is shown on ExhA, AR Map Ad2.

Wetland #61 This wetland is a depression within an old oxbow in the lower floodplain. NRCS soil map unit is I147B Velva sandy loam, 0-6% slopes, occasionally flooded. This wetland was not on the NWI, NRCS classified it as PEMA. Vegetation was dominated by sedge (Carex sp.) which met the rapid test for hydric vegetation. Hydric soils met by F6, redox dark surface and hydrology was met with A3, saturation. This wetland is shown on ExhA, AR MapAd2.

Wetland #62 This wetland is a depression within an old oxbow in the lower floodplain. NRCS soil map unit is I147B Velva sandy loam, 0-6% slopes, occasionally flooded. This wetland was not on the NWI, NRCS classified it as PEMA. Vegetation was dominated by cattails (Typha sp) which met the rapid test for hydric vegetation. Hydric soils met A12, thick dark surface and hydrology was met with A1, surface water present. This wetland is shown on ExhA, AR Map Ad2.

Wetland #63 This wetland is a depression within an old oxbow in the lower floodplain. NRCS soil map unit is I147B Velva sandy loam, 0-6% slopes, occasionally flooded. This wetland was not on the NWI; NRCS classified it as PEMA. Vegetation was dominated by sedge (Carex sp) which met the rapid test for hydric vegetation. Hydric soils met A12, thick dark surface and hydrology was met with A3, surface saturation. This wetland is shown on ExhA, AR Map Ad2.

Wetland #64 This wetland is classified on the NWI as PSSC/FOA. This wetland meets fen criteria. NRCS soil map unit is I147B Velva sandy loam, 0-6% slopes, occasionally flooded. Hydrophytic vegetation was dominated by redosior dogwood (Cornus stolonifera) and sandbar willow (Salix exigua) and met the dominance test. WPC had identified an organic horizons and meeting hydric indicators A1 or A2 – histosol or histic epipedon. Hydrology was met by A3 – saturation. This wetland is shown on ExhA, AR Map Ad3.

Wetlands #65 and 66 These wetlands are in depressions within an old oxbow in the lower floodplain. NRCS soil map unit is I147B Velva sandy loam, 0-6% slopes, occasionally flooded. This wetland was not on the NWI; NRCS classified it as PEMA. Vegetation was dominated by cattails (Typha sp.) which met the rapid test for hydric vegetation. Hydric soils met F6, redox dark surface and hydrology was met with A2, high water table. This wetland is shown on ExhA, AR Map Ad3.

Wetland #67 This wetland is classified on the NWI with multiple designations: as PSSC, PEMC, PEMF and PEMA. This wetland meets fen criteria. NRCS soil map unit is I370A Rauville silty clay loam, 0-1% slope, frequently flooded. Hydrophytic vegetation was dominated by cattails (Typha sp), redosior dogwood (Cornus stolonifera) and sandbar willow (Salix exigua) which met the dominance test. WPC had identified an organic horizons and meeting hydric indicators A1 or A2 – histosol or histic epipedon. Hydrology was met by A3 – saturation. This wetland is shown on ExhA, AR Map Ad3.

Wetland #68 This wetland is located in a depression within an old oxbow in the lower floodplain. NRCS soil map unit is I147B Velva sandy loam, 0-6% slopes, occasionally flooded. This wetland was not on the NWI; NRCS classified it as PEMA. Vegetation was dominated by cattails (Typha sp.) which met the rapid test for hydric vegetation. Hydric soils met F6, redox dark surface and hydrology was met with A2, high water table. This wetland is shown on ExhA, AR Map Ad3.

Wetland #69 This wetland is a depression within an old oxbow in the lower floodplain. NRCS soil map unit is I147B Velva sandy loam, 0-6% slopes, occasionally flooded. This wetland was not on the NWI; NRCS classified it as PEMA. Vegetation was dominated by cattails (Typha sp.) which met the rapid test for hydric vegetation. Hydric soils met A12, thick dark surface and hydrology was met with A3, surface saturation. This wetland is shown on ExhA, AR Map Ad3.

Wetland #70 This wetland is a remnant of the original river channel which was altered with a road and bridge realignment which occurred sometime after 1957. NRCS soil map unit is I147B Velva sandy loam, 0-6% slopes, occasionally flooded. This wetland was not on the NWI; NRCS classified it as PEMC. Vegetation was dominated by cattails (Typha sp.) which met the rapid test for hydric vegetation. Hydric soils met A12, thick dark surface and hydrology was met with A1, surface water and A3 saturation. This wetland is shown on ExhA, AR Map Ad3.

Wetland #71 This wetland is classified by NWI with multiple designations: as PSSA and PEMC. This wetland meets fen criteria. NRCS staff mapped this wetland. NRCS soil map unit is I370A Rauville silty clay loam, 0-1% slope, frequently flooded. Hydrophytic vegetation was dominated by cattails (Typha sp), redosior dogwood (Cornus stolonifera) and sandbar willow (Salix exigua) and met the dominance test. WPC had identified organic soil horizons and meeting hydric indicators A1 or A2 – histosol or histic epipedon. This wetland is shown on ExhA, AR Map Ad3.

Wetlands 72, 73 and 74 These wetlands are contiguous with Wetland 71; however they do not have histic epipedons and are not part of the fen. These wetlands are classified on the NWI as PEMA and PEMC. NRCS staff mapped these wetlands. NRCS soil map unit is predominantly I370A Rauville silty clay loam, 0-1% slope, frequently flooded, but also includes some acres of I159A Wyndmere-Tiffany fine sandy loam, 0-2% slope. Hydrophytic vegetation was dominated by cattails (Typha sp) which met the rapid test for hydrology. These wetlands are shown on ExhA, AR Map Ad3.

Wetland #75 This is a fringe wetland around the perimeter of the Larimore Dam Reservoir. The deepwater habitat (Ow-8) upper boundary starts 8.2 feet below low water or normal pool elevation (Federal Geographic Data Committee, 2013). The normal pool is 1068.4, resulting in upper boundary of

deepwater habitat and lower boundary of this fringe wetland to be 1060.2 feet. The upper boundary of this fringe wetland averages 1074 feet. NRCS soil map unit is I147B Velva sandy loam, 0-6% slopes, occasionally flooded. It is classified as a lake in the NWI – L1UBHh. The majority of this wetland is open water; the upper fringe vegetation is cattail/reed canary grass dominant and quickly transitions to mixed riparian tree/herbaceous vegetation and soils which do not meet hydric criteria. This wetland is shown on ExhA, AR Map Ad1 and Ad2.

Wetland #76 This wetland is heavily impacted by the dam and is almost an extension of OW-8. NRCS soil map unit is I147B Velva sandy loam, 0-6% slopes, occasionally flooded. It is classified as a lake in the NWI – L1UBHh, however the mixed vegetation along with open water places it closer to a PEMC. Vegetation was a mix of mature trees and hydrophytic understory and met the dominance test for hydrophytic vegetation. Hydric soils met A 12, thick dark surface and hydrology was met with A1 surface water indicators. This wetland is shown on ExhA, AR Map Ad2.

Added Other Waters

OW-7 This basin is an oxbow connected to the Turtle River just upstream of the reservoir. The hydrology of this water body is impacted by the dam impoundment. The majority of the basin is within NWI L1UBHh, i.e. it is considered part of the lake hydrology. The area maintains open water hydrology in most years. This wetland is shown on ExhA, AR Map Ad2.

OW-8 This basin is the reservoir of Larimore Dam. The majority of the basin is within NWI L1UBHh. The reservoir is in an open water condition during April – October in most years. The basin is used for recreation and is park of Grand Forks County WRD Larimore Dam Recreation area which includes a campground. This wetland is shown on ExhA, AR Map Ad1 and Ad2.

OW-9 This is the portion of the Upper Turtle River from the reservoir upstream to ND State Hwy 18 where it merges into OW6. The NRI designation for the river is R4SBF. The channel side slopes and riverbanks are mostly steep and supported relatively few abutting wetlands. There is groundwater and seepage flow that facilitates year-round flow and often times prohibits complete freezing in the winter. This wetland is shown on ExhA, AR Map Ad2 and Ad3.

Table 2 Combined Wetland Data

Wetland #	Acres	NWI	Field Observation	Soil	FEN Ac.
1	0.58		PEM1A	I159A	
2	0.01		PEM1A	I213B	
3	0.02		PEM1Ax	I159A	
4	0.52		PEM1Ax	I213B	
5	0.05		PEM1Ax	I159A	
6	2.16		PEM1Ax	I159A	
7	0.15		PEM1Ax	I159A	
8	0.03		PEM1Ax	I365B	
9	0.11		PEM1Ax	I213B	
10	0.76		PEM1Ax	I365B	

11	0.02		PEM1A	I147B	
12	0.03		PEM1A	I147B	
13	0.12		PEM1F	I575E	
17	0.44	PFOC	PEM1/SS1F	I575E	
20	11.86	PEM1C	PEM1/FO1Cd	I308A	
22	0.02		PEM1/SS1A	I163A	
23	0.02		PEM1/SS1A	I163A	
28	3.55	PSSA+PEM1C	PEM1/SS1F	I146B	3.55
31	14.58	PEM1Ad	PEM1/SS1Cd	I159A	
32	0.07		PEM1A	I146B	
33	0.26	PEM1A	PEM1/SSA	I146B	
34	0.02		PEM1A	I146B	
35	0.66	PEM1C	PEM1/SS1Ad	I146B	
37	0.77		PEM1A/C/F	I146B	
38	0.3	PEM1C	PEM1/SSA	I146B	
39	0.11	PABFx	PEM1/SSA	I147B	
41	0.13		PEM1A	I159A	
42	1.77		PEM1A	I159A	
43	3.46		PEM1A	I159A	
44	2.2	PEM1A	PEM1A	I159A	
46	0.24	PEMA		I594A	
49	0.26			G147F	
50	0.25		PEMA	I147B	
51	0.15		PEMA	I147B	
52	0.83		PEMA	I147B	
53	2.69	PEMC		I370A	
54	6.07	PSSC		I370A	
55	5.49	PSSC		I370A	5.49
56	1.05		PEMA	I147B	
57	0.11		PEMA	I147B	
58	0.17		PEMA	I147B	
59	0.47		PEMA	I147B	
60	0.31		PEMA	I147B	
61	0.13		PEMA	I147B	
62	0.14		PEMA	I147B	
63	0.33		PEMA	I147B	
64	11.27	PSSC		I147B	11.27
65	0.12		PEMA	I147B	
66	0.08		PEMA	I147B	
67	40.3	PSSC+		I370A	40.3
68	0.18		PEMA	I147B	
69	0.14		PEMA	I147B	
70	0.57		PEMA	I147B	
71	10.11	PEMC		I370A	10.11
72	1.1		PEMA	I370A	
73	1.15	PEMC		I370A	
74	5	PEMA		I594A	
75	18.33	L1UBGh		I147B	

76	9.84	L1UBGh/Pem1Ch		I147B	
Total	**161.66**				**70.72**

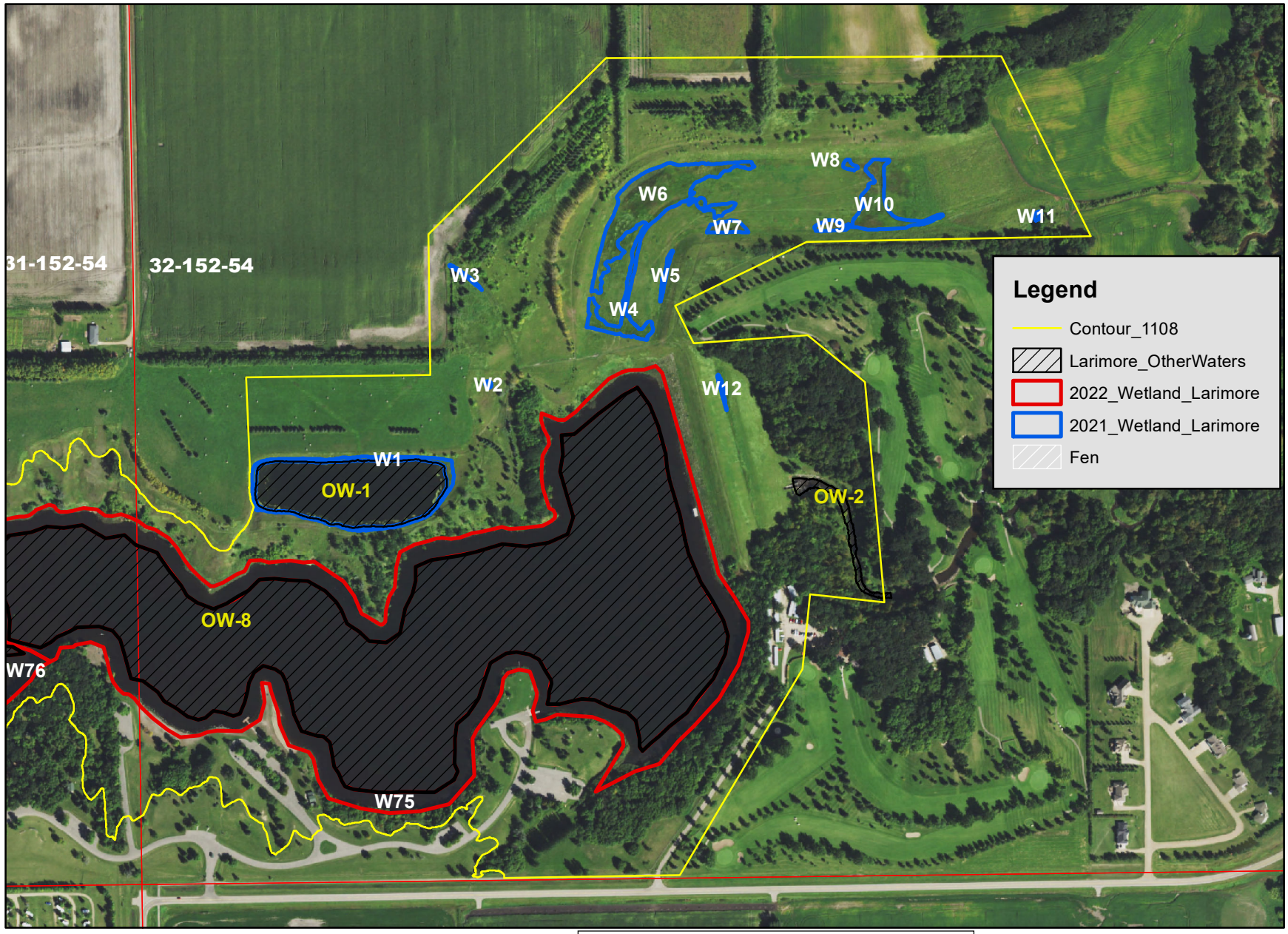
Table 3 Combined Other Waters Data

Wetland	Acres	NWI	NWI Field Observed
OW-1	4.32	PABFx	
OW-2	0.45	R5UBH & R4SBC	R2UB2
OW-4	4.44	R5UBH + R4SBC + PEM1C	R2UB2
OW-5	6.25	R4SBC	R2UB2
OW-6	6.52	R4SBF	
OW-7	0.77	L1UBHh	
OW-8	45.99	L1UBHh	
OW-9	10.08	R4SBF	
Total	**78.82**		

References

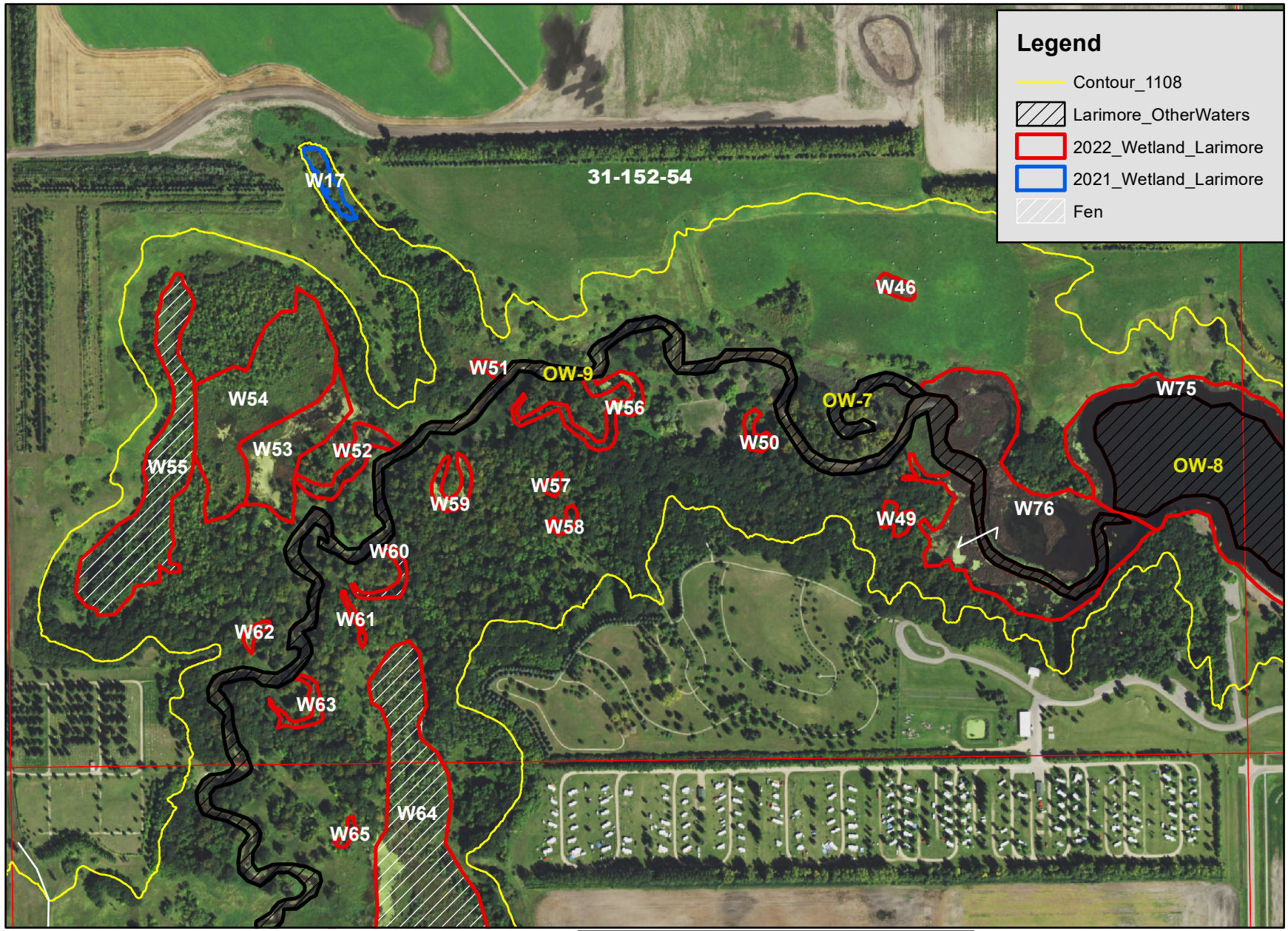
Federal Geographic Data Committee, 2013. Classification of Wetlands and Deepwater Habitats of the United States, Adapted from Cowardin, Carter, Golet, and LaRoe (1979), Wetlands Subcommittee, FGDC-STD-004-2013, Second Edition, August 2013.

U.S. Department of Agriculture, 2021. 210-Part 650 Engineering Field Handbook, Chapter 19 Hydrology Tools for Wetland Identification and Analysis, 2nd Edition, February 2021.



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Exhibit A
Aquatic Resource Map Ad1
Grand Forks County, ND

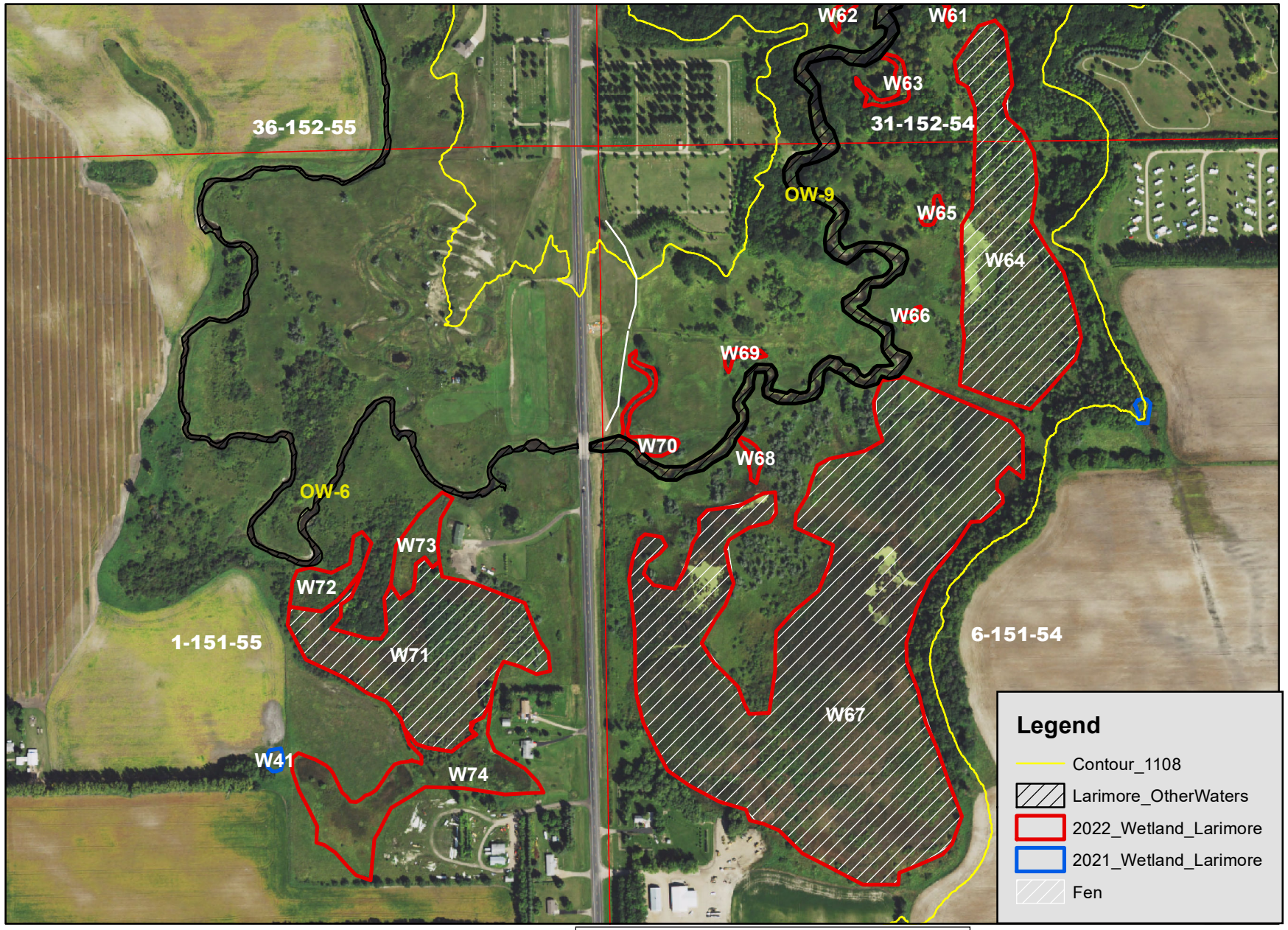


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Exhibit A
Aquatic Resource Map Ad2
Grand Forks County, ND

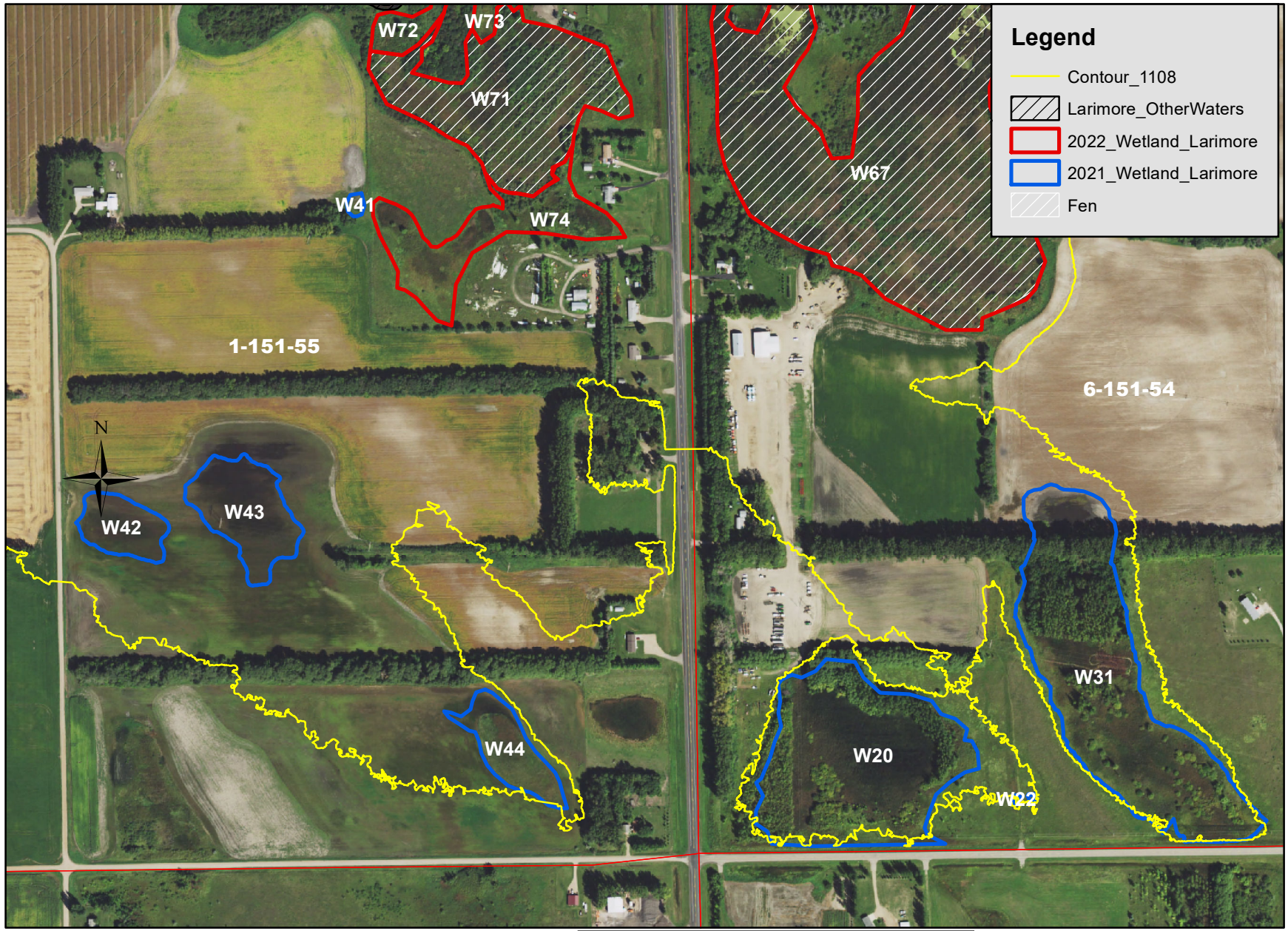
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Exhibit A
Aquatic Resource Map Ad3
Grand Forks County, ND

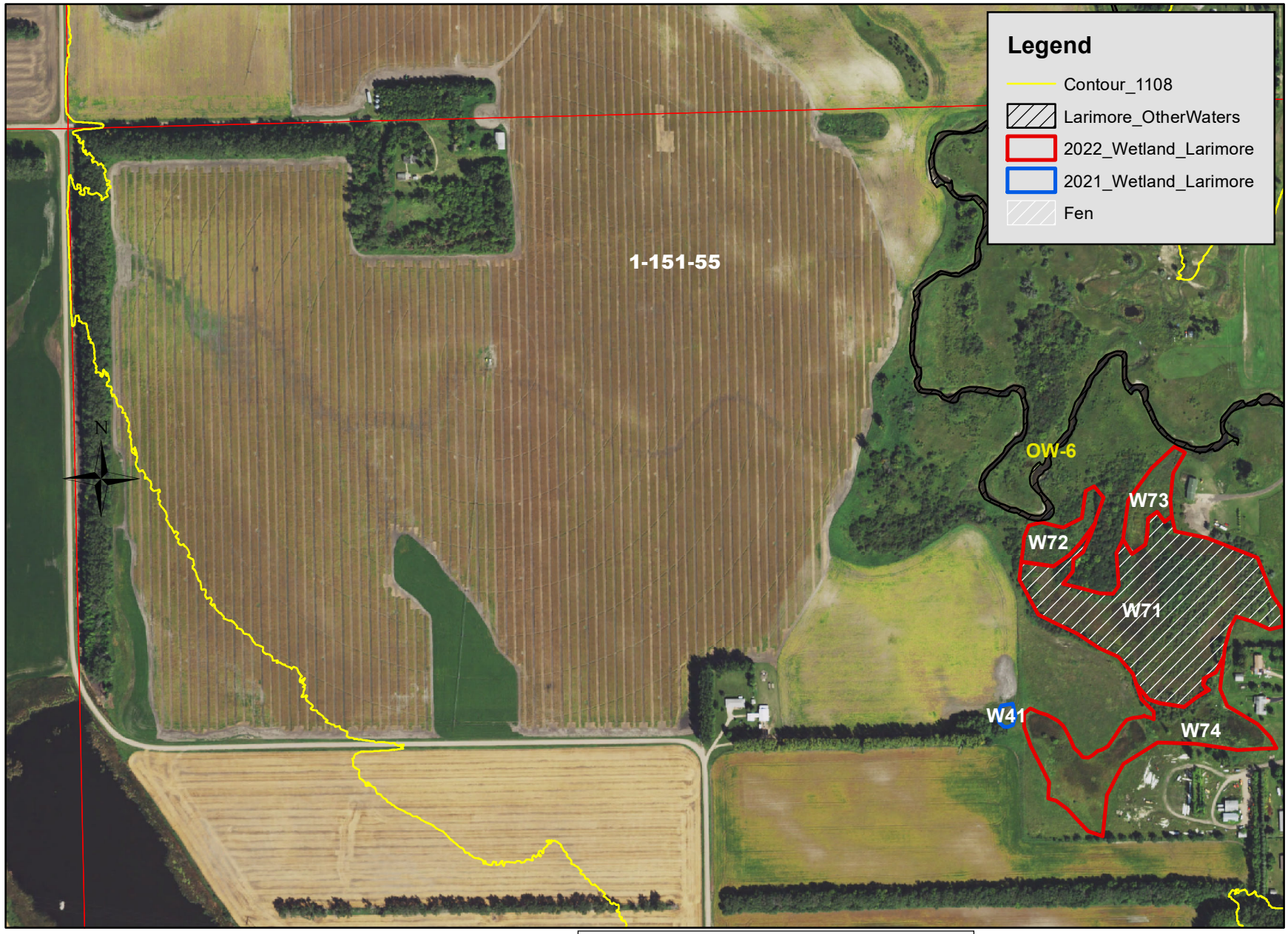


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Exhibit A
Aquatic Resource Map Ad4
Grand Forks County, ND

N

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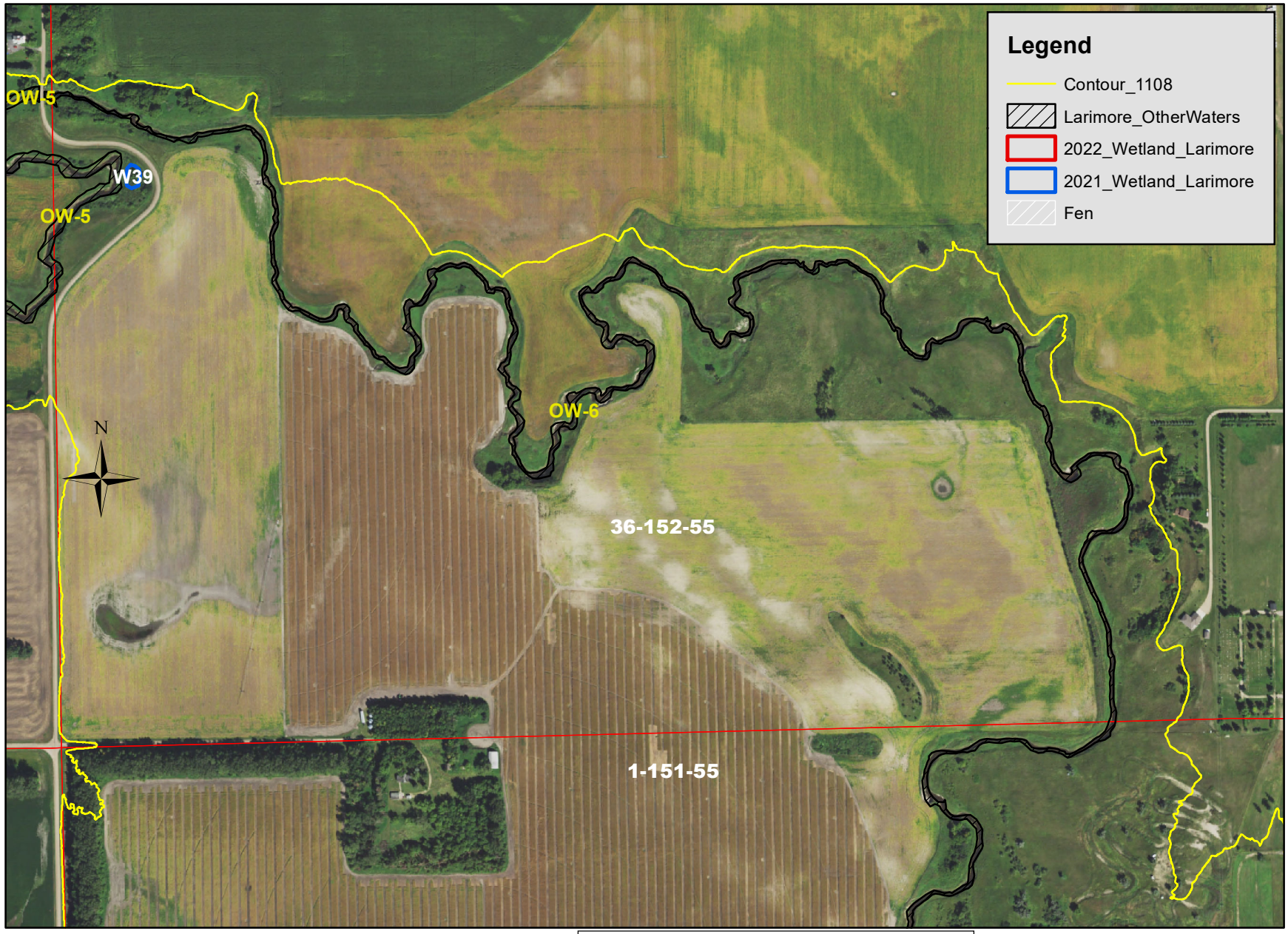


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Exhibit A
Aquatic Resource Map Ad5
Grand Forks County, ND

N

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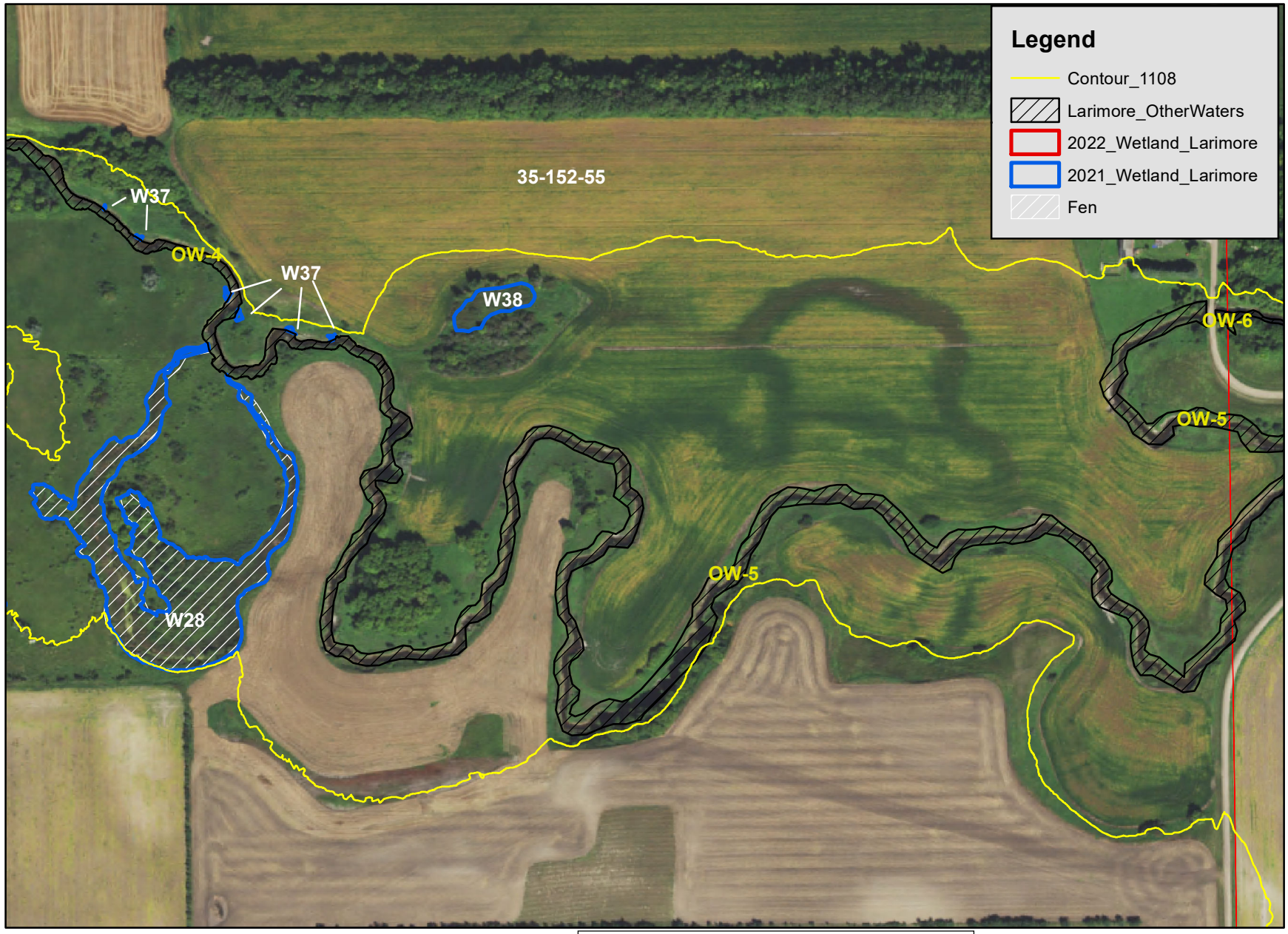


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Exhibit A
Aquatic Resource Map Ad6
Grand Forks County, ND

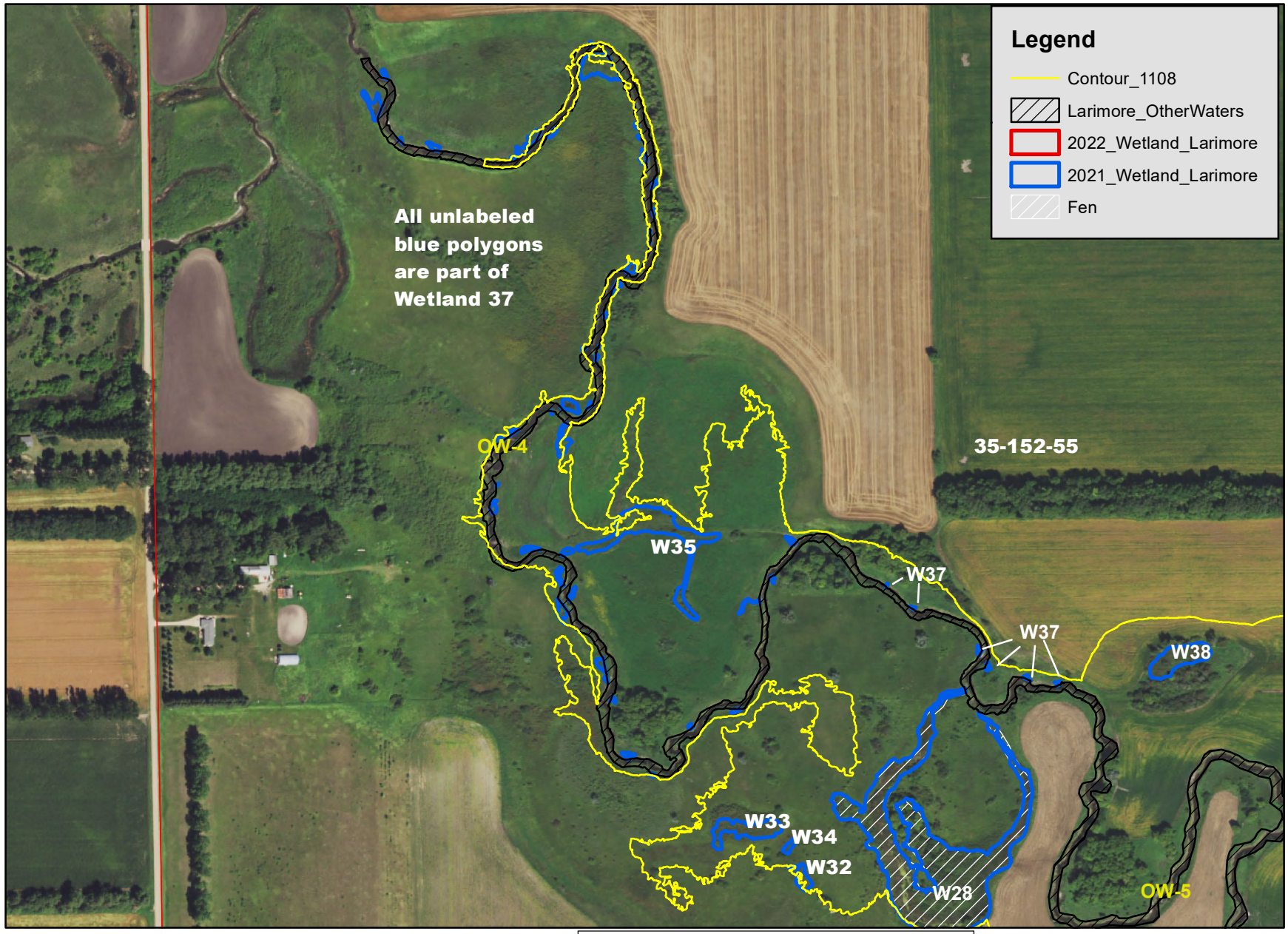
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Exhibit A
Aquatic Resource Map Ad7
Grand Forks County, ND



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Exhibit A
Aquatic Resource Map Ad8
Grand Forks County, ND