

**Glacier Ridge Wind Farm
Glacier Ridge Wind Farm, LLC
Barnes County, North Dakota**

Wetlands and Other Waters Evaluation Report



August 2016

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ACRONYMS/ABBREVIATIONS

| Acronyms/Abbreviations | Definition |
|------------------------|---|
| AJD | Approved Jurisdictional Determination |
| BWSR | Board of Water and Soil Resources |
| CWA | Clean Water Act |
| EPA | Environmental Protection Agency |
| FmHA | Farmers Home Administration |
| GIS | Geographic Information System |
| GPS | Global Positioning System |
| HUC | Hydrologic unit code |
| MW | Megawatt |
| NHD | National Hydrography Dataset |
| NOAA | National Oceanic and Atmospheric Administration |
| NRCS | Natural Resource Conservation Service |
| NRPW | Non-relatively permanent water |
| NWI | National Wetlands Inventory |
| NWP | Nationwide Permit |
| O&M | Operations and maintenance |
| OHWM | Ordinary high water mark |
| PCN | Pre-construction notification |
| PJD | Preliminary Jurisdictional Determination |
| PLS | Public Land Survey System |
| RPW | Relatively permanent water |
| SSURGO | Soil Survey Geographic (database) |
| TNW | Traditional navigable water |
| USACE | United States Army Corps of Engineers |
| USDA | United States Department of Agriculture |
| USFWS | United States Fish and Wildlife Service |
| USGS | United States Geological Survey |
| WoUS | Waters of the United States |

1.0 INTRODUCTION

Glacier Ridge Wind Farm, LLC (Glacier Ridge), a subsidiary of Renewable Energy Systems Americas, Inc. (RES Americas) contracted with Tetra Tech, Inc., (Tetra Tech) to conduct a wetlands and other waters evaluation survey of its proposed Glacier Ridge Wind Farm (Project), located in Barnes County, North Dakota (**Figure 1**). The proposed Project will have a nameplate capacity of approximately 300 megawatts (MW), consisting of up to 87 Vestas 3.45 MW wind turbines.

This report describes the results of the surveys for wetlands and other waters performed for the proposed Project. The report includes a description of the Project Area and Survey Corridor, methods used to identify and evaluate wetlands and other waters, agency consultation, survey results and conclusions, and references used to support the conclusions. Appendices include figures illustrating the Project and survey results, site photographs, and Wetland Determination Data Forms.

1.1 PROJECT DESCRIPTION AND SURVEY CORRIDOR

The Project Area is the location where Project facilities may be located and includes approximately 53.8 square-miles (34,450 acres) of land under option or easement by Glacier Ridge. The Project Area is located approximately five miles northeast of Valley City in Barnes County, North Dakota as shown on **Figure 1**. The Project Area encompasses all or portions of 68 sections of land in 7 townships (**Table 1**) consisting primarily of privately owned agricultural cropland.

Table 1: Public Land Survey (PLS) Description of the Project Area

| County | Township Name | Township | Range | Section(s) |
|--------|---------------|----------|-------|--------------------------|
| Barnes | Alta | 140N | 57W | 2-5, 9-11 |
| | Weimer | 141N | 56W | 6, 7, 17-20, 30 |
| | Noltimier | 141N | 57W | 1, 2, 9-16, 21-28, 34-36 |
| | Minnie Lake | 142N | 56W | 6, 7, 18, 19, 30, 31 |
| | Grand Prairie | 142N | 57W | 1-3, 12-15, 22-27, 34-36 |
| | Ellsbury | 143N | 56W | 18, 19, 30 |
| | Baldwin | 143N | 57W | 14, 23-26, 34-36 |

The Survey Corridor is defined as the area within the Project Area specifically evaluated for wetlands and other waters as part of this survey. Geographic Information System (GIS) shapefiles for the Project facilities included as part of this survey were provided by Glacier Ridge and were used to establish the Survey Corridor as follows:

- A 500-foot diameter area centered on the turbine locations in the June 29, 2016 layout, including 87 primary turbine locations and 12 alternate turbine locations;
- A 200-foot wide corridor centered on the approximately 42 miles of service roads in the June 29, 2016 layout;
- A 100-foot wide corridor centered on the approximately 75 miles of electrical collection lines in the June 29, 2016 layout;
- An approximately 5 acre area for the operations and maintenance (O&M) facility and electrical substation location in the July 6, 2016 layout; and

- A 400-foot diameter area centered on the temporary meteorological tower location in the July 1, 2016 layout.

1.2 PHYSICAL SETTING, CLIMATE AND HYDROLOGY

The Project Area is located within the Level IV Drift Plains Ecoregion (Bryce et. al. 1996). The topography of the ecoregion is the result of the retreating Wisconsinan glaciers, which left a subtly undulating topography and a thick layer of glacial till. There are numerous temporary and seasonal wetlands in this ecoregion, with fewer semi-permanent wetlands present than in surrounding areas. The majority of this region is cultivated with wetlands being drained or simply tilled and planted (Bryce et. al. 1996).

The climate of the region is continental and is usually quite warm in the summer (the average daily maximum temperature in the summer is 80 degrees Fahrenheit) with frequent spells of hot weather and occasional cool days. It is cold in winter when arctic air frequently surges over the area (the average daily minimum temperature in the winter is 0 degrees Fahrenheit) (USDA NRCS 1990). The average annual total precipitation in Barnes County is about 18 inches. Of this, about 14 inches, or more than 75 percent, usually falls in April through September (USDA NRCS 1990).

The majority of the Project Area is located in the Maple River watershed basin (8-digit hydrologic unit code [HUC8]: 09020205). These portions of the Project Area are drained by numerous unnamed intermittent tributaries that flow to the east and southeast to the Maple River. The Maple River drains southeast and then northeast to the Sheyenne River, and ultimately, to the Red River of the North. A small portion of the southwestern part of the Project Area is located within the Lower Sheyenne watershed basin (HUC8: 09020204). This area is drained by unnamed intermittent tributaries that flow to the west and southwest to the Sheyenne River. The Sheyenne River also flows southeast and then northeast to the Red River of the North.

1.3 REGULATORY FRAMEWORK

Tetra Tech reviewed regulations pertaining to water resources in the Project Area and assessed the extent to which wetlands and other waters in the area may be regulated by Federal and State agencies. Applicable agencies and regulations are summarized below.

1.3.1 U.S. Army Corps of Engineers (USACE)

All discharges of dredged or fill material into waters of the United States (WoUS) that result in permanent or temporary losses of WoUS are regulated by the USACE under Section 404 of the Clean Water Act (CWA). The USACE regulates projects in navigable waters under Section 10 of the Rivers and Harbors Act.

Under USACE and U.S. Environmental Protection Agency (EPA) regulations, wetlands are defined as “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.” In non-tidal waters, the lateral extent of USACE jurisdiction is determined by the ordinary high water mark (OHWM), which is defined as the “line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas” (33 Code of Federal Regulations [CFR] 328[e]).

1.3.1.1 Waters of the United States and Jurisdictional Determinations

The extent of the USACE regulatory jurisdiction over WoUS as defined in the CWA was further refined by the USACE and EPA in a final rule defining the scope of waters protected under the CWA published in the Federal Register on June 29, 2015, which was to become effective as of August 28, 2015 (80 FR 37104, June 29, 2015). However, the state of North Dakota is currently involved in litigation concerning the new CWA rule. In lieu of the decision on the new rule, as it may be resolved in North Dakota, the USACE will default to the preexisting definition for “waters of the United States” under Section 404 of the CWA (33 CFR 328.3[a]) as further refined in a 2008 memorandum issued jointly by the EPA and USACE (EPA and USACE 2008). A comparison of the scope of WoUS definitions in the old rule and new rule are summarized in **Table 2** and a summary of the preexisting definition for WoUS as used for determining jurisdiction in this report follows below:

The USACE will assert jurisdiction over the following waters:

- Traditional navigable waters (TNWs);
- Wetlands adjacent¹ to TNWs;
- Non-navigable tributaries of TNWs that are relatively permanent (RPWs); and
- Wetlands that directly abut² RPWs.

The USACE may assert jurisdiction over other certain types of waters based on a fact-specific analysis as to whether they have a significant nexus with a TNW. These types of waters include:

- Non-navigable tributaries that are non-relatively permanent (NRPW);
- Wetlands adjacent to NRPWs; and,
- Wetlands adjacent to, but not directly abutting, an RPW.

The USACE generally will not assert jurisdiction over the following features:

- Swales or erosional features (e.g. gullies, small washes characterized by low volume, infrequent or short duration of flow); and,
- Ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water.

The USACE will apply the significant nexus standards as follows:

- A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of downstream traditional navigable waters; and,
- Significant nexus includes consideration of hydrologic and ecological factors.

The USACE is the only entity that determines whether federal jurisdiction extends to specific wetlands or waters. The USACE does this by issuing Preliminary Jurisdictional Determinations (PJDs) and Approved Jurisdictional Determinations (AJDs). PJDs are non-binding written indications from the USACE that waters, including wetlands, identified on a parcel may be WoUS. If jurisdiction is unclear, PJDs will often treat all waters and wetlands as if they

¹ The term “adjacent” is defined as “bordering, contiguous, or neighboring,” and includes wetlands separated from a tributary by barriers such as natural river berms, man-made dikes, beach dunes and similar features.

² A continuous surface connection to the tributary must be present, the wetland may not be separated from the tributary by uplands, a berm, dike, or similar features.

are jurisdictional waters. AJDs are official USACE determination that jurisdictional WoUS are either present or absent on specific sites. AJDs are generally reliable for five years and may be appealed through the USACE administrative appeal process.

Given the USACE's sole authority to make Jurisdictional Determinations, suggestions of jurisdiction or the lack of jurisdiction regarding wetlands and other waters in this report are preliminary and based on Tetra Tech's interpretation of the guidance described above, desktop review of mapping, and evidence observed in the field.

Table 2: Comparison of Old Rule and New Rule for Defining WoUS and Determining Jurisdiction

| Subject | Old Rule | New Rule (Under Injunction) |
|--|--|---|
| Navigable Waters | Jurisdictional | Jurisdictional |
| Interstate Waters | Jurisdictional | Jurisdictional |
| Territorial Seas | Jurisdictional | Jurisdictional |
| Impoundments | Jurisdictional | Jurisdictional |
| Tributaries to Traditional Navigable Waters | Did not define tributary. | Jurisdictional Defined tributary for the first time as water features with bed, banks and OHWM, and flow downstream to a TNW, interstate water or the territorial sea. |
| Adjacent Wetlands/Water | Included wetlands adjacent to traditional navigable waters and directly abutting RPWs. Wetlands adjacent RPWs and NRPS were subject to a significant nexus evaluation to determine jurisdiction. | Includes waters adjacent to, or neighboring, jurisdictional waters including: waters within 1,500 feet of a TNW, waters within 100 feet of a tributary, and waters within the 100-year floodplain and within 1,500 feet of a TNW or tributary. |
| Isolated or "Other" Waters | Included all other waters the use, degradation or destruction of which could affect interstate or foreign commerce. | Includes specific waters that are similarly situated: prairie potholes, Carolina and Delmarva bays, pocosins, western vernal pools in California, and Texas coastal prairie wetlands when they have a significant nexus. Includes waters with a significant nexus within the 100-year floodplain greater than 1,500 feet from a TNW as well as waters with a significant nexus within 4,000 feet of a TNW or tributary. |
| Exclusions to the definition of "Waters of the US" | Excluded waste treatment systems and prior converted cropland. | Categorically excludes those in old rule and adds two types of ditches, groundwater, gullies, rills, non-wetland swales, constructed components for Municipal Separate Storm Water Sewer System (MS4s) and water delivery/reuse, and erosional features. |

1.3.1.2 Section 404 Permits

The USACE determines the type of permit, if any, that may be required under the CWA for projects that affect WoUS. The USACE authorizes certain relatively minor activities in WoUS under Nationwide Permits (NWP). NWPs that may apply to the Project include NWP 12 for Utility Line Activities, NWP 14 for Linear Transportation Projects, and NWP 51 for Land-Based Renewable Energy Generation Facilities. The USACE may permit wetland impacts associated with wind energy collection line systems or access roads under NWP 12 or NWP 14 rather than NWP 51, especially if the particular wind project has no wetland impacts associated with turbine pads.

NWPs 12, 14, and 51 are written to authorize activities that impact up to 0.5 acre of non-tidal WoUS, including the loss of no more than 300 linear feet of stream bed. An Individual Permit is required from the USACE for projects impacting greater than 0.5 acre of wetland. Pre-construction notification (PCN) to the USACE is required under NWP 51 regardless of the area of wetland impact. Under NWPs 12 and 14, a PCN to the USACE is required if the proposed activity will permanently impact more than 0.1 acre of jurisdictional wetland, and a PCN may be required for impacts less than 0.1 acre under NWP 12 and NWP 14 if certain other criteria are met. Compensatory wetland mitigation is required for all activities that impact more than 0.1 acre of wetland, and the USACE determines the need for compensatory mitigation on a case-by-case basis. To comply with authorization from the USACE under NWPs, prospective permittees must comply with the general conditions identified within the relevant NWP (USACE 2012).

Impacts for linear projects, such as utilities and roads, are typically assessed at each crossing and are not cumulative across a project. However, individual channels of a braided stream, individual arms of a large irregular wetland or lake, a stream and its adjacent wetlands, etc. are not separate waterbodies and such crossings cannot be considered separately.

1.3.2 U.S. Fish and Wildlife Service (USFWS)

The USFWS Valley City Wetland Management District manages wetland, grassland and Farmers Home Administration (FmHA) conservation easements on private lands in Cass, Traill, Barnes, Griggs, and Steele counties in east-central North Dakota. The easements afford permanent protection to wetland basins and grasslands that provide important seasonal habitat to waterfowl, shorebird and grassland nesting species during the spring migration and nesting seasons.

Wetland and FmHA easements do not allow the burning, leveling, filling, and/or draining of protected wetland basins without a permit from the USFWS. However, landowners are permitted to till and farm these areas when they are not wet. No permanent impacts to these basins are allowed from wind farm construction activities. Temporary impacts may be permitted, but the original elevation contours must be restored when construction is complete.

There are approximately 5,366 acres (16% of the Project Area) of USFWS easement lands located within the Project Area, which are depicted on **Figure 1**.

1.3.3 North Dakota State Water Commission

The North Dakota State Water Commission—Office of the State Engineer (Commission) is the regulatory body that permits actions in wetlands in the state of North Dakota. The Commission issues three types of permits: a Drain Permit, a Wetland Restoration Permit, and a Wetland Creation Permit. The state does not have a permit requirement for fill placed in a wetland.

A Drain Permit is issued for projects that drain ponds, sloughs, lakes, wetlands, or any similar series that has a watershed greater than 80 acres. A Wetland Restoration Permit is required for projects that restore wetlands less than the size of the original wetland. A Wetland Creation Permit is required for projects creating wetlands capable of storing more than 25 acre-feet of water.

The proposed Project does not meet the criteria for any of these three permits. Therefore, no state permit for wetlands is anticipated to be required for the proposed Project.

2.0 METHODS

Tetra Tech used a tiered approach to evaluate potential wetlands and other waters within the Project Area and Survey Corridor. Utilizing this approach, general wetland features were first identified during a desktop data review. The desktop data was used to guide Glacier Wind in Project facility siting prior to the field survey, and was also utilized during a facility micrositing field visit with RES Americas engineers to further avoid and reduce impacts to wetlands and other waters. The micrositing visit was followed by a wetlands and other waters evaluation field survey that included identification of jurisdictional and non-jurisdictional wetlands and non-wetland waters within the Survey Corridor based on the preliminary Project layout.

2.1 DESKTOP DATA REVIEW

Prior to and during the wetlands and other waters evaluation survey, available information was reviewed to identify areas that may exhibit wetland and other surface water characteristics. These data layers were evaluated as a whole to make probable wetland and other waters determinations. This included review of the U.S. Geological Survey (USGS) National Hydrography Dataset (NHD), the USFWS National Wetlands Inventory (NWI), the Soil Survey Geographic (SSURGO) database, and aerial photographs.

2.1.1 Desktop Wetland Mapping

Recent aerial photography was reviewed in combination with the NHD, NWI, SSURGO soils and climate data to identify potential wetland areas within the Project Area. Aerial photographs were reviewed for photo signatures that may indicate the presence of a wetland including:

- Crop stress – differences in vigor of planted crops often seen as a pale green or yellow color
- Drowned out – cropped areas that appear to have been planted, but all or part of the crop has been drowned out
- Not cropped – visual evidence that an area with natural vegetative cover was planted around
- Standing water – visible surface water
- Altered pattern – detectable differences in vegetation or cropping patterns resulting from delayed planting dates or other alterations to standard farming practices
- Wetland signature – changes in vegetation color and/or texture in non-cropped areas

The locations of potential wetland basins within the Project Area were digitized using ArcGIS mapping software. Potential wetland area boundaries were mapped conservatively for use by Glacier Ridge during initial Project facility siting in order to avoid and minimize potential wetland impacts. Those potential wetland areas located within the Survey Corridor were field checked during the wetlands and other waters field survey.

2.2 MICROSITING

The purpose of micrositing is to view the preliminary proposed locations of Project facilities and make adjustments as necessary to meet regulatory and set-back requirements and constructability criteria. Aerial photographs, NHD, and NWI data were utilized, along with limited field observations, to determine if wetlands or other waters are located within the vicinity of proposed Project facilities. Subsequently, recommendations were made in the field to modify the proposed layout for impact avoidance.

2.3 WETLANDS AND OTHER WATERS EVALUATION SURVEY

The purpose of the wetlands and other waters evaluation survey was to identify the presence and location of wetlands and other surface waters within the Survey Corridor and determine which, if any, may be subject to USACE jurisdiction. All areas of the Survey Corridor were investigated on foot to identify potential wetlands and other waters.

2.3.1 Antecedent Precipitation Review

Antecedent precipitation conditions were evaluated using the “30-Day Rolling Total” method described in technical guidance issued by the Minnesota Board of Soil and Water Resources (BWSR 2015). The Minnesota methodology was used as comparable methods have not been established for North Dakota, and the states have similar wetland landscapes. This method involves summing the prior 30-day precipitation totals for each day and plotting this “rolling total” on a daily basis. Precipitation data for a three month period prior to the field surveys was obtained from the National Oceanic and Atmospheric Administration (NOAA) for the climatological station nearest the Project Area. A plot of the normal precipitation range was overlaid on the daily plot in order to evaluate whether antecedent precipitation was greater or less than normal throughout a month. The “normal precipitation range” was considered to be between the 30% chance of precipitation “less than” and “greater than” values from the USDA NRCS Wetlands (WETS) Climate Table for the climatological station.

2.3.2 Field Survey

The wetland survey was conducted in general conformance with the Level 2 onsite routine wetland determination method described in the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987). However, due to the large number of probable non-jurisdictional wetlands within the Project Area and Glacier Ridge’s commitment to minimize wetland impacts, only a small subset of surveyed wetlands were fully delineated in accordance with the three-parameter approach outlined in the Corps of Engineers Wetlands Delineation Manual (USACE 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region, Version 2.0 (USACE 2010). When a potential wetland was encountered in the Survey Corridor³, sufficient information was collected to make a preliminary USACE jurisdictional determination based on the guidance provided by EPA and USACE (2008) summarized in Section 1.3.1.1 of this report.

Potential wetlands preliminarily determined to be USACE jurisdictional based on the available information, and that may be permanently impacted by the Project, were fully delineated. At each of these potential wetlands, Tetra Tech established a transect in a representative transition zone of the potential wetland nearest the location of potential impacts that would result from development of the Project. Each transect consisted of at least one sample point in potential wetland, and if that point met wetland delineation criteria, at least one sample point in non-wetland. Soils, vegetation, and hydrology data were recorded on Wetland Determination Data Forms. Plant species dominance at sample points was based on the percent cover visually estimated within a 5-foot radius of the sample point for the herbaceous layer, a 15-foot radius for the shrub layer, and a 30-foot radius for tree and vine layers. Wetland indicator status for all plant species followed the USACE 2016 National Wetland Plant List (Lichvar et al 2016). Tetra Tech photographed each sample point location and each delineated wetland. Wetlands were classified according to Circular 39 (Shaw and Fredine 1956) and Cowardin (Cowardin et. al. 1979) methods.

³ Includes potential wetland areas and other waters identified during the desktop data review including those in the NWI, NHD and digitized from aerial photographs (see Section 2.1.1), as well as potential wetlands and other waters observed in the field.

Potential wetland features determined to be non-jurisdictional and those determined to be jurisdictional without anticipated permanent impacts were investigated based on the minimum amount of information deemed necessary in the professional judgement of the wetland specialist conducting the survey to determine if a wetland, as defined by the USACE, was present and, if so, to establish a boundary. Minimum information generally included visual observations of hydrology, topography and vegetation. If needed, soils were also observed. If, based on observations made at the time of the field visit, a potential wetland did not meet all three wetland delineation criteria (hydrophobic vegetation, hydric soils and hydrology) it was determined to be non-wetland. Observations for potential wetland areas were generally made at the lowest elevation within the Survey Corridor where the likelihood of meeting wetland delineation criteria was greatest. Observations were recorded in a field notebook that is on record at the Tetra Tech office in Bloomington, Minnesota. Tetra Tech photographed observation point locations, surveyed wetlands, and investigated non-wetland areas. Wetlands were classified according to Circular 39 (Shaw and Fredine 1956) and Cowardin (Cowardin et. al. 1979) methods.

Boundaries for non-wetland waters (i.e., ponds and streams) were established based on observations of the OHWM as defined by the USACE (see Section 1.3.1). Wetland and other waters boundaries were generally only established within the Survey Corridor. Wetlands and other waters boundaries that extended beyond the Survey Corridor were mapped at the discretion of the surveyor based on the feature size, perceived usefulness to Glacier Ridge in future Project facility layout modifications, and property access. Wetland and other waters boundaries were mapped using hand-held Geographic Positioning System (GPS) technology (see Section 2.3.2 below) and were not flagged at the time of the field survey.

2.3.3 Digital Capture of Data

A GIS specialist designed a geodatabase specifically for the Project that was used to capture wetland and other waters feature location data in the field using Trimble GPS technology, as well as to manage and display features for quality control and electronic deliverables. The geodatabase was loaded on a Trimble GeoXT handheld GPS unit, which has an accuracy of one meter or less, and ran both ESRI's ArcPad 10 and Trimble GPS Correct software packages. The geodatabase contains three types of feature classes for data capture: wetland points, wetland lines, and wetland polygons. Additional attribute data collected in the field included:

- Date feature was collected;
- Wetland specialist who evaluated and collected the feature;
- Feature type:
 - Circular 39: seasonally flooded wetland (Type 1), wet meadow wetland (Type 2), shallow marsh wetland (Type 3), deep marsh (Type 4), shallow open water (Type 5)
 - Cowardin: PEMA, PEMAf, PEMB, PEMC, PABH, R4SB, etc. (see **Appendix E** for key to Cowardin codes)
 - Other waters: pond, NRPW, RPW
- Whether the entire boundary was mapped;
- Jurisdictional status;
- Whether the wetland was fully delineated; and
- Average width and depth of linear stream features.

After the field data were post-processed, the wetland specialists who captured the field data conducted a quality control review of the geodatabase to ensure the features collected correspond with field observations and attribute data entered was accurate.

3.0 RESULTS

3.1 DESKTOP DATA REVIEW

The following sections describe the data sources reviewed prior to conducting Project micro-siting and utilized during the wetlands and other waters evaluation survey. These data sources include NHD, NWI, SSURGO, climate data, and aerial photographs.

3.1.1 National Hydrography Dataset (NHD)

NHD data for the Project Area was obtained from the USGS (USGS 2016). The NHD depicts numerous unnamed streams within the Project Area. All of the stream flow generally to the east toward the Maple River and, ultimately, to the Red River of the North, which is a TNW. Perennial, intermittent, and ephemeral streams and drainages identified within the Survey Corridor were investigated during the wetlands and other waters evaluation survey. The NHD data are presented on **Figure 2**.

3.1.2 National Wetlands Inventory (NWI)

NWI data for the Project Area was obtained from the USFWS (USFWS 2015). The NWI data indicated the presence of 126 freshwater emergent wetlands (PEMA, PEMC and PEMF), 4 freshwater forested/shrub wetlands (PFOA and PFO/EMC), and 2 freshwater ponds (PABFx) mapped within the Survey Corridor. NWI wetlands identified within the vicinity of the Survey Corridor were investigated during the wetlands and other waters evaluation survey. The NWI data are presented on **Figure 2**.

3.1.3 SSURGO Soils

Soils data for Barnes County were obtained from the United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) (USDA NRCS 2016b). This information was used to study the distribution of hydric soils within the Project Area and Survey Corridor.

Soil, as it relates to wetland delineations, must be classified as a hydric soil for the area to qualify as a wetland in accordance with the 1987 Manual (Environmental Laboratory 1987) and the Regional Supplement (USACE 2010). Hydric soils are defined as soils that are formed under conditions of saturation, flooding, or ponding that occurs long enough during the growing season to develop anaerobic conditions. In the SSURGO dataset, soils may be classified using the following categories:

- Non-hydric – all series components rated as non-hydric
- Predominantly non-hydric – minority of soil components that are considered hydric accounting for 1 to 33% of the series
- Partially hydric – a mix of hydric and non-hydric soil components with hydric components accounting for 34 to 66% of the series
- Predominantly hydric – majority of soil components that are considered hydric accounting for 67 to 99% of the series
- Hydric – all series components rated as hydric

Table 3: Soil Series in the Survey Corridor

| Symbol | Soil Series | Percent Hydric | Hydric Component Landform | Percent of Survey Corridor Area |
|----------------|-------------------------------------|----------------|---------------------------------------|---------------------------------|
| G167B | Balaton-Wyard loams | 14 | Depressions, Ground moraines | 3.54 |
| G144B | Barnes-Buse loams | 8 | Depressions | 23.46 |
| G143C G143D | Barnes-Buse-Langhei loams | 6 | Depressions | 7.54 |
| G680B G680C | Barnes-Sioux complex | 0 | na | 5.31 |
| G143A G143B | Barnes-Svea loams | 6 | Depressions | 26.42 |
| G143F | Buse-Barnes loams | 6 | Depressions | 0.08 |
| G680F | Buse-Sioux complex | 0 | na | 0.66 |
| G250A | Divide loam | 14 | Depressions | 0.10 |
| G100A | Hamerly-Tonka complex | 40 | Depressions, Ground moraines | 16.75 |
| G101A | Hamerly-Wyard loams | 12 | Depressions, Ground moraines | 3.61 |
| G782B | Kranzburg-Lismore silty clay loams | 3 | Depressions | 3.43 |
| G732C | Lanona-Buse complex | 1 | Depressions | 0.32 |
| G782A | Lismore-Kranzburg silty clay loams | 3 | Depressions | 0.70 |
| G521A | Lowe loam | 94 | Flood plains, Depressions | 0.16 |
| G523A | Lowe-Fluvaquents, channeled complex | 93 | Flood plains, Depressions | 1.58 |
| G3A | Parnell silty clay loam | 94 | Depressions, Ground moraines, Marshes | 0.40 |
| G275A | Renshaw loam | 0 | na | 0.01 |
| G276B | Renshaw-Sioux complex | 3 | Depressions | 0.06 |
| G123A | Svea-Cavour loams | 4 | Depressions | 0.31 |
| G732B | Swenoda-Barnes complex | 2 | Depressions | 2.19 |
| G2A | Tonka silt loam | 89 | Depressions, Ground moraines | 0.07 |
| G6A | Vallers loam | 83 | Ground moraines, Depressions | 0.01 |
| G118A | Vallers loam, saline | 79 | Ground moraines, Depressions | 2.95 |
| G12A | Vallers, saline-Parnell complex | 86 | Ground moraines, Depressions, Marshes | 0.34 |

According to reviewed data, there are 24 soil series represented within the Survey Corridor. The majority of the Survey Corridor area is composed of soils that are classified as predominantly non-hydric (72%) or partially hydric (17%). The remainder of the soils in the Survey Corridor are classified as not hydric (6%) or predominantly hydric (5%). There are no hydric soils mapped within the Survey Corridor. These hydric soils determinations are taken from the National List of Hydric Soils (USDA-NRCS 2015). The type and extent of soils found in the Survey Corridor are summarized in **Table 3**, and the distribution of hydric soils within the Project Area is depicted on **Figure 3**.

3.1.4 Aerial Photography

Aerial photography for the Project Area in combination with antecedent precipitation data from NOAA (Menne et al. 2012) was reviewed to identify potential wetland areas. Reviewed aerial photographs included an image from fall 2015 (NAIP 2015) and summer 2011 (Bing 2011). Antecedent precipitation conditions for the reviewed aerial photographs were evaluated using the “Three Prior Month” method described in technical guidance issued by the Minnesota Board of Soil and Water Resources (BWSR 2015). The antecedent precipitation review showed the 2011 photograph was taken during a period with wet antecedent precipitation, and the 2015 photograph was taken during a period with normal antecedent precipitation (**Table 4**) (USDA NRCS 2016a).

Table 4: Antecedent Precipitation for Recent Aerial Photographs

| Precipitation Data for Project Area: | | | |
|--|--|---|---|
| Station Name: CASSELTON AGRONOMY FARM, ND US GHCND:USC00321408 | | Photo Date: July 7, 2011 | |
| Score using 1971-2000 normal period | | | |
| (values are in inches) | first prior month: June 2011 | second prior month: May 2011 | third prior month: April 2011 |
| Precipitation total for this location: | 5.63 | 3.86 | 2.18 |
| there is a 25% chance this location will have less than: | 2.48 | 1.80 | 0.69 |
| there is a 25% chance this location will have more than: | 4.29 | 3.19 | 1.77 |
| type of month: dry normal wet | Wet | wet | wet |
| monthly score | 3 * 3 = 9 | 2 * 3 = 6 | 1 * 3 = 3 |
| multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet) | 18 (Wet) | | |
| Precipitation Data for Project Area: | | | |
| Station Name: CASSELTON AGRONOMY FARM, ND US GHCND:USC00321408 | | Photo Date: September 26, 2015 | |
| Score using 1981-2010 normal period | | | |
| (values are in inches) | first prior month: August 2015 | second prior month: July 2015 | third prior month: June 2015 |
| Precipitation total for this location: | 2.90 | 3.60 | 4.07 |
| there is a 25% chance this location will have less than: | 1.78 | 1.83 | 2.48 |
| there is a 25% chance this location will have more than: | 3.22 | 3.94 | 4.29 |
| type of month: dry normal wet | Normal | normal | normal |
| monthly score | 3 * 2 = 6 | 2 * 2 = 4 | 1 * 2 = 2 |
| multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet) | 12 (Normal) | | |

The review of recent aerial photography indicated the presence of 460 potential wetland areas within the Survey Corridor. Potential wetland areas identified during the desktop review of recent aerial photography in the vicinity of the Survey Corridor were investigated during the wetlands and other waters evaluation survey. The identified potential wetland areas and the 2015 aerial photograph are presented on **Figure 4**.

3.2 MICROSITING

A Tetra Tech wetland specialist met with representatives of Glacier Ridge on June 21, 2016 to review select preliminary proposed Project facilities' locations targeted for construction in 2016. The previously reviewed data including potential wetland areas identified from aerial photographs, NHD and NWI were utilized in addition to limited field observations to determine if wetlands or other waters were located within the vicinity of proposed Project facilities and recommendations were made in the field to modify the proposed Project facilities to avoid impacts to wetland and waters features.

3.3 WETLANDS AND OTHER WATERS EVALUATION SURVEY

The wetlands and other waters evaluation survey was conducted for the majority of the Survey Corridor from June 21-30, 2016. Some property within the Survey Corridor was not accessible at the time of the June survey. These areas were surveyed from August 1-3, 2016 in addition to the locations of Project facilities modified following micro-siting. The following sections describe the results of the wetlands and other waters evaluation survey including an antecedent precipitation analysis, summary of mapped wetlands and other waters and field observations, probable USACE jurisdictional determinations, and an impact analysis.

3.3.1 Antecedent Precipitation

Precipitation data was obtained from NOAA (Menne, et. al. 2012) for two climatological stations near the Project Area: Valley City 2.0 NW (station ID GHCND:US1NDBR0002) and Casselton Agronomy Farm (station ID GHCND:USC00321408). The Valley City station is located approximately 12 miles southwest of the center of the Project Area and is the closest station to the Project Area with relatively consistent, recent precipitation data. However, there are 16 missing observations from the March 1 to July 31 period (10% of days during this period), and the reported rainfall amounts appear to generally be higher than those reported by other nearby stations. Due to the potentially imprecise data reported by this station, precipitation data from the Casselton station located approximately 30 miles southeast of the center of the Project Area was also reviewed. The Casselton dataset has 11 missing observations from July, but the data for March, April, May and June are complete. **Chart 1** and **Chart 2** show the results of the 30-Day Rolling Total analysis for the Valley City and Casselton stations.

A review of the precipitation data from the Valley City station shows generally normal precipitation levels in March, April, and most of May. There was a large rain event (2.3 inches) reported on May 23. After this point, precipitation levels are much wetter than normal with several additional large rain events reported in June and July. Notably, these include 2.35 inches of rain reported on June 15, 1.47 inches on July 7, and 1.42 inches on July 27 (**Chart 1**).

A review of the precipitation data from the Casselton station shows a similar pattern of precipitation as the Valley City station, but with lower rainfall totals. The Casselton station shows slightly lower than normal precipitation levels in March, with normal precipitation levels in most of April. By late April, precipitation levels are wetter than normal, largely due to a significant rain event on April 25 when 1.26 inches of rain were recorded. Precipitation levels remain wetter than normal until mid-May, when they return to the normal range. From mid-May through the end of July, precipitation levels fluctuate between the wet end of the normal range and drier than normal levels. Notable rain events include 1.74 inches recorded on May 31, and a total of 2.87 inches recorded from July 10 through July 12 (**Chart 2**).

Chart 1: Valley City 2.0 NW Station Precipitation March 1, 2016 – July 31, 2016

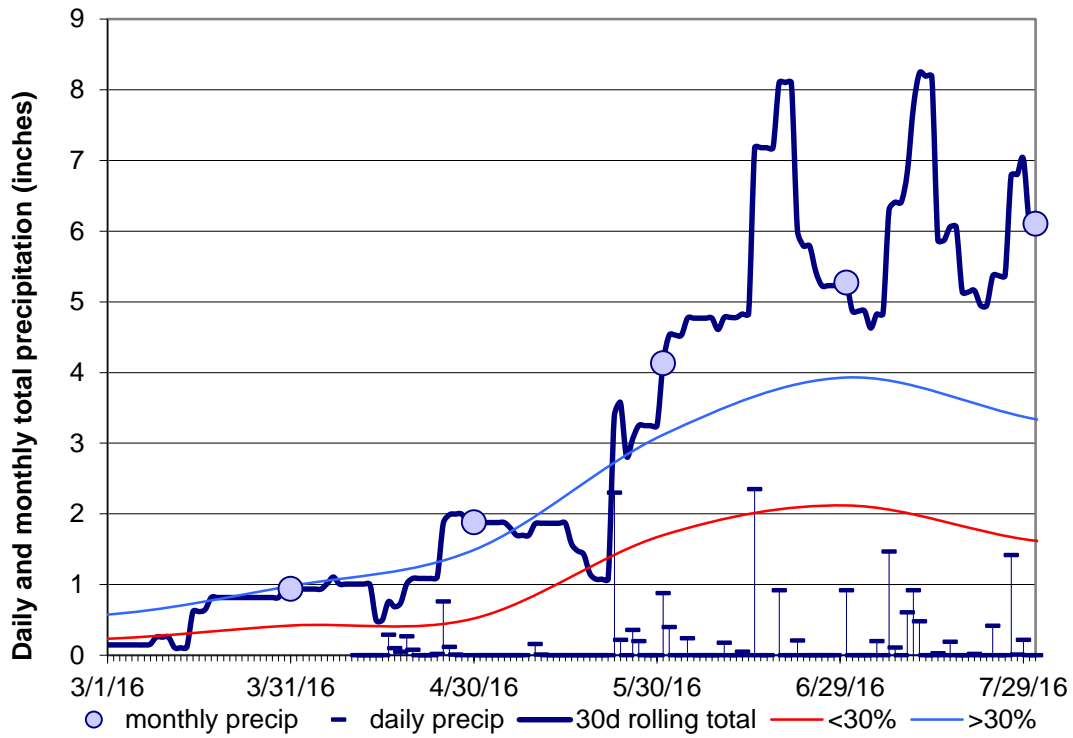
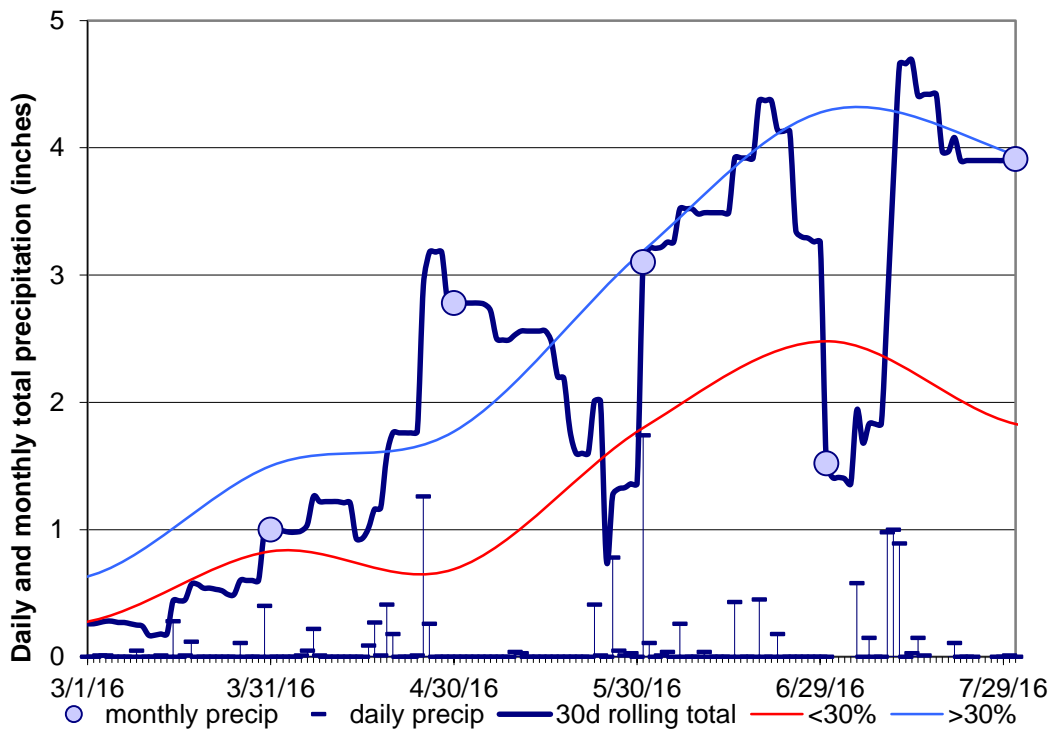


Chart 2: Casselton Agronomy Farm Station Precipitation March 1, 2016 – July 31, 2016



Observations made during the June field survey suggested hydrologic conditions were normal to dry. These observations are generally more consistent with the Casselton precipitation data showing higher precipitation in late May and drying conditions in late June when the field survey was conducted. Hydrologic conditions observed during the August field survey were wetter than in June, which is also consistent with the Casselton data showing a significant rain event in mid-July approximately three weeks prior to the August field survey.

3.3.2 Wetlands and Other Waters

During the wetlands and other waters evaluation survey, Tetra Tech identified 466 wetlands, 5 NRPWs and 1 RPW. Of these, 34 wetlands were delineated. Additionally, wetland delineation sample points were placed at five potential wetland areas that did not meet wetland delineation criteria. Wetland determination data forms for delineated wetlands and non-wetland points are presented in **Appendix B**.

All of the 460 potential wetland areas identified during the desktop data review (see Section 3.1.4) in the Survey Corridor were reviewed during the field survey, as well as 26 additional potential wetland areas located just outside the Survey Corridor. Of the 486 total potential wetland areas observed during the field survey, 398 were confirmed to be present in the field and were mapped, and 88 were determined to be non-wetlands based on the observations made at the time of the field survey. Some potential wetland areas were mapped as multiple wetlands or other water features, while others were combined into a single wetland, so the 398 field confirmed potential wetland areas were mapped as 408 wetland or other water features. Additionally, 58 wetlands were mapped during the field survey that were either not identified in the desktop potential wetlands dataset (44 wetlands) or were located outside the area initially assess during the desktop review (14 wetlands). The majority of these were relatively small (less than 0.5 acres). All of the surveyed wetlands and other waters are listed in **Appendix C** and are depicted on **Figure 4**.

Wetlands and other waters were classified using the USFWS Circular 39 (Shaw and Fredine 1971) and Cowardin (Cowardin et. al. 1979) classification systems. Circular 39 classifications were selected based on the “wettest” dominant component of the wetland, and many of the shallow marsh, deep marsh, and shallow open water wetlands include bands of drier classes of wetlands on their edges. When appropriate, multiple Cowardin classes were assigned to a wetland complex consisting of more than one class of wetland (e.g. PEMC/PEMA for a shallow marsh wetland with a border of seasonally flooded wetland). **Table 5** provides a summary of the wetland and water types that were observed during the survey, and representative photographs of each wetland type are presented in **Appendix D**. A key for the Cowardin classification system is presented in **Appendix E**.

General observations of vegetation, soils, and hydrology conditions recorded during the field survey are summarized below.

3.3.2.1 Vegetation

Wetlands observed within the Survey Corridor were typically vegetated with a variety of wetland plants typical of the central North Dakota ecotone. Many of the seasonally flooded and wet meadow wetlands were observed to be cultivated and were either barren or vegetated with crops (soybeans, corn, wheat, sunflowers, canola, or alfalfa). Natural and weedy vegetation commonly observed in cultivated and non-cultivated seasonally flooded and wet meadow wetlands included grasses (fox-tail barley [*Hordeum jubatum*], large barnyard grass [*Echinochloa crus-galli*], reed canary grass [*Phalaris arundinacea*], freshwater cord grass [*Spartina pectinata*], and field meadow-foxtail [*Alopecurus pratensis*]), sedges (*Carex sp.*), horsetails (*Equisetum sp.*), and various forbs including rough cocklebur (*Xanthium strumarium*), stinging nettle (*Urtica dioica*), and prickly lettuce (*Lactuca serriola*). Shallow and deep marsh wetlands were often dominated by cattails (*Typha sp.*). Other species observed in shallow and deep marsh

wetlands included: American water-plantain (*Alisma subcordatum*), sedges (*Carex sp.*), spike-rushes (*Eleocharis sp.*), smartweeds (*Persicaria sp.*), curly dock (*Rumex crispus*), willows (*Salix sp.*), dark-green bulrush (*Scirpus atrovirens*), and soft-stem club-rush (*Schoenoplectus tabernaemontani*). Deep-water portions of deep marsh and shallow open water wetlands were not observed during the survey for indications of non-emergent (submerged or floating) vegetation.

3.3.2.2 Soils

Soils observed within the Survey Corridor were typically loamy with textures ranging from loam to silty clay loam to clay loam. A few areas, particularly near drainageways, had more sandy soils with sandy loam or sandy clay textures. A very thick (20 to 40 or more inches), black (10YR 2/1) A horizon typical of prairies soils was observed in most locations in the Survey Corridor. As a result, the thick dark surface (A12) hydric soil indicator was the most often documented indicator at wetland sample plots.

Table 5: Wetland and Other Water Types Observed in the Survey Corridor

| Number Surveyed | Circular 39 | Cowardin | Description |
|-----------------|--|----------------|--|
| 353 | Type 1 Seasonally Flooded Basins or Flats | PEMA, PEMAf | These wetlands may be inundated or saturated for variable periods, but are usually well drained during much of the growing season. Vegetation is variable. |
| 13 | Type 2 Fresh Wet Meadows | PEMB, PEMBf | These wetlands are typically not inundated, but soils remain saturated within a few inches of the surface during most of the growing season. Vegetation typically includes grasses, sedges, rushes and various broad-leaved plants. |
| 91 | Type 3 Shallow Fresh Marshes | PEMC, PEMCd | These wetlands typically have soils that remain saturated during the growing season and are commonly inundated with up to six inches of water. Vegetation typically includes grasses, bulrushes, spikerushes and various marsh plants including cattails, arrowheads and smartweeds. |
| 4 | Type 4 Deep Fresh Marshes | PEMF, PABF | These wetlands are typically inundated with six inches to three feet or more of water during the growing season. Vegetation typically includes cattails, reeds, bulrushes, spikerushes and wild rice as well as pondweeds, coontail, watermilfoils, duckweeds, and waterlilies in deeper water. |
| 5 | Type 5 Open Water | PEMH, PABH | Includes shallow ponds and reservoirs with less than 10 feet of water and a border of emergent vegetation. Vegetation (typically in areas with water depth less than 6 feet) may include: pondweeds, naiads, wildcelery, coontail, watremilfoils, muskgrasses, waterlilies, and spaderdocks. |
| 5 | N/A | R4USC | Streams with intermittent flow that generally contain flowing water for only part of the year. When water is not flowing, it may remain in isolated pools or surface water may be absent. The streambed varies in substrate and form depending on the gradient of the channel, velocity of water, and sediment load. |
| 1 | N/A | R2UBH | Streams with low gradient and flow velocity, but water generally flows year-round. The substrate typically consists of sand and mud. |

3.3.2.3 Hydrology

The drainage system in the Project Area is poorly developed with relatively few drainage swales or streams, and numerous isolated wetlands. Several linear drainageways were observed in the Survey Corridor that lacked bed and/or bank characteristics that precluded them from being considered streams, but met the criteria to be considered wetlands. Many of the drainageways and streams observed in the Survey Corridor appeared to have been modified by straightening or channelizing, and some swales appeared to have been developed between wetlands to facilitate drainage and benefit agricultural use of the land. The five NRPWs and one NRPS identified in the Survey Corridor appear to flow toward the Maple River, and ultimately, to the Red River of the North, the closest TNW to the Project Area.

Approximately half of the wetlands and other waters surveyed were inundated or saturated at the surface at the time of the field survey. The remaining wetlands, primarily seasonally flooded PEMAf types, did not exhibit any of the primary wetland hydrology indicators. Hydrology criteria for these wetlands were established based on observations of secondary wetland hydrology indicators. The secondary indicators observed most often were surface soil cracks (B6), sparsely vegetated concave surface (B8), drainage patterns (B10), and geomorphic position (D2).

3.3.3 USACE Jurisdiction

Each of the wetlands and other waters features identified during the wetlands and other waters evaluation survey was reviewed for potential USACE jurisdiction in accordance with USACE and USEPA guidance as described in Section 1.3.1.1 of this report, and a preliminary jurisdictional determination was recommended for each. Of the 472 wetlands and other waters identified during the survey, 74 were determined to potentially have a hydrologic connection to the Red River of the North (68 wetlands, 5 NRPWs, and 1 RPW) and meet the criteria to be considered WoUS under the currently effective regulations. These wetlands and waters would, therefore, likely be subject to USACE regulatory jurisdiction. The remaining 398 wetlands appeared to be isolated waters that would not likely be subject to USACE regulatory jurisdiction under the currently effective regulations. If, however, the new CWA rule as previously proposed were implemented, these prairie pothole wetlands could be subject to a significant nexus evaluation to determine if they are WoUS. Only the USACE can make the final determination on the jurisdiction of wetlands and other waters.

4.0 IMPACT ANALYSIS

An analysis of potential wetlands and other waters that may be impacted by the Project was conducted based on the results of the wetlands and other waters evaluation survey and current Project facilities layout. Many of the estimated impacts may be reduced or eliminated by Glacier Ridge with future modifications to the Project facilities layouts. The following sections include a description of the assumed permanent and temporary impact areas, results of the impact analysis for the Project, and regulatory implications.

4.1 IMPACT AREAS

For the purposes of this assessment, permanent impacts resulting from the Project are considered to be the Project footprint during operation. Project infrastructure that could exert permanent impacts includes turbines, access roads, collection system junction boxes, the substation and the O&M building. Temporary impacts would occur during construction to accommodate equipment and temporary laydown activities beyond the built Project infrastructure. **Table 6** outlines the estimated permanent and temporary impact areas anticipated for Project infrastructure.

Table 6: Proposed Project Facility Impact Assumptions

| Proposed Project Component | Construction Disturbance | Temporary Construction Disturbance to be Reclaimed | Permanent Disturbance (Operation) |
|----------------------------|--------------------------------------|--|--------------------------------------|
| Wind Turbines | 4.5 acres per turbine | 4.3 acres per turbine | 0.2 acre per turbine |
| Access Roads | 68 feet wide per linear foot of road | 48 feet wide per linear foot of road | 20 feet wide per linear foot of road |
| Collection Lines | 40 feet wide per linear foot | 40 feet wide per linear foot minus 12 x 8 feet for each junction box | 12 x 8 feet for each junction box |
| Meteorological Towers | 1.25 acres per tower | 1.25 acres per tower | 5 square feet per permanent tower |
| Substation | 5 acres | 3 acres | 2 acres |
| O&M building | 3 acres | 1 acre | 2 acres |

4.2 ESTIMATED IMPACTS TO WETLANDS AND OTHER WATERS

The analysis of impacts revealed that 320 wetlands and other waters may be impacted by the Project. Of these, the majority are non-jurisdictional. Glacier Ridge is committed to avoiding all impacts to wetlands on USFWS wetland easements, as well as reducing or eliminating impacts to USACE jurisdictional wetlands and other WoUS. Impact avoidance and minimization will be achieved by modifications to Project facility layouts and implementation of avoidance measures during construction. Permanent and temporary impacts to non-jurisdictional wetlands may also be reduced as practicable. **Table 7** includes a summary of estimated impacts, and a detailed listing of estimated impacts can be found in **Appendix F**.

Table 7: Wetlands and Other Waters Impacts Summary

| Impact Type | Wetlands and Other Waters Impacted | | | |
|-------------|------------------------------------|-----------------|--------------------|--------|
| | USACE Jurisdictional | USFWS Easement* | Non-Jurisdictional | Total† |
| Permanent‡ | 13 | 9 | 59 | 80 |
| Temporary | 65 | 30 | 231 | 319 |

* Glacier Ridge is committed to avoiding all impacts to wetlands on USFWS wetland easements

† Total may be less than sum of jurisdictional counts as some wetlands fall under the jurisdiction of the both USACE and USFWS

‡ Most permanently impacted wetlands and other waters will also be subject to temporary impacts

5.0 USFWS CONSULTATION

Tetra Tech has initiated consultation with the USFWS Valley City Wetland Management District regarding wetland basins on USFWS easement tracts within the Project Area. Mr. Kurt Tompkins, District Manager, has been identified as the primary point of contact for the consultation.

Tetra Tech contacted Mr. Tompkins prior to the wetlands and other waters evaluation field survey to discuss the proposed methodology and confirm it would adequately capture wetland basins on USFWS easement tracts. Mr. Thompson confirmed that the proposed methodology would be adequate. Tetra Tech also invited Mr. Tompkins to visit the Project Area during the field survey to provide additional on-site guidance regarding wetland basins on USFWS easement tracts; however, Mr. Tompkins indicated that he would not need to visit the Project Area at this time and would review Tetra Tech's survey results upon completion of the field effort. As requested, Tetra Tech has provided Mr. Tompkins with GIS shapefiles of the 46 wetlands identified on USFWS easement tracts to review and confirm that all wetland basins within the Survey Corridor on easement tracts had been identified, and that all of the surveyed wetland boundaries were accurate. As of the date of this report, Tetra Tech is waiting to receive the requested feedback from the USFWS.

6.0 CONCLUSIONS AND RECOMENDATIONS

Tetra Tech completed a wetlands and other waters evaluation survey for the proposed Glacier Ridge Wind Farm located in Barnes County, North Dakota. A total of 466 wetlands, 5 NRPWs and 1 RPW were identified during the survey. Of these, 68 wetlands, 5 NRPWs, and 1 RPW were preliminarily determined to fall under the jurisdiction of the USACE, and 46 wetlands were identified on USFWS easement tracts.

An estimated 240 wetlands and other waters may be temporarily impacted by the Project as currently proposed, and permanent and temporary impacts may occur for an additional 79 wetlands and other waters. Permanent impacts only may occur for one wetland. Permanent impacts to 13 USACE jurisdictional wetlands and other WoUS (SJ112, SK064, WJ189, WJ128, WJ205, WJ324, WJ325, WK036, WK058, WK060, WK123, WK138, and WK142) and 9 wetlands on USFWS easement tracts (WJ069, WJ071, WJ072, WJ106, WJ128, WJ177, WJ284, and WJ326) are currently estimated. With the exception of WJ128, all estimated permanent impacts to USACE jurisdictional wetlands and other WoUS are less than 0.1 acre.

Glacier Ridge has committed to avoiding and minimizing impacts to potential USACE jurisdictional wetlands and other WoUS, as practicable, and avoiding all impacts to wetlands on USFWS wetland easements. Avoidance and minimization will be achieved in modifications to Project facility layouts, reduction in the construction footprint in certain areas, and horizontal drilling of electrical collection lines, where appropriate and feasible, as reflected in the final layout maps provided to the North Dakota Public Service Commission on August 12, 2016.

The recommended USACE jurisdictional determinations presented in this report are preliminary, only the USACE can make the final determination of jurisdiction for wetlands and other waters. Therefore, Tetra Tech recommends obtaining an AJD from the USACE for any wetlands that will be permanently or temporarily impacted by the Project. The USACE will also determine the type of permit, if any, that is required. Glacier Ridge intends to limit impacts to USACE jurisdictional WoUS to those that would be approved under NWP 12 or NWP 14 and fall under the 0.1 acre per-crossing impact that would not require completion of a PCN.

7.0 REFERENCES

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APPENDIX A – FIGURES

Figure 1 – Project Location

Figure 2 – NHD and NWI

Figure 3 – SSURGO Soils

Figure 4 – Wetlands and Other Waters Survey Results

APPENDIX B – WETLAND DETERMINATION DATA FORMS

APPENDIX C – SURVEYED WETLANDS AND OTHER WATERS FEATURES

Table C-1: Surveyed Streams

| Stream ID | Map Book Page | Stream Type | Cowardin Class | Jurisdiction | Average Width (feet) |
|-----------|---------------|-------------|----------------|--------------|----------------------|
| SJ109 | F5 | NRPW | R4USC | USACE | 5 |
| SJ112 | F5 | NRPW | R4USC | USACE | 5 |
| SJ170 | F5 | RPW | R2UBH | USACE | 4 |
| SK085 | K3 | NRPW | R4USCd | USACE | 3 |
| SK135 | I6 | NRPW | R4USC | USACE | 12 |
| SK149 | K4 | NRPW | R4USCd | USACE | 12 |

Table C-2: Surveyed Wetlands

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|------------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WJ001 | D5 | Seasonally Flooded Basin | PEMAf | | 0.376 |
| WJ006 | D5 | Seasonally Flooded Basin | PEMAf | | 0.043 |
| WJ007 | C4 | Shallow Marsh | PEMC | USACE | 5.767 |
| WJ009 | C4 | Seasonally Flooded Basin | PEMAf | | 0.155 |
| WJ010 | C4 | Seasonally Flooded Basin | PEMAf | | 1.425 |
| WJ011 | C4 | Seasonally Flooded Basin | PEMAf | | 0.020 |
| WJ012 | C4 | Seasonally Flooded Basin | PEMAf | | 0.144 |
| WJ013 | C4 | Seasonally Flooded Basin | PEMAf | | 0.349 |
| WJ014 | C4 | Seasonally Flooded Basin | PEMAf | | 0.185 |
| WJ015 | C4 | Seasonally Flooded Basin | PEMAf | | 0.128 |
| WJ016 | C4 | Seasonally Flooded Basin | PEMAf | | 0.098 |
| WJ017 | C3 | Seasonally Flooded Basin | PEMAf | | 0.195 |
| WJ018 | C4 | Seasonally Flooded Basin | PEMAf | | 0.131 |
| WJ021 | C3 | Shallow Marsh | PEMC/PEMAf | | 0.645 |
| WJ023 | C3 | Seasonally Flooded Basin | PEMAf | | 0.095 |
| WJ024 | C3 | Seasonally Flooded Basin | PEMAf | | 0.086 |
| WJ025 | C3 | Seasonally Flooded Basin | PEMAf | | 0.302 |
| WJ026 | C3 | Seasonally Flooded Basin | PEMA | | 0.183 |
| WJ027 | C3 | Shallow Marsh | PEMC/PEMAf | | 0.227 |
| WJ028 | C3 | Seasonally Flooded Basin | PEMAf | | 0.243 |
| WJ029 | D3 | Seasonally Flooded Basin | PEMAf | | 0.273 |
| WJ030 | D3 | Seasonally Flooded Basin | PEMAf | | 0.115 |
| WJ031 | D3 | Shallow Marsh | PEMC/PEMAf | | 0.934 |
| WJ032 | D3 | Shallow Marsh | PEMC/PEMAf | | 0.124 |
| WJ033 | D3 | Seasonally Flooded Basin | PEMAf/PEMC | | 1.156 |
| WJ034 | E2 | Seasonally Flooded Basin | PEMAf | | 0.250 |
| WJ035 | E2 | Seasonally Flooded Basin | PEMAf | | 0.366 |
| WJ036 | E2 | Shallow Marsh | PEMC/PEMAf | | 0.448 |
| WJ038 | E2 | Seasonally Flooded Basin | PEMA | | 0.049 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|---------------------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WJ040 | E4 | Seasonally Flooded Basin | PEMAf | | 0.334 |
| WJ042 | E4 | Seasonally Flooded Basin | PEMAf | | 0.397 |
| WJ043 | E4 | Shallow Marsh | PEMC/PEMAf | | 0.469 |
| WJ044 | E4 | Shallow Marsh | PEMC/PEMAf | | 0.248 |
| WJ048 | E4 | Seasonally Flooded Basin | PEMAf | | 0.158 |
| WJ049 | E4 | Seasonally Flooded Basin | PEMAf | | 0.382 |
| WJ050 | E4 | Seasonally Flooded Basin | PEMAf | USACE | 1.249 |
| WJ051 | E4 | Seasonally Flooded Basin | PEMAf | | 0.376 |
| WJ052 | E4 | Seasonally Flooded Basin | PEMA/PEMBf | | 2.015 |
| WJ053 | E4 | Seasonally Flooded Basin | PEMAf | | 0.257 |
| WJ054 | E4 | Seasonally Flooded Basin | PEMAf | | 0.318 |
| WJ055 | E4 | Seasonally Flooded Basin | PEMAf | | 0.034 |
| WJ056 | E3 | Seasonally Flooded Basin | PEMAf | | 0.143 |
| WJ057 | E3 | Shallow Marsh | PEMC/PEMAf | | 0.480 |
| WJ058 | E2 | Shallow Marsh | PEMC/PEMAf | USACE | 0.368 |
| WJ060 | E3 | Seasonally Flooded Basin | PEMAf | | 0.103 |
| WJ061 | E3 | Shallow Open Water | PEMH/PEMC/ PEMAf | | 15.941 |
| WJ062 | E3 | Wet Meadow | PEMB | | 0.042 |
| WJ063 | E3 | Wet Meadow | PEMB | | 0.280 |
| WJ064 | E3 | Wet Meadow | PEMB | | 0.024 |
| WJ065 | E3 | Deep Marsh | PEMF/PEMC/ PEMB | | 1.246 |
| WJ066 | E3 | Seasonally Flooded Basin | PEMAf | | 0.386 |
| WJ067 | E3 | Seasonally Flooded Basin | PEMAf | | 0.056 |
| WJ068 | D3 | Shallow Marsh | PEMH/PEMC | | 0.322 |
| WJ069 | B4 | Seasonally Flooded Basin | PEMAf/PEMC | | 1.884 |
| WJ070 | B4 | Shallow Marsh | PEMC | | 0.753 |
| WJ071 | B4 | Seasonally Flooded Basin | PEMAf/PEMC | | 1.235 |
| WJ072 | B4 | Seasonally Flooded Basin | PEMAf | | 0.169 |
| WJ074 | B4 | Seasonally Flooded Basin | PEMAf | | 0.306 |
| WJ076 | B4 | Seasonally Flooded Basin | PEMAf | | 0.071 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|------------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WJ077 | B4 | Seasonally Flooded Basin | PEMAf | | 0.098 |
| WJ079 | B4 | Seasonally Flooded Basin | PEMAf | | 0.255 |
| WJ080 | B4 | Seasonally Flooded Basin | PEMAf | | 0.132 |
| WJ082 | B4 | Seasonally Flooded Basin | PEMAf | | 0.228 |
| WJ084 | B4 | Shallow Marsh | PEMC | USACE | 14.679 |
| WJ085 | C4 | Seasonally Flooded Basin | PEMAf/PEMC | USACE, USFWS | 4.036 |
| WJ086 | C4 | Seasonally Flooded Basin | PEMAf | | 0.090 |
| WJ087 | C4 | Seasonally Flooded Basin | PEMAf | | 0.028 |
| WJ088 | E3 | Seasonally Flooded Basin | PEMAf | | 0.357 |
| WJ090 | E3 | Shallow Open Water | PEMH/PEMAf | | 4.239 |
| WJ091 | E3 | Seasonally Flooded Basin | PEMAf | | 0.545 |
| WJ092 | E3 | Seasonally Flooded Basin | PEMAf | | 0.559 |
| WJ093 | E3 | Seasonally Flooded Basin | PEMAf | | 0.044 |
| WJ094 | E3 | Seasonally Flooded Basin | PEMAf | | 0.042 |
| WJ095 | E3 | Seasonally Flooded Basin | PEMAf | | 0.465 |
| WJ096 | E3 | Seasonally Flooded Basin | PEMAf | | 0.189 |
| WJ097 | E3 | Seasonally Flooded Basin | PEMAf | | 0.057 |
| WJ098 | E3 | Seasonally Flooded Basin | PEMAf | | 1.163 |
| WJ099 | E3 | Seasonally Flooded Basin | PEMAf | | 0.045 |
| WJ100 | E5 | Seasonally Flooded Basin | PEMAf | | 1.096 |
| WJ101 | E5 | Seasonally Flooded Basin | PEMAf | | 0.157 |
| WJ102 | E5 | Seasonally Flooded Basin | PEMAf | | 0.132 |
| WJ103 | E5 | Seasonally Flooded Basin | PEMAf | | 0.223 |
| WJ104 | E5 | Seasonally Flooded Basin | PEMAf | | 1.471 |
| WJ105 | E5 | Seasonally Flooded Basin | PEMAf | | 0.401 |
| WJ106 | E5 | Seasonally Flooded Basin | PEMAf | | 0.438 |
| WJ107 | F5 | Seasonally Flooded Basin | PEMAf | | 0.282 |
| WJ108 | F4 | Seasonally Flooded Basin | PEMA | USACE | 0.014 |
| WJ115 | G4 | Seasonally Flooded Basin | PEMAf | | 0.037 |
| WJ116 | F5 | Seasonally Flooded Basin | PEMAf | USACE | 0.289 |
| WJ117 | F5 | Seasonally Flooded Basin | PEMAf | | 0.108 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|------------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WJ118 | F5 | Seasonally Flooded Basin | PEMAf/PEMC | | 0.970 |
| WJ119 | F5 | Seasonally Flooded Basin | PEMAf | | 0.083 |
| WJ120 | F5 | Seasonally Flooded Basin | PEMAf | | 0.266 |
| WJ121 | F5 | Seasonally Flooded Basin | PEMAf | | 0.193 |
| WJ122 | F5 | Seasonally Flooded Basin | PEMAf | | 0.087 |
| WJ123 | F5 | Seasonally Flooded Basin | PEMAf | | 0.109 |
| WJ124 | F5 | Seasonally Flooded Basin | PEMAf | | 0.107 |
| WJ125 | F5 | Seasonally Flooded Basin | PEMAf | | 0.204 |
| WJ127 | F5 | Seasonally Flooded Basin | PEMAf | | 0.089 |
| WJ128 | F5 | Shallow Marsh | PEMC/PEMAf | USACE, USFWS | 21.818 |
| WJ129 | F5 | Seasonally Flooded Basin | PEMAf | | 0.957 |
| WJ130 | F5 | Seasonally Flooded Basin | PEMAf | | 0.039 |
| WJ131 | F5 | Seasonally Flooded Basin | PEMAf | | 0.107 |
| WJ132 | F5 | Shallow Marsh | PEMC/PEMAf | | 0.962 |
| WJ134 | F5 | Seasonally Flooded Basin | PEMAf | | 1.008 |
| WJ135 | G4 | Seasonally Flooded Basin | PEMAf | | 0.089 |
| WJ137 | G4 | Seasonally Flooded Basin | PEMAf | | 1.019 |
| WJ138 | G4 | Seasonally Flooded Basin | PEMAf | | 0.052 |
| WJ141 | G4 | Seasonally Flooded Basin | PEMAf | | 0.275 |
| WJ142 | G4 | Seasonally Flooded Basin | PEMAf | | 0.218 |
| WJ143 | G4 | Seasonally Flooded Basin | PEMAf | | 0.097 |
| WJ144 | G4 | Seasonally Flooded Basin | PEMAf | | 0.033 |
| WJ145 | G4 | Seasonally Flooded Basin | PEMAf | | 0.172 |
| WJ146 | G4 | Seasonally Flooded Basin | PEMAf | | 0.400 |
| WJ147 | G4 | Seasonally Flooded Basin | PEMAf | | 0.063 |
| WJ148 | G4 | Seasonally Flooded Basin | PEMAf | | 0.202 |
| WJ150 | G4 | Seasonally Flooded Basin | PEMAf | | 0.059 |
| WJ151 | G4 | Seasonally Flooded Basin | PEMAf | | 0.275 |
| WJ152 | G4 | Seasonally Flooded Basin | PEMAf | | 0.063 |
| WJ154 | G4 | Seasonally Flooded Basin | PEMAf | | 0.098 |
| WJ155 | G4 | Seasonally Flooded Basin | PEMAf | USACE | 0.048 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|-------------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WJ157 | G4 | Seasonally Flooded Basin | PEMAf | | 0.132 |
| WJ158 | G4 | Seasonally Flooded Basin | PEMAf | | 0.030 |
| WJ159 | G4 | Seasonally Flooded Basin | PEMAf | | 0.063 |
| WJ160 | G4 | Seasonally Flooded Basin | PEMAf | | 0.263 |
| WJ161 | F4 | Seasonally Flooded Basin | PEMA/PEMC | | 0.410 |
| WJ162 | G4 | Seasonally Flooded Basin | PEMAf | | 0.024 |
| WJ163 | G4 | Seasonally Flooded Basin | PEMAf | | 0.042 |
| WJ164 | G4 | Seasonally Flooded Basin | PEMAf | | 0.097 |
| WJ165 | G4 | Seasonally Flooded Basin | PEMAf | | 0.014 |
| WJ166 | G4 | Seasonally Flooded Basin | PEMAf | | 0.161 |
| WJ167 | G4 | Seasonally Flooded Basin | PEMAf | | 0.053 |
| WJ168 | G4 | Seasonally Flooded Basin | PEMAf | | 0.068 |
| WJ169 | F5 | Shallow Marsh | PEMC/PEMAf | USACE | 0.156 |
| WJ171 | F5 | Seasonally Flooded Basin | PEMAf | | 0.294 |
| WJ172 | F5 | Wet Meadow | PEMBf/PEMAf | USACE, USFWS | 0.801 |
| WJ173 | F5 | Seasonally Flooded Basin | PEMAf | | 0.081 |
| WJ174 | F5 | Seasonally Flooded Basin | PEMAf/PEMC | | 0.082 |
| WJ175 | E5 | Seasonally Flooded Basin | PEMAf | | 0.310 |
| WJ176 | E5 | Seasonally Flooded Basin | PEMAf | | 0.305 |
| WJ177 | E5 | Seasonally Flooded Basin | PEMAf | | 0.618 |
| WJ178 | E5 | Wet Meadow | PEMB | | 2.216 |
| WJ179 | E5 | Shallow Marsh | PEMC/PEMAf | USACE, USFWS | 1.747 |
| WJ180 | D3 | Shallow Marsh | PEMC/PEMB | | 0.779 |
| WJ181 | E3 | Shallow Marsh | PEMC | | 0.046 |
| WJ182 | D3 | Seasonally Flooded Basin | PEMA | | 0.016 |
| WJ183 | D3 | Shallow Marsh | PEMC | USACE | 0.211 |
| WJ184 | D3 | Seasonally Flooded Basin | PEMAf | | 0.219 |
| WJ185 | D3 | Shallow Marsh | PEMC/PEMAf | USACE | 2.252 |
| WJ186 | H4 | Seasonally Flooded Basin | PEMAf | | 0.593 |
| WJ187 | H4 | Seasonally Flooded Basin | PEMAf | | 0.244 |
| WJ188 | G4 | Seasonally Flooded Basin | PEMAf | | 0.062 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
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| | | Circular 39 | Cowardin | | |
| WJ189 | H4 | Seasonally Flooded Basin | PEMAf | USACE | 0.213 |
| WJ191 | H4 | Seasonally Flooded Basin | PEMA | USACE | 0.098 |
| WJ196 | H4 | Seasonally Flooded Basin | PEMAf | | 0.660 |
| WJ198 | H4 | Shallow Marsh | PEMC | USACE | 0.225 |
| WJ199 | H4 | Seasonally Flooded Basin | PEMAf | | 0.091 |
| WJ200 | H4 | Seasonally Flooded Basin | PEMAf | | 0.114 |
| WJ201 | H4 | Seasonally Flooded Basin | PEMAf | | 0.199 |
| WJ202 | H3 | Seasonally Flooded Basin | PEMAf | USACE | 0.200 |
| WJ203 | H3 | Shallow Marsh | PEMC/PFO | | 0.404 |
| WJ204 | H5 | Seasonally Flooded Basin | PEMAf/PEMC | | 0.647 |
| WJ205 | H5 | Seasonally Flooded Basin | PEMAf | USACE | 0.525 |
| WJ206 | H5 | Seasonally Flooded Basin | PEMA | | 0.365 |
| WJ207 | I5 | Shallow Marsh | PEMC/PEMAf | USACE | 2.313 |
| WJ210 | I4 | Seasonally Flooded Basin | PEMA | USACE | 4.858 |
| WJ211 | I4 | Seasonally Flooded Basin | PEMAf | | 0.194 |
| WJ213 | I4 | Seasonally Flooded Basin | PEMAf | | 0.040 |
| WJ215 | I4 | Seasonally Flooded Basin | PEMAf | | 0.025 |
| WJ217 | I4 | Seasonally Flooded Basin | PEMAf | | 0.256 |
| WJ218 | I4 | Seasonally Flooded Basin | PEMAf | | 0.501 |
| WJ219 | I4 | Seasonally Flooded Basin | PEMAf | | 0.231 |
| WJ220 | I4 | Seasonally Flooded Basin | PEMAf | | 0.434 |
| WJ221 | I4 | Seasonally Flooded Basin | PEMAf | | 0.209 |
| WJ222 | I4 | Seasonally Flooded Basin | PEMAf | | 0.196 |
| WJ223 | I4 | Seasonally Flooded Basin | PEMA | USACE | 0.037 |
| WJ224 | I4 | Seasonally Flooded Basin | PEMA | USACE | 0.335 |
| WJ225 | I3 | Seasonally Flooded Basin | PEMAf | | 0.037 |
| WJ226 | I3 | Seasonally Flooded Basin | PEMAf | | 0.156 |
| WJ227 | I3 | Shallow Marsh | PEMC | USACE | 0.191 |
| WJ228 | I3 | Seasonally Flooded Basin | PEMAf/PEMC | | 0.738 |
| WJ230 | I3 | Seasonally Flooded Basin | PEMAf | | 0.082 |
| WJ231 | I3 | Seasonally Flooded Basin | PEMAf | | 0.167 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
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| | | Circular 39 | Cowardin | | |
| WJ232 | I3 | Seasonally Flooded Basin | PEMAf | | 0.156 |
| WJ233 | I3 | Seasonally Flooded Basin | PEMAf | | 1.180 |
| WJ234 | I3 | Shallow Marsh | PEMC/PEMA | | 6.789 |
| WJ235 | I3 | Deep Marsh | PEMF | | 0.528 |
| WJ236 | I3 | Seasonally Flooded Basin | PEMAf | | 0.082 |
| WJ237 | I3 | Seasonally Flooded Basin | PEMAf | | 0.390 |
| WJ238 | I3 | Deep Marsh | PEMF/PEMAf | | 0.239 |
| WJ239 | I3 | Seasonally Flooded Basin | PEMAf | | 0.038 |
| WJ240 | I3 | Seasonally Flooded Basin | PEMAf | | 0.028 |
| WJ241 | I3 | Shallow Marsh | PEMC | USACE | 0.323 |
| WJ245 | J3 | Shallow Marsh | PEMC | | 1.946 |
| WJ246 | J2 | Shallow Open Water | PEMH | | 1.402 |
| WJ247 | J2 | Seasonally Flooded Basin | PEMA | | 0.061 |
| WJ250 | J2 | Seasonally Flooded Basin | PEMAf | | 0.066 |
| WJ251 | J2 | Seasonally Flooded Basin | PEMAf | | 0.362 |
| WJ252 | J2 | Seasonally Flooded Basin | PEMAf | | 0.162 |
| WJ253 | J2 | Seasonally Flooded Basin | PEMAf/PEMC | | 1.521 |
| WJ254 | J2 | Wet Meadow | PEMBf | | 0.178 |
| WJ255 | J2 | Seasonally Flooded Basin | PEMAf | | 0.206 |
| WJ256 | J2 | Seasonally Flooded Basin | PEMAf | | 0.188 |
| WJ257 | J2 | Seasonally Flooded Basin | PEMAf | | 0.097 |
| WJ258 | J2 | Seasonally Flooded Basin | PEMAf | | 0.113 |
| WJ259 | J3 | Seasonally Flooded Basin | PEMAf | | 0.010 |
| WJ261 | J2 | Seasonally Flooded Basin | PEMAf | | 0.261 |
| WJ263 | J2 | Seasonally Flooded Basin | PEMAf | | 0.082 |
| WJ264 | K2 | Seasonally Flooded Basin | PEMAf | | 0.471 |
| WJ265 | J2 | Wet Meadow | PEMBf | | 0.075 |
| WJ266 | D3 | Seasonally Flooded Basin | PEMAf | | 0.242 |
| WJ267 | D3 | Seasonally Flooded Basin | PEMAf | | 0.110 |
| WJ268 | D3 | Seasonally Flooded Basin | PEMAf | | 0.161 |
| WJ269 | D3 | Shallow Marsh | PEMC | | 0.809 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|------------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WJ270 | D3 | Seasonally Flooded Basin | PEMAf | | 0.059 |
| WJ271 | D3 | Shallow Marsh | PEMC | USACE | 0.190 |
| WJ272 | D3 | Seasonally Flooded Basin | PEMAf | | 0.192 |
| WJ273 | I3 | Wet Meadow | PEMB/PEMAf | USACE | 1.972 |
| WJ274 | I3 | Shallow Marsh | PEMC/PEMAf | | 0.072 |
| WJ275 | I3 | Seasonally Flooded Basin | PEMAf | | 0.081 |
| WJ276 | I3 | Seasonally Flooded Basin | PEMAf | | 0.064 |
| WJ278 | H1 | Shallow Marsh | PEMC | | 0.022 |
| WJ279 | I1 | Seasonally Flooded Basin | PEMAf | | 0.327 |
| WJ280 | H2 | Shallow Marsh | PEMC/PEMAf | | 0.225 |
| WJ281 | H2 | Shallow Marsh | PEMC/PEMAf | | 1.353 |
| WJ282 | H2 | Seasonally Flooded Basin | PEMA | | 0.060 |
| WJ283 | H2 | Seasonally Flooded Basin | PEMA | | 0.019 |
| WJ284 | H2 | Seasonally Flooded Basin | PEMAf | | 0.198 |
| WJ285 | H2 | Shallow Marsh | PEMC/PEMAf | | 0.849 |
| WJ286 | H2 | Seasonally Flooded Basin | PEMAf | | 0.028 |
| WJ287 | H2 | Seasonally Flooded Basin | PEMAf | | 0.062 |
| WJ288 | H2 | Seasonally Flooded Basin | PEMAf | | 0.175 |
| WJ289 | H2 | Seasonally Flooded Basin | PEMAf | | 0.293 |
| WJ290 | H2 | Seasonally Flooded Basin | PEMAf | | 0.071 |
| WJ291 | H2 | Shallow Marsh | PEMC/PEMAf | USACE, USFWS | 3.279 |
| WJ292 | H2 | Shallow Open Water | PEMH/PEMAf | | 0.230 |
| WJ293 | I4 | Seasonally Flooded Basin | PEMAf | | 0.074 |
| WJ294 | I4 | Seasonally Flooded Basin | PEMAf | USACE | 0.845 |
| WJ295 | I4 | Shallow Marsh | PEMC/PEMAf | USACE | 0.348 |
| WJ296 | I4 | Seasonally Flooded Basin | PEMAf/PEMC | | 0.261 |
| WJ297 | I3 | Seasonally Flooded Basin | PEMAf | | 0.178 |
| WJ298 | J4 | Seasonally Flooded Basin | PEMAf | | 0.384 |
| WJ299 | J4 | Seasonally Flooded Basin | PEMAf/PEMC | | 1.637 |
| WJ300 | J5 | Shallow Marsh | PEMC/PEMAf | | 0.480 |
| WJ302 | J4 | Seasonally Flooded Basin | PEMAf | | 0.158 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|-------------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WJ303 | J4 | Seasonally Flooded Basin | PEMAf | | 0.285 |
| WJ304 | J4 | Seasonally Flooded Basin | PEMAf | | 0.288 |
| WJ305 | J4 | Seasonally Flooded Basin | PEMAf | | 0.475 |
| WJ306 | J4 | Seasonally Flooded Basin | PEMAf | | 0.206 |
| WJ307 | J4 | Seasonally Flooded Basin | PEMAf | USACE | 0.050 |
| WJ308 | J4 | Shallow Marsh | PEMC/PEMAh | | 3.644 |
| WJ309 | J4 | Seasonally Flooded Basin | PEMAf | | 0.115 |
| WJ312 | K3 | Seasonally Flooded Basin | PEMAf | | 0.037 |
| WJ313 | K3 | Seasonally Flooded Basin | PEMAf | | 0.027 |
| WJ314 | L3 | Seasonally Flooded Basin | PEMA | USACE | 0.018 |
| WJ315 | E4 | Seasonally Flooded Basin | PEMAf | | 0.142 |
| WJ316 | E4 | Seasonally Flooded Basin | PEMAf/PEMCf | | 0.484 |
| WJ317 | E4 | Seasonally Flooded Basin | PEMAf | USACE, USFWS | 1.527 |
| WJ318 | E4 | Seasonally Flooded Basin | PEMAf/PEMCf | USACE, USFWS | 2.371 |
| WJ319 | E4 | Seasonally Flooded Basin | PEMAf/PEMCf | | 4.222 |
| WJ320 | E4 | Shallow Marsh | PEMC | | 0.215 |
| WJ321 | I2 | Seasonally Flooded Basin | PEMAf/PEMC | | 2.194 |
| WJ322 | I2 | Seasonally Flooded Basin | PEMAf/PEMB | | 1.301 |
| WJ323 | I2 | Seasonally Flooded Basin | PEMAf | | 2.263 |
| WJ324 | J4 | Shallow Marsh | PEMC/PEMB | USACE | 2.810 |
| WJ325 | K4 | Seasonally Flooded Basin | PEMA | USACE | 0.617 |
| WJ326 | I2 | Shallow Marsh | PEMC/PEMAf | | 0.391 |
| WJ327 | I2 | Seasonally Flooded Basin | PEMAf | | 0.212 |
| WJ328 | I2 | Seasonally Flooded Basin | PEMAf | | 0.401 |
| WJ329 | I2 | Seasonally Flooded Basin | PEMAf | | 0.079 |
| WJ330 | I2 | Seasonally Flooded Basin | PEMAf | | 0.156 |
| WJ331 | I2 | Seasonally Flooded Basin | PEMAf | | 0.073 |
| WJ333 | I2 | Seasonally Flooded Basin | PEMAf | | 0.018 |
| WJ334 | I2 | Seasonally Flooded Basin | PEMAf | | 0.060 |
| WJ335 | I2 | Seasonally Flooded Basin | PEMAf | | 0.220 |
| WJ337 | I2 | Seasonally Flooded Basin | PEMAf | | 0.187 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|------------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WJ338 | I2 | Seasonally Flooded Basin | PEMAf | | 0.246 |
| WJ339 | E5 | Shallow Marsh | PEMC/PEMAf | | 0.354 |
| WJ340 | E4 | Seasonally Flooded Basin | PEMAf | | 0.232 |
| WJ341 | E4 | Seasonally Flooded Basin | PEMAf | | 0.142 |
| WJ342 | E4 | Seasonally Flooded Basin | PEMAf | | 0.075 |
| WJ346 | M3 | Seasonally Flooded Basin | PEMAf | USACE | 0.341 |
| WJ347 | A3 | Shallow Marsh | PEMC | | 0.120 |
| WK001 | M1 | Seasonally Flooded Basin | PEMAf | | 0.161 |
| WK002 | M2 | Seasonally Flooded Basin | PEMAf | | 0.520 |
| WK005 | M2 | Shallow Marsh | PEMC | | 0.633 |
| WK006 | M2 | Seasonally Flooded Basin | PEMAf | | 0.228 |
| WK007 | M2 | Seasonally Flooded Basin | PEMAf | | 0.072 |
| WK008 | M2 | Seasonally Flooded Basin | PEMAf | | 0.106 |
| WK009 | M2 | Seasonally Flooded Basin | PEMAf | | 0.381 |
| WK010 | N2 | Seasonally Flooded Basin | PEMAf | | 0.099 |
| WK011 | M2 | Shallow Marsh | PEMC | | 1.454 |
| WK012 | M2 | Seasonally Flooded Basin | PEMAf | | 0.163 |
| WK015 | M2 | Seasonally Flooded Basin | PEMAf | | 0.034 |
| WK016 | M2 | Shallow Open Water | PABH/PEMC | | 20.808 |
| WK017 | N2 | Seasonally Flooded Basin | PEMAf | | 0.016 |
| WK018 | N2 | Seasonally Flooded Basin | PEMAf | | 0.052 |
| WK019 | N2 | Seasonally Flooded Basin | PEMAf | | 0.120 |
| WK020 | N2 | Shallow Marsh | PEMC | USACE | 2.076 |
| WK021 | N2 | Deep Marsh | PABF/PEMC | | 15.219 |
| WK022 | N2 | Seasonally Flooded Basin | PEMAf | | 0.251 |
| WK024 | M3 | Shallow Marsh | PEMC/PEMB | | 0.697 |
| WK026 | M3 | Seasonally Flooded Basin | PEMAf | | 0.303 |
| WK027 | M3 | Seasonally Flooded Basin | PEMAf | | 0.787 |
| WK028 | M3 | Seasonally Flooded Basin | PEMAf | | 0.257 |
| WK029 | M3 | Seasonally Flooded Basin | PEMAf | | 0.393 |
| WK030 | M3 | Seasonally Flooded Basin | PEMAf | | 0.850 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|------------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WK031 | M3 | Seasonally Flooded Basin | PEMAf | | 0.145 |
| WK033 | M3 | Seasonally Flooded Basin | PEMAf | | 0.224 |
| WK035 | M4 | Seasonally Flooded Basin | PEMAf | | 0.324 |
| WK036 | M4 | Seasonally Flooded Basin | PEMAf | USACE | 0.843 |
| WK039 | M4 | Seasonally Flooded Basin | PEMAf | | 0.301 |
| WK040 | M4 | Seasonally Flooded Basin | PEMAf | | 0.300 |
| WK045 | M3 | Seasonally Flooded Basin | PEMAf | | 0.023 |
| WK047 | M3 | Seasonally Flooded Basin | PEMAf | | 0.122 |
| WK048 | M3 | Seasonally Flooded Basin | PEMAf/PEMC | USACE | 1.641 |
| WK049 | M3 | Seasonally Flooded Basin | PEMAf | | 0.363 |
| WK050 | M3 | Seasonally Flooded Basin | PEMAf | USACE | 0.056 |
| WK051 | M3 | Seasonally Flooded Basin | PEMAf | USACE | 0.042 |
| WK052 | M4 | Wet Meadow | PEMBf | | 2.038 |
| WK053 | M4 | Wet Meadow | PEMB | | 0.329 |
| WK054 | M4 | Seasonally Flooded Basin | PEMAf | | 0.148 |
| WK055 | M4 | Seasonally Flooded Basin | PEMAf | | 0.121 |
| WK057 | M4 | Seasonally Flooded Basin | PEMAf | | 1.097 |
| WK058 | M4 | Seasonally Flooded Basin | PEMAf | USACE | 0.556 |
| WK060 | M4 | Seasonally Flooded Basin | PEMAf/PEMC | USACE | 2.271 |
| WK061 | M4 | Seasonally Flooded Basin | PEMAf | | 0.423 |
| WK062 | M4 | Seasonally Flooded Basin | PEMAf | | 0.185 |
| WK063 | L4 | Seasonally Flooded Basin | PEMAf | | 0.101 |
| WK064 | L4 | Shallow Marsh | PEMC/PEMAf | USACE | 0.131 |
| WK066 | L4 | Seasonally Flooded Basin | PEMAf | | 0.563 |
| WK068 | L2 | Shallow Marsh | PEMC/PEMAf | | 0.614 |
| WK070 | K2 | Seasonally Flooded Basin | PEMAf | | 0.645 |
| WK071 | K2 | Shallow Marsh | PEMC | | 1.559 |
| WK075 | K2 | Seasonally Flooded Basin | PEMAf | | 0.074 |
| WK077 | J3 | Shallow Marsh | PEMC | | 0.276 |
| WK079 | K3 | Shallow Marsh | PEMC | USACE | 0.514 |
| WK080 | K3 | Seasonally Flooded Basin | PEMAf | | 0.208 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|------------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WK081 | K3 | Seasonally Flooded Basin | PEMAf | | 0.276 |
| WK082 | K3 | Shallow Marsh | PEMC/PEMAf | | 0.444 |
| WK083 | K3 | Seasonally Flooded Basin | PEMAf | | 0.202 |
| WK084 | K3 | Wet Meadow | PEMBd | USACE | 0.211 |
| WK086 | K3 | Seasonally Flooded Basin | PEMAf | USACE | 0.134 |
| WK087 | J5 | Wet Meadow | PEMB | | 0.214 |
| WK088 | J5 | Shallow Marsh | PEMC | | 1.152 |
| WK089 | J5 | Shallow Marsh | PEMC | | 2.256 |
| WK090 | J5 | Shallow Marsh | PEMC | | 0.417 |
| WK091 | J5 | Shallow Marsh | PEMC | | 0.131 |
| WK092 | J5 | Seasonally Flooded Basin | PEMA | | 0.152 |
| WK093 | J5 | Shallow Marsh | PEMC | | 0.494 |
| WK094 | J5 | Shallow Marsh | PEMC | | 0.949 |
| WK095 | J5 | Shallow Marsh | PEMC | | 1.851 |
| WK096 | J5 | Shallow Marsh | PEMC | | 0.378 |
| WK097 | J5 | Shallow Marsh | PEMC | | 0.723 |
| WK098 | J5 | Shallow Marsh | PEMC | | 1.223 |
| WK099 | J5 | Shallow Marsh | PEMC | | 0.477 |
| WK100 | J5 | Shallow Marsh | PEMC | | 0.491 |
| WK101 | J5 | Seasonally Flooded Basin | PEMA | | 0.024 |
| WK102 | J5 | Seasonally Flooded Basin | PEMA | | 0.132 |
| WK103 | J5 | Seasonally Flooded Basin | PEMAf | | 0.213 |
| WK104 | J5 | Seasonally Flooded Basin | PEMA/PEMC | | 1.177 |
| WK106 | J5 | Shallow Marsh | PEMC | | 0.266 |
| WK107 | J5 | Shallow Marsh | PEMC | | 0.455 |
| WK108 | J5 | Shallow Marsh | PEMC | | 0.576 |
| WK109 | J5 | Shallow Marsh | PEMC/PEMAf | | 0.445 |
| WK110 | J4 | Shallow Marsh | PEMC | | 2.739 |
| WK111 | J5 | Shallow Marsh | PEMC | | 1.169 |
| WK112 | J5 | Seasonally Flooded Basin | PEMAf | | 0.473 |
| WK113 | J5 | Shallow Marsh | PEMC | | 0.345 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|---------------------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WK114 | J5 | Seasonally Flooded Basin | PEMAf | | 0.122 |
| WK115 | J5 | Seasonally Flooded Basin | PEMAf | | 0.397 |
| WK116 | J5 | Seasonally Flooded Basin | PEMAf | | 0.119 |
| WK117 | J5 | Wet Meadow | PEMB/PEMA/ PEMCf | USACE | 15.753 |
| WK118 | J5 | Shallow Marsh | PEMC | | 0.667 |
| WK119 | J5 | Seasonally Flooded Basin | PEMAf | | 0.183 |
| WK120 | J5 | Shallow Marsh | PEMC | | 0.285 |
| WK121 | J5 | Seasonally Flooded Basin | PEMAf | | 0.129 |
| WK122 | J5 | Seasonally Flooded Basin | PEMAf/PEMC | | 1.823 |
| WK123 | J5 | Shallow Marsh | PEMC/PEMAf | USACE | 2.064 |
| WK125 | K5 | Shallow Marsh | PEMC | USACE | 0.377 |
| WK126 | K5 | Shallow Marsh | PEMC | | 0.722 |
| WK128 | J6 | Seasonally Flooded Basin | PEMAf | | 1.157 |
| WK129 | J6 | Shallow Marsh | PEMC | | 1.776 |
| WK130 | J6 | Seasonally Flooded Basin | PEMAf | | 0.487 |
| WK131 | J6 | Seasonally Flooded Basin | PEMAf | | 0.445 |
| WK134 | J6 | Seasonally Flooded Basin | PEMAf | | 0.136 |
| WK135 | I6 | Shallow Marsh | PEMCd/PEMAf | USACE | 8.247 |
| WK136 | I6 | Shallow Marsh | PEMC | | 1.767 |
| WK138 | I6 | Shallow Marsh | PEMCd/PEMAf | USACE | 0.930 |
| WK139 | I6 | Seasonally Flooded Basin | PEMAf | | 0.505 |
| WK141 | I6 | Seasonally Flooded Basin | PEMAf | | 0.131 |
| WK142 | I6 | Seasonally Flooded Basin | PEMAf | USACE | 0.218 |
| WK143 | I6 | Shallow Marsh | PEMC/PEMAf | | 0.675 |
| WK144 | I6 | Shallow Marsh | PEMC | | 1.745 |
| WK145 | J6 | Shallow Marsh | PEMC/PEMAf | | 3.394 |
| WK146 | K4 | Seasonally Flooded Basin | PEMAf/PEMC | | 0.385 |
| WK147 | K4 | Seasonally Flooded Basin | PEMAf | | 0.181 |
| WK149 | K4 | Seasonally Flooded Basin | PEMAf/PEMC | USACE | 10.288 |
| WK150 | M3 | Seasonally Flooded Basin | PEMAf | USACE | 0.240 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|----------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WK151 | M3 | Seasonally Flooded Basin | PEMAf | | 0.061 |
| WK152 | M2 | Seasonally Flooded Basin | PEMAf | | 0.232 |
| WK153 | M2 | Seasonally Flooded Basin | PEMAf | | 0.248 |
| WK154 | L3 | Seasonally Flooded Basin | PEMAf | | 0.266 |
| WK155 | L3 | Shallow Marsh | PEMC | USACE | 0.266 |
| WK156 | K4 | Seasonally Flooded Basin | PEMAf | | 0.117 |
| WK157 | K4 | Seasonally Flooded Basin | PEMAf | | 0.114 |
| WK158 | K4 | Seasonally Flooded Basin | PEMAf | | 0.237 |
| WK160 | K4 | Seasonally Flooded Basin | PEMAf | | 0.066 |
| WK161 | K4 | Seasonally Flooded Basin | PEMAf | | 0.284 |
| WK162 | K4 | Seasonally Flooded Basin | PEMAf | | 0.209 |
| WK164 | K4 | Seasonally Flooded Basin | PEMAf | | 0.274 |
| WK165 | K4 | Seasonally Flooded Basin | PEMAf | | 0.091 |
| WK166 | K4 | Seasonally Flooded Basin | PEMAf | | 1.721 |
| WK170 | K4 | Seasonally Flooded Basin | PEMAf | | 0.141 |
| WK171 | K4 | Seasonally Flooded Basin | PEMAf | | 0.142 |
| WK173 | K4 | Seasonally Flooded Basin | PEMAf | | 0.620 |
| WK175 | K4 | Seasonally Flooded Basin | PEMAf | | 2.374 |
| WK176 | K4 | Seasonally Flooded Basin | PEMAf | | 0.215 |
| WK177 | K4 | Seasonally Flooded Basin | PEMAf | | 0.414 |
| WK178 | K4 | Seasonally Flooded Basin | PEMAf | | 0.122 |
| WK180 | K4 | Seasonally Flooded Basin | PEMAf | | 0.165 |
| WK181 | K4 | Seasonally Flooded Basin | PEMAf | | 0.307 |
| WK182 | K4 | Seasonally Flooded Basin | PEMAf | | 0.188 |
| WK183 | K4 | Seasonally Flooded Basin | PEMAf | | 0.067 |
| WK184 | K5 | Shallow Marsh | PEMC | USACE | 1.248 |
| WK185 | K4 | Seasonally Flooded Basin | PEMAf | | 0.233 |
| WK188 | K4 | Seasonally Flooded Basin | PEMAf | | 0.618 |
| WK189 | K4 | Seasonally Flooded Basin | PEMAf | | 0.550 |
| WK193 | K4 | Seasonally Flooded Basin | PEMAf | | 0.125 |
| WK196 | K4 | Seasonally Flooded Basin | PEMAf | | 0.099 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|------------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WK197 | J4 | Seasonally Flooded Basin | PEMAf | | 0.199 |
| WK198 | J4 | Seasonally Flooded Basin | PEMAf | | 0.115 |
| WK199 | J4 | Seasonally Flooded Basin | PEMAf | | 0.466 |
| WK200 | J4 | Shallow Marsh | PEMC/PEMAf | | 0.980 |
| WK201 | J4 | Shallow Marsh | PEMC/PEMAf | | 0.477 |
| WK203 | J4 | Seasonally Flooded Basin | PEMAf | USACE | 1.700 |
| WK204 | J4 | Seasonally Flooded Basin | PEMAf | | 0.428 |
| WK205 | J4 | Seasonally Flooded Basin | PEMAf | | 0.114 |
| WK206 | J4 | Seasonally Flooded Basin | PEMAf | | 0.134 |
| WK207 | J4 | Seasonally Flooded Basin | PEMAf | | 0.219 |
| WK208 | J4 | Seasonally Flooded Basin | PEMAf | USACE | 0.895 |
| WK209 | J4 | Seasonally Flooded Basin | PEMAf | USACE | 0.319 |
| WK210 | J4 | Shallow Marsh | PEMC/PEMAf | | 0.453 |
| WK211 | J4 | Seasonally Flooded Basin | PEMAf | USACE | 0.360 |
| WK212 | J4 | Seasonally Flooded Basin | PEMAf | | 1.111 |
| WK213 | J4 | Seasonally Flooded Basin | PEMAf | | 0.946 |
| WK214 | J3 | Seasonally Flooded Basin | PEMAf | | 0.205 |
| WK215 | J3 | Seasonally Flooded Basin | PEMA | | 0.183 |
| WK216 | J3 | Seasonally Flooded Basin | PEMAf | | 0.292 |
| WK217 | J3 | Seasonally Flooded Basin | PEMAf | USACE | 0.355 |
| WK218 | J3 | Shallow Marsh | PEMC | USACE | 0.314 |
| WK219 | I4 | Seasonally Flooded Basin | PEMAf | | 0.229 |
| WK220 | I4 | Seasonally Flooded Basin | PEMAf | | 0.442 |
| WK221 | I4 | Seasonally Flooded Basin | PEMAf | | 0.560 |
| WK222 | I3 | Seasonally Flooded Basin | PEMAf | | 0.122 |
| WK223 | I3 | Seasonally Flooded Basin | PEMAf | | 0.148 |
| WK224 | I3 | Seasonally Flooded Basin | PEMAf | | 0.124 |
| WK225 | J3 | Seasonally Flooded Basin | PEMAf | USACE | 1.727 |
| WK226 | K3 | Seasonally Flooded Basin | PEMAf | | 0.135 |
| WK227 | K3 | Seasonally Flooded Basin | PEMAf | USACE | 1.224 |
| WK228 | K3 | Seasonally Flooded Basin | PEMAf | USACE | 0.146 |

| Wetland ID | Map Book Page | Wetland Type | | Jurisdiction | Surveyed Area (acres) |
|------------|---------------|--------------------------|----------|--------------|-----------------------|
| | | Circular 39 | Cowardin | | |
| WK229 | K3 | Seasonally Flooded Basin | PEMAf | | 0.092 |
| WK230 | K3 | Seasonally Flooded Basin | PEMAf | | 0.234 |
| WK231 | K3 | Seasonally Flooded Basin | PEMAf | | 0.195 |
| WK232 | K3 | Seasonally Flooded Basin | PEMAf | | 0.356 |
| WK233 | L3 | Seasonally Flooded Basin | PEMAf | USACE | 0.043 |

APPENDIX D – PHOTOGRAPHS

APPENDIX E – COWARDIN WETLAND CLASSIFICATION KEY

APPENDIX F – ESTIMATED IMPACTS TO WETLANDS AND OTHER WATERS

Table F-1: Estimated USACE and USFWS Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ¹ | | |
|------------|---------------|----------------------------------|-----------------|-----------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WJ128 | F5 | Shallow Marsh | PEMC/PEMAf | USACE, USFWS | 0.367 | 1.100 | 1.467 |
| WJ071 | B4 | Seasonally Flooded Basin | PEMAf/PEMC | USFWS | 0.076 | 0.226 | 0.301 |
| WJ189 | H4 | Seasonally Flooded Basin | PEMAf | USACE | 0.057 | 0.000 | 0.057 |
| WJ069 | B4 | Seasonally Flooded Basin | PEMAf/PEMC | USFWS | 0.054 | 0.356 | 0.410 |
| WK123 | J5 | Shallow Marsh | PEMC/PEMAf | USACE | 0.040 | 0.346 | 0.387 |
| WJ324 | J4 | Shallow Marsh | PEMC/PEMB | USACE | 0.033 | 0.235 | 0.268 |
| WJ205 | H5 | Seasonally Flooded Basin | PEMAf | USACE | 0.025 | 0.338 | 0.362 |
| WJ326 | I2 | Shallow Marsh | PEMC/PEMAf | USFWS | 0.023 | 0.066 | 0.089 |
| WK058 | M4 | Seasonally Flooded Basin | PEMAf | USACE | 0.014 | 0.187 | 0.201 |
| WK142 | I6 | Seasonally Flooded Basin | PEMAf | USACE | 0.012 | 0.046 | 0.059 |
| WJ284 | H2 | Seasonally Flooded Basin | PEMAf | USFWS | 0.011 | 0.026 | 0.037 |
| WK138 | I6 | Shallow Marsh | PEMCd/ PEMAf | USACE | 0.011 | 0.047 | 0.057 |
| WK036 | M4 | Seasonally Flooded Basin | PEMAf | USACE | 0.008 | 0.186 | 0.194 |
| WJ325 | K4 | Seasonally Flooded Basin | PEMA | USACE | 0.007 | 0.033 | 0.040 |
| WK060 | M4 | Seasonally Flooded Basin | PEMAf/PEMC | USACE | 0.005 | 0.506 | 0.510 |
| WJ177 | E5 | Seasonally Flooded Basin | PEMAf | USFWS | 0.004 | 0.469 | 0.473 |
| WJ072 | B4 | Seasonally Flooded Basin | PEMAf | USFWS | 0.004 | 0.024 | 0.029 |
| SK064 | L4 | Shallow Marsh | PEMC/PEMAf | USACE | 0.002 | 0.015 | 0.017 |
| WJ106 | E5 | Seasonally Flooded Basin | PEMAf | USFWS | 0.002 | 0.416 | 0.418 |
| SJ112 | F5 | NRPW | R4USC | USACE | 0.001 | 0.005 | 0.006 |
| WJ105 | E5 | Seasonally Flooded Basin | PEMAf | USFWS | <0.001 | 0.226 | 0.226 |
| WK135 | I6 | Shallow Marsh | PEMCd/ PEMAf | USACE | 0.000 | 1.177 | 1.177 |
| WK225 | J3 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 1.130 | 1.130 |

¹ Wetlands and other waters are listed in descending order of permanent impacts and then temporary impacts

Table F-1: Estimated USACE and USFWS Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ¹ | | |
|------------|---------------|----------------------------------|----------------|-----------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WJ084 | B4 | Shallow Marsh | PEMC | USACE | 0.000 | 1.071 | 1.071 |
| WJ281 | H2 | Shallow Marsh | PEMC/PEMAf | USFWS | 0.000 | 0.917 | 0.917 |
| WJ291 | H2 | Shallow Marsh | PEMC/PEMAf | USACE, USFWS | 0.000 | 0.585 | 0.585 |
| WJ273 | I3 | Wet Meadow | PEMB/PEMAf | USACE | 0.000 | 0.546 | 0.546 |
| WJ172 | F5 | Wet Meadow | PEMBf/PEMAf | USACE, USFWS | 0.000 | 0.536 | 0.536 |
| WK227 | K3 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.521 | 0.521 |
| WJ085 | C4 | Seasonally Flooded Basin | PEMAf/PEMC | USACE, USFWS | 0.000 | 0.444 | 0.444 |
| WJ179 | E5 | Shallow Marsh | PEMC/PEMAf | USACE, USFWS | 0.000 | 0.419 | 0.419 |
| WJ317 | E4 | Seasonally Flooded Basin | PEMAf | USACE, USFWS | 0.000 | 0.418 | 0.418 |
| WJ210 | I4 | Seasonally Flooded Basin | PEMA | USACE | 0.000 | 0.413 | 0.413 |
| WJ207 | I5 | Shallow Marsh | PEMC/PEMAf | USACE | 0.000 | 0.410 | 0.410 |
| WJ178 | E5 | Wet Meadow | PEMB | USFWS | 0.000 | 0.301 | 0.301 |
| WK048 | M3 | Seasonally Flooded Basin | PEMAf/PEMC | USACE | 0.000 | 0.278 | 0.278 |
| WK149 | K4 | Seasonally Flooded Basin | PEMAf/PEMC | USACE | 0.000 | 0.265 | 0.265 |
| WJ294 | I4 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.260 | 0.260 |
| SK135 | I6 | NRPW | R4USC | USACE | 0.000 | 0.229 | 0.229 |
| WJ171 | F5 | Seasonally Flooded Basin | PEMAf | USFWS | 0.000 | 0.204 | 0.204 |
| WK217 | J3 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.194 | 0.194 |
| WJ007 | C4 | Shallow Marsh | PEMC | USACE | 0.000 | 0.186 | 0.186 |
| WK218 | J3 | Shallow Marsh | PEMC | USACE | 0.000 | 0.155 | 0.155 |
| WJ050 | E4 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.151 | 0.151 |
| WJ316 | E4 | Seasonally Flooded Basin | PEMAf/PEMCf | USFWS | 0.000 | 0.123 | 0.123 |
| WK203 | J4 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.091 | 0.091 |
| WK125 | K5 | Shallow Marsh | PEMC | USACE | 0.000 | 0.090 | 0.090 |
| WJ202 | H3 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.087 | 0.087 |

Table F-1: Estimated USACE and USFWS Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ¹ | | |
|------------|---------------|----------------------------------|----------------|-----------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WJ173 | F5 | Seasonally Flooded Basin | PEMAf | USFWS | 0.000 | 0.081 | 0.081 |
| WJ295 | I4 | Shallow Marsh | PEMC/PEMAf | USACE | 0.000 | 0.078 | 0.078 |
| WJ058 | E2 | Shallow Marsh | PEMC/PEMAf | USACE | 0.000 | 0.075 | 0.075 |
| WK086 | K3 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.075 | 0.075 |
| WK150 | M3 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.074 | 0.074 |
| WJ176 | E5 | Seasonally Flooded Basin | PEMAf | USFWS | 0.000 | 0.069 | 0.069 |
| WK155 | L3 | Shallow Marsh | PEMC | USACE | 0.000 | 0.063 | 0.063 |
| WJ116 | F5 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.057 | 0.057 |
| WJ282 | H2 | Seasonally Flooded Basin | PEMA | USFWS | 0.000 | 0.056 | 0.056 |
| WJ224 | I4 | Seasonally Flooded Basin | PEMA | USACE | 0.000 | 0.056 | 0.056 |
| WJ280 | H2 | Shallow Marsh | PEMC/PEMAf | USFWS | 0.000 | 0.051 | 0.051 |
| WJ086 | C4 | Seasonally Flooded Basin | PEMAf | USFWS | 0.000 | 0.049 | 0.049 |
| WK228 | K3 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.049 | 0.049 |
| WJ185 | D3 | Shallow Marsh | PEMC/PEMAf | USACE | 0.000 | 0.041 | 0.041 |
| WJ271 | D3 | Shallow Marsh | PEMC | USACE | 0.000 | 0.040 | 0.040 |
| WJ339 | E5 | Shallow Marsh | PEMC/PEMAf | USFWS | 0.000 | 0.040 | 0.040 |
| WK084 | K3 | Wet Meadow | PEMBd | USACE | 0.000 | 0.038 | 0.038 |
| WJ286 | H2 | Seasonally Flooded Basin | PEMAf | USFWS | 0.000 | 0.028 | 0.028 |
| WJ318 | E4 | Seasonally Flooded Basin | PEMAf/PEMCf | USACE, USFWS | 0.000 | 0.027 | 0.027 |
| WJ198 | H4 | Shallow Marsh | PEMC | USACE | 0.000 | 0.027 | 0.027 |
| WK209 | J4 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.026 | 0.026 |
| WJ227 | I3 | Shallow Marsh | PEMC | USACE | 0.000 | 0.026 | 0.026 |
| WJ087 | C4 | Seasonally Flooded Basin | PEMAf | USFWS | 0.000 | 0.024 | 0.024 |
| WJ191 | H4 | Seasonally Flooded Basin | PEMA | USACE | 0.000 | 0.024 | 0.024 |
| WJ340 | E4 | Seasonally Flooded Basin | PEMAf | USFWS | 0.000 | 0.021 | 0.021 |

Table F-1: Estimated USACE and USFWS Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ¹ | | |
|------------|---------------|----------------------------------|----------------|--------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WJ169 | F5 | Shallow Marsh | PEMC/PEMAf | USACE | 0.000 | 0.019 | 0.019 |
| WJ319 | E4 | Seasonally Flooded Basin | PEMAf/PEMCf | USFWS | 0.000 | 0.017 | 0.017 |
| WK233 | L3 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.015 | 0.015 |
| WJ314 | L3 | Seasonally Flooded Basin | PEMA | USACE | 0.000 | 0.014 | 0.014 |
| SK149 | K4 | NRPW | R4USCd | USACE | 0.000 | 0.014 | 0.014 |
| WK211 | J4 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.014 | 0.014 |
| WJ307 | J4 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.010 | 0.010 |
| WK051 | M3 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.009 | 0.009 |
| WJ155 | G4 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.007 | 0.007 |
| WJ223 | I4 | Seasonally Flooded Basin | PEMA | USACE | 0.000 | 0.005 | 0.005 |
| WJ108 | F4 | Seasonally Flooded Basin | PEMA | USACE | 0.000 | 0.005 | 0.005 |
| SJ170 | F5 | RPW | R2UBH | USACE | 0.000 | 0.004 | 0.004 |
| SK085 | K3 | NRPW | R4USCd | USACE | 0.000 | 0.003 | 0.003 |
| WK208 | J4 | Seasonally Flooded Basin | PEMAf | USACE | 0.000 | 0.003 | 0.003 |
| WJ241 | I3 | Shallow Marsh | PEMC | USACE | 0.000 | 0.002 | 0.002 |
| WJ285 | H2 | Shallow Marsh | PEMC/PEMAf | USFWS | 0.000 | 0.001 | 0.001 |

Table F-2: Estimated Non-Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ² | | |
|------------|---------------|----------------------------------|----------------|--------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WJ052 | E4 | Seasonally Flooded Basin | PEMAf/ PEMBf | None | 0.112 | 1.442 | 1.554 |
| WK088 | J5 | Shallow Marsh | PEMC | None | 0.027 | 1.044 | 1.071 |
| WJ233 | I3 | Seasonally Flooded Basin | PEMAf | None | 0.011 | 0.550 | 0.561 |
| WJ104 | E5 | Seasonally Flooded Basin | PEMAf | None | 0.081 | 0.409 | 0.490 |
| WJ321 | I2 | Seasonally Flooded Basin | PEMAf/PEMC | None | 0.001 | 0.451 | 0.453 |
| WJ118 | F5 | Seasonally Flooded Basin | PEMAf/PEMC | None | 0.000 | 0.431 | 0.431 |
| WK166 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.008 | 0.415 | 0.423 |
| WJ220 | I4 | Seasonally Flooded Basin | PEMAf | None | 0.089 | 0.330 | 0.419 |
| WK112 | J5 | Seasonally Flooded Basin | PEMAf | None | 0.060 | 0.352 | 0.411 |
| WK175 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.007 | 0.384 | 0.391 |
| WJ204 | H5 | Seasonally Flooded Basin | PEMAf/PEMC | None | 0.000 | 0.365 | 0.365 |
| WK011 | M2 | Shallow Marsh | PEMC | None | 0.000 | 0.358 | 0.358 |
| WJ234 | I3 | Shallow Marsh | PEMC/PEMA | None | 0.052 | 0.306 | 0.358 |
| WK115 | J5 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.330 | 0.330 |
| WK144 | I6 | Shallow Marsh | PEMC | None | 0.000 | 0.302 | 0.302 |
| WK216 | J3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.292 | 0.292 |
| WK090 | J5 | Shallow Marsh | PEMC | None | 0.000 | 0.283 | 0.283 |
| WJ203 | H3 | Shallow Marsh | PEMC/PFO | None | 0.000 | 0.274 | 0.274 |
| WJ322 | I2 | Seasonally Flooded Basin | PEMAf/PEMB | None | 0.014 | 0.259 | 0.273 |
| WJ299 | J4 | Seasonally Flooded Basin | PEMAf/PEMC | None | 0.064 | 0.202 | 0.266 |
| WJ100 | E5 | Seasonally Flooded Basin | PEMAf | None | 0.070 | 0.195 | 0.265 |
| WK100 | J5 | Shallow Marsh | PEMC | None | 0.000 | 0.256 | 0.256 |
| WJ120 | F5 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.256 | 0.256 |

² Wetlands and other waters are listed in descending order of total impact

Table F-2: Estimated Non-Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ² | | |
|------------|---------------|----------------------------------|---------------------|--------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WK232 | K3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.245 | 0.245 |
| WJ246 | J2 | Shallow Open Water | PEMH | None | 0.046 | 0.198 | 0.244 |
| WJ042 | E4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.243 | 0.243 |
| WJ323 | I2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.242 | 0.242 |
| WJ090 | E3 | Shallow Open Water | PEMH/PEMAf | None | 0.070 | 0.169 | 0.239 |
| WK104 | J5 | Seasonally Flooded Basin | PEMA/PEMC | None | 0.065 | 0.166 | 0.231 |
| WK052 | M4 | Wet Meadow | PEMBf | None | 0.000 | 0.226 | 0.226 |
| WJ142 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.218 | 0.218 |
| WJ061 | E3 | Shallow Open Water | PEMH/PEMC/ PEMAf | None | 0.000 | 0.213 | 0.213 |
| WK214 | J3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.196 | 0.196 |
| WJ180 | D3 | Shallow Marsh | PEMC/PEMB | None | 0.000 | 0.189 | 0.189 |
| WJ092 | E3 | Seasonally Flooded Basin | PEMAf | None | 0.041 | 0.146 | 0.187 |
| WJ251 | J2 | Seasonally Flooded Basin | PEMAf | None | 0.008 | 0.177 | 0.185 |
| WJ025 | C3 | Seasonally Flooded Basin | PEMAf | None | 0.043 | 0.142 | 0.185 |
| WJ254 | J2 | Wet Meadow | PEMBf | None | 0.000 | 0.178 | 0.178 |
| WJ297 | I3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.178 | 0.178 |
| WJ098 | E3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.177 | 0.177 |
| WK215 | J3 | Seasonally Flooded Basin | PEMA | None | 0.000 | 0.176 | 0.176 |
| WJ328 | I2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.169 | 0.169 |
| WJ091 | E3 | Seasonally Flooded Basin | PEMAf | None | 0.045 | 0.124 | 0.169 |
| WK022 | N2 | Seasonally Flooded Basin | PEMAf | None | 0.051 | 0.108 | 0.160 |
| WK120 | J5 | Shallow Marsh | PEMC | None | 0.054 | 0.106 | 0.159 |
| WJ308 | J4 | Shallow Marsh | PEMC/PEMAh | None | 0.000 | 0.159 | 0.159 |
| WJ186 | H4 | Seasonally Flooded Basin | PEMAf | None | 0.048 | 0.110 | 0.159 |

Table F-2: Estimated Non-Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ² | | |
|------------|---------------|----------------------------------|--------------------|--------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WJ255 | J2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.157 | 0.157 |
| WJ066 | E3 | Seasonally Flooded Basin | PEMAf | None | 0.034 | 0.123 | 0.157 |
| WK021 | N2 | Deep Marsh | PABF/PEMC | None | 0.000 | 0.157 | 0.157 |
| WJ009 | C4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.155 | 0.155 |
| WK154 | L3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.148 | 0.148 |
| WK207 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.147 | 0.147 |
| WJ043 | E4 | Shallow Marsh | PEMC/PEMAf | None | 0.043 | 0.098 | 0.141 |
| WJ033 | D3 | Seasonally Flooded Basin | PEMAf/PEMC | None | 0.041 | 0.099 | 0.140 |
| WK220 | I4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.139 | 0.139 |
| WK077 | J3 | Shallow Marsh | PEMC | None | 0.000 | 0.138 | 0.138 |
| WK206 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.002 | 0.132 | 0.134 |
| WJ095 | E3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.132 | 0.132 |
| WJ010 | C4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.130 | 0.130 |
| WJ065 | E3 | Deep Marsh | PEMF/PEMC/ PEMB | None | 0.000 | 0.127 | 0.127 |
| WK224 | I3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.124 | 0.124 |
| WK178 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.122 | 0.122 |
| WK114 | J5 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.122 | 0.122 |
| WK222 | I3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.122 | 0.122 |
| WJ056 | E3 | Seasonally Flooded Basin | PEMAf | None | 0.038 | 0.082 | 0.119 |
| WK116 | J5 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.119 | 0.119 |
| WK157 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.114 | 0.114 |
| WJ298 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.024 | 0.091 | 0.114 |
| WK205 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.114 | 0.114 |

Table F-2: Estimated Non-Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ² | | |
|------------|---------------|----------------------------------|----------------|--------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WJ338 | I2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.112 | 0.112 |
| WK221 | I4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.111 | 0.111 |
| WK113 | J5 | Shallow Marsh | PEMC | None | 0.000 | 0.110 | 0.110 |
| WJ206 | H5 | Seasonally Flooded Basin | PEMA | None | 0.000 | 0.109 | 0.109 |
| WJ305 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.108 | 0.108 |
| WK143 | I6 | Shallow Marsh | PEMC/PEMAf | None | 0.000 | 0.107 | 0.107 |
| WJ187 | H4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.105 | 0.105 |
| WJ269 | D3 | Shallow Marsh | PEMC | None | 0.000 | 0.102 | 0.102 |
| WK080 | K3 | Seasonally Flooded Basin | PEMAf | None | 0.032 | 0.069 | 0.101 |
| WJ304 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.099 | 0.099 |
| WJ253 | J2 | Seasonally Flooded Basin | PEMAf/PEMC | None | 0.000 | 0.099 | 0.099 |
| WK027 | M3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.099 | 0.099 |
| WK119 | J5 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.097 | 0.097 |
| WK066 | L4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.096 | 0.096 |
| WJ023 | C3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.095 | 0.095 |
| WK229 | K3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.092 | 0.092 |
| WK162 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.022 | 0.068 | 0.089 |
| WK180 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.089 | 0.089 |
| WJ245 | J3 | Shallow Marsh | PEMC | None | 0.000 | 0.088 | 0.088 |
| WJ222 | I4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.088 | 0.088 |
| WJ226 | I3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.087 | 0.087 |
| WJ051 | E4 | Seasonally Flooded Basin | PEMAf | None | 0.021 | 0.065 | 0.086 |
| WJ024 | C3 | Seasonally Flooded Basin | PEMAf | None | 0.020 | 0.065 | 0.086 |
| WJ070 | B4 | Shallow Marsh | PEMC | None | 0.002 | 0.081 | 0.083 |

Table F-2: Estimated Non-Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ² | | |
|------------|---------------|----------------------------------|----------------|--------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WJ302 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.029 | 0.052 | 0.080 |
| WJ329 | I2 | Seasonally Flooded Basin | PEMAf | None | 0.057 | 0.022 | 0.079 |
| WJ228 | I3 | Seasonally Flooded Basin | PEMAf/PEMC | None | 0.015 | 0.061 | 0.076 |
| WK103 | J5 | Seasonally Flooded Basin | PEMAf | None | 0.022 | 0.054 | 0.076 |
| WK204 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.019 | 0.054 | 0.073 |
| WJ028 | C3 | Seasonally Flooded Basin | PEMAf | None | 0.016 | 0.055 | 0.071 |
| WK231 | K3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.071 | 0.071 |
| WJ161 | F4 | Seasonally Flooded Basin | PEMA/PEMC | None | 0.003 | 0.067 | 0.071 |
| WJ137 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.070 | 0.070 |
| WJ096 | E3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.069 | 0.069 |
| WJ001 | D5 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.067 | 0.067 |
| WK183 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.067 | 0.067 |
| WJ217 | I4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.065 | 0.065 |
| WJ275 | I3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.064 | 0.064 |
| WK139 | I6 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.064 | 0.064 |
| WJ076 | B4 | Seasonally Flooded Basin | PEMAf | None | 0.026 | 0.038 | 0.063 |
| WJ016 | C4 | Seasonally Flooded Basin | PEMAf | None | 0.019 | 0.043 | 0.063 |
| WJ261 | J2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.061 | 0.061 |
| WK129 | J6 | Shallow Marsh | PEMC | None | 0.000 | 0.059 | 0.059 |
| WK057 | M4 | Seasonally Flooded Basin | PEMAf | None | 0.005 | 0.054 | 0.059 |
| WK091 | J5 | Shallow Marsh | PEMC | None | 0.000 | 0.059 | 0.059 |
| WK110 | J4 | Shallow Marsh | PEMC | None | 0.006 | 0.050 | 0.055 |
| WJ151 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.011 | 0.044 | 0.055 |

Table F-2: Estimated Non-Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ² | | |
|------------|---------------|----------------------------------|----------------|--------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WK122 | J5 | Seasonally Flooded Basin | PEMAf/PEMC | None | 0.000 | 0.053 | 0.053 |
| WJ258 | J2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.053 | 0.053 |
| WJ027 | C3 | Shallow Marsh | PEMC/PEMAf | None | 0.015 | 0.036 | 0.051 |
| WK146 | K4 | Seasonally Flooded Basin | PEMAf/PEMC | None | 0.000 | 0.050 | 0.050 |
| WK121 | J5 | Seasonally Flooded Basin | PEMAf | None | 0.008 | 0.042 | 0.049 |
| WJ257 | J2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.049 | 0.049 |
| WK040 | M4 | Seasonally Flooded Basin | PEMAf | None | 0.002 | 0.047 | 0.049 |
| WJ131 | F5 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.049 | 0.049 |
| WK212 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.049 | 0.049 |
| WK141 | I6 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.048 | 0.048 |
| WJ296 | I4 | Seasonally Flooded Basin | PEMAf/PEMC | None | 0.000 | 0.048 | 0.048 |
| WJ175 | E5 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.048 | 0.048 |
| WJ164 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.015 | 0.031 | 0.046 |
| WK197 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.006 | 0.040 | 0.046 |
| WJ160 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.001 | 0.044 | 0.046 |
| WJ103 | E5 | Seasonally Flooded Basin | PEMAf | None | 0.015 | 0.030 | 0.045 |
| WJ181 | E3 | Shallow Marsh | PEMC | None | 0.000 | 0.044 | 0.044 |
| WJ093 | E3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.044 | 0.044 |
| WJ147 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.041 | 0.041 |
| WK031 | M3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.041 | 0.041 |
| WK176 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.041 | 0.041 |
| WJ213 | I4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.040 | 0.040 |
| WK170 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.039 | 0.039 |

Table F-2: Estimated Non-Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ² | | |
|------------|---------------|----------------------------------|----------------|--------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WJ115 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.037 | 0.037 |
| WJ337 | I2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.037 | 0.037 |
| WJ167 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.036 | 0.036 |
| WJ218 | I4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.036 | 0.036 |
| WJ309 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.036 | 0.036 |
| WJ135 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.036 | 0.036 |
| WK009 | M2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.034 | 0.034 |
| WK173 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.034 | 0.034 |
| WK070 | K2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.033 | 0.033 |
| WJ159 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.033 | 0.033 |
| WJ265 | J2 | Wet Meadow | PEMBf | None | 0.000 | 0.033 | 0.033 |
| WJ144 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.033 | 0.033 |
| WJ146 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.033 | 0.033 |
| WJ335 | I2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.031 | 0.031 |
| WJ143 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.030 | 0.030 |
| WK030 | M3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.029 | 0.029 |
| WJ306 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.028 | 0.028 |
| WK026 | M3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.027 | 0.027 |
| WK199 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.027 | 0.027 |
| WJ094 | E3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.027 | 0.027 |
| WJ063 | E3 | Wet Meadow | PEMB | None | 0.000 | 0.026 | 0.026 |
| WJ231 | I3 | Seasonally Flooded Basin | PEMAf | None | 0.013 | 0.012 | 0.026 |
| WK152 | M2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.025 | 0.025 |

Table F-2: Estimated Non-Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ² | | |
|------------|---------------|----------------------------------|----------------|--------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WK010 | N2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.025 | 0.025 |
| WJ200 | H4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.024 | 0.024 |
| WK101 | J5 | Seasonally Flooded Basin | PEMA | None | 0.000 | 0.024 | 0.024 |
| WJ293 | I4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.023 | 0.023 |
| WJ088 | E3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.023 | 0.023 |
| WJ256 | J2 | Seasonally Flooded Basin | PEMAf | None | 0.008 | 0.015 | 0.023 |
| WJ040 | E4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.022 | 0.022 |
| WJ074 | B4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.022 | 0.022 |
| WJ211 | I4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.022 | 0.022 |
| WK230 | K3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.021 | 0.021 |
| WJ221 | I4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.021 | 0.021 |
| WJ303 | J4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.021 | 0.021 |
| WK131 | J6 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.020 | 0.020 |
| WJ266 | D3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.020 | 0.020 |
| WJ163 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.019 | 0.019 |
| WJ062 | E3 | Wet Meadow | PEMB | None | 0.000 | 0.019 | 0.019 |
| WK007 | M2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.018 | 0.018 |
| WJ333 | I2 | Seasonally Flooded Basin | PEMAf | None | 0.012 | 0.006 | 0.018 |
| WK151 | M3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.018 | 0.018 |
| WK016 | M2 | Shallow Open Water | PABH/PEMC | None | 0.000 | 0.018 | 0.018 |
| WJ034 | E2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.017 | 0.017 |
| WJ064 | E3 | Wet Meadow | PEMB | None | 0.000 | 0.016 | 0.016 |
| WK219 | I4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.016 | 0.016 |

Table F-2: Estimated Non-Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ² | | |
|------------|---------------|----------------------------------|----------------|--------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WJ121 | F5 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.016 | 0.016 |
| WJ235 | I3 | Deep Marsh | PEMF | None | 0.000 | 0.015 | 0.015 |
| WJ247 | J2 | Seasonally Flooded Basin | PEMA | None | 0.000 | 0.015 | 0.015 |
| WJ017 | C3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.015 | 0.015 |
| WK182 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.015 | 0.015 |
| WJ237 | I3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.015 | 0.015 |
| WK145 | J6 | Shallow Marsh | PEMC/PEMAf | None | 0.000 | 0.014 | 0.014 |
| WJ141 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.014 | 0.014 |
| WK128 | J6 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.013 | 0.013 |
| WJ327 | I2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.012 | 0.012 |
| WJ165 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.004 | 0.007 | 0.012 |
| WJ148 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.011 | 0.011 |
| WJ263 | J2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.011 | 0.011 |
| WJ077 | B4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.011 | 0.011 |
| WJ035 | E2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.010 | 0.010 |
| WJ038 | E2 | Seasonally Flooded Basin | PEMA | None | 0.000 | 0.009 | 0.009 |
| WJ162 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.009 | 0.009 |
| WK033 | M3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.008 | 0.008 |
| WJ313 | K3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.008 | 0.008 |
| WJ097 | E3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.008 | 0.008 |
| WJ232 | I3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.007 | 0.007 |
| WJ199 | H4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.007 | 0.007 |
| WJ012 | C4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.007 | 0.007 |

Table F-2: Estimated Non-Jurisdictional Wetlands and Other Waters Impacts

| Feature ID | Map Book Page | Circular 39 Type/ Stream Type | Cowardin Class | Jurisdiction | Impact Area (acres) ² | | |
|------------|---------------|----------------------------------|----------------|--------------|----------------------------------|-----------|-------|
| | | | | | Permanent | Temporary | Total |
| WK083 | K3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.007 | 0.007 |
| WJ259 | J3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.006 | 0.006 |
| WK002 | M2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.006 | 0.006 |
| WJ026 | C3 | Seasonally Flooded Basin | PEMA | None | 0.000 | 0.005 | 0.005 |
| WJ032 | D3 | Shallow Marsh | PEMC/ PEMAf | None | 0.000 | 0.004 | 0.004 |
| WJ079 | B4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.003 | 0.003 |
| WJ236 | I3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.003 | 0.003 |
| WK061 | M4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.003 | 0.003 |
| WK196 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.003 | 0.003 |
| WJ230 | I3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.003 | 0.003 |
| WJ067 | E3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.002 | 0.002 |
| WJ036 | E2 | Shallow Marsh | PEMC/ PEMAf | None | 0.000 | 0.002 | 0.002 |
| WJ145 | G4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.002 | 0.002 |
| WJ082 | B4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.002 | 0.002 |
| WK181 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.001 | 0.001 |
| WJ267 | D3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.001 | 0.001 |
| WK089 | J5 | Shallow Marsh | PEMC | None | 0.000 | 0.000 | 0.000 |
| WJ054 | E4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.000 | 0.000 |
| WJ330 | I2 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.000 | 0.000 |
| WJ225 | I3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.000 | 0.000 |
| WK156 | K4 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.000 | 0.000 |
| WJ029 | D3 | Seasonally Flooded Basin | PEMAf | None | 0.000 | 0.000 | 0.000 |