

**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
	Noltmier	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 (hydrophic 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

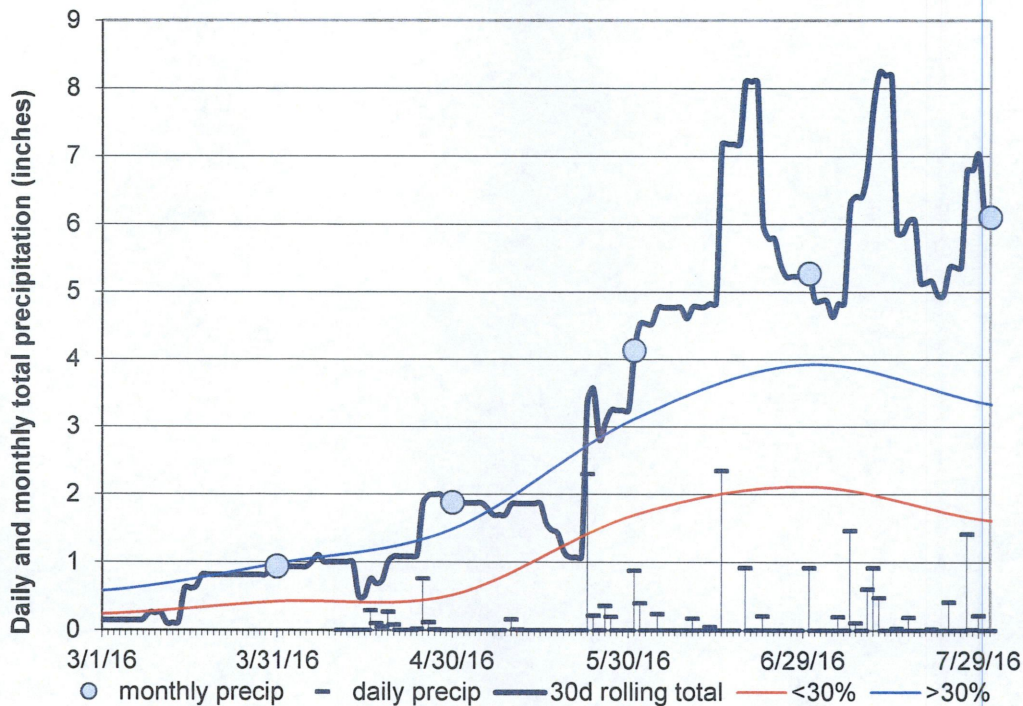
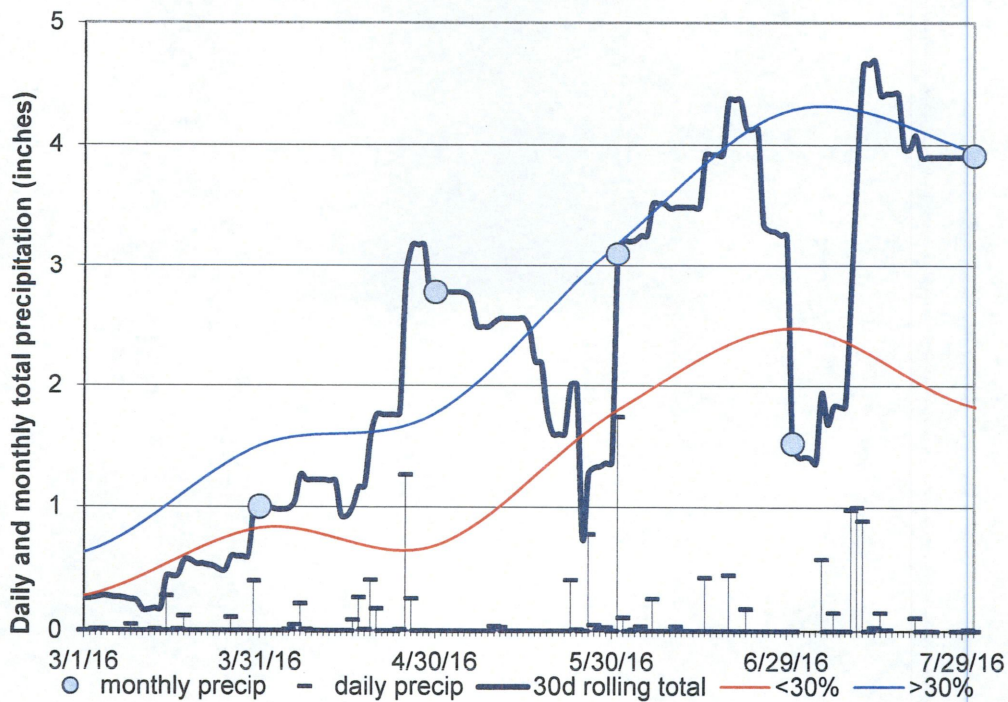


Chart 2: Casselton Agronomy Farm Station Precipitation March 1, 2016 – July 31, 2016



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 assessed 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, watermilfoils, muskgrasses, waterlilies, and spaderocks.
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			Total†
	USACE Jurisdictional	USFWS Easement*	Non-Jurisdictional	
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

- Bing Maps Aerial. 2011. Web Mapping Service (WMS).
- Bryce, S.A., Omernik, J.M., Pater, D.A., Ulmer, M., Schaar, J., Freeouf, J., Johnson, R., Kuck, P., and Azevedo, S.H., 1996, Ecoregions of North Dakota and South Dakota, (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,500,000).
- BWSR. 2015. Evaluating Antecedent Precipitation Conditions: Using Climate Data Available in Minnesota. BWSR Technical Guidance, May 2015. Available at <http://www.bwsr.state.mn.us/wetlands/wca/antecedent-precip.pdf>.
- "Clean Water Rule: Definition of 'Waters of the United States'; Final rule," 80 Federal Register 124 (29 June 2015), pp. 37054 - 37127.
- Cowardin, L.M., V.M. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service, Biological Services Program, Washington, DC, USA. FWS/OBS-79/31. 103pp.
- "Definition of Waters of the United States" 38 C.F.R. Part 328 (2012).
- Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station. Available online at <http://el.erdc.usace.army.mil/elpubs/pdf/wlman87.pdf>
- EPA and USACE. 2008. "Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in *Rapanos v. United States* & *Carabell v. United States*." December 2. Available online at http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/cwa_guide/cwa_juris_2dec08.pdf.
- Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. The National Wetland Plant List: 2016 Wetland Ratings. *Phytoneuron* 2016-30: 1-17. Available online at <http://wetland-plants.usace.army.mil/>
- Menne, M.J., I. Durre, B. Korzeniewski, S. McNeal, K. Thomas, X. Yin, S. Anthony, R. Ray, R.S. Vose, B.E. Gleason, and T.G. Houston. 2012. Global Historical Climatology Network - Daily (GHCN-Daily), Version 3.22. NOAA National Climatic Data Center. <http://doi.org/10.7289/V5D21VHZ> August 2016.
- Shaw, S.P. and C.G. Fredine. 1971. Wetlands of the United States. U.S. Fish and Wildlife Circular 39. U.S. Department of the Interior, Washington, D.C. 67 pp.
- USACE. 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region. ERDC/EL TR-10-1, U.S. Army Engineer Research and Development Center, Vicksburg, MS.
- USACE. 2012. "2012 Nationwide Permits, Conditions, District Engineer's Decision, Further Information, and Definitions (with corrections)" Available online at http://www.usace.army.mil/Portals/2/docs/civilworks/nwp/2012/NWP2012_corrections_21-sep-2012.pdf.
- USDA NRCS. 1990. Soil Survey of Barnes County, North Dakota. Available online at: <http://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=ND>.

USDA NRCS. 2015. National List of Hydric Soils, all states. December. Available online at <http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/>.

USDA NRCS. 2016a. Casselton Agronomy Farm and Valley City 3 NNW WETS Tables. Available online at http://www.wcc.nrcs.usda.gov/climate/wets_doc.html. August 2016.

USDA NRCS. 2016b. Soil Survey Geographic (SSURGO) database for Barnes County, North Dakota. Vector Digital Data.

USFWS. 2015. National Wetlands Inventory. Vector Digital Data.

USGS. 2016. National Hydrography Dataset (NHD) High resolution dataset for the Red Subregion (0902). Vector Digital Data.

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)
		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)
		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