Delineation of Potential Waters of the United States

Zayo Prineville-to-Reno Fiber Optic Project

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Executive Summary

On behalf of the Zayo Group, LLC, Stantec Consulting Services Inc. (Stantec) conducted a delineation of waters of the United States for the California segment of the Prineville, Oregon, to Reno, Nevada underground fiberoptic network project (project). The study area (i.e., area within which Stantec evaluated the potential for project-related effects) includes the California Department of Transportation right-of-way along U.S. Highway 395 (US 395) and Lassen County ROW along Standish Buntingville Road. The study area is in Modoc, Lassen, and Sierra Counties, California and encompasses approximately 5,976 acres (ac). The delineation was conducted in accordance with the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (USACE 2008a). The field delineation was conducted from August 13 to September 10, 2019 and from March 9 to May 13, 2020.

A total of 238.212 ac of potential waters of the United States were delineated and mapped within the study area, including riparian wetlands (14.249 ac), riparian/fresh emergent wetland complexes (26.475 ac), fresh emergent wetlands (67.223 ac), seasonal wetlands (94.7 ac), wetland swales (1.402 ac), wetland seep springs (1.749 ac), perennial streams (12.753 ac, 3,120.569 linear feet [lf]), intermittent streams (2.324 ac, 11,872.253 lf), ephemeral streams (3.758 ac, 34,588.139 lf), irrigation canals (3.816 ac, 5,148.898 lf), vegetated ditches (0.016 ac, 191.428 lf), non-vegetated ditches (0.123 ac, 2,105.88 lf), and ponds (9.624 ac).

The purpose of this delineation is to document and describe waters of the United States to support a Preliminary Jurisdictional Determination from the U.S. Army Corps of Engineers (USACE). This delineation is subject to verification by the USACE, Sacramento District. Stantec advises all parties to treat the information contained herein as preliminary until the USACE provides written verification of the boundaries of its jurisdiction.

If the USACE wishes to conduct a field verification, they do not need landowner permission as the study area is within the California Department of Transportation right-of-way along US 395.

Abbreviations

ac	acre
CFR	Code of Federal Regulations
ºF	degrees Fahrenheit
FAC	Facultative
FACW	Facultative Wet
ft	foot/feet
lf	linear feet
msl	mean sea level
NWI	National Wetlands Inventory
OBL	Obligate
OHWM	ordinary high water mark
Project	Prineville, Oregon, to Reno, Nevada underground fiberoptic network project
Stantec	Stantec Consulting Services Inc.
US 395	U.S. Highway 395
USACE	U.S. Army Corp of Engineers
WETS	Wetland Station
WGS 84	World Geodetic System 1984

1.0 PROJECT LOCATION

The California segment of the Prineville, Oregon, to Reno, Nevada underground fiber optic network (project) is located in Modoc, Lassen, and Sierra Counties, California. The study area encompasses approximately 5,976 acres (ac) and consists of a linear alignment running approximately 192 miles along U.S. Highway 395 (US 395) from the California-Oregon border to the California-Nevada border. See Table 1 for the 7.5-minute U.S. Geological Survey quadrangles and township, range, and sections that fall within the study area.

Table 1: Quadrangles and Township, Range, & Sections

Quad	Township/Range	Section(s)									
ALTURAS	41N 12E	1	2	11	12	13	24				
	42N 12E	12	13	14	23	24	26	35			
ANDERSON MTN	36N 13E	8	17	19	20	29	30	32			
BECKWOURTH PASS	22N 17E	2	11	14	23						
	23N 17E	1	2	11	14	23	25	26	35	36	
CONSTANTIA	23N 17E	1									
	24N 17E	2	11	12	13	24	25	36			
	24N 18E	30	31								
	25N 17E	21	27	28	34	35					
DAVIS CREEK	44N 14E	5									
	45N 14E	8	17	20	29	32					
DOYLE	25N 17E	6	7	8	17	18	20	21			
EVANS CANYON	21N 17E	1	12								
	21N 18E	18	19								
	22N 17E	23	26	35	36						
FIVE SPRINGS	31N 15E	2									
	32N 15E	23	26	35							
HERLONG	26N 15E	11	12								
INFERNAL CAVERNS	39N 13E	5									
	40N 13E	5	8	17	20	29	32				
	41N 12E	24	25								
	41N 13E	30	31								
KARLO	31N 15E	2	10	11	14	15	22	27	34		
	32N 15E	35									
LAUER RESERVOIR	44N 13E	25									
	44N 14E	5	7	8	18	19	30				
LIKELY	38N 13E	5	8	17							
	39N 13E	5	8	17	20	29	32				

Quad	Township/Range	Section(s)									
LITCHFIELD	29N 14E	10	11	14	15	16					
MADELINE	37N 13E	3	9	10	16	21	28	32	33		
	38N 13E	16	17	21	27	28	34				
MAHOGANY RIDGE	42N 12E	1	12								
	42N 13E	5	6	7							
MCDONALD PEAK	35N 13E	10	14	15	23						
	36N 13E	5	8	32	33						
	37N 13E	32									
MCKESICK PEAK	25N 16E	1									
	25N 17E	6									
	26N 15E	11	12	13							
	26N 16E	7	17	18	20	21	22	26	27	35	36
MILFORD	26N 15E	2	3	4	11						
	27N 14E	25	26								
	27N 15E	30	31	32	33						
RAVENDALE	33N 14E	1									
	33N 15E	6									
	34N 14E	15	22	23	25	26	36				
SHAFFER MTN	29N 14E	13	14								
	29N 15E	4	8	9	17	18					
	30N 15E	3	10	15	22	27	33	34			
	31N 15E	34									
SHINN MTN	32N 15E	14	23								
SNOWSTORM MTN	32N 15E	3	4	9	10	11	14	15			
	33N 15E	6	7	8	17	18	20	28	29	33	
STANDISH	28N 13E	1	2	11	14	23	24	25			
	28N 14E	5	6								
	29N 14E	15	16	17	20	21	29	32			
STONY RIDGE	27N 14E	5	6	8	9	16	21	22	26	27	
	28N 13E	25	36								
	28N 14E	31									
SUGAR HILL	45N 14E	5	8								
	46N 14E	3	4	9	15	16	21	22	28	32	33
	47N 14E	34									
SURPRISE	42N 13E	4	5								
	43N 13E	1	2	11	14	22	23	27	28	33	
	44N 13E	25	36								
TERMO	34N 14E	5	6	8	9	15	16				
	35N 13E	23	25	26	36						

Quad	Township/Range	Section(s)									
	35N 14E	31									
TULE MOUNTAIN	38N 13E	17									
WILLOW RANCH	47N 14E	1	2	11	14	15	22	23	27	34	
	48N 14E	24	25	36							

The approximate center of the study area is located at latitude 40.74027 degrees, longitude 120.3196 degrees (World Geodetic System of 1984 [WGS 84]). The study area is shown in Appendix A (Figures 1-1 through 1-33).

2.0 ENVIRONMENTAL SETTING

2.1 CURRENT/RECENT LAND USE

The 192-mile study area, which is centered along US 395, extends across several counties and is bounded by multiple land use types, including residential, commercial, agricultural, and undeveloped properties.

2.2 SITE TOPOGRAPHY AND ELEVATION

2.2.1 Modoc County

The topography of the study area within Modoc County is relatively flat, with a majority of the study area occurring within the North Fork and South Fork of the Pit River Valleys and between Goose Lake and the Warner Mountains foothills. The topography slopes towards the middle of the county from the north and south. Within Modoc County, the study area ranges in elevation from approximately 4,400 foot/feet (ft) to 4,900 ft mean sea level (msl).

2.2.2 Lassen County

The topography of the study area within Lassen County varies from flat plains to rolling foothills. In the northern portion of the county, the study area crosses the Madeline Plains, a closed basin surrounded by mountains consisting of extinct volcanic cones. Within the central portion of the county, the topography varies between the foothills of the surrounding volcanic cones and valleys, including Secret Valley and Honey Lake Valley. In the southern portion of the county within the study area lies the flat southwestern boundary of Honey Lake Valley and Long Valley, adjacent to the Diamond Mountains. The study area continues south through the Upper Long Valley towards the Sierra County border. Within Lassen County, the study area ranges in elevation from approximately 4,000 ft to 5,800 ft msl.

2.2.3 Sierra County

The topography of the study area within Sierra County is relatively flat, with the entire study area occurring in the Upper Long Valley. Within the Sierra County, the study area ranges in elevation from approximately 5,000 ft to 5,100 ft msl.

2.3 CLIMATE

2.3.1 Modoc County

Climate within the study area in Modoc County is based on historical weather data collected at Alturas Municipal Airport, California Wetland Station (WETS) (NOAA 2019a). The airport is located in central Modoc County, approximately 1.1 miles west of the study area:

Type: The climate of the area is characterized as humid continental, with cold winters and warm to hot, sometimes humid summers.

Precipitation: Precipitation in central Modoc County primarily occurs as rain. The average annual rainfall is approximately 11.20 inches.

Air Temperature: Air temperatures in central Modoc County range between an average January high of 43.3 degrees Fahrenheit (ºF) and an average July high of 90.1ºF. The annual average high is approximately 63.7ºF.

Growing Season: The growing season (i.e., 50 percent probability of air temperature 28ºF or higher) in central Modoc County is approximately 125 days and occurs between May and September.

2.3.2 Lassen County

Climate within the study area in Lassen County is based on historical weather data collected at Susanville 2SW, California WETS Station (NOAA 2019b). The WETS Station is located in southern Lassen County, approximately 12.6 miles northwest of the study area at the same relative elevation:

Type: The climate of the area is characterized as humid continental, with cold winters and warm to hot, sometimes humid summers.

Precipitation: Precipitation in southern Lassen County primarily occurs as rain, with some snow. The average annual rainfall is approximately 12.63 inches, and the average annual snowfall is approximately 18.4 inches.

Air Temperature: Air temperatures in southern Lassen County range between an average January high of 41.4ºF and an average July high of 88.9ºF. The annual average high is approximately 64.1ºF.

Growing Season: The growing season (i.e., 50 percent probability of air temperature 28ºF or higher) in southern Lassen County is approximately 154 days and occurs between May and October.

2.3.3 Sierra County

Climate within the study area in Sierra County is based on historical weather data collected at Sierraville RS, California WETS Station (NOAA 2019c). The WETS Station is located in central Sierra County, approximately 19.7 miles southwest of the study area at the same relative elevation:

Type: The climate of the area is characterized as humid continental, with cold winters and warm to hot, sometimes humid summers.

Precipitation: Precipitation in central Sierra County occurs as both rain and snow. The average annual rainfall is approximately 25.03 inches, and the average annual snowfall is approximately 45.7 inches.

Air Temperature: Air temperatures in central Sierra County range between an average January high of 43.0ºF and an average July high of 84.6ºF. The annual average high is approximately 63.3ºF.

Growing Season: The growing season (i.e., 50 percent probability of air temperature 28ºF or higher) in central Sierra County is approximately 112 days and occurs between May and September.

2.4 HYDROLOGY AND HYDROLOGIC FEATURES

2.4.1 Modoc County

The primary hydrologic features in the study area within Modoc County include the North Fork and South Fork of the Pit River and Goose Lake. Numerous tributaries flow into the North Fork and South Fork Pit Rivers, with a majority of tributaries originating in the Warner Mountains. Hydrology for these two rivers is provided by precipitation and snowmelt (Phillips and Denburgh 1971). The Pit River flows southwest to Shasta Lake and is one of the major tributaries to the Sacramento River. Goose Lake is an alkaline lake located in northern Modoc County and spans the California-Oregon border. Multiple tributaries from the surrounding mountains flow into Goose Lake, with the main hydrologic sources being Thomas Creek and Drews Creek. On rare occasions, water from Goose Lake flows into the North Fork Pit River via Russel Slough (Phillips and Denburgh 1971).

2.4.2 Lassen County

The primary hydrologic features in the study area within Lassen County include Long Valley Creek, Susan River, Secret Creek, and Honey Lake. Long Valley Creek flows north to south into Honey Lake and at times flows adjacent and through the study area. Numerous tributaries flow into Long Valley Creek from the surrounding mountains. Susan River flows west to east into Honey Lake and is the primary hydrologic source for the lake. The river flows through the study area between the communities of Standish and Litchfield. This area also includes other drainages such as Harrison Slough, Dill Slough, and Woodstock Canal. A majority of the water from Susan River is diverted into irrigation canals for agricultural use within Honey Lake Valley (Rockwell 1993). Secret Creek originates near Snowstorm Mountain in central Lassen County and flows south into Willow Creek before flowing into Susan River. Secret Creek flows adjacent and through the study area between Snowstorm and Shinn Mountains then flows southwest away from the study area into Secret Valley. Honey Lake is an alkaline lake located in southeastern Lassen County and is a closed basin. There are multiple creeks and streams that flow into Honey Lake from the surrounding mountains and foothills. However, the lake receives minimal surface flow most years, with a majority of the tributaries being ephemeral, excepting Susan River (Rockwell 1993). Hydrology for this region of Lassen County is provided by precipitation and snowmelt.

2.4.3 Sierra County

The primary hydrologic feature in the study area within Sierra County includes Long Valley Creek. Long Valley Creek originates in the eastern foothills of the Bald Mountain Range. The creek flows northwest through Sierra County, adjacent to the study area. Multiple tributaries flow into Long Valley Creek from the surrounding foothills. Hydrology is provided primarily by precipitation.

2.5 SOIL MAP UNITS

One hundred fifty-one soil map units occur in the study area, including ten hydric soil map units. They are described in the following soil surveys (NRCS 2019):

- *Soil Survey of the Modoc County, Alturas Area, California*
- *Soil Survey of the Modoc National Forest Area, California*
- *Susanville Area, Parts of Lassen and Plumas Counties, California*
- *Plumas National Forest Area, California*
- *Sierra Valley Area, California, Parts of Sierra, Plumas, and Lassen Counties*

Table 2 includes ten soil map units in the study area that are considered hydric and provides the drainage class and depth to restrictive layer for each hydric soil type. All soil map units within the study area are provided in Appendix B and shown in Appendix A (Figures 2-1 through 2-33).

Table 2: Hydric Soil Map Units in the Study Area

Map Unit Name Taxonomy	Map Unit Reference Code	Drainage Class	Depth to Restrictive Layer (cm)	Hydric Soils
Modoc County				
Balman loam	104	Somewhat poorly drained	>200	Yes
Pasquetti silty clay loam, partially drained	173	Poorly drained	>200	Yes
Pasquetti silty clay loam, drained	174	Poorly drained	>200	Yes
Pit silty clay loam, 0 to 2 percent slopes	176	Somewhat poorly drained	>200	Yes
Pit clay, 2 to 5 percent slopes	177	Somewhat poorly drained	>200	Yes
Lassen County				
Artray sandy loam, 2 to 9 percent slopes	109	Poorly drained	>200	Yes
Dryvalley silt loam, sandy substratum, 0 to 2 percent slopes	182	Well drained	>200	Yes
Dryvalley-Playas complex, 0 to 2 percent slopes	183	Well drained	>200	Yes

Map Unit Name Taxonomy	Map Unit Reference Code	Drainage Class	Depth to Restrictive Layer (cm)	Hydric Soils
Fluvents-Riverwash complex, 0 to 1 percent slopes	203	Poorly drained	>200	Yes
Pit clay, 0 to 2 percent slopes	324	Poorly drained	>200	Yes

Note:
cm = centimeter

2.6 VEGETATION COMMUNITIES

Vegetation communities are based on descriptions provided in *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988). Sixteen vegetation communities occur throughout the study area and are described below.

Jeffrey Pine. The Jeffrey pine (*Pinus jeffreyi*) community occurs in one location west of Honey Lake. This community is dominated by Jeffrey pine and Western juniper (*Juniperus occidentalis*). The understory consistent primarily of shrubs, including big sagebrush (*Artemisia tridentata* ssp. *tridentata*) and bitterbrush (*Purshia tridentata*).

Juniper. The juniper community occurs throughout the study area and is the most common tree dominated vegetation community. This forest community is dominated by Western juniper, little sagebrush (*Artemisia arbuscula* ssp. *arbuscula*), curl leaved mountain mahogany (*Cercocarpus ledifolius*), bitterbrush, and big sagebrush. Perennial grasses and herbs occur among the trees and shrubs, including blue fescue (*Festuca idahoensis*), curly bluegrass (*Poa secunda*), and Thurber's needle grass (*Stipa thurberiana*).

Aspen. The aspen (*Populus tremuloides*) community occurs in the northern portion of the study area near the North Fork of the Pit River. This forest community is dominated by aspen, with mountain snowberry (*Symphoricarpos rotundifolius*) common in the shrub layer.

Montane Riparian. The montane riparian community occurs along streams and within meadows throughout the study area, and primarily consists of riparian shrub species, including interior rose (*Rosa woodsii*), sandbar willow (*Salix exigua*), Himalayan blackberry (*Rubus armeniacus*), shining willow (*Salix lucida*), and arroyo willow (*Salix lasiolepis*). However, one black cottonwood (*Populus trichocarpa*) stand occurs near New Pine Creek in the northern portion of the study area.

Bitterbrush. The bitterbrush community occurs in many topographic settings throughout the study area but is most prominent in highly permeable and well-drained soils characteristic of sagebrush steppe environments. This shrub community is dominated by bitterbrush, big sagebrush, rubber rabbitbrush (*Ericameria nauseosa*), and spineless horsebrush (*Tetradymia canescens*).

Sagebrush. The sagebrush community occurs in a variety of topographic settings and is the most common vegetation community in the study area. This shrub community is characterized by big sagebrush and is present in pure stands with grasses and forbs as well as in stands co-dominated with rubber rabbitbrush and bitterbrush. Other sagebrush communities include little sagebrush, silver sagebrush (*Artemisia cana*), and mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), which usually occur in mixed stands with big sagebrush in microhabitats. Little sagebrush occurs in rocky and shale flats and open rocky ground throughout the study area. Silver sagebrush occurs in one mesic area north of Mud Flat and is co-dominant with big sagebrush, interior rose, and greasewood (*Sarcobatus vermiculatus*). Mountain big sagebrush occurs in foothills and on mountain slopes adjacent to Goose Lake and Honey Lake in the study area.

Montane Chaparral. Montane chaparral occurs in a small location at the far northern end of the study area near Goose Lake. This community is dominated by bitter cherry (*Prunus emarginata*) and Klamath plum (*Prunus subcordata*) along with big sagebrush, yellow rabbitbrush (*Chrysothamnus viscidiflorus*), and rubber rabbitbrush. Native bunch grasses such as ashy ryegrass (*Elymus cinereus*) and curly bluegrass occur between shrubs.

Alkali Desert Scrub. The alkali desert scrub community occurs in high concentrations in areas of alkaline soils, such as those found in old lakebeds, playas, and intermittently flooded desert sinks in the central portion of the study area. This shrub community is dominated by greasewood and yellow rabbitbrush and contains an understory characterized by grasses such as cheatgrass (*Bromus tectorum*), bulbous bluegrass (*Poa bulbosa*), and salt grass (*Distichlis spicata*). An herbaceous inclusion of this shrub community occurs in Mud Flat, a dry alkali lakebed in the central portion of the study area. The herbaceous community is dominated by tansyleaf evening primrose (*Taraxia tanacetifolia*) and povertyweed (*Iva axillaris*).

Annual Grassland. Annual grasslands are dominated by non-native invasive grass species and occur throughout the study area in disturbed roadside areas. Cheatgrass dominates the community and often co-occurs with medusahead (*Elymus caput-medusae*) and other non-native grasses and forbs.

Perennial Grassland. Perennial grasslands occur throughout the study area and are dominated by perennial native grasses. Common grass species in this community include crested wheatgrass (*Agropyron cristatum*), meadow foxtail (*Alopecurus pratensis*), one spike oat grass (*Danthonia unispicata*), curly bluegrass, ashy ryegrass, salt grass, and squirreltail (*Elymus elymoides*). Scattered shrubs, such as big sagebrush and patches of annual grasses, also occur throughout this vegetation community.

Wet Meadow. Wet meadow occurs in wet seeps and drainages adjacent to large grasslands throughout the study area. This community is dominated by Baltic rush (*Juncus arcticus* ssp. *balticus*) and may be co-dominant with yarrow (*Achillea millefolium*), spikerushes (*Eleocharis* spp.), and Nebraska sedge (*Carex nebrascensis*).

Fresh Emergent Wetland. Fresh emergent wetland occurs in select locations in the central and southern portions of the study area. It occurs in semi-permanently flooded freshwater marshes and is dominated by broadleaf cattail (*Typha latifolia*) and hardstem bulrush (*Schoenoplectus acutus*). Other common species in this community include spikerushes, Nebraska sedge, rushes (*Juncus* spp.) and a low cover of riparian shrubs, including willow (*Salix* spp.).

Riverine. Riverine includes the open water and non-vegetated portions of perennial and intermittent streams in the study area, including the Pit River, Long Valley Creek, and Secret Creek, and other features that either flow year-around or have a non-vegetated river channel.

Irrigated Hayfield. Irrigated hayfield includes areas used for alfalfa (*Medicago sativa*) and hay production. This community is located in the northern portion of the study area.

Urban. The urban community was used to designate areas of ornamental trees and shrubs. These areas include hedges, ornamental trees, and other landscaping in rural residential areas. Most areas mapped as urban occur in the northern half of the study area.

Barren. Under Mayer and Laudenslayer (1988), barren includes areas that naturally or artificially contains less than 2 percent herbaceous vegetation cover or less than 10 percent tree or shrub cover. In the study area, barren mainly occurs in areas that are not vegetated due to human activity and land use. These areas include roads, road shoulders, structures, and parking areas throughout the study area.

3.0 METHODS

Stantec conducted an onsite routine delineation of wetlands and “other waters” of the United States based on field observations of positive indicators for wetland vegetation, hydrology, and soils; and indicators of an ordinary high water mark (OHWM). Field observations were conducted from August 13 to September 10, 2019, and from March 9 to May 13, 2020. The routine delineation includes a standard three-parameter pair of data points to determine wetland features, other waters, and uplands. This methodology is consistent with the approach outlined in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (USACE 2008a). Plant taxonomy follows *The Jepson Manual: Vascular Plants of California, Second Edition* (Baldwin et al. 2012), including applicable errata and revisions (Jepson Flora Project 2020). Wetland indicator status for plant species was confirmed using *The National Wetland Plant List* (Lichvar et al. 2016), and the “50/20 Rule” or “Prevalence Index” was applied to determine plant dominance (USACE 2008a). Presence of primary and secondary wetland hydrology indicators were documented for potential aquatic resources. The OHWM was determined using the approach outlined in *A Field Guide to the Identification of the OHWM in the Arid West Region of the Western United States* (USACE 2008b).

Soil pits were dug in representative wetland features, adjacent uplands, and suspect areas to a depth sufficient to document the presence or confirm the absence of hydric soil or wetland hydrology indicators. Soils were examined to assess field indicators of hydric soils. Stantec evaluated soils for positive indicators of hydric soils in the field following the criteria outlined in *Field Indicators of Hydric Soils in the United States* (Vasilas et al. 2018). Soil colors were determined using a Munsell soil color chart. The hydric status of each soil map unit occurring in the study area was reviewed using the *Web Soil Survey* (NRCS 2019).

Other waters are defined as traditional navigable waters and their tributaries (33 Code of Federal Regulations [CFR] 329). Delineation of other waters was based on presence of an OHWM as defined in USACE regulations (33 CFR 328.3 and 33 CFR 328.4). Physical characteristics of an OHWM include but are not limited to the following conditions: a natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, presence of litter and debris, leaf litter disturbed or washed away, scour, deposition, presence of bed and bank, and water staining. At least one data point was selected to best represent the OHWM of other waters for each other waters’ type. These data points were used to collect information regarding the depth and width of the OHWM along with dominant substrate, anthropogenic influences, and other features (floodplain, low flow channel, etc.) associated with the other waters’ type.

Prior to conducting the on-site routine delineation, the U.S. Fish and Wildlife Service’s, National Wetlands Inventory (NWI) Wetlands Mapper (USFWS 2019) was reviewed to determine if any surface water and wetland features were previously mapped in the study area and general vicinity. Surface water and wetland features within NWI are described by the Cowardin et al. (1979) system, as amended by subsequent updates (Federal Geographic Data Committee 2013). The USACE Aquatic Resources Excel spreadsheet, which includes specific information about the wetland and other waters’ features that were delineated, including their Cowardin type, was completed and submitted as a separate deliverable with this report (Appendix C).

Numerous data points were established in the study area and were used to characterize and document each wetland or other water feature type, the adjacent upland, and suspect areas. In situations where adjacent wetland feature types supported similar vegetation composition and indicators of hydrology, one set of data points was excavated for one wetland features and then applied to adjacent features. The boundaries of delineated features and the associated data points were mapped using a sub-meter-accurate Arrow Global Positioning Service Unit paired with Apple iPad loaded with Collector for ArcGIS. All spatial data was collected in the WGS 84 datum.

4.0 RESULTS AND DISCUSSION

Potential waters of the United States occur in the study area as wetlands and other waters. Wetlands include riparian wetland, riparian fresh emergent wetland complex, fresh emergent wetland, seasonal wetland, wetland swale, and wetland seep spring. Other waters include perennial stream, intermittent stream, ephemeral stream, irrigation canal, vegetated ditch, non-vegetated ditch, and pond.

The boundaries and area of potential waters of the United States occurring in the study area are illustrated in Appendix A (Figures 3-1 through 3-341). A total of 238.212 ac of potential waters of the United States were delineated. A summary of the delineated features is presented in Table 3 below. A list of all delineated potential waters of the United States is provided in Appendix C. Routine wetland determination data forms are presented in Appendix D. A plant list is provided in Appendix E. Representative photographs of the delineated features and data point locations are presented in Appendix F.

Table 3: Potential Waters of the United States Summary

Potential Waters of the United States	Total Acres	Total Linear Feet	Cowardin Type[1]
Wetlands			
Riparian Wetland	14.249	N/A	PSS, PEM, PEM/PSS, PFO, PSS/PFO, R4SB, R5, R4UB, R3UB, R3SB
Riparian Fresh Emergent Wetland Complex	26.475	N/A	PEM, PEM/PSS, PSS
Fresh Emergent Wetland	67.223	N/A	PEM, PEM/PSS
Seasonal Wetland	94.700	N/A	PEM, PEM/PSS, PSS
Wetland Swale	1.402	N/A	PEM, PEM/PSS, PSS
Wetland Seep Spring	1.749	N/A	PEM, PEM/PSS
Other Waters			
Perennial Stream	12.753	3,120.569	R3SB, R2AB, R5UB, R3UB, RFT, R4SB, R2UB, R2AB, R4UB
Intermittent Stream	2.324	11,872.253	R4SB
Ephemeral Stream	3.758	34,588.139	R4SB, R4UB, R5, RFT, R5UB, R5SB
Irrigation Canal	3.816	5,148.898	R4UB, R4SB, R5UB, R3UB, R3SB, R5

Potential Waters of the United States	Total Acres	Total Linear Feet	Cowardin Type[1]
Vegetated Ditch	0.016	191.428	R4UB
Non-Vegetation Ditch	0.123	2,105.88	R4SB, R4UB, R5UB
Pond	9.624	N/A	PUB, L1UB
Total Potential Waters of the United States	**238.212**	**57,027.17**	**N/A**

1. Cowardin et al. 1979
L1UB = Lacustrine, Unconsolidated Bottom
PEM = Palustrine Emergent
PSS = Palustrine Scrub-Shrub
PFO = Palustrine Forested
PUB = Palustrine, Unconsolidated Bottom
R2AB = Riverine Lower Perennial, Aquatic Bed
R2UB = Riverine Lower Perennial, Unconsolidated Bottom
R3SB = Riverine Upper Perennial, Streambed
R3UB = Riverine Upper Perennial, Unconsolidated Bottom
R4 = Riverine Intermittent
R4SB = Riverine Intermittent, Streambed
R4UB = Riverine Intermittent, Unconsolidated Bottom
R5 = Unknown Perennial
R5UB = Unknown Perennial, Unconsolidated Bottom
R5SB = Unknown Perennial, Streambed
RFT = Riverine Flow-through

4.1 WETLANDS

4.1.1 Riparian Wetland

Riparian wetlands are generally associated with streams or other semi-permanent wetland types. These features are typically dominated by woody deciduous shrubs, trees, and vines but may also be entirely dominated by herbaceous species. Riparian wetlands exhibit positive indications of frequent ponding or flooding for long durations. A total of 62 riparian wetlands occur in the study area. Dominant plant species occurring in these features include narrowleaf willow (Facultative Wet [FACW]), reed canarygrass (*Phalaris arundinacea*) (FACW), common spikerush (*Eleocharis palustris*) (Obligate [OBL]), and Kentucky bluegrass (*Poa pratensis*) (Facultative [FAC]). Wetland hydrology is provided by long-duration inundation indicated by surface water, high water table, saturation, and oxidized rhizospheres. Secondary hydrologic indicators observed include FAC-neutral test, drainage pattern, drift and sediment deposits. Hydric soil criteria are met through indicators of long-duration inundation, including the observation of depleted matrix, loamy gleyed matrix, and redox dark surface.

4.1.2 Riparian Fresh Emergent Wetland Complex

Riparian fresh emergent wetland complexes include both riparian wetlands and fresh emergent wetland hydrology and vegetation species. These features generally include a two-tier canopy, with a defined tree and shrub stratum and an herbaceous stratum within a swale or depressional landform. A total of 35 riparian fresh emergent wetland complexes occur in the study area. Dominant plant species occurring in these features include arroyo willow (FACW), Nebraska sedge (OBL), reed canarygrass (FACW), narrowleaf willow (FACW), broadleaf cattail (OBL), and hardstem bulrush (OBL). Wetland hydrology is provided by long-duration inundation indicated by surface water, high water table, saturation, and water-stained leaves. Secondary hydrologic indicators observed include FAC-neutral test and drainage pattern. Hydric soil criteria are met through indicators of long-duration inundation, including the observation of depleted matrix. Problematic soils observed for these features include low chroma matrix with some redox concentrations and volcanic parent material.

4.1.3 Fresh Emergent Wetland

Fresh emergent wetlands are frequently flooded long enough for anaerobic conditions to occur and for perennial herbaceous hydrophytic vegetation to become established. These wetlands generally form within basins or depressions located on flat to gently rolling topography. A total of 131 fresh emergent wetlands occur in the study area. Dominant plant species occurring in these features include Kentucky blue grass (FAC), Nebraska sedge (OBL), fox tail barley (*Hordeum jubatum*) (FAC), soft rush (*Juncus effuses*) (FACW), reed canarygrass (FACW), saltgrass (FAC), hardstem bulrush (OBL), broadleaf cattail (OBL), and meadow foxtail (FAC). Wetland hydrology is provided by long-duration inundation indicated by visual signs of surface soil cracks, oxidized rhizospheres along living roots, surface water, high water table, saturation, and water-stained leaves, with secondary hydrologic indicators including drainage pattern and passing the FAC-neutral test. Hydric soil criteria are met through indicators of long-duration inundation, including the observation of depleted matrix with prominent redox concentrations.

4.1.4 Seasonal Wetland

Seasonal wetlands can be variable, ranging from flat to low-lying areas that exhibit positive field indicators of long-duration saturation during the growing season to areas that exhibit a morphology and hydrology similar to vernal pools but lack a vernal pool vegetation community. A total of 51 seasonal wetlands occur in the study area. Dominant plant species occurring in these features include Nebraska sedge (OBL), reed canarygrass (FACW), and broadleaved pepperweed (*Lepidium latifolium*) (FAC). Wetland hydrology is provided by seasonal duration inundation indicated by soil surface cracks, water marks, and drift deposits. Secondary hydrologic indicators observed include FAC-neutral test and drainage pattern. Hydric soil criteria are met through indicators including redox dark surface and depleted matrix.

4.1.5 Wetland Swale

Wetland swales are natural or human-made shallow channels with gently sloping sides that exhibit positive field indicators of long-duration saturation or ponding during the growing season. Wetland swales can be dominated by woody deciduous trees, shrubs, or herbaceous species. A total of 17 wetland swales occur in the study area. Dominant plant species occurring in these features include Pacific willow (*Salix lasiandra*) (FACW), meadow foxtail (FAC), mountain bog bulrush (*Scirpus microcarpus*) (OBL), yellow willow (*Salix lutea*) (OBL), broadleaf cattail (OBL), narrowleaf willow (FACW), Baltic rush (*Juncus balticus*) (FACW), and narrow leaf cattail (*Typha angustifolia*) (OBL). Wetland hydrology is provided by long-duration inundation indicated by surface water, high water table, saturation, and oxidized rhizospheres. Secondary hydrologic indicators observed include water marks, sediment deposits, and FAC-neutral test. Hydric soil criteria are met through indicators including depleted matrix with redox concentrations and redox dark surface.

4.1.6 Wetland Seep Spring

Wetland seep springs are wetlands that are supported by the discharge of groundwater (i.e., a seep or a spring). These are typically found at the base of hillsides, on escarpments in hilly landscapes or in other areas where seeps and springs are present. Wetland seep springs may be perennial or seasonal, depending on the nature of the groundwater discharge. A total of four wetland seep springs occur in the study area. Dominant plant species occurring in these features include western rush (*Juncus occidentalis*) (FACW), soft rush (FACW), and broadleaf cattail (OBL). Wetland hydrology is provided by long-duration inundation indicated by surface water, high water table, and saturation. Secondary hydrologic indicators observed include drainage patterns and FAC-neutral test. Hydric soil criteria are met through indicators including depleted below dark surface with redox concentrations.

4.2 OTHER WATERS

4.2.1 Perennial Streams

Perennial streams consist of natural drainages that convey water perennially or near perennially, such as rivers and larger streams. Perennial streams typically support a well-developed riparian corridor. A total of 96 perennial streams occur in the study area and are characterized as bed and bank features that exhibit indicators of an OHWM including a break in bank slope and change in average sediment texture, vegetation species, and vegetation cover. Dominant substrate ranges from silt and sandy loam to large cobble and boulders. OHWM width ranges from 5 to 47 ft, and depth ranges from 1 to 5 ft. Top of bank width ranges from 12 to 47 ft ,and depth ranges from 3 to 8 ft.

4.2.2 Intermittent Streams

Intermittent streams include natural drainages that exhibit an OHWM and convey waters intermittently during the late fall, winter, and spring months. Hydrology is usually provided by both precipitation and groundwater discharge. Larger intermittent streams may support a well-developed riparian corridor. A total of 107 intermittent streams occur in the study area and are characterized as bed and bank features that exhibit indicators of an OHWM, including a break in bank slope and change in average sediment texture and vegetation cover. Dominant substrate is silty clay. OHWM width ranges from 2 to 5 ft, and depth ranges from 0.5 to 1 ft. Top of bank width ranges from 2 to 12 ft, and depth ranges from 0.5 to 2 ft.

4.2.3 Ephemeral Streams

Ephemeral streams include natural drainages that exhibit an OHWM and convey waters during and directly after precipitation events. These drainage channels are usually located above the groundwater reservoir and lack a well-developed riparian corridor. A total of 168 ephemeral streams occur in the study area and are characterized as bed and bank features that exhibit indicators of an OHWM including a break in bank slope and change in average sediment texture, vegetation species, and vegetation cover. Dominant substrate ranges from cobble and pebbles to sand. OHWM and top of bank width ranges from 3 to 16 ft, and depth ranges from 0.5 to 2 ft. OHWM and top of bank width and depth were the same for a majority of delineated ephemeral streams.

4.2.4 Irrigation Canals

Irrigation canals are human-made linear features that convey water to agricultural irrigation systems. Irrigation canals can be concrete or earth-lined and vary in width and depth, depending on the number of irrigation systems being supplied with water. When earth-lined, these canals can support hydrophytic vegetation growing within or on the banks of the canal. A total of 33 irrigation canals occur in the study area and are characterized as a bed and bank features that exhibit indicators of an OHWM including a break in bank slope and change in average sediment texture, vegetation species, and vegetation cover. OHWM and top of bank width ranges from 4 to 14 ft, and depth ranges from 0.5 to 5 ft. Vegetation was observed along the banks for a majority of the irrigation canals.

4.2.5 Vegetated Ditches

Vegetated ditches are manmade linear features that support ephemeral or intermittent flow. They are considered vegetated because a majority of the bed and bank is covered with either hydrophytic or upland vegetation species occurring above and below the OHWM. Two vegetated ditches occur in the study area and are characterized as bed and bank features that exhibit indicators of an OHWM including a break in bank slope and change in average sediment texture, vegetation species, and vegetation cover. Dominant substrate ranges from sand to silty loam. OHWM and top of bank width ranges from 3 to 6 ft, and depth ranges from 0.5 to 1 ft. Soil surface cracks, drift deposits, and sediment deposits were observed in vegetated ditches with no surface water present.

4.2.6 Non-Vegetated Ditches

Non-vegetated ditches are human-made linear features that support ephemeral or intermittent flow but lack hydrophytic or upland vegetation within the ditch. A total of 17 non-vegetated ditches occur in the study area and are characterized as a bed and bank feature that exhibit indicators of an OHWM including a break in bank slope, nick points, sediment sorting, and change in average sediment texture and vegetation cover. Dominant substrate ranges from sandy gravel to cobbles and boulders. OHWM and top of bank width ranges from 1 to 5 ft, and depth ranges from 0.5 to 1 ft. OHWM and top of bank width and depth were the same for a majority of delineated non-vegetated ditches. These ditches received roadside runoff from US 395.

4.2.7 Ponds

Ponds are open water features that are part of a tributary system, have an interstate or foreign commerce connection, or are created for ranching such as stock ponds for cattle. They may be seasonal or perennial depending on the nature of their water source and may have hydrophytic vegetation growing within or along the pond margins. Six ponds occur in the study area and are characterized as open water features that exhibit indicators of an OHWM including break in slope and change in average sediment texture, vegetation species, and vegetation cover. Dominant substrate ranged from loam to sandy loam. Pond depth ranges from 1 to more than 10 ft, and width ranges from 14 to more than 2,000 ft. A majority of the ponds had some hydrophytic vegetation growing along the margins including willow sp. and cattail sp.

5.0 CONCLUSION

Potential waters of the United States delineated within the study area occupy a total of 238.212 ac and include wetlands and other waters. Table 4 provides a summary of all delineated features.

Table 4: Delineated Features Summary Table

Potential Waters of the United States	Total Acres	Total Linear Feet
Wetlands	205.798	N/A
Other Waters	32.414	57,027.17
Total Potential Waters of the United States	**238.212**	**57,027.17**

Determinations of waters of the United States, including wetlands, are based on current conditions, (i.e., normal circumstances) were made in accordance with relevant U.S. Environmental Protection Agency and USACE guidance. Determinations are subject to verification by the USACE. Stantec advises all interested parties to treat the information contained herein as preliminary pending written verification of jurisdictional boundaries by the USACE.

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