

# Aquatic Resources Delineation Report Bridge J-15-G

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## Executive Summary

Stanley Consultants, Inc. (Stanley) has prepared an aquatic resources delineation for the proposed replacement of two corrugated metal pipes on State Highway (CO) 9 south of Guffey, Colorado, known as the J-15-G Bridge Replacement Project (Project). The purpose of the delineation is to identify any potential waters of the U.S. (WOTUS) and/or wetlands, with the potential to be impacted by Project activities. The delineation was conducted in accordance with the 1987 Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987) and the Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0) (USACE 2010).

This delineation reports on the finding at the CDOT bridge J-15-G surveyed area (3.40 acres), where the OHWM for Mack Gulch (PSS1A: 0.28 acres and 370 linear ft) was delineated. This tributary to Currant Creek is an ephemeral drainage with a dense shrub layer dominated by narrowleaf willow (*Salix exigua*) within the channel, suggesting infrequent and relatively low flows. No wetlands were found within the area of potential Project impacts.

The delineation findings presented in this report will be used to assess potential Project impacts to surface water resources. The findings may be used to develop Project designs that minimize or avoid impacts to surface waters resources or, if impacts to these resources are unavoidable, to understand the total anticipated impacts that would need to be approved or permitted by the USACE. Depending on the level of impacts, the Project would likely require permitting under the Nationwide Permit (NWP) program. The NWP program is available for projects with relatively minor impacts (the exact nature of the impacts and acreage thresholds depend on the applicable NWP), while Individuals Permits (IPs) are required for projects with larger impacts and can involve a lengthy permitting process.

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Appendix D – Signed Property Access Letter (not included; needs to be obtained prior to permitting efforts)

## **Acronyms and Abbreviations**

BLM	Bureau of Land Management
CDOT	Colorado Department of Transportation
CO	Colorado State Highway
CWA	Clean Water Act
IP	Individual Permit
NRCS	Natural Resources Conservation Service
NWI	National Wetland Inventory
NWP	Nationwide Permit
NWPL	National Wetland Plant List
OHWM	ordinary high water mark
PIA	Potential Impact Area
PSS	palustrine scrub-shrub
ROW	right-of-way
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WOTUS	water of the United States

# 1. Introduction

On behalf of the Colorado Department of Transportation (CDOT), Stanley Consultants, Inc. (Stanley) has prepared an aquatic resources delineation for the proposed replacement of two corrugated metal pipes on Colorado State Highway (CO) 9 south of Guffey, Colorado, known as the J-15-G Bridge Replacement Project (Project). The purpose of the delineation is to identify any potential waters of the U.S. (WOTUS) and/or wetlands, present within the area of potential Project impacts.

The presence of wetlands and other waters were assessed within the vicinity of the proposed Project construction. The boundaries of potential WOTUS were then delineated to determine the extent of waters subject to regulation under the Clean Water Act within the area of potential Project impacts. The purpose of this delineation report is to facilitate efforts to:

- Avoid or minimize impacts to aquatic resources during the design process.
- Document aquatic resource boundary determinations for review by regulatory authorities.

Field investigations were conducted on August 30, 2020, by wetland biologists for Stanley Consultants, Inc.

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## 2. Location and Project Description

### 2.1 Location

The surveyed Potential Impact Area (the PIA) is approximately 3.40 acres and is located entirely on private land along CO 9. Bridge J-15-G is located approximately 5.9 miles south of the town center of Guffey in Park County, Colorado (38.670036/-105.484821), in Sections 6 and 7 of Township 16 South, Range 72 West (6<sup>th</sup> Principal Base and Meridian) (Appendix A, Figure 1). The PIA includes the CDOT right-of-way (ROW), the two corrugated metal pipes, and an extra buffer north of the bridge for a proposed temporary traffic bypass. A map of the PIA is located in the Aquatic Resources Delineation Map in Appendix A.

### 2.2 Purpose and Need

The two corrugated metal pipes at J-15-G were installed in 1971 along CO 9, a key corridor connecting residents and tourists from southern Colorado to the recreational activities in the Rocky Mountains. Due to age, much of the two pipes are severely corroded and areas of section loss ranging from 25 percent to 100 percent are present along the length of the pipes. The corrosion has allowed removal of the surrounding sediment leading to bulging and distortion in several areas. In addition, part of the exposed portion of one pipe shows impact damage.

This bridge is nearing the end of its design life and must be replaced to prevent potential failure.

### 2.3 Project Description

The CDOT Region 2 Bridge Bundle Design Build Project consists of the replacement of a total of nineteen (19) structures bundled together as a single design-build project. These structures are rural bridges on essential highway corridors (U.S. Highway [US] 350, US 24, CO 239 and CO 9) in southeastern and central Colorado. These key corridors provide rural mobility, intra- and interstate commerce, movement of agricultural products and supplies, and access to tourist destinations. The design build project has two funding sources; Bridge J-15-G will be jointly funded by the USDOT FHWA Competitive Highway Bridge Program grant and the Colorado Bridge Enterprise (Project No. 23558).

Bridge J-15-G is located on CO 9 at milepost 15.970, approximately 6.6 miles southeast of Guffey, Colorado (Figure 1). The bridge is comprised of two corrugated metal pipes (7 feet [ft] in diameter) that flows from Mack Gulch cross through before discharging into Currant Creek, located immediately downstream (south) of the structure. The Project will replace this structure with a culvert or bridge.

No bypass is currently planned for this location; during construction of the new structure, the existing structure will likely be split to allow work to proceed on one side of the structure while accommodating traffic on the other side. The area of disturbance will be restricted

to the limits of the ROW. Once bridge construction is completed and ready for use, any disturbed areas will be restored to the original contours and reseeded.

## 2.4 Directions to the Site

The PIA is accessible from Colorado Springs, Colorado, by taking US 24 west towards Florissant, Colorado for approximately 24 miles. In Florissant, turn left onto Teller County Road 1 and continue south for approximately 9 miles before turning right on County Road 11 to continue south for another 9 miles until County Road 11 ends at Teller County Road/CO Road 102. Turn right onto Teller County Road/CO Road 102 and take it for approximately 16 miles to CO 9. Turn left (south) onto CO 9 for approximately 4.7 miles before reaching the Project bridge. There is a pullout located on the northeast side of the bridge that provides sufficient space for parking.

# 3. Methods

## 3.1 Regulatory Context

Section 404 of the Clean Water Act (CWA) regulates the discharge of dredged or fill material into WOTUS and is administered by the U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (EPA). The definition of WOTUS has been in flux in recent years, with the latest definition published by the EPA in the Navigable Waters Protection Rule, which went into effect on June 22, 2020, in 49 states. Due to an injunction issued by a federal court in Colorado, the Navigable Waters Protection Rule has not gone into effect in Colorado, and instead the state remains under the post-*Rapanos v. United States* (Rapanos) guidance (USACE and EPA 2008). The potential for waters of the U.S. within the PIA therefore will be evaluated per the definition in the Rapanos guidance. Since the WOTUS definition under Rapanos is more expansive than the Navigable Waters Protection Rule, assessing the PIA under Rapanos ensures that no additional reevaluation is likely to be required in the event CWA applicability changes in Colorado during the period of Project construction.

The Rapanos guidance defines waters of the U.S. as traditional navigable waters (TNWs), relatively permanent waters, and their adjacent wetlands.<sup>1</sup> Additionally, the Rapanos guidance includes all tributaries with a bed and bank or ordinary highwater mark (OHWM) that have a significant nexus to a Traditionally Navigable Water, as well as wetlands, ponds, impoundments, and lakes located adjacent to said tributaries. Under Section 404 of the CWA, the OHWM defines the lateral extent of federal jurisdiction in non-tidal WOTUS (absent adjacent wetlands) (33 U.S.C. 1251). Per the regional guidance developed by the Corps (Mersel and Lichvar 2014), OHWM in Colorado is considered to be the “physical and biological signature established and maintained at the boundaries of the active channel.” Mersel and Lichvar (2014) state the OHWM identification in non-perennial streams is based on three primary physical or biological indicators—topographic

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<sup>1</sup> Adjacent is defined as “bordering, contiguous, or neighboring” in the Rapanos guidance.



break in slope, change in sediment characteristics, and change in vegetation characteristics.

### 3.2 Wetland Delineation

The wetland delineation was conducted in accordance with the 1987 *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the Regional Supplement to the *Corps of Engineers Wetlands Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (USACE 2010). The entire PIA was assessed by the biologists to determine the presence or absence of wetland features. Any location that contained some potential as a wetland based on the National Wetland Inventory (NWI) mapping (Appendix B) or observed surface conditions, such as the presence of dominant hydrophytic vegetation or surface hydrology, was investigated more closely with a sampling point containing a soil pit that was recorded in a delineation field form with photo documentation (Appendix C).

Sources of information used in this investigation include:

- Web Soil Survey – See Appendix B, Custom Soil Resource Report.
- Aerial photography of the PIA from the National Agriculture Imagery Program (NAIP) taken in 2017, and from aerial drone photography collected by Stanley.
- National Wetland Plant List, version 3.4 (USACE 2018)
- Munsell Soil-Color Charts (Munsell Color 2009)
- NWI Map – See Appendix B, NWI Mapping

### 3.3 Non-Wetland Waters Delineation

The PIA was examined for any potential OHWM supporting features, such as root exposure, water staining, silt deposits, litter removal, etc. (Mersel and Lichvar 2014, USACE 2005), that might provide information interpreting recent flow levels (e.g., drift/wrack deposits or headcutting) or that might eliminate or reinforce potential OHWM locations. Stanley also examined aerial photography and hydrologic data to support the Section 404 CWA assessment. The boundaries of any non-wetland water features were identified by the OHWM indicators and recorded using a Trimble sub-meter GPS antenna connected to a tablet or smart phone, and were also surveyed using the same sub-meter GPS unit.

## 4. Existing Conditions

### 4.1 Topography

The PIA is located within the valley containing Mack Gulch, surrounded by rolling hillsides and the river terraces and slopes. The elevation at the site is approximately 8,000 feet (ft) above mean sea level (AMSL).

Land use in the vicinity of the PIA predominantly consists of the CO 9 transportation corridor, rural residences and roads, and ranching activities. The area immediately surrounding the Project consists of a mixture of BLM and privately-owned lands (Appendix A, Figure 2). No other structures or residences are located within the PIA.

### 4.2 Climate

The PIA is located approximately half way between the two nearest weather stations at Canon City and Hartsel, Colorado. Due to the distance to each station and the differences in elevation between the stations, climate data from both locations is presented here.

Canon City, Colorado, has an average maximum temperature of 67°F and average minimum temperature of 37°F (U.S. Climate Data 2020a). The average annual precipitation is 13.47 inches of rain and 42 inches of snowfall (U.S. Climate Data 2020a). The monthly precipitation average for August is 2.23 inches; however, during this past August (when field survey was conducted) the rainfall was measured at 2.54 inches (Weather Underground 2020b), which is slightly above normal.

Hartsel, Colorado, has an average maximum temperature of 53° F and average minimum temperature of 17° F (U.S. Climate Data 2020b). The average annual precipitation is 10.86 inches of rain and 46 inches of snowfall (U.S. Climate Data 2020b). The monthly precipitation average for August is 2.42 inches; however, during this past August the rainfall was measured at 0.83 inches, which is well below normal (Weather Underground 2020a).

### 4.3 NWI Mapping

The National Wetlands Inventory (NWI) has mapped the drainage crossing under the Project bridge as freshwater forested/ shrub wetland (PSS1A). See Appendix B, Supporting Maps, NWI Mapping.

### 4.4 Plant Communities

The plant community in the drainage in the PIA consists primarily of a dense riparian layer within the channel and sparse to moderately sparse shrubby herbaceous vegetation on the uplands adjacent to the road. The riparian vegetation contains a dense shrub layer of narrowleaf willow (*Salix exigua*), while the herbaceous layer is dominated by Baltic rush (*Juncus balticus*). Additional species observed within the PIA include wild mint (*Mentha*

arvensis), an unidentified sedge (*Carex* sp.; individual specimens were not in a condition to identify the species), and Canada thistle (*Cirsium arvense*).

#### 4.5 Hydrology

The dominant hydrological feature in the PIA is Mack Gulch, an ephemeral drainage that which crosses through the J-15-G structure and extends parallel to CO 9 upstream and downstream of the PIA. Mack Gulch discharges into Current Creek approximately 2.3 miles downstream of the PIA, which travels south until the stream's confluence with Tallahassee Creek, after which it discharges into the Arkansas River. From there, the Arkansas River flows approximately east and then southeast to the Mississippi River and south to the Gulf of Mexico.

The primary hydrology input in the PIA is stormwater flows from Mack Gulch, with other minor inputs comprised of sources such as groundwater and surface runoff from the adjacent hillsides and the highway.

No fens are located within the vicinity of the PIA (OTIS 2020). The nearest mapped potential fen is a low confidence fen more than 2 miles downstream of the PIA.

#### 4.6 Soils

Two soils were identified in the PIA (Table 1; also see Appendix B Soil Resource Report). Soils mapped within the PIA are predominantly nonhydric or nonhydric (NRCS 2020). Soils observed in the test soils pits sampled during field survey were all nonhydric as well.

**Table 1. NRCS Soils Mapped within PIA**

Soil Map Unit Name	Potentially Hydric?
Boyle-Rock outcrop complex, 40 to 60 percent slopes	Nonhydric
Jodero sandy loam, 2 to 5 percent slopes	Predominantly Nonhydric

## 5. Aquatic Resource Results

Delineation results reflect the conditions as observed at the time of investigation and were used to determine the OHWM boundaries shown in Appendix A (Figure 2). Representative photos of the OHWM boundaries can be found in Appendix C. The following subsection summarizes the results of the delineation, including a description of the delineated OHWM and justification for the boundaries. Feature details are summarized in Table 2 (Aquatic Resources within the PIA).

**Table 2. Aquatic Resources within the PIA**

Name	Cowardin Classification	Location (Lat/Long)	Size (ac)	Length (ft)
<b>Non-wetland Waters</b>				
Mack Gulch	PSS1A	38.670036/-105.484821	0.28	370
<b>Totals</b>			<b>0.28</b>	<b>370</b>

All portions of the PIA were examined for their potential to support wetlands. The dominant vegetation observed within the PIA is Baltic rush and narrowleaf willow, both of which are FACW species within the Western Mountains, Valleys, and Coast Region. However, the hydrology indicators were limited to secondary indicators (geomorphic position and the FAC-Neutral Test) and the soil test pits revealed dry, sandy soils that, while dark, did not contain redox and did not qualify as hydric soils.

## 5.1 Mack Gulch

Mack Gulch is an ephemeral drainage (370 linear ft, 0.28 acres) that discharges into Currant Creek approximately 2.3 miles downstream (south) of the bridge. The upstream extent of the OHWM begins approximately 375 ft upstream from the bridge; above this point, the drainage consists of a swale with no visible OHWM. The Mack Gulch OHWM features within the PIA is primarily characterized by flattened vegetation, water stained vegetation, and debris deposition. Dense riparian vegetation fills the drainage, creating multiple small channels (shallow, 1-2 ft wide, dissipating quickly) within the broader OHWM.

The OHWM boundary was defined by the change in topography along the edges of Mack Gulch. The sides of the drainage, which is sandwiched between the road (CO 9) and the adjacent hillslope around the PIA, rise relatively rapidly and vegetation transitions quickly to upland species above the OHWM.

Wetland vegetation and secondary indicators of hydrology were present within the PIA; however, test pits taken within the ephemeral channel were found to contain nonhydric soils. Photographic documentation of Mack Gulch is presented in Appendix C – Photo Inventory.

## 6. Interstate Commerce

Federal authority to regulate waters within the United States is primarily derived from the Commerce Clause, which gives Congress the power to regulate interstate commerce. Section 404 of the Clean Water Act defines the limits of jurisdiction as encompassing navigable waters and waters of the U.S. including, among other water bodies, “waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce” (40 CFR § 120.2(1)(i)).

The section of the drainage intersecting the PIA is ephemeral and does not appear to support interstate commerce. In the event that it does support interstate commerce, however, the replacement of the existing bridge with an updated structure to meet CDOT standards will not affect water flows or alter the ability of the stream to support any future interstate commerce.

## 7. Summary

One tributary (totaling 0.28 acres and 370 linear feet) was identified and delineated within the PIA. No wetlands were identified within the PIA.

### 7.1 Anticipated Impacts

In the event that the selected Project design will impact any potential WOTUS delineated in this report, the impacts to these resources would need to be approved or permitted by the USACE. Depending on the level of impacts, the Project would likely require permitting under the Nationwide Permit (NWP) program. The NWP program is available for projects with relatively minor impacts (the exact nature of the impacts and acreage thresholds depend on the applicable NWP), while Individual Permits are required for projects with larger impacts and can involve a lengthy permitting process.

### 7.2 Avoidance and Mitigation Measures

Measures to avoid, minimize, or mitigate for potential impacts to wetlands and other WOTUS include:

- Tailoring design to avoid or minimize impacts as much as possible given structural constraints.
- Having construction methods and equipment that can avoid or minimize temporary impacts by reducing footprint of machines used or accessing work from roadway fill or other uplands.
- Developing compensatory mitigation measures, if permanent impacts are not avoidable. These measures would be a part of the permitting process with USACE or would be conducted through CDOT, depending on the final jurisdiction determination.
- Developing a detailed and thorough construction plan which includes best management practices. An example is a Stormwater Pollution Prevention Plan that incorporates measures to protect sensitive resources such as stormwater run-off, pollutants, etc. due to construction activities.

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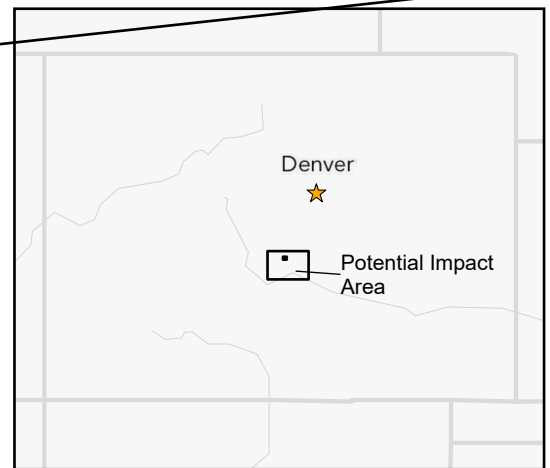
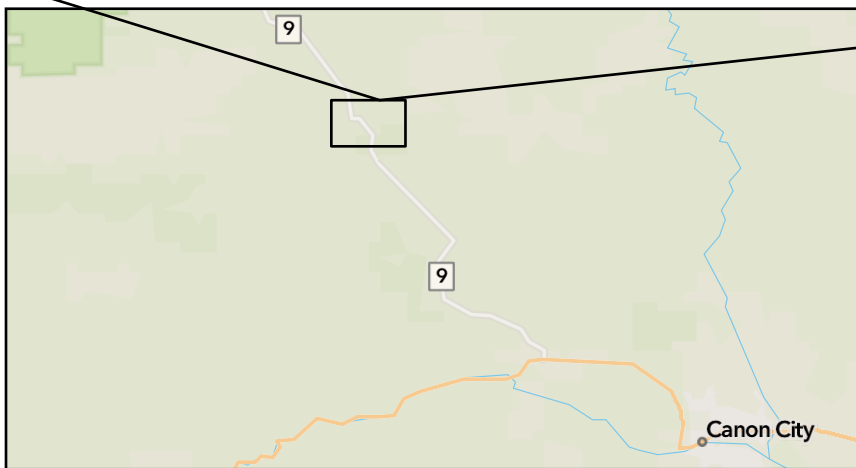
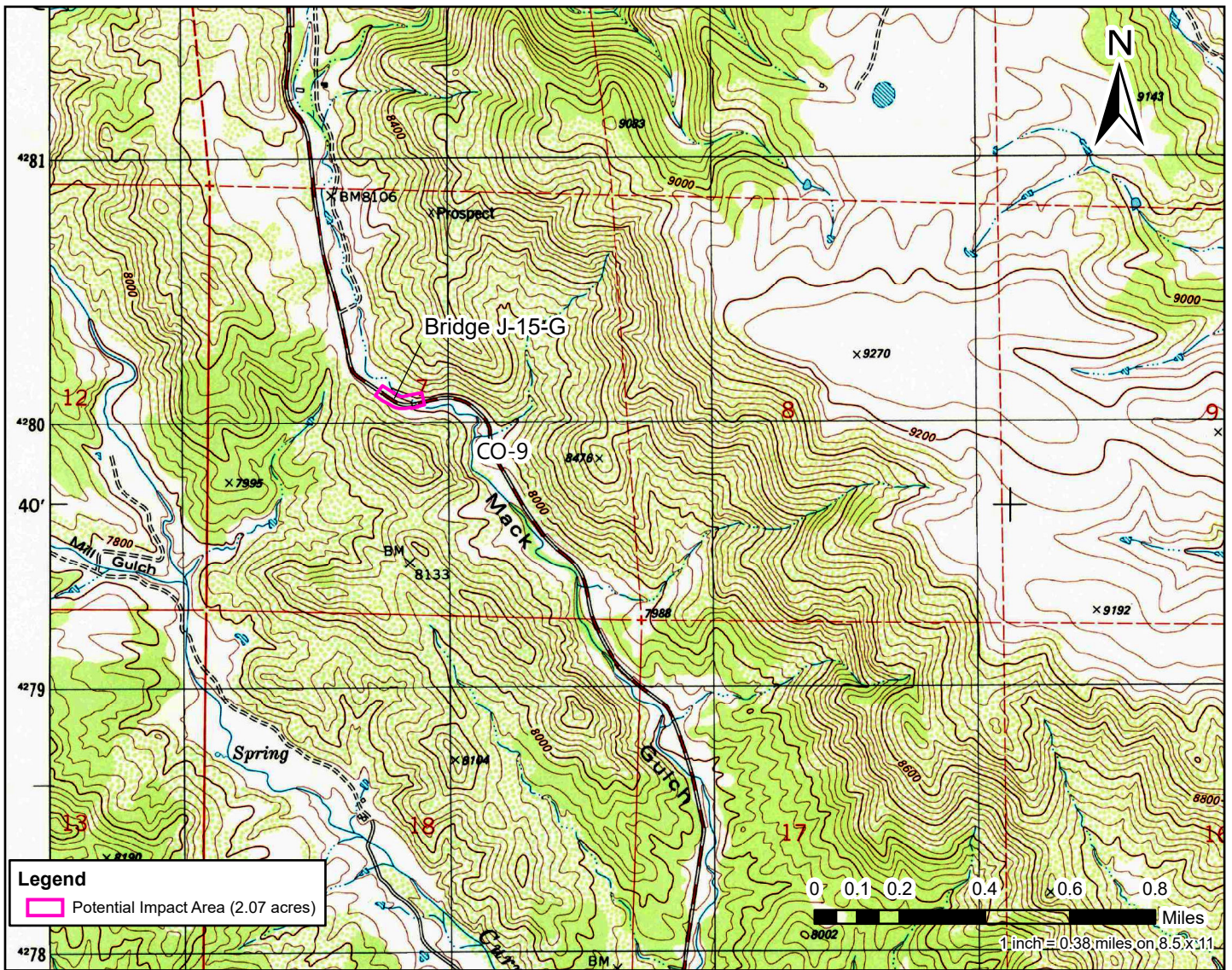
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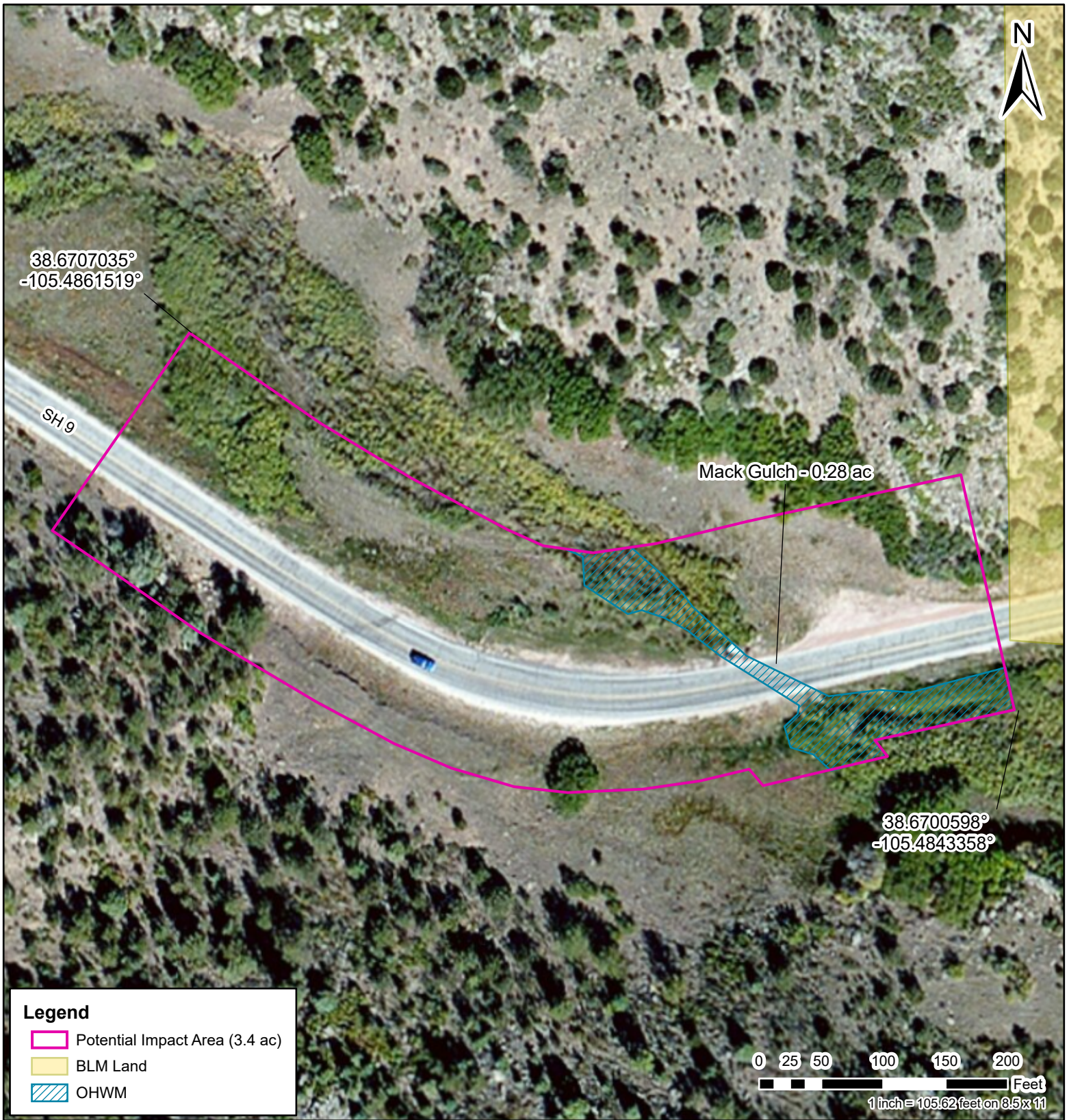
## **Appendix A**

### Aquatic Resources Delineation Maps



**COLORADO DEPARTMENT OF TRANSPORTATION**  
 Region 2 Bridge Rebuild Project - Bridge J-15-G  
 Aquatic Resources Delineation Report

**Figure 1**  
 Vicinity Map



COLORADO DEPARTMENT OF TRANSPORTATION  
 Region 2 Bridge Rebuild Project - Bridge J-14-C  
 Aquatic Resources Delineation Report

**Figure 2**  
 Aquatic Resources Delineation



Stanley Consultants INC.

Data Source: Stanley Consultants, Inc., CDOT, USGS PAD-US  
 Image Source: ArcGIS Online, World Imagery (Clarity)

Date Exported: 12/9/2020 9:51 AM

Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere  
 Datum: WGS 1984







## **Appendix B**

### Supporting Maps and Documents



December 8, 2020

**Wetlands**

- |   |                                |   |                                   |   |          |
|---|--------------------------------|---|-----------------------------------|---|----------|
|  | Estuarine and Marine Deepwater |  | Freshwater Emergent Wetland       |  | Lake     |
|  | Estuarine and Marine Wetland   |  | Freshwater Forested/Shrub Wetland |  | Other    |
|   |                                |  | Freshwater Pond                   |  | Riverine |

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

# Custom Soil Resource Report for Fremont County Area, Colorado

**J-15-G**



# Preface

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Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist ([http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2\\_053951](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951)).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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# How Soil Surveys Are Made

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Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

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scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

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The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

# Custom Soil Resource Report Soil Map



Map Scale: 1:1,750 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

### MAP LEGEND

**Area of Interest (AOI)**

 Area of Interest (AOI)


**Soils**


 Soil Map Unit Polygons


 Soil Map Unit Lines


 Soil Map Unit Points

**Special Point Features**

 Blowout

 Borrow Pit


 Clay Spot


 Closed Depression

 Gravel Pit

 Gravelly Spot


 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water


 Perennial Water

 Rock Outcrop


 Saline Spot

 Sandy Spot

 Severely Eroded Spot


 Sinkhole


 Slide or Slip


 Sodic Spot


 Spoil Area

 Stony Spot


 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

**Water Features**

 Streams and Canals


**Transportation**

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

**Background**

 Aerial Photography

### MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

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

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

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

Soil Survey Area: Fremont County Area, Colorado  
 Survey Area Data: Version 18, Jun 5, 2020

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

Date(s) aerial images were photographed: May 18, 2020—May 21, 2020

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

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
9	Boyle-Rock outcrop complex, 40 to 60 percent slopes	2.4	26.5%
46	Jodero sandy loam, 2 to 5 percent slopes	6.7	73.5%
<b>Totals for Area of Interest</b>		<b>9.1</b>	<b>100.0%</b>

## Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,



## Custom Soil Resource Report

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

## Fremont County Area, Colorado

### 9—Boyle-Rock outcrop complex, 40 to 60 percent slopes

#### Map Unit Setting

*National map unit symbol:* jql4  
*Elevation:* 7,500 to 8,500 feet  
*Mean annual precipitation:* 14 to 18 inches  
*Mean annual air temperature:* 43 to 46 degrees F  
*Frost-free period:* 85 to 110 days  
*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Boyle, warm, and similar soils:* 60 percent  
*Rock outcrop:* 25 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Boyle, Warm

##### Setting

*Landform:* Mountainsides  
*Landform position (three-dimensional):* Mountainflank  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Residuum weathered from gneiss and/or residuum weathered from granite

##### Typical profile

*A - 0 to 3 inches:* very gravelly sandy loam  
*Bt - 3 to 17 inches:* extremely gravelly sandy clay loam  
*Cr - 17 to 21 inches:* weathered bedrock

##### Properties and qualities

*Slope:* 40 to 55 percent  
*Depth to restrictive feature:* 10 to 20 inches to paralithic bedrock  
*Drainage class:* Well drained  
*Runoff class:* High  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to high (0.06 to 2.00 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water capacity:* Very low (about 0.9 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 7e  
*Hydrologic Soil Group:* D  
*Hydric soil rating:* No

#### Description of Rock Outcrop

##### Typical profile

*R - 0 to 60 inches:* unweathered bedrock

**Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 8s

*Hydric soil rating:* No

**Minor Components**

**Jodero**

*Percent of map unit:*

*Hydric soil rating:* No

**Bronell**

*Percent of map unit:*

*Hydric soil rating:* No

**46—Jodero sandy loam, 2 to 5 percent slopes**

**Map Unit Setting**

*National map unit symbol:* jqjl

*Elevation:* 7,700 to 8,700 feet

*Mean annual precipitation:* 11 to 15 inches

*Mean annual air temperature:* 43 to 46 degrees F

*Frost-free period:* 80 to 100 days

*Farmland classification:* Prime farmland if irrigated

**Map Unit Composition**

*Jodero and similar soils:* 90 percent

*Minor components:* 5 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Jodero**

**Setting**

*Landform:* Fans, stream terraces

*Down-slope shape:* Concave, linear

*Across-slope shape:* Linear

*Parent material:* Mixed alluvium

**Typical profile**

*A1 - 0 to 10 inches:* sandy loam

*A2 - 10 to 30 inches:* sandy clay loam

*A3 - 30 to 45 inches:* loam

*2C - 45 to 60 inches:* very gravelly loamy sand

**Properties and qualities**

*Slope:* 2 to 5 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Well drained

*Runoff class:* Low

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*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high  
(0.20 to 2.00 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Calcium carbonate, maximum content:* 5 percent

*Available water capacity:* Moderate (about 6.9 inches)

### **Interpretive groups**

*Land capability classification (irrigated):* 4c

*Land capability classification (nonirrigated):* 4c

*Hydrologic Soil Group:* B

*Ecological site:* R049XD202CO - Loamy Foothill 11-14 Inches P.Z.

*Hydric soil rating:* No

### **Minor Components**

#### **Aquolls**

*Percent of map unit:* 5 percent

*Landform:* Flood-plain steps

*Hydric soil rating:* Yes

#### **Cascajo variant**

*Percent of map unit:*

*Hydric soil rating:* No

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## **Appendix C**

### Photo Inventory



**Photo 1**

**Feature:** Mack Gulch

**Date:** 8/30/2020

**Photo Location:** Upstream (north) side of bridge, facing upstream (north)

**Description:** This photo is taken at the upstream extent of the channel's OHWM. Upstream of the OHWM, the channel widens to the point where stormwaters are primarily sheet flow. Downstream of this point, Mack Gulch is more channelized as the drainage becomes more constricted by the road (SH 9) and adjacent hillside.

**Appendix C**

CDOT BRIDGE J-15-G REBUILD PROJECT  
Aquatic Resources Delineation Report  
Photo Inventory 1





**Photo 2**

**Feature:** Mack Gulch

**Date:** 8/30/2020

**Photo Location:** Upstream (north) side of bridge, facing downstream (south)

**Description:** The Mack Gulch OHWM within the PIA is primarily characterized by deposition of debris, flattened vegetation, and water stained vegetation. The dark area near the top center of the photo is one of the two drainage pipes that comprise the J-15-G structure.



**Photo 3**

**Feature:** Mack Gulch

**Date:** 8/30/2020

**Photo Location:** Upstream (north) side of bridge, within channel.

**Description:** The OHWM transitions to swale periodically. There are 2-3 narrow channels (1-2 ft wide) within the OHWM boundaries. Dry, gravelly soil on the raised ground between the channels do not contain wetland characteristics.

## Appendix C

### CDOT BRIDGE J-15-G REBUILD PROJECT Aquatic Resources Delineation Report Photo Inventory 1



**Photo 4**

**Feature:** Mack Gulch

**Date:** 8/30/2020

**Photo Location:** Downstream (south) side of bridge, facing upstream (north)

**Description:** The segments of the channel within the PIA contain a dense overstory of narrowleaf willow (*Salix exigua*) and an herbaceous understory dominated by Baltic rush (*Juncus balticus*). No hydric soils were found in the test pits conducted within the PIA.



**Photo 5**

**Feature:** Mack Gulch

**Date:** 8/30/2020

**Photo Location:** Downstream (south) side of bridge, facing downstream (south)

**Description:** The portion of Mack Gulch within the PIA (both upstream and downstream of the J-15-G structure) is characterized by a dense shrub layer dominated by narrowleaf willow. The OHWM boundary was defined by the change in topography along the edges of Mack Gulch. The sides of the drainage, which is sandwiched between the road (SH 9) and the adjacent hillslope around the PIA, rise relatively rapidly and vegetation transitions quickly to upland species above the OHWM.

**Appendix C**

CDOT BRIDGE J-15-G REBUILD PROJECT  
Aquatic Resources Delineation Report  
Photo Inventory 2



**Photo 6**

**Feature:** Mack Gulch

**Date:** 8/30/2020

**Photo Location:** Downstream (south) side of bridge, within channel

**Description:** Multiple small channels that dissipate and reappear were observed within the OHWM boundaries. These small channels did not display consistent enough OHWM features to require individual delineation.

**Appendix C**

CDOT BRIDGE J-15-G REBUILD PROJECT  
Aquatic Resources Delineation Report  
Photo Inventory 3

## **Appendix D**

### **Signed Property Access Letter**

(not included; needs to be obtained prior to permitting efforts)