



MEMORANDUM

Date: August 8, 2021

To: Hans Schuster, GMT Exploration Company, LLC

From: Tim DeMasters, CORVUS Environmental Consulting, LLC

Re: OHWM Assessment of Coal Creek for the Crystal Ruby Well Pad and Access Road in Elbert County, Colorado

This memorandum has been prepared on behalf of GMT Exploration Company, LLC (GMT) and presents an updated subset of the results of a natural resources assessment (NRA) for the “Crystal Ruby” well pad and access road (Crystal Ruby project). The project is located in northwest Elbert County, Colorado (Figures 1 and 2). CORVUS Environmental Consulting, LLC (CORVUS) has been retained by GMT to assist with the NRA related to the project.

Supplementary information can be found in the accompanying materials, including:

- Attachment A – Figures
 - Figure 1 – Regional Map
 - Figure 2 – Aerial Overview
- Attachment B – Photographic Log

Regulatory Setting

Federal regulations define the ordinary high-water mark (OHWM) as “that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a 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. Under Section 404 of the Clean Water Act (CWA), the OHWM defines the lateral extent of federal jurisdiction in non-tidal waters of the United States (WOTUS) in the absence of adjacent wetlands” (Lichvar and Mersel 2014).

Regional OHWM guidance documents have been published by the US Army Corps of Engineers for both the Arid West Region and Coastal Mountains, Valleys and Coasts Region. This project is located within the Great Plains region (USACE 2010), which does not have a specific OHWM guidance document, so applicable portions of either of the two adjacent regions are often used.

The COGCC recently adopted updated wildlife rules (1200 Series) in support of the 2019 Colorado Senate Bill 19-181 law to “ensure that oil and gas development and operations in Colorado are regulated in a manner that protects public health, safety, welfare, the environment and wildlife resources” (effective January 15, 2021).

The COGCC 1200 Series Rules (Rules) provide the framework for planning oil and gas operations in a manner that minimizes impacts to sensitive wildlife species and habitat. In some instances, the Rules call for notice to and consultation with the Colorado Parks and Wildlife (CPW) during the permitting process to allow for identification of sensitive species and high priority habitats (HPHS) and to provide a framework for avoidance, minimization, and mitigation of impacts to wildlife. CPW has identified a list HPHs and provided recommendations to avoid and minimize impacts to wildlife from land use development.

Colorado Parks and Wildlife references the OHWM under the recently published “Colorado Parks and Wildlife’s (CPW) Recommendations to Avoid and Minimize Impacts to Wildlife from Land Use Development in Colorado”. Specifically,

“Aquatic Native Species Conservation Waters - Streams and lakes, managed by Colorado Parks and Wildlife for native fish species buffered to 500 ft. for use in SB181 oil and gas analyses. Most data pulled from National Hydrography Dataset (NHD) created and maintained by USGS” (CPW 2020).

Ordinary High Water Mark Assessment

Ordinary high water mark (OHWM), as defined by the US Army Corps of Engineers, can be defined by the observation of a number of physical characteristics, commonly including (but not limited to) the following list (USACE 2005):

- Shelving
- Changes in the character of soil
- Destruction of terrestrial vegetation
- Presence of litter and debris
- Wracking
- Vegetation matted down, bent, or absent
- Sediment sorting
- Leaf litter disturbed or washed away
- Scour
- Deposition
- Multiple observed flow events
- Bed and banks
- Water staining
- Change in plant community

Generally, a combination of two or more of the above indicators are used to define the ordinary high water mark, the most common of which are “bed and bank” and destruction of terrestrial vegetation (lack of upland plants in the channel). The term Bed and Bank is used to describe what is often referred to as a “stream bed”, or a consistent path where water flows, if/when it flows.

COGCC uses a slightly different name and definition than the US Army Corps; ORDINARY HIGH-WATER LINE (OWHL) shall mean the line that water impresses on the land by covering it for sufficient periods to cause physical characteristics that distinguish the area below the line from the area above it (Rules and Regulations 100 series). Characteristics of the area below the line include, when appropriate, but are not limited to, **deprivation of the soil of substantially all terrestrial vegetation and destruction of its agricultural vegetative value**. A flood plain adjacent to surface waters is not considered to lie within the surface waters' ordinary high-water line.

The Coal Creek drainageway, broadly labeled as an intermittent stream on the national hydrography dataset, is located approximately 180 feet to the east of the well pad site and approximately 80 feet to the east of the access road. **At the time of the field assessment there was no surface water, no defined bed and bank and therefore no OHWM nor OHWL associated with the drainage** (see Attachment B - Photolog). Furthermore, any groundwater or baseflow does not occur often enough to develop wetland habitat. Upland vegetation was observed to be present within, and throughout the historic drainageway. Two small (30' x 5') areas were observed to lack vegetation, one of which is likely a cattle wallow in wet years. A common upland grass species, smooth brome (*Bromus inermis*), dominates the lowest areas in almost the entirety of the drainageway, indicating that the soils are well drained and do not pool or flow water during most (including recent) normal years.

A previous study by a third-party similarly found no OHWM in Coal Creek in 2017, commissioned for the County Road 178 Extension, which stated (Tiglas 2017):

Sampling Point A
This community is associated with Coal Creek proper at the west end of the project area. The drainage is flat with small banks to the east and west sides forming a slight depression on the landscape. No clear flow line is discernable within the drainageway.

One wetland determination sample point was taken in a depressional swale area, adjacent to the proposed access road (latitude 39.50762635, longitude -104.6515009), approximately 100 feet from Coal Creek. No hydrophytic vegetation indicators, hydric soil indicators, or hydrology (USACE 2010) were present.

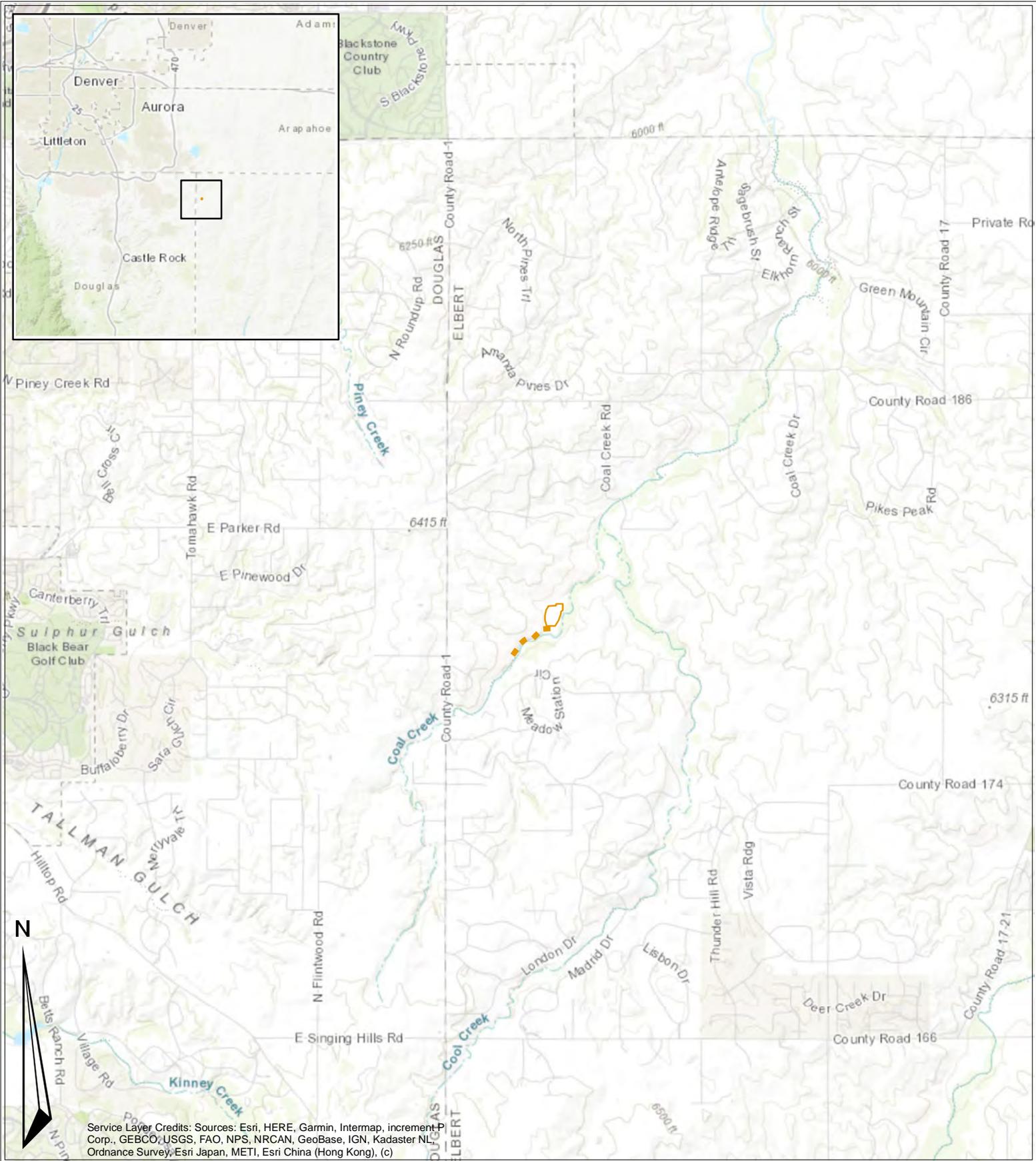
Results

The portion of Coal Creek within the vicinity of the project and buffer area **does not receive** any normal (or ordinary) flows which would develop a mappable ordinary high-water line. There is **no evidence or examples of deprivation of the soil of substantially all terrestrial vegetation** and destruction of its agricultural vegetative value within the

study area. This pad and road complies with the setbacks set under Native Fish and Other Native Aquatic Species Conservation Waters (100s, 200s series).

References

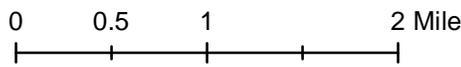
- Lichvar, Robert W. and Mersel, Matthew K, 2014. A Guide to Ordinary High Water Mark (OHWM) Delineation for Non-perennial Streams in the Western Mountains, Valleys, and Coast Region of the United States. August 2014. Accessed online <https://erdc-library.erdc.dren.mil/jspui/bitstream/11681/5501/1/ERDC-CRREL-TR-14-13.pdf>
- Tiglas, Darcy A. 2017. "Wetland Delineation at the proposed New County Road 178 and County Road 13 Extension Roadway Construction Project Site in Elbert County Near Parker, Colorado". November 2017.
- U.S. Army Corps of Engineers (USACE), 2005. Regulatory Guidance Letter – Ordinary High Water Mark Identification. No 05-05, December 7, 2005. Accessed online <https://usace.contentdm.oclc.org/utis/getfile/collection/p16021coll9/id/1253>.
- U.S. Army Corps of Engineers (USACE), 2010. Regional supplement to the Corps of Engineers wetland delineation manual: Great Plains Region (Version 2.0). Environmental Laboratory ERDC/EL TR-10-3. Vicksburg (MS): USACE Engineer Research and Development Center.
- USGS, 2021. National Hydrography Dataset (NHD), <https://www.usgs.gov/core-science-systems/ngp/national-hydrography>. Website accessed March 10, 2021.



Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c)

Crystal Ruby Well Pad Analysis

- Facility Pad
- Pad Access



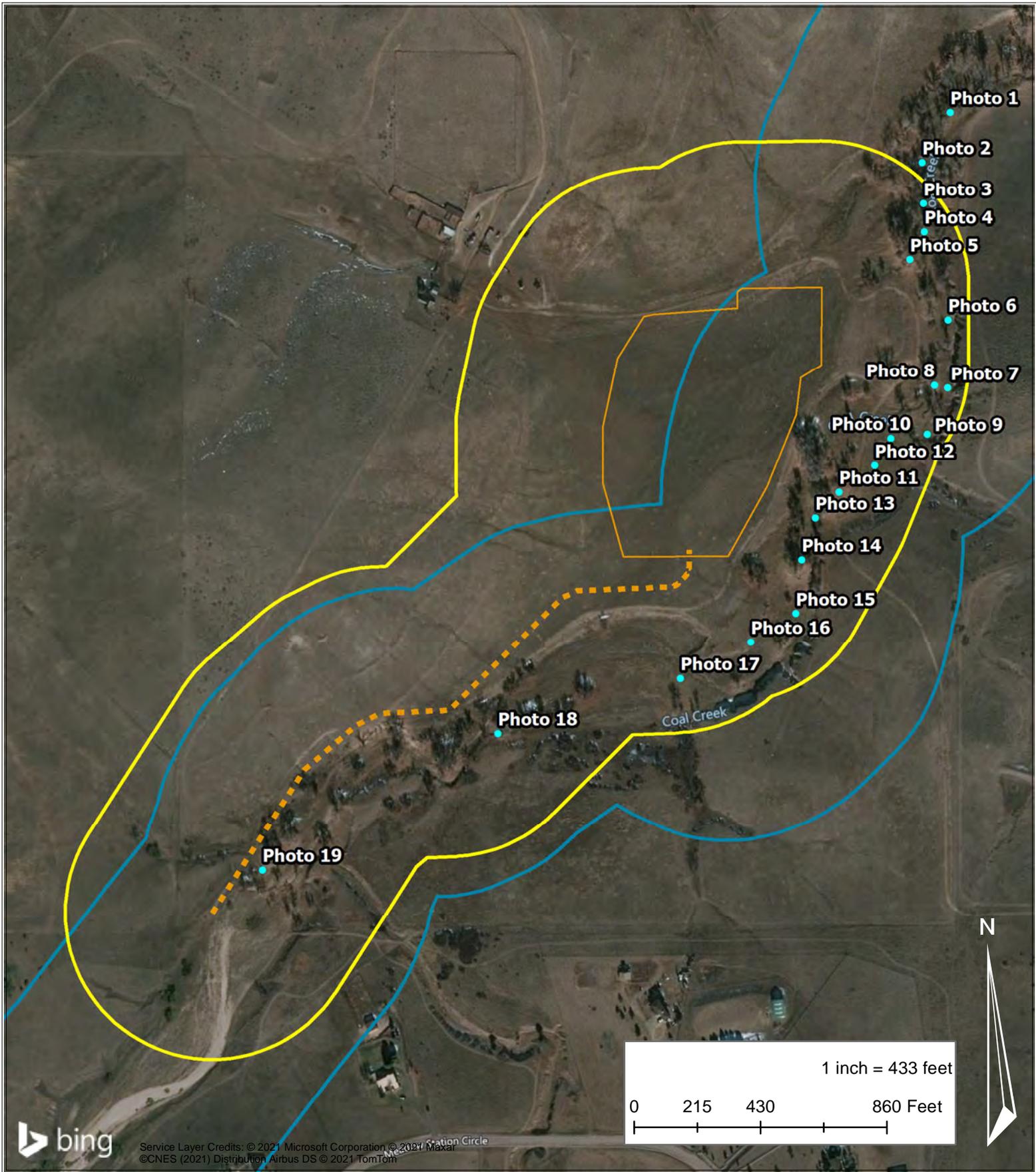
1 inch = 1 miles

FIGURE 1

REGIONAL MAP

Elbert County, Colorado
Map Date: 3/19/2021





Crystal Ruby Well Pad Analysis

- Photo Points
- Facility Pad
- Pad access
- 500-foot buffer
- Aquatic Native Species Conservation Waters

FIGURE 2 AERIAL OVERVIEW WITH BUFFER

Elbert County, Colorado
Map Date: 8/6/2021



Photo Log for the Proposed Crystal Ruby Well Pad and Access Road in Elbert County, Colorado
OHWM Assessment

Photos Taken: July 30, 2021. Photos ordered north to south.



Photo 1. View of northern riparian area. This area does not exhibit destruction of terrestrial vegetation (OHWM indicator).

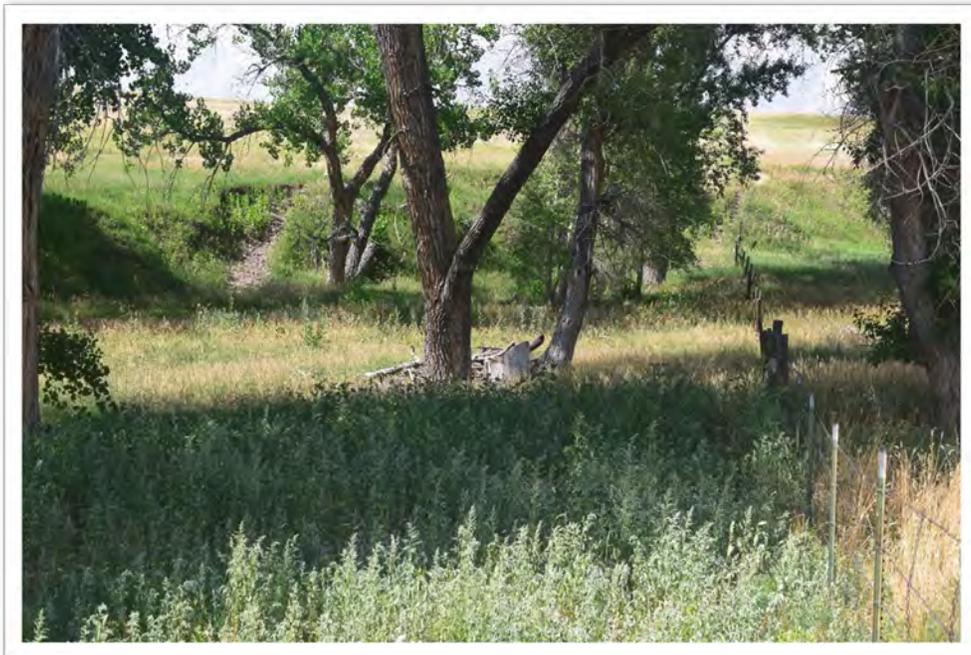


Photo 2. Alternate view of northern riparian area. Area is fully vegetated and does not exhibit matted down, bent, or absent vegetation (OHWM indicator).

Photo Log for the Proposed Crystal Ruby Well Pad and Access Road in Elbert County, Colorado
OHWM Assessment

Photos Taken: July 30, 2021. Photos ordered north to south.



Photo 3. View of northern riparian area facing outside the riparian area. Area does not exhibit water staining on trees (OHWM indicator).

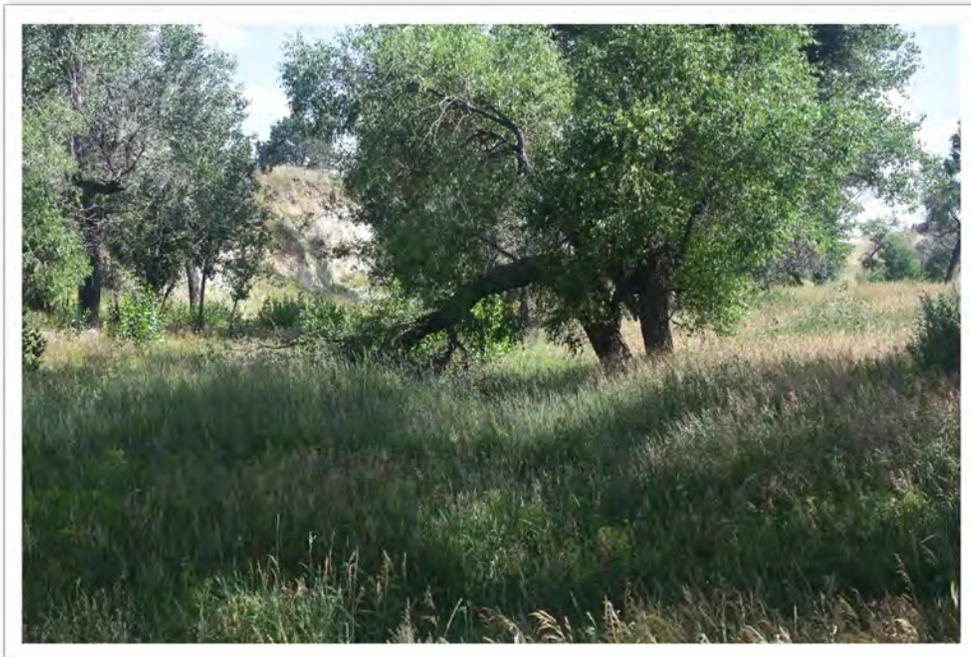


Photo 4. View within the riparian area showing no channel indicators and no evidence of observable flow events (OHWM indicator).

Photo Log for the Proposed Crystal Ruby Well Pad and Access Road in Elbert County, Colorado
OHWM Assessment

Photos Taken: July 30, 2021. Photos ordered north to south.



Photo 5. View looking across the riparian area with no channel indicators present. Vegetation community on the terrace exhibits overlap with species in the riparian area.

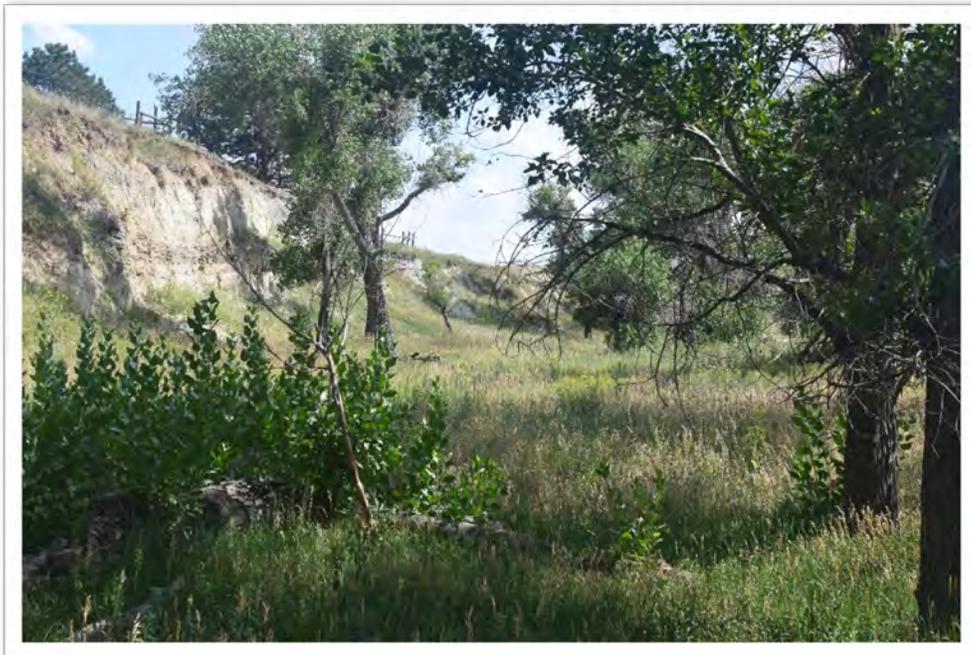


Photo 6. View along the eastern terrace with no channel indicators including bed and bank (OHWM indicator).

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OHWM Assessment

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Photo 7. View looking into the riparian area with no destruction of terrestrial vegetation.



Photo 8. View of edge of two-track road within riparian corridor. No channel indicators present.

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OHWM Assessment

Photos Taken: July 30, 2021. Photos ordered north to south.



Photo 9. View of eastern terrace and upland vegetation community within the riparian area. Dominant grass species in the riparian area (smooth brome) also dominant on top of the terrace.



Photo 10. View of smooth brome understory within the riparian corridor. No water staining present on trees within the riparian corridor.

Photo Log for the Proposed Crystal Ruby Well Pad and Access Road in Elbert County, Colorado
OHWM Assessment

Photos Taken: July 30, 2021. Photos ordered north to south.



Photo 11. View of two-track road within the riparian corridor. Area lacks OHWM indicators.



Photo 12. View in the southern portion of the site showing a fully vegetated riparian corridor with no OHWM indicators.

Photo Log for the Proposed Crystal Ruby Well Pad and Access Road in Elbert County, Colorado
OHWM Assessment

Photos Taken: July 30, 2021. Photos ordered north to south.



Photo 13. View within the riparian corridor showing robust vegetation cover with no matted down or bent individual's indicative of recent flow.



Photo 14. View within the riparian corridor showing full vegetation cover and a lack of OHWM indicators.

Photo Log for the Proposed Crystal Ruby Well Pad and Access Road in Elbert County, Colorado
OHWM Assessment

Photos Taken: July 30, 2021. Photos ordered north to south.



Photo 15. Eastern terrace and a fully vegetated riparian corridor lacking bed and banks.



Photo 16. Up-close photo of upland vegetation within the riparian corridor including prickly pear cactus and smooth brome.

Photo Log for the Proposed Crystal Ruby Well Pad and Access Road in Elbert County, Colorado
OHWM Assessment

Photos Taken: July 30, 2021. Photos ordered north to south.

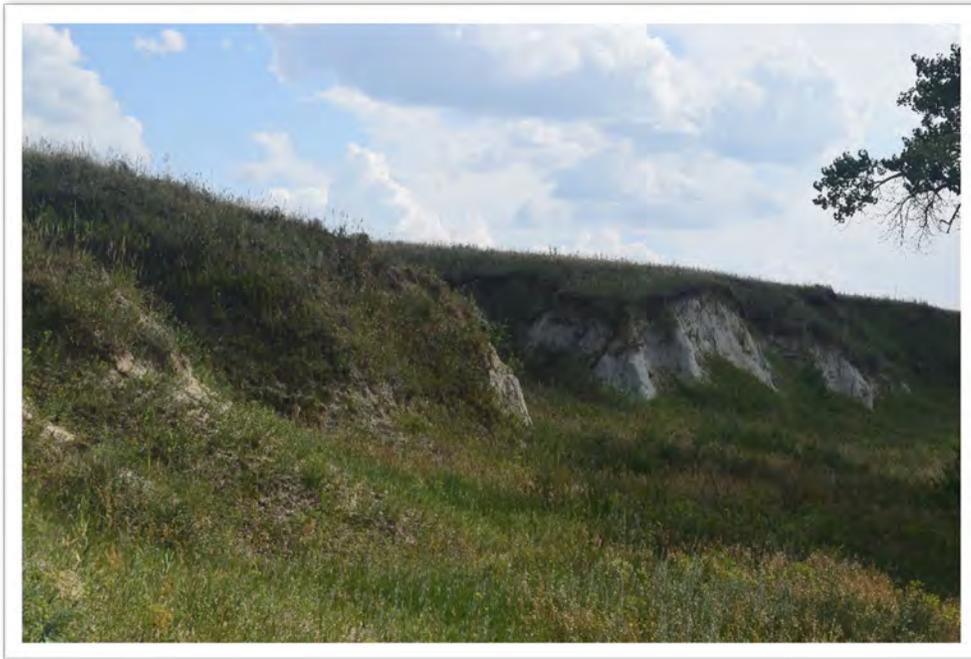


Photo 17. View of fully vegetated terrace with an upland vegetation community extending down into the riparian area.



Photo 18. Alternative view of fully vegetated riparian corridor lacking bed and banks.

Photo Log for the Proposed Crystal Ruby Well Pad and Access Road in Elbert County, Colorado
OHWM Assessment

Photos Taken: July 30, 2021. Photos ordered north to south.



Photo 19. View of southern part of the site facing the County Road construction. Area is fully vegetated and lacking bed and bank characteristics.



Photo 20. Example of one of two bare areas, where cattle likely wallow or contribute to loss of vegetation.