

**CAERUS OIL AND GAS  
PCU A27-197 CDP PAD  
VEGETATION ASSESSMENT**



*Cover Photo: Reference Area.*

**Prepared for:  
Caerus Oil and Gas  
143 Diamond Avenue  
Parachute, CO 81635**

**Prepared by:**  
 **WestWater Engineering**  
2516 FORESIGHT CIRCLE, #1  
GRAND JUNCTION, COLORADO 81505

**January 2023**

## INTRODUCTION

Caerus Oil and Gas (Caerus), requested that WestWater Engineering (WestWater) conduct a vegetation assessment for the PCU A27-197 CDP pad location. Approximately 5.7 acres would be disturbed during initial construction of the pad. The project would be located on surface administered by the Bureau of Land Management (BLM) White River Field Office (WRFO) in Section 27, Township 1 South, Range 97 West.

## PROJECT AREA DESCRIPTION

The proposed PCU A27-197 CDP pad would be located in the valley bottom of Lee Gulch at an elevation of approximately 6,300 feet. The area surrounding the proposed pad location is composed of gently rolling ridges divided by draws and drainages that flow west towards Piceance Creek. There are no prominent topographic features present in the general vicinity. The historical and current land use description at the site (per COGCC descriptions on Form 2A) is Rangeland.

Vegetation within the project area is primarily composed of Basin big sagebrush shrublands intermixed with greasewood with an understory of grass and forb species. Common plants observed in the project area are presented in Table 1.

**Table 1. Common plant species observed during surveys.**

Common Name	Scientific Name	Abundance*	Habitat Type
<b>Grasses</b>			
Cheatgrass	<i>Bromus tectorum</i>	xx	Sagebrush shrublands
Indian ricegrass	<i>Achnatherum hymenoides</i>	x	Sagebrush shrublands
Muttongrass	<i>Poa fendleriana</i>	xx	Sagebrush shrublands
Squirreltail	<i>Elymus elymoides</i>	xx	Sagebrush shrublands
Western wheatgrass	<i>Pascopyrum smithii</i>	xxx	Sagebrush shrublands
<b>Forbs</b>			
Curvseed butterwort	<i>Ceratocephala testiculata</i>	xxx	Sagebrush shrublands
Desert madwort	<i>Alyssum desertorum</i>	xxx	Sagebrush shrublands
Flatspine stickseed	<i>Lappula occidentalis</i>	xxx	Sagebrush shrublands
Plains prickly pear	<i>Opuntia polyacantha</i>	xxx	Sagebrush shrublands
Scarlet gilia	<i>Ipomopsis aggregata</i>	x	Sagebrush shrublands
<b>Shrubs/Trees</b>			
Basin big sagebrush	<i>Artemisia tridentata tridentata</i>	xxx	Sagebrush shrublands

Common Name	Scientific Name	Abundance*	Habitat Type
Broom snakeweed	<i>Gutierrezia sarothrae</i>	x	Sagebrush shrublands
Greasewood	<i>Sarcobatus vermiculatus</i>	xx	Sagebrush shrublands
Prairie sagewort	<i>Artemisia frigida</i>	xx	Sagebrush shrublands, pinyon/juniper
Rubber rabbitbrush	<i>Ericameria nauseosa</i>	xx	Sagebrush shrublands, pinyon/juniper
*Abundance: x = uncommon frequency, xx = moderate frequency, xxx= common frequency			

## VEGETATION ASSESSMENT

### Sampling methods

The vegetation sampling protocol used involves a modified “line point-intercept method” based on the National Park Service Fire Monitoring Handbook (USDI National Park Service 2003) and Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems, Volume 1: Core Methods (Herrick et al 2015). The line point-intercept method uses the contact of a point to measure cover. The theory behind this method is that if an infinite number of points are placed in a two-dimensional area, the exact cover of a plant species can be determined by counting the number of points that intersect that species.

One reference transect was established near the pad in a similar vegetation community. The following techniques were used to collect the sample data:

1. Each sample site was randomly selected within an area representative of the vegetative community being affected by the project.
2. The transect was designated Reference Transect.
3. A metal rebar stake was placed in the ground to anchor a 50-meter measuring tape (0-meters) and the tape extended across the vegetation on the site. A second rebar stake was placed and anchored the 50-meter end of the tape.
4. The beginning and ending point of the transect was recorded using a GPS receiver. Azimuths from the 0-meter to the 50-meter point were recorded.
5. Photographs were taken along the transect that recorded vegetation condition from 0 to 50-meters.
6. Point count data were collected at 1.0-meter intervals along a 50-meter tape measure using a thin, straight metal rod for a total of fifty samples taken along the transect.
7. The first plant species encountered was recorded in the “Top Layer” column. Subsequent species and litter were recorded in the “Lower Canopy Layers” columns. Each species was recorded by 4 letter code (first two letters each of genus and species); unique species were recorded only once per sample point.
8. Ground cover was recorded as a species code (for a basal intercept), rock, bedrock, moss, soil, embedded litter, or duff as defined by the sampling protocol.

9. Other species of vegetation incidentally observed in the sample area were recorded (in addition to those recorded during sampling).

Identification of plant species was aided by using pertinent published field guides (Ackerfield 2015, Whitson et al. 2006, Weber and Wittmann 2012).

## **Results**

Vegetation monitoring was conducted by WestWater scientists on September 21, 2022. Monitoring was conducted late in the growing season; however, species were still able to be identified based on vegetative characteristics present. Percent foliar cover and percent basal cover results from the line-point intercept permanent transect are provided in Table 2, along with the latitude/ longitude locations and magnetic azimuth from 0-meters to 50-meters for the transect. Photographs of the reference area are provided in Appendix A.

**Table 2. Percent Foliar and Basal Cover for Reference Transect**

<b>Transect 1 – Reference Area</b>		
<b>Transect Location (UTM Zone 12, NAD83 datum)</b>		
<b>0-meter terminus: 4424612N, 732942E</b>		
<b>50-meter terminus: 4424572N, 732972E</b>		
<b>Azimuth (true north): 138°</b>		
<b>Group</b>	<b>% Foliar Cover</b>	<b>% Basal Cover</b>
Native Perennial Graminoids	44	2
Introduced Perennial Graminoids	0	0
Native Annual Graminoids	0	0
Introduced Annual Graminoids	14	0
Native Perennial Forbs	0	0
Introduced Perennial Forbs	0	0
Native Annual/Biennial Forbs	10	0
Introduced Annual/Biennial Forbs	2	0
Subshrubs/Shrubs	14	0
Trees	0	0
<b>Total</b>	<b>84</b>	<b>0</b>
<b>Bare ground %</b>	<b>16</b>	

The reference transect is located in basin big sagebrush shrubland plant community composed primarily of basin big sagbrush and greasewood with an understory of cheatgrass, native perennial grass species, and native and non-native forb species. A summary of plant species recorded along the transect and their percent foliar cover along is displayed in Table 3.

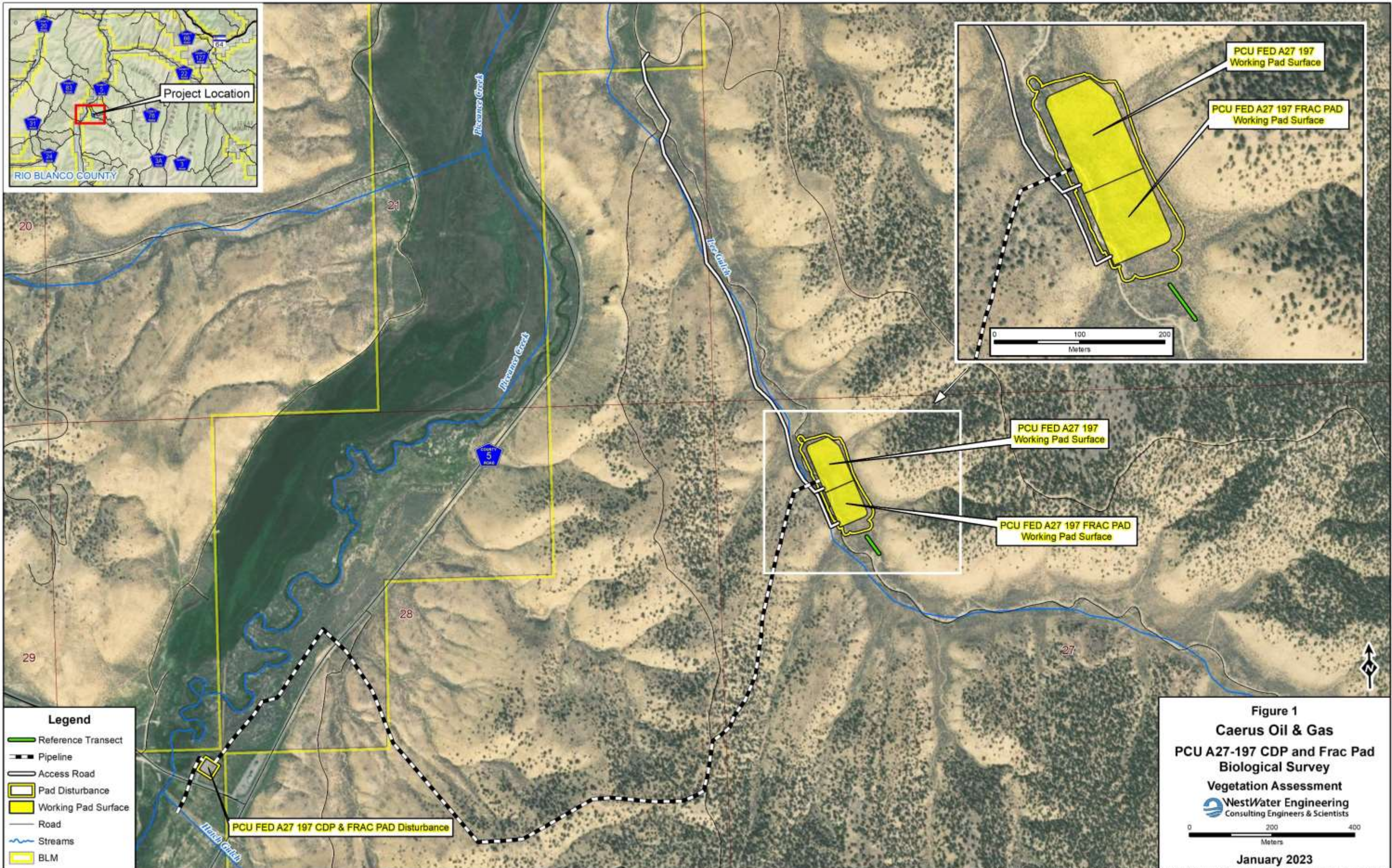
**Table 3. Plant Species Recorded Along Reference Transect**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Percent Foliar Cover</b>
Basin big sagebrush	<i>Artemisia tridentata</i> spp. <i>tridentata</i>	8
Cheatgrass	<i>Bromus tectorum</i>	14
Desert madwort	<i>Desert madwort</i>	2
flatspine stickseed	<i>Lappula occidentalis</i>	6
Indian ricegrass	<i>Achnatherum hymenoides</i>	2
Longflower rabbitbrush	<i>Chrysothamnus depressus</i>	6
Needle and thread	<i>Hesperostipa comata</i>	38
Pinyon goosefoot	<i>Chenopodium atrovirens</i>	4
Slender wheatgrass	<i>Elymus trachycaulus</i>	4
<b>Total</b>		

## REFERENCES

- Ackerfield, J. 2015. Flora of Colorado. Colorado State University Herbarium, Brit Press.
- Herrick, J.E., J.W. Van Zee, S.E. McCord, E.M. Courtright, J.W. Karl, and L.M. Burkett. 2015. Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems, Second Edition, Volume 1: Core Methods. USDA-ARS Jornada Experimental Range, Las Cruces, NM.
- USDI, National Park Service. 2003. Fire Monitoring Handbook. Boise (ID): Fire Management Program Center, National Interagency Fire Center. 274p.
- Weber, W. A., and R. C. Wittman. 2012. Colorado Flora, Western Slope. Fourth Edition. University Press of Colorado, Boulder.
- Whitson, T. D. (editor), L. C. Burrill, S. A. Dewey, D. W. Cudney, B. E. Nelson, R. D. Lee, and Robert Parker. 2006. Weeds of the West, Ninth Edition. Western Society of Weed Science in cooperation with Cooperative Extension Services, University of Wyoming. Laramie.







**APPENDIX A**  
**REFERENCE AREA PHOTOGRAPHS**



East



North



South



West

**PCU A27-197 CDP PAD  
REFERENCE PICTURES**

Date Taken: 9/21/22

Taken By: WestWater Engineering

Reference Area Location: Lat: 39.9396, Long: -108.273635





Overhead

**PCU A27-197 CDP PAD  
REFERENCE PICTURES**

Date Taken: 9/21/22

Taken By: WestWater Engineering

Reference Area Location: Lat: 39.9396, Long: -108.273635