



Draft Barneby Ridge-cress Habitat Evaluation Memorandum

Uinta Basin Railway

Seven County Infrastructure Coalition

July 30, 2020

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Appendix A. Barneby Ridge-cress Potential Habitat Maps

1.0 Introduction

The Seven County Infrastructure Coalition (Coalition), a governmental entity comprising Carbon, Daggett, Duchesne, Emery, San Juan, Sevier, and Uintah Counties, is proposing a new railway that would connect the Uinta Basin's various industries to the national rail network. Currently, the Uinta Basin does not have rail service, and freight needs are met primarily through trucking over a limited highway network. The railway (proposed action) would be constructed and operated under the authority of the U.S. Surface Transportation Board (STB). STB, in conjunction with other regulatory bodies, is preparing an Environmental Impact Statement (EIS) for this railway, which has the potential to cause environmental impacts. STB has identified three railway alternative routes for analysis in the EIS. The Coalition, through its consultant, HDR, is conducting engineering and environmental activities in support of the EIS.

The Endangered Species Act (ESA; 16 United States Code Sections 1531–1544) provides for the conservation of threatened and endangered species and the ecosystems on which they depend. Section 3 of the ESA prohibits the “taking” of any endangered species and defines “taking” broadly to include actions that are not necessarily intended to cause harm to the species (an “incidental taking”).

Section 7 of the ESA requires federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) before taking any action that could affect a federally listed threatened or endangered species or designated critical habitat for an endangered species. In addition, federal agencies must ensure that their actions are not likely to jeopardize the continued existence of any listed species or to destroy or adversely modify any designated critical habitat.

A Biological Assessment (BA) must be prepared whenever a listed or proposed species and its habitat could be affected by the proposed action. The BA should address the anticipated impacts to all listed and proposed species found in the area. The BA is used to determine whether formal consultation or additional meetings with USFWS are necessary. The contents of a BA are discretionary but generally include results of on-site inspections to determine the presence of listed or proposed species and an analysis of the likely effects of the proposed action on the species or habitat based on biological studies, literature review, and expert opinion.

This memorandum describes the methodology for determining potentially suitable habitat for Barneby ridge-cress (*Lepidium barnebyanum*), a federally threatened species, in the study areas of the three alternative railway routes:

- **Indian Canyon**, as defined by a conceptually engineered route dated November 22, 2019;
- **Wells Draw**, as defined by a conceptually engineered route dated November 22, 2019; and
- **Whitmore Park**, as defined by a conceptually engineered route dated February 12, 2020.

The study areas are predominantly 1,000 feet wide and encompass about 500 feet on either side of the proposed centerline. They cross Uintah, Duchesne, Carbon, and Utah Counties. However, in some areas, the study areas are wider where the design team anticipates that a wider earthwork footprint might be needed to accommodate design features.

2.0 Barneby Ridge-crest Biology

2.1 Description

Barneby ridge-crest is a cream-flowered perennial herb in the mustard family. It grows from a deep, woody taproot and has smooth stems with narrow leaves clustering at the base of the plant. Plants are approximately 2 to 6 inches tall and grow in cushion-shaped tufts or clumps that are up to 8 inches wide. Cream-colored flowers bloom in May and alternate along a stem rising 1 to 2.5 inches above the base of the plant (USFWS 1990).

2.2 Status and Trends

Barneby ridge-crest was listed as endangered under the ESA on September 28, 1990 (55 Federal Register 39860). The species is known from one small population in Duchesne County, Utah. This population comprises three separate stands near Indian Canyon approximately 3 miles south and southwest of the town of Duchesne, Utah (USFWS 1990, 2011). One stand is west of Indian Canyon Creek on the north ridge of Skitz Canyon, a tributary to Indian Canyon, on the divide south of the Strawberry River. The second stand is on the ridge east of Indian Canyon Creek approximately 2 miles southeast of the westernmost stand. The third stand is on a ridge approximately 0.5 mile east of the second stand.

Barneby ridge-crest is considered vulnerable to extinction from uncontrolled off-road vehicle use within the species' habitat, from habitat loss through oil and gas development, and due to its low population numbers and limited range (USFWS 1990). A recovery plan for this species was finalized in 1993 (USFWS 1993).

2.3 Habitat

Barneby ridge-crest is endemic to ridge crests of limestone shale derived from Uinta and Green River Formations and is found between 6,200 and 6,500 feet in elevation (USFWS 1990). These shale barrens appear white, like highly weathered concrete, and occur in pockets in pinyon-juniper woodlands dominated by pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*). Barneby ridge-crest grows in close association with other mound-forming species including stemless four-nerve (*Tetrandeum acaulis*), table Townsend daisy (*Townsendia mensana*), Hooker's sandwort (*Arenaria hookeri*), and Colorado feverfew (*Parthenium ligulatum*) (USFWS 1990, 2011). Other associated species include Bateman's buckwheat (*Eriogonum batemanii*), tufted milkvetch (*Astragalus spatulatus*), and rough Indian paintbrush (*Castilleja scabrida*).

2.4 Life History

Barneby ridge-crest blooms in early May, and seeds are shed in June and July. Seeds are small, about 1 millimeter (0.04 inch) across, and born in seed pods called silicles that are about 4 to 5 millimeters (0.16 to 0.20 inch) long (USFWS 1990). Little is known about specific pollinators or the long-term population dynamics of the species (USFWS 1993).

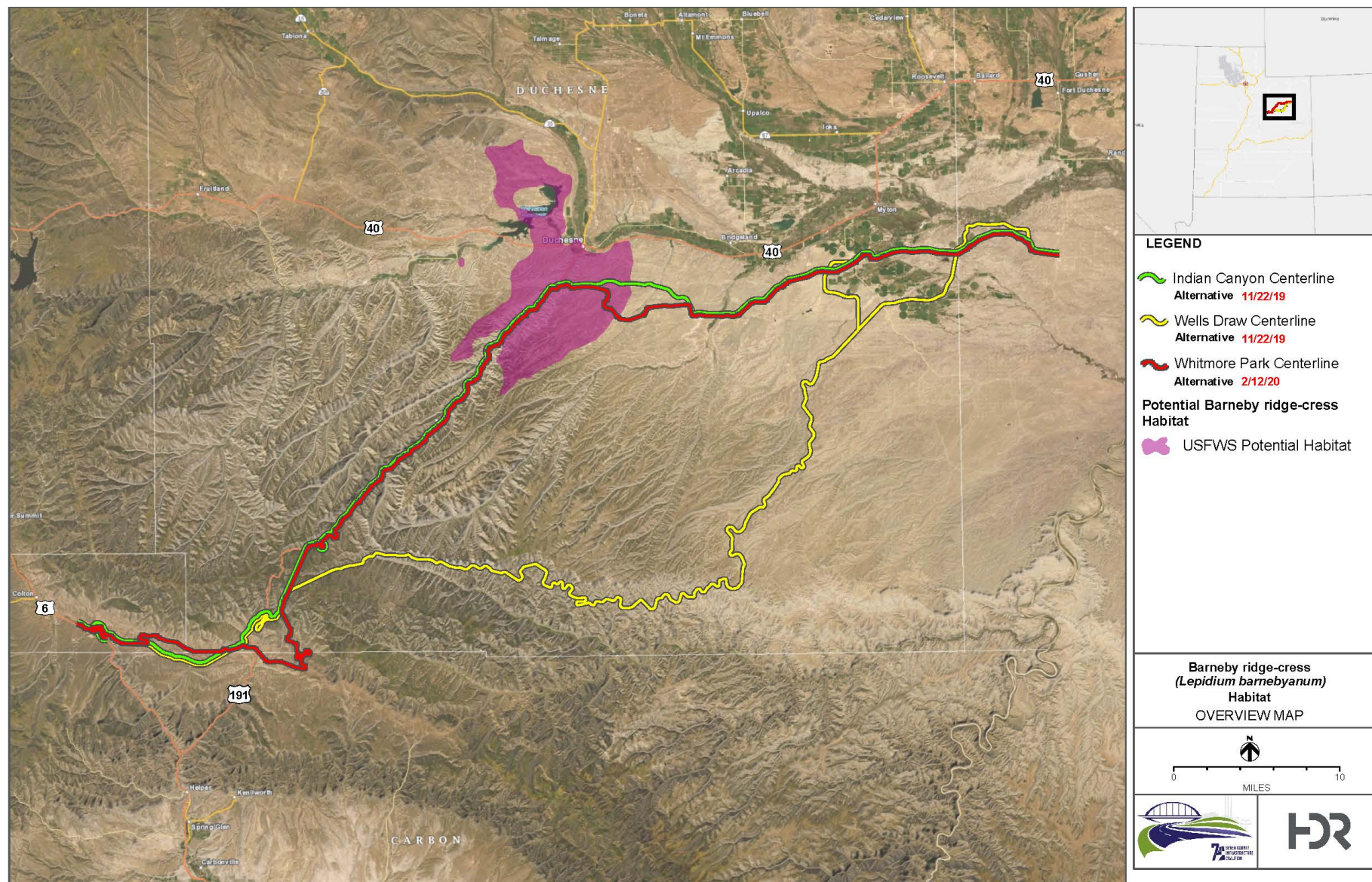
3.0 Methodology

USFWS provided a polygon in geographic information systems (GIS) format that shows potential habitat for Barneby ridge-crest (Moore 2019). To identify suitable habitat in the study areas, HDR used GIS software to confirm where this potential habitat polygon overlap the three alternative study areas. Figure 1 provides an overview map of the three alternatives and the USFWS potential habitat polygon. Once this overlapping area was defined, high-quality aerial images (collected by AeroGraphics from June to October 2019) were used to identify sites that appeared white, thus representing the white limestone shale habitat preferred by Barneby ridge-crest (see Section 2.3, Habitat).

HDR prepared tablets equipped with the ESRI data-collection application Collector for use in both field navigation and data entry. The Collector application included data layers for aerial images, study area boundaries, the USFWS potential habitat polygon, and the refined white areas identified on desktop computers. HDR biologists then visually inspected sites both within the USFWS potential habitat polygon as well as areas determined to be white through aerial images to confirm whether sites displayed characteristics consistent with the description of Barneby ridge-crest habitat in Section 2.3, Habitat.

Field evaluation was conducted on July 17, 2020. Following the field evaluation, HDR biologists used the field data to further refine and digitize areas of potentially suitable habitat in the study areas.

Figure 1. Overview Map of Alternative Routes and the USFWS Barneby Ridge-cross Potential Habitat Polygon



4.0 Results

Field evaluations confirmed that areas identified as white on aerial images were also white on the ground and displayed the habitat characteristics described in Section 2.3, Habitat. These white areas were located in pinyon-juniper woodlands and included mound-forming species. Figure 2 provides a photo of one such location. However, HDR biologists also confirmed that areas adjacent to these white sites were also located in pinyon-juniper habitat and also included other mound-forming species, although the mound-forming species occurred at a higher density in the white shale locations.

Figure 3 provides a photo of potential Barneby ridge-cross habitat in a general pinyon-juniper woodland setting. In addition, areas adjacent to the white sites varied in light-brown colors and could be interpreted to resemble weathered concrete. For this reason, potentially suitable habitat is presented in two categories: general pinyon-juniper habitat and white shale habitat.

- **General pinyon-juniper habitat** includes pinyon-juniper woodlands where the USFWS potential habitat polygon overlaps the three alternative study areas.
- **White shale habitat** is a subset of the general pinyon-juniper habitat and includes sites that appeared white on aerial images where the USFWS potential habitat polygon overlaps the three alternative study areas.

Figure 2. Potential Barneby Ridge-cross Habitat on White Shale



Figure 3. Potential Barneby Ridge-cross Habitat in General Pinyon-juniper Woodland



HDR biologists identified approximately 288.61 acres of general pinyon-juniper habitat and 36.19 acres of white shale habitat in the Indian Canyon study area, and 389.51 acres of general pinyon-juniper habitat and 50.8 acres of white shale habitat in the Whitmore Park study area. The USFWS potential habitat polygon does not overlap the Wells Draw study area. Table 1 summarizes the acreage of potential habitat by land ownership and study area, and Appendix A shows the distribution of the potentially suitable Barneby ridge-cross habitat identified in the Indian Canyon and Whitmore Park study areas. Pinyon-juniper habitat acreage includes white shale habitat acreage and represents the most conservative (highest-acreage) estimate of habitat acreage.

Table 1. Acreage by Land Ownership for Barneby Ridge-crest Potential Habitat

Property Ownership	Indian Canyon Study Area		Wells Draw Study Area		Whitmore Park Study Area	
	Pinyon-juniper Habitat ^a	White Shale Habitat	Pinyon-juniper Habitat ^a	White Shale Habitat	Pinyon-juniper Habitat ^a	White Shale Habitat
Private	194.12	21.88	0	0	295.46	36.44
Tribal	94.49	14.31	0	0	94.05	14.36
Bureau of Land Management	0	0	0	0	0	0
U.S. Department of Agriculture Forest Service	0	0	0	0	0	0
Utah Department of Transportation	0	0	0	0	0	0
Utah School and Institutional Trust Lands Administration	0	0	0	0	0	0
Total acreage	288.61	36.19	0	0	389.51	50.8

^a Pinyon-juniper habitat acreage includes white shale habitat acreage.

5.0 References

Moore, Joseph

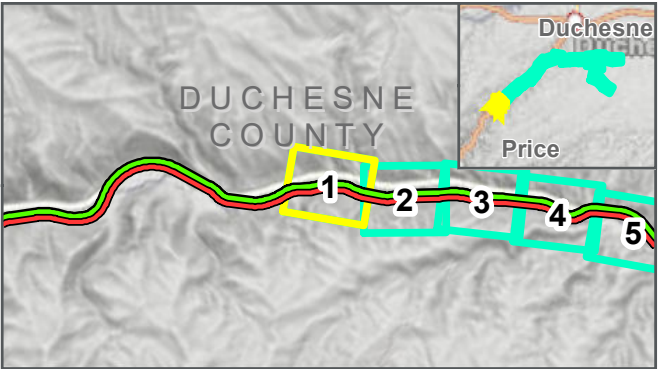
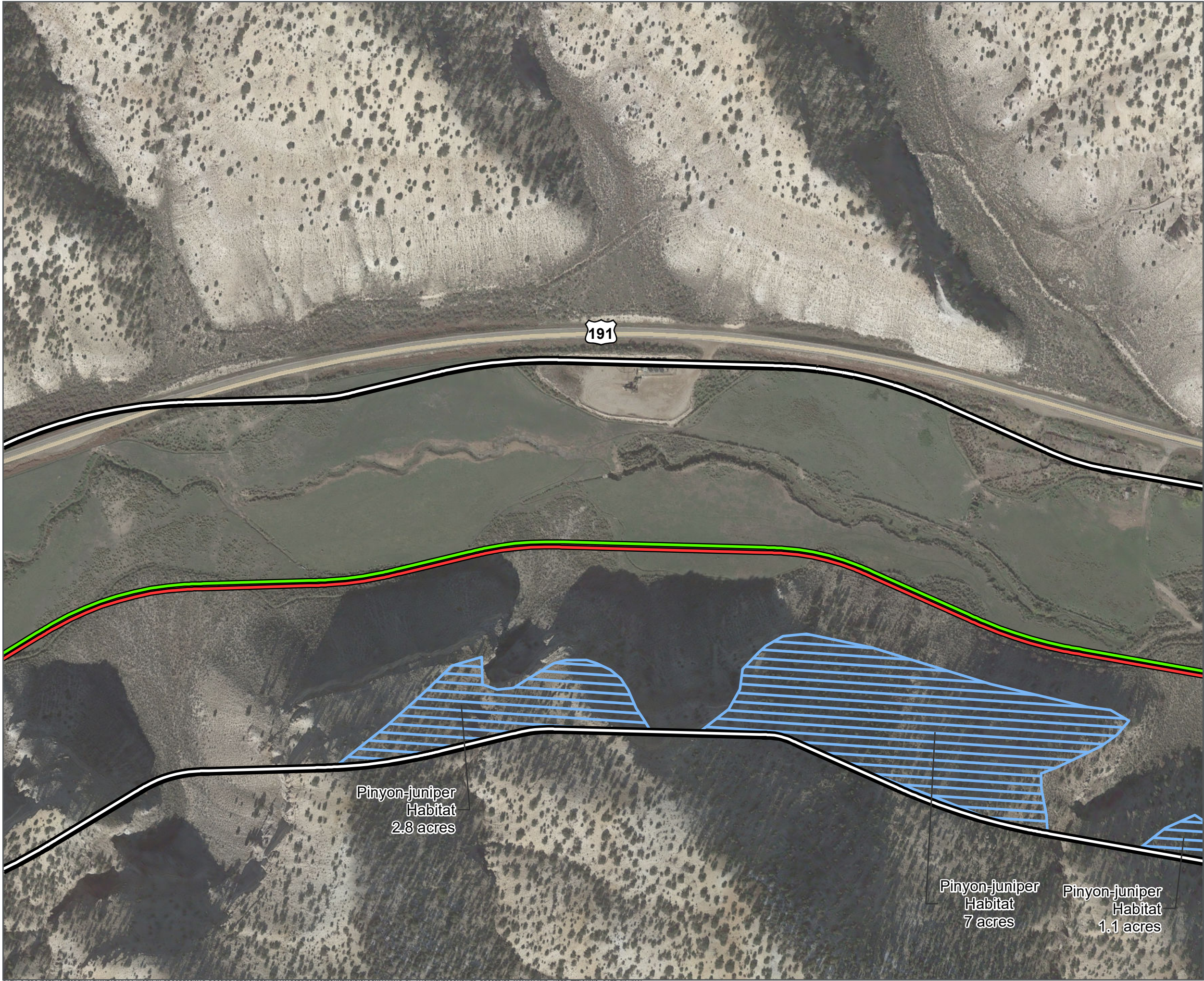
- 2019 Email from Joseph Moore of USFWS to Amy Croft, Michael Perkins, Kevin Keller, and Karen Nichols of HDR regarding ESA species for the Uinta Basin Railway Project. September 10.

[USFWS] U.S. Fish and Wildlife Service

- 1990 Endangered and Threatened Wildlife and Plants; Endangered Status for the Plant *Lepidium barnebyanum* (Barneby Ridge-crest). Federal Register 55(189): 39860–39864.
- 1993 Barneby Ridge-crest Recovery Plan. USFWS Region 6.
- 2011 *Lepidium barnebyanum* (Barneby Ridge-crest) 5-year Review: Summary and Evaluation. USFWS, Utah Field Office.

APPENDIX A

Barneby Ridge-cross Potential Habitat Maps



LEGEND

- Map Extent (current view in yellow)
- Study Area
- Indian Canyon Centerline
- Whitmore Park Centerline

Barneby Ridge-cress Potential Habitat

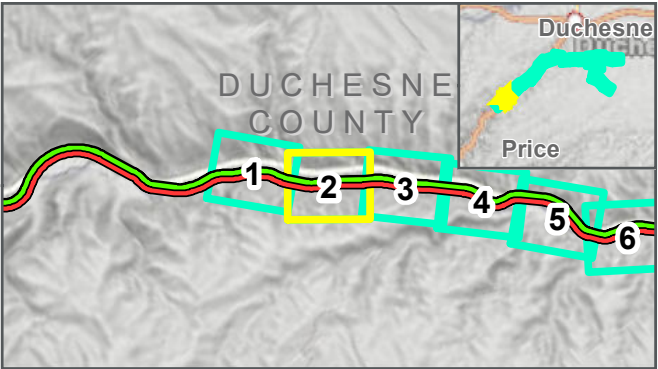
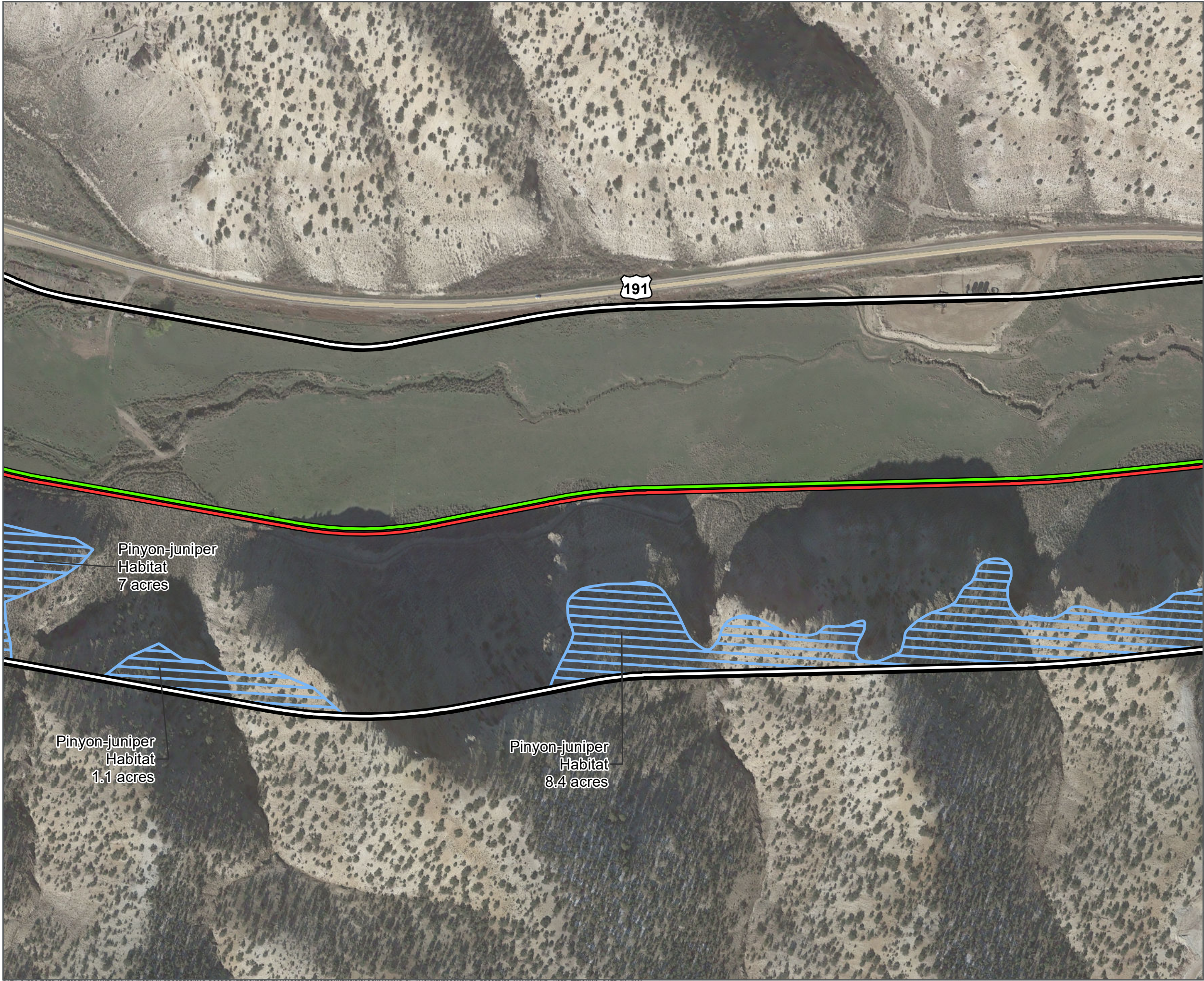
- Pinyon-juniper Potential Habitat
- White Shale Potential Habitat

Barneby Ridge-cress (*Lepidium barnebyanum*) Habitat
MAP SERIES

0 125 250 Feet
1 inch = 250 Feet

DATA SOURCES:
SWReGAP Landcover
Utah Google Imagery
Basemap (2013-2015)
COORDINATE SYSTEM:
Utah State Plane

Page:1 of 23



LEGEND

- Map Extent (current view in yellow)
- Study Area
- Indian Canyon Centerline
- Whitmore Park Centerline

Barneby Ridge-cress Potential Habitat

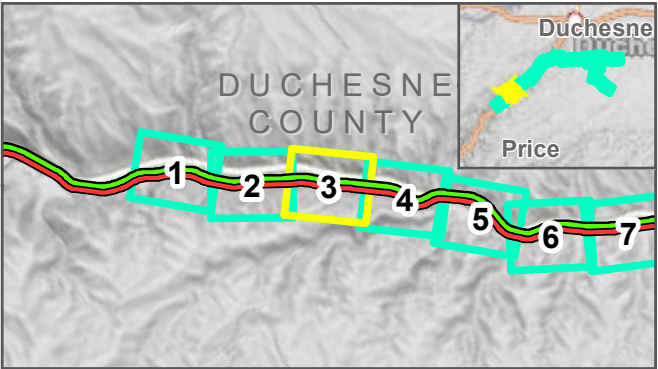
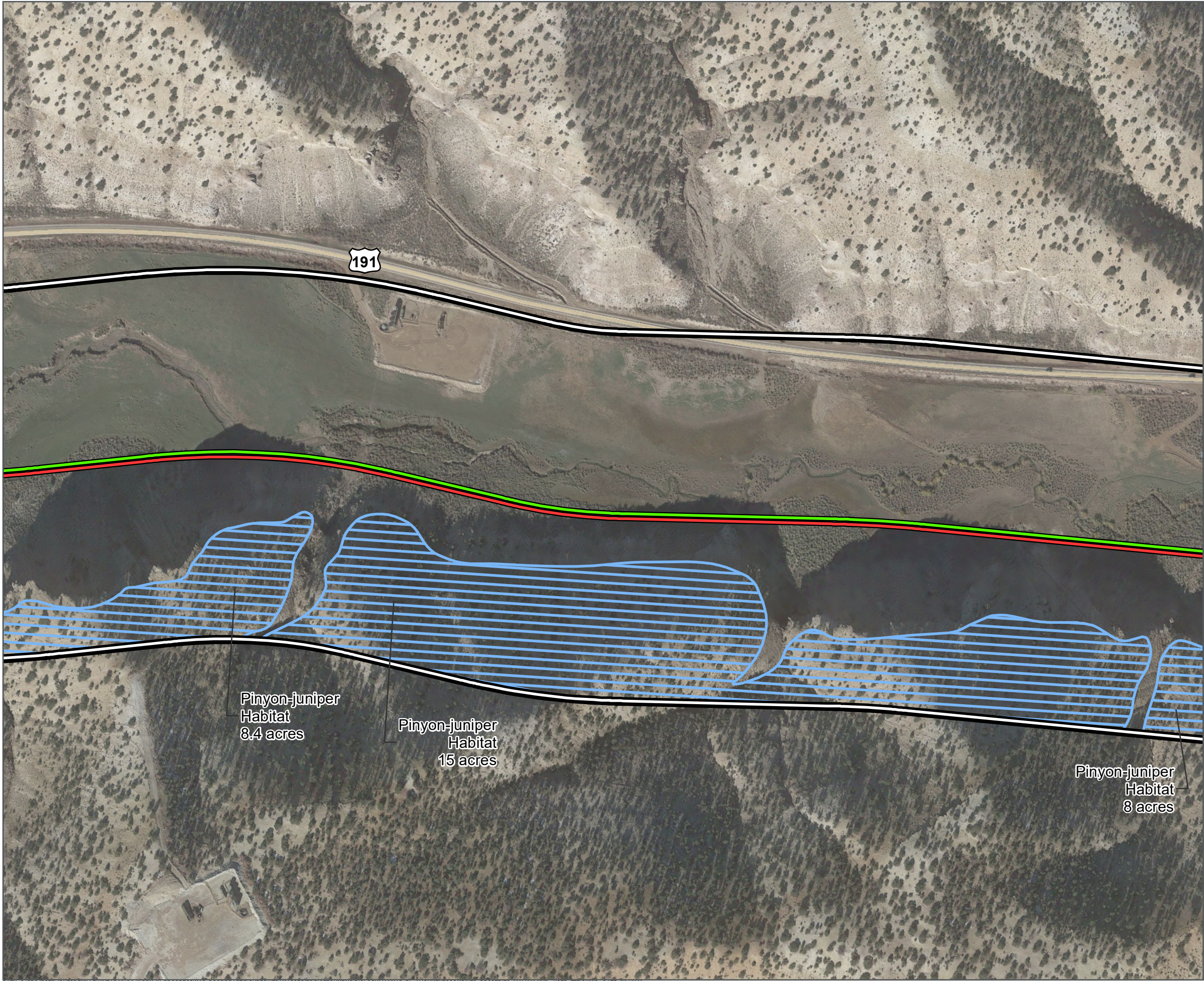
- Pinyon-juniper Potential Habitat
- White Shale Potential Habitat

Barneby Ridge-cress (*Lepidium barnebyanum*) Habitat
MAP SERIES

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DATA SOURCES:
SWReGAP Landcover
Utah Google Imagery
Basemap (2013-2015)
COORDINATE SYSTEM:
Utah State Plane

Page:2 of 23



LEGEND

- Map Extent (current view in yellow)
- Study Area
- Indian Canyon Centerline
- Whitmore Park Centerline

Barneby Ridge-cress Potential Habitat

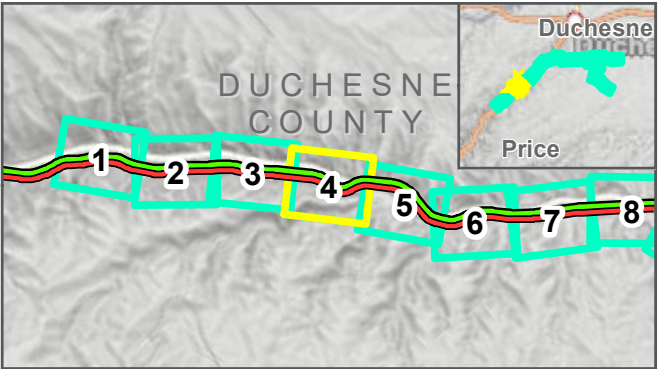
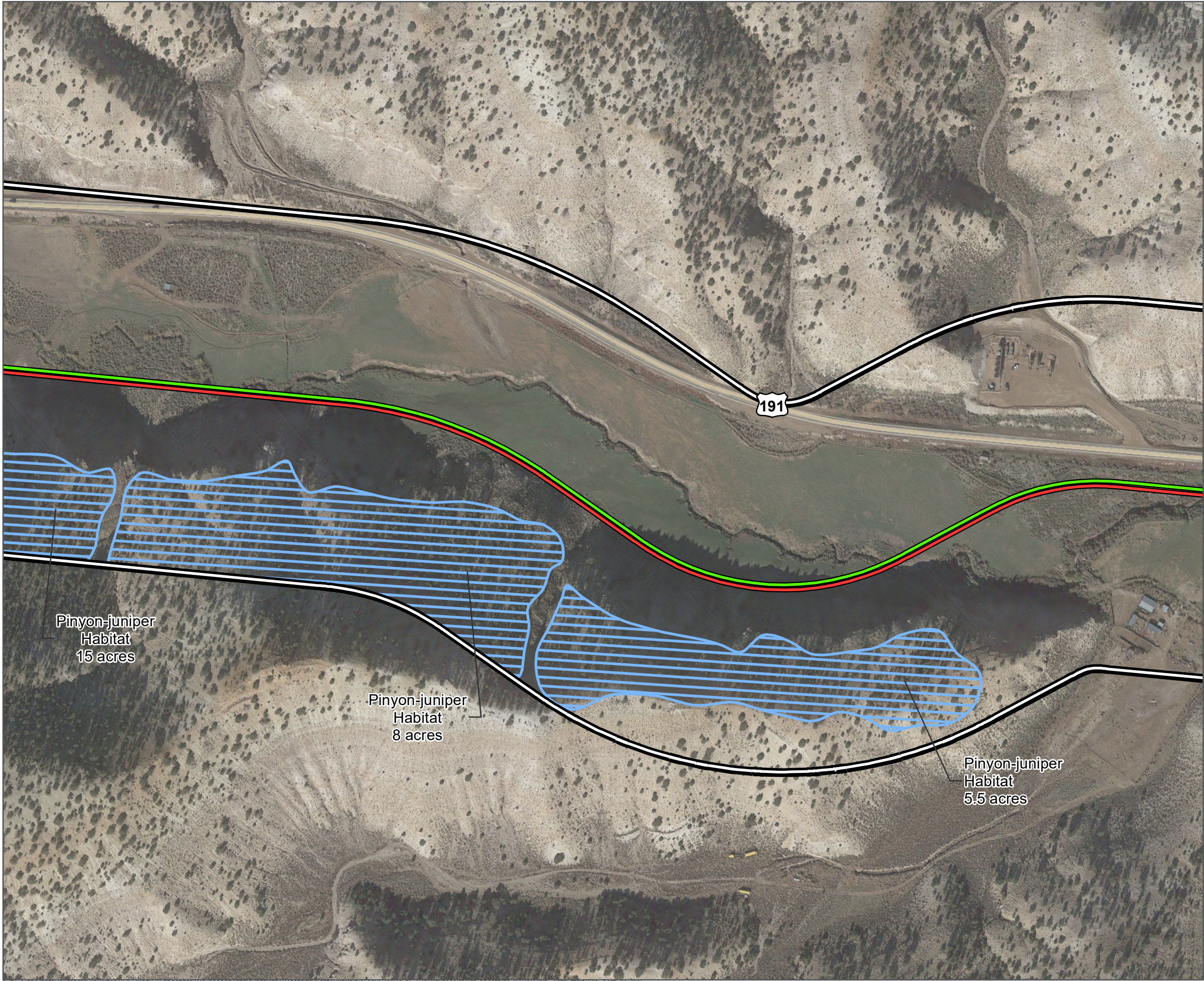
- Pinyon-juniper Potential Habitat
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Barneby Ridge-cress (*Lepidium barnebyanum*) Habitat
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DATA SOURCES:
SWReGAP Landcover
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LEGEND

- Map Extent (current view in yellow)
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- Indian Canyon Centerline
- Whitmore Park Centerline

Barneby Ridge-cress Potential Habitat

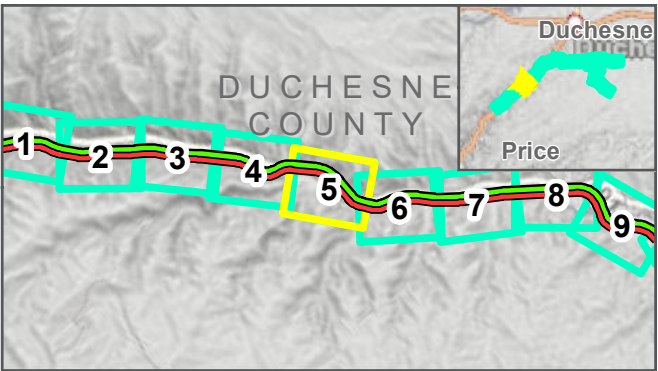
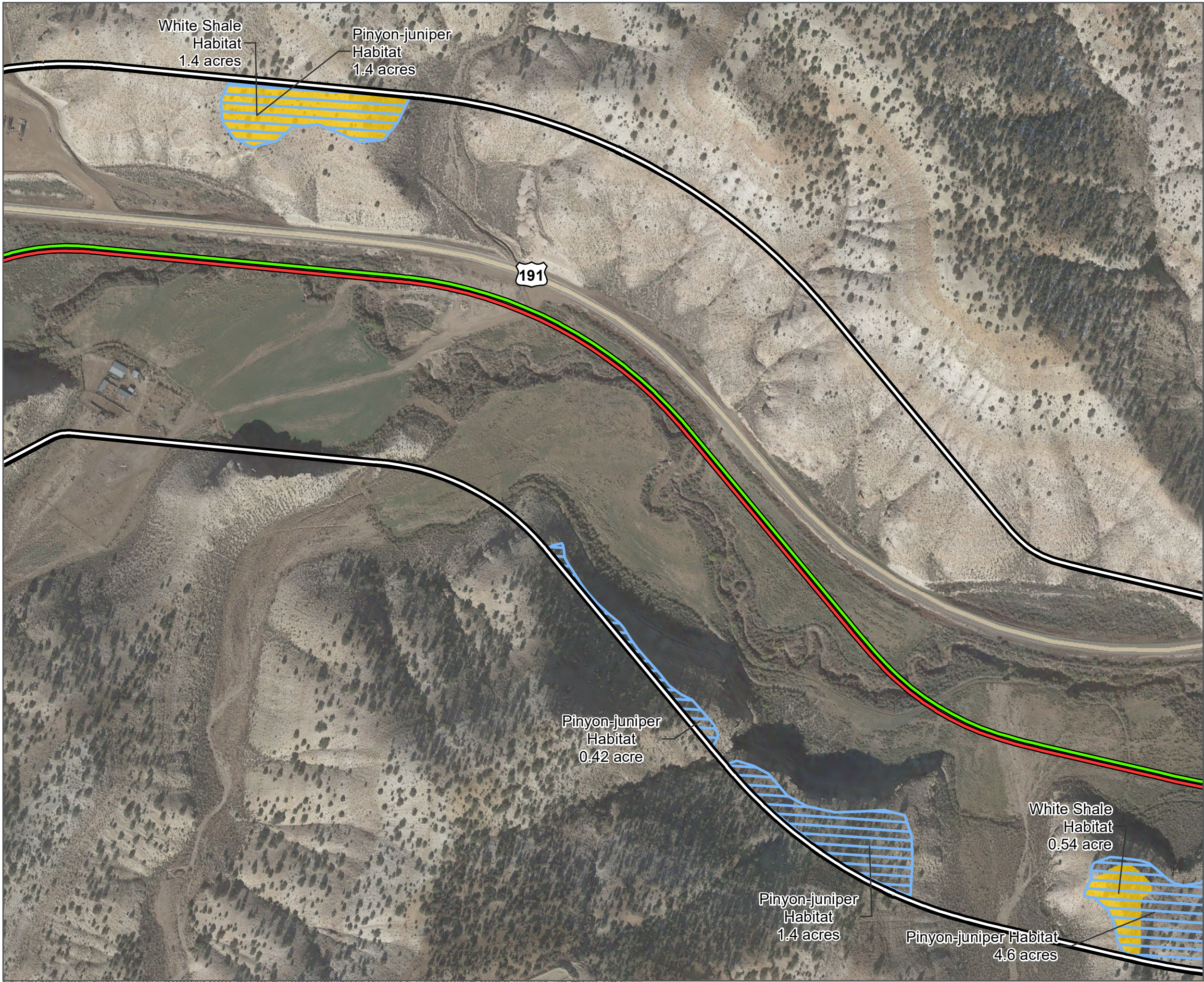
- Pinyon-juniper Potential Habitat
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Barneby Ridge-cress (*Lepidium barnebyanum*) Habitat
MAP SERIES

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DATA SOURCES:
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COORDINATE SYSTEM:
Utah State Plane

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LEGEND

- Map Extent (current view in yellow)
- Study Area
- Indian Canyon Centerline
- Whitmore Park Centerline



Barneby Ridge-cress Potential Habitat

- Pinyon-juniper Potential Habitat
- White Shale Potential Habitat

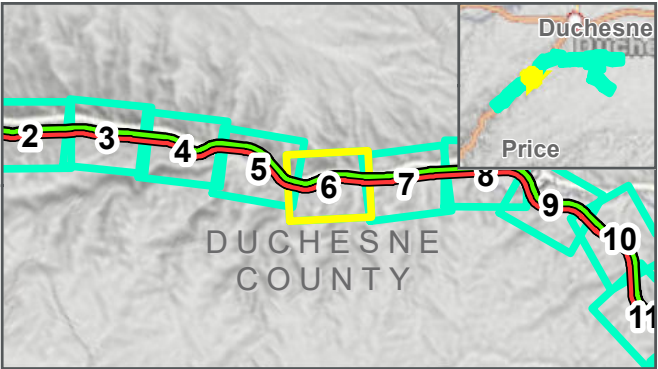
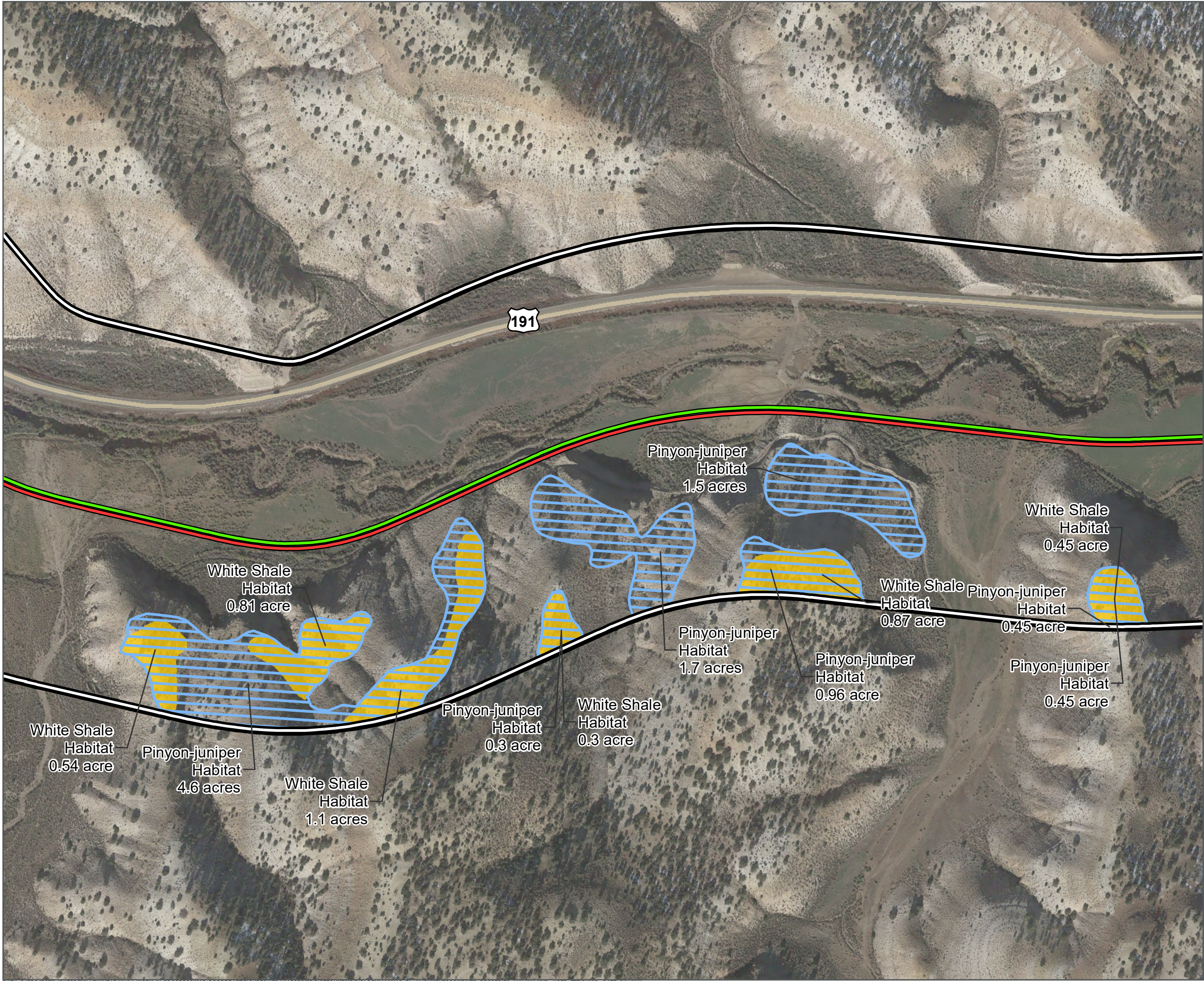
Barneby Ridge-cress (*Lepidium barnebyanum*) Habitat
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DATA SOURCES:
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Utah Google Imagery
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Utah State Plane

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LEGEND

- Map Extent (current view in yellow)
- Study Area
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- Whitmore Park Centerline

Barneby Ridge-cress Potential Habitat

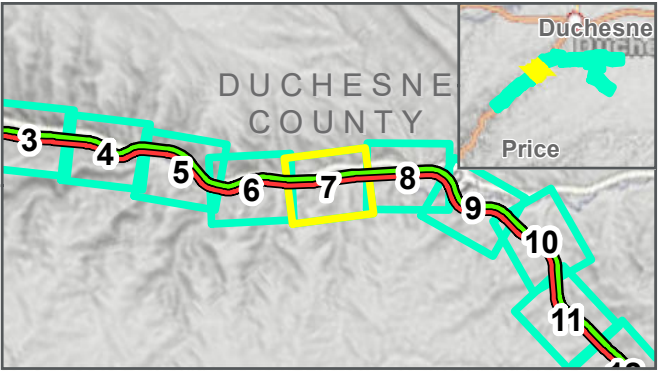
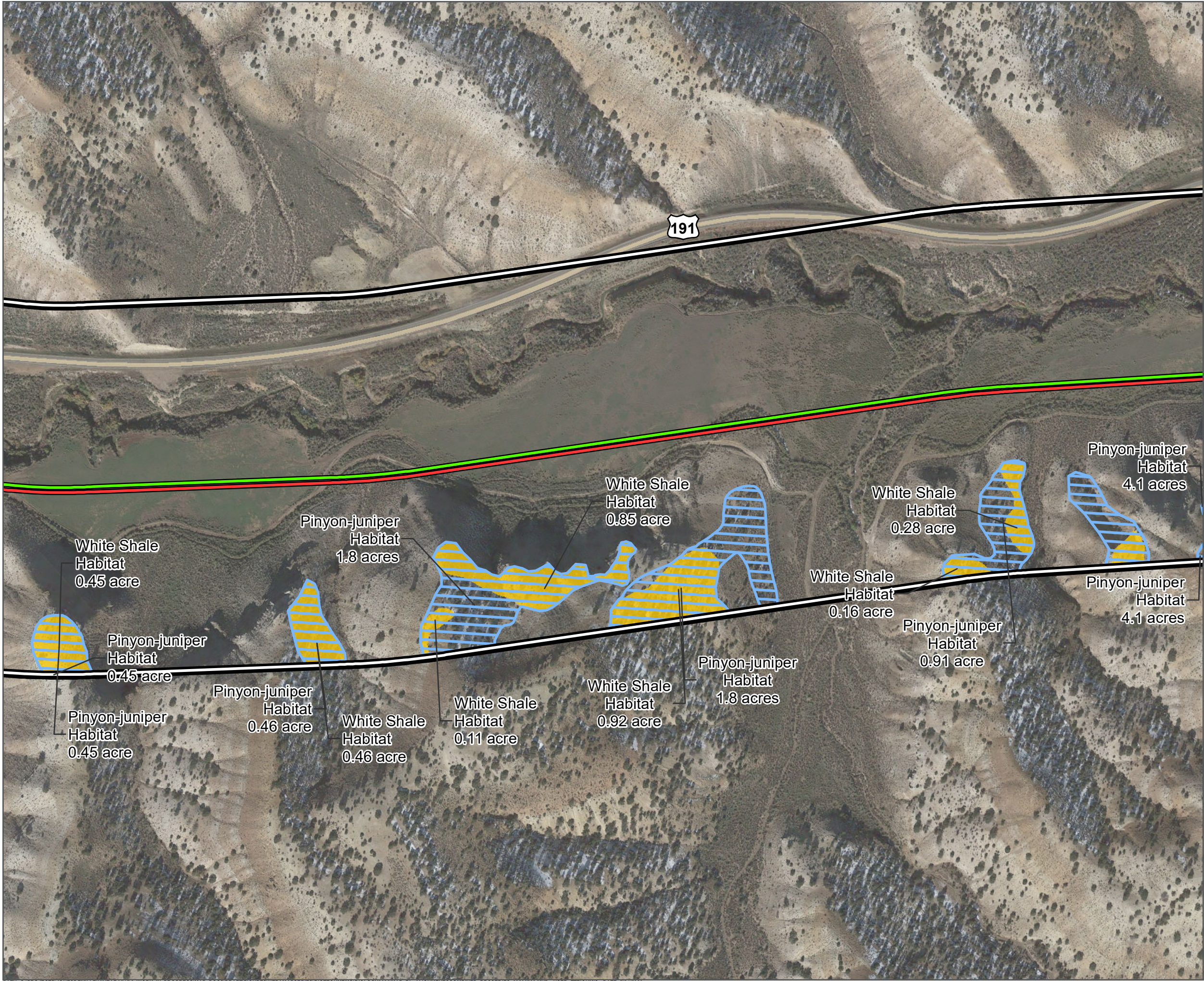
- Pinyon-juniper Potential Habitat
- White Shale Potential Habitat

Barneby Ridge-cress (*Lepidium barnebyanum*) Habitat
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DATA SOURCES:
SWReGAP Landcover
Utah Google Imagery
Basemap (2013-2015)
COORDINATE SYSTEM:
Utah State Plane

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LEGEND

- Map Extent (current view in yellow)
- Study Area
- Indian Canyon Centerline
- Whitmore Park Centerline

Barneby Ridge-cross Potential Habitat

- Pinyon-juniper Potential Habitat
- White Shale Potential Habitat



Barneby Ridge-cross (*Lepidium barnebyanum*) Habitat

MAP SERIES

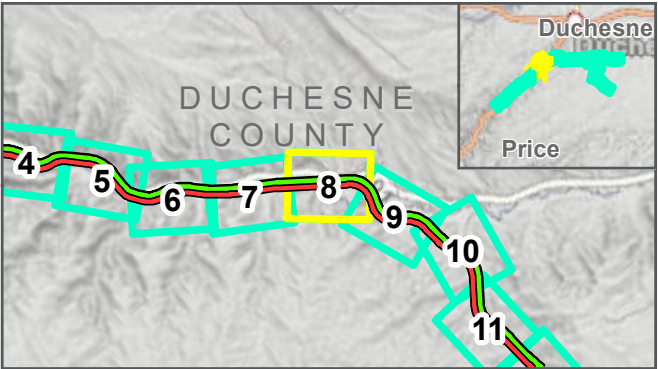
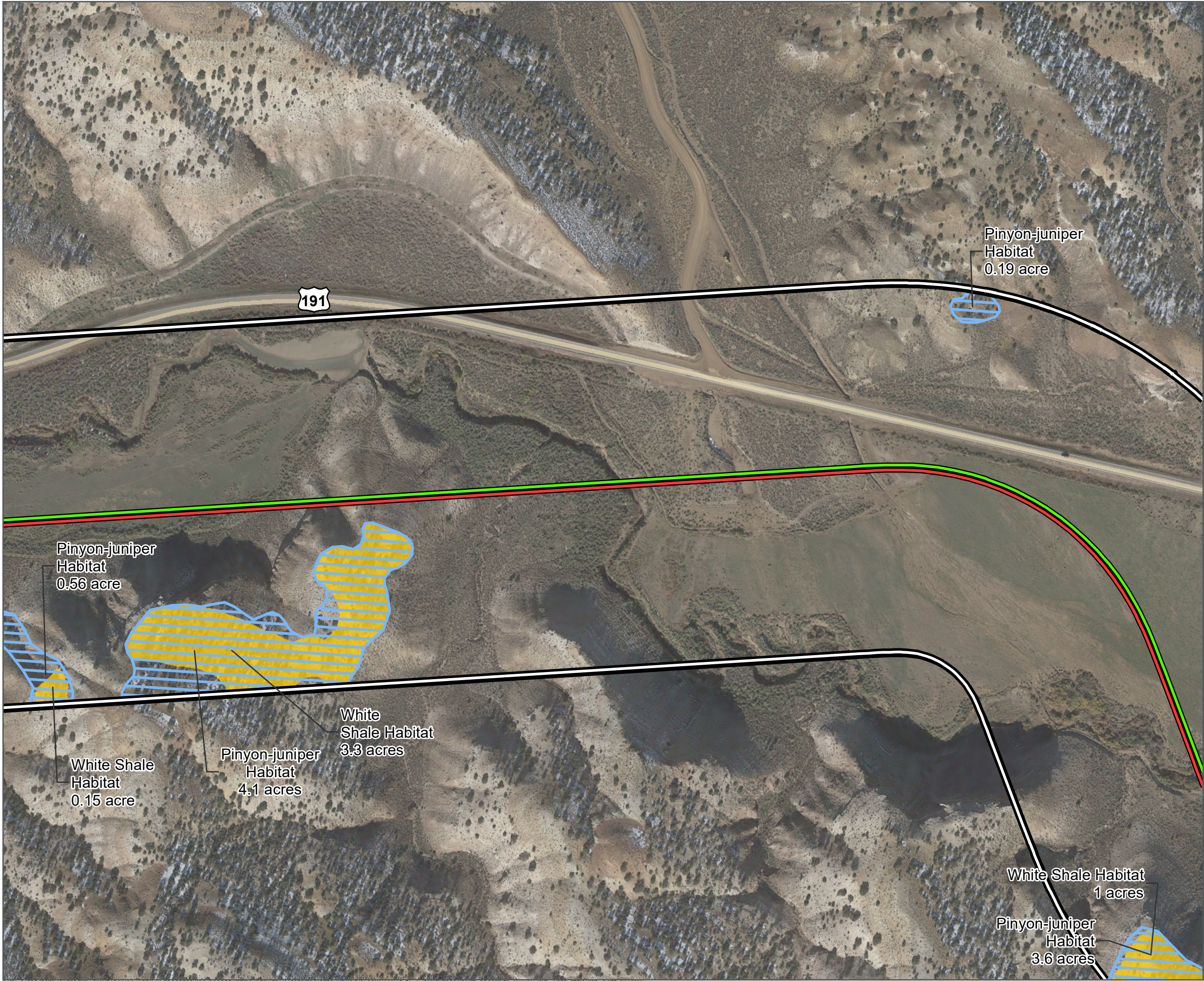
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LEGEND

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- Whitmore Park Centerline

Barneby Ridge-cress Potential Habitat

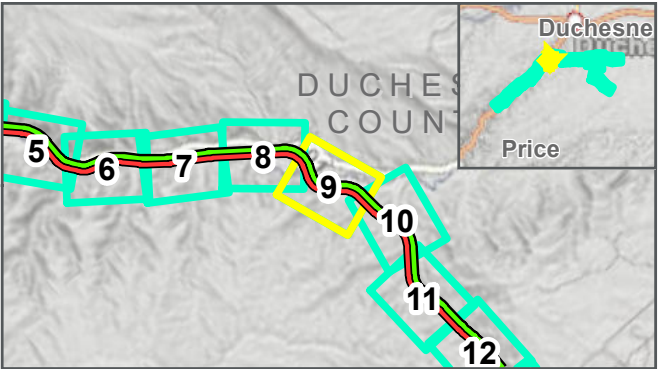
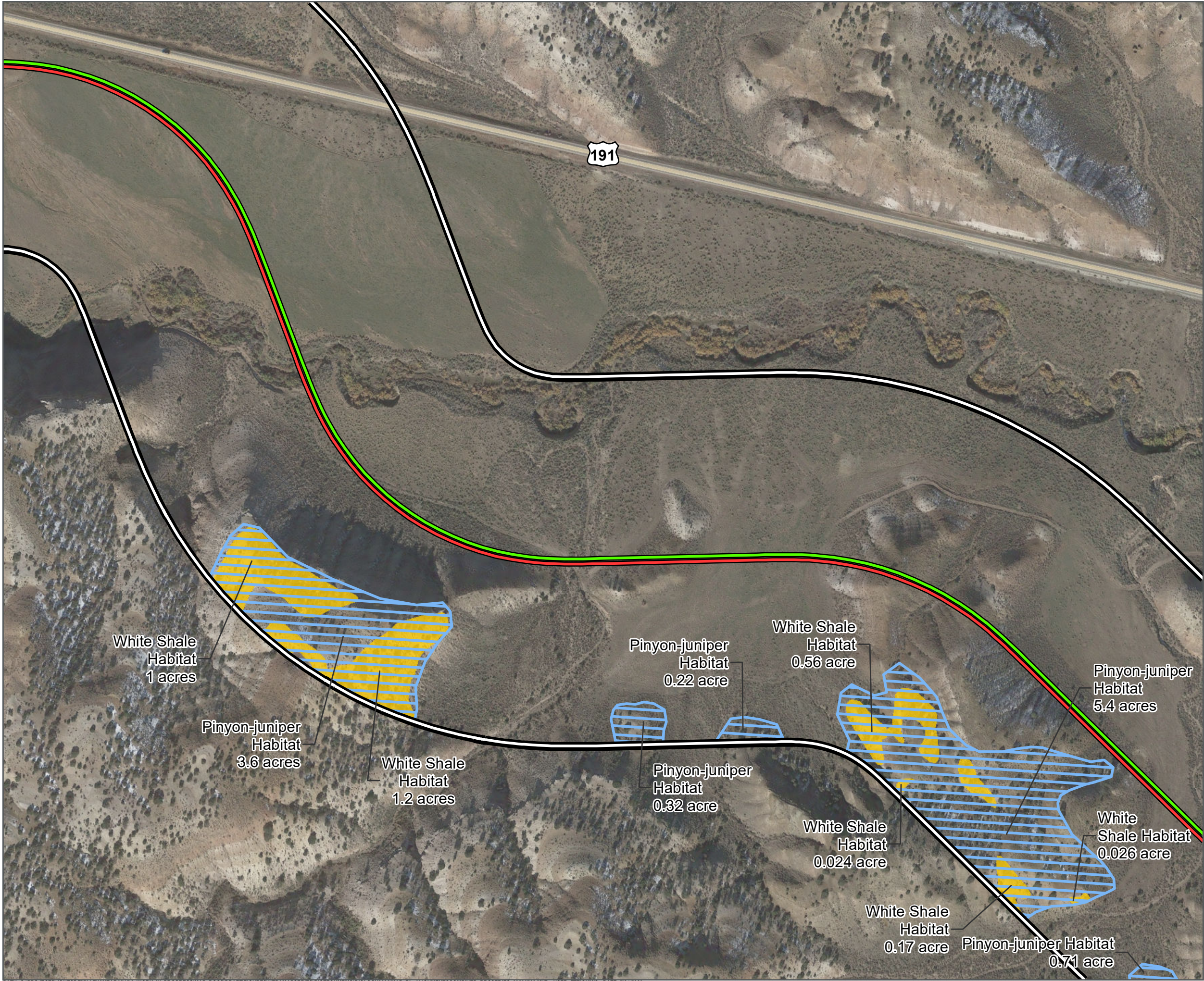
- Pinyon-juniper Potential Habitat
- White Shale Potential Habitat

Barneby Ridge-cress (*Lepidium barnebyanum*) Habitat
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Utah Google Imagery
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COORDINATE SYSTEM:
Utah State Plane

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LEGEND

- Map Extent (current view in yellow)
- Study Area
- Indian Canyon Centerline
- Whitmore Park Centerline

Barneby Ridge-cress Potential Habitat

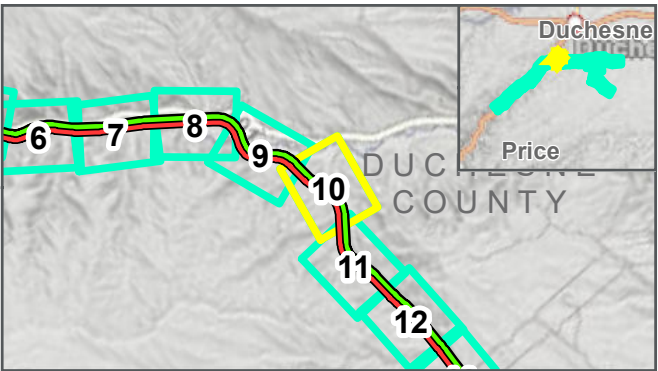
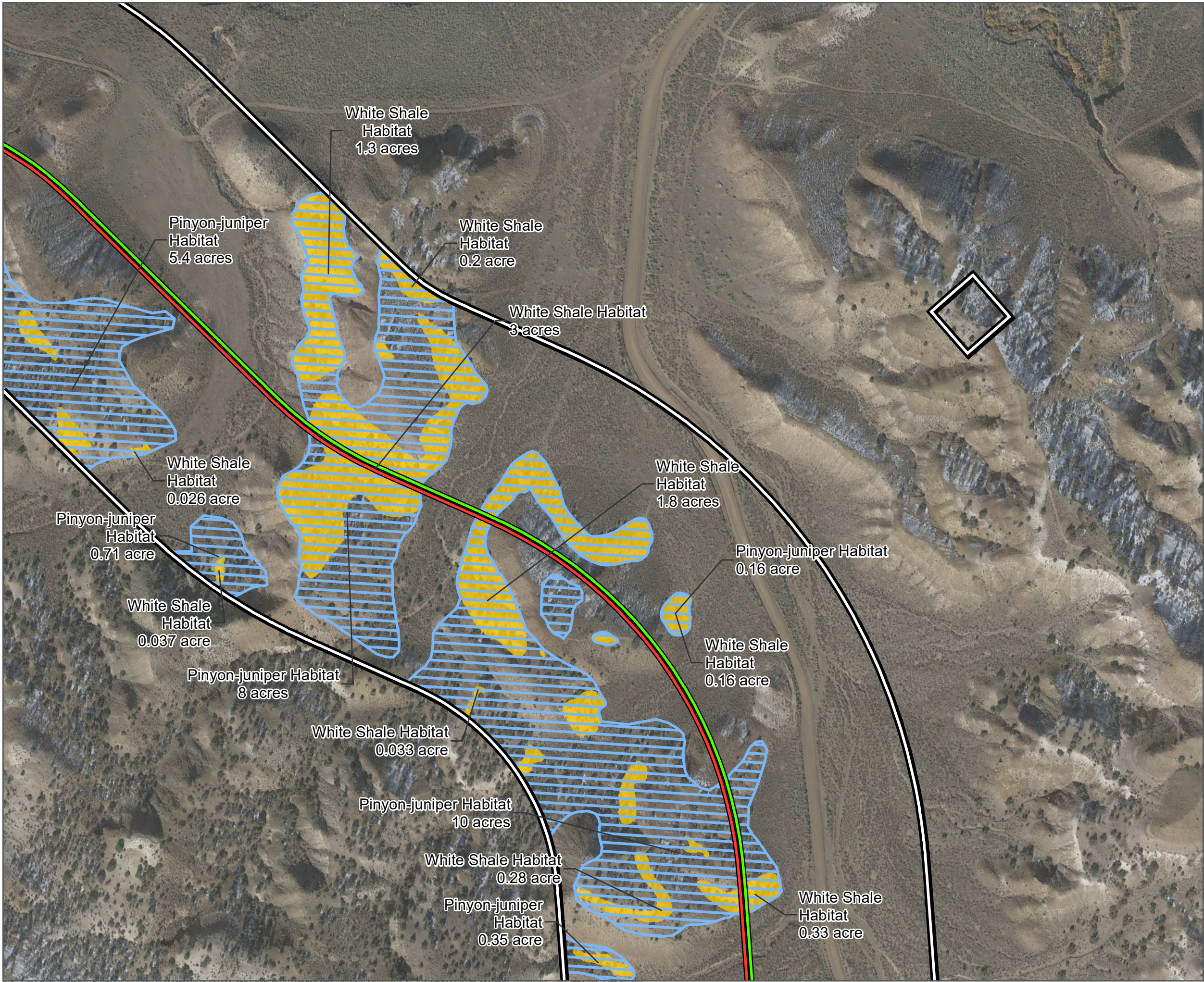
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Barneby Ridge-cress (*Lepidium barnebyanum*) Habitat
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COORDINATE SYSTEM:
Utah State Plane

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- LEGEND
- Map Extent (current view in yellow)
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 - Whitmore Park Centerline



Barneby Ridge-cress Potential Habitat

- Pinyon-juniper Potential Habitat
- White Shale Potential Habitat

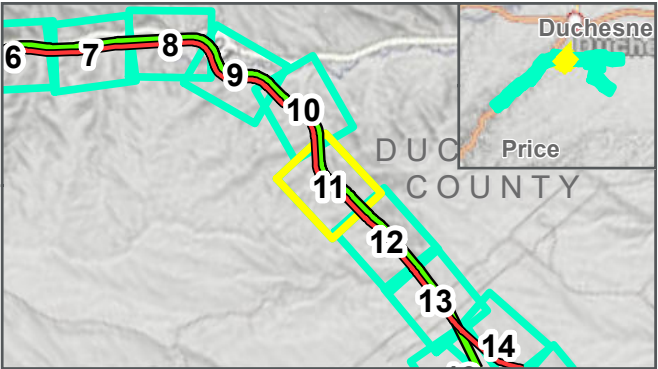
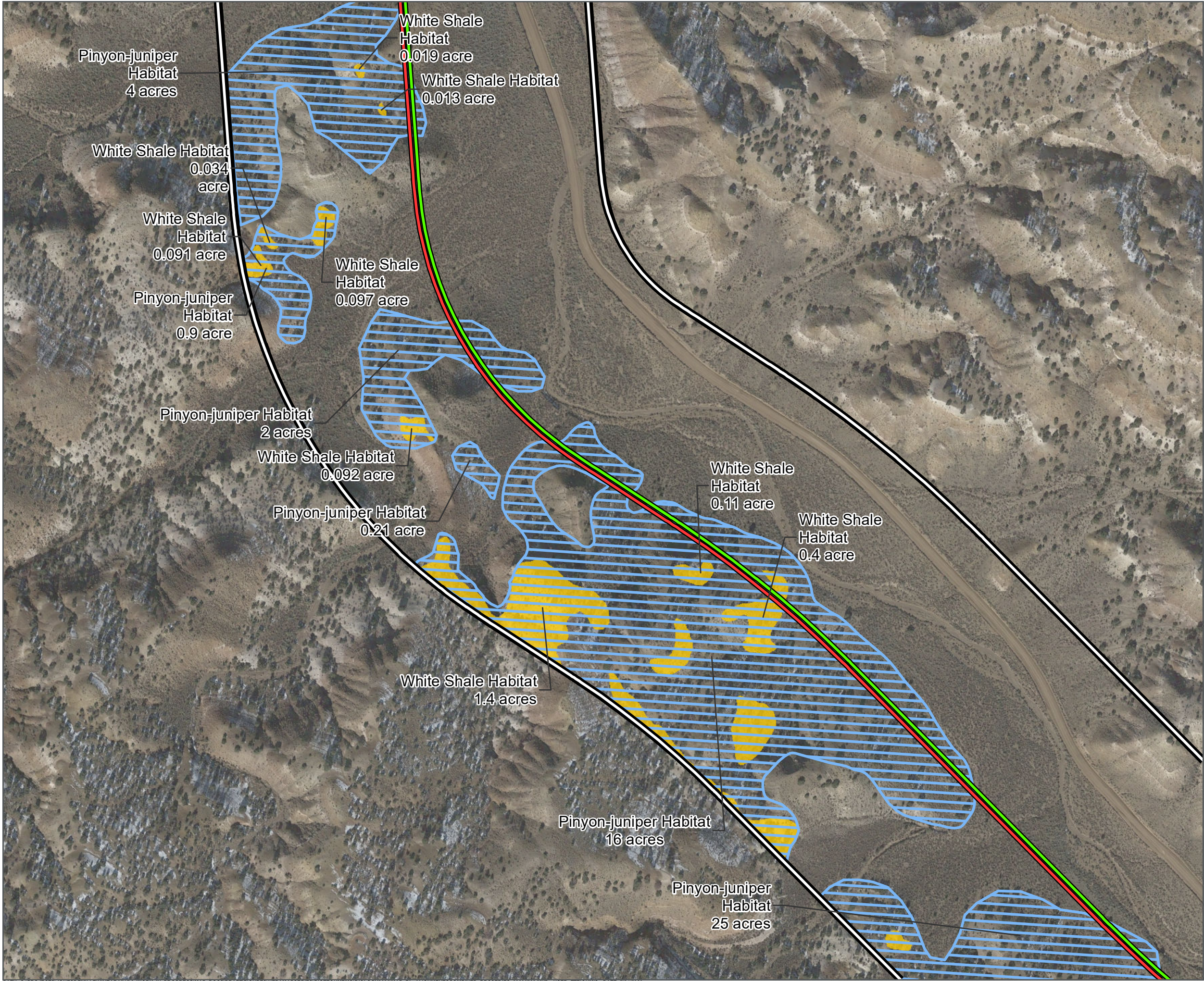
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Utah State Plane

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Barneby Ridge-cress Potential Habitat

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- White Shale Potential Habitat

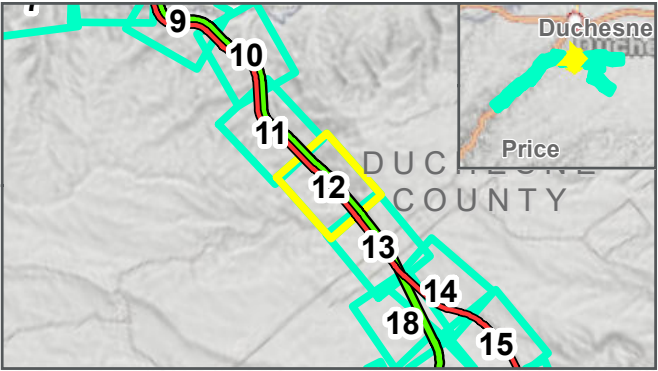
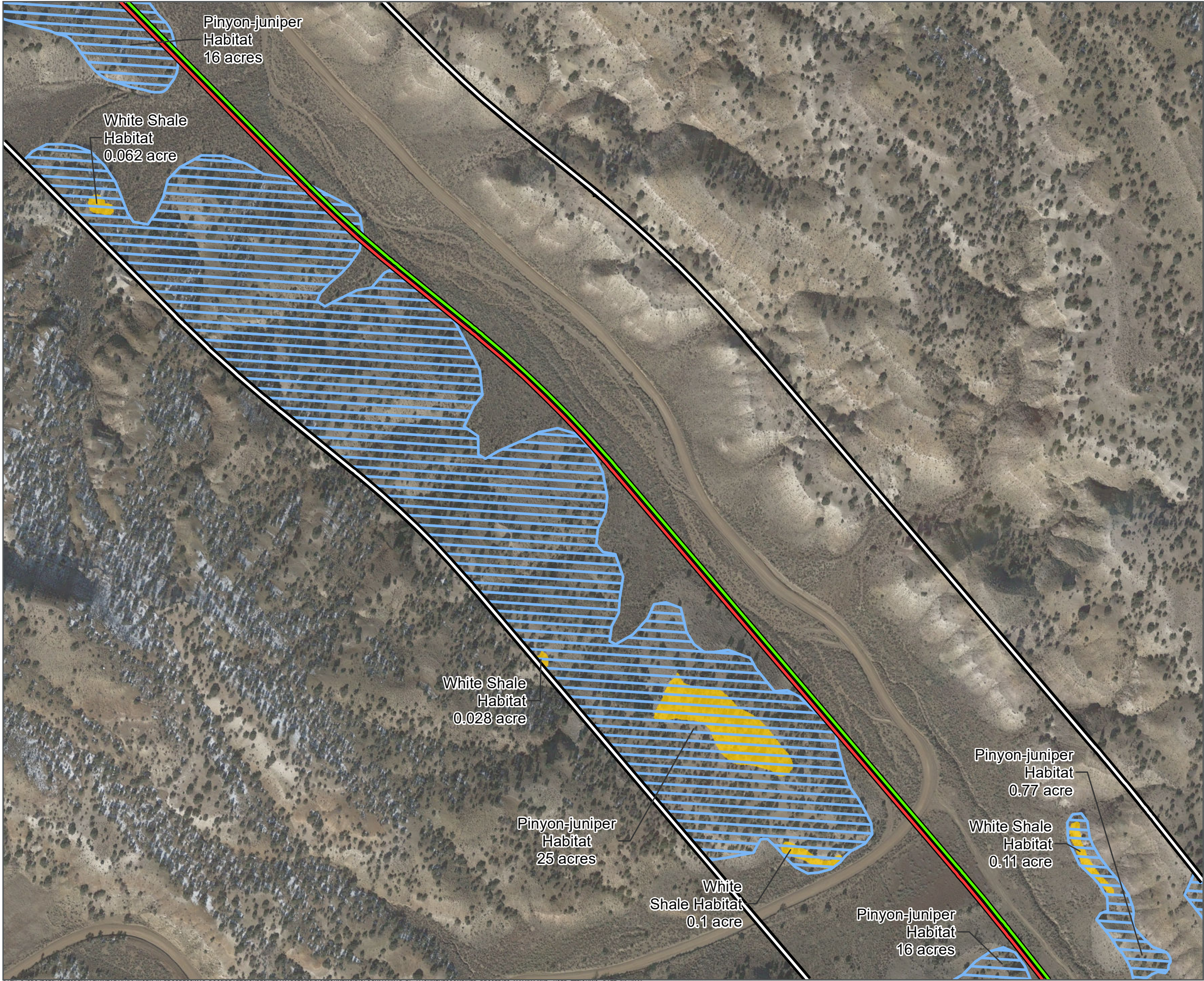
Barneby Ridge-cress (*Lepidium barnebyanum*) Habitat
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Utah State Plane

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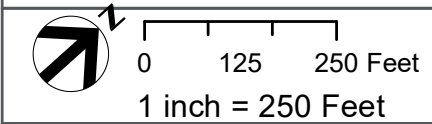


- LEGEND
- Map Extent (current view in yellow)
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Barneby Ridge-cress Potential Habitat

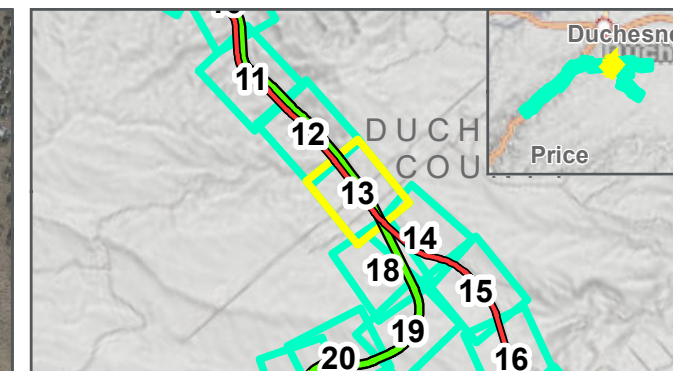
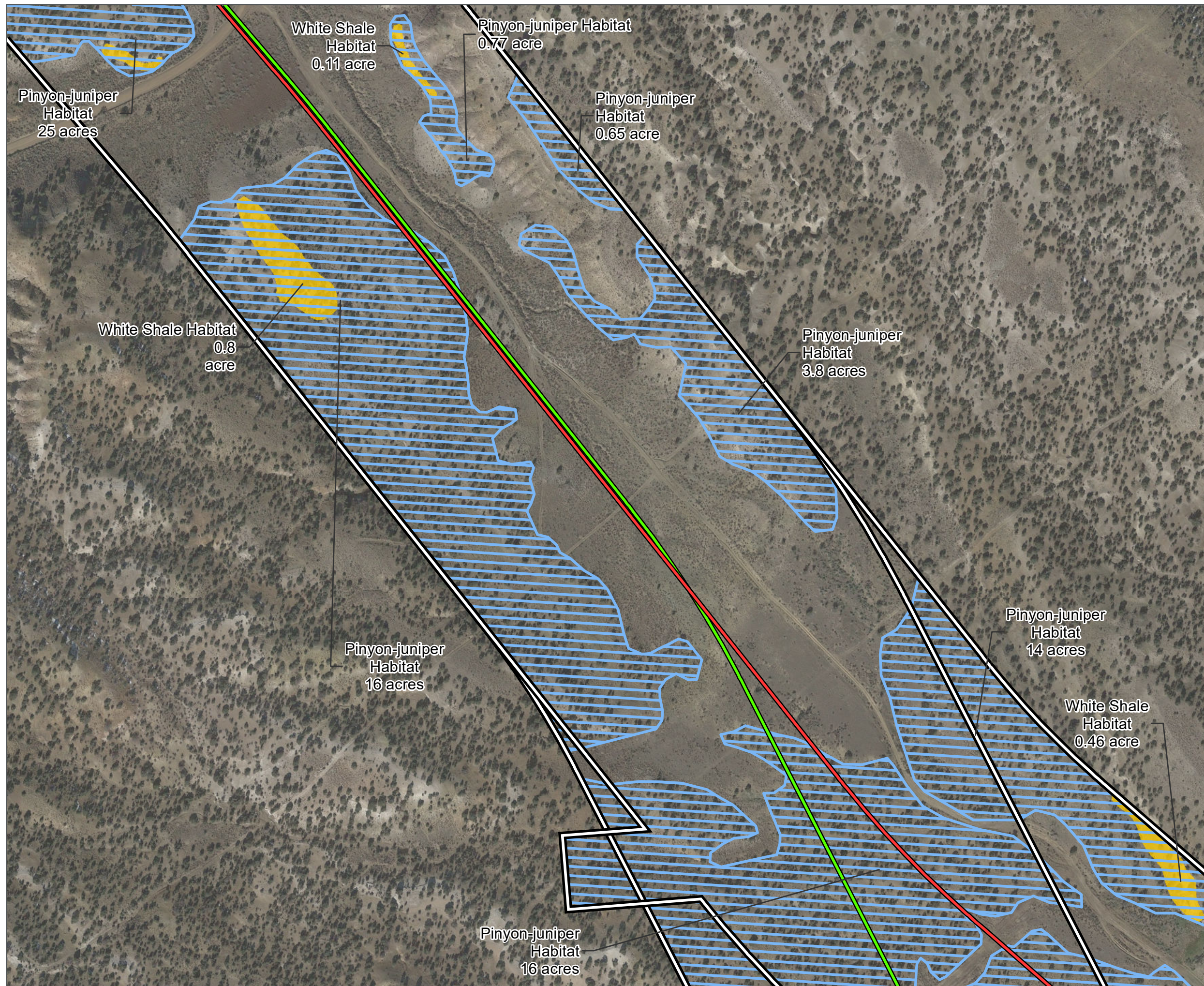
- Pinyon-juniper Potential Habitat
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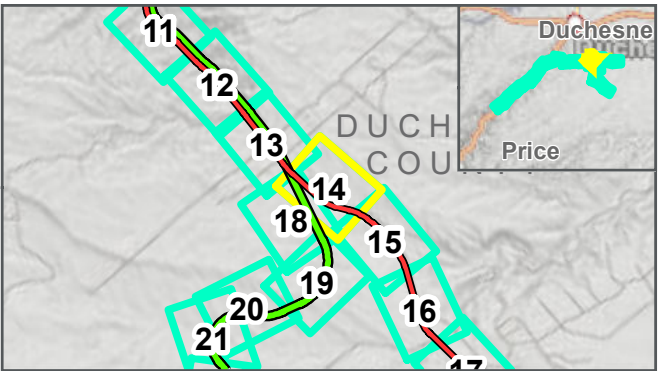
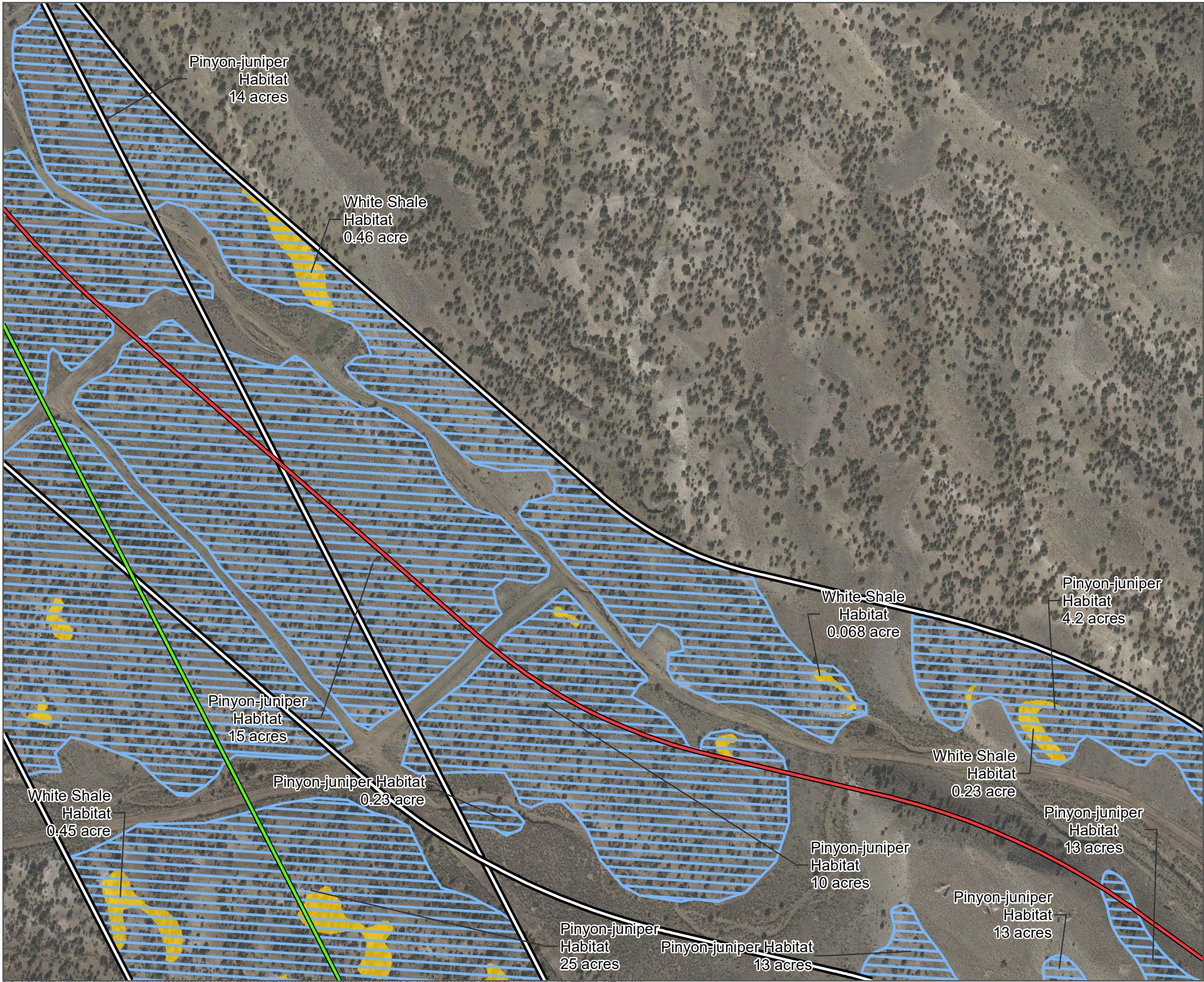
Barneby Ridge-cress (*Lepidium barnebyanum*) Habitat MAP SERIES



DATA SOURCES:
SWReGAP Landcover
Utah Google Imagery
Basemap (2013-2015)
COORDINATE SYSTEM:
Utah State Plane







LEGEND

- Map Extent (current view in yellow)
- Study Area
- Indian Canyon Centerline
- Whitmore Park Centerline



Barneby Ridge-cress Potential Habitat

- Pinyon-juniper Potential Habitat
- White Shale Potential Habitat

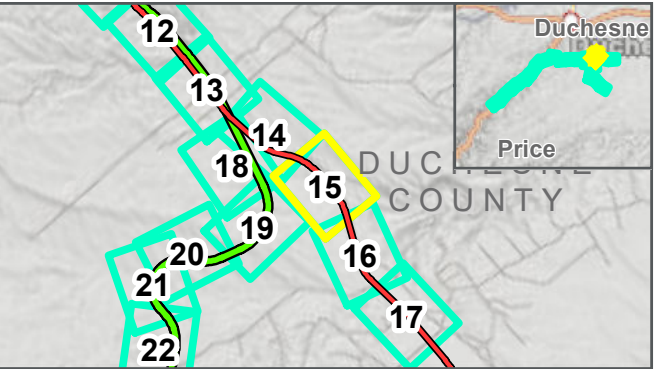
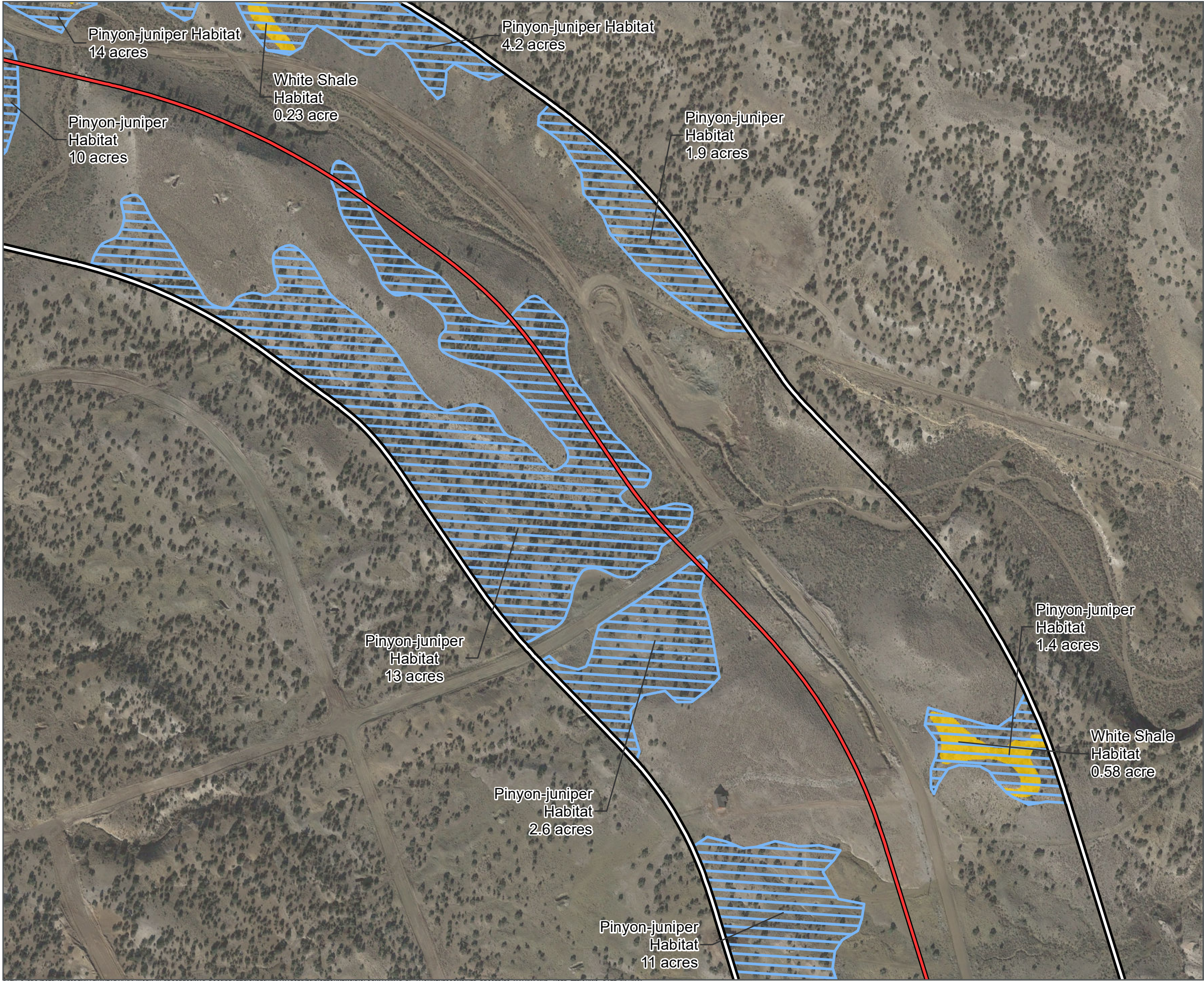
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COORDINATE SYSTEM:
Utah State Plane

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LEGEND

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Barneby Ridge-cress Potential Habitat

- Pinyon-juniper Potential Habitat
- White Shale Potential Habitat

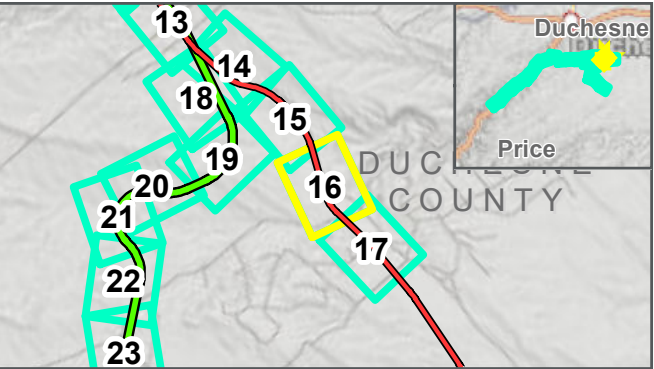
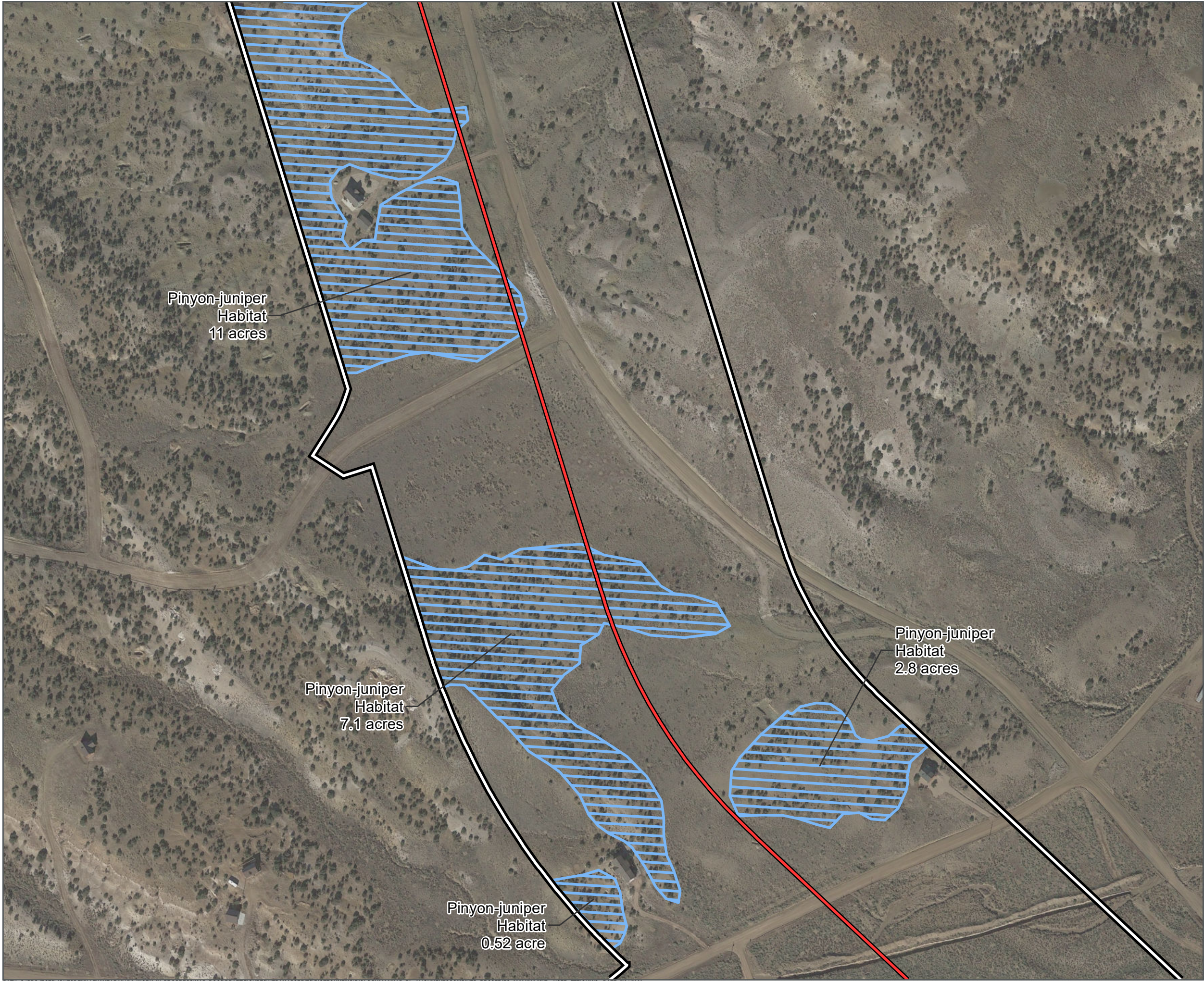
Barneby Ridge-cress (*Lepidium barnebyanum*) Habitat
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Utah Google Imagery
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COORDINATE SYSTEM:
Utah State Plane

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LEGEND

- Map Extent (current view in yellow)
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Barneby Ridge-cress Potential Habitat

- Pinyon-juniper Potential Habitat
- White Shale Potential Habitat

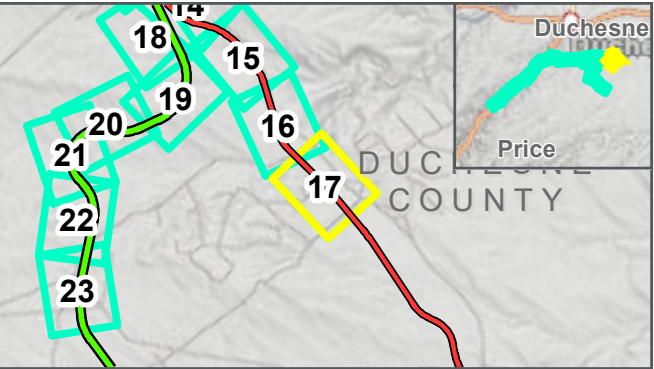
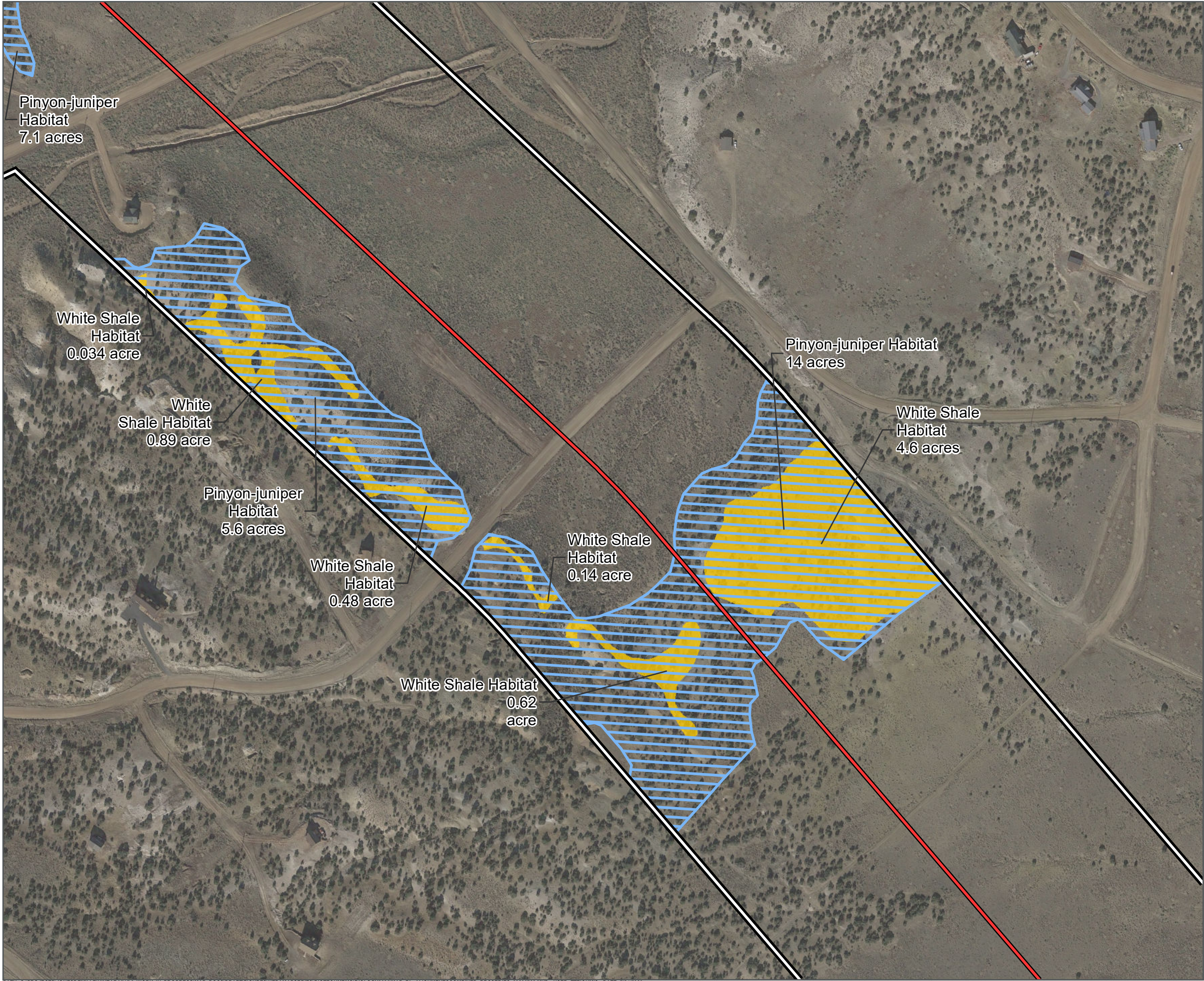
Barneby Ridge-cress (*Lepidium barnebyanum*) Habitat
MAP SERIES

0 125 250 Feet
1 inch = 250 Feet

DATA SOURCES:
SWReGAP Landcover
Utah Google Imagery
Basemap (2013-2015)
COORDINATE SYSTEM:
Utah State Plane

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LEGEND

- Map Extent (current view in yellow)
- Study Area
- Indian Canyon Centerline
- Whitmore Park Centerline

Barneby Ridge-cress Potential Habitat

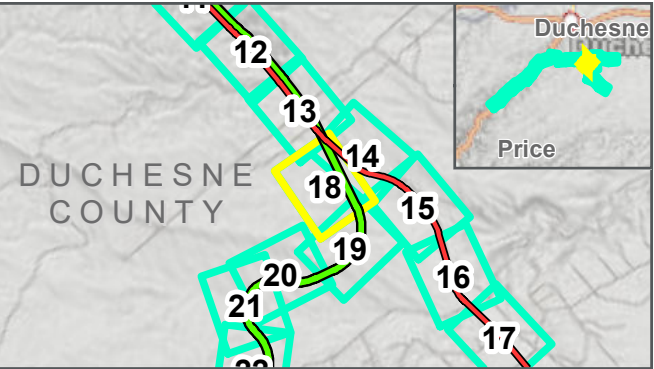
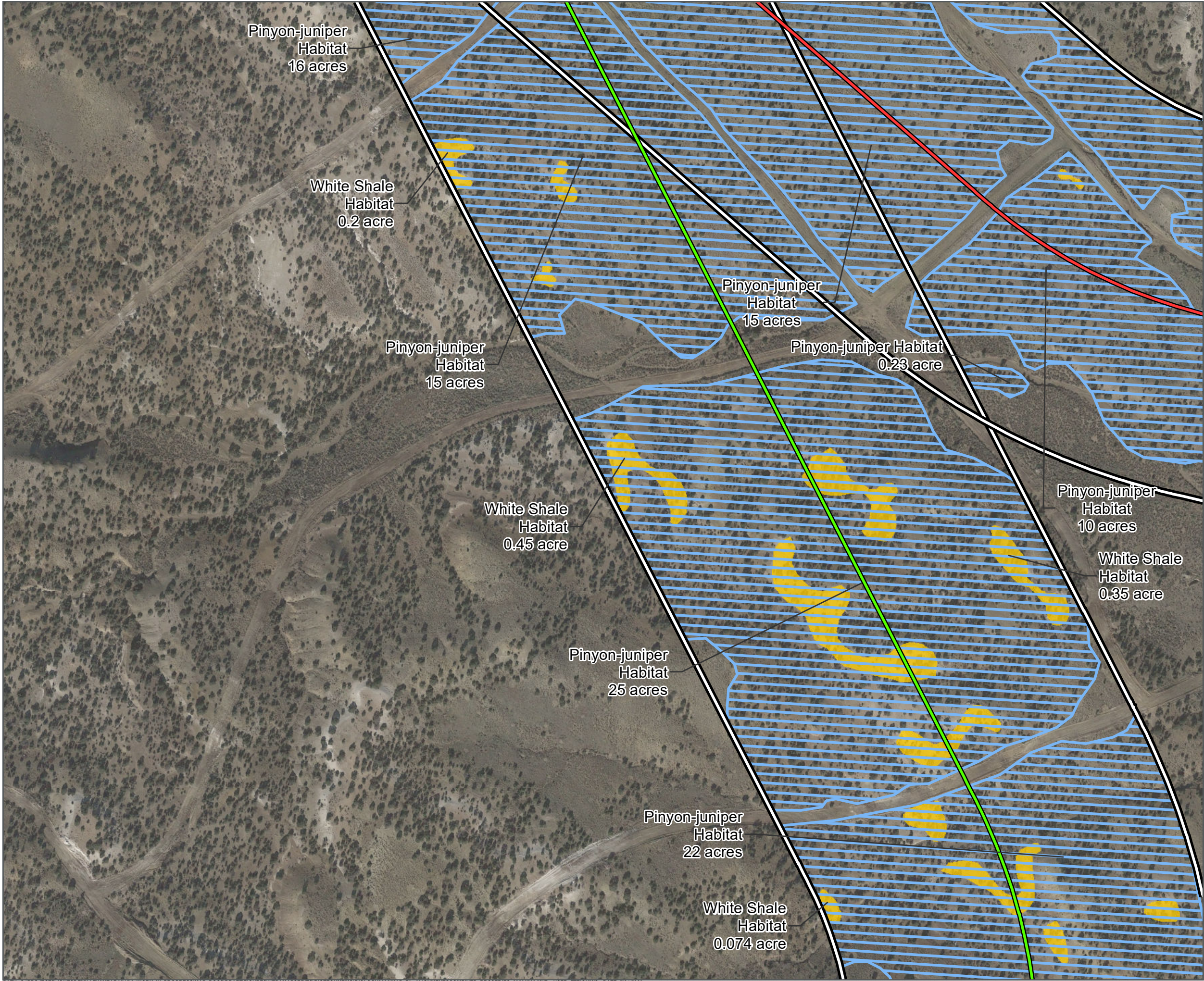
- Pinyon-juniper Potential Habitat
- White Shale Potential Habitat

Barneby Ridge-cress (*Lepidium barnebyanum*) Habitat
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DATA SOURCES:
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COORDINATE SYSTEM:
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LEGEND

- Map Extent (current view in yellow)
- Study Area
- Indian Canyon Centerline
- Whitmore Park Centerline

Barneby Ridge-cress Potential Habitat

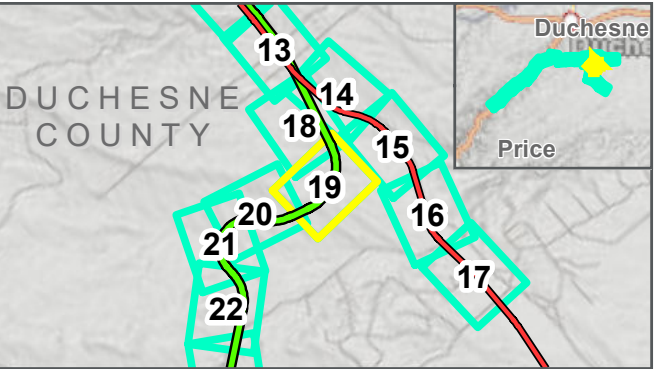
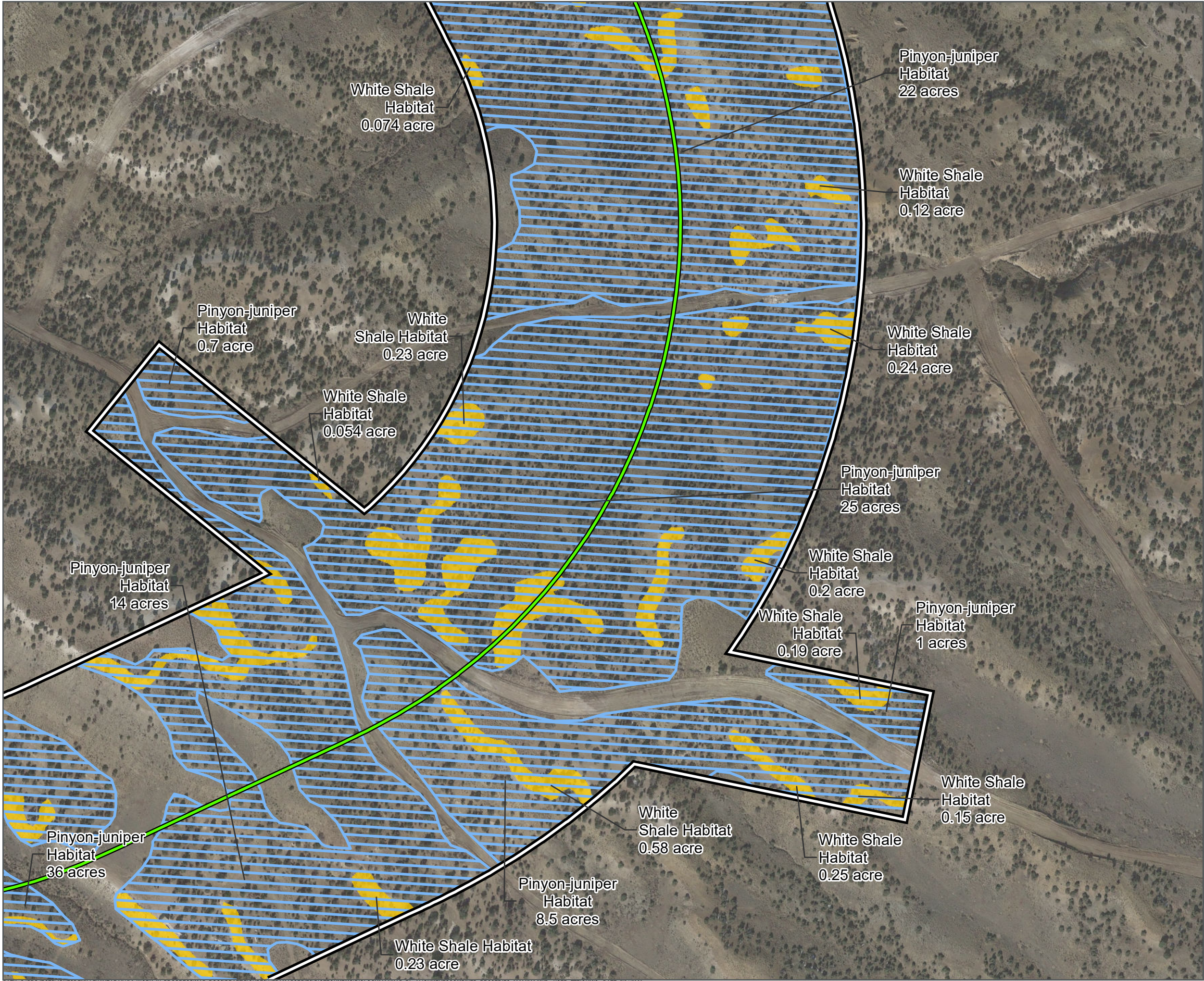
- Pinyon-juniper Potential Habitat
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Barneby Ridge-cress (*Lepidium barnebyanum*) Habitat
MAP SERIES

1 inch = 250 Feet

DATA SOURCES:
SWReGAP Landcover
Utah Google Imagery
Basemap (2013-2015)
COORDINATE SYSTEM:
Utah State Plane

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LEGEND

- Map Extent (current view in yellow)
- Study Area
- Indian Canyon Centerline
- Whitmore Park Centerline
- Pinyon-juniper Potential Habitat
- White Shale Potential Habitat

Barneby Ridge-cress Potential Habitat

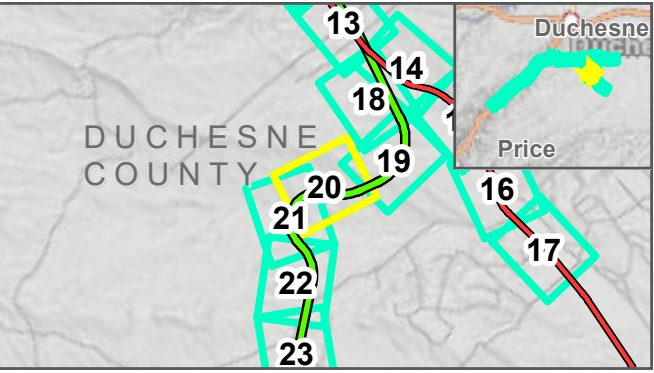
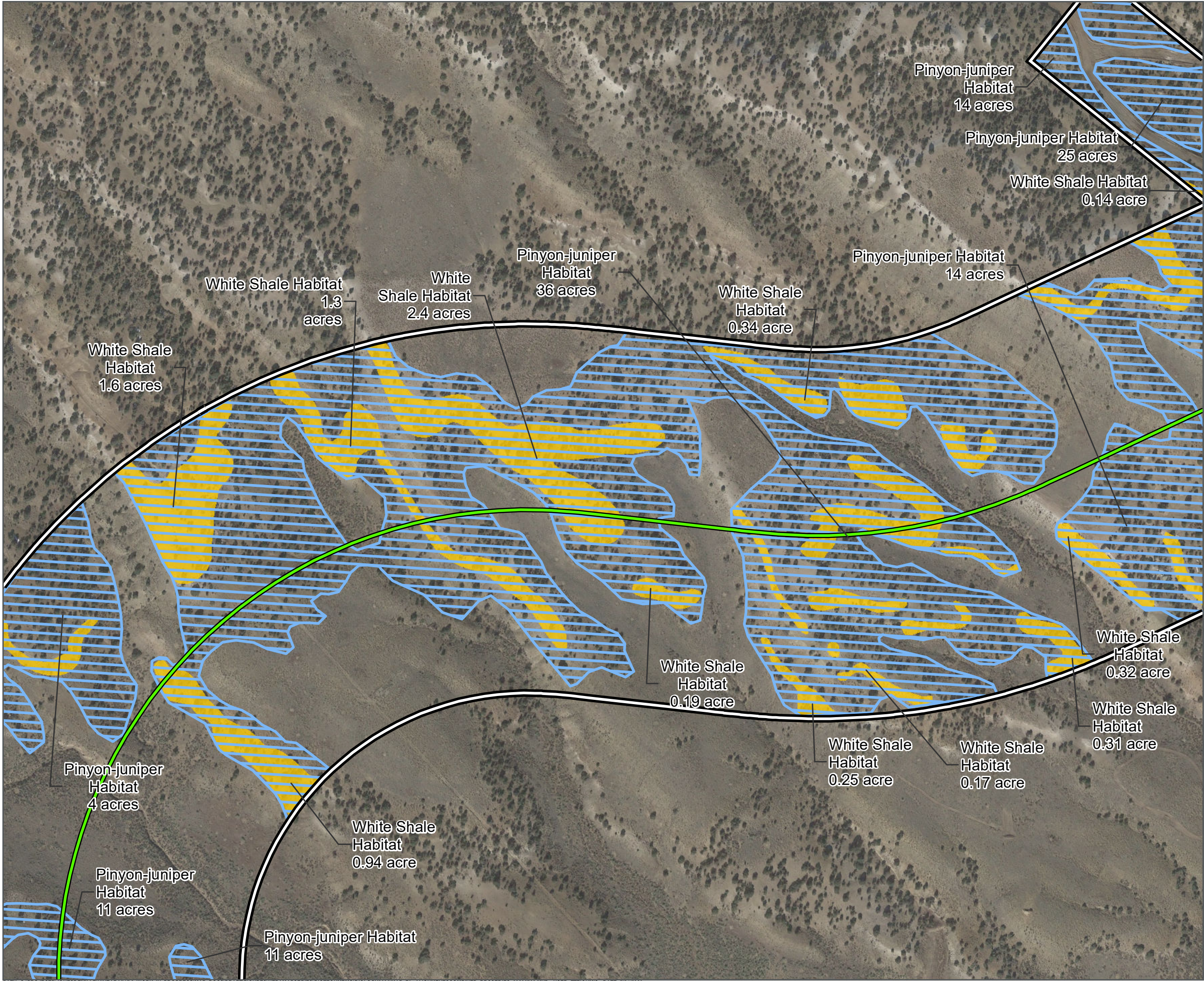
Barneby Ridge-cress (*Lepidium barnebyanum*) Habitat

MAP SERIES

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DATA SOURCES:
SWReGAP Landcover
Utah Google Imagery
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COORDINATE SYSTEM:
Utah State Plane

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LEGEND

- Map Extent (current view in yellow)
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Barneby Ridge-cress Potential Habitat

- Pinyon-juniper Potential Habitat
- White Shale Potential Habitat

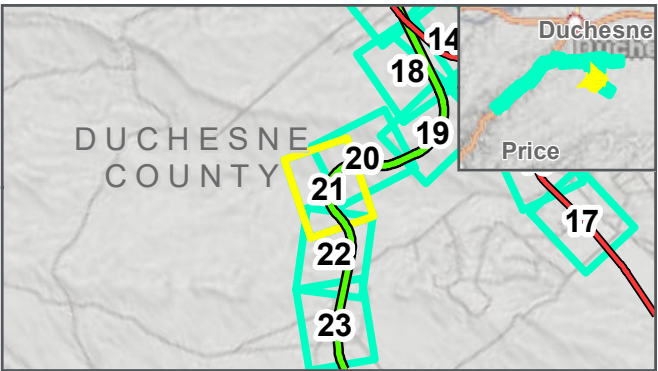
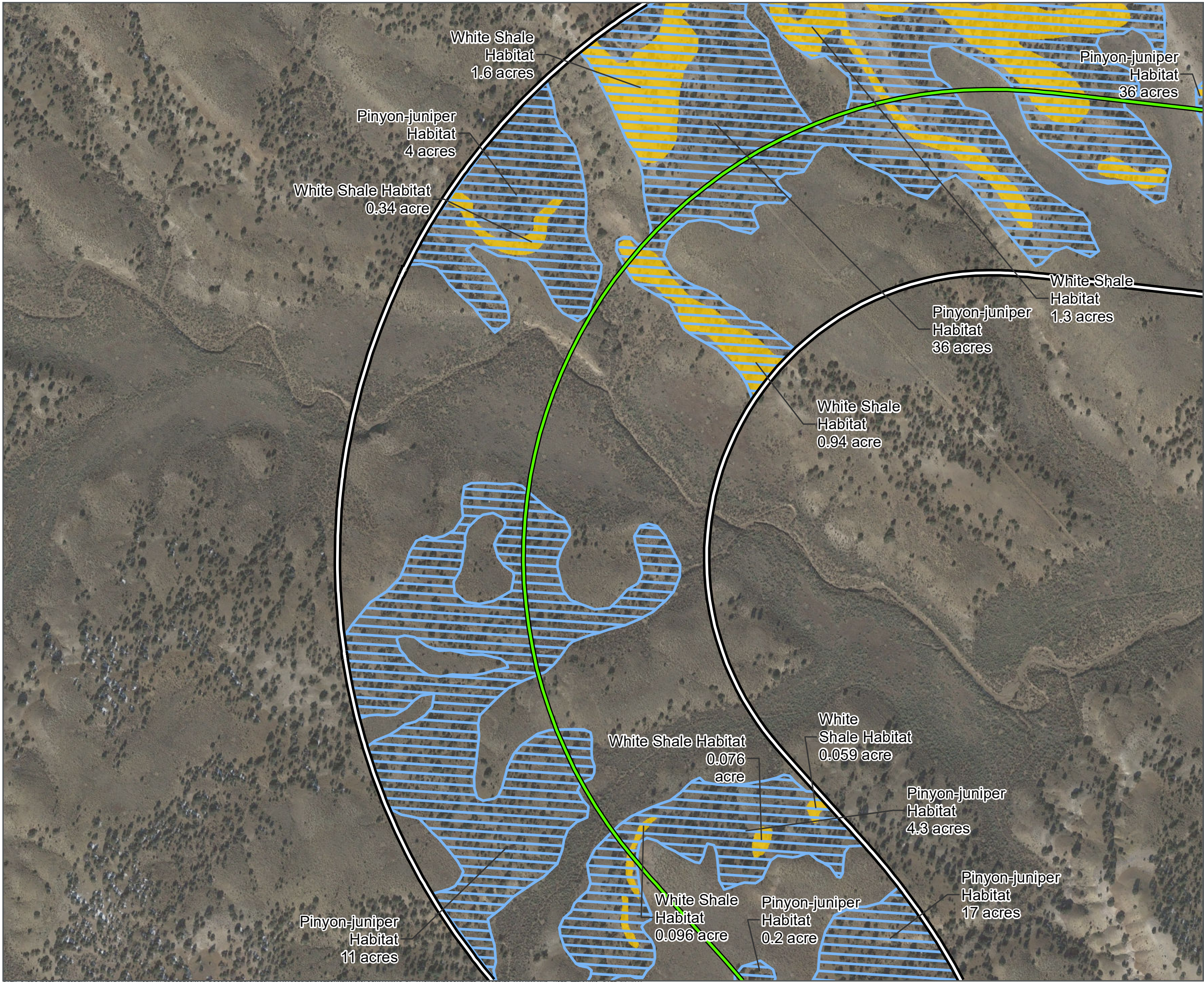
Barneby Ridge-cress (*Lepidium barnebyanum*) Habitat MAP SERIES

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DATA SOURCES:
SWReGAP Landcover
Utah Google Imagery
Basemap (2013-2015)
COORDINATE SYSTEM:
Utah State Plane

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LEGEND

- Map Extent (current view in yellow)
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Barneby Ridge-cress Potential Habitat

- Pinyon-juniper Potential Habitat
- White Shale Potential Habitat



Barneby Ridge-cress (*Lepidium barnebyanum*) Habitat

MAP SERIES

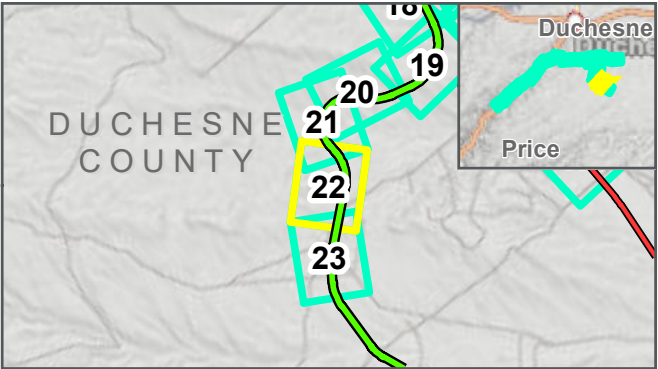
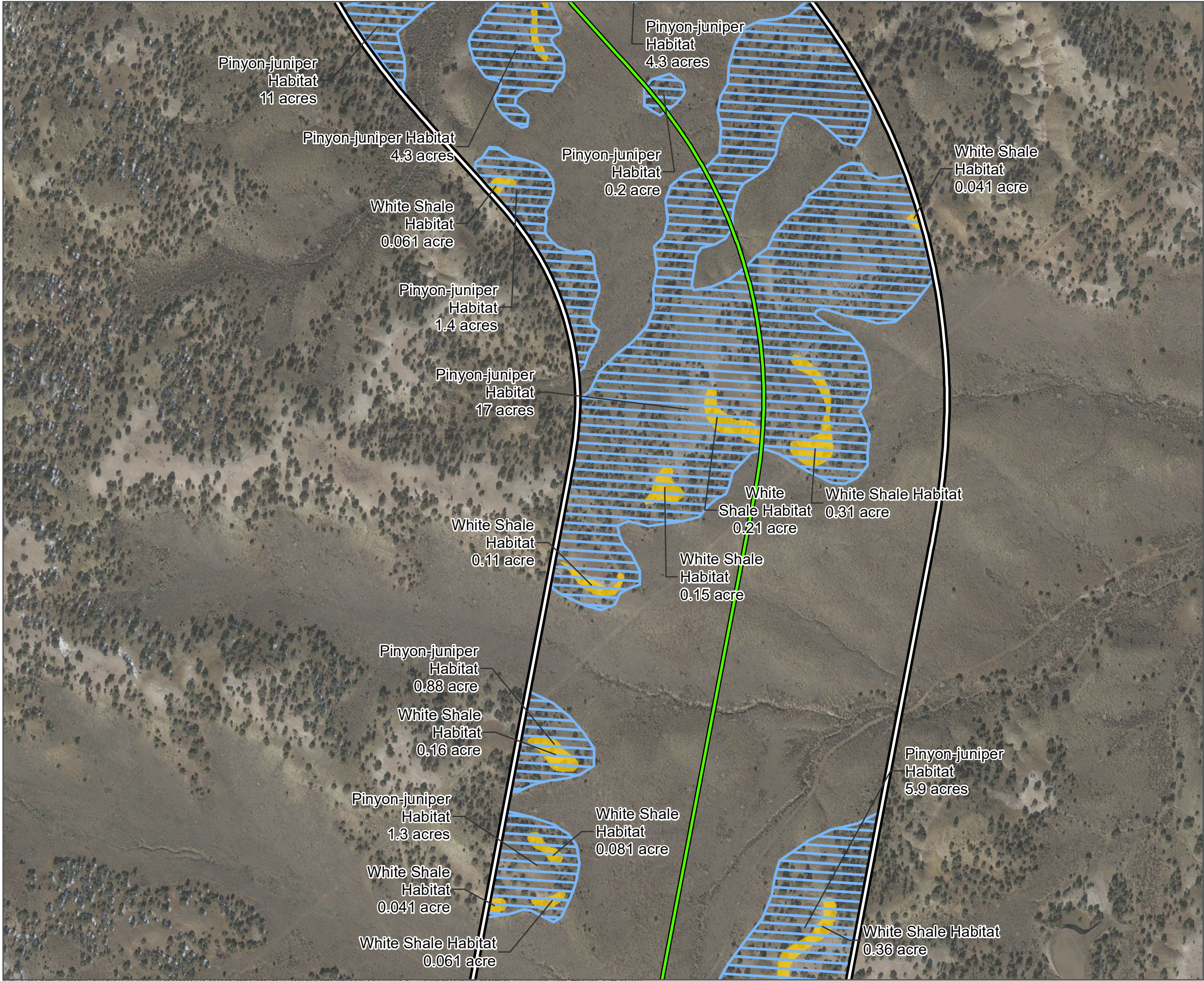
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DATA SOURCES:
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COORDINATE SYSTEM:
Utah State Plane

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LEGEND

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Barneby Ridge-cress Potential Habitat

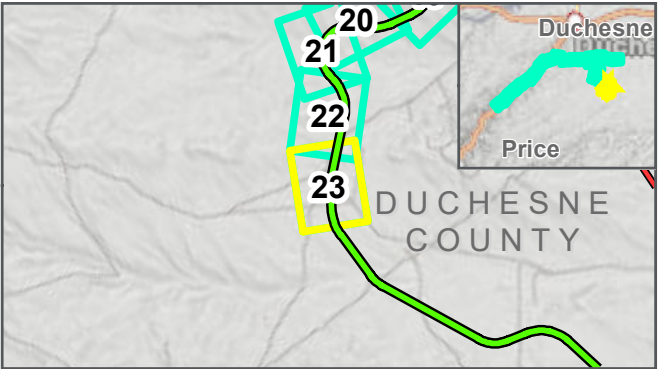
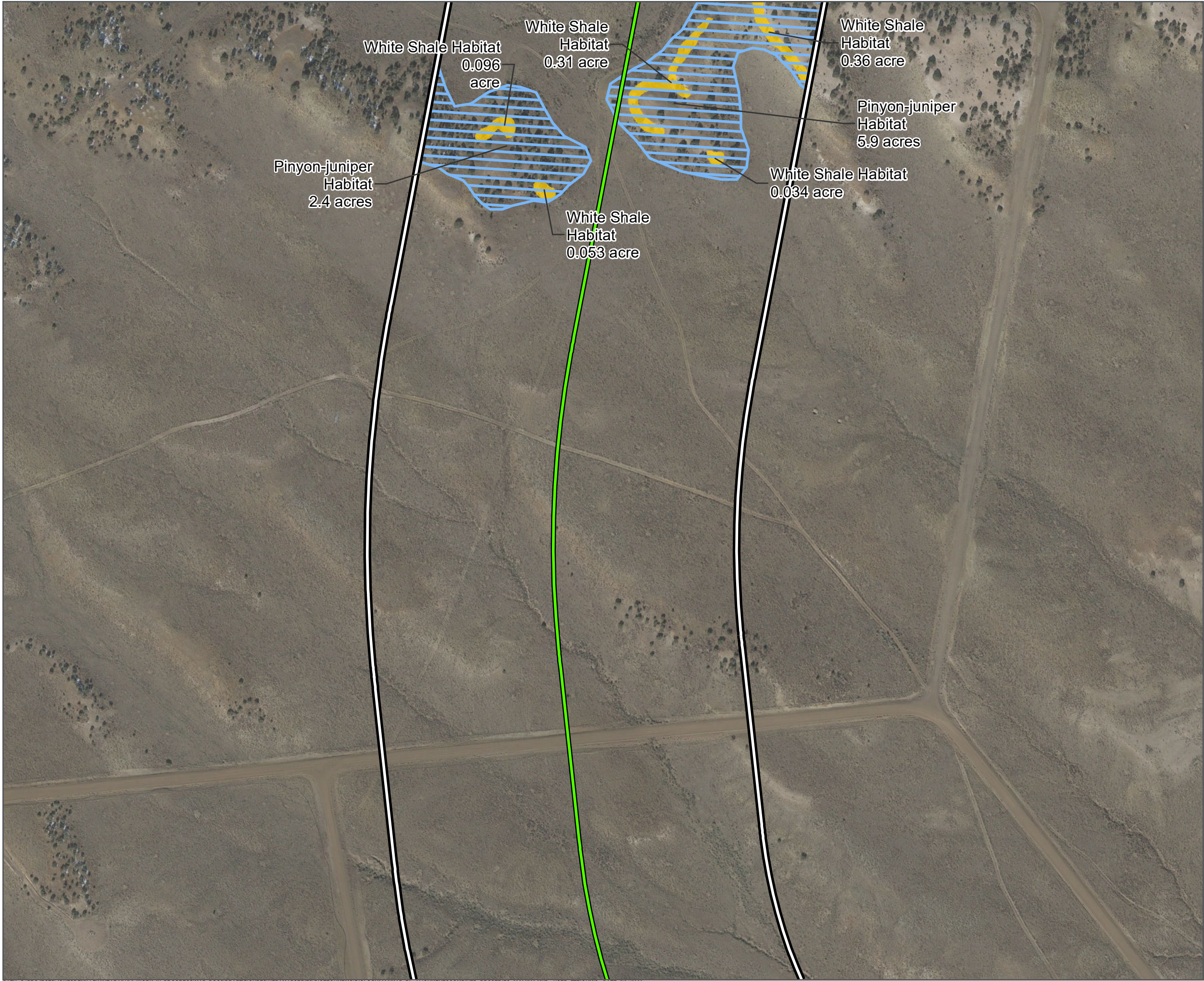
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Barneby Ridge-cress (*Lepidium barnebyanum*) Habitat
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Barneby Ridge-cress Potential Habitat

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Barneby Ridge-cress (*Lepidium barnebyanum*) Habitat
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COORDINATE SYSTEM:
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