

# PIKE SOLAR LLC



Appendix X- Integrated Noxious Weed Management  
Plan

November 25, 2020

## **Integrated Noxious Weed Management Plan**

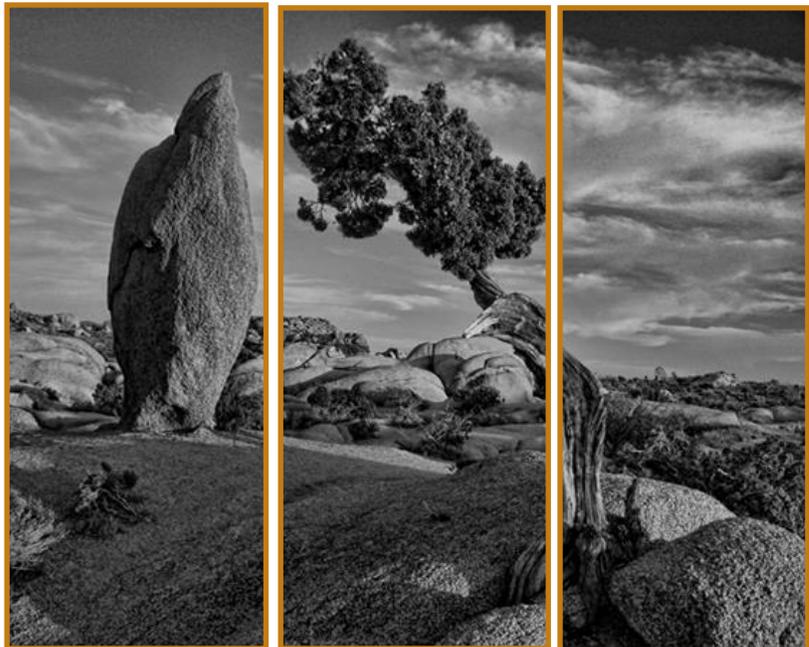
Pike Solar Project  
El Paso County, Colorado

**Prepared For:**

Palmer Solar, LLC, and JSI Construction Group, LLC  
1710 29<sup>th</sup> Street, Suite 1068  
Boulder, Colorado 80301

**Pinyon Project No.:**

I/20-1215-02





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November 25, 2020

## Integrated Noxious Weed Management Plan

Pike Solar Project  
El Paso County, Colorado

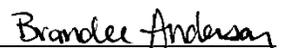
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## I. Introduction

Palmer Solar, LLC (Palmer Solar), and JSI Construction Group, LLC (JSI), are developing a large-scale photovoltaic solar energy facility on approximately 2,625 acres of undeveloped rangeland near Fountain in El Paso County, Colorado (Figure 1). Pinyon Environmental, Inc. (Pinyon), was contracted to write an Integrated Noxious Weed Management Plan (INWMP) for the project to support project development and meet permitting requirements.

When implemented properly, this INWMP fulfills county and state noxious weed management requirements and recommendations, including:

- State of Colorado Executive Order D 006 99 Development and Implementation of Noxious Weed Management Programs of July 19, 1999
- Colorado Noxious Weed Act (Colorado Revised Statutes; Title 35, Article 5.5) (Colorado Revised Statutes, 2016a)
- El Paso County's *Noxious Weed Management Plan*, Approved December 28, 2017 (El Paso County, 2017)
- *Noxious Weeds and Control Methods* rendered by the El Paso County, Colorado Community Services Department Environmental Division (El Paso County, 2018)

### I.1 Background

Noxious weeds are invasive plant species pursuant to management requirements under the Colorado Noxious Weed Act. Because of the adverse effects of noxious weeds to the environment and the economy, the Colorado Noxious Weed Act requires landowners and managers to eradicate and/or control the spread of noxious weeds.

The Colorado Department of Agriculture (CDA) is the lead agency in charge of noxious weed management requirements and recommendations in Colorado. The CDA classifies noxious weeds into three categories: List A (high priority), List B (medium priority), and List C (low priority). List A species have been designated by the CDA for eradication, meaning that known locations of List A species require treatment. List B species have been designated for eradication, suppression, or control based on species and location. The CDA has written management plans for all List A and most List B noxious weed species. These management plans are included in the Code of Colorado Regulation entitled *Rules Pertaining to the Administration and Enforcement of the Colorado Noxious Weed Act* (8 CCR 1206-2; CDA, 2007).

The CDA does not yet have written management plans for List C species and therefore does not yet require management for List C species. The management plans for List C species will be designed to support the efforts of local governing bodies to facilitate more effective integrated weed management on private and public lands. The goal of these plans will not be to stop the continued spread of these species but to provide additional education, research, and biological control resources to jurisdictions that choose to require management of List C species (CDA, 2017). The CDA also maintains a Watch List of weed species that may become problematic and may need to be listed as noxious weeds in the future.

Additionally, the Colorado Noxious Weed Act stipulates that each county in Colorado must adopt a noxious weed management plan for its jurisdiction. The El Paso County Noxious Weed Management Plan was approved by the Board of County Commissioners on December 28, 2017, and defers to the state noxious weed list and management goals (El Paso County, 2017).

## **1.2 Project Location**

Pike Solar provided Pinyon with the boundaries where the maximum extent of project impacts are anticipated to occur. This area is further referred to in this report as the “study area.” The study area is located just east of Calhan Reservoir and about five miles southeast of the City of Fountain in El Paso County, Colorado (Figure 1). The approximate geographical location of the project is centered at decimal degree coordinates (World Geodetic System [WGS] 84) latitude 38.644141°, longitude -104.631250°. The project is located in multiple Sections, Township 16 South, Ranges 64 and 65 West, of the 6<sup>th</sup> Principal Meridian on the United States Geological Survey (USGS) Fountain, Fountain Northeast, Fountain Southeast, and Buttes, Colorado 7.5-Minute Quadrangles (USGS, 1994a; USGS, 1961; USGS, 1975; USGS, 1994b). The elevation of the study area ranges from approximately 5,370 to 5,590 feet above mean sea level.

## 2. Methods

To complete this INWMP, Pinyon reviewed the noxious weed data summarized in the following reports (no noxious weed inventory was conducted):

- *Noxious Weed Inventory Report* completed by Pinyon for Colorado Springs Utilities, dated December 3, 2018 (this report was shared with Palmer Solar and JSI with the permission of Colorado Springs Utilities) (Pinyon, 2018)
- *Biological Resources Report* completed by Pinyon for Palmer Solar JSI, dated October 19, 2020 (Pinyon, 2020)

The data from these reports were used to create this INWMP and to develop a Noxious Weed Inventory Map (Figure 2).

## 3. Results

### 3.1 Land Use and General Habitat

The study area is located in a rural area surrounded by open rangeland. The study area can be broadly categorized into two habitat types: upland areas dominated by shortgrass prairie habitat and wetter areas associated with Williams Creek and its numerous tributaries (Appendix A, Photos 1 and 2) (Figure 1). During the previous studies, the uplands had evidence of prior agricultural use and were heavily grazed in areas, but generally contained few noxious weeds. Williams Creek and associated tributaries were generally wetter and had higher weed densities.

### 3.2 Noxious Weeds in the Study Area

Four species of noxious weeds were observed in the study area in medium densities (i.e., populations had 40 to 70 percent cover): three List B species, Canada thistle (*Cirsium arvense*), hoary cress (*Cardaria draba*), and salt cedar (*Tamarix chinensis*) and one List C species, field bindweed (*Convolvulus arvensis*) (Figure 2; Appendix A, Photos 3 through 6; Table 1).

Canada thistle, salt cedar, and field bindweed were prevalent throughout Williams Creek and associated tributaries and were common in disturbed areas, such as along roads, two-tracks, and fence lines. Hoary cress was prevalent throughout Williams Creek and associated tributaries in the southern portion of the study area. Hoary cress was also noted in isolated populations in disturbed upland areas, especially where livestock congregate.

### 3.3 Noxious Weed Vectors

Numerous vectors for noxious weed transport were identified in the study area. A fenced pump station with various associated infrastructure such as water tank, building, and access road were located in the study area. Human activities associated with utilities maintenance and operation in this area may inadvertently introduce noxious weeds.

Much of the study area is open rangeland currently used to graze cattle. Livestock may act as a noxious weed vector by transporting and introducing noxious weeds in new areas and disturbing the soil, which can help noxious weeds become established. Hay that may be used to supplement grazing may contain noxious weed seeds. Places where cattle gather in the study areas, such as near water troughs and in riparian areas, typically have higher densities of noxious weeds. Additionally, agricultural maintenance activities may be acting as a vector. For example, noxious weeds were often noted along roads, two-tracks, and fence lines.

Natural vectors such as wildlife, water, wind, or gravity may be transporting noxious weed seeds and propagules into and throughout the study area. Usually natural vectors move noxious weed seeds along natural features and elevational gradients. For example, in the study area, Canada thistle is located in high densities in the Williams Creek drainage and at the base of natural erosional features located throughout the northeastern portion of the study area (Appendix A, Photo 3). Canada thistle is likely being deposited and spread in these areas as a result of wind and/or water, which is likely transporting seeds downslope. Once noxious weeds are introduced to and have become established in an area, the spread of the noxious weed seeds could easily be facilitated via natural vectors.

## 4. Integrated Noxious Weed Management Plan

The sections below outline general and project-specific noxious weed management priorities and Best Management Practices (BMPs). Table I outlines management goals and recommended control measures for the noxious weeds that were noted in the study area and Appendix B contains noxious weed fact sheets including pertinent identification information, plant phenology, and applicable treatments from the CDA and El Paso County.

### 4.1 General Noxious Weed Management Priorities

El Paso County has established the following priorities for noxious weed management: prevention; inventory, mapping, and monitoring; control; restoration; and education and awareness (El Paso County, 2017).

#### 4.1.1 Prevention

Prevention focuses on the early detection and eradication of small noxious weed populations to prevent spread. It is easier to prevent the spread of weeds when the weed populations are confined to a limited space than to eradicate weeds from areas in which large populations have already been established. *Section 4.2 Project-specific Weed Management Priorities* addresses project-specific priorities focused on noxious weed prevention.

#### 4.1.2 Inventory, Mapping, and Monitoring

Inventory, mapping, and monitoring is used to develop noxious weed management strategies and evaluate vegetation trends over time. By mapping noxious weed populations prior to and following construction activities, the effectiveness of weed control efforts can be quantified. On June 7 through 9, 2018, Pinyon conducted a noxious weed inventory of the study area as part of the Colorado Springs Utilities Local Systems Properties *Noxious Weed Inventory Report* (Figure 2) (Pinyon, 2018). Ongoing noxious weed inventory, mapping, and monitoring objectives are outlined in *Section 4.3.3 Post Construction*.

#### 4.1.3 Control

To effectively control noxious weed populations, a combination of cultural, mechanical, biological, and chemical control methods can be used.

Cultural controls, such as using weed-free hay and promoting weed education, are widely used and can be the most cost-effective techniques. Cultural controls can be effective at reducing the likelihood of all noxious weed species noted in the study area from spreading. Project-specific cultural BMPs are outlined in *Section 4.3 Project Specific Best Management Practices*.

Mechanical controls, such as mowing and hand pulling, can be labor intensive and are predominantly used for smaller infestations. Mowing can be effective at reducing Canada thistle and hoary cress populations noted in the study area. Mechanical treatments for the noxious weeds noted in the study area are described in Appendix B and Table I.

Biological controls (biocontrols) are very cost efficient; however, they take a long time to be effective and do not result in eradication of the weed. Biocontrols can be an effective long-term control technique for weeds that have large, established populations and if the management goal is suppression. Biocontrols are available for several noxious weeds noted in the study area, including Canada thistle, salt cedar, and field bindweed (Appendix B). However, due to the short-term nature of construction, biocontrols are not recommended for this project.

Chemical controls use herbicides to disrupt weed growth. Herbicides are widely used and can be effective at eradicating weed species. However, herbicides can damage or kill non-target plants and have other environmental consequences if not used properly. Because of the risks associated with herbicide use, ***all herbicide applications must be performed by personnel under the supervision of a certified applicator licensed by the CDA*** (in accordance with the Colorado Pesticide Applicator Act, Colorado Revised Statutes; Title 35, Article 10) ***and in accordance with the product label*** (Colorado Revised Statutes, 2016b).

#### 4.1.4 Restoration

Revegetation with native species deters the germination of noxious weed seeds. Project-specific BMPs that address the reintroduction of native plants are outlined in *Section 4.3.2 Construction and Reclamation/Reseeding*.

#### 4.1.5 Education and Awareness

Education and awareness objectives focus on public outreach to promote the benefits of noxious weed management to five major groups of stakeholders:

- 1) rural property owners with noxious weed infestations,
- 2) urban property owners with noxious weed infestations,
- 3) land managers and property owners without regulated weeds,
- 4) local, county, and state government agencies, and
- 5) community and non-profit groups focused on parks, conservation, and restoration issues.

Public outreach tools used by El Paso County include informational handouts and brochures, formal presentations, training courses, staffing booths at community and regional events, and the County website.

For this project, education and awareness of construction and operations personnel regarding the implementation of this INWMP will be key to its successful implementation (see *Section 4.3.2 Construction and Reclamation/Reseeding*).

## 4.2 Project-specific Weed Management Priorities

The following priorities for weed management are based on the information obtained during the noxious weed inventory, and the management goals set by the CDA and El Paso County.

**Priority 1:** No List A species were observed within the study area. However, if any List A species are found prior to or during construction, it is a priority that these species be eliminated. List A species that occur in similar environments and that may develop within the study area if introduced include, but are not limited to: cypress spurge (*Euphorbia cyparissias*), hairy willow-herb (*Epilobium hirsutum*), Japanese knotweed (*Fallopia japonica*), and myrtle spurge (*Euphorbia myrsinites*).

**Priority 2:** Hoary cress was prevalent throughout Williams Creek and associated tributaries in the southern portion of the study area and was also noted in isolated populations in disturbed upland areas, especially where livestock congregate (Figure 2). Because the CDA's and El Paso County's management goal for this species in the study area is elimination (starting in 2021), management of this species should be prioritized (Appendix C).

**Priority 3:** Canada thistle and salt cedar were prevalent throughout Williams Creek and associated tributaries (Figure 2). Canada thistle was also common in disturbed areas, such as along roads, two-tracks, and fence lines

(Figure 2). Suppression is the CDA's and El Paso County's management goal for these species in the study area (Appendix C). Efforts to suppress the spread of these species should be prioritized in sensitive riparian areas (Williams Creek and associated tributaries), along roads/two-tracks, and along fence lines. Because natural vectors move noxious weed seeds along natural features and elevational gradients, it is recommended that management be prioritized in the northern portion of the study area first, then work south (because Williams Creek flows north to south).

**Priority 4:** Field bindweed was prevalent throughout Williams Creek and associated tributaries and was common in disturbed areas, such as along roads, two-tracks, and fence lines. (Figure 2). Management of field bindweed, a List C species, is not required by law and management of this species is not recommended. However, should the project decide to manage field bindweed, efforts to suppress the spread of field bindweed should be focused in sensitive riparian areas (Williams Creek and associated tributaries), along roads/two-tracks, and along fence lines.

### 4.3 Project-specific Best Management Practices

Noxious weed management BMPs shall be followed both prior to and during construction as well as during reclamation/reseeding activities to prevent the spread of noxious weeds. It is important to note that the success of the treatment is contingent upon the timing of the treatment and the plant phenology (i.e., the timing of plant life-cycle events). For example, many herbicides are effective during a plant's rosette stages (spring or fall). Therefore, if construction activities are anticipated to begin in the winter, plans should be made to treat some species the preceding season, if practical. The timing of effective treatment and plant phenology are summarized in Appendix B and Table I.

#### 4.3.1 Pre-construction

The following BMPs shall be performed prior to construction:

- Prior to the start of construction or re-start of construction after a delay of more than three weeks, List B noxious weed populations shall be treated using mechanical and chemical methods. Species-specific treatment recommendations are summarized in Appendix B and Table I. The extent of treatment shall depend upon the location of the proposed construction activity:
  - In Upland Areas: If the proposed construction activity is to occur in an upland area, all List B populations within 50 feet of the proposed area of disturbance shall be treated prior to construction.
  - In Wetter Areas (i.e., Williams Creek and associated Tributaries): If the proposed construction activity is to occur within 100 feet of Williams Creek or its associated tributaries, all List B populations within that area shall be treated prior to construction.
- Prior to construction activities, high priority noxious weed species populations shall be treated using mechanical and chemical methods (Appendix B, Table I). This includes hoary cress populations noted in the study area (see *Section 4.2 Project-specific Weed Management priorities*). Because construction activities can exacerbate the spread of noxious weeds, treating these high priority populations prior to construction can help to reduce their spread.

#### 4.3.2 Construction and Reclamation/Reseeding

The following BMPs shall be performed during construction and reclamation/reseeding:

- Construction personnel shall be made aware of this INWMP and the correct implementation of the BMPs contained herein.
- During construction and reclamation/reseeding, all List B species shall be treated using mechanical and chemical methods. Species-specific treatment recommendations are summarized in Appendix B and Table I. The extent of treatment shall depend upon the location of the proposed construction activity, as described in *Section 4.3.1 Pre-construction*.
- Contractor vehicles shall be inspected before they are used for construction to ensure that they are free of soil and debris capable of transporting noxious weed seeds or roots. Heavy construction equipment shall be cleaned prior to use in the study area.
- Disturbed areas shall be permanently stabilized and reclaimed by reseeded with a native seed mixture. If areas are completed and permanent stabilization (i.e., seeding) cannot occur due to the time of year (e.g., winter months), mulch and mulch tackifier will be used for temporary erosion control until seeding can occur.
- All topsoil, either imported or salvaged on the study area, shall be treated with an herbicide for noxious weeds prior to final seeding (ensure timing of herbicide application does not impact seed germination).
- Only certified weed-free mulch and hay/straw bales shall be used on the project (in accordance with the Colorado Weed Free Forage Crop Certification Act, Colorado Revised Statutes; Title 35, Article 27.5) (Colorado Revised Statutes, 2016c).

#### **4.3.3 Post Construction**

The following BMPs shall be performed after construction:

- Following revegetation, noxious weed infestations shall be routinely mowed during the growing season to prevent the spread of Canada thistle and hoary cress and the introduction of other noxious weeds to the study area.
- One year after construction is completed, the study area shall be surveyed for new noxious weed infestations. The survey shall occur during the growing season and shall be used to inform whether additional treatment is required. The priorities outlined in *Section 4.2 Project-specific Weed Management Priorities* shall be used to guide and focus treatments.
- Following the initial post-construction survey, the study area shall be surveyed for noxious weeds once every five years during the growing season. The survey shall be used to inform whether additional treatment is required. The priorities outlined in *Section 4.2 Project-specific Weed Management Priorities* shall be used to guide and focus treatments.

#### **4.4 Project-specific Documentation**

To show that noxious weed management activities are being implemented, activities related to noxious weeds shall be documented. A sample form that can be used to document weed management activities has been included in Appendix D. This form can be used to document various noxious weed management-related activities including:

- Noxious weed inventory and/or inspections.
- Noxious weed management activities.
- Vehicle and/or equipment inspections.

In addition to the filled-out form documenting noxious weed management activities, other documentation shall also be maintained. This documentation may include:

- Copies of seed tags that document noxious weed percentage.
- Seed testing results.
- Weed-free certification for hay bales and straw.
- Weed-free certification for topsoil.
- Herbicide spray sheets that include herbicide applicator name, company, and CDA license number. Herbicide spray sheets also should include herbicide type, amount, and target species of application.

## 5. References

- CDA, 2007. *Code of Colorado Regulation entitled "Rules Pertaining to the Administration and Enforcement of the Colorado Noxious Weed Act" (8 CCR 1206-2)*. Colorado Department of Agriculture, Conservation Services Division Entire rule effective March 30, 2018.
- CDA, 2017. *The Official State Portal, Colorado Department of Agriculture Website*. Colorado Department of Agriculture. Available at: <http://www.colorado.gov/ag>. Accessed November 2020.
- Colorado Revised Statutes, 2016a. *Colorado Noxious Weed Act; Title 35, Article 5.5*. State of Colorado.
- Colorado Revised Statutes, 2016b. *Colorado Pesticide Applicator Act; Title 35 Article 10*. State of Colorado.
- Colorado Revised Statutes, 2016c. *Colorado Weed Free Forage Crop Certification Act; Title 35 Article 27.5*. State of Colorado.
- El Paso County, 2017. *Noxious Weed Management Plan*. El Paso County, Colorado. Board of County Commissioner's approval December 28, 2017. Available at: <https://assets-communityservices.elpasoco.com/wp-content/uploads/Environmental-Division-Picture/Noxious-Weeds/Weed-Management-Plan-December-2017.pdf>. Accessed November 2020.
- El Paso County, 2018. *Noxious Weeds and Control Methods*. El Paso County, Colorado. Community Services Department Environmental Division. Available at: <https://assets-communityservices.elpasoco.com/wp-content/uploads/Environmental-Division-Picture/Noxious-Weeds/Noxious-Weed-Control-Book.pdf>. Accessed November 2020.
- Pinyon, 2018. *Noxious Weed Inventory Report*. Completed by Pinyon Environmental, Inc., for Colorado Springs Utilities, dated December 3, 2018.
- Pinyon, 2020. *Biological Resources Report*. Completed by Pinyon Environmental, Inc., for Palmer Solar LLC and JSI Construction LLC, dated October 19, 2020.
- USGS, 1994a. "7.5-Minute Topographic Map, Fountain, Colorado," US Geological Survey, 1961. Revised 1994.
- USGS, 1994b. "7.5-Minute Topographic Map, Buttes, Colorado," US Geological Survey, 1961. Revised 1994.
- USGS, 1961. "7.5-Minute Topographic Map, Fountain Northeast, Colorado," US Geological Survey, 1961.
- USGS, 1975. "7.5-Minute Topographic Map, Fountain Southeast, Colorado," US Geological Survey, 1961. Revised 1975.

**Table I Management Goals and Control Measures for Noxious Weeds in the Study Area**

Common Name	Scientific Name	USDA Plant Code	Distribution within Study Area <sup>1</sup>	Management Goals <sup>2</sup>	Control Methods <sup>3</sup>	
					Chemical	Mechanical
<b>List B</b>						
Canada Thistle	<i>Cirsium arvense</i>	CIAR4	Prevalent throughout Williams Creek and associated tributaries. Common in disturbed areas, such as along roads, two-tracks, and fence lines.	Suppression for entire project area (see Page 104 of Rules).	Apply herbicides during the spring bud to bloom stage and fall regrowth, and immediately after mowing.	Mow every 10 to 21 days throughout the growing season. Best in combination with fall herbicide treatment.
Hoary Cress	<i>Cardaria draba</i>	CADR	Prevalent throughout Williams Creek and associated tributaries in the southern portion of the study area. Noted in isolated populations in disturbed upland areas, especially where livestock congregate.	Elimination for entire project area by 2021 (see Page 59 of Rules).	Apply herbicides during the early spring to summer growth stages (especially when flowering), and immediately after mowing.	Mow repeatedly during the early spring and summer, especially before plants bolt. Best in combination with fall herbicide treatment.

Common Name	Scientific Name	USDA Plant Code	Distribution within Study Area <sup>1</sup>	Management Goals <sup>2</sup>	Control Methods <sup>3</sup>	
					Chemical	Mechanical
Salt Cedar	<i>Tamarix chinensis</i>	TACH2	Prevalent throughout Williams Creek and associated tributaries, especially in wetter areas.	Suppression for entire project area (see Page 23 of Rules).	Apply herbicide to tree-stumps and roots (above soil surface) immediately after the tree is cut. Apply herbicide to roots, root collar, and trunk to a height of 12 to 15 inches above ground (summer to fall). Apply herbicide to foliage when plants are growing (May to September).	Large trees can be cut down using chainsaws and small trees with loppers. Apply herbicide to tree-stumps and roots (above soil surface) immediately after the tree is cut.
<b>List C</b>						
Field Bindweed	<i>Convolvulus arvensis</i>	COAR4	Prevalent throughout Williams Creek and associated tributaries. Common in disturbed areas, such as along roads, two-tracks, and fence lines.	No specific weed management goal set by state.	Apply herbicides after bloom (late summer to fall).	None.

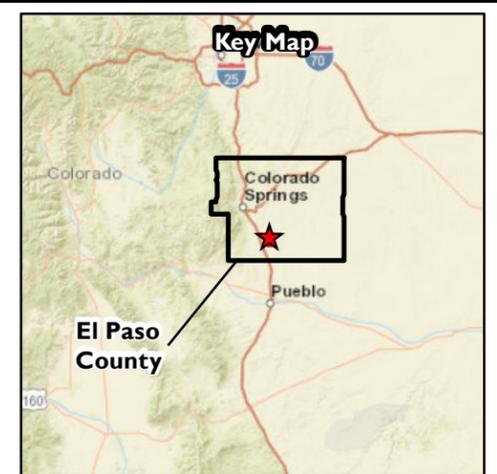
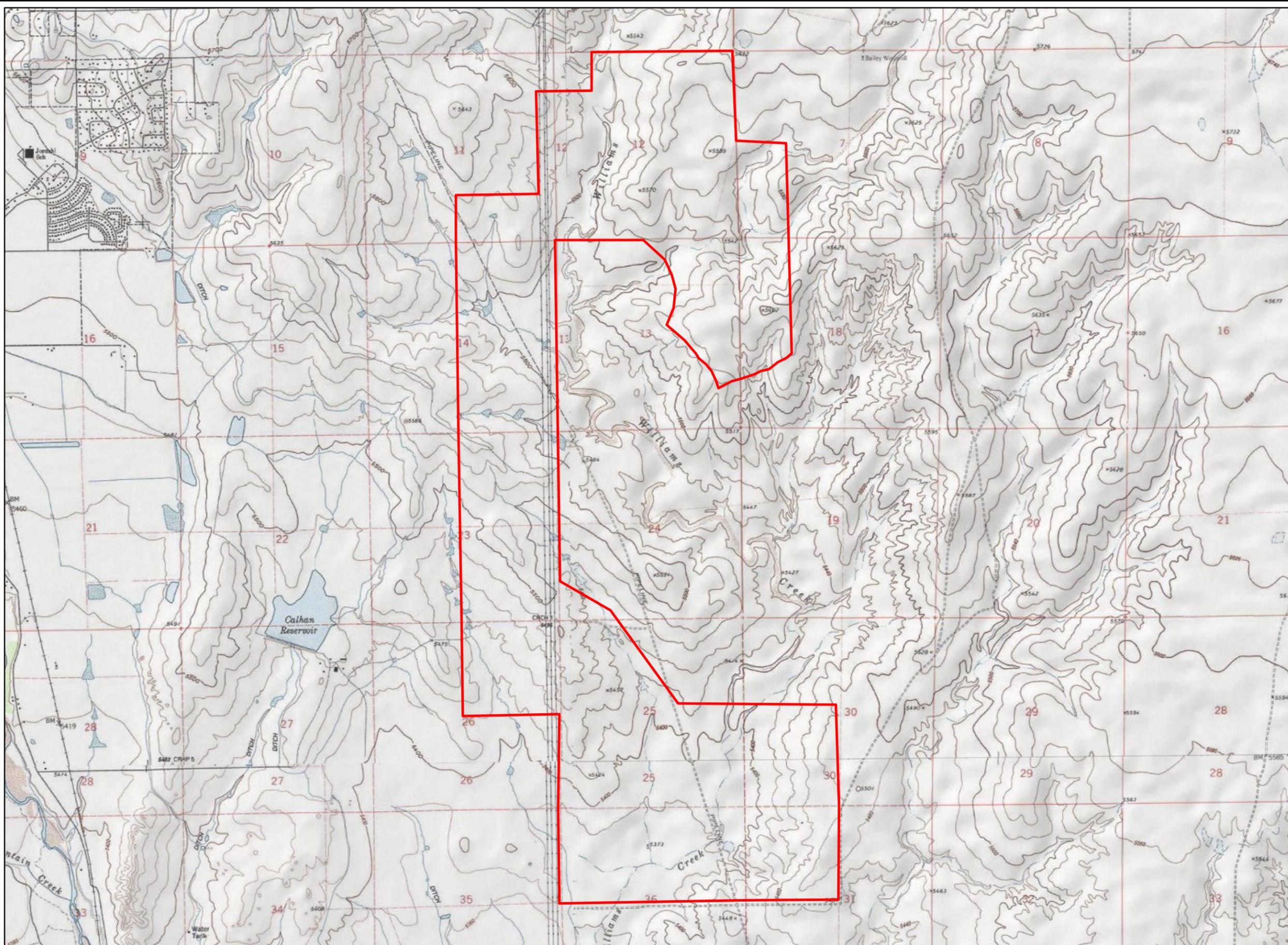
<sup>1</sup>See Figure 2 for details on distribution within the project area.

<sup>2</sup>Refer to Rules Pertaining to the Administration and Enforcement of the Colorado Noxious Weed Act (8 CCR 1206-2, Effective March 30, 2018) for more information.

<sup>3</sup>Refer to El Paso County's *Noxious Weeds and Control Methods* and the Colorado Department of Agriculture's Noxious Weed Fact Sheets for more information (see Appendix B).

USDA = United States Department of Agriculture

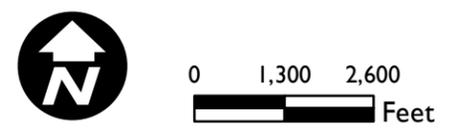
## Figures



**Legend**

 Study Area

USGS 7.5" Topographic Map  
 Fountain, Colorado 1961 (revised 1994)  
 Fountain NE, Colorado 1961  
 Fountain SE, Colorado 1961 (revised 1974)  
 Buttes, Colorado 1961 (revised 1994)



**PROJECT LOCATION**  
 Pike Solar Project  
 El Paso County, Colorado

Site Location: Multiple Sections, Township 16S, Ranges 64 and 65W, 6th Principal Meridian

Pinyon Project Number: I/20-1215-02

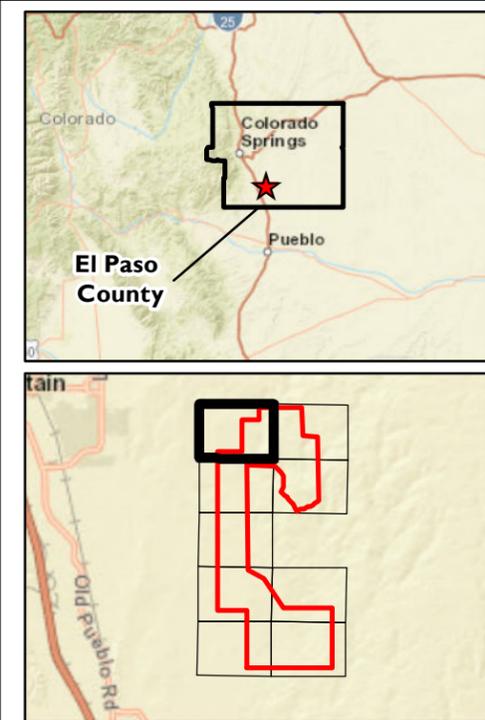
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Reviewed By: PMW

Date: I I/25/2020

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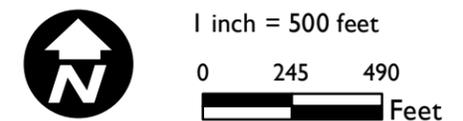
### Legend

-  Study Area
-  U.S. Geological Survey National Hydrography Dataset Flowline

#### Noxious Weeds:

-  Hoary Cress
-  Canada Thistle
-  Field Bindweed
-  Salt Cedar
-  Other (See Label in Map)

Noxious weeds were mapped in June 2018.



### NOXIOUS WEED INVENTORY

Pike Solar Project  
El Paso County, Colorado

Drawn By: PJW

Figure: 2a

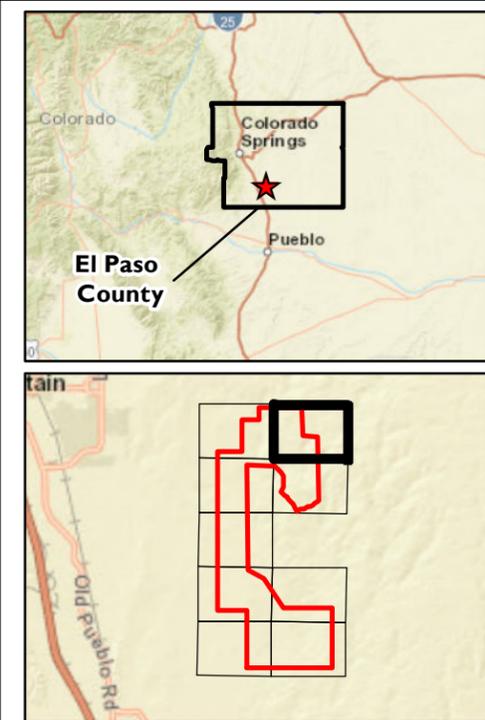
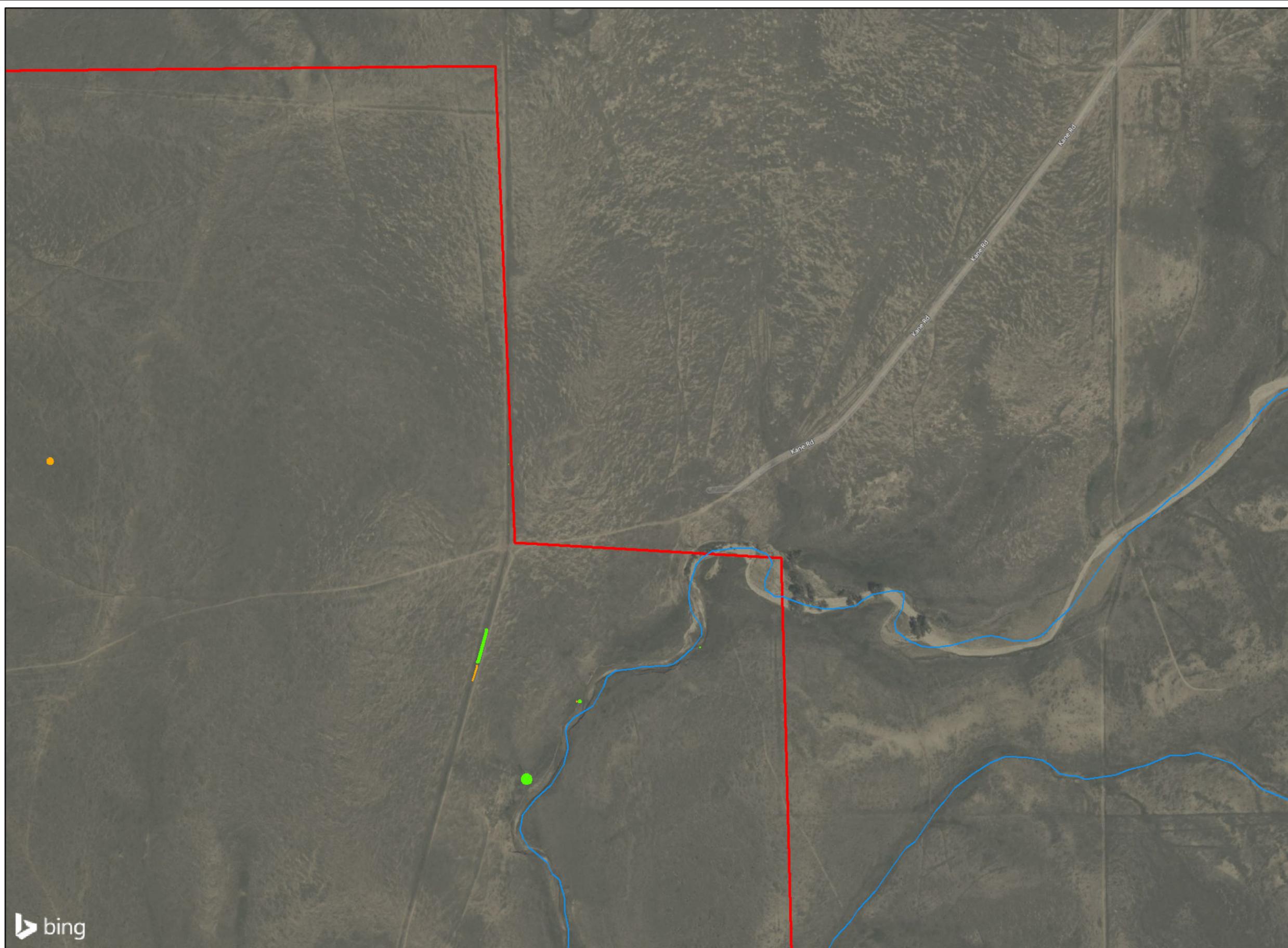
Reviewed By: BCA

Date: 11/25/2020

Site Location: Multiple Sections, Township 16S, Ranges 64 and 65W, 6th Principal Meridian

Pinyon Project Number: I/20-1215-02

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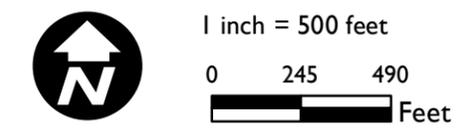
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-  Study Area
-  U.S. Geological Survey National Hydrography Dataset Flowline

#### Noxious Weeds:

-  Hoary Cress
-  Canada Thistle
-  Field Bindweed
-  Salt Cedar
-  Other (See Label in Map)

Noxious weeds were mapped in June 2018.



### NOXIOUS WEED INVENTORY

*Pike Solar Project  
El Paso County, Colorado*

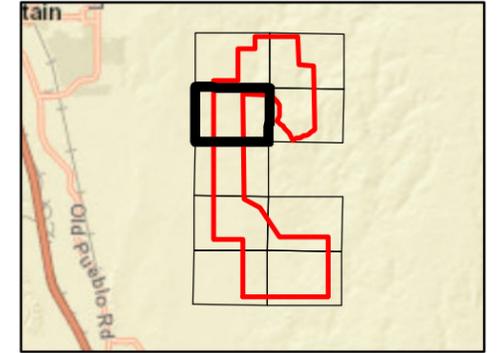
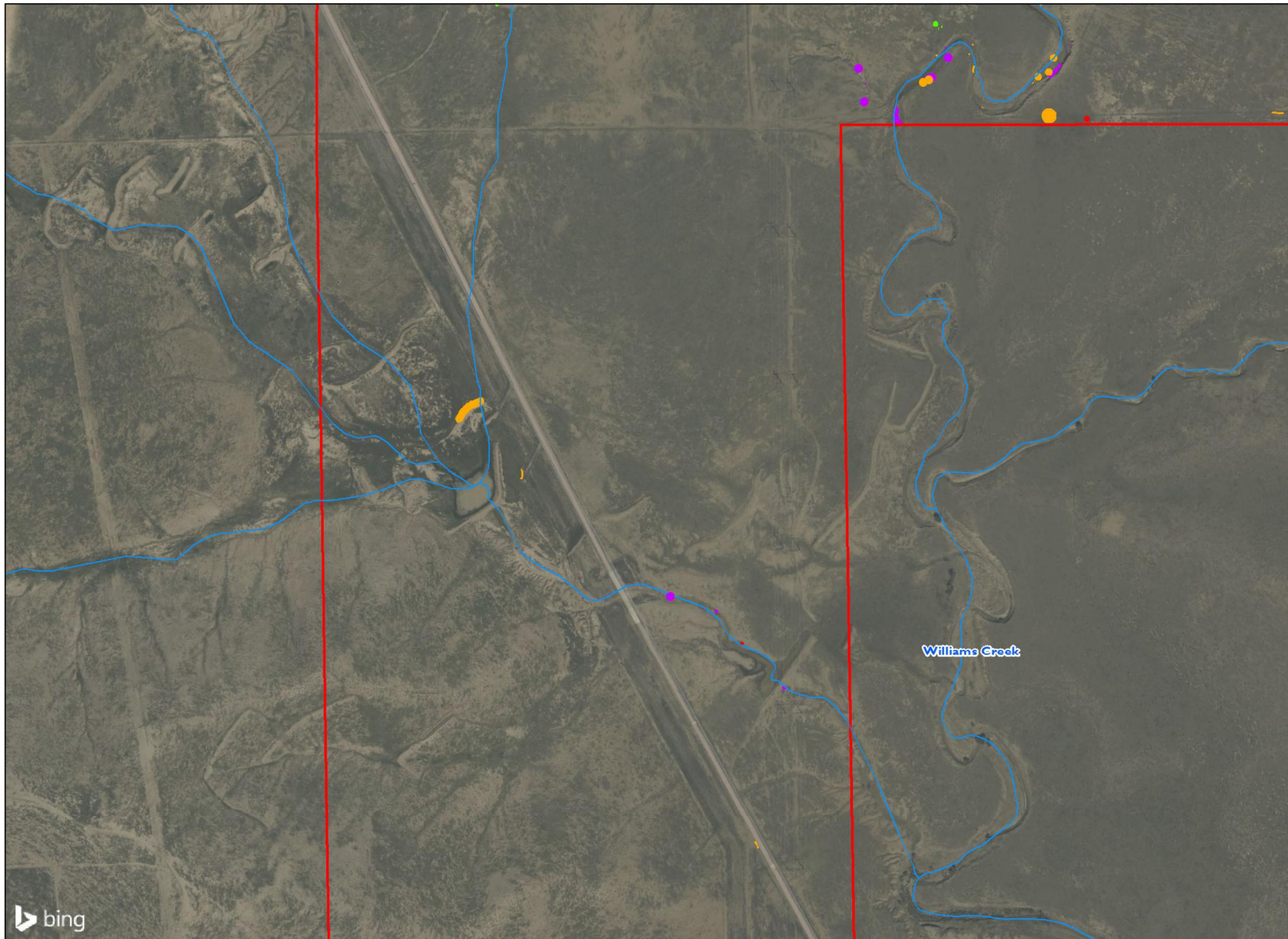
Site Location: Multiple Sections, Township 16S, Ranges 64 and 65W, 6th Principal Meridian

Pinyon Project Number: I/20-1215-02

Drawn By: PJW      Figure: 2b

Reviewed By: BCA      Date: 11/25/2020

Document Path: Z:\PROJECTS\2020\120121502 Juwi Pike Solar Project\Figures\ArcMap\MXD\Bio\INWMP\BIO02\_NoxxWeeds\_PikeSolar.mxd



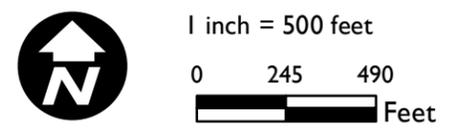
**Legend**

-  Study Area
-  U.S. Geological Survey National Hydrography Dataset Flowline

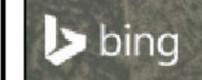
**Noxious Weeds:**

-  Hoary Cress
-  Canada Thistle
-  Field Bindweed
-  Salt Cedar
-  Other (See Label in Map)

Noxious weeds were mapped in June 2018.



**NOXIOUS WEED INVENTORY**  
*Pike Solar Project*  
*El Paso County, Colorado*



Site Location: Multiple Sections, Township 16S, Ranges 64 and 65W, 6th Principal Meridian

Pinyon Project Number: I/20-1215-02

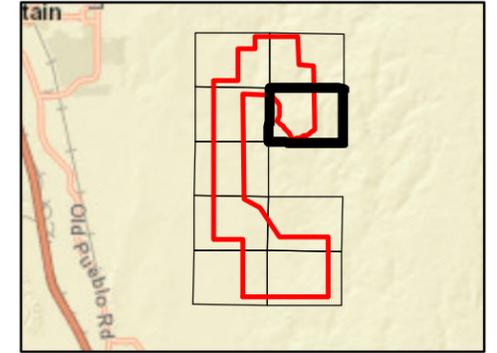
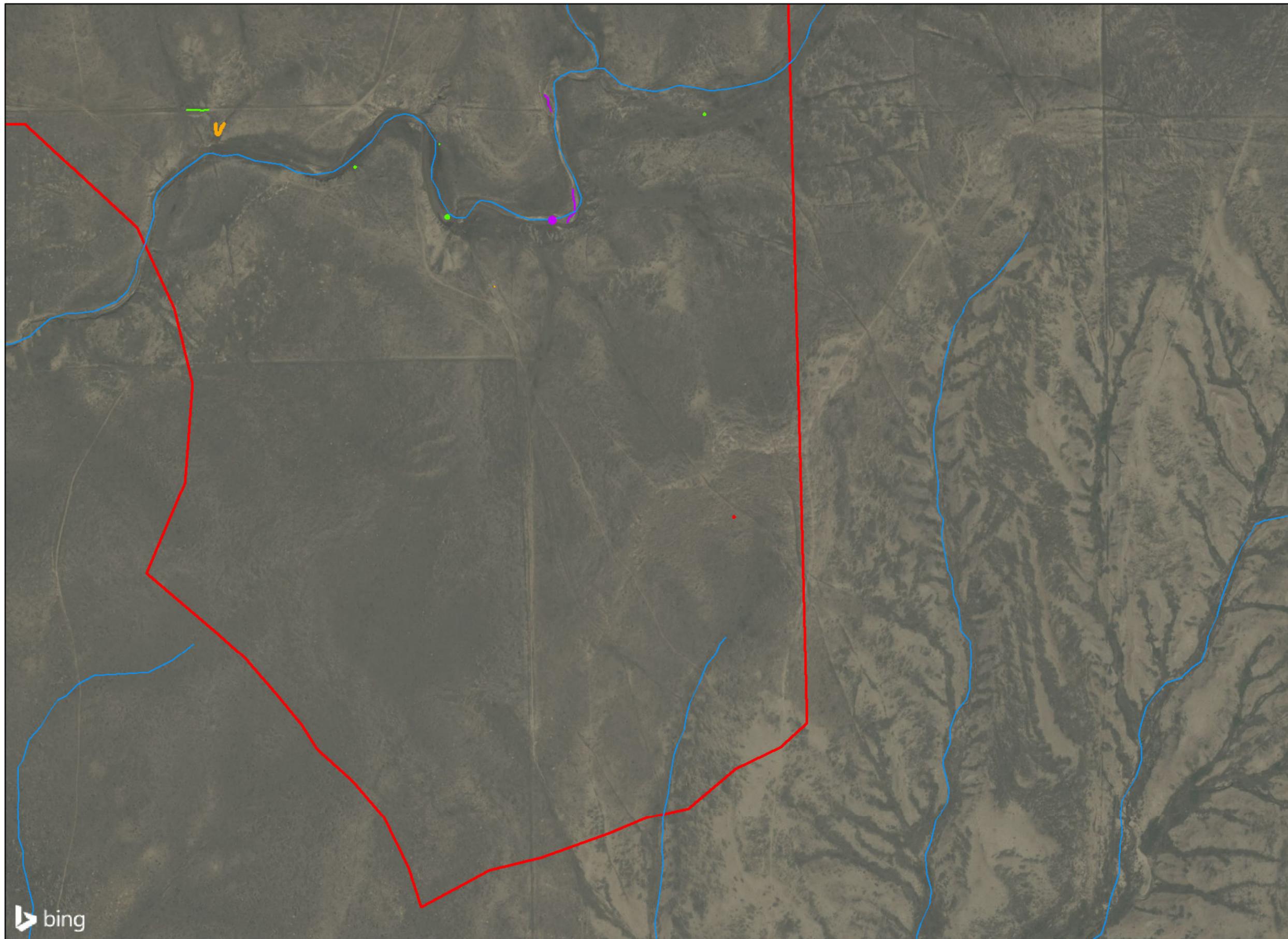
Drawn By: PJW

Figure: 2c

Reviewed By: BCA

Date: 11/25/2020

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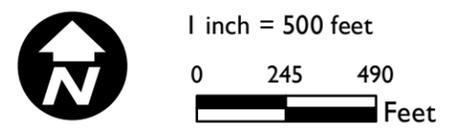
**Legend**

-  Study Area
-  U.S. Geological Survey National Hydrography Dataset Flowline

**Noxious Weeds:**

-  Hoary Cress
-  Canada Thistle
-  Field Bindweed
-  Salt Cedar
-  Other (See Label in Map)

Noxious weeds were mapped in June 2018.



**NOXIOUS WEED INVENTORY**  
*Pike Solar Project*  
*El Paso County, Colorado*

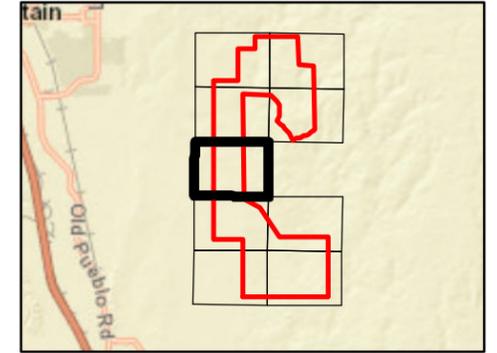
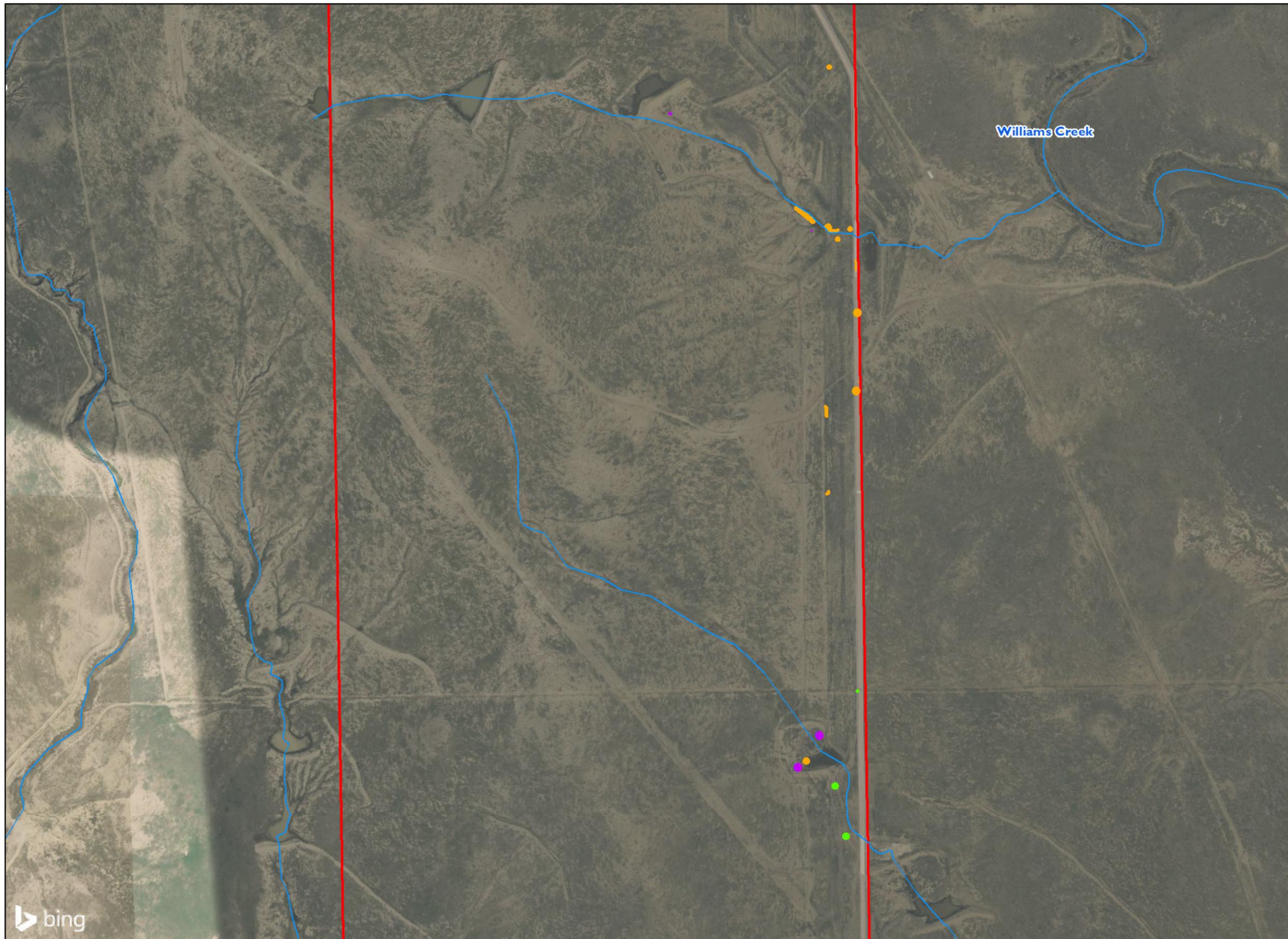
Site Location: Multiple Sections, Township 16S, Ranges 64 and 65W, 6th Principal Meridian

Pinyon Project Number: I/20-1215-02

Drawn By: PJW Figure: 2d

Reviewed By: BCA Date: 11/25/2020

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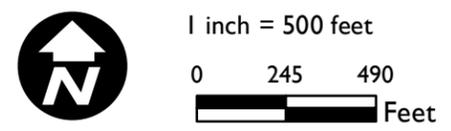
### Legend

-  Study Area
-  U.S. Geological Survey National Hydrography Dataset Flowline

#### Noxious Weeds:

-  Hoary Cress
-  Canada Thistle
-  Field Bindweed
-  Salt Cedar
-  Other (See Label in Map)

Noxious weeds were mapped in June 2018.



### NOXIOUS WEED INVENTORY

*Pike Solar Project  
El Paso County, Colorado*

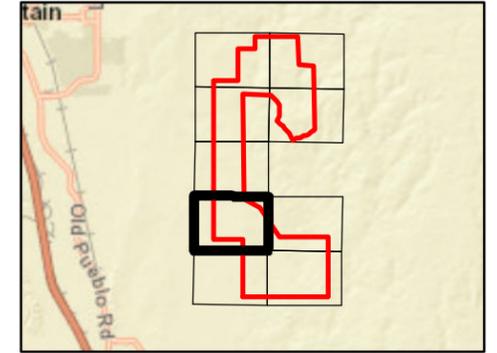
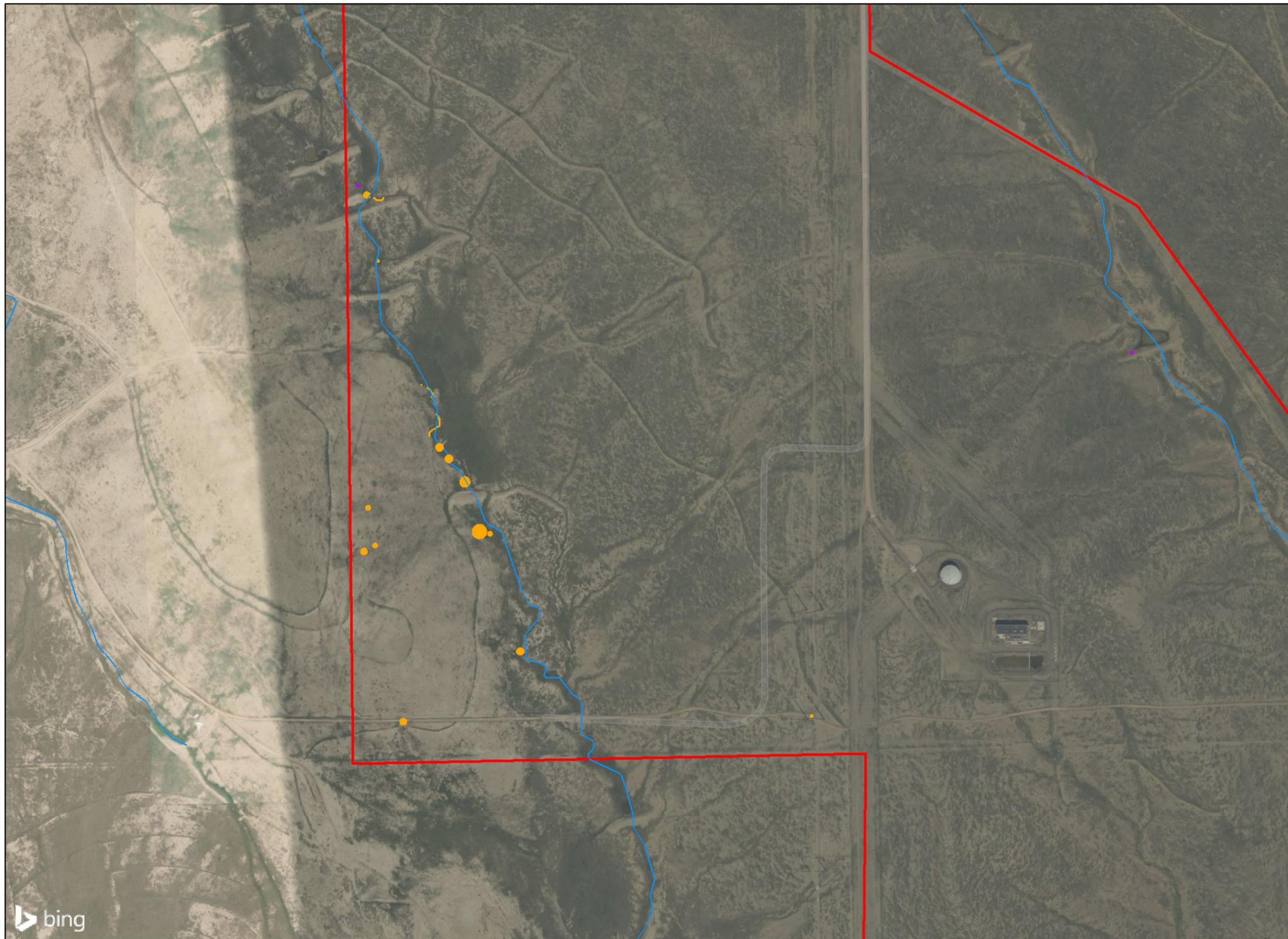
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Pinyon Project Number: I/20-1215-02

Drawn By: PJW Figure: 2e

Reviewed By: BCA Date: 11/25/2020

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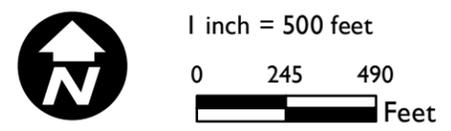
**Legend**

-  Study Area
-  U.S. Geological Survey National Hydrography Dataset Flowline

**Noxious Weeds:**

-  Hoary Cress
-  Canada Thistle
-  Field Bindweed
-  Salt Cedar
-  Other (See Label in Map)

Noxious weeds were mapped in June 2018.



**NOXIOUS WEED INVENTORY**  
*Pike Solar Project*  
*El Paso County, Colorado*



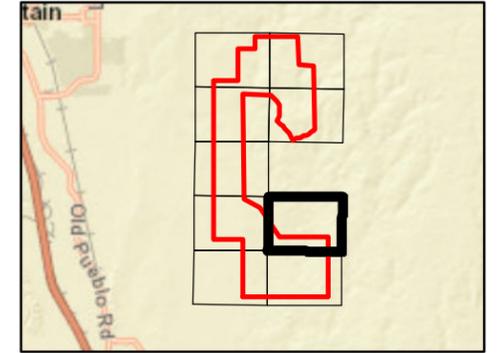
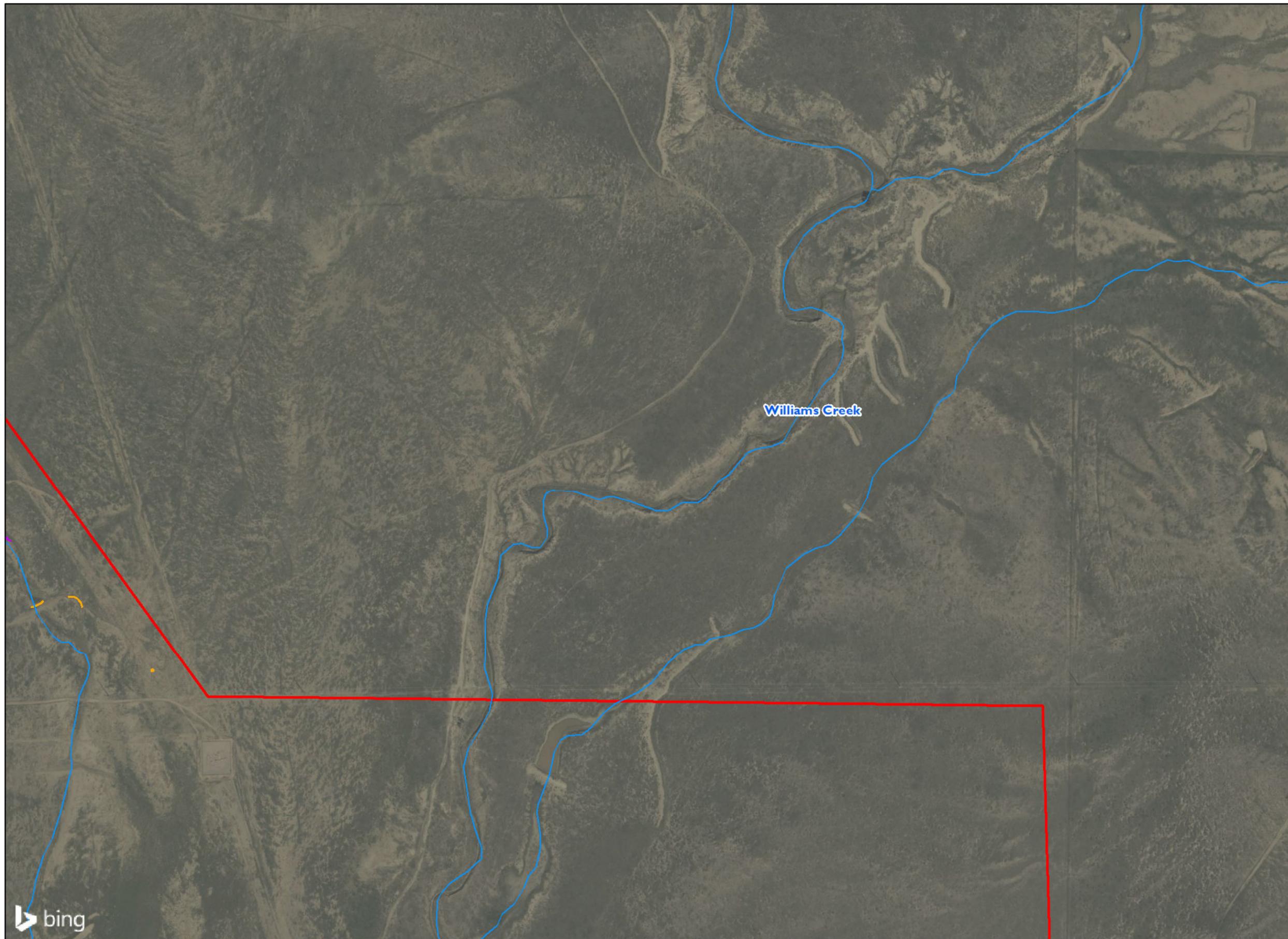
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Pinyon Project Number: I/20-1215-02

Drawn By: PJW      Figure: 2f

Reviewed By: BCA      Date: 11/25/2020

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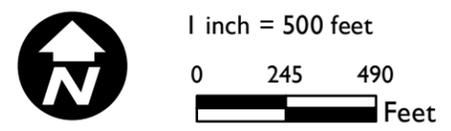
### Legend

-  Study Area
-  U.S. Geological Survey National Hydrography Dataset Flowline

### Noxious Weeds:

-  Hoary Cress
-  Canada Thistle
-  Field Bindweed
-  Salt Cedar
-  Other (See Label in Map)

Noxious weeds were mapped in June 2018.



## NOXIOUS WEED INVENTORY

*Pike Solar Project  
El Paso County, Colorado*



Site Location: Multiple Sections, Township 16S, Ranges 64 and 65W, 6th Principal Meridian

Pinyon Project Number: I/20-1215-02

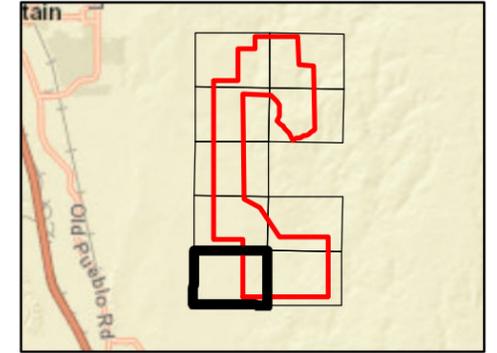
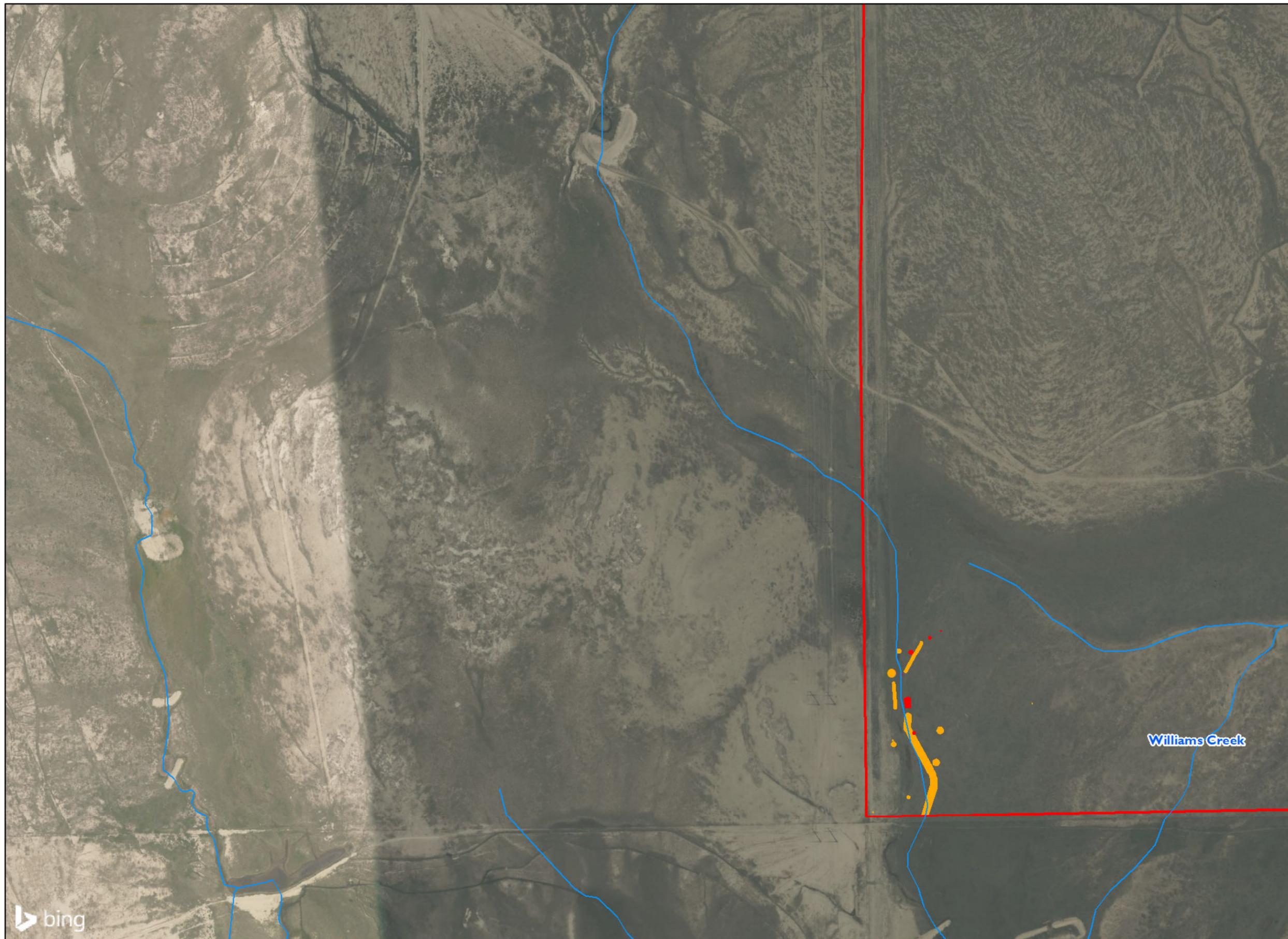
Drawn By: PJW

Figure: 2g

Reviewed By: BCA

Date: 11/25/2020

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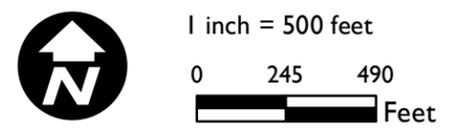
### Legend

-  Study Area
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#### Noxious Weeds:

-  Hoary Cress
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-  Salt Cedar
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### NOXIOUS WEED INVENTORY

*Pike Solar Project  
El Paso County, Colorado*

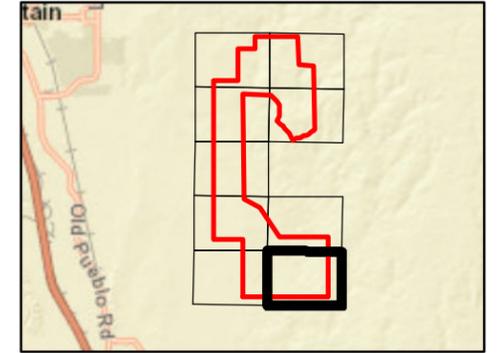
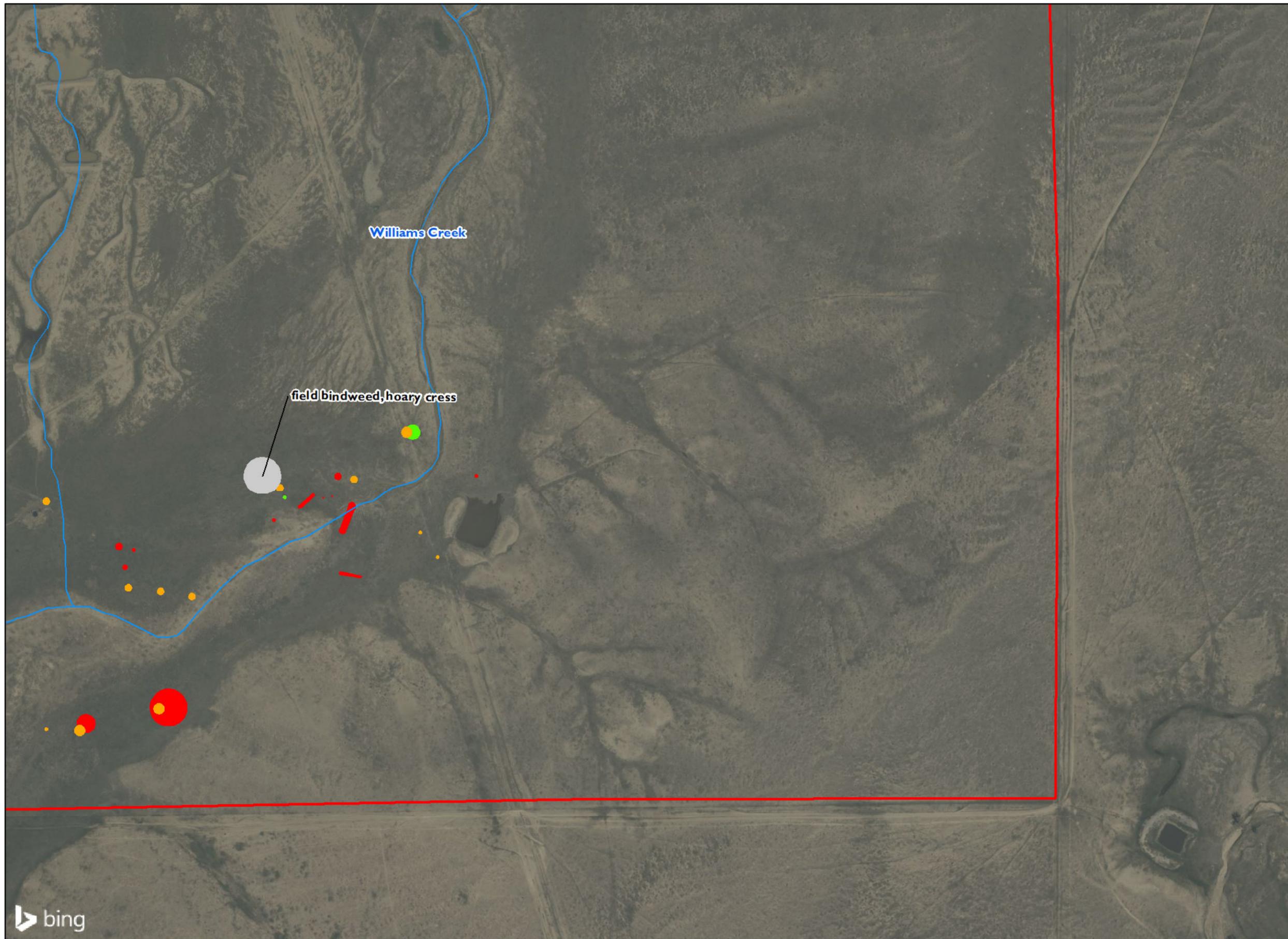
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Pinyon Project Number: I/20-1215-02

Drawn By: PJW      Figure: 2h

Reviewed By: BCA      Date: 11/25/2020

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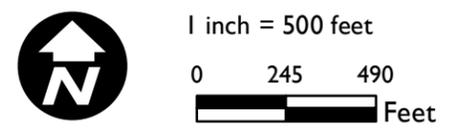
**Legend**

-  Study Area
-  U.S. Geological Survey National Hydrography Dataset Flowline

**Noxious Weeds:**

-  Hoary Cress
-  Canada Thistle
-  Field Bindweed
-  Salt Cedar
-  Other (See Label in Map)

Noxious weeds were mapped in June 2018.



**NOXIOUS WEED INVENTORY**  
*Pike Solar Project*  
*El Paso County, Colorado*



Site Location: Multiple Sections, Township 16S, Ranges 64 and 65W, 6th Principal Meridian

Pinyon Project Number: I/20-1215-02

Drawn By: PJW      Figure: 2i

Reviewed By: BCA      Date: 11/25/2020

Document Path: Z:\PROJECTS\2020\120121502 Juwi Pike Solar Project\Figures\ArcMap\MXD\Bio\INWMP\BIO02\_NoxxWeeds\_PikeSolar.mxd

## **Appendix A      Photographic Log**

Photo 1.  
Representative  
view of upland  
habitat in the  
study area.  
Photo taken June  
7, 2018.



Photo 2.  
Representative  
view of Williams  
Creek. Photo  
taken June 9,  
2018.



Photo 3. View of Canada thistle (*Cirsium arvense*) located at the base of an erosional feature in the study area. Photo taken June 8, 2018.



Photo 4. View of hoary cress (*Cardaria draba*) located in the riparian area of Williams Creek in the study area. Photo taken June 8, 2018.



Photo 5. View of salt cedar (*Tamarix chinensis*) growing along Williams Creek. Photo taken week of September 7, 2020.



Photo 6. View of field bindweed (*Convolvulus arvensis*) in the study area (notice white flowers). Photo taken June 7, 2018.



## **Appendix B      Noxious Weed Fact Sheets**

## Appendix B

### Noxious Weed Fact Sheets

Common Name	Scientific Name	USDA Plant Code
<b>List B</b>		
Canada Thistle	<i>Cirsium arvense</i>	CIAR4
Hoary Cress	<i>Cardaria draba</i>	CADR
Salt Cedar	<i>Tamarix chinensis</i>	TACH2
<b>List C</b>		
Field Bindweed	<i>Convolvulus arvensis</i>	COAR4



its root system, and quickly form dense stands. Each fragmented piece of root, 0.25 inch or larger, is capable of forming new plants. The key to controlling Canada thistle is to eliminate seed production and to reduce the plant's nutrient reserves in its root system through persistent, long-term management.

Canada thistle is one of the most troublesome noxious weeds in the U.S. It can infest diverse land types, ranging from roadsides, ditch banks, riparian zones, meadows, pastures, irrigated cropland, to the most productive dryland cropland. Large infestations significantly reduce crop and cattle forage production and native plant species. It is a host plant to several agricultural pests and diseases. Canada thistle prefers moist soils, but it can be found in a variety of soil types. It has been found at elevations up to 12,000 feet.

Effective Canada thistle control requires a combination of methods. Prevention is the most important strategy. Maintain healthy pastures and rangelands, and continually monitor your property for new infestations. Established plants need to be continually stressed. Management options become limited once plants begin to produce seeds. Details on the back of this sheet can help to create a management plan compatible with your site ecology.

Canada thistle (*Cirsium arvense*) is a non-native, deep-rooted perennial that spreads by seeds and aggressive creeping, horizontal roots called rhizomes. Canada thistle can grow 2 to 4 feet in height. The leaves are oblong, spiny, bright green, and slightly hairy on the undersurface. Unlike other noxious biennial thistles which have a solitary flower at the end of each stem, Canada thistle flowers occur in small clusters of 1 to 5 flowers. They are about 1 cm in diameter, tubular shaped, and vary from white to purple in color.

Canada thistle emerges from its root system from late April through May. It flowers in late spring and throughout the summer. It produces about 1,000 to 1,500 seeds per plant that can be wind dispersed. Seeds survive in the soil for up to 20 years. Additionally, Canada thistle reproduces vegetatively through



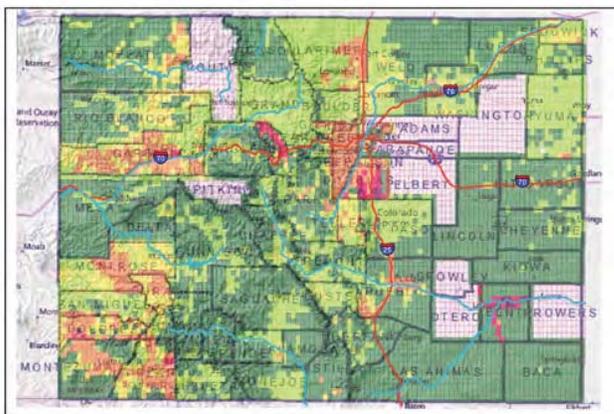
Canada thistle  
*Cirsium arvense*

## 2013 Quarter Quad Survey

Canada Thistle  
*Cirsium arvense*

2013 Quarterquad Survey  
Distribution and Abundance  
in Colorado

129,572+ Infested Acres



Distribution Legend: 0 acres 1-10 acres 11-50 acres 51-300 acres 301-999 acres >1000 acres Not Reported

Acreage estimates supplied by County Weed Coordinators and compiled by the Colorado Department of Agriculture.

Canada thistle is designated as a “List B” species as described in the Colorado Noxious Weed Act. It is required to be either eliminated, contained, or suppressed depending on the local infestations. For more information visit [www.colorado.gov/ag/weeds](http://www.colorado.gov/ag/weeds) and click on the Noxious Weed Program link or call the State Weed Coordinator at the Colorado Department of Agriculture, Conservation Services Division, (303) 869-9030.

### Key ID Points

1. Cluster of 1-5 white to purple flowers on a stem.
2. Floral bracts are spineless.
3. Small flowers that are 1 cm in diameter.
4. Perennial, rhizomatous plant with spiny, oblong, green leaves.

# Integrated Weed Management Recommendations

Integrated weed management is imperative for effective Canada thistle control. This weed needs to be continually stressed, forcing it to exhaust root nutrient stores, and eventually die. Mowing or grazing can be followed up with herbicide application. Avoid hand-pulling and tilling which can stimulate the growth of new plants.



## CULTURAL

Prevention is the best control strategy. Maintain healthy pastures, riparian areas, and rangelands. Prevent bare ground caused by overgrazing, and continually monitor your property for new infestations. Establishment of select grasses can be an effective control.

## BIOLOGICAL

Cattle, goats, and sheep will graze on Canada thistle when plants are young and succulent in the spring. Follow up grazing with a fall herbicide application. Insects are available, and provide limited control. Currently, collection and distribution methods for Canada thistle rust (*Puccinia punctiformis*) are being refined. For more information on Canada thistle biocontrol, contact the Colorado Department of Agriculture - Palisade Insectary at (970) 464-7916.

## MECHANICAL

Due to Canada thistle's extensive root system, hand-pulling and tilling create root fragments and stimulate the growth of new plants. Mowing can be effective if done every 10 to 21 days throughout the growing season. Combining mowing with herbicides will further enhance Canada thistle control.

## CHEMICAL

The table below includes recommendations for herbicides that can be applied to rangeland and some pastures. Treatments may be necessary for an additional 1 to 3 years because of root nutrient stores. Always read, understand, and follow the label directions.

Herbicide	Rate	Application Timing
Aminopyralid* (Milestone)	5-7 oz. product/acre + 0.25% v/v non-ionic surfactant OR 1 teaspoon product/gal water + 0.32 oz./gal water	Apply in spring at the pre-bud growth stage until flowering and/or to fall regrowth. Can also add chlorsulfuron (Telar) at 1 oz./acre to the mix.
Clopyralid + Triclopyr (Prescott; Redeem; others)	3 pints product/acre + 0.25% v/v non-ionic surfactant OR 1.25 oz. product/gal water + 0.32 oz./gal water	Apply until flowering and/or fall regrowth.
Aminocyclopyrachlor + chlorsulfuron (Perspective)*	5.5 oz. product/acre + 0.25% v/v non-ionic surfactant	Apply to spring rosette to flower bud growth stage; or fall. IMPORTANT: Applications greater than 5.5 oz. product/acre exceeds the threshold for selectivity. DO NOT treat in the root zone of desirable trees and shrubs. Not for use on grazed or feed forage.

Note: \*Product not permitted for use in the San Luis Valley.

Additional herbicide recommendations for this and other species can be found at:  
[www.colorado.gov/agconservation/CSUHerbicideRecommendations.pdf](http://www.colorado.gov/agconservation/CSUHerbicideRecommendations.pdf)

# Canada thistle

*Cirsium arvense*

## LIST B

### Canada thistle - *Cirsium arvense*

A deep-rooted perennial that spreads mainly through an aggressive rhizomatous root system, but also through seed production. Often grows in wet areas, but can grow in a variety of habitats. Small pieces of root (½ inch) can form new plants. Tilling and hand-pulling stimulate the growth of plants and are not an effective means of control.

#### Identification:

- Leaves: Spine-tipped, dark green, oblong, and crinkled.
- Flowers: Small purple (sometimes white) clusters on ends of branches.
- Stems: Hollow and spineless.

#### Control methods:

Biological: Grazing by cattle, goats, and sheep when plants are young. Insects available; have not shown effective control.

Rust fungus (*Puccinia punctiformis*) collection and distribution methods are being refined.

Mechanical: Neither hand-pulling or tilling is an option. Mowing can be effective if done every 10 to 21 days during the growing season. Especially effective combined with fall herbicide treatment.

#### Chemical:

Recommendations only! Always read, understand and follow the label.

#### **The label is the law!**

*Aminopyralid*: Apply in spring until flowering and/or to fall re-growth. Especially effective in fall after the first light frost.

*Clopyralid + triclopyr* : Apply in spring until flowering or fall regrowth.

*Aminoclopyrachlor + chlorsulfuron*: Effective from rosette to bud stage, also to fall regrowth.

# Hoary cress

Colorado Department of  
Agriculture

305 Interlocken Pkwy  
Broomfield, CO 80021

(303) 869-9030  
weeds@state.co.us



## Key ID Points

1. White flowers.
2. Grows erect 10-24" in height.
3. Leaf is 3/4-4" long with blunt end and fine white hairs.

## Hoary cress Identification and Management

well on alkaline soils.



## Identification and Impacts

**H**oary cress (*Lepidium draba*) commonly known as whitetop, is a creeping perennial that is a member of the mustard family and native to Europe. The stems, in the rosette stage, may grow up to 2 inches in height and produce grayish-green leaves that are lance shaped. The leaves are alternate and 3/4 to 4 inches long. The upper leaves have 2 lobes that clasp the stem. The plant has numerous small, white flowers with 4 petals on stalks radiating from a stem. Seed capsules are heart-shaped with two small, flat, reddish brown seeds. One plant can produce from 1,200 to 4,800 seeds. The plants emerge in early spring with stems emerging from the center of each rosette in late April. Hoary cress flowers from May to June and plants set seed by mid-summer.

**H**abitats for Hoary Cress include: fields, waste places, meadows, pastures, croplands and along roadsides. It is typically found on unshaded, generally open areas of disturbed ground. It generally does better with moderate amounts of precipitation and grows

**T**he key to effective control of Hoary cress is prevention. Preventing the encroachment of these weeds is the most cost-effective management. Preventing invasions by limiting seed dispersal, monitoring and using weed free hay, and quarantine animals that may have grazed in infested areas. Beyond prevention, the key is early detection when infestations are small, and aggressive management. Integrated Weed Management is required for proper control. Details on the back of this sheet can help to create a management plan compatible with your site ecology.

**H**oary cress is designated as a "List B" species in the Colorado Noxious Weed Act. It is required to be either eradicated, contained, or suppressed depending on the local infestations. For more information visit [www.colorado.gov/ag/weeds](http://www.colorado.gov/ag/weeds) and click on the Noxious Weed Management Program. Or call the State Weed Coordinator at the Colorado Department of Agriculture, Conservation Services Division.



Photos © Kelly Uhing, Colorado Department of Agriculture; Mark Schwarzlander, University of Idaho, Above map: Crystal Andrews, Colorado Department of Agriculture,

*Lepidium draba*

**CULTURAL**

Prevent the establishment of new infestations by minimizing disturbance and seed dispersal, eliminating seed production and maintaining healthy native communities. Contact your local Natural Resources Conservation Service for seed mix recommendations. Planting competitive legumes, such as alfalfa, can reduce Hoary cress in crop rotations.

**BIOLOGICAL**

There is no biological control available for Hoary cress. Since biological control agents take years to research, develop and release, no releases are expected in the foreseeable future. For more information, contact the Palisade Insectary of the Colorado Department of Agriculture at 970-464-7916.

**MECHANICAL**

Mowing several times before the plants bolt stresses Hoary cress and forces the plant to use nutrient reserves stored in the root system. Combining mowing with herbicides will further enhance control of this weed. Mow repeatedly during the summer, then apply a herbicide in the fall.

*Integrated Weed Management:*

*No single treatment provides effective, long term control. The best and first defense is always prevention. Once established, integrate a variety of combinations of competitive planting, crop rotations, and herbicides. This can reduce Hoary cress to manageable levels.*

# Hoary cress

**HERBICIDES**

NOTE: The following are recommendations for herbicides that can be applied to range and pasturelands. Rates are approximate and based on equipment with an output of 30 gal/acre. Please read label for exact rates. Always read, understand, and follow the label directions. The herbicide label is the LAW!

Herbicide	Rate	Application Timing
Chlorsulfuron* (Telar)	1 oz. product/acre + 0.25% v/v non-ionic surfactant	Apply at flowering. (Early spring to early summer)
Metsulfuron (Escort XP)	1 oz. product/acre + 0.25% v/v non-ionic surfactant	Apply at flowering. (Early spring to early summer)
Imazapic (Plateau, Panoramic)	12 oz./acre + 2 pints/acre methylated seed oil or crop oil concentrate	Apply at late flower to post-flower growth stage. (Late spring to mid-summer)

Note: \*This herbicide has residual soil activity that will affect all broadleaf seedlings germinating after application has occurred.

Additional herbicide recommendations for other species can be found at:  
[www.colorado.gov/agconservation/CSUHerbicideRecommendations.pdf](http://www.colorado.gov/agconservation/CSUHerbicideRecommendations.pdf)

## LIST B

### Hoary cress - *Cardaria draba*

A.K.A. whitetop, this perennial member of the mustard family (*Brassicaceae*) reproduces by seeds and creeping rhizomes. One of the first noxious weeds to emerge in the spring, it flowers in early spring and sets seed by mid-summer. Single plants are capable of producing as many as 4,800 seeds that can remain viable in the soil for about 3 years. Hoary cress prefers moderate precipitation, alkaline soils, lots of sun, and disturbed sites, and can grow in a variety of habitats.

#### Identification:

- Flowers: White with four petals, flat-topped flower clusters.
- Leaves: Blue-green, lance-shaped, serrated edges, blunt ends.
- Seeds: Heart-shaped capsules hold two flat reddish-brown seeds.

#### Control methods:

##### Biological:

No biological control available.

##### Mechanical:

Mow frequently in early spring before the bolting stage to stress the plant. Mow several times during the summer, and apply herbicide during the fall for optimum control.

##### Chemical:

Recommendations only! Always read, understand and follow the label.

#### **The label is the law!**

*Chlorsulfuron*: Apply while flowering.

*Metsulfuron*: Apply while flowering (Early spring to early summer).

# Saltcedar

Colorado Department of  
Agriculture

305 Interlocken Pkwy  
Broomfield, CO 80021

(303) 869-9030  
weeds@state.co.us



## Key ID Points

1. Saltcedar is a tall shrub or small tree that has white to pink flowers in clusters called racemes.
2. Leaves are small and scaly.

## Saltcedar Identification and Management



### Identification and Impacts

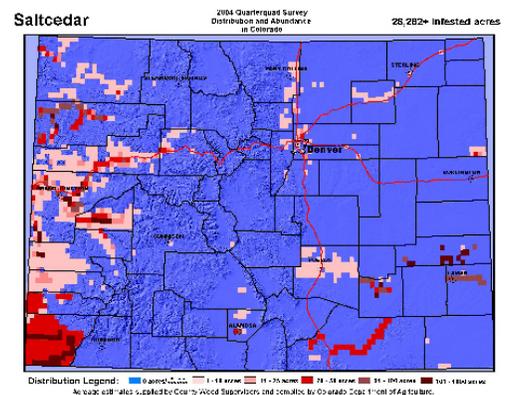
Saltcedar, or tamarisk (*Tamarix spp.*), is a non-native deciduous evergreen shrub or small tree that grows from 5 to 20 feet tall. The bark on saplings and stems is reddish-brown. The leaves are small, scale-like and bluish-green in color. Tiny pink to white flowers have five petals and grow on slender racemes. Saltcedar reproduces by seeds as well as vegetatively. A mature plant can produce up to 600,000 seeds per year. Seeds are viable for up to 45 days under ideal conditions. Saltcedar buds break dormancy in February or March. Flowering occurs anytime between April and August. Ideal conditions for saltcedar seedling survival are saturated soil during the first few weeks of life, a high water table, and open sunny ground with little competition from other plants.

Saltcedar was introduced from central Asia, northern Africa, and southern Europe for ornamental purposes and for stream bank stabilization. It is now widespread in the United States. Saltcedar crowds out native stands of riparian and wetland vegetation. Saltcedar increases salinity of surface soil, rendering the soil inhospitable to native plant species. Saltcedar can be

found along floodplains, riverbanks, streambanks, marshes, and irrigation ditches. It's heavy use of water has contributed to the intensity of the drought.

The most effective method of control for saltcedar is to prevent its establishment through proper land management. Monitor susceptible areas for new infestations. An integrated weed management approach has proven to be an effective control when dealing with saltcedar. Details on the back of this sheet can help to create a management plan compatible with your site ecology.

Saltcedar is designated as a "List B" species on the Colorado Noxious Weed Act. It is required to be either eradicated, contained, or suppressed depending on the local infestations. For more information, please visit [www.colorado.gov/ag/csd](http://www.colorado.gov/ag/csd) and click on the Noxious Weed Program link. Or call the State Weed Coordinator of the Colorado Department of Agriculture, Conservation Services Division, 303-239-4100.



Plant and flower photos © Kelly Uhing. Leaf photo © USDA Aphis PPQ. Infestation photo above, © Steve Dewey, Invasive.org. Tamarisk branch © Stevens County, WA Noxious Weed Control Board

*Tamarix spp.*



**CULTURAL**

After a saltcedar infestation is managed, revegetation is necessary in order to protect the soil resource and reduce the threat of reinvasion. Seeded grasses, willow stakes, and cottonwood cuttings can reduce the chances of saltcedar reinvading managed sites.



**BIOLOGICAL**

The saltcedar leaf beetle (*Diorhabda elongata*) larvae and adults feed on foliage. This causes stem dieback and potential death of the plant if defoliation is consistent. The leaf beetle should be available for limited distribution. For more information, contact the Palisade Insectary of the Colorado Department of Agriculture, 970-464-7916.



**MECHANICAL**

A bulldozer or prescribed fire can be used to open up large stands of saltcedar. These methods must be followed up with a herbicide treatment of the resprouts when they are 1 to 2 meters tall. Chainsaws, or loppers for smaller plants, are effective for cut-stump treatments to smaller infestations or in environmentally-sensitive management areas.

*Integrated Weed Management:*

*Select the appropriate control method based on the size of the area and other environmental or cultural considerations. Re-seed controlled areas with desirable species to protect the soil resource and to prevent or slow saltcedar reinvasion. Follow up control efforts the same growing season and for several years afterwards.*

# Saltcedar

**HERBICIDES:** The following are recommendations for herbicides that can be applied to range and pasturelands. Rates are approximate and based on hand-held equipment with an output of 30 gallons per acre. Always read, understand, and follow the label directions. **The herbicide label is the LAW!**

Herbicide	Rate	Application Timing
Triclopyr (Garlon 4, Remedy)	20-30% solution in basal bark oil. The herbicide Pathfinder comes pre-mixed in oil and does not require dilution.	Cut-Stump Treatment: Apply to the cambial layer of the tree immediately after the cut-stump treatment and to roots above soil surface. (Summer to fall) Basal Bark Treatment: Spray till wet but not dripping; the roots above soil surface, root collar, and lower trunk to a height of 12-15 inches above ground (Summer to fall)
Glyphosate* (Rodeo - approved aquatic label)	Undiluted (100% solution) or 50% solution in basal bark oil	Cut-Stump Treatment: Apply to the cambial layer of the tree immediately after the cut-stump treatment and to roots above soil surface. Diluted solutions requires regular agitation. (Summer to fall)
Triclopyr (Garlon 4, Remedy) + Aminopyralid (Milestone)	3 qts. Garlon 4/acre + 7 oz. Milestone/acre + 0.25% v/v non-ionic surfactant	Broadcast foliar treatment: Apply when plants are growing rapidly. (May to September)
Note: *These products are non-selective and will kill any vegetation contacted.		
Additional herbicide recommendations for other species can be found at: <a href="http://www.colorado.gov/agconservation/CSUHerbicideRecommendations.pdf">www.colorado.gov/agconservation/CSUHerbicideRecommendations.pdf</a>		



## LIST B

### **Tamarisk (Salt cedar) - *Tamarix* spp.**

A small shrub or tree that reproduces vegetatively and by seed. Mature plants can produce up to 600,000 seeds that are viable for up to 45 days. It increases the salinity of the soil surface, which favors its growth while hindering native plant growth. It is often found in floodplains, along river banks, stream banks, irrigation ditches, and marshes.

#### **Identification:**

- Flowers: Tiny, pink to white, 5 petals, slender flower stalks.
- Leaves: Small, scale-like (like juniper), bluish-green in color.
- Stems: Reddish-brown color.

#### **Control Methods:**

##### Biological:

*Diorhabda* elongata-Leaf beetle, is available for limited distribution.

##### Mechanical:

Bulldozing can be used to open up large stands of salt cedar; follow up with herbicide treatment of re-growth when 1 to 2 meters tall.

The cut-stump method can be applied with a chainsaw, or loppers for smaller plants.

##### Chemical:

Recommendations only! Always read, understand and follow the label.

#### **The label is the law!**

Cut-stump method refers to mechanically cutting down the tree, then immediately applying herbicide to the stump.

*Triclopyr*: Cut-stump & basal bark - Summer to fall.

*Glyphosate* (Aquatic): Cut-stump - Summer to fall. Treat the cambium immediately after cutting and to roots above the ground.

*Triclopyr* + *Aminopyralid*: Broadcast foliar treatment: Apply when plants are growing rapidly—May to September.

# Field bindweed

Colorado Department of  
Agriculture

305 Interlocken Pkwy  
Broomfield, CO 80021

(303) 869-9030  
weeds@state.co.us



## Key ID Points

1. Leaves are shaped like arrowheads.
2. Flowers are funnel-shaped, white to pink, and have two small bracts one inch below the flower base.

## Field bindweed Identification and Management



### Identification and Impacts

**F**ield bindweed (*Convolvulus arvensis*) is a non-native deep-rooted perennial that reproduces from seed and creeping, horizontal roots (rhizomes). Field bindweed stems are prostrate (grows low to the ground) and twining, and grow up to 6 feet long. Leaves are distinguishable by their arrowhead shape. The flowers are bell or trumpet-shaped, white to pink in color, and are about 1 inch long. Field bindweed seeds can remain viable in the soil for up to 40 years.

**F**ield bindweed emerges from its root system in the spring. Flowering occurs from June to September and until the first fall frost. The number of seeds produced per plant ranges from 25 to 300 and seed production is variable depending on environmental conditions. Field bindweed is an extremely difficult noxious weed to control because, in part, of its taproot that may go 20 feet deep into the soil, and which repeatedly gives rise to numerous long rhizomes.

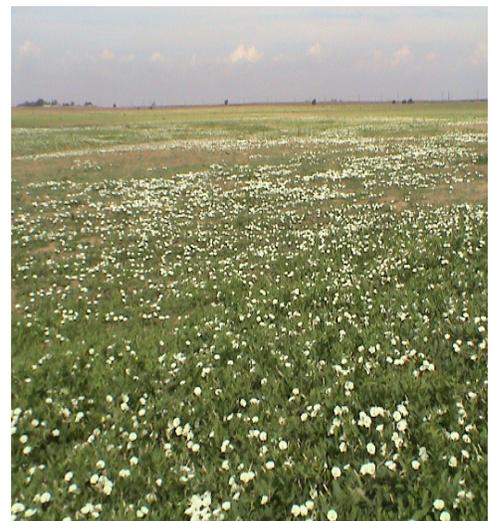
**F**ield bindweed is a problem throughout Colorado. It is one of the most competitive perennial weeds. It is widespread in cultivated areas, pastures, lawns, gardens, roadsides, and waste areas from 4,000 to 8,000

feet in elevation.

**T**o successfully manage field bindweed, containment and persistence in controlling existing stands are necessary in order to exhaust the root system and deplete the soil seed bank. This weed needs to be continually stressed, forcing it to exhaust root nutrient stores and eventually die. Of all control methods, prevention is most important. Maintain healthy pastures and rangeland and continually monitor your property for new infestations. A healthy cover of desirable perennial plants will assist in discouraging field bindweed establishment.

**F**ield bindweed is designated as a "List C" species on the Colorado Noxious Weed Act. It is required to be either eradicated, contained, or suppressed depending on the local jurisdictions managing this species.

**O**n the back of this sheet are field bindweed management recommendations. For more information, visit [www.ag.state.co.us/csd/csdhome.html](http://www.ag.state.co.us/csd/csdhome.html). Or call the State Weed Coordinator at the Colorado Department of Agriculture, Conservation Services Division, 303-239-4100.



White flower © Mary Ellen Harte, Invasive.org.  
All other photos © Kelly Uhing.

*Convolvulus arvensis*



**CULTURAL**  
Establishment of selected grasses can be an effective cultural control of field bindweed. Contact your local Natural Resources Conservation Service for seed mix recommendations. Maintain healthy pastures and prevent bare spots caused by overgrazing. Bareground is prime habitat for **weed invasions**.



Bindweed mite damage

**BIOLOGICAL**  
The bindweed gall mite, *Aceria mahlerbae*, has proven to be effective in reducing field bindweed infestations. This is an option for large infestations. To obtain a mite release, contact the Colorado Department of Agriculture, 970-464-7916.



**MECHANICAL**  
Cutting, mowing, or pulling has a negligible effect unless the plants are cut below the surface in the early seedling stage. Well-established populations have a large seed bank in the soil that can remain viable for over 40 years.

*Integrated Weed Management:*

*Field bindweed requires active management once it is established because of its potential to regenerate rapidly. Even small infestations should be viewed as a serious threat and managed aggressively.*

*Contain and persistently control infestations in order to exhaust the root system and deplete the soil seed bank.*

*Maintain a healthy cover of perennial plants to discourage field bindweed establishment.*

**HERBICIDES:** The following are recommendations for herbicides that can be applied to range and pasturelands. *Rates are approximate and based on equipment with an output of 30 gallons per acre. Please read label for exact rates. Always read, understand, and follow the label directions. The herbicide label is the LAW!*

HERBICIDE	RATE	APPLICATION TIMING
Clarity + 2,4-D Amine	1 qt./acre or 1 oz/gal water	Just after full-bloom and/or fall. DO NOT apply near or under trees/shrubs or where soils have rapid permeability. DO NOT apply when outside temperatures will exceed 85 degrees. Add non-ionic surfactant @ 0.32oz/gal water or 1 qt/100 gal water.
Tordon 22K *this is a Restricted Use Pesticide*	1 qt./acre or 1 oz/gal water	Just after full-bloom and/or fall. DO NOT apply near or under trees/shrubs or where soils have rapid permeability. Add non-ionic surfactant @ 0.32oz/gal water or 1qt/100 gal water.
Roundup Ultra *non-selective herbicide, will kill all vegetation*	4 - 5 qts./acre or 4 - 5 oz/gal water	Apply at full-bloom and/or fall. Add non-ionic surfactant @ 0.32oz/gal water or 1qt/100 gal water. Use caution when applying near grasses or other desirable vegetation.

# Field bindweed



## LIST C

### Field bindweed - *Convolvulus arvensis*

A deeply rooted perennial that reproduces through seeds and rhizomes. Taproots can extend up to 20 feet deep into the soil and seeds can remain viable for up to 40 years. Commonly found throughout Colorado in, pastures, roadsides, waste areas, lawns, and gardens from 4,000 to 8,000 feet in elevation.

#### Identification:

- Flowers: White to light pink, trumpet or bell-shaped.
- Leaves: Arrowhead shape.
- Stems: Prostrate, twining, up to 6 feet long.

#### Control Methods:

##### Biological:

The Bindweed Gall Mite, *Aceria mahlerbae*, is available for control and has been successful.

##### Mechanical:

Cutting, mowing, and pulling have negligible effects unless plants are cut below the soil surface in the early seedling stage.

##### Chemical:

Recommendations only! Always read, understand and follow the label.

#### **The label is the law!**

*Dicamba + 2,4-D:* Apply just after full bloom and/or in fall.

*Picloram:* Apply just after full bloom and/or in fall.

*Glyphosate:* Apply when plants are in full bloom and/or in fall.

## **Appendix C      Noxious Weed Control Requirement Maps**

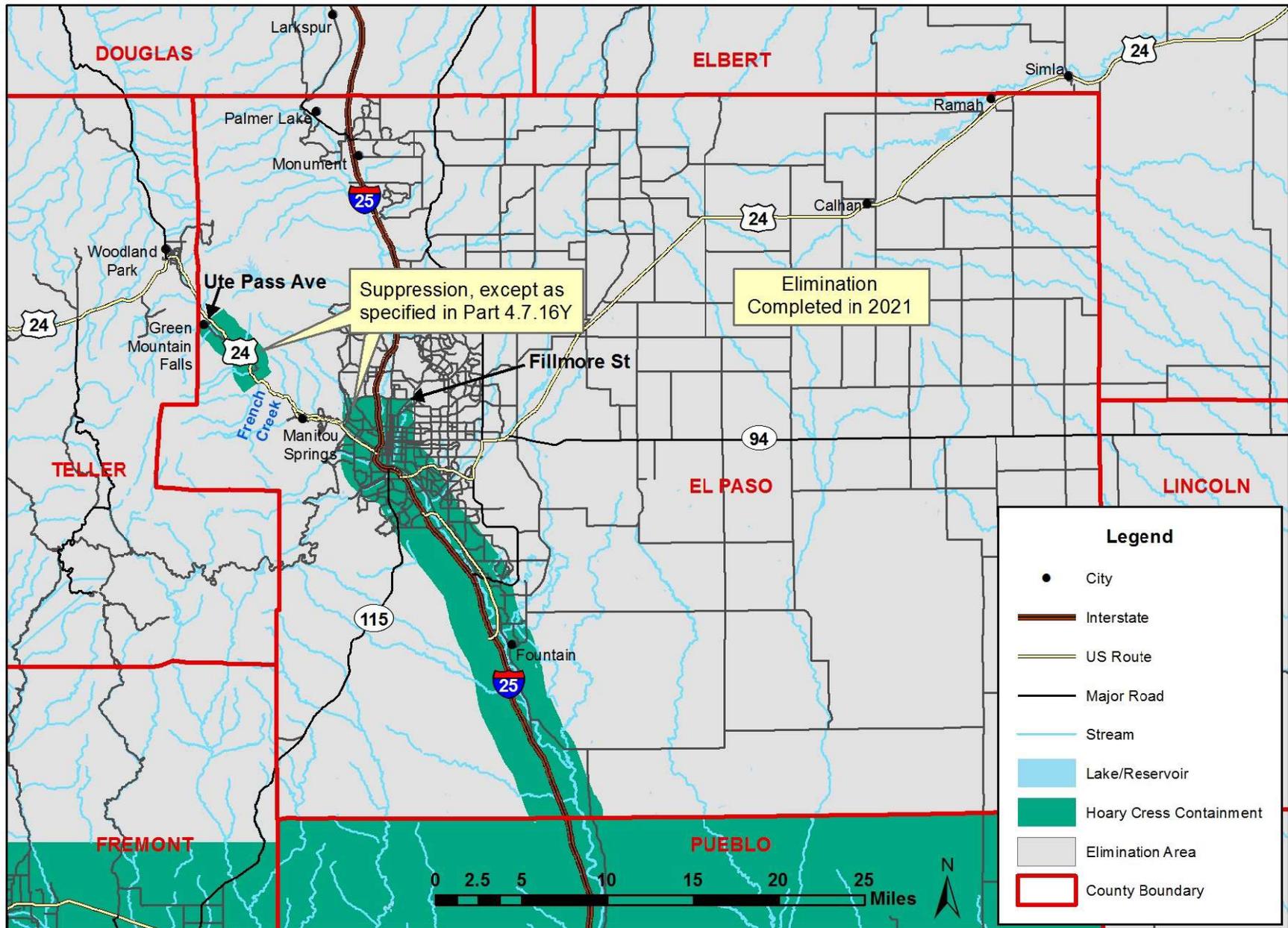
## Appendix C

### Noxious Weed Control Requirements Maps

Common Name	Scientific Name	USDA Plant Code
List B		
Hoary Cress	<i>Cardaria draba</i>	CADR
Salt Cedar	<i>Tamarix chinensis</i>	TACH2

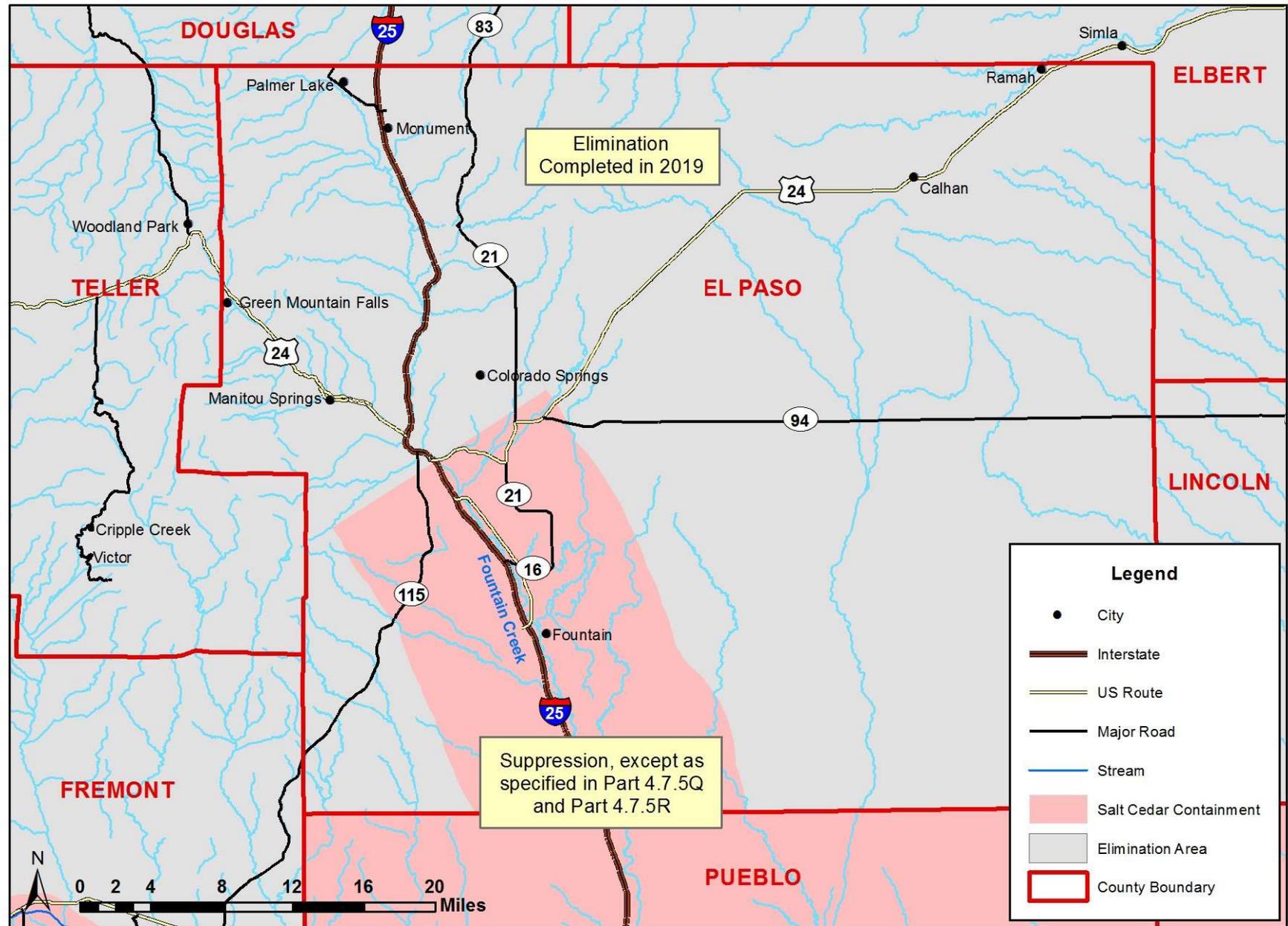
# Hoary Cress (*Cardaria draba*) El Paso County

Figure 13.08



# Salt Cedar (*Tamarix chinensis*, *T. parviflora*, and *T. ramosissima*) El Paso County

Figure 4.06



## **Appendix D      Blank Documentation Form**



**Pike Solar Project, El Paso County, Colorado  
 NOXIOUS WEED MANAGEMENT ACTIVITY DOCUMENTATION**

Date:	Name:
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<b>Activity (check all that apply):</b>	
<input type="checkbox"/> Weed Management .....	Go to Section A
<input type="checkbox"/> Weed Inventory/Inspection.....	Go to Section B
<input type="checkbox"/> Vehicle/Equipment Inspection.....	Go to Section C
<input type="checkbox"/> Other (Describe)	

<b>Section A – Weed Management</b>	
<input type="checkbox"/> Mowing	<input type="checkbox"/> Deadheading
<input type="checkbox"/> Hand pulling	<input type="checkbox"/> Herbicide application (fill out section below)
<input type="checkbox"/> Weed free straw/bales (attach certification)	<input type="checkbox"/> Weed free seed (attach seed tags)
<input type="checkbox"/> Weed free topsoil (attach documentation)	<input type="checkbox"/> Other (describe)
Target Area (stationing and description):	Target Species:
<b>Herbicide Application</b> (either fill out below or attach spray sheet with same information)	
Name and Company of Applicator:	Colorado Herbicide Application License Number:
Weather/Wind:	Application Method:
Herbicide Used (Name and Active Ingredient):	Total Amount and Rate used:
Target area (stationing and description):	Target Species:



**Pike Solar Project, El Paso County, Colorado**  
**NOXIOUS WEED MANAGEMENT ACTIVITY DOCUMENTATION**

<b>Section B – Weed Inspection/Inventory</b>	
Target Area (stationing and description):	Target Species:
Reason for inspection/inventory:	
Summary of findings:	
Follow up activities needed:	
<input type="checkbox"/> Follow up activities completed (provide details)	

<b>Section C - Vehicle/Equipment Inspection</b>	
<input type="checkbox"/> Tires/treads free of mud	<input type="checkbox"/> Tires/treads free of plant material
<input type="checkbox"/> Understory free of mud	<input type="checkbox"/> Understory free of plant material
<input type="checkbox"/> Mud scraped off	<input type="checkbox"/> Mud washed off
<input type="checkbox"/> Plant material removed	<input type="checkbox"/> Plant material washed off
<input type="checkbox"/> Other (describe)	