

SALT CEDAR REMOVAL IN THE NO-MOW ZONES IN THE RIO GRANDE CANALIZATION PROJECT, HATCH, NEW MEXICO

Prepared for:



U.S. Section, International
Boundary and Water
Commission

Prepared by:



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INCORPORATED

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Contract 191BWC2OD0003
Task Order 191BWC21F0099

May 2023



Photograph: No-Mow Zone of the Rio Grande Canalization Project
prior to Saltcedar Removal, Vernadero Group Inc., 2021

EXECUTIVE SUMMARY

Vernadero Group Inc. (Vernadero) was tasked with the removal and disposal of saltcedar (*Tamarix* spp.) within three sections of the Rio Grande floodplain in the vicinity of Hatch and Rincon, in Doña Ana County, New Mexico. The project area is within the No-Mow Zones of the U.S. Section, International Boundary and Water Commission's Rio Grande Canalization Project. The three sections of the floodplain within the No-Mow Zones where saltcedar and other invasive plant species were removed totaled 247 acres.

In October and November 2021, Vernadero mapped approximately 108 acres of saltcedar, and approximately 0.25 acre of giant reed (*Arundo donax*) and phragmites (*Phragmites* sp.). Immediately following the mapping of invasive plant species, Vernadero's subcontractor Brushmaster LLC excavated and mulched all saltcedar, giant reed, and phragmites within the three sections of floodplain, completing the removal work by March 2022. Following mechanical removal and mulching, Vernadero mapped and estimated the height of the mulch piles, determining approximately 13,249 cubic yards of saltcedar were excavated. In June 2022, Vernadero surveyed for resprouting saltcedar for treatment with herbicide. In November 2022, Brushmaster LLC mechanically removed selected larger saltcedar resprouts and applied herbicide to all resprouts utilizing a cut-stump treatment method. Vernadero and Brushmaster LLC conducted a reconnaissance inspection of resprouts in March 2023; the remaining resprouts were again treated with herbicide in April 2023.

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LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|-----------------|---|
| Brushmaster LLC | Brushmaster |
| GIS | Geographic Information System |
| GPS | Global Positioning System |
| RCGP | Rio Grande Canalization Project |
| ROD | Record of Decision |
| USIBWC | International Boundary and Water Commission, U.S. Section |
| Vernadero | Vernadero Group Inc. |

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1.0 INTRODUCTION

The U.S. Section of the International Boundary and Water Commission (USIBWC) was granted the authority to construct, operate, and maintain the Rio Grande Canalization Project (RGCP) through the Act of June 4, 1936, 49 Statute 1463, Public Law No. 648. USIBWC operates and maintains the RGCP under the requirements of the May 12, 1906, Convention with Mexico; the Act of June 4, 1936; and 22 United States Code 277, implementing regulations for the USIBWC. The RGCP consists of a narrow river corridor that extends 105.4 miles along the Rio Grande, from below Percha Dam in Sierra County, New Mexico, downstream to the American Dam in El Paso County, Texas. A levee system for flood control extends 57 miles on the west side and 74 miles on the east side of the Rio Grande in the RGCP (USIBWC 2014).

In June 2009, the USIBWC signed the Record of Decision (ROD) for River Management Alternatives for the RGCP (USIBWC 2009) based on a 2004 Environmental Impact Statement. The ROD committed the USIBWC to continuing to implement its statutory requirements of flood control and water deliveries while implementing environmental measures in the long-term management of the river corridor and creating a River Management Plan. One environmental measure in the ROD was the cessation of mowing on nearly 2,000 acres, where the USIBWC would manage the floodplain for grasslands. In 2012, the USIBWC identified over 1,500 acres as No-Mow Zones and began implementing no-mowing practices in 2013.

Since the implementation of the No-Mow Zones, saltcedar (*Tamarix* spp.) has invaded the floodplain at a rate faster than crews have been able to manage the invasive plant species. Mature saltcedar is prominent within the No-Mow Zones. USIBWC contracted with Vernadero Group Inc. (Vernadero) to remove saltcedar, giant reed (*Arundo donax*), and phragmites (*Phragmites australis*) in 247 acres of No-Mow Zones along three segments of the Rio Grande, outside of Hatch, New Mexico (Figures 1-1, 1-2, and 1-3). These corridors span roughly west to east, and are hereafter referred to as Area 1, Area 2, and Area 3. Vernadero subcontracted the initial saltcedar and giant reed removal and subsequent control activities to Brushmaster LLC (Brushmaster). Vernadero conducted all project management, vegetation mapping, and reporting for this task order.

Vernadero mapped the extent of saltcedar and giant reed in the three areas prior to the start of mechanical removal of both species. After mechanical removal of those species, the plant biomass was mulched on the site. To estimate the biomass removed, Vernadero mapped the area of the mulch piles and estimated their respective heights. These estimations provided a volume that represented the biomass of saltcedar and giant reed that had been removed. Vernadero surveyed the project area after removal activities and mapped any areas with resprouting saltcedar. Resprouting saltcedar was both mechanically removed and treated with herbicide.

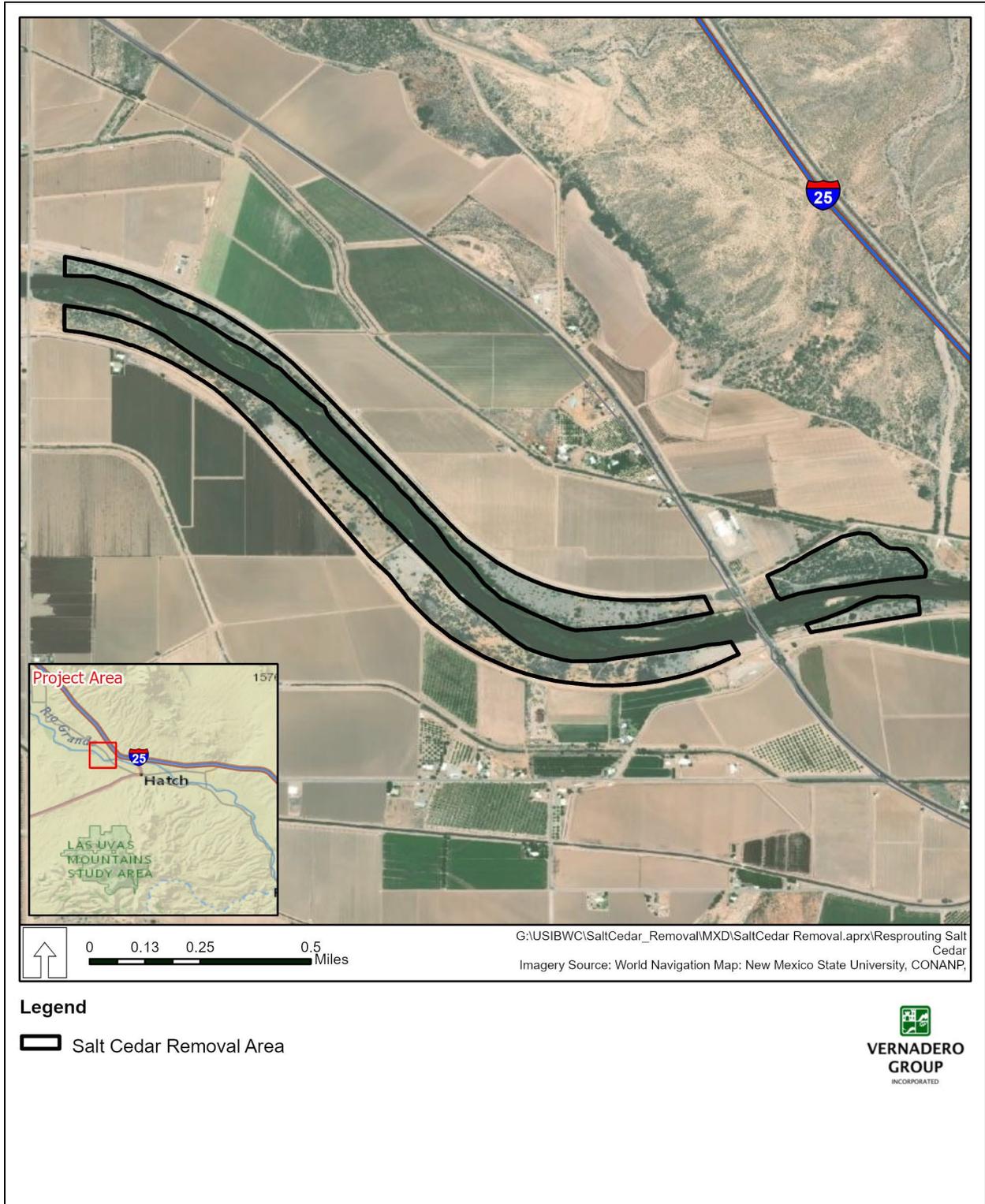


Figure 1-1. Saltcedar Removal Area 1

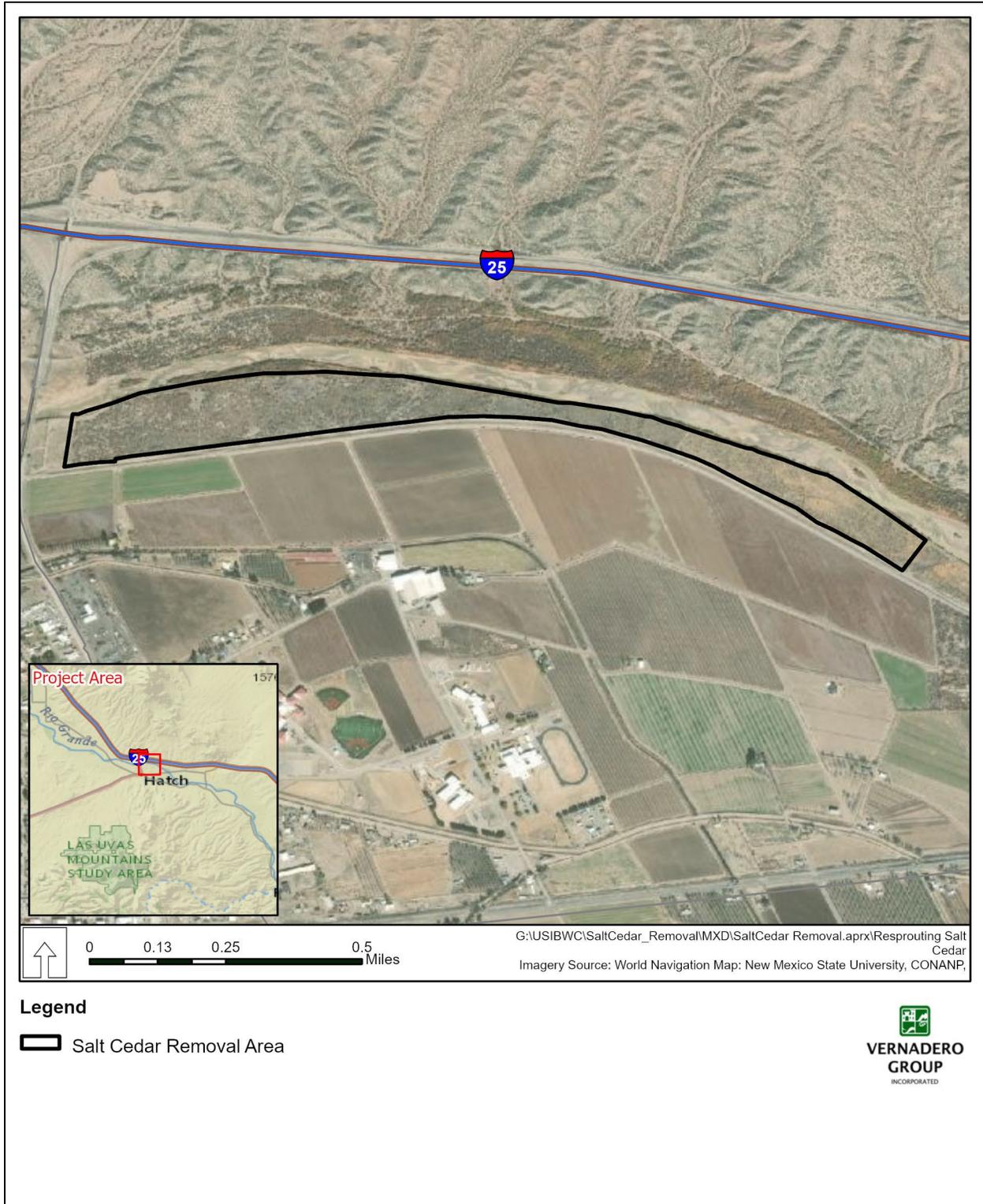


Figure 1-2. Saltcedar Removal Area 2

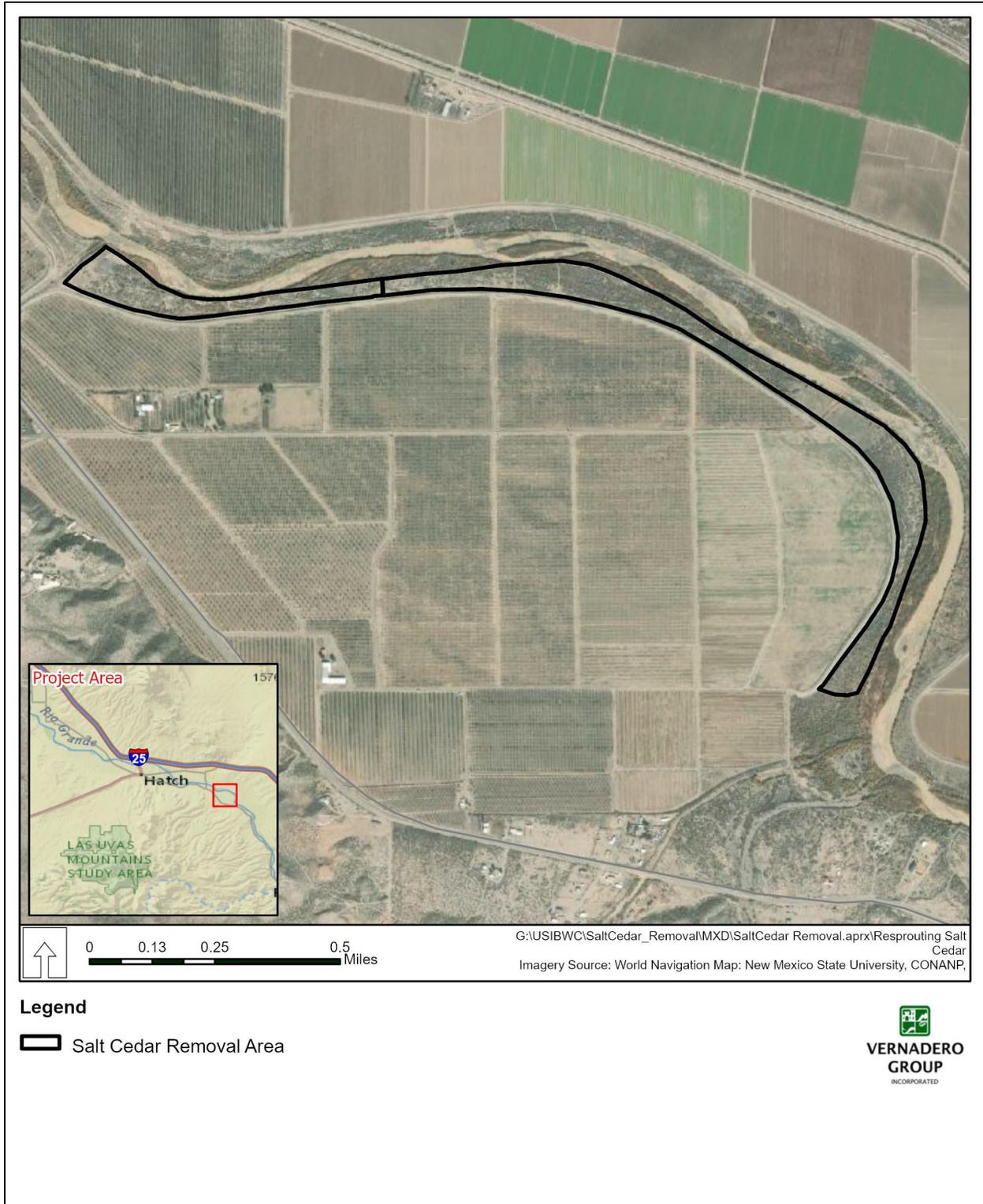


Figure 1-3. Saltcedar Removal Area 3

2.0 PROJECT TASKS AND METHODOLOGY

2.1 Task 1 – Remove Invasive Vegetation

Vernadero surveyed 247 acres in the project area and mapped approximately 108 acres of saltcedar in the No-Mow Zones in three corridors along the Rio Grande (Figures 2-1, 2-2, and 2-3) in November 2021. Mapping technology included the use of ESRI ArcGIS Field Maps and an EOS Arrow 100 global positioning system (GPS) unit with submeter accuracy. With submeter precision, Vernadero mapped the area of saltcedar stands, as well as giant reed and phragmites, by creating polygons on the map. Points were used instead of polygons to represent one or very few saltcedar plants when not found in a dense stand. For calculation purposes, an area of 5 square meters was assigned to each mapped point. In addition to mapping area, Vernadero estimated the density (1s, 10s, 100s, or 1,000s) of individuals for each mapped feature. Vernadero also mapped approximately 0.25 acre of phragmites and giant reed in the 247 acres of the No-Mow Zones.

Brushmaster excavated the invasive plant species, removing all shoots and roots, starting in December 2021, and completed excavation in March 2022, prior to the start of the bird nesting season. Invasive plant species (saltcedar, giant reed, and phragmites) were removed mechanically by use of a tracked John Deere 160G LC excavator with an articulated thumb attachment and bucket. As much of the plants' root crown and lateral roots were removed as possible while minimizing disturbance of existing native plants. Native vegetation was avoided to the greatest extent practicable, but some native mesquite (*Prosopis* spp.) trees in the floodplain were damaged or removed during saltcedar removal. Damage to the banks of the Rio Grande was avoided entirely.

A Caterpillar 259 tracked skid steer with a brush rake attachment was used to mitigate ruts and holes left from pulling and removing saltcedar. Following vegetation removal activities, the ground was left as level as possible.

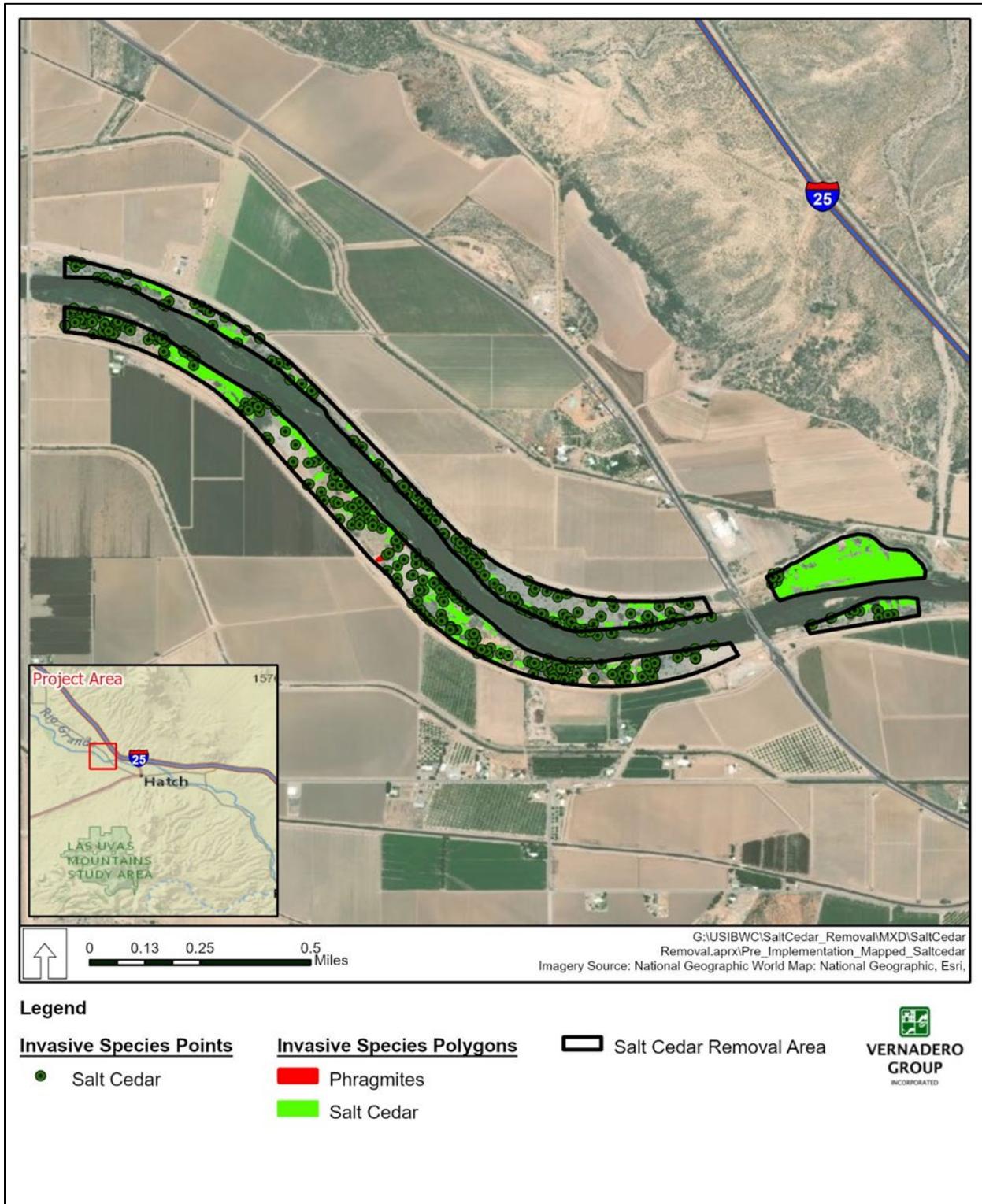


Figure 2-1. Mapped Invasive Plant Species in Area 1

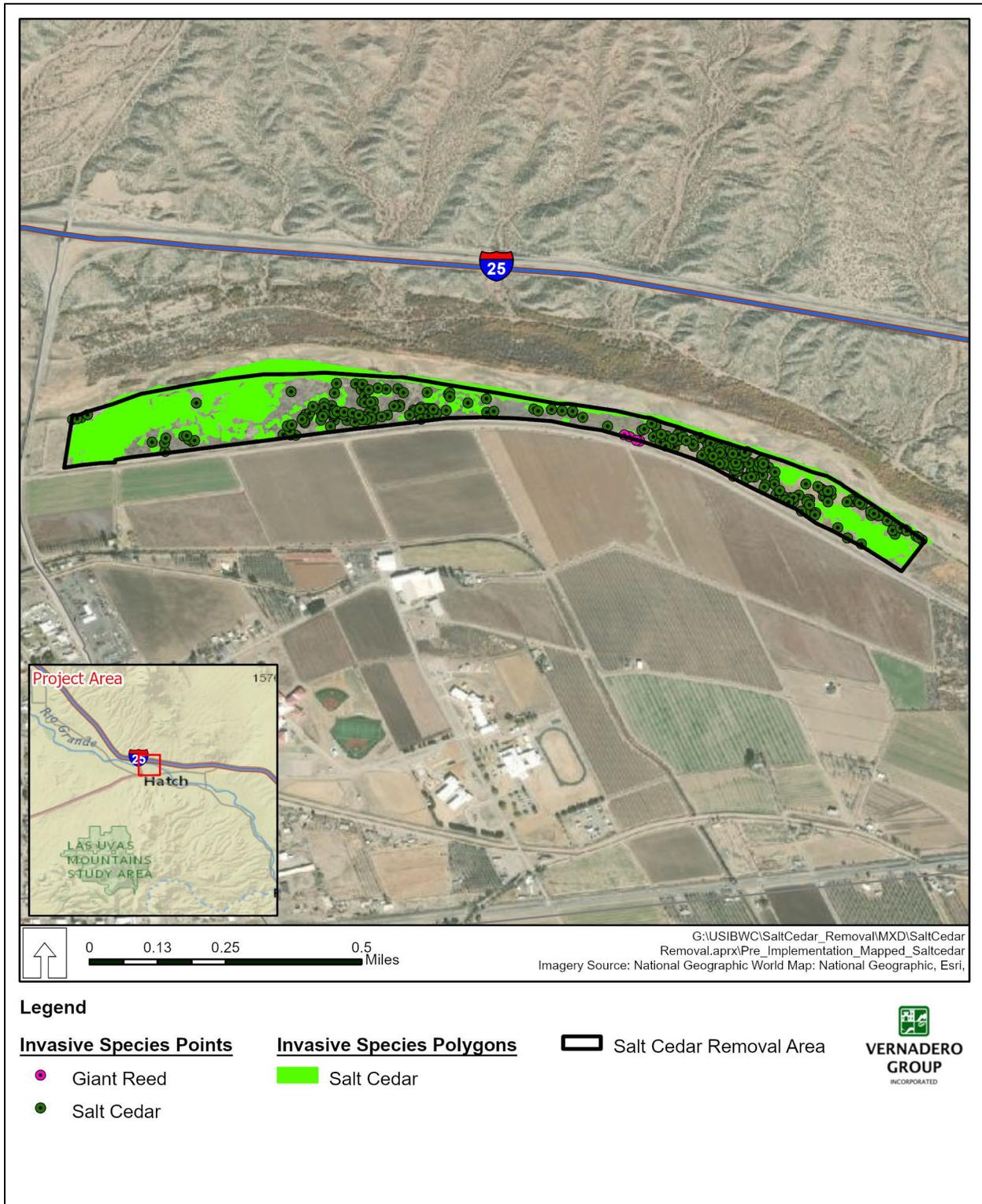


Figure 2-2. Mapped Invasive Plant Species in Area 2

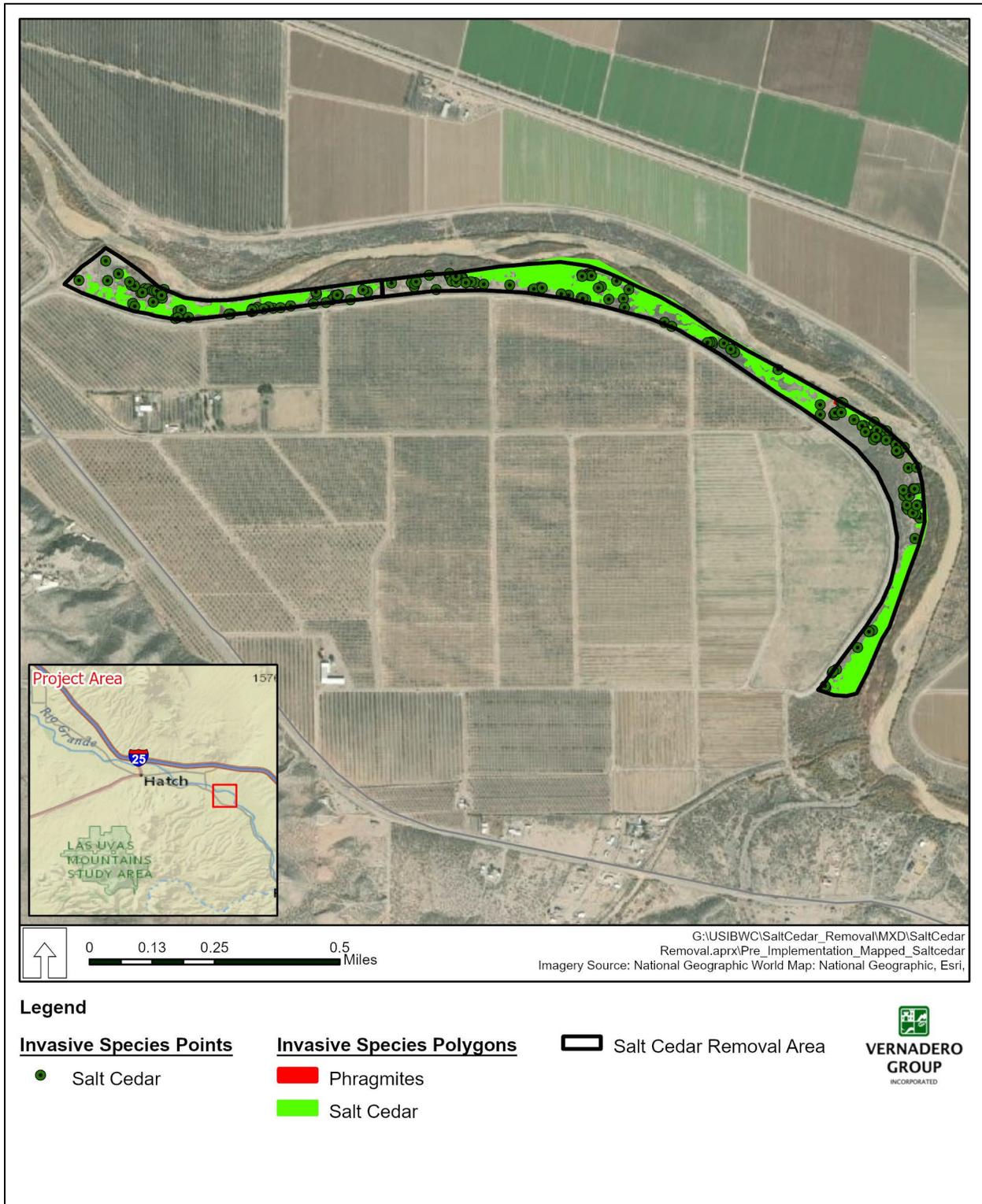


Figure 2-3. Mapped Invasive Plant Species in Area 3

2.2 Task 2 – Eliminate Vegetation Debris

All vegetation debris at each saltcedar removal site was mulched by Brushmaster using a Barko Mulcher 937. Mulching occurred immediately after vegetation removal, and the mulching effort extended from December 2021 through March 2022. Mulched material was carefully spread into larger and thinner mulch piles using a skid steer to ensure the depth of mulch would not preclude the growth of native plant species. Saltcedar root balls were mulched along with all other woody vegetation debris. All plant material was mulched to a size that was small enough that regrowth and resprouting would not occur from removed invasive plant material. Vernadero mapped mulch piles and estimated mulch pile heights immediately during and after Brushmaster's mulching effort (Figures 2-4, 2-5, and 2-6). Using the area and height of mulch piles, we estimated the cubic volume of biomass excavated and mulched. Representative photographs of mulch piles are documented in a photograph log in Appendix A and are provided in Appendix B.

In June 2022, Vernadero surveyed Areas 1, 2, and 3 and mapped approximately 10 acres of resprouting saltcedar in the No-Mow Zones (Figures 2-7, 2-8, and 2-9). Representative photographs of resprouting saltcedar are listed in Appendix A and are provided in Appendix B. Following mapping of saltcedar, Brushmaster employed chemical treatment with herbicide from July through November 2022. Garlon 4 was used along with a cut-and-stump-spray method to treat all resprouts. In November 2022, Brushmaster conducted additional mulching of material, including larger resprouts. All mulched resprouts were also treated with Garlon 4. All herbicide was applied using backpack sprayers.

Vernadero and Brushmaster completed a reconnaissance survey of resprouts in Areas 1, 2, and 3 in March 2023. Remaining saltcedar resprouts that were identified in March 2023 were treated again with Garlon 4 in April 2023 using a cut-and-stump-spray method and backpack sprayers. The April 2023 treatment of saltcedar resprouts completed the invasive plant species control efforts in the No-Mow Zones under this task order.



Figure 2-4. Mulch Piles after Excavation in Area 1

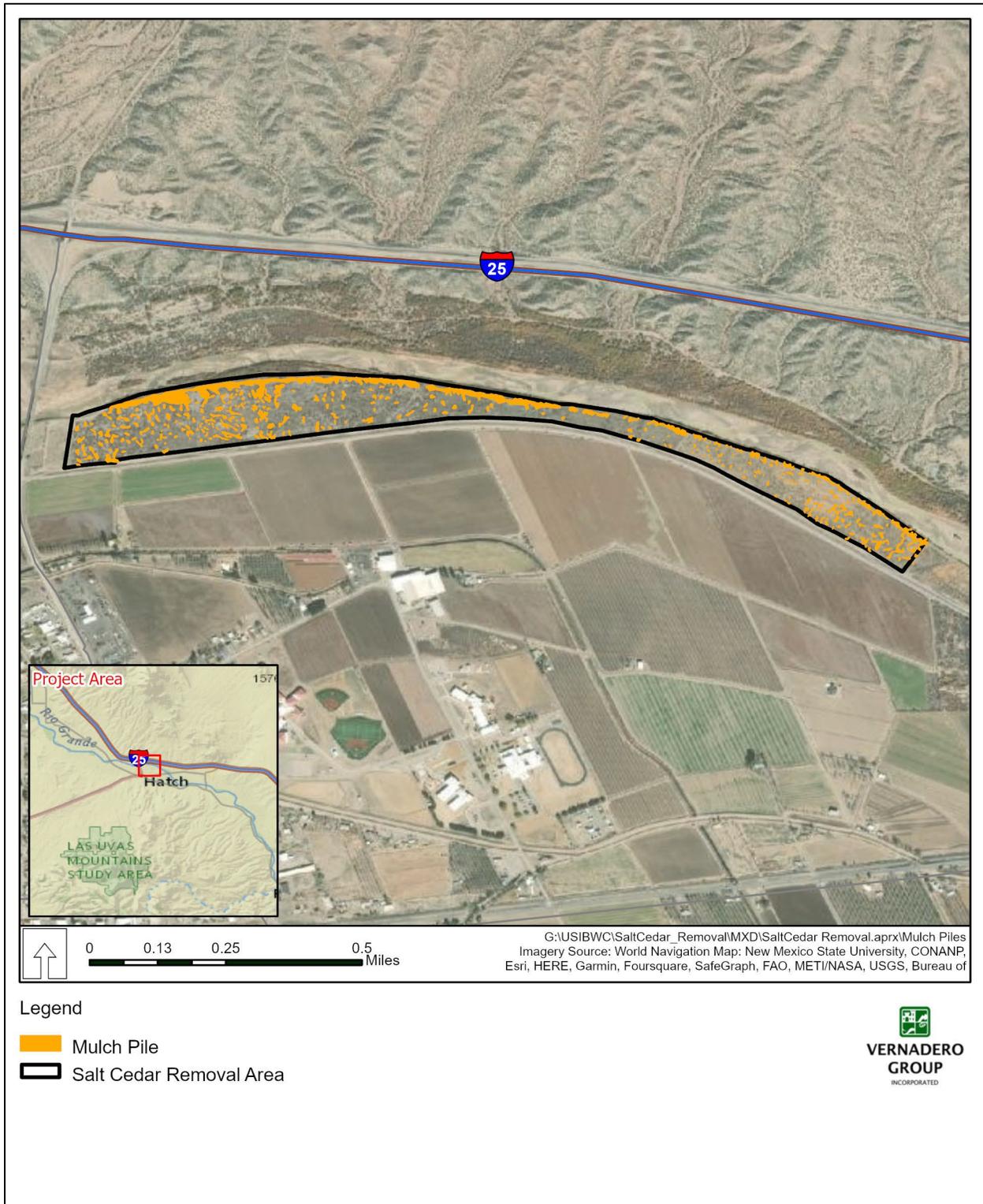


Figure 2-5. Mulch Piles after Excavation in Area 2

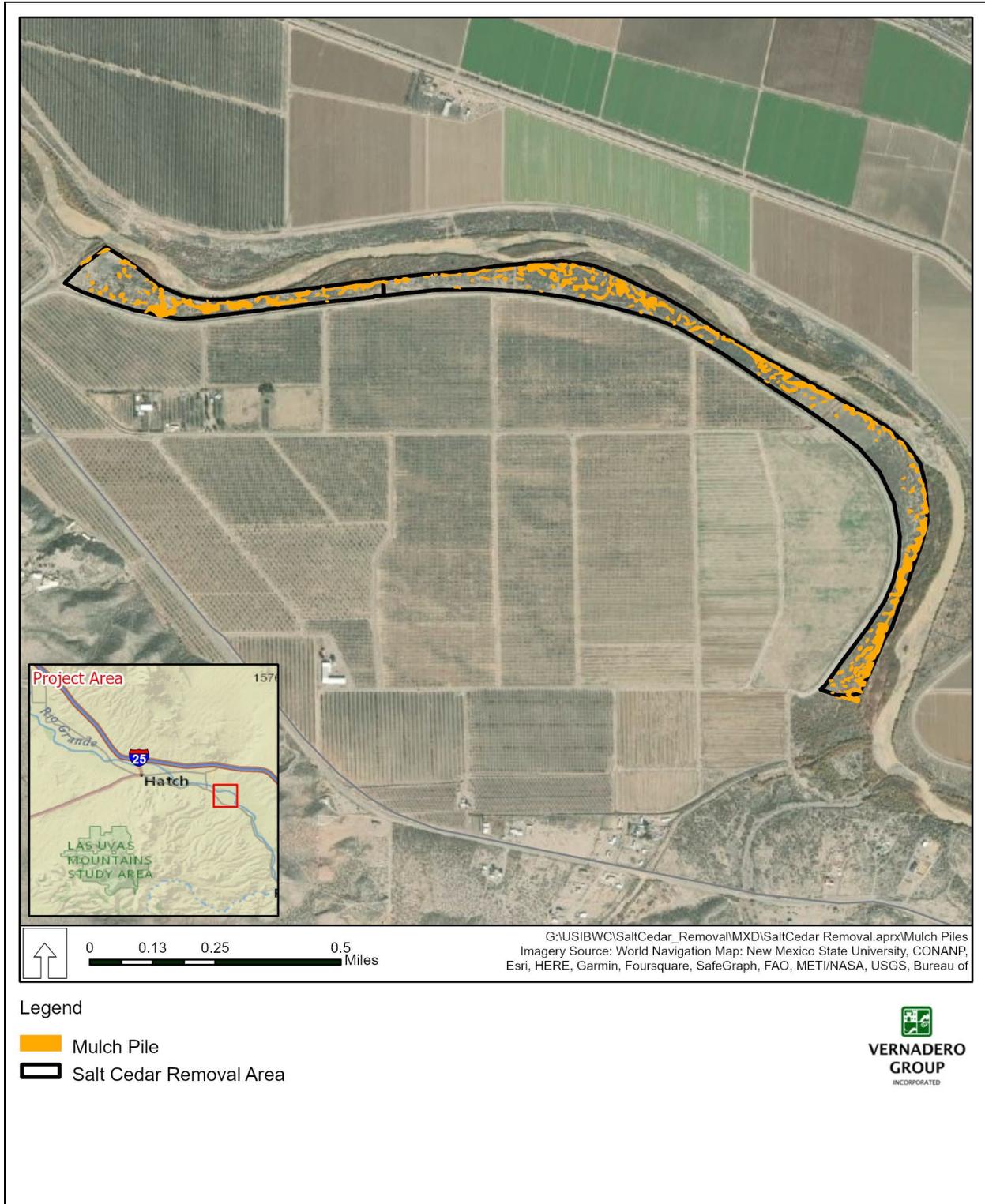


Figure 2-6. Mulch Piles after Excavation in Area 3



Figure 2-7. Saltcedar Resprouts in Area 1 (June 2022)

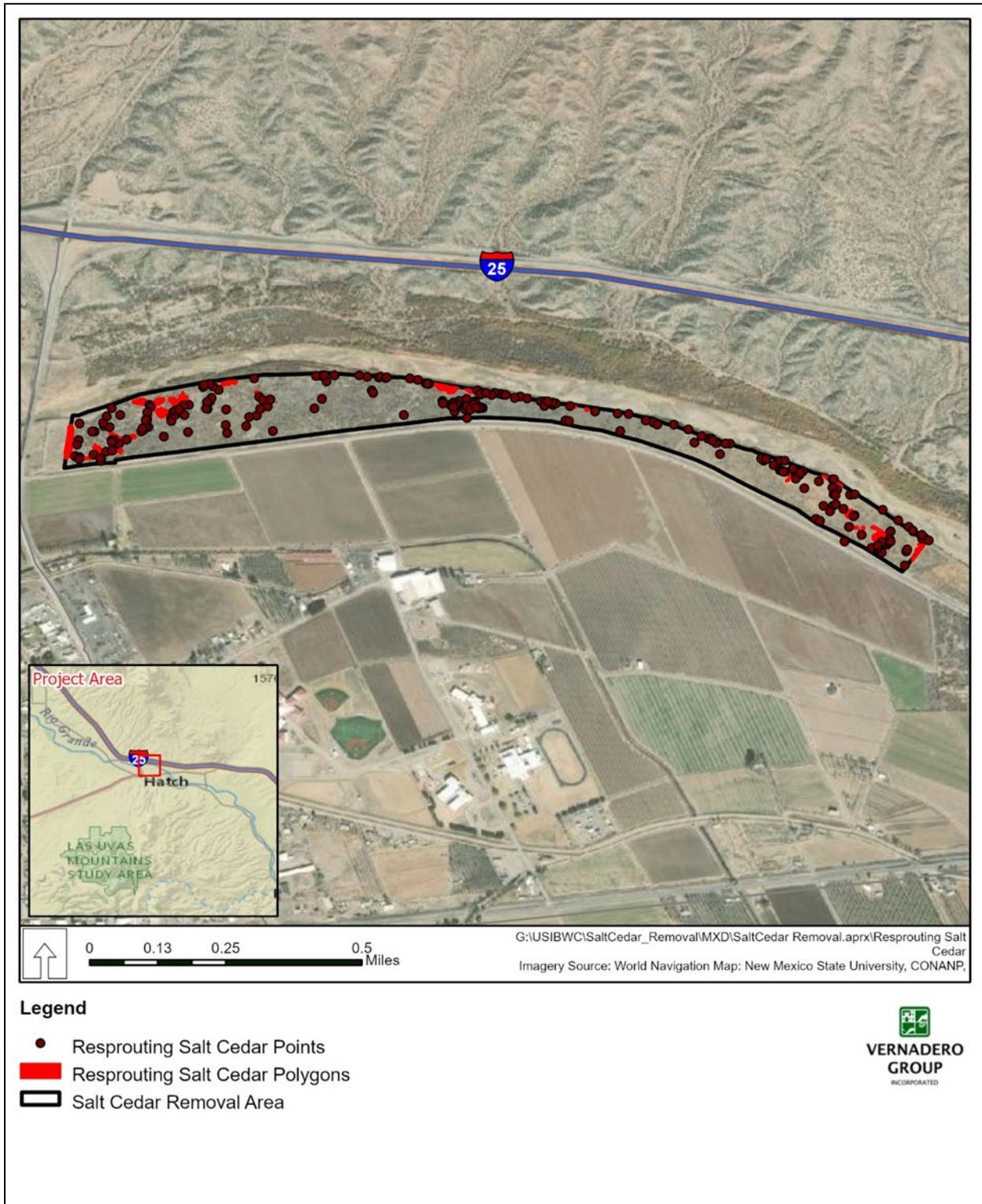


Figure 2-8. Saltcedar Resprouts in Area 2 (June 2022)

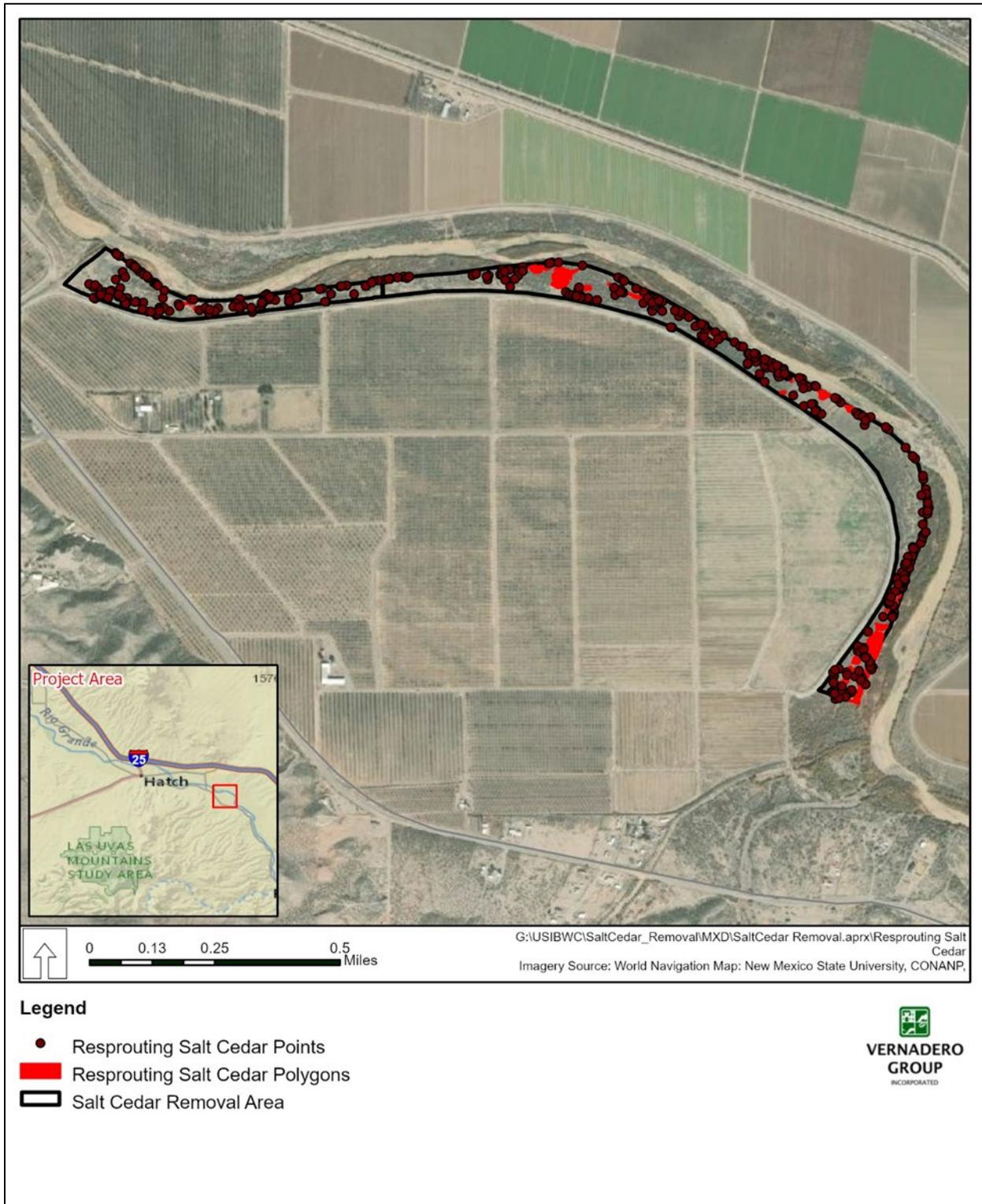


Figure 2-9. Saltcedar Resprouts in Area 3 (June 2022)

2.3 Task 3 – Project Administration

Vernadero conducted a kickoff teleconference, documented work with photographs (see Appendices A and B), and provided estimates of the area and volume of invasive plant species removed in Areas 1, 2, and 3 of the No-Mow Zones. Geospatial data were delivered in an ESRI file geodatabase that is compatible with the ArcGIS version currently used by USIBWC. A schedule for all work completed is given in Table 2-1. Vernadero submitted monthly progress reports with details regarding work and financial progress and maintained coordination and communication with USIBWC staff throughout the period of performance.

Table 2-1. Completed Progress for Saltcedar Removal

| Activity | Dates |
|---|-----------------------------|
| Mechanical invasive species removal | November 2021 to March 2022 |
| First cut stump herbicide treatment | July to November 2022 |
| Additional mulching of large debris and saltcedar resprouts | November 2022 |
| Herbicide retreatment of resprouts | April 2023 |

3.0 RESULTS

3.1 Saltcedar Area and Removal Estimates

Table 3-1 presents the area of saltcedar in Areas 1, 2 and 3 of the No-Mow Zones prior to mechanical removal of invasive plant species and the area of saltcedar resprouts following the completion of mechanical removal activities.

Table 3-1. Saltcedar Cover and Removal Results

| Saltcedar Mapping Event | Area (acres) | Percentage of Project Area |
|--|--------------|----------------------------|
| Saltcedar prior to Mechanical Removal (November 2021) | 108 | 43.7% |
| Saltcedar Resprouts Following Mechanical Removal (June 2022) | 11 | 4.04% |

Nearly half (47.3 percent) of the project area had saltcedar cover prior to the start of mechanical removal activities. As mapped in June 2022, resprouting saltcedar had a total cover of 4.04 percent of the total project area, representing only 9.3 percent of the original area mapped. These estimates indicate that the initial saltcedar cover in Areas 1, 2, and 3, of the No-Mow Zones was reduced by just over 90 percent. No giant reed or phragmites were observed following the initial removal of plant species.

While performing work, Vernadero biologists observed many areas where illegal dumping occurred. Photographs documenting trash in the floodplain of Areas 1, 2, and 3, are in Appendix B.

Based on density estimates recorded with each mapped saltcedar geographic information system (GIS) feature, Vernadero estimated that there were 9,539 individuals in the project area prior to removal. Vernadero mapped approximately 36 acres of mulch piles with an average height of 2.3 inches, equating to an estimated 13,249 cubic yards of saltcedar mulched on the site. Calculations for volume estimates are provided in Appendix C.

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4.0 DISCUSSION AND CONCLUSIONS

Vernadero and Brushmaster successfully implemented the tasks associated with this task order and removed and controlled saltcedar, giant reed, and phragmites in the floodplain of Areas 1, 2, and 3 of the No-Mow Zones. Treating resprouts through the end of the task order's period of performance will support short-term control of these invasive plant species.

Approximately 11 acres of resprouting saltcedar were observed in early June 2022 after complete removal of all saltcedar in the project area. This rapid regrowth is a strong indication of how competitive and hardy saltcedar is, and it is Vernadero's recommendation that herbicide application continue in Areas 1, 2, and 3 of the No-Mow Zones to prevent the recolonization of these areas by saltcedar in the future. The effort for an annual application of herbicide to saltcedar resprouts in these cleared areas would be less than having to return and mechanically remove mature saltcedar in 10 to 12 years, if left untreated.

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5.0 REFERENCES

United States International Boundary and Water Commission (USIBWC). 2014. Rio Grande Canalization Project River Management Plan. Last Updated November 12, 2014.

United States International Boundary and Water Commission (USIBWC). 2009. Record of Decision: River Management Alternatives for the Rio Grande Canalization Project. <http://www.ibwc.gov/EMD/CanalizationWebpage/ROD_EIS%20June2009.pdf>. Accessed March 6, 2023.

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Appendix A. Photograph Log

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INTERNATIONAL BOUNDARY & WATER COMMISSION
LOG OF PHOTOGRAPHIC DOCUMENTATION

PROJECT: Saltcedar Removal in the RGCP No-Mow Zones

CONTRACT NUMBER: 191BWC20D0003

CONTRACTOR: Vernadero Group Inc

| PHOTO # | DATE | FILENAME | PHOTOGRAPHER'S NAME | ORIENTATION | AREA | LOCATION OR STRUCTURE | DESCRIPTION OF PHOTO |
|---------|------------|----------|---------------------|--------------|--------|-----------------------|--|
| 1 | 10/26/2021 | 1_A.jpg | Eric Webb | not recorded | Area 1 | Rio Grande, Hatch, NM | Mature cottonwoods |
| 2 | 10/26/2021 | 2_A.jpg | Eric Webb | not recorded | Area 1 | Rio Grande, Hatch, NM | Saltcedar in dense willows |
| 3 | 10/26/2021 | 3_A.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | |
| 4 | 10/27/2021 | 3_B.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | |
| 5 | 10/26/2021 | 4_A.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | Saltcedar mixed with Typha |
| 6 | 10/26/2021 | 5_A.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | |
| 7 | 10/26/2021 | 5_B.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | |
| 8 | 10/26/2021 | 6_A.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | |
| 9 | 10/26/2021 | 7_A.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | Salt cedar |
| 10 | 10/26/2021 | 8_A.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | Mixed saltcedar and natives. Rhus and Prosopis |
| 11 | 10/26/2021 | 9_A.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | Salix mesquite and salt cedar |
| 12 | 10/26/2021 | 10_A.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | Rhus aromatica |
| 13 | 10/26/2021 | 11_A.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | |
| 14 | 10/26/2021 | 11_B.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | |
| 15 | 10/26/2021 | 12_A.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | Four wing saltbush |
| 16 | 10/26/2021 | 13_A.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | |
| 17 | 10/26/2021 | 14_A.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | Cattails and saltcedar |
| 18 | 10/26/2021 | 15_A.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | Mixed salt cedar and willows |
| 19 | 10/26/2021 | 15_B.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | Mixed salt cedar and willows |

| | | | | | | | |
|----|------------|----------|--------------|--------------|--------|-----------------------|------------|
| 20 | 10/26/2021 | 16_A.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | Arundo |
| 21 | 10/26/2021 | 16_B.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | Arundo |
| 22 | 10/26/2021 | 17_A.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | Rio Grande |
| 23 | 10/26/2021 | 18_A.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | Beehives |
| 24 | 10/27/2021 | 19_A.jpg | Nikki Gordon | not recorded | Area 1 | Rio Grande, Hatch, NM | Trash |
| 25 | 10/27/2021 | 19_B.jpg | Nikki Gordon | not recorded | Area 1 | Rio Grande, Hatch, NM | Trash |
| 26 | 10/27/2021 | 20_A.jpg | Nikki Gordon | not recorded | Area 1 | Rio Grande, Hatch, NM | Trash |
| 27 | 10/27/2021 | 21_A.jpg | Nikki Gordon | not recorded | Area 1 | Rio Grande, Hatch, NM | Trash |
| 28 | 10/27/2021 | 22_A.jpg | Nikki Gordon | not recorded | Area 1 | Rio Grande, Hatch, NM | Landscape |
| 29 | 10/27/2021 | 22_B.jpg | Nikki Gordon | not recorded | Area 1 | Rio Grande, Hatch, NM | Landscape |
| 30 | 10/27/2021 | 23_A.jpg | Nikki Gordon | not recorded | Area 1 | Rio Grande, Hatch, NM | Trash |
| 31 | 10/27/2021 | 24_A.jpg | Nikki Gordon | not recorded | Area 1 | Rio Grande, Hatch, NM | Trash |
| 32 | 10/27/2021 | 24_B.jpg | Nikki Gordon | not recorded | Area 1 | Rio Grande, Hatch, NM | Trash |
| 33 | 10/27/2021 | 24_C.jpg | Nikki Gordon | not recorded | Area 1 | Rio Grande, Hatch, NM | Trash |
| 34 | 10/27/2021 | 25_A.jpg | Nikki Gordon | not recorded | Area 1 | Rio Grande, Hatch, NM | Trash |
| 35 | 10/27/2021 | 26_A.jpg | Nikki Gordon | not recorded | Area 1 | Rio Grande, Hatch, NM | Trash |
| 36 | 10/27/2021 | 27_A.jpg | Nikki Gordon | not recorded | Area 1 | Rio Grande, Hatch, NM | Trash |
| 37 | 10/27/2021 | 27_B.jpg | Nikki Gordon | not recorded | Area 1 | Rio Grande, Hatch, NM | Trash |
| 38 | 10/27/2021 | 28_A.jpg | Nikki Gordon | not recorded | Area 1 | Rio Grande, Hatch, NM | Trash |
| 39 | 10/27/2021 | 29_A.jpg | Nikki Gordon | not recorded | Area 1 | Rio Grande, Hatch, NM | Trash |
| 40 | 10/27/2021 | 30_A.jpg | Nikki Gordon | not recorded | Area 1 | Rio Grande, Hatch, NM | Trash |
| 41 | 10/27/2021 | 31_A.jpg | Nikki Gordon | not recorded | Area 1 | Rio Grande, Hatch, NM | Landscape |
| 42 | 10/27/2021 | 32_A.jpg | Nikki Gordon | not recorded | Area 1 | Rio Grande, Hatch, NM | Trash |

| | | | | | | | |
|----|------------|----------|--------------|--------------|--------|-----------------------|-----------------------|
| 43 | 10/27/2021 | 33_A.jpg | Nikki Gordon | not recorded | Area 1 | Rio Grande, Hatch, NM | Landscape |
| 44 | 10/27/2021 | 34_A.jpg | Nikki Gordon | not recorded | Area 1 | Rio Grande, Hatch, NM | Trash |
| 45 | 10/27/2021 | 35_A.jpg | Nikki Gordon | not recorded | Area 1 | Rio Grande, Hatch, NM | Trash |
| 46 | 10/28/2021 | 36_A.jpg | Nikki Gordon | North | Area 1 | Rio Grande, Hatch, NM | Trash; facing N |
| 47 | 10/28/2021 | 37_A.jpg | Nikki Gordon | East | Area 1 | Rio Grande, Hatch, NM | Trash; facing E |
| 48 | 10/28/2021 | 38_A.jpg | Nikki Gordon | East | Area 1 | Rio Grande, Hatch, NM | Trash; facing E |
| 49 | 10/28/2021 | 39_A.jpg | Nikki Gordon | North | Area 1 | Rio Grande, Hatch, NM | Snake shed; facing N |
| 50 | 10/28/2021 | 40_A.jpg | Nikki Gordon | North | Area 1 | Rio Grande, Hatch, NM | Trash; facing N |
| 51 | 10/28/2021 | 41_A.jpg | Nikki Gordon | North | Area 1 | Rio Grande, Hatch, NM | Wasp nest? Facing N |
| 52 | 10/28/2021 | 42_A.jpg | Nikki Gordon | East | Area 1 | Rio Grande, Hatch, NM | Trash; facing E |
| 53 | 10/28/2021 | 43_A.jpg | Nikki Gordon | not recorded | Area 1 | Rio Grande, Hatch, NM | Landscape |
| 54 | 10/28/2021 | 43_B.jpg | Nikki Gordon | not recorded | Area 1 | Rio Grande, Hatch, NM | Landscape |
| 55 | 10/28/2021 | 44_A.jpg | Nikki Gordon | North | Area 1 | Rio Grande, Hatch, NM | Trash; facing N |
| 56 | 10/28/2021 | 45_A.jpg | Nikki Gordon | East | Area 1 | Rio Grande, Hatch, NM | Trash; facing E |
| 57 | 10/28/2021 | 46_A.jpg | Nikki Gordon | North | Area 1 | Rio Grande, Hatch, NM | Trash; facing N |
| 58 | 10/28/2021 | 47_A.jpg | Nikki Gordon | West | Area 1 | Rio Grande, Hatch, NM | Trash; facing W |
| 59 | 10/28/2021 | 48_A.jpg | Nikki Gordon | South | Area 1 | Rio Grande, Hatch, NM | Trash; facing S |
| 60 | 10/28/2021 | 49_A.jpg | Nikki Gordon | North | Area 1 | Rio Grande, Hatch, NM | Landscape; facing N |
| 61 | 10/28/2021 | 50_A.jpg | Nikki Gordon | West | Area 1 | Rio Grande, Hatch, NM | Trash; facing W |
| 62 | 2/3/2022 | 51_A.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | |
| 63 | 2/3/2022 | 52_A.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | |
| 64 | 2/3/2022 | 53_A.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | Arundo stand mulched. |
| 65 | 2/3/2022 | 54_A.jpg | Eric Webb | not recorded | Area 3 | Rio Grande, Hatch, NM | |

| | | | | | | | |
|----|----------|----------|--------------|--------------|--------|-----------------------|-----------------------|
| 66 | 2/3/2022 | 55_A.jpg | Eric Webb | not recorded | Area 3 | Rio Grande, Hatch, NM | |
| 67 | 2/3/2022 | 55_B.jpg | Eric Webb | not recorded | Area 3 | Rio Grande, Hatch, NM | |
| 68 | 2/3/2022 | 56_A.jpg | Eric Webb | not recorded | Area 3 | Rio Grande, Hatch, NM | |
| 69 | 2/3/2022 | 57_A.jpg | Eric Webb | not recorded | Area 3 | Rio Grande, Hatch, NM | |
| 70 | 2/3/2022 | 58_A.jpg | Eric Webb | not recorded | Area 3 | Rio Grande, Hatch, NM | |
| 71 | 2/3/2022 | 59_A.jpg | Eric Webb | not recorded | Area 3 | Rio Grande, Hatch, NM | |
| 72 | 2/3/2022 | 59_B.jpg | Eric Webb | not recorded | Area 3 | Rio Grande, Hatch, NM | |
| 73 | 2/3/2022 | 60_A.jpg | Eric Webb | not recorded | Area 3 | Rio Grande, Hatch, NM | |
| 74 | 2/3/2022 | 61_A.jpg | Eric Webb | not recorded | Area 3 | Rio Grande, Hatch, NM | |
| 75 | 2/3/2022 | 61_B.jpg | Eric Webb | not recorded | Area 3 | Rio Grande, Hatch, NM | |
| 76 | 2/3/2022 | 62_A.jpg | Eric Webb | not recorded | Area 3 | Rio Grande, Hatch, NM | |
| 77 | 2/3/2022 | 62_B.jpg | Eric Webb | not recorded | Area 3 | Rio Grande, Hatch, NM | |
| 78 | 2/3/2022 | 63_A.jpg | Eric Webb | not recorded | Area 3 | Rio Grande, Hatch, NM | Rio Grande in Feb |
| 79 | 2/3/2022 | 64_A.jpg | Eric Webb | not recorded | Area 3 | Rio Grande, Hatch, NM | |
| 80 | 2/2/2022 | 65_A.jpg | Nikki Gordon | South | Area 2 | Rio Grande, Hatch, NM | Trash; S |
| 81 | 2/2/2022 | 66_A.jpg | Nikki Gordon | East | Area 2 | Rio Grande, Hatch, NM | Landscape; E |
| 82 | 2/2/2022 | 66_B.jpg | Nikki Gordon | East | Area 2 | Rio Grande, Hatch, NM | Landscape; E |
| 83 | 2/3/2022 | 67_A.jpg | Nikki Gordon | West | Area 2 | Rio Grande, Hatch, NM | Landscape; W |
| 84 | 2/3/2022 | 67_B.jpg | Nikki Gordon | West | Area 2 | Rio Grande, Hatch, NM | Landscape; W |
| 85 | 2/3/2022 | 68_A.jpg | Nikki Gordon | South | Area 2 | Rio Grande, Hatch, NM | Landscape; S |
| 86 | 2/3/2022 | 69_A.jpg | Nikki Gordon | North | Area 2 | Rio Grande, Hatch, NM | Unmulched Tamarisk; N |
| 87 | 2/3/2022 | 70_A.jpg | Nikki Gordon | East | Area 2 | Rio Grande, Hatch, NM | Trash; E |
| 88 | 2/3/2022 | 71_A.jpg | Nikki Gordon | Northwest | Area 2 | Rio Grande, Hatch, NM | Raptor; NW |

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|-----|-----------|----------|--------------|--------------|--------|-----------------------|--|
| 89 | 2/3/2022 | 71_B.jpg | Nikki Gordon | Northwest | Area 2 | Rio Grande, Hatch, NM | Raptor; NW |
| 90 | 2/3/2022 | 71_C.jpg | Nikki Gordon | Northwest | Area 2 | Rio Grande, Hatch, NM | Raptor; NW |
| 91 | 2/3/2022 | 72_A.jpg | Nikki Gordon | North | Area 2 | Rio Grande, Hatch, NM | Landscape; N |
| 92 | 2/3/2022 | 73_A.jpg | Nikki Gordon | South | Area 2 | Rio Grande, Hatch, NM | Trash; S |
| 93 | 2/3/2022 | 74_A.jpg | Nikki Gordon | West | Area 2 | Rio Grande, Hatch, NM | Mesquite; W |
| 94 | 2/3/2022 | 75_A.jpg | Nikki Gordon | Northeast | Area 2 | Rio Grande, Hatch, NM | Landscape; NE |
| 95 | 2/1/2022 | 76_A.jpg | Coby Bartram | Northwest | Area 3 | Rio Grande, Hatch, NM | Look through windshield of Barko. Foreground has been mulched, background plucked but not mulched; W side river looking NW |
| 96 | 2/1/2022 | 76_B.jpg | Coby Bartram | Northwest | Area 3 | Rio Grande, Hatch, NM | Look through windshield of Barko. Foreground has been mulched, background plucked but not mulched; W side river looking NW |
| 97 | 1/26/2022 | 77_A.jpg | Coby Bartram | North | Area 3 | Rio Grande, Hatch, NM | Option three, mulching, before and after; W side R looking N |
| 98 | 1/26/2022 | 77_B.jpg | Coby Bartram | North | Area 3 | Rio Grande, Hatch, NM | Option three, mulching, before and after; W side R looking N |
| 99 | 1/26/2022 | 77_C.jpg | Coby Bartram | North | Area 3 | Rio Grande, Hatch, NM | Option three, mulching, before and after; W side R looking N |
| 100 | 2/11/2022 | 78_A.jpg | Coby Bartram | North | Area 3 | Rio Grande, Hatch, NM | Which way did they go; W side R looking N |
| 101 | 2/18/2022 | 79_A.jpg | Coby Bartram | Southeast | Area 1 | Rio Grande, Hatch, NM | Second rake after first mulching. Pile will be re-mulched; E side R looking SE |
| 102 | 2/21/2022 | 80_A.jpg | Coby Bartram | Northwest | Area 1 | Rio Grande, Hatch, NM | Second raking piles to be re-mulched; E side R looking NW |
| 103 | 6/29/2022 | 80_B.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | Resprout |
| 104 | 2/21/2022 | 81_A.jpg | Coby Bartram | Southeast | Area 1 | Rio Grande, Hatch, NM | Skid Steer raking up mulched piles to be re-mulched; E side R looking SE |
| 105 | 2/21/2022 | 81_B.jpg | Coby Bartram | Southeast | Area 1 | Rio Grande, Hatch, NM | Skid Steer raking up mulched piles to be re-mulched; E side R looking SE |
| 106 | 6/30/2022 | 81_C.jpg | Eric Webb | not recorded | Area 1 | Rio Grande, Hatch, NM | Resprout |
| 107 | 3/15/2022 | 82_A.jpg | Nikki Gordon | Northwest | Area 2 | Rio Grande, Hatch, NM | Landscape, in riverbed; Facing NW |
| 108 | 6/29/2022 | 82_B.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | Salt Cedar |
| 109 | 6/29/2022 | 83_A.jpg | Eric Webb | North | Area 2 | Rio Grande, Hatch, NM | Rio Grande; Looking north |
| 110 | 6/29/2022 | 83_B.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | Resprout |

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|-----|-----------|-----------|--------------|----------------|--------|-----------------------|---|
| 111 | 6/30/2022 | 84_A.jpg | Eric Webb | South | Area 1 | Rio Grande, Hatch, NM | Homeless encampment; South |
| 112 | 6/30/2022 | 84_B.jpg | Eric Webb | South | Area 1 | Rio Grande, Hatch, NM | Homeless encampment; South |
| 113 | 6/29/2022 | 84_C.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | Resprout |
| 114 | 6/30/2022 | 85_A.jpg | Eric Webb | West | Area 1 | Rio Grande, Hatch, NM | Saltcedar RR sprout; Facing West |
| 115 | 6/29/2022 | 85_B.jpg | Eric Webb | not recorded | Area 2 | Rio Grande, Hatch, NM | Resprout |
| 116 | 6/30/2022 | 86_A.jpg | Eric Webb | North | Area 1 | Rio Grande, Hatch, NM | Saltcedar resprout; North |
| 117 | 7/5/2022 | 87_A.jpg | Eric Webb | Southeast | Area 1 | Rio Grande, Hatch, NM | Resprouts and mulch pile; SE |
| 118 | 7/6/2022 | 88_A.jpg | Eric Webb | North | Area 3 | Rio Grande, Hatch, NM | Resprouts salt cedar; N |
| 119 | 11/7/2021 | 89_A.jpg | Nikki Gordon | East,Northeast | Area 1 | Rio Grande, Hatch, NM | Trash; E/NE |
| 120 | 11/7/2021 | 89_B.jpg | Nikki Gordon | East,Northeast | Area 1 | Rio Grande, Hatch, NM | Trash; E/NE |
| 121 | 11/7/2021 | 90_A.jpg | Nikki Gordon | North | Area 1 | Rio Grande, Hatch, NM | Trash; N |
| 122 | 11/7/2021 | 91_A.jpg | Nikki Gordon | North | Area 1 | Rio Grande, Hatch, NM | Trash; N |
| 123 | 11/7/2021 | 92_A.jpg | Nikki Gordon | West | Area 1 | Rio Grande, Hatch, NM | Birds; W, 200+ m away |
| 124 | 11/7/2021 | 92_B.jpg | Nikki Gordon | West | Area 1 | Rio Grande, Hatch, NM | Birds; W, 200+ m away |
| 125 | 11/7/2021 | 92_C.jpg | Nikki Gordon | West | Area 1 | Rio Grande, Hatch, NM | Birds; W, 200+ m away |
| 126 | 11/7/2021 | 93_A.jpg | Nikki Gordon | Southwest | Area 1 | Rio Grande, Hatch, NM | Trash; SW |
| 127 | 11/7/2021 | 94_A.jpg | Nikki Gordon | North | Area 1 | Rio Grande, Hatch, NM | Wasps nest?; N |
| 128 | 11/7/2021 | 95_A.jpg | Nikki Gordon | North | Area 1 | Rio Grande, Hatch, NM | Green waste; N |
| 129 | 11/7/2021 | 96_A.jpg | Nikki Gordon | West | Area 1 | Rio Grande, Hatch, NM | Trash; W |
| 130 | 11/8/2021 | 97_A.jpg | Nikki Gordon | Southeast | Area 2 | Rio Grande, Hatch, NM | Landscape; SE, Floodplain |
| 131 | 11/8/2021 | 98_A.jpg | Nikki Gordon | East | Area 2 | Rio Grande, Hatch, NM | Trash; E, Floodplain |
| 132 | 11/8/2021 | 99_A.jpg | Nikki Gordon | Northeast | Area 2 | Rio Grande, Hatch, NM | Trash; NE, Floodplain |
| 133 | 11/9/2021 | 100_A.jpg | Dick Lanford | North | Area 1 | Rio Grande, Hatch, NM | South side looking north, northeast; South side |

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| 134 | 11/9/2021 | 100_B.jpg | Dick Lanford | Northeast | Area 1 | Rio Grande, Hatch, NM | South side looking north, north east; South side |
| 135 | 11/5/2021 | 101_A.jpg | Dick Lanford | South | Area 1 | Rio Grande, Hatch, NM | After plucking; Looking South |
| 136 | 11/5/2021 | 101_B.jpg | Dick Lanford | South | Area 1 | Rio Grande, Hatch, NM | After plucking; Looking South |
| 137 | 11/5/2021 | 102_A.jpg | Dick Lanford | North | Area 1 | Rio Grande, Hatch, NM | Southwest corner of southern plot; Southwest looking north |
| 138 | 11/5/2021 | 102_B.jpg | Dick Lanford | North | Area 1 | Rio Grande, Hatch, NM | Southwest corner of southern plot; Southwest looking north |
| 139 | 11/8/2021 | 103_A.jpg | Dick Lanford | North | Area 1 | Rio Grande, Hatch, NM | South looking north to river; Looking north |
| 140 | 11/8/2021 | 103_B.jpg | Dick Lanford | North | Area 1 | Rio Grande, Hatch, NM | South looking north to river; Looking north |
| 141 | 11/9/2021 | 104_A.jpg | Nikki Gordon | North | Area 3 | Rio Grande, Hatch, NM | Salt cedar lining the perimeter, outside the project are ; N, Floodplain |
| 142 | 11/9/2021 | 104_B.jpg | Nikki Gordon | North | Area 3 | Rio Grande, Hatch, NM | Salt cedar lining the perimeter, outside the project area; N, Floodplain |
| 143 | 12/28/2021 | 105_A.jpg | Nikki Gordon | Northeast | Area 2 | Rio Grande, Hatch, NM | Mulch pile; NE |
| 144 | 11/9/2021 | 106_A.jpg | Nikki Gordon | South | Area 3 | Rio Grande, Hatch, NM | Salt cedar lining perimeter, outside of project area; S, Floodplain |
| 145 | 11/9/2021 | 106_B.jpg | Nikki Gordon | South | Area 3 | Rio Grande, Hatch, NM | Salt cedar lining perimeter, outside of project area; S, Floodplain |
| 146 | 11/10/2021 | 107_A.jpg | Dick Lanford | North, Northeast | Area 1 | Rio Grande, Hatch, NM | South side looking north/ northeast; South |
| 147 | 11/10/2021 | 107_B.jpg | Dick Lanford | South | Area 1 | Rio Grande, Hatch, NM | South side looking north/ northeast; South |
| 148 | 11/11/2021 | 108_A.jpg | Dick Lanford | East | Area 1 | Rio Grande, Hatch, NM | West looking east; West side |
| 149 | 11/11/2021 | 108_B.jpg | Dick Lanford | East | Area 1 | Rio Grande, Hatch, NM | West looking east; West side |
| 150 | 11/17/2021 | 109_A.jpg | Coby Bartram | South | Area 1 | Rio Grande, Hatch, NM | Mulched cab; W side, looking down s |
| 151 | 11/17/2021 | 109_B.jpg | Coby Bartram | South | Area 1 | Rio Grande, Hatch, NM | Mulched cab; W side, looking down s |
| 152 | 11/17/2021 | 110_A.jpg | Coby Bartram | South | Area 1 | Rio Grande, Hatch, NM | Mulched s cedar; W side river looking S |
| 153 | 11/19/2021 | 111_A.jpg | Coby Bartram | North | Area 2 | Rio Grande, Hatch, NM | Looking N, before plucking; Hatch Bridge, W side R, |
| 154 | 11/19/2021 | 111_B.jpg | Coby Bartram | North | Area 2 | Rio Grande, Hatch, NM | Looking N, before plucking; Hatch Bridge, W side R, |
| 155 | 11/17/2021 | 112_A.jpg | Coby Bartram | North | Area 1 | Rio Grande, Hatch, NM | Photo take in operator seat of mulcher; W side R looking N |
| 156 | 11/19/2021 | 113_A.jpg | Coby Bartram | Northeast | Area 1 | Rio Grande, Hatch, NM | Before and after mulching; W, looking N, E |

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| 157 | 11/19/2021 | 113_B.jpg | Coby Bartram | Northeast | Area 1 | Rio Grande, Hatch, NM | Before and after mulching; W, looking N, E |
| 158 | 11/19/2021 | 113_C.jpg | Coby Bartram | Northeast | Area 1 | Rio Grande, Hatch, NM | Before and after mulching; W, looking N, E |
| 159 | 11/19/2021 | 114_A.jpg | Coby Bartram | East | Area 1 | Rio Grande, Hatch, NM | Pile after mulching; W side river looking E |
| 160 | 11/19/2021 | 115_A.jpg | Coby Bartram | Northwest | Area 1 | Rio Grande, Hatch, NM | Looking NW mulched pile in foreground. unmulched in background; W side river |
| 161 | 11/19/2021 | 115_B.jpg | Coby Bartram | Northwest | Area 1 | Rio Grande, Hatch, NM | Looking NW mulched pile in foreground. unmulched in background; W side river |
| 162 | 11/24/2021 | 116_A.jpg | Coby Bartram | Northwest | Area 1 | Rio Grande, Hatch, NM | Mulching W side River; W side looking NW |
| 163 | 11/24/2021 | 116_B.jpg | Coby Bartram | Northwest | Area 1 | Rio Grande, Hatch, NM | Mulching W side River; W side looking NW |
| 164 | 11/24/2021 | 116_C.jpg | Coby Bartram | Northwest | Area 1 | Rio Grande, Hatch, NM | Mulching W side River; W side looking NW |
| 165 | 11/27/2021 | 117_A.jpg | Dick Lanford | Northeast | Area 2 | Rio Grande, Hatch, NM | South side, looking northeast; South |
| 166 | 11/20/2021 | 118_A.jpg | Dick Lanford | North | Area 2 | Rio Grande, Hatch, NM | Southwest end looking north; South |
| 167 | 11/13/2021 | 119_A.jpg | Dick Lanford | North | Area 1 | Rio Grande, Hatch, NM | South side next to river looking north; South |
| 168 | 11/16/2021 | 120_A.jpg | Dick Lanford | North | Area 1 | Rio Grande, Hatch, NM | South side looking north; South side |
| 169 | 11/29/2021 | 121_A.jpg | Dick Lanford | Northeast | Area 2 | Rio Grande, Hatch, NM | South side, looking northeast; South side |
| 170 | 12/9/2021 | 122_A.jpg | Coby Bartram | East | Area 1 | Rio Grande, Hatch, NM | Barko 937 mulcher and Terex R350T skid steer with Toshog mulching head; E side river looking E |
| 171 | 12/2/2021 | 123_A.jpg | Coby Bartram | North | Area 1 | Rio Grande, Hatch, NM | After mulching; W side River looking N |
| 172 | 12/2/2021 | 123_B.jpg | Coby Bartram | North | Area 1 | Rio Grande, Hatch, NM | After mulching W side River looking N |
| 173 | 12/7/2021 | 124_A.jpg | Coby Bartram | West | Area 1 | Rio Grande, Hatch, NM | Mulching piles and before mulching; E side River looking W |
| 174 | 12/7/2021 | 124_B.jpg | Coby Bartram | West | Area 1 | Rio Grande, Hatch, NM | Mulching piles and before mulching; E side River looking W |
| 175 | 11/30/2021 | 125_A.jpg | Coby Bartram | West | Area 1 | Rio Grande, Hatch, NM | After mulching; W side R 1 look W 2 N 3 E |
| 176 | 11/30/2021 | 125_B.jpg | Coby Bartram | North | Area 1 | Rio Grande, Hatch, NM | After mulching; W side R 1 look W 2 N 3 E |
| 177 | 11/30/2021 | 125_C.jpg | Coby Bartram | East | Area 1 | Rio Grande, Hatch, NM | After mulching; W side R 1 lookW 2 N 3 E |
| 178 | 12/9/2021 | 126_A.jpg | Coby Bartram | North | Area 1 | Rio Grande, Hatch, NM | Foreground mulched pile with unmulched piles in background ; S hwy 187 E side looking N |
| 179 | 12/9/2021 | 126_B.jpg | Coby Bartram | North | Area 1 | Rio Grande, Hatch, NM | Foreground mulched pile with unmulched piles in background; S hwy 187 E side looking N |

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| 180 | 12/7/2021 | 127_A.jpg | Coby Bartram | Northeast | Area 3 | Rio Grande, Hatch, NM | Before and after plucking; W side River looking NE |
| 181 | 12/7/2021 | 127_B.jpg | Coby Bartram | Northeast | Area 3 | Rio Grande, Hatch, NM | Before and after plucking; W side River looking NE |
| 182 | 12/7/2021 | 127_C.jpg | Coby Bartram | Northeast | Area 3 | Rio Grande, Hatch, NM | Before and after plucking; W side River looking NE |
| 183 | 12/14/2021 | 128_A.jpg | Coby Bartram | West | Area 1 | Rio Grande, Hatch, NM | Mulched and unmulched; E side river looking 1W 2N |
| 184 | 12/14/2021 | 128_B.jpg | Coby Bartram | North | Area 1 | Rio Grande, Hatch, NM | Mulched and unmulched; E side river looking 1W 2N |
| 185 | 12/7/2021 | 129_A.jpg | Coby Bartram | Southwest | Area 1 | Rio Grande, Hatch, NM | 937 Barko Mulcher and Cat 259 with rake attached; E side River looking SW |
| 186 | 12/7/2021 | 129_B.jpg | Coby Bartram | Southwest | Area 1 | Rio Grande, Hatch, NM | 937 Barko Mulcher and Cat 259 with rake attached; E side River looking SW |
| 187 | 12/29/2021 | 130_A.jpg | Nikki Gordon | West | Area 1 | Rio Grande, Hatch, NM | Trash; W |
| 188 | 12/28/2021 | 131_A.jpg | Nikki Gordon | Northeast | Area 2 | Rio Grande, Hatch, NM | Excavator; NE |
| 189 | 12/29/2021 | 132_A.jpg | Nikki Gordon | East | Area 1 | Rio Grande, Hatch, NM | potential regrowth in future, plant base not removed; E, looking down |
| 190 | 12/28/2021 | 133_A.jpg | Nikki Gordon | East | Area 2 | Rio Grande, Hatch, NM | Plucked salt cedar, pre-mulched; E |
| 191 | 12/28/2021 | 134_A.jpg | Nikki Gordon | North | Area 2 | Rio Grande, Hatch, NM | Excavator; N |
| 192 | 12/29/2021 | 135_A.jpg | Nikki Gordon | North | Area 1 | Rio Grande, Hatch, NM | Trash; N |
| 193 | 12/29/2021 | 136_A.jpg | Nikki Gordon | West | Area 1 | Rio Grande, Hatch, NM | Potential regrowth in future (base of plant wasn't ripped out); W (facing down) |
| 194 | 12/29/2021 | 137_A.jpg | Nikki Gordon | East | Area 1 | Rio Grande, Hatch, NM | Trash; E |
| 195 | 12/28/2021 | 138_A.jpg | Nikki Gordon | North | Area 2 | Rio Grande, Hatch, NM | Salt cedar, removed from ground, pre-mulched; N |
| 196 | 12/28/2021 | 139_A.jpg | Nikki Gordon | North | Area 2 | Rio Grande, Hatch, NM | Excavator; N |
| 197 | 12/29/2021 | 140_A.jpg | Nikki Gordon | West | Area 1 | Rio Grande, Hatch, NM | Potential regrowth in future (base of plant wasn't ripped out); W (facing down) |
| 198 | 12/29/2021 | 141_A.jpg | Nikki Gordon | West | Area 1 | Rio Grande, Hatch, NM | Trash; W |
| 199 | 12/28/2021 | 142_A.jpg | Nikki Gordon | West | Area 2 | Rio Grande, Hatch, NM | Machine used to rake/ evenly distribute mulch; W |
| 200 | 12/30/2021 | 143_A.jpg | Nikki Gordon | Southwest | Area 1 | Rio Grande, Hatch, NM | Trash; SW |
| 201 | 12/30/2021 | 144_A.jpg | Nikki Gordon | South | Area 1 | Rio Grande, Hatch, NM | Dead birds, not sure what killed them; S |
| 202 | 1/25/2022 | 145_A.jpg | Coby Bartram | North | Area 2 | Rio Grande, Hatch, NM | Mulching before and after in same photo. South end of option 2; W side river looking N |

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| 203 | 1/25/2022 | 145_B.jpg | Coby Bartram | North | Area 2 | Rio Grande, Hatch, NM | Mulching before and after in same photo. South end of option 2; W side river looking N |
| 204 | 12/16/2021 | 146_A.jpg | Coby Bartram | East | Area 3 | Rio Grande, Hatch, NM | Excavator and skid; W side River looking E |
| 205 | 12/20/2021 | 147_A.jpg | Coby Bartram | North | Area 2 | Rio Grande, Hatch, NM | R350T Terex skid steering raking; W side River looking N |
| 206 | 12/20/2021 | 147_B.jpg | Coby Bartram | North | Area 2 | Rio Grande, Hatch, NM | R350T Terex skid steering raking; W side River looking N |
| 207 | 12/16/2021 | 148_A.jpg | Coby Bartram | West | Area 1 | Rio Grande, Hatch, NM | Barko next to mulched piles; W side river looking W |
| 208 | 2/1/2022 | 149_A.jpg | Nikki Gordon | East | Area 1 | Rio Grande, Hatch, NM | Landscape; E |
| 209 | 2/1/2022 | 150_A.jpg | Nikki Gordon | Northeast | Area 2 | Rio Grande, Hatch, NM | Landscape; NE |
| 210 | 11/2/2021 | 151_A.jpg | Coby Bartram | Southwest | Area 1 | Rio Grande, Hatch, NM | E side River; Looking SW |
| 211 | 11/2/2021 | 151_B.jpg | Coby Bartram | Southwest | Area 1 | Rio Grande, Hatch, NM | E side River; Looking SW |
| 212 | 11/2/2021 | 152_A.jpg | Coby Bartram | South | Area 1 | Rio Grande, Hatch, NM | Before and after plucking; Looking S W |
| 213 | 11/2/2021 | 152_B.jpg | Coby Bartram | West | Area 1 | Rio Grande, Hatch, NM | Before and after plucking; Looking S W |
| 214 | 11/2/2021 | 152_C.jpg | Coby Bartram | South | Area 1 | Rio Grande, Hatch, NM | Before and after plucking; Looking S W |
| 215 | 11/2/2021 | 152_D.jpg | Coby Bartram | West | Area 1 | Rio Grande, Hatch, NM | Before and after plucking; Looking S W |

Appendix B. Photographs

FORMAT PAGE



Figure B-1. Mature Saltcedar Prior to Excavation (Photo #9)



Figure B-2. Mature Saltcedar Prior to Excavation in Background with Willows and Mesquite in Foreground (Photo #11)



Figure B-3. Mature Cottonwood with Saltcedar in Foreground (Photo #1)



Figure B-4. Saltcedar and Mesquite (Photo #16)



Figure B-5. Mature Saltcedar and *Typha* sp. along Rio Grande Bank (Photo #5)



Figure B-6. Saltcedar with *Typha* sp. in Background (Photo #17)



Figure B-7. Rio Grande (Photo #41)



Figure B-8. Rio Grande (Photo #28)



Figure B-9. *Atriplex canescens*, "Four-wing Saltbush" (Photo #15)



Figure B-10. *Rhus aromatica*, "Skunk Bush" (Photo #12)



Figure B-11. *Prosopis* sp., "Mesquite" (Photo #93)



Figure B-12. Illegal Dumping, in *Pluchia sericea*, "Arrow Weed" (Photo #36)



Figure B-13. Illegal Dumping (Photo #48)



Figure B-14. Illegal Dumping (Photo #57)



Figure B-15. Saltcedar and Willows, Illegal Dumping (Photo #119)



Figure B-16. Illegal Dumping (Photo #45)



Figure B-17. Illegal Dumping (Photo #44)



Figure B-18. Illegal Dumping (Photo #59)



Figure B-19. Excavation in Progress (Photo #204)

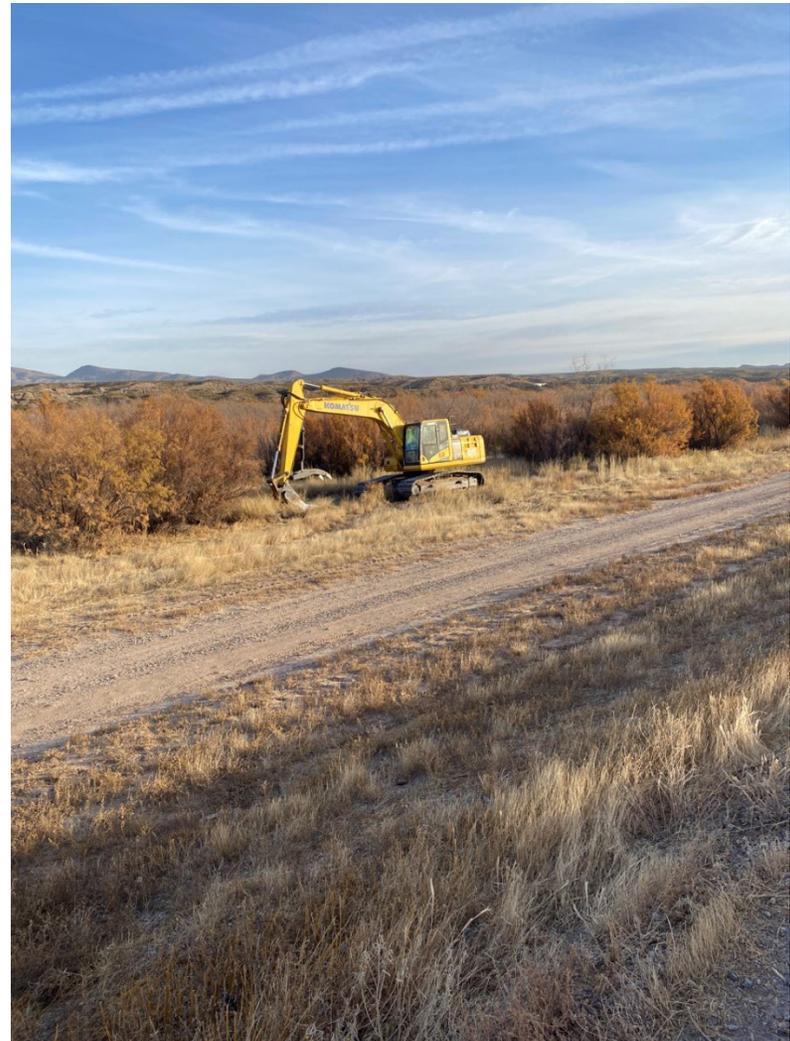


Figure B-20. Excavator (Photo #148)



Figure B-21. Excavated Saltcedar, Excavator in Background (Photo #188)



Figure B-22. 937 Barko Mulcher and Cat 259 with Rake Attached (Photo #186)



Figure B-23. Mulching and Raking in Progress (Photo #158) **Figure B-24. Mulching and Raking in Progress (Photo #152)**



Figure B-25. 937 Barko Mulcher and Cat 259 with Rake Attached (Photo #193)



Figure B-26. Barko 937 Mulcher and Terex R350T Skid Steer with Toshihog Mulching Head (Photo #164)



Figure B-27. Mulch Pile (Photo #62)



Figure B-28. Mulch Pile (Photo #63)



Figure B-29. Arundo Mulch (Photo #64)



Figure B-30. Mulch Pile (Photo #65)



Figure B-31. Mulch Pile (Photo #177)



Figure B-32. Unmulched Saltcedar in Background (Photo #178)



Figure B-33. Resprouting Saltcedar (Photo #210)



Figure B-34. Resprouting Saltcedar (Photo #212)



Figure B-35. Resprouting Saltcedar (Photo #213)



Figure B-36. Resprouting Saltcedar (Photo #215)



Figure B-37. Resprouting Saltcedar (Photo #112)



Figure B-38. Resprouting Saltcedar (Photo #214)

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Appendix C. Calculations for Estimates

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C.0 CALCULATIONS FOR ESTIMATES**C.1 Removed Saltcedar (Volume)**

Helpful conversions:

$$1 \text{ Acre} = 6,272,640 \text{ in}^2$$

$$1 \text{ yard} = 3 \text{ feet}$$

The area for each mulch pile was multiplied by its respective height and then summed, resulting in 618,154,787.9 cubic inches. Cubic inches were converted to cubic feet:

$$618,154,787.9 \text{ in}^3 \times 1 \text{ ft} / 12 \text{ in} = 357,726.2 \text{ ft}^3$$

Finally, cubic footage was converted to cubic yards, resulting in a total of 13,249.12 cubic yards mulched:

$$357,726.2 \text{ ft}^3 \times 1 \text{ yd}^3 / 27 \text{ ft}^3 = 13,249.1 \text{ yd}^3$$

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