Riparian Habitat Restoration at Four Sites in New Mexico and Texas: Shalem Colony, Vinton A and B, and Valley Creek Restoration Sites

Title:

Final Restoration Report
Version: October 2017 to January 2020

Date: **February 28, 2020**

Prepared for:

United States Section
International Boundary and Water Commission
4191 N Mesa St.
El Paso, TX 79902

Prepared by: IDEALS-AGEISS, LLC

848 W. Hadley Ave.
Las Cruces, NM 88005

Contract Number: IBM15D0006
Task Order Number: IBM17T0011

TABLE OF CONTENTS

Section **Page**

LIST OF TABLES

Table **Page**

LIST OF FIGURES

Figure **Page**

LIST OF APPENDICES

Appendix

LIST OF ABBREVIATIONS / ACRONYMS

BA	Biological Assessment
BO	Biological Opinion
GPS	Global Positioning System
NA	not applicable
RGCP	Rio Grande Canalization Project
ROD	Record of Decision
U.S.	United States
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USIBWC	U.S. Section of the International Boundary and Water Commission
UTM	Universal Transverse Mercator

1.0 INTRODUCTION

Historically, the Rio Grande in southern New Mexico was characterized by a wide, active floodplain with numerous marshes, backwater, oxbow pools, and a fringe forest of cottonwoods (*Populus* spp.), willows (*Salix* spp.), and shrubby phreatophytes (USFWS 2005). Stream flows, although subject to great fluctuations, were believed to be perennial in all years. By 1880 however, most of the land along the river that could be irrigated was under development. Between 1938 and 1943, the United States (U.S.) Section of the International Boundary and Water Commission (USIBWC) constructed the Rio Grande Canalization Project (RGCP) spanning a 105-mile reach of the Rio Grande from Percha Diversion Dam, New Mexico to American Dam in El Paso, Texas. The RGCP was constructed to facilitate compliance with equitable allocation of water between the United States and Mexico under the U.S.-Mexico Convention of 1906 (Act of June 4, 1936, PL 648; 49 Stat. 1463), and to provide flood protection against a 100-year flood event. The RGCP straightened and channelized the river, armored the riverbanks, constructed levees, and cleared the floodplain. RGCP construction and subsequent floodplain and channel maintenance have significantly reduced the occurrence and extent of aquatic, riparian, and wetland habitat.

Riparian and wetland habitats support a variety of floral and faunal species and are an important habitat found along the floodplains of Rio Grande River system. These habitats support threatened and endangered species including the southwestern willow flycatcher (*Empidonax traillii extimus*). Changes and reductions to riparian systems including the removal or reduction of riparian vegetation, reductions in water flow, alteration of flow patterns, and physical modifications to waterways have caused decline of some riparian species' populations. A reduction in occurrence and extent of wetland and riparian habitat is evident along the RGCP.

The USIBWC recognized the need to accomplish flood control, water delivery, and operation and maintenance activities in a manner that enhanced or restored the riparian ecosystem. On June 4, 2009, the USIBWC issued a Record of Decision (ROD) on long-term management of the RGCP as the culmination of the *Final Environmental Impact Statement (EIS): River Management Alternatives for the Rio Grande Canalization Project*. The ROD authorized restoration of aquatic habitat and a mosaic of native riparian plant communities at 30 sites totaling more than 550 acres over 10 years (through 2019). The principal objectives of the restoration are to enhance river-floodplain hydrologic connectivity; reduce exotic vegetation; restore endangered species habitat; and reestablish riparian habitat. The RGCP *Conceptual Restoration Plan and Cumulative Effects Analysis, Rio Grande-Caballo Dam to American Dam, New Mexico and Texas* (2009) was developed in coordination with the U.S. Army Corps of Engineers (USACE). The plan focused on restoring healthy riparian function, improving terrestrial wildlife habitat at sites, and enhancing the natural riverine process. The 2009 USIBWC ROD (USIBWC 2004, 2009) identified a phased implementation approach for restoration measures. Phase I included the collection of additional site-specific data and design of site-specific implementation plans, which was documented in the 2011 *Site Implementation Plans for the Rio Grande Canalization Project Restoration Implementation Plan* (TRC 2011). The USIBWC used the Conceptual Restoration Plan and Site Implementation Plans as guides for restoration site implementation, including the site improvement for flycatcher breeding habitat.

The 2011 Biological Assessment (BA) for implementation of the ROD included site-specific information and species data collected during the phased implementation (SWCA 2011). The U.S. Fish and Wildlife Service (USFWS) issued a Biological Opinion (BO) in August 2012, which provided Reasonable and Prudent Measures that the USIBWC would undertake to ensure the protection of the flycatcher including establishing and maintaining breeding habitat (USFWS 2012). Since the 2012 BO, restoration activities included cessation of mowing on 1,838 acres of no-mow zones (which include most restoration sites) and the active management and restoration of 15 sites. In 2017 (IDEALS-AGEISS 2017), the BA was updated with information on the ROD implementation, changes in listed species status and critical habitat, and channel maintenance activities discussed in the River Management Plan (USIBWC 2016). In 2017, USIBWC consulted with the USFWS on the potential impacts to threatened and endangered species as a result of channel maintenance activities documented in USIBWC's River Management Plan for RGCP (USIBWC 2016), and USIBWC was issued a new BO for the actions (USFWS 2017).

In September 2017, USIBWC awarded Task Order IBM17T0011 to IDEALS-AGEISS for the restoration of a total of 70.9 acres of riparian habitat at four sites along the RGCP in compliance with the ROD as well as the 2012 and 2017 BOs. One restoration site is north of Las Cruces, New Mexico (Shalem Colony), two are in Vinton, Texas (Vinton A and B), and one is in El Paso, Texas (Valley Creek; Figure 1-1). Table 1-1 lists the restoration goals of these sites.

This final report is to describe the current conditions, the restoration monitoring activities, and results from October 2017 to January 2020 at the Shalem Colony, Vinton A and B, and Valley Creek restoration sites.

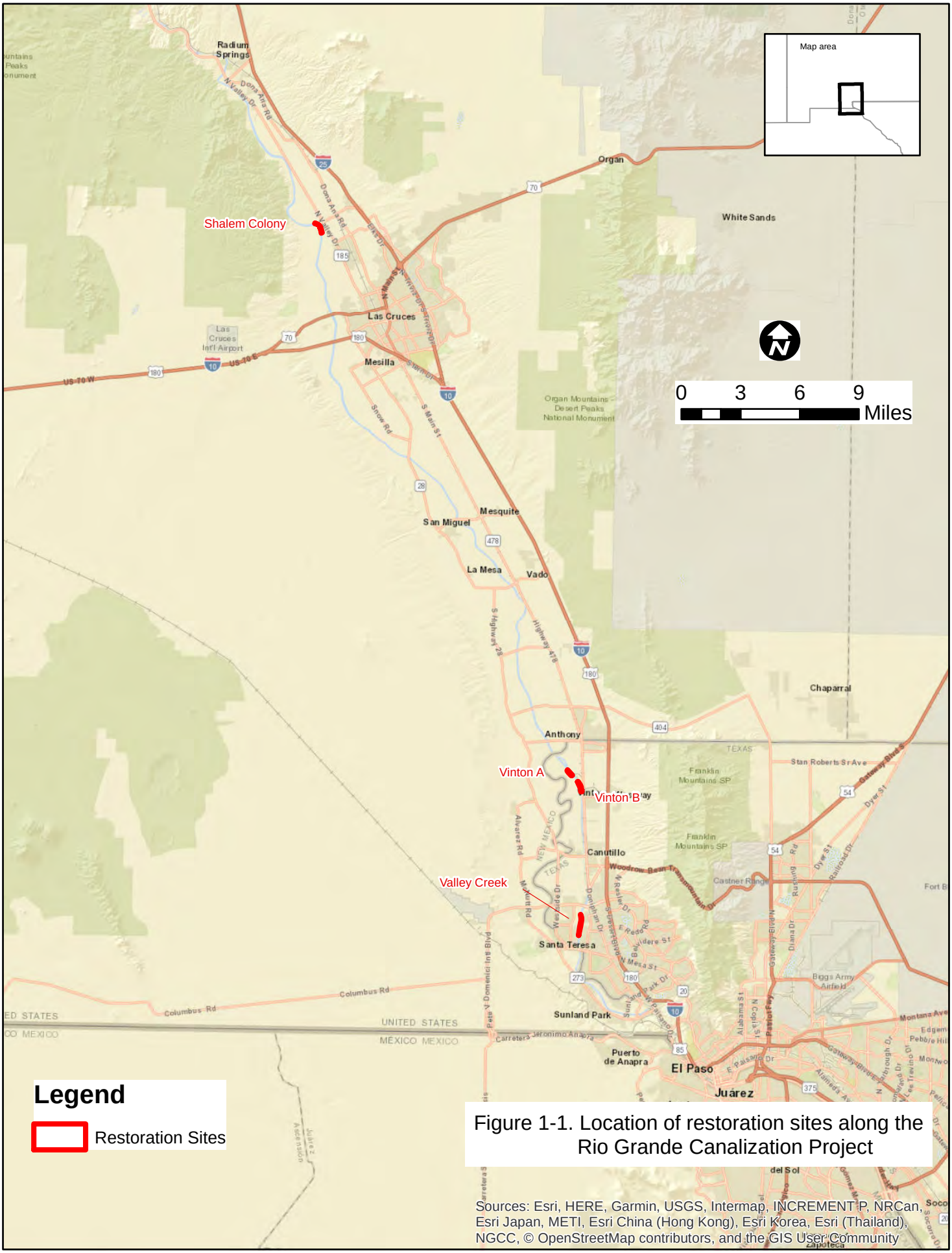

Map area
Shalem Colony
Vinton A
Vinton B
Valley Creek
Legend
Restoration Sites
0 3 6 9
Miles
Radium Springs
Organ
White Sands
Las Cruces
Mesilla
San Miguel
Mesquite
La Mesa
Vado
Chaparral
Anthony
Canutillo
Santa Teresa
Sunland Park
Puerto de Anapra
El Paso
Juárez
Organ Mountains - Desert Peaks National Monument
Franklin Mountains SP
Biggs Army Airfield
Fort Bliss
UNITED STATES
MÉXICO MEXICO
Columbus Rd
Figure 1-1. Location of restoration sites along the Rio Grande Canalization Project
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

Table 1-1. Summary of Work Planned and Implemented at Habitat Restoration Sites

Site	Acres	Targeted Habitat	Before Restoration Conditions- October 2017/ Planned Restoration Work	Restoration Work Implemented 2017-2020
Shalem Colony	14.2	Screwbean mesquite forest	Historically this site was a well-developed mesquite forest. Planned restoration efforts included: ▪ Coyote willow replacement at the banks where saltcedars were extracted ▪ Limited additional long stem plantings incorporated on the site to provide structural diversity ▪ Limited number of cottonwoods incorporated throughout the site close to the river	Completed saltcedar extraction. Approximately 0.5 acre of grass seeding was conducted in the highly disturbed areas. A minimal number of coyote willows were transplanted along the river bank. Ten cottonwood poles and 10 Goodding's willows were planted at the site. Long stem shrubs were planted away from the river edge and incorporated in small patches. Replanting efforts occurred in January 2020.
Vinton A	14.7	Riparian forest	Planned restoration efforts to achieve a 50 percent cover of the riparian forest site included: ▪ Long stem shrubs towards the levee road, but away from the bare ground adjacent to the levee ▪ Scattered groups of cottonwoods throughout the site to provide some structural diversity at the site	Saltcedars were extracted from the site and approximately 2.25 acres of grass seeding was placed in the disturbed areas in August 2018. Goodding's willows and cottonwoods were scattered throughout the site and long stem shrubs were planted in patches between the native vegetation and the river. Coyote willows were transplanted along the river bank where saltcedars were extracted in late winter 2018. Re-planting efforts occurred from December 2019 through January 2020 and additional shrub species were adding to increase diversity.
Vinton B	20	Riparian woodland	Planned restoration efforts to target canopy cover of about 50 percent included: ▪ Groupings of cottonwoods spread throughout the site ▪ Coyote willows planted along the river bank where saltcedar was removed ▪ Clumps of Goodding's willows spaced throughout the site ▪ Long stem shrubs planted towards the levee road, but away from the bare ground adjacent to the levee, and mixed with the native vegetation	Coyote willows were transplanted along the river bank where saltcedars were extracted. Approximately 0.6 acre of grass seeding was conducted on the site near the levee road. Clumps of Goodding's willows were planted closer to the edge of the site near the river with concentrations in the middle and northern part of the site. Cottonwoods were clumped throughout the site. Re-planting efforts occurred in January 2020.

Site	Acres	Targeted Habitat	Before Restoration Conditions- October 2017/ Planned Restoration Work	Restoration Work Implemented 2017-2020
Valley Creek	22	Open riparian woodland	Restoration efforts planned at this site included: ▪ Goodding's willow and cottonwood trees planted with an overall canopy cover of about 30 percent ▪ Scattered patches of shrubs throughout the area at a high density with some open areas; clustering to assist with more uniform mowing areas and a planting layout to minimize encroachment along the trail path and thus provide a buffer between the trail and plantings	Riverside areas where saltcedar were extracted were planted with transplanted coyote willows. Cottonwoods were planted in patches throughout the site. The site received 1.0 acre of grass seeding. Shrubs were clustered in areas particularly around the open sitting areas and along the sides of the canal. Goodding's willows and cottonwoods were scattered throughout the site with Goodding's willows concentrated more between the trail and the river edge. Re-planting efforts occurred from December 2019 through January 2020.

2.0 RESTORATION METHODOLOGY

Prior to conducting any work, the field crew established a minimum of three camera points for each restoration site (Table 2-1). Each camera point has a Global Positioning System (GPS) location and is permanently marked for future reference. Three photo points for each camera point (where the camera is located) were established and permanently marked (fencepost or rebar). The azimuth was noted and an identification number was assigned to each photo and camera point. The points had an adequate view of the site to document the anticipated growth of revegetated areas and to monitor the stability of in-stream work. Photo point information was collected during the following periods of the project: pre-implementation monitoring, pre-restoration monitoring, and six times during post-restoration events. Additional photos were taken of any significant changes and points of interest. Photos were documented in accordance with Federal and National Archives and Records Administration regulations. Each photo meets the USIBWC requirements for pixel array and was uniquely numbered and labeled for identification. Qualitative monitoring field sheets developed by USIBWC were used to document conditions at each site during each monitoring period.

Table 2-1. Established Photo Points for Each Restoration Site

Restoration Site[1]	Photo Point 1		Photo Point 2		Photo Point 3		Photo Point 4	
	UTM E	UTM N	UTM E	UTM N	UTM E	UTM N	UTM E	UTM N
Shalem Colony	326749	3583732	326975	3583524	327099	3583126	NA	NA
Vinton A	347322	3538824	347168	3539009	347272	3538862	NA	NA
Vinton B	348222	3537607	348134	3537847	348048	3538038	NA	NA
Valley Creek	348078	3525795	348099	3525933	348190	3526506	348270	3526977

1 Specific bearings from each photo point are contained in Appendix C.
NA not applicable
UTM Universal Transverse Mercator

2.1 Site Preparation

Prior to implementation of the restoration effort, two types of signage were posted within the restoration properties. Within each restoration site, two steel post signs and flexible delineator posts were maintained at approximately 200 to 400 feet apart. Contractors coordinated with USIBWC and the City of El Paso for the Valley Creek restoration signage to ensure notice to the public of restoration activities and to minimize disruption of recreational activities. During the project, continual coordination with the City of El Paso occurred for the Valley Creek restoration site.

To protect native vegetation identified at the site, vegetation was flagged prior to site preparation. Exotic species were then removed in order to increase the current native habitat. Saltcedar (*Tamarisk spp*.) plants were cut near the base of the plant with a chainsaw, these branches were then run through a wood chipper with the woodchips being dispersed throughout the site. Following removal of the branches and trunks, a backhoe and excavator with a bucket and grappler (clasping thumb) attachment was used to extract the large root masses including the root crown. This removal process was used for saltcedars along the stream bank and throughout the restoration sites within the floodplain. Other low-growing noxious weeds (e.g., Russian thistle [*Salsola tragus*]) were grubbed using a compact skid steer with brush hog

attachment. Site preparation began in January 2017, continued in concurrence with planting activities at other restoration sites, and was completed in May 2018.

Saltcedar extraction at Vinton B, 24 April 2018

Shalem Colony restoration site after saltcedar extraction, 23 February 2018

New invasive species growth identified during the monitoring phase and outside of the 30-foot buffer of the river channel or seasonal pond was treated with chemical application of herbicides. Identified species were treated in areas inaccessible to mechanical methods or where mechanical methods were not appropriate. A Commercial Applicator, licensed by the New Mexico Department of Agriculture, determined the application concentrations and rates of the herbicide. Saltcedar re-sprouts were treated with Garlon® 4 herbicide in September 2018 outside the migratory bird nesting season (March 1 to August 31).

2.2 Native Planting

IDEALS-AGEISS developed a restoration plan (IDEALS-AGEISS 2018; Appendix A) based on guidance from the RGCP Conceptual Restoration Plan (USACE 2009) and RGCP River Restoration Site Implementation Plans (TRC 2011). Within these plans, planting plans were presented (Appendix A and B) and planting activities in the field followed these plans. The following changes to the project were approved by USIBWC:

1. Coyote willows were transplanted from the islands being removed for channel maintenance.

2. The timing of the transplants necessitated completing the remaining pole plantings in winter 2018.

3. In hopes to increase survivorship, long stem shrub and potted tree planting occurred in fall 2018.

4. The City of El Paso requested that the 10 ash trees intended for Valley Creek not be planted. Desert willows (*Chilopsis linearis*) were planted instead.

The 2017 BO allows the USIBWC to remove some vegetation within the channel that is suitable for the flycatcher as long as USIBWC continues to implement riparian habitat restoration and follows other requirements and recommendations (USFWS 2017). In the 2017 BO, the USFWS recommended that USIBWC transplant vegetation from islands slated for removal in the channel. Several islands in the El Paso area were slated for removal as part of the island channel maintenance. USIBWC worked with IDEALS-AGEISS to incorporate the vegetation transplant activities as part of this restoration task order.

Prior to USIBWC crews removing the island sediment, IDEALS-AGEISS extracted willows from islands designated for removal and transplanted them to the sites. IDEALS-AGEISS crews used a front-end loader to extract clumps of coyote willows with the root balls, approximately 20 stems per bucket load, and placed them in an excavated trench within the floodplain along the riverbank. The trench was dug deep enough such that the root balls would be in contact with groundwater during the winter months when the water table is at its lowest. Once the willows and root balls were placed in the trench, it was then backfilled taking care to not damage newly transplanted willows and to eliminate any voids within the backfill material. Coyote willows from the islands were transplanted from January to March 2018 at the Valley Creek and Vinton B sites and in January 2019 for Shalem and Vinton A sites.

Example of coyote willow transplanting from vegetated islands at the Vinton A site (24 January 2019)

Cottonwood pole planting, Valley Creek 16 April 2018

Cottonwood poles and Goodding's willow nursey stock for planting was purchased from Santa Ana Native Plants Bernalillo, New Mexico (cottonwoods) and Hydra Aquatic Albuquerque, New Mexico (Goodding's willows). Cottonwood poles and Goodding's willows were 12- to 16-feet long and approximately 2 to 3 inches in diameter. An auger was used to plant cuttings after the cuttings soaked for approximately 2 weeks. Planting was conducted in late winter/early spring months (February through April). Due to the timing for the transplants, not all sites were planted in the spring of 2018, and the remaining poles were planted winter 2018-2019.

Based on other restoration sites, fall plantings for the long-stem shrubs seem to promote better survivorship; therefore; plantings of these species were moved to late fall 2018. Shrub planting was conducted using an approximate 3-foot auger hole. A 4-inch well around the shrubs was then created to retain additional moisture (Appendix B).

Site specific planting maps based on the required plantings (see Table 2-2) were developed for each restoration site in the Restoration Plan (IDEALS-AGEISS 2018).

Shrubs for planting at the restoration sites, 25 October2018

Table 2-2. Planting Requirements for the Four Restoration Sites

Planting	Shalem Colony	Vinton A	Vinton B	Valley Creek
Coyote willow poles	50	2,940	3,000	1,100
Gooding's willow poles	10	441	200	220
Cottonwood poles	10	1,029	800	440
Long stem riparian shrubs	50	1,470	1,600	1,000
Arizona ash	0	5	5	0
Desert willow	0	5	0	20

2.3 Groundwater Monitoring

During each monitoring period and assessment, groundwater levels were collected and analyzed at the existing USIBWC shallow groundwater monitoring wells at the restoration sites, and the information was used to supplement the groundwater monitoring data from the past several years. Groundwater measurements were taken to the top of the polyvinyl chloride casing inside the steel protector.

2.4 Restoration Monitoring

A pre-implementation monitoring assessment was conducted on 19 and 25 October 2017 prior to any work at the sites in support of the restoration plan. The field crew identified and mapped the distribution of invasive species for removal and riparian habitat (specifically the willow species of interest) to be protected during restoration efforts.

Once the noxious vegetation was removed, and the site prepped for planting, a pre-restoration assessment of the four sites was conducted. This assessment documented the remainder of the native vegetation on each site and the baseline habitat prior to planting and was conducted in March 2018.

Six post-restoration assessments were conducted in May, August, and October of 2018, and April, August, and October of 2019. During post-restoration efforts, native and non-native species were noted as well as approximate cover. Both random and fixed plot approaches (1/10th-acre plots) were used to approximate the type and percent of ground, brush, and canopy cover. The circular plots measure 37.2 feet in diameter. Immediately after planting, three to four fixed plots were established within each restoration site. In addition, during each monitoring session, three additional random plots were chosen and monitored if the site was planted. During the October 2018 and October 2019 monitoring sessions, all planted poles and willows were counted to determine survivorship. Percent cover and species composition were recorded on each site's field monitoring sheet. In addition, any changes in vegetation condition were noted on the field monitoring sheet, as well as stream bank conditions and any wildlife sightings.

3.0 RESULTS

3.1 Groundwater Monitoring

Groundwater levels are historically higher at the two Vinton sites compared to the Valley Creek site except during irrigation release periods when they are similar (Appendix C). The well at Valley Creek that was destroyed was re-established early in 2018 (VC-MW-1). Table 3-1 presents information tabulating groundwater levels at the Vinton A, Vinton B, and Valley Creek restoration sites. No wells were established on or near the Shalem Colony site.

Table 3-1. Groundwater Monitoring Well Data

Site	Well ID	Site Visit Dates and Water Depth Below Surface Measured in Feet							
		Pre-implementa-tion 2017	Pre-restora-tion 2018	Post-restoration 2018/2019					
		Nov 2017	3/6/18	May 2018	Aug 2018	Oct 2018	April 2019	July 2019	Oct 2019
Valley Creek	VC-MW-1	Destroyed	8.32	8.06	3.21	6.80	8.8	2.6	3.84
	VC-MW-2	5.02	8.14	2.27	8.2	6.00	9.0	6.2	3.93
Vinton A	VA-MW-1	3.87	8.94	3.37	2.92	3.90	9.75	2.9	2.79
	VA-MW-2	4.07	8.07	2.99	1.74	3.50	9.2	2.6	3.18
Vinton B	VB-MW-1	4.25	10.22	4.26	2.99	4.00	12.5	2.1	3.74
	VB-MW-2	3.79	Well dry-obstructed with sediment at 11.6	3.86	Unable to open	Unable to open	Unable to open	Unable to open	3.64

3.2 Pre-Restoration Site Conditions

Pre-restoration site conditions described below are based on a 2016 survey (IDEALS-AGEISS 2016) as well as surveys conducted during October 2017 (Appendix C and D). Abundance of floral species observed on each site was documented (Table 3-2).

Table 3-2. Vegetative Species Observed Prior to Restoration Efforts and the Four Sites.

Common Name	Scientific Name	Abundance			
		Shalem Colony	Vinton A	Vinton B	Valley Creek
Coyote willow	*Salix exigua*	Moderate	-	-	Low
Cottonwood	*Populus deltoides*	-	-	-	Low
Screwbean mesquite	*Prosopis pubescens*	High	Moderate-High	Moderate	-
Salt cedar	*Tamarix chinensis*	Moderate	Moderate-high	Moderate-high	Sparse
Russian thistle	*Salsola kali*	High	High-moderate	Moderate	-
Bulrush	*Blysmus sp.*	Low	-	-	-
Willow baccharis	*Baccharis salicina*	Low	-	-	Low

Common Name	Scientific Name	Abundance			
		Shalem Colony	Vinton A	Vinton B	Valley Creek
Cattail	*Typha sp.*	-	-	-	Low
Four-winged saltbush	*Atriplex canescens*	-	Moderate-low	Moderate	-
Smooth pigweed	*Amaranthus hybridus*	-	High	High	-
Rabbit brush	*Ericameria sp.*	-	-	Low-moderate	-
Wolfberry	*Lycium spp.*	-	Low-moderate	-	-
Siberian elm	*Ulmus pumila*	-	Sporadic	Low	-

3.2.1 Shalem Colony

Mowing has been discontinued along most of the site since the 1990s, leading to the mature screwbean mesquite (*Prosopis pubescens*) forest (>5 acres) with scattered saltcedar (*Tamarisk spp.*). The area has high abundance of large screwbean mesquite forming a large thicket of vegetation. The vegetation on the southern lateral along the bank at this site is bulrush (*Scirpus spp.*) and cattail (*Typha spp.*) in low abundance. The southern portion of the site has riparian vegetation along the river in the form of mixed vegetation dominated by tall screwbean mesquite with coyote willow (*Salix exigua*) and saltcedar (showing the effects of *Diorhabda* infestation). Coyote willow is in moderate abundance and could be developed at the site. False seep willow (*Bacharis salicifolia*) occurs in low abundance. The main exotic species noted during both surveys are saltcedar in moderate abundance and Russian thistle (*Salsola tragus*) in high abundance. Most of the saltcedars occurring on this site can be removed without damaging native vegetation.

The soils on the Shalem Colony site are Brazito loamy fine sand with a clay layer typically ranging from 5 to 18 percent. These soils are characterized by deep, well drained, nearly level soil that formed in mixed alluvium on the floodplain near river channels. The salinity of the soils onsite is low for the most part; however, some soil samples showed a high salinity reading which may affect plant survivability. No groundwater wells occur on the site however the 2010 soil survey documents the depth to water table ranged from 47 to over 60 inches in three test locations (TRC 2010). Permeability in this soil type is rapid and the soils tend to have a low holding capacity. The site also has very high banks.

The dirt road running through the site and the levee road are heavily used and there is a fair amount of trash at this site. The restoration site is adjacent to a large pecan orchard. Habitat at this site is not currently suitable for flycatchers; however, this area might be suitable for flycatchers during years with long-term river flow (IDEALS-AGEISS 2016). Upland portions of the site are disturbed with smooth pigweed (*Amaranthus hybridus*), tumbleweed (*Salsola tragus*), mixed grasses, and forbs. This site receives a fairly high level of recreational use. Pre-restoration site conditions and the distribution of native species to protect and invasive saltcedars to remove are noted in Figure 3-1. Pre-restoration photos of the site can be found in Appendix D.

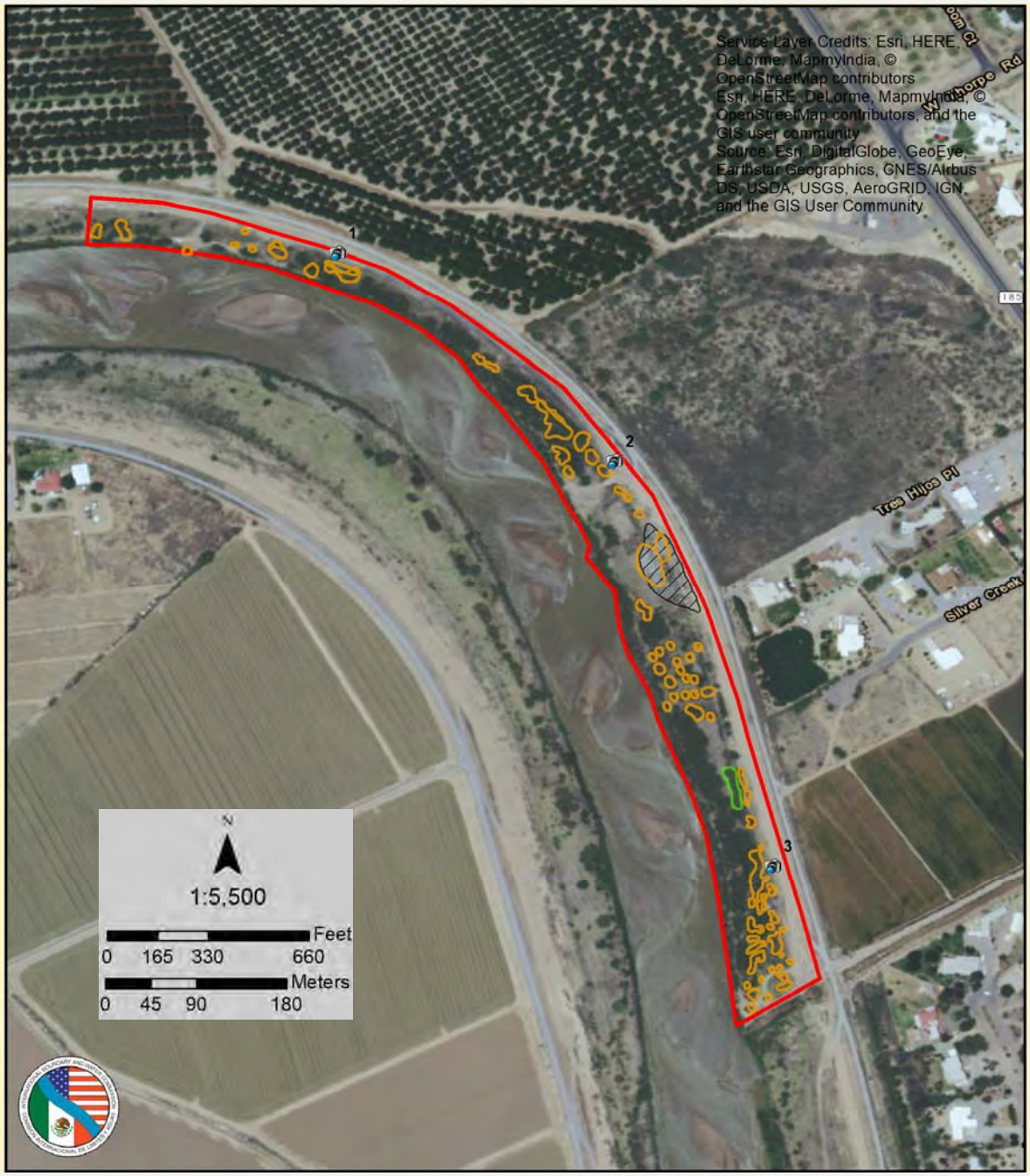


Figure 3-1. Pre-restoration Conditions at the Shalem Colony Restoration Site

3.2.2 Vinton A

Mowing has been discontinued at the Vinton A site since 2011 and the site is nearly contiguous along the west side of the river with the Vinton B site. Dominant tree and shrub vegetation at the site consist of saltcedar, screwbean mesquite, and four-wing saltbush (*Atriplex canescens*). Good stands of mesquite occur sporadically through the site (Appendix C). Smooth pigweed is dense and abundant on the site with wolfberry (*Lycium spp.*) in low to moderate abundance. Saltcedar is present throughout the site in some dense stands and currently shows limited signs of stress from *Diorhabda*. Other invasive species on the site include moderate to high abundance of Russian thistle and sporadic Siberian elms (*Ulmus pumila*). The central portion of Vinton A has an area of mixed vegetation that may be adequate for flycatchers within the next few years, although yellow-billed cuckoos (*Coccyzus americanus*) habitat does not currently exist at this site (IDEALS-AGEISS 2016). The pre-restoration distribution of saltcedar and native vegetation is noted in Figure 3-2. Pre-restoration photos can be found in Appendix D.

The Agua variant soils found at the Vinton A site are fine sandy loam which is deep and somewhat poorly drained. Clay comprises approximately 4 to 18 percent of the soils type, although some higher clay concentrations were documented in some of the sample horizons (TRC 2010). Salinity at the sites is low. Groundwater levels are highly dependent on water availability in the river and vary considerably at the site with historical records indicating depths that range from 2.6- to 13.7-feet below the surface at Vinton A.

3.2.3 Vinton B

This 25-acre site on the west side of the river is a mixed-shrub habitat with scattered four-wing saltbush and rabbitbrush (*Chrysothamnus nauseosus*) in moderate abundance. Tall, dense patches of smooth pigweed are abundant through the site. Screwbean mesquite and saltcedar dominate. Siberian elms are found on the site as well as other non-native species such as fescue grass (*Festuca spp*.) and Russian thistle. The site has not been mowed since 2011. Pre-restoration site conditions and the distribution of invasive saltcedar are presented in Figure 3-3 and pre-restoration photos can be found in Appendix D.

Like the Vinton A site, Agua variant soils are found at the Vinton B site. Salinity at the site is low. Groundwater levels vary considerably at this site, with historical records indicating depths that range from 2.5- to 15-feet below the surface, and levels are highly dependent on water availability in the river.

Vinton B site pre-restoration conditions with saltcedar along the river bank, 14 November 2017

Vinton B site pre-restoration conditions, 14 November 2017

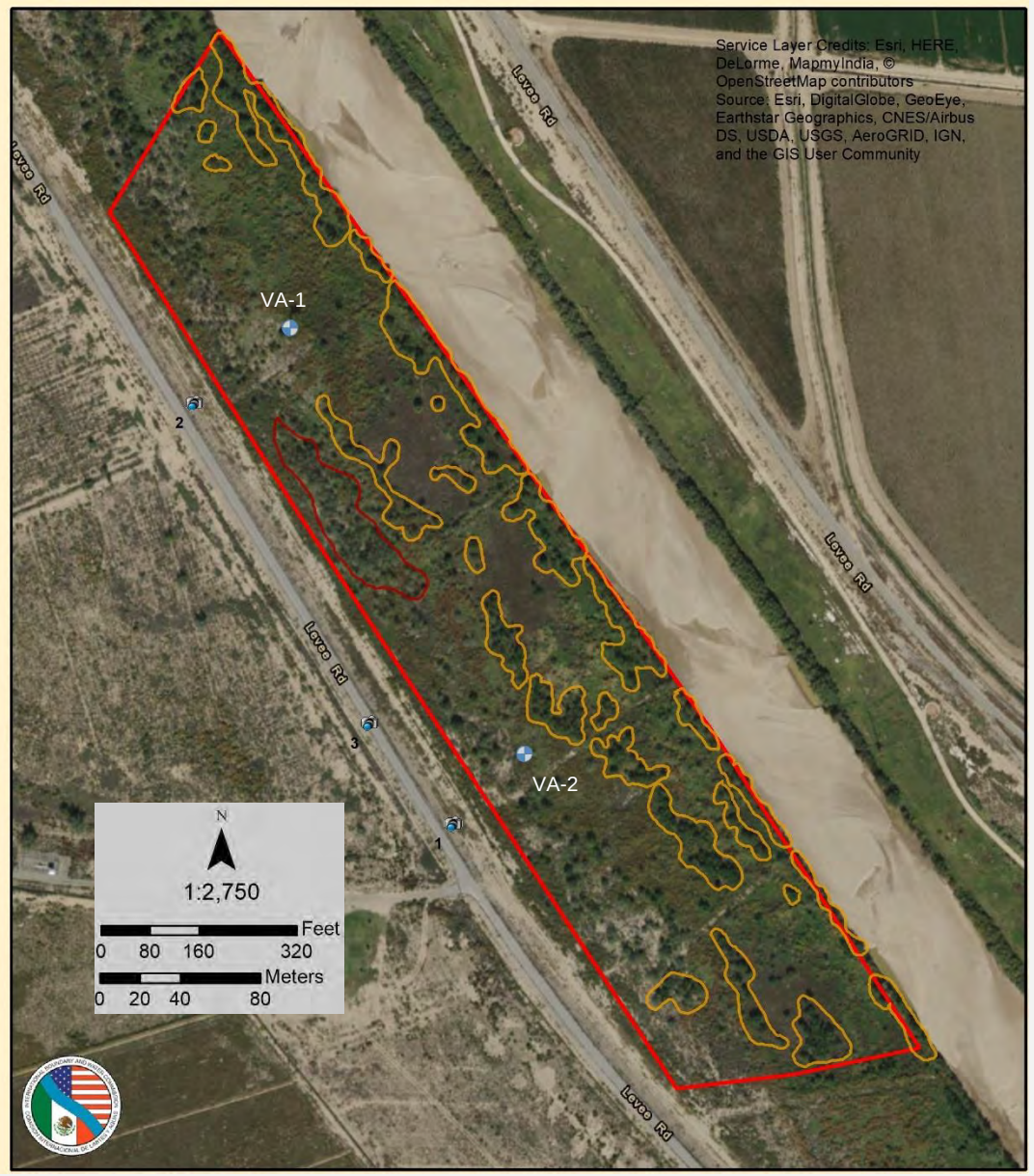


Figure 3-2. Pre-restoration Conditions at the Vinton A Restoration Site

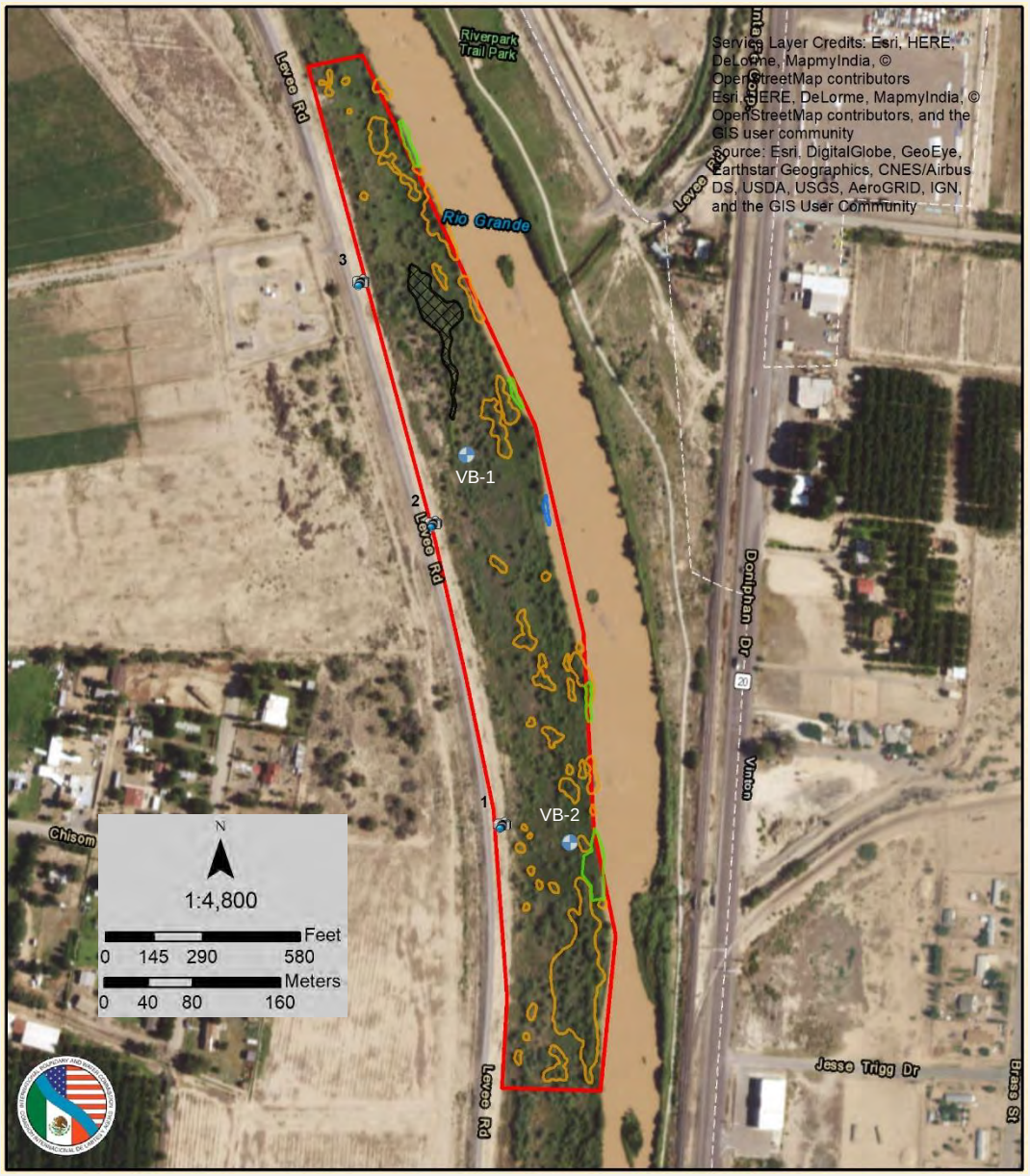


Figure 3-3. Pre-restoration Conditions at the Vinton B Restoration Site

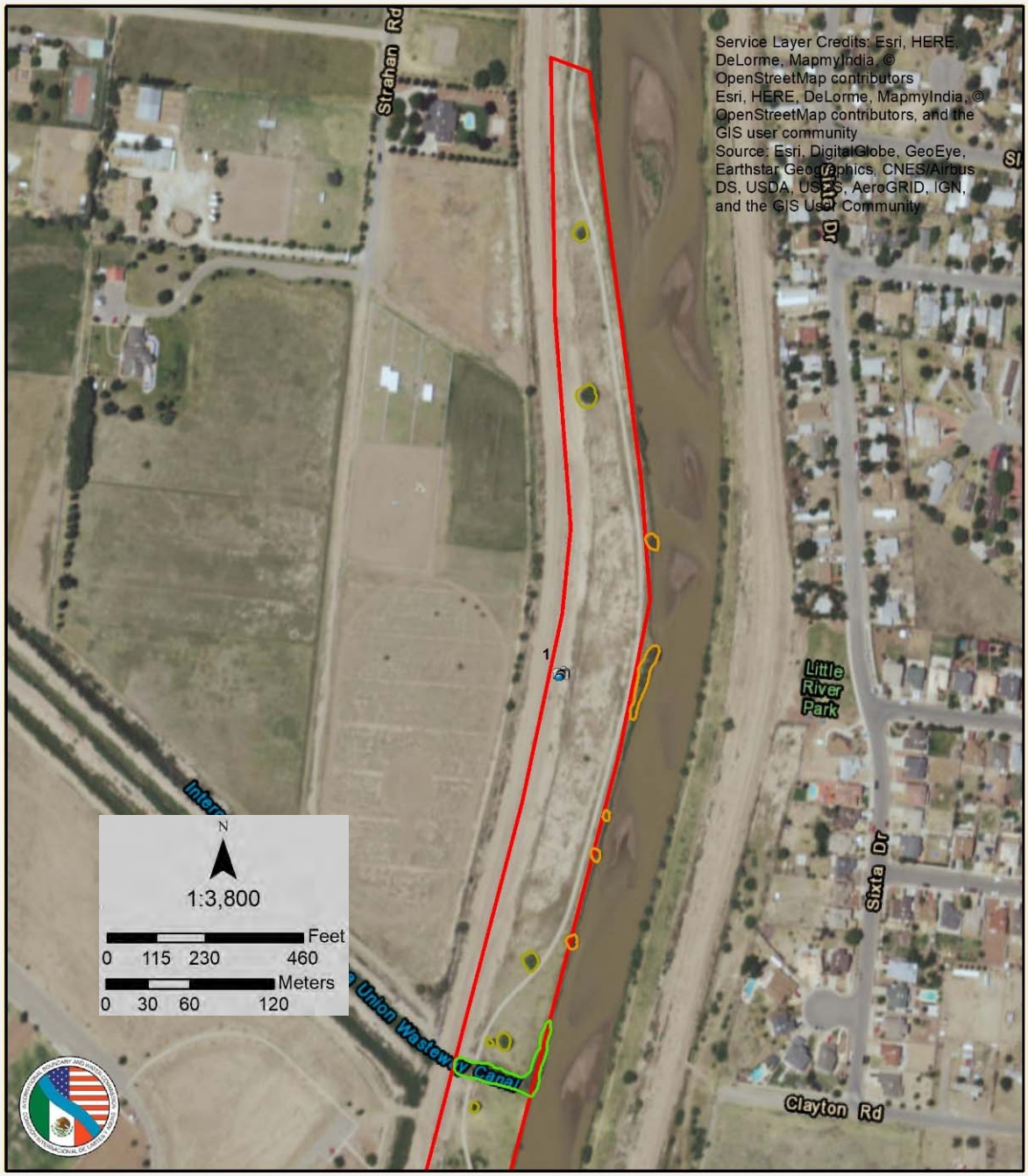
3.2.4 Valley Creek

This site is part of a recreation lease to the City of El Paso, which mows the site regularly. This site is adjacent to a large residential area and has pathways with permanent trail rest areas running through it. Ground cover was mostly fescue that is routinely maintained by mowing away from the river. The bank has grass (*Sorghum halepense*) and intermittent narrow patches of coyote willow and false seep willow (*Bacharis salicifolia*) restricted to the top the bank with widely scattered large cottonwood (*Populus deltoides*). Cattails are also found in small patches. Currently this site does not support suitable habitat for cuckoo or flycatchers (IDEALS-AGEISS 2016). Distribution of native and invasive species prior to restoration at the Valley Creek site is shown in Figures 3-4 and 3-5. Pre-restoration photos are presented in Appendix D.

The Valley Creek site also is comprised of the fine sandy loam Agua variant soils with typically 4 to 17 percent clay composition. These soils are deep and somewhat poorly drained. Soil salinity is not considered a hazard at this site. Historical records indicate groundwater levels range from 2.75- to 9.3-feet below the surface.

3.3 Post-Restoration Site Conditions

Native forbs and grasses were found throughout all four restoration sites and made up a large part of the ground cover (Appendix C). Dominant vegetation at the four sites varied (Table 3-3). Kochia (*Kochia scoparia*), Bermuda grass (*Cynodon dactylon*), and camelthorn (*Alhagi maurorum*) were the most common non-native species to dominate the sites during the August 2019 monitoring (when the largest diversity and covering of species was documented). These species were prevalent in the disturbed areas where saltcedars were removed, and kochia was present in the coyote willow (*Salix exigua*) transplant areas of Vinton B and Valley Creek. Approximately 10.38 acres of saltcedar was removed: Valley Creek 0.61 acre, Vinton A 4.6 acres, Vinton B 3.9 acres, and Shalem Colony 1.27 acres. From September 19-21, 2018, a licensed applicator treated saltcedar re-sprouts with Garlon® 4 herbicide at the restoration sites.



Legend

- Project Area
- Current Saltcedar Stand
- Cottonwood
- Existing Coyote Willow
- Photo Point

Figure 3-4. Pre-restoration Conditions at the Valley Creek North Restoration Site

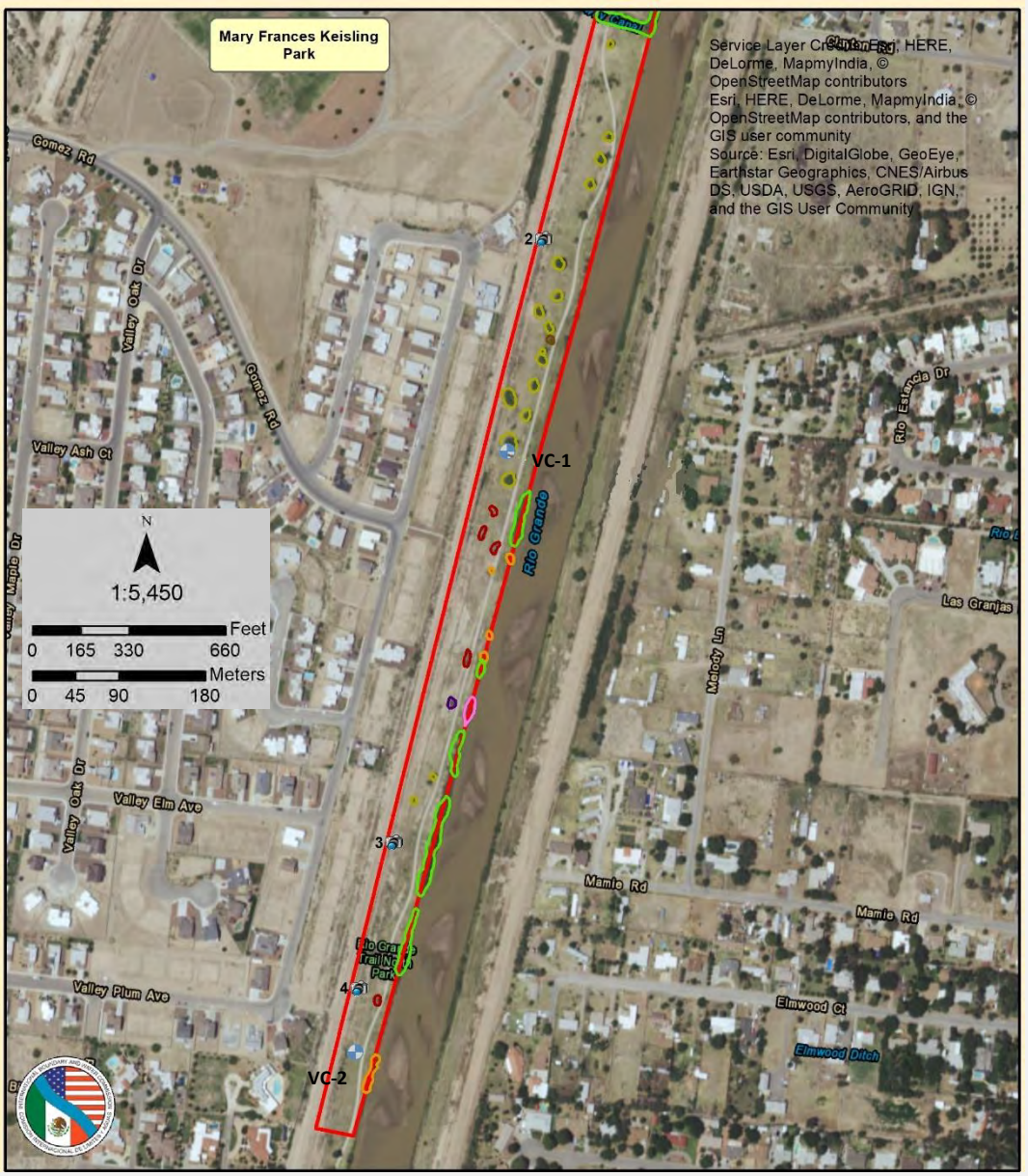


Figure 3-5. Pre-restoration Conditions at the Valley Creek South Restoration Site

Table 3-3. Dominant Vegetation Cover Observed at the Four Restoration Sites, August 2019

Scientific Name	Common Name	Estimated Percent Cover			
		Shalem Colony	Vinton A	Vinton B	Valley Creek
Native Species					
Aerigeron spp.	Daisy	2	-	-	-
Ambrosia sp.	Ragweed	2	-	-	-
Apocynum cannabinum	Dogbane	10	-	-	1
Atriplex canascens	Saltbush	-	-	-	5
Baccharis salicina	Willow baccharis	-	5	-	2
Carex sp.	Sedge	-	-	-	1
Chloris sp.	Finger grass	1		-	-
Cinna spp.	Woodreeds	5	15	2	-
Conyza spp.	Horseweed	4	-	-	-
Cressa truxillensis	Spreading alkaliweed	-	6	10	35
Cyclona sp.	Pigweed	-	-	7	-
Datura stramonium	Jimson weed	-	-	1	-
Distichlis spicata	Salt grass	10	30	20	18
Gaura mollis	Velvetweed	-	-	-	5
Lactuca serriola	Prickly lettuce	-	-	-	9
Lycium torreyi	Wolfberry	10	3	5	4
Machaeranthera tanacetifolia	Tansyleaf tansyaster	2	1	-	-
Oenothera pallida	Pale evening primrose	1	-	-	-
Opuntia spp.	Prickly pear cactus	1	-	-	-
Panicum spp.	Grass	1	-	3	-
Phoradendron leucarpum	Mistletoe	1	-	-	-
Populus deltoides	Cottonwood	-	7	8	9
Potulaca spp.	Purslane	1	-	-	-
Prosopis glandulosa	Honey mesquite	-	5	4	-
Prosopis pubescens	Screwbean mesquite	20	18	30	5
Rhus trilbata	Three-leaf sumac	2	-	-	-
Ribes	Ribes	-	-	-	-
Salix exigua	Coyote willow	15	8	15	15
Salix gooddingii	Goodding's willow	-	2	3	2
Sesuvium verrucosum	Western sea-purslane	-	4	6	20
Sphaeralcea spp.	Globe mallow	1	-	-	-
Sphaerophysa salsula	Bladder vetch	-	-	-	6
Solanum elaeagnifolium	Silver nightshade	5	10	12	8
Sporobolus airoides	Alkali sacaton	8	-	6	-
Sporobolus constrictus	Spike dropseed	1	-	-	-
Suaeda nigra	Bush seepweed	30	-	-	25
Tribulus terrestris	Goathead	2	-	-	-

Scientific Name	Common Name	Estimated Percent Cover			
		Shalem Colony	Vinton A	Vinton B	Valley Creek
Tricetum spp.	Oatgrass	1	-	-	-
Typha spp.	Cattail	2	-	-	-
Non-Native Species					
Conyza spp.	Camelthorn	-	40	55	-
Cynodon dactylon	Bermuda grass	4	35	25	65
Kochia scoparia	Kochia	20	65	35	5
Salsola kali	Russian thistle (tumble weed)	3	-	6	1
Tamarix chinensis	Saltcedar	2	10	20	7

3.3.1 Shalem Colony

Shalem Colony is dominated by coyote willows along the banks (20 percent) and screwbean mesquite (20 percent) throughout the site (Table 3-3). Sporadic re-sprouting of saltcedar has occurred. Kochia still is the dominant invasive species on the site (20 percent). During the August and October 2019 monitoring, a diversity of herbaceous species was noted. Bush seepweed (Sueda nigra), dogbane (*Apocynum cannabinum*), wolfberry (*Lycium torreyi*), and saltgrass (*Distichlis spicata*) continued to dominate the understory on the site.

Approximately 0.5 acre of grass seeding was conducted during August 2018 in disturbed areas on the site. The long stem shrub plantings occurred during November 2018 and the pole plantings of cottonwoods, Goodding's willows, and the coyote willows during February 2019 (Figure 3-6; Appendix B).

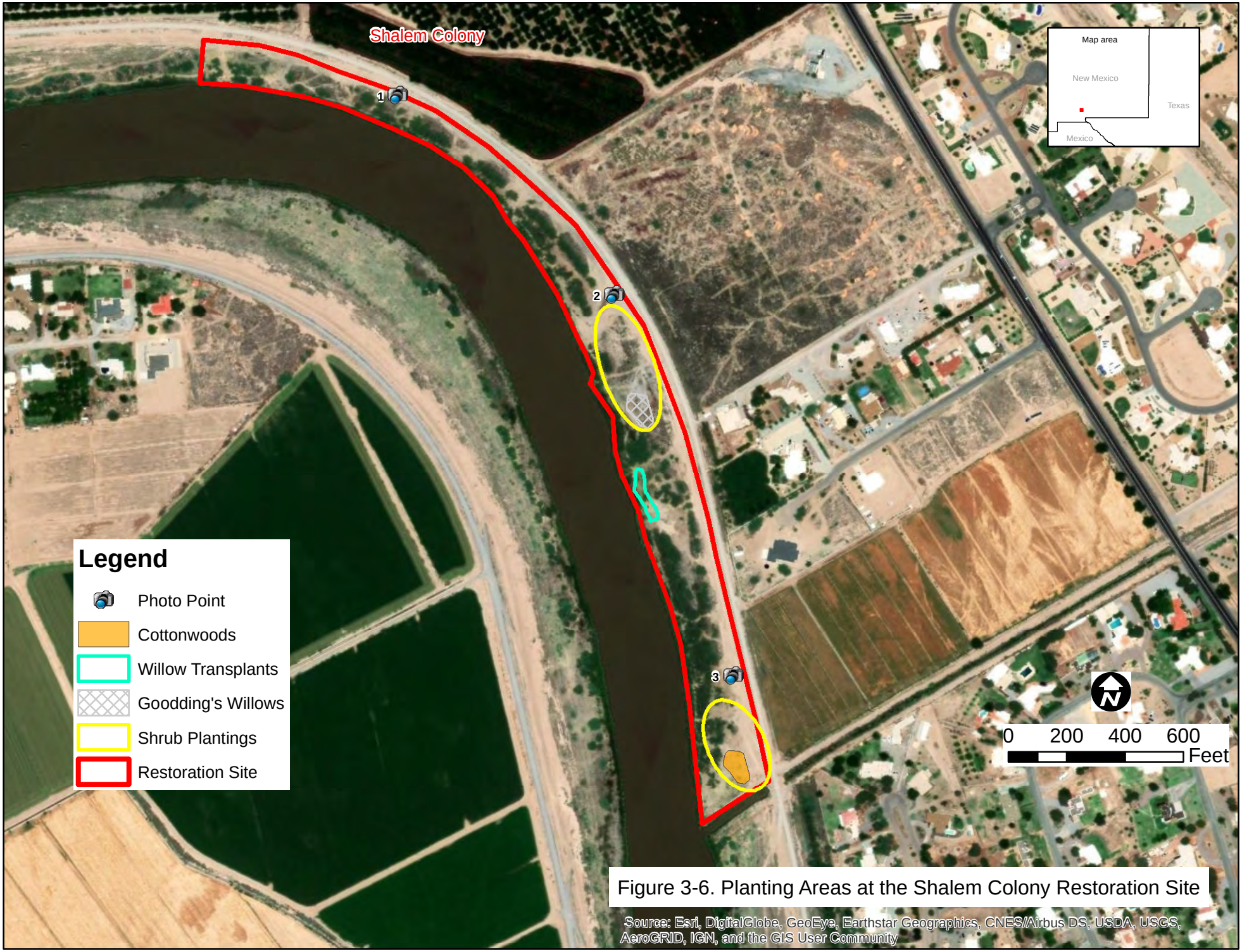


Figure 3-6. Planting Areas at the Shalem Colony Restoration Site

3.3.2 Vinton A

Grass seeding occurred in open areas that sustained disturbance during saltcedar extraction throughout the Vinton A site during the week of 5 August 2018 (2.25 acres). Four-wing saltbush shrubs (*Atriplex canescens*) were planted during fall 2018 at the site. Coyote willow whips were harvested in January 2019 and approximately 2,970 coyote willows were transplanted to the site. Goodding's willows (441) and cottonwood (1,014) pole planting started in January 2019 (Figure 3-7). All Goodding's willows and cottonwood poles were planted by February 2019 after first grubbing the site for weeds. Poles were watered immediately after planting and again in March.

Kochia documented at the Vinton A site in shrub planted areas (17 October 2019)

During the August 2019 monitoring, it was noted that screwbean mesquite continued to dominate the canopy, while salt grass dominated the forb layer (Table 3-3). A dramatic increase in non-native species was seen at the site during both the August and the October 2019 monitoring sessions (Appendix C). Kochia and camelthorn were the predominant species at the site (Table 3-3). The kochia was extremely dense in the areas of the planted long stem shrubs often creating an impenetrable wall.

Native grasses growing between the riparian habitat along the river and the kochia stands, 17 October 2019

Figure 3-7. Planting Areas at the Vinton A Restoration Site

3.3.3 Vinton B

Approximately 1,561 of the recommended 3,000 coyote willows were transplanted along the bank at the Vinton B site and 0.6 acre of grass seeding was conducted in 2018 (Figure 3-8). Long stem shrubs were planted at the site in fall of 2019. The remaining coyote willow whips were harvested in January 2019 and were transplanted to the site. All recommended Goodding's willows (200) and cottonwood poles (800) were planted by February 2019 and watering was performed after planting in both February and March.

As of August 2019, a low abundance of saltcedar (20 percent) remained at the Vinton B site and consisted of small re-growth sporadic individuals. August monitoring documented that large screwbean mesquite still occur in moderate abundance (Table 3-3). Like the Vinton A site, kochia and camelthorn have invaded the site, but not in the same density as the Vinton A site. Salt grass and spreading alkaliweed (*Cressa truxillensis*) were the dominant native plants in the shrub and forb layer. In October 2019, non-native species such as Bermuda grass, camelthorn, and kochia still dominated the cover. A diversity of native herb and shrub species was documented throughout the site during October 2019 monitoring (Appendix C).

Overview at Vinton B restoration site, 17 October 2019

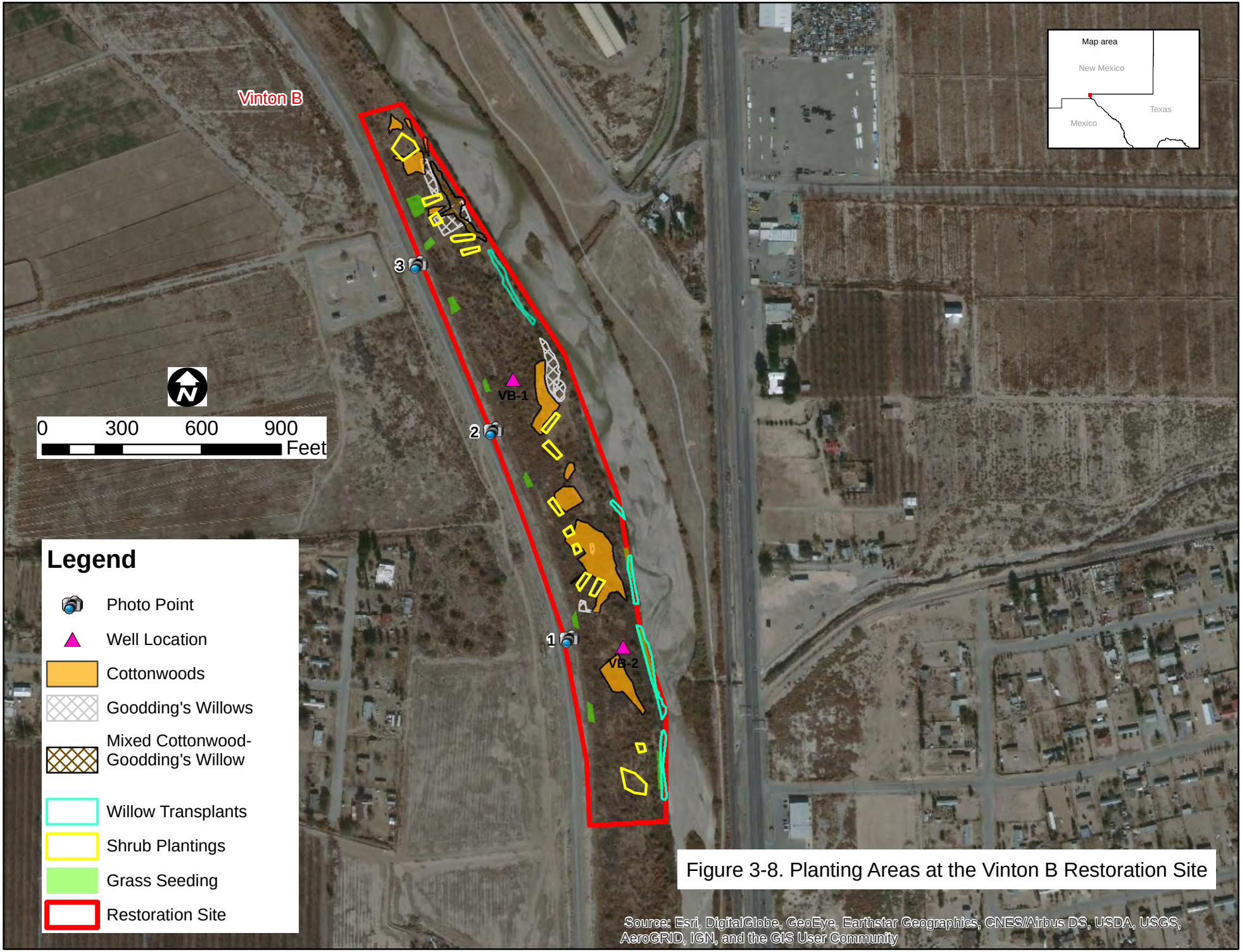


Figure 3-8. Planting Areas at the Vinton B Restoration Site

3.3.4 Valley Creek

Valley Creek restoration site is a recreational lease to the City of El Paso. The City mows the site regularly and maintains it as a park. This site is adjacent to a large residential area and has pathways with permanent concrete benches. Approximately 1,291 coyote willows were transplanted along the bank at the site and 1.0 acre of grass seeding was conducted in 2018 (1,100 willows were recommended; Figures 3-9 and 3-10). Four hundred and forty cottonwoods were planted on the site in 2018; however, 317 were destroyed by City of El Paso's maintenance crews and by vandalism. By February 2019, 220 Goodding's willows, 1,000 long-stem shrubs, and 20 desert willows (*Chilopsis linearis*) were planted at the restoration site. The City of El Paso asked that ash trees not be planted at the site, so desert willows were used instead.

Coyote willows currently dominate the banks, and scattered mature cottonwoods are the next prevalent tree species (Table 3-3). Low re-sprouting occurrence of saltcedar was noted in August and October 2019, however Bermuda grass dominated the ground cover. A variety of other native forbs and shrubs, such as Western sea purslane (*Sesuvium verrucosum*), bush seepweed (*Suaeda nigra*), salt grass, and spreading alkaliweed were noted during the October 2019 monitoring at this site (Appendix C).

Mowing still occurs at the Valley Creek Restoration site (11 October 2019)

As noted, mature cottonwood trees were present on the Valley Creek site prior to restoration efforts. The cottonwoods become more concentrated in an open gallery toward the north end of the site; many of which were heavily infested with mistletoe. Forty-two cottonwoods were surveyed at Valley Creek and most of the trees had a low infestation (less than 4 clumps). Mistletoe tends to spread faster in multi-storied and monoculture stands (USDA 2010). Seeds may also fall from mistletoe in the upper parts of the trees creating new infestations on lower branches. Birds feed off of the berries, digest the pulp, and excrete the seeds, which can then adhere to the branches of living trees. When the seed germinates, it grows into tree tissues. It may take up to 2 years for the plant to bloom and produce viable seed. Based on discussions with arborists and New Mexico State University Extension, there is a good chance that mistletoe, once established on a host tree that is dominant to the area, tends to remain attracted to that

specific tree species. However, mistletoe provides important components for wildlife habitat and some recommend that removing the infestation should be avoided unless other defects in the tree are significant (Halloin 2003).

The most effective way to control mistletoe and prevent its spread is to prune infected branches, if possible, as soon as the parasite appears. Thinning-type pruning cuts to remove infected branches at their point of origin or back to large lateral branches was used. Infected branches were cut at least 1-foot below the point of mistletoe attachment in order to completely remove embedded haustoria. Mistletoe mitigation occurred in February 2019.

No recent evidence of herbivory was observed at any of the sites. However, the IDEALS-AGEISS team biologists did observe other instances which had an impact, or the potential to impact, restoration efforts. Pocket gopher activity was pronounced at the Valley Creek, Vinton A, and Vinton B sites. This species can be a serious threat to reforestation and restoration efforts in North America (Engeman and Witmer 2007). Pocket gophers can kill young plants and trees by clipping above ground, girdling trees at the surface, and pruning roots below ground (Witmer and Engeman 2007). No clipped or girdled shrubs were noted during the monitoring sessions; however, potential damage to the root systems of some of the shrubs could have occurred during the spring before other forbs were available for foraging.

Pocket gopher activity around the long stem shrubs at Valley Creek, 27 November 2018

Figure 3-9. Planting Areas at the Valley Creek North Restoration Site

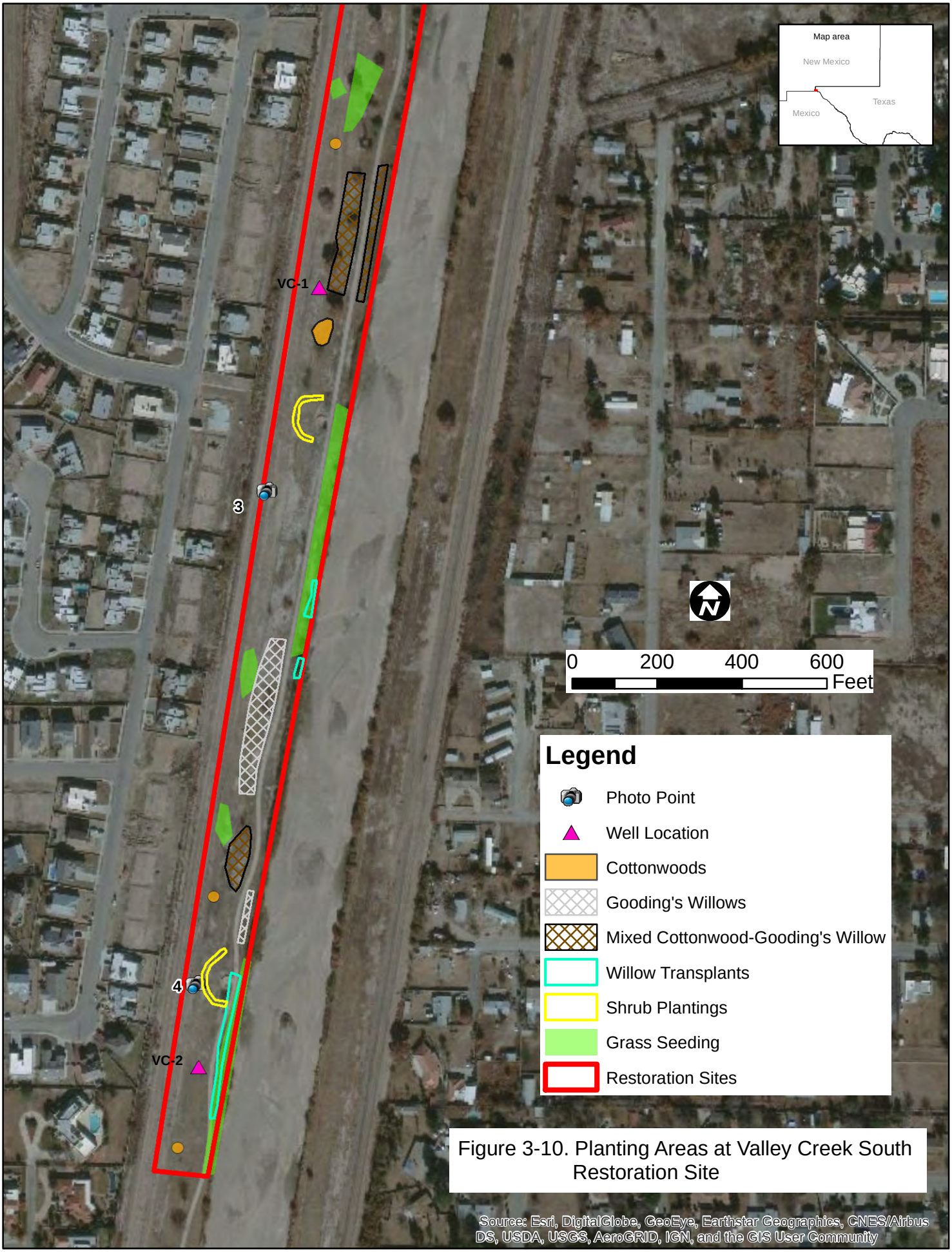


Figure 3-10. Planting Areas at Valley Creek South Restoration Site

Wildlife species observed at the four restoration sites varied throughout the year (Appendix C) and were predominantly avian. A diversity of avian species was noted during the October 2019 monitoring effort (Table 3-4).

Table 3-4. Wildlife Species Observed at all Restoration Sites in October 2019

Scientific Name	Common Name	Restoration Site			
		Shalem Colony	Vinton A	Vinton B	Valley Creek
Accipiter cooperii	Cooper's hawk		X	X	
Agelaius phoeniceus	Red-winged blackbird				X
Anas platyrhynchos	Mallard			X	X
Ardea alba	Great egret				X
Ardea herodias	Great blue heron				X
Auriparus flaviceps	Verdin				X
Buteo jamaicensis	Red-tailed hawk		X		X
Callipepla gambelii	Gambles quail		X		
Carduelis psaltria	Lesser Goldfinch	X	X		
Charadrius vociferus	Killdeer	X			X
Circus hudsonius	Northern harrier		X		
Cistothorus palustris	Marsh wren		X		X
Colaptes auratus	Red-shafted flicker				X
Columba livia	Rock dove				X
Cnemidophorus exsanguis	Chihuahuan Spotted Whiptail			X	
Egretta thula	Snowy Egret				X
Euphagus cyanocephalus	Brewer's Blackbird				X
Falco sparverius	American kestrel		X	X	
Geothlypis trichas	Common Yellowthroat		X		
Haemorhous mexicanus	House finch	X		X	X
Hirundo rustica	Barn swallow		X		X
Icteria virens	Yellow-breasted Chat		X		X
Junco hyemalis	Dark-eyed Junco		X		
Lepus californicus	Black-tailed jackrabbit		X		
Melospiza lincolnii	Lincoln sparrow		X		
Melospiza melodia	Song sparrow		X		X
Mimus polyglottos	Northern mockingbird				X
Nycticorax nycticorax	Black-crowned Night Heron				X
Passer domesticus	House sparrow			X	X
Plegadis chihi	White-faced Ibis		X		
Pipilo maculatus	Spotted Towhee			X	X
Quiscalus mexicanus	Great-tailed Grackle				X
Sayornis nigricans	Black Phoebe				X
Sayornis saya	Say's phoebe			X	X

Scientific Name	Common Name	Restoration Site			
		Shalem Colony	Vinton A	Vinton B	Valley Creek
Setophaga coronata	Yellow-rumped warbler				X
Spizella passerina	Chipping Sparrow				X
Sturnella neglecta	Western meadowlark		X		
Sylvilagus audubonii	Desert Cottontail		X	X	
Tachycineta thalassina	Violet-green Swallow		X		
Turdus migratorius	American Robin		X		
Tyrannus verticalis	Western King Bird				X
Vireo bellii	Bells' Vireo		X		
Zenaida asiatica	White-winged dove				X
Zenaida macroura	Mourning dove		X		X
Zonotrichia leucophrys	White-crowned sparrow	X		X	X

3.4 Native Planting Survivorship

Species planted at each site were dependent upon the desired habitat for the restoration site. The species of long stem plants varied between sites, but the total quantity of each species planted followed the recommendations from the RGCP Conceptual Restoration Plan (USACE 2009) and RGCP Site Implementation Plan (TRC 2011) and outlined in the 2018 restoration plan (IDEALS-AGEISS 2017). Species and quantities planted at each site are documented in Table 2-2 and planting sheets are provided in Appendix B.

Example of cottonwood regrowth from the base, Valley Creek, 9 August 2018

During each monitoring event, IDEALS-AGEISS Team biologists inspected the transplanted willows, long stem shrubs, and the pole plantings to document survival and evaluate their overall health status. With the number of trees to be planted, IDEALS-AGEISS recommended survivorship plots be established on each site to provide a sample of the site until the October 2018 and October 2019 monitoring when all planted species were accounted for. Dead trees were flagged during the May and August monitoring periods when noted, although flagging unfortunately did not last through the summer. In October 2018 and 2019, the IDEALS-AGEISS Team biologists walked transects through the sites to identify all the plantings. Poles that appeared to be dormant or dead were examined for regrowth at the base of the pole and a "snap test" was applied to the outer branches when no regrowth was noted. Poles that showed no signs of regrowth and easily cracked or broke during snap tests were recorded as mortalities.

Per the request of the USFWS and stipulations in the 2017 BO, coyote willows were transplanted from islands being removed for channel maintenance. Willows were transplanted to all restoration sites to fill in gaps along the banks where saltcedar extraction occurred. These clumps of willows were difficult to count in every bucket load, so USIBWC and IDEALS-AGEISS determined that an average of 20 willows was contained in each bucket load. Willow transplantation was extremely successful given that mature willows and root balls were transplanted at each site. Kochia was very prominent during the October 2018 and 2019 monitoring periods and was found growing on the edge of the willow transplants towards the restoration site. Survivorship of the transplanted willows was near 100 percent at all the sites and the second year the transplants were difficult to distinguish from the native plants. GPS locations of the transplanted willows enabled biologists to identify the transplanted areas during the 2019 monitoring. Willow sprouts were found during the 2019 monitoring season. Survivorship of the other plant species varied widely between sites. Survivorship estimates documented through the October 2019 monitoring period are noted in the sections below.

First year coyote willow transplants at Valley Creek, 15 May 2018.

Second year coyote willow transplants at Valley Creek, 19 April 2019.

3.4.1 Shalem Colony

In November 2018, 50 four-winged saltbush plants were planted. Fifty coyote willows, 10 cottonwoods (*Populus deltoids*), and 10 Goodding's willows (*Salix gooddingii*) were planted between January and February 2019 on the site. In April, planted shrubs appear to be doing well; however, the Goodding's willows and cottonwood poles appeared stressed. All t-posts for the survivorship plots and photo points were missing, but a full count of all planted species was conducted. All coyote willows were accounted for, five Goodding's willows could not be located, and three cottonwoods were alive while the other seven were stressed. By the October 2019 monitoring (Table 3-5), none of the cottonwoods had survived and 70 percent of the Goodding's willows were alive. The four-wing salt bushes were thriving on the site.

Table 3-5. Shalem Colony Restoration Site October 2019 Survival

Status	Coyote Willows	Goodding's Willows	Cottonwoods	Four-wing Salt Bush
Planted	50[a]	10[a]	10[a]	50
October 2019				
Alive	50	6	0	49
Stressed	0	1	0	1
Dead	0	3	10	0
Survival	100%	70%	0%	100%

a Plantings did not occur in 2018.

3.4.2 Vinton A

The Vinton A site was not planted until late 2018 (shrubs) and early 2019 for the harvested coyote willow whips and the cottonwood and Goodding's willow poles with the exception of 15 cottonwoods planted in 2018. With the exception of the transplanted coyote willows, survivorship on this restoration site was poor (Table 3-6). By August 2019, the invasive species kochia dominated 65 percent of the site.

Kochia was noted in August 2019 post-restoration monitoring in low abundance. By October 2019, the species had spread to over 30 percent of the site and by August 2019 up to 65 percent. Approximately 4.6 acres of saltcedar were removed creating a large patchwork of disturbed areas. The kochia invaded these disturbed patches and created very dense monotypic layers of vegetation that choked out the replanted vegetation in several areas. Some of the shrubs in the middle of the large kochia patches were found to still be thriving, but time will tell as the site further matures.

Table 3-6. Vinton A Restoration Site October 2018 and 2019 Survival

Status	Coyote Willows	Goodding's Willows	Cotton-woods	Four-wing salt bush	Desert Willow	Arizona Ash
Planted	2,970[a]	441[a]	1,029	1,470	5	5
October 2018						
Alive	-	-	1[b]	-	-	-
Stressed	-	-	10	-	-	-
Dead	-	-	4	-	-	-
Survival	-	-	73%	-	-	-
October 2019						
Alive	2,968	176	371	516	2	0
Stressed	0	10	40	21	0	0
Dead	2	67	217	228	0	0
Survival	99%	42%	40%	36%	40%	0%

a Plantings did not occur in 2018.
b Only 15 cottonwoods were planted in 2018.

Cottonwoods and salt grass at the Vinton A restoration site, 17 October 2019

Kochia growing at the Vinton A site, 17 October 2019

3.4.3 Vinton B

By the October 2018 monitoring event, only about one third of the coyote willows had been transplanted. The remaining plantings for this site occurred during fall 2018 and winter of 2019. Like the Vinton A site, Vinton B had a high density of ground cover dominated by three invasive plants: camelthorn, Bermuda grass, and kochia. Cottonwood and coyote willow pole survival was very low at the site, with several poles not accounted for as no evidence of the plantings remained (Table 3-7). Kochia has invaded several of the planting holes. Four-wing salt bush plantings at the site were thriving during the 2019 monitoring sessions. The majority of the shrubs was flowering during the 2019 season and was well established.

Overview of Vinton B restoration site during the October 2019 monitoring, 17 October 2019

Table 3-7. Vinton B Restoration Site October 2018 and 2019 Survival

Status	Coyote Willows	Goodding's Willows	Cottonwoods	Four-wing salt bush	Arizona Ash
Planted	3,061	200[a]	800[a]	1,600[a]	5[a]
October 2018					
Alive	1,048[b]	-	-	-	-
Stressed	0	-	-	-	-
Dead	4	-	-	-	-
Survival	100%	-	-	-	-
October 2019					
Alive	3,045	88	80	1,533	0
Stressed	0	1	538	29	0
Dead	16	68	4	48	5
Survival	99%	45%	11%	97%	0%

a Plantings did not occur until after the October 2018 monitoring event.
b Only 1,561 coyote willows were planted prior to the monitoring event in October 2018. Although it was not possible to count all the willows individually in the transplant area due to the density of the kochia growth and access to the willows; all the patches along the river bank were thriving and no stressed or additional dead coyote willows were documented.

3.4.4 Valley Creek

The Valley Creek restoration site received all the transplanted coyote willows during the 2018 season. The cottonwoods were also planted during 2018; however, as of October 2018, 317 cottonwood poles were destroyed by maintenance crews mowing the floodplain and vandalism (18 cottonwoods damaged in June 2018) since being planted in April which has impacted the restoration efforts. Long stem shrubs were planted in November 2018 and Goodding's willows in February 2019.

Mowing at Valley Creek site does decrease non-native species but has potential to impact restoration efforts, 3 October 2019

Cottonwood survival for the remaining trees as well as the Goodding's willows was greater at the Valley Creek site than the other three sites (Table 3-8). Shrub survivorship was highly dependent upon the

species with the four-wing salt bush having the greatest survivorship. In addition to the known planted shrubs, IDEALS-AGEISS biologists documented what appeared to be 41 alive and 32 stressed New Mexico olive plants around some of the sitting areas. Overall shrub survival, not including the additional New Mexico olive plants, was 77 percent.

Table 3-8. Valley Creek Restoration Site October 2018 and 2019 Survival

Status	Coyote Willows	Goodding's Willows	Cotton-woods	Four-wing salt bush	Anderson Wolfberry	Desert Willow	NM Olive/ Unknown Shrubs
Planted	1,290	220[a]	440	456[a]	544[a]	20[a]	-
October 2018							
Alive	1,288	-	65	-	-	-	-
Stressed	53	-	50	-	-	-	-
Dead	0	-	8	-	-	-	-
Survival	100%	-	94%[b]	-	-	-	-
October 2019							
Alive	1,282	120	75	420	229	1[c]	41[d]
Stressed	5	24	13	16	24	0	57
Dead	1	52	32	7	14	19	41
Survival	99%	65%	72%[b]	96%	46%	5%	NA

a Plantings did not occur until after October 2018.
b Estimate does not include known 317 destroyed trees. Only 123 trees remained after the 2018 season.
c Although only 20 desert willows were supposed to be planted, survival estimates documented more plants on site.
d Several shrubs with no leaves or other distinguishing characteristics were found that could not be identified to species.

Long stem shrubs planted at Valley Creek restoration site, 24 October 2018

3.4.5 Replanting

After the October 2019 monitoring event, IDEALS-AGEISS made the following recommendations to the USIBWC for the re-planting efforts:

- Increase shrub diversity on the sites that need shrub replanting.
- At the Vinton A and Vinton B sites, add more structural diversity to existing canopy layer by interspersing long stem shrubs with the existing mesquite trees and with replanted poles.
- At the Valley Creek site, install additional flagging around the long stem plantings at the seating areas to prevent them from being run over by the mowers. However, it is hard to maintain the flagging and flagging degrades with weather.
- Consider using baccharis as one of the long stem shrub species and change the wolfberry species from *Lycium andersonii* to *Lycium torreyi*.

Re-planting on the sites occurred from December 2019 to January 2020. During the replanting efforts, soil amendments were added to each planting and poles and shrubs were watered immediately after planting. In order to increase species diversity and structural diversity, replanting efforts for the long stem shrubs were slightly altered. Although four-wing salt bush had the highest survival for the species of long stem shrubs planted due to their arid and salt-tolerant adaptations, a restoration site with monotypic understory was not the preferred goal (Table 3-9).

Table 3-9. Floral Species Re-Planting During Restoration Efforts

Common Name	Scientific Name	Shalem Colony	Vinton A	Vinton B	Valley Creek
Goodding's willow	*Salix gooddingii*	2	189	81	43
Cottonwood	*Populus deltoids*	9	464	596	150
Wolfberry	*Lycium barbarum*	0	52	0	
New Mexico olive	*Forestiera neomexicana*	0	200	0	44
Mule fat	*Baccharis salicifolia*	0	232	0	0
False indigo bush	*Amorpha fruticose*	0	231	0	44
Desert Willow	*Chilopsis linearis*	0	2	0	0
Arizona Ash	*Fraxinus velutina*	0	4	4	0

The Shalem Colony site needed mainly replacement of the pole plantings. These new poles were placed near the middle of the site early in January 2020 with the Goodding's willows mixed in with some of the cottonwood plantings (Figure 3-11).

The Vinton A site replanting efforts had challenges due to the density (and height) of the invasive species kochia. The area was grubbed before planting the shrubs. For the Vinton A restoration site a mixture of baccharis, false indigo, New Mexico olive and wolfberry long stem shrubs were added to the site. The shrubs were distributed throughout the site, with concentrations in the middle of the site, and intermixed with the mesquite forest (Figure 3-12). Goodding's willows and cottonwoods were replanted throughout the site in January 2020 with the willows concentrated near the river bank.

Arizona ash trees were re-planted at the Vinton B site during early January 2020, while cottonwood and Goodding's willows were planted later that month (Figure 3-13). Goodding's pole plantings were concentrated at middle of the site while cottonwood plantings were spread throughout the site.

A minimal number of long stem shrub re-plantings were required at the Valley Creek site (Figure 3-14 and 3-15). Shrubs were re-planted in December 2019. All cottonwood and Goodding's willow poles were replanted between December 2019 and January 2020. Cottonwood were planted denser towards the south end of the site and then individually through the middle of the site. Shrubs were planted in four areas at the site with 22 plants in each area. Goodding's willows were re-planted along the lateral canal that crosses the site and feeds into the river.

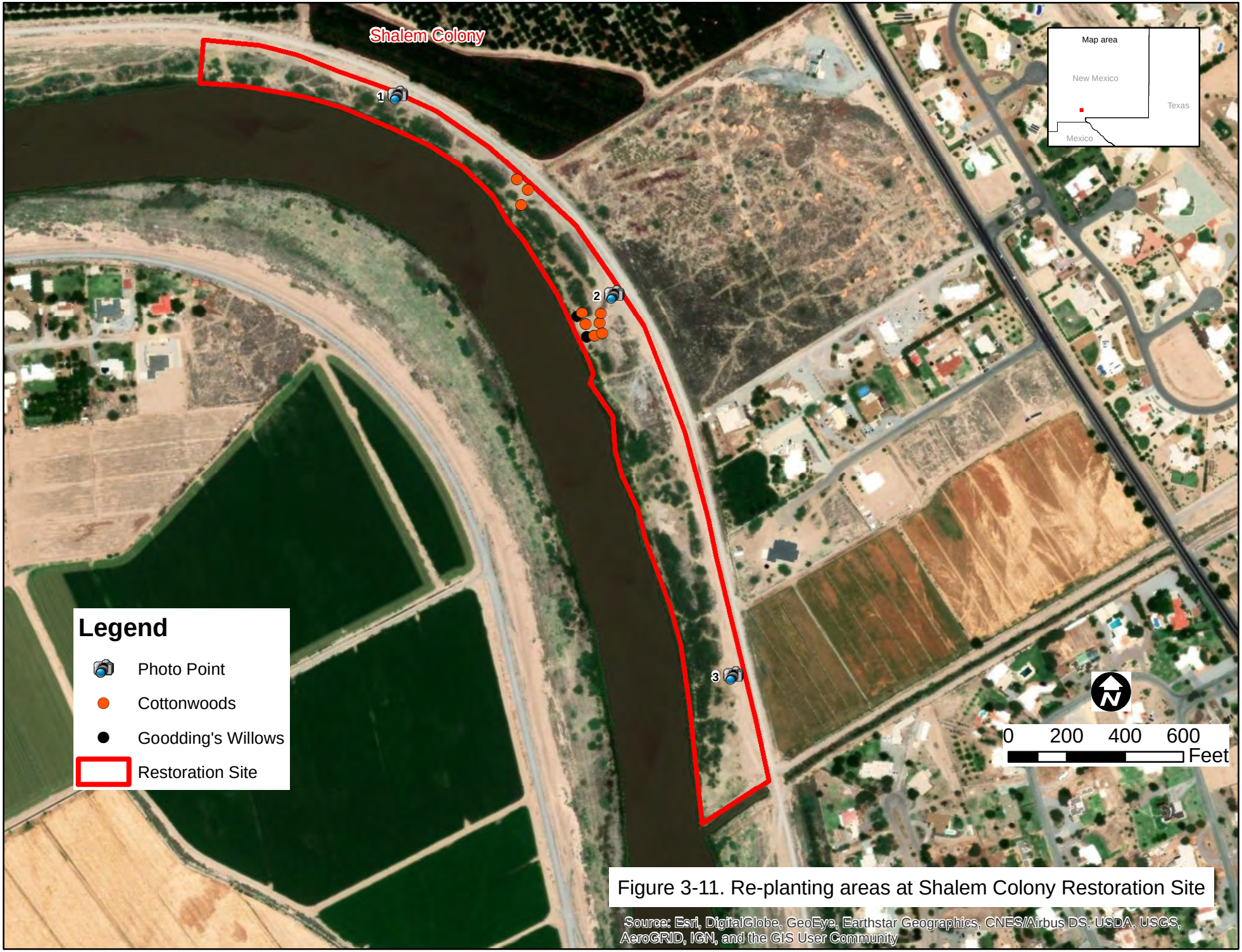


Figure 3-11. Re-planting areas at Shalem Colony Restoration Site

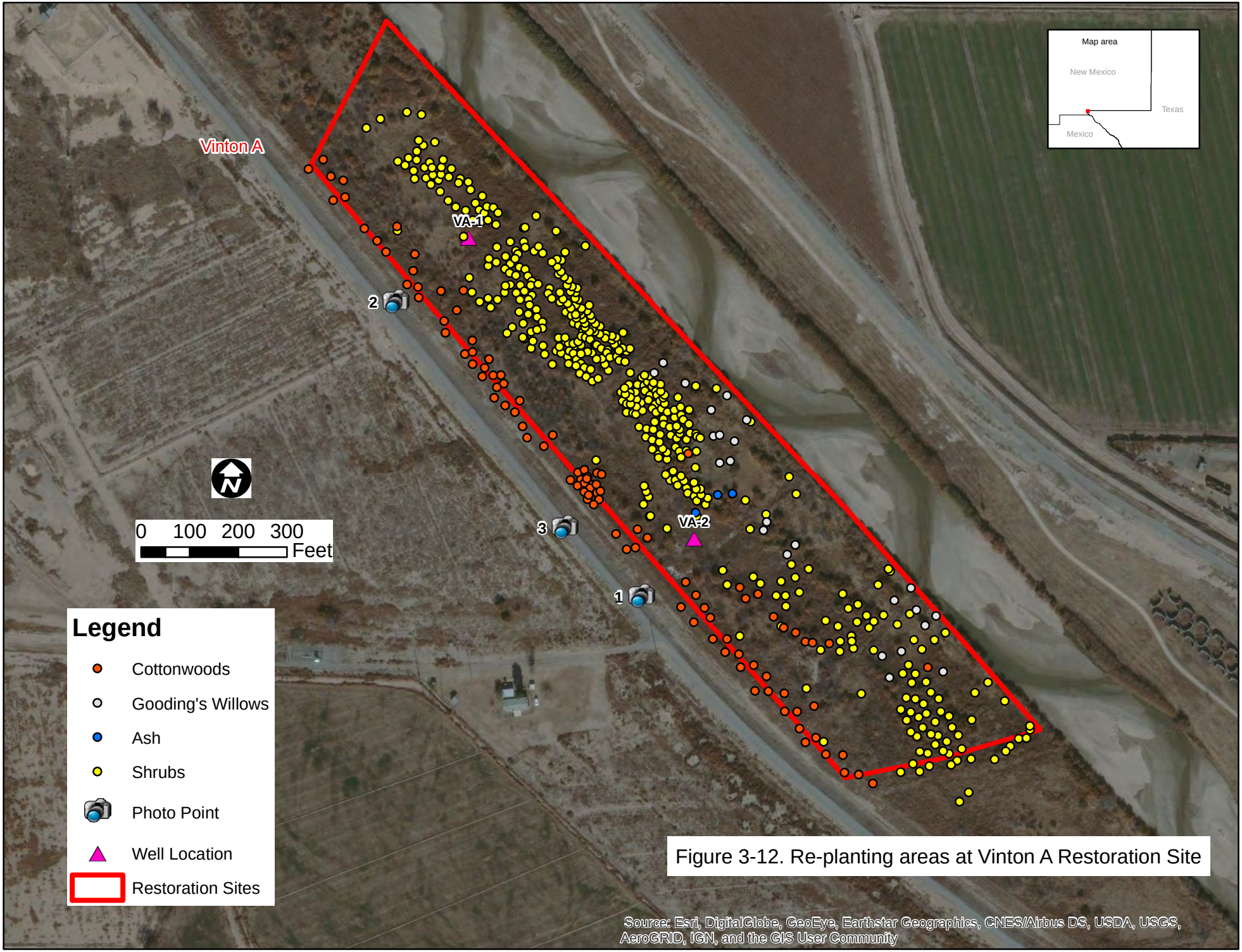


Figure 3-12. Re-planting areas at Vinton A Restoration Site

Figure 3-13. Re-Planting areas at Vinton B Restoration Site

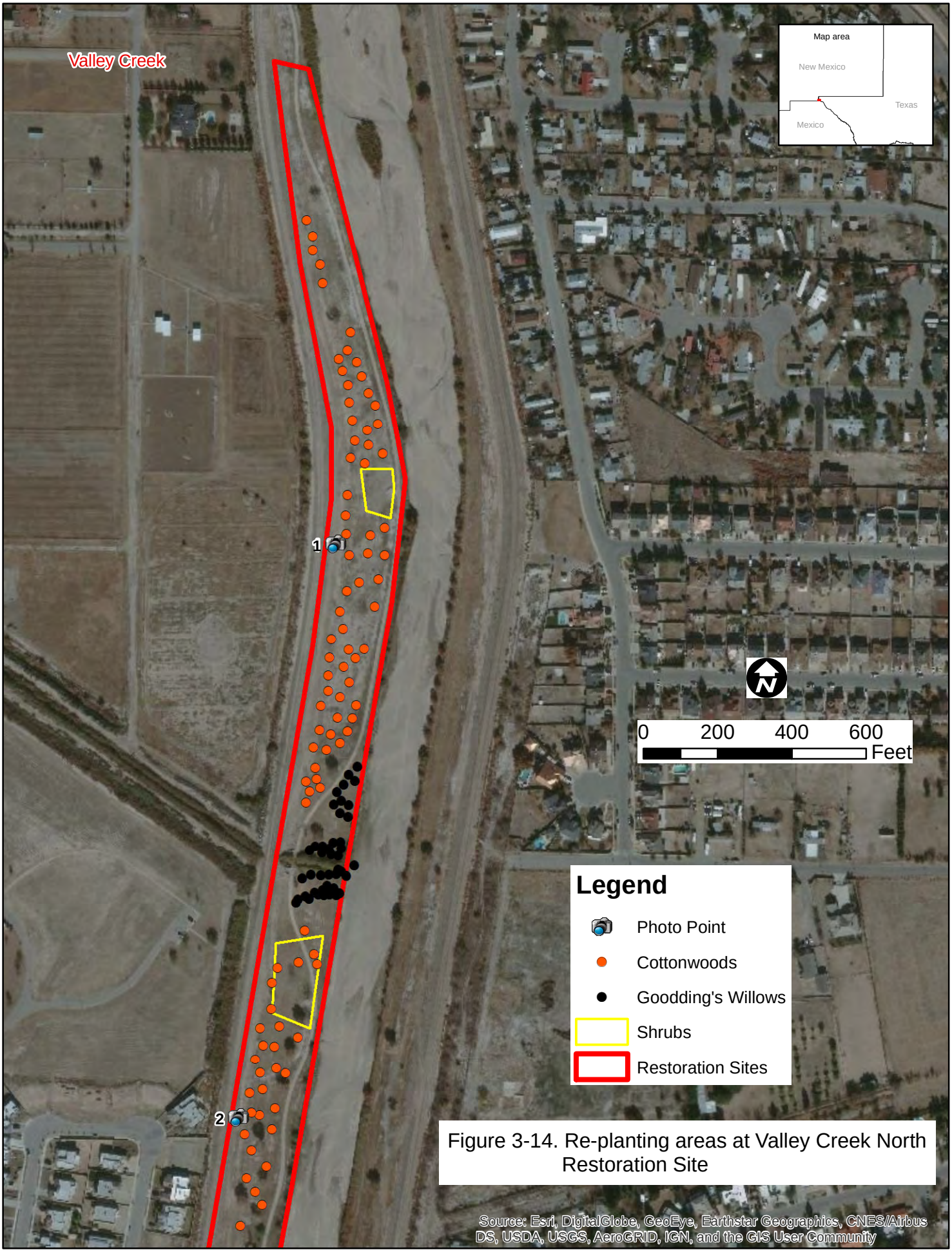


Figure 3-14. Re-planting areas at Valley Creek North Restoration Site

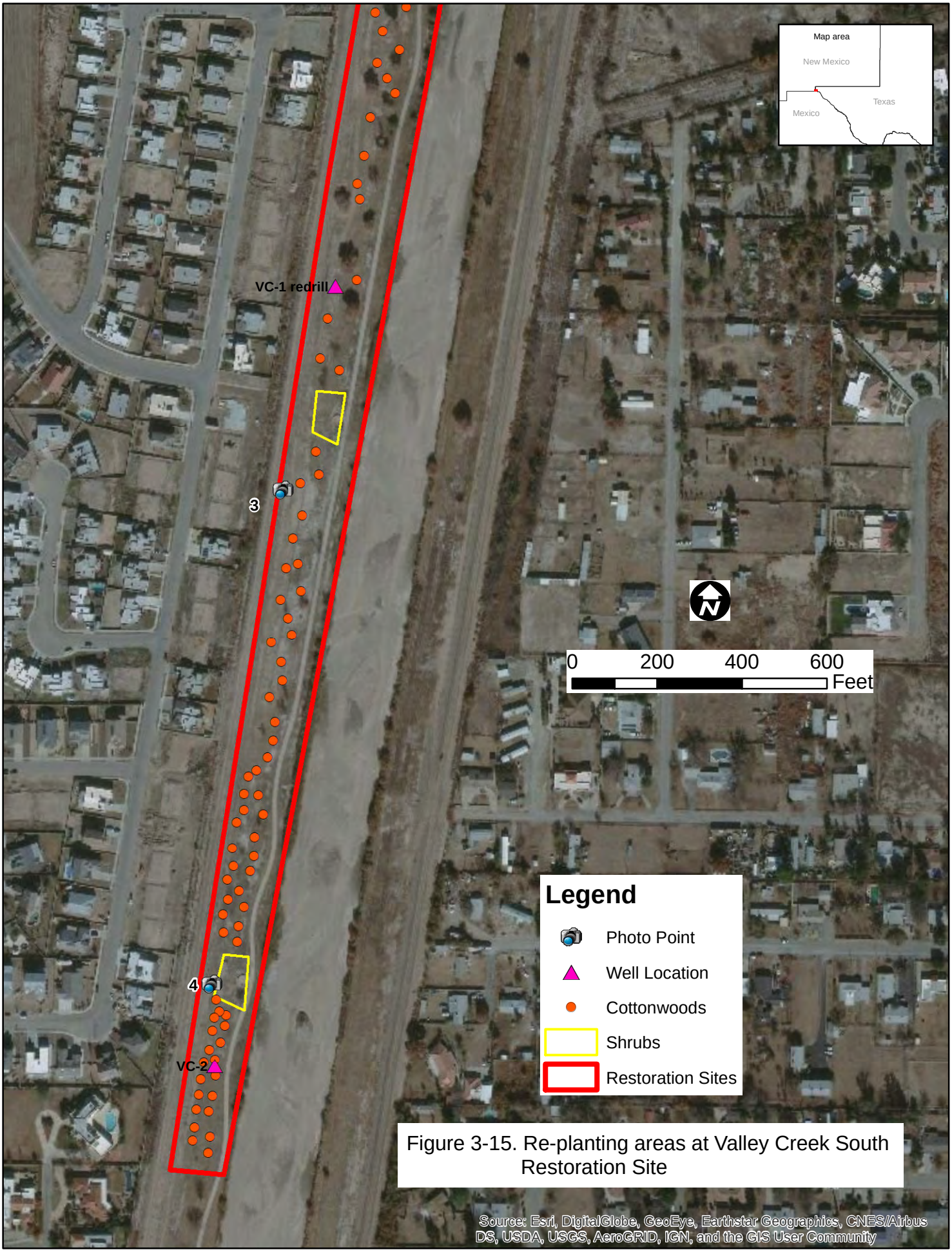


Figure 3-15. Re-planting areas at Valley Creek South Restoration Site

4.0 CONCLUSIONS AND DISCUSSION

Coyote willow transplants established well and quickly along the river banks at all the sites. Survivorship was 100 percent for the areas transplanted although the invasive species kochia tended to establish in the transplant areas.

Many of the cottonwood poles remaining at the sites showed signs of stress although some also showed re-sprouting at the base of the pole. Irrigation peak releases occurred in mid-March and June-July 2018, and an unusually late and minimal monsoon season did not provide much moisture. In addition the majority of the cottonwood poles were planted during the winter 2018-2019 season and irrigation release that year was not until the end of May. Maintenance activities by City of El Paso and vandalism at the Valley Creek site also affected cottonwood survival.

4.1 Shalem Colony

The Shalem Colony restoration site is a well-established mesquite forest. Restoration efforts are directed at enhancing/maintaining this habitat. This site receives a lot of recreational activity and is near a popular aquatic recreation site. This site had the highest diversity of plant species recorded (n = 25) compared to the other three sites with species diversities ranging from 13-18 species. This site is expected to continue to develop into good mesquite habitat and IDEALS-AGEISS recommends no further planting for the site.

4.2 Vinton A and B

Groundwater levels at both Vinton sites are highly dependent on water availability in the river and vary considerably at the site based on historical records. Coyote willow transplants have been very successful at both sites, and is a recommended methodology for future plantings.

Invasive species such as kochia had the greatest impact on species survival at these two site with greater impacts observed at Vinton A. Kochia was present in moderate abundance during the pre-planting efforts. Approximately 4 acres of saltcedar were removed from each site with a large portion of removal occurring in the middle of the site for Vinton A. The kochia at Vinton A was concentrated in these saltcedar removal sites in the middle of the unit. In addition, both of these sites had heavy pocket gopher usage through the first growing season which can also influence seed distribution.

Kochia is not listed on New Mexico or Texas noxious weed lists and is often used in agriculture for forage although in large quantities, it can be toxic to livestock. Kochia can be highly invasive and breaks off at the base to create a tumbleweed that then can spread more seeds (USDA 2010). The species can take advantage of moisture when available through seed germination of seeds that can occur multiple times throughout the growing season (USDA 2010). Currently there is not any herbicide that is registered specifically for weed control of kochia and herbicide-resistant kochia has been documented (Texas A&M 2019). Although over 2 acres of grass seeding occurred on the Vinton A site, the seeding occurred only 2 months prior to the planting of the long stem shrubs. Grass seeding likely had not developed well enough prior to any plantings of the shrubs that may have occurred in those areas. By the October 2019 monitoring, salt grass coverage on Vinton A was 30 percent and 20 percent on Vinton B. In those areas where the native grass cover dominated, kochia was out competed. To reduce the competition to the planted shrubs and poles, IDEALS-AGEISS recommends considering some type of native grass seeding

in early spring prior to the development of kochia in areas that still have bare ground. Future projects should consider grass seeding in saltcedar removal areas where kochia is already present on the site to increase competition with the invasive species.

4.3 Valley Creek

The Valley Creek site is maintained as a park by the City of El Paso and does receive pedestrian and bicyclists activity. Because of this, mowing of the site will continue. Although mowing has impacted restoration efforts through the destruction of pole plantings, mowing has also helped reduce competition with invasive species. The mowing regime at Valley Creek keeps the invasive species limited to the low growing Bermuda grass which does dominate the site's understory. IDEALS-AGEISS and USIBWC coordinated with the City on their subsequent mowing events to avoid impacts to other plantings including shrubs. The City established a plan for their contracted mowers to avoid future impacts. USIBWC will change lease requirements to incorporate measures to avoid impacting restoration plantings during the mowing of the site. To prevent future destruction of the planted trees and to potentially appease the neighboring residential areas that prefer some open viewshed, cottonwoods planted through the middle of the site were reduced in density to reduce competition and potentially allow for a more open viewshed. Goodding's willow survival was better at this site then the other three sites with the majority of the Goodding's planted between the trail and the river. Replanting efforts focused on increasing the riparian habitat found along the lateral canal that crosses the site and feeds into the river (Figure 3-14). This area also contains long stem shrubs that will provide some structural complexity.

Continual coordination with the City of El Paso will be imperative for the continual restoration of this site. Although all plants at the site were flagged and the shrub planting areas delineated and flagged, the flagging does not last more than usually one season. IDEALS-AGEISS recommends periodic monitoring of the site to ensure that mowing has not impacted the planting efforts. With the current maintenance by the city to reduce invasive species and competition, the site should be able to develop without further restoration efforts. Re-planted cottonwoods that occur away from the river edge may benefit from an additional watering in late spring especially if the irrigation release for 2020 is late like it was in 2019.

5.0 MANAGEMENT RECOMMENDATIONS

Currently, the extent of riparian and wetland plant communities in the historic floodplain of the RGCP has been reduced; however, little information is available to accurately quantify the reduction. In addition to direct replacement by agricultural and urban development throughout the reach, the groundwater elevation in the valley was lowered by the construction of drains in the 1920s (USACE 2009). Successful establishment of restoration sites requires availability of water especially during the first few growing seasons. IDEALS-AGEISS recommends the following management actions to ensure success of future restoration projects:

- Continue communication with City of El Paso to ensure long stem shrub plantings, Goodding's willows, and cottonwoods are not damaged by maintenance activities.
- Continue to conduct willow transplants when possible. Transplantation of mature coyote willows with their established root balls provides high survivorship at the sites. In addition, the habitat is well on its way to establishment using these mature trees.
- Maintain and even improve outreach with neighbors in the vicinity of the restoration sites. Consider density and height of the tree species planted at the sites and the potential to block residential viewsheds.
- Consider the use of swales at sites to promote water retention and increase vigor and survival of pole plantings.
- For new Goodding's willows and cottonwood pole plantings, create a shallow well around the tree to catch rain water and provide positive flow towards the root systems.
- Although all the sites had monitoring wells, they do not necessarily capture the variability of groundwater depth across the sites. Others have suggested the use of several sets of nested piezometers located at different areas across the floodplain to capture this variability before and during restoration to allow plantings in areas with good groundwater connection (GSRC 2018). IDEALS-AGEISS recommends at a minimum conducting several test drillings across the site to look at variability prior to planting.
- Consider planting cottonwoods at a lower density to reduce competition. Long-term survival of cottonwoods is generally associated with high flows during the periods of establishment. Young plants are especially susceptible to drought when the water table drops below their rooting zone (OSU 2002). Competition between new plantings created by dense plantings can decrease the survivorship of cottonwoods.
- Continue to monitor invasive species at least annually and conduct treatments as needed.
- Consider for future restoration contracts increasing the watering requirement especially if the irrigation release continues to be later in the year.

6.0 REFERENCES

GSRC (Gulf South Research Corporation and SWCS Environmental Consultants). 2018. Riparian habitat restoration at four sites in Doña Ana County, New Mexico: Jaralosea, Yeso East, Yeso West, adn Crow Canyon C. Final Monitoring Report.

Halloin, L. 2003. Tree hazards and forest management in southeast region campgrounds. Available at: http://www.dnr.wa.gov/publications/rp_fh_wadnrtreehazard.pdf. Accessed 13 November 2017.

IDEALS-AGEISS. 2016. Biological survey report for the Rio Grande Canalization Project.

IDEALS-AGEISS. 2018. Habitat Restoration Plan for Shalem Colony, Vinton A and B, and Valley Creek Restoration Sites. January 2018.

IDEALS-AGEISS. 2017. Updated Biological Assessment for Long-term River Management of the Rio Grande Canalization Project.

OSU (Oregon State University). 2002. Cottonwood establishment, survival, and stand characteristics. OSU Extension. Available at: https://catalog.extension.oregonstate.edu/em8800. Accessed 21 January 2020.

SWCA (SWCA Environmental Consultants). 2011. Final Biological Assessment-Integrated Land Management for Long-Term River Management of the Rio Grande Canalization Project.

Texas A&M. 2010. Herbicide-resistent kochia invading Texs high plains. Available at: https://agrilifeextension.tamu.edu/blog/2019/10/10/herbicide-resistant-kochia-invading-texas-high-plains/. Accessed 28 January 2020.

TRC. 2010. Soil Survey Resource Report for Rio Grande Canalization Implementation Plan

TRC 2011. Site Implementation Plans for the Rio Grande Canalization Project Restoration Implementation Plan.

USACE (U.S. Army Corps of Engineers). 2009, March. Conceptual Restoration Plan and Cumulative Effects Analysis, Rio Grande-Caballo Dam to American Dam, New Mexico and Texas. Albuquerque, NM.

USDA. (U.S. Department of Agriculture). 2010. Kochia (*Kochia scoparia*) plant guide. Available at: https://plants.usda.gov/plantguide/pdf/pg_kosc.pdf. Accessed 28 January 2020

USFWS (U.S. Fish and Wildlife Service). 2005. Fish and Wildlife Coordination Act Report for the Rio Grande Canalization Project, New Mexico and Texas. U.S. Fish and Wildlife Service, New Mexico Ecological Services Field Office, Albuquerque.

USFWS. 2012. Biological Opinion (Opinion) on the Effects of the United States Section of the International Boundary and Water Commission (IBWC) Proposed Action of an Integrated Land Management Alternative for Long-Term Management (Land Management Alternative) of the Rio Grande Canalization Project (RGCP) in Sierra County and Doña Ana County, New Mexico, and El Paso County, Texas. Consultation No. 02ENNM00-2012-F-0016.

USFWS. 2017. Final Biological Opinion for U.S. International Boundary and Water Commission Long-Term River Management of the Rio Grande Canalization Project, New Mexico. Prepared by U.S. Department of the Interior, Fish and Wildlife Service, New Mexico Ecological Services Field Office. August 16, 2017.

USIBWC (U.S. Section of the International Boundary and Water Commission). 2004. Final Environmental Impact Statement: River Management Alternatives for the Rio Grande Canalization Project. Available at: http://www.ibwc.gov/EMD/documents/Final_EIS.pdf.

USIBWC. 2009. Record of Decision, River Management Alternatives for the Rio Grande Canalization Project. United States Section of the International Boundary and Water Commission, El Paso, Texas.

USIBWC. 2016. River Management Plan for the Rio Grande Canalization Project. Prepared by USIBWC. December 2016. Available at: https://www.ibwc.gov/Files/USIBWC_RGCP_River_Management_Plan_FINAL_December_8_2016_reduced.pdf

Witmer, G.W., and R.M. Engemen. 2007. Subterranean Rodents as Pests: The Case of the Pocket Gopher. *In*: Subterranean Rodents. Edited by S. Begall, H. Burda, and C. Schleich.

APPENDIX A

Restoration Plan

Habitat Restoration Plan for Shalem Colony, Vinton A and B, and Valley Creek Restoration Sites

Title:

Version: **FINAL**

Date: **January 2018**

Prepared for:

United States Section
International Boundary and Water Commission
4171 N Mesa St., Suite C310
El Paso, TX 79902

Prepared by: IDEALS-AGEISS, LLC

848 W. Hadley Ave.
Las Cruces, NM 88005

Contract Number: IBM15D0006

Task Order Number: IBM17T0011

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Figure **Page**

LIST OF APPENDICES

Appendix

LIST OF ABBREVIATIONS / ACRONYMS

BA	Biological Assessment
BO	Biological Opinion
EIS	Environmental Impact Statement
GPS	Global Positioning System
RGCP	Rio Grande Canalization Project
ROD	Record of Decision
USFWS	U.S. Fish and Wildlife Service
USIBWC	U.S. Section of the International Boundary and Water Commission

1.0 INTRODUCTION

Historically, the Rio Grande in southern New Mexico was characterized by a wide, active floodplain with numerous marshes, backwater, oxbow pools, and a fringe forest of cottonwoods (*Populus* spp.), willows (*Salix* spp.), and shrubby phreatophytes (USFWS 2005). Stream flows, although subject to great fluctuations, were believed to be perennial in all years. By 1880 however, most of the land along the river that could be irrigated was now under development. Between 1938 and 1943, the U.S. Section of the International Boundary and Water Commission (USIBWC) constructed the Rio Grande Canalization Project (RGCP) spanning a 105-mile reach of the Rio Grande from Percha Diversion Dam, New Mexico to American Dam in El Paso, Texas. The RGCP was constructed to facilitate compliance with equitable allocation of water between the United States and Mexico under the U.S.-Mexico Convention of 1906 (Act of June 4, 1936, PL 648; 49 Stat. 1463) and to provide flood protection against a 100-year flood event. The RGCP straightened and channelized the river, armored the riverbanks, constructed levees, and cleared the floodplain. RGCP construction and subsequent floodplain and channel maintenance have significantly reduced the occurrence and extent of aquatic, riparian, and wetland habitat.

The purpose of this restoration plan is to describe the current conditions and the restoration activities planned to improve a total of 70.9 acres of habitat at four restoration sites along the RGCP in compliance with the 2009 USIBWC Record of Decision (ROD) on long-term management of the RGCP as well as the 2011 and 2017 biological assessments (BAs). Restoration efforts are concentrated at one site north of Las Cruces, New Mexico (Shalem Colony), two in Vinton, Texas (Vinton A and B), and one in El Paso, Texas (Valley Creek). The goal of the restoration activities is to reduce exotic vegetation, enhance river-floodplain hydrologic connectivity, restore endangered species habitat, and reestablish riparian habitat. Specifically habitat restoration efforts will be aimed at establishing riparian forest and woodland and improving mesquite forest.

2.0 THE RIO GRANDE CANALIZATION PROJECT RECORD OF DECISION BACKGROUND

Riparian and wetland habitats support a variety of floral and faunal species and are an important habitat found along the floodplains of the Rio Grande River system. These habitats support threatened and endangered species including the flycatcher. Changes and reductions to riparian systems including the removal or reduction of riparian vegetation, reductions in water flow, alteration of flow patterns, and physical modifications to waterways have caused decline of some riparian species' populations. A reduction in occurrence and extent of wetland and riparian habitat is evident along the RGCP. The RGCP was constructed to facilitate water deliveries to the Rincon and Mesilla Valleys in New Mexico, El Paso Valley in Texas, and Juárez Valley in Mexico, and to provide flood control.

The USIBWC recognized the need to accomplish flood control, water delivery, and operation and maintenance activities in a manner that enhanced or restored the riparian ecosystem. In 2004, the USIBWC completed the *Final Environmental Impact Statement (EIS) River Management Alternatives for the USIBWC Rio Grande Canalization Project* (Final EIS) for long-term management alternatives of the RGCP (USIBWC 2004). Alternatives addressed practices such as flood control, channel maintenance and erosion reduction, as well as environmental measures intended to enhance river floodplain hydrologic connectivity, and support restoration of native riparian and aquatic habitats along the RGCP. The USIBWC issued a ROD on June 4, 2009 for the Integrated Land Management Alternative (USIBWC 2009). The ROD committed the USIBWC to continuing the flood control and water delivery mission while implementing environmental enhancements. An important element of the ROD consisted of riparian habitat restoration at 30 sites along the RGCP, four of which are the subject of this restoration plan (Figure 2-1).

The RGCP Conceptual Restoration Plan (2009), which was developed in coordination with the U.S. Army Corps of Engineers (USACE 2009), was incorporated into the ROD. The plan focused on restoring healthy riparian function, improving terrestrial wildlife habitat at sites, and enhancing the natural riverine process. As part of the Final EIS, the ROD identified a phased implementation approach for restoration measures. Phase I included the collection of additional site-specific data and design of site-specific implementation plans, which were documented in the 2011 *RGCP River Restoration Site Implementation Plans* (TRC 2011). The Conceptual Plan and Site Implementation Plans are guides for restoration site implementation, including the site improvement for southwestern willow flycatcher (*Empidonax traillii extimus*; flycatcher) breeding habitat.

The 2011 BA for implementation of the ROD included site-specific information and species data collected during the phased implementation (SWCA 2011). The U.S. Fish and Wildlife Service (USFWS) issued a Biological Opinion (BO) in August 2012, which provides Reasonable and Prudent Measures that the USIBWC will undertake to ensure the protection of the flycatcher including establishing and maintaining breeding habitat (USFWS 2012). Since the 2012 BO, restoration activities have included cessation of mowing on 1,838 acres of No-Mow Zones (which include most restoration sites) and the active management and restoration of 15 sites. In 2017 (IDEALS-AGEISS 2017), the BA was updated with information on the ROD implementation, changes in listed species status and critical habitat, and channel maintenance activities discussed in the River Management Plan and a new BO was issued in August 2017.

Figure 2-1. Location of Restoration Sites along the Rio Grande Canalization Project

3.0 EXISTING CONDITIONS

Existing site conditions described below are based on a 2016 survey (IDEALS-AGEISS 2016) as well as surveys conducted during pre-implementation monitoring in October 2017 (Appendix A).

3.1 Shalem Colony

Mowing has been discontinued along most of the site since the 1990s, leading to the mature screwbean mesquite (*Prosopis pubescens*) forest (>5 acres) with scattered saltcedar (*Tamarisk spp*.; Figure 3-1). The area has high abundance of large screwbean mesquite forming a large thicket of vegetation. The vegetation on the southern lateral along the bank at this site is bulrush (*Scirpus spp.*) and cattail (*Typha spp*.) in low abundance. The southern portion of the site has riparian vegetation along the river in the form of mixed vegetation dominated by tall screwbean mesquite with coyote willow (*Salix exigua*) and saltcedar (showing the effects of *Diorhabda* infestation). Coyote willow is in moderate abundance and could be developed at the site. False seep willow (*Bacharis salicifolia*) occurs in low abundance. The main exotic species noted during both surveys are saltcedar in moderate abundance and Russian thistle (*Salsola tragus*) in high abundance (Figure 3-2). Most of the saltcedars occurring on this site can be removed without damaging native vegetation.

The dirt road running through the site and the levee road are heavily used and there is a fair amount of trash at this site. The restoration site is adjacent to a large pecan orchard. Habitat at this site is not currently suitable for flycatchers; however, this area might be suitable for flycatchers during years with long-term river flow (IDEALS-AGEISS 2016). Upland portions of the site are disturbed with smooth pigweed (*Amaranthus hybridus*), tumbleweed (*Salsola tragus*), mixed grasses, and forbs (Table 3-1). Fauna detected at the site during the 2017 site visit are presented in Table 3-2. This site receives a fairly high level of recreational use. Current site conditions and the distribution of native species to protect and invasive saltcedars to remove are noted in Figure 3-3.

The soils on the Shalem Colony site are Brazito loamy fine sand with a clay layer typically ranging from 5 to 18 percent. These soils are characterized by deep, well drained, nearly level soil that formed in mixed alluvium on the floodplain near river channels. The salinity of the soils onsite is low for the most part; however, some soil samples showed a high salinity reading which may affect plant survivability. No groundwater wells occur on the site however the 2010 soil survey documents the depth to water table ranged from 47 to over 60 inches in three test locations (TRC 2010). Permeability in this soil type is rapid and the soils tend to have a low holding capacity. The site also has very high banks.

Figure 3-1. Pre-implementation Photo of Shalem Colony at Photo Point 1

Figure 3-2. Pre-implementation Photo of Shalem Colony at Photo Point 3

Figure 3-3. Existing Conditions at the Shalem Colony Restoration Site

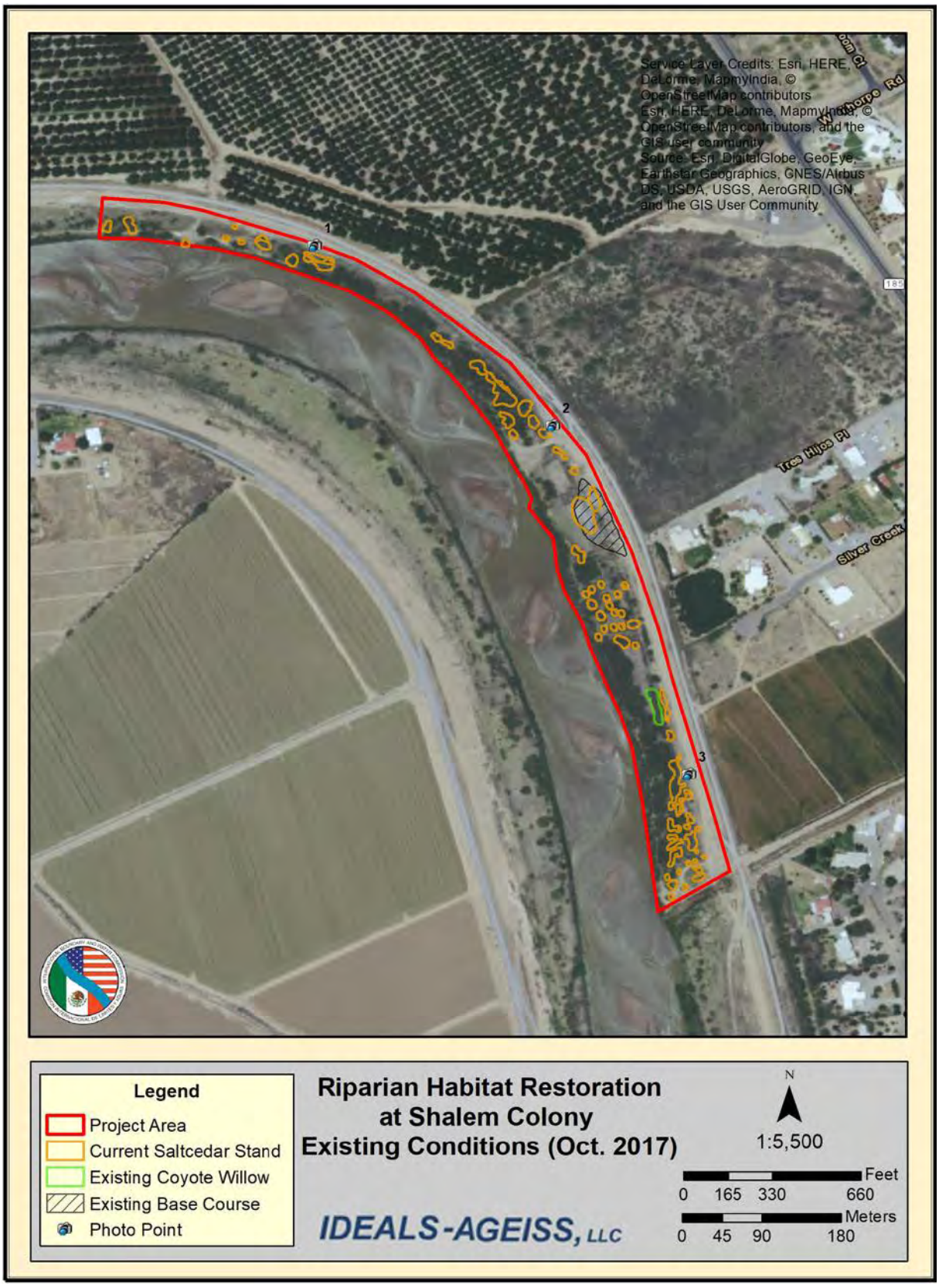


Table 3-1. Plants Observed at Shalem Colony Restoration Site

Scientific Name	Common Name	Native/Non-native Species
Amaranthus hybridus	smooth pigweed	native
Aristida species	unidentified three-awn grass	native
Astragalus sp.	milkvetch	native
Bacharis salicifolia	false seep willow	native
Distichlis spicata	saltgrass	native
Prosopis pubescens	screwbean mesquite	native
Salix exigua	coyote willow	native
Salsola tragus	Russian thistle	non-native
Scirpus spp	bullrush	native
Solanum elaeagnifolium	silverleaf nightshade	native
Sporobolus airoides	alkali sacaton	native
Tamarix ramosissima	saltcedar	non-native
Typha latifolia	broadleaf cattail	native

Table 3-2. Wildlife Species Observed at Shalem Colony Restoration Site, October 2017

Scientific Name	Common Name
Canis lupus familiaris	Domestic dog
Canis latrans	Coyote
Cardinalis sinuatus	Pyrrhuloxia
Corvus brachyrhynchus	American Crow
Falco sparverius	American Kestrel
Haemorhous mexicanus	House Finch
Pipilo chlorurus	Green-tailed Towhee
Pipilo maculatus	Spotted Towhee
Procyon lotor	Raccoon
Sylvilagus audubonii	Desert cottontail rabbit
Zonotrichia leucophrys	White-crowned Sparrow

3.2 Vinton A

Mowing has been discontinued at the Vinton A site since 2011 and the site is nearly contiguous along the west side of the river with the Vinton B site. Dominant tree and shrub vegetation at the site consists of saltcedar, screwbean mesquite, and four-wing saltbush (*Atriplex canescens*; Figure 3-4). Good stands of mesquite occur sporadically through the site. Smooth pigweed is dense and abundant on the site with wolfberry (*Lycium spp.*) in low to moderate abundance. Saltcedar is present throughout the site in some dense stands and currently shows limited signs of stress from *Diorhabda* (Figure 3-5). Other invasive species on the site include moderate to high abundance of Russian thistle and sporadic Siberian elms (*Ulmus pumila*). The central portion of Vinton A has an area of mixed vegetation that may be adequate for flycatchers within the next few years, although yellow-billed cuckoos (*Coccyzus americanus*) habitat does not currently exist at this site (IDEALS-AGEISS 2016). Vegetation and fauna observed at the Vinton A site are listed in Tables 3-3 and 3-4 respectively. The current distribution of saltcedar and native vegetation is noted in Figure 3-6.

Figure 3-4. Pre-implementation Photo of Vinton A at Photo Point 1

Figure 3-5. Pre-implementation Photo of Vinton A at Photo Point 2

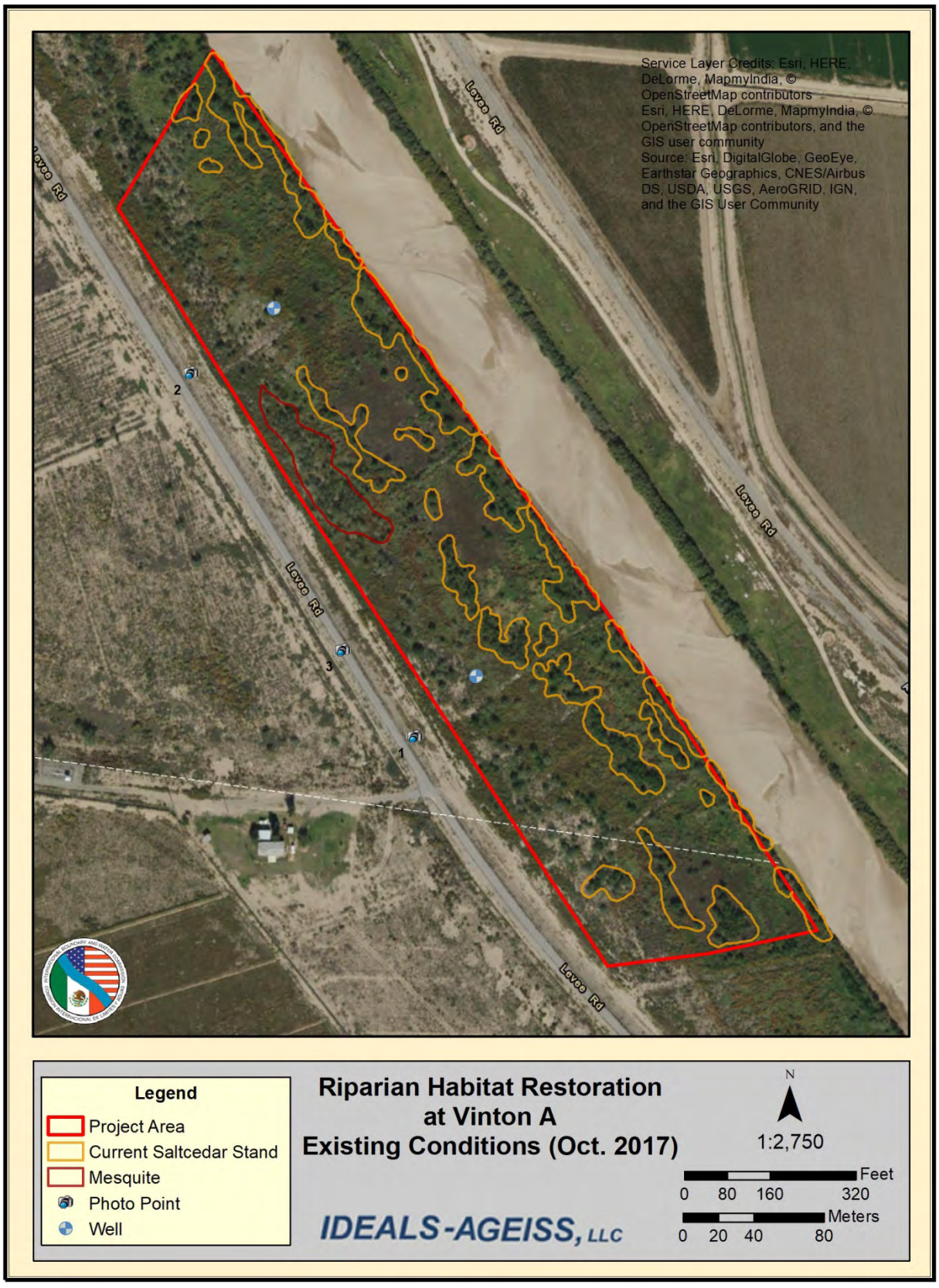
Table 3-3. Plants Observed at Vinton A Restoration Site

Scientific Name	Common Name	Native/Non-native Species
Amaranthus palmeri	pigweed	native
Atriplex canescens	four-wing saltbush	native
Distichlis spicata	saltgrass	native
Kochia scoparia	kochia	non-native
Lycium spp.	wolfberry	native
Populus deltoides	cottonwood	native
Prosopis glandulosa	honey mesquite	native
Prosopis pubescens	screwbean mesquite	native
Festuca	fescue grass	may be either
Salix exigua	coyote willow	native
Spharlacea coccinia	globemallow	native
Tamarix ramosissima	saltcedar	non-native
Ulmus pumila	Siberian elm	non-native

Table 3-4. Wildlife Species Observed at Vinton A Restoration Site, October 2017

Scientific Name	Common Name
Anas platyrhynchos	Mallard
Bubulcus ibis	Cattle Egret
Canis lupus familiaris	Domestic dog
Cardinalis sinuatus	Pyrrhuloxia
Charadrius vociferus	Killdeer
Columba livia	Rock Dove
Dryobates scalaris	Ladder-backed Woodpecker
Haemorhous mexicanus	House Finch
Melospiza lincolnii	Lincoln Sparrow
Pipilo chlorurus	Green-tailed Towhee
Setophaga coronata	Yellow-rumped Warbler
Spizella passerina	Chipping Sparrow
Sturnella neglecta	Western Meadowlark
Thomomys spp	Gopher
Tyto alba	Barn Owl
Zenaida macroura	Mourning Dove
Zonotrichia leucophrys	White-crowned Sparrow

Figure 3-6. Existing Conditions at the Vinton A Restoration Site



The Agua variant soils found at the Vinton A site are fine sandy loam which is deep and somewhat poorly drained. Clay comprises approximately 4 to 18 percent of the soils type, although some higher clay concentrations were documented in some of the sample horizons (TRC 2010). Salinity at the sites is low. Groundwater levels are highly dependent on water availability in the river and vary considerably at the site with historical records indicating depths that range from 2.6 to 13.7 feet below the surface at Vinton A.

3.3 Vinton B

This 25-acre site on the west side of the river is a mixed-shrub habitat with scattered four-wing saltbush and rabbitbrush (*Chrysothamnus nauseosus*) in moderate abundance (Figure 3-7). Tall, dense patches of smooth pigweed are abundant through the site. Screwbean mesquite and saltcedar dominate (Figure 3-8). Siberian elms are found on the site as well as other non-native species such as fescue grass (*Festuca spp*.) and Russian thistle. The site has not been mowed since 2011. Current site conditions and the distribution of invasive saltcedar are presented in Figure 3-9.

The Agua variant soils found at the Vinton sites are fine sandy loam which is deep and somewhat poorly drained. Clay comprises approximately 4 to 18 percent of the soils type, although some higher clay concentrations were documented in some of the sample horizons (TRC 2010). Salinity at the sites is low. Groundwater levels vary considerably at this site, with historical records indicating depths that range from 2.5 to 15 feet below the surface, and levels are highly dependent on water availability in the river.

Figure 3-7. Pre-implementation Photo of Vinton B at Photo Point 1

Figure 3-8. Pre-implementation Photo of Vinton B at Photo Point 3

Figure 3-9. Existing Conditions at the Vinton B Restoration Site

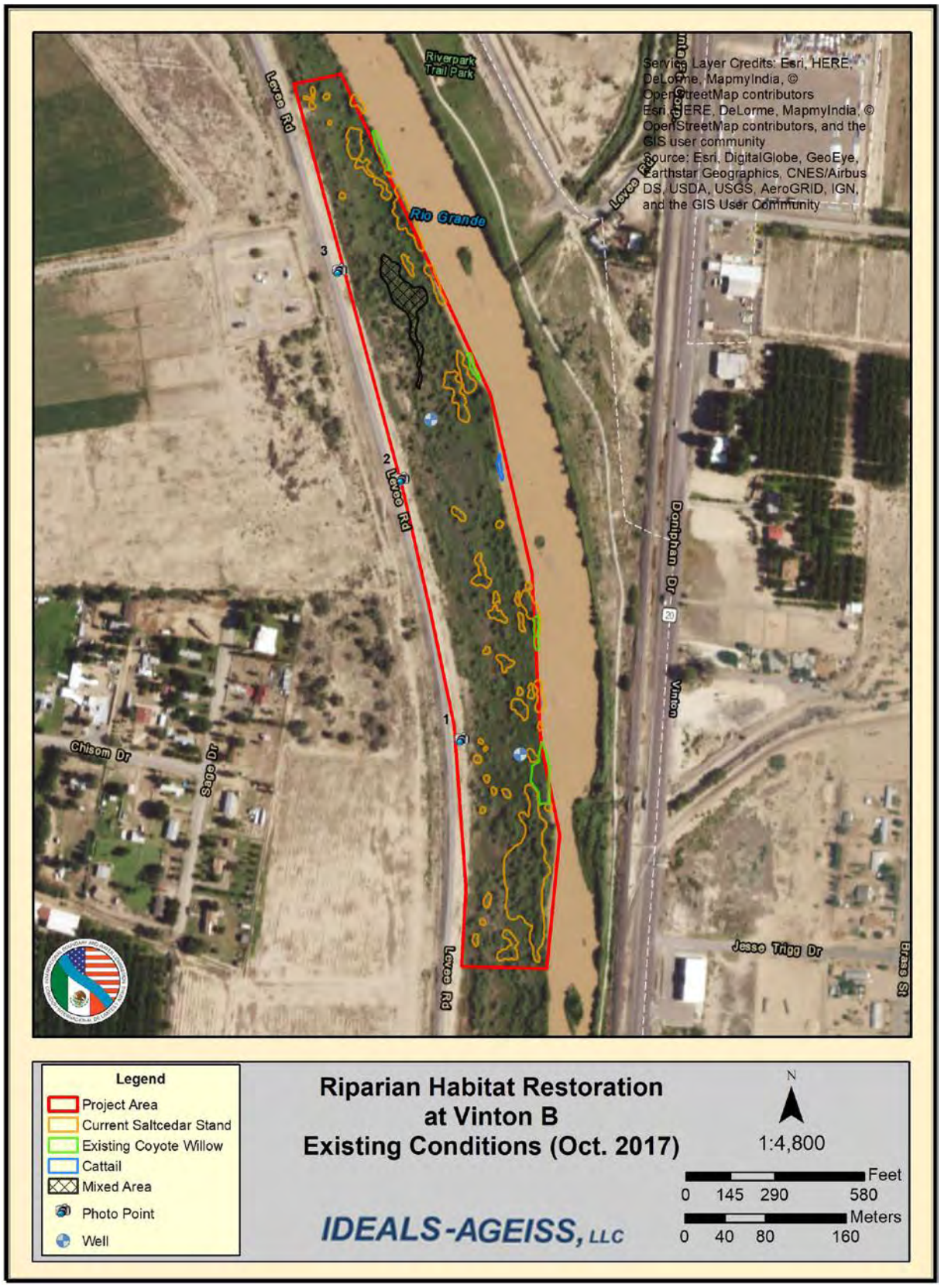


Table 3-5. Plants Observed at Vinton B Restoration Site

Scientific Name	Common Name	Native/Non-native Species
Amaranthus palmeri	pigweed	native
Atriplex canescens	four-wing saltbush	native
Chrysothamnus nauseosus	rubber rabbitbrush	native
Distichlis spicata	saltgrass	native
Kochia scoparia	kochia	non-native
Prosopis glandulosa	honey mesquite	native
Prosopis pubescens	screwbean mesquite	native
Festuca	fescue grass	may be either
Salix exigua	coyote willow	native
Spharlacea coccinia	globemallow	native
Tamarix ramosissima	saltcedar	non-native
Ulmus pumila	Siberian elm	non-native

Table 3-6. Wildlife Species Observed at Vinton B Restoration Site, October 2017

Scientific Name	Common Name
Accipiter cooperii	Copper's hawk
Agelaius phoeniceus	Red-winged Blackbird
Anas platyrhynchos	Mallard
Anas spp.	Teal spp.
Ardea alba	Great Egret
Ardea herodias	Great Blue Heron
Bubulcus ibis	Cattle Egret
Cistothorus palustris	Marsh Wren
Colaptes auratus	Northern Flicker
Dryobates scalaris	Ladder-backed Woodpecker
Haemorhous cassinii	Cassin's Finch
Haemorhous mexicanus	House Finch
Melospiza lincolnii	Lincoln Sparrow
Passerina caerulea	Blue Grosbeak
Pipilo chlorurus	Green-tailed Towhee
Pituophis catenifer sayi	Bull snake
Regulus calendula	Ruby-crowned Kinglet
Sayornis saya	Say's Phoebe
Setophaga coronata	Yellow-rumped Warbler
Thomomys spp	Gopher
Toxostoma crissale	Crissal Thrasher
Tyto alba	Barn Owl
Zenaida asiatica	White-winged Dove
Zenaida macroura	Mourning Dove
Zonotrichia leucophrys	White-crowned Sparrow

3.4 Valley Creek

This site is part of a recreation lease to the City of El Paso, which mows the site regularly. This site is adjacent to a large residential area and has pathways with permanent trail rest areas running through it (Figure 3-10). Ground cover appears to be mostly fescue that is routinely maintained by mowing away from the river. The bank has grass (*Sorghum halepense*), and intermittent narrow patches of coyote willow and false seep willow (*Bacharis salicifolia*) restricted to the top the bank with widely scattered large cottonwood (*Populus deltoides*; Figure 3-11). Cattails are also found in small patches. Currently this site does not support suitable habitat for cuckoo or flycatchers (IDEALS-AGEISS 2016). Vegetation and fauna observed at the site are listed in Tables 3-7 and 3-8. Distribution of native and invasive species at the Valley Creek site is shown in Figures 3-12 and 3-13.

The Valley Creek site also is comprised of the fine sandy loam Agua variant soils with typically 4 to 17 percent clay composition. These soils are deep and somewhat poorly drained. Soil salinity is not considered a hazard at this site. Historical records indicate groundwater levels range from 2.75 to 9.3 feet below the surface.

Figure 3-10. Pre-implementation Photo of Valley Creek at Photo Point 2

Figure 3-11. Pre-implementation Photo of Valley Creek at Photo Point 4

Table 3-7. Plants Observed at Valley Creek Restoration Site

Scientific Name	Common Name	Native/Non-native Species
Bacharis salicifolia	false seep willow	native
Distichlis spicata	saltgrass	native
Kochia scoparia	kochia	non-native
Polygonum	smartweed	native
Populus deltoides	cottonwood	native
Prosopis pubescens	screwbean mesquite	native
Salix exigua	coyote willow	native
Tamarix ramosissima	saltcedar	non-native
Ulmus pumila	Siberian elm	non-native

Table 3-8. Wildlife Species Observed at Valley Creek Restoration Site, October 2017

Scientific Name	Common Name
Ardea herodias	Great Blue Heron
Bucephala albeola	Bufflehead
Canis lupus familiaris	Domestic dog
Thomomys spp	Gopher

Figure 3-12. Existing Conditions at the Valley Creek Restoration Site (North)

Figure 3-13. Existing Conditions at the Valley Creek Restoration Site (South)

4.0 DESIGN AND IMPLEMENTATION ACTIVITIES

The design plans for each site are based on the Conceptual Plans developed by the 2009 U.S. Army Corps of Engineers and the 2011 Site Implementation Plans, in addition to the changes requested by USIBWC in the Statement of Work. The restoration sites focus on the creation of different habitats: screwbean mesquite forest (potential cuckoo habitat), open riparian woodland, and riparian woodland or forest. No grass seeding will be conducted at any of the sites. Specific tree and shrub plantings are identified in Table 4-1. The conceptual layout of the plantings is further defined for each site in the sections below.

Table 4-1. Planting Regime for the Restoration Sites

Planting	Shalem Colony	Vinton A	Vinton B	Valley Creek
Coyote willow poles[1]	50 (65)	2,940 (3910)	3,000 (4.000)	1,100 (1,463)
Goodding's willow poles[1]	10 (13)	441 (586)	200 (266)	220 (292)
Cottonwood poles[1]	10 (13)	1,029 (1368)	800 (1,064)	440 (585)
Longstem riparian shrubs	50	1,470	1,600	1,000
Arizona ash	0	5	5	10
Desert willow	0	5	0	10
Grass and forb seeding	none	none	none	none

[1] The plant numbers include an increase in count (number in parenthesis) to account for planting two poles in at least 1/3 of the augured holes.

4.1 Site Preparation and Planting Methodology

4.1.1 Site Preparation

Prior to implementation of the restoration effort, two types of signage will be posted within the restoration properties for all but the Valley Creek site which will be coordinated with the City of El Paso. Within each restoration site, two steel post signs and flexible delineator posts will be maintained at approximately 200 to 400 feet apart. Coordination with USIBWC and the City of El Paso for the Valley Creek restoration signage will occur to ensure notice to the public of restoration activities and to minimize disruption of recreational activities.

To protect native vegetation identified at the site, vegetation will be flagged prior to site preparation. Exotic species will then be removed in order to increase the current native habitat. Using a backhoe or excavator with a bucket and grappler (clasping thumb) attachment to extract large root masses below the crown, individual saltcedars along the existing stream bank and throughout the identified restoration site within the floodplain will be extracted. Figures 3-3, 3-6, 3-9, 3-12, and 3-13 show where these saltcedars are located currently within the restoration sites. Other mechanical equipment such as skid steers or other hand held mechanical devices may also be used if certain field conditions or site constraints are discovered in the field. Other low growing noxious weeds (e.g., Russian thistle) will be grubbed using a compact skid steer with brush hog attachment.

New invasive species growth identified during the monitoring phase and outside of the 30-foot buffer of the river channel or seasonal pond will be treated with chemical application of herbicides. Identified species will be treated in areas where mechanical methods are inaccessible or not appropriate. A Commercial Applicator, licensed by the New Mexico Department of Agriculture, will determine the

application concentrations and rates of the herbicide. Garlon® 4 is the anticipated herbicide for the permanent removal of invasive species, such as saltcedar. Application of the herbicide will depend on the proximity of native species to the non-native species. Localized basal placement of the herbicide (versus foliar) can be used to prevent drift and protect surrounding native plants. Habitat® may also be used if needed in the buffer area. Herbicides will not be used on the levees. Vegetation will be treated outside the migratory bird nesting season (March 1 to August 31).

4.1.2 Planting Methodology

For all sites, cottonwood nursey stock and willows for planting will be purchased locally that are 12 to 16 feet long and approximately 2 to 3 inches in diameter. An auger will be used to plant cuttings after the cuttings have soaked for 2 weeks. Planting will be conducted in late winter/early spring months (February through March). Willow whips are typically cut 5 to 8 feet long but will need to be cut longer to reach the water table; they can be cut close to the ground. The ideal diameter of a cut whip is less than 1 inch. Poles and cuttings will be soaked in large tubs with water brought from offsite prior to planting. Live stakes will be cut at an angle along the bottom with bud ends facing upwards when planted (see Appendix B).

Longstem riparian plants purchased will include: three-leaf sumac (*Rhus trilobata*), New Mexico olive (*Forestiera neomexicana*), false indigo bush (*Amorpha fruticosa*), and wolfberry. Some screwbean mesquite may also be used to enhance sites based on targeted habitat. Proper installation will be to place them into the capillary fringe at the time of planting for root expansion. The planting holes will be dug 2.0 times wider than the container size of the plants. The hole will be dug 1.5 times the depth of the root ball to ensure the root collar is level with the ground and not covered by soil (see Appendix B). If planted too high, the exposed root collar will dry out the specimen; if too low, the vegetative structure of the specimen will be compromised. The depth to the capillary fringe will vary; however, data from groundwater wells will provide an estimate of placement into this capillary fringe. Placing mulch around each longstem shrub will also reduce soil moisture loss.

A site-specific planting field sheet will be developed and will include date and location of plant groups, overall health of plant groups, as well as field notes with regard to the specific site and weather conditions. Between mid-March and mid-April, a water tender will be used to apply required amounts of water (5 gallons per tree and 2 gallons per bush) to the plantings within each of the restoration sites. Longstem plantings will be watered two times between April and July 15. Additional watering periods may occur should the need arise as determined during the site monitoring. In order to establish sufficient growth over the first growing season at the open riparian woodland sites, watering tubes for shrub plantings will be used. A typical watering tube is 1- to 3-inch diameter PVC pipe with perforation to ensure the displacement of moisture at root ball depth in order to promote growth and root expansion. The water tube typically protrudes about 6 inches above the soil surface when placed with the bottom end at depth near the root ball to ensure water getting directly to the root ball. For especially the longstem shrubs, landscape grade mulch (or mulch made from the vegetation previously removed) will be incorporated in/around the planting holes to increase water retention and provide supportive nutrients to the transplants to increase survival. To test for survivability based on planting time, a portion of the longstem shrubs will be planted in the spring and a portion in the fall of 2018. Live stakes will be provided along area that experiencing any heavy erosion along the slope of the embankment. Existing coyote willow whips not used during transplanting procedures will be used as staking the embankment in

areas seeing extensive erosion. The staking procedure may be provided in areas where ground cover is sparse.

Ground water conditions throughout Vinton and Valley Creek range from 3.7 feet to 5.0 feet below ground surface as of early November 2017. Ground water depths are expected to vary slightly as the season progress through the winter months into early spring. Below is information tabulating current ground water levels at the Vinton and Valley Creek sites which were taken on 10 November 2017 between 1400 and 1645 hours. No monitoring well information is currently available for Shalem Colony.

Table 4-2. Pre-implementation Groundwater Monitoring, 10 November 2017

Restoration Site	Well No.	Time of Monitoring	Depth to Water from Surface (feet)
Valley Creek	VC-MW-1	1400	Destroyed
	VC-MW-2	1345	5.02
Vinton A	VA-MW-1	1645	3.87
	VA-MW-2	1615	4.07
Vinton B	VB-MW-1	1545	4.25
	VB-MW-2	1515	3.79

4.2 Shalem Colony

Targeted habitat for this 14.2-acre site is screwbean mesquite forest; therefore, willow and cottonwood pole plantings will be limited. The 2011 Site Implementation Plans did not call for any plantings at this site; however, adding some additional riparian species may provide diversity at this restoration site. Since groundwater levels are unknown, planting will occur in patches close to the river edge. Three-leaf sumac and some screwbean mesquite will be planted in two areas along the site to add to plant diversity and provide shrub layer in areas lacking structure (Figure 4-1). Although the site already contains screwbean mesquite, the target habitat for this site is a screwbean mesquite forest and the species is well adapted to the areas and likely will survive well. Three-leaf sumac will provide additional structure on the site. Patches of willows will be used to supplement areas along the river where saltcedars are removed and minimal re-sprouting is occurring currently. Limited cottonwoods will be placed throughout the site.

4.3 Vinton A

Desired habitat at this 14.7-acre site is a riparian forest. The implementation plans prescribed a cottonwood forest with canopy cover ranging from 50 to 100 percent. Exotic vegetation will be removed as described in Section 4.1. During site preparation, disturbance will be minimized in areas of native shrubs and grasses. Native vegetation areas will be flagged before the start of the site preparation. Coyote willow whips will be planted at approximately 200 per acre, Goodding's willow whips at 30 per acre, longstem shrubs at 100 per acre, and cottonwood poles at 70 per acre. Five desert willows will also be planted. Coyote willows will be grouped along the river bank in areas where the saltcedars have been removed (Figure 4-2). Longstem shrubs will be planted towards the levee road, but away from the bare ground adjacent to the levee, with cottonwoods scattered throughout the site (planted in groups) to provide some structural diversity at the site. Additional longstem shrubs will be planted closer to the river where native vegetation is already present.

Figure 4-1. Shalem Colony Planting Layout

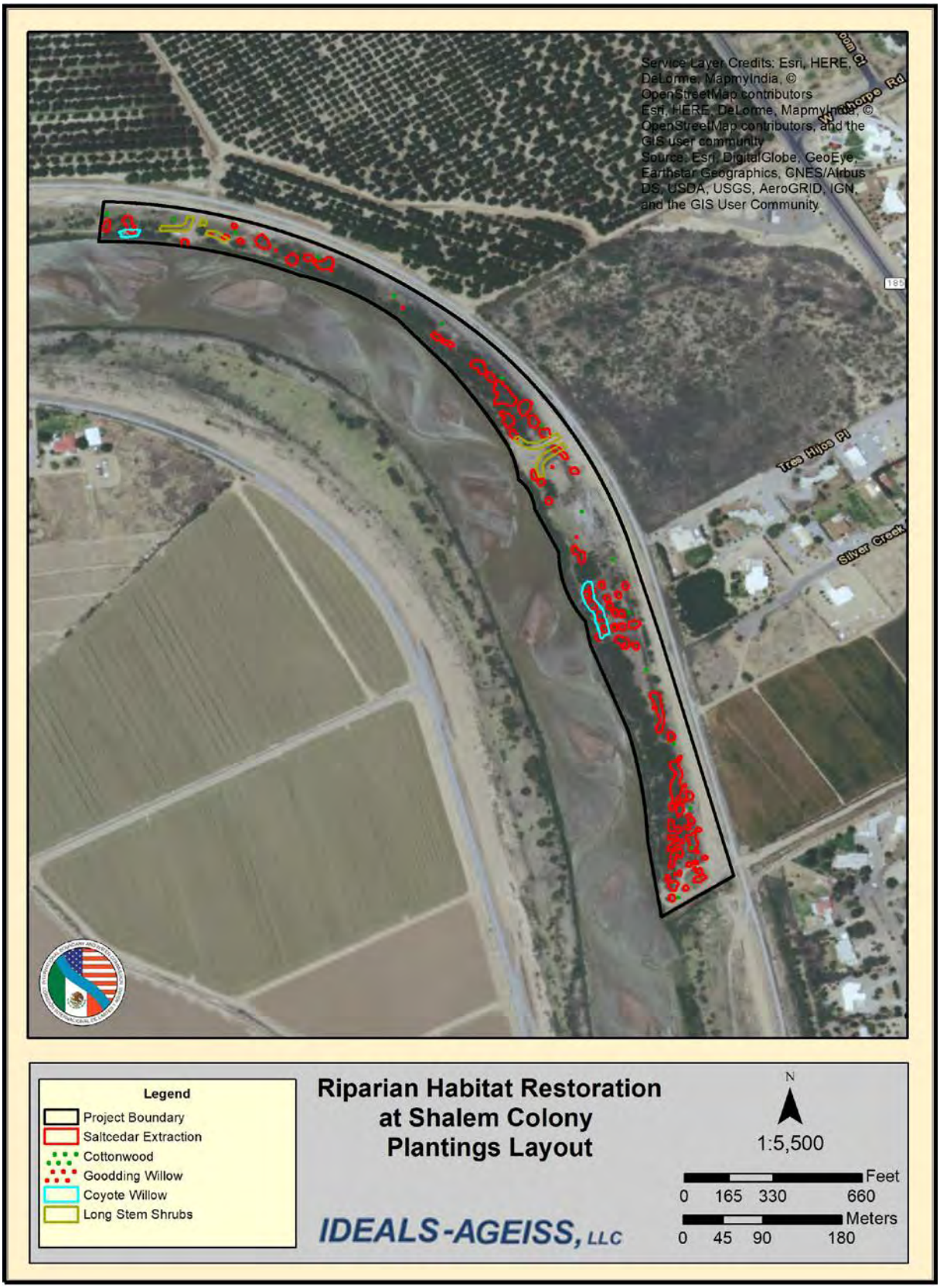
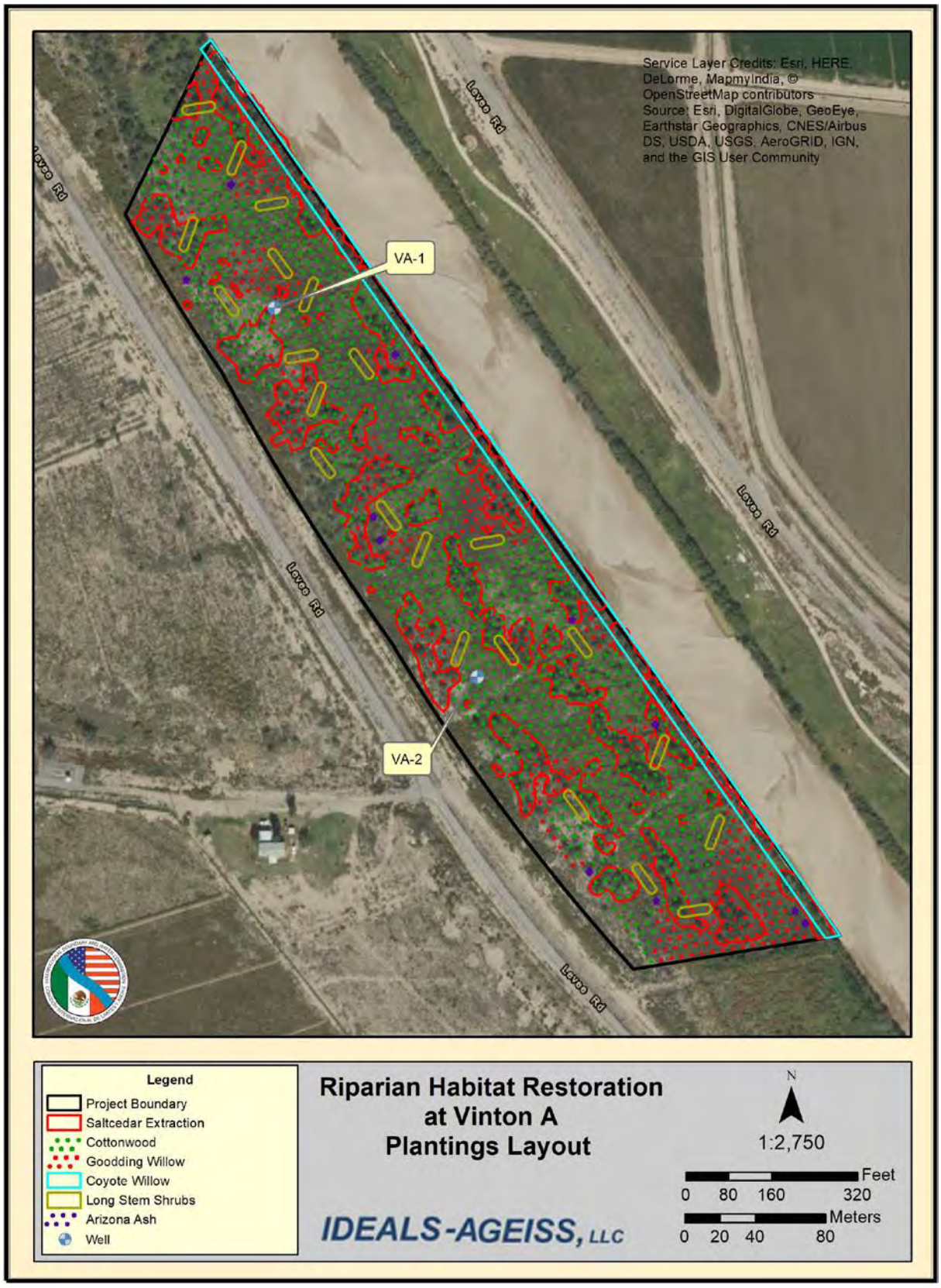


Figure 4-2. Vinton A Planting Layout



4.4 Vinton B

This 20-acre site through restoration efforts would be designated riparian woodland habitat. The implementation plan prescribed scattered patches and individual trees planted with an overall canopy cover of about 50 percent. Coyote willow whips will be planted at approximately 150 per acre, Goodding's willow whips at 10 per acre, cottonwood poles at 40 per acre, and longstem riparian shrubs at 80 per acre. Plantings for the Vinton B site are similar to the Vinton A site with clumps of cottonwoods spread throughout the site and coyote willow planted along the river bank where salt cedar is removed (Figure 4-3). Clumps of Goodding's willows are spaced throughout the site. Longstem shrubs will be planted towards the levee road, but away from the bare ground adjacent to the levee, and mixed with the native vegetation.

4.5 Valley Creek

For the open riparian woodland site at Valley Creek (22 acres), the site will be dominated by scattered patches of vegetation. Valley Creek will remain a recreation site and will continue to be mowed per the City of El Paso specifications (4 to 6 inches); therefore, in the Statement of Work USIBWC proposed fewer shrubs than stated in the implementation plan. In addition, the trail serves as a dual function as a bike and pedestrian trail and planting design was developed to minimize conflicts between bicyclists and pedestrians and to reduce encroachment onto the trail.

Longstem shrubs will be concentrated in areas adjacent to the laterals. Goodding's willow and cottonwood trees can be planted with an overall canopy cover of about 30 percent. Shrubs (coyote willow, sumac, seep-willow, etc.) would form scattered patches throughout the area at a high density with some open areas (TRC 2011). The clustering would assist with more uniform mowing areas and provide for a planting layout that would minimize encroachment along the trail path and thus provide a buffer between the trail and plantings. Coyote willow whips will be planted at approximately 100 per acre, Goodding's willow whips at 10 per acre, cottonwood poles at 20 per acre, and longstem riparian shrubs at 160 per acre. Minimal saltcedar extraction is needed on the north end of the site (Figure 4-5). Coyote willows and longstem shrubs will be planted between the river and the walking and bicycle path with a 10-foot buffer between the vegetation and the pathway. Patches of Goodding's willows and cottonwoods will be placed throughout the site (Figures 4-4 and 4-5). Cottonwoods will be distributed amongst the long-stem shrubs where the laterals meet the river. Riverside areas where saltcedar are extracted will be planted with coyote willows. Vegetation will not be planted within 10 feet of monitoring wells to protect their integrity.

Figure 4-3. Vinton B Planting Layout

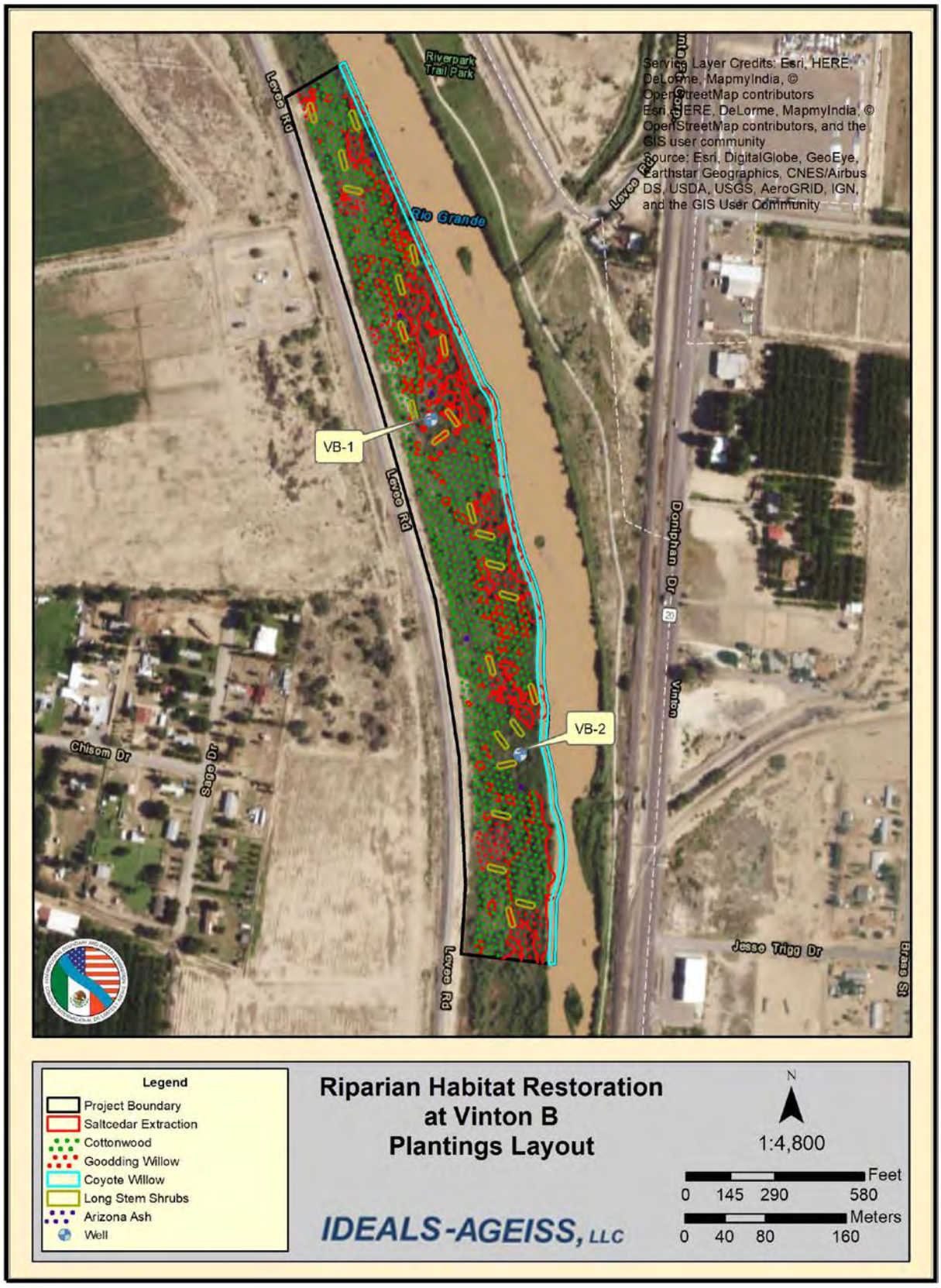


Figure 4-4. Valley Creek North Planting Layout

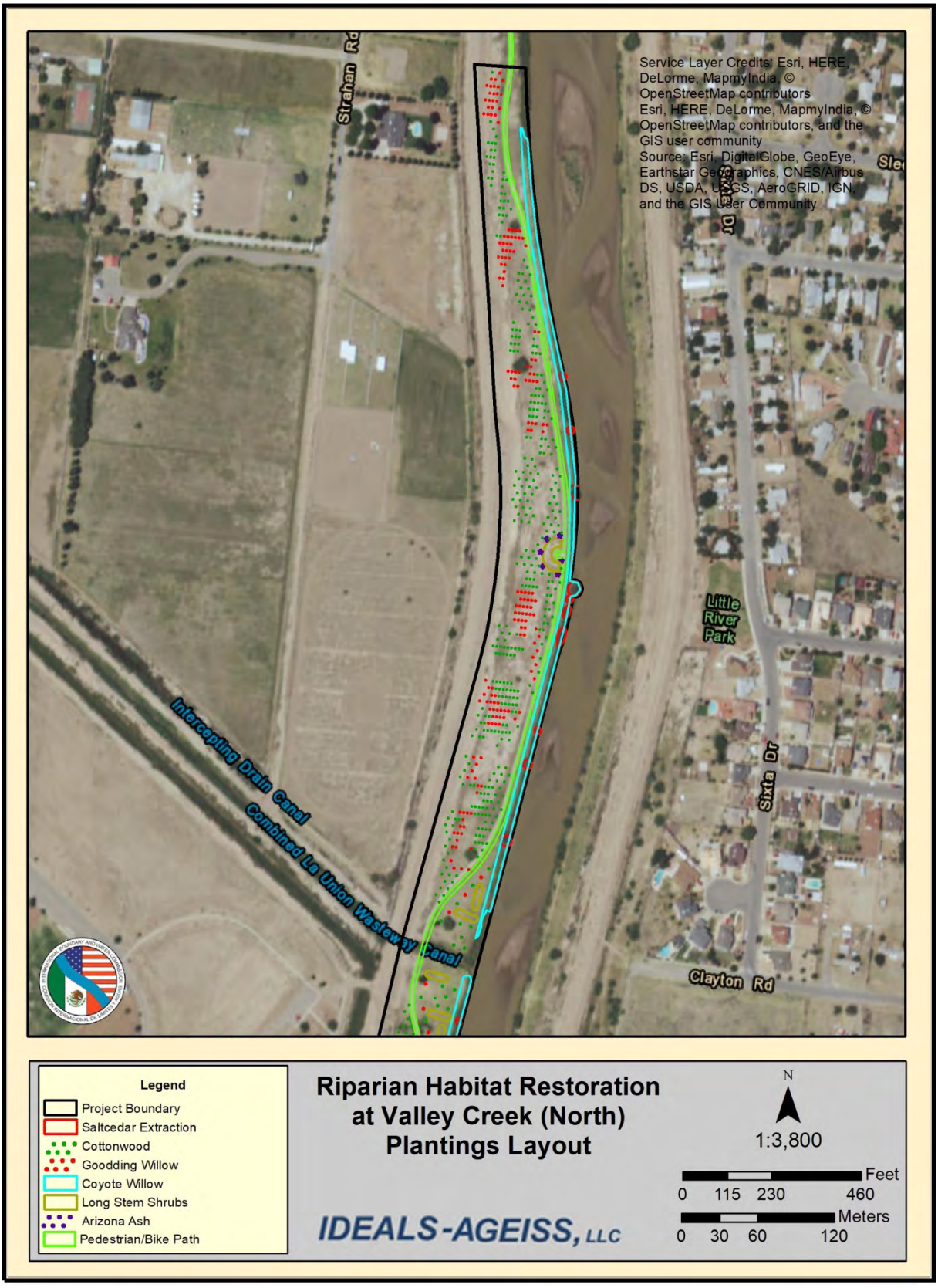
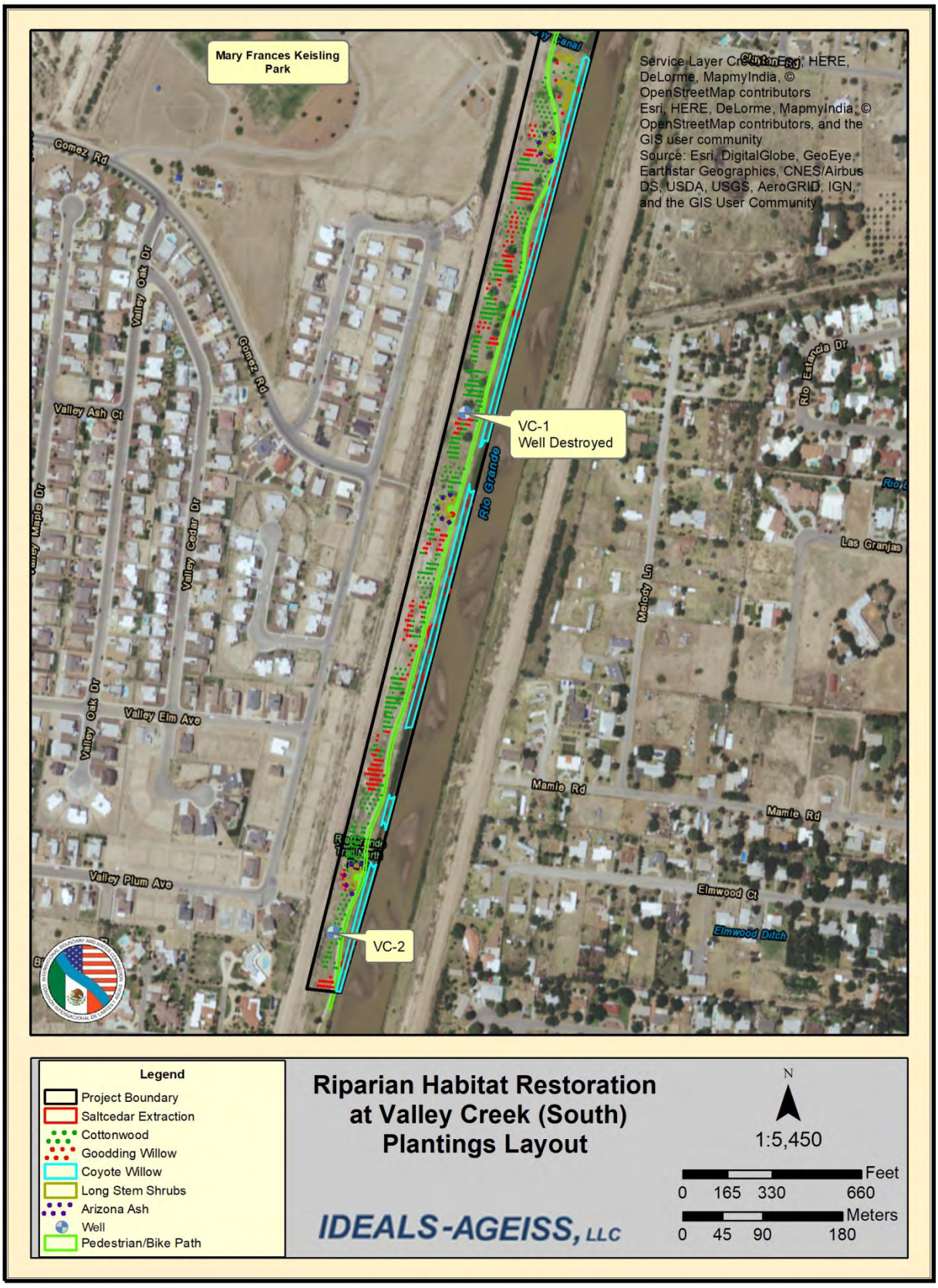


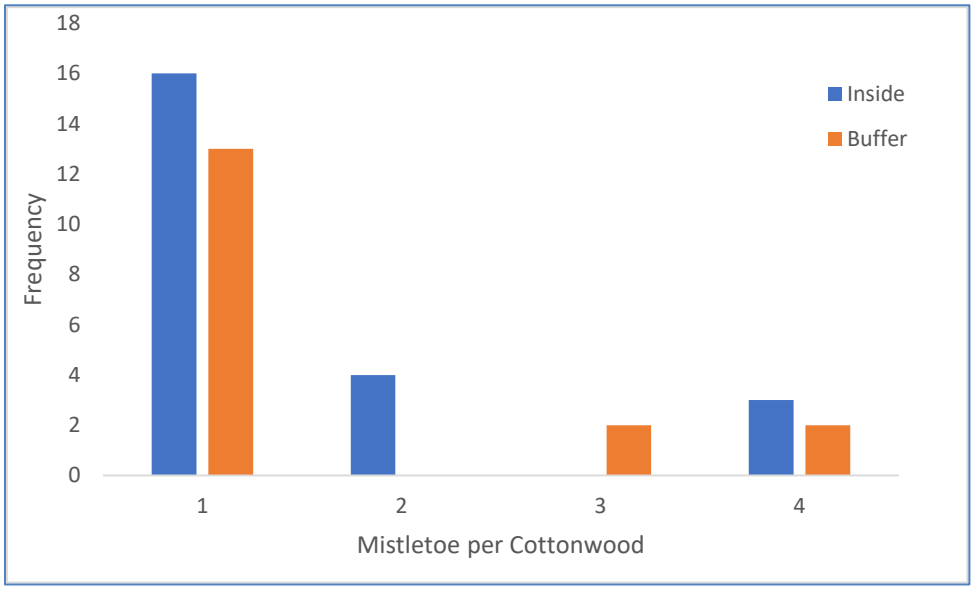
Figure 4-5. Valley Creek South Planting Layout



4.5.1 Mistletoe Assessment and Remediation

Cottonwoods at the Valley Creek site both inside the restoration site and at the buffer, were assessed for mistletoe infestation during the pre-implementation monitoring period and the number of clumps for each individual tree noted. Figure 4-6 shows the number of mistletoe clumps per cottonwood at the Valley Creek restoration site where the heaviest infestation was noted. Forty-two cottonwoods were surveyed at Valley Creek and most trees had low infestations. Mistletoe tends to spread faster in multi-storied and monoculture stands (USDA 2010). Mistletoe provides important components for wildlife habitat and some recommend that removing the infestation should be avoided unless other defects in the tree are significant (Halloin 2003). The most effective way to control mistletoe and prevent its spread is to prune infected branches, if possible, as soon as the parasite appears. Thinning-type pruning cuts to remove infected branches at their point of origin or back to large lateral branches will be used. Infected branches will be cut at least 1 foot below the point of mistletoe attachment in order to completely remove embedded haustoria. Cuttings will occur in the winter when seeds are not being produced. Done properly, limb removal for mistletoe control can maintain or even improve tree structure. The field crew will avoid severe heading (topping) if possible; such pruning weakens a tree's structure, and destroys its natural form. Pruning to control the mistletoe is recommended for the trees since infestation is currently low. Mistletoes infecting a major branch or the trunk where it cannot be pruned may be controlled by cutting off the mistletoe flush with the limb or trunk. To increase effectiveness of the pruning, the area can be wrapped with a few layers of wide, black polyethylene to exclude light (Perry and Elmore 2006).

Figure 4-6. Histogram of Mistletoe Clumps per Cottonwood at the Valley Creek Restoration Site



5.0 DEBRIS AND SOIL SPOILS MANAGEMENT

A chipper/grinder will be used to process and masticate extracted vegetation to a size ranging from 1 to 2 inches across. Processed vegetation will be disposed of onsite and dried. A sufficient drying time will be implemented to prevent any root stock fragments from re-sprouting before applying the much. Mulch will be applied to vegetation within the floodplain to provide organic material and a base for seed germination, to assist in moisture retention, and aide in erosion control. Additional mulch will be placed over compacted roads within the restoration site. No mulch will be placed on the levee toe road. Subsequent monitoring of the site will assess the need to spray any mulched areas for resprouting. Any excess vegetation debris will be collected into piles to dry for approximately 6 to 9 months and treated with prescribed burns at the Vinton A and B sites. Excess debris at the Valley Creek site will be hauled and disposed of at a permitted landfill or recycle center. Minimal debris resulting from extraction operations at the Shalem Colony site will be mulched and spread on site to aide in moisture retention.

The holes created from saltcedar extraction and for planting will generate excess soil material that will need to be hauled and deposited in an upland location. Potential locations would include permitted a landfill facility, site and infrastructure developments requiring the material, or other off site authorized disposal area. No spoils will be deposited within the active river channel. At the discretion of USIBWC officials, the spoils may be spread where large saltcedar cavities are created from extraction or at the toe of the levee toward the river to improve any drainage.

6.0 SEDIMENT AND EROSION CONTROL MEASURES

Sediment and erosion control measures will be implemented throughout the life of the project in order to minimize sediment-laden runoff and unwanted soil degradation. Every phase of a construction project has the potential of contributing significant quantities of sediment load due to soil breakdown as a result of construction activities. Temporary erosion control measures will be implemented early in construction in order to mitigate dust and any runoff pollution, if any, generated by restoration activities. The removal of vegetation is considered one of the primary reasons for dust and sediment accumulation. As a result, water will be provided on a regular basis to ensure soil materials are adequately saturated in order to minimize airborne soil particles and limit dust accrual to nearby residences, pedestrians, and traffic. Best Management Practices, such as silt fences and straw bales, will be used on an as-needed basis; however, due to the existing topography, sediment transport as a result of rainfall runoff will not have a significant impact on the site compared to potential dust accumulation. Silt fencing will be installed across slopes on contour lines. Due to the proposed earthwork (extraction) at all sites, National Pollution Discharge Elimination System (NPDES) requirements will be adhered to during the progression of the project. A notice of intent will be filed along with a low erosivity waiver.

7.0 MONITORING

Prior to conducting any work, the field crew established a minimum of three camera points for each restoration site (Table 7-1). Each camera point has a Global Positioning System (GPS) location and is permanently marked for future reference. Two to three photo points for each camera point (where the camera is located) were also established and permanently marked (fencepost or rebar). The distance between camera and photo point and the azimuth was noted and an identification number was assigned to each photo and camera point. The points will give an adequate view of the site to document the anticipated growth of revegetated areas (a meter stick placed in the view area will allow documentation of plant height and growth progression), and to monitor the stability of in-stream work. Photo point information will be collected during eight periods of the project: pre-implementation monitoring, pre-restoration monitoring, and six times during post-monitoring events. Additional photos will be taken of any significant changes and points of interest. Photos will be documented in accordance with Federal and National Archives and Records Administration regulations. Each photo will meet the USIBWC requirements for pixel array and will be uniquely numbered and labeled for identification.

During each monitoring period and assessment, groundwater levels will be collected and analyzed at the existing USIBWC shallow groundwater monitoring wells at Vinton A and B and Valley Creek restoration sites and the information will be used to supplement the groundwater monitoring data from the past several years.

Table 7-1. Established Photo Points for Each Restoration Site[1]

Restoration Site	Photo Point 1		Photo Point 2		Photo Point 3		Photo Point 4	
	UTM E	UTM N	UTM E	UTM N	UTM E	UTM N	UTM E	UTM N
Shalem Colony	326749	3583732	326975	3583524	327099	3583126	NA	NA
Vinton A	347322	3538824	347168	3539004	348437	3526991	NA	NA
Vinton B	348222	3537607	348134	3537847	348048	3538038	NA	NA
Valley Creek	348437	3526991	348141	3526503	348317	3515976	348077	3525795

[1] Specific bearings at each photo point are contained in Appendix A.

7.1 Pre-implementation Assessment

A pre-implementation monitoring assessment was conducted on 19 and 25 October 2017 prior to any work at the sites in support of the restoration plan. The distribution of invasive species for removal, as well as riparian habitat (specifically the willow species of interest) to be protected during restoration efforts, were identified and mapped. Wildlife species and floral species observed on the site were documented (Appendix A) and groundwater levels measured. Pre-implementation photos for all photo points are contained in Appendix A.

7.2 Pre-restoration Assessment

Once the noxious vegetation has been removed, and the site prepped for planting, a pre-restoration assessment of the four sites will be conducted. This assessment will document the remainder of the native vegetation on each site and the baseline habitat prior to site implementation. Photo assessments and groundwater measurements will occur during the monitoring session as described above.

7.3 Post-restoration Assessment

Six post-restoration assessments will be conducted in April, June, and October of 2018; and February, April, and June of 2019. During post-monitoring efforts, vegetation species and percent cover of created and restored areas before and after will be compared; and a comparison to reference riparian areas within the project vicinity will be provided. The comparison of these areas will guide potential corrective actions and maintenance needs during the course of the monitoring period. Both random and fixed plot approaches (1/10th-acre plots) will be used to approximate the type and percent of ground, brush, and canopy cover. Immediately after planting, three to four fixed plots will be established within each restoration site. In addition, during each monitoring session, three additional random plots will be chosen and monitored. Percent cover and species composition will be recorded on data sheets imported into a field tablet and each on its own field monitoring sheet. Percentage mortality rate for species will be calculated based on the representative plots. In addition, any changes in vegetation condition will be noted on the field monitoring sheet, as well as stream bank conditions and any wildlife sightings. Dead trees will be flagged during each assessment. During the post-implementation assessments, any sprouts of saltcedar or other exotic species encountered will be re-treated and their locations will be recorded by GPS for future survey efforts.

During the post-restoration effort, potential issues that may occur from wildlife damage (e.g., beaver) will be noted. Tree protection measures may be recommended (e.g., tree protectors, sand paint) to protect vegetation from wildlife damage and increase the efficacy of plantings if damage is extensive. Field personnel will observe the site to determine if any potential issues may occur from wildlife damage and act accordingly.

All monitoring site assessments will be coordinated with USIBWC. These post-monitoring events will allow assessment of the mortality of the new plantings. If the mortality exceeds 15 percent, then equivalent stock will be replanted during the 2018 season.

8.0 REFERENCES

Halloin, L. 2003. Tree Hazards and Forest Management in Southeast Region Campgrounds. Available at: http://www.dnr.wa.gov/publications/rp_fh_wadnrtreehazard.pdf. Accessed 13 November 2017.

IDEALS-AGEISS. 2016. Biological Survey Report for the Rio Grande Canalization Project.

IDEALS-AGEISS. 2017. Updated Biological Assessment for Long-term River Management of the Rio Grande Canalization Project.

Perry, E.J. and C.L. Elmore. 2006. Pest notes-mistletoe. University of California Agriculture and Natural Resources. Publication 7437. Available at: http://www.ufei.org/ForesTree/files/collected/pnmistletoe.pdf. Accessed 13 November 2017.

SWCA (SWCA Environmental Consultants). 2011. Final Biological Assessment-Integrated Land Management for Long-Term River Management of the Rio Grande Canalization Project.

TRC. 2010. Soil Survey Resource Report for Rio Grande Canalization Implementation Plan.

TRC. 2011. Site Implementation Plans for the Rio Grande Canalization Project Restoration Implementation Plan.

USACE (U.S. Army Corps of Engineers). 2009, March. Conceptual Restoration Plan and Cumulative Effects Analysis, Rio Grande-Caballo Dam to American Dam, New Mexico and Texas. Albuquerque, NM.

USDA (U.S. Department of Agriculture). 2010. Management Guidelines for Dwarf Mistletoe: *Arceuthobium spp.* Available at: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5187427.pdf. Accessed 13 November 2017.

USFWS (U.S. Fish and Wildlife Service). 2005. Fish and Wildlife Coordination Act Report for the Rio Grande Canalization Project, New Mexico and Texas. U.S. Fish and Wildlife Service, New Mexico Ecological Services Field Office, Albuquerque.

USFWS. 2012. Biological Opinion (Opinion) on the Effects of the United States Section of the International Boundary and Water Commission (IBWC) Proposed Action of an Integrated Land Management Alternative for Long-Term Management (Land Management Alternative) of the Rio Grande Canalization Project (RGCP) in Sierra County and Doña Ana County, New Mexico, and El Paso County, Texas. Consultation No. 02ENNM00-2012-F-0016.

USIBWC (U.S. International Boundary and Water Commission). 2004. Final Environmental Impact Statement: River Management Alternatives for the Rio Grande Canalization Project. Available at: http://www.ibwc.gov/EMD/documents/Final_EIS.pdf.

USIBWC. 2009. Record of Decision River Management Alternatives for the Rio Grande Canalization Project. United States Section International Boundary and Water Commission, El Paso, Texas.

APPENDIX A

Pre-implementation Monitoring Forms and Photos

Pre-Implementation Qualitative Monitoring Field Sheet

Site: Shalem Colony Date: 19 Oct 2017

Participants: C. Britt, D. Burkett, Ryan, Andrew Target habitat: Screwbean msqt. Forest

Document conditions at restoration site prior to restoration work implementation:

Identifiable Native Species	Abundance (Sporadic individuals, Low, Moderate, High)	Comments
Screwbean Mesquite	At High ≥ 4m in N. portion	Excellent large individuals forming Good thickets/stands
Coyote willow	Moderate	Could be developed in site
False Seep Willow	low	
bullrush	-along banks-in river low	
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Comments**
Saltcedar		
Salt Cedar	Moderate	most Can be removed w/o damage to Natives
Russian thistle	High	

General Site Conditions: Adjacent to large Pecan orchard - May be Suitable for Cuckoo - excellent old Screwbean msqt. grove. Sandy site lots of Alkali Sacaton w/ pigweed in open areas

Observed Wildlife: domestic dog, Coyote, Am Crow, Cottontail rabbit, white crowned sparrow, Raccoon, House Finch, Spotted Towhee, Green-tailed Towhee, White-crowned sparrow, Pyrrhuloxia, American Kestrel

Photos Taken: 3 Seperate photo points established/staked with 3 photos taken at overlapping azimuths

max height of native vegetation 6 m

max height of non-native vegetation 5 m

Shalem Colony Photopoints

Photopoint 1	NAD83 Zone 13 R	Easting	326749	Northing	3583732
Target 1	22°				
Target 2	200°				
Target 3	180°				
Photopoint 2	NAD83 Zone 13 R	Easting	326975	Northing	3583524
Target 1	254°				
Target 2	230°				
Target 3	202°				
Photopoint 3	NAD83 Zone 13 R	Easting	327099	Northing	3583126
Target 1	300°				
Target 2	230°				
Target 3	216°				

10192017_1_Shalem Colony Photopoint 1 Target 1

10192017_2_Shalem Colony Photopoint 1 Target 2

10192017_3_Shalem Colony Photopoint 1 Target 3

10192017_4_Shalem Colony Photopoint 2 Target 1

10192017_5_Shalem Colony Photopoint 2 Target 2

10192017_6_Shalem Colony Photopoint 2 Target 3

10192017_7_Shalem Colony Photopoint 3 Target 1

10192017_8_Shalem Colony Photopoint 3 Target 2

10192017_9_Shalem Colony Photopoint 3 Target 3

Pre-Implementation Qualitative Monitoring Field Sheet

Site Valley Creek Date 25 oct 2017

Participants C. Bratt, D. Bartlett, Ryan, Andrew Target habitat

Document conditions at restoration site prior to restoration work implementation:

Identifiable Native Species	Abundance (Sporadic individuals, Low, Moderate, High)	Comments
Coyote willow	low	restricted patches on river bank
Cottonwood	low	a few trees at wide intervals
False Seep willow	low	scattered along bank
Cat tail	low	few small patches
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Comments**
Saltcedar	Sparse - on river bank	

General Site Conditions: Park - minimal existing wildlife habitat mowed/maintained for walking trails

Observed Wildlife : gopher, domestic dog, Great blue Heron, bufflehead

Photos Taken: None

max height of native vegetation _____

max height of non-native vegetation _____

Valley Creek Photopoints

Photopoint 1	NAD83 Zone 13 R	Easting	348437	Northing	3526991
Target 1	35°				
Target 2	90°				
Target 3	159°				
Photopoint 2	NAD83 Zone 13 R	Easting	348141	Northing	3526503
Target 1	34°				
Target 2	92°				
Target 3	152°				
Photopoint 3	NAD83 Zone 13 R	Easting	348317	Northing	3525976
Target 1	30°				
Target 2	87°				
Target 3	145°				
Photopoint 4	NAD83 Zone 13 R	Easting	348077	Northing	3525795
Target 1	32°				
Target 2	88°				
Target 3	141°				

10252017_1_Valley Creek Photopoint 1 Target 1

10252017_2_Valley Creek Photopoint 1 Target 2

10252017_3_Valley Creek Photopoint 1 Target 3

10252017_4_Valley Creek Photopoint 2 Target 1

10252017_5_Valley Creek Photopoint 2 Target 2

10252017_6_Valley Creek Photopoint 2 Target 3

10252017_7_Valley Creek Photopoint 3 Target 1

10252017_8_Valley Creek Photopoint 3 Target 2

10252017_9_Valley Creek Photopoint 3 Target 3

10252017_10_Valley Creek Photopoint 4 Target 1

10252017_11_Valley Creek Photopoint 4 Target 2

10252017_12_Valley Creek Photopoint 4 Target 3

Pre-Implementation Qualitative Monitoring Field Sheet

Site Vinton A Date 25 oct. 2017

Participants C. Britt, D Babbitt, Ryan, Andrew Target habitat

Document conditions at restoration site prior to restoration work implementation:

Identifiable Native Species	Abundance (Sporadic individuals, Low, Moderate, High)	Comments
Screwbean mesq	Abundnt - mod	Some good stands - Sporadic
Four-wing Saltbush	Moderate - low	
Smooth Pigweed	dense - Abundnt	
Wolfberry	low - Moderate	
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Comments**
Saltcedar	High - Moderate	Present throughout site Some dense stands
Russian thistle	High - Moderate	
Siberian elm	Sporadic	

General Site Conditions: Broad - moderately dense mixed Screwbean + Salt Cedar tree habitat with sub shrubs, pigweed + grasses

Observed Wildlife: Mallard duck, rock dove, killdeer, domestic ~~dog~~, ladder backed woodpecker, gopher . . . Green-tailed Towhee, Lincoln's Sparrow, Pyrrhuloxia, white-crowned sparrow, cattle egret, mourning dove, House finch

Photos Taken: 2 photo points established - 3 photos taken @ overlapping Azimuths

max height of native vegetation 6 m

max height of non-native vegetation 4m

Barn Owl
Mourning Dove
Western Meadowlark
Chipping Sparrow
Yellow-rumped Warbler

Photopoints

Photopoint 1 13R 347322 / 3538824

T1 - 0°
T2 - 45°
T3 - 100°

Photopoint 2 13R 347168 / 3539009

T1 - 10°
T2 - 45°
T3 - 95°

Vinton A Photopoints

Photopoint 1	NAD83 Zone 13 R	Easting	347322	Northing	3538824
Target 1	0°				
Target 2	45°				
Target 3	100°				
Photopoint 2	NAD83 Zone 13 R	Easting	347168	Northing	3539004
Target 1	10°				
Target 2	45°				
Target 3	95°				
Photopoint 3	NAD83 Zone 13 R	Easting	348437	Northing	3526991
Target 1	344°				
Target 2	36°				
Target 3	79°				

10252017_1_Vinton A Photopoint 1 Target 1

10252017_2_Vinton A Photopoint 1 Target 2

10252017_3_Vinton A Photopoint 1 Target 3

10252017_4_Vinton A Photopoint 2 Target 1

10252017_5_Vinton A Photopoint 2 Target 2

10252017_6_Vinton A Photopoint 2 Target 3

10252017_7_Vinton A Photopoint 3 Target 1

10252017_8_Vinton A Photopoint 3 Target 2

10252017_9_Vinton A Photopoint 3 Target 3

Pre-Implementation Qualitative Monitoring Field Sheet

Site Hilton B Date 25 October 2017

Participants C. Burt, D Burlett, Ryan, Andrew Target habitat

Document conditions at restoration site prior to restoration work implementation:

Identifiable Native Species	Abundance (Sporadic individuals, Low, Moderate, High)	Comments
Screwbean Mesq	Moderate	Some nice trees not thick
Smooth Pigweed	Abundant	difficult to walk through - dense tall
four wing Saltbush	Moderate	Scattered shrubs
Rabbit brush	- low moderate	Scattered shrubs
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Comments**
Saltcedar	Moderate - dominant	
Siberian elm	- low	
fescue grass	- Moderate - high	
Russian thistle	Moderate	

General Site Conditions: Mixed Scrub habitat with dense pigweed Salt Cedar & Screwbean Mesq dominate

Observed Wildlife : Barn owl, killdeer, Northern Harrier, wx Sparrow, Mourning dove Ruby Crowned kinglet, gopher, bull snake, yellow-rumped warbler..... wildlife on back..

Photos Taken: 3 photo points established w/ 3 photos ea @ overlapping azimuths

max height of native vegetation 4M

max height of non-native vegetation 4M

Wildlife

Cooper's Hawk
Mallard
Teal spp
Blue Grosbeak
White-winged Dove

Red-winged Blackbird
Marsh Wren
Ladder-backed Woodpecker
Lincoln's Sparrow
Crissal Thrasher

Great Blue Heron
Say's Phoebe
Cassin's Finch
Great Egret
Cattle Egret

House Finch

Photopoints

Photopoint 1 13R 348222/3537607

T1 – 130° True north (4H)
T2 – 50°
T3 – 20°

Photopoint 2 13R 348134/3537847

T1 – 15°
T2 – 65°
T3 – 115°

Photopoint 3 13R 348048/3538038

T1 – 15°
T2 – 90°
T3 – 140°

Vinton B Photopoints

Photopoint 1	NAD83 Zone 13 R	Easting	348222	Northing	3537607
Target 1	130°				
Target 2	50°				
Target 3	20°				

Photopoint 2	NAD83 Zone 13 R	Easting	348134	Northing	3537847
Target 1	15°				
Target 2	65°				
Target 3	115°				

Photopoint 3	NAD83 Zone 13 R	Easting	348048	Northing	3538038
Target 1	15°				
Target 2	90°				
Target 3	140°				

10252017_1_Vinton B Photopoint 1 Target 1

10252017_2_Vinton B Photopoint 1 Target 2

10252017_3_Vinton B Photopoint 1 Target 3

10252017_4_Vinton B Photopoint 2 Target 1

10252017_5_Vinton B Photopoint 2 Target 2

10252017_6_Vinton B Photopoint 2 Target 3

10252017_7_Vinton B Photopoint 3 Target 1

10252017_8_Vinton B Photopoint 3 Target 2

10252017_9_Vinton B Photopoint 3 Target 3

Groundwater Levels Monitoring Field Sheet

Participants ANDREW GUERRA Date 12/8/17

Site	Well ID	TOC Elevation	Ground Surface Elevation	Casing Height	Date	Time	Water Level Reading TOC	Water Depth (Reading TOC - Casing Height)	Comments/Observations
Valley Creek	VC-MW-1	3755.64	3752.26	3.38	11/10/17	2:00 PM	—	—	WELL DESTROYED
	VC-MW-2	3754.72	3751.16	3.56	11/10/17	1:45 PM	8.58	5.02	NONE
Vinton A	VA-MW-1	3780.70	3777.44	3.46	11/10/17	4:45 PM	7.33	3.87	NONE
	VA-MW-2	3780.41	3776.76	3.43	11/10/17	4:15 PM	7.50	4.07	NONE
Vinton B	VB-MW-1	3777.12	3774.04	3.08	11/1017	3:45 PM	7.33	4.25	NONE
	VB-MW-2	3777.31	3773.60	3.71	11/10/17	3:15 PM	7.50	3.79	NONE

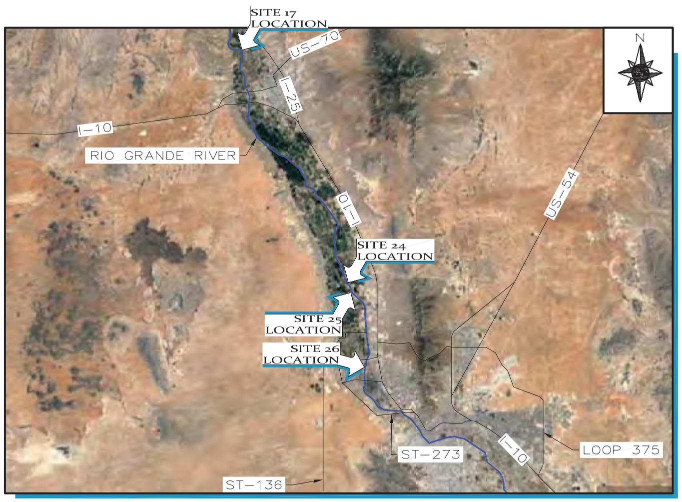
APPENDIX B

Restoration Design Plans

INTERNATIONAL BOUNDARY AND WATER COMMISSION
HABITAT RESTORATION PROJECT
SHALEM COLONY, VINTON A
VINTON B AND VALLEY CREEK

Rio Grande Restoration Project
141028-022.004/.005/G.C.
1st Review
December 15, 2017

DONA ANA COUNTY, NEW MEXICO
EL PASO COUNTY, TEXAS
DECEMBER 14, 2017



VICINITY MAP
NOT TO SCALE

INDEX OF DRAWINGS

Date: Dec 11, 2017 - 3:03pm User:Nathan
Drawing File: Y:\000000-000 IBWC River Restoration Project\Dwg\Rio Grande Restoration Project - North Site - Drew.dwg
Layout Name: G1

PLANS PREPARED FOR:

INTERNATIONAL BOUNDARY AND WATER COMMISSION
U.S. SECTION
4171 NORTH MESA, SUITE C-310
EL PASO, TX 79902-1441

IDEALS, inc
848 W. HADLEY AVENUE
LAS CRUCES, NM 88005
WEBSITE: www.ideals-inc.com
PHONE :575-532-9652 FAX :575-532-5045

ALL SITE NOTES

REMOVAL:

MOST SITES REQUIRE BRUSH REMOVAL, MAINLY THE VEGETATION OF SALT CEDAR. CLEARING METHODS FOR REMOVAL OF SALT CEDAR INCLUDE:

- CUTTING TO GROUND LEVEL AND TREATING THE STUMPS WITH HERBICIDE, SUCH AS GARLON (TRICLOPYR) APPLIED FROM A BACKPACK SPRAYER TO THE EXPOSED CUT. THESE TECHNIQUES MUST BE PERFORMED DURING LATE DECEMBER AND JANUARY SO THAT HERBICIDE IS DRAWN INTO THE ROOD SYSTEM OF THE PLANTS. IT IS ESSENTIAL TO REMOVE OR KILL THE SUBSURFACE ROOT CROWN OF SALT CEDAR TO PREVENT RE-SPROUTING.
- FUTURE SPOT TREATMENTS FOR RE-VEGETATION OF NON-DESIRABLE PLANTS CAN ALSO BE DONE USING HERBICIDE.
- SELECTIVE EXTRACTION, SUCH AS WITH A BACKHOE, USE OF A HYDRAULIC THUMB ATTACHMENT TO THE BACKHOE ARM IS EFFICIENT IN REMOVING SELECTED TREES AND ROOT CROWNS WITH LESS SOIL DISTURBANCE.
- STRANDS OF LARGE, DENSE SALT CEDAR CAN BE CLEARED WITH A SCRAPER OR BULLDOZER, FOLLOWED BY ROOT PLOWING TO REMOVE THE ROOT CROWN.

NOTE:

BIRD SPECIES IN THE PROJECT AREA THAT ARE PROTECTED UNDER THE MIGRATORY BIRD TREATY ACT (MBTA) MAY NEST IN AREAS CONTAINING TREES, GRASSES, OR OTHER SUITABLE HABITAT. VEGETATION CLEARING ACTIVITIES SHOULD BE SCHEDULED TO OCCUR OUTSIDE THE MARCH THROUGH AUGUST MIGRATORY BIRD NESTING SEASON, WHEN POSSIBLE. IF VEGETATION CLEARING ACTIVITIES MUST OCCUR DURING THE NESTING SEASON OF BIRDS PROTECTED UNDER THE MBTA, THAN THE AREAS PROPOSED FOR DISTURBANCES MUST BE SURVEYED FOR NESTING BIRDS PRIOR TO CONSTRUCTION TO AVOID INADVERTENT DESTRUCTION OF NESTS AND EGGS.

SITE SPECIFICATIONS

MINIMUM NUMBER OF PLANTINGS AT EACH SITE						
SITE	GRASS AND FORB SEEDING (ACRES)	COYOTE WILLOW WHIPS	GOODING WILLOW POLES	COTTONWOOD POLES	LONGSTEM RIPARIAN SHRUBS	DESERT WILLOW AND/OR DESERT ASH
SHALEM COLONY	0	50	10	10	50	0
VINTON A	0	2940	441	1029	1470	10
VINTON B	0	3000	200	800	1600	5
VALLEY CREEK	0	1100	220	440	1000	20
TOTAL	0	7090	871	2279	4120	35

SITE LEGEND

PROJECT LEGEND

PROJECT LIMITS (ALREADY HAVE IDENTIFIED)
RIO GRANDE FLOODWAY BOUNDARY
RIVER LEVEE
MULTI-USE PATH
APPARENT PROPERTY BOUNDARY
MONITORING WELL
EXISTING MAJOR CONTOUR (3915)
EXISTING MINOR CONTOUR (3914)

EXISTING PLANT SPECIES TO BE TRANSPLANTED (EPS-T)

1. COYOTE WILLOW
2. PYRUS

EXISTING PLANT SPECIES TO BE REMOVED (EPS-R)

1. SALTCEDAR
2. RUSSIAN OLIVE
3. KOCHIA
4. GIANT CANE
5. EXOTIC PHRAGMITES
6. MESQUITE

EXISTING PLANT SPECIES TO BE PROTECTED (EPS-P)

1. COTTONWOOD
2. MESQUITE
3. COYOTE WILLOW
4. ACACIA
5. BACCHARIS
6. CAT TAIL

NEW PLANTS SPECIES (NPS)

1. GRASSES AND FORB SEEDING
2. COYOTE WILLOW WHIPS
3. GOODING WILLOW POLES
4. COTTONWOOD POLES
5. LONG-STEM RIPARIAN SHRUBS
6. DESERT WILLOW
7. ARIZONA ASH

Disclaimer

Upon acceptance of these plans for construction, the contractor agrees to familiarize himself with the project and verify the location and correctness of any and all appurtenances, right-of-way, property lines, elevations, obstructions, hazards, or conflicts that may exist upon examination of actual field conditions. design of these plans was based on available information and interpretation of available data. any discrepancies discovered, shall be immediately brought to the attention of the engineer for evaluation, the contractor shall accept all liability and risks for construction proceeding prior to engineers evaluation.

Texas 811 Know what's below. Call before you dig.

New Mexico One Call, Inc. Call 2 days before you dig! Dial 811 or 1-800-321-2537

~RIO GRANDE~
~RESTORATION PROJECT~
~ SITE NOTES AND LEGENDS ~

Plan Revisions

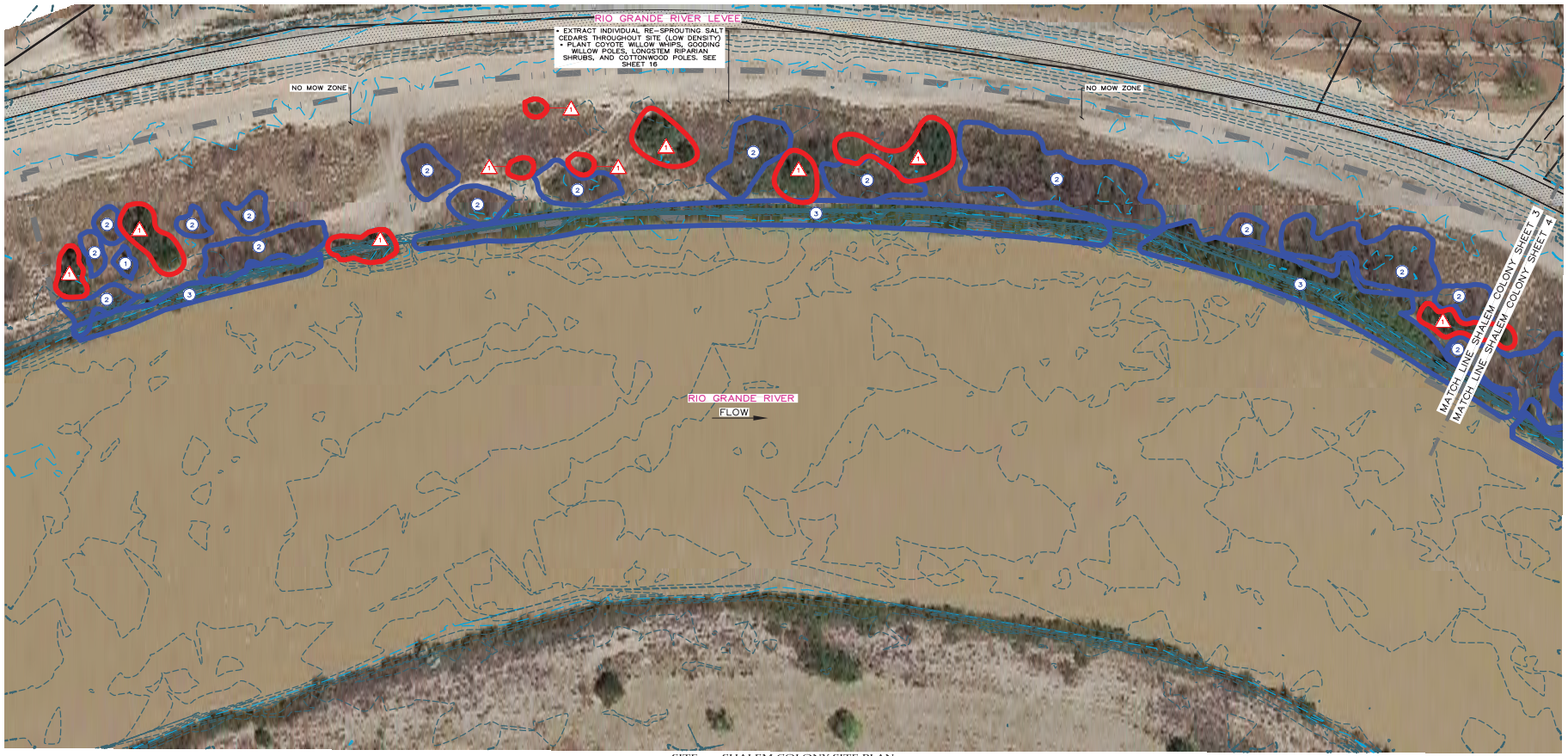
Date : 2017/12/15
T.O. # 14020-023.004
Engineer : M.Dubbin
Drawn by : G. Chavez
Checked by : A. Guerra

Engineer's Stamp

IDEALS, inc
348 W. HADLEY AVENUE
LAS CRUCES, NM 88005
WEBSITE:www.ideals-inc.com
PHONE:575-532-9652 FAX:575-532-5045

Sheet Number
2
OF 21

Date: Dec 11, 2017 - 2:05pm User Name:
Drawing File: Y:\000\000\000 BWC River Restoration Project\Dwg\Rio Grande Restoration Project - North Site - Drew.dwg
Layout Name: G2



SITE 17 - SHALEM COLONY SITE PLAN

SCALE: 1"=40'

SITE 17 – SHALEM COLONY SHEET MAP

NOT TO SCALE

PROJECT LEGEND

- PROJECT LIMITS (ALREADY HAVE IDENTIFIED)
- RIO GRANDE FLOODWAY BOUNDARY
- RIVER LEVEE
- MULTI-USE PATH
- APPARENT PROPERTY BOUNDARY
- MONITORING WELL
- 3915 EXISTING MAJOR CONTOUR
- 3914 EXISTING MINOR CONTOUR

EXISTING PLANT SPECIES TO BE TRANSPLANTED (EPS-T)

1. COYOTE WILLOW
2. PYRUS

EXISTING PLANT SPECIES TO BE REMOVED (EPS-R)

1. SALTCEDAR
2. RUSSIAN OLIVE
3. KOCHIA
4. GIANT CANE
5. EXOTIC PHRAGMITES
6. MESQUITE

EXISTING PLANT SPECIES TO BE PROTECTED (EPS-P)

1. COTTONWOOD
2. MESQUITE
3. COYOTE WILLOW
4. ACACIA
5. BACCHARIS
6. CAT TAIL

Texas 811 Know what's below. Call before you dig.

New Mexico One Call, Inc. Call 2 days before you dig! Dial 811 or 1-800-321-2537

Disclaimer

Upon acceptance of these plans for construction, the contractor agrees to familiarize himself with the project and verify the location and correctness of any and all appurtenances, right-of-way, property lines, elevations, obstructions, hazards, or conflicts that may exist upon examination of actual field conditions. design of these plans was based on available information and interpretation of available data. any discrepancies discovered, shall be immediately brought to the attention of the engineer for evaluation, the contractor shall accept all liability and risks for construction proceeding prior to engineers evaluation.

~RIO GRANDE~
~RESTORATION PROJECT~
~ SITE 17 - SHALEM COLONY ~

Plan Revisions

Date : 2017/12/15
T.O. # 14020-023.004
Engineer : M.Dubbin
Drawn by : G. Chavez
Checked by : A. Guerra

Engineer's Stamp

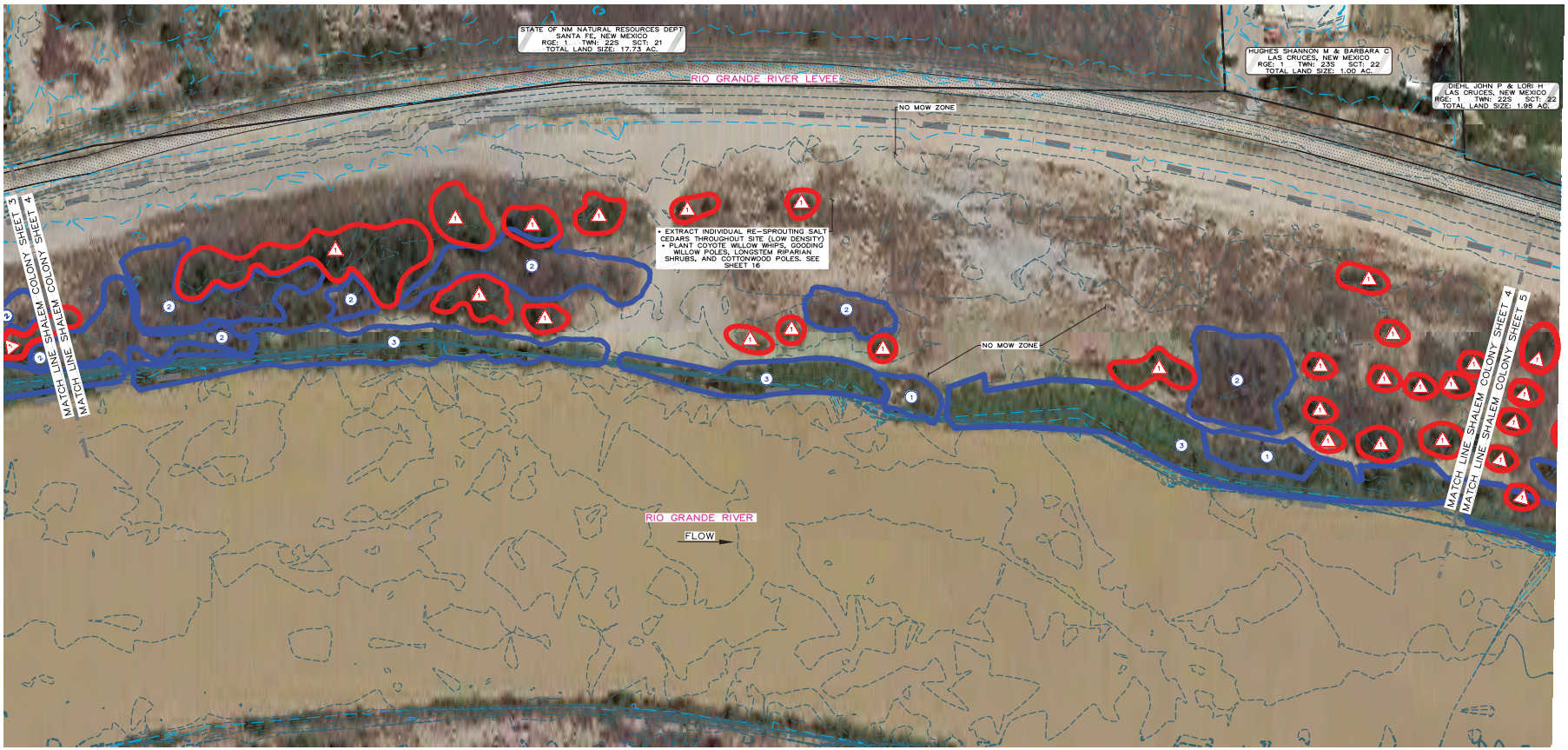
IDEALS, inc
848 W. HADLEY AVENUE
LAS CRUCES, NM 88005
WEBSITE:www.ideals-inc.com
PHONE:575-532-9652 FAX:575-532-5045

Sheet Number

3

OF 21

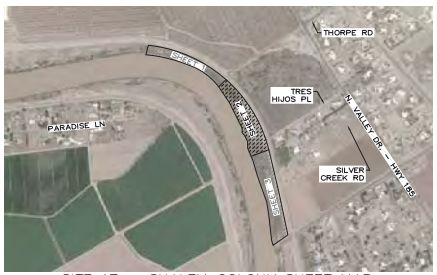
Date: Dec 11, 2017 - 2:07pm User:Nathan
Drawing File: Y:\000\000\000 BWC River Restoration Project\Dwg\Rio Grande Restoration Project - North Site - Drew.dwg
Layout Name: SH-3



SITE 17 - SHALEM COLONY SITE PLAN

SCALE: 1" = 40'

SCALE: 1"=40'



SITE 17 – SHALEM COLONY SHEET MAP
NOT TO SCALE

PROJECT LEGEND

- PROJECT LIMITS (ALREADY HAVE IDENTIFIED)
- RIO GRANDE FLOODWAY BOUNDARY
- RIVER LEVEE
- MULTI-USE PATH
- APPARENT PROPERTY BOUNDARY
- MONITORING WELL
- 3915 EXISTING MAJOR CONTOUR
- 3914 EXISTING MINOR CONTOUR

EXISTING PLANT SPECIES TO BE TRANSPLANTED (EPS-T)

1. COYOTE WILLOW
2. PYRUS

EXISTING PLANT SPECIES TO BE REMOVED (EPS-R)

1. SALTCEDAR
2. RUSSIAN OLIVE
3. KOCHIA
4. GIANT CANE
5. EXOTIC PHRAGMITES
6. MESQUITE

EXISTING PLANT SPECIES TO BE PROTECTED (EPS-P)

1. COTTONWOOD
2. MESQUITE
3. COYOTE WILLOW
4. ACACIA
5. BACCHARIS
6. CAT TAIL

Disclaimer

Upon acceptance of these plans for construction, the contractor agrees to familiarize himself with the project and verify the location and correctness of any and all appurtenances, right-of-way, property lines, elevations, obstructions, hazards, or conflicts that may exist upon examination of actual field conditions. design of these plans was based on available information and interpretation of available data. any discrepancies discovered, shall be immediately brought to the attention of the engineer for evaluation, the contractor shall accept all liability and risks for construction proceeding prior to engineers evaluation.

~RIO GRANDE~
~RESTORATION PROJECT~
~ SITE 17 - SHALEM COLONY ~

Plan Revisions

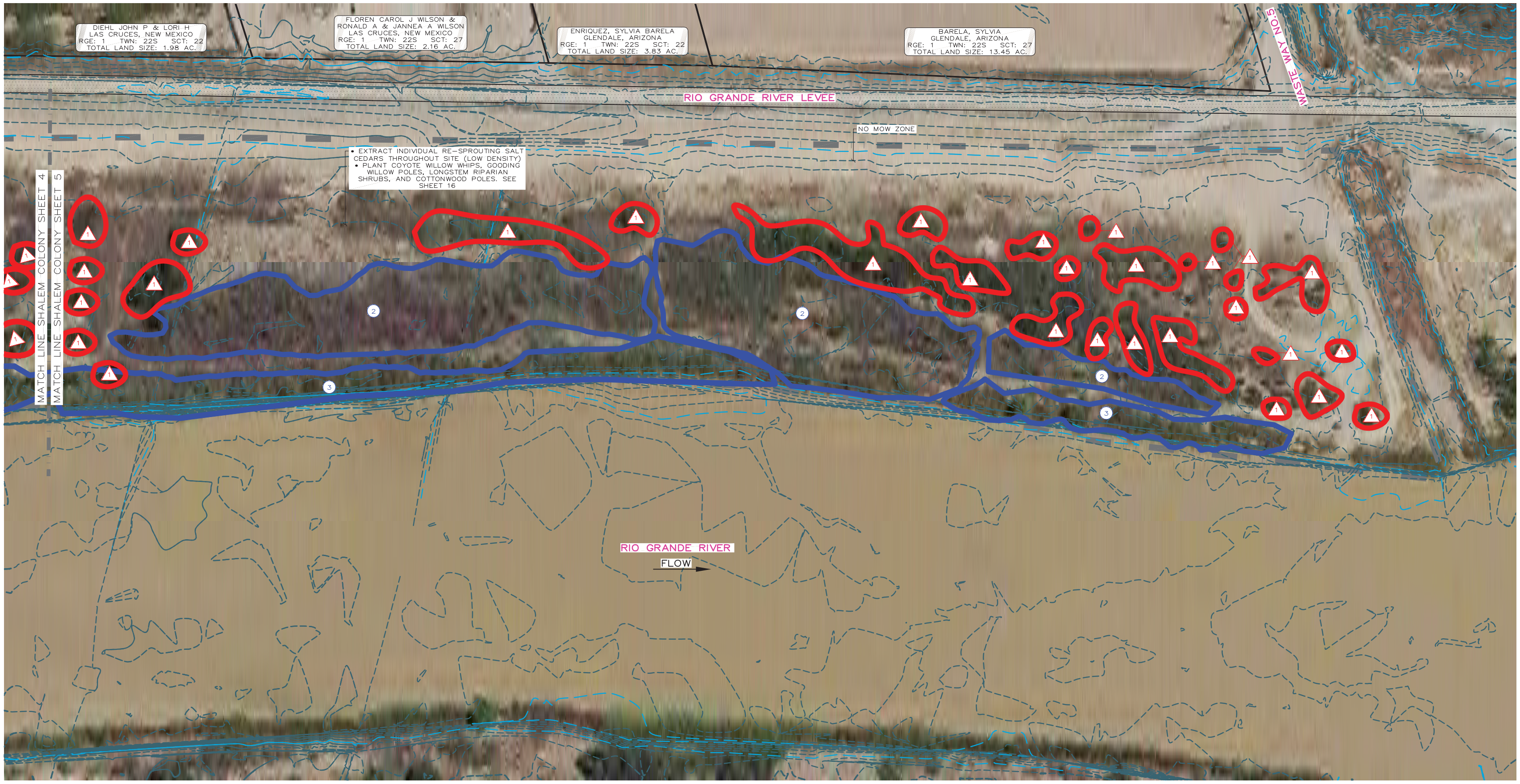
Date : 2017/12/15
T.O. # 14020-023.004
Engineer : M.Dublin
Drawn by : G. Chavez
Checked by : A. Guerra

Engineer's Stamp

IDEALS, inc
848 W. HADLEY AVENUE
LAS CRUCES, NM 88005
WEBSITE:www.ideals-inc.com
PHONE:575-532-9652 FAX:575-532-5045

Sheet Number
4
OF 21

Date: Dec 11, 2017 - 2:10pm User Name:
Drawing File: Y:\000\000\000 IBWC Rivet Restoration Project\Dwg\Rio Grande Restoration Project - North Site - Drew.dwg
Layout Name: Sht-4



SITE 17 - SHALEM COLONY SITE PLAN

SCALE: 1" = 40'

40 0 40 80
20 60

SCALE: 1"=40'

SITE 17 – SHALEM COLONY SHEET MAP

NOT TO SCALE

Date: Dec 11, 2017 - 3:12pm User:Nathan
Drawing File: Y:\000000-000 IBWC River Restoration Project\Dwg\Rio Grande Restoration Project - North Site - Drew.dwg
Layout Name: Sh-5

PROJECT LEGEND

	PROJECT LIMITS (ALREADY HAVE IDENTIFIED)
	RIO GRANDE FLOODWAY BOUNDARY
	RIVER LEVEE
	MULTI-USE PATH
	APPARENT PROPERTY BOUNDARY
	MONITORING WELL
3915	EXISTING MAJOR CONTOUR
3914	EXISTING MINOR CONTOUR

EXISTING PLANT SPECIES TO BE TRANSPLANTED (EPS–T)

1. COYOTE WILLOW
2. PYRUS

EXISTING PLANT SPECIES TO BE REMOVED (EPS–R)

1. SALTCEDAR
2. RUSSIAN OLIVE
3. KOCHIA
4. GIANT CANE
5. EXOTIC PHRAGMITES
6. MESQUITE

EXISTING PLANT SPECIES TO BE PROTECTED (EPS–P)

1. COTTONWOOD
2. MESQUITE
3. COYOTE WILLOW
4. ACACIA
5. BACCHARIS
6. CAT TAIL

Texas811 Know what's below. Call before you dig.

New Mexico One Call, Inc. Call 2 days before you dig! NMOC Dial 811 or 1-800-321-2537

Disclaimer

Upon acceptance of these plans for construction, the contractor agrees to familiarize himself with the project and verify the location and correctness of any and all appurtenances, right-of-way, property lines, elevations, obstructions, hazards, or conflicts that may exist upon examination of actual field conditions. design of these plans was based on available information and interpretation of available data. any discrepancies discovered, shall be immediately brought to the attention of the engineer for evaluation, the contractor shall accept all liability and risks for construction proceeding prior to engineers evaluation.

N

~RIO GRANDE~
~RESTORATION PROJECT~
~ SITE 17 - SHALEM COLONY ~

Plan Revisions

Date : 2017/12/15
T.O. # 14029-022.004
Engineer : M.Dubbin
Drawn by : G. Chavez
Checked by : A. Guerra

Engineer's Stamp

IDEALS, inc
848 W. HADLEY AVENUE
LAS CRUCES, NM 88005
WEBSITE:www.ideals-inc.com
PHONE:575-532-9652 FAX:575-532-5045

Sheet Number

5

OF 21

SITE 24 - VINTON A SITE PLAN

SCALE: 1" = 40'

40 0 40 80

20 60

SCALE: 1"=40'

EXISTING PLANT SPECIES TO BE TRANSPLANTED (EPS-T)

1. COYOTE WILLOW
2. PYRUS

EXISTING PLANT SPECIES TO BE REMOVED (EPS-R)

1. SALTCEDAR
2. RUSSIAN OLIVE
3. KOCHIA
4. GIANT CANE
5. EXOTIC PHRAGMITES
6. MESQUITE

EXISTING PLANT SPECIES TO BE PROTECTED (EPS-P)

1. COTTONWOOD
2. MESQUITE
3. COYOTE WILLOW
4. ACACIA
5. BACCHARIS
6. CAT TAIL

PROJECT LEGEND

PROJECT LIMITS (ALREADY HAVE IDENTIFIED)
RIO GRANDE FLOODWAY BOUNDARY
RIVER LEVEE
MULTI-USE PATH
APPARENT PROPERTY BOUNDARY
MONITORING WELL
3915 EXISTING MAJOR CONTOUR
3914 EXISTING MINOR CONTOUR

SITE 24 – VINTON A SHEET MAP

NOT TO SCALE

Date: Dec 11, 2017 - 3:19pm User:Nathan
Drawing File: Y:\000000-000 IBWC River Restoration Project\Dwg\Rio Grande Restoration Project - North Site - Drew.dwg
Layout Name: VA-6

Texas811 Know what's below. Call before you dig.

New Mexico One Call, Inc. Call 2 days before you dig! Dial 811 or 1-800-321-2537
NM1C Professional Resources for Damage Prevention

Disclaimer

Upon acceptance of these plans for construction, the contractor agrees to familiarize himself with the project and verify the location and correctness of any and all appurtenances, right-of-way, property lines, elevations, obstructions, hazards, or conflicts that may exist upon examination of actual field conditions. design of these plans was based on available information and interpretation of available data. any discrepancies discovered, shall be immediately brought to the attention of the engineer for evaluation, the contractor shall accept all liability and risks for construction proceeding prior to engineers evaluation.

~RIO GRANDE~
~RESTORATION PROJECT~
~ SITE 24 - VINTON-A ~

Plan Revisions

Date : 2017/12/15
T.O. # 14029-022.004
Engineer : M.Dubbin
Drawn by : G. Chavez
Checked by : A. Guerra

Engineer's Stamp

IDEALS, inc
848 W. HADLEY AVENUE
LAS CRUCES, NM 88005
WEBSITE:www.ideals-inc.com
PHONE:575-532-9652 FAX:575-532-5045

SITE 24 - VINTON A SITE PLAN

SCALE: 1" = 40'

40 0 40 80
20 60

SCALE: 1"=40'

EXISTING PLANT SPECIES TO BE TRANSPLANTED (EPS-T)

1. COYOTE WILLOW
2. PYRUS

EXISTING PLANT SPECIES TO BE REMOVED (EPS-R)

1. SALTCEDAR
2. RUSSIAN OLIVE
3. KOCHIA
4. GIANT CANE
5. EXOTIC PHRAGMITES
6. MESQUITE

EXISTING PLANT SPECIES TO BE PROTECTED (EPS-P)

1. COTTONWOOD
2. MESQUITE
3. COYOTE WILLOW
4. ACACIA
5. BACCHARIS
6. CAT TAIL

PROJECT LEGEND

PROJECT LIMITS (ALREADY HAVE IDENTIFIED)
RIO GRANDE FLOODWAY BOUNDARY
RIVER LEVEE
MULTI-USE PATH
APPARENT PROPERTY BOUNDARY
MONITORING WELL
3915 EXISTING MAJOR CONTOUR
3914 EXISTING MINOR CONTOUR

SITE 24 - VINTON A SHEET MAP

NOT TO SCALE

Date: Dec 11, 2017 - 3:22pm User:Nathan
Drawing File: Y:\000000-000 IBWC River Restoration Project\Dwg\Rio Grande Restoration Project - North Site - Drew.dwg
Layout Name: VA-7

Texas 811 Know what's below. Call before you dig.

New Mexico One Call, Inc. Call 2 days before you dig! NMOC Dial 811 or 1-800-321-2537 Professional Resources for Damage Prevention

Disclaimer

Upon acceptance of these plans for construction, the contractor agrees to familiarize himself with the project and verify the location and correctness of any and all appurtenances, right-of-way, property lines, elevations, obstructions, hazards, or conflicts that may exist upon examination of actual field conditions. design of these plans was based on available information and interpretation of available data. any discrepancies discovered, shall be immediately brought to the attention of the engineer for evaluation, the contractor shall accept all liability and risks for construction proceeding prior to engineers evaluation.

~RIO GRANDE~
~RESTORATION PROJECT~
~ SITE 24 -VINTON-A ~

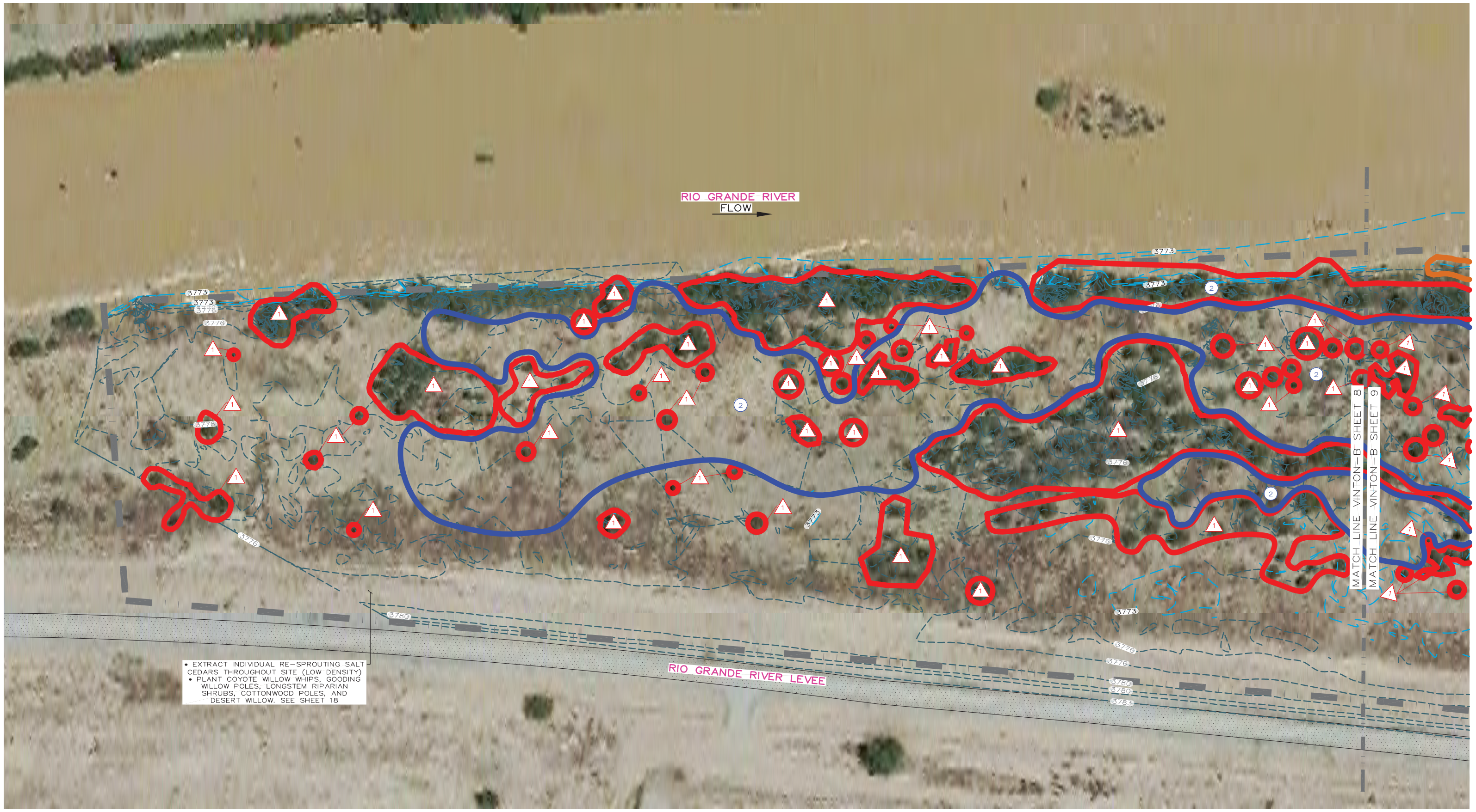
Plan Revisions

Date : 2017/12/15
T.O. # 14029-022.004
Engineer : M.Dubbin
Drawn by : G. Chavez
Checked by : A. Guerra

Engineer's Stamp

IDEALS, inc
848 W. HADLEY AVENUE
LAS CRUCES, NM 88005
WEBSITE:www.ideals-inc.com
PHONE:575-532-9652 FAX:575-532-5045

Sheet Number
7
OF 21



SITE 25 - VINTON B SITE PLAN

SCALE: 1" = 40'

40 0 20 40 60 80

SCALE: 1"=40'

EXISTING PLANT SPECIES TO BE TRANSPLANTED (EPS-T)

1. COYOTE WILLOW
2. PYRUS

EXISTING PLANT SPECIES TO BE REMOVED (EPS-R)

1. SALTCEDAR
2. RUSSIAN OLIVE
3. KOCHIA
4. GIANT CANE
5. EXOTIC PHRAGMITES
6. MESQUITE

EXISTING PLANT SPECIES TO BE PROTECTED (EPS-P)

1. COTTONWOOD
2. MESQUITE
3. COYOTE WILLOW
4. ACACIA
5. BACCHARIS
6. CAT TAIL

PROJECT LEGEND

PROJECT LIMITS (ALREADY HAVE IDENTIFIED)
RIO GRANDE FLOODWAY BOUNDARY
RIVER LEVEE
MULTI-USE PATH
APPARENT PROPERTY BOUNDARY
MONITORING WELL
3915 EXISTING MAJOR CONTOUR
3914 EXISTING MINOR CONTOUR

VINTON B SHEET MAP

NOT TO SCALE

Date: Dec 11, 2017 - 3:25pm User:Nathan
Drawing File: Y:\000000-000 IBWC River Restoration Project\Dwg\Rio Grande Restoration Project - North Site - Drew.dwg
Layout Name: VB-8

Texas811 Know what's below. Call before you dig.

New Mexico One Call, Inc. NM1C Call 2 days before you dig! Dial 811 or 1-800-321-2537

Disclaimer

Upon acceptance of these plans for construction, the contractor agrees to familiarize himself with the project and verify the location and correctness of any and all appurtenances, right-of-way, property lines, elevations, obstructions, hazards, or conflicts that may exist upon examination of actual field conditions. design of these plans was based on available information and interpretation of available data. any discrepancies discovered, shall be immediately brought to the attention of the engineer for evaluation, the contractor shall accept all liability and risks for construction proceeding prior to engineers evaluation.

~RIO GRANDE~
~RESTORATION PROJECT~
~ SITE 25 -VINTON-B ~

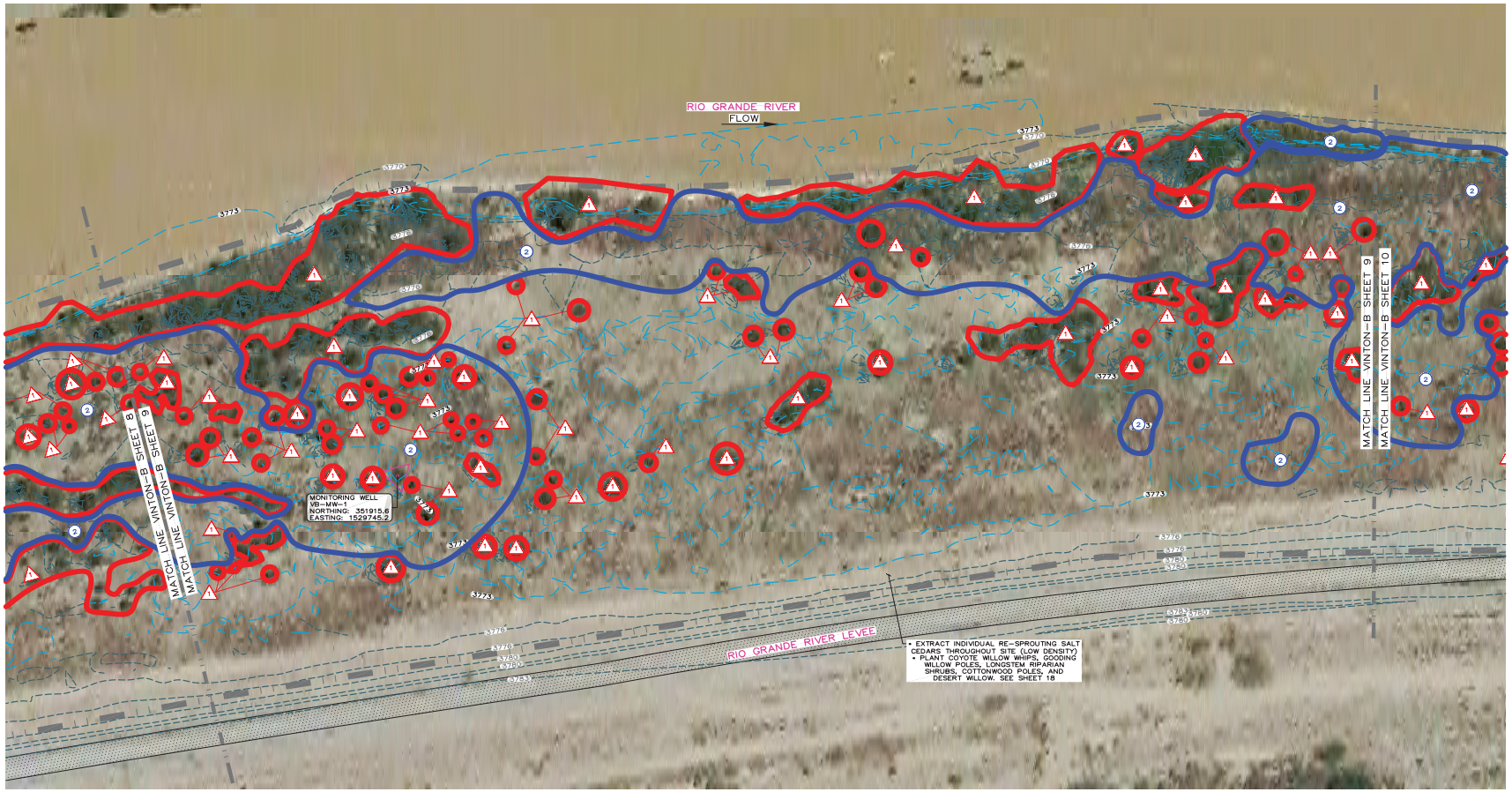
Plan Revisions

Date : 2017/12/15
T.O. # 141029-022.004
Engineer : M.Dubbin
Drawn by : G. Chavez
Checked by : A. Guerra

Engineer's Stamp

IDEALS, inc
848 W. HADLEY AVENUE
LAS CRUCES, NM 88005
WEBSITE:www.ideals-inc.com
PHONE:575-532-9652 FAX:575-532-5045

Sheet Number
8
OF 21



SITE 25 - VINTON B SITE PLAN

SCALE: 1" = 40'

40 0 40 80

20 60

SCALE: 1"=40'

PROJECT LEGEND

- PROJECT LIMITS (ALREADY HAVE IDENTIFIED)
- RIO GRANDE FLOODWAY BOUNDARY
- RIVER LEVEE
- MULTI-USE PATH
- APPARENT PROPERTY BOUNDARY
- MONITORING WELL
- 3915 EXISTING MAJOR CONTOUR
- 3914 EXISTING MINOR CONTOUR

EXISTING PLANT SPECIES TO BE TRANSPLANTED (EPS-T)

1. COYOTE WILLOW
2. PYRUS

EXISTING PLANT SPECIES TO BE REMOVED (EPS-R)

1. SALTCEDAR
2. RUSSIAN OLIVE
3. KOCHIA
4. GIANT CANE
5. EXOTIC PHRAGMITES
6. MESQUITE

EXISTING PLANT SPECIES TO BE PROTECTED (EPS-P)

1. COTTONWOOD
2. MESQUITE
3. COYOTE WILLOW
4. ACACIA
5. BACCHARIS
6. CAT TAIL

VINTON B SHEET MAP

NOT TO SCALE

Disclaimer

Upon acceptance of these plans for construction, the contractor agrees to familiarize himself with the project and verify the location and correctness of any and all appurtenances, right-of-way, property lines, elevations, obstructions, hazards, or conflicts that may exist upon examination of actual field conditions. design of these plans was based on available information and interpretation of available data. any discrepancies discovered, shall be immediately brought to the attention of the engineer for evaluation, the contractor shall accept all liability and risks for construction proceeding prior to engineers evaluation.

Texas 811 Know what's below. Call before you dig.

New Mexico One Call, Inc. Call 2 days before you dig! Dial 811 or 1-800-321-2537

N

~RIO GRANDE~
~RESTORATION PROJECT~
~ SITE 25 -VINTON-B ~

Plan Revisions

Date : 2017/12/15
T.O. # 14020-023.004
Engineer : M.Dubbin
Drawn by : G. Chavez
Checked by : A. Guerra

Engineer's Stamp

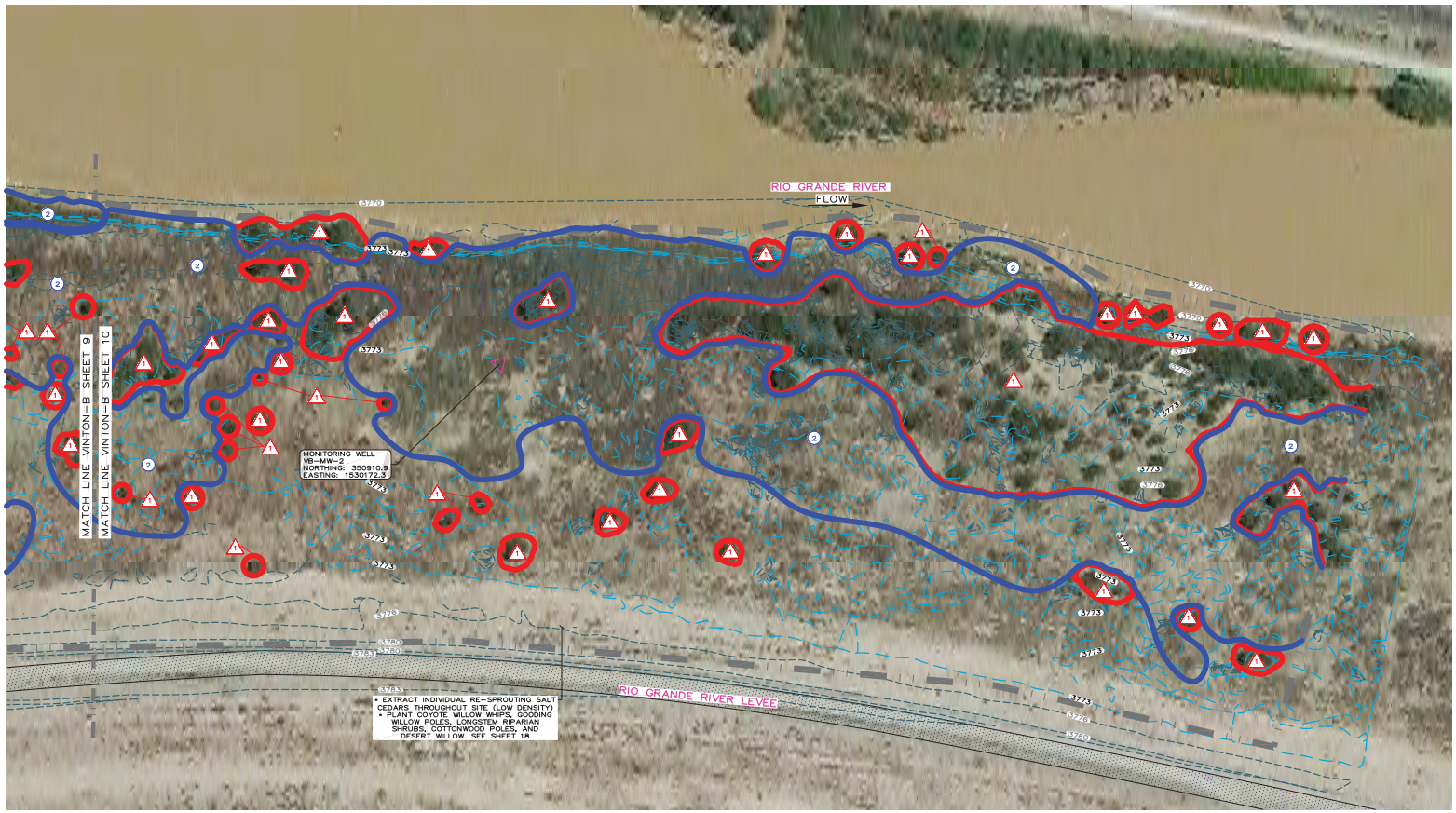
IDEALS, inc
848 W. HADLEY AVENUE
LAS CRUCES, NM 88005
WEBSITE:www.ideals-inc.com
PHONE:575-532-9652 FAX:575-532-9045

Sheet Number

9

OF 21

Date: Dec 11, 2017 - 2:27pm User Name:
Drawing File: Y:\000\000\000 IBWC Rio\2 Restoration Project\Dwg\Rio Grande Restoration Project - North Site - Drew.dwg
Layout Name: VB-9



SITE 25 - VINTON B SITE PLAN

SCALE: 1" = 40'

40 0 40 80

20 60

SCALE: 1"=40'

VINTON B SHEET MAP

NOT TO SCALE

PROJECT LEGEND

- PROJECT LIMITS (ALREADY HAVE IDENTIFIED)
- RIO GRANDE FLOODWAY BOUNDARY
- RIVER LEVEE
- MULTI-USE PATH
- APPARENT PROPERTY BOUNDARY
- MONITORING WELL
- EXISTING MAJOR CONTOUR (3915)
- EXISTING MINOR CONTOUR (3914)

EXISTING PLANT SPECIES TO BE TRANSPLANTED (EPS-T)

1. COYOTE WILLOW
2. PYRUS

EXISTING PLANT SPECIES TO BE REMOVED (EPS-R)

1. SALTCEDAR
2. RUSSIAN OLIVE
3. KOCHIA
4. GIANT CANE
5. EXOTIC PHRAGMITES
6. MESQUITE

EXISTING PLANT SPECIES TO BE PROTECTED (EPS-P)

1. COTTONWOOD
2. MESQUITE
3. COYOTE WILLOW
4. ACACIA
5. BACCHARIS
6. CAT TAIL

Texas 811 Know what's below. Call before you dig.

New Mexico One Call, Inc. Call 2 days before you dig! Dial 811 or 1-800-321-2537

Disclaimer

Upon acceptance of these plans for construction, the contractor agrees to familiarize himself with the project and verify the location and correctness of any and all appurtenances, right-of-way, property lines, elevations, obstructions, hazards, or conflicts that may exist upon examination of actual field conditions. design of these plans was based on available information and interpretation of available data. any discrepancies discovered, shall be immediately brought to the attention of the engineer for evaluation, the contractor shall accept all liability and risks for construction proceeding prior to engineers evaluation.

N

~RIO GRANDE~
~RESTORATION PROJECT~
~ SITE 25 -VINTON-B ~

Plan Revisions

Date : 2017/12/15
T.O. # 14020-023.004
Engineer : M.Dubbin
Drawn by : G. Chavez
Checked by : A. Guerra

Engineer's Stamp

IDEALS, inc
848 W. HADLEY AVENUE
LAS CRUCES, NM 88005
WEBSITE:www.ideals-inc.com
PHONE:575-532-9652 FAX:575-532-5045

Sheet Number

10

OF 22

Date: Dec 11, 2017 - 1:50pm User:Nathan
Drawing File: Y:\000\000\000 BWC River Restoration Project\Dwg\Rio Grande Restoration Project - North Site - Drew.dwg
Layout Name: VB-10

SITE 26 - VALLEY CREEK SITE PLAN

SCALE: 1" = 40'

SCALE: 1"=40'

VALLEY CREEK SHEET MAP

NOT TO SCALE

PROJECT LEGEND

PROJECT LIMITS (ALREADY HAVE IDENTIFIED)
RIO GRANDE FLOODWAY BOUNDARY
RIVER LEVEE
MULTI-USE PATH
APPARENT PROPERTY BOUNDARY
MONITORING WELL
EXISTING MAJOR CONTOUR
EXISTING MINOR CONTOUR

EXISTING PLANT SPECIES TO BE TRANSPLANTED (EPS-T)

1. COYOTE WILLOW
2. PYRUS

EXISTING PLANT SPECIES TO BE REMOVED (EPS-R)

1. SALTCEDAR
2. RUSSIAN OLIVE
3. KOCHIA
4. GIANT CANE
5. EXOTIC PHRAGMITES
6. MESQUITE

EXISTING PLANT SPECIES TO BE PROTECTED (EPS-P)

1. COTTONWOOD
2. MESQUITE
3. COYOTE WILLOW
4. ACACIA
5. BACCHARIS
6. CAT TAIL

Texas811 Know what's below. Call before you dig.

New Mexico One Call, Inc. NMOC Call 2 days before you dig! Dial 811 or 1-800-321-2537

Disclaimer

Upon acceptance of these plans for construction, the contractor agrees to familiarize himself with the project and verify the location and correctness of any and all appurtenances, right-of-way, property lines, elevations, obstructions, hazards, or conflicts that may exist upon examination of actual field conditions. design of these plans was based on available information and interpretation of available data. any discrepancies discovered, shall be immediately brought to the attention of the engineer for evaluation, the contractor shall accept all liability and risks for construction proceeding prior to engineers evaluation.

~RIO GRANDE~
~RESTORATION PROJECT~
~ SITE 26 -VALLEY CREEK ~

Plan Revisions

Date : 2017/12/15
T.O. # 14029-022.004
Engineer : M.Dubbin
Drawn by : G. Chavez
Checked by : A. Guerra

Engineer's Stamp

IDEALS, inc
848 W. HADLEY AVENUE
LAS CRUCES, NM 88005
WEBSITE:www.ideals-inc.com
PHONE:575-532-9652 FAX:575-532-5045

Sheet Number
11
OF 21

Date: Dec 11, 2017 - 3:31pm User:Nathan
Drawing File: Y:\00000-000 IBWC River Restoration Project\Dwg\Rio Grande Restoration Project - North Site - Drew.dwg
Layout Name: VC-11

SITE 26 - VALLEY CREEK SITE PLAN

SCALE: 1" = 40'

SCALE: 1"=40'

PROJECT LEGEND

- PROJECT LIMITS (ALREADY HAVE IDENTIFIED)
- RIO GRANDE FLOODWAY BOUNDARY
- RIVER LEVEE
- MULTI–USE PATH
- APPARENT PROPERTY BOUNDARY
- MONITORING WELL
- 3915 EXISTING MAJOR CONTOUR
- 3914 EXISTING MINOR CONTOUR

EXISTING PLANT SPECIES TO BE TRANSPLANTED (EPS–T)

1. COYOTE WILLOW
2. PYRUS

EXISTING PLANT SPECIES TO BE REMOVED (EPS–R)

1. SALTCEDAR
2. RUSSIAN OLIVE
3. KOCHIA
4. GIANT CANE
5. EXOTIC PHRAGMITES
6. MESQUITE

EXISTING PLANT SPECIES TO BE PROTECTED (EPS–P)

1. COTTONWOOD
2. MESQUITE
3. COYOTE WILLOW
4. ACACIA
5. BACCHARIS
6. CAT TAIL

VALLEY CREEK SHEET MAP
NOT TO SCALE

Date: Dec 11, 2017 - 3:33pm User:Nathan
Drawing File: Y:\000000-000 IBWC River Restoration Project\Dwg\Rio Grande Restoration Project - North Site - Drew.dwg
Layout Name: VC-12

Disclaimer

Upon acceptance of these plans for construction, the contractor agrees to familiarize himself with the project and verify the location and correctness of any and all appurtenances, right-of-way, property lines, elevations, obstructions, hazards, or conflicts that may exist upon examination of actual field conditions. design of these plans was based on available information and interpretation of available data. any discrepancies discovered, shall be immediately brought to the attention of the engineer for evaluation, the contractor shall accept all liability and risks for construction proceeding prior to engineers evaluation.

N

~RIO GRANDE~
~RESTORATION PROJECT~
~ SITE 26 -VALLEY CREEK ~

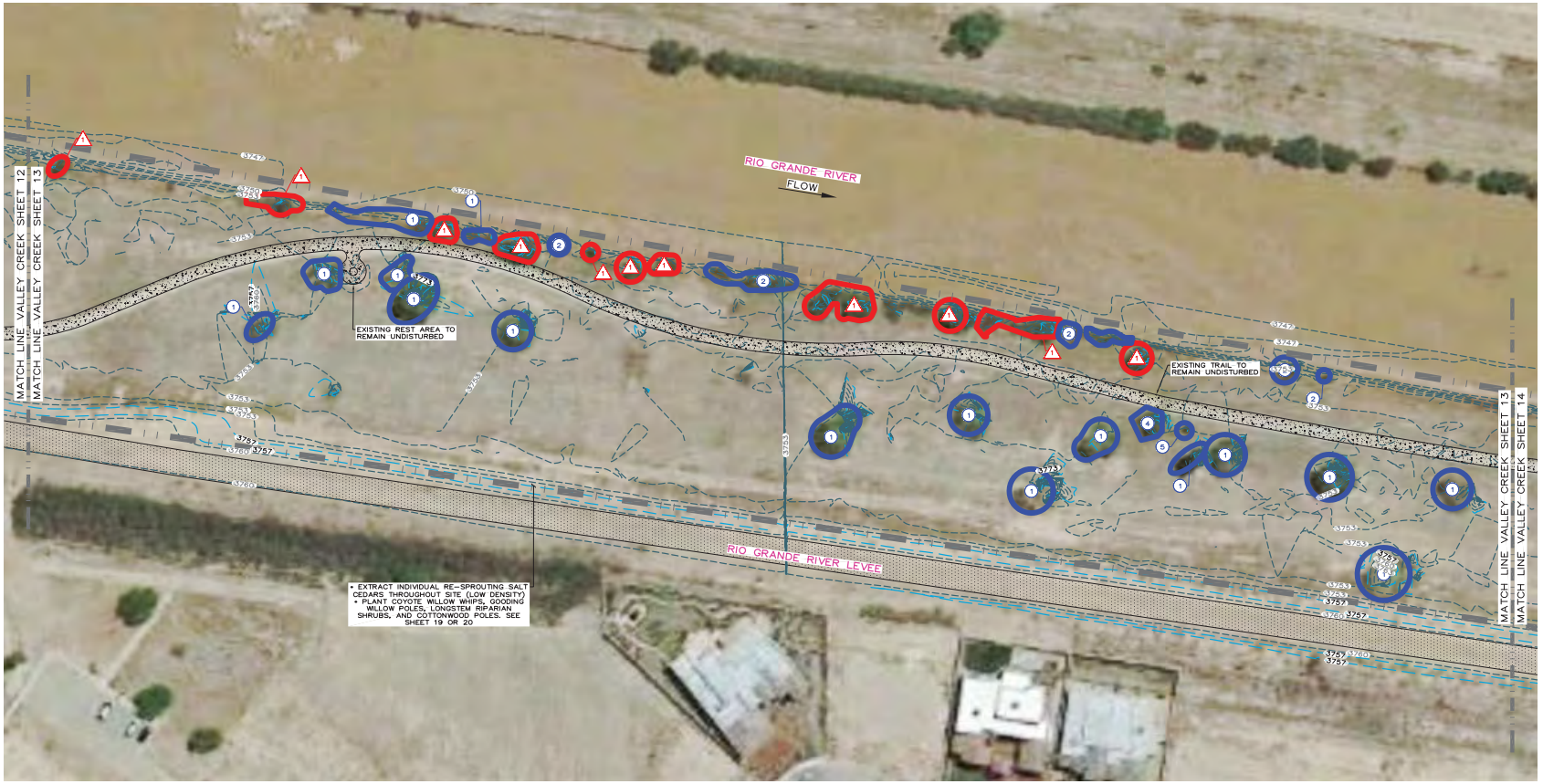
Plan Revisions

Date : 2017/12/15
T.O. # 14029-022.004
Engineer : M.Dubbin
Drawn by : G. Chavez
Checked by : A. Guerra

Engineer's Stamp

IDEALS, inc
848 W. HADLEY AVENUE
LAS CRUCES, NM 88005
WEBSITE:www.ideals-inc.com
PHONE:575-532-9652 FAX:575-532-5045

Sheet Number
12
OF 21



SITE 26 - VALLEY CREEK SITE PLAN

SCALE: 1" = 40'

40 0 40 80

20 60

SCALE: 1"=40'

VALLEY CREEK SHEET MAP

NOT TO SCALE

PROJECT LEGEND

- PROJECT LIMITS (ALREADY HAVE IDENTIFIED)
- RIO GRANDE FLOODWAY BOUNDARY
- RIVER LEVEE
- MULTI-USE PATH
- APPARENT PROPERTY BOUNDARY
- MONITORING WELL
- 3915 EXISTING MAJOR CONTOUR
- 3914 EXISTING MINOR CONTOUR

EXISTING PLANT SPECIES TO BE TRANSPLANTED (EPS-T)

1. COYOTE WILLOW
2. PYRUS

EXISTING PLANT SPECIES TO BE REMOVED (EPS-R)

1. SALTCEDAR
2. RUSSIAN OLIVE
3. KOCHIA
4. GIANT CANE
5. EXOTIC PHRAGMITES
6. MESQUITE

EXISTING PLANT SPECIES TO BE PROTECTED (EPS-P)

1. COTTONWOOD
2. MESQUITE
3. COYOTE WILLOW
4. ACACIA
5. BACCHARIS
6. CAT TAIL

Texas 811 Know what's below. Call before you dig.

New Mexico One Call, Inc. Call 2 days before you dig! Dial 811 or 1-800-321-2537

Disclaimer

Upon acceptance of these plans for construction, the contractor agrees to familiarize himself with the project and verify the location and correctness of any and all appurtenances, right-of-way, property lines, elevations, obstructions, hazards, or conflicts that may exist upon examination of actual field conditions. design of these plans was based on available information and interpretation of available data. any discrepancies discovered, shall be immediately brought to the attention of the engineer for evaluation, the contractor shall accept all liability and risks for construction proceeding prior to engineers evaluation.

N

~RIO GRANDE~
~RESTORATION PROJECT~
~ SITE 26 -VALLEY CREEK ~

Plan Revisions

Date : 2017/12/15
T.O. # 14020-023.004
Engineer : M.Dubbin
Drawn by : G. Chavez
Checked by : A. Guerra

Engineer's Stamp

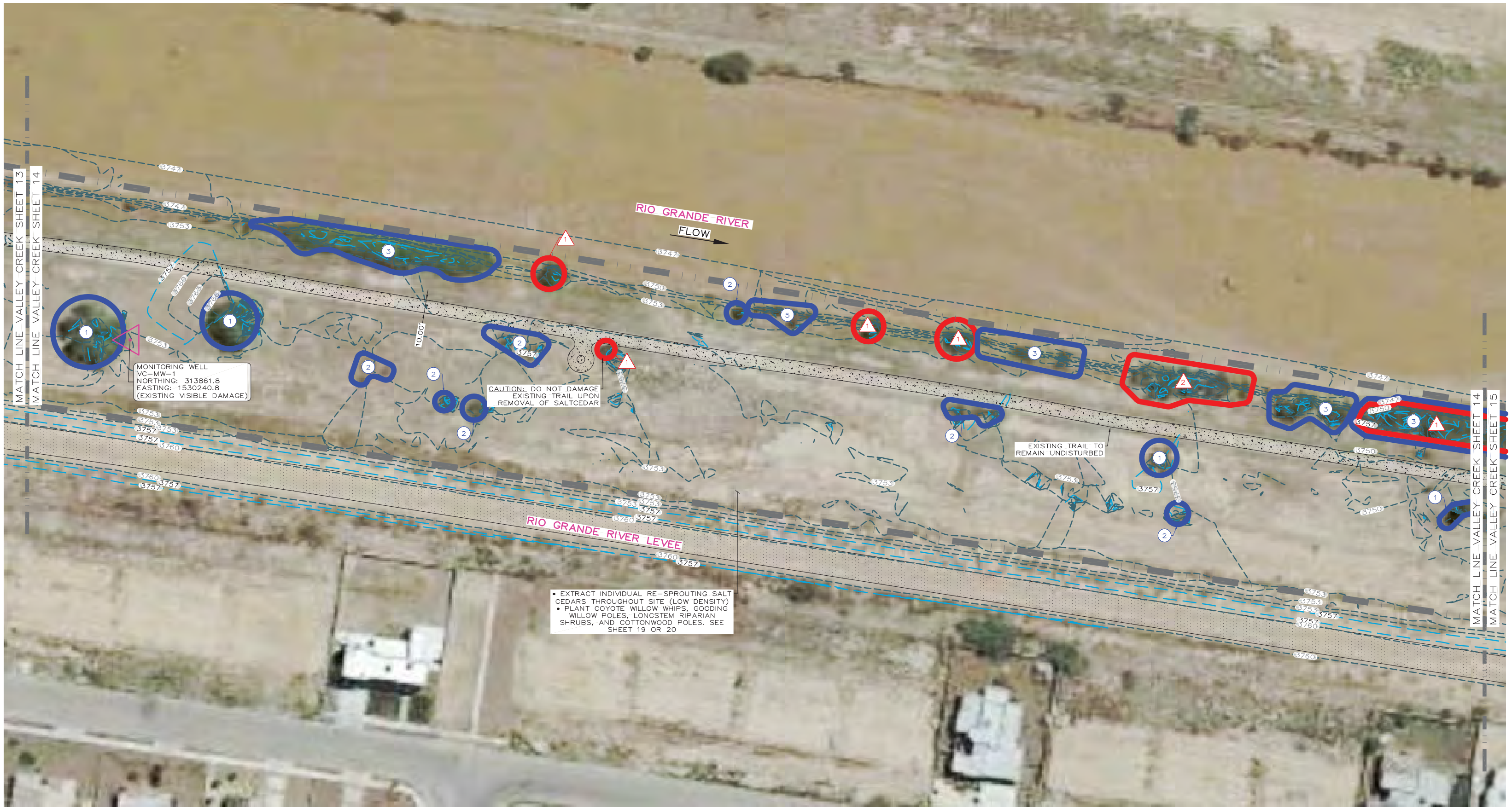
IDEALS, inc
848 W. HADLEY AVENUE
LAS CRUCES, NM 88005
WEBSITE:www.ideals-inc.com
PHONE:575-532-9652 FAX:575-532-5045

Sheet Number

13

OF 21

Date: Dec 11, 2017 - 2:39pm User Name:
Drawing File: Y:\000\000\300 BWC River Restoration Project\Dwg\Rio Grande Restoration Project - North Site - Drew.dwg
Layout Name: VC-13



SITE 26 - VALLEY CREEK SITE MAP

SCALE: 1" = 40'

40 0 40 80

20 60

SCALE: 1"=40'

EXISTING PLANT SPECIES TO BE TRANSPLANTED (EPS-T)

1. COYOTE WILLOW
2. PYRUS

EXISTING PLANT SPECIES TO BE REMOVED (EPS-R)

1. SALTCEDAR
2. RUSSIAN OLIVE
3. KOCHIA
4. GIANT CANE
5. EXOTIC PHRAGMITES
6. MESQUITE

EXISTING PLANT SPECIES TO BE PROTECTED (EPS-P)

1. COTTONWOOD
2. MESQUITE
3. COYOTE WILLOW
4. ACACIA
5. BACCHARIS
6. CAT TAIL

PROJECT LEGEND

PROJECT LIMITS (ALREADY HAVE IDENTIFIED)
RIO GRANDE FLOODWAY BOUNDARY
RIVER LEVEE
MULTI-USE PATH
APPARENT PROPERTY BOUNDARY
MONITORING WELL
3915 EXISTING MAJOR CONTOUR
3914 EXISTING MINOR CONTOUR

VALLEY CREEK SHEET MAP

NOT TO SCALE

Date: Dec 11, 2017 - 3:38pm User:Nathan
Drawing File: Y:\00000-000 IBWC River Restoration Project\Dwg\Rio Grande Restoration Project - North Site - Drew.dwg
Layout Name: VC-14

Texas 811 Know what's below. Call before you dig.

New Mexico One Call, Inc. Call 2 days before you dig! NMOC Dial 811 or 1-800-321-2537

Disclaimer

Upon acceptance of these plans for construction, the contractor agrees to familiarize himself with the project and verify the location and correctness of any and all appurtenances, right-of-way, property lines, elevations, obstructions, hazards, or conflicts that may exist upon examination of actual field conditions. design of these plans was based on available information and interpretation of available data. any discrepancies discovered, shall be immediately brought to the attention of the engineer for evaluation, the contractor shall accept all liability and risks for construction proceeding prior to engineers evaluation.

N

~RIO GRANDE~
~RESTORATION PROJECT~
~ SITE 26 -VALLEY CREEK ~

Plan Revisions

Date : 2017/12/15
T.O. # 14029-022.004
Engineer : M.Dubbin
Drawn by : G. Chavez
Checked by : A. Guerra

Engineer's Stamp

IDEALS, inc
848 W. HADLEY AVENUE
LAS CRUCES, NM 88005
WEBSITE:www.ideals-inc.com
PHONE:575-532-9652 FAX:575-532-5045

Sheet Number

14

OF 21

SITE 26 - VALLEY CREEK SITE PLAN

SCALE: 1" = 40'

40 0 40 80

20 60

SCALE: 1"=40'

VALLEY CREEK SHEET MAP

NOT TO SCALE

PROJECT LEGEND

- PROJECT LIMITS (ALREADY HAVE IDENTIFIED)
- RIO GRANDE FLOODWAY BOUNDARY
- RIVER LEVEE
- MULTI-USE PATH
- APPARENT PROPERTY BOUNDARY
- MONITORING WELL
- 3915 EXISTING MAJOR CONTOUR
- 3914 EXISTING MINOR CONTOUR

EXISTING PLANT SPECIES TO BE TRANSPLANTED (EPS-T)

1. COYOTE WILLOW
2. PYRUS

EXISTING PLANT SPECIES TO BE REMOVED (EPS-R)

1. SALTCEDAR
2. RUSSIAN OLIVE
3. KOCHIA
4. GIANT CANE
5. EXOTIC PHRAGMITES
6. MESQUITE

EXISTING PLANT SPECIES TO BE PROTECTED (EPS-P)

1. COTTONWOOD
2. MESQUITE
3. COYOTE WILLOW
4. ACACIA
5. BACCHARIS
6. CAT TAIL

Texas 811 Know what's below. Call before you dig.

New Mexico One Call, Inc. NMOC Call 2 days before you dig! Dial 811 or 1-800-321-2537

Disclaimer

Upon acceptance of these plans for construction, the contractor agrees to familiarize himself with the project and verify the location and correctness of any and all appurtenances, right-of-way, property lines, elevations, obstructions, hazards, or conflicts that may exist upon examination of actual field conditions. design of these plans was based on available information and interpretation of available data. any discrepancies discovered, shall be immediately brought to the attention of the engineer for evaluation, the contractor shall accept all liability and risks for construction proceeding prior to engineers evaluation.

N

~RIO GRANDE~
~RESTORATION PROJECT~
~ SITE 26 -VALLEY CREEK ~

Plan Revisions

Date : 2017/12/15
T.O. # 14020-023.004
Engineer : M.Dubbin
Drawn by : G. Chavez
Checked by : A. Guerra

Engineer's Stamp

IDEALS, inc
848 W. HADLEY AVENUE
LAS CRUCES, NM 88005
WEBSITE:www.ideals-inc.com
PHONE:575-532-9652 FAX:575-532-5045

Sheet Number

15

OF 21

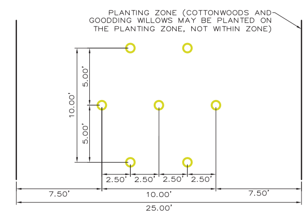
Date: Dec 11, 2017 - 2:40pm User:Nathan
Drawing File: Y:\000\000\000 BWC River Restoration Project\Dwg\Rio Grande Restoration Project - North Site - Drew.dwg
Layout Name: VC-15

SITE 17 - SHALEM COLONY PLANTING MAP

SCALE: 1" = 150'

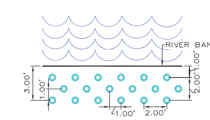
150 0 150 300
75 225

SCALE: 1"=150'



NOTE:
LONGSTEM SHRUBS PLACED PARALLEL TO PEDESTRIAN/BIKE PATH SHALL MAINTAIN 10.00' MINIMUM SEPARATION FROM CONCRETE EDGE.

LONGSTEM SHRUBS PLANT PATTERNS
NOT TO SCALE



NOTE:
COYOTE WILLOW STEMS TO BE BURIED 3'-0" (MIN) INTO GROUND USING 1" DIAMETER DRILL BIT, POWER AUGER, OR PUNCH BAR.

COYOTE WILLOW POLES PLANT PATTERNS
NOT TO SCALE

SITE 17 – SHALEM COLONY
NOT TO SCALE

MINIMUM NUMBER OF PLANTINGS AT EACH SITE							
SITE	GRASS AND FORB SEEDING (ACRES)	COYOTE WILLOW WHIPS	GOODING WILLOW POLES	COTTONWOOD POLES	LONGSTEM RIPARIAN SHRUBS	DESERT WILLOW / ARIZONA ASH	SALT CEDAR EXTRACTION (ACRES)
SHALEM COLONY	0	50	10	10	50	0/0	±1.27

Texas811 Know what's below. Call before you dig.

New Mexico One Call, Inc. NMOC Call 2 days before you dig! Dial 811 or 1-800-321-2537
Professional Resources for Damage Prevention

Disclaimer

Upon acceptance of these plans for construction, the contractor agrees to familiarize himself with the project and verify the location and correctness of any and all appurtenances, right-of-way, property lines, elevations, obstructions, hazards, or conflicts that may exist upon examination of actual field conditions. design of these plans was based on available information and interpretation of available data. any discrepancies discovered, shall be immediately brought to the attention of the engineer for evaluation, the contractor shall accept all liability and risks for construction proceeding prior to engineers evaluation.

N

~RIO GRANDE~
~RESTORATION PROJECT~
~ SITE 17 - SHALEM COLONY ~
~ PLANTING ~

Plan Revisions

Date : 2017/12/15
T.O. # 14029-022.004
Engineer : M.Dubbin
Drawn by : G. Chavez
Checked by : A. Guerra

Engineer's Stamp

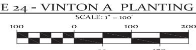
IDEALS, inc
848 W. HADLEY AVENUE
LAS CRUCES, NM 88005
WEBSITE:www.ideals-inc.com
PHONE:575-532-9652 FAX:575-532-5045

Sheet Number
16
OF 21

Date: Dec 11, 2017 – 3:50pm User:Nathan
Drawing File: Y:\000000-000 IBWC River Restoration Project\Dwg\North and South Planting Plans.dwg
Layout Name: SHA PLANT- 16

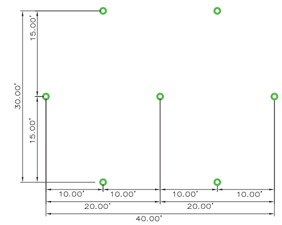
SITE 24 - VINTON A PLANTING MAP

SCALE: 1"=100'

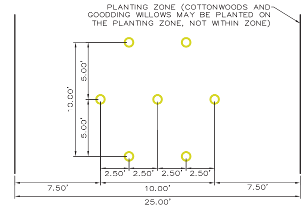


SCALE: 1"=100'

SITE 24 — VINTON A
NOT TO SCALE

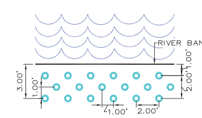


COTTONWOODS & GOODDING WILLOW PLANT PATTERNS
NOT TO SCALE



NOTE:
LONGSTEM SHRUBS PLACED PARALLEL TO PEDESTRIAN/BIKE PATH SHALL MAINTAIN 10.00' MINIMUM SEPARATION FROM CONCRETE EDGE.

LONGSTEM SHRUBS PLANT PATTERNS
NOT TO SCALE



NOTE:
COYOTE WILLOW STEMS TO BE BURIED 3'-0' (MIN) INTO GROUND USING 1" DIAMETER DRILL BIT, POWER AUGER, OR PUNCH BAR.

COYOTE WILLOW POLES PLANT PATTERNS
NOT TO SCALE

MINIMUM NUMBER OF PLANTINGS AT EACH SITE							
SITE	GRASS AND FORB SEEDING (ACRES)	COYOTE WILLOW WHIPS	GOODING WILLOW POLES	COTTONWOOD POLES	LONGSTEM RIPARIAN SHRUBS	DESERT WILLOW / ARIZONA ASH	SALT CEDAR EXTRACTION (ACRES)
VINTON A	0	2940	441	1029	1470	5/5	±4.60

Disclaimer

Upon acceptance of these plans for construction, the contractor agrees to familiarize himself with the project and verify the location and correctness of any and all appurtenances, right-of-way, property lines, elevations, obstructions, hazards, or conflicts that may exist upon examination of actual field conditions. design of these plans was based on available information and interpretation of available data. any discrepancies discovered, shall be immediately brought to the attention of the engineer for evaluation, the contractor shall accept all liability and risks for construction proceeding prior to engineers evaluation.

N

~RIO GRANDE~
~RESTORATION PROJECT~
~ SITE 24 - VINTON A ~
~ PLANTING ~

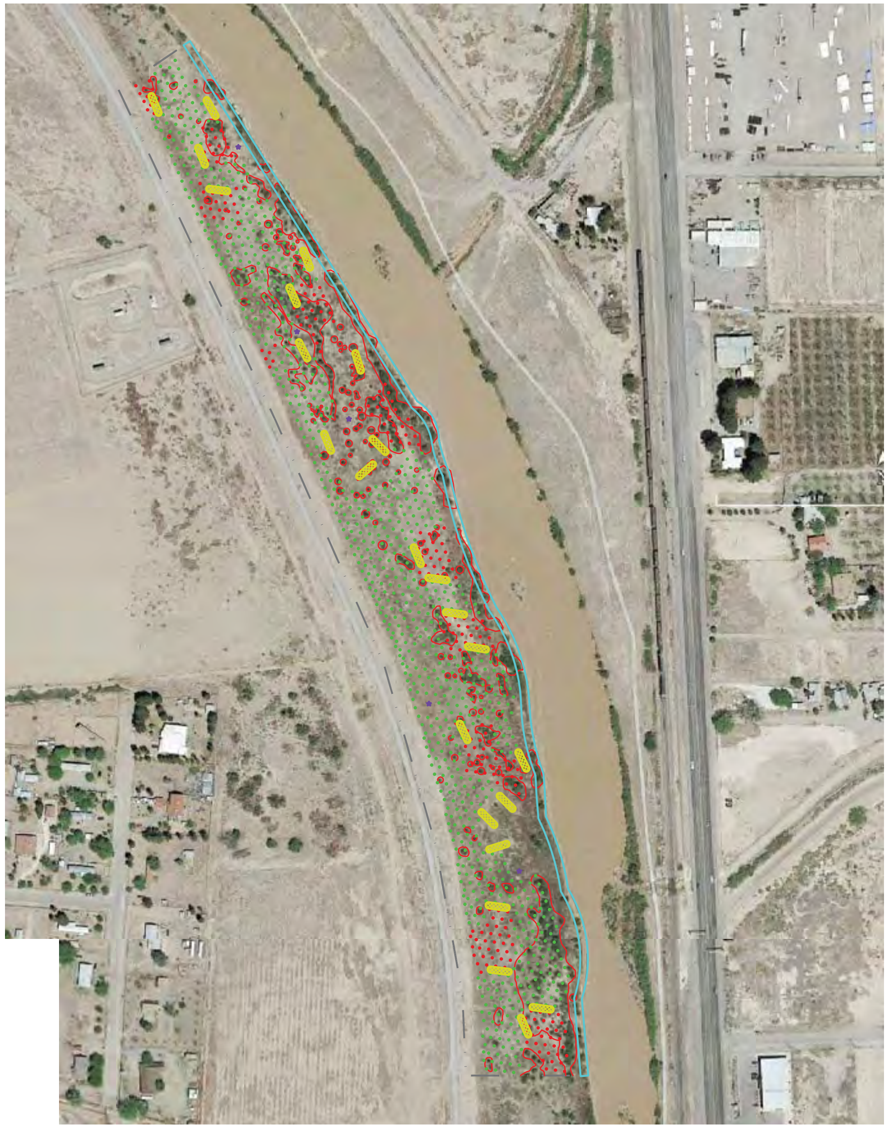
Plan Revisions

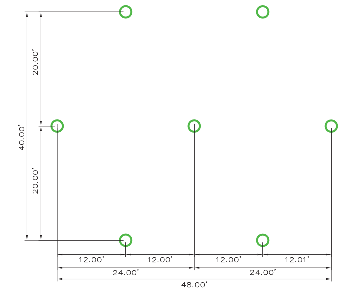
Date : 2017/12/15
T.O. # 14029-022.004
Engineer : M.Dubbin
Drawn by : G. Chavez
Checked by : A. Guerra

Engineer's Stamp

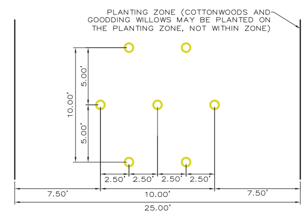
IDEALS, inc
848 W. HADLEY AVENUE
LAS CRUCES, NM 88005
WEBSITE:www.ideals-inc.com
PHONE:575-532-9652 FAX:575-532-5045

Date: Dec 11, 2017 - 3:52pm User:Nathan
Drawing File: Y:\000000-000 IBWC River Restoration Project\Dwg\North and South Planting Plans.dwg
Layout Name: VIN A PLANT- 17



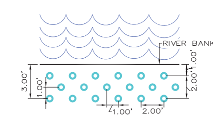


COTTONWOODS & GOODDING WILLOW PLANT PATTERNS
NOT TO SCALE



NOTE:
LONGSTEM SHRUBS PLACED PARALLEL TO PEDESTRIAN/BIKE PATH SHALL MAINTAIN 10.00' MINIMUM SEPARATION FROM CONCRETE EDGE.

LONGSTEM SHRUBS PLANT PATTERNS
NOT TO SCALE



NOTE:
COYOTE WILLOW STEMS TO BE BURIED 3'-0" (MIN) INTO GROUND USING 1" DIAMETER DRILL BIT, POWER AUGER, OR PUNCH BAR.

COYOTE WILLOW POLES PLANT PATTERNS
NOT TO SCALE

SITE 24 - VINTON B PLANTING MAP
SCALE: 1" = 100'
150 0 150 300
75 225
SCALE: 1"=150'

SITE 25 – VINTON B
NOT TO SCALE

Date: Dec 11, 2017 – 3:53pm User:Nathan
Drawing File: Y:\00000-000 IBWC River Restoration Project\Dwg\North and South Planting Plans.dwg
Layout Name: VN B PLANT- 18

MINIMUM NUMBER OF PLANTINGS AT EACH SITE							
SITE	GRASS AND FORB SEEDING (ACRES)	COYOTE WILLOW WHIPS	GOODING WILLOW POLES	COTTONWOOD POLES	LONGSTEM RIPARIAN SHRUBS	DESERT WILLOW / ARIZONA ASH	SALT CEDAR EXTRACTION (ACRES)
VINTON B	0	3000	200	800	1600	0/5	±3.91

Texas 811
Know what's below. Call before you dig.

New Mexico One Call, Inc. NMOC Call 2 days before you dig! Dial 811 or 1-800-321-2537
Professional Resources for Damage Prevention

Disclaimer

Upon acceptance of these plans for construction, the contractor agrees to familiarize himself with the project and verify the location and correctness of any and all appurtenances, right-of-way, property lines, elevations, obstructions, hazards, or conflicts that may exist upon examination of actual field conditions. design of these plans was based on available information and interpretation of available data. any discrepancies discovered, shall be immediately brought to the attention of the engineer for evaluation, the contractor shall accept all liability and risks for construction proceeding prior to engineers evaluation.

N

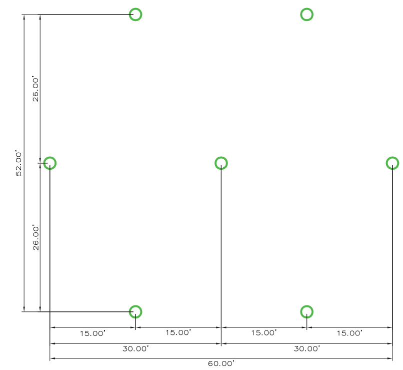
~RIO GRANDE~
~RESTORATION PROJECT~
~ SITE 25 - VINTON B ~
~ PLANTING ~

Plan Revisions

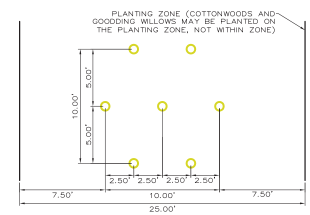
Date : 2017/12/15
T.O. # 14029-022.004
Engineer : M.Dubbin
Drawn by : G. Chavez
Checked by : A. Guerra

Engineer's Stamp

IDEALS, inc
848 W. HADLEY AVENUE
LAS CRUCES, NM 88005
WEBSITE:www.ideals-inc.com
PHONE:575-532-9652 FAX:575-532-5045

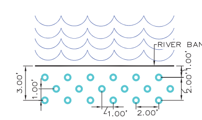


COTTONWOODS & GOODDING WILLOW PLANT PATTERNS
NOT TO SCALE



NOTE:
LONGSTEM SHRUBS PLACED PARALLEL TO PEDESTRIAN/BIKE PATH SHALL MAINTAIN 10.00' MINIMUM SEPARATION FROM CONCRETE EDGE.

LONGSTEM SHRUBS PLANT PATTERNS
NOT TO SCALE



NOTE:
COYOTE WILLOW STEMS TO BE BURIED 3'-0" (MIN) INTO GROUND USING 1" DIAMETER DRILL BIT, POWER AUGER, OR PUNCH BAR.

COYOTE WILLOW POLES PLANT PATTERNS
NOT TO SCALE

SITE 26 - VALLEY CREEK PLANTING MAP
SCALE: 1" = 100'
150 0 150 300
75 225
SCALE: 1"=150'

Date: Dec 11, 2017 - 3:56pm User:Nathan
Drawing File: Y:\00000-000 IBWC River Restoration Project\Dwg\North and South Planting Plans.dwg
Layout Name: VC PLANT- 19

VALLEY CREEK SHEET MAP
NOT TO SCALE

MINIMUM NUMBER OF PLANTINGS AT EACH SITE							
SITE	GRASS AND FORB SEEDING (ACRES)	COYOTE WILLOW WHIPS	GOODING WILLOW POLES	COTTONWOOD POLES	LONGSTEM RIPARIAN SHRUBS	DESERT WILLOW / ARIZONA ASH	SALT CEDAR EXTRACTION (ACRES)
VALLEY CREEK	0	1100	220	440	1000	10/10	±0.61

Texas 811
Know what's below. Call before you dig.

New Mexico One Call, Inc. NMOC Call 2 days before you dig! Dial 811 or 1-800-321-2537
Professional Resources for Damage Prevention

Disclaimer

Upon acceptance of these plans for construction, the contractor agrees to familiarize himself with the project and verify the location and correctness of any and all appurtenances, right-of-way, property lines, elevations, obstructions, hazards, or conflicts that may exist upon examination of actual field conditions. design of these plans was based on available information and interpretation of available data. any discrepancies discovered, shall be immediately brought to the attention of the engineer for evaluation, the contractor shall accept all liability and risks for construction proceeding prior to engineers evaluation.

N

~RIO GRANDE~
~RESTORATION PROJECT~
~ SITE 26 - VALLEY CREEK ~
~ PLANTING ~

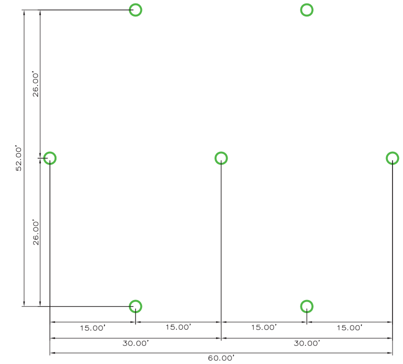
Plan Revisions

Date : 2017/12/15
T.O. # 14029-022.004
Engineer : M.Dubbin
Drawn by : G. Chavez
Checked by : A. Guerra

Engineer's Stamp

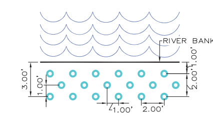
IDEALS, inc
848 W. HADLEY AVENUE
LAS CRUCES, NM 88005
WEBSITE:www.ideals-inc.com
PHONE:575-532-9652 FAX:575-532-5045

Sheet Number
19
OF 21



COTTONWOODS & GOODDING WILLOW PLANT PATTERNS
NOT TO SCALE

NOTE:
LONGSTEM SHRUBS PLACED PARALLEL TO PEDESTRIAN/BIKE PATH SHALL MAINTAIN 10.00' MINIMUM SEPARATION FROM CONCRETE EDGE.



NOTE:
COYOTE WILLOW STEMS TO BE BURIED 3'-0" (MIN) INTO GROUND USING 1" DIAMETER DRILL BIT, POWER AUGER, OR PUNCH BAR.

COYOTE WILLOW POLES PLANT PATTERNS
NOT TO SCALE

SITE 26 - VALLEY CREEK PLANTING MAP
SCALE: 1" = 100'
150 0 150 300
75 225
SCALE: 1"=150'

VALLEY CREEK SHEET MAP
NOT TO SCALE

MINIMUM NUMBER OF PLANTINGS AT EACH SITE							
SITE	GRASS AND FORB SEEDING (ACRES)	COYOTE WILLOW WHIPS	GOODING WILLOW POLES	COTTONWOOD POLES	LONGSTEM RIPARIAN SHRUBS	DESERT WILLOW / ARIZONA ASH	SALT CEDAR EXTRACTION (ACRES)
VALLEY CREEK	0	1100	220	440	1000	10/10	±0.61

Disclaimer

Upon acceptance of these plans for construction, the contractor agrees to familiarize himself with the project and verify the location and correctness of any and all appurtenances, right-of-way, property lines, elevations, obstructions, hazards, or conflicts that may exist upon examination of actual field conditions. design of these plans was based on available information and interpretation of available data. any discrepancies discovered, shall be immediately brought to the attention of the engineer for evaluation, the contractor shall accept all liability and risks for construction proceeding prior to engineers evaluation.

N

~RIO GRANDE~
~RESTORATION PROJECT~
~ SITE 26 - VALLEY CREEK ~
~ PLANTING ~

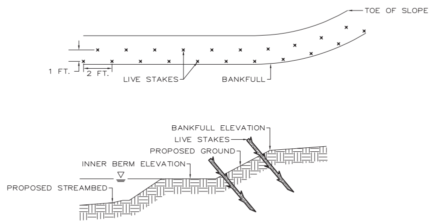
Plan Revisions

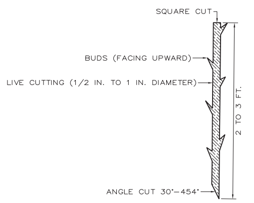
Date : 2017/12/15
T.O. # 14029-022.004
Engineer : M.Dubbin
Drawn by : G. Chavez
Checked by : A. Guerra

Engineer's Stamp

IDEALS, inc
848 W. HADLEY AVENUE
LAS CRUCES, NM 88005
WEBSITE:www.ideals-inc.com
PHONE:575-532-9652 FAX:575-532-5045

Date: Dec 11, 2017 - 3:57pm User:Nathan
Drawing File: Y:\00000-000 IBWC River Restoration Project\Dwg\North and South Planting Plans.dwg
Layout Name: VC PLANT- 20





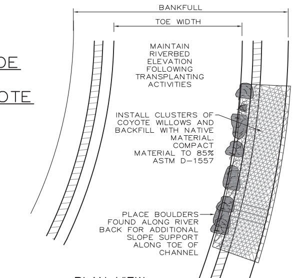
LIVE STAKE
SCALE: NOT TO SCALE

NOTES:

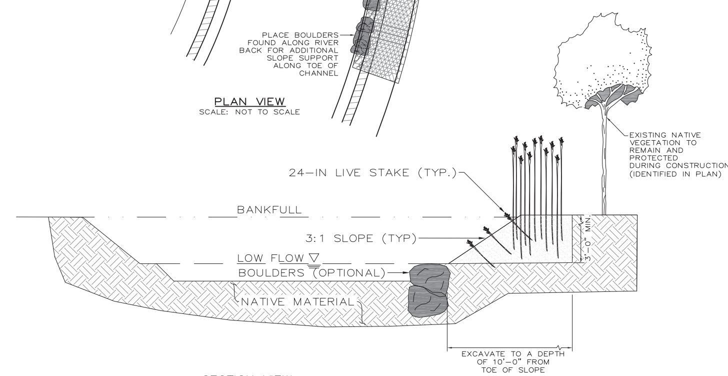
1. LIVE STAKES SHALL BE SPACED APPROXIMATELY 2' ON CENTER, WITH RANDOM SPACING, BETWEEN THE BANKFULL AND INTER BERM STAGE.
2. LIVE STAKES SHALL BE PLANTED ON BOTH SIDES OF RIFFLES AND ON THE OUTSIDE BANK OF POOLS.
3. LIVE STAKES SHALL BE DRIVEN UNTIL APPROXIMATELY 3/4 OF LIVE STAKE IS WITHIN GROUND.
4. A STARTER HOLE MAY BE REQUIRED IF STAKING THROUGH MATTING, ROCK OR COMPACTED SOILS.
5. IF STARTER HOLE IS NEEDED, MINIMIZE AIR POCKET.
6. ALL MATERIALS ARE TO BE APPROVED BY ENGINEER OR ENGINEER'S ONSITE CONSTRUCTION MANAGER.

DETAIL–LIVE STAKING (OPTIONAL)
SCALE: NOT TO SCALE

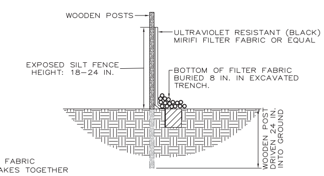
DETAIL–BOULDER TOE PREP FOR TRANSPLANTING COYOTE WILLOWS
SCALE: NOT TO SCALE



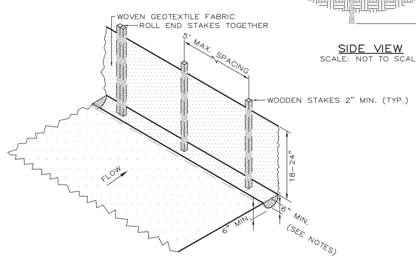
PLAN VIEW
SCALE: NOT TO SCALE



SECTION VIEW
SCALE: NOT TO SCALE



SIDE VIEW
SCALE: NOT TO SCALE

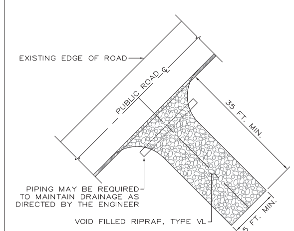


ISOMETRIC VIEW
SCALE: NOT TO SCALE

NOTES:

1. SILT FENCE SHALL BE INSTALLED ACROSS SLOPES ON THE CONTOUR LINE.
2. ATTACH FILTER FABRIC TO WOODEN STAKES WITH STAPLES, HOGRINGS OR OTHER MATERIALS APPROVED BY THE ENGINEER.
3. WOODEN STAKES SHALL BE INSTALLED ON THE DOWNHILL SIDE OF FILTER FABRIC.
4. BURY THE BOTTOM 12 INCHES OF FILTER FABRIC IN A 6"X6" TRENCH (TO PREVENT SEDIMENT FROM ESCAPING UNDER THE FENCE) AND BACK FILL WITH SOIL.
5. JOIN SILT FENCE SECTIONS BY ROLLING END STAKES TOGETHER TO CREATE AN UNBROKEN SEDIMENT BARRIER.
6. MULCH BERMS MAY BE APPROVED BY THE ENGINEER ON A CASE-BY-CASE BASIS.
7. SILT FENCE SHALL BE PLACE AROUND THE STAGING AND STOCKPILING AREA.
8. THE SILT FENCING PERIMETER SHALL BE CHECKED AFTER ALL RAIN EVENTS.

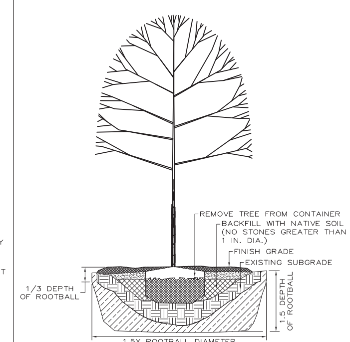
DETAIL–SILT FENCE
SCALE: NOT TO SCALE



NOTES:

1. PROVIDE SUFFICIENT TURNING RADIUS TO ACCOMMODATE LARGE TRUCKS.
2. ENTRANCE(S) SHOULD BE LOCATED TO PROVIDE FOR UTILIZATION BY ALL CONSTRUCTION VEHICLES.
3. ENTRANCES MUST BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR DIRECT FLOW OF MUD ONTO STREETS. PERIODIC TOP DRESSING WITH STONE WILL BE NECESSARY.
4. ANY MATERIAL TRACKED ONTO THE ROADWAY MUST BE CLEANED UP IMMEDIATELY.
5. GRAVEL CONSTRUCTION ENTRANCE SHALL BE LOCATED AT ALL POINTS OF INGRESS AND EGRESS UNTIL SITE IS STABILIZED. FREQUENT CHECKS OF THE DEVICE AND TIMELY MAINTENANCE MUST BE PROVIDED.
6. PLACE FILTER FABRIC BENEATH STONE. FABRIC SHALL MEET REQUIREMENTS SPECIFIED IN TECHNICAL SPECIFICATIONS.
7. ALL MATERIALS ARE TO BE APPROVED BY ENGINEER OR ENGINEERS ONSITE CONSTRUCTION MANAGER.
8. THE TYPE VL RIPRAP SHALL BE 2 FT. THICK.

DETAIL–TEMPORARY CONSTRUCTION ENTRANCE
SCALE: NOT TO SCALE



DETAIL–CONTAINERIZED TREE PLANTING
SCALE: NOT TO SCALE

~RIO GRANDE~
~RESTORATION PROJECT~
~ GENERAL DETAILS ~

Plan Revisions

Date : 2017/12/15
T.O. # 14029-022.004
Engineer : M.Dubbin
Drawn by : G. Chavez
Checked by : A. Guerra

Engineer's Stamp

IDEALS, inc
848 W. HADLEY AVENUE
LAS CRUCES, NM 88005
WEBSITE:www.ideals-inc.com
PHONE:575-532-9652 FAX:575-532-5045

Sheet Number
21
OF 21

Disclaimer

Upon acceptance of these plans for construction, the contractor agrees to familiarize himself with the project and verify the location and correctness of any and all appurtenances, right-of-way, property lines, elevations, obstructions, hazards, or conflicts that may exist upon examination of actual field conditions. design of these plans was based on available information and interpretation of available data. any discrepancies discovered, shall be immediately brought to the attention of the engineer for evaluation, the contractor shall accept all liability and risks for construction proceeding prior to engineers evaluation.

Date: Dec 13, 2017 - 4:46pm User:Nathan
Drawing File: Y:\00000-000 IBWC River Restoration Project\Dwg\Rio Grande Restoration Project - North Site - Drew.dwg
Layout Name: GD-21

APPENDIX B

Planting Datasheets

Legend

- Project Boundary
- Saltcedar Extraction
- Cottonwood
- Goodding Willow
- Coyote Willow
- Long Stem Shrubs

Riparian Habitat Restoration at Shalem Colony Plantings Layout

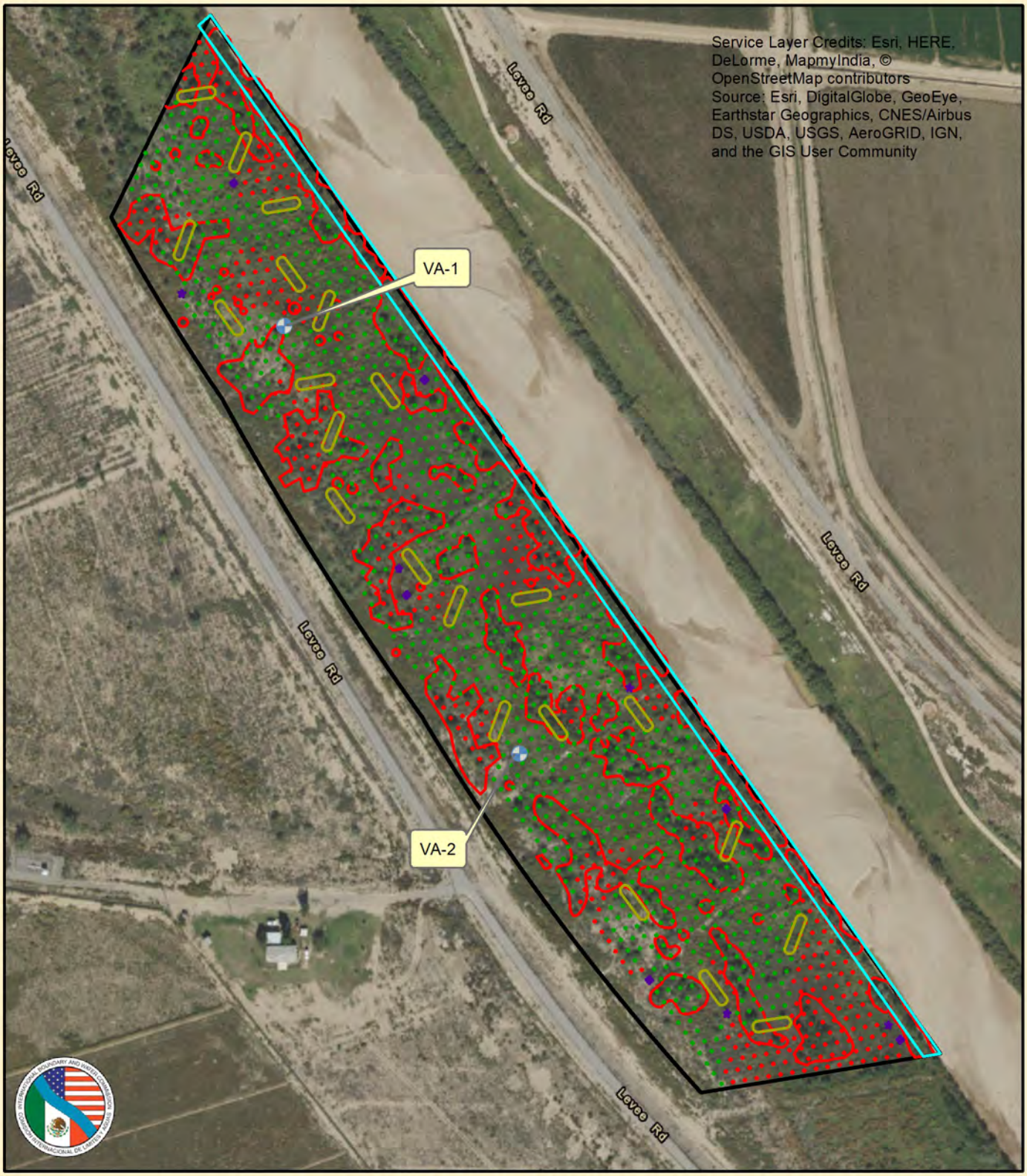
N

1:5,500

Feet
0 165 330 660

Meters
0 45 90 180

IDEALS-AGEISS, LLC



Legend

- Project Boundary
- Saltcedar Extraction
- Cottonwood
- Goodding Willow
- Coyote Willow
- Long Stem Shrubs
- Arizona Ash
- Well

Riparian Habitat Restoration at Vinton A Plantings Layout

N

1:2,750

Feet
0 80 160 320

Meters
0 20 40 80

IDEALS-AGEISS, LLC

Legend

- Project Boundary
- Saltcedar Extraction
- Cottonwood
- Goodding Willow
- Coyote Willow
- Long Stem Shrubs
- Arizona Ash
- Well

Riparian Habitat Restoration at Vinton B Plantings Layout

N

1:4,800

Feet
0 145 290 580

Meters
0 40 80 160

IDEALS-AGEISS, LLC

Legend

- Project Boundary
- Saltcedar Extraction
- Cottonwood
- Goodding Willow
- Coyote Willow
- Long Stem Shrubs
- Arizona Ash
- Pedestrian/Bike Path

Riparian Habitat Restoration at Valley Creek (North) Plantings Layout

N

1:3,800

Feet
0 115 230 460

Meters
0 30 60 120

IDEALS-AGEISS, LLC

Legend

- Project Boundary
- Saltcedar Extraction
- Cottonwood
- Goodding Willow
- Coyote Willow
- Long Stem Shrubs
- Arizona Ash
- Well
- Pedestrian/Bike Path

Riparian Habitat Restoration at Valley Creek (South) Plantings Layout

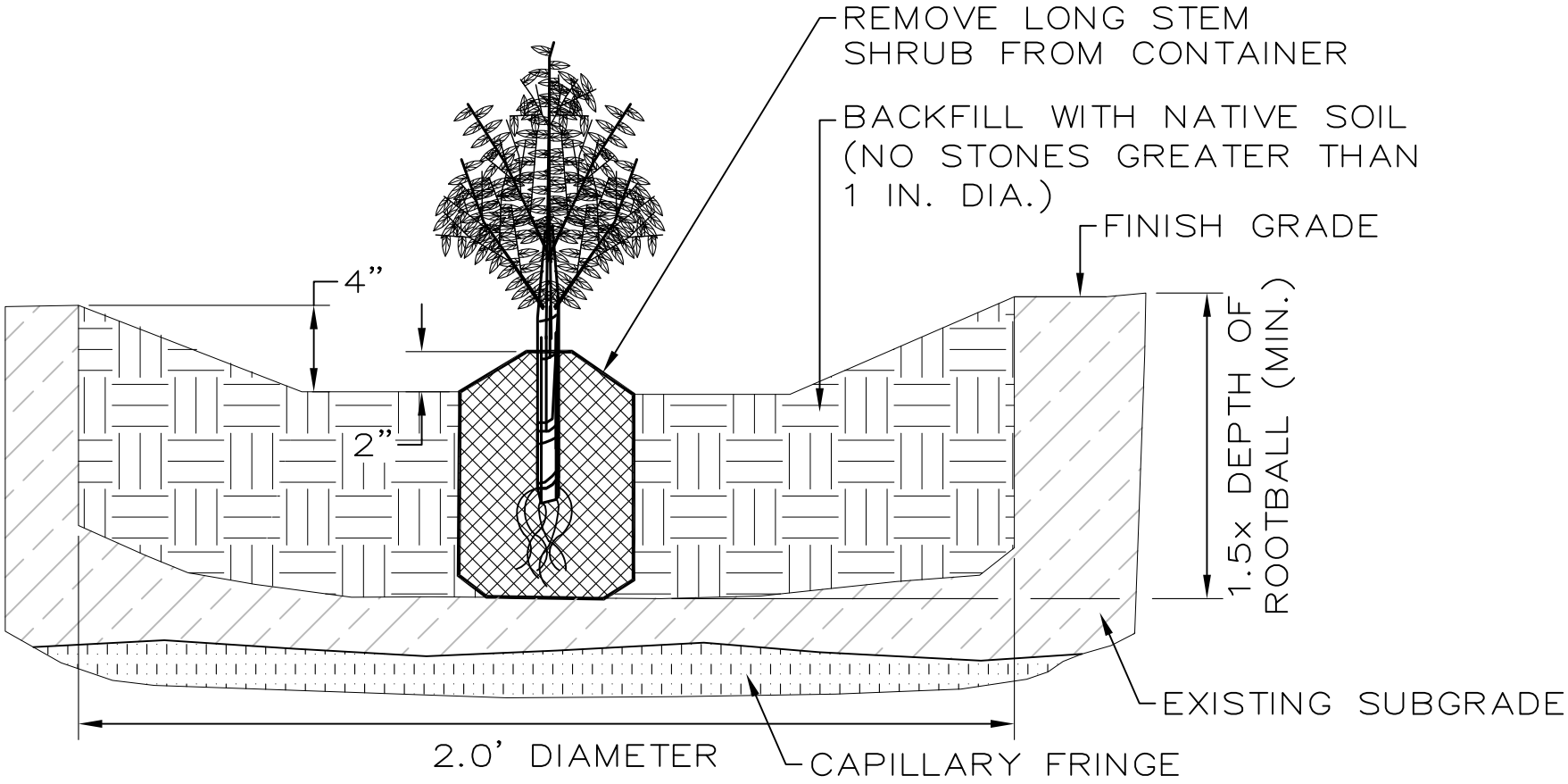
N

1:5,450

Feet
0 162.5 325 650

Meters
0 37.5 75 150

IDEALS-AGEISS, LLC



SHRUB PLANTING (TYP.)

SCALE: NOT TO SCALE

Planting Field Sheet

Site VINTON A Date Planted Varies

Participants IDEALS Auger Depth ~9' Trench with mini excavator

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow			
Cottonwood	15		4/24/18 ~9FT loop w/mini excavator
Long Stem Shrub (specify in comments)			
Other			

General Location of trees planted AT north end of site. Area (acres) ~14.7ac

Provide GPS coordinates of planting locations or a sketch of the site: ~31°58'37.77" X 106°37'01.50"

Planting Field Sheet

Site _____ Date Planted _____

Participants _____ Auger Depth _____

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow			
Cottonwood			
Long Stem Shrub (specify in comments)			
Other			

General Location of trees planted _____ Area (acres) _____

Provide GPS coordinates of planting locations or a sketch of the site:

Planting Field Sheet

Site Vinton B Date Planted See Below

Participants IDEALS Auger Depth ~10' Deep Trench

Species	# Planted	Stock/Origin	Comments
Coyote Willow (Transplants)	1561	Transplants from riverbed	3/7/18 - 3/14/18
Goodding's Willow			
Cottonwood			
Long Stem Shrub (specify in comments)			
Other			

General Location of trees planted Coyote along riverbanks Area (acres) ~20ac

Provide GPS coordinates of planting locations or a sketch of the site: 31.96508 X -106.60550 - 227LF x 2.5 willow/LF = 568 willow

31.963572 X -106.605194 - 397LF x 2.5 willow/LF = 993 willow

Planting Field Sheet

Site Valley Creek Date Planted See Below

Participants IDEALS Auger Depth 9FT Auger / 9FT Trench w/mini excavator

Species	# Planted	Stock/Origin	Comments
Coyote Willow	1290	Transplants from Riverbed	3/1/18 - 3/6/18
Goodding's Willow			
Cottonwood	440	Santa Ana Native Plants	4/16/18 - 4/17/18
Long Stem Shrub (specify in comments)			
Other			

General Location of trees planted Coyote along riverbank Others Throughout entire site Area (acres) ~22ac

Provide GPS coordinates of planting locations or a sketch of the site: 31.860233 X -106.605003, 109LF x 2.5 will/LF = 273 willow

31.859827 X -106.605072, 57LF x 2.5 will/LF = 143 willow

31.857420 X -106.605583, 350LF x 2.5 will/LF = 875 willow

Planting Field Sheet

Site Valley Creek Date Planted 10/16/18 - 10/31/18

Participants G. Biel, L. Ross Auger Depth ~3-4'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow			
Cottonwood			
Long Stem Shrub (specify in comments)	1,000	High Desert Native Plants	Four-Wing Saltbush (456) Anderson Wolfberry (544)
Other Desert willow	20	High Desert	

General Location of trees planted around sitting areas and irrigation canal Area (acres) ~0.4

Provide GPS coordinates of planting locations or a sketch of the site: Map provided

---

Planting Field Sheet

Site Vinton A Date Planted 11/16/18-12/5/18

Participants G. Biel, L. Ross Auger Depth ~3-4'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow			
Cottonwood			
Long Stem Shrub (specify in comments)	1470	High Desert	
Other Desert willow Arizona ash	10	High Desert	5 each

General Location of trees planted large patches throughout site Area (acres) 0.3

Provide GPS coordinates of planting locations or a sketch of the site: Map provided

Planting Field Sheet

Site Venten B Date Planted 11/8/18 - 11/15/18

Participants G. Biel, L. Ross Auger Depth ~3-4'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow			
Cottonwood			
Long Stem Shrub (specify in comments)	1600	High Desert Native Plants	Four-wing salt bush
Other Arizona Ash	5	High Desert	

General Location of trees planted throughout site Area (acres) 0.6

Provide GPS coordinates of planting locations or a sketch of the site: Map provided

---

Planting Field Sheet

Site Shalem Colony Date Planted 11/16/18 - 11/30/18

Participants G. Biel, L. Ross Auger Depth ~3-4'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow			
Cottonwood			
Long Stem Shrub (specify in comments)	50	High Desert	Four-wing salt bush
Other			

General Location of trees planted middle of the site Area (acres) 0.04

Provide GPS coordinates of planting locations or a sketch of the site: Map provided

Planting Field Sheet

Site: Venten B Date Planted: 01/02/19 - 2/20/19

Participants: G. Biel Auger Depth: ~9' w/ mini excavator

Species	# Planted	Stock/Origin	Comments
Coyote Willow	1500	transplant	9-10' trench; along riverbank
Goodding's Willow	200	High Desert Native Plants	
Cottonwood	800	High Desert Native Plants	
Long Stem Shrub (specify in comments)			
Other			

General Location of trees planted: Cottonwoods spread throughout site; Gooddings near riverbank at northern end Area (acres): 2.5

Provide GPS coordinates of planting locations or a sketch of the site: Map provided

---

Planting Field Sheet

Site: Shalem Colony Date Planted: 2/1/19 - 2/28/19

Participants: G. Biel Auger Depth: ~9' w/ mini excavator

Species	# Planted	Stock/Origin	Comments
Coyote Willow	50	transplant	along river bank
Goodding's Willow	10	High Desert Native Plants	
Cottonwood	10	High Desert Native Plants	
Long Stem Shrub (specify in comments)			
Other			

General Location of trees planted: Near the center of the site Area (acres): ~0.4

Provide GPS coordinates of planting locations or a sketch of the site: map provided

Planting Field Sheet

Site Valley Creek Date Planted 2/1/19 - 2/20-19

Participants G. Biel Auger Depth ~9' w/ mini excavator

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow	220	High Desert Native Plants	
Cottonwood			
Long Stem Shrub (specify in comments)			
Other			

General Location of trees planted Near river bank and the trail Area (acres) 0.1

Provide GPS coordinates of planting locations or a sketch of the site: Map provided

---

Planting Field Sheet

Site Vinton A Date Planted 12/18/19 - 2/20/19

Participants G. Biel Auger Depth ~9' w/ mini excavator

Species	# Planted	Stock/Origin	Comments
Coyote Willow	2970	transplants	~9' trench along river bank
Goodding's Willow	441	High Desert Native Plants	
Cottonwood	1017	High Desert Native Plants	
Long Stem Shrub (specify in comments)			
Other			

General Location of trees planted Spread throughout site between river and mesquite patches Area (acres) 5.6

Provide GPS coordinates of planting locations or a sketch of the site: Map provided

Planting Field Sheet

Site Vinton A Date Planted 12-3-19

Participants Ben, Gil M., Todd H., Alfred C. Auger Depth 3.5'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow			
Cottonwood			
Long Stem Shrub (specify in comments)	162	Hydra Nursery	Baccharis, False Indigo NM olive, Wolfberry
Other			

General Location of trees planted The north 1/3 of the site Area (acres) _____

Provide GPS coordinates of planting locations or a sketch of the site:

Planting Field Sheet

Site Vinton A Date Planted 12-4-19

Participants Ben, Gil M., Todd H., Alfred C. Auger Depth 3.5'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow			
Cottonwood			
Long Stem Shrub (specify in comments)	162	Hydra Nursery	Seep Willow, False Indigo, NM olive, Wolfberry
Other			

General Location of trees planted Midde 1/3 Area (acres) _____

Provide GPS coordinates of planting locations or a sketch of the site:

Planting Field Sheet

Site Vinton A Date Planted 12-5-19

Participants Ben, Gil M., Alfred C. Auger Depth 3.5'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow			
Cottonwood			
Long Stem Shrub (specify in comments)	175	Hydra Nursery	Seep willow, False Indigo NM olive, Wolfberry
Other			

General Location of trees planted First Half Area (acres) _____

Provide GPS coordinates of planting locations or a sketch of the site:

Planting Field Sheet

Site Vinton A Date Planted 12-6-19

Participants Ben, Gil M., Alfred C., Jimmy M. Auger Depth 3.5'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow			
Cottonwood			
Long Stem Shrub (specify in comments)	216	Hydra Nursery	Seep Willow, False Indigo, NM olive
Other			

General Location of trees planted Last Half Area (acres) _____

Provide GPS coordinates of planting locations or a sketch of the site:

Planting Field Sheet

Site Valley Creek Date Planted 12-6-19

Participants Ben, Gil M., Alfred C., Jimmy M. Auger Depth 3.5'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow			
Cottonwood			
Long Stem Shrub (specify in comments)	88	Hydra Nursery	NM Olive, False Indigo
Other			

General Location of trees planted At All sitting areas (4) Area (acres) _____

Provide GPS coordinates of planting locations or a sketch of the site:

Planting Field Sheet

Site: Vinton A
Date Planted: 12-24-19
Participants: Gil M., Alfred C., Jimmy M., Marcos C.
Auger Depth: 8' - 10'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow	40	Hydra Nursery	
Cottonwood			
Long Stem Shrub (specify in comments)			
Other			

General Location of trees planted: Norther 1/3 Vinton A
Area (acres):

Provide GPS coordinates of planting locations or a sketch of the site:

Planting Field Sheet

Site: Vinton A
Date Planted: 12-26-19
Participants: Gil M., Alfred C., Jimmy M., Marcos C.
Auger Depth: 8' - 10'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow	119	Hydra Nursery	
Cottonwood			
Long Stem Shrub (specify in comments)			
Other			

General Location of trees planted: Middle & Southern Vinton A
Area (acres):

Provide GPS coordinates of planting locations or a sketch of the site:

Planting Field Sheet

Site: Valley Creek — Date Planted: 1/13/20

Participants: Gil M., Alfred C., Marcos C. — Auger Depth: 8'-10'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow			
Cottonwood	150	Hydra Nursery	
Long Stem Shrub (specify in comments)			
Other			

General Location of trees planted: Entire planting site boundary to boundary — Area (acres):

Provide GPS coordinates of planting locations or a sketch of the site:

Planting Field Sheet

Site: Valley Creek — Date Planted: 1/14/20

Participants: Gil M., Alfred C., Marcos C. — Auger Depth: 8'-10'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow	43	Hydra Nursery	
Cottonwood			
Long Stem Shrub (specify in comments)			
Other			

General Location of trees planted: North and South side of pedestrian bridge on Valley Creek site. — Area (acres):

Provide GPS coordinates of planting locations or a sketch of the site:

Planting Field Sheet

Site Vinton A Date Planted 1|14|20

Participants Ben, Alfred C. Auger Depth 1'-2'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow			
Cottonwood			
Long Stem Shrub (specify in comments)			
Other	4	Hydra Nursery	Ash tree plantings

General Location of trees planted Group of 4 middle of the site. Area (acres)

Provide GPS coordinates of planting locations or a sketch of the site:

Planting Field Sheet

Site Vinton B Date Planted 1|14|20

Participants Ben, Alfred C. Auger Depth 1'-2'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow			
Cottonwood			
Long Stem Shrub (specify in comments)			
Other	4	Hydra Nursery	Ash tree plantings

General Location of trees planted Group of 4 middle of the site. Area (acres)

Provide GPS coordinates of planting locations or a sketch of the site:

Planting Field Sheet

Site Shalem Colony Date Planted 1/14/20

Participants Gil M., Marcos C. Auger Depth 8'-10'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow	2	Hydra Nursery	
Cottonwood	9	11	
Long Stem Shrub (specify in comments)			
Other			

General Location of trees planted 2 areas most deteriorated by vehicles. Area (acres) _____

Provide GPS coordinates of planting locations or a sketch of the site:

Planting Field Sheet

Site Vinton A Date Planted 1/15/20

Participants Gil M, Alfred C., Marcos C Auger Depth 8'- 10'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow			
Cottonwood	111	Hydra Nursery	
Long Stem Shrub (specify in comments)			
Other			

General Location of trees planted Northern 1/3 of site Area (acres) _____

Provide GPS coordinates of planting locations or a sketch of the site:

Planting Field Sheet

Site Vinton A Date Planted 1/16/20

Participants Gil M., Alfred C., Marcos C. Auger Depth 8'-10'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow			
Cottonwood	128	Hydra Nursery	
Long Stem Shrub (specify in comments)			
Other			

General Location of trees planted Middle 1/3 of site Area (acres) _____

Provide GPS coordinates of planting locations or a sketch of the site:

Planting Field Sheet

Site Vinton A Date Planted 1/17/20

Participants Gil M, Alfred C., Marcos C Auger Depth 8'- 10'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow			
Cottonwood	120	Hydra Nursery	
Long Stem Shrub (specify in comments)			
Other			

General Location of trees planted Middle 1/3 into South 1/3 Area (acres) _____

Provide GPS coordinates of planting locations or a sketch of the site:

Planting Field Sheet

Site Vinton A Date Planted 1/21/20

Participants Gil M., Alfred C., Marcos C. Auger Depth 8'-10'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow			
Cottonwood	105	Hydra Nursery	
Long Stem Shrub (specify in comments)			
Other			

General Location of trees planted Southern 1/3 Area (acres) _____

Provide GPS coordinates of planting locations or a sketch of the site:

Planting Field Sheet

Site Vinton B Date Planted 1/23/20

Participants Ben, Alfred C., Marcos C Auger Depth 8'-10'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow			
Cottonwood	45	Hydra Nursery	Equipment servicing scheduled the next few days.
Long Stem Shrub (specify in comments)			
Other			

General Location of trees planted Northern 1/3 of site Area (acres) _____

Provide GPS coordinates of planting locations or a sketch of the site:

Planting Field Sheet

Site Vinton B Date Planted 1/24/20

Participants Ben, Alfred C., Marcos C. Auger Depth 8'-10'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow			
Cottonwood	160	Hydra Nursery	
Long Stem Shrub (specify in comments)			
Other			

General Location of trees planted Northern 1/3 of site Area (acres) _____

Provide GPS coordinates of planting locations or a sketch of the site: moving to the middle 1/3

Planting Field Sheet

Site Vinton B Date Planted 1/27/20

Participants Ben, Alfred C., Marcos C Auger Depth 8'-10'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow			
Cottonwood	60	Hydra Nursery	
Long Stem Shrub (specify in comments)			
Other			

General Location of trees planted Middle 1/3 site Area (acres) _____

Provide GPS coordinates of planting locations or a sketch of the site:

Planting Field Sheet

Site Vinton B Date Planted 1/28/20

Participants Ben, Alfred C., Marcos C. Auger Depth 8'-10'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow			
Cottonwood	140	Hydra Nursery	
Long Stem Shrub (specify in comments)			
Other			

General Location of trees planted Middle 1/3 site Area (acres) _____

Provide GPS coordinates of planting locations or a sketch of the site:

Planting Field Sheet

Site Vinton B Date Planted 1/29/20

Participants Ben, Alfred C., Marcos C Auger Depth 8'-10'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow			
Cottonwood	140	Hydra Nursery	
Long Stem Shrub (specify in comments)			
Other			

General Location of trees planted Southern 1/3 site Area (acres) _____

Provide GPS coordinates of planting locations or a sketch of the site:

Planting Field Sheet

Site Vinton B Date Planted 1/30/20

Participants Ben, Alfred C., Marcos C. Auger Depth 8'-10'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow			
Cottonwood	51	Hydra Nursery	
Long Stem Shrub (specify in comments)			
Other			

General Location of trees planted Southern 1/3 site Area (acres) _____

Provide GPS coordinates of planting locations or a sketch of the site:

Planting Field Sheet

Site Vinton A Date Planted 1/30/20

Participants Ben, Alfred C., Marcos C Auger Depth 8'-10'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow	36	Hydra Nursery	Completes Goodding willows on Vinton A.
Cottonwood			
Long Stem Shrub (specify in comments)			
Other			

General Location of trees planted 3 groups of 12 in Southern 1/3 of site Area (acres) _____

Provide GPS coordinates of planting locations or a sketch of the site:

Planting Field Sheet

Site Vinton B Date Planted 1/30/20

Participants Ben, Alfred C., Marcos C. Auger Depth 8'-10'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow	82	Hydra Nursery	
Cottonwood			
Long Stem Shrub (specify in comments)			
Other			

General Location of trees planted Open area in middle 1/3 of the site Area (acres) _____

Provide GPS coordinates of planting locations or a sketch of the site:

Planting Field Sheet

Site Vinton A Date Planted 1/30/20

Participants Ben, Alfred C. Auger Depth 8'-10'

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow			
Cottonwood			
Long Stem Shrub (specify in comments)			
Other	2	Hydra Nursery	Desert Willows

General Location of trees planted Both planted Northern part of site Area (acres) _____

Provide GPS coordinates of planting locations or a sketch of the site:

Planting Field Sheet

Site _____ Date Planted _____

Participants _____ Auger Depth _____

Species	# Planted	Stock/Origin	Comments
Coyote Willow			
Goodding's Willow			
Cottonwood			
Long Stem Shrub (specify in comments)			
Other			

General Location of trees planted _____ Area (acres) _____

Provide GPS coordinates of planting locations or a sketch of the site:

APPENDIX C

Monitoring Datasheets

Pre-Implementation Monitoring Datasheets

Pre-Implementation Qualitative Monitoring Field Sheet

Site: Shalem Colony   Date: 19 Oct 2017

Participants: C. Britt, D. Burkett, Ryan, Andrew   Target habitat: Screwbean msqt. Forest

Document conditions at restoration site prior to restoration work implementation:

Identifiable Native Species	Abundance (Sporadic individuals, Low, Moderate, High)	Comments
Screwbean Mesquite	At High ≥ 4m in N. portion	Excellent large individuals forming Good thickets/stands
Coyote willow	Moderate	Could be developed in site
False Seep Willow	low	
bullrush	- along banks - in river low	
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Comments**
Saltcedar		
Salt Cedar	Moderate	most can be removed w/o damage to natives
Russian thistle	High	

General Site Conditions: Adjacent to large Pecan orchard - may be suitable for Cuckoo - excellent old Screwbean msqt. grove. Sandy site lots of Alkali Sacaton w/ pigweed in open areas

Observed Wildlife: domestic dog, Coyote, Am Crow, Cottontail rabbit, wht-crowned sparrow, Raccoon, House Finch, Spotted Towhee, Green-tailed Towhee, White-crowned sparrow, Pyrrhuloxia, American Kestrel

Photos Taken: 3 Seperate photo points established/staked with 3 photos taken at overlapping azimuths

max height of native vegetation 6 m

max height of non-native vegetation 5 m

Pre-Implementation Qualitative Monitoring Field Sheet

Site Valley Creek Date 25 oct 2017

Participants C. Bratt, D. Bartlett, Ryan, Andrew Target habitat

Document conditions at restoration site prior to restoration work implementation:

Identifiable Native Species	Abundance (Sporadic individuals, Low, Moderate, High)	Comments
Coyote willow	low	restricted patches on river bank
Cottonwood	low	a few trees at wide intervals
False Seep willow	low	scattered along bank
Cat tail	low	few small patches
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Comments**
Saltcedar	Sparse - on river bank	

General Site Conditions: Park - minimal existing wildlife habitat mowed/maintained for walking trails

Observed Wildlife : gopher, domestic dog, Great blue Heron, bufflehead

Photos Taken: None

max height of native vegetation _____

max height of non-native vegetation _____

Pre-Implementation Qualitative Monitoring Field Sheet

Site Vinton A Date 25 oct. 2017

Participants C. Britt, D Babbitt, Ryan, Andrew Target habitat

Document conditions at restoration site prior to restoration work implementation:

Identifiable Native Species	Abundance (Sporadic individuals, Low, Moderate, High)	Comments
Screwbean mesq	Abundnt - mod	Some good stands - Sporadic
Four-wing Saltbush	Moderate - low	
Smooth Pigweed	dense - Abundnt	
Wolfberry	low - Moderate	
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Comments**
Saltcedar	High - Moderate	Present throughout site Some dense stands
Russian thistle	High - Moderate	
Siberian elm	Sporadic	

General Site Conditions: Broad - moderately dense mixed Screwbean + Salt Cedar tree habitat with sub shrubs, pigweed + grasses

Observed Wildlife: Mallard duck, rock dove, killdeer, domestic ~~dog~~, ladder backed woodpecker, gopher . . . Green-tailed Towhee, Lincoln's Sparrow, Pyrrhuloxia, white-crowned sparrow, cattle egret, mourning dove, House finch

Photos Taken: 2 photo points established - 3 photos taken @ overlapping Azimuths

max height of native vegetation 6 m

max height of non-native vegetation 4m

Pre-Implementation Qualitative Monitoring Field Sheet

Site Hilton B Date 25 October 2017

Participants C. Burt, D Burlett, Ryan, Andrew Target habitat

Document conditions at restoration site prior to restoration work implementation:

Identifiable Native Species	Abundance (Sporadic individuals, Low, Moderate, High)	Comments
Screwbean Mesq	Moderate	Some nice trees not thick
Smooth Pigweed	Abundant	difficult to walk through - dense tall
four wing Saltbush	Moderate	Scattered shrubs
Rabbit brush	- low moderate	Scattered shrubs
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Comments**
Saltcedar	Moderate - dominant	
Siberian elm	- low	
fescue grass	- Moderate - high	
Russian thistle	Moderate	

General Site Conditions: Mixed Scrub habitat with dense pigweed Salt Cedar & Screwbean Mesq dominate

Observed Wildlife : Barn owl, killdeer, Northern Harrier, wx Sparrow, Mourning dove Ruby Crowned kinglet, gopher, bull snake, yellow-rumped warbler..... wildlife on back..

Photos Taken: 3 photo points established w/ 3 photos ea @ overlapping azimuths

max height of native vegetation 4M

max height of non-native vegetation 4M

Groundwater Levels Monitoring Field Sheet

Participants ANDREW GUERRA Date 12/8/17

Site	Well ID	TOC Elevation	Ground Surface Elevation	Casing Height	Date	Time	Water Level Reading TOC	Water Depth (Reading TOC - Casing Height)	Comments/Observations
Valley Creek	VC-MW-1	3755.64	3752.26	3.38	11/10/17	2:00 PM	—	—	WELL DESTROYED
	VC-MW-2	3754.72	3751.16	3.56	11/10/17	1:45 PM	8.58	5.02	NONE
Vinton A	VA-MW-1	3780.70	3777.44	3.46	11/10/17	4:45 PM	7.33	3.87	NONE
	VA-MW-2	3780.41	3776.76	3.43	11/10/17	4:15 PM	7.50	4.07	NONE
Vinton B	VB-MW-1	3777.12	3774.04	3.08	11/1017	3:45 PM	7.33	4.25	NONE
	VB-MW-2	3777.31	3773.60	3.71	11/10/17	3:15 PM	7.50	3.79	NONE

Pre-restoration Monitoring Datasheets

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet

Site SHALEM COLONY Date 6 March 2018

Participants P. Houghton Target Habitat Screwbean Mesquite Forest

Identifiable Native Species	Abundance (None, Sporadic individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
Screwbean Mesquite	High	50-60%	Tall, mature trees; some have Mistletoe
Baccharis (seep willow)	Low	10%	
Coyote Willow	Low - Moderate	25%	Mostly near bank
Grasses	Low - Moderate	25%	Tall grasses in areas
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Percent Cover (Estimate)**	**Comments**
Saltcedar	Moderate	30%	Most near bank
Kochia	Low	10%	
Russian Thistle	Low	5%	

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) 75%

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead Average = Sum A/ (Sum D + Sum A)				Comments
					Plot 1	Plot 2	Plot 3	Average	
Coyote Willow					A	A	A		
					D	D	D		
Goodding's Willow					A	A	A		
					D	D	D		
Cottonwood					A	A	A		
					D	D	D		
Long Stem Shrub (specify in					A	A	A		
					D	D	D		
Other					A	A	A		
					D	D	D		

General Site Conditions: Screwbean Mesquite dominant, grasses & non-native forbs in patches, dissected by cleared paths/roads. Pecan Orchard adjacent to east

Observed Wildlife: Northern Flicker, White-crowned Sparrow, Ladder-backed Woodpecker, Mourning Dove, White-winged Dove, Killdeer, Curve-billed Thrasher

Photos Taken: Nine photos total: Photopoint 1, Targets 1-3; Photopoint 2, Targets 1-3; Photopoint 3, Targets 1-3

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet

Site VINTON A Date 6 March 2018

Participants Perrianne Houghton Target Habitat Riparian Forest

Identifiable Native Species	Abundance (None, Sporadic individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
Screwbean Mesquite	Moderate	35	
4-Wing Saltbush	Low	15	
Amaranth sp.	Moderate	25	Mixed w/ Kochia, dense
Wolfberry	Low	15	
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Percent Cover (Estimate)**	**Comments**
Saltcedar	Moderate	30	Scattered
Kochia	Low - moderate	20	Dense in places
Russian Thistle	Low - moderate	25	

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) 85%

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead Average = Sum A/ (Sum D + Sum A)				Comments
					Plot 1	Plot 2	Plot 3	Average	
Coyote Willow					A	A	A		
					D	D	D		
Goodding's Willow					A	A	A		
					D	D	D		
Cottonwood					A	A	A		
					D	D	D		
Long Stem Shrub (specify in					A	A	A		
					D	D	D		
Other					A	A	A		
					D	D	D		

General Site Conditions: Scattered stands of Mesquite and salt cedar along bank & extending toward levee. Amaranth, grasses & introduced forbs dense in places.

Observed Wildlife: Western Meadowlark, Turkey Vulture, Dark-eyed Junco, Spotted Towhee.

Photos Taken: → Photopoint 1, Targets 1-3; Photopoint 2, Targets 1-3; Photopoint 3, Targets 1-3. Nine photos total

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet

Site VINTON B Date 6 March 2018

Participants P. Houghton Target Habitat Riparian Woodland

Identifiable Native Species	Abundance (None, Sporadic individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
Screwbean Mesquite	Moderate	35%	
4-wing Saltbush	Moderate-Low	25%	scattered
Rabbitbrush	Low	15%	
Amaranth sp.	High	60%	Dense in places & mixed w/Kochia
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Percent Cover (Estimate)**	**Comments**
Saltcedar	Moderate	~30%	Near bank & scattered
Kochia	Moderate	25%	
Russian Thistle	Low	10%	scattered

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) 90%

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead Average = Sum A/ (Sum D + Sum A)				Comments
					Plot 1	Plot 2	Plot 3	Average	
Coyote Willow					A	A	A		
					D	D	D		
Goodding's Willow					A	A	A		
					D	D	D		
Cottonwood					A	A	A		
					D	D	D		
Long Stem Shrub (specify in					A	A	A		
					D	D	D		
Other					A	A	A		
					D	D	D		

General Site Conditions: Most Mesquites and Salt Cedar are along and near bank, some toward levee. Amaranth (Pigweed) dense & high.

Observed Wildlife: White-crowned Sparrow, Northern Harrier, Gambel's Quail

Photos Taken: Nine photos total: Photopoint 1, Targets 1-3; Photopoint 2, Targets 1-3; Photopoint 3, Targets 1-3.

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet

Site Valley Creek Date 02/05/18

Participants BZ PH Target Habitat Riparian Habitat

Identifiable Native Species	Abundance (None, Sporadic individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
Coyote Willow	Moderate-High on banks	5% total	Thick along banks.
Cottonwood	Sporadic	2%	
Baccharis	Sporadic along banks	1%	
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Percent Cover (Estimate)**	**Comments**
Saltcedar	None	0%	almost all removed

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) _____

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead Average = Sum A/ (Sum D + Sum A)				Comments
					Plot 1	Plot 2	Plot 3	Average	
Coyote Willow					A	A	A		
					D	D	D		
Goodding's Willow					A	A	A		
					D	D	D		
Cottonwood					A	A	A		
					D	D	D		
Long Stem Shrub (specify in					A	A	A		
					D	D	D		
Other					A	A	A		
					D	D	D		

General Site Conditions: Very open. Salt Cedar removed, Heavy Willow cover in 10ft strip along banks of river

Observed Wildlife: ~~ACE~~ AMKE, RSFL, LBWO, MoDo, NoMo

Photos Taken: At photo points 3 per point

Participants P. Houghton Date 3/6/18

Groundwater Levels Monitoring Field Sheet

Site	Well ID	TOC Elevation	Ground Surface Elevation	Casing Height	Date	Time	Water Level Reading TOC	Water Depth (Reading TOC - Casing Height)	Comments/Observations
Valley Creek	VC-MW-1	3755.64	3752.26	3.38	3-6-18	8:50 AM	11.70	8.32	None
	VC-MW-2	3754.72	3751.16	3.56	3-6-18	9:23 AM	11.70	8.14	None
Vinton A	VA-MW-1	3780.70	3777.44	3.46	3-6-18	2:18 PM	12.40	8.94	None
	VA-MW-2	3780.41	3776.76	3.43	3-6-18	1:17 PM	11.50	8.07	None
Vinton B	VB-MW-1	3777.12	3774.04	3.08	3-6-18	3:30 PM	13.3	10.22	None
	VB-MW-2	3777.31	3773.60	3.71	3-6-18	3:48 PM	—	—	Well dry - obstructed with sediment at 15.3' from TOC

Post-restoration Monitoring Datasheets

May 2018

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet

Site: Shalem Colony Date: 16 May 2019

Participants: B. Z Volanek, W. Argo Target Habitat: screwbean mesquite forest

Identifiable Native Species	Abundance (None, Sporadic individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
Mesquite (both)	moderate	50%	tall and mature
wolfberry	low	<5%	
coyote willow	low	20%	along bank
grasses	low	20%	
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Percent Cover (Estimate)**	**Comments**
Saltcedar	sporadic	<1%	small

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) 75% forest and ground cover

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead Average = Sum A/ (Sum D + Sum A)				Comments
					Plot 1	Plot 2	Plot 3	Average	
Coyote Willow					A	A	A		
					D	D	D		
Goodding's Willow					A	A	A		no plantings
					D	D	D		
Cottonwood					A	A	A		
					D	D	D		
Long Stem Shrub (specify in					A	A	A		
					D	D	D		
Other					A	A	A		
					D	D	D		

General Site Conditions: good mesquite w/ grass cover

Observed Wildlife: Nr. mocker, Gambels Quail, House finch, bullfrog, black chin hummingbird, cliff swallow, NOMO, potential SWFL

Photos Taken: photo points psyrrheloxia

Site: Shalem Colony **Date:** 16 May 2018

Permanent Plot #1

326651 E
3583743 N

Species	Alive	Stressed	Dead
Coyote willow	little		
Goodding's willow			
Cottonwood			
honey mesquite	2		
SB mesquite	1		

Notes: Coyote willow in plot on natural
2% wolfberry; 2% guaco

Permanent Plot #2

326972 E
3583436 N

Species	Alive	Stressed	Dead
Coyote willow	7		
Goodding's willow			
Cottonwood			
honey mesquite	1		
SB mesquite	1		

Notes: Coyote willows are natural
prickley pear (1); gooseberry (1)
2% wolfberry; 50% grass gr. cover

Permanent Plot #3

327027 E
3583300 N

natural

Species	Alive	Stressed	Dead
Coyote willow	2		
Goodding's willow			
Cottonwood			
SB mesquite	3		

Notes: guaco scattered on site

Permanent Plot #4

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Random Plot #1

no trees/shrubs have been planted so no random plots taken

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Random Plot #2

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Random Plot #3

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet

Site Upton A Date 16 May 2018

Participants B. Zvolanek, W. Argo Target Habitat riparian forest

Identifiable Native Species	Abundance (None, Sporadic individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
Mesquite	moderate	30-40%	
ground cover - grasses	moderate	20-30%	
salt bush	low	10-15%	
Wolfberry	low	10%	
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Percent Cover (Estimate)**	**Comments**
Saltcedar	none	~~0~~	

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) ~25% groundcover + forest

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead Average = Sum A/ (Sum D + Sum A)				Comments
					Plot 1	Plot 2	Plot 3	Average	
Coyote Willow					A	A	A		not planted
					D	D	D		
Goodding's Willow					A	A	A		not planted
					D	D	D		
Cottonwood					A	A	A		few planted
					D	D	D		
Long Stem Shrub (specify in					A	A	A		
					D	D	D		
Other					A	A	A		
					D	D	D		

General Site Conditions: Very open and no salt cedar

Observed Wildlife: road runner, RWB, merlin, cottontail, Gambels quail, no Dove, Mockingbird, cotton rat (dead), marine blue butterfly, common yellow throat, ladder back woodpecker, brown headed cowbird, western meadowlark

Photos Taken: photo points

Site: Vinton A

Date: 16 May 2016

Permanent Plot #1

347507 E
3534824 N

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			
honey mesquite	4		

Notes: Near river edge

Random Plot #1

all the trees/shrubs have not been planted so no random plots taken

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Permanent Plot #2

347348 E
3534916 N

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			
honey mesquite	1		

Notes:

Random Plot #2

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Permanent Plot #3

347213 E
3539025 N

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood	6	9	
SB mesquite	1		

Notes: Near VA-1 well
pea covering 25% of plot

Random Plot #3

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Permanent Plot #4

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet

Site: Fenton B Date: 16 May 2018

Participants: B. Zvolanek, W. Argo Target Habitat: Riparian woodland habitat

Identifiable Native Species	Abundance (None, Sporadic individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
Mesquite - both	Moderate	50%	
wolfberry	low	<5%	
wild flower	moderate	10-15%	
rabbit brush	low	10-15%	
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Percent Cover (Estimate)**	**Comments**
Saltcedar	sporadic	<1%	small regrowth

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) 70 - 75%
wildflower grand cover

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead Average = Sum A/ (Sum D + Sum A)				Comments
					Plot 1	Plot 2	Plot 3	Average	
Coyote Willow					A	A	A	180/180	~50% planted
					D	D	D		
Goodding's Willow					A	A	A		not planted until fall
					D	D	D		
Cottonwood					A	A	A		
					D	D	D		
Long Stem Shrub (specify in					A	A	A		not planted until fall
					D	D	D		
Other					A	A	A		
					D	D	D		

General Site Conditions: good mesquite & grand cover; very minimal salt cedar

Observed Wildlife: Gambles quail; house finch; cliff swallow, northern mockingbird, common yellow throat; RWB; blue grosbeak; black chin hummer, Mallard; ladder back woodpecker; spotted sandpiper; western kingbird, great horned owl; Swainson's Hawk, white wing & mourning dove; chipping sparrow, cottontail; jack rabbit; barn swallow; western meadowlark

Photos Taken: photo points

Site: Vinton B

Date: 16 May 2018

Permanent Plot #1

348313 E
3537465 N

transplant

Species	Alive	Stressed	Dead
Coyote willow	67	—	—
Goodding's willow			
Cottonwood			
honey mesquite	6		
SB mesquite	3		

Notes: kobeilinia about 20% of plot

Permanent Plot #2

348267 E
3537736 N

transplant

Species	Alive	Stressed	Dead
Coyote willow	38	—	—
Goodding's willow			
Cottonwood			
honey mesquite	3		

Notes: wet flower ground cover across the site

Permanent Plot #3

348094 E
3538091 N

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			
Honey mesquite	3		

Notes: no plantings yet
Baccharis ~1%

Permanent Plot #4

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Random Plot #1

348314 E
3537519 N

transplant

Species	Alive	Stressed	Dead
Coyote willow	85		
Goodding's willow			
Cottonwood			

Notes: 1 small salt cedar; 20% kobeilinia

Random Plot #2

not enough planted to do other random plots

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Random Plot #3

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet

Site: Valley Creek Date: 15 May 2018

Participants: B. Zuvlanet, W. Arjo Target Habitat: open riparian woodland

Identifiable Native Species	Abundance (None, Sporadic individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
cottonwood	sporadic individuals	2%	
screw bean mesq	sporadic	1%	
coyote willow	low	<5%	along bank

Identifiable Exotic (Non-Native) Species	Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)	Percent Cover (Estimate)	Comments
Saltcedar	none	0	

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) 0% shrub, 30-40% tree; 30-40% grasses/weeds

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead Average = Sum A/ (Sum D + Sum A): Plot 1	Plot 2	Plot 3	Average	Comments
Coyote Willow	transplant	normal		4-6'	A	A	A	117/118	
					D	D	D		
Goodding's Willow		—			A	A	A		not planted yet
					D	D	D		
Cottonwood		some stressed		3-5'	A	A	A	47/47	
					D	D	D		
Long Stem Shrub (specify in					A	A	A		
					D	D	D		
Other					A	A	A		
					D	D	D		

General Site Conditions: very open park area w/ scattered large cottonwoods

Observed Wildlife: ~~[illegible]~~ phainopepla, NoMo, barn swallow, cliff swallow, white wing dove, mourning dove, house finch, Eurasian collared dove, black chinned hummingbird, chipping sparrow, blue grosbeak

Photos Taken: photo points

Site: Valley Creek

Date: 15 May 2018

Permanent Plot #1 348080 E 3525721 N

transplant

Species	Alive	Stressed	Dead
Coyote willow	79		1
Goodding's willow			
Cottonwood	2	2	

Notes: open area w/ flea bane along river
added 2' on the plot radius due to sidewalk

Random Plot #1 348091 E 3525836 N

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood	2	5	

Notes:

Permanent Plot #2 348127 E 3526036 N

Species	Alive	Stressed	Dead
Coyote willow	36	2	—
Goodding's willow	—	—	—
Cottonwood	4	3	—

Notes: added 4' on radius due to sidewalk

Random Plot #2 348160 E 3526261 N

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood	3	7	
SB mesquite	1		

Notes: quaia scattered in plot

Permanent Plot #3 348161 E 3526171 N

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood	7	2	—

Notes:

Random Plot #3 348192 E 3526423 N

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood	4	6	

Notes: 1 natural lg cottonwood
chenopoda

Permanent Plot #4

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Groundwater Levels Monitoring Field Sheet

Participants B. Zvolanek, W. Arjo Date 5/15/18 - 5/16/18

Site	Well ID	TOC Elevation	Ground Surface Elevation	Casing Height	Date	Time	Water Level Reading TOC	Water Depth (Reading TOC - Casing Height)	Comments/Observations
Valley Creek	VC-MW-1	3755.64	3752.26	3.6 ~~3.38~~	5/15/18	1415	11.66	8.06	
	VC-MW-2	3754.72	3751.16	3.56	5/15/18	1330	5.83	2.27	
Vinton A	VA-MW-1	3780.70	3777.44	3.46	5/16/18	0942	5.83	3.37	
	VA-MW-2	3780.41	3776.76	3.43	5/16/18	0910	6.42	2.99	
Vinton B	VB-MW-1	3777.12	3774.04	3.08	5/16/18	0841	7.34	4.26	
	VB-MW-2	3777.31	3773.60	3.71	5/16/18	0814	7.0	3.86	

Post-restoration Monitoring Datasheets

August 2018

Participants BRYAN ZVOLANEK, PERRIANNE HOUGHTON Date 08/29/18

Groundwater Levels Monitoring Field Sheet

Site	Well ID	TOC Elevation	Ground Surface Elevation	Casing Height	Date	Time	Water Level Reading TOC	Water Depth (Reading TOC - Casing Height)	Comments/Observations
Valley Creek	VC-MW-1	3755.64	3752.26	3.38	08/29/18	10:18	198cm	98cm	3.21 feet
	VC-MW-2	3754.72	3751.16	3.56	08/29/18	09:46	352cm	250cm	8.20 feet
Vinton A	VA-MW-1	3780.70	3777.44	3.46	08/29/18	12:22	199cm	89cm	2.92 feet
	VA-MW-2	3780.41	3776.76	3.43	08/29/18	12:57	173cm	53cm	1.74 feet
Vinton B	VB-MW-1	3777.12	3774.04	3.08	08/29/18	13:39	195cm	91cm	2.99 feet
	VB-MW-2	3777.31	3773.60	3.71	08/29/18				LOCK WOULD NOT OPEN STUCK SHUT
Shulem									
"									

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet

1730

Site Shalem Colony Date 08/28/18

Participants Brian Zvolanek, Perrianne Houghton Target Habitat Riverine Restoration

Identifiable Native Species	Abundance (None, Sporadic individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
Screwbean	Moderate	15%	large thickets
Honey Mesquite		15%	
Coyote willow	low	20%	on banks
Wolfberry	low	5%	
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Percent Cover (Estimate)**	**Comments**
Saltcedar	Sporadic	1%	resprouts need
Kochia	Moderate	10%	
Cynodon	Moderate	20%	

Opuntia 1%
Ribes 1%

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) _____

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead Average = Sum A/ (Sum D + Sum A)				Comments
					Plot 1	Plot 2	Plot 3	Average	
Coyote Willow					A	A	A		
					D	D	D		
Goodding's Willow					A	A	A		no plantings
					D	D	D		
Cottonwood					A	A	A		
					D	D	D		
Long Stem Shrub (specify in					A	A	A		
					D	D	D		
Other					A	A	A		
					D	D	D		

General Site Conditions: no planting yet, very similar to last visit, mesquite thickets & willows along river - grass & disturbed areas

Observed Wildlife: Mourning Dove, White-winged Dove, Roadrunner, House Finch, Barn swallow cottontail, phainopepla

Photos Taken:

Site: Shalem Colony

Date: 08/28/18

Permanent Plot #1

Species	Alive	Stressed	Dead
Coyote willow	108		
Goodding's willow			
Cottonwood			
Hinds	2		
Screwbean	1		

Notes: Natural Coyote willow

Random Plot #1

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Permanent Plot #2

Species	Alive	Stressed	Dead
Coyote willow	8		
Goodding's willow			
Cottonwood			
Hinds	1		
Screwbean	1		

Notes: Natural Coyote

Random Plot #2

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Permanent Plot #3

Species	Alive	Stressed	Dead
Coyote willow	2		
Goodding's willow			
Cottonwood			
Screwbean	3		

Notes:

Random Plot #3

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Permanent Plot #4

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

No random plots as no plantings present.

13:10 PM

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet

Site Vinton A Date 08/29/18

Participants Bryan Zvicanvetky, Pennanne Houghton Target Habitat Rio grande Riverine Rest.

Bulrush - 1%
Saltgrass - 5%
alkali Sacaton - 5%
Sedges: 1%
muhly grass - 1%
wolfberry - 1%
Baccharis - 2%
saltbush
Cynodon - 30%

Identifiable Native Species	Abundance (None, Sporadic individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
Screwbean Mesquite	moderate	30%	
Coyote Willow	Low	75%	on banks
Solanum	moderate	5%	
Milkweed	moderate	5%	

Identifiable Exotic (Non-Native) Species	Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)	Percent Cover (Estimate)	Comments
Saltcedar	Sporadic	2%	resprouts weed pulling
Kochia	High	30%	everywhere
Camel thorn	High	20%	everywhere

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) 30% tree/shrub, 80% grass/forb

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead Average = Sum A/ (Sum D + Sum A) Plot 1	Plot 2	Plot 3	Average	Comments
Coyote Willow	X				A / D	A / D	A / D		
Goodding's Willow	X				A / D	A / D	A / D		
Cottonwood	poles	stressed			A / D	A / D	A / D	100%	mostly v. stressed 3 dead of 15
Long Stem Shrub (specify in					A / D	A / D	A / D		
Other					A / D	A / D	A / D		

General Site Conditions: lots of invasive early successional species. Gopher activity. No random plots done.

Observed Wildlife: White winged Dove, Crissal thrasher, cottontail, gophers, Bullock's Oriole, N. Mockingbird, Barn Swallow, Western Kingbird, Spotted Sandpiper, black-chinned Hummer. Northern Harrier

Photos Taken:

13-10

Site: Vinton A

Date: 08/29/18

Permanent Plot #1

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			
Mesquite	4		

Notes: Mostly very stressed

Random Plot #1

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Permanent Plot #2

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			
honey Mesquite	1		

Notes: Cocklebur + Camelthorn everywhere

Random Plot #2

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Permanent Plot #3

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood	6	91	3

Notes: Mostly v. Stressed

Random Plot #3

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Permanent Plot #4

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

No random plots taken

15:00 1

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet

Site: Vinton B Date: 08/29/18

Participants: BRYAN ZWOLANEK, PEOPLE ALIVE HOUGHTON Target Habitat: RIO GRANDE Riverine Riparian

Jimsonweed 2%
Bulrush 1%
alkali sacaton 1%
Saltgrass 5%
muhlygrass 1%
wolfberry 1%
Baccharis 1%
Honey Mesquite 5%
Cynodon 30%

Identifiable Native Species	Abundance (None, Sporadic individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
Screwbean Mesquite	moderate	30%	
Coyote Willow	low	75%	along banks
Solanum	Moderate	5%	
Milkweed	moderate	5%	

Identifiable Exotic (Non-Native) Species	Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)	Percent Cover (Estimate)	Comments
Saltcedar	Sporadic	1%	resprouts
Camel thorn	High	20%	very common
Kochia	High	20%	very common

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) 30% shrub/tree 70% grass/forb

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead Average = Sum A/ (Sum D + Sum A)				Comments
					Plot 1	Plot 2	Plot 3	Average	
Coyote Willow	transplant	thrive			A	A	A	100%	doing well
					D	D	D		
Gooding's Willow	X				A	A	A		
					D	D	D		
Cottonwood	X				A	A	A		
					D	D	D		
Long Stem Shrub (specify in	X				A	A	A		
					D	D	D		
Other	X				A	A	A		
					D	D	D		

General Site Conditions: Very similar to Vinton A. Some large mesquites, but mostly grass & forbs gopher activity.

Observed Wildlife: White winged dove, mourning dove, Barn swallow, Lincoln sparrow, cottontail

Photos Taken:

Site: Vinton B

Date: 08/29/18

Permanent Plot #1

Species	Alive	Stressed	Dead
Coyote willow	67		
Goodding's willow			
Cottonwood			
Screwbean	3		
honeymesquite	6		

Notes: all transplants doing well at edge of mesquite thicket

Permanent Plot #2

Species	Alive	Stressed	Dead
Coyote willow	38		
Goodding's willow			
Cottonwood			
mesquite	3		

Notes: transplant thriving

Permanent Plot #3

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			
Honey	3		
screwbean	1		

Notes: lots of camel thorn & cynodon

Permanent Plot #4

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Random Plot #1

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Random Plot #2

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Random Plot #3

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

No random plots done

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet 9:55 AM

Site Valley Creek Date 08/29/18

Participants BRYAN ZVOLANEK, PERRIANNE HOUGHTON Target Habitat RIO GRANDE RESTORATION

Identifiable Native Species	Abundance (None, Sporadic individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
Cottonwood	Sporadic	2%	Nice adult trees
Screwbean	Sporadic	2%	Scattered adults
Coyote Willow	Sporadic	>5%	on banks
Chlorocantha Spinosa	Sporadic	5%	on banks
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Percent Cover (Estimate)**	**Comments**
Saltcedar	Sporadic to None	1%	very low
Cynodon		80%	dominant cover

buckhorn

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) _____

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead Average = Sum A/ (Sum D + Sum A)				Comments
					Plot 1	Plot 2	Plot 3	Average	
Coyote Willow	transplant	thriving			A	A	A	100%	doing well
					D	D	D		
Goodding's Willow	none				A	A	A		
					D	D	D		
Cottonwood	poles	stressed			A	A	A	100%	about 1/8-1/2 survives
					D	D	D		
Long Stem Shrub (specify in					A	A	A		
					D	D	D		
Other					A	A	A		
					D	D	D		

General Site Conditions: Large gopher activity, Quite a few trees fallen on ground. Still some surviving Cottonwoods (about 1/8). Some poles mowed down. Almost no tamarisk

Observed Wildlife: Gopher, Black-chinned Hummer, Say's Phoebe, Lincoln Sparrow, Yellow-rumped

Photos Taken: _____

will gopher activity affect health of saplings?

8 dead Cottonwoods, mowed down between plots

9:55 AM

Site: Valley Creek

Date: 08/29/18

Permanent Plot #1

Species	Alive	Stressed	Dead
Coyote willow	23		
Goodding's willow			
Cottonwood	2	2	

Notes: transplant looks good

Permanent Plot #2

Species	Alive	Stressed	Dead
Coyote willow	28		
Goodding's willow			
Cottonwood	1	3	3

Notes:

Permanent Plot #3

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood	1	3	2

Notes:

Permanent Plot #4

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

all very close together. do we want another PP further away?

Random Plot #1

348109
352 5973

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood	3	1	1

Notes:

Random Plot #2

348131
3526073

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood	2	2	
Big Goodings	1		

Notes:

Random Plot #3

348182
3526328

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood	4	2	

Notes: good cottonwoods

Very Stressed or Dead Between plots (orange flags)

Cotton 8 dead (moved)

Post-restoration Monitoring Datasheets

October 2018

Alkali Sacaton
Amaranthus sp
Portacula sp
Chenopodium sp
Ash
Rhus trilobata
Ribes aureum
Fraxinus
Ambrosia

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet

Site: Shalem Colony Date: 10/18/18

Participants: BZ, PH Target Habitat: Riverine Restoration

Identifiable Native Species	Abundance (None, Sporadic individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
Screwbean Mesquite	Moderate	30%	Some big groves
Cynodon Dactylon	Moderate	10%	
Coyote Willow	Low	~3%	on banks
Baccharis	Low	~1%	on banks
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Percent Cover (Estimate)**	**Comments**
Saltcedar			
Kochia Scoparia	Low		
Melilotus alba	Low		

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) ~ 85%

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead Average = Sum A/ (Sum D + Sum A)				Comments
					Plot 1	Plot 2	Plot 3	Average	
Coyote Willow					A	A	A		
					D	D	D		
Goodding's Willow					A	A	A		
					D	D	D		
Cottonwood					A	A	A		
					D	D	D		
Long Stem Shrub (specify in					A	A	A		
					D	D	D		
Other					A	A	A		
					D	D	D		

General Site Conditions: Very Muddy from rain

Observed Wildlife: Pyrrhuloxia, ruby-crowned kinglet, Yellow-rumped Warbler, Barn Swallow, Mourning Doves,

Photos Taken:

Site: Shalem Creek

Date: 10/18/18

Permanent Plot #1

Species	Alive	Stressed	Dead
Coyote willow	123		
Goodding's willow			
Cottonwood			
Honey Mesquite	2		
Screwbean	1		

Notes: Naturally occurring Willows

Random Plot #1

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes: _____

Permanent Plot #2

Species	Alive	Stressed	Dead
Coyote willow	8		
Goodding's willow			
Cottonwood			
Honey Mesquite	1		
Screwbean	1		

Notes: _____

Random Plot #2

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes: _____

Permanent Plot #3

Species	Alive	Stressed	Dead
Coyote willow	2		
Goodding's willow			
Cottonwood			
Screwbean	3		

Notes: _____

Random Plot #3

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes: _____

Permanent Plot #4

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes: _____

Honey Mesquite
Solanum elaeagnifolium
Portulaca sp.
Baccharis Salicifolia or salicina
Lycium sp
Purple fall aster
alkali sacaton
Achnatherum hymenoides
Trianthema portulacastrum
Chloracantha spinosa
Melilotus albus
Chenopodium sp.
4-wing Saltbush
Asclepias subverticillata
Datura wrightii
Carex sp.
Juncus sp.
Russian Thistle

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet

Site: Vinton A Date: 10/19/18

Participants: BZ, PH Target Habitat: Riverine Restoration

Identifiable Native Species	Abundance (None, Sporadic individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
Screwbean Mesquite	Low	5%	scattered groves
Cynodon dactylon	Moderate	20%	dominant grass
Distichlis spicata	Moderate	10%	doing better at this site than others
Coyote Willow	Low	5%	high on banks
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Percent Cover (Estimate)**	**Comments**
Saltcedar	Sporadic	1%	very low at this site
Kochia Scoparia	High	30%	out of control
Camelthorn	High	15%	dominant shrub cover

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) 80%

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead Average = Sum A/ (Sum D + Sum A)				Comments
					Plot 1	Plot 2	Plot 3	Average	
Coyote Willow					A	A	A		
					D	D	D		
Goodding's Willow					A	A	A		
					D	D	D		
Cottonwood					A	A	A	A-1 S-10 D-3	T=14
					D	D	D		
Long Stem Shrub (specify in					A	A	A		
					D	D	D		
Other					A	A	A		
					D	D	D		

General Site Conditions: Kochia has invaded disturbed areas where tamarisk was taken out. Good sedge growth + even some Juncus coming up. Good saltgrass areas

Observed Wildlife: Yellow-faced pocket gopher, white-crowned sparrow, Killdeer, Sora!, Great Blue Heron, Northern Harrier, Osprey, Gambel's Quail, Western Meadowlark, Barn Swallow, Mourning Dove, Red-winged Blackbird, Red-tailed Hawk, House Finch

Photos Taken:

Site: Vinton A

Date: 10/19/18

Permanent Plot #1

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			
Honey Mesquite	4		

Notes: lots of Kochia

Random Plot #1

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Permanent Plot #2

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			
Honey Mesquite	1		

Notes: Lots of Kochia

Random Plot #2

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Permanent Plot #3

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood	1	10	3

Notes: could not find one Cottonwood

Random Plot #3

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Permanent Plot #4

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Asclepias subverticalla
Solanum elaeagnifolium
Chloracantha spinosa
fall purple aster
Cattail sp
Portulaca sp.
Carex
Datura wrightii
Honey Mesquite
Baccharis
Alkali sacaton
Melilotus alba
Achnatherum hymenoides
Chenopodium sp.

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet

Site: Vinton B Date: 10/19/18

Participants: BZ PH Target Habitat: Riverine Restoration

Identifiable Native Species	Abundance (None, Sporadic individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
Screwbean Mesquite	Low	5%	Scattered Groves
Cynodendactylon	High	20%	
Distichlis spicata	High	20%	doing well!
Coyote Willow	Low	5%	high along banks
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Percent Cover (Estimate)**	**Comments**
Saltcedar			
Kochia scoparia	High	~20%	not as bad as Vinton A, but not good.
Camel thorn	Moderate	10%	Dominant herb cover

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) 80%

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead Average = Sum A/ (Sum D + Sum A)				Comments
					Plot 1	Plot 2	Plot 3	Average	
Coyote Willow		thriving			A	A	A		A- 1,048
					D	D	D		
Goodding's Willow					A	A	A		
					D	D	D		
Cottonwood					A	A	A		
					D	D	D		
Long Stem Shrub (specify in					A	A	A		
					D	D	D		
Other					A	A	A		
					D	D	D		

General Site Conditions: Kochia has grown in disturbed ground where tamarisk was removed and in willow berms, Salt grass growth is good.

Observed Wildlife: Yellow-faced pocket gopher, Mourning Dove, Great blue heron, White-crowned Sparrow, Great Egret, Red-winged Blackbird.

Photos Taken:

Site: Vinton B

Date: 10/19/18

Permanent Plot #1

Species	Alive	Stressed	Dead
Coyote willow	75		
Goodding's willow			
Cottonwood			
Honey Mesquite	6		
Screwbean Mes.	3		

Notes: transplant all alive

Random Plot #1

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes: _____

Permanent Plot #2

Species	Alive	Stressed	Dead
Coyote willow	45		
Goodding's willow			
Cottonwood			
Honey Mesquite	3		

Notes: _____

Random Plot #2

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes: _____

Permanent Plot #3

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			
Honey Mesquite	3		
Screw bean	1		

Notes: _____

Random Plot #3

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes: _____

Permanent Plot #4

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes: _____

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet

Site Valley Creek Date 10/17/18

Participants ~~BZ~~, PH, WA Target Habitat Riverine Restoration

Kochia scoparia
Chloracantha Spinosa
Sporobolus airoides
Astragalus lentiginosus
Sphaerophysa Salsula
Russian thistle
Chenopodium leptophyllum
purple fall aster
Datura wrightii
~~Verbena~~
Portulaca oleracea
Melilotus albus
Elymus canadensis
Schoenoplectus pungens
Cyperus sp.
Amaranthus sp.
Typha sp.
Solanum elaeagn. folium

Identifiable Native Species	Abundance (None, Sporadic individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
Coyote Willow	low	5%	
Cynodon dactylon	high	30%	ground cover
Distichus spicata	high	30%	ground cover
screwbean mesquite	low	5%	
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Percent Cover (Estimate)**	**Comments**
Saltcedar	Low	~ 3%	one large missed + many resprouts.

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) _____

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead Average = Sum A/ (Sum D + Sum A)				Comments
					Plot 1	Plot 2	Plot 3	Average	
Coyote Willow		thriving			A	A	A		A - 1288 S - 53
					D	D	D		
Goodding's Willow					A	A	A		
					D	D	D		
Cottonwood		normal			A	A	A		A - 65 S - 50 D - 8 Mowed/lost prev. → 317
					D	D	D		
Long Stem Shrub (specify in					A	A	A		
					D	D	D		
Other					A	A	A		
					D	D	D		

General Site Conditions: Very high kochia in front of transplants. Many poles topped. Lots of pocket gopher activity

Observed Wildlife: American kestrel, yellow-faced pocket gopher, fence lizard, red-winged blackbird, Audubon's warbler, Great Egret, Osprey, sharp-shinned hawk, House finch, Say's Phoebe, Lincoln's Sparrow, Savannah Sparrow, red-shafted flicker, Mourning Dove, White-winged Dove, Northern Mockingbird, Turkey Vulture, Killdeer, Barn Swallow

Photos Taken:

Participants BZ, PH

Date

Groundwater Levels Monitoring Field Sheet

Site	Well ID	TOC Elevation	Ground Surface Elevation	Casing Height	Date	Time	Water Level Reading TOC	Water Depth (Reading TOC - Casing Height)	Comments/Observations
Valley Creek	VC-MW-1	3755.64	3752.26	3.38	10/17/18	1554			208cm 81.9 inches 6.8ft
	VC-MW-2	3754.72	3751.16	3.56	10/17/18	1520			183cm 72 inches 6ft
Vinton A	VA-MW-1	3780.70	3777.44	3.46	10/19/18	0818			120cm 47.2 inches 3.9ft
	VA-MW-2	3780.41	3776.76	3.43	10/19/18	0836			106cm 41.7 inches 3.5ft
Vinton B	VB-MW-1	3777.12	3774.04	3.08	10/19/18	0901			122cm 48 inches 4 ft
	VB-MW-2	3777.31	3773.60	3.71	10/19/18	0914			Could not open lock

Post-restoration Monitoring Datasheets

April 2019

Phoradendron macrophyllum
Solanum elaeagnifolium
Prosopsis glandulosa
Lepidium lasiocarpum
Distichlis spicata
Erioneuron sp.
Sporobolus airoides
Erigeron trayci
Ephedra trifurca
Opuntia engelmannii
Sysymbrium altissimum
Descurainia pinnata
Senecio flaccidus
Machaeranthera tanacetifolia
Phragmites australis
Oenothera pallida

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet

Site Shalem Colony Date 04/16/19

Participants Bryan Zvolanek, Perrianne Houghton Target Habitat ~~Riparian Restoration~~ Screwbean mesquite forest

Identifiable Native Species	Abundance (None, Sporadic Individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
Screwbean Mesquite	Moderate	30%	thick groves
Lycium torreyi	Moderate	10%	
Coyote Willow	High on banks	10%	
Rhus trilobata	low	5%	in screwbean groves
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Percent Cover (Estimate)**	**Comments**
Saltcedar	Sporadic	<1%	
Kochia Scoparia	moderate	10%	

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) 30%

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead Average = Sum A/ (Sum D + Sum A) Plot 1	Plot 2	Plot 3	Average	Comments
Coyote Willow		thriving/normal			A	A	A	80A	Newer coyote transplants not as healthy as prior transplants. Dry river may be a factor.
					D	D	D		
Goodding's Willow		stressed			A	A	A	5A	
					D	D	D	5 missing	
Cottonwood		stressed			A	A	A	3A	
					D	D	D	75	
Long Stem Shrub (specify in		normal			A	A	A	54 A	
					D	D	D		
Other					A	A	A		
					D	D	D		

General Site Conditions: Shrubs look good, but the few poles look like a mess. Most on southward + leaning. Missing all photo + plot T-bars. Shrubs to

Observed Wildlife: White-winged Dove, Barn Swallow, Pyrrhuloxia, Phainopepla, Gray flycatcher, Mourning dove, Wilson's Warbler, Verdin, lesser goldfinch, Black phoebe, yellow-faced pocket gopher, black-chinned hummingbird, Crissal thrasher, American robin, Gambel's quail

Photos Taken:

Butterflies: Sleepy orange, checkered + Cabbage whites, Queen, monarch, field crescent, marine blue, Western pygmy blue

Sporobolus airoides
Cynodon dactylon
Chloracantha spinosa
Lycium torreyi
Baccharis salicifolia
Solanum elaeagnifolium
Lepidium lasiocarpum
Sysimbrium altissimum
Descurainia pinnata
Gessium texanellus
Sessurium vericosum

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet

Site: Vinton A Date: 04/17/19

Participants: Bryan Zvolanek, Perrianne Houghton Target Habitat: Riparian Restoration

Identifiable Native Species	Abundance (None, Sporadic individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
Screwbean Mesquite	Moderate	20%	Scattered grown trees
Coyote Willow	High along banks	10%	High along banks
Distichlis spicata	Moderate	5-10%	2nd most prevalent grass.
Prosopis glandulosa	low	2%	Scattered teney Mesquites
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Percent Cover (Estimate)**	**Comments**
Saltcedar	Sporadic	<1%	just small sprouts
~~Kochia~~ Cynodon dactylon	high Moderate	15%	lots of Kochia
Alhagi maurorum	Moderate	15%	lots of it

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) 85%

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead; Average = Sum A/ (Sum D + Sum A)				Comments
					Plot 1	Plot 2	Plot 3	Average	
Coyote Willow		thriving			A	A	A		Doing great
					D	D	D		
Goodding's Willow		stressed			A	A	A	MA 2A 3S 1D	~50% alive
					D	D	D		
Cottonwood		stressed			A	A	A	4A 4A 5D	~50% alive
					D	D	D		
Long Stem Shrub (specify in		normal			A	A	A		looking good, but Kochia is a concern.
					D	D	D		
Other					A	A	A		
					D	D	D		

General Site Conditions: Kochia is a problem at both Vinton. Plants are coming up in holes for poleplantings & may crowd them out. 2 brushpiles. Disturbed areas ripe for Kochia take over.

Observed Wildlife: Western meadowlark, Gambel's Quail, White-winged dove, red-winged blackbird, black-chinned hummingbird, violet-green swallow, barn swallow, Western Kingbird, turkey vulture, Swainson's hawk, Crissal thrasher, white-crowned sparrow, black-tailed jackrabbit, yellow-faced pocket gopher

Photos Taken:

Site: Vinton A

Date: 04/17/19

Permanent Plot #1

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			
Honey Mesquite	5		
Screwbean	2		

Notes: _____

Random Plot #1

347206
3539070

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow	4	8	1
Cottonwood	12	22	

Notes: Kochia invasion at base of poles.

Permanent Plot #2

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow	3	6	
Cottonwood	21	32	
Screwbean	1	2	

Notes: Kochia at base of planted poles

Random Plot #2

347309
3538997

Species	Alive	Stressed	Dead
Coyote willow	26		
Goodding's willow	7	15	
Cottonwood			

Notes: Kochia at base of planted poles

Permanent Plot #3

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood	1	4	5
Screwbean	1		

Notes: Kochia at base of poles

Random Plot #3

347415
3538812

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood	13	36	

Notes: Kochia at base of poles

Permanent Plot #4

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes: _____

Cynodon dactylon
Solanum elaeagnifolium
Lycium torreyi
Baccharis salicifolia
Chloracantha spinosa
Datura stramonium
Lepidium lasiocarpum
Sisymbrium altissimum
Descurainia pinnata
Cressa truxillensis
Sporobolus airoides
Sesuvium verrucosum

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet

Site: Vinton B Date: 04/17/19

Participants: Bryan Zvolanek, Perrianne Naughton Target Habitat: Riparian Restoration

Identifiable Native Species	Abundance (None, Sporadic individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
Screwbean Mesquite	Moderate	20%	large groves
Coyote Willow	High on banks	10%	
Distichlis spicata	Moderate	15%	2nd most prevalent grass
Honey Mesquite	low	3%	
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Percent Cover (Estimate)**	**Comments**
Saltcedar	Sporadic	<1%	just small shoots
Kochia Scoparia	moderate-high	25%	coming up in disturbed soil
Alhagi maurorum	moderate	15%	

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) 85%

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead. Average = Sum A/ (Sum D + Sum A)				Comments
					Plot 1	Plot 2	Plot 3	Average	
Coyote Willow		thriving			A	A	A	6 A	
					D	D	D		
Goodding's Willow		stressed			A	A	A	14 A 5 S	40% survival (alive)
					D	D	D		
Cottonwood		stressed			A	A	A	9 A 6 S	40% survival (alive)
					D	D	D		
Long Stem Shrub (specify in		normal			A	A	A		looking good, but Kochia coming up
					D	D	D		
Other					A	A	A		
					D	D	D		

General Site Conditions: Never coyote transplants not as vigorous as other sites, but keeping on Kochia is abig concern here, coming up in pole holes, and where ever the ground soil has been disturbed. River is completely dry; brush piles, one of which is very large.

Observed Wildlife: Mourning dove, black-chinned hummingbird, Gambel's Quail, Swainson's hawk, western meadowlark, Cassin's finch, Verdin, yellow-rumped warbler, western kingbird, violet-green swallow, barn swallow, northern mockingbird, white-crowned sparrow, Snowy egret, yellow-faced pocket-gopher, desert cottontail, gray fox (deceased).

Photos Taken: Butterflies: checkered & cabbage whites, western pygmy blue, TX hairstreak blue, field crescent

Site: Vinton B

Date: 04/17/19

Permanent Plot #1

Species	Alive	Stressed	Dead
Coyote willow	69		
Goodding's willow			
Cottonwood			
Screwbean	9		
Honey mesquite	4		
tamarisk	1		

Notes: _____

Random Plot #1

348042
3538157

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow	13	4	
Cottonwood	6	26	

Notes: Kochia at base of pole

Permanent Plot #2

Species	Alive	Stressed	Dead
Coyote willow	40		
Goodding's willow			
Cottonwood			

Notes: _____

Random Plot #2

348134
3538048

Species	Alive	Stressed	Dead
Coyote willow	511	63	
Goodding's willow			
Cottonwood			

Notes: river is dry. May affect transplant health

Permanent Plot #3

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow	1	1	
Cottonwood		8	
Screwbean	1		

Notes: _____

Random Plot #3

348201
3537875

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood	3	26	

Notes: Kochia in pole bases

Permanent Plot #4

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes: _____

Oenothera? Gaura suffulata
Hordeum murinum
Hordeum pusilla
Crossa truxanellus
Sesuvium verrucosum
Lepidium lasiocarpum
Sysybrium altissimum
Descurainia pinnata
Chloracantha spinosa
Polygonum sp.
Pseudognaphalium stamineum
Veronica sp.
Cattail sp.
Oenothera speciosa
Heliotropium curassavicum
Kochia scoparia
Schoenoplectus pungens
Prosopsis glandulosa
Phoradendron macrophyllum

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet

Site: Valley Creek Date: 04/19/19

Participants: Bryan Zwolanek, Perrianne Houghton Target Habitat: RIPARIAN RESTORATION

Identifiable Native Species	Abundance (None, Sporadic individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
Cottonwood	Low	5.1.	mature trees
Distichlis spicata	Moderate	10.1.	2nd most prevalent grass
Screwbean Mesquite	Sporadic	5.1.	scattered mature trees
Coyote Willow	Higher on banks	10.1.	
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Percent Cover (Estimate)**	**Comments**
Saltcedar	Sporadic	<1.1.	very few
Cynodon dactylon	High	~40.1.	most ground cover
Sphaerophysa salsula	Moderate	5.1.	

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) 70.1.

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead; Average = Sum A/ (Sum D + Sum A)				Comments
					Plot 1	Plot 2	Plot 3	Average	
Coyote Willow		thriving			A / D	A / D	A / D	90A	
Goodding's Willow		stressed			A / D	A / D	A / D	25A 175	~45.1. survive alive
Cottonwood		stressed			A / D	A / D	A / D	5A 4S 2D	~45.1. survivable alive
Long Stem Shrub (specify in		normal			A / D	A / D	A / D		
Other					A / D	A / D	A / D		

General Site Conditions: brushpiles, low tamarisk, low kochia (lowest of all sites) transplant Coyote willows look good, fair cotton/Goddings survival

looks like some mistletoe control has taken place. Mistletoe limbs in brush piles

Observed Wildlife: Northern mockingbird, white-winged dove (nesting), Wilson's warbler, yellow-rumped warbler, black-chinned hummingbird, ladder-backed woodpecker

Photos Taken:

Butterflies: checkered white, cabbage white, western pygmy blue, funereal duskywing, pipevine swallowtail

Site: Valley Creek

Date: 04/19/19

Permanent Plot #1

Species	Alive	Stressed	Dead
Coyote willow	90		
Goodding's willow			
Cottonwood		2	

Notes: Coyote Willows looking v. good

Random Plot #1

348113
352584.6

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow	13	8	
Cottonwood			

Notes:

Permanent Plot #2

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood	1	1	2
Honey Mesquite	2		
Screwbean	1		

Notes:

Random Plot #2

348123
352598.2

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow	7	5	
Cottonwood	3		

Notes:

Permanent Plot #3

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood	1	1	

Notes:

Random Plot #3

348184
352630.7

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow	5	4	
Cottonwood			
honey mesquite	5		

Notes: mesquite are small saplings

Permanent Plot #4

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Participants P. Houghton Date 4/17/19 Groundwater Levels Monitoring ~~Field Sheet~~

Site	Well ID	TOC Elevation	Ground Surface Elevation	Casing Height	Date	Time	Water Level Reading TOC	Water Depth (Reading TOC - Casing Height)	Comments/Observations
Valley Creek	VC-MW-1	3755.64	3752.26	3.38 [illegible]	4/19/19	1035	146"	106"	[illegible]
	VC-MW-2	3754.72	3751.16	3.56 = 40"	4/19/19	957	148"	108"	WB → TOC = 227" - 79" = 148 - 40 = 108
Vinton A	VA-MW-1	3780.70	3777.14	3.46 [illegible]	[illegible]	[illegible]	160"	[illegible]	Well [illegible]
	VA-MW-2	3780.41	3776.76	Gr. → TOC 3.43 48"	4/17/19	1346	158"	110"	WB → TOC = 180" - 22 = 158 - 48 = 110
Vinton B	VB-MW-1	3777.12	3774.04	3.08 [illegible]	[illegible]	[illegible]	192"	150"	[illegible]
	VB-MW-2	3777.31	3773.60	3.71	4/17/19	1514	—	—	Not able to open Lock on well
Shulem "									

Post-restoration Monitoring Datasheets

August 2019

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet

Site Shalem Colony Date 8/20/19

Participants K Hucks, P. Houghton Target Habitat Screwbean Mesquite

Identifiable Native Species	Abundance (None, Sporadic individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
See attached			
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Percent Cover (Estimate)**	**Comments**
Saltcedar			
See attached			

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) 75%

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead Average = Sum A/ (Sum D + Sum A)				Comments
					Plot 1	Plot 2	Plot 3	Average	
Coyote Willow		thriving			A	A	A		doing well on banks
					D	D	D		
Goodding's Willow		stressed			A	A	A		
					D	D	D		
Cottonwood		stressed			A	A	A		
					D	D	D		
Long Stem Shrub (specify in		normal			A	A	A		
					D	D	D		
Other					A	A	A		
					D	D	D		

General Site Conditions: split into two days due to storm

Observed Wildlife: See attached

Photos Taken:

Site: Shalem Colony

Date: 8/20 & 8/22, 2019

Permanent Plot #1

Species	Alive	Stressed	Dead
Coyote willow	134		16
Goodding's willow			
Cottonwood			

Notes: t-post missing

Random Plot #1

Species	Alive	Stressed	Dead
Coyote willow	59		
Goodding's willow			
Cottonwood			

Notes:

Permanent Plot #2

Species	Alive	Stressed	Dead
Coyote willow	53		5
Goodding's willow			
Cottonwood			

Notes: t-post missing

Random Plot #2

Species	Alive	Stressed	Dead
Coyote willow	123		
Goodding's willow			
Cottonwood			

Notes:

Permanent Plot #3

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes: nothing planted in plot?

Random Plot #3

Species	Alive	Stressed	Dead
Coyote willow	74		
Goodding's willow			
Cottonwood			

Notes:

Permanent Plot #4

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Site Shalem Colony
Date 8/20/19 / 8/23/19

Identifiable Native Species	Abundance (None, Sporadic, Low, Moderate, High)	Percent Cover (Estimate)	Comments
Prosopis screwbean mesquite	low	20%	
Apocynum milkweed	low	10%	
Solanum night shade	sporadic	5%	
Sporobolus airoides	low	8%	
Machaeranthera aster (purple)	sporadic	2%	
Sporobolus cryptandrus	sporadic	1%	trace
Suaeda nigra	moderate	30%	
Ambrosia sp.	sporadic	2%	
Chloris sp. finger grass	sporadic	1%	
coyote willow Salix exigua	low/mod	15%	
Lycium wolfberry	low	10%	
goathead	sporadic	2%	
cynodon dactylon	low	40%	
sphaeralcea sp. globe mallow	sporadic	1%	
panicum sp.	sporadic	1%	trace
Portulaca sp.	sporadic	1%	trace
Distichlis spicata	low	10%	
Konysa horse weed	low	40%	
aerigeron	sporadic	2%	
Tricetum	sporadic	1%	
Cenha	low	5%	
mistletoe	sporadic	1%	
typha	sporadic	2%	
Opuntia	sporadic	1%	
rhus trilobata	sporadic	2%	
pale evening primrose	sporadic	1%	

Site Shalem Colony
Date 8/20, 8/23/2019

Identifiable Exotic (Non-Native) Species	Abundance (None, Sporadic, Low, Moderate, High)	Percent Cover (Estimate)	Comments
kochia	moderate	20%	
tumbleweed	sporadic	3%	
tamarisk	sporadic	2%	

Site Shalem Colony
Date 8/20/19 & 8/23/19

Type of wildlife	Code	Name
bird	HOFI	House Finch
bird	GAQU	Gambels Quail
bird	BCHU	Black-chinned Hummingbird
bird	MODO	Mourning Dove
bird	BARS	Barn Swallow
bird	SUTA	Summer Tanager
bird	LBWO	Ladder-backed Woodpecker
bird	LEGO	Lesser Goldfinch
bird	AMCR	American Crow
bird	WEKI	Western Kingbird
bird	BLGR	Blue Grosbeak
bird	KILL	Killdeer
bird	VGSW	violet-green swallow
bird	COYE	Common Yellowthroat
bird	YBCH	Yellow-breasted Chat
bird	BEVI	Bell's Vireo
bird	MALL	Mallard
bird	OCWA	Orange-crowned warbler
bird	WIWA	Wilson's warbler
bird	NOMO	Northern Mockingbird
bird	BUOR	Bullock's oriole

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet

Site Vinton A Date 8/22/19

Participants K. Hucks / P. Houghton Target Habitat Riparian Restoration

Identifiable Native Species	Abundance (None, Sporadic individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
See attached			
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Percent Cover (Estimate)**	**Comments**
Saltcedar			
see attached			

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) 90%

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead Average = Sum A/ (Sum D + Sum A)				Comments
					Plot 1	Plot 2	Plot 3	Average	
Coyote Willow	banks	thriving			A	A	A		banks. thick kochia overhead but look good
					D	D	D		
Goodding's Willow		stressed			A	A	A		few planted spots alive
					D	D	D		
Cottonwood		stressed			A	A	A		45% alive, but those look good
					D	D	D		
Long Stem Shrub (specify in		normal			A	A	A		hard to find
					D	D	D		
Other					A	A	A		
					D	D	D		

General Site Conditions: Kochia is high & thick. several planting wells do not contain target species

Observed Wildlife:

Photos Taken: See attached.

Site: Vinton A

Date: 8/22/19

Permanent Plot #1

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood	1		1
Honey Mesquite	2		
Screwbean	1		

Notes: Kochia around

Random Plot #1

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood	10		1
Screwbean	3		

Notes: kochia around

Permanent Plot #2

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow	1		
Cottonwood	20		18

Notes: thick with Kochia

Random Plot #2

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow	1		
Cottonwood	3		2
Screwbean	18		

Notes: Kochia moving in

Permanent Plot #3

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood	1		9
Screwbean	1		

Notes: Kochia throughout

Random Plot #3

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow	1		
Cottonwood	7		10
Screwbean	1		

Notes: Cottonwood: alive dying well

Permanent Plot #4

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Site Vinton A
Date 8/22/19

Identifiable Native Species	Abundance (None, Sporadic, Low, Moderate, High)	Percent Cover (Estimate)	Comments
coyote willow	low	8%	only along banks
screwbean mesquite	moderate	18%	scattered
distichlis spicata	moderate	30%	
baccharis salicifolia	low	5%	
Lycium torreyi	low	3%	
nightshade Solanum elaeagnifolium	moderate	10%	
sesuvium verrocosum	low	1%	
Cenna spp.	moderate	15%	
Cressa truxillensis	low	6%	
Goodding's verbena	low	2%	
cottonwood	low	7%	
honey mesquite	low	5%	scattered
cynodon dactylon	moderate	35%	
tansy aster machaeranthera sp	sporadic	1%	

Site Vinton A
Date 8/22/19

Identifiable Exotic (Non-Native) Species	Abundance (None, Sporadic, Low, Moderate, High)	Percent Cover (Estimate)	Comments
kochia	high	65%	throughout site
tamarix	low	10%	scattered
camelthorn Alhagi sp.	moderate	40%	flowering

Site Vinton A
Date 8/22/19

Type of wildlife	Code	Name
mammal	DECO	desert cottontail
bird	GRRO	Greater Roadrunner
bird	KILL	Killdeer
bird	WEME	Western meadowlark
bird	MODO	Mourning Dove
bird	WWDO	White-winged Dove
bird	YBCH	Black Phoebe
bird	MALL	Mallard
bird	CAEG	Cattle Egret; Flyover
bird	BCHU	Black-chinned hummingbird
bird	BLPH	Black Phoebe
bird	BLGR	Blue Grosbeak
bird	BARS	Barn swallow
bird	GTGR	Great-tailed Grackle
bird	VGSW	Violet-green swallow
bird	WFIB	White-faced Ibis
bird	COYE	Common Yellowthroat
bird	WEKI	Western Kingbird
bird	GAQU	Gambels Quail

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet

Site Vinton B Date 8/22/19

Participants K. Hucks / P. Houghton Target Habitat Riparian Restoration

Identifiable Native Species	Abundance (None, Sporadic individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
See attached			
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Percent Cover (Estimate)**	**Comments**
Saltcedar			
See attached			

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) 55%

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead Average = Sum A/ (Sum D + Sum A)				Comments
					Plot 1	Plot 2	Plot 3	Average	
Coyote Willow		thriving			A	A	A		
					D	D	D		
Goodding's Willow		normal			A	A	A		declining since last visit
					D	D	D		
Cottonwood		stressed			A	A	A		doing ok in some areas
					D	D	D		
Long Stem Shrub (specify in		normal			A	A	A		
					D	D	D		
Other					A	A	A		
					D	D	D		

General Site Conditions: exotic cover relatively high. Plantings doing well in some places but not others

Observed Wildlife: See attached

Photos Taken:

Site: Vinton B

Date: 8/22/19

Permanent Plot #1

Species	Alive	Stressed	Dead
Coyote willow	77		
Goodding's willow			
Cottonwood			
Screwbean	11		

Notes: _____

Random Plot #1

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood	4		21

Notes: _____

Permanent Plot #2

Species	Alive	Stressed	Dead
Coyote willow	35		4
Goodding's willow			
Cottonwood			
Screwbean	6		

Notes: _____

Random Plot #2

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood	6		3
Screwbean	2		

Notes: _____

Permanent Plot #3

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow	1		
Cottonwood			7
Screwbean	1		

Notes: Cottonwoods not doing well

Random Plot #3

Species	Alive	Stressed	Dead
Coyote willow	7		
Goodding's willow	13		
Cottonwood	2		
Screwbean	3		

Notes: plantings doing well here

Permanent Plot #4

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes: _____

Site Vinton B
Date 8/22/19

Identifiable Native Species	Abundance (None, Sporadic, Low, Moderate, High)	Percent Cover (Estimate)	Comments
coyote willow	moderate	15%	concentrated on banks
screwbean	Moderate	20%	
Cynodon dactylon	moderate	25%	
Cressa truxillensis	moderate	10%	
Panicum sp.	low	3%	
Datura stramonium Devil's snare	sporadic	1%	
Lycium torreyi	low	5%	
Cottonwood	low	8%	
Goodding's willow	low	3%	
Cenna sp.	sporadic	2%	
pigweed Cycloma sp.	low	7%	
Sesuvium verrucosum	low	6%	
Nightshade Solanum elaegnifolium	moderate	12%	
sporobolus airoides	low	1%	
distichlis	moderate	20%	
honey mesquite	low	4%	

Site Vinton B
Date 8/22/19

Identifiable Exotic (Non-Native) Species	Abundance (None, Sporadic, Low, Moderate, High)	Percent Cover (Estimate)	Comments
tamarisk	moderate	20%	
Kochia	moderate	35%	
tumbleweed	low	6%	
camel thorn	high	55%	

Site Vinton B
Date 8/22/19

Type of wildlife	Code	Name
bird	YBCH	Yellow-breasted Chat
bird	BLGR	Blue Grosbeak
bird	MODO	Mourning Dove
bird	GAQU	Gambel's Quail
bird	TUVU	Turkey Vulture
bird	SWHA	Swainson's Hawk
bird	ATFL	Ash-throated Flycatcher
bird	EUCD	Eurasian Collared-Dove
bird	WWDO	White-winged Dove
mammal	DECO	desert cottontail
bird	GRRO	Greater Roadrunner
bird	WEKI	Western Kingbird

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet

Site: Valley Creek Date: 8/22/19

Participants: K Hucks / D Hampton Target Habitat: Riparian Restoration

Identifiable Native Species	Abundance (None, Sporadic individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
See attached			

Identifiable Exotic (Non-Native) Species	Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)	Percent Cover (Estimate)	Comments
Saltcedar			
See attached			

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) 30%

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead Average = Sum A/ (Sum D + Sum A) Plot 1	Plot 2	Plot 3	Average	Comments
Coyote Willow		thriving			A	A	A		thriving, recruiting, small [illegible]
					D	D	D		
Goodding's Willow		stressed			A	A	A		45%
					D	D	D		
Cottonwood		stressed			A	A	A		45%
					D	D	D		
Long Stem Shrub (specify in		stressed			A	A	A		50%
					D	D	D		
Other					A	A	A		
					D	D	D		

General Site Conditions: low exotics not much veg structure

Observed Wildlife:

Photos Taken: See attached

Site: Valley Creek

Date: 8/22/19

Permanent Plot #1

Species	Alive	Stressed	Dead
Coyote willow	160		4
Goodding's willow			
Cottonwood	1		

Notes: small willows, thriving

Random Plot #1

Species	Alive	Stressed	Dead
Coyote willow	28		
Goodding's willow			
Cottonwood			
E			
L	9	2	10
A	14		2

Notes:

Permanent Plot #2

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood	1		
(Strawberry)	3		

Notes:

Random Plot #2

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood	1		1
Strawberry	2		

Notes:

Permanent Plot #3

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood	1		1

Notes:

Random Plot #3

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow	3	1	2
Cottonwood	2		1

Notes: plantings doing fairly well

Permanent Plot #4

Species	Alive	Stressed	Dead
Coyote willow			
Goodding's willow			
Cottonwood			

Notes:

Site Vallen Creek
Date 8/22/19

Identifiable Native Species	Abundance (None, Sporadic, Low, Moderate, High)	Percent Cover (Estimate)	Comments
coyote willow Salix exigua	moderate	15%	doing best @ S end
cottonwood	low	9%	
sesuvium verrucosum	moderate	20%	
Cressa truxillensis	moderate	35%	
bladder-vetch Sphaerophysa salsula	low	6%	
Suaeda nigra	moderate	25%	
cynodon dactylon	high	65%	
Distichlis spicata	moderate	18%	
Baccharis salicifolia	sporadic	2%	
Lycium torreyi	low	4%	
saltbush Atriplex canescens	low	5%	
Carex sp.	sporadic	1%	
nightshade Solanum elaeagnifolium	low	8%	
screwbean Prosopsis pubescens	low	5%	
Lactuca serriola	low	9%	
Guara mollis	low	5%	
Goodding's willow Salix gooddingi	sporadic	2%	
dogbane Apocynum cannabinum	sporadic	1%	

Site Valley Creek
Date 8/22/19

Identifiable Exotic (Non-Native) Species	Abundance (None, Sporadic, Low, Moderate, High)	Percent Cover (Estimate)	Comments
kochia	low	5%	
tamarisk	low	7%	
tumble weed	sporadic	1%	

Site Valley Creek
Date 8/22/19

Type of wildlife	Code	Name
bird	HOFI	House Finch
bird	MODO	Mourning Dove
bird	TUVU	Turkey Vulture
bird	VGSW	Violet-green Swallows
bird	GRRO	Greater Roadrunner
bird	RWBL	Red-winged blackbird
bird	WWDO	White-winged Dove

Groundwater Levels Monitoring Field Sheet

Participants K. Hucks, P. Houghton Date 8-22-2019

Site	Well ID	TOC Elevation	Ground Surface Elevation	Casing Height	Date	Time	Water Level Reading TOC	Water Depth (Reading TOC - Casing Height)	Comments/Observations
Valley Creek	VC-MW-1	3755.64	3752.26	3.38 1.0m	8-22-19	1438	180 cm 70.9"	80cm 31.5"	B→TOC = 6.10m, H_2O = 4.30m (610 − 430 = 180 − 100 = 80)
	VC-MW-2	3754.72	3751.16	3.56 1.1m	8-22-19	1402	190 cm 74.9"	79cm 31.1"	B→TOC = 5.82 m, H_2O = 3.89 m (582; 389 = 190 − 110 = 79)
Vinton A	VA-MW-1	3780.70	3777.44	3.46 1.10m	8-22-19	1828	199cm 78.3"	89cm 35.0"	B→TOC = 5.91 m, H_2O = 3.92 m (591 − 392 = 199 − 110 = 89)
	VA-MW-2	3780.41	3776.76	3.43 1.23m	8-22-19	1800	201cm 79.1"	78cm 30.7"	B→TOC = 4.73, H_2O = 2.72m (473 − 272 = 201 − 123 = 78)
Vinton B	VB-MW-1	3777.12	3774.04	3.08 1.6m	8-22-19	1707	224cm 88.2"	64cm 25.2"	B→TOC = 5.83m, H_2O = 3.59m (583 − 359 = 224 − 160 = 64)
	VB-MW-2	3777.31	3773.60	3.71	8/22-19	1642	—	—	Could not open lock, tried WD-40 - possibly broken & jammed
~~Shulem~~ "									

Post-restoration Monitoring Datasheets

October 2019

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet

Site Shalem Colony Date 17 Oct 2019

Participants K. Hucks, S. Allen Target Habitat screwbean mesquite

Identifiable Native Species	Abundance (None, Sporadic individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
See attached			
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Percent Cover (Estimate)**	**Comments**
Saltcedar			
see attached			

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) _____

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead Average = Sum A/ (Sum D + Sum A)				Comments
	found	planted			Plot 1	Plot 2	Plot 3	Average	
Coyote Willow	A = 50	50			A	A	A	✓	100% survival
					D	D	D		
Goodding's Willow	S: 1 D: 3 A: 6	10			A	A	A	7/10	70% survival
					D	D	D		
Cottonwood	S: Ø D: 10 A: Ø	10			A	A	A	Ø/10	Ø% survival
					D	D	D		
Long Stem Shrub (specify in 4-wing	S: 1 D: Ø A: 49	50			A	A	A	50/50	100% survival
					D	D	D		
Other					A	A	A		
					D	D	D		

General Site Conditions: Good survival of all plantings except cottonwoods

Observed Wildlife: see attached

Photos Taken:

Site Shalem Colony
Date 17 Oct 2019

Identifiable Native Species	Abundance (None, Sporadic, Low, Moderate, High)	Percent Cover (Estimate)	Comments
coyote willow	moderate	20%	
Baccharis	low	5%	
screwbean	moderate	18%	
Solanum elaegnifolium	low	7%	
Distichlis spicata	moderate	12%	
cottonwood	sporadic	2%	
Apocynum	low	10%	
Cenna	low	5%	
Panicum sp.	sporadic	1%	
Polygonum sp.	low	3%	
Tricetum	sporadic	1%	
Mistletoe	sporadic	2%	
Rhus trilobata	sporadic	2%	
Opuntia sp.	sporadic	1%	
Ambrosia	sporadic	2%	
Chloris	sporadic	1%	
Sueda nigra	moderate	30%	
Sporobolus constrictus	sporadic	1%	
Sporobolus aeroides	low	8%	
Wolfberry Lycium	low	10%	
Spherolaca Globe mallow	sporadic	2%	
Aerigeron	sporadic	1%	
Konysa	low	4%	
Typha	sporadic	2%	
4-wing saltbush	low	4%	
Gooddings willow	sporadic	2%	

Site Shalem Colony
Date 17 Oct 2019

Identifiable Exotic (Non-Native) Species	Abundance (None, Sporadic, Low, Moderate, High)	Percent Cover (Estimate)	Comments
cynodon dactylon	low	4%	
Kochia	moderate	22%	
tumbleweed	low	3%	
tamarix	sporadic	2%	

Site Shalem Colony
Date 17 Oct 2019

Type of wildlife	Code	Name
bird	HOFI	House Finch
bird	KILL	Killdeer
bird	WCSP	White-crowned Sparrow
bird	LEGO	Lesser Goldfinch

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet

Site Vinton A Date 15-17 October 2019

Participants K. Hucks, N. Arjo, C. Britt, S. Allen Target Habitat Riparian Restoration

Identifiable Native Species	Abundance (None, Sporadic individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
See attached			
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Percent Cover (Estimate)**	**Comments**
Saltcedar			
see attached			

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) _____

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead Average = Sum A/ (Sum D + Sum A)				Comments
	found	planted			Plot 1	Plot 2	Plot 3	Average	
Coyote Willow	D=2 A=2968	2970			A	A	A	2968	100% Survival
					D	D	D	2970	
Goodding's Willow	S=10 D=167 A=176	441			A	A	A	186	42% survival
					D	D	D	441	
Cottonwood	S=40 D=217 A=371	1029			A	A	A	411	40% survival
					D	D	D	1029	
Long Stem Shrub (specify in all	S=21 D=228 A=518	1480			A	A	A	537	36% survival
					D	D	D	1480	
Other					A	A	A		
					D	D	D		

General Site Conditions: Kochia both tall & thick throughout site. Hard to get through all planting areas.

Observed Wildlife: see attached

Photos Taken:

Site Vinton A
Date 15 Oct 2019

Identifiable Native Species	Abundance (None, Sporadic, Low, Moderate, High)	Percent Cover (Estimate)	Comments
Distichlis spicata	moderate	30%	
screwbean	moderate	18%	
Solanum	moderate	10%	
Sueda nigra	low	6%	
honey mesquite	low	5%	
cottonwood	moderate	12%	
Sporobolus airoides	low	4%	
Lepidium sp.	low	2%	
coyote Willow	moderate	15%	
Sesuvium verrocosum	low	4%	
Cenna	moderate	15%	
Cressa truxillensis	low	6%	
Goodding's willow	low	7%	
Machaeranthera	sporadic	1%	
Atriplex canescens	moderate	11%	
Lycium	low	2%	
Desert willow	sporadic	1%	

Site Vinton A
Date 15 Oct 2019

Identifiable Exotic (Non-Native) Species	Abundance (None, Sporadic, Low, Moderate, High)	Percent Cover (Estimate)	Comments
Kochia	high	70%	
tumbleweed	moderate	10%	
Camel thorn	moderate	40%	
cynodon dactylon	moderate	30%	

Site Vinton A
Date 15 Oct 19

Type of wildlife	Code	Name
bird	GAQU	Gambel's Quail
bird	MODO	Mourning Dove
bird	NOHA	Northern Harrier
bird	RTHA	Red-tailed Hawk
bird	AMKE	American Kestrel
bird	COHA	Cooper's Hawk
bird	VGSW	Violet-green Swallow
mammal	BTJA	Black-tailed jackrabbit
bird	MARW	Marsh Wren
bird	BEVI	Bell's Vireo
bird	LEGO	Lesser Goldfinch
mammal	DECO	Desert cottontail
bird	COYE	Common Yellowthroat
bird	YBCH	Yellow-breasted Chat
bird	SOSP	Song Sparrow
bird	WFIB	White-faced Ibis
bird	AMRO	American Robin
bird	WEME	Western Meadowlark
bird	DEJU	Dark-eyed Junco
bird	BARS	Barn Swallow
bird	LISP	Lincoln Sparrow

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet

Site Vinton B Date 15 Oct 2019

Participants K. Hucks, W. Argo, C. Britt, S. Aleen Target Habitat riparian restoration

Identifiable Native Species	Abundance (None, Sporadic individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
See attached			
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Percent Cover (Estimate)**	**Comments**
Saltcedar			
See attached			

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) _____

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead Average = Sum A/ (Sum D + Sum A)				Comments
	found	planted			Plot 1	Plot 2	Plot 3	Average	
Coyote Willow	D=16 A=3045	3061			A	A	A	3045/3061	99.7% survival
					D	D	D		
Goodding's Willow	S=1 D=68 A=88	200			A	A	A	89/200	45% survival
					D	D	D		
Cottonwood	S=4 D=538 A=80	800			A	A	A	84/800	11% survival
					D	D	D		
Long Stem Shrub (specify in all)	S=29 D=48 A=1533	1605			A	A	A	1562/1605	97% survival
					D	D	D		
Other					A	A	A		
					D	D	D		

General Site Conditions: Good shrub survival (saltbush), poor tree survival. good coyote willow survival

Observed Wildlife: see attached

Photos Taken:

Site Vinton B
Date 15 Oct 19

Identifiable Native Species	Abundance (None, Sporadic, Low, Moderate, High)	Percent Cover (Estimate)	Comments
Screwbean	moderate	30%	
Cottonwood	low	9%	
Coyote Willow	moderate	17%	
Cenna sp.	sporadic	2%	
Sesuvium verrocosum	low	7%	
Sueda nigra	low	5%	
Distichelis spicata	moderate	20%	
Purple tansy aster	sporadic	2%	
mustard sp.	sporadic	1%	
Lycium	low	5%	
Erica meria	sporadic	1%	
Solanum Elaeagnofolium	moderate	12%	
Bacharis salicifolia	low	3%	
Honey mesquite	low	4%	
Cyclonia sp.	low	7%	
Cressa Truxillensis	moderate	10%	
Gooddings Willow	low	6%	
Atriplex canescens	moderate	12%	
Panicum sp.	low	3%	
Sporobolus aeroides	low	6%	

Site Vinton B
Date 15 Oct 19

Identifiable Exotic (Non-Native) Species	Abundance (None, Sporadic, Low, Moderate, High)	Percent Cover (Estimate)	Comments
Tamarix	moderate	20%	
kochia	moderate	35%	
tumbleweed	low	6%	
camelthorn	high	55%	

Site Vinton B
Date 15 Oct 19

Type of wildlife	Code	Name
bird	HOSP	House Sparrow
bird	COHA	Cooper's Hawk
bird	SAPH	Says Phoebe
bird	AMKE	American Kestrel
bird	WCSP	White-crowned Sparrow
bird	HOFI	House Finch
bird	SPTO	Spotted Towhee
mammal	DECO	Desert Cottontail
bird	MALL	Mallard
reptile	CSWH	Chihuahuan spotted Whiptail

Restoration Work Effectiveness - Qualitative Monitoring Field Sheet

Site Valley Creek Date 15 Oct 2019

Participants K. Hucks, W. Arjo, C. Britt, S. Allen Target Habitat Riparian Restoration

Identifiable Native Species	Abundance (None, Sporadic individuals, Low, Moderate, High)	Percent Cover (Estimate)	Comments
See attached			
Identifiable Exotic (Non-Native) Species	**Abundance (None, Sporadic individuals, Low, Moderate, High, Monotypic)**	**Percent Cover (Estimate)**	**Comments**
Saltcedar			
See attached			

OVERALL PERCENT COVER OF VEGETATION AT SITE (planted and naturally recruited) _____

Success of plantings:

Species	General Planting Area (s)	Vigor (stressed, normal, thriving)	Density (stems /acre)	Height Range	Survival Rate (average of 3 subplot counts) A = Alive, D = Dead Average = Sum A/ (Sum D + Sum A)				Comments
	found	planted			Plot 1	Plot 2	Plot 3	Average	
Coyote Willow	S: 5 D: 1 A: 1282	1290			A	A	A	1287/1290	100% survival
					D	D	D		
Goodding's Willow	S: 24 D: 52 A: 120	220			A	A	A	144/220	65% survival
					D	D	D		
Cottonwood	S: 13 D: 32 A: 75	440			A	A	A	88/440	20% survival
					D	D	D		
Long Stem Shrub (specify in all)	S: 97 D: 81 A: 691	1020			A	A	A	788/1020	77% survival
					D	D	D		
Other					A	A	A		
					D	D	D		

General Site Conditions: poor cottonwood survival, decent shrub survival

Observed Wildlife: See attached

Photos Taken:

Site Valley Creek
Date 15 oct 2019

Identifiable Native Species	Abundance (None, Sporadic, Low, Moderate, High)	Percent Cover (Estimate)	Comments
Cottonwood	low	10%	
Coyote Willow	moderate	20%	
Lycium	low	9%	
Atriplex canescens	low	8%	
Desert Willow	sporadic	2%	
Screwbean mesquite	low	6%	
Sueda nigra	moderate	25%	
Goodings willow	low	5%	
Solanum elaegnifolium	low	8%	
Purple aster Machaeranthera tanacetifolia	sporadic	1%	
Panicum sp.	low	2%	
Polygonum sp.	low	2%	
Typha sp.	low	3%	
Sporobolis aeroides	low	4%	
Cressa truxillensis	moderate	35%	
Sesuvium verrocosum	moderate	20%	
Baccharis salicifolia	sporadic	2%	
Carex sp.	sporadic	1%	
Lactuca serriola	low	8%	
Apocynum cannabinum	sporadic	1%	
Cenna	low	3%	
Sphaerophysa salsula	low	6%	
NM olive	low	4%	

Site Valley Creek
Date 15 Oct 2019

Identifiable Exotic (Non-Native) Species	Abundance (None, Sporadic, Low, Moderate, High)	Percent Cover (Estimate)	Comments
Kochia	low	5%	
tamarix	low	1e%	
tumbleweed	low	7%	
cynodon dactylon	high	1e5%	

Site Valley Creek
Date 15 Oct 2019

Type of wildlife	Code	Name
bird	MODO	Mourning Dove
bird	HOSP	House Sparrow
bird	GTGR	Great-tailed Grackle
bird	GREG	Great Egret
bird	SNEG	Snowy Egret
bird	GBHE	Great Blue Heron
bird	BCNH	Black-crowned Night-Heron
bird	MALL	Mallard
bird	WWDO	White-winged Dove
bird	WEKI	Western Kingbird
bird	YBCH	Yellow-breasted Chat
bird	SPTO	Spotted Towhee
bird	BLPH	Black Phoebe
bird	NOMO	Northern Mockingbird
bird	ROPI	Rock Pigeon
bird	HOFI	House Finch
bird	KILL	Killdeer
bird	CHSP	Chipping Sparrow
bird	RWBL	Red-winged Blackbird
bird	NOFL	Northern Flicker
bird	BARS	Barn Swallow
bird	WCSP	White-crowned Sparrow

Site Valley Creek
Date 15 Oct 2019

Type of wildlife	Code	Name
bird	VERD	Verdin
bird	YRWA	Yellow-rumped Warbler
bird	SOSP	Song Sparrow
bird	BRBL	Brewer's Blackbird
bird	MARW	Marsh Wren
bird	SAPH	Say's Phoebe

Groundwater Levels Monitoring Field Sheet

Participants K. Hucks Date 15 Oct 2019

Site	Well ID	TOC Elevation	Ground Surface Elevation	Casing Height	Date	Time	Water Level Reading TOC	Water Depth (Reading TOC - Casing Height)	Comments/Observations
Valley Creek	VC-MW-1	3755.64	3752.26	3.38 0.99	10/15	0813	216 cm 85"	117 cm 44.1"	608 - 392 = 216 - 99 = 117 B → TOC: 608 H2O: 392
	VC-MW-2	3754.72	3751.16	3.56 1.05	10/15	0755	225 cm 88.6"	120 cm 47.2"	576 - 351 = 225 - 105 = 120 B → TOC: 576 H2O 351
Vinton A	VA-MW-1	3780.70	3777.44	3.46 1.11	10/15	1334	196 cm 77.2"	85 cm 33.5"	588 - 392 = 196 - 111 = 85 B → TOC: 588 H2O: 392
	VA-MW-2	3780.41	3776.76	3.43 1.26	10/15	1255	223 cm 87.8"	97 cm 38.2"	467 - 244 = 223 - 126 = 97 B → TOC: 467 H2O: 244
Vinton B	VB-MW-1	3777.12	3774.04	3.08 1.10	10/15	1117	224 cm 88.2"	114 cm 44.9"	575 - 351 = 224 - 110 = 114 B → TOC: 575 H2O: 351
	VB-MW-2	3777.31	3773.60	3.71 1.23	10/15	1047	234 cm 92.1"	111 cm 43.7"	480 - 246 = 234 - 123 = 111 B → TOC: 480 H2O: 246
Shulem									

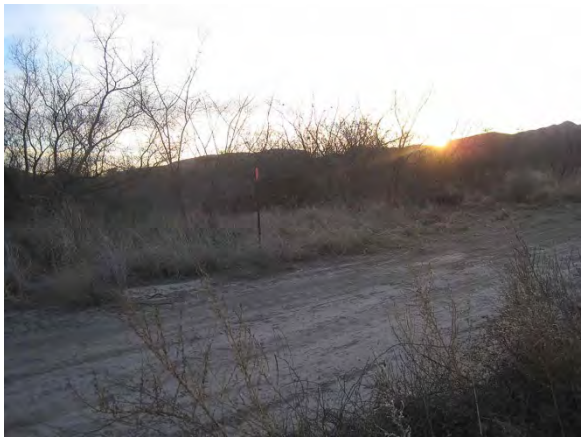
APPENDIX D

Repeat Photos

Shalem Colony Photos

Photo Point 1 Target 1

19 October 2017



6 March 2018

16 May 2018

28 August 2018

18 October 2018

16 April 2019

20 August 2019

17 October 2019

Photo Point 1 Target 2

19 October 2017

6 March 2018

16 May 2018

28 August 2018

18 October 2018

16 April 2019

20 August 2019

17 October 2019

Photo Point 1 Target 3

19 October 2017

6 March 2018

16 May 2018

28 August 2018

18 October 2018

16 April 2019

20 August 2019

17 October 2019

Photo Point 2 Target 1

19 October 2017

6 March 2018

16 May 2018

28 August 2018

18 October 2018

16 April 2019

20 August 2019

17 October 2019

Photo Point 2 Target 2

19 October 2017

6 March 2018

16 May 2018

28 August 2018

18 October 2018

16 April 2019

20 August 2019

17 October 2019

Photo Point 2 Target 3

19 October 2017

6 March 2018

16 May 2018

28 August 2018

18 October 2018

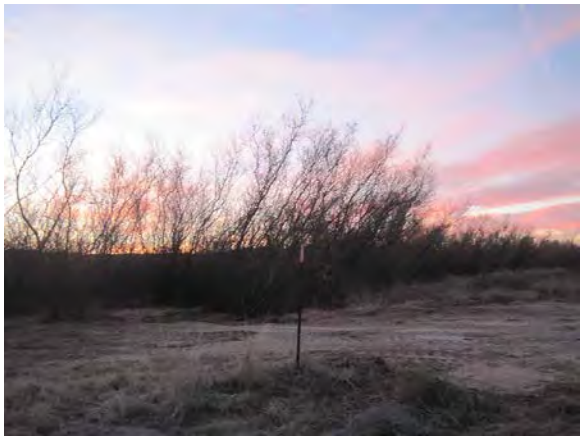
16 April 2019

20 August 2019

17 October 2019

Photo Point 3 Target 1

19 October 2017



6 March 2018

16 May 2018

28 August 2018

18 October 2018

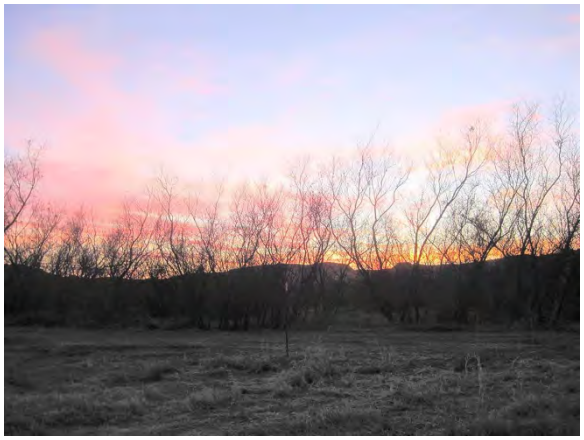
16 April 2019

20 August 2019

17 October 2019

Photo Point 3 Target 2

19 October 2017



6 March 2018

16 May 2018

28 August 2018

18 October 2018

16 April 2019

20 August 2019

17 October 2019

Photo Point 3 Target 3

19 October 2017

6 March 2018

16 May 2018

28 August 2018

18 October 2018

16 April 2019

20 August 2019

17 October 2019

Vinton A Photos

Photo Point 1 Target 1

25 October 2017

6 March 2018

16 May 2018

29 August 2018

19 October 2018

17 April 2019

22 August 2019

15 October 2019

Photo Point 1 Target 2

25 October 2017

6 March 2018

16 May 2018

29 August 2018

19 October 2018

17 April 2019

22 August 2019

15 October 2019

Photo Point 1 Target 3

25 October 2017

6 March 2018

16 May 2018

29 August 2018

19 October 2018

17 April 2019

22 August 2019

15 October 2019

Photo Point 2 Target 1

25 October 2017

6 March 2018

16 May 2018

29 August 2018

19 October 2018

17 April 2019

22 August 2019

15 October 2019

Photo Point 2 Target 2

25 October 2017

6 March 2018

16 May 2018

29 August 2018

19 October 2018

17 April 2019

22 August 2019

15 October 2019

Photo Point 2 Target 3

25 October 2017

6 March 2018

16 May 2018

29 August 2018

19 October 2018

17 April 2019

22 August 2019

15 October 2019

Photo Point 3 Target 1

25 October 2017

6 March 2018

16 May 2018

29 August 2018

19 October 2018

17 April 2019

22 August 2019

15 October 2019

Photo Point 3 Target 2

25 October 2017

6 March 2018

16 May 2018

29 August 2018

19 October 2018

17 April 2019

22 August 2019

15 October 2019

Photo Point 3 Target 3

25 October 2017

6 March 2018

16 May 2018

29 August 2018

19 October 2018

17 April 2019

22 August 2019

15 October 2019

Vinton B Photos

Photo Point 1 Target 1

25 October 2017

6 March 2018

16 May 2018

29 August 2018

19 October 2018

17 April 2019

22 August 2019

15 October 2019

Photo Point 1 Target 2

25 October 2017

6 March 2018

16 May 2018

29 August 2018

19 October 2018

17 April 2019

22 August 2019

15 October 2019

Photo Point 1 Target 3

25 October 2017

6 March 2018

16 May 2018

29 August 2018

19 October 2018

17 April 2019

22 August 2019

15 October 2019

Photo Point 2 Target 1

25 October 2017

6 March 2018

16 May 2018

29 August 2018

19 October 2018

17 April 2019

22 August 2019

15 October 2019

Photo Point 2 Target 2

25 October 2017

6 March 2018

16 May 2018

29 August 2018

19 October 2018

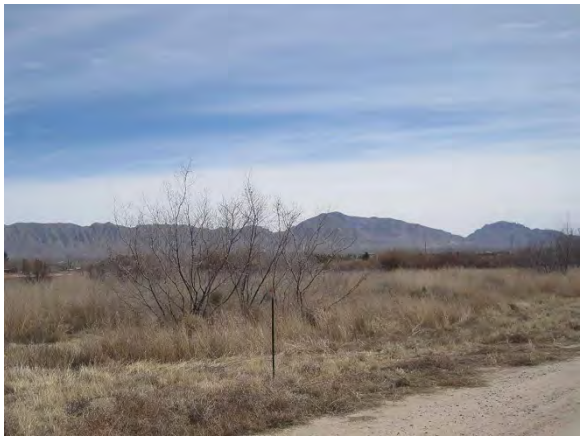
17 April 2019

22 August 2019

15 October 2019

Photo Point 2 Target 3

25 October 2017



6 March 2018

16 May 2018

29 August 2018

19 October 2018

17 April 2019

22 August 2019

15 October 2019

Photo Point 3 Target 1

25 October 2017

6 March 2018

16 May 2018

29 August 2018

19 October 2018

17 April 2019

22 August 2019

15 October 2019

Photo Point 3 Target 2

25 October 2017

6 March 2018

16 May 2018

29 August 2018

19 October 2018

17 April 2019

22 August 2019

15 October 2019

Photo Point 3 Target 3

25 October 2017

6 March 2018

16 May 2018

29 August 2018

19 October 2018

17 April 2019

22 August 2019

15 October 2019

Valley Creek Photos

Photo Point 1 Target 1

10 November 2017

5 February 2018

15 May 2018

29 August 2018

17 October 2018

19 April 2019

22 August 2019

15 October 2019

Photo Point 1 Target 2

10 November 2017

5 February 2018

15 May 2018

29 August 2018

17 October 2018

19 April 2019

22 August 2019

15 October 2019

Photo Point 1 Target 3

10 November 2017

5 February 2018

15 May 2018

29 August 2018

17 October 2018

19 April 2019

22 August 2019

15 October 2019

Photo Point 2 Target 1

10 November 2017

5 February 2018

15 May 2018

29 August 2018

17 October 2018

19 April 2019

22 August 2019

15 October 2019

Photo Point 2 Target 2

10 November 2017

5 February 2018

15 May 2018

29 August 2018

17 October 2018

19 April 2019

22 August 2019

15 October 2019

Photo Point 2 Target 3

10 November 2017

5 February 2018

15 May 2018

29 August 2018

17 October 2018

19 April 2019

22 August 2019

15 October 2019

Photo Point 3 Target 1

10 November 2017

5 February 2018

15 May 2018

29 August 2018

17 October 2018

19 April 2019

22 August 2019

15 October 2019

Photo Point 3 Target 2

10 November 2017

5 February 2018

15 May 2018

29 August 2018

17 October 2018

19 April 2019

22 August 2019

15 October 2019

Photo Point 3 Target 3

10 November 2017

5 February 2018

15 May 2018

29 August 2018

17 October 2018

19 April 2019

22 August 2019

15 October 2019

Photo Point 4 Target 1

10 November 2017

5 February 2018

15 May 2018

29 August 2018

17 October 2018

19 April 2019

22 August 2019

15 October 2019

Photo Point 4 Target 2

10 November 2017

5 February 2018

15 May 2018

29 August 2018

17 October 2018

19 April 2019

22 August 2019

15 October 2019

Photo Point 4 Target 3

10 November 2017

5 February 2018

15 May 2018

29 August 2018

17 October 2018

19 April 2019

22 August 2019

15 October 2019