

## **Final Project Report**

**Project Title: Muddy River Habitat Restoration**

**Project Number: 2013-NPS-1446D**

### **Executive Summary:**

Clark County, NV Desert Conservation Program and the National Park Service Lake Mead Exotic Plant Management Team (LAKE EPMT) entered into a partnership agreement beginning in April 2018 through August 2019 to conduct habitat restoration involving invasive plant control, native plant propagation, grow out and transplanting, site maintenance and monitoring. The restoration site is located along the Muddy River Parcel E of the Muddy River Reserve Unit, Moapa, Nevada.

This work was supported by the Clark County Desert Conservation Program and funded by Southern Nevada Public Land Management Act as project #2013-NPS-1446D, to further implement or develop the Clark County Multiple Species Habitat Conservation Plan.

### **Introduction:**

The purpose of this project is to conduct riparian restoration on the Clark County Desert Conservation Program (DCP) Muddy River Reserve Unit E to enhance habitat for Multiple Species Habitat Conservation Plan (MSHCP) covered species and increase connectivity to the riparian zone by expanding the streamside habitat.

The goal of this project is to provide restoration services for the enhancement of habitat for native riparian species of concern for the MSHCP.

Non-native invasive plants and other weeds are commonly known to degrade ecological habitats, alter potential desirable native plant community recovery, reduce overall potential for wildlife diversity and increase wildfire potential including fire frequency and intensity. Some weeds are categorized by the State of Nevada as noxious, which land owners are required by law to control. Weed management is a vital component of not only being a good land steward and neighbor within a community but is a critical step toward restoring lands for maximizing native species habitats.

Once undesirable plants are controlled then desirable vegetation can be planted through active revegetation, and natural re-colonization of desirable plants can occur, referred to as passive restoration.

## **Methods and Materials:**

The first phase of this project was to control undesirable vegetation from the unit and determine which native plant species to revegetate the area, according to soil and hydrologic site conditions that are capable of supporting and sustaining these desired species. Plants species were then ordered and produced by the NPS Song Dog Nursery at Lake Mead National Recreation Area.

Much of the undesirable vegetation was removed by heavy equipment, and herbicide was later applied to tamarisk re-sprouts using the low volume basal spray method with 20% Garlon 4 Ultra herbicide mixed with 80% Improved JLB basal oil. Cut stump treatment of tamarisk was also applied using the same herbicide to many trees that were along the banks. Some aquatic herbicide was used on tamarisk trees growing directly over or next to the water. Ropes and pole saws were used for some tamarisk trees along the edge of steep banks to keep the trees from falling in the river. Tamarisk tree slash was windrow piled at the base of the road, which can be used for barricading and/or vertical mulch.

Plant surveys and treatments were accomplished by systematically covering the area on foot by using a grid-type pattern to ensure thorough coverage.

Non-native plant surveys were conducted during site monitoring visits. Non-native annual and perennial plant species were documented during surveys and geospatially recorded using hand held global positioning system (GPS units) devices including computer tablets and mobile phones. All plant inventories and treatments were recorded with GPS using standards according to the North American Invasive Species Management Association (NAISMA.org). Project related photographs were taken using digital cameras, and cameras within phones and tablets.

Weed treatments primarily consisted of two methods including mechanical and chemical. Mechanical methods included hand pulling or hoeing with a hand tool for small isolated annual weed populations encountered. The majority of weeds were treated using spot foliar herbicide method applied with back pack sprayers equipped with adjustable nozzles.

Revegetation included using the deep planting of long stem plant method for shrubs and trees planted on site. For a description of this method refer to Dreesen and Fenchel, Los Lunas Plant Material Center, USDA-NRCS, NM. Approximately 18 inch length coyote willow (*Salix exigua*) cuttings were also planted by sticking directly into moist soil along the streambank by hand. These cuttings were collected at the nursery coppice yard by using loppers and pruning shears and hauled in water tub containers. Perennial grass was transplanted using traditional planting methods, not deep planting. Plants were hauled to the site directly from the nursery in a covered truck. Tubex brand tree shelters were installed on each transplant except the grass to

protect from herbivory and to assist with monitoring and to concentrate watering down into the tube.

Monthly watering of plants was conducted by hauling a 300 gallon water trailer tank to the site and then transferred to 5 gallon buckets and each plant was watered with an average of 2-3 gallons.

**Results:**

Three species of weeds were treated during the project. 139 native trees, shrubs and grasses were planted. Approximately 1,500 gallons of total water was applied to the plants during the project. For more detailed project results please refer to the following tables, data summaries, maps and project photos.



## Lake Mead Inter-Regional Exotic Plant Management Team Treatments

**Partner:** Clark County  
**Location:** Muddy River Reserve Unit E  
**Dates:** 6/14/2019, 7/10/2019

**Treatment Methods:** Foliar Spot, Basal Bark

**Herbicide Concentrate:** 0.0225 gal Roundup Pro Concentrate  
0.0225 gal Weedar 64  
2.5 floz Polaris

**Herbicide Mixture Rate:** Mix #1: 1% Roundup Pro Concentrate, 1% Weedar 64 (0.25% Target Pro)  
Mix #2: 10 floz/gal Polaris (0.5% Target Pro)

**Herbicide Total Mix:** Mix #1: 2.25 gal  
Mix #2: 0.25 gal

Treatment Summary				
Species	Total Surveyed Acres	Net Infested Acres	Gross Infested Acres Treated	Net Treated Acres
<i>Salsola kali</i> Russian thistle	0.51	0.12	0.72	0.0036
<i>Tamarix ramosissima</i> Tamarisk	0.51	0.004	0.004	0.0006
<i>Centaurea melitensis</i> Maltese star thistle	0.51	0.0001	0.0001	0.0001

These definitions are based on NAISMA standards please visit [www.naisma.org](http://www.naisma.org) for more information. These definitions can also be found on the back of this report. For Questions please contact Curt Deuser at [curt\\_deuser@nps.gov](mailto:curt_deuser@nps.gov) (702) 293 - 8979

**Partner:** Clark County  
**Location:** Muddy River Reserve Unit E  
**Dates:** 3/19/2019

**Treatment Methods:** Revegetation, Basal Bark

**Herbicide Concentrate:** 0.1 gal Garlon 4 Ultra

**Herbicide Mixture Rate:** 20% Garlon 4 Ultra, 80% JB Oil Plus

**Herbicide Total Mix:** 0.5 gal

**Total Area Revegetated:** 0.5 acres

Treatment Summary				
Species	Total Surveyed Acres	Net Infested Acres	Gross Infested Acres Treated	Net Treated Acres
<i>Tamarix ramosissima</i> Tamarisk	0.51	0.1	0.1	0.0005

Revegetation Summary				
Species	1 Gallon Count	5 Gallon Count	Pole Cutting Count	Total Count
<i>Prosopis glandulosa</i>	5	12		17

<i>Prosopis pubescens</i>	10			10
<i>Populus fremontii</i>	5			5
<i>Salix exigua</i>	10		60	70
<i>Salix goodiingii</i>	10			10
<i>Sporobolus airoides</i>	57			57
<i>Chilopsis linearis</i>	10			10
<i>Baccharis salicifolia</i>	20			20

### Acreage Definitions

**Surveyed Area**

Any area covered during the course of weed management / control activities. An area may be considered “surveyed” regardless of the presence / absence of target weed species. Surveyed area is obtained by GPSing the perimeter, GPSing perimeter points or digitized on screen using landform references.

**Gross Infested Area**

The gross infested area is defined as the general perimeter of the infestation. Gross infested areas contain the target species and the spaces between populations or individuals. A gross infested area is calculated by adding up the total acreage of all mapped weed infestations, without taking into account percent cover.

**Net Infested Area**

Actual area occupied by weed species within the gross infested area, which does not contain the spaces between individuals and populations. The total infest area (with the gross infested area) may be comprised of multiple infested areas, described by polygons, buffered points, buffered lines, or be calculated as the result of a stem count in which each individual is assigned a coverage multiplier.

**Net Treated Area**

Treated area is either the infested area or subset of an infested area which has received treatment action. Treatment area is calculated using the same standards as infested area.

\* All of these terms apply to single species measurements. When there is more than one weed species in an area, the above measurements need to be applied to each species (population) individually.



**Distribution Form**  
 Lake Mead National Recreation Area  
 Song Dog Native Plant Nursery  
 Resource Management and Visitor Services  
 601 Nevada Way Boulder City, NV 89005  
 Office: 702-293-8776



NATIVE PLANT NURSERY

<b>Requesting Agency</b>	
Name:	Curt Deuser
Agency:	NPS - EPMT
Project Name:	Muddy River
Address:	
Phone:	

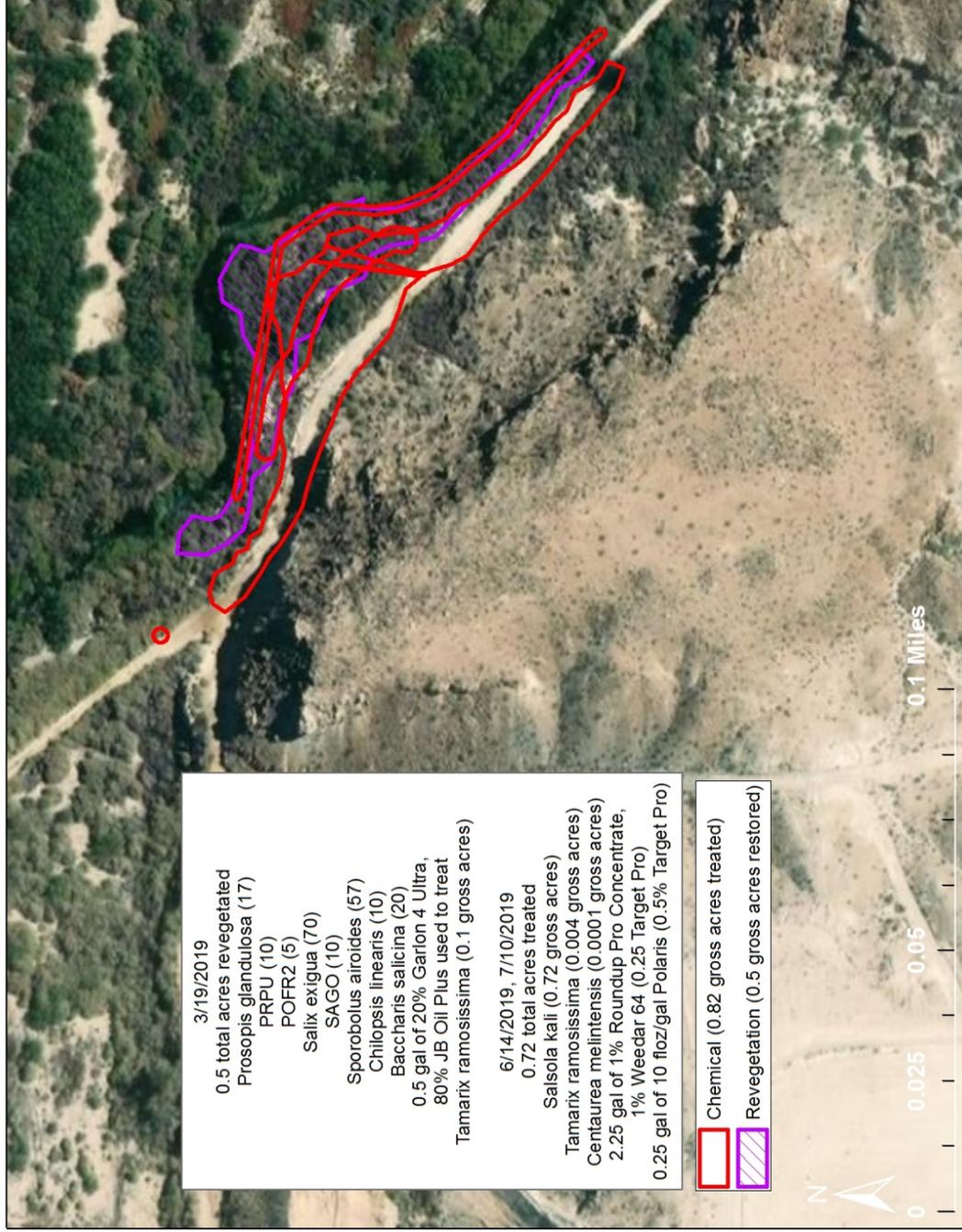
<b>Distribution Number:</b>	2019-9011
<b>Request Date:</b>	May 2018
<b>Pick-up Date:</b>	3/18/2019

Plant (Scientific Name)	Pot Size	Quantity	Pot Price	Total
Desert willow ( <i>Chilopsis linearis</i> )	1-gallon	10	\$4.00	\$40.00
Velvet ash ( <i>Fraxinus velutina</i> )	1-gallon	0	\$4.00	\$0.00
Honey mesquite ( <i>Prosopis glandulosa</i> )	1-gallon	5	\$4.00	\$20.00
Screwbean mesquite ( <i>Prosopis pubescens</i> )	1-gallon	10	\$4.00	\$40.00
Cottonwood ( <i>Populus fremontii</i> )	1-gallon	5	\$4.00	\$20.00
Coyote willow ( <i>Salix exigua</i> )	1-gallon	10	\$4.00	\$40.00
Gooddings willow ( <i>Salix gooddingii</i> )	1-gallon	10	\$4.00	\$40.00
Alkali sacaton ( <i>Sporobolus airoides</i> )	1-gallon	57	\$4.00	\$228.00
Sticky seepwillow ( <i>Baccharis salicifolia</i> )	1-gallon	20	\$4.00	\$80.00
Honey mesquite ( <i>Prosopis glandulosa</i> )	5-gallon	12	\$10.00	\$120.00
	<b>Totals</b>	<b>139</b>		<b>\$628.00</b>

Signature and Date: \_\_\_\_\_



# 2019 LAKE EPMT Muddy River Reserve Habitat Restoration



## Project Photos



Photo 1. Lake Mead EPMT briefing before work begins.



Photo 2. Using power auger to dig deep holes for planting.



Photo 3. Using power auger to dig deep holes for planting.



Photo 4. Looking down into auger hole with new mesquite transplant before backfilling.



Photo 5. Watering plant through top of Tubex tree shelters.



Photo 6. View of scattered placement of plantings utilizing natural low spots.

### **Evaluation and Discussion:**

Weed treatments have been effective. Many of the more desirable plants are resprouting after the initial grading of the site. The revegetation is doing well and many of the plants are still alive, although mortality of some plants has occurred. Quail bush seedlings have been observed coming into the site which will help prevent future weeds from colonizing and help increase plant cover on the site. The grading removal of some of the vegetation on the site was very helpful with gaining access and clearing space for more desirable vegetation.

### **Conclusions and Recommendations:**

Continue to monitor and treat for weeds. Malta Starthistle and Russian thistle weeds will likely continue to recruit into the site due to the ground disturbance related to the grading and some of the pre-restoration activities. We also recommend continued watering of the transplants for the remainder of the summer through October 2019, totaling 3 additional watering events. We also recommend some supplemental planting of approximately 8 ash trees and up to 100 more *salix exigua* willow cuttings along the banks. We recommend placing restoration signs up adjacent to the road and possibly some sort of roadside barrier if vehicles drive into the site. The tamarisk slash may work well for a nice natural barrier. We are interested and willing to continue with future work on this project site.

### **Acknowledgements:**

Report prepared by the Lake Mead Exotic Plant Management Team (LAKE EPMT). Project reporting and data management production by Rachel Skoza, LAKE EPMT. Report narrative, analysis and recommendations prepared by Curt Deuser. Thanks to the field work completed by many individuals from the LAKE EPMT.

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### **References:**

David Dreesen and Gregory Fenchel. "Deep Planting Long-Stem Nursery Stock: An Innovative Method to Restore Riparian Vegetation in the Arid Southwest". Technical Note. Rangelands 36(2): 52-56

North American Invasive Species Management Association, Weed Mapping Standards, [www.naisma.org](http://www.naisma.org)

Nevada Department of Agriculture, State Listed Noxious Weeds.  
[http://agri.nv.gov/Plant/Noxious\\_Weeds/Noxious\\_Weed\\_List/](http://agri.nv.gov/Plant/Noxious_Weeds/Noxious_Weed_List/)

Johnson, K. A. (2000). *Sporobolus airoides*. Retrieved 01 20, 2012, from U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory:  
<http://www.fs.fed.us/database/feis/>