

CLARK COUNTY DCP AND NATIONAL PARK SERVICE

# Boulder City Conservation Easement Weed Survey 2021 Annual Report

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Clark County DCP Project Number 2017-NPS-1710B



## **Annual Report**

**Project Title: Boulder City Conservation Easement Weed Survey**

**Project Number: 2017-NPS-1710B**

**Deliverable: D31**

### **Executive Summary:**

Clark County, NV and the National Park Service Lake Mead Invasive Plant Management Team (LAKE IPMT) entered into a partnership agreement contract two year renewal beginning in December 2019 through November 2021 to survey and treat invasive weed species on the Clark County Desert Conservation Program (DCP) Boulder City Conservation Easement (BCCE) properties.

The main purpose of this project is to conduct surveys of routes in the BCCE to detect non-native vegetation and conduct targeted treatments of existing occurrences of invasive, non-native vegetation. The survey area includes 95 miles of open public roads and 43 miles of private right-of-way maintenance roads. The location and extent of infestations were recorded with GPS units, and treatments of exotics were completed on a prioritized basis. Project Deliverables and Milestones due dates are described in detail on a table in the appendix. A lot of valuable information has been exchanged and vegetation management work has been accomplished on the ground to meet current site objectives.

The project has been successful at detecting and controlling small populations of high priority weeds such as Sahara mustard (*Brassica tournefortii*) in isolated areas within the BCCE. Buffel grass (*Cenchrus ciliaris*) was previously detected and treated on the BCCE, this find was very alarming and is only the second report of this species found in Clark County ever according to our knowledge. And we are encouraged to find that no living buffel grass plants were found in 2021 due to our treatments funded by this project. With the exception of mediterranean grass (*schismus sp*) on certain years, most of the acreage and routes within the BCCE do not currently contain many weeds.

This work was supported by the Clark County Desert Conservation Program and funded by Section 10, as project 2017-NPS-1710B, to further implement or develop the Clark County Multiple Species Habitat Conservation Plan.

## **Introduction:**

The primary purpose of this project is to conduct weed surveys along the BCCE travel routes and conduct targeted treatments of priority weeds. 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. The goal of this project is to support vegetation management and maintenance activities in the BCCE to maintain and improve desert tortoise habitat. The objectives include conducting winter, spring and summer weed surveys and control treatments by surveying roadsides within the BCCE. Weed treatments will focus on incipient populations to prevent new weeds from establishing on a widespread basis. A list of plants observed is provided along with data and reports.

## **Methods and Materials:**

Methods include on the ground ocular surveys primarily by vehicle and sometimes on foot by field crews. Surveys were conducted up to 10 meters on each side of roads/routes. However, once targeted weedy plants were detected within the initial survey zone, continued surveys would occur on foot beyond the 10 meters of roadside to determine the extent of the population. Typically a driver and a passenger/surveyor conducted the surveys in a four wheel drive pick-up truck travelling 5 to 10 miles per hour, road conditions permitting. Locations of noxious weeds and treatments were recorded with mapping-grade global positioning system (hand-held tablets such as iPads or iPhones) units and input and processed into GIS computer programs back in the office. Treatment methods included selective spot foliar herbicide applications to targeted weeds using 4 gallon backpack sprayers with adjustable nozzles and pressure. This is a low impact and selective method that causes minimal to no harm to existing desirable vegetation on site. Hand pulling and hoeing of weeds was also utilized when appropriate.

Non-native plant surveys were conducted at least two seasons a year during the winter and spring/summer time periods for the first 8 months of this project (2020). Twice-a-year surveys during these time periods were designed to detect a variety of species that may emerge during weather patterns related to these seasons. Non-native annual and perennial plant species were documented during surveys and geospatially recorded using hand held global positioning system (GPS) devices. 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 or phone cameras.

East-west trending Quail Wash on the northern boundary of the northeast unit just south of Boulder City was surveyed and treated on foot since higher densities of Sahara mustard were again found in this area. This area will require further monitoring and treatment for Sahara mustard in the future.

**Results:**

For project results please refer to the following Data Summaries, Maps and Plant List. Pages 5-12.



**IPMT**  
 Invasive Plant  
 Management Team  
 Lake Mead



**Lake Mead Invasive Plant  
 Management Team Treatments**

**Partner:** Clark County Desert Conservation Program  
**Location:** Boulder City Conservation Easement  
**Dates:** 2/11/2021, 2/17/2021, 4/15/2021, 8/16-18/2021, 8/23-25/2021

**Treatment Methods:** Foliar Spot

**Herbicide Concentrate:** 0.42 gal Roundup Pro Concentrate

**Herbicide Mixture Rate:** Mix #1: 2% Roundup Pro Concentrate (0.5% Alligare 90)

**Herbicide Total Mix:** Mix #1: 21 gal

**Accomplishments**

Species	Total Surveyed Acres	Infested Acres	Gross Infested Acres Treated	Treated Acres
<i>Brassica tournefortii</i> Sahara Mustard	838	0.004	NA	NA
<i>Sisymbrium altissimum</i> Tall Tumblemustard	838	0.0004	NA	NA
<i>Salsola kali</i> Russian Thistle	838	0.1	NA	NA
<i>Erodium cicutarium</i> Stork's bill	593	0.7	NA	NA
<i>Bromus diandrus</i> Smooth brome	838	0.00005	NA	NA
<i>Schismus arabicus</i> Arabian Schismus	593	0.0007	NA	NA

<i>Tribulus terrestris</i> Puncturevine	196	0.98	7.6	0.1
<i>Sorghum bicolor</i> Sorghum	4.5	0.02	4.5	0.02
<i>Tripleurospermum perforatum</i> False Mayweed	630.6	219.3	NA	NA

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

## 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.

### 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.

### Treated Area

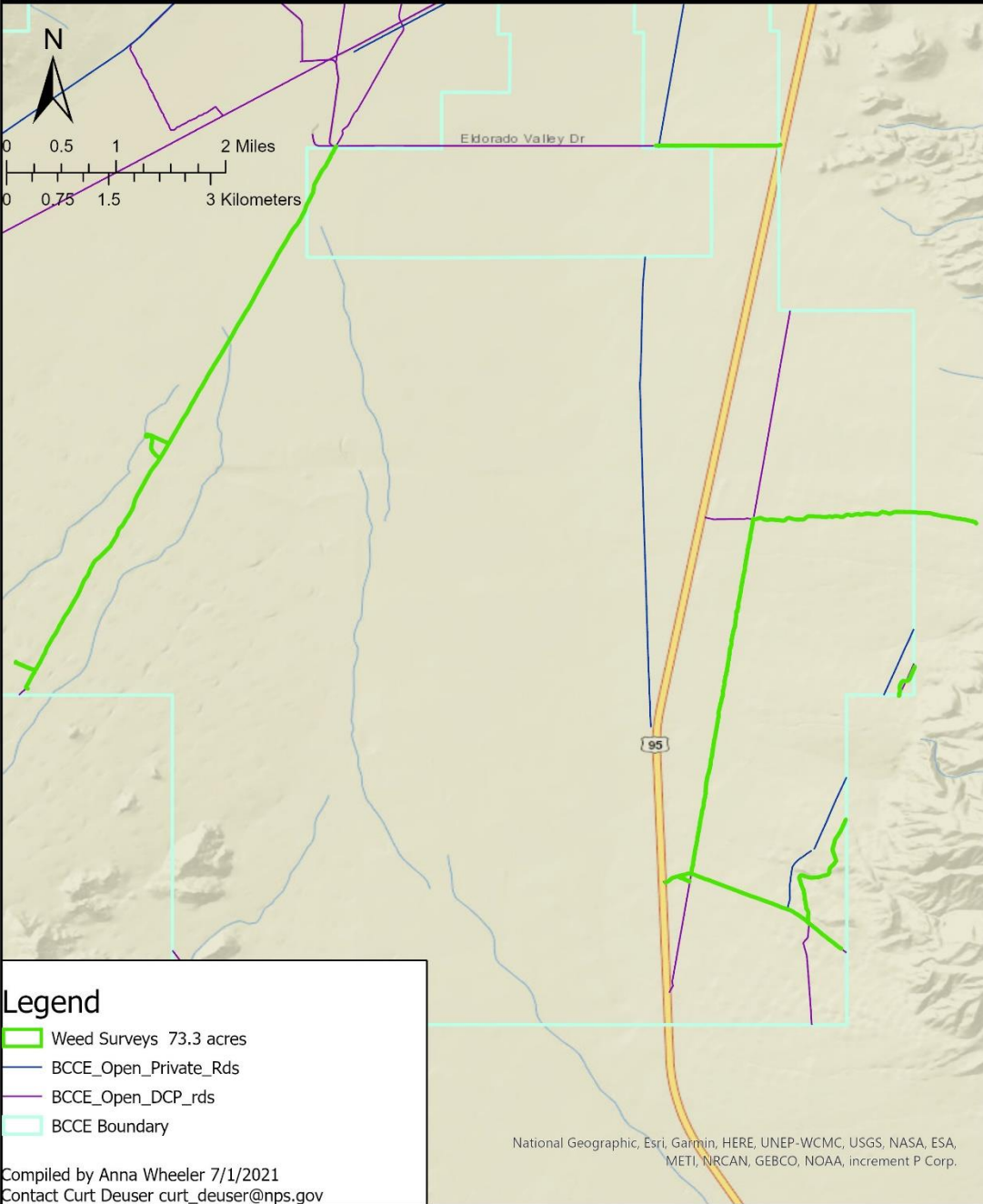
Treated area is either the infested area or subset of an infested area which has received treatment action. Treatment area is calculated using the same standards as infested area.

\* 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



# BCCE April 2021 Surveys

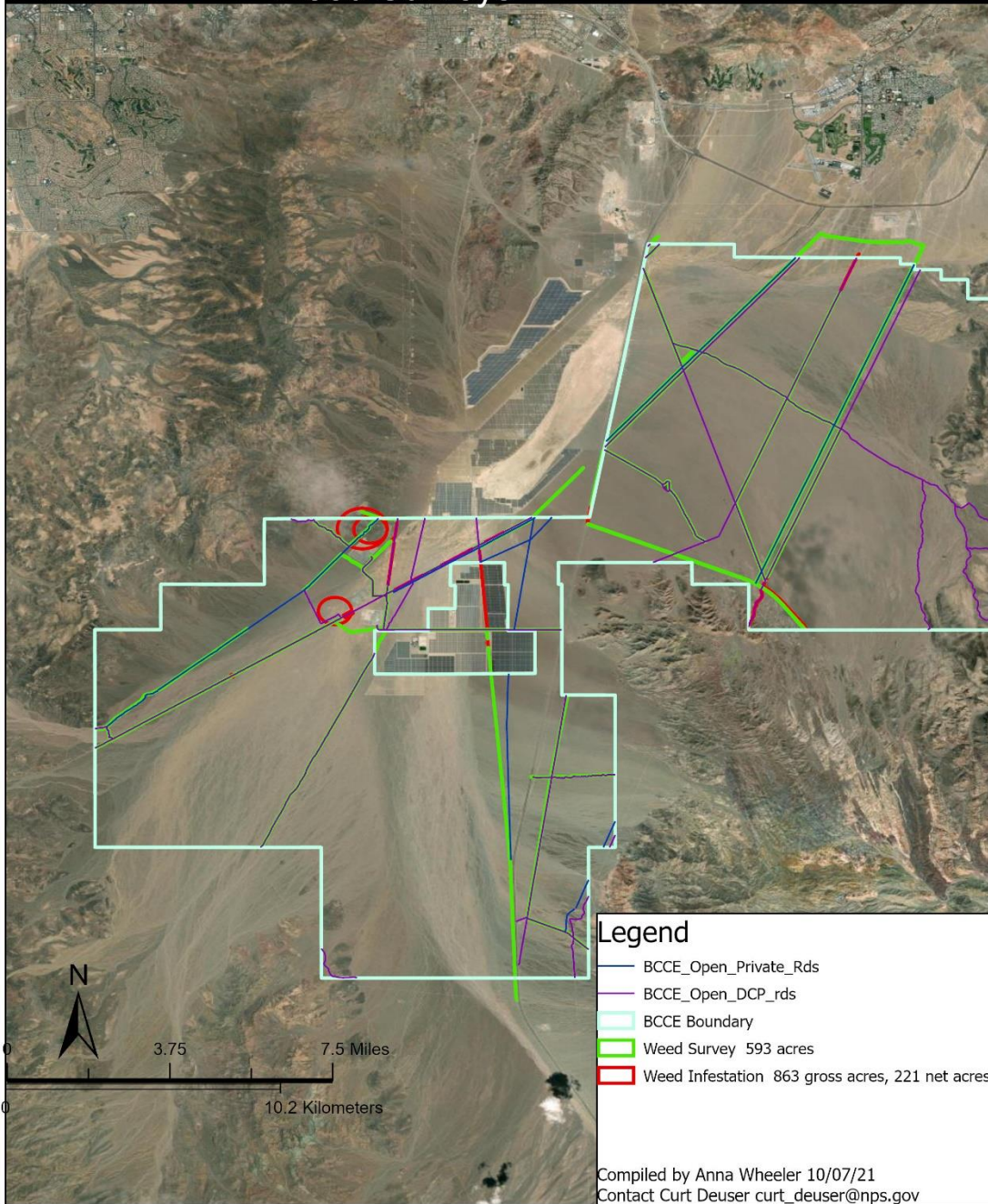
Lake Mead IPMT  
National Park Service  
U.S. Department of the Interior





# BCCE August 2021 Weed Surveys

Lake Mead IPMT  
National Park Service  
U.S. Department of the Interior



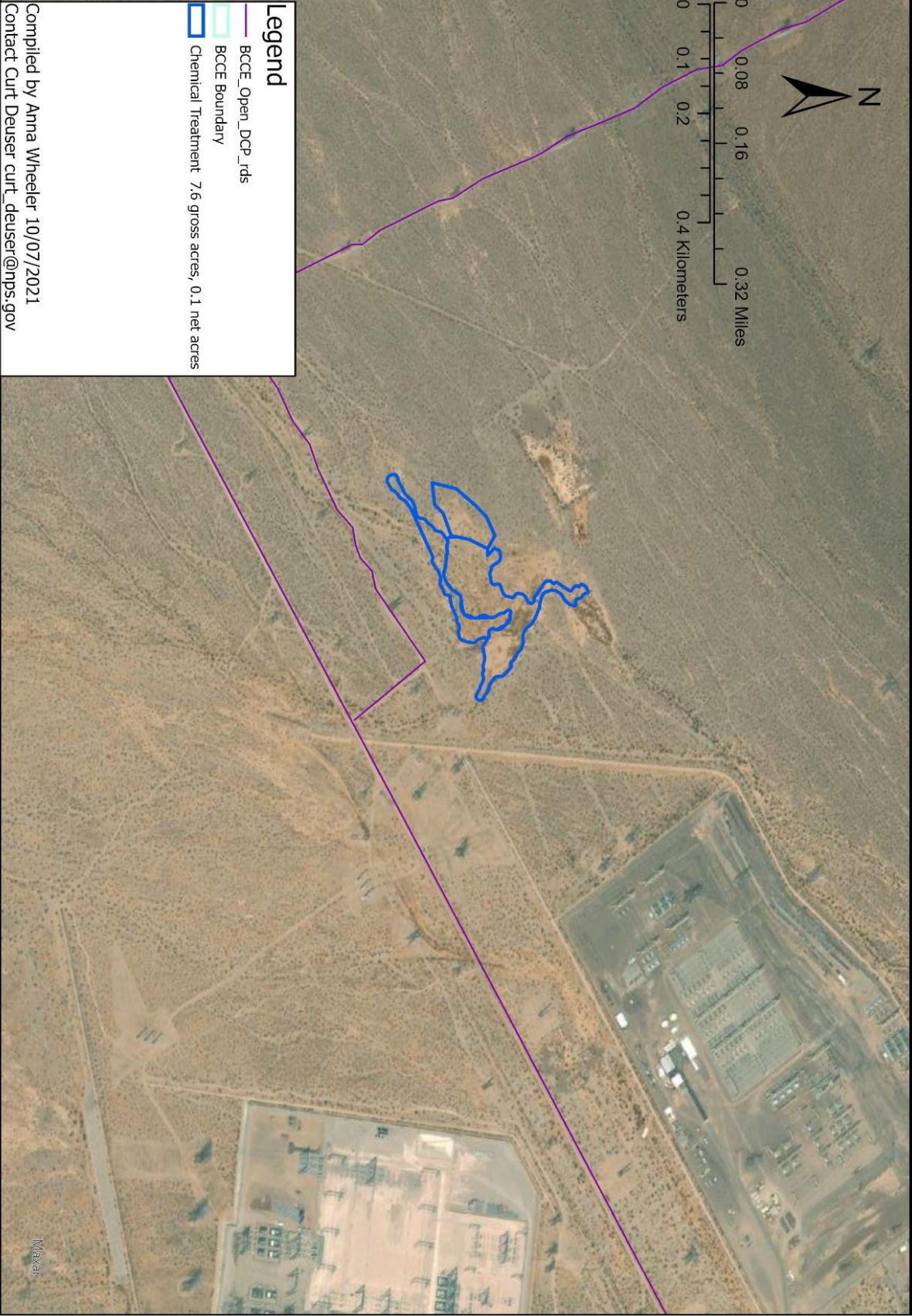




IPMT

# BCCE August 2021 Chemical Treatments

Lake Mead Invasive Plant Management Team  
National Park Service  
U.S. Department of the Interior



Compiled by Anna Wheeler 10/07/2021  
Contact Curt Deuser curt\_deuser@nps.gov

**Boulder City Conservation Easement Observed Plant Species List (2014-2021)**

Abronia pogonantha	Mojave sand verbena	N
Abronia villosa	Hairy sand verbena	N
Acacia greggii	Catclaw acacia	N
Adenophyllum cooperi	Coopers dogweed	
Amaranthus albus	Tumble pigweed	N
Amaranthus fimbriatus	Fringed amaranth	
Ambrosia dumosa	White bursage	N
Amsinckia tessellata	Bristly fiddleneck	N
Argythamnia neomexicana	New mexico silverbush	N
<b>Arundo donax</b>	<b>Giant reed</b>	<b>E (dead)</b>
Astragalus tephrodes	Ashen milkvetch (possible)	N
Atriplex polycarpa	Cattle saltbush (possible)	N
Boerhavia coccinea.	Scarlet spiderling	N
Boerhavia wrightii	Wright's boerhavia	N
Bouteloua aristidoides	Needle grama	N
Bouteloua barbata	Sixweeks grama	N
<b>Brassica juncea</b>	<b>Indian mustard</b>	<b>E</b>
<b>Brassica nigra</b>	<b>Black mustard</b>	<b>E (may be <i>Hirschfeldia incana</i>, need to verify)</b>
<b>Brassica tournefortii</b>	<b>Sahara mustard</b>	<b>E</b>
<b>Bromus trinii</b>	<b>Chillian brome (possible)</b>	<b>E</b>
<b>Bromus rubens</b>	<b>Red Brome</b>	<b>E</b>
Camissonia brevipes	Golden suncup	N
Camissonia campestris	Mojave suncup	N
Castilleja angustifolia	Indian paintbrush	N
<b>Cenchrus cilare</b>	<b>Buffel Grass</b>	<b>E</b>
<b>Chondrilla juncea</b>	<b>Rush skeleton weed (possible)</b>	<b>E</b>
Condea emoryi	Desert lavender	N

Cryptantha sp. N	Forget-me-not sp. N
Cylindropuntia bigelovii	Teddy-bear cholla N
Dalea mollissima	Silk dalea N
Dasyochloa pulchella	Desert fluff-grass N
Echinocactus sp.	Barrel cactus N
Encelia farinosa	Brittlebush N
Ephedra californica	Mormon tea N
Euphorbia abramsiana	Abram's spurge N
Euphorbia albomarginata	Rattle snake sandmat N
Euphorbia arizonica	Arizona spurge N
Eriogonum fasciculatum	Eastern Mojave buckwheat N
<b>Erodium cicutarium</b>	<b>Redstem filaree, Stork's bill E</b>
Eschscholzia glyptosperma	Mojave poppy N
Ferocactus cylindraceus	California barrel cactus N
Kallstroemia californica	California caltrop N
Larrea tridentata	Creosotebush N
Lotus strigosus	Hairy lotus N
Lupinus arizonicus	Arizona lupine N
Malacothrix glabrata	Desert dandelion N
<b>Malva sp.</b>	<b>Big-leaf mallow E</b>
Mentzelia affinis	Yellow comet N
Mentzelia involucrata	Sand blazing star N
Nicotiana attenuata	Coyote tobacco N
Oenothera deltoids	Dune evening primrose N
Opuntia basillares	Beavertail cactus N
Optunia versicolor	Staghorn cholla N
Pectis papposa	Cinchweed N
Perityle emoryi	Rock daisy N

Phacelia crenulata	Notch-leaf phacelia	N
Phacelia ivesiana	Ives phacelia	N
Physalis crassifolia	Ground cherry	N
Plantago ovate	Desert plantain	N
Pleuraphis rigida	Big galleta	N
Prosopis glandulosa	Honey mesquite	N
<b>Salsola kali</b>	<b>Russian thistle</b>	<b>E</b>
Salvia columbariae	Mojave desert chia	N
Salazaria Mexicana	Paper bag bush	
<b>Schismus arabicus/barbatus</b>	<b>Mediterranean grass</b>	<b>E</b>
Senna armata	Desert senna	N
<b>Sisymbrium iro</b>	<b>London rocket</b>	<b>E</b>
Sphaeralcea ambigua	Desert mallow	N
<b>Tamarix ramosissima</b>	<b>Salt cedar</b>	<b>E</b>
Tiquilia plicata	Fan-leaf Crinklemat	N
Tragia ramosa	Noseburn (possible)	N
<b>Tribulus terrestris</b>	<b>Puncture Vine</b>	<b>E</b>
Yucca schidigera	Mojave Yucca	

N = native / E = exotic / (possible) = identification tentative, specimen or photo lacking defining characteristics

Original list was created from observations recorded during spring/summer 2014 (non-vouchered observations) primarily developed by Daniel Townsend, NPS Lake Mead EPMT, and species are added each year as observed. Contact Curt Deuser 702-293-8979

## **Evaluation and Discussion of Results:**

Most of the BCCE is relatively weed free on an overall acreage basis.

It is important to note that it is most effective to control weeds early before they become well established and develop seed banks making it difficult for long term control. This approach is referred to in weed management as early detection rapid response. There are some examples of early detection and control that were found and controlled by treatment during this project within the BCCE. A classic example of this was the detection and treatment of 13 individual buffel grass (*Cenchrus ciliaris*) plants scattered in three separate locations within a powerline corridor that has been recently constructed and restored. Two buffel grass plants were originally reported by a BLM contractor conducting monitoring of the restoration sites. We surveyed the area in more detail and found and treated 13 individual plants. About 5 were seedlings and the others were less than 1 meter mature plants with evidence of flowering and seeding. I suspect that these plants were brought into the site by the restoration activities either from contaminated transplants, seeding or vehicles. Regardless of how this plant was introduced we will continue to conduct very focused detailed buffel grass surveys on foot in this corridor and our goal is complete eradication, a zero tolerance goal. Buffel grass poses a very high threat to the BCCE and tortoise habitat. Buffel grass in the Tucson, Arizona area has dominated and spread causing hazardous wild fire fuels and has altered the wildfire regime in the Sonoran Desert. As of August 2021 there were no living buffel grass found in the previously treated areas of the BCCE. All buffel grass plants from the original population were dead due to our treatments and no new plants were detected in the surrounding areas. Another threat to the BCCE is Sahara mustard (*Brassica tournefortii*) which is on the Nevada Department of Agriculture state listed Noxious weeds that are widespread common problems in Clark County although it has not established up to its potential within the BCCE yet. The biggest threat of Sahara mustard to the BCCE appears to be coming from Boulder City lands adjacent to the northern boundary of the BCCE. The extreme northern portions of roads I, G, and D and adjacent power line right of way roads contained the most weeds within the BCCE. In 2021 much less Sahara mustard was observed in the Quail Wash area within the BCCE and its population density continues to decline in most previous years treated areas, which is very good and promising that our efforts are working. Fairly large dense populations of Russian thistle (*Salsola spp*) continue to exist during the summer months along some of these roads in the sandy areas, but this species is a low priority for treatment mainly because it is limited to ground disturbed areas and does not compete with desirable native plants very well in natural areas. Russian thistle was treated in 2019 and 2020 summers along a new powerline corridor within and adjacent to recently post construction restored sites and the populations were temporarily eliminated due to these previous treatments. These annual weed species display a wide variety of production from year to year, for example in 2015 and 2016 these same areas

contained much less Russian thistle populations presumably due to weather variance and how it relates to germination and subsequent production. Six small tamarisk trees (*Tamarix ramosissima*) (1.5 to 2.5 meters tall) that were treated in 2018 in a drainage ditch near the paved Eldorado Valley Road adjacent to the solar complex remain dead in 2021. It was a very dry year during most of 2021, however some monsoonal rain events did occur during the summer which produce some populations of the exotic invasive puncture vine (*Tribulus terrestris*) that were detected and treated in the southern unit (refer to map on page 9). This species typically only germinates during warm season mid summer rains and is an annual plant so its important to treat before seed maturity to prevent future seedbank inputs.



Photo Description: This area in the photo contains puncture vine (*Tribulus terrestris*). Photo taken in southern BCCE South Unit just southwest of some of the solar complexes. (Curt Deuser, NPS, August 2021). These population were spot treated with herbicide to prevent seed production.



Photo Description: This is a close up photo showing the scattered puncture vine (*Tribulus terrestris*) plants within the larger field from the photo above. Photo taken in southern BCCE South Unit just southwest of some of the solar complexes. (Curt Deuser, NPS, August 2021). These population were spot treated with herbicide to prevent seed production.

### **Acknowledgements:**

Report prepared by the Lake Mead Invasive Plant Management Team (LAKE IPMT). Project reporting and data management production by Anna Wheeler, Acting LAKE IPMT Data Manager. Report analysis and narrative was prepared by Curt Deuser, NPS Ecologist. Thanks to the field work completed by many individuals from the LAKE IPMT.

*This work was supported by the Clark County Desert Conservation Program and funded by Section 10, as project 2017-NPS-1710B, to further implement or develop the Clark County Multiple Species Habitat Conservation Plan.*

### **References:**

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