

CLARK COUNTY DCP AND NATIONAL PARK SERVICE

Boulder City Conservation Easement Weed Survey 2025 Annual Report

Clark County DCP Project Number 2021-NPS-2005D



Road M during a survey for puncturevine on the BCCE. No puncturevine found. NPS Photo.

Annual Report

Project Title: Boulder City Conservation Easement Weed Survey

Project Number: 2021-NPS-2005D

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 with an optional two-year renewal beginning in January 2024 through December 2025 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 buffelgrass plants were found in 2025 due to our past treatments funded by this project. Most of the acreage and routes within the BCCE do not currently contain many weeds. Much less puncturevine (*Tribulus terrestris*) was detected in the summer of 2025 especially compared to the large outbreak that occurred during summer 2022 in the southern unit of the BCCE adjacent to a few of the roads.

This work was supported by the Clark County Desert Conservation Program and funded by Section 10, as project 2021-NPS-2005D, 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 landowners 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 being established 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 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 iPhone) 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 annual and perennial plant species were documented during surveys and geospatially recorded using handheld 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 phone cameras.

Results:

For project results please refer to the following Data Summaries, Maps and Plant List. Pages 5-19.



IPMT
Invasive Plant
Management Team
Lake Mead



Invasive Plant Chemical Treatment Report

Partner: Clark County
Location: Boulder City Conservation Easement
Date(s): 4/1/2025 and 4/28/2025
Treatment Method(s): Chemical treatment using either basal bark or cut/stump methods. Please see geodatabase for polygon specifics.
Note(s): Treatment area is in the old, abandoned corral, off Highway 95.

Accomplishments

Species	Total Surveyed Acres	Gross Infested Acres Treated	Infested Acres	Treated Acres
<i>Tamarix ramosissima</i> Salt cedar	819.2	0.440	0.032	0.032

Herbicide Mix #1: basal bark

Herbicide	Amount	Mix Rate	Surfactant	Total Mix
Garlon 4 Ultra	19.92 fl oz	20.75%	79.25% JLB Oil Plus Improved	0.75 gallon

Herbicide Mix #2: cut/stump

Herbicide	Amount	Mix Rate	Surfactant	Total Mix
Garlon 4 Ultra	26.56 fl oz	20.75%	79.25% JLB Oil Plus Improved	1 gallon

These definitions are based on the 2019 NISIMS Fields and Domains guide. Please refer to <https://irma.nps.gov/DataStore/DownloadFile/617128> for more information. These definitions can also be found on the back of this report. Compiled by Maegan Stephenson. For questions, please contact Tarl Norman at tarl_norman@nps.gov or (702) 293-8979.

Invasive Plant Survey Report

Partner: Clark County
Location: Boulder City Conservation Easement
Date(s): 3/5/2025, 3/13/2025, 3/18/2025, 3/24-25/2025,
 4/1/2025, 4/28-30/2025 and 5/20/2025
Survey Method(s): Spring annual weeds driving survey.
Note(s): 0 = negative presence of species.

Accomplishments				
Species	Total Surveyed Acres	Gross Infested Acres	Infested Acres	Treated Acres
<i>Brassica tournefortii</i> Sahara mustard	819.2	0	0	None found
<i>Pennisetum ciliare</i> Buffelgrass		0	0	None found

These definitions are based on the 2019 NISIMS Fields and Domains guide. Please refer to <https://irma.nps.gov/DataStore/DownloadFile/617128> for more information. These definitions can also be found on the back of this report. Compiled by Maegan Stephenson. For questions, please contact Tarl Norman at tarl_norman@nps.gov or (702) 293-8979.

Acreage Definitions

Surveyed Area

Any area covered during 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 accounting for estimated percent cover.

Gross Infested Area Treated

Gross infested area treated is the gross acreage of treatment. Gross acreage is defined as the general perimeter of the treatment. Gross infested areas treated contain the target species treated and the spaces between populations or individuals. A gross infested area treated is calculated by adding up the total gross acreage of all mapped treatment areas without accounting for estimated percent cover.

Infested Area

The estimated acreage that the weed species occupies derived from gross infested acres and estimated percent cover.

Treated Area

Treated area is the net acreage of treatment area, calculated as:

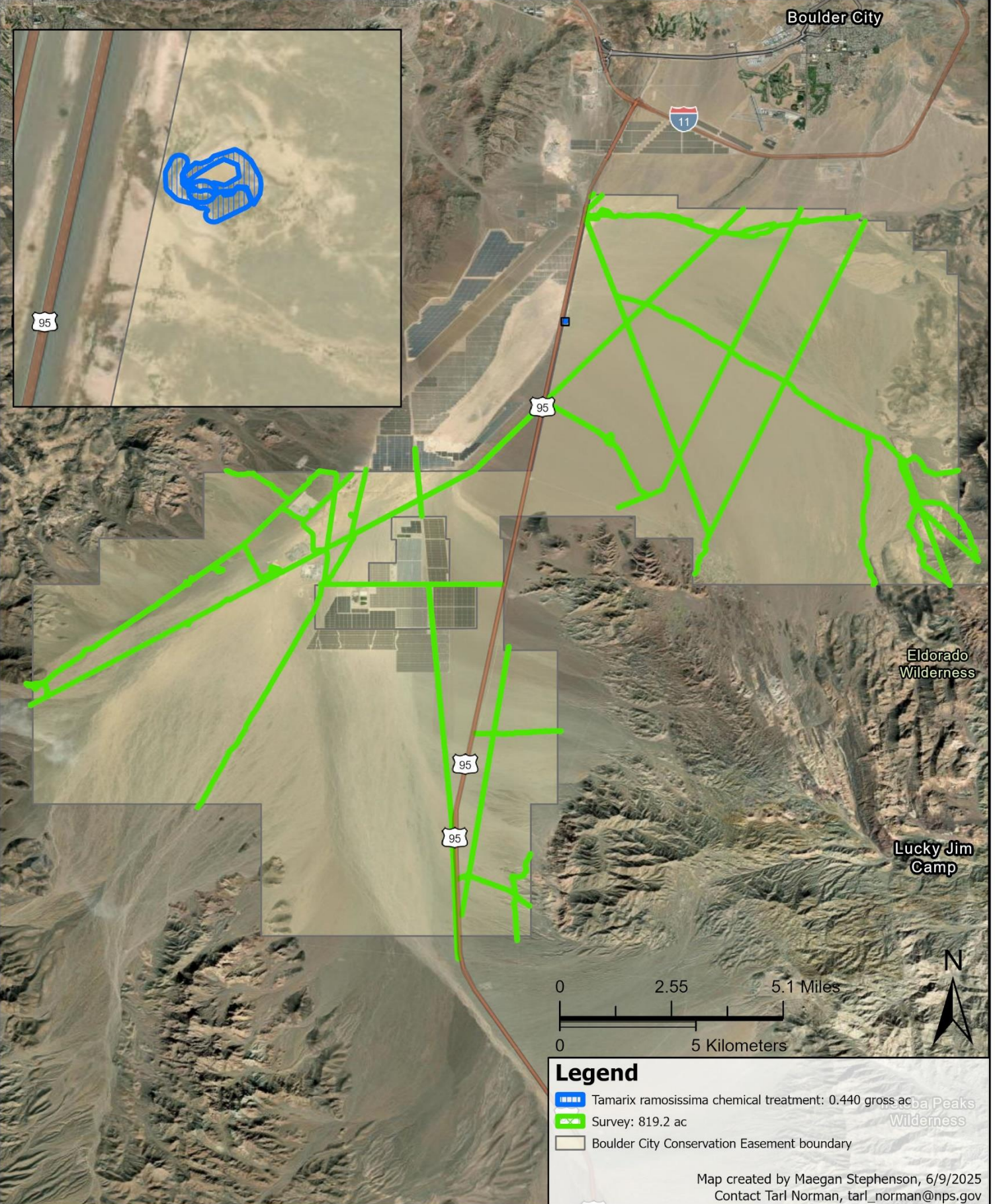
$[\text{ChemicalComponentPy.GrossAcres}] * [\text{ChemicalComponentPy.EST_CVR_RT}] / 100$ (if no calibration rate exists) or $\text{Total Mix Volume} / \text{Calibration Rate}$ (if calibration rate exists).

All 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.



Clark County: BCCE March - May 2025

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





IPMT
Invasive Plant
Management Team
Lake Mead



Invasive Plant Manual Treatment Report

Partner: Clark County
Location: Boulder City Conservation Easement
Date(s): 8/14/2025
Treatment Method(s): Manual removal via hand-pulling. Puncturevine had gone to seed at the time of removal.

Accomplishments				
Species Treated	Total Surveyed Acres	Gross Infested Acres Treated	Infested Acres	Treated Acres
<i>Tribulus terrestris</i> Puncturevine	538.9	1.02	0.03	0.03

These definitions are based on the 2019 NISIMS Fields and Domains guide. Please refer to <https://irma.nps.gov/DataStore/DownloadFile/617128> for more information. These definitions can also be found on the back of this report. Compiled by Maegan Stephenson. For questions, please contact Tarl Norman at tarl_norman@nps.gov or (702) 283-2194.

Invasive Plant Survey Report

Partner: Clark County

Location: Boulder City Conservation Easement

Date(s): 6/12/2025, 7/1/2025, 7/8/2025, 7/14-15/2025, 7/21/2025, and 8/14/2025

Survey Method(s): Some Russian thistle infestations already senescent at the time of mapped inventory. Please see geodatabase for polygon specifics.

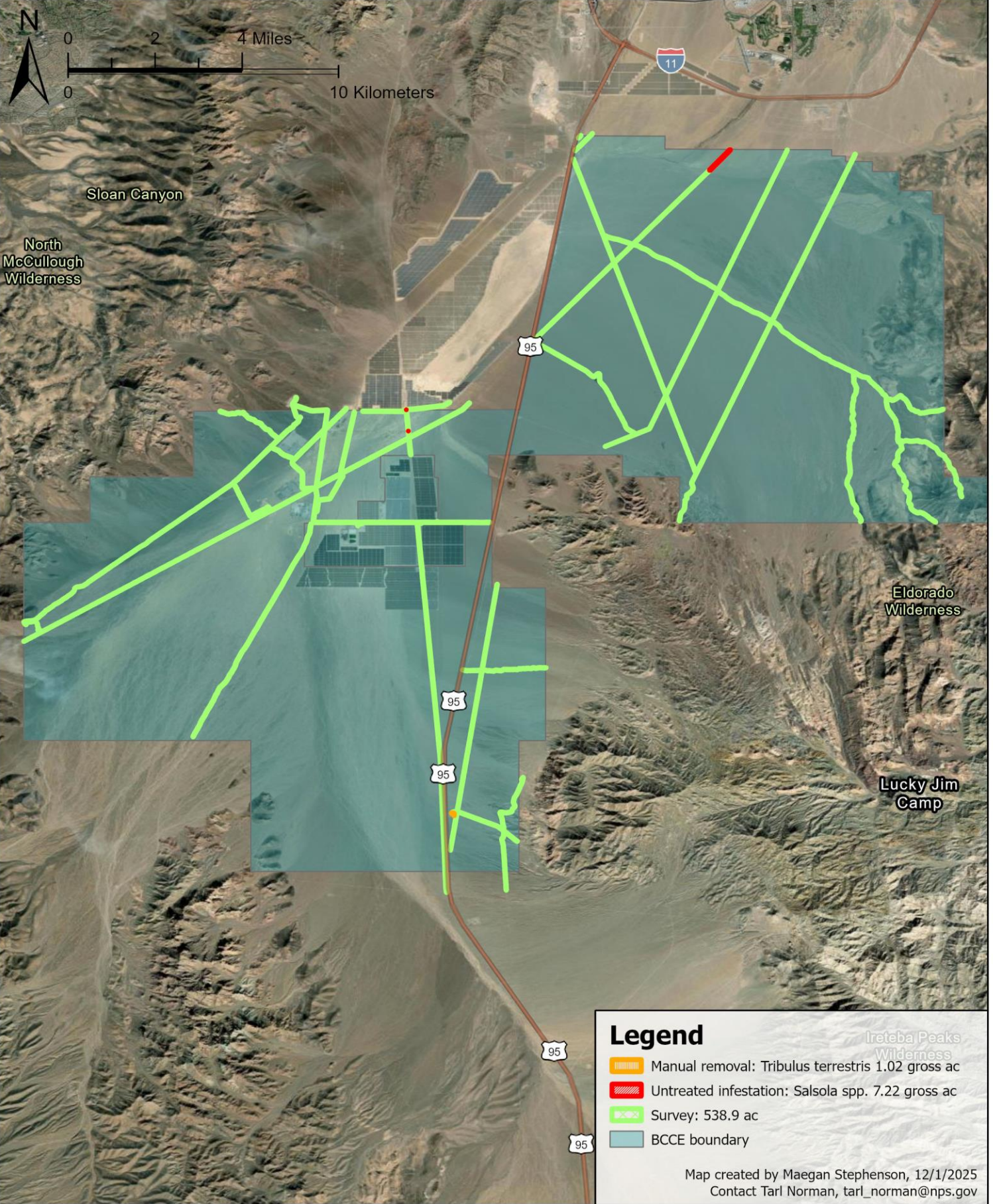
Accomplishments				
Species	Total Surveyed Acres	Gross Infested Acres	Infested Acres	Treated Acres
<i>Salsola spp.</i> Russian thistle	538.9	7.22	0.21	Not treated

These definitions are based on the 2019 NISIMS Fields and Domains guide. Please refer to <https://irma.nps.gov/DataStore/DownloadFile/617128> for more information. These definitions can also be found on the back of this report. Compiled by Maegan Stephenson. For questions, please contact Tarl Norman at tarl_norman@nps.gov or (702) 283-2194.







Boulder City Conservation Easement Summer 2025

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



Legend

-  Manual removal: *Tribulus terrestris* 1.02 gross ac
-  Untreated infestation: *Salsola* spp. 7.22 gross ac
-  Survey: 538.9 ac
-  BCCE boundary

Map created by Maegan Stephenson, 12/1/2025
Contact Tarl Norman, tarl_norman@nps.gov

Acreage Definitions

Surveyed Area

Any area covered during 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.

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Gross Infested Area Treated

Gross infested area treated is the gross acreage of treatment. Gross acreage is defined as the general perimeter of the treatment. Gross infested areas treated contain the target species treated and the spaces between populations or individuals. A gross infested area treated is calculated by adding up the total gross acreage of all mapped treatment areas without accounting for estimated percent cover.

Infested Area

The estimated acreage that the weed species occupies derived from gross infested acres and estimated percent cover.

Treated Area

Treated area is the net acreage of treatment area, calculated as:

$[\text{ChemicalComponentPy.GrossAcres}] * [\text{ChemicalComponentPy.EST_CVR_RT}] / 100$ (if no calibration rate exists) or $\text{Total Mix Volume} / \text{Calibration Rate}$ (if calibration rate exists).

All 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.

Project Photos:



Above: Native *Kallstroemia californica* and invasive *Tribulus terrestris* found side-by-side at the BCCE. NPS Photo.

Below: Spot spraying *Tribulus terrestris* with herbicide along Eldorado Valley Drive. NPS Photo.





Above and below: Native *Pleuraphis rigida*, common name Big Galleta grass, prevalent throughout the BCCE. NPS Photo.



Boulder City Conservation Easement Plant Species List (2014-2024)

<i>Abronia pogonantha</i>	Mojave sand verbena	N
<i>Abronia villosa</i>	Hairy sand verbena	N
<i>Acacia greggii</i>	Catclaw acacia	N
<i>Adenophyllum cooperi</i>	Coopers dogweed	N
<i>Allionia incarnata</i>	Windmill plant	N
<i>Amaranthus fimbriatus</i>	Fringed amaranth	N
<i>Ambrosia dumosa</i>	White bursage	N
<i>Ambrosia salsoa</i>	Cheesebush	N
<i>Amsinckia tessellata</i>	Bristly fiddleneck	N
<i>Argythamnia neomexicana</i>	New Mexico silverbush	N
<i>Aristida purpurea</i>	Purple three-awn	N
<i>Arundo donax</i>	Giant reed	E (dead)
<i>Argemone albiflora</i>	White prickly poppy	N
<i>Astragalus tephrodes</i>	Ashen milkvetch (possible)	N
<i>Astragalus</i> spp.	Unknown, silver-leafed with tomentose hairs.	9/7/22
<i>Atriplex polycarpa</i>	Cattle saltbush (possible)	N
<i>Baileya multiradiata</i>	Desert marigold	N
<i>Boerhavia coccinea</i>	Scarlet spiderling	N
<i>Boerhavia wrightii</i>	Wright's boerhavia	N
<i>Bouteloua aristidoides</i>	Needle grama	N
<i>Bouteloua barbata</i>	Sixweeks grama	N
<i>Bouteloua curtipendula</i>	Sideoats grama	N
<i>Brassica juncea</i>	Indian mustard	E
<i>Brassica nigra</i>	Black mustard	E (may be <i>Hirschfeldia incana</i>, need to verify)

Brassica tournefortii**Bromus trinii***Camissonia brevipes**Camissonia campestris**Castilleja angustifolia***Chondrilla juncea***Chorizanthe rigida**Condea emoryi**Cryptantha* sp. N*Cylindropuntia bigelovii**Cylindropuntia acanthocaropa**Cylindropuntia ramosissima**Dalea mollissima**Dasyochloa pulchella**Ditaxis neomexicana**Echinocactus polycephalus**Echinocereus engelmannii**Encelia farinosa**Ephedra californica**Eriogonum fasciculatum**Eriogonum inflatum***Erodium cicutarium***Eschscholzia glyptosperma**Euphorbia abramsiana**Euphorbia albomarginata***Sahara mustard E****Chilean chess (possible) E**

Golden suncup N

Mojave suncup N

Indian paintbrush N

Rush skeletonweed (possible) E

Rigid spineflower N

Desert lavender N

Forget-me-not sp. N

Teddy-bear cholla N

Buckhorn cholla N

Pencil cholla N

Silk dalea N

Desert fluff-grass N

New Mexico silverbush N

Clustered barrel cactus N

Hedgehog cactus N

Brittlebush N

Mormon tea N

Eastern Mojave buckwheat N

Desert trumpet N

Redstem filaree, Stork's bill E

Mojave poppy N

Abram's spurge N

Rattlesnake sandmat N

<i>Euphorbia arizonica</i>	Arizona spurge N
<i>Ferocactus cylindraceus</i>	California barrel cactus N
<i>Kallstroemia californica</i>	California caltrop N
<i>Krameria erecta</i>	Littleleaf ratany N
<i>Larrea tridentata</i>	Creosotebush N
<i>Lotus strigosus</i>	Hairy lotus N
<i>Lupinus arizonicus</i>	Arizona lupine N
<i>Malacothrix glabrata</i>	Desert dandelion N
Malva sp.	Big-leaf mallow E
<i>Mammillaria tetrancistra</i>	Fishhook cactus N
<i>Mentzelia affinis</i>	Yellow comet N
<i>Mentzelia ivolucrata</i>	Sand blazing star N
Mollugo cerviana	Thread stem carpet weed E
<i>Nicotiana attenuata</i>	Coyote tobacco N
<i>Oenothera deltoids</i>	Dune evening primrose N
<i>Opuntia basilaris</i>	Beavertail cactus N
<i>Optunia versicolor</i>	Staghorn cholla N
<i>Palafoxia arida</i>	Spanish needles N
<i>Pectis papposa</i>	Cinchweed N
<i>Perityle emoryi</i>	Rock daisy N
<i>Petalonyx thurberi</i>	Common sandpaper bush N
<i>Phacelia crenulata</i>	Notch-leaf phacelia N
<i>Phacelia ivesiana</i>	Ives phacelia N
<i>Physalis crassifolia</i>	Ground cherry N
<i>Plantago ovate</i>	Desert plantain N

<i>Pleuraphis rigida</i>	Big galleta	N
<i>Prosopis glandulosa</i>	Honey mesquite	N
<i>Salsola kali</i>	Russian thistle	E
<i>Salvia columbariae</i>	Mojave desert chia	N
<i>Salazaria neomexicana</i>	Paper bag bush	N
<i>Schismus arabicus</i>	Arabian schismus	E
<i>Schismus barbatus</i>	Mediterranean grass	E
<i>Senna armata</i>	Desert senna	N
<i>Sisymbrium irio</i>	London rocket	E
<i>Sphaeralcea ambigua</i>	Desert mallow	N
<i>Tamarix ramosissima</i>	Salt cedar	E
<i>Tiquilia plicata</i>	Fan-leaf Crinkleemat	N
<i>Tragia ramosa</i>	Noseburn (possible)	N
<i>Tribulus terrestris</i>	Puncturevine	E
<i>Yucca schidigera</i>	Mojave yucca	N

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

List reflects non-vouchered observations recorded from 2014 through 2025. Primarily developed by Daniel Townsend, Carlee Coleman and Curt Deuser, NPS Lake Mead IPMT. Contact Tarl Norman 702-283-2194.

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 buffelgrass (*Cenchrus ciliaris*) plants scattered in three separate locations within a powerline corridor that has been recently constructed and restored. Two buffelgrass plants were originally reported by a BLM contractor conducting monitoring of the restoration sites. We surveyed the area in more detail and detected and treated 13 individual plants. About 5 were seedlings and the others were less than 1 meter in diameter mature plants with evidence of flowering and seeding. The suspicion is that these plants were brought into the site by restoration activities either from contaminated transplants, seeding or vehicles. As of the end of April 2025, there were no living buffelgrass plants found in the previously treated areas of the BCCE. All buffelgrass plants from the original population were dead due to our treatments and no new plants were detected in the surrounding areas. This site will continue to be monitored in the future per a new agreement for work on the BCCE. Another threat to the BCCE is Sahara mustard (*Brassica tournefortii*) which is on the Nevada Department of Agriculture's state noxious weeds list. Sahara mustard is a widespread common weed 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 winter of 2024/2025 minimal Sahara mustard was observed in the BCCE and the Quail Wash area within the BCCE and its population density continues to decline in previously treated areas. This is promising that our efforts are working even after above normal rainfall occurred during the winter of 2022/2023 which can stimulate Sahara mustard and other winter annual plant species to establish. The winter of 2024/2025 experienced normal to below normal precipitation. This resulted in below average annual plant (native and non-native) production. Mediterranean grass (*Schismus* spp) was not observed on a widespread basis this year as in previous years. Russian thistle (*Salsola* spp) continues 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. Most of these annual weed species display a wide variety of production from year to year, dependent on precipitation timing and weather conditions. 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 2025. In April of 2025, 25-30 tamarisk plants were treated near an old corral just east of Highway 95. This is one of the few places that tamarisk exists within the BCCE. The BCCE in general has very little habitat to support tamarisk.

Although summer 2022 produced the largest populations of puncturevine (*Tribulus terrestris*) we have observed since we've been partnering on this project since 2014, puncturevine population outbreaks during the summer of 2024 and 2025 were less common throughout most of the BCCE. Some of the adjacent roadside areas inside the solar plant complex along the paved Eldorado Valley Road continued to have plants which we treated. Puncturevine, also known as goathead, is on the Nevada Department of Agriculture State Noxious Weed List. It is a low-growing prostrate plant that spreads radially from the crown, sometimes more than 6 feet in diameter. It produces a fruit that forms a sharp woody bur that commonly punctures bike tires and can penetrate shoes. It can also be toxic to grazing animals if consumed. During summer 2025 large dense populations of puncturevine were not observed in the southern unit of the BCCE including along roads L, P and southern parts of K except along the paved Eldorado Valley Road (refer to maps above). We treated well beyond 10 meters of roadsides in most cases. We plan to continue surveys in future summers of these areas to detect and control these populations. We recommend and will continue to maintain a zero-tolerance approach to controlling this species when found in the northern unit and outside of these higher density areas and in restoration sites throughout the BCCE. Treatments of these plants via spot spraying herbicide when found along the road corridors and beyond reduces a major amount of potential seed production. We also noticed during surveys that a native Caltrop, *Kallstroemia californica* is very similar in appearance to puncturevine and we developed some useful plant identification diagnostics and side by side photo comparisons to help identify the puncturevine and avoid the native caltrop plants.

Acknowledgements:

Report prepared by the Lake Mead Invasive Plant Management Team (LAKE IPMT). Project reporting and data management production by Maegan Stephenson, LAKE IPMT Data Manager.

Report analysis and narrative was prepared by Tarl Norman, NPS Biologist. Thanks to the field work completed by many individuals from the LAKE IPMT, including Tyler Jack, Erin (Ouen) Moore, Brandon Blackburn, Corbin Gentzler, Maegan Stephenson, Jacob Pope, Wesley Scott, Kolbeinn Wesen, Alexander Demers, Nicholas Koch, and Stephanie Sonnenberg.

This work was supported by the Clark County Desert Conservation Program and funded by Section 10, as project 2021-NPS-2005D, to further implement or develop the Clark County Multiple Species Habitat Conservation Plan.

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