



# Chihuahuan Sun



Newsletter of the Chihuahuan Desert Network

Spring 2017

## Our Second Issue

Thank you for all the positive feedback we received on the first issue of the *Chihuahuan Sun*, the newsletter of the Chihuahuan Desert Network (CHDN). We hope that you find this issue to be just as informative. New this time is a park spotlight page to highlight efforts by a network park to protect park natural resources. Amistad National Recreation Area's work to control an exotic plant species and provide habitat for migrating monarch butterflies is featured on page 13.

As always, I welcome your comments and input. You may contact me at [marcia\\_wilson@nps.gov](mailto:marcia_wilson@nps.gov) or 575-646-5294.

*-Marcia Wilson, CHDN Program Manager*

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A storm arriving in Guadalupe Mountains National Park

# Exotic Plants Monitoring

## Fall 2016 Monitoring Results

The autumnal exotic plant monitoring season marked the completion of the 12<sup>th</sup> season of data collection. Surveys were completed in four of the network's seven parks, with Fort Davis National Historic Site, White Sands National Monument and Rio Grande Wild and Scenic River not being surveyed. A total of 1,807 50-meter (164-ft) sample blocks along roads and trails were surveyed, covering a total distance of approximately 45.18 km (28.07 mi). The surveyed distance is much shorter than in past seasons due to changes executed this past spring in the sampling scheme (see the Fall 2016 issue of the *Chihuahuan Sun* for more information).

Lehmann lovegrass (*Eragrostis lehmanniana*) and yellow bluestem (*Bothriochloa ischaemum*) were the two nonnative species that were observed most frequently during monitoring. Lehmann lovegrass was present in 11.3% of blocks, and yellow bluestem was in 11.0%. Both these species are of significant concern in the Chihuahuan Desert because of impacts that they have to desert ecosystems and the difficulties of controlling their invasions. No new invasive species were found in CHDN parks last season.

This spring, the CHDN exotic plant crew will be monitoring for exotic plants from late March through mid May in Big Bend National Park, Carlsbad Caverns National Park, and Guadalupe Mountains NP. The exotics monitoring spring field schedule is on page 14.

Park	Distance Surveyed	# of Species	Most Common Exotic Species Detected - Fall 2016 Monitoring
Amistad NRA	11.0 km	15	Yellow bluestem, buffelgrass, Bermudagrass,
Big Bend NP	14.15 km	12	Lehmann lovegrass, yellow bluestem, Bermudagrass, Russian thistle
Carlsbad Caverns NP	8.65 km	6	Lehmann lovegrass, yellow bluestem, horehound, David's spurge
Guadalupe Mountains NP	11.38 km	8	Lehmann lovegrass, yellow bluestem, Russian thistle, puncturevine

Species identified include *Bothriochloa ischaemum* (yellow bluestem), *Cenchrus ciliaris* (buffelgrass), *Cynodon dactylon* (Bermudagrass), *Eragrostis lehmanniana* (Lehmann lovegrass), *Salsola tragus* (Russian thistle), *Marrubium vulgare* (horehound), *Euphorbia davidii* (David's spurge), *Tribulus terrestris* (puncturevine)



Crew Member David Pinigis monitoring for exotic plants along Spur 454 in Amistad NRA

# Exotic Plants Monitoring

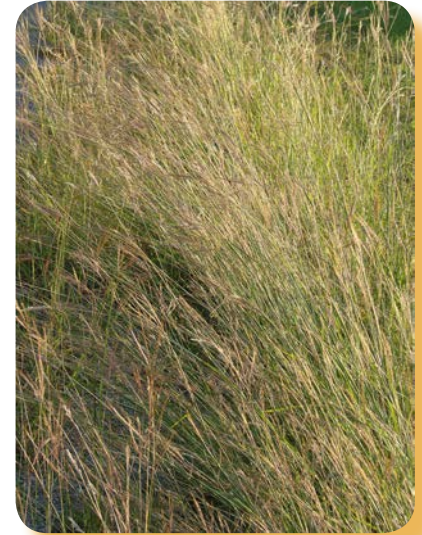
## Management Success: Carlsbad Caverns NP

Carlsbad Caverns NP's natural resources staff has been leading the way in controlling invasive species along park roads and in high visitor use areas. After the 2011 Loop Fire, the park hired a contractor to seed roadsides with hydromulch with a mixture of native seeds in order to increase the likelihood that native species would take hold after the fire. In the past, Carlsbad Caverns has had issues along roads with yellow bluestem (*Bothriochloa ischaemum*), Lehmann lovegrass (*Eragrostis lehmanniana*), Napa thistle (*Centaurea melitensis*) and horehound (*Marrubium vulgare*).

Nearly 21 acres along the main park entrance road were hydroseeded. In addition to the seeding treatment, the contractor also treated nonnative species with herbicide applications on seven occasions between 2014 and 2016. Herbicide treatment areas included the roadsides, the Visitor Center parking lots and the Bat Draw restoration areas.

Based on several years of CHDN exotics monitoring data, it appears that exotic species richness and abundance are declining in the areas that CHDN surveys. Data analysis has not been completed, but field observations suggest that invasive species richness may have declined.

Park staff continue to monitor treatment areas, and has had the CHDN exotics crew conduct rapid assessments of the parking lots to try to discover any new occurrences of invasive plant species.



Yellow bluestem

## Spreading Invasion: Prickly Lettuce

Prickly lettuce (*Lactuca serriola*) is an exotic plant that is starting to spread in CHDN parks. Prickly lettuce is invading many areas in the Chihuahuan Desert and presents a high risk for further encroachment in CHDN parks. It is present in CHDN parks and is on exotic crew's watch list but has not been found in any of the transects during exotics monitoring. The species is also a threat to parks in the Southern Plains Network, north of CHDN parks.

Prickly lettuce is an annual or biennial plant that can produce up to 200,000 seeds per plant. Seedlings typically emerge in the fall and develop into a rosette that overwinters until a flower stalk emerges. These stalks can grow nearly 1.8 m (6 ft) tall and the lower part of stalks is usually covered by small spines. It is native to Europe, Asia, and north Africa.

This drought-tolerant species usually colonizes disturbed areas such as roadsides and can be a horticultural weed in no-tillage fields. It is considered to be an invasive species in the western states. Seeds can be dispersed by wind, and may also be spread by water.

Prickly lettuce can be controlled by pulling, but the plant has a deep tap root. Mowing is not considered an effective treatment since plants will regrow the flower stalk. It can also be controlled with herbicide.



Photo by Jim Kennedy / Creative Commons

# Uplands Monitoring

## Fall 2016: Second Rotation Monitoring

### *Vegetation and soils monitoring*

The uplands monitoring crew had a busy and successful fall field season, monitoring 49 plots in five parks (Big Bend NP, Carlsbad Caverns NP, Fort Davis NHS, Guadalupe Mountains NP and White Sands NM). Most plots visited last fall were installed and last monitored in 2011, except at Carlsbad Caverns where the final plots of the first rotation were established.

The uplands crew consisted of Crew Lead Tim Pine, Megan Podolinsky, Jonathin Horsley, David Pinigis, JoAnn Miller and Melissa Nicolli.

The field season began in the higher elevations at Fort Davis NHS in August and concluded in White Sands NM in December. In between, the crew experienced much of the beauty of the Chihuahuan Desert while collecting detailed data that will help park managers understand the diverse vegetation communities found in their parks.

Please see the following pages for some of the highlights from the last field season.



Dog Canyon in Guadalupe Mountains NP

### Special Thanks for Lightening the Uplands Crew's Loads

Guadalupe Mountains NP Mule Packer **Mark White's** assistance enabled the uplands crew to gain access to an area of Carlsbad Caverns NP that had previously been inaccessible. The plots were as far as 24 km (15 miles) from the Guadalupe Ridge Trailhead and it was not possible for the crew to carry enough water into the backcountry to complete their work. Mark and his string of mules carried 50 gallons of water along with field gear into the backcountry for the crew. CHDN field



crews had tried twice previously to monitor sites in this area, but were unable to because of the plots' remoteness. Without the support of the Guadalupe Mountains mule team, the network would have had to eliminate these plots from the monitoring protocol. So thanks to Mark and his mules from the entire crew (Tim, Megan, JoAnn, David, and Melissa).

# Uplands Monitoring

## Parks Provide Important Support to Uplands Crew

### *Vegetation and soils monitoring*

Conducting uplands vegetation and soils monitoring in the rugged backcountry of Chihuahuan Desert parks is challenging. Plots are often deep in the backcountry and can only be accessed by long day-hikes or overnight trips. Good communication, collaboration and assistance (especially with logistics such as housing or backcountry camping reservations) from park staff helps ensure safe, efficient, and pleasant tours for the field crew while enabling them to focus on collecting the best quality data in order to provide parks with information about the condition of park vegetation and soils.



Patrick Martinez and White Sand's UTV helped the uplands crew monitor three plots in a single day, a CHDN record!

Last fall, the CHDN uplands crew was assisted by crew leads from two other networks. **Sarah Karinen** of the Northern Colorado Plateau Network, based in Moab, Utah, assisted with monitoring in Carlsbad Caverns NP, Fort Davis NHS and Guadalupe Mountains NP. **Will Coffee** from the Southern Colorado Plateau Network in Flagstaff, Arizona volunteered to help monitor plots in Big Bend NP. The contributions from these employees of other networks made data collection more efficient and also provided important opportunities for collaboration and information-sharing between networks.

The uplands crew would like to thank:

#### Big Bend NP

- David Larson, Chief of Resource Management
- Joe Sirotnik, Botanist
- Raymond Skiles, Wildlife Biologist

#### Carlsbad Caverns NP

- Rod Horrocks, Cave Specialist
- Luis Flores, Exotic Plant Specialist

#### Fort Davis NHS

- John Heiner, Chief of the Ranger Division

#### Guadalupe Mountains NP

- Mike Medrano, Chief of Resource Management
- Jonena Hearst, Geologist
- Mike Garel, Park Ranger
- Lisa Garcia, Administration
- Val Call, Maintenance
- Mark White, Mule Packer

#### White Sands NM

- David Bustos, Chief of Resource Management
- Patrick Martinez, Biological Science Technician
- Megan Davenport, Biological Science Technician



The uplands crew at Pine Top Cabin in Guadalupe Mountains NP. From left to right: Crew lead Tim Pine, Megan Podolinsky, JoAnn Miller, and David Pinigis

# Uplands Monitoring

## Big Bend National Park

### Vegetation and soils monitoring

Even though the uplands crew only monitored eight plots last fall in Big Bend NP, the plots encompassed a large variety of the ecotypes that occur in the park. Crew members observed everything from oak-dominated grasslands in the Chisos Mountains to desert pavement near the Mexican border.

With the exception of the two plots in the Chisos Mountains, plots were scattered all over the park. As a result, the crew had to move camp every day and drive from field location to field location. The combination of driving and breaking down camp daily considerably added to the work load of the crew.

Two plots near the Rio Grande River were on gravelly substrates and had relatively little vegetation. One plot contained only

creosotebush (*Larrea tridentata*), and had evidence of recent cattle grazing (footprints and fecal matter). The other plot contained creosotebush, littleleaf krameria (*Krameria erecta*) and several species of prickly pear (*Opuntia spp.*).

Except for one nail, the crew was able to find every piece of hardware that the previous crews installed five years ago when the plots were first monitored. Species counts were very high in the plots, sometimes even two- to three-times higher than in 2011, partly a result of the very experienced crews doing the 2016 monitoring and drought conditions prior to 2011.

The crew will return to Big Bend in fall 2017 to monitor a larger number of plots than were visited during the 2016 season.



The desert and mountain landscapes of Big Bend NP contain a wide range in vegetation communities, ranging from desert pavements with vascular vegetation largely limited to scattered creosotebush in the lowest elevations (above left) to woodlands high in the Chisos Mountains (above right). Alpenglow on the Chisos Mountains (below).



# Uplands Monitoring

## Carlsbad Caverns National Park

### Vegetation and soils monitoring

The uplands crew installed and monitored eight permanent plots during three tours at Carlsbad Caverns NP. These plots were the final plots to be installed in the first rotation of monitoring. The crew will revisit plots established in 2012 in fall 2017 to begin the second rotation at Carlsbad Caverns.

The field season took the crew deep into the backcountry in the area northeast of Slaughter Canyon to monitor two plots above 1580 m (5,200 ft) in elevation. Guadalupe Mountains NP's mule packer supported fieldwork in that area by carrying in water and gear for the crew (see page 4 for more information). These high elevation plots had dense understories of perennial grasses and shrubs including sideoats grama (*Bouteloua curtipendula*), slim tridents (*Tridens muticus*), and pungent oak (*Quercus pungens*).

A plot at approximately 1440 m (4,400 ft) in elevation on a northeast-facing slope on top of the escarpment near the beginning of the Loop Road was very consistent with other similarly-situated localities in the area. There was no canopy, and the sub-canopy was dominated by Pinchot juniper (*Juniperus*

*pinchotii*), skeletonleaf goldeneye (*Viguiera stenoloba*), smooth-leaf sotol (*Dasyllirion leiophyllum*), beargrass (*Nolina microcarpa*), and robust perennial grass species. Native grasses included green sprangletop (*Leptochloa dubia*), slim tridents, plains lovegrass (*Eragrostis intermedia*) and curlyleaf muhly (*Muhlenbergia setifolia*).

Four of the eight plots monitored appear to have burned during the Loop Fire in June 2011.

The crew found a few plants of Lee's pincushion cactus (*Coryphantha sneedii* var. *leei*), a threatened species only known from a restricted area in and around the park (see below), during their fall field work.

The only exotic plant species encountered in an uplands plot was Lehmann lovegrass (*Eragrostis lehmanniana*). Lehmann lovegrass is native to South Africa. This warm-season, perennial bunchgrass has an aggressive, spreading habit, and it displaces native grasses. It is one of the exotic plant species of significant concern in the Chihuahuan Desert.

### Threatened Species: Lee's Pincushion Cactus

Lee's pincushion cactus (*Coryphantha sneedii* var. *leei*) is only found in Eddy County, NM, occurring in the Guadalupe Mountains. The cactus is named after geologist W. T. Lee who collected it in the 1920s while assessing the area for national park status. The species was listed as threatened by the US Fish and Wildlife Service in 1979. It typically only grows on top of limestone ridges, often growing in cracks in bedrock.

The plants are identified by their profusely branching stems (up to 200-250 stems in some individuals) and their conspicuously hairy spines. While the species has a very restricted distribution in southeastern New Mexico, it can be locally common. The species doesn't appear to be threatened by illegal collecting (commercially-grown specimens are readily available), but fires and climate change (including drought) could be threats to the species' survival.



Scale is in cm.

# Uplands Monitoring

## Fort Davis National Historic Site

### Vegetation and soils monitoring

The uplands crew visited 10 plots in Fort Davis NHS, including nine plot revisits, and one plot that was established for the first time. The new plot was installed to replace a plot that had been moved into a different stratum. Because of its small size, all uplands plots at Fort Davis are monitored in the same year. Given the fact that uplands plots are monitored every five years, the next monitoring in Fort Davis will occur in 2021.

Half of Fort Davis' plots were in areas that burned in the Rockhouse Fire in 2011 and were monitored shortly thereafter.

These plots had strikingly more vegetation in 2016 compared to 2011 when vegetation was sparse in the aftermath of the fire.

The other monitoring highlight was the great plant diversity in the plots. One plot included 105 different plant species. The highest number of species previously identified in a CHDN plot was 93 at Carlsbad Caverns NP. Exotic species were also uncommon, with only Russian thistle (*Salsola spp.*) found in three plots and common purslane (*Portulaca oleracea*) present in one plot.



Uplands plots at Fort Davis in 2011 (left) and in 2016 (right) shows how much more vegetation was present in the plots in 2016 compared to 2011. Monitoring in 2011 occurred shortly after the Rockhouse Fire, and vegetation has rebounded considerably in the subsequent five years.



# Uplands Monitoring

## Guadalupe Mountains National Park

### Vegetation and soils monitoring

Last fall, the uplands crew visited many different types of the ecosystems found at Guadalupe Mountains while monitoring 11 plots. The crew started off by monitoring in a Douglas fir (*Pseudotsuga menziesii*) forest plot and finished down in the Ocotillo-dominated (*Fouquieria splendens*) grasslands of the Patterson Hills.

The first monitoring trip started with the crew hiking to the Pine Top Cabin via the Tejas Trail from Pine Springs Canyon in order to monitor two plots in the Guadalupe high country. A plot on a north-facing slope of a hill at approximately 23,00 m (7,600 ft) consisted of a Douglas fir-southwestern white pine (*Pinus strobiformis*)-Gambel oak (*Quercus gambelii*) woodland containing a variety of grasses in the understory. The crew then

traveled north to a plot on McKittrick Ridge. This plot consisted of a ponderosa pine (*Pinus ponderosa*)-alligator juniper (*Juniperus deppeana*)/gray oak (*Quercus grisea*)-silk tassel (*Garrya ovata*) (silver mountain mahogany (*Cercocarpus montanus*)-desert ceanothus (*Ceanothus greggii*)) shrubland. The plot had dense vegetation consisting largely of gray oak.

The crew also monitored three plots located above the Dog Creek Campground on the north end of the park. Although these plots are relatively close to one another, they each had distinctive vegetation, at least partly because of slope aspect. Northwest-facing Plot 502\_021 was dominated by pointleaf oak (*Quercus pungens*) and a mixed grass matrix. Plot 502\_008, which is south-facing, consisted of smooth-leaf sotol (*Dasylirion leiophyllum*), silver mountain mahogany, and sideoats grama (*Bouteloua curtipendula*) with several other grasses and forbs. The third plot (502\_002) was a alligator juniper-pine muhly (*Muhlenbergia dubia*) savanna with indiagrass (*Sorghastrum nutans*) and native grasses and forbs in the understory.

Five plots in the southern part of the park were in shrublands, mixed shrublands and savannas.



Pointleaf oak in Plot 502\_021



Smooth-leaf sotol with a mixed grass matrix in Plot 502\_008

The Tejas Trail in Guadalupe Mountains NP

# Uplands Monitoring

## White Sands National Monument

### *Vegetation and soils monitoring*

The uplands crew was able to complete eleven plots in five days of monitoring at White Sands NM in December 2016. This monitoring marked the first time that the uplands crew revisited plots at White Sands. Most of the plots were located in the area between Lake Lucero and the Dunes Drive.

A significant area (65%) of the monument is excluded from the uplands protocol because of the nature of the distinctive landscape of White Sands, including landforms that typically lack vegetation. Excluded areas include the Alkali flat, barren dunes, Lake Lucero, other intermittent lakes, and the salt flats.

Plots consisted of shrublands or mixed shrublands dominated by honey mesquite (*Prosopis glandulosa*), Torrey's jointfir (*Ephedra torreyana*) and/or sandsage (*Artemisia filifolia*) and grasslands consisting of burrograss (*Scleropogon brevifolius*), sand dropseed (*Sporobolus contractus*), alkali sacaton (*Sporobolus airoides*), hairy grama (*Bouteloua hirsuta*) and/or gyp (or gypsum) grama (*Bouteloua breviseta*).

Only one plot was located north of Dunes Drive. This plot also was the only one of the monitored plots in which soap tree yucca (*Yucca elata*) was found in any abundance. Hairy coldenia (*Tiquilia hispidissima*) was the most common plant in the plot, with gyp grama, and hoary rosemarymint (*Poliomintha incana*) also being common.

All monitored plots were also found to be free of exotic plant species.

### Biological Soil Crust



One of the highlights of uplands monitoring at White Sands is observing the extremely well-developed biological soil crusts. Gypsiferous soils are often fine-textured with high concentrations of sulfate and calcium, characteristics that favor the development of biological soil crusts with high lichen diversity. Some lichen species are restricted to crusts on gypsiferous soils.



## Crew Gearing Up for Springs Monitoring

*2017 Field Season to Begin in February*

In February 2017, the CHDN springs crew will be kicking off their new field season. This year's crew will again be led by Megan Podolinsky. Given the cross-training and collaboration between field crews, the springs crew will consist of staff who completed exotics and vegetation and soils monitoring during the fall season. This year the crew will consist of Timothy Pine, Jonathin Horsley, David Pinigis, JoAnn Miller and Melissa Nicolli.

Springs monitoring will occur in Amistad NRA, Big Bend NP, Carlsbad Caverns NP, Guadalupe Mountains NP, and White Sands NM.

The crew plans on visiting all springs monitored last year to collect the HOBO temperature sensors that were deployed. Two sensors were sited at each spring: one in the air and one at the spring orifice. By analyzing the temperature difference between the two sensors over the year, information about the persistence of the springs may be inferred. If a spring becomes dry, the temperature measured by the datalogger placed in the spring should approach the temperature recorded by the air-based sensor.

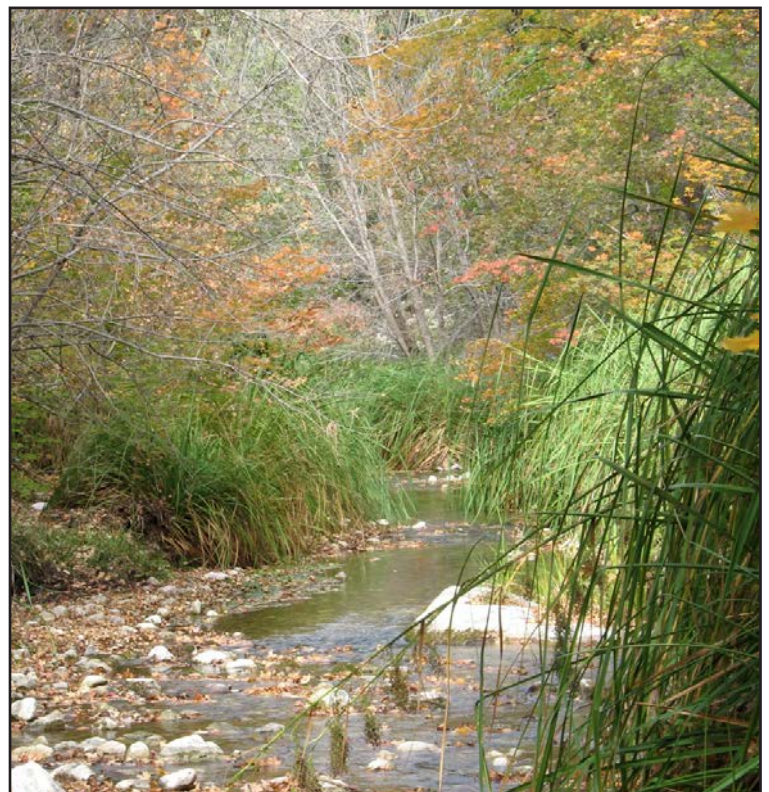
In addition to visiting all springs monitored in 2016, the crew will also be visiting other potentially relevant spring sites. The network staff are in the process of identifying potential "sentinel springs," and will then work with park staff to develop a final list. These sentinel springs will be the focus on future monitoring. Many springs will be evaluated during the upcoming field season to determine whether they will be placed on the potential sentinel springs list based on a set of predetermined criteria such as presence of water, risk of vandalism and accessibility.

The springs protocol narrative is being finalized and will soon be in review.

### Water Note

Crew lead Megan Podolinsky attended a USGS Water Quality Training in Lakewood, Colorado. In the training, she was joined by other NPS employees from various inventory and monitoring programs. The course took place over two weeks and covered the fundamentals of collecting quality data in the field, techniques Megan will apply to CHDN springs.

Monitoring at Water Boy Tinaja in Big Bend NP (top) and McKittrick Canyon in Guadalupe Mountains NP (bottom).



## GIS Analyst Lauren Lien Maps Out New Adventures

Lauren Lien began working for the Chihuahuan Desert Network as a Data Management Technician in September 2012. Between then and now, she worked under several different titles, the most recent being GIS Analyst. While working at CHDN, Lauren learned much under the mentorship of other Data Managers including current Data Manager Mark Isley. This mentorship took Lauren from being a person who had never seen the icon for ArcMap and had no idea what a query was, to someone who can confidently be considered a subject matter expert in both. Having learned so much from this position, she's made the tough decision to leave it and pursue her dream of becoming a Physician's Assistant. Everyone at CHDN wishes Lauren the best of luck in reaching her dream. The staff also thanks her for all her contributions to the network over the past several years.



### CHDN Crew "Cross-Pollination"

CHDN has continued with its crew "cross-pollination" last season by having field staff participate in uplands, exotics and springs crews. Last fall, members of the uplands crew worked under Exotics Crew Lead Jonathin Horsely to monitor for exotic species along park roads and trails. In turn, Jonathin and Megan Podolinsky, the Springs Crew Lead, worked under Uplands Crew Lead Tim Pine to monitor vegetation and soils.

Having crew members and leads gain multidisciplinary skills following three different monitoring protocols builds a field staff with better knowledge of Chihuahuan Desert natural history, and gives them new experiences and opportunities. For example, Jonathin was able to experience some of the backcountry in Chihuahuan Desert parks away from park roads and trails included in the exotic plant monitoring protocol. In turn, assisting with exotics monitoring gave Tim experience that increased his knowledge of and skill set in identifying the exotic and invasive species found in network parks.

## Amistad National Recreation Area

### Restoring native vegetation

The natural resource staff at Amistad NRA has been hard at work weeding through invasive species issues, and finding ways to preserve migrating populations of monarch butterflies (*Danaus plexippus*). Both initiatives help ensure the integrity of park ecosystems.

Tree tobacco (*Nicotiana glauca*) is high priority invasive species at Amistad. It grows in stands along the lake shore and its population varies depending on lake levels, as it is mostly found below the 342 m (1122 ft) inundation line where there is continual disturbance. Tree tobacco can outcompete native species, decrease water flow, and alter wildlife habitats.



Controlling tree tobacco

In 2016, Amistad staff, along with the Southwest Exotic Plant Management Team, tested a new method for controlling the spread of tree tobacco by scorching cut stumps with weed burners. The goal of this treatment is to damage the xylem and phloem of the plant in such a way as to kill it. In the one small test area, there was an estimated 70% reduction in overall biomass after the treatments. This method is useful because it can be used in

areas, such as the lake shore and in the proximity of cultural sites, where herbicide and other mechanical methods are not possible. Amistad plans to continue testing this method in FY17.

Amistad resource staff has also set up a project for interns to monitor the populations and roosts for passing monarch butterflies. Monarch butterflies migrate through several of CHDN parks, and Amistad NRA and Big Bend NP generally see the most individuals during the migration. Habitat for monarchs is often degraded or nonexistent along the migration route.

Individual butterflies are counted and popular roosts are noted during surveys. These data are then used to plan restoration of certain areas to create more butterfly-friendly habitat. Park staff has noted lack of food/nectar along the migration route through the park. This lack of sustenance is attributed to the increase in nonnative grass cover throughout the park causing a parallel reduction in flowering species. The park has previously done restoration work to increase monarch habitat, and plans future efforts. Additional monarch monitoring will occur in FY17.

### Welcome Back Ben Cooper

Ben started working for CHDN as an SCA intern for its first springs inventory in 2010. He then served as a crew lead for the springs and uplands protocol from 2011 to 2014. In 2016,



after completing his MS degree in Plant Biology and Conservation from Northwestern University, Ben returned to CHDN as the Assistant Data Manager.





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# CHDN Spring 2017 Monitoring Schedule

Park	Springs Monitoring	Exotics Monitoring
Amistad NRA	April TBA	--
Big Bend NP	2/7 - 2/14 2/22 - 3/1	3/22 - 3/29
Guadalupe Mountains NP	3/7 - 3/14 3/22 - 3/29	3/22 - 3/29 4/5 - 4/12
Carlsbad Caverns NP	3/7 - 3/14 3/22 - 3/29	4/5 - 4/12
White Sands NM	April TBA	--

- The Technical Committee Meeting will take place in Amistad NRA, 3/15 - 3/16.
- Groundwater monitoring at Guadalupe Mountains NP will take place in conjunction with exotics monitoring from 3/22 - 3/29.
- Landbird monitoring in the uplands of Big Bend NP may occur during the entire month of April.



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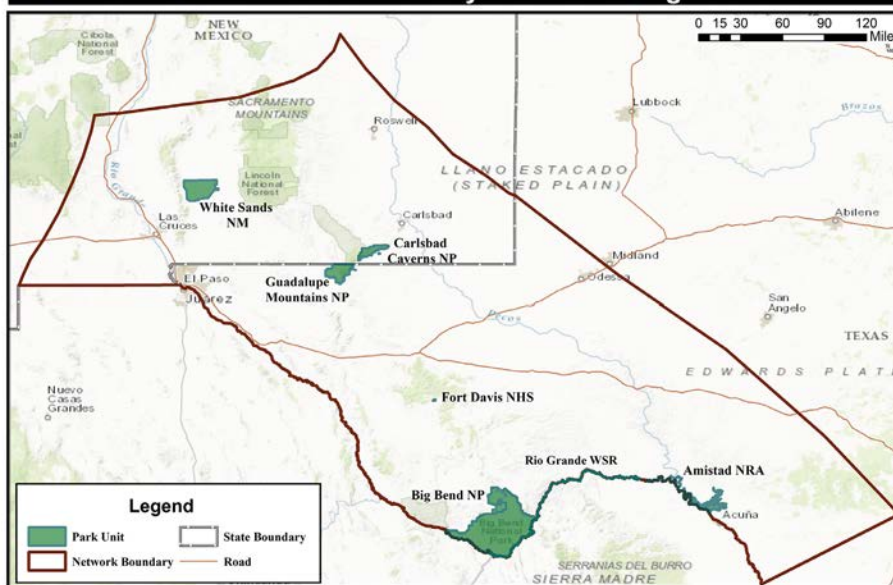
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## Chihuahuan Desert Inventory and Monitoring Network



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