Chihuahuan Desert Network
Inventory & Monitoring Program

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Natural Resource Stewardship and Science

Chihuahuan Sun

Newsletter of the Chihuahuan Desert Network Fall 2016

Welcome

Welcome to the *Chihuahuan Sun*, the new newsletter of the Chihuahuan Desert Network (CHDN). Our hope with this newsletter is to update park staff and our collaborators on the monitoring work we did last spring and to provide information on scheduled monitoring for the fall field season. We plan on publishing twice a year, and you can look for the next issue in February 2017. I welcome any feedback you may have on this newsletter and please let me know if there are any subjects that you would like to see in future issues. You may contact me at marcia_wilson@nps.gov or at 575-646-5294.

Another change at CHDN that we are excited about is that the network has fully embraced the idea of cross-training for field crews. All field crews are now trained in all protocols we survey. As a result, any crew member at CHDN can be sent into the field to complete field tasks for any protocol. It allows for a mixing of skill sets, and is a way to obtain the most consistent data possible. Some of the best moments of this past season came about because of the collaboration of crews in the field. The exotics and springs monitoring crews spent quite a bit of time together, especially at Big Bend National Park. It was great to see crew members quickly transition between each protocol.

As I write this, our field staff is busy preparing for exotic plants and uplands monitoring for the autumnal field season. We hope to see you in the parks this fall.

-Marcia Wilson, CHDN Program Manager

Inside this issue

Monitoring for exotic plants took place along the Chisos Basin Loop Trail in Big Bend NP in spring 2016.

Exotic Plant Monitoring Enters a New Era at CHDN

In 2016, CHDN entered its 11th season (6th year) of data collection for the exotic plant monitoring protocol. Data were collected in five of the network's seven parks.[1] During the season, a total of 2,546 blocks along roads and trails were surveyed, covering a total distance of 127.3 km (79.1 mi). Exotic species diversity within CHDN parks appears to have changed very little in recent seasons, including this spring (although we haven't done any statistical analyses of the data yet). The most common species found was Lehmann lovegrass (*Eragrostis lehmanniana*) which was found in 13.1% of survey blocks.

Big changes occurred in the exotic plant monitoring protocol this past vernal season. With the onset of electronic data entry in early 2012, the efficiency of surveying has dramatically increased. Crews, who were once only able to complete approximately two km (1.2 mi) of surveying daily, can now easily survey 6 - 7 km (3.7 - 4.3 mi) per day. To enhance survey efficiency and to simplify the sampling design, the network decided to change the sampling scheme. In the past, each park had its own scheme based on the number of transects located there, as well as what areas park staff found to be most beneficial to their own planning for invasive species management. These procedures worked well, but were also quite cumbersome and somewhat complicated and confusing. After carefully examining the current scheme, the network adopted a simpler, yet still effective, strategy. All parks are now on an 18-month rotation of their respective transects (meaning that each transect is monitored once every 18 months). This change was implemented at the very beginning of the 2016 season, and has, so far, been efficient. It has reduced heavy seasonal workloads and has allowed separate crews more time to assist each other in the field.

Preparations for the autumnal 2016 season are in progress! Transects have been selected in the new sampling scheme and maps have been made. The seasonal staff will be on board soon as the fall season is just around the corner.

[1]Exotics data were not collected at White Sands National Monument and the Rio Grande Wild and Scenic River.

Monitoring for exotic plants above Hospital Canyon in 29 plots in the area burned in the Rock House Fire of 2011 in Fort Davis NHS.

Exotic Plants Monitoring

Exotic Plants by the Numbers

Park	Distance Surveyed	Most Common Exotic Species Detected - Spring 2016 Monitoring
Amistad NRA	24.5 km	Buffelgrass, yellow bluestem, Bermudagrass, Malta starthistle
Big Bend NP	30.9 km	Lehmann lovegrass, yellow bluestem, Bermudagrass, Malta starthistle
Carlsbad Caverns NP	27.85 km	Lehmann lovegrass, horehound, common mullein
Fort Davis NHS	13.3 km	Russian thistle, yellow bluestem, Bermudagrass, horehound
Guadalupe Mountains NP	30.8 km	Yellow bluestem, Lehmann lovegrass, horehound, yellow sweetclover

Species identified include *Cenchrus ciliaris* (buffelgrass), *Bothriochloa ischaemum* (yellow bluestem), *Cynodon dactylon* (Bermudagrass), *Centaurea melintensis* (Malta starthistle), *Eragrostis lehmanniana* (Lehmann lovegrass), *Marrubium vulgare* (horehound), *Verbascum thapsus* (common mullein), and *Melilotus officinalis* (yellow sweetclover).

Management Success

Many CHDN parks have begun treatment of their most invasive species, yielding results that are evident in CHDN monitoring. For example, Carlsbad Caverns NP has used contractors to control yellow bluestem, Lehmann lovegrass and Bermudagrass, and has trained maintenance staff to spot high-priority invasive species. At Fort Davis NHS, staff have been treating horehound mechanically and chemically. Additionally, regular mowing along roads and trails by the maintenance staff has decreased the density of yellow bluestem in those areas.

New Invader: Common Mullein

Only one new exotic plant species was found last spring during monitoring. Common mullein (*Verbascum thapsus*) was present in Fort Davis National Historic Site in one area in the maintenance complex where it possibly was brought in along with some fill dirt with a pine planting. Common mullein is a biennial plant that is competitive in disturbed areas. The plant only consists of a basal florette in its first year of growth. In the second year, common mullein sends up a flower stalk that may reach up to two m (6.6 ft) and produce up to 100,000 seeds that remain viable for multiple years. Common mullein is one of the "top 10" exotic species of concern for CHDN.

Common mullein is native in Eurasia where it is found mostly on dry stony hillsides and woodlands. While only ranked low for its exotic plant impact using the *Handbook for Ranking Exotic Plants for Management and Control* (Hiebert and Stubbendieck 1993), the species has an innate ability to become a pest in open landscapes. Generally understood to only occupy disturbed lands, mullein also grows in undisturbed open areas such as meadows on the eastern side of the Sierra Nevada Mountains in California, and in areas with young basaltic lava flows and cinder deposits in the southwest.

The plant may be controlled by cutting off the flower stalk prior to seed set and double bagging seedheads to dispose of them. Mullein can also be easily handpulled, but care should be taken to minimize soil disturbance.

Hiebert, R. D. and J. Stubbendieck. 1993. Handbook for Ranking Exotic Plants for Management and Control. Natural Resources Report NPS/NRM, RWO/ NRR-93/08. National Park Service, Denver, Colorado.

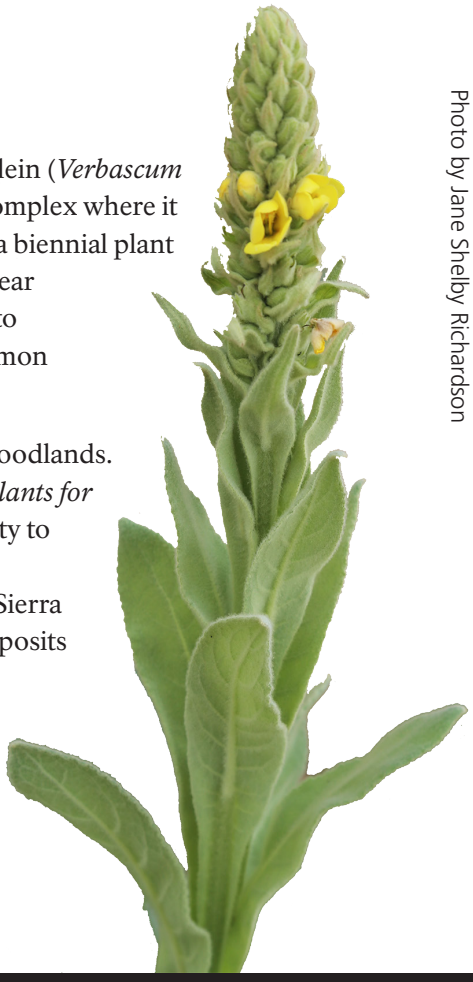

Photo by Jane Shelby Richardson

Desert Wings

Sixth year of landbird monitoring

Bird surveys were resumed in CHDN for the 2016 breeding season after a one-year hiatus. Prior to this, landbirds were surveyed annually in CHDN parks between 2010 and 2014. In order to conduct the point counts at the six network parks, CHDN established an agreement with Tucson Audubon Society. The surveys began at Big Bend NP on April 6th and continued in the parks through May 21st.

The Tuscon Audubon Society surveyed a total of 883 point counts this year with a total of 9,162 individual birds of 134 species recorded. Preliminary results indicate that a desert resident species, the black-throated sparrow, was one of the most common species at four of the parks surveyed. This result is similar to the 2014 surveys. Cassin's sparrow and scaled quail, both species of conservation concern, were well represented at a few of the network parks.

The number of birds observed varied widely among the parks surveyed. The greatest number of species was recorded at Big Bend (n = 90). At Big Bend NP, a grey hawk, a pair of American kestrels, and an Audubon's warbler were observed near the Rio Grande River. The fewest number of species was observed at Fort Davis NHS (n = 35). Fort Davis NHS staff saw pair of red-tailed hawks nesting in Hospital Canyon. The uncommon Montezuma quail was detected once during the 2016 survey at Fort Davis NHS.

The 2016 Annual Report for the CHDN landbird monitoring will be completed by this fall.

Park	Most Common Bird Species Detected During Spring 2016 Monitoring
Amistad NRA	Cassin's sparrow, northern mockingbird, northern cardinal, black-throated sparrow, & Bell's vireo
Big Bend NP	Black-throated sparrow, cactus wren, pyrrhuloxia, Bell's vireo & turkey vulture
Carlsbad Caverns NP	Black-throated sparrow, scaled quail, northern mockingbird, rufous-crowned sparrow, & mourning dove
Fort Davis NHS	Canyon wren, cactus wren, black-throated sparrow, ash-throated flycatcher, & Eurasian collared-dove
Guadalupe Mountains NP	Black-throated sparrow, cactus wren, Scott's oriole, northern mockingbird, & scaled quail
White Sands NM	Black-throated sparrow, northern mockingbird, Scott's oriole, western kingbird, & ash-throated flycatcher

Photo by Hotspotbirding.com

Black-throated sparrow

Bird Notes

- Of interest was the observation of several Mexican species at Amistad NRA: green kingfisher, crested caracara, and great kiskadee.
- Western tanager and lark bunting were detected for the first time during monitoring at Guadalupe Mountains NP (although not new species for the park).
- Rattlesnake Springs, the only riparian area at Carlsbad Caverns NP, featured a western flycatcher, orchard oriole, and vermilion flycatcher.
- At White Sands NM, bird detections were sparse at nearly all of the transects. Most of the detections were of common desert residents, most notably northern mockingbird and black-throated sparrow.

Wading Through the Aquatic Desert

Continuing Seeps and Springs Monitoring

The CHDN springs crew sampled 31 springs at five parks in the Chihuahuan Desert during the 2016 vernal season. CHDN welcomed a veteran of the uplands crew, Megan Podolinsky, as its new springs crew lead. With the help of multiple staff, namely David Pinigis, Tim Pine, Jonathin Horsley, Lauren Lien, Marcia Wilson, and volunteer Janet Burcham, as well as numerous park staff members, the crew monitored all springs scheduled for 2016.

The season's sampling kicked off in late February with a training week at Guadalupe Mountains National Park. Staff from the Sonoran Desert Network traveled to the park to join and contribute to the training. This week proved vitally important in helping the CHDN crew continue to efficiently monitoring the remainder of the springs throughout the season.

After completing monitoring at Guadalupe Mountains NP, the crew visited springs in Big Bend NP for the rest of March. Although sampling occurred during the busy season and in above average temperatures, the crew monitored 14 springs. Park staff graciously allowed the team to camp at designated sites and helped with a heat incident.

In April, three springs each in Carlsbad Caverns National Park and White Sands NM were sampled. To wrap up the season, the crew traveled to Amistad National Recreation Area to sample five sites.

The CHDN springs monitoring protocol is still in its pilot phase. It includes measuring water quality (temperature, dissolve oxygen, total dissolved solids, pH, and conductivity), water chemistry, discharge, and describing the area including its vegetation, wildlife signs and presence/absence of macroinvertebrates. Anthropogenic impacts and natural disturbances such as flooding and wildfire are also noted. Because most of the springs sites monitored are very small, they can change a great deal from year to year based on water availability.

Air and water temperature loggers were also deployed at monitoring sites this year.

Water Notes

- This fall, the uplands crew will be monitoring wells at Guadalupe Mountains to analyze the depth of the water table.
- One of last season's highlights was traveling by park boat to reach monitoring sites in Amistad NRA.

Megan Podolinsky taking water quality samples at Dead Man Canyon Spring in Amistad NRA.

Second Rotation Monitoring Set to Begin

Vegetation and soils monitoring

In fall 2016, CHDN will begin the second rotation of terrestrial vegetation and soils monitoring in the network. The protocol established a five-year rotation for uplands plots. The first plots in the CHDN were established in 2011 at Big Bend NP, Fort Davis NHS, Guadalupe Mountains NP, and White Sands NM. Upland plots at Carlsbad Caverns NP were established in 2012. The overall goal of the terrestrial vegetation and soils monitoring is to understand broad-scale changes in vegetation and soils in the context of ecological processes and stressors.

The protocol utilizes permanent plots to measure vegetation and soils vital signs, including vegetative cover of common perennial species, species frequency, density of ocotillo (*Fouquieria sp.*), a flagship plant in the Chihuahuan Desert, soil cover including that of biological soil crust, soil aggregate stability, and soil bulk density. Soils and vegetation are monitored in conjunction with each other because they are closely interrelated in order to gain a more complete view of ecological function.

The newly-hired field crew (see page 9) is looking forward to getting into the field this fall. Crew lead Tim Pine enjoys teaching new technicians about the incredible plant diversity in the Chihuahuan Desert. The field schedule requires the crew to spend an above average amount of time in the remote backcountry of several parks. The season will be physically and mentally challenging, but also rewarding. They will be visiting plots in Fort Davis NHS, Guadaulpe Mountains NP, Carlsbad Caverns NP, Big Bend NP and White Sands NM between late August and December. See page 10 for the complete field schedule.

Upland Notes

- The status reports on the first five-year rotation of uplands monitoring are in progress.
- Three of the uplands plots that the crew will be monitoring in Guadalupe Mountains NP are in the Coyote Fire burn area. The lighting-caused Coyote Fire burned 14,442 acres in the northwest part of the park in May and June 2016.

Seeing cacti in bloom, like the strawberry hedgehog cactus (*Echinocereus stramineus*) (above) is always a highlight of monitoring. Uplands plots include six transects for measuring vegetation, soil cover and fuel load (right).

Vegetation Map Verification at White Sands NM

Vegetation in a moving world

Last spring, CHDN field staff assisted with "ground truthing" selected points for vegetation mapping and classification for White Sands NM. The vegetation map is being produced through a cooperative agreement between the National Park Service and the Natural Heritage New Mexico Program (an affiliate of the University of New Mexico). Vegetation maps describe plant communities and characterize their spatial distribution in order to increase the understanding of plant species and communities.

The CHDN crew along with two botanists from the Southwest Exotic Plant Management Team visited validation points throughout the park. The crews were assisted by White Sands biological technician Patrick Martinez who helped with daily logistics, safety check-ins, and transporting crew members in the park UTV to some of the most remote locations in the monument.

The validation points were strategically selected based on analysis of remote sensing mapping. Field crews observed vegetation communities on the ground in order to clarify and rectify some of the anomalies in the satellite imagery. The crews were also able to fine tune the vegetation association dichotomous key used to define vegetation associations, and potentially discovered some previously undescribed/ unaccounted for vegetation associations.

Defining and mapping vegetation communities is especially challenging at White Sands NM because it is an incredibly dynamic landscape. An area of vegetation can be consumed by a dune and then reappear as a different community after the dune passes. Additionally, the gypsum soils exert a great influence on the monument's vegetation. Many plants are gypsophiles and grow only in soils derived from gypsum. A park such as White Sands NM with unique geologic features also generally has distinctive vegetation communities and associations.

Based on the data the crews collected, the draft vegetation map will be refined prior to the accuracy assessments conducted this fall by independent third-party technicians. After the vegetation map passes the accuracy assessments, the map can then be finalized. At this time, the map is tentatively scheduled for completion near the end of 2017.

Ground truthing in White Sands NM.

Follow CHDN Field Crews on Instagram

@chihuahuandesertnps

Staff Updates

Crew Leads Spend Off-Seasons in Other Networks

Northern Colorado Plateau, Southern Plains and Greater Yellowstone Networks

CHDN crew leads Jonathin Horsley, Tim Pine and Megan Podolinsky spent their summer off-seasons working and receiving cross-training in other networks. These opportunities enabled crew leads to gain field experience in monitoring protocols while escaping the heat of the Chihuahuan sun.

Uplands crew lead Tim Pine traveled to the Northern Colorado Plateau Network (NCPN) to cross-train with their river protocol. Tim spent eight days on the Yampa River in Dinosaur National Monument learning data collection techniques used to analyze the dynamics of river channel morphology. CHDN wanted to gain this experience in hopes of assisting Big Bend NP in their data collection on the Rio Grande River. Not only did Tim gain invaluable experience in monitoring river vital signs, he did so on one of the last remaining free-flowing river in the Colorado River basin. Tim also assisted in uplands vegetation and soils monitoring in Black Canyon of the Gunnison National Park.

Tim Pine on the Yampa River in Dinosaur NM.

Jonathin Horsley, exotics crew lead, is a shared employee with the Southern Plains Network (SOPN). Jonathin spent his summer as the crew lead for exotics monitoring in the SOPN, who uses the same protocol as CHDN. SOPN monitors for exotic plant species in all 11 of their parks that include a number of historical sites along the Santa Fe Trail, two national recreation areas and two national monuments in Texas, Oklahoma, Kansas, eastern Colorado, and northern New Mexico. Over the summer, Jonathin traveled from park to park, dodging the stray tornado. He summed up his summer as, "Big thunderstorms, many exotic plants, and more grass than most people see in their lifetime. Ah, life in the Southern Plains!"

Jonathin Horsley assisting with pollinator studies in Washita Battlefield NHS in Oklahoma.

Megan Podolinsky traveled the greatest distance of the three CHDN crew leaders. Megan, who is lead for springs monitoring in CHDN, joined the Greater Yellowstone Network (GRYN) for two months to assist with monitoring amphibians, water resources and participate in the 13th year of monitoring whitebark pines (*Pinus albicaulis*) in Yellowstone National Park. Megan assisted Water Ecologist Dr. Andrew Ray and Hydrotech Mary Levandowski monitoring amphibians in wetland habitats using visual observation and netting, and measuring water quality in the river systems in GRYN parks. Megan found it interesting from the hydrological and ecological perspectives to monitor water quality in a different type of system than the springs and seeps in the Chihuahuan Desert and is "fired up" to monitor springs in CHDN parks again next spring.

Megan Podolinksy surveying for amphibians at Tern Lake in Yellowstone NP.

Introducing the Uplands Monitoring Crew

Uplands Crew Lead **Tim Pine** returns for his third season at CHDN. He has also spent two seasons with the Northern Great Plains Network and two seasons for the Northern Colorado Plateau Network.

JoAnn Miller spent the last field season as a Fire Effects Monitor in Zion National Park. JoAnn has also worked at Wind Cave National Park, Big Thicket National Preserve, Assateague Island National Seashore, and Ozark National Scenic Riverways.

David Pinigis will be returning to CHDN for his second season. In the last two years, David has also worked as a crew lead for Vegetation and Natural Resources Management at Mesa Verde National Park. David has worked for the Northern Great Plains Inventory and Monitoring Network, as well as five seasons as a Biological Science Technician at Rocky Mountain National Park.

Melissa Nicolli joins CHDN from Mesa Verde National Park, where she has spent the past two field seasons working as a lead for the Vegetation and Natural Resources Management Crew. Melissa has also worked for Shenandoah National Park and Craters of the Moon National Monument and Preserve as a Biological Science Technician.

Crew members working along a transect in an uplands monitoring plot in White Sands NM.

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CHDN Fall 2016 Monitoring Schedule

Park	Uplands Monitoring	Exotics Monitoring
Amistad NRA	--	9/21 - 9/28 10/5 - 10/8
Big Bend NP	9/21 - 9/28 (Chisos) 11/30 - 12/7 (Low Elevation)	9/21 - 9/28 10/5 - 10/8
Fort Davis NHS	8/23-8/30	--
Guadalupe Mountains NP	9/7 - 9/14 (Bowl & Pine Springs) 10/19 - 10/26 (Dog Canyon) 11/2 - 11/9 (Patterson Hills)	9/7 - 9/14
Carlsbad Caverns NP	10/5 - 10/12 11/15 - 11/22	9/7 - 9/14
White Sands NM	12/14 - 12/21	--