Chihuahuan Sun

Newsletter of the Chihuahuan Desert Network November 2019

CHDN Highlights for 2019

It has been my great pleasure to lend a hand with the Chihuahuan Desert Network (CHDN) this year! In addition to keeping the program rolling, we have been pursuing three goals in 2019: (1) getting status and trend reporting moving forward (see Recent and Upcoming Reports); (2) refilling the many CHDN vacancies, and prioritizing field positions (see Staff Updates) – we were down to 2.5 FTE of NPS staff this spring!); and (3) engaging staff in a program review of the Southwest Network Collaboration (SWNC), which consists of Chihuahuan Desert, Southern Plains (SOPN), and Sonoran Desert (SODN) networks, serving 29 parks across the American Southwest.

Recognizing our shared resource issues, similar ecosystems, and very limited budgets (all three SWNC networks are in the bottom third of network monitoring budgets), we established the collaboration in 2010. With the completion of our final monitoring protocols in 2018, and with nearly a decade of collaboration under our belts, it was time to assess the sustainability and efficacy of our programs in the face of flat (or even declining) budgets.

Unlike when we chose "vital signs" in the early 2000s, we now have precise, detailed data on the time and costs requirements for each monitoring protocol. SWNC staff aggregated this data to determine our core staffing and budget needs to sustain the overall program, and then began developing a range of scenarios for restructuring the program to ensure that we meet our mission into the future. After we finish "kicking the tires" on the details of these scenarios, we will present them for your consideration at the upcoming Technical Committee (Resource Managers) and Board of Directors (Superintendent) meetings.

– *Andy Hubbard,* Acting CHDN Program Manager

Sunset, Chisos Mountains, Big Bend NP

Protocol Updates & News

Uplands

CHDN has welcomed back Tim Pine and Susan Singley to the Uplands Crew! The 2019 season kicked off in September with monitoring in the Chisos Mountains in Big Bend National Park (NP), and will continue through the end of the calendar year. The crew would like to thank Guadalupe Mountains NP for letting them stay at Ship-On-The-Desert during their tour.

Thanks to the heavy rains in fall 2018, the highlight of the season was the phenomenal spring bloom in Big Bend NP where the Upland Crew worked and camped.

Exotic Plants–Early Detection

Spring 2019 Exotic Plant–Early Detection sampling was completed in April, with the park reports completed and distributed in November. We found one new exotic species, *Cyclospermum leptophyllum* (marsh parsley), an annual lawn weed, at Carlsbad Caverns NP. Thanks to the heavy rains in fall 2018, the highlight of the season was the phenomenal spring bloom in Big Bend NP where the Upland Crew worked and camped.

Climate, Groundwater & Springs

CHDN has made several improvements and has met significant milestones in monitoring three key vital signs: climate, groundwater and springs. Climate data for all CHDN parks is available on the climateanalyzer.org website. CHDN analyzes climate information for each water year (October through September), including departures from normals, drought status, and extreme weather events. CHDN made a major investment in automating groundwater monitoring in 2019 which should improve the precision of our data and reduce field costs.

All 37 sentinel springs in CHDN parks were successfully sampled in spring 2019. The network made a substantial investment in high-precision water quality sondes to improve water quality data for the Springs protocol going forward. CHDN will be recruiting a new Aquatic Science Biological Science Technician in fall 2019.

Dune Dynamics (White Sands National Monument)

CHDN Data Manager Mark Isley is working on implementing the second Dune Stability and Integrity Monitoring Protocol which focuses on the stability and integrity of the White Sands NM dunefield and complements the initial White Sands Dune Dynamics protocol's focus on intradune processes. This protocol uses freely-available remotely-sensed data to quantify broader scale changes in the extent and conditions that control the dune processes such as dunefield area and changes in soil moisture. Initial efforts have centered around objectively delineating the dunefield boundary and show promising results, although some refinement is still needed to ensure the scientific validity of the metrics derived from changes in the boundary over time. The technique makes use of a large volume of Landsat 8 imagery (92 scenes from 2013-2019) which has created an opportunity to partner with the national remote sensing program to prototype the technique for doing this type of analysis using cloud computing resources. Our FY2020 goal is to complete our analysis and produce both a report on the results and an internal white paper on the technologies, techniques, and associated costs of the computational methods used in the analysis.

Working and camping in continual rain during fall 2018 came with the reward of the best spring bloom the crew has seen in Big Bend, March 2019

***Mentzelia multiflora* (Blazingstar) and *Nama hispida* (bristly nama) add to the phenomenal spring bloom in Big Bend March 2019**

Network News

(continued from previous page)

Channel Morphology/Riparian Vegetation (Big Bend NP and Rio Grande Wild and Scenic River)

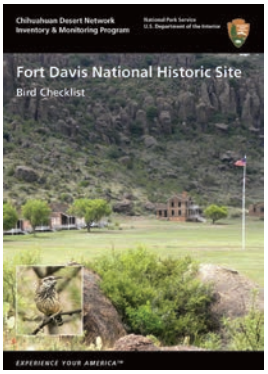
Big Bend NP and CHDN staff engaged in several meetings with partners to clarify roles and sampling approaches, and to develop a more programmatic approach that complements existing research and monitoring effort along the Rio Grande.

Landbirds

Dr. Robert Gitzen and graduate student Jessica Colbaugh of Auburn University are completing trend analysis for long-term bird monitoring in CHDN parks, with a final report expected at year end 2019. Writer/editor Patty Valentine-Darby, biologist Greg Levandoski of Regalis Environmental, and biologist Missy Powell are teaming up with Auburn University for coordination and completion of the report. Jessica Colbaugh will be presenting some of the results of the landbird trend analysis at the Chihuahuan Desert Conference in El Paso in November this year.

Texas State Flower *Lupinus havardii* (Texas Bluebonnet) paint Big Bend NP purple horizon to horizon (right).

CHDN Producing Bird Checklists for Network Parks



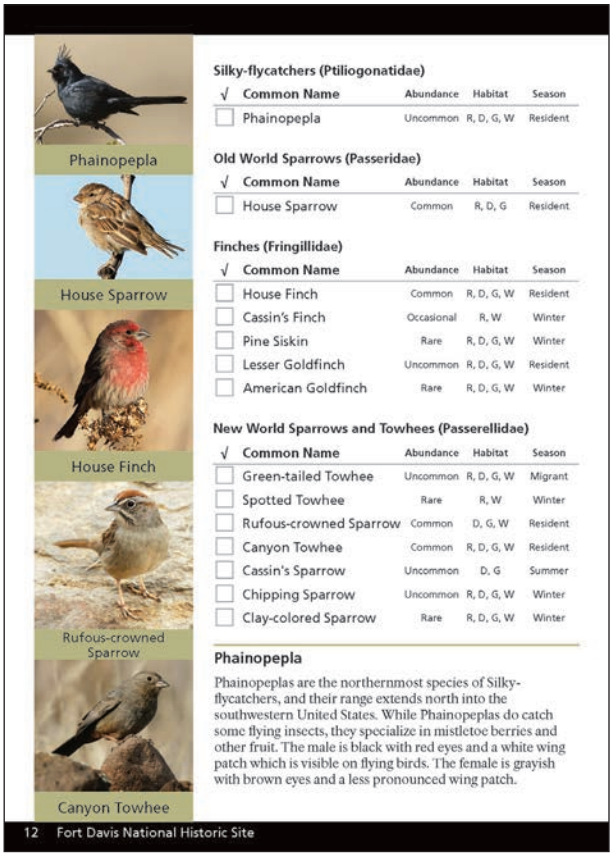
Working in collaboration with park staff, CHDN has produced illustrated interactive bird checklists for Amistad National Recreation Area (NRA) and Fort Davis National Historic Site (NHS). A checklist for White Sands NM is nearly complete, and one for Carlsbad Caverns NP is under development. Chamizal National Memorial is also interested in working with CHDN staff to develop a checklist.

The parks will have copies of the 5x7-inch booklets commercially printed. The checklists are also available as accessible, interactive (Section 508-compatible) PDFs from the CHDN website, and the Fort Davis and Amistad park websites.

The checklists provide baseline information about bird species, as well as park-specific content that is of interest to both serious and casual birders. The data source is NPSpecies, CHDN landbird surveys, and expert reviews. Wildlife photographer Robert Shantz generously provided permission to use his images.

The Southern Plains Network has requested assistance from CHDN to develop bird checklists for the parks in their network. The available template and format will be adapted to reduce preparation time.

To learn more, please contact Missy Powell at 575-646-5481 or melissa_powell@contractor.nps.gov.



CHDN's Recent & Upcoming Reports

During the last year, CHDN has published a number of monitoring protocols, monitoring reports and inventory reports in the peer-reviewed Natural Resource Report (NRR) series. A few highlights of the network's recent publications are below.

Vegetation Map Reports

The White Sands NM Vegetation Classification and Map was published in 2019, whereas some key issues with the accuracy assessment for the Guadalupe Mountains NP map led park and network staff to request additional support from WASO. Final maps, reports, and products for vegetation mapping at Amistad NRA, Big Bend NP, and Rio Grande Wild and Scenic River (WSR) were reviewed and the cooperator is completing revisions prior to final publication.

Climate and Water Status Reports

The network has published its first Climate and Water Resources Status Reports that use CHDN monitoring data and other complimentary information harvested from publicly available sources to help parks understand changes in climate, groundwater, springs, and water quality. These factors are major drivers of ecosystems and they dramatically shape ecosystem structure and function. Springs information, including water persistence, core water quality, discharge, and disturbance, are included in these reports. The water year 2018 report for Amistad NRA was published in October 2019 and reports for Carlsbad Caverns NP and Guadalupe Mountains NP are in preparation. We are currently evaluating the format of these reports with our Sonoran Desert Network collaborators, and are anticipating that reports for Big Bend NP, Fort Davis NHS, and White Sands NM will be published in 2020.

Status Reports for Terrestrial Vegetation and Soils

With some assistance from Daniel Winkler (USGS), we are completing the first Status Report for Terrestrial Vegetation and Soils at White Sands NM, with Big Bend NP to follow. Reports for Guadalupe Mountains NP and Carlsbad Caverns NP will be produced in 2020.

Exotic Species Status and Trend Reports

Park-specific reports summarizing 2018-2019 exotic plant surveys were completed and distributed for each CHDN park except for WHSA, where this protocol is not conducted due to the unique dune conditions. For 2020, we will pilot a new reporting approach that leverages the NPS Portal Geographic Information System coupled with streamlined reports. The idea is to turn around the exotic plant information much more quickly (days not months) so as to better support effective treatment by the Invasive Plant Management Team or park-based weed control efforts. The portal allows us to quickly share geospatial information in the context of other park resources. We will have a training and demonstration on this powerful mapping tool at the next CHDN Technical Committee meeting.

Ben Cooper has been analyzing data from a small study on repeatability among observers and has started to analyze our data for trend. We hope to publish the observer repeatability study in 2019.

Monitoring Protocols

CHDN published two monitoring protocols during the last year. The Springs, Seeps, and Tinajas Monitoring Protocol for the Chihuahuan and Sonoran Desert networks was published in November 2018. The protocol outlines the background, objectives and methods for long-term monitoring of arid-land springs in the two networks. Dune Stability and Integrity Monitoring Protocol for the Gypsum Dunefield in White Sands National Monument was published in December in 2018.

In March 2019, the network also published the Protocol Implementation Plan for Monitoring Geomorphic Change along the Rio Grande in Big Bend National Park. The plan details how CHDN will use the Big Rivers Geomorphology peer-reviewed and published protocol from the Northern Colorado Plateau Network to monitor changes in the geomorphology of the Rio Grande.

A black widow eating an agave beetle as observed by the Upldands monitoring crew.

New Dinosaur Species from Big Bend NP

New Species Described from Fossil Collected in the 1980s

©ICRA Art

In July 2019, researchers Albert Prieto-Márquez, Jonathan R. Wagner, and Thomas Lehman published a paper in the *Journal of Systematic Palaeontology* describing a new species of hadrosaur dinosaur based on a type specimen found in Big Bend NP. The bones were collected in the 1980s from the Aguja Formation exposed along the flank of the Rattlesnake Mountains.

The Aguja Formation is well known for its dinosaurian fauna, with almost 70 species of dinosaurs having been discovered therein. The Aguja Formation was deposited in a tropical coastal swamp during a time in the late Cretaceous (82 to 75 million years ago) when the Big Bend area was closer to equator. Big Bend was then on the shore of a broad shallow seaway (the Western Interior Seaway) that stretched across North America from the Gulf of Mexico to the Arctic Ocean.

Almost all of the dinosaurs in the Aguja Formation have been found in the upper portion of the formation. The new species, *Aquilarhinus palimentus,* was found in the lower part of the formation, which is only sparsely fossiliferous. In western North America, rocks that were deposited in continental environments during the late Cretaceous are rare, making the lower Aguja Formation and its fossil record of outstanding geologic significance. Big Bend's fossil record is additionally important because it is from the southern part of North America. Most hadrosaur fossils on this continent have been found in Utah, Montana, and Alberta, Canada.

The Aguja Formation is widely exposed in Big Bend NP where it thins to the east. The lower part of the formation consists of carbonaceous mudstone, a number of prominent sandstone intervals, coal beds, and concretion horizons that were deposited in poorly drained marshes and bays and low energy channels. The concretion interval is the only part of the lower unit that has yielded significant vertebrate fossils.

The Aguja Formation. The beds have been tilted by later mountain-building activity, and darker layers are the shale

The new species is in a new genus of primitive hadrosaurs. Hadrosaurs are a group of herbivore dinosaurs more informally known as duck-billed dinosaurs. *A. palimentus* was named for its distinctive nose and chin: 'aquila' meaning eagle, and 'rhinos,' meaning 'nose,' and 'pala' meaning shovel, and 'mentus' meaning chin. The shape of its jaw enabled the dinosaur to scoop loosely rooted aquatic plants in its tidal marsh environment.

The new species is more primitive than most other known hadrosaurs, and provides important information on the hadrosaur evolution. It's more primitive than the main group of hadrosaurs (the saurolophids), suggesting a greater unrealized diversity of early hadrosaurids that had been previously realized.

Big Bend NP Geologist Don Corrick said, "*Aquilarhinus* is an important addition to Big Bend's remarkable fossil diversity. Over 1,200 taxa of fossils are already known from the park, but our visitors — especially our youngest visitors — are particularly interested in dinosaurs. I think that this discovery, made from a specimen collected 30 years ago, highlights the importance of curated collections, and we should give a shout-out to our curatorial staff and partners who care for these collections."

The work was conducted under permit from the Division of Science and Resource Management at Big Bend NP, and the Texas Vertebrate Paleontology Collections at the University of Texas at Austin, where the fossil is stored.

To learn more:

An unusual 'shovel-billed' dinosaur with trophic specializations from the early Campanian of Trans-Pecos Texas, and the ancestral hadrosaurian crest by Albert Prieto-Márquez, Jonathan R. Wagner & Thomas Lehman in Journal of Systematic Palaeontology. Available at https://www.tandfonline.com/doi/full/10.1080/14772019.2019.1625078

All NPS fossil resources are protected under the Paleontological Resources Preservation Act of 2009 (Public Law 111-11, Title VI, Subtitle D; 16 U.S.C. §§ 470aaa - 470aaa-11).

In Memorium

Remembering Joe Sirotnak, Long-time Big Bend NP Biologist

Joe Sirotnak worked as the Botanist for Big Bend National Park and the Rio Grande Wild and Scenic River between September 24, 2000 and October 14, 2016. He moved on from Big Bend NP to work for the Bureau of Land Management as the ecologist of the Morley Nelson Snake River Birds of Prey National Conservation Area in Idaho. On June 18, 2019, Joe passed away due to cancer.

Some or "most" of you who work in parks in the Chihuahuan Desert and/or with the CHDN monitoring program may have been fortunate enough to work with Joe. Early on in his career at Big Bend NP, he worked with CHDN staff on baseline vegetation inventories and was a lead figure in the development of the vegetation vital signs monitoring program. He established long-term monitoring plots for endangered cactus populations, developed landscape-scale control measures on invasive grasses, and authored the Exotic Vegetation Management Plan for Big Bend NP and Rio Grande WSR.

Joe was an inspiring individual, always generous with his time and knowledge. His understanding of plant communities and species identification was legendary in the Big Bend NP Division of Science and Resource Management. He knew them all. He was frequently tested by the staff, especially with the smallest of annuals. You know the ones that grow between the small desert pavement gravels! His responses were always helpful and quick and of course he used the scientific names.

Joe possessed a tremendous level of interest in working collaboratively with counterparts in Mexico and the United States to develop the research and monitoring protocols that were needed to implement the restoration actions on the Rio Grande. His hard work established permanent monitoring transects and he led on the program to remove exotic river cane (*Arundo donax*) from over 60 miles of riparian zone along both the Texas and Mexico side of the Rio Grande. Through his work, Joe exemplified the binational management and project coordination needed to restore the Rio Grande at the landscape scale.

One of Joe's favorite past times was baseball and following the Yankees. There were many times on the Rio Grande where you would find Joe at his tent, after a hard day of field work, listening to a Yankees game. For wilderness enthusiasts, you may have disagreed, but Joe's smile and interest in the score of the game would have won you over.

Joe had a type of discreet humor that was fun to be around. He always had a smile to greet you and his field data sheets captured moments of brevity when he would give names to specific bunch grasses he had been monitoring for over a decade. One example is the population of Guadalupe Fescue (*Festuca ligulata*) in the Chisos Mountains. There are a few hearty bunchgrasses, to this day, that have their specific tag number but also their nickname provided by Joe. He also inspired field staff when he showed them how to survey stands of river cane that appeared impossible to survey, 500 feet wide by 500 feet long, next to the flowing Rio Grande. It was all about establishing the baseline and Joe showed everyone how to get the job done. This was some of the hardest work in the field and Joe was there to provide leadership by example. He referred to one really epic survey transect as the "Milpa," or corn field. Getting the baseline established before restoration treatments were implemented was the hard part. Joe got it done!

Whether Joe was your friend or colleague, you knew you could count on him and there wasn't anyone better to be working next to you in some of the harshest field conditions. Whether it was pushing through impenetrable river cane, rowing against winds on the Rio Grande, or conducting project assessments in hot summer conditions, Joe was there willing to lead or participate as a team member. Joe was also there when good sound advice

Joe with a park crew surveying for rare cactus populations in 2005.

In Memorium

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was needed on the next steps to take in restoring habitats along the Rio Grande or in the uplands of the Chihuahuan Desert.

The staff at Big Bend NP, the Mexican Commission of Natural Protected Areas (Maderas del Carmen, Ocampo, Rio Bravo del Norte National Monument, and Santa Elena Canyon), and CHDN, as well as local partners in Texas and across the country, have suffered a profound loss. We are all grateful for everything Joe did to preserve the resources of the National Park Service and beyond. Joe will be missed!

Article courtesy of David Larson, Big Bend NP Chief of Science and Resource Management and Acting Superintendent of Fort Davis National Historic Site.

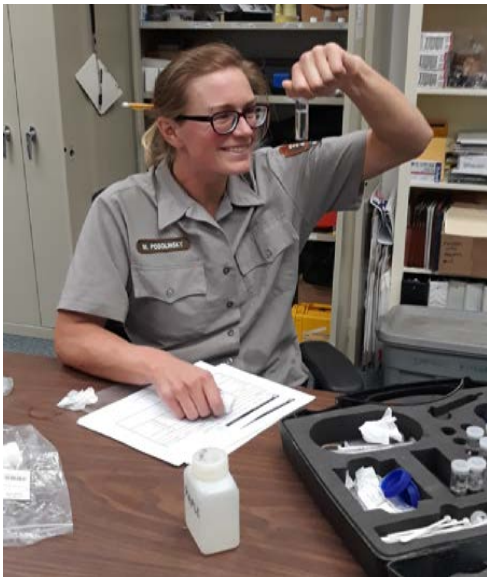
Staff Updates

Lindsay Smythe Takes Refuge Manager Position with USFWS

Former CHDN Field Coordinator **Lindsay Smythe** took a new job as refuge manager for San Andres National Wildlife Refuge (NWR) in February 2019. San Andres NWR is within White Sands Missile Range and is east of White Sands NM and provides important habitat for desert bighorn sheep. Having started her career with US Fish & Wildlife Service almost 20 years ago, Lindsay was excited to return to the agency and the wildlife field and to get the opportunity to manage a place as unique as San Andres. She is also learning a plethora of new skills — like how to maintain roads with a rock crusher.

Megan Podolinsky Springs Into Private Sector

After six years with CHDN, former Seeps and Springs Monitoring Crew Lead Megan Podolinsky switched gears for a job in the private sector. Megan joined Coldwater Engineering, a small environmental engineering firm based out of Helena, Montana, as their primary environmental scientist. She began her new job with wetland delineation surveys and reports and is learning the entire environmental permitting process and even how to draw bridges in AutoCAD! Although it's a completely different world from plant and spring surveys at national parks, Megan uses all her expertise and skills learned at CHDN.



CHDN Partners with San Andres NWR

In April 2019, Megan Podolinsky visited San Andres NWR to train US Fish and Wildlife staff on the CHDN Springs monitoring protocol. She and refuge Biological Technician Tyler Rogers gathered data at Salt Spring and Stinking Spring on the refuge. CHDN had previously monitored four springs on the refuge in 2011, data from which were incorporated into the refuge Water Resource Inventory and Assessment. The refuge hopes to gather more complete data on its numerous remote springs, many of which have been rarely visited or monitored.

Jonathin Horsley Joins New Mexico State Parks

Former Invasive Plant Monitoring Crew Leader for CHDN and SOPN, Jonathin Horsley, is now the park manager at Pancho Villa State Park in Columbus, New Mexico. Pancho Villa State Park preserves historic structures associated with the Pancho Villa Raid in 1916. The Pancho Villa Raid was the first armed invasion of the continental United States since the War of 1812. The U.S. Customs House in Columbus, built in 1902, serves as the visitor center.

The park is currently in the slow season and Jonathin and his staff are getting caught up on a backlog of projects and maintenance issues.

Staff Updates

CHDN Staffers Receive Awards

In August 2018, **Mark Isley**, CHDN Data Manager, received the I&M Innovations in Data Management award. The award acknowledges individuals or teams who develop and implement innovative and impactful data management systems or solutions.

Mark Isley

Mark had an instrumental role in developing and deploying CHDN's new automated procedure for generating documents containing information field crews need to revisit sites for the Uplands and Springs protocols. Crews need photographs, data, travel directions, and lists of species of concern from previous visits. The automated process queries protocol databases for sites to be visited during the current field season and takes minutes to complete instead of days of manual information gathering.

Andy Hubbard, PhD, Acting CHDN Program Manager and SODN Program Manager, received the 2019 Intermountain Region's Director's Award for Professional Excellence in Natural Resource Stewardship. Andy was recognized for his exemplary commitment and dedication to science-informed management, the creation of the Desert Research Learning Center, his development of the concept of *Assessment Points* as a tool to communicate potential problems in the condition of park resources to park management, and for additional accomplishments.


Andy Hubbard

Andy is now a candidate for the national-level Director's Award to be announced later this year. Andy has been the SODN Program Manager since 2001 and has also overseen CHDN since Marcia Wilson's retirement at the end of December 2018.

Helen Thomas Joins SWNC Data Management Team

Helen Thomas has accepted the SODN data manager position and is now part of the SWNC data management team, which consists of data management staff from CHDN, SODN, and SOPN. Helen is serving in a project management role for the SWNC DM team, coordinating and tracking tasks, and leading weekly team meetings. She is working closely with CHDN DM staff in a number of areas including field crew support, IT support, and coordinating project work. Helen recently assisted with preparation for the CHDN uplands field season, and also helped with end of year IT purchasing for the network.

Prior to joining SODN, Helen served as the data manager for the Northern Colorado Plateau for 13 years, where she oversaw the design, development, implementation, and maintenance of the network's data management applications and processes. She also worked previously as a software development manager and consultant, with a focus on designing, developing, and implementing enterprise information systems. She also previously taught graduate-level courses in database systems.

Tim Pine Rejoins CHDN

Tim Pine was recently hired as the new Biological Science Technician. Tim has worked with CHDN in a variety of capacities for about five years. He was the Uplands crew lead from August 2014 to December 2018, and most recently has worked as a part of the field crew as an employee of Tucson Audubon Society. Tim has also previously worked for the Northern Colorado Plateau and Northern Great Plains Networks. In his new position, Tim will provide his expert botanical and field sampling skills in support of the Exotic Plants, Terrestrial Vegetation and Soils, and Springs monitoring protocols.

Contact Us

Andy Hubbard
Acting Program Manager
andy_hubbard@nps.gov
520-751-6861

Cheryl McIntyre
Ecologist/Physical Scientist
cheryl_mcintyre@nps.gov
575-635-3659

Mark Isley
Data Manager
mark_j_isley@nps.gov
575-635-0150

Brandon Gottung
Uplands Field Crew Lead
brandon_gottung@nps.gov
575-644-1313

Tim Pine
Biological Science Technician
timothy_pine@nps.gov
480-980-4571

Kiki Fahey
Biological Science Technician
kristina_fahey@nps.gov

Leslie Aills
Administrative Assistant
leslie_aills@nps.gov
520-751-6863

Ben Cooper
Ecologist (Tucson Audubon Society)
ben_cooper@nps.gov
575-646-5481

Missy Powell
Biologist (Tucson Audubon Society)
melissa_powell@contractor.nps.gov
575-646-5481

Henry Whitenack
Assistant Data Manager
(NM WRRI)
henry_whitenack@nps.gov

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Acting Program Manager
Andy Hubbard

Editing and Design
Allyson Mathis

Contributors: *Andy Hubbard, Allyson Mathis, Missy Powell, Brandon Gottung, Tim Pine, Cheryl McIntyre, Mark Isley, Helen Thomas, David Larson, Don Corrick, Lindsay Smythe, Megan Podolinsky*

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Chihuahuan Desert Network

New Mexico State University, MSC 3ARP
3655 Research Drive, Genesis Building D
Las Cruces, NM 88003

https://www.nps.gov/im/chdn/index.htm