Sonoran Desert Network
Inventory and Monitoring Program

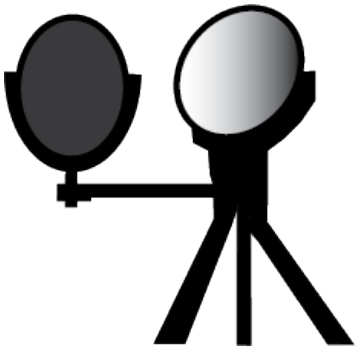
National Park Service
U.S. Department of the Interior

The Heliograph

Official Newsletter of the Sonoran Desert Network and Desert Research Learning Center

Winter 2019

In This Issue



Meet the New Boss: Take Our Virtual Tour

The tour starts at the habitat of our resident desert tortoise, Boss.

Now open to the public on Tuesdays (9:00–4:30), the Desert Research Learning Center offers visitors a self-guided tour of its grounds via smartphone.

The tour showcases the desert environment and demonstrates sustainable practices in arid lands. Tour stops include a pollinator garden, a heritage orchard, an artificial tinaja and flowing stream, and a variety of native plants and foods, all sustained by a rainwater collection system. The webpage for each stop tells users how they can incorporate the displayed techniques at their own homes and help conserve desert wildlife.

You can view the tour from your smartphone or desktop.

Need Science Content for Your Park Website? We've Got That!

Network staff can provide park webmasters with everything they need to pull SODN science content into their park webpages.

Now that our website is part of the CMS, it's easy to use Sonoran Desert Network content to help populate your park's Science & Research page—or create a subpage dedicated to SODN science.

We're so excited about this that **we'll provide you the html, a photo, and step-by-step instructions** to make it happen! You can see examples of what this looks like at the Tuzigoot NM or Montezuma Castle NM websites (thanks, MOCA/TUZI!).

Plus, you can now find the very latest SODN publications all in the same place—just visit our What's New page to find everything we've produced in the past two years.

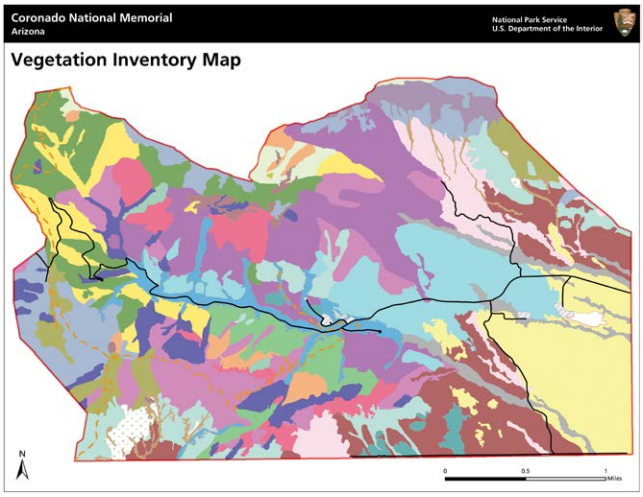
How the Past Influences Today's Landscape at Casa Grande Ruins National Monument

Creosotebush at Casa Grande Ruins National Monument.

Our vegetation monitoring at Casa Grande Ruins National Monument has shown the park to be surprisingly low in plant diversity. Across six vegetation plots and eight years, only one common perennial species was found on all plots: the shrub, creosotebush (*Larrea tridentata).* On the other hand, biological soil crusts have colonized nearly 60% of the available habitat—one of the highest rates observed on any Sonoran Desert park. Our recent report uses assessment points to identify a few potential problems park staff should keep their eye on. It also reveals that today's lack of plant diversity may have its roots in the area's recent—and ancient—history. **Read more . . .**

Vegetation Map Completed for Coronado National Memorial

Knowing what's growing where, and what kinds of habitat occur in a park, helps park managers with park planning, resource monitoring, interpretive programs, prescribed fire, and climate-change response, among other tasks. At Coronado National Memorial, we mapped 25 vegetation associations, ranging from dense, non-native grasslands dominated by exotic Lehmann lovegrass to steep expanses of exposed bedrock dominated by mountain mahogany and evergreen sumac. **Read more . . .**



Vegetation map of Coronado National Memorial.

Updates on Climate and Water Resources

Hydrologic conditions are closely related to climate conditions. Because the two are better understood together, the Sonoran Desert Network reports on climate in conjunction with water resources. In 2018, we completed reports and briefs for climate and water resources at Casa Grande Ruins NM, Gila Cliff Dwellings NM, Montezuma Castle and Tuzigoot NMs, and Tumacácori NHP.

To find out what it's like to collect streams data in the Sonoran Desert—and get to know our aquatic ecologist—don't miss our podcast, "A Day in the Field with the SODN Streams Crew."

Surveying for macroinvertebrates at Gila Cliff Dwellings National Monument.

Project Updates

Springs

The second season of springs monitoring was successfully completed in WY2018. The 37-day funding lapse and consequent cessation of work delayed the important start-of-season training for WY2019 springs sampling. Despite this significant setback, training has been rescheduled and sampling all SODN spring sites should occur as planned.

Streams

The SODN Streams Monitoring Protocol was published in October. Index sites have been established on all perennial streams in network parks. These sites, located in four parks, were used to pilot methods and test

Beaver Creek, Montezuma Castle NM.

results. In the next phase of this project, at least one index site will be established in each SODN park. These will include monitoring sites on intermittent streams, such as Rincon Creek at Saguaro NP, and on ephemeral streams, such as Bonita Creek at Chiricahua NM. Selection and establishment of sample sites is planned during WY19, with monitoring to begin in WY20. The monitoring crew started the new water year (October–September) with visits to all the perennial sites. Continuous water quality monitoring began on Beaver Creek at Montezuma Castle NM, where measurements of core water quality parameters were collected every 15 minutes for a two-week deployment. Routine monitoring was not significantly impacted by the 37-day funding lapse and consequent cessation of work in 2018–2019, and will continue for the rest of the water year as scheduled. Selection of new index sites was delayed but we are hopeful for its successful completion.

Uplands

A total of 44 plots were re-sampled across the following parks this past season: Casa Grande Ruins NM (3 plots), Chiricahua NM (3; five more were planned but delayed due to weather), Coronado NMem (3), Fort Bowie NHS (10), Organ Pipe Cactus NM (4), Saguaro NP–East (7; more were planned but delayed due to wildland fire considerations), Saguaro NP–West (5) and Tumacácori NHP (9). Delayed plots will be completed during the 2019 season. We also successfully completed installation of 20 plots on Pima County lands, as part of our ongoing collaboration with Pima County's Office of Sustainability and Conservation. Currently, staff are identifying unknown plant collections and performing quality checks on data.

Vegetation Inventory and Mapping

Three reports were completed this past year. The Coronado NMem report is published and available in IRMA (see article in this newsletter). The report for Montezuma Castle NM is in final preparation for publishing. The report for Gila Cliff Dwellings NM report is out for external review. December saw the completion of accuracy assessment (AA) work at Saguaro NP–East, with over 1,900 assessment plots sampled park-wide. This was an enormous, eight-month effort, culminating several years' work to classify and map the park. Staff are currently reviewing the AA data and beginning the reporting and final product development. Field work at Organ Pipe Cactus NM continued last spring, with several weeks of data collection and ground-based mapping. The data have been incorporated with other datasets and used to update and fill out the classification of vegetation types at the monument, as well as to re-digitize several key areas in the park. We plan to conduct a validation effort this spring,

A validation effort for vegetation mapping at Organ Pipe Cactus NM will be conducted this spring.

comparing cover data and photos for legacy plots to map attributes in order to quantify the accuracy of current mapping extents within the park's massive, broad valleys. Results will inform where future field mapping effort should be focused. No field work is currently scheduled.

Wildlife Cameras

Wildlife camera monitoring is designed to estimate occupancy of small to mid-sized wildlife, like this coatimundi.

Over the next few months, staff and citizen scientists plan to make routine visits to Casa Grande Ruins, Gila Cliff Dwellings, Montezuma Castle, and Tonto national monuments to check SD cards and replace batteries in wildlife cameras. In these smaller parks, our goal is to keep the cameras out year-round. The 37-day funding lapse and consequent cessation of work forced us to cancel camera deployment planned for Saguaro NP's Tucson Mountain District, and complicated plans for deployment at Organ Pipe Cactus and Chiricahua national monuments.

At the Desert Research Learning Center

- **The Learning Center is now offering public programs at 1:00 p.m. on Tuesdays.** From now through March 2019, program topics will alternate by week:
    - *First and Third Tuesdays*: Fish, Frogs, and Water—Oh My! Rio Sonoyta pupfish and lowland leopard frogs
    - *Second and Fourth Tuesdays:* A Drink in the Desert: The waters that bring life to a dry land.
- The DRLC has continued to have a strong presence of IVIPs (International Volunteers in Parks). Most recently, we hosted two IVIPS from Slovakia and one from Great Britain.
- Distance learning is coming to the DRLC. The system will enable remote education programs for classes and public centers that cannot physically come to the center. The system will also be available for use by SODN park staff in interpretation and education.
- Through our citizen science program, members of the University of Arizona Wildlife Society and Environmental Awareness Society have gained experience deploying wildlife cameras at Organ Pipe Cactus, Chiricahua, and Gila Cliff Dwellings national monuments.
- We have added two new fish species to the DRLC stream habitat: speckled dace and desert suckers.

Arrivals and Departures

It's hard to believe we're saying it, but after 15 years with the Sonoran Desert Network, data manager **Kristen Bonebrake** has traded in tinajas and columnar cacti for glaciers and seastars. As data manager for the North Coast and Cascades Network, Kristen takes her incredible talents to an organization that monitors everything from subalpine vegetation on the slopes of Mt. Rainier to marine communities where Lewis and Clark wintered on the Pacific shore. It would be hard to overstate the positive impact Kristen has had on SODN operations over the past decade and a half, or how much she will be missed. Happy trails, Kristen!

Kristen Bonebrake started with SODN in 2003.

We've also bid farewell to **Dávid and Terezia Mach**, international interns at the Desert Research Learning Center for almost six months in 2018. Hailing from the Slovak Republic, they were supported through the NPS International VIP program. Dávid and Terezia are recent graduates of Comenius University with Master Degrees in GIS and geoecology, and had previously worked for the Slovakian Ministry of Agriculture and Rural Development. At the DRLC, the couple used geospatial analysis to model the impacts of fire severity on post-fire flow events and stream morphology at Gila Cliff Dwellings NM. Reports on their work are expected to be published mid-2019.

IVIPs Dávid and Terezia Mach.

Dávid and Terezia have worked in or visited nearly 20 U.S. national parks; hiked in Germany, Poland, Austria and Croatia; and travelled extensively in Thailand. They now live in Bratislava, where they enjoy traditional cooking and professional disco dancing. *Na zdravie*, Dávid and Terezia!

Calendar

Park	February	March	April	May
CAGR	–	Wildlife cameras*	–	–
CHIR/FOBO	–	–	Springs (Apr 15–22)*	–
CORO	–	–	Springs (Apr 1–5)*	–
GICL	Streams (Feb 6–7)	–	Wildlife cameras*	Streams (May 1–2)
MOCA/TUZI	Streams (Feb 12–13)	Springs (Mar 11–14) Wildlife cameras (MOCA/MOWE)*	–	Streams (May 16–21)
ORPI	–	Springs (Mar 18–22)*	–	–
SAGE	–		Springs (Apr 8–10)	–
TONT	–	Springs (Mar 11–14)	–	Wildlife cameras*
TUMA	Streams (Feb 18)	–	Streams (Apr 23)	Streams (May 13–15)

*tentative

The Heliograph is produced by the National Park Service Sonoran Desert Network.
To submit questions or comments, please contact alice_wondrak_biel@nps.gov.