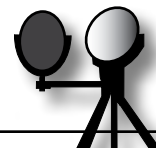


# The Heliograph

Official Newsletter of the Sonoran Desert Network

Volume 2, Issue 1



Students from Tanque Verde Elementary follow SODN ecologist Evan Gwilliam into the field.

## SODN Supports Saguaro NP BioBlitz

When the National Geographic Society BioBlitz brought its high-octane natural resource roadshow to Saguaro National Park in October 2011, the Sonoran Desert Network staff seized the opportunity to help make the event a huge success. SODN data manager Kristen Beaupré led the overall data management effort, coordinating the digitization of more than 175 datasheets at several locations onsite, working with all the other teams, and engaging in a lot of high-pressure troubleshooting. Other SODN staff led field trips, entered data, and did whatever else was asked of them. Whether

they were out at the event or keeping the wheels on the bus back at the office, everyone contributed to this rewarding effort. BioBlitz teams tallied at least 859 different species in 24 hours. Included in that total were more than 400 species, mostly invertebrates and non-vascular plants, new to park lists, and at least one species of bryophyte believed to be new to science (found on a SODN-led field trip!). The results of the count are not yet final; stay tuned! BioBlitz 2012 will take place in Rocky Mountain National Park.

... *Related article* →

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## BioBlitz

"... a 24-hour event in which teams of volunteer scientists, families, students, teachers, and other community members work together to find and identify as many species of plants, animals, microbes, fungi, and other organisms as possible.

A BioBlitz gives adults, kids, and teens the opportunity to join biologists in the field and participate in bona fide research expeditions. It's a fun and exciting way to learn about the biological diversity of local parks and to better understand how to protect them."

—<http://www.nationalgeographic.com/explorers/projects/bioblitz/>





## Message from the Program Manager

I believe we will eventually look back at 2012 as a "year of transition" for the SODN program.

As we respond to the grim NPS budget reality—including the complete loss of the NPS Climate Change Monitoring Program—the efficiencies gained through partnerships become more crucial than ever. Our ongoing collaboration with the Chihuahuan Desert and Southern Plains networks has been bolstered by an emerging partnership with the nascent U.S Fish and Wildlife Service I&M Program. Fish and Wildlife Service (FWS) monitoring experts are developing pilot studies on refuges in Arizona and New Mexico to determine if selected NPS monitoring protocols will meet their information needs, and we at SODN are excited to gain access to the impressive vertebrate ecology expertise that resides on the FWS staff. In particular, FWS is a leader in developing innovative data management strategies and sophisticated data management applications for monitoring mammals with remote wildlife cameras. As budgets wither, it is critical that we effectively capitalize on these and other potential partnerships to sustain and enhance our mission.

Another major transition will be the relocation of the SODN office. SODN has been co-located with our Sonoran Institute partners since 2003, an arrangement that greatly facilitated our many shared projects. However, later this year, we anticipate relocating the SODN program and its FWS I&M partners to the former BLM Tucson Field Office Building (located adjacent to Saguaro NP–Rincon Mountain District). Although the details and final approval process are still in the works, we expect the move will likely be completed by early summer. The facility is ideally set up to serve as the Desert Research Learning Center, which has thus far remained a "virtual" (online) institution only. Stay tuned for more details on this exciting opportunity.

—Andy Hubbard

# Arrivals and Departures

Clerk **ALBERT CASELLA**, biological science technician **BETSY VANCE**, and Student Conservation Association (SCA) intern **LIZ GUINESSEY** have ridden into the SODN sunset. Albert has shifted his primary focus of study at the University of Arizona to anthropology. Betsy is pursuing a Master of Science in the College of Forestry at the University of Washington. Liz recently returned to the U.S. after completing work with a youth hostel in Colombia, and is currently pursuing seasonal biotech positions.

SODN is happy to welcome back returning employees **SHANNON MCCLOSKEY** (hydrologic technician, Streams) and **LAURA TENNANT** (biological science technician, Wildlife). Joining the vegetation mapping effort are biological science technicians **JEFF GALVIN**, **GREG GOODRUM**, and **SHANNON HENKE**.

Former SCA intern **NICOLE SULLIVAN** is SODN's new physical science technician (Streams), and **LAURA PALACIOS** is our new student intern clerk extraordinaire.



Nicole Sullivan and Liz Guinessey.

Betsy Vance rehydrates.



Shannon Henke.



Shannon McCloskey.



Action shot! Albert Casella mans his BioBlitz data-entry station.



# Project Updates

## Groundwater

Groundwater monitoring continues at Chiricahua NM, Fort Bowie NHS, Coronado NMEM, Saguaro NP, Organ Pipe Cactus NM, and Tumacácori NHP. Water supply wells at Montezuma Castle NM, Montezuma Well, and Tuzigoot NM have been investigated for possible monitoring but configuration of the wellheads at these locations was found to be inaccessible for monitoring purposes. Reconfiguration of the wellheads during future pump servicing was recommended. The hydrologist presented a talk summarizing monitoring data and groundwater conditions at Organ Pipe Cactus NM at the Trinational Symposium, "Celebrating the Sonoran Desert" in Ajo, Arizona, in March. Charles Conner of Organ Pipe Cactus NM was a co-author on the presentation.

## Invasive Exotic Plants

This spring, we have implemented the invasive exotic early detection protocol at four SODN parks: Casa Grande Ru-

ins NM, Tumacácori NHP, Coronado NMEM, and Chiricahua NM. In June, we will add Gila Cliff Dwellings NM to that list. Efforts to date have focused on streamlining field-data collection and data management. To that end, SODN has been working closely with the Chihuahuan Desert and Southern Plains networks to design and build an ArcPad-based data-collection form, which will enable us to collect all data on a handheld computer with integrated GPS. The data collected will then be easily appended into a geodatabase back at the office. Our intent is to maximize efficiency in data collection and then quickly manage the data and send them back to the parks. Overall, the protocol design seeks to provide information that facilitates a "rapid response" to exotic plant observations.

## Landbirds

Revisions to the SODN Landbird Monitoring Protocol are nearly complete. The original protocol has been extensively revised to (1) incorporate occupancy and community-scale bird parameters, and (2) include the Southern Plains, Chihuahuan Desert, and Northern Great Plains networks. The actual field portion remains unchanged, and most SODN parks are nearing the five-year "critical mass" of data to support trend analyses. For additional information, please contact Rob Bennetts (robert\_bennetts@nps.gov) or Andy Hubbard (andy\_hubbard@nps.gov).

## Natural Resource Condition Assessments

NRCAs for Chiricahua NM, Coronado NMEM, and Fort Bowie NHS have been completed and are undergoing technical review. Writing is still in progress on the reports for Montezuma Castle and Tuzigoot NMs, Tumacácori NHP, and Gila Cliff Dwellings NM. Information is being gathered for the Tonto NM report.

## Streams

Quarterly water quantity and water quality samples were collected at SODN and SOPN parks. In addition, 11 cross-sections and a longitudinal profile were surveyed at Tumacácori NHP, using total-station and GPS equipment. Previous cross-sections from protocol development were integrated into the effort. In cooperation with the Friends of the Santa Cruz River and Arizona Department of Game and Fish, fish were sampled in the Santa Cruz River using electrofishing and various passive and active capture techniques. This is the first time SODN has collected fish monitoring data—very exciting!

## Springs

In cooperation with our friends in the Chihuahuan Desert Network, 60 springs and tinajas were sampled in most SODN parks (including backcountry sites at Saguaro NP) as we tested and improved sampling methods and techniques during the fall and early winter.

## Uplands

Uplands data from last season have all been finalized and reports are posted or shortly forthcoming. This coming field season, beginning in June, will see the first-ever repeat sampling of plots! Sampling was initiated at Chiricahua NM in the fall of 2007, and each plot is sampled every five years. Crews will also continue to establish new plots at Organ Pipe Cactus NM, Coronado NMEM, and both units of Saguaro NP.

## Vegetation Mapping

Mapping field work has been restricted to Saguaro NP (TMD) this spring, with crews working to continue map creation in unmapped areas, as well as validating existing data. Sixteen vegetation community type descriptions were drafted last year and attributed to each mapped area. We are continuing to refine these



**National Park Service**  
U.S. Department of the Interior

The Sonoran Desert Network is one of 32 National Park Service inventory and monitoring networks nationwide that are implementing vital signs monitoring in order to assess the condition of park ecosystems and develop a stronger scientific basis for stewardship and management of natural resources across the National Park System.

### Sonoran Desert Network

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### Phone

520-546-1607

### Website

<http://science.nature.nps.gov/im/units/sodn>

The National Park Service cares for the special places saved by the American people so that all may experience our heritage.

... continued on page 5 →

# Tales from BioBlitz!

During the BioBlitz, Kara Raymond, SCAs Nicole Sullivan and Liz Guinessey, and I led two groups to a series of tinajas in the Loma Verde drainage at the Rincon District of Saguaro NP. The first was a group of 40 fifth graders (and parents and chaperones) from the Tanque Verde School District. We enjoyed a beautiful day and learned about xeroriparian ecosystems, including vegetation, macroinvertebrates, water quality, and how water flows through systems. Everyone made it back to the bus!

The second group was composed of local Tucsonans and the BioBlitz Youth Ambassador Dara (and her very cool dad); Dara (in yellow shirt at right) has attended several BioBlitzes and learned a lot at the Saguaro event. Our group hiked about a mile to a series of tinajas, where we searched for aquatic invertebrates. It must be noted that Dara proclaimed the activity led by the SODN crew her "favorite inventory," writing on her blog, "Aquatic inventory was awesome! I saw a diamondback rattlesnake and 2 other unidentified snakes. I also saw the skeleton of a coyote or fox, exoskeleton of a dragonfly larva, water scorpion, horse hair (the kind of worm), and learned about a bacteria layer called schmutz-decke. I also saw dragonflies mating. Aquatic inventory was my favorite inventory. Thank you, Ranger Evan!!" For more of Dara's BioBlitz blog, visit: <http://www.nature.nps.gov/biology/biodiversity/SAGUBlog.cfm>

—Evan Gwilliam, Aquatic Ecologist

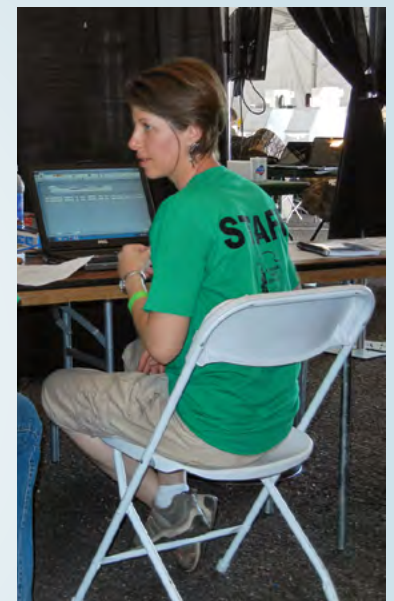


It was an honor and great learning experience to work with Saguaro National Park for the 2011 BioBlitz. The Sonoran Desert Network and Saguaro National Park staffs and many other partners worked together to make the BioBlitz event a great success that everyone could be proud of. The best part for me was meeting park staff who I would not have had the pleasure of working with in my typical role as the SODN data manager. With all those other wonderful NPS employees, I learned a lot about working in a much larger team environment.

The SODN staff is approximately 30 strong; our team synergy easily promotes productivity and high-quality results. BioBlitz was the largest team effort I have ever been involved in, and with a team size of approximately 90 people, communication was the single largest challenge for me. The differences in how, when, and in which format each person wanted to receive communications varied greatly (and often reflected people's personality traits!). The event itself was amazing.

Seeing all of the volunteers, partners, NPS staff, scientists, and public participants milling around and being truly excited about learning about the Sonoran Desert, and the beauty it offers, was an experience I will never forget. During BioBlitz, more than 800 individual species were observed, including amphibians (3 species), birds (98 species), mammals (24 species), reptiles (31 species), invertebrates (246 species), fungi (6 species), non-vascular plants (28 species), and vascular plants (390 species). Many of the scientists are still hard at work examining specimens collected from the field that can only be identified in the lab.

Others have already turned over their post-BioBlitz results to the park, adding ever still to the total inventory count. Saguaro NP plans to issue a press release with those adjusted numbers in April.



—Kristen Beaupré, Data Manager



## Project Updates

continued from page 3

based on current field observations. Roughly 60% of the park has been groundtruthed, and work will continue throughout this year.

In June, we will initiate a new mapping and classification project at Gila Cliff

Dwellings NM. This project, originally scheduled for 2011, was postponed due to the Miller Fire. Efforts have been made to coordinate with the U.S. Forest Service to ensure that the area between the two NPS units at this park will be included in our map, creating a contiguous area and following more natural boundaries.

Accuracy assessments are scheduled for Montezuma Castle NM (both units), Coronado NMEM, and Chiricahua NM. The latter two parks both had extensive wildfire activity this past summer; therefore, we will combine accuracy assessments with notations of post-fire response and vegetation changes.

During BioBlitz, I was fortunate to be stationed at Manning Cabin (RMD) and charged with assimilating, entering, and keeping track of all the data from various scientists. I also helped to record plant-species observations, along with SAGU fire ecologist James Leckie. Two school groups hiked up to Manning Camp with us: 13 students from Flowing Wells High School and 7 from Wakefield Middle School. Fun was had by all! Joining our species-recording frenzy were bird, moth and plant experts. The students were given opportunities to learn about plants, reptiles (we found a large snakeskin), moths, wildlife cameras, mule-packing logistics, wilderness survival skills, and Leave No Trace ethics. And, of course, how far it really is to the top of the Rincon Mountains . . .

—Sarah Studd, Vegetation Ecologist



Taking a closer look at a horned lizard (*Phrynosoma* sp.).



A sheet with a black light was set up each night by moth expert Jennifer Bundy (shown here) to attract moths.



Students watched as a mule was loaded up with all of our camping gear and food. Thank you, mules!

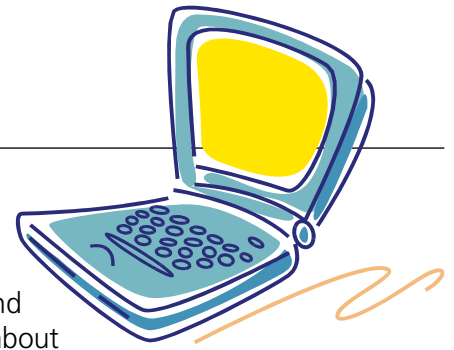


Wakefield students found a recent snakeskin shed near Manning Cabin.



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## Sonoran Desert Inventory & Monitoring Network

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### Saguaro National Park



Situated to the east and west of Tucson, Arizona, the two distinct districts of Saguaro National Park encompass a tremendous amount of ecological diversity. To the west, the Tucson Mountain District ranges from 2,180 to 4,687 feet in elevation and contains three biotic communities: desert, thornscrub, and semi-desert grassland. To the east, the Rincon Mountain District ranges from 2,670 to 8,666 feet in elevation and contains five biotic communities: thornscrub, semi-desert grassland, Madrean evergreen woodland, and temperate forest.

The higher Rincon peaks comprise the park's "sky islands," though surrounded by desert, the montane habitats found here support boreal species more commonly found in northern latitudes. Climate change is a strong concern here, as there are no higher habitats into which forest species can migrate to escape predicted increases in temperature.

The saguaro cactus (*Carnegiea gigantea*), which gives the park its name and which it was created, in part, to protect, grows only in the Sonoran Desert of the U.S. and Mexico. The spread of invasive exotic buffelgrass (*Conchocarpus ciliaris*, formerly *Pennisetum ciliare*) in the park, which has introduced wildfire to a desert landscape whose flora did not evolve with it, poses a major threat to this signature species.

SODN monitors air quality; climate; groundwater; landbirds; seeps, springs, and tinajas; terrestrial vegetation and soils; and washes at Saguaro NP.

<< previous park      next park >>



It's never been easier to find the information you need about what we're monitoring where and what we've found so far!

At the SODN website (<http://science.nature.nps.gov/im/units/sodn>), each park now has its own page featuring interactive information, a photo slide show, and handy links to briefs, reports, plant checklists, photo galleries, and more.

The monitoring pages have received a facelift, with important information now right at the top of the page. We've also continued to add [staff profile pages](#), so you can learn more about us—and recognize us when we show up at your park!

Our [Facebook page](#) grows more popular each day! Be sure and Like us to receive updates on our activities and findings, as well as posts about new research, job openings, park happenings, cool photos, and other Sonoran-iana! You can access Facebook from your government computer, and you don't need to log in or even have a Facebook account to view our page.

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## Sonoran Desert Inventory & Monitoring Network

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### Vegetation & Soils

**Importance/Issues**  
Generating over 99.9% of the Earth's biomass, plants are the primary producers of life on our planet. Vegetation therefore represents much of the biological foundation of terrestrial ecosystems, and vegetation comprises or interacts with all primary structural and functional components of these systems. Vegetation is highly influenced by environmental factors, such as soil texture, depth, and landform type. Especially as they relate to water, these influences are magnified at local scales in the Sonoran and Chihuahuan deserts and Apache Highlands ecoregions.

**Parks Monitored**  
Casa Grande Ruins NM, Chiricahua NM, Coronado NM, Fort Bowie NHS, Gila Cliff Dwellings NM, Montezuma Castle NM, Organ Pipe Cactus NM, Saguaro NP, Tonto NM

**Monitoring Objectives**  
1) Determine the status of and detect trends in vegetative cover (%) of common (> 10% absolute cover) native and non-native perennial plant species that occur in terrestrial ecosystems  
2) Determine the status of and detect trends in the frequency (%) of uncommon (10% cover) native perennials, all annual lifeforms, and all non-native species in terrestrial ecosystems  
3) Determine the status and detect trends in the density (individuals/hectare) of columnar cacti and ocotillo

**Available Information**  
Monitoring briefs  
Monitoring reports  
Monitoring trip summaries  
Monitoring protocol  
Plant checklists by park

**NEW!**  
Uplands Trip Summaries: CAGR, CHIR, CORO, ORPI, and SAGE, 2011  
Photos of common Sonoran Desert plants, biological soil crusts, and the vegetation & soils monitoring process are available at the network's Flickr photostream!

**Contacts**  
Andy Hubbard, Program Manager, Sonoran Desert Network  
Sarah Studd, Ecologist (Vegetation)  
Cheryl McIntyre, Ecologist, New Mexico State University

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Government Organization  
The Sonoran Desert Network conducts natural resource monitoring in 11 U.S. national parks in order to assess the condition of park ecosystems and develop a stronger scientific basis for natural resource stewardship and management.

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**Sonoran Desert Network**  
4 hours ago · 45

Good morning, landbirds! People are out looking for you today through Wednesday at Saguaro NP (TMD). (evb)

Recent Posts by Others on Sonoran Desert Network    See All

# Staff profile: Cheryl McIntyre

Although newly hired by the National Park Service, Physical Scientist Cheryl McIntyre is a familiar face around SODN. She's been collaborating on network projects since she started with the Sonoran Institute in 2004 and more recently with New Mexico State University. Technically employed by SODN's Southwest Network Collaboration (SWNC) partner the Chihuahuan Desert Network, Cheryl is responsible for physical-science aspects of protocol development and monitoring for both networks and is part of a SWNC group developing ways to improve electronic data collection in the field. A chemist by education, her primary area of expertise is soil science and geomorphology.

Cheryl got hooked on dirt while taking a walk with Saguaro NP's Don Swann. Having been given the opportunity to work on early protocol development and conceptual modeling on the SODN uplands protocol, she read up on biological soil crusts (BSCs) and, while on a hike with Don, "started noticing all these little guys growing in the ground. I found a moss and squirted some water on it, and it changed colors! And from

then on I was hooked. I thought, Are you kidding me? There are all these little things down there that you don't notice—or hardly notice—and you squirt water on them and they change colors and start doing things. There's this whole other world? This is awesome!"

After a three-year sojourn in Corpus Christi, Texas (where her husband, Josh, is stationed as an instructor pilot for the Air Force), Cheryl will return to Tucson this July. In the fall, she will begin her PhD at the University of Arizona, focusing on biological soil crusts in the Sonoran and Chihuahuan deserts.

*Author's note: After going on my own hike with Cheryl at Saguaro NP last fall, I proceeded to spend a good portion of the next day crawling around the trail at Tonto NM, photographing BSCs. Which, as it turns out, really are every bit as cool as Cheryl thinks they are.*

—Alice Wondrak Biel,  
Writer-Editor



Example of moss activating in response to water. From left: dry, wet, green!

## Is it Hot in Here?

### Monitoring Response to the Miller, Horseshoe II, and Monument Fires

In response to the intense wildfire season of 2011, SODN has committed to re-sample many, if not all, of our existing Uplands plots at Gila Cliff Dwellings NM, Coronado NM, and Chiricahua NM this fall. We have worked closely with the Burned Area Emergency Rehabilitation (BAER) teams and national NPS fire liaisons to develop a strategy for tracking and monitoring fire-related changes in vegetation and soils. In addition to repeating our normal sampling measures, we will conduct composite burn index (CBI) assessments at each site. This will be a considerable effort yet is important and valuable for interpreting trends/changes in species composition, abundance, and distribution in response to this disturbance.

Within a few weeks post-fire at each park, we were able to visit the majority of our long-term monitoring-plot locations (both existing and potential future sites) and performed rapid assessments of substrate and vegetation burn severity. A total of 135 sites were sampled. These data will help inform and prioritize this year's efforts and have already been used to refine fire-severity maps for each park unit.

Wash and spring sites at Chiricahua NM were also revisited, and riparian vegetation at Gila Cliff Dwellings NM, which was sampled post-fire, will be re-sampled this year.

—Sarah Studd and Evan Gwilliam, Ecologists





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All photos in this document are courtesy of the National Park Service.

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<http://science.nature.nps.gov/im/units/sodn>

## Where Are We?

Here's what's going on in April, May and June:

Project	Month(s) and Park(s)
Invasive Exotic Plants	Monitoring will occur at Coronado NMEM in April, Chiricahua NM in May, and Gila Cliff Dwellings NM in June/July.
Landbirds	Check the network's <a href="#">Facebook page</a> for the current whereabouts of the Landbirds crew.
Streams	A SODN crew will survey stream cross-sections and longitudinal profiles at two SOPN parks, Chickasaw NRA and Washita Battlefield NHP. Quarterly sampling of water quality and quantity will occur in SODN parks and several SOPN parks (Bent's Old Fort NHS, Pecos NHP, Chickasaw NRA, Washita Battlefield NHS). Concurrent sampling of benthic macroinvertebrates will occur in SODN parks.
Washes	Methods testing will commence in earnest at Saguaro NP (TMD) and Chiricahua NM, with the installation of indirect slope-area stream gage stations.
Vegetation Mapping	Mapping and classification work will take place at Gila Cliff Dwellings NM in June/July.
Uplands	Monitoring will occur at Organ Pipe Cactus NM in April and at Gila Cliff Dwellings NM in June/July.

SOPN = Southern Plains Network