



The Heliograph

Official Newsletter of the Sonoran Desert Network



Electronic data collection is increasing the network's efficiency and reducing its costs.

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Goodbye, Datasheets!

Did you know that the Inventory & Monitoring Program is required to dedicate approximately one-third of its resources to the task of data management? All of that data ends up in computers, but until recently, it didn't all start out that way. Instead, a big pile of paper and Rite-in-the-Rain datasheets and a collection of pencils was part of a field crew's essential equipment. Datasheets were manually completed in the field and then entered into electronic databases back at the office—an extra step that not only proved time-consuming (and thus, expensive), but also introduced the possi-

bility of transcription errors.

When the three **Southwest Network Collaboration** (SWNC) data managers (from SODN, the Chihuahuan Desert Network, and Southern Plains Network) discovered that the highest labor costs associated with data management came in the form of data verification—the task of comparing the data entered into the databases to the field datasheets—they put their heads together and decided to explore the possibility of implementing electronic data collection. Thanks to the Department of the Interior's



SODN congratulates newly installed Tumacácori National Historical Park superintendent Bob Love! Bob was previously chief ranger for Saguaro National Park. We look forward to working with Bob in his new capacity.

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Arrivals and Departures



We've said goodbye to cartographic technician **DAN STAUNING**, biological technician **LAURA CRUMBACHER**, and physical science technician **NICOLE SULLIVAN**. Dan is now a technical expert with GIS software company ESRI, Laura is working on the National Park Service/U.S. Fish and Wildlife Service Legacy Plants project at the University of Arizona Herbarium (as a UA employee), and Nicole is a conservation expert with an engineering firm in New Orleans.

Welcome to seasonal biological technician **NATALIE WILSON**, who is working on Burned Area Emergency Response projects at Chiricahua NM, Coronado NMEM, and Gila Cliff Dwellings NM (mostly refining watershed assessments and exotic plant monitoring). SODN's newest Student Conservation Association interns are **IAN HIGGINS**, **MICHELLE KOSTUK**, and **ANNA TAUGHER**.



Michelle Kostuk

Natalie Wilson

Ian Higgins

Anna Taugher

Staff profile: Shannon McCloskey

When Hydrological Technician Shannon McCloskey was growing up in the village of Albers, Illinois, her internal compass pointed West, and she dreamt of moving to Arizona. At 18, she packed up and made it happen, moving to Flagstaff to attend Northern Arizona University.

Armed with a degree in advertising, Shannon returned to St. Louis, where she spent a year working in her field of specialty before developing a nagging feeling that she wasn't doing enough to help improve the world. That all changed when, during a visit to Grand Canyon National Park, Shannon ran into "a group of dirty, stinky boys digging in the dirt," and thought, "That's a job? Amazing!" She was soon part of that park's Trails Crew, and spent the next eight years helping to maintain the backcountry pathways of the Grand Canyon.

Working on trails best accessible via raft was not only her favorite part of the job, but also broadened her experience with backcountry travel and the safety issues associated with it. Shannon uses that knowledge, as well as that gained while serving as a backcountry ranger at Saguaro National Park, in her collateral duties as SODN's safety representative. In addition

to sampling water quality, channel morphology, and macroinvertebrates for the SODN Streams program, Shannon is leading the network's effort to improve employee safety and was recently certified as an Operational Leadership instructor. Her primary goal for the network's safety program is to ensure that everyone—regardless of position, rank, or whether s/he is a group's designated leader—feels comfortable enough to speak up about safety, because although different people may have different levels of experience, all experience is valuable.

Away from work, Shannon enjoys travel, weight lifting, hiking, running, and just about anything else that happens outside—especially if it happens in the Caribbean, South America, or the beauty of Arizona's wide-open spaces.



—Alice Wondrak Biel, Science Writer

Project Updates

Invasive Exotic Plants

Invasive exotic plant surveys were conducted at Gila Cliff Dwellings National Monument (NM) starting in late July. A second round of early detection monitoring was completed at Chiricahua NM and Coronado National Memorial (NMEM) in late August and early September.

Landbirds

Rocky Mountain Bird Observatory staff are processing the SODN landbirds data collected earlier this year. Following data verification and analysis, we will complete the annual bird reports by the end of 2012.

Natural Resource Condition Assessments

Work continues on the NRCA reports for Montezuma Castle/Tuzigoot NMs, Tumacácori National Historical Park (NHP), Gila Cliff Dwellings NM, and Tonto NM. We are writing chapters, creating maps and figures, gathering infor-

mation, and performing other necessary tasks. Anna Iwaki, Scientist Coordinator for last year's Saguaro National Park (NP) BioBlitz, came on board in May to help us with this project, primarily by writing the sections on herps and mammals. Our target date for completion of these reports is the end of this calendar year.

Streams

Quarterly sampling of water quantity and quality was completed at all stream index sites at five SODN parks this summer, and at Pecos NHP as part of the Southwest Network Collaboration (SWNC). SWNC crews collected data on flow and the concentration of more than 30 parameters (e.g., temperature, dissolved oxygen) at the index sites. These data help SWNC ecologists and park managers meet agency, federal, and state-mandated water quality objectives and provide insight into the dynamics of aquatic and riparian systems.

We have also been testing methods for deploying and retrieving multiparameter water quality data loggers at several SWNC parks. In Water Year (WY) 2013, we will deploy these instruments quarterly at all SODN parks where streams are monitored, and at Pecos NHP and Bent's Old Fort National Historic Site (NHS) in the Southern Plains Network (SOPN). These important datasets will allow for understanding daily, seasonal, and annual trends in core water quality parameters.

SWNC staff have finished surveying cross-sections and longitudinal channel profiles at two other SOPN parks, Chickasaw National Recreation Area and Washita Battlefield NHS. This work will help SWNC ecologists and park managers to understand the dynamics of stream channel morphology at these parks. SWNC staff also met with park staff at Bent's Old Fort NHS to prepare for more intensive monitoring of streams and groundwater planned for WY13.

Springs

In September, Southwest Network Collaboration crews revisited sites at upper elevations in the Rincon District of Saguaro NP, investigating the seasonal differences of plant species and other physical metrics.

Uplands

Uplands monitoring this fall will be split between focusing on re-sampling all established plots at Gila Cliff Dwellings NM, Chiricahua NM, and Coronado NMEM, and continuing to establish new plots at these and other units. In September, we headed into the backcountry at Saguaro NP (Rincon Mountain District) to put in another round of plots. Organ Pipe Cactus NM and Saguaro NP (Tucson Mountain District) will be the focus for the remainder of the fall.

Vegetation Mapping

Vegetation mapping was initiated at Gila Cliff Dwellings NM in July. Efforts there will continue through September, when the field-data collection phase should be complete. Progress has also been made on developing a draft base map of vegetation types for Saguaro NP (Rincon Mountain District), using LIDAR and satellite-image derived products. This map will guide field efforts slated to begin in the fall months. Accuracy assessments of the draft Montezuma Castle NM vegetation map will commence in early winter.

Washes

In June, SODN installed a stream gaging station at a test site in Monument Wash at Saguaro NP. This station uses a modified method developed by the U.S. Geological Survey to calculate stream discharge using logging pressure transducers. The data from this station will help SODN to refine upcoming work necessary in developing the SODN washes monitoring protocol.



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.

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

Goodbye, Datasheets!

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existing enterprise agreement with GIS software developer ESRI, the SWNC's move to electronic field data collection required only minimal expenditure beyond the necessary field laptops and handheld GPS units. As eliminating the extra step from the data cycle is expected to save the networks approximately 400 work hours per year, the up-front investment should yield significant long-term cost savings.

As it turns out, electronic data collection not only increases time- and cost-efficiency, but also increases overall data completeness and accuracy in several ways. One, the electronic data form can be programmed to require a user to complete all areas of a form before exiting it, eliminating the possibility of missing data. Pre-programmed pick lists and response parameters reduce the possibility of user error (for example, a user would be prevented from inputting a pH of 21 instead of 12), but an "Other" option is available in case something legitimately anomalous is discovered. And of course, there are no more worries about illegible handwriting, indecipherable abbreviations or other notation, or transcription errors.

When fire disturbances recently occurred in several SWNC areas, the Exotic Plants–Early Detection protocol was chosen as the pilot project for electronic data entry. Exotic plants data are managed in an ArcSDE geodatabase. Prior to heading into the field, monitoring crews load their Trimbles with the proper dataset, as the SWNC data managers have developed an ArcPad application to mimic field data collection work flow and ease the data-entry process. To create the application, the data managers coded the picklists,

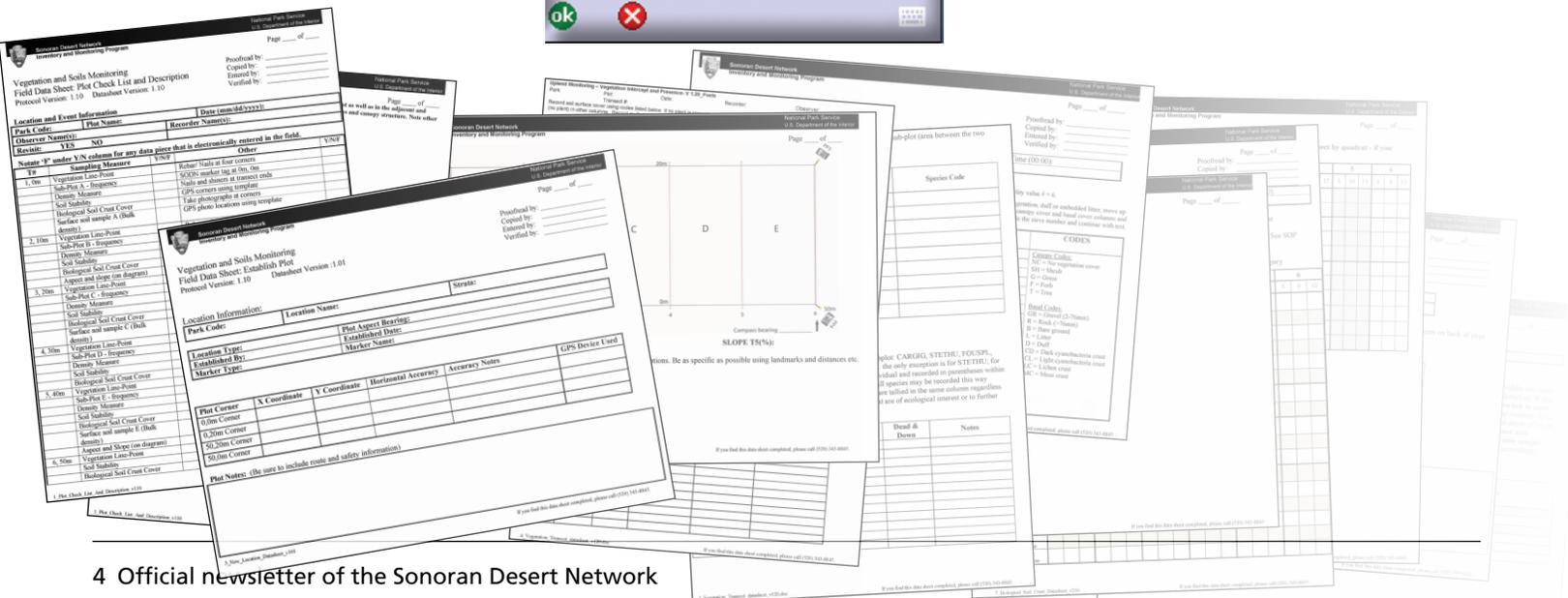
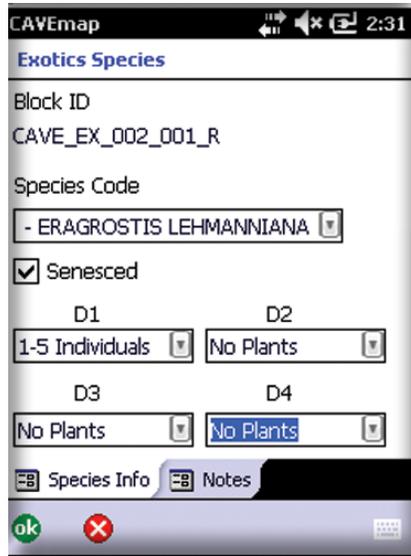


Devices used for field data collection.

parameters, and completeness requirements described above, as well as fields designed to autofill throughout a data collection effort, such as the park unit code or user initials. Picklists were designed to be park-specific. To mitigate the possibility of a system or application crash, the program autosaves and stores the information as it is entered.

Because the data collected are spatial in nature, creating maps of the exotics found is quick and easy, which helps to ensure that we can provide park resource management staff and Exotic Plant Management Teams with the latest data for use in planning control efforts. Even the data themselves are easily shared. Because the databases exist at an enterprise level, the information contained within them can be replicated as read-only and shared with anyone, anywhere with an Internet connection. We plan to continue to search for ways to gain efficiencies through enterprise solutions.

—Kristen Beaupré, Data Manager
Alice Wondrak Biel, Science Writer



SODN Staff Mentors Young Scientists

On a recent afternoon at Saguaro National Park's Madrona Pools, Tucson City High School (TCHS) students got a taste of what life as a field scientist might be like. As part of a new partnership between the Sonoran Desert Network and the Ironwood Tree Experience (through the nascent Desert Research Learning Center), SODN ecologist Evan Gwilliam and Tiffany Ash, the class instructor and Ironwood Tree Experience project lead, introduced students from TCHS's field ecology class to what an ecologist does—from planning a project and collecting the data to analyzing the data and presenting the results.

The project includes classroom and field components. In the classroom, natural resource field specialists from resource management, aquatic ecology, wildlife biology, and vegetation ecology deliver lectures on a wide variety of topics. Students then take the information from these specialists into the field, using both national parks and wildlife refuges as "living laboratories" where they conduct focused

projects through hands-on experience.

The initial class began with a lecture on general field methods, including the importance of close observation and accurate note-taking, then focused on the field site for this project, the Madrona Pools. The instructors emphasized the importance of the site to local wildlife, explained that the Madrona Pools are sensitive habitat, and introduced the specific methods used by National Park Service (NPS) scientists to collect monitoring data at the site.

The students then spent a day at the pools, conducting a site assessment of several tinajas (permanent or semi-permanent pools) near the Madrona Ranger Station in Saguaro National Park's Rincon Mountain District. Students took site photographs, drew site maps, assessed human and natural impacts, collected water quality data and identified macroinvertebrates, and learned about the wildlife (including wildlife cameras) and physical processes of the

Madrona Pool system. In addition to a meaningful learning experience, the data that the students collected may be used by the NPS to better manage the Madrona Pools.

Using their field notes and collected data, the students presented the results of their site assessment and their experience to a group that included fellow students, instructors from their school, and several invited guests—including NPS and U.S. Fish and Wildlife Service scientists.

By all accounts, the students had a fine time in this segment of the course and are looking forward to the next project: conducting a saguaro cactus census at Saguaro National Park's Section 17 research area. We at SODN are excited about the future of this project and the opportunity it provides to cultivate young scientists and connect our youth with these special protected places.

—Evan Gwilliam, Aquatic Ecologist



Where Are We?

Here's where we'll be monitoring what in October, November, and December:

Park	October	November	December
CORO	SPRINGS UPLANDS: Uplands and postfire monitoring (10/10–11/17) WASHES: Installation of gaging station		-
FOBO	-	SPRINGS (11/30)	-
GICL	STREAMS: Quarterly & macroinvertebrates (10/4–11); Channel morphology (10/29–11/5) Sonde retrieval (10/22–25)		STREAMS: Water quantity, channel morphology (12/10–14)
MOCA/TUZI	STREAMS: Quarterly sampling (10/29–30)	STREAMS: Sonde retrieval (MOWE, 11/13)	-
ORPI	UPLANDS (10/14–20, 10/28–11/3)		-
SAGE	-	SPRINGS: monitoring (11/8–9); channel morphology testing (11/15–16) UPLANDS: 9 sites, dates TBD WASHES: Protocol testing (11/26–30)	-
SAGW	-	-	UPLANDS: 6 sites, dates TBD
TONT	-	SPRINGS (11/5–7)	-
TUMA	-	STREAMS: Fish survey (11/2); Quarterly sampling (11/6); Sonde retrieval (11/19)	-
PECO*	STREAMS: Quarterly & macroinvertebrates (10/4–11); Sonde retrieval (10/22–25)	-	-
BEOL*	STREAMS: Quarterly sampling (10/1–7); Sonde retrieval (10/22–25)	-	-

*Southern Plains Network

CORO=Coronado National Memorial, FOBO=Fort Bowie National Historic Site, GICL= Gila Cliff Dwellings National Monument, MOCA/TUZI= Montezuma Castle and Tuzigoot national monuments, MOWE= Montezuma Castle National Monument (Well unit), ORPI=Organ Pipe Cactus National Monument, SAGE= Saguaro National Park–East, SAGW= Saguaro National Park–West, TONT= Tonto National Monument, TUMA= Tumacácori National Historical Park, PECO= Pecos National Historical Park, BEOL= Bent's Old Fort National Historic Site



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(Don't worry; our phone numbers haven't changed.)

