



# The Heliograph

Quarterly Newsletter of the Sonoran Desert Network



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## How does the SWNC work?

Under the SWNC, the three networks, in varying combinations of two or three, will share protocols, training, data management, and reporting responsibilities for eight different protocols: air quality, climate, invasive exotic plants, uplands, groundwater, landbirds, and surface water (streams and seeps/springs/tinajas). A complete breakdown of which protocols and responsibilities will be shared among which networks can be found at the SWNC SharePoint site, <http://inpchdnms03/SWNC/CP/SitePages/Home.aspx>.

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## Reaching Beyond the Boundaries: The Southwest Network Collaboration

By now, you may have heard about our participation in the Southwest Network Collaboration (SWNC), a joint effort between SODN, the Chihuahuan Desert Network (CHDN), and the Southern Plains Network (SOPN) to share not only monitoring protocols, but also data collection and reporting duties. The goal of the SWNC is to improve effectiveness and efficiency across all three networks.

### How did the SWNC come about?

Collaboration between SODN and SOPN actually began back in 2007, when SODN called on SOPN program manag-

er Rob Bennetts, a world-recognized expert in bird monitoring, to help revise its landbird monitoring protocol. Around the same time, SODN and SOPN joined the effort to create the Learning Center of the American Southwest (LCAS; [www.southwestlearning.org](http://www.southwestlearning.org)), a virtual learning center dedicated to promoting understanding of the natural and cultural resources of the American Southwest through science and education (see box, page 4). The Chihuahuan Desert Network is also an LCAS partner. Discussions about expanding these extant partnerships between SODN, SOPN, and CHDN began in 2009.





### Message from the Program Manager

Despite the conclusion of the NPS/Sonoran Institute student intern program a few years ago, the integration of SODN

activities with student scholarship is stronger than ever. Students comprise more than half of the SODN staff, either through NPS student hiring authorities, the Student Conservation Association (SCA), or volunteer initiatives with undergraduate students pursuing independent projects.

Data Manager Kristen Beaupré and Plant Ecologist Sarah Studd are completing MS programs in the University of Arizona's School of Natural Resources through the NPS Student Career Experience Program (SCEP); upon graduation, they will assume permanent positions with SODN.

Steve Buckley, Dan Stauning, Mark Jacobson, and Albert Casella are also pursuing degrees through the University of Arizona, and supporting SODN vegetation mapping and monitoring efforts through the NPS Student Temporary Employment Program (STEP). Steve is working on PhD research on floras of the American Southwest; Dan is completing a post-graduate program in GIS. Mark and Albert are undergraduates in the School of Natural Resources and Department of Ecology and Evolutionary Biology, respectively. Betsy Vance, also employed through the STEP program, is conducting post-graduate research on soil-vegetation interactions through a fellowship with her alma mater (Mount Holyoke College) and an independent study project with the Geosciences program at Pima Community College. Stephanie Roussel, David Fenlon, and Greg Goodrum are SCA interns working on various monitoring and vegetation mapping projects; as full-time interns with completed Bachelor's degrees, their experiences at SODN are designed to prepare them for graduate research.

Blending scholarship with I&M projects benefits both staff and the program. To expand this effort, we are currently in discussions with the University of Arizona's School of Natural Resources to develop a formal, programmatic approach to integrating SODN work experience with undergraduate and graduate programs.

—Andy Hubbard

# Arrivals and Departures

After a year and a half of service, Biological Science Technician **DANIEL WINKLER** has departed SODN to begin his master's research through the University of California–Merced, where he will research the effects of climate change on vegetation communities. During the summer, Dan will collect data at the Niwot Ridge Long-term Ecological Research near Boulder, Colorado; during the school year, he will take classes and work as a teaching assistant in Merced. Dan's project, which is part of a larger study examining shifts in treeline, will investigate the impacts of climate change on alpine perennial plants by simulating and speeding up the process using infrared heaters to warm plots. Dan worked on the vegetation mapping field crew for over a year and helped complete mapping efforts at Chiricahua NM, Coronado NMem, Tonto NM, and Saguaro NP. He was a valuable member of the SODN team, bringing great energy and enthusiasm to his work. While he will be greatly missed, we wish him all the best in his endeavors!

**KATE CONNOR** will leave SODN in late May to begin a position as a Restoration Ecologist at Organ Pipe Cactus National Monument. Kate has been with SODN for more than four years, beginning as a field crew lead for the vegetation mapping program, where she was instrumental in helping to refine data collection methods and get the program off the



ground. After that she moved into a term position as the lead field technician for all vegetation and soils protocols. Kate's extensive prior experience working in field-based roles has been a tremendous benefit, with her planning and implementation skills (especially for back-country trips) rubbing off on the rest of the office! She has become intimate with the flora in all of the network parks, and we are very happy to know that we will continue to work with her as she begins a new journey at Organ Pipe.

**BETH FALLON** is departing SODN this July to begin a doctoral program in plant biology at the University of Minnesota. Beth has been the field crew lead for all vegetation mapping efforts at SODN parks for the last three years and has made great contributions to the program. She has worked hard throughout her tenure to evolve and improve our field methods and data management, and has been instrumental in adapting the protocol to new situations and parks. Beth mentored and supervised multiple employees and interns, sharing her knowledge and providing great leadership. Good luck, and stay in touch!

—Sarah Studd, Vegetation Ecologist



Happy Trails to Kate, Dan, and Beth!

# Project Updates

## Air Quality

The SODN air quality protocol has been updated to include parks from the Chihuahuan Desert and Southern Plains networks (see cover story). The document has been reviewed and submitted for NRTR publication.

## Exotic Plants

SODN-specific criteria have been added to this multi-network protocol, which completed the review process. In collaboration with park resource staff, areas of high invasion probability have been identified for future monitoring, with consideration of existing park efforts. Planning, database development, and sampling-frame mapping will continue for the next few months.

## Groundwater

Groundwater monitoring continues at Chiricahua NM, Fort Bowie NHS, Coronado NMem, Saguaro NP, Organ Pipe Cactus NM, and Tumacácori NHP. At Saguaro NP, a well that was once used to

supply water to the former Madrona pack base camp was located and added to the monitoring program. This abandoned well was more or less forgotten until it was discovered during the creation of maps for the SODN groundwater protocol (thank you, Dan Stauning!). Data from this well will prove valuable in the analysis of hydrogeologic relationships between shallow and deep aquifers in the Rincon Creek drainage. Another forgotten well was located by Saguaro NP trail crew members and archeologist Ron Beckwith near Hope Camp in the Rincon Mountain District. This well was investigated, logged into the SODN wells metadata archive, and capped.



Javelina Tinaja, Organ Pipe Cactus NM.

## Landbirds

Preparations for the upcoming season of SODN landbirds monitoring began in March, and monitoring was initiated in April at Casa Grande Ruins NM, Coronado NMem, Organ Pipe Cactus NM, Saguaro NP (RMD & TMD), Tonto NM, and Tumacácori NHP. Landbird monitoring will continue into early June; check the [SODN Facebook page](#) for updates on where the crew is. The 2010 annual landbird monitoring report was released in January 2011; links to the full report and project summary are available at the [SODN website](#).

## NRCAs

The draft final Natural Resource Condition Assessment report for the southeast Arizona parks (Chiricahua NM, Coronado NMem, and Fort Bowie NHS) is in review, and work is continuing on condition assessments for the other five SODN parks that have already held scoping meetings. The SODN NRCA team has begun writing the Montezuma Castle

NM/Tuzigoot NM report, and the assessment is scheduled for presentation to park staff on July 14, 2011. NRCAs for Tumacácori NHP, Gila Cliff Dwellings NM, and Tonto NM are currently in the information-gathering phase. Due to uncertainty about NRCA funding and the SODN budget, the amount of NRCA work to be accomplished this year is yet to be determined, but we remain committed to completing the assessments that have been started. Implementation for the remaining SODN parks (Casa Grande Ruins NM, Organ Pipe Cactus NM, and Saguaro NP) is uncertain as the Intermountain Regional Office considers who will take the lead on future NRCAs.

## Springs

The springs and tinajas inventory at Organ Pipe Cactus NM has been completed, except for a few sites that will be surveyed over the next few months. Springs at Tonto NM will be visited in May and June. Botanist and bryophyte expert John Spence recently completed a fruitful two-week detail at SODN, writing an SOP and conducting a workshop on collecting and identifying moss and lichen samples collected during springs inventories. He also identified moss samples collected during the 2010 springs inventory. The results will be published in the NPS Natural Resource Technical Report series.

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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.

# Staff profile: Kara Raymond

Her work may not take her quite from Tucson to Tatum, but it comes close! Hydrologic Technician Kara Raymond spends a lot of time on the road. Not only does she collect quarterly water samples and measurements on perennial streams around the Sonoran Desert Network, she is also helping to implement streams monitoring in the Southern Plains Network, as part of the Southwest Network Collaboration (see cover story). That work has regularly taken her to Pecos NHP, New Mexico, and will also include visits to Lyndon B. Johnson NHP, Texas.

Fortunately, far-off travel is not a novelty for Kara, a native Milwaukeean who spent her first year after college working for an environmental non-profit organization in Indonesia, where she assisted the local staff with grantwriting, translation, and improving their English skills. She came to SODN in July 2010, from a position with another environmental non-profit based in Asheville, North Carolina, where she coordinated a volunteer water quality monitoring program. In Tucson, she is currently helping the local chapter of Engineers Without Borders, to which she belongs, to plan an assessment trip to Mexico for the purpose of improving sources of drinking water in Puerto de Valle, Guanajuato.

Kara completed her undergraduate studies at the University of Wisconsin–Madison, with a double major in Conservation Biology and Religion. She earned her Master’s degree in Water Resources Science at the University of Minnesota, where—ironically—she found the local salsa-dancing scene to be a few kicks ahead of what she’s experienced down south!

Kara’s other duties for SODN include surveying streams for channel morphology monitoring; she also helped complete the recent inventory of springs and tinajas at Organ Pipe Cactus NM. When not working or dancing, Kara enjoys cultivating her container garden at her vintage, Spanish-style apartment, which she describes as the best in Tucson.

—Alice Wondrak Biel, Writer-Editor



## Reaching Beyond the Boundaries

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Field crews will not be shared across networks, with the exception of one SODN staff member who will conduct streams monitoring in SOPN parks, and whose expenses while doing that monitoring will be covered by SOPN. However, for protocols shared across networks, the methods and datasheets used by field crews will be uniform, and the data for all networks collaborating on a given protocol will be stored by a single designated network. In most cases, analysis and reporting duties will be similarly assigned to a single network. Information distribution is also consolidated under the SWNC, as most SWNC protocols, reports, and other information products are hosted by the Learning Center of the American Southwest.

## How does SODN benefit?

Through this collaboration, SODN broadens its base of available expertise, gaining access to I&M staff with specialties and experience beyond what we have in-house. This effort also offers possibilities for networks to share staff; as mentioned earlier, SODN and SOPN will share a hydrologic technician position. In addition, SODN and CHDN have arranged to share a vegetation ecologist position that will complete data analysis and reporting efforts for both networks. By freeing up network funds for use in other areas, shared positions such as these can offer networks significant financial and operational efficiencies. Ultimately, SODN remains accountable to its own board of directors, which is responsible for reviewing and approving (or rejecting) the network’s annual report and workplan each year, and so will be provided the opportunity to determine whether

the overall returns from this new partnership continue to be commensurate with—or even exceed—the investment.

—Alice Wondrak Biel, Writer-Editor



The Learning Center of the American Southwest, which currently offers roughly 500 products addressing more than 150 topics and 90 projects, serves information not only about individual resources, but also about the integration and interaction of those resources—for example, environmental histories that examine how natural resources impact cultural values and actions. Forty-eight parks and protected areas spanning seven states comprise the Learning Center.

## Project Updates

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### Streams

Continuous water-level and discharge telemetry has been implemented in Beaver Creek at Montezuma Castle NM. Channel morphology monitoring has been implemented at Gila Cliff Dwellings NM and Pecos NHP (Southern Plains Network). At each park, data were collected on 11 cross-sections spanning the riparian zone. Channel elevation was

surveyed across the stream segment, and habitat mapping was conducted at the index reach. Quarterly sampling was completed at all SODN parks and at Pecos NHP. SODN staff participated in the Santa Cruz River Researchers' Day. Proceedings, presentations, and posters for this event can be found at <http://www.southwestlearning.org/getinvolved/outreach/workshops/scr>.

### Uplands

Soil laboratory analyses have been completed for all 2010 plot sites. Data man-

agement, checking, and archiving has been completed, and reporting is almost done for 2010 data. Field work will resume in August at Chiricahua NM.

### Vegetation Mapping

Field data collection and mapping continued into February at Saguaro NP (TMD), and has since been evaluated and transferred to the spatial database. Data analyses will be conducted in order to complete the map prior to field validation in the fall.

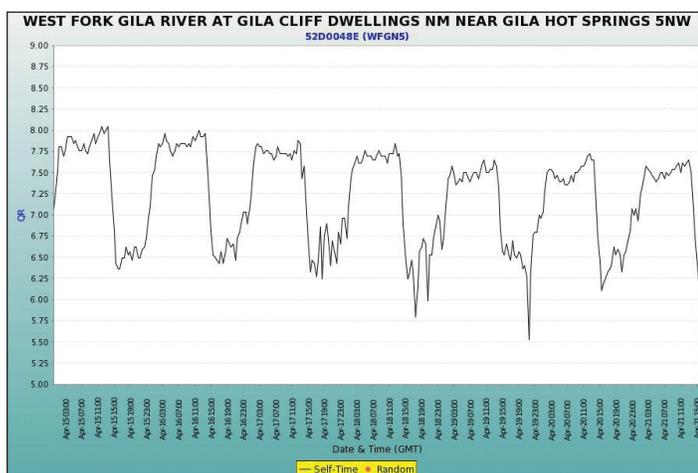
## The Data Came from Outer Space: Stream Gaging Implementation Continues

At Gila Cliff Dwellings NM, locations have been identified for the installation of crest-stage gages on the West Fork of the Gila River. Crest-stage gages are used to determine the slope of the water surface during high flow events, which is necessary for calculating discharge during floods. Estimates of flood discharges are needed for establishing a rating curve for stream gage locations; the rating curve relates water level (or stage) in streams to discharge.

SODN also supports a stream gaging station on Beaver Creek, at Montezuma Castle NM. Here, SODN and MOCA staff work together to maintain hardware and collect data. Satellite telemetry was added to this stream gage site in April 2011, allowing station data to be collected via the NOAA GOES (Geostationary Operational Environmental Satellites) system. Data have been collected in this manner at Gila Cliff Dwellings NM since January 2010. It will be necessary to fine-tune the Beaver Creek data stream—a task that should be completed in early May. Data from both of these stream gages are also posted by the National Weather Service Hydrologic Automated Data System

(HADS), and can be accessed at <http://www.weather.gov/oh/hads/> by searching for WFGN5 (West Fork Gila River, GICL) or BCMA3 (Beaver Creek, MOCA). The chart below shows discharge, in cubic feet per second, at the West Fork Gila River pedestrian bridge. When viewing these data, keep in mind that times shown on the HADS web pages are all Greenwich Mean Time, seven hours ahead of Mountain Standard Time.

—Colleen Filippone, Regional Hydrologist

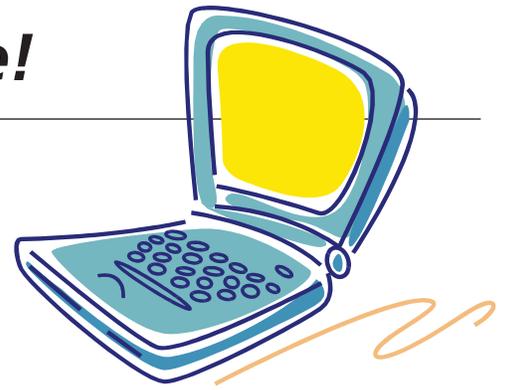


Example of GICL discharge plot from the HADS web site.



Instrumentation at the Beaver Creek site.

# See What You're Missing Online!



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Check the SODN home page for a link to the network's Facebook page, where you'll find updates on where our crews are when, links to job announcements, SODN-related trivia, new findings, and more!

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

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This site is best viewed in Internet Explorer 8.0 or Safari 4.0.5.

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On February 28, 2011, we told the Facebook universe about this cool discovery:

Organ Pipe Cactus found growing at Saguaro NP!!! This single individual was discovered growing at the Tucson Mountain District of Saguaro NP last week by the vegetation mapping field crew. This is a new species record for the park and will be formally documented and added to their flora. Organ Pipe Cactus (*Stenocereus thurberi*) are rarely seen growing this far north, and this is one of only a handful known to be in the Tucson vicinity - a pretty cool find.

Read more at [http://azstarnet.com/news/local/article\\_970671b2-b6c6-58b5-bc83-df30315d337a.html](http://azstarnet.com/news/local/article_970671b2-b6c6-58b5-bc83-df30315d337a.html)





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

Visit us on the web at  
<http://science.nature.nps.gov/im/units/sodn>

## Where Are We?

Monitoring currently scheduled during the next quarter includes:

Project	Month(s) and Park(s)
Springs	In May and June, the remaining springs at <b>Organ Pipe Cactus NM</b> and springs at <b>Tonto NM</b> will be visited, completing the SODN springs & tinajas inventory. High-elevation springs at <b>Saguaro NP (RMD)</b> will be revisited in late June to re-assess sites during low precipitation and dry conditions.
Streams	Riparian vegetation sampling will occur at <b>Gila Cliff Dwellings NM</b> in May and at <b>Pecos NHP (SOPN)</b> in June. Quarterly sampling will occur at <b>SODN parks</b> and <b>Pecos NHP</b> during this quarter, including macroinvertebrate sampling at <b>Montezuma Castle NM</b> (both units), <b>Tuzigoot NM</b> , and <b>Tumacácori NHP</b> .
Vegetation Mapping	Mapping and classification work will start at <b>Gila Cliff Dwellings NM</b> in May and continue in June. In July, SODN will prepare for and begin field work at <b>Montezuma Castle NM</b> (both units).
Uplands	In July, preparation and training will begin for work at <b>Chiricahua NM</b> in August.
NRCA	The assessment for <b>Montezuma Castle</b> and <b>Tuzigoot NMs</b> will be made on July 14.

SOPN = Southern Plains Network