



Southwest Biological Science Center Monthly Update

As a unit of the U.S. Geological Survey (USGS), the mission of the Southwest Biological Science Center (SBSC) is to provide quality scientific information needed to conserve and manage natural and biological resources, with an emphasis on the species and ecosystems of the southwestern United States. The SBSC has two research branches: *Terrestrial Dryland Ecology* and *River Ecosystem Science*, which includes the Grand Canyon Monitoring and Research Center (GCMRC)). Both branches conduct research on the biology, ecology, and natural processes of the Southwest. SBSC has two field stations in Arizona (Flagstaff and Tucson) and one in Moab, Utah. You can find the SBSC online at: <https://usgs.gov/centers/sbsc>.

WELCOME

Below are recent products and activities coming from the SBSC, and **SBSC personnel have an asterisk after their names**. If you would like more information about the SBSC or with anything in this month's update contact Todd Wojtowicz (twojtowicz@usgs.gov).

IMAGE OF THE MONTH



A cloudy day in January over Humphreys Peak in northern Arizona
(Photo credit: Todd Wojtowicz, USGS)

OUTREACH

Media, Broadcasts, and Films

Find us on Twitter

Look for us on Twitter (<https://twitter.com/usgsaz>). We post photos depicting field work, restoration approaches, arthropods, wildlife, flowers, and beautiful natural areas. We also provide links to our website and highlight some of our recent science.

Nonnative species in Grand Canyon

Scott VanderKooi*, chief of SBSC's Grand Canyon Monitoring and Research Center, was quoted in an Arizona Daily Sun article about nonnative fish species in Grand Canyon. The title of the article is, **Park service proposes methods to control invasives in Grand Canyon**, and can be found here: http://azdailysun.com/news/local/park-service-proposes-methods-to-control-invasives-in-grand-canyon/article_00c0709c-fca2-5564-bacb-d24a9c7ec21a.html.



San Pedro River and riparian vegetation.
(Photo Credit: Pamela Nagler, USGS)

Public, Partner, and Youth Outreach Activities

Outreach in Tucson, Arizona

On January 9, The National Weather Service in Tucson, SBSC, and several other USGS science centers held their Annual Chili Cook-off outreach event in Tucson, AZ. The event was used to present current research to local city and county officials, Office of Emergency Management, National Park Service, Salt River Project, AZ Department of Transportation, and others.

Capped uranium mines and plant communities

Kathryn Thomas* and her graduate student met with a Department of Energy contractor to discuss the use of climate envelope models Kathryn developed for dominant plant species of the southern Colorado Plateau. They are interested in understanding how potential changes in native plant communities surrounding capped uranium mine tailing cells may influence what plants may colonize the tailing cells.



Flowering native blue grama grass.
(Photo Credit: Erika Geiger, USGS)

SCIENCE

Published Papers, Reports, Data Releases, etc.

- Agha, M., Ennen, J.R., Nowakowski, A.J., Lovich, J.E.*, Sweat, S.C., and Todd, B.D., 2018, **Macroecological patterns of sexual size dimorphism in turtles of the world**: Journal of Evolutionary Biology, <http://onlinelibrary.wiley.com/doi/10.1111/jeb.13223/full>.
- Dukes, D., Gonzales, H.B., Ravi, Sujith, Grandstaff, D.E., Van Pelt, R.S., Li, J., Wang, G., and Sankey, J.B.*, 2018, **Quantifying post-fire aeolian sediment transport using rare earth element tracers**: Journal of Geophysical Research: Biogeosciences, <https://doi.org/10.1002/2017JG004284>.

- Lovich, J.E.*, Puffer, S.R.*, Cummings, K.L.*, and Greely, S., 2018, **Feasibility study for re-establishing southwestern pond turtles and Mojave tui chubs to Afton Canyon ACEC**. U.S. Geological Survey Cooperators Report to the Bureau of Land Management under IAA No. L16PG00229. 30 pp.
- Poitras, T.B., Villarreal, M.L., Waller, E.K., Nauman, T.W.*, Miller, M.E., and Duniway, M.C.*, 2018, **Identifying optimal remotely-sensed variables for ecosystem monitoring in Colorado Plateau drylands**: Journal of Arid Environments, <http://www.sciencedirect.com/science/article/pii/S0140196317302410>.
- Powers, M., Kolka, R., Bradford, J.*, Palik, B., and Jurgensen, M., 2018, **Forest floor and mineral soil respiration rates in a northern Minnesota red pine chronosequence**: Forests, <http://www.mdpi.com/1999-4907/9/1/16>.
- Ramcharan, A., Hengl, T., Nauman, T.*, Brungard, C., Waltman, S., Willis, S., and Thompson, J., 2018, **Soil property and class maps of the conterminous United States at 100-meter spatial resolution**: Soil Science Society of American Journal, <https://dl.sciencesocieties.org/publications/sssaj/abstracts/0/0/sssaj2017.04.0122>.
- Voichick, N.*, Topping, D.J.*, and Griffiths, R.E.*, 2017, **Technical note: false low turbidity readings during high suspended-sediment concentrations**: Hydrology and Earth System Sciences, <https://doi.org/10.5194/hess-2017-528>.
- Winkler, D.E.*, Conner, J.L., Huxman, T.E., and Swann, D.E., 2018, **The interaction of drought and habitat explain space-time patterns of establishment in saguaro (*Carnegiea gigantea*)**: Ecology, <http://onlinelibrary.wiley.com/doi/10.1002/ecy.2124/full>.

Presentations, Posters, Lectures, Workshops, and Panels

- Muehlbauer, J.*, 2018, **Aquatic invertebrate drift patterns downstream of Colorado River Basin dams** [presentation]: Colorado River Area Biologists Meeting.
- Munson, S.M.*, Bradford, J.B.*, Butterfield, B.J., Copeland, S.M.*, Bunting, E.L., and Webb, R.H., 2018, **Long-term plant response to climate across the southwestern U.S.: implications for restoration** [presentation]: Society for Rangeland Management Annual Meeting.
- Ward, D.*, 2018, **New ammonia based tools for removal of invasive aquatic species** [presentation]: Colorado River Area Biologists Meeting.

OTHER NOTABLES

SBSC personnel assist hikers in need

On a recent trip to Lees Ferry to monitor the trout population, personnel from SBSC's Grand Canyon Monitoring and Research Center (GCMRC) assisted four hikers. The hikers rappelled down a canyon and were planning on using small, inflatable rafts to float to Lees Ferry. However, their rafts were damaged and the hikers were wet and cold, and did not have the gear for an overnight stay. GCMRC personnel noticed the hikers at ~8:00 PM. The hikers were transported to the GCMRC camp, where they got warmed up, and were provided transportation back to Lees Ferry later that evening.

Antarctica and tourists

Jayne Belnap* was in Antarctica in January working on a New Zealand-funded project to map the vulnerability of soils to human trampling in the Dry Valleys. This study will attempt to find places that contain soils that can tolerate elevated levels of tourists (and trampling) and make known those places that may be sensitive to trampling.



Typical Dry Valleys, Antarctica landscape. (Photo Credit: Jayne Belnap)

Predicting high impact insects

The 'Predicting High Impact Insects' Powell working group that Kathryn Thomas* is part of met with Dr. Jeff Morisette, chief scientist of the National Invasive Species Council Secretariat, to discuss the assessment the council is conducting and how the results of the working group's current and ongoing analysis could contribute. Plans were made to continue discussions with focus on the 'assessment of US. risk analysis and horizon scanning capacities' theme within the assessment.

Collaboration with Altar Valley Conservation Alliance

Kathryn Thomas* met with the science and conservation coordinator for the Altar Valley Conservation Alliance to discuss how SBSC ecology research can benefit the work of the Alliance. The Altar Valley, southwest of Tucson and just north of the Mexican border, comprises around 610,000 acres of semi-desert grassland and constitutes a partnership among ranchers and county, state, and federal land managers, including Buenos Aires National Wildlife Refuge. Thomas was invited to further collaboration with the Alliance through their Watershed Working Group.



Nonnative lovegrass and native mesquite shrubs in Altar Valley. (Photo Credit: Chris Jarchow, USGS)

Restoration Assessment & Monitoring Program for the Southwest (RAMPS)

1) Molly McCormick*, project coordinator of the Restoration Assessment & Monitoring Program for the Southwest (RAMPS), attended a community meeting in Cottonwood, hosted by Friends of the Verde River Greenway (FVRG). Molly discussed ongoing and new ideas for collaboration. FVRG is a grassroots community organization that is working on restoration issues and water supply in the Verde River watershed. For more information about RAMPS: <https://usgs.gov/sbsc/ramps>.

2) Molly McCormick* also attended a newly formed restoration community hosted by the Central Arizona Conservation Alliance. Groups in attendance included the McDowell-Sonoran Preserve, City of Phoenix, Maricopa County, Scottsdale Community College, Desert Botanical Garden, and Arizona State University. Participants scheduled talks, field trips, and discussed ways to share information. They also discussed the



Gully caused by erosion in a semi-arid rangeland. (Photo Credit: Molly McCormick, USGS)

need to systematically test restoration strategies being developed by each of these organizations, and RAMPS may help facilitate this effort as part of the ongoing RAMPS Field Trial Network project. For more information about the RAMPS Field Trial Network project:

https://www.usgs.gov/centers/sbsc/science/distributed-field-trial-network-dryland-restoration?qt-science_center_objects=0#qt-science_center_objects.




Experimental restoration plots used to test several approaches for the restoration of moisture-limited rangelands.
(Photo Credit: Molly McCormick, USGS)

For more information about the Southwest Biological Science Center:

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<https://www.usgs.gov/centers/sbsc>

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