



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* (TDE) and *River Ecosystem Science* (RES, which includes the Grand Canyon Monitoring and Research Center (GCMRC)). Both branches conduct research on the biology, ecology, and 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 on anything in this month's update contact Todd Wojtowicz (twojtowicz@usgs.gov).

IMAGE OF THE MONTH



Upstream view of the Colorado River below Glen Canyon Dam in Glen Canyon.
(Photo credit: Emily Palmquist, USGS)

UPCOMING CONFERENCE

The Biennial Conference of Science & Management on the Colorado Plateau & Southwest Region

Location: Flagstaff, AZ

Dates: September 11-14, 2017

Homepage of conference: <https://nau.edu/merriam-powell/biennial-conference/>

Online registration: <https://nau.edu/Merriam-Powell/Biennial-Conference/Registration/>



Juniper, red rocks, and clouds in the arid Southwest
(Photo credit: Anne Kelly, USGS)

OUTREACH

Media, Broadcasts, and Films

Find us on Twitter

You can check in on multiple USGS science centers based in Arizona by going to our state USGS Twitter account (<https://twitter.com/usgsaz>). Take a look at our photos depicting field work, restoration approaches, water sampling, volcanoes, arthropods, wildlife, flowers, and beautiful natural areas.



Winter flight of octocopter drone in Flagstaff.
(Photo credit: Joel Sankey, USGS)

Public, Partner, and Youth Outreach Activities

Cecil Schwalbe* (emeritus) conducted a tactile and auditory outreach event for the Tucson Society of the Blind where he discussed reptiles and brought baby desert tortoises, a Gila monster, and three species of snake.



Cute little desert tortoise.
(Photo credit: Jeff Lovich, USGS)

SBSC's David Ward*, Max Davis from the Flagstaff Boy Scouts, and Scout Troop 7127 assisted the USGS with the construction of a holding facility for several large flathead catfish at a fish facility in Flagstaff, AZ. These catfish are used for outreach and education to help teach the public about the negative impacts that invasive aquatic species cause when they are released into the environment illegally.

SBSC's Grand Canyon Monitoring and Research Center works with Grand Canyon Youth to take youth on trips down the Colorado River in Grand Canyon. These trips have the youth conduct citizen science in support of ongoing SBSC science projects. The July 13-28 trip had youth capturing lizards, setting aquatic insect traps, collecting data on bat calls, and conducting other field work activities. Carol Fritzinger* coordinates these trips with Grand Canyon Youth. For more information on SBSC's citizen science:

<https://www.usgs.gov/centers/sbsc/science/citizen-science-light-trapping-grand-canyon>



SBSC researcher and Grand Canyon Youth participants setting up light a trap to capture flying insects emerging from river (from a past trip).
(Photo credit: USGS & David Herasimtschuk from Freshwaters Illustrated)

SCIENCE

Presentations, Posters, Lectures, Workshops, and Panels

Duniway, M.*, 2017, **Solution-based science: addressing emerging issues in the desert Southwest** [presentation]: U.S. Department of the Interior Museum.

Maynard, J.J., Nauman, T.W.*, and Salley, S.W., 2017, **Digital mapping of ecological site groups using a nationally scalable modeling framework** [presentation]: National Cooperative Soil Survey (NCSS) conference.

Ramcharan, A., Hengl, T., Nauman, T.*, Brungard, C., Waltman, S., Wills, S., and Thompson, J., 2017, **Soil property and class 100-meter grid maps at the conterminous United States: Soilgrids+** [presentation]: National Cooperative Soil Survey (NCSS) conference.

van Riper III, C. *, Darrah, A., Greenery, H., and Boyce, A., 2017, **Nest site enhancement can influence polygamy on the Cordilleran flycatcher** [presentation]: American Ornithological Society meeting.

Yackulic, C.*, 2017, **Modelling the joint dynamics of interacting species using occupancy or mark-recapture data** [presentation]: EURING Analytical Meeting & Workshop.

Published Papers, Reports, Data Releases, etc.

Dibble, K.L.*, Yard, M.D.*, Ward, D.L.*, and Yackulic, C.B.*, 2017, **Does bioelectrical impedance analysis accurately estimate the physiological condition of threatened and endangered desert fish species?**: Transactions of the American Fisheries Society, v. 146, no. 5, p. 888-902, <http://dx.doi.org/10.1080/00028487.2017.1302993>.

Doherty, K.D.*, Butterfield, B.J.*, and Wood, T.E., 2017, **Matching seed to site by climate similarity: techniques to prioritize plant materials development and use in restoration**: Ecological Applications, v. 27, no. 3, p. 1010-1023. <http://dx.doi.org/10.1002/eap.1505>.

Dymond, S.F., Bradford, J.B.*, Bolstad, P.V., Kolka, R.K., Sebestyen, S.D., and DeSutter, T.M., 2017, **Topographic, edaphic, and vegetative controls on plant-available water**: Ecohydrology, <http://dx.doi.org/10.1002/eco.1897>.

Gleason, K.E.*, Bradford, J.B.*, Bottero, A., D'Amato, A.W., Fraver, S., Palik, B.J., Battaglia, M.A., Iverson, L., Kenefic, L., and Kern, C.C., 2017, **Competition amplifies drought stress in forests across broad climatic and compositional gradients**: Ecosphere, v. 8, no. 7, <http://dx.doi.org/10.1002/ecs2.1849>.

McHugh T.A., Morrissey, E.M., Mueller, R.C., Gallegos-Graves, L.V., Kuske, C.R., and Reed, S.C.*, 2017, **Bacterial, fungal, and plant communities exhibit no biomass or compositional response to two years of simulated nitrogen deposition in a semiarid grassland**: Environmental Microbiology, v. 19, p. 1600-1611, <http://onlinelibrary.wiley.com/doi/10.1111/1462-2920.13678/full>.

Pennington, V.E., Palmquist, K.A., Bradford, J.B.*, and Lauenroth, W.K., 2017, **Climate and soil texture influence patterns of forb species richness and composition in big sagebrush plant communities across their spatial extent in the western U.S.**: Plant Ecology, <http://dx.doi.org/10.1007/s11258-017-0743-9>.

Rottler, C.M., Burke, I.C., Palmquist, K.A., Bradford, J.B.*, and Lauenroth, W.K., 2017, **Current reclamation practices after oil and gas development do not speed up succession or plant community recovery in big sagebrush ecosystems in Wyoming**: Restoration Ecology, <http://onlinelibrary.wiley.com/doi/10.1111/rec.12543/full>.

Thomas, K.A.*, and Guertin, P., 2017, **Southwest Exotic Mapping Program (SWEMP) Database, 2007**: U.S. Geological Survey data release, <https://doi.org/10.5066/F7WQ02JX>.

Whitney, K.M., Vivoni, E.R., Duniway, M.C.*, Bradford, J.B.*, Reed, S.C.*, and Belnap, J.*, 2017, **Ecohydrological role of biological soil crusts across a gradient in levels of development**: Ecohydrology, <http://onlinelibrary.wiley.com/doi/10.1002/eco.1875/full>.

AWARDS

Charles van Riper III* received the **Wildlife Disease Association (WDA) Emeritus Award** at the recent WDA Conference in Chiapas. This award is given to those who have retired, but have contributed to the study of wildlife disease in significant ways.

Charles Yackulic* is co-author of a paper that was selected to receive the 2017 **Harry R. Painton Award**. The Painton award is given in odd-numbered years to the author(s) of an outstanding paper published in the four preceding years in The Condor. The paper that was selected for the award is:

Dugger, K.M., Forsman, E.D., Franklin, A.B., Davis, R.J., White, G.C., Schwarz, C.J., Burnham, K.P., Nichols, J.D., Hines, J.E., Yackulic, C.B.*, and others, 2016, **The effects of habitat, climate, and barred owls on long-term demography of northern spotted owls**: Condor, v:118, p: 57–116, <http://www.bioone.org/doi/full/10.1650/CONDOR-15-24.1>.

OTHER NOTABLES

Briefing to the Department of the Interior

The Department of the Interior was briefed on a paper that will be published soon that explored restoration trends in the Southwest from 1940-2010. The authors of the paper are Stella Copeland* (lead author; Northern Arizona University and USGS, SBSC); Seth Munson* and John Bradford* (USGS, SBSC), David Pilliod and Justin Welty (USGS, Forest and Rangeland Ecosystem Science Center); and Brad Butterfield (Northern Arizona University). The title of the paper is: **Long-term trends in restoration and associated land treatments in the Southwest United States**.

Kuwait

SBSC hosted a two-day meeting with SBSC personnel, members of the USGS International Program, Arizona Water Science Center, Fort Collins Science Center, and the Western Geographic Science Center to discuss different aspects of an SBSC-lead inventory and monitoring program for the terrestrial landscapes of Kuwait. David Lytle*, Charles Drost*, Sasha Reed*, Mike Duniway*, Seth Munson*, Kathryn Thomas*, Pamela Nagler*, and John Bradford* from the SBSC attended the meeting.

Digital soil mapping

Travis Nauman* joined the Technology and Digital Soil Mapping committees of the National Cooperative Soil Survey (NCSS) and provided leadership and guidance for developing the next generation of soil surveys for the USA.



Soil profile in the Jornada Experimental Range.
(Photo credit: Mike Duniway, USGS)

Biodiversity

From July 17-21, Jayne Belnap* was representing the US Government at an author meeting for the UN-sponsored Intergovernmental Panel on Biodiversity and Ecosystem Services (similar to the Intergovernmental Panel on Climate Change) in Rome, Italy. This is the final author meeting before the production of the final draft.

Reclamation

Mike Duniway*, Travis Nauman*, and Rebecca Mann* travelled to Vernal, UT and Meeker, CO to meet with BLM and USFWS collaborators, visit potential field sites, and plan future research. USGS is initiating new research on success of past reclamation activities and tests of new approaches for reclaiming oil and gas developments in these important regions.

Forests and climate change

John Bradford* contributed to a field tour as part of the National Silviculture Workshop in Flagstaff, Arizona on Wednesday, July 19. He provided educational materials to the ~160 attendees and presented research results about ongoing studies examining forest responses to climate change and extreme climate events.



Ponderosa pine stand after a wildfire.
(Photo credit: John Bradford)

Insect invasion

The USGS Powell Center working group "Predicting the next high-impact

insect invasion" will be held their second week-long meeting in Fort Collins, Colorado from July 31 to August 5. The group is working on understanding the traits and factors that determine the risk of introduced herbivorous insects on North American native plants with initial focus on non-native conifer specialists. Research ecologist Kathryn Thomas* from the SBSC attended; Thomas and project post-doc Angela Mech also presented the project in a seminar at the Fort Collins Science Center.



**Vasey's Paradise in Marble Canyon on the Colorado River.
(Photo credit: Scott VanderKooi, USGS)**