



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



Sediment from the Paria River mixing with the Colorado River during monsoon season in 2013. For information on SBSC sediment science: https://www.usgs.gov/centers/sbsc/science/fluvial-river-sediment-dynamics?qt-science_center_objects=0#qt-science_center_objects.
(Photo credit: Freshwaters Illustrated & 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.

A balancing act in the Grand Canyon: the high flow experiments

Scott VanderKooi*, chief of SBSC's Grand Canyon Monitoring and Research Center, was interviewed for a piece published by the Environmental Monitor titled, **A balancing act in the Grand Canyon: the high flow experiments** (<http://www.fondriest.com/news/balancing-act-grand-canyon-high-flow-experiments.htm>). The article also links to a manuscript with SBSC's Paul Grams* (lead author), David Topping*, and Ted Melis* as co-authors titled, **Building sandbars in the Grand Canyon** (<https://eos.org/features/building-sandbars-in-the-grand-canyon>).



Blue grama (*Bouteloua gracilis*) grass in flower.
(Photo Credit: Erika Geiger, USGS)

Continued interest in the 2014 pulse-flow impacts on the Colorado River Delta

James Leenhouts (Arizona Water Science Center) was interviewed by KUNC, an NPR station in Colorado, about the results of the 2014 pulse-flow. Newly sparked interest in those results was generated by the recently published special issue in Ecological Engineering titled, **Environmental flows for the Colorado River Delta: results of an experimental pulse release from US to Mexico**. The special issue contains research papers by several USGS centers including Arizona Water Center, Fort Collins Science Center, and the Southwest Biological Science Center. SBSC's Pamela Nagler* is one of the editors of the special issue. Additionally, Pamela Nagler, Chris Jarchow*, Erich Mueller*, David Topping*, Paul Grams*, and Charles van Riper III* of the SBSC have papers in the issue.



Aerial view of lower Colorado River Delta depicting vegetation greenup due to 2014 pulse-flow of Colorado River.
(Photo Credit: Chris Jarchow, USGS)

Here is a link to the KUNC piece titled, **Simulated flood injected life into thirsty Colorado River Delta, new data shows**: <http://www.kunc.org/post/simulated-flood-injected-life-thirsty-colorado-river-delta-new-data-shows>. Here is the link to the special Ecological Engineering issue: <http://www.sciencedirect.com/science/journal/09258574/106?sdc=1&sdc=2>.

Public, Partner, and Youth Outreach Activities

High school students safely handling reptiles

Videos of Cecil Schwalbe* (SBSC emeritus) and the high school students he was working with was published in The Cursor, a publication of the School of Journalism, University of Arizona. Cecil taught the students how to safely handle reptiles and the students created videos that can be found here: <https://thechronicleua.weebly.com/20172.html>. Additionally, a photo of Cecil and the students can be found on page 7 of The Cursor's Fall 2017 issue:

https://issuu.com/michaelc76/docs/cursor_2017_issuu_final.



Terrapin. (Photo Credit: Jeff Lovich)

People from Mexico and United States attend Rio Grande/Rio Bravo Basin management forum

On November 7-8, David Dean* attended a binational forum in El Paso, TX regarding the management of the Rio Grande/Rio Bravo basin. The forum consisted of 150 participants, with approximately equal numbers from the U.S. and Mexico. Participants ranged in background from federal water management agencies, federal scientists, non-governmental organizations, academic scientists, irrigators, city officials, tribal members, policymakers, and private companies. The purpose of the meeting was to share creative approaches to meet challenges of water management, inspire collaboration, and highlight and build upon successes to protect the river for future generations. The forum was organized by the World Wildlife Fund.

Desert tortoise field trip with U.S. Fish and Wildlife personnel

Jeff Lovich* led a desert tortoise field trip at his study site south of Joshua Tree National Park for employees of the Fish and Wildlife Service Desert Tortoise Recovery Office (Headquartered in Reno, NV) and associated staff from the Palm Springs and Las Vegas field offices. About 10 Fish and Wildlife Service employees participated and they even found three new (unmarked) tortoises.



Close-up of desert tortoise in Joshua Tree National Park.
(Photo Credit: Jeff Lovich Research Team, USGS)

Mojave Native Plant Program annual meeting

Molly McCormick* attended the Mojave Native Plant Program Annual Meeting and interacted with personnel from Bureau of Land Management field offices, U.S. Forest Service representatives, and private organizations doing restoration work across the Mojave.

Short course on Structure from Motion and Lidar remote sensing

Joel Sankey*, Alan Kasprak*, and Joshua Caster* conducted a short course on Structure from Motion and Lidar remote sensing and data processing for Glen Canyon National Recreation Area archaeology staff.



Using a helicopter to gather Lidar data over the Colorado River in 2013.
(Photo Credit: Joel Sankey, USGS)

Portland, OR interested in the implications of a wildfire, erosion, and watershed sediment study

SBSC's Joel Sankey* and Jason Kreitler (Western Geographic Science Center) had a conference call meeting with the Portland, Oregon Water Bureau, Climate Science Program. They wanted to discuss the utility and implications of Joel's recently published paper about the effects of climate, wildfire, and erosion on western watersheds by future fire. In particular, they were concerned about the Bull Run Watershed that supplies their city with drinking water and was threatened by the Eagle Creek Fire this past summer. The link to Joel's paper is here: <http://onlinelibrary.wiley.com/doi/10.1002/2017GL073979/full>.

SCIENCE

Published Papers, Reports, Data Releases, etc.

Buscombe, D., Grams, P.E.*, and Kaplinski, M.A., 2017, **Compositional signatures in acoustic backscatter over vegetated and unvegetated mixed sand-gravel riverbeds**: Journal of Geophysical Research: Earth Surface, v. 122, no. 10, p. 1771-1793, <http://dx.doi.org/10.1002/2017JF004302>.

Darrah, A.J., and van Riper III, C.*, 2017, **Riparian bird density decline in response to biocontrol of *Tamarix* from riparian ecosystems along the Dolores River in SW Colorado, USA**: Biological Invasion, <https://link.springer.com/article/10.1007/s10530-017-1569-z>.

- Dzul, M.C.*, Yackulic, C.B.*, and Korman, J., 2017, **Estimating disperser abundance using open population models that incorporate data from continuous detection PIT arrays**: Canadian Journal of Fisheries and Aquatic Sciences, <https://doi.org/10.1139/cjfas-2017-0304>.
- Hartwell, M.A.*, Diab, C.D.*, Arundel, T.R.*, Falvo, C.I., Everette, A.L., and Faundeen, J.L., 2017, **USGS Southwest Repeat Photography Collection: Kanab Creek, southern Utah and northern Arizona, 1872-2010**: U.S. Geological Survey data release, <https://doi.org/10.5066/F72R3Q5W>.
- Ironside, K.E.*, Mattson, D., Choate, D., Stoner, D., Arundel, T.R.*, Hansen, J., Theimer, T., Holton, B., Jansen, B., Sexton, J.O., Longshore, K., Edwards Jr., T.C., and Peters, M., 2015, **Variable terrestrial gps telemetry detection rates: parts 1 - 7**— Data: U.S. Geological Survey data release, <https://doi.org/10.5066/F7PG1PT2>.
- Ironside, K.E.*, Mattson, D.J.*, Theimer, T., Jansen, B.*, Holton, B., Arundel, T.*, Peters, M., Sexton, J.O., and Edwards, T.C. Jr, 2017, **Quantifying animal movement for caching foragers: the path identification index (PII) and cougars, *Puma concolor***: Movement Ecology, <https://movementecologyjournal.biomedcentral.com/articles/10.1186/s40462-017-0115-z>.
- Sankey, T., Donager, J., McVay, J., and Sankey, J.B.*, 2017, **UAV lidar and hyperspectral fusion for forest monitoring in the southwestern USA**: Remote Sensing of Environment, v. 195, p. 30-43, <https://doi.org/10.1016/j.rse.2017.04.007>.
- Schmeller, D.S., Böhm, M., Arvanitidis, C., Barber-Meyer, S., Brummitt, N., Chandler, M., Chatzinikolaou, E., Costello, J.J., Ding, H., Garcia-Moreno, J., Gill, M., Haase, P., Jones, M., Julliard, R., Magnusson, W.E., Martin, C.S., McGeoch, M., Mihoub, J-B., Pettorelli, N., Proenca, V., Peng, C., Regan, E., Schmiedel, U., Simaika, J.P., Weatherdon, L., Waterman, C., Xu, H., and Belnap, J.*, 2017, **Building capacity in biodiversity monitoring at the global scale**: Biodiversity and Conservation, v. 26, no. 12, p. 2765-2790, <http://dx.doi.org/10.1007/s10531-017-1388-7>.
- Mueller, E.R.*, Grams, P.E.*, Hazel Jr., J.E., and Schmidt, J.C., 2018, **Variability in eddy sandbar dynamics during two decades of controlled flooding of the Colorado River in Grand Canyon**: Sedimentary Geology, v. 363, p. 181-199, <https://doi.org/10.1016/j.sedgeo.2017.11.007>.
- Neher, C., Duffield, J., Bair, L.*, Patterson, D., and Neher, K., 2017, **Testing the limits of temporal stability: willingness to pay values among Grand Canyon whitewater boaters across decades**: Water Resource Research, <http://onlinelibrary.wiley.com/doi/10.1002/2017WR020729/full>.
- Ralston, B.E.*, Cobb, N.S., Brantley, S.L., Higgins, J., and Yackulic, C.B.*, 2017, **Taxonomic and compositional differences of ground-dwelling arthropods in riparian habitats in Glen Canyon, Arizona, USA**: Western North American Naturalist, v. 77, p. 369-384, <http://www.bioone.org/toc/wnan/77/3>.

Presentations, Posters, Lectures, Workshops, and Panels

- Belnap, J.*, 2017, **Assembly rules and patterns in dryland vascular plant communities: biological soil crusts can play an influential role** [presentation]: Drylands, Deserts and Desertification, Ben-Gurion University of the Negev.

Barger, N.N., Faist, A., Antoninka A.J., Giraldo Silva, A., Velasco Ayuso, S., Bowker, M.A., Reed, S.C.*, Duniway, M.*, Garcia-Pichel, F., and Belnap, J.*, 2017, **Biocrust inoculum development and soil stabilization strategies to promote biocrust restoration** [presentation]: Drylands, Deserts and Desertification, Ben-Gurion University of the Negev.

McCormick, M.*, 2017, **RAMPS: Restoration Assessment and Monitoring Program for the Southwest** [presentation]: Northern Arizona University, Lab of Landscape Ecology and Conservation Biology.

Muehlbauer, J.*, 2017, **Beyond the meter tape: defining ecological boundaries using food web metrics** [presentation]: Northern Arizona University.

Sankey, J.*, 2017, **Riparian remote sensing in Glen and Grand Canyons: vegetation, sediment, and cultural resources** [presentation]: Department of Interior, Colorado River Steering Committee meeting.

PUBLICATIONS HIGHLIGHTED BY OTHER SCIENTISTS & ORGANIZATIONS

Joel Sankey* is the lead author of a recently published paper in *Frontiers in Ecology and the Environment*. That journal highlighted Joel's paper in a piece titled, **Post-fire erosion could clog reservoirs** (<http://onlinelibrary.wiley.com/doi/10.1002/fee.1726/full>). SBSC's Erich Mueller* is one of the co-authors on Joel's paper titled, **Climate, wildfire, and erosion ensemble foretells more sediment in western USA watersheds**, and the paper can be found here:

<http://onlinelibrary.wiley.com/doi/10.1002/2017GL073979/abstract>.

OTHER NOTABLES

Increasing interest in Restoration Assessment and Monitoring Program for the Southwest (RAMPS)

Molly McCormick, coordinator of the Restoration Assessment & Monitoring Program for the Southwest (RAMPS), was asked to join the Southwest Seeds Partnership steering committee, which is regional effort implementing the National Seed Strategy and increasing local plant materials availability for restoration projects across the Southwest. Additionally, Molly was elected to the Southwest Vegetation Managers Association board. The goal of RAMPS is to strengthen restoration and rehabilitation efforts in the water-limited Southwest by providing agencies and private partners science, tools, and guidance on effective strategies. RAMPS is currently comprised of ~20 federal and state agencies, universities, and private organizations and more information on this program can be found here: <https://usgs.gov/sbsc/ramps>.



RAMPS scientist in a field meeting with land managers.
(Photo Credit: Mike Duniway, USGS)

Interest in USGS report about brown-headed cowbird parasitism

A science writer with Utah State University contacted Charles van Riper III* to request a 1996 report he co-authored about brown-headed cowbird parasitism at Montezuma Castle National Monument. The report will be used to assist in the writing of a Natural Resource Condition Assessment (NRCA) for the national monument. To get a copy of the report, contact Charles at charles_van_riper@usgs.gov. To get the published manuscript based on the report (a much condensed version of the report):

<http://www.bioone.org/doi/pdf/10.1648/0273-8570-75.3.303>.

Drylands, Deserts and Desertification Conference in Israel

Jayne Belnap* was in Israel to present at the Drylands, Deserts and Desertification Conference hosted by Ben-Gurion University of Negev. Additionally, Jayne is a co-convenor of the **Desert soil crusts: current and future roles in desert ecosystems** session.

Published image used as cover photo

An image (see below) from a recent publication by scientists from Northern Arizona University (Daniel Buscombe (lead author) and Matt Kaplinski) and SBSC (Paul Grams*) was used as the cover photo for the October 2017 (volume 122, issue 10) of the Journal of Geophysical Research: Earth Surface. The paper, titled **Compositional signatures in acoustic backscatter over vegetated and unvegetated mixed sand-gravel riverbeds**, can be found here: <http://onlinelibrary.wiley.com/doi/10.1002/2017JF004302/epdf>.

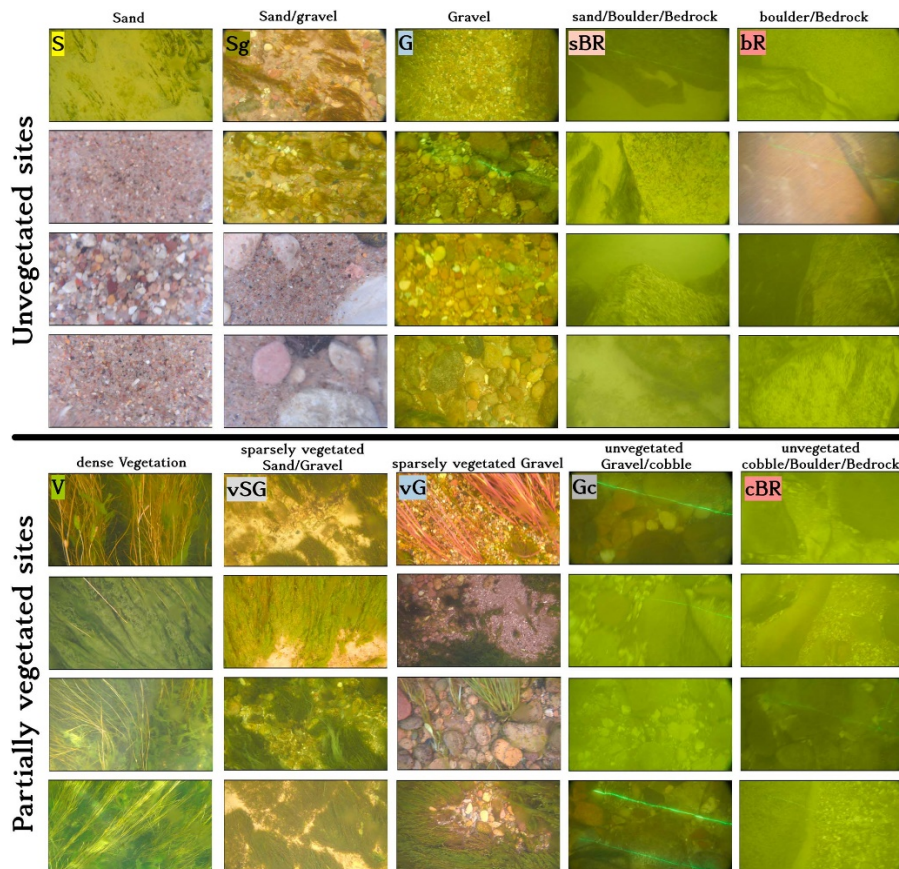


Image from figure 3 of Buscombe et al. (2017) used as cover image for a scientific journal. “Example imagery for each of 10 unique substrate classes easily identifiable by eye, arranged in two groups of five. The first group are found in sites where the riverbed is completely unvegetated (top four rows). The second group (bottom four rows) are found in partially vegetated riverbeds.” (Photo Credit and partial caption (in quotes) from Buscombe et al. (2017), Journal of Geophysical Research: Earth Surface)

For more information about the Southwest Biological Science Center:

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

