



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 research 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



Looking down on the Colorado River Delta, Mexico—October 13, 2015
(Photo credit: Chris Jarchow, 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.

STEM Night photos

Photos of children interacting with fish and turtles brought to a STEM Night event in Flagstaff, Arizona by SBSC's Grand Canyon Research and Monitoring staff were published in the Arizona Daily Sun: http://azdailysun.com/news/local/photo-gallery-flagstaff-stem-celebration-at-the-skydome/collection_dc4ffbed-4628-5026-9f5d-f533b1d9ea16.html#2.



Part of the insect display that SBSC's Morgan Ford used to educate the public at STEM Night in Flagstaff, AZ (Photo Credit: Camile Diab, USGS).

Public, Partner, and Youth Outreach Activities

Teaching university students how to apply for federal jobs

Social scientist Helen Fairley* gave a lecture at Northern Arizona University to two senior-level Environmental Studies capstone classes titled " **Applying for Federal Jobs in the 21st Century: What kinds of jobs are out there, and how to successfully compete for them.**" The talk was geared towards helping graduating students understand the range of environmentally-oriented job opportunities throughout the federal government, how to be competitive when applying for those jobs, and tips for navigating the USAJOBS application process. For more information, please contact Helen Fairley, hfairley@usgs.gov. 928-556-7285.

Fish show and tell for students

David Ward* conducted a fish show and tell and discussed introduced species and native fish conservation for two classes at the Switzer Mesa Montessori School in Flagstaff, Arizona. There were 30 3rd to 5th graders in each class.



A native, endangered humpback chub from the Colorado River, Grand Canyon (Photo Credit: Scott VanderKooi, USGS)

STEM Night in Flagstaff, Arizona

The SBSC, Astrogeology Science Center, Western Geographic Science Center, and Arizona Water Science Center participated in Flagstaff's STEM Night with the assistance of Melody Hartke from the USGS Flagstaff Science Campus warehouse. SBSC's David Ward*, Ben Vaage*, Ken Sheehan*, and Morgan Ford* showed the public native and nonnative fish and aquatic insects from the Colorado River.

Master gardeners meeting

Molly McCormick* presented at the Yavapai County Master Gardeners meeting in Camp Verde, Arizona. The presentation was about pollinator habitat and restoration in water-limited ecosystems.

Glen Canyon Dam Adaptive Management Program

1) Scott VanderKooi*, Chief of the GCMRC, attended a public meeting convened by the Arizona Game and Fish Department in Marble Canyon, Arizona on March 5. The meeting was held to discuss a proposal to stock rainbow trout this spring into the Colorado River near Lees Ferry to supplement the trout fishery immediately downstream of Glen Canyon Dam in northern Arizona. Scott answered questions regarding the status of trout populations in Glen Canyon and the effects of experimental flows from Glen Canyon Dam on the downstream aquatic ecosystem.

2) GCMRC personnel met with stakeholders for their annual reporting meeting on March 6-7 in Flagstaff, Arizona. GCMRC personnel, in the role as science providers for the Glen Canyon Dam Adaptive Management Program, provided oral and poster presentations of recent findings and moderated discussions with stakeholders on a wide variety of topics including water quality, nonnative and native fish, sediment, sandbars, archeological and cultural resources, recreation, riparian vegetation, aquatic insects, and citizen science.

3) Michael Moran*, Deputy Chief of the GCMRC, attended the Lower Colorado River Science Symposium on March 8 in Las Vegas, Nevada. The purpose of the meeting was for scientists, resource managers, and academics to share the results of their scientific work on the lower Colorado River. Michael gave a presentation on some of the results of the sediment and water quality resources work performed by the GCMRC in Lake Powell and downstream of Glen Canyon.

4) Scott VanderKooi* gave a presentation to the board of the Colorado River Energy Distributors Association in Tempe, Arizona on March 23. Scott provided an overview of results presented at the March 6-7 Annual Reporting Meeting to stakeholders of the Glen Canyon Dam Adaptive Management Program. In addition, Scott presented on potential flow experiments that may be conducted in 2018 in Glen and Grand Canyons and research and monitoring activities to be conducted in support of these experiments.



Looking down on the Colorado River, Grand Canyon
(Photo Credit: Scott VanderKooi, USGS)



Lake Powell near the mouth of the Escalante arm of the reservoir (Photo Credit: Bridget Deemer, USGS)

Aquatic insect monitoring

Jeff Muehlbauer* and Morgan Ford* went to Parker, Arizona to help the Environmental Protection Office of the Colorado River Indian Tribes set up an aquatic insect drift monitoring protocol on a 44 mile stretch of the Colorado River through their Reservation.



Damselfly larva found in the Colorado River
(Photo Credit: USGS/Freshwaters Illustrated)

Restoration Assessment & Monitoring for the Southwest (RAMPS)

1) SBSC's RAMPS personnel Katie Laushman* and Molly McCormick* had two meetings to discuss the installation of experimental gardens as part of the RAMPS Restoration Field Trial Network. One meeting was with the natural resource technicians at Montezuma Well National Monument and the manager of Arizona Game and Fish's Horseshoe Ranch. The second meeting was with Dr. Elise Gornish from University of Arizona, and Dr. Ron Pulliam and Allegra Mount from Borderlands Restoration Network in Patagonia, Arizona. For more information on RAMPS: <https://usgs.gov/sbsc/ramps>. For more information on the Restoration Field Trial Network:

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

2) Katie Laushman* and Molly McCormick* visited the Bar T Bar Ranch, east of Flagstaff, Arizona with rancher Bob Prosser. The purpose of the trip was to choose two sites that will be used in an upcoming Restoration Field Trial Network.

3) Molly McCormick* attended the Coconino Natural Resource Conservation Districts annual working group meeting to learn more about past conservation actions and future conservation priorities set forth by area ranchers and farmers in Coconino County.



Natural Resource Conservation Service display illustrating effects of different soil-vegetation combinations on water runoff and absorption (Photo Credit: Molly McCormick, USGS)

SCIENCE

Published Papers, Reports, Data Releases, etc.

- Grams, P.E.*, Tusso, R.B., and Buscombe, D., 2018, **Automated remote cameras for monitoring alluvial sandbars on the Colorado River in Grand Canyon, Arizona**: U.S. Geological Survey Open-File Report 2018–1019, 50 p., <https://doi.org/10.3133/ofr20181019>.
- Lovich, J.E.*, Thomas, M., Ironside, K.*, Yackulic, C.*, and Puffer, S.R.*, 2018, **Spatial distribution of estuarine diamond-backed terrapins (*Malaclemys terrapin*) and risk analysis from commercial blue crab (*Callinectes sapidus*) trapping at the Savannah Coastal Refuges Complex, USA**: Ocean and Coastal Management, v. 157, p. 160-167, <https://www.sciencedirect.com/science/article/pii/S0964569117308852>.
- Nagler, P.L.*, Nguyen, U., Bateman, H.L., Jarchow, C.J.*, Glenn, E.P., Waugh, W.JI, and van Riper, C. III*, 2018, **Northern tamarisk beetle (*Diorhabda carinulata*) and tamarisk (*Tamarix* spp.) interactions in the Colorado River basin**: Restoration Ecology, <http://onlinelibrary.wiley.com/doi/10.1111/rec.12575/full>.
- Voichick, N.*, Topping, D.J.*, and Griffiths, R.E.*, 2018, **Technical note: false low turbidity readings from optical probes during high suspended-sediment concentrations**: Hydrology and Earth System Science, v. 22, p. 1767-1773, <https://www.hydrol-earth-syst-sci.net/22/1767/2018/>.
- Wilson, S.D., Schlaepfer, D.R., Bradford, J.B.*, Lauenroth, W.K., Duniway, M.C.*, Hall, S.A., Jamiyansharav, K., Jia, G., Lkhagva, A., Munson, S.M.*, and Pyke, D.A., 2018, **Functional group, biomass, and climate change effects on ecological drought in semiarid grasslands**: Journal of Geophysical Research: Biogeosciences, <https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2017JG004173>.

Presentations, Posters, Lectures, Workshops, and Panels

McCormick, M.* , Munson, S.* , Butterfield, B., and Copeland, S.* , 2018, **RAMPS: Restoration Assessment and Monitoring Program for the Southwest** [presentation]: 5th Tri-National Sonoran Desert Symposium.

Muehlbauer, J.* , 2018, **Invertebrate drift throughout Colorado River Basin tailwaters** [presentation]: Lower Colorado River Science Symposium.

Thomas, K.* , Jarchow, C.* , and Stauffer, B* , 2018, **A look to Sonoran plant community vulnerability to changing climate** [presentation]: 5th Tri-National Sonoran Desert Symposium.

PUBLICATIONS HIGHLIGHTED BY OTHER SCIENTISTS & ORGANIZATIONS

A recently published paper with SBSC's Jeff Lovich* as a co-author was picked as the editor's choice article by the Journal of Evolutionary Biology. The title of the paper is "**Macroecological patterns of sexual size dimorphism in turtles of the world**", and can be found here:

<http://onlinelibrary.wiley.com/doi/10.1111/jeb.13223/full>.

The associated editor of the Journal of Applied Ecology wrote a blog highlighting a recently published paper that has SBSC's Kim Dibble* and Ted Kennedy* as co-authors. The highlighted paper presents results about the importance of tributaries to organic matter inputs and the aquatic food web of the Colorado River downstream of Glen Canyon Dam. The blog post is titled "**Tributaries may reset the legacy of dams in large rivers**" and can be found here:

<https://jappliedecologyblog.wordpress.com/2018/03/27/tributaries-may-reset-legacy-of-dams/>. The paper the post is based on is titled "**Pulsed flows, tributary inputs and food-web structure in a highly regulated river**" and can be found here: <https://besjournals.onlinelibrary.wiley.com/doi/abs/10.1111/1365-2664.13109>.

OTHER NOTABLES

Shellie Puffer's* photo of a desert tortoise was selected to be the cover photo for the most recent edition of Current Herpetology.

**For more information about the
Southwest Biological Science Center:**

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