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 Rivers Ecosystem Science (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.

WELCOME

Below are recent products and activities coming from the SBSC. Underlined names indicate SBSC personnel. If you would like more information on anything in this month's update contact Todd Wojtowicz (twojtowicz@usgs.gov).

IMAGE OF THE MONTH

A flash flood in Havasu Creek, a tributary of the Colorado River, on August 27, 2016 (photo credit: David Dean, USGS)

OUTREACH

Media, Broadcasts, and Films

The northern Arizona NPR station, KNAU, featured a new snake vivarium located at Northern Arizona University (NAU) in its Earth Notes program titled, "NAU's Snake Vivarium". The facility houses the narrow-headed gartersnake, which was recently listed as "Threatened" under the Endangered Species Act. Erika Nowak, an NAU scientist, has led the research on the narrow-headed gartersnake and she was instrumental in the development of the new facility. The vivarium includes aspects of the gartersnake's natural habitat including native plants, rocks, a waterfall, riffles, and ponds, and the goal of the facility is to facilitate breeding and reintroduction of the gartersnake. SBSC researchers, such as Charles Drost, has worked with Erika on narrow-headed gartersnake research, and SBSC's David Ward was an integral part of the design, construction, and troubleshooting of the water feature in the facility. Here is the link to the KNAU piece: http://knau.org/post/earth-notes-nau-s-snake-vivarium#stream/0.

Public and Partner Outreach Activities

SBSC's Cecil Schwalbe, USGS emeritus herpetologist, led an outreach event on Wednesday, October 26 at Harelson Elementary School for the 3rd grade class as part of the STEAM (science, technology, engineering, arts, and math) project on ecosystems. He discussed the life cycles of spiders and talked about other examples of Sonoran Desert wildlife. Shane Selleck, SBSC outreach coordinator for the Tucson office, organized the event and provided on-site support. For additional information contact sselleck@usgs.gov.

SCIENCE

Presentations, Posters, Lectures, Workshops, and Panels

Bradford, J.B.,Schlaepfer, D.R., Lauenroth, W.K., Duniway, M.C., Hall, S.A., Hochstrasser, T., Jamiyansharav, K., Jia, G., Lkhagva, A., Munson, S.M., Pyke, D.A., Tietjen, B., and Wilson, S.D., 2016, **Climate change impacts on drought and ecosystem services in temperate** drylands [presentation]: World Congress Silvo-Pastoral Systems 2016.

Buscombe, D., 2016, **Particle size 'by proxy': decoding the textural information in remotely sensed landforms** [seminar]: Northern Arizona University, School of Earth Sciences and Environmental Sustainability.

Duniway, M., and Nauman, T., 2016, **New tools for assessing land-uses impacts on Colorado Plateau landscapes** [presentation]: Southern Rockies Landscape Conservation Cooperative. The presentation was based off of a paper recently published by Nauman and Duniway titled, **The automated reference toolset: a soil-geomorphic ecological potential matching algorithm**. Link to the presentation: https://www.youtube.com/watch?v=0WhesMtKuQA&feature=youtu.be. Link to the paper: file:///U:/Papers%20&%20Products-SBSC/Duniway,%20Michael/Nauman%20&%20Duniway%20(2016)-Automated%20Reference%20Toolset_Soil-Geomorphic%20Ecol%20Algorithm.pdf.

Ironside, K., 2016, **Trophic dynamics in the southwestern USA: a top predator, the cougar, and their** prey [lecture]: Northern Arizona University, Undergraduate/Graduate Mammalogy Course.

Lovich, J.E., 2016, **Renewable energy development and wildlife conservation: the new frontier** [presentation]: California State University, Fullerton; U.S. Fish and Wildlife, Palm Springs; and the California Department of Fish and Wildlife, Inland Deserts Region Field Offices.

Nagler, P.L., 2016, **Working for the U.S. Geological Survey** [lecture]: University of Arizona, School of Natural Resources and the Environment.

Reed, S.C., 2016, **Dryland response to anthropogenic change: a biogeochemical perspective** [seminar]: Arizona State University, School of Life Sciences.

Reed, S.C., 2016, **Plant-soil connections and Colorado Plateau ecosystem responses to a changing climate** [seminar]: University of Nevada, Reno.

Yackulic, C., Reid, J., Nichols, J.D., Davis, R., Rossman, S., and Zipkin, E., 2016, **Implications of dynamic spatial processes for habitat associations, competitive interactions, and extinction risk** [presentation]: The Wildlife Society's 23rd Annual Conference.

Published Papers, Reports, and Data Releases

Bair, L.S., Rogowski, D.L., and Nehr, C., 2016, **Economic value of angling on the Colorado River at Lees Ferry: using secondary data to estimate the influence of seasonality**: North American Journal of Fisheries Management: no. 6, p. 1229-1239. Online link to paper: http://dx.doi.org/10.1080/02755947.2016.1204388.

Buscombe, D., and Grams, P.E., 2016, **Stochasticity of riverbed backscattering, with implications for acoustical classification of non-cohesive sediment using multibeam sonar** *in* Constantinescu, G., Garcia, M., and Hanes, D., eds., River Flow 2016: London, UK, Taylor & Francis Group, p. 1496-1509. Link to chapter: https://dbuscombe usgs.github.io/media/pdfs/BuscombeGrams_RiverFlow2016_fullpaper_final.pdf.

Dzul, M.D., Yackulic, C.B., Korman, J., Yard, M.D., and Muehlbauer, J., 2016, **Incorporating temporal heterogeneity in environmental conditions into a somatic growth model**: Canadian Journal of Fisheries and Aquatic Sciences, DOI: 10.1139/cjfas-2016-0056. Online link to paper: http://www.nrcresearchpress.com/doi/abs/10.1139/cjfas-2016-0056#.V_KEvvkrJhF.

Jarchow, C.J., Nagler, P.L., Glenn, E.P., Ramirez-Hernandez, J., and Rodriguez-Burgeño, E., 2016, **Evapotranspiration by remote sensing: an analysis of the Colorado River Delta before and after the Minute 319 pulse flow to Mexico**: Ecological Engineering. Online link: http://authors.elsevier.com/sd/article/S0925857416305833.

Kazacos, K.R., 2016, ***Baylisascaris* larva migrans**: U.S. Geological Survey Circular 1412, Abbott, R. C., and van Riper, C, III, (eds), 122 p., 3 appendixes. Online link: http://pubs.er.usgs.gov/publication/cir1412.

Kortenhoeven, E., Muehlbauer, J., and Kennedy, T., 2016, **Hydropower waves, insect eggs, and citizen science - What's up with the aquatic foodbase in Grand Canyon?**: Boatman's Quarterly Review, no. 3, no. 29, p. 19-22.

Lovich, J.E., Agha, M., Painter, C.W., Cole, L., Fitzgerald, A., Narum, K., and Jennings, R.D., 2016, **Aspects of the reproductive ecology of female turtles in New Mexico**: Western North American Naturalist, v. 76, p. 291-297. Online link: http://scholarsarchive.byu.edu/wnan/vol76/iss3/5.

Munson, S.M., Sankey, T.T., Xian, G., Villarreal, M.L., and Homer, C.G., 2016, **Decadal shifts in grass and woody plant cover are driven by prolonged drying and modified by topo-edaphic properties**: Ecological Applications, DOI: 10.1002/eap.1389. Online link: http://onlinelibrary.wiley.com/doi/10.1002/eap.1389/abstract.

Reynolds, R.L., Munson, S.M., Fernandez, D.P., Goldstein, H.L., and Neff, J.C., 2016, **Concentrations of mineral aerosol from desert to plains across the central Rocky Mountains, western United States**: Aeolian Research, v. 23(A), p. 21–35. Online link: http://dx.doi.org/10.1016/j.aeolia.2016.09.001.

Rossman, S., Yackulic, C.B., Saunders S.P., Reid, J., Davis, R., and Zipkin, E.F., 2016, **Dynamic N-occupancy models: estimating demographic rates and local abundance from detection-nondetection data**: Ecology, DOI: 10.1002/ecy.1598. Early online link: http://onlinelibrary.wiley.com/doi/10.1002/ecy.1598/full.

Topping, D.J., Wright, S.A., Griffiths, R.E., and Dean, D.J., 2016, **Long-term continuous acoustical suspended-sediment measurements in rivers – theory, evaluation, and results from 14 stations on five rivers** *in* Constantinescu, G., Garcia, M., and Hanes, D., eds., River Flow 2016: London, UK, Taylor & Francis Group, p. 1510-1518. Link to book: https://www.crcpress.com/River-Flow-2016-Iowa-City-USA-July-11-14-2016/Constantinescu-Garcia-Hanes/p/book/9781138029132

Wertin, T.M., and Reed, S.C., 2016. **Experimental design plant and soil measurement data, Colorado Plateau**, 2011: U.S. Geological Survey data release, http://dx.doi.org/10.5066/F7PG1PVH.

van Riper, C., III, Abbott, R.C., Friend, M., and Bunck, C., 2016. Forward. pp. iii-iv, *in*: Kazacos, K.R., 2016, ***Baylisascaris* larva migrans**: U.S. Geological Survey Circular 1412. 122 p., 3 appendixes. http://pubs.er.usgs.gov/publication/cir1412.

Voichick, N., Kennedy, T., Topping, D., Griffiths, R., and Fry, K., 2016, **Water clarity of the Colorado River – implications for food webs and fish communities**: Fact Sheet 2016-3053. Online link: http://pubs.usgs.gov/fs/2016/3053/fs20163053.pdf.

New Grants and Other Funded Opportunities

Terry Arundel and Meredith Hartwell received an award from the Community for Data Integration's (CDI) Data at Risk team for digitization and release of the Repeat Photography Collection (previously called Desert Laboratory Repeat Photography Collection). Now housed by the SBSC in Flagstaff, Arizona, it is the largest repeat photography collection in the world, with images of the Colorado River and Plateau, southwest U.S., Mexico, and Kenya from the late 1800s to present. The collection is a compilation of several USGS scientists' life work, most notably Raymond Turner and Robert H. Webb. Research conducted using repeat photographic images provides valuable opportunities to document, analyze and track landscape change through time due to anthropogenic and ecological causes, including climate change. The assessments compliment data gathered from GIS, remote sensing, satellite and aerial imagery, and are used for resource and ecosystem conservation and management. A pilot of the preservation project will be released by CDI through ScienceBase in 2016.

LET'S WELCOME NEW SBSC RESEARCHERS

Bridget Deemer recently joined the Grand Canyon Monitoring and Research Center (GCMRC, part of the Rivers Ecosystem Branch of the SBSC) as a postdoctoral ecologist. Bridget recently completed her Ph.D. at Washington State University where she studied nitrogen removal and greenhouse gas production in reservoirs. While at GCMRC, she will investigate how conditions within Lake Powell influence downstream riverine productivity. She will be working with Charles Yackulic (GCMRC), Robert Hall (University of Wyoming), and others within SBSC.

Rob Massatti has also recently joined the SBSC and will be working within the Terrestrial Dryland Ecology branch of the SBSC. Rob as a broad range of botanical experience in both ecological and evolutionary research. He has studied the flora throughout the Rocky Mountains, Colorado Plateau, Great Basin, and Pacific Northwest while participating in various research projects, during his MS research at the Rocky Mountain Herbarium, and as the Assistant Director of Conservation Research at the Institute for Applied Ecology. More recently, Rob earned a Ph.D. at the University of Michigan, during which he used genomic data to elucidate the evolutionary history of a clade of sedges (*Carex* species) restricted to higher elevations across western North America. He will be working with Troy Wood and other SBSC scientists applying his knowledge toward informing seed sourcing for restoration projects across the Colorado Plateau.