

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 *Rivers 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. Underlined names indicate SBSC personnel, and the SBSC branch (RES or TDE, see previous section) they are affiliated with is identified. If you would like more information on anything in this month's update contact Todd Wojtowicz (twojtowicz@usgs.gov).

IMAGE OF THE MONTH



**Mountain lion in a ponderosa pine.
(photo credit: Kirsten Ironside, USGS)**

OUTREACH

Media, Broadcasts, and Films

A recently published paper by [Travis Nauman](#) and [Mike Duniway](#) (TDE, Southwest Biological Science Center) and Miquel Villarreal and Travis Poitras (Western Geographical Science Center) titled, “**Disturbance automated reference toolset (DART): assessing patterns in ecological recovery from energy development on the Colorado Plateau**”, has received a lot of attention this past month. The paper discusses a novel methodological approach to evaluating the amount of **vegetation cover** on plugged, abandoned **gas and oil well pads** in the Southwest. Below is a list of the attention the paper as received.

- **USGS press release**, which can be found on our website: <https://www.usgs.gov/news/new-scientific-approach-assesses-land-recovery-following-oil-and-gas-drilling>
- **USGS Facebook post** (posted on February 7), which can be found here: <https://www.facebook.com/USGeologicalSurvey/>
- **E&E News: “USGS eyes stronger reclamation practices in Southwest”**; <http://www.eenews.net/energywire/2017/02/09/stories/1060049779>
- **World Oil: “New scientific approach assesses land recovery following oil and gas drilling”**; <http://www.worldoil.com/news/2017/2/8/new-scientific-approach-assesses-land-recovery-following-oil-and-gas-drilling>
- **Science Newsline Nature and Earth: “New scientific approach assesses land recovery following oil and gas drilling”**; <http://www.sciencenewsline.com/summary/2017020721510060.html>
- **Science Daily: “New scientific approach assesses land recovery following oil and gas drilling”**; <https://www.sciencedaily.com/releases/2017/02/170207162118.htm>
- **The Daily Sentinel: “Tool may help focus well-pad reclamation efforts”**; <http://www.gjsentinel.com/news/articles/tool-may-help-focus-wellpad-reclamation-efforts/>

SCIENCE

Presentations, Posters, Lectures, Workshops, and Panels

[Kennedy, T. A.](#), **Little bugs, big data, and Grand Canyon** [presentation]: University of North Carolina at Chapel Hill, Curriculum in Environment and Ecology. ([RES](#))

[Mann, R.](#), [Duniway, M.](#), Miller, M.E., and Ballenger, L., 2017, **Using Connectivity Modifiers to restore degraded grasslands in Canyonlands and Arches National Parks** [presentation]: Society for Range Management 70th Annual Meeting. ([TDE](#))

[Mann, R.](#), [Duniway, M.](#), Miller, M.E., and Ballenger, L., 2017, **Using Connectivity Modifiers to restore degraded grasslands in Canyonlands and Arches National Parks** [presentation]: NPS Northern Colorado Plateau Network 2017 Technical Committee Meeting. ([TDE](#))

[Mann, R.](#), [Duniway, M.](#), Miller, M.E., and Ballenger, L., 2017, **Using Connectivity Modifiers to restore degraded grasslands in Canyonlands and Arches National Parks** [presentation]: Colorado Plateau Native Plant Program 2017 Annual Meeting. ([TDE](#))

Metcalfe, A., **Big-river bugs: a citizen science approach** [presentation]: Northern Colorado Plateau Network Annual Meeting. (RES)

Sankey, J., 2017, **Predicting future, post-fire erosion and sedimentation with watershed models in the Western USA** [presentation]: Northern Arizona University, School of Forestry. (RES)

Published Papers, Reports, Data Releases, etc.

Bastille-Rousseau, G., Gibbs, J.P., Campbell, K., Yackulic, C.B., and Blake, S., 2017, **Ecosystem implications of conserving endemic versus eradicating introduced large herbivores in the Galapagos Archipelago**: Biological Conservation, n. 209, p. 1-10, <http://dx.doi.org/10.1016/j.biocon.2017.02.015>. (RES)

Baxter, C.V., Kennedy, T.A., Miller, S.W., Muehlbauer, J.D., and Smock, L.A., 2017, **Chapter 21: Macroinvertebrate drift, adult insect emergence, and oviposition**, in Hauer, F.R., and Lamberti, G.A., eds., *Methods in Stream Ecology Third Edition*, vol. 1: Ecosystem structure, Academic Press, p. 435-456. (RES)

Butterfield, B.J., Bradford, J.B., Munson, S.M., and Gremer, J.R., 2017, **Aridity increases below-ground niche breadth in grass communities**: Plant Ecology, doi:10.1007/s11258-016-0696-4. <http://link.springer.com/article/10.1007/s11258-016-0696-4>. (TDE)

Lovich, J.E., 2017, **Population attributes red eared slider Japan data: U.S. Geological Survey data release**, <https://dx.doi.org/10.5066/F71C1V2B>. (TDE)

Nauman, T.W., Duniway, M.C., Villarreal, M.L., and Poitras, T.B., 2017, **Disturbance automated reference toolset (DART): assessing patterns in ecological recovery from energy development on the Colorado Plateau**: Science of the Total Environment. Online link: <http://www.sciencedirect.com/science/article/pii/S0048969717300347>. (TDE)

Norman, L.M., Sankey, J.B., Dean, D.J., Caster, J., DeLong, S.B., DeLong, W.M., and Pelletier, J.D., 2017, **Quantifying geomorphic change at ephemeral stream restoration sites using a coupled-model approach**: Geomorphology, v. 283, p. 1–16. Online link: <http://www.sciencedirect.com/science/article/pii/S0169555X16307759>. (RES)

Ward, D.L., Casper, A.F., Counihan, T.D., Bayer, J.M., Waite, I.R., Kosovich, J.J., Chapman, C.G., Irwin, E.R., Sauer, J.S., Iches, B.S., and McKerrow, A.J., 2017, **Long-term fish monitoring in large rivers: utility of “benchmarking” across basins**: Fisheries, no. 42, v. 2, p online, <http://www.tandfonline.com/doi/pdf/10.1080/03632415.2017.1276330?needAccess=true>. (RES)

Yackulic, C.B., 2017, **Competitive exclusion over broad spatial extents is a slow process: evidence and implications for species distribution modeling**: Ecography. Online link: <http://onlinelibrary.wiley.com/doi/10.1111/ecog.02836/epdf>. (RES)

Young, K.E., and Reed, S.C., 2017, **Spectrally monitoring the response of the biocrust moss *Syntrichia caninervis* to altered precipitation regimes**: Scientific Reports, 7, 41793, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5292960/>. (TDE)

Zhou, X., Smith, H., Giraldo Silva, A., Belnap J., and Garcia-Pichel, F., 2016, **Differential responses of dinitrogen fixation, diazotrophic cyanobacteria and ammonia oxidation reveal a potential warming-induced imbalance of the n-cycle in biological soil crusts**: PLOS ONE, v. 11, no. 10, e0164932, <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0164932> and <http://dx.doi.org/10.1371/journal.pone.0164932>. (TDE)

New Grants and Other Funded Opportunities

A Graduate Research Internship Program (GRIP) was awarded to SBSC's Jeff Muehlbauer (RES). The goal of the program is to give National Science Foundation-supported students the opportunity and funding to work with USGS personnel on subjects of interest to the USGS, and to give them the opportunity to interact with USGS staff in person at a USGS Center. The title of Jeff's GRIP project is, "**Meta-population genetics of Colorado River aquatic insect fauna in Grand Canyon**". Erin Abernethy from Oregon State University assisted in the development of the GRIP proposal and will be conducting the research.

SBSC PUBLICATIONS HIGHLIGHTED BY OTHER SCIENTISTS

A paper (Cole et al. (2011)) whose first author was an SBSC researcher (Kenneth Cole) at the time of publication, and the second author is currently an SBSC researcher (Kirsten Ironside, TDE), was referred to in a recently published manuscript in the journal *Science*. Cole et al. (2011) used paleobiology, climate data, and current distribution data to assess past and ongoing shifts in the distribution of Joshua tree. The recently published *Science* paper refers to Cole et al. (2011) as an "illustrative example" of using paleobiology to inform whether or not historical ecosystems can be maintained, and provides a concise summary of their findings. The Cole et al. (2011) paper is titled, "**Past and ongoing shifts in Joshua tree distribution support future modeled range contraction**", and can be found here: <http://onlinelibrary.wiley.com/doi/10.1890/09-1800.1/abstract>. The newly published *Science* paper that references Cole et al. (2011) is titled, "**Merging paleobiology with conservation biology to guide the future of terrestrial ecosystems**", and can be found here: <http://science.sciencemag.org/content/355/6325/eaah4787>.

A commentary was recently published in *New Phytologist* that discusses a paper by Seth Munson (TDE, SBSC) and A. Lexine Long (US Forest Service) titled, "**Climate drives shifts in grass reproductive phenology across the western USA**". The authors of the commentary found the results of the Munson and Long paper interesting and were impressed by the methodological approach of the paper. Munson and Long used long-term herbarium records (1895-2013) to assess the phenology of C₄, C₃, annual, and perennial grasses. The title of the commentary is "**Insights into grass phenology from herbarium specimens**", and the link to the commentary is here: <http://onlinelibrary.wiley.com/doi/10.1111/nph.14439/full>. The link to the Munson and Long paper is here: <http://onlinelibrary.wiley.com/doi/10.1111/nph.14327/abstract>.

AWARDS

The book, *Ecosystems of California*, received two PROSE Awards from American Publishers this year. Specifically, the book won the award for “Excellence in Physical Sciences & Mathematics” and the “Environmental Science” category award. SBSC’s Jayne Belnap (TDE) is the lead author of the *Deserts chapter* of the book (chapter 30). The link to the book is here:

<http://www.ucpress.edu/book.php?isbn=9780520278806>. The link to the awards is here:

<https://proseawards.com/winners/>.

Daniel Buscombe, Paul Grams, and Sean Smith were awarded the 2017 Best Technical Note Award from Environmental & Water Resources Institute (part of the American Society of Civil Engineers) for their paper, “**Automated Riverbed Sediment Classification Using Low-Cost Sidescan Sonar**”.

Their paper is published in the Journal of Hydraulic Engineering:

[http://ascelibrary.org/doi/abs/10.1061/\(ASCE\)HY.1943-7900.0001079](http://ascelibrary.org/doi/abs/10.1061/(ASCE)HY.1943-7900.0001079). (RES)

Brent Sigafus (TDE, Southwest Biological Science Center) and Jeff Balmat (Arizona Water Science Center) received an Occupational Safety and Health Award of Excellence from Bill Miller, Bureau Occupational Safety and Health Program Manager, for their support of the Collateral Duty Safety Program Coordinator Meeting January 24-26 in Phoenix, AZ at the BLM Training Center.

OTHER NOTABLES

Leadership within the DOI and USGS, was briefed on a paper that was coming out (now available) authored by Travis Nauman, Mike Duniway (TDE) and others titled, “**Disturbance automated reference toolset (DART): assessing patterns in ecological recovery from energy development on the Colorado Plateau**”. The paper describes a novel method to assess the recovery of vegetation cover on abandoned and plugged oil and gas well pads in the Southwest, and quantifies patterns in the degree of vegetation recovery on abandoned well pads compared to intact, reference sites. The link to the paper is here:

<http://www.sciencedirect.com/science/article/pii/S0048969717300347>.

Scott VanderKooi, Chief of SBSC’s GCMRC/RES, Dave Lytle, SBSC Center Director, and GCMRC/RES staff attended the winter meeting of the Glen Canyon Dam Adaptive Management Program's Adaptive Management Work Group (AMWG) in Tempe, AZ on February 15-16. VanderKooi and GCMRC Deputy Chief Mike Moran (RES) presented a summary of results from the January 24-25, 2017 Annual Reporting Meeting to AMWG stakeholders and solicit their input for GCMRC's next Triennial Work Plan (FY2018-20). For more information, contact svanderkooi@usgs.gov.

Jayne Belnap, Pamela Nagler, Sasha Reed (TDE), and Kimberly Dibble (RES) are among the women that have been selected to be profiled in a USGS publication featuring women in science at the USGS. The book is part of the WISDom: Women in Science Dialog program.

Bridget Deemer (RES) attended the Association for the Sciences of Limnology and Oceanography (ASLO) conference in Honolulu, HI. She co-chaired a special session at the conference entitled, “**Methane oxidation across aquatic ecosystems: opening the methane black box**”. Here is a link to the session description Bridget co-chaired:

<http://www.sgmeet.com/aslo/honolulu2017/sessionschedule.asp?SessionID=036>.

Charles van Riper III (TDE, Emeritus) served on the USGS Innovation Center Advisory Group (ICAG) last week and reviewed FY17 Innovation Fund proposals. Here is the link to the USGS Innovation Center:

<https://geography.wr.usgs.gov/InnovationCenter/about.html>.