Anya Nova Metcalfe

Ecologist

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Education:

Northern Arizona University — **Flagstaff, AZ**
M.S. Biological Sciences — **2018**

Prescott College — **Prescott, AZ**
B.A. Environmental science with emphasis in aquatic resources — **2012**
Minor in Adventure Education

Universidad de Guanajuato — **Guanajuato, Mexico**
Foreign exchange student, Hydrology department — **2010**

Work Experience:

U.S. Geological Survey — **2012-*present***
Grand Canyon Monitoring and Research Center & Southwest Biological Science Center — Flagstaff, AZ
Ecologist GS 11 Series 0408 40 hours/week

-Analyzing, compiling, and managing various and usually large ecological datasets
-Employing complex statistical techniques such as Bayesian regression models, mixed effects models, and spatial statistics to analyze and communicate complex ecological patterns
-Presenting research to and working alongside resource managers
-Publishing research papers in peer-reviewed journals
-Conducted foodweb research in the Colorado River watershed that spanned 7 states
-Coordinating public involvement in community science data gathering
-Using expert knowledge of Colorado River Basin aquatic insect fauna to identify taxa to species
-Processed 1,953 light trap samples (1,102,811 insects / 1,428 hours) as of 01/01/2023
-Maintaining a safe lab environment, keeping inventory of supplies, and ensuring accurate data
-Spent more than 400 days in remote sections of Grand Canyon and Glen Canyon collecting aquatic and terrestrial invertebrate specimens using a myriad of traps and methods including drift nets, Hess samplers, ponar, light traps, sticky traps, and emergence traps
-Inspiring youth through scientific outreach through field work and front country presentations
-Curating and managing a small in-house entomological reference collection
-Led workshops on Trichoptera identification
-Participated and led various center efforts to improve campus diversity, equity, inclusion, and accessibility

U.S. Geological Survey — **July - October 2020**
Water Mission Area — Remote
Social media strategist (20 hours/week, 10 week detail)

-Managed Instagram account (@USGS_streamgages) for USGS Water Mission Area

-Developed daily social media content for national distribution

Museum of Northern Arizona **2012-2013**

Curatorial Assistant Flagstaff, AZ

-Handling, sorting, labeling, and identifying entomological specimens for museum collections

-Organizing and maintaining a collection of more than 200,000 specimens

-Collected over 2,000 invertebrate specimens in the field

-Overseeing and organizing museum volunteers

Summer Among the Peaks Discovery Camp

Bug Camp Instructor July 2012, July 2013

-Instructing 10 students during week long bug camps with daily field trips

Grand Canyon Wildlands Council **2012-2014**

Lead Technician Flagstaff, AZ

-Leading collection of interdisciplinary datasets on flora, fauna, hydrology, and human impact

-Wrote technical field reports describing field sites and sampling efforts

Springs Stewardship Institute **2011-2012**

Field Technician Flagstaff, AZ

-Collected invertebrate specimens from over 40 springs on public lands in AZ and NV

-Gathering interdisciplinary datasets on the biology, geology, hydrology, and archaeology of springs

-Aided in the facilitation of 2 workshops for spring monitoring and restoration.

US Forest Service/ Americorps **2010**

Interpretation Internship Santa Fe National Forest, NM

-Created and delivered 8 educational programs for mixed-age audiences

-Designed and illustrated a field guide to freshwater macroinvertebrates

-Made 2,000+ contacts with forest visitors

Additional Scientific Research and Field Experience:

Field ecologist – Aquatic insect surveys in Glen Canyon/CO River 2012-present

USGS/GCMRC

-Sampling aquatic insects at various life stages using a wide array of sampling equipment

Field Technician – Monitoring fish populations Glen Canyon/CO River 2012-present

USGS/GCMRC

-Handling, identifying, sexing, measuring, and tagging fish

-With a team, processing up to 5,000 fish a night (collected by electroshocking)

-Working nocturnally (8 pm – 4 am)

Trip participant – Sesquicentennial Colorado River Exploratory Expedition 2019

USGS/UWY

-Selected as a USGS participant in river trip celebrating 150 years since Powell Expedition

Field Technician 2012

Seeds of Success/Northern Arizona University

-Identifying and collecting seeds from native plants in Southern Utah

-Using a field press to collect voucher specimens for Flagstaff herbarium and Smithsonian collections

Field Assistant – Monitoring populations of Humpback Chub in the Colorado River Apr 2012, Sept 2012

US Fish and Wildlife Service

-Capturing fish using hoop and trammel nets

-Handling, identifying, sexing, measuring, and PIT tagging fish

Elk calf-mortality study at **the Valle Caldera National Wildlife Refuge, NM** June - July 2011

-Tagging calves with ear tag transmitter, locating wildlife using telemetry, appropriately handling calves

Independent research project on benthic invertebrates of the Colorado River and its tributaries 2011

-Sampled insects from ten tributaries and 9 sites along the Colorado River during a 21 day river trip

-Authored an unpublished 8 page report and presented at Prescott College Grand Canyon Symposium

Collecting baseline resource data in remote technical slot canyons of Grand Canyon 2013

-Collecting data on the ecology, hydrology, geology, and recreation impacts of technical slot canyons
-Rappeling as much as 200 ft/pitch, swimming in cold water, hiking long distances, and packrafting

***Colpomenia tuberculata* as a microhabitat in Estero Santa Rosa, Sonora, Mexico** 2011
-Collecting, identifying, and recording the marine macroinvertebrates that live within a brown alga
-Collection methods required hiking, kayaking, snorkeling, and extensive wading
-Co-wrote a 15 page unpublished report

Electro-shocking with a backpack unit to remove invasive fish Intermittent 2010-2015
-Participated in 14 collective days of fish removal in Prescott National Forest, AZ, Santa Fe National Forest, NM and Bright Angel Creek in Grand Canyon National Park, AZ.

Monitoring tamarisk beetle populations on the Colorado River 2011
-Assisting a masters student (CSU) in collecting tamarisk beetles in Grand Canyon

Surveying beaver population in the Verde River, AZ 2010
-Three weeks locating, surveying, and monitoring beaver dams for the Nature Conservancy

Verde River and Butte Creek Restoration Field Technician 2009

Volunteer Work:

Co-instructor for Girls Who Code 2018
-assisted middle school girls with coding project in after-school club

Giving presentations at public schools 2011-present
->8 presentations on entomology for Flagstaff Festival of Science (annual)
-Leaf litter sample processing at Sinagua Middle School (annual) 2019 - 2021
-2 hour presentation on Environmental Careers in a rural school district (Dewey, AZ)
-Various field trip tours at USGS SBSC

Guest teacher for ecology club "Los delfines jovenes" in Bahia de Kino, Sonora, Mexico 2011
-Preparing and facilitating lessons on marine biology in Spanish for middle school students

Founder and president of marine conservation group "Make a Wave" in Pompano Beach, FL 2007-2009
-Initiated and led 64 member club for 3 years
-Received grant for $2,000 of water quality testing equipment & training
-Led weekly sampling and analysis of a local inlet for presence of E. Coli for one year
-Featured in 3 local newspapers and the magazine Teen Vogue

Instructor and activities coordinator at children's museum "Young @ Art" 2006-2008
-Volunteered 300+ hours
-Assisted in organization of 3 events and fundraisers

Grants & Recognition

Federal agencies

QRP USGS/USFWS grant to continue research on aquatic insects of upper Colorado River Basin, partnership with Upper Colorado Endangered Fish Recovery Program ($75,000) 2018

Dinosaur National Monument grant to continue Citizen Science efforts in park ($10,000) 2018

Dinosaur National Monument grant to begin a Citizen Science monitoring project for aquatic insects ($33,000) 2016

Rhode Island School of Design (RISD) Maharam STEAM fellowship to collaborate with RISD M.F.A. student ($5,000) 2014

Societies & Organizations

Climate change in Navajo Nation: Raising awareness and understanding community perspectives (Burroughs Welcome Fund, $50,000) 2024

Western Bat Working Group Bob Berry Award ($2,000 training & new detector) 2015

Aldo Leopold Land Ethic Leader Workshop (Land Steward Fellowship, $200 training) 2012

Surfrider Foundation ($2,000 marine water testing equipment and training) 2007

Academic

AmeriCorps Award Recipient, Student Conservation Association ($1200) 2011

Community Service Education Award ($1200)	2011
Sustainability Scholar, The North American Mobility Program ($5000)	2010
Prescott College Designated Class Archivist ($300 photography award)	2010
John Wesley Powell Scholarship ($8,000 for academic achievement)	2009
Environmental and Social Justice Scholarship ($8,000 for community leadership)	2009
George Snow Foundation Scholar ($12,000 for academic achievement)	2009
Ford Salute to Education Scholar ($1,000 for academic achievement)	2009
Charles Franklin Parker Scholar ($4,000 for community leadership)	2009

Specialized Training:

- Spatial Statistical Network Modeling (Boise, ID) 2019
- Bayesian Modeling (Flagstaff, AZ) 2019
- Swiftwater certified (NOLS) 2017
- Titley ANABAT software training (Raleigh, NC) 2015
- Trichoptera of the Southwest Workshop (Flagstaff, AZ) 2014
- Springs Restoration Workshop (Las Vegas, NV) 2012
- Wilderness First Responder Current, Since 2011
- Grand Canyon Semester selected participant (Prescott College, AZ) 2011
- Aldo Leopold Land Ethic Leader Workshop (Albuquerque, NM) 2011
- Completed B-3 Combination Helicopter/Airplane Safety Course (DOI) 2010

Scientific Publications

Gaillard, C., Keany J., Metcalfe, A., Diehl, J., Ranjan, P., & Biggs, D. 2024. Mobile apps for 30 x 30 equity. Nature.

Metcalfe, A., Fritzinger, C., T. Weller, Dodrill, M., Szydlo, C., Muehlbauer, J., Yackulic, C., Holton, B., Durning, L., Sankey, J., & Kennedy, T. 2023. Insectivorous bat foraging tracks the availability of aquatic flies (Diptera). Journal of Wildlife Management.

Metcalfe, A., Muehlbauer, J., Ford, M., & Kennedy, T. 2023. Colorado River Basin. In Delong, M. & T. Jardine (Eds.). Rivers of North America (2nd ed.). Wiley.

Allen, D., Gill, B., Metcalfe, A., Bonjour, S., Wang, J., Valentin, D., & N. Grimm. 2023. Taxonomic identity, biodiversity, and antecedent disturbances shape the dimensional stability of stream invertebrates. Limnology and Oceanography letters.

Kennedy, T., Metcalfe, A., Deemer, B., Ford, M., Szydlo, C., & Yackulic, C. 2022. Little bugs, big data, and Colorado River adaptive management: Preliminary findings from the ongoing bug flow experiment at Glen Canyon Dam. Boatman's Quarterly Review 35(3):26-31.

Metcalfe, A., Kurthen A., Freedman J., & Orfinger, A. 2022. The Grand Caddis hatch of JASM 2022: Trichoptera natural history observations at the Joint Aquatic Sciences Meeting in Grand Rapids, Michigan (USA). Limnology and Oceanography Bulletin 31(4):101–106.

Metcalfe, A., Kennedy, T., Mendez, G., & Muehlbauer, J. 2022. Applied citizen science in freshwater research. WIREs water. **Invited primer.**

Patrick, C., Anderson, K., Brown, B., Hawkins, C., Metcalfe, A., Saffarinia, P., Siqueira, T., Swan, C., Tonkin, J., & Yuan, L. 2021. The application of metacommunity theory to the management of riverine ecosystems. WIREs Water.

Metcalfe, A., Muehlbauer, J., Kennedy, T., Yackulic, C., Dibble, K., & Marks, C. 2021. Net-spinning caddisfly distribution in large regulated river. Freshwater Biology.

Metcalfe, A., Kennedy, T., Marks, C., Smith, A., & Muehlbauer, J. 2020. Spatial genetic structuring of a widespread aquatic insect in the Colorado River Basin: evidence for *Hydropsyche oslari* species complex. Freshwater Science 39 (2)

Metcalfe, A., Muehlbauer, J., Ford, Morgan, & Kennedy, T. 2020. Bug Flows: Don't count your midges until they hatch. The Boatman's Quarterly Review 32(4): 8-11.

Metcalfe, A. 2019. Adult net-spinning caddisfly (*Hydropsyche* spp.) catch rates and morphology from large rivers of the southwestern United States, 2015-2016: U.S. Geological Survey data release. Available from <https://doi.org/10.5066/P94N7GI9.

Metcalfe, A. 2019. Locality based caddisfly (*Hydropsyche oslari*) sampling data and CO1 sequences from the southwestern United States, 2013-2016: U.S. Geological Survey data release. Available from <https://doi.org/10.5066/P93GMB1Y.

Nathan, L., Mamoozadeh, N., Tumas, H., Gunselman, S., Klass, K., Metcalfe, A., Edge, C., Waits, L., Spruell, P., Lowery, E. & Connor, E. 2019. A spatially-explicit, individual-based demogenetic simulation framework for evaluating hybridization dynamics. Ecological Modelling 401: 40-51.

Metcalfe, A. 2018. Aquatic insect distribution in the Colorado River Basin. Masters Thesis. Northern Arizona University. Available from Proquest (<https://search.proquest.com/docview/2051910485)

Eitzel, M., Cappadonna, J., Santos-Lang, C., Duerr, R., West, S., Virapongse, A., Kyba, C., Bowser, A., Cooper, C., Sforzi, A., Metcalfe, A., Harris, E., Thiel, M., Haklay, M., Ponciano, L., Roche, J., Ceccaroni, L., Shilling, F., Dörler, D., Heigl, F., Kiessling, T., Davis, B., & Jiang, Q. 2017. Citizen science terminology matters: Exploring key terms. Citizen Science: Theory and Practice 2: 1-20. DOI: 10.5334/cstp.96.

Kennedy, T., Muehlbauer, J., Yackulic, C., Lytle, D., Miller, S., Dibble, K., Kortenhoeven, E., Metcalfe, A., & Baxter, C. 2016. Flow management for hydropower extirpates aquatic insects, undermining river food webs. BioScience 77: 561–575. DOI: 10.1093/biosci/biw059. **BioScience Editor's Choice and featured in Press Releases by USGS, Oregon State U., Conservation Magazine, and others.**

Metcalfe, A., Kennedy, T., & Fritzinger, C. 2016. Moth Mystery Hour. The Boatman's Quarterly Review 27(4): 15-16.

Metcalfe, A., Kennedy, T., & Muehlbauer, J. 2016. Phenology of the adult angel lichen moth (Cisthene angelus) in Grand Canyon, USA. The Southwestern Naturalist 61: 233–240. DOI: 10.1894/0038-4909-61.3.233

Metcalfe, A., Kennedy, T. & Muehlbauer, J. 2016. Angel lichen moth abundance and morphology data, Grand Canyon, AZ, 2012. US Geological Survey Data Release. DOI: 10.5066/F7154F5S

Manuscripts in progress

Metcalfe, A., Kennedy, T., Weller. 2023. Trade-offs in designing a participatory acoustic study: User engagement and data quality comparison of SongMeter4 and Echometer. *To be submitted to:* Frontiers in Ecology and the Environment.

Major conference presentations (as lead author only)

Metcalfe, A., Kennedy, T., Fritzinger, C., Dodrill, M., Yackulic, C., Muelhbaur, J., Holton, B., Durning, L., Sankey, T., and Weller, T. 2024. Bats, Bugs, and Boaters: Insectivorous bat foraging along the Colorado River in Grand Canyon is determined by the availability of aquatic flies. AZ/NM joint annual meeting of AFS/TWG. Flagstaff, AZ.

Metcalfe, A., Kennedy, T., Muehlbauer J., Starbuck, M., & Lytle, D. 2023. Evaluating Bug Flows: Phenology, diet, and growing conditions of a Hydropsychid caddisfly during a stable flow experiment. Society for Freshwater Science. Brisbane, Australia.

Metcalfe, A. & Kennedy, T. 2022. Community scientists shed light on aquatic foodwebs in Grand Canyon, Arizona, USA. Invited oral presentation for session on 'Uncertainty and error in hydrological citizen science observations.' American Geophysical Union. Chicago, IL.

Metcalfe, A., Kennedy, T., Fritzinger, C., Dodrill, M., Yackulic, C., Muelhbaur, J., Holton, B., Durning, L., Sankey, T., and Weller, T. 2022. Bats, Bugs, and Boaters: Insectivorous bat foraging along the Colorado River in Grand Canyon is determined by the availability of aquatic flies. Invited speaker for special session "Colorado River Natural Resources in an Era of Uncertainty: Using Science to Inform River Management.' Biennial Conference of Science and Management on the Colorado Plateau. Flagstaff, AZ.

Metcalfe, A. 2022. Citizen scientists shed light on aquatic foodwebs in Grand Canyon, Arizona, USA. Invited speaker for session on "Water, citizen science, and stakeholder engagement" at the International Symposium on Water Sustainability 2022 hosted by Hong Kong University and the Jockey Club Water Initiatives on Sustainability and Engagement. Virtual.

Metcalfe, A., Kennedy, T., Weller, T., Szydlo, C., Muehlbauer, J., Dodrill, M., Durning,L. Sankey, J. & Fritzinger, C. 2022. Insectivorous bat foraging along the Colorado River in Grand Canyon is determined by aquatic prey availability. Joint Aquatic Sciences Meeting. Grand Rapids, MI.

Metcalfe, A., Kennedy, T., Weller, T., Szydlo, C., Muehlbauer, J., Dodrill, M., & Fritzinger, C. 2022. Insectivorous bat foraging along the Colorado River in Grand Canyon is determined by aquatic prey availability. Glen Canyon Dam Adaptive Management Program annual reporting meeting. Virtual.

Metcalfe, A., Muehlbauer, J., Kennedy, T., Yackulic, C., Dibble, K., & Marks, C. 2020. (Poster). Net-spinning caddisfly distribution in a large regulated river. Ecological Society of America annual meeting. Virtual.

Metcalfe, A., Kennedy, T., Muehlbauer, J., Marks. J. 2019. Gene flow among net-spinning caddisfly populations in the Colorado River Basin. Biennial Conference of Science and Management on the Colorado Plateau. Invited speaker for special session "Evaluating the effects of flow and connectivity on river ecosystems." Flagstaff, AZ.

Metcalfe, A., Kennedy, T., Muehlbauer, J. 2019. Genetic diversity of a widespread net-spinning caddisfly (Hydropsyche oslari). Society Freshwater Science annual meeting. Salt Lake City, UT.

Metcalfe, A., Kennedy, T., Muehlbauer, J. 2019. Genetic diversity of a widespread net-spinning caddisfly (Hydropsyche oslari). (Poster). Glen Canyon Dam Adaptive Management Program annual reporting meeting. Phoenix, AZ.

Metcalfe, A. 2018. Shedding light on aquatic insects of the Colorado River Basin with citizen science. The 39th annual researchers meeting for the Upper Colorado River Endangered Fish & Recovery Program. Vernal, UT.

Metcalfe, A. 2018. Shedding light on aquatic insects of the Colorado River Basin with citizen science. Glen Canyon Dam Adaptive Management Program annual reporting meeting. Phoenix, AZ.

Metcalfe, A. Mixon, R. 2017. Do dams affect bat diets? Western Bat Working Group annual meeting. Fort Collins, CO.

Metcalfe, A., Kennedy, T., Muehlbauer, J. 2017. The Grand Beyond: Aquatic foodbase of the Upper Colorado River Basin (Poster). Glen Canyon Dam Adaptive Management Program annual reporting meeting. Phoenix, AZ.

Metcalfe, A., Kennedy, T., Muehlbauer, J. 2017. The Colorado River Basin: Aquatic insect diversity and distribution in a fragmented riverscape. Society for Freshwater Science annual meeting. Raleigh, NC.

Metcalfe, A., Kennedy, T., Muehlbauer, J. 2016. Compounding Impoundments: aquatic insect distribution and emergence in a fragmented riverscape. Society for Freshwater Science annual meeting. Sacramento, CA.

Other, invited, scientific presentations

Metcalfe, A. 2022. Citizen science and aquatic foodwebs in Grand Canyon, Arizona, USA. Invited guest instructor for Northern Arizona University Grand Canyon Semester.

Metcalfe, A. 2021. Entomological research in the Colorado River Basin. Upward Bound Math & Science. Navajo Nation (virtual presentation).

Metcalfe, A. 2019. What are Bug Flows? Field presentation to the Coconino County Watershed Partnership. Page, AZ.

Metcalfe, A., Kennedy, T., Muehlbauer, J. 2019. Colorado River ecosystem response to the 2018 Bug Flow Experiment released from Glen Canyon Dam. Grand Canyon River Guides Training Seminar. Marble Canyon, AZ.

Metcalfe, A. 2017. What is Citizen Science? Consultative Group for Biological Diversity annual meeting. Flagstaff, AZ.

Metcalfe, A., Kennedy, T., Muehlbauer, J. 2017. Comparative emergence studies in the upper basin using citizen science light traps. Western Area Power Administration webinar (virtual presentation).

Metcalfe, A. 2016. Big River Bugs: A Citizen Science Approach. Moab Festival of Science. Moab, UT.

Metcalfe, A. 2016. Aquatic insect diversity and distribution in the Colorado River Basin. Center for Ecosystem Science and Society seminar. Flagstaff, AZ.

External media coverage

- 3 cool ways USGS is studying bats in national parks (2023). https://www.usgs.gov/news/featured-story/3-cool-ways-usgs-studying-bats-national-parks
- Boaters, Bugs, and the uncertain future of the Colorado River (2022). Interviewed in article about Colorado River and climate change <https://azdailysun.com/news/local/boaters-bugs-and-the-uncertain-future-of-the-colorado-river/article_4fdb8678-de0e-11ec-844f-e3f302e2bdaa.html?utm_medium=social&utm_source=twitter&utm_campaign=user-share>
- Science Moab podcast (2022) "River bugs: Aquatic insects of Grand Canyon". <https://sciencemoab.org/river-bugs/>
- Society for Freshwater Science (2021) Guest for Making Waves podcast "River guides are science guides" <https://freshwater-science.org/news/making-waves-ep-49>
- USGS (2019) Guest for podcast about Citizen Science. "Outstanding in the Field: Citizen Science – Your Data in Action" <https://www.usgs.gov/media/audio/outstanding-field-ep-2-citizen-science-your-data-action>
- Arizona PBS (2019) Interviewed for documentary about the future of Grand Canyon National Park. <https://azpbs.org/2019/02/beyond-the-rim-the-next-100-years-of-grand-canyon-national-park>
- National Geographic (2016) Interviewed for "At 17 million tears old, Grand Canyon still has lessons to teach." <https://video.nationalgeographic.com/video/short-film-showcase/00000156-e673-dbd5-add6-fff3e6d30000>
- Scientific American (2019) Article about conducting aquatic ecology research in Grand Canyon. <https://www.scientificamerican.com/article/re-engineering-the-colorado-riverto-save-the-grand-canyon >
- Associated Press, picked up by The New York Times, The Washington Post, US News and World Report, and others (2018) Story describing the Bug Flows experiment <https://apnews.com/accec230d442406fa7bedf4af219c5d1>
- Bureau of Reclamation (2018) Official press release describing Bug Flows experiment <https://www.usbr.gov/newsroom/newsrelease/detail.cfm?RecordID=62133 13)>
- Undark Magazine (2018) Essay about conducting aquatic ecology research in Grand Canyon https://undark.org/article/wilo-doyle-colorado-river-insects/
- NAU (2017) Featured on Center for Ecosystem Science and Society page < http://ecoss.nau.edu/team/anya-metcalfe/>
- National Public Radio KNAU (2017) *Cisthene angelus* paper. <https://www.knau.org/post/earth-notes-angel-lichen-moths>
- Science Magazine (2016) Scientific reinterpretation of the BioScience hydropeaking paper. <http://science.sciencemag.org/content/353/6304/1099>
- Arizona Daily Sun (2016) Story about BioScience hydropeaking paper. <http://azdailysun.com/news/local/dam-management-plan-aims-to-boost-native-fishbugs/article_8f2a949c-03ee-5f96-86b4-eda52fd0ffbf.html>
- National Public Radio KNAU (2016) Story about BioScience hydropeaking paper. <http://knau.org/post/study-hydropower-decimates-aquatic-insects-coloradoriver#stream/0>
- High Country News (2016) Reinterpretation of BioScience hydropeaking paper. <https://www.hcn.org/issues/48.12/new-measures-could-reduce-glen-canyon-damsimpact-on-the-grand-canyon-a-bit >
- Columbia Basin Fish & Wildlife News Bulletin (2016) Summary of BioScience hydropeaking paper. <http://www.cbbulletin.com/436660.aspx>
- American Fisheries Society (2016) Summary of BioScience hydropeaking paper. <https://fisheries.org/2016/05/citizen-science-reveals-how-river-food-webs-areaffected-by-hydropower-practices/>

- Conservation Magazine (2016) Summary of BioScience hydropeaking paper. <http://conservationmagazine.org/2016/05/simple-trick-make-dams-less-damagingriver-ecosystems/>
- USGS (2016) Official press release for BioScience hydropeaking paper. <https://www.usgs.gov/news/river-food-webs-threatened-widespread-hydropowerpractice>
- Oregon State University (2016) Official press releases for BioScience hydropeaking paper. <https://today.oregonstate.edu/archives/2016/may/hydropeaking-river-waterlevels-disrupting-insect-survival-river-ecosystems>
- BioScience (2016) Editor's choice selection for BioScience hydropeaking paper. <http://bioscienceaibs.libsyn.com/hydroelectric-dams-kill-insects-wreak-havoc-withfood-webs>

Students & Technicians Mentored

Ari Brisco-Schofield. University of California San Diego. Summer 2024.
-Internship supervisor Youth Excellence in Science (YES) Ecology Summer Fellows Program
-Acoustic file analysis and management, R statistical analysis, aquatic entomology, youth outreach

Ryan Murphy Northern Arizona University, Environmental Sciences. Spring 2024.
-Internship supervisor for ENV 408 and mentor in acoustic data file management

Rachel Diehl New Jersey Institute of Technology. Summer 2022.
-Internship supervisor Youth Excellence in Science (YES) Ecology Summer Fellows Program
-Aquatic entomology, field methods for ecology, data management and analysis

Diana Valentin Northern Arizona University, Environmental Sciences. Summer 2021.
-Internship supervisor for ENV 408, scientific illustration

Gabriella Mendez Northern Arizona University, Environmental Sciences. Spring 2021.
-Internship supervisor for ENV 408, scientific illustration

Alexander Gonzalez Northern Arizona University, Environmental Sciences. Fall 2020.
-Internship supervisor for ENV 408 and mentor in caddisfly taxonomy

Emilio Saladino Northern Arizona University, Environmental Sciences. 2019 – 2020.
-Internship supervisor for ENV 408 and mentor in Science outreach

Brece Hendrix Northern Arizona University, Forestry., Biological technician 2015-2018.
-Supervisor and mentored in aquatic entomology

Kate Aitchison Rhode Island School of Design. 2015-2016.
-Collaborator in science communication for Maharam STEAM Fellowship

Professional Service

- Peer reviewer for Environmental Entomology, Journal of Environmental Management, Journal of Applied Ecology, Environmental Science and Policy, and other scientific publication outlets
- Flagstaff Science Center Outreach Committee since 2013
- Classroom speaker for Flagstaff Festival of Science since 2012
- Volunteer with Ecological Society of America Career Central

Additional Skills and Interests:

- Trilingual (Russian, Spanish, English)
- Outdoor enthusiast: experienced river runner, hiker, canyoneer, and rock climber
- Certified Wilderness First Responder since May 2011
- Proficient with R, GIS, Inkscape, Github, Microsoft Office, and a suite of analysis tools for genetic and acoustic data

Header photo by Freshwaters Illustrated