

JEFFREY DANIEL MUEHLBAUER

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EXPERTISE

Project Management. Oversight of budgets, staffing, and project timelines for day-to-day operations of a large research lab, supervision and mentoring, regular interactions and presentations with clients, stakeholders, and organizational superiors, responsibility for project execution and success.

River Ecology. Stream and riparian community ecology, large river ecosystems, cross-ecosystem subsidies, aquatic and riparian macroinvertebrates, food webs, stable isotope analysis, fish diets, aquatic biogeochemistry, leaf decomposition.

Hydrology & Geomorphology. Geomorphic surveys, in-stream hydraulics, sediment transport (incipient motion analysis), modeling (HEC-RAS).

Restoration & Urbanization. Stream and wetland compensatory mitigation, dam removal, ecological monitoring, effects of urbanization and restoration on aquatic ecosystems.

Statistics & Coding. Multi-level mixed effects modeling, Bayesian forecasting, multivariate statistics, community analysis, ordination.

Software & Database Development. R package development, SQL and VBA-based database development, Microsoft Access and SQL Server-based database maintenance.

Research Logistics. Design and implementation of multi-year, international and domestic research in both remote and densely-populated regions, small and large-group mentoring and leadership, oversight of simultaneous projects, lab management.

Large River Fieldwork. Initiated, organized, led multi-year studies in large river ecosystems:

- Colorado River Basin: Colorado, Green, San Juan, Little Colorado, & Gunnison Rivers, western US (5th–8th Order, heavily regulated, endangered species), 2013–Pres.
- Rio Chama, NM (5th Order, Wild and Scenic, recreation and water quality), 2020–Pres.
- Bright Angel Creek, AZ (1st–3rd Order, nonnative trout removal), 2016–Pres.
- Danube River Basin: Danube, Sava, & Drava Rivers, central Europe (7th–10th Order, ship traffic, groin fields, industrial forestry & fisheries, confluences), 2010–2011
- Tagliamento River, Italy (1st–7th Order, braided, alpine, un-dammed), 2010–2011
- Elbe River, Germany (8th Order, groin fields, cruise ship traffic), 2011
- Coweeta LTER & Little Tennessee River, NC (1st–6th Order, natural), 2009–2010
- Hudson & Indian Rivers, NY (5th Order, dam flood pulses), 2007
- Timberlake stream/wetland, NC (drought, restoration monitoring), 2007–2012
- Meeting of the Waters & New Hope Creeks, NC (3rd Order, urbanizing), 2008
- Fossil Creek, AZ (karst spring, dam removal), 2003–2007

EDUCATION

PhD Ecology. University of North Carolina at Chapel Hill, 2013

- Thesis: “Stream signatures” and aquatic-terrestrial interactions in arthropod food webs

MS Ecology. University of North Carolina at Chapel Hill, 2010

- Thesis: Ecological heterogeneity in streams: geomorphic and hydrologic influences on macroinvertebrate community structure

BS Biology & Chemistry. Northern Arizona University, 2007

Ecology Emphasis, with Honors, *Summa cum laude*. 4.0 GPA.

- Thesis: Short-term effects of dam decommissioning and flow restoration

RESEARCH & EMPLOYMENT

US Geological Survey, Alaska Cooperative Fisheries and Wildlife Research Unit. Fairbanks, AK. Supervisor: Dr. Jeffrey A. Falke

- Assistant Unit Leader, Fisheries Biologist (GS-12), 4/1/2021–Pres, 40+ hrs/wk.

University of Alaska Fairbanks, Institute of Arctic Biology, Department of Fisheries, and Department of Biology and Wildlife. Fairbanks, AK.

- Assistant Professor, 4/1/2021–Pres (concurrent with AKCFWRU)

US Geological Survey, Grand Canyon Monitoring and Research Center and Southwest Biological Science Center. Flagstaff, AZ. Supervisor: Dr. Theodore A. Kennedy

- Fisheries Biologist (GS-12), 1/1/2021–4/1/2021, 40+ hrs/wk.
- Research Biologist (GS-12), 5/1/2017–1/1/2021, 40+ hrs/wk.
- Postdoctoral Fellow, Research Ecologist (GS-12), 5/1/2013–5/1/2017, 40+ hrs/wk.

University of North Carolina. Chapel Hill, NC. Advisor: Dr. Martin W. Doyle

- University Fellow, 6/1/2007–5/1/2013, 40+ hrs/wk.
- Geography/Ecology TA/RA, 9/1/2008–5/1/2012, 40+ hrs/wk.

Leibniz Institute of Freshwater Ecology & Inland Fisheries (IGB). Berlin, Germany.

Collaborators: Drs. Klement Tockner, Michael T. Monaghan, Martin T. Pusch

- Visiting Fellow, 5/1/2011–9/1/2011, 40+ hrs/wk.
- Tagliamento River research station, 5/1/2010–9/1/2010, 40+ hrs/wk.

Northern Arizona University. Flagstaff, AZ. Advisor: Dr. Jane C. Marks

- Research Associate, Department of Biology, 8/1/2003–5/1/2007, 10-40+ hrs/wk.

Ecological Restoration Institute. Flagstaff, AZ. Director: Dr. Peter Z. Fulé

- Assistant Crew Leader, 5/1/2006–9/1/2006, 60 hrs/wk.
- Research Assistant, 4/1/2004–5/1/2007, 10–60 hrs/wk.

Duke University. Durham, NC. Director: Dr. Christopher B. Newgard

- Chemist/Geneticist Intern, 5/1/2005–9/1/2005, 40+ hrs/wk.

Boy Scouts of America Camp Raymond. Parks, AZ.

- Ropes Course Instructor, 2003, 40 hrs/wk.

Northland Youth Conservation Corps. Flagstaff, AZ.

- Americorps Team Member, 2002, 40 hrs/wk.

SCIENTIFIC PUBLICATIONS

Asterisks () indicate mentored student/technician lead author*

- 24) *Abernethy, E.F., Muehlbauer, J.D., Kennedy, T.A., Tonkin, J.D., Van Driesche, R. & Lytle, D.A. (2021) Hydropeaking intensity and dam proximity limit aquatic invertebrate diversity in the Colorado River Basin. *Ecosphere* 12: e03559. DOI: 10.1002/ecs2.3559
- 23) *Metcalfe, A.N., Muehlbauer, J.D., Kennedy, T.A., Yackulic, C.B., Dibble, K.L. & Marks, J.C. (2021) Net-spinning caddisfly distribution in large regulated rivers. *Freshwater Biology*. 66:89–101. DOI: 10.1111/fwb.13617
- 22) Muehlbauer, J.D., Larsen, S., Jonsson, M. & Emilson, E.J.S. (2020) Variables affecting resource subsidies from streams and rivers to land and their susceptibility to global change stressors. In: *Contaminants and Ecological Subsidies: The Land-Water Interface* (Eds J.M. Kraus, D.M. Walters & M.A. Mills), pp 129–155. Springer, Cham, Switzerland. DOI: 10.1007/978-3-030-49480-3_7
- 21) *Metcalfe, A.N., Kennedy, T.A., Marks, J.C., Smith, A.D. & Muehlbauer, J.D. (2020) Spatial population structure of a widespread aquatic insect in the Colorado River Basin: evidence for a *Hydropsyche oslari* species complex. *Freshwater Science* 39:309–320. DOI: 10.1086/709022

SCIENTIFIC PUBLICATIONS (CONTINUED)

- 20) Muehlbauer, J.D., Lupoli, C.A. & Kraus, J.M. (2019) Aquatic–terrestrial linkages provide novel opportunities for freshwater ecologists to engage stakeholders and inform riparian management. *Freshwater Science* 38:946–952. DOI: 10.1086/70610
- 19) Muehlbauer, J.D., Kennedy, T.A., Copp, A.J. & Sabol, T.A. (2017) Deleterious effects of net clogging on the quantification of stream drift. *Canadian Journal of Fisheries and Aquatic Sciences* 74:1041–1048. DOI: 10.1139/cjfas-2016-0365
- 18) Baxter, C.V., Kennedy, T.A., Miller, S.W., Muehlbauer, J.D. & Smock, L.A. (2017) Macroinvertebrate drift, adult insect emergence and oviposition. In: *Methods in Stream Ecology* (Eds F.R. Hauer & G.A. Lamberti), 3rd edition, Vol. 1, *Ecosystem Structure*, pp 435–456. Academic Press, Boston, MA. DOI: 10.1016/B978-0-12-416558-8.00021-4
- 17) Dzul, M.C., Yackulic, C.B., Korman, J., Yard, M.D. & Muehlbauer, J.D. (2017) Incorporating temporal heterogeneity in environmental conditions into a somatic growth model. *Canadian Journal of Fisheries and Aquatic Sciences* 74: 316–326. DOI: 10.1139/cjfas-2016-0056
- 16) *Metcalfe, A.N., Kennedy, T.A. & Muehlbauer, J.D. (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
- 15) *Smith, J.T., Muehlbauer, J.D. & Kennedy, T.A. (2016) Evaluating potential sources of variation in Chironomidae catch rates on sticky traps. *Marine and Freshwater Research*. 67: 1987–1990. DOI: 10.1071/MF15189
- 14) Kennedy, T.A., Muehlbauer, J.D., Yackulic, C.B., Lytle, D.A., Miller, S.W., Dibble, K.L., Kortenhoeven, E.W., Metcalfe, A.N. & Baxter, C.V. (2016) Flow management for hydropower extirpates aquatic insects, undermining river food webs. *BioScience* 77: 561–575. DOI: 10.1093/biosci/biw059
- 13) Larsen, S., Muehlbauer, J.D. & Martí, E. (2016) Resource subsidies between stream and terrestrial ecosystems under global change. *Global Change Biology* 22: 2489–2504. DOI: 10.1111/gcb.13182
- 12) *Clay, P.A., Muehlbauer, J.D. & Doyle, M.W. (2015) Effect of tributary and braided confluences on aquatic macroinvertebrate communities and geomorphology in an alpine river watershed. *Freshwater Science* 34: 845–856. DOI: 10.1086/682329
- 11) *Smith, J.T., Kennedy, T.A. & Muehlbauer, J.D. (2014) Building a better sticky trap: description of an easy to use trap and pole mount for quantifying the abundance of adult aquatic insects. *Freshwater Science* 33: 972–977. DOI: 10.1086/676998
- 10) *Copp, A., Kennedy, T.A. & Muehlbauer, J.D. (2014) Barcodes are a useful tool for labeling and tracking ecological samples. *Bulletin of the Ecological Society of America* 95: 293–300. DOI: 10.1890/0012-9623-95.3.293
- 9) Muehlbauer, J.D., Collins, S.F., Doyle, M.W. & Tockner, K. (2014) How wide is a stream? The spatial extent of the potential “stream signature” in terrestrial food webs using meta-analysis. *Ecology* 95: 44–55. DOI: 10.1890/12-1628.1
- 8) Wang, H., Zhang, Z., Muehlbauer, J.D., He, Q. & Jiang, D. (2014) Linking stoichiometric homeostasis of microorganisms with soil phosphorous dynamics in wetlands subjected to microcosm warming. *PLoS ONE* 9: e85575. DOI: 10.1371/journal.pone.0085575
- 7) Riggsbee, J.A., Doyle, M.W., Julian, J.P., Manners, R., Muehlbauer, J.D., Sholtes, J. & Small, M.J. (2013) Influence of aquatic and semi-aquatic organisms on channel forms and processes. In: *Treatise on Geomorphology* (Ed J.F. Schroder), Vol. 9, *Fluvial Geomorphology* (Ed E. Wohl), pp 189–202. Academic Press, San Diego, CA. DOI: 10.1016/B978-0-12-374739-6.00237-2

SCIENTIFIC PUBLICATIONS (CONTINUED)

- 6) Muehlbauer, J.D. & Doyle, M.W. (2012) Knickpoint effects on macroinvertebrates, sediment, and discharge in urban and forested streams: Urbanization outweighs micro-scale heterogeneity. *Freshwater Science* 31: 282–295. DOI: 10.1899/11-010.1
- 5) Muehlbauer, J.D., Duncan, J. M. & Doyle, M.W. (2012) Benign use of salt slugs on aquatic macroinvertebrates: Measuring discharge with salt during an aquatic ecology study. *River Research & Applications* 28: 1858–1863. DOI: 10.1002/rra.1546
- 4) Muehlbauer, J.D., Doyle, M.W. & Bernhardt, E.S. (2011) Macroinvertebrate community responses to a dewatering disturbance gradient in a restored stream. *Hydrology and Earth System Sciences* 15: 1771–1783. DOI: 10.5194/hess-15-1771-2011
- 3) Fuller, R.L., Griego, C., Muehlbauer, J.D., Dennison, J. & Doyle M.W. (2010) Response of stream macroinvertebrates in flow refugia and high-scour areas to a series of floods: A reciprocal replacement study. *Journal of the North American Benthological Society (now Freshwater Science)* 29: 750–760. DOI: 10.1899/09-107.1
- 2) Muehlbauer J.D., LeRoy C.J., Lovett J.M., Flaccus K.K., Vlieg J.K. & Marks J.C. (2009) Short-term responses of decomposers to flow restoration in Fossil Creek, Arizona, USA. *Hydrobiologia* 618: 35–45. DOI: 10.1007/s10750-008-9545-3
- 1) Joseph, J.W., Odegaard, M.L., Ronnebaum, S.M., Burgess, S.C., Muehlbauer, J., Sherry, A.D. & Newgard, C.B. (2007) Normal flux through ATP-citrate lyase or fatty acid synthase is not required for glucose-stimulated insulin secretion. *Journal of Biological Chemistry* 282: 31592–31600. DOI: 10.1074/jbc.M706080200

MANUSCRIPTS IN REVIEW

- 25) *Metcalf, A.N., Ford, M.A., Muehlbauer, J.D. & Kennedy, T.A. (In Press) Colorado River Basin. In: *Rivers of North America* (Eds M.D. DeLong & T.D. Jardine), 2nd edition. Academic Press, Boston, MA.
- 26) *Metcalf, A.N., Kennedy, T.A., Mendez, G. & Muehlbauer, J.D. (In Review) Applied citizen science in freshwater research. *For WIREs Water*
- 27) Muehlbauer, J.D., Clay, P.A., Doyle, M.W. & Tockner, K. (In Revision) Landscape controls on stream signatures: the forest edge as the stream boundary for terrestrial food webs. *For Ecological Monographs*
- 28) *Abernethy, E.F., Muehlbauer, J.D., Kennedy, T.A., Dziedzic, K.E., Elder, H., Burke, M.K. & Lytle, D.A. (In Review) Population connectivity of aquatic insects in a dam-regulated, desert river. *For River Research and Applications*

THESES

- 2) Muehlbauer, J.D. (2013) “Stream signatures” and aquatic-terrestrial interactions in arthropod food webs. PhD Thesis, University of North Carolina at Chapel Hill. 279 pp.
- 1) Muehlbauer, J.D. (2010) Ecological heterogeneity in streams: geomorphic and hydrologic influences macroinvertebrate community structure. MS Thesis, University of North Carolina at Chapel Hill. 138 pp.

OUTREACH & CREATIVE WRITING

- 5) *Metcalf, A., Muehlbauer, J., Kennedy, T. & Ford, M. (2020) Bug Flows: don't count your midges until they hatch. *Boatman's Quarterly Review*, Spring 2020: 5 pp.
- 4) *Kortenhoeven, E.W., Muehlbauer, J.D. & Kennedy, T.A. (2016) Hydropower waves, insect eggs and citizen science: what's up with the aquatic food base in Grand Canyon? *Boatman's Quarterly Review*, Fall 2016: 5 pp.
- 3) Muehlbauer, J.D. (2007) Getting all wet at the ERI: a study of how riparian restoration influenced the aquatic ecosystem in Fossil Creek, Arizona. *Ecological Restoration Institute Newsletter*, Spring 2007: 3 pp.
- 2) Muehlbauer, J.D. (2004) Bridges, beer cans, and bulldozers: in search of answers along Abbey's Road. *A Celebration of Ideas*, NAU Honors Publication Fall 2004: 14 pp.
- 1) Muehlbauer, J.D. (2004) Superhumans: Raskolnikov, Meursault, Napoleon, and beyond. *A Celebration of Ideas*, NAU Honors Publication Spring 2004: 10–12.

DATA RELEASES

- 7) Muehlbauer, J.D. & Abernethy, E.F. (2021) Benthic macroinvertebrate tailwater data in the Colorado River Basin, 2013 & 2015. *USGS Data Release*. DOI: 10.5066/P9DM0X8U.
- 6) Ryan, A., Ford, M., Muehlbauer, J., Kennedy, T. & Deemer, B.R. (2020) Carbon, nitrogen, and phosphorus content of adult emergent Diptera before and after a fire-storm sequence in the Colorado River near Shinumo Creek, Grand Canyon, AZ. *USGS Data Release*. DOI: 10.5066/P9ODBTRV
- 5) Muehlbauer, J.D., Metcalfe, A.N., Kennedy, T.A. & Ford, M.A (2019) Insect catch rates and angler success data during Bug Flows at Glen Canyon Dam. *USGS Data Release*. DOI: 10.5066/P9WA8D0G
- 4) Muehlbauer, J.D., Kennedy, T.A., Copp, A.J. & Sabol, T.A. (2017) Stream drift sampling in Arizona, 2014—Data. *USGS Data Release*. DOI: 10.5066/F71J97WD
- 3) *Metcalf, A.N., Kennedy, T.A. & Muehlbauer, J.D. (2016) Angel lichen moth abundance and morphology data, Grand Canyon, AZ, 2012. *USGS Data Release*. DOI: 10.5066/F7154F5S
- 2) Kennedy, T.A. & Muehlbauer, J.D. (2016) Flow management, aquatic insects and river food webs—Data. *USGS Data Release*. DOI: 10.5066/F7WM1BH4
- 1) Muehlbauer, J.D. (2014) How wide is a stream? Spatial extent of the potential "stream signature" in terrestrial food webs using meta-analysis—Data. *Ecological Archives* E095-006.

SOFTWARE & DATABASE DEVELOPMENT

- 6) *GCgage* package for R statistical software (In Prep) Functions for using Colorado River gage data to route discharge, temperature, and turbidity through the Grand Canyon. *Available on GitHub*.
- 5) *Foodbase* SQL Server Database with Microsoft Access front end (2019) SQL/VBA-based database infrastructure for data entry, management, QA/QC, formatting, and export. *Data available on GitHub*.
- 4) *packload* function for R statistical software (2019) Convenience wrapper for loading R libraries. *Available on GitHub*.
- 3) *foodbase* package for R statistical software (2017) Functions for reading and working with Foodbase data. *Available on GitHub*.
- 2) *plots* package for R statistical software (2016) Convenience functions for common plotting operations. *Available on GitHub*.

SOFTWARE & DATABASE DEVELOPMENT (CONTINUED)

- 1) *bugR* package for R statistical software (2016) Functions for common ecological analyses of invertebrate data. Available on *GitHub*.

MEDIA COVERAGE

- 25) *National Public Radio KNAU* (2020) Featured in story about contrasting goals in Colorado River flow experiments <https://www.knau.org/post/colorado-river-bugs-spark-two-unprecedented-experiments-opposite-goals>
- 24) National Socio-Environmental Synthesis Center (2020) Article describing interdisciplinary collaboration <https://www.sesync.org/news/mon-2020-06-08-2149/researchers-share-key-ingredients-for-building-momentum-for>
- 23) *This Week at Interior* (2020) Weekly US Department of the Interior video, highlighting third Bug Flows experiment <https://www.doi.gov/video/this-week-interior-may-8-2020>
- 22) Bureau of Reclamation (2020) Official press release describing third Bug Flows experiment <https://www.usbr.gov/newsroom/newsrelease/detail.cfm?RecordID=70708>
- 21) *Payson Roundup* (2019) Story describing angling study during Bug Flows experiment https://www.paysonroundup.com/news/local/what-is-a-bug-flow-experiment/article_3507528b-b4b3-54d1-8ba4-bebeac43e360.html
- 20) *National Public Radio KNAU* (2019) Featured in story about second Bug Flows experiment <https://www.knau.org/post/bugs-benefit-low-weekend-flows-colorado-river>
- 19) *Associated Press*, picked up by *National Public Radio*, *The New York Times*, *The Washington Post* and others (2019) Story describing results of the Bug Flows experiment <https://www.apnews.com/559d592341b14993af436845c7db4a31>
- 18) *This Week at Interior* (2020) Weekly US Department of the Interior video, highlighting second Bug Flows experiment <https://www.doi.gov/video/this-week-interior-may-17-2019>
- 17) Bureau of Reclamation (2019) Official press release describing second Bug Flows experiment <https://www.usbr.gov/newsroom/newsrelease/detail.cfm?RecordID=65908>
- 16) *Scientific American* (2019) Article about conducting aquatic ecology research in Grand Canyon <https://www.scientificamerican.com/article/re-engineering-the-colorado-river-to-save-the-grand-canyon>
- 15) *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>
- 14) 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/>
- 12) *Science Magazine* (2016) Scientific reinterpretation of the *BioScience* hydropeaking paper. <http://science.sciencemag.org/content/353/6304/1099>
- 11) *Arizona Daily Sun* (2016) Story about *BioScience* hydropeaking paper. http://azdailysun.com/news/local/dam-management-plan-aims-to-boost-native-fish-bugs/article_8f2a949c-03ee-5f96-86b4-eda52fd0ffbf.html
- 10) *National Public Radio KNAU* (2016) Story about *BioScience* hydropeaking paper. <http://knau.org/post/study-hydropower-decimates-aquatic-insects-colorado-river#stream/0>
- 9) *High Country News* (2016) Reinterpretation of *BioScience* hydropeaking paper. <https://www.hcn.org/issues/48.12/new-measures-could-reduce-glen-canyon-dams-impact-on-the-grand-canyon-a-bit>

MEDIA COVERAGE (CONTINUED)

- 8) *Columbia Basin Fish & Wildlife News Bulletin* (2016) Summary of *BioScience* hydropeaking paper. <http://www.cbbulletin.com/436660.aspx>
- 7) American Fisheries Society (2016) Summary of *BioScience* hydropeaking paper. <https://fisheries.org/2016/05/citizen-science-reveals-how-river-food-webs-are-affected-by-hydropower-practices/>
- 6) *Conservation Magazine* (2016) Summary of *BioScience* hydropeaking paper. <http://conservationmagazine.org/2016/05/simple-trick-make-dams-less-damaging-river-ecosystems/>
- 5) USGS (2016) Official press release for *BioScience* hydropeaking paper. <https://www.usgs.gov/news/river-food-webs-threatened-widespread-hydropower-practice>
- 4) Oregon State University (2016) Official press releases for *BioScience* hydropeaking paper. <https://today.oregonstate.edu/archives/2016/may/hydropeaking-river-water-levels-disrupting-insect-survival-river-ecosystems>
- 3) *BioScience* (2016) Editor's choice selection for *BioScience* hydropeaking paper. <http://bioscienceaibs.libsyn.com/hydroelectric-dams-kill-insects-wreak-havoc-with-food-webs>
- 2) *Faculty of 1000* (2004) Write up regarding "Stream Signatures" *Ecology* paper. <https://f1000.com/prime/718343875>
- 1) SFS Podcast "Making Waves" (2004) Interview regarding "Stream Signatures" *Ecology* paper. <https://conference.usu.edu/sfsweb/Education-and-Outreach/Media/Podcast/MW12---Jeffery-Muehlbauer.cfm>

INVITED SEMINARS

- 11) "Bug Flows" in Lees Ferry and Grand Canyon. Trout Unlimited Chapter Meeting, 2020
- 10) "Bug Flows!" USGS Southwest Biological Science Center Brown Bag, 2019
- 9) "Dammed and adrift in the Colorado River Basin." USGS Southwest Biological Science Center All-Hands Meeting, 2017
- 7-8) "Beyond the meter tape: defining ecological boundaries using food web metrics." ASU Polytechnic Global Institute of Sustainability Seminar, 2015; NAU Biology Department Seminar, 2017
- 6) "Food web ecology in the Colorado River in Grand Canyon." NAU Wildlife Society Chapter Meeting, 2015
- 5) "'Stream signatures' and aquatic-terrestrial interactions in arthropod food webs." USGS Southwest Biological Science Center Brown Bag Seminar, 2013
- 4) "'How big is a river? How far do bugs fly? Hold on, you do what?' And other questions preschoolers (and parents) ask." UNC Royster Society of Fellows Interdisciplinary Seminar, 2012
- 3) "Stream signatures: Assessing Hydrologic and geomorphic controls in riverine-floodplain biotic subsidies." IGB Seminar, 2010
- 2) "Water, watersheds & people." UNC special course on water issues, 2010
- 1) "Carbon dioxide" (for 200 children). Chapel Hill/Carrboro City Schools, 2009

CONFERENCE PRESENTATIONS (LEAD AUTHOR)

- 24) Muehlbauer, J.D. & Kennedy, T.A. (2019) Colorado River ecosystem responses to the 2018 Bug Flow experiment from Glen Canyon Dam. SFS.
- 23) Muehlbauer, J.D. & Kennedy, T.A. (2018) Invertebrate drift throughout Colorado River Basin tailwaters. Lower Colorado River Science Symposium.
- 22) Muehlbauer, J.D. (2018) Aquatic invertebrate drift patterns downstream of Colorado River Basin dams. Colorado River Aquatic Biologists Meeting.
- 20) Muehlbauer, J.D., Quigley, T.J. & Kennedy, T.A. (2017) Can we relate terrestrial-aquatic linkages to hydropower flows downstream of a large dam? (Invited talk). SFS.
- 19) Muehlbauer, J.D. & Kennedy, T.A. (2016) Dammed and adrift: patterns of invertebrate drift throughout Colorado River Basin tailwaters. SFS.
- 18) Muehlbauer, J.D., Kennedy, T.A., Kortenhoeven, E.W. & Smith, J.T. (2015) Longitudinal and temporal patterns of food availability for endangered humpback chub, *Gila cypha*, in the Little Colorado River, Arizona. Desert Fishes Council.
- 17) Muehlbauer, J.D., Kennedy, T.A., Kortenhoeven, E.W. & Smith, J.T. (2015) There's more than one way to shade a river: contrasting influence of canyon orientation and water clarity on aquatic invertebrate densities. ESA.
- 16) Muehlbauer, J.D., Kennedy, T.A., Smith, J.T., Sankey, J.B. & Kortenhoeven, E.W. (2014) Advances in emergent insect sampling: new sticky trap designs and automated sample processing. Joint Aquatic Sciences Meeting.
- 15) Muehlbauer, J.D., Kennedy, T.A. & Yackulic, C.B. (2013) Shear stress drives local variation in invertebrate drift in a large river. AGU.
- 14) Muehlbauer, J.D. (2013) How long is "long enough" in ecological restoration monitoring? UNC Curriculum for the Environment & Ecology Student Research Symposium.
- 13) Muehlbauer, J.D., Clay, P. & Doyle, M.W. (2012) Temporal succession and island biogeography in a braided river ecosystem following flash flooding: a bank-side community perspective. SFS.
- 12) Muehlbauer, J.D., Doyle, M.W. & Tockner, K. (2011) Effects of river geomorphology on the spatial importance of aquatic energy flows into terrestrial food webs. AGU.
- 11) Muehlbauer, J.D., Tockner, K. & Doyle, M.W. (2011) "Stream signatures:" aquatic subsidy importance to terrestrial food webs with distance from the stream. NABS.
- 10) Muehlbauer, J.D. & Doyle, M.W. (2010) Does urbanization overcome micro-scale heterogeneity? Knickpoint effects on macroinvertebrates, sediment, and discharge in urban and forested streams. ASLO/NABS.
- 9) Muehlbauer, J.D., Bernhardt, E.S. & Doyle, M.W. (2009) Macroinvertebrate community responses to an experimental drought gradient on the outer coastal plain of North Carolina. NABS.
- 8) Muehlbauer, J.D. & Doyle, M.W. (2008) Knickpoint effects on habitat and the macroinvertebrate community. Stream Restoration in the Southeast Conference.
- 7) Muehlbauer, J.D., *et al.* (2007) Short-term effects of dam decommissioning and flow restoration in Fossil Creek. ESA/SER.
- 6) Muehlbauer, J.D., LeRoy, C.J., Lovett, J.M., Vlieg, J.K., Flaccus, K.K. & Marks, J.C. (2007) Short-term effects of diversion dam decommissioning and flow restoration on decomposition, fungal biomass, and the macroinvertebrate community in Fossil Creek, AZ, USA (Poster). NAU Undergraduate Research and Design Day.
- 3-5) Muehlbauer, J.D., *et al.* (2005) Diversion dam reduces decomposition, fungal biomass and macroinvertebrate abundance and diversity (Poster). AGU/NABS, NAU Undergraduate Research & Design Day; NAU Undergraduate Showcase.

CONFERENCE PRESENTATIONS (LEAD AUTHOR, CONTINUED)

- 2) Muehlbauer, J.D. (2004) Bridges, Beer Cans, and Bulldozers: In Search of Answers along Abbey's Road. NAU Fall Honors Symposium.
- 1) Muehlbauer, J.D. (2004) Superhumans: Raskolnikov, Meursault, Napoleon, and Beyond. NAU Spring Honors Symposium.

CONFERENCE PRESENTATIONS (CO-AUTHOR)

- 35) Deemer, B.R., Yackulic, C.B., Hall, R.O., Dodrill, M.J., Kennedy, T.A., Muehlbauer, J., Topping, D., Voichick, N. & Yard, M. (2021) An experimental flow increases gross primary production up to 400 kilometers downstream in a regulated river. ASLO.
- 34) *Metcalf, A.N., Muehlbauer, J.D., Kennedy, T.A., Yackulic, C.B., Dibble, K.L. & Marks, J.C. (2020) Damming determines caddisfly distribution in a large river basin. ESA.
- 33) *Lupoli, C.A., Kennedy, T.A., Muehlbauer, J.D., Sabo, J.L. & Yackulic, C.B. (2020) Exploring the effects of hydropowering in the Flaming Gorge and Lees Ferry. ESA.
- 32) Boyer, J.K., Rogowski, D.L., Kennedy, T.A. & Muehlbauer, J.D. (2019) Hydropowering limits on aquatic invertebrates in the Grand Canyon affect fish biomass (Poster). AFS.
- 31) Kennedy, T.A., Muehlbauer, J.D. & Rogowski, D.L. (2019) Colorado River ecosystem responses to the 2018 Bug Flow experiment from Glen Canyon Dam. Biennial Conference of Science & Management on the Colorado Plateau.
- 30) *Metcalf, A.N., Kennedy, T.A., Marks, J.C. & Muehlbauer, J.D. (2019) Gene flow among net-spinning caddisfly populations in the Colorado River Basin. Biennial Conference of Science & Management on the Colorado Plateau.
- 29) *Lupoli, C.A., Kennedy, T.A., Muehlbauer, J.D., Sabo, J.L. & Yackulic, C.B. (2019) Hydropower and aquatic-terrestrial linkages in the Colorado River. SFS.
- 28) *Metcalf, A.N., Kennedy, T.A., Marks, J.C. & Muehlbauer, J.D. (2019) Gene flow among net-spinning caddisfly populations in the Colorado River Basin. SFS.
- 27) *Lupoli, C.A., Kennedy, T.A., Muehlbauer, J.D., Sabo, J.L. & Yackulic, C.B. (2018) Does hydropower affect food web connectivity in an arid large-river system? ESA.
- 26) Muehlbauer, J.D. & Kennedy, T.A. (2018) Longitudinal drift recovery patterns downstream of large dams. SFS.
- 25) *Abernethy, E.F., Muehlbauer, J.D., Kennedy, T.A., Van Driesche, R.P. & Lytle, D.A. (2018) Hydropowering dams facilitate ecological dominance. SFS.
- 24) *Lupoli, C.A., Sabo, J.L., Kennedy, T.A., Muehlbauer, J.D. & Yackulic, C.B. (2017) Hydropower and the aquatic-terrestrial dynamic along the Colorado River. Biennial Conference of Science & Management on the Colorado Plateau.
- 23) Deemer, B.R., Yackulic, C.B., Hall, R.O., Kennedy, T.A. Muehlbauer, J.D. (2017) Phosphorous releases from a large dam are a lever on primary production and higher trophic levels up to 120 kilometers downstream. SFS.
- 22) *Metcalf, A.N., Kennedy, T.A., Muehlbauer, J.D. & Marks, J.C. (2017) The Colorado River Basin: aquatic insect diversity and distribution in a fragmented riverscape. SFS.
- 21) *Abernethy, E.F., Kennedy, T.A., Muehlbauer, J.D., Van Driesche, R.P. & Lytle, D.A. (2017) Aquatic invertebrate community structure downstream of hydropowering dams in the Colorado River Basin (Poster). SFS.
- 20) *Daubert, M.E., Muehlbauer, J.D., Kennedy, T.A. & Healy, B.D. (2017) Aquatic invertebrate response to trout removal in Bright Angel Creek, Grand Canyon, AZ (Poster). SFS.
- 19) *Lupoli, C.A., Sabo, J.L., Kennedy, T.A., Muehlbauer, J.D. & Yackulic, C.B. (2017) Terrestrial-aquatic linkages in the Grand Canyon (Poster). SFS.

CONFERENCE PRESENTATIONS (CO-AUTHOR, CONTINUED)

- 18) Kennedy, T.A., Muehlbauer, J.D., Yackulic, C.B., Lytle, D.A., Miller, S.W., Dibble, K.L., Kortenhoeven, E.W. & Metcalfe, A.N. (2016) Flow management for hydropower extirpates aquatic insects, the foundation of river food webs. SFS.
- 17) *Abernethy, E.F., Kennedy, T.A., Muehlbauer, J.D., Van Driesche, R.P. & Lytle, D.A. (2016) Benthic aquatic invertebrate community composition and species abundance downstream of Fontenelle Dam. SFS.
- 16) Evans, M.J., Kennedy, T.A. & Muehlbauer, J.D. (2016) Variability in blackfly, midge, and caddisfly resource utilization downstream of a large dam. SFS.
- 15) *Kortenhoeven, E.W., Muehlbauer, J.D., Kennedy, T.A. & Metcalfe, A.N. (2015) Spatial and temporal patterns of emergent aquatic insects of the San Juan River in Utah, USA from Bluff to Clay Hills. Desert Fishes Council.
- 12–14) Kennedy, T.A., Muehlbauer, J.D., Lytle, D.A., Yackulic, C.B., Kortenhoeven, E.W. & Metcalfe, A.N. (2015) Little bugs, big data, and Grand Canyon: light trapping by river rafters yields insights into Colorado River aquatic insect dynamics. International Society for River Science; Biennial Conference of Science & Management on the Colorado Plateau; Desert Fishes Council.
- 10) Kennedy, T.A., Muehlbauer, J.D., Dodrill, M.J., Copp, A.C. & Yard, M.D. (2015) Big flood, small flood, spring flood, fall flood: how controlled flood timing affects food web response in the Glen Canyon Dam tailwater. SFS.
- 9) Schroer, M., Miller, S., Courtwright, J., Muehlbauer, J. & Kennedy, T. (2015) Oviposition habitat selectivity of tailwater macroinvertebrates: a methodological approach from the Colorado River Basin (Poster). SFS.
- 8) Kennedy, T.A., Muehlbauer, J.D., Yackulic, C.B., Kortenhoeven, E.W. & Metcalfe, A.N. (2014) Flow management is a primary control on insect emergence in the Colorado River in Grand Canyon. Joint Aquatic Sciences Meeting.
- 7) *Smith, J.T., Muehlbauer, J.D. & Kennedy, T.A. (2014) Determining the effects of insect pheromone release on sticky trap catch rates (Poster). Joint Aquatic Sciences Meeting.
- 6) *Copp, A.J., Kennedy, T.A. & Muehlbauer, J.D. (2014) Don't get clogged up: using net filtration efficiencies to inform deployment length in drift studies (Poster). Joint Aquatic Sciences Meeting.
- 5) Kennedy, T.A., Yackulic, C.B., Muehlbauer, J.D., Kortenhoeven, E. W. & Copp, A.J. (2013) High resolution sampling of insect emergence by citizen scientists leads to fundamental insights about the life history of aquatic insects in the Colorado River, Grand Canyon. Biennial Conference of Science & Management on the Colorado Plateau.
- 4) *Smith, J.T., Kennedy, T.A. & Muehlbauer, J.D. (2013) Building a better bug trap: Petri dishes as a low cost and easy to use sticky trap (Poster). Biennial Conference of Science & Management on the Colorado Plateau.
- 3) *Copp, A.J., Kennedy, T.A. & Muehlbauer, J.D. (2013) Learning from retailers: barcoding is a useful tool for labeling and tracking samples in field and lab settings (Poster). Biennial Conference of Science & Management on the Colorado Plateau.
- 2) Seiter, S., Jobe, R.T., Anton, A., Bidgood, E.P., Breckheimer, I., Caplow, S.C., Evans, B., Faestel, M., Muehlbauer, J.D., Palmquist, K., Seymour, S.D., Tessel, S.M., & Moody, A. (2009) The Great Smoky Mountains All-Taxa Biological Inventory: lessons for sampling design, management, and citizen science. ESA.
- 1) Fuller, R., Griego, C., Dennison, J., Muehlbauer, J.D. & Doyle, M.W. (2009) Response of stream macroinvertebrates in flow refugia and high scour areas to a series of floods: A reciprocal replacement study. NABS.

STAKEHOLDER PRESENTATIONS

- 52) Deemer, B.R., Kennedy, T.A., Muehlbauer, J.D. & Yackulic, C.B. (2021). Nutrients, primary production, and the Colorado River foodbase. Glen Canyon Dam Adaptive Management Working Group Meeting.
- 51) Muehlbauer, J.D. & Kennedy, T.A. (2021) Bug Flows 2020. Glen Canyon Dam Adaptive Management Program Annual Reporting Meeting.
- 49–50) Muehlbauer, J.D. & Kennedy, T.A. (2020) Bug Flows update. Glen Canyon Dam Adaptive Management Program Technical Working Group Meeting, Grand Canyon Fish Cooperators Meeting.
- 47–48) Traynham, L.E., VanderKooi, S.P., Kennedy, T.A., Muehlbauer, J.D. & Patno, H.E. (2020) Potential LTEMP experiments spring and summer 2020. Glen Canyon Dam Adaptive Management Working Group Webinar, Leadership Team Webinar.
- 46) Kennedy, T.A. & Muehlbauer, J.D. (2020) Bug Flows monitoring results. Glen Canyon Dam Adaptive Management Working Group Experimental Technical Team Meeting.
- 44–45) Kennedy, T.A. & Muehlbauer, J.D. (2020) Colorado River ecosystem response to the Bug Flow experiment. Glen Canyon Dam Adaptive Management Program Annual Reporting Meeting, Tribal representative consultation meeting.
- 43) Boyer, J.K., Rogowski, D.L., Kennedy, T.A. & Muehlbauer, J.D. (2020) Hydropower limits on aquatic invertebrates in the Grand Canyon affect fish biomass (Poster). Glen Canyon Dam Adaptive Management Program Annual Reporting Meeting.
- 42) *Metcalf, A.N. Muehlbauer, J.D. & Kennedy, T.A. (2020) Aquatic insect diversity and distribution in the Colorado River Basin. Upper Colorado Endangered Fish Recovery Program Meeting.
- 41) *Metcalf, A.N., Muehlbauer, J.D. & Kennedy, T.A. (2020) Gene flow among net-spinning caddisfly populations in the Colorado River Basin (Poster). Upper Colorado Endangered Fish Recovery Program Meeting.
- 40) Muehlbauer, J.D., Daubert, M.E., Kennedy, T.A. & Healy, B.D. (2019) Bug monitoring in Bright Angel Creek. Grand Canyon Fish Cooperators Meeting.
- 39) Kennedy, T.A. & Muehlbauer, J.D. (2019) Little bugs, big data, and adaptive management. Grand Canyon Fish Cooperators Meeting.
- 38) Muehlbauer, J.D. & Kennedy, T.A. (2019) Macroinvertebrate communities in Grand Canyon: prey resources available to support early life history stages of Colorado pikeminnow. Colorado Pikeminnow Workshop.
- 37) Kennedy, T.A., Muehlbauer, J.D. & Dodrill, M. J. (2019) Bug Flows update. Glen Canyon Dam Adaptive Management Program Technical Working Group Meeting.
- 36) Kennedy, T.A. & Muehlbauer, J.D. (2019) Preliminary observations from Bug Flow implementation and resource response. Glen Canyon Dam Adaptive Management Program Technical Working Group Meeting.
- 35) *Metcalf, A.N., Kennedy, T.A. & Muehlbauer, J.D. (2019) Bug Flows update. Colorado River Guides Training Seminar.
- 34) Muehlbauer, J.D., Metcalf, A.N. & Kennedy, T.A. (2019) Citizen science aquatic insect sampling. Colorado River Basin Recovery Meeting.
- 33) Kennedy, T.A. & Muehlbauer, J.D. (2019) Bug Flows implementation and resource response. Glen Canyon Dam Adaptive Management Program Annual Reporting Meeting.
- 32) Kennedy, T.A. & Muehlbauer, J.D. (2019) Big flood, small flood, spring flood, fall flood: HFE timing affects food base response? Glen Canyon Dam Adaptive Management Program Annual Reporting Meeting.

STAKEHOLDER PRESENTATIONS (CONTINUED)

- 31) *Metcalf, A.N., Kennedy, T.A. & Muehlbauer, J.D. (2019) Genetic diversity of a widespread net-spinning caddisfly (despread net-spinning caddisfly (*Hydropsyche oslari*) (Poster). Glen Canyon Dam Adaptive Management Program Annual Reporting Meeting.
- 30) *Lupoli, C.A., Kennedy, T.A., Muehlbauer, J.D., Sabo, J.L. & Yackulic, C.B. (2019) Hydropower and the aquatic-terrestrial dynamic downstream of Glen Canyon Dam (Poster). Glen Canyon Dam Adaptive Management Program Annual Reporting Meeting.
- 28–29) Kennedy, T.A. & Muehlbauer, J.D. (2018) Update on the progress of the bug flow experiment. Glen Canyon Dam Adaptive Management Technical Working Group Meeting, Glen Canyon Dam Adaptive Management Working Group Meeting.
- 27) Kennedy, T.A. & Muehlbauer, J.D. (2018) Discussion of bug flow experiment. Zuni Tribal Council Meeting.
- 26) Kennedy, T.A., Metcalf, A.N. & Muehlbauer, J.D. (2018) Little bugs, big data, and Colorado River adaptive management. Colorado River Guides Training Seminar.
- 25) Grantz, K., VanderKooi, S. & Muehlbauer, J.D. (2018) Possible LTEMP experiment in 2018: macroinvertebrate production flows (bug flows). Glen Canyon Dam Adaptive Management Working Group Experimental Technical Team Meeting.
- 24) Muehlbauer, J.D., Kennedy, T.A., Dodrill, M.J. & Ellsworth, C. (2018) Bug flows optimizations and predictions. Glen Canyon Dam Adaptive Management Program Annual Reporting Meeting.
- 23) *Lupoli, C.A., Kennedy, T.A., Muehlbauer, J.D., Sabo, J.L. & Yackulic, C.B. (2018) Hydropower and the aquatic-terrestrial dynamic downstream of Glen Canyon Dam (Poster). Glen Canyon Dam Adaptive Management Program Annual Reporting Meeting.
- 21–22) *Metcalf, A.N., Kennedy, T.A. & Muehlbauer, J.D. (2018) Shedding light on aquatic insects of the Colorado River Basin with citizen science. Upper Colorado River Endangered Fish Recovery Plan Meeting and Glen Canyon Dam Adaptive Management Program Annual Reporting Meeting.
- 20) Muehlbauer, J.D. (2017) Brown trout in Glen Canyon: insights from an expert elicitation survey. Glen Canyon Dam Adaptive Management Program Annual Reporting Meeting.
- 19) Muehlbauer, J.D. (2017) Fluvial aquatic ecology of the Colorado River. Glen Canyon Dam Adaptive Management Program Annual Reporting Meeting.
- 18) Kennedy, T.A., Dodrill, M.J., Yackulic, C.B. & Muehlbauer, J.D. (2017) Floods, flows, and the aquatic foodbase. Glen Canyon Dam Adaptive Management Program Annual Reporting Meeting.
- 17) *Daubert, M.E., Ingram, A.E., Muehlbauer, J.D. & Kennedy, T.A. (2017) Aquatic invertebrate response to brown trout removal in Bright Angel Creek: study design and preliminary results (Poster). Glen Canyon Dam Adaptive Management Program Annual Reporting Meeting.
- 16) *Lupoli, C.A., Kennedy, T.A., Muehlbauer, J.D. & Yackulic, C.B. (2017) Terrestrial-aquatic linkages in the Grand Canyon (Poster). Glen Canyon Dam Adaptive Management Program Annual Reporting Meeting.
- 15) Deemer, B.R., Yackulic, C.B., Hall, R.O., Kennedy, T.A. & Muehlbauer, J.D. (2017) Lake Powell nutrient dynamics are a lever on food webs near the LCR (Poster). Glen Canyon Dam Adaptive Management Program Annual Reporting Meeting.
- 14) Muehlbauer, J.D. & Bair, L. (2016) Brown trout expert elicitation survey results. Grand Canyon Fish Cooperators Meeting.
- 13) Muehlbauer, J.D., Kortenhoeven, E.K., Kennedy, T.A. & Yackulic, C.B. (2016) Little Colorado River foodbase research: 3 years on. Grand Canyon Fish Cooperators Meeting.

STAKEHOLDER PRESENTATIONS (CONTINUED)

- 12) Muehlbauer, J.D. (2016) Aquatic foodbase of the Little Colorado River. Glen Canyon Dam Adaptive Management Working Group Meeting.
- 11) Muehlbauer, J.D., Kennedy, T.A. & Kortenhoeven, E.W (2016) Food availability in the Little Colorado River over space and time. Glen Canyon Dam Adaptive Management Program Annual Reporting Meeting.
- 10) Kennedy, T.A., Muehlbauer, J.D., Yackulic, C.B., Lytle, D.A. & Miller, S.W. (2016) A life history bottleneck for aquatic insects arising from hydropeaking. Glen Canyon Dam Adaptive Management Program Annual Reporting Meeting.
- 9) Muehlbauer, J.D., Kennedy, T.A. & Kortenhoeven, E.K. (2015) Little Colorado River foodbase update. Grand Canyon Fish Cooperators Meeting.
- 8) Kennedy, T.A., Muehlbauer, J.D., Lytle, D.A. & Yackulic, C.B. (2015) Mainstem foodbase update. Grand Canyon Fish Cooperators Meeting.
- 7) Muehlbauer, J.D., Kennedy, T.A., Kortenhoeven, E.W. & Smith, J.T. (2015) Aquatic insect densities throughout the LCR: preliminary results (Poster). Glen Canyon Dam Adaptive Management Program Annual Reporting Meeting.
- 6) Kennedy, T.A., Dodrill, M.J., Copp, A.J. & Muehlbauer, J.D. (2014) Invertebrate drift in Glen Canyon, 2007-2013. Glen Canyon Dam Adaptive Management Program Annual Reporting Meeting.
- 5) Kennedy, T.A., Muehlbauer, J.D., Dibble, K.L. & Yackulic, C.B. (2014) Dude, where's my foodbase? (Poster) Glen Canyon Dam Adaptive Management Technical Working Group Meeting.
- 4) Kennedy, T.A., Muehlbauer, J.D. & Yackulic, C.B. (2014) Foodweb update. Glen Canyon Dam Adaptive Management Program Annual Reporting Meeting.
- 3) Muehlbauer, J.D., Kennedy, T.A. & Yackulic, C.B. (2014) Shear stress and benthic densities control spatial variation in invertebrate drift concentrations throughout Glen Canyon. Grand Canyon Fish Cooperators Meeting.
- 2) *Smith, J.T., Kennedy, T.A. & Muehlbauer, J.D. (2014) Building a better bug trap: Petri dishes as a low cost and easy to use sticky trap (Poster). Glen Canyon Dam Adaptive Management Program Annual Reporting Meeting.
- 1) *Copp, A.J., Kennedy, T.A. & Muehlbauer, J.D. (2014) Learning from retailers: barcoding is a useful tool for labeling and tracking samples in field and lab settings (Poster). Glen Canyon Dam Adaptive Management Program Annual Reporting Meeting.

GRANTS & RECOGNITIONS

~\$7,000,000 in total grant and fellowship support

Federal Agencies (indicate lead PI or mentored student/technician lead, all others Co-PI)*

- Bureau of Reclamation Glen Canyon Dam Adaptive Management Program 3-year workplan for aquatic foodbase research in Colorado River, 2021–2023 (\$2,175,000)
- Bureau of Reclamation WaterSMART grant for Rio Chama aquatic insect water quality monitoring (with New Mexico Wilderness Alliance), 2020–2021 (\$39,000)
- *Bureau of Reclamation support for aquatic invertebrate monitoring during Bright Angel Creek trout removal, 2019–2021 (\$56,000)
- Bureau of Reclamation Experimental Fund support for additional research and monitoring during Bug Flows experiment, 2018–2021 (\$181,000)
- *NSF-USGS INTERN Program support, 2020
- Bureau of Reclamation Glen Canyon Dam Adaptive Management Program 3-year workplan for aquatic invertebrate ecology, 2018–2020 (\$2,362,000)
- Bureau of Reclamation Glen Canyon Dam Adaptive Management Program 3-year workplan for aquatic foodbase research in Colorado River, 2015–2017 (\$1,148,000)
- *Western Area Power Administration grant for aquatic food web research in Colorado River Basin, 2015–2017 (\$395,000)
- *USGS Pathways Program support for undergraduate interns, 2014–2017 (\$42,000)
- *NSF-USGS Graduate Research Improvement Program support, 2017
- *USGS Southwest Biological Science Center Discretionary Funding, 2013 (\$5,000)

Societies & Organizations

- Association for the Sciences of Limnology & Oceanography Travel Award, 2012 (\$500)
- IGB (Berlin) Fellowship in Freshwater Science, 2011 (~\$6000)
- CUAHSI Hydrology Pathfinder Fellowship, 2010 (\$5000)
- Sigma Xi Grant in Aid of Research (GiAR), 2010 (\$800)
- North American Benthological Society President's Award, 2009 (\$900)
- Binghamton Geomorphology Symposium Student Scholarship, 2009 (\$75)
- Kirk Smith Ecological Restoration Institute Scholarship, 2005 (\$500)
- Exchange Club Chapter and Regional Scholarships for Patriotism, 2003 (\$3,000)
- Canon International Envirothon First Place in Aquatics Section, 2003
- Arizona Envirothon State Champions, 2003
- Eagle Scout (Boy Scouts of America), 2001

GRANTS & RECOGNITIONS (CONTINUED)

University of North Carolina at Chapel Hill

- Royster Society Fellowship, 2007–2012 (~\$200,000)
- Graduate & Professional Student Federation Travel Award, 2009 (\$400)

Northern Arizona University

- Gold Axe Award (most prestigious undergraduate award given at NAU), 2007
- Biology Senior Scholastic Award (outstanding undergraduate research), 2007 (\$250)
- Bayless Biology Scholarship (highest GPA in Biology Department), 2007 (\$250)
- Chemistry Senior Scholar Award (outstanding departmental contribution), 2007 (\$250)
- Provost's Scholarship, 2003–2007 (~\$50,000)
- Robert C. Byrd Arizona Scholarship, 2003–2007 (\$12,000)
- Raymond Scoutmaster Scholarship, 2006 (\$500)

MENTORING

Christina Lupoli. Ph.D. student, Arizona State University, 2016–2021.

- Committee member for project on aquatic-terrestrial linkages on the Colorado River
- Mentor for NSF-USGS INTERN program

Erin Abernethy. Ph.D. student, Oregon State University, 2015–2021.

- Mentor for NSF-USGS Graduate Research Improvement Program (GRIP) Intern

Anya Metcalfe. M.S. NAU, 2015–2018, GS-09 Ecologist 2018–2021.

- GS-09 ecologist specializing in aquatic ecology of large rivers
- Unofficial mentor during MS degree

Morgan Ford. USGS GS-09 Ecologist, 2016–2021.

- Lab manager overseeing day-to-day operations of lab

David Goodenough. B.S. NAU, 2014–2017, USGS GS-07 Ecologist 2014–2020.

- Internship through USGS Pathways Youth and Education in Science Program

Eric Kortenhoeven. USGS GS-07 Ecologist, 2013–2017

- Research technician and mentee in ecological field studies
- Left to pursue M.S. in aquatic ecology, Oregon State University

Josh Smith. USGS GS-09 Ecologist, 2013–2014

- Published research on sticky trap designs and midge behaviors (see above)
- Current GS-09 wildlife refuge specialist with US Fish and Wildlife Service, Burbank, WA

Patrick Clay. B.S. UNC Environmental Science, 2013. Research Assistant, 2009–2013

- UNC SURF Fellowship for international research on Tagliamento River (\$5,000)
- Published research on confluences and braided river hydro-ecology (see above)
- Completed PhD in disease ecology, Rice University

Ben Bogardus. B.S. UNC Environmental Science, 2010. Research Assistant, 2007–2010

- Undergraduate research on channel bathymetry of largest stream restoration in NC
- Completed masters degree in international water development, Villanova University

Daniel Band. B.S. UNC Environmental Science, 2010. Research Assistant, 2007–2010

- Completed masters degree, UNC Department of City & Regional Planning

TEACHING

FISH/BIOL F492P/F692P: Readings in Stream Ecology. UAF, Fairbanks, AK, 1/2022–5/2022.

- Seminar on classic readings in the field; lead instructor

ENST 201: Environment & Society. UNC, Chapel Hill, NC 8/2009–12/2009, 8/2012–12/2012.

- Course on (inter)national environmental issues and policies, ~200 students
- Taught 3 recitation sections of ~20 students each; lectured, graded, led discussions

ENST 698: Cistern Water Quality Capstone Course. UNC, Chapel Hill, NC 1/2011–5/2011

- Provided guidance for 9-student undergraduate team in water quality sampling
- Facilitated data collection, analysis, and reporting as Graduate Research Consultant

GEOG 442: River Processes. UNC, Chapel Hill, NC 8/2010–12/2010

- Graduate/upper undergraduate 20-student class in fluvial geomorphology
- Lectured occasionally, prepared and graded assignments as Teaching Assistant
- GEOG 110: Environmental Systems*. UNC, Chapel Hill, NC 8/2008–12/2008, 1/2011–5/2011
- First-year environmental sciences lecture class for general college, ~150 students
- Lectured occasionally, graded, and held office hours as Teaching Assistant.

ECOL 569: Current Issues in Ecology. UNC, Chapel Hill, NC 1/2009–5/2009

- First-year Ecology graduate core class on researching and publishing a paper
- Led discussions, graded, provided writing assistance as Teaching Assistant

TEACHING (CONTINUED)

HON 399: Beyond the Bachelors. NAU, Flagstaff, AZ 1/2006–5/2007

- Honors class for ~10 students considering graduate school
- Assisted with de novo course creation: Syllabus/scheduling/material development
- Designed, supervised, and maintained online class component as Teaching Assistant

TRAININGS

Socio-Environmental Approaches to Watershed Management and Governance. Socio-Environmental Synthesis Center (SESYNC), Annapolis, MD, 2020

Ecological Forecasting Short Course. Near-Term Ecological Forecasting Initiative, Boston, MA, 2018

CPR/AED. American Red Cross, Flagstaff, AZ 2018

Wilderness First Aid. Wilderness Medical Association, Flagstaff, AZ 2016

Motorboat Operator Certification Course (MOCC). US Department of the Interior, Flagstaff, AZ 2015

Leadership Intensive Training. US Geological Survey, Flagstaff, AZ 2015

ONE Leadership Training. US Department of the Interior, Flagstaff, AZ 2014

Ecosystem Ecology Short Course. Cary Institute of Ecosystem Studies, Millbrook, NY, 2010

PROFESSIONAL SERVICE

Justice, Equity, Diversity, and Inclusion (JEDI) Committees. UAF

- Co-Chair (Dept. Biology & Wildlife) 2021–Pres.; Member (Dept. Fisheries) 2021–Pres.

Constitutional Revision Committee. Society for Freshwater Science

- Chair 2017–2018; Co-Chair 2020–2021.; Member 2014–2016, 2019–2020, 2021–Pres.

Author English Help Volunteer

- Ecological Society of America, 2006–Pres.; Society for Freshwater Science, 2017–Pres.

Graduate Student President. UNC Curriculum for the Environment & Ecology, 2012–2013

Undergraduate Awards Committee. Society for Freshwater Science, 2012–2013

Seminar Committee. UNC Curriculum for the Environment & Ecology

- Chair 2011–2012; Member 2008–2009, 2010–2011

Faculty Search Committee. UNC Curriculum for the Environment & Ecology, 2011–2012

Associate Editor. Aquatic Sciences, 2021–Pres.

Ad-hoc Associate Editor. Ecological Applications, 2017

Peer-Reviewer. (≥1 each)

- *Proposals:* NSF Division of Environmental Biology (DEB), Consortium of Universities for the Advancement of Hydrologic Science (CUAHSI) Pathfinder Grant
- *General ecology:* Ecology, J Applied Ecol, Global Change Biol, Ecol & Evol, Ecosystems, J Biogeography, Restoration Ecol, PeerJ, Oecologia, Ambio, Sci Total Env, Env Entomology, PLoS ONE, Methods in Ecol & Evol, Biol Invasions
- *Aquatic ecology:* Freshwater Sci, Canadian J Fisheries & Aquatic Sci, River Research & Appl, Estuaries and Coasts, Aquatic Sci, Hydrobiologia, J Freshwater Ecol
- *Hydrology & geomorphology:* Water Resources Research, Limnology & Oceanography: Fluids & Env, J American Water Resources Assoc, J Hydrology, Hydrol Processes

SYNERGISTIC ACTIVITIES

"Science Expert." Flagstaff Schools, Trinity Heights United Methodist Church, Chapel Hill/Carrboro City Schools, 2009–Pres.

Internship Mentor. Doris Duke Conservation Scholars Program, 2014

Special Session Organizer and Chair. "Emergent insects as focal taxa for bridging ecological understanding across ecosystems: a synthesis of current knowledge and novel applications". Joint Aquatic Sciences Meeting, 2014.

Virtual Science Fair Mentor. Ravenscroft School, 2011–2013

"Instars" Undergraduate Program Mentor. Society for Freshwater Science, 2012

Aquatic Ecology Consultant. Durham Museum of Life & Science, 2012

"Water Bug Expert." NC Museum of Natural Sciences "BugFest", NC Department of Water Quality, NC State Fair, 2010–2012

Graduate Research Consultant. UNC Cistern Water Quality Capstone, 2011

Envirothon Coach. Sinagua (AZ) High School Envirothon team, 2006–2007

Coordinator. Sierra Club & Sierra Student Coalition (SSC), 2002–2007

Assistant Scoutmaster, Ropes Instructor & Trip Leader. Boy Scouts of America, 2003–2007

Chapter President/VP. NAU Student Affiliates of the American Chemical Society, 2005–2007

Organizer. Society of Environmental Communicators, 2005–2007

Volunteer. The Nature Conservancy, 2002–2005

Affiliated Member.

- Ecological Society of America (ESA), 2005–Pres.
- Society for Freshwater Science (SFS), 2008–Pres.
- Honor Society of Phi Kappa Phi, 2005–Pres.
- American Geophysical Union (AGU), 2007–2016
- Association for the Sciences of Limnology and Oceanography (ASLO), 2009–2016
- Sigma Xi, 2010–2016
- Society for Ecological Restoration International (SER), 2005–2014
- European Geosciences Union (EGU), 2011–2013
- Student Affiliates of the American Chemical Society (SAACS) 2003–2007