

# TARA K. MUENZ

## Assistant Director of Education, Stroud Water Research Center

### EDUCATION

**MASTER OF SCIENCE** - *University of Georgia, Odum School of Ecology – Athens.*

Focus: Conservation Ecology and Sustainable Development

Thesis: Streamside Buffer Effectiveness: Macroinvertebrate and Amphibian Species as Indicators of Stream Health in an Impacted Agricultural System, Southwest Georgia.

**BACHELOR OF ARTS** - *Miami University of Ohio – Oxford.*

Major: Zoology. Minors: Geology, Italian, Chemistry

Undergraduate Research: Effects of Nutrient Fluctuations on Zooplankton Dynamics in Experimental Ponds

### PROFESSIONAL EXPERIENCE

#### **ASSISTANT DIRECTOR OF EDUCATION: OCTOBER 2015-PRESENT**

*Stroud Water Research Center- Avondale, Pennsylvania*

#### **EDUCATION PROGRAM MANAGER: APRIL 2014-SEPTEMBER 2015**

*Stroud Water Research Center-Avondale, Pennsylvania*

#### **STATE COORDINATOR, GEORGIA ADOPT-A-STREAM: JANUARY 2009-APRIL 2014**

*Georgia Department of Natural Resources, Environmental Protection Division Non-Point Source Program  
Atlanta, Georgia*

#### **LEAD RESEARCH TECHNICIAN, AQUATIC BIOLOGY LABORATORY: JUNE 2004-JANUARY 2009**

*Joseph W. Jones Ecological Research Center, Newton, Georgia*

### **INSTRUCTOR FOR WORKSHOPS AND COURSES**

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#### **INSTRUCTOR:**

- 3 workshops to instruct teachers in rock pack network methods and curricula (Montana State University)
- 24 trainings for the Leaf Pack Network International Program (1-2 day trainings)
- 12 (2-day) trainings for New Jersey Department of Environmental Protection's Stream School & Ambassador Trainings for citizen monitors in watershed assessments (physical habitat, aquatic macroinvertebrates, freshwater ecology 101)
- 7 two-day EnviroDIY Stream Sensor workshops across the U.S.
- Pennsylvania State Parks; advanced macroinvertebrate identification and chemistry training.
- Pennsylvania Master Watershed Steward Program Trainings
- Georgia Adopt-A-Stream (AAS) Training workshops in Chemical, Bacterial, Macroinvertebrate, Amphibian and Physical Habitat Monitoring, data management & visualization; 2004-2014; Led over 350 workshops
- Georgia Master Naturalist Trainings: Aquatic ecology (water chemistry, macroinvertebrates, amphibians)
- Georgia State Parks, Naturalist Training in aquatic macroinvertebrates and amphibians
- Project WET and Getting Little Feet WET workshops
- WET, WILD, PLT Triple Facilitator Course: amphibian training
- Environmental Education Research Academy (EERA), teacher training workshop, 2004-2008
- Watershed Awareness, Tifton, Georgia, 2002
- Introduction to Stream Restoration Using Natural Channel Design Techniques, 2003

- Freshwater Mussel Ecology and Identification, 2005-2008

**ASSISTANCE WITH UNIVERSITY, SOCIETY AND NONPROFIT COURSES:**

- Course Topics: bioassessment, Stream monitoring protocols, stream ecology, longleaf pine ecosystem ecology, mussel ecology, the art and ecology of barrier islands
- Stream Ecology classes for the University of Pennsylvania, The Pennsylvania State University, Temple University, West Chester University, Lincoln University, University of Georgia, Millersville University.
- Coordinator for Stroud Water Research Center's CZO National Science Foundation REU/RET program, 2014-2016. In partnership with The Pennsylvania State University.
- Isolated Wetland Ecology and Invertebrate Identification, 2004-2008. Short-course with UGA.

## **PUBLICATIONS & PRESENTATIONS**

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### PEER REVIEWED PUBLICATIONS & TECHNICAL REPORTS

Marcum-Dietrich, Z.Stunkard. Z.Krauss, S. Kerlin, C.Staudt, **T.Muenz**, D.Kline. 2022. Stormy WATERS: COVID-19 transition to online learning for an Environmental Education middle school curriculum. Science Educator. Winter 2021/Spring 2022 Vol. 28, No. 2.

**Muenz, T.K.**, M.J. Wilson, S.Kerlin, M.Louw. 2022. (*in prep*). The volunteer macroinvertebrate identification training environment: a synthesis of approaches, design, best practices and materials used across the United States. To be submitted to the Citizen Science Association Journal: Theory and Practice.

S.Ensign, D.Arscott., S.Hicks, A.Aufdenkampe, **T.Muenz**, J.Jackson. D.Bressler. 2020. A Digital Mayfly Swarm is Emerging. Eos publication of the American Geophysical Union.

W. Tietjen, S. Becker, **T.K. Muenz**, S.W. Golladay. 2017. Observations on the Spider Fauna of geographically isolated wetlands in Southwestern Georgia. Georgia Journal of Science. Vol. 75 No. 2, Article 14.

**Muenz, T.K.**, S.W. Golladay, L.L. Smith, and G.Vellidis. 2008. Diet and Abundance of the Southern Two-lined Salamander (*Eurycea cirrigera*) in an agricultural area, southwest Georgia. Southeastern Naturalist. 7(4): 691-704.

**Muenz, T.K.**, A.Kaeser, B.Bass, and D.Steen. 2008. Predation of the spiny softshell (*Apalone spinifera*). Herpetological Review 39:2.

**Muenz, T.K.**, S.P.Opsahl, S.W. Golladay, D.W. Hicks, B.Clayton, and R.C. Thomas. 2007. Viability of mussel habitat condition and conservation priority areas in the Flint River Basin. in T. Rasmussen (ed), Proceedings of the 2007 Georgia Water Resources Conference. Athens, Georgia.

S.W. Golladay, D.W. Hicks, and **T.K. Muenz**. 2007. Long-term changes in stream flow in the lower Flint River Basin, Southwestern Georgia, associated with water use and climatic variation. in T. Rasmussen (ed), Proceedings of the 2007 Georgia Water Resources Conference. Athens, GA.

**Muenz, T.K.** S. W. Golladay, G. Vellidis, and L. L. Smith. 2006. Journal of Environmental Quality. Stream Buffer Effectiveness in an Agriculturally Influenced Area, Southwestern Georgia: Responses of Water Quality, Macroinvertebrates, and Amphibians. 35:1924-1938.

**Muenz, T.K.**, S.P. Opsahl, S. W. Golladay D. W. Hicks, B.Clayton, K. A. Cressman. 2006. Final Report to the U.S. Fish and Wildlife Service. Assessment of stream habitat in the Flint River Basin.

S.W. Golladay and **T. K Muenz**. Survey and relocation study of unionids in Chickasawhatchee Creek and Elmodel Wildlife Management Areas, Southwest Georgia: Final Report. Georgia Department of Natural Resources, October 2006.

**Muenz, T.K.** S. W. Golladay, L. L. Smith, and G. Vellidis. 2005. Using Adopt-A-Stream in the Coastal Plain: A case study in southwest Georgia. Pp. 819-822, in K. Hatcher (ed), Proceedings of the 2005 Georgia Water Resources Conference. Athens, Georgia.

Chastain, C.A., S.W. Golladay, and **T.K.Muenz**. 2005. Historic and current unionid mussel distribution in tributaries of the lower Flint River, Southwest Georgia. Proceedings of the Georgia Water Resources Conference. Athens, GA.

**Muenz TK** and LL Smith. 2005. County records for: *Pseudotriton ruber* (Red Salamander). Herpetological Review 36:73

**Muenz TK** and LL Smith. 2005. County records for: *Hyla chrysoscelis* (Cope's Gray Tree Frog). Herpetological Review 36:74.

**Muenz TK** and LL Smith. 2005. County records for: *Hyla squirella* (Squirrel Tree frog). Herpetological Review 36:75.

**Muenz TK** and LL Smith. 2005. County records for: *Storeria occipitomaculata* (Red-bellied Snake). Herpetological Review 36:84.

**Muenz, T.K.**, S.W. Golladay, G. Vellidis, and L.L. Smith. 2003. Streamside buffer effectiveness: Macroinvertebrate and amphibian species as indicators of water quality in an impacted agricultural system, Coastal Plain, Georgia. Pp.354-357, vol.1, in K. Hatcher (ed), Proceedings of the 2003 Georgia Water Resources Conference. Athens, GA.

**Muenz, T.K.** and K.M. Andrews. 2002. The recovery of nesting habitat: a proactive approach for conservation of the hawksbill sea turtle, *Eretmochelys imbricata*, Long Island, Antigua, West Indies. Proceedings of the Twenty-third Symposium on Sea Turtle Biology. Miami, FL.

#### EDUCATION & OUTREACH MATERIALS, WEBSITES, SOCIAL MEDIA PAGES

Dyson, D.S., **T.K. Muenz**, E.Reutebuch. [Spring 2014](#). Alabama Water Watch and Georgia Adopt-A-Stream Partner with the U.S. Forest Service to Monitor and Protect Watersheds in the Escambia Experimental Forest. Alabama's Treasured Forest Magazine, Alabama Forestry Commission.

**Muenz, T.K.** 2006. CSA magazine article. Stream health indicators and conservation buffers: amphibians and aquatic invertebrates show potential.

Georgia Adopt-A-Stream [Newsletters](#) (editor and primary author for select articles), January 2009-March 2014.

Stroud Water Research Center 'Upstream' newsletter articles (select) and Annual Report main articles ([2014](#), pgs. 6-9; [2015](#) pgs 6-9).

E-[Newsletters](#) for the Leaf Pack Network, 2015-present (400 + recipients)

Georgia Adopt-A-Stream Monitoring [Manuals](#) (editor; first author on selected manuals)

Leaf Pack Network [website](#) (co-manage; Word Press)

Contributor to V2 of macroinvertebrates.org [website](#)

#### SELECTED PRESENTATIONS

**Muenz, T.K.** (oral). Macroinvertebrates.org: An Open Educational Tool and Training Resource. The 47<sup>th</sup> North American Association for Environmental Education Annual Conference. October 2018. Spokane, WA.

**Muenz, T.K.** (oral). Greening STEM Technologies: DIY Sensor Stations for Stream Monitoring and Education. Pennsylvania Science Teachers Association Annual Conference. October 2018. State College, PA.

**Muenz, T.K.** (oral). Leaf Pack Network presentation, sponsored by the LaMotte Company. National Science Teacher Assoc. Conference. March 2018, Atlanta, GA.

**Muenz, T.K.** and C. Leonard (oral). Merging Science, Students and Streamside Forest Monitoring. Pennsylvania Association of Environmental Educators Annual Conference. March 2018, State College, PA.

**Muenz, T.K.** (oral). Greening STEM Technologies: DIY Sensor Stations for Stream Monitoring and Education. Pennsylvania Association of Environmental Educators Annual Conference. March 2018, State College, PA.

**Muenz, T.K.** and S. Kerlin (oral). Dragonflies, Stoneflies, Mayflies, Oh My! Pennsylvania Association of Environmental Educators Annual Conference. March 2017, McKeever Environmental Center.

**Muenz, T.K.** and M. Wilson (oral). Trainer Survey Results for Macro.org. Learning to See, Seeing to Learn Design Charrette. May 12, 2017. Stroud Water Research Center.

**Muenz, T.K.** (oral). WikiWatershed.org: Stewardship tools for watershed engagement and learning. Pennsylvania Agriculture Association of Teachers Conference. July 2017. W.B.Saul school in Philadelphia.

Kerlin, S. and **Muenz, T.K.** (oral). 2016. Open Source Online GIS to Teach Watershed Modeling. North American Association for Environmental Education Conference, Madison, WI.

**Muenz, T.K.**, (Oral). 2016. Slimy Leaves for Healthy Streams, Training in the Leaf Pack Network. National Science Teacher Assoc. Conference, Nashville, TN.

Marcum-Dietrich, C., Staudt, C., & **Muenz, T.K.** (oral). NSF Teaching Environmental Sustainability-Model My Watershed. Annual National Science Teacher Association Conference, Nashville, TN.

**Muenz, T.K.**, (Poster). 2015. Model My Watershed. American Association for the Advancement of Science, San Jose, CA.

**Muenz, T.K.**, (March 13-15, 2016). (Workshop). Trout Grow on Trees. Pennsylvania Association for Environmental Educators State Conference, Poconos, PA.

**Muenz, T.K.** Amphibian Monitoring with Georgia Adopt-A-Stream. 2012. National Water Quality Monitoring Conference, Portland, Oregon.

**Muenz, T.K.** Evaluating Volunteer Monitoring Program Success (3-hour Workshop). 2012. National Water Quality Monitoring Conference, Portland, Oregon.

Stepenuck, K. B. Deutsch, S. Ruiz-Cordova, **T. Muenz**, A. Hughes, S. Patrick, and E. Conway. September 2011. *How to Be Outstanding in the Stream: Exploring Methods and Approaches for Volunteer Stream Monitoring*. Southern Regional Water Conference. Athens, GA.

**Muenz, T.K.** 2011. Landscaping for sea turtles. 2011 WIDECASST Annual Meeting at the 31<sup>st</sup> International Sea Turtle Symposium. San Diego, CA.

**Muenz, T.K.** and J. Buitrago. 2011. Landscaping for Sea Turtles: Nesting Habitat Designs for the Hawksbill Sea Turtles, *Eretmochelys imbricate* on a Developed Beach, Long Island, Antigua, West Indies. 31<sup>st</sup> International Sea Turtle Symposium. San Diego, CA.

**Muenz, T.K.**, S.W. Golladay, D.W. Hicks, and R.C. Thomas. 2008. Land use and streamflow change in the Lower Flint River Basin Georgia. Environmental Flows Conference. Athens, GA.

**Muenz, T.K.**, S.W. Golladay, D.W. Hicks, and R.C. Thomas. 2008. Streamflow challenges to freshwater mollusks in the

Lower Flint River Basin Georgia: Implications for conservation priority areas. Society for Conservation Biology Meeting. Chattanooga, TN.

**Muenz, T.K.**, S.P. Opsahl, K.A. Cressman, and S.W. Golladay. March 2007. A Regional Assessment of Historical Mussel Habitat Condition in the Flint River Basin, Georgia. Freshwater Mollusk Conservation Society Meeting, Little Rock, AR.

**Muenz, T.K.**, S.P. Opsahl, K.A. Cressman, and S.W. Golladay. 2006. A Regional Assessment of Historical Mussel Habitat Condition in the Flint River Basin, Georgia. North American Benthological Society Meeting, Anchorage, AK.

**Muenz, T.K.**, S.P. Opsahl, K.A. Cressman, and S.W. Golladay. 2006. A Regional Assessment of Historical Mussel Habitat Condition in the Flint River Basin, Georgia. The Lower ACF Conference, Albany, GA.

**Muenz, T.K.** 2005. Adopt-A-Stream and Professional Data: How do They Compare? A look at the Invertebrate Index. Georgia Rivers Network Conference, Milledgeville, GA. Invited speaker.

**Muenz, T.K.** S. W. Golladay, L. L. Smith, and G. Vellidis. 2005. Using Adopt-A-Stream in the Coastal Plain: A case study in southwest Georgia. Georgia Water Resources Conference. Athens, GA

**Muenz, T.K.** and K.M. Andrews. 2005. The reconciliation of hawksbill (*Eretmochelys imbricata*) nesting habitat with vegetation islands on Long Island, Antigua, West Indies. Twenty-fifth Annual Symposium on Sea Turtle Biology. Savannah, Georgia.

**Muenz, T.K.**, S.W. Golladay, G.Vellidis and L.L. Smith. 2003. Streamside buffer effectiveness: Macroinvertebrate and amphibian species as indicators of water quality in an impacted agricultural system, Coastal Plain, Georgia. Georgia Water Resources Conference. Athens, GA.

**Muenz, T.K.**, L.L. Smith, S.W. Golladay, and G.Vellidis. 2003. Amphibians as indicator species for stream recovery: A case study from the Coastal Plain, Georgia. All Florida Herpetology Conference, Gainesville, FL.

**Muenz, T.K.** and K.M. Andrews.2002. The recovery of nesting habitat: A proactive approach for conservation of the hawksbill sea turtle, *Eretmochelys imbricata*, Long Island, Antigua, West Indies. Twenty-third Annual Symposium on Sea Turtle Biology. Miami, FL.

**Muenz, T.K.**, S.W. Golladay, and G.Vellidis. 2002. Stream buffer effectiveness: Macroinvertebrate and salamander species as bioindicators of ecosystem stress, Coastal Plain, Georgia. Ecological Society of America/ Society for Ecological Restoration Conference, Tucson, AZ.

## **AWARDS AND GRANTS**

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Co-PI or lead PI

Pennsylvania Department of Environmental Protection Environmental Education General Grants (2019-present). Several awards (\$20k/year) for projects relating to increasing accessibility to meaningful watershed education for K-12 students.

Pennsylvania Fish and Boat Commission's R3 grants (\$25k/annually, 2019-2022). Providing boating and angling education and recreation to marginalized communities in southeastern Pennsylvania.

National Science Foundation Innovations in Development Sub-award for "Learning to See, Seeing to Learn: A Sociotechnical System Supporting Taxonomic Identification Activities in Volunteer-Based Water Quality Biomonitoring." (\$104,000 for 3 yrs; 2016-2019.); Lead for sub-award as a training expert; manage budget; contribute(d) to design, analysis and manuscript preparation and presentation of macroinvertebrate trainer survey. Participate in team meetings, planning, report writing and other grants tasks. Assisted with the coordination of 2-day design charrette, wire-frame design of website V2, selection of taxa, blog site posting, and creation of education and training materials. Site can be viewed [here](#).

Environmental Protection Agency National Model EE grant 'Greening STEM Technologies: A Model for Advancing Do-It-Yourself (DIY) Environmental Sensing Networks to Support Citizen Science and Primary and Secondary Education.' Co-PI

for project. Manage 14 sub-awardee partnerships and contract agreements, grant outputs and milestones; submitted quarterly, semi-annual, annual and final reports; assisted with workshop design including support materials, presentation content, evaluations and assessments; assisted in writing portions of final manual; led team to implement two 3-day teacher workshops and agenda; scheduled and assisted with the deployment of 11 sensor stations; coordinated and assisted in the instruction of seven 2-3 day trainings for teachers, students and watershed organizations.

Society for Freshwater Science Leaf Pack Sponsorship: Five years of successfully obtaining monies in the amount of \$3,000-\$10,000/year for organizing and leading workshops across the country (Portland, OR; Madison, WI; Sacramento, CA; Raleigh, NC; Detroit, MI; Salt Lake City, UT) for the Society's Education and Outreach Committee. Submit final reports and annual application to SFS Committee; manage budgets and project. For 2019, assisting in the design of SFS Taxonomic Certification for Volunteer Level ID.

Consortium for Scientific Assistance to Watersheds (C-SAW): Submitted and managed grant applications from 2015-2018, totaling \$40,000 in approved funds.

### **Education Lead**

National Science Foundation 'Sediment Stabilization by Animals in Stream Ecosystems: Consequences for Erosion, Ecosystem Processes, and Biodiversity.' Serve as education project lead (for broader impacts) which focuses on the net-spinning caddisfly; developed and conducted 1 pilot training workshop in their monitoring and ID (Rock Pack) in Bozeman, MT. Led the creation of workshop agenda, materials and co-authored presentations with PI. Materials included a manual, lessons/activities, video (in progress), methods instruction and direction for PI research.

Leaf Pack Network: serve as administrator for the international program. In coordination with IT staff delivered e-newsletters to over 400 subscribers; assisted with interim database creation in google forms and participate on committee to develop new database; manage LP Facebook page; update and improve [website](#) as necessary. Answer participant email inquiries; continue video communications with schools; maintain favorable relationship with the LaMotte Co. Present one full-day leaf pack workshops as requested.

Developing a Water Atlas for the ACOSA Region of Costa Rica, Blue Moon Fund: Assisted researchers and managers in the ACOSA region of southwestern Costa Rica to collect and disseminate information on streams and rivers to a variety of community stakeholders. Aspects of the two-year project which I lead included (1) creation of education programs and a watershed-wide volunteer-base monitoring program to teach school students, researchers, and other citizens about stream health and monitoring protocols; (2) and development of an online water [atlas](#) to store, visualize, and share data among government managers and scientists, nongovernmental organizations, and citizens.

Plain Sect (PS) Watershed Education: In partnership with watershed restoration department, lead stream education programs for PS schools, engaging students and their families in streamside forest monitoring; develop Plain Sect curriculum.

Trout Grow on Trees Program: Produced curriculum materials, co-created [website](#) and social media presence, pilot tested a beta version of the new environmental education program in elementary schools and with TU chapters.

National Science Foundation: Introducing Critical Zone Observatory (CZO) Science to Students and Teachers: Engaged college students and teachers in summer research internships studying two observatories: the Christina River Basin and the Susquehanna Shale Hills site. Coordinator and instructor over 3 summers to over 30 undergraduates. [Website](#).

### **Current Projects**

International coordinator for the Plant A Million Project of the Love, Peace, Harmony Foundation, 2018- present

Outreach Coordinator, Restore Our Roots native plant committee, Downingtown, Pennsylvania, 2019-present

## **MEDIA SPOTS**

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WHYY episode ‘Fly, Teachers, Fly’: <https://vimeo.com/299903227/347e6f63c0>

Leaf Pack Network Introduction <https://recordings.join.me/ocTb4WsJGkmfTzW29hy9lw>

NPR/WHYY Philadelphia, public educational interview on the Leaf Pack Network, 2014: <https://whyy.org/segments/citizen-scientist-track-tiny-critters-to-determine-health-of-the-watershed/>

Program Video: As state coordinator for Georgia Adopt-A-Stream, 2014:

<https://www.youtube.com/watch?v=f9C67d5OsmI&feature=share>

NBC 41, Macon, GA: As state coordinator for Georgia Adopt-A-Stream 2013:

<https://www.youtube.com/watch?v=bJGY0BBSseM&feature=youtu.be>

Instructional Video for Georgia Adopt-A-Stream (co-authored/directed): <https://www.youtube.com/watch?v=7POkh86j4oE>

Delaware River Bioblitz (at 1:54 mins): <https://www.youtube.com/watch?v=PFAIkkIRiig>