

Anthony Joseph Timpano

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Research Interests

Interdisciplinary science to understand and mitigate anthropogenic impacts to stream ecosystems. Emphasis on applied ecology of aquatic benthic macroinvertebrate communities, aquatic ecotoxicology, biological monitoring & assessment, and development & implementation of related environmental policy. Research topics to date:

- Resource-extraction effects on water quality
- Salinity and trace-metal effects on aquatic ecosystem structure
- Use of continuous water quality data for improved ecological modeling

Education

M.S.	Environmental Sciences and Engineering	Virginia Tech	2011
B.S.	Environmental Science	Virginia Tech	2002

Scholarships and Fellowships

Doctoral Scholar, Institute for Critical Technology and Applied Science	Virginia Tech	2013 - Present
Global Change Interdisciplinary Fellow	Virginia Tech	2013 - Present

Professional Experience

2011 – 2013 Research Associate Virginia Tech Blacksburg, VA
Served as primary technician on research project funded by U.S. Dept. of Interior Office of Surface Mining, Reclamation, and Enforcement.

- Designed and executed water quality and biological sampling plan to evaluate invertebrate community response to elevated dissolved solids in coal-mining influenced streams.
- Processed water chemistry samples on numerous analytical instruments.
- Conducted taxonomic identification of invertebrates for all biological samples.
- Compiled raw data and conducted all statistical analyses, including developing predictive models relating biological community structure to water quality.

2001 – 2008 Aquatic Biologist Biological Monitoring, Inc. Blacksburg, VA
Consultant to industry and municipalities concerning Clean Water Act compliance.

- Managed aquatic bioassay laboratory
- Conducted laboratory and field-based biological monitoring of water quality
- Conducted benthic macroinvertebrate and fish community assessments
- Served as benthic macroinvertebrate taxonomist
- Sampled and analyzed waters for chemical constituents
- Assisted in preparation of reports to government agencies and clients

Professional Societies

Society for Freshwater Science (formerly North American Benthological Society)

Certifications

Society for Freshwater Science Certified Benthic Macroinvertebrate Taxonomist – Eastern EPT Genera (2011-2015)

Publications

Peer-Reviewed Articles:

Cañedo-Argüelles, M., C. P. Hawkins, B. J. Kefford, R. B. Schäfer, B. J. Dyack, S. Brucet, D. Buchwalter, J. Dunlop, O. Frör, J. Lazorchak, E. Coring, H. R. Fernandez, W. Goodfellow, A. L. González Achem, S. Hatfield-Dodds, B. K. Karimov, P. Mensah, J. R. Olson, C. Piscart, N. Prat, S. Ponsá, C.-J. Schulz, **A. J. Timpano** (2016). Saving freshwater from salts. *Science*, 351(6276), 914-916.

Boehme, E. A., Zipper, C. E., Schoenholtz, S. H., Soucek, D. J., & **Timpano, A. J.** (2016). Temporal dynamics of benthic macroinvertebrate communities and their response to elevated specific conductance in Appalachian coalfield headwater streams. *Ecological Indicators*, 64, 171-180.

Timpano, A.J., S.H. Schoenholtz, D.J. Soucek, C.E. Zipper. 2015. Salinity as a limiting factor for biological condition in mining-influenced Central Appalachian headwater streams. *Journal of the American Water Resources Association (JAWRA)*. 51(1): 240-250. DOI: 10.1111/jawr.12247.

Northington, R.M, E.F. Benfield, S.H. Schoenholtz, **A.J. Timpano**, J.R. Webster, C.E. Zipper. 2011. An assessment of structural attributes and ecosystem function in restored Virginia coalfield streams. *Hydrobiologia*. 671(1):51-63.

Timpano, A.J., S.H. Schoenholtz, D.J. Soucek, C.E. Zipper. 2010. Isolating effects of total dissolved solids on aquatic life in central Appalachian coalfield streams. . p. 1284 -1302, in: *Proceedings, National Meeting of the American Society of Mining and Reclamation*.

M.S. Thesis:

Timpano, A.J. 2011. Levels of Dissolved Solids Associated With Aquatic Life Effects in Headwater Streams of Virginia's Central Appalachian Coalfield Region. M.S. Thesis. Virginia Tech, Blacksburg, Virginia.

Trade and Outreach Publications:

Zipper C.E., S. Schoenholtz, D. Soucek, **A.J. Timpano**, B. Boehme. 2011. Total dissolved solids in Appalachian coalfield streams: Current research approaches. *Virginia Mining Journal* 24(3): 21-26.

Timpano A.J., C.E. Zipper, S. Schoenholtz, D. Soucek. 2011. Comparing total dissolved solids, conductivity, and major ions as potential aquatic life stressors in Appalachian coalfield streams. p. 22-25, in: Reclamation Matters (publication of the American Society of Mining and Reclamation). Spring.

Report to Research Sponsors:

Timpano, A. J., S. Schoenholtz, D. J. Soucek, C. E. Zipper. 2015. Effective monitoring and assessment of total dissolved solids as a biotic stressor in mining-influenced streams. Final Technical Report. Prepared for U.S. Office of Surface Mining. March 31, 2015.

Timpano A.J., S. Schoenholtz, C.E. Zipper, D. Soucek. 2014. Effective monitoring and assessment of total dissolved solids as a biotic stressor in mining-influenced streams - Interim Technical Report. Prepared for U.S. Office of Surface Mining. March 31, 2014.

Timpano A.J., S. Schoenholtz, C.E. Zipper, D. Soucek. 2011. Levels of Dissolved Solids Associated with Aquatic Life Effects in Headwater Streams of Virginia's Central Appalachian Coalfield Region. Final report prepared for Virginia Department of Environmental Quality; Virginia Department of Mines, Minerals, and Energy; and Powell River Project. April 2011. 55p. + App.

Other Articles and Reports:

Zipper C.E., S. Schoenholtz, D. Soucek, **A.J. Timpano**, B. Boehme. 2011. Total dissolved solids in Appalachian coalfield streams: Current research approaches. p. 60-66, in: 2011 Powell River Project Research and Education Program Reports. Powell River Project, Virginia Tech, Blacksburg.

Timpano A.J., S. Schoenholtz, D. Soucek, C.E. Zipper. 2010. Determining water quality criteria for total dissolved solids in streams of southwestern Virginia. p. 71-79 in: 2010 Powell River Project Research and Education Program Reports.

Timpano A.J., S. Schoenholtz, D. Soucek, C.E. Zipper. 2010. Isolating effects of total dissolved solids on aquatic life in central Appalachian coalfield streams. p. 80-93 in: Powell River Project Research and Education Program Reports.

Northington R.M., J. R. Webster, E. F. Benfield, S. H. Schoenholtz, **A.J. Timpano**, D.M. Evans, C.E. Zipper. 2009. A preliminary assessment of ecosystem function in Virginia coalfield streams. p. 95-106 in: 2009 Powell River Project Research and Education Program Reports.

Timpano A.J., S. Schoenholtz, D. Soucek, C.E. Zipper. 2009. Effects of total dissolved solids in streams of southwestern Virginia. p. 82-94 in: 2009 Powell River Project Research and Education Program Reports.

Schoenholtz S., D. Soucek, C.E. Zipper, **A.J. Timpano**. 2008. Effects of total dissolved solids in streams of southwestern Virginia. p. 54-57 in: 2008 Powell River Project Research and Education Program Reports.

Abstracts:

- Timpano, A.J.**, S. Schoenholtz, C. Zipper and D. Soucek. 2012. Linking Temporal Patterns of Dissolved Solids in Central Appalachian Coalfield Streams to Mining Sources. P. 499, In: Proceedings, American Society of Mining and Reclamation Annual Meeting. 11-13 June 2012, Tupelo MS.
- Timpano A.J.**, S. Schoenholtz, D. Soucek, C.E. Zipper. 2011. Levels of dissolved solids associated with aquatic life effects in headwater streams of Virginia's central Appalachian coalfield region. p. 58-59, in: 2011 Powell River Project Research and Education Program Reports.
- Timpano A.J.**, S. Schoenholtz, D. Soucek, C.E. Zipper. 2011. Levels of dissolved solids associated with aquatic life effects in Virginia's central Appalachian coalfield streams. p. 85-86, in: Proceedings, 2011 West Virginia Surface Mine Drainage Task Force Symposium. March 29-30, Morgantown.
- Timpano A.J.**, S. Schoenholtz, C.E. Zipper, D. Soucek. 2010. Determination of dissolved solids limits for aquatic life protection in central Appalachian coalfield streams. Abstract WP121, in: Abstract Book, 31st Annual Meeting, Society for Environmental Toxicology and Chemistry. November 7-11, Portland OR.

Professional Presentations

Invited Presentations

- Timpano, A.J.**, S.H. Schoenholtz, D.J. Soucek, C.E. Zipper. 2014. Using Continuous Conductivity Data to Predict Macroinvertebrate Community Structure in Headwater Streams. Invited Speaker, 2014 Workshop for the Society of Environmental Toxicology and Chemistry Global Advisory Group on Freshwater Salinisation. Witzenhausen, Germany. March 10, 2014.
- Timpano, A.J.**, B. Boehme, D. Drover, S.H. Schoenholtz, D.J. Soucek, C.E. Zipper. 2012. Field-Based Approaches for Evaluating Aquatic Life Effects of Salinization in Central Appalachian Coalfield Streams. Invited speaker, USEPA Region 5 Major Ion Toxicity Workshop. Chicago, Illinois. April 2-4, 2012.
- Timpano, A.J.**, S.H. Schoenholtz, D.J. Soucek, C.E. Zipper. 2011. Levels of dissolved solids associated with aquatic life effects in headwater streams of Virginia's central Appalachian coalfield region. Invited speaker, meeting of the Virginia Coal Mining Interagency Working Group. Abingdon, Virginia. May 2011.
- Timpano, A.J.**, S.H. Schoenholtz, D.J. Soucek, C.E. Zipper. 2011. Levels of dissolved solids associated with aquatic life effects in headwater streams of Virginia's central Appalachian coalfield region. Invited speaker, Virginia Mining Association Engineering Seminar. Abingdon, Virginia.

Contributed Presentations

- Timpano, A. J.**, B. Boehme, D. Drover, S. H. Schoenholtz, D. J. Soucek, K. Whitmore, C. E. Zipper. 2015. Stream ecosystem responses to mining-induced salinization in Appalachia.

Oral presentation at American Society of Mining and Reclamation 2015 Annual Meeting. Lexington, Kentucky. June 10, 2015.

- Timpano, A. J.**, S. H. Schoenholtz, D. J. Soucek, C. E. Zipper. 2015. Accounting for temporal variability of conductivity for effective management of salinity as a freshwater aquatic life stressor. Oral presentation at Society for Freshwater Science 2015 Annual Meeting. Milwaukee, Wisconsin. May 19, 2015.
- Drover D., S.H. Schoenholtz, C.E. Zipper, **A.J. Timpano**, D.J. Soucek. 2014. Detection of invertebrate community change in mine-influenced streams using quantitative sampling. Poster presentation at Joint Aquatic Sciences Meeting 2014. Portland, Oregon. May 18-23, 2014
- Timpano, A.J.**, S. Schoenholtz, D. Soucek, and C. Zipper. 2014. Effects of long-term salinization: a multi-year study of invertebrate community structure in coal mine-influenced streams. Joint Aquatic Sciences Meeting 2014. Portland, Oregon. May 19, 2014.
- Timpano, A.J.**, S. Schoenholtz, D. Soucek, and C. Zipper. 2013. Continuous conductivity data for field-based exposure-response modeling. Oral presentation at Society of Environmental Toxicology and Chemistry 2013 North America Annual Meeting. Nashville, Tennessee. November 18, 2013.
- Timpano, A.J.**, S. Schoenholtz, D. Soucek, and C. Zipper. 2013. Continuous conductivity monitoring for predicting macroinvertebrate community structure in coal mining-influenced streams. Oral presentation at Society for Freshwater Science 2013 Annual Meeting. Jacksonville, Florida. May 22, 2013.
- Timpano, A.J.**, B. Boehme, D. Drover, S. Schoenholtz, C. Zipper and D. Soucek. 2012. Benthic macroinvertebrate response to total dissolved solids in coal mine streams. Oral presentation at Symposium, Environmental Considerations in Energy Production. Appalachian Regional Initiative for Environmental Science. Charleston, West Virginia. April 16, 2013.
- Timpano, A.J.**, B. Boehme, D. Drover, S.H. Schoenholtz, D.J. Soucek, C.E. Zipper. 2012. Overview of Virginia Tech Research: Aquatic Life Effects of Salinization in Central Appalachian Coalfield Streams. Oral presentation at Virginia Department of Mines, Minerals and Energy, Big Stone Gap, Virginia. June 27, 2012.
- Timpano, A.J.**, S.H. Schoenholtz, D.J. Soucek, C.E. Zipper. 2012. Challenges of Linking Temporal Patterns of In-Stream Conductivity to Mining Landuses. American Society of Mining and Reclamation Annual Meeting. Tupelo, Mississippi. June 12, 2012.
- Timpano, A.J.**, S.H. Schoenholtz, D.J. Soucek, C.E. Zipper. 2012. Salinity as a Benthic Macroinvertebrate Community Organizer in Virginia's Central Appalachian Coalfield Streams. Ecological Society of America – Mid-Atlantic Chapter Annual Meeting. Blacksburg, Virginia. April 14, 2012.

Note: Other professional presentations are described by Abstracts.

Research Grants

Contributed to preparation of the following grant proposals, all of which were funded:

Timpano, A. J., S. H. Schoenholtz, C. E. Zipper, D. J. Soucek. Stream Ecosystem Response to Mining-Induced Salinization in Appalachia. A Proposal Submitted to U.S. Office of Surface Mining Reclamation and Enforcement. March 11, 2015. \$200,000.

Schoenholtz S., C.E. Zipper. Effective Monitoring and Assessment of Total Dissolved Solids as a Biotic Stressor in Mining-Influenced Streams: Follow On Extension 1/2013 through 12/2013. \$44,000 from Virginia Department of Mines, Minerals and Energy.

Schoenholtz S., C.E. Zipper. Characterizing Variability of Biological Response to Elevated TDS in Appalachian Coalfield Streams. 5/2011 through 6/2013. \$50,000 from Powell River Project.

Schoenholtz S., C.E. Zipper. Characterizing Variability of Biological Response to Elevated TDS in Appalachian Coalfield Streams. 7/2011 through 6/2012. \$15,000 from Virginia Department of Mines, Minerals and Energy.

Schoenholtz S., C.E. Zipper, W.L. Daniels. Effective Monitoring and Assessment of Total Dissolved Solids as a Biotic Stressor in Mining-Influenced Streams. 1/2011 through 12/2012. \$198,188 from US Office of Surface Mining.

Schoenholtz, S.H., E.F. Benfield, W.L. Daniels, K. McGuire, D. Soucek, A. Timpano, J. Webster, C.E. Zipper. Headwater Stream Water Quality Responses to Mountaintop Removal Mining. 7/2012 through 6/2013. \$32,000 from Institute for Critical Technology and Applied Science, Virginia Tech.

Schoenholtz, S.H. Mechanisms Underlying Biotic Response to Elevated Total Dissolved Solids. 7/2011 through 6/2016. \$441,098 from Appalachian Research Initiative for Environmental Science.

Teaching and Advising

Served as teaching assistant at Virginia Tech for FOR 2214: Introductory Land and Field Measurements. Fall 2014. Graded laboratory assignments, assisted with classroom and field laboratory instruction.

Served as teaching assistant at Virginia Tech for FOR 3724: Forest Boundaries and Roads. Spring 2014. Assisted with grading tests and field laboratory logistics.

Served as teaching assistant at Virginia Tech for FOR 4354/5354G: Forest Soils and Hydrology. Fall 2013. Led a lecture and field laboratory on water quality, graded problem sets, assisted in test preparation.

Served as teaching assistant at Virginia Tech for ENSC 3604: Fundamentals of Environmental Science. Fall 2009. Assisted in preparation and grading of tests, met with students to assist learning.

Assisted in guiding other graduate students working with Drs. Schoenholtz and Zipper by advising research site selection, demonstrating field and laboratory techniques, and providing leadership in project planning and coordination. 2009 – 2016.

Served as supervisor to undergraduate research assistants (16 students 2008 - 2016) by conducting candidate selection, laboratory training, and field work guidance.

Public Outreach

“Passport to Discovery”, a hands-on journey through the world of biological science for children of all ages. SEEDS Nature Center, Blacksburg, Virginia. April 12, 2014. Co-creator and operator of freshwater biological monitoring learning station.