

## James B. Heffernan

Department of Biological Sciences  
University Park, OE 167  
Florida International University  
Miami, FL 33199

Phone: (305) 348-3101  
Fax: (305) 348-1986  
E-mail: [jheffer@fiu.edu](mailto:jheffer@fiu.edu)  
<http://www.fiu.edu/~jheffer/>

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### EDUCATION

Ph.D. Biology, 2007. School of Life Sciences, Arizona State University, Tempe, AZ. Dissertation Title:  
Wetlands as an alternative stable state in desert streams. Advisor: Dr. Stuart Fisher

B.A. Ecology and Evolutionary Biology, 2000. Cornell University, Ithaca, NY

### POSITIONS HELD

Assistant Professor of Wetland Ecosystem Ecology, Department of Biological Sciences and Southeast  
Environmental Research Center, Florida International University, January 2009-present

Post-Doctoral Associate, University of Florida Water Institute and School of Forest Resources and Conservation,  
May 2007-December 2008. Advisor: Dr. Matt Cohen.

Teaching Assistant, Department of Biology, Arizona State University;

Bio 100: The Living World, Fall 2001, Spring 2002

Bio 187: Introduction to Life Sciences, Fall 2005, Spring 2006

Research Assistant, Institute of Ecosystem Studies, Millbrook NY; 2000-2001

### HONORS

ASU Division of Graduate Studies Dissertation Fellowship, 2006-2007

NSF Graduate Research Fellowship, 2002-2005.

University Graduate Scholarship, Arizona State University, 2001-2003

### PUBLICATIONS

Roach, W.J., J.B. Heffernan, N.B. Grimm, R. Arrowsmith, C. Eisinger, and T. Rychener. 2008. Unintended  
consequences of urbanization for aquatic ecosystems: a case study from the Arizona desert. *BioScience*  
58(8):715-727. doi:10.1641/B580808

Heffernan, J.B., R.A. Sponseller, and S.G. Fisher. 2008. Consequences of a biogeomorphic regime shift for the  
hyporheic zone of a Sonoran Desert stream. *Freshwater Biology* 53(9):1954-1968. doi:10.1111/j.1365-  
2427.2008.02019.x

Heffernan, J.B. 2008. Wetlands as an alternative stable state in desert streams. *Ecology* 89(5):1261-1271.

\**Faculty of 1000 Exceptional Paper* (<http://www.f1000biology.com/article/id/1124430/evaluation>)

Fisher, S.G., J.B. Heffernan, R.A. Sponseller, and J.R. Welter (2007). Functional Ecomorphology: Feedbacks  
between Form and Function in Fluvial Landscape Ecosystems. *Geomorphology* 89: 84-96.  
doi:10.1016/j.geomorph.2006.07.013

Grimm, N.B., R.J. Arrowsmith, C. Eisinger, J. Heffernan, D.B. Lewis, A. MacLeod, L. Prashad, W.J. Roach, T.  
Rychener, and R.W. Sheibley (2005). Effects of urbanization on nutrient biogeochemistry of aridland streams.  
In R. DeFries, G. Asner, and R. Houghton (editors). Ecosystem interactions with land use change. American  
Geophysical Union Geophysical Monograph Series

Sabo, J.L., R. Sponseller, M. Dixon, K. Gade, T. Harms, J. Heffernan, A. Jani, G. Katz, C. Soykan, J. Watts, and J.  
Welter (2005). Riparian zones increase regional species diversity by harboring different, not more species.  
*Ecology* 86(1): 56-62.

Heffernan, J.B., and R. A. Sponseller (2004). Re-mobilization and processing of nutrients in Sonoran Desert riparian soils following artificial re-wetting. *Biogeochemistry* 70(1):117-134.

Fisher, S.G., R.A. Sponseller, and J.B. Heffernan (2004). Horizons in stream biogeochemistry: Flowpaths to progress. *Ecology* 85(9): 2369-2379.

Stelzer, R.S., J. Heffernan and G.E. Likens (2003). The influence of dissolved nutrients and particulate organic matter quality on microbial respiration and biomass in a forest stream. *Freshwater Biology* 48 (11): 1925-1937.

### **Manuscripts in Review**

Heffernan, J.B., D.M. Liebowitz, T.K. Frazer, J.M. Evans, and M.J. Cohen. *In revision*. Algal blooms and adaptive management in Florida springs: alternatives to the nitrogen enrichment hypothesis. *Ecological Applications*.

### **Manuscripts in Preparation**

Heffernan, J.B., M.J. Cohen, T.K. Frazer, R.G. Thomas, T.J. Rayfield, J. Gulley, J.B. Martin, J.J. Delfino, and W.D. Graham. *In prep*. Nitrogen dynamics in a spring-fed Florida river.

Heffernan, J.B. and S.G. Fisher. *In Prep*. Plant-nitrogen interactions during wetland establishment in a Sonoran desert stream.

Watts, D.L., M.J. Cohen, J.B. Heffernan, T. Osborne, and M.W. Clark. *In Prep*. Hydrologic modification and the loss of self-organized patterning in the Everglades ridge-slough mosaic.

Rayfield T.J., R.G. Thomas, J. Gulley, J. J. Delfino, J.B. Martin M.J. Cohen, and J.B. Heffernan. *In Prep*. High-frequency in-situ nitrate measurements using commercial sensors based on flow-injection analysis and ultraviolet spectroscopy technology.

Heffernan, J.B., and M.J. Cohen. *In prep*. Direct and indirect coupling of productivity and diel NO<sub>3</sub> dynamics in a spring-fed river.

### **AWARDS**

#### **Current**

Hyporheic Nitrogen Metabolism of Spring Run and Blackwater Rivers. St. John's River Water Management District. \$240,000 (1/1/09-9/31/10). PI: MJ Cohen (University of Florida). Subcontract (\$84,200/2yrs) to JBH at FIU.

Collaborative Research: Controls on Delivery and Fate of Water, Nitrogen and Calcium in a Spring-Fed Karst River. 2009-2012. National Science Foundation. PI: Wendy Graham, University of Florida. Co-PI with 4 others. \$410,000 (3/1/09-2/29/12). \$81,783 to JBH at FIU.

#### **Pending**

Conditional metrics and ecosystem services in isolated wetlands of the Southeast Coastal Plain. US Environmental Protection Agency. \$474,000 (9/1/09-8/31/12), MJ Cohen PI, co-PIs: MT Brown, JB Heffernan. Subcontract (\$173,469/3yrs) to JBH at FIU.

The Monitoring and Assessment Plan (MAP) Greater Everglades Wetlands Module- LandscapePattern- Ridge, Slough, and Tree Island Mosaics. South Florida Water Management District. \$893,000 (4/1/09-9/30/12), JB Heffernan (PI), M Ross, J Sah, L Scinto.

#### **Completed**

NSF Doctoral Dissertation Improvement Grant: "Temporal Dynamics of Alternative Stable States in a Desert Stream." \$11,300. June 2005-May 2007

ASU Graduate and Professional Students Association Research Grant: "Reciprocal Interactions Between Plant Establishment and Nitrogen Availability in a Sonoran Desert Stream." \$1661. Oct 2004-June 2005

#### **SERVICE AND SYNERGISTIC ACTIVITIES**

Collaborator, Florida Coastal Everglades Long-Term Ecological Research site (FCE-LTER).

Cross-site working group: Integrated socio-ecology of lawns and residential landscapes

EcoTrends working group: States changes and regime shifts

Reviewer for: *Ecological Applications*, *Freshwater Biology*, *Geoderma*, *Journal of Arid Environments*, *JGR-Biogeosciences*, *Journal of the North American Benthological Society*

Member: Ecological Society of America, American Society of Limnology and Oceanography, North American Benthological Society

Organizer, Special Session on Nutrients and Hyporheic Processes, Consortium of Universities for the Advancement of Hydrologic Science (CUAHSI), Biennial Science Meeting, July 14<sup>th</sup>-16<sup>th</sup>, 2008, Boulder, CO

#### **INVITED SEMINARS**

Nitrogen dynamics in Florida springs from hours to decades. Marine Biology Program, Florida International University. February 27<sup>th</sup>, 2009.

Wetlands as an alternative stable state in desert streams. Department of Biological Sciences, Florida International University. February 19<sup>th</sup>, 2008.

Wetlands as an alternative stable state in desert streams. Department of Fisheries and Wildlife, Michigan State University. January 17<sup>th</sup>, 2008.

Effects and fates of rising nitrogen loads to Florida springs. Department of Fisheries and Aquatic Sciences, University of Florida. November 9<sup>th</sup>, 2007.

Wetlands as an alternative stable state in desert streams. Center for Wetlands, University of Florida. October 3<sup>rd</sup>, 2007.

#### **CONTRIBUTED ORAL PRESENTATIONS (FIRST AUTHOR ONLY)**

Heffernan, J.B., M.J. Cohen, T.K. Frazer, R.G. Thomas, T.J. Rayfield, J. Gulley, J.B. Martin, J.J. Delfino, and W.D. Graham. 2009. Nitrogen dynamics in a spring-fed river. American Society of Limnology and Oceanography, Nice, France.

Heffernan, J.B., M.J. Cohen, and T.K. Frazer. 2008. Nitrogen dynamics in Florida springs. North American Benthological Society, Salt Lake City, UT.

Heffernan, J.B. , M.J. Cohen, T.K. Frazer, J.M. Evans, and D.M. Liebowitz. 2008. Re-evaluating the role of nitrate enrichment in Florida Springs. University of Florida Water Institute Symposium, Gainesville, FL.

Heffernan, J.B. and S.G. Fisher, 2007. Wetlands as an alternate state in desert streams. American Society of Limnology and Oceanography, Santa Fe, NM.

Heffernan, J.B. and S.G. Fisher, 2006. Wetlands as an alternate state in desert streams. Ecological Society of America, Memphis, TN.

Heffernan, J.B., R.A. Sponseller, and S.G. Fisher, 2006. Effects of herbaceous vegetation on the hyporheic zone of a desert stream. North American Benthological Society, Anchorage, AK.

Heffernan, J.B., R.A. Sponseller, and S.G. Fisher, 2004. Vegetation establishment in a Sonoran Desert stream: Implications for N dynamics. Ecological Society of America, Portland, OR.

Heffernan, J.B., R.A. Sponseller, and S.G. Fisher, 2003. Re-mobilization and processing of nutrients in Sonoran Desert riparian soils following artificial re-wetting. North American Benthological Society, Athens, GA.

#### **CONTRIBUTED POSTERS**

Heffernan, J.B., M.J. Cohen, J. Martin, T. Rayfield, R. Thomas, J. Delfino, and W. Graham. 2008. Solute delivery and processing in a spring-fed river. Consortium of Universities for the Advancement of Hydrologic Science, Biennial Meeting, July 14-16<sup>th</sup>, Boulder, CO.

Watts, D.L., M.J. Cohen, J.B. Heffernan, T.Z. Osborne, and M.W. Clark. 2008. Soil elevation as an indicator of Everglades ridge and slough alternative stable states. University of Florida Water Institute Symposium, Gainesville, FL.

Liebowitz, D.M., M.J. Cohen, J.B. Heffernan, and T.K. Frazer. 2008. Exploring Alternative Controls of Algal Proliferation in Florida's Springs. Southeastern Environmental Flows Conference, October 27-29<sup>th</sup>, Athens, GA.

#### **PUBLIC OUTREACH**

Research in the Santa Fe River Hydrologic Observatory: Where does all the nitrate go? October 5<sup>th</sup>, 2007. Ichetucknee Springs Basin Working Group meeting, Lake City, FL.

#### **GUEST LECTURES AND OTHER PRESENTATIONS**

Geomorphology Seminar (ASU GPH 591; Instructor: Dr. Mark Schmeekle). Wetlands as an alternative stable state in desert streams. April 15<sup>th</sup>, 2007.

Geomorphology (ASU GEO 592; Instructor: Dr. J. R. Arrowsmith). Interactions between ecological and geomorphic processes. November 15<sup>th</sup>, 2006.

Ecosystems (ASU MBIO 521; Instructor: Dr. S.G. Fisher). Wetlands as an alternative stable state in desert streams. December 5<sup>th</sup>, 2005.