

# Field Testing the Educational and Land Use Planning Value of a New Nitrogen Modeling Tool in the Niantic River Watershed

## Basic Information

<b>Title:</b>	Field Testing the Educational and Land Use Planning Value of a New Nitrogen Modeling Tool in the Niantic River Watershed
<b>Project Number:</b>	2012CT256B
<b>Start Date:</b>	3/1/2012
<b>End Date:</b>	2/28/2014
<b>Funding Source:</b>	104B
<b>Congressional District:</b>	2
<b>Research Category:</b>	Not Applicable
<b>Focus Category:</b>	Nitrate Contamination, Models, Education
<b>Descriptors:</b>	
<b>Principal Investigators:</b>	Juliana Barrett, Chester Arnold, Emily Wilson

## Publication

1. Arnold, C. D.Q. Kellogg, K. Forshay, C. Damon, E. H. Wilson, A. Gold, E.A. Wentz, and M.M. Shimizu. 2013. Tracking the fate of watershed nitrogen: the “N-Sink” web tool and two case studies. Final Technical Report submitted to the EPA Office of Research and Development. 39pp.

**State:** CT

**Project Number:** 2012CT256B

**Title:** Field Testing the Educational and Land Use Planning Value of a New Nitrogen Modeling Tool in the Niantic River Watershed

**Project Type:** Information Transfer

**Focus Category:** Nitrate Contamination, Models, Education

**Keywords:** nitrogen source/sink

**Start Date:** 3/1/2012

**End Date:** 2/28/2014

**Congressional District:** 2

**PI:** Barrett, Juliana  
email: juliana.barrett@uconn.edu

**Co-PI(s):**  
Arnold, Chester  
email: chet.arnold@uconn.edu

Wilson, Emily  
email: emily.wilson@uconn.edu

**Introduction/Research Objective:**

We propose to deploy and test a relatively easy to use desktop GIS model that estimates N sources and sinks in a watershed, and that can estimate N delivery from a particular location in the watershed to the outlet. This will be a valuable tool for local land use decision makers and communities wishing to reduce N pollution to their waters. There are two principal objectives of this project. Our first objective is to provide useful and actionable information to the four towns in the Niantic River watershed on existing and future N source and sink areas, coupled with planning, development and conservation strategies to minimize N export from the former and maximize N processing by the latter.

Our second objective is to use this as a pilot project to test the efficacy of the maps and data created by the N-Sink model. CLEAR's *Nonpoint Education for Municipal Officials* (NEMO) program has a long and successful history of taking geospatial environmental information and folding it into educational programs and products that assist local land use decision makers. The role of UConn CLEAR/NEMO in the development of N-Sink is to review and critique the tool, both with respect to its technical GIS functionality and the projected usefulness of the information it produces.

Our team's feeling is that N-Sink will prove to be a very useful tool at the local level. However, what is truly needed is a pilot project to test this assumption, and to see what improvements can be made both to model outputs and to the educational programs that use them, based on our own observations and feedback from our municipal clientele. Our expectation is that the proposed project will serve to fine-tune and improve the educational and planning value of the N-Sink model, which will then be ready to be expanded in its geographic scope.

**Methods/Procedures/Progress:**

The N-Sink prototype model was transformed from an ArcMap desktop tool to a web-based tool using ArcGIS Viewer for Flex. The tool highlights N sources and sinks within a watershed, and allows non-technical users to estimate relative N removal efficiencies from any chosen point within the project area's coastal HUC-12 watersheds (the Niantic River watershed in southeastern Connecticut and the Saugatucket River watershed in southern Rhode Island on the west side of Narragansett Bay).

**Presentations at any conferences or workshops related to research project.**

- 1) Webinar for EPA June 27, 2013 by Chet Arnold and Dorothy "Q" Kellogg
  
- 2) Workshop on N-Sink for the Niantic River Watershed Nitrogen Workgroup October 28, 2013. This workgroup consists of technical and scientific representatives from federal, state, academic, and NGO's (including The Nature Conservancy, Millstone Nuclear Power Plant, Connecticut Eastern Conservation District and private consulting firms). The group meets regularly to discuss monitoring challenges and knowledge gaps pertaining to managing nitrogen in the Niantic system. The Niantic River watershed is on the state's impaired waters list, due in part, to nitrogen pollution. The presentation looked at nitrogen reduction/delivery from several sites within the watershed. The examples were placed near each other so as to explore nitrogen delivery estimates based on small but important changes in the flow path. The post presentation discussion was very helpful to furthering the use of N-Sink as a tool. There is a great deal of workgroup interest in N-Sink. Numerous offers were made to share nitrogen data collected within the watershed that could be used to test N-Sink. Also, discussed was how the tool could best be used by practitioners, and who is the best audience for the tool. This information, as well as input from other groups, will be used by the N-Sink team to optimize the user interface for easy navigation and comprehension.
  
- 3) Presentation, National Land Grant/Sea Grant Water Conference, Portland, OR, April 22, 2012 by Q Kellogg and Chet Arnold

**Tool Access.**

The N-Sink web tool is published through a UConn CLEAR website:

<http://clear.uconn.edu/projects/nsink/>

In addition, the University of Rhode Island has a website for N-Sink which includes a demo of the N-Sink tool and a draft guidance document:

[http://www.uri.edu/cels/nrs/whl/Research/n\\_mgmt/](http://www.uri.edu/cels/nrs/whl/Research/n_mgmt/)

**Future Work on N-Sink:**

Christine Kirchhoff and J. Barrett have submitted a CT IWR proposal to further work on the N-Sink tool (FY 2014-15) Title: Evaluating and enhancing communities' willingness to adopt N-Sink as a community based pollution mitigation decision tool

A meeting was held at University of Rhode Island on November 13, 2013 to discuss funding, outreach and next steps related to N-Sink. EPA, USDA's Natural Resources Conservation Service (NRCS), The Nature Conservancy and RI Coastal Resources Management Council are very interested in furthering the uses of this tool.

Chet Arnold and Q. Kellogg are submitting a proposal to EPA Office of Research and Development to continue the testing of N-Sink and determine its geographic extensibility.