

# UPDATE FROM THE CENTER FOR THE ENVIRONMENT

Addressing the science, policies, culture and economics of the natural environment in northern New England through collaborative research and education

Plymouth State University

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## Research

### **PSU Joins in Road Salt Study: State, PSU Research Chloride Reduction**

Plymouth State University researchers Steve Kahl and Dari Sassan have received a \$40,000 grant from the N.H. Department of Environmental Services to study protection of waterways by reducing use of road salt. The grant is part of a DES water quality study in advance of the widening of I-93 south of Concord. Sassan, a graduate student at the Center for the Environment, will use the data for his master's thesis in environmental science and policy. The project will evaluate sources of salt in five southern New Hampshire towns to assess how to decrease the amount of chloride in streams to meet water quality criteria.



Road salt (sodium chloride) is increasingly being recognized as a contaminant in New England surface waters because of land development, more roads and the need for de-icing these roads. Chloride is often linked to a general decrease in water quality: nutrients such as nitrogen and phosphorus increase in lakes leading to algal blooms and increased occurrence of invasive plant species. Recent publications, including those by researchers at PSU, have documented increases in chloride of as much as 400 percent in New England lakes in the past 20 years. Some lake water supplies in central New Hampshire have recently recorded 50 percent increases in sodium chloride. Some New Hampshire streams are regularly in violation of the aquatic life toxicity limit of 230 parts per millions of chloride.

CFE Director Steve Kahl is a veteran researcher in water quality studies, including studies on the fate and transport of road salt in water-sheds. He has conducted a variety of projects on lake water chemistry, acid rain and mercury. While Kahl doesn't downplay the difficulty of reducing salt loading, he believes the I-93 corridor salt project is a "win-win situation" for both DES and PSU.

"This is an example of how PSU as a regional university is enhancing its expertise to serve New Hampshire in a cost-effective manner, by integrating

regional service into its new graduate programs," said Kahl. "We want these PSU programs to raise the educational aspirations and training of citizens, especially in the northern part of the state and to provide increased economic opportunities."

Dari Sassan, a New Hampshire native, cites his primary career objective as preserving the character of northern New Hampshire in a way that creates economic and environmental sustainability. "In creating the Center for the Environment, PSU has responded to the regional need for professionals trained to deal with the new challenges that a rapidly changing landscape poses," Sassan said. "Through this and other projects the Center for the Environment has taken on, CFE graduate students are gaining valuable, real world knowledge that will allow them to hit the ground running as they enter the workforce."

## Outreach

### **Exhibit Evaluation**

Brian Eisenhauer, associate director of the CFE, and a team of undergraduate students are collaborating with the Squam Lakes Science Center on two service learning projects in the 2006–2007 academic year.

The first is a research-driven evaluation of visitors' perceptions of the River Otter exhibit at the Science Center. The findings will be used in the redesign of the exhibit and to enhance the educational messages it delivers. The second project analyzes traffic flow patterns at the Science Center and how they affect visitors' on-site experiences and learning. Results will help the Science Center design aids to improve the educational outcomes of self-directed tours of their exhibits.

### **Environmental Planning Workshop**

The CFE recently partnered with the North Country Council on applied training in environmental planning for local officials in North Country communities. The project is part of NCC's Community Outreach Program. A two-part workshop was held on October 12 and 26, 2006 at NCC. Presenters were Stacey Doll and Christine Walker (NCC), and June Hammond Rowan (CFE) and Steve Whitman (Jeff Taylor & Associates and Plymouth State University).

The workshop focused on applied techniques and local environmental topics, and included practical, hands-on

training for working with applications for development. Twenty representatives from planning boards and conservation commissions of 10 North Country towns participated in the workshop.

Participants' comments included: "I learned several new ideas that I plan to discuss in my town."; "We will take this information and use it to better our town."; and "The workshop was very informative. Keep them coming!!!"

Additional workshops may be scheduled to meet the demand.

## Education

### **Field Courses**

Field courses are an integral part of the MS in *Environmental Science and Policy*. The Center for the Environment has developed several new courses designed to teach skills for field work and research. Field Methods in Water Resources, taught by hydrologist Kevin McGuire, addresses methods of hydrologic and climatic field measurements, such as measuring water flow rates, soil moisture and ground water, which are useful in watershed management, hydrology, and water resources. This winter, McGuire will be teaching Snow Hydrology, covering the role of snow in the hydrologic cycle. This course will be held at the Hubbard Brook Research Forest and is offered in partnership with the Hubbard Brook Research Foundation.

This past summer Rick Van de Poll taught a course in methods of sampling



vegetation. This and a companion course in wildlife research methods are useful

for developing natural resource inventories.

In addition, the CFE has developed an agreement with the Humboldt Field Research Institute in Maine allowing Plymouth State University students to take summer courses at Humboldt for graduate credit. Humboldt offers a wide range of field courses, expanding options for students.

More information about these and other projects is available at [www.plymouth.edu/cfe](http://www.plymouth.edu/cfe).

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## Regional Water Quality Laboratory

The Center for the Environment is developing a new water quality laboratory. In 2007, this lab will serve as a satellite regional lake water quality laboratory in partnership with the N.H. Department of Environmental Services. The lab will be a more convenient site for testing samples for the state's lake and river monitoring programs in the Lakes Region and northern New Hampshire, and will also serve the CFE's research needs.

Space for the lab in Boyd Science Center at PSU was designated in the fall of 2005. Equipment purchases and setup are underway. The lab is already performing a wide range of water analyses. Facilities include a laboratory space of about 1000 sq. ft., and a common high bay/field staging area. Equipment in the lab allows CFE researchers to perform analyses on turbidity, apparent color, closed cell pH, equilibrated pH, acid neutralizing capacity, total phosphorus, fluoride, chloride, bromide, nitrate, nitrite, phosphate, sodium, potassium, calcium, magnesium, sulfate, ammonium, conductivity, filtering, total suspended solids, aluminum, dissolved oxygen, and rhodamine-WT. All samples for research analyzed in this facility follow guidelines established by the Environmental Protection Agency and/or NHDES.

Currently six students (graduate and undergraduate) are working in the lab, running a variety of analyses and giving them practical experience. Over two hundred samples have been processed since May 2006.

**Yes, I'd like to help!**  Please send me more information about the Center and its programs.  
 I may be interested in a tax-deductible donation of a vehicle to support research in the Center.

My interests are:

N.H. forests     N.H. lakes     N.H. rivers     N.H. mountains  
 drinking water     land development     toxics in the environment     Other (please specify)

My primary geographic interest is in the following region:  Lakes Region     White Mountains     Other (please specify)

Name: \_\_\_\_\_ E-mail Address: \_\_\_\_\_

Address: \_\_\_\_\_ Phone: \_\_\_\_\_

*If you would prefer to receive this newsletter electronically in the future, please let us know at [jhammondrowan@plymouth.edu](mailto:jhammondrowan@plymouth.edu).*

### ***Talks, Presentations and Conferences***

In July 2006, **Brian Eisenhauer**, CFE associate director, presented the keynote address at the Newfound Lake Region Association Annual Meeting. His talk, "**Threats and Solutions to Lake Quality: A Watershed Perspective and Potential Partnerships**," focused on threats to water quality in lakes in the region, the CFE's activities throughout the region to address those concerns, and the utility of a watershed perspective and social science data in citizen driven efforts to protect water quality. Eisenhauer also presented a workshop at the **N.H. Planners Association Annual Meeting** in October on "Citizen Survey Techniques for Planners." A key element of local, regional and state land use planning is assessing the needs, attitudes, values and perceptions of a community or region. The workshop focused on survey design and delivery. **June Hammond Rowan**, outreach

and development coordinator, and **Steve Whitman**, Jeff Taylor and Associates and PSU, assisted with the preparation of the presentation.

**June Hammond Rowan** presented a talk on unique initiatives at PSU and in the Plymouth area addressing energy conservation and renewable energy at the annual meeting of the Northern New England Chapter of the American Planners Association, Sept. 21–22. She gave a similar invited talk at the N.H. Office of Energy and Planning's Fall Planning and Zoning Conference, Oct. 28.

**Steve Kahl**, director of the CFE, was invited to give the closing remarks at the Maine Mountain Conference at Saddleback Mountain in Rangeley, Maine, on Oct. 21. He also presented "**Acid Rain and high elevation lakes: the acid rain in Maine does not fall entirely on the plain.**"

*For more information visit [www.plymouth.edu/cfe](http://www.plymouth.edu/cfe).*



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