

# ENVIRONMENTAL CHANGE IN Northeastern North America

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During last year's annual conference of the New England – Saint Lawrence Valley Geographical Society (NESTVAL) in Montreal, Canada, we were approached by the senior editor of the *Northeastern Geographer* to consider co-editing a special issue of the journal that focused on environmental change. While we had not worked together in the past, we had separately conducted research projects, published papers and taught courses on various facets of the subject. Stephen Young, an American from Salem State University, is a physical geographer with expertise in the area of remote sensing and vegetation change, while Darren Bardati, a Canadian from Bishop's University, is a natural resource geographer with interests in resource and environmental management and climate change adaptation at the community level. We are as distinct in our conceptual approaches, methods and emphases, as two University professors studying environmental change in the Northeast can be. Yet, somehow, we found a complementarity to our research interests that is perhaps symbolic of other researchers in the region.

North America's northeastern region, which we define broadly as New York State, the six New England States (Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire and Maine) as well as five Canadian Provinces (Quebec, New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador) is highly diverse in its physical and human geography.

Recognizing that the study of environmental change includes the broad diversity of ways to understand change and disturbance in the environment by natural ecological processes, or those exacerbated by anthropomorphic activities including social, political and economic aspects, we felt that the *Northeastern Geographer* would be an excellent venue to highlight some of that diversity.

Following last year's NESTVAL Conference, a call for papers for this special issue went out to all geography departments at all the universities in the Northeastern region. Following initial abstracts, we received numerous papers by the April 30, 2012 deadline. Those who were selected to go through the peer-review process were then sent out for review over the summer months. Final reviews and corrections were submitted by October. In the following pages you will find five papers that represent the diversity of approaches on the topic that we were hoping to achieve.

The first article (*Land preservation and sustainability in America's northeastern northern forest*) by Daniel Moscovici (Richard Stockton College of New Jersey) takes a look at the Northern

Forest, which stretches from Lake Ontario in New York to Maine's Atlantic coast. These forests remain one of the last intact, mostly private forests in the United States and comprise the most productive forest region of the Northeast. With the demise of large forestry operations and forest-sector jobs in this region, new forms of economic development and land use are occurring and there is the need for coordinated, regional conservation planning. There is a concern about the fragmentation of the forest. The Northern Forest, in large intact parcels, can maintain a variety of positive ecosystem services for the region, such as maintaining water quality as many of the region's main waterways flow out of the Northern Forest. This paper uses GIS to examine the correlation between preservation of the forest and sustainability characteristics (such as elevation and forest cover) and then proposes ideas to help transition the region in sustainable development.

Staying on the forest theme, the next article (*The dendroclimatological potential of white birch (Betula papyrifera) in Labrador, Canada*) by Geoffrey Kershaw (Dalhousie University) and Colin Laroque (Mount Allison University) takes us to Labrador and the far northern reaches of the boreal forest in the Northeast. Trees that survive at the extreme of their climatological limits are well suited for building climate reconstructions and so the authors explore the usefulness of white birch at their climate extreme. They test the dendroclimatological potential of white birch by comparing a master chronology with temperature and precipitation data from the region. The study demonstrates a correlation between annual rings and summer temperature and as well as a minor relationship with moisture from the previous summer. This paper shows that high-quality dendrochronological data can be attained from white birch trees in the Labrador region. This is important information which will provide us with yet another tool to piece together past climates of the Northeast and further our understanding of environmental change in this region.

Our third article (*"Obsolete Archaism, Utopian Dreams and Manure": Biogas and Dairy Livelihoods in Vermont*) by Thomas Loder (University of Kentucky) explores the use of cow manure to produce electrical energy in Vermont as an interesting and potentially viable alternative energy source. The article provides a broad overview of the current biogas debate and then looks at the details of farm-base dairy biogas in Vermont. This article shows that at first there was great enthusiasm about biogas production in Vermont, but market realities dampened enthusiasm and the state had to step in to stabilize prices. The article looks deeply into dairy production and determines that while it might not make the best environmental sense, when considered with the added benefit to the economic lives of struggling dairy farmers, then it is a positive influence and should be supported. This article explores one of the potential alternative energy sources for the Northeast and demonstrates that the benefits are beyond environmental, social also.

The fourth article (*Analysis of Land Surface Temperature Change for Northeastern North America using MODIS Thermal data, 2001 to 2011*) is by Hengzhi Hu, Paul Curtis and Stephen Young (Salem State University). This article analyzes land surface temperature change from satellite data for the Northeast over the past decade. Based on a variety of data sources, it is becoming clear that the world is warming, and the Northeast appears to be no exception. The authors use global-scale satellite-based thermal data (MODIS) and analyze Land Surface Temperature (LST) of the Northeast. They analyzed LST for daytime (10:30 AM) and nighttime (10:30 PM) data from 2001 to 2011 on seasonal to interannual time scales. They found that

over the time period the temperature in the region has been warming, both at night and during the day. They discovered a strong correlation between the North Atlantic Oscillation's (NAO) negative phase and a warming of Northeast North America with 2010 having the warmest land surface temperatures during a deep NAO negative phase. This research provides yet another way of understanding the changing environment of Northeastern North America.

Our fifth and last article (*The New Deal Versus Yankee Independence: The Failure of Comprehensive Development on the Connecticut River, and its Long-Term Consequences*) by Eve Vogel and Alexandra Lacy (University of Massachusetts, Amherst) and is our most in-depth look at an environmental issue in the region. One of the largest rivers flowing out of the Northern Forest is the Connecticut River. Vogel and Lacy look at the political tensions in the Northeast during the New Deal era and show how it influenced the lack of a coordinated Connecticut rivershed development and they show the modern-day consequences of it. During the 1930s and 40s, despite the fact that multiple people and agencies wanted comprehensive development of the Connecticut River basin, it was stalled by people arguing over it for twenty years. This resulted in the Connecticut River management being divided spatially, functionally and institutionally with no overarching management. In recent years, however, this management structure has allowed some flexibility in terms of providing natural flows for fish and ecosystems.

In addition to our five main articles we have included three book reviews. Norman Jones, Matthew Peros and Darren Bardati, all hailing from Bishop's University, each review a climate change textbook recently published and widely used in undergraduate classrooms. These include: *Climate Change: From Science to Sustainability* (by S. Peake and J. Smith, Oxford University Press, 2009); *Climate Change: Science, Impacts and Solutions 2nd edition* (by A. Barrie Pittock, Earthscan, 2009); and *Adaptation to Climate Change: From Resilience to Transformation* (by M. Pelling, Routledge, 2011). Each book provides the scientific basic foundation for students to form a solid understanding of climate change and its impacts, and each provides a discussion on the human responsibility and possible actions to be taken to help mitigate and adapt to these climatic changes.

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