NSRC
Northeastern States Research Cooperative

Project Impacts
NSRC-FUNDED RESEARCH FINAL REPORT

Northeast Environmental Sensor Network Encourages Scientist Collaboration and Public Engagement

PROJECT AWARD YEAR AND TITLE:
2013
Development of Real-Time Environmental Sensor Technology and Applications for the Northeast: A Proposal from the NERC Northeastern Environmental Sensor Working Group (NESN)

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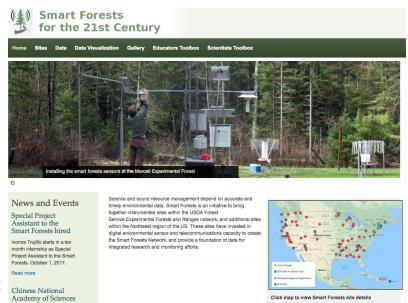Smithsonian Environmental Research Cen., MD

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Advances in environmental sensor technology, wireless communications, and software applications have enabled development of low-cost, low-power environmental sensors and sensor networks that can communicate environmental conditions to researchers, managers and the public in real time. This emerging technology generates information at unprecedented temporal and spatial scales and helps to better understand the physical, chemical, and biological "pulse" of terrestrial and aquatic ecosystems.

NSRC researchers established the Northeast Environmental Sensor Network (NESN) to help the regional research community develop and share infrastructure and expertise on operating, maintaining, and analyzing environmental sensor data and making it public. They envision a regional long-term, multi-site, multi-sensor network to detect short and long-term environmental change in northeastern North America. To address sustainability of this network, NESN merged resources with the USDA Forest Service Smart Forests network, which has a longer funding timeline.

Researchers established an interactive web portal that serves as a demonstration site and information clearinghouse and points users – scientists, educators, and the public – to relevant information sources and real-time data visualizations from ecosystem study sites in the Northeast. They developed tools and displays for merging near real-time data streams from multiple sites to encourage data comparison and collaboration among investigators. Researchers use high resolution environmental sensor data to run an ecosystem-scale carbon and nitrogen cycling model in real time on daily time steps for the Northeast and to better understand ecosystem dynamics during the critical winter-to-spring transition in the Northeast. These real time "windows on watersheds" provide exciting new ways to engage the public and provide novel tools for educators and students.