The North Carolina Climate Change Science Partnership: A Collaboration between Research Scientists and Science Education Centers

Draft: 5 March 2003

Summary

This paper outlines and invites participation in a new collaborative effort for education in North Carolina: a state-wide partnership between research scientists and science education centers (e.g., science museums, teachers, and radio) to engage in tangible projects that improve the public understanding of climate change science.

Motivation

Global climate change is likely to become one of the most important and persistent societal issues that the people of North Carolina will face in the 21st century. Potential impacts in the state include sea-level rise and increased coastal erosion, more extreme summer heat across the state, water supply constraints for growing cities, rainfall variability for the agricultural industry, and loss of species in forests, wetlands, and other ecosystems.

Unfortunately, studies have shown that (at least nationally)[1], the level of public understanding of climate change science is quite low.

The low level of understanding is no surprise. Global climate change science covers a wide spectrum of technically and scientifically complex areas such as energy generation, meteorology, transportation, forest ecology, health, hydrology, economics, agronomy, coastal and ocean dynamics, and atmospheric chemistry.

Further, the topic has become highly politicized, leading to many conflicting and often inaccurate accounts of the science in popular media reports. There are few highly credible sources to help them understand – without bias – what we know about climate change science and what our options for addressing it in the future may be.

Thus, there is poor understanding of a scientifically complex issue that will be increasingly important to the well-being of many people in North Carolina.

[1] Sterman, J. and Booth Sweeney, L. Cloudy skies: assessing public understanding of global warming. System Dynamics Review, Vol. 18 No. 2, Summer 2002. Meadows, G. and R. Wiesenmayer (1999) Identifying and Addressing Students' Alternative Conceptions of the Causes of Global Warming: The Need for Cognitive Conflict, *Journal of Science Education and Technology* **8**(3): 235-239. Francis, C., E. Boyes, et al. (1993). "Ideas of Elementary students about reducing the "Greenhouse Effect"." Science Education **77**(4): 375-392.

Several Opportunities

Such a challenge creates multiple opportunities for organizations in North Carolina.

First, efforts to improve public understanding of climate change science are likely to attract significant federal, state, and private philanthropy funding over the coming decade.

Second, from the national repository of climate data in Asheville to the universities in the Research Triangle to research sites at the coast, North Carolina boasts a significant number of major research facilities and climate change scientists, many of whom are personally and institutionally motivated to share their work with a scientifically-interested public.

Third, the state boasts strong science museums in many cities as well as the country's only organized partnership of such museums – the North Carolina Grassroots Science Center Collaborative.

Fourth, North Carolina is home to a diverse and growing community of non-profit organizations interested in climate change and its possible impacts to their constituency. These include environmental organizations, organizations interested in preserving habitat and species, bird watchers, and members of the faith community. These groups could both contribute to and benefit from a collaborative effort on climate change science.

A Potential Partnership

Therefore, we envision an important, fundable, executable partnership within the state: to create opportunities for research scientists and their institutions to come together with science education centers and non-profit organizations to improve the public understanding of climate change science.

We envision a shared effort building on the strengths of existing organizations rather than the creation of a new, high-overhead organization. The specific activities of such a partnership are being developed. Many projects and ideas are based on experience from a similar climate change science center collaborative currently operating in New England. Early possibilities for North Carolina include:

- An opportunity for science museum staff and other educators to visit research institutions where cutting-edge science is being done and interact directly with the scientists who are doing it. Possibilities include Duke University's Phytotron where plants are subjected to different climates and atmospheres so that scientists can understand the possible effects of increases greenhouse gases and climate change on plant growth.
- Adapting educational programs and products developed by the New England Science Center Collaborative to help science museums better serve families, schools and adult learners including a climate change backpack for informal science education or training in a facilitated interactive simulation.

- A traveling exhibit on climate change science that could tour the state's science centers. This effort could "piggyback" on an exhibit currently under development in New England.
- A series of lectures for science museum staff and other educators given by research scientists at NC research institutions such as the Phytotron for science museum staff and other educators.

The current plan is to start with one specific activity of the greatest interest among collaborating institutions, and run with it.

The New England Experience

The idea proposed in this paper grew out of the experiences of the four-year-old New England Science Center Collaborative (NESCC), whose mission is "to link scientists from leading climate change research institutions with science centers to educate the public about climate change." With an annual budget of about $250,000, the NESCC employs two people part-time, (one full-time equivalent) and serve fourteen science centers with a total of 3 million annual visitors, six research centers, and several other organizations. The effort in North Carolina grows out of the desire of the NESCC to see if their model of a research/science-center partnership would be effective in other regions.

NESCC

Addressing climate change by linking research institutions to science centers and the public

New England Science Center Collaborative

Programs

The NESCC runs a variety of successful, on-going programs including:

- Meet the Scientists – research scientists provide a program outlining their work to science center staff, docents, volunteers, and environmental organizations at the institution itself. The two groups interact informally and tour research facilities
- The Climate Change Backpack – NESCC developed a teaching tool that includes graphs, maps, experiments, games, a climate change play, an imitation ice core, a compact fluorescent light bulb, clothesline and pins, and a bookmark listing websites to consult for more information. The materials fit into a backpack and the curriculum can be adapted according to the audience and available teaching time. One of the grants supports staff trainings in using the backpack.
- Radio spots on "The Weather Notebook". Every Tuesday, the topic of this popular short form radio show syndicated to public radio stations nationwide is on climate change science.
- A traveling exhibit – A major effort is underway to develop a 600-1200 square foot traveling exhibit on climate change science.

Funding

The partnership between the informal science education centers and the research centers has been attractive to funders so far. Grants to support the work of the NESCC, which

were run through individual centers, have come from private foundations and federal agencies.

Motivations

Members of NESCC find different motivations for dedicating time to this effort:

Leaders in informal science centers want to educate the public on climate change but lack the technical expertise and money to do it themselves. They also report that they need people and organizations to bring the science alive for learners and, thus, want direct interaction with scientists. In addition, the collaborative provides an opportunity for staff from multiple science and nature centers to interact and leverage ideas from each other. Often larger institutions have been able to provide expertise, experience and support for efforts in smaller institutions.

Scientists in research centers feel an obligation (often personally and contractually) to share their findings with the public, but find climate science too technical for many in the general public. Science centers provide a good vehicle for getting their research to a local audience, without a lot of additional effort.

Actions

Drew Jones, a contractor to the NESCC, and Michael Shore of Environmental Defense have been talking with representatives of the science museum community and members of the research community about how to engage others in a consideration of the merits of a partnership here in NC. Members and staff of the NESCC have been serving as advisors to the NC effort.

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Appendix: New England Science Center Collaborative Member Organizations

(*indicates members on steering committee)

Science Centers

Audubon Society of New Hampshire, Concord, NH*

Fairbanks Museum and Planetarium, St. Johnsbury, VT
Christa McAuliffe Planetarium, Concord, NH*
Museum of Science, Boston, MA*
New England Aquarium, Boston, MA*
(and the Newport Exploration Center, Newport, RI)
Seacoast Science Center, Portsmouth, NH
Squam Lakes Natural Science Center, Holderness, NH*

Environmental Education Organizations
Appalachian Mountain Club, Pinkham Notch, NH
Chewonki Foundation, Wiscasset, ME*
Clean Air - Cool Planet, Portsmouth, NH
Environmental Defense, Boston, MA*
Harris Center for Conservation, Harrisville, NH
Maine Department of Environmental Protection, Augusta, ME
NH Department of Environmental Services, Concord, NH
Northern Forest Heritage Park, Berlin, NH
Save the Bay, Providence, RI
Society for the Protection of New Hampshire Forests, Concord, NH
Vermont Leadership Center, East Charleston, VT
White Mountain National Forest, Laconia, NH
Wright Center for Innovative Science Education, Medford, MA

Research Institutions
Brown University, Center for Environmental Studies, Providence, RI*
Cold Regions Research & Engineering Laboratory, Hanover, NH*
Center for Health and the Global Environment, Harvard Medical School, Boston, MA
Hubbard Brook Foundation, Hanover, NH
Mount Washington Observatory, North Conway, NH
Tufts Climate Initiative, Tufts University, Medford, MA
University of New Hampshire, Earth, Ocean, & Space Institute, Durham, NH*
Waquoit Bay National Estuarine Research Reserve, Waquoit, MA

Organizational Structure
A ten-member Steering Committee meets bi-monthly to oversee the organization and formulate goals. The Audubon Society of New Hampshire is the fiscal agent for the Collaborative. NESCC members participate in three professional development days a year, at which time they tour a research site or organization that is working on climate change issues or emission reductions. These meetings are designed to: 1) educate members, 2) increase institutional awareness of current research and 3) create shared programming opportunities. For more information go to: www.nescc.info .