

Executive Summary

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THE WORKSHOP

The New England Regional Climate Change Impacts Workshop, hosted by the University of New Hampshire's Institute for the Study of Earth, Oceans, and Space, was held at the New England Center on the University's campus in Durham, New Hampshire from September 3-5, 1997. Funding support for the workshop was provided by the National Science Foundation. More information about the workshop can be found at our website: <http://www.necci.sr.unh.edu>.

A total of 122 participants, representing a broad range of stakeholders from all the New England states plus upstate New York, attended the first two days of the workshop. September 5th was a writing day involving breakout session leaders, rapporteurs and facilitators focused on production of a draft version of the Summary Report. Representatives from each of the seven sectoral breakout groups (Business/Insurance and Industry, Energy and Utilities, Government and Resource Management, Human Health, Information Transfer and Public Awareness, Natural Resources and Recreation and Tourism) have reviewed and contributed to the final version of the report. This Summary Report provides input to the U.S. Climate Change Forum held November 12-13, 1997 in Washington, D.C.

The first day of the workshop was focused on soliciting stakeholder/sectoral perspectives and concerns. Invited stakeholder/sectoral presentations occurred during a morning plenary session, followed by sector-based breakout sessions in the afternoon. The breakout groups were tasked with identifying current stress factors impacting each sector noted above. Daniel Goldin, NASA Administrator presented a lunchtime keynote address.

The second day's plenary session focused on the science of climate change, followed by presentations on the current regional climate, evidence of past climate variability, and Alaskan evidence of the impact of climate warming at high latitudes. The seven sectoral breakout groups addressed additional impacts of climate change on the cur-



NASA Administrator, Daniel S. Goldin, presents keynote address at the New England Regional Climate Change Impacts Workshop.

rent stresses affecting each sector. They also identified knowledge gaps, research needs and appropriate response strategies.

Over the course of the two-day workshop, each sectoral breakout session met for a total of three two-hour periods. Session leaders reported back to the general assembly at the end of each day on the group's findings and recommendations. Summaries of each of the sectoral breakout groups are given below.

The third day of the workshop was devoted to writing the initial draft of the workshop summary report.

Workshop Attendees

Of the 122 participants attending the two-day workshop, approximately one-half (57) represented non-academic, non-agency sectors from business and industry, non-governmental organizations, state and local governments and education. It is important to note that while nearly half of the workshop participants represented a range of stakeholders, their views, as expressed in this report, represent a limited cross-section of stakeholder opinions and perspectives. A continuing effort must be made to solicit a broader range of input regarding climate change impacts to the New England/upstate New York region. Over 100

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workshop participants returned for day two of the workshop, and 75 were present for the final wrap-up session at 6:00 p.m. Twenty-seven people participated in writing the initial draft of the Workshop Summary Report on September 5.

Media Coverage

Media coverage for the workshop was a component of planned outreach to provide education about climate change issues. Media relations and communications were coordinated by a consulting professional with experience in dealing with the campus, state, regional and national media. Coverage was extensive, and included local (New Hampshire TV, Channel 9, New Hampshire Public Radio and print media), regional (Boston Globe, New York Times) and national (several Associated Press stories) media outlets.

The Plenary Sessions

Following welcoming remarks and an overview of workshop goals and objectives, representatives from each of the seven sectors presented regional climate change issues of concern and relevance to these stakeholder groups. While the first day of the workshop was focused on stakeholder perspectives, the second day focused on the science of climate change. Plenary presentations again were both sectoral and regional in scope and provided scientific evidence regarding likely climate change impacts on each sector in the New England region.

SECTORAL BREAKOUT SUMMARIES

The **Business/Insurance and Industry** sector concluded that enough information and understanding was available on the topic of climate change to suggest that human activities contribute to global warming and climate change. Suggestions included providing a centralized and authoritative source for data, greater utilization of current technologies which control heat trapping gas emissions, providing incentive programs to reduce emissions, enacting programs which preserve existing carbon dioxide sinks, and demonstrating that the political will at regional and national levels exists to address the issues of climate change.

Key findings and recommendations reported by the **Energy and Utilities** group focused on development of policies which are "no regrets" or policies which are economically viable and result in reductions of greenhouse gas emissions. Additionally, their recommendations included the greater use of renewable energy sources for New England's future energy requirements, adapting policy to ensure maximized energy efficiency,

investment of national funding into research and application of new technologies, an industry-wide initiative for addressing climate change issues, and the development of a centralized and factual information base.

Generally, the findings of the **Government and Resource Management** group reflected those which were found by the Energy and Utilities group. Additional points highlighted by this group included the need to develop a strong educational network to address and engage all members of society in focusing attention on climate change issues, with particular emphasis on policy makers, industry representatives, meteorologists and foresters. A need for cost-efficient programs which result in win/win strategies was identified.

The **Human Health** group focused on the impacts that climate change may have on health related issues. A strong concern issued by the group was the current lack of information and attention to the human health effects of climate change. It was pointed out that the Northeast may be particularly vulnerable to climate change due to its geographical location. Specific concerns included the risks of increased UVB radiation due to stratospheric ozone reduction, air, land and water contamination via long-distance pollution transport, the increase of severity and frequency of high temperature events, reduction in air and water quality due to complex factors of climate, the potential increase in incidences of algal blooms in coastal areas, and the little-understood effects climate change could have on disease occurrences and pathways. Several symptoms of these impacts were considered.

The **Information Transfer and Public Awareness** group discussed one of the sentiments echoed by all of the other breakout groups: the need for greater public awareness and understanding about climate change issues. This group focused their discussion on four areas: the need for advancement of scientific literacy regarding climate change issues, identification of key climate change concepts, the current lack of effective and useful information on climate change, and the increasing need for effective and accurate communication. Key recommendations included the need for better communication from knowledgeable, accurate and credible sources like scientists and researchers, developing on-going relationships with the local, regional and national media to facilitate accurate reporting, and developing experiential-based science learning methods and programs for schools and other general public audiences.

The **Natural Resources** group highlighted the complex nature of issues confronting their group by addressing the ecological, sociological, economic and sector-based aspects of the Northeast. This group believes that natural resources and natural resource industries will be sensitive to climate change. Yet, they believe that the issues are not currently well understood and stakeholders, in general, from this sector are not aware of the issues. Their recommendations include research focused on improving climate models which can provide temperature and precipitation variability scenarios for New England, as well as research to improve the understanding of impacts on ecological, economic, and agronomic variables. Several other recommendations and win-win situations were pointed out in their report.

The **Recreation and Tourism** group stated that climate conditions profoundly affect recreation and tourism in the Northeast, and that this sector is a strong contributor to the regional economy. Most activities occur outdoors and are therefore strongly affected by climate, yet indoor activities are also climate driven. It was recognized that climate concerns are not evenly distributed across all activities: some stand to lose while some stand to gain from climate change. A number of examples of adverse effects on the sector were presented in their report. A strong recommendation, among many, from this group was to focus on long-term mitigation strategies of climate change rather than on short-term coping. The need for education of stakeholders from this sector on climate change issues was also pointed out.

SIGNIFICANT FINDINGS

Cross-cutting significant findings were drawn from each of the breakout session reports and plenary summaries. These findings, the plenary summaries, and the breakout session reports, have been reviewed by interested participants.

1. Education on issues related to climate change is not readily available and is essential for informed discussion of these issues; education should include a critical review of the evidence for climate change.
2. A regional integrated assessment of climate change impacts to New England is needed.
3. Regional examples of climate change are needed.
4. Stakeholder perceptions are that the consequences of global warming and climate change have the potential for substantial impacts.

5. The levels of uncertainty are high, but policy, research and continued awareness need to be addressed now on the issues of climate change.
6. The consequences of climate change will exacerbate current environmental stresses for all sectors.
7. "Next steps" and guidance (what to do) are needed to direct appropriate and effective public response to climate change issues (i.e., increasing levels of greenhouse gases).
8. Access to scientific and regional data on climate change, including critical evaluation of evidence for recent changes in climate, does not exist and needs to be developed.
9. The potential role of the El Niño-Southern Oscillation (ENSO) as a factor influencing the weather of New England/upstate New York was recognized and seen to be of great importance.
10. Although the workshop did not dwell on the "bad news," the overall climate change impact on New England is likely to be negative, with some sectors possibly benefiting from these impacts.
11. Policy and funding issues need to be addressed at the local, state, and federal levels to show stakeholders that government views climate change as an important issue—one which all members of society need to pool resources and work together in order to solve.
12. Incentive programs to reduce emissions and/or preserve and enhance existing CO₂ sinks must be developed.

KNOWLEDGE GAPS AND RESEARCH NEEDS

Specific knowledge gaps and research needs were identified and are listed below:

1. A clear relationship between human activities and climate change must be established;
2. A "danger level" for CO₂ must be identified as well as appropriate target levels for both reducing and eliminating the threat of global warming;
3. The ability to separate noise (the natural background or variability in the system) from signal (human contributions) in CO₂ data must be developed;
4. A quantitative assessment of the environmental and economic impacts of climate change for the New England region is needed to assess the risks of a "business as usual" scenario;

5. Appropriate policy responses to limit emissions must be identified;
6. A range of response options must be developed for possible implementation, from new enhanced technologies to selective use of fossil fuels;
7. A research program focused on enhanced technologies must be developed;
8. Improved models (climate, integrated assessment, economic) and predictions must be developed;
9. The cause and effect relationships between specific remedial actions and CO₂ level reductions must be identified and quantified;
10. An understanding of the interaction of multiple stressors on natural systems is lacking but essential for determining the impacts of climate change on natural and managed systems;
11. Effective educational programs must be developed and presented to the public.

WIN-WIN SCENARIOS

During the course of the workshop several examples of significant win-win scenarios were identified by workshop participants. These regional examples were:

1. Promoting the development of more extensive and efficient forest stands through selective management practices will result in increased CO₂ uptake (i.e., improved carbon sinks) as well as more productive sources of fibers for the pulp and paper industry.
2. The development of high-efficiency / alternative energy sources will not only reduce the CO₂ produced but will eliminate many air pollutants (SO_x, NO_x, O₃) currently impacting the New England region.
3. Investment in cleaner technologies that alleviate the problem of CO₂ production also reduce business and industries liabilities, strengthen its good neighbor image, and create a strong regional manufacturing presence.
4. Implementation of energy efficiency programs have the potential to decrease the cost of doing business and make regional industry more competitive (the Germans and Japanese use half the energy per dollar of gross domestic product as the U.S.).
5. Improving scientific and environmental literacy among the general public can be accomplished by supporting research professionals for their direct involvement in outreach activities. By broadening the role of scientists and public

officials to include communication, we are likely to engage the public in the debate on the seriousness of global environmental issues.

6. Documentation of human health issues by medical professionals for the purposes of studying the impacts on health by climate change can motivate commitment and action to mitigation strategies by government, industry and individuals. This can then have feedbacks to preventative health care and diagnosis. Demonstrating a direct link between climate change and human health will bring climate issues to the forefront of the public's attention.
7. Improvement of techniques for preserving and improving soil quality in managed and natural ecosystems and farmlands will benefit industry and landowners by helping to sustain productivity and enhance the carbon sequestration by such soils. Incentive programs which encourage landowners to sequester carbon in their soils should be developed, which will benefit the landowner and help to reduce the carbon dioxide levels in the atmosphere.

WORKSHOP RECOMMENDATIONS

Three broad recommendations, based on the outcomes of the workshop, are as follows:

1. This workshop was a success in bringing stakeholders and experts together for a dialogue on climate change impacts in New England; but, this workshop represents only a first step in a process which must be continued in order to develop a viable regional assessment.
2. More in-depth background research must be conducted, both to understand the regional impacts as they relate to individual stakeholder groups and to precisely define the human impact on climate change.
3. The final recommendation is that we need to begin work with stakeholders and the general public on action items.

A clear message from participants, which was reiterated several times, was that the research and findings on climate change issues and the implications for New Englanders need to be stated in clear, easy to read and understand language. Scientists and other experts in the field of climate change need to communicate in "plain English."