



**Preparing New Jersey for Climate Change:  
A Workshop for Decision Makers  
November 29, 2011**

***Workshop Proceedings***

Organized by Clean Air-Cool Planet in Partnership with Rutgers University  
Hosted at the Edward J. Bloustein School of Planning and Public Policy, New Brunswick

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Organized by Clean Air-Cool Planet in partnership with the Edward J. Bloustein School of Planning and Public Policy and the Rutgers Climate and Environmental Change Initiative at Rutgers, the State University of New Jersey, with support from PSEG, *Preparing New Jersey for Climate Change* brought together a broad array of experts to discuss climate change impacts of particular importance to New Jersey. Over the course of one day experts gathered to better understand the risks and economic impacts to New Jersey from climate change.

More specifically, the forum provided an opportunity for participants to begin a dialog on ways in which New Jersey can and should prepare for the devastating impacts that a changing climate and rising sea levels will have on the State's economy, the health of our residents, our natural resources, and the extensive infrastructure system that delivers transportation services, energy and clean water to millions of New Jerseyans. Much of the focus of the workshop centered on climate change impacts on:

**Public Health** - As a result of increases in extreme heat events, changes in drinking water supply as a result of drought, and salt water intrusion and changes in rainfall, increases in cardiovascular and respiratory diseases as a result of worsening air quality, and increases in insect-transmitted diseases historically confined to warmer climates with a disproportionate impact on extremely vulnerable populations such as children, elderly, economically disadvantaged and people with pre-existing conditions or limited mobility, are expected.

**Agriculture** - Increased irrigation and refrigeration costs and increases in costs to address pests and noxious weeds due to frequent short-term droughts and high heat, and changes in temperature affecting growing seasons and market competition for key crops, are anticipated. New Jersey's agricultural industry contributes more than \$900 million to the state's economy annually, with our revenue per acre from agriculture being third in the nation. In 2009, fifteen counties were designated as natural disaster areas due to crop damage from heavy rainfall.

**Watershed, Rivers and Coastal Adaptation to Climate Change** - More frequent and more severe storms will result in increased erosion along the coast affecting homes, businesses, and roads, increases in flooding and storm damage. Additionally, other impacts that are anticipated from more frequent and

more severe storms include decreased functionality of septic and sewer systems as a result of water intrusion and soil saturation from increased sea levels, as well as diminution of the overall vitality of the State's critical shore tourism industry. More than 60 percent of our State's residents live in coastal areas. At more than \$500 billion, the annual economic exposure of New Jersey's coastal assets to weather related events in 2007 is fifth in the country among hurricane-exposed states.

**Built infrastructure** – Impacts are anticipated on maintenance of roads, bridges, tunnels and railways; functionality of public transit, aviation systems; ports operations, and energy infrastructure including transmission lines and power plants; housing stock particularly in coastal areas and urban and suburban waterfront communities; and drinking water and wastewater infrastructure. New Jersey has hundreds of billions of dollars of assets at risk in the coastal area as well as billions of dollars at risk in transportation nodes and corridors.

**Natural Resources** - Changes to water temperatures may affect fish populations, the likelihood of wildfires, a reduced ability of natural systems to provide important societal services such as flood control, clean water, tourism and fisheries, increased costs to maintain parks and open spaces due to increased in pests and invasive species, and changes in fish and wildlife habitats as a result of sea level rise.

The November 29 gathering pointed to the need for undertaking aggressive climate change preparedness as an antidote to forestalling serious public health impacts, economic, ecological and infrastructure investment impacts. Workshop participants recognized that, even if the most aggressive efforts were underway to stall climate change, the best outcome would be reducing global surface temperatures from their projected worst case by 3-4°F. In that scenario, as a densely populated coastal State, with aging infrastructure and housing stock, New Jersey remains highly vulnerable to the impacts of climate change. Additionally, the workshop pointed to the need to focus New Jersey's preparedness efforts on key areas affecting the State's economy and quality of life: public health; watersheds, rivers and coastal communities; built infrastructure; and natural resources. Recommendations clearly pointed to a strong role for Rutgers, as the State University, to work through a stakeholder process to build capacity in New Jersey.

## Setting the Stage

Workshop participants were greeted by Dr. James W. Hughes, Dean of the Rutgers Bloustein School of Planning and Public Policy, Dr. Robert M. Goodman, Dean of the Rutgers School of Environmental and Biological Sciences and Anne E. Hoskins, Senior Vice President for Public Affairs and Sustainability at PSEG. All three highlighted the critical nature of planning for climate change impacts in New Jersey given the State's geographic vulnerability, unique natural resources and infrastructure investments.

An initial panel set the stage for the remainder of the day by presenting overall impacts of climate change anticipated in the Garden State. Panel members included **Dr. Anthony J. Broccoli**, Professor of Environmental Science and Director of the Climate & Environmental Change Initiative at Rutgers University, **Dr. Kim Knowlton**, Assistant Clinical Professor of Environmental Health Sciences at the Mailman School of Public Health at Columbia University, and **Dr. Joseph Seneca**, University Professor at the Bloustein School of Planning and Public Policy at Rutgers University.

**Dr. Anthony Broccoli** - Dr. Broccoli provided an overview of the science related to climate change and its impacts. He provided a broad overview of impacts anticipated in New Jersey and the northeast including impacts to public health, flooding, and precipitation. He challenged workshop participants to not view the need

to address climate change mitigation as an alternative to addressing climate change preparedness by pointing out that even the most aggressive mitigation efforts will only reduce global temperatures in the worst case scenarios by 3-4 degrees, making efforts to prepare for climate impacts compelling. Dr. Broccoli laid out five challenges to advancement of effective and comprehensive adaptation planning:

- The need to for the scientific community to process data and research results into “actionable” science that can be readily used by engineers, planners, decision makers;
- The compelling demand for development of local information and climate impact models that can practically be applied in planning and decision-making;
- The value of applying a risk assessment approach in which uncertainties can be balanced with sound science to move beyond “analysis paralysis” and allow for decision-making;
- The need to assess the extent to which there may be “tipping points” in the climate system in terms of determining the cumulative impacts of nor’easters, hurricanes, and severe storms and their collective consequences.
- The pressing need for more effective communication between climate research community and potential users of climate information, including state, federal and local decision-makers.

**Dr. Kim Knowlton** – Dr. Kim Knowlton laid out a concise yet robust illustration of the impacts of a changing New Jersey climate to public health. Her presentation stressed that the public health community is now recognizing climate change as one of the most serious public health threats facing the U.S. while there is generally little among most Americans of the public health impacts of climate change. Dr. Knowlton highlighted the fact that only 13 states have climate-health preparedness plans with New Jersey being among those states without any current planning in place.

Dr. Knowlton began her presentation by giving an overview of public health impacts of climate change that are more direct and likely to be more recognized by the general public. These include: increased frequency of extreme heat events especially in urban areas, greater likelihood of forest fires that can have impacts on public health in surrounding communities, increases in cardio respiratory diseases and allergies due to an escalation in regional and local air pollutants, and increases in diseases that are transmitted by insects (e.g. mosquitoes), the population of which will increase due to warmer temperatures. She cited several critically important sets of data that underscored the immediate nature of these public health impacts, including the following predictions:

- Increases in summer heat-related mortality in the tri-state region of 70% by 2050;
- Increases in pollen by 320% of pollen by 2050;
- Increases in summer ozone-related mortality by 4.5% in the region by 2050; and
- An average of a month of days above 100<sup>0</sup>F.

Dr. Knowlton also outlined additional public health impacts that are less direct and thought of by the general public as being a consequence of a changing climate. She discussed vulnerability of increases in tropical diseases, insecurity of food and water supply, and increases in food and water borne diseases.

Dr. Knowlton discussed the limited set of data available nationally examining the economic outcomes of public health impacts of climate change. She presented an overview of recent research that quantified costs associated with public health outcomes of six climate change incidents throughout the United States. In these analyses, researchers pointed to \$14 billion in health-related costs from six climate related events in the U.S. that occurred from 2002-2009.

Dr. Knowlton suggested that critical climate-health preparedness strategies include identifying local vulnerabilities; tracking environmental changes and health threats; and promoting education and public dialogue among practitioners, policy makers and vulnerable publics. She highlighted several recommendations to promote comprehensive adaptation preparedness efforts:

- Development of state and regional climate health adaptation plans that target the most vulnerable communities;
- Innovative identification of resources to support national, state and local preparedness efforts;
- Employment of processes to promote consensus on ways to advance climate adaptation as a planning priority;
- Advocacy for continued support for creation of a national database on climate-sensitive events and associated health outcomes; and
- Continued enhancement of a base of scientific knowledge on public health impacts and costs associated with climate change.

**Dr. Joseph Seneca** – Dr. Joseph Seneca focused his presentation on the impacts of climate change on the economic value of ecological services in New Jersey. His presentation outlined the ecosystem services provided by key natural resources in New Jersey and the economic value that may be lost from those resources as a result of climate change impacts.

Dr. Seneca encouraged the participants to think broadly about climate impacts on natural resources beyond aesthetic value to incorporate economic value from natural resource goods and services. Examples of ecosystem services provided by natural resources in New Jersey include goods such as commercially harvested fish and shellfish, mining including sand mining for purposes of beach replenishment and services provided by natural resources in New Jersey including outdoor recreation, nutrient recycling, water filtration, and buffering from floods and storms. Dr. Seneca indicated that a true valuation of loss of these goods and services would require viewing the service as an asset with a quantified economic value. Services for which New Jersey has begun to assess economic value include surf fishing, bird watching, shore tourism, storm buffering and from tidal marshes and recreational values from key natural resources.

## **Economic Impact**

A second panel focused on quantifying the economic impacts of climate change in New Jersey. Two panelists presented compelling data regarding economic consequences of climate change impacts on New Jersey's natural and built assets. The panel included **Dr. Robin Leichenko**, Associate Professor of Geography and Director of the Rutgers University Initiative on Climate and Society, and **Dr. Megan Linkin**, Assistant Vice President at Allianz Risk Transfer, Inc.

**Dr. Robin Leichenko** – Dr. Leichenko challenged workshop participants to consider the direct costs associated with climate change impacts, such as damage to physical infrastructure, capital assets, property, as well as the indirect costs that result from damage or loss of assets (e.g., costs of business interruption; lost wages due to decline in tourism following an extreme storm event). She discussed the need to determine the relative benefit of investing in adaptation measures in relationship to the economic loss associated with climate change impacts. She posed two succinct questions at the heart of assessing the economic consequences of climate change in New Jersey:

- What is the monetary value of New Jersey's assets (including property, infrastructure, capital assets) believed to be at risk to sea level rise and other threats?

- What are the economic costs and benefits associated with different types of adaptation measures such as protection, accommodation, or planned retreat?

Dr. Leichenko illustrated an analytical approach on economic cost and benefits of climate change adaptation in three sectors: agriculture, water infrastructure and transportation infrastructure:

*Agriculture* – Agriculture is an industry that contributes \$986 million to New Jersey’s economy with revenue per acre being third in the nation at \$1,300/acre. Agricultural operations occupy 16 percent of the state’s total land area. New Jersey’s agricultural industry is dominated by specialty crops including greenhouses and nurseries, vegetables and fruits and the State’s key commodities include horse farming (\$85 million in revenue), blueberries (\$82 million), chicken eggs (\$41 million, corn (\$39 million) and cranberries (\$25 million). Anticipated sensitivities to climate change in the agricultural industry include effects from:

- Increased frequency of high rainfall, high wind and hail events
- Warmer winters, expanding expand the range of weeds, insects, pests
- Warmer summer temperatures and longer growing seasons
- Increased frequency of summer heat stress and drought
- Higher levels of atmospheric carbon dioxide (CO<sub>2</sub>), changing growth and maximum yield conditions

As an example of the costs of climate change, Dr. Leichenko summarized that in 2009, 15 New Jersey counties were designated as natural disaster areas due to crop damage from heavy rainfall and the state’s wheat crop was down 27 percent due to excessive rainfall.

*Water infrastructure* – Dr. Leichenko identified some of the costs associated with rising sea levels, increased storm surges and flooding on wastewater treatment plants and distribution systems, and salt water intrusion into aquifers. These costs include:

- Increased flood damage;
- Increased costs of water quality maintenance due to precipitation changes and higher temperatures;
- Increased costs of storm water management from more intense rainfall events;
- Increased costs associated with droughts, both for emergency measures and the loss of value to consumers of restricted supplies

*Transportation Infrastructure* – Dr. Leichenko summarized the potential costs associated with climate change on New Jersey’s extensive network of transportation infrastructure, including:

- Increased costs associated with rising sea levels and associated storm surges on large transportation systems in coastal areas, including road, rail, aviation and maritime transport facilities;
- Increased costs associated with inland flooding from potentially more frequent and intense precipitation – impacts on roads, public transit systems and railroads, including more frequent outages;
- Costs associated with rising temperatures and more frequent heat waves on rail tracks, road surfaces and other fixed investment ;
- Costs of ice storms and high winds on air, road, and rail transport and outages due to weather-related power failures impacting all forms of transportation;

**Dr. Megan Linkin** – Dr. Linkin presented an overview of the economic risks associated with climate change impacts from the perspective of the insurance industry. She estimated that the sensitivity of New Jersey’s gross state product (GSP) to weather variability is 8-10% and that, at approximately \$600 billion, the State has the fifth highest economic coastal exposure among hurricane exposed states. She provided a historic overview of hurricane devastation in New Jersey and discussed the greatly increased economic losses from current day hurricanes in New Jersey’s coastal communities as a result of significant increases in development and population growth in that region of the State. As an example, Dr. Linkin highlighted that the impacts from Hurricane Irene which was estimated to result in \$755 million insured losses in New Jersey alone.

Dr. Linkin outlined the particular vulnerabilities of the New Jersey/New York metropolitan region pointing to insurance industry data that identifies the region as being in the top 10 in the U.S. for exposure of population to coastal flooding, second in the U.S. for assets exposed to coastal flooding, and second in the world for assets vulnerable to wind damage. Even under a “business as usual” climate scenario, Dr. Linkin indicated that \$2.5 trillion of assets in the region are potentially exposed to impacts of sea level rise.

Dr. Linkin identified a ‘nightmare’ scenario of climate impacts in New Jersey being equal to a borderline Category 3-4 with landfall in southern Ocean County, in which case the industry estimates potential insured losses of 2-3 times the losses associated with Hurricane Katrina.

## **Military Preparedness, Science, and Leadership**

Following the two morning panels, workshop participants met over lunch. **Dr. Richard L. McCormick**, President of Rutgers University, greeted the attendees and pledged the commitment of the University to work with state leaders in New Jersey to advance climate preparedness actions, science and policies.

President McCormick was joined as a lunchtime speaker by **Captain Tony Miller**, Deputy Director, U.S. Navy Task Force Climate Change and former New Jersey Governors **Honorable James J. Florio**, and **Honorable Thomas H. Kean**.

**Captain Tony Miller** explained that the U.S. Navy is responding to climate change because of existing and emerging conditions: open Arctic waters, disaster assistance and base installations worldwide. The Navy has begun a multi-year vulnerability study with its bases all over the world -- signaling to the civilian audience that climate preparedness is ranked high today in the military sector.

**Governor Kean** reminded audience members that climate science is sound, and warned that future generations will suffer if the challenges and policy solutions to climate change are not made an immediate priority by policy makers and elected officials. He pointed to a policy report prepared in his administration laying out early actions to be taken to address climate change and challenged the audience to move beyond dialog on climate change preparedness to implementation of cost effective, practical actions.

**Governor Florio** asserted that a public undertaking is essential, because public awareness of and support for climate preparedness are critical. To tackle the problem, he said, is to protect our neighbors and our communities and country. He characterized preparing for climate change as a patriotic undertaking and one that, has at its core, strengthening New Jersey’s economic competitiveness and its sustainable future.

## Sector Focus in the Afternoon:

Following lunch, workshop participants broke into four focused concurrent sessions. In each break out session, subject area experts and sectoral leaders gave brief presentations focusing on climate change preparedness priorities within the sector. The brief presentations were designed to engender a dialog among break-out session participants to develop recommendations for preparedness actions in New Jersey within that sector. The sessions were structured as such:

- **Public Health and Environmental Justice**
  - *Moderator:* Dr. Nicky Sheats, Director; Center for the Urban Environment, Thomas Edison State College
  - *Panelists:* Dr. George Luber, Associate Director for Climate Change, Centers for Disease Control ; David Henry, Princeton Regional Health Commission, Health Officer ; and Dr. Leonard Bielory, M.D., Director, STARx Allergy and Asthma Center, LLC; and Rutgers University.
- **Infrastructure**
  - *Moderator:* Dr. Michael Weinstein, Director, PSEG Institute for Sustainability Studies, Montclair State University
  - *Panelists:* Dr. Dave Robinson, New Jersey State Climatologist; Christine Neely, Director Regulatory Affairs, PSEG Power; Jeff Perlman, Principal Planner, North Jersey Transportation Planning Authority and Dr. Jessica Sanchez, Delaware River Basin Commission; Chair, NJ Clean Water Council.
- **Watershed, Rivers and Coastal Adaptation to Climate Change**
  - *Moderator:* Anthony MacDonald; Director, Urban Coast Institute, Monmouth University
  - *Panelists:* Dr. Ken Miller, Professor II Vice Chair, Rutgers University; Mark Mauriello, Director of Environmental Affairs and Planning, Edgewood Properties; Zoe Johnson, Program Manager, Office for a Sustainable Future, Maryland Department of Natural Resources; and Tim Dillingham, Executive Director, American Littoral Society.
- **Agriculture and Natural Resources**
  - *Moderator:* Michael Catania; President, Conservation Resources, Inc.
  - *Panelists:* George Gay, Northeast Natural Resource Center, National Wildlife Federation; Andrew Milliken, North Atlantic Landscape Conservation Coordinator, US Fish and Wildlife Service; Jen Adkins, Executive Director, Partnership for the Delaware Estuary; Jim Laine, Laine Farms, Hillsborough NJ

Many of the panel presentations in the afternoon break-out sessions tested and affirmed the five challenges to adaptation planning, outlined earlier in the day by Dr. Anthony J. Broccoli. General themes during break-out session discussions included:

- Changing people's perceptions and behaviors in the long term and through social learning is not occurring at present. Practitioners and experts need to approach climate preparedness in terms of systems thinking. One priority is connecting stakeholders with scientists willing to be engaged with the community. "Off the shelf" technologies are available to address climate impacts and yield short term benefits while we plan longer term. Many participants stressed the need for a collective statewide strategy based on "actionable" science that can drive communication with affected populations, the general public and decision-makers.
- Adaption planning and building resilience is a long-term process interrupted by weather events and disruptions in the short-term. Efforts need to be underway that incorporate climate preparedness into state planning, statewide planning, regulatory and infrastructure investment efforts while at the same time

ensuring that anticipated climate impacts are reflected in flood and hazard mitigation planning, , and into county and municipal planning.

- The public is not aware enough of the economic, health and environmental risks of climate change; yet storms, beach loss and riverine flooding seem to present important entry points for adaptation education. Risk communication needs to accompany risk perception: asking the questions of audiences to move discussions forward. Publics react (and cause policy makers to react) to solve immediate problems – failing, however, to attend to qualified and longer-term risk assessments.
- There needs to be an ongoing dialogue between all of the players (local government, non-profits, scientists and technical experts). Realtors and developers are a necessary yet over-looked stakeholder and resource. Data needs to be shared and a process needs to be pushed forward where findings and projects are shared. Providers of services to vulnerable populations understand that many different media channels are necessary to communicate effectively.
- With adaptation and climate preparedness, “the rubber meets the road” at the local level was a recurring theme heard throughout the day. Yet, participants stressed that local efforts can and should be driven by a statewide strategy to ensure information transfer, development of best practices and efficient use of limited resources. Much discussion focused on the need for a collective statewide strategy completed by local preparedness demonstration projects, vulnerability and benefits analyses. Statewide efforts form the basis for support of local demonstration efforts through statewide policy, resources, technical assistance, information transformer and science support.

More specific discussions within the individual break-out sessions focused on the following observations:

**Public Health and Environmental Justice:** Discussion focused on the need for a statewide strategy that supports community-based approaches recognizing that specific populations are particularly vulnerable to the public health impacts of climate change. The effort’s initial focus should be on identifying and communicating the public health risks of climate change both to the general public and to the public health community. Participants stressed building capacity for addressing climate change related public health issues by building upon the existing public health infrastructure in New Jersey as well as by learning from best practices at the federal level, in other states and other communities. There was agreement of the need to build greater awareness about public health consequences of climate change within the traditional public health community including physicians and local public health officers. Anticipated vulnerable communities include poor residents and people of color which can lead to communication challenges due to cultural and language barriers and distrust of government.

**Infrastructure:** Participants focused their discussion on the importance of developing a long term adaptation strategy regarding climate change as a critical component of maintaining statewide economic prosperity in order to ensure the resilience of a statewide network of infrastructure that supports energy, goods movement, transportation, ports, water supply and wastewater management. In general, there was consensus that the public is not well educated on the economic implications of climate change risks. Coupled with historic public reluctance to support long term strategic planning for infrastructure investments, there is the potential to scare the public or make the public immune to the critical need to plan for infrastructure impacts of climate change. Ways to address these challenges include ensuring sound communication between infrastructure planners and scientists along with stakeholders, development of a statewide plan complemented by specific strategy development for small projects. Participants pointed to the efforts that have been underway in New York State and New York City as good examples of ways to highlight infrastructure impacts of climate change. Infrastructure planning is an ideal setting to look for opportunities for public-private partnerships in which there can be consensus on incorporating climate change into infrastructure planning and investment.

**Watershed, Rivers and Coastal Adaptation to Climate Change:** Similar to discussion in other break-out groups, the participants discussed the need for enhanced communication of climate change impacts to the general public and decision-makers. Participants stressed the need for communication to be focused on communication of risks and economic costs associated with climate change impacts along with economic benefits of preparedness actions. As part of this communication, participants agreed that complete costs associated with climate change impacts need to be documented and communicated, for example with regards to federal insurance for flood prone structures. Doing so may prompt general support for action based on a recognition that the long term costs of climate change on New Jersey's water and coastal resources are long lasting and significant. The group also pointed to potential economic advantages of preparedness in terms of job creation with regards to restoration of natural systems that protect against flooding, salt water intrusion, etc. As such, the group felt a need for the state to ensure a long term vision of enhancing natural systems, such as inland buffers, that will provide sustainable protections from climate change impacts. Key audiences to pull into discussions regarding statewide and local strategic planning include emergency managers, planning officials, public health officials and ensuring that all involved arrive at consensus on a common planning horizon at the local and state levels. The group stressed the need for collaboration with the scientific community to engender "actionable" science that can be incorporated in state level decision-making such as incorporation of climate scenarios in rulemaking, state strategic planning and wastewater and water quality planning, all of which will drive local decision-making. The participants stressed the need for leadership at the state level to foster statewide decisions that will prompt local action. Similarly, the group discussed the importance of relying on existing regulatory structures with compliance provisions at the state and local level to advance integration of climate change preparedness actions rather than creating new regulatory structures.

**Agriculture and Natural Resources:** The group focused considerable discussion on the need for immediate and creative statewide planning that can support and drive actions at the local level. The value of high profile projects that provide "win-win" (i.e. climate change preparedness, natural resource protection and economic development) can be a sound communication tool. Demonstration projects are an essential element of advancing a statewide plan. In responding to Governor Kean's call to "let the leaders lead," the group stressed the need for dialog among the NGO community, state and local government, the academic community and the private sector. As an example, the group discussed the fact that 80% of forestland in the Northeast is privately owned which points to the need for engagement of the private sector. In general, the group felt that efforts both at the state and local levels in New Jersey to address climate change impacts is poor and that there is a critical role that the university can play, with affected communities and stakeholders, to advance sound policies and practices. An effective approach may be a coalition-driven stakeholder approach that makes independent recommendations on the need for state and local actions. Additionally, there are significant opportunities for collaboration with conservation organizations and the private sector to advance demonstration projects that can be celebrated and promoted. Similar to other groups, the participants discussed the critical need for development of "actionable" science that can directly translate into decision-making and policies at the state and local level. The group also stressed the need for consideration of climate change impacts to become an integral part of planning and decision-making and not an "add on" to core policies and programs related to agriculture and natural resources and that, the best way to ensure such sustainable approaches, is to undertake an independent process, with stakeholders and affected communities, that can make recommendations for statewide efforts to support decision-making at the state and local levels.

## Recommendations and Next Steps

Several themes echoed throughout the day and were reflected in overall recommendations presented by each of the four break-out groups at the conclusion of the workshop. These overall themes include:

- New Jersey runs the risk of falling behind other states that have undertaken or begun to undertake statewide strategic planning for climate change preparedness. Efforts underway and completed in other states provide New Jersey with valuable lessons in cost effective strategies to undertake statewide strategic planning through collective partnership of federal, state and local decision-makers, scientists, the NGO community, private sector leaders and other stakeholders. Maryland and New York's statewide efforts, in particular, were cited as positive examples for New Jersey to consider.
- New Jersey needs to recognize climate change preparedness as an economic priority for the State with the need to focus efforts on preparing key sectors that underlie the State's economy including: public health along with a recognition of anticipated disproportionate impacts on already vulnerable populations, an extensive statewide network of housing, transportation, energy and water infrastructure, a nationally robust agricultural industry, and natural resources that provide economically critical goods and services.
- Advancing sound and cost effective climate preparedness strategies necessitates a paradigm in which "actionable" science informs public policy and decision-making. The academic community can and should play a critical role in advancing a statewide dialog that is driven by science, concurrence on climate change scenarios, common commitment to the development of best practices informed by local experiences, and consideration of cost benefit.
- Establishment of new organizations is not needed. Rather, key decision-makers and stakeholders can be engaged through existing systems or, more specifically, through an Alliance of existing organizations with facilitation through the state university. Discussions continued about the need for a comprehensive plan, frequently updated with new information and easily accessible by all stakeholders. Discussion focused on the plan being created by a coalition across interests within the private and public sector as well as involving the NGO community and private sector leaders. In general, the focus called for the value of such a plan being facilitated by one independent organization such as the State University.
- Best practices also exist across the country on communication of the need to prepare for climate change. New Jersey can and should take advantage of this research and experiences as part of statewide strategic planning to build recognition for economic impacts associated with climate change that face New Jersey. Workshop participants also discussed the need for overall public education on climate change impacts and their impact on statewide and local economies. Communication efforts need to integrate climate change impacts into issues that the general public cares about such as impact on water resources, air quality and public health.
- In general, there was agreement that a risk assessment approach can and should ground overall climate preparedness planning efforts in New Jersey. To support such an approach, there was discussion of the need for a single repository for data pertaining to various types of climate change science, including social sciences, in order to foster information sharing and development of best practices.

- Several areas of additional investigation were identified: There is a clear need to continue work to document the economic value of New Jersey's natural and built assets that will be negatively impacted as a result of climate change. Additionally, workshop participants pointed to the compelling need for development of more reliable predictive climate models at the local level to complement global models. These models could be used to identify local critical areas for protection and planning. Similarly, there is a need for development on consensus within the state on climate scenarios to allow for consistent statewide planning.

*Preparing New Jersey for Climate Change: A Workshop for Decision Makers* served to increase awareness of climate change impacts and issues. Building upon the workshop will mean creating a network for information exchange, best practice development, and public communications related to climate change adaptation and preparedness in New Jersey. There seemed to be consensus among workshop participants that moving forward with climate change preparedness needs to be perceived as a critical economic priority for New Jersey. As a densely populated coastal State, the landscape of which is rife with aging infrastructure and housing stock, New Jersey remains highly vulnerable to the impacts of climate change. Consensus at the workshop seemed to point to the need for the need for New Jersey to act now to prepare our residents, our communities, and our infrastructure for increased extreme weather events, high heat days, flooding and sea level rise.

Based on recommendations made at the Workshop, Rutgers University is moving forward with the creation of a "network" of policymakers, practitioners, academics, Non-governmental organization leaders, private sector leaders and others. Facilitated by the University, this "New Jersey Climate Adaptation Alliance" will serve as an informal forum for exchange of ideas, projects, best practices, policy ideas and outreach and education within the State on climate change preparedness. The "Alliance" is not intended to be an advocacy forum nor is it intended to be a standalone organization. Rather, as discussed and recommended at the [November 29](#) workshop, the "Alliance" will serve to facilitate discussion among state practitioners, leaders and policymakers on climate change adaptation issues, policies, science and strategies.

Rutgers University and Clean Air-Cool Planet websites provide workshop details, including video of the morning and luncheon speakers as well as speaker presentations from throughout the day:

<http://climatechange.rutgers.edu/njadapt>

<http://www.cleanair-coolplanet.org/preparingnj/>