

National Exercise Program Climate Change Preparedness and Resilience Exercise Series
Houston Climate Change Preparedness and Resilience Workshop

Highlights

Conducted on Monday, October 6, 2014, the Houston Climate Change Preparedness and Resilience Workshop engaged 93 participants from across the whole community in a thought-provoking conversation on climate change adaptation and resiliency planning in the Houston-Galveston region.

Sponsored by the White House National Security Council Staff, Council on Environmental Quality, and Office of Science and Technology Policy, in collaboration with the National Exercise Division, and hosted by Mayor Annise Parker, the City of Houston, and NASA's Johnson Space Center, the workshop *achieved the overarching goal of advancing the climate adaptation dialogue and identifying collaborative and sustainable approaches to community based climate preparedness and resilience capabilities.*

Using climate science from the Third U.S. National Climate Assessment as a foundation supplemented by science from the local experts, the discussions focused on the effects of climate change, the associated challenges and opportunities, and specific immediate actions to collaboratively and sustainably prepare, plan for, or help mitigate future projected climate impacts on the Houston-Galveston area.

Workshop participants included local, state, and federal representatives as well as private sector, non-governmental, and academic partners who have roles, responsibilities, and expertise as they relate to climate adaptation, hazard mitigation, and resiliency planning efforts.

Feedback from the participants was overwhelming positive. They appreciated the opportunity to discuss climate change adaptation opportunities and challenges, and importantly, build networks to continue the discussion of climate change resiliency planning in the Houston-Galveston region.

Key highlights from the discussion include:

- **Identification of opportunities to align natural and built systems:** Participants noted the need to adapt infrastructure design standards to address projected consequences and cascading effects from climate change (particular to sea level rise and higher temperatures) – and discussed opportunities to achieve better alignment of natural and built/engineered infrastructure and systems. Participants from private sector organizations and non-governmental organizations highlighted ongoing as well as projected activities and opportunities in support of these efforts.
- **Recognition of critical interdependent lifelines:** Participants suggested mapping critical lifelines (e.g. electricity, telecommunications, water, and transportation) across the region to demonstrate interdependencies and identify areas that are most vulnerable. Participants from academic institutions and federal agencies offered modeling resources to support these efforts.
- **Need for strategic messaging:** Participants from all organizations discussed the importance of strategic messaging to drive action now to reduce long-term vulnerability and prioritize investments in large-scale resiliency projects in order to save money later.
- **Many partnerships exist, but a more coordinated approach is needed:** Participants identified a wide variety of existing coalitions, partnerships, associations and committees in the Houston-Galveston region that address sustainability, resiliency, and preparedness issues – however, participants acknowledged the need to unify disparate efforts being undertaken into a more cohesive climate change resiliency governance framework.
- **Agreement from all participants on the need for a unified regional resilience framework:** All participants verbally agreed to pursue a Houston-Galveston Regional Resilience Plan that involves the whole community and contains flexible and dynamic short-term requirements driving toward a long-term strategic vision that “builds a better, more resilient Houston-Galveston region.”

National Exercise Program Climate Change Preparedness and Resilience Exercise Series
Colorado Climate Change Preparedness and Resilience Workshop

Highlights

Conducted on Thursday, October 9, 2014, the Colorado Climate Change Preparedness and Resilience Workshop engaged over 85 participants from across the whole community in a thought-provoking conversation on climate change adaptation and resilience planning in the State of Colorado. Sponsored by the White House National Security Council Staff, Council on Environmental Quality, and Office of Science and Technology Policy, in collaboration with the National Exercise Division, and hosted by the State of Colorado and the City of Fort Collins, the workshop *achieved the overarching goal of advancing the climate adaptation dialogue and identifying collaborative and sustainable approaches to community based climate preparedness and resilience capabilities.*

Using climate science from the Third U.S. National Climate Assessment as a foundation supplemented by science from the local experts (in particular the authors of the 2014 Climate Change in Colorado report), the discussions focused on the effects of climate change in Colorado, the associated challenges and opportunities, and specific immediate actions to collaboratively and sustainably prepare, plan for, or help mitigate future projected climate impacts.

Workshop participants included local, state, tribal, and federal representatives as well as private sector, non-governmental, and academic partners who have roles, responsibilities, and expertise as they relate to climate adaptation, hazard mitigation, and resilience planning efforts. Feedback from the participants was very positive. They appreciated the opportunity to discuss climate change adaptation opportunities and challenges, and importantly, build networks to continue the discussion of climate change resiliency planning.

Key highlights from the discussion include:

- **Colorado is forward leaning in identifying and understanding its vulnerabilities to climate change and taking action to create a more resilient Colorado.** Participants noted several planning documents that have been developed already, including *Climate Change in Colorado*, *State Drought Plan*, and *Colorado Climate Change Vulnerability Study*, which provide local and state agencies with the relevant scientific background to inform adaptation and resilience planning, including how climate change will affect the local and state economy and resources. However, participants did note several areas where adaptation planning is still in its infancy, including addressing the effects of climate change on ground water, watersheds, and populations of disproportionate impact. The State of Colorado is planning to develop a Colorado Climate Action Plan that will include a comprehensive risk analysis to identify specific risks to Colorado.
- **Water is the resource most affected by future changes in Colorado's climate, and a resource that affects all other critical sectors.** Given its criticality, participants agreed on the need to build a collaborative relationship between agriculture, energy, and urban communities to address the challenges in sharing water, especially in times of long-term drought. They also noted that there is no adaptation strategy to maintain water availability during drier times. Participants also discussed the current challenges in building new water infrastructure, improving water-use efficiency, and identifying legislative efforts to share diminishing water resources.
- **Numerous opportunities exist to build public-private partnerships.** Participants noted opportunities to pursue partnerships with the insurance and reinsurance industry, local and regional businesses, research and academic communities, and the agriculture and energy sectors. Participants also mentioned the Colorado Emergency Preparedness Partnership, whose mission is to build public-private partnerships to strengthen preparedness capabilities. In addition, the Nature Conservancy has formed a public-private partnership in another rural community to develop and implement a climate change strategy.

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Highlights

- **Many public partnerships already exist, but there are opportunities to broaden collaboration.** Participants identified a wide variety of existing coalitions, partnerships, associations and committees in Colorado that address sustainability, resiliency, and preparedness issues – however, participants acknowledged the need to integrate these current efforts to more cohesively enhance climate change resilience across the region. Regional and local federal partners were challenged to determine how they come together to best support Colorado’s climate change adaptation and resiliency efforts – and to potentially identify a unified governance structure to support sustainable adaptation activities.
- **There is a need to integrate social and economic sciences into the climate change science and adaptation dialogue.** Numerous participants noted the increasing need to integrate social and economic science into the fundamental climate science dialogue. Integrating these disciplines will advance the field and help connect the physical science of climate change with impacts to society and the economy at multiple scales (national to local). This connection is critical to informing actionable decisions for adaptation and improving the understanding of community risks and place-based adaptation options. This type of integration between fundamental climate science and social and economic science is long overdue.
- **There is a need for science translation of and strategic messaging on climate change risks, opportunities, and potential solutions.** Participants noted the challenge in translating climate change science into actionable information for leaders to develop policy decisions and communicate effective messages to the public. Rather than focusing on an uncertain future, participants suggested integrating future climate change projections and risks into current strategies for existing stressors such as drought, wildfires, and flooding, as these hazards are just as relevant today.

National Exercise Program Climate Change Preparedness and Resilience Exercise Series
Alaska Climate Change Preparedness and Resilience Workshop

Highlights

Conducted on Monday, October 27, 2014, the Alaska Climate Change Preparedness and Resilience Workshop engaged 53 participants from across the whole community in a thought-provoking conversation on climate adaptation and resilience planning in the State of Alaska. Supported by the State of Alaska Division of Homeland Security and Emergency Management, the workshop helped to advance the Alaskan climate adaptation dialogue and identify collaborative and sustainable approaches to community-based climate preparedness and resilience capabilities.

Using technical scientific inputs that supported the development of the *Third U.S. National Climate Assessment*, the discussions focused on key focus areas and concepts: environmental, social and cultural, economic, and security. These areas gave context for examining effects of climate variability and change in Alaska, associated challenges and opportunities across two generational time horizons – our time and our children’s time. Additionally, specific immediate actions and sustainable approaches to preparation, planning, or mitigation of future projected climate effects were examined in the context of our children’s and grandchildren’s time.

Workshop participants included local, state, tribal, and federal representatives as well as private sector, non-governmental, and academic partners who have roles, responsibilities, and expertise related to climate adaptation, hazard mitigation, and resilience planning. Feedback from participants was very positive, as they appreciated the opportunity to discuss climate adaptation opportunities and challenges, and more importantly, build networks to sustain discussion of hazard mitigation and resilience planning.

Key highlights from discussions include:

Strong desire to re-invigorate the Governor’s Subcabinet on Climate Change and the Immediate Action Working Group.

The Governor’s Subcabinet on Climate Change, initiated in 2007, consisted of several working groups to address climate change-related issues. The Subcabinet dissolved after completing work outlined in their charter and institutionalizing findings into state agency budgets. The Immediate Action Working Group consisted of agency leadership from state and federal agencies. It was chartered to identify hazard mitigation and adaptation projects that were needed immediately to enhance Alaska’s resilience to climate variability and change. Although participants agreed that missions of both the Subcabinet and Immediate Action Working Group were complete at the time, there is still an ongoing need for an over-arching governance structure to provide oversight, guidance, and structure to ongoing collaborative climate adaptation preparedness and resilience efforts described by participants.

Challenges exist in preserving traditional way of life for Alaska Native communities and adapting to the effects of climate change.

Participants stressed the importance of engaging Alaska Native communities and listening to what they need, rather than prescribing to them what they should do to adapt. For example, Alaska Native communities are concerned that their hunting and fishing opportunities will be diminished in the future. They are depending on science to guide policies that support adaptation and ensure regulations placed on hunting and fishing are not unnecessarily restrictive. Alaska Native communities are adaptive by nature, efforts should be made to understand and support existing adaptation efforts such as the use of new equipment and techniques that capitalize on changing climate. For example Alaska Native communities can now conduct whale hunts during the fall season since there is less sea ice.

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Alaska Climate Change Preparedness and Resilience Workshop

- Existing conditions in Alaska Native communities, such as substance abuse and violence, could be exacerbated with the perceived loss of culture and way of life that may accompany changes in climate. Participants stressed the importance of ensuring support systems and services, especially education, are in place to anticipate and address these issues before they arise. In addition, preservation of transportation infrastructure in the face of climate consequences – such as thawing permafrost, coastal and riverbank erosion, and more frequent storms and wildfires – is crucial to rural Alaskan communities’ access to jobs, education, and public health services.

- **Increased shipping in the Arctic presents opportunities and challenges.**
Participants noted an increase in private sector activity in the Arctic, centered on the movement of ships, barges, and planes, as the Arctic climate is changing and becoming more amenable to shipping. U.S. government actions in response to the increased shipping traffic, however, are still in the initial planning stages. For example, the U.S. Coast Guard investigates Arctic waterway safety and port requirements that are expanding above the Arctic Circle. Participants stressed that now is the time to ensure infrastructure is in place to prepare for additional likelihood for spills that may result from increased traffic and oil/gas exploration. They also cautioned against developing new plans when the U.S. Contingency Plan outlines the necessary activities for the management of oil spills. Inversely, future technologies and energy sources may reduce likelihood of environmental disasters from oil and gas exploration.

- **Federal grants do not have flexibility to fund resiliency projects.**
Participants noted multiple challenges to gaining access to federal grant funds that could support making their communities more resilient. Challenges include:
 1. The standard cost-benefit analysis for federal grants and projects does not adequately weigh human and societal factors. One long-term planning challenge is that projects have to meet cost-benefit analysis requirements to qualify for FEMA grants, U.S. Army Corps of Engineers projects, and other grant programs. However, in Alaska there are Alaska Native community infrastructure (e.g., homes, schools, and other public service building) that are at risk of falling into the ocean and need to be either protected with expensive engineering projects, re-located further inland or re-located to higher ground. However, while the population of many Alaskan communities is small, the threat to these communities and their existence influences cost-benefit calculations used to determine funding of grant requests or U.S. Army Corps of Engineers projects. It is necessary to modify (or adapt) cost-benefit assumptions to examine the value of whole community investment in Alaska Native community relocation or structure elevation.
 2. It is difficult to use federal grants for proactive funding of community resilience projects. Funding is easier following an emergency, but federal emergency funding is restrictive. One example participants provided is that Federal emergency funds require roads to be rebuilt exactly the same as they were prior to the emergency. However, grant funding in this response and recovery fashion does not address long-term problems resulting from the loss of sea ice or thawing permafrost.
 3. Currently, natural resource assets are not valued in the same way as other assets. Challenges exist in determining appropriate dollar amounts to spend on infrastructure to ensure those resources are well protected and restored over time.

**National Exercise Program Climate Change Preparedness and Resilience Exercise Series
Hampton Roads Climate Adaptation Preparedness and Resilience Exercise**

Highlights

Conducted on December 2, 2014, the Hampton Roads Climate Adaptation, Preparedness, and Resilience Exercise engaged 168 participants from across the whole community in a thought-provoking conversation on climate adaptation and resiliency planning in the Hampton Roads metropolitan region of southeastern Virginia.

Sponsored by the White House National Security Council Staff, Council on Environmental Quality, and Office of Science and Technology Policy, in collaboration with the National Exercise Division, and hosted by Old Dominion University and the Hampton Roads Sea Level Rise Preparedness and Resilience Intergovernmental Planning Pilot Project, the workshop advanced climate adaptation dialogue and identified collaborative and sustainable approaches to community-based climate preparedness and resilience capabilities.

Using climate science from the Third U.S. National Climate Assessment: *Climate Change Impacts in the United States* as a foundation, and supplemented by science from local subject-matter experts, the discussions focused on the effects of climate change, the associated challenges and opportunities, and specific immediate actions to collaboratively and sustainably prepare, plan for, or help mitigate future projected climate impacts on the Hampton Roads area.

Exercise participants included local, state, and federal representatives, as well as private sector, non-governmental, and academic partners who have roles, responsibilities, and expertise as they relate to climate adaptation, hazard mitigation, and resiliency planning efforts.

Key highlights from the exercise include:

Attaining organizational cohesion and collaboration among the various Hampton Roads jurisdictions remains the most pressing challenge to meaningful climate change mitigation planning. The Hampton Roads metropolitan area is comprised of several independent municipal jurisdictions and lacks an effective regional governmental structure. To date, competing economic interests other issues among these localities have precluded progress on many collective challenges. The sense among the exercise participants was that climate adaptation is such a formidable test to the future viability of the region that it might be the one issue that could bring the jurisdictions together in common cause.

Transportation critical infrastructure was identified the most serious and economically important climate change vulnerability. Even today, the low-lying geographical characteristics of the Hampton Roads have rendered transportation as a difficult component of the region's infrastructure to manage. The climate-based projections for 2044 and 2084 make current transportation arteries nonviable for supporting economic activity, let alone emergency evacuation. For this reason, transportation infrastructure was identified as one of the highest priorities for the Pilot Project.

Transformation of the Hampton Roads economy is a climate adaptation imperative. The exercise scenarios for 2044 and 2084 posited an environment in which climate-related effects may no longer support the present-day major local industries of the U.S. Navy, maritime commerce, tourism, and seafood. While mitigation options should most certainly be researched and pursued to preserve these engines of the local economy, climate adaptation may present other economic opportunities that should be conceived and seized.