Municipal Adaptation and Resiliency: Cities at the Forefront

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Office of Ocean and Coastal Resource Management | Coastal Services Center
Outline

Coastal Preparedness, Response, Recovery, and Resilience

Strategic Partnerships

Opportunities for Collaboration
2013: Year in Review

January-December 2013 Statewide Ranks
National Climatic Data Center/NESDIS/NOAA

Preliminary Significant U.S. Weather and Climate Events for 2013

DROUGHT
Drought conditions greatly expanded across the Intermountain West, much of the Plains, and the Southeast. From January 1 to December 31, the percent area of the contiguous U.S. in drought expanded from 61.7% to 81.1%. Drought conditions worsened in the West.

WATER LEVELS
In early 2013, Lakes Michigan and Huron reached record low levels in the 137-year period of record, according to the U.S. Army Corps of Engineers. An all-time Great Lakes high water level was set above average.

SNOW
This spring snow cover extent for the contiguous U.S. was the 10th largest on record. The northeastern U.S. had more snow during the spring than the preceding winter season.

TORNADOES
A tornado outbreak in Kansas on November 17 was the largest since 1994, ranking 35th on the hardiness scale. A total of 776 tornadoes occurred in the U.S., with 196 twisters confirmed.

SUNSHINE
Dry, sunny conditions were widespread across the Southeast, Midwest, and Northern Plains where numerous cities had their wettest year on record.

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Coastal Communities: Vital to U.S. and International Economies

- $6.6 T – Contribution to GDP from Coastal Counties
- 51 million jobs
- Coastal habitats help reduce impacts of floods, storms, and climate change on coastal communities by absorbing water, wave energy, and other stressors.

Port Clinton, OH
Context Matters

POPULATION DENSITY IS GROWING AT THE COAST
Regardless of how the coast is defined, it is **substantially more crowded** than the U.S. as a whole, and population density in coastal areas will continue to increase in the future.

In 2010: **Out of the 3 million mi² of land in the US**
- <10% or 275,351 mi² comprise Coastal Shoreline Counties
- <20% or 511,971 mi² comprise Coastal Watershed Counties

In 2010: **Out of the 313 million people living in the US**
- 39% or 123.3 million people lived in Coastal Shoreline Counties
- 52% or 163.8 million people lived in Coastal Watershed Counties

In 2010: A small amount of land and a large number of people means high density

In Just 40 Years: 1970-2010
- Coastal Shoreline Counties added 125 persons/mi²
- Coastal Watershed Counties added 99 persons/mi²
- United States as a whole added 36 persons/mi²

Note: Land area and density values exclude Alaska. Population values include Alaska and US Territories.

Source: U.S. Census Bureau, 2011b; NOAA, 2012; Cowell et al., 2010
Preparedness, Response, Recovery, and Resiliency

Ensuring Safe, Efficient, and Environmentally Sound Marine Navigation

Supporting Community Livelihood

Promoting Resilience to Coastal Hazards

Office of Ocean and Coastal Resource Management | Coastal Services Center
NOAA Technical Memorandum GLERL-153

LAURENTIAN GREAT LAKES BASIN
CLIMATE CHANGE ADAPTATION

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1 University of Michigan School of Natural Resources, Cooperative Institute for Limnology and Ecosystem Research and NOAA, Great Lakes Environmental Research Laboratory
2 Old Woman Creek Estuarine Research Reserve
3 NOAA National Ocean Service (Great Lakes Regional Coordinator)
4 Minnesota Sea Grant
5 Ohio Sea Grant
6 Minnesota Sea Grant
7 St. Lawrence Seaway Development Corporation U.S. Department of Transportation

Edited by Dawn Nelson and Rebecca Hald

March 2011

Top Ten Needs Identified For the Great Lakes Basin

Note: These ten needs are a general overview ("10,000 foot level") of the approximately 300 needs addressed in the NOAA Technical Memorandum.

1. Research and implementation of resilient land use and physical planning/design that incorporates local economic drivers, infrastructure management/monitoring, transportation, and land-sea interactions.

2. Management, coordination, and adjustment of maps, models, and collected data to incorporate new information and to allow for regional, as well as downscaled forecasting, analysis, and assessment of climate change-related events.

3. Regional needs coordination and relationship building between/among federal agencies, states, and local governments for the sake of efficient knowledge exchange through improved communication, decreased redundancy, and reduced regulatory/cross-jurisdictional conflicts.

4. Increased climate change and NOAA literacy through "actionable science" from federal agencies, education efforts, community outreach, tribal engagement, increased communication with stakeholders, and end-user/public participation.

5. Biological/ecological research, assessment, and monitoring, as well as prioritization of ecosystem restoration, in order to mitigate environmental stressors and monitor ecosystem health.

6. Decision maker trainings revolving around utilizing sector-specific, as well as general tools/strategies to implement clear and flexible ecosystem-based management programs that properly manage/protect resources (e.g., forests, fisheries, beaches, floodplains).

7. States, municipalities, and managers (land use planners, emergency managers, and extension agents) need current, comprehensive, near-term, and regional relevant climate change data to incorporate into decision-making (e.g., drafting ordinances, master plans, and evacuation plans).

8. Financial support, as well as political guidance and resource leverage for local climate adaptation efforts/projects.

9. Engineering, design, and social research as it applies to data collection methods, modeling, forecast uncertainty, extreme event attribution, and community resiliency.

10. Assessing the impacts of climate change on natural resource demands/budgets, and how those impacts will affect different sectors of the economy.
Economics of Green Infrastructure
Strategies for Climate Change

- Climate trends show more frequent, intense rain events
- Communities need to help adapting
- Pilot effort to show economic benefit of GI
- Technical support to pilots and methodology to share
A team of University of Michigan graduate students needs your input!

Who Are We?
We are a team of seven University of Michigan graduate students conducting a Master’s Project focusing on climate adaptation with NOAA’s Great Lakes Regional Collaboration Team, in partnership with the Great Lakes and St. Lawrence Cities Initiative (GLSLCI).

What Are Our Objectives?
1) Develop an online toolbox of municipal climate adaptation planning materials. The toolbox will include training modules, climate readiness self-assessment checklists, GIS maps and community-informed infographics.

2) Conduct case studies of Great Lakes municipalities to identify best practices for city and community engagement in climate change and disaster preparedness, as well as barriers to adaptation planning.

How Much Time Will it Take?
We estimate the total time commitment not to exceed ten hours over a four week period. Interviewees will also have the option to be featured on our project blog!

Participation in Our Project May Involve:
- Correspondence with us via email or telephone to schedule a meeting;
- An interview with our Team (questions will be sent in advance for your review);
- Providing feedback on training modules, infographics and other adaptation planning resources we develop;
- Assistance identifying participants for a focus group of local stakeholders.

Interested? Please contact ClimateReadyGLCities@umich.edu for more information

http://climatevictors.blogspot.com/
WELCOME TO THE MARS COMMUNITY OF PRACTICE (MARS CoP) PORTAL!

The Cities Initiative, in cooperation with its partners OCCIR and CAP, have created the Municipal Adaptation and Resiliency Service (MARS), with the objective of accelerating climate change adaptation and building resiliency in its over 100 member municipalities across the Great Lakes and St. Lawrence basin. MARS is focused on practical steps that may be implemented over the short term in both small towns and large cities.

To take advantage of the resources and interactive functions that MARS offers, you must register on this page. Simply go to the right of this screen, and click on register.

MARS includes three main elements:
Tools, Products, Services...OH MY!

http://www.drought.gov/drought/content/resources/reports

http://coastalmanagement.noaa.gov/climate/docs/adaptationgreatlakes.pdf
Highlight: Lake Levels
Lake Level Viewer in Development

Current Data Processing

GREEN – Processing Complete
RED – Processing Underway

Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Lake Level Viewer Development

• Beta release is scheduled for late July 2014
• Final release (Version 1) to be delivered late Summer 2014
• Future FY15 GLRI Funds:
  – Navigational Channel Bathymetry data from USACE & NOAA OCS
  – Fill in existing bathymetry gaps

Holland Cover, NY (Lake Ontario)
Lake Level Viewer Development
0 Feet
Lake Level Viewer Development
-3 Feet
Lake Level Viewer Development
-6 Feet
Lake Level Viewer Development
+3 Feet
Collaboration Opportunities: GLWQA Climate Impacts Annex 9

Part 1: Fundamentals of Climate Change

Part 2: Climate Change Impacts
- Lake Levels
- Ice Cover
- Severe Weather
- Ecosystem Change

Part 3: Great Lakes Water Quality

Key Questions for GLWQA Annexes
- AOCs: How will changes in climate and weather patterns affect plans for delisting these areas? Is climate change being considered in those plans? What information is needed to inform future activities and reduce risk?
- Lakewide Management: Recognizing that each of the LAMPS has handled climate impacts and adaptation a bit differently, what information is necessary for all lakes going forward? Is there a standard set of information that each lake will require in the development of the nearshore framework, ecosystem objectives, and the LAMP every five years?
- Chemicals of Mutual Concern: What climate and weather information is necessary to track the life cycles of these chemicals?
- Nutrients: What climate and weather information is necessary to inform the Nutrients work ahead?
- Discharge from Vessels: Are there climate connections that we should be aware of and concerned with going forward?
- Aquatic Invasive Species: Need to consider both known invaders and "unknown" invaders. What will changes in temperature and nearshore habitats have over the long term for these species?
- Habitat and Species: What information can the Climate Annex provide that will help going forward?
- Groundwater: What climate variables need to be monitored and reported for advance planning with regard to ground water? Who needs to receive that information and on what time frequency?
- Science: What don’t we understand about climate impacts? Where is the science lagging behind our management needs? What science is needed to inform management decisions on the ground?
Collaboration Opportunities: Lakewide Management Action Plans

Resources

NOAA Climate
http://www.climate.gov/

Coastal Climate Adaptation
http://collaborate.csc.noaa.gov/climateadaptation/default.aspx

Lake Level Viewer
http://www.csc.noaa.gov/digitalcoast/

Coming Soon!

NOAA GLERL Water Level Dashboard
http://www.glerl.noaa.gov/data/now/wlevels/dbd/portal.html

Regional Climate Outlook
http://www.drought.gov/drought/content/resources/reports