Water Resource Strategies and Information Needs in Response to Extreme Weather/Climate Events

Nancy Beller-Simms (NOAA) & Karen Metchis (EPA)

ACWI – May 30, 2013
This Study

• A snapshot in time of a cross section of “typical” communities that have experienced extreme events.

• Examine the state of play in American communities as they begin to cope with extreme weather and climate events.

• Study how they planned, coped, and expect to adapt to extremes given the new normal (growing awareness of new extreme trends).
What is an Extreme Event?

Many definitions (e.g., IPCC, NCA, etc.)

Many approaches to defining (e.g., economic, physical, social...)

Our approach:
- an 'extreme event' was one that was notable in some way (e.g., broke previous records or inflicted major damage)
- extremes are defined by impacts on the community and the extraordinary measures required to cope
The Extreme Events Team

Screen: Kenan Ozekin, Water RF
Back Row: Lauren Fillmore, WERF, Karen Metchis, US EPA, Erica Brown, Noblis
Front Row: Nancy Beller-Simms, NOAA, Claudio Ternieden, CTC

With special thanks:
Amrith Sagar, Caroline Hemenway, Miriam Heller, Nancy Tosta, Rob Greenwood
Partnerships

• Unique partnership of 2 federal agencies; 2 water-related research foundations; and 2 other applied science research organizations

• Working relationships began in 2009

• Funded initial workshop

The Future of Research on Climate Change Impacts on Water

A Workshop Focusing on Adaptation Strategies and Information Needs

Subject Area: Water Resources and Environmental Sustainability
> 4 inches of rain in 24 hours – March 13-14, 2012
1. Resilience = Readiness for multiple types and occurrences of extreme events

- **Russian River**
  - Flood ’06
  - Drought + Frost ‘07-’09

- **Apalachicola-Chattahoochee-Flint**
  - Drought ’07/08
  - Flood Sept. ‘09
  - Flood Winter ‘09/10
  - Drought ‘12

- **Central Texas**
  - Drought ‘06/07,
  - Flood ’07
  - Drought + Wildfires ’11
  - Drought 2010-present

- **National Capital Region**
  - Derecho June ‘12
  - Superstorm Sandy Oct. ‘12

- **Tidewater Virginia**
  - H. Isabel ‘03
  - Nor’easter Ida ‘09
  - Hurricane Irene Aug ‘11
  - Tropical Storm Lee Sept ‘11
  - Two Nor’easters ‘12

- **Lower Missouri River**
  - Record Floods ‘52, ’93, ’11
  - Drought ‘12/13
Impacts, Responses, and Costs Vary

**Drought**
- Impacts: slow moving (ex. wildfire!)
- Response: sustained over long periods of time
- Costs: reduced revenue, repairs, new technologies
- Dynamics: divisiveness

**Floods/storms:**
- Impacts: acute
- Response: ER, recovery
- Costs: damage, recovery
- Dynamics: cooperation

They all require community buy-in for long-term solutions
2. Resilience = critical water services are prioritized

During/after Emergencies – first priorities

- Restoring access to potable water
- Controlling wastewater discharges

Water utilities depend on:

- Electricity
- Communication systems
- Supply Chains (fuel, chlorine)
- Transit
- Emergency response
...and re: resilience -> public expectations are aligned with willingness to pay

Engage the public about:

- The feasibility and cost of reducing risks
- Their readiness and role in protecting their own safety and property
- (hint: view the media as a constituency)
3. Resilience = emergency response + long term preparedness

-> Utilities must actively embrace both!

- > Utilities are increasingly:
  • skilled at responding to emergencies
  • conducting vulnerability assessments

- > But implementing adaptation plans is limited
...and Resilience =
formal and informal networks

- **Formal** support and communication networks establish clear roles during emergencies
- **Informal** networks and relationships provide flexibility for problem solving
4. Resilience = coordination beyond service area or jurisdictional boundaries

- Many organizations and constituents play a role that affects watershed management and utility operations.
- Failure to understand interdependencies can undermine success of everyone’s actions.
5. Resilience = community leadership and innovation

- Water utility managers are competently taking action *within their span of control*
- Overcoming boundaries requires leadership to navigate a community-wide path to resilience
…and Resilience = communication and cooperation

- The unique local political, environmental, and social context can facilitate or constrain community ability to address vulnerabilities
- Having the right messenger(s) matters
- A trusted, neutral party can convene and engage sectors in problem solving for locally viable solutions
6. Resilience = active engagement in acquiring information

There is no ‘silver-bullet’ decision support tool

- More information at practical temporal and spatial scales is available than realized
- Decision makers need to be informed of and trained to use available tools.

All tools require effort to customize and apply to local conditions
7. Resilience = multi-disciplinary teams to create actionable information

Useful decision support can often be met by working with integrated teams

- **Water utilities:** articulate their needs in the context of specific decisions
- **Water managers and water users:** gain cross-sector understanding

- **Climate modelers and academics:** understand local and sectoral needs
- **Stakeholders:** buy-in to solutions
Other Resilience Lessons
Future Products

• 2-pagers summarizing impacts, response and lessons learned

• Final report – synthesis
  • More detailed case studies
  • Synthesis of lessons, tools and needs

• Peer-reviewed and trade-specific publications

• Webinars

• Conference Talks
Thank you!

Fact Sheets on Site Visits: http://cpo.noaa.gov/ClimatePrograms/ClimateSocietalInteractionsCSI/SARPProgram/ExtremeEventsCaseStudies.aspx