Introduction to Climate Ready Water Utilities Initiative (CRWU)

John Whitler, Water Security Division, US EPA
Olga Morales, Rural Community Assistance Corporation and Chair of the National Drinking Water Advisory Council

January 23, 2013

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## CRWU Webinar Series

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<td>Introduction to CREAT</td>
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<td>March 6, 2013</td>
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<td>Workshop Planner/ Adaptation Strategies Guide</td>
<td>April 10, 2013</td>
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<td>Using CREAT for Planning and Decision Support</td>
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- Additional topics and dates under consideration
- Visit [http://www.epa.gov/climatereadyutilities](http://www.epa.gov/climatereadyutilities) for updates
Housekeeping

- Polling questions
- Mute/un-mute
- Hand raise function
- Questions
- Technical difficulties
CRWU Mission Statement

To provide the water sector (drinking water, wastewater, and stormwater utilities) with the practical tools, training, and technical assistance needed to adapt to climate change by promoting a clear understanding of climate science and adaptation options.
Overview

- Background on climate change and CRWU
- CRWU Tools & Resources
- Implementation – collaboration with utilities and their partners
Connect with CRWU

- Visit us on the web at: www.epa.gov/climatereadyutilities
- Contact us for questions, help and feedback at: CRWUhelp@epa.gov
What Types of Changes Are Expected?

- Increasing temperatures
- Changing precipitation patterns
  - Less in some areas, more in others
  - Frequency and magnitude of extreme precipitation events
  - Changes in snowfall and snowpack
- Changing patterns of extreme weather events
- Rising sea level
Impacts of Climate Change

- Degraded water quality and treatment challenges
- Lower reservoir levels and water shortages
- Stormwater management challenges
- Coastal flooding from storm surges
- Loss of wetlands and coastal ecosystems
- Increased frequency and extent of floods
- Increased residential demand
- Earlier spring runoff
- Reduced groundwater recharge
- Saltwater intrusion into coastal aquifers
Impacts of Climate Change

- Degraded water quality and treatment challenges
- Earlier spring runoff
- Lower reservoir levels and water shortages
- Increased residential demand

Increasing temperature
Impacts of Climate Change

- Reduced groundwater recharge
- Degraded water quality and treatment challenges
- Lower reservoir levels and water shortages
- Stormwater management challenges

Changing precipitation
Impacts of Climate Change

Increase frequency and extent of floods

Stormwater management challenges
Impacts of Climate Change

- Loss of wetlands and coastal ecosystems
- Coastal flooding from storm surges
- Saltwater intrusion into coastal aquifers
- Sea-level Rise
What is a Climate Ready Water Utility?

The National Drinking Water Advisory Council (NDWAC) approved the formation of a working group to evaluate “Climate Ready Water Utilities.”

Charge included identifying:

- Behaviors that characterize a climate ready utility
- Needed tools, trainings and products that would help utilities engage in climate ready behaviors
- Mechanisms that would facilitate adaptation and mitigation by the water sector
National Drinking Water Advisory Council Report

- Released January 2011
- 11 findings of barriers to mitigation and adaptation actions by utilities
- 12 recommendations to help EPA and utilities move forward
- Result: EPA started CRWU initiative
Adaptive Response Framework

Explore elements of climate readiness
Elements of Climate Readiness

Adaptive Response Framework

- Awareness
- Adaptation
- Mitigation
- Policies
- Community
- Partnership

Climate Ready
• Incorporate climate change into existing planning practices
• Range of activities can build “climate readiness” at your utility
• Use of adaptive management may be critical component of becoming and staying a climate ready water utility
• Reference guide for using Framework
• Key concepts and actions for each element
• Resources that support pursuing actions
Climate Ready Tools & Resources

Climate Ready Process

Adaptive Response Framework

Explore Elements of Climate Readiness

Learn Climate and Adaptation Basics

Research and Gather Information

Collaborate with Partners

Assess Risks and Evaluate Opportunities

Extreme Events Workshop Planner

Climate Resilience Evaluation and Awareness Tool

Adaptation Strategies Guide

Toolbox

Comprehensive Strategies Guide for Water Utilities

Prepared for Extreme Weather Events: Workshop Planner for the Water Sector
 Adaptation Strategies Guide

Learn climate and adaptation basics
Adaptation Strategies Guide

- Reference guide for adaptation planning
- Easy-to-navigate briefs
  - Regional climate impacts
  - Utility-specific challenges
  - Sustainable strategies
- Adaptation options to consider
- Glossary and planning worksheet
**Regional Climate Briefs**

- Browse regional climate data
  - Projected changes
  - Anticipated challenges
- Jump to specific challenge briefs
- Review example data and related challenges
Challenge Briefs

- Translating climate data into utility-relevant challenges
- Adaptation options relevant to this challenge
**Adaptation Options**

- Options provided in three categories
  - Planning
  - Operational
  - Capital/Infrastructure
- Relative cost ($-$$$)
- No Regrets
- Utility Examples

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<th>Planning (Continued)</th>
<th>Cost</th>
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<tr>
<td>Integrate climate-related risks into capital improvement plans, including options that provide resilience against current and potential future sea level and storm surge risks.</td>
<td>$</td>
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<tr>
<td>Participate in community planning and regional collaborations related to climate change adaptation.</td>
<td>$-$$</td>
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<tr>
<td>Implement policies and procedures for post-flood repairs.</td>
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<th>Operational Strategies</th>
<th>Cost</th>
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<tr>
<td>Monitor and inspect the integrity of existing infrastructure.</td>
<td>$-$$</td>
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<tr>
<td>Monitor flood events and drivers that may impact flood and water quality models (e.g., storm intensity, sea level).</td>
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<th>Capital/Infrastructure Strategies</th>
<th>Cost</th>
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<td>Acquire and manage coastal ecosystems, such as coastal wetlands, to attenuate storm surge and reduce coastal flooding (“soft protection”).</td>
<td>$$$</td>
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<tr>
<td>Set aside land to support future flood-proofing needs (e.g., beavers, dikes, and extractable piers).</td>
<td>$$$</td>
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<tr>
<td>Build flood barriers, sea walls, levees, and related structures to protect infrastructure.</td>
<td>$-$$</td>
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<td>Establish alternative power supplies, potentially through on-site generation, to support operations in case of loss of power.</td>
<td>$-$$</td>
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<td>Relocate facilities (e.g., treatment plants) to higher ground.</td>
<td>$$$</td>
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<tr>
<td>Improve pumps for backflow prevention.</td>
<td>$$</td>
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<tr>
<td>Increase capacity for wastewater and stormwater collection, treatment and discharge, including redundancies to hedge against infrastructure losses and disruptions.</td>
<td>$$$</td>
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<tr>
<td>Increase treatment capabilities to address water quality changes (e.g., increased turbidity or salinity).</td>
<td>$$$</td>
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**Example**

The Massachusetts Water Resources Authority (MWRA) incorporated sea-level rise into plans for building a wastewater treatment plant on Deer Island in Boston Harbor. Raw sewage collected from on-shore communities is pumped under Boston Harbor and up to the treatment plant. After treatment, the effluent is discharged into the harbor through a gravity outfall. The MWRA originally planned to lower the level of Deer Island about 3.6 feet to be closer to sea level, reducing pumping costs. However, design engineers were concerned that sea level rise would necessitate construction of a seawall around the treatment plant, which would require pumping the effluent over the seawall. To avoid this outcome, the plant was built 3.0 feet higher than it would otherwise have been built. This height was chosen because it accommodated the predicted amounts of sea level rise through 2050 as well as the planned life of the facility. Construction on Deer Island Wastewater Treatment Plant was completed in 1998 (Bauserling et al., 2004, CAP 2007, CAKE 2011).
Toolbox

Research and gather information
Toolbox

• Interactive online database geared towards the water sector

• Current toolbox contains approximately 600 resources
  – Publications
  – Current activities
  – Funding opportunities
  – Events
  – Tools and models
Climate Ready Water Utilities Toolbox

The CRWU Toolbox provides access to resources containing climate-related information relevant to the water sector. The Toolbox contains highlighted resources below organized into categories to help guide the user to the most relevant information. Hundreds of additional resources in the Toolbox can be searched by geographic region, water utility type and size, water resources, climate change impact, and climate change response strategies. These resources will be updated frequently to provide the most current water sector climate change information.

Some of the resources on this page are links to non-EPA websites that provide additional information about Climate Ready Water Utilities. In these cases, you will leave the EPA.gov domain and enter another page with more information. EPA cannot attest to the accuracy of information on that non-EPA page. Providing links to a non-EPA Web site is not an endorsement of the other site or the information it contains by EPA or any of its employees. Also, be aware that the privacy protection provided on the EPA.gov domain (see Privacy and Security Notice) may not be available at the external link.
### Which categories of information would you like to search?

- Activities
- Funding
- Publications and Reports
- Tools and Models
- Training, Workshops and Seminars

### Who are you?

**Region**
- Not Region Specific
- Northeast
- Southeast
- Midwest
- Great Plains
- Northwest
- Southwest
- Alaska
- Islands (HI/PR)
- Tribal lands
- Coastal areas
- International

**Utility Type**
- Not Type Specific
- Drinking Water
- Storm Water
- Wastewater
- Combined

**Utility Size**
- Not Size Specific
- Small (up to 3300)
- Medium (3301 - 10000)
- Large (10001 - 100000)
- Very Large (100000 or more)

### What are your concerns?

**Climate Impact**
- Sea level
- Temperature
- Precipitation
- Storm frequency & intensity
- Seasonal hydrology
- Glacial / snow pack melt
- Evaporation

**Water Resource Type**
- Droughts
- Floods
- Source & receiving water quality
- Ecosystems
- Competing water uses
- Public health
- Groundwater
- Surface water
- Desalinated water
- Reclaimed water

**Response Strategy**
- Mitigation
- Adaptation

### Show Results
Preparing for Extreme Weather Events: Workshop Planner for the Water Sector

Collaborate with partners
Workshop planner contains materials needed to plan and conduct a workshop on how extreme weather events could impact your utility and watershed.

Users are encouraged to work with partners and stakeholders outside of the utility to open lines of communication and ensure a comprehensive discussion.

Workshops allow participants to gain a better understanding of the impacts and identify what steps can be taken now to provide greater resilience in the long-term.
Five scenarios are included:
- Flooding
- Drought
- Sea-level rise
- Wildfire
- Reduced snowpack

Available on CRWU website
http://www.epa.gov/climatereadyutilities
Climate Resilience Evaluation & Awareness Tool (CREAT)

Assess risks and evaluate opportunities
Build Awareness

- Explore local climate data
- View links to publications, models, and other tools

Assess Risk

- Catalog data and assumptions
- Understand and assess climate impacts

Plan Adaptation

- Compare adaptation options
- Generate reports to support decisions
Climate Data in CREAT

View data from multiple climate stations, scenarios, and time periods

Annual and monthly temperature and precipitation

Intense precipitation events and sea-level rise
CREAT 2.0 is freely available for download from the CRWU website

Training videos are integrated into software with example analysis files
Climate Ready Process

Adaptive Response Framework

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Climate Ready Tools & Resources
CRWU Implementation

Working collaboratively with utilities and partners
CRWU-CRE Exercises

- North Hudson Sewerage Authority, NY/NJ Harbor NEP, EPA Region 2
  - Joint risk assessment
  - Explored collaborative adaptation strategies
  - Fostered relationship between wastewater utility and NEP
  - Documented methodology and lessons learned
• Morro Bay Water Purveyors, Morro Bay NEP
  – Climate projections integrated into groundwater basin management plan
  – Sustainable yield calculations used to support CREAT assessment

• Albemarle-Pamlico NEP
  – Coastal utilities from Manteo and Columbia, North Carolina
  – Joint risk assessment with focus on sea-level rise
Implementation – Pilots and Exercises

- CRWU/CRE Exercises
- CREAT Pilots
- Workshop Planner Exercises
We always appreciate feedback and collaboration when it comes to climate resiliency at utilities.

- Send questions to CRWUhelp@epa.gov
- Host pilot projects and exercises to improve and learn about available tools
- Share your success stories with CRWU and other utilities as part of future releases
- Visit EPA climate change page: http://epa.gov/climatechange
## Upcoming Events

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To register for these events and download resources, visit the CRWU website:

[www.epa.gov/climatereadyutilities](http://www.epa.gov/climatereadyutilities)
Thank you

Any questions?

Curt Baranowski
Baranowski.Curt@epa.gov

John Whitler
Whitler.John@epa.gov

Amy Posner
Posner.Amy@epa.gov

Laura Dubin
Dubin.Laura@epa.gov

CRWUhelp@epa.gov