

U.S. EPA's Creating Resilient Water Utilities



Our Mission

- Provide water sector utilities with the practical tools, training, and technical assistance needed to increase resilience to climate risks
- Promote a clear understanding of complex climate science and potential long-term adaptation options
- Collaborate with utilities and partners to increase our reach and improve our support and resources

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CRWU: www.epa.gov/crwu



Utility Resilience Critical to Community Resilience

- Safe drinking water and clean water services are critical to public and environmental health
- Utilities are anchor institutions in their communities, providing critical services and leadership in climate resilience
- Available funding can accelerate the development of water infrastructure to bolster resilience and readiness to future climate impacts like extreme temperatures, precipitation, and natural disasters
- Effective preparedness and adaptation requires awareness and a clear understanding of climate science data and potential long-term adaptation options



Scenario-based Decision Support



Which uncertainties are likely to challenge your decisions?

- Worried about climate conditions and exposure of your system to related threats?
- Are shifting economic conditions and your ability to recover after events going to dominate the risks from the event itself?
- Is your system ready or should assessments focus on current conditions and performance along with adaptive benefits?





Discover: Find out which extreme weather events pose significant challenges to your utility and build scenarios to identify potential impacts.

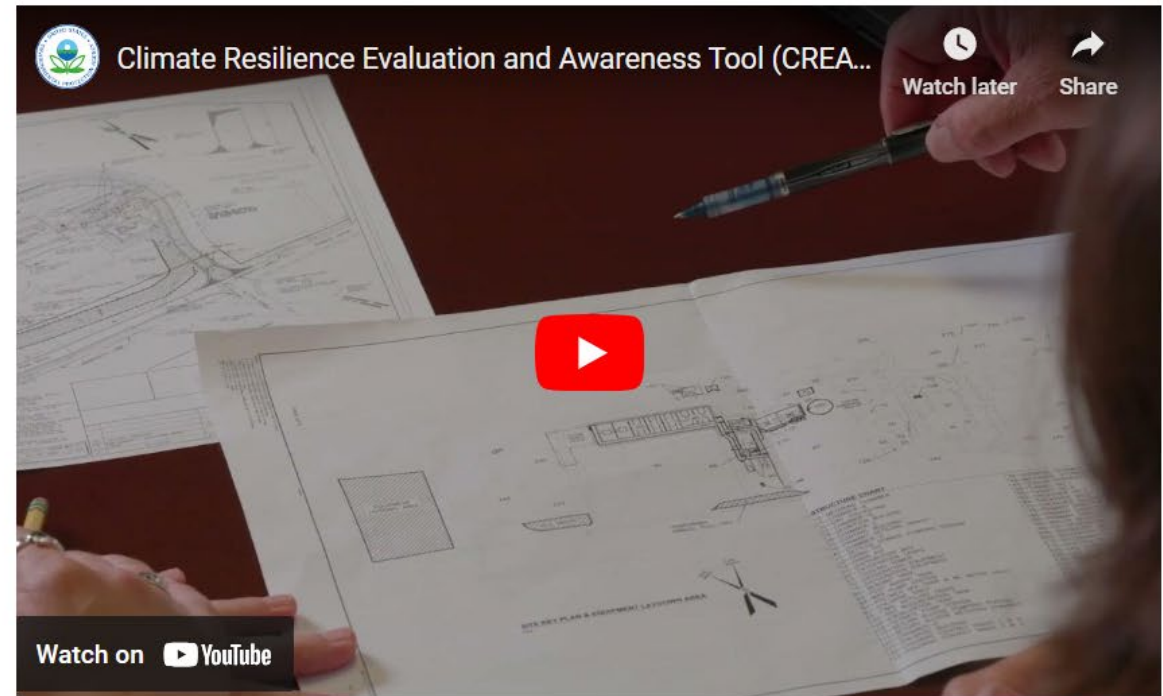
Assess: Identify your critical assets and the actions you can take to protect them from the consequences of climate change on utility operations.

Share: Generate reports describing the costs and benefits of your risk reduction strategies for decision-makers and stakeholders.

To see what other utilities have done to increase their climate change resilience using CREAT, visit EPA's **Case Study and Information Exchange Map**. This map provides links to brief stories of planning efforts being conducted by water utilities across the United States. These utilities have shared their experiences and lessons learned with the goal of assisting other water sector utilities that are currently developing their own plans or responding to recent events.

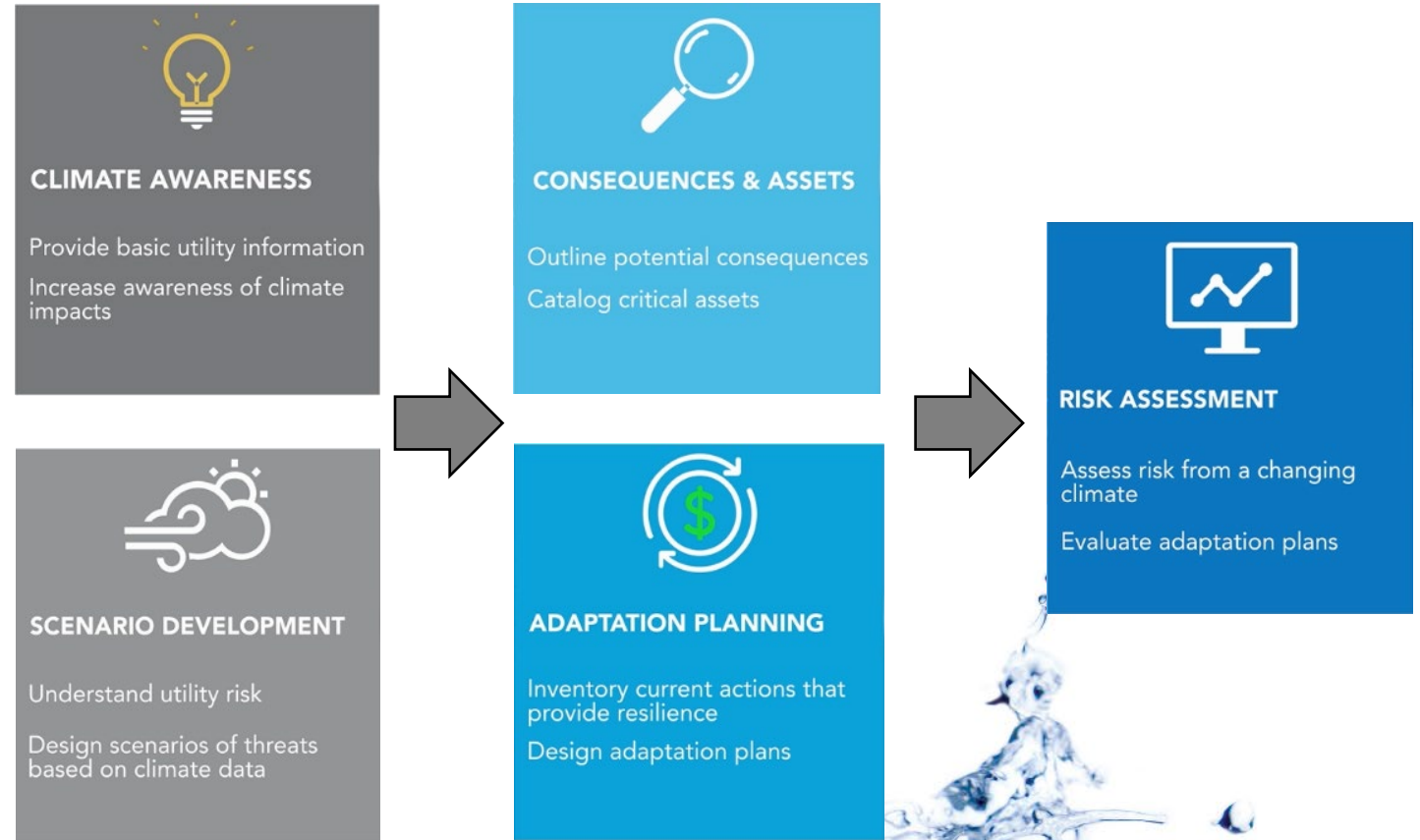
EPA encourages utilities that have their own stories to share to contact us at CRWUhelp@epa.gov

Get Started



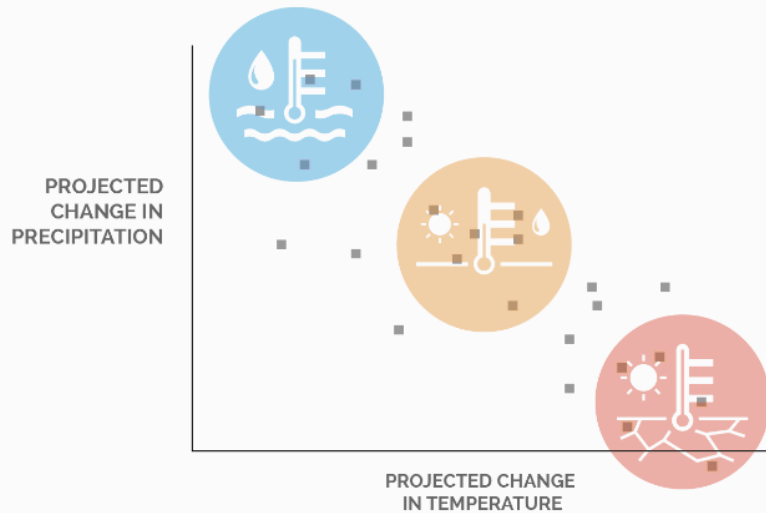
Climate Risk Assessments

- Process prioritizes the threats posed by climate conditions and the values of specific utility components to the utility and their community
- Facilitates collaboration across the organization, integrating inputs from several business units into results that can
 - Evaluate current levels of risk
 - Project adaptation performance
 - Inform planning decisions



Scenario Selection

- CMIP data at “local” scales (undergoing update to downscaled CMIP6 at higher resolution [1/16 deg] and consistent with other EPA tools and ongoing research efforts)
- Scenarios based on model ensembles selected for system locations to describe a range of potential changes
 - Annual and monthly average conditions
 - Extreme precipitation (2y -> 100y storms; 24h and 72h durations)
 - Streamflow (gages and National Water Model network; 7Q10, 7Q2, min/max)
 - Sea level rise (2022 scenarios and high tide flooding)



HISTORICAL CONDITIONS – based on annual and monthly averages of temperature and precipitation from the observed climate, assuming no change in conditions.



HOTTER AND DRIER FUTURE CONDITIONS – based on the models projecting the highest temperature increases and the lowest precipitation increases, often decreased relative to today.



MODERATE FUTURE CONDITIONS – based on models projecting the median values of changes in temperature and precipitation.



WARMER AND WETTER FUTURE CONDITIONS – based on the models projecting the highest precipitation increases and the lowest temperature increases, often increased relative to today.

CRWU Data Services

- Access to decision-relevant climate data is a critical capacity gap for many water systems
- Understanding the applicability of available data often requires translation and context for making design and operational decisions as part of resilience planning
- Leveraging published data sets from Federal agencies and academic groups, and the experiences of our partners using these data, CRWU provides access to these data focused on water sector needs

The screenshot displays the CRWU Data Services website interface. At the top, there is a dark navigation bar with four tabs: 'Home', 'Index' (which is highlighted with a blue underline), 'Guide', and 'More Info'. Below the navigation bar, the main content area is organized into several sections, each with a title and a list of data services. Each service entry includes a small representative image, a title, and a short description.

Climate Projections

- Average Annual Temperature**
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- Average Annual Precipitation**
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Flooding

- Extreme Precipitation**
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- Hurricane Frequency**
Number of hurricanes that have struck locations along the Eastern seaboard in the past ___ years.
- Storm Surge Flooding**
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- Sea Level Rise**
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Drought, Heat, & Fire

- Extreme Heat**
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- Drought Intensity**
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- Wildfire Trends**
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Support for Defining Scenarios

- Beyond climate data and associated threats, CREAT includes other water management and community-level challenges
- Relies on assessor to define the levels/thresholds/trends based on their experience or judgement, or using their own data



Water Supply Management



Peak Service Challenges



Water Quality Management



Natural Disasters



Ecosystem/Landscape Management



Population/Demographic Changes



Sector Water/Service Needs



Interdependent Sector Reliability



Sea Level Rise

Consequences / Monetized Risk Reduction

- Consequences assessed on a scale that presents quantitative (\$) ranges associated with levels from relatively minor losses in an event/year to more significant losses
- These decisions generate discussions about when events may require systems to borrow to recover or even change how they operate or plan going forward

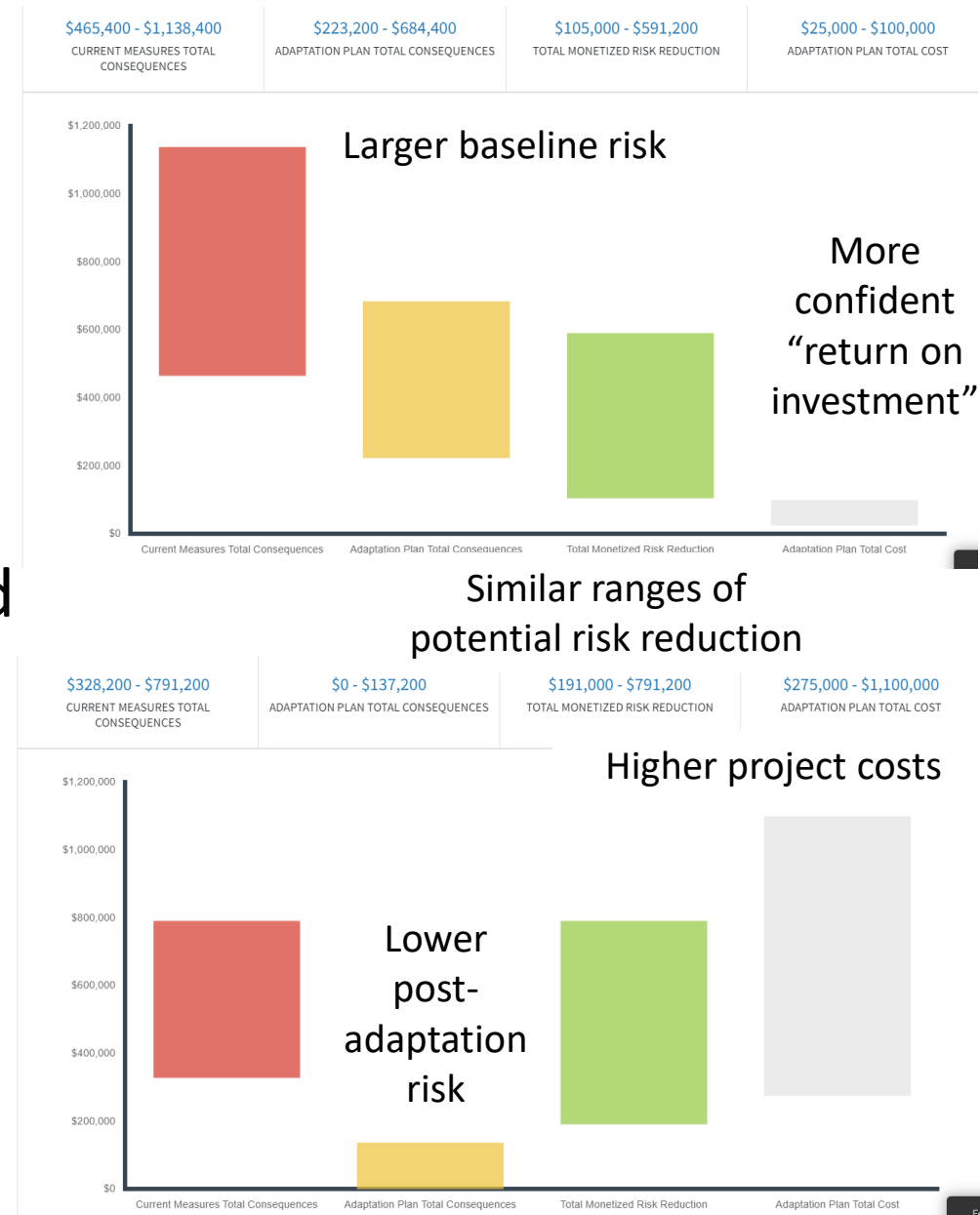
CONSEQUENCE CATEGORIES	LOW	MEDIUM	HIGH	VERY HIGH
Utility Business Impacts MONETIZE <input type="checkbox"/> OFF	Operating revenue loss evaluated in terms of the magnitude and recurrence of service interruptions. Consequences range from long-term loss of expected operating revenue to minimal potential for any loss.			
	Minimal potential for loss of revenue or operating income	Minor and short-term reductions in expected revenue	Seasonal or episodic compromise of expected revenue or operating income	Long-term or significant loss of expected revenue or operating income
	N/A	N/A	N/A	N/A
Utility Equipment Damage MONETIZE <input checked="" type="checkbox"/> ON	Costs of replacing the service equivalent provided by a utility or piece of equipment evaluated in terms of the magnitude of damage and financial impacts. Consequences range from complete loss of the asset to minimal damage to the equipment.			
	Minimal damage to equipment	Minor damage to equipment	Significant damage to equipment	Complete loss of asset
	\$0 - \$56,000	\$56,000 - \$142,000	\$142,000 - \$342,000	\$342,000+

Ex: 2 MGD wastewater system in MA with “mid-range” financial condition



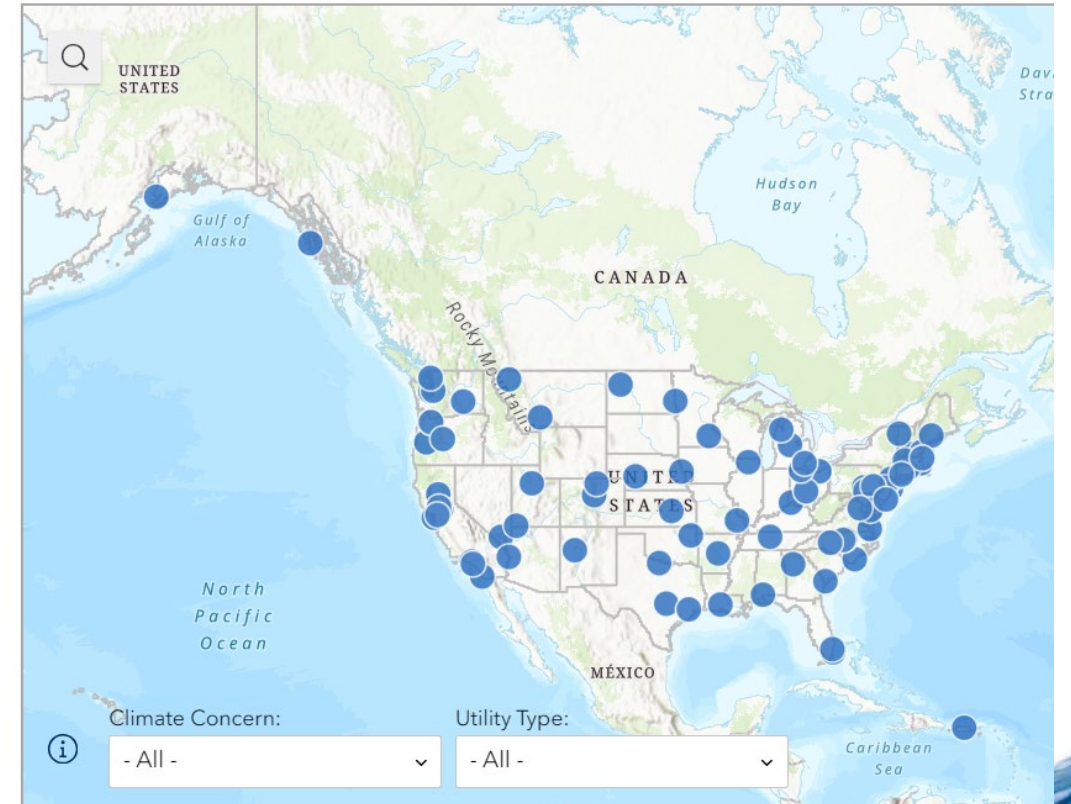
Results and Reporting

- Assessment results gauge the potential reductions in loss from adaptation investments
- Process can be revisited / iterated with new information or when new partners are engaged
- Results can be incorporated into messaging
 - Build public confidence
 - Support funding applications
 - Present to boards or other officials



Direct Technical Assistance and Training

- Climate Change Risk Assessment Technical Assistance:
 - FY23: 71 communities benefited from 50 assessments through direct assistance
 - FY24: 33 communities so far (16 assessments) with 16 additional assessments planned/underway
 - FY25: Projected 10% growth in program
- Coordinated with EPA's larger WaterTA network
 - National and Regional Environmental Finance Centers
 - Funding Coordination
 - Clean Water & Drinking Water SRFs (States and HQ)
 - EPA's WIFIA
 - FEMA's BRIC Program
 - USDA's Rural Utility Service
- Workshops and Training
 - EPA Regional Staff / Tribal Networks / Rural Water
 - Water Sector Association Conferences and Training



South Monmouth Regional Sewerage Authority (NJ)

- The South Monmouth Regional Sewerage Authority (SMRSA) is located in Monmouth County, New Jersey, and serves over 50,000 people in eight coastal communities,
- A long history of coastal flooding and storm surge motivated their assessment and recent improvements (portable pumping stations)
- Technical assistance guided their use of CREAT, helping to evaluate the performance of several projects they are considering:
 - Relocate the pump station to higher elevation
 - Install flood doors
 - Build a sea wall around pump stations
- The Authority partnered with EPA to host training event for other coastal systems to share experiences and promote climate change considerations when preparing for the next storm



Montague and South Hadley (MA)

- Montague Water Pollution Control Facility and South Hadley Water Pollution Control Division serve 2,000 and 17,000 residents, respectively
- Focus of their assessment was on impacts of changing storms and challenges to collection and treatment
- Technical assistance guided their use of CREAT, helping to evaluate the performance of several current practices (storage, pumping, upgrades/elevation) and potential improvements:
 - Natural Flow Improvements
 - Pump Replacements
 - Inflow and Infiltration Assessment / Pipe Lining
- Participants included Massachusetts Department of Environmental Protection and the Pioneer Valley Planning Commission, fostering the consideration of climate change and potential adaptation into their relationships with State and watershed organizations



City of Crisfield (MD)

- Crisfield provides stormwater services for 2,400 people living on MD's Eastern Shore using a ditch and sewer system designed for 1 million gallons per day (MGD)
- Focus of their assessment was on flooding driven by combination of coastal storm surge, intense precipitation events, tidal flooding, and sea level rise
- Technical assistance guided their use of CREAT, helping to evaluate the performance of two options for a portion of their current system:
 - Ditch Maintenance
 - Convert to Closed System
- Participants are working concurrently with NOAA, FEMA and the Nature Conservancy on projects aimed to build resilience in Crisfield



Traverse City (MI)

- Traverse City provides wastewater services to about 50,000 customers across five townships
- Their assessment focused on flooding along the shoreline of Lake Michigan caused by heavy precipitation events
- Technical assistance guided their use of CREAT, helping to evaluate the performance of two options to mitigate overflows in a portion of their service area:
 - Increased Wet Well Storage Capacity
 - Relocate and Upsize Riverfront Main
- Results of this assessment helped inform changes to SRF-funded project that accommodates higher flow events under some future climate scenarios



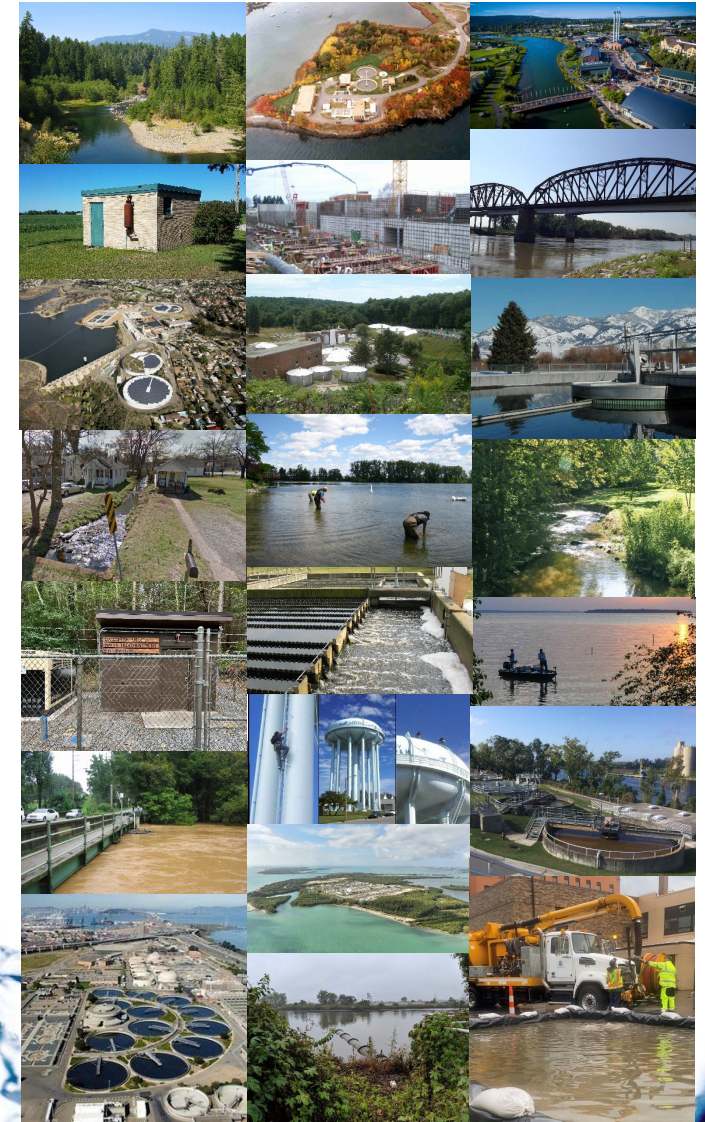
Clackamas County (OR)

- Water Environment Services (WES) provides wastewater collection and treatment services to approximately 190,000 people
- Focus of their assessment was on flooding of pump station in the channel migration zone (CMZ) along the Sandy River and potential to add to their current practices in response to flooding events (backup power, temporary barriers)
- Technical assistance guided their use of CREAT, helping to evaluate the performance of several projects they are considering to mitigate flood damage to vulnerable facilities:
 - Replace with submersible facility or relocate outside CMZ
 - Bypass through higher elevation pumps and new treatment plant



Summary of Northwest Communities

- Eight OR/WA/AK communities serving 1,500 to 300,000
- Most facing supply challenges; causes vary
 - drought / floods / wildfire
- Water resources were often the focus of assessments
- Many adaptations are frequently identified
 - Monitoring water quality and watersheds
 - Watershed management
 - Increasing storage
 - ASR
 - Alternate or expanded sources / wells



Review of How our TA Program is Being Utilized

- Priority needs for decision support:
 - Scenario focus: Climate / Economic / Adaptation
 - Threat types: Flood (Hazard) / Supply (Drought) / Supply (Other)
 - Asset Focus: Water Resources / Infrastructure
 - Adaptations: Operational / Green Inf / Incremental Build / Major Projects
 - Outcomes: Additional TA / Funded Project / Revisited by CRWU
- Will any patterns based on size, region or sector (DW/WW/SW) emerge?

CRWU coming to a town near you

- Two training events
 - Open to utility owners and operators in WA and OR - Washington/Pacific Northwest Regional Training: <https://form.jotform.com/240995082320051>
 - Second event for RCAP TA providers will be held in Portland, Oregon on July 10.
- Assessments under our technical assistance program
 - City of Portland's Bureau of Environmental Services
 - King County (WA) Water District
 - City of Langley, WA
 - Salishan Sanitary District (OR) [case study for RCAP training]



BUILDING RESILIENCE AND ADAPTING TO CLIMATE CHANGE IMPACTS FOR DRINKING WATER AND WASTEWATER UTILITIES

EXPANDING CLIMATE AWARENESS AND RESILIENCE TRAINING FOR THE WATER SECTOR IN THE PACIFIC NORTHWEST



June 25, 2024 | 9:30 am – 3:00 pm (plan to arrive by between 9:00 and 9:30 am)



LOCATION: Lewis Creek Visitor Center, 5808 Lakemont Blvd. SE, Bellevue, WA 98006



SECURITY: Participants do not need to show a picture ID, but must complete the sign-in sheet



CONTACT INFORMATION:
For any issues the day of the training, please contact: Alfredo Lagos, 202-549-7092.



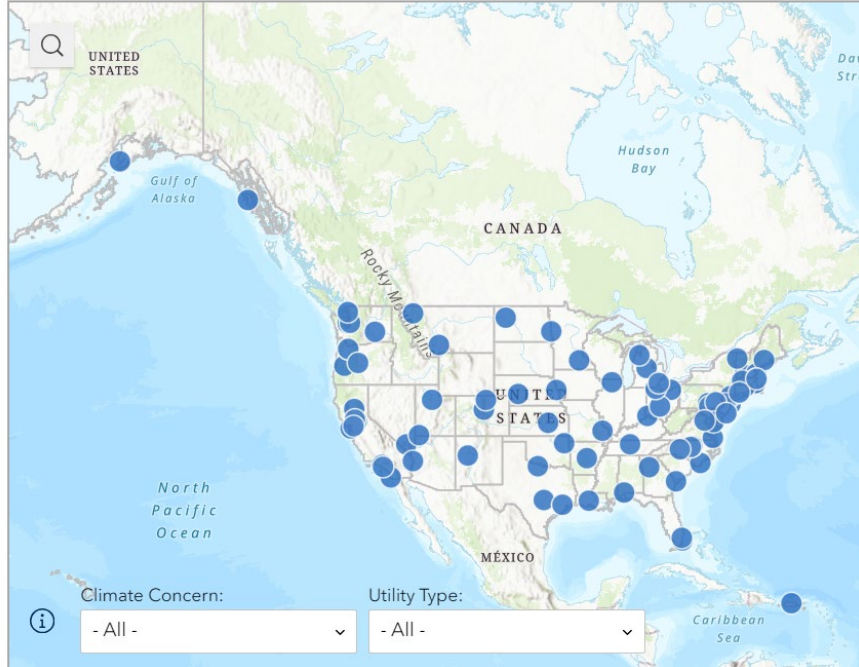
CRWU's Reflections on Scenario Planning

- Introducing communities to scenario-based planning (or making decisions under uncertain conditions) while incorporating climate science and adaptation concepts
- Providing shared language and concepts to foster connections and help systems exchange knowledge and experience
- Supporting visibility (and capabilities) of communities in need of financial support to those that can provide further assistance and access to that support for eligible projects



U.S. EPA's Creating Resilient Water Utilities

- Supporting climate adaptation at drinking water, wastewater and stormwater utilities as part of EPA's technical assistance efforts
- Providing access to climate change information and risk assessment framework
- Connecting systems to partners and funding opportunities



Drought



Ecosystem Changes



Floods



Service Demand And Use



Water Quality Degradation

+ Add Custom Threat

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