



# EPA's Climate Ready Water Utilities: Supporting Utilities Adapting to the Impacts of Climate Change

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# CLIMATE READY PROCESS

The Climate Ready Water Utilities initiative offers practical tools and resources to help the water utility sector understand and adapt to climate change impacts.





## Web Products for Collaboration

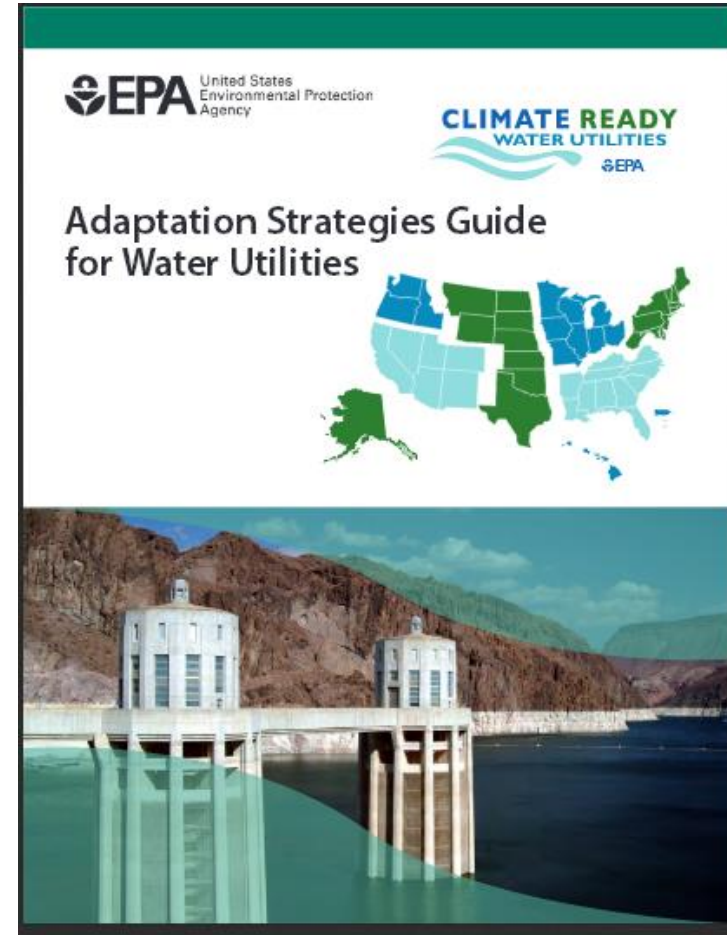
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Learn from others and exchange information to build effective and coordinated plans to increase resilience

# Adaptation Strategies Guide Overview

[LINK](#)

- Guide for utilities to consider climate change in utility planning
- Translations of climate science into impacts and adaptation strategies for utilities
- Past updates for sustainability and 2014 National Climate Assessment
- **PLANNED UPDATE**
  - Web application instead of PDF
  - Additional utility case studies





# Case Study and Information Exchange

LINK

## Adaptation Case Study and Information Exchange

Climate Ready Water Utilities



Welcome and Case Studies

Drought

Floods

Ecosystem Changes

Service Demand

Water Quality

Videos

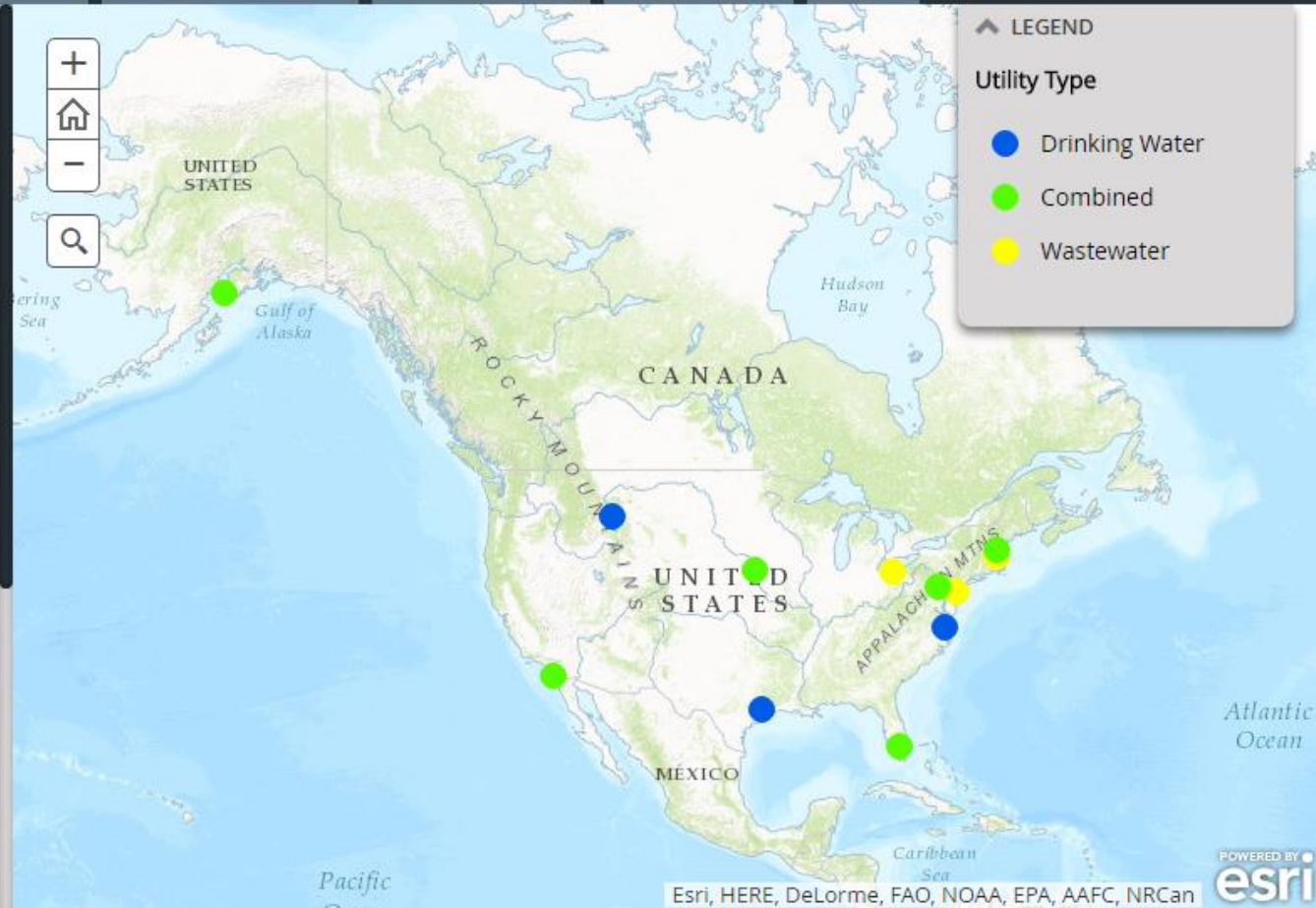
Welcome to the U.S. Environmental Protection Agency's (EPA) Adaptation Case Study and Information Exchange, which has been developed under the Climate Ready Water Utilities (CRWU) initiative. This tool allows water sector -- drinking water, wastewater and stormwater -- utilities to learn about climate change adaptation planning efforts from their peers across the United States.

Water sector utilities are actively planning to address climate change impacts. These efforts and their lessons learned can help to inform other water sector utilities with their own adaptation planning processes and decision making. EPA encourages utilities to connect with one another for information on how their communities can pursue similar adaptation strategies.

### How to use this map

Each point on this map represents a drinking water, wastewater or combined utility. Clicking on a point generates a pop-up box that provides the name, type and applicable climate threats facing a particular utility, as well as the corresponding adaptation measures that the utility considered for implementation. Click on the tabs located at the top of the page to filter the utilities by climate threat.

Click the link near the bottom of the pop-up to access a case study that summarizes the utility's



Esri, HERE, DeLorme, FAO, NOAA, EPA, AAFC, NRCAN

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# Example Case Studies – Seminole Tribe of Florida

- Assessment focused on demand and wildfire after exploration of flooding risk revealed potential impacts lower than other risks
- Planning efforts encompass multiple communities with different needs and potential hazards



Natural Disasters



Water Supply  
Management

LOCATION	POTENTIAL ADAPTIVE MEASURES
Brighton Reservation (Wildfire)	Clear tree line near backup generator on the adjacent property at the water treatment plant
	Improve fire wall by replacing fence near facilities
	Relocate the backup generator away from the tree line
Hollywood Reservation (Increased Demand)	Install meters at isolation valves to track water use
	Adopt of drought-tolerant landscaping at the casino and consider irrigation changes
	Implement of a 'Healthy Homes' program to encourage adoption of water-saving devices
	Improve existing groundwater monitoring system
	Conduct community outreach to raise awareness of drought conditions and potential conservation activities

# Example Case Studies – Camden County MUA (NJ)

- Assessment focused on improving operations under changing climate conditions as well as addressing potential extreme events
- Planning efforts encompass multiple goals for optimizing energy use and cost along with gains in resilience

GOAL	ADAPTIVE MEASURES
Improve water quality / Reduce CSOs	Capturing excess stormwater using planted trees and rain gardens through the Camden SMART initiative
	“Daylighting” streams that had previously been paved over using a low interest loan from the New Jersey Environmental Infrastructure Trust
	Converting an abandoned building into a riverside park
	Cleaning inlets to optimize the sewer system’s performance through changes in operations and maintenance
Improve air quality	Replacing netting systems to optimize the sewer system’s performance through changes in operations and maintenance
	Installing catalytic converters to reduce emissions
Minimize costs	Reducing I&I to minimize energy use and cost throughout the CCMUA system
	Using gravity connections as a replacement to municipal pumping stations
	Implementing electric peak shaving
	Using heating loops and energy-efficient equipment to increase total energy efficiency
Reduce energy	Installing a 1.8 megawatt solar panel array through a purchase agreement at no cost to CCMUA, and buying power from the contractor at a discounted rate
	Implementing a sewage-to-heat facility through a grant from the New Jersey Board of Public Utilities which converts latent heat in sewage into heat at the plant
	Building a digester facility to produce enough biogas to meet about 50 to 60% of the utility’s power needs
	Installing a 1.8 megawatt solar panel array to provide 10% of energy needs at the wastewater treatment plant




# Climate Resilience Evaluation & Awareness Tool (CREAT)

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Assess Risks and Plan Adaptation for your Utility




# CREAT 3.0

**CREAT 3.0** CLIMATE RESILIENCE EVALUATION & AWARENESS TOOL

GET STARTEDRESOURCESHELP

LoginRegister



## Build Climate Resilience at Your Utility

The **Climate Resilience Evaluation and Awareness Tool** is a risk assessment and planning application for water, wastewater and stormwater utilities.

**CREAT** helps water sector utilities understand and adapt to climate change.


**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.

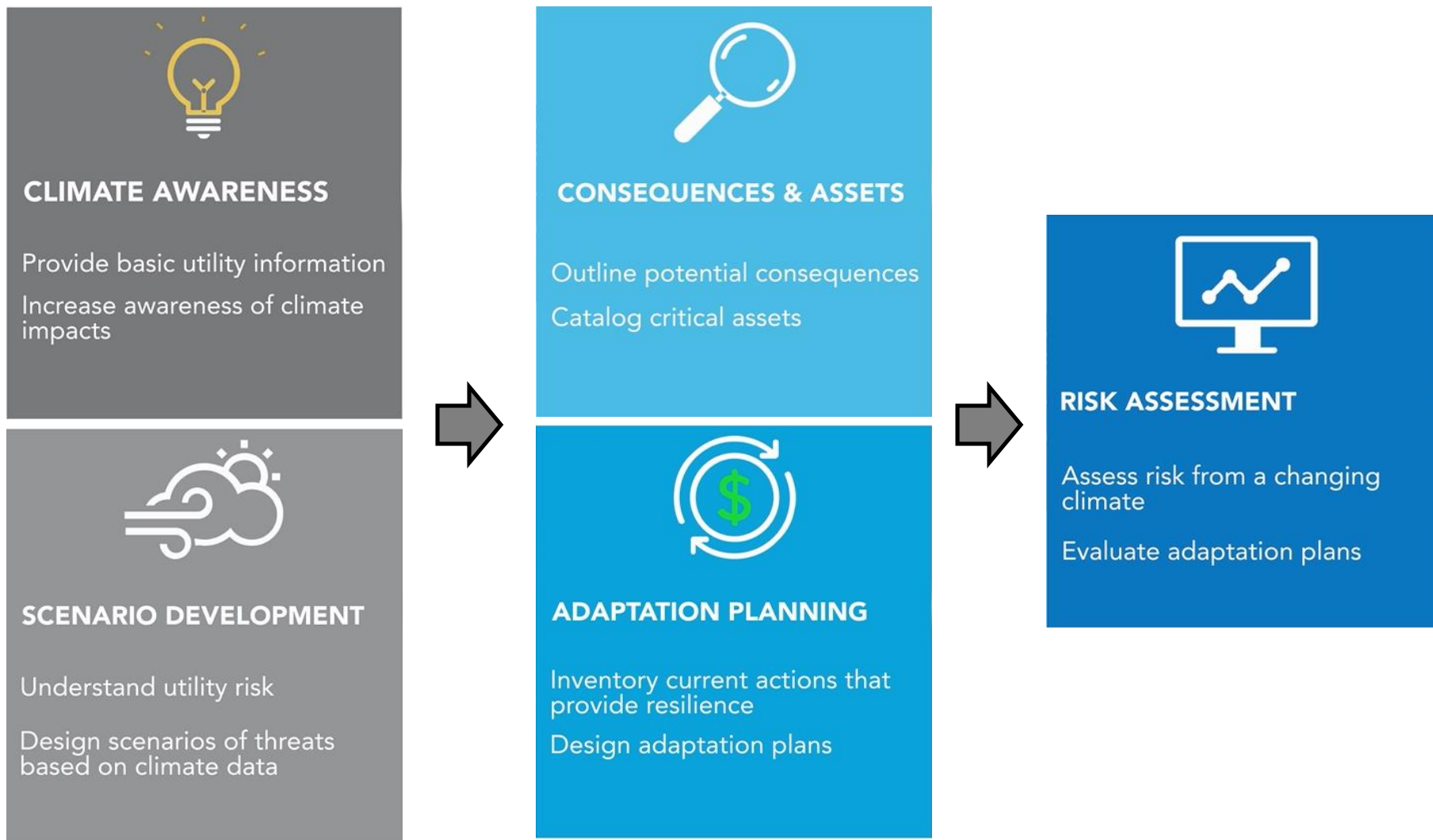
Get Started

Climate Resilience Evaluation and Awareness Tool (CREAT) Welco...



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## Climate Change – Water : Data Services

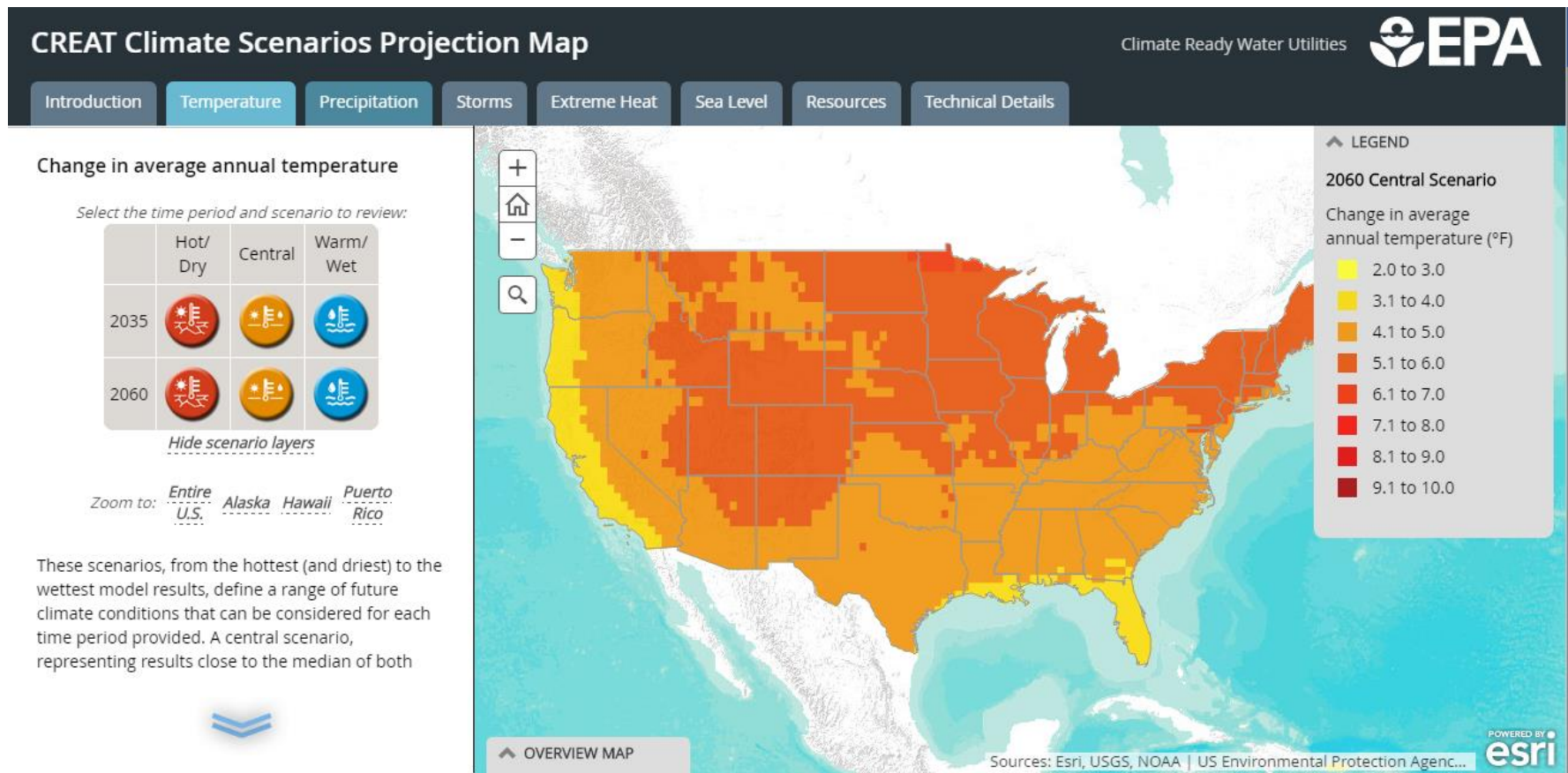
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Explore climate change, related hazards and  
adaptation options at your location

# Scenario-Based Climate Change Map

[LINK](#)

Provides scenarios that capture the range of projected changes in temperature and precipitation from models

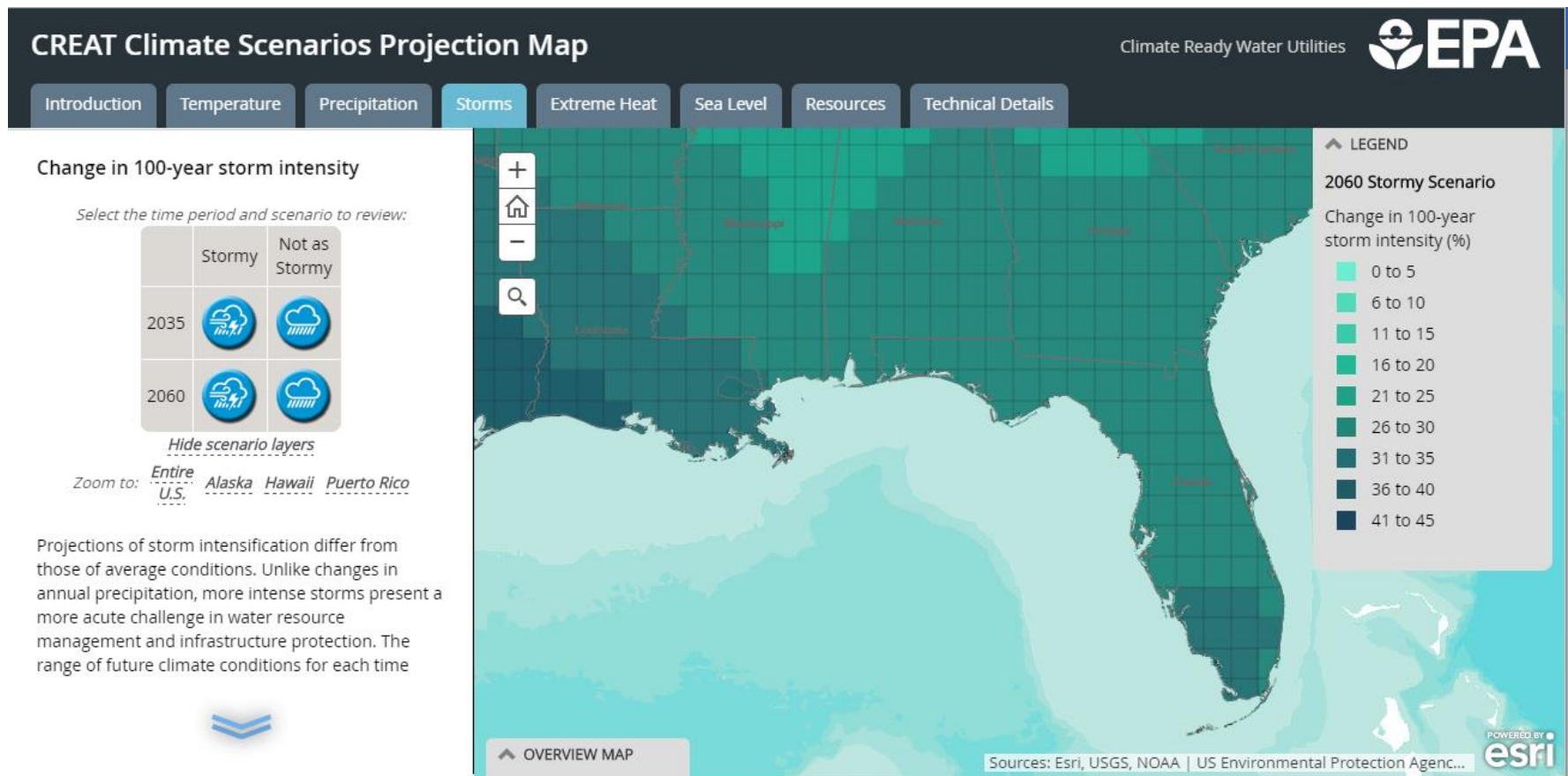




# Scenario-Based Climate Change Map

[LINK](#)

Data includes changes in average conditions and extreme events (hot days and storms), plus sea level rise





# Scenario-Based Climate Change Map

[LINK](#)

For the grid cell containing Miami:

Change in Average Annual Temperature

Period	Scenario		
	Hot/ Dry	Central	Warm/ Wet
2035	2.0 °F	1.7 °F	1.5 °F
2060	3.8 °F	3.3 °F	2.8 °F

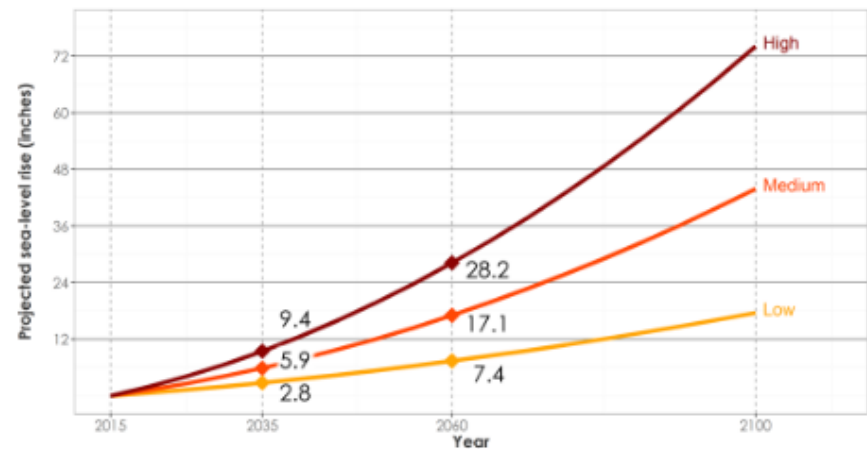
Change in Average Annual Precipitation

Period	Scenario		
	Hot/ Dry	Central	Warm/ Wet
2035	-5.0%	-0.9%	2.3%
2060	-9.8%	-1.7%	4.6%

Change in 100-Year Storm Intensity

Period	Scenario	
	Stormy	Not as Stormy
2035	14.4%	2.8%
2060	28.0%	5.5%

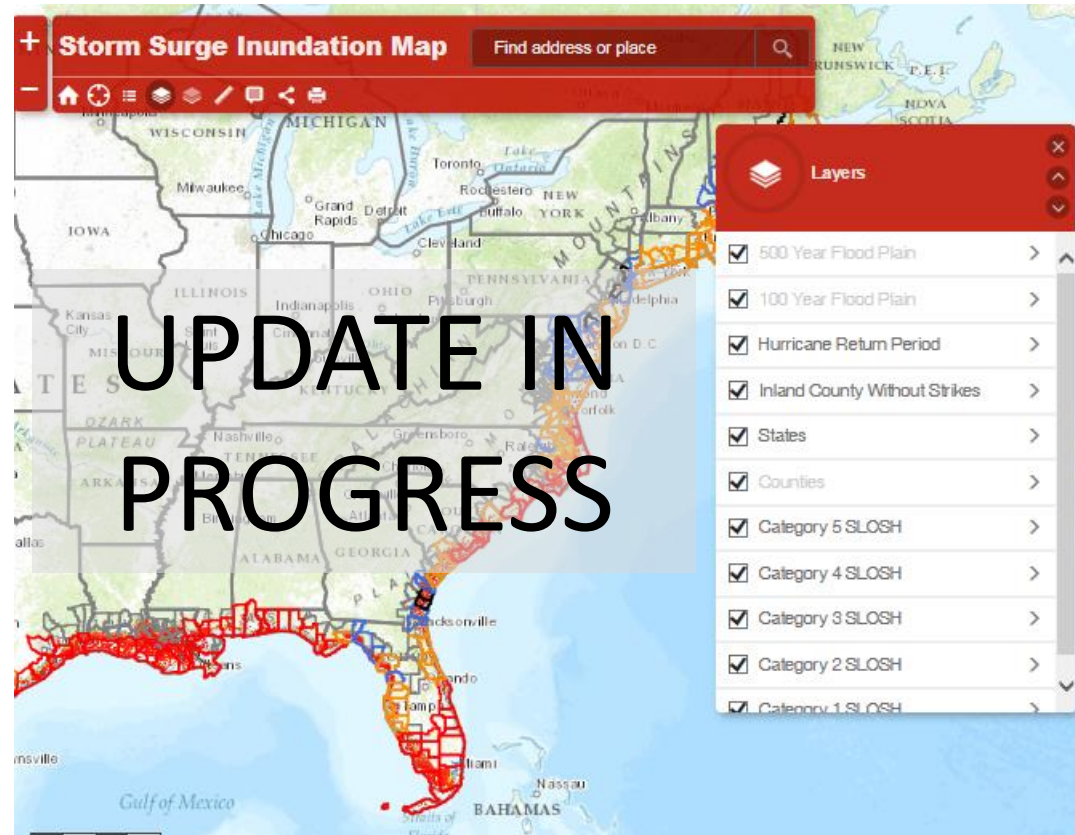
Sea Level Rise Projections



# Storm Surge Inundation Map

LINK

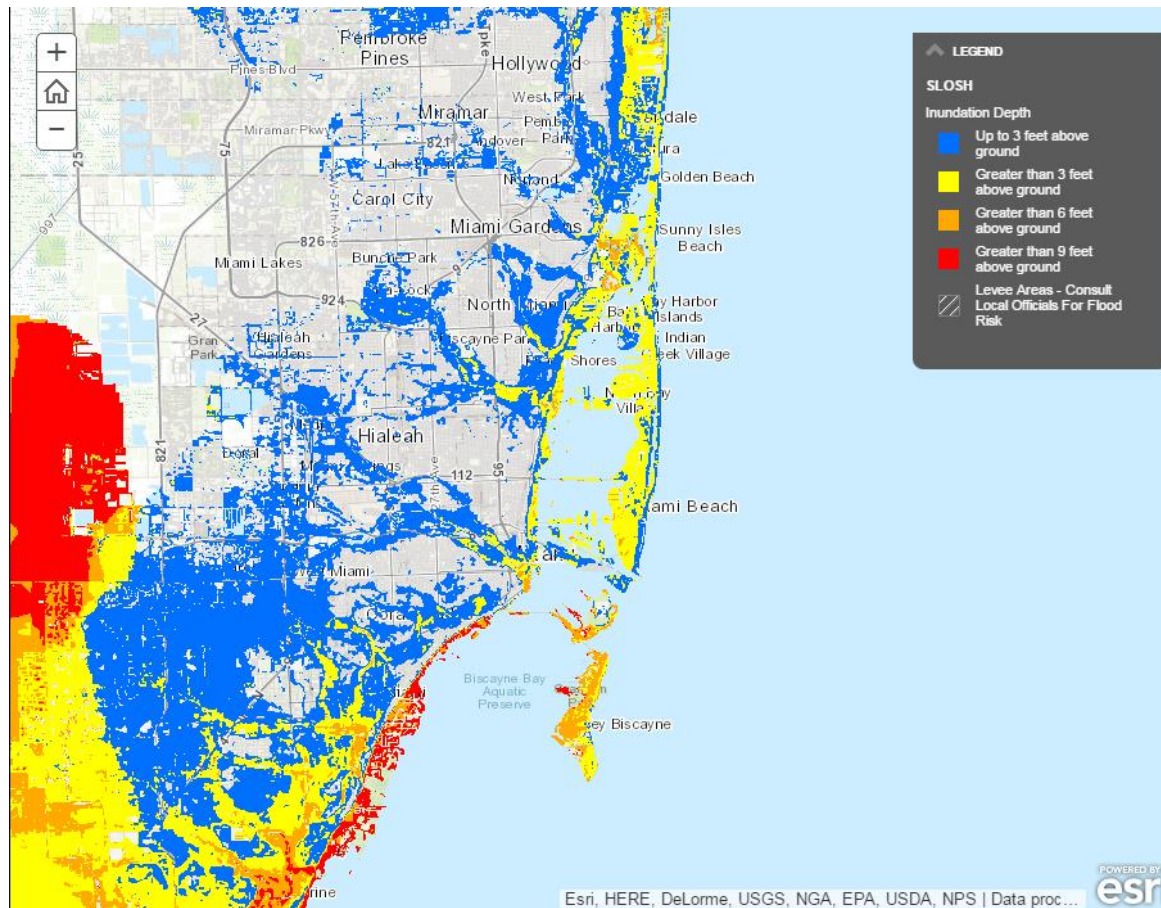
- Access current worst-case coastal storm surge scenarios and hurricane strike frequency information
- Layers include FEMA flood zones and inundation from Sea, Lake, and Overland Surge from Hurricanes (SLOSH) model results



# Storm Surge Inundation Map

[LINK](#)

For Miami-Dade County:



Hurricane Statistics for Miami-Dade Co, FL		
Category	# of strikes	Return period* (yrs)
1	6	18
2	5	22
3	8	14
4	4	28
5	2	55

*\*Return period is defined as the average recurrence interval of a hurricane of similar magnitude over an extended period of time, e.g., 1900-2009*

- Frequency of storms and potential flood depth useful for planning
- Caution: no consideration of sea level rise or more intense storm events



## Pilots and Outreach Activities

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Join a Community of Climate Ready Water Utilities

# Water Utility Climate Resilience Support Projects





# Case Study and Information Exchange

LINK

## Adaptation Case Study and Information Exchange

Climate Ready Water Utilities



### Welcome and Case Studies

### Drought

Encourages utilities to connect with one another for information on how their communities can pursue similar adaptation strategies.

### How to use this map

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Click the link near the bottom of the pop-up to access a case study that summarizes the utility adaptation measures and provides contact information for the utility.

Have your own climate adaptation story?

[Click here to share your case study.](#)

Learn more about climate readiness through these resources:

[Climate Ready Water Utilities Homepage](#)  
[Adaptation Strategies Guide for Water Utilities](#)  
[Climate Resilience Evaluation & Awareness Tool \(CREAT\)](#)  
[Scenario-Based Projected Changes Map](#)

## Add Your Story To The Map

Use this form to share your story. Please fill out as many items in the form as you can.

Please provide accurate contact information. EPA will contact you to verify information prior to adding your case study to the map.

### 1. Enter Information

Utility Name

City

State

Utility Type

Utility Size

Primary Climate-Related Challenges

255 characters remaining

### Case Study: Water and Wastewater Utilities Planning for Climate Change



#### CITY OF BOZEMAN, MONTANA

##### Background

The city of Bozeman, Montana provides drinking water services to approximately 38,000 people. Snowpack melt captured in the Sourdough and Hyalite watersheds reaches the 22 million gallons per day (MGD) Sourdough Water Treatment Plant via local creeks and serves as the city's primary water source. In addition, an infiltration gallery and a 3.5 MGD water treatment plant delivers groundwater from the Lyman Creek Spring.

##### Climate Threats

Drought and wildfire are the two primary climate threats to the city of Bozeman, both of which have the potential to increase with a changing climate. The city of Bozeman is concerned that future droughts will impact management and allocation of their local water resources. Droughts also have the potential to impact water quality because of their tendency to increase the occurrence of blue-green algae. Wildfires in the Sourdough and Hyalite watersheds have the potential to negatively impact water quality due to erosion that can increase turbidity, sedimentation and metal concentrations. Direct damage to equipment, specifically the Hyalite Reservoir and its intake, is also a concern related to wildfire.

##### Planning Process

To better understand the vulnerabilities of its drinking water infrastructure and operations, the city of Bozeman assessed potential climate change impacts using the U.S. Environmental Protection Agency's (EPA) Climate Resilience Evaluation and Awareness Tool (CREAT). The CREAT assessment brought together individuals from EPA and various departments within the city of Bozeman to think critically about potential climate impacts, prioritize assets and consider possible adaptation options.

##### Adaptation Measures

The city of Bozeman considered the potential consequences of drought, water quality changes and wildfires on their drinking water assets and operations. To assess each of these potential threats, the city considered how potential adaptive measures would help lower consequences. The table below summarizes how adaptation options were grouped into two packages: those that provided the highest potential return on investment, and those that are included in their Integrated Water Resource Plan (IWRP).

# CLIMATE READY PROCESS

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**Join our mailing list:** [crwuhelp@epa.gov](mailto:crwuhelp@epa.gov)

# Workshop Planner for Climate Change and Extreme Events

- Walks users through all of the steps of planning, conducting and evaluating a workshop
- Determine actions that a utility or community can take today to be resilient to several extreme event scenarios
- Open lines of communication between utilities and other local partners to assess potential impacts and adaptation to extreme events



DEMO