

## Resilience Planning and Adaptation Training for Water and Wastewater Utilities

*While you wait, please...*

- 1) **Connect to the Wi-Fi network** listed on your “CREAT Exercise Handout”
- 2) **Login to CREAT** following the instructions in your “CREAT Exercise Handout”
- 3) **Go to** <https://www.sciencemissionsupport.com/creatsouthernutah>; under section ‘Training Materials’, download to your computer the ***Example CREAT Assessment File (CREAT)***



# **Resilience Planning and Adaptation Training for Water and Wastewater Utilities**

## **Welcome, Workshop Objectives & Agenda**

MARCH 28, 2019

**Brie Thompson**, Washington County Water Conservancy District

**Ashley Greene**, U.S. EPA Headquarters

**Alfredo Lagos**, GDIT

# Workshop Objectives

- Share information about how environmental conditions and extreme weather events could impact water, wastewater, and stormwater utilities in the southwestern U.S.
- Introduce EPA's Creating Resilient Water Utility (CRWU) resources and tools.
- Conduct a risk assessment using the Climate Resilience Evaluation and Awareness Tool (CREAT).
- Identify and share information on adaptation strategies to build utility long-term resilience.
- Share information on available resources for financing resilience and adaptation.

# Training Agenda

Time	Event
8:30 a.m.	Welcome, Agenda Review and Participant Introductions <b><i>Brie Thompson, Washington County Water Conservancy District</i></b>
9:00 a.m.	Presentation: Regional Extreme Weather Projections and Water Sector Impacts <b><i>Brian McInerney, National Weather Service</i></b>
9:20 a.m.	Presentation: Adaptation Utility Case Study <b><i>Ashley Nay, Weber Basin Water Conservancy District</i></b>
9:40 a.m.	Presentation: CRWU Overview
10:00 a.m.	Presentation: CREAT Overview
10:10 a.m.	CREAT Module 1: Climate Awareness
10:30 a.m.	Break
10:45 a.m.	CREAT Module 2: Scenario Development
11:30 a.m.	CREAT Module 3: Consequences & Assets
12:00 p.m.	Lunch (provided on-site)

# Training Agenda

Time	Event
12:50 p.m.	Jeopardy
1:00 p.m.	CREAT Module 4: Adaptation Planning, Part 1
1:20 p.m.	Small Group Discussion: Prioritization of Potential Adaptation Measures
2:15 p.m.	Break
2:30 p.m.	CREAT Module 4: Adaptation Planning, Part 2
3:00 p.m.	CREAT Module 5: Risk Assessment
3:45 p.m.	Presentation: Financing Resilience and Adaptation <i>Michael Grange, Utah Department of Environmental Quality</i> <i>Janna Wilkinson, Utah Division of Emergency Management</i>
4:15 p.m.	Workshop Wrap-up
4:30 p.m.	Adjourn



# **Resilience Planning and Adaptation Training for Water and Wastewater Utilities**

## **Introductions and Perspectives on Extreme Events**

**Alfredo Lagos, GDIT**

# What group do you represent?

1. Drinking Water Utility
2. Wastewater Utility
3. Stormwater Utility
4. Combined Utility
5. Association
6. Private Sector
7. Local Government
8. State Government
9. Federal Government
10. Consultant



## Have you conducted any extreme event or climate adaptation planning at your organization?

1. Yes
2. No
3. Not sure





## Have you ever used CREAT or any other USEPA Creating Resilient Water Utilities (CRWU) resource before?

1. Yes
2. No
3. Not sure

# What potential extreme weather or future environmental condition impact are you most concerned about at your organization?

1. Drought
2. Flooding
3. Harmful Algal Blooms (HABs)
4. Wildfire
5. Windstorms
6. Other

# Introductions

- Name
- Title
- Affiliation
- Brief statement about your experience with or concerns about extreme events or potential environmental impacts to your utility, organization, or location



**Resilience Planning and Adaptation Training  
for Water and Wastewater Utilities**

**Regional Extreme Weather Projections  
and Water Sector Impacts**

**Brian McInerney, National Weather Service**



**Resilience Planning and Adaptation Training  
for Water and Wastewater Utilities**

**Adaptation Utility Case Study:  
Weber Basin Water Conservancy District**

**Ashley Nay, Weber Basin Water Conservancy District**



# **Resilience Planning and Adaptation Training for Water and Wastewater Utilities**

## **CRWU Overview**

**Ashley Greene, EPA**

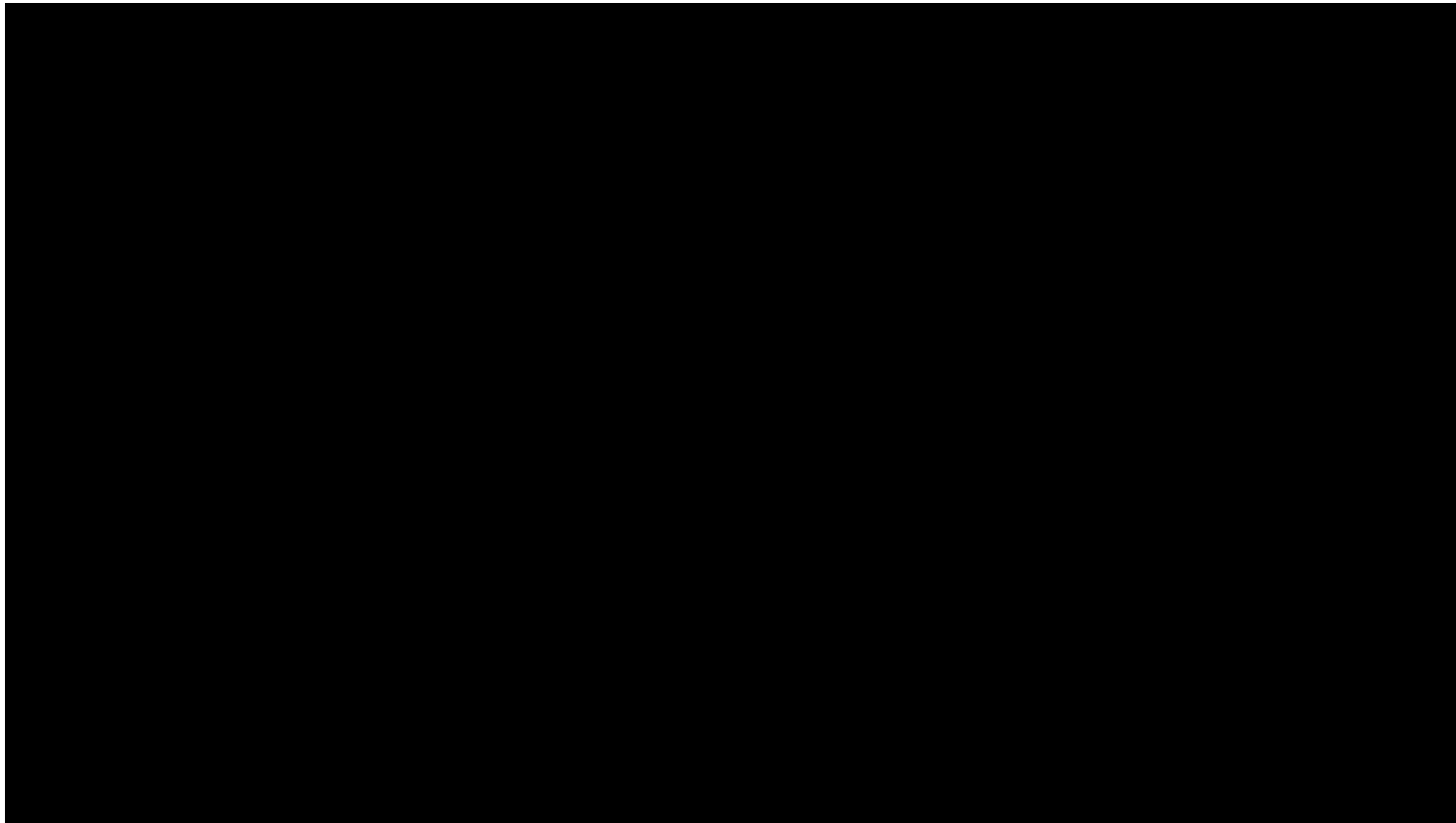


# **Resilience Planning and Adaptation Training for Water and Wastewater Utilities**

## **CREAT Overview**

**Mary Jo Kricorian, GDIT**

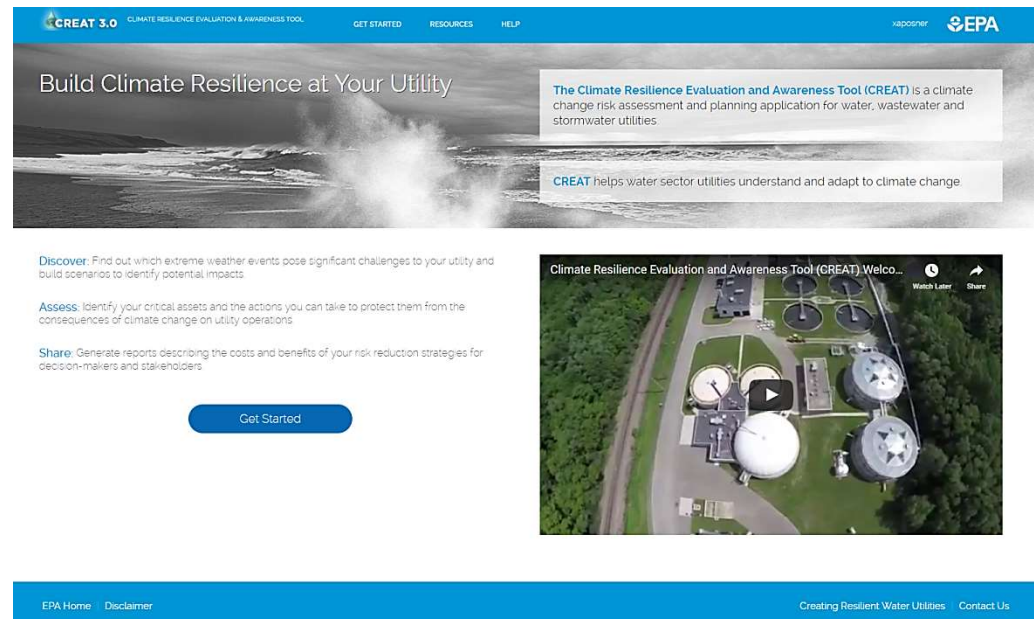
# CREAT Welcome Video



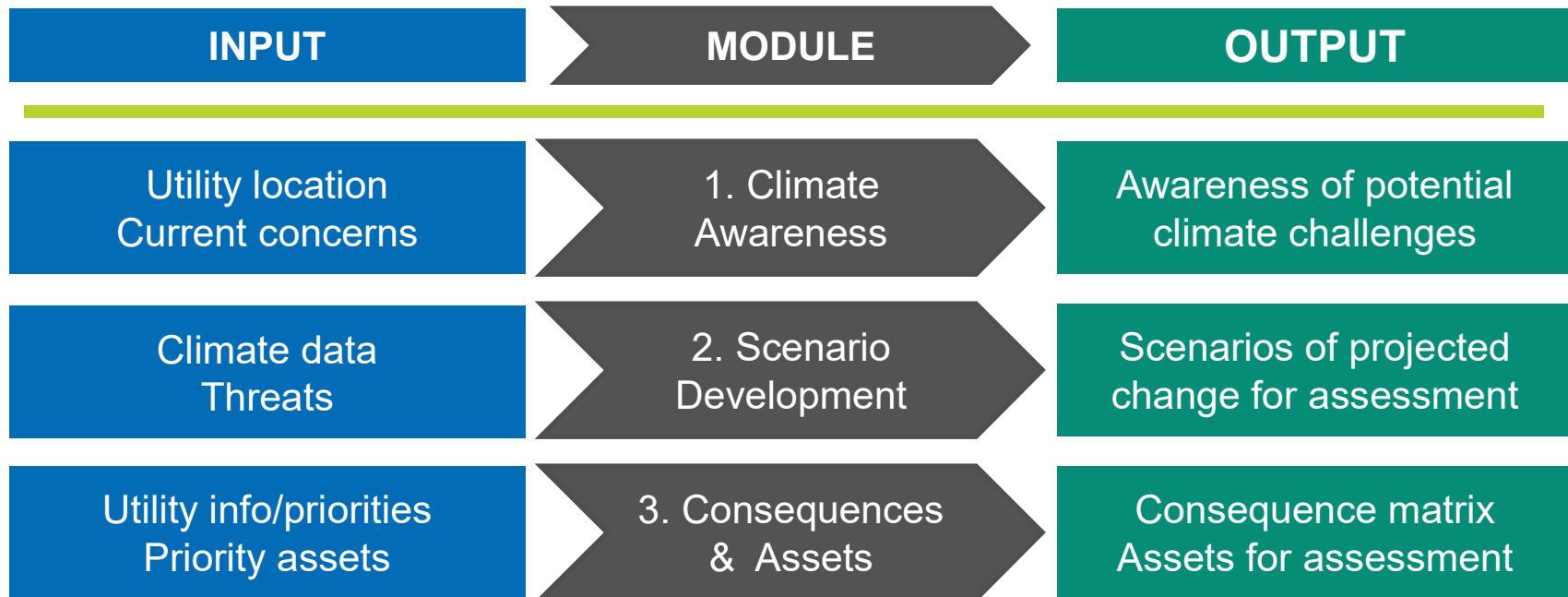


# CREAT Overview

- Easy to use
- Decision support tool
- Step by step process
- Up to date climate data
- Streamlined analysis option



# CREAT process overview

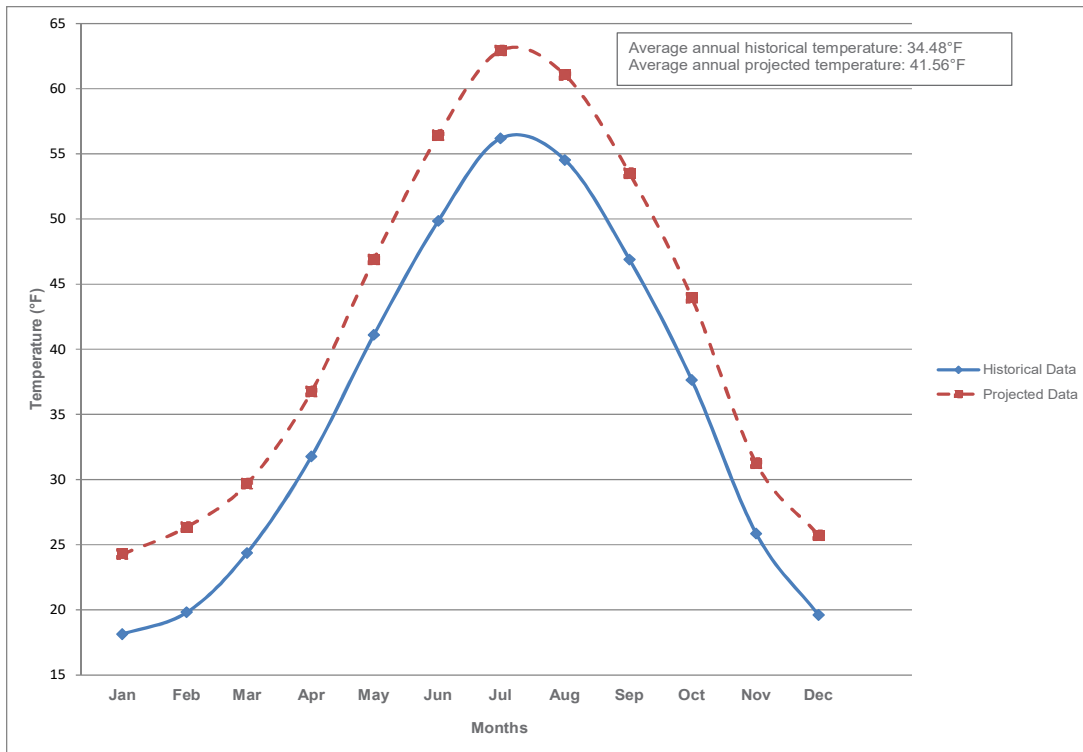


# CREAT process overview



# What will the future look like?

- Identify threats and learn how they might change over time



- Projected climate data to help guide this thought exercise

# What can I do to protect critical infrastructure and utility operations?

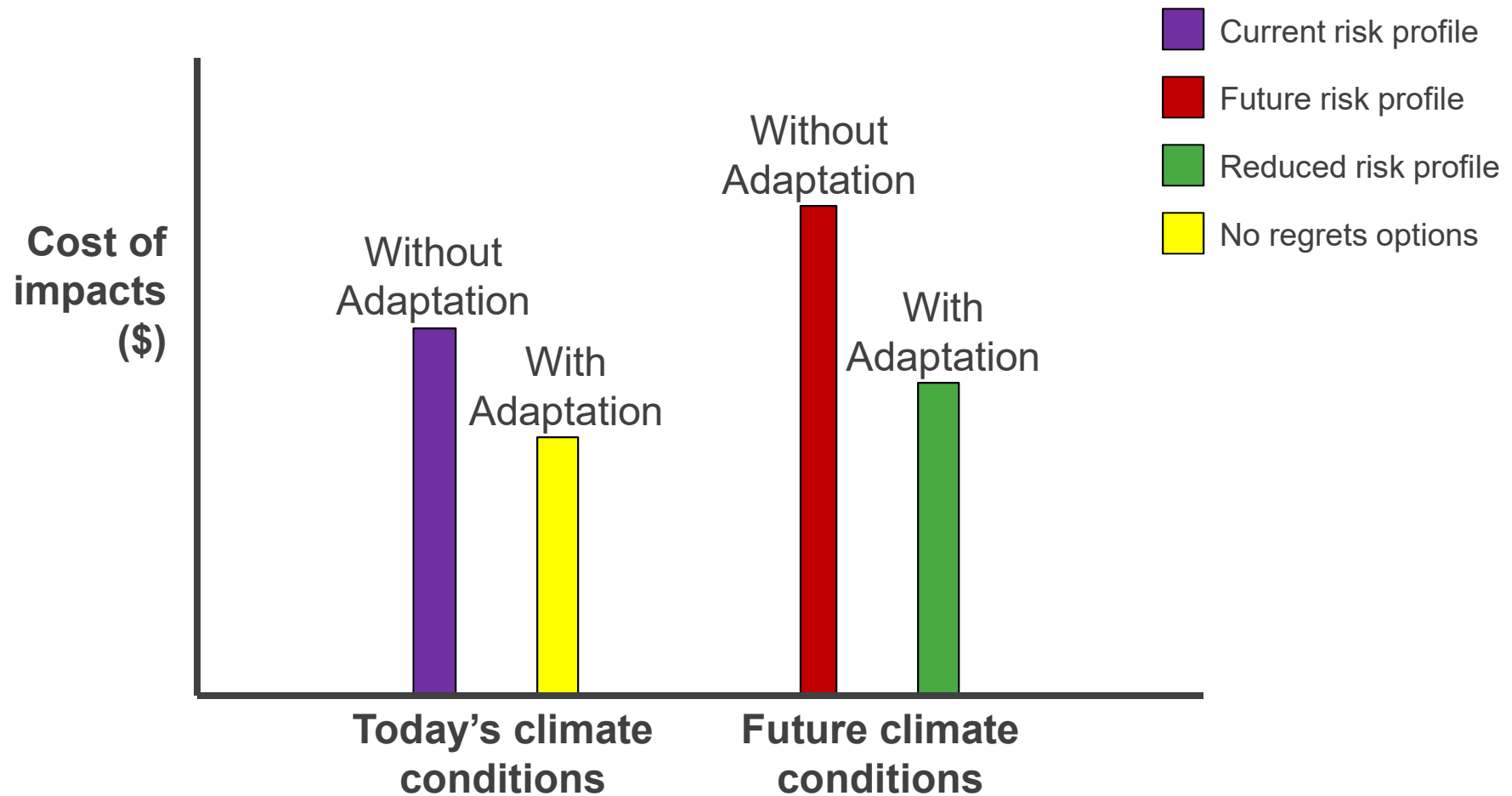
- Learn about potential consequences to business revenue, equipment damage and changes in water quality and quantity
- Identify adaptation strategies for additional resilience

## CREAT Adaptive Measures Library (Step 1 of 2)

Choose an adaptive measure from the CREAT provided library. Choose an adaptive measure from the CREAT-provided library below, then click "Next" to refine your selection.

CONSTRUCT	
ALTERNATE WASTEWATER / STORMWATER CAPABILITIES	<input type="button" value="SELECT"/> <input type="button" value="+"/> <input type="button" value="-"/>
BACK-UP POWER	<input type="button" value="SELECT"/> <input type="button" value="+"/> <input type="button" value="-"/>
FACILITY LOCATION	<input type="button" value="SELECT"/> <input type="button" value="+"/> <input type="button" value="-"/>
HYDROLOGIC BARRIER	<input type="button" value="SELECT"/> <input type="button" value="+"/> <input type="button" value="-"/>
INCREASED CAPACITY - WASTEWATER / STORMWATER	<input type="button" value="SELECT"/> <input type="button" value="+"/> <input type="button" value="-"/>
LEVEE	<input type="button" value="SELECT"/> <input type="button" value="+"/> <input type="button" value="-"/>
LOW-HEAD DAM	<input type="button" value="SELECT"/> <input type="button" value="+"/> <input type="button" value="-"/>

# CREAT in a Bar Graph (Simplified)



# CREAT in a Bar Graph (Real-world Result)



# How do I decide which measures to implement?

Cost to adapt

Cost of impacts

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# Are these strategies beneficial to implement?

- **Consider the likelihood that the threats will occur**
  - Are your adaptation strategies still cost effective?
  - Are some of your strategies “No regrets” strategies?
- **Identify external impacts of implementation**
  - Will my energy costs go up?
  - What funding sources are available?
  - How can I minimize the costs to my customers?
  - Do the water conservation strategies impact other sectors?




# CREAT Outputs

- Interim summary reports
- Data exports
- Plan report

### Climate Awareness Report

Potential future climate conditions for Toms River

Climate change presents challenges to water, wastewater and stormwater utilities and the communities they serve. Those utilities that adapt to these changes may need to raise rates to develop new water supplies and adjust their treatment and operations. Without adaptation, infrastructure and operations designed for historical climate conditions could be overwhelmed or damaged. Main breaks, overflows, and service outages would lead to lost local business revenue and public health concerns. Several changes are possible for your utility's location and each future has unique challenges to consider:

 What if the climate were significantly hotter?	5.51°F increase in average annual temperature and
<ul style="list-style-type: none"> <li>• Adjust treatment processes to warmer waters and alter water quality</li> <li>• Utility crews and equipment stressed during hot days</li> </ul>	
 What if the climate were significantly wetter?	
<ul style="list-style-type: none"> <li>• Strained reservoirs, overwhelmed treatment and flood facilities during sustained and intense storm events</li> <li>• Adjust treatment processes to lesser quality inflow due soil erosion and contaminants from overland flows</li> </ul>	
 What if the climate were significantly drier?	
<ul style="list-style-type: none"> <li>• Revenue loss from reduced usage during voluntary or mandatory conservation actions in response to drought</li> <li>• Operational changes to increase efficiency, conserve and access alternate supplies during intense drought</li> </ul>	
 How will rising sea level affect our community?	
<ul style="list-style-type: none"> <li>• Frequent flooding during storms due to higher sea level increasing storm surges</li> <li>• Coastal aquifers more vulnerable to saline intrusion with higher sea level</li> </ul>	

### CREAT WWTP protection measures Plan Report TOMS RIVER

#### CONTENTS

Background.....	1
Utility Information.....	1
Adaptation Planning.....	2
Risk Assessment Results.....	3
Next Steps.....	4
Attachment A – Scenario Data.....	5
Attachment B – Consequence Definitions.....	6
Attachment C – Plan Comparison.....	7
Attachment D – Likelihood Sensitivity.....	8

#### Background

This report summarizes the potential for reducing consequences that Toms River may experience due to current and projected climate conditions. These consequences are the foundation of the risk that climate conditions may pose to those assets defined as vulnerable by the assessor.

System type	Combined Wastewater
Volume treated (Million Gallons per Day)	35
Population served	95,000

The focus of this report is the WWTP protection measures, defined as the following: This plan includes all measures that would protect the WWTP from coastal storm surges and sea level rise. In each case, where consequences were assessed, the potential gains of implementing this plan were determined in comparison to current resilience to these same conditions. The ability to protect assets to day is described in the Current Measures plan, where those practices and infrastructure protections that currently exist provide some level of consequence reduction in the face of assessed threats.

For each asset, a guided risk assessment was conducted based on the occurrence of multiple scenarios of the same threat; please see Attachment A. For example, the possible consequences to a pump station due to flooding could be assessed across several scenarios of historical or projected changes in precipitation. The time period over which to consider both threats and the ability to implement plans is a critical component of this assessment. The time period selected for this analysis was from 2016 to 2100, which aligns with the 2060 projected climate and sea level data provided in CREAT.

The types of consequences considered by the assessor in the risk assessment summarized in this report were selected based on the types of losses anticipated for those threats and assets being considered; please see Attachment B. For each type of economic consequence, a monetary scale was selected to define levels of consequence to use during risk assessment.

# Who uses CREAT and for what purposes?

- **Inform Planning Efforts**

- Large SW drinking water utility assessed drought and management of future water supplies
- Group of West Coast small drinking water utilities examined how saline intrusion could impact future water rights
- Drinking water utility assessed risks from drought, changes in water quality, and loss of access to primary water supply

- **Justify Funding Requests**

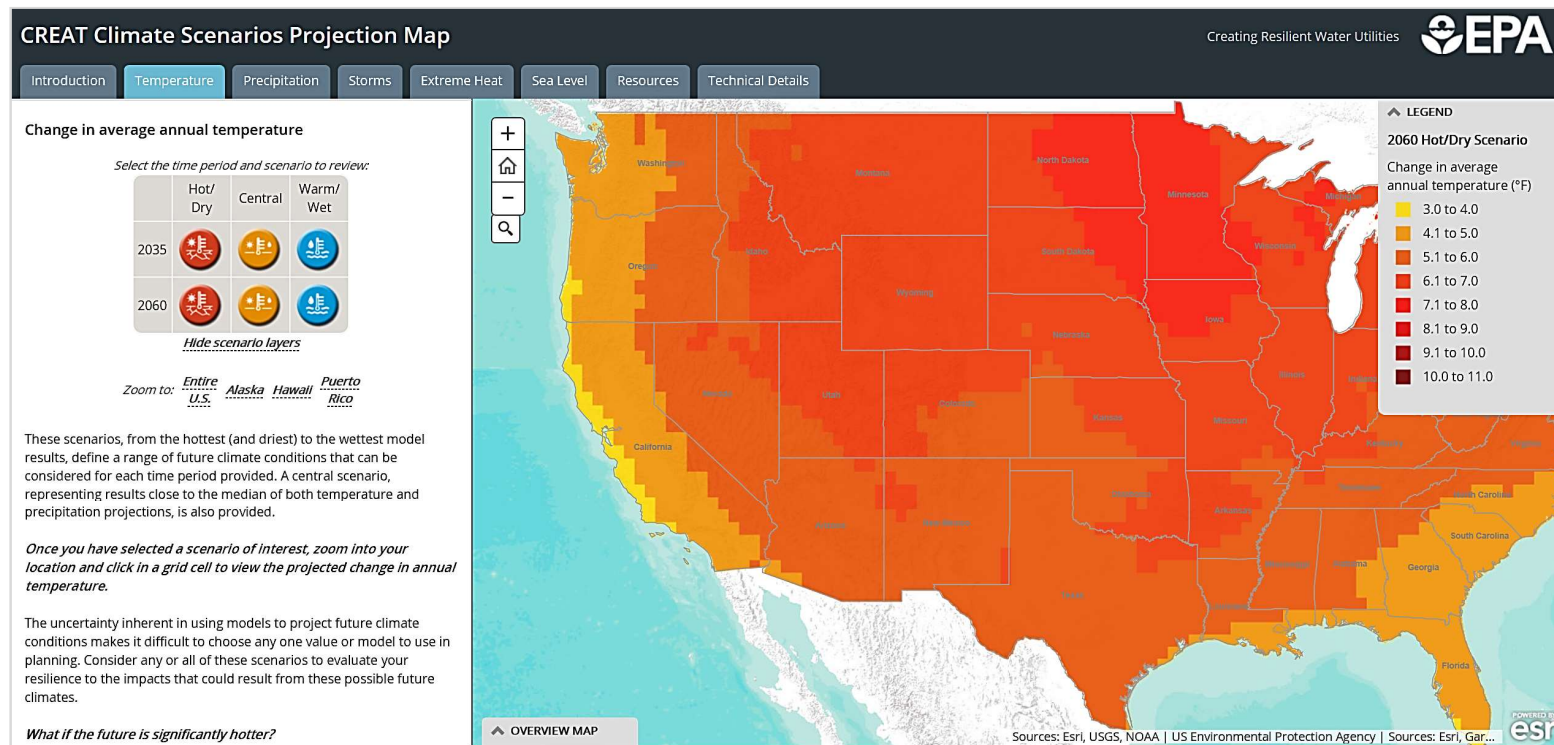
- Large East Coast wastewater utility evaluated and justified funding for a sea wall to protect from coastal storm surge

# Who should I include in my CREAT assessment?

- **Project lead**
- **Assessment team**
  - Operations staff
  - Planning staff
  - Finance staff
  - Climate scientists
  - State or federal funding organizations
  - Other nearby utilities

# What information should I have before I start my CREAT assessment?

- Assessment priorities and goals
- Review utility information
- Review the CREAT Climate Scenarios Projection Map



# What topic do you most want to learn about today?

1. Projected climate data
2. Adaptation strategies
3. Successful resilience planning efforts
4. New resources and tools
5. Funding
6. Other

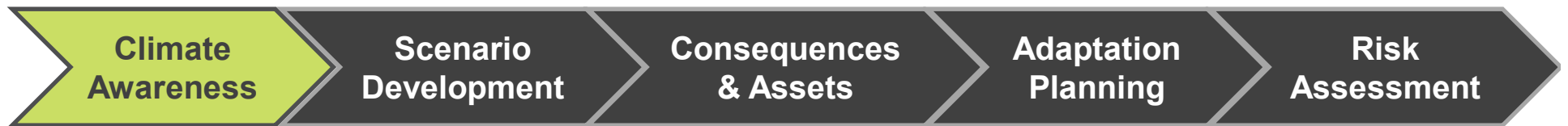


**Resilience Planning and Adaptation Training  
for Water and Wastewater Utilities**

**CREAT Training Module 1:  
Climate Awareness**

**Alfredo Lagos, GDIT**

# Step 1 in the Risk Assessment Process



This module provides basic information about climate impacts and allows you to enter general information about your utility




# Module 1: Climate Awareness

**GOAL:** Increase awareness of climate impacts for your utility's location to help inform future assessment inputs and decisions

Climate Change Basics

Click on any region in the map below to learn about climate change impacts in that area. You can also review national or coastal climate impacts and learn about how climate change is expected to impact a specific sector by clicking on the Topic Links.



Topic Links

- National
- Sea Level Rise
- Agriculture
- Human Health
- Coasts
- Water
- Transportation
- Rural Communities
- Extreme Weather
- Energy
- Forest
- Ecosystems

**i** Note: Map and Topic Links open in a new window or tab in your web browser.

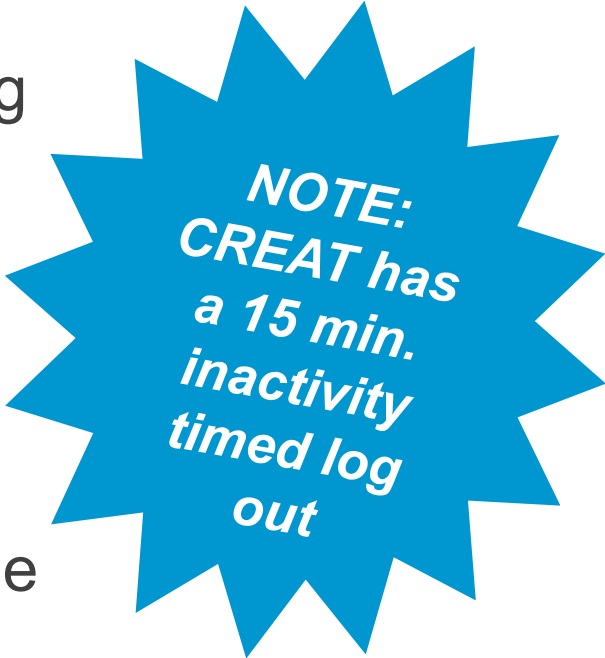
## Example utility for CREAT analysis

- Washington County Water Conservancy District (WCWCD)
- Located in Washington County, Utah
- Primarily wholesale water provider; over 175,000 people in service area
- Climate-related concerns include:
  - Water supply management concerns including drought, reduced snowpack, shorter runoff period
  - Water quality management concerns including harmful algal blooms and increased sediment and nutrient-loading caused by forest fires



# Module 1: Climate Awareness

- Go to: <https://creat.epa.gov>
- Click 'Existing users: Log in' and log in using your WAA account
- Click on 'Get Started'
- Click on 'Build New Analysis'
- Name the analysis – If you are using the generic username, add your initials to the file name
- For 'Is this a streamlined analysis?', leave default answer of 'No' selected
- Click 'Save'



**NOTE:**  
*CREAT has  
a 15 min.  
inactivity  
timed log  
out*

# Module 1: Climate Awareness

- Complete Module 1 in CREAT using the handout
  - Enter utility information
  - Select current concerns

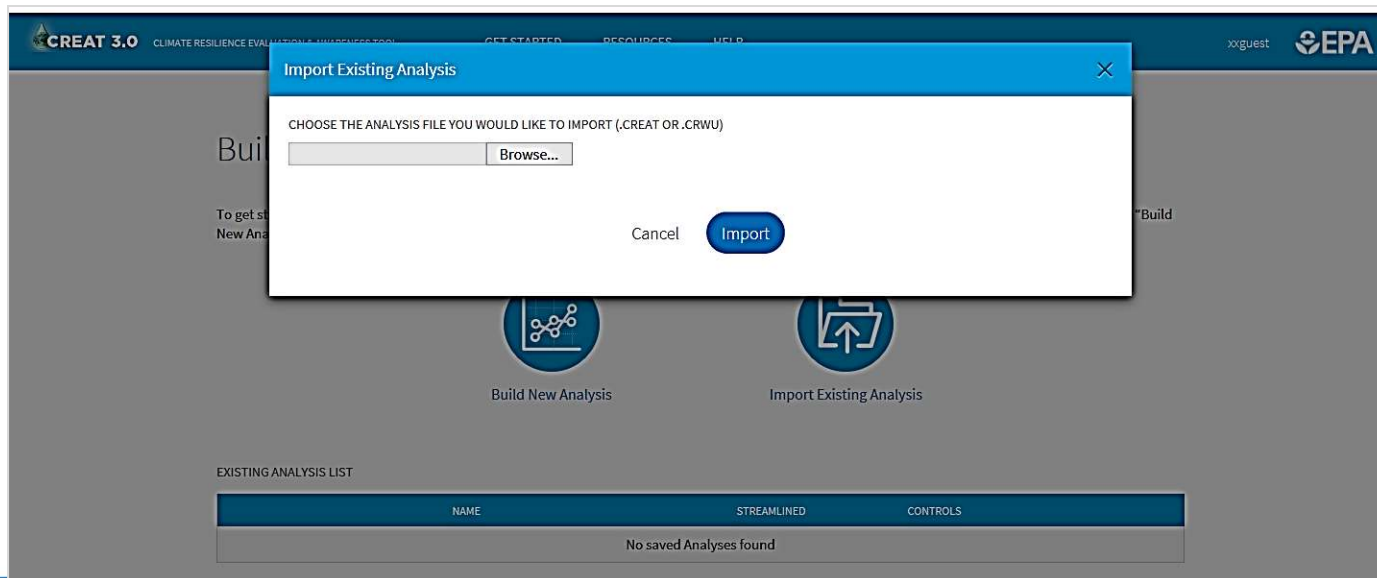
The screenshot displays the CREAT 3.0 interface for the 'Climate Awareness Module'. The header includes the logo 'CREAT 3.0 CLIMATE RESILIENCE EVALUATION & AWARENESS TOOL', navigation links 'GET STARTED', 'RESOURCES', and 'HELP', and the EPA logo. A sidebar on the left lists navigation options: 'Climate Awareness' (selected), 'Utility Information' (active), 'Utility Location', 'Climate Change Basics', 'Current Concerns', 'Awareness Summary', 'Scenario Development', 'Consequences & Assets', 'Adaptation Planning', and 'Risk Assessment'. The main content area is titled 'CREAT Demo Utility Information' and contains a form with the following fields and options:

- UTILITY NAME:** A text input field labeled 'Utility Name'.
- OWNERSHIP:** Radio buttons for 'PUBLIC' (selected) and 'PRIVATE'.
- ADDRESS:** A text input field labeled 'Address'.
- FINANCIAL CONDITION:** Radio buttons for 'ADEQUATE', 'GOOD' (selected), and 'STRONG'.
- CITY:** A text input field labeled 'City'.
- POPULATION SERVED:** A text input field with the value '0'.
- STATE:** A dropdown menu labeled 'Select a state'.
- SYSTEM TYPE:** A dropdown menu labeled 'Select system type'.
- ZIP:** A text input field labeled 'Zip Code'.
- MILLIONS OF GALLONS PER DAY (MGD):** A text input field with the value '0' and an 'MGD' unit label.

At the bottom of the form are 'Back' and 'Continue >' buttons. A 'Feedback' button is located on the right side of the interface.

# Module 1: Climate Awareness

- Click on 'Get Started'
- Click on 'Import Existing Analysis'
- Click on 'Browse' to find the file you saved earlier – *So. Utah Demo File*
  - If file not saved earlier, go to <https://www.sciencemissionsupport.com/creatsouthernutah>;  
see section **Training Materials, Example CREAT Assessment File**
- Click 'Open' and enter '123' for 'Enter Encryption Passphrase'
- Click 'Import' to populate the existing analysis list
- Click the 'Resume' button next to the Southern Utah Demo File



# CREAT Module 1 Recap

- **What type of utility is WCWCD?**
  - Serves over 175,000 people
  - Publicly owned
  - Water utility
- **What are we currently concerned about?**
  - Water supply management – drought, reduced snowpack, shorter runoff period
  - Water quality management – harmful algal blooms
  - Natural disasters – floods

## Next Step

- Identify how our current concerns could change in the future



# Resilience Planning and Adaptation Training for Water and Wastewater Utilities

**Break**



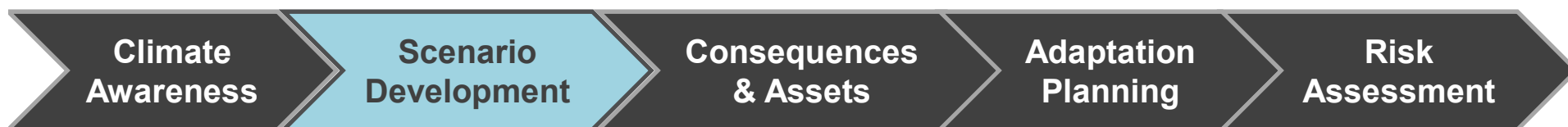
**Resilience Planning and Adaptation Training  
for Water and Wastewater Utilities**

**CREAT Training Module 2:  
Scenario Development**

**Mary Jo Kricorian, GDIT**



## Step 2 in the Risk Assessment Process



What have we done so far?

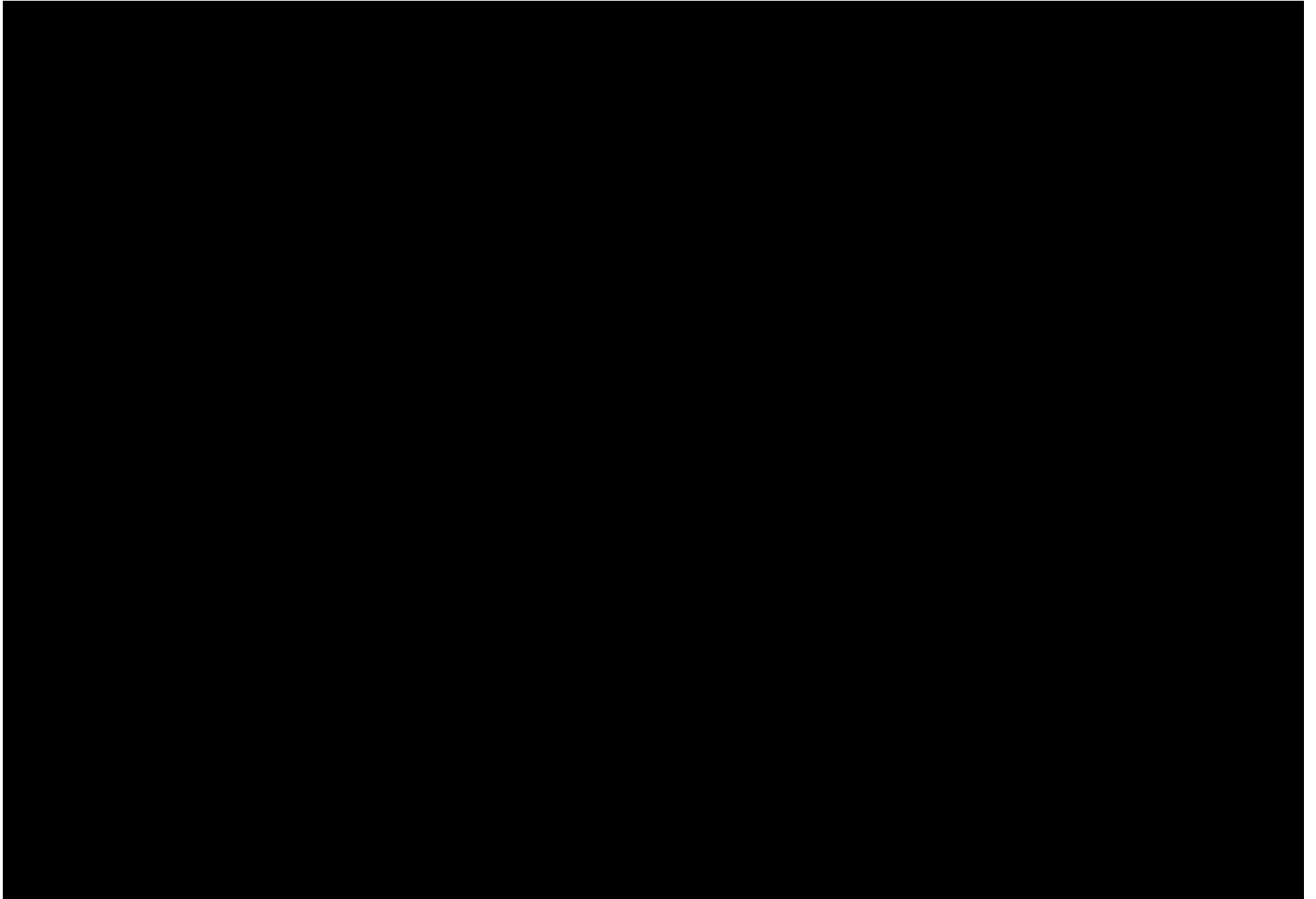
- Reviewed climate impacts
- Identified our current concerns

This module prompts you to think critically about the challenges your utility may face under future climate conditions and allows you to build scenarios to use in your assessments

# Module 2: Scenario Development

**GOAL:** Develop scenarios of potential future climate conditions for assessing impacts through time

# Scenario Development Module Video



# What is a scenario?

- In CREAT, scenarios are projected changes in climate with respect to average conditions, extreme events, and sea level rise
- Scenarios can represent potential climate conditions based on historical records, climate models or other data.



## Baseline Scenario

- Historical climate conditions for a given location
- Use this scenario to compare current threats with how they could change in the future

# What could the future be like?

**Projected Scenarios** – Define projected scenarios to consider a range of potential conditions



How would threats change if the future was hotter and drier?

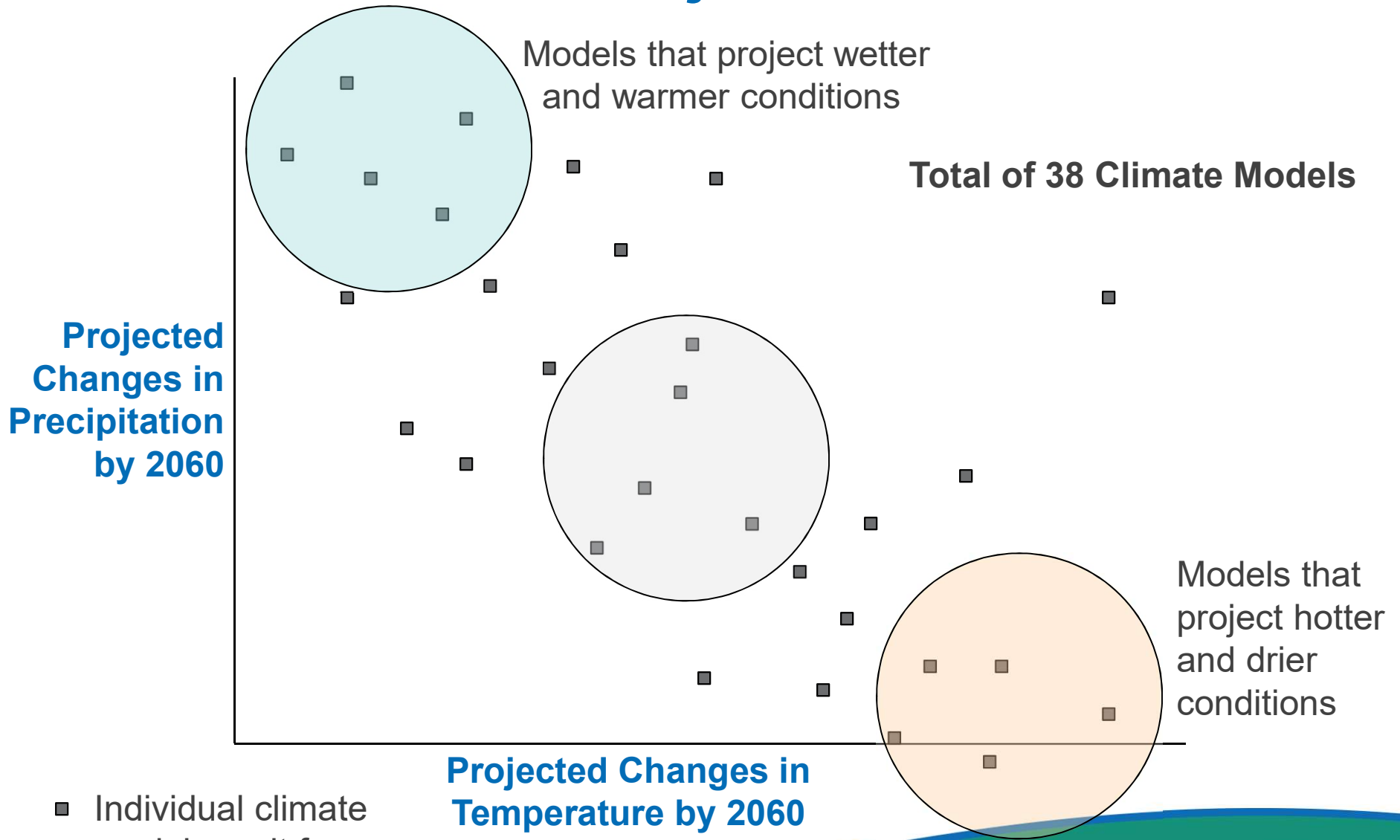


Or if the future was warmer and wetter than it is now?



What would moderate changes look like?

# CREAT-Provided Projected Scenarios



- Individual climate model result for this location

# Threat Definition

- Define threats to capture impacts of future climate conditions
- Consider how past events could occur **more frequently** or result in **increased damage or challenges** to assets and operations
  - **Drought**: duration, annual or seasonal rainfall, reservoir levels, stream flow
  - **Floods**: flooded/damaged equipment, expected river levels
  - **Wildfire**: area burned, duration of impacts to water supply

# Module 2: Scenario Development

- Complete Module 2 in CREAT
  - Review historical and projected climate data
  - Build scenarios of future conditions
  - Identify and define threats

The screenshot displays the CREAT 3.0 user interface. The top navigation bar includes the CREAT 3.0 logo, the text 'CLIMATE RESILIENCE EVALUATION & AWARENESS TOOL', and navigation links for 'GET STARTED', 'RESOURCES', and 'HELP'. On the right side of the header, the user 'xalagos' and the EPA logo are visible. A left-hand sidebar menu contains the following items: 'Climate Awareness', 'Scenario Development' (selected), 'Consequences & Assets', 'Adaptation Planning', and 'Risk Assessment'. Under 'Scenario Development', the sub-menu items are: 'Scenario Primer' (selected), 'Threat Identification', 'Baseline Scenario', 'Time Period', 'Projected Scenarios', 'Threat Definition', and 'Scenario Summary'. The main content area is titled 'Scenario Primer' and includes a video player for 'Climate Resilience Evaluation and Awareness T...'. The video player has a play button and a 'Feedback' button on the right. Below the video, there are 'Back' and 'Continue >' buttons.

CREAT 3.0 CLIMATE RESILIENCE EVALUATION & AWARENESS TOOL GET STARTED RESOURCES HELP xalagos EPA

Climate Awareness

Scenario Development

- Scenario Primer
- Threat Identification
- Baseline Scenario
- Time Period
- Projected Scenarios
- Threat Definition
- Scenario Summary

Consequences & Assets

Adaptation Planning

Risk Assessment

CREAT Demo Scenario Development Module

## Scenario Primer

To get started on your climate change risk assessment, you will identify and define climate **threats** you want to consider for this analysis based on the current concerns identified in the Climate Awareness module. Watch the video located on the right-hand side of this screen for an overview of the Scenario Development module.

In this module, you will review historical climate conditions provided by CREAT for your location, such as temperature, precipitation and storm events, which will help you to understand how these conditions drive your threats of concern. This historical climate data is used to build a **Baseline Scenario** for comparison with scenarios of future climate conditions.

There are a number of potential future climate conditions you could plan for based on changes in temperature, precipitation and storm events, which might exacerbate your current threats or present new threats. The projections in CREAT represent potential future climate conditions that range from hotter and drier to wetter and stormier.

You will want to review the CREAT data and consider how your threats will change in response to these future climate conditions. With the addition of sea level rise values for coastal facilities, CREAT delivers the ability to define identified threats as scenarios for assessment.

When this module is complete, you will have developed projected scenarios that represent changes in threats for your assessment. Understanding how climate may change in the future will help you to identify adaptation options and improve your resilience to climate change impacts.

Climate Resilience Evaluation and Awareness T...

Back Continue >

Feedback



**By 2060, the Washington County area would have an annual average temperature of 59.12°F, which would be close to which state's current annual average temperature?**

1. California
2. Arkansas
3. Delaware
4. Colorado

The current 100-year storm event produces approximately 3.88 inches in a 24-hour period. What could be the new amount of rain in a 24-hour period for a 100-year event in the Washington County area by 2060?

1. 2.69 inches/24hr
2. 3.92 inches/24hr
3. 5.22 inches/24hr
4. 6.01 inches/24hr

## How many climate models does CREAT use to provide climate scenarios?

1. 5
2. 13
3. 29
4. 38

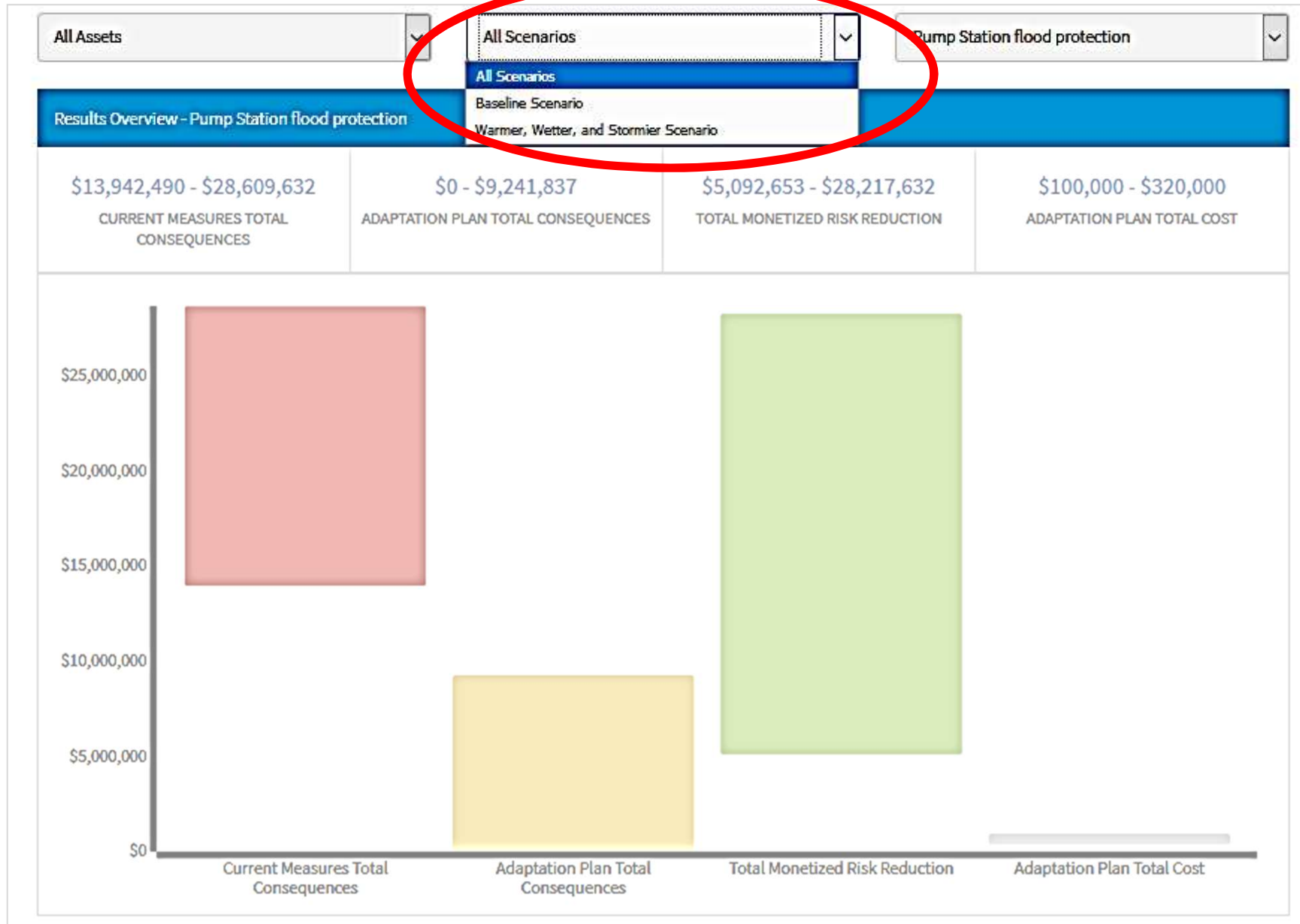
## CREAT Module 2 Recap

- **What threat are we focusing on for this assessment?**
  - Drought – lower reservoir levels resulting from drought
- **How could this threat change in the future?**
  - Increased temperature in colder months
  - Overall decreased precipitation
  - 100-year storm event could become more intense
- **What does this mean for our utility?**
  - Snow pack melting earlier and at lower elevations
  - Winter warm spells lead to more rain/less snow at higher elevations
  - Less snow and more unpredictable rain events could impact WCWCD's ability to capture water

### Next Step

- Identify the assets that are most vulnerable to impacts and the consequences the utility would experience from this threat

# Building our Risk Assessment – add scenarios





# **Resilience Planning and Adaptation Training for Water and Wastewater Utilities**

## **Identifying Current Concerns Small Group Discussion**

**Mary Jo Kricorian, GDIT**

# Small Group Instructions

## GROUP CHARGE

- At your table, share current concerns or threats relevant for your critical assets
- After 10 minutes, the trainers will call on some tables to hear about your discussion, covering:
  - Top current concerns/threats in your group
  - Rationale for your top concern



**Resilience Planning and Adaptation Training  
for Water and Wastewater Utilities**

**CREAT Training Module 3:  
Consequences & Assets**

**Alfredo Lagos, GDIT**



# Step 3 in the Risk Assessment Process



So far we have identified:

- Impacts from future climate conditions
- Current utility concerns
- Threat of concern
- Scenarios that outline current and future climate conditions
- How the threat might change over time

This module gives you the opportunity to consider the different types of consequences that may result from your threats and to identify priority assets for your assessment

# Module 3: Consequences & Assets

**GOAL:** Review CREAT's scorecard for use during your risk assessment and catalog assets and their value to the utility

# Consequence Categories

- Default categories capture the full range of potential consequences your utility could experience from a threat
- **CREAT Economic Consequence Categories**
  - Utility Business Impacts
  - Utility Equipment Damage
  - Source/Receiving Water Impacts
  - Environmental Impacts
- Default \$ values for monetized risk are available for 4 levels: Low, Medium, High, Very High
- Option to consider Public Health consequences
  - Value of Statistical Life (VSL)
  - Value of Statistical Injury (VSI)

# Economic Consequences Matrix

Monetary range for each level of each consequence category is based on:

- **Utility Profile**

- System type
- Utility size
- Financial condition

- **Benchmarking data**

- EPA's Community Water System Survey (EPA 2009)
- American Water Works Association Benchmarking Performance Indicators for Water and Wastewater Utilities (AWWA 2015)

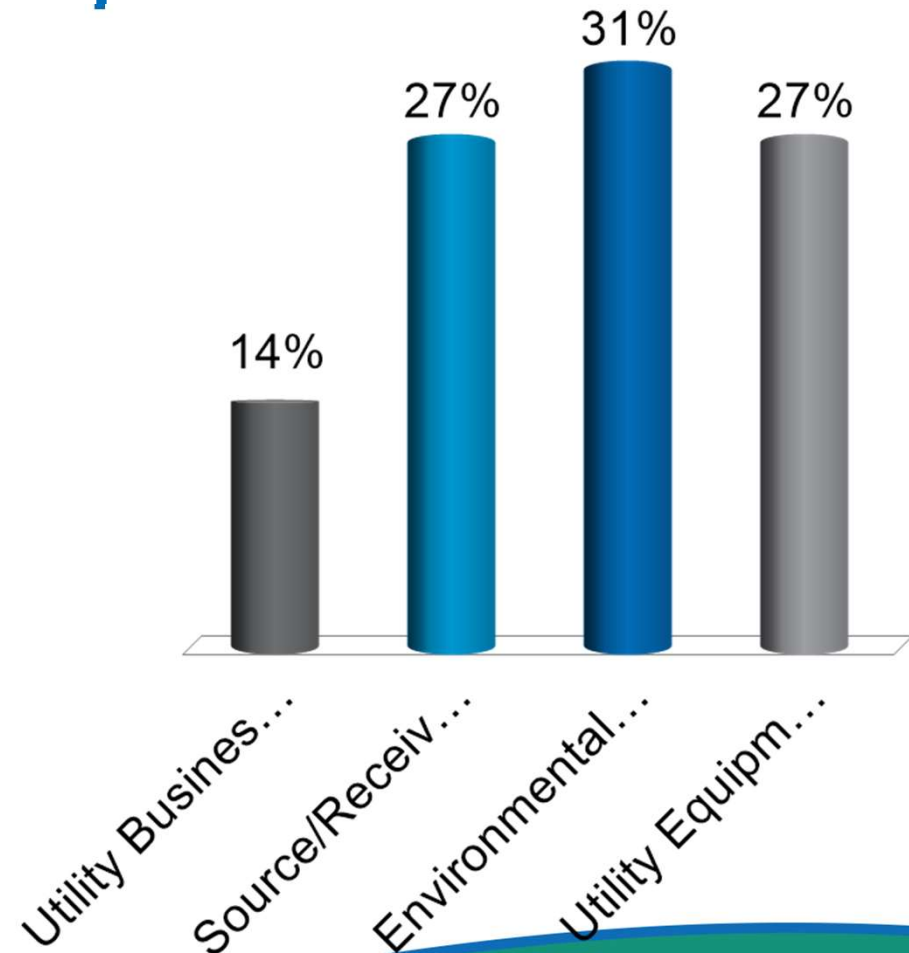
# Module 3: Consequences & Assets

- Complete Module 3 in CREAT
  - Review economic and public health consequences
  - Select critical assets

The screenshot displays the CREAT 3.0 web application interface. The header includes the logo 'CREAT 3.0 CLIMATE RESILIENCE EVALUATION & AWARENESS TOOL', navigation links 'GET STARTED', 'RESOURCES', and 'HELP', and the EPA logo with the text 'xalagos'. The left sidebar contains a menu with categories: 'Climate Awareness', 'Scenario Development', 'Consequences & Assets' (selected), 'Adaptation Planning', and 'Risk Assessment'. Under 'Consequences & Assets', the sub-menu items are: 'Consequences Primer' (selected), 'Economic Consequences Matrix', 'Public Health Consequences', 'Asset Definition', and 'Consequences Summary'. The main content area is titled 'CREAT Demo Consequences Primer' and includes a search icon and 'Consequences and Assets Module'. The text explains that users have identified threats and selected data to define scenarios, and provides instructions on how to use the video on the right-hand side. A video player is embedded on the right, showing a worker in a blue shirt and safety gear working on a large pipe. Below the video are 'Back' and 'Continue >' buttons. A vertical 'Feedback' button is located on the right edge of the video player.

# For the WCWCD example assessment, which economic consequence category had the highest maximum monetary consequence level?

1. Utility Business Impacts
2. Source/Receiving Impacts
3. Environmental Impacts
4. Utility Equipment Damage



# CREAT Module 3 Recap

- **What consequences could we face if our threat occurs?**
  - Not enough water supply
  - Water quality impacts
- **Which asset(s) are we most concerned about and why?**
  - Virgin River basin water supplies
  - Decreases in precipitation could cause reduced storage/snowpack

## Next Step

- Identify what **existing** strategies are protecting our asset and what **potential** strategies we could implement to provide more protection



# Resilience Planning and Adaptation Training for Water and Wastewater Utilities

**LUNCH** (provided on-site)

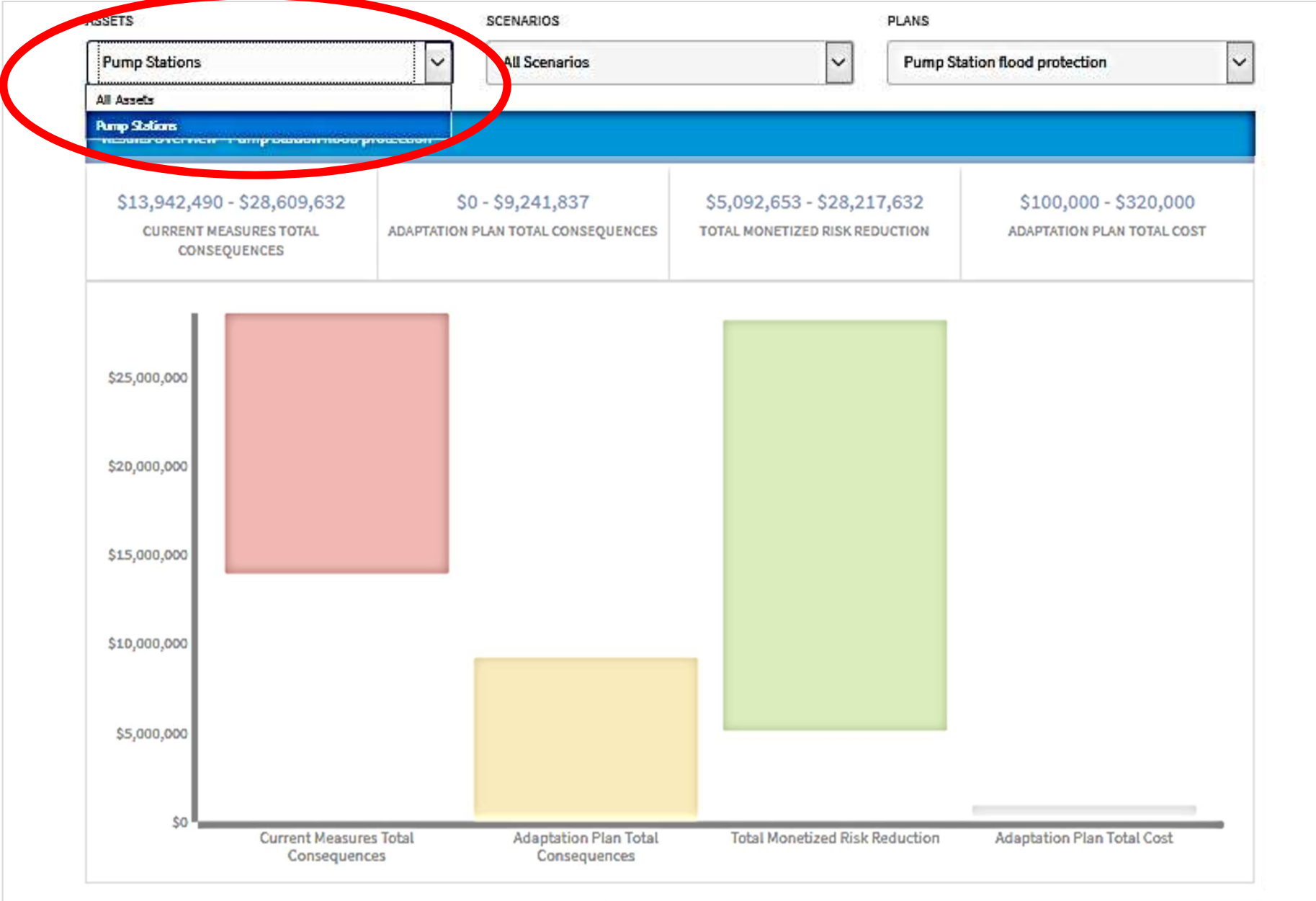




# Resilience Planning and Adaptation Training for Water and Wastewater Utilities

**Jeopardy**

# Building our Risk Assessment – *add assets*



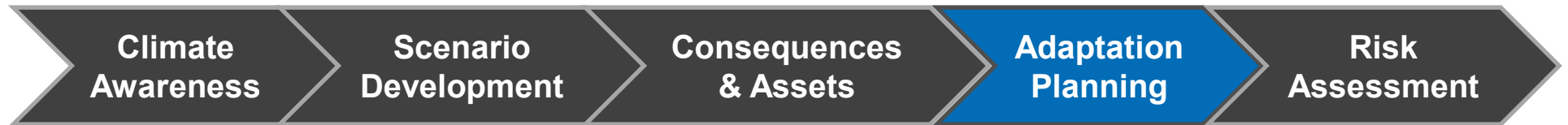


**Resilience Planning and Adaptation Training  
for Water and Wastewater Utilities**

**CREAT Training Module 4:  
Adaptation Planning  
Part 1**

**Mary Jo Kricorian, GDIT**

# Step 4 in the Risk Assessment Process



So far, we have identified:

- Our threat
- How that threat could change through time
- The types of consequences if the threat were to occur
- Which assets are most at risk to the threat

This module allows you to document anything you are currently doing or would consider doing to increase resilience to threats and to organize these options into plans

# Module 4: Adaptation Planning, Part 1

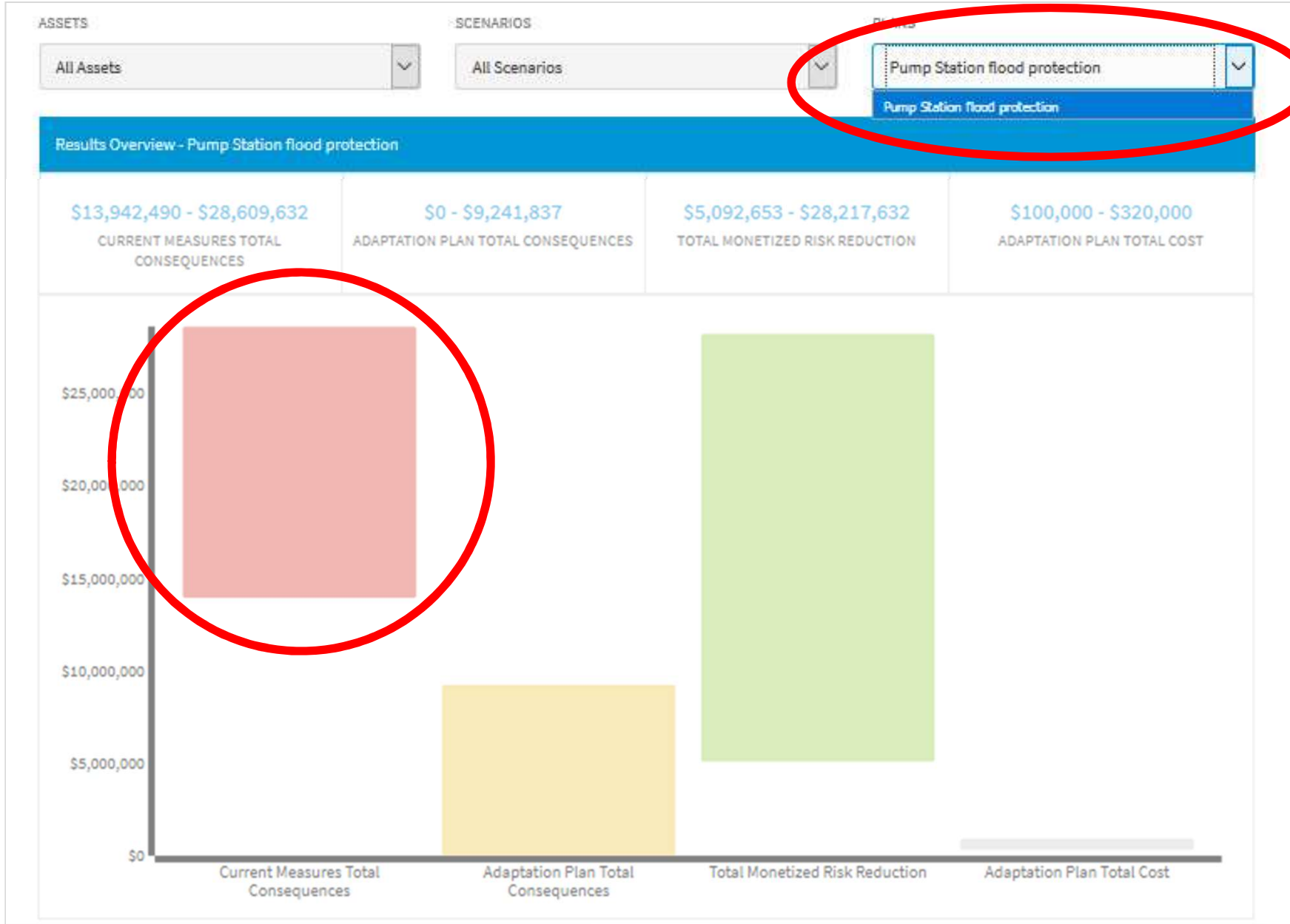
**GOAL:** Document existing adaptation strategies for protecting assets

# Module 4: Adaptation Planning, Part 1

- **Begin Module 4 in CREAT**
  - Identify existing adaptive measures that increase resilience

The screenshot displays the CREAT 3.0 web application interface. The header includes the CREAT 3.0 logo, the text "CLIMATE RESILIENCE EVALUATION & AWARENESS TOOL", navigation links for "GET STARTED", "RESOURCES", and "HELP", and the user name "xalagos" next to the EPA logo. A left sidebar menu lists the following sections: "Climate Awareness", "Scenario Development", "Consequences & Assets", "Adaptation Planning" (which is expanded to show "Adaptation Primer", "Existing Adaptive Measures", "Potential Adaptive Measures", "Adaptation Plans", and "Adaptation Summary"), and "Risk Assessment". The main content area is titled "CREAT Demo" and "Adaptation Planning Module". It features the heading "Adaptation Planning Primer" and a paragraph of introductory text: "In this module, you will consider how different actions called adaptive measures can mitigate the consequences of a threat occurring to a given asset. You will be asked to identify and define specific actions to develop an inventory of options to help you build resilience to climate change through the adaptation planning process. First, you will identify existing adaptive measures your utility has already put into practice or built. These existing measures will help you understand your current resilience to various threats and how you can build upon these measures to increase your capabilities. Next, you will choose potential adaptive measures and group these into adaptation plans that will help you assess how you can reduce the risk of future climate change to your utility." Below the text are two buttons: "Back" and "Continue >". A vertical "Feedback" button is located on the right side of the content area.

# Building our Risk Assessment – *add adaptation plans*





**Resilience Planning and Adaptation Training  
for Water and Wastewater Utilities**

**Identifying Potential Adaptive Measures  
Small Group Discussion**

**Mary Jo Kricorian, GDIT**



# Small Group Instructions

## • GROUP CHARGE

- Think about potential adaptive measures that could be implemented to further protect the utility's critical assets
- Assess the strengths and weaknesses of the provided menu of potential adaptive measures
- Identify and rank your top 5 potential adaptive measures
- Draw on your own experience and think about constraints you would consider in making planning decisions (e.g., financial, political, regulatory)
- Identify any questions about adaptive measures or CREAT

## • SELF-FACILITATED PROCESS

- Assign a note-taker to capture key ideas
- Identify someone to report-out on your discussion, covering:
  - Priority adaptive measures identified by your group
  - Rationale for your priorities
  - Questions about CREAT



# **Resilience Planning and Adaptation Training for Water and Wastewater Utilities**

## **Prioritization of Potential Adaptive Measures**

**Alfredo Lagos, GDIT**

# Small Group Reports

- Priority adaptive measures identified by your group
- Rationale for your priorities
- Questions about CREAT
- Other key takeaways, questions or feedback

***Which adaptive measures would you build into an adaptation plan?***



# Resilience Planning and Adaptation Training for Water and Wastewater Utilities

**Break**

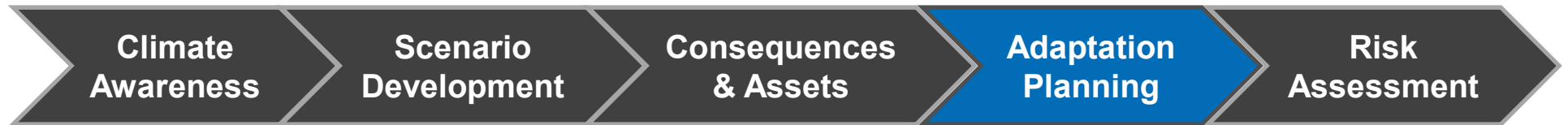


**Resilience Planning and Adaptation Training  
for Water and Wastewater Utilities**

**CREAT Training Module 4:  
Adaptation Planning  
Part 2**

**Mary Jo Kricorian, GDIT**

## Step 4 in the Risk Assessment Process



This module allows you to document measures you currently have in place or would consider implementing in the future to increase resilience and to organize these measures into plans

# Module 4: Adaptation Planning, Part 2

**GOAL:** Document potential adaptation plans for protecting assets

# How do utilities typically design adaptation plans?

- **Some examples of how utilities approach this challenge:**
  - Develop a ‘no-regrets’ plan
  - Develop plans based on available funding or that complement other utility priorities
  - Develop plans to be implemented over time
  - Develop different plans based on certain trigger events or thresholds



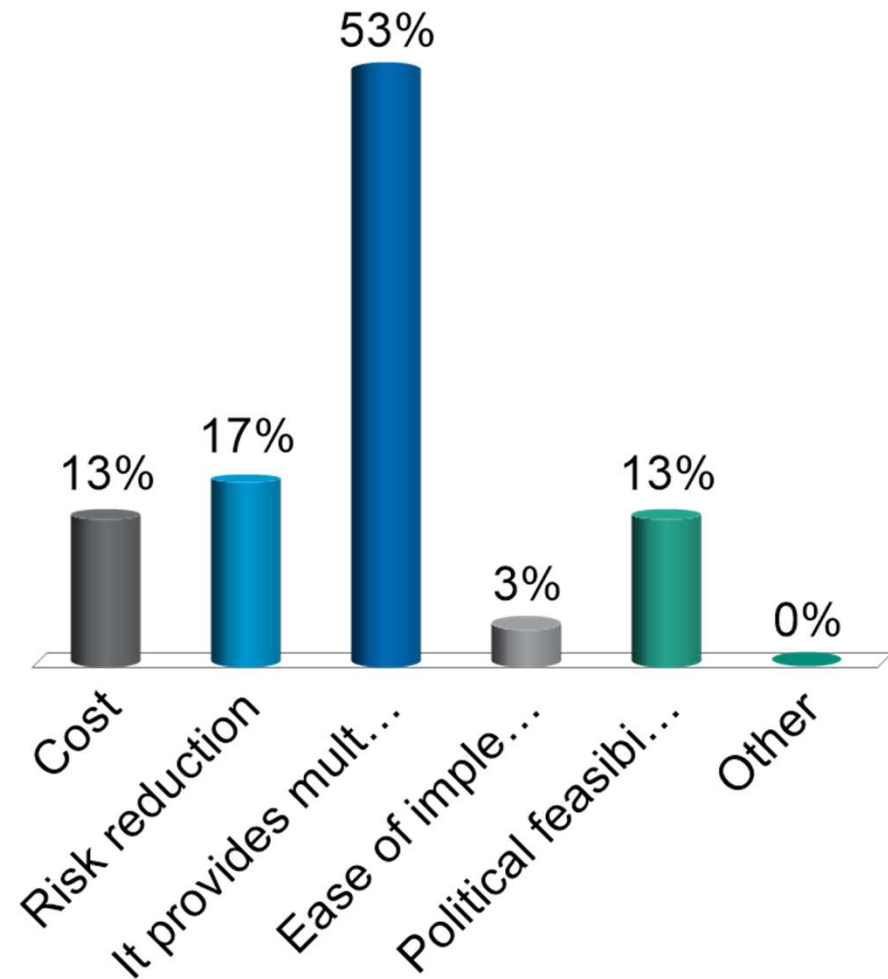
# Module 4: Adaptation Planning, Part 2

- **Complete Module 4 in CREAT**
  - Identify potential adaptive measures that increase resilience
  - Build adaptation plans

The screenshot displays the CREAT 3.0 web application interface. The top navigation bar includes the CREAT 3.0 logo, the text "CLIMATE RESILIENCE EVALUATION & AWARENESS TOOL", and links for "GET STARTED", "RESOURCES", and "HELP". The EPA logo and the name "xalagos" are also visible in the top right. A left sidebar menu lists several modules: "Climate Awareness", "Scenario Development", "Consequences & Assets", "Adaptation Planning" (which is expanded to show "Adaptation Primer", "Existing Adaptive Measures", "Potential Adaptive Measures", "Adaptation Plans", and "Adaptation Summary"), and "Risk Assessment". The main content area is titled "CREAT Demo" and "Adaptation Planning Module". It features a heading "Adaptation Planning Primer" and a paragraph of introductory text: "In this module, you will consider how different actions called adaptive measures can mitigate the consequences of a threat occurring to a given asset. You will be asked to identify and define specific actions to develop an inventory of options to help you build resilience to climate change through the adaptation planning process. First, you will identify existing adaptive measures your utility has already put into practice or built. These existing measures will help you understand your current resilience to various threats and how you can build upon these measures to increase your capabilities. Next, you will choose potential adaptive measures and group these into adaptation plans that will help you assess how you can reduce the risk of future climate change to your utility." Below the text are two buttons: a "Back" button and a "Continue >" button. A vertical "Feedback" button is located on the right side of the content area.

# What is the most important consideration for your organization when considering measures to implement?

1. Cost
2. Risk reduction
3. It provides multiple benefits
4. Ease of implementation
5. Political feasibility
6. Other



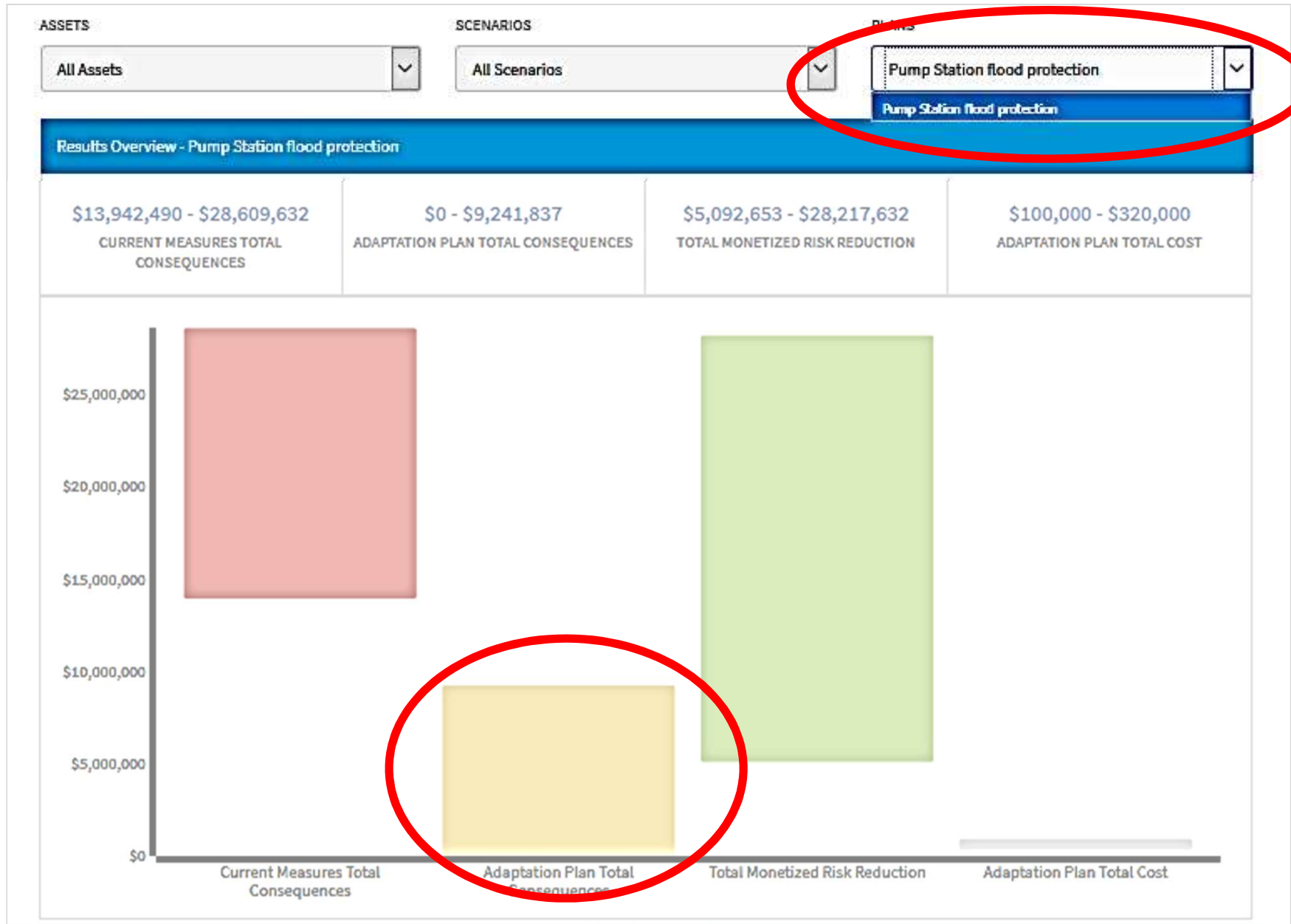
## CREAT Module 4 Recap

- **What are we most worried about in the future?**
  - Longer and more severe drought events combined with increased demand exceeds available water supply
- **How do we currently protect our assets?**
  - Community outreach
  - Metering of secondary irrigation water
  - Rebates
  - Water audits
- **What are we thinking about doing in the future?**
  - Ash Creek Project
  - Increase water supply storage
  - Water Loss Reduction

### Next Step

- Identify the potential benefits from implementing our adaptation plans

# Building our Risk Assessment – add adaptation plans



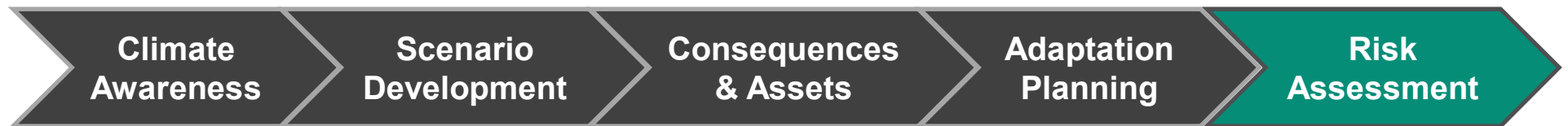


**Resilience Planning and Adaptation Training  
for Water and Wastewater Utilities**

**CREAT Training Module 5:  
Risk Assessment**

**Alfredo Lagos, GDIT**

# Step 5 in the Risk Assessment Process



So far, we have identified:

- Our threat
- How that threat can change through time
- The types of consequences if the threat were to occur
- Which assets are at risk to the threat
- Current and new strategies to protect these assets from the threat
- Plans of adaptation strategies that we could implement

This module guides you through the risk assessment process and provides monetized risk and plan costs as outputs

# Module 5: Risk Assessment

**GOAL:** Assess the capabilities and benefits of plans across your defined scenarios

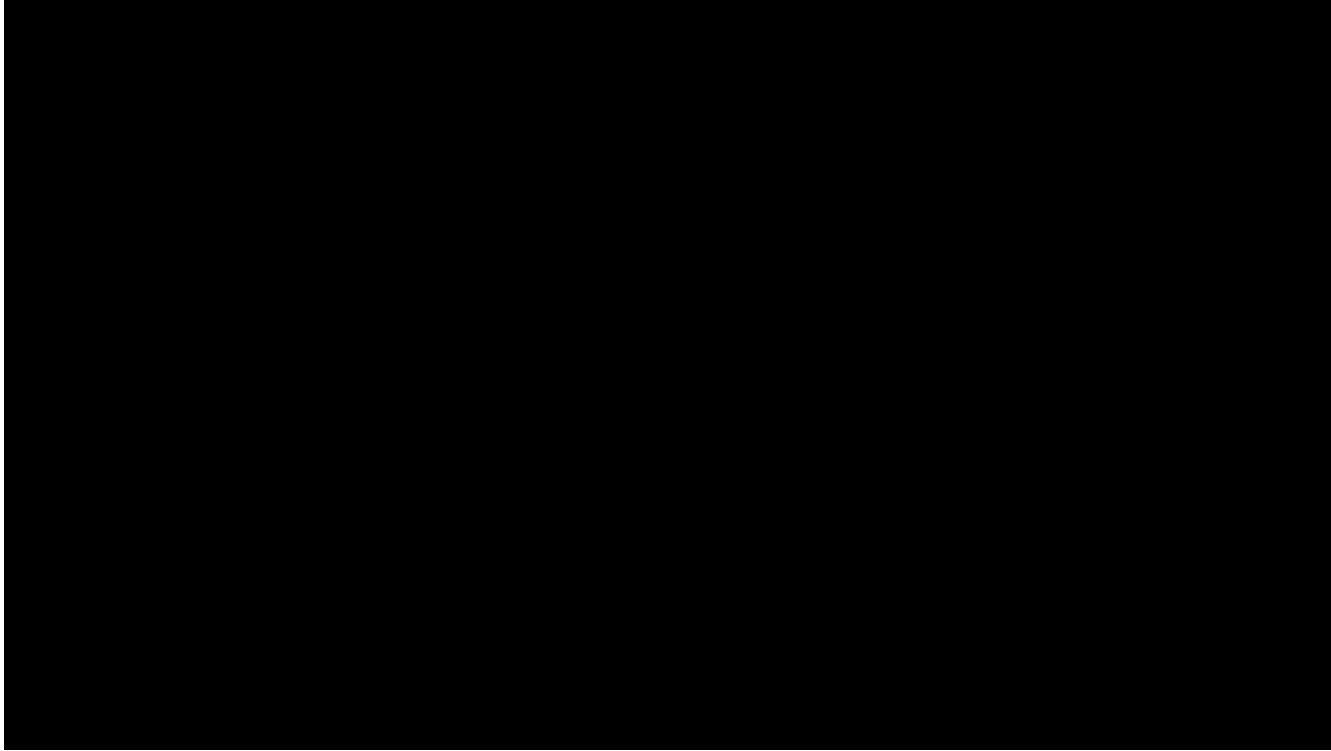
**Conducting assessments for individual asset/threat pairs is typically the most difficult step**

# Asset-Threat Pairs

- **Assess consequences** from the threat occurring and impacting your asset
  - Select level of consequences (Low – Very High) for each category in the Economic Consequences Matrix
  - Consequences are summed across all categories
  - Assess consequences for each scenario and adaptation plan
- **Assessment shows:**
  - Consequences the utility could experience with and without adaptation measures
  - Calculate benefits of implementing adaptation plans
  - Compare benefits to the cost of implementing the plan



# Risk Assessment Video

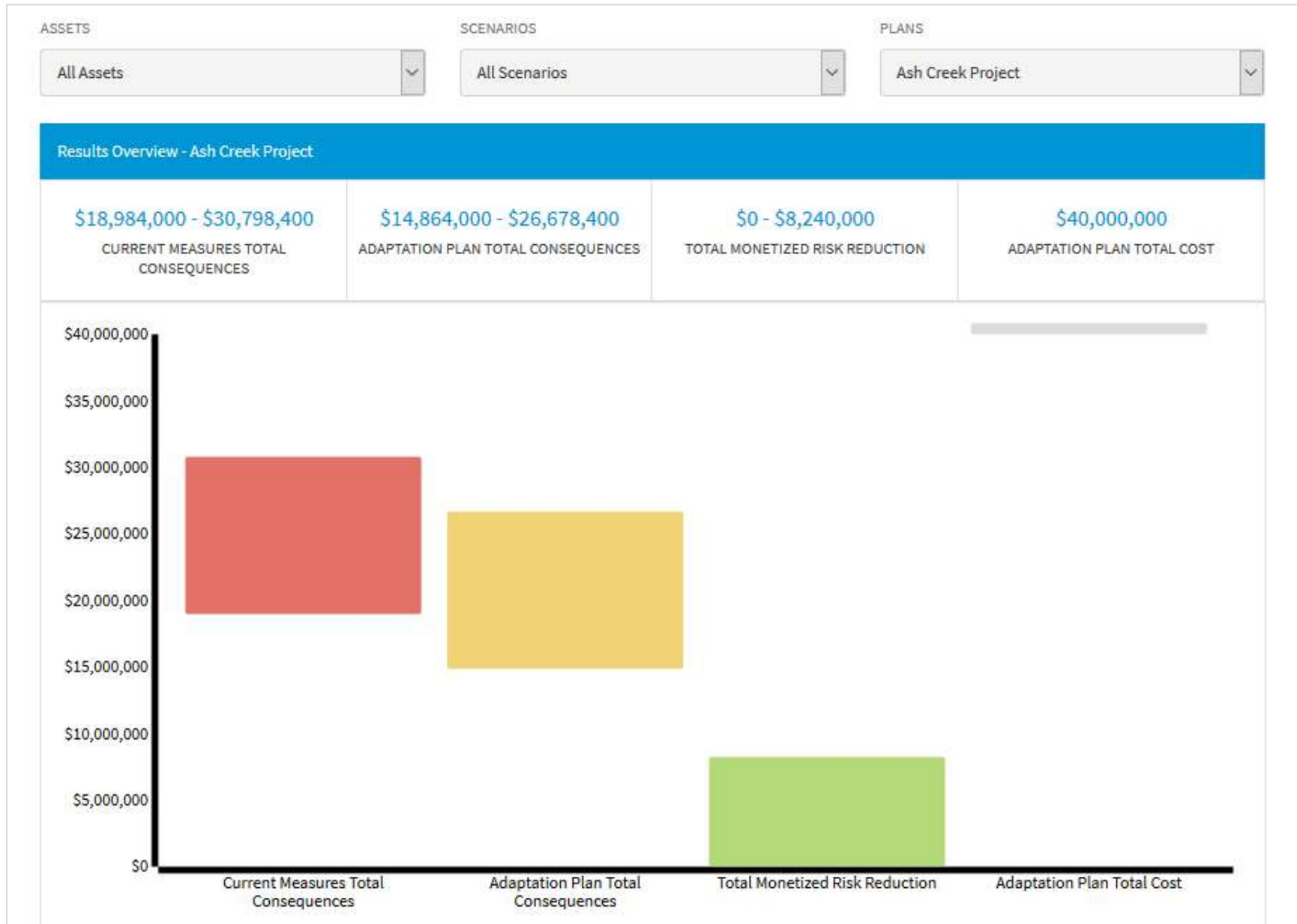


# Module 5: Risk Assessment

- Complete Module 5 in CREAT
  - Assess consequences for asset-threat pair
  - Review results

The screenshot displays the CREAT 3.0 interface. The top navigation bar includes the logo 'CREAT 3.0 CLIMATE RESILIENCE EVALUATION & AWARENESS TOOL', navigation links 'GET STARTED', 'RESOURCES', and 'HELP', and user information 'xalagos' and the 'EPA' logo. A left sidebar menu lists: 'Climate Awareness', 'Scenario Development', 'Consequences & Assets', 'Adaptation Planning', and 'Risk Assessment' (which is expanded to show 'Risk Primer', 'Asset/Threat Pairs', 'Risk Results', 'Likelihood Sensitivity', and 'Plan Comparison'). The main content area is titled 'CREAT Demo Risk Primer' and includes a video player. The video is titled 'Climate Resilience Evaluation and Awareness To...' and features a man in a field with the text 'How resilient are we already?'. Below the video are 'Back' and 'Continue >' buttons. A 'Feedback' button is visible on the right edge of the interface.

# Building our Risk Assessment – *risk results*



# CREAT Module 5 Risk Assessment Recap

## Using CREAT, our risk assessment identifies:

- Our climate threat
- How that threat can change through time
- Types of consequences if the threat were to occur
- Which assets were at risk to the threat
- Existing and potential strategies to protect the asset
- Plans of adaptation strategies to provide further protection
- Benefits of implementing adaptation plans compared to the cost of doing nothing
- How likelihood can inform adaptation decision making
- External benefits of plan implementation

# What do we do now that we have completed our CREAT assessment?

- Communicate our results to decision-makers
- Identify additional information to refine our assessment
- Secure funding for adaptation implementation
- Share our findings with partners, customers and other stakeholders
- Add our adaptation case study to CRWU's [Adaptation Case Study and Information Exchange](#) map



# **Resilience Planning and Adaptation Training for Water and Wastewater Utilities**

## **Funding Resilience and Adaptation**

**Michael Grange, Utah Department of Environmental Quality  
Janna Wilkinson, Utah Division of Emergency Management**



# Resilience Planning and Adaptation Training for Water and Wastewater Utilities

## Training Wrap-Up

# CREAT Training Wrap-up

- Complete a CREAT assessment for your utility or provide technical assistance for an organization in using CREAT
- Communicate opportunities for using CREAT with other utility personnel
- Provide staff training on CREAT and other CRWU resources
- Review funding handout and identify opportunities for building climate resilience



# How to sign up to use CREAT

1. Go to [creat.epa.gov](http://creat.epa.gov)

2. Click “New Users: Register” and complete form

EPA United States Environmental Protection Agency

Environmental Topics    Laws & Regulations    About EPA    Search EPA.gov

Related Topics: [Creating Resilient Water Utilities \(CRWU\)](#)    CONTACT US    SHARE

## CREAT Risk Assessment Application for Utilities

CREAT is a risk assessment application that helps utilities to adapt to extreme weather events by better understanding current and long-term weather conditions. [Sign up for CRWU News](#)

- **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 extreme weather events on utility operations.
- **Share:** Generate reports describing the costs and benefits of your risk reduction strategies for decision makers and stakeholders.

Existing users: [Log in](#)

**New users: [Register](#)**

### Related Information

- [CREAT methodology guide](#)
- [CREAT Climate Scenarios Projection Map](#)

EPA United States Environmental Protection Agency

### EPA Web Application Access Self Registration

**PURPOSE**  
This form is for outside business partners and affiliates to request access to an authorized EPA Community/Application.

**IMPORTANT NOTE:**  
THIS FORM is ONLY for outside business partners and affiliates that do not have an EPA LAN account.

DO NOT complete if you are an EPA employee or an on-site contractor with an EPA LAN account. If you have an EPA LAN account and are having difficulty logging in, contact the EPA Call Center 1-866-411-4372

ALL FIELDS ARE REQUIRED

EPA Contact Name:

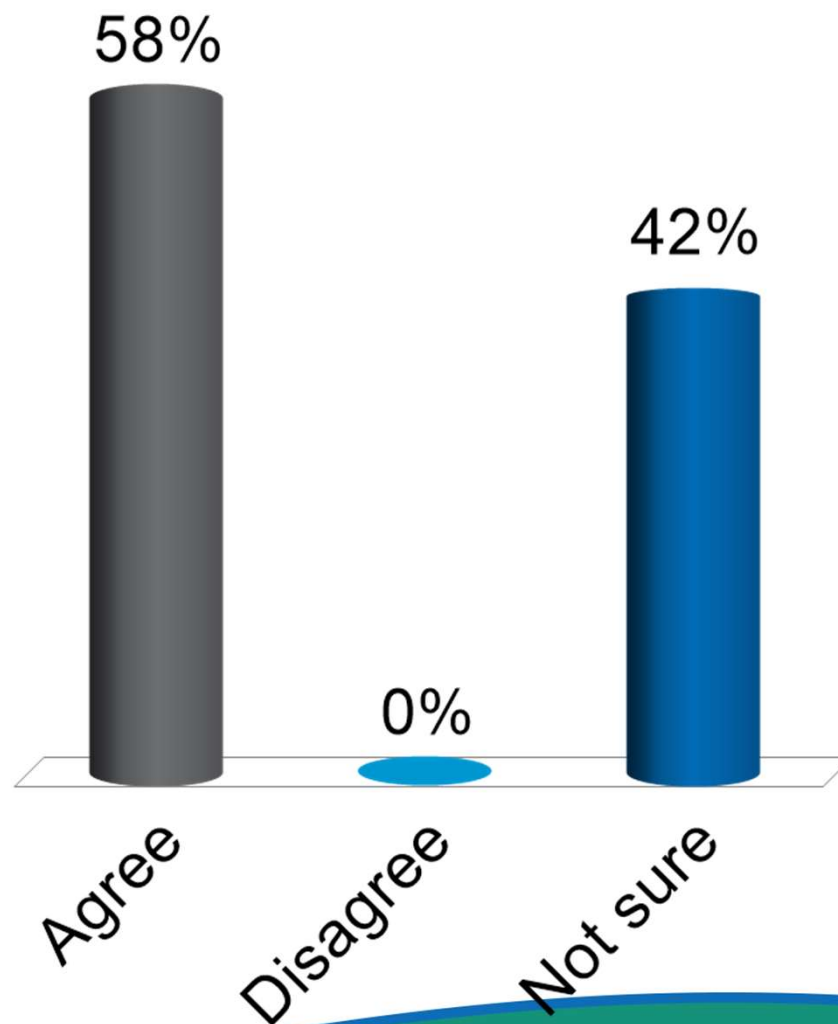
EPA Contact's Email Address:   
e.g. emailId@epa.gov

EPA Contact's Phone Number:   
e.g. (xxx) xxx-xxxx

Your Information

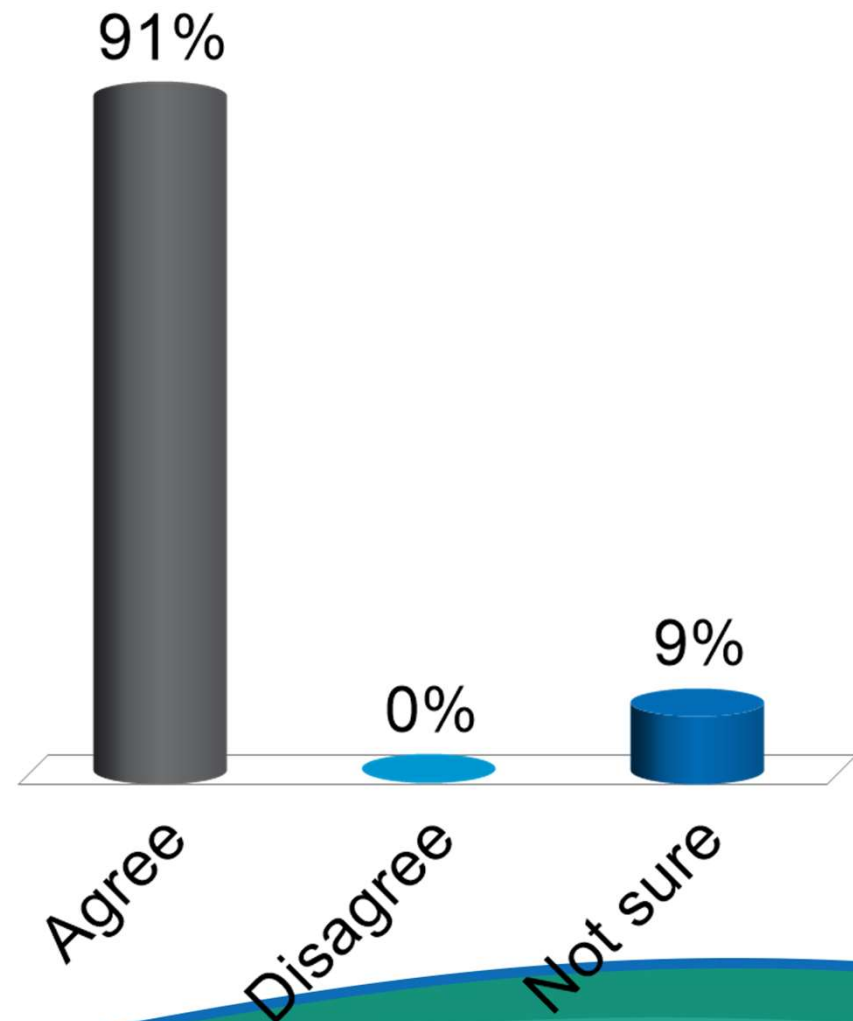
# I will use CREAT at my organization to conduct a risk assessment.

1. Agree
2. Disagree
3. Not sure



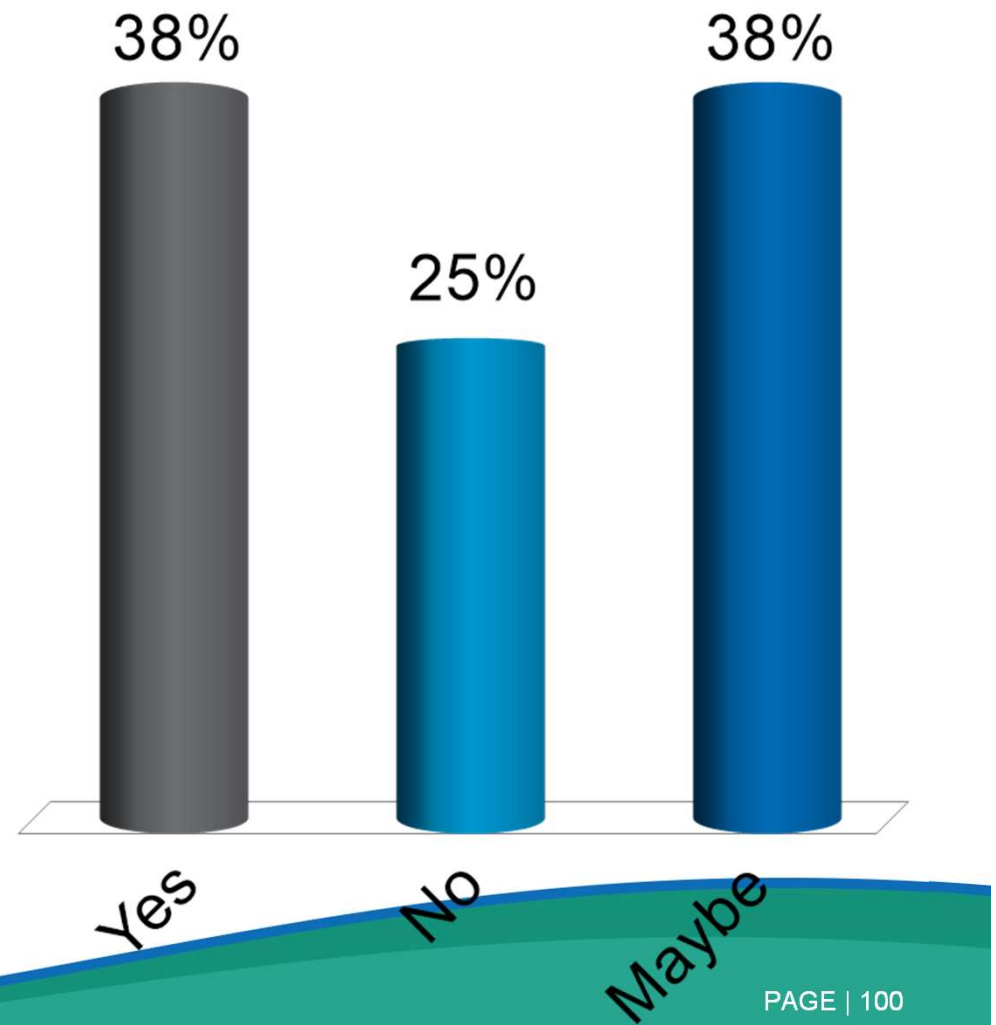
# I will share the information I learned at this training with my colleagues and management.

1. Agree
2. Disagree
3. Not sure



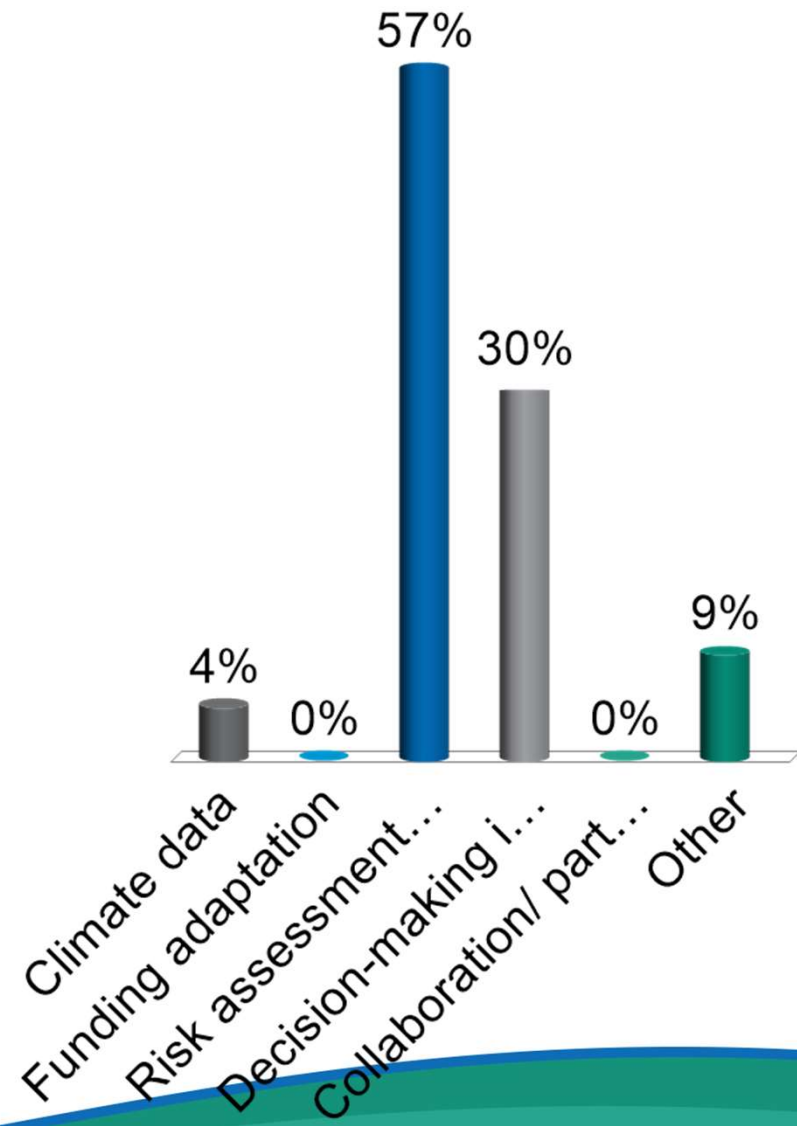
# Would you like to participate in future webinars to learn more about CRWU resources or get additional help with your CREAT assessment?

1. Yes
2. No
3. Maybe



# What topic would you like more information on in the future?

1. Climate data
2. Funding adaptation
3. Risk assessment processes
4. Decision-making in face of uncertainty
5. Collaboration/ partnerships
6. Other



# Contact Us

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