Resiliency Means Business: Preparing for Risks to Safe and Reliable Service

August 9, 2022 -- 1:00 p.m.– 2:00 p.m. EDT

Trainer: Jack Kartez, New England Environmental Finance Center

This program is made possible under a cooperative agreement with US EPA.

Jack Kartez – Some Trainer Background

Practice Areas: **Natural Hazards & Disaster Planning**

Climate Adaptation Planning & Finance

Organization Development

Local Government Finance

Founding Faculty, Texas A&M Hazard Reduction & Recovery Center, 1991

Co-Founder, New England Environmental Finance Center, 2001

Water Security Division Products and Services List

The U.S. Environmental Protection Agency's (EPA) Water Security Division (WSD) has developed a robust suite of products and services to improve the resilience of the water sector to all types of hazards. WSD resources can be found at www.epa.gov/waterresilience. Direct links to specific tools and resources are provided below.

Products are organized by topic: America's Water Infrastructure Act, Assess Risks, Emergency Preparedness, Laboratory Support, Risk Communication, Mutual Aid and Assistance, Training and Exercises, Emergency Response and Recovery. The following product, Route to Resilience, incorporates the critical stages of resiliency and can assist water and wastewater utilities in locating the appropriate services to fulfill their needs.

Route to Resilience (RtoR)

RtoR helps small and medium sized drinking water and wastewater utilities learn more about becoming resilient to all-hazards. The interactive desktop application guides utilities through five stops along the Route to Resilience – Assess, Plan, Train, Respond, and Recover – and provides users with a custom report that highlights specific products and tools.

Source: USEPA


CHALLENGES
BIG
DATA

New England Environmental Finance Center

RESILIENCY:

the ability of a person or organization to anticipate, prepare for, and respond to change and sudden disruptions in order to survive and prosper.

Webinar Agenda

1. Basics: Resiliency and Emergency Planning , AWIA
2. Risk Assessment **Tools** (VSAT, Small Systems Checklist)
3. Risk Prioritization & Uncertainty
4. Risk Reduction Prioritization **Tools** (RSG, CREAT)
5. Resilience Planning Process **Frameworks**
6. Getting Help, Q & A

Risk Assessment Certification Deadlines **AWIA**

Population served	Due
≥100,000	March 31, 2020
50,000-99,999	December 31, 2020
3,301-49,999	June 30, 2021

Source: USEPA

New England Environmental Finance Center

4.1 Unauthorized Entry into Utility Facilities

Properly installed and maintained intrusion detection sys
other unauthorized access into your utility facilities, but r
watch groups are also effective.

4.2 Water Contamination

Notification of source water contamination may come fro
primacy agency, 911, LEPC, the National Response Ce
groups. Therefore, it is important to build working relatio
information.

Potential contamination in your finished water or distribu
customer complaints, public health surveillance, physica
sample analysis, online water quality monitoring, and ad
backflow events or meter tampering. These are all comp
System as described on EPA's Water Quality Surveillar

4.3 Cyber Intrusion

Learning about and reporting cyber threats helps all utili
malevolent act. For example, signing up for alerts on the
timely information about current security issues, vulneral
and implement corrections to system vulnerabilities can

4.4 Hazardous Chemical Release

Routine inspection of your hazardous chemical storage
unexpected chemical release. Identified problems can b
chlorine gas, can alert you to any leaks in a timely fa

4.5 Natural Hazards

Natural hazards such as extreme weather can cause
Water Utility Response On-The-Go Mobile Application c
an efficient response.

4.6 Power Outages

Your utility can detect impending power outages more e

Wildfire

- Remove debris, dead trees, and other fire-hazard materials
- Institute high fire danger procedures such as smoking bans and fire bans
- Install fire-resilient building materials
- Modify treatment process for sediment in water
- Install backflow valves on service connections, fireproof concrete meter boxes, a contamination of distribution pipes from volatile organic compounds
- For more mitigation options, see EPA's Incident Action Checklist for Wildfires

Community Water System Emergency Response Plan

Template and Instructions

DROUGHT RESPONSE AND RECOVERY

A Basic Guide for Water Utilities

BEST PRACTICE: Implement a rate structure that will stabilize revenues to cover your fixed costs, but has conservation pricing (tiered and seasonal rates) to send a pricing signal to help reduce demand. Explore the option of adopting special drought rates.

Incident Action Checklists for Water Utilities

Source: USEPA

WATER/WASTEWATER AGENCY RESPONSE NETWORK

WARN℠

WATER /WASTEWATER AGENCY RESPONSE NETWORK

A Water and Wastewater Agency Response Network is a network of utilities helping other utilities to respond

EPA United States Environmental Protection Agency

Search EPA.gov

Environmental Topics | Laws & Regulations | Report a Violation | About EPA

Water Resilience

CONTACT US

- Water Resilience Home
- America's Water Infrastructure Act Risk Assessment and Emergency Response Plan Requirements

Small System Risk and Resilience Assessment Checklist

This guidance is intended for small community water systems (CWSs) serving greater than 3,300

Complete the *Risk and Resilience Assessment Checklist* here

EPA offers the *Risk and Resilience Assessment Checklist* in two formats. A fillable PDF format is provided on the pages that follow. This format has fixed fields and may not be changed by the user. Alternatively, a Word version may be accessed by clicking on the icon below. The Word version may be changed by the user. **The content of the PDF and Word versions is the same.** To access the Word version, the file must be downloaded to your computer.

Risk and Resilience Assessment Checklist

Table 2b: Source Water (Natural Hazards)

Asset Category: *Source Water*

Examples of Assets in this Category: Encompasses all sources examples include rivers, streams, lakes, source water reservoirs,

Natural Hazards Select the natural hazards in the left column that pose a significant risk to this asset category at the CWS.	**Brief Description of Impacts** If you select a natural hazard in *Water* asset category, briefly de could impact this asset categor service, and public health as ap
☐ Hurricane	
☐ Flood	
☐ Earthquake	

Source: USEPA

Comparison of Checklist and VSAT

EPA United States Environmental Protection Agency

CHECKLIST

- **Qualitative** risk assessment – **identifies** threats, vulnerabilities, and consequences but does not estimate risk value.
- **Countermeasures** may be **identified,** and the benefits described but not estimated.
- **"Paper" analysis** that requires minimal resources to complete.

VSAT

- **Quantitative** risk assessment – **estimates** threats, vulnerabilities, consequences and monetized risk.
- **Countermeasures** may be **quantified** for cost, risk reduction, and cost-benefit analysis.
- **E-tool analysis** can require significant time and informational resources to complete.

Source: USEPA

VSAT WEB

Assess the risk and resilience at drinking water and wastewater systems. Also, estimate risks from malevolent threats and natural hazards to evaluate improvement for increased security and resilience.

Let's get started

Start a New Analysis

Import VSAT Web File

EPA

Identify the Utility's Critical Asset Categories and Relevant Threat Type (Qualitative Risk Assessment)

Determine what asset categories are critical to your ability to treat water/wastewater, protect public health and the environment, and economically sustain your community

Asset Categories:

- Physical barriers
- Source water
- Pipes and Constructed Conveyances, Water Collection, and Intake
- Pretreatment and Treatment
- Storage and Distribution Facilities
- Electronic, Computer, or other Automated Systems (including the security of such systems)
- Monitoring Practices
- Financial Infrastructure
- The Use, Storage, or Handling of Chemicals
- The Operation and Maintenance of the Utility

16

Perform Risk Assessments (Quantitative Risk Assessment)

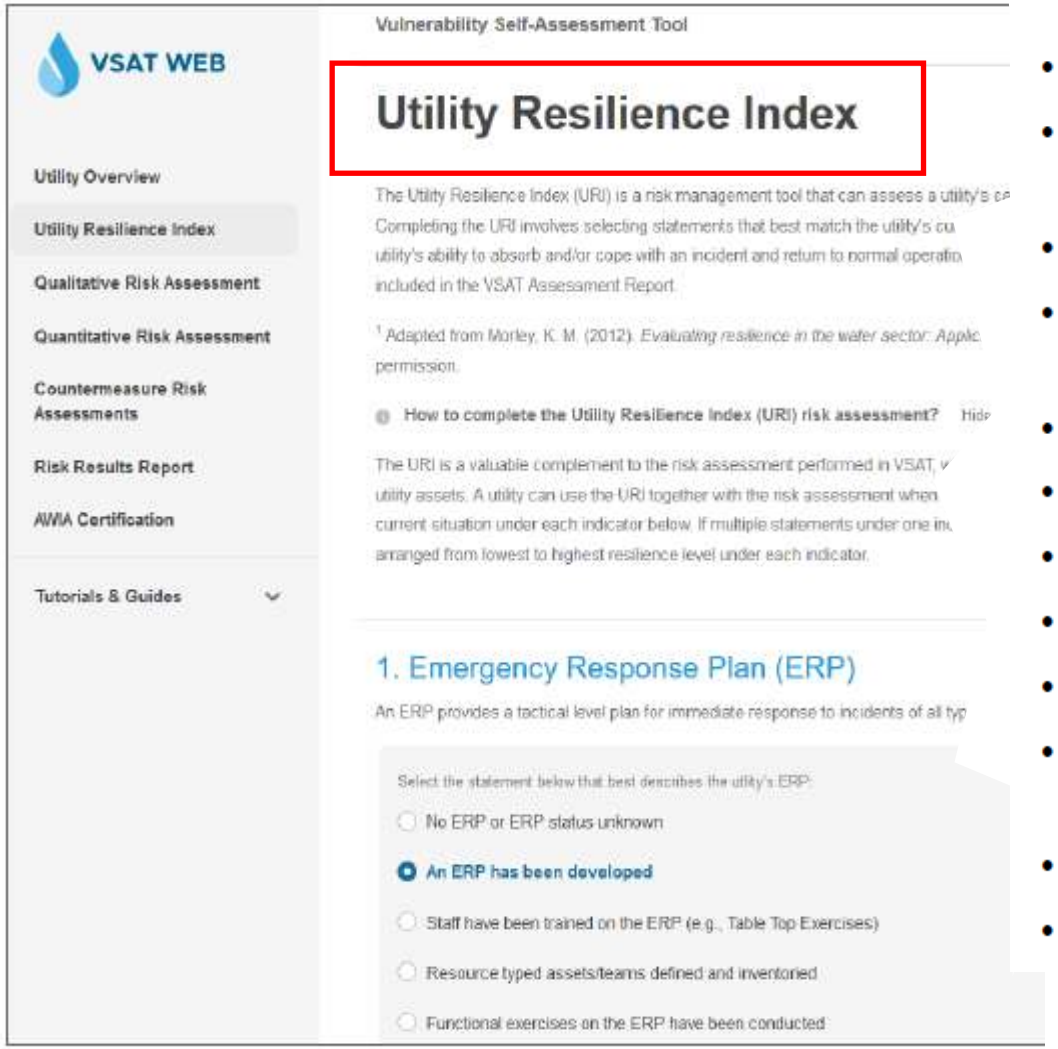
Perform Baseline Risk Assessment for Each Asset/Threat Pair

1. Enter Public Health and Economic Consequences
   - *WHEAT Calculator*
2. Estimate Threat Likelihood
3. Estimate Vulnerability Likelihood
   - *Vulnerability Likelihood Calculator*

Source: USEPA

12 Indicators

Analyze the Utility's Resiliency



Source: USEPA

Analyze the Utility's Resiliency

- **Emergency Response Plan (ERP):** An ERP has been developed
- **National Incident Management System (NIMS) Compliance:** ICS 200/300 provided to key staff
- **Mutual Aid and Assistance (MAA):** Intrastate (e.g., WARN)
- **Emergency Power for Critical Operations (EPCO):** Up to 24 hours of backu power
- **Minimum Daily Demand/Treatment (MDDT):** 25 hours to 48 hours
- **Critical Parts and Equipment (CPE):** 1 week to less than 3 weeks
- **Critical Staff Resilience (CSR):** Greater than 50 to 75%
- **Business Continuity Plan (BCP):** BCP completed
- **Utility Bond Rating (UBR):** AA
- **Government Accounting Standards Board (GASB) Assessment:** 41 to 60 assessed
- **Unemployment:** > +/- 2 National Average
- **Median Household Income (MHI):** +/- 5% State Median

RESILIENCE MANAGEMENT

FINANCIAL
SYSTEMS

CAPITAL
PLANNING

WORKFORCE
DEVELOPMENT
(including training, succession)

EMERGENCY MANAGEMENT

NATURAL HAZARDS

MALEVOLENT ACTS

PREPAREDNESS PLANNING
RESPONSE
RECOVERY
MITIGATION-RISK REDUCTION

ASSET
MANAGEMENT

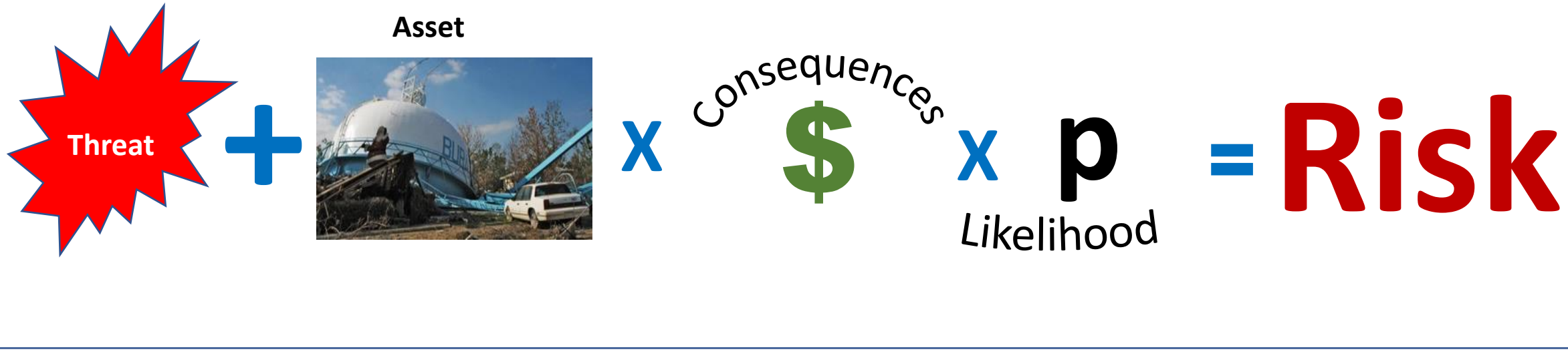
COMMUNICATION
CAPABILITIES

COLLABORTAIONS—
PARTNERS (CBWR)

OPERATIONAL
PRACTICES
(including digital cybersecurity)

Not Just In CRISIS

Risk to critical infrastructure such as water systems is a function of **threat likelihood** (probability), **vulnerability** of an asset, and c**onsequences** if the threat is realized.



EPA

VSAT Terminology

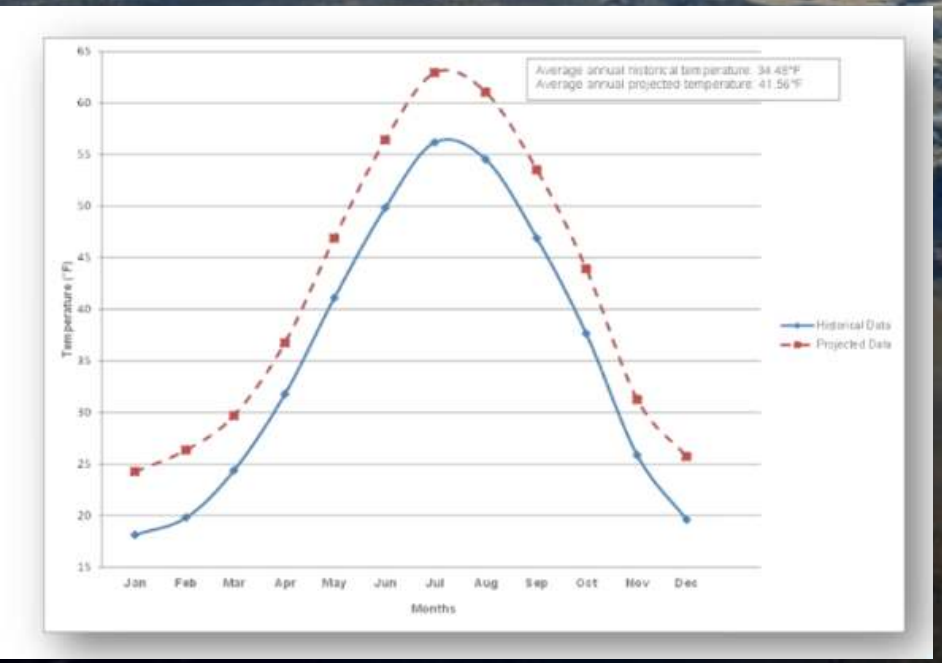
- **Threat**
  - Malevolent Acts
  - Natural Hazards
  - Dependency/Proximity Threats
- **Asset**
- **Asset-threat pair**
- **Countermeasures**

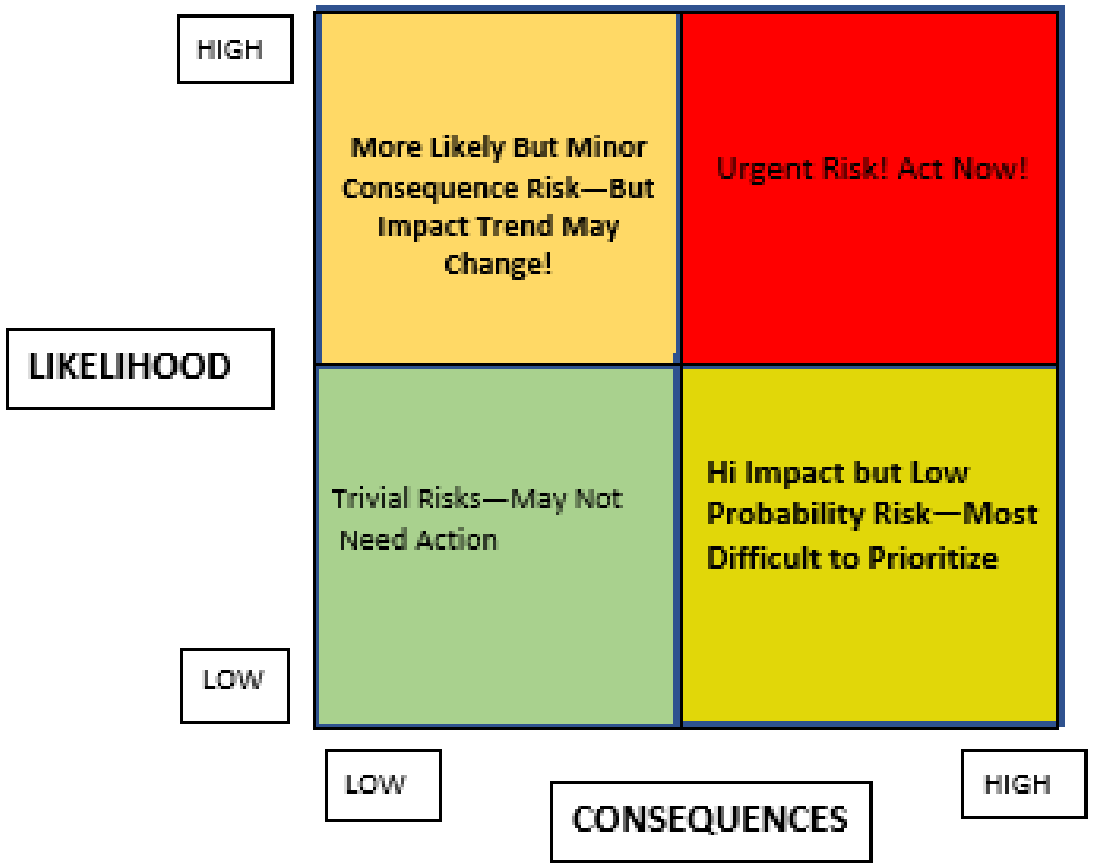
Source: USEPA

- Overall Risk = Likelihood × Consequence

	Consequence (C)				
Likelihood (P)	**C ≤ 10**	**10 < C ≤ 25**	**25 < C ≤ 50**	**50 < C ≤ 75**	**C > 75**
P ≤ 10%	Very Low	Low	Low	Fair	Fair
10% < P ≤ 30%	Low	Fair	Fair	Fair	Moderate
30% < P ≤ 50%	Low	Fair	Fair	Moderate	Moderate
50% < P ≤ 70%	Fair	Moderate	Moderate	Moderate	High
70% < P ≤ 90%	Fair	Moderate	Moderate	High	Very High
P > 90%	Fair	Moderate	High	Very High	Very High

?
Non-Stationarity

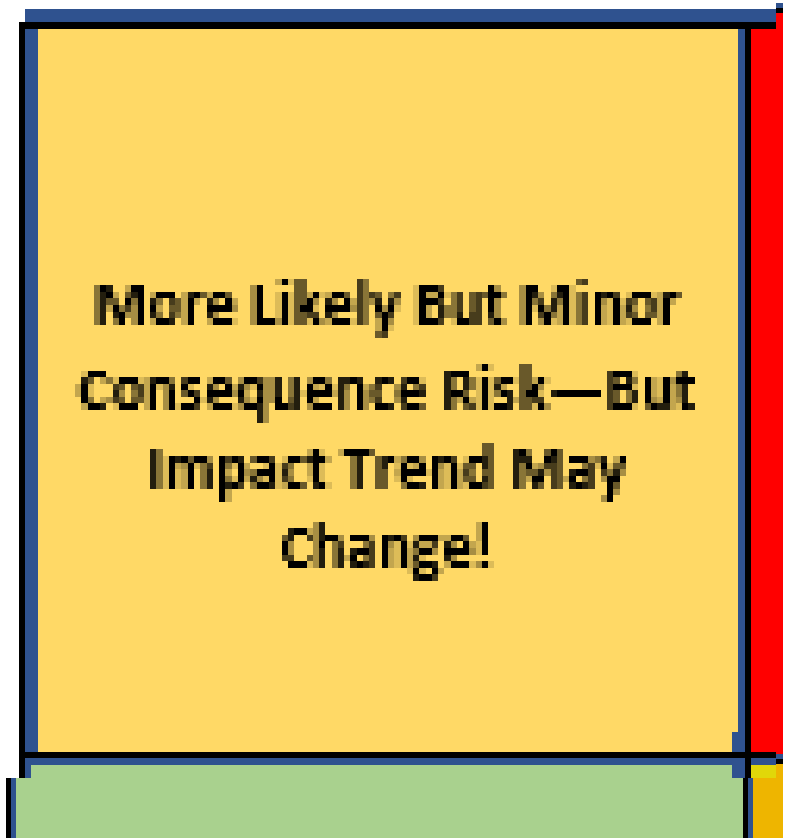




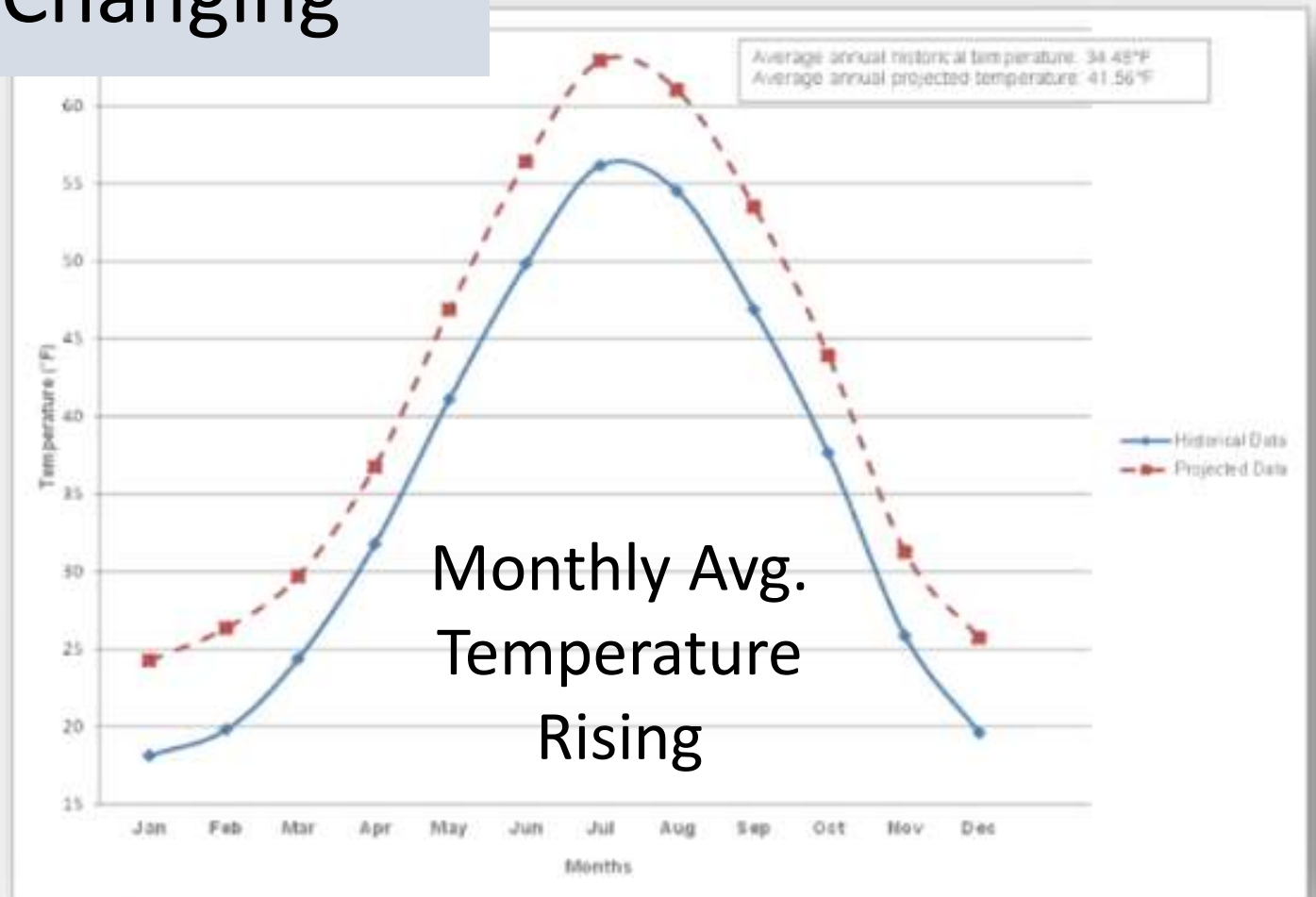
A Basic Framework for Risk Prioritization

Baselines are Changing

HIGH

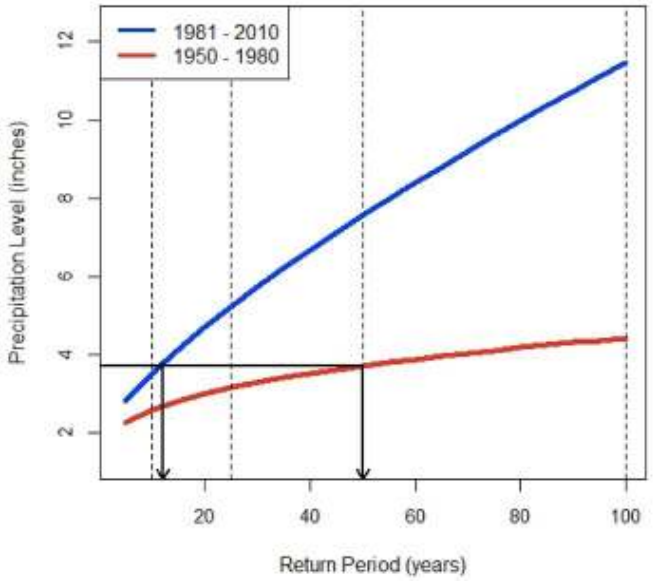


OOD

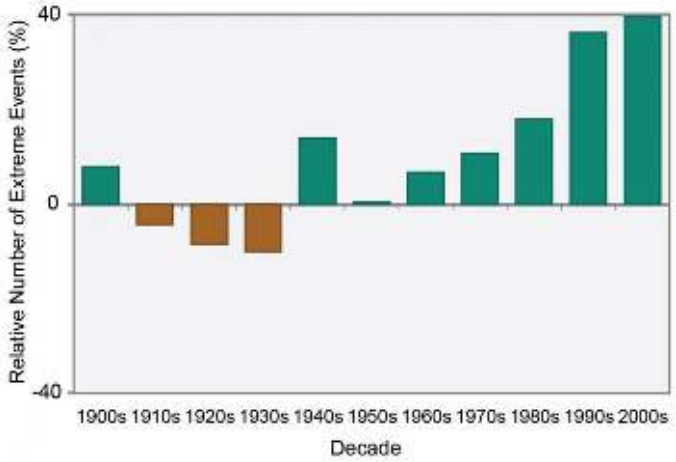


Monthly Avg. Temperature Rising

Increasing Storm Frequency



Observed U.S. Trend in Heavy Precipitation

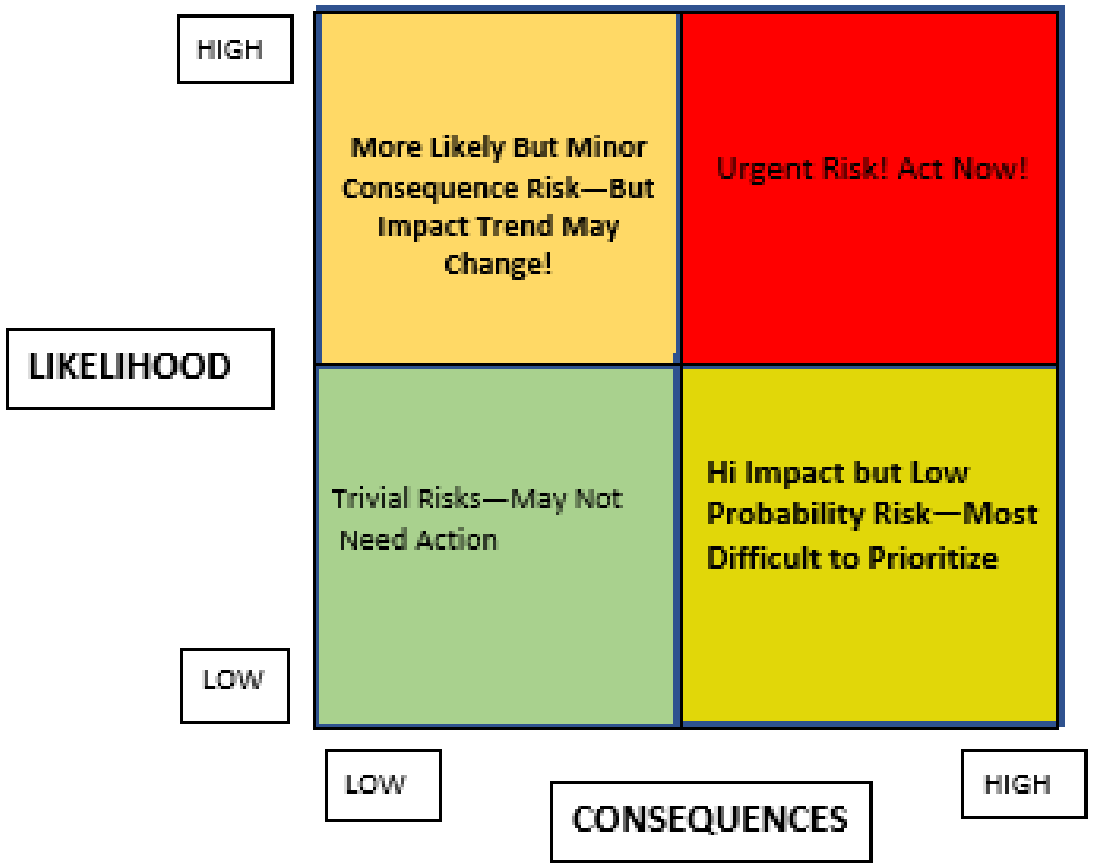


And this.....Worcester in October 2016

....while we were in the middle of our worst drought since the 1960s!

Level 4 DROUGHT WARNING

Source: City of Worcester, MA



A Basic Framework for Risk Prioritization

EPA's Creating Resilient Water Utilities Initiative

Resilient Strategies Guide

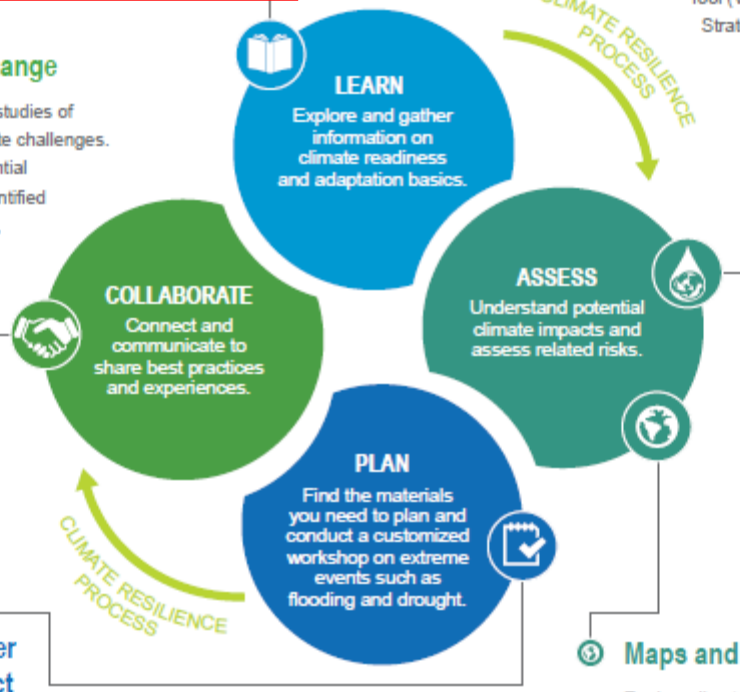
Consider planning priorities, resilience building, and customized information based on the experiences of other utilities and best available science. Once strategies are identified, the Guide links to data from EPA's Water Finance Clearinghouse, provides a report, and can generate a file for use in the Climate Resilience Evaluation and Awareness Tool.

Climate Resilience Evaluation and Awareness Tool (CREAT)

Assess potential climate impacts and related risks. The tool guides users through a threat identification process and the design of adaptation plans based on their considered threats. CREAT features a series of simple modules, a user-friendly interface, climate data projections, and monetized risk results. CREAT also has import capacity and integrates with other EPA tools such as the Vulnerability Self-Assessment Tool (VSAT) and Resilient Strategies Guide.

Case Study and Information Exchange

Explore real-world case studies of utilities addressing climate challenges. Review and submit potential adaptation strategies identified by utilities of similar type, location, or climate challenge.



Workshop Planner for Climate Impact and Extreme Events Adaptation

Design and facilitate an adaptation planning workshop that explores how more intense and frequent extreme weather events can impact water resources. This tool allows users to pick a climate scenario and customize materials to conduct a workshop, including invitations, agendas, and presentations. A built-in registration management system allows you to invite and track participants.

Maps and Data Services

Review climate model and natural hazard data, including the following resources:

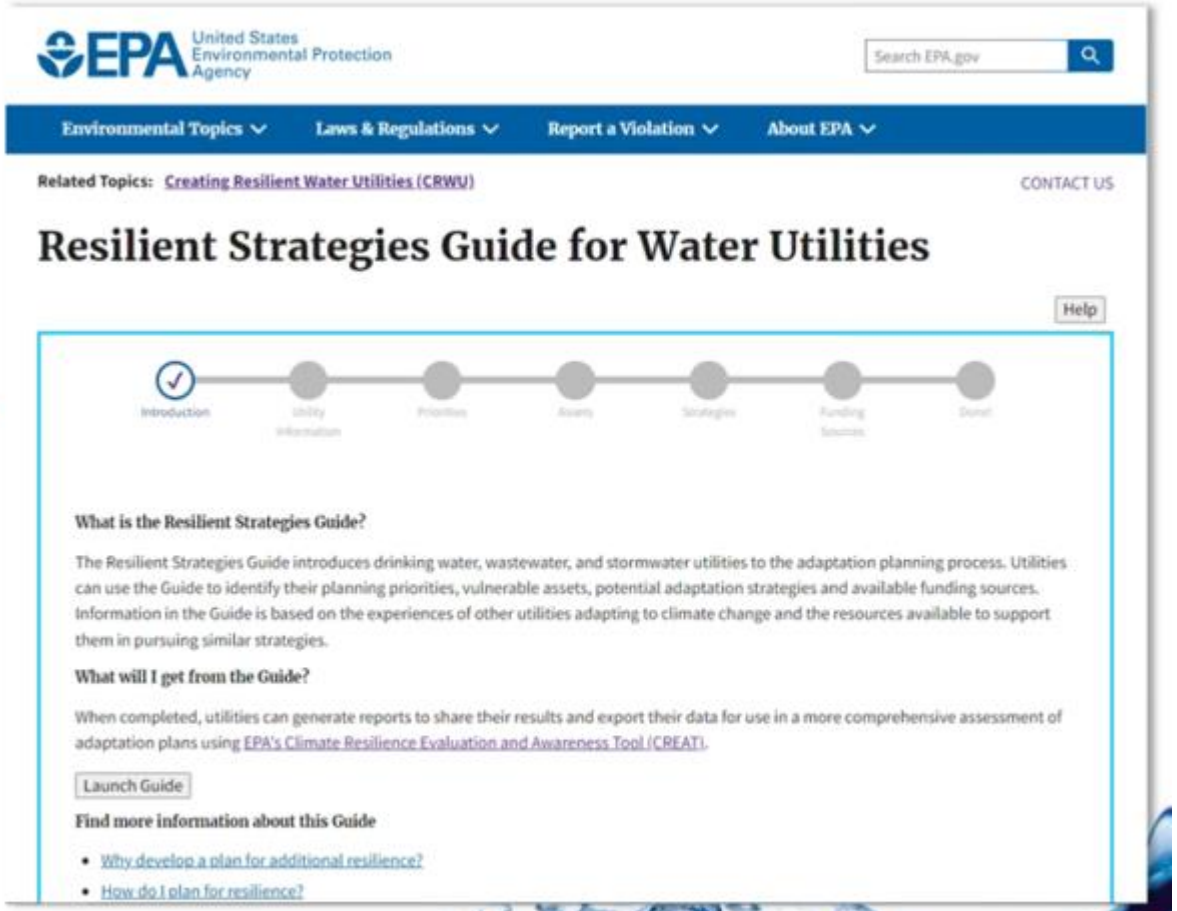
- Average Temperatures and Extreme Heat
- Average Precipitation and Storm Intensity
- Coastal Flooding and Sea Level Rise
- Storm Surge Flooding and Hurricane Strike Frequencies
- Streamflow Dynamics for Supply and Discharge Planning

Source: USEPA

Click to save a picture to your desktop.

Resilient Strategies Guide

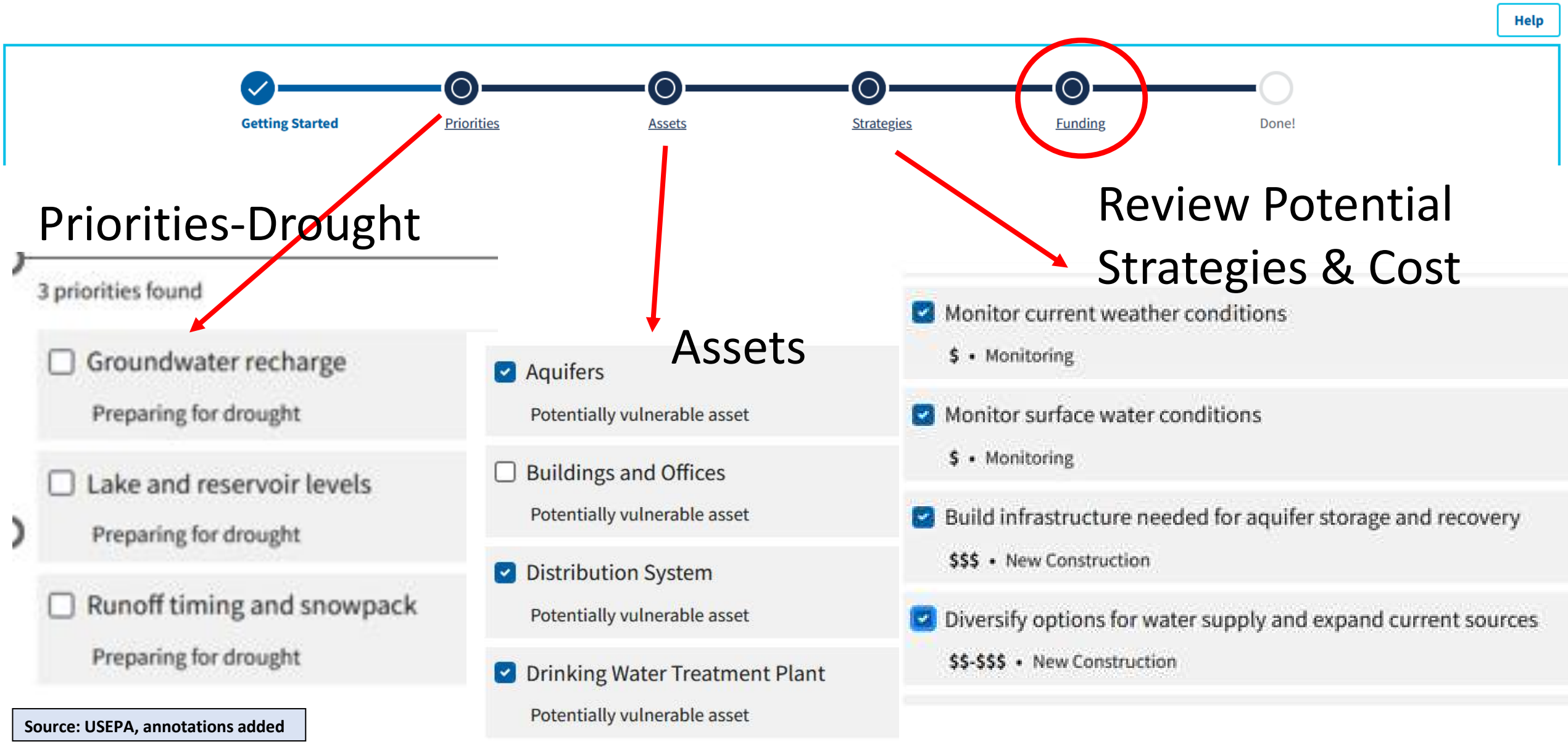
- **Free**, online application for reviewing resilience strategies used by water utilities
- Introduction to adaptation planning for those with limited experience
- Provides **strategies** based on location, priorities, and assets
- Provides **funding options** based on selected strategies



EPA

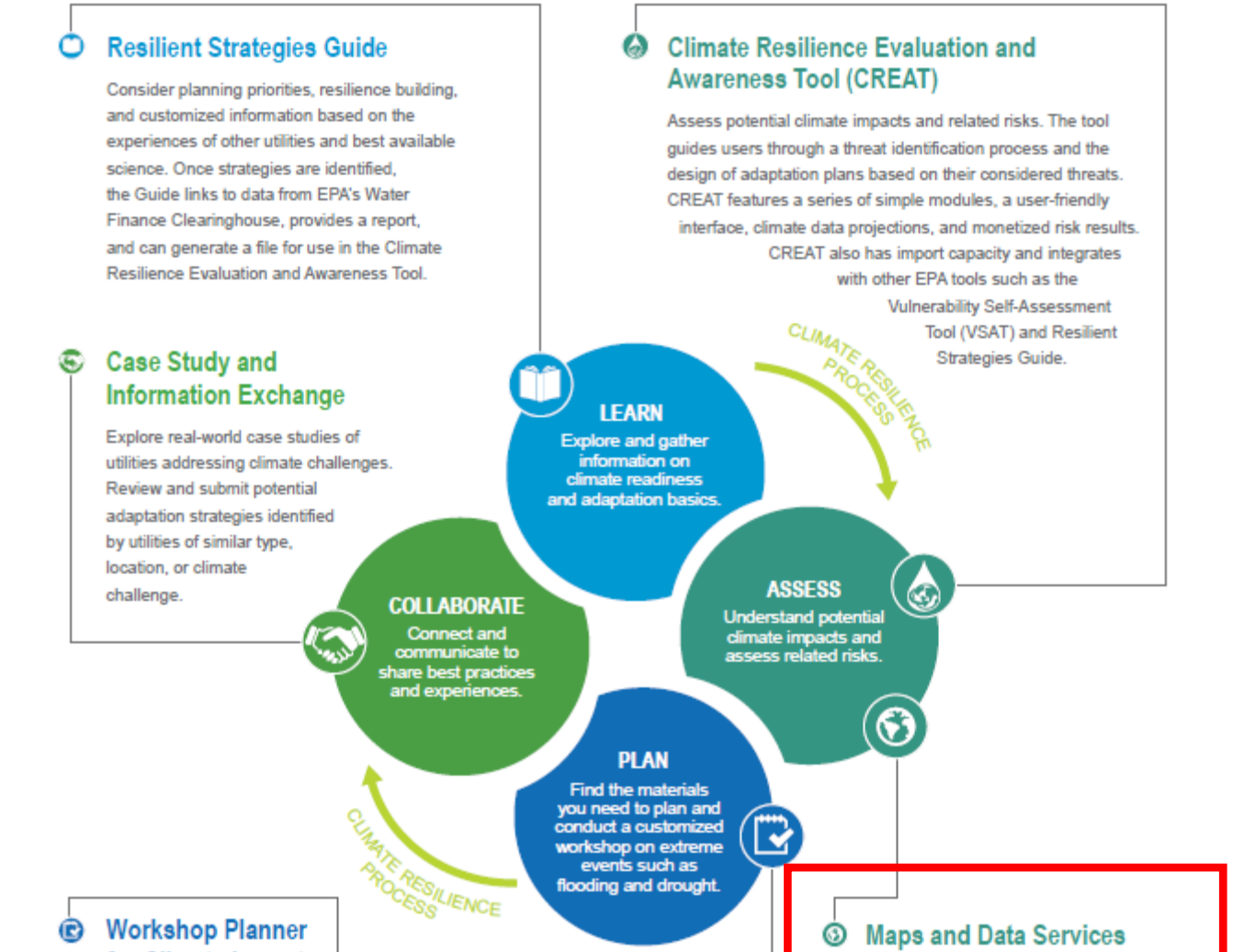
Source: USEPA

Resilient Strategies Guide for Water Utilities



Source: USEPA, annotations added

EPA's Creating Resilient Water Utilities Initiative



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Source: USEPA

New England Environmental Finance Center

CREAT Climate Scenarios Projection

Introduction | Temperature | Precipitation | Storms

Creating Resilient Water Utilities

EPA

eat | Sea Level | Resources | Technical Details

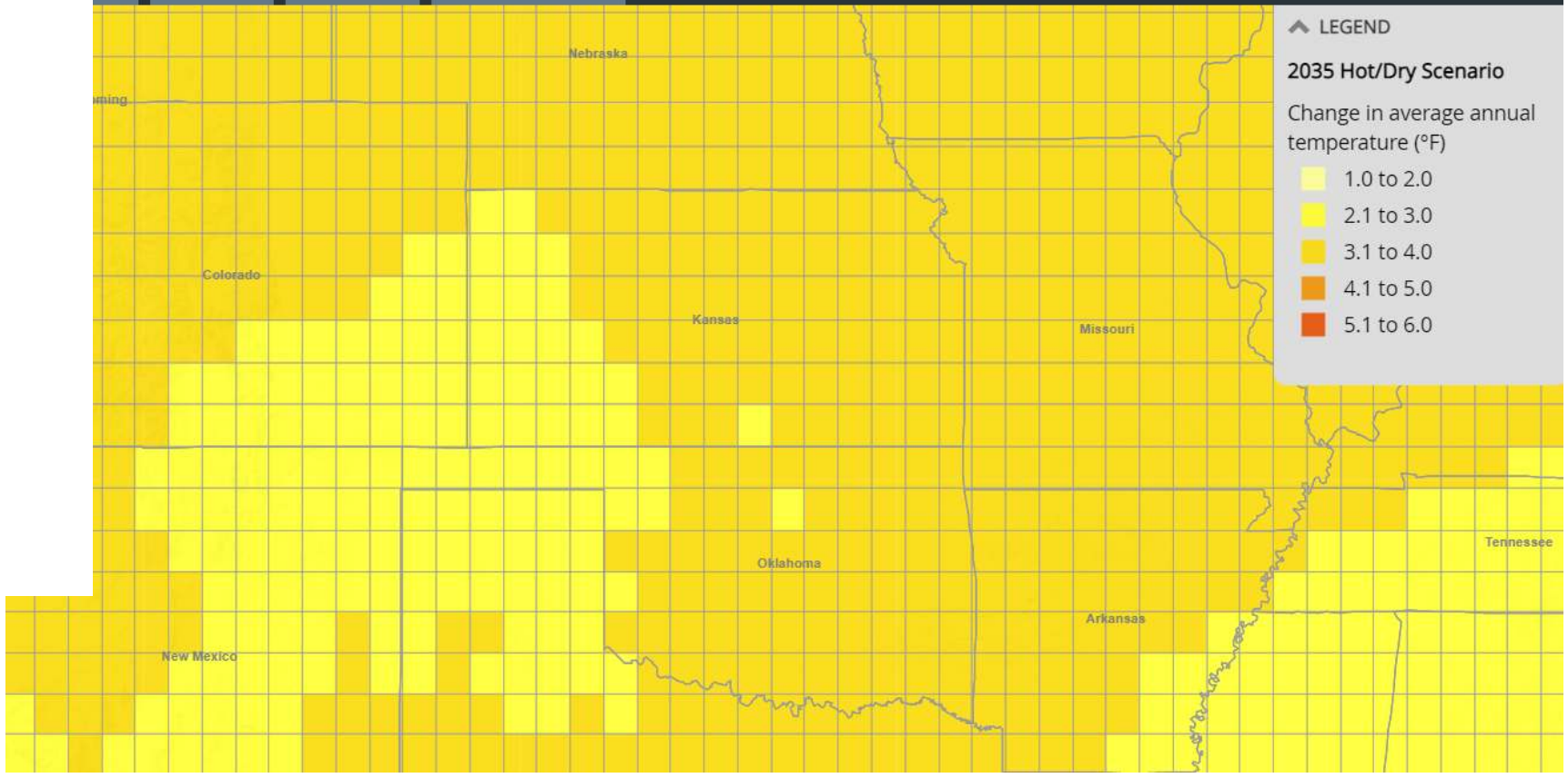
Change in average annual temperature

Select the time period and scenario to review:

	Hot/ Dry	Central	Warm/ Wet
2035			
2060			

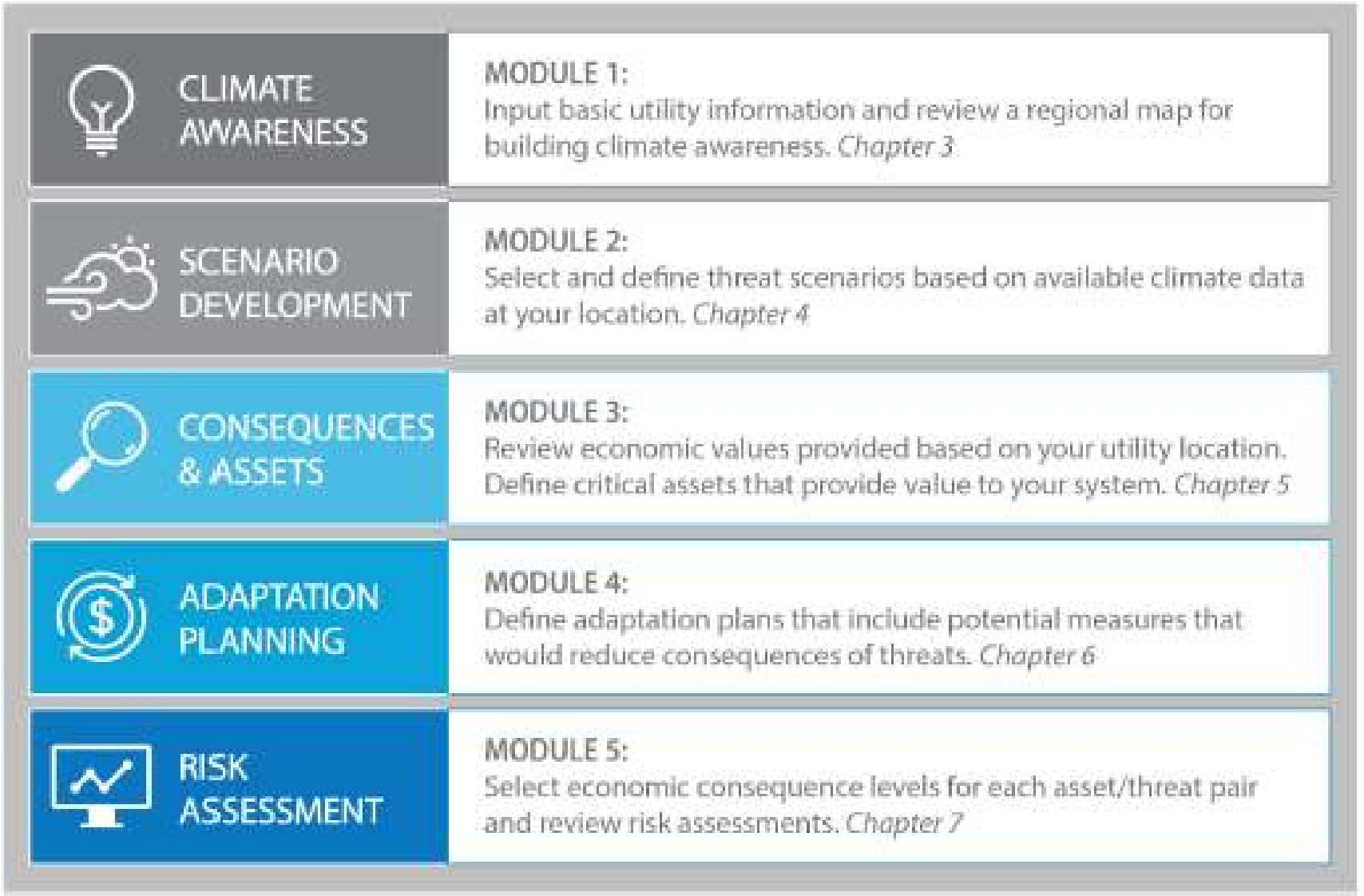
Hide scenario layers

Zoom to: *Entire U.S.* *Alaska* *Hawaii* *Puerto Rico*



Source: USEPA

EPA CREAT – Climate Resilience Evaluation & Awareness Tool –

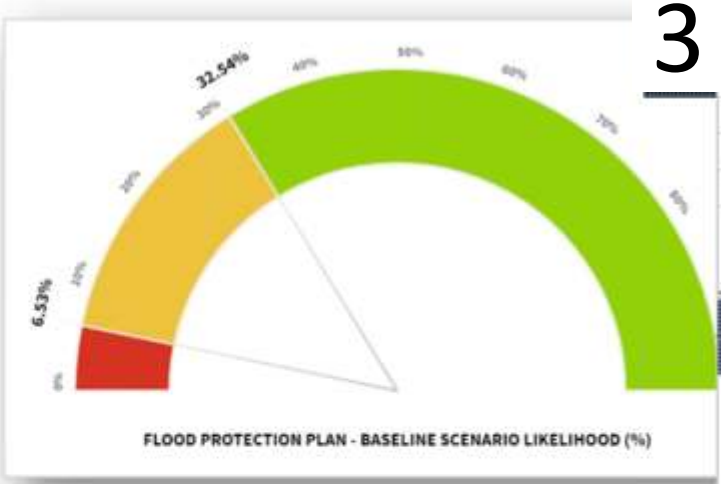


Source: USEPA

Likelihood Sensitivity

- **RED** – Wait and See
- **ORANGE** – Consider Implementing Plan
- **GREEN** – Implement Plan

3



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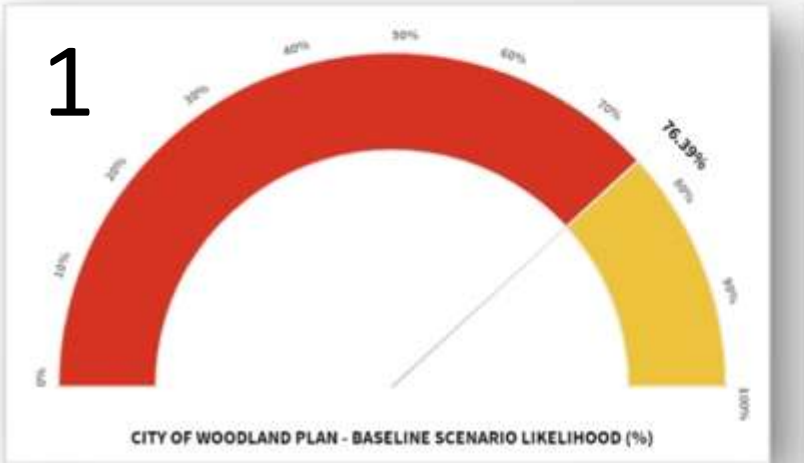

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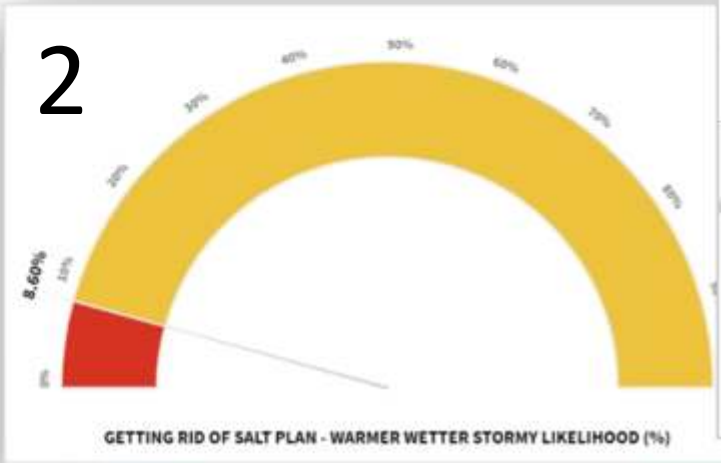

Source: USEPA

Links to tools will all be listed with guidance in your post-training fact sheet.

Source: USEPA, annotations added

Assess

Desired Capability Goal (choose one)	Description
◉ Basic	Perform a risk assessment for high consequence assets and evaluate the cost/benefits of taking actions to reduce risks to those assets. In addition, develop a Risk Management Plan containing a prioritized list of risk mitigation projects and implement low-cost risk reduction measures. Integrate higher cost risk reduction projects into capital improvement planning. **Learn More**
○ Advanced	Perform a risk assessment consistent with the AWWA J100-10 Risk and Resilience Management of Water and Wastewater Systems and evaluate the cost/benefits of taking actions to reduce risks. In addition, develop a Risk Management Plan containing a prioritized list of risk mitigation projects that achieves acceptable risk levels for all major assets and implements risk reduction measures lowering all high risk assets to medium/ low risk. **Learn More**

Learn More

Assess - Basic

To achieve the "Basic" level for Assess, perform a risk assessment for high consequence assets (i.e., assets that would result in the highest public health and/or economic impacts if attacked or damaged) and the highest likelihood threats. Then evaluate the cost and benefit of additional countermeasures to reduce the risk level of the highest risk assets.

In addition, develop a risk management plan that contains a prioritized list of risk mitigation projects. The list should contain near-term process improvement projects (e.g., emergency response planning, improved security procedures) and long-term capital improvement projects (e.g., enhanced physical or cyber security, back-up power).

Finally, implement low-cost process-focused activities and projects that can be accomplished in the near term with current funding. Integrate the Risk Management Plan into your utility's long range and capital investment planning for other projects as needed.

Source: USEPA, annotations added

Water Utility Climate Alliance Members

Source: https://www.wucaonline.org

The Framework

Mapping Climate-related Risks and Opportunities to Water Utility Business Functions: A Framework

Before the Business Function Mapping Tabletop Exercise

During the Business Function Mapping Tabletop Exercise

Step 1. Define Assessment Objectives and Initiate Planning

Step 1a. Articulate the value of investing in the assessment

Step 1b. Define assessment objectives with utility leadership

Step 1c. Identify an internal assessment leader

Step 1d. Develop an assessment scope, timeline, and budget

Step 2. Determine the Focus for the Assessment

Step 2a. Review Figure 4 in the supplemental Guidebook to identify business functions and critical sub-functions for the water utility

Step 2b. Prioritize mission-critical business functions to assess

Step 2c. Form a cross-functional working group or exercise planning team (EPT)

Step 2d. Identify existing people, resources, and background materials to establish a foundation of known and projected (future) climate conditions

Step 2e. Schedule regular briefings with the leadership team

Step 3. Design and Prepare for a Climate Risk and Opportunity Mapping Workshop or Tabletop Exercise (TTX)

Step 3a. Prepare for and design an interactive TTX or workshop by conducting initial, midterm, and final planning meetings with the working group or EPT

Step 3b. Conduct a "Climate 101" training to establish baseline knowledge

Step 3c. Design exercise scenarios and time horizons to be used to explore impacts, opportunities, and solutions

Step 3d. Develop the TTX agenda and associated materials and prepare for TTX conduct

Step 4. Map Potential Impacts of Climate Stressors and Cascading Effects

Step 4a. Identify critical path activities, decision points, and existing processes for each business function

Step 4b. Discuss existing underlying conditions and vulnerabilities for each business function

Step 4c. Identify key climate stressors relevant to the business functions

Step 4d. Brainstorm and map how climate stressors intersect with existing vulnerabilities and identify cascading effects for each business function

Step 5. Identify and Prioritize Risks Relative to Mission-critical Business Functions

Step 5a. Discuss the water utility's risk tolerance

Step 5b. Define climate risk prioritization criteria (high, medium, low)

Step 5c. Assess and prioritize risks for each selected business function

Step 5d. Identify gaps in data and information that are needed to inform climate-related assessments and decision-making

Step 6. Identify Opportunities and Solutions Across Business Functions

Step 6a. Develop an initial set of solutions, opportunities, and associated co-benefits

Step 6b. Identify short- and long-term solutions to manage risks and maximize sustainability and resilience opportunities

Step 6c. Develop recommendations to implement solutions and assign business function points of contact

Step 6d. Present findings and discuss next steps for implementation with the leadership team

Step 6e. Establish a process for reevaluating assessment findings, objectives, and assessing additional business functions; monitor and regularly report progress

HOW TO READ THIS GRAPHIC:

Steps in grey are the "BASIC" steps utilities can take to begin identifying climate risks and opportunities.

Steps in blue are the "ADVANCED" steps for those utilities who may already be on their journey to assess climate change impacts to critical business functions and are working to more holistically mainstream climate risks, adaptation, and resilience into all relevant plans, policies, and procedures.

Source (and next 2 slides: https://www.wucaonline.org/assets/pdf/project -5056-guidebook

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Step 5c. Assess and prioritize risks for each selected business function

Step 5d. Identify gaps in data and information that are needed to inform climate-related assessments and decision-making

Step 6. Identify Opportunities and Solutions Across Business Functions

Step 6a. Develop an initial set of solutions, opportunities, and associated co-benefits

Step 6b. Identify short- and long-term solutions to manage risks and maximize sustainability and resilience opportunities

Step 6c. Develop recommendations to implement solutions and assign business function points of contact

Step 6d. Present findings and discuss next steps for implementation with the leadership team

Step 6e. Establish a process for reevaluating assessment findings, objectives, and assessing additional business functions; monitor and regularly report progress

Mitigation

Basic Risk Assessment Process

The Framework

Mapping Climate-related Risks and Opportunities to Water Utility Business Functions: A Framework

Before the Business Function Mapping Tabletop Exercise

During the Business Function Mapping Tabletop Exercise

Step 1. Define Assessment Objectives and Initiate Planning

Step 1a. Articulate the value of investing in the assessment

Step 1b. Define assessment objectives with utility leadership

Step 1c. Identify an internal assessment leader

Step 1d. Develop an assessment scope, timeline, and budget

Step 2. Determine the Focus for the Assessment

Step 2a. Review Figure 4 in the supplemental Guidebook to identify business functions and critical sub-functions for the water utility

Step 2b. Prioritize mission-critical business functions to assess

Step 2c. Form a cross-functional working group or exercise planning team (EPT)

Step 2d. Identify existing people, resources, and background materials to establish a foundation of known and projected (future) climate conditions

Step 2e. Schedule regular briefings with the leadership team

Step 3. Design and Prepare for a Climate Risk and Opportunity Mapping Workshop or Tabletop Exercise (TTX)

Step 3a. Prepare for and design an interactive TTX or workshop by conducting initial, midterm, and final planning meetings with the working group or EPT

Step 3b. Conduct a "Climate 101" training to establish baseline knowledge

Step 3c. Design exercise scenarios and time horizons to be used to explore impacts, opportunities, and solutions

Step 3d. Develop the TTX agenda and associated materials and prepare for TTX conduct

Step 4. Map Potential Impacts of Climate Stressors and Cascading Effects

Step 4a. Identify critical path activities, decision points, and existing processes for each business function

Step 4b. Discuss existing underlying conditions and vulnerabilities for each business function

Step 4c. Identify key climate stressors relevant to the business functions

Step 4d. Brainstorm and map how climate stressors intersect with existing vulnerabilities and identify cascading effects for each business function

Step 5. Identify and Prioritize Risks Relative to Mission-critical Business Functions

Step 5a. Discuss the water utility's risk tolerance

Step 5b. Define climate risk prioritization criteria (high, medium, low)

Step 5c. Assess and prioritize risks for each selected business function

Step 5d. Identify gaps in data and information that are needed to inform climate-related assessments and decision-making

Step 6. Identify Opportunities and Solutions Across Business Functions

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Step 6e. Establish a process for reevaluating assessment findings, objectives, and assessing additional business functions; monitor and regularly report progress

HOW TO READ THIS GRAPHIC:

Steps in grey are the "BASIC" steps utilities can take to begin identifying climate risks and opportunities.

Steps in blue are the "ADVANCED" steps for those utilities who may already be on their journey to assess climate change impacts to critical business functions and are working to more holistically mainstream climate risks, adaptation, and resilience into all relevant plans, policies, and procedures.

People + Knowledge Process

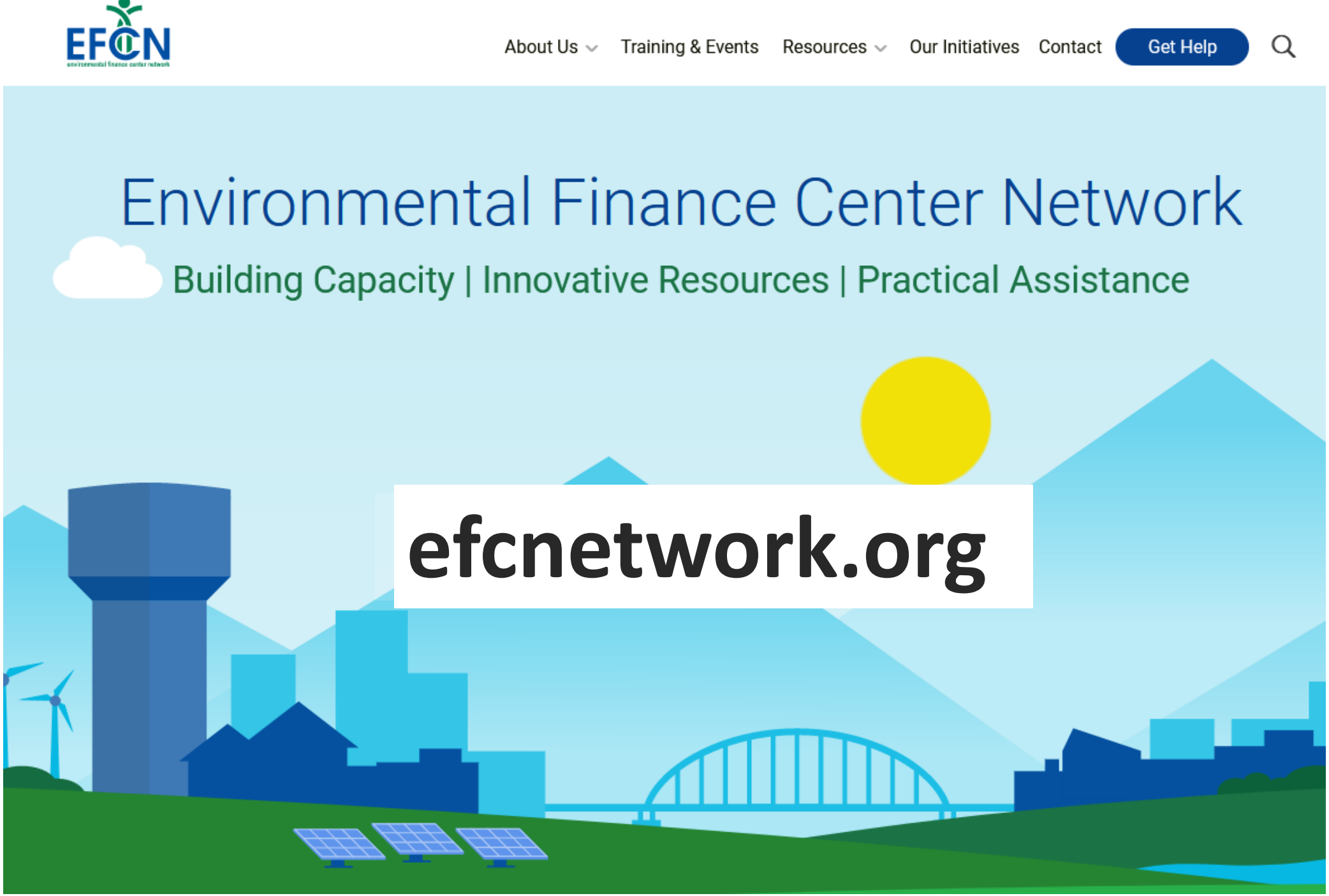
One of the WUCA "Leading Practices" for the Water Sector:

Water Utility Climate Alliance

UNDERSTAND

Understanding is continuous and foundational to climate adaptation work. Knowing more about climate change science, how your system functions along with its underlying conditions and key vulnerabilities,

Source: https://www.wucaonline.org/adaptation-in-practice/leading-practices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Building TMF Capacity
for Small Water Systems

Building TMF Capacity for Small Water Systems Project

Building TMF Capacity for Small Water Systems expands the breadth and depth of our project, previously known as Smart Management for Small Water Systems, to enable an additional focus on technical capacity along with the managerial, and financial capacity previously included.

Learn More

What Kind of Assistance Can EFCN Provide for Your Small Water or Wastewater System?

If you choose to request assistance via our form, please know that we will not share your contact information and will only use it to follow-up with you on your request.

- Creating an asset management plan
- Near-term financial planning and rate setting
- Analyzing your revenues and expenses
- Offering ideas on how to effectively budget
- Assessing options to lower energy bills
- Water loss auditing and mapping breaks
- Assessing vulnerability to hazards and planning for climate-related threats
- Identifying sources of outside funding
- Collaborating with other water systems
- Long-term capital planning
- Technical topics such as chlorine disinfection, water math, and more
- Succession plan development
- Job description review
- Salary studies or comparisons

Request assistance now or contact us for more information.

Name*

Title / Position*

Phone Number*

Email*

Name of the system you represent*

City*

Sate*

Are you requesting assistance on behalf of a drinking water or wastewater system?*

Select

Send me a copy of my responses

Submit

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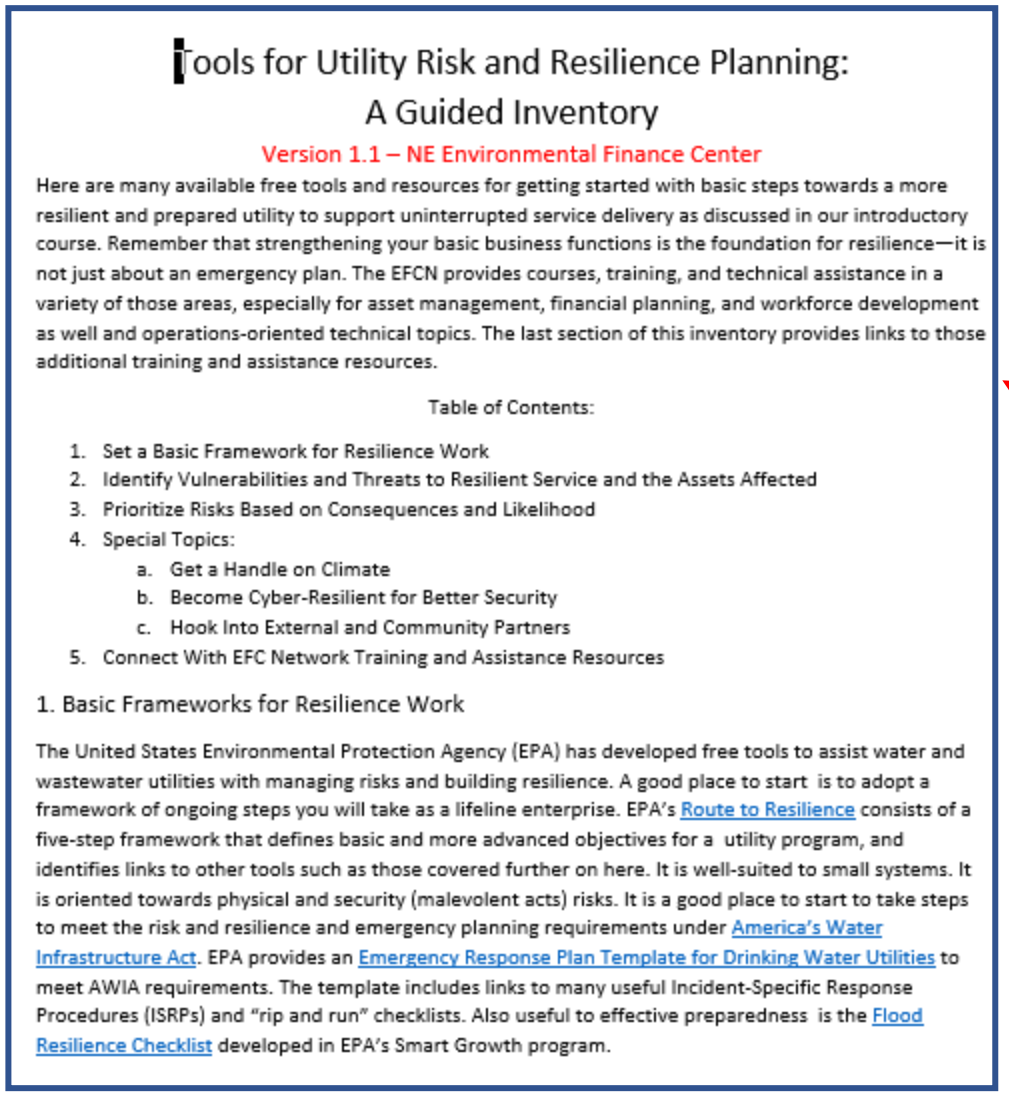

Tools for Utility Risk and Resilience Planning:
A Guided Inventory

Version 1.1 – NE Environmental Finance Center

Here are many available free tools and resources for getting started with basic steps towards a more resilient and prepared utility to support uninterrupted service delivery as discussed in our introductory course. Remember that strengthening your basic business functions is the foundation for resilience—it is not just about an emergency plan. The EFCN provides courses, training, and technical assistance in a variety of those areas, especially for asset management, financial planning, and workforce development as well and operations-oriented technical topics. The last section of this inventory provides links to those additional training and assistance resources.

Table of Contents:

1. Set a Basic Framework for Resilience Work
2. Identify Vulnerabilities and Threats to Resilient Service and the Assets Affected
3. Prioritize Risks Based on Consequences and Likelihood
4. Special Topics:
   a. Get a Handle on Climate
   b. Become Cyber-Resilient for Better Security
   c. Hook Into External and Community Partners
5. Connect With EFC Network Training and Assistance Resources

1. Basic Frameworks for Resilience Work

The United States Environmental Protection Agency (EPA) has developed free tools to assist water and wastewater utilities with managing risks and building resilience. A good place to start is to adopt a framework of ongoing steps you will take as a lifeline enterprise. EPA's Route to Resilience consists of a five-step framework that defines basic and more advanced objectives for a utility program, and identifies links to other tools such as those covered further on here. It is well-suited to small systems. It is oriented towards physical and security (malevolent acts) risks. It is a good place to start to take steps to meet the risk and resilience and emergency planning requirements under America's Water Infrastructure Act. EPA provides an Emergency Response Plan Template for Drinking Water Utilities to meet AWIA requirements. The template includes links to many useful Incident-Specific Response Procedures (ISRPs) and "rip and run" checklists. Also useful to effective preparedness is the Flood Resilience Checklist developed in EPA's Smart Growth program.

Thank You!

Contact Jack Kartez at jackk@maine.edu or:
make request on the EFC Network website.

Don't forget to download and save the Tools Document

Building TMF Capacity for Small Water Systems

EFCN environmental finance center network

Environmental Finance Center Syracuse University

New England Environmental Finance Center


Cybersecurity

From the experts: cybersecurity-based user awareness and education practices

- Have a Cybersecurity Emergency Response Plan
- Maintain an updated inventory of hardware and software
- Perform regular cyber threat and vulnerability monitoring
- Establish complex passwords and a good password policy
- Use multifactor authentication
- Update or patch software regularly
- Utilize reputable antivirus and malware software
- Remove or disable unused features, ports, software, and devices
- Use network firewalls
- Limit remote connections to SCADA* systems
- Install independent cyber-physical safety systems (cut-outs)

There are other basic practices as well…see links in the resource document.

* Supervisory Control and Data Acquisition systems