Federal Data, Tools, and Resources for Building Climate Resilience

A QUICK REFERENCE FOR BEGINNERS AND DATA GEEKS ALIKE

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Goals of today’s talk is to provide:

- Examples of Practical, Tested, Plain Language Federal Sites
- Valuable Contacts to Better Understand Science, Data, and Applicability
- Other Useful Bits of Information
Risk is increasing. We address this problem locally.

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Improve capacity to understand and manage climate-related risks and opportunities

Help communities and businesses become more resilient to extreme events
Meet the Challenges of a Changing Climate
Find information and tools to help you understand and address your climate risks.

LEARN ABOUT OUR RESILIENCE FRAMEWORK
SEE WHAT OTHERS ARE DOING
USE THE CLIMATE EXPLORER
TOUR THE TOOLKIT

toolkit.climate.gov
The Steps to Resilience
From a Water/Community Planning Perspective

1. Explore Hazards
2. Assess Vulnerability & Risks
3. Investigate Options
4. Prioritize & Plan
5. Take Action

Did you know?
Why should I care?
What can we do about it?
Step 1: Explore Hazards

- Gather a team of people who want to protect local assets.
- Check past weather events and future climate trends.
- List the things you value that could be damaged.
Examples of NOAA Partnerships

- **Regional Integrated Science and Assessments** – supports research projects that address climate-sensitive issues of concern to decision makers and policy planners at a regional level. There are currently 11 active RISA teams.
River Forecast Centers - Provide observations for river/stream gaging stations. Some of the available information includes river observations and forecasts, weather observations and forecasts, water supply, seasonal information, and other information.
NE Regional Climate Center

- Turf grass
- Apple frost risk
- Grape hardiness
- Road freeze/thaw
- Mosquito control
- Extreme precipitation
- Pest/Crop Mgt.
- Emerald Ash Borer
- Gypsy moth
- Lawn watering
- Stewart’s Disease Risk
- Winter Storms
Where is drought this week?
August 22-28, 2018

29.2% of the US land area. 73.9 million people are experiencing drought.
National Climate Assessment
Water Resources Dashboard

This dashboard provides access to maps and data that can help water resource managers and urban planners monitor the potential for extreme precipitation and drought in their regions. The scope and content of dashboard entries are driven by input from users. Individuals who contributed to this resource are listed under About the Climate Resilience Toolkit.

https://toolkit.climate.gov/waterdashboard
• American Planning Association (APA)
• American Water Works Association (AWWA)
• Association of Metropolitan Water Agencies (AMWA)
• Environmental Protection Agency (US EPA)
• National Oceanic and Atmospheric Admin. (NOAA)
• Water Environment Federation (WEF)
• Water Environment and Reuse Foundation (WERF)
• Water Research Foundation (WRF)

Partners
Forecasts and Outlooks

NWS Forecasts
View current conditions and short- to medium-range (1-7 days) forecasts for precipitation, temperature, wind, and clouds. These forecasts often identify potential hazards such as heavy precipitation three or more days in advance.
Visit data source

Quantitative Precipitation Forecasts
View forecasts of cumulative precipitation for periods from 6 hours to 7 days into the future. Monitoring this site can alert decision makers of the potential for wet weather and/or flooding.
View tool demo
Visit data source

National Water Model (NWM)
View streamflow for approximately 4,000 locations across the contiguous United States. Get short-range (hourly), medium-range (1-10 days), and long-range (up to 30 days) forecasts.
Launch the NWM Experimental Image Viewer
View tool demo
Visit data source

Storm Prediction Center
Drought Outlook
Hazards Outlook
Current Observations

Daily Streamflow Conditions
Dots on this map indicate current streamflow; a quick look can show if water levels in your region are high, normal, or low. Click any region on the site, and then select stations to access graphs or raw data on streamflow and precipitation. Monitoring this site can help water managers judge short-term future supply.

Visit data source >

River Observations
View current and predicted flood status at more than 7,500 gauges in the United States. Click to zoom in on a region, and then roll your cursor over gauge locations to view hydrographs of recent and forecast discharge levels.

Visit data source >

River Forecast Centers
View observed flow conditions across 13 regions of the contiguous United States. For each gauge location, access hydrographs showing observed and predicted water levels that account for upcoming weather and snowmelt.

Visit data source >

Current Drought
This weekly map—updated every Thursday—shows experts’ assessments of regional conditions related to dryness and drought. The maps focus on broad-scale conditions, so local conditions may vary.

View data source >

Soil Moisture
Access maps that show estimates of surface soil moisture. View Total, Anomaly, Percentile, or Change in soil moisture over the last month or season. Monitoring this site can help decision makers judge field conditions and the potential for drought.

Water Quality Information
WATERS (Watershed Assessment, Tracking, & Environmental Results System) provides comprehensive information about the quality of surface water across the nation.

Visit data source >
Historical Observations

Daily Summary Observations
Access summary observations from more than 90,000 land-based stations around the world. Data may include precipitation, maximum and minimum temperature, temperature at the time of observation, and snow depth. A How-to Guide provides assistance with selecting stations of interest in the map interface.

Visit data source

1981-2010 Daily Normals by Weather Station
Use this GIS interface to select stations for which you want to view daily normals. Climate Normals are the latest three-decade averages of climatological variables, including temperature and precipitation. Hourly, monthly, and annual normals are also available.

Visit data source

Hourly Precipitation
Use this GIS interface to select from more than 5000 stations that indicate maximum observed rates of rainfall. You can consult these records to see historical extremes for locations of interest.

Visit data source

Extreme Events
Access various records of extreme events such as heat waves, droughts, tornadoes, and...
Map Layers from Data.gov

Rivers, Streams, etc.
This tile cache base map combines the National Hydrography Dataset (NHD) and the Watershed Boundary Dataset (WBD). Use the data as an overlay in your own analysis software, or access it through the Climate Explorer.
Visit data source ▶
Case Study ▶
View this layer in the Climate Explorer ▶

Flood Hazard Zones
Local areas that carry an official designation of risk with respect to flooding show up on this map. The map highlights land that FEMA has judged to have a chance of flooding or lie within a regulatory floodway. Checking which areas of a community carry these designations is an important part of assessing vulnerability. View the layer in your own analysis software or the Climate Explorer.
Visit data source ▶
Case Study ▶
View this layer in the Climate Explorer ▶

Impervious Surfaces (2011)
Parking lots, rooftops, and roads block water from seeping into the ground. These impervious surfaces can increase stormwater runoff, promote flooding, and contaminate surface waters. Explore this tile cache base map of impervious surfaces in your own analysis software, or view it in the Climate Explorer.
Visit data source ▶
Case Study ▶
View this layer in the Climate Explorer ▶

Land cover (2011)
This satellite-derived map can help viewers figure out what is on the ground across a region. Colors show 21 different categories of natural vegetation, crops, and agriculture. View the layer in your own analysis software or the Climate Explorer.
Visit data source ▶
Case Study ▶
View this layer in the Climate Explorer ▶

View estimates of the number of humans living within each square kilometer of the planet during the year 2000. Users can compare the locations of urban and rural areas.
Visit data source ▶
Case Study ▶
View this layer in the Climate Explorer ▶

Social Vulnerability Index
This map shows communities’ vulnerability to environmental hazards based on demographic measures drawn mostly from the 2010 Census. Local officials can
We have held 11 seminars, with nearly 500 registered attendees and an additional 600 visits on youtube.

Learning Seminars
CLIMATE EXPLORER

This visualization tool provides interactive graphs and maps of climate projections and observations. It can display historical temperature and precipitation observations for hundreds of climate stations, and offers map layers of valued assets and climate threats.

LAUNCH THE CLIMATE EXPLORER

LEARN MORE ABOUT THE CLIMATE EXPLORER

LAUNCH THE LEGACY VERSION OF CLIMATE EXPLORER
Downscaled CMIP3 and CMIP5 Climate and Hydrology Projections

Access an archive of statistically downscaled versions of daily and monthly temperature and precipitation projections. The archive also includes monthly hydrology projections.

Important Notice for Using Climate Projections

Climate projections can be useful for making decisions about the future, but the limitations of climate models make it easy to misinterpret or misuse their results. Be aware that:

- Climate projections are not predictions. Projections are based on assumptions about future human emissions of greenhouse gases and other policy choices.
Step 2: Assess Vulnerability & Risks

- Determine which of your assets are exposed to harm
- Assess each asset’s vulnerability
- Estimate the risk to each asset

When your assessment is complete, decide if you can accept the risk that climate presents to your assets.
Climate Resilience Evaluation & Awareness Tool (CREAT)

Assess Risks and Plan Adaptation for your Utility
CREAT Overview

- Web-based tool for conducting **risk assessment** of potential impacts at your utility
- Multiple scenarios provided to help **capture uncertainty**
- Assessments will help inform **planning**
- Results from CREAT help utilities compare **risk reduction and implementation costs**
- Which utility type and size best describes your system?
- Which current concerns are important to your system?
- Which threats, related to current and future concerns, should be assessed first?
- Would a specific set of climate conditions be critical to defining these threats?
Which types of consequences represent the value of assets to your utility and community?

Which assets are both critical and vulnerable to threats being assessed?

Are there current measures already in place to provide resilience to threats?

What adaptation plans could be implemented to increase resilience?
CREAT Process

**CLIMATE AWARENESS**
Provide basic utility information
Increase awareness of climate impacts

**SCENARIO DEVELOPMENT**
Understand utility risk
Design scenarios of threats based on climate data

**CONSEQUENCES & ASSETS**
Outline potential consequences
Catalog critical assets

**ADAPTATION PLANNING**
Inventory current actions that provide resilience
Design adaptation plans

**RISK ASSESSMENT**
Assess risk from a changing climate
Evaluate adaptation plans
Applications of CREAT

- Opportunity to inform communications with decision-makers, customers, and funders on potential risks and response options

- Process supports evaluation and prioritization of current plans or more prospective options for building resilience

- Results can be integrated to build out plans based on common climate scenarios and economic assumptions
  - Multiple consequence categories for a single system
  - Multiple systems or sectors serving a single community/municipality
  - Multiple communities with shared watershed/resources
Water Utility Climate Resilience Support Projects
Step 3: Investigate Options

- Consider possible solutions for your highest risks.
- Check how others have responded to similar issues.

At the end of your investigation, you’ll have a list of solutions stakeholders are willing to support.
Motivating the Agricultural Community to Build Climate Resilience
Climate change adaptation isn’t always welcome as a topic of conversation, even among those who could benefit from it. A recent study hints at a possible path forward.
Read more

Navajo Nation: Hotter, Drier Climate Puts Sand Dunes on the Move
Send dunes cover roughly one-third of the Navajo Reservation in northeastern Arizona. Higher temperatures and lower precipitation totals projected for the region have researchers monitoring dune motion and considering solutions.
Read more

Climate Outlooks Help Water Supply Planning
When water utility personnel recognized their groundwater withdrawals were damaging ecosystems in the Tampa Bay area, they found new ways to reduce their dependence on it.
Read more

Water Recycling in Clayton County, Georgia
Just south of Atlanta’s busy Hartsfield-Jackson International Airport, Clayton County seems like an obvious place for metropolitan growth. But more homes and businesses mean a higher demand on the county’s limited water supplies.
Read more
Waterfront Restaurant Rebuilds to Remain Open Through Future Storms

Property owners in New Jersey can check their vulnerability to sea level rise and storm surge using an interactive mapping tool—the NJ Flood Mapper. Here's how one restaurant owner used results from the tool in his long-term planning.

The ledger for Panihi Bistro in Tuckerton, New Jersey, is one that owners fear. When Superstorm Sandy hit, the owner—husband and wife team of Lisa and Robert—had to decide whether to rebuild or move on. October 2012 flooded hundreds of businesses, forcing them to close. Faced with the loss of his income, restaurant owner Ivar Johnson's first reaction was to rebuild right away. His seaside restaurant, Panihi Bistro in Tuckerton, New Jersey, had been heavily damaged, and it seemed that reopening as quickly as possible was the best way to move forward. When his rebuilding got under way, however, Johnson learned that flooding due to storms was not the only threat to his seaside business. He learned that rising sea level was also a factor to consider.

Related Video: “After Sandy: Facing the Future” from Climate.gov

Considering the future

Johnson's team examined FEMA's floodplain maps to learn about past flood conditions, and then consulted FEMA's Advisory Base Flood Elevation levels to consider the potential for future flooding. Johnson also worked with a local expert, Lisa Auermiller of the Jacques Cousteau National Estuarine Research Reserve, to understand the vulnerability his restaurant faced.

Steps to Resilience:

1. Identify the Risk
2. Measure the Risk
3. Mitigate the Risk
4. Evaluate the Risk
5. Take Action

Tools:

- Sea Level Rise and Coastal Flooding Impacts Viewer
- NJ Flood Mapper
- Getting to Resilience
- Sea Level Rise Tool for Sandy Recovery

Topic:

- Coastal Flood Risk
- Sea Level Rise
- Coastal Flood Risk
- Storm Surge

Additional Resources:

- Climate.gov: After Sandy: Facing the Future

Partners:

- Federal Emergency Management Agency (FEMA)
Tools available to help you manage your climate-related risks and opportunities and to help guide you in building resilience to extreme events. Browse the list below, or filter by topic and/or tool functionality in the boxes above. To expand your results, click the Case Studies link.
Step 4: Prioritize & Plan

- Evaluate costs, benefits, and your team’s capacity to accomplish each action.
- Rank the expected value of each action.
- Integrate the highest-value actions into a stepwise plan.

The result will be a comprehensive plan to implement your favored solutions.
Flood Resilience: A Basic Guide for Water and Wastewater Utilities

With a user-friendly layout, embedded videos, and flood maps to guide you, EPA's Flood Resilience Guide is your one-stop resource to know your flooding threat and identify practical mitigation options to protect your critical assets.

You may need a PDF reader to view some of the files on this page. See EPA's About PDF page to learn more.
Step 5: Take Action

- Move forward with stakeholders who accept responsibility and bring resources to take action.
- Check to see if your actions are increasing resilience.

As you move forward, you’ll monitor, review, and report on your project.
https://cpo.noaa.gov/Grants
Thank You!

For more information (including listserve):

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