A Brief Overview of the U.S. Climate Resilience Toolkit

toolkit.climate.gov

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September 23, 2020


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Steps to Resilience
Case Studies
Tools
Expertise
Regions
Topics
Search
Meet the Challenges of a Changing Climate
Find information and tools to help you understand and address your climate risks.
LEARN HOW TO BUILD RESILIENCE ›
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USE THE CLIMATE EXPLORER ›
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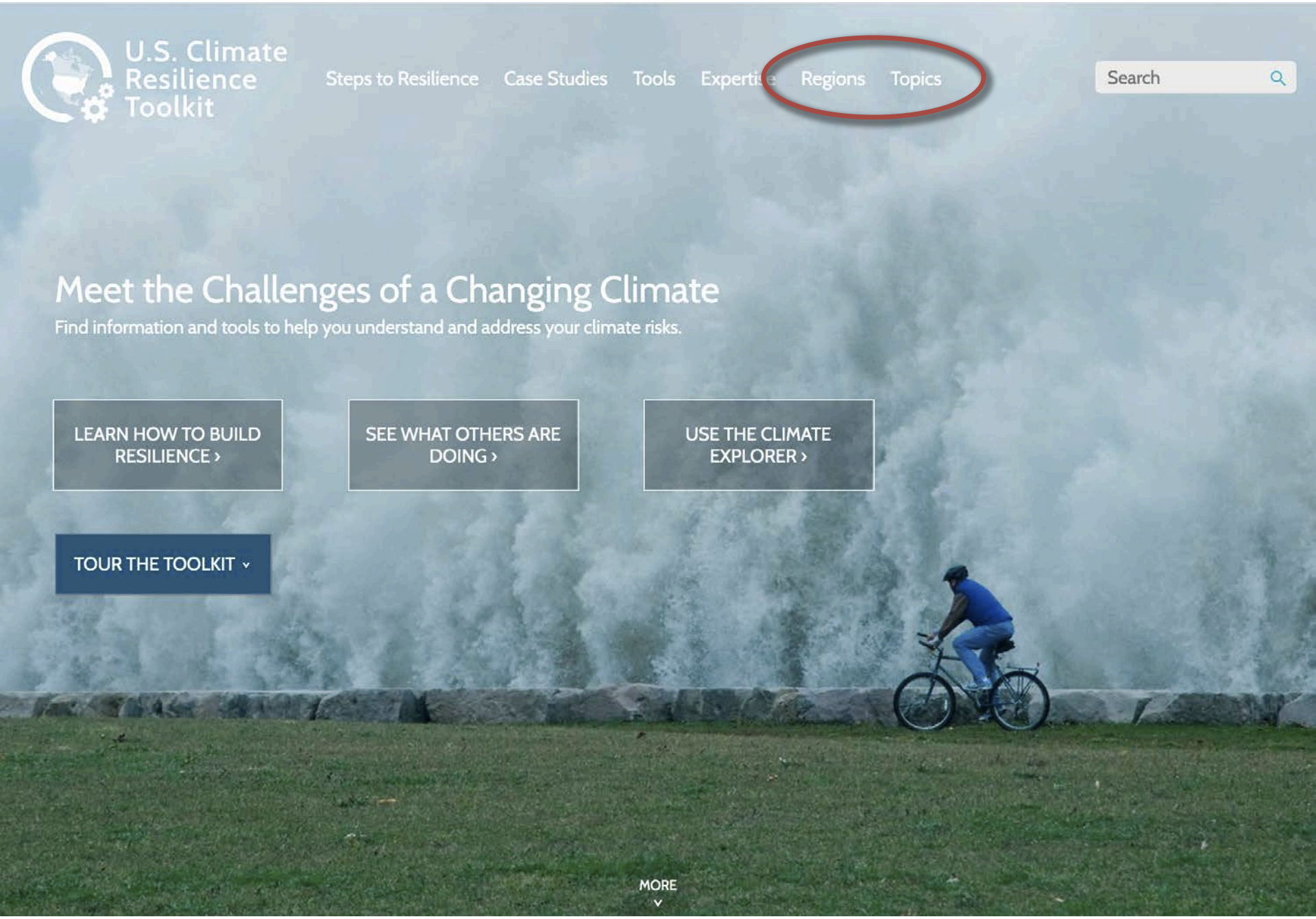
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Steps to Resilience
Case Studies
Tools
Expertise
Regions
Topics
Search
Meet the Challenges of a Changing Climate
Find information and tools to help you understand and address your climate risks.
LEARN HOW TO BUILD RESILIENCE ›
SEE WHAT OTHERS ARE DOING ›
USE THE CLIMATE EXPLORER ›
TOUR THE TOOLKIT
MORE

U.S. Climate Resilience Toolkit

Steps to Resilience | Case Studies | Tools | Expertise | Regions | Topics

Search

REGIONS

ALASKA AND THE ARCTIC ›

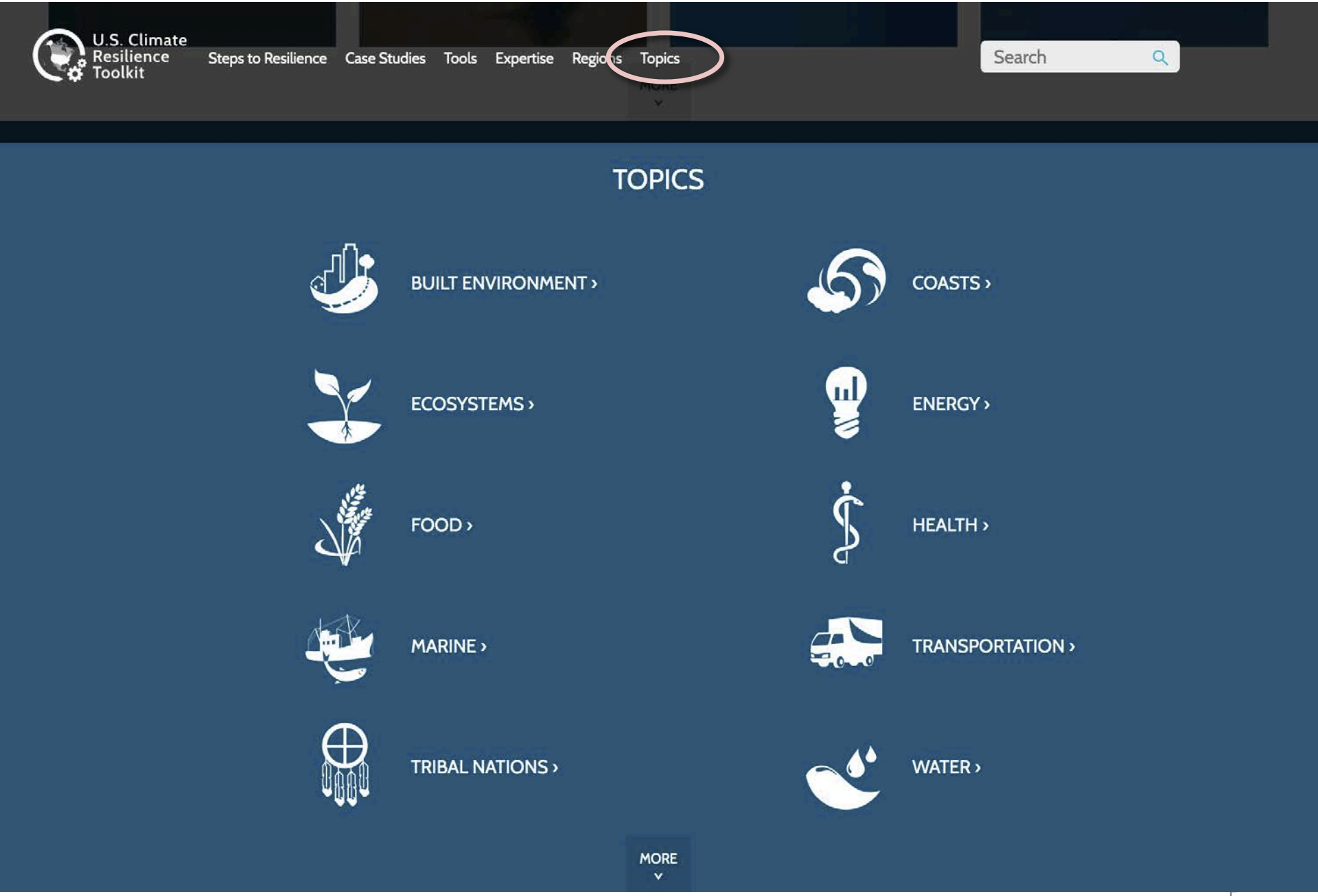
GREAT LAKES ›

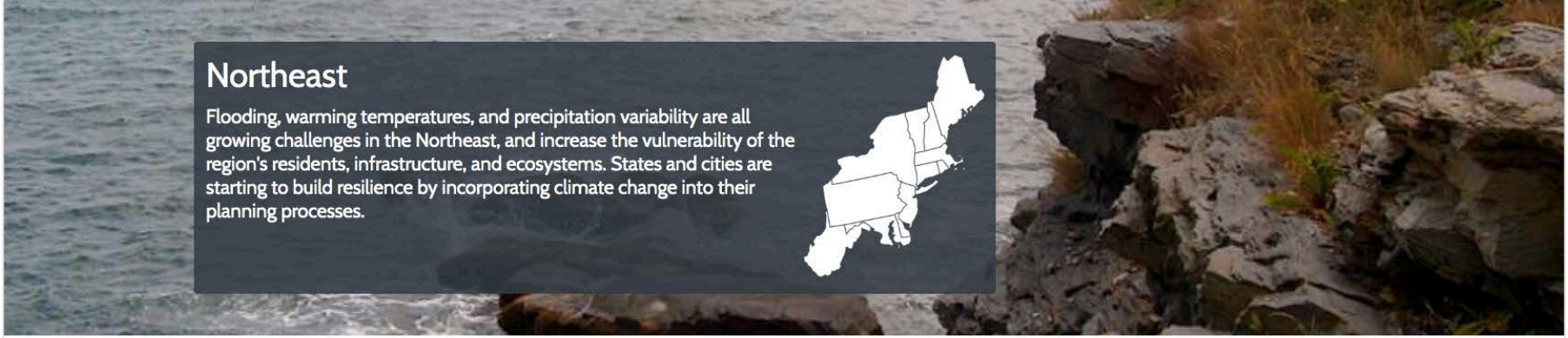
HAWAI'I AND PACIFIC ISLANDS ›

MIDWEST ›

NORTHEAST ›

MORE


U.S. Climate Resilience Toolkit
Steps to Resilience
Case Studies
Tools
Expertise
Regions
Topics
Search
TOPICS
BUILT ENVIRONMENT ›
COASTS ›
ECOSYSTEMS ›
ENERGY ›
FOOD ›
HEALTH ›
MARINE ›
TRANSPORTATION ›
TRIBAL NATIONS ›
WATER ›
MORE



Northeast

Flooding, warming temperatures, and precipitation variability are all growing challenges in the Northeast, and increase the vulnerability of the region's residents, infrastructure, and ecosystems. States and cities are starting to build resilience by incorporating climate change into their planning processes.

Key Points:

- *Sea level along coastlines in the Northeast has risen approximately one foot since 1900—a rate that exceeds the global average. Due to local land subsidence in the region, the rate of sea level rise over the next century is expected to continue exceeding global levels.*
- *The Northeast has seen a greater increase in extreme precipitation than any other region in the United States: the amount of precipitation falling in very heavy events between 1958 and 2010 increased by more than 70 percent. The frequency of heavy downpours is projected to continue increasing as the century progresses.*
- *The frequency, intensity, and duration of heat waves in the region is expected to increase through the next century, while the frequency, intensity, and duration of cold air outbreaks is expected to decrease.*
- *Climate change impacts in the Northeast—including coastal and riverine flooding and heat waves—will challenge its environmental, social, and economic systems, increasing the vulnerability of its residents, especially its most disadvantaged populations.*
- *Public and private infrastructure in the Northeast—buildings, roads, rail lines, airport facilities, and ports—will be increasingly compromised by climate-related hazards over the next century, as will agriculture, fisheries, and ecosystems.*
- *Climate change risks are increasingly being incorporated into state and municipal planning processes; however, implementation of adaptation and resilience-building measures is just beginning.*

Adapted from the Third National Climate Assessment.

The Northeast region includes states ranging from New England to the Mid-Atlantic, encompassing Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, West Virginia,

Northeast Regional Resources

View all Northeast Case Studies ›
View all Northeast Tools ›
View all Northeast Reports ›
View all Northeast Training Cours[illegible]s ›
New England Federal Partners W[illegible]e ›

Summary messages

Reference

Narrative text

Table of Contents

Complete set of all region's resources

Infrastructure and the Built Environment

Sea level rise, flooding, and more frequent extreme precipitation and excessive heat events threaten to compromise the Northeast's extensive infrastructure systems. Buildings, roads, railways, airports, ports, and utility systems face increasing risk from weather- and climate-related events.

Regional Subtopic

Narrative text

ensive built infrastructure present in the Northeast is increasingly challenged by weather- and e-related impacts. As a result of early settlement patterns, the region has some of the oldest buildings and facilities in the United States, much of it built along the region's coastline. These structures—as well as ergy, transportation, water, and sanitation systems that make up the regional built environment—were t to withstand the new conditions and extreme events projected to occur over the next century. ion of services that depend upon these systems can have a negative impact on public health and ith the potential for significant repercussions in the regional economy.

Manhattan suffered a widespread power outage during Hurricane Sandy.

Sea level in the Northeast has risen approximately one foot since 1900—a rate that exceeds the global average—and the rapid changes are increasing the risk for flooding in the region's coastal areas. Unless people take measures to adapt to new conditions, New York State could lose the use of 212 miles of roads, 77 miles of rail, 3,647 acres of airport facilities, and 539 acres of runways after regional sea level has risen by

Table of Contents

All relevant case studies

Case Studies

Addressing Water Supply Risks from Flood and Drought ›

Elevated Rehabilitation Facility Functions Flawlessly Through Hurricane Sandy ›

Exploring Adaptation Options for Water Infrastructure at Sea Level ›

Extreme Rainfall Analyses Can Point to Right Size for Culverts ›

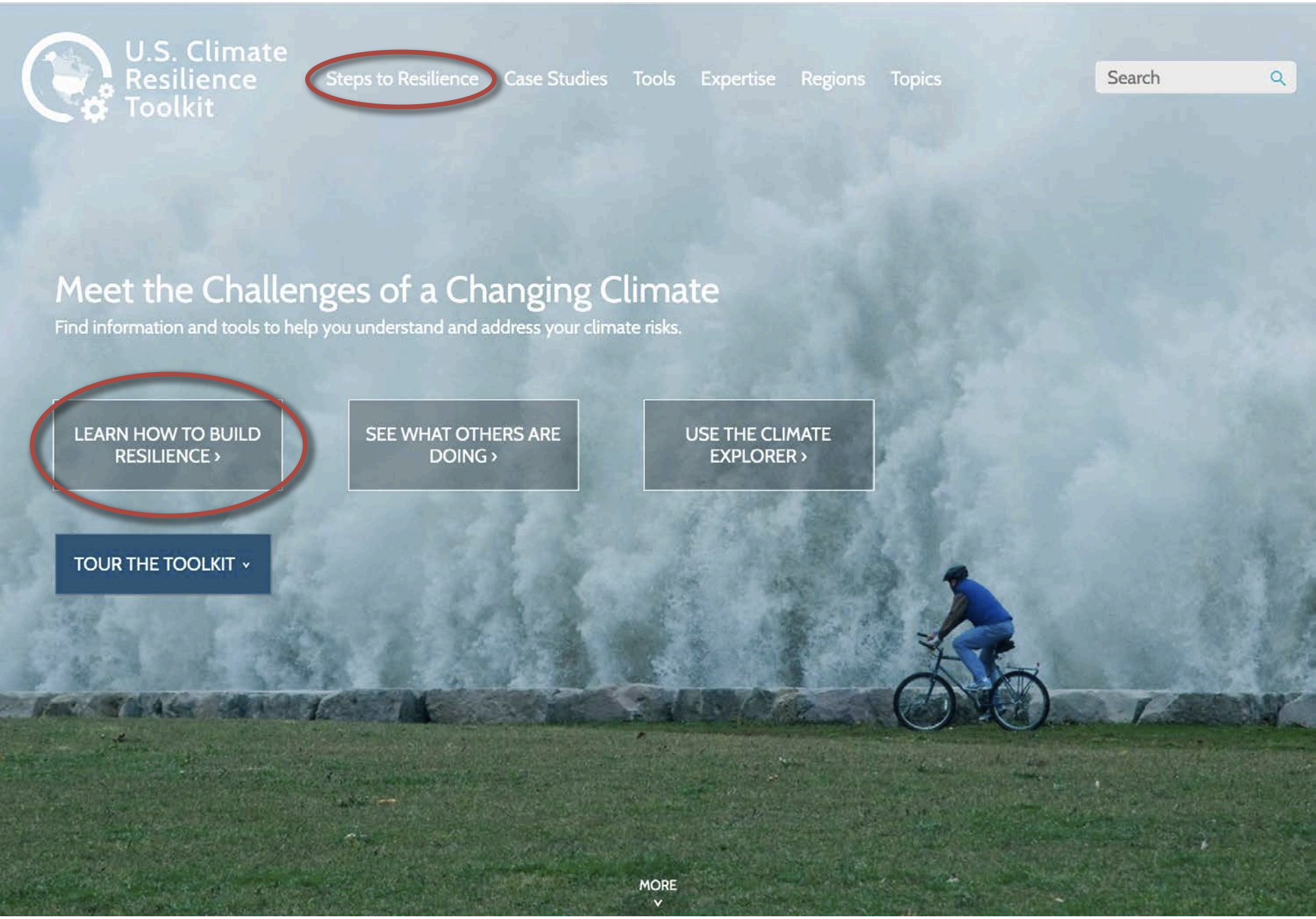
Green or Gray? Choosing to Preserve Water Quality ›

1 2 3 next › last »

All relevant tools

Related Tools

Climate Change Preparedness and Resilien Checklist ›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Steps to Resilience
Case Studies
Tools
Expertise
Regions
Topics
Search
Meet the Challenges of a Changing Climate
Find information and tools to help you understand and address your climate risks.
LEARN HOW TO BUILD RESILIENCE ›
SEE WHAT OTHERS ARE DOING ›
USE THE CLIMATE EXPLORER ›
TOUR THE TOOLKIT
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STEPS TO RESILIENCE

Use this framework to discover and document climate hazards, then develop workable solutions to lower climate-related risks. Click any step to learn more.

Did you know?

Why should we care?

What can we do about it?

Summary overview

You are here in the StR process

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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.*

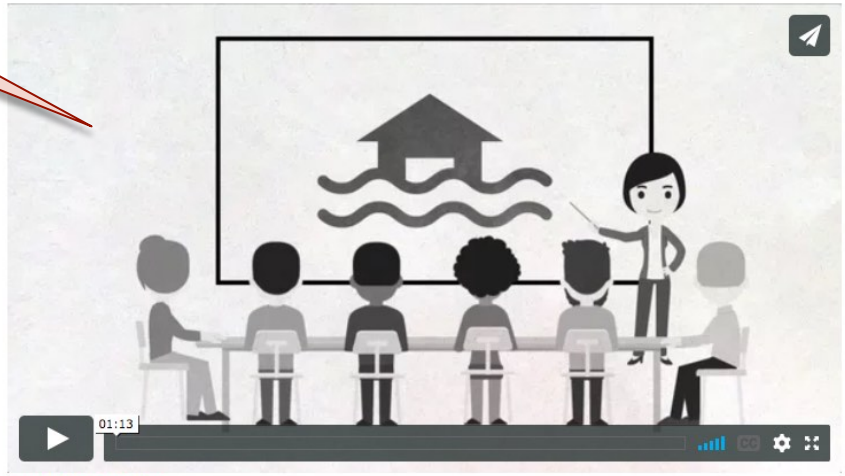
After this exploration, you'll discover if weather and climate represent a hazard to things you value.

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

Video orientation for each step

Links to case studies showing others taking this step.

Steps to Resilience › Explore Hazards ›



Step 1. Explore Hazards

Establish a team

- Engage stakeholders and decide how you'll work together.

There's a saying: "If you want to go fast, go alone. If you want to go far, bring others." In almost every case, projects that build climate *resilience* require going far *(linked terms in these Steps to Resilience pages provide access definitions and examples)*.

To ensure you have the broad support necessary to implement a resilience-building project, start by recruiting a comprehensive group of stakeholders. All the individuals and organizations that could be

Case Studies
- Motivating the Agricultural Community to Climate Resilience ›
- Shopping Mall Exhibit Raises Awareness of Sea Level Rise ›
- Yukon Delta Villages Document Baseline Environmental Data ›

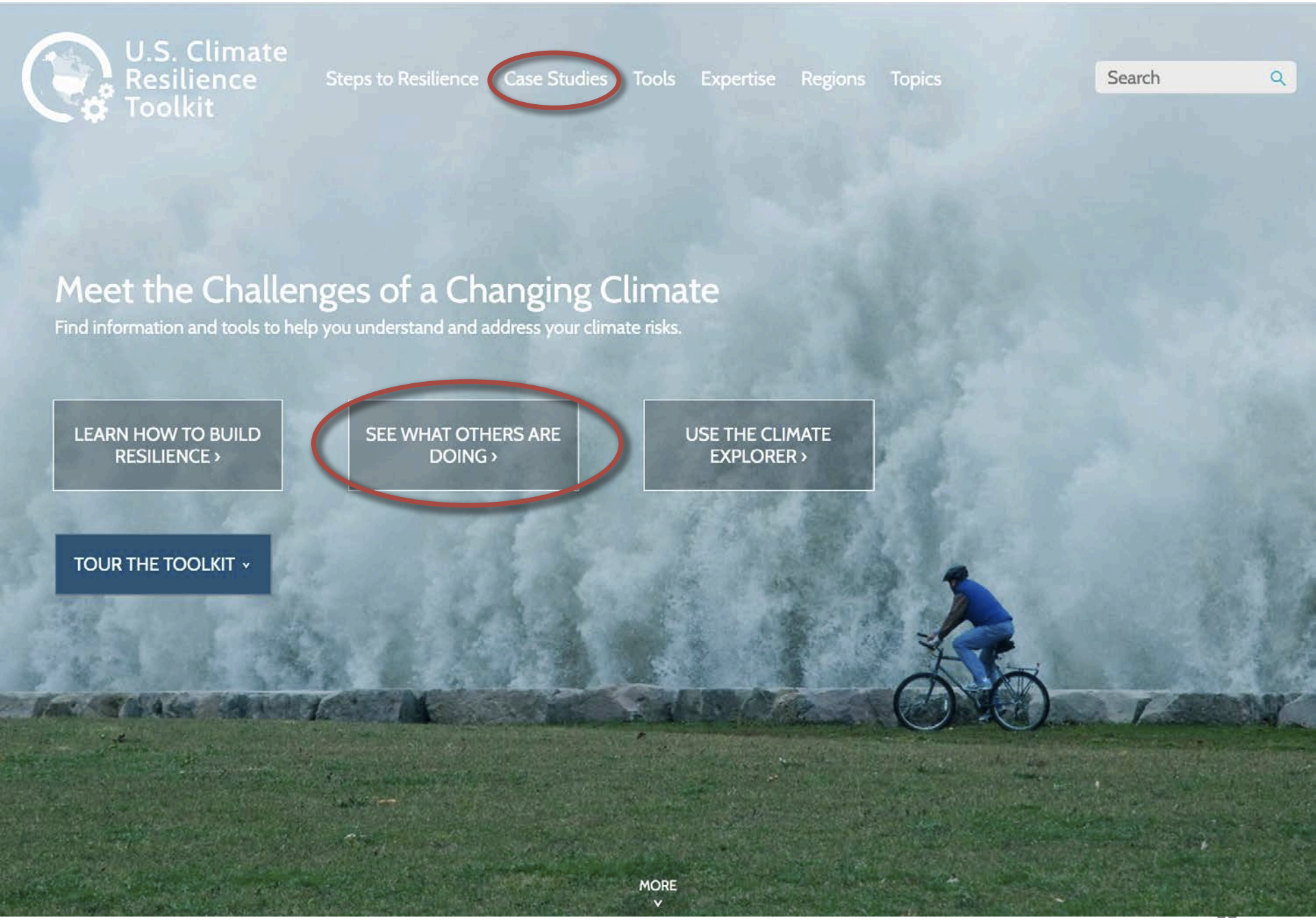
Tools
- Climate at a Glance ›
- Climate Explorer ›
- Coastal Flood Exposure Mapper ›
- Guidelines for Considering Traditional Knowledges in Climate Change Initiatives ›
- Hawai'i and U.S. Pacific Islands Region Climate Impacts and Outlook ›
- Local Environmental Observer (LEO) Network ›
- Pacific Islands Regional Climate Assessment (PIRCA) ›
- Sea Level Rise and Coastal Flooding Impacts Viewer ›

Relevant Reports
- Climate Change Impacts in the United States: The Third National Climate Assessment ›

Links to tools useful/relevant to this step.

Narrative text on each step of the StR process

Glossary & downloadable spreadsheet to help users capture notes


U.S. Climate Resilience Toolkit
Steps to Resilience
Case Studies
Tools
Expertise
Regions
Topics
Search
Meet the Challenges of a Changing Climate
Find information and tools to help you understand and address your climate risks.
LEARN HOW TO BUILD RESILIENCE ›
SEE WHAT OTHERS ARE DOING ›
USE THE CLIMATE EXPLORER ›
TOUR THE TOOLKIT
MORE

U.S. Climate Resilience Toolkit

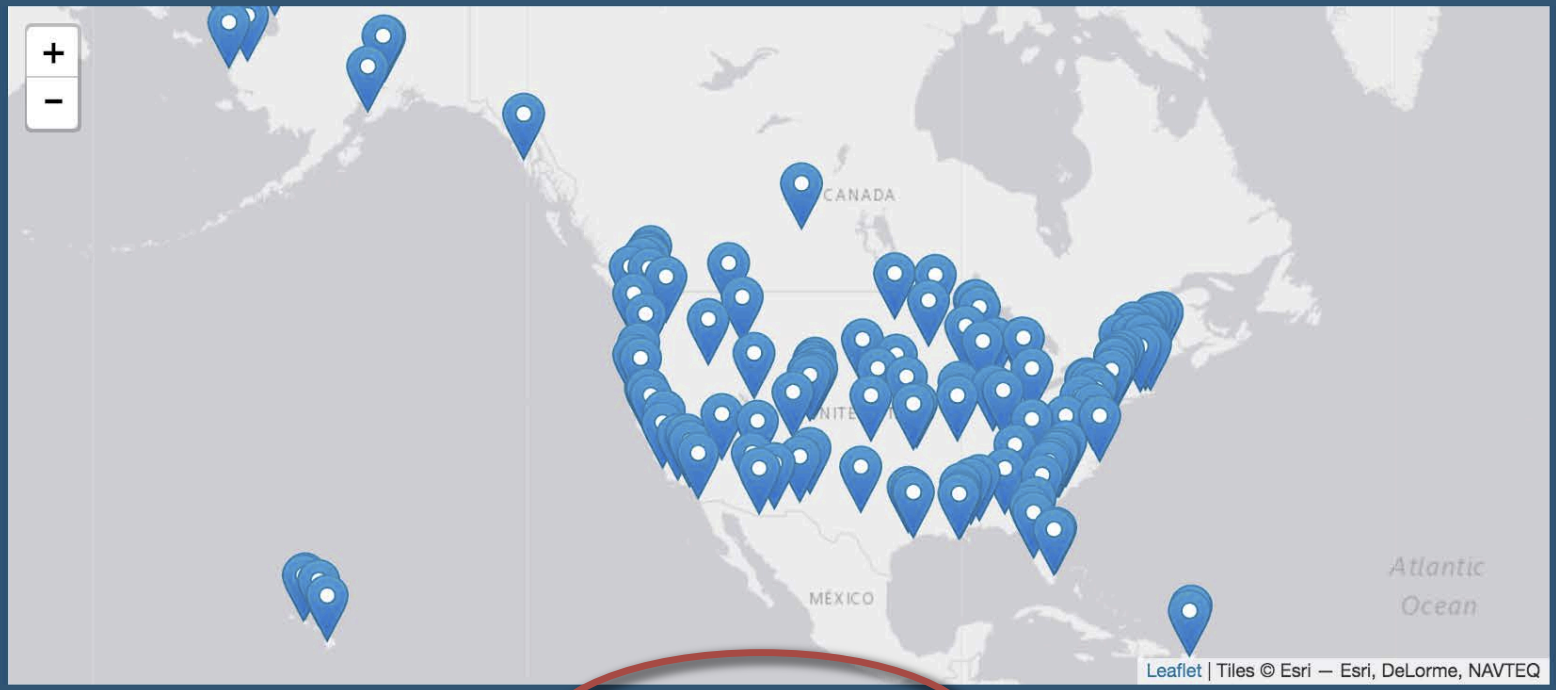
Steps to Resilience | Case Studies | Tools | Expertise | Regions | Topics

MORE

Search

CASE STUDIES

Explore case studies to see how people are building resilience for their businesses and in their communities. Click dots on the map below to preview case studies, or browse all case studies by clicking the button below the map.



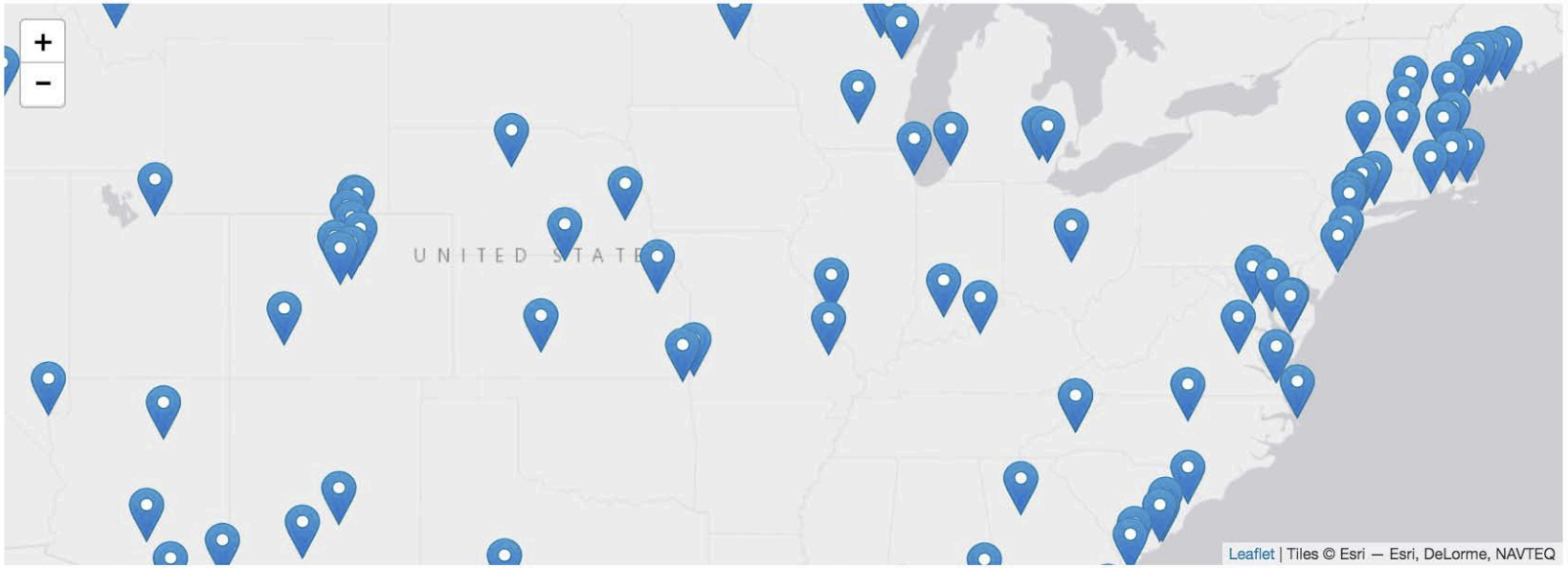
BROWSE ALL CASE STUDIES ›

MORE

Case Studies

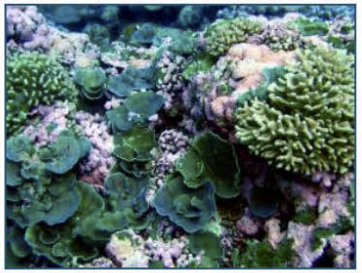
Filter by climate threat/stressor: ▼ | Filter by topic: ▼ | Filter by steps to resilience: ▼ | Filter by region: ▼

Communities, businesses, and individuals are taking action to document their vulnerabilities and build resilience to climate-related impacts. Click dots on the map to preview case studies, or browse stories below the map. Use the drop-down menus above to find stories of interest. To expand your results, click the Clear Filters link.



A Climate for Resilience

The City of Houston faces an array of climate vulnerabilities: flooding, drought, tropical cyclones, and



A Coral Bleaching Story With an Unknown Ending

Changing ocean conditions pose an

A New Generation of Water Planners Confronts Change Along the Colorado River

A Town with a Plan: Community, Climate, and Conversations

Case Studies

Filter by climate threat/stressor: ▼ | Filter by topic: ▼ | Filter by steps to resilience: ▼ | Filter by region: ▼

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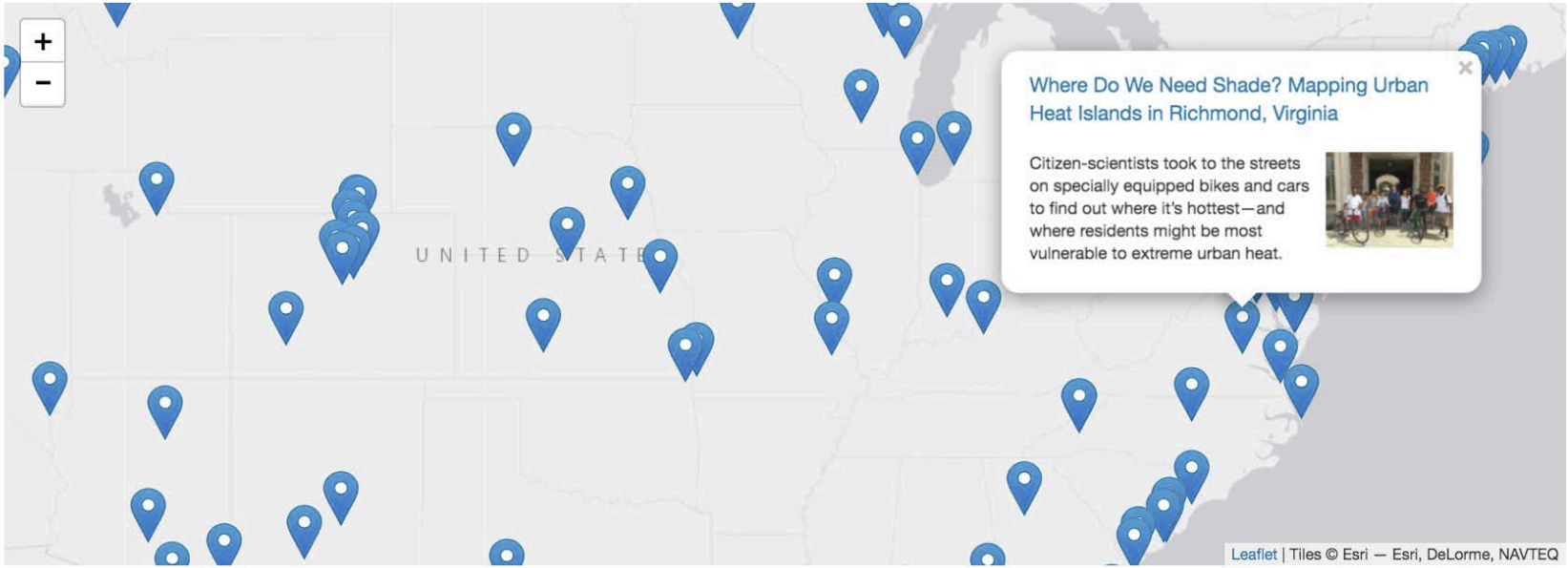

A Climate for Resilience

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A New Generation of Water Planners Confronts Change Along the Colorado River

A Town with a Plan: Community, Climate, and Conversations

Title & summary overview

Where Do We Need Shade? Mapping Urban Heat Islands in Richmond, Virginia

Citizen-scientists took to the streets on specially equipped bikes and cars to find out where it's hottest—residents might be most vulnerable to extreme urban heat.

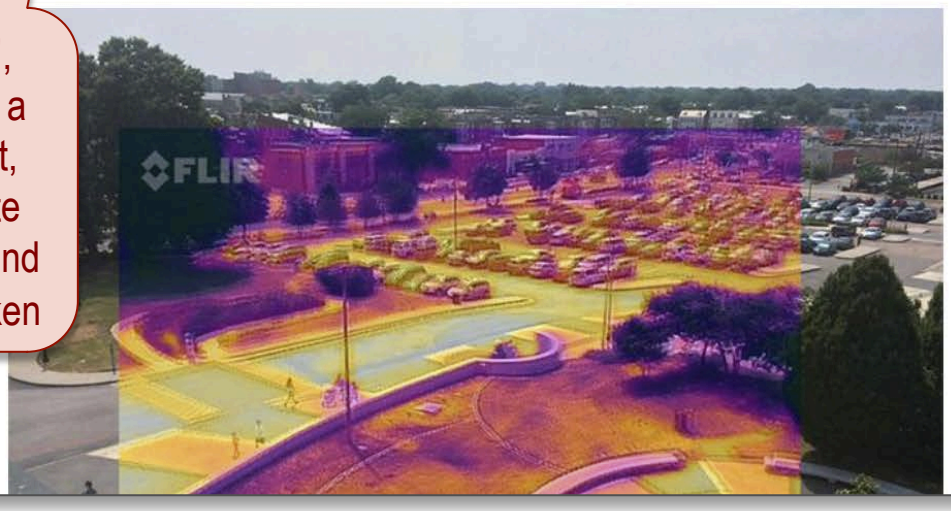
You are here in 'Steps to Resilience'

Share this on social media

Richmond—the capital of Virginia—is situated on the James River amidst the low, rolling hills of the Virginia Piedmont. One of the nation's oldest cities, Richmond boasts a population of almost 225,000. Walking through this dynamic city yields a wide range of culture, landscape...and temperatures.

Similar to other cities across the mid-Atlantic region, Richmond experiences generally warm and humid summer days. And like other densely populated cities, the city experiences an urban heat island effect: unshaded roads and buildings across the city gain heat through the day and radiate it to the surroundings, increasing air temperature. As a result, highly developed areas experience warmer temperatures than surrounding areas.

The 'story', introducing a protagonist, their climate challenge, and action(s) taken



Steps to Resilience

This content supports the highlighted step.

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

Tools

Climate Explorer ›

R Statistical Analysis Software

CRT tool(s) featured in this case study

Topics

Built Environment › C...

Built Environment › Soc...

Built Environment › Plan...

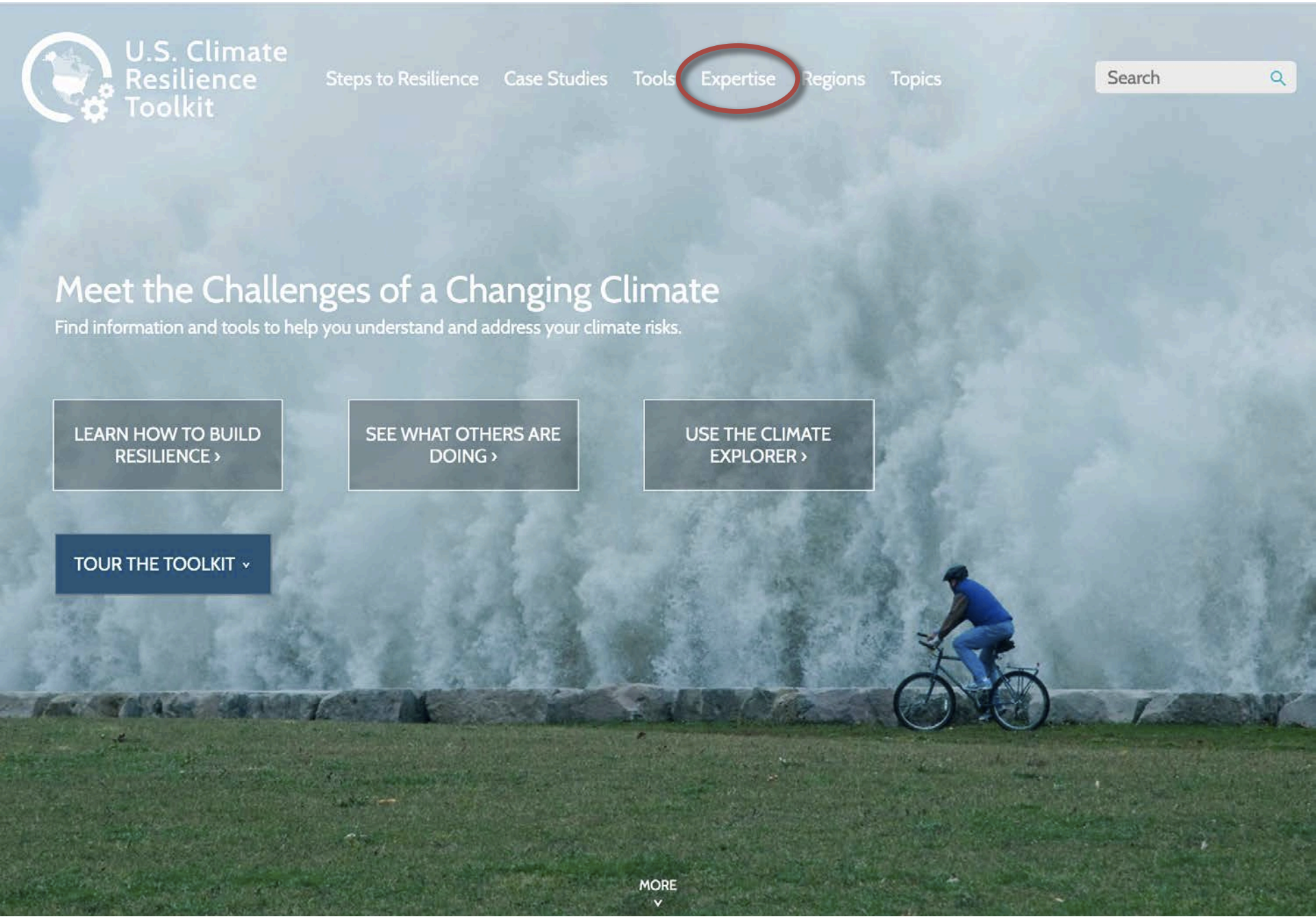
Health › Extreme Heat—NIHHIS ›

CRT **Regions** & **Topics** relevant to this case study

Additional Resourc...

Interactive webmap of t... island dataset (3:00–...

Whom to contact for more details


U.S. Climate Resilience Toolkit
Steps to Resilience
Case Studies
Tools
Expertise
Regions
Topics
Search
Meet the Challenges of a Changing Climate
Find information and tools to help you understand and address your climate risks.
LEARN HOW TO BUILD RESILIENCE ›
SEE WHAT OTHERS ARE DOING ›
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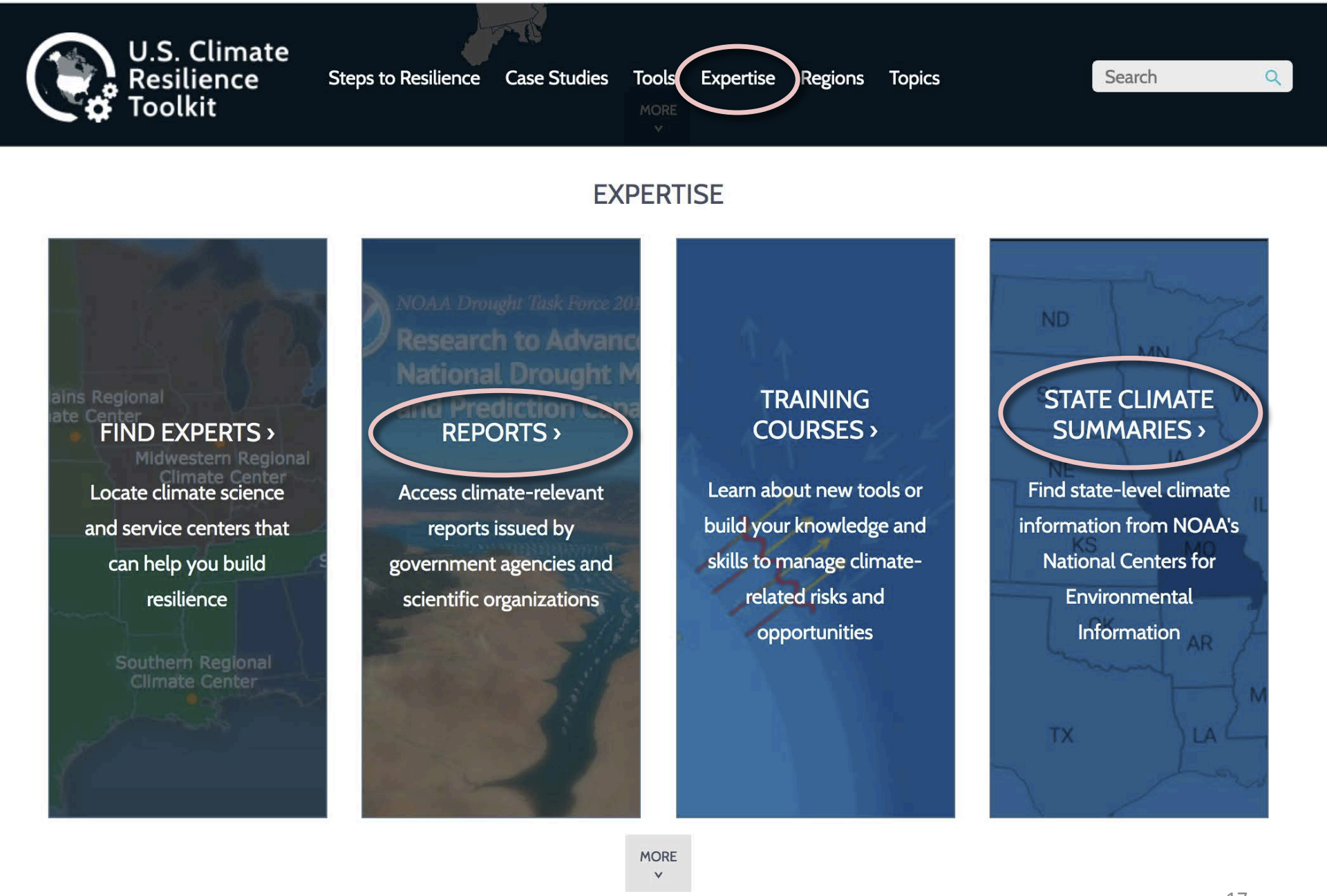
TOUR THE TOOLKIT
MORE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Steps to Resilience
Case Studies
Tools
Expertise
Regions
Topics
MORE
Search
EXPERTISE
FIND EXPERTS ›
Locate climate science and service centers that can help you build resilience
Midwestern Regional Climate Center
Southern Regional Climate Center
REPORTS ›
Access climate-relevant reports issued by government agencies and scientific organizations
TRAINING COURSES ›
Learn about new tools or build your knowledge and skills to manage climate-related risks and opportunities
STATE CLIMATE SUMMARIES ›
Find state-level climate information from NOAA's National Centers for Environmental Information
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MN
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NE
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MO
IL
AR
TX
LA
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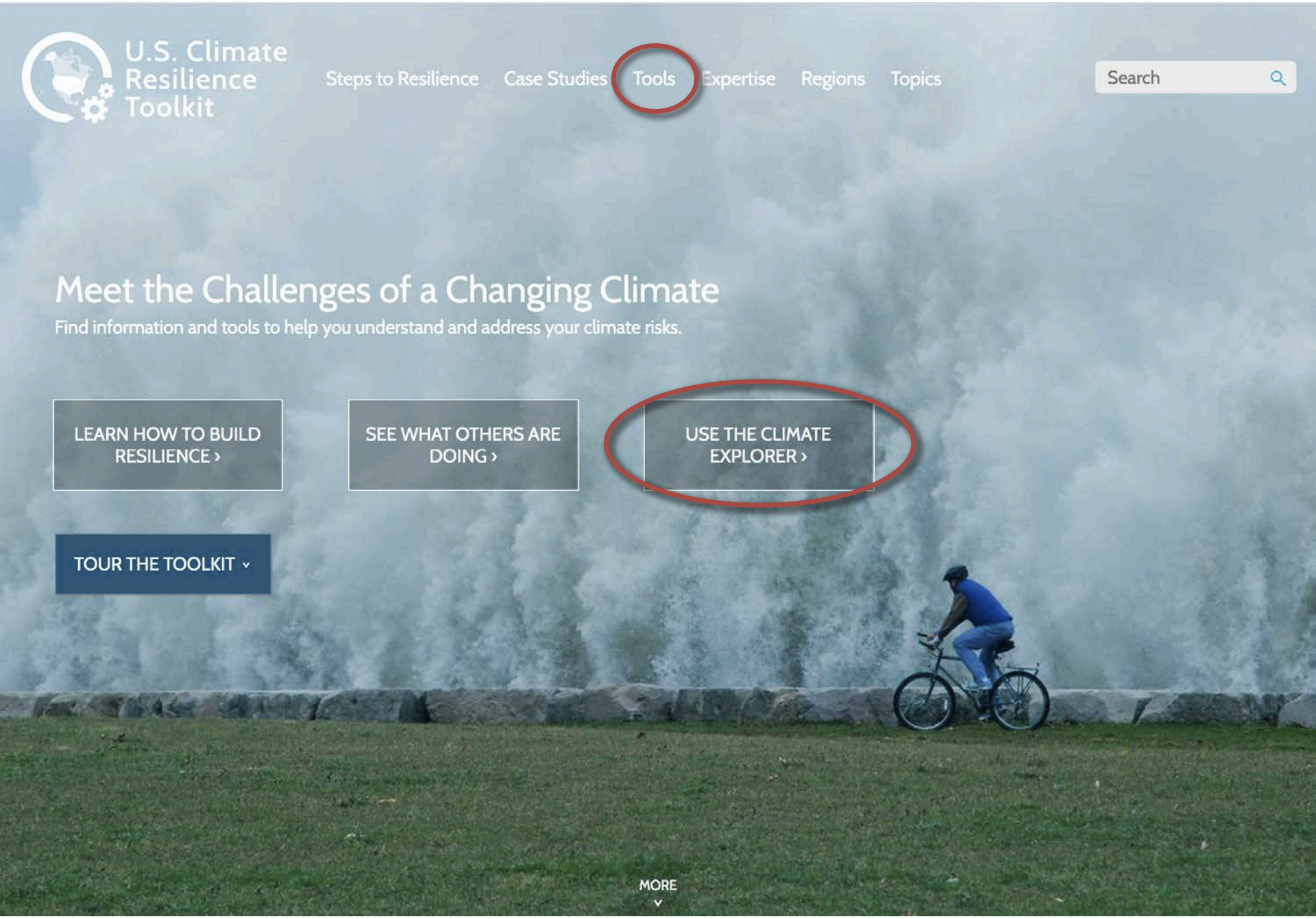
U.S. Climate Resilience Toolkit
Steps to Resilience
Case Studies
Tools
Expertise
Regions
Topics
Search
Meet the Challenges of a Changing Climate
Find information and tools to help you understand and address your climate risks.
LEARN HOW TO BUILD RESILIENCE ›
SEE WHAT OTHERS ARE DOING ›
USE THE CLIMATE EXPLORER ›
TOUR THE TOOLKIT
MORE

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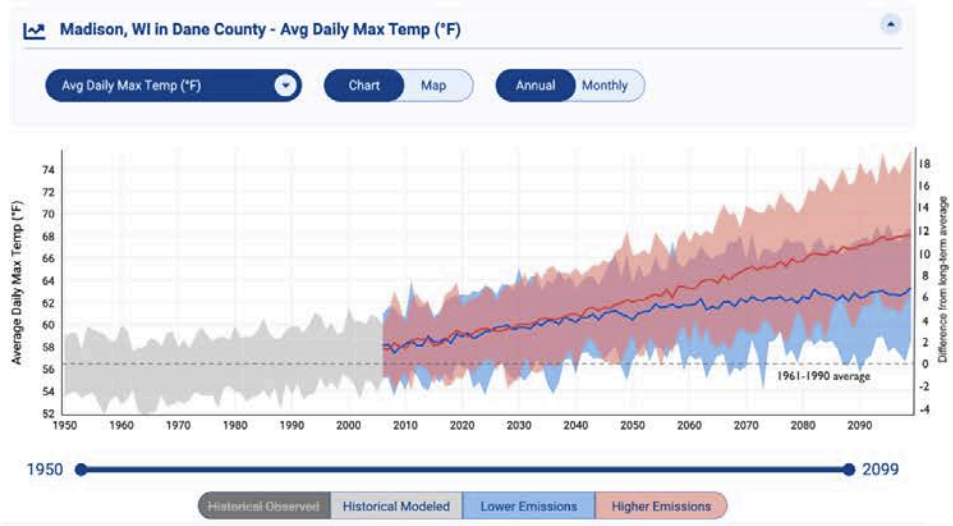
TRIBAL NATIONS › WATER ›

Steps to Resilience | Case Studies | Tools | Expertise | Regions | Topics | MORE

Search

CLIMATE EXPLORER

This visualization tool generates interactive graphs and maps showing climate projections and observations for any county in the contiguous United States. You can also explore historical temperature and precipitation observations at hundreds of climate stations, and view observed and projected days of high-tide flooding at more than 90 coastal tide-gauge stations.

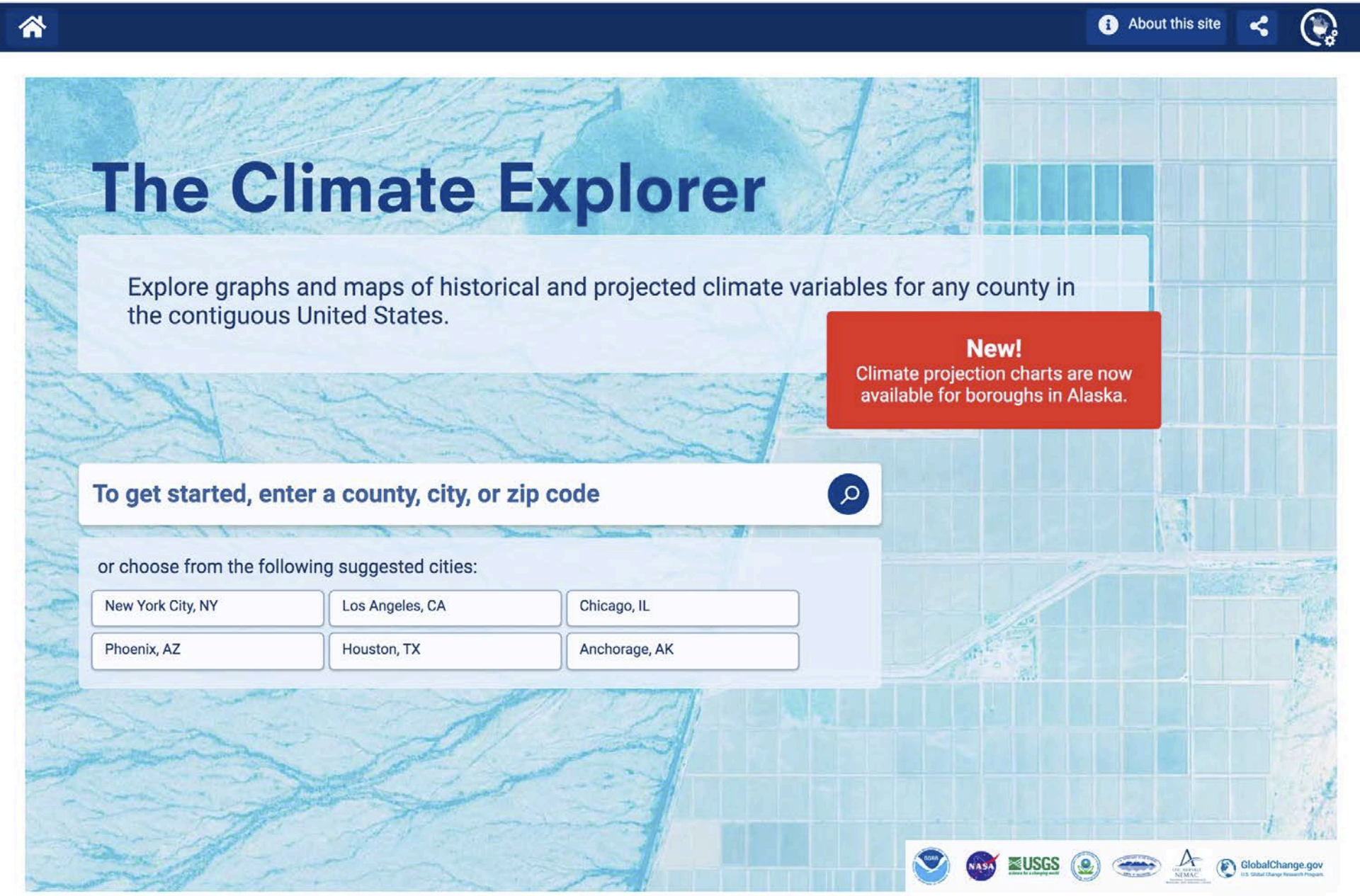


LAUNCH THE CLIMATE EXPLORER ›

LEARN MORE ABOUT CLIMATE EXPLORER ›

Image Credits:

Landing panel: A bicycle rider beside an apparent wall of water in Chicago's Diversey Harbor Park, as 50–60 mph winds from Hurricane Sandy kicked up 20-foot waves along the shores of Lake Michigan. Photo: Image by Chris Bentley, CC BY-NC-ND 2.0, via Flickr. Learn more about building climate resilience in the Great Lakes in our Great Lakes regional section.


About this site
The Climate Explorer
Explore graphs and maps of historical and projected climate variables for any county in the contiguous United States.
New!
Climate projection charts are now available for boroughs in Alaska.
To get started, enter a county, city, or zip code
or choose from the following suggested cities:
New York City, NY
Los Angeles, CA
Chicago, IL
Phoenix, AZ
Houston, TX
Anchorage, AK
USGS
GlobalChange.gov

The Climate Explorer

About this site

Blacksburg, VA

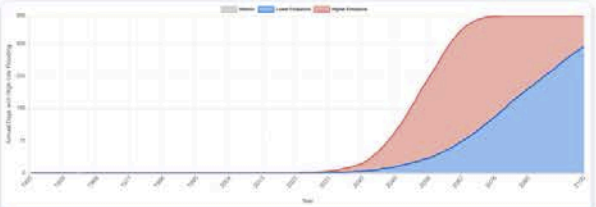
Select one of the following for Blacksburg, VA in Montgomery County

Climate Maps

Compare past and projected future conditions in your county.

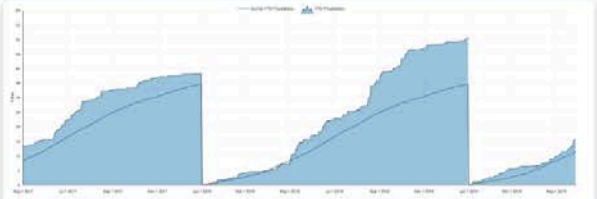
Climate Charts

Check past and projected values for climate variables.



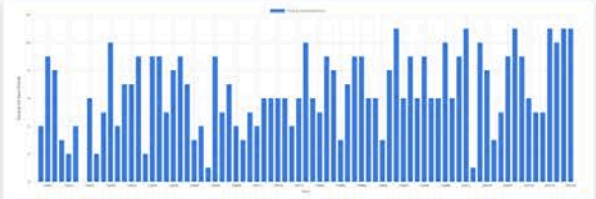
High-Tide Flooding

View the number of high-tide floods in the past and projected for the future.



Historical Weather Data

Compare daily weather at local observing stations to long-term climate.



Historical Thresholds

Check how often temperature or precipitation has exceeded user-defined values.

Region Based

Station Based

Cards Home | Climate Charts | Climate Maps | Historical Data | Historical Thresholds | High-tide

The Climate Explorer

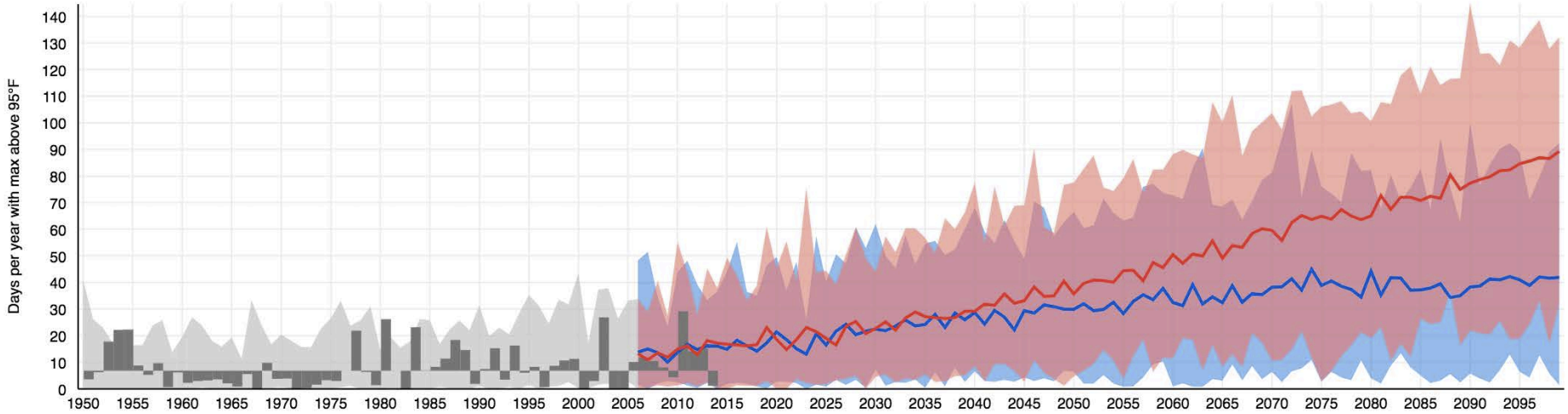
About this site

Henrico County, VA

Stations

Henrico County, VA Days w/ max > 95°F

Days w/ max > 95°F | Chart | Map | Annual | Monthly | Downloads | About the graph

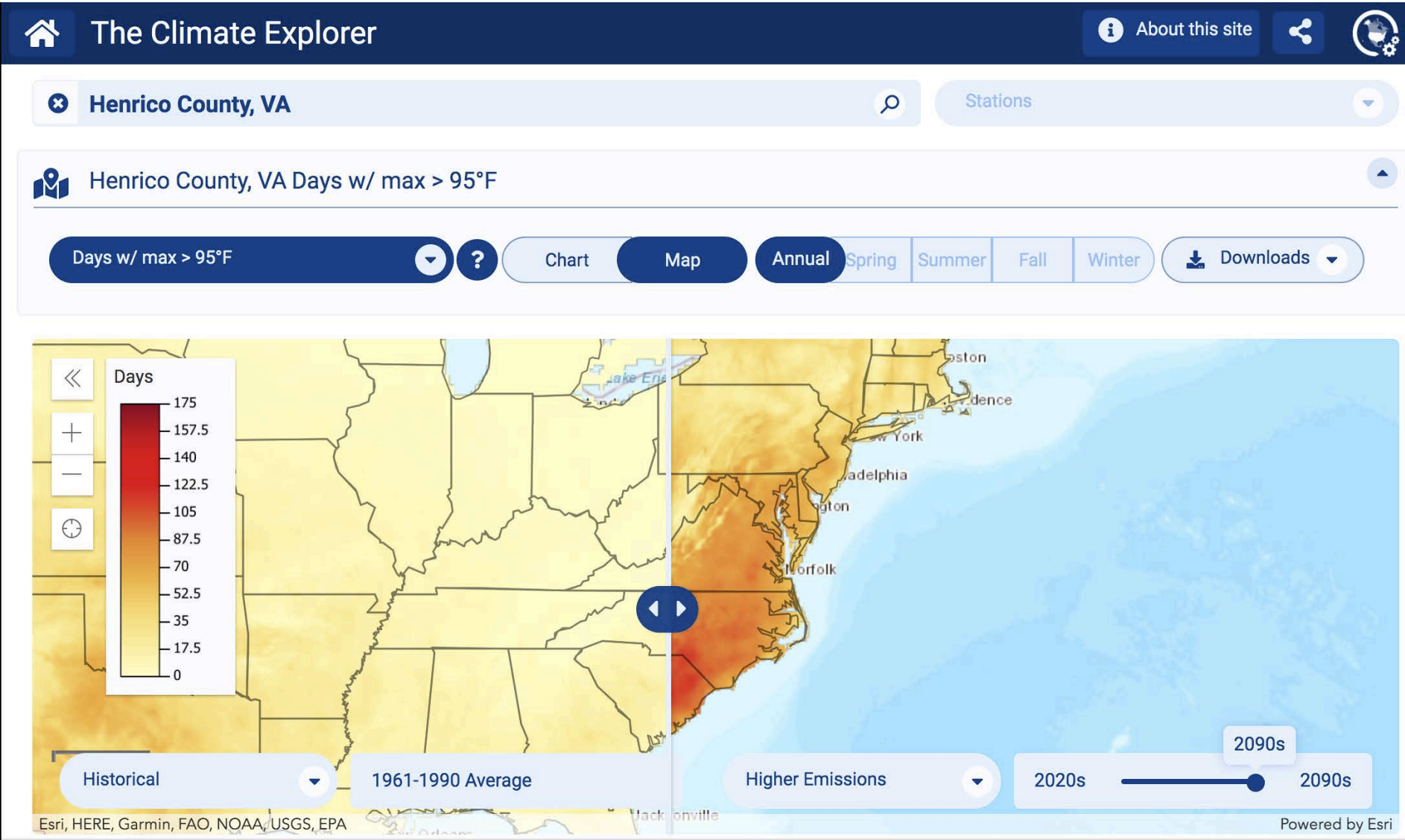


1950 — 2099

Historical Observed | Historical Modeled | Lower Emissions | Higher Emissions

Region Based: Cards Home | Climate Charts | Climate Maps

Station Based: Historical Data | Historical Thresholds | High-tide


The Climate Explorer
About this site
Henrico County, VA
Stations
Henrico County, VA Days w/ max > 95°F
Days w/ max > 95°F
Chart
Map
Annual
Spring
Summer
Fall
Winter
Downloads
Days
175
157.5
140
122.5
105
87.5
70
52.5
35
17.5
0
Historical
1961-1990 Average
Higher Emissions
2020s
2090s
2090s
Esri, HERE, Garmin, FAO, NOAA, USGS, EPA
Powered by Esri
Region Based
Station Based
Cards Home
Climate Charts
Climate Maps
Historical Data
Historical Thresholds
High-tide

The Climate Explorer

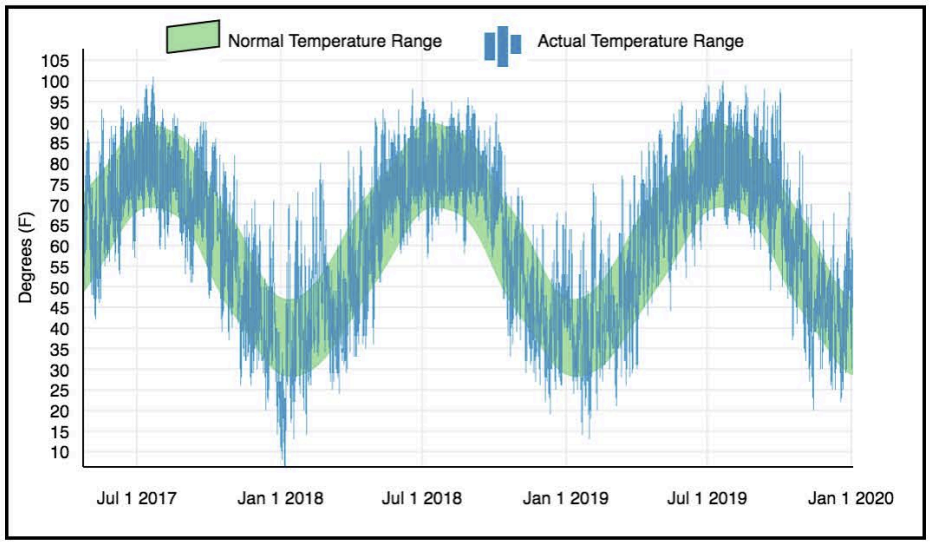
About this site

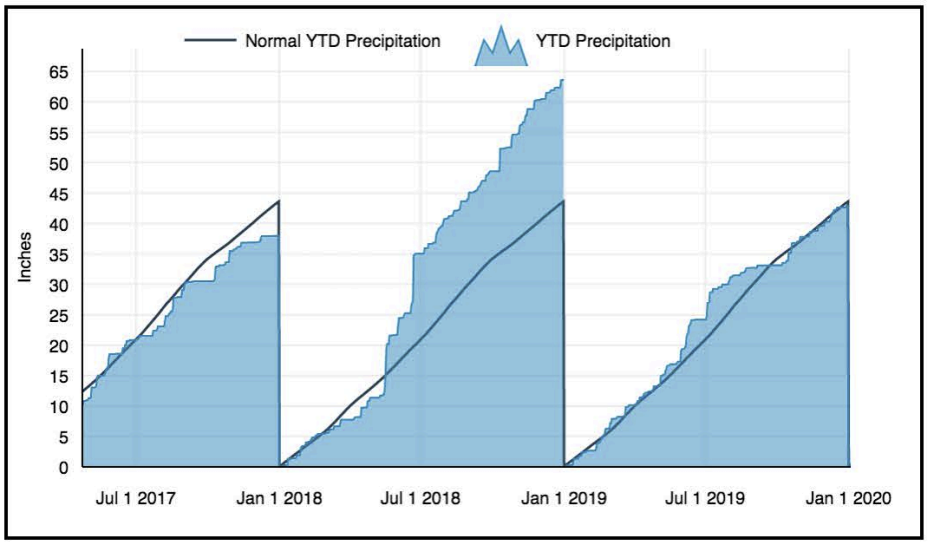
Henrico County, VA

RICHMOND INTERNATIONAL AP - (USW000137

Station id: USW00013740 Station: RICHMOND INTERNATIONAL AP

Chart | Map | Downloads | About the graph





Region Based

Cards Home | Climate Charts | Climate Maps

Station Based

Historical Data | Historical Thresholds | High-tide

Norfolk, VA

Sewells Point, VA - (8638610)

Station id: 8638610 Station: Sewells Point, VA Local threshold: 0.53m over MHHW

Chart | Map | Historical | Historical & Modeled | Downloads | About the graph