Creating Resilient Watershed Regions to Meet the Challenges of a Changing Risk Landscape

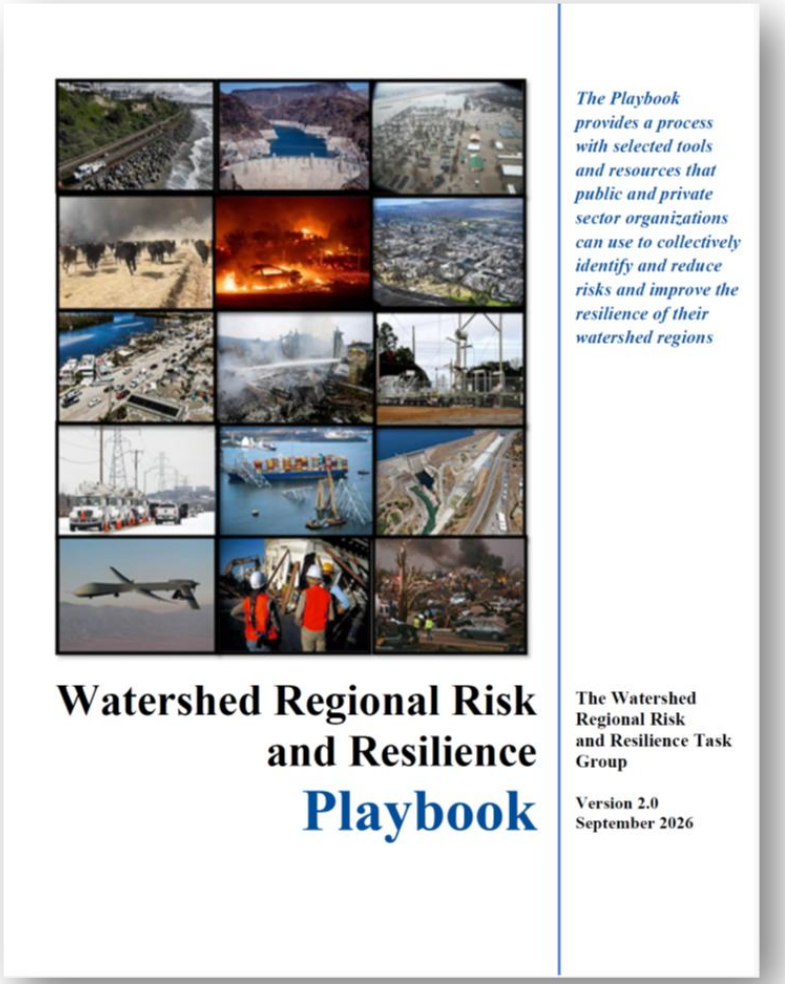
Webinar Overview

This webinar is intended to:

- Familiarize cross-sector, multi-jurisdiction, and other stakeholders with what it takes to build resilient watershed regions
- How to accomplish this with customizable guidance tools and resources provided in the ***Watershed Regional Risk and Resilience Playbook***

The Playbook:

- Was a key outcome of a program launched in 2023 by the U.S. Army Corps of Engineers in partnership with resilience practitioners and experts from government, the public sector, non-profit organizations, and academic institutions
- Leverages, integrates. and advances resilience knowledge and capabilities developed over the past 25 years to provide a holistic approach and process to improve the resilience of watershed regions and the communities and supporting infrastructures within them



Webinar Overview, Cont.

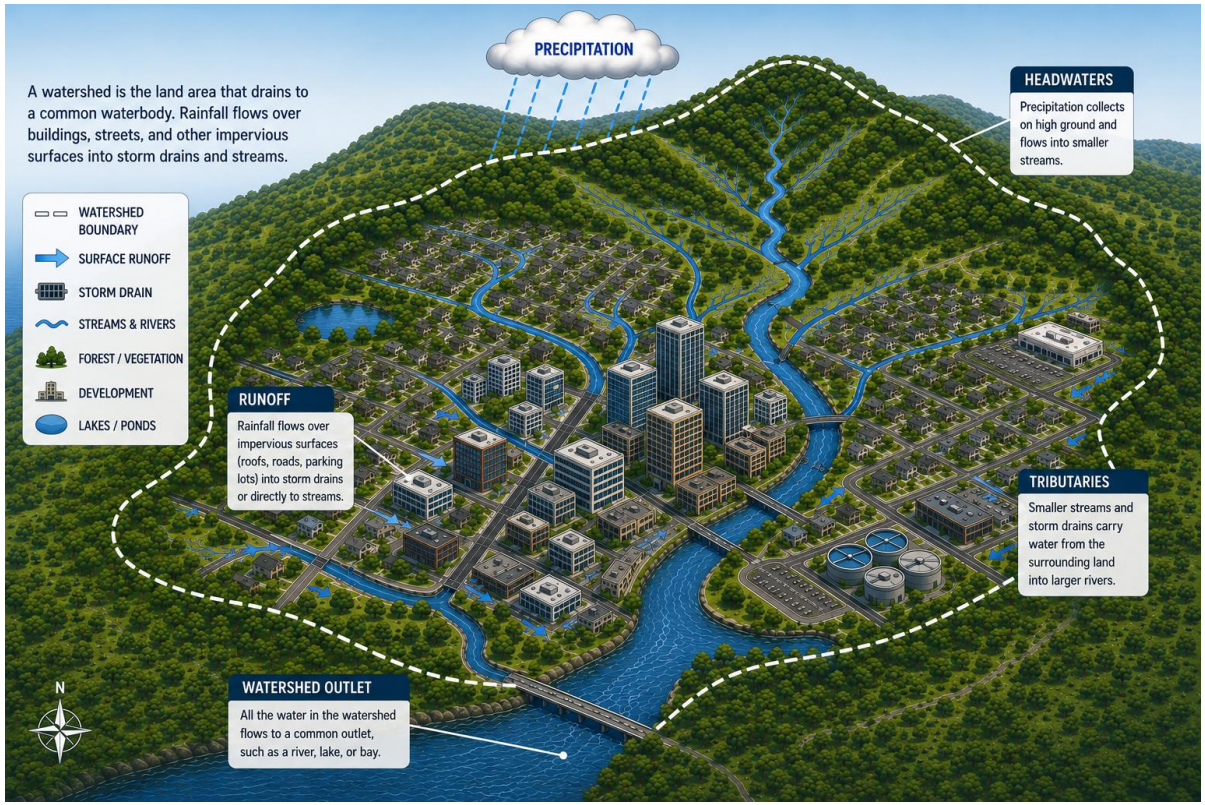
The webinar will describe:

- The drivers behind the need for enhancing watershed resilience
- What achieving it requires, and
- A practical and doable approach and seven-step process with tools and resources that can be adapted to meet the needs of communities and organizations with differing levels of knowledge, capabilities, staff, and financial resources

At the end of the webinar, we will have time for participant questions and general discussion

- **Please put questions and comments that come to mind during the webinar presentation in the chat, so we can address them at that time**

Why We Need Resilient Watershed Regions in an Era of Escalating Risks

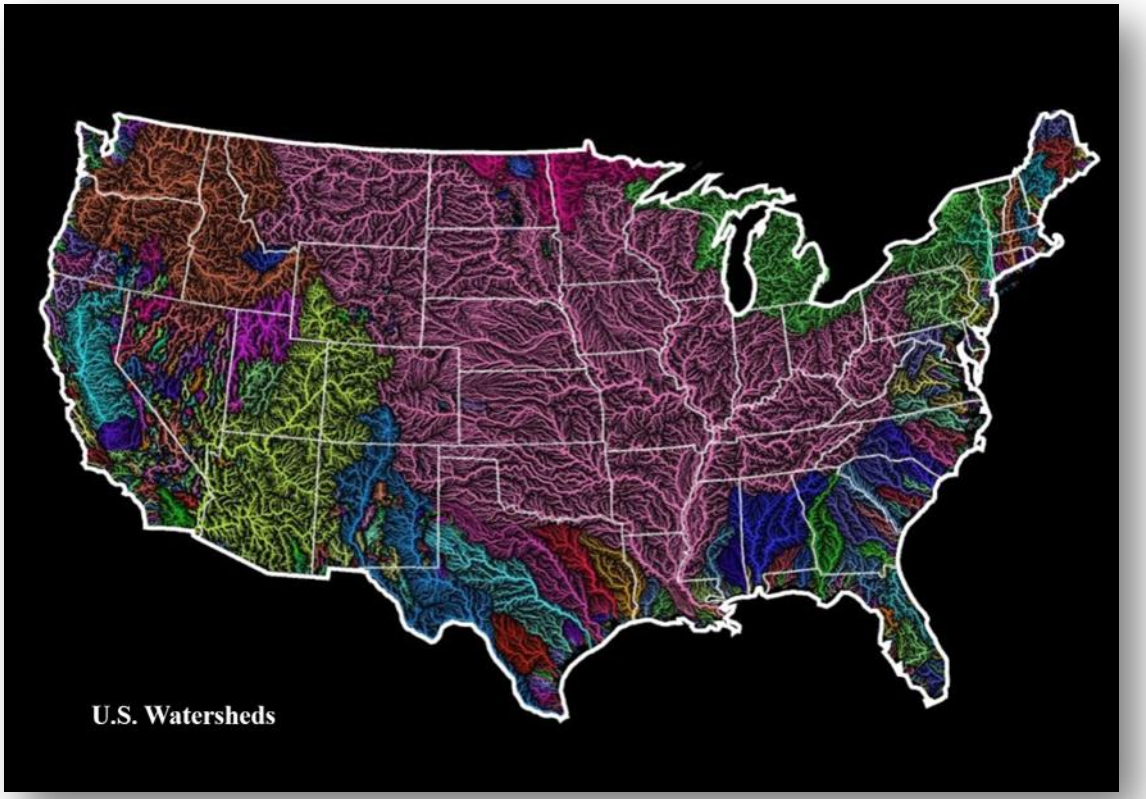


Everyone lives in a watershed region

Why We Need Resilient Watershed Regions, Cont.

The United States has 22 major watershed regions that correspond to the largest drainage basins in the country, and within each of these there are many diverse sub-regions

- All of them are unique, ranging from small local areas to crossing several states or national borders
- They vary from densely populated urban areas with extensive co-located infrastructure to a single small rural community

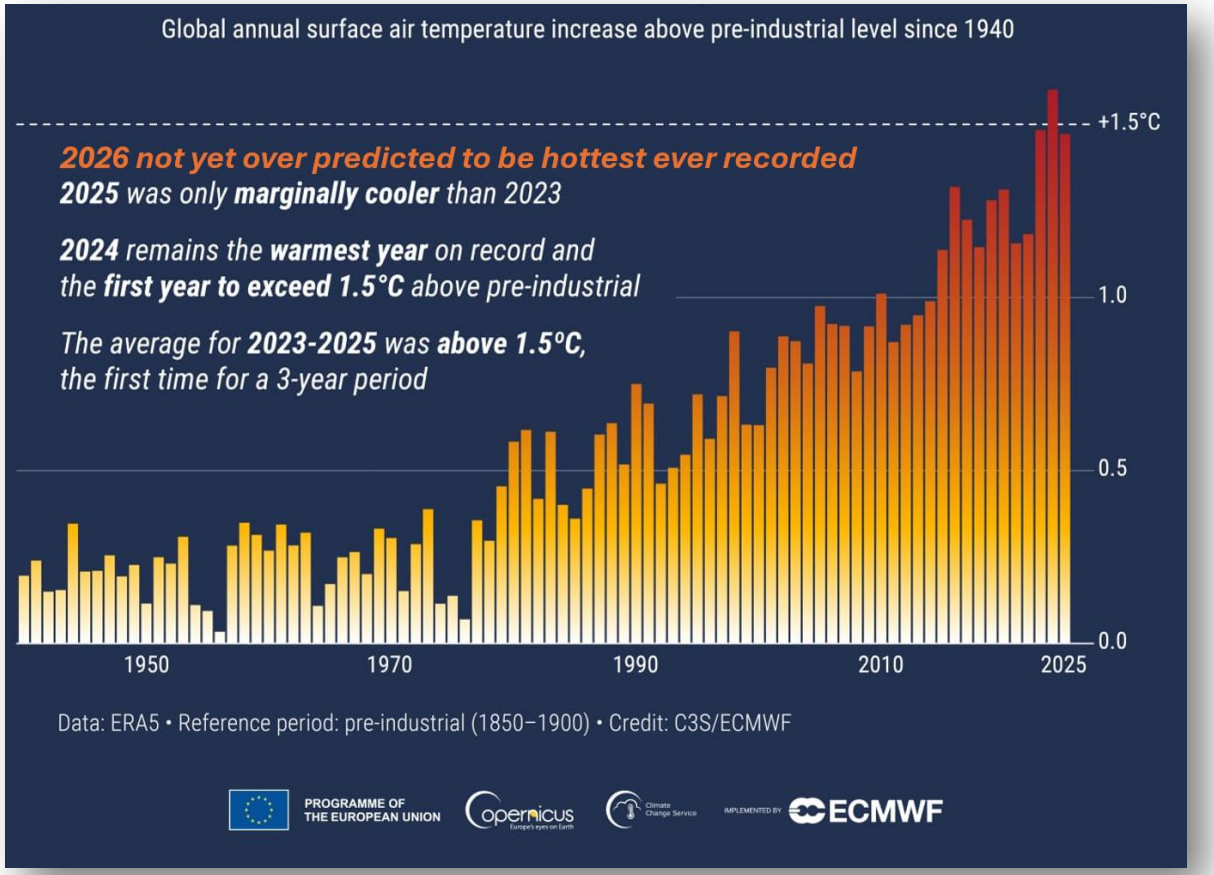


Why We Need Resilient Watershed Regions, Cont.

- What all watershed regions have in common is they face a rapidly changing risk landscape that is making them increasing vulnerable to disasters and other events
- Whether natural or manmade, these events can cause widespread, prolonged impacts to communities and their supporting interdependent infrastructures

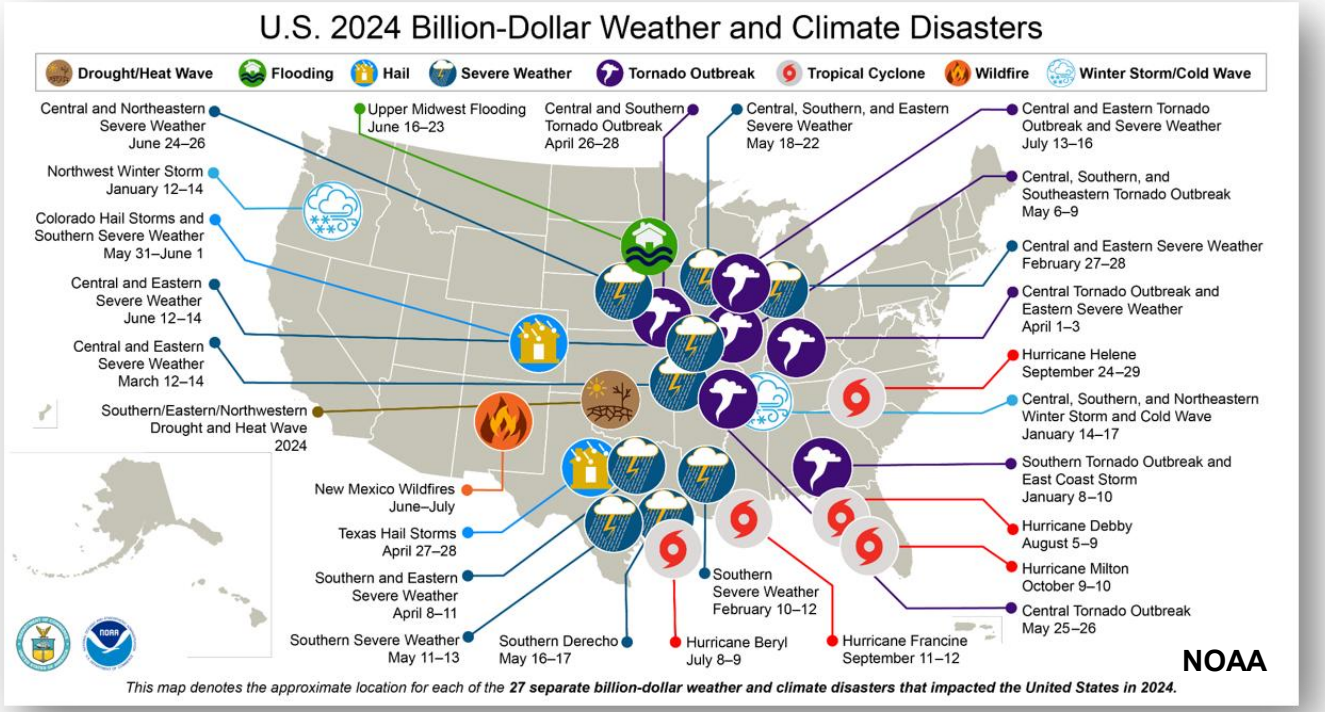
Drivers Behind the Changing Risk Landscape

Climatic changes with an unprecedented increase over the last two decades in annual global temperatures, sea-level rise, and altered weather patterns



Drivers Behind the Changing Risk Landscape, Cont.

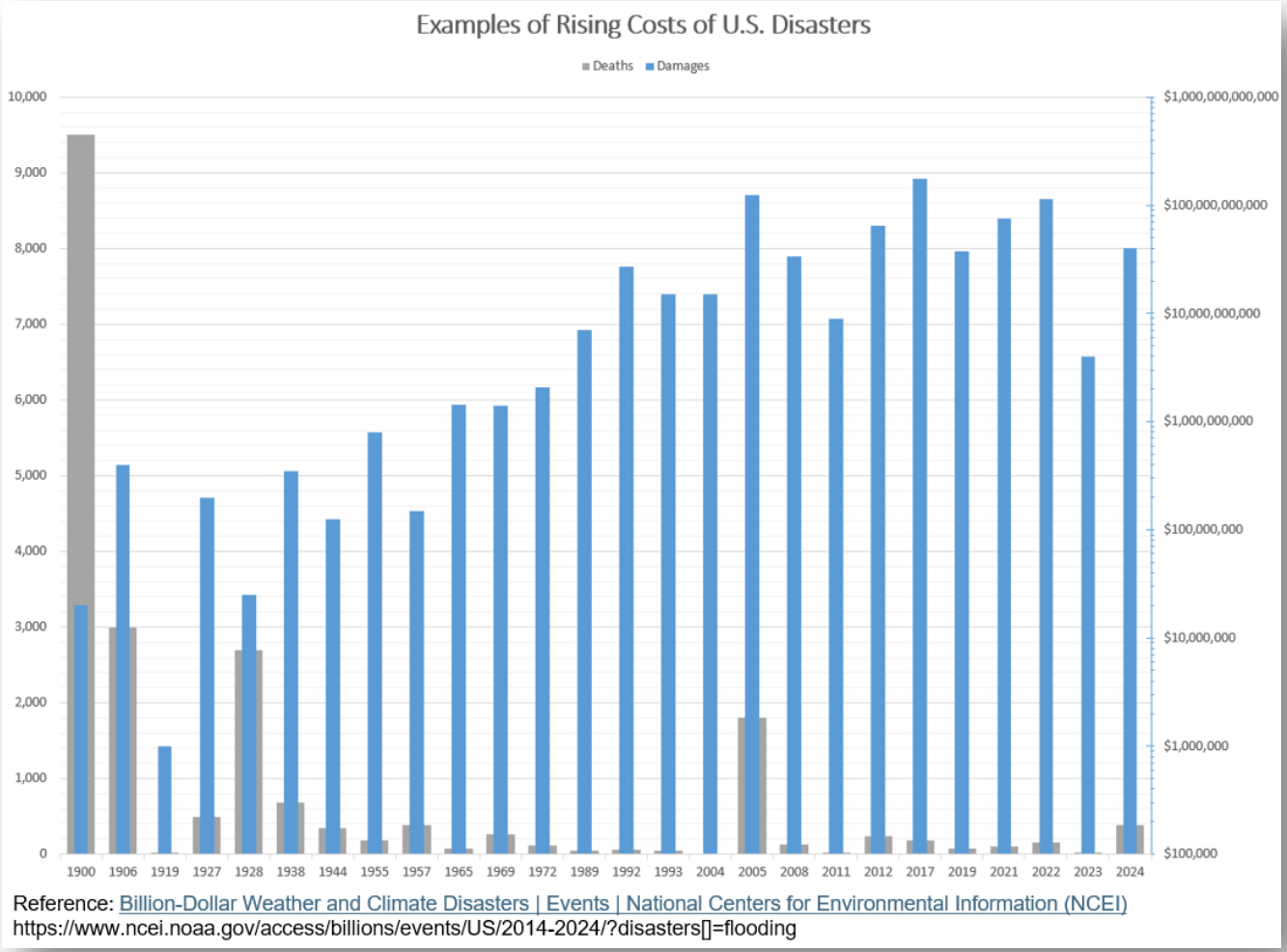
- Climatic changes have contributed to increasing occurrences of major floods, wildfires, tornado outbreaks, heatwaves, prolonged droughts, and other events of escalating scope, scale, and costs affecting virtually all regions of the country
- During 2025, there were 23 events with at least $1 billion in damages, third highest number since 1980, lagging only 2023 and 2024, with 28 and 27 events, respectively*



*U.S. Billion-Dollar Weather and Climate Disasters in 2025 | Climate Central

Drivers Behind the Changing Risk Landscape, Cont.

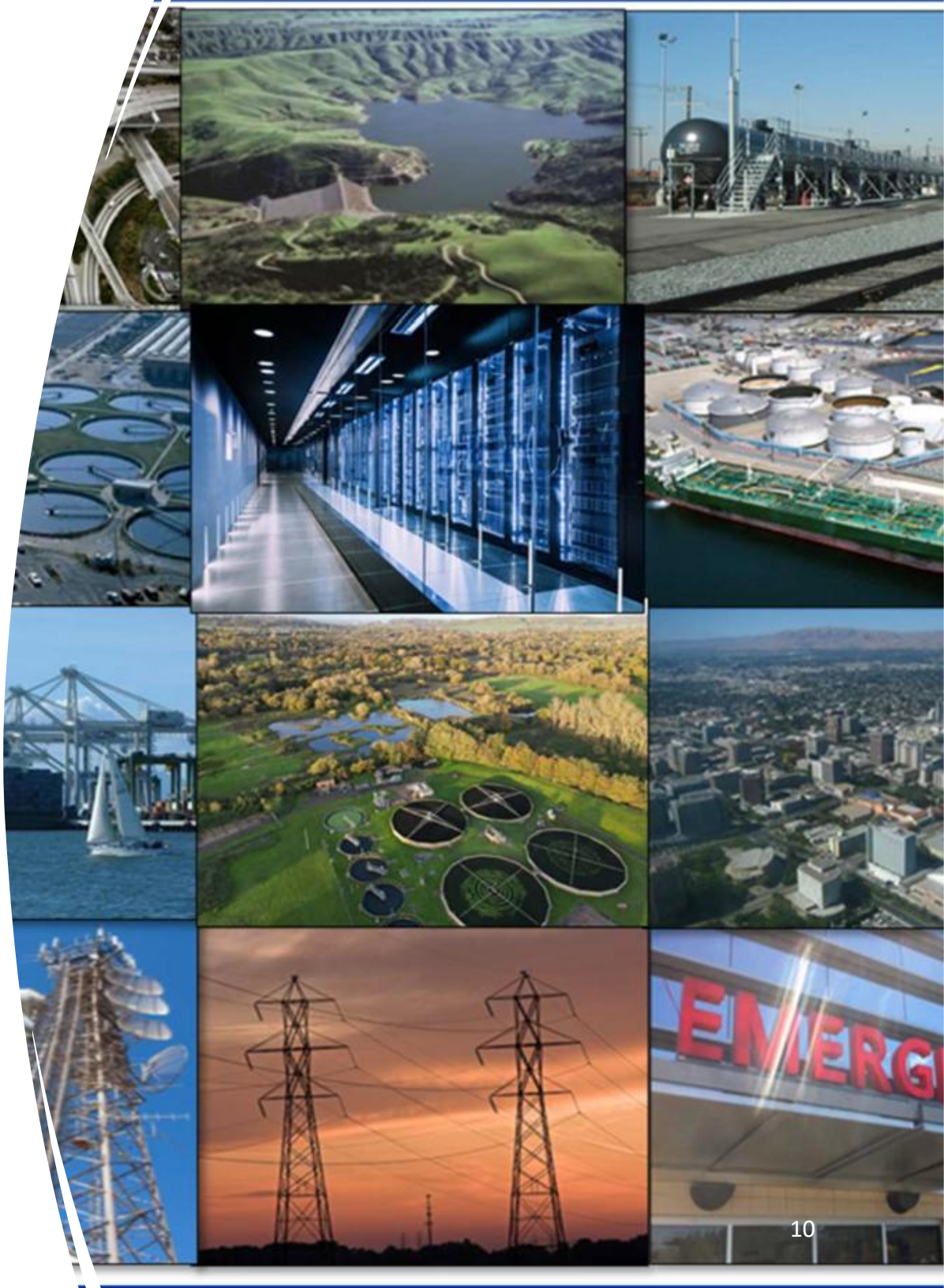
- Contributing to escalating costs over the decades are population growth across the U.S. along with development of supporting built environments and interdependent infrastructures vulnerable to multi-hazard disasters



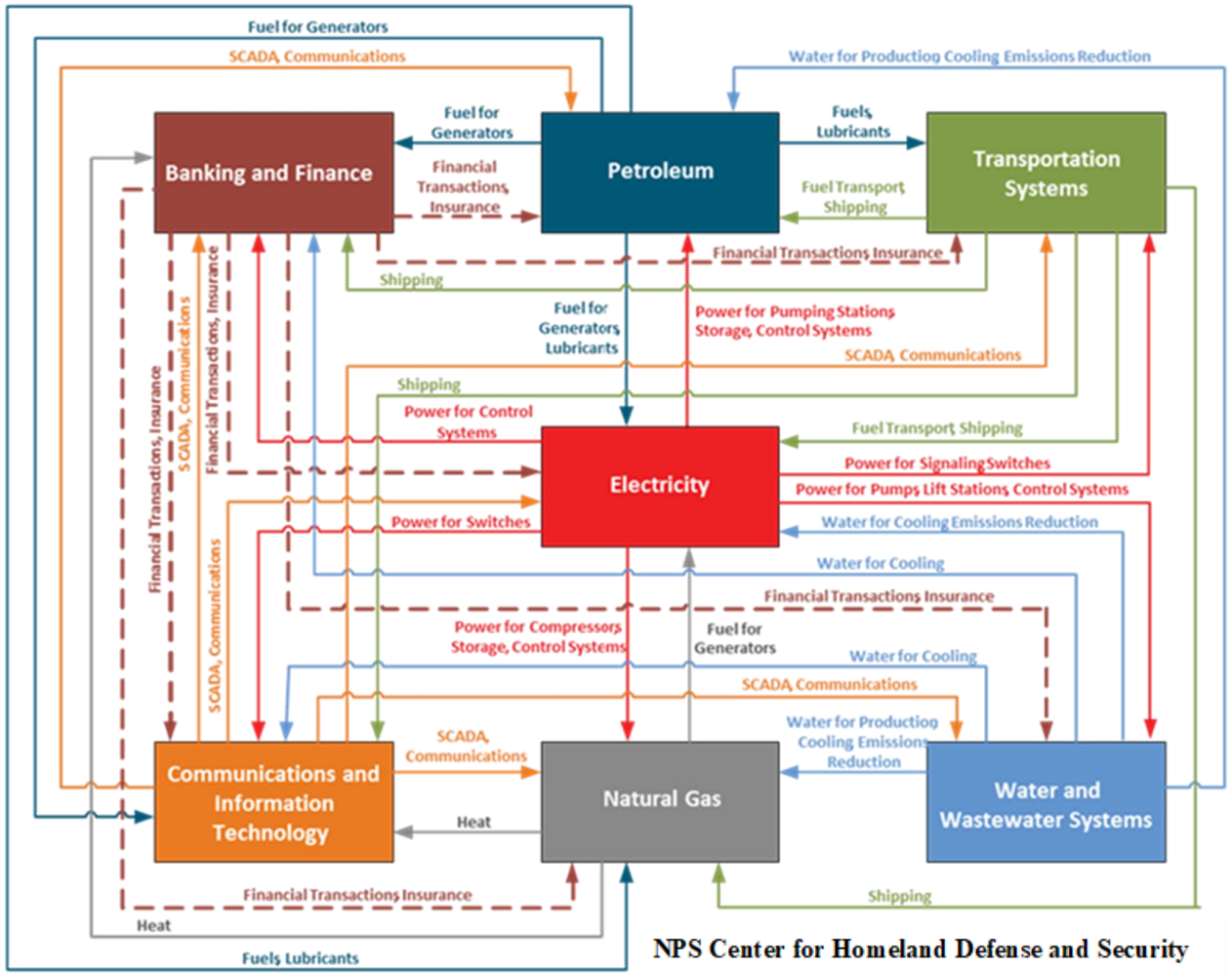
Reference: Billion-Dollar Weather and Climate Disasters | Events | National Centers for Environmental Information (NCEI)
https://www.ncei.noaa.gov/access/billions/events/US/2014-2024/?disasters[]=flooding

Drivers Behind the Changing Risk Landscape, Cont.

Technological advances in electronics, computing, other digital technologies, and AI that are tightening interconnectivity among the critical infrastructure functions and services and supply chains that support watershed regions and making them increasing vulnerable to natural and manmade hazards, including physical and cyber attacks



Drivers Behind the Changing Risk Landscape, Cont.



Cyber and physical infrastructure interdependencies in a disaster or other event can cause cascading and prolonged damage and disruptions of water, energy, transportation, communications, healthcare, agriculture and food production, financial systems, and many other essential services

- Understanding these interconnections, their vulnerabilities, and risks under different scenarios, is fundamental to creating resilient watershed regions
- Requires a "*systems of systems*" approach to assessing interdependencies that involves identification, mapping, and analysis of the relationships among systems, sectors, and external factors that influence each other

Drivers Behind the Changing Risk Landscape, Cont.

Aging and deteriorating critical infrastructures that manage, support, and sustain watershed regions

- Of particular risk are water management infrastructures, such as dams, levees, and water and wastewater treatment systems, and energy systems

Drivers Behind the Changing Risk Landscape, cont.

These infrastructures in many parts of the country are increasingly stressed beyond their original design by extreme weather conditions, growing demands of burgeoning populations, and the need to support the computing, electronic, and digital systems that enable our way of life

- A prime example are data centers that require continuous large amounts of reliable and redundant power and communications and a substantial water supply for cooling

One of Amazon's many data centers

Drivers Behind the Changing Risk Landscape, Cont.

Societal changes that have escalated multi-hazard regional risks

- Expansion of people and infrastructure into rural and undeveloped wildland-urban interface areas historically prone to wildfires and vulnerable to periodic flooding
- Increased exposure to, and transmission of existing and emerging diseases affecting humans, animals, and agriculture that could lead to widespread health impacts and future pandemics

Drivers Behind the Changing Risk Landscape, Cont.

Small low-resource communities, particularly in rural areas across the nation, may lack sufficient staff and financial resources to devote to prevention, preparedness, and mitigation actions

- They also may not be easily accessible to first responders, requiring mutual assistance from neighboring regions or states

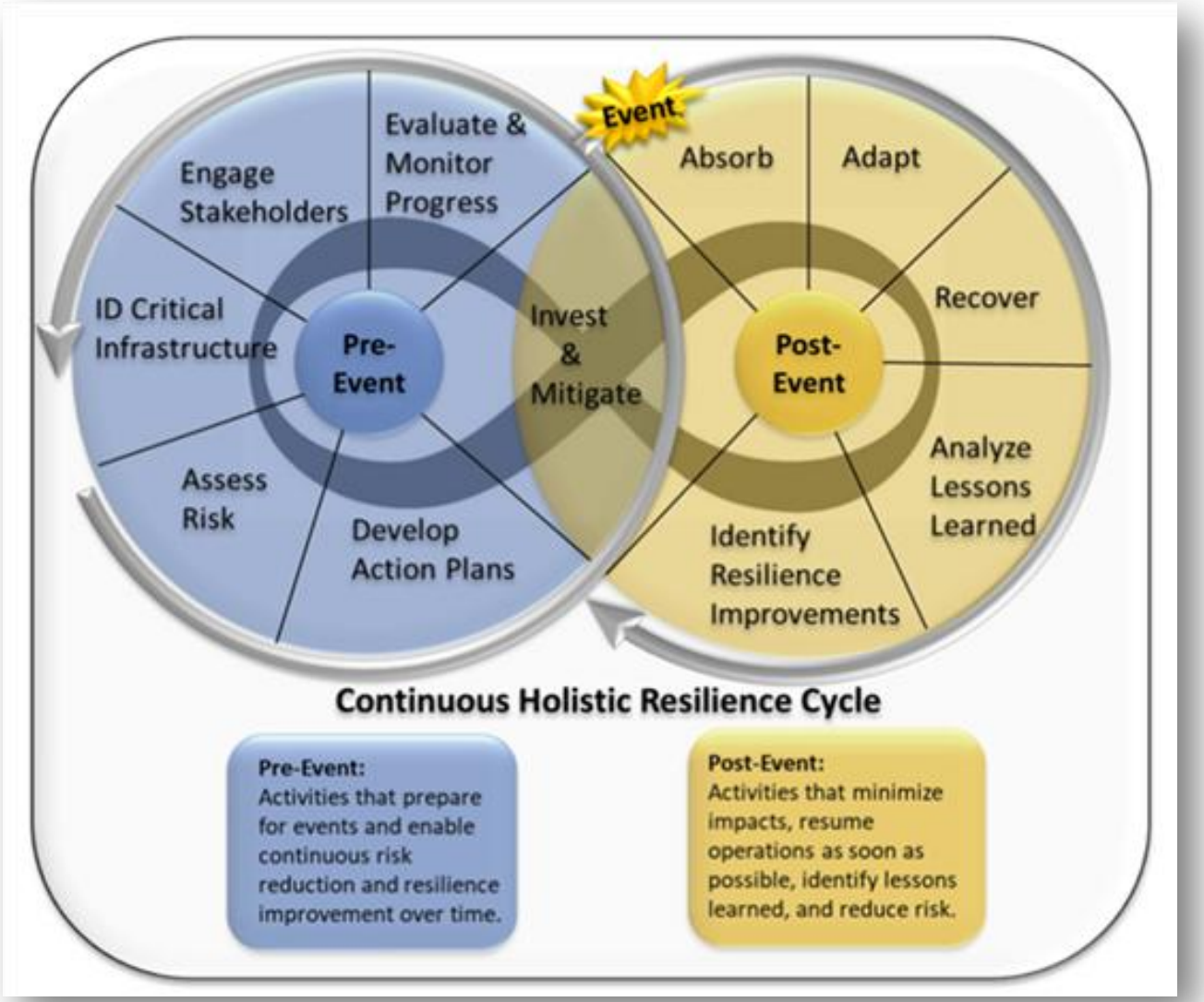
What Makes a Watershed Region Resilient?

A Watershed region is resilient if its decisionmakers and key stakeholders can anticipate/adapt to changing conditions, limit impacts, and recover rapidly from adverse events:

- Quickly provide temporary housing and get people back to work, reopen businesses and schools, and resume power, healthcare, communications, transportation, and other essential services
- Rapidly restore damaged or destroyed housing and other structures, utilities, roads, bridges, and other critical infrastructure
- Return to near normal, or as necessary, new normal conditions as expeditiously as possible

What Watershed Regional Resilience Requires

A continuous holistic approach and process encompassing preparedness, pre-and post-event mitigation, response and recovery/restoration, and which includes protection and prevention



What Watershed Regional Resilience Requires, Cont.

Broad stakeholder collaboration, which is essential for cross-sector information-sharing to:

- Enable undertaking the holistic approach and process fundamental to achieving watershed resilience
- Illuminate dependencies and interdependencies and how they can cause under different scenarios cascading impacts
- Determine resilience improvement actions and how they will be implemented, including securing necessary investments
- Undertake the identified mitigation and other risk reduction actions

Operationalizing the Holistic Approach with the Watershed Regional Risk and Resilience Playbook

Produced by a national Task Group of practitioners and experts

Provides:

- ***Guidance*** that public, private sector and non-profit organizations can use and a customizable process with selected tools and resources to reduce all-hazards risks and improve the resilience of their watershed regions
- ***Instructions on how to use an Artificial Intelligence (AI) Assistant*** to help undertake the Playbook guidance*

***The instructions, including information on the benefits and limits of using an AI assistant and prompts to facilitate usage, can be downloaded at** https://nr3c.org/resources-1

Key Focus Areas that Comprise the Scope of a Holistic Regional Risk and Resilience Initiative

Each of the 15 broad Focus Areas shown at right has a corresponding set of **Needs and Capabilities** listed in the Playbook that can be examined across the resilience mission space to determine risk reduction and other resilience improvement actions*

***The Focus Areas were originally devised by a national task force of practitioners and experts in the aftermath of Hurricane Katrina in August 2005 and subsequently customized by federal, state, and local agencies and non-profit organizations for use in resilience planning and capacity building**

How to Undertake the Holistic Approach through a Seven-Step Process

The Playbook provides descriptions of each step in the process and how to accomplish it:

1. Lay the foundation with broad stakeholder engagement
2. Characterize regional infrastructures and design the assessment
3. Identify and collect data
4. Determine priority risks and resilience actions
5. Develop an Action Strategy and Implementation Plan
6. Seek and secure resources and investments for implementation and sustainment, and
7. Enable continuous resilience improvement using lessons learned from future events, exercises, and best practices from other states and regions*

***Playbook users may wish to consult other multi-step resilience planning guides and frameworks available on the Internet and included in the Playbook Tools and Resources**

Step 1: Laying the Foundation

- ***Recruit a facilitating entity*** (e.g., a non-profit, consultant, or university) to help conduct outreach, engage key stakeholders, and provide administrative and other support
- ***Create a core team*** of representatives from key cross-sector and discipline organizations to provide guidance and oversight
- ***Convene a multi-stakeholder coalition of representatives*** from all levels of government, critical infrastructures, private sector and non-profit organizations with roles, responsibilities, or vested interests in improving watershed regional resilience*

***The Playbook provides a detailed list of organizations that ideally would be included in the coalition.**

Step 2: Characterizing Regional Infrastructures and Designing the Assessment

- ***Determine the geographic scope*** of the region for the assessment
- ***Identify and characterize infrastructures and other essential service providers*** in the region and the communities they support that would be the focus of the assessment, along with their high-level dependencies and interdependencies
- ***Determine the threats or hazard(s)*** that require assessment and the factors driving the need for a regional risk reduction Action Strategy
- ***Determine the tools, data acquisition and analysis methods***, including stakeholder workshops, tabletop exercises, and other resources needed to undertake the assessment

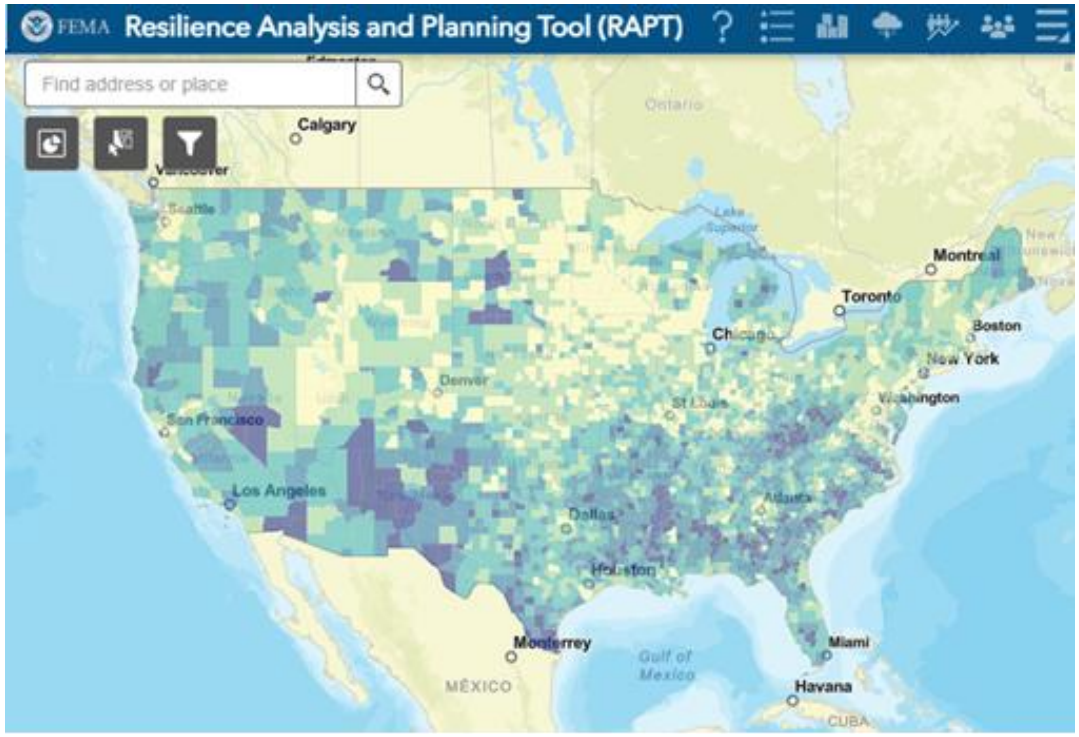
Step 3: Identify and Collect Data

- ***Identify where and how to obtain data and other information*** to illuminate vulnerabilities, damage and disruption durations, and potential interdependencies-related impacts
- ***Conduct a gap analysis*** of the region's current local resilience plans, procedures, capabilities and resources, and policies and regulations to ascertain what can be leveraged and where there are needs that require attention

Note: **These tasks can be labor and resource intensive and should be tailored to available staff, funding, and technical expertise. The Playbook offers ideas for how this could be accomplished**

Step 4: Determine Priority Risks and Resilience Actions

- ***Using the results from Step 3, examine vulnerabilities*** to threats and hazards, consequences that may result, and potential actions to reduce risk and improve resilience capabilities
  - This can be accomplished with workshops and tabletop exercises and publicly available hazard risk modeling resources and analytical tools, GIS and other technical expertise to evaluate the interdependencies-related risks



Step 5: Develop an Action Strategy and Implementation Plan

- ***Identify resilience challenges, gaps, mitigation and other risk reduction solutions*** and validate these with the stakeholder coalition
- ***Incorporate these into a regional risk reduction Action Strategy*** of short, medium-term, and longer-term projects and activities
- ***Produce an Implementation Plan*** that:
  - Describes how each of the projects and activities would be led, managed, conducted, and monitored with arrangements for cost-sharing, both financial and in-kind contributions
  - Covers how to enable continuous resilience improvement through adding needs and actions based on new lessons learned from future watershed region events and exercises*

***The Playbook resources include templates developed by federal agencies and non-profits that can be used for Step 5**

Step 6: Seek and Secure Resources and Investments for Implementation and Sustainment

- ***Identify ways to secure resources*** for implementing risk reduction projects and to sustain stakeholder coalition activities
  - Potential sources of funding include federal and other grants, program funds, capital investments, and other resources*

***Links to some of these are included in the Playbook resources**

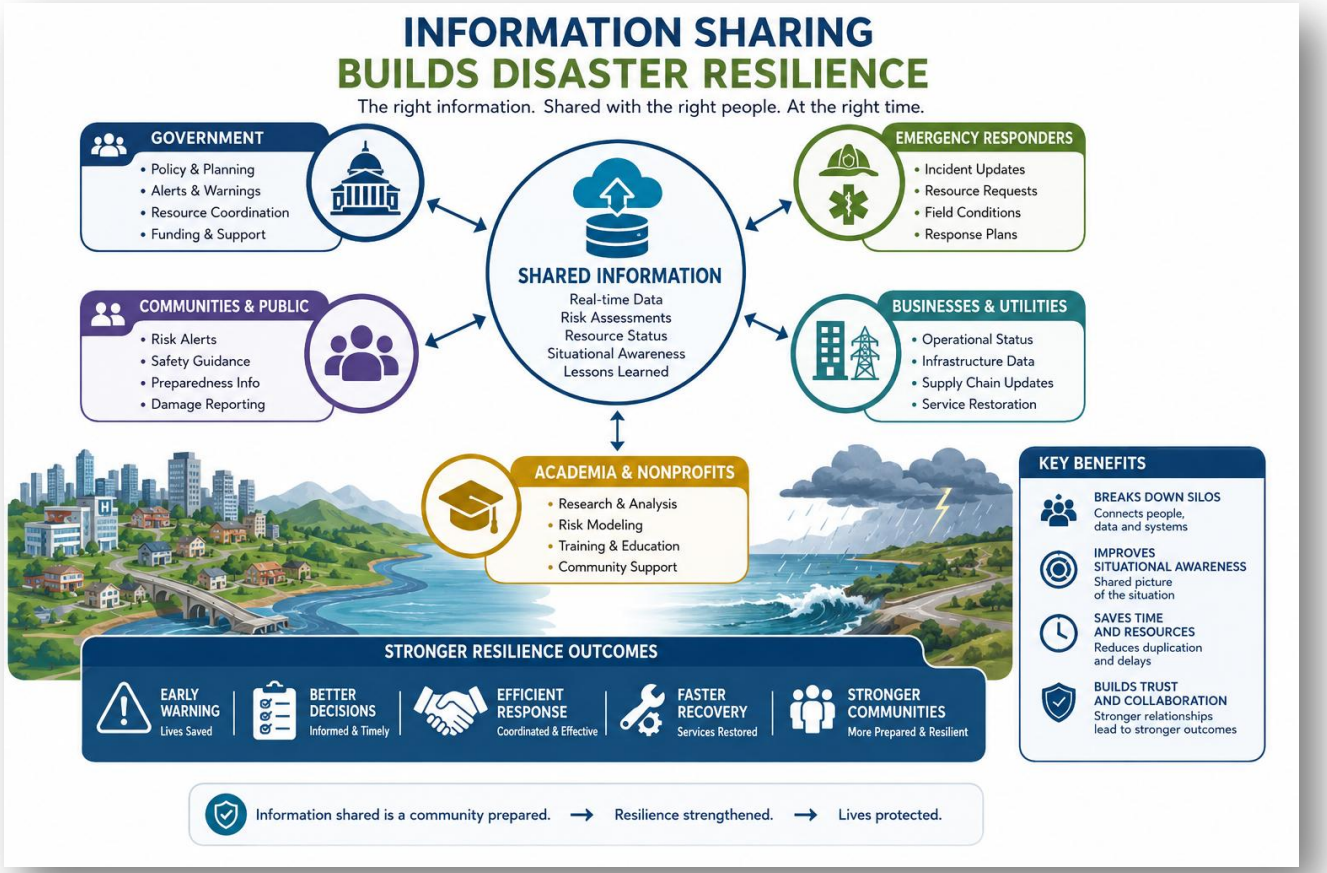
Step 7: Enabling Continuous Resilience Improvement

- ***Move forward with the Action Strategy projects and activities as resources allow*** and evaluate progress made to accomplish each and new risk reduction and resilience actions that have been added
  - Activities should include periodic workshops and exercises and additional regional risk assessments to assess the utility of ongoing resilience improvements
  - Resilience metrics and standards can help gauge progress made
- ***Share watershed regional risk and resilience assessment outcomes and lessons learned*** with states, localities, and key stakeholders in other regions in the nation to leverage knowledge and best practices

Additional Playbook Guidance

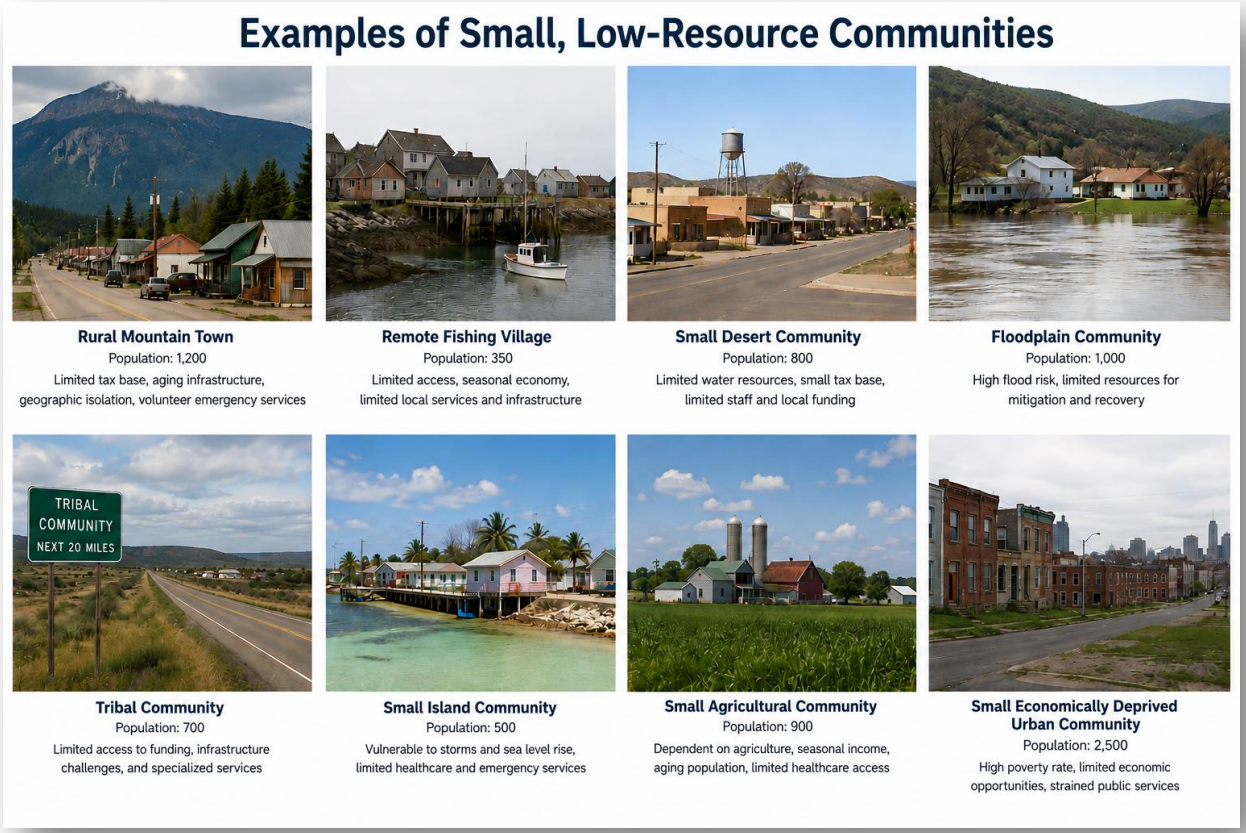
Playbook users can find ideas and best practices for:

- **Facilitating information sharing** to assess regional risks and overcoming traditional constraints posed by sensitive and proprietary data



Additional Playbook Guidance, Cont.

- **How to accommodate the needs of low-resource communities** that may lack resilience expertise, economic resources, and face declining populations by engaging and involving them in regional risk and resilience initiatives



Additional Playbook Guidance, Cont.

- **Generating political will and societal support for incorporating watershed resilience into cultures and practices** through outreach and training of political and industry leaders and the general public

Additional Playbook Guidance, Cont.

Lastly, the Playbook enables users to *Ask the Expert*

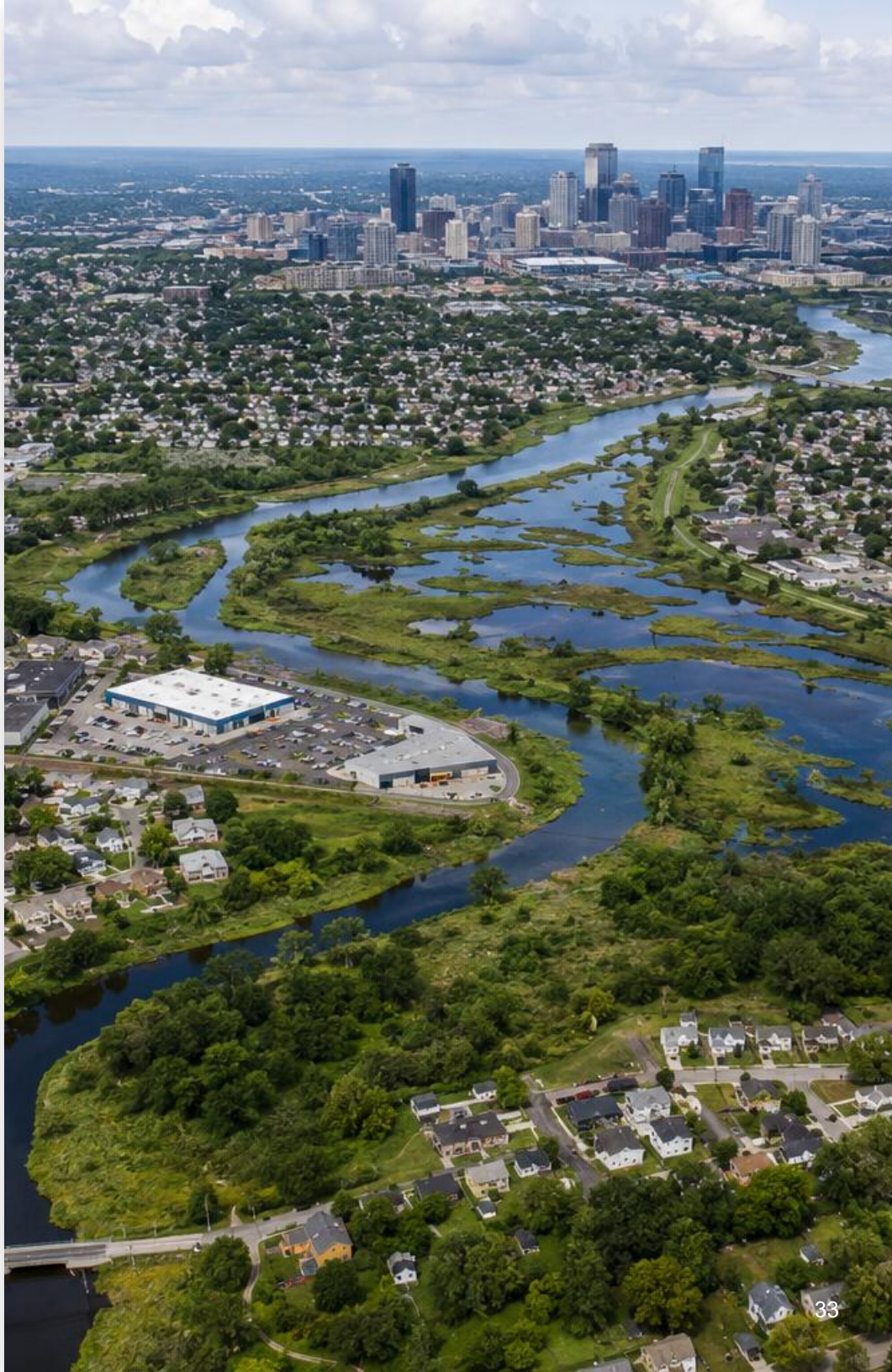
- A section of the end provides names and contact information of Watershed Regional Risk and Resilience Task Group members with their areas of expertise who are available to provide advice and guidance on how to use the Playbook and its tools and resources

Benefits of the Holistic Approach outlined in the Playbook

Provides states, localities, and cross-sector stakeholders enhanced understanding of the changing risk landscape and associated vulnerabilities, impacts, and risks that can be used for planning and resilience capacity-building

Facilitates collaboration among private-public sector and non-profit organizations and develops the trust and relationships necessary to sustain continuous resilience improvements

Enables development of a *roadmap to watershed regional resilience* through providing stakeholders access to guidance, technical assistance, avenues to share information, and other tools and resources



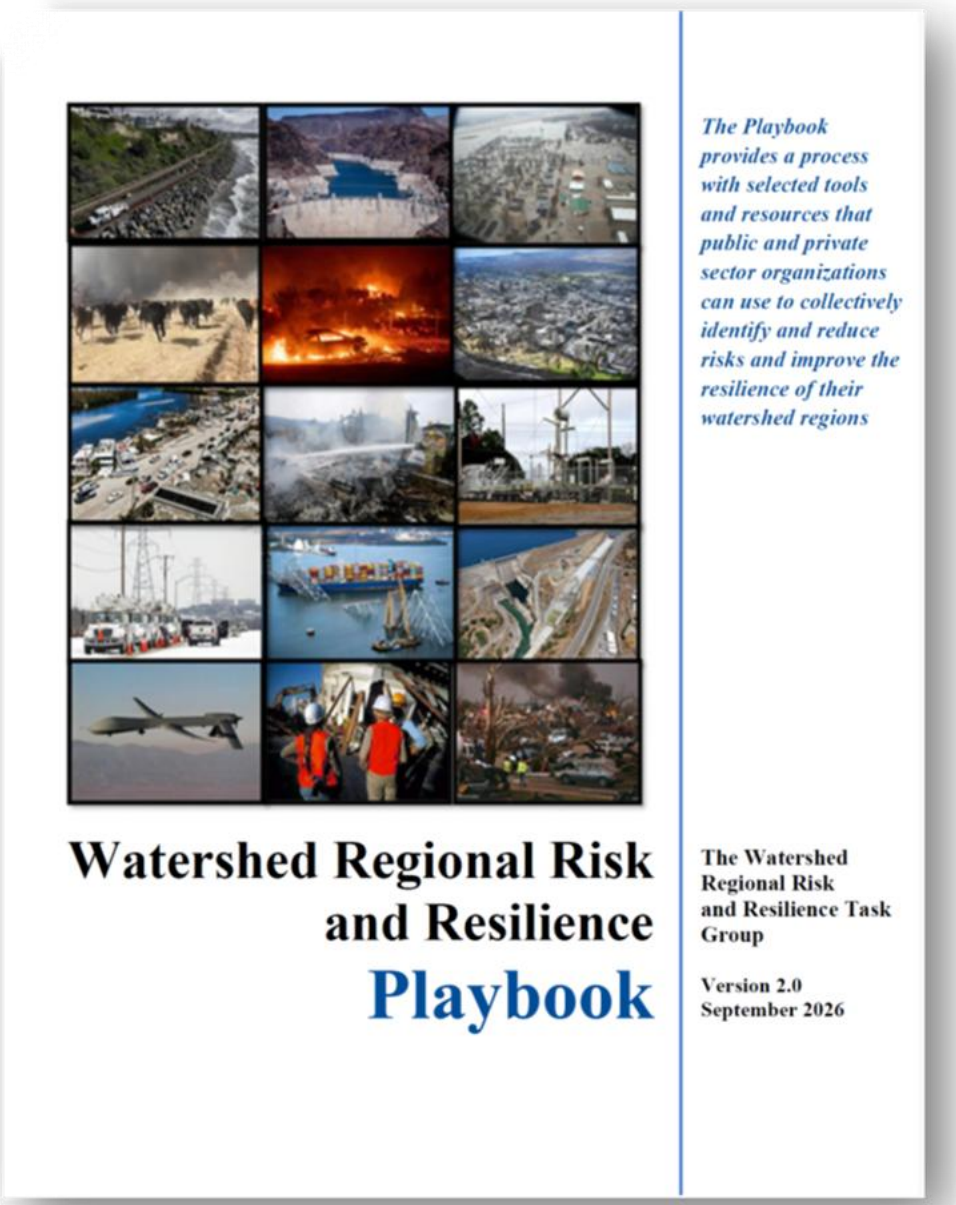
Resource Requirements for a Watershed R3 Initiative and Typical Timeframes

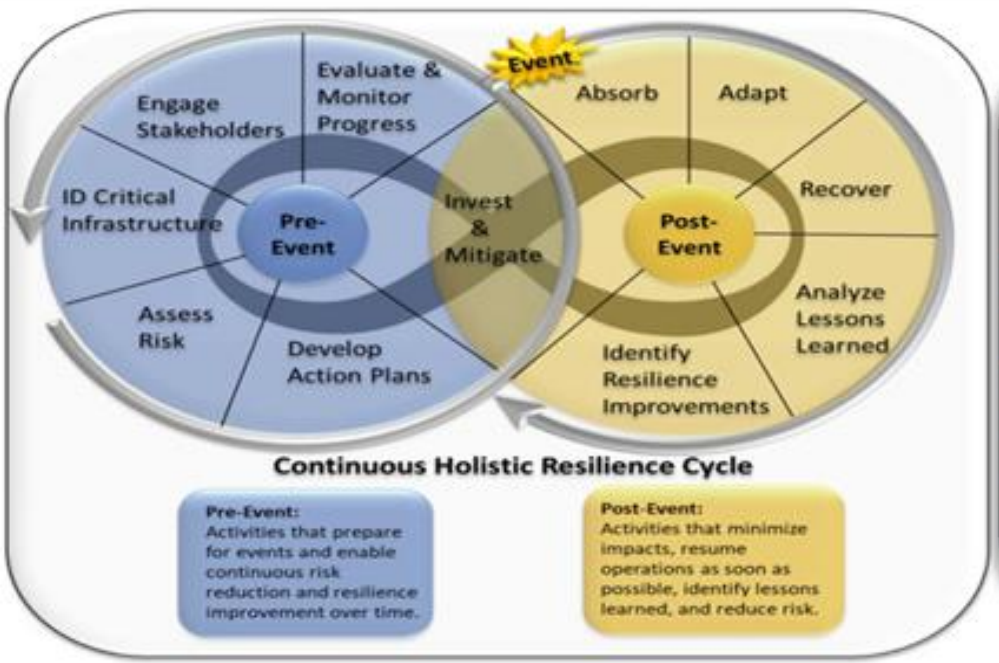
Duration of an Initiative and support necessary will depend on how the Initiative leaders, core team and stakeholder coalition design it, available resources, creativity, and flexibility

- An option for low resource communities or regions is a "no frills" Initiative that relies on workshops and a tabletop exercise to identify high-level priority resilience gaps and solution options
- Having a sponsoring organization (e.g., a local, state, or federal agency that can provide funding for technical support is ideal, but not essential
  - *In-kind volunteer contributions from private sector organizations, universities, or non-profits can provide valuable volunteer support with expertise, data, analysis capabilities, free venues for meetings, facilitation services, and other resources*
- Re. duration, from creating the core team and stakeholder coalition through developing and validating the Action Strategy and Implementation Plan with a final stakeholder meeting typically takes seven to nine months, but can be extended out to a year or more if time and resources allow

For Further Information

The *Watershed Regional Risk and Resilience Playbook* with a customizable copy of this webinar, Playbook Fact Sheet, and other resources for regional stakeholder outreach and engagement can be accessed at: https://nr3c.org/resources-1




Event
Engage Stakeholders
Evaluate & Monitor Progress
ID Critical Infrastructure
Pre-Event
Invest & Mitigate
Assess Risk
Develop Action Plans
Absorb
Adapt
Post-Event
Recover
Analyze Lessons Learned
Identify Resilience Improvements
Continuous Holistic Resilience Cycle
Pre-Event:
Activities that prepare for events and enable continuous risk reduction and resilience improvement over time.
Post-Event:
Activities that minimize impacts, resume operations as soon as possible, identify lessons learned, and reduce risk.

Questions?