



# RESILIENT RHODY

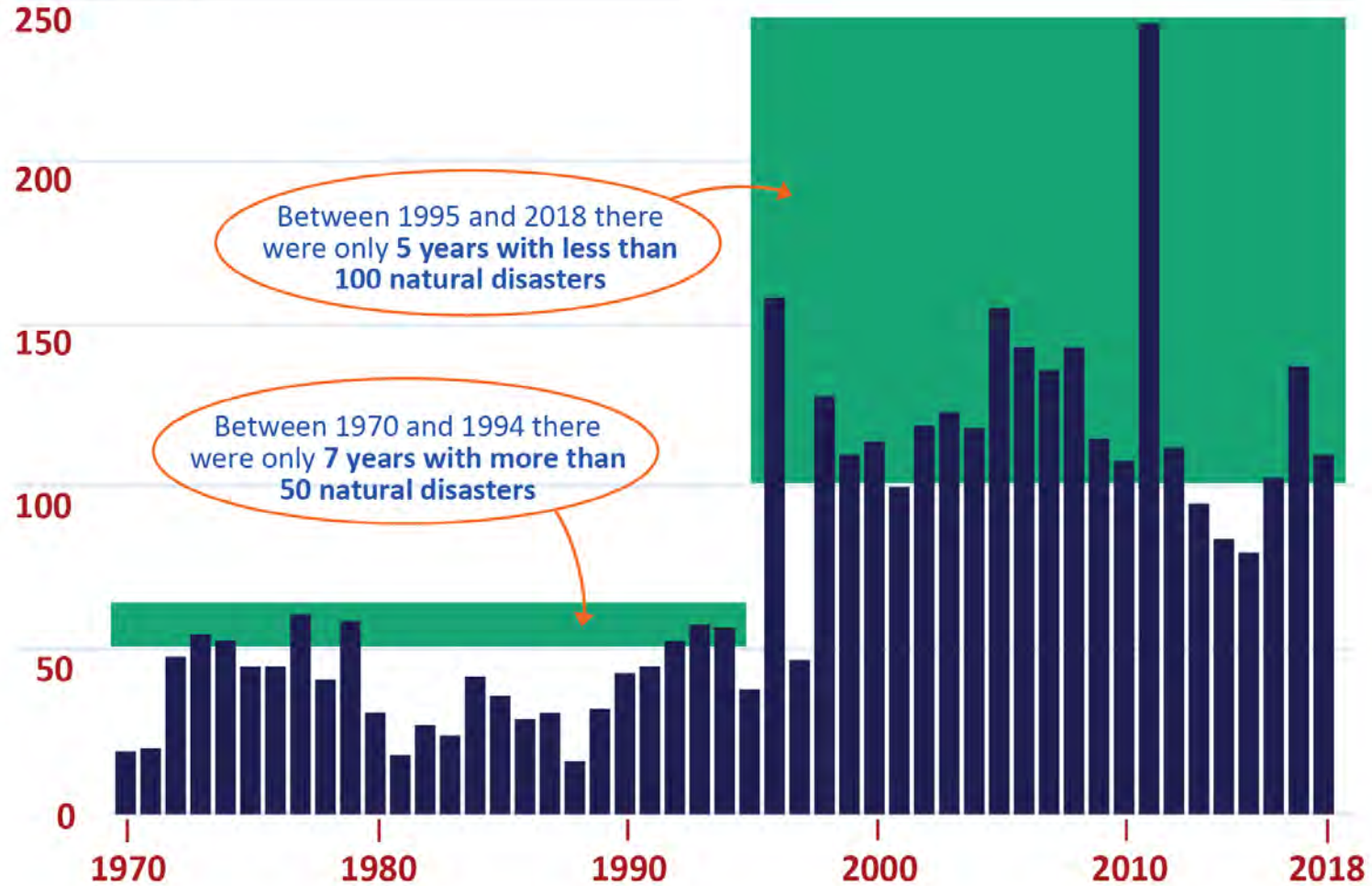
AN ACTIONABLE VISION FOR ADDRESSING THE  
IMPACTS OF CLIMATE CHANGE IN RHODE ISLAND



# Natural Disasters Have Tripled Since the 1970's

FEMA Disaster Declarations: 1970-2018 (ytd)

# of disasters

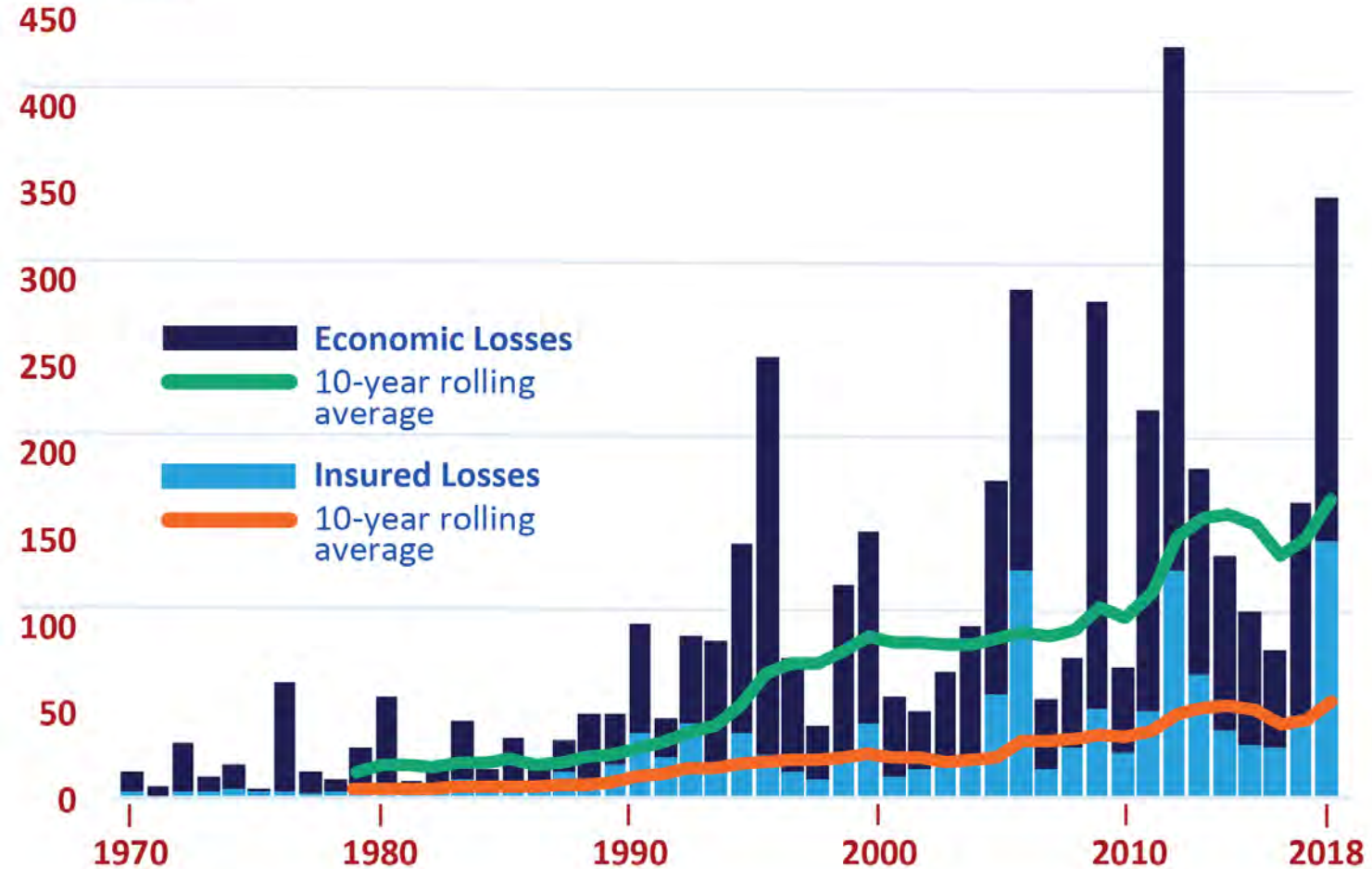


In 2017 and 2018 alone, the United States suffered over \$300 billion in damages from weather and climate disaster events

# The Growing Burden of Uninsured Losses

Natural Catastrophe Losses 1970-2017 (in 2017 USD billion)

# of disasters



Of the top 20 costliest hurricanes to land on U.S. soil, all but three occurred since 2000

## Resilient Rhody what's at risk



- 15,380 active flood insurance policies covering over \$3.8 billion in residential and commercial property



- 337 miles of state and municipal roadway are vulnerable to flooding in a 100 yr. storm surge event

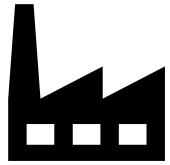


- Salt marshes provide recreational and commercial fishing activities with an estimated of \$6,417 an acre. Coastal wetlands generate \$2 billion annually.

## Resilient Rhody what's at risk



- 100% of state drinking water supply – 85% surface water



- All state ports totaling 3.1 million tons of cargo and \$200M in economic benefits over 2,400 jobs



- The state's 360,000 acres of forest land are being impacted by drought and invasive pests



- Providence County has the worst air quality in the Boston-Worcester-Providence metro area and received an F for high ozone days (American Lung Foundation)



Resilient Rhody

# Strategy Goals

- Catalyze the planning and vulnerability studies already developed and move towards implementation
- Identify and prioritize resiliency actions the State can control to demonstrate progress and implementation
- Prioritize actions that promote cross-agency collaboration and support municipalities in resilience planning and project implementation

Westerly inundated with  
flood waters in 2010



## RHODE ISLAND MANIFESTATIONS OF CLIMATE CHANGE

- 1** Sea Level Rise
- 2** Warming Air Temperatures
- 3** Warming Water Temperatures
- 4** Storm Frequency And Intensity
- 5** Changing Biodiversity
- 6** Precipitation and Inland Flooding

# Resilient Rhody framework



Making the Case for  
Climate Resilience



RESILIENCE THEME:  
Emergency Preparedness



RESILIENCE THEME:  
Natural Systems



RESILIENCE THEME:  
Critical Infrastructure  
and Utilities



RESILIENCE THEME:  
Community Health  
and Resilience



Financing Climate  
Resilience Projects





# Resilient Rhody Actions

Projects

Projects and processes that can be accelerated now and in the future with existing resources

Policies

Policies in state control to drive climate adaptation across agencies

Programs

Programs and initiatives developed by state agencies to assist municipalities and communities become more climate resilient

Financing

Highlight existing and emerging financing mechanisms



# Strategy Implementation

- Established the Resilient Rhody Implementation Core Team
- Finalizing a Resilient Rhody implementation plan
- Developing a priority action list for immediate implementation
  - Specific projects to align with actions across chapters and agencies



# Strategy Implementation

## EC4 Resilience Coordinators

- **Shaun O'Rourke**, RIBB, Chief Resilience Officer
- **Melinda Hopkins**, State Hazard Mitigation Officer, RIEMA
- **Laura Bozzi**, Climate Change Program Manager, RIDOH
- **Caitlin Chaffee**, Policy Analyst, CRMC
- **Liz Stone and Bill Patenaude**, RIDEM
- **Julia Gold**, Chief of Sustainability, Autonomous Vehicles, and Innovation, RIDOT
- **Carrie Gill and Barbara Cesaro**, OER
- **Jonathan Schrag**, DPUC
- **Bill Ash**, Managing Director of Financial Services
- **Caitlin Greeley**, Principal Planner, Statewide Planning (also rep. for DOA)
- **Laura Sullivan**, Assistant Chief, Office of Housing & Community Development



# Collaboration Driving Resilience Projects

*Groundbreaking of the Warren Wastewater Treatment Facility*



- Strategic partnerships between state agencies, academic institutions, and organizations drive climate resilience projects
- From projected sea level mapping tools to upgrades to wastewater treatment facilities, Rhode Island is working collaboratively to address the impacts of climate change now.

- Rhode Island has 668 inventoried dams. Each is classified by hazard based on its current condition or the likelihood of failure.
- 96 are classified as high hazard
- In 2017, RIDEM studied the capacity of high hazard and significant hazard dams to safely withstand a 500-year storm.
- Six dam removals and river restoration projects have already been completed on the Pawcatuck River.



Critical Infrastructure Action:  
Prioritize remediation actions and investments identified in RIDEM's 2017 dam hazard study to ensure compliance and downstream safety.

*Bradford Dam removal. Photo: The Nature Conservancy*

- In 2017, DEM released the study Implications of Climate Change for RI Wastewater Collection and Treatment Infrastructure.
- Communities documented concerns which helped decision-makers appreciate the need for resilience upgrades.
- Small-and-large-scale improvements have been enacted at wastewater treatment facilities in Westerly, Narragansett, Smithfield, Warren, and Warwick.



Critical Infrastructure & Utilities Recommended Action: Accelerate treatment system and pumping station hardening projects identified in Implications of Climate Change for RI Wastewater Collection & Treatment Infrastructure.

*Above: Operators at West Warwick Regional Wastewater Treatment Facility use a boat to assess plant damage after historic flooding in 2010.*

*Far Above left: The Warwick Wastewater Treatment Facility with an inundated pumping station in 2010. Far Above Right: A newly elevated station in 2013.*



2018

\$47.3 MILLION



# green economy and clean water bond

This bond invests in water quality, land cleanup, farmland, recreational facilities, and open space to ensure Rhode Island remains a wonderful place to live, visit, and raise a family.

Rhode Island's vibrant green economy accounts for more than 15,000 jobs and adds \$2.5 billion to the economy each year.

- 2016 URI study



# Resilient Rhody Initiatives Underway



# Resilient Rhody Municipal Resilience Program

- Developed in partnership between Rhode Island Infrastructure Bank and The Nature Conservancy
- The MRP is open to all 39 municipalities in Rhode Island
- The MRP will provide technical assistance to three selected municipalities to complete the “Community Resilience Building” process developed by TNC
- Municipalities will identify priority climate resilience projects
- Dedicated implementation funding will be available after successfully completing the “Community Resilience Building” process

# Resilient Rhody Stormwater Accelerator

- Financing to accelerate implementation of stormwater initiatives through low-cost upfront capital
- Backed by a funding source that will eventually reimburse the project
- First projects in the Woonasquatucket River watershed are about to close with implementation complete by fall 2019
- Pipeline of ~\$3M in projects over next 9 months
- Evaluating opportunity for deploying new and innovative financing for project implementation

[www.climatechange.ri.gov](http://www.climatechange.ri.gov)

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Chief Resilience Officer, State of Rhode Island  
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# RIEMA

Charging Trailer & Table



CERT Rodeo

Resource Container Box



Valley Falls HazMat Exercise



Volvo Races – Operation Support



# Initiatives

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- Regional Seminars: Recovery Town Halls
- Mitigation
- THIRA / SPR



# Recovery Town Hall

- Pre-recovery planning within municipalities.
- Discuss and identify recovery strategies in Rhode Island.
- Introduce new policies and/or procedures for recovery operations.
- Additional Topics
  - Debris Management
  - Recovery Support Functions
  - Damage Assessment Planning
  - Mitigation



East Bay Recovery Town Hall





# Phases of Recovery

Weeks - Months

## Phase 2 – Repair

- Continue neighborhood stabilization
- Re-vision public services and amenities
- Repair major infrastructure

Days - Weeks

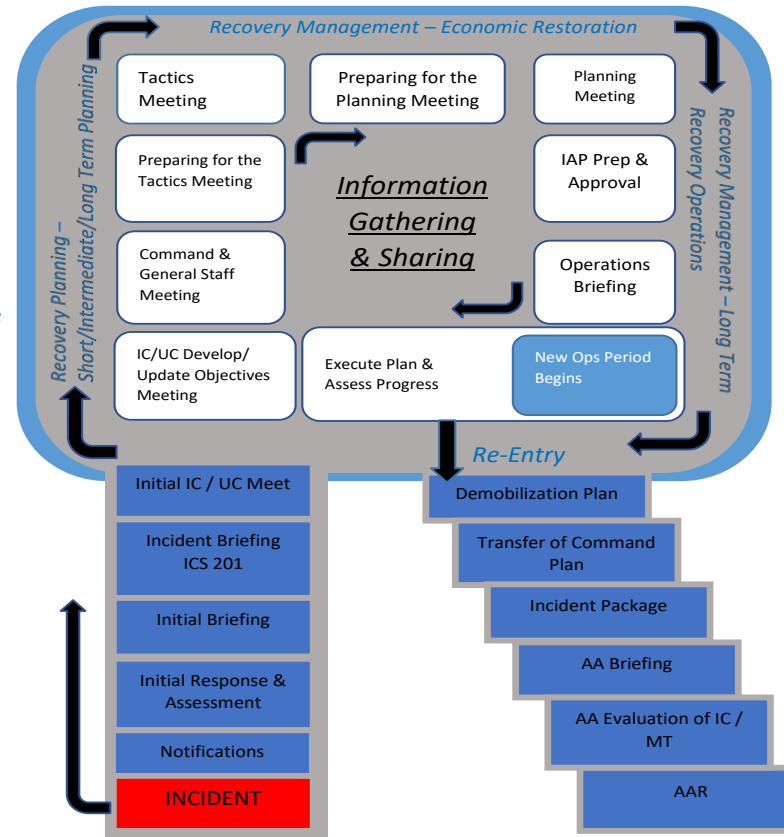
## Phase 1 Stabilization

- Help returning residents and businesses
- Stabilize communities and help rebuild together safely
- Use modular or temporary facilities to provide full coverage
- Accommodate additional residents and businesses

Months - Years

## Phase 3 Reconstruction / Revitalization

- Complete reconstruction and revision of public services and amenities
- Invest in permanent infrastructure and facilities
- Improve infrastructure to spur revitalization and accommodate additional population



# Mitigation

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- Facilitate long-range planning activities.
- Activities that protect life, property and environment from future disaster damages.
- Implement mitigation actions pre and post-disaster.
- Strategic guide for decisions.



*Pawtucket and Central Falls Multi-Jurisdiction Hazard Mitigation Plan*



# Eligible Activities

Activities	HMGP	PDM	FMA
<b>Mitigation Projects</b>	X	X	X
Property Acquisition and Structure Demolition	X	X	X
Property Acquisition and Structure Relocation	X	X	X
Structure Elevation	X	X	X
Mitigation Reconstruction			X
Dry Floodproofing of Historical Residential Structures	X	X	X
Dry Floodproofing of Non-residential Structures	X	X	X
Localized Flood Reduction Projects	X	X	X
Non-Localized Flood Reduction Projects	X	X	
Structural Retrofitting of Existing Buildings	X	X	
Non-structural Retrofitting of Existing Buildings and Facilities	X	X	X
Safe Room Construction	X	X	
Wind Retrofit for One- and Two-Family Residences	X	X	
Infrastructure Retrofit	X	X	X
Soil Stabilization	X	X	X
Wildfire Mitigation	X	X	
Post-Disaster Code Enforcement	X		
Generators	X	X	
5 Percent Initiative Projects	X		
Advance Assistance	X		
<b>Hazard Mitigation Planning</b>	X	X	X
<b>Management Costs</b>	X	X	X



# THIRA / SPR

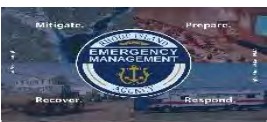
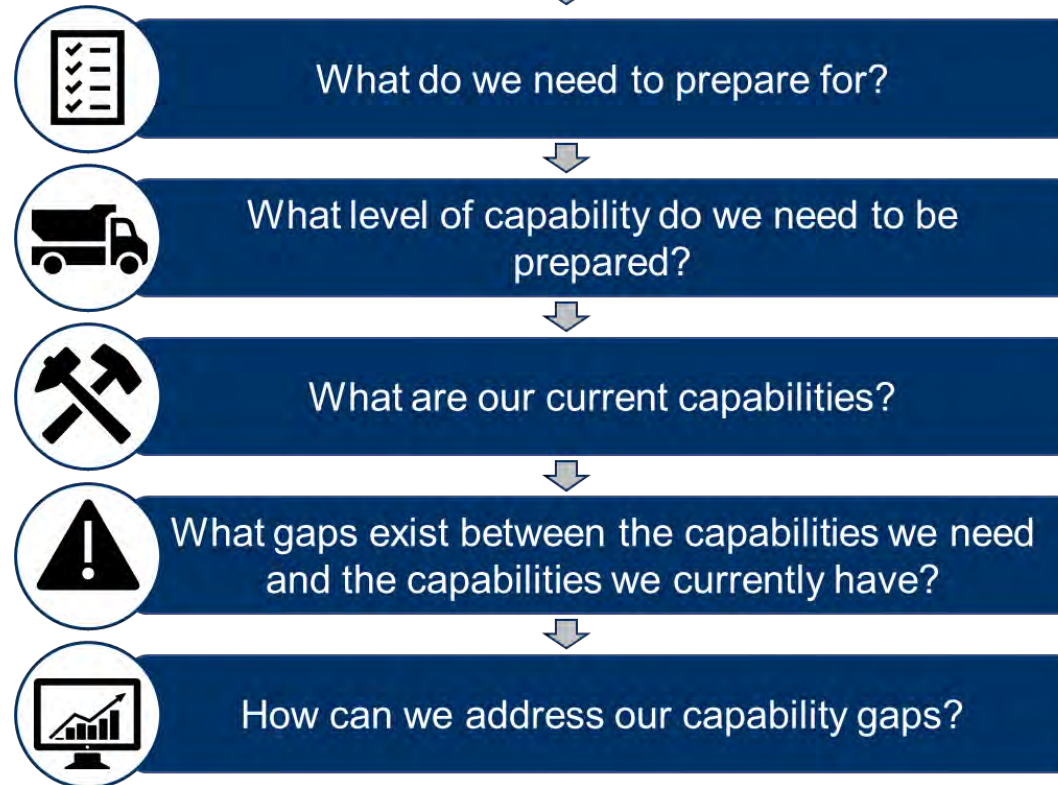
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- Threats Hazards Identification Risk Assessment
  - three-step risk assessment process that helps communities:
    - Threats and Hazards
    - Impact
    - Capabilities
- Stakeholder Preparedness Review
  - self-assessment of a jurisdiction's current capability levels against the targets identified in the Threat and Hazard Identification and Risk Assessment (THIRA)



# THIRA/SPR Important?

Communities can use the THIRA/SPR to answer:



# THIRA – Investment, Training, and Planning

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- Address gaps to prioritize and drive investments for building and sustaining capabilities
- Use data to focus training investments on the specific training gaps
- Build and sustain capabilities
- Funding Use
- Planning Efforts



# Questions / Comments?

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