Planning for Resiliency

How to Weather the Storm

Khris Dodson, Associate Director
Syracuse University Environmental Finance Center
Thursday, March 1, 2018

www.efc.syr.edu

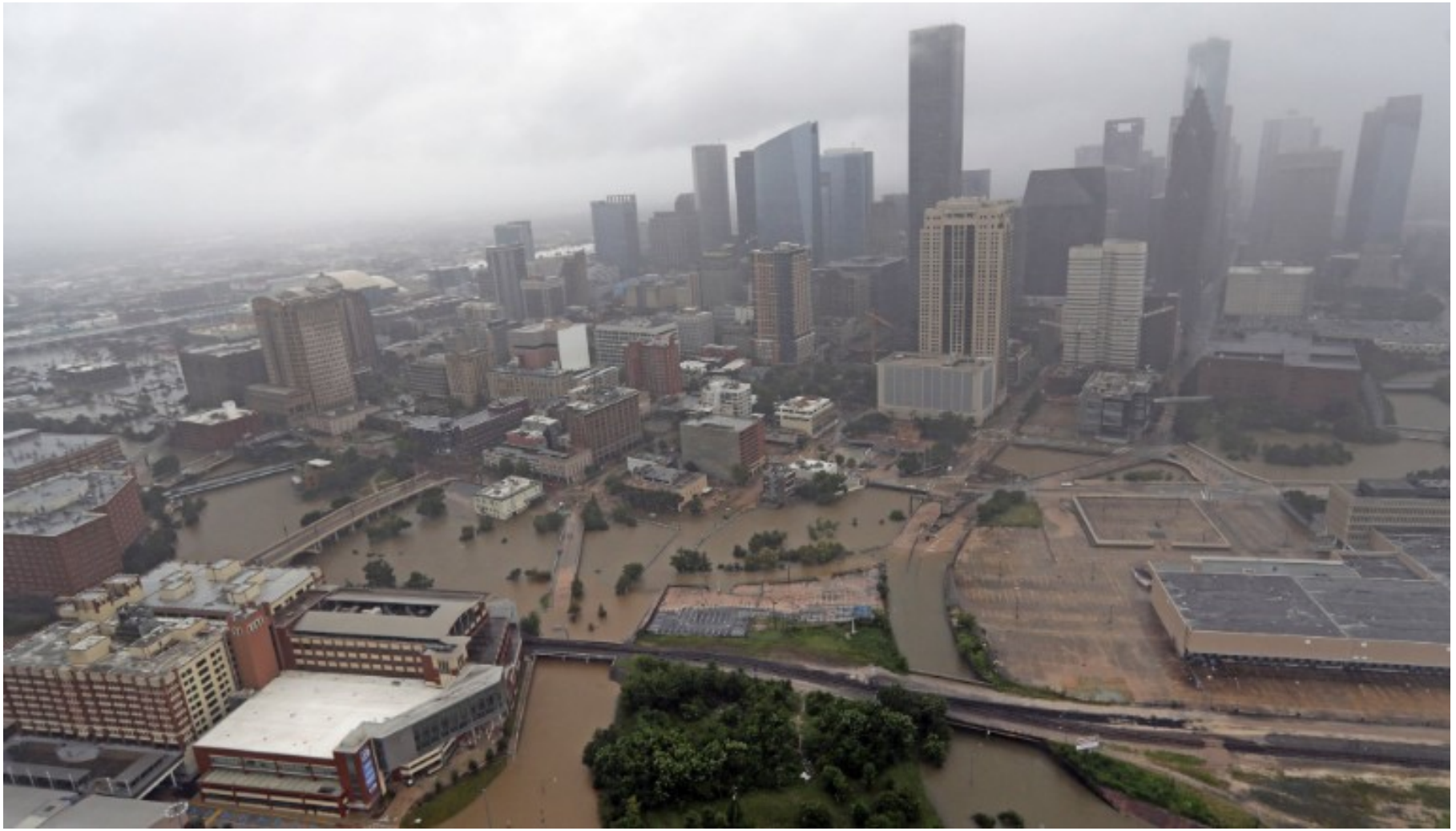
Environmental Finance Center
Syracuse University

Agenda

- Defining Resilience
- Trends in risks, threats and community vulnerabilities
- Establishing frameworks for planning ahead
- Implementing resilience strategies
- Funding and tools available to assist decision-makers

What is resiliency?

A resilient community is one in which residents and institutions have the capacity to prepare for, respond to, and recover from events and trends with minimal outside assistance.

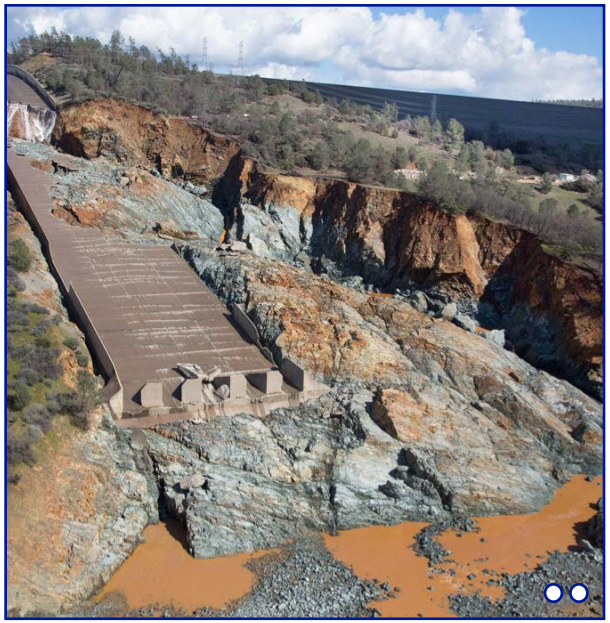


Sometimes we don’t know we’re not resilient

How, if and where do we rebuild?

Proactive Resiliency Planning vs. Reactive Disaster Response

Waiting is Costly

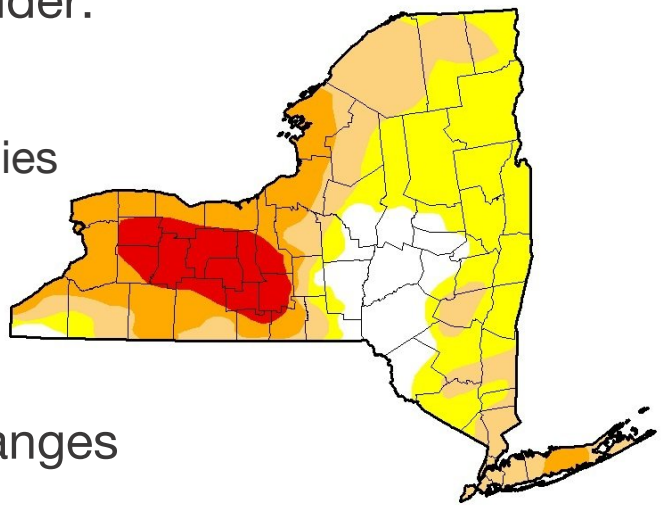


○ Katrina ○○ Oroville Dam ⁘ Flint ⁘ UCLA

Resiliency Considerations

Community resiliency can include:

- Municipal financial health
- Community financial health
  - Is your portfolio diversified? Consider:
    - community demographics
    - Commerce
    - relation to neighboring communities
- Environment:
  - water supply,
  - impacts from storms,
  - drought,
  - social, cultural, and economic changes
- Adaptation to {~~Climate~~} Change
- Social, cultural, and economic changes



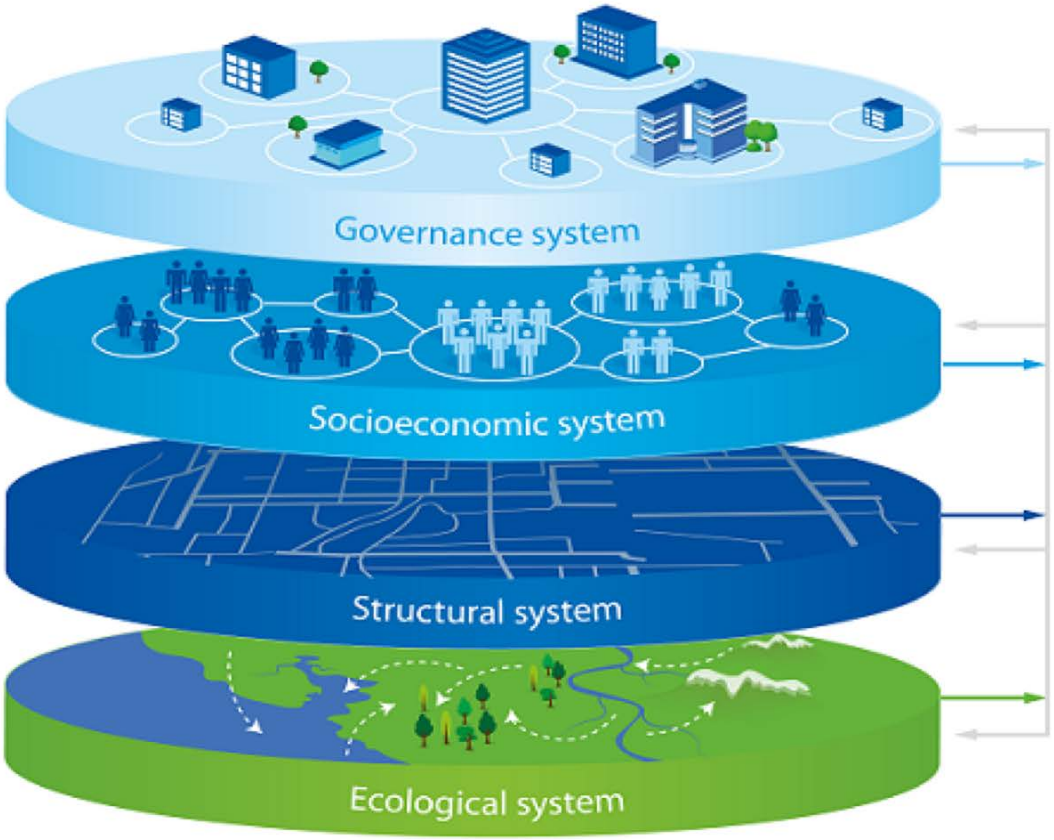

Water Stress in the U.S.
Water Supply Stress Index
0.0
0.1–0.2
0.3–0.4
0.5–0.6
0.7–0.8
0.9–1.0
1.1–6.4
Low
High


OIL SPILL
AREA CLOSED
NO WATER CONTACT
East Bay Regional Park District

Endicott Johnson Shoes:

- Major employer in Binghamton area
- Welfare Capitalism: homes, schools, parks, infrastructure, jobs

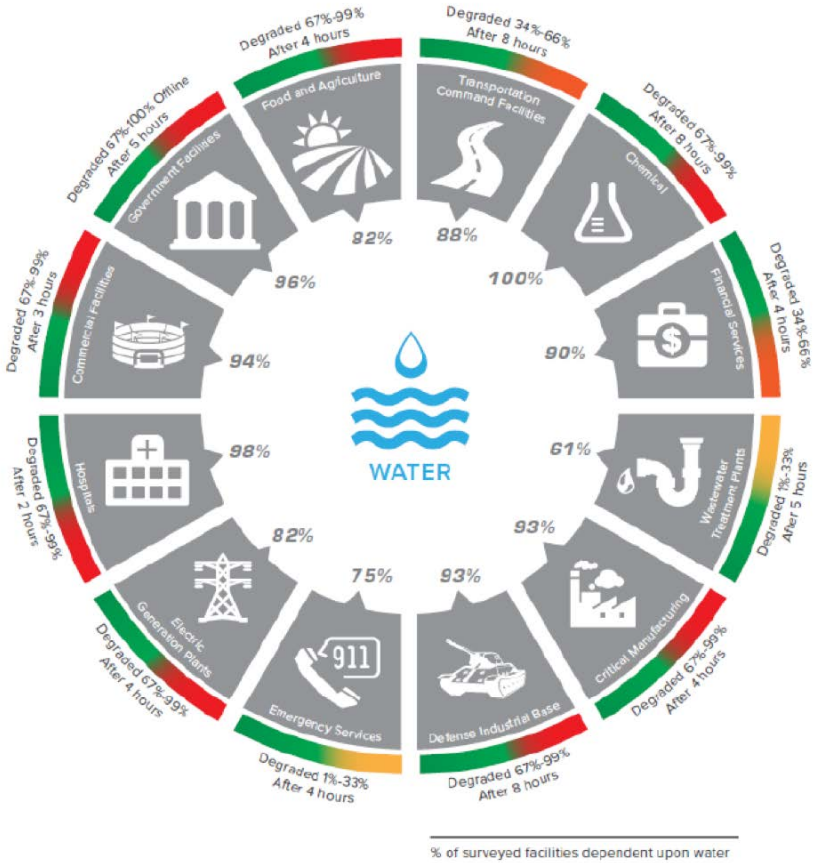
Multi-layered Systems Mindset



The multi-layered systems mindset in DNV GL's Systems & Urban Resilience Framework (SURF) model. The model views urban areas as systems with a unique profiles of mutually interconnected ecological, structural, socioeconomic, and governance systems.

Impacts to Critical Infrastructure

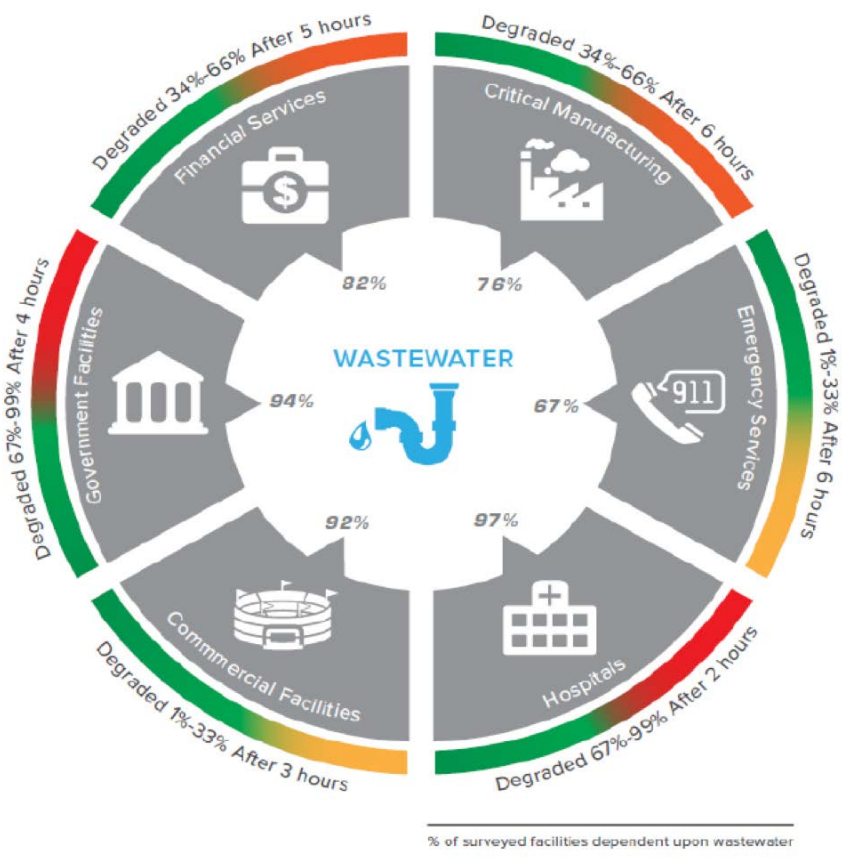
LOSS OF WATER SERVICES



Note: This data represents a majority (60 percent or greater) dependence on water.

FIGURE 3.—Critical Infrastructure Dependent on Water and Potential Functional Degradation Following a Loss of Water Services (Courtesy of DHS and Argonne National Laboratory).

LOSS OF WASTEWATER SERVICES

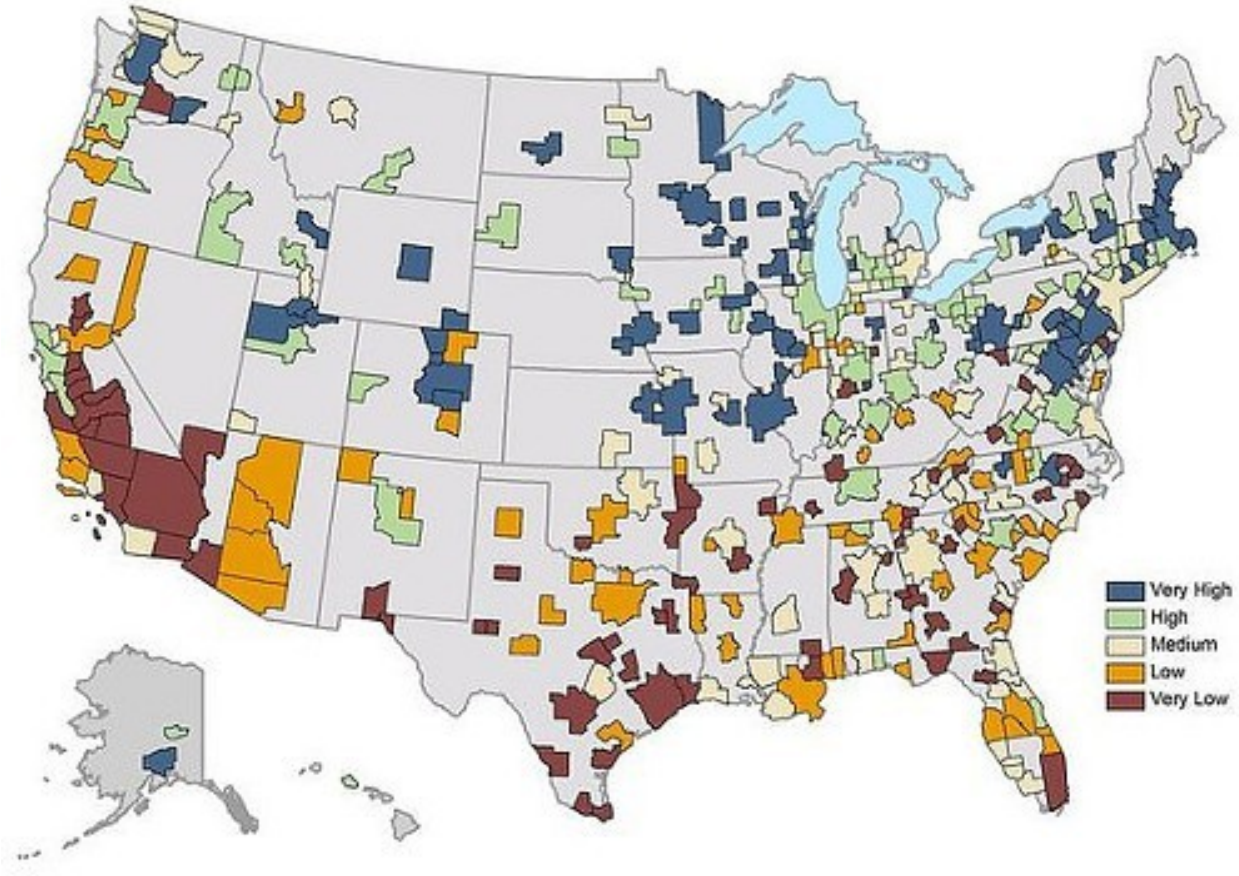


Note: This data represents a majority (60 percent or greater) dependence on wastewater services.

FIGURE 4.—Critical Infrastructure Dependent on Wastewater and Potential Functional Degradation Following a Loss of Wastewater Services (Courtesy of DHS and Argonne National Laboratory).

https://www.massport.com/media/266269/Report_Sector-Resilience-Report-Water-and-Wastewater.pdf

Who is Resilient?



How can you become resilient?

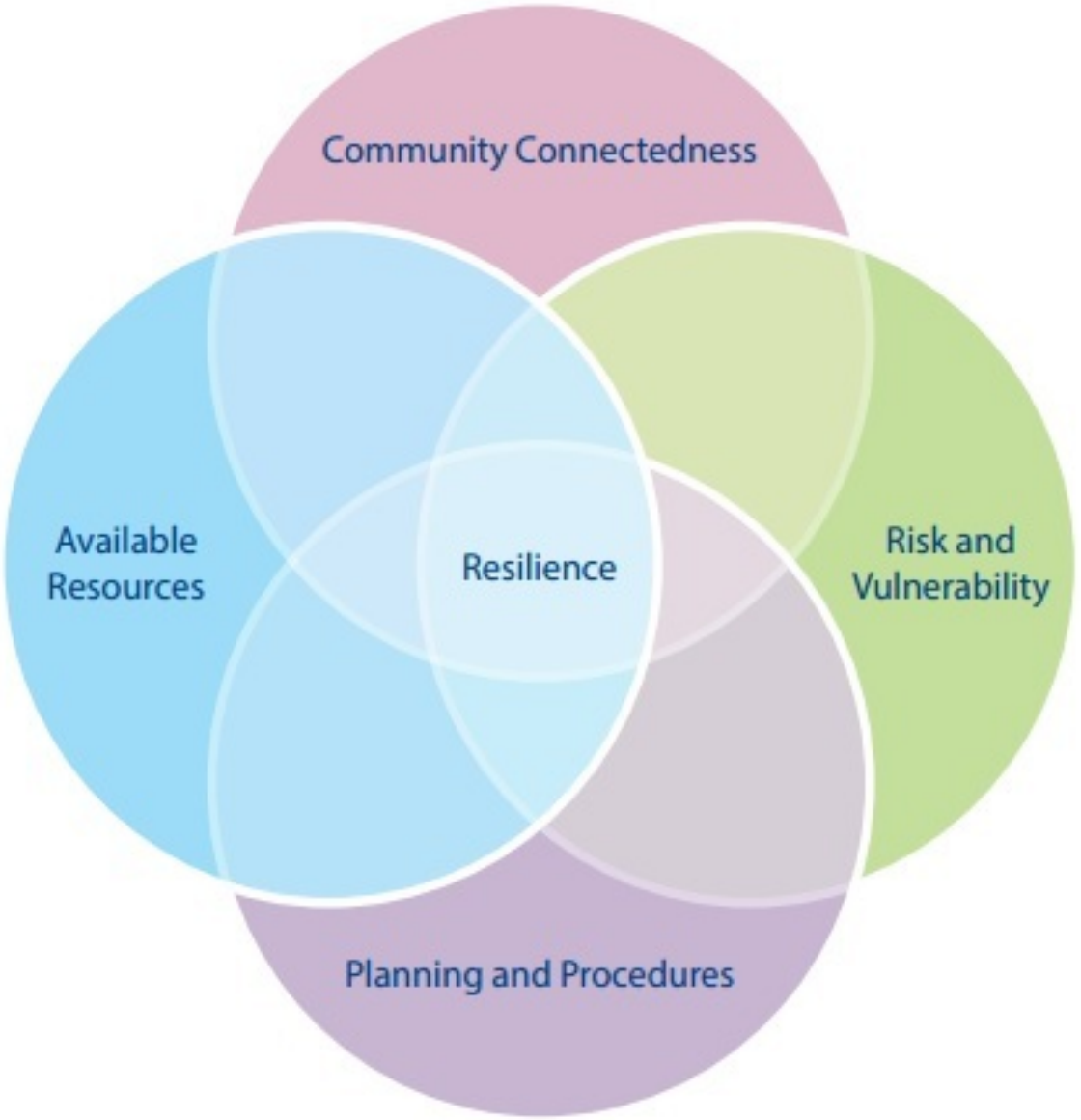
Planning for Resiliency

- ✓ Comprehensive Plans
- ✓ Zoning
- ✓ Asset Management Planning
- ✓ Capital Improvement Planning
- ✓ Land-Use Planning

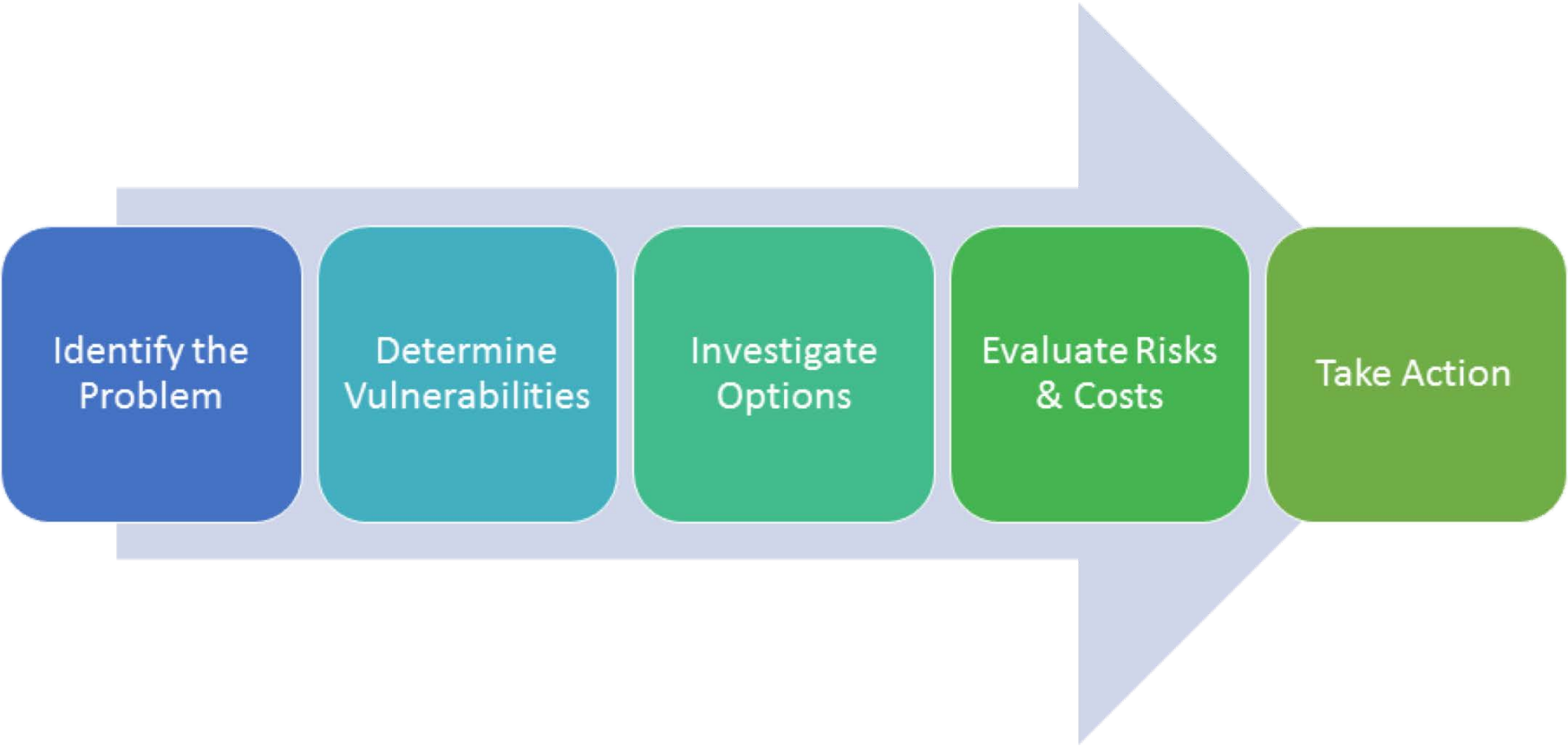
RISK ASSESSMENT MATRIX				
SEVERITY / PROBABILITY	Catastrophic (1)	Critical (2)	Marginal (3)	Negligible (4)
Frequent (A)	High	High	Serious	Medium
Probable (B)	High	High	Serious	Medium
Occasional (C)	High	Serious	Medium	Low
Remote (D)	Serious	Medium	Medium	Low
Improbable (E)	Medium	Medium	Medium	Low
Eliminated (F)	Eliminated			

4 Rs of Resiliency

Redundancy
Robust
Resources
Rapid Response



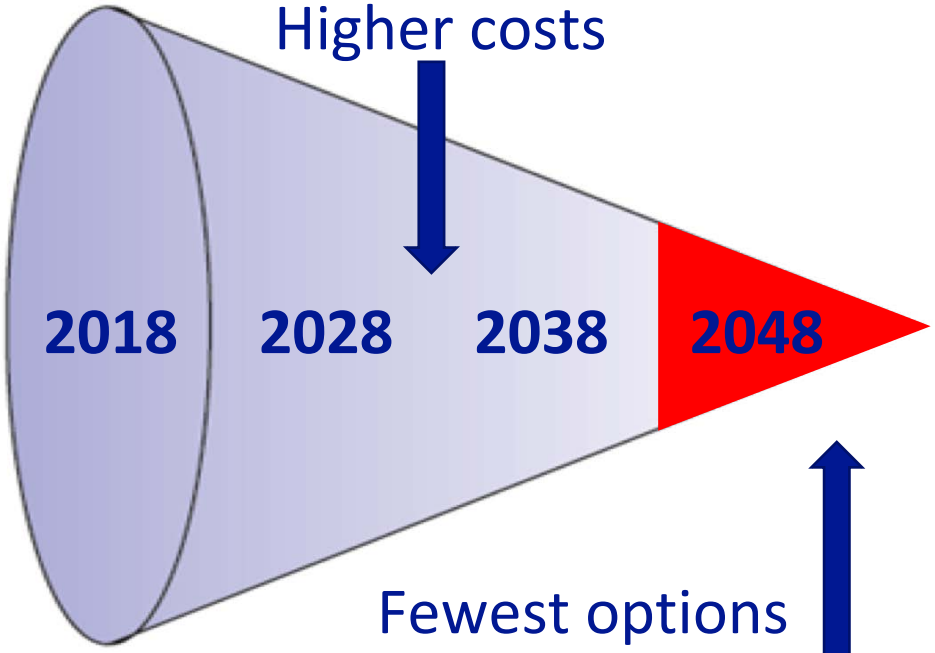
Steps toward Resiliency



The Hard Sell

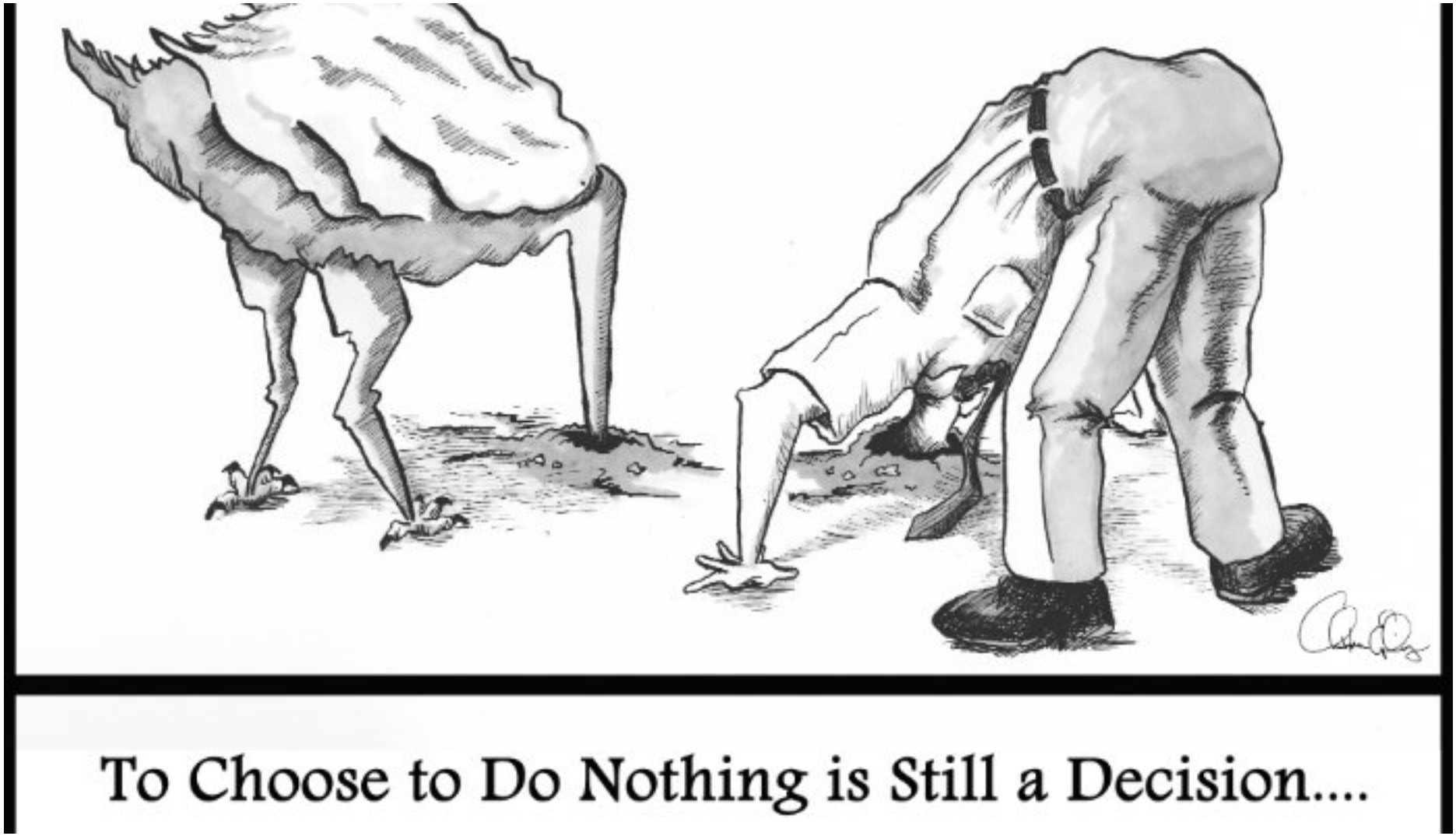
Fewer options
Higher costs

Multiple options
Lower costs



Fewest options
Highest costs
Including damage and recovery costs

But, why bother?



To Choose to Do Nothing is Still a Decision....

Community Experience Snapshots

Reprieved New York plant drives local investment

06 February 2018

The James A Fitzpatrick nuclear power plant, which had been scheduled to close a year ago, is today driving significant investment in local businesses in New York State, Exelon said yesterday. More than $15 million was invested in 2017 in capital projects to support the plant for long-term operations.

Fitzpatrick (Image: Entergy)

Former plant owner Entergy announced in 2016 it would close the single-unit plant in January last year, despite being licensed to operate until 2034, because of economic conditions. However the state of New York

Related Stories

- New York State benefits from nuclear investment
- Entergy completes Fitzpatrick transfer
- Exelon to buy Fitzpatrick nuclear plant
- Entergy to retire FitzPatrick plant

WNA Links

- Fitzpatrick
- Nuclear Power in the USA

Related Links

- Exelon

Venice Italy: Today

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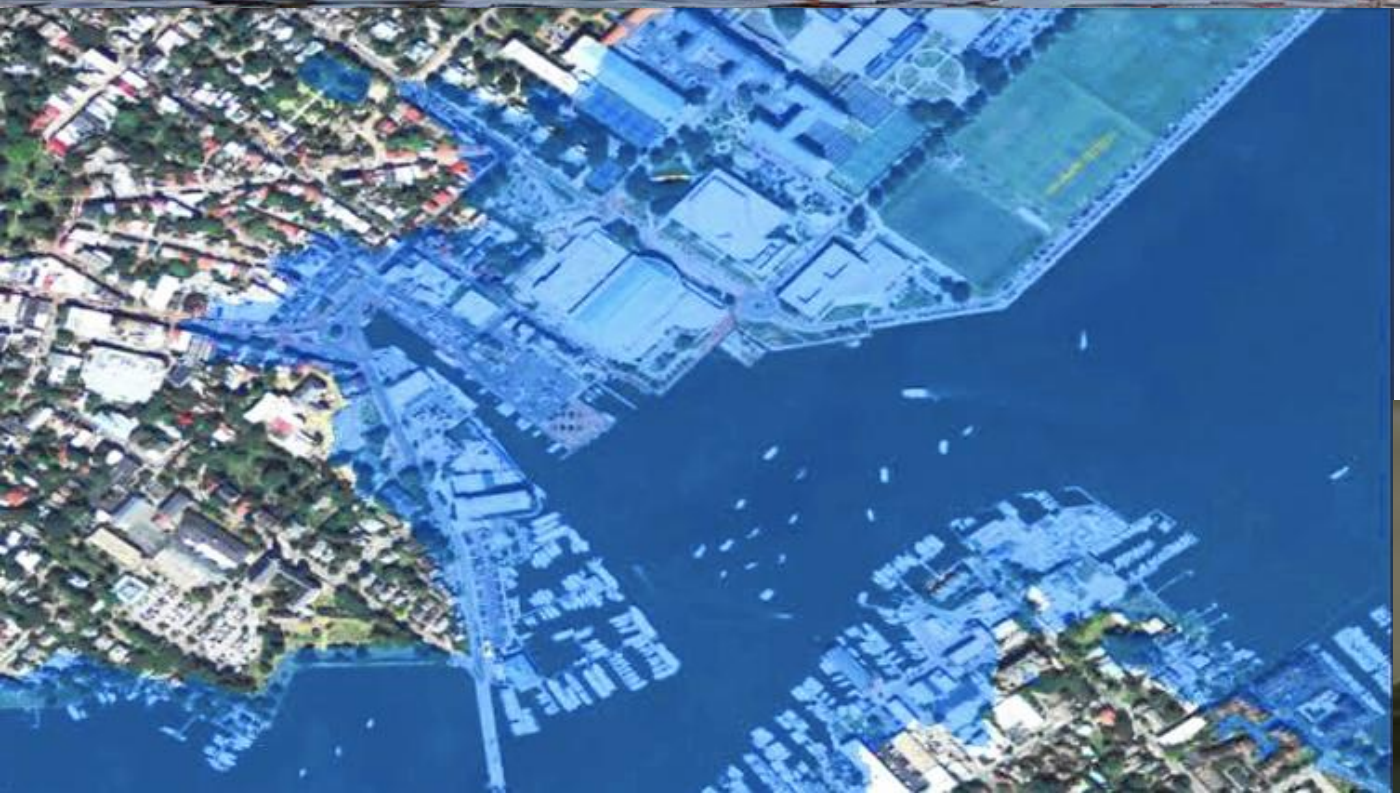
Annapolis, MD



50 tidal flooding events per year, when there used to **none** at all.

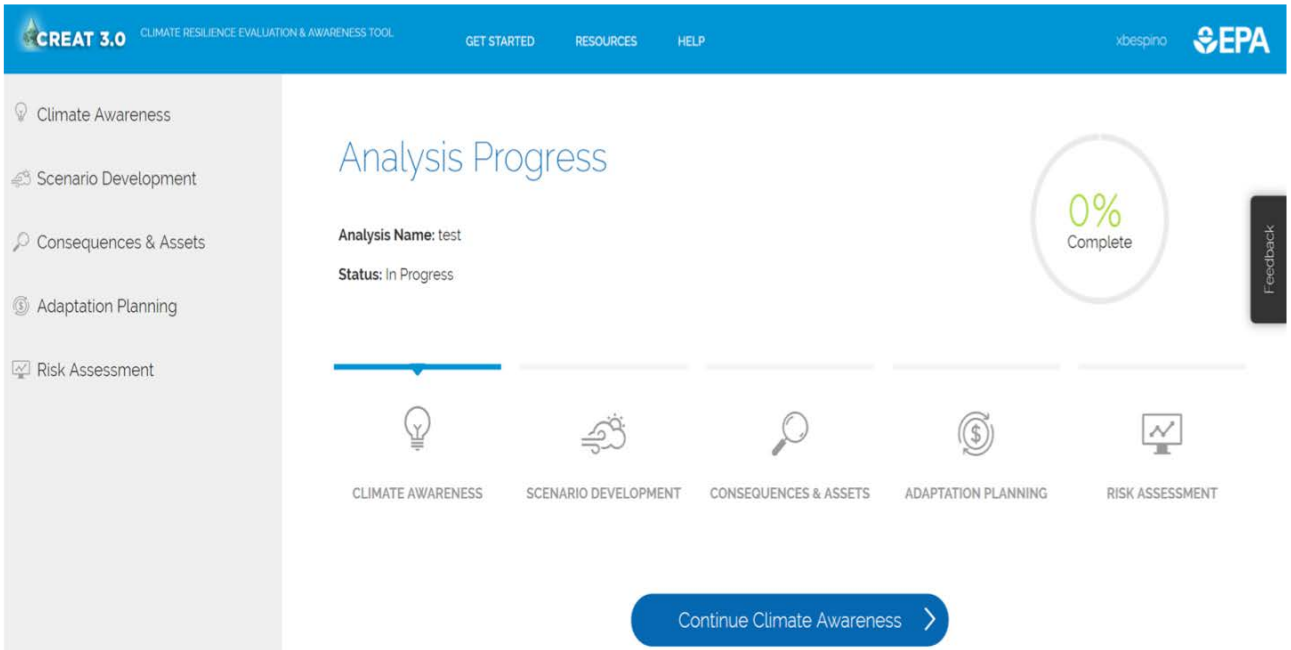
The US Naval Academy is building a wall.

2011: Lourdes Hospital, Binghamton

What building resiliency looks like: Binghamton-Johnson City Joint STP Case Study

Climate Resilience Evaluation and Awareness Tool (CREAT)

- Risk assessment tool
- Helps utilities in adapting to extreme weather events through a better understanding of current and future climate conditions.

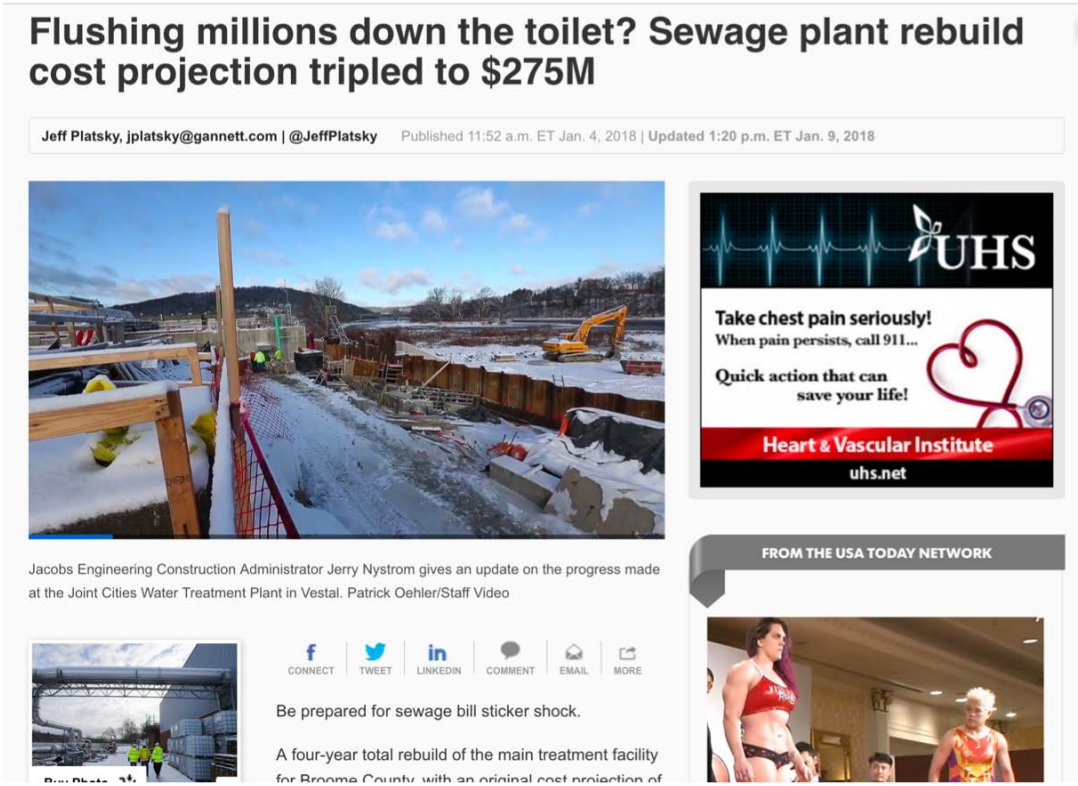


https://www.epa.gov/crwu/build-resilience-your-utility

https://youtu.be/fa0oK_jE8Zw

BJCJSTP's existing measures to protect the plant from high flow events:

- Sand bags as temporary flood barriers
- System performance models
- Weather forecast monitoring
- Emergency Response Plan for flooding events



Flushing millions down the toilet? Sewage plant rebuild cost projection tripled to $275M

Jeff Platsky, jplatsky@gannett.com | @JeffPlatsky Published 11:52 a.m. ET Jan. 4, 2018 | Updated 1:20 p.m. ET Jan. 9, 2018

Jacobs Engineering Construction Administrator Jerry Nystrom gives an update on the progress made at the Joint Cities Water Treatment Plant in Vestal. Patrick Oehler/Staff Video

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Be prepared for sewage bill sticker shock.

A four-year total rebuild of the main treatment facility

Potential Adaptive Measures for Binghamton-Johnson City Joint Sewage Treatment Plant

	ADAPTIVE MEASURE	DESCRIPTION	ESTIMATED COST
	Back-up generators	Three (3) back-up generators and diesel storage tanks to provide power for the entire plant and related processes during future power outages.	$50,000 - $150,000
	Alternate wastewater capabilities	Develop redundant treatment processes. Development or replacement could include entire facility or just critical portions to support operations when damage or loss occurs.	$3,000,000 - $10,000,000
	Hydrologic barrier	Develop hydrologic barriers to counter flooding. Manipulating natural landscapes to absorb or redirect flooding is often more aesthetic than building structures. Construction and design must consider projected flood magnitudes and local hydrography.	$750,000 - $1,250,000
	Flood wall	Construct a flood wall for protection against high flow events. Construction and design is 1.5 feet of freeboard above the 2011 storm event level.	$1,750,000 - $4,000,000
	Submersible pumps	Install submersible pumps that will not be significantly impacted by flood waters entering the plant.	$1,500,000 - $3,000,000
	Raise electrical equipment	Raise electrical equipment above the 2011 flood level.	$50,000 - $100,000
	Raise VFDs	Raise the Variable Frequency Drives (VFDs) at least one foot above the 2011 flood level.	$50,000 - $100,000
	Flood risk management plan	Develop phased, adaptive risk management plan for urban flood risks and treatment requirements that will prioritize the ability to limit or prevent damage to the facility during floods. Integrating observations, process models and decision frameworks provides a powerful suite of tools to anticipate potential flood scenarios and deal with flood damage.	$7,500 - $10,000
	Water tight doors	Install water tight doors at critical infiltration points to mitigate impacts of flood waters on plant and equipment.	$200,000 - $500,000
	Permeable pavement	Install permeable pavement at the facility to allow for infiltration of stormwater through the pavement surface reducing runoff (and localized flooding). Could be constructed from porous asphalt, porous concrete, and interlocking pavers.	$100,000 - $350,000
	Flood models	Build integrated flood models for catchments and urban drainage. Beyond many current hydrologic and flood models, these new models should ensure that changing climate conditions can be accommodated in models and that these models include topographic information (GIS) and risk assessment components.	$35,000 - $75,000
	Quick disassembly pumps	Retrofit existing pumps to make it easier to disassemble them and remove them in advance of a flooding event. Costs include the retrofitting and the cost to remove them for one event.	$50,000 - $100,000

Significant Risks to Consider

- Aging Infrastructure
- Infiltration and Inflow (I/I) Issues
- Changing Regulations
- Population Growth/ Development
- Structural Concerns – Site flooding

Ideas for Implementing Resilience Strategies

Flooding Impacts

- Regional interconnections
- Alternative power supplies
- Monitor and inspect infrastructure
- Elevate or flood-proof assets
- Join a mutual aid network

Changes in Seasonal Runoff

- Monitor
- Incorporate predictions of snowpack and runoff changes into models
- Update drought contingency plans
- Diversify water supplies
- Increase storage capacity
- Establish regional interconnections

Increased Runoff

- Green infrastructure
- Distributed systems
- Invest in watershed management
- Model potential stormwater impacts to your service area
- Monitor runoff, vegetation and land use changes

Stressed Sewer Systems

- Green infrastructure
- Acquire and manage existing ecosystems
- Reduce infiltration and inflow by managing assets
- Increase capacity or capabilities of wastewater treatment system and facilities
- Model potential stormwater impacts to your service area

Community and Economic Impacts

- Collaborate Discuss adaptation options with local businesses
- Communicate adaptation activities and plans to customers
- Become marketers
- Raise rates in an affordable and responsible way

Paying for Resiliency


REGIONAL COUNCILS
NORTH COUNTRY
FINGER LAKES
CENTRAL NEW YORK
MOHAWK VALLEY
CAPITAL REGION
WESTERN NEW YORK
SOUTHERN TIER
MID-HUDSON
LONG ISLAND
NEW YORK CITY

REDCs and You

- Each Region created a strategic plan.
  - Main initiatives
  - Critical issues
  - Challenges
  - Strategies and goals to improve economy

- Align your project goals with regional strategies to get funding!

REDC and the CFA

Selection Criteria for NYS DEC/EFC Wastewater Infrastructure Engineering Planning Grant		
	Points Assigned	Criteria
Regional Economic Development Priority	20	Alignment with the goals and priorities of its REDC
Performance Measures	40	Severity of existing water quality impairments
Strategies	24	Proposed project is required by a Consent Order, SPDES permit or TMDL
Process	8	Local commitment
Vision	4	Planning project is identified in a formally adopted plan
NYS DEC Regional Priority	4	Alignment with the goals and priorities of the DEC region that the project is located

As soon as possible…

- Have the support of your REDC – submit a white paper or form (depends on region) as soon as a project is identified as viable.
- Align community strategies with REDC strategies
- Get the 20 points!

Guidebook

- Resources announced April or May
- Applications due July 28th

Be in the know…www.regionalcouncils.ny.gov

More About the Central New York Region

Our Region	Our Vision	Our Resources
VIEW REGION	SEE VISION	SEE RESOURCES

Contact Us

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GET DIRECTIONS

You can’t (necessarily) buy resiliency

But, you can become resilient by investing in things that will make you so.

- Infrastructure upgrades
- Community planning
- Building capacity
- Economic development

Climate Smart Communities Grant Program

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

NEW YORK STATE OF OPPORTUNITY. | Climate Smart Communities

Part of the Environmental Protection Fund

Climate Smart Communities Grants

Who is eligible?

- **Local governments only**
  - Counties, cities, towns, villages in NYS
- Others may participate as part of a partnership with a designated, eligible lead applicant
- Do **NOT** need to be a Registered Climate Smart Community to apply

Climate Smart Communities Grants

When are applications due?

- Applications deadline (?) July 2018
- Read the **Request for Applications** (RFA) for complete info

How do I apply?

- Apply online through the **Consolidated Funding Application** (CFA) at https://apps.cio.ny.gov/apps/cfa/index.cfm

Climate Smart Communities Grants

What is the match?

- Required local match is 50% of project costs
- **Match w/ in-kind municipal staff salaries**
- Eligible costs:
  - Travel & equip.
  - Salaries & fringe benefits
  - Contractual services

- No state or federal funds as match

Climate Smart Communities Grants

What kinds of projects are eligible?

- Two categories of grants: **implementation** and **certification** (planning)

Climate Smart Communities Grants

Implementation projects:

- Total available: $9.5 million
- Award size: $10,000 to $2 million
- Construction projects
- No more than 15% on design & engineering

Climate Smart Grants: Implementation

Eligible adaptation projects:

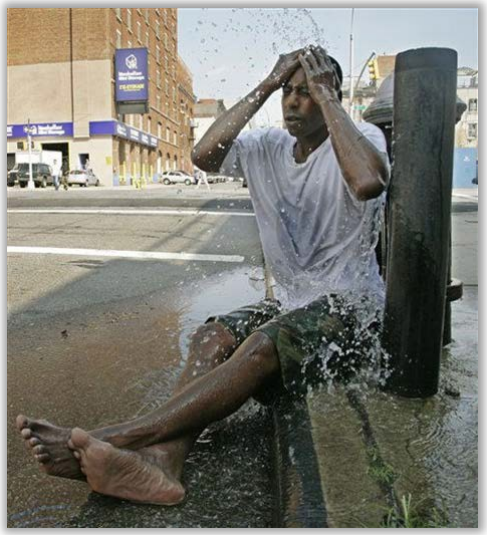
- **Reduce future flood risk (1 of 2 categories):**
  - Increase natural resiliency (e.g., living shorelines)
  - Relocate or retrofit critical infrastructure or facilities
  - Replace or right-size flow barriers (i.e., culverts & bridges)
    - To facilitate emergency response and/or protect people, infrastructure and natural resources

Climate Smart Grants: Implementation

Eligible adaptation projects:

- **Extreme event preparation (2 of 2):**
  - Address anticipated future extreme heat conditions
    - E.g., cooling centers, shade structures
  - Improve emergency preparedness and response systems
    - E.g., warning systems

Climate Smart Communities Grants



Certification projects:

- Total available: $500,000
- Award size: $10,000 to $100,000
- For planning, assessments, inventories, development of strategies
- Actions from the **CSC Certification Program**
  - **CSCC Manual** is online at http://www.dec.ny.gov/energy/96511.html

Climate Smart Grants: Certification

Eligible adaptation projects:

- **Adaptation planning actions** such as:
  - Vulnerability assessments (7.1), CSRP process (7.3), identification of climate adaptation strategies (7.4)
- **Land use planning actions** such as:
  - Development of comprehensive plans with sustainability or smart growth principles (6.1, 6.2), creating resource-efficient site design guidelines (6.5), conducting natural resource inventories (6.17),

Thank you for participating in today's session!

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