



# Planning for Resiliency

## How to Weather the Storm

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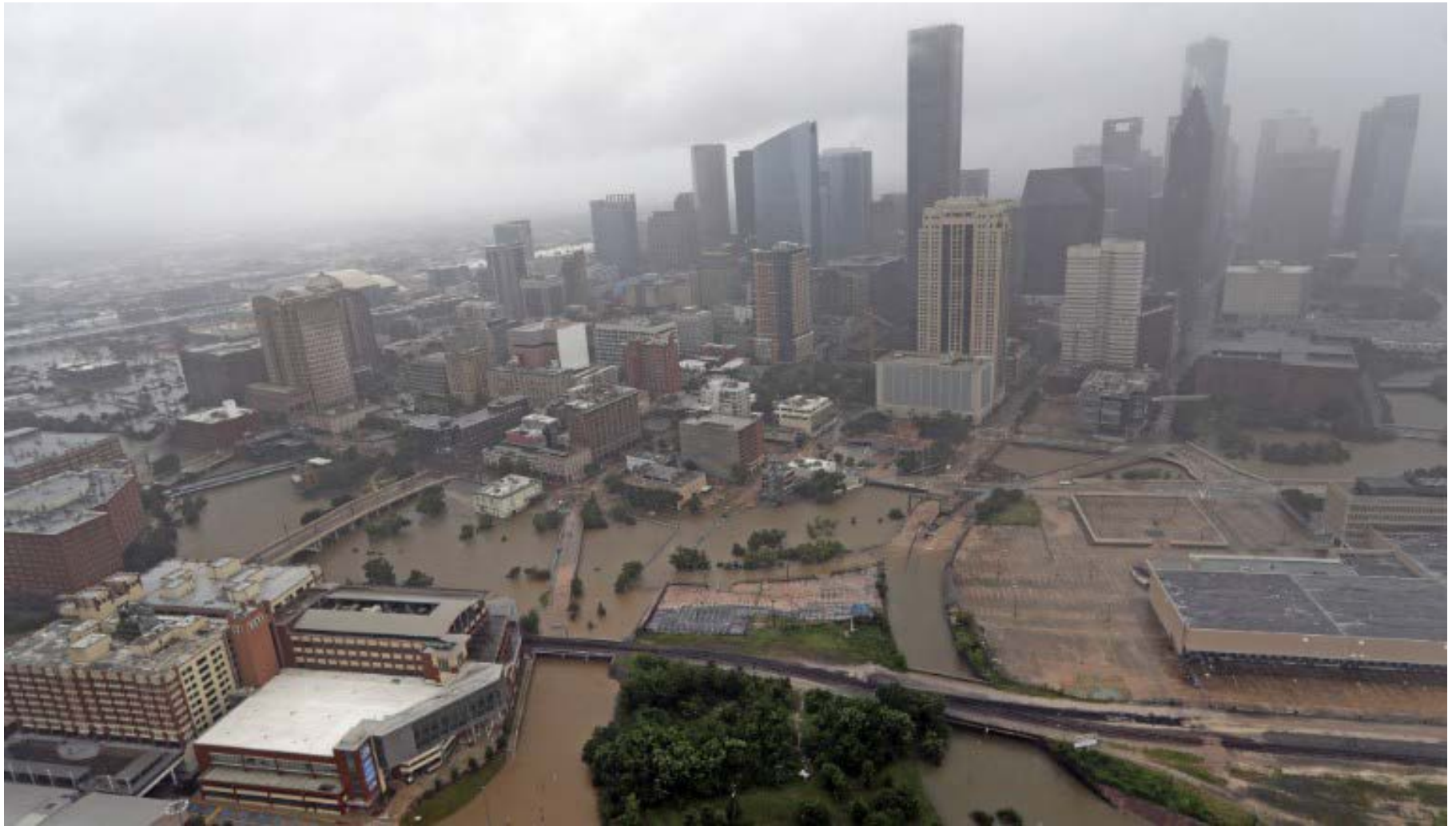
*Syracuse University*



# What is resiliency?

Resilience is the ability to respond and recover from disasters and includes those inherent conditions that allow the system to absorb impacts and cope with an event, as well as post-event planning to reorganize, change, and learn in response of a threat.





**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

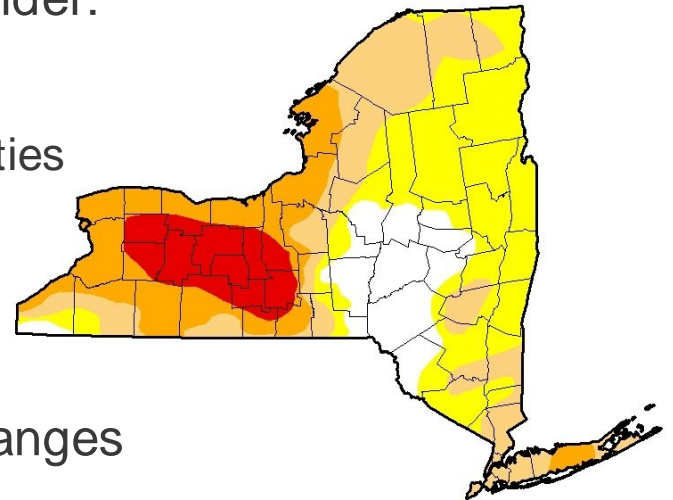


○ UCLA

# Resiliency Considerations

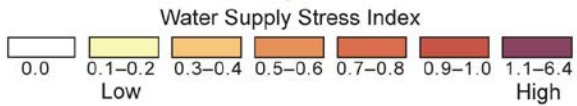
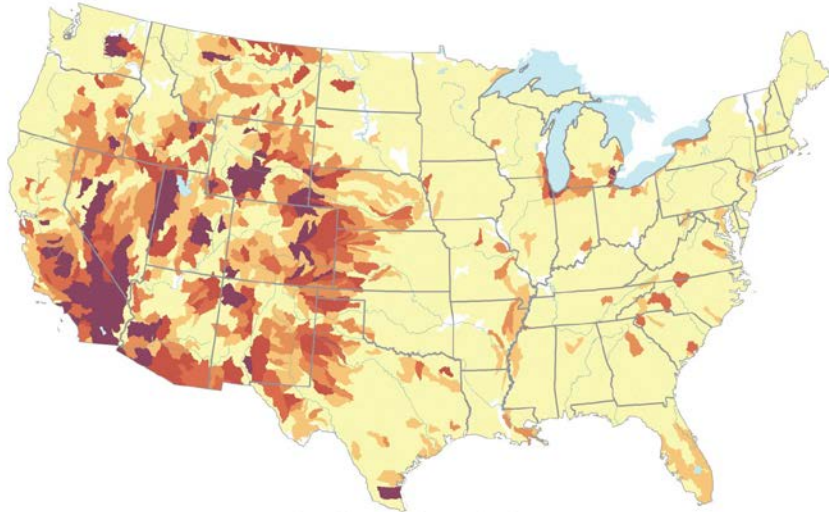
Community resiliency can include:

- 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



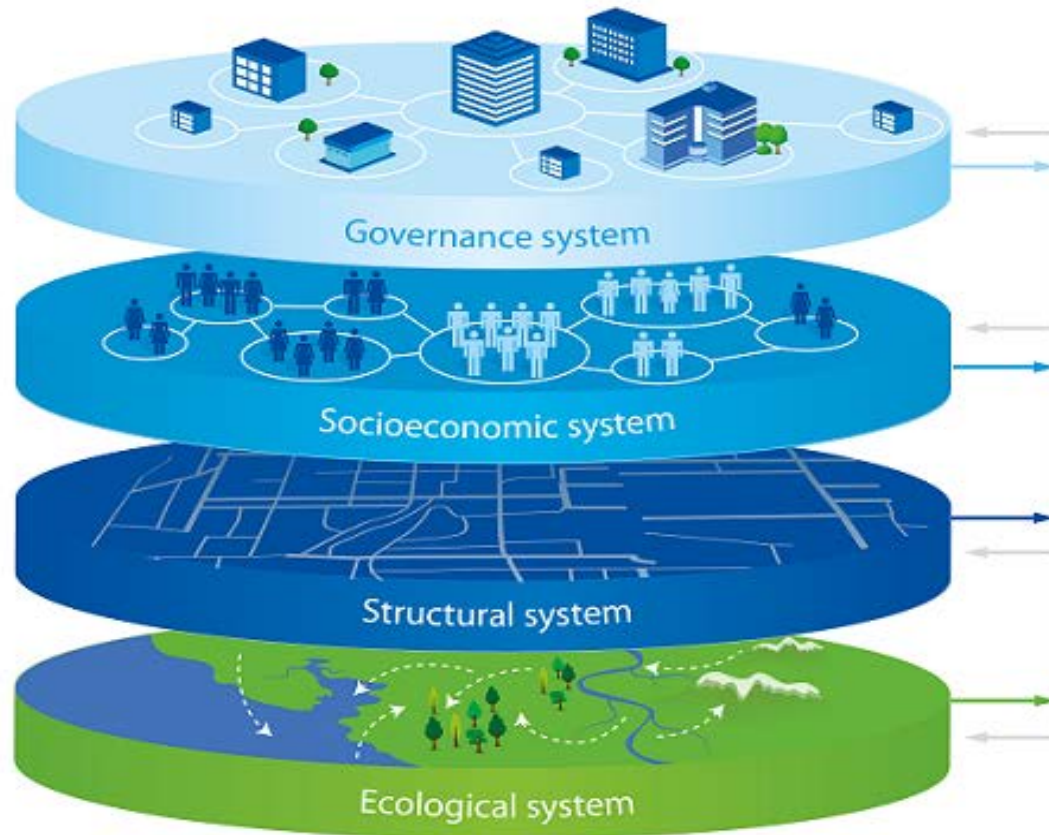


## Water Stress in the U.S.





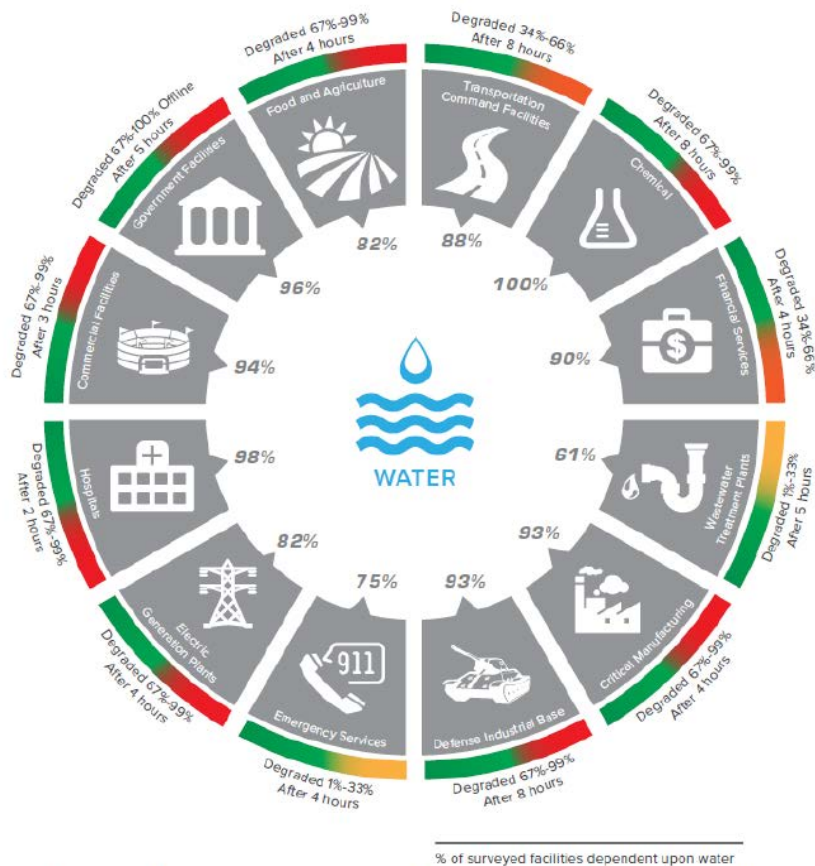
# We are Multi-layered



**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

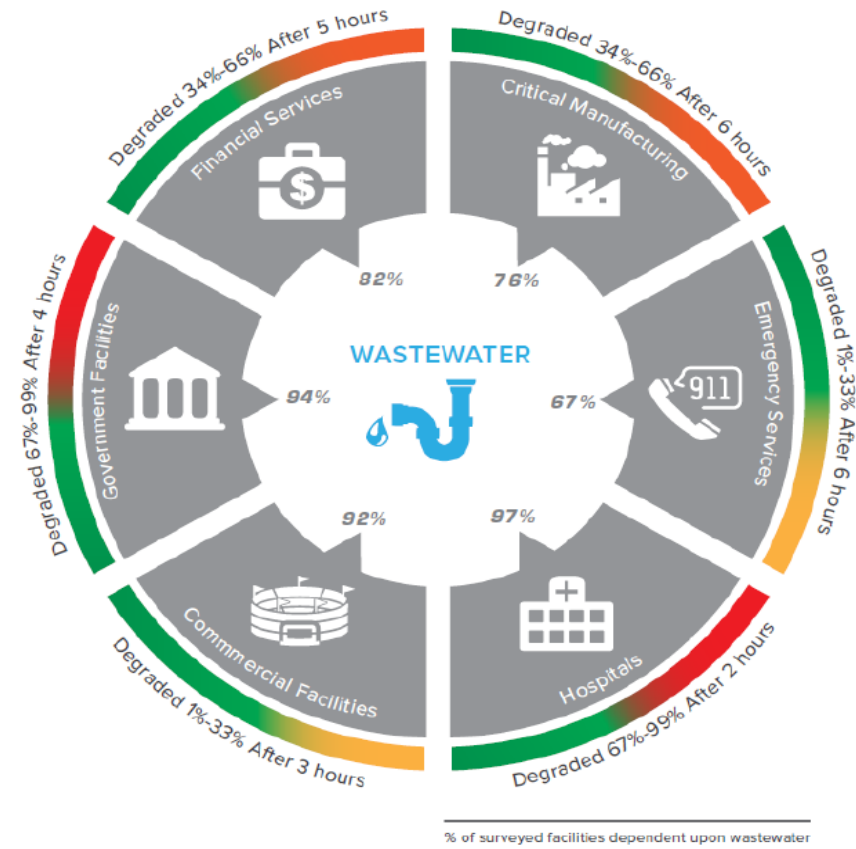
## LOSS OF WATER SERVICES



**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).



**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



Identify the Problem

Determine Vulnerabilities

Investigate Options

Evaluate Risks & Costs

Take Action

# The Hard Sell



**But, why bother?**



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





# Community Experience Snapshots

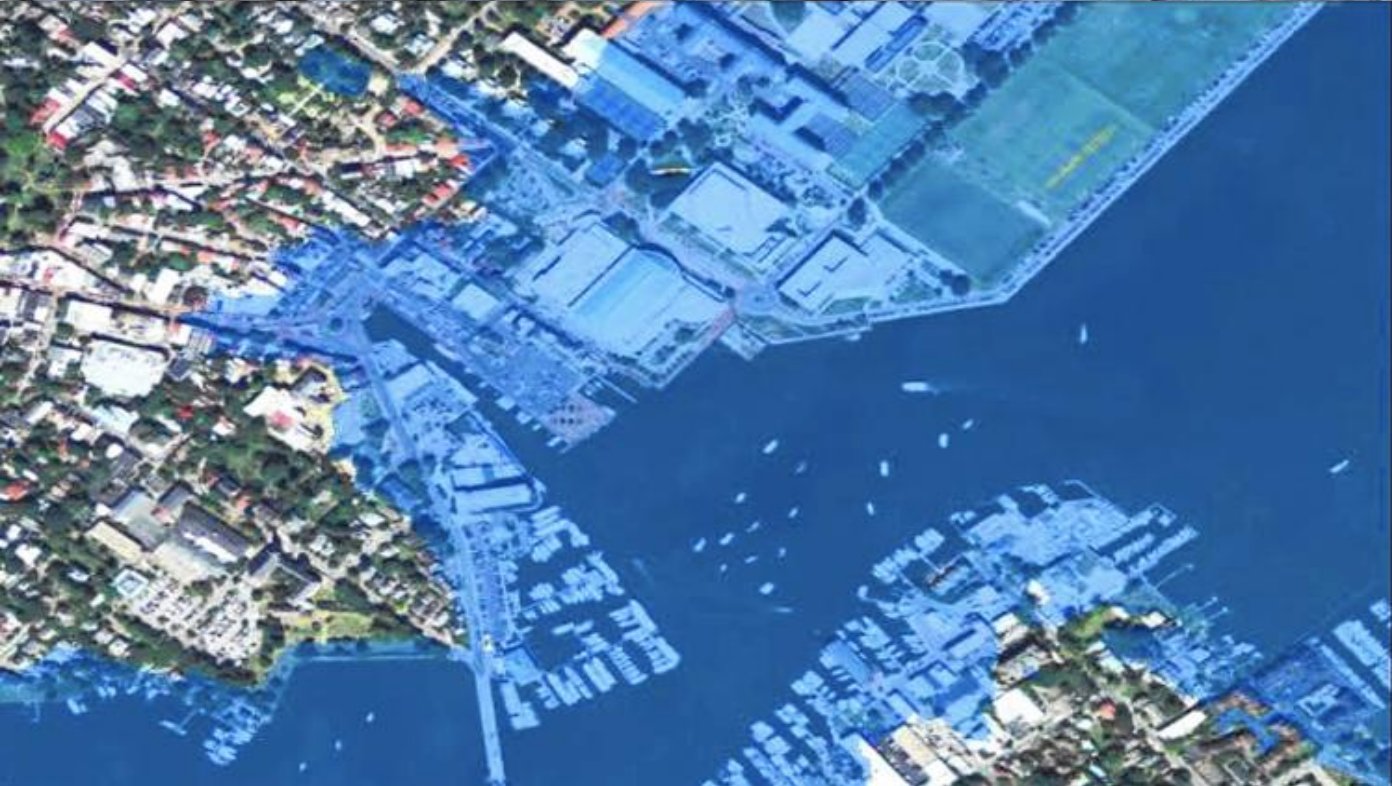


# Venice Italy: Today





# 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



# **Ideas for Implementing Resilience Strategies**

# Significant Risks to Consider



Aging Infrastructure

Infiltration and Inflow (I/I) Issues

Changing Regulations

Population Growth/ Development

Structural Concerns – Site flooding



## Flooding Impacts

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



## Changes in Seasonal Precipitation

- Incorporate predictions of snowpack and runoff changes into models
- Drought contingency plans
- Diversify water supplies
- Increase storage capacity





## Increased Runoff

- Green infrastructure
- Watershed management
- Monitor runoff, vegetation and land use changes

## Stressed Sewer Systems

- Reduce infiltration and inflow by managing assets
- Increase capacity of wastewater treatment facilities







# Community and Economic Impacts



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



# Scenarios

	5th summer drought	5th year of 60 days over 90 degrees	5th winter with no snow	3rd year of severe winter flooding
Built Environment				
Utilities/Communication				
Transportation				
Natural Environment				
Social Environment				
Economy				

**Your assets**



# Built Environment





# Utilities





# Transportation





# Natural Environment



# Social Environment







# Economy

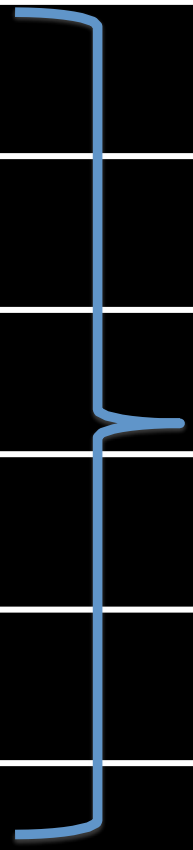


Cultural?

# Scenarios

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**Your assets**



**5th summer  
of drought**

**5th winter  
with no snow**

What does **your** community look  
like under various futures?

	<b>5th summer of drought</b>	<b>5th winter with no snow</b>
Natural Environment	Lake temperatures up 10 degrees Trout dying	Pest infestations due to warmer weather
Economic	Recreational businesses losing money	Ski resorts remain closed Summer tourist season lasts longer

# Paying for Resiliency





# 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



# And you can do that through...

- Looking at local funds to get some initial work done
- Apply to Regional Economic Development Council CFA funding programs such as:
  - Climate Smart Communities
  - DEC Engineering planning grants
  - NYSERDA
  - DOS

And, we'll discuss more of this in the next session!





**Thank you for participating in today's session!**

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