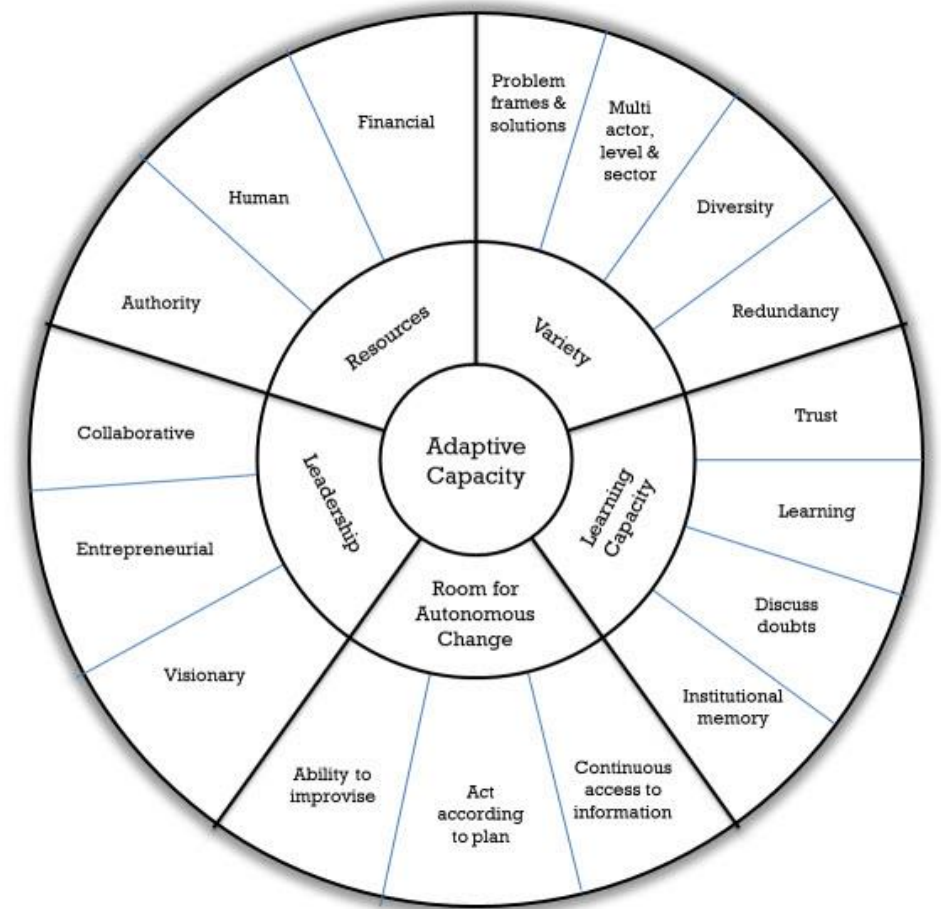


IMPACTS ADAPTATION VULNERABILITY

Module 1B: Climate Adaptation
Fundamentals

Overview

1. Introducing climate adaptation
2. Elements of successful adaptation planning
3. Adaptation models
4. Identifying our adaptation priorities





Introducing climate adaptation

WHY ADAPTATION PLANNING IS CRITICAL FOR GREAT LAKES CITIES

Introducing climate adaptation

Climate change is *already* in motion: lowering GHG emissions is not enough

Mitigation: take action to reduce greenhouse gas emissions and prevent worst-case climate change scenarios



“Avoid the unmanageable”

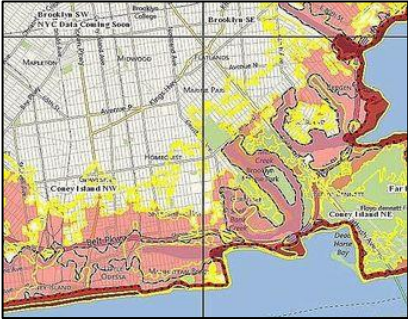
Adaptation: take action to reduce vulnerability and increase resilience to existing and projected climate change impacts



“Manage the unavoidable”

Introducing climate adaptation

Adaptation is context-specific and can take many forms



Updated flood map



Green infrastructure



Cool pavement



Urban forestry

Adaptation may be...

- Intentional or a benefit of actions taken for other purposes
- Reactive or proactive
- To current or expected future conditions
- Localized or widespread
- Focused on reducing negative impacts
- Focused on increasing opportunities

Adaptation usually builds on existing programs that reduce vulnerability, e.g.:

- Heat alert and response programs
- Vector control programs
- Stormwater management

Introducing climate adaptation

Adaptation is not new

...but it was mostly reactive in the past:

- Following Hurricane Hazel in 1954, Ontario developed regulations that restricted developments on flood plains
- Following heat waves in the 1980s and 1990s, many municipalities developed heat alert and response systems
- Following the August 2005 storm, the City of Toronto developed new overflow protection for Black Creek

These actions all followed the impact of disaster events. Using historical climate trends and projection models, we now aim to reduce or prevent the impact of such future events.



Introducing climate adaptation

What *is* new for adaptation?

- Thinking ahead, rather than only looking back
- Estimating future impacts via historical climate trends and projections
- This new *proactive* form of adaptation is especially important for:
 - Climate impacts that could inflict major damage and suffering
 - Long-lived, costly infrastructure
 - Natural systems that educe municipal climate risks



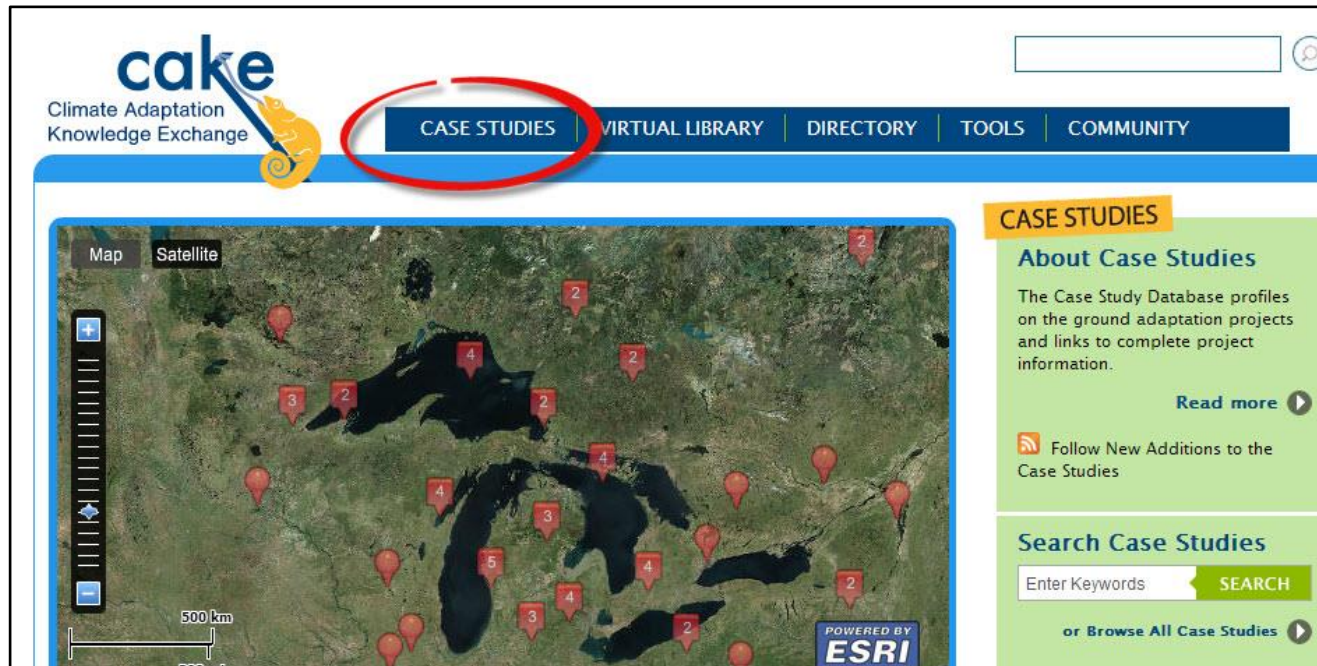
*"I skate to where the **puck is going to be**, not where it **has been**." - Wayne Gretzky*

Much like Wayne, we want to plan ahead for a range of climate scenarios, and not just focus on what's happening in the present

Introducing climate adaptation

Proactive adaptation is drawing increasing attention

Cities are moving forward and many are taking note. [CakeX](#) collects case studies of municipal adaptation efforts.



 GOAL AREA: Climate & Energy Reduce climate impacts through adaptation and mitigation efforts and increase resource efficiency		
Objective Number	Objective Title and Purpose	Available Points
CE-I	Climate Adaptation: Strengthen the resilience of communities to climate change impacts on built, natural, economic, and social systems	15

STAR Community Rating System

Nationwide (US) sustainability rating system includes points for climate adaptation

More info: <http://www.starcommunities.org/>

Introducing climate adaptation

“No regrets” adaptation provides benefits *now*

Look for the no-regrets strategies that create win-win scenarios:

- Adaptations that can be justified based on current climate *and further* justified based on climate change
- As the climate changes, there are *more* benefits
- If climate does not change, benefits still exist because we’re better adapted to current risks



Hurricane Sandy proved we still haven't adapted to our current climate. No-regrets adaptation is the low-hanging fruit that benefits us no matter which climate change scenario comes to pass.

Introducing climate adaptation

Proactive planning is more effective and less costly than reactive planning

Upfront investment vs. longer-term costs of inaction

- True fiscal responsibility requires a long-term view
- Upfront investment in adaptation efforts can pay off long-term by reducing:
 - Infrastructure damage
 - Energy costs
 - Liability risks (lawsuits)
 - Public health risks



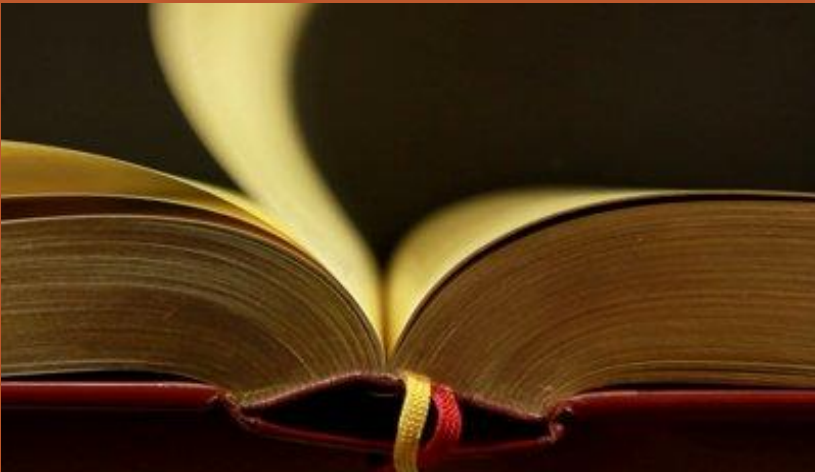
Additional Resources:

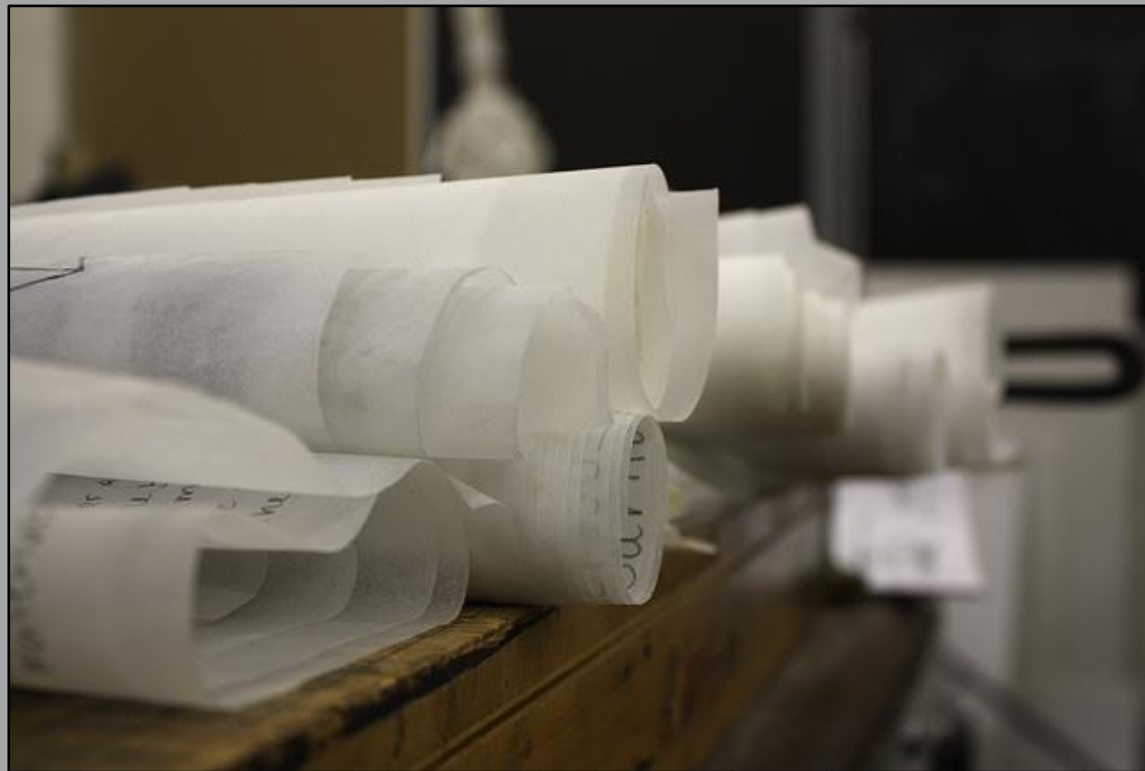
[Freshwater Future & EcoAdapt: Consider Climate Change Adaptation](#)

Helpful primer on climate adaptation in the GL region, including an overview of impacts and tips to getting started

[US EPA: Climate Change Impacts and Adapting to Change](#)

Evaluation of Climate Change by sectors, public use tools and federal and EPA programs.





Elements of successful adaptation planning

A COLLECTION OF BEST PRACTICES

Elements of successful adaptation planning

Chicago Climate Action Plan's 5 Themes

1. Build resilient infrastructure and management systems
2. Embed climate readiness in routine planning process
3. Look for win-win (no regrets) actions
4. Take incremental steps
5. Be aware and flexible, continually incorporating new data



Elements of successful adaptation planning

Adaptation process: iterative, non-linear, transparent

- Identify risks and vulnerabilities
- Plan, assess, and select options
- Implement
- Monitor and evaluate
- Revise strategy and research; share lessons learned

Stakeholder engagement throughout process



Elements of successful adaptation planning

Stakeholder engagement

Elements of successful adaptation planning

Dealing with uncertainty

1. Acknowledge uncertainties
2. Manage uncertainties
 - Prepare for a range of extremes
 - Prioritize “no regrets” programs
 - Incorporate uncertainty into plans
3. Be firm about what we *do* know
 - Temperature is increasing
 - Precipitation patterns changing
 - More extreme events
 - Previous norms no longer hold





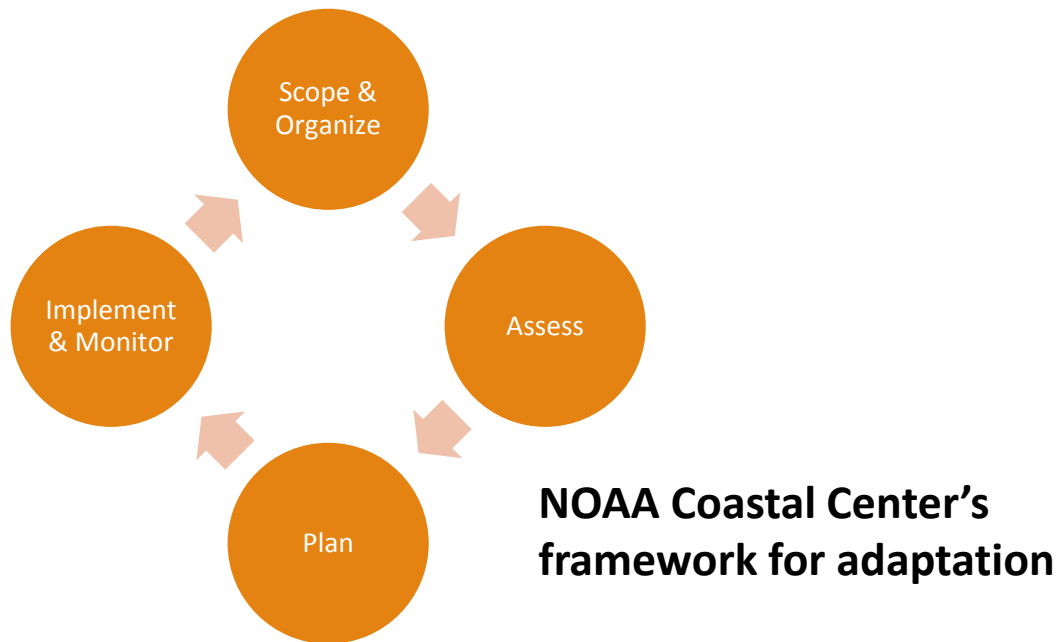
Adaptation Models

PATHS TO BUILDING ADAPTIVE CAPACITY

Adaptation models

Consult “expert” roadmaps & checklist

There is no one-size-fits-all adaptation model, but there helpful guides and checklists that spark “adaptive thinking”



Example adaptation checklist

suggested checklist for governments on how to prepare for climate change

MILESTONE 1: Initiate your climate resiliency effort (Chapters 4-7)

- ☐ Scope the climate change impacts to your major sectors (Chapter 4)
- ☐ Pass a resolution or administrative order directing your government to prepare for climate change (Chapter 4)
- ☐ Build and maintain support to prepare for climate change (Chapter 5)
- ☐ Build your climate change preparedness team (Chapter 6)
- ☐ Identify your planning areas relevant to climate change impacts (Chapter 7)

MILESTONE 2: Conduct a climate resiliency study (Chapters 8-9)

- ☐ Conduct a climate change vulnerability assessment (Chapter 8)
- ☐ Conduct a climate change risk assessment (Chapter 9)
- ☐ Prioritize planning areas for action (Chapter 9)

MILESTONE 3: Set preparedness goals and develop your preparedness plan (Chapter 10)

- ☐ Establish a vision and guiding principles for a climate resilient community
- ☐ Set your preparedness goals
- ☐ Develop, select and prioritize your preparedness actions

MILESTONE 4: Implement your preparedness plan (Chapter 11)

- ☐ Ensure that you have the right implementation tools

MILESTONE 5: Measure your progress and update your plan (Chapter 12)

- ☐ Develop and track measures of resilience
- ☐ Update your plan

Adaptation models

Write adaptation actions into sustainability plans (example: Chicago)

- 2006 Mayor Daley established Climate Change Task Force (CCTF)
- CCTF evaluated potential climate impacts, economic costs, and risk assessments
- 2008 CCTF released **Chicago Climate Action Plan (CCAP)**, which included nine adaptation actions
- Implemented adaptation actions thus far include:
 - Tree canopy expansion
 - Integration of future climate scenarios into stormwater management
 - Development of green urban design projects
 - Extreme Weather Operations Plan

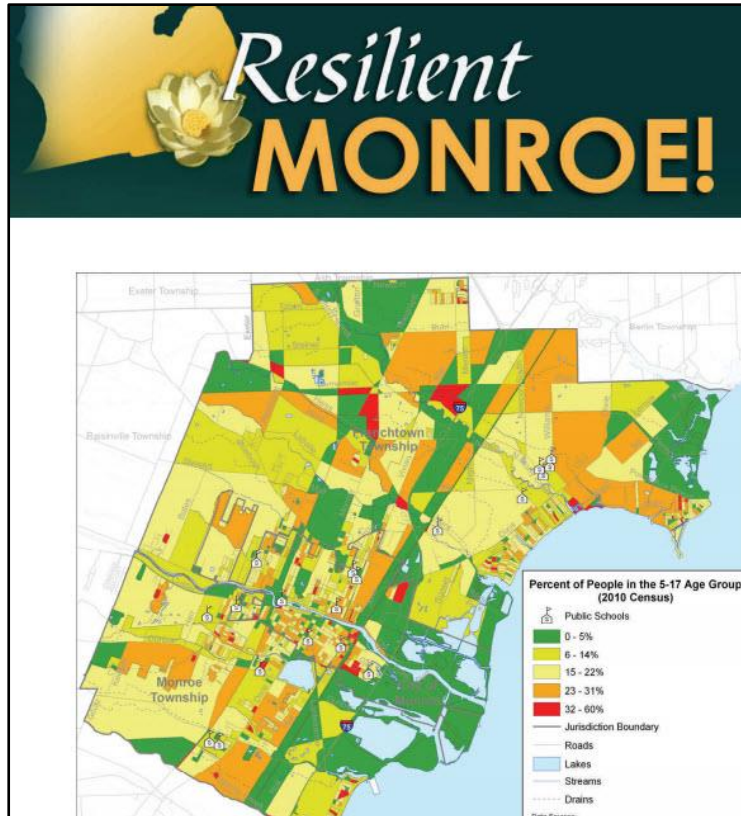


The Chicago Planning Commission adopted a green urban design document after the CCAP's release



Adaptation models

Integrate climate adaptation into land-use planning



Resilient Monroe Project

2013: City of Monroe and two nearby townships pooled resources to revise master plans and form joined Community Planning Committee

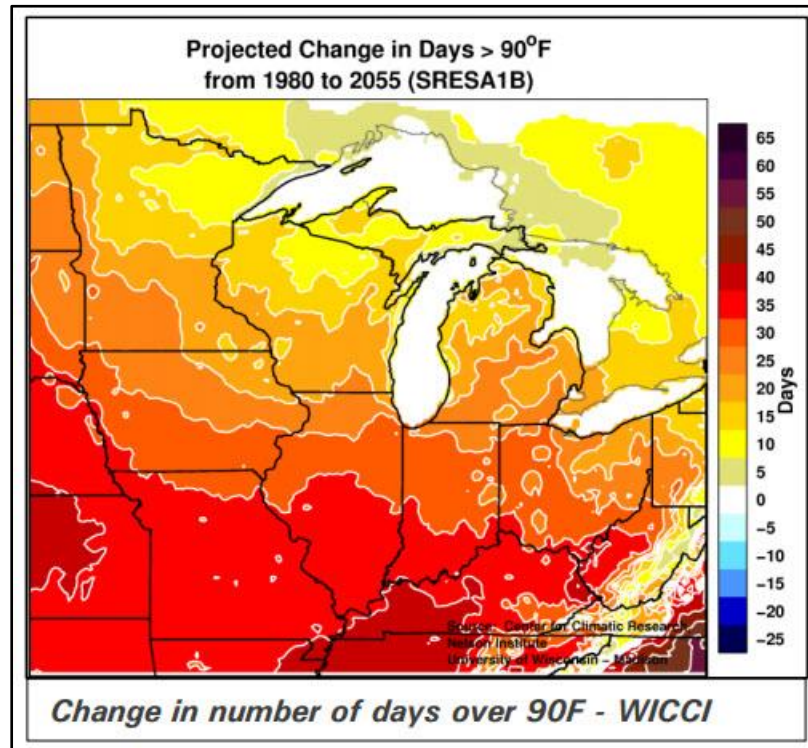
Refined land use and development plans to adapt to unpredictable circumstances

Resilient Monroe Resource Atlas includes chapter on climate vulnerabilities, including:

- Historic climate data
- Climate trends & concerns
- Vulnerability mapping

Adaptation models

Create independent adaptation plan



Report includes WICCI info about projected climate change

Dane County Climate Change Preparedness Plan

In 2013, Dane County Climate Action Council was created to ensure county preparedness for weather extremes

Council facilitated internal review of preparations and potential modifications to operations and capital investments

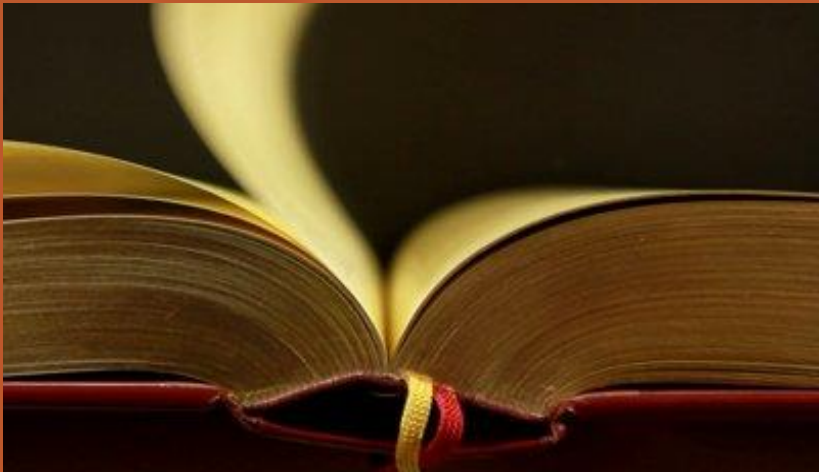
Report identifies vulnerabilities and sector-based near-term and long-term strategies:

- Public health
- Public safety
- Emergency management

Adaptation models

Incentivize private sector and public involvement in adaptation

Additional
Resources:



[US State and Local Adaptation Plans](#)

Georgetown Climate Center map and table that highlight the status of adaptation plans at the state and local levels.

All Plans	State Plans	Local Plans
State▲		Adaptation Plan Information
New York		New York City Building Resiliency Task Force S June 2013 New York City's Building Resiliency Task Force Rebuilding and Resiliency, to study how to impr resiliency, as well as how to help communities
Ohio		Cleveland (Ohio) Climate Action Plan: Building October 2013 Cleveland Mayor Frank G. Jackson's Office of S Action Advisory Committee with representative industrial, educational, government, and non-p



[Federal and EPA Adaptation Plans](#)

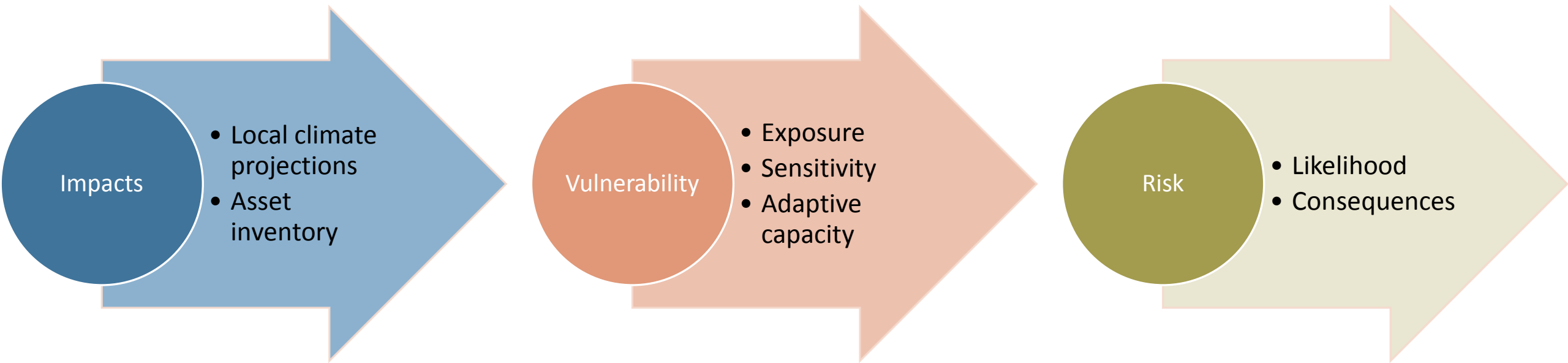
Including adaptation plans at national level at EPA and other government agencies such as USAID, USDA, DOD, DOE, HHS, DHS, etc.



Identifying our adaptation priorities

Identifying our adaptation priorities

Assess impacts, vulnerability, risk



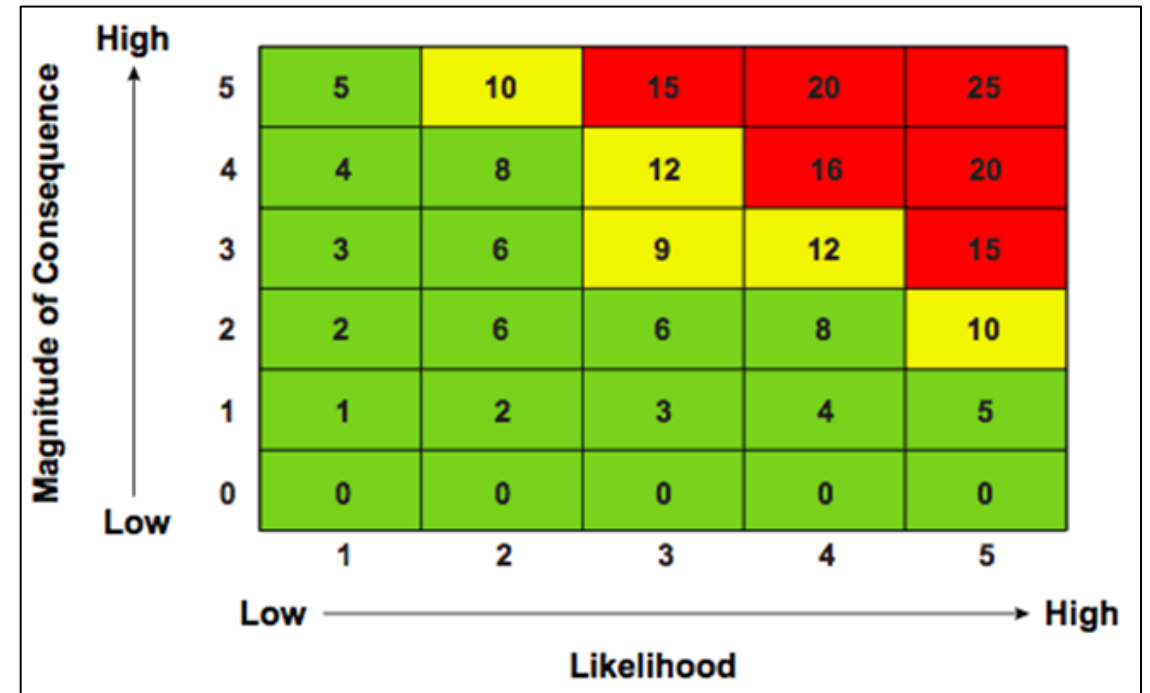
Identifying our adaptation priorities

Identify impacts and consequences

1. Identify climate change impacts and consequences
2. Assess physical characteristics and exposure
3. Consider adaptive capacities
4. Develop scenarios and simulate change
5. Summarize vulnerability and identify focus areas

Risk is a combination of:

1. Likelihood of an event occurring
2. Level of consequence if the event occurs



Chicago's risk assessment chart.

Identifying our adaptation priorities

Analyze impacts to calculate priorities

To calculate priorities, consider:

1. How many municipal activities would be affected by each risk?
2. How soon are the impacts likely to be realized?

Table 3.1 (cont)																	
Impact	Risk	Timing **	Construction, Buildings & Property	Tourism	Environment	Fire	Fleet Management	Housing	Human Services	Emergency Management	Police	Public Health	Streets and Sanitation	Transportation	Water Management	Parks and Open Space	Storm Water Management
Increase in heat related deaths	High	Now	x	x		x		x	x	x	x	x		x		x	
Increase in heat related hospitalization	High	Now				x			x	x	x	x					
Increase in health impacts due to "water-in-basement" incidents	High	Near	x			x				x		x	x		x		

Sample of Chicago's Prioritization

Now = 2010

Near = 2035

Mid = 2040-2069

Identifying our adaptation priorities

Tools & guides

1. [EcoAdapt's Climate Vulnerability Assessment Quick Guide](#)
2. [Guide to Climate Change Adaptation in Cities](#)



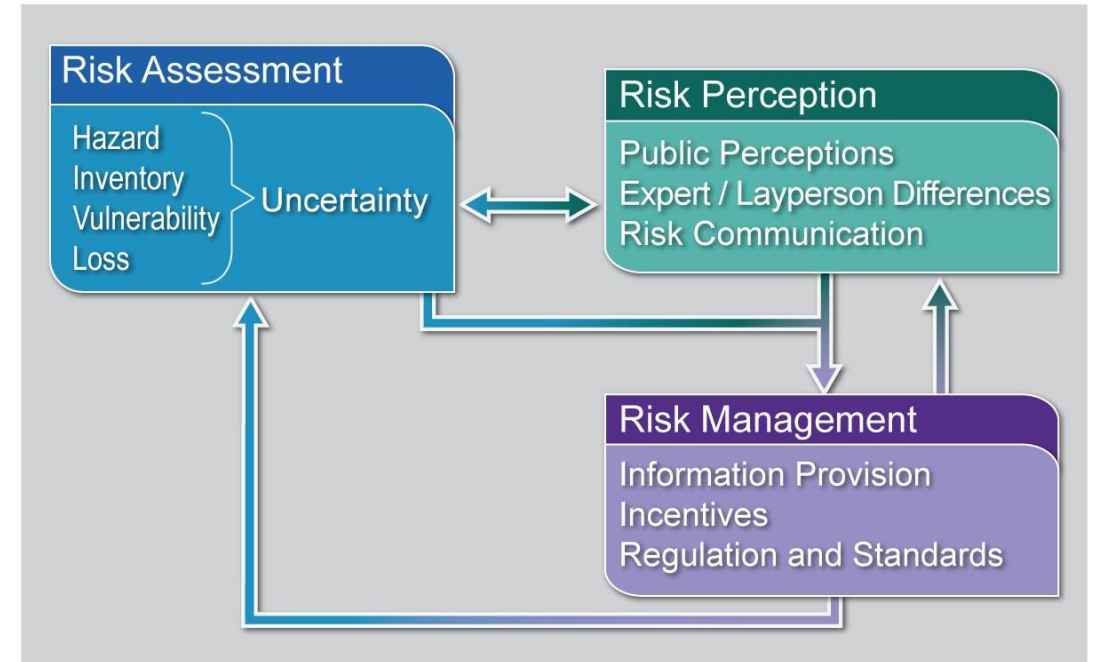
Identifying our adaptation priorities

Public feedback on risk assessment

Public discussion of the assessment is important because:

- Issues may have been overlooked
- People may disagree about the priorities or want to help determine priorities
- Private sector programs may offer opportunities for partnership in implementing adaptation plans

Linking Risk Assessment and Risk Perception with Risk Management of Climate Change



Identifying our adaptation priorities

Evaluate, select, and prioritize actions

1. What strategy can help reduce or prevent the impact? *How* does it reduce the problem?
2. What other climate impacts does this strategy address?
3. What data do you need to determine how effective this strategy would be in your area?
4. What agencies or organizations would be responsible for implementing this strategy?
5. Are there ways to share costs? (e.g. through joint projects?)

Sample strategies:

- green infrastructure
- stream buffers
- tree planting
- water conservation
- zoning
- regulatory changes
- energy distribution
- light-colored roofing
- ecosystem restoration

Additional Resources:

[Roadmap for Adapting to Coastal Risk](#)

NOAA online training and resources that help communities address climate hazards and vulnerabilities. Includes link to 1-hour recorded introduction, resources, and case studies

[Adopting to Coastal Climate Change](#)

A guidebook for development planners in US coastal regions by USAID.

[A Coastal Community Resilience Evaluation Tool](#)

A non-regulatory tool to assist local decision-makers in the identification of planning, mitigation and adaptation opportunities to build capacity for coastal community resilience.

