

Integrating Climate Science into Local Planning

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CMAP Environment and Natural Resources Committee
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Climate change
science

The work of
planning

Data
availability

Local
capacity

What are we trying to answer?

- What kind of climate data and information do local governments need to make informed plans?
- What barriers do communities face in using climate data in the local planning process?
- How can planners and the scientific community work together to integrate climate science into the planning and decision-making process?



CLIMATE RESILIENCE PLANNING IN NORTHEASTERN ILLINOIS



ON

TO

2050

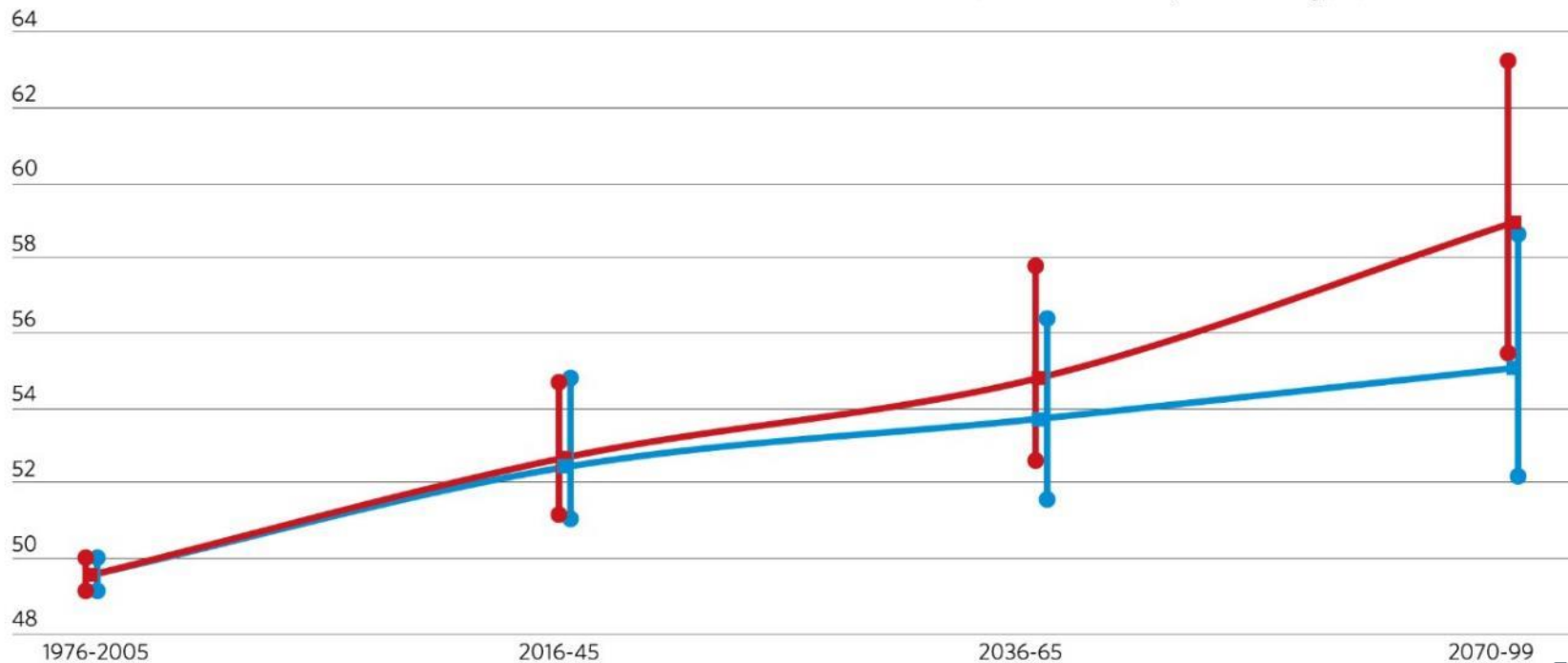


Resilience

Prepare for rapid changes, both known and unknown

Range of projected daily average temperature, in degrees Fahrenheit, in northeastern Illinois

- High-emissions scenario mean
- Low-emissions scenario mean



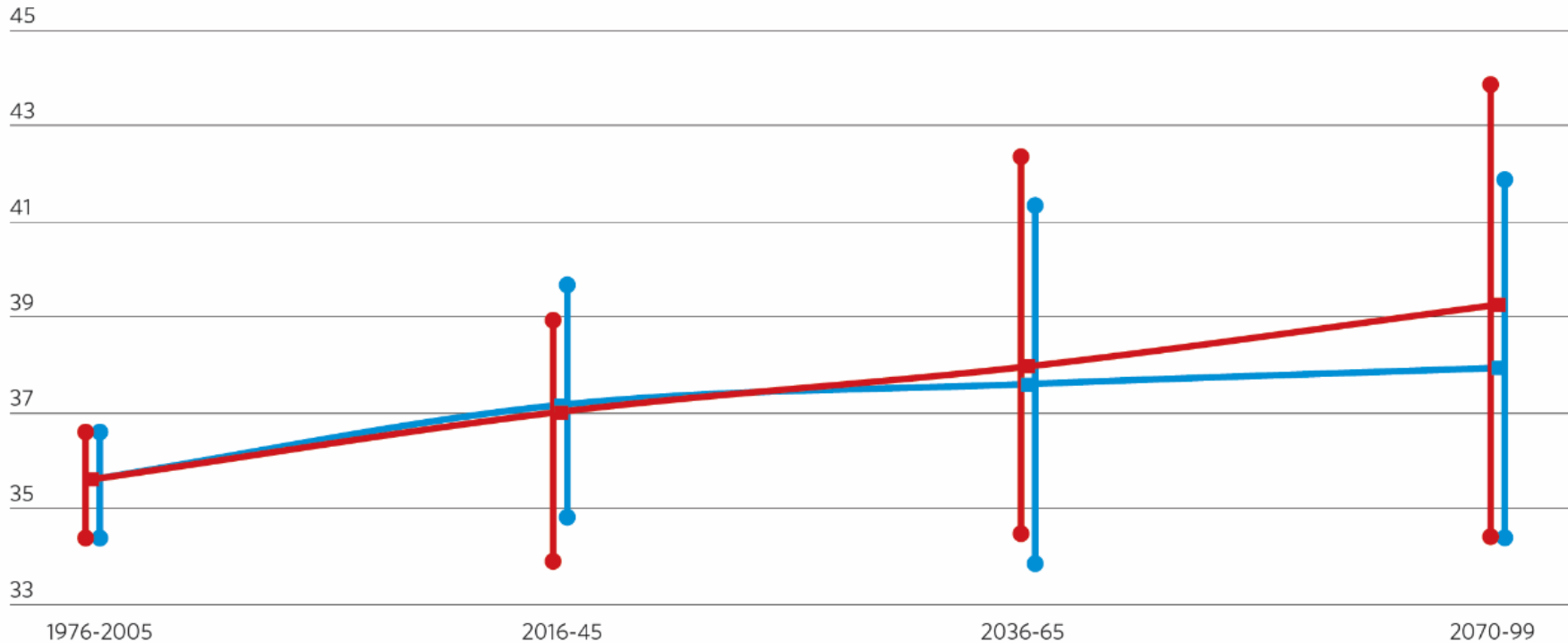
Note: Under a scenario that assumes emissions will continue to increase, regional temperatures are expected to increase by nine degrees Fahrenheit above historical levels. Under a lower emissions scenario, regional temperatures are expected to increase by five degrees above historical levels.

Source: D.W. Pierce, D. R. Cayan, and B. L. Thrasher, 2014: Statistical downscaling using Localized Constructed Analogs (LOCA). *Journal of Hydrometeorology*, 15, 2558-85.

Range of projected annual total precipitation, in inches, in northeastern Illinois

Source: D.W. Pierce, D. R. Cayan, and B. L. Thrasher, 2014: Statistical downscaling using Localized Constructed Analogs (LOCA). *Journal of Hydrometeorology*, 15, 2558-85.

- High-emissions scenario mean
- Low-emissions scenario mean



Climate Resilience

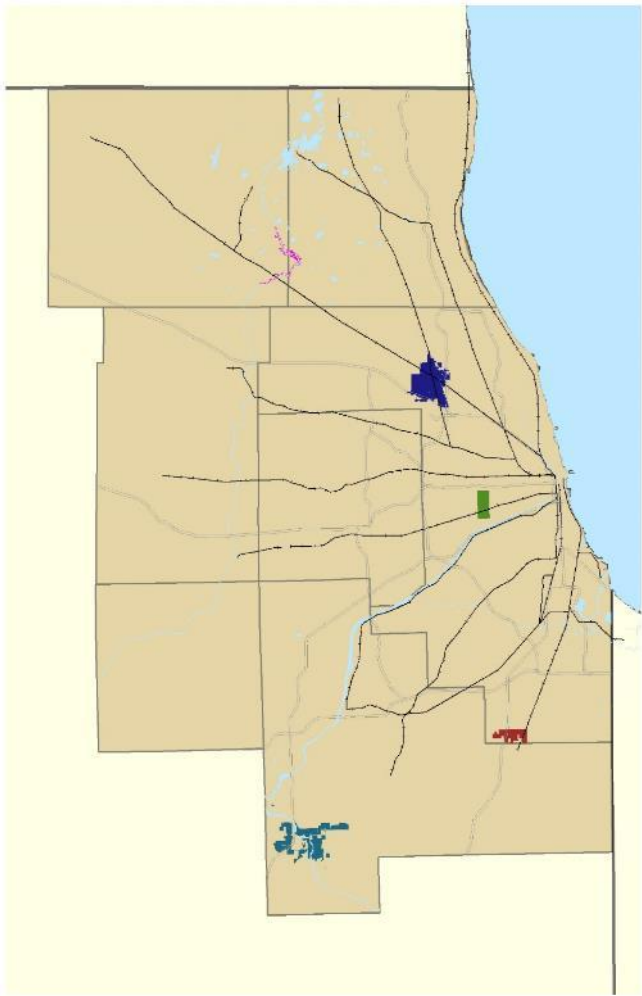


The ability for the region and its communities to **prepare for and recover from acute shocks and chronic stresses** and **transform its infrastructure, natural systems, and social structures** to be more responsive.

Climate Resilience

A region prepared for climate change

- Incorporate resilience into planning
- Implement gray and green infrastructure
- Improve operational response to weather events
- Create more flexible and decentralized electric grid
- Diversify agricultural systems
- Explore a regional climate resilience platform



 CMAP REGION

 INTERSTATES

 METRA LINES

 SURFACE WATER

Climate Assessment Pilot Communities

 BERWYN

 DES PLAINES

 RICHTON PARK

 WILMINGTON

 MCHENRY COUNTY - FOX RIVER

Community Partners

Vulnerability Analysis

Key Findings

Climate and Natural Hazards

Vulnerability and Risk Assessment

1. Critical Infrastructure

2. Social Vulnerability

3. Economic Impacts

Critical Assets

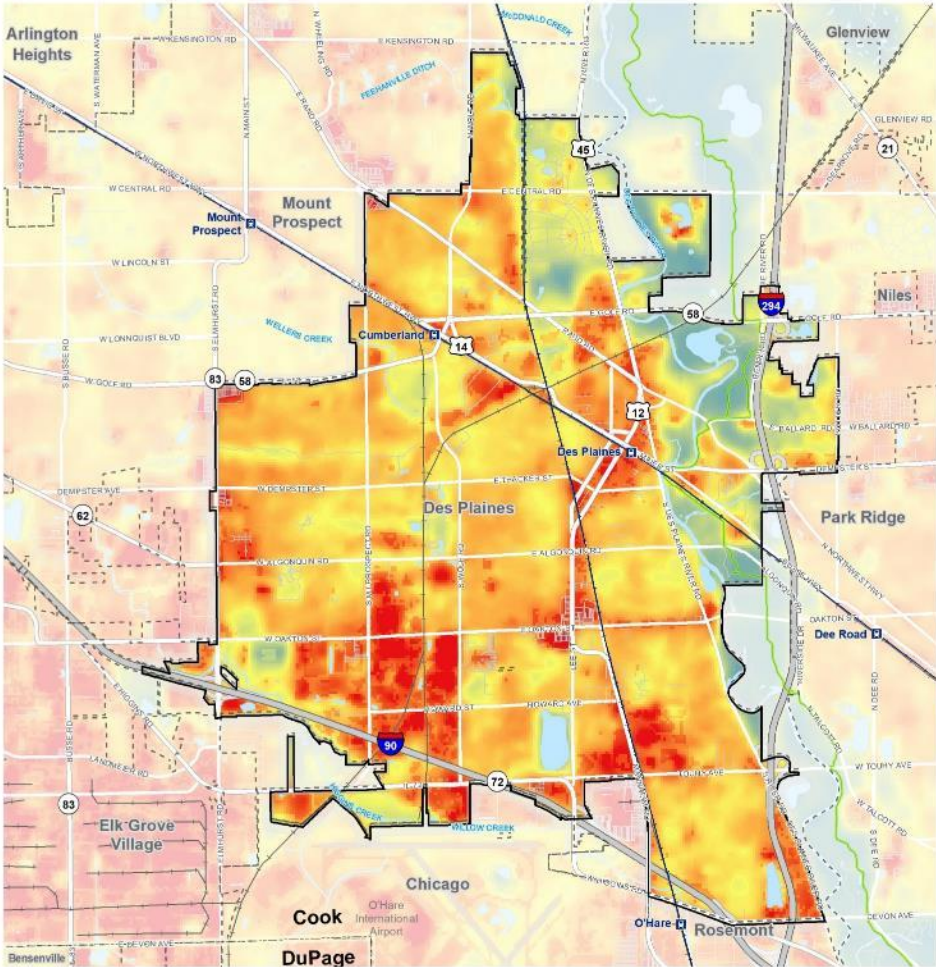


Source: Chicago Metropolitan Agency for Planning, 2018.

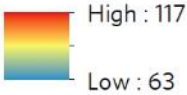


Vulnerability Analysis

Heat Impacts



Land Surface Temperature



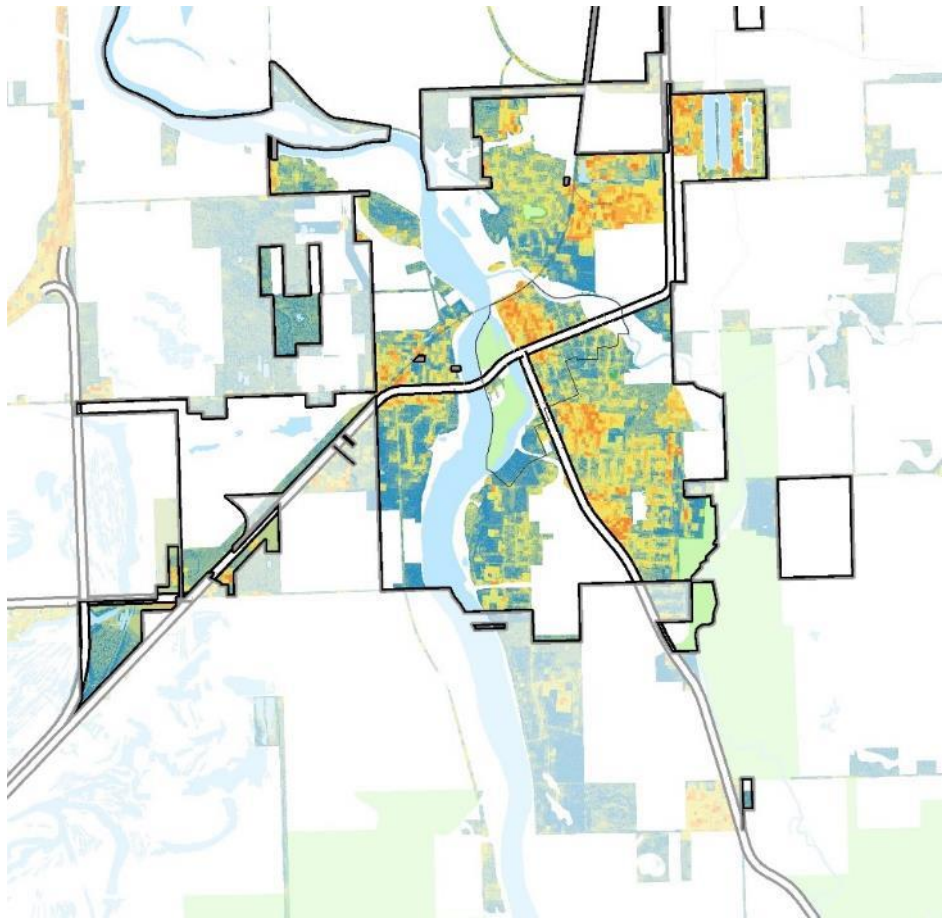
- City of Des Plaines
- Unincorporated Areas
- County Boundary
- Open Space
- Cemetery
- Water



Chicago Metropolitan Agency for Planning, 2018.

Vulnerability Analysis

Stormwater Impacts



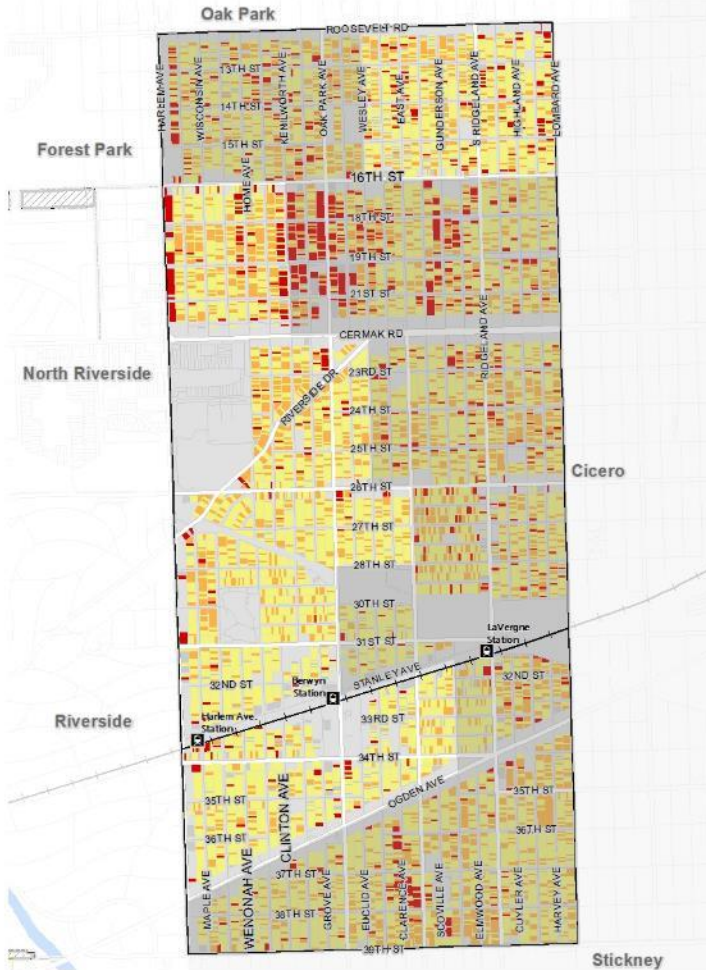
Wilmington Downtown - Urban Flood Susceptibility Index

- Wilmington Downtown Study Area
- Major Road
- Railroad
- Water
- Open Space

FSI score
High : 10
Low : 1

Vulnerability Analysis

Social Vulnerability



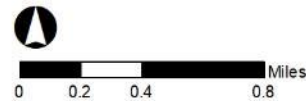
Property Vulnerability

Basement Finish, Residential Properties

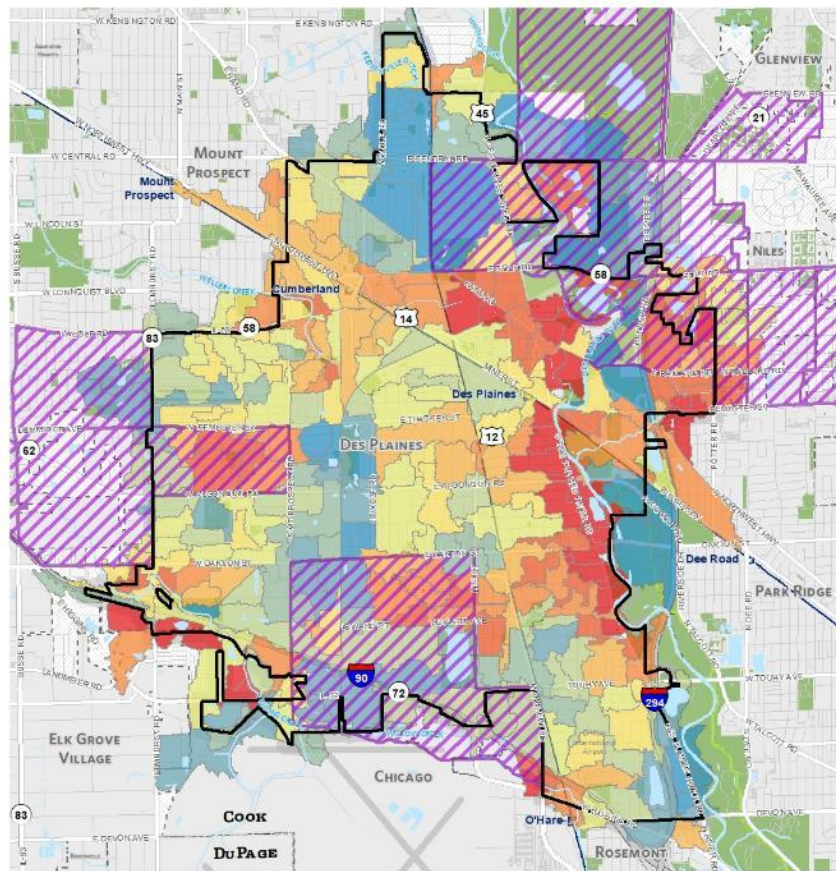
- N/A (no)
- Rec
- Apartment


Economically Disconnected Areas

- Metra Stations
- Metra Rail (BNSF)
- City of Berwyn

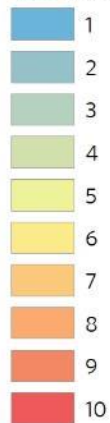



Source: Chicago Metropolitan Agency for Planning, 2017.



 Economically Disconnected Areas*

Urban FSI** by Catchment (mean)



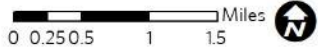
-  City of Des Plaines
-  Unincorporated Areas
-  Open Space
-  Cemetery
-  Water

Vulnerability Analysis

Social Vulnerability

Chicago Metropolitan Agency for Planning, 2018.

* Based on ACS 2014 tracts.
 ** Variables in Urban FSI (Flood Susceptibility Index):
 Age of First Development, Combined Sewer Service Areas,
 Base Flood Elevation, and Impervious Cover.



Lessons Learned

- Importance of scoping
- Need for guidance on data resources
- Framing uncertainty as part of planning
- There is enough data to be informative





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Climate Information and Local Planning: Guidance for Planners in the Great Lakes

- Decision-Making Under Climate Uncertainty
- Assessing Community Vulnerability
- Climate Information in the Local Planning Process
- Climate Knowledge and Capacity-Building
- Making the Case

Decision-Making Under Climate Uncertainty

- When will the impacts occur and how big (or small) will they be?
- Precision of data
- Differences between models
- Reliance on historical data due to uncertainty of climate projections
- Cost of responding and adapting expensive infrastructure
- No perfect projection or climate information is available

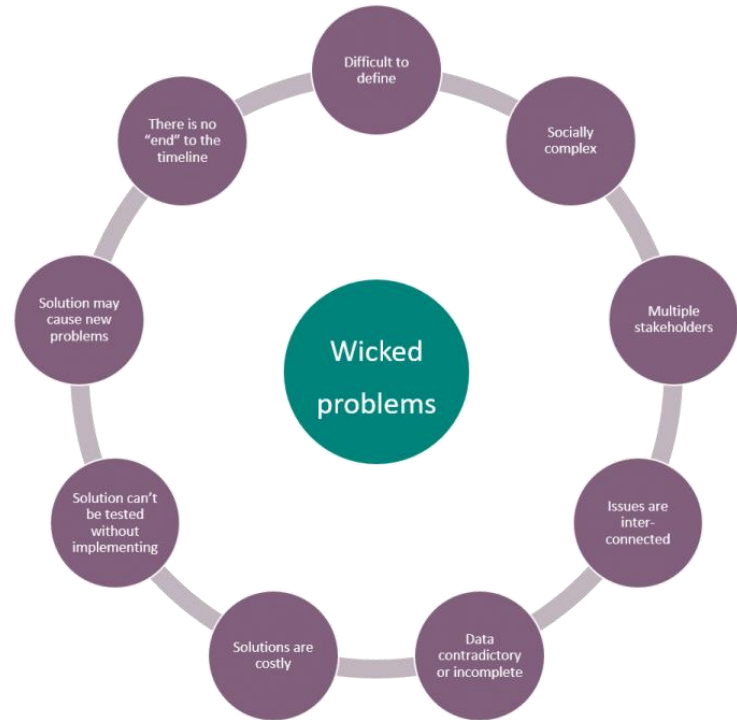
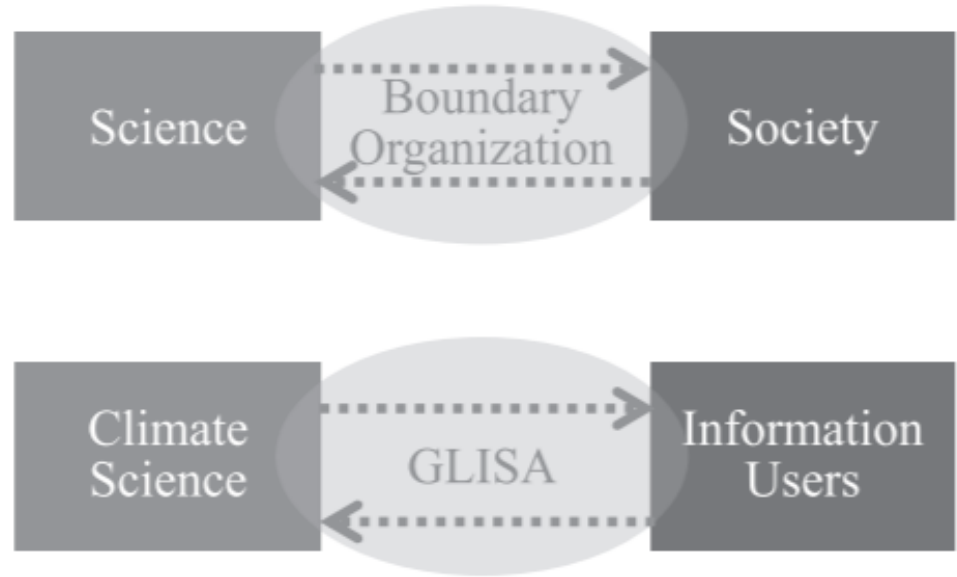


Image courtesy of Siena Consulting.
Adapted from Rittel and Webber, 1973.

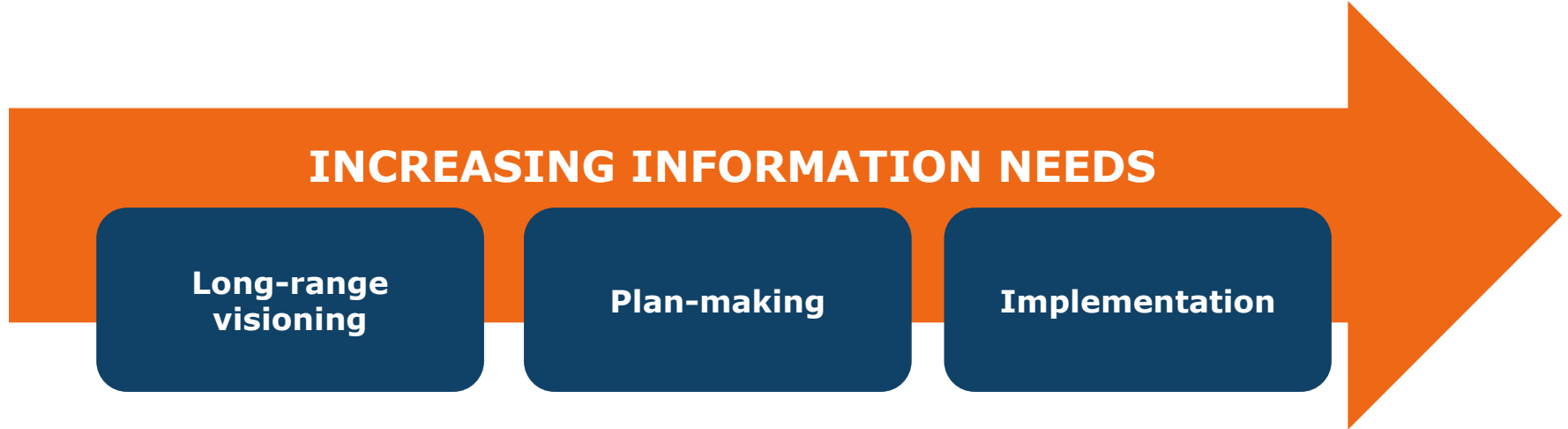
Decision-Making Under Climate Uncertainty

- Use **existing** networks to link practitioners with climate data
- Integrate **local and historical climate data** to build trust
- Provide guidance on how to **account for uncertainty**
- Map **networks** to better understand how information moves across areas of practice



Graphic via Lemos et al. 2014. Moving Climate Information off the Shelf: Boundary Chains and the Role of RISAs as Adaptive Organizations

Climate Information and the Local Planning Process



Climate Information and the Local Planning Process

Long-range visioning

Establishing the future climate conditions

Assessing the general risks

Consider impacts to the community

Climate Information and the Local Planning Process

Climate Change in the Great Lakes Region

GLISA
A NOAA RISA TEAM

Average
Temperature



2.3°F

1951-2017

Frost-free
Season



16 Days

1951-2017

Total
Precipitation



14%

1951-2017

Heavy Precipitation
Events



35%

1951-2017

Climate Information and the Local Planning Process

Plan-Making

What type of plan is being developed?

What information already exists, and where?

What kind of information is needed?

Climate Information and the Local Planning Process

Implementation

Implementation happens along a spectrum

An infrastructure project? A zoning code revision? A policy initiative?

Climate Knowledge and Capacity Building

- Support staff through professional development and training.
- Build a sense of staff, agency, and community ownership of local climate information
- Encourage networking, partnerships, experience sharing, and collaboration among municipal staff, and between local, regional, state, and federal agencies
- Identify the specific web-based tools that your staff will use
- Ensure that local staff and city departments are capable of continuing climate planning efforts begun or initiated by consultants and outside experts.

Making the Case

- Understanding your audience
 - Consider values and interests
 - Think critically about the need for technical information

Making the Case

- Build on what works
 - What is there already community support for?
 - Focus on co-benefits

Making the Case

- Overcome psychological distance
 - Extreme events can be powerful illustrations of future conditions

Making the Case

- The economic argument
 - Imminent community concerns can outweigh preparing for the future
 - Future climate conditions will likely impact local economies

The importance of regional organizations

Uncertainty is the name of the game

Be flexible – Approaches vary!