



Chicago Metropolitan
Agency for Planning

Session 2C-2 Resources for equitable flood resilience

IAFSM 2023 Annual Conference

March 14, 2023



Poll

Where do you work?

1. Chicagoland
2. Downstate
3. Out of state

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What does FSI stand for?

1. Flooded site identifier
2. Flood susceptibility index
3. Flooded seeking infrastructure
4. Feeling some indigestion

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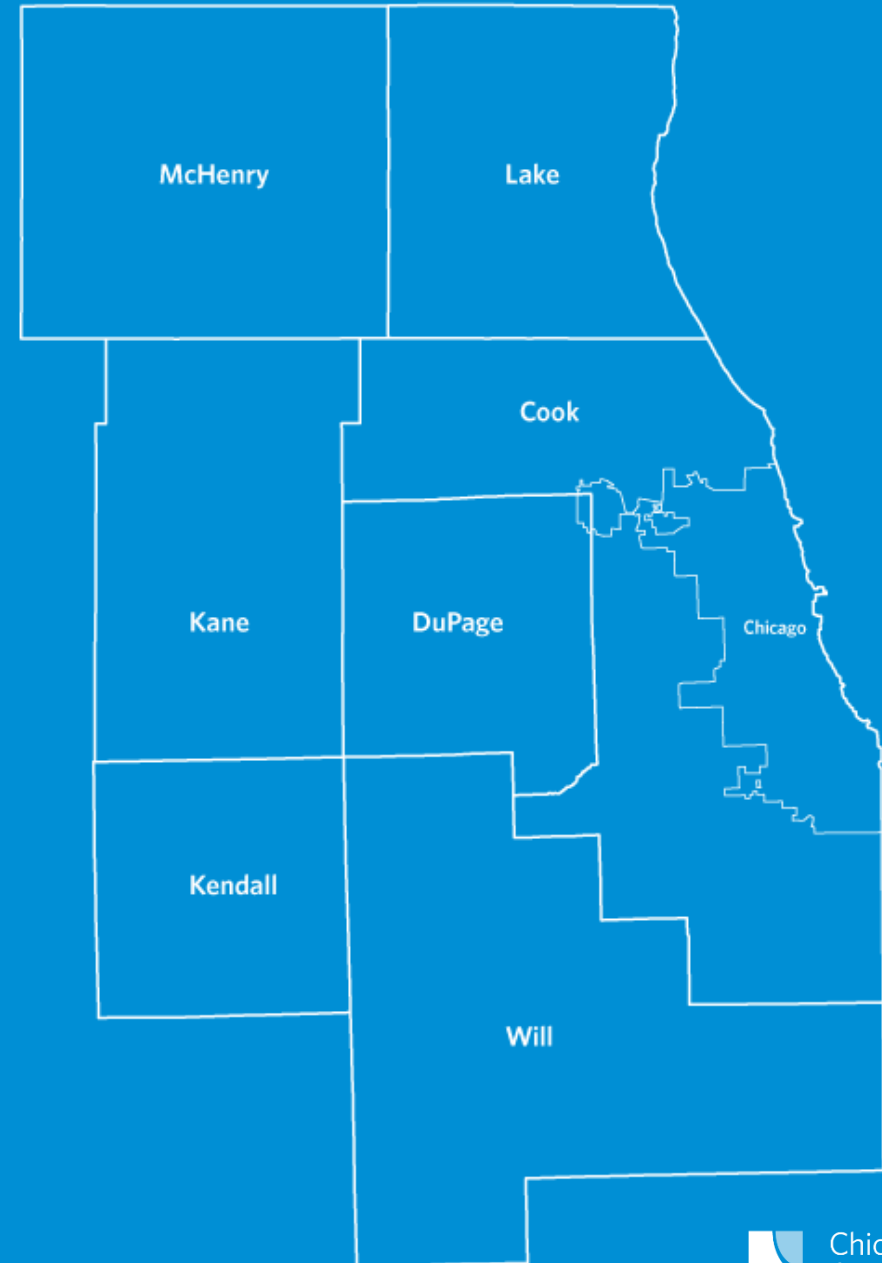
How familiar are you with the FSI?

1. I have used it
2. I have heard about it
3. Given my previous answer, I am clearly hearing about it for the first time

Who is CMAP?

Metropolitan planning organization
for northeastern Illinois

- Land use and transportation planning
- Policy and data research
- Government coordination

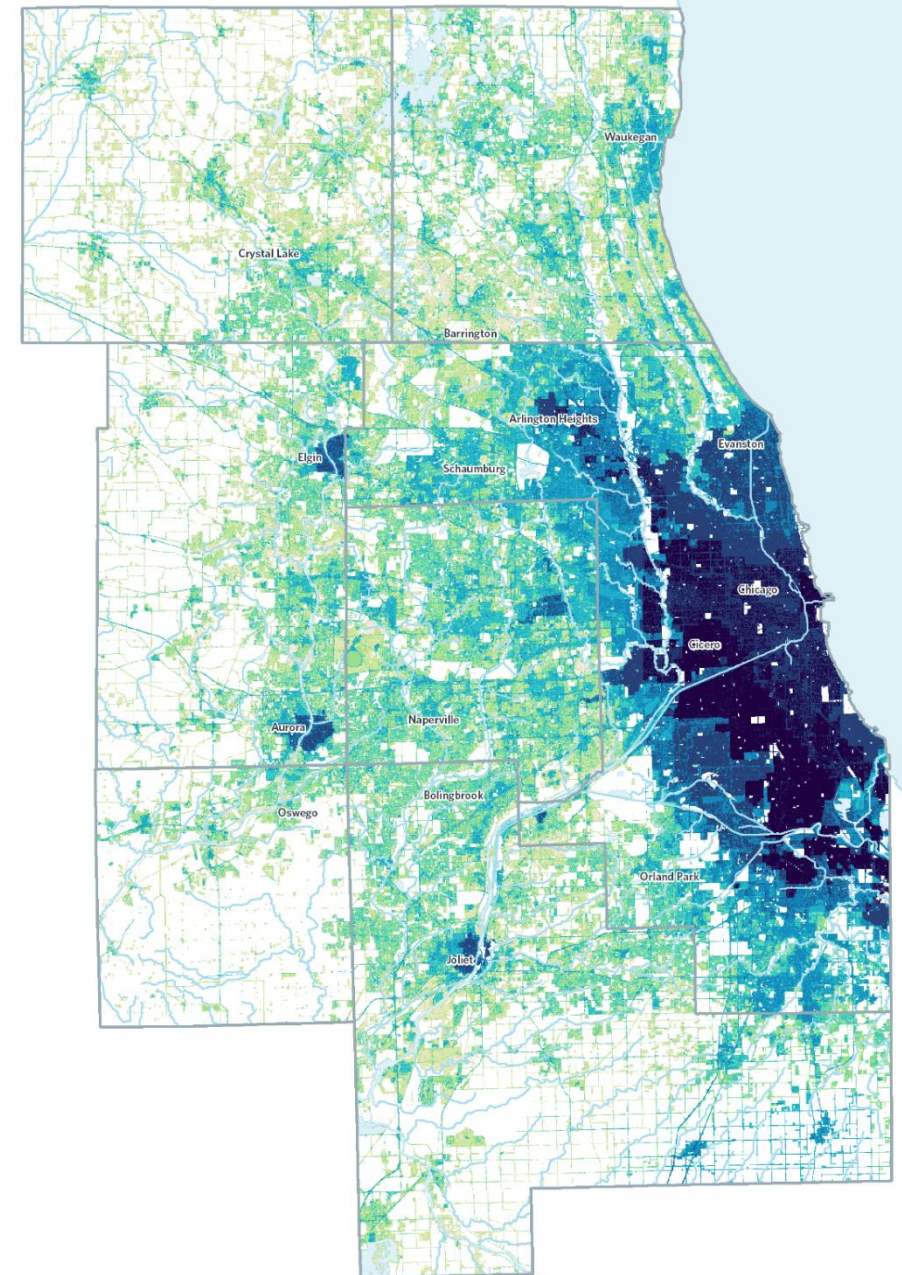


Flood susceptibility index (FSI)

Purpose: Identify priority
areas across the region for
flood mitigation activities

Urban Flood Susceptibility Index

- 10 (more susceptible)
- 9
- 8
- 7
- 6
- 5
- 4
- 3
- 2
- 1 (less susceptible)



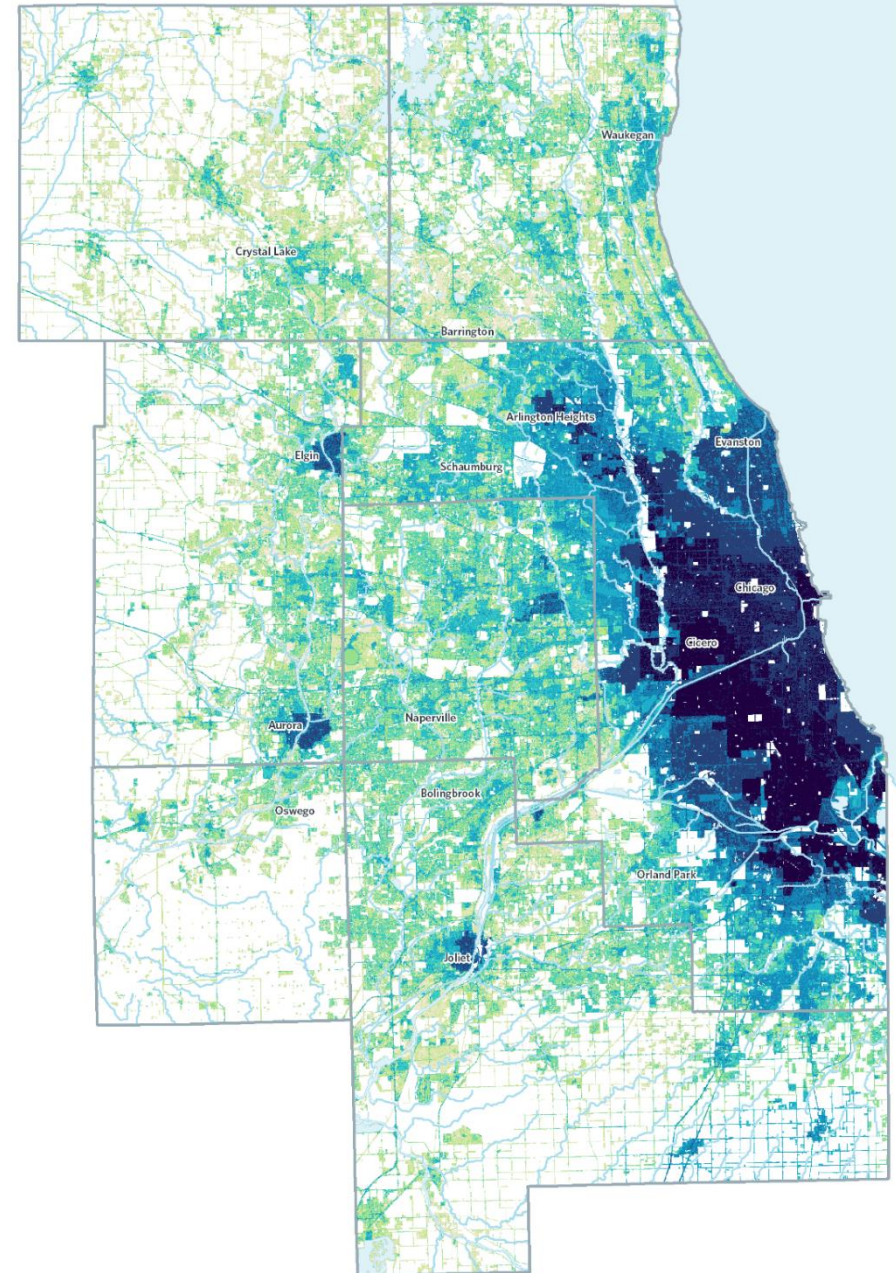
What is the FSI?

Use flood-related factors to identify priority areas based on past flooding locations

Urban and riverine index, scale of 1 to 10

Urban Flood Susceptibility Index

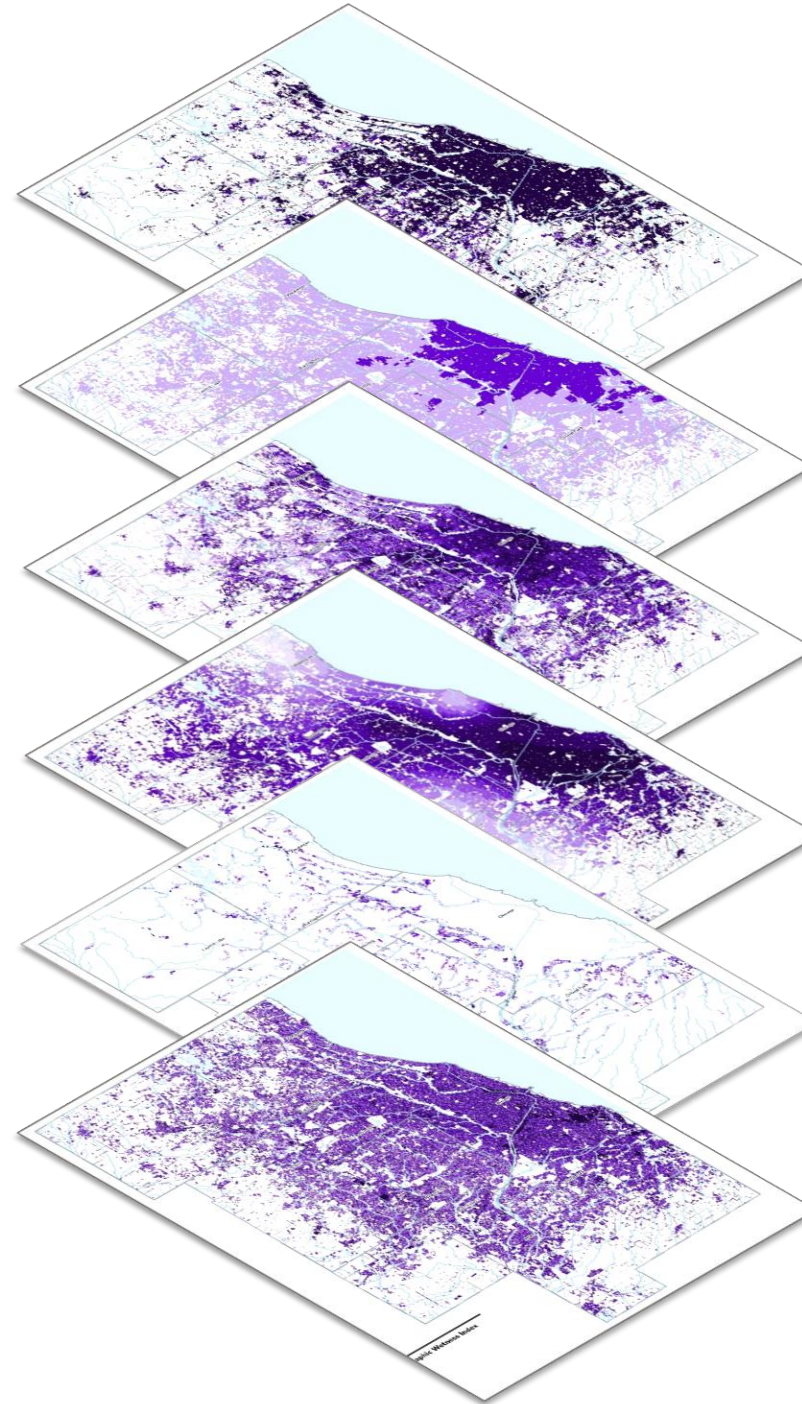
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- 2
- 1 (less susceptible)



Urban FSI

Focuses on developed land
outside the 100-yr floodplain
/ MWRD 100-yr inundation

Six flood-related factors



Impervious cover

Sewer type

Age of first development

Precipitation variation,
10-year, 2-hour storm event

Elevation differential
with base flood elevation

Topographic wetness index
(low-lying areas)



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Flood location data

FEMA NFIP, Individual
Assistance Grants, and
Discovery Data

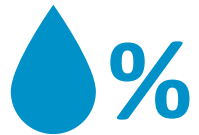
Chicago 311 Standing Water
Locations

DuPage, Kendall, Lake, and
MWRD



Frequency ratio approach

Statistical method to identify flood-susceptible areas based on the observed relationship between reported flood locations and flood-related factors.



$$\frac{\textit{Percent of flood events in factor category}}{\textit{Percent of study area in factor category}} = \textit{Frequency ratio}$$



Frequency ratio approach

Combined Sewer Service Areas for the Urban Index

Factor	Categories	Percent (%) of Study Area	Percent (%) of Flood Locations	Frequency Ratio
Combined Sewer Service Area	Present	15.8%	27.4%	2.35
	Absent	84.2%	72.6%	0.75

$$\frac{27.4\% \text{ of flood locations in "Present" category}}{15.8\% \text{ of study area is "Present" category}} = FR \text{ of } 2.35$$

FSI applications

Local Technical Assistance
projects (CMAP)

Stormwater master planning
assistance (Metropolitan
Water Reclamation District of
Greater Chicago)

Open space and green
infrastructure decisions (The
Nature Conservancy)



Why are we updating the FSI?

Make more relevant to partners

Account for more flood location
data

Refine methodology

Explore additional flood-related
factors



Other factors being considered

Basin area

Stream frequency

Storage capacity

Soils

Future precipitation

Depressions



How long will it take?

Release update by end of 2023

Open to receiving additional
input and data

Kelsey Pudlock

kpudock@cmaphillinois.gov

312.386.8631





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Investing in an equitable flood-resilient future



Why?



Flooding does not impact all people or communities equally



There is unprecedented funding for resilience improvements



We have a responsibility to address disparities

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Which of these data have you used to inform your work?

1. Age
2. Disability
3. English proficiency
4. Health conditions
5. Income
6. Race and ethnicity
7. Environmental burden (air quality, proximity to hazardous sites)

An aerial photograph of a residential neighborhood where streets and yards are flooded with brown water. The houses have various roof colors, and there are many green trees. A semi-transparent blue rectangle is overlaid in the center of the image, containing white text.

Who is most impacted by flooding?



Why does it flood?

Floodplains, low-lying areas

Poorly drained

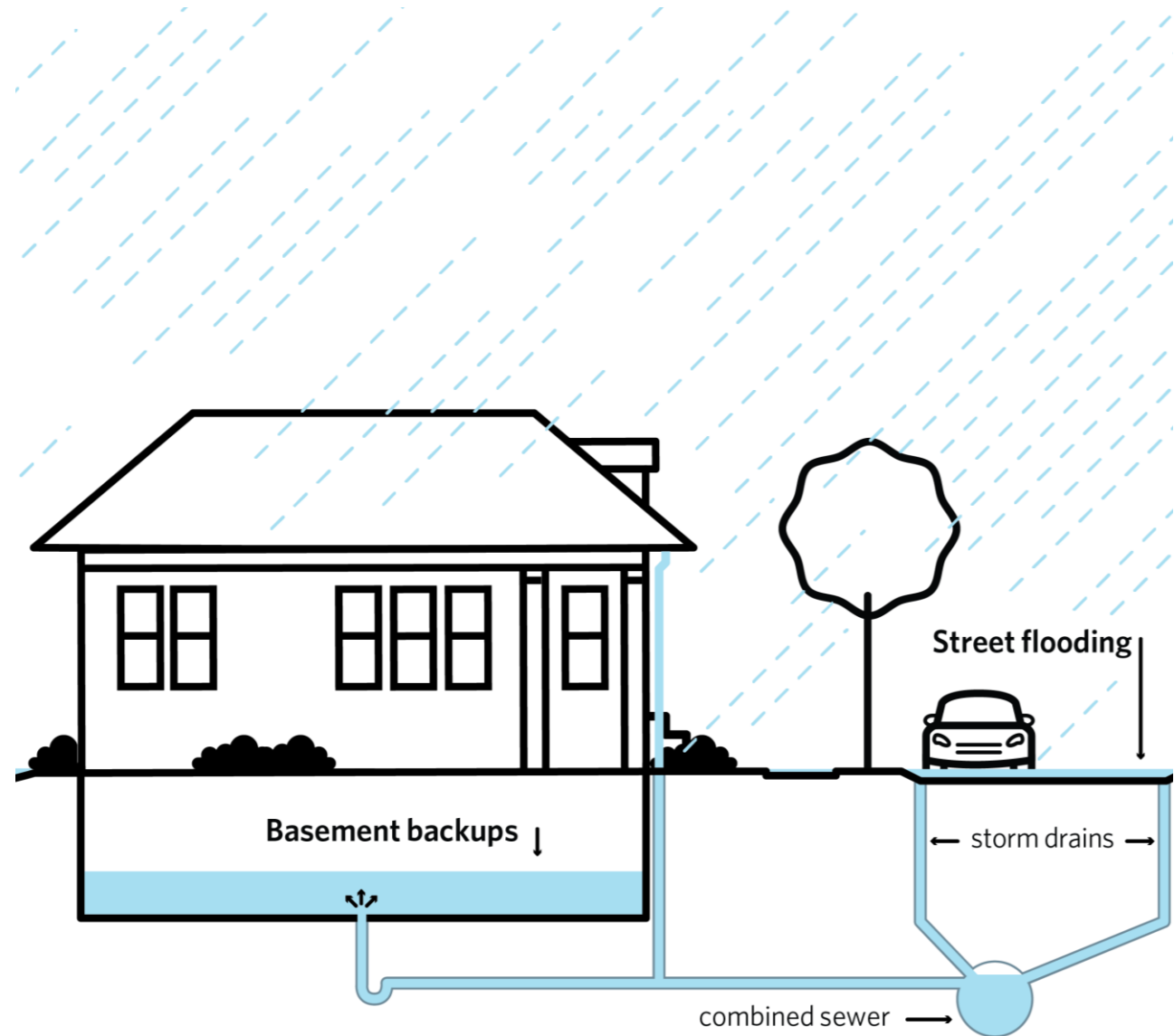
Drainage paths



Why does it flood?

Infrastructure is:

- old
- poorly maintained
- insufficient



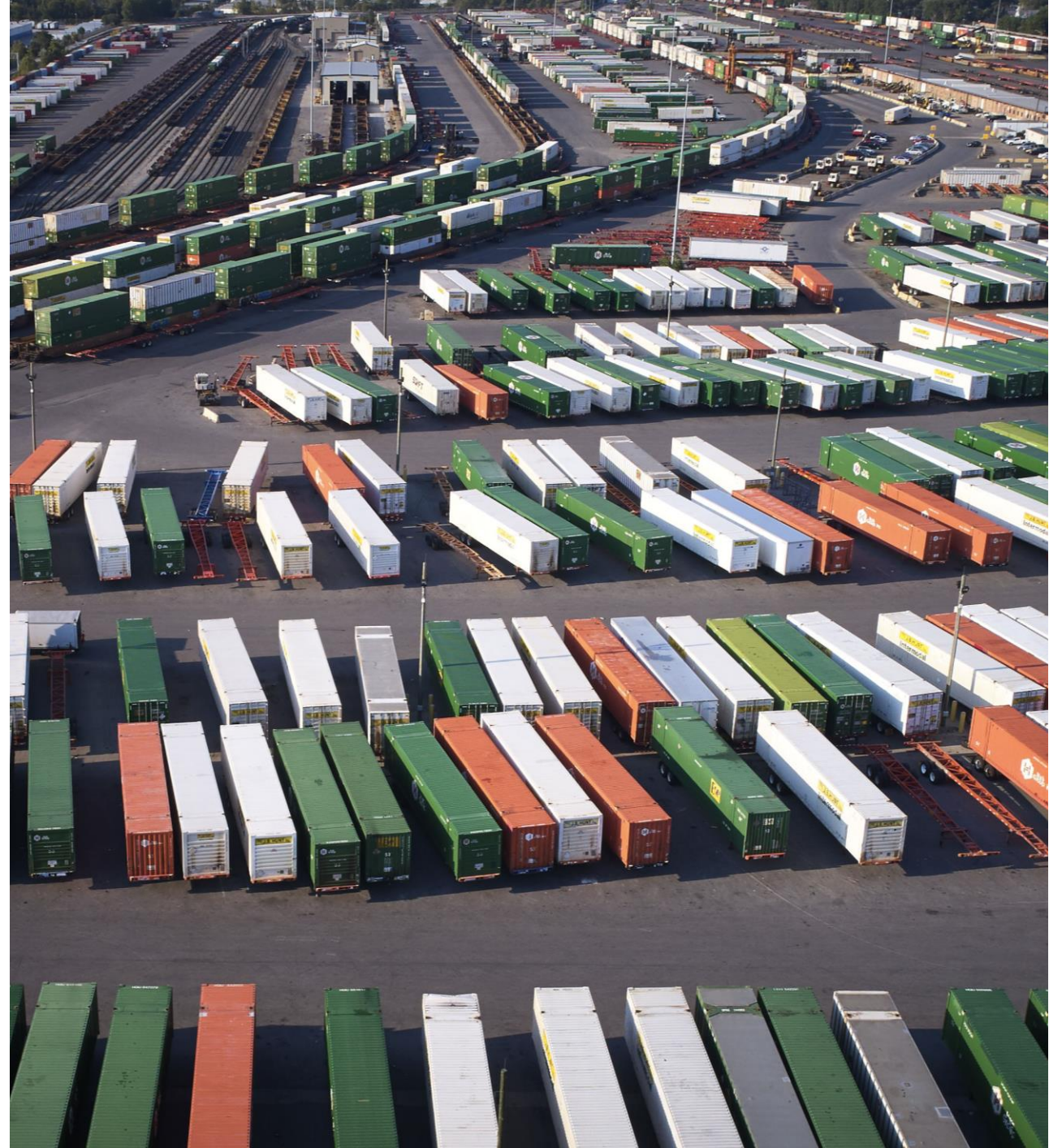


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What makes flooding worse?

More impervious cover

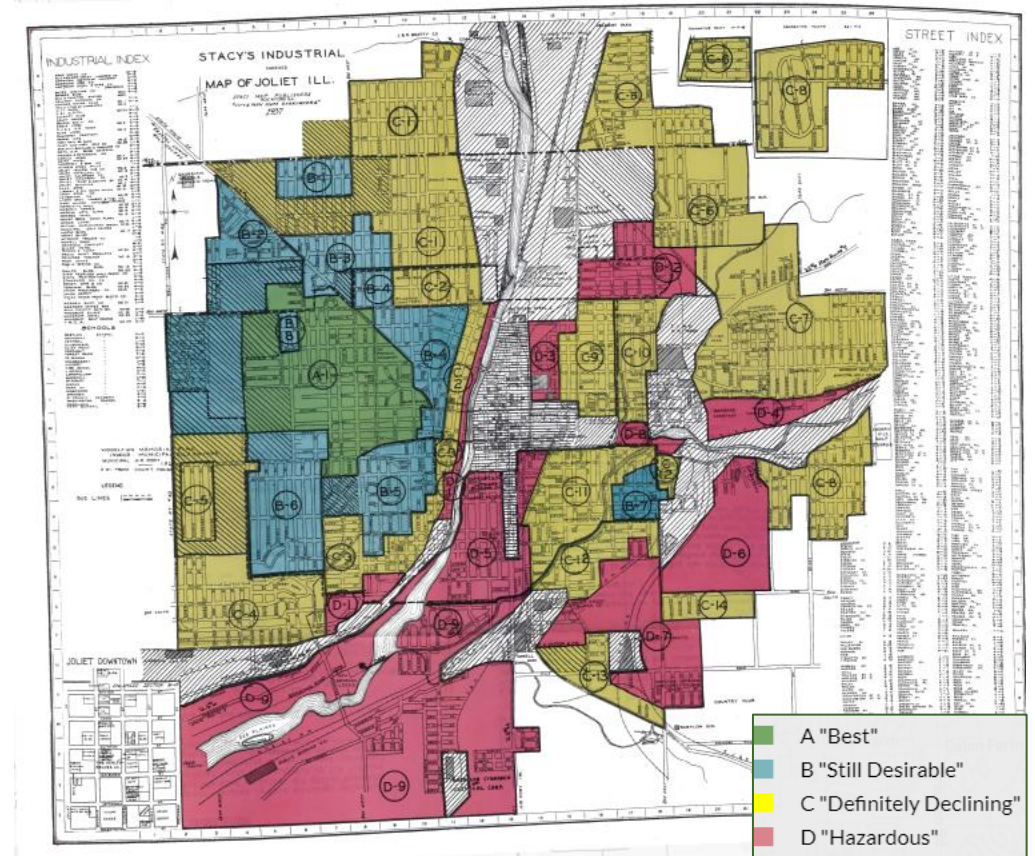
Polluting land uses



How did we get here?

Policies and practices that restrict who can live where

- Redlining and racial covenants
- Land use and zoning (i.e., single-family zoning)



Home Owners' Loan Corporation ("redlining") map for Joliet, IL.

Source: Mapping Inequality,

<https://dsl.richmond.edu/panorama/redlining/#loc=13/41.526/-88.137&city=joliet-il>

Individual ability to recover

- Financial resources to make repairs
- Access to insurance (health, flood, etc.)
- Limited options for renters



Municipal capacity to respond

- Disinvestment leads to low revenue
- Technical expertise and staff capacity
- Ability to apply for funding



An aerial photograph of a residential neighborhood where many streets and yards are flooded with brown water. The houses have various roof colors, and there are many green trees. A semi-transparent blue rectangle is overlaid in the center of the image, containing white text.

How is funding shifting to meet the need?

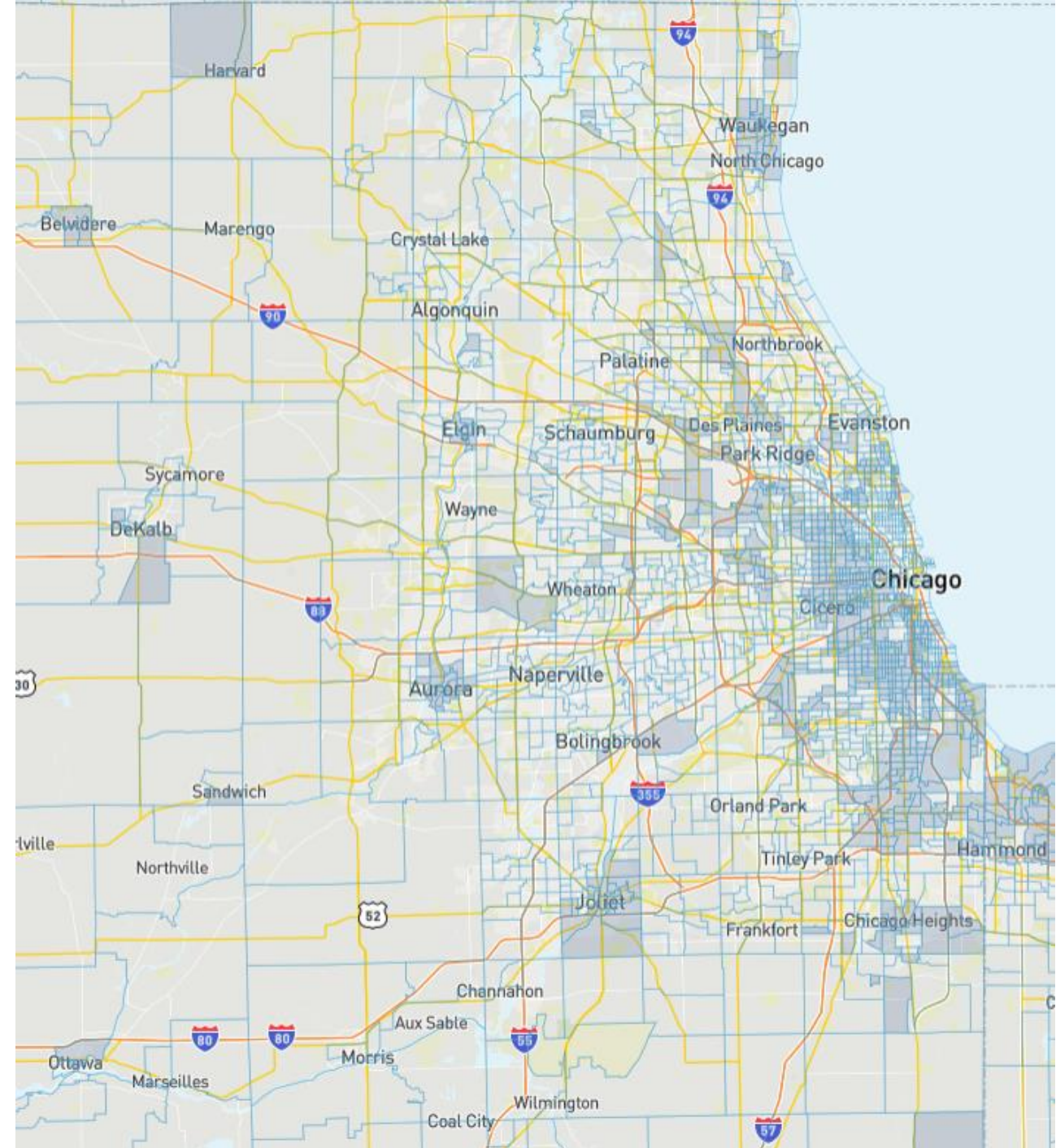


Justice40 Initiative

40% of benefits to high-need communities (“disadvantaged” census tracts)

Applies to FEMA (BRIC, FMA),
EPA (CWSRF, Section 319),
USACE, and others

Source: Climate and Environmental Justice Screening Tool,
<https://screeningtool.geoplatform.gov>



An aerial photograph of a residential neighborhood where streets and yards are flooded with brown water. The houses have various roof colors, and there are many green trees. A semi-transparent blue rectangle is overlaid in the center of the image, containing white text.

**How can we improve
our work?**



Build community partnerships

- Build trust
- Educate and empower
- Engage to influence planning and design
- Compensate for time and expertise



Use equity data to assess risk and benefits

- Who is burdened?
- Who benefits?
- Who is missing from the table?
- Are we advancing equity over time?



Next steps and guidance

1

Ongoing

Engage government partners and community-based organizations

2

Ongoing

Compile equity-focused data

3

Sep 2023

Develop guidance to incorporate equity into investment decisions

4

Oct 2023-Jun 2024

Help partners prioritize and implement practices

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What areas would you like to receive more guidance on?

1. Community partnerships and engagement
2. Data analysis
3. Project prioritization/selection
4. Contract procurement
5. Operations and maintenance



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Thank you

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