



**CHICAGO
REGION
TREES
INITIATIVE**

Our Trees.
Our Communities.
Our Future.

Trees: Equity for Climate Resilience

Emily Okallau

Community Outreach Coordinator
Chicago Region Trees Initiative



CRTI: Chicago Region Trees Initiative

Vision: The Chicago region will be the most verdant, most livable, most resilient region in North America

Mission: CRTI believes that trees are critical to achieving this vision.

- Trees are healthier and more abundant, diverse, & equitably distributed
- Provide benefits to all people and communities that live in the region
- 4 goals
 - Inspire people to value trees
 - Increase the Chicago region's tree canopy
 - Reduce threats to trees
 - Enhance oak ecosystems



Why Trees?

Social

Make us happier

Financial

\$1.37-\$3.09 return for \$1 planted
(environmental improvements)

Physical / mental health

Healthier lives

Stormwater

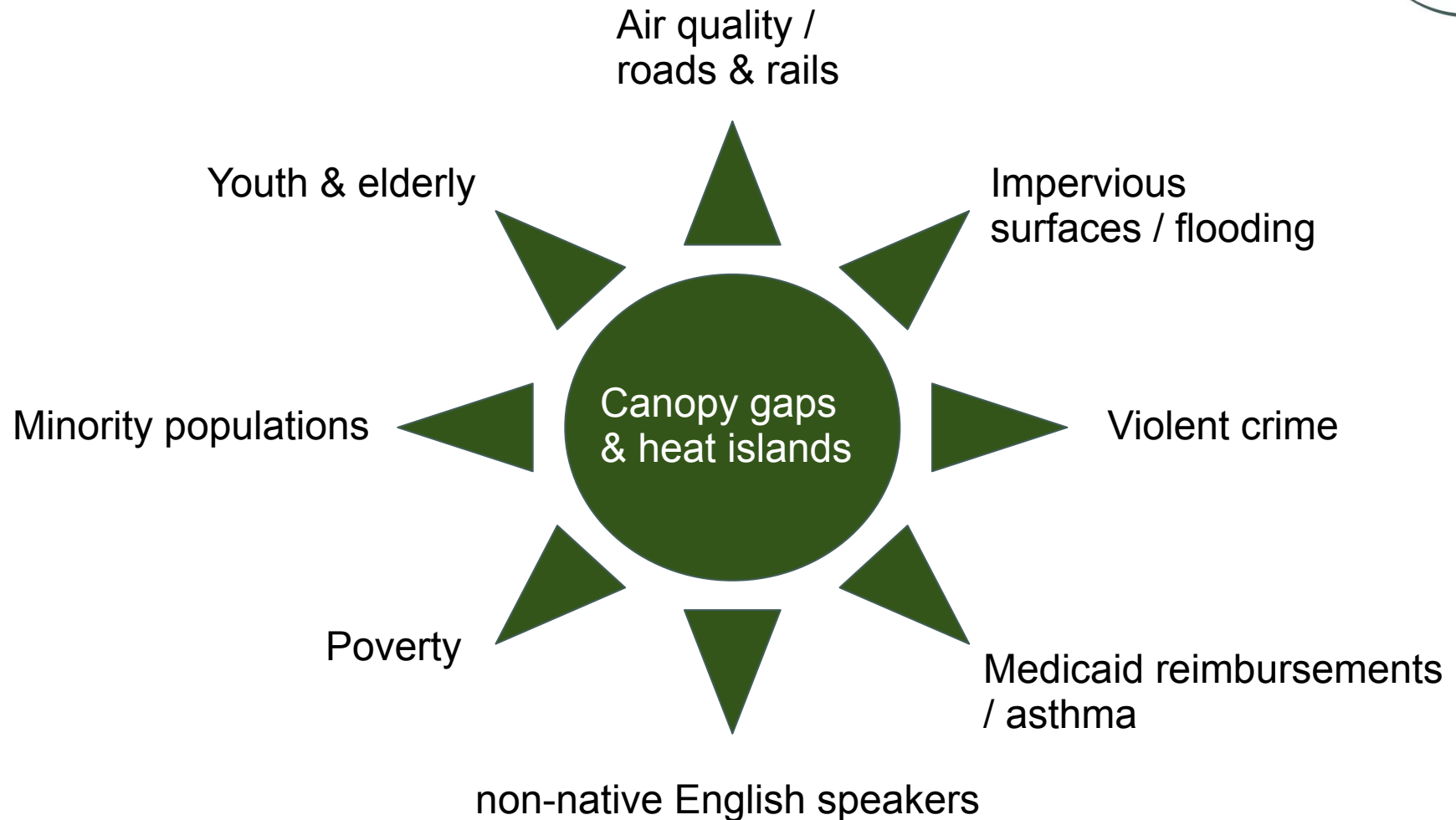
Reduces flooding & pollution



Tree Data: Making data usable

- LiDAR
 - Ground-truthing / tree census
 - Tree inventories
- Size classes
- Comparing to socioeconomic data

Data Comparison: Vulnerabilities



Data Comparison: Vulnerabilities



	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Muni	Pop Density	Housing Density	English 2nd	Percent Poverty	Median Household Income	Percent food stamps	% un-employed	Percent minority	Total medicaid reimb.	EPA Toxins	Imper.	Temp.	Rank
2	Addison	3,509.57	1,175.21	12.208	6.9323	59,372.36	12.066	11.08235	29.4526	1,470,900.81	2.4335	43%	79.29	34
3	Algonqui	2,204.39	745.86	3.2159	2.8883	98,061.61	2.7002	8.605452	13.7902	1,499,442.52	1.3713	23%	75.01	167
4	Alsip	2,776.20	1,006.81	4.1815	6.3176	56,138.81	12.855	12.54974	29.1893	2,142,120.52	2.8172	45%	79.31	30
5	Antioch	949.20	343.22	1.1403	6.2489	79,061.38	7.3366	8.525373	10.3141	1,399,221.06	1.3295	18%	72.25	203
6	Arlington	4,740.62	1,878.31	7.0822	3.2819	80,706.92	4.206	6.264979	12.7253	2,205,230.94	2.3064	35%	78.13	100
7	Aurora	4,001.86	1,222.00	6.2086	5.0558	77,260.44	11.749	9.427686	33.9271	945,950.67	1.7251	33%	77.09	84
8	Bannock	1,875.66	530.13	1.3137	1.5722	145,410.22	0.7486	4.748683	11.1711	1,025,061.00	2.0101	19%	73.03	246
9	Barringt	1,060.27	374.32	3.399	4.7502	110,146.99	3.8823	8.945155	14.5807	1,877,217.55	1.6263	25%	73.84	214
10	Barringt	544.28	177.65	2.1285	6.2491	118,908.95	3.2607	8.136122	16.8246	2,524,187.42	1.3493	3%	68.47	301
11	Bartlett	2,140.62	726.70	3.868	3.1212	96,723.96	4.1541	7.251144	21.802	1,643,637.50	1.5218	21%	75.13	136
12	Batavia	2,086.02	758.89	1.6369	3.3415	97,048.40	6.3507	7.688572	10.3403	1,424,911.77	1.5855	33%	75.15	138
13	Beach P	1,548.28	533.29	2.9083	4.8595	68,695.64	9.5592	10.10862	36.8764	1,947,582.31	1.2628	14%	71.31	264
14	Bedford	1,660.20	552.59	15.248	5.8842	49,965.19	9.3089	10.6917	18.09	2,183,821.14	2.193	59%	80.26	12
15	Beecher	141.22	51.12	0	4.2	67,980.73	3.98	12.59995	6.80182	4,095,841.62	1.011	21%	74.08	156
16	Bellwood	7,995.54	2,552.50	2.5495	5.8297	52,456.47	23.424	15.15943	86.4971	1,401,514.72	2.2535	48%	82.81	28
17	Bensenv	2,466.35	858.69	11.29	7.8358	56,050.53	13.013	10.48886	36.2118	1,399,553.69	3.5193	50%	80.56	11
18	Berkeley	2,934.20	1,064.61	3.5102	3.0114	61,838.65	11.049	10.29681	51.0516	2,825,622.99	2.7491	51%	80.47	23
19	Berwyn	14,530.36	4,710.29	9.1743	6.4718	56,969.78	17.059	12.22046	37.8404	1,745,721.50	1.9567	59%	83.29	17
20	Big Rock	49.18	18.40	0.3009	1.9009	67,114.25	5.7984	11.39492	4.47466	2,116,274.76	0.9794	5%	73.22	239
21	Bloomin	3,416.54	1,327.00	5.1009	4.131	70,945.17	6.6169	7.451523	22.407	1,412,693.97	1.8793	32%	77.24	88
22	Blue Isla	4,954.41	1,731.99	7.1489	8.4174	39,228.71	27.282	15.62418	64.7645	1,612,560.85	2.7091	41%	78.09	43

Size Matters



Size (DBH)	Total \$\$	CO2 \$\$	Annual CO2	Storm-water \$\$	Runoff avoided	Rainfall avoided	Air pollution \$\$	CO2 \$\$ to date	Lifetime equivalent
2 in	1.28	0.39	16	0.37	42	116	0.51	0.49	5.7
5 in	3.89	1.33	57	0.93	104	290	1.63	4.54	53.26
10 in	11.23	3.61	155	2.31	258	716	5.31	25.35	297
20 in	25.21	6.07	261	6.15	688	1908	12.99	143	1681
30 in	34.06	5.43	233	10.54	1180	3273	18.09	395	4628
40 in	37.90	7.84	337	11.66	1305	3621	18.39	809	9482

Size Matters



Size (DBH)	Total \$\$	CO2 \$\$	Annual CO2	Storm-water \$\$	Runoff avoided	Rainfall avoided	Air pollution \$\$	CO2 \$\$ to date	Lifetime equivalent
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10 in	11.23	3.61	155	2.31	258	716	5.31	25.35	297
20 in (fair)	21.27	4.97	214	5.04	564	1565	11.27	143	1680
30 in (excellent)	34.06	5.43	233	10.54	1180	3273	18.09	395	4628
30 in (good)	33	5.15	221	10.02	1120	3109	17.44	395	4628
30 in (poor)	22.85	3.36	144	6.54	731	2029	12.96	395	4628

Climate Resilience & Tree Equity



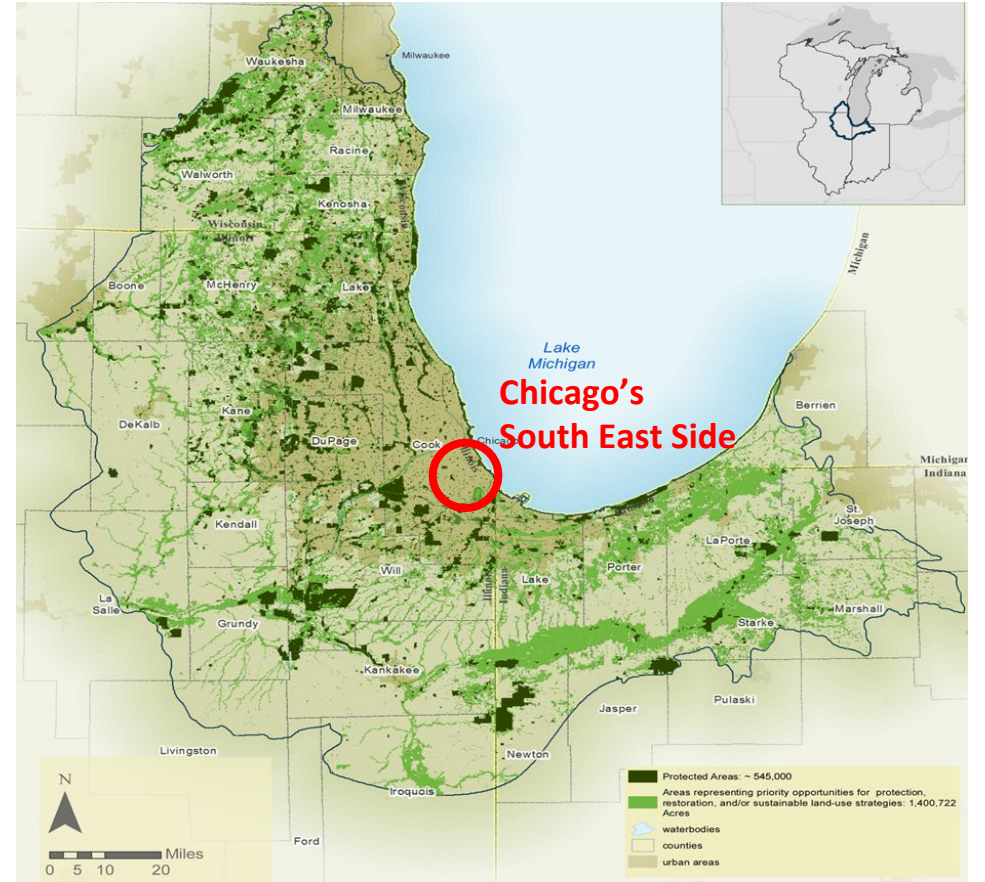
- Who are the most vulnerable among us?
 - How do we know we are able to assist them?
 - Data... but also ground-truthing
- Who should be at the table?
- How can we augment work that is already in progress?



Conclusions

- Trees help people & the environment
- We need to take good care of trees
- It's important to be equitable in allocating tree resources

Emily Okallau || eokallau@mortonarb.org





An aerial photograph of a residential neighborhood in Chicago, showing rows of houses with brown roofs and green trees. In the background, a large industrial site with a large body of water and a bridge is visible under a grey sky. The text is overlaid in the center of the image.

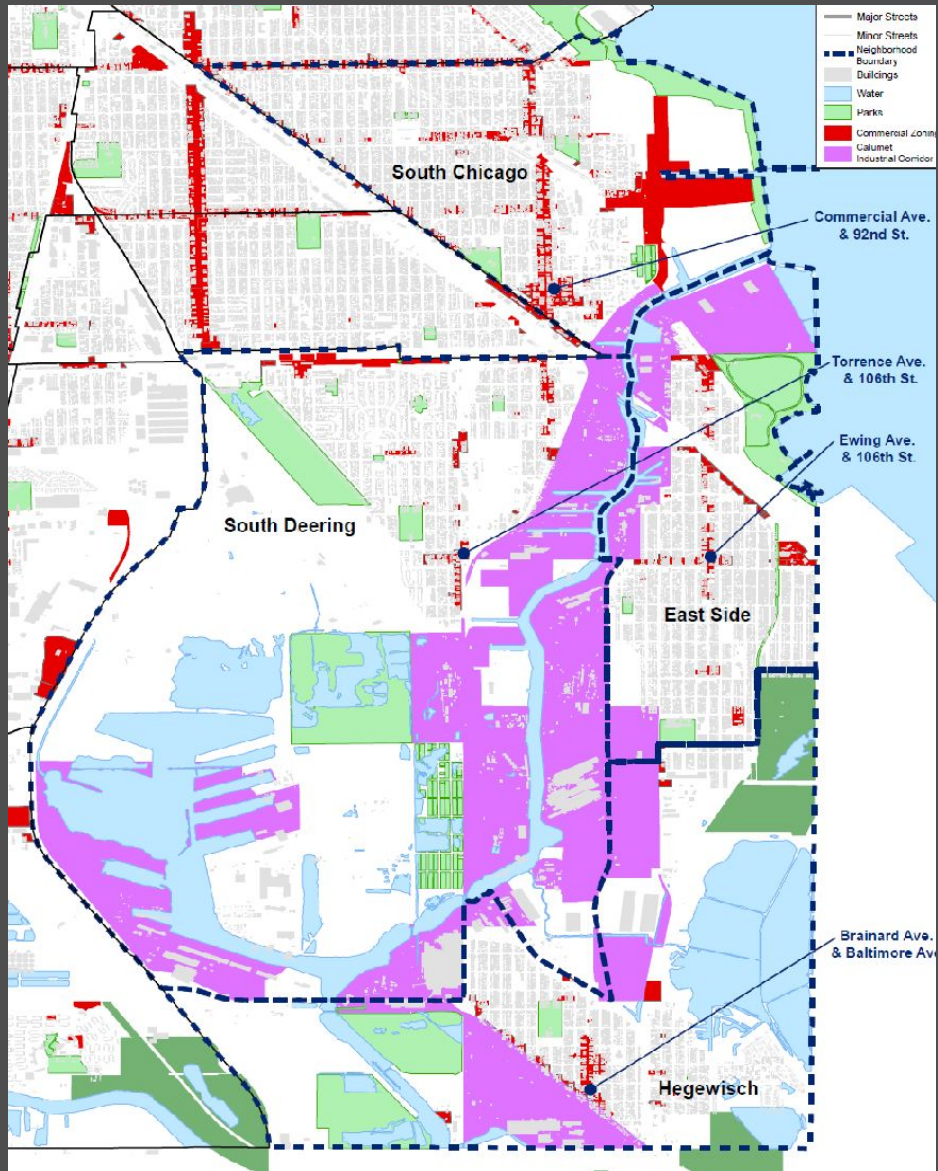
**CHICAGOANS BATTLE
MANGANESE
DUST POLLUTION**

GOALS

1. **HOW WE WORK:** Elevate community expertise to advance plans and policies
2. **WHAT:** Have a thriving GL community that is safe to work, learn and play









Lori Lightfoot

Mayor of Chicago

Olga Bautista

Alliance for the Great Lakes

One Chicago for All
A CALL TO ACTION FOR A MORE INCLUSIVE AND EQUITY-ORIENTED CITY

One Chicago for All

Far South Side Neighborhood Conversation
Wednesday, June 28th, 1:30-3:00pm
Villa Madalena, 3205 East 91st Street

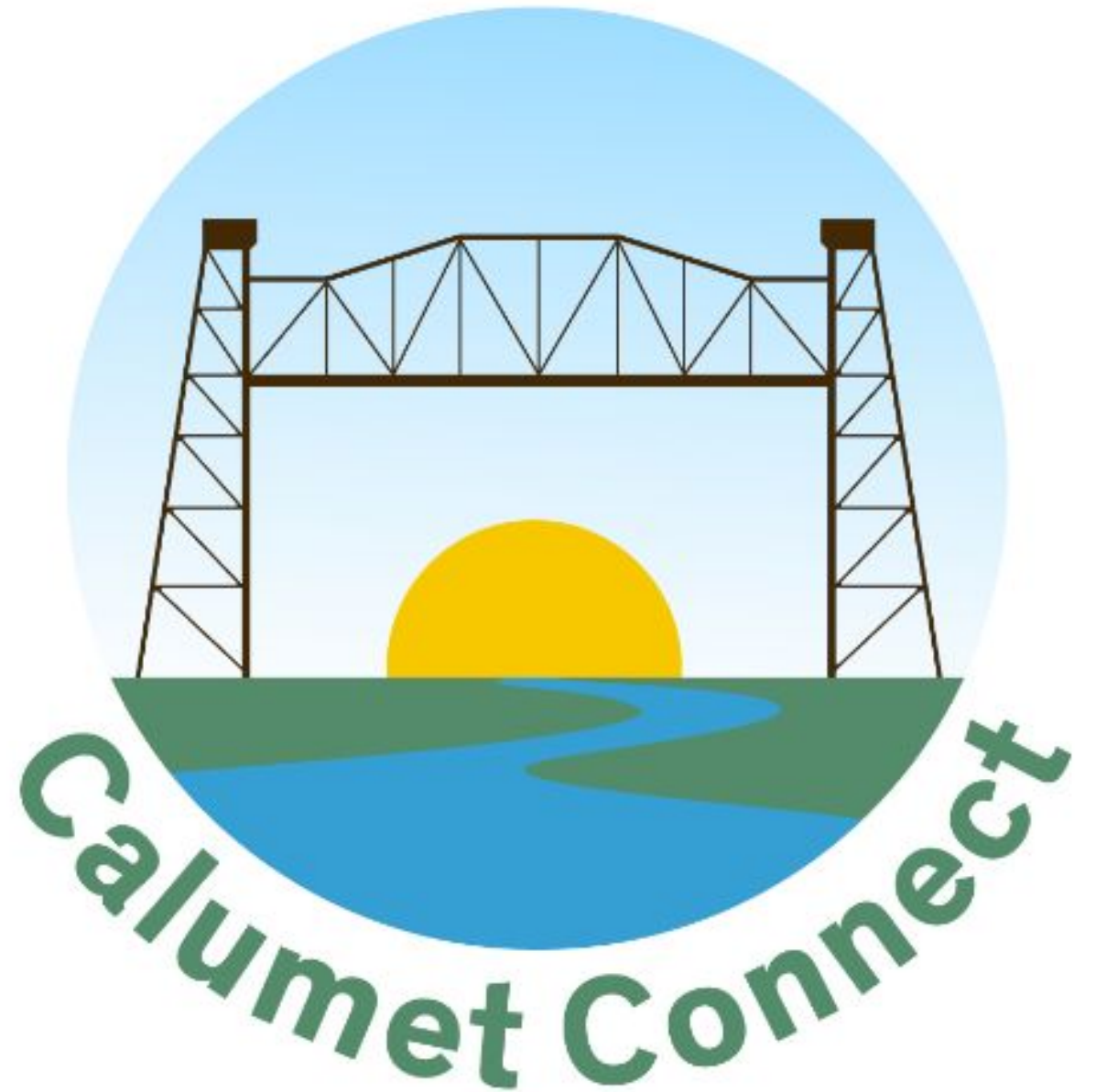
Hosts:
• Angelo Hurlock, Christian Adams
• Andrea Spence & Vanessa St. Laurentino Ramirez, Spencer
Facilitator: Consuelo Brown

- 1. Opening + Welcome - V
- 2. Introductions
- 3. Dialogue

- What is a key challenge for your community?
- How might this challenge be addressed?
- In what way...

- Topics:
- 1. How...
 - 2. Pub...
 - 3. EG...
 - 4. W...

Educate to Action







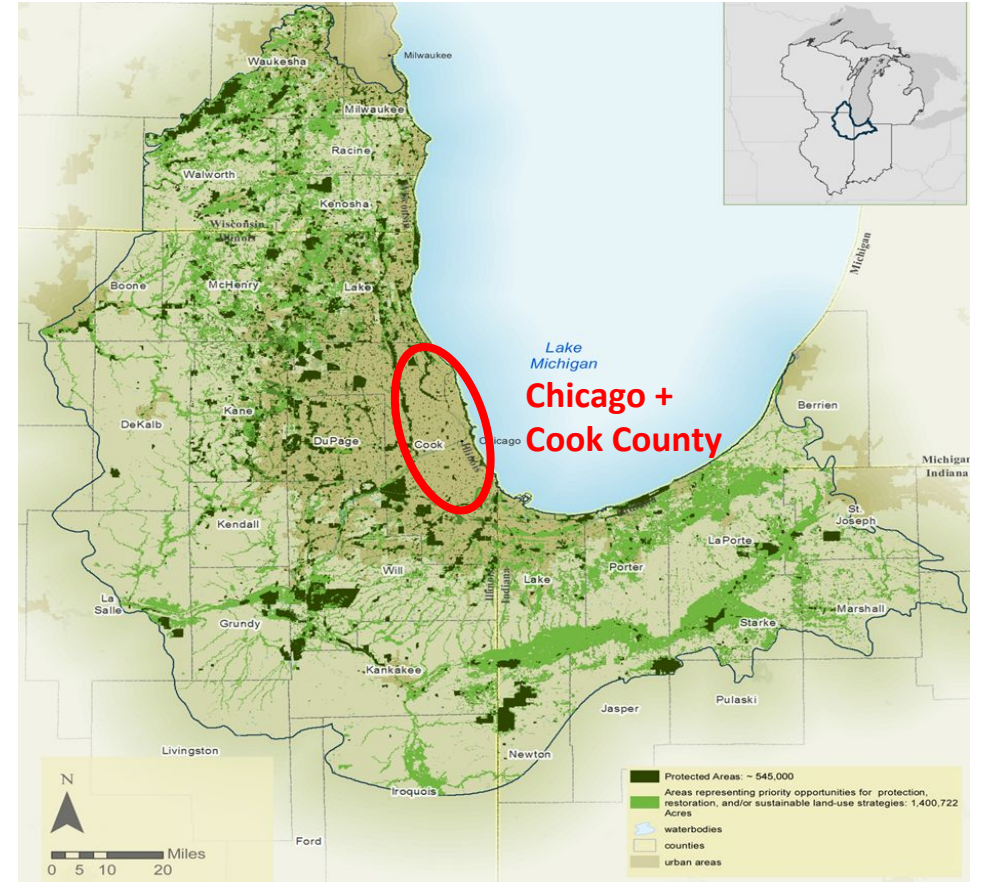


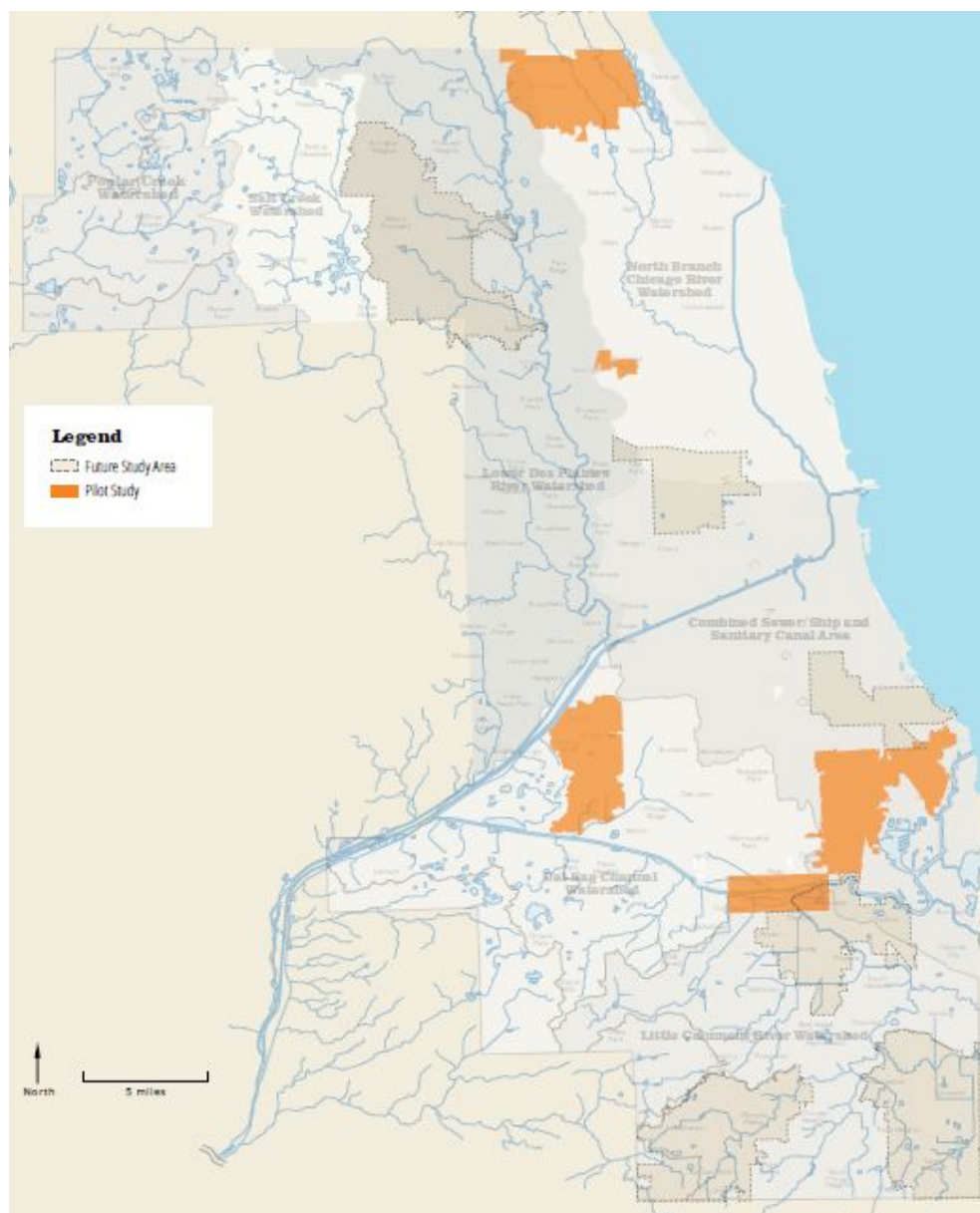






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Metropolitan Water Reclamation District (MWRD) stormwater master plan pilot studies



City of Chicago Green Stormwater Infrastructure Strategy – not comprehensive, does not include long-term funding or financing. Residents still experience persistent flooding.







REDUCING STORMWATER IMPACTS



ENHANCING URBAN BIODIVERSITY



CONNECTING PEOPLE & NATURE

Climate Risk, Equity, and Natural Infrastructure

John Legge



Chicago Greenprint: Identifying Community Climate Vulnerability





NO
PARKING
BETWEEN
SIGNS
→

NO
PARKING
HERE
←
TO
CORNER
←

RIVER SIDE



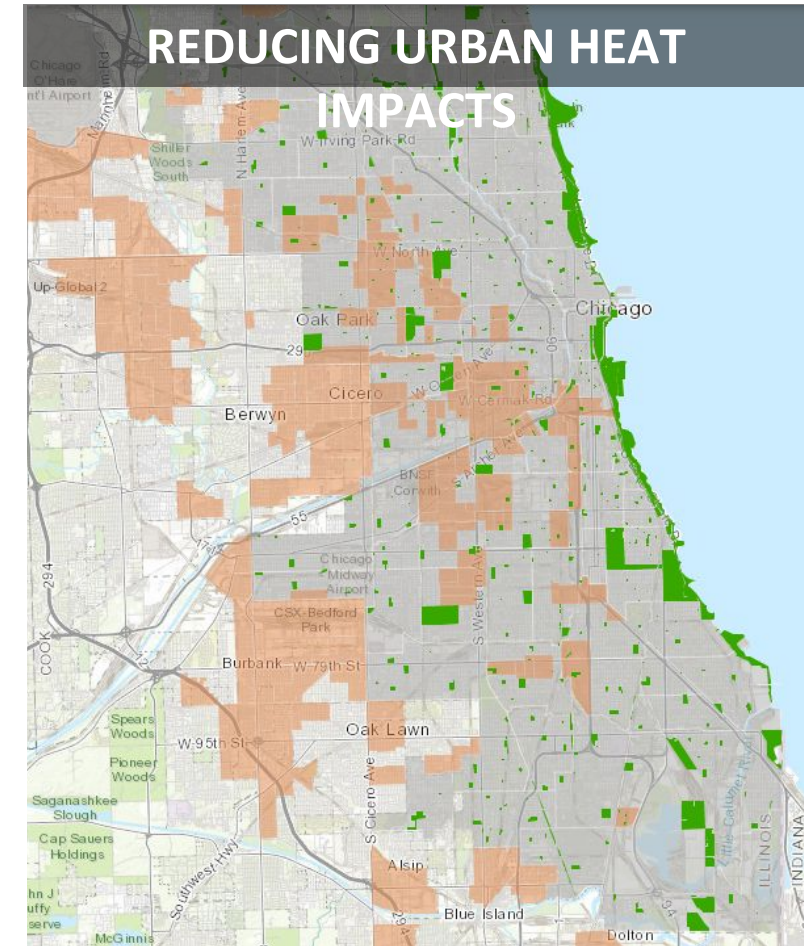
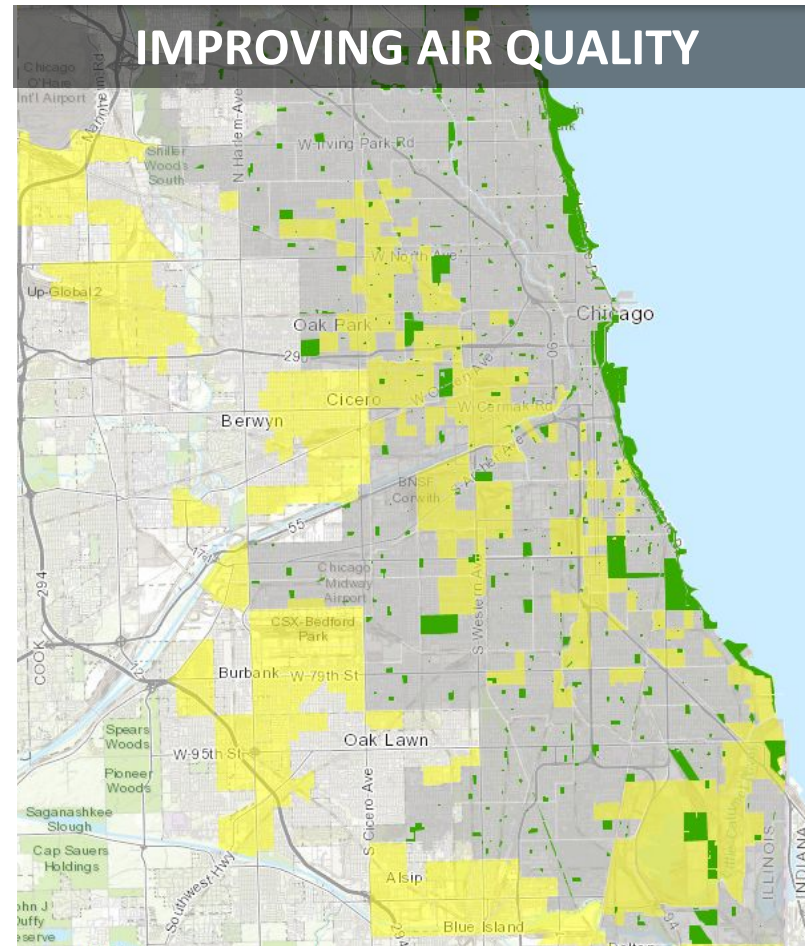
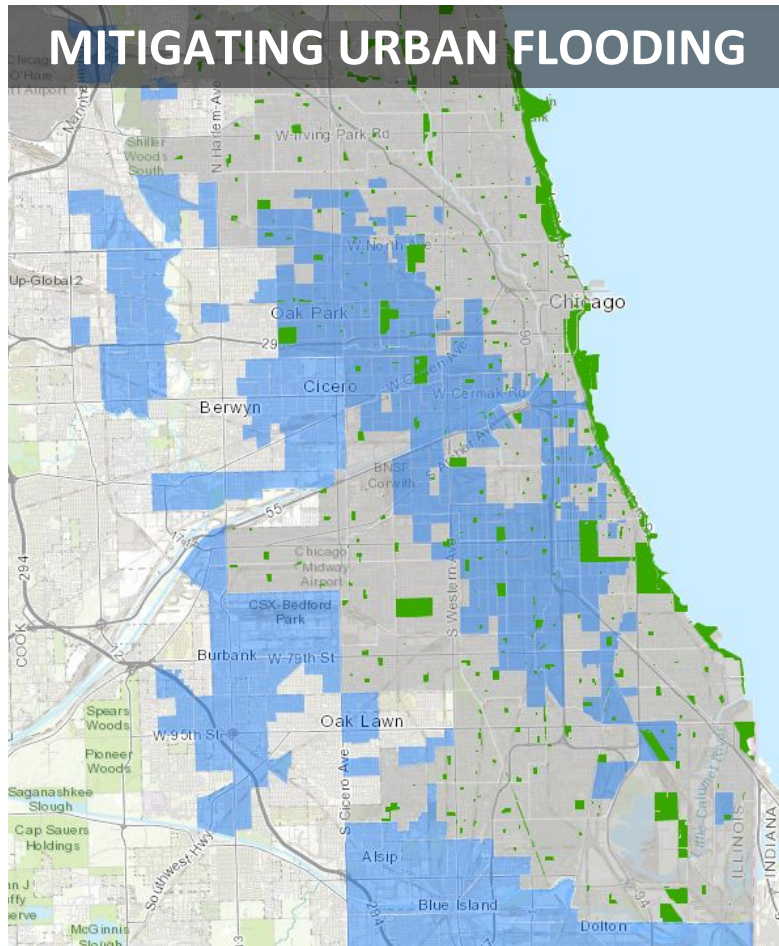




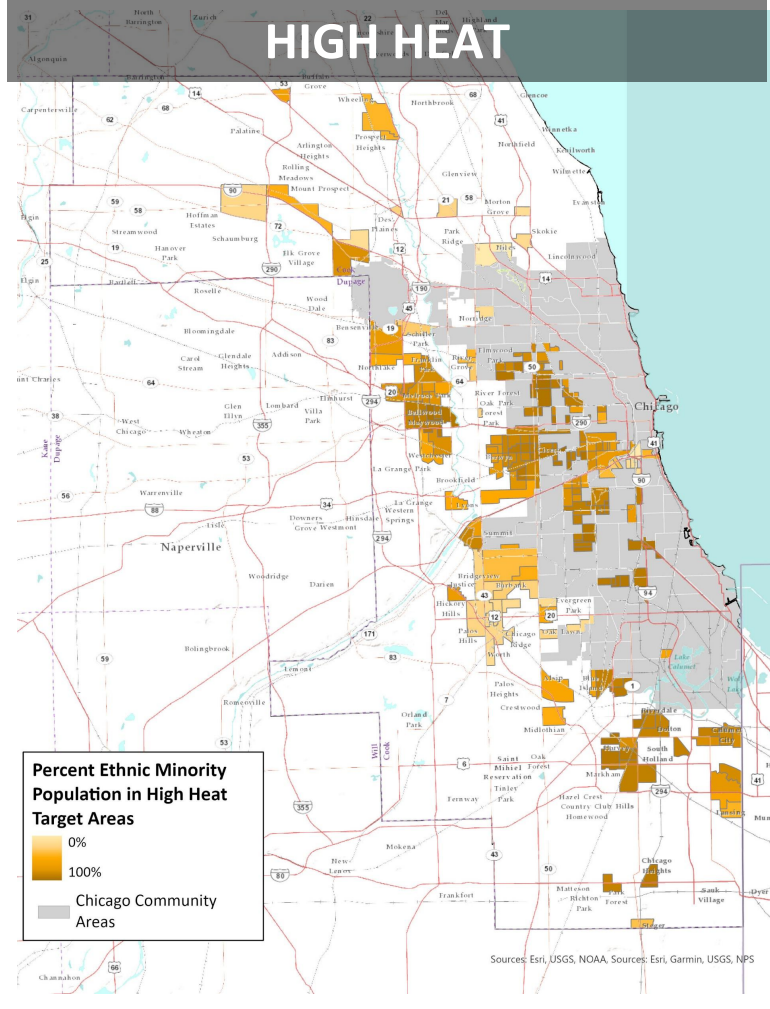
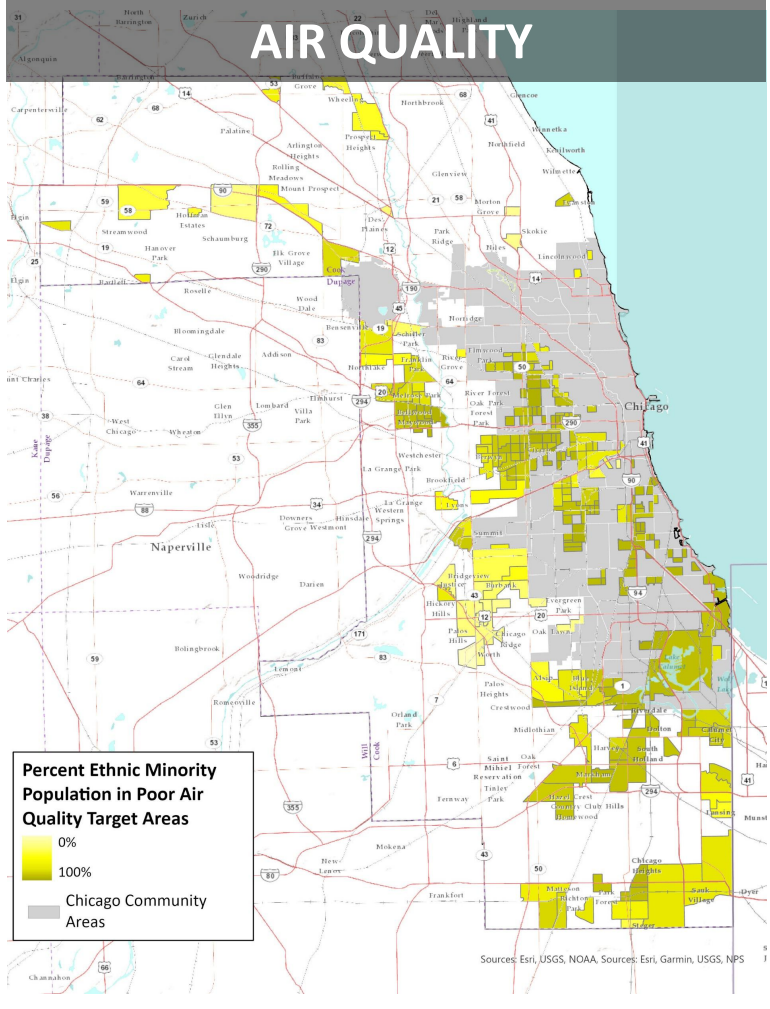
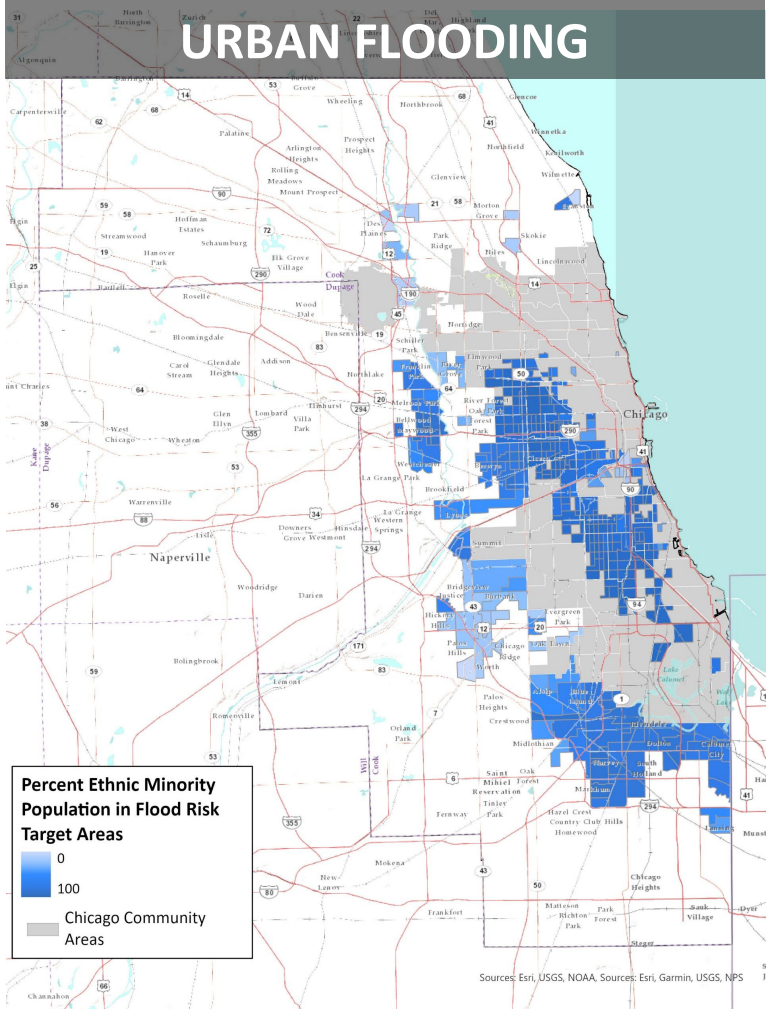
All Data Layers Used

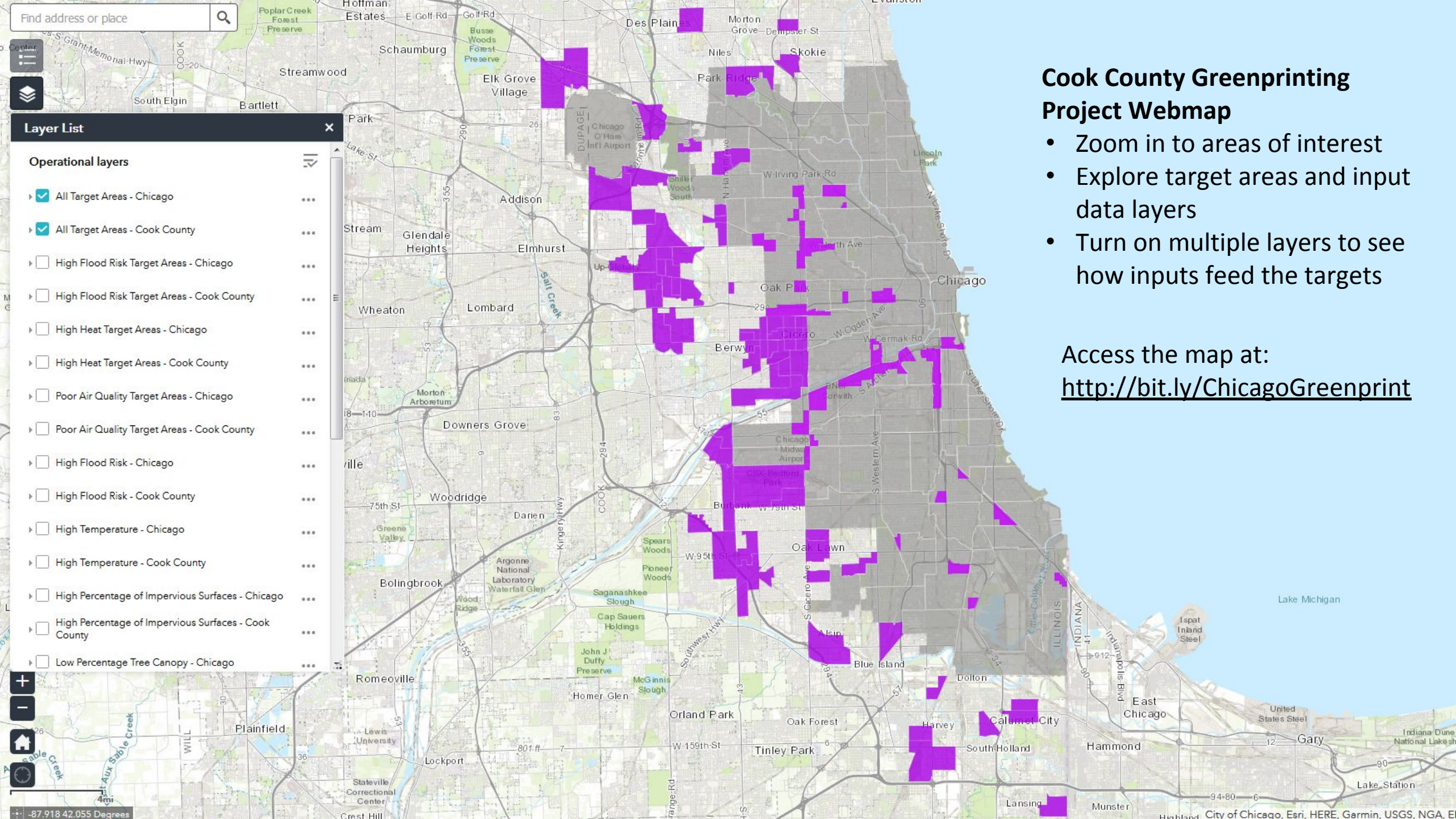
- **Lower Tree Canopy Density** (Source: Morton Arboretum)
- **Higher Percentage of Impervious Surfaces** (Morton Arboretum)
- **Higher Median Summer Temperature** (Source: USGS LANDSAT)
- **Higher Flood Susceptibility** (Source: Chicago Metropolitan Agency for Planning)
- **Higher Air Toxins and Cancer Risk** (Source: US EPA)
- **Higher Average Daily Vehicle Traffic** (Source: IL Department of Transportation)
- **US Census Data**
 - Lower Median Household Income
 - Higher Percentage of Youth Under 18
 - Higher Percentage of Adults Over 65

Identifying where Natural Infrastructure will benefit communities at greatest risk



Racial Equity and Climate Risk





Find address or place

Layer List

- Operational layers
- All Target Areas - Chicago
 - All Target Areas - Cook County
 - High Flood Risk Target Areas - Chicago
 - High Flood Risk Target Areas - Cook County
 - High Heat Target Areas - Chicago
 - High Heat Target Areas - Cook County
 - Poor Air Quality Target Areas - Chicago
 - Poor Air Quality Target Areas - Cook County
 - High Flood Risk - Chicago
 - High Flood Risk - Cook County
 - High Temperature - Chicago
 - High Temperature - Cook County
 - High Percentage of Impervious Surfaces - Chicago
 - High Percentage of Impervious Surfaces - Cook County
 - Low Percentage Tree Canopy - Chicago

Cook County Greenprinting Project Webmap

- Zoom in to areas of interest
- Explore target areas and input data layers
- Turn on multiple layers to see how inputs feed the targets

Access the map at:
<http://bit.ly/ChicagoGreenprint>

-87.918 42.055 Degrees

City of Chicago, Esri, HERE, Garmin, USGS, NGA

Building Nature-Based Stormwater Storage



RAIN GARDENS/BIOSWALES



CONSTRUCTED WETLANDS



DETENTION BASINS



GREEN ROOFS



GREEN STREETS



PERMEABLE PAVEMENT



NATIVE PLANTING



TREES



PAVEMENT
REMOVAL

What is StormStore?

Partnership between TNC and the Metropolitan Planning Council (MPC)

A model marketplace for stormwater credit trading that aims to:

- **Lower costs** of reducing urban flooding
- Help communities + landowners to **achieve co-benefits of natural infrastructure**
- **Improve community resiliency** + opportunities for economic development
- **Provide greater flexibility** for developers
- **Optimize placement** of stormwater infrastructure and nature-based solutions

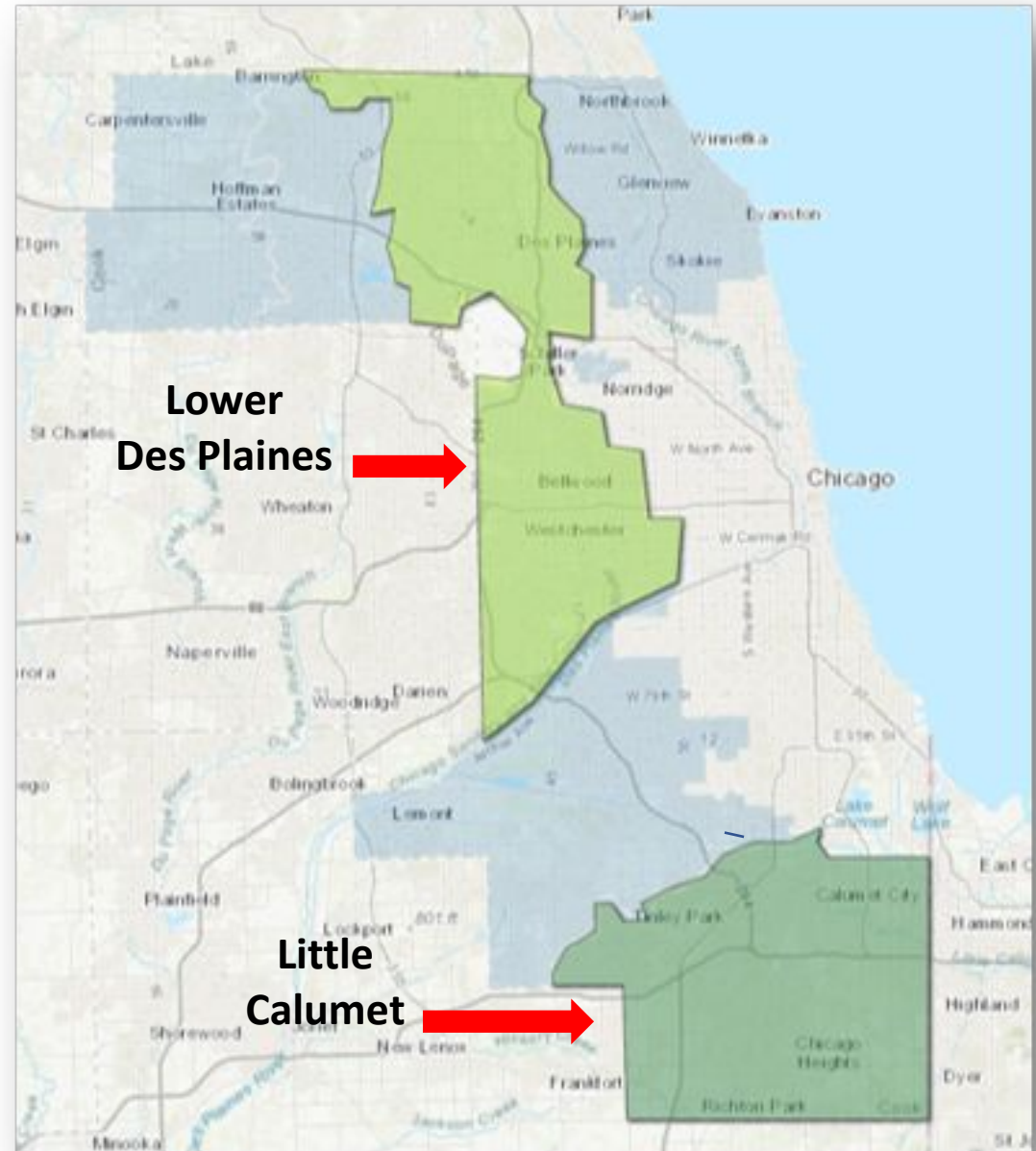


New Credit Trading Pilot Study in Cook County

This **5-year Pilot Program** will allow...

- Developers an alternative path to stormwater compliance in **Little Calumet** and **Lower Des Plaines** watershed planning areas
- A portion of required stormwater controls to be met offsite;
- Metropolitan Water Reclamation District staff 5 years to study the benefits and impacts of trading

...We intend to use this pilot period to prototype the StormStore marketplace



Thank you!

John Legge
Chicago Conservation
Director
john.legge@tnc.org



RESOURCES MENTIONED

Greenprint mapping tool:
www.bit.ly/ChicagoGreenprint

Greenprint story map:
www.bit.ly/ChiStorymap

StormStore Information (Metropolitan Planning Council):
<https://www.metroplanning.org/work/project/48/subpage/2>



URBAN FLOODING AND SOCIAL EQUITY

Marcella Bondie Keenan | Center for Neighborhood Technology

A photograph of a flooded urban street. The water is dark and reflects the surrounding trees and sky. A dark semi-transparent overlay covers the middle portion of the image, containing the title and bullet points. The top and bottom portions of the image show the original scene without the overlay.

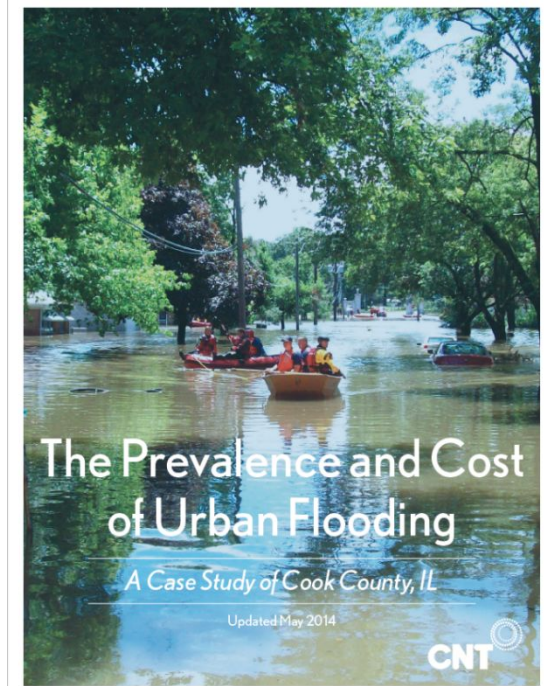
“Urban Flooding” Defined

- The inundation of property due to stormwater overwhelming local drainage systems (e.g. sewers)
- Not related to coastal or riverine flooding

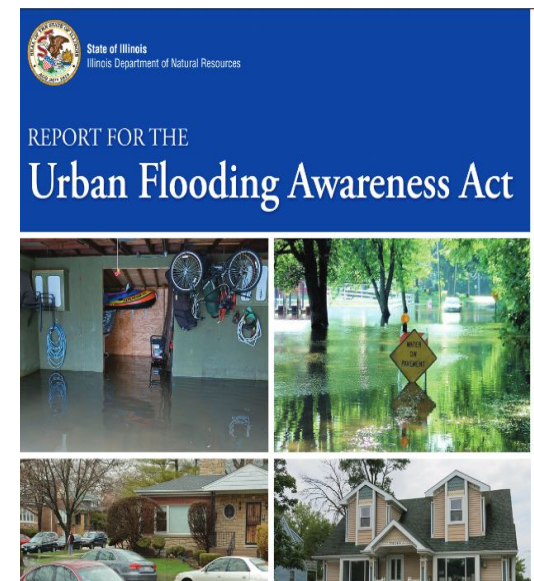
Identifying Urban Flooding Risk Areas + Impact

- Established approach: Flood risk is modeled based only on the presence of rivers and coasts (FEMA FIRMs).
- Urban flooding approach: Identify actual flooding areas through: Insurance claim data, 311 data, Structured interviews, Community forums
- IDNR Illinois study (IDNR, 2015)
 - Insurance data from 2007 - 2014
 - Total amount of flood damages paid: \$2.319 Billion
 - Percent of Counties Impacted: 99%
- CNT Cook County study (2014)
 - Insurance data, Interviews, Focus groups
 - Significant health and job impacts

Percent of IL Claims Outside FEMA Floodplain: 92.3%



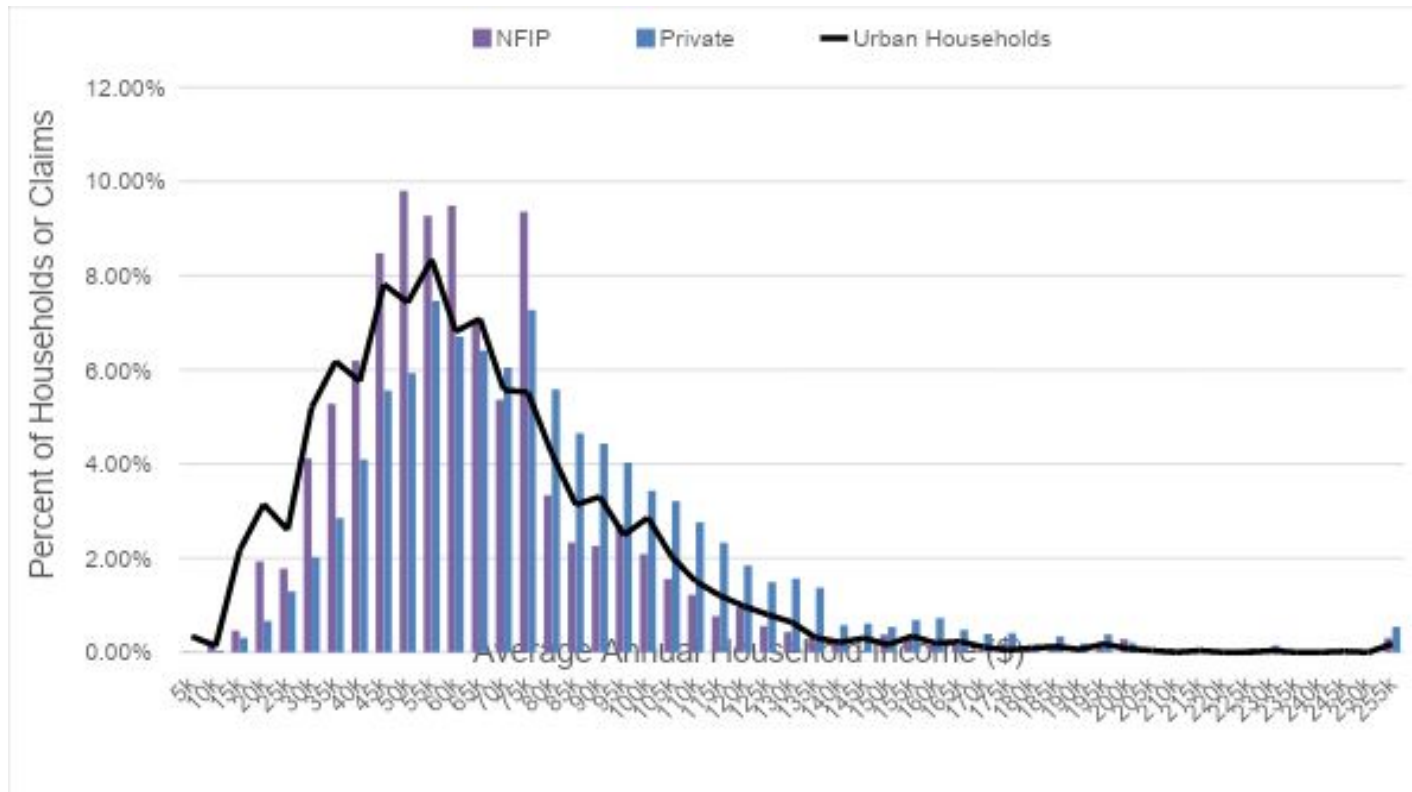
CNT (2014), *The Prevalence and Cost of Urban Flooding: A Case Study of Cook County, IL*



IDNR Urban Flooding Awareness Study (2015)

LOW + MODERATE INCOME FAMILIES MORE IMPACTED BY FLOODING

IDNR (2015) study demonstrate that lower-income families are disproportionately impacted by flooding

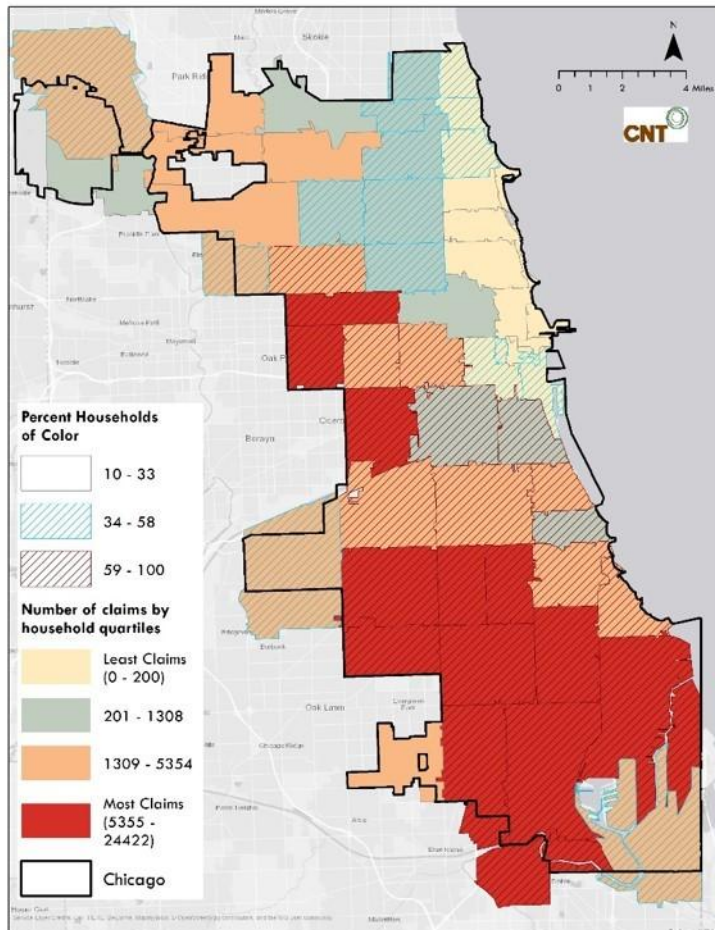


CNT Flooding + Race Study: City of Chicago (2018)

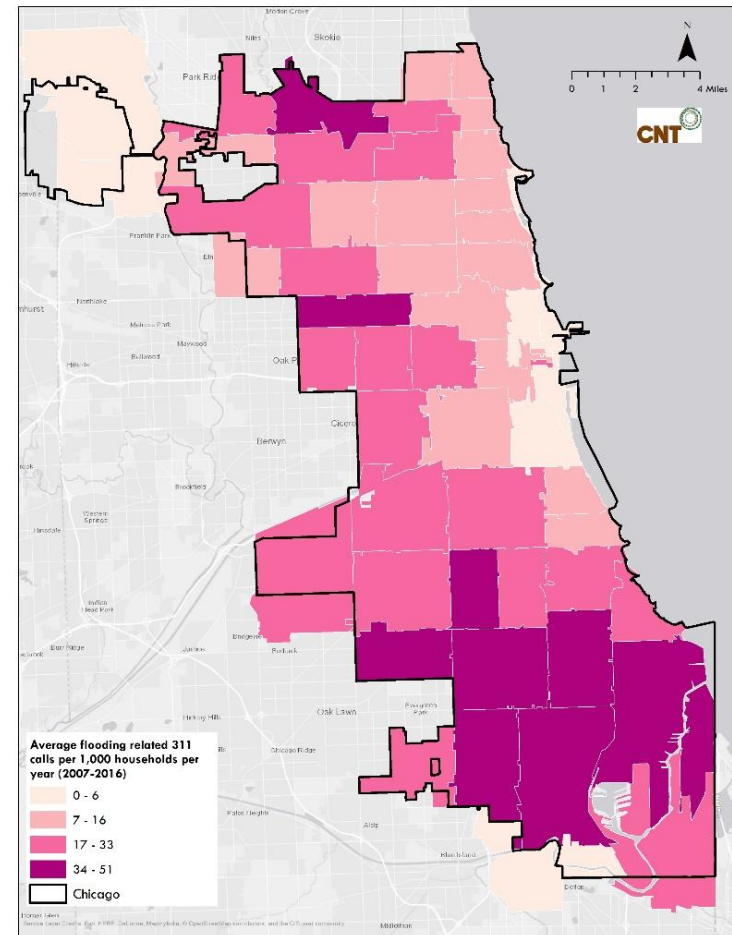
- Insurance claim data, 2007 to 2016
- Flood damage insurance payouts were made in **95% of Chicago's zip codes**
- Total number of insurance claims: **229,743**
- Total amount of flood damages paid: **\$433 Million**
- **87% of claims were paid in communities of color**

COMMUNITIES OF COLOR MORE IMPACTED BY FLOODING

Flood Insurance Claims (CNT, 2018)



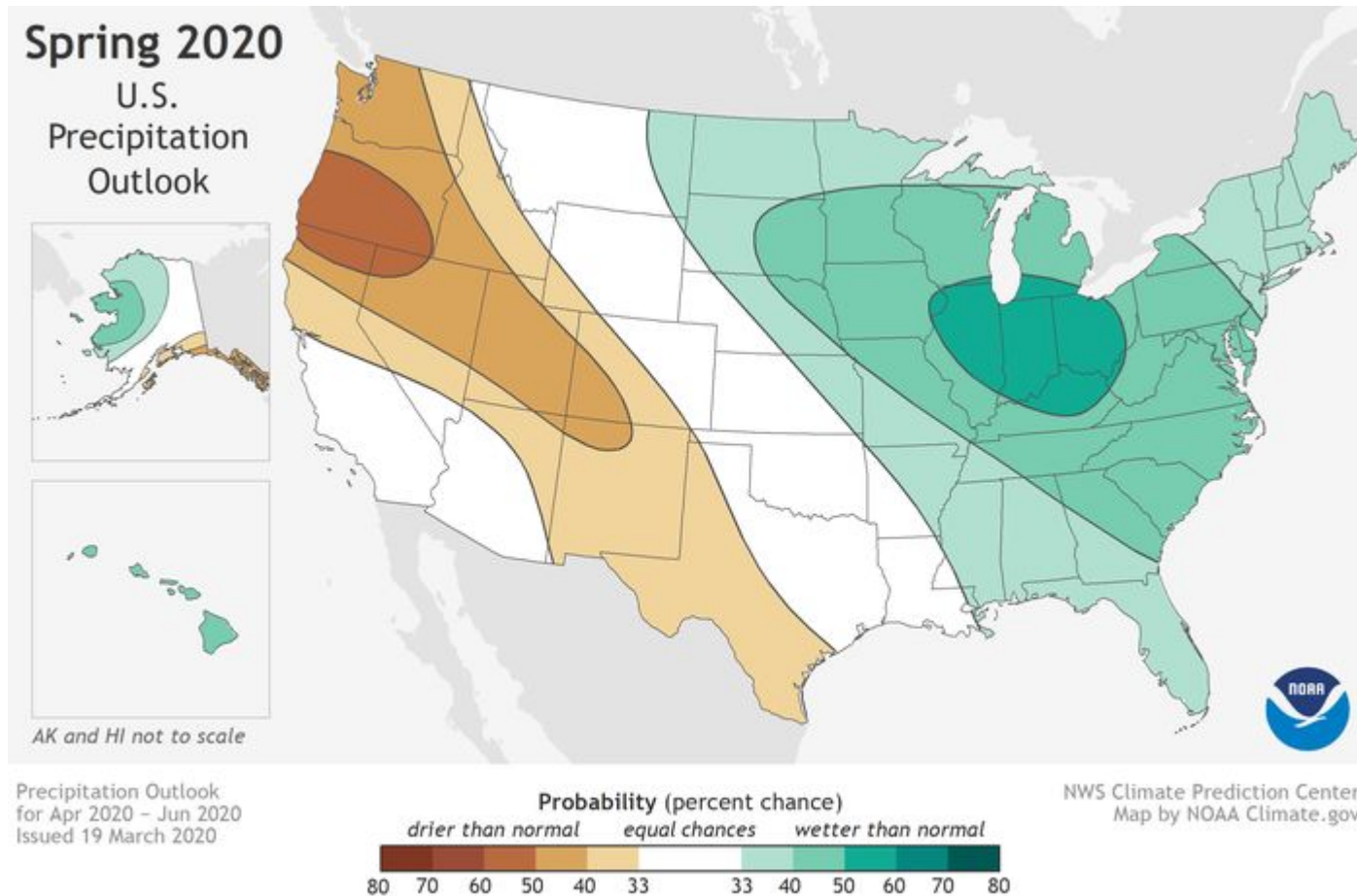
311 Flooding Calls (CNT, 2018)





Flooding + Pandemic

What does it mean to “shelter-in-place” when your home is flooded?





Nature-Based Flooding Solutions

An engineered network of green infrastructure projects — across a neighborhood — can provide flexible, affordable **stormwater utility** services to supplement traditional sewer systems.

LINKING GREEN INFRASTRUCTURE BENEFITS TO COMMUNITY PRIORITIES (CNT, 2020, GREEN VALUES STRATEGY GUIDE)

	Less Flooding	Cleaner Air	Less Heat Stress	More Beauty	Jobs Training	Space to Play + Gather	Quieter Streets	Safer Neighborhood	Climate Protection
Strategy									
Stormwater Park	●	●	●	●	●	●		●	●
Buffer Park	●	●	●	●	●	●	●	●	●
Parkway Bioswale	●	●	●	●	●			●	●
Home + Community Rain Garden	●	●	●	●				●	●
Street Zipper	●								

RainReady Homes

Home
Assessment

Report +
Retrofit
Design

Construction
Support

Evaluation

- Chicago & South Suburbs (2014): Foundation-funded CNT pilot
- Chicago (2015-16): CDBG-DR full grants to LMI flood victims city-wide
- Cook County (2017-19): CDBG-DR full grants to LMI flood victims county-wide
- Oak Park (Ongoing): Municipally-funded cost share grants. 724,000 gallons of rain diverted to date.
- Evanston (Ongoing): Partially-funded grants for Affluent Neighborhoods Climate Resilient Home retrofits



THANK YOU

Marcella Bondie Keenan | mbkeenan@cnt.org

CNT (2018), *Assessing Disparities of Urban Flood Risk for Households of Color in Chicago*

Full report:

<https://www.cnt.org/publications>

Flood Equity interactive map:

<https://www.cnt.org/urban-flooding/flood-equity-map>

Summary Article (8/23/19):

<https://www.cnt.org/blog>

