Climate Vulnerability Assessment (CVA)

Localized Flooding & Extreme Heat – Update

Metropolitan Council Land Use Advisory Committee

09/20/2018

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Climate Vulnerability Assessment - Recap

- July 21, 2016 – LUAC Presentation with Scoping
- May 18, 2017 – LUAC Presentation on CVA & Human Vulnerability
- September 21, 2017 – LUAC Presentation on Localized Flooding Map & Messaging
- September 20, 2018 – LUAC Presentation on CVA Progress & Feedback

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Today's Discussion

- Overview
- Localized Flooding & Extreme Heat
- Lead by Example & Provide Resources
- Next Steps & Feedback from LUAC

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Assessing the Vulnerability of the Built Environment

Climate impacts related to:

- **Water -** Floodways and localized flooding
- **Heat -** Urban Heat Island (UHI)

Two pronged approach:

1) Assess our regional systems and assets
   - Strategies to address vulnerabilities

2) Develop suggested strategies & tools for local governments

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Who has been involved in this project?

Academic Institutions:

- University of St. Thomas
- University of Minnesota
- Macalester College

Climate Vulnerability Assessment

Communities:

- About 25 Communities & 3 Counties

Other Stakeholders:

- Watershed Districts
- State Agencies
- Non-profits
- Engineering Firms
- White House Office of Science and Technology Policy

IMAGE SOURCE: Freshwater Society

Why Rain & Heat?

Climate Change Trends in Minnesota through 2099

Hazard	*Projections Through 2099*	*Confidence in Projected Changes*
Warming Winters	Continued loss of cold extremes and dramatic warming of coldest conditions	**Highest**
Extreme Rainfall	Continued increase in frequency and magnitude; unprecedented flash-floods	
Heat Waves	More hot days with increases in severity, coverage, and duration of heat waves	**High**
Drought	More days between precipitation events, leading to increased drought severity, coverage, and duration	**Moderately High**
Heavy Snowfall	Large events less frequent as winter warms, but occasional very large snowfalls	**Moderately Low**
Severe Thunderstorms & Tornadoes	More “super events” possible, even if frequency decreases	

SOURCE: *MN DNR State Climatology Office.*

Project Update

- Localized Flooding Analysis
  - Transportation and Transit
  - Wastewater
  - Council-owned Housing
  - Regional Parks and Trails
  - Water Supply


IMAGE SOURCE: MnDOT

- Localized Flooding Tools
  - Story Map
  - Interactive Flood Map
  - Publicly Available Data

- Extreme Heat Tools
  - Story Map
  - Interactive Extreme Heat Map
  - Publicly Available Data

- Human Vulnerability

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Localized Flooding

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IMAGE SOURCE: City of St. Louis Park

Observation of Mega Rain Events* in MN

Over half of Mega Rain Events since 1866 occurred since 2002

Challenges

Most infrastructure planned for 5- to 10-year storm events

Under new modelling, the 100-year event has increased by 25%

*Defined as 6” or greater rains covering at least 1000 square miles and a peak amount of 8” or greater

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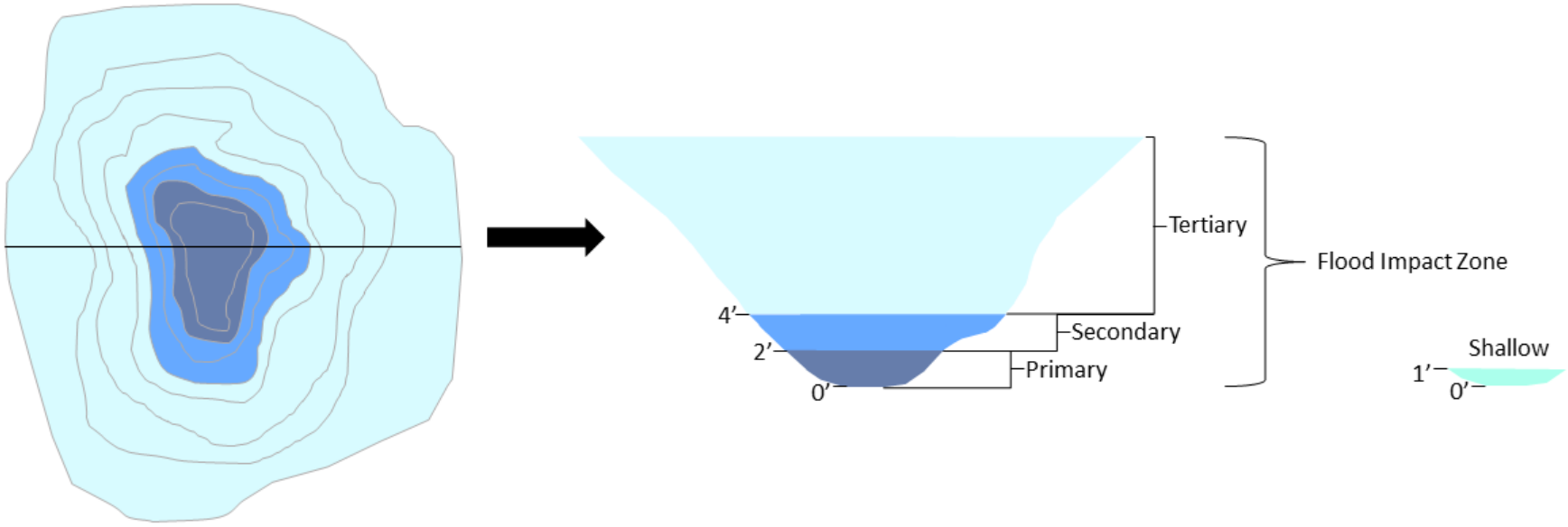
Localized Flooding

Council Bluespot Categorization

Bluespot Depth	Flood Hazard Category	Bluespot Symbology
3 in-1 foot total	Shallow	
0-2 feet	Primary	
2-4 feet	Secondary	
>4 feet	Tertiary	

Isolated 3in-1ft Bluespots

Flood Impact Zone (FIZ)



Localized Flooding – Acute and Chronic Stress

Flash flood traps cars under Roseville underpass (PHOTO)

BY MIKE MULLEN

TUESDAY, JULY 5, 2016 AT 7:51 PM

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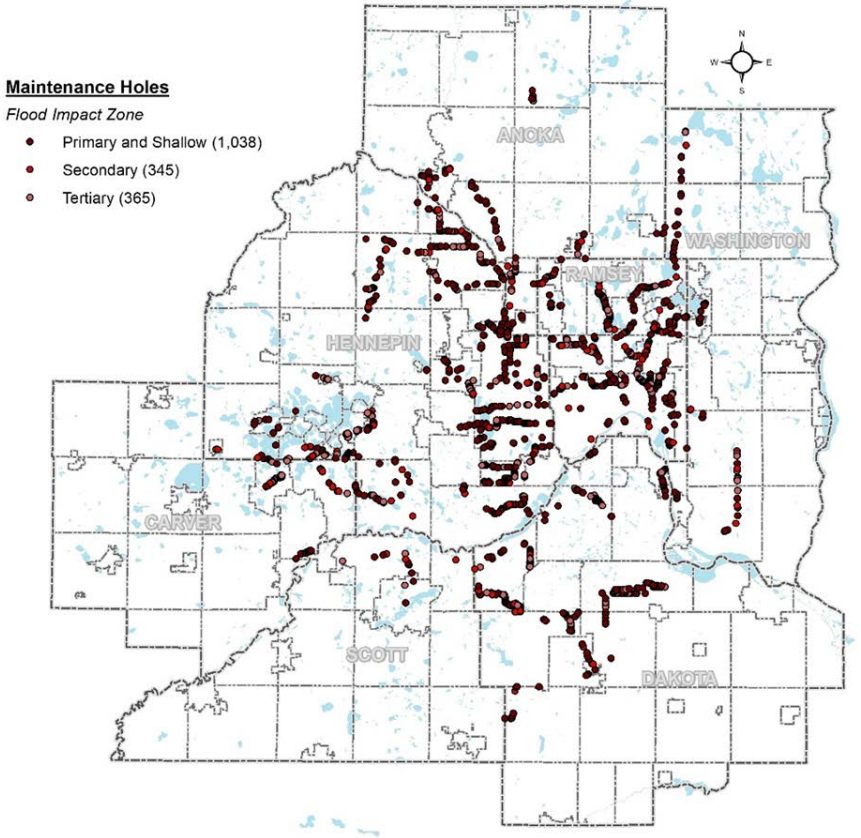
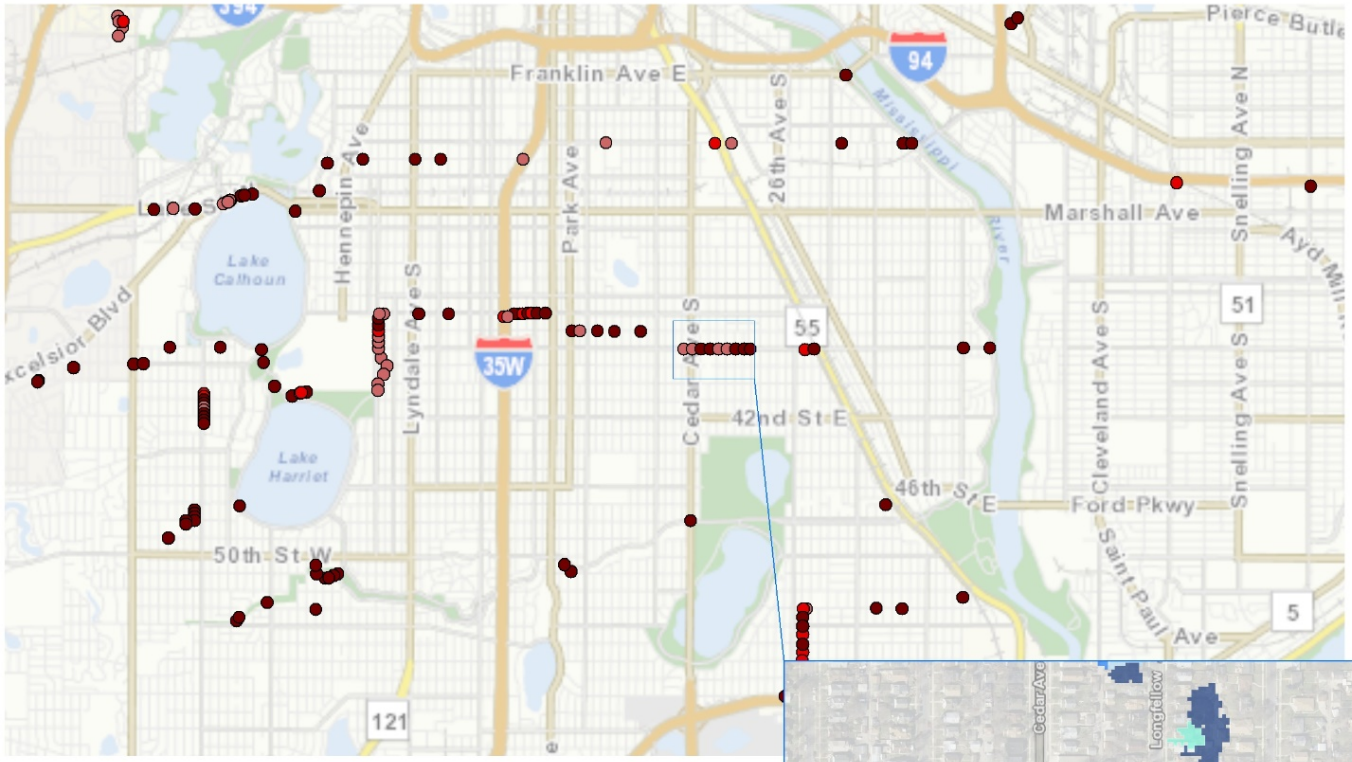
Lead by Example – Localized Flooding

Maintenance Holes Example

			Flood Impact Zone % Assets in a FIZ				
Asset	Total	Total Assets in FIZ*	Primary	Primary Mean Max. Depth	Secondary	Tertiary	Shallow
Maintenance Holes	7550	23.5% (1773)	45.7% (811)	4.37ft	19.8% (351)	21.5% (382)	12.9% (229)

IMAGE SOURCE: Met Council





Maintenance Holes

Flood Impact Zone

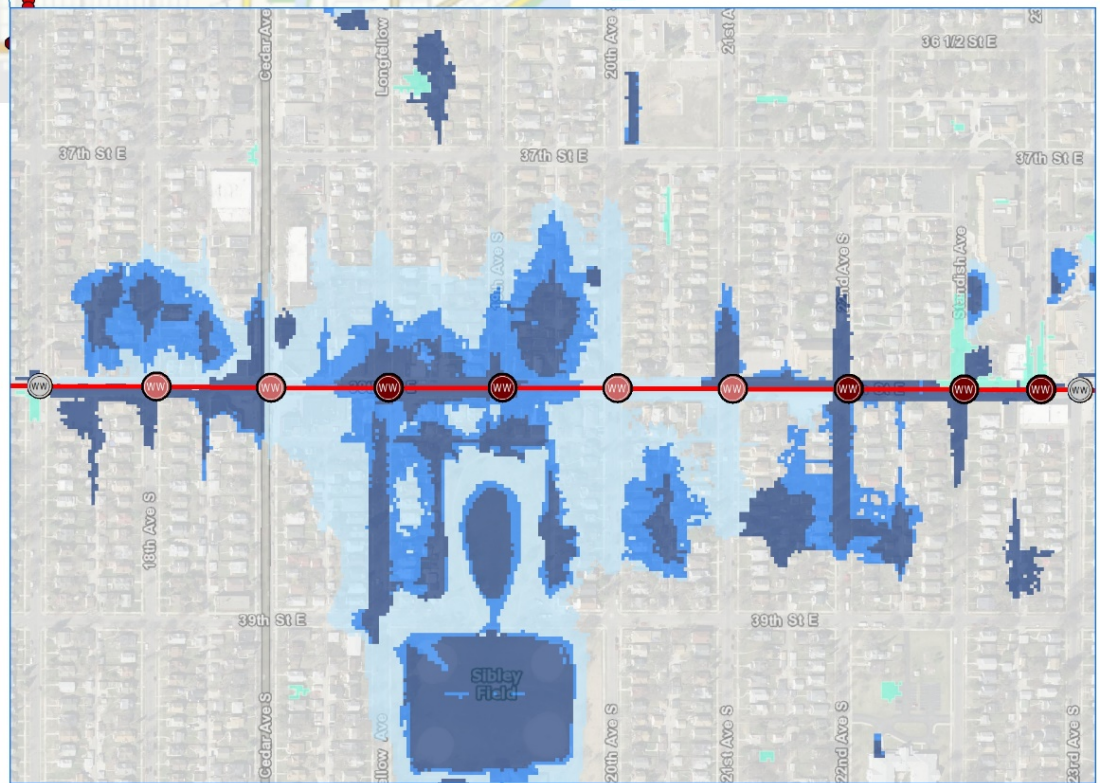
- Primary and Shallow
- Secondary
- Tertiary
- None

MCES Interceptors

- Gravity

Flood Impact Zones

- Primary
- Secondary
- Tertiary
- Shallow



Lead by Example

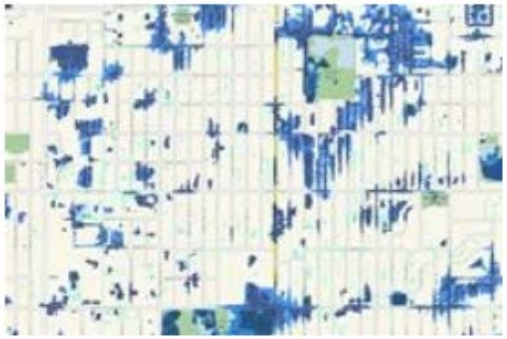
Localized Flooding

Maintenance Holes Example

Provide Resources – Localized Flooding

https://metrocouncil.org/cva

Localized Flooding Story Map



Localized Flood Map Screening Tool

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Extreme Heat

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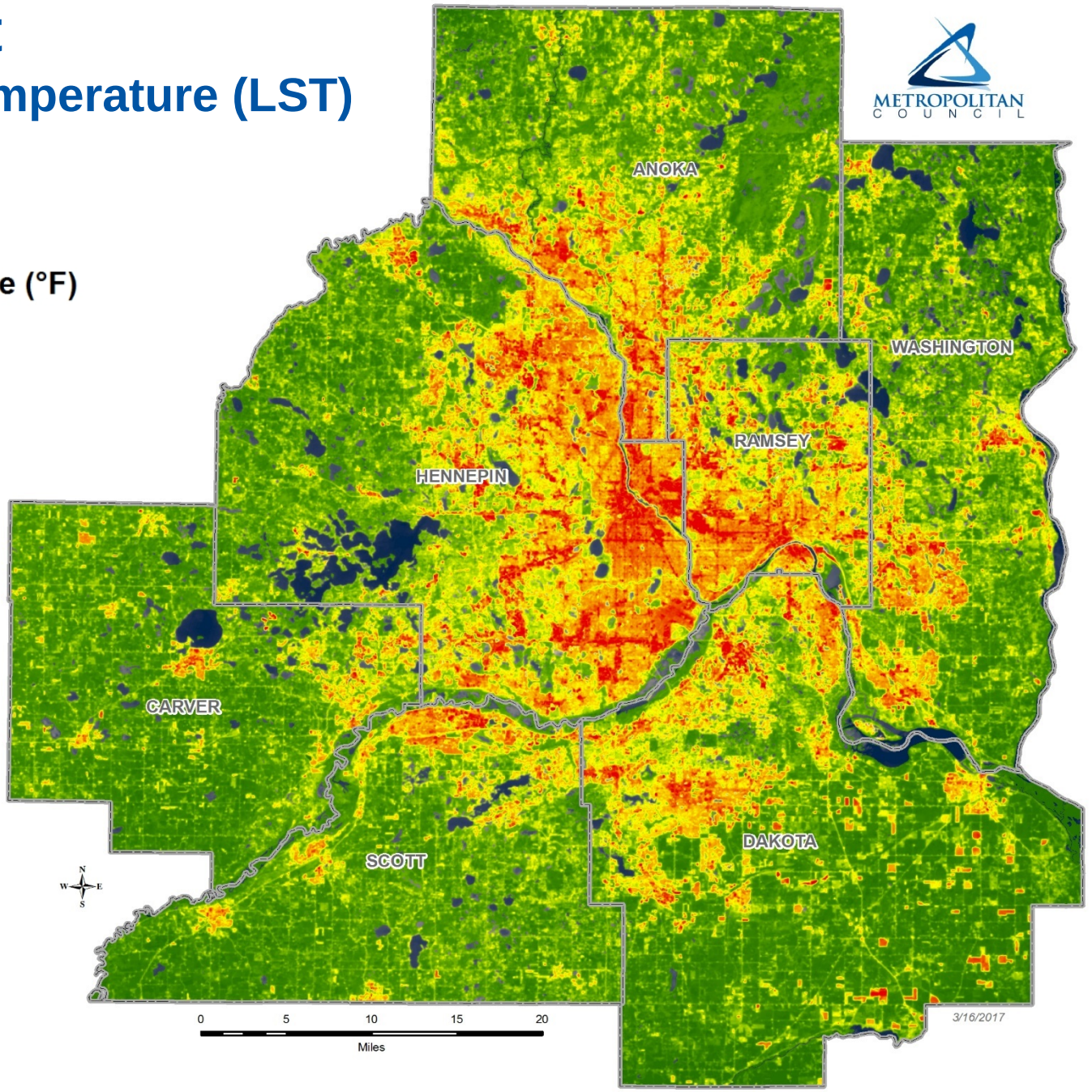
Extreme Heat

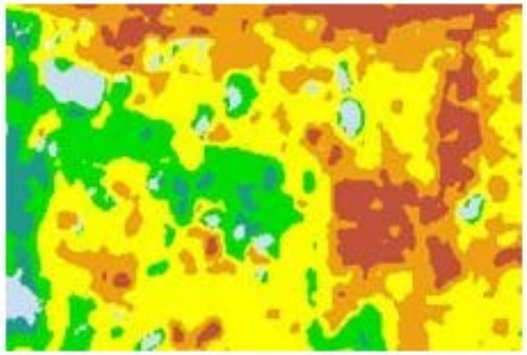
Land Surface Temperature (LST)



Provide Resources – Extreme Heat

https://metrocouncil.org/cva

Extreme Heat Story Map



Extreme Heat Map Tool

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Next Steps

- **Finalize CVA Chapters**
  - **– Autumn & Winter 2018**
- **Finalize Web Content & Tools**
  - **– Autumn & Winter 2018**
- **Stakeholder Outreach**
  - **– Winter & Spring 2019**

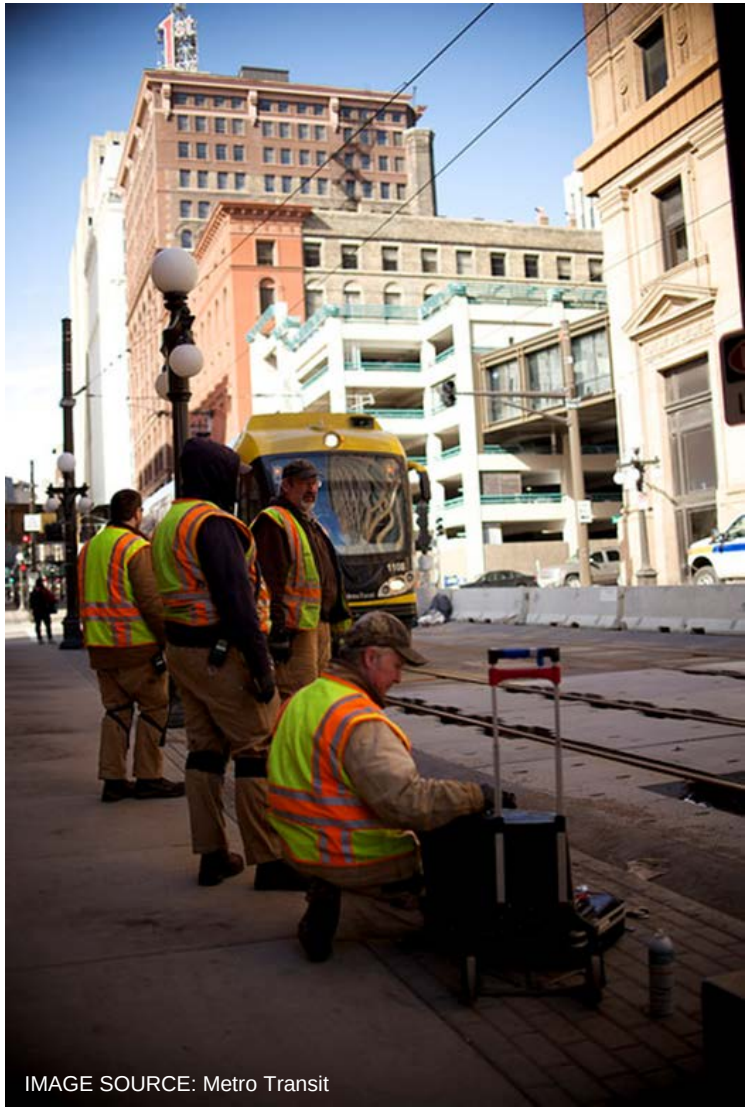

IMAGE SOURCE: Metro Transit

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LUAC Feedback on Outreach & Communication

Challenges

- Disparate Geography
- Community Sensitivities
- Lack of Capacity/Expertise
- Abstract Concepts
- Technical Jargon

Opportunities

- Creative Outreach
- Community Interest
- Desire for Strategies
- Local Examples
- Plain Language

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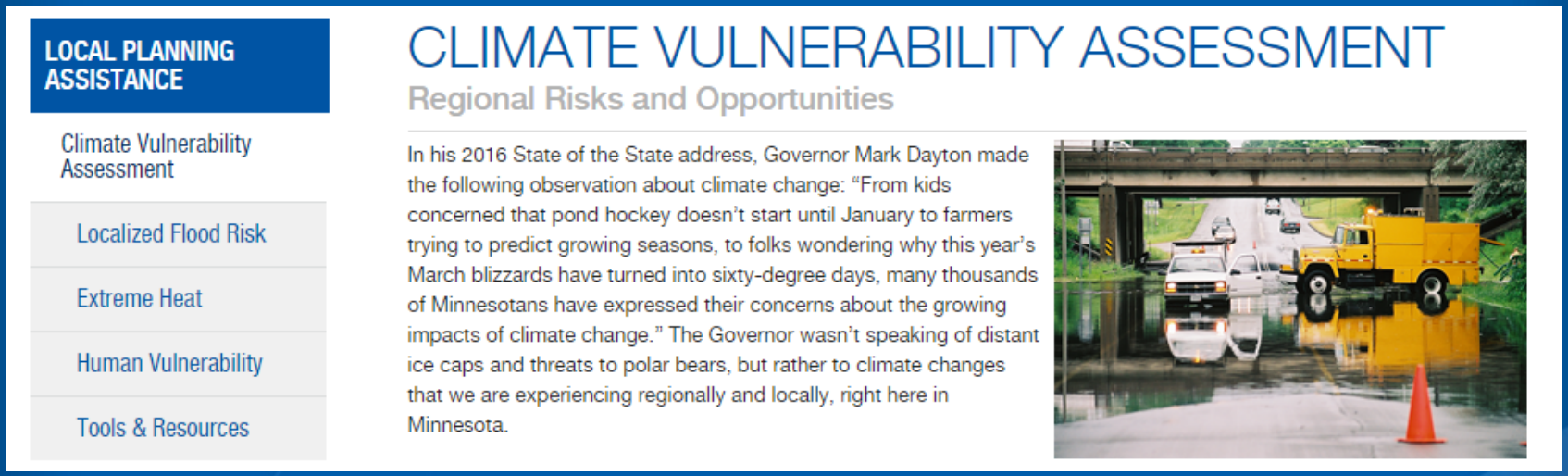
Climate Vulnerability Assessment

www.metrocouncil/CVA



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