# 2025 Report Card for America's Infrastructure *Stormwater Overview*

June 17, 2025

National Municipal Stormwater Alliance

2025 REPORT CARD FOR AMERICA'S INFRASTRUCTURE

ASCE AMERICAN SOCIETY OF CIVIL ENGINEERS

# Agenda

- Overview of ASCE Report Card - Darren Olson
- Resilience Criterion – Carol Haddock
- Condition, Operations and Maintenance Criterion – Jamie Houle
- Capacity Criterion – Scott Taylor
- Funding and Future Need Criterion – Kurt Woolford
- Q&A

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# 2025 REPORT CARD FOR AMERICA'S INFRASTRUCTURE

**Darren Olson**, P.E., BC. WRE, M.ASCE, Chair, ASCE National Committee on America's Infrastructure; Vice President, Christopher B. Burke Engineering, Ltd.

**Carol Ellinger Haddock**, P.E., MPA, F.ASCE, Former Director, Houston Department of Public Works; Sr. Program Advisor, Black & Veatch

**Jamie Houle,** Ph.D., Vice Chair, NMSA; Director, UNH Stormwater Center

**Scott Taylor**, P.E., D.WRE, Chair, NMSA; Project Specialist, AtkinsRealis

**Kurt Woolford**, Executive Director, Lake County, Illinois, Stormwater Management Commission

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# Housekeeping

- This webcast is being recorded
- Recording of the event and a PDF of slides will be made available
- 1.5 PDHs are available
- Attendee input via typed in questions
- Please send technical/technological questions via chat function

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# Overview of ASCE Report Card

**Darren Olson**, P.E., BC. WRE, M.ASCE
Chair, ASCE National Committee on America's Infrastructure; Vice President, Christopher B. Burke Engineering, Ltd.

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# 2025 REPORT CARD

## FOR AMERICA'S INFRASTRUCTURE

# 2025 Report Card for America's Infrastructure

| | | |
|---|---|---|
| AVIATION | | D+ |
| BRIDGES | | C |
| BROADBAND | NEW | C+ |
| DAMS | ↑ | D+ |
| DRINKING WATER | | C- |
| ENERGY | ↓ | D+ |
| HAZARDOUS WASTE | ↑ | C |
| INLAND WATERWAYS | ↑ | C- |
| LEVEES | ↑ | D+ |
| PARKS AND RECREATION | ↑ | C- |
| PORTS | ↑ | B |
| RAIL | ↓ | B- |
| ROADS | ↑ | D+ |
| SCHOOLS | | D+ |
| SOLID WASTE | | C+ |
| STORMWATER | | D |
| TRANSIT | ↑ | D |
| WASTEWATER | | D+ |

**America's Cumulative Infrastructure Grade**


| | |
|---|---|
| A | EXCEPTIONAL |
| B | GOOD |
| C | MEDIOCRE |
| D | POOR |
| F | FAILING |

# Key Trends

1. Aging infrastructure systems are increasingly vulnerable to natural disasters and extreme weather events, creating unexpected and often avoidable risks to public safety and the economy.

2. Recent federal and state investments have had a positive impact, but the full force of increased funding will take years to realize. Sustained investment is key to providing certainty and ensuring planning goes to development, as well as making larger infrastructure projects attainable.

3. Unreliable or unavailable data on key performance indicators continues to impact certain infrastructure sectors.

# Methodology

- CAPACITY
- OPERATION AND MAINTENANCE
- CONDITION
- PUBLIC SAFETY
- FUNDING
- RESILIENCE
- FUTURE NEED
- INNOVATION

# What the Grades Mean


**EXCEPTIONAL**
Fit for the future


**GOOD**
Adequate for now


**MEDIOCRE**
Requires attention


**POOR**
At risk


**FAILING/CRITICAL**
Unfit for purpose

# National Trends in Stormwater that Shaped the Grade

2021 Grade = D ⟷ 2025 Grade = D

- Capacity ⟷
  - More green, grey infrastructure being funded nationally through CWSRF, but rising frequency of severe events

- Condition/ O&M ⟷
  - Miles of impaired streams increased from 588,000 (2018) to 703,000 (2022)
  - Stormwater utilities* with maintenance plans up from 38% to 42%
  - MS4s* with stormwater asset management
    - Phase I Communities – 63%
    - Phase II Communities – 35%

* Water Environment Federation (WEF) 2022 National MS4 Needs Assessment

- Funding and Future Need ⟷
  - EPA's 2022 Clean Watershed Needs Survey estimated 20-year capital improvement needs increased from $23.8B (2012) to $115.3B (2022)
  - Some funding increases to water sector from IIJA
  - Number of "stormwater utilities" increasing and fees increasing slightly from $5.34 (2018) to $6.06 (2023)

- Public Safety and Innovation ⟷
  - Increase in the frequency and severity of disasters costing >$1B
    - 2010 – 2019: >130 occurrences
    - 2019 – 2023: 102 and counting
  - NOAA Atlas 15 will be fully available in 2027

- Resilience ↓
  - Only 26% of municipalities* use updated design standards and specifications to address climate change and stormwater resilience

# Resilience Criterion

**Carol Ellinger Haddock**, P.E., MPA, F.ASCE, Former Director, Houston Department of Public Works; Sr. Program Advisor, Black & Veatch

# Stormwater Resilience

- Harsher conditions due to more frequent, intense weather
- “Above all approach” incl. green infra, land-use practices, and reuse of stormwater in drier areas
- Emergency action plans bolster stormwater management in response to disaster situations
- Only 26% of municipalities use updated design/specs to address disasters (WEF MS4 survey)

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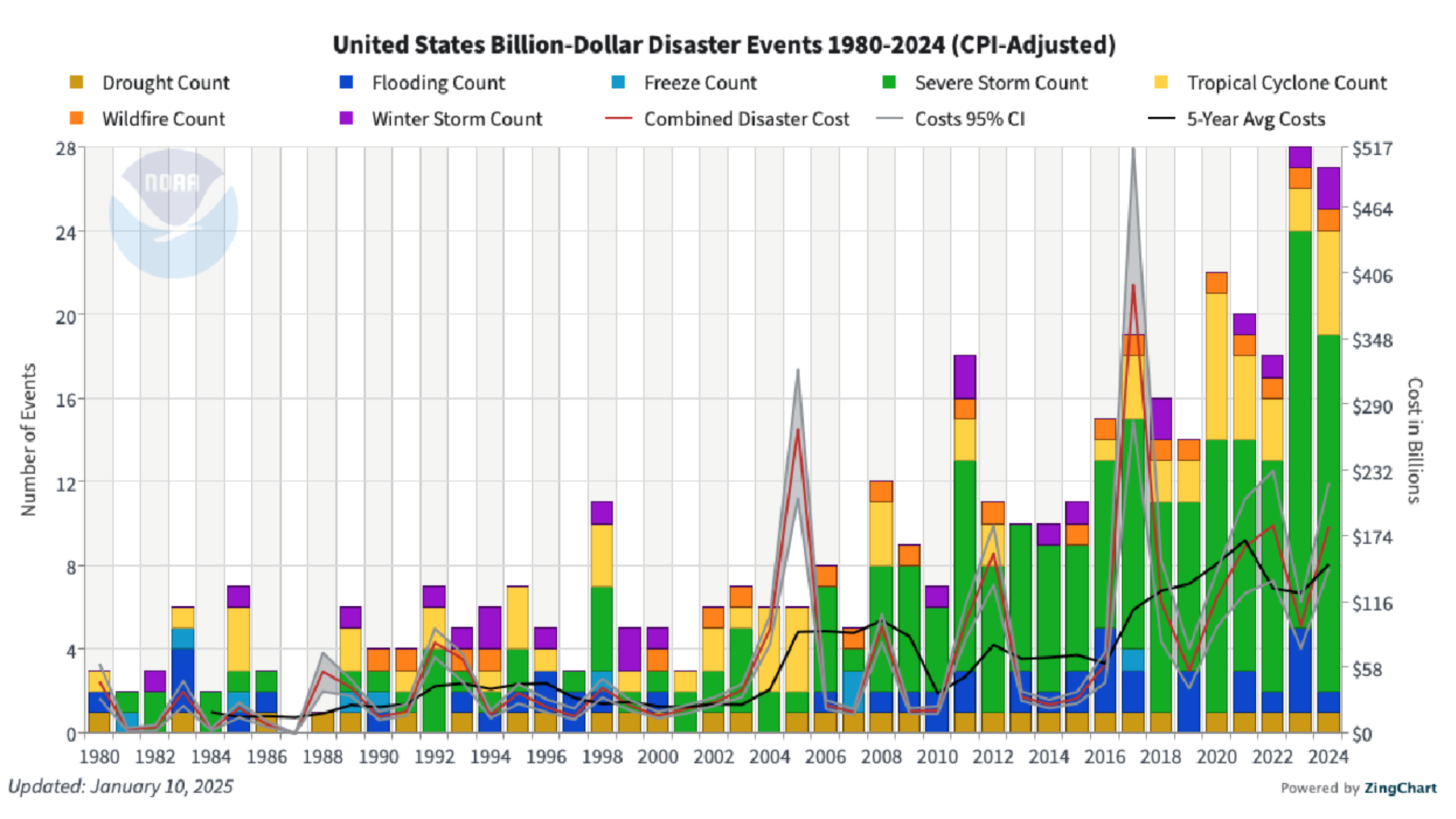
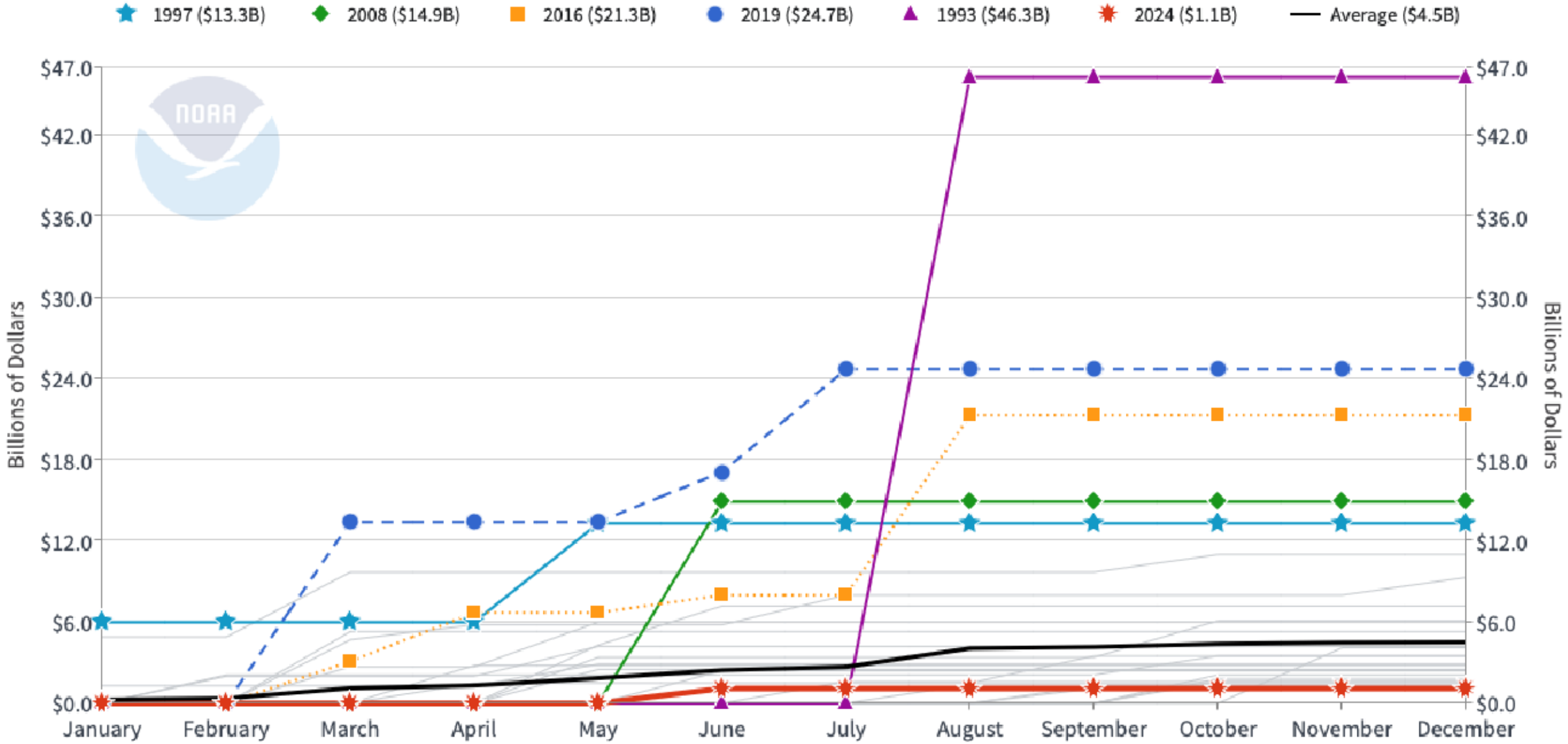

United States Billion-Dollar Disaster Events 1980-2024 (CPI-Adjusted)
Drought Count
Flooding Count
Freeze Count
Severe Storm Count
Tropical Cyclone Count
Wildfire Count
Winter Storm Count
Combined Disaster Cost
Costs 95% CI
5-Year Avg Costs
Number of Events
Cost in Billions
0
4
8
12
16
20
24
28
$0
$58
$116
$174
$232
$290
$348
$406
$464
$517
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
Updated: January 10, 2025
Powered by ZingChart

# 1980-2024 United States Billion-Dollar Disaster Year-to-Date Event Cost (CPI-Adjusted)

Flooding

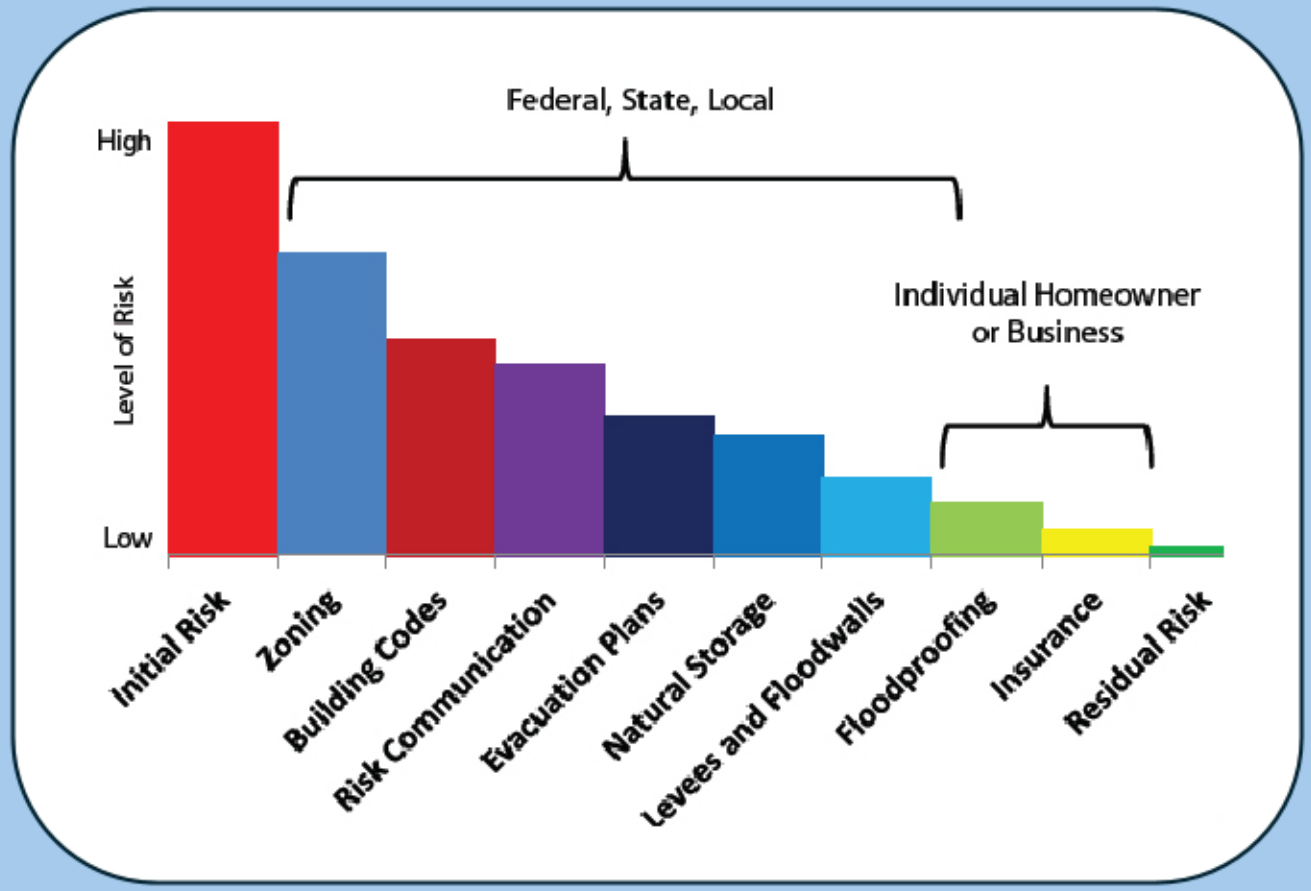



*Updated: January 10, 2025*

*Event statistics are added according to the date on which they ended.* Powered by ZingChart

# Flood Risk Reduction

- Avoid
- Reduce
- Harden
- Leave




*(Source: data from National Research Council, 2013, and the NFIP, 2013 as modified from USACE)*

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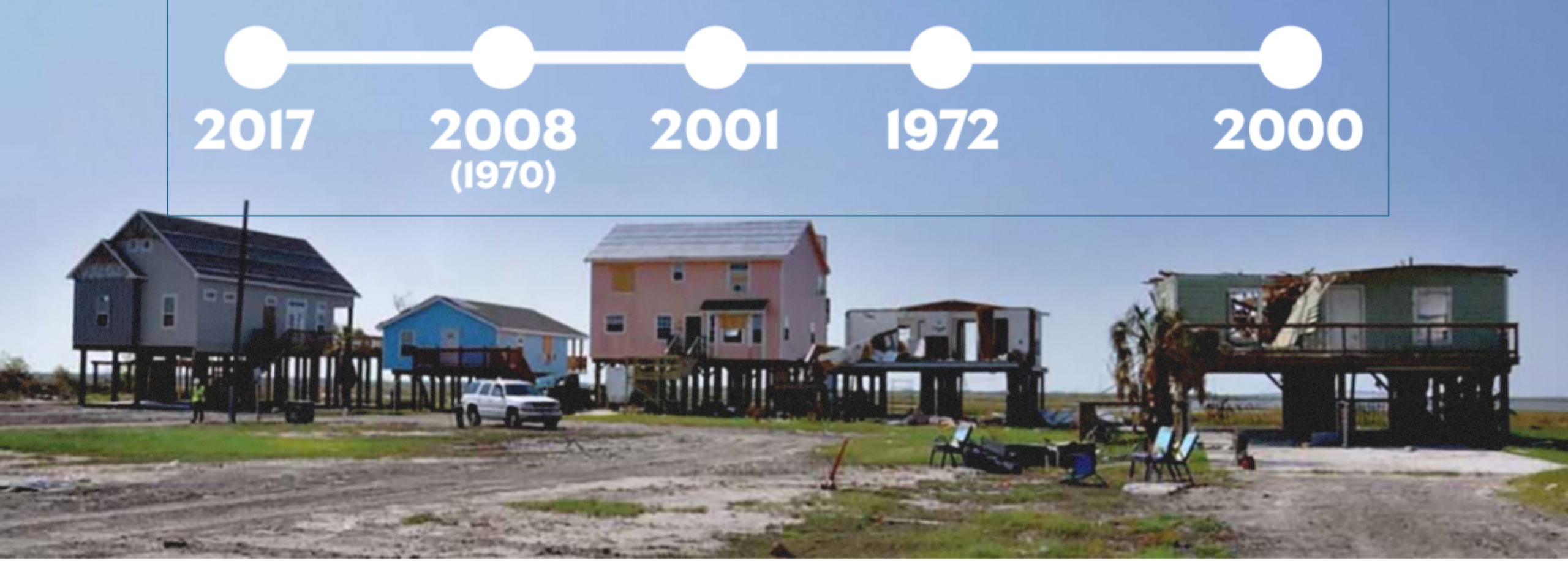
# RISK REDUCTION – AVOID




# RISK REDUCTION – AVOID
# IMPORTANCE OF BUILDING CODES

Rockport, Texas after Hurricane Harvey (2017)

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# FLOOD RISK REDUCTION – REDUCE

## HURRICANES AND STORMS

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# EVERY $1 SPENT ON MITIGATION IN NEW CODE CONSTRUCTION SAVES $11 IN DISASTER REPAIR AND RECOVERY COSTS

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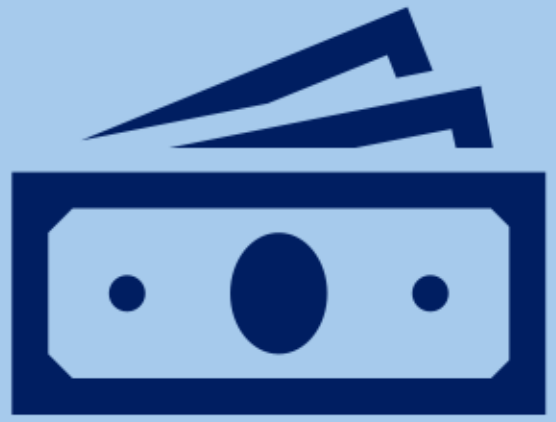
# RESILIENCY TOOLS

ELEVATION GRANTS

DEMO REBUILD



BUYOUTS

## MITIGATION SUCCESSES

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# RESILIENCY SUCCESSES

REDUCE

**ELEVATION**
**Raising existing structures**

**BUYOUT AND DEMOLITION**
**restore riparian areas/create greenspace**

LEAVE

**MITIGATION**

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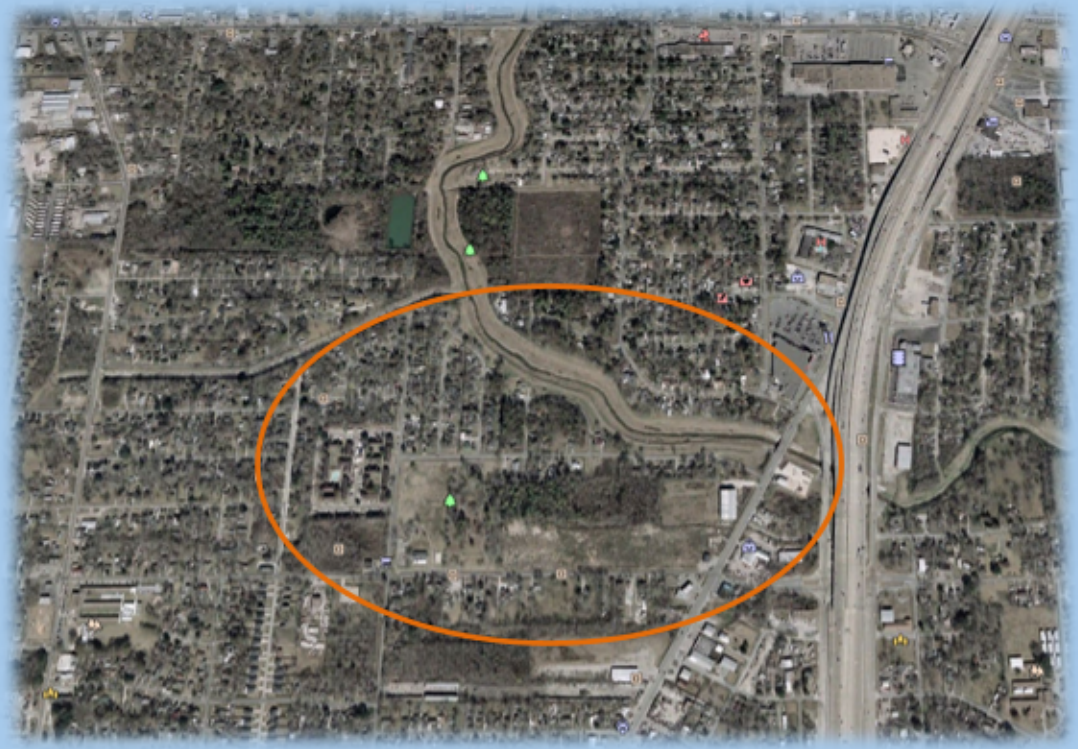
# RESILIENCY SUCCESSES

## 2001 – Tropical Storm Allison



People rescued off rooftops

## 2017 – Hurricane Harvey

Bretshire Stormwater Detention Basin

# REGIONAL MITIGATION

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# RESILIENCY SUCCESSES

Some hospitals evacuated, but Houston's medical word mostly withstands Harvey


Floodwaters approached Houston's Bed Taub Hospital on Sunday as staff repeatedly revised plans To evacuate patients because of Flooding from Hurricane Harvey (Andrew Kragie/AP)

## 2001 Tropical Storm Allison

*"virtually every hospital was broken in one way or another"*

Kenneth Mattox, Ben Taub Hospital

## 2017 Hurricane Harvey

*"the streets looked like rivers"*

*"the lights were on"*

William McKeon, Texas Medical Center

HARDEN

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# VISION FOR A RESILIENT HOUSTON


- A HEALTHY PLACE TO LIVE
- AN EQUITABLE, INCLUSIVE, AND AFFORDABLE CITY
- A LEADER IN CLIMATE ADAPTATION
- A CITY THAT GROWS UP, NOT OUT
- A TRANSFORMATIVE ECONOMY THAT BUILDS FORWARD

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# VISION FOR A RESILIENT HOUSTON

Build Houston Forward

Greater Houston Flood Mitigation Consortium


Smart Cities

Humanitarian Action Plan


Plan Houston


Water Conservation

Opportunity Plan

Complete Communities

Bayou Greenways 2020

Homelessness Initiatives

MetroNEXT


Action Plan for Harvey Recovery


METRO Solutions

Climate Action Plan

HGAC's Our Great Region


Health Disparities & Health Inequity Report

Harris County Talking Transition

"The capacity within an urban area to survive, adapt and thrive no matter what kind of chronic stresses and acute shocks they experience."

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# Condition, Operations and Maintenance Criterion

**Jamie Houle,** Ph.D., Vice Chair, NMSA;
Director, UNH Stormwater Center

# Inspection and Maintenance

- Performance efficiency and effectiveness can deteriorate as systems age.
- In the Water Environment Federation's (WEF) 2022 National MS4 Needs Assessment, more than 60% of surveyed stormwater utilities (643) cited aging infrastructure and workforce/staffing needs as critical challenges to properly functioning systems.

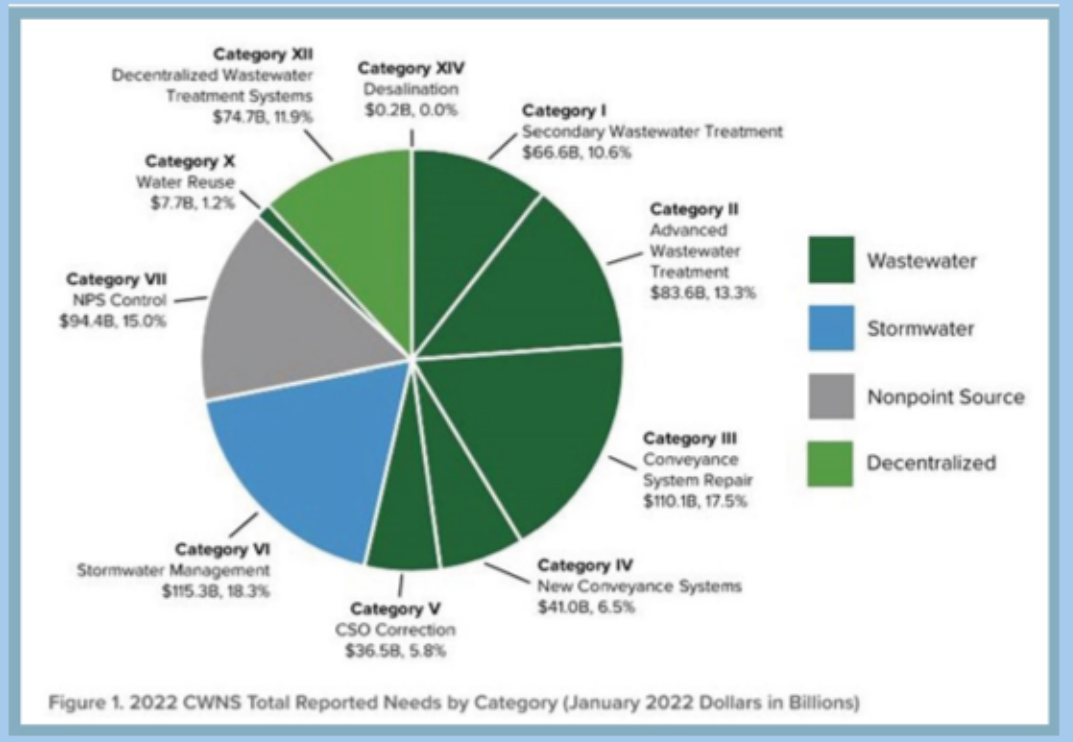

Figure 1. 2022 CWNS Total Reported Needs by Category (January 2022 Dollars in Billions)

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# Inspection and Maintenance

- Under the NPDES program, all MS4s are required to have maintenance plans for their stormwater systems.
- From 2018 to 2021, the number of stormwater utilities developing and implementing maintenance plans has increased from 38% to 42%.
- 63% of MS4 Phase I communities have stormwater asset management plans and 35% of Phase II reporting them.

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# Inspection and Maintenance

- Inspection and Maintenance is not a cost category included in the clean water needs survey.
- Consequences of no maintenance or deferred maintenance are the potential increase of urban flooding and threats to water quality.
- In the U.S., the length of impaired rivers and streams increased from about 424,000 miles in 2010 to more than 588,000 in 2018 to over 703,000 in 2022.


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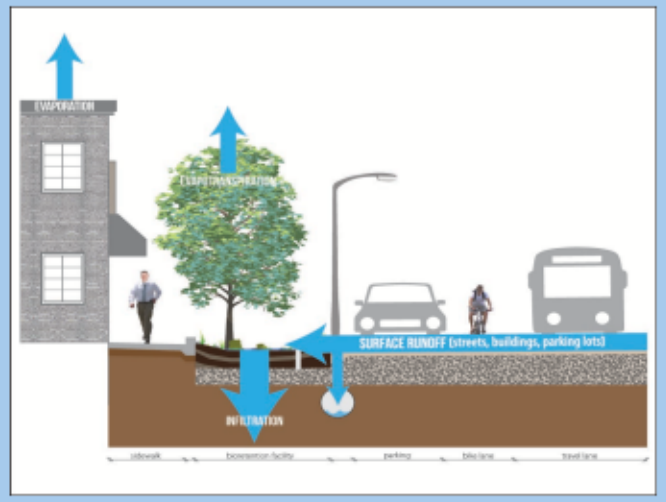
# Capacity Criterion

**Scott Taylor**, P.E., D.WRE, Chair, NMSA;
Project Specialist, AtkinsRealis

# **CAPACITY**
# DOES THE INFRASTRUCTURE'S CAPACITY MEET CURRENT AND FUTURE DEMANDS?




*General:*

- Number of stormwater utilities or districts.
- Does existing capacity meet demand in growing urban areas?
- Are local governments assessing the need for increased capacity in addition to evaluating maintenance needs?
- Does existing infrastructure meaningfully address water quality components?
- How will the changing climate impact existing capacity?

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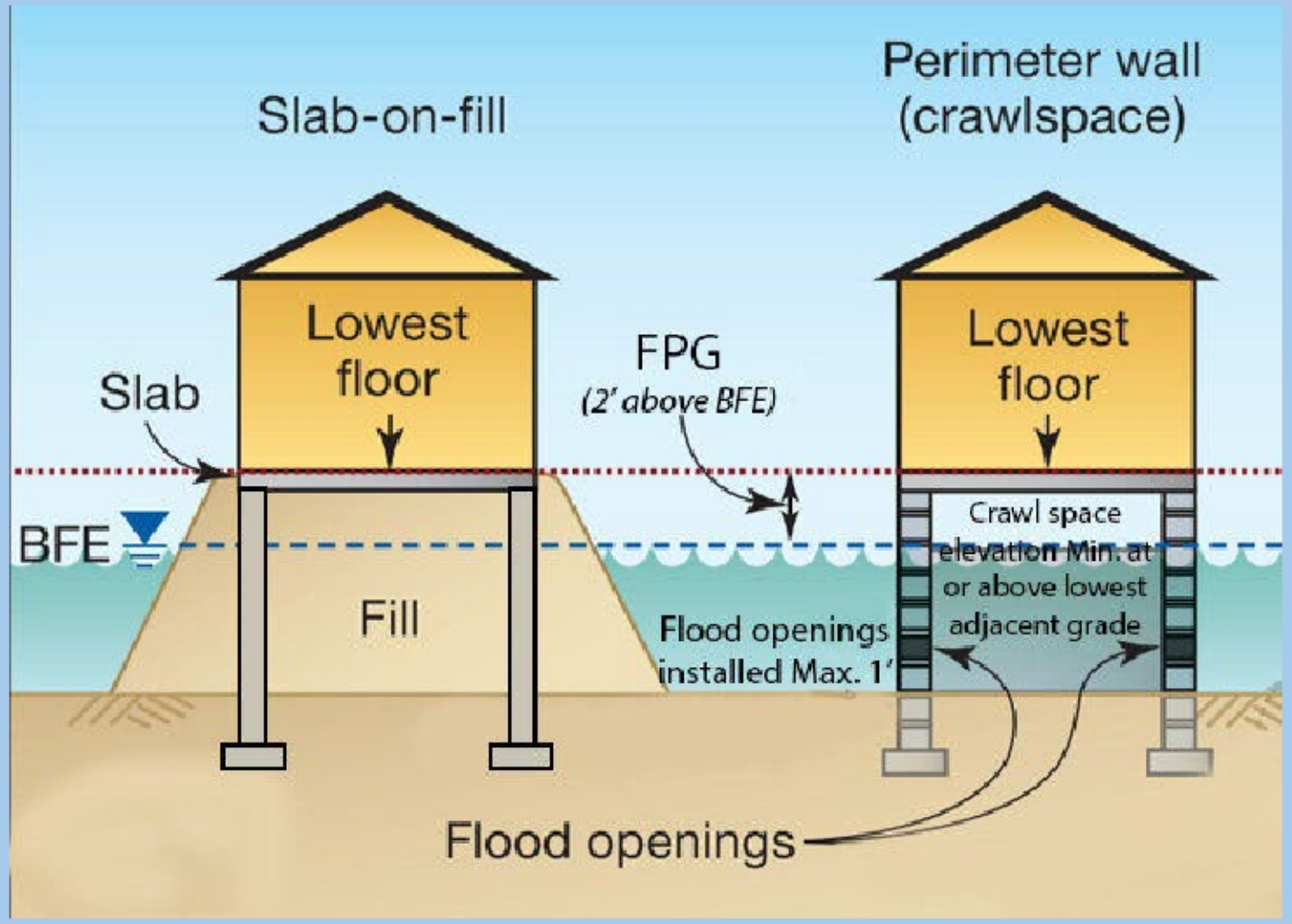
Slab-on-fill
Perimeter wall
(crawlspace)
Lowest
floor
Slab
FPG
(2' above BFE)
Lowest
floor
BFE
Fill
Crawl space
elevation Min. at
or above lowest
adjacent grade
Flood openings
installed Max. 1'
Flood openings

# Criteria– Storm Drains and Appurtenances

The methodology for scoring the capacity of surface water quality infrastructure is based on two criteria:

1. The ability to improve water quality using an analysis of the percentage of both wet and dry weather runoff from developed areas that is treated, infiltrated or reused.

2. The ability of the system to convey urban runoff safely to the receiving water – ensuring that urban flooding does not occur, that structures are protected, and that public safety is provided. This is evaluated using the local drainage criteria as well as FEMA criteria.

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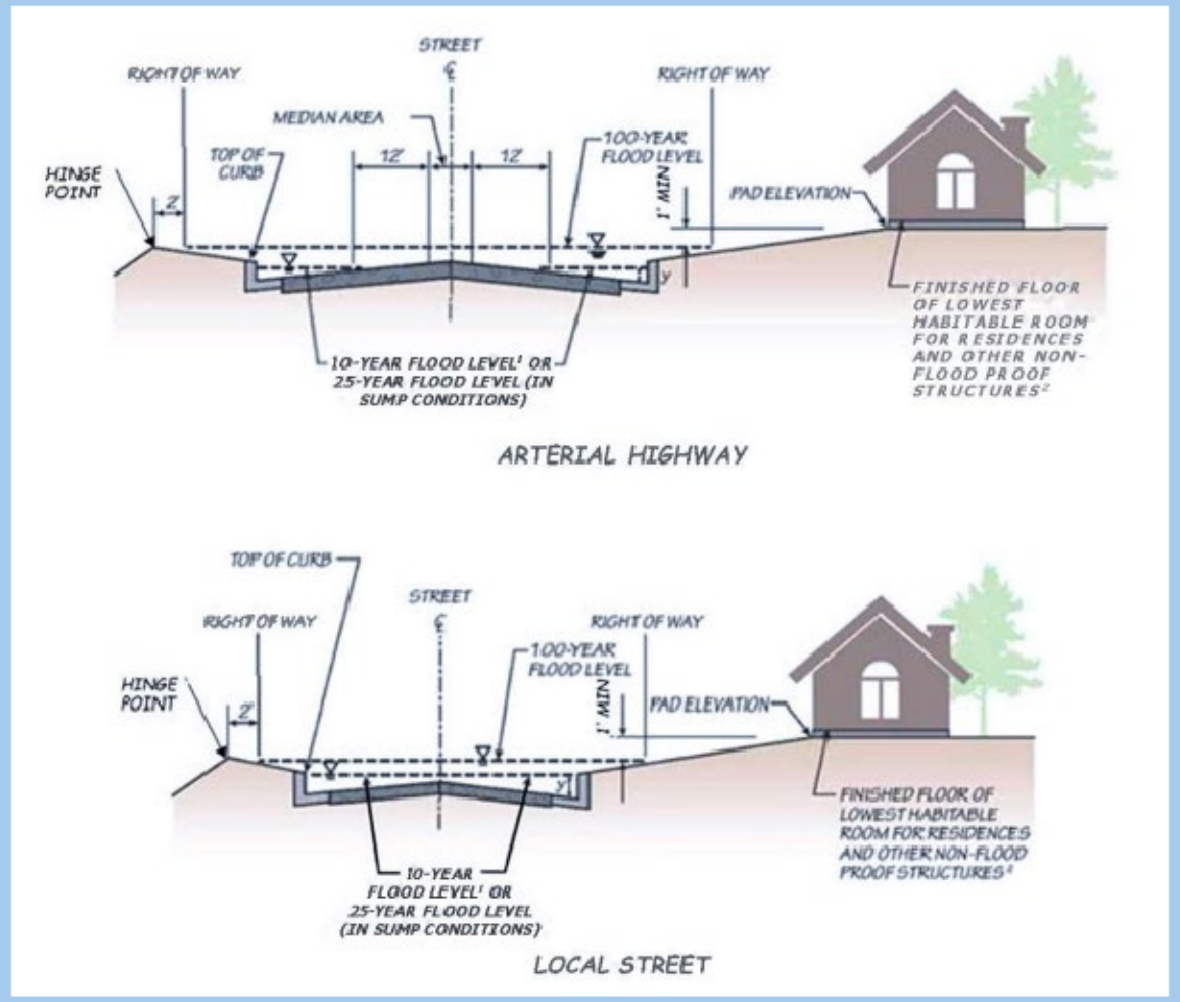

STREET
RIGHT OF WAY
RIGHT OF WAY
MEDIAN AREA
TOP OF CURB
12'
12'
100-YEAR FLOOD LEVEL
1' MIN
HINGE POINT
Z'
PAD ELEVATION
y
FINISHED FLOOR OF LOWEST HABITABLE ROOM FOR RESIDENCES AND OTHER NON-FLOOD PROOF STRUCTURES[2]
10-YEAR FLOOD LEVEL[1] OR 25-YEAR FLOOD LEVEL (IN SUMP CONDITIONS)
ARTERIAL HIGHWAY
TOP OF CURB
STREET
RIGHT OF WAY
RIGHT OF WAY
100-YEAR FLOOD LEVEL
1' MIN
HINGE POINT
Z'
PAD ELEVATION
y
FINISHED FLOOR OF LOWEST HABITABLE ROOM FOR RESIDENCES AND OTHER NON-FLOOD PROOF STRUCTURES[4]
10-YEAR FLOOD LEVEL[1] OR 25-YEAR FLOOD LEVEL (IN SUMP CONDITIONS)
LOCAL STREET

# Funding and Future Need Criterion

**Kurt Woolford**, Executive Director, Lake County, Illinois, Stormwater Management Commission

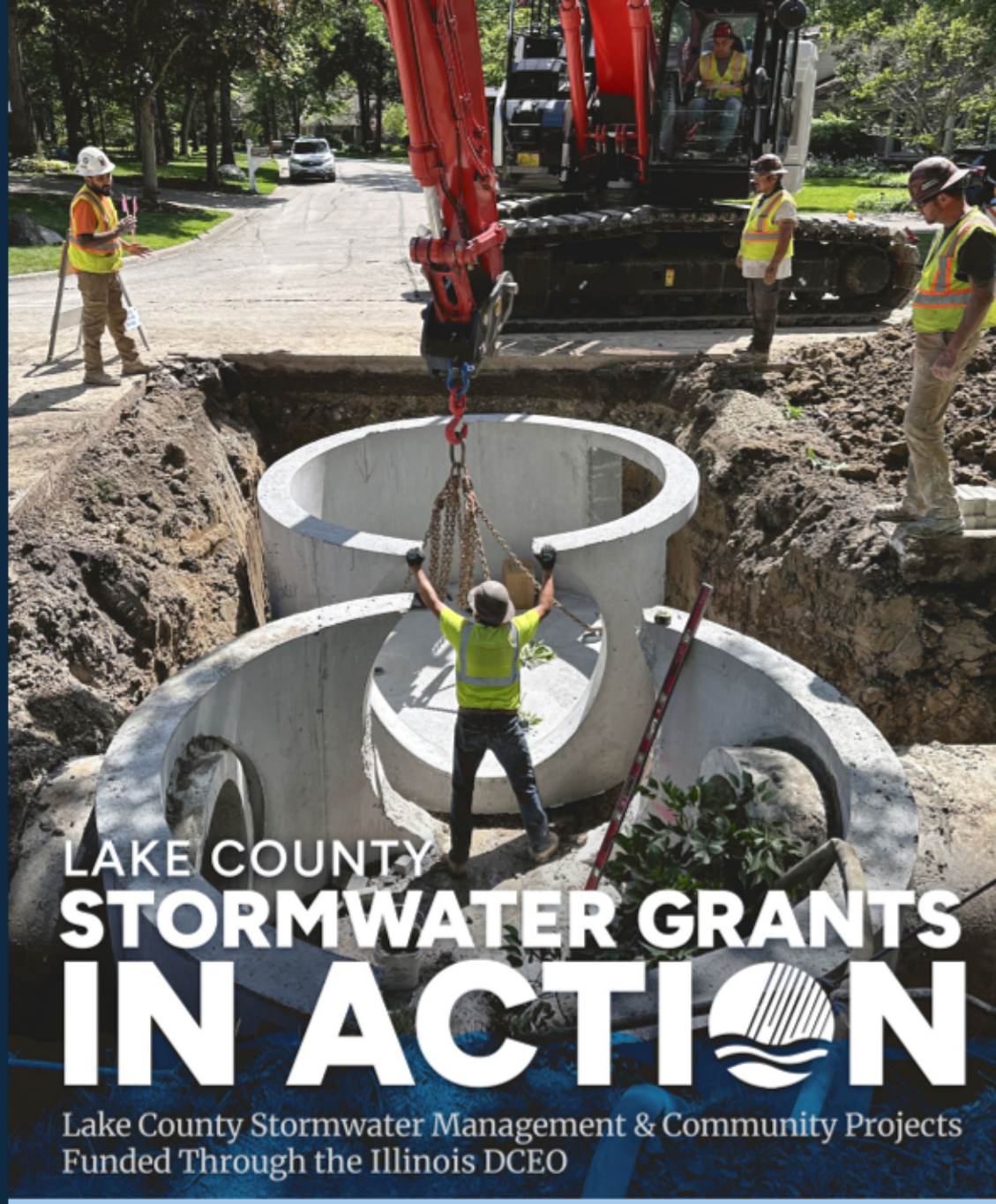
STORMWATER MANAGEMENT COMMISSION

*SMC's mission is to coordinate the stormwater activities of over 80 local jurisdictions to improve water quality, reduce flood damages, and restore and enhance the natural drainage system.*

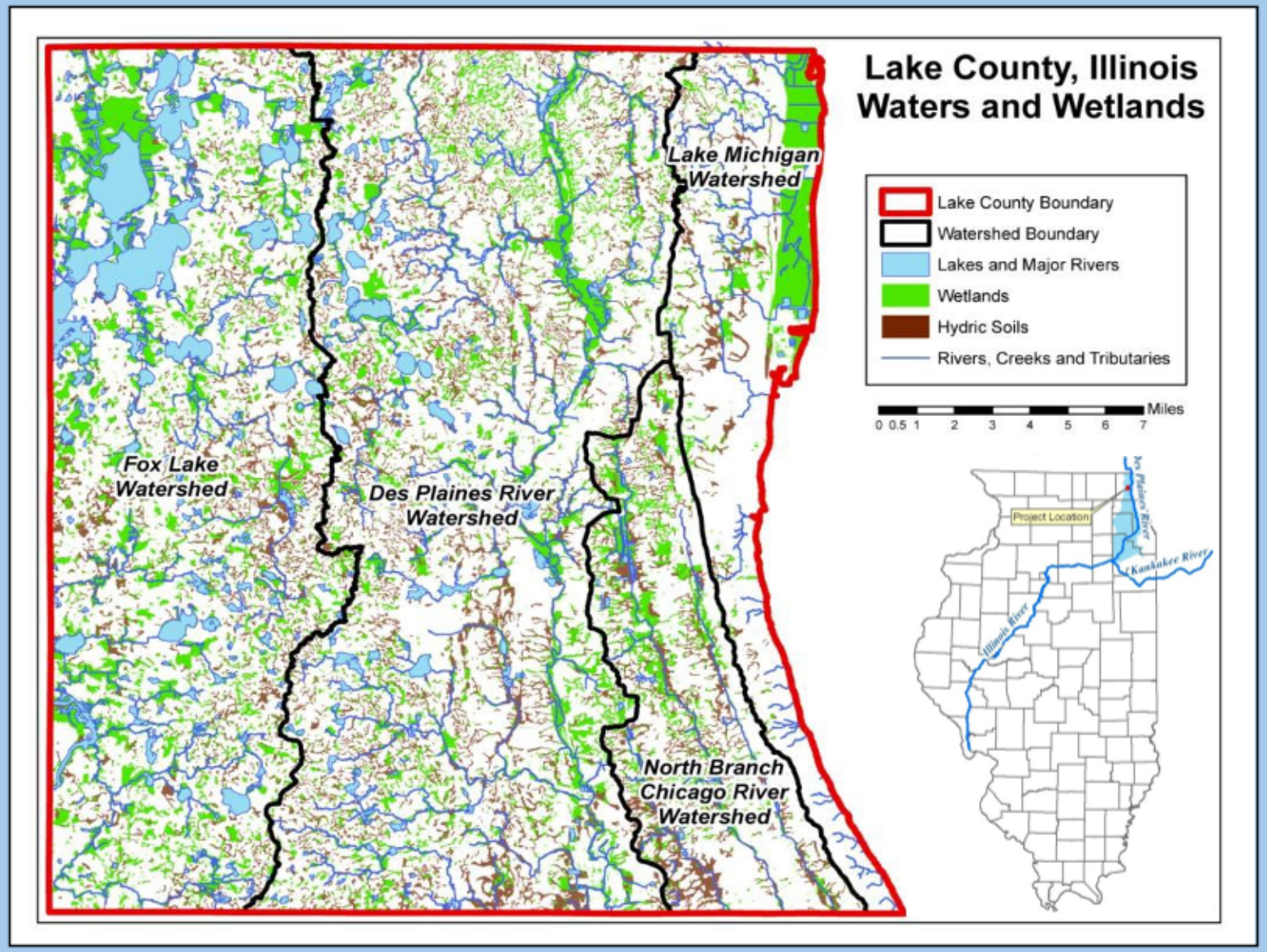
# Stormwater Infrastructure Funding & Future Needs

**Kurt Woolford**
Executive Director
Lake County Stormwater Management Commission

2025 Report Card for America's Infrastructure
*Stormwater Overview*
June 17, 2025



# Countywide Drainage System




- Local Population: 718,604
- Area: 470 square miles
  (20% of Lake County is “wet”)
- 170+ lakes
- 400+ miles of streams
- 60,000+ acres of wetlands
- 15,000 acres of potentially restorable wetlands
- 72 Municipal Separate Storm Sewer Systems (MS4)
  No combined sewers

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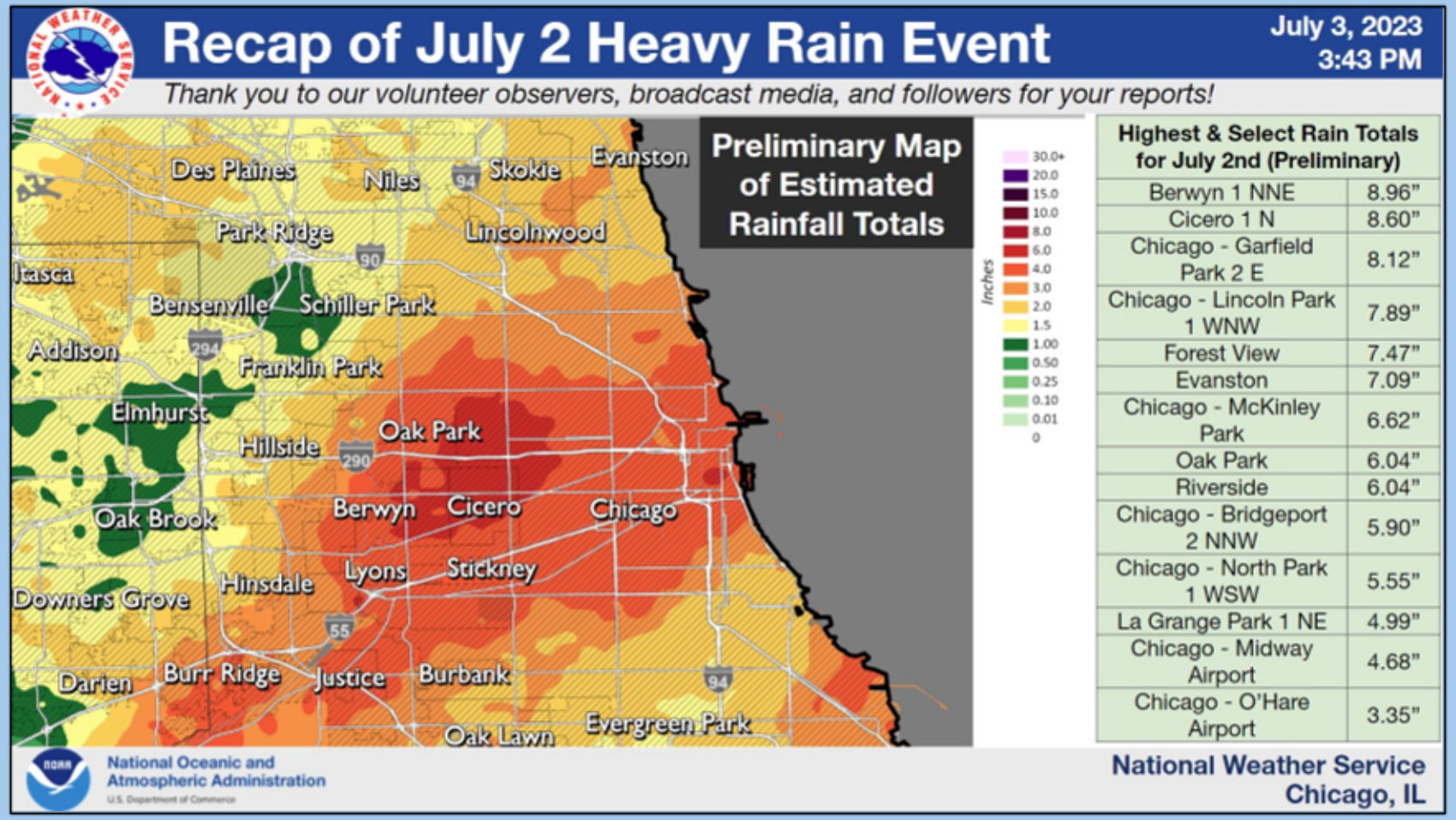
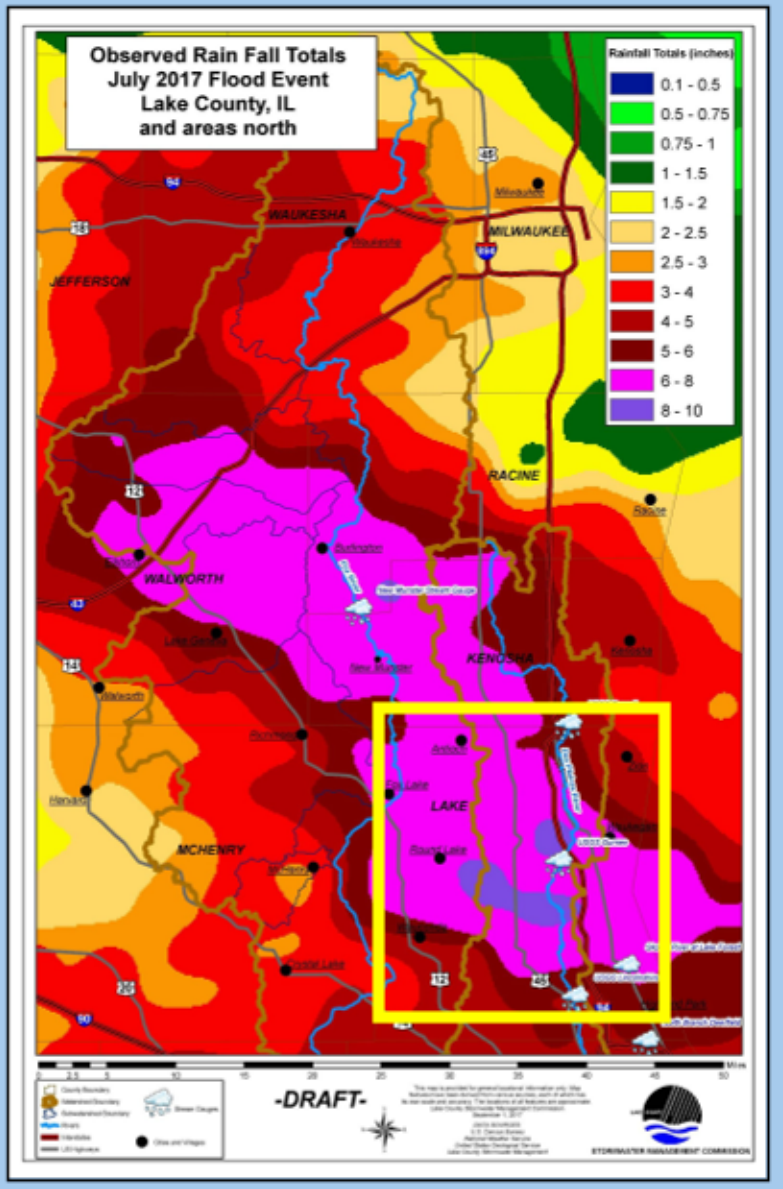
# Our Rainfall Reality

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# Finding Money for Infrastructure

## Identify potential funding source(s)

- Grants* (determine cost-match)
- General Fund
- User Fee / Utility
- Capital Program
- Other

* Identify potential administrative agent and determine eligibility

* Align with Federal infrastructure priorities and replace “trigger” words with commonsense approaches, national security, resilient nation, sound local decisions, taxpayer benefit, infrastructure prioritization, strategic investments, communities resilient to dynamic threats and hazards, local decisions, tools

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# Stormwater Funding Alternatives

| Funding Method | County-Wide Applicability | Equitable Allocation of Costs | Used for Capital Costs | Used for O&M Costs | Used for Engineering Costs | Reliable Funding Source |
|---|---|---|---|---|---|---|
| Stormwater User Fee | T | T | T | T | T | T |
| Property Tax | T | | T | T | T | |
| Special Assessment Districts | | T | T | | | T |
| Special Service Areas | | | T | | | T |
| Local Sales Tax | T | | T | T | T | |
| Gasoline Tax | T | | T | T | T | |
| Permit Fees | | T | | | T | |
| Penalties and Fines | | T | | | | |
| Homeowner Associations | | T | T | T | | |
| Subdivision Exactions | | T | T | | | |
| Fee-In-Lieu-Of Charges | | T | T | | | |
| Tap-On Fees | | T | T | T | T | |
| Betterment Charges | | | T | | | |
| Impact Fees | | T | T | | T | |
| Grants | T | | T | | T | |

Source: Lake County Stormwater Management Funding Method Comparison Matrix (2002)

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# Stormwater Infrastructure Funding Sources

## Major External Sources (Grants)

| | |
|---|---|
| Illinois Department of Commerce & Economic Opportunity | $124.6 Million |
| FEMA | $30 Million |
| Illinois Department of Natural Resources | $11.7 Million |
| EPA | $10.1 Million |

## Internal Sources (General Fund)

**Stormwater Infrastructure Repair Fund (SIRF)**

$1.7 Million

$11 Million in Projects

**FY2025 Watershed Management Board (WMB)**

$189,610

$4.3 Million in Projects

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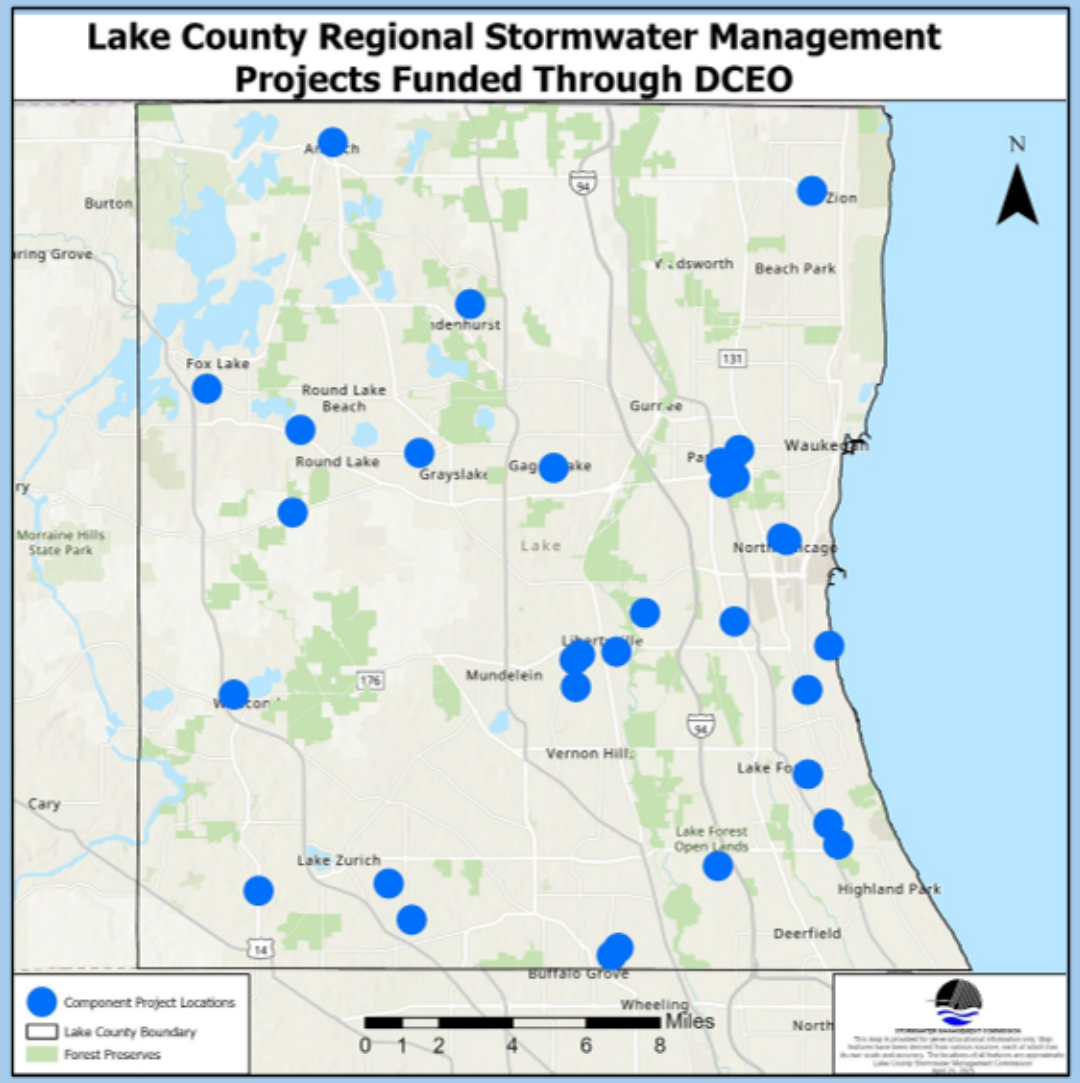
ASCE American Society of Civil Engineers

# Rebuild Illinois Capital Program




## DCEO Round 1

- **$30** million grant
- **13** county-wide projects with local sponsors
- Completed in **2024**
- Benefiting over **2,300** properties and **25** roads

## DCEO Round 2

- **$30** million grant
- **16** county-wide projects with local sponsors
- Completion **11/2024 - 10/2026**
- Expected to benefit over **2,000** properties and **100** roads

*Bangs Lake Outfall Groundbreaking*
*Wauconda, IL – June 6, 2025*

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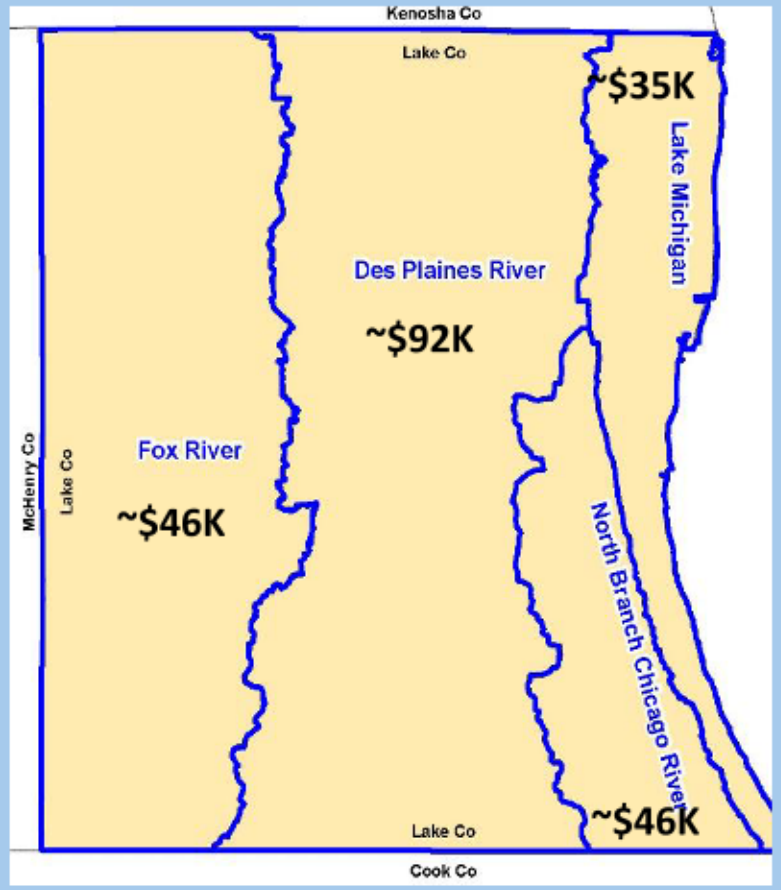
# WMB Cost-Match Local Grant Program

Estimated FY2026 Watershed Funding Allocation




- Reimbursable
- Demands exceed available funds from General Fund (Property Tax)

# Watershed Management Board (WMB) Grant

The Lake County Stormwater Management Commission (SMC) administers an annual grant program, Watershed Management Board Grants to help reduce flood damages and improve water quality. The WMB oversees the allocation of SMC funding and staff resources for projects across the four watersheds of Lake County.

## WMB Grant Program:

- Has limited funding, which is divided among Lake County's watersheds.
- This is a competitive grant program.
- Requires a minimum of 50% local match.
- Projects required as part of a regulatory permit are not eligible for WMB funding.
- Projects that address individual maintenance needs are not eligible.
- Requires an elected official sponsor (WMB Member).
- SMC staff reviews project proposals and makes recommendations to the WMB for their approval of projects. Projects recommended for funding by the WMB are forwarded to the SMC Commission for final approval and funding appropriations.

## Project Proposals and Prioritization Criteria:

1. Mitigating multi-jurisdictional flood problems
2. Mitigating multi-parcel flood issues (structural and nuisance)
3. Enhancing water quality and natural resources in ecologically sensitive locations

# Stormwater Infrastructure Repair Fund

## SIRF Estimated FY2026 (General) Funding: $135,000

The following shall be considered by SMC staff in the development of the staff recommendation. The project by itself or as a component of a candidate project shall to the extent possible:

A. Benefit multiple jurisdictions

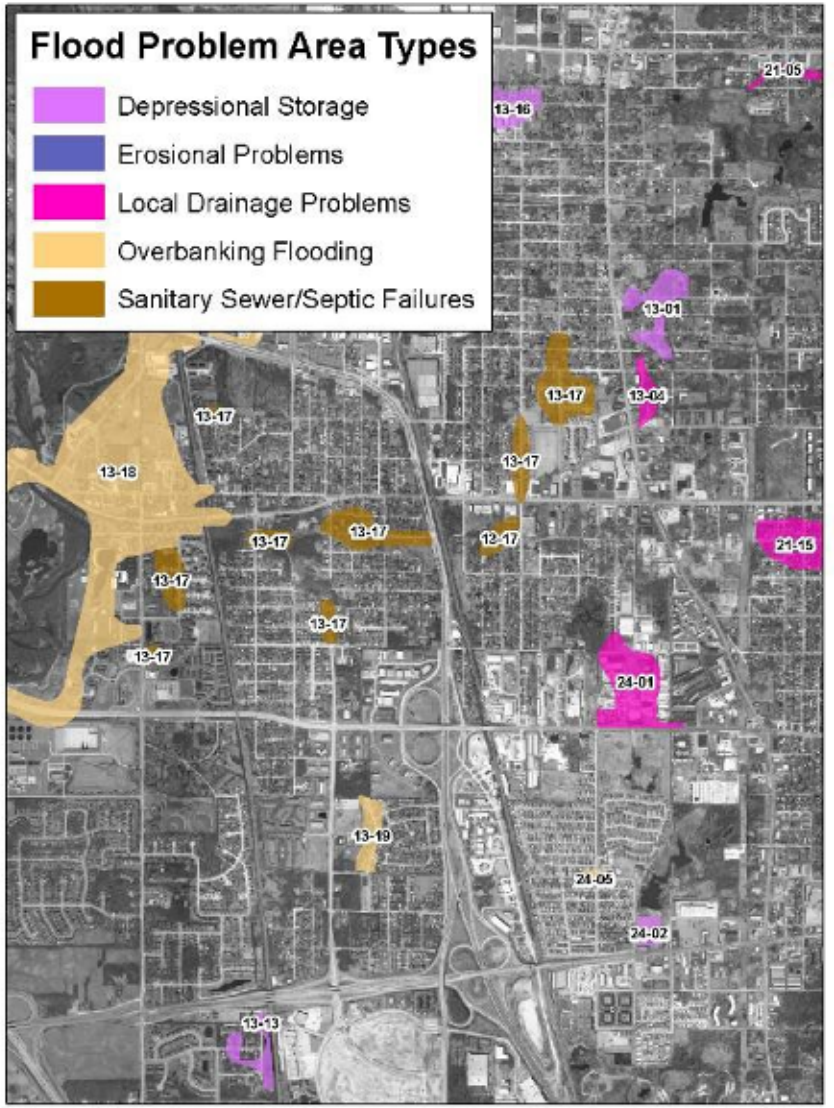
B. Have beneficial results during flood events at a minimum of the 10 year storm level with higher protection levels being preferred.

C. Enhance surface water quality utilizing best management practices.

D. Alleviate flood damages with consideration of the type and quantity of damages occurring as follows in priority order:

Individual parcels within a project area will be assigned a damage type(s) and the rating for the project area is determined by totaling the rating(s) for each parcel, and adding frequency of occurrence and additional funding credit beyond minimum required.

| Damage Priority | Flood Damage Type | Evaluation Criteria<br>Number and Frequency of Occurrences |
|---|---|---|
| 1 | Structural Damage | |
| 2 | Flooded Building | |
| 3 | Health and Safety | |
| 4 | Road Flooding | |
| 5 | Disruption of Revenue | |
| 6 | Parking Lot Flooding | |
| 7 | Nuisance Flooding | |

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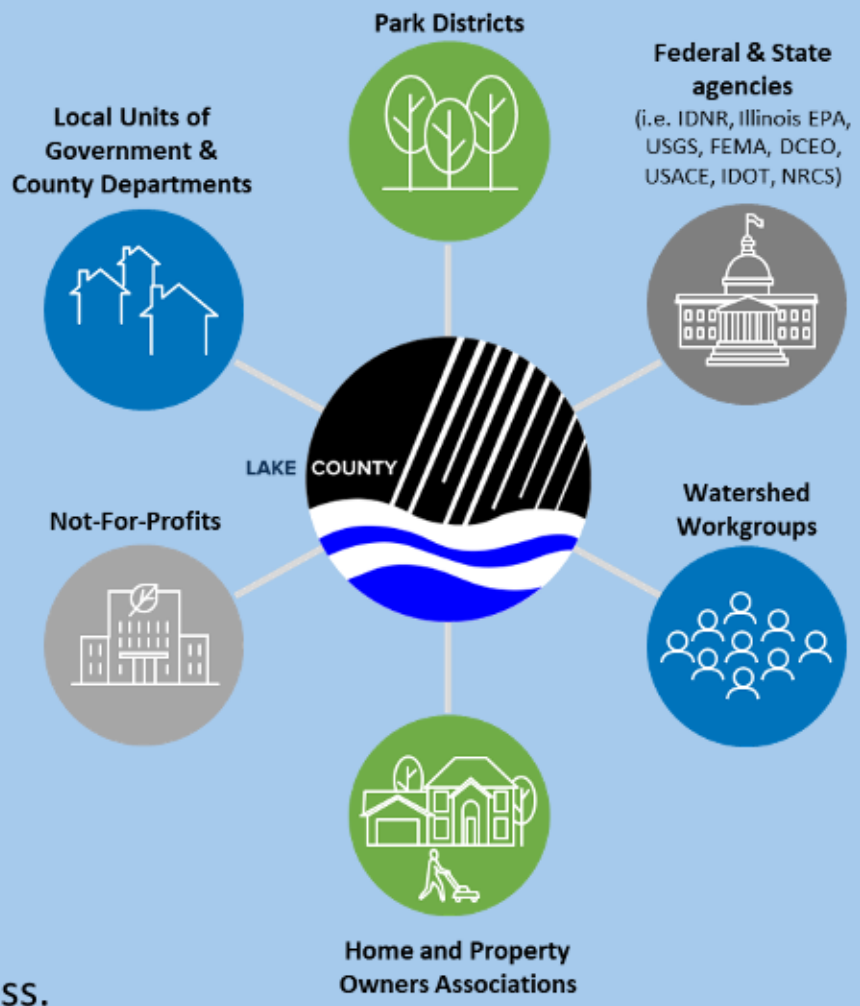
# Partnerships

Since 1990, SMC has been able to implement its mission through strong partnerships. SMC has worked with partners on numerous projects and programs and has provided collaboration between Lake County and adjacent counties.

**251**
**PROJECT PARTNERS:**

- **23** Townships
- **66** Municipalities
- **5** Federal
- **39** Local
- **109** Private
- **9** State

**TYPES OF PARTNERS:**




## STRENGTH IN PARTNERSHIPS

- Help local partners see how their individual vision can fit into a shared vision for Lake County.
- Mobilize public and private resources to achieve common goals. Be good stewards of Lake County's values and resources.
- Build policies and services from the local level. Respect local uniqueness.
- Advance regional infrastructure solutions and services with the support of federal, state, and local agencies.

nmsa National Municipal Stormwater Alliance

ASCE AMERICAN SOCIETY OF CIVIL ENGINEERS

# Thank You!

LAKE COUNTY

STORMWATER MANAGEMENT COMMISSION

**500 W. Winchester Road, Suite 201**
**Libertyville, IL 60048**


- Visit lakecountyil.gov/stormwater
- Subscribe to Mainstream newsletter
- Follow us on Facebook
- Attend future public information meetings
- Call us at (847) 377-7700
- Email us at stormwater@lakecountyil.gov

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# Questions?

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**Carol Ellinger Haddock**, P.E., MPA, F.ASCE, Former Director, Houston Department of Public Works; Sr. Program Advisor, Black & Veatch

**Jamie Houle,** Ph.D., Vice Chair, NMSA; Director, UNH Stormwater Center

**Scott Taylor**, P.E., D.WRE, Chair, NMSA; Project Specialist, AtkinsRealis

**Kurt Woolford**, Executive Director, Lake County, Illinois, Stormwater Management Commission


Find more details, please visit InfrastructureReportCard.org.

Thank you!