

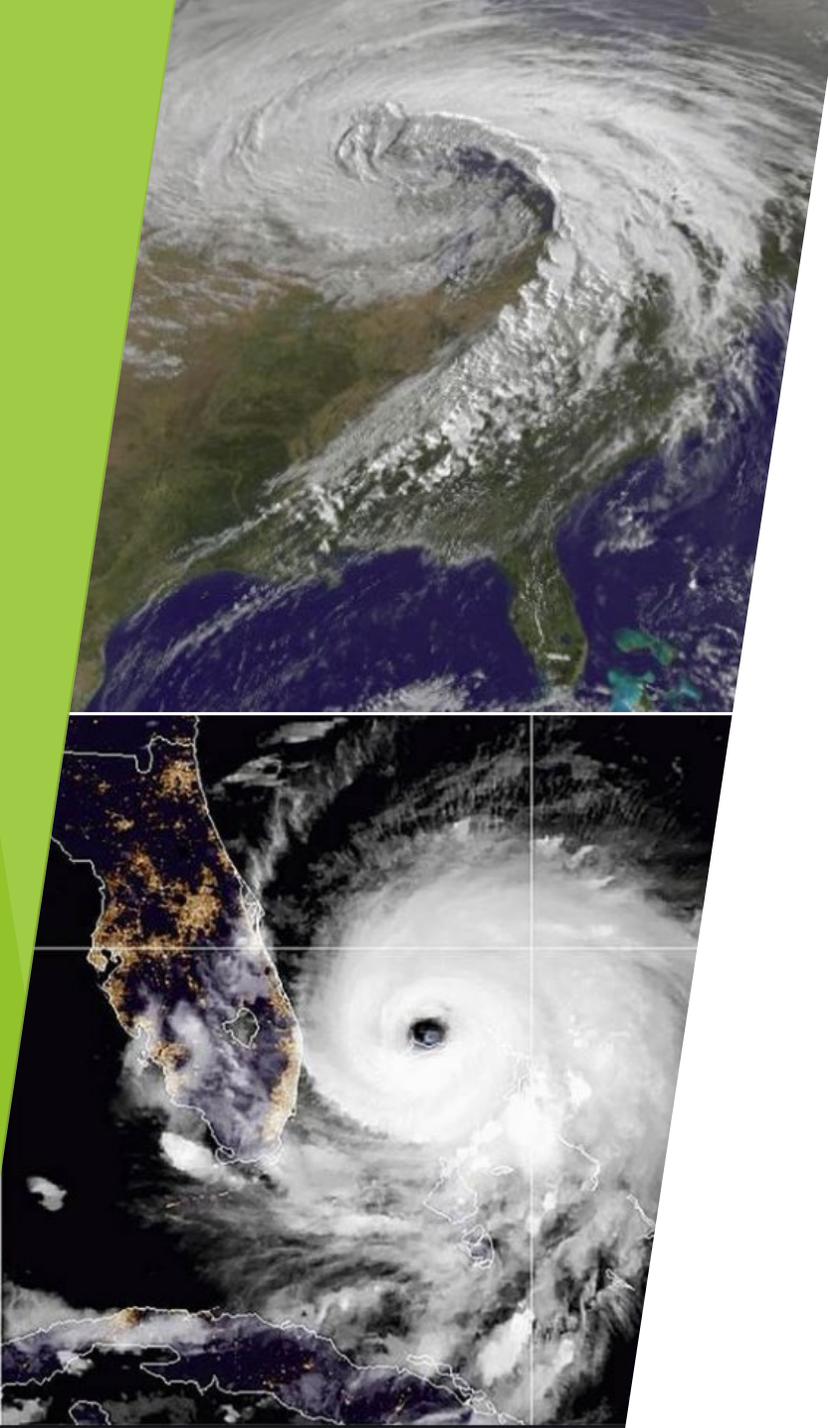
Lake County Stormwater Management Commission

**Gaging the Weather and Increasing Rainfall
and where do we go from here?**

Today: Global - Regional - Local

Global

- ▶ What evidence is there for climate change - data driven, forget the term climate change, the globe is getting warmer!
- ▶ Warm air holds more water
- ▶ Warm air has more energy
- ▶ Why are we getting record cold? - and what is a bomb cyclone?



Atmospheric Moisture Increase

The atmosphere holds 7 percent more moisture per 1.8°F / 1°C of warming (since 1750)

Storms are Stronger?

‘Strength’ Needed to Lift 2” of Rain?

- ▶ 2” of rain over 1 acre = 453,000 lbs of water
- ▶ 226 tons

Regional - Stronger Storms

- ▶ Storms holding more water - there is a trend

Regional - More Rain

- ▶ Total precipitation data shows increasing trend

National Climate Assessment Concludes:

- ▶ High confidence of heavier precipitation and more frequent

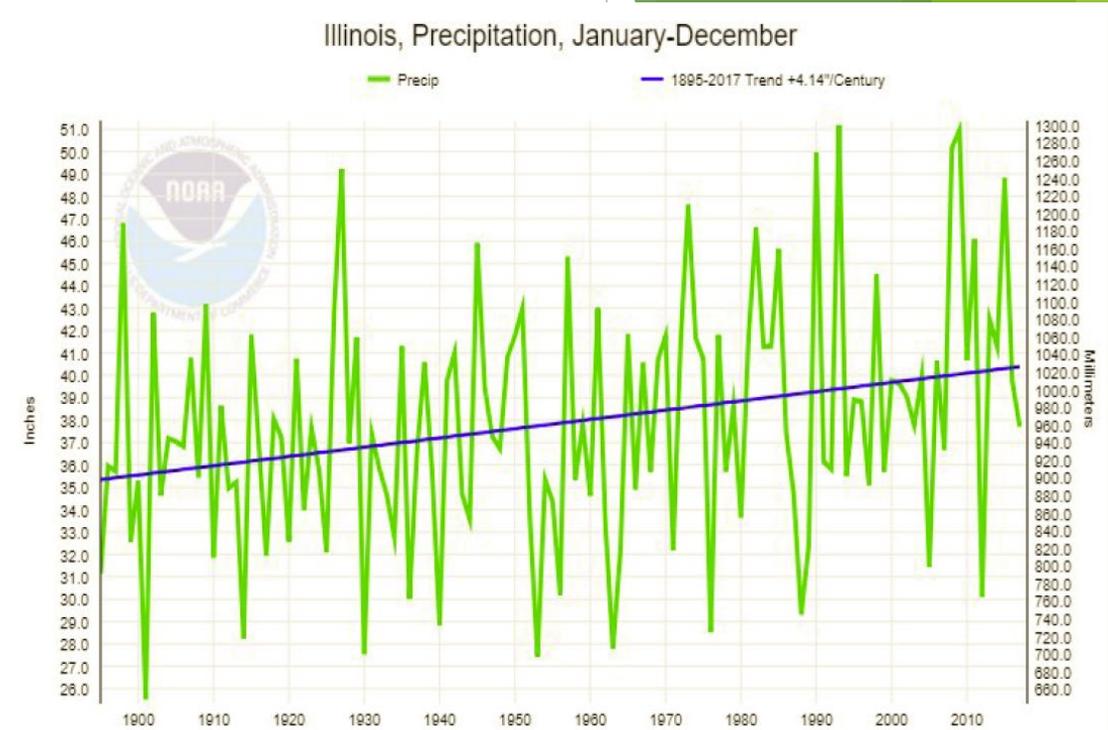
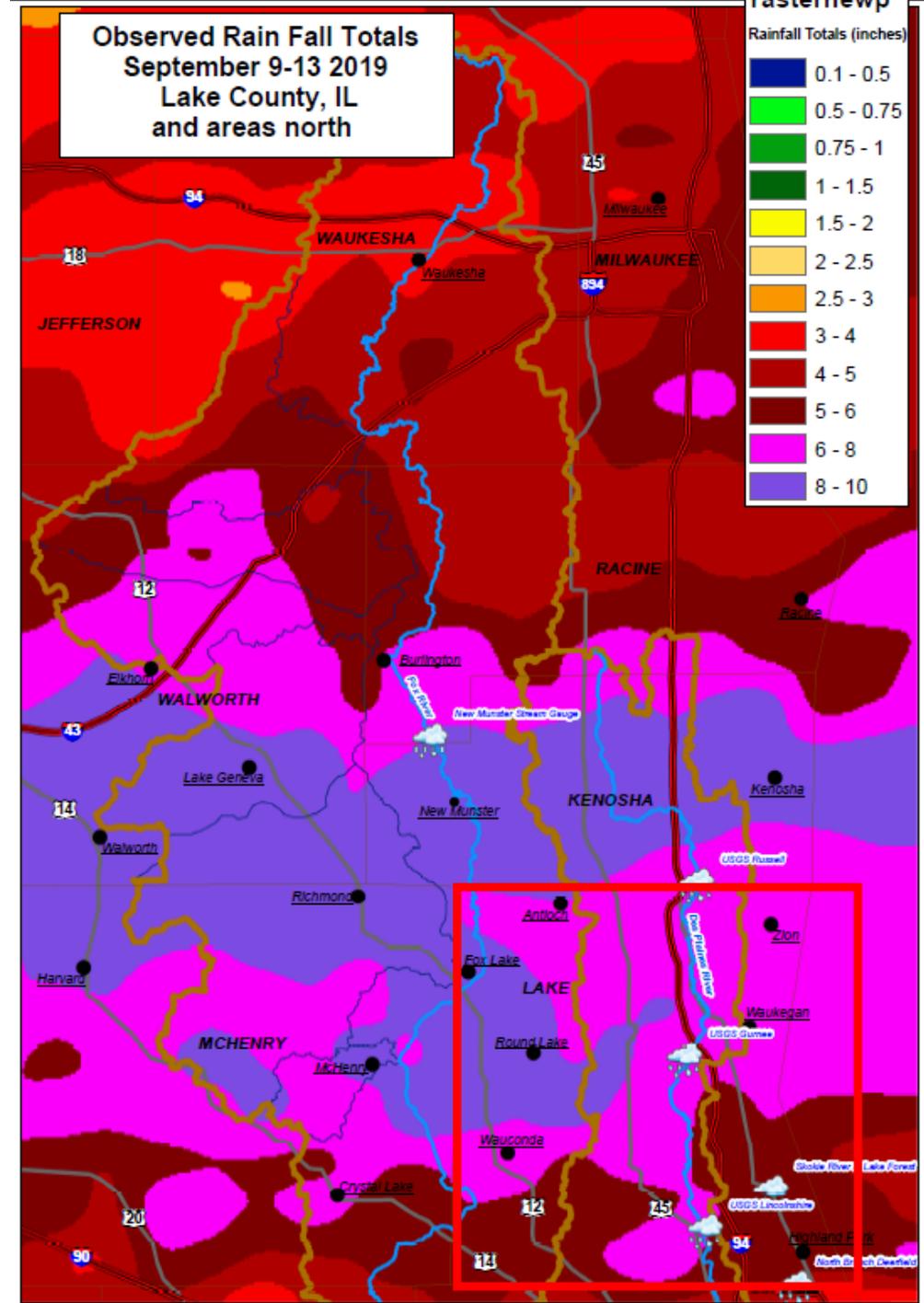


Figure 3 Statewide average annual precipitation for Illinois from 1895 to 2017. The green line shows the year-to-year variability. The blue line is a linear trend showing an increase of 4.14 inches over the past century. Source: NOAA NCEI, 2018.

Evidence - More

Recent History (September 2019)

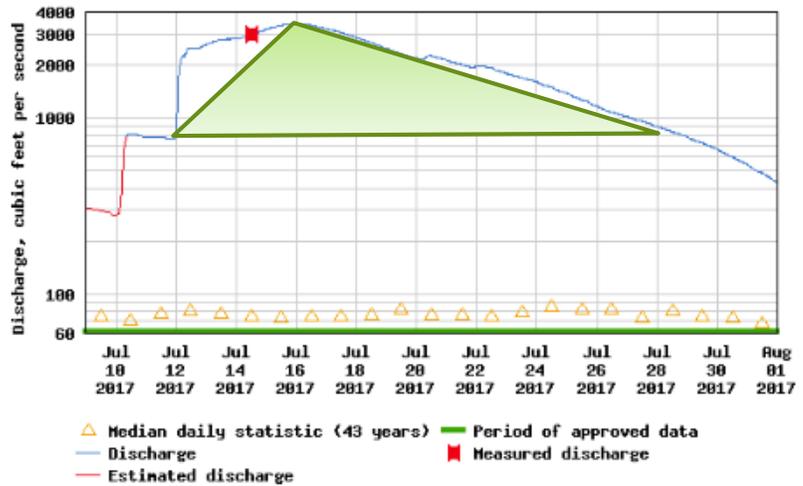
- ▶ Received between 6"-10" in Lake County in 5 days
- ▶ All major basins in the county flood damage affected
- ▶ Fox/Des Plaines/North Branch Chicago River



Discharge, cubic feet per second

Most recent instantaneous value: 98.5 09-04-2019 08:30 CST

USGS 05528000 DES PLAINES RIVER NEAR GURNEE, IL



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How Much is more?

What volume of water is in a storm? (July 2017)

Volume Above Flood Stage (Route 120 Gage)

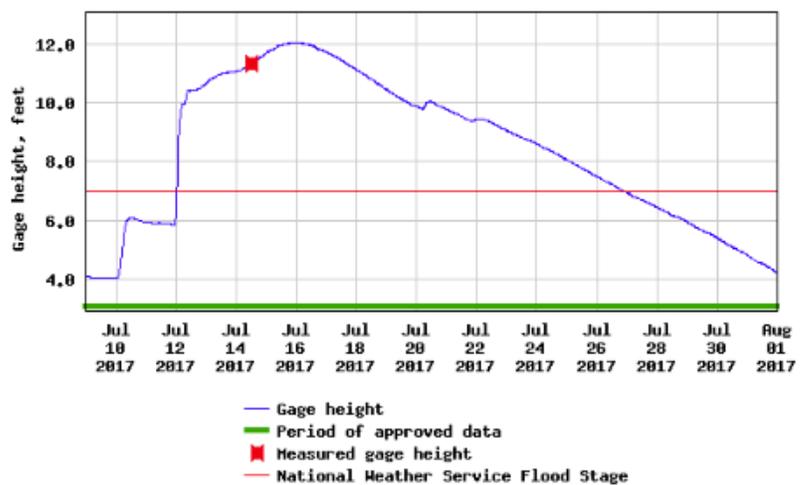
$A = \frac{1}{2} \text{ Base (time) } \times \text{ Height (flow) } = \text{ Volume}$

$\text{Volume} = \frac{1}{2} (14 \text{ days}) \times (2600 \text{ cfs})$

Gage height, feet

Most recent instantaneous value: 2.36 09-04-2019 08:30 CST

USGS 05528000 DES PLAINES RIVER NEAR GURNEE, IL



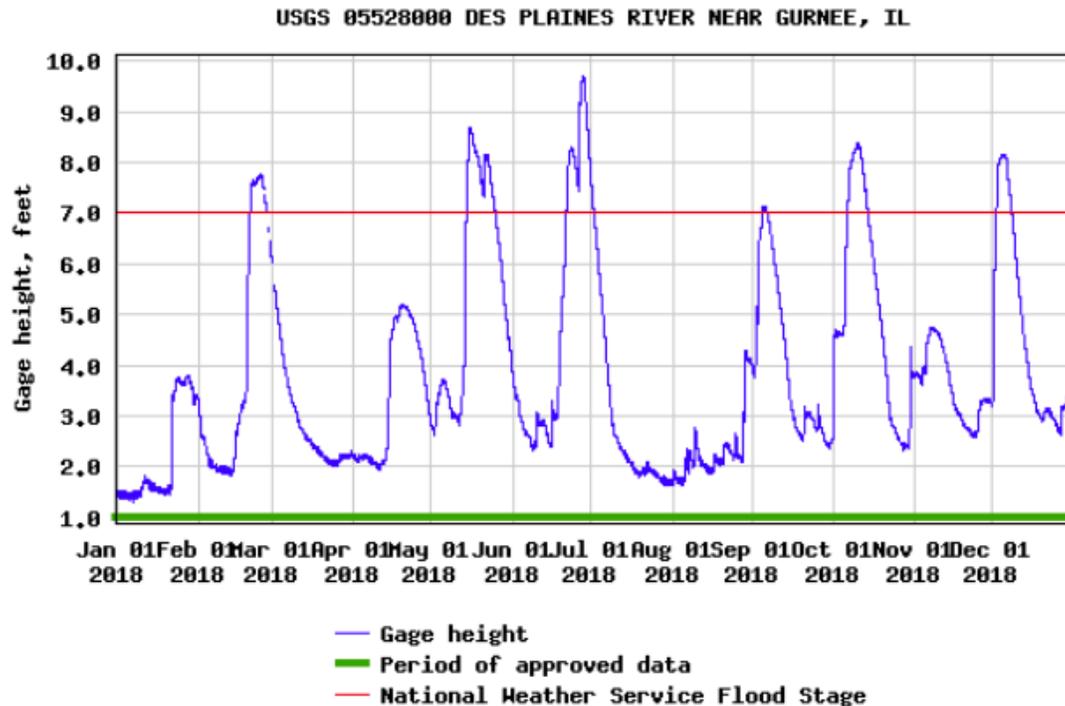
Storm Flood Volume = 36,000 Acre-feet

Evidence - More Often

► 2018 (Route 120 Gage)

Above flood stage during 6 separate storm events, for over 60 days of the year

Gage height, feet



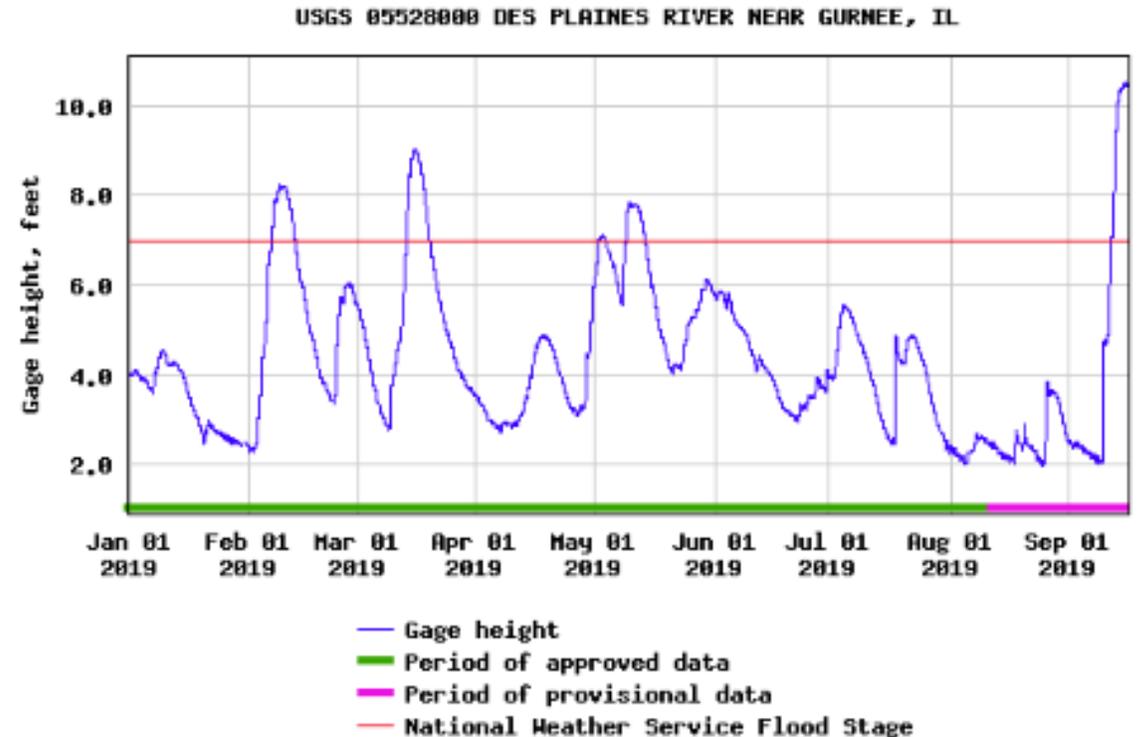
Evidence - More Often

► 2019 (Route 120 Gage)

Above flood stage during 5 separate storm events, and counting?

Gage height, feet

Most recent instantaneous value: 10.46 09-16-2019 15:30 CST



Flood Information for Lake County

Des Plaines River Flood Inundation

http://geoserver.dnr.illinois.gov/UDPR_INUND/inund2pub.html

Fox River and Chain O' Lakes Flood Maps

<https://lakecountyl.maps.arcgis.com/apps/MapSeries/index.html?appid=288d6cc1e5a041b8bc6c480699ffa2da>

Lake County Passage (Road Flooding)

<https://lakecountypassage.com/>



Where do we go from here

Plan
(Prevent)

Prepare

Respond

Recover

Mitigate

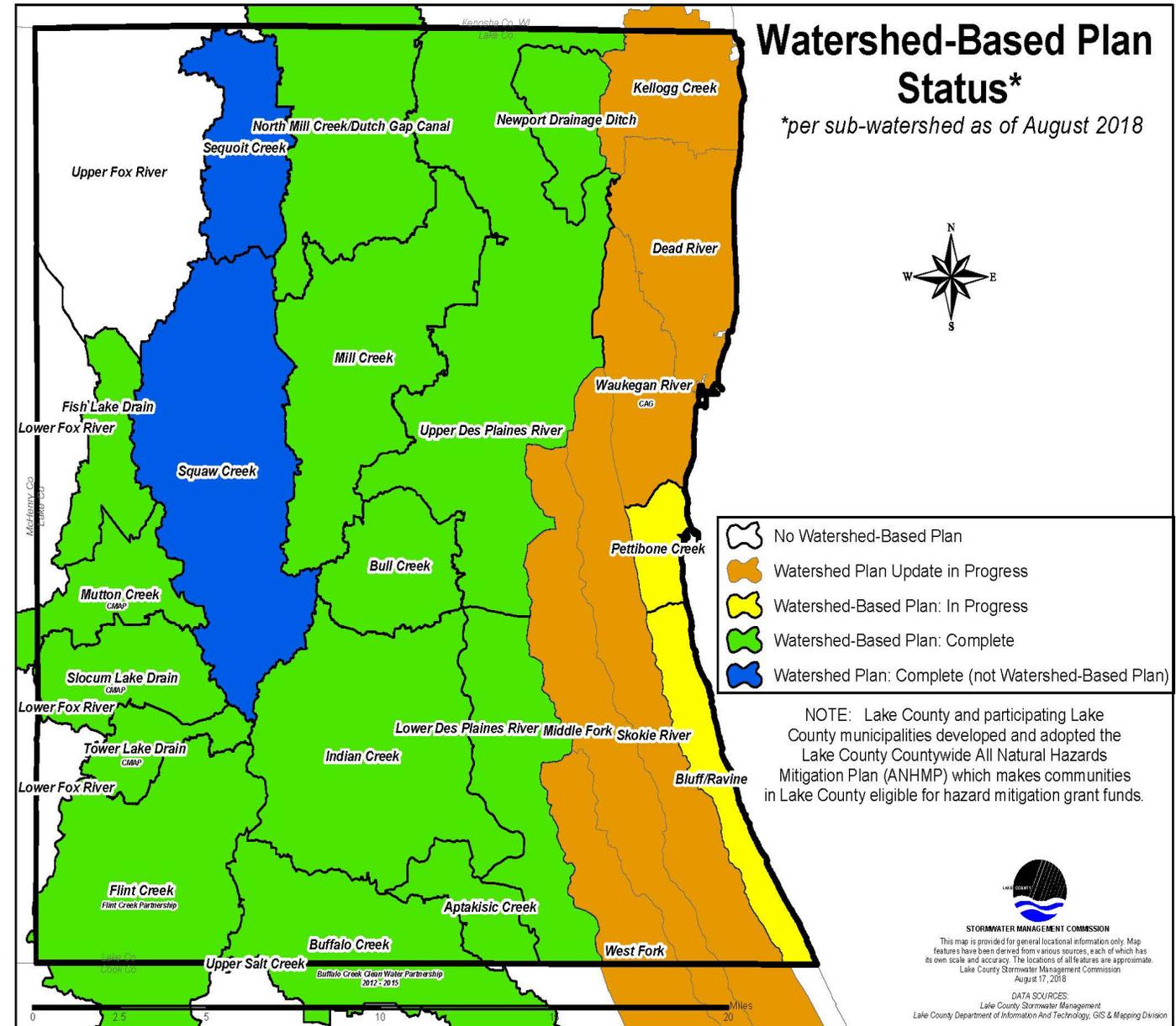
Watershed Development Ordinance Reaction (Prevent)

- *Increase Des Plaines River Flood Protection Elevation (WDO)*
- *New Rainfall Tables*
- *New Rainfall Intensity Distributions (ISWS In Progress)*
- *Modify Detention Holding and Overflow Capacities*

Plan

Watershed Planning

- ▶ Basis for water resource management
- ▶ Identifies problems and solutions - both flooding and water quality based)
- ▶ Allows project grant funding eligibility
- ▶ Educates Stakeholders on the problems and solutions



Prepare

- ▶ Flood Problem Area Inventory
- ▶ Site-specific action plan - concept designs
- ▶ Implement Projects
- ▶ Provide Homeowner Resources
- ▶ *Advocate for FIS Mapping Updates*

Respond

- ▶ SMC has an adopted Flood Response Manual
- ▶ After Action Briefing following each major flood requires update to manual

DRAFT



STORMWATER MANAGEMENT COMMISSION

FLOOD RESPONSE MANUAL

Adopted April 6, 2006
Revised April 23, 2009
Revised December 28, 2010
Revised Summer 2013
Revised March 2016
Revised August 2017

Mitigate

- ▶ Buyouts! - Over 200 purchased to-date, many more to come
- ▶ IDNR Buyout Project Approved for Lake County (another 12 homes)
- ▶ Infrastructure
 - ▶ Storage (smaller watershed reservoirs, detention ponds)
 - ▶ Conveyance (storm sewers, culverts, stream maintenance and restoration)

QUESTIONS?