

Floodproofing and Increased Rainfall Public Information Meeting

Tuesday, September 17



STORMWATER MANAGEMENT COMMISSION

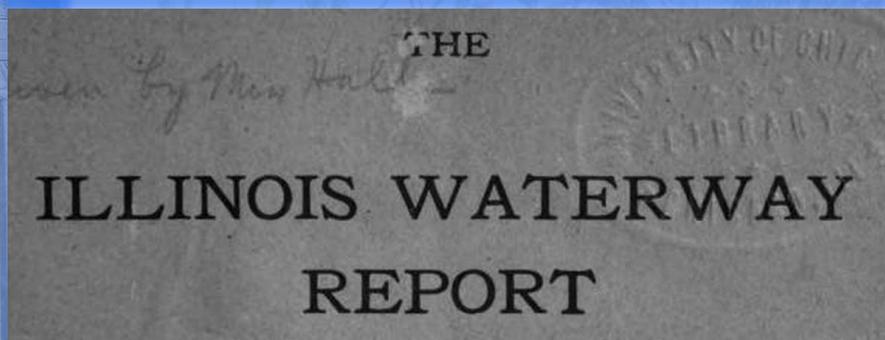
Kurt Woolford
Kelcey Traynoff
Mike Warner



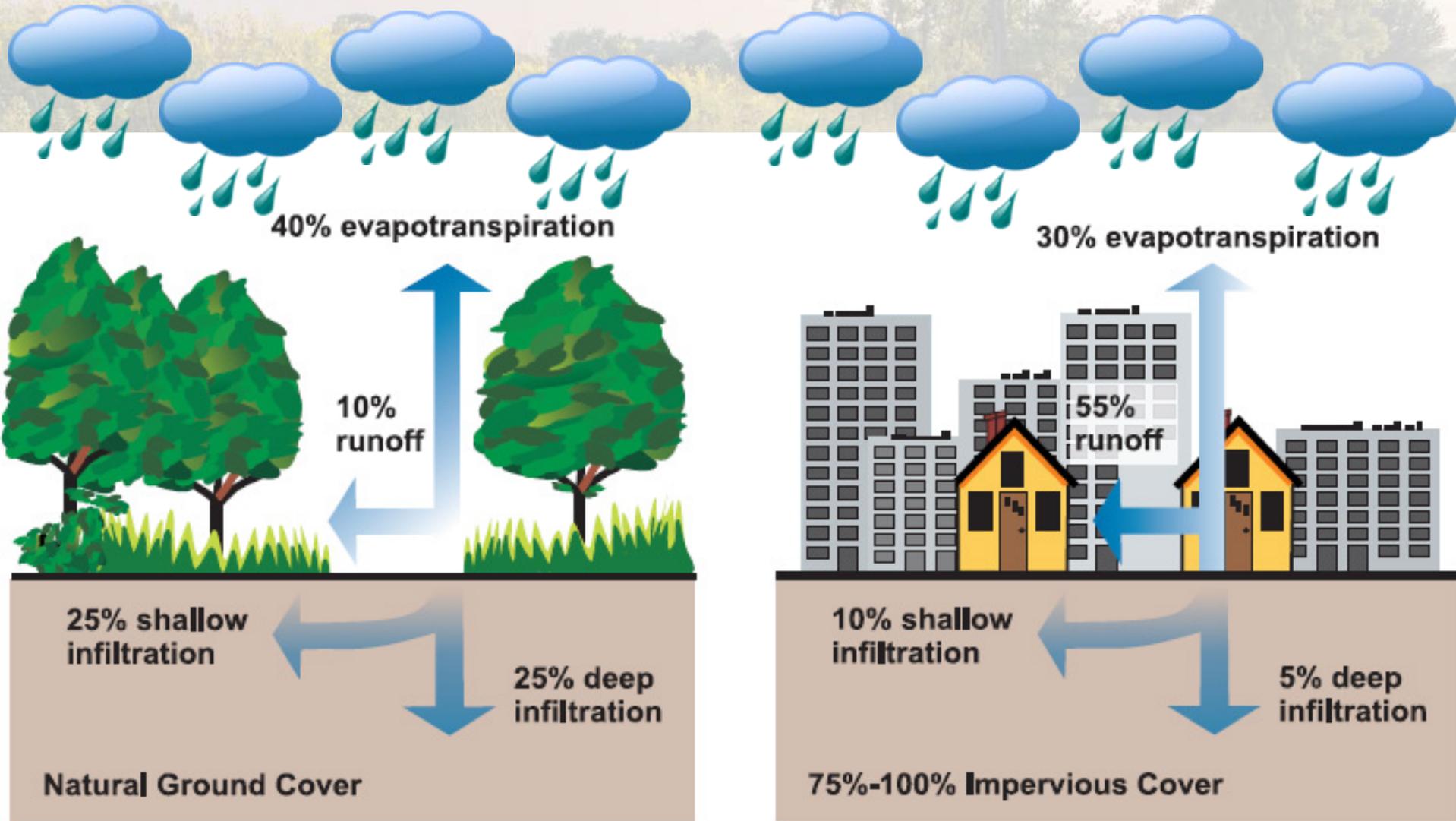
Earliest Recorded Des Plaines River Flood

the lake of Illinois. At the extremity of this lake would be the cut or canal of which I have spoken, to have a passage to the St. Louis river, which empties into the Mississippi. The bark, having entered this river, could easily sail to the Gulf of Mexico.”

Marquette returned to Chicago late in 1674, and wintered “two leagues” from the lake, adjacent to the west fork of the south branch of the Chicago river, near Robey street. On March 29, 1675, he was driven from his cabin by flood waters, due to the spring breakup of the Desplaines river and ice gorges. He secured his effects in trees and took refuge on a “hillock.” On March 31, he embarked in two canoes and proceeded to the Illinois country, passing



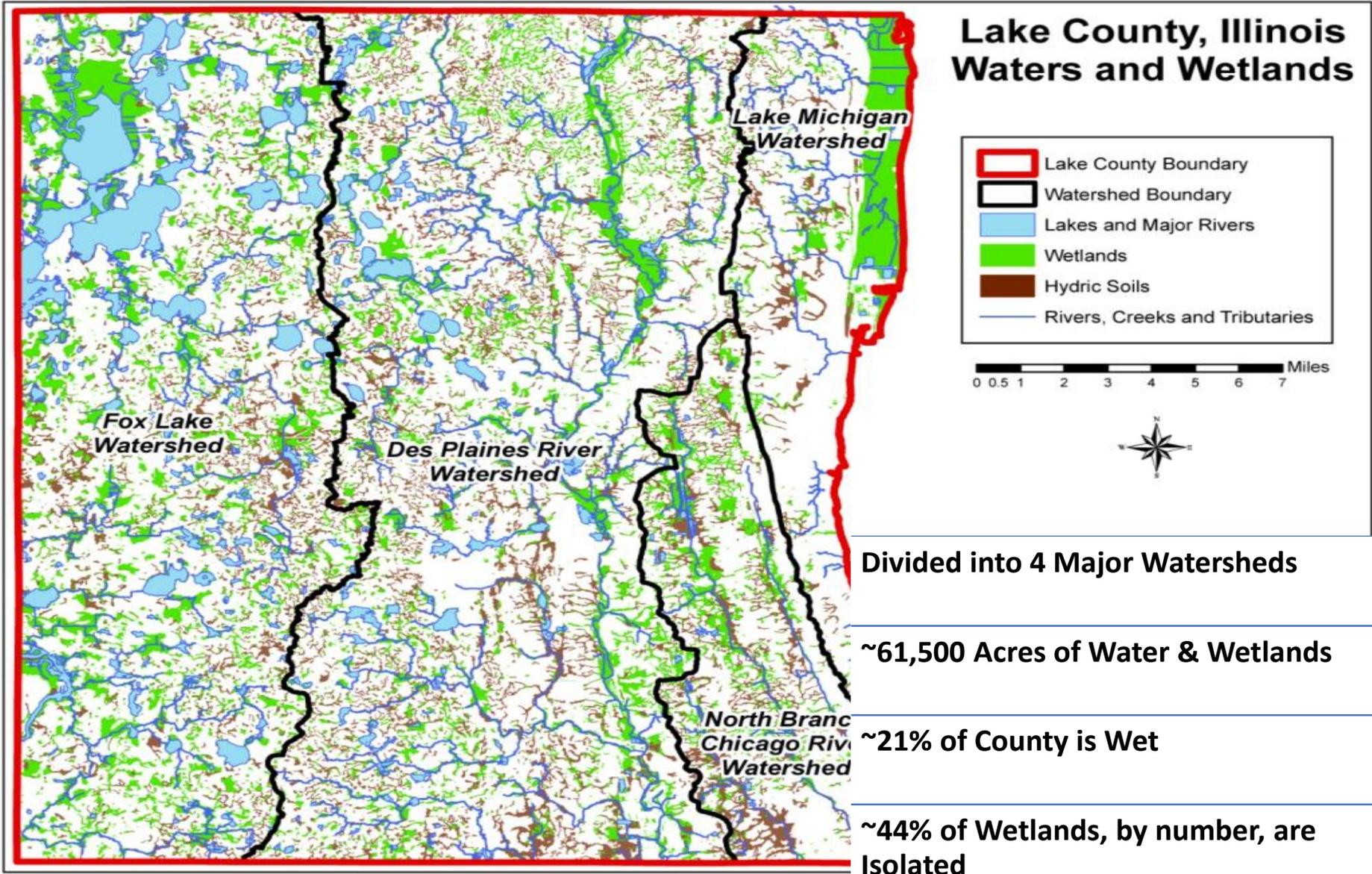
Why is Stormwater Management Important?



Impervious surfaces increase the volume and rate of stormwater runoff



Why is Stormwater Management Important... ...in Lake County?



Flood Safety

Do You Really Know How Deep the Water is?

12 inches of fast-moving water can carry away a small car.



6 inches of fast-moving water can knock over and carry away an adult.



18-24 inches of fast-moving water can carry away most large SUVs, vans and trucks.



Flood Safety

Never Drive Into Flood Waters



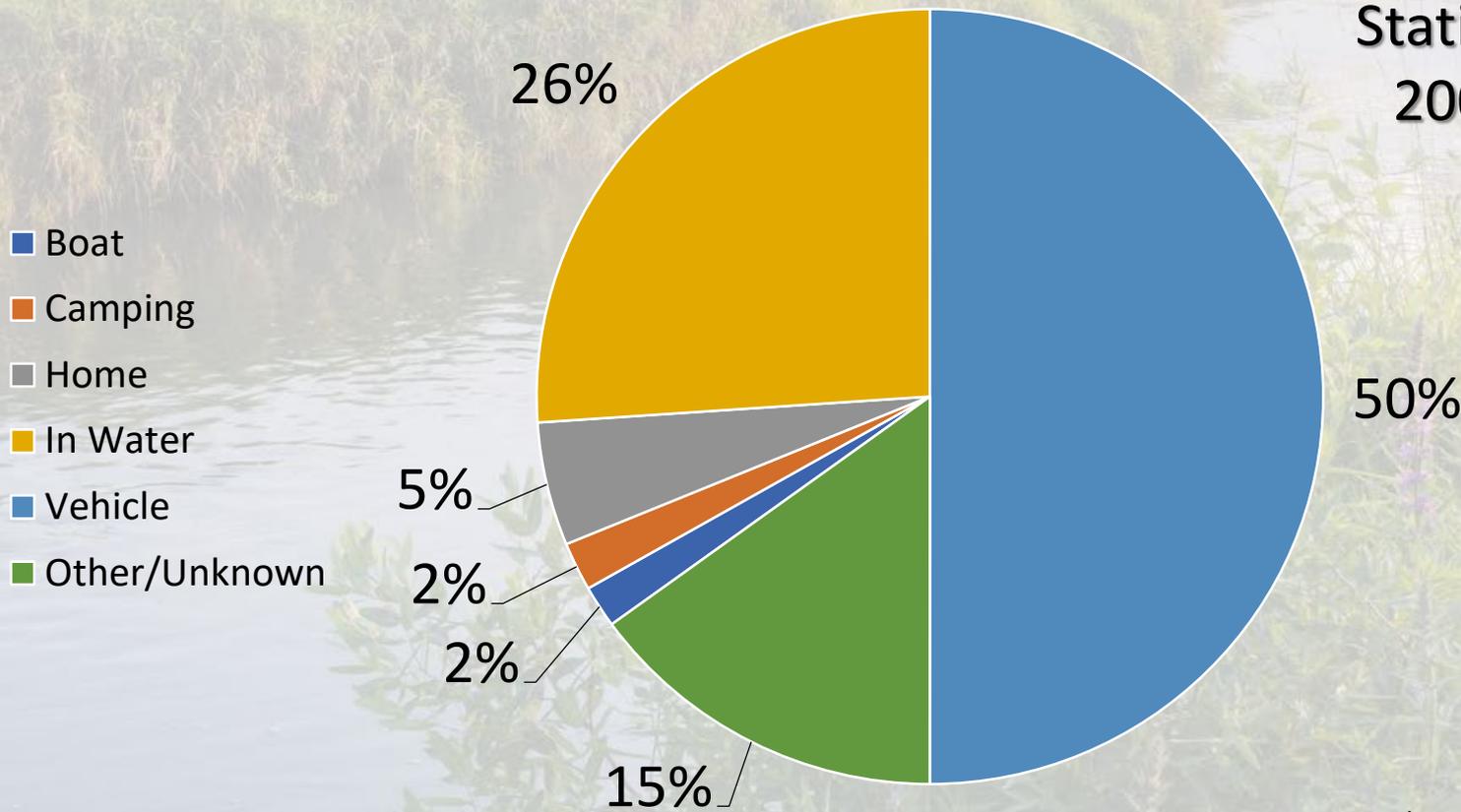
even if the water appears calm

Driving into flood waters also puts rescuers' lives at risk **Turn Around Don't Drown!**



Flood Fatalities: Location

Statistics from
2000 - 2018



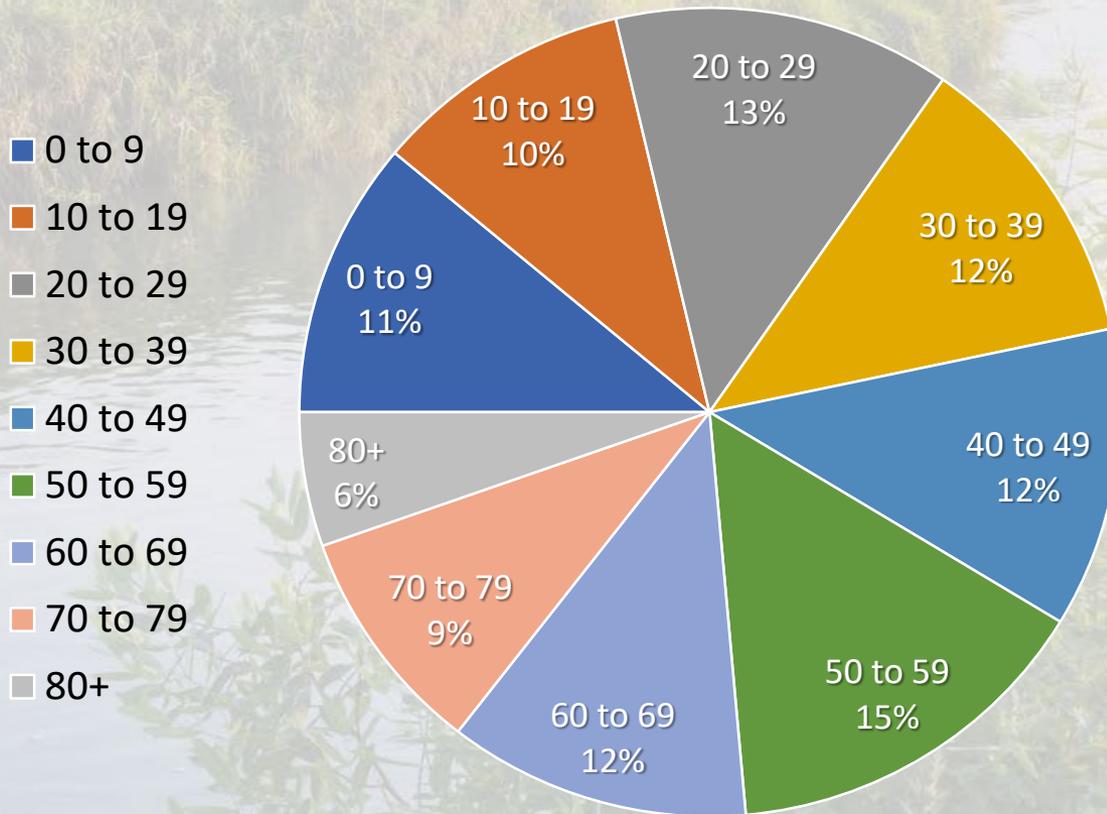
<https://www.weather.gov/hazstat/>



STORMWATER MANAGEMENT COMMISSION

Flood Fatalities: Age

Statistics from
2000 - 2018

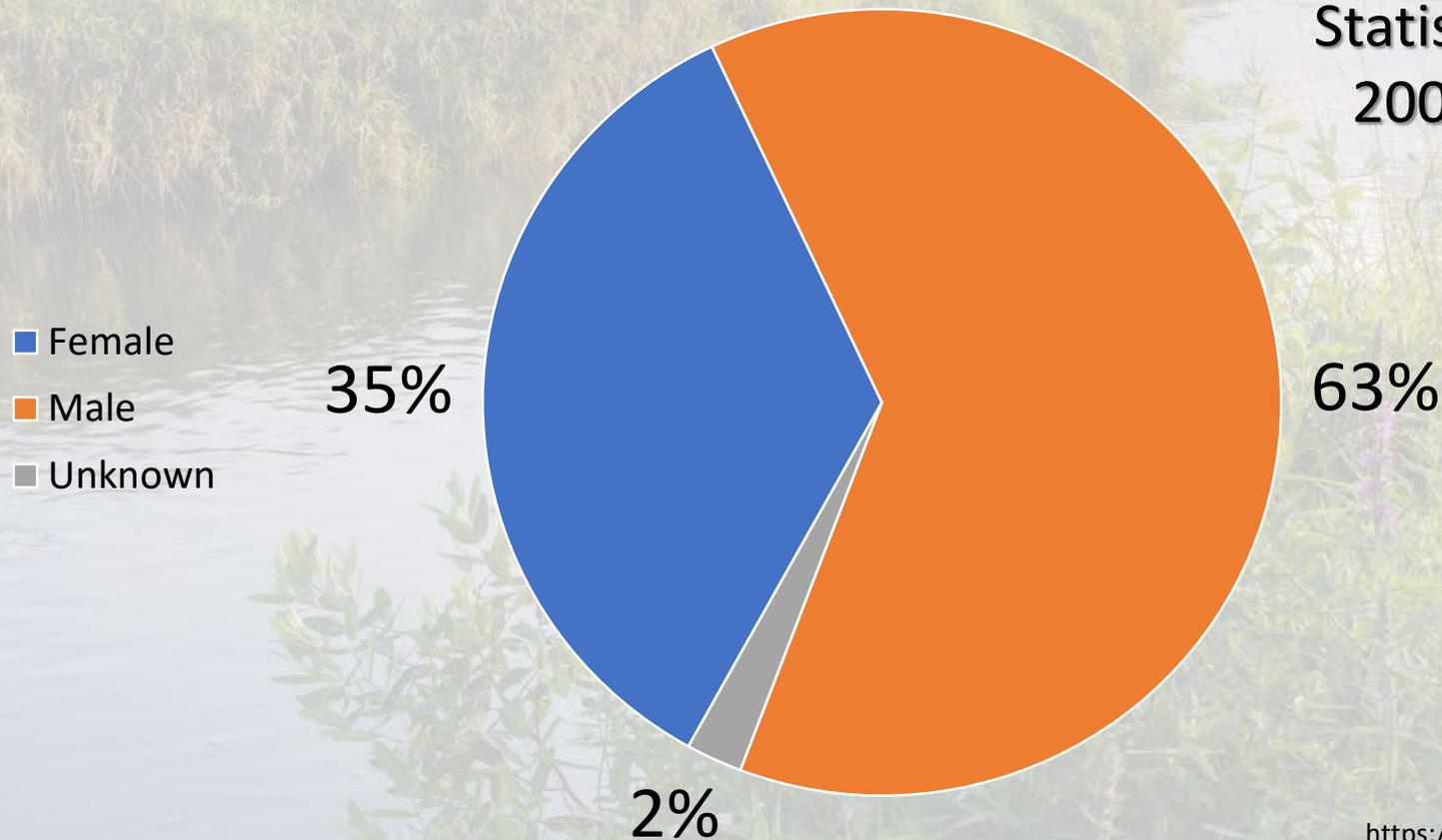


<https://www.weather.gov/hazstat/>



Flood Fatalities: Gender

Statistics from
2000 - 2018



<https://www.weather.gov/hazstat/>



STORMWATER MANAGEMENT COMMISSION

Flood Protection Tip #1

"AN OUNCE OF
PREVENTION IS WORTH A
POUND OF CURE"



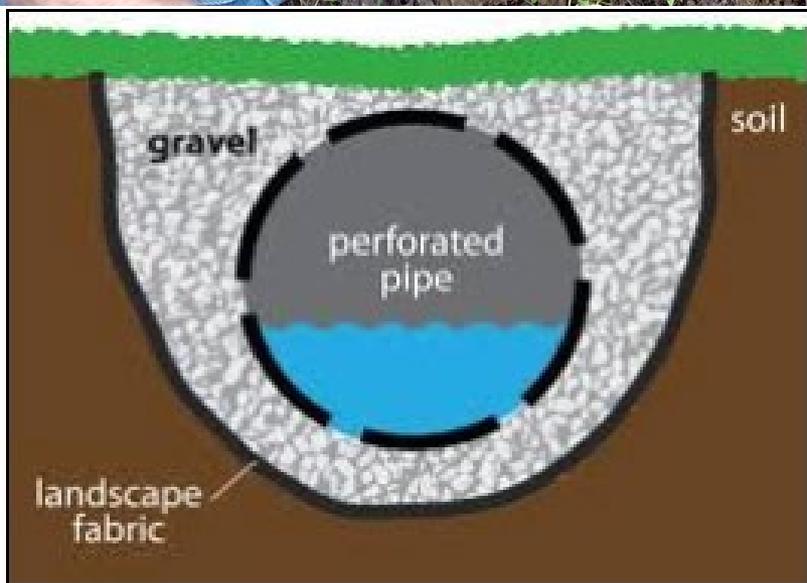
Gutter and Downspout Maintenance



Yard Grading and Positive Slope



Yard Inlets and Drains



Temporary and Permanent Barrier Systems



Permanent Barrier Systems / Automated Technologies

- **This is not an exhaustive list of options – please ask/look around!**
- Invisible flood control wall <http://floodcontrolam.com/>
- Flex Wall <https://www.ilcdoover.com/catalog/side-deployed-flex-wall/>
- PS Doors <https://www.psfloodbarriers.com/residential-flood-protection/>
- Vertically Deployed FlexWall <https://www.ilcdoover.com/catalog/flex-wall/>
- Flood Break <https://floodbreak.com/>



<https://www.ilcdoover.com/catalog/side-deployed-flex-wall/>



<https://www.psfloodbarriers.com/product/hydrodefense-flood-plank/>



US Army Corps
of Engineers®



STORMWATER MANAGEMENT COMMISSION

Rapidly Deployable Technologies

- **This is not an exhaustive list of options – please ask/look around!**
- **Gabion Baskets**
 - HESCO <https://www.hesco.com/products/flood-barriers/>
 - Louisiana Floodwall <https://www.flooddefensegroup.com/our-products/louisiana-floodwall/>
- **Trapezoidal linked bags**
 - Trapbag <https://trapbag.com/>
 - RIBS <https://www.flooddefensegroup.com/our-products/ribs/>
- **Free Standing Retaining Walls**
 - Muscle Wall <https://www.flooddefensegroup.com/our-products/muscle-wall/>
 - Geodesign Barriers <https://geodesignbarriers.com/>
 - PortaDam <https://portadam.com/>
 - RapiDam Rigid <http://www.floodguards.com/rapidam.aspx>
- **Water Weighted Retaining Walls**
 - Aqua Fence <https://www.aquafence.com/>
 - Diluvium <https://www.floodproofing.com/perimeter-flood-barriers>
 - NOAQ Boxwall <https://www.flooddefensegroup.com/our-products/noaq-boxwall/>
 - RapiDam Water-Gate <http://www.quickdams.com/water-gate-1/>
- **Water Bladders**
 - AquaDam <http://www.aquadam.net/>
 - RapiDam Tube
 - Tiger Dam <https://usfloodcontrol.com/>
- **Other Resources**
 - <https://www.fmapprovals.com/products-we-certify/products-we-certify/flood-mitigation-products>
 - <http://nationalfloodbarrier.org/>



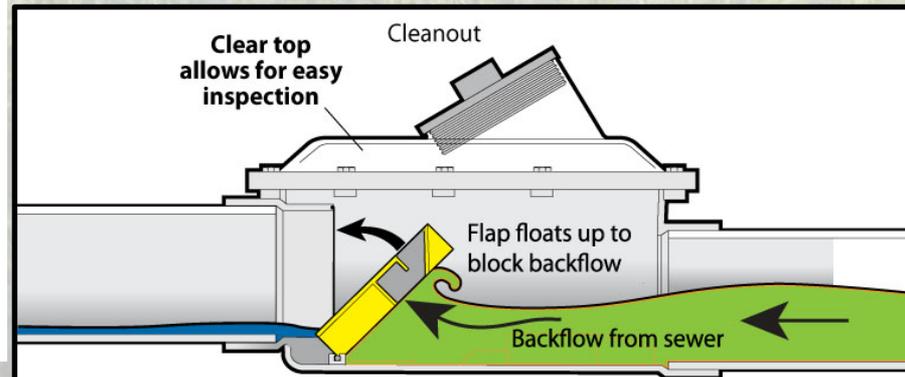
Sewer Back-up Protection

Overhead Sewer

Plug

Upper-floor plumbing rerouted to overhead pipe instead of in-floor pipe

Existing basement plumbing routed to pit with grinder pump



Type of Flooding: Overland Flooding

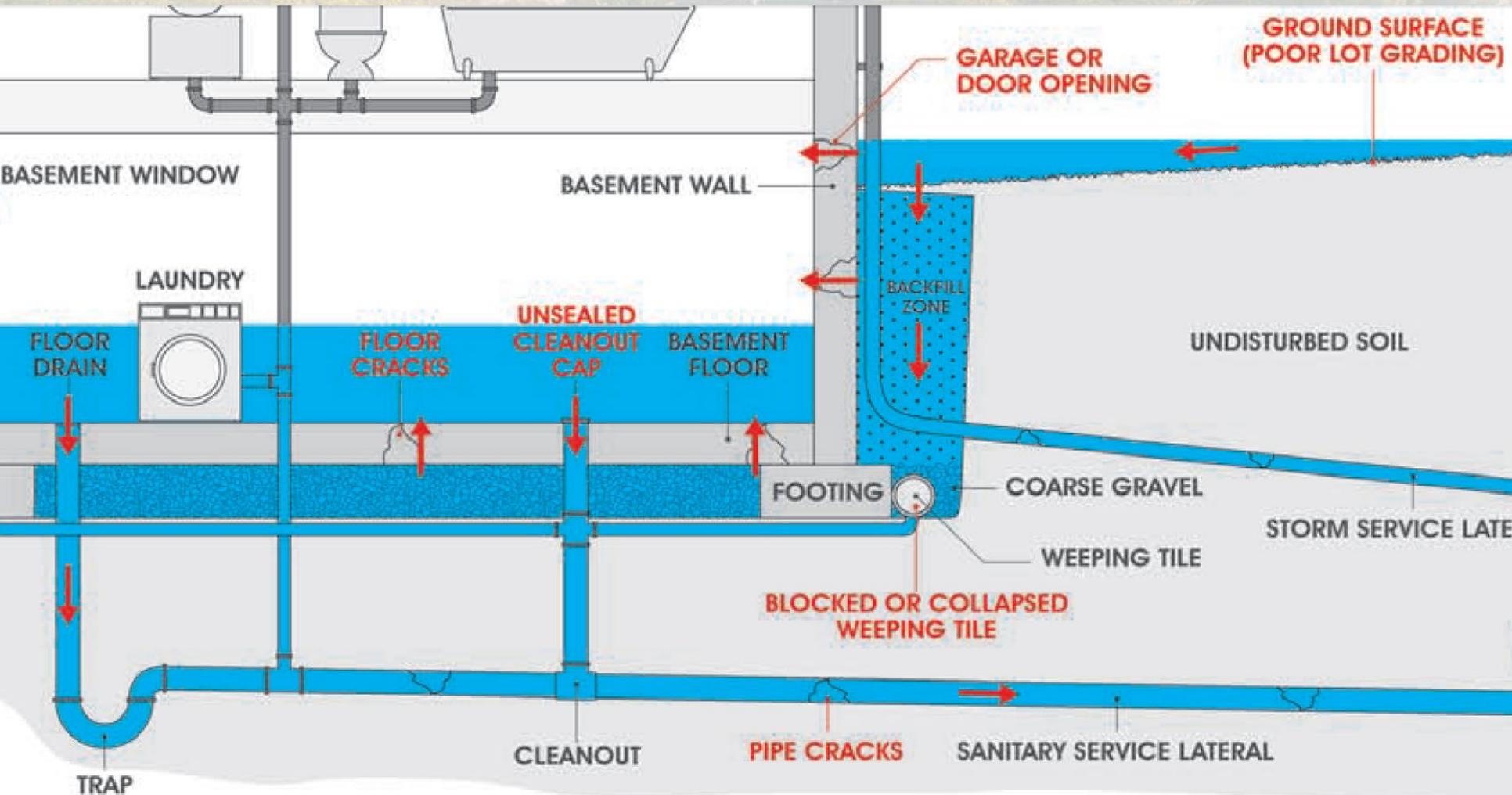


Image credit: The Institute for Catastrophic Loss Reduction



STORMWATER MANAGEMENT COMMISSION

Type of Flooding: Groundwater Infiltration

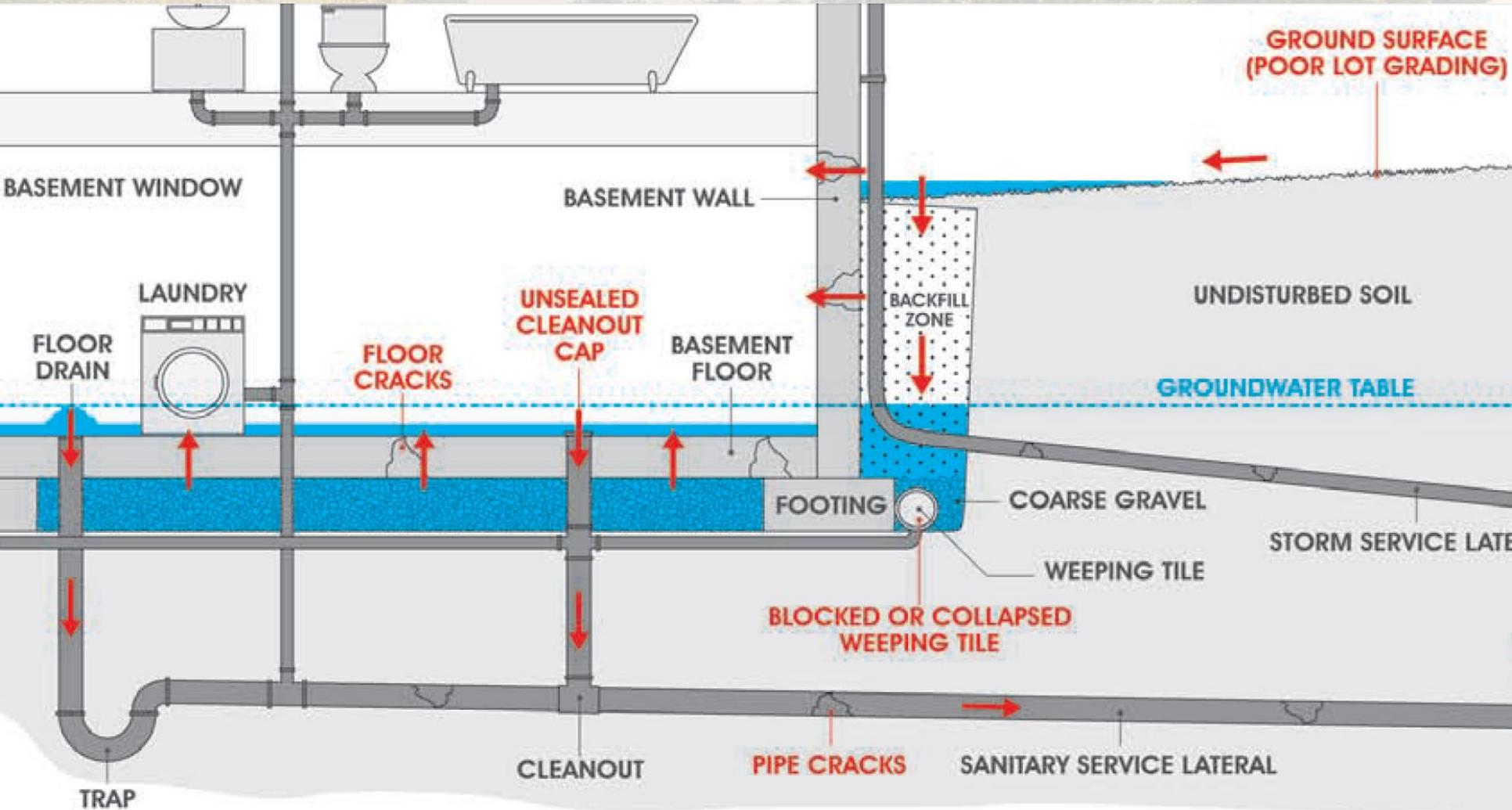


Image credit: The Institute for Catastrophic Loss Reduction



STORMWATER MANAGEMENT COMMISSION

Type of Flooding: Sewer Backup

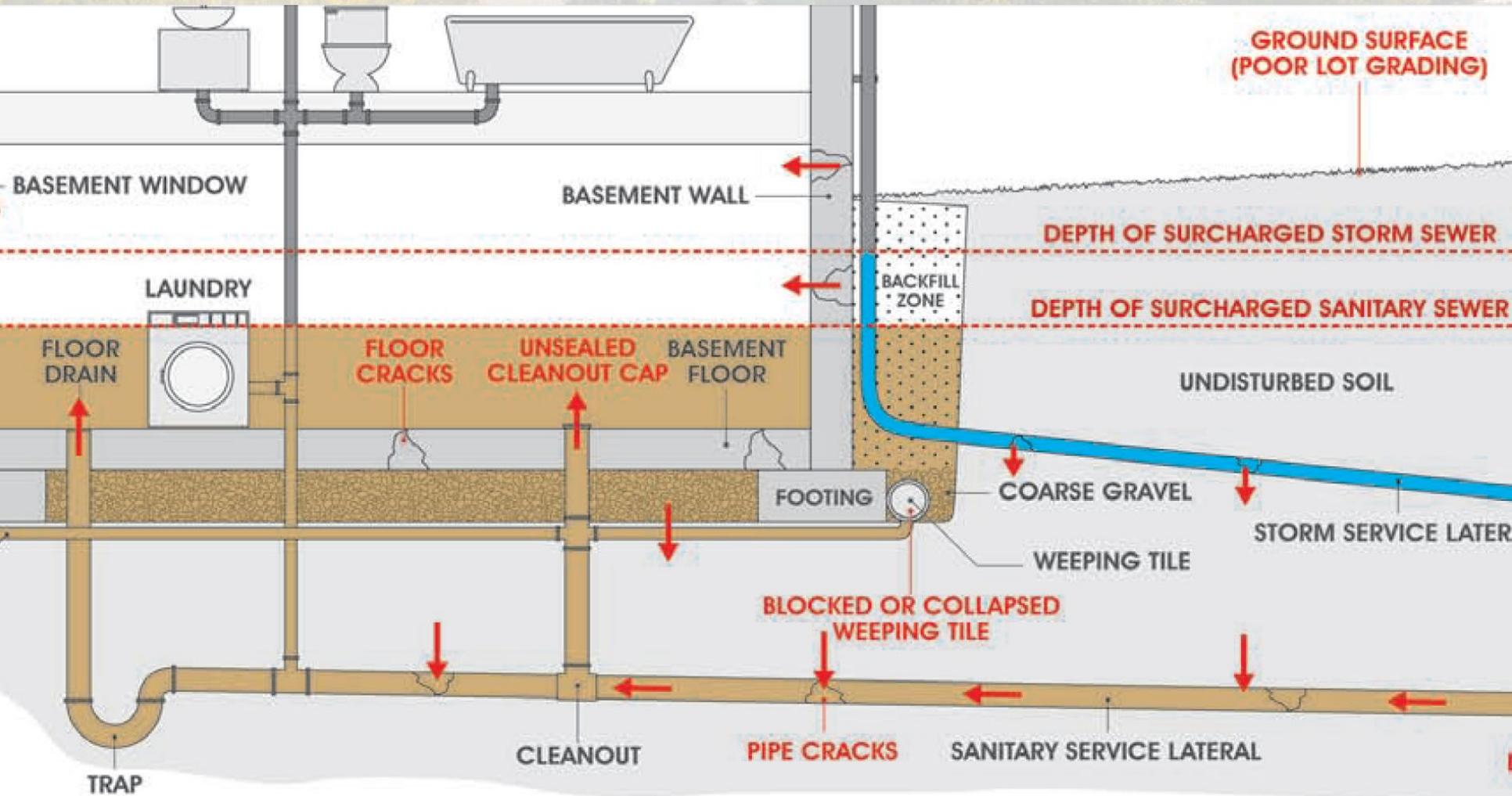


Image credit: The Institute for Catastrophic Loss Reduction



Home Protected from Flooding

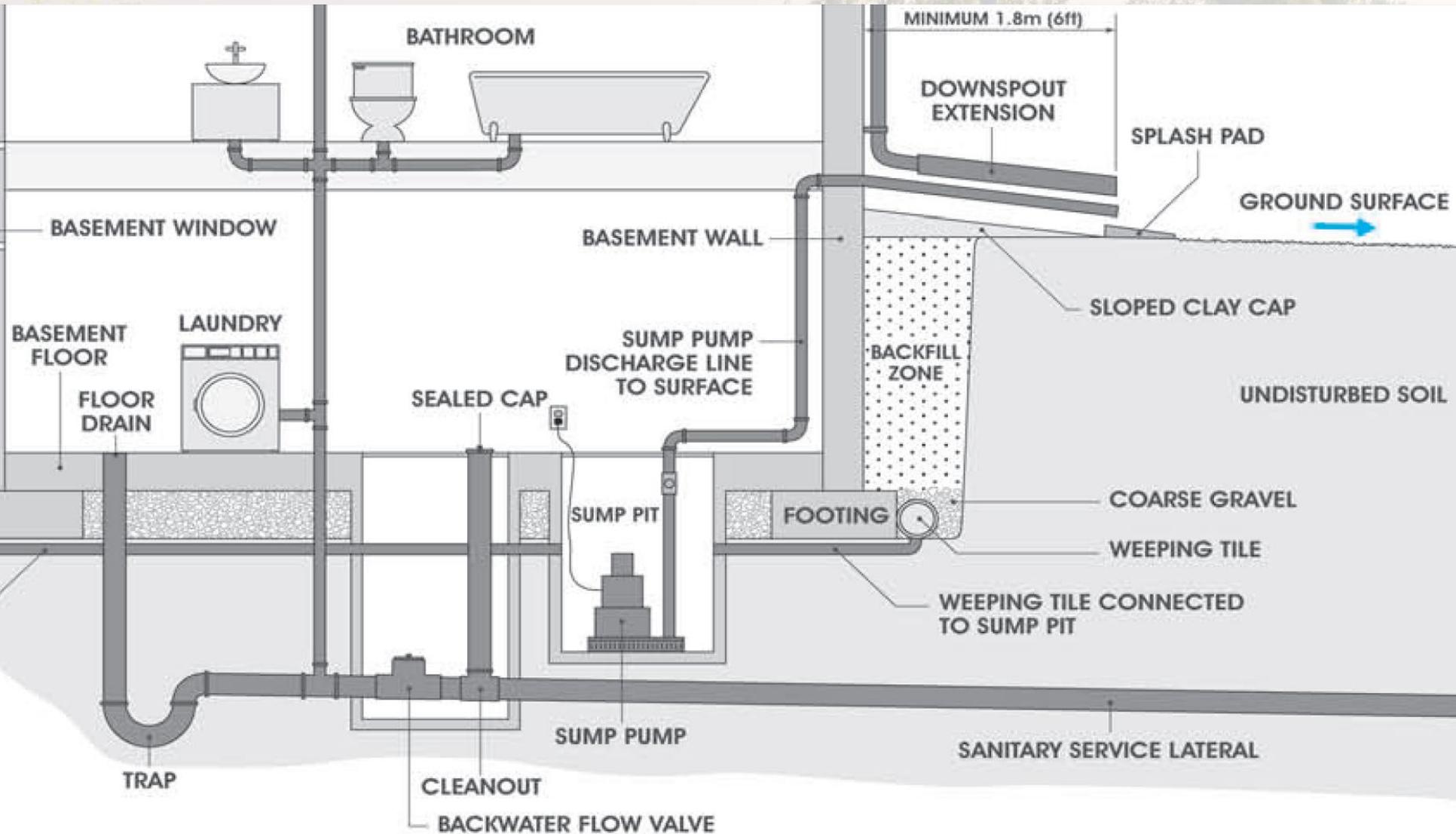


Image credit: The Institute for Catastrophic Loss Reduction



STORMWATER MANAGEMENT COMMISSION



**STEEL BEAMS TO
REINFORCE
FOUNDATION WALL
FROM BUCKLING/
CRACKING**

**EXCAVATED TRENCH
FOR DRAIN TILE AND
WINDOW WELL**





**STEEL BEAM AND
BRACKET CONNECTED
TO FLOOR JOIST**



**WINDOW WELL
DRAIN HOLE**

**WALL ANCHOR PLATES TO
REINFORCE FOUNDATION
FROM BUCKLING/CRACKING**





**WALL PLATES AND TIEBACK
RODS ARE ANCHORED
INTO SOLID GROUND**



**INSTALLED WINDOW WELL
WITH DRAIN PIPE AND
COARSE GRAVEL**





**PERFORATED PIPE AND
COARSE GRAVEL
ALLOWS WATER TO
FREELY DRAIN TO
SUMP PIT/PUMP**

**BASEMENT FLOOR SLAB CUT
OPEN TO INSTALL INTERIOR
PERIMETER DRAIN TILE/PIPE**



**STRUCTURAL
REINFORCEMENTS**

CRACK SEALING

**WINDOW WELL
DRAIN PIPE**

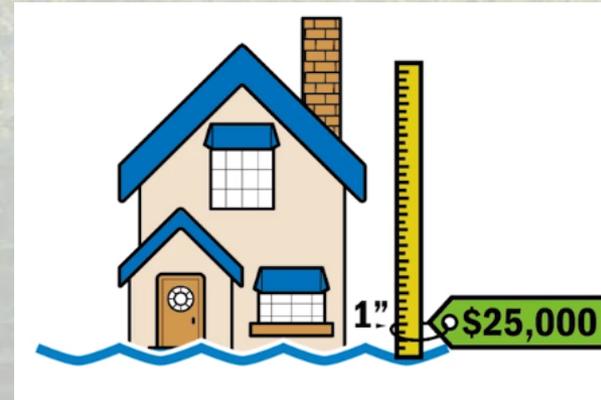
INTERIOR DRAIN TILE

**DUAL SUMP PITS, PUMPS, AND
BATTERY BACKUP PUMPS**

Why do I need Flood Insurance?

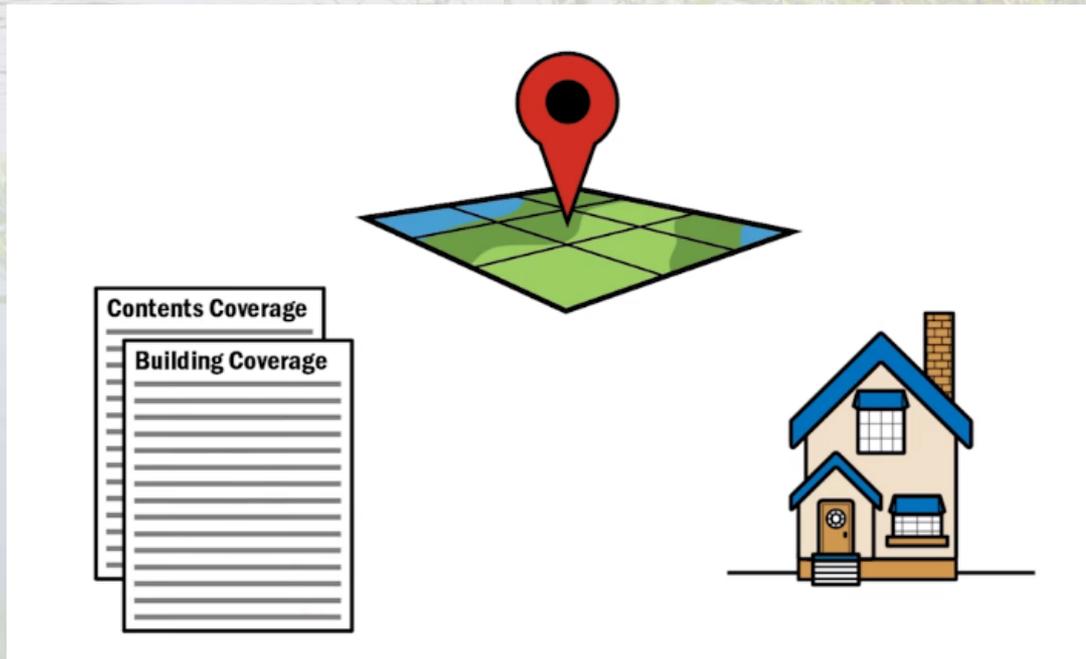
- Floods are the most common and costly natural disaster in the U.S.
- Floods happen in all 50 states
- 98% of U.S. counties have been impacted by a flooding event.
- 2/3 of homes are underinsured against natural disasters (including floods & earthquakes).
- Homeowners & Renters Insurance do not cover flood damage.
- Federal Disaster Aid provides limited help, usually in the form of a low-interest loan.
- Insured property owners recover faster & more completely than uninsured neighbors.
- You may be required to have flood insurance.
- **1" of water in your home can costs about \$25,000 of damage.**

¹ FEMA.gov/national-flood-insurance-program.



How can I buy Flood Insurance?

- Contact your Insurance Agent or visit Floodsmart.com.
- Your insurance agent will help you determine what coverage is right for you and the cost.
- If you live outside of a high-risk flood area, a lower cost Preferred Risk Policy is available.
- NFIP subsidized policies vs. 100% Private (can drop coverage)



Rainfall frequency sources

TP-40, ISWS Bulletin 70, NOAA Atlas 14

U.S. DEPARTMENT OF COMMERCE
Lester B. Nixon, Secretary

WEATHER BUREAU
F. W. Hutchinson, Chief

TECHNICAL PAPER NO. 40

RAINFALL FREQUENCY ATLAS OF THE UNITED STATES

for Durations from 30 Minutes to 24 Hours and
Return Periods from 1 to 100 Years

Prepared by
DAVID M. HENDERFIELD
Cooperative Studies Section, Hydrologic Services Division
for
Engineering Division, Soil Conservation Service
U.S. Department of Agriculture



WASHINGTON, D.C.
May 1961

Reprinted and Revised January 1962

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. Price \$1.00

BULLETIN 70



Frequency Distributions and Hydro climatic Characteristics of Heavy Rainstorms in Illinois

by FLOYD A. HUFF and JAMES R. ANGEL

Title: Frequency Distributions and Hydroclimatic Characteristics of Heavy Rainstorms in Illinois.

Abstract: This report presents the results of an extensive investigation of the distribution of heavy rainstorms in Illinois based on data from 61 precipitation stations operated during 1901-1961. Shown are frequency distributions of point rainfall for periods ranging from 5 minutes to 10 days and for recurrence intervals of from 2 minutes to 100 years. Results are presented in two forms: isohyets for 10 regions of approximately hexagonal precipitation climate, and rainfalls isopleths based on the 61 station data. Frequency relations are presented on both an annual and seasonal basis. Results of a special investigation are presented for Chicago and the surrounding six counties subject to urban influences on precipitation distribution. Information is provided on the expected frequency of point rainfall. Frequency distributions show the mean in the 30 regions of similar rainstorm climate. Information is also provided on the spatial and temporal characteristics of heavy rainstorms in Illinois.

References: Huff, Floyd A., and James R. Angel. Frequency Distributions and Hydroclimatic Characteristics of Heavy Rainstorms in Illinois. Illinois State Water Survey, Champaign, Bulletin 70, 1969.

Indexing Terms: Climatology, heavy rainstorms, hydroclimatology, hydroclimatology, Illinois, rainfall, synoptic weather conditions.



NOAA

NOAA Atlas 14

Precipitation-Frequency Atlas of the United States

Volume 7 Version 2.0: Alaska

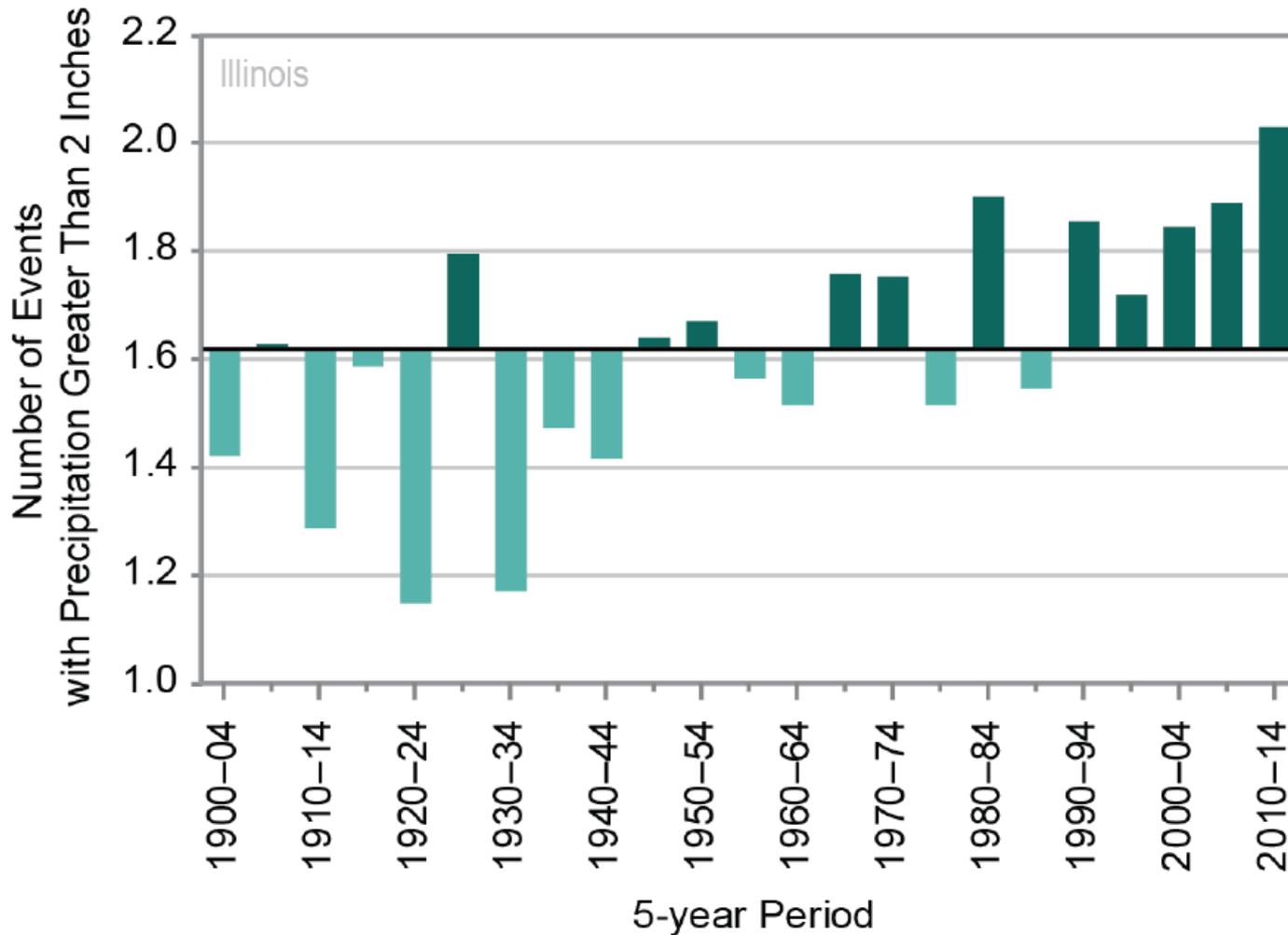
Sanja Perica¹, Douglas Kane², Sarah Dietz¹, Kazungu Maitaria¹,
Deborah Martin¹, Sandra Pavlovic¹, Ishani Roy¹, Svetlana
Stuefer², Amy Tidwell¹, Carl Trypaluk¹, Dale Unruh¹, Michael
Yeika², Enca Betts², Geoffrey Bonnin¹, Sarah Heim¹, Lillian
Hiner¹, Elizabeth Lilly², Jayashree Narayanan², Fenglan Yan¹,
Tan Zhao²

Department of
Commerce,
Oceanic
and
Atmospheric
Administration,
National Oceanic
and
Atmospheric
Administration
Center

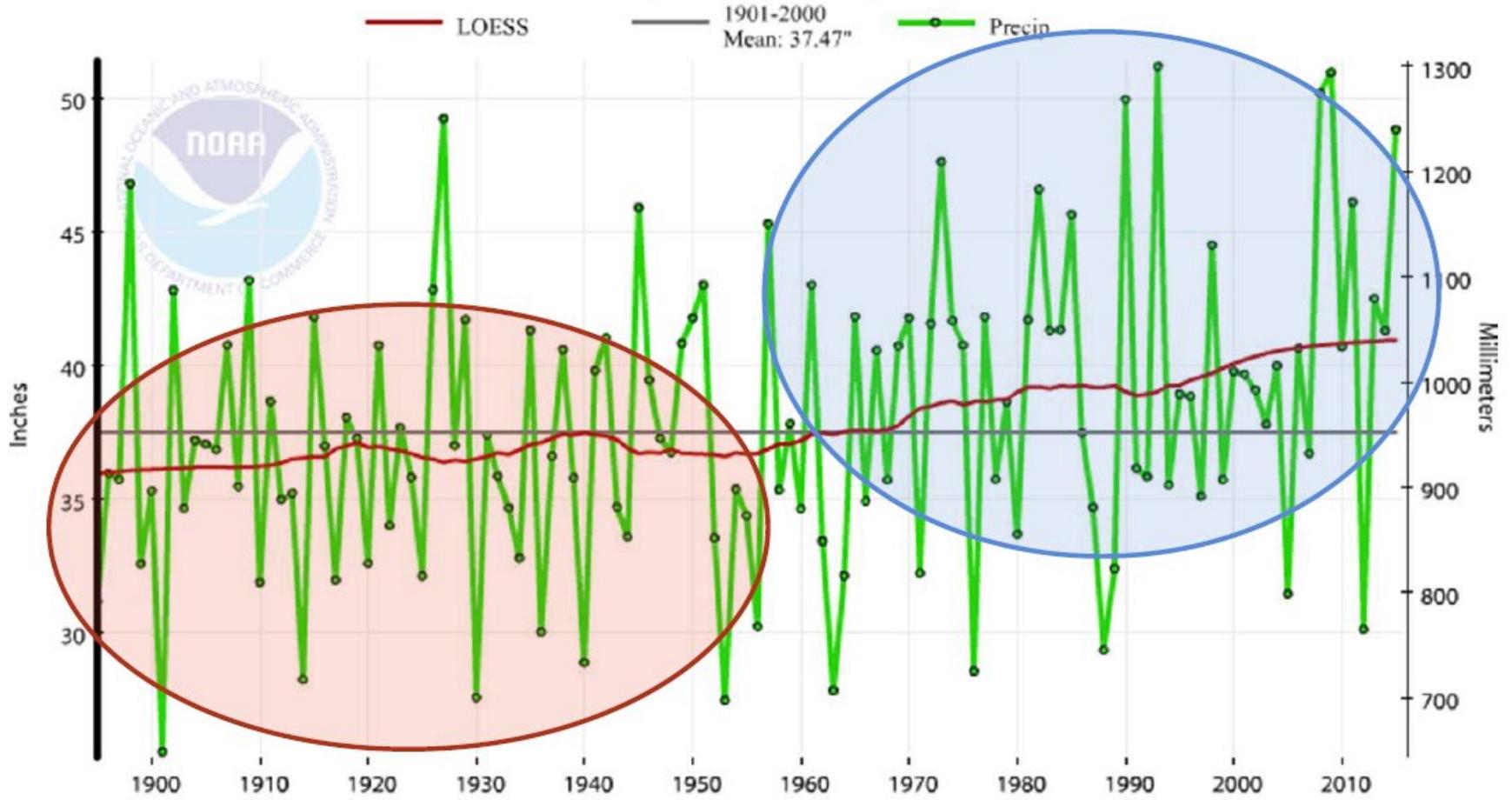
Spring,
2012

Illinois

Observed Number of Extreme Precipitation Events



Illinois, Precipitation, January-December





U.S. Global Change
Research Program

CLIMATE SCIENCE SPECIAL REPORT

- Volume I of the NCA4
- Precipitation will continue to increase (medium confidence)
- Heavy precipitation events will increase in frequency and amounts (high confidence)

<https://science2017.globalchange.gov/>

Contract Report 2017-05
December 2017

Impacts of Potential Future Climate Change on the Expected Frequency of Extreme Rainfall Events in Cook, DuPage, Lake and Will Counties in Northeastern Illinois

Momcilo Markus, James Angel, Kexuan Wang, Gregory Byard, Sally McConkey, Zoe Zaloudek

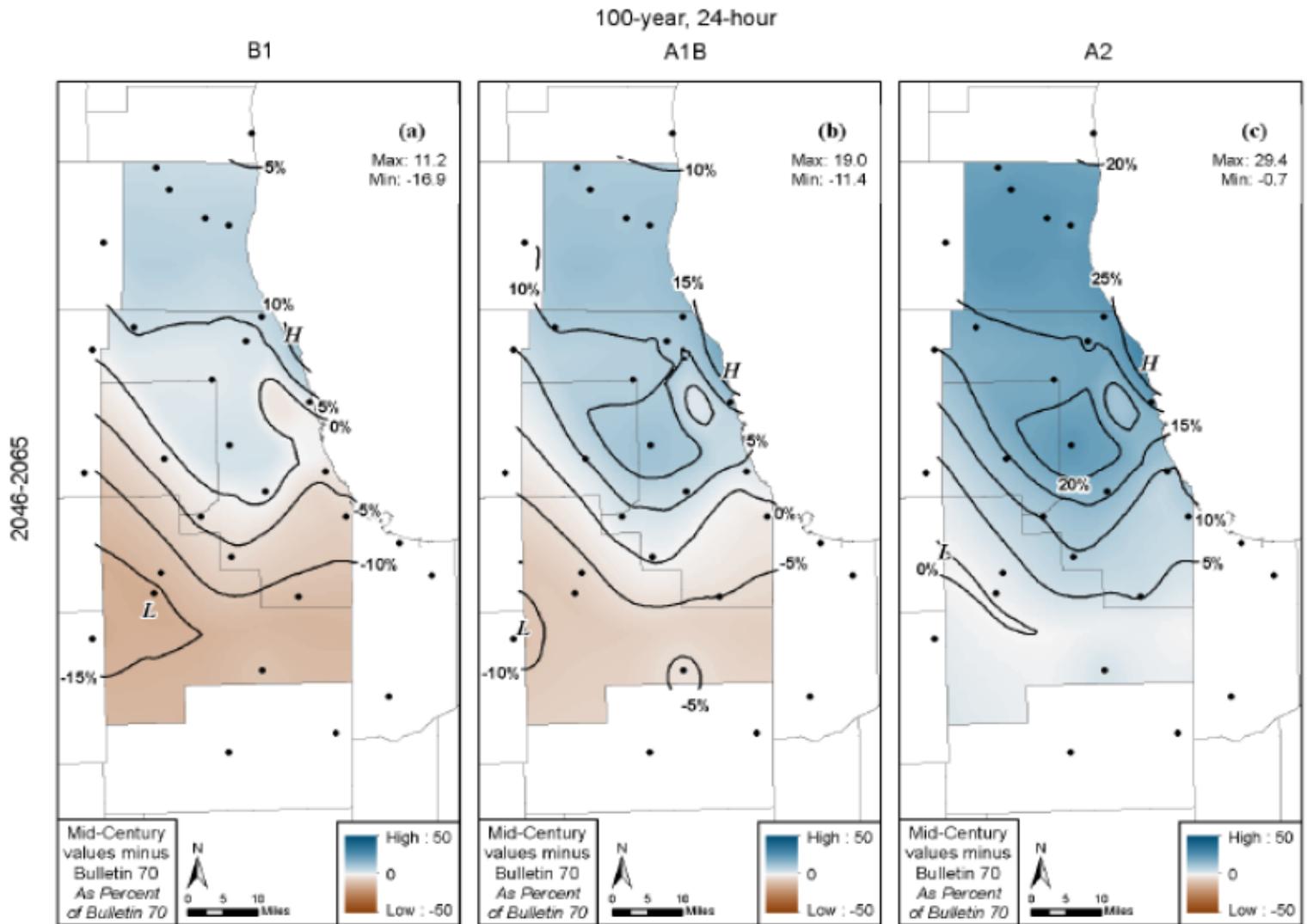


Figure B1.4. Percent differences between projected 100-year 24-hour projected values for mid-21st century based on CMIP3 UW data and Bulletin 70

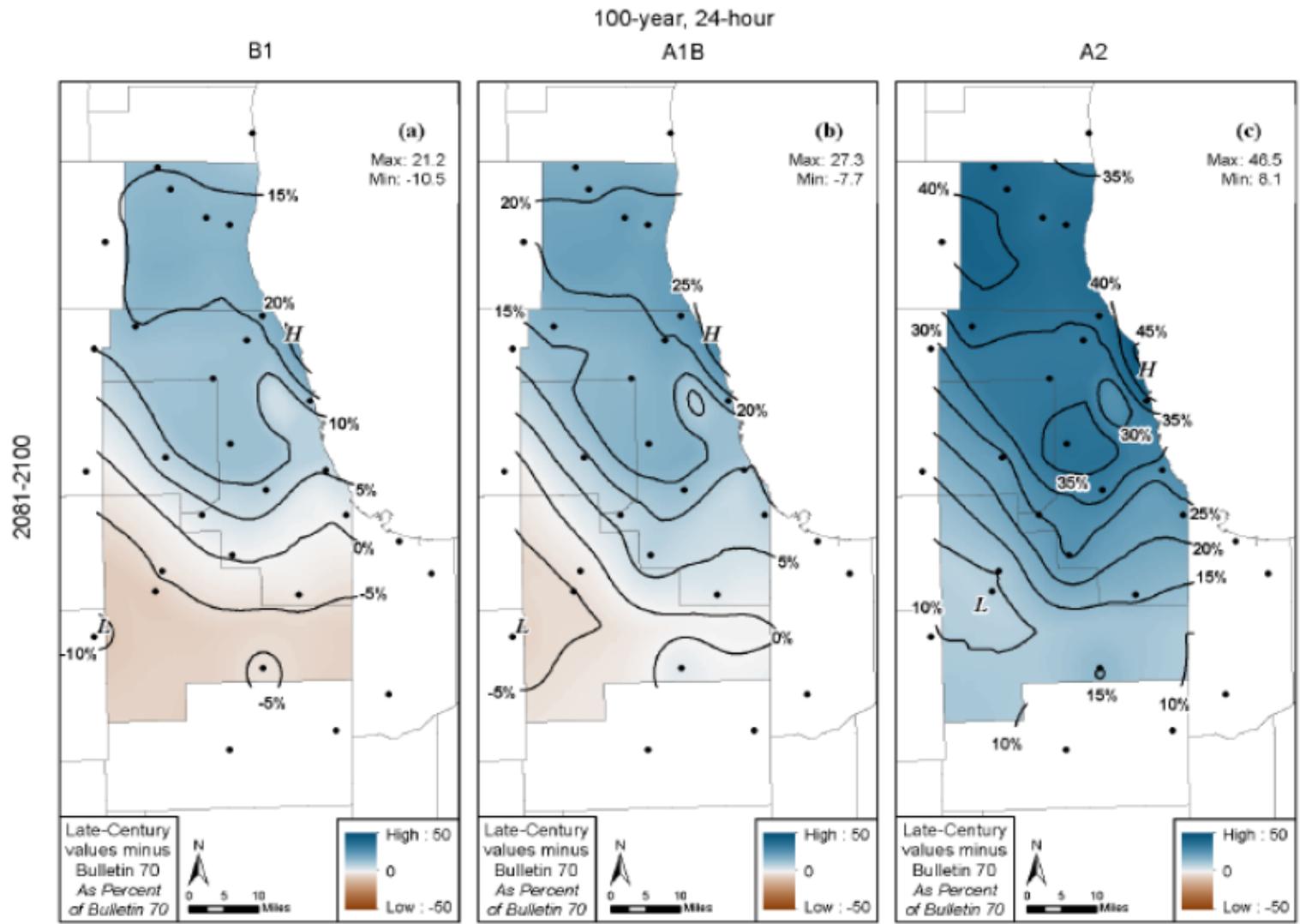
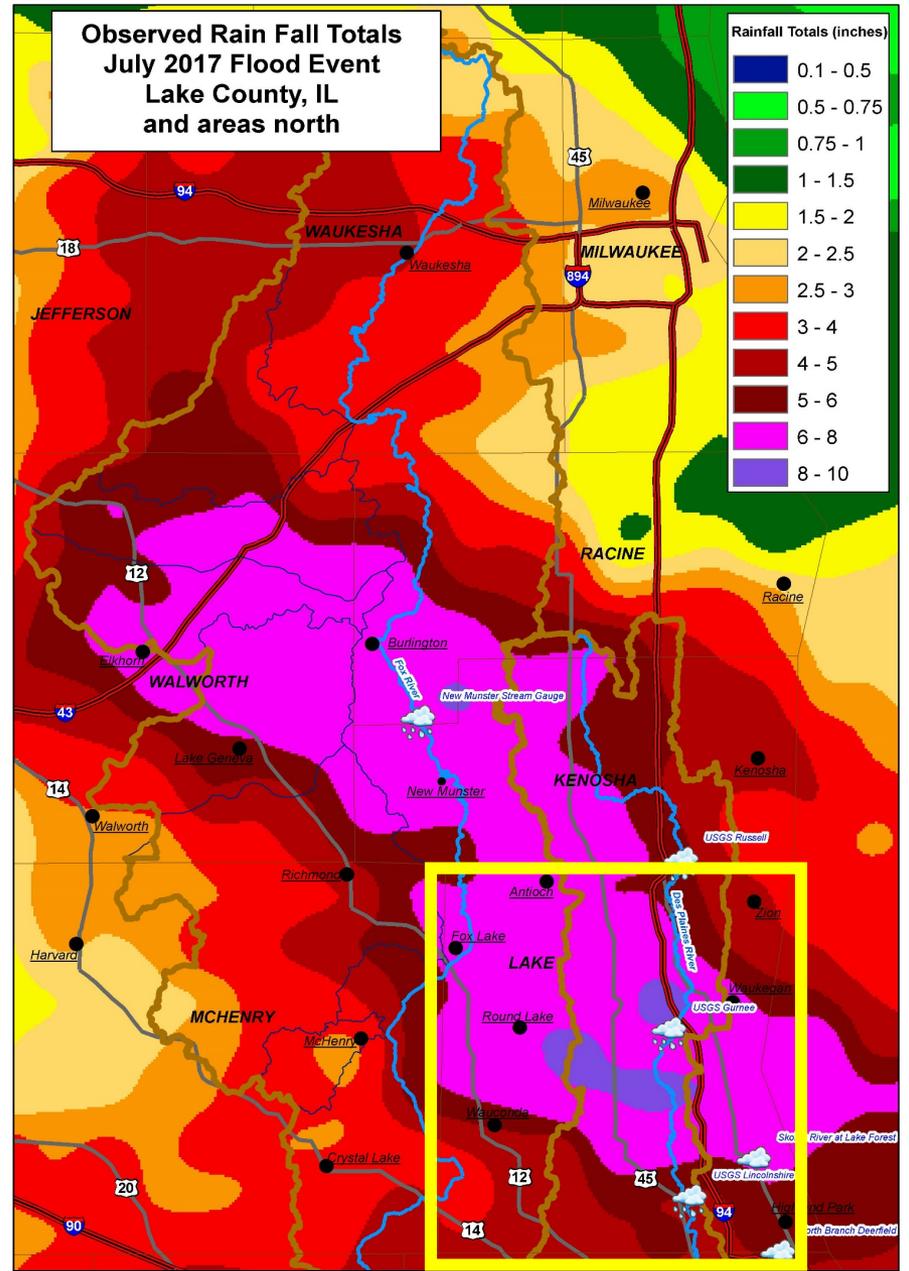
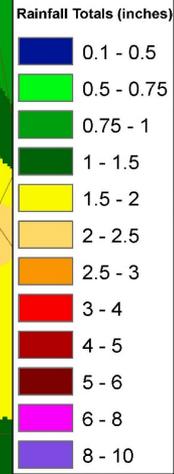


Figure B2.4. Percent differences between projected 100-year 24-hour projected values for late 21st century based on CIMP3 UW data and Bulletin 70

Observed Rain Fall Totals July 2017 Flood Event Lake County, IL and areas north



0 2.5 5 10 15 20 25 30 35 40 45 50 Miles

-DRAFT-

County Boundary
 Watershed Boundary
 Subwatershed Boundary
 Rivers
 Interstates
 US Highways
 Stream Gauges
 Cities and Villages

This map is provided for general locational information only. Map features have been derived from various sources, each of which bears its own scale and accuracy. The locations of all features are approximate.
 Lake County Stormwater Management Commission
 September 1, 2017

DATA SOURCES:
 U.S. Census Bureau
 National Weather Service
 United States Geological Service
 Lake County Stormwater Management

STORMWATER MANAGEMENT COMMISSION



STORMWATER MANAGEMENT COMMISSION

Lake County SMC's Regulatory Program

WDO first adopted October 18, 1992

Establish consistent, uniform, minimum county-wide requirements for new development.

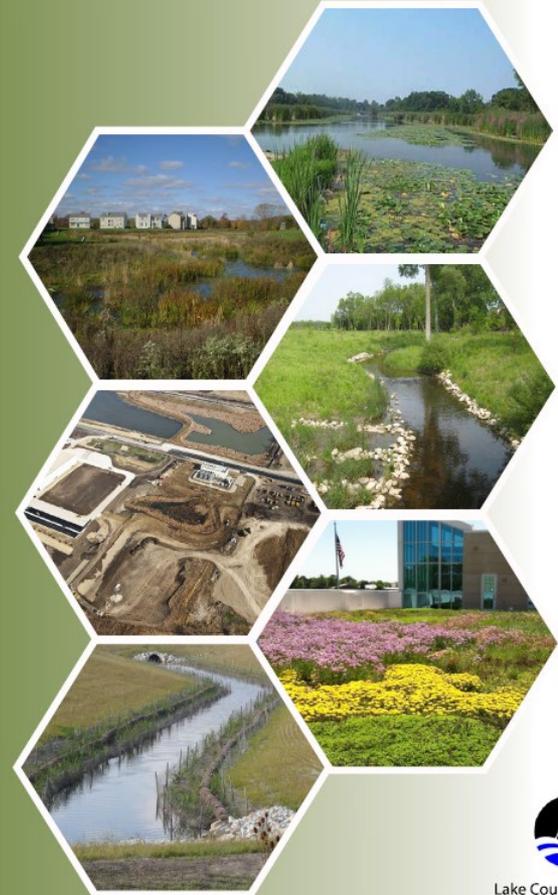
Seek balanced input from:

- Governmental agencies
- Municipalities
- Environmental
- Property owners and developers

Done in a public forum.

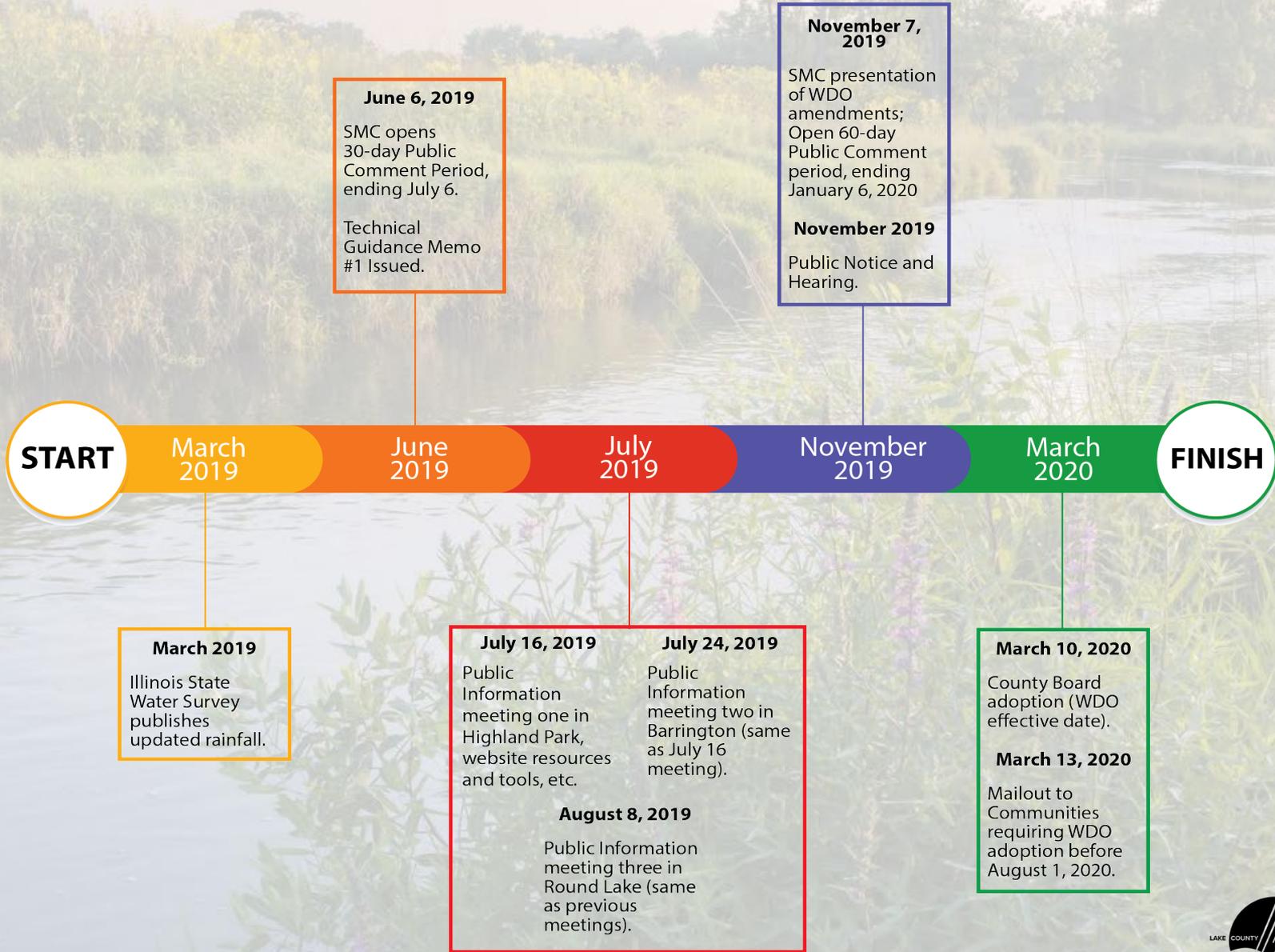
Watershed Development Ordinance

Effective October 13, 2015



Lake County Stormwater
Management Commission

Watershed Development Ordinance Timeline



Gaging the Weather



How can I get more information about increased rainfall?

- Visit lakecountyil.gov/4185
- Subscribe to the SMC newsletter
- Follow us on social media
- Attend future public information meetings
- Call us at 847-377-7700
- Email us at stormwater@lakecountyil.gov



Question and Answer Session

