Office of Water Resources

Capital Flood Reduction & Urban Flooding

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IL Department of Natural Resources
Office of Water Resources

Urban & Stormwater Flooding

Des Plaines, June 2000

Riverside, April 2013

Urban & Stormwater Flooding

Ottawa, April 2013

Des Plaines, April 2013

Presentation Outline

- Office of Water Resources Organization
- Capital Flood Damage Reduction Program
- Urban Flood Awareness Act

OWR Mission

Lead state agency for:

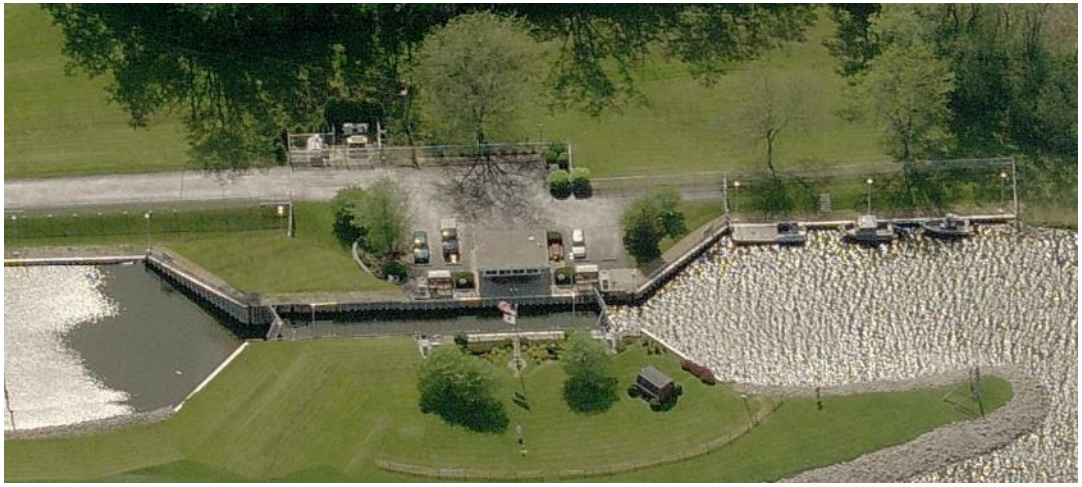
- Water Resources Planning
- Flood Control
- Navigation
- Floodplain Management, National Flood Insurance Program
- Water Supply, Drought,
- and interstate organizations on water resources.

OWR Organization

Division of Capital Programs

- Planning
  - Water Related studies - Flood Control, Dam Removal
  - Flood Surveillance – Technical Liaison to IEMA
  - Water Supply, Drought
  - Surveys, Streamgaging – cooperator with USGS
- Operations
  - Operation & Maintenance of state owned facilities
  - Stream maintenance crew
- Design
  - Plans & Specifications
  - Construction Supervision

OWR Projects



Stratton Lock and Dam Rehabilitation

Blackberry Creek Dam Removal

Crystal Creek Flood Control

OWR Organization

Division of Resource Management

- Regulatory Program
  - Floodplain Management
  - Public Waters
- Statewide Program
  - National Flood Insurance Program - coordination
  - Mitigation buyouts
- Dam Safety Program
  - Permitting and inspection of dams
- Lake Michigan Program
  - Illinois water allocation
  - Regulation of activities in and adjacent to Lake Michigan

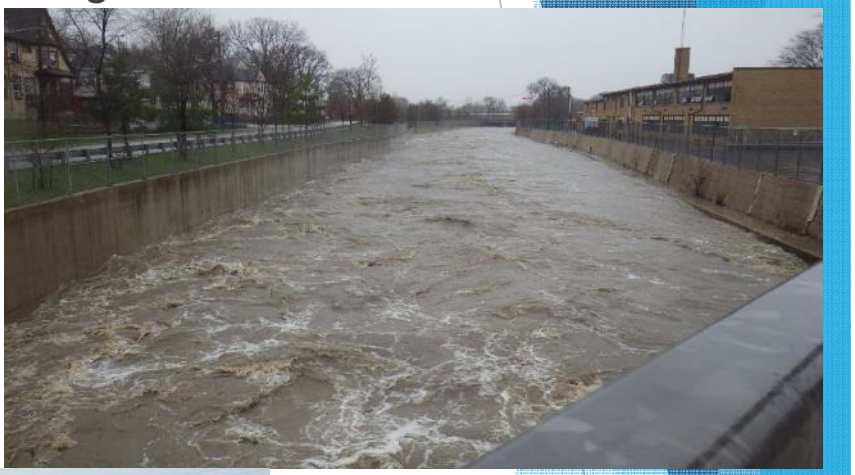
Capital Flood Damage Reduction

- The primary capital activity of the Office is in the area of flood damage reduction. The Office assists units of local government with flood damage reduction projects through planning, design, construction.
    - The Flood Control Act of 1945, 615 ILCS 15,
- Provides the Office of Water Resources legal authority to participate in flood control projects.

Capital Flood Damage Reduction

Types of projects IDNR/OWR can participate in as part of an overall flood control plan to mitigate flood damages.

- Channel modification/rehabilitation
- Bridge and culvert replacement
- Stormsewers
- Detention reservoirs
- Levees & Floodwalls
- Pumpstations



Capital Flood Damage Reduction

- Help begins with a letter from local official asking for assistance with a flood problem that is beyond the scope of the municipality to effectively remediate.

- If IDNR-OWR has the authority to provide help, a study of the flood problem will be initiated, and begins with the planning phase.

- If there is a desired alternative with a favorable Benefit/Cost Ratio and local sponsorship then the study proceeds to the next step of design followed by construction.

Capital Flood Damage Reduction

- An eligible flood problem has to include damages to structures. It can not be soley based on street flooding and/or local drainage issues.

- A project can include stormwater components as part of an overall plan to reduce flood damages in a community.

Capital Flood Damage Reduction

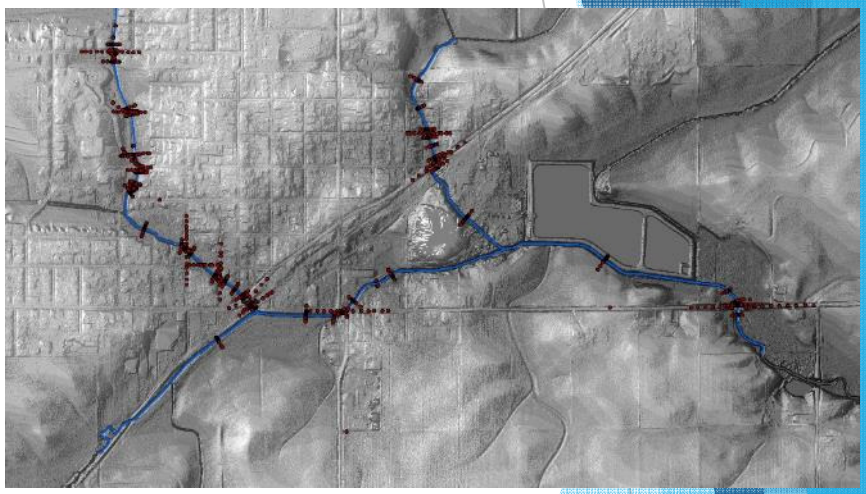
Funding Responsibilities

- OWR
  - Planning
  - Project Design
  - Construction
    - B/C > 1 – 100% , B/C < 1 – Up to Amortized Benefits

- Local Municipality
  - Right-of-Way
  - Utility Re-location
  - Permit fees
  - Operations & Maintenance
  - FIS Re-mapping

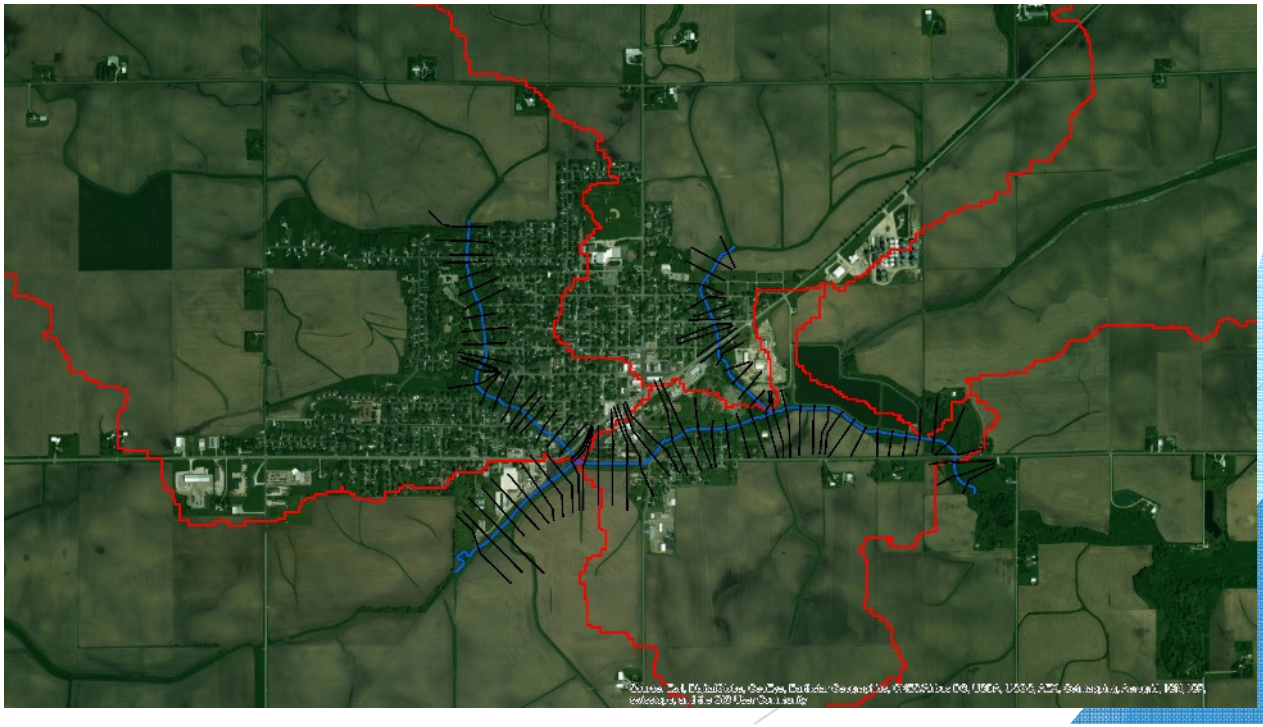
Capital Flood Damage Reduction Study

- Acquire existing data
  - Topographic Surveys, Structure Surveys, Highwater Marks
  - Wetlands, Cultural Resources
  - Flood Damage Estimates
- GIS digital data
  - LiDAR, Aerial Photos, Shape Files
- Other Information
  - Community Concerns, Flood Insurance Studies,
  - Historic construction documents



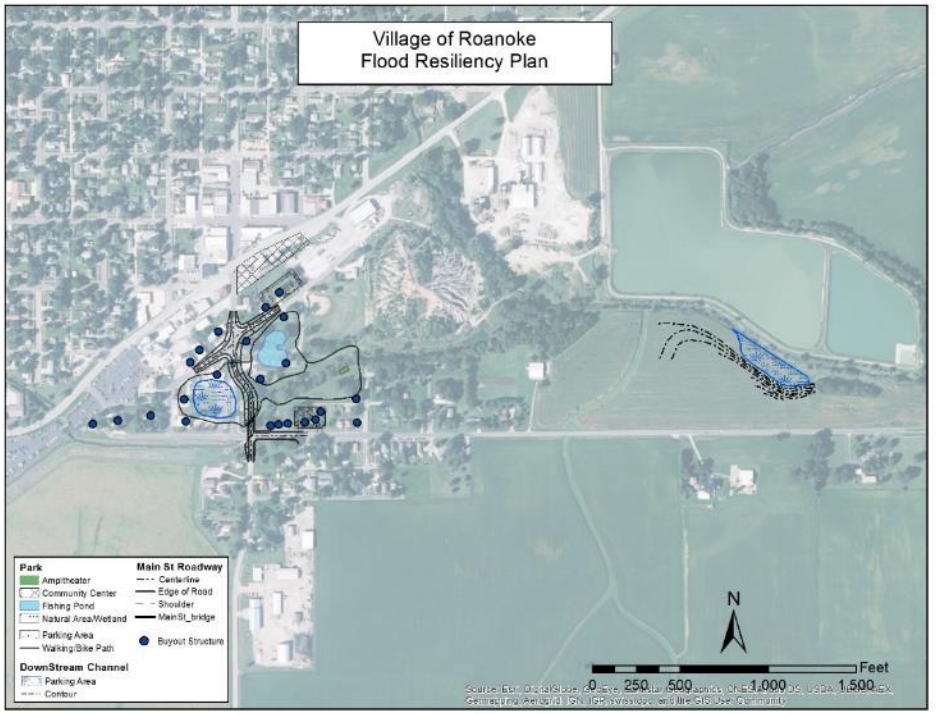
Capital Flood Damage Reduction Study

- Create Existing Conditions Hydraulic and Hydrologic Models
- Model Calibration

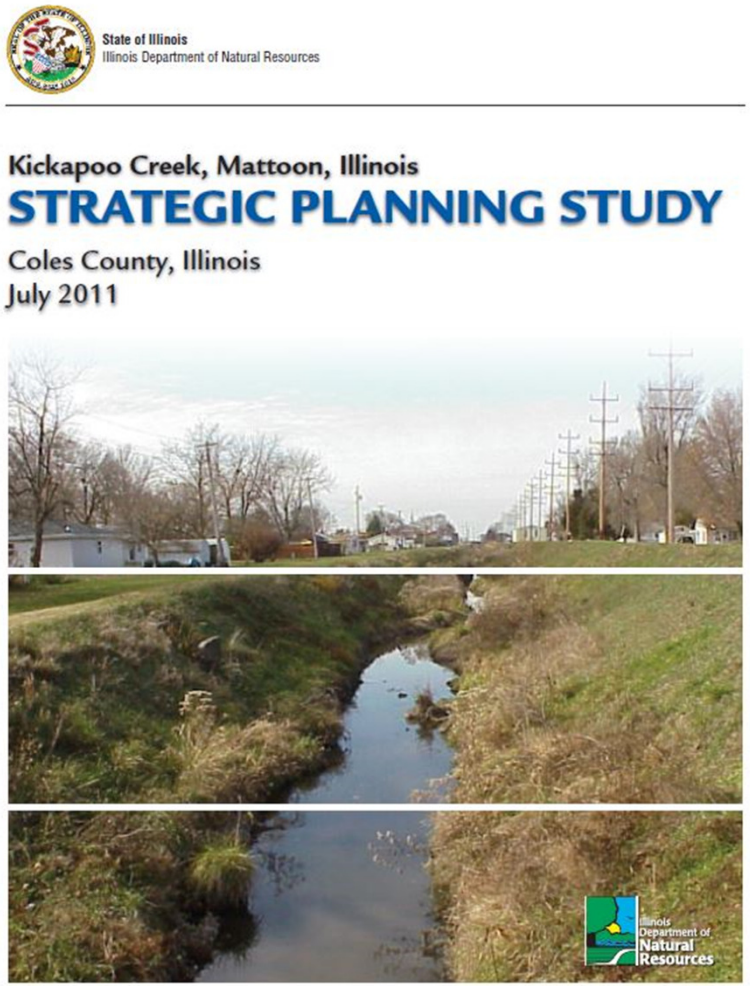


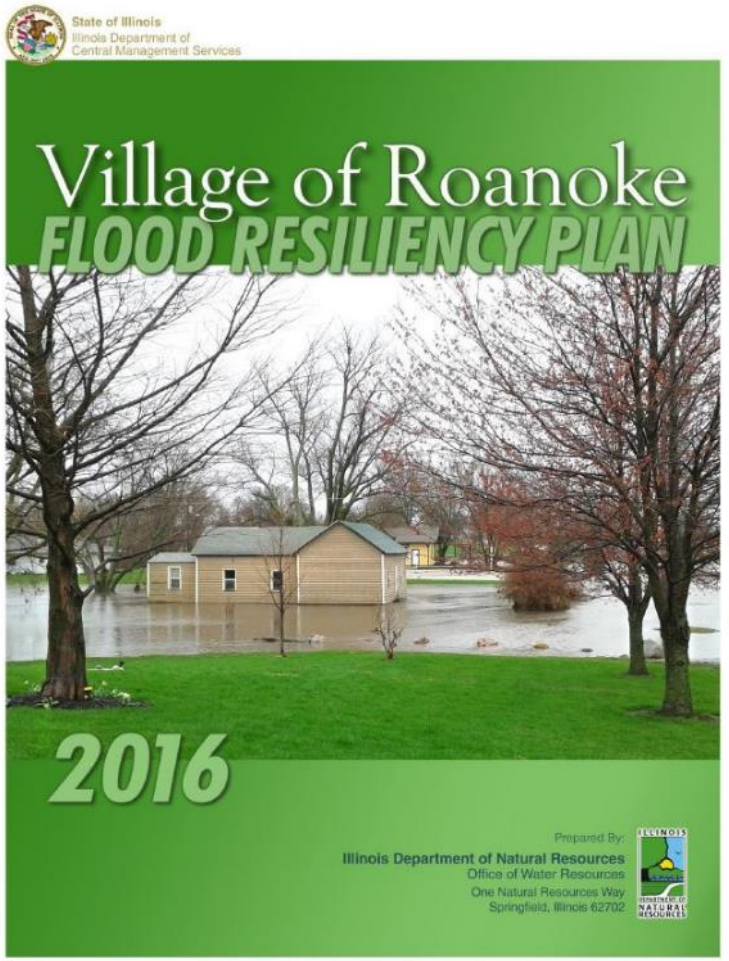
Capital Flood Damage Reduction Study

- Alternative Analysis
  - Full range of alternatives
- Economic Analysis
  - Average Annual Damages and Benefits
  - Benefit/Cost Ratio



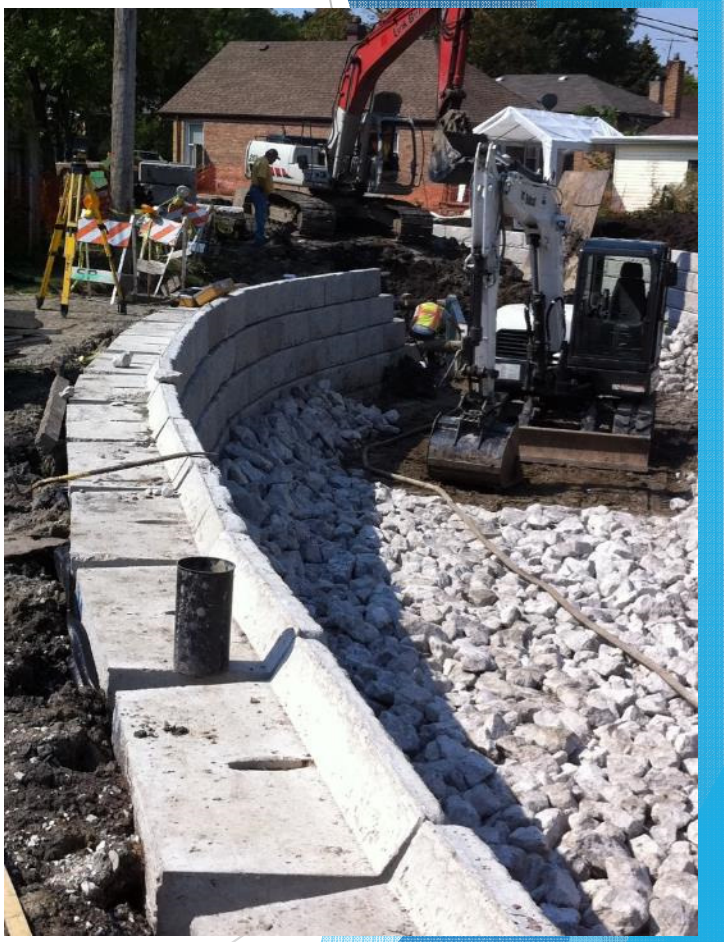
Capital Flood Damage Reduction Study



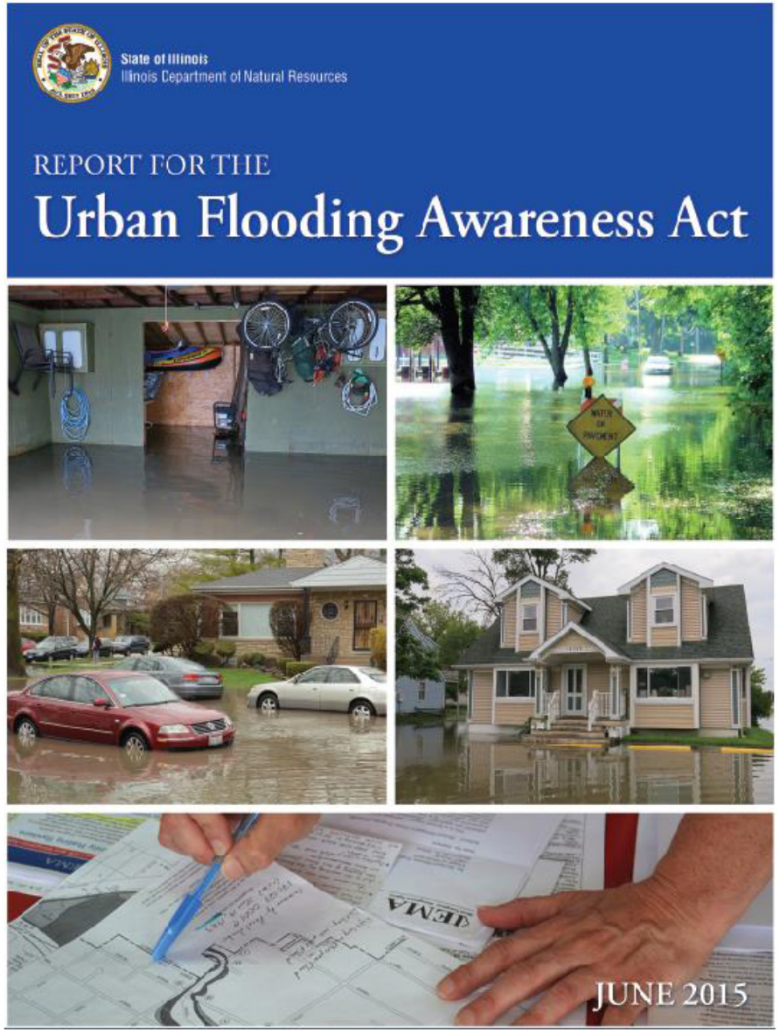


Capital Flood Damage Reduction Study

- Permits
  - IDNR CERP, OWR Floodway Construction Permit,
  - USACE, IEPA
- Contractual Agreements
  - Local Sponsors
- Project Design
- Bid Letting
- Construction



Urban Flooding Awareness Act

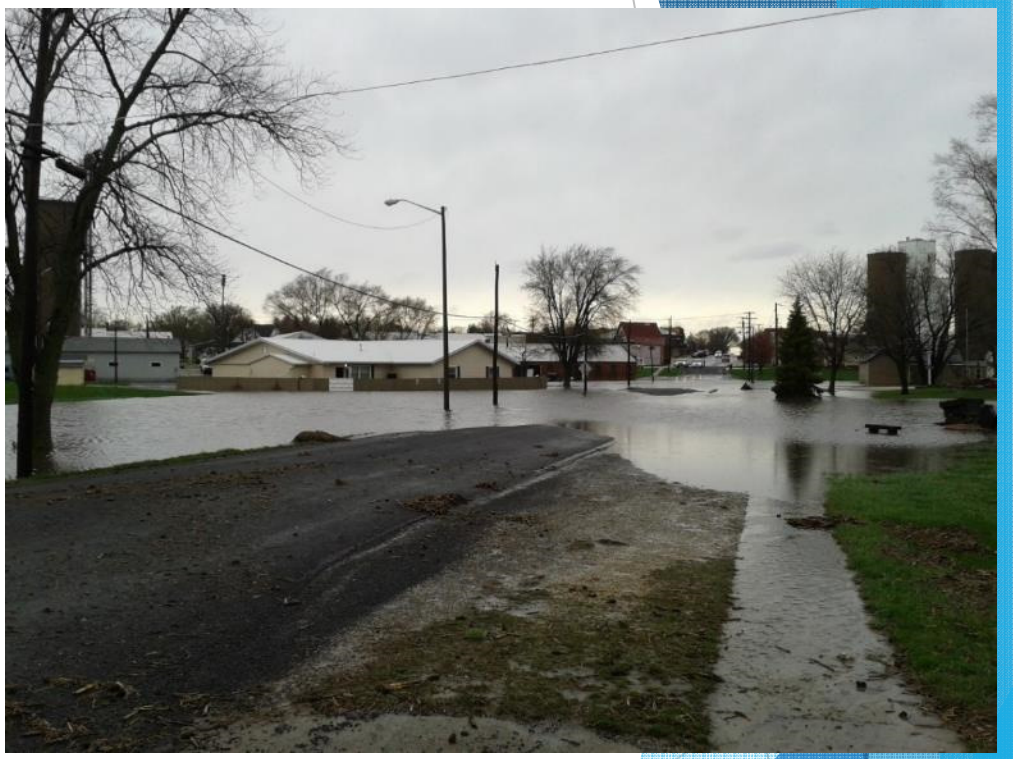


Report is available online at:

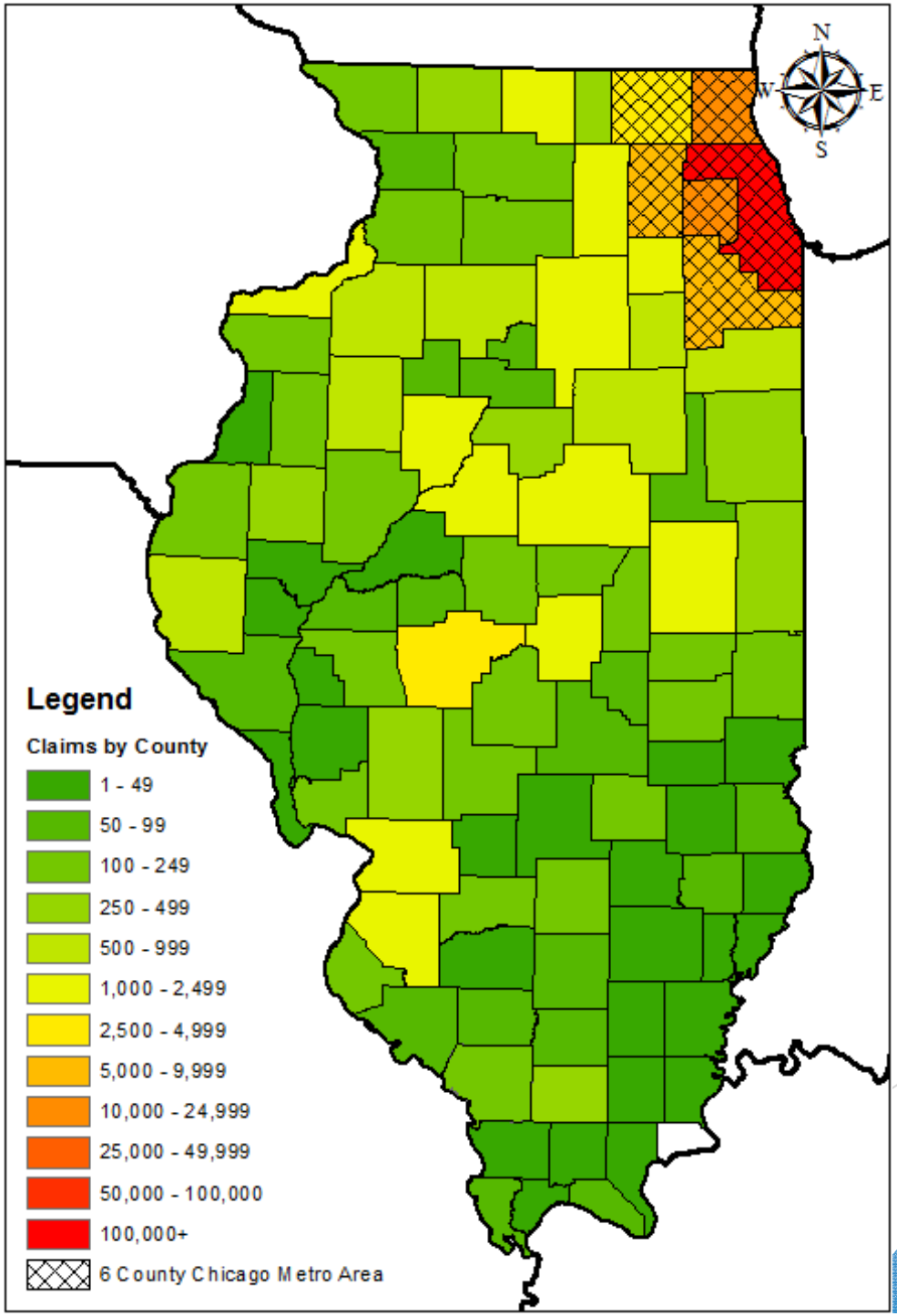
https://www.dnr.illinois.gov/WaterResources/Pages/UrbanFloodingAwareness.aspx

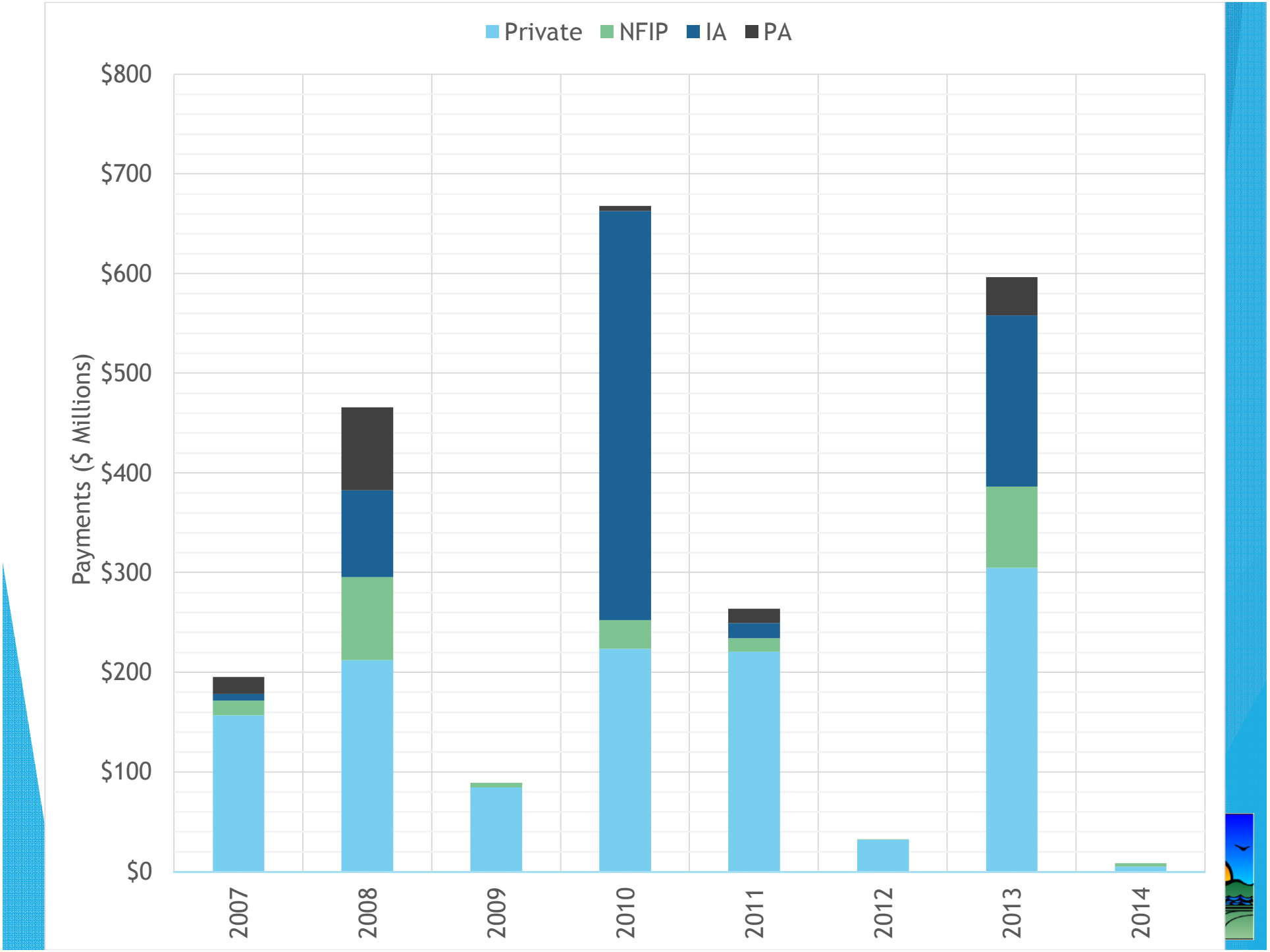
Urban Flooding

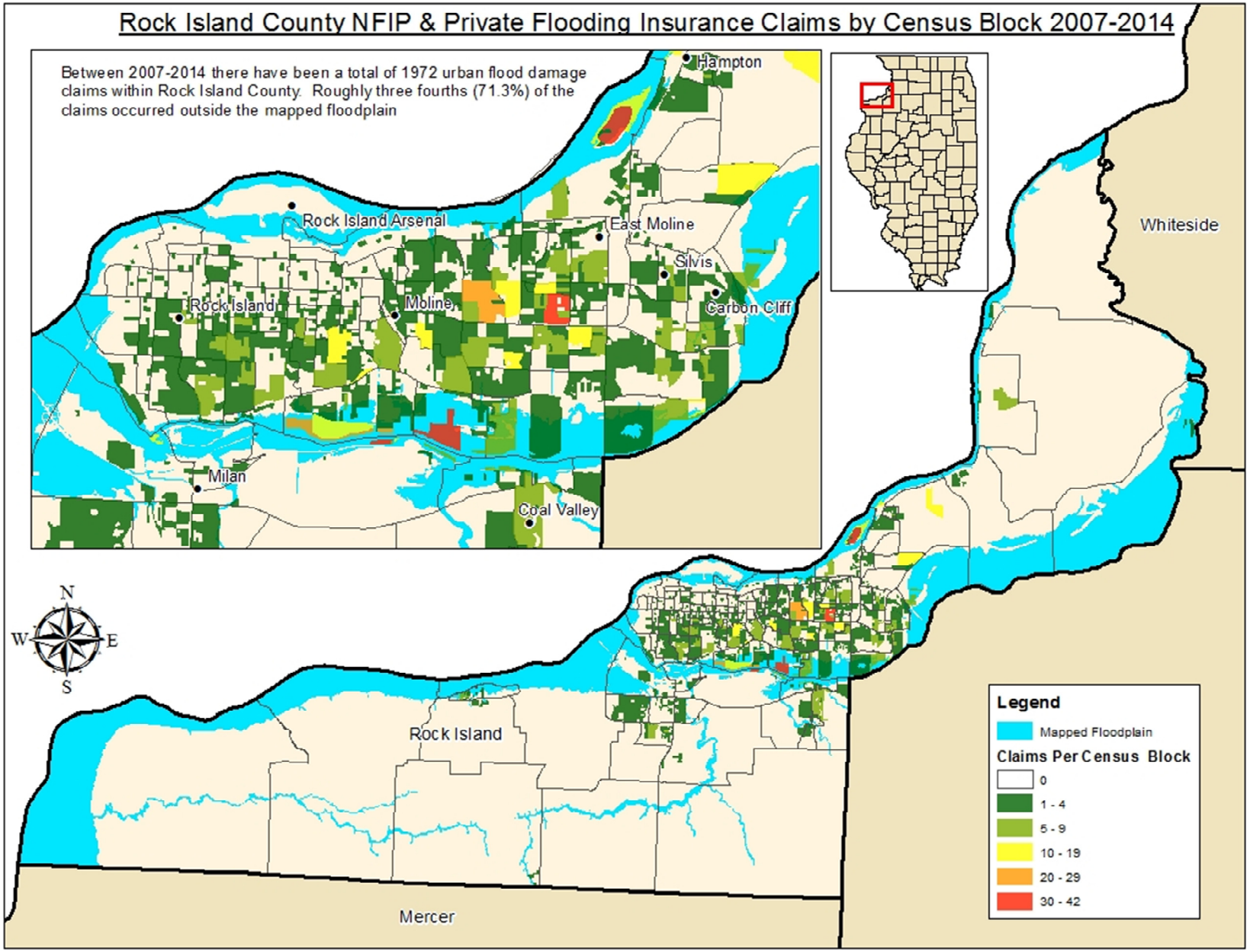
- Urban flooding occurs statewide
- $2.3 Billion in damages from 2007 - 2014
- $1.2 billion paid for sewer backup in basements
- Over 90% of urban flooding damage claims occur outside of mapped floodplains.



County Claims

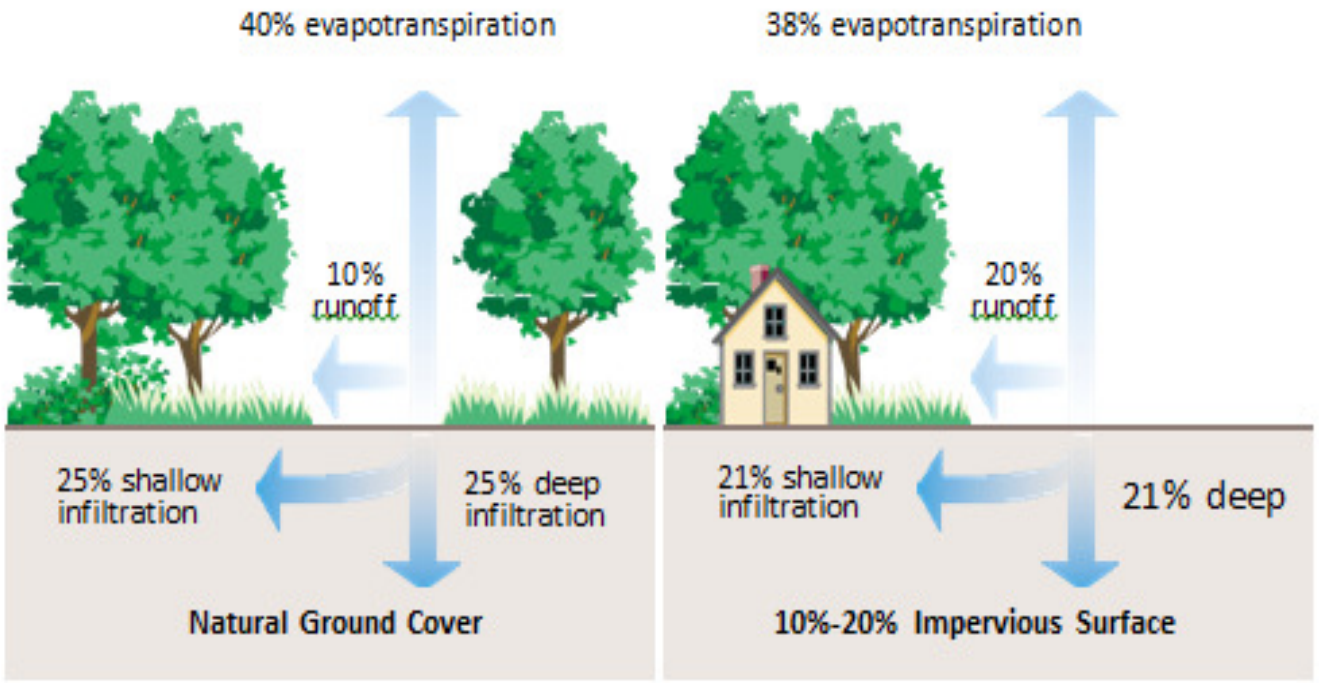


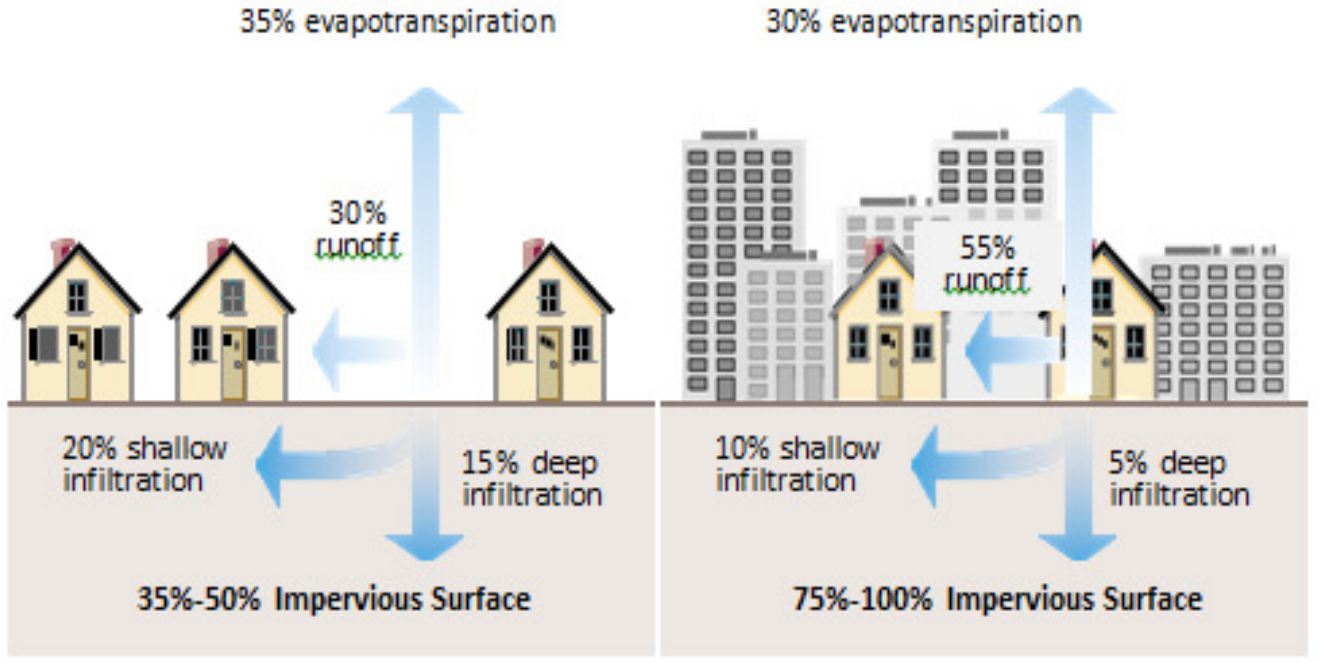

Private
NFIP
IA
PA
$800
$700
$600
$500
$400
$300
$200
$100
$0
Payments ($ Millions)
2007
2008
2009
2010
2011
2012
2013
2014

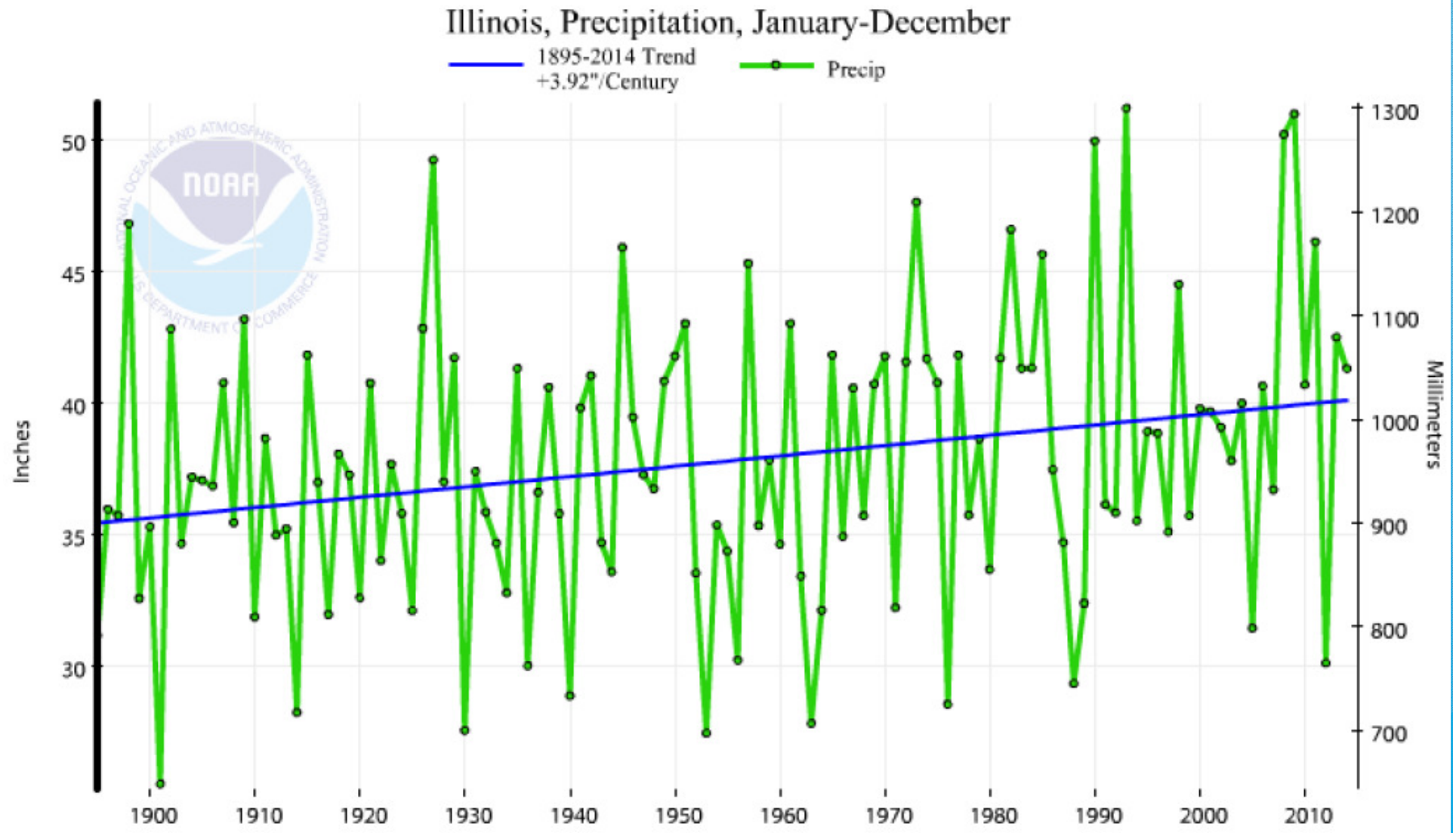

Rock Island County NFIP & Private Flooding Insurance Claims by Census Block 2007-2014
Between 2007-2014 there have been a total of 1972 urban flood damage claims within Rock Island County. Roughly three fourths (71.3%) of the claims occurred outside the mapped floodplain
Hampton
Rock Island Arsenal
East Moline
Silvis
Rock Island
Moline
Carbon Cliff
Milan
Coal Valley
Whiteside
Rock Island
Mercer
N
W
E
S
Legend
Mapped Floodplain
Claims Per Census Block
0
1 - 4
5 - 9
10 - 19
20 - 29
30 - 42

Urban Flooding

- Causes are unique to the specific location
- Urbanization
- Climate Change
- Lack of Stormwater authority and funding stream


40% evapotranspiration
38% evapotranspiration
10% runoff
20% runoff
25% shallow infiltration
25% deep infiltration
21% shallow infiltration
21% deep
Natural Ground Cover
10%-20% Impervious Surface


35% evapotranspiration
30% evapotranspiration
30% runoff
55% runoff
20% shallow infiltration
15% deep infiltration
10% shallow infiltration
5% deep infiltration
35%-50% Impervious Surface
75%-100% Impervious Surface

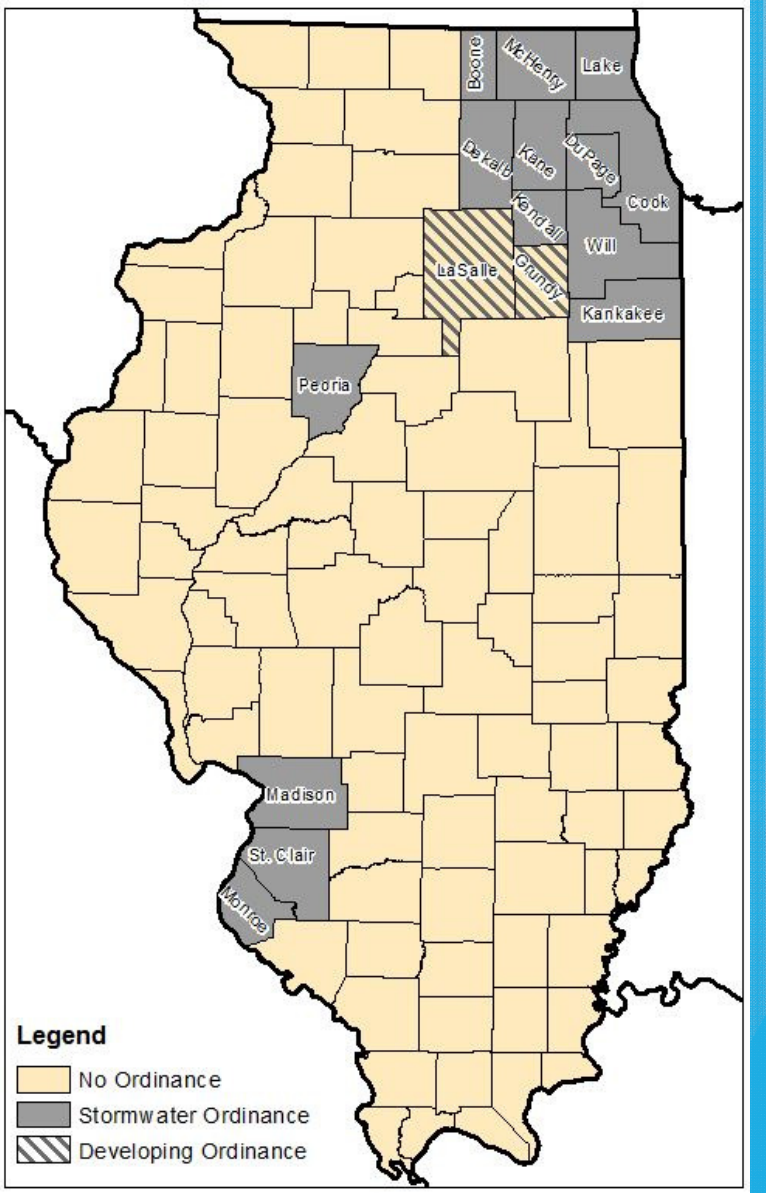

Illinois, Precipitation, January-December
1895-2014 Trend
+3.92"/Century
Precip
Inches
Millimeters
50
45
40
35
30
1300
1200
1100
1000
900
800
700
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010

Top 10 Recommendations

1. Authority to generate stormwater fees
2. Stormwater planning and management authority
3. Insurance agent flood insurance continuing education
4. Update rainfall frequency distribution information
5. Create a state model local stormwater ordinance
6. Continue funding data collection
7. IDNR/IEPA should expand state revolving fund
8. An awareness campaign about urban flooding for citizens
9. Annual funding for repetitive flood loss in/out of floodplain
10. Fund mitigation programs to better leverage Federal funds

1. – 2. Stormwater Fee and Management Authority

- Authority to have a designated funding stream
- 16 Counties have or are developing stormwater ordinances
- Authority to develop countywide ordinances should be granted to all counties.
- Bill is currently in the state legislative process.



3. Flood Insurance Continuing Education

- Mandate flood insurance continuing education training for insurance agents.

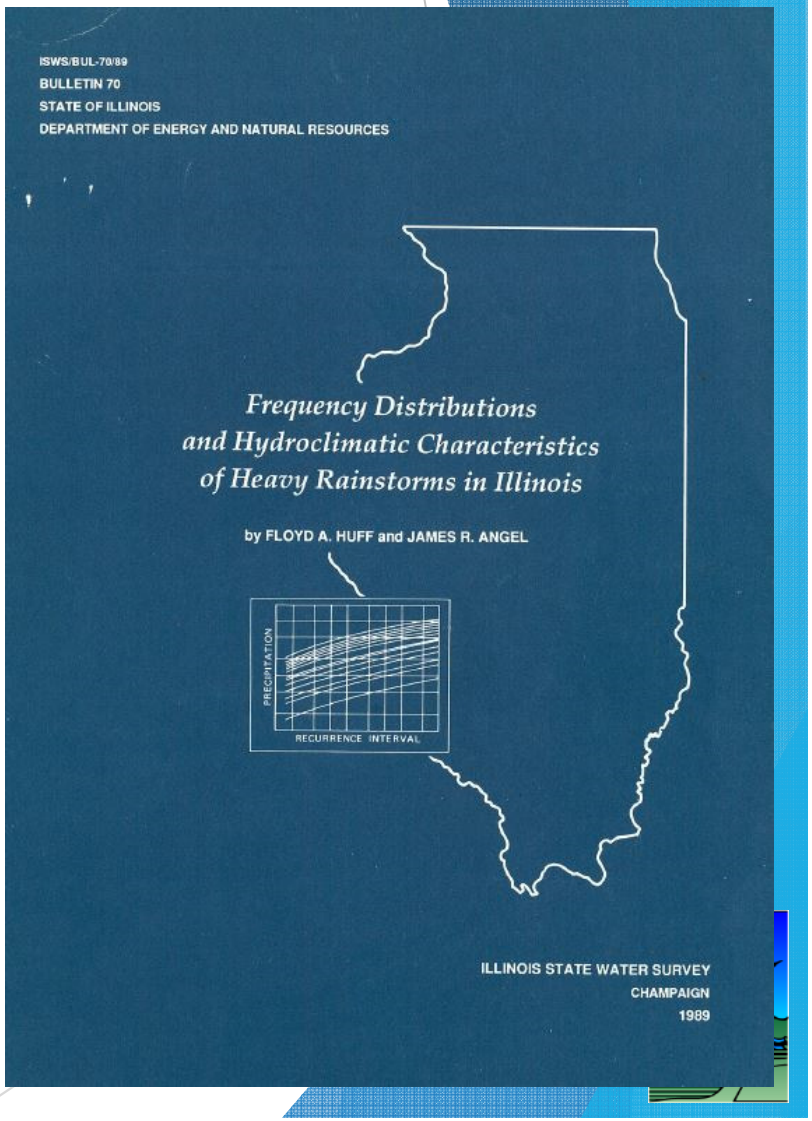
NATIONAL FLOOD INSURANCE PROGRAM

Agents.FloodSmart.gov

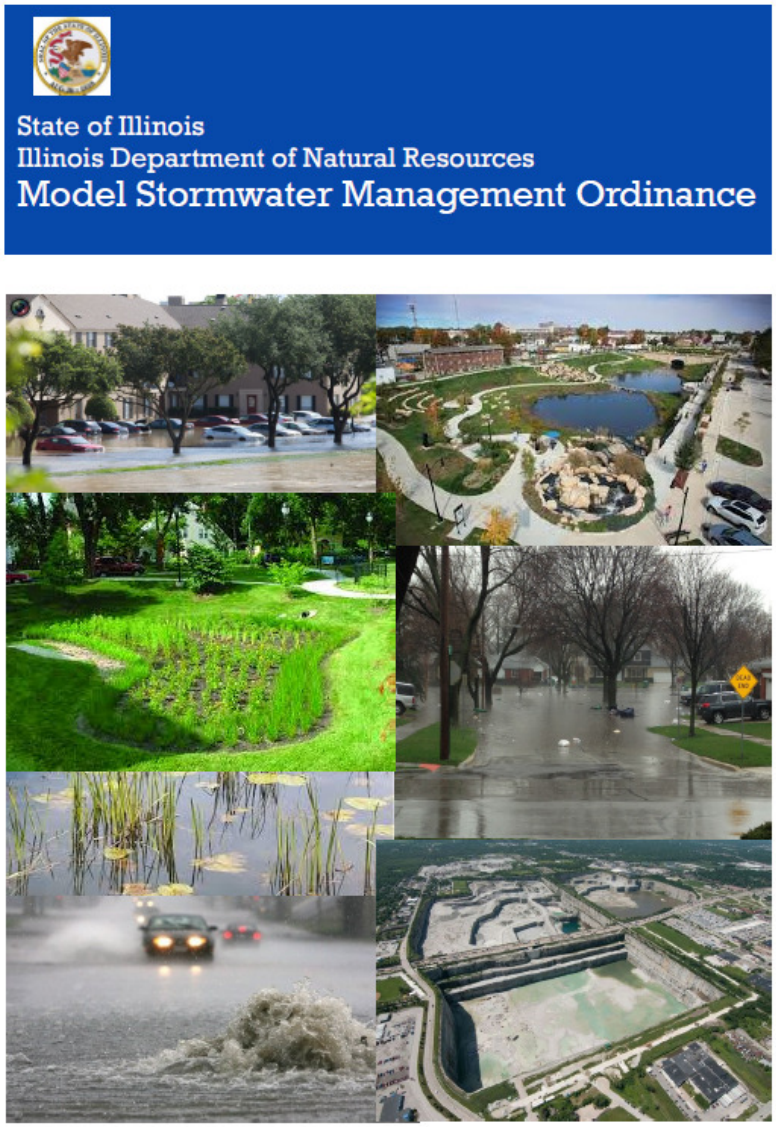
A FloodSmart site for NFIP agents

4. Update Rainfall Frequency Data

- Update of Bulletin 70 is currently underway by the Illinois State Water Survey.
- Estimated to be complete by the end of 2018



5. Model Stormwater Ordinance



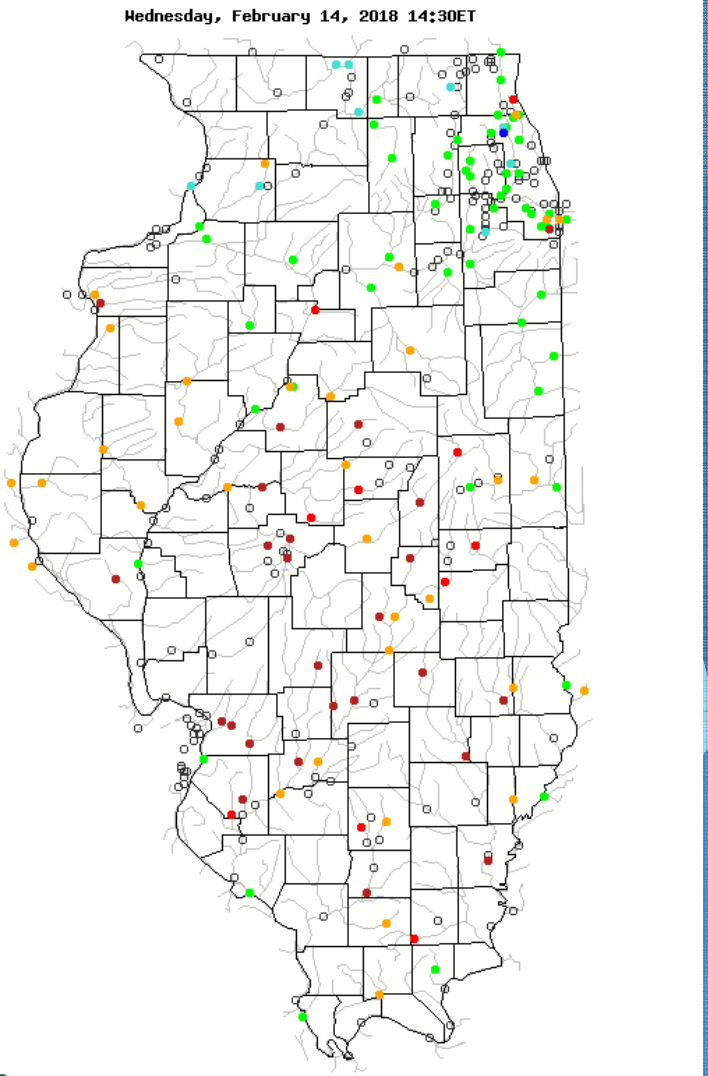
Ordinance is available online at:

https://www.dnr.illinois.gov/WaterResources/Pages/UrbanFloodingAwareness.aspx

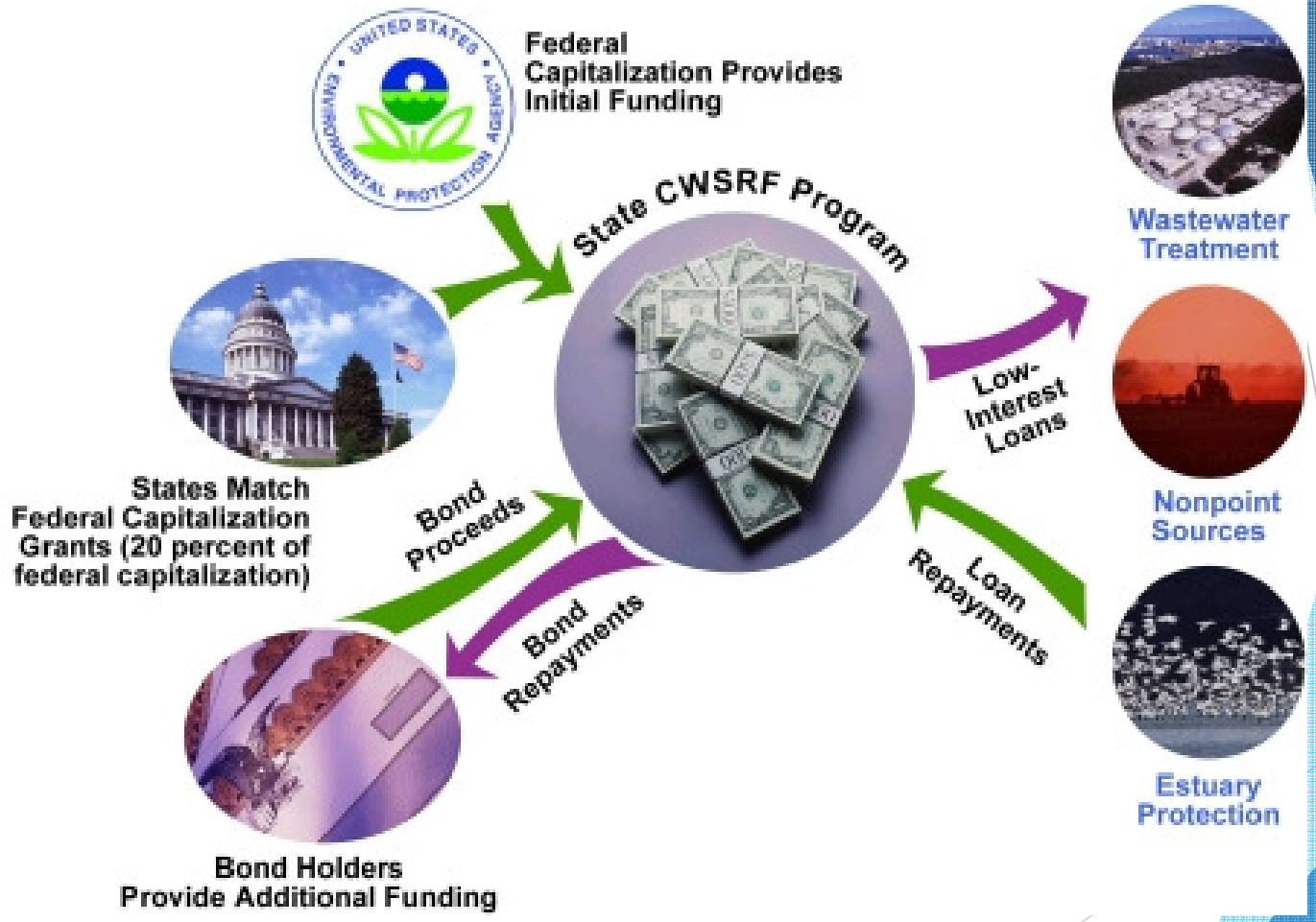
5. Model Stormwater Ordinance

ORDINANCE	COMMENTARY
community ordinances (i.e., fire vehicle access, etc.); D. The use of native, deep-rooted landscaping as an alternative to turf grass; E. The use of open vegetated channels, filter strips, and infiltration (basins, trenches, floodplain restoration, etc.) to convey, filter, and infiltrate stormwater runoff and minimize the usage of minor stormwater systems; F. Preservation of the natural infiltration and storage characteristics of the site (e.g., disconnection of impervious cover, on-lot bio-retention facilities, rooftop detention, parking lot detention); G. Structural measures that provide water quality and volume control (stormwater wetlands, wet detention facilities, sedimentation traps, etc.); H. Structural measures that provide only quantity control and conveyance; I. Other methods as may be found in the Illinois Urban Manual. 3. All volume reductions plus volume control practices from proposed BMPs shall equal or exceed the required control volume (1" x new impervious area) 503.0 Site Runoff Controls Site runoff control for large storms, up to the 100-year event, is essential to protect against immediate downstream erosion and flooding. 1. Post-development discharge rates shall not exceed the exiting conditions discharge rates for the 2-, 10-, 25-, 50- and 100-year critical duration storm events. If it is shown that the peak rates of discharge indicated by the post-development analysis are less than or equal to the peak rates of discharge indicated by the existing conditions analysis for 2-, 10-, 25-, 50-, and 100-year critical duration storms, then the requirements of this section have been met. Otherwise, the applicant shall provide additional controls as necessary to satisfy the peak rate of discharge requirement. Peak runoff rates shall be based on the critical duration storm. 2. Any concentrated stormwater discharges leaving a site must be conveyed into an existing channel, storm sewer, or overland flow path with adequate downstream stormwater capacity and will not result in increased erosion, flood damage, or other drainage hazard.	A higher standard of site control for storms up to the 500-year event may be used. Local municipalities may wish to impose more stringent requirements for a particular watershed or reach of stream due to local knowledge of risk.

6. Continue Funding Data Collection

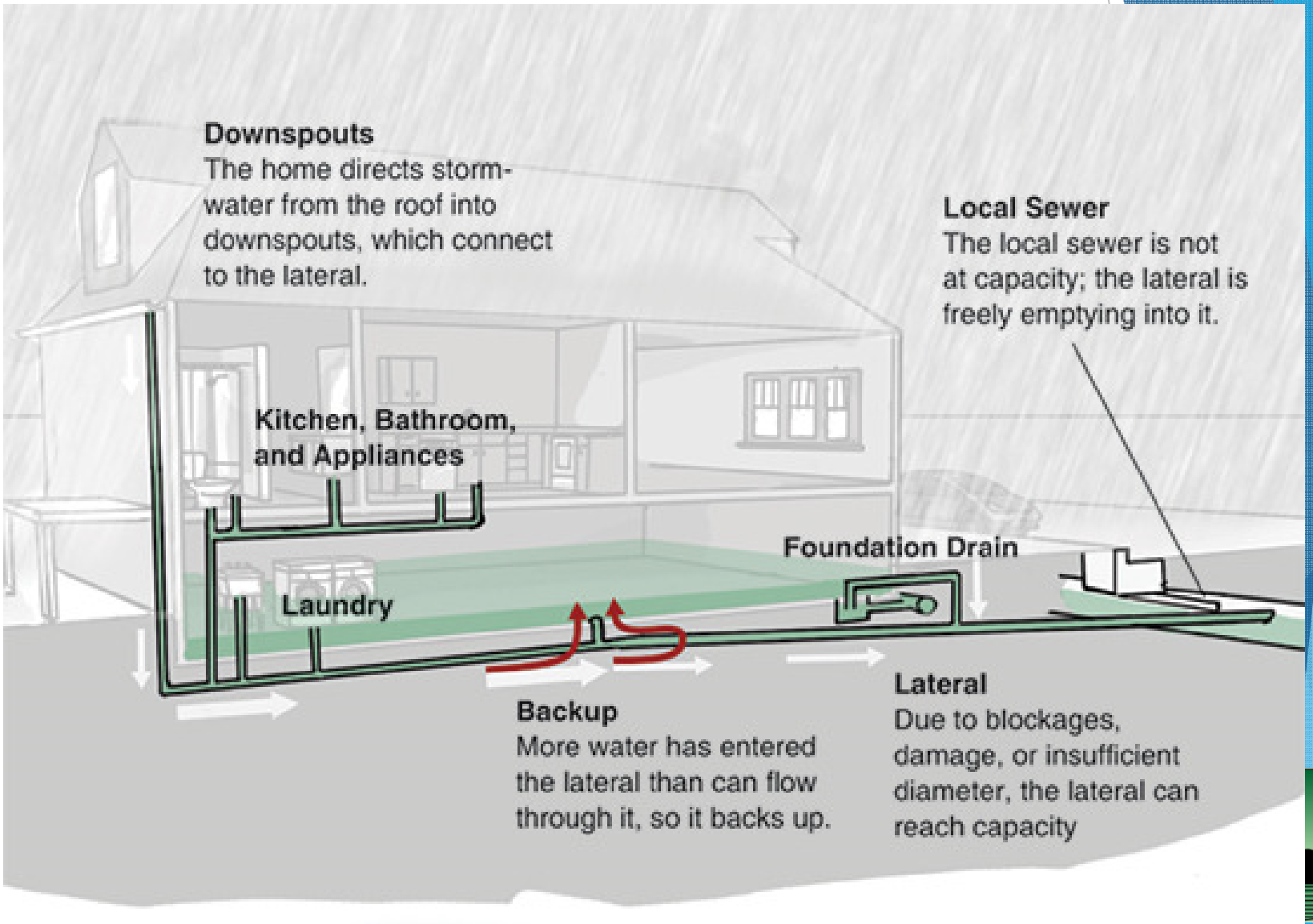


7. IDNR/IEPA Stormwater Revolving Fund



Example: Clean Water State Revolving Fund

8. Awareness campaign about Urban Flooding for Citizens – Homeowner Responsibility



9. Annual Funding for repetitive loss structures

1982. The Ottawa "flats" underwater

2008. The same Ottawa "flats" after buyouts

10. Continue Funding Flood Hazard Mitigation Projects

Questions?

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Flood Control Planning

- ILLINOIS COMPILED STATUTES:
  - 515 ILSC 5- Fish and Aquatic Life Code
  - 520 ILCS 10- Illinois Endangered Species Protection Act
  - 520 ILCS 20- Wildlife Habitat Management Areas Act
  - 520 ILCS 25- Habitat Endowment Act
  - 520 ILCS 5- Wildlife Code
  - 525 ILCS 40- State Forest Act
  - 525 ILCS 33- Illinois Open Land Trust Act
  - 525 ILCS 45- Water Use Act of 1983
  - 605 ILCS 30- Bikeway Act
  - 505 ILCS 140- Watershed Improvement Act
  - 520 ILCS 15: Wildlife Restoration Cooperation Act
  - 525 ILCS 25- Illinois Lake Management Program Act