

The Evolution of Stormwater Management in Northeast Illinois

or “How to Avoid Surface Water Disaster”



STORMWATER MANAGEMENT COMMISSION

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AGENDA

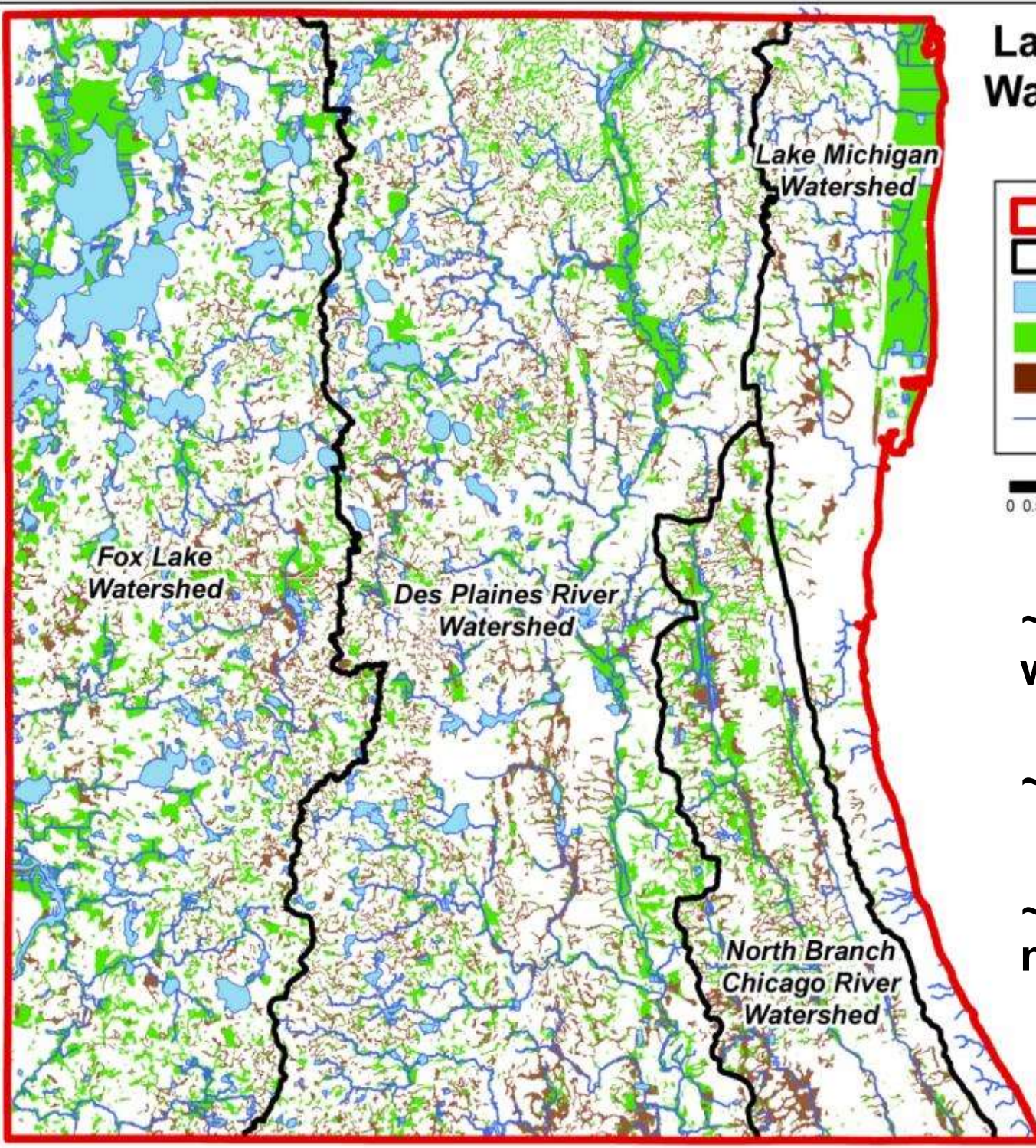
- **Chicago's Early Days**
- **1960's Flood Hazard Maps**
- **1970's Detention Basins**
- **1980's Ditka Flood Era**
- **1990's County Stormwater Ordinances**
- **Current: Green Infrastructure**
- **Future: Urban Flooding**



170 Lakes and 400 Miles of Streams and Rivers



Lake County, Illinois Waters and Wetlands

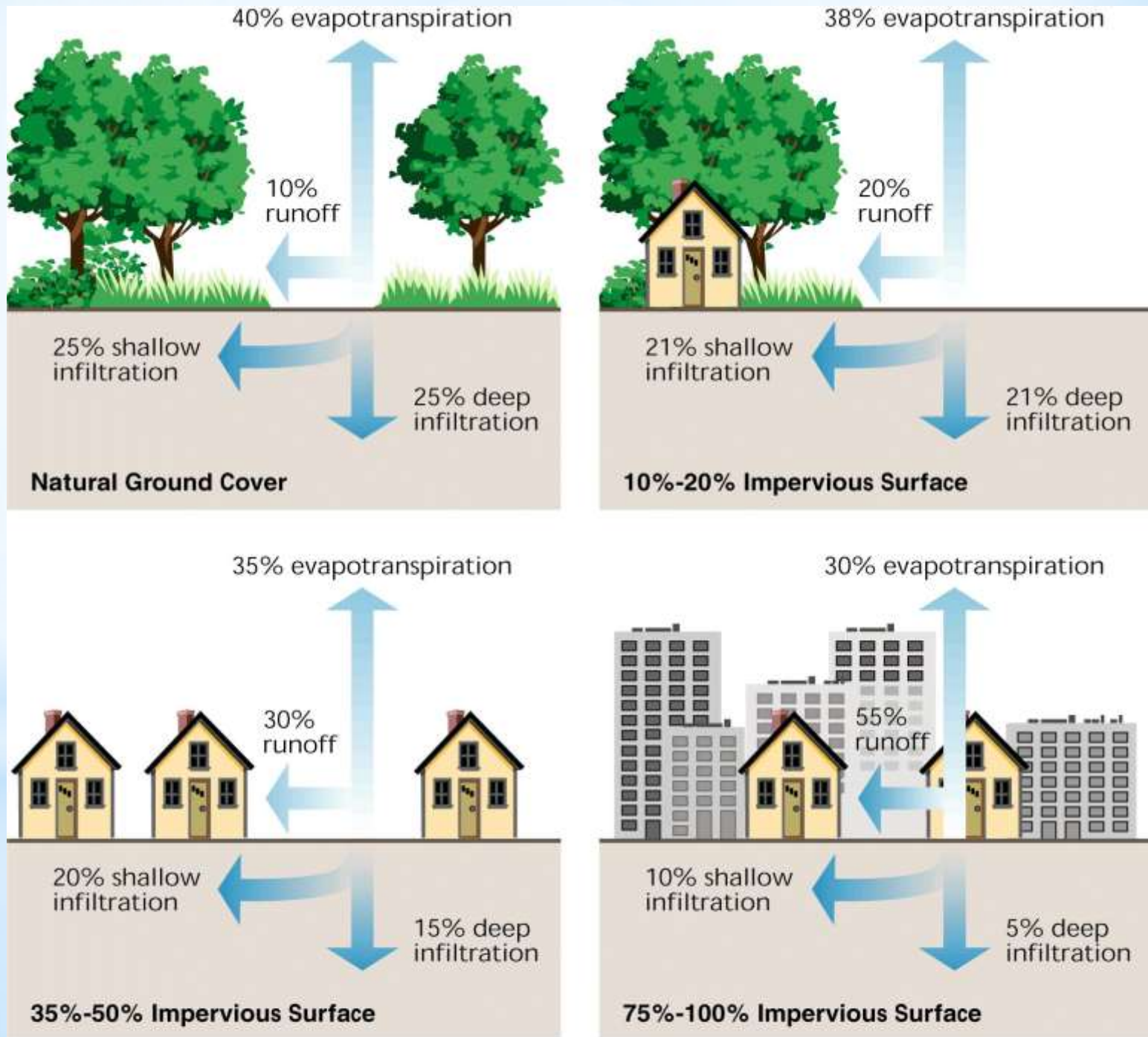


**~61,500 acres of
waters and wetlands**

~21% of County is wet

**~ 44% of wetlands, by
number, are “isolated”**

Why is Stormwater Management Important?



Earliest Recorded Flood in Chicago

...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."



Chicago River Landscape



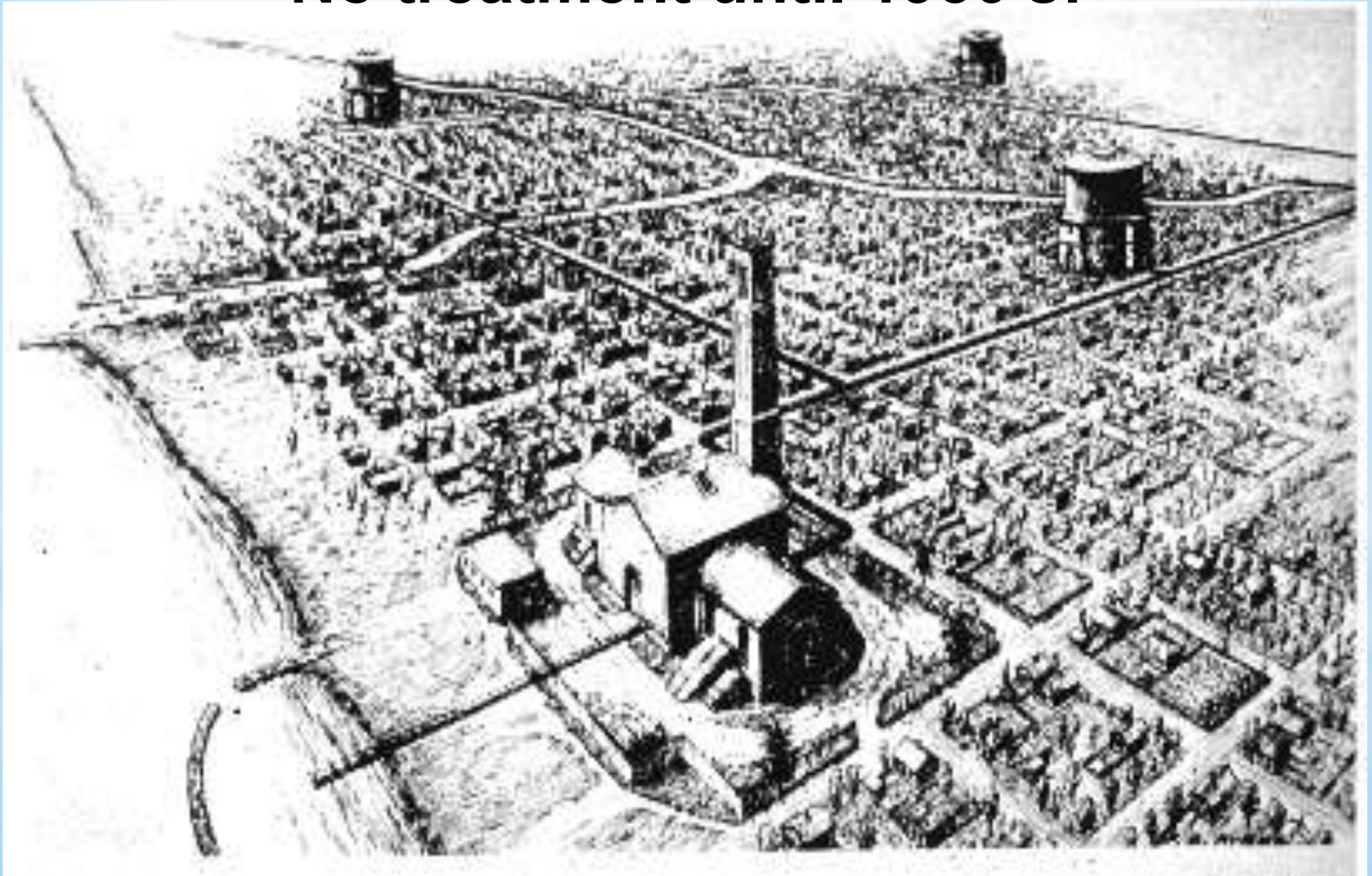
Courtesy of Chicago Historical Society

Rapidly Growing City

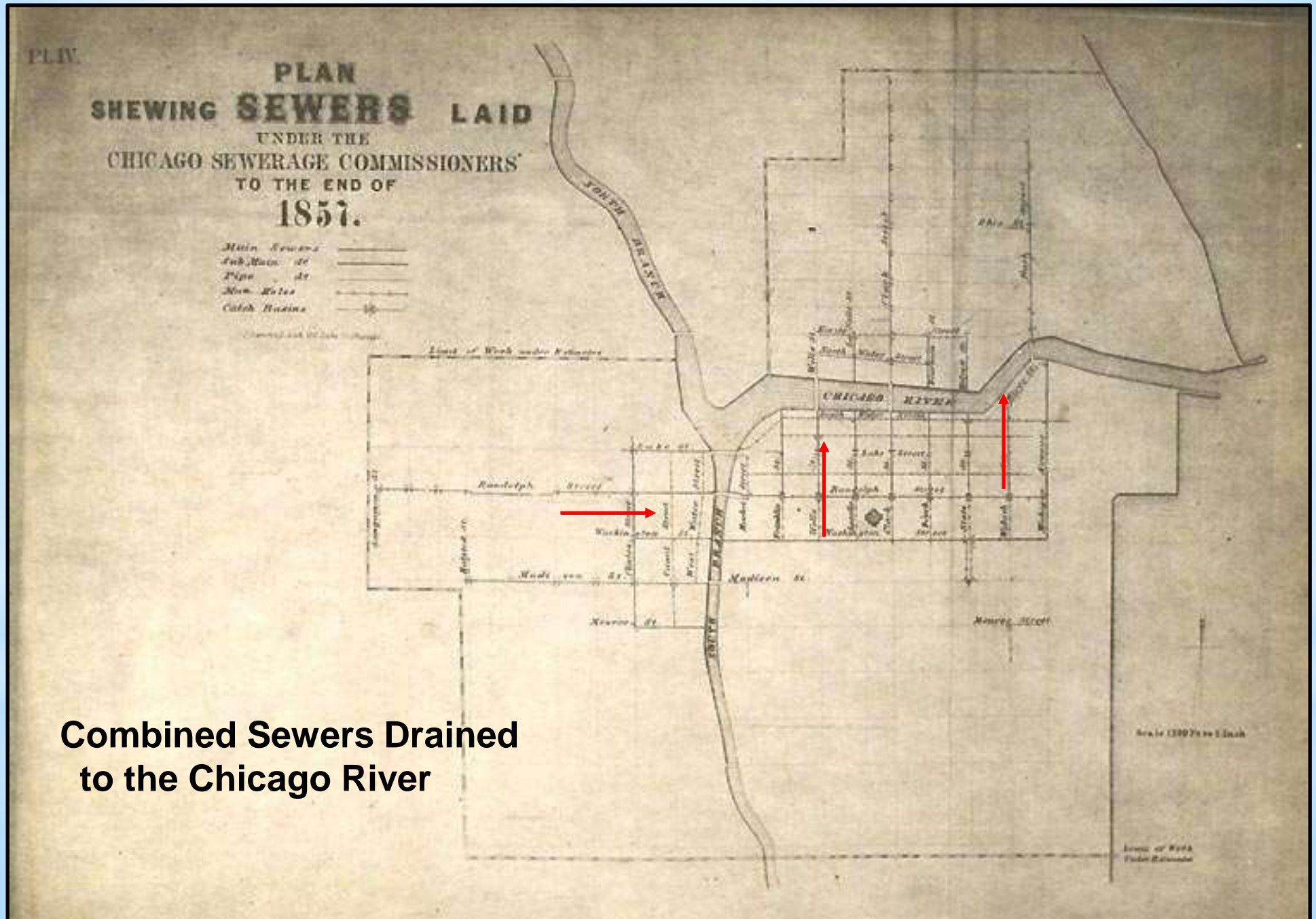


First Municipal Water Supply System 1853

No treatment until 1930's!



Combined Sewers 1857



**Combined Sewers Drained
to the Chicago River**

Raising Street to Build Combined Sewers



New street level

Old street level

Courtesy Chicago Public Library

Clark Street 1857

Improving Sewer Infrastructure Performance



Inherent Conflict...

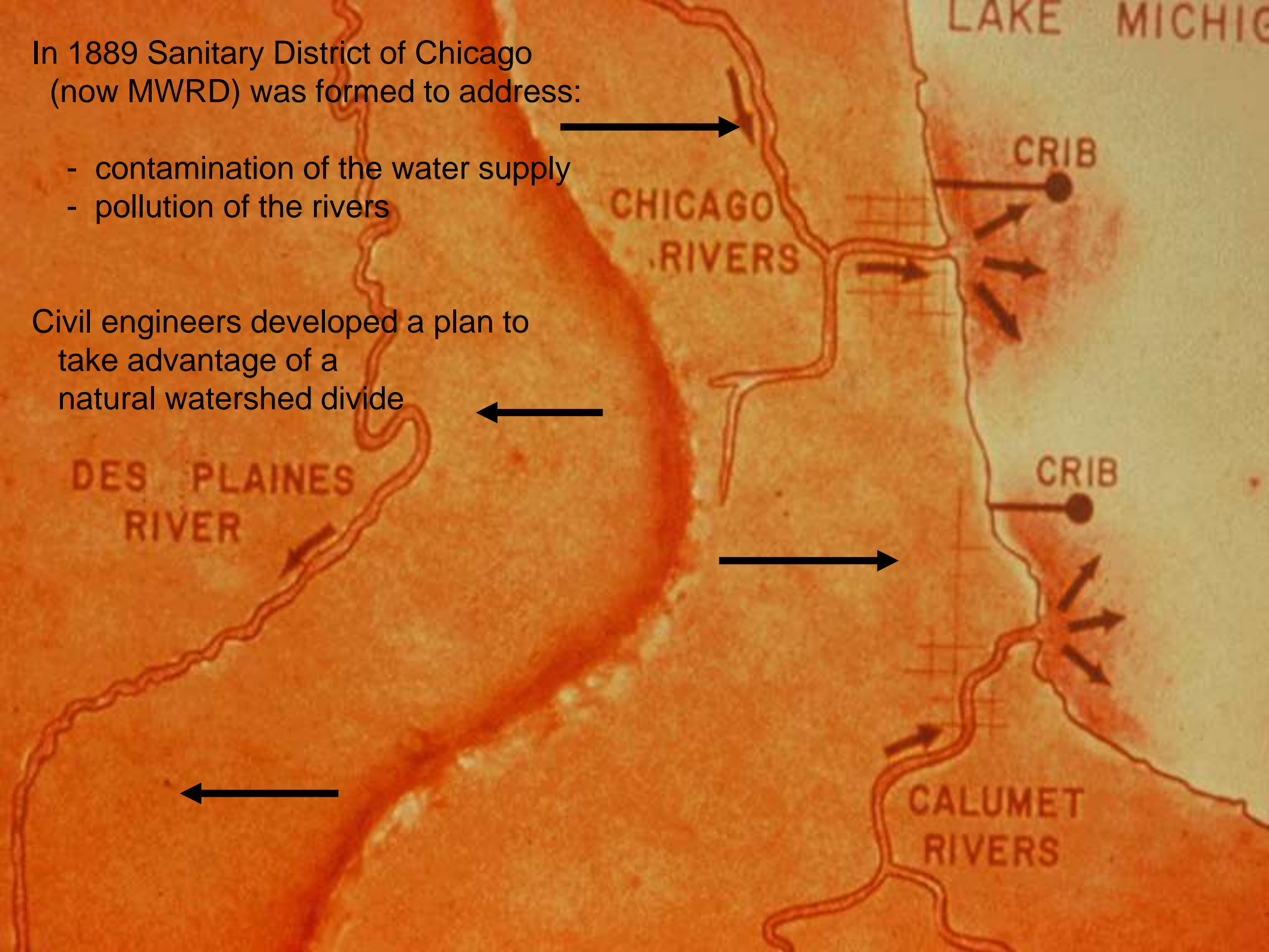


...Need a Solution!

In 1889 Sanitary District of Chicago
(now MWRD) was formed to address:

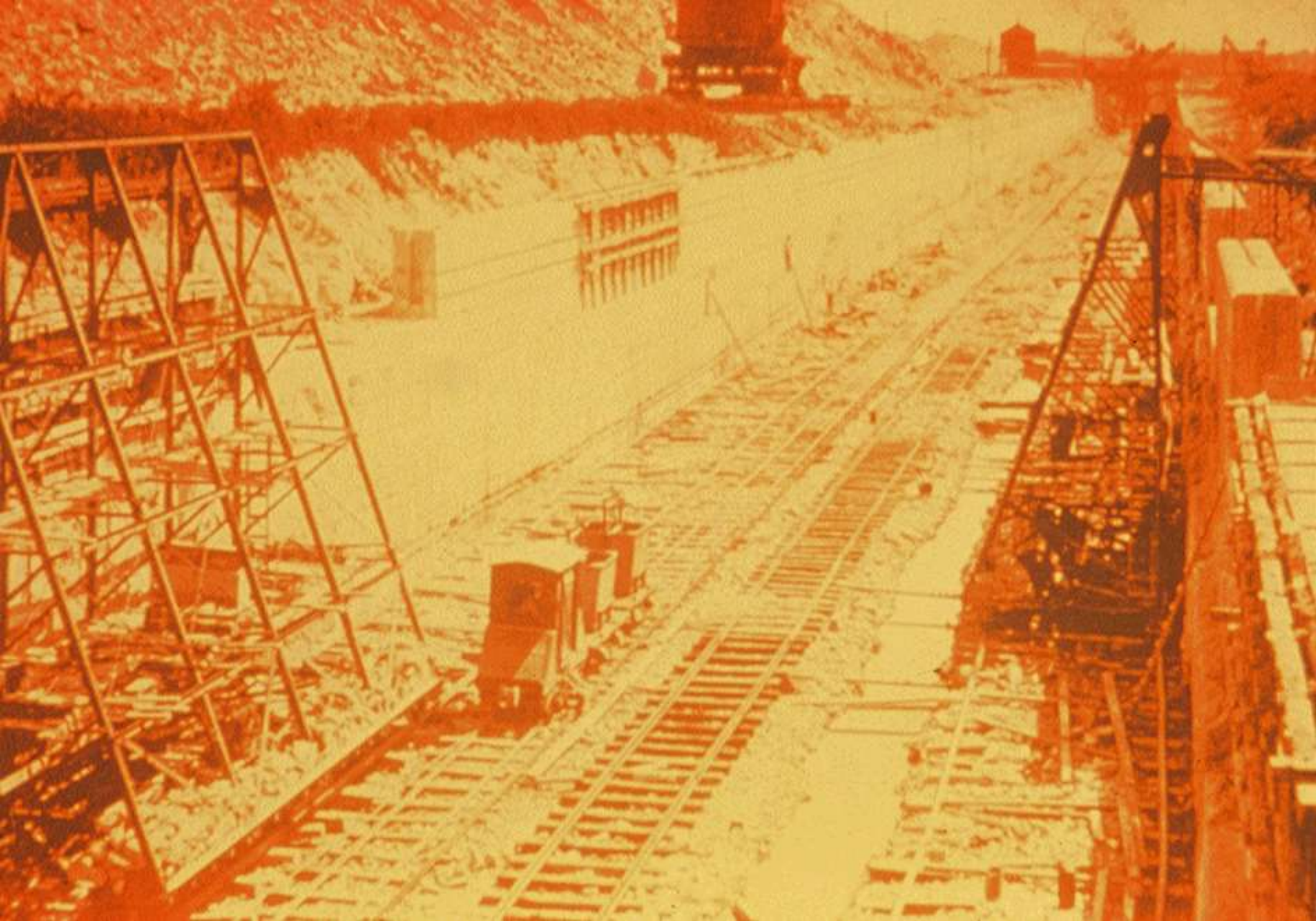
- contamination of the water supply
- pollution of the rivers

Civil engineers developed a plan to
take advantage of a
natural watershed divide



Chicago School of Earth Moving 1892-1900



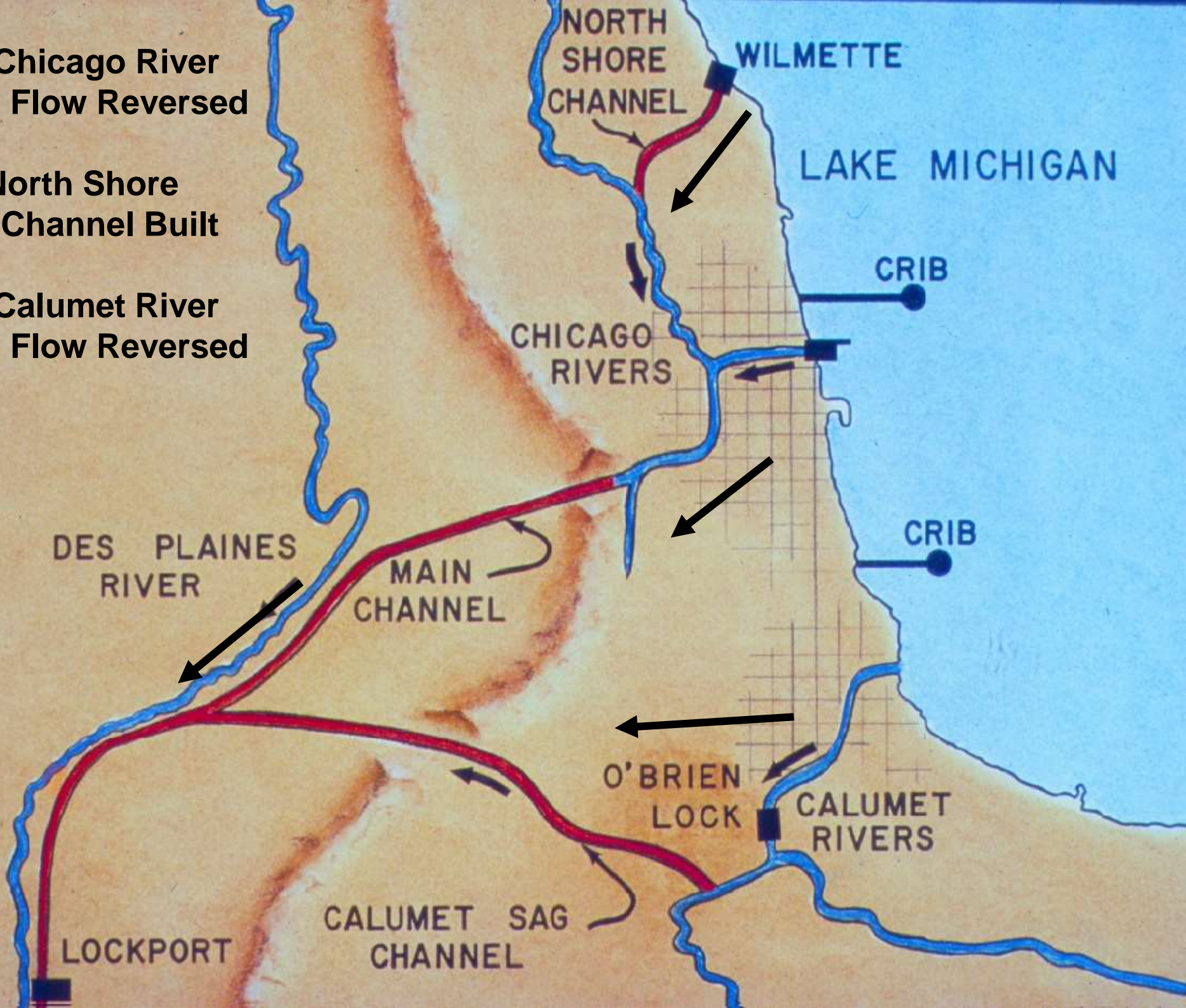


Courtesy of Metropolitan Water Reclamation District

1900 Chicago River
Flow Reversed

1911 North Shore
Channel Built

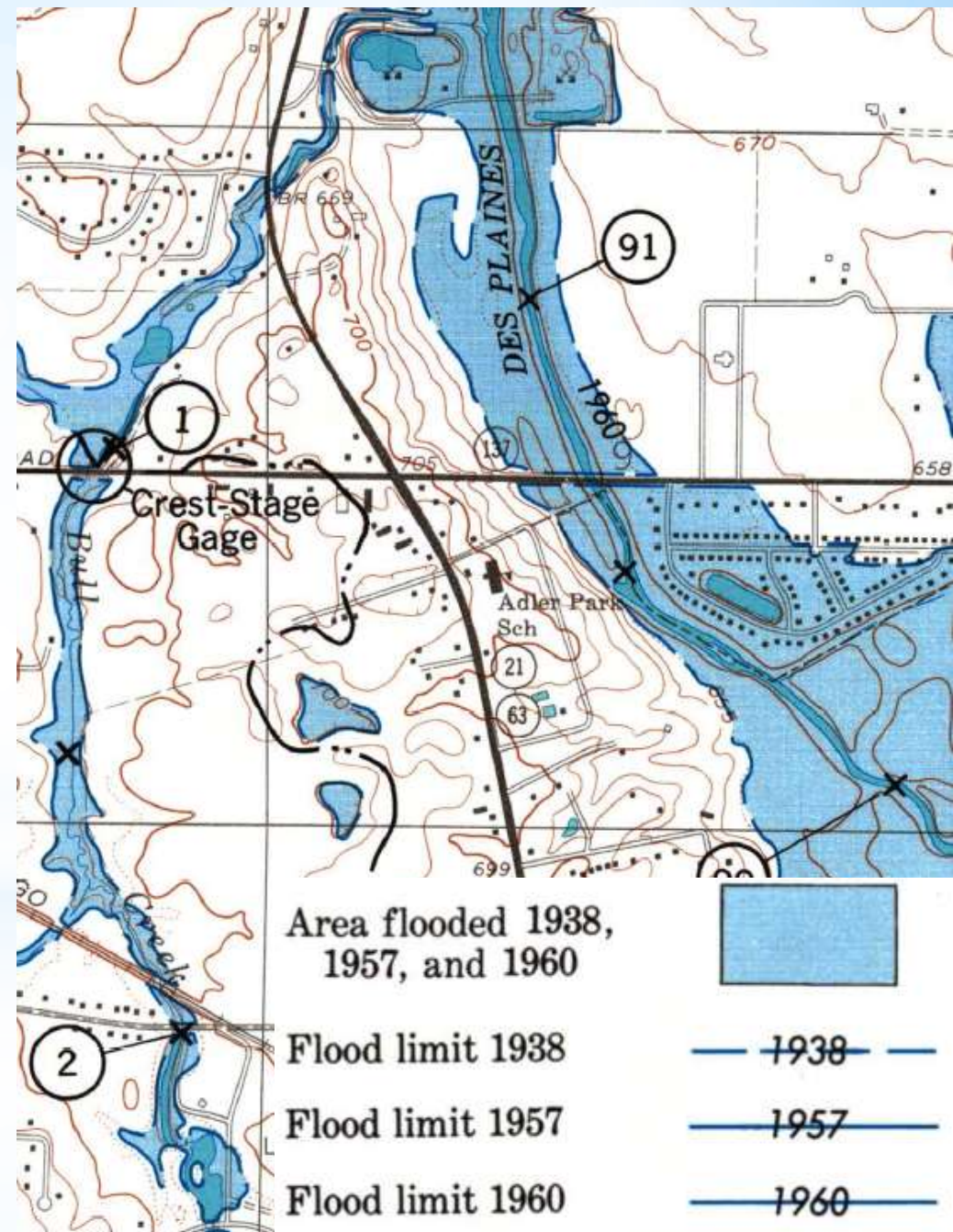
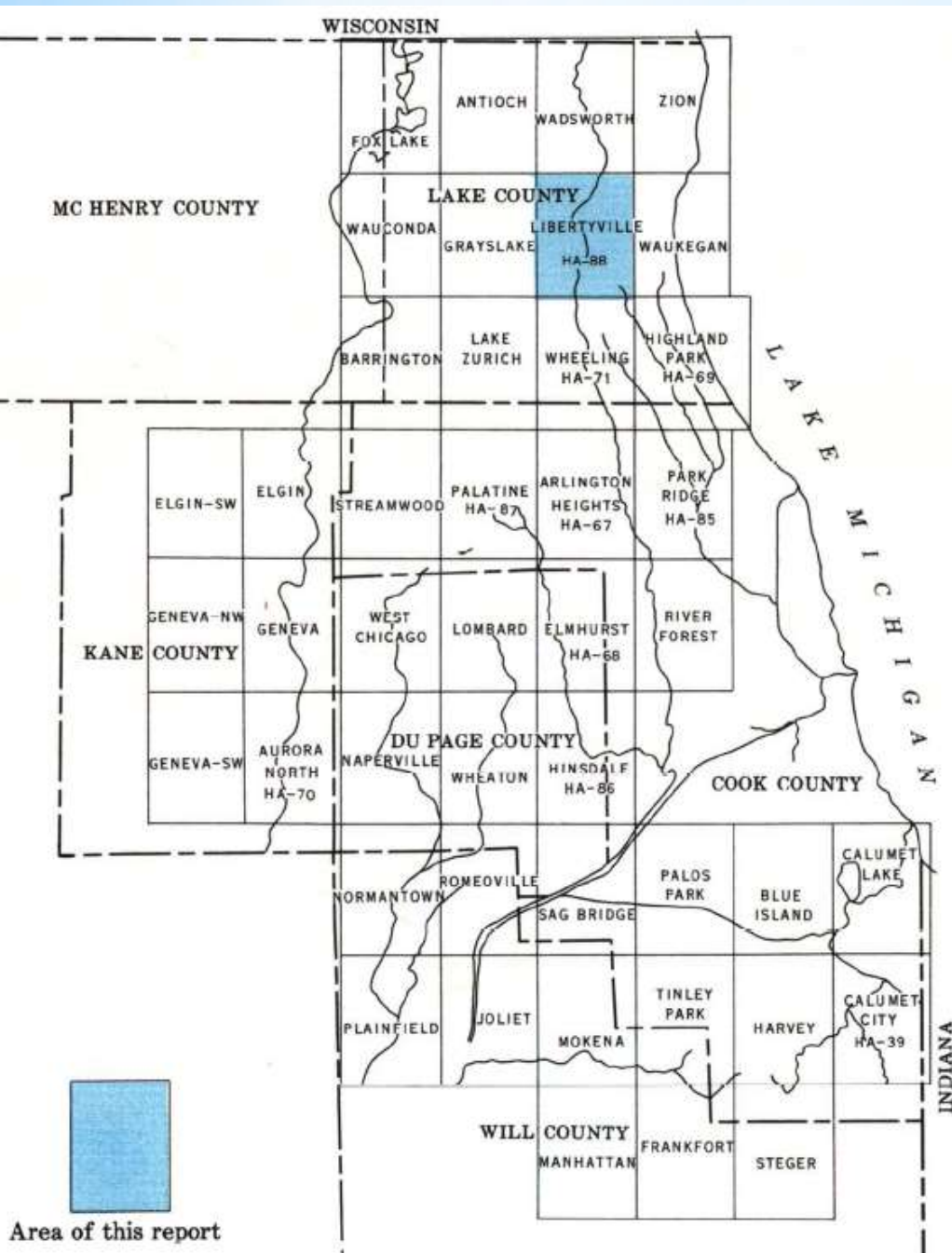
1922 Calumet River
Flow Reversed



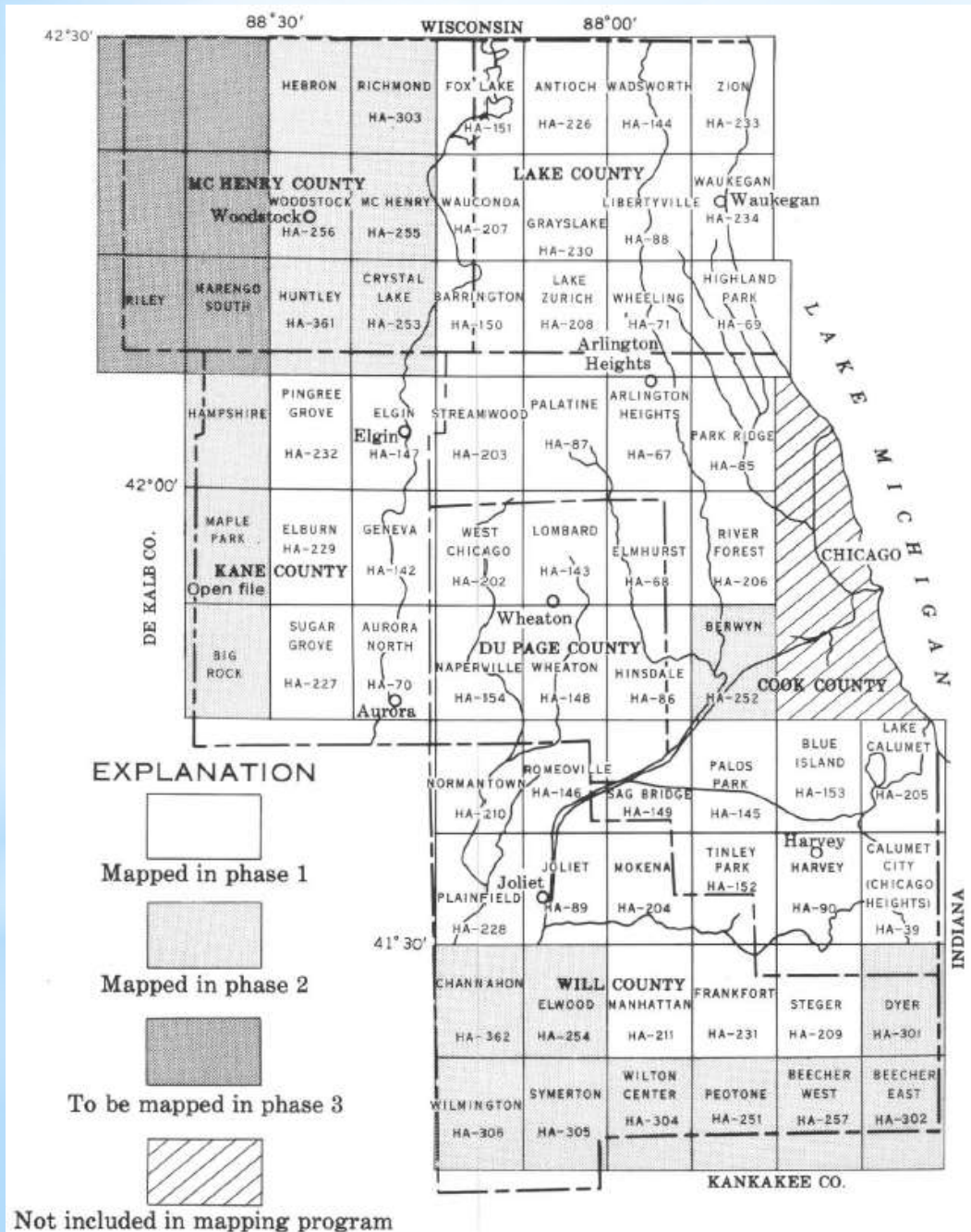


CHICAGO RIVER CONTROLLING WORKS

Hydrologic Atlases (HA Maps) Phase 1



Urban Development Advised to Avoid Floodplains



**1964 NIPC Model
Floodplain Zoning
Ordinance**

**1967 MWRD (then known
as MSD) Policy for
Permit Issuance**

**1969 HA-MAP
Coverage**

Rise of the Detention Basins

- **Richard Nixon was President.**
- **Engineering calculations were performed with a slide rule and charts.**
- **Suburban Cook County was undergoing rapid development as cornfields became subdivisions and shopping malls.**
- **MSD Blue Ribbon Committee formed in 1969. Developed Stormwater Regulations as a Companion Ordinance for MWRD Sewer Permit Ordinance.**
- **Companion Ordinance adopted in 1970**
- **Effective date: January 1, 1972. First agency in the nation to require site detention. I-294 demarcation.**

1980's Ditka Flood Era

- **Chicago Bears win Super Bowl XX. Life is good...**
- **8 months later extreme floods hit the region**
- **Less than a year later catastrophic floods hit the region again**
- **State legislation is enacted to allow Northeast Illinois Counties to develop Comprehensive Stormwater Plans and Ordinances**
- **Bears don't go back to the Super Bowl for 20 years**

Lake County SMC's Regulatory Program

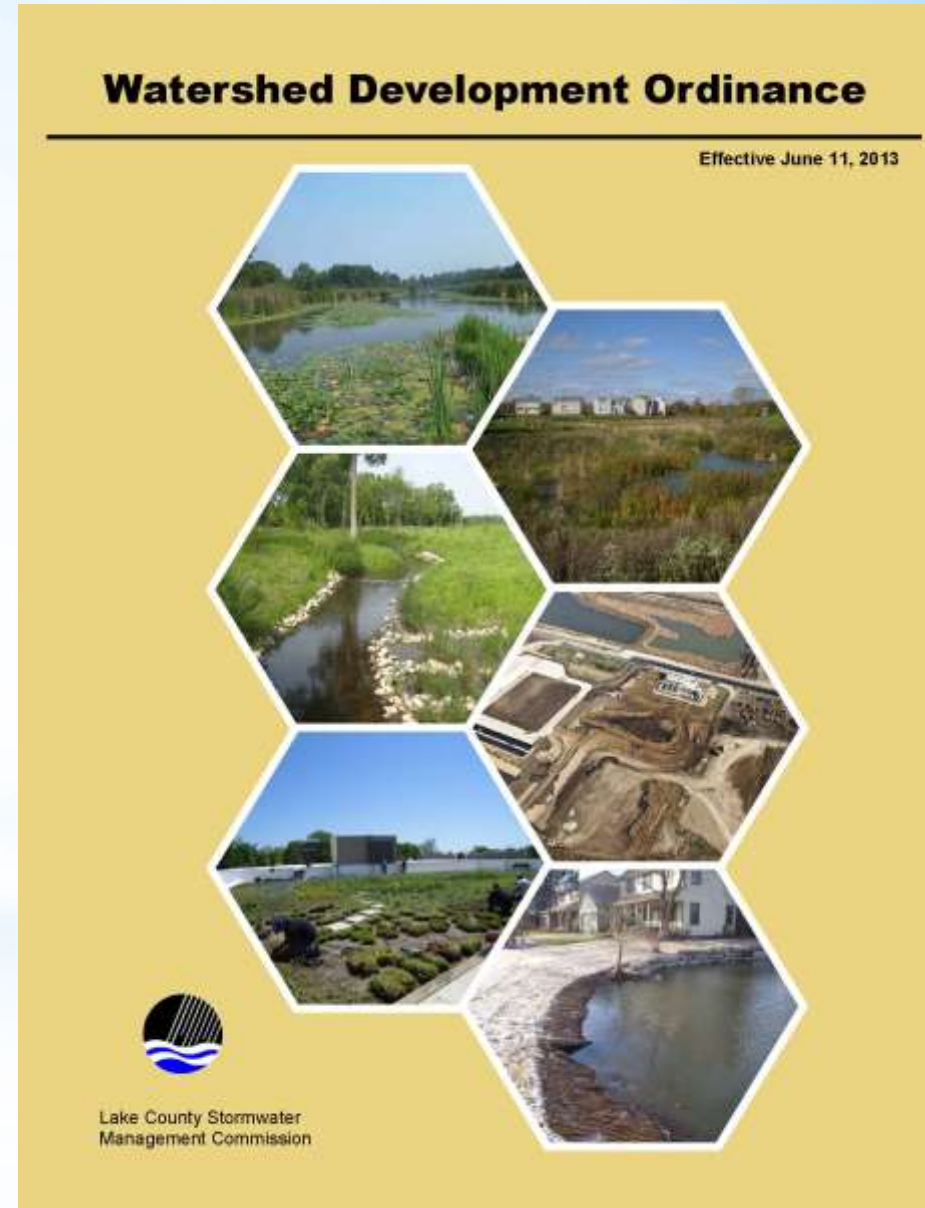
WDO first adopted October 18, 1992

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.



Stormwater Management Systems



Wet Detention Basins

Dry Detention Basins



Stormwater Management Systems



Native Plant
Buffers



Stormwater Management Systems

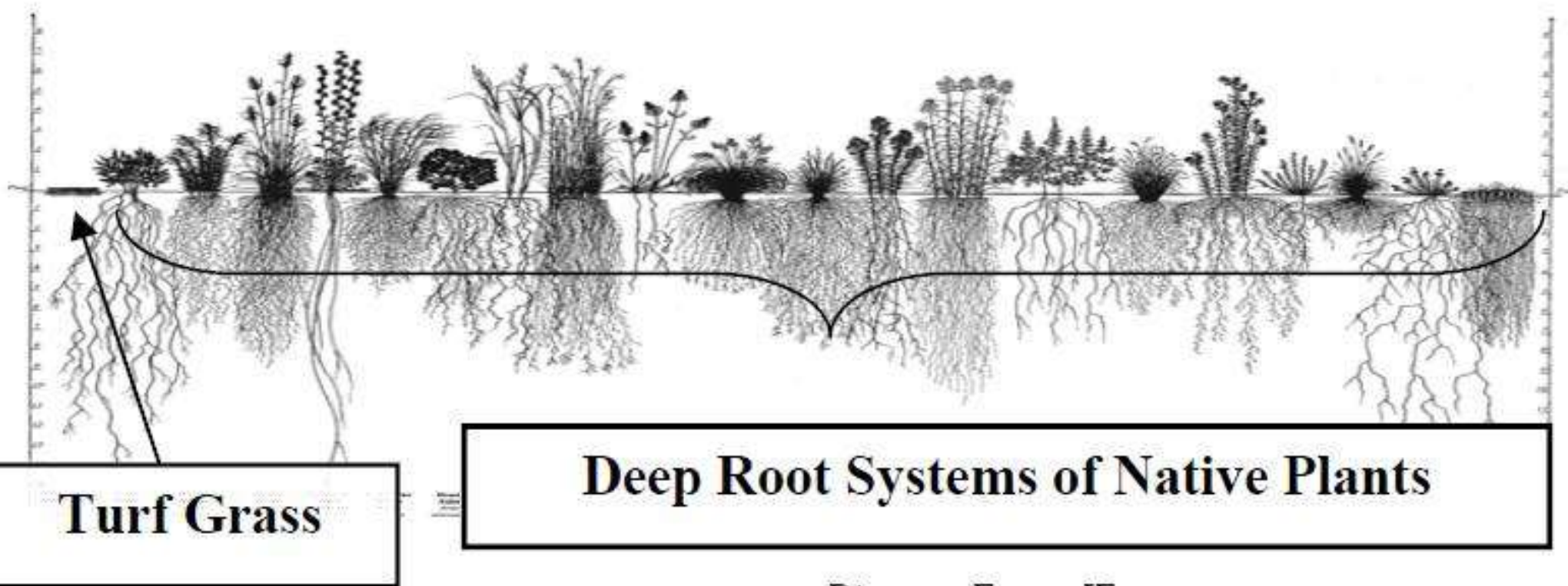


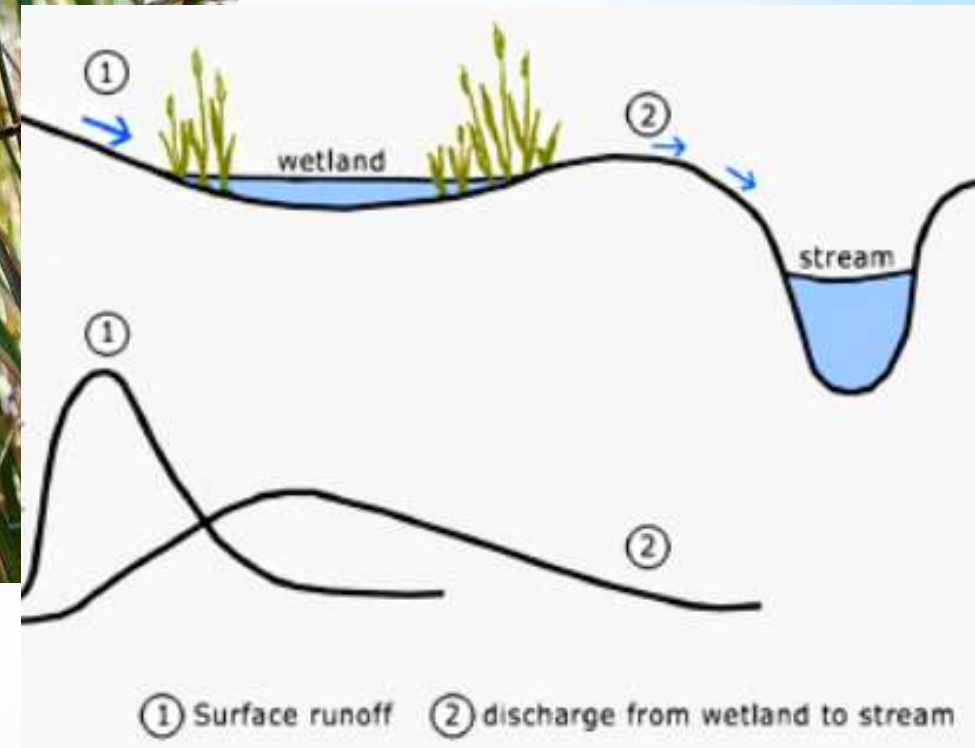
Diagram From: JFnew

Stormwater Management Systems

Vegetated Swales a.k.a 'Ditches'



Stormwater Management Systems



TARP

Tunnel and Reservoir Plan aka “Deep Tunnel”



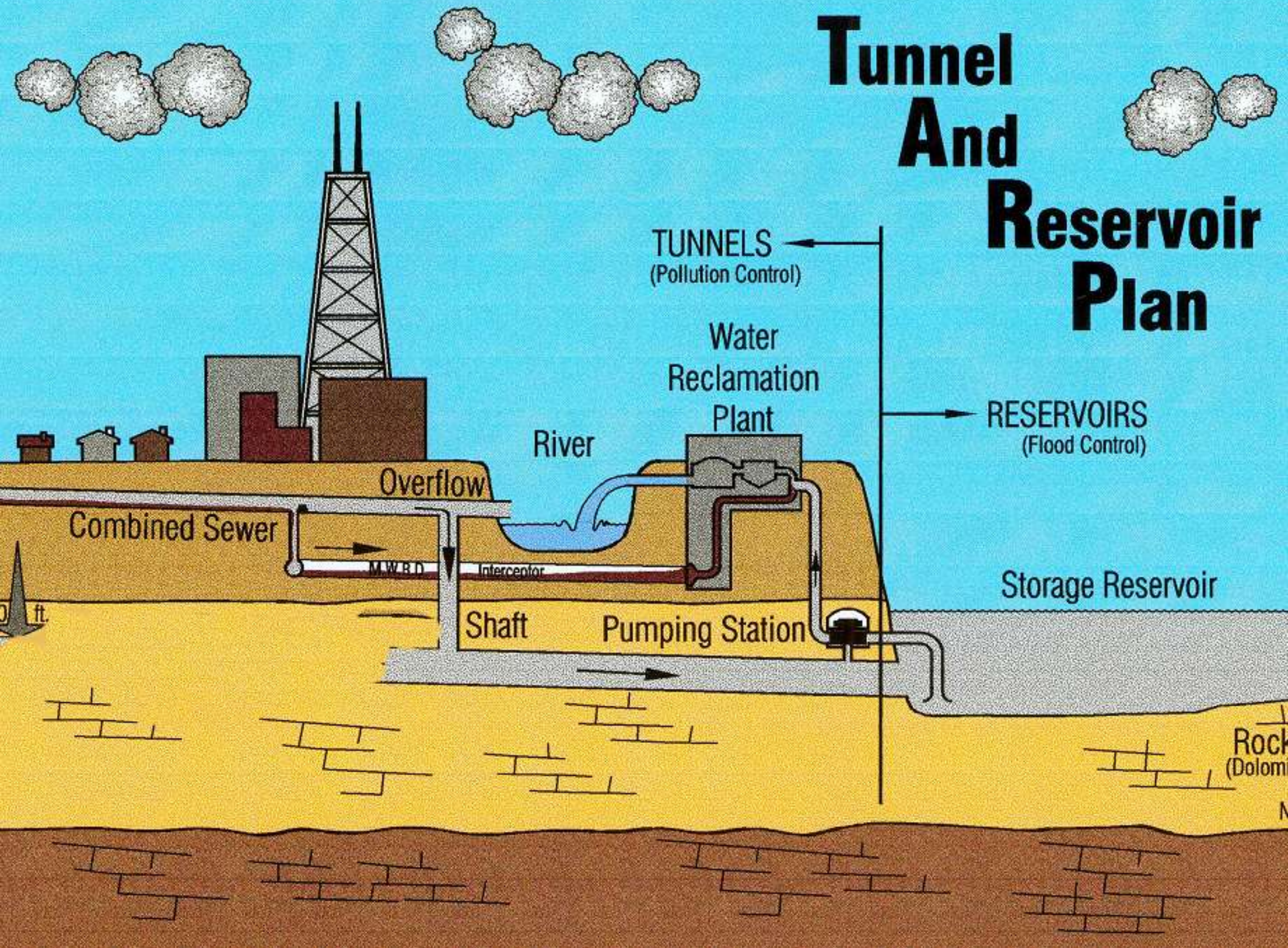
* Phase I - Tunnel

- * 109.4 miles, 30'd, ~210 ft deep
- * Completed 2006

* Phase II - Reservoirs

- * O'Hare - 1996, 350MG
- * McCook - 2014, 2024 10BG
- * Thornton - 2003, 3.1BG, 2014, 7.9BG

Tunnel And Reservoir Plan



17' Branch Tunnel Meets 32' Main Tunnel



Courtesy of MWRDGC

1/20/2000

Thornton Reservoir 2004





Green Infrastructure

Designers are given a wide degree of flexibility in meeting the requirements

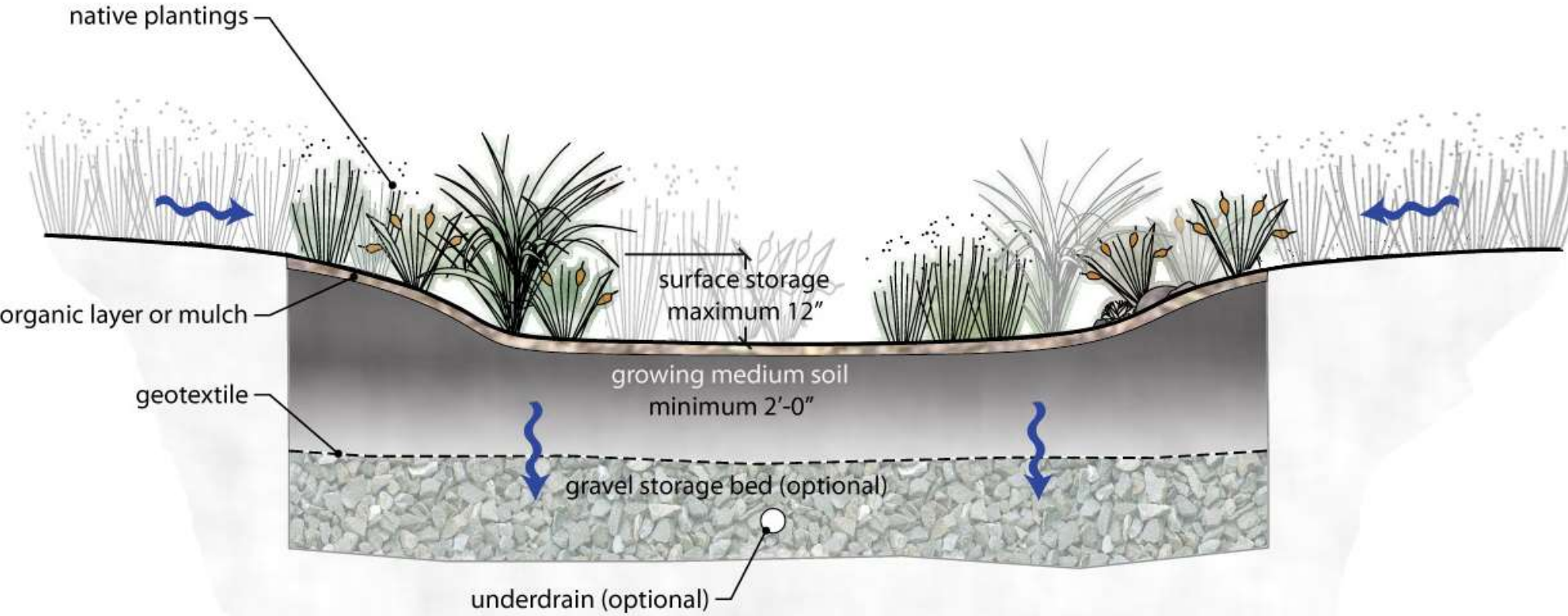


Permeable pavement

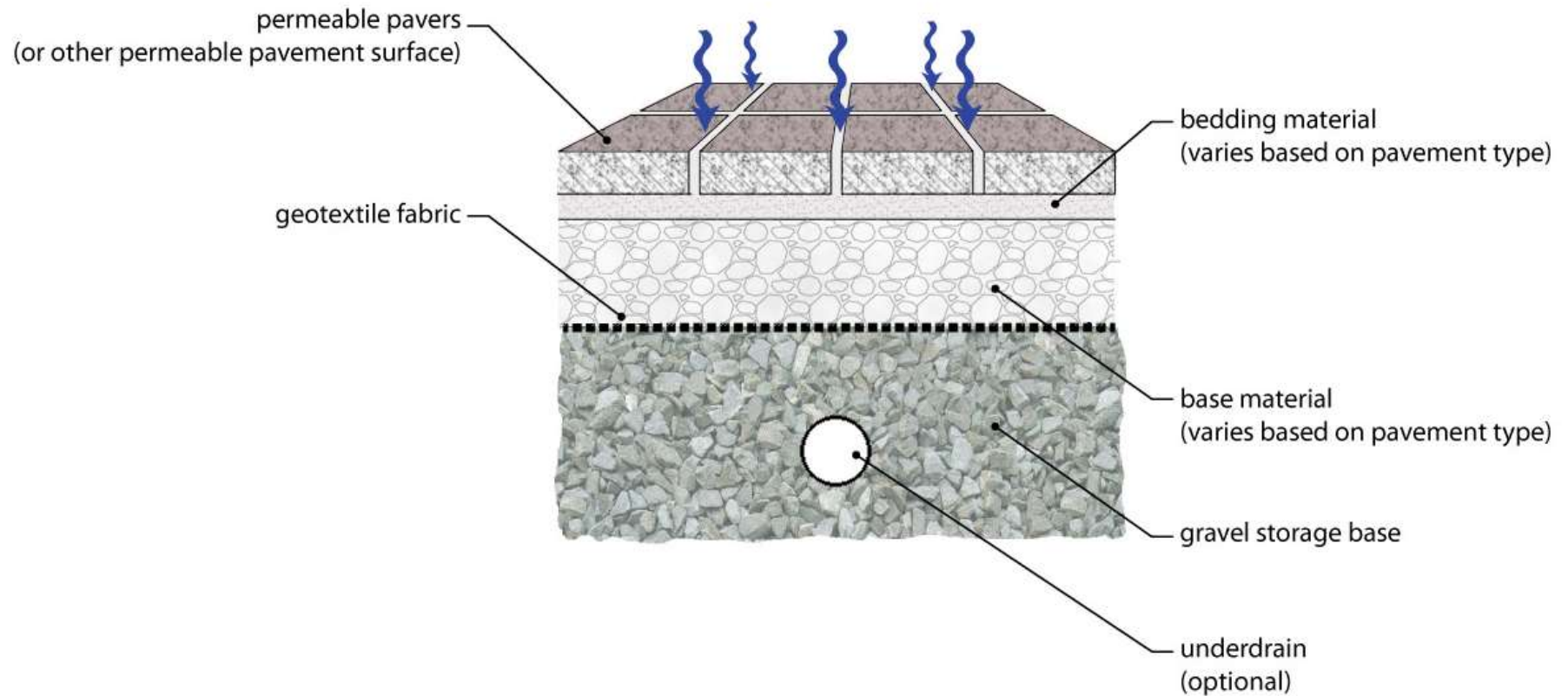


Bioswales

Bio-infiltration Systems



Permeable Pavements



Buckingham Fountain Permeable Pavers 2009



Green Roof at Chicago City Hall





Green Alley Program

- 1,900 miles of public alleyways in Chicago, the largest of any city in the world.
- Total of 3,500 acres of impermeable surface, the equivalent area of over 5 Midway Airports.

Alley Summary

Total: 13,000 Alleys

- 20% Currently Unimproved
- 20% in Need of Repairs

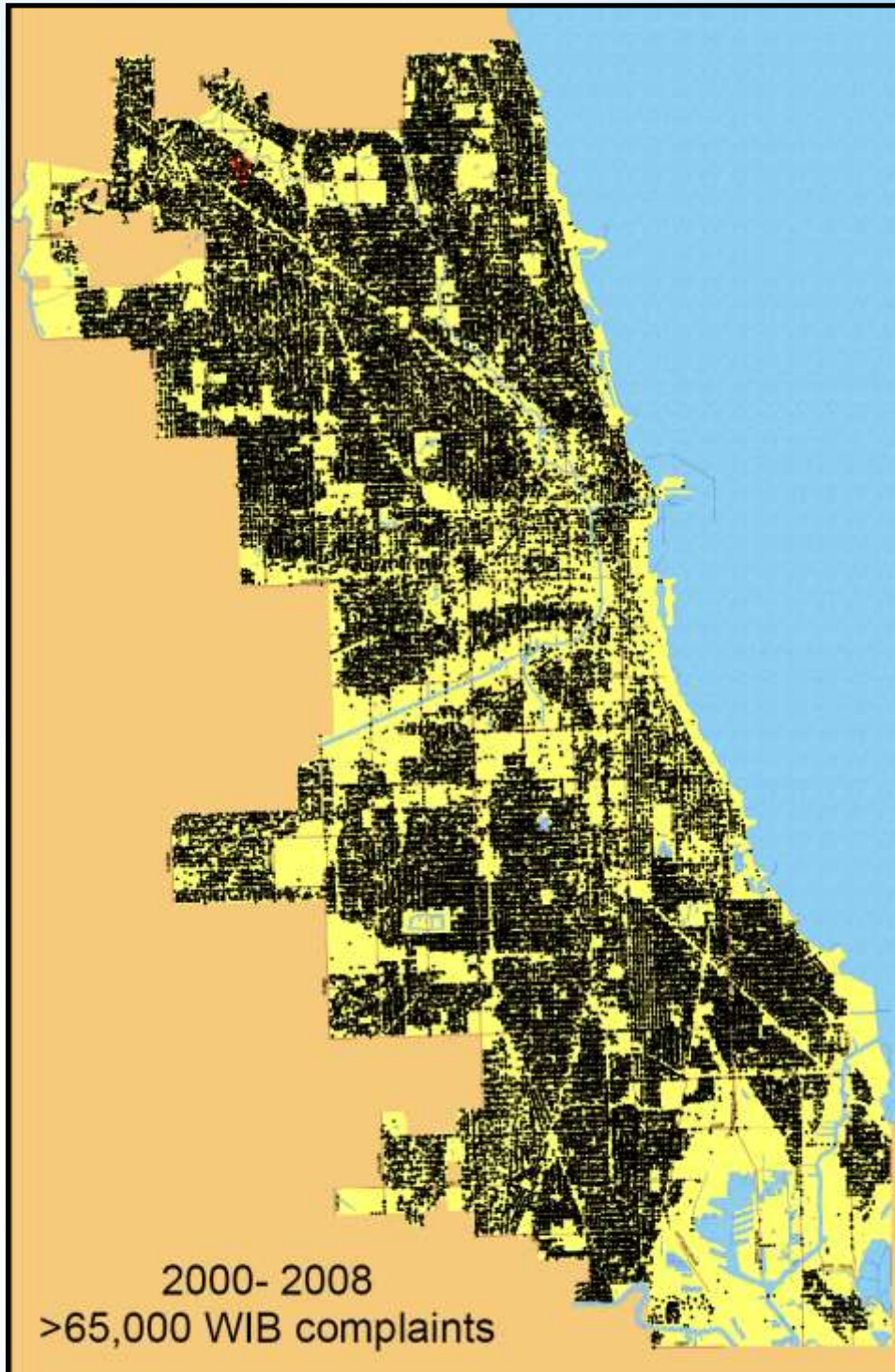
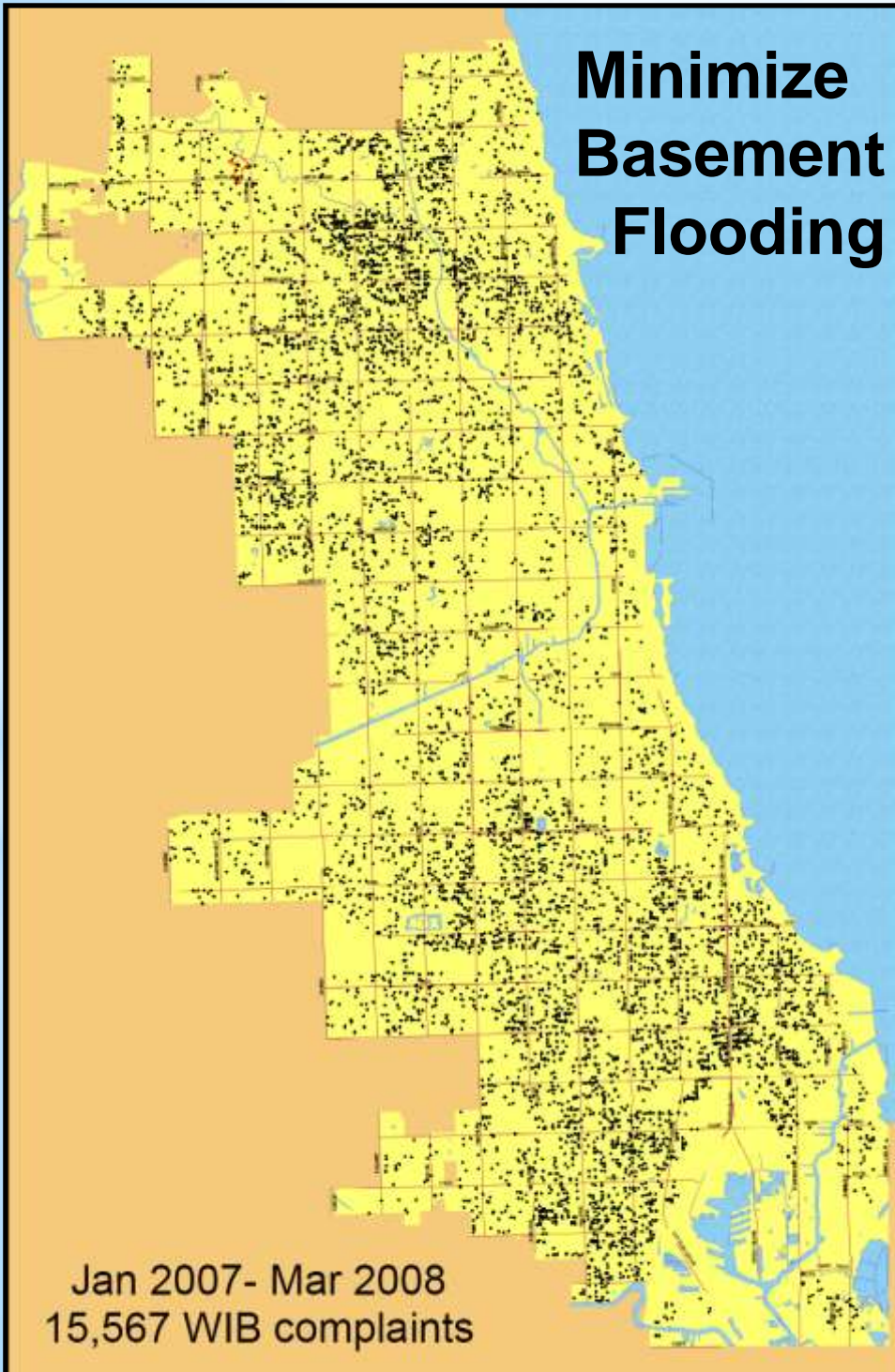
Urban Flooding

- **Illinois General Assembly pass the ‘Urban Flooding Awareness Act’ (Public Act 98 0858) in 2014.**
- **Act directs a host of state agencies, regional authorities, FEMA, and other relevant parties to work together with IDNR to develop and submit a report**
- **Report will review and evaluate the latest research, laws, regulations, policies, procedures, and institutional knowledge regarding urban flooding**
- **To be delivered to the General Assembly and Governor by June 30, 2015**

Minimize Basement Flooding

Jan 2007- Mar 2008
15,567 WIB complaints

2000- 2008
>65,000 WIB complaints





**Decrease Overland Flooding
and Stormwater Impacts**



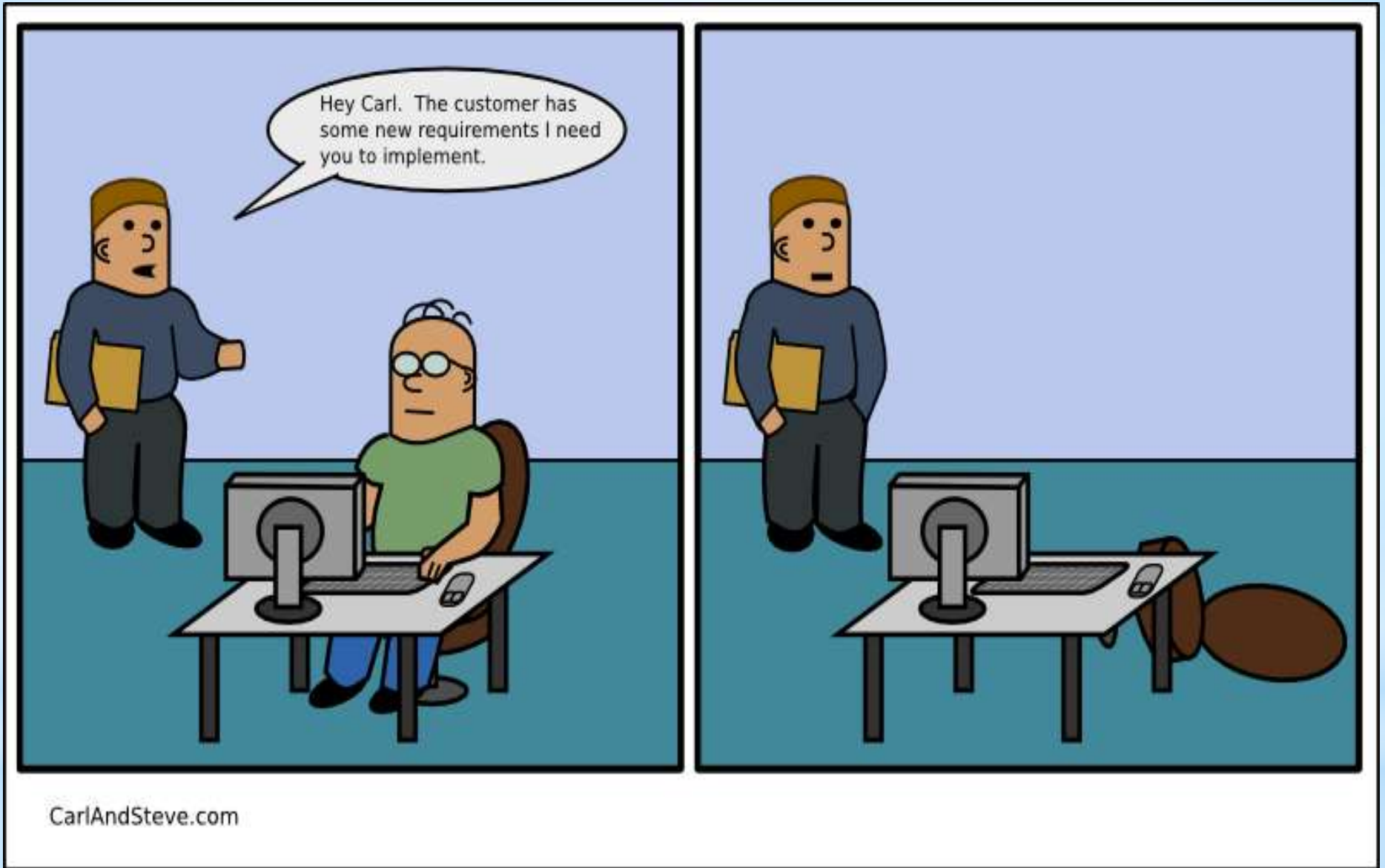
Protect Public Safety

Signs of Failing Stormwater Systems

- * Poorly draining areas
- * Erosion and scour
- * Deposits of sediment and silt
- * Obstructed inlets
- * Clogged restrictor manholes
- * Displaced rock 'rip-rap'



Questions???



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