



Metropolitan Water Reclamation District of Greater Chicago

# Stormwater Planning

## Billions of Gallons for Climate Resiliency:

## Site Selection for MWRD Flood Storage Project

IAFSM Conference, March 2024

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V3 Companies





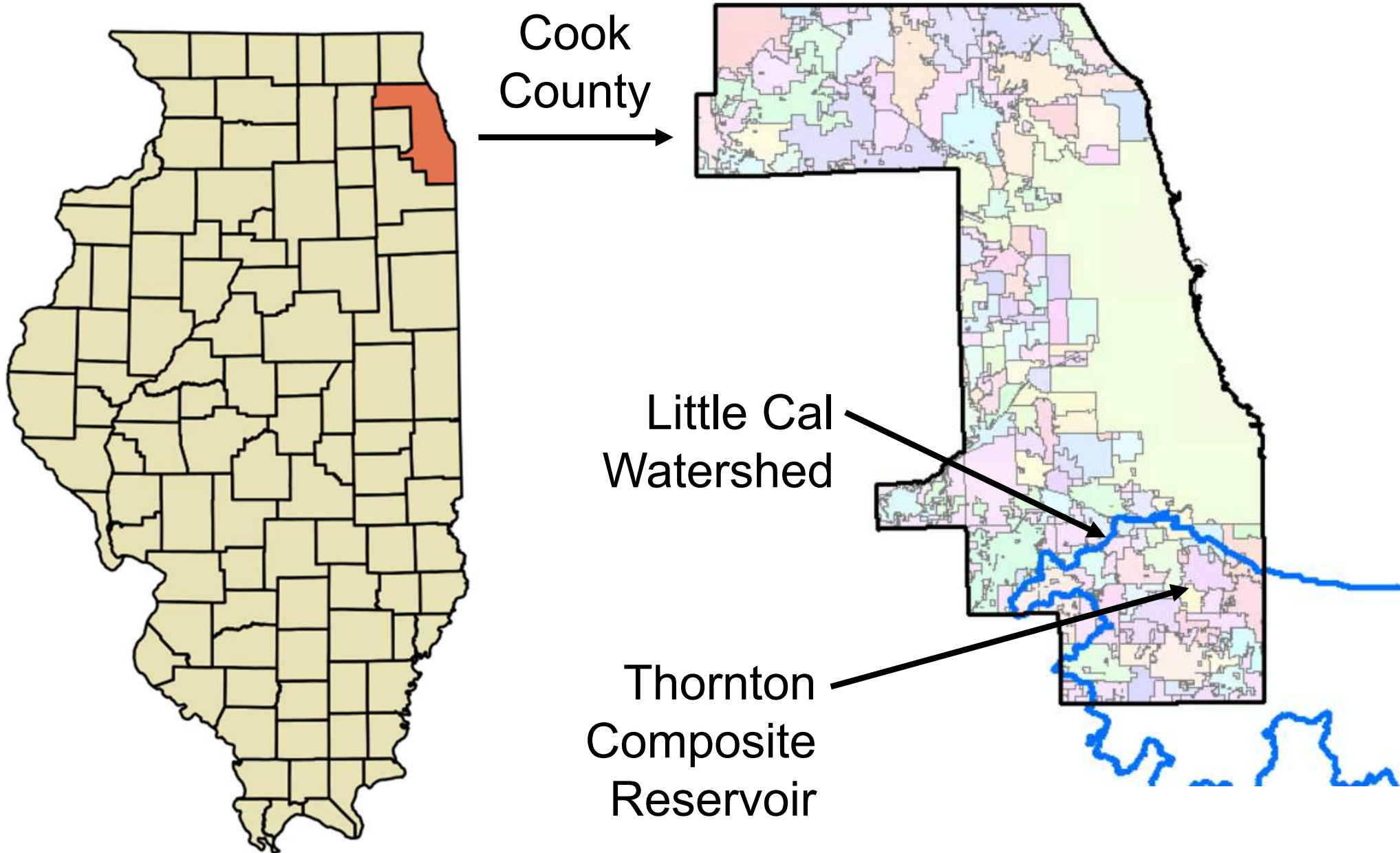
# Agenda



- Brief History of Thornton Composite Reservoir
- Why More Storage is Needed
- Site Selection Process for New Storage

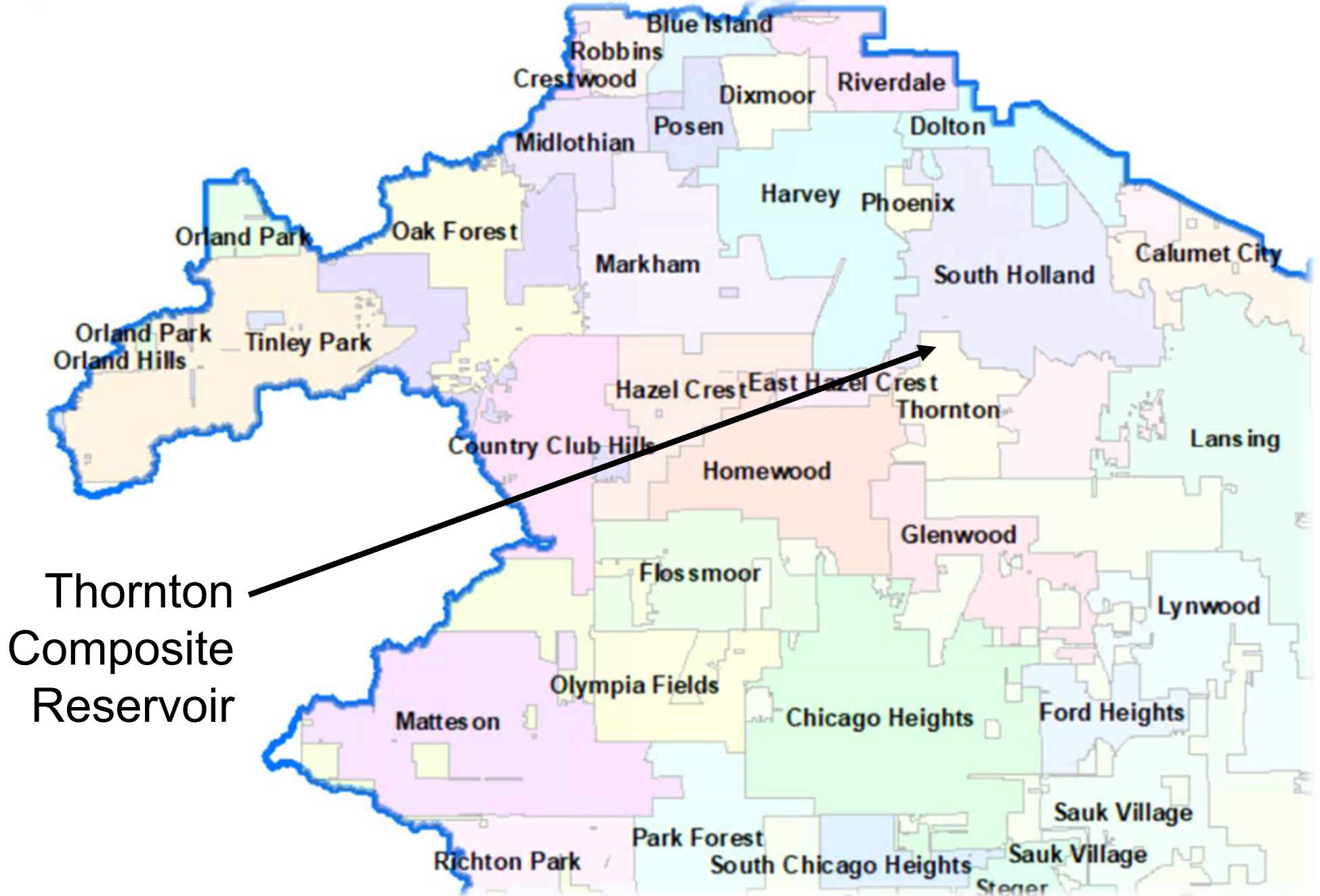


# Brief History of Thornton Composite Reservoir





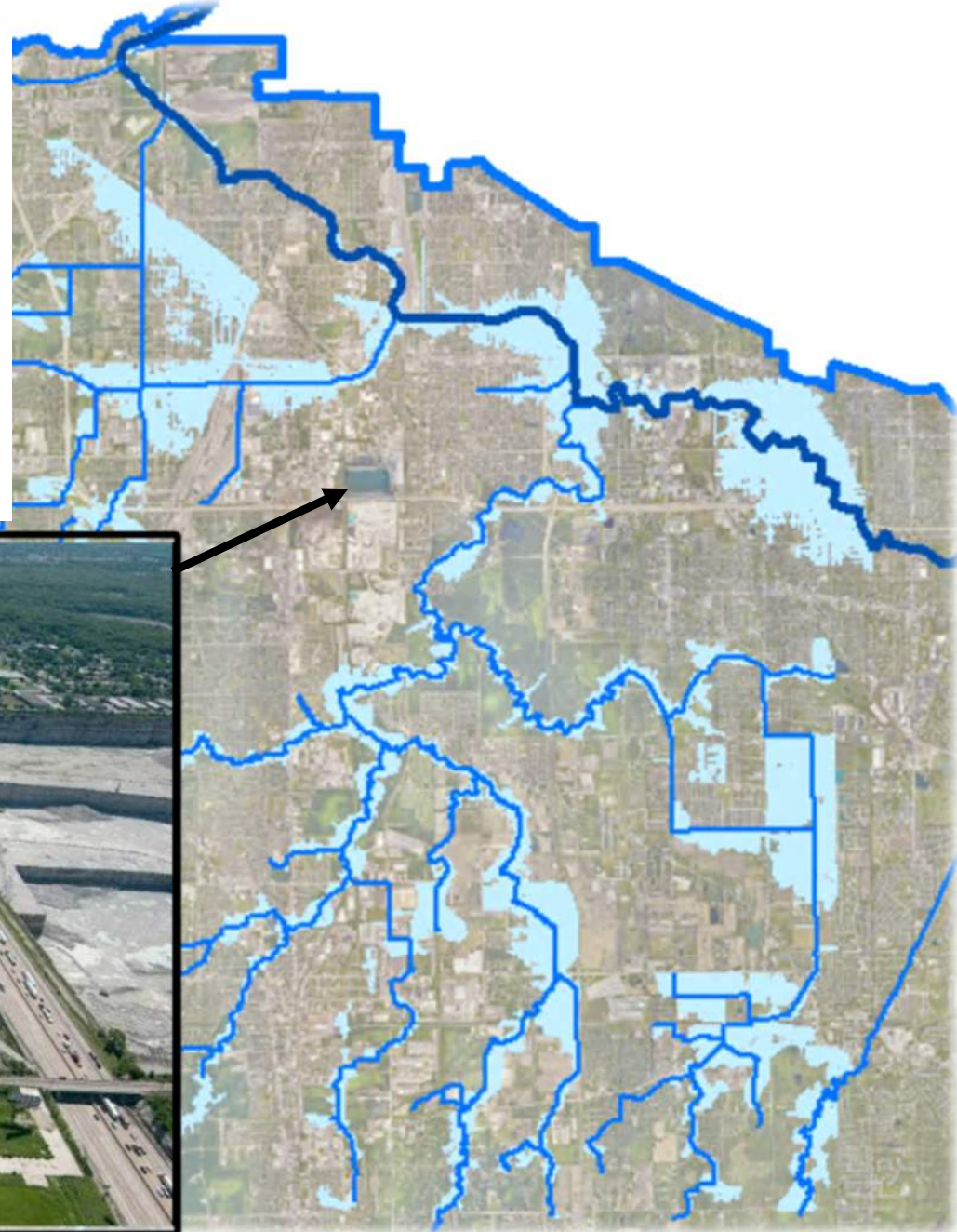
# Brief History of Thornton Composite Reservoir





# Brief History of Thornton Composite Reservoir

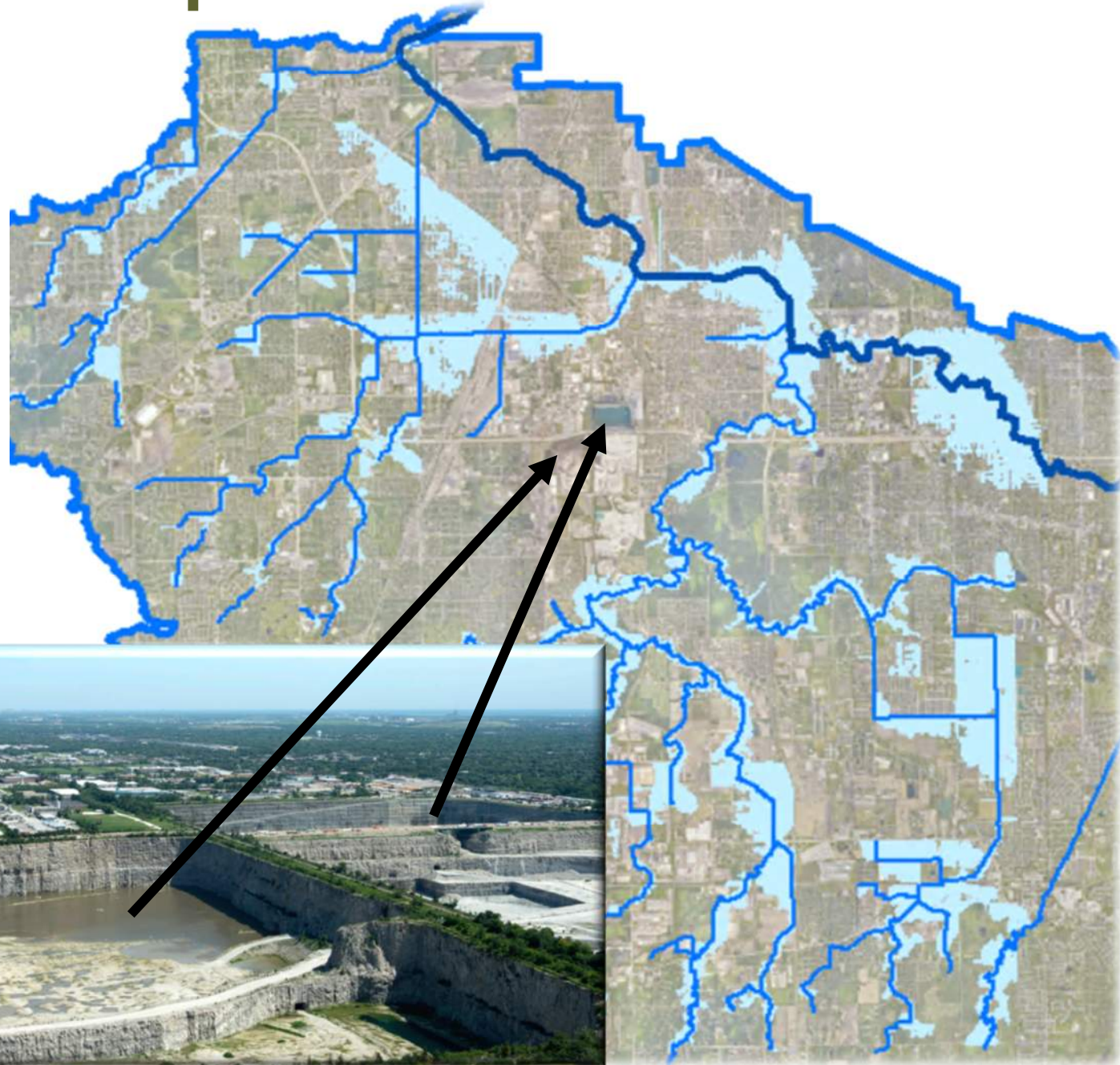
- **1998: NRCS Little Cal Watershed Plan** called for 3.1 BG flood storage to capture Thorn Creek
- **Thornton Comp Reservoir design:** 3.1 BG from Thorn Creek plus 4.8 BG combined sewage from Calumet TARP



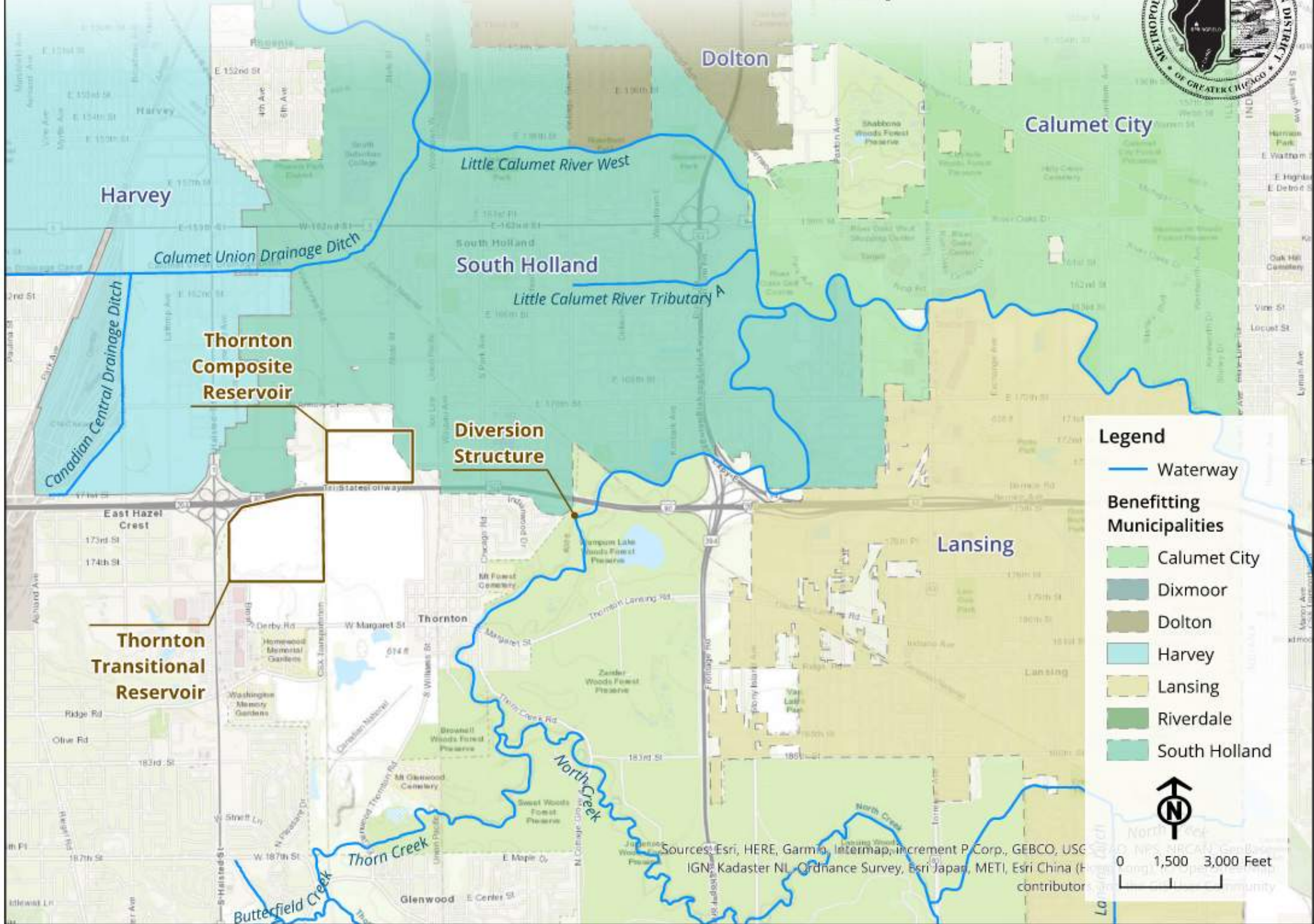


# Brief History of Thornton Composite Reservoir

- Thornton Composite Reservoir was to be finished 2015
- **Interim: Thornton Transitional Reservoir, 3.1 BG, complete March 2003**



# Exhibit 1: Thornton Transitional Reservoir Location Map



**Legend**

- Waterway
- Benefiting Municipalities**
  - Calumet City
  - Dixmoor
  - Dolton
  - Harvey
  - Lansing
  - Riverdale
  - South Holland



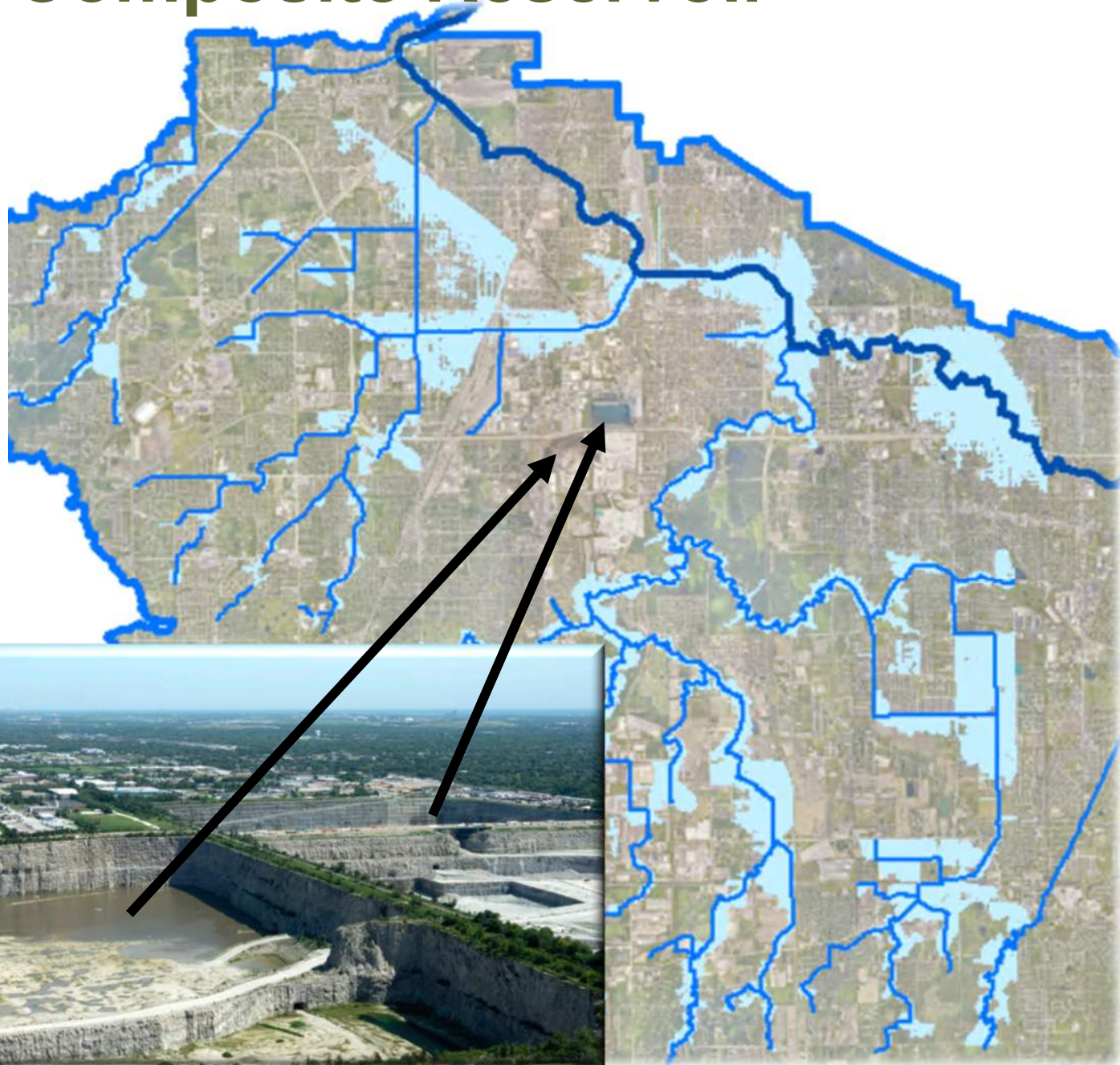
0 1,500 3,000 Feet

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (F) contributor



# Brief History of Thornton Composite Reservoir

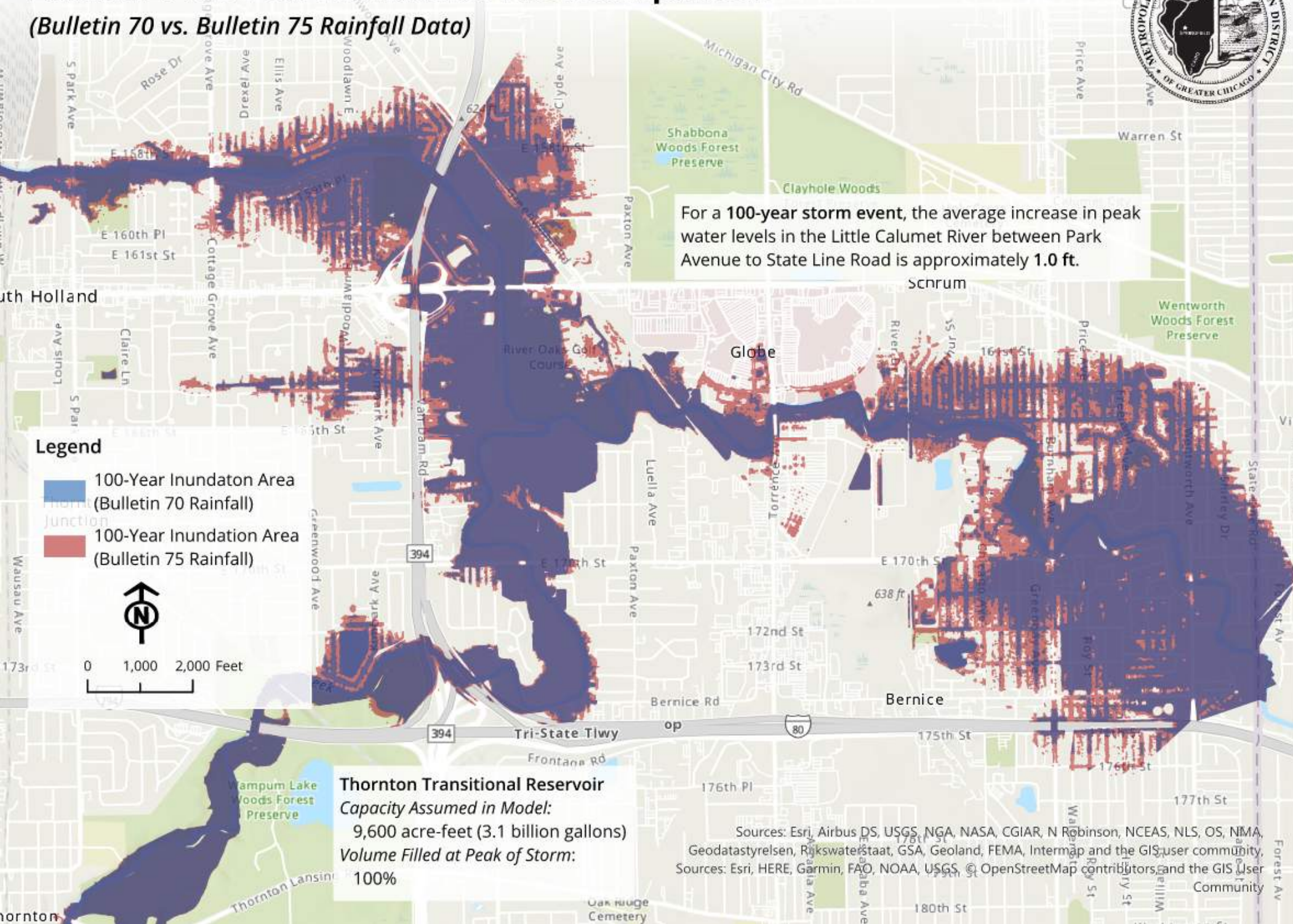
- Composite Reservoir completed in 2015.
- Transitional Reservoir was to be decommissioned in 2015, 5-yr lease extension granted
- MWRD study showed flood benefit if Transitional Reservoir storage remained





# Exhibit 2: 100-Year Inundation Area Comparison

(Bulletin 70 vs. Bulletin 75 Rainfall Data)



For a 100-year storm event, the average increase in peak water levels in the Little Calumet River between Park Avenue to State Line Road is approximately 1.0 ft.

- Legend**
- 100-Year Inundation Area (Bulletin 70 Rainfall)
  - 100-Year Inundation Area (Bulletin 75 Rainfall)



0 1,000 2,000 Feet

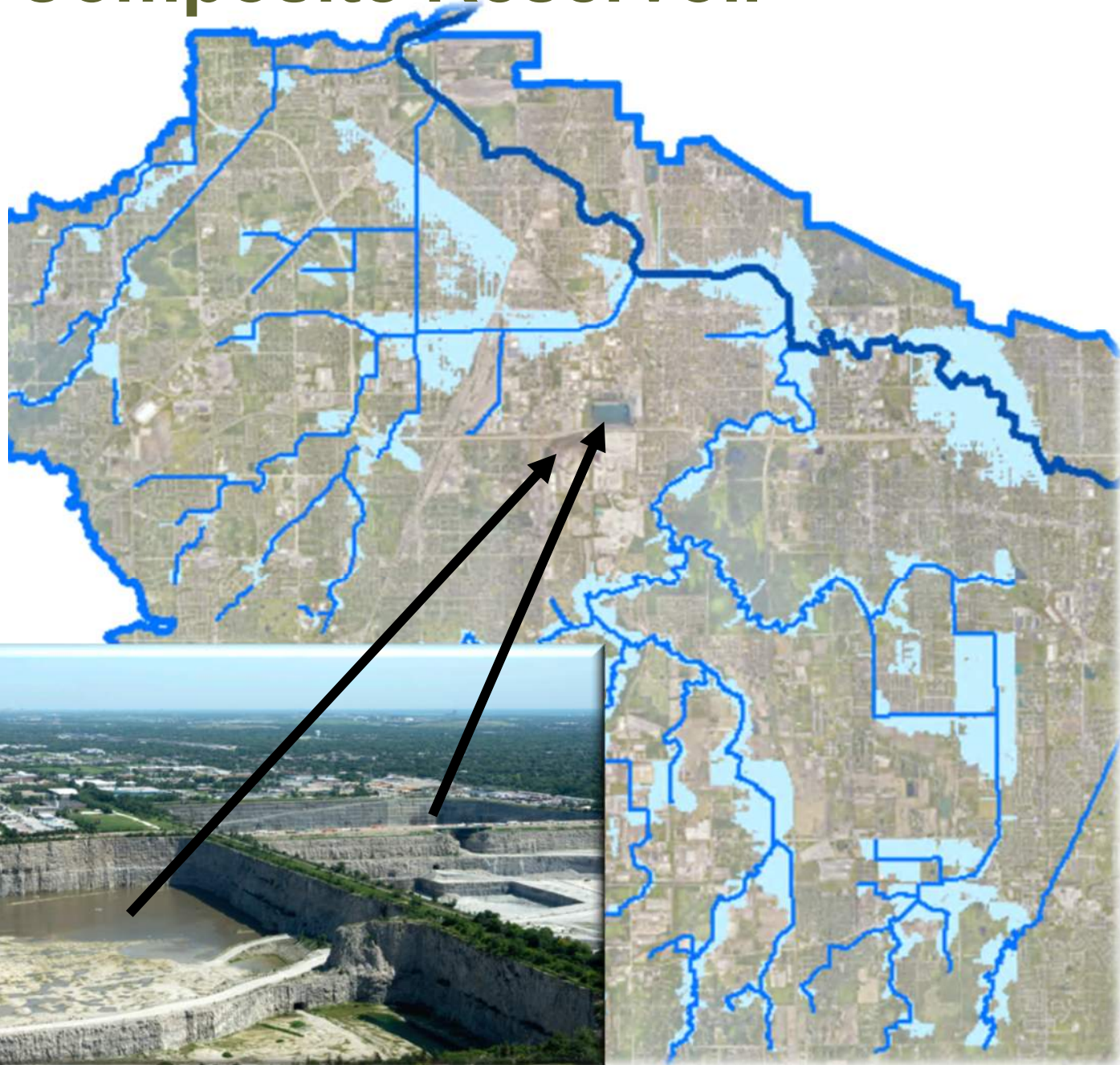
**Thornton Transitional Reservoir**  
 Capacity Assumed in Model:  
 9,600 acre-feet (3.1 billion gallons)  
 Volume Filled at Peak of Storm:  
 100%

Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community, Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors and the GIS User Community



# Brief History of Thornton Composite Reservoir

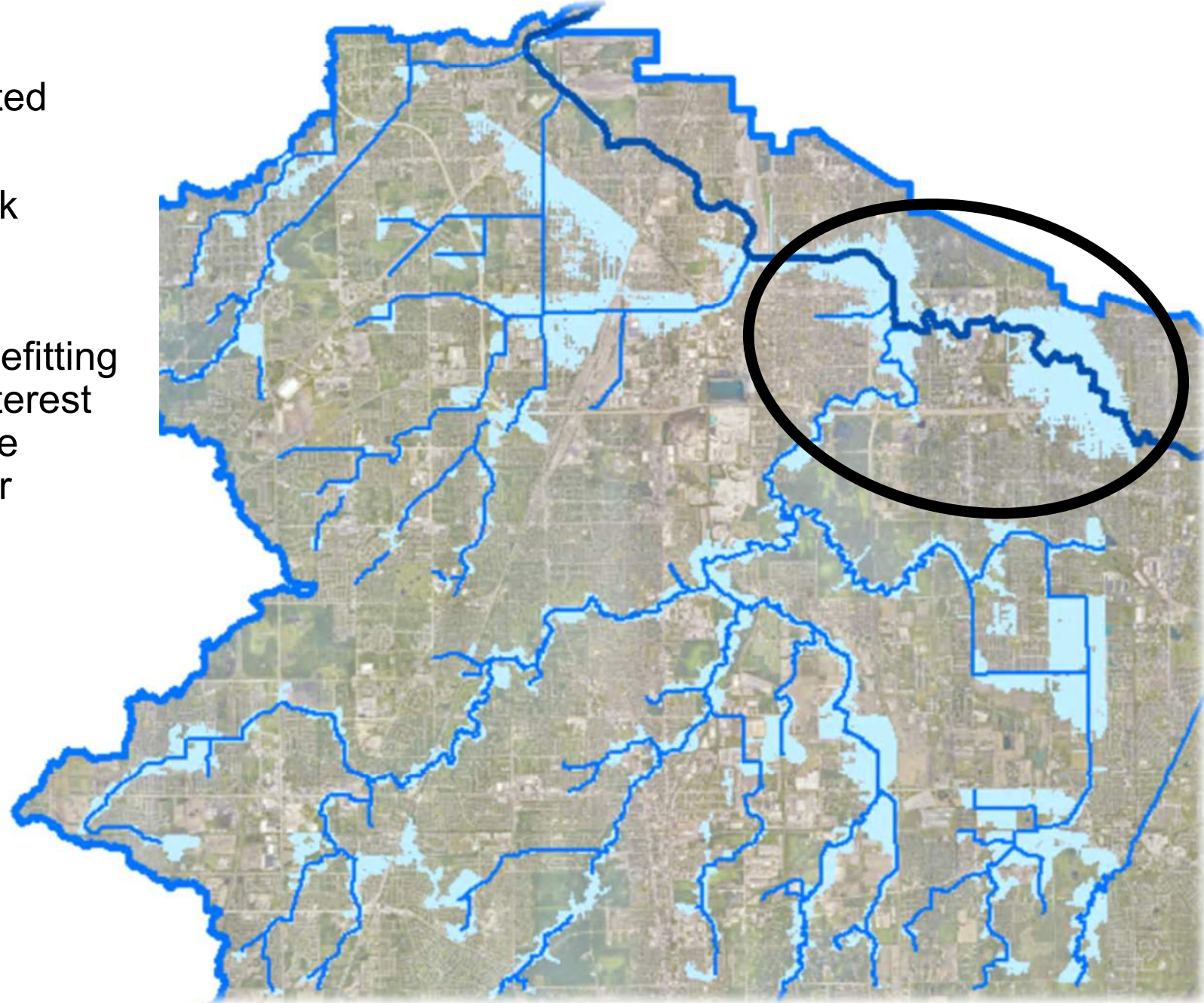
- Lease for Transitional Reservoir site could not be renewed
- Transitional Reservoir decommissioned September 2022
- MWRD initiated study to identify new storage locations





# New Flood Storage Site Selection Process

- Site selection process initiated
- Sites all over southern Cook County were evaluated
- Focus on benefitting the area of interest along the Little Calumet River





# New Flood Storage Site Selection Process



## Vision:

- New flood storage combined with recreational opportunities
- Partnership between MWRD, FPDCC, key stakeholders



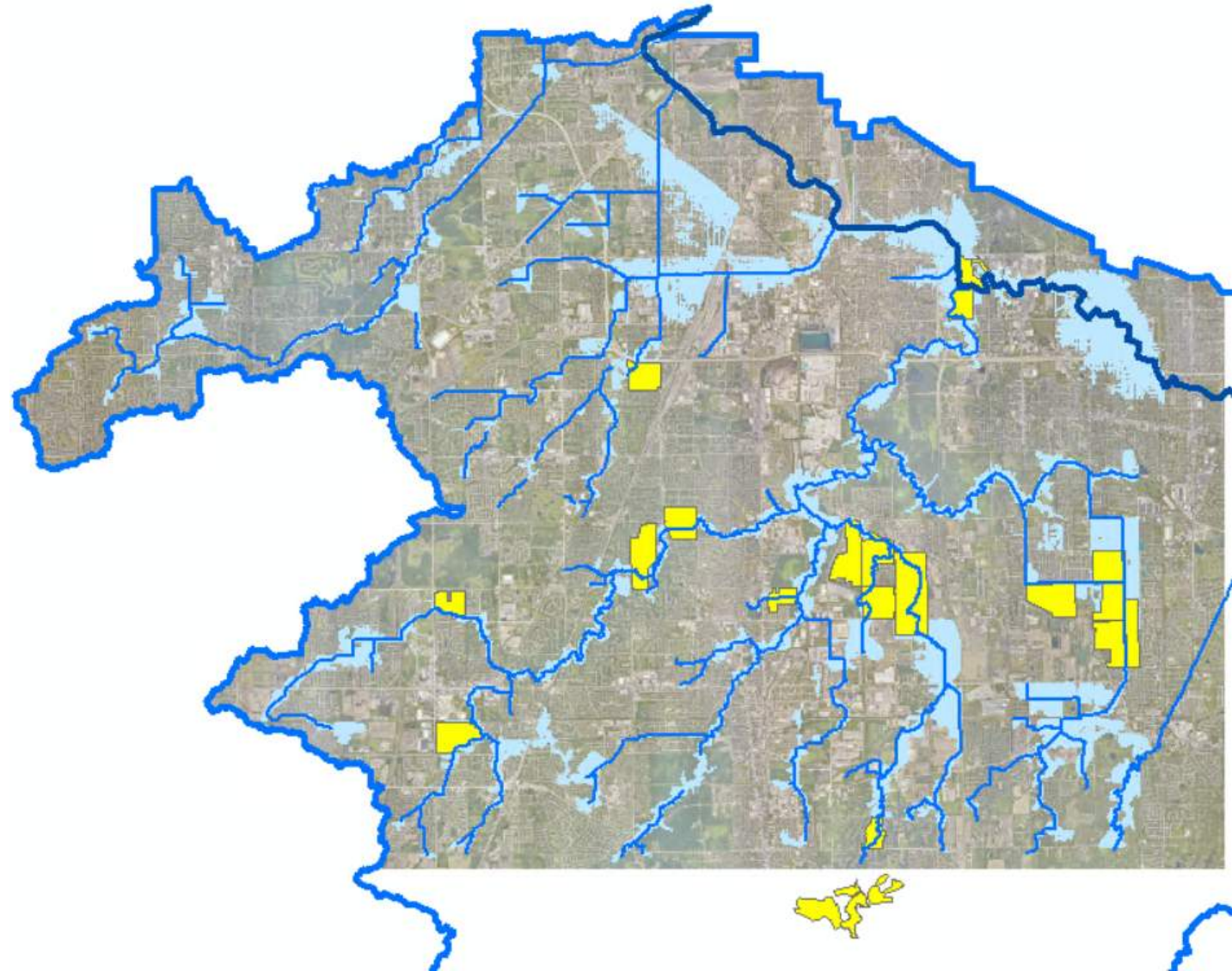


# New Flood Storage Site Selection Process

## Site Identification Considerations

- Ag land or vacant land near a stream
- No significant floodplain
- Large areas, regular shapes (> 75 ac)
- Large upstream trib areas (> 10 sq mi)

**14 sites identified**





# New Flood Storage Site Selection Process

## Wetland Assessment

- Desktop wetland screening
- Identify possible size and location
- Identify possible permitting and mitigation requirements

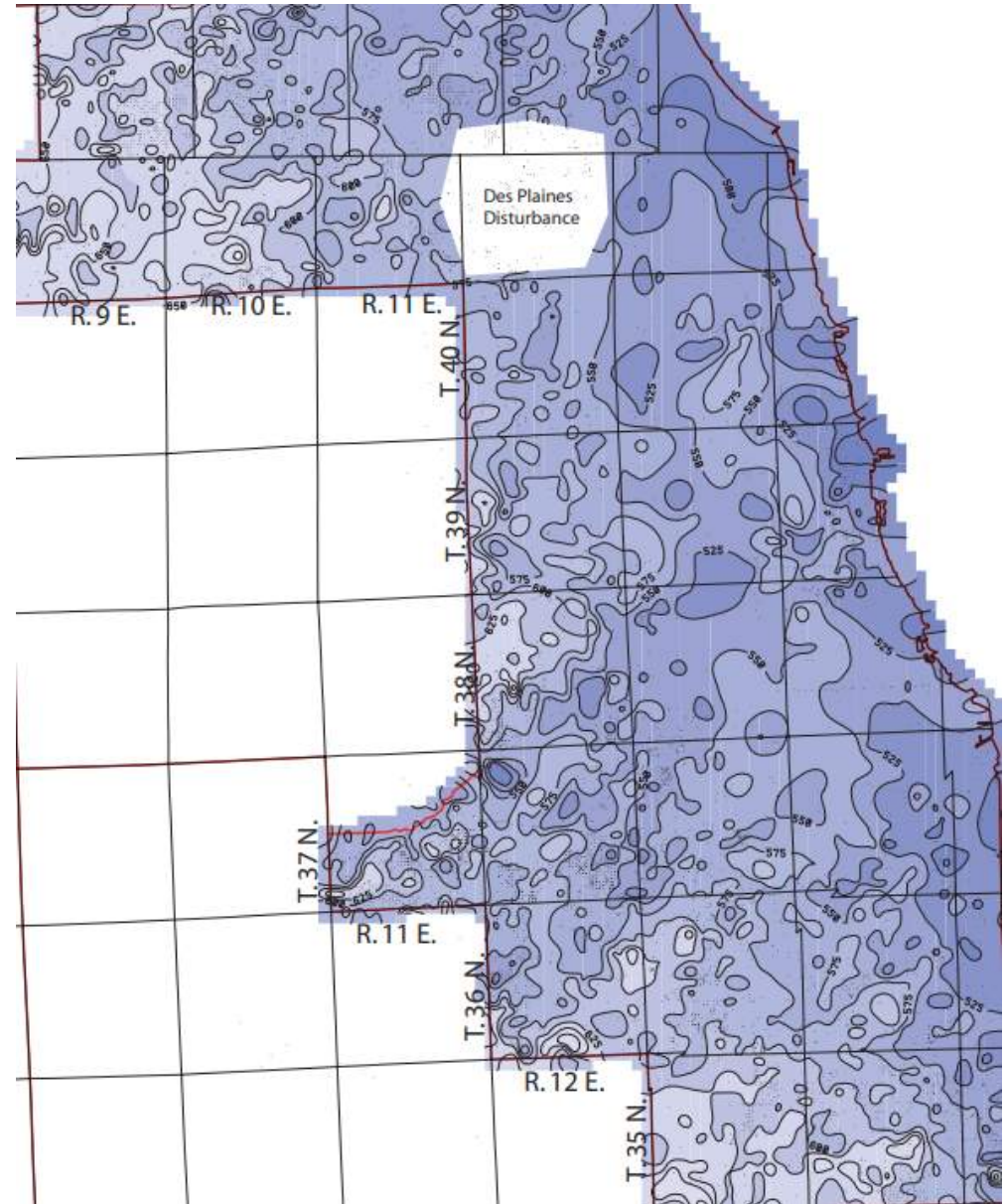




# New Flood Storage Site Selection Process

## Geoscience Assessment

- Bedrock Evaluation
- Determine possible depth of excavation without blasting
- Determine potential for groundwater impacts

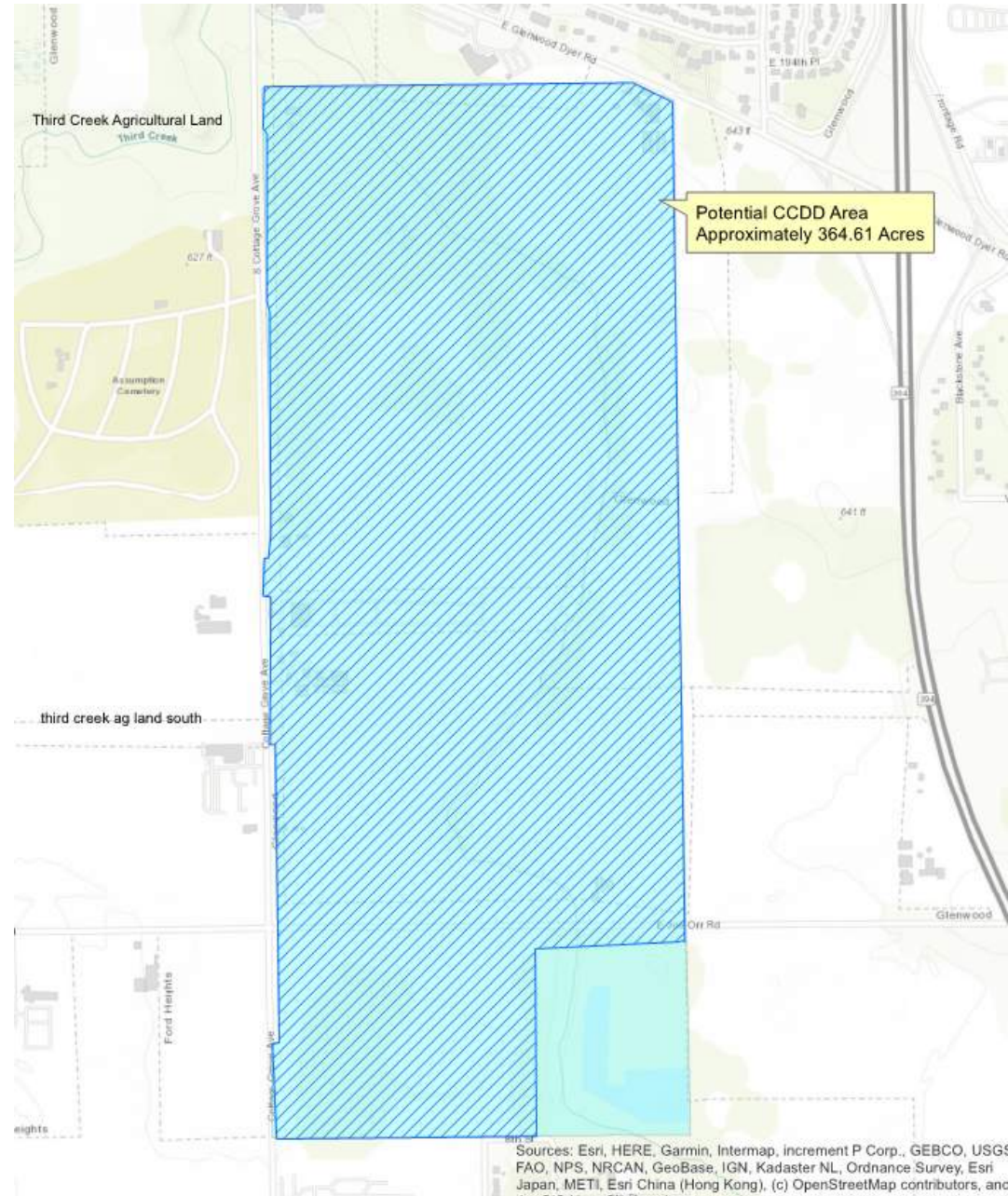




# New Flood Storage Site Selection Process

## Environmental Assessment

- CCDD screening
- Evaluation of historic land use
- Determine potential for disposal at CCDD site



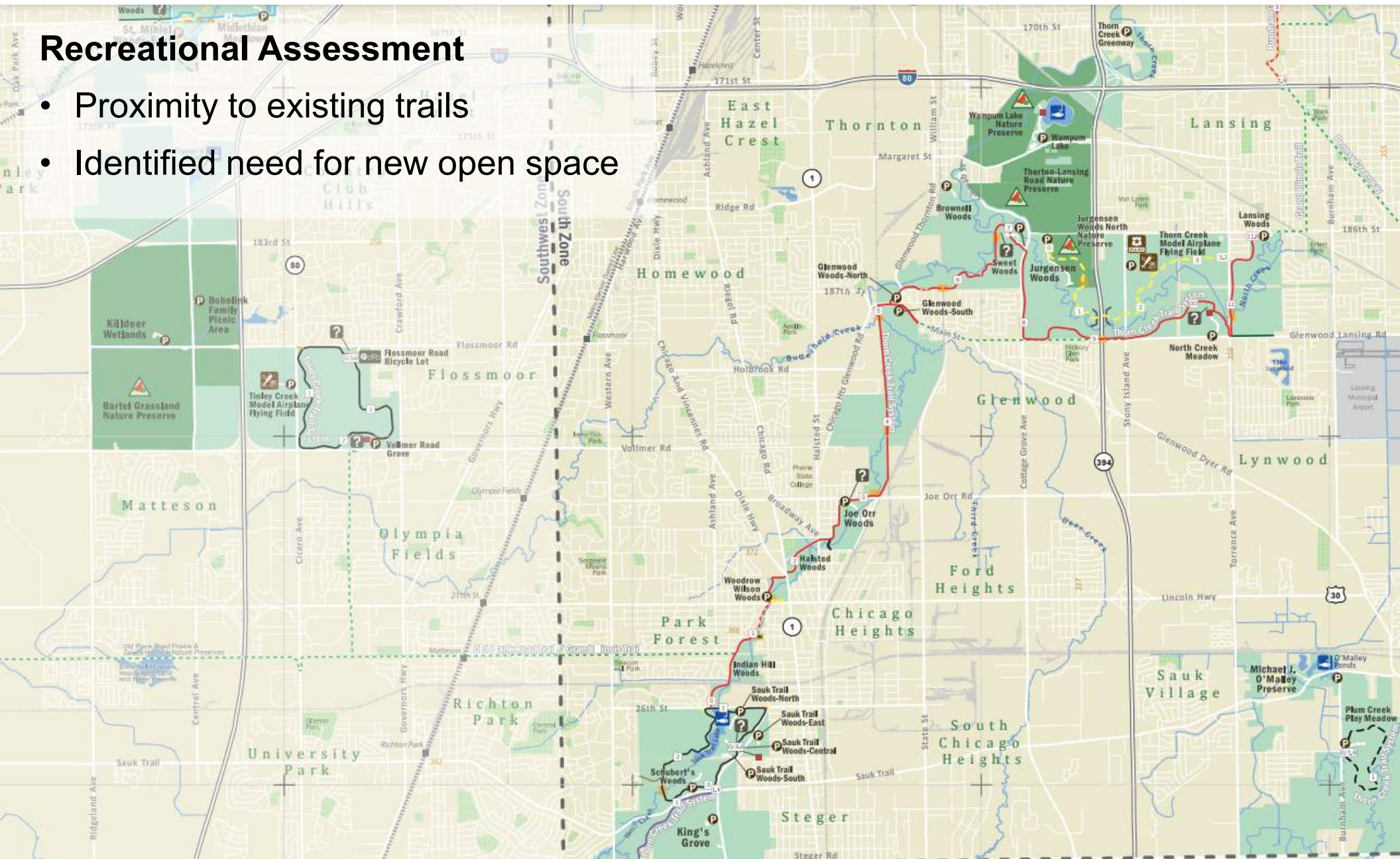




# New Flood Storage Site Selection Process

## Recreational Assessment

- Proximity to existing trails
- Identified need for new open space





# New Flood Storage Site Selection Process

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Property Owner	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Green	Yellow	Green	Yellow	Yellow	Green	Green	Green
Subwatershed	Yellow	Yellow	Yellow	Green	Green	Green	Green	Green	Green	Green	Yellow	Yellow	Green	Green
% CCDD	Yellow	Green	Green	Green	Green	Yellow	Green	Green	Yellow	Green	Orange	Green	Green	Green
% Wetlands	Green	Green	Green	Green	Orange	Yellow	Yellow	Orange	Yellow	Orange	Orange	Green	Green	Orange
% Floodplain	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Green	Green	Yellow
% Floodway	Green	Green	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Green	Yellow	Green	Green	Green	Green
Storage Vol Potential	Green	Green	Green	Green	Yellow	Green	Green	Yellow	Yellow	Yellow	Yellow	Orange	Orange	Orange
Distance to TARP	Orange	Orange	Orange	Orange	Orange	Orange	Green	Green	Orange	Orange	Orange	Green	Orange	Orange
Gravity?	Orange	Green	Orange	Green	Green	Green	Green	Green	Green	Green	Green	Green	Orange	Orange
Topo Condition	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Orange	Green
Multi-use potential	Green	Yellow	Yellow	Green	Green	Green	Green	Yellow	Yellow	Orange	Yellow	Yellow	Green	Yellow
Stakeholder Potential	Orange	Orange	Orange	Green	Green	Green	Yellow	Yellow	Green	Orange	Green	Orange	Orange	Orange
<b>Recommendation</b>	Green	Green	Yellow	Green	Green	Green	Green	Green	Orange	Orange	Yellow	Orange	Orange	Orange

→ **Seven Sites Selected to Advance to Quantitative Analysis**

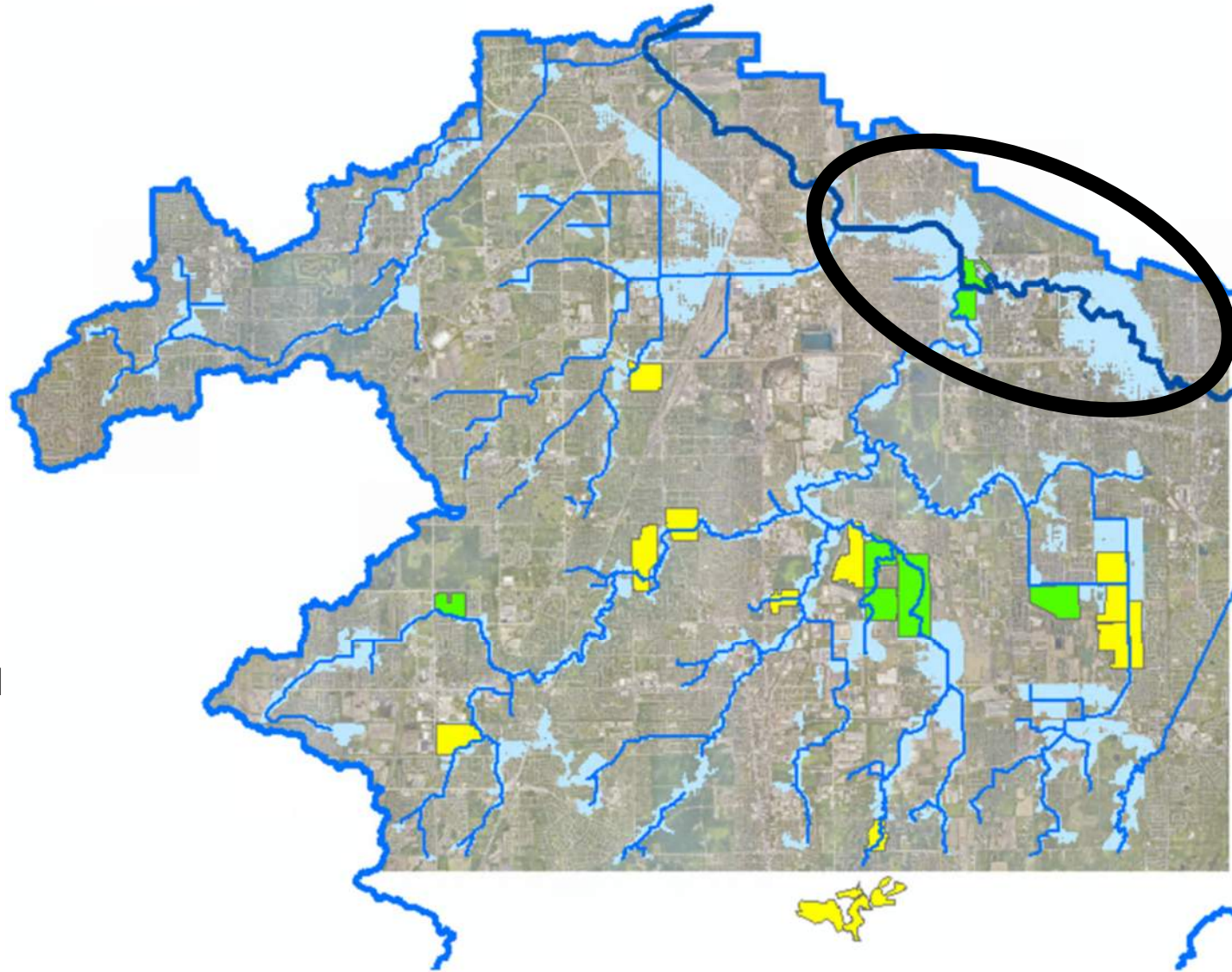




# New Flood Storage Site Selection Process

## Quantitative Assessment

- Performed hydraulic modeling of 7 sites
- Focus was benefits to Little Calumet
- Storage potential for each site
- HEC-RAS:
  - Storage individually and in combinations
  - Gravity and Pumped

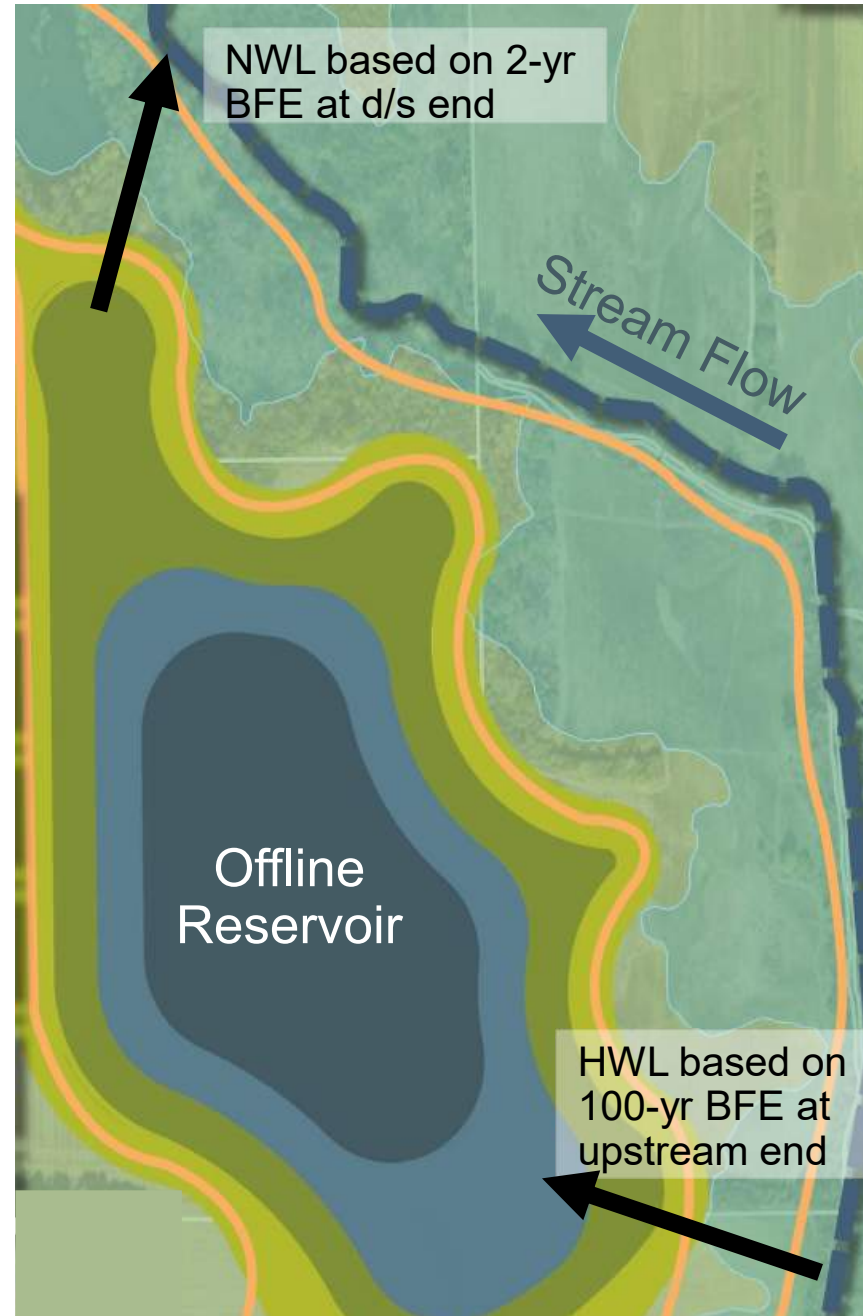




# New Flood Storage Site Selection Process

## Quantitative Assessment

- Storage potential for each site:
  - HWL: 100-yr BFE
  - Gravity: 2-yr BFE
  - Pumped: bedrock
  - Shape: considered setbacks, floodplain

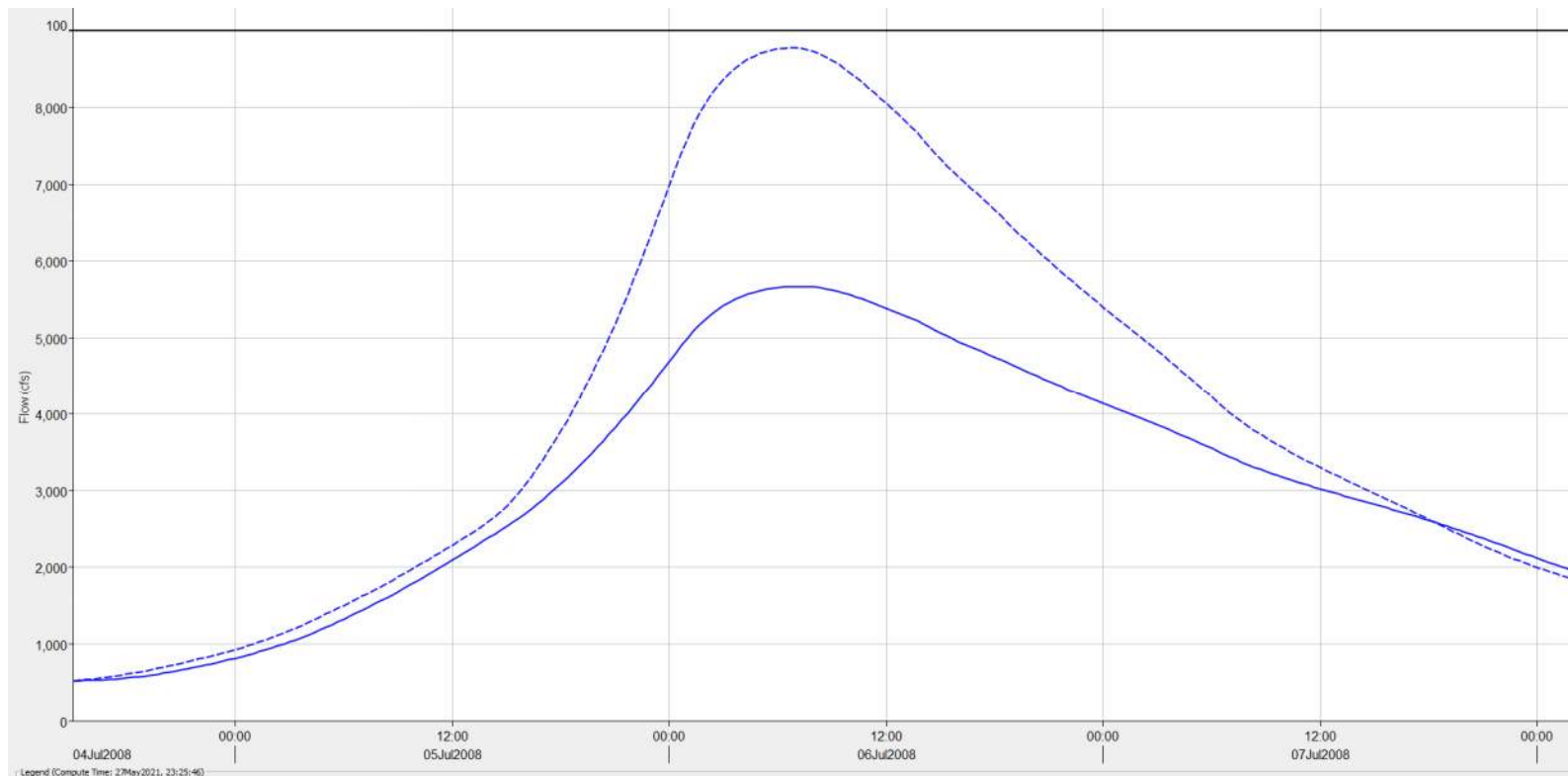




# New Flood Storage Site Selection Process

## Quantitative Assessment

- Results showed meaningful reductions in flow hydrographs with storage in place
- 100 yr BFE reduction on Little Cal varied from -0.1 ft to -1.5 ft





# New Flood Storage Site Selection Process

## Quantitative Assessment

- GIS analysis of results
- Determined structures, parcels benefitted by each alternative



### Legend

- B75\_100YR48HR\_10000ACFT\_inundation
- B75\_100YR48HR\_9000ACFT\_inundation
- B75\_100YR48HR\_8000ACFT\_inundation
- B75\_100YR48HR\_7000ACFT\_inundation
- B75\_100YR48HR\_6000ACFT\_inundation
- B75\_100YR48HR\_T\_inundation

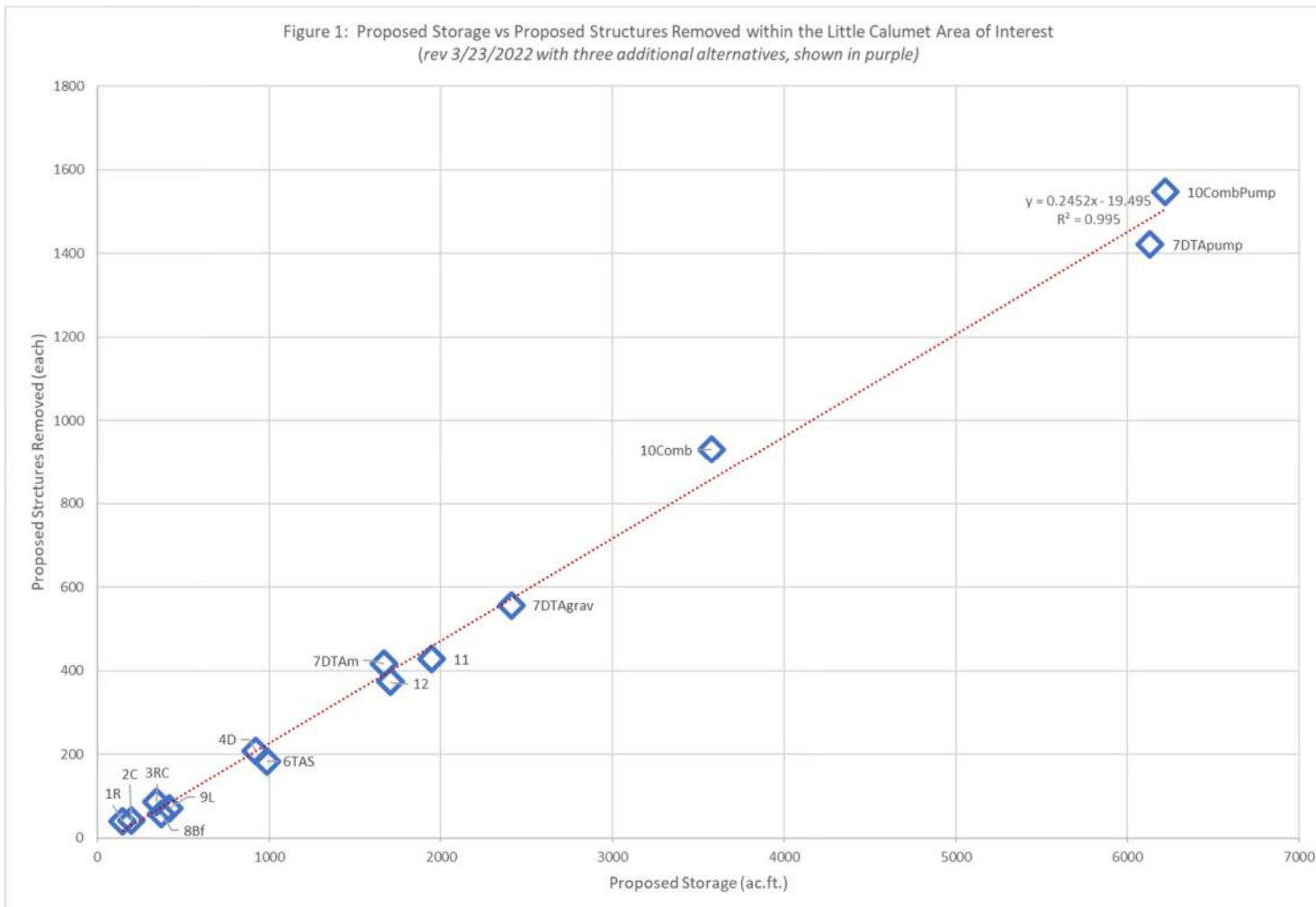




# New Flood Storage Site Selection Process

## Quantitative Assessment

- Storage versus Benefit: linear relationship

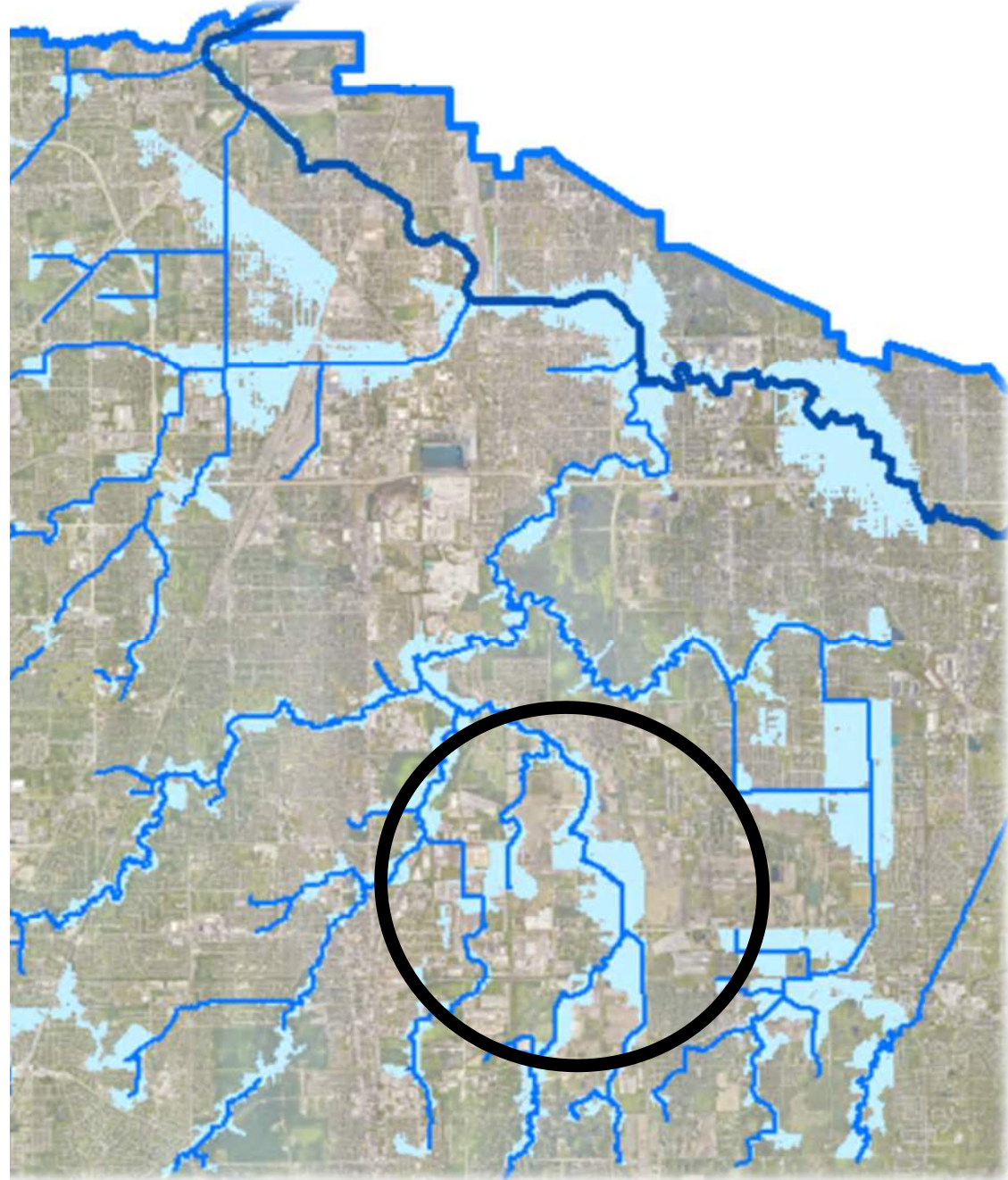




# New Flood Storage Site Selection Process

## Current Status

- Area selected to advance to feasibility planning
- Hundreds of homes and parcels removed from floodplain
- Thousands of homes benefit from lower depths, shorter durations of flooding
- IGA between stakeholders
- Grant funding secured for feasibility planning, seeking funding for design and construction







# New Flood Storage Site Selection Process



## Questions?

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