DRAINING CHICAGO
A Complicated, Ever-Changing, and Surprising Story
September 14, 2019
Welcome to Chicago
Richard Lanyon
CHICAGO AREA DRAINAGE BEFORE SETTLEMENT

DIRECTION OF FLOW

N

RIVER HERE HIGHER THAN LAKE MICHIGAN

RIVER HERE LOWER THAN LAKE MICHIGAN

SUBCONTINENTAL DIVIDE

NORTH BRANCH

DES PLAINES RIVER

SOUTH BRANCH

WEST FORK

PORTAGE CREEK

MUD LAKE

LITTLE CALUMET RIVER

CALUMET RIVER

CHICAGO RIVER

LAKE MICHIGAN

DEEP PLAINES RIVER

SUBCONTINENTAL DIVIDE

0 MILES 10
NORTHEASTERN ILLINOIS CANALS AND RIVERS
1848 TO 1899
CHICAGO POPULATION

Year: 1840, 1850, 1860, 1870, 1880, 1890, 1900, 1910, 1920, 1930, 1940

Population:
- 1840: 500000
- 1850: 1000000
- 1860: 1500000
- 1870: 2000000
- 1880: 2500000
- 1890: 3000000
- 1900: 3500000
- 1910: 4000000
- 1920: 4500000
- 1930: 5000000
- 1940: 5500000
RAISING THE STREETS BEGAN IN 1855
CHICAGO SEWERS & WATER SUPPLY 1856 TO 1871

Ellis Sylvester Chesbrough

FIGURE 2
CHICAGO 1880s

• Public water supply problems: loss of pressure and not treated
• River grossly polluted and an offensive nuisance
• 1880, Citizen Association proposes river reversal
• 1885, August flood from the Des Plaines River caused extensive damage
• 1886, public outrage leads to creation of the Drainage and Water Supply Commission
• 1887, City accepts plan to build canal to reverse river flow, state legislation introduced
• 1889, City expands and Sanitary District created
Illinois & Michigan Canal
At Lemont
South Branch of the Chicago River
FIVE STAGES OF WORK TO REVERSE THE FLOW OF THE CHICAGO RIVER
1892 to 1899
Des Plaines River Spillway and Levee
Construction Camp - Levee - Des Plaines River
Steam Shovel Excavating Overburden
500 Pound Dynamite Blast
Manually Loading Broken Rock
into a Hopper for Hoisting and Transport
By a Cableway
To the Spoil Pile
Letting Water into the Excavated Canal near Kedzie Avenue on January 2, 1900
Water Rushing over the Lockport Dam
Permanent flow reversal began January 17, 1900
...and one outlet at Lockport

77-mile network of canals with three inlets on lakefront...
70% of the water passing Lockport is water reclamation plant effluent.
OCTOBER 1914
LOOKING WEST TOWARD SAG BRIDGE

Original Calumet-Sag Channel
CANAL BUILDING TIMELINE

• 1848 Illinois & Michigan Canal opens
• 1900 Sanitary & Ship Canal opens
• 1907 Sanitary & Ship Canal extended and North Branch channelized
• 1916 South Branch deepened and widened
• 1917 North Shore Channel completed
• 1922 Original Calumet-Sag Channel completed
• 1933 Illinois Waterway opened, replaces I&M Canal
• 1965 Calumet-Sag Channel and Little Calumet River widened and new lock completed

• 65 years to reach current capacity, no capacity increases since 1965
ELIMINATING NORTH SIDE SEWER DISCHARGES TO THE LAKE BY 1907
ELIMINATING SOUTH SIDE SEWER DISCHARGES TO THE LAKE BY 1907
Intercepting Sewer Network and Water Reclamation Plants

Plant construction:
- 1920 to 1940, three large plants in Chicago
- 1970 to 1985, four smaller suburban plants

555 miles of intercepting sewers convey an average of 1.3 billion gallons of sewage and stormwater each day to seven water reclamation plants.
COMBINED SEWER PROBLEM

Before

Deep Tunnel
Pre-1985

Dry Weather Flow

Wet Weather Overflow

Treated Effluent

Water Reclamation Plant

Combined Sewer

Overflow

M.W.R.D. Interceptor

Rock Stratum
(Dolomite Limestone)

Niagara

Galena-Platteville
Tunnels and reservoirs will capture all combined stormwater and eliminate all overflows, except for the few very large storms each year.
<table>
<thead>
<tr>
<th>System</th>
<th>Area Sq. Mi.</th>
<th>Tunnel Length Miles</th>
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<tbody>
<tr>
<td>Calumet</td>
<td>91</td>
<td>36.7</td>
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<tr>
<td>Des Plaines</td>
<td>35</td>
<td>25.6</td>
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<tr>
<td>Mainstream</td>
<td>220</td>
<td>40.5</td>
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<tr>
<td>Upper Des Plaines</td>
<td>14</td>
<td>6.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>360</strong></td>
<td><strong>109.4</strong></td>
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Figure 45: Diagram of a drop shaft system including flood stage, normal water level, drop shaft, outfall, open grate, vapor, street surface, tide gate, municipal, sluice gate, connecting sewer, connecting sewer, water flow, separating wall, aspirating vent, and deep tunnel.
Deep Tunnel

Drop Shaft boot
Majewski Reservoir
400 million gallons

Kirie Water Reclamation Plant
capacity = 110 million gallons per day
Thornton Reservoir

7 billion gallons
Capacity = 430 million gallons per day

CALUMET WATER RECLAMATION PLANT
McCook Reservoir, Stage 1, 3.5 billion gallons
McCook Reservoir Mainstream Tunnel Portal
McCook Reservoir, Stages 1 & 2, 10 billion gallons
McCook Reservoir, first total fill event, February 21, 2018
Capacity = 1.44 billion gallons per day
Thank You for loving Lake Michigan