Chicago Area Waterway System: An Overview of the New Recreational Use Standards and Attainability Challenges

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Chicago Area Waterway System

78 miles of man-made canals and highly altered natural river reaches.

CAWS is the receiving water for three large WRPs that currently discharge secondary treated effluents.

CAWS supports growing volume of recreational activities (e.g., boating, fishing, streamside recreation) and provides aquatic habitat.
The North Shore Channel – 7.7 miles long, 90 ft wide, 5 to 10 ft deep, steep earthen side slopes

North Branch Chicago River
7.7 miles long, 90 to 300 ft wide, 10 to 15 feet deep, steep earthen slopes and vertical dock walls
Chicago River- 1.5 miles long, 200 to 400 ft wide, 20 to 26 ft deep, vertical side walls

South Branch Chicago River 4.5 miles long, 200 to 250 ft wide, 15 to 20 ft deep, vertical dock walls throughout
Chicago Sanitary & Ship Canal - 31.1 mile long man-made, 160 to 300 ft wide, 20 to 27 ft deep, east bank is a vertical concrete wall, west bank varies from vertical dock wall to a steep rockfill embankment.
Little Calumet River: 6.9 miles long, 250 to 350 ft wide, 12 ft deep, vertical dock walls and earthen side slopes

Calumet Sag Channel: 16.2 miles long, 225 ft wide, 10 feet deep, earthen slopes and vertical north walls
Prior to UAA CAWS consisted of two recreational use designations:

- **General Use**
  - North Shore Channel (Lake Michigan to North Side WRP)
  - Chicago River
  - Calumet River (Lake Michigan to O’ Brien Lock and Dam)

- **Secondary Contact**
  - All Remaining Reaches
CAWS Recreational Use Designations

- CAWS UAA Final Order of IPCB (Incorporating USEPA Review)
  - General Use Reaches Remain Same
    - North Shore Channel (Lake Michigan to North Side WRP)*
    - Calumet River (Lake Michigan to O’ Brien Lock & Dam)*
  - Primary Contact Designation
    - North Shore Channel South of North Side WRP
    - North Branch Chicago River/North Branch Canal
    - Chicago River
    - South Branch Chicago River
    - Little Calumet River (Confluence with Calumet and Grand Calumet Rivers to Calumet Sag Channel)
    - Calumet Sag Channel
CAWS Recreational Use Designations
(Post UAA Cont’d)

– Incidental Contact Designation

• Bubbly Creek
• Chicago Sanitary & Ship Canal (From S. Branch Chicago River to Confluence with Cal Sag Channel)
• Chicago Sanitary & Ship Canal (From Confluence with Cal Sag Channel to Des Plaines River)*
• Lake Calumet and its Connecting Channel
• Grand Calumet River
• Calumet River (O’ Brien Lock & Dam to Confluence with Little Calumet and Grand Calumet Rivers)
CAWS Recreational Use Standards

- **Secondary Contact** – No microbial criteria

- **General Use:**
  - 30-day geometric mean Fecal Coliform <200 cfu/100 mL
  - Not more than 10% of samples >400 cfu/100 mL

- **Primary Contact:**
  - Effluent disinfection requirement (i.e. Fecal Coliform limits identical to General Use)
  - Water Quality Standard Likely same as General Use

- **Incidental Contact** – No microbial criteria
Proposed Recreational Uses

Primary Contact
2nd Order June 16, 2011

Incidental Contact
is where the probability of ingestion of water is unlikely

Non-Contact
is where human contact with water is unlikely

Non-Recreational
is where no recreational boating is likely
Sources of Contamination

**Caution**

*Escherichia coli (E. coli)* is a fecal coliform bacterium that is used as a water quality indicator. High numbers of *E. coli* suggest the presence of other, more harmful, bacteria. During and shortly after days of heavy rainfall and/or high winds, this location has had high counts of *E. coli* compared to the level set by the Michigan Environmental Health Association.

**Water contact may be harmful during and/or after recent rainfall and windy days**

Bird feces appear to be a major factor in the bacteria problem at this location. Do not feed ducks, swans, geese or gulls! This will reduce the human threat by limiting waterfowl concentrations near water used by Park visitors.

**Twenty-First Annual NRDC Report, June 2011**

**Reported Sources of Beach water Contamination Statewide (number of closing/advisory days)**

- 337 (66%) unknown sources of contamination
- 107 (21%) agriculture
- 60 (12%) combined sewer overflows
- 4 (1%) storm water runoff
Sources of Bacteria

- Bacteria associated with fecal origins are present in the environment and are not unique to CAWS (USGS, 2010)
WRP EFFLUENT DISINFECTION

• North Side WRP
  – Receiving water: North Shore Channel
  – Technology Selection: Ultraviolet Irradiation
  – Disinfection Operational Date: March 1, 2016

• Calumet WRP
  – Receiving water: Little Calumet River
  – Technology Selection: Chlorination/Dechlorination
  – Disinfection Operational Date: Fall, 2015
Challenges of the System: Impervious Surfaces
Chicago Area Waterway System Combined Sewer Overflows

Legend:
- Chicago Combined Sewer Overflow
- MWRA Combined Sewer Overflow
- Other Combined Sewer Overflow

North Branch Chicago River (NBCR)
- From the confluence with the NSC to the confluence with the Chicago River

North Shore Channel (NSC)

South Branch of the Chicago River (SCBR) & South Fork (Bubbly Creek)

Chicago Sanitary and Ship Canal (CSSC)

Calumet–Sag Channel (CSC)
- From the confluence with the Grand Calumet River to the Calumet/Sag Channel

Calumet River (CR)
- From O'Brian Lock and Dam to Lake Michigan

Lake Calumet

Other locations and features are indicated on the map.
TARP Capacity & Completion Schedule

CSO Storage Volume

- Tunnel Storage
- Reservoir Storage
MWRD FECAL COLIFORM (FC) SURVEILLENCE STUDY OF CAWS

- MWRDGC R&D Report No. 2007-79

- Rainfall occurs ~40% of days in a calendar year and effects on Fecal coliform persist for at least two days

- FC was >400 cfu/100 mL Upstream of North Side WRP 88, 86, and 45% of the time during heavy rain (~0.5 in), light rain (0.1 in) or dry periods

- FC was >400 cfu/100 mL in North Branch Chicago River Upstream of CAWS 97, 93, and 77% of the time during heavy rain, light rain or dry periods

- FC was >400 cfu/100 mL Upstream of Calumet WRP 53, 15, and 8% of the time during heavy rain (~0.7 in), light rain (~0.3 in) or dry periods

- FC was >400 cfu/100 mL in the Little Calumet River Upstream of the CAWS 95, 90, and 60% of the time during heavy rain, light rain or dry periods
CAWS POST-TARP IMPROVEMENTS

• Sediment
• Stormwater Inflow/Runoff
• Tributaries
• Wildlife
• Primary Contact Recreation Safety