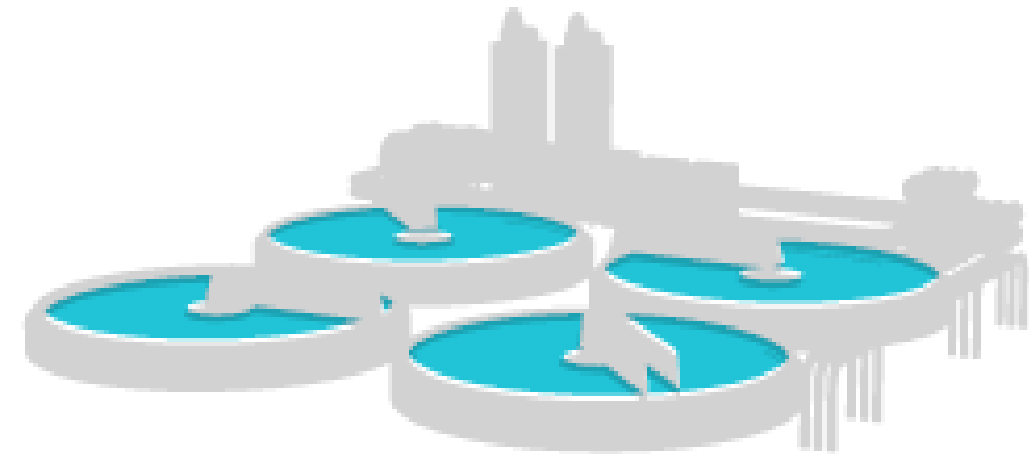


2021 Point Source Nutrient Loads



Illinois Nutrient Loss Reduction Strategy Workshop
November 1, 2022
Trevor Sample
Illinois EPA



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NUTRIENT LOSS
REDUCTION STRATEGY

2021 Point Source Nutrient Loads

- Total Phosphorus and Total Nitrogen Loads were calculated for 2021
- Major Municipal Facilities
 - Discharge Monitoring Report data and data from facilities
- Major and Minor Industrial facilities
 - USEPA Pollutant Loading tool
- Minor Municipal Facilities
 - Updated loads from 2011 estimates.



Major Municipal Point Source Facilities

- Major facility= Design Average Flow ≥ 1 million gallons per day
- 211 major municipal facilities
- Used Data from Monthly Discharge Monitoring Reports (DMR)
 - Wastewater facilities required to submit monthly effluent sampling data to Illinois EPA. Most major municipal facilities are required to submit total nitrogen and total phosphorus concentrations.
- Facilities that are not required to submit nutrient concentration data were contacted and voluntarily submitted internal data. Illinois Association of Wastewater Agencies also submitted data for some facilities not required to submit DMR data.



Major Municipal Point Source Facilities

- Monthly Flow (MGD) and total phosphorus, total nitrogen concentrations (mg/l) were used to calculate monthly loads for each facility. Monthly loads were added to calculate annual loads.
- *Monthly Avg Flow Value (MGD) *Monthly Avg Nutrient Concentration (mg/l) *8.34 (conversion factor) *30.417 (avg days in a month)*
- Monthly flow and concentration values were screened for outliers. Facilities are contacted to verify or correct suspicious data.



Industrial Wastewater Treatment Facilities

- USEPA Water Pollutant Loading Tool was used to calculate annual nutrient loads
 - Uses DMR data to auto-calculate annual loads
 - 19 Majors, 298 minors with nitrogen loads
 - 12 Majors, 49 minors with phosphorus loads
- DMR data for facilities with large loads were reviewed to check accuracy of tool.
- Facilities with large changes in loads from the previous year were also investigated



2021 Statewide Point Source Total Phosphorus Loads*

| Point Source Sector | Total Phosphorus Load (million lb/yr) |
|----------------------------------|--|
| 2011 Baseline | 18.1 |
| 2021 Total Phosphorus Load | 13.6 |
| > 211 Major Municipals | 10.7 |
| >Minor Municipals | 2.4 (previous estimate)* |
| >Major and Minor Industrials | 0.5 |
| Reductions from 2011 Baseline | 4.5 (24.9%) |

Minor Municipal Facilities

- Previous estimates for minor municipal facilities were made by the Science Team at University of Illinois during the development of the Science Assessment in 2013.
- Based on available 2011 flow data and estimates for concentrations
- Total phosphorus load was estimated at 2.4 million pounds based on spreadsheets provided by U of I.
- For 2021 point source loads, Illinois EPA updated this estimate
 - Used 2021 DMR monthly flow data
 - Used a default concentration of 4 mg/l
 - This results in a load of **1.3 million pounds**.



Updated 2021 Statewide Point Source Total Phosphorus Loads

| Point Source Sector | Total Phosphorus Load (million lb/yr) |
|----------------------------------|--|
| 2011 Baseline | 18.1 |
| 2021 Total Phosphorus Load | 13.6 |
| > 211 Major Municipals | 10.7 |
| >Minor Municipals | 1.3 (updated estimate) |
| >Major and Minor Industrials | 0.5 |
| Reductions from 2011 Baseline | 5.5 (30.6%) |

Compared to 16% TP reduction from baseline in 2020

Major Municipal Facilities

By the numbers...

Total Phosphorus Concentrations

2020

90 Facilities

annual average total phosphorus
concentration of **1 mg/L** or less

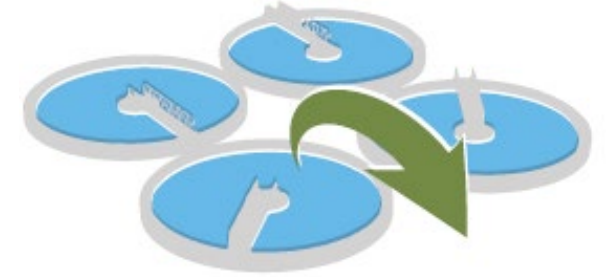
31 Facilities ≤ 0.5 mg/L

2021

94 Facilities

annual average total phosphorus
concentration of **1 mg/L** or less

39 Facilities ≤ 0.5 mg/L



2020-2021 TP Load changes

97 facilities increase TP loads= 456,500 lbs

114 facilities decrease TP loads= 2.0 M lbs

=net decrease of 1.5 M lbs

Major Municipal Flows

2020: 779 billion gallons

2021: 703 billion gallons

9.75% decrease



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2021 Top 10 Major Municipal Facilities Total Phosphorus Loads

| NPDES ID | Facility Name | 2021 TP Annual Loads (lbs) |
|-----------|-----------------------------------|----------------------------|
| IL0028061 | MWRDGC CALUMET | 2,553,033 |
| IL0028321 | SANITARY DISTRICT OF DECATUR | 1,601,329 |
| IL0028053 | MWRDGC STICKNEY* | 1,277,750 |
| IL0028088 | MWRDGC TERRENCE J O'BRIEN | 1,036,758 |
| IL0027201 | FOUR RIVERS SANITATION AUTHORITY | 235,553 |
| IL0036340 | MWRDGC-JOHN E. EGAN | 221,709 |
| IL0034061 | NAPERVILLE-SPRINGBROOK WRC | 181,804 |
| IL0028657 | FOX RIVER WRD - ALBIN D PAGORSKI* | 147,477 |
| IL0027731 | BLOOMINGTON NORMAL WRD -WEST | 127,637 |
| IL0027723 | THORN CREEK BASIN SD | 123,564 |
| TOTAL | | 7,506,614 |

Top 10 facilities comprise 60% of the statewide point source phosphorus load.

*1 mg/L TP limit in effect

Note: 110 facilities discharged less than 10,000 lbs TP in 2021



Metropolitan Water Reclamation District of Greater Chicago

- Service area of 882 square miles including city of Chicago and 128 suburban communities in Cook County
 - 10.35 million people per day
- Operate seven wastewater treatment facilities
 - Stickney, Calumet, O'Brien, Egan, Kirie, Lemont, Hanover Park
 - Combined, contributed 42% of statewide point source phosphorus load in 2021



MWRDGC Annual Total Phosphorus Loads

| NPDES | Facility Name | 2011 | 2018 | 2019 | 2020 | 2021 |
|---------------------------------|---------------|-----------|-----------|-----------|-----------|------------------|
| IL0028053 | Stickney | 2,351,312 | 707,230 | 2,164,828 | 2,435,218 | 1,277,750 |
| IL0028061 | Calumet | 2,450,714 | 1,990,902 | 2,191,160 | 2,569,259 | 2,553,033 |
| IL0028088 | O'Brien | 971,083 | 931,333 | 947,758 | 978,314 | 1,036,758 |
| IL0047741 | Kirie | 141,985 | 40,012 | 52,639 | 51,584 | 58,435 |
| IL0036340 | Egan | 233,759 | 209,074 | 219,942 | 210,437 | 221,709 |
| IL0036137 | Hanover Park | 75,920 | 72,106 | 69,306 | 58,396 | 67,332 |
| IL0028070 | Lemont | 18,469 | 18,797 | 18,537 | 17,940 | 22,730 |
| | Total | 6,243,242 | 3,969,454 | 5,664,170 | 6,321,148 | 5,237,748 |
| % of Total Point Source TP Load | | | 29 | 38 | 42 | 42 |



2021 Statewide Total Nitrogen Loads

| Point Source Sector | Total Nitrogen Load (million lb/yr) |
|----------------------------------|--|
| 2011 Baseline | 87.3 |
| 2021 Total Nitrogen | 76.6 |
| > 211 Major Municipals | 71.4 |
| >Minor Municipals | 3.0 |
| >Major and Minor Industrials | 2.2 |
| Reductions from 2011 Baseline | 10.7 (12.2%) |

20 facilities have TN reduction goals in their permit

Compared to 4.7% reduction compared to baseline in 2020



ILLINOIS
NUTRIENT LOSS
REDUCTION STRATEGY

Nutrient Assessment and Reduction Plans (NARPs)

- Special condition added to NPDES permits for major municipal facilities that meet criteria
 - Discharge to a water body impaired for a phosphorus-related impairment
 - Discharge to a water body at risk for eutrophication
- NARP can be completed by an individual facility or multiple facilities in the same watershed.
- A NARP will
 - Determine phosphorus target levels
 - Identify phosphorus reductions by point and nonpoint sources
 - Include a schedule for implementation
 - May include water quality trading



Nutrient Assessment and Reduction Plans (NARPs)

- Currently, **66** individual facilities are developing NARPs.
- **86** facilities are developing NARPs as part of a watershed group.
- It was determined that **57** facilities do not meet the criteria to develop a NARP.
- **5** facilities are still to be determined.
- Most NARPs are due in December 2023 or 2024.



Nutrient Assessment and Reduction Plans (NARPs)

- Illinois EPA developed an online interactive map showing the locations of facilities and their NARP status:
- <https://illinois-epa.maps.arcgis.com/home/item.html?id=dd82c86b7325412f823f623b51fe6db9>

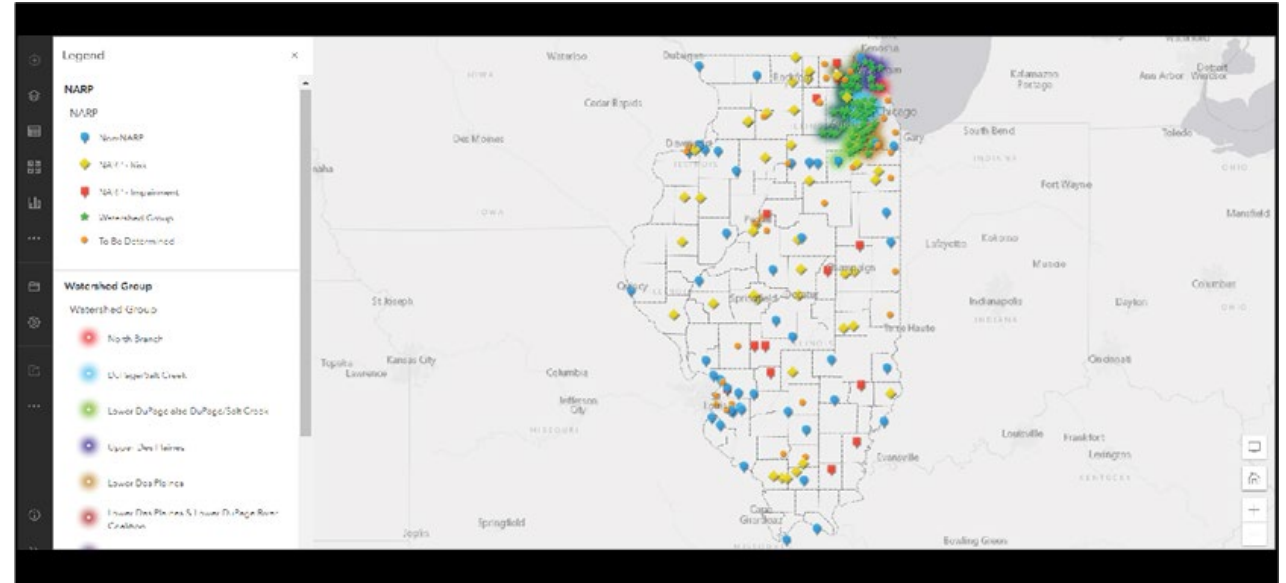


Figure 5.2. Screenshot of the NARP map website

Summary

- Point Source TP loads decreased 30.6% compared to baseline.
- Point Source TN loads decreased 12.2% compared to baseline.
- Total Phosphorus limits continue to be included in permits for Major Municipal facilities.
- Optimization, Feasibility, and NARP studies continue to be developed.
- Expect to see long term reductions in total phosphorus from the point source sector.
 - Most major municipals will need to meet 0.5 mg/L TP between 2025-2035 depending on treatment method.

