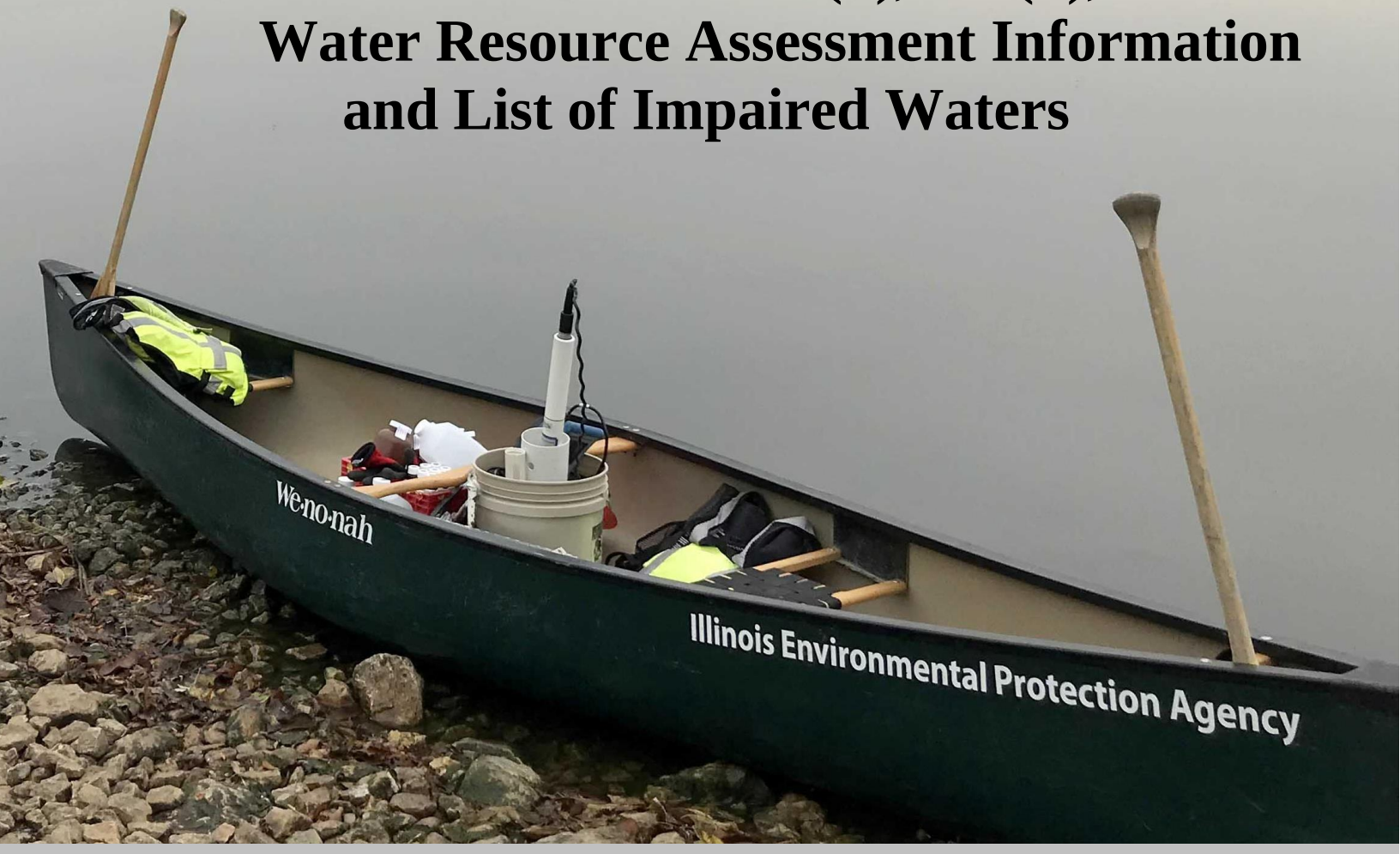
Illinois Integrated Water Quality Report and Section 303(d) List, 2020/2022

June 2022

Clean Water Act Sections 303(d), 305(b), and 314 Water Resource Assessment Information and List of Impaired Waters



Illinois Environmental Protection Agency
Bureau of Water

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EXECUTIVE SUMMARY

The 2020/2022 Integrated Report format is based on federal guidance for meeting the requirements of Sections 305(b), 303(d) and 314 of the Clean Water Act. The basic purpose of this report is to provide information to the federal government and the citizens of Illinois on the condition of surface water in the state. This information is provided in detail in Appendix A and summarized in the executive summary.

Statewide Summary of Designated Use Support

Streams

For reporting cycle 2020/2022, 18,508 miles (15.5%) of the total 119,299 miles of streams in Illinois have been assessed for attainment of at least one designated use. For each of many stream segments throughout the state, Illinois EPA determines attainment of applicable designated uses by analyzing various information. When sufficient data are available, each designated use in each segment is assessed as attained (i.e., "Fully Supporting") or not attained (i.e., "Not Supporting"). The term "impaired" refers to a condition in which at least one designated use is not attained.

The percent of Illinois stream miles assessed as Fully Supporting and Not Supporting by designated use in 2020/2022 reporting cycle is listed in Table ES-1. The major potential causes of impairment in Illinois streams (Table ES-2) are: fecal coliform bacteria impairing Primary Contact; mercury and polychlorinated biphenyls (PCBs) in fish tissue impairing Fish Consumption; low dissolved oxygen, physical-habitat alterations, high phosphorus, excessive siltation, and high total suspended solids impairing Aquatic Life; and atrazine, iron, simazine, and nitrate impairing Public and Food Processing Water. Specific assessment results for streams are shown in Appendix A-1.

Table ES-1. Individual Use Support Summary for Streams, Reporting Cycle 2020/2022

Designated Use	Miles Assessed	Assessed Miles (%)	Fully Supporting Miles (%)	Not Supporting Miles (%)	Miles Not Assessed (%)
Aesthetic Quality	14,430	12.1	97.3	2.7	87.9
Aquatic Life	18,242	15.3	59.5	40.5	84.7
Indigenous Aquatic Life	89	100	38.4	61.6	0
Primary Contact	4,755	4.0	14.7	85.3	96
Public and Food Processing Water Supply	884	100	59.7	40.3	0
Fish Consumption	4,871	4.1	0	100	95.9

Note: Numbers and percentages may not add up due to slight rounding errors.

Table ES-2. Potential Causes of Use Impairments in Streams, Reporting Cycle 2020/2022

Potential Cause of Impairment	Stream Miles Impaired
Oxygen, Dissolved	2,975
Mercury	4,328
Fecal Coliform	4,056
Polychlorinated biphenyls	3,365
Alteration in stream-side or littoral vegetative covers	2,006
Phosphorus (Total)	1,583
Loss of Instream Cover	1,331
Sedimentation/Siltation	1,106
Changes in Stream Depth and Velocity Patterns	724
Total Suspended Solids (TSS)	698
Other flow regime alterations	743
Cause Unknown	2,034
pH	282
Iron	393
Manganese	166
Chloride	125
Aquatic Algae	490
Atrazine	195
Dioxin (including 2,3,7,8-TCDD)	168
Fish-Passage Barrier	41
Aldrin	2,541

Lakes

A total of 428 lakes were assessed for at least one of the six uses: Aquatic Life, Fish Consumption, Primary Contact, Public and Food Processing Water Supply, Aesthetic Quality, and Indigenous Aquatic Life (Table ES-3).

For reporting cycle 2020/2022, a total of 159,510 lake acres were assessed for attainment of at least one designated use. This represents 49.4% percent of the total lake and pond acreage with at least one designated use (322,896.2) in the state. The percent of Illinois lakes and lake acres assessed as Fully Supporting and Not Supporting by designated use in 2020/2022 reporting cycle are listed in Table ES-4. Overall, the percent of lake acres assessed out of those with at least one designated use has remained relatively consistent over the last ten cycles – about 46 to 49 percent. As with streams, each designated use in a lake is assessed as attained or not attained. Specific assessment results for lakes are shown in Appendix A-2.

Table ES-3. Individual Use Support Summary for Lakes, Reporting Cycle 2020/2022.

Designated Use[1]	Number of Lakes Assessed	Percent of Statewide Lakes Assessed	Percent of Assessed Lakes	
			Fully Supporting	Not Supporting
Aesthetic Quality	397	0.4	16.6	83.4
Aquatic Life	395	0.4	90.4	9.6
Fish Consumption	146	0.2	0.7	99.3
Indigenous Aquatic Life	1	100.0	100.0	0.0
Primary Contact	16	0.0	43.8	56.2
Public and Food Processing Water Supply	59	99.7	67.8	32.3

Note: Numbers and percentages may not add up due to slight rounding errors.

1. Statewide, Illinois has 91,456 lakes and ponds designated for general uses, one lake designated for Indigenous Aquatic Life Use, and 59 lakes designated for Public and Food Processing Water Supply Use.

Table ES-4. Area of Illinois Lakes in Acres Assessed as Fully Supporting and Not Supporting, Reporting Cycle 2020/2022

Designated Use[1]	Statewide Acres Designated[1]	Acres Assessed	Percent of Assessed Acres	
			Fully Supporting	Not Supporting
Aesthetic Quality	322,896	146,594	10.2	89.8
Aquatic Life	321,296	146,767	92.0	8.0
Fish Consumption	322,896	131,455	2.0	98.0
Indigenous Aquatic Life	1,600	1,600	100	0.
Primary Contact	321,296	2,404	45.4	54.6
Public and Food Processing Water Supply	74,243	74,015	89.6	10.4

The major potential causes of lake impairment (Table ES-5) are: phosphorus (total), total suspended solids, and aquatic algae impairing Aesthetic Quality; phosphorus (total), dissolved oxygen, and total suspended solids impairing Aquatic Life; atrazine, nitrate, simazine, and manganese impairing Public and Food Processing Water Supply; and, mercury and polychlorinated biphenyls (PCBs) in fish tissue impairing Fish Consumption.

Table ES-5. Potential Causes of Use Impairments of Lakes, Reporting Cycle 2020/2022

Potential Cause of Impairment	Impaired Lake Area (Acre)
Phosphorus (Total)	130,147
Mercury	118,386
Total Suspended Solids (TSS)	56,539
Polychlorinated biphenyls	28,865
Aquatic Algae	19,030
Oxygen, Dissolved	7,777
Aquatic Plants (Macrophytes)	6,789
Cause Unknown	6,747
Chlordane	4,220
pH	1,597
Sedimentation/Siltation	4,246
Silver	4,194
Aldrin	19,942
Nitrogen, Nitrate	3,072
Turbidity	1,531
Simazine	1,222
Terbufos	0
Manganese	1,215
Fecal Coliform	1,312
Nonnative Fish, Shellfish, or Zooplankton	634
Atrazine	3,277
Cadmium	524
Endrin	19,921
Zinc	524
Nickel	325
Fluoride	172
Hexachlorobenzene	172
Non-Native Aquatic Plants	85.9
Odor	35
Color	35
Debris/Floatables/Trash	35
Total Dissolved Solids	22
Copper	0

The trophic status of Illinois lakes in reporting cycle 2020/2022 is listed in Table ES-6.

Table ES-6. Trophic Status of Illinois Lakes, Reporting Cycle 2020/2022

Trophic Status	Number of Lakes	Lake Area (Acre)
Hypereutrophic (TSI ≥70)	135	68,308
Eutrophic (TSI ≥50 & <70)	299	79,726
Mesotrophic (TSI ≥40 & <50)	67	8,144
Oligotrophic (TSI <40)	13	424
Unknown	197	166,296
Total:	711	322,896

Lake Michigan

The State of Illinois has jurisdiction over and assesses the quality of three Lake Michigan water types: Lake Michigan Open Waters, Lake Michigan Shoreline, and Lake Michigan Harbors, all bordering Cook and Lake Counties in the northeastern corner of the state. Of the total 1,526 square miles of Lake Michigan open waters in Illinois jurisdiction, only 196 square miles were assessed. All 196 square miles were rated as Fully Supporting for Aquatic Life, Primary Contact, Aesthetic Quality, and Public and Food Processing Water Supply use. However, the Illinois portion of Lake Michigan is assessed as Not Supporting for Fish Consumption due to contamination primarily from polychlorinated biphenyls and mercury. In addition, 64 miles of Lake Michigan shoreline in Illinois were assessed as Not Supporting for Primary Contact and Fish Consumption due to contamination from *E. coli* bacteria, polychlorinated biphenyls, and mercury.

The summaries of Lake Michigan attainment assessment results for harbors, open waters, and shoreline are in Table ES-7.

Table ES- 7. Individual Use-Support Summary for Lake Michigan Basin-Waters, Reporting Cycle 2020/2022.

Lake Michigan Harbors (Square Miles)

Designated Use[1]	Total Size	Total Assessed		Size Fully Supporting	Size Not Supporting
		Size	%		
Aesthetic Quality	2.15	2.15	100	2.14	0
Aquatic Life	2.15	2.15	100	2.14	0
Fish Consumption	2.14	0.34	15.9	0	0.34
Primary Contact	2.14	0.91	42.5	0.91	0

Lake Michigan Open Water (Square Miles)

Designated Use[1]	Total Size	Total Assessed		Size Fully Supporting	Size Not Supporting	Size Not Assessed
		Size	%			
Aesthetic Quality	1,526	196	12.8	196	0	1,330
Aquatic Life	1,526	196	12.8	196	0	1,330
Fish Consumption	1,526	196	12.8	0	196	1,330
Primary Contact	1,526	196	12.8	196	0	1,330
Public and Food Processing Water Supplies	196	196	100	196	0	0

Lake Michigan Shoreline (Miles)

Designated Use[1]	Total Size	Total Assessed		Size Fully Supporting	Size Not Supporting	Size Not Assessed
		Size	%			
Aesthetic Quality	64	0	0	0	0	64
Aquatic Life	64	0	0	0	0	64
Fish Consumption	64	64	100	0	64	0
Primary Contact	64	64	100	0	64	0

1. Illinois has jurisdiction over 1,526 square miles of Lake Michigan open water, 2.14 square miles of Lake Michigan harbors, and 64 miles of Lake Michigan shoreline, which are covered under the Lake Michigan Basin Water Quality Standards. Also, 196 square miles of Lake Michigan are designated for Public and Food Processing Water Supply Use.

The summaries of causes of designated use impairments of Lake Michigan harbors, open waters, and shoreline are in Table ES-8.

Table ES-8. Potential Causes of Use Impairment of Lake Michigan-Basin Waters, Reporting Cycle 2020/2022

Lake Michigan Harbors (Square Miles)

Potential Cause of Impairment	Impaired Area (Square Miles)
Mercury	0.4
Polychlorinated biphenyls	0.4

Lake Michigan Open Waters (Square Miles)

Potential Cause of Impairment	Impaired Area (Square Miles)
Mercury	196
Polychlorinated biphenyls	196

Lake Michigan Shoreline (Miles)

Potential Cause of Impairment	Impaired Length (Mile)
Escherichia coli	64
Mercury	64
Polychlorinated biphenyls	64

Significant Publicly Owned Lakes

"Significant Publicly Owned Lakes" are defined as having 20 acres or more surface area; however, some smaller lakes, that provide substantial public access and benefits to the citizens of Illinois, have also been defined as 'significant." For summary information regarding "significant publicly owned lakes," refer to Appendix A-4.

PART A: INTRODUCTION

A-1. Reporting Requirements

The 2020/2022 Integrated Report is primarily based on guidance from the U.S. Environmental Protection Agency (USEPA) and is intended to satisfy, in a single report, the requirements of sections 305(b), 303(d), and 314 of the Federal Water Pollution Control Act Amendments of 1972 (Federal Water Pollution Control Act Ammendmens 1972) and subsequent amendments (hereafter, collectively called the "Clean Water Act" or "CWA") .

According to Section 305(b) of the Clean Water Act, each state, territory, tribe, and interstate commission (hereafter collectively called "state") must submit to USEPA "a report which shall include—

(A) a description of the water quality of all navigable waters in such State during the preceding year;

(B) an analysis of the extent to which all navigable waters of such State provide for the protection and propagation of a balanced population of shellfish, fish, and wildlife, and allow recreational activities in and on the water;

(C) an analysis of the extent to which the elimination of the discharge of pollutants and a level of water quality which provides for the protection and propagation of a balanced population of shellfish, fish, and wildlife and allows recreational activities in and on the water, have been or will be achieved by the requirements of this Act, together with recommendations as to additional action necessary to achieve such objectives and for what waters such additional action is necessary;

(D) an estimate of (i) the environmental impact, (ii) the economic and social costs necessary to achieve the objective of this Act in such State, (iii) the economic and social benefits of such achievement, and (iv) an estimate of the date of such achievement; and

(E) a description of the nature and extent of nonpoint sources of pollutants, and recommendations as to the programs which must be undertaken to control each category of such sources, including an estimate of the costs of implementing such programs."

Illinois EPA reports the resource quality of its waters in terms of the degree to which the beneficial uses[1] of those waters are supported and the reasons (causes and sources) beneficial uses may not be supported. In addition, states are required to provide an assessment of the water quality of all publicly owned lakes, including the status and trends of such water quality as specified in Section 314(a)(1) of the Clean Water Act.

[1] Beneficial uses, also called designated uses, are discussed in more detail in Section B-2 Water Pollution Control Program, Illinois Surface Water Quality Standards.

Section 303(d) of the Clean Water Act and corresponding regulations in Title 40 of the Code of Federal Regulations, require states to:

- Identify water quality-limited waters where effluent limitations and other pollution control requirements are not sufficient to implement any water quality standard;
- Identify pollutants causing or expected to cause water quality standards violations in those waters;
- Establish a priority ranking for the development of Total Maximum Daily Load[2] (TMDL) calculations including waters targeted for TMDL development within the next two years; and,
- Establish TMDLs for all pollutants preventing or expected to prevent the attainment of water quality standards.

This list of water quality limited waters is referred to as the "303(d) List" in this report.

The Integrated Report process has two major phases corresponding to the requirements noted above. In the first phase, use support assessments are conducted for all waters and all designated uses for which data are available to make assessments. As part of that process all potential causes (both "pollutant" and "nonpollutant" causes) of impairment are identified. These assessment results, which include all use support assessments and all potential causes of use impairment for all assessed waters, are shown in Appendix A.

The next phase involves categorizing waters based on whether any uses are impaired, whether pollutant or nonpollutant causes are identified and whether or not a TMDL is required. **A subset of all assessed waters and causes of impairment is identified as the 303(d) List** (Appendix C). It includes only those waters that have uses that are impaired by pollutants and that require a TMDL. Each entry on the 303(d) List is a unique combination of a water body segment (also known as an assessment unit[3]) and pollutant cause of impairment that requires a separate loading calculation. Also, as part of this second phase, each assessment unit-pollutant combination on the 303(d) List is prioritized for TMDL development and a two-year schedule for TMDL development is created. TMDLs are only conducted for causes of impairment that are classified as pollutants such as metals or pesticides. Nonpollutant causes of impairment such as habitat degradation are not a component of Illinois' 303(d) List submission.

The distinction between "pollutant" and "nonpollutant" is critical in this process. Section 502(6) of the Clean Water Act, defines a pollutant as *"dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into water."* In general, pollutants are substances, chemicals, materials or wastes and their components that are discharged into the water. Pollution, as defined by the Clean Water Act Section 502(19), is *''the man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of a water body.''* This is a broad term that encompasses many types of changes to a water body, including

[2] Total Maximum Daily Load calculations determine the amount of a pollutant a water body can assimilate without exceeding the state's water quality standards or impairing the water body's designated uses.
[3] A lake, a stream segment, or an open-water area, harbor or shoreline segment of Lake Michigan for which a use attainment assessment is made.

alterations that do not result from the introduction of a specific pollutant or the presence of pollutants at a level that causes impairment. In other words, all waters impaired by human intervention suffer from some form of pollution. In some cases, the pollution is caused by the presence of a pollutant, and a TMDL is required. For assessment purposes, Illinois EPA classifies almost all causes of impairment as pollutants. The classification of each cause of impairment is shown in the guidelines for identifying potential causes of impairment related to each use. Some nonpollutant causes may in turn be caused by pollutants. Whenever nonpollutant causes are identified, we attempt to determine if pollutants are ultimately responsible for the impairment, and what those pollutants are.

While pollutant causes of impairment are addressed by Illinois EPA's TMDL program, nonpollutant causes are addressed by other agency programs such as Clean Water Act Section 319 grants for nonpoint source pollution control activities and other grant programs.

To the extent possible, the 2020/2022 Illinois Integrated Report is based on USEPA's *Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act* issued July 29, 2005 (USEPA 2005), and additional guidance contained in USEPA memorandums from the Office of Wetlands, Oceans and Watersheds regarding Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions.

A-2. Major Changes from the 2018 Integrated Report

The Illinois Environmental Protection Agency (Illinois EPA or "we") develops and-applies a new method to use continuously monitored results of the United States Geological Survey to assess attainment of Aquatic Life Use at 12 large-stream sites (Appendix B-1). These data represent sites at which automated meters repeatedly measure parameters such as dissolved oxygen, pH, water temperature, specific conductivity, flow, nitrate, and phosphate at short time intervals (e.g., every 15 minutes). The data range from January 1, 2015 through December 31, 2019.

We update the chronic-standard methodology for assessing attainment and identifying causes of impairment of Aquatic Life Use in streams, lakes, and Lake Michigan (Appendix B-2). If a relevant chronic standard is exceeded for more than four days as determined by linear interpolation of three or more observations, then the water-chemistry condition indicates the potential for moderate impairment. If the chronic standard is exceeded for more than one independent set of observations, then the water-chemistry condition indicates the potential for severe impairment.

We no longer refer directly to Illinois Department of Public Health fish-consumption advisories to assess attainment of Fish Consumption Use. Rather, we more clearly and explicitly define the concentration-based guidelines that are used for those advisories. In effect, our guidelines remain largely consistent with the advisories.

We do not report potential sources of impairment in the Assessment, Total Maximum Daily Load Tracking, and Implementation System (ATTAINS) for the combined 2020/2022 Integrated Report.

As follows and as data and time allow, we may dissociate total nitrogen and sedimentation/siltation as observed effects. For the combined 2020/2022 and later integrated water-quality reports, if Aquatic Life Use becomes attained in a stream segment with which at least one of the two aforementioned observed effects is associated, then we will dissociate the observed effect because the use is no longer impaired. For stream segments having at least one observed effect and for which Aquatic Life Use remains not attained, we may opt to assess removal of the observed effect(s). To assess removal of an observed effect requires applying the relevant Illinois EPA cause guideline used during reporting cycle 2006. Specifically, to justify removal of total nitrogen as an observed effect requires that none of the most recent, applicable results of nitrate/nitrite in water exceeds 7.8 mg/l. To justify removal of sedimentation/siltation as an observed effect requires that none of the most recent, applicable observations of stream-bottom composition indicate more than 50% of the stream bottom comprising silt, mud, or equivalent fine sediment. Typically, the most recent, applicable results are those from a three-year period, consistent with prevailing Illinois EPA assessment methodology. We will not apply these guidelines for any new identifications of observed effects or causes of impairment. However, if Illinois adopts a new numeric water-quality standard for total nitrogen or sedimentation/siltation (subject to United States Environmental Protection Agency [USEPA] approval) and Illinois EPA develops a corresponding standards-based guideline for either substance as a cause of Aquatic Life Use impairment, then the aforementioned approach for removing an observed effect no longer applies.

Non-standards-based pollutant causes of use impairment

In reporting cycle 2020/2022, several pollutant causes of use impairment remain associated with impaired waters despite these causes lacking a basis in Illinois water-quality standards. In past reporting cycles, we applied various cause guidelines that were not based on Illinois water-quality standards (Appendix B-3). We have since stopped using these cause guidelines, yet causes remain as a result of past application. Starting in cycle 2020/2022 and extending to later cycles, we may opt to dissociate (remove) these causes of impairment even if the relevant use remains not attained. To assess removal of these causes requires applying the relevant cause guidelines that Illinois EPA last used to identify these causes. Specifically, for any such cause, to justify removal requires that none of the most recent, applicable results or observations exceed the former cause guideline. We will not apply these former guidelines for any new identifications of causes of use impairment. However, if Illinois adopts a new numeric water-quality standard for any of the relevant pollutants (subject to USEPA approval) and Illinois EPA develops a corresponding standards-based guideline for the pollutant as a cause of use impairment, then the aforementioned approach to remove the cause no longer applies.

A-3. Primary Data Sources and Time Periods Covered

Data Used for This Assessment Cycle

We base cycle 2020/2022 surface-water assessments of use attainment primarily on biological, water-chemistry, physical-habitat, or fish-tissue information collected from 2015 through 2019 by various monitoring programs (Illinois EPA 2014). These programs include the Ambient Water Quality Monitoring Network, Intensive Basin Surveys, Facility Related Stream Surveys, the Fish Contaminant Monitoring Program, the Ambient Lake Monitoring Program, the Harmful Algal Bloom Program, the Volunteer Lake Monitoring Program, the Lake Michigan Monitoring

Program, and monitoring for developing Total Maximum Daily Loads (TMDL). We also consider data from outside sources that include the Illinois Department of Natural Resources, the Lake County Health Department, the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC), the United States Geological Survey, TMDL contractors, and others. We update use attainment when sufficient, relevant, new information is available. In addition, we update assessments to correct errors in previous assessments. Older assessments are based on the most recent data available, which may be over 15 years old in some cases.

In reporting cycle 2020/2022, we update stream assessments of Aquatic Life Use and Aesthetic Quality for stream segments in these major river basins: Kishwaukee River, Chicago River/Little Calumet River, Embarras River, middle and lower Wabash River, Skillet Fork, middle and lower Illinois River, Vermilion and Little Vermillion rivers (Wabash Basin), Macoupin Creek, Pecatonica River, Fox River, La Moine River, Kaskaskia River, Shoal Creek, Little Wabash River, Rock River, Des Plaines River, Sangamon River, South Fork Sangamon River, Salt Creek, Big Muddy River, Green River, upper Illinois River, Mississippi River south, and Cache River

For these basins, we primarily use data of Intensive Basin Surveys from 2016-2019. However, we also use data from 2015-2019 of the Ambient Water Quality Monitoring Network or Facility Related Stream Surveys (Illinois EPA 2014). We also use data from 2015-2019 of the MWRDGC Ambient Water Quality Monitoring program. Finally, in a few cases for which relevant data are available for waters outside these basins, we update assessments as well.

We update all use-attainment assessments of Lake Michigan with Lake Michigan Monitoring Program data from 2015 through 2019.

We assess attainment of Indigenous Aquatic Life Use, Upper Dresden Island Pool Aquatic Life Use, Chicago Area Waterway System Aquatic Life Use A, and Chicago Area Waterway System and Brandon Pool Aquatic Life Use B in the Chicago Area Waterways by using water data from 2015 through 2019 from various sources.

We update assessments of Primary Contact Use in streams by using Illinois EPA Ambient Water Quality Monitoring Network data and MWRDGC data from 2015 through 2019. We do not update assessments of Primary Contact Use in lakes because no new, relevant fecal-coliform results are available.

We update assessments of Fish Consumption Use with new fish-tissue data from 2015 through 2019.

We update Aquatic Life Use and Aesthetic Quality in lakes with Ambient Lake Monitoring Program data from 2015 through 2019.

We update assessments of Public and Food Processing Water Supply Use in streams, lakes, and Lake Michigan by using data from various sources, from 2015 through 2019.

Solicitation of Information

For assessing attainment of uses in Illinois surface waters, Illinois EPA routinely considers data from four outside sources including, (1) biological data (of streams) collected by the Illinois Department of Natural Resources as part of cooperative Intensive Basin Surveys, (2) physicochemical water data (of lakes) provided by the Lake County Public Health Department, (3) U.S. Geological Survey Long Term Resource Monitoring Program that focuses on the upper Mississippi River and (4) U.S. Geological Survey continuous-monitoring data collected from 12 locations in 2015-2019.

On July 16, 2018, Illinois EPA posted the "*Guidance for Submission of Surface Water Data For Consideration in Preparing the 2020 Integrated Report on Illinois Water Quality, including the List of Clean Water Act Section 303(d) Impaired Waters*"(IEPA 2018) and associated data-solicitation information on the Illinois Environmental Protection Agency website. The guidance describes the required format for data packages and associated quality assurance documentation and provides instruction on how and when (by October 15, 2018) to submit data for consideration for assessments in the report.

After determining, with approval from USEPA Region 5, that Illinois EPA would develop this combined 2020/2022 Integrated Report, we posted the "*Guidance for Submission of Surface Water Data For Consideration in Preparing the combined 2020/2022 Integrated Report on Illinois Water Quality, including the List of Clean Water Act Section 303(d) Impaired Waters*"(IEPA 2021) and associated data-solicitation information on the Illinois Environmental Protection Agency website on February 17, 2021. The guidance describes the required format for data packages and associated quality assurance documentation and provides instruction on how and when (by April 15, 2021) to submit data for consideration for assessments in the report.

We received data sets and other information from the following external organizations: Metropolitan Water Reclamation District of Greater Chicago, Southeast Environmental Task Force, Fox River Study Group, Chicago Sierra Club Water Team, Eagle View Group, River Prairie Group, and Northwest Cook County Sierra Club Water Sentinels. We evaluated and considered all submitted data that met Illinois EPA quality assurance/quality control requirements (Appendix B-4). For this report, we used data submitted by Metropolitan Water Reclamation District of Greater Chicago.

PART B: BACKGROUND

B-1. Total Surface Waters

Illinois has abundant water resources (Table B 1). The U.S. Geological Survey's National Hydrography Dataset (NHD 1:24,000 scale) shows approximately 119,244 miles of streams within the state's borders, including major rivers such as the Big Muddy, Cache, Des Plaines, Embarras, Fox, Illinois, Kankakee, Kaskaskia, Little Wabash, Rock, Sangamon, and Vermilion rivers. In addition, the NHD shows 911 miles of large rivers forming the state's western (Mississippi River), eastern (in part, Wabash River), and southern (Ohio River) borders. Throughout this document, we refer to all flowing waters of all sizes as streams.

More than 91,400 freshwater lakes and ponds exist in Illinois, 3,256 of which have a surface area of six acres or more (Illinois Department of Natural Resources 1999). The term freshwater lake is used for any Illinois lake other than Lake Michigan and its harbors. About three-fourths of Illinois' freshwater lakes are man-made, including dammed stream and side-channel impoundments, strip-mine lakes, borrow pits, and other excavated lakes. Natural lakes include glacial lakes in the northeastern counties, sinkhole ponds in the southwest, and oxbow and backwater lakes along major rivers.

Illinois is bordered by one of the Great Lakes, Lake Michigan. The state has jurisdiction over approximately 1,526 square miles of Lake Michigan open water and 64 miles of Lake Michigan shoreline, bordering Cook and Lake counties in the northeastern corner of the state. Lake Michigan is the third largest of the Great Lakes and is the largest body of fresh water located entirely within the boundaries of the United States. With the exception of the polar ice caps, the Great Lakes form the largest freshwater system on earth.

Table B 1. Illinois Atlas

Topic	Value	Scale	Source
State Population in year 2020	12,812, 508		US Census Bureau
State Surface Area (sq. mi.)	56,250		
Major Watersheds	52		USGS
Total Stream Miles	119,244	1:24,000	NHD
Interior Stream Miles	118,333	1:24,000	NHD
Perennial Streams	25,019	1:24,000	NHD
Intermittent Streams	78,245	1:24,000	NHD
Ditches and Canals	3676	1:24,000	NHD
Other	11,393	1:24,000	NHD
Border Stream Miles	911	1:24,000	NHD
Mississippi River	582	1:24,000	NHD
Ohio River	131	1:24,000	NHD
Wabash River	198	1:24,000	NHD
Freshwater Lakes and Ponds	91,456	(1)	(1)
Total Acreage	318,477	(1)	(1)
Total Freshwater Lakes (6 acres and more)	3,256	(1)	(1)
Total Freshwater Lake Acreage (6 acres and more)	253,224	(1)	(1)
Publicly Owned Freshwater Lakes	1,279	(1)	(1)
Publicly Owned Lake Acreage	154,333	(1)	(1)
Freshwater Lakes over 5,000 Acres	4	(1)	(1)
Acreage of Freshwater Lakes over 5,000 Acres	61,545	(1)	(1)
Lake Michigan		(1)	(1)
Illinois Shoreline Miles[2]	63.95	1:24,000	NHD
Illinois Square Miles	1,526	(1)	(1)
Total Shallow Water Wetlands Acreage	720,000	(1)	(1)

NHD = National Hydrography Dataset

1. 1999 Inventory of Illinois Surface Water Resources, Illinois Department of Natural Resources, Division of Fisheries, April 2000.
2. The length of Lake Michigan Shoreline Segments was recalculated in 2014 based on the high resolution (1:24,000 scale) NHD.

B-2. Surface Water Pollution Control Program

Illinois EPA's Bureau of Water works to ensure that Illinois' rivers, streams, and lakes will support all uses for which they are designated including protection of aquatic life, primary contact recreation, aesthetic quality, drinking water supply, and fish consumption. They also ensure that Illinois public water supply systems provide water that is consistently safe to drink, and that Illinois' groundwater resources are protected for designated drinking water and other beneficial uses.

The Bureau of Water monitors the quality of the state's surface and groundwater resources; runs a municipal, stormwater, and industrial effluent permitting program; regularly inspects sources of pollution and citizen complaints; ensures compliance with regulatory standards; and enforces applicable requirements. They also provide a number of loan and grant programs designed to upgrade existing and build new wastewater, stormwater treatment and public water supply infrastructure; reduce nonpoint source pollution; conduct green infrastructure projects; and protect and restore Illinois' inland lakes and streams.

Illinois Surface Water Quality Standards

Water pollution control programs are designed to protect the beneficial uses of the water resources of the state. Each state has the responsibility to set water quality standards that protect these beneficial uses, also called "designated uses." Illinois waters are designated for various uses including aquatic life, wildlife, agricultural use, primary contact (e.g., swimming, water skiing), secondary contact (e.g., boating, fishing), industrial use, public and food-processing water supply, and aesthetic quality. Illinois' water quality standards provide the basis for assessing whether the beneficial uses of the state's waters are being attained.

The Illinois Pollution Control Board is responsible for setting water quality standards to protect designated uses. The Illinois EPA is responsible for developing scientifically based water quality standards and proposing them to the Illinois Pollution Control Board for adoption into state rules and regulations. The federal Clean Water Act requires the states to review and update water quality standards every three years. Illinois EPA, in conjunction with USEPA, identifies and prioritizes those standards to be developed or revised during this three-year period.

The Illinois Pollution Control Board has established four primary sets (or categories) of narrative and numeric water quality standards for surface waters. The standards are available at the Pollutions Control Board website:
https://pcb.illinois.gov/SLR/IPCBandIEPAEnvironmentalRegulationsTitle35.
Each set of standards is intended to help protect various designated uses established for each category (Table B-2).

- General Use Standards (35 Ill. Adm. Code Part 302, Subpart B) - These standards apply to almost all waters of the state and are intended to protect aquatic life, wildlife, agricultural, primary contact, secondary contact, and most industrial uses. These General Use standards are also designed to ensure the aesthetic quality of the state's aquatic environment and to protect human health from disease or other harmful effects that could occur from ingesting aquatic organisms taken from surface waters of the state.
- Public and Food Processing Water Supply Standards (35 Ill. Adm. Code Part 302, Subpart C) - These standards protect surface waters of the state for human consumption or for processing of food products intended for human consumption. These standards apply at any point at which water is withdrawn for treatment and distribution as a potable water supply or for food processing.
- The Chicago Area Waterway System and Lower Des Plaines River Water Quality and Indigenous Aquatic Life Standards apply to about 86 miles of canals, channels, and modified streams and to Lake Calumet, in northeastern Illinois (35 Ill. Adm. Code Section 302 Subpart D). These standards replaced the previous Secondary Contact and Indigenous Aquatic Life Standards, which were intended to protect-indigenous aquatic life limited only by the physical configuration of the body of water, characteristics, and origin of the water and the presence of contaminants in amounts that do not exceed these water-quality standards. Currently only one Assessment Unit (South Fork South Branch Chicago River, IL_HCA-01) is designated for Indigenous Aquatic Life Use. Three new aquatic-life uses now also apply: Upper Dresden Island Pool Aquatic Life Use, Chicago Area Waterway System Aquatic Life Use A, and Chicago Area Waterway System and Brandon Pool Aquatic Life Use B.
- Lake Michigan Basin Water Quality Standards (35 Ill. Adm. Code 302, Subpart E) – These standards protect the beneficial uses of the open waters, harbors, waters within breakwaters, and the waters within Illinois jurisdiction tributary to Lake Michigan, except for the Chicago River, North Shore Channel, and Calumet River.

Table B-2. Illinois Designated Uses and Applicable Water Quality Standards, Reporting Cycle 2020/2022

Illinois EPA Designated Uses	Application of Designated Uses and Standards[1]	Illinois Water Quality Standards[1]
Aquatic Life	Streams, Freshwater Lakes	General Use Standards
	Lake Michigan-basin waters	Lake Michigan Basin Standards
Aesthetic Quality	Streams, Freshwater Lakes	General Use Standards
	Lake Michigan-basin waters	Lake Michigan Basin Standards
	Specific Chicago-area waters	Chicago Area Waterway System and Lower Des Plaines River Water Quality and Indigenous Aquatic Life Standards[2]
Upper Dresden Island Pool Aquatic Life Use	Specific Chicago-area waters	Chicago Area Waterway System and Lower Des Plaines River Water Quality and Indigenous Aquatic Life Standards[2]
Chicago Area Waterway System Aquatic Life Use A	Specific Chicago-area waters	
Chicago Area Waterway System and Brandon Pool Aquatic Life Use B	Specific Chicago-area waters	
Indigenous Aquatic Life	South Fork South Branch Chicago River	
Primary Contact	Streams, Freshwater Lakes	General Use Standards
	Lake Michigan-basin waters	Lake Michigan Basin Standards
	Specific Chicago-area waters [3]	Chicago Area Waterway System and Lower Des Plaines River Water Quality and Indigenous Aquatic Life Standards[2]
Public and Food Processing Water Supply	Streams, Freshwater Lakes, Lake Michigan-basin waters	Public and Food Processing Water Supply Standards
Fish Consumption	Streams, Freshwater Lakes	General Use Standards (Human Health)
	Lake Michigan-basin waters	Lake Michigan Basin Standards (Human Health)
	Specific Chicago-area waters	Chicago Area Waterway System and Lower Des Plaines River Water Quality and Indigenous Aquatic Life Standards[2]

1. As defined in 35 Ill. Adm. Code Parts 302 and 303: https://pcb.illinois.gov/SLR/IPCBandIEPAEnvironmentalRegulationsTitle35.
2. Chicago Area Waterway System and Lower Des Plaines River Water Quality and Indigenous Aquatic Life Standards replaced the Secondary Contact and Indigenous Aquatic Life Standards.
3. Waters designated for Primary Contact Recreation Use under the Chicago Area Waterway System and Lower Des Plaines River Water Quality and Indigenous Aquatic Life Standards must meet the fecal coliform criteria in the General Use Standards.

Narrative Standards and Antidegradation Regulations

Water quality standards generally consist of three components: designated uses, a set of numeric and narrative criteria to protect those uses, and an antidegradation statement. In Illinois, the antidegradation statement (35 Ill. Adm. Code 302.105) is separate and covers all designated uses. This component of Illinois' water quality standards describes regulations that protect "*existing uses of all waters of the State of Illinois, maintain the quality of waters with quality that is better than water quality standards, and prevent unnecessary deterioration of waters of the State*."

All Illinois water quality standards include a narrative description of their intent, and nearly all also have associated numeric components for applying the concepts of the narrative component. For example, narrative language in the General Use standard at 35 Ill. Adm. Code 302.210 protects against toxic substances, "harmful to human health, or to animal, plant or aquatic life." A well-defined quantitative methodology then follows for how to derive numeric criteria intended to provide this protection. Only a few Illinois water-quality standards are exclusively narrative, i.e., having no explicit numeric component in the standard to apply them. For example, the standard at 35 Ill. Adm. Code 302.203 called "Offensive Conditions" simply comprises language that prohibits "sludge or bottom deposits, floating debris, visible oil, odor, plant or algal growth, color or turbidity of other than natural origin" in all "general use" waters of the state. Because of revisions that were made to 35 Ill. Adm. Code 302.203, 302.403 and 302.515 by the Illinois Pollution Control Board in 1990 and 1997, these exclusively narrative standards apply only to the protection of aesthetic quality in Illinois waters.

Derived Water Quality Criteria

The narrative standards in Title 35 of the Illinois Administrative Code, Section 302.210 and in Subpart F for General Use Waters and at 302.540 and elsewhere in Subpart E allow the Illinois EPA to derive numeric water quality criteria values for any substance that does not already have a numeric standard in the Illinois Pollution Control Board regulations. These criteria serve to protect aquatic life, human health or wildlife, although wildlife-based criteria have not yet been derived. Illinois EPA derived criteria can be found at the following web site: https://www2.illinois.gov/epa/topics/water-quality/standards/Pages/derived-criteria.aspx.

B-3. Cost/Benefit Assessment

Section 305(b) requires the state to report on the economic and social costs and benefits necessary to achieve Clean Water Act objectives. Information on costs associated with water quality improvements is complex and not readily available for developing a complete cost/benefit assessment. Individual state fiscal year 2020 program costs of pollution control activities in Illinois follow. Economic benefits of water quality improvements, while difficult to quantify, include increased opportunities for water-based recreational activities, enhanced commercial and sport fisheries, recovery of damaged aquatic environments, and reduced costs of water treatment to various municipal and industrial users.

Cost of Pollution Control and Water Protection Activities

The Illinois EPA Bureau of Water distributed a total of $427 million in loans during SFY2020 for construction of municipal wastewater treatment facilities. Other Water Pollution Control program and Groundwater/Source Water Protection costs for Bureau of Water activities conducted in 2020 are summarized in Table B-3.

Table B-3. Water Pollution Control Program Costs for the Illinois Environmental Protection Agency's Bureau of Water, State Fiscal Year 2020

Activity	Cost
Monitoring	$7,676,783
Planning	$ 107,192
Point Source Control Programs	$9,892,085
Nonpoint Source Control Programs	$4,328,209
Groundwater/Source-Water Protection	$3,850,701
Total	**$25,854,970**

PART C: SURFACE WATER MONITORING AND ASSESSMENT

C-1. Monitoring Program

Illinois EPA's "Surface Water Monitoring Strategy" (Illinois EPA 2014) provides a detailed discussion of all agency monitoring programs. Field, laboratory, and data-management procedures are explained in the Illinois EPA Bureau of Water's "Quality Assurance Project Plan" (Illinois EPA 1994). Specific programs that contribute data to the assessment of streams include the Ambient Water Quality Monitoring Network, the Pesticide Monitoring Subnetwork, Facility-Related Stream Surveys, and Intensive Basin Surveys (Figure C-1). Programs that contribute data to freshwater lake assessments include the Ambient Lake Monitoring Program and the Volunteer Lake Monitoring Program. The Lake Michigan Monitoring Program provides data for the assessment of Lake Michigan. The Fish Contaminant Monitoring Program provides data for the assessment of all water resources (streams, freshwater lakes, and Lake Michigan).

C-2. Assessment Methodology

Illinois EPA uses various information (including, but not limited to, Illinois water-quality standards) to assess attainment of the following designated uses in Illinois surface waters: Aquatic Life Use, Indigenous Aquatic Life Use, Chicago Area Waterway System Aquatic Life Use A, Chicago Area Waterway System and Brandon Pool Aquatic Life use B, Upper Dresden Island Pool Aquatic Life Use, Primary Contact Use, Public and Food Processing Water Supply Use, Fish Consumption Use, and Aesthetic Quality. This assessment methodology document describes how we use monitoring data that reflect resource condition to assess attainment of each designated use and to identify causes of non-attainment, in each type of Illinois surface-water body.

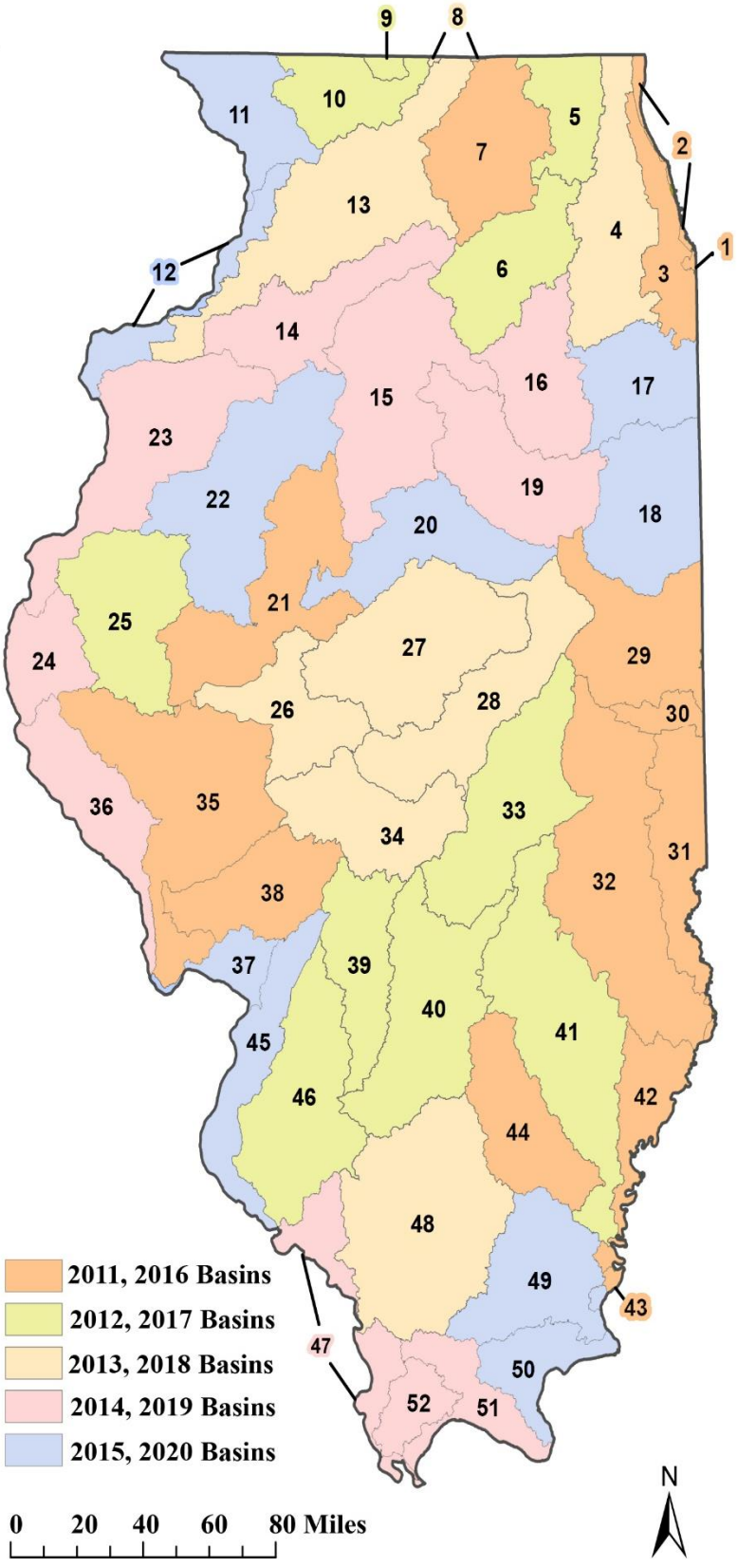
Assessment Units

Illinois EPA bases assessments of attainment of designated uses on data from sites. In our databases, we represent each site as a geographic point of specific latitude and longitude. We extrapolate site-based data and information to represent larger areas called Assessment Units (e.g., a stream segment, a freshwater lake, an open-water area in Lake Michigan).

For streams, Assessment Unit length is based on stream size (USEPA 1997). Assessments of Aquatic Life Use typically apply approximately 10 miles upstream and downstream from the sampling site for wadable streams, about 25 miles upstream and downstream for unwadable streams (i.e., generally $\geq 7^{th}$ order, $\geq$ 3.5 ft. average depth, and fish sampled with an electrofishing boat), and approximately 50 miles upstream and downstream for large rivers (i.e., Illinois and Wabash rivers). However, the length of any particular Assessment Unit is determined by considering factors such as point- or nonpoint-source inputs; variation in land use; variation in riparian vegetation, stream banks, slope, or channel morphology; stream confluences or diversions; or hydrologic modifications such as channelization or dams. Based on these factors, Assessment Units may be longer or shorter than suggested by the aforementioned general guidelines. For Mississippi River, Assessment Units mostly reflect a September 2003 interstate memorandum of understanding, among five states (i.e., Illinois, Iowa, Minnesota,

Figure C-1. IEPA/IDNR Intensive Basin Survey Schedule, 2011-2020

ID	Name	HUC8
1	Little Calumet-Galien	04040001
2	Pike-Root	04040002
3	Chicago	07120003
4	Des Plaines	07120004
5	Upper Fox	07120006
6	Lower Fox	07120007
7	Kishwaukee	07090006
8	Middle Rock	07090002
9	Sugar	07090004
10	Pecatonica	07090003
11	Apple-Plum	07060005
12	Copperas-Duck	07080101
13	Lower Rock	07090005
14	Green	07090007
15	Lower Illinois-Senachwine Lake	07130001
16	Upper Illinois	07120005
17	Kankakee	07120001
18	Iroquois	07120002
19	Vermilion	07130002
20	Mackinaw	07130004
21	Lower Illinois-Lake Chautauqua	07130003
22	Spoon	07130005
23	Flint-Henderson	07080104
24	Bear-Wyaconda	07110001
25	La Moine	07130010
26	Lower Sangamon	07130008
27	Salt	07130009
28	Upper Sangamon	07130006
29	Vermilion	05120109
30	Middle Wabash-Little Vermilion	05120108
31	Middle Wabash-Busseron	05120111
32	Embarras	05120112
33	Upper Kaskaskia	07140201
34	South Fork Sangamon	07130007
35	Lower Illinois	07130011
36	The Sny	07110004
37	Peruque-Piasa	07110009
38	Macoupin	07130012
39	Shoal	07140203
40	Middle Kaskaskia	07140202
41	Little Wabash	05120114
42	Lower Wabash	05120113
43	Highland-Pigeon	05140202
44	Skillet	05120115
45	Cahokia-Joachim	07140101
46	Lower Kaskaskia	07140204
47	Upper Mississippi-Cape Girardeau	07140105
48	Big Muddy	07140106
49	Saline	05140204
50	Lower Ohio-Bay	05140203
51	Lower Ohio	05140206
52	Cache	07140108



Missouri, and Wisconsin), that addresses water-quality assessment for Clean Water Act reporting (https://umrba.org/document/interstate-wq-assessment-reaches-mou). For Ohio River, segmentation is based on Ohio River Valley Water Sanitation Commission assessments.

For assessing attainment of uses in lakes other than Lake Michigan, the entire lake is the Assessment Unit. For assessments in Lake Michigan open waters, we use data collected from nearshore sites of the Lake Michigan Monitoring Program. A single nearshore Assessment Unit is 64 miles long, bounded north by the Wisconsin-Illinois border, south by the Indiana-Illinois border, west by the shoreline, and east by a 5-km offshore limit. This Assessment Unit represents 196 square miles, which is 12.8% of the approximately 1,526 square miles of Lake Michigan in Illinois. The Lake Michigan shoreline in Illinois comprises 51 Assessment Units that span 64 miles (excluding harbors and harbor entrances). For assessments in Lake Michigan harbors, we use data collected from different sites directly in harbors.

Attainment of Designated Uses

Illinois EPA determines the resource condition of each Assessment Unit by determining whether each applicable designated use is attained. For each designated use in each Assessment Unit, our assessment concludes one of two possible use support levels: “Fully Supporting” or “Not Supporting.” Fully Supporting means that the designated use is attained. Not Supporting means that the use is not attained. Uses determined to be Not Supporting are called “impaired,” and waters that have at least one use assessed as Not Supporting are also called impaired. For each impaired use in each Assessment Unit, we identify potential causes of the impairment as explained in various following sections. Hereafter, for brevity, when we say "*assess*" we mean "*assess attainment of*" (e.g., "We *assess* Aquatic Life Use in streams by using indicators of biological condition.").

Aquatic Life Use- Streams

To assess attainment of Aquatic Life Use in streams, we use biological information, physicochemical data (of conditions in water), and physical-habitat information collected primarily via three monitoring programs: Intensive Basin Surveys, Ambient Water Quality Monitoring Network, or Facility Related Stream Surveys. We use the fish Index of Biological Integrity (Karr et al. 1986; Smogor 2000, 2005), the macroinvertebrate Index of Biological Integrity (Tetra Tech, Inc. 2004), and the Macroinvertebrate Biotic Index (Illinois EPA 1994) as biological indicators of aquatic-life condition. To help interpret biological information, we use physical-habitat information that includes quantitative or qualitative measures of stream-bottom composition and qualitative descriptors of channel and riparian conditions (Table C-1).

Physicochemical data of water conditions also inform our assessments. These data include measures of “conventional” parameters (e.g., dissolved oxygen, pH, and temperature), priority pollutants, non-priority pollutants, and other pollutants (USEPA 2002). Some physicochemical data represent *continuous* monitoring, i.e., one or more parameters measured at least once per hour over multiple days or longer. We use continuously monitored results of water temperature, dissolved oxygen, and pH, as available from some sites, to help assess Aquatic Life Use in streams. Additionally, for 12 large-stream sites continuously monitored by the U.S. Geological Survey, we apply custom assessment guidelines to accommodate the unusually large amount of

data. For details of how we use these data, see Appendix B-1. In a minority of streams for which biological information is unavailable, we assess Aquatic Life Use primarily by using physicochemical data alone. Finally, when we conclude that Aquatic Life Use is not attained, we use physicochemical data and physical-habitat information to help identify potential causes of the impairment.

We apply each biological index to distinguish among three attainment levels: no impairment, moderate impairment, and severe impairment (Table C-2). We also interpret physicochemical data (more briefly called "water chemistry"; Table C-3) and physical-habitat information (Table C-4) to supplement the biological information when assessing attainment of Aquatic Life Use.

Table C-1 illustrates how we interpret and integrate biological indicators, water chemistry and physical-habitat information to guide the assessment of Aquatic Life Use. The last stage of the assessment process reviews the assessment conclusion. This review helps improve the accuracy of Aquatic Life Use assessments. In this review, we consider the available biological, water-chemistry, and habitat data while applying site-specific knowledge and other information about the environmental setting. This "other" information may include field notes and observations, knowledge of the stream's biological potential, the presence of potential sources of pollution, or watershed information. Based on this review, we may modify the preliminary attainment decision that is indicated in any previous cell in Table C-1. For example, apparently conflicting biological information may require case-specific interpretation, including investigation of possible error or ambiguity in an IBI score, especially when scores are near the threshold values in Table C-2. In some cases, when insufficient information exists to make a new assessment, the previous assessment status remains unchanged.

If we determine that Aquatic Life Use is not attained ("Not Supporting"), we apply the cause guidelines of Table C-5. Generally, one exceedance of an applicable Illinois water-quality standard (related to protection of aquatic life) results in identifying the parameter as a potential cause of impairment. Additional guidelines used to determine potential causes of impairment include site-specific standards (35 Ill. Adm. Code 303, Subpart C) or adjusted standards (https://pcb.illinois.gov/SLR/IPCBandIEPAEnvironmentalRegulationsTitle35).

In some cases of impaired Aquatic Life Use, no pollutant cause of impairment (Table C-5) is identified. If we determine that the impairment is not attributable to any pollutant, then the Assessment Unit is categorized as "4C", depending on the results of other use-attainment assessments. In each of these cases, physicochemical data are available but show no violation of an Illinois water-quality standard (In some cases in which a Total Maximum Daily Load study determines that violations of the dissolved-oxygen standard are not caused by a pollutant, the Assessment Unit may be included in category 4C.). We do not place Assessment Units in Category 4C unless sufficient water-chemistry data are available (as defined in Table C-1). In addition, we consider available information related to the Assessment Unit, including the amount of water-chemistry data, characteristics of the stream, the degree of impairment, the presence of potential pollution sources, National Pollutant Discharge Elimination System permits, watershed information, or whether the impairment is attributable to degraded habitat or other non-pollutant causes. If we judge that an unidentified pollutant is contributing to the impairment, then Cause Unknown is identified as an additional cause, and the Assessment Unit is placed in Category 5.

Table C-1. Decision Table to Assess Aquatic Life Use in Streams

Each table cell represents a preliminary attainment decision based primarily on biological data: fish Index of Biological Integrity (fIBI), macroinvertebrate Index of Biological Integrity (mIBI), and Macroinvertebrate Biotic Index (MBI). See Table C-2 for how to interpret these biological indicators. See Table C-3 and Table C-4 for how to interpret surrogate water-chemistry data or physical-habitat data. The final review in table cell 8 applies to every preliminary attainment decision.

Biological Condition	**A. fIBI Indicates No Impairment fIBI ≥ 41**	**B. fIBI Indicates Moderate Impairment 20 < fIBI < 41**	**C. fIBI Indicates Severe Impairment fIBI ≤ 20**	**D. fIBI is Unavailable**
1. mIBI Indicates No Impairment mIBI ≥ 41.8	*Fully Supporting* (Water chemistry and other data are considered during final review) (See cell 8 below.)	If water-chemistry data or habitat data indicate a potential for impairment, then *Not Supporting*. Otherwise, *Fully Supporting*	*Not Supporting*	If water-chemistry data indicate a potential for severe impairment, then *Not Supporting* Otherwise, *Fully Supporting*
2. mIBI Indicates Moderate Impairment 20.9 < mIBI < 41.8	If water-chemistry data or habitat data indicate a potential for impairment, then *Not Supporting* Otherwise, *Fully Supporting*	*Not Supporting*	*Not Supporting*	*Not Supporting*
3. mIBI Indicates Severe Impairment mIBI ≤ 20.9	*Not Supporting*	*Not Supporting*	*Not Supporting*	*Not Supporting*

Table C-1. (Cont.) Decision Table to Assess Aquatic Life Use in Streams.

Biological Condition	A. fIBI Indicates No Impairment fIBI ≥ 41	B. fIBI Indicates Moderate Impairment 20 < fIBI < 41	C. fIBI Indicates Severe Impairment fIBI ≤ 20	D. fIBI is Unavailable
4. mIBI is Unavailable and MBI Indicates No Impairment MBI ≤ 5.9	*Fully Supporting*	*Not Supporting*	*Not Supporting*	If water-chemistry data indicate a potential for moderate impairment, then *Not Supporting*. If water-chemistry data and sufficient habitat data[(1)] indicate no impairment, then *Fully Supporting.* Otherwise, no assessment is made[(2)].
5. mIBI is Unavailable and MBI Indicates Moderate Impairment 5.9 < MBI ≤ 8.9	If water-chemistry data or habitat data indicate a potential for impairment, then *Not Supporting*. Otherwise, *Fully Supporting*	*Not Supporting*	*Not Supporting*	*Not Supporting*
6. mIBI is Unavailable and MBI Indicates Severe Impairment MBI > 8.9	*Not Supporting*	*Not Supporting*	*Not Supporting*	*Not Supporting*

Table C-1. (Cont.) Decision Table to Assess Aquatic Life Use in Streams.

Biological Condition	A. fIBI Indicates No Impairment fIBI $\geq$ 41	B. fIBI Indicates Moderate Impairment 20 < fIBI < 41	C. fIBI Indicates Severe Impairment fIBI $\leq$ 20	D. fIBI is Unavailable
7. mIBI and MBI are Unavailable	If water-chemistry data indicate a potential for severe impairment, then *Not Supporting* Otherwise, *Fully Supporting*	*Not Supporting*	*Not Supporting*	If water-chemistry data indicate a potential for moderate impairment, then *Not Supporting*. If water-chemistry data indicate a potential for severe impairment, then *Not Supporting*. If sufficient water-chemistry data(3) and sufficient habitat data(1) indicate no impairment, then *Fully Supporting*. Otherwise, no assessment is made(2).
8. Final review using site-specific knowledge and considering available biological, water-chemistry, physical-habitat, and other information. This review considers factors such as the extent to which biological-indicator scores exceed or fall short of impairment thresholds, the type and degree of water-quality-standard exceedances, the type and degree of habitat degradation, and the presence of pollution sources. Based on this review, the biologist may modify the preliminary attainment decision. If current data are not adequate to make a new assessment, then the previous assessment status remains unchanged.				

1. "*Sufficient habitat data*" means a dataset at least as representative of physical-habitat conditions as the dataset that is typically available from an Intensive Basin Survey. For relatively few waters, assessments of Aquatic Life Use as *Fully Supporting* may lack consideration of habitat data because appropriate physical-habitat indicators have not yet been fully developed or conditions prevented comprehensive habitat measurements or observations. Typically, these are large-stream locations.
2. If a previous assessment exists, it remains unchanged.
3. "*Sufficient water chemistry data*" means a dataset at least as representative of water-chemistry conditions as the three-year dataset that is typically available from an Ambient Water Quality Monitoring Network site.

Table C-2. Impairment Thresholds of Biological Indicators to Assess Aquatic Life Use in Streams

Biological Indicator	No Impairment	Moderate Impairment	Severe Impairment
	Fully Supporting	Not Supporting	Not Supporting
Fish Index of Biological Integrity (fIBI)	fIBI $\geq$ 41	20 < fIBI < 41	fIBI $\leq$ 20
Macroinvertebrate Index of Biological Integrity (mIBI)	mIBI $\geq$ 41.8	20.9 < mIBI < 41.8	mIBI $\leq$ 20.9
Macroinvertebrate Biotic Index (MBI)	MBI $\leq$ 5.9	5.9 < MBI $\leq$ 8.9	MBI > 8.9

Table C-3. Interpreting Water Chemistry Data to Indicate Potential Impairment of Aquatic Life Use in Streams

Number of Observations[(1)]	Type of Parameter	Water-Quality Standard	Water-Chemistry Condition Indicating Potential for Moderate Impairment[(2)]	Water Chemistry Condition Indicating Potential for Severe Impairment[(2)]
Ten or more observations are available for the applicable water-chemistry parameter	Toxic[(3)]	Acute	For any single parameter, two observations exceed the applicable standard[(4)].	For any single parameter, three or more observations exceed the applicable standard.
		Chronic	For any single parameter, there is one exceedance of the applicable standard[(5)].	For any single parameter, there are two or more independent exceedances of the applicable standard[(5)(6)].
	Nontoxic[(7)]	Other	For any single parameter, more than 10% but no more than 25% of observations exceed the applicable standard	For any single parameter, more than 25% of observations exceed the applicable standard; or, there are one or more independent exceedances of any standard that requires multiple observations to apply[(5)].

Table C-3. (Cont.) Interpreting Water Chemistry to Indicate Potential Impairment of Aquatic Life Use in Streams

Number of Observations[1]	Type of Parameter	Water-Quality Standard	Water-Chemistry Condition Indicating Potential for Moderate Impairment[2]	Water-Chemistry Condition Indicating Potential for Severe Impairment[2]
Fewer than 10 observations are available for the applicable water-chemistry parameter	Toxic[3]	Acute	Among all parameters, one observation exceeds an applicable standard.	Among all parameters, two or more observations exceed an applicable standard.
		Chronic	Among all parameters, there is one exceedance of an applicable standard [6].	Among all parameters, there are two or more independent exceedances of an applicable standard [5][6].
	Nontoxic[7]	Other	Among all parameters, two observations exceed an applicable standard.	Among all parameters, three or more observations exceed an applicable standard.

1. The most recent consecutive three years of data are used. It is not necessary that observations be available for every parameter of each type; the assessment is based on available data. As used in Table C-1, "*sufficient water chemistry data*" means a dataset at least as representative of water-chemistry conditions as the three-year dataset that is typically available from an Ambient Water Quality Monitoring Network site.
2. If conditions in at least one table cell apply, then the potential for impairment is indicated.
3. Includes 2, 4-D, alachlor, atrazine, ammonia, arsenic, barium, benzene, cadmium, chloride, chlorine, chromium (hexavalent and trivalent), copper, cyanazine, cyanide, dicamba, endrin, ethylbenzene, fluoride, iron, lead, manganese, mercury, metolachlor, metribuzin, nickel, selenium, silver, sulfate, terbufos, toluene, xylenes, and zinc or any parameter with an acute or chronic aquatic-life criterion derived according to 35 IAC 302.210. If no specific chronic water-quality standard applies, then the standard is interpreted as an acute one.
4. Hereafter in this table, "*applicable standard*" refers to an Illinois General Use Water Quality Standard, 35 IAC 302.208, 302.212, 303.444, and 35 IAC 303.311 through 303.445) or an aquatic-life criterion derived according to 35 IAC 302.210.
5. Relevant chronic standards are defined in 35 IAC 302.208, 302.210, 302.212, and 303.444. We apply chronic standards as follows. If the chronic standard is exceeded for more than four days as determined by linear interpolation of three or more observations, then the water-chemistry condition indicates the potential for moderate impairment. If the chronic standard is exceeded for more than one *independent* set of observations, then the water-chemistry condition indicates the potential for severe impairment. For details see Appendix B-2: *A New Method to Apply Chronic Water-Quality Standards When Assessing Attainment of Aquatic Life Use in Illinois Waters*
6. For a chronic standard, *independent exceedance* means a set of exceeding observations that does not share any observations with another set of exceeding observations.
7. Includes: water temperature, pH, and dissolved oxygen.

Table C-4. Interpreting Physical Habitat to Indicate Potential Impairment of Aquatic Life Use in Streams

Degraded Habitat Conditions[1] Indicating the Potential for Impairment[2]	Information Sources Used to Determine Degraded Habitat
Moderate to severe habitat alteration by channelization and dredging activities, removal of riparian vegetation, bank failure, heavy watershed erosion or alteration of flow regime (USEPA 1997).	Illinois EPA field observations and notes documenting: new channelization; or, >50% of riparian vegetation is denuded; or, heavy sediment deposition; or, the presence of dams/impoundments. A Qualitative Habitat Evaluation Index (Rankin 1989) assessment indicating: instream cover is "nearly absent" (due to anthropogenic causes); or, there is "recent channelization/no recovery;" or, substrate quality indicates "Silt heavy;" or, there is no riparian width; or, bank erosion is "heavy/severe."

1. As used in Table C-1 "s*ufficient habitat data*" means a dataset at least as representative of physical-habitat conditions as the dataset that is typically available from an Intensive Basin Survey.
2. If any of the conditions exist, the potential for impairment is indicated.

Table C-5. Guidelines to Identify Potential Causes of Impairment of Aquatic Life Use in Streams

Pesticides and Other Organic Pollutants	Guidelines Based on Water-Quality Standards[1]
2,4-D	Acute: 100 µg/L[2], Chronic: 8 µg/L[2]
Alachlor	Acute: 1100 µg/L[2]
alpha-BHC	Acute: 31 µg/L[2], Chronic: 2.5 µg/L[2]
Atrazine	Acute: 82 µg/L[2], Chronic: 9 µg/L[2]
Benzene	Acute: 4200 µg/L, Chronic: 860 µg/L
Cyanazine	Acute: 370 µg/L[2], Chronic: 30 µg/L[2]
Dicamba	Acute: 1500 µg/L, Chronic: 150 µg/L
Endrin	Acute: 160 µg/L[2], Chronic: 33 µg/L[2]
Ethylbenzene	Acute: 150 µg/L, Chronic: 14 µg/L
Metolachlor	Acute: 380 µg/L[2], Chronic: 30.4 µg/L[2]
Metribuzin	Acute: 8.4 mg/L[2]
Terbufos	Acute: 0.024 µg/L[2]
Toluene	Acute: 2000 µg/L, Chronic: 600 µg/L
Trifluralin	Acute: 26 µg/L[2], Chronic: 1.1 µg/L[2]
Xylenes (total mixed)	Acute: 920 µg/L, Chronic: 360 µg/L
Metal Pollutants	
Arsenic	Acute: 360 µg/L (dissolved), Chronic: 190 µg/L (dissolved)
Barium	Acute: 5000 µg/L
Boron	Acute: 40100 µg/L, Chronic: 7600 µg/L
Cadmium	Hardness dependent
Copper	Hardness dependent
Chromium, hexavalent	Acute: 16 µg/L, Chronic: 11 µg/L
Chromium, trivalent	Hardness dependent
Iron	Acute: 1000 µg/L (dissolved)
Lead	Hardness dependent
Manganese	Hardness dependent
Mercury	Acute: 2.2 µg/L (dissolved), Chronic: 1.1 µg/L(dissolved)
Nickel	Hardness dependent
Selenium	Acute: 1000 µg/L
Silver	Acute: 5 µg/L
Zinc	Hardness dependent
Other Pollutants[3]	
Ammonia (Total)	Temperature and pH dependent
Cause Unknown	If the pollutant causing a water quality standard violation is unknown, cause unknown is listed[3]
Chlorides	Acute: 500 mg/L
Chlorine	Acute: 19 µg/L, Chronic: 11 µg/L
Cyanide	Acute: 22 µg/L, Chronic: 5.2 µg/L

Table C-5 (Cont.) Guidelines to Identify Potential Causes of Impairment of Aquatic Life Use in Streams

Other Pollutants (Cont.)[3]	
Fluoride	Hardness dependent
Dissolved Oxygen[4]	Seasonal and water body dependent
pH	Acute: <6.5 or >9.0
Sulfate	Hardness and chloride dependent
Temperature, Water *(used only for thermal point sources)*	Dependent on season and 2.8°C maximum rise in water temperature[5]
Other Toxic Pollutants	(any pollutant with aquatic life criteria derived under 35 IAC 302.210)[2]
Nonpollutants	**Guidelines Not Based on Water-Quality Standards**
Alteration in stream-side or littoral vegetative covers	Observed degradation from alteration in stream-side or littoral vegetative covers[6, 7]
Alteration in wetland habitats	Observed degradation from alteration in wetland habitats[5]
Changes in stream depth and velocity patterns	Observed degradation from alteration/reduction of hydrologic diversity[6, 7]
Fish Kills	Documented fish kill from Illinois Department of Natural Resources or Illinois EPA records[6]
Fish-Passage Barrier	Observed degradation from fish-passage barrier[6]
Loss of instream cover	Observed degradation from reductions in instream cover[6, 7]
Flow alterations	Observed degradation from flow alterations[6, 7]
Non-Native Fish, Shellfish, or Zooplankton	Observed degradation from non-native fish, shellfish or zooplankton[6, 7]
Physical substrate habitat alterations	Observed degradation from substrate alterations

1. General Use Water Quality Standards at 35 Ill. Adm. Code 302, Subpart B. Unless otherwise indicated, a single exceedance of a water-quality standard indicates a potential cause of impairment. For applying these guidelines, Illinois EPA typically uses data from our three primary stream-monitoring programs: Ambient Water Quality Monitoring Network (most recent three years), Intensive Basin Surveys (most recent survey), Facility Related Stream Surveys (most recent survey).
2. Criterion derived according to 35 Ill. Adm. Code 302.210. Derived water-quality criteria are available at https://www2.illinois.gov/epa/topics/water-quality/standards/Pages/derived-criteria.aspx.
3. Cause Unknown means unknown pollutant and is used when the pollutant causing a water-quality standard violation is not identified or when no causes are identified.
4. In some Assessment Units, a TMDL study may have determined that violations of the dissolved-oxygen standard are not caused by a pollutant. For these cases, the cause, "Dissolved Oxygen", is classified as a non-pollutant.
5. 35 Ill. Adm. Code 302.211.
6. See Table C-4.
7. Site-specific observation, information, or knowledge.

Aquatic Life Use – Lakes

We assess Aquatic Life Use in lakes by using the Aquatic Life Use Index (ALI) (Table C-6 and Table C-7). To calculate the ALI score, we use the Trophic State Index (TSI; Carlson 1977), the percent surface area macrophyte coverage during the peak growing season (June through August), and the median concentration of nonvolatile suspended solids.

Physicochemical water data collected via the Ambient Lake Monitoring Program or by non-Illinois EPA persons under an approved quality assurance project plan also inform our assessments of Aquatic Life Use. The data used include: Secchi disk transparency, chlorophyll *a*, total phosphorus (epilimnetic samples only), nonvolatile suspended solids (epilimnetic samples only), and percent surface area macrophyte coverage. We collect data a minimum of four times per year (April through October) from one or more lake sites. Lake data must meet the following minimum requirements (Figure C-2): 1) at least four out of seven months (April through October) of data are available, 2) at least two of these months occur during the peak growing season of June through August (this requirement does not apply to nonvolatile suspended solids), and 3) usable data are available from at least half of the sites sampled within any given lake each month. As outlined in Figure C-2, we calculate a whole-lake TSI value for the median Secchi disk transparency, median total phosphorus (epilimnetic sample depths only), and median chlorophyll *a* value. We require a minimum of two parameter-specific TSI values to calculate parameter-specific use support determinations, which we use to make the assessment. We incorporated the 0.05 mg/L Illinois General Use Water Quality Standard for total phosphorus in lakes (35 Ill. Adm. Code 302.205) into the weighting criteria used to assign point values for the ALI.

Table C-6. Aquatic Life Use Index

Indicator	Parameters	Range	Points
1. Trophic State Index (TSI)	For data collected April-October: Whole-lake TSI value calculated from median total phosphorus (epilimnetic sample only), median chlorophyll *a*, and median Secchi disk transparency values.	a. <60 b. ≥60<85 c. ≥85<90 d. ≥90	a. 40 b. 50 c. 60 d. 70
2. Macrophyte Coverage	Average percentage of lake area covered by macrophytes (emergent, floating, and submersed) during peak growing season (June through August). Determined by: a. Macrophyte survey conducted during same water year as the chemical data used in the assessment, or b. Average value based on reported field observations.	a. ≥15<40 b. ≥10<15, ≥40<50 c. ≥5<10, ≥50<70 d. <5, ≥70	a. 0 b. 5 c. 10 d. 15
3. Nonvolatile Suspended Solids Concentration	For data collected April-October: Median concentration (mg/L) of nonvolatile suspended solids in epilimnetic samples.	a. <12 b. ≥12<15 c. ≥15<20 d. ≥20	a. 0 b. 5 c. 10 d. 15

Figure C-2. Flow Chart to Assess Aquatic Life Use in Lakes

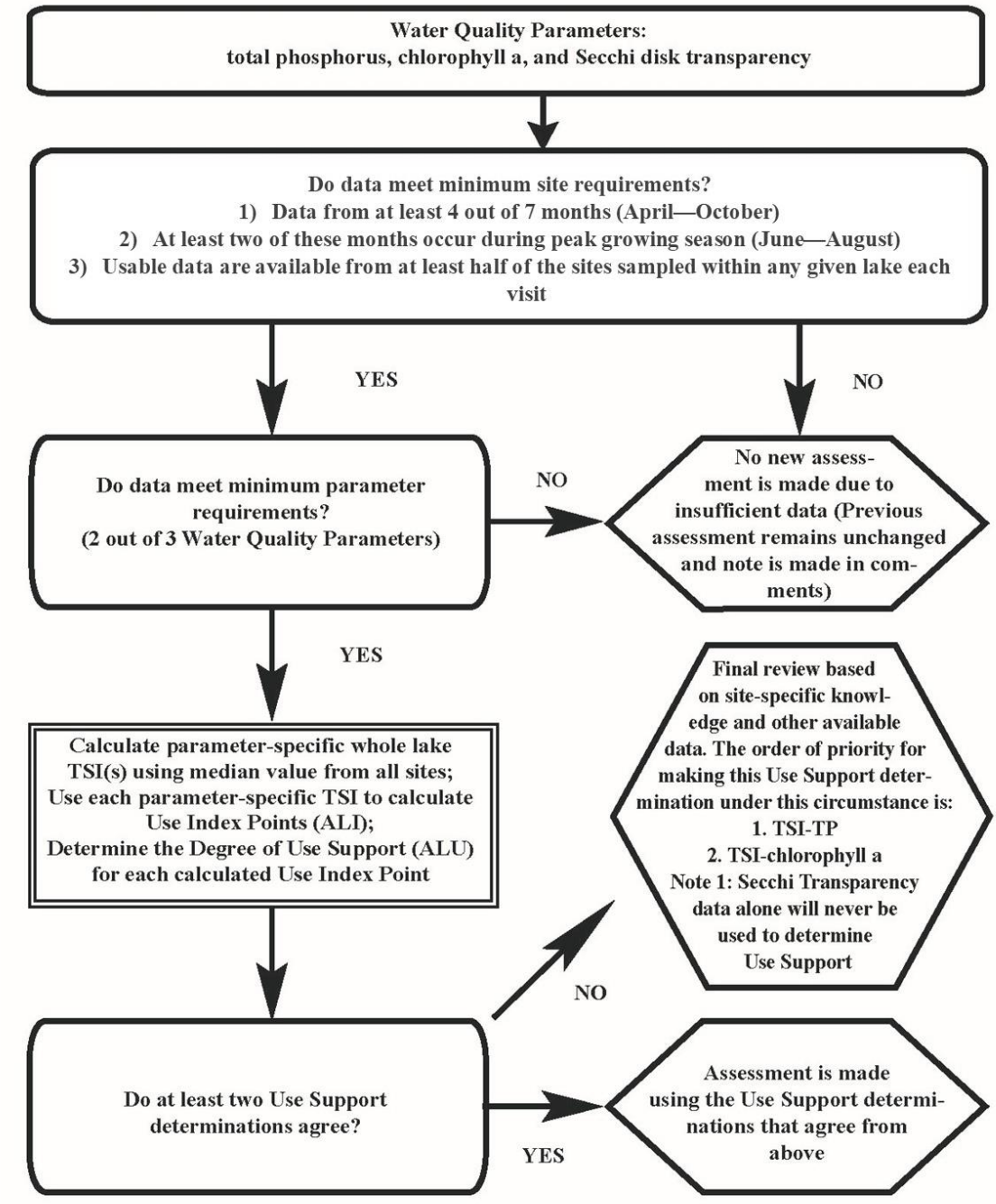


Table C-7. Impairment Threshold of the Aquatic Life Use Index to Assess Aquatic Life Use in Lakes

Use Support	Guidelines
Fully Supporting	Total ALI points are <75
Not Supporting	Total ALI points are ≥75

When Aquatic Life Use is found to be Not Supporting in a particular lake, we identify potential causes of impairments. Table C-8 lists specific guidelines used to determine potential causes of impairment of Aquatic Life Use in lakes. One exceedance of an applicable Illinois water quality standard at any site or depth in the lake results in identifying the parameter as a potential cause of impairment. Additional guidelines used to determine potential causes of impairment include site-specific standards (35 Ill. Adm. Code 303.Subpart C) or adjusted standards available at https://pcb.illinois.gov/SLR/IPCBandIEPAEnvironmentalRegulationsTitle35.) We also consider documented anthropogenic disturbances to lake habitat as the basis for identifying some non-pollutant causes.

Table C-8. Guidelines for Identifying Potential Causes of Impairment of Aquatic Life Use in Lakes

Pesticides and other Organic Pollutants	Guidelines Based on Water Quality Standards[1, 2]
2,4-D	Acute: 100 µg/L[3], Chronic: 8 µg/L[3]
Alachlor	Acute: 1100 µg/L[3]
alpha-BHC	Acute: 31 µg/L[3], Chronic: 2.5 µg/L[3]
Atrazine	Acute: 82 µg/L[3], Chronic: 9 µg/L[3]
Benzene	Acute: 4200 µg/L, Chronic: 860 µg/L
Cyanazine	Acute: 370 µg/L[3], Chronic: 30 µg/L[3]
Dicamba	Acute: 1500 µg/L[3], Chronic: 150 µg/L[3]
Endrin	Acute: 160 µg/L[3], Chronic: 33 µg/L[3]
Ethylbenzene	Acute: 150 µg/L, Chronic: 14 µg/L
Metolachlor	Acute: 380 µg/L[3], Chronic: 30.4 µg/L[3]
Metribuzin	Acute: 8.4 mg/L[3]
Terbufos	Acute: 0.024 µg/L[3]
Toluene	Acute: 2000 µg/L, Chronic: 600 µg/L
Trifluralin	Acute: 26 µg/L[3], Chronic: 1.1 µg/L[3]
Xylenes (total mixed)	Acute: 920 µg/L, Chronic: 360 µg/L
Metal Pollutants	
Arsenic	Acute: 360 µg/L (dissolved), Chronic: 190 µg/L (dissolved)
Barium	Acute: 5000 µg/L
Boron	Acute: 40100 µg/L[3], Chronic: 7600 µg/L[3]
Cadmium	Hardness dependent
Copper	Hardness dependent
Chromium, hexavalent	Acute: 16 µg/L, Chronic: 11 µg/L
Chromium, trivalent	Hardness dependent
Iron	Acute: 1000 µg/L (dissolved)
Lead	Hardness dependent

Table C-8 (Cont.) Guidelines to Identify Potential Causes of Impairment of Aquatic Life Use in Lakes

Metal Pollutants (Cont.)	Criteria Based on Water Quality Standards[2] (Cont.)
Manganese	Hardness dependent
Mercury	Acute: 2.2 μg/L (dissolved), Chronic: 1.1 μg/L(dissolved)
Nickel	Hardness dependent
Selenium	Acute: 1000 μg/L
Silver	Acute: 5 μg/L
Zinc	Hardness dependent
Other Pollutants[4]	
Ammonia (Total)	Temperature and pH dependent
Cause Unknown	If the pollutant causing a water quality standard violation is unknown, cause unknown is listed[5]
Chlorides	Acute: 500 mg/L
Chlorine	Acute: 19 μg/L, Chronic: 11 μg/L
Cyanide	Acute: 22 μg/L, Chronic: 5.2 μg/L
Fluoride	Hardness dependent
Dissolved Oxygen[4]	Seasonal and water body dependent
pH	Acute: <6.5 or >9.0
Phosphorus (Total)	Acute: 0.05 mg/L in lakes ≥ 20 acres[6]
Sulfate[4]	Hardness and chloride dependent
Temperature, Water *(used only for thermal point sources)*	Dependent on season and 2.8°C maximum rise in water temperature[7]
Other Toxic Pollutants	(any pollutant with aquatic life criteria derived under 35 IAC 302.210)[3]
Nonpollutant Causes	**Guidelines Not Based on Water Quality Standards**
Alteration in stream-side or littoral vegetative covers[6]	Observed degradation from alteration in stream-side or littoral vegetative covers[8]
Alteration in wetland habitats	Observed degradation from alteration in wetland habitats[8]
Fish Kills	Documented fish kill from Illinois Department of Natural Resources or Illinois EPA records[8]
Non-Native Aquatic Plants	Observed degradation from non-native aquatic plants[8]
Non-Native Fish, Shellfish, or Zooplankton[8]	Observed degradation from non-native fish, shellfish or zooplankton[8]

1. A single exceedance of a water-quality standard indicates a potential cause of impairment. Determination of causes is normally based on the most recent year of data from the Ambient Lake Monitoring Program or Source Water Assessment Program.
2. General Use Water Quality Standards at 35 Ill. Adm. Code 302, Subpart B.
3. Guideline derived according to 35 Ill. Adm. Code 302.210. Derived water-quality criteria are available at https://www2.illinois.gov/epa/topics/water-quality/standards/Pages/derived-criteria.aspx.
4. In some lakes, a TMDL study may have determined that violations of the dissolved-oxygen standard are not caused by a pollutant. For these lakes, the cause "Dissolved Oxygen" is classified as a non-pollutant.
5. Cause Unknown means unknown pollutant and is used when the pollutant causing a water-quality standard violation is not identified or when no causes are identified.
6. The total phosphorus standard at 35 Ill. Adm. Code 302.205 applies to lakes of 20 acres or larger.
7. 35 Ill. Adm. Code 302.211.
8. Site-specific observation, information, or knowledge.

Aquatic Life Use – Lake Michigan

Aquatic Life Use assessments apply to Lake Michigan open waters and Lake Michigan harbors. These assessments are based on the applicable Lake Michigan Basin Water Quality Standards. We use the most-recent three years of physicochemical water data to assess Aquatic Life Use (Table C-9).

Table C-9. Guidelines to Assess Aquatic Life Use in Lake Michigan Open Waters and Harbors

Lake Michigan Basin Water Quality Standards[1]	Fully Supporting	Not Supporting
	For every parameter	For any single parameter
Conventionals[2]: Percent of samples exceeding standards	≤10%	>10%
Other Chemical Constituents[3]: Number of samples exceeding acute standard	<2	≥2
Other Chemical Constituents[3]: Number of samples exceeding chronic standard	No exceedances	At least one exceedance

1. 35 Ill. Adm. Code 302, Subpart E. Based on the most current three years of data from Lake Michigan Monitoring Program sampled three times per year.
2. 35 Ill. Adm. Code, 302.502, 302.503, 302.507: dissolved oxygen, pH, and water temperature
3. 35 Ill. Adm. Code 302, 504, 302.535, and 302.540.

If an Assessment Unit of Lake Michigan is Not Supporting Aquatic Life Use, we identify potential causes of impairment. Table C-10 lists the guidelines for identifying potential causes of Aquatic Life Use impairment. These guidelines are based on Lake Michigan Basin Water Quality Standards. In general, at least one exceedance of a numeric standard within the most recent three-year period indicates a potential cause of impairment.

Table C-10. Guidelines to Identify Potential Causes of Impairment of Aquatic Life Use in Lake Michigan Open Waters and Harbors

Pesticides and other Organic Pollutants	Guidelines Based on Water Quality Standards[1, 2]
Benzene	Acute: 3900 µg/L, Chronic: 800 µg/L
bis (2-ethylhexyl) phthalate	Acute: 76 µg/L[3], Chronic: 17 µg/L[3]
Dieldrin	Acute: 240 ng/L, Chronic: 56 ng/L
Endrin	Acute: 0.086 µg/L, Chronic: 0.036 µg/L
Ethylbenzene	Acute: 150 µg/L, Chronic: 14 µg/L
Lindane (gamma BHC)	Acute: 0.95 µg/L
Parathion	Acute: 0.065 µg/L, Chronic: 0.013 µg/L
Pentachlorophenol (PCP)	pH dependent
Toluene	Acute: 2000 µg/L, Chronic: 610 µg/L
Xylenes (total mixed)	Acute: 1200 µg/L, Chronic: 490 µg/L
Arsenic	Acute: 340 µg/L (dissolved), Chronic 148 µg/L (dissolved)
Barium	Acute: 5 mg/L
Boron	Acute: 40100 µg/L[3], Chronic: 7600 µg/L[3]
Cadmium	Hardness dependent

Table C-10. (Cont.) Guidelines to Identify Potential Causes of Impairment of Aquatic Life Use in Lake Michigan Open Waters and Harbors

Metal Pollutants	Guidelines Based on Water Quality Standards[1, 2]
Copper	Hardness dependent
Chromium, hexavalent	Acute: 16 µg/L, Chronic: 11 µg/L
Chromium, trivalent	Hardness dependent
Iron	Acute: 1 mg/L (dissolved)
Lead	Hardness dependent
Manganese	Acute: 1 mg/L
Mercury	Acute: 1700 ng/L (dissolved), Chronic: 910 ng/L (dissolved)
Nickel	Hardness dependent
Selenium	Chronic: 5.0 µg/L (dissolved)
Zinc	Hardness dependent
Other Pollutants	
Ammonia (Total)	Acute: 15 mg/L
Ammonia (Un-ionized)	Temperature and pH dependent
Cause Unknown	If the pollutant causing a water quality standard violation is unknown, cause unknown is listed[4]
Chlorides	Acute: 500 mg/L
Chlorine	Acute: 19 µg/L, Chronic: 11 µg/L
Cyanide	Acute: 22 µg/L, Chronic: 5.2 µg/L
Fluoride	Acute: 1.4 mg/L
Dissolved Oxygen	≥90% saturation in open waters, 5.0 mg/L in remainder of basin[5]
pH	Acute: <7.0 or >9 in open waters; <6.5 or >9.0 in remainder of basin
Temperature, Water *(used only for thermal point sources)*	1.7°C maximum rise in water temperature
Total Dissolved Solids	Acute: 1000 mg/L or Conductivity > 1667 umho/cm
Nonpollutant Causes	**Guidelines not based on Water Quality Standards**
Alteration in stream-side or littoral vegetative covers	Observed degradation from alteration in stream-side or littoral vegetative covers[6]
Non-Native Aquatic Plants	Observed degradation from non-native aquatic plants[6]
Non-Native Fish, Shellfish, or Zooplankton	Observed degradation from non-native fish, shellfish or zooplankton[6]

1. Generally, a single exceedance of a water quality standard indicates a potential cause of impairment. For applying these guidelines, Illinois EPA typically uses data from the Lake Michigan Monitoring Program (most recent three years).
2. Illinois Lake Michigan Basin Water Quality Standards, 35 Ill. Adm. Code, Subpart E.
3. The guideline was derived according to 35 Ill. Adm. Code 302.540. Derived water-quality criteria are available at https://www2.illinois.gov/epa/topics/water-quality/standards/Pages/derived-criteria.aspx.
4. Cause Unknown means unknown pollutant and is used when the pollutant causing a water-quality standard violation is not identified or when no causes are identified.
5. Dissolved oxygen must not be less than 90% of saturation, except due to natural causes, in the open waters of Lake Michigan. In other waters of the Lake Michigan Basin, dissolved oxygen must not be less than 6.0 mg/L during at least 16 hours of any 24-hour period, nor less than 5.0 mg/L at any time.
6. Site-specific observation, information, or knowledge.

Indigenous Aquatic Life Use, Upper Dresden Island Pool Aquatic Life Use, Chicago Area Waterway System Aquatic Life Use A, and Chicago Area Waterway System and Brandon Pool Aquatic Life Use B

The Chicago Area Waterway System and Lower Des Plaines River Water Quality and Indigenous Aquatic Life Standards apply to about 86 miles of canals, channels, and modified streams and to Lake Calumet, in northeastern Illinois (35 Ill. Adm. Code Section 302 Subpart D). These standards replaced the previous Secondary Contact and Indigenous Aquatic Life Standards, which were intended to protect-indigenous aquatic life limited only by the physical configuration of the body of water, characteristics, and origin of the water and the presence of contaminants in amounts that do not exceed these water-quality standards. Currently only one Assessment Unit (South Fork South Branch Chicago River, IL_HCA-01) is designated for Indigenous Aquatic Life Use. Three new aquatic-life uses now also apply: Upper Dresden Island Pool Aquatic Life Use, Chicago Area Waterway System Aquatic Life Use A, and Chicago Area Waterway System and Brandon Pool Aquatic Life Use B.

For the 2020-2022 reporting cycle, the new uses and water-quality standards serve as the basis for assessing attainment and identifying causes of use impairment. We compare available physicochemical water data to the appropriate guidelines (Table C-11 and C-12).

Table C-11. Guidelines to Assess Indigenous Aquatic Life Use, Upper Dresden Island Pool Aquatic Life Use, Chicago Area Waterway System Aquatic Life Use A, or Chicago Area Waterway System and Brandon Pool Aquatic Life Use B

Chicago Area Waterway System and Lower Des Plaines River Water Quality and Indigenous Aquatic Life Standards[1]	**Fully Supporting**	**Not Supporting**
	For every parameter	**For any single parameter**
Conventionals[2]: Percent of samples exceeding standards	≤10%	>10%
Other Chemical Constituents[3]: Number of samples exceeding acute standard	<2	≥2
Other Chemical Constituents[3]: Number of samples exceeding chronic standard	No exceedances	At least one exceedance

1. 35 Ill. Adm. Code, 302, Subpart D. For applying these guidelines, Illinois EPA typically uses the most recent three years of data from our Ambient Water Quality Monitoring Network or other sources.
2. 35 Ill. Adm. Code 302.404, 302.405, and 302.408: Dissolved oxygen, pH, and water temperature.
3. 35 Ill. Adm. Code 302.407, 302.408, 302.409, 302.412, and 302.410.

Table C-12. Guidelines to Identify Potential Causes of Impairment of Indigenous Aquatic Life Use, Upper Dresden Island Pool Aquatic Life Use, Chicago Area Waterway System Aquatic Life Use A, or Chicago Area Waterway System and Brandon Pool Aquatic Life Use B

Pollutants	Indigenous Aquatic Life Use	Other Aquatic-Life Uses
	Guidelines Based on Water Quality Standards[1,2]	
Metal Pollutants		
Arsenic	1000 µg/L (total)	Acute: 340 µg/L, Chronic: 150 µg/L (trivalent, dissolved)
Barium (total)	5000 µg/L	
Cadmium	150 µg/L (total)	Hardness dependent (dissolved)
Copper	1000 µg/L (total)	Hardness dependent (dissolved)
Chromium, hexavalent	300 µg/L	Acute: 16 µg/L, Chronic: 11 µg/L
Chromium, trivalent	1000 µg/L	Hardness dependent
Iron	500 µg/L (dissolved); 2000 µg/L (total)	1000 µg/L (dissolved)
Lead	100 µg/L (total)	Hardness dependent (dissolved)
Manganese	1000 µg/L (total)	Hardness dependent (dissolved)
Mercury	0.5 µg/L (total)	Acute: 22 µg/L, Chronic: 10 µg/L (dissolved)
Nickel	1000 µg/L (total)	Hardness dependent (dissolved)
Selenium (total)	1000 µg/L	1000 µg/L
Silver	1100 µg/L (total)	Hardness dependent (dissolved)
Zinc	1000 µg/L (total)	Hardness dependent (dissolved)
Other Pollutants		
Ammonia	0.1 mg/L (Un-ionized)	Temperature and pH dependent (total)
Benzene	—	Acute: 4200 µg/L, Chronic: 860 µg/L
Chloride	—	500 mg/L
Cyanide	0.1 mg/L	Acute: 22 µg/L, Chronic: 10 µg/L
Ethylbenzene	NA	Acute: 150 µg/L, Chronic: 14 µg/L
Fluoride	15 mg/L	Hardness dependent
Oil and Grease	15 mg/L	—
Dissolved Oxygen[3]	≥ 4.0 mg/L (≥ 3.0 mg/L in the Cal-Sag Channel)	Seasonal and water body dependent
pH	≥6.0 & ≤9.0	≥6.5 & ≤9.0
Phenols	0.3 mg/L	—
Sulfate	—	Hardness & Chloride dependent
Temperature, Water *(used only for thermal point sources)*	100° F maximum & must not exceed 93 °F more than 5% of time	Dependent on season and 2.8 °C maximum rise in water temperature
Total Dissolved Solids	1500 mg/L (Conductivity >2500 umho/cm)	1500 mg/L

Table C-12. (Cont.) Guidelines to Identify Potential Causes of Impairment of Indigenous Aquatic Life Use, Upper Dresden Island Pool Aquatic Life Use, Chicago Area Waterway System Aquatic Life Use A, or Chicago Area Waterway System and Brandon Pool Aquatic Life Use B

Pollutants	Indigenous Aquatic Life Use	Other Aquatic-Life Uses
	Guidelines Based on Water Quality Standards[1,2]	
Other Pollutants		
Toluene	—	Acute: 2000 µg/L, Chronic: 600 µg/L
Total Residual Chlorine	—	Acute: 19 µg/L, Chronic: 11 µg/L
Xylenes	—	Acute: 920 µg/L, Chronic: 360 µg/L
Other Toxic Substances[4]		
Any toxic substance not listed above[4]	One half the 96-hour median tolerance limit	(any pollutant with aquatic-life criteria derived under 35 IAC 302.612 through 302.618, 302,621, 302.627, or 302.630)[2]
Nonpollutant Causes	**Criteria Not Based on Water Quality Standards[5]**	
Fish Kills	Documented fish kill from Illinois Department of Natural Resources or Illinois EPA Records[5]	
Fish-Passage Barrier	Observed degradation from fish-passage barrier[5]	
Low flow alterations	Observed degradation from low flow alterations[5]	
Non-Native Fish, Shellfish, or Zooplankton	Observed degradation from non-native species[5]	
Other flow alterations	Observed degradation from other flow alterations[5]	

1. Unless otherwise indicated, for numeric guidelines, a single exceedance of a water-quality standard indicates a potential cause of impairment. For applying these guidelines, Illinois EPA typically uses data from our three primary stream-monitoring programs: Ambient Water Quality Monitoring Network (most recent three years), Intensive Basin Surveys (most recent survey), and Facility-Related Stream Surveys (most recent survey).
2. Chicago Area Waterway System and Lower Des Plaines River Water Quality and Indigenous Aquatic Life Standards, 35 Ill. Adm. Code, 302, Subpart D
3. In some Assessment Units a TMDL study may have determined that violations of the dissolved- oxygen standard are not caused by a pollutant. For these cases, the cause "Dissolved Oxygen" is classified as a non-pollutant.
4. 35 Ill. Adm. Code 302.410.
5. Site-specific observation, information, or knowledge.

Fish Consumption Use– Streams, Lakes, and Lake Michigan

Fish Consumption Use is associated with all waterbodies in the state. We assess Fish Consumption Use by using fish-tissue data collected at various sites. We extrapolate the site-based results to apply to all Assessment Units of the entire named waterbody (stream or lake).

Fish Consumption use assessments follow the U.S. Food & Drug Administration (FDA) Action Levels as criteria (Table C-13), except for polychlorinated biphenyls, mercury, and chlordane. For these contaminants, we use the risk-based process developed in the *Protocol for a Uniform*

Great Lakes Sport Fish Consumption Advisory (Anderson et al. 1993), herein after referred to as the Protocol). The Protocol requires the determination of a Health Protection Value, for a contaminant, that is then used with five meal consumption frequencies based on eight ounces of uncooked filet (Table C-14).

Except in extraordinary circumstances, two or more recent sampling events in a waterbody in two different sampling years finding fish exceeding a level of concern for one or more contaminants are necessary to make or change a Fish Consumption Use assessment (based on data collected since 1985). Similarly, two or more recent samples from two different years finding no fish exceeding criteria are necessary for rescinding a "Not Supporting" assessment.

Table C-15 lists guidelines for assessing attainment of Fish Consumption Use.

Table C-16 lists guidelines to identify potential causes of Fish Consumption Use impairment. Although all parameters with FDA action levels are listed in the table, only polychlorinated biphenyls, mercury, and chlordane have been detected in Illinois fish samples at levels that would warrant a fish-consumption advisory.

Table C-13. U.S. Food and Drug Administration Action Level Used in Fish Consumption Use Assessments

Pollutants	Action Level (mg/kg)
Aldrin	0.3
DDT (Total)	5.0
Dieldrin	0.3
Endrin	0.3
Heptachlor	0.3
Heptachlor epoxide	0.3
Mirex	0.1
Toxaphene	5.0

Table C-14. Health Protection Values (HPVs) and Criteria Levels for Sport-Fish-Consumption Advisories for Polychlorinated Biphenyls, Methyl Mercury, and Chlordane

Pollutants	HPV (ug/kg/day)	Target Population Effect	Meal Frequency	Criteria Levels(mg/kg)
Polychlorinated biphenyls	0.05	All (emphasis on sensitive[(1)]) Reproductive/ developmental effects	Unlimited	0 – 0.05
			1 meal/week	0.06 – 0.22
			1 meal/month	0.23 – 0.95
			1 meal/2 months	0.96 – 1.9
			Do not eat	>1.9

Table C-14. (Cont.) Health Protection Values (HPVs) and Criteria Levels for Sport-Fish-Consumption Advisories for Polychlorinated Biphenyls, Methyl Mercury, and Chlordane

Pollutants	HPV (ug/kg/day)	Target Population Effect	Meal Frequency	Criteria Levels (mg/kg)
Methyl mercury	0.1	Sensitive[1], Reproductive/ developmental effects	Unlimited	0 – 0.05
			1 meal/week	0.06 – 0.22
			1 meal/month	0.23 – 1.0
			Do not eat	>1.0
	0.3	Nonsensitive[1], Nervous system effects	Unlimited	0 – 0.15
			1 meal/week	0.16 – 0.65
			1 meal/month	0.66 – 1.0
			Do not eat	>1.0
Chlordane	0.15	All, Liver effects	Unlimited	0 – 0.15
			1 meal/week	0.16 – 0.65
			1 meal/month	0.66 – 2.8
			1 meal/2 months	2.9 – 5.6
			Do not eat	>5.6

1. Sensitive Population includes pregnant or nursing women, women of child-bearing age, and children under 15. Nonsensitive Population includes women beyond child-bearing age and men over 15.

Table C-15. Guidelines to Assess Fish Consumption Use in Streams, Lakes, and Lake Michigan

Use Support	Guidelines[1]
Fully Supporting[2]	1. For available and applicable results of any of the following substances in fish tissue, no FDA action levels are exceeded in the two most recent years: aldrin, DDT (total), dieldrin, endrin, heptachlor, heptachlor epoxide, mirex, toxaphene; and 2. Polychlorinated biphenyls are less than 0.06 mg/kg and chlordane is less than 0.16 mg/kg in fish tissue, of each species, in the two most-recent years of samples collected since 1985; and, 3. Mercury is less than 0.06 mg/kg in fish tissue, of each species, in the two most recent years of samples collected since 1985, and those samples include a large size class[3] of at least one predator species[4] in two different years.
Not Supporting	1. For available and applicable results of any of the following substances in fish tissue, at least one FDA action level is exceeded in the two most recent years: aldrin, DDT (total), dieldrin, endrin, heptachlor, heptachlor epoxide, mirex, or toxaphene; or 2. Polychlorinated biphenyls are greater than or equal to 0.06 mg/kg or chlordane is greater than or equal to 0.16 mg/kg in fish tissue of any species in at least one of the two most-recent years of samples collected since 1985;[3] or 3. Mercury is greater than or equal to 0.06 mg/kg in fish tissue of any species in at least one of the two most-recent years of samples collected since 1985.[5]

1. In general, all data for each Assessment Unit are combined to make the assessment.
2. An assessment of Fully Supporting Fish Consumption Use requires fish-tissue data from two different years (1985 or later). If more than two years of fish-tissue data are available (1985 or later), only the two most recent years of data (per species) are used in the assessment process.
3. The meaning of "large size class" varies with species and water body.
4. "Predatory species" include northern pike, muskellunge, flathead catfish, chinook salmon, coho salmon, lake trout, brown trout, white bass, striped bass, striped-bass hybrids, smallmouth bass, largemouth bass, spotted bass, sauger, walleye, and saugeye.
5. Only one sample of fish tissue (1985 or later) exceeding criteria levels is necessary for an assessment of Not Supporting. If more than two years of fish-tissue data are available (1985 or later), only the two most recent years of data (per species) are used in the assessment process.

Table C-16. Guidelines to Identify Potential Causes of Impairment of Fish Consumption Use in Streams, Lakes, and Lake Michigan

Potential Cause	Guidelines
Aldrin	Assessment Unit-specific fish-tissue data indicating concentration above the corresponding FDA Action Level.
Chlordane	
DDT	
Dieldrin	
Endrin	
Heptachlor	
Heptachlor epoxide	
Mirex	
Polychlorinated biphenyls	
Toxaphene	
Mercury	Assessment Unit-specific fish-tissue data indicating mercury ≥0.06 mg/kg

Primary Contact Use– Streams and Lakes

"Primary contact" means "...*any recreational or other water use in which there is prolonged and intimate contact with the water involving considerable risk of ingesting water in quantities sufficient to pose a significant health hazard, such as swimming and water skiing*" (35 Ill. Adm. Code 301.355). We assess Primary Contact Use by using fecal-coliform bacteria data. The General Use Water Quality Standard for fecal-coliform bacteria specifies that during the months of May through October, fecal-coliform bacteria counts must not exceed a geometric mean of 200 cfu/100 ml, based on a minimum of five samples taken over not more than a 30-day period. Also, no more than 10% of the samples during any 30-day period should exceed 400 cfu/100 ml (35 Ill. Adm. Code 302.209). This standard protects Primary Contact Use of Illinois waters by humans.

We rarely sample fecal-coliform bacteria at a frequency necessary to apply the General Use standard (i.e., at least five times in a 30-day period during May through October). Therefore, we base the assessment guidelines on concentration thresholds of the standards applied in the context of more-typical data availability.

To assess Primary Contact Use, we use fecal-coliform bacteria from water samples collected in May through October, over the most recent five-year period (i.e., 2015 through 2019 for this report). We calculate the geometric mean of fecal-coliform bacteria concentration and the frequency of exceedance for the entire set of samples collected from May through October over five years. We then compare calculated geometric means and the frequency of exceedance to the standard-based thresholds (Table C-17 and Table C-18). Some portions of stream segments are exempt from the fecal-coliform-bacteria water-quality standard; Primary Contact Use does not apply in these segments (35 Ill. Adm. Code 302.209).

Because Illinois EPA does not collect fecal-coliform bacteria samples in lakes and no other applicable data were available, there are no new assessments of Primary Contact Use for

lakes in this report. However, 1,814 lake acres remain assessed for Primary Contact Use based on data received from the Lake County Health Department prior to 2002.

Table C-17. Guidelines to Assess Primary Contact Use in Streams and Lakes

Use Support	Guidelines
Fully Supporting	No exceedances of the fecal-coliform-bacteria standard in the last five years, and the geometric mean of all fecal-coliform-bacteria observations in the last five years ≤200 cfu/100 ml, and ≤10% of all observations in the last five years exceed 400 cfu/100 ml.
Not Supporting	At least one exceedance of the fecal-coliform-bacteria standard in the last five years (when sufficient data is available to assess the standard); or, The geometric mean of all fecal-coliform-bacteria observations in the last five years >200 cfu/100 ml, or >10% of all observations in the last five years exceed 400 cfu/100 ml.

Table C-18. Guidelines to Identify Potential Causes of Impairment of Primary Contact Use in Streams and Lakes

Potential Cause	Guidelines
Fecal Coliform	When Primary Contact Use is assessed as Not Supporting based on the criteria in Table C-17, Fecal Coliform is listed as the cause.

Primary Contact Use – Lake Michigan Open Waters and Shoreline Waters

We assess Primary Contact Use in Lake Michigan open waters and Lake Michigan shoreline waters by using fecal-coliform bacteria. We collect fecal-coliform-bacteria data in the nearshore segment as part of the Lake Michigan Monitoring Program but collect an insufficient number of samples during a 30-day period to apply the standard as exactly prescribed. In addition, we collect these samples in the open lake, which may not reflect conditions in shoreline areas. Table C-19 lists guidelines used to assess Primary Contact Use in Lake Michigan Open Waters.

Table C-19. Guidelines to Assess Primary Contact Use in Lake Michigan Open Waters

Use Support	Guidelines [1, 2]
Fully Supporting	Geometric mean of all fecal-coliform-bacteria observations <200 cfu/100 ml, and ≤10% of observations exceed 400 cfu/100 ml.
Not Supporting	The geometric mean of all fecal-coliform-bacteria observations >200 cfu/100 ml, or >10% of observations exceed 400 cfu/100 ml.

1. Based on most-current three years of data from Lake Michigan Monitoring Program sampled approximately three times per year.
2. 35 Ill. Adm. Code 302.505.

At 51 Lake Michigan shoreline segments, local agencies collect daily *Escherichia coli* bacteria samples at beaches during the swimming season. These agencies may post advisories or close beaches if samples exceed 235/100 ml *Escherichia coli* bacteria (77 Ill. Adm. Code 820). Illinois EPA uses the advisory information to assess Primary Contact Use, in Lake Michigan Shoreline Assessment Units, based on the guidelines in Table C-20.

Table C-20. Guidelines to Assess Primary Contact Use in Lake Michigan Shoreline Assessment Units

Use Support	Guidelines[1]
Fully Supporting	For any shoreline segment, on average, less than one bathing area closure/advisory per year of less than one week's duration.
Not Supporting	For any shoreline segment, on average, at least one bathing area closure/advisory per year, or at least one bathing area closure of longer than one-week duration.

1. Based on most-current three years of data.

Guidelines to identify causes of impairment of Primary Contact Use in Lake Michigan open-water and shoreline Assessment Units are listed in Table C-21.

Table C-21. Guidelines to Identify Potential Causes of Impairment of Primary Contact Use in Lake Michigan Open Water and Shoreline Assessment Units

Potential Cause	Guidelines[1, 2]
Fecal Coliform	Geometric mean of all fecal-coliform-bacteria observations (minimum of five samples) collected during the most recent three years >200 cfu/100 ml, or >10% of observations exceed 400 cfu/100 ml.
Escherichia coli	For any shoreline segment, on average at least one bathing beach closure/advisory per year based on *E. coli* bacteria.

1. The applicable fecal-coliform standard in 35 Illinois Administrative Code, Part 302, Subpart E, Section 302.505 requires a minimum of five samples in not more than a 30-day period. However, because samples are seldom available frequency, the guidelines are based on a minimum of five samples (May through October) over the most recent three-year period.
2. Department of Public Health Bathing Beach Code (77 Ill. Adm. Code 820.400): An *Escherichia coli* count of 235 colonies/100 ml in each of two samples collected on the same day shall require closing the beach. Note: beaches in Lake County and suburban Cook County are closed when one sample exceeds 235/100 ml; beach managers in Chicago post advisories when a geometric mean of two consecutive water samples exceeds 235 *E. coli* cfu/100 ml. Beaches in Chicago are closed-when sewage is released to Lake Michigan and remain closed until the geometric mean of two consecutive water samples is less than 235 *E. coli* cfu/100ml.

Public and Food Processing Water Supply Use– Streams, Lakes, and Lake Michigan

We assess attainment of Public and Food Processing Water Supply Use only in waters in which the use is currently occurring, as evidenced by the presence of an active public-water-supply intake. The assessment of Public and Food Processing Water Supply Use is based on conditions in both untreated and treated water (Table C-22). By incorporating data of programs related to both the federal Clean Water Act and the federal Safe Drinking Water Act, these guidelines provide a comprehensive assessment of Public and Food Processing Water Supply Use.

Assessments of Public and Food Processing Water Supply Use recognize that characteristics and concentrations of substances in Illinois surface waters can vary and that a single assessment guideline may not protect sufficiently in all situations. Using multiple assessment guidelines helps improve the reliability of these assessments. When applying these assessment guidelines, Illinois EPA also considers the water-quality substance, the level of treatment available for that substance, and the monitoring frequency of that substance in the untreated water.

One of the assessment guidelines for untreated water uses a frequency-of-exceedance threshold (10%) because this threshold represents the true risk of impairment better than does a single exceedance of a water-quality criterion. Assessment guidelines also recognize situations in which water treatment that consists only of "*...coagulation, sedimentation, filtration, storage and chlorination, or other equivalent treatment processes*" (35 Ill. Adm. Code 302.303; hereafter called "conventional treatment") may be insufficient for reducing potentially harmful levels of some substances. To determine if a Maximum Contaminant Level (MCL) violation in treated water would likely occur if treatment additional to conventional treatment were not applied (see 35 Ill. Adm. Code 302.305), we compare the concentration of the potentially harmful substance in untreated water to the MCL-threshold concentration. If the concentration in untreated water exceeds an MCL-related threshold concentration, then an MCL violation could reasonably be expected in the absence of additional treatment.

Table C-22 provides the guidelines to assess attainment of Public and Food Processing Water Supply Use in Illinois streams, lakes, and Lake Michigan. In general, compliance with an MCL for treated water is based on a running four-quarter (i.e., annual) average, calculated quarterly, of samples collected at least once per calendar quarter (e.g., April-June, October-December). However, for some untreated-water intake locations, sampling occurs at a frequency that differs from that of treated water. Consequently, we simply use quarterly average concentrations for substances in untreated water. Table C-23 lists the guidelines to identify potential causes of Public and Food Processing Water Supply Use impairment.

Table C-22. Guidelines to Assess Public and Food Processing Water Supply Use in Streams, Lakes, or Lake Michigan

Degree of Use Support	Guidelines
Fully Supporting	For each substance in untreated water, for the most-recent three years of readily available data or equivalent dataset, a) ≤ 10% of observations exceed an applicable Public and Food Processing Water Supply Standard[1]; and b) for which the concentration is not readily reducible by conventional treatment, i) no observation exceeds by at least fourfold the Maximum Contaminant Level threshold concentration[2] for that substance; and ii) no quarterly average concentration exceeds the Maximum Contaminant Level threshold concentration[2] for that substance; and[3], For each substance in treated water, no violation of an applicable Maximum Contaminant Level[2] occurs during the most recent four years of readily available data.
Not Supporting	For any single substance in untreated water, for the most-recent three years of readily available data or equivalent dataset, a) > 10% of observations exceed a Public and Food Processing Water Supply Standard[1]; or b) for which the concentration is not readily reducible by conventional treatment, i) at least one observation exceeds by at least fourfold the Maximum Contaminant Level threshold concentration[2] for that substance; or ii) the quarterly average concentration exceeds the Maximum Contaminant Level threshold concentration[2] for that substance; or, For any single substance in treated water, at least one violation of an applicable Maximum Contaminant Level[2] occurs during the most recent three or four years of readily available data. or, Closure to use as a drinking-water resource (cannot be treated to allow for use).

1. 35 Ill. Adm. Code 302.304 and 302.306.
2. 35 Ill. Adm. Code 611.300, 611.301, 611.310, 611.311, and 611.325.
3. Some waters were assessed as Fully Supporting based on treated-water data only.

Table C-23. Guidelines to Identify Potential Causes of Impairment of Public and Food Processing Water Supply Use in Streams, Lakes, or Lake Michigan

Potential Cause	Guidelines [1]	
	Numeric Standard[2]	Maximum Contaminant Level[3]
1,1,1-Trichloroethane	—	0.2 mg/L
1,1,2-Trichloroethane	—	5 µg/L
1,2,4-Trichlorobenzene	—	0.07 mg/L
1,2-Dibromo-3-chloropropane (Dibromochloropropane DBCP)	—	0.2 µg/L
1,2-Dichloroethane	—	5 µg/L
1,2-Dichloropropane	—	5 µg/L
2,3,7,8-Tetrachlorodibenzo-p-dioxin (only)	—	0.03 ng/L
2,4,5-TP (Silvex)	0.01 mg/L	0.05 mg/L
2,4-D	0.1 mg/L	0.01 mg/L
Alachlor	—	2 µg/L
Aldrin	1 µg/L	1 µg/L
Antimony	—	6 µg/L
Arsenic	0.05 mg/L	0.010 mg/L
Asbestos	—	7 MFL[4]
Atrazine	—	3 µg/L
Barium	1.0 mg/L	2 mg/L
Benzene	—	5 µg/L
Benzo[a]pyrene (PAHs)	—	0.2 µg/L
Beryllium	—	4 µg/L
Boron	1.0 mg/L	—
Cadmium	0.010 mg/L	5 µg/L
Carbofuran	—	0.04 mg/L
Carbon tetrachloride	—	5 µg/L
Chlordane	3 µg/L	2 µg/L
Chlorides	250 mg/L	—
Chlorobenzene (mono)	—	0.1 mg/L
Chromium (total)	0.05 mg/L	0.1 mg/L
cis-1,2-Dichloroethylene	—	0.07 mg/L
Cyanide	—	0.2 mg/L
Dalapon	—	0.2 mg/L
DDT	0.05 mg/L	0.05 mg/L
DEHP (di-sec-octyl phthalate) (Di(2-ethylhexyl)phthalate)	—	6 µg/L
Di (2-ethylhexyl) adipate	—	0.4 mg/L
Dichloromethane (methylene chloride)	—	5 µg/L
Dieldrin	1 µg/L	1 µg/L

Table C-23. (Cont.) Guidelines to Identify Potential Causes of Impairment of Public and Food Processing Water Supply Use in Streams, Lakes, or Lake Michigan

Potential Cause	Guidelines (1)	
	Numeric Standard(2)	Maximum Contaminant Level(3)
Dinoseb	—	7 µg/L
Diquat	—	0.02 mg/L
Endothall	—	0.1 mg/L
Endrin	0.2 µg/L	2 µg/L
Ethylbenzene	—	0.7 mg/L
Ethylene dibromide	—	0.05 µg/L
Fecal Coliform	geometric mean of five samples in ≤30 days ≥2000 per 100 ml	—
Fluoride	—	4 mg/L
Glyphosate	—	0.7 mg/L
Heptachlor	0.1 µg/L	0.1 µg/L
Heptachlor epoxide	0.1 µg/L	0.1 µg/L
Hexachlorobenzene	—	1 µg/L
Hexachlorocyclopentadiene	—	0.05 mg/L
Iron	0.3 mg/L (dissolved)	1.0 mg/L (for CWS serving ≥1000 people or ≥300 connections)
Lead	0.05 mg/L	—
Lindane	4 µg/L	0.2 µg/L
Manganese	1.0 mg/L	0.15 mg/L (for CWS serving ≥1000 people or ≥300 connections)
Mercury	—	2 µg/L
Methoxychlor	0.1 mg/L	0.04 mg/L
Nitrate/Nitrite (nitrate + nitrite as N)	—	10 mg/L
Nitrogen, Nitrate	10 mg/L	10 mg/L
Nitrogen, Nitrite	—	1 mg/L
o-Dichlorobenzene	—	0.6 mg/L
Oil and Grease	0.1 mg/L	—
Oxamyl (Vydate)	—	0.2 mg/L
Parathion	0.1 mg/L	—
p-Dichlorobenzene	—	0.075 mg/L
Pentachlorophenol (PCP)	—	1 µg/L
Phenols	1 µg/L	—
Picloram	—	0.5 mg/L
Polychlorinated biphenyls (PCBs)	—	0.5 µg/L
Selenium	0.01 mg/L	0.05 mg/L
Simazine	—	4 µg/L
Styrene	—	0.1 mg/L
Sulfates	250 mg/L	—
Tetrachloroethylene	—	5 µg/L
Thallium	—	2 µg/L

Table C-23. (Cont.) Guidelines to Identify Potential Causes of Impairment of Public and Food Processing Water Supply Use in Streams, Lakes, or Lake Michigan

Potential Cause	Guidelines (1)	
	Numeric Standard(2)	Maximum Contaminant Level(3)
Toluene	—	1 mg/L
Total Dissolved Solids	500 mg/L	—
Toxaphene	5 µg/L	3 µg/L
trans-1,2-Dichloroethylene	—	0.1 mg/L
Trichloroethylene	—	5 µg/L
Vinyl chloride	—	2 µg/L
Vinylidene chloride (1, 1–Dichloroethylene)	—	7 µg/L
Xylene(s) (total) (mixed)	—	10 mg/L
Zinc	—	5 mg/L

1. In general, for untreated water, a cause is identified if:
   a) 10% or more of the observations exceed the applicable numeric standard; or
   b) for any substance for which the concentration is not readily reducible by conventional treatment,
      i) any observation exceeds by at least fourfold the treated-water Maximum Contaminant Level threshold concentration for the substance; or
      ii) any quarterly average concentration exceeds the treated-water Maximum Contaminant Level threshold concentration for the substance; or
      iii) any running annual average concentration exceeds the treated-water Maximum Contaminant Level threshold concentration for that substance.

   For treated water, a cause is identified if there is any violation of the Maximum Contaminant Level for the substance. Identification of causes is based primarily on data from these monitoring programs: Ambient Water Quality Monitoring Network, Intensive Basin Surveys, Ambient Lake Monitoring Program, Lake Michigan Monitoring Program, and the Source Water Assessment Program.
2. 35 Ill. Adm. Code 302, Subpart C: Public and Food Processing Water Supply Standards
3. Maximum Contaminant Levels are from 35 Ill. Adm. Code 611, Subpart F: Maximum Contaminant Levels (MCLs) and Maximum Residual Disinfectant Levels (MRDLs).
4. MFL – million fibers per liter, for fibers less than 10 microns.

Aesthetic Quality – Streams

We assess Aesthetic Quality in streams by using the narrative standards in 35 Ill. Adm. Code 302.203 (for streams covered by General Use Standards), 302.403 (for streams covered by Chicago Area Waterway System and Lower Des Plaines River Water Quality and Indigenous Aquatic Life Standards), or 302.515 (for streams covered by Lake Michigan Basin Standards). Illinois EPA biologists, who are experienced with the natural conditions and expectations for the streams in each basin, apply these standards by using a form we developed for this process. The assessment involves determining whether observed conditions in the stream represent conditions prohibited by the standard. When we determine that the standard is not attained, we document the relevant condition as the cause of non-attainment. These conditions are based on the language in the standard and include, "sludge, bottom deposits, floating debris, visible oil, odor, plant or algal growth (aquatic macrophytes or aquatic algae), color, or turbidity." In addition, when we determine that plant or algal growth is causing non-attainment, we identify phosphorus (total) as a contributing cause. The guidelines to assess Aesthetic Quality in streams are in Table C-24. Guidelines to identify causes of non-attainment are in Table C-25.

Table C-24. Guidelines to Assess Aesthetic Quality in Streams

Use Support Rating	Criteria
Fully Supporting	Narrative Standard in 35 Ill. Adm. Code 302.203, 302.403 or 302.515 is attained
Not Supporting	Narrative Standard in 35 Ill. Adm. Code 302.203, 302.403 or 302.515 is not attained

Table C-25. Guidelines to Identify Causes of Aesthetic Quality Impairment in Streams

Potential Cause	Guidelines[(1)]
Sludge	The presence of sludge that violates the narrative standard
Bottom Deposits	The presence of bottom deposits that violates the narrative standard
Floating Debris	The presence of floating debris that violates the narrative standard
Visible Oil	The presence of visible oil that violates the narrative standard
Odor	The presence of odor that violates the narrative standard
Aquatic Plants, Macrophytes	The presence of aquatic macrophytes that violates the narrative standard
Aquatic Algae	The presence of aquatic algae that violates the narrative standard
Phosphorus (total)	Narrative standard is not attained due to aquatic plant or algal growth
Color	The presence of color that violates the narrative standard
Turbidity	The presence of turbidity that violates the narrative standard

1. 35 Ill. Adm. Code 302.203, 302.403, or 302.515

Aesthetic Quality – Lakes

We assess Aesthetic Quality in lakes by using the numeric phosphorus standard for lakes with a surface area of 20 acres or more (35 Ill. Adm. Code 302.205) and the narrative standards of 35 Ill. Adm. Code 302.203 or 302.403 (for Lake Calumet). We use information of the Ambient Lake Monitoring Program or the Harmful Algal Bloom Program.

Assessing attainment of the narrative standards requires knowing the natural conditions and expectations of the lake. We compare conditions in the lake to those prohibited by the standard. When we determine that the standard is not attained, we document the relevant conditions as the cause of non-attainment. These conditions include: "sludge, bottom deposits, floating debris, visible oil, odor, plant or algal growth, color, or turbidity of other than natural origin." In addition, when we determine that plant or algal growth causes non-attainment, we identify phosphorus (total) as a contributing cause.

For lakes with a surface area of at least 20 acres, we also apply the phosphorus standard of 35 Ill. Adm. Code 302.205. If 10% or more of the surface total-phosphorus values exceed the standard (0.05 mg/L), then we identify phosphorus (total) as a cause of non-attainment. sThe guidelines to assess Aesthetic Quality in lakes are in Table C-26. Guidelines to identify causes of non-attainment are in Table C-27.

Table C-26. Aesthetic Quality in Lakes

Use Support	Guidelines
Fully Supporting	Narrative Standard of 35 Ill. Adm. Code 302.203 or 302.403 is attained and ≤ 10% of total-phosphorus results in surface samples exceed 0.05 mg/L (for lakes with a surface area of 20 acres or more).
Not Supporting	Narrative Standard in 35 Ill. Adm. Code 302.203 or 302.403 is not attained or > 10% of total-phosphorus results in surface samples exceed 0.05 mg/L (for lakes with a surface area of 20 acres or more).

Table C-27. Guidelines to Identify Causes of Impairment of Aesthetic Quality in Lakes

Potential Cause	Guidelines[1]
Sludge	The presence of sludge that violates the narrative standard
Bottom Deposits	The presence of bottom deposits that violates the narrative standard
Floating Debris	The presence of floating debris that violates the narrative standard
Oil	The presence of visible oil that violates the narrative standard
Odor	The presence of odor that violates the narrative standard
Algae	The presence of aquatic algae that violates the narrative standard
Aquatic Plants (Macrophytes)	The presence of aquatic macrophytes that violates the narrative standard
Phosphorus, Total	Narrative standard is not attained due to aquatic plant or algal growth or > 10% of total-phosphorus results in surface samples exceed 0.05 mg/L (for lakes with a surface area of 20 acres or more).
Color	The presence of color that violates the narrative standard
Turbidity	The presence of turbidity that violates the narrative standard

1. 35 Ill. Adm. Code 302.203, 302.205, and 302.403.

Aesthetic Quality – Lake Michigan Open Waters

Open waters of Lake Michigan means all areas of the lake in Illinois jurisdiction lakeward from a line drawn across the mouth of tributaries to Lake Michigan, but not including waters enclosed by constructed breakwaters (35 Ill. Adm. Code 303.443(a)). Assessments of Aesthetic Quality in Lake Michigan Open Waters use the Offensive Conditions narrative standard (35 Ill. Adm. Code 302.515), and the phosphorus standard for open waters (35 Ill. Adm. Code 302.504(c)). Assessing attainment of the narrative standards requires knowing the natural conditions and expectations of Lake Michigan open waters. We compare conditions in the lake to those prohibited by the standard. When we determine that the standard is not attained, we document the relevant conditions as the cause of non-attainment. These conditions include: "sludge, bottom deposits, floating debris, visible oil, odor, plant or algal growth, color, or turbidity of other than natural origin." When we determine that plant or algal growth causes non-attainment, we identify phosphorus (total) as a contributing cause. Also, when greater than 10% of the samples exceed the Lake Michigan open-water standard for phosphorus, we assess Aesthetic Quality as Not Supporting and identify phosphorus as a cause of the impairment. Table C-28 has assessment guidelines; Table C-29 has cause guidelines.

Table C-28. Guidelines to Assess Aesthetic Quality in Lake Michigan Open Waters

Use Support	Guidelines
Fully Supporting	Narrative Standard in 35 Ill. Adm. Code 302.515 is attained and ≤ 10 % of samples exceed 7 µg/L total phosphorus.
Not Supporting	Narrative Standard in 35 Ill. Adm. Code 302.515 is not attained or > 10 % of samples exceed 7 µg/L total phosphorus.

Table C 29. Guidelines to Identify Causes of Aesthetic Quality Impairment in Lake Michigan Open Waters

Potential Cause	Guidelines[1]
Sludge	The presence of sludge that violates the narrative standard
Bottom Deposits	The presence of bottom deposits that violates the narrative standard
Floating Debris	The presence of floating debris that violates the narrative standard
Visible Oil	The presence of visible oil that violates the narrative
Odor	The presence of odor that violates the narrative standard
Aquatic Plants, Macrophytes	The presence of aquatic macrophytes that violates the narrative standard
Aquatic Algae	The presence of aquatic algae that violates the narrative standard
Phosphorus (Total)	> 10 % of samples exceed 7 µg/L total phosphorus or narrative standard is not attained due to aquatic plant or algal growth
Color	The presence of color that violates the narrative standard
Turbidity	The presence of turbidity that violates the narrative standard

1. 35 Ill. Adm. Code 302.504 or 302.515.

Aesthetic Quality – Lake Michigan Harbors and Shoreline Waters

We assess Aesthetic Quality in Lake Michigan harbors and shoreline waters by using the Offensive Conditions narrative standard of 35 Ill. Adm. Code 302.515. Assessing attainment of the narrative standard requires knowing the natural conditions and expectations for Lake Michigan Basin waters. We compare conditions in the lake to those prohibited by the standard. When we determine that the standard is not attained, we document the relevant conditions as the cause of non-attainment. These conditions include: "sludge, bottom deposits, floating debris, visible oil, odor, plant or algal growth, color or turbidity of other than natural origin."

If we identify aquatic plants or algae as a cause of Aesthetic Quality impairment, then we identify total phosphorus as a contributing cause. Table C-30 has assessment guidelines; Table C-31 has cause guidelines.

Table C-30. Guidelines to Assess Aesthetic Quality in Lake Michigan Harbors and Shoreline Waters

Use Support	Guidelines
Fully Supporting	Narrative Standard in 35 Ill. Adm. Code 302.515 is attained
Not Supporting	Narrative Standard in 35 Ill. Adm. Code 302.515 is not attained

Table C-31. Guidelines to Identify Causes of Aesthetic Quality Impairment in Lake Michigan Harbors and Shoreline Waters

Potential Cause	Guidelines[1]
Sludge	The presence of sludge that violates the narrative standard
Bottom Deposits	The presence of bottom deposits that violates the narrative standard
Floating Debris	The presence of floating debris that violates the narrative standard
Visible Oil	The presence of visible oil that violates the narrative
Odor	The presence of odor that violates the narrative standard
Aquatic Plants, Macrophytes	The presence of aquatic macrophytes that violates the narrative standard
Aquatic Algae	The presence of aquatic algae that violates the narrative standard
Phosphorus (Total)	Narrative standard is not attained due to aquatic plant or algal growth
Color	The presence of color that violates the narrative standard
Turbidity	The presence of turbidity that violates the narrative standard

1. 35 Ill. Adm. Code 302.515.

C-3. Assessment Results

This section presents the results of Illinois' surface water assessments, including the five-part categorization of all surface waters, the Section 303(d) List, state level summaries of designated use support, and CWA Section 314 (Lakes Program) reporting requirements.

Five-Part Categorization of Surface Waters

USEPA's latest Integrated Report guidance (USEPA 2005) calls for all waters of the state to be reported in a five-category system as below. Although the guidance allows waters to be placed into more than one category, Illinois EPA treats all categories as mutually exclusive.

Category 1: Segments are placed into Category 1 if all designated uses are supported, and no use is threatened. (Note: Illinois does not assess any waters as threatened)

Category 2: Segments are placed in Category 2 if all designated uses that were assessed are supported. (All other uses are reported as Not Assessed or Insufficient Information).

Category 3: Segments are placed in Category 3 when there is insufficient available data and/or information to make a use support determination for any use.

Category 4: Contains segments that have at least one impaired use but a TMDL is not required. Category 4 is further subdivided as follows based on the reason a TMDL is not required.

Category 4a: Segments are placed in Category 4a when a TMDL to address a specific segment/pollutant combination has been approved or established by USEPA. Illinois EPA places water bodies in category 4a only if TMDLs have been approved for all pollutant causes of impairment.

Category 4b: Segments are placed in Category 4b if technology-based effluent limitations required by the Act, more stringent effluent limitations required by state, local, or federal authority, or other pollution control requirements (e.g., best management practices) required by local, state or federal authority are stringent enough to implement applicable water quality standards (40 CFR 130.7(b)(1)) within a reasonable period of time.

Category 4c: Segments are placed in Category 4c when the state demonstrates that the failure to meet an applicable water quality standard is not caused by a pollutant, but instead is caused by other types of pollution (i.e., only nonpollutant causes of impairment). Water bodies placed in this category are usually those where Aquatic Life use is impaired by habitat related conditions. (See discussion in Section C-2 Assessment Methodology, Aquatic Life-Streams.)

Category 5: Segments are placed in Category 5 if available data and/or information indicate that at least one designated use is not being supported and a TMDL is needed. Water bodies in Category 5 (and their pollutant causes of impairment) constitute the 303(d) List that USEPA will review and approve or disapprove pursuant to 40 CFR 130.7.

Category 5-alt: Waters are placed in category 5-alt when alternative restoration approaches are used to address impairments instead of traditional TMDLs. An alternative restoration approach is a plan or a set of actions pursued in the near-term designed to attain water quality standards. Waters in category 5-alt remain on the 303(d) list until water quality standards are achieved or a TMDL is developed. When a State decides to pursue an alternative restoration approach for waters on its 303(d) list, USEPA expects the State to provide documentation that such an

approach is designed to meet water quality standards and is a more immediately beneficial or practicable way to achieve water quality standards than the development of a TMDL in the near future. USEPA considers the adequacy of the State's documentation for pursuing an alternative restoration approach in determining whether to give credit to such an approach. For this cycle, Illinois has no waters in category 5-alt.

Table C-32 shows the results of this categorization for all Illinois surface waters. The category for each individual water body is shown in Appendices A-1, A-2 , and A-3.

Table C-32. Size of Surface Waters Assigned to Reporting Categories[(1)]

Water Body Type	Category							Total in State	Total Assessed
	1	2	3	4a	4b	4c	5		
Streams (mile)	0	6,782	100,791	613	0	1,013	10,088	119,287	18,495
Freshwater Lakes (acre)	0	5,638	163,386	3,850	0	0	150,023	322,896	159,510
Lake Michigan Harbors (sq. mile)	0	1.80	0	0.29	0	0	0.06	2.15	2.15
Lake Michigan Open Waters (sq. mile)	0	0	1,330	0	0	0	196	1,526	196
Lake Michigan Shoreline (mile)	0	0	0	64	0	0	0	64	64

1. Categories are mutually exclusive. Illinois does not report water bodies in more than one category.

Section 303(d) List

The Clean Water Act and USEPA regulations require states to submit a list of water-quality-limited waters still requiring TMDLs, pollutants causing the impairment, and a priority ranking for TMDL development (including waters targeted for TMDL development within the next two years. This integrated report combines all of the requirements of sections 305(b), 303(d), and 314 into a single document.

Category 5 waters constitute Illinois' 303(d) List. The complete list is found in Appendices C-1 and C-2. The development of this list is based on the assessment methodology for determining attainment of designated uses for each water body segment as described previously in Section C-2. Those waters that have at least one Not Supporting designated use and at least one pollutant cause of impairment are included on the 303(d) List unless they fall under the specific exceptions described in categories 4a, 4b, or 4c. Waters included on previous lists are also included on the current list unless new information is available to update the assessment or there is other "good cause" for delisting them (see below). A complete list of all water bodies, all use attainment assessments, and all identified potential causes of impairment (both pollutant and nonpollutant) is found in Appendices A-1, A-2, and A-3.

Prioritization of the Illinois Section 303(d) List

All pollutant causes of impairment associated with impaired designated uses require TMDL development. USEPA regulations at 40 CFR Part 130.7(b)(4) require establishing a priority ranking of 303(d) listed waters for the development of TMDLs that accounts for the severity of pollution and the designated uses. The prioritization of Illinois Section 303(d) List was done on a watershed basis instead of on individual water body segments. Illinois EPA watershed boundaries are based on USGS ten-digit hydrologic units (HUC). Developing prioritization for severity of pollution at the watershed scale provides Illinois with the ability to address watershed issues at a manageable level and document improvements to a watershed's health. The Illinois Section 303(d) List was prioritized based on the steps listed below:

Step 1- A high priority is given to waters where public water supply use is impaired by atrazine, simazine, or nitrate. For those waters, TMDLs will be developed based on the entire watershed, whether smaller or larger than a ten-digit HUC.

Step 2- Watersheds with no approved or ongoing TMDLs were given medium priority. Ranking within this group is based on the total number of potential causes in each watershed that require TMDL development. The more potential causes of impairment identified, the higher the priority given to the watershed.

Step 3- Watersheds that have approved or ongoing TMDLs are given the lowest priority. However, TMDL implementation still occurs in watersheds with a low priority. The prioritization process for TMDL development does not affect TMDL implementation.

Illinois Section 303(d) waters are listed in order of priority in Appendix C-1.

Scheduling of TMDL Development

In accordance with USEPA regulations under 40 CFR Part 130.7(b)(4), "the priority ranking shall specifically include the identification of waters targeted for TMDL development in the next two years." In addition, USEPA guidance encourages states to ensure that the schedule provides that all TMDLs for every pollutant-segment combination listed on previous Section 303(d) Lists be established in a time frame that is no longer than 8 to 13 years from the time the pollutant-segment combination is first identified in Category 5.

In Illinois, development of TMDLs will be conducted on a watershed basis (i.e., USGS 10-digit hydrologic units) meaning that impaired waters upstream of a particular segment will have all TMDLs conducted at the same time. In order to ensure that all TMDLs are completed in a reasonable time frame, Illinois' TMDL development schedule calls for the initiation of efforts in approximately six TMDL watersheds in each year in the next 13 years. Appendix C-3 shows the watersheds, water bodies and pollutants for which TMDLs will be developed in the next two years. The TMDL development schedule provided in Appendix C-3 replaces all schedules previously submitted by the Illinois EPA to USEPA. The schedule will be reviewed and updated in the future, as needed, to ensure timely development of TMDLs, given available resources.

The Illinois EPA's long-term schedule for TMDL development for all waters on the 2020/2022 Section 303(d) List, projected over a 13-year period, is consistent with other Illinois EPA program cycles that are typically five years, including statewide monitoring programs such as the rotational intensive river basin surveys and issuance of NPDES permits. The long-term TMDL development schedule will be reviewed and revised, as needed, in conjunction with future Section 303(d) Lists submitted to USEPA.

In August of 2011, USEPA's Office of Water, in cooperation with the Association of Clean Water Administrators (ACWA), and the Environmental Law Institute (ELI), started developing the framework for the Long-Term Vision for Assessment, Restoration, and Protection under the CWA Section 303(d) Program (The Vision). The Vision is intended to help states, tribes, and territories prioritize impaired waterbodies for TMDL development, or use alternative approaches, and adaptive implementation plans for waterbodies to meet their designated uses and applicable water quality standards. Illinois EPA has worked with USEPA to develop The Vision prioritization goals for the TMDL development program in Illinois.

Illinois EPA's Vision for Assessment, Restoration, and Protection under the CWA Section 303(d) Program is two-fold. The two strategies are referred as:

1) **TMDL Development/Alternative Approach - Short-Term Vision Goal (2015-2018)**
2) **Nutrient Priority Watersheds - Long-Term Vision Goal (2016-2022)**

The logic behind each of these two strategies and the way each strategy will be implemented are discussed in detail in the **Long-Term Vision for Assessment, Restoration, And Protection Under the CWA Section 303(D) PROGRAM (The Vision)** as outlined in Appendix C-5 of this report. The report is also available at the Agency's TMDL website**:** https://www2.illinois.gov/epa/topics/water-quality/watershed-management/tmdls/Pages/303d-list.aspx

Removal of Waters on Illinois' 2018 Section 303(d) List

USEPA's Integrated Report guidance explains what constitutes good cause for not including in the current submission, segments that were included on the previous Section 303(d) List. These include:

1. The assessment and interpretation of more recent or more accurate data in the record demonstrate that the applicable WQS(s) is being met.

2. The results of more sophisticated water quality modeling demonstrate that the applicable WQS(s) is being met.

3. Flaws in the original analysis of data and information led to the segment being incorrectly listed.

4. A demonstration pursuant to 40 CFR 130.7(b)(1)(ii) that there are effluent limitations required by state or local authorities that are more stringent than technology-based effluent

limitations, required by the CWA, and that these more stringent effluent limitations will result in the attainment of WQSs for the pollutant causing the impairment.

5. A demonstration pursuant to 40 CFR 130.7(b)(1)(iii) that there are other pollution control requirements required by state, local, or federal authority that will result in attainment of WQSs for a specific pollutant(s) within a reasonable time (i.e., 4b).

6. Documentation that the state included on a previous Section 303(d) List an impaired segment that was not required to be listed by EPA regulations, (e.g., segments where there is no pollutant associated with the impairment).

7. Approval or establishment by USEPA of a TMDL since the last Section 303(d) List.

8. A state inappropriately listed a segment that is within Indian country, as defined in 18 U.S.C. Section 1151.

9. Other relevant information that supports the decision not to include the segment on the Section 303(d) List.

All water body/pollutant combinations on Illinois' Section 303(d) List from 2018 are included on the 2020/2022 Section 303(d) List except the water body/pollutant combinations removed under the criteria cited above. Illinois EPA delists entire water bodies if all the designated uses are assessed as fully supporting or if all pollutant causes of impairment have been addressed by approved TMDLs. Listed causes of impairment may change when uses are reassessed even if the water is still considered impaired.

In a few instances when pollutant causes are delisted, there is a potential for an entire water body segment to be moved from Category 5 (the 303d List) to Category 4C (waters impaired by pollution but not by any pollutant, Appendix C-7). When any delisting results in a water body being moved from Category 5 to Category 4C, a review is conducted to determine whether any pollutant may still be causing impairment in that water body. If it is suspected that the water body is still impaired by a pollutant, cause unknown is listed and the water body remains on the 303(d) List.

Appendix C-4 lists all segment/pollutant combinations included in Illinois' 2018 303(d) List but not included on theon the 2020/2022 List submission.

TMDL Development and Implementation Status

In Illinois, most TMDLs are developed by individual contractors that have been selected through a competitive bidding process. Illinois EPA personnel manage the contracts. There are three stages in the TMDL development process.

Stage 1- Watershed Characterization, Data Analysis, and Methodology Selection

- Description of the watershed
- Collection/analysis of available data
- Identify methodologies, procedures, and models

- Determine if additional data is needed

Stage 2- Data Collection (optional stage)*

- Evaluate Stage 1 and collect additional data as needed
- The Agency or a contractor will collect data

Stage 3- Model calibration, TMDL Scenarios, Implementation Plan

- Develop TMDLs with data from Stages 1 and 2
- Develop and evaluate several scenarios
- Develop an implementation plan

*Stage 2 was added in the 2003 round of TMDLs. If Stage 1 identifies data as lacking, additional data may be collected for a more accurate TMDL development.

Appendix C- 6 shows the implementation status of all TMDLs for the state of Illinois and includes the TMDL watersheds in progress. We anticipate that TMDL development for each watershed will be completed approximately three years from the initiation date. Stage 1 is scheduled to take a maximum of 12 months. Stage 2 is optional, and the time frame will depend on the type and quantity of additional data required. Stage 3 has a maximum time frame of 18 months. To date, contractors are doing most of the TMDL development work for Illinois EPA.

The Illinois EPA views TMDLs as a tool for developing water-quality-based solutions that are incorporated into an overall watershed management approach. The TMDL establishes the link between water quality standards attainment and water-quality-based control actions. For these control actions to be successful, they must be developed in conjunction with local involvement, which incorporates regulatory, voluntary and incentive-based approaches with existing applicable laws and programs. The Illinois programs that have provided funds for implementation of TMDL watersheds include: Illinois EPA's Nonpoint Source Management Program, and the Illinois Department of Agriculture's Conservation Practices Program (CPP).

The Illinois EPA administers the Illinois Nonpoint Source Management Program to meet the requirements of Section 319 of the Clean Water Act (CWA). Section 319 projects can include educational programs and nonpoint source pollution control projects such as Best Management Practices (BMPs).

PART D: PUBLIC PARTICIPATION

The Agency solicited information from the public to be used in the use assessment process as described in Section A3.

We also solicited public input on the assessment results. A draft of the 2020/2022 Integrated Report was placed on the Illinois EPA website (https://www2.illinois.gov/epa/topics/water-quality/watershed-management/tmdls/Pages/303d-list.aspx) for public review on February 14, 2022 and notices were sent out to all known interested parties of its availability. Hard copies of the report were available for those who requested them. Public comments were accepted from February 14, 2022 until midnight, March 16, 2022. The Agency responded to all pertinent comments and incorporated changes into the existing document. Responses to comments are documented in a Responsiveness Summary (Appendix E).

For TMDL development, the Illinois EPA has a comprehensive approach offering opportunities for stakeholders to participate, review and comment throughout the TMDL development process. For watersheds in which the development of TMDLs is currently underway, the Illinois EPA holds three public meetings. All public meetings are held at a location within the effected watershed to enable greater local participation. Illinois EPA and its contractor typically provide an update of the progress made. The final public meeting held within the watershed, is on the draft TMDL report. The public/stakeholders have an opportunity to comment 30 days prior to the meeting date, during the meeting and generally 30 days after the meeting. In addition, where applicable, the report is distributed to the Illinois Department of Agriculture, the USDA—Natural Resources Conservation Service and other state and federal partners prior to release to the public for technical review and input.

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