

Division of Surface Water

Ohio 2008 Integrated Water Quality Monitoring and Assessment Report

*Prepared to fulfill the requirements of
Sections 303(d), 305(b), and 314 of the Clean Water Act*



Final Report
Submitted to U.S. EPA on March 31, 2008
Approved by U.S. EPA on May 5, 2008

Ted Strickland, Governor
Chris Korleski, Director

Table of Contents

Section A: An Overview of Water Quality in Ohio: 2008

Section B: Ohio's Water Resources

B1: Facts and Figures.....	B-1
B2: General summary of condition: progress toward the "80% by 2010" goal.....	B-3

Section C: Managing Water Quality

C1: Program Summary – Surface Water	C-1
C2: Program Summary – Environmental and Financial Assistance.....	C-18
C3: Program Summary – Drinking and Ground Waters.....	C-20
C4: Program Summary – Environmental Services	C-20
C5: Cooperation among State Agencies and Departments	C-21
C6: Economic Costs and Benefits of Pollution Controls	C-21

Section D: Framework for Reporting and Evaluation

D1: Assessment Units.....	D-1
D2: Ohio's WQS Use Designations	D-3
D3: Sources of Existing and Readily Available Data	D-4
D4: Evaluation of the Ohio River.....	D-8
D5: Public Involvement in Compiling Ohio's Section 303(d) List of Impaired Waters.....	D-8
D5.1: Solicitation for External Water Quality Data, 2008 Integrated Report Project	D-9
D5.1.1: Web Page with Instructions for Submitting Level 3 Credible Data.....	D-10
D5.2: Web Page Announcing 2008 IR Preparation.....	D-16
D5.3: Notice of Availability and Request for Comments FWPCA Section 303(d) TMDL Priority List for 2008.....	D-17
D6: Public Comments and Responses to Comments on Draft Report	D-18
D6.1: General Comments	D-18
D6.2: Evaluation of Beneficial Use: Human Health (Fish Contaminants).....	D-20
D6.3: Evaluation of Beneficial Use: Recreation	D-20
D6.4: Evaluation of Beneficial Use: Aquatic Life Use.....	D-27
D6.5: Evaluation of Beneficial Use: Public Drinking Water Supply	D-31
D6.6: Miscellaneous Issues	D-32
D6.7: Monitoring Schedule.....	D-41
D6.8: Exotic Species	D-42

Section E: Evaluating Beneficial Use: Human Health (Fish Contaminants)

E1: Background	E-1
E2: Evaluation Method and Rationale.....	E-1
E3: Results.....	E-7
E4: Supplemental Information.....	E-17
E4.1: Calculation of Fish Concentrations from Water Quality Standards Inputs.....	E-17
E4.2: What's the Difference between the Fish Consumption Advisory Decision and the Impairment Decision?.....	E-21

Section F: Evaluating Beneficial Use: Recreation

F1: Background.....	F-1
F2: Evaluation Method	F-1
F3: Results.....	F-4

Section G: Evaluating Beneficial Use: Aquatic Life

G1: Background and Rationale	G-1
G2: Evaluation Method	G-2
G3: Results	G-4

Section H: Evaluating Beneficial Use: Public Drinking Water Supply

H1: Background	H-1
H2: Evaluation Method.....	H-3
H3: Results	H-4
H4: Supplemental Information	H-9

Section I: Considerations for Future Lists

I1: Wetlands	I-1
I2: Inland Lakes and Reservoirs	I-2
I3: Mercury Program at Ohio EPA	I-4
I3.1: Ohio Law	I-4
I3.2: Ohio Projects.....	I-4
I3.3: Interagency Groups.....	I-6
I3.4: Ohio Resources	I-7
I4: Preview of Potential 2010 Methodology.....	I-7
I4.1: Human Health (Fish Contaminants).....	I-8
I4.1.1: Evaluation Method.....	I-8
I4.1.2: Results	I-9
I4.2: Recreation.....	I-9
I4.2.1: Evaluation Method.....	I-9
I4.2.2: Results	I-11
I4.3: Aquatic Life	I-12
I4.3.1: Evaluation Method.....	I-12
I4.3.2: Results	I-19
I4.4: Public Drinking Water Supply.....	I-22
I4.4.1: Evaluation Method.....	I-22
I4.4.2: Results	I-22

Section J: Addressing Waters Not Meeting Water Quality Goals

J1: Assigning Waters to Categories	J-2
J2: Prioritizing the Impaired Waters: the 303(d) List	J-5
J3: Removing Waters from the 303(d) List	J-7
J4: Schedule for TMDL Work.....	J-8

Section K: Maps

Section L: Summary Tables of Waterbody Conditions, List of Prioritized Impaired Waters, and Monitoring and TMDL Schedules

L1: Status of Watershed Assessment Units.....	L1-1
L2: Status of Large River Assessment Units	L2-1
L3: Status of Lake Erie Assessment Units.....	L3-1
L4: Section 303(d) List of Prioritized Impaired Waters (Category 5).....	L4-1
L5: Monitoring and TMDL Schedules for Ohio's Watershed and Large River Assessment Units	L5-1

Section M: Water Body Assessment Unit Results

M1: Legend and Explanatory Notes.....	M1-1
M2: Watershed Assessment Unit Results.....	M2-1
M3: Large River Assessment Unit Results	M3-1
M4: Lake Erie Assessment Unit Results.....	M4-1

References

List of Tables and Figures

Tables

B-1. Ohio's water resource statistics.....	B-2
B-2. List of Ohio's principal streams and large rivers.....	B-5
B-3. Progress towards the 80% by 2010 Aquatic Life Use goal over the last four Integrated Report assessment cycles.....	B-11
E-1. Aggregate state statistics for fish contaminant data compared to human health criteria.....	E-7
E-2. Waters impaired because levels of PCBs or mercury in fish tissue exceed the threshold level upon which the WQS criterion is based.	E-8
E-3. Waters not significantly impaired because fish tissue levels of PCBs or mercury do not exceed the threshold level upon which the WQS criterion is based.	E-12
E-4. Waters with contaminants that affect fish tissue, not included in Table E-2 for these pollutants.	E-13
E-5. Waters for which the existing impaired status cannot be confirmed because data have become historical and no new data are available.	E-13
E-6. Waters with current fish tissue data where inadequate samples exist to determine impairment status.....	E-13
F-1. Seasonal geometric mean <i>E. coli</i> levels at Ohio's 23 public beaches along Lake Erie.....	F-6
F-2. The number of days (and the percentage for all years) when Ohio Lake Erie public beaches exceeded Ohio's single sample maximum <i>E. coli</i> criterion compared to the total number of days in the sampling period, 2002 – 2006.	F-7
F-3. Bathing water geometric mean <i>E. coli</i> exceedance frequency at 23 Lake Erie public beaches from 2001-2005.....	F-9
F-4. Overall differences in the assessment of recreation use attainment, 2004 to 2008.	F-9
F-5. Assessment units listed as impaired for recreation use in 2006 and found to be in attainment in the 2008 report.	F-10
F-6. Assessment units listed as attaining for recreation use in 2006 and found to be impaired in the 2008 report.	F-11
G-1. Summary of aquatic life use assessment for Ohio's Watershed, Large River, and Lake Erie Assessment Units: 2002, 2004, 2006, and 2008.	G-6
G-2. Breakdown by watershed size category of sites/miles in full attainment in 218 monitored Watershed Assessment Units based on data collected from 1997 – 2005.	G-6
G-3. Assessment of the top five causes of aquatic life impairment based on biological and water quality survey data collected from 1997 - 2006.....	G-7
H-1. Public Drinking Water Supply Impairment Determination.	H-4
H-2. Waters designated as impaired for PDWS beneficial use.....	H-8

Tables (continued)

H-3. PDWS beneficial use assessment results by water system.....	H-9
I-1. Anticipated statewide numerical criteria for the protection of recreation use subcategories.	I-10
I-2. Results of the upper Mahoning River watershed analysis.....	I-11
I-3. Results of the Walnut Creek watershed analysis.	I-11
I-4. Results for the Walnut Creek watershed using the proposed HUC12 methodology.	I-20
I-5. Results for the Upper Mahoning watershed using the proposed HUC12 methodology.....	I-21
J-1. Summary of results for each beneficial use.	J-1
J-2. Comparison of 303(d) listing results for Ohio's inland waters: 2002, 2004, 2006 and 2008.	J-2
J-3. Summary of changes in 303(d) category from 2006 to 2008.....	J-4
J-4. Priority points for impaired assessment units.	J-6
J-5. Assessment units removed from category 5 because new data are available.	J-7
J-6. Assessment unit removed from category 5 based on TMDL approval.	J-8
J-7. Ohio TMDLs ¹ approved by U.S. EPA.....	J-9
J-8. Short-term schedule for TMDL development.	J-13

Figures

B-1. Ohio Scenic River System (Ohio DNR 2007).....	B-3
B-2. Map of Ohio's principal streams and large rivers.	B-10
B-3. Progress towards the "80% by 2010" Aquatic Life Use goal over the last four Integrated Report assessment cycles (2002 – 2008).....	B-11
C-1. Antidegradation categories for Ohio Streams.	C-17
C-2. Water Pollution Control Fund 10-year trend.....	C-24
D-1. Ohio's large river assessment units (rivers with drainages greater than 500 mi ²).....	D-2
D-2. Ohio's watershed assessment units (11-digit HUCs, 8-digit HUCs shown with a heavy line).....	D-3
E-1. Illustration of the relationship among the water quality standard (WQS) values, the values that trigger issuance of fish consumption advisories (FCAs) and the resulting decision regarding waterbody impairment associated with an FCA.	E-2
E-2. Flowchart for the Categorization of Fish Tissue Data for the Integrated Report.	E-6
F-1. Lake Erie beaches sampled by Ohio health departments.	F-2
F-2. Seasonal frequency of advisory postings at Ohio's Lake Erie public beaches.	F-8
G-1. Progress towards the 80% by 2010 Goal based on Ohio's 23 Large River Assessment Units. Data compiled over the last four 10-year Integrated Report cycles with the current 2008 cycle including data collected from 1997 - 2006.....	G-7
G-2. Progress towards the 80 by 2010 Goal based on Ohio's 331 Watershed Assessment Units. Data compiled over the last four 10-year Integrated Report cycles with the current 2008 cycle including data collected from 1997 - 2006.....	G-8
H-1. Ohio watershed assessment units that contain at least one active surface water drinking water intake.	H-2
H-2. Assessment units with nitrate indicator results.	H-6
H-3. Assessment units with pesticide indicator results.	H-7
I-1. Flowchart for determining if spatial assessment score can occur based on headwater sampling locations.....	I-14
I-2. Sampling sites by drainage area and attainment status for HUC12 2050600011704.	I-15
I-3. Sampling sites by drainage area and attainment status overlain with the portion of the watershed captured by the headwater sites.....	I-16

Figures (continued)

I-4.	Sampling sites by drainage area and attainment status for HUC12 050301030406.	I-17
I-5.	Sampling sites by drainage area and attainment status overlain with the portion of the watershed captured by the headwater sites.	I-18
I-6.	HUC11 5080001070 Great Miami River (downstream Plum Creek to upstream Spring Creek; excluding GMR) shown with public drinking water supply intakes.	I-23
J-1.	Comparison of category results for watershed units: 2002 IR vs. 2008 IR.	J-3
J-2.	Priority points assigned based on use impairment or other factors (extra points).	J-5

List of Acronyms

AmphIBI	amphibian index of biotic integrity
AOC	Area of Concern (as identified under the Great Lakes Water Quality Agreement)
AU	assessment unit
BEACH	Beaches Environmental Assessment and Coastal Health (Act)
BMP	best management practice
BUI	Beneficial Use Impairment (as described in Annex 2 of the Great Lakes Water Quality Agreement)
CABB	Center for Applied Bioassessment and Biocriteria
CAFO	Concentrated Animal Feeding Operations
Corps	U.S. Army Corps of Engineers
CREP	Conservation Reserve Enhancement Program
CRP	Conservation Reserve Program
CSO	combined sewer overflow
CSP	Conservation Security Program
CWH	Coldwater Habitat
CWA	Clean Water Act
DDAGW	Division of Drinking and Ground Waters
DDT	dichlorodiphenyltrichloroethane
DEFA	Division of Environmental and Financial Assistance
DES	Division of Environmental Services
DLG	Digital Line Graph
DSW	Division of Surface Water
EAG	External Advisory Group
EQIP	Environmental Quality Incentives Program
EWH	Exceptional Warmwater Habitat
FCA	fish consumption advisory
FFY	federal fiscal year
FWPCA	Federal Water Pollution Control Act
GRP	Grassland Reserve Program
HUC	hydrologic unit code
IR	Integrated Report
kg	kilogram
L	liter
LaMP	Lakewide Management Plan
LCI	Lake Condition Index
LEC	(Ohio) Lake Erie Commission
LEPF	(Ohio) Lake Erie Protection Fund
LRAU	large river assessment unit

LRW	Limited Resource Water
LTCP	long-term control plan
MBI	Midwest Biodiversity Institute
MF	membrane filter
mg	milligram
mi ²	square miles
MOR	monthly operating data
MPN	most probable number
MS4	municipal separate storm sewer systems
MWH	Modified Warmwater Habitat
NEORS	Northeast Ohio Regional Sewer District
ng	nanogram
NHD	National Hydrography Dataset
NOI	notice of intent
NPDES	National Pollutant Discharge Elimination System
NPS	nonpoint source
NSSP	National Shellfish Sanitation Program
OAC	Ohio Administrative Code
ODH	Ohio Department of Health
ODNR	Ohio Department of Natural Resources
ORC	Ohio Revised Code
ORSANCO	Ohio River Valley Water Sanitation Commission
OTMP	Ohio Tributary Monitoring Program
OWDA	Ohio Water Development Authority
OWRC	Ohio Water Resources Council
PAHs	polyaromatic hydrocarbons
ppb	parts per billion
PCB	polychlorinated biphenyls
PDWS	Public Drinking Water Supply
PS	point source
PTI	permit to install
PTO	permit to operate
PWS	Public Water Supply
QA	quality assurance
QC	quality control
RF3	Reach File Version 3
RM	river mile
SDWA	Safe Drinking Water Act
SDWIS	Safe Drinking Water Information System
SFY	state fiscal year (July 1 to June 30)
sq mi	square miles
SSM	single-sample maximum
STORET	STOrage and RETrieval (a U.S. EPA water quality database)
SWIMS	Surface Water Information Management System
TMDL	total maximum daily load
TOC	total organic carbon
U.S. EPA	United States Environmental Protection Agency
µg	microgram
USC	United States Code
USGS	U.S. Geological Survey

VIBI	vegetation index of biotic integrity
WAUs	watershed assessment unit
WHIP	Wildlife Habitat Incentives Program
WPCLF	Water Pollution Control Loan Fund
WQ	water quality
WQC	Water Quality Certification (Section 401)
WQMP	Water Quality Management Plan
WQPSD	Water Quality Permit Support Document
WQS	water quality standards
WRP	Wetlands Reserve Program
WRRSP	Water Resource Restoration Sponsor Program
WSRLA	Water Supply Revolving Loan Account
WWH	Warmwater Habitat

Executive Summary

The *Ohio 2008 Integrated Water Quality Monitoring and Assessment Report* summarizes water quality conditions in the State of Ohio. The report satisfies Ohio's water quality reporting requirements under Sections 303(d), 305(b), and 314 of the Clean Water Act. The report was last updated in 2006.

Using methods devised to determine the suitability of waters for four specific uses—aquatic life (fish and aquatic insects), recreation such as boating and swimming, human health impacts related to fish tissue contamination, and public drinking water supplies—available data were compared with water quality goals. The results indicate which waters are meeting goals and which are not. Waters not meeting the goals for one or more of the four types of uses are referred to as *impaired*. The waters found to be impaired are prioritized and scheduled for further study and restoration. The report also includes the monitoring schedule that Ohio EPA plans to follow for the next several years.

The report describes the methods used to judge impairment of each type of use. The methods have evolved in each reporting cycle as the Agency gains access to more data and develops better ways to interpret them. This is the first reporting cycle to include an evaluation of public drinking water supplies.

Results are reported for 331 watershed units, 23 large river units (those draining more than 500 square miles), and 3 Lake Erie nearshore units. Additional information on streams draining between 50 and 500 square miles is presented. General information on Ohio's water quality is also reported in the form of statistics and progress toward Ohio's "80% attainment of the aquatic life use goal."

The 2008 highlights include the following:

- The overall number of "303(d) listed" waters did not change significantly.
- Six out of 66 eligible waters were impaired for nitrate under the public drinking water supply use designation; two out of 35 were impaired for atrazine.
- Fewer waters are without any data (i.e., condition unknown), although the number of waters with data collected within the past 10 years decreased slightly.
- Most of the watersheds for which new data are collected show impairment of one or more uses.
- Overall, the 2008 report includes assessment results for more waters, but does not indicate any substantial decline or improvement in Ohio's waters over the past two years.

Data from the report indicate that incremental improvements in water quality and progress toward the "80% attainment of the aquatic life use goal" continue. In general, large rivers in Ohio are meeting aquatic life use goals at a much higher percentage than smaller streams. Most water quality impairments are related to modification of the landscape in both urban and agricultural settings.