

OHIO RIVER VALLEY WATER SANITATION COMMISSION

Ohio River Basin Restoration Plan Development

Ohio River Basin Alliance



Ohio River Basin Alliance

A Unified Voice for the Ohio River

The Ohio River Basin Alliance (ORBA) is a collaborative, unified voice of stakeholders for water resource priorities of the Ohio River Basin striving to sustain healthy ecosystems and river communities and vibrant water-dependent economies.

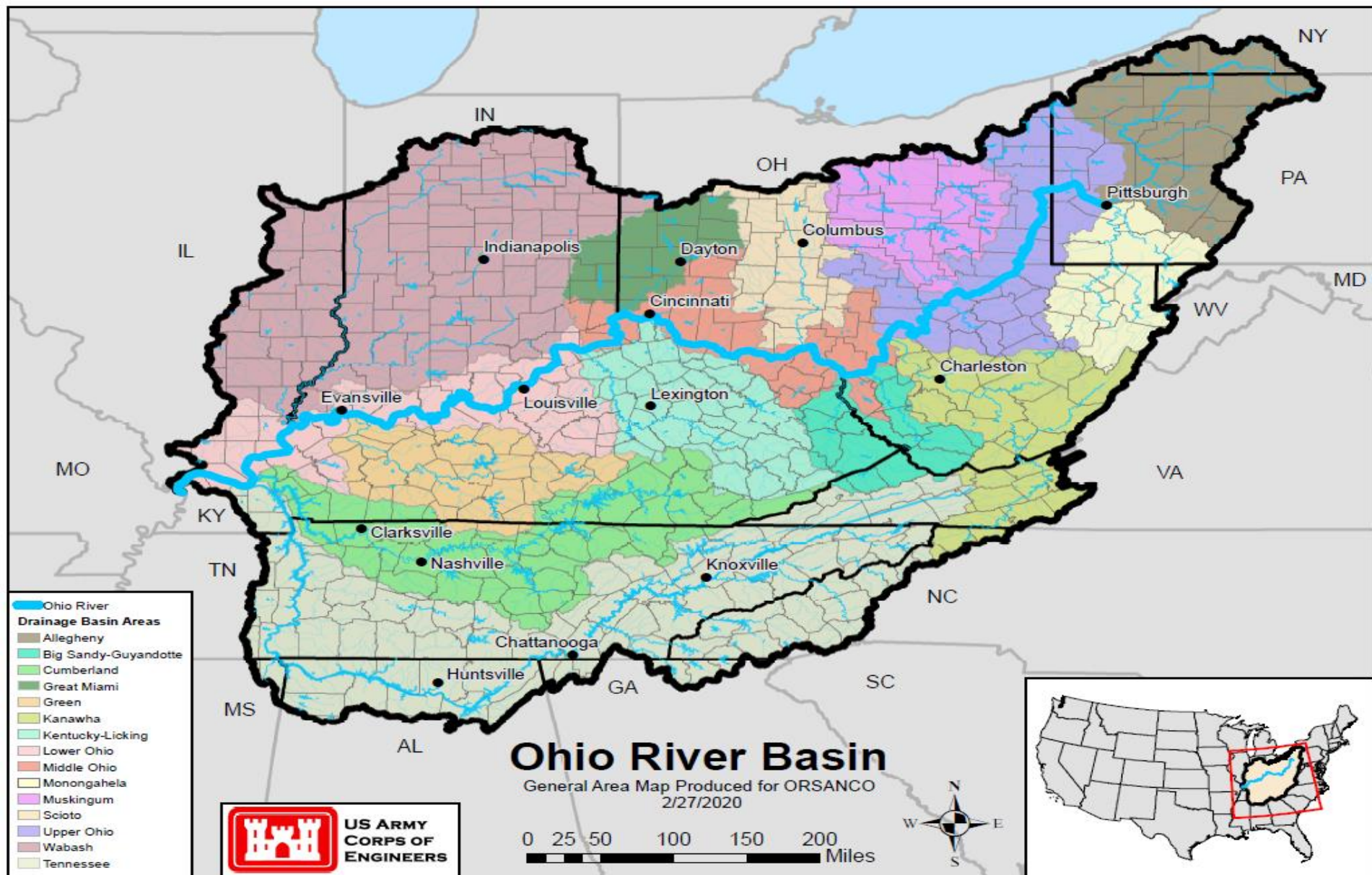
ORBA is a voluntary collaborative that provides a forum for addressing water resource issues in the Ohio River Basin in today's changing environment. ORBA began in 2009 as an outgrowth of the Ohio River Basin Summit co-led by Ohio River Valley Water Sanitation Commission (ORSANCO), the US Army Corps of Engineers, and the US Environmental Protection Agency.

Today, ORBA includes members from over 130 organizations including local, state and federal agencies, as well as commissions, industry, academia, and not-for-profit organizations.

ORBA, through ORSANCO fiscal sponsorship, executed a US Army Corps of Engineers Planning Assistance to States (PAS) initiative. The result is the collaborative *Plan for the Ohio River Basin 2020 - 2025*. This document provides six Ohio River Basin-wide goals, objectives and strategic actions as a framework for progress.

- [Plan for the Ohio River Basin](#)
- [Release ORBA Plan for 102120 v3](#)
- [ORBA By-Laws](#)
- [Climate Change Data](#)
- [ORBA Steering Committee](#)

Ohio River Basin

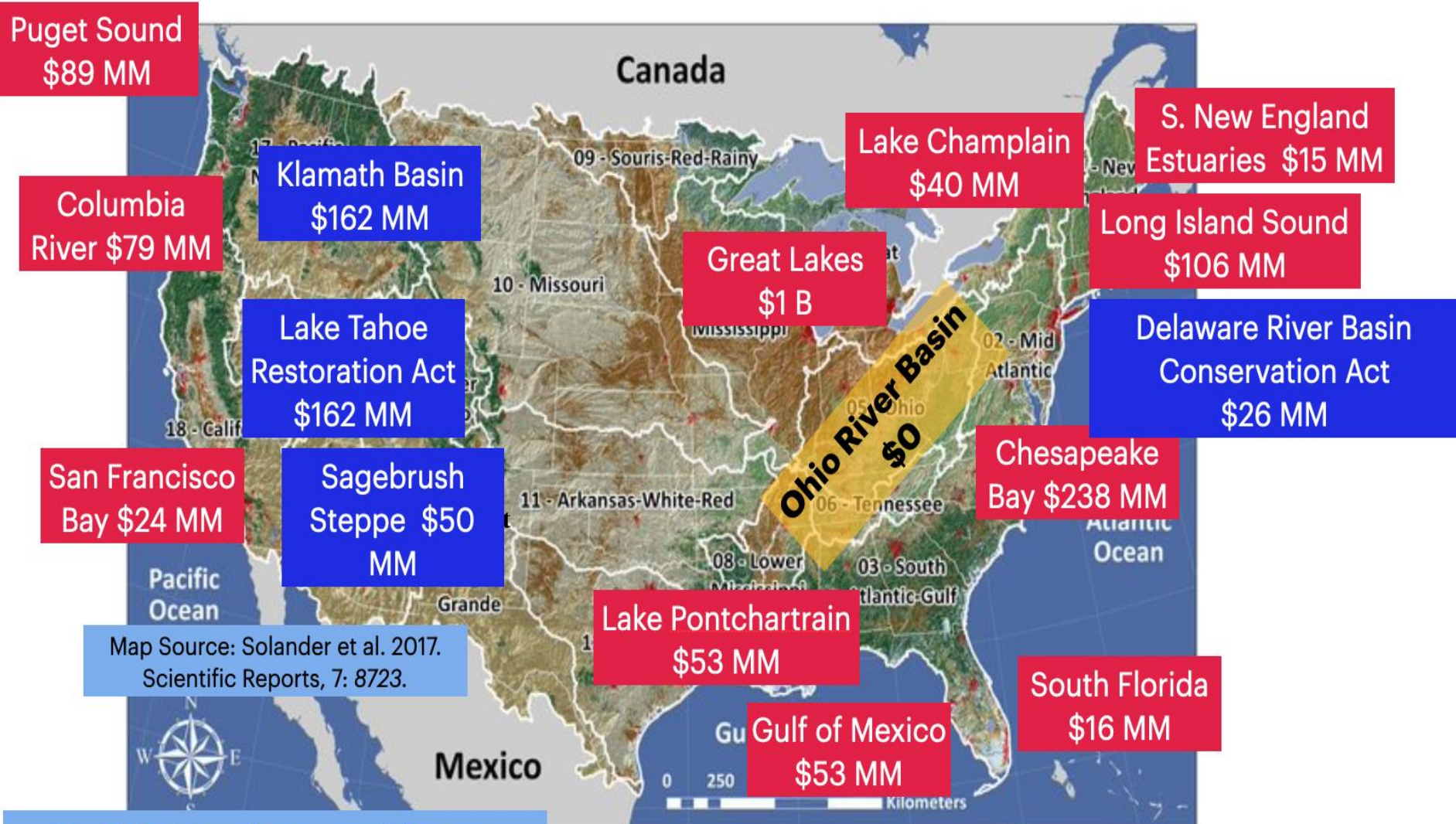


Where is the Ohio River Basin?

DEPARTMENT OF THE INTERIOR, ENVIRONMENT, AND
RELATED AGENCIES APPROPRIATIONS BILL, 2020
USEPA Geographic Program Funding Levels:

Great Lakes Restoration Initiative	- \$320 M
Chesapeake Bay	- \$ 85 M
Puget Sound	- \$ 33 M
Long Island Sound	- \$ 21 M
Gulf of Mexico	- \$ 17.55 M
Lake Champlain	- \$ 13.39 M
Southern New England Estuaries	- \$ 5.4 M
San Francisco Bay	- \$ 5.019 M
South Florida	- \$ 3.504 M
Columbia River Basin	- \$ 1.1 M

Geographic Ecological Restoration Funding in Infrastructure Investment and Jobs Act



USEPA funding - red boxes
USFWS funding - blue boxes

Clarify Plan for Ohio River Basin versus Ohio River Basin Restoration Plan/Initiative

- Plan for Ohio River Basin is a multi-goal area broad Plan for the Ohio River Basin
- Developed by USACE, ORBA and ORSANCO
- Very Broad Goals with multiple funding streams and varied timing for implementation
- The restoration plan, once delivered to the U.S. Congress, will set the stage for a future **Ohio River Restoration Initiative** that will provide federal funding and resources to implement the plan, similar to other federal geographic funding initiatives, e.g. Great Lakes, Chesapeake Bay, Florida Everglades, etc.
- Ohio River Basin Restoration Plan/Initiative is a single project-priority that is currently the Abundant Clean Water and Healthy and Productive Ecosystems Work Group number one priority out of many different projects
- Several Abundant Clean Water Work Group strategic priorities will not be funded or advanced through this effort

Discuss Collaboration between Abundant Clean Water and Healthy and Productive Ecosystems Work Groups

- Acid mine drainage
- Nonpoint Source (NPS) pollution (nutrient management, HAB's, nutrient trading)
- Toxics
- Water infrastructure (drinking water and wastewater)
- Habitats and Species
- Invasive Species
- Environmental Justice

Propose 3 to 5 long-term goals

- a. Virtually eliminate surface and ground water impairments due to mining activities.
- b. Ensure that all abandoned and bond forfeiture mines are adequately reclaimed.
- c. Ensure that active mine wastes are treated sufficiently so as not to cause impairments.
- d. Ensure that all operations and maintenance activities are funded long-term and completed on a regular basis.

Propose short-term actions (to be accomplished in first 5 years)

- a. Inventory of all abandoned and bond forfeiture mines that require reclamation.
- b. Inventory of all active mines contributing to impairments.
- c. Develop and implement state-run monitoring programs to identify all mining-related impairments and for long-term surveillance.
- d. Develop plans for all mines to abate identified impairments.
- e. Begin implementing reclamation plans.

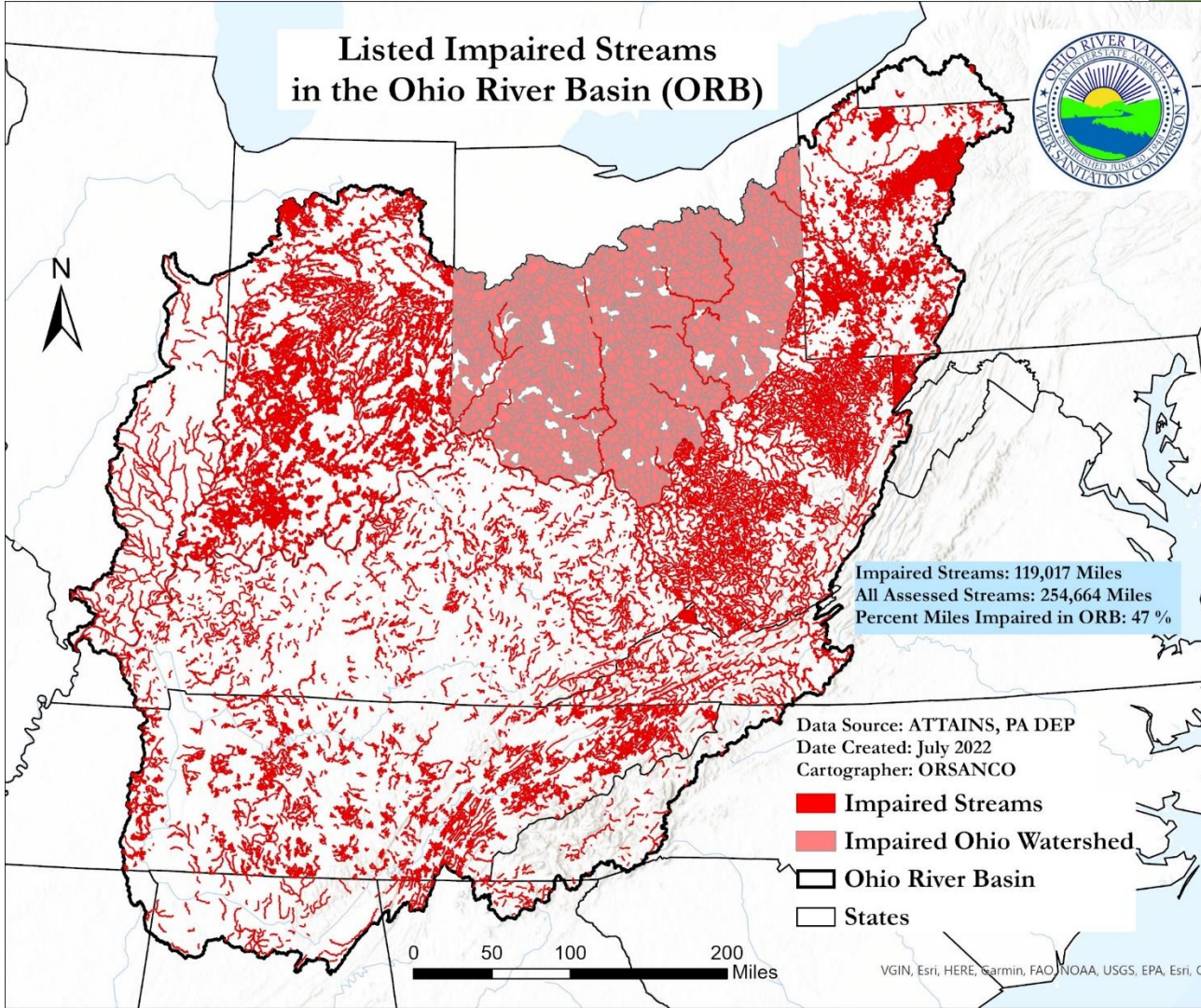
Identify indicators, milestones & outcomes

- a. By 2027, states will design and implement comprehensive monitoring programs and identify all mining-related impaired waters and the mines causing those impairments.
- b. By 2027, states will review, and update as appropriate, all water quality standards related to mining-related impairments.
- c. By 2030, develop reclamation plans for all abandoned mine lands, bond forfeiture mines, and active mines causing or contributing to impairments.
- d. By 2030, all active mines are fully controlled.
- e. By 2032, complete reclamation activities on 25% of all abandoned and bond forfeiture mines.
- f. By 2037, complete reclamation activities on 50% of all abandoned and bond forfeiture mines.
- g. By 2042, complete reclamation activities on 90+% of all abandoned and bond forfeiture mines.
- h. Development of research and applied science for AMD treatment (new treatment system designs, system autopsies, aggregation of what works and what doesn't, use of bacteria, promotion of REE and CM).

Impaired Waters of the Ohio River Basin & Causes

June 2022

Listed Impaired Streams in the Ohio River Basin (ORB)



Impaired Streams: 119,017 Miles
All Assessed Streams: 254,664 Miles
Percent Miles Impaired in ORB: 47 %

Data Source: ATTAINS, PA DEP
Date Created: July 2022
Cartographer: ORSANCO

- Impaired Streams
- Impaired Ohio Watershed
- Ohio River Basin
- States

0 50 100 200 Miles

VGIN, Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, Esri, C

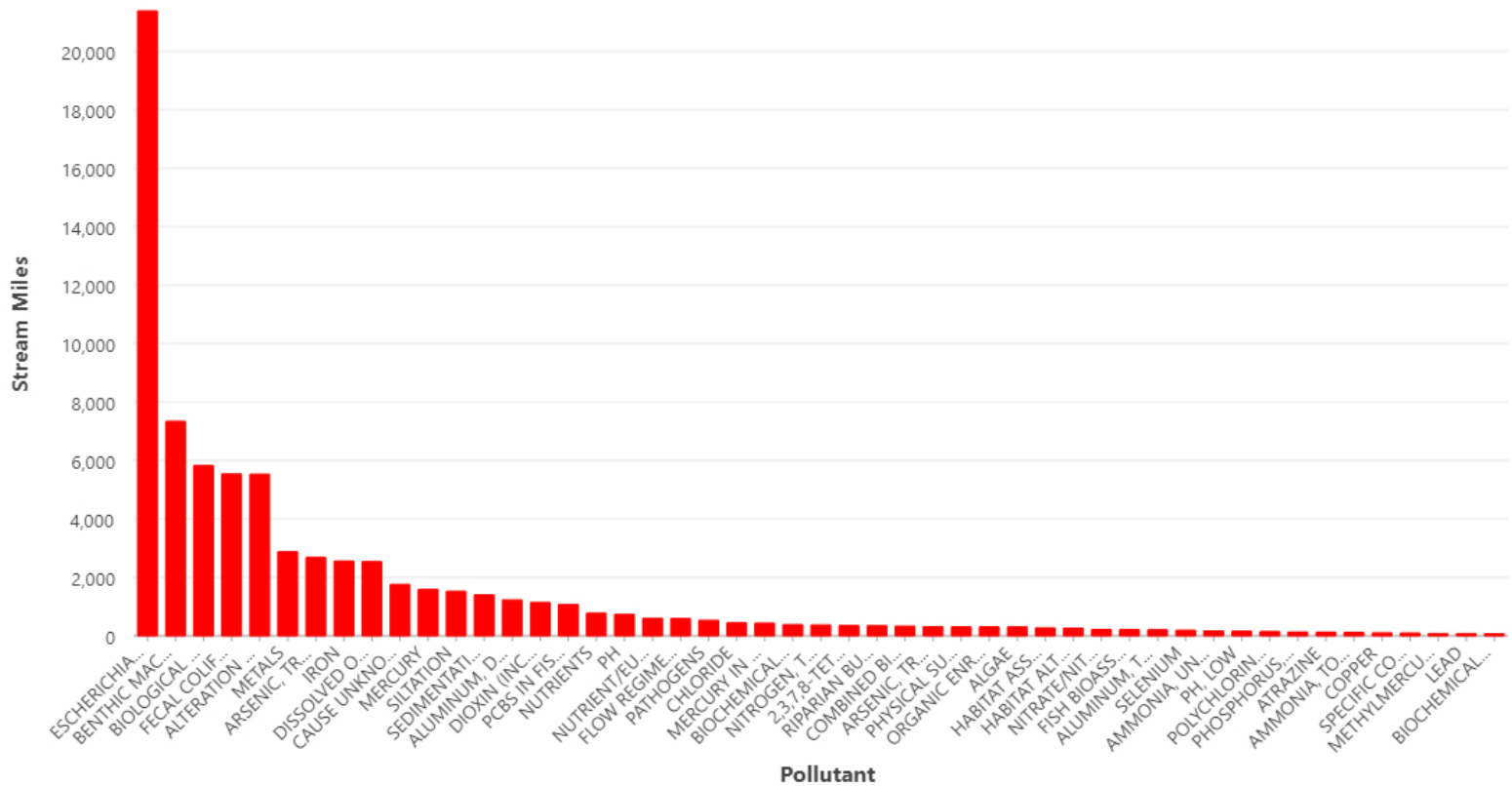
Impaired Streams in Ohio River Basin

State	Year	Agency/Data Source	Miles of Streams in ORB	Miles of Impaired Streams in ORB	Percent Miles Impaired in ORB
AL	2020	Alabama Department of Environmental Management	1,926	788	40.9%
GA	2022	Georgia Environmental Protection Division	740	420	56.7%
IL	2018	Illinois Environmental Protection Agency	6,427	2,635	41.0%
IN	2022	Indiana Department of Environmental Management	53,422	24,641	46.1%
KY	2020	Kentucky Energy and Environment Cabinet	10,877	8,106	74.5%
MD	2022	Maryland Department of Environment	1,819	1,105	60.7%
MS	2020	Mississippi Department of Environmental Quality	107	15	13.6%
NC	2020	NYDECA	3,829	553	14.4%
NY	2016	North Carolina Department of Environmental Quality	4,186	47	1.1%
OH	2022	Ohio Environmental Protection Agency	45,146	41,004	90.8%
PA	2020	Pennsylvania Department of Environmental Protection	32,071	10,476	32.7%
TN	2022	Tennessee Department of Environment & Conservation	48,033	12,198	25.4%
VA	2020	Virginia Department of Environmental Quality	18,367	2,924	15.9%
WV	2016	West Virginia Department of Environmental Protection	27,715	14,107	50.9%
		Total	254,664	119,017	46.7%

Impaired Streams by Causes in ORB

Top 50 out of 113 Pollutants

Impaired Streams Pollutant Causes in the Ohio River Basin



Pollutant	Stream Miles
ESCHERICHIA COLI (E. COLI)	21,382.10
BENTHIC MACROINVERTEBRATES BIOASSESSMENTS	7,337.04
BIOLOGICAL INTEGRITY	5,823.85
FECAL COLIFORM	5,537.50
ALTERATION IN STREAM-SIDE OR LITTORAL VEGETATIVE COVERS	5,529.16
METALS	2,876.85
ARSENIC, TRIVALENT, DISSOLVED	2,679.99
IRON	2,555.12
DISSOLVED OXYGEN	2,536.65
CAUSE UNKNOWN	1,756.57
MERCURY	1,585.84
SILTATION	1,525.42
SEDIMENTATION/SILTATION	1,406.75
ALUMINUM, DISSOLVED	1,228.35
DIOXIN (INCLUDING 2,3,7,8-TCDD)	1,142.56
PCBS IN FISH TISSUE	1,078.52
NUTRIENTS	772.4151
PH	734.9611
NUTRIENT/EUTROPHICATION BIOLOGICAL INDICATORS	599.75
FLOW REGIME MODIFICATION	588.1539
PATHOGENS	529.4357
CHLORIDE	442.0539
MERCURY IN FISH TISSUE	434.42
BIOCHEMICAL OXYGEN DEMAND (BOD)	380.718
NITROGEN, TOTAL	371.78
2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN	348.2
RIPARIAN BUFFER, LACK OF	341
COMBINED BIOTA/HABITAT BIOASSESSMENTS	327
ARSENIC, TRIVALENT	310.38
PHYSICAL SUBSTRATE HABITAT ALTERATIONS	303.93
ORGANIC ENRICHMENT	303.3666
ALGAE	302.8552
HABITAT ASSESSMENT	271.45
HABITAT ALTERATIONS	256.6612
NITRATE/NITRITE (NITRITE + NITRATE AS N)	214.01
FISH BIOASSESSMENTS	209.1247
ALUMINUM, TOTAL	202.59
SELENIUM	190.85
AMMONIA, UN-IONIZED	166.9497

Pollutant	Stream Miles
PH, LOW	157.69
POLYCHLORINATED BIPHENYLS (PCBS)	149.9564
PHOSPHORUS, TOTAL	126.29
ATRAZINE	124.85
AMMONIA, TOTAL	116.33
COPPER	99.3244
SPECIFIC CONDUCTIVITY	94.95
METHYLMERCURY	78.35
LEAD	74.71
BIOCHEMICAL OXYGEN DEMAND (BOD), CARBONACEOUS	71.67
NITRATE	63.28
ARSENIC	62.1147
1,1,2,2-TETRACHLOROETHANE	59.734
TOTAL DISSOLVED SOLIDS (TDS)	57.7003
TEMPERATURE	50.96
AMMONIA	48.78
INDEX OF BIOLOGICAL INTEGRITY (IBI)	46.9
LOSS OF INSTREAM COVER	46.86
DIOXIN	43.2482
ALKALINITY	42.96
CHLORINE	34.7693
NON-NATIVE FISH/SHELLFISH/ZOOPLANKTON	34.2491
OTHER ANTHROPOGENIC SUBSTRATE ALTERATIONS	33.6
TOXICITY	32.3902
LOW FLOW ALTERATIONS	32.22
COPPER, DISSOLVED	30.76
MANGANESE	30.74
DEWATERING	30.5268
THERMAL MODIFICATIONS	30.2455
CHROMIUM, TRIVALENT, DISSOLVED	30.04
AQUATIC PLANTS (MACROPHYTES)	26.35
CADMIUM	26
COMBINATION BENTHIC/FISHES BIOASSESSMENTS	25.85
TOTAL SUSPENDED SOLIDS (TSS)	25.3243
SULFATE	24.4085
OIL AND GREASE	22.9681
CYANIDE (AS FREE CYANIDE)	21.76
ALUMINUM	21.1243

Pollutant	Stream Miles
NICKEL	16.52
ORGANIC ENRICHMENT (SEWAGE) BIOLOGICAL INDICATORS	16.5
CHLOROPHYLL-A - AQUATIC LIFE USE SUPPORT	16.4676
ENDRIN	16.2
CHROMIUM, HEXAVALENT	16.04
DISSOLVED OXYGEN SUPERSATURATION	15.3
SILVER	14.14
FLOW ALTERATION-CHANGES IN DEPTH AND FLOW VELOCITY	13.92
CHLOROPHYLL-A	13.75
FISH PASSAGE BARRIER	13.2246
PARTICLE DISTRIBUTION (EMBEDDEDNESS)	13.15
CHROMIUM, HEXAVALENT, DISSOLVED	12.98
SILVER, DISSOLVED	11.28
DDT (DICHLORODIPHENYLTRICHLOROETHANE)	11.08
CESIUM	10.6
OSMOTIC PRESSURE	10.3632
CADMIUM, DISSOLVED	9.6
TURBIDITY	8.5365
CREOSOTE	8.4
DDE (DICHLORODIPHENYLDICHLOROETHYLENE)	8.25
ETHYLENE GLYCOL	7.3
COLOR	6.78
NITROGEN, AMMONIA	6.5
ALDRIN	5.2575
BIFENTHRIN	4.65
AMMONIA-NITROGEN	4.41
ORGANICS	3.3568
ODOR	2.92
NICKEL, DISSOLVED	2.66
DDD (DICHLORODIPHENYLDICHLOROETHANE)	2.49
SALINITY	2.15
NITROGEN	1.98
DDT	1.96
DEMETON	1.7
COAL ASH	0.76
ZINC, DISSOLVED	0.07

Data Sources for Impaired Streams

State	Organization	Contact	Obtainment	Data type	Reporting Year
Alabama	AL Department of Environmental Management	http://adem.alabama.gov/programs/water/303d.cnt (only 2020 was available at time of download)	Downloaded from website	305(b) and 303(d) streams	2020
Georgia	Environmental Protection Division	https://epd.georgia.gov/geographic-information-systems-gis-databases-and-documentation	Downloaded from website	305(b) and 303(d) Streams	2022
Illinois	Resource Management Mapping Service; Illinois EPA	https://www.rmms.illinois.edu/ https://www.rmms.illinois.edu/MetadataHtmlFiles/303d%20Streams%202016%20metadata.htm	Downloaded from website	305(b) and 303(d) streams	2018
Indiana	IN DNR	https://maps.indiana.edu/previewMaps/Hydrology/Water_Quality_Impaired_Waters_303d_2016.html	Downloaded from website	303(d) streams	2022
Kentucky	Kentucky Energy and Environment Cabinet	https://mywaterway.epa.gov/state/KY/water-quality-overview	Downloaded from website	305(b) and 303(d) streams	2020
Maryland	Maryland Department of Environment	https://mdewin64.mde.state.md.us/WSA/IR-TMDL/index.html	Downloaded from website	Integrated Report Data	2022
Mississippi	Mississippi Department of Environmental Quality	https://opcgis.deq.state.ms.us/tmdltool/	Downloaded from website	303(d) impaired streams	2020
New York	NY Department of Environmental Conservation	https://gis.ny.gov/gisdata/inventories/details.cfm?DSID=1117	Downloaded from website	The Waterbody Inventory/Priority Waterbodies List (WI/PWL) dataset	2016
North Carolina	NC Department of Environment Quality	https://data.ncdenr.opendata.arcgis.com/datasets/ncdenr::2018-integrated-report-final-full-resolution/explore?location=34.846836%2C-80.041490%2C7.00	Downloaded from website	Integrated Report, streams	2020
Ohio	O DNR; Division of Mineral Resources Management	https://oepa.maps.arcgis.com/apps/webappviewer/index.html?id=af9b57fe031d4eea8937f474c00f97f3	Downloaded from website	Integrated Report, watersheds	2022
Pennsylvania	Pennsylvania Department of Environmental Protection	https://www.pasda.psu.edu/download/dep/historic/IntegratedListNonAttaining/(IntegratedListNonAttaining2022_04.zip)	Downloaded from website	Integrated List Non-Attaining 305(b) and 303(d) streams	2020
Tennessee	Tennessee Division of Water Resources	Richard Cochran	Emailed (8/27/2021)	Water Quality Assessment 305(b) and 303(d) streams & TN AMD projects/passive treatment systems	2022
Virginia	Virginia Department of Environmental Quality	https://geohub-vadeq.hub.arcgis.com/datasets/56b9c1e2419f4211a610199f8a4ff973_173/about	Downloaded from website	Final WQA IR Assessment	2020
West Virginia	WV DEP	https://dep.wv.gov/WWE/watershed/IR/Pages/303d_305b.aspx	Downloaded from website	305(b) and 303(d) streams	2016

Also available to be downloaded from Attains:
<https://www.epa.gov/waterdata/get-data-access-public-attains-data#AttainsGeo>




Impaired Lakes in ORB

Listed Impaired Lakes in the Ohio River Basin




Impaired Lakes: 1,044,637 Acres
All Assessed Lakes: 2,262,056 Acres
Percent Acres Impaired in ORB: 46%

Data Source: ATTAINS
Date Created: June 2022
Cartographer: ORSANCO

-  Ohio River Basin
-  States
-  Impaired Lakes

0 50 100 200 Miles

A horizontal scale bar with markings at 0, 50, 100, and 200 miles.

VGIN, Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, Esri, USGS

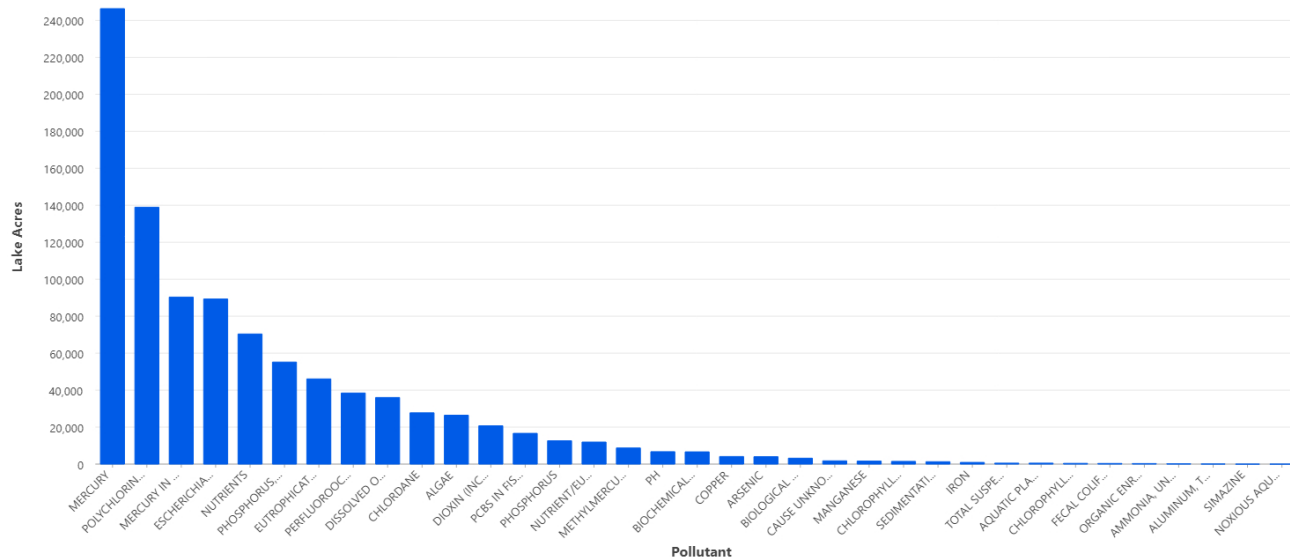
Impaired Lakes in Ohio River Basin

State	Year	Agency/Data Source	Acres of Lakes in ORB	Acres of Impaired Lakes in ORB	Percent Acres Impaired in ORB
AL	2020	Alabama Department of Environmental Management	348,370	181,472	52.1%
GA	2022	Georgia Environmental Protection Division	14,486	7,050	48.7%
IL	2018	Illinois	24,935	23,655	94.9%
IN	2022	Indiana	101,538	46,868	46.2%
KY	2020	Kentucky	371,137	173,118	46.6%
MD	2022	Maryland	4,963	4,907	98.9%
MS	2020	Mississippi	2,948	0	0.0%
NY	2016	New York	20,778	18,798	90.5%
NC	2020	N.C. Dept. of Environmental Quality	48,411	741	1.5%
OH	2022	Ohio Environmental Protection Agency	108,308	74,743	69.0%
PA	2020	Pennsylvania	52,668	40,193	76.3%
TN	2022	Tennessee	1,135,299	453,455	39.9%
VA	2020	Virginia	8,518	7,999	93.9%
WV	2016	West Virginia	19,698	11,638	59.1%
Total			2,262,056	1,044,637	46.2%

Impaired Lakes by Causes in ORB

Pollutants	Lake Acres
MERCURY	246,389
POLYCHLORINATED BIPHENYLS (PCBS)	138,982
MERCURY IN FISH TISSUE	90,345
ESCHERICHIA COLI (E. COLI)	89,293
NUTRIENTS	70,379
PHOSPHORUS, TOTAL	55,194
EUTROPHICATION, NUTRIENTS	46,102
PERFLUOROOCCTANE SULFONATE (PFOS)	38,443
DISSOLVED OXYGEN	36,015
CHLORDANE	27,746
ALGAE	26,428
DIOXIN (INCLUDING 2,3,7,8-TCDD)	20,740
PCBS IN FISH TISSUE	16,646
PHOSPHORUS	12,607
NUTRIENT/EUTROPHICATION BIOLOGICAL INDICATORS	11,934
METHYLMERCURY	8,711
PH	6,727
BIOCHEMICAL OXYGEN DEMAND (BOD)	6,642
COPPER	4,092
ARSENIC	4,010
BIOLOGICAL INTEGRITY	3,176
CAUSE UNKNOWN	1,743
MANGANESE	1,600
CHLOROPHYLL-A	1,486
SEDIMENTATION/SILTATION	1,284

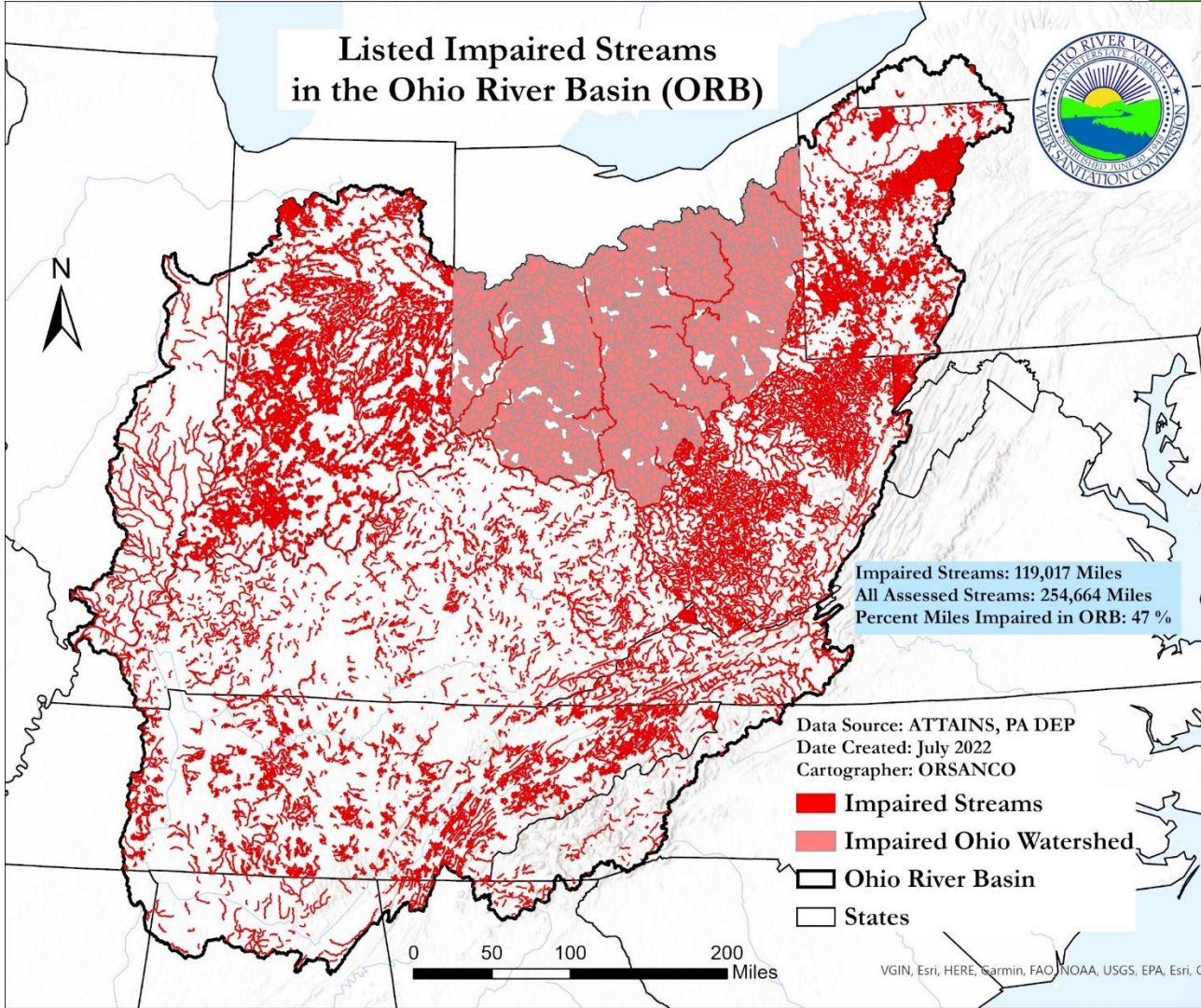
Impaired Lake Pollutant Causes in the Ohio River Basin



Acid Mine Drainage Impaired Waters of Ohio River Basin

July 2022

Listed Impaired Streams in the Ohio River Basin (ORB)



Impaired Streams: 119,017 Miles
All Assessed Streams: 254,664 Miles
Percent Miles Impaired in ORB: 47 %

Data Source: ATTAINS, PA DEP
Date Created: July 2022
Cartographer: ORSANCO

- Impaired Streams
- Impaired Ohio Watershed
- Ohio River Basin
- States





0 50 100 200 Miles

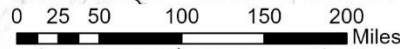
VGIN, Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, Esri, C

Mining Impaired Streams in the Ohio River Basin (ORB)



Mining ONLY Impaired Streams: 13,344 miles
Impaired Streams: 119,017 miles
Percent Mining Only Impaired in ORB: 10%

- Date Created: July 2022
- Cartographer: ORSANCO
-  Ohio Watersheds w/ AMD
-  Mining Impaired Streams
-  States
-  Ohio River Basin



VGIN, Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, Esri, CGIAR, USGS

Mining Impaired Streams in the Ohio River Basin

State	Miles of Streams Assessed in ORB	Miles of Impaired Streams in ORB	Miles of ONLY Mining Related Impaired Streams in ORB	Percent Mining Impaired Streams out of All Impaired Streams in ORB
Alabama	1,926	788	16	2%
Georgia	740	420	0	0%
Illinois	6,427	2,635	169	6%
Indiana	53,422	24,641	166	0.7%
Kentucky	10,877	8,106	2,520	31%
Maryland	1,819	1,105	122	11%
Mississippi	107	15	0	0%
New York	4,186	47	0	0%
North Carolina	3,829	553	?	
Ohio	45,146	41,004	3,499	9%
Pennsylvania	32,071	10,476	3,589	34%
Tennessee	48,033	12,198	1,097	9%
Virginia	18,367	2,924	415	14%
West Virginia	27,715	14,107	1,751	12%
Total	254,664	119,017	13,344	10%

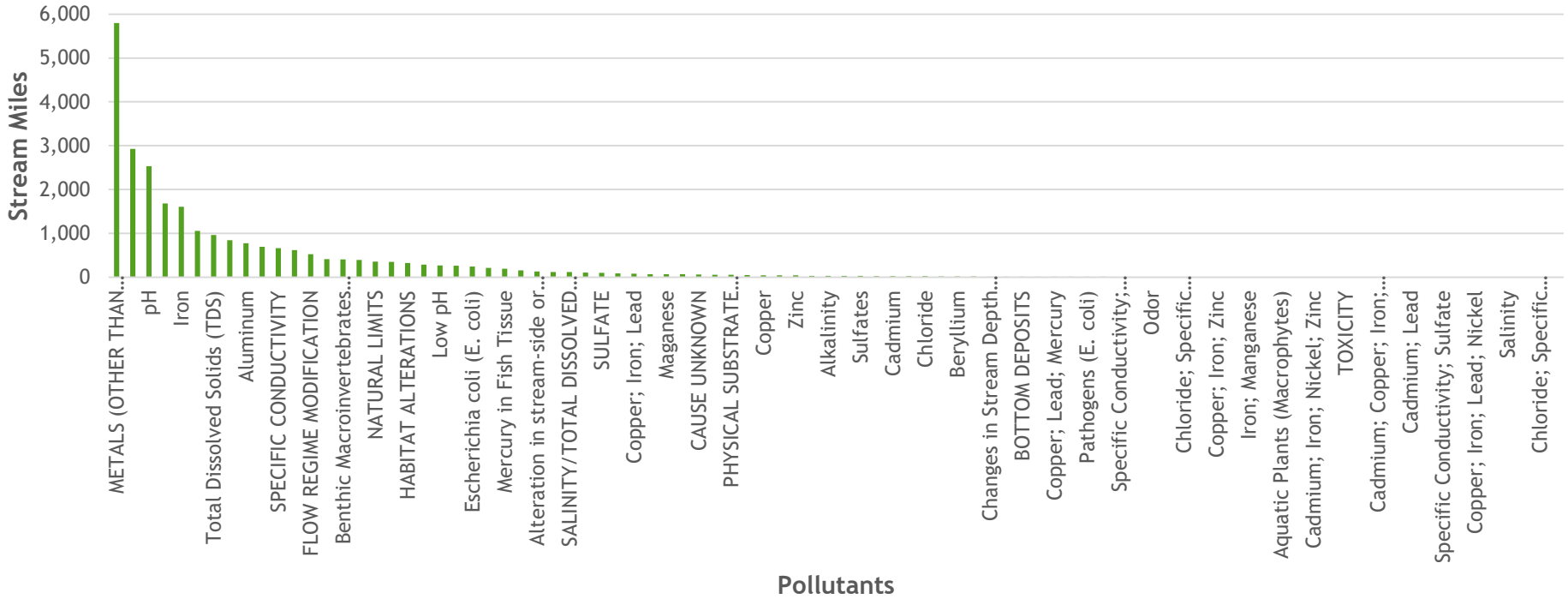
-Missing AMD source data from North Carolina

Data Sources for Mining Impaired Streams

State	Organization	Contact	Obtainment	Data type	Reporting Year
Alabama	AL Department of Environmental Management	http://adem.alabama.gov/programs/water/303d.cnt (only 2020 was available at time of download)	Downloaded from website (12/3/2021)	305(b) and 303(d) streams	2020
Georgia	Environmental Protection Division	https://epd.georgia.gov/geographic-information-systems-gis-databases-and-documentation	Downloaded from website (12/7/2021)	305(b) and 303(d) Streams	2020
Illinois	Resource Management Mapping Service; Illinois EPA	https://www.rmms.illinois.edu/ https://www.rmms.illinois.edu/MetadataHtmlFiles/303d%20Streams%202016%20metadata.htm	Downloaded from website (8/27/2021)	305(b) and 303(d) streams	2016
Indiana	IN DNR; Abandoned Mine Land Program	Andy Ripley	Emailed (2/15/2022)	AMD impacted streams	2022
Kentucky	KY Division of Abandoned Mine Lands	Lucas Graham	Emailed (2/28/2022)	AMD mining related impaired streams	2020
Maryland	Maryland Department of Environment	https://mdewin64.mde.state.md.us/WSA/IR-TMDL/index.html	Downloaded from website (2/3/2022)	Integrated Report Data	2018
Mississippi	Mississippi Department of Environmental Quality	https://opcgis.deq.state.ms.us/tmdltool/	Downloaded from website (12/2/2021)	303(d) impaired streams	2020
New York	NY Department of Environmental Conservation	https://gis.ny.gov/gisdata/inventories/details.cfm?DSID=1117	Downloaded from website (8/26/2021)	The Waterbody Inventory/Priority Waterbodies List (WI/PWL) dataset	2016
North Carolina	NC Department of Environment Quality	https://data-ncdenr.opendata.arcgis.com/datasets/ncdenr::2018-integrated-report-final-full-resolution/explore?location=34.846836%2C-80.041490%2C7.00	Downloaded from website (8/27/2021)	Integrated Report, streams	2018
Ohio	O DNR; Division of Mineral Resources Management	Jeff Calhoun	Emailed (2/22/2022)	Watersheds w/ AMD	2016
Pennsylvania	Pennsylvania Department of Environmental Protection	https://www.pasda.psu.edu/download/dep/historic/IntegratedListNonAttaining/ (IntegratedListNonAttaining2022_04.zip)	Downloaded from website (7/25/2022)	Integrated List Non-Attaining 305(b) and 303(d) streams	2022
Tennessee	Tennessee Division of Water Resources	Richard Cochran & Karina Bynum	Emailed (8/27/2021 & 2/15/2022)	Water Quality Assessment 305(b) and 303(d) streams & TN AMD projects/passive treatment systems	2020
Virginia	Virginia Department of Environmental Quality	https://geohub-vadeq.hub.arcgis.com/datasets/56b9c1e2419f4211a610199f8a4ff973_173/abouut	Downloaded from website (9/2/2021)	Final WQA IR Assessment	2020
West Virginia	WV EPA; Division of Water and Waste Management	Mindy Neil	Emailed (6/10/2022)	AMD mining related impaired streams	2016

Mining Impaired Streams by Causes in ORB

Ohio River Basin Mining Impaired Streams by Pollutant



Mining Impaired Streams by Causes in ORB

Pollutant	Stream Miles
METALS (OTHER THAN MERCURY)	5,797.09
Mercury	2,927.17
pH, low	2,504.67
Iron	1,299.34
Sedimentation/Siltation	1,291.85
Bio	1,058.08
PARTICLE DISTRIBUTION (EMBEDDEDNESS)	847.29
Fecal Coliform	694.97
Al	688.96
Total Dissolved Solids (TDS)	675.14
Dissolved Oxygen	624.47
SEDIMENT	591.48
FLOW REGIME MODIFICATION	523.89
Manganese	480.11
Benthic Macroinvertebrates Bioassessments	407.31
NATURAL LIMITS	355.07
Al Trout	351.06
Siltation	331.37
HABITAT ALTERATIONS	323.68
Fe Trout	290.54
Escherichia coli (E. coli)	250.30
Specific Conductance	238.21
ORGANIC ENRICHMENT	209.63
SALINITY/TOTAL DISSOLVED SOLIDS/CHLORIDES/SULFATES	140.99
ALTERATION IN STREAM-SIDE OR LITTORAL VEGETATIVE COVERS	130.81
Selenium	104.20
Nickel	89.75
TURBIDITY	85.64
CAUSE UNKNOWN	85.31
ALUMINUM	84.88
SULFATE	81.08
Lead	72.84
PCBs in Fish Tissue	68.57
Phosphorus (Total)	59.04

Pollutant	Stream Miles
Loss of Instream Cover	57.55
Total Suspended Solids (TSS)	55.91
PHYSICAL SUBSTRATE HABITAT ALTERATIONS	55.58
TOTAL TOXICS	52.21
Sulfates	49.06
COPPER	44.94
HYDROGEN SULFIDE	43.91
Zinc	42.86
AMMONIA	27.88
Chloride	23.08
Beryllium	18.89
Nutrient/Eutrophication Biological Indicators	18.50
Boron	18.27
Cadmium	16.78
Changes in Stream Depth and Velocity Patterns	16.11
OTHER ANTHROPOGENIC SUBSTRATE ALTERATIONS	15.84
BOTTOM DEPOSITS	15.57
Alkalinity	13.85
FISH PASSAGE BARRIER	13.36
SPECIFIC CONDUCTIVITY	13.36
Nutrients	11.86
Pathogens (E. coli)	11.86
Temperature	11.19
Carbonate as CaCO3	10.74
Bottom Deposits	9.60
Odor	9.60
Dioxin	8.20
Lowflowalt	7.64
Aquatic Plants (Macrophytes)	7.44
Silver	7.22
TOXICITY	4.83
HYDROLOGIC ALTERATION	3.68
Maganese	3.66
Nitrogen (Total)	3.24
OTHER CAUSE	2.16

Propose 3 to 5 long-term goals

- a. Virtually eliminate surface and ground water impairments due to mining activities.
- b. Ensure that all abandoned and bond forfeiture mines are adequately reclaimed.
- c. Ensure that active mine wastes are treated sufficiently so as not to cause impairments.
- d. Ensure that all operations and maintenance activities are funded long-term and completed on a regular basis.

Propose short-term actions (to be accomplished in first 5 years)

- a. Inventory of all abandoned and bond forfeiture mines that require reclamation.
- b. Inventory of all active mines contributing to impairments.
- c. Develop and implement state-run monitoring programs to identify all mining-related impairments and for long-term surveillance.
- d. Develop plans for all mines to abate identified impairments.
- e. Begin implementing reclamation plans.

Identify indicators, milestones & outcomes

- a. By 2027, states will design and implement comprehensive monitoring programs and identify all mining-related impaired waters and the mines causing those impairments.
- b. By 2027, states will review, and update as appropriate, all water quality standards related to mining-related impairments.
- c. By 2030, develop reclamation plans for all abandoned mine lands, bond forfeiture mines, and active mines causing or contributing to impairments.
- d. By 2030, all active mines are fully controlled.
- e. By 2032, complete reclamation activities on 25% of all abandoned and bond forfeiture mines.
- f. By 2037, complete reclamation activities on 50% of all abandoned and bond forfeiture mines.
- g. By 2042, complete reclamation activities on 90+% of all abandoned and bond forfeiture mines.
- h. Development of research and applied science for AMD treatment (new treatment system designs, system autopsies, aggregation of what works and what doesn't, use of bacteria, promotion of REE and CM).