APPENDIX A:

2022 INTEGRATED REPORT TABLES

Table 1: Summary of use support by waterbody type.

Designated Use	Total Size [1]	Size Assessed	Percent Assessed	Size Fully Supporting	Size Not Supporting
Rivers and Streams (Miles)					
Full Body Contact (Recreational Use)	63,511	33,904	53.4%	9,277	24,627
Human Health and Wildlife (Fishable Use)	63,508	8,865	14.1%	3,361	5,604
Public Water Supply [2]	377	23	6.1%	23	0
Warm Water Aquatic Life (Aquatic Life Use)	63,511	36,653	57.7%	24,820	11,833
Lake Michigan Shoreline (Miles)					
Full Body Contact (Recreational Use)	67	67	100.0%	0	67
Human Health and Wildlife (Fishable Use)	67	67	100.0%	0	67
Public Water Supply [1]	35	35	100.0%	35	0
Warm Water Aquatic Life (Aquatic Life Use)	67	67	100.0%	63	4
Lake Michigan (Acres)					
Human Health and Wildlife (Fishable Use)	154,176	154,176	100%	0	154,176
Lakes and Reservoirs (Acres)					
Full Body Contact (Recreational Use)	129,547	39,790	30.7%	30,503	9,287
Human Health and Wildlife (Fishable Use)	129,662	81,335	62.0%	42,215	39,120
Public Water Supply [1]	29,262	16,871	57.7%	230	16,641
Warm Water Aquatic Life (Aquatic Life Use)	129,547	16,125	12.5%	5,919	10,206

Source: U.S. EPA Assessment, Total Maximum Daily Load (TMDL) Tracking and Implementation System (ATTAINS) Indiana data for the 2022 Integrated Report Cycle (Version: Organization Public Comment).

[1] Total size shown for rivers and streams differ from those shown in Table 2 due to different information sources (ATTAINS versus the Indiana Reach Index). IDEM is working to resolve these differences by the 2022 cycle.

[2] While all waterbodies in Indiana are designated for aquatic life and recreational uses, not all are designated for use as a public water supply. There are a total of 29,541 lake acres and 111 stream miles (including 35 miles of shoreline) designated for use as a public water supply in Indiana.

Table 2: Atlas information.

Description	Value	Units
Indiana population [1]	6,805,985	People
Indiana surface area [2]	36,099	Square Miles
Total miles of rivers and streams [3]	63,511	Miles
Number of lakes, reservoirs and ponds [4]	1,582	-
Total size of lakes, reservoirs, ponds [4]	129,662	Acres
Great Lakes [4]	154,176	Acres
Great Lakes shoreline [4]	67	Miles
Fresh water wetlands [5]	913,999	Acres

[1] U.S. Census Bureau (estimated July 21,2021): https://www.census.gov/quickfacts/IN

[2] Indiana Department of Administration State Information Center.

[3] The Indiana High Resolution Reach Index (Version 20190129) lists 62,162 river and stream miles in Indiana. This value has been adjusted up to 63,511 miles to account for waters that are not yet indexed but which are tracked in U.S. EPA's Assessment, Total Maximum Daily Load (TMDL) Tracking and Implementation System (ATTAINS) (Version: Organization Public Comment).

[4] U.S. EPA ATTAINS data for Indiana's 2022 Integrated Report Cycle (Version: Organization Public Comment). Note this value may include both publicly owned and private lakes, reservoirs and ponds.

[5] Calculated value based on data derived from the National Wetlands Inventory of the U.S. Fish & Wildlife Service (USFWS) obtained from the GIO.wetlands_NWI_USFWS_IN geospatial data layer. Data are current as of May 2014. Calculation includes wetlands classified as: Freshwater Emergent, Freshwater Forested/Shrub, Riverine, and "Other". Wetlands classified in the data set as Ponds or Lakes were not included.

Table 3: Clean Water Act Sections 205(j) and 319(h) investments for state fiscal years (SFY) 2003-2021. Table does not include an additional $434,328 from the American Recovery and Reinvestment Act of 2009, which was awarded through the State Revolving Fund (SRF) Program.

Federal Fiscal Year	205(j)		319(h)	
	Number of Projects	Amount Awarded	Number of Projects	Amount Awarded
2003	6	$507,054	34	$4,544,480 [1]
2004	6	$497,220	27	$4,159,332 [2]
2005	3	$254,430	21	$3,747,145 [3]
2006	2	$251,310	18	$3,374,538
2007	2	$148,915	12	$3,022,961
2008	0	0	8	$2,967,181
2009	2	$271,432	9	$2,759,609
2010	2	$293,753	11	$3,653,209
2011	4	$699,775	8	$2,457,215
2012	2	$331,250	8	$2,221,471
2013	2	$337,750	7	$2,276,973
2014	3	$341,000	9	$2,628,234
2015	2	$340,000	9	$2,317,768
2016	2	$196,000	10	$3,124,410
2017	3	$323,000	12	$2,862,430
2018	3	$308,516	8	$3,564,000
2019	3	$387,000	9	$3,528,000
2020	3	$387,000	9	$3,777,000
2021	3	$386,279	13	$3,827,000

[1] Includes two in-house projects totaling $526,122.

[2] Includes two in-house projects totaling $248,792.

[3] Includes one in-house project totaling $155,686.

Table 4: Reduction of sediment, phosphorus, and nitrogen reaching Indiana waters.

Dates	Sediment Reduction (tons/year)	Phosphorus Reduction (pounds/year)	Nitrogen Reduction (pounds/year)
2000-2003	35,870	42,662	85,710
2004	18,561	21,993	44,527
2005	33,415	39,347	79,349
2006	25,831	40,538	99,434
2007	23,279	126,529	125,848
2008	18,119	25,400	65,367
2009	7,965	15,479	15,319
2010	33,420	31,374	66,400
2011	28,880	33,434	70,450
2012	47,616	94,980	141,709
2013	54,507	92,360	170,376
2014	67,403	168,542	168,710
2015	97,212	132,737	228,334
2016	101,205	126,732	243,402
2017	95,100	104,442	283,455
2018	113,882	120,566	313,520
2019	62,630	63,478	140,106
2020	119,813	215,657	448,930
2021	40,647	72,227	169,556

Source: IDEM OWQ nonpoint source project tracking database

Table 5: Summary of changes in water quality in watersheds reported to U.S. EPA under its success measures (SP-12 and WQ-10a) programs.

Stream Name	HUC	Stream Miles Improved	Impairment Removed	List Year Removed
Pigeon	05140202	32	Chlordane	2002
Lower Clifty Creek	051202060107	8.12	E. coli	2010
West Fork Big Walnut	051202030104	34.64	E. coli	2010
East Fork Big Walnut	051202030102	15.76	E. coli	2010
Bull Run	071200011308	25.09	Impaired biotic communities	2012
Metcalf Ditch	041000030504	14.33	Impaired biotic communities	2012
North Prong Stotts Creek	051202011404	1.25	Impaired biotic communities	2012
South Prong Stotts Creek	051202011405	13.23	Impaired biotic communities	2012
Mill Creek	051201011404	13.14	Impaired biotic communities	2012
Jenkins Ditch	051201070308	2.13	Impaired biotic communities	2012
Emma Creek	040500011201	2.32	Impaired biotic communities	N/A
Devils Backbone	051401040502	21	E. coli	2014
Flowers Creek	051201040601	12.72	Impaired biotic communities, dissolved oxygen, nutrients	2018
Buck Creek-Busseron Creek	051201111509	37.3	Nutrients, impaired biotic communities	2018
Pendleton Branch	050902030902	22	E. coli, impaired biotic communities	2018
South Fork Wildcat Creek	051201070400	5.48	Impaired biotic communities	2020
Boyles Ditch	051201070400	5.59	Impaired biotic communities	2020

Stream Name	HUC	Stream Miles Improved	Impairment Removed	List Year Removed
Hogan Creek	0509020304	14.5	E. Coli, Impaired biotic communities	2022
Stump Ditch-Kilmore Creek	05120107040070	11.6	Impaired biotic community	2022
Little Deer Creek	051201050503	11.94	E. Coli, Impaired biotic community	2022

*From 2003-2018, U.S. EPA used Measure SP-12 (commonly called “Measure W”) to track improvements in water quality conditions in impaired watersheds resulting from watershed planning and restoration activities. For the purposes of meeting this measure, improvements were demonstrated by the removal of at least 40 percent of the impairments or impaired miles/acres in the watershed from the state’s 303(d) List of Impaired Waters or by valid scientific information that indicates significant watershed-wide improvement in one or more water quality parameters associated with the impairments listed on Indiana’s 2002 303(d) list.

Table 6: State Revolving Fund (SRF) investments in state fiscal years (SFY) 2020 and 2021.

SRF Program	Number of Projects	Loan Amount	Savings Realized
Clean Water	55	$790,804,608	$185,061,609
Drinking Water	30	$168,931,473	$61,327,002

Source: SRF program tracking database

Table 7: OWQ's primary and secondary water quality monitoring objectives and the types of monitoring approaches – Targeted (T), Probabilistic (P), and/or Fixed Station (F) – needed to meet them.

Key	Monitoring Objective	Priority	Monitoring Approach			Priority Rationale
			P	T	F	
A	Conduct water quality assessments pursuant to CWA Section 305(b) to support the development of Indiana's Integrated Report to U.S. EPA	Primary	X	X	X	Required for CWA Section 106 funding
B	Development of Indiana's CWA Section 303(d) List of Impaired Waters for Indiana's Integrated Report	Primary	X	X	X	Required for CWA Section 106 funding
C	Develop Total Maximum Daily Loads to address impairments identified on Indiana's 303(d) list	Primary	X	X	X	Required for CWA Section 106 funding
D	Determine trends and trophic status of Indiana's lakes and reservoirs under CWA Section 314	Primary	X	X		Required for CWA Section 106 funding
E	Develop water quality criteria, including nutrient criteria for lakes and reservoirs, rivers and streams	Primary	X	X		Required for CWA Section 106 funding
F	Support watershed planning and restoration efforts	Primary	X	X	X	Required for CWA Section 319 funding and to meet performance measures in U.S. EPA's Strategic Plan
G	Identify water quality improvements accomplished by watershed restoration efforts funded through CWA programs	Primary		X		Required to meet performance measures in U.S. EPA's Strategic Plan
H	Support the development of public health advisories related to the use of Indiana's water resources, including fish consumption advisories and recreational use advisories	Primary		X		Supports protection of human health
I	Determine ambient groundwater quality and extent of contaminated areas	Primary		X		Supports protection of human health

Table 8: Individual use support summary for Indiana streams.

Designated Uses					
Designated Use	Total Size (Miles)	Size Assessed (Miles)	Percent Assessed	Size Fully Supporting (Miles)	Size Not Supporting (Miles)
Full Body Contact (Recreational Use)	63,511	33,904	53.4%	9,277	24,627
Human Health and Wildlife (Fishable Use)	63,508	8,965	14.1%	3,361	5,604
Public Water Supply	377	23	6.1%	23	0
Warm Water Aquatic Life (Aquatic Life Use)	63,511	36,653	57.7%	24,820	11,833

Source: U.S. EPA Assessment, Total Maximum Daily Load (TMDL) Tracking and Implementation System (ATTAINS) Indiana data for the 2022 Integrated Report Cycle (Version: Organization Public Comment).

Table 9: Summary of parameters causing or indicating impairment of Indiana streams.

Parameter Causing/Indicating Impairment	Total Size (Miles)
ESCHERICHIA COLI (E. COLI)	24,627
BIOLOGICAL INTEGRITY	8,880
PCBS IN FISH TISSUE	4,926
DISSOLVED OXYGEN	3,462
NUTRIENTS	3,142
MERCURY IN FISH TISSUE	597
POLYCHLORINATED BIPHENYLS (PCBS)	364
DIOXIN (INCLUDING 2,3,7,8-TCDD)	364
PH	301
MERCURY, TOTAL	222
CHLORIDE	204
AMMONIA, UN-IONIZED	139
HABITAT ALTERATIONS	69
SEDIMENTATION/SILTATION	65
SULFATE	46
CYANIDE (AS FREE CYANIDE)	30
TEMPERATURE	16
OIL AND GREASE	29
ZINC	16
CADMIUM	10

PESTICIDES	7
NICKEL	6
NICKEL, DISSOLVED	6
COPPER	6

Source: U.S. EPA Assessment, Total Maximum Daily Load (TMDL) Tracking and Implementation System (ATTAINS) Indiana data for the 2022 Integrated Report Cycle (Version: Organization Public Comment).

Table 10: Summary of potential sources impairing Indiana streams.

Potential Sources of Impairment	Total Size (Miles)	Number of Stream Reaches
AGRICULTURE		
AGRICULTURE	2,242	442
CROP PRODUCTION WITH SUBSURFACE DRAINAGE	2,213	384
LIVESTOCK (GRAZING OR FEEDING OPERATIONS)	5,490	1,016
UNRESTRICTED CATTLE ACCESS	752	132
CONFINED ANIMAL FEEDING OPERATIONS - CAFOS (POINT SOURCE)	0	0
CONFINED ANIMAL FEEDING OPERATIONS (NPS)	158	25
CONSTRUCTION		
HIGHWAYS, ROADS, BRIDGES, INFRASTRUCTURE (NEW CONSTRUCTION)	0	0
SITE CLEARANCE (LAND DEVELOPMENT OR REDEVELOPMENT)	29	5
GROUND WATER LOADINGS		

CONTAMINATED GROUNDWATER	13	3
HABITAT ALTERATIONS (NOT DIRECTLY RELATED TO HYDROMODIFICATION)		
HABITAT MODIFICATION - OTHER THAN HYDROMODIFICATION	28	9
LOSS OF RIPARIAN HABITAT	1,109	230
STREAMBANK MODIFICATIONS/DESTABILIZATION	334	71
HYDROLOGIC ALTERATION		
CHANNELIZATION	276	44
DAM OR IMPOUNDMENT	40	8

Potential Sources of Impairment	Total Size (Miles)	Number of Stream Reaches
INDUSTRIAL		
INDUSTRIAL POINT SOURCE DISCHARGE	241	47
INDUSTRIAL THERMAL DISCHARGES	16	6
LAND APPLICATION/WASTE SITES/TANKS		
IMPACTS FROM LAND APPLICATION OF WASTES	10,247	1,954
DISCHARGES FROM BIOSOLIDS (SLUDGE) STORAGE, APPLICATION OR DISPOSAL	43	8
SALT STORAGE SITES	0	0
LEGACY/HISTORICAL POLLUTANTS		
CERCLA NPL (SUPERFUND) SITES	0	0
CONTAMINATED SEDIMENTS	270	58
HISTORIC BOTTOM DEPOSITS (NOT SEDIMENT)	64	10

MUNICIPAL DISCHARGES/SEWAGE		
COMBINED SEWER OVERFLOWS	1,467	362
ILLICIT CONNECTIONS/HOOK-UPS TO STORM SEWERS	251	35
MUNICIPAL POINT SOURCE DISCHARGES	2,777	542
MUNICIPAL POINT SOURCE IMPACTS FROM INADEQUATE INDUSTRIAL/COMMERCIAL PRETREATMENT	0	0
PACKAGE PLANT OR OTHER PERMITTED SMALL FLOWS DISCHARGES	2,316	496
SANITARY SEWER OVERFLOWS (COLLECTION SYSTEM FAILURES)	21	5
SEPTAGE DISPOSAL	104	17
SEWAGE DISCHARGES IN UNSEWERED AREAS	7,170	1,329
Potential Sources of Impairment	**Total Size (Miles)**	**Number of Stream Reaches**
NATURAL/WILDLIFE		
DROUGHT-RELATED IMPACTS	65	7
NATURAL SOURCES	4,262	743
WILDLIFE OTHER THAN WATERFOWL	82	10
NATRUAL CONDITIONS - WATER QUALITY STANDARDS USE ATTAINABILITY ANALYSES NEEDED	18	1
OTHER		
SOURCES OUTSIDE STATE JURISDICTION OR BORDERS	1	1
UPSTREAM SOURCE	732	159
UPSTREAM/DOWNSTREAM SOURCE	27	4
RECREATION AND TOURISM (NON-BOATING)		
GOLF COURSES	57	19

RESOURCE EXTRACTION		
COAL MINING DISCHARGES (PERMITTED)	14	5
IMPACTS FROM ABANDONED MINE LANDS (INACTIVE)	467	97
SILVICULTURE (FORESTRY)		
SILVICULTURE ACTIVITIES	15	1
SPILLS/DUMPING		
ILLEGAL DUMPS OR OTHER INAPPROPRIATE WASTE DISPOSAL	436	87
UNKNOWN		
SOURCE UNKNOWN	11,663	2,467
Potential Sources of Impairment	**Total Size (Miles)**	**Number of Stream Reaches**
UNSPECIFIED NONPOINT SOURCE		
NON-POINT SOURCE	14,010	2,654
URBAN-RELATED RUNOFF/STORMWATER		
UNSPECIFIED URBAN STORMWATER	156	36
WASTES FROM PETS	144	27
WET WEATHER DISCHARGES (NON-POINT SOURCE)	1,439	299
YARD MAINTENANCE	5	2

Source: U.S. EPA Assessment, Total Maximum Daily Load (TMDL) Tracking and Implementation System (ATTAINS) Indiana data for the 2022 Integrated Report Cycle (Version: Organization Public Comment).

Table 11: Individual use support summary for Indiana's Lake Michigan shoreline.

Designated Uses					
Designated Use	Total Size (Miles)	Size Assessed (Miles)	Percent Assessed	Size Fully Supporting (Miles)	Size Not Supporting (Miles)
Full Body Contact (Recreational Use)	67	67	100%	0	67
Human Health and Wildlife (Fishable Use)	67	67	100%	0	67
Public Water Supply	35	35	100%	35	0
Warm Water Aquatic Life (Aquatic Life Use)	67	67	100%	63	4

Source: U.S. EPA Assessment, Total Maximum Daily Load (TMDL) Tracking and Implementation System (ATTAINS) Indiana data for the 2022 Integrated Report Cycle (Version: Organization Public Comment).

Table 12: Summary of parameters causing or indicating impairment of Indiana's Lake Michigan shoreline.

Parameter Causing/Indicating Impairment	Total Size (Miles)
ESCHERICHIA COLI (E. COLI)	67
MERCURY IN FISH TISSUE	67
PCBS IN FISH TISSUE	67
CYANIDE (AS FREE CYANIDE)	4

Source: U.S. EPA Assessment, Total Maximum Daily Load (TMDL) Tracking and Implementation System (ATTAINS) Indiana data for the 2022 Integrated Report Cycle (Version: Organization Public Comment).

Table 13: Summary of potential sources impairing Indiana's Lake Michigan Shoreline.

Potential Sources of Impairment	Total Size (Miles)	Number of Stream Reaches
LAND APPLICATION WASTE SITES		
SEWAGE DISCHARGE IN UNSEWERED AREAS	22	2
SPILLS AND UNPERMITTED DISCHARGES		
ILLICIT CONNECTIONS/HOOK-UPS TO STORM SEWERS	22	2
OTHER		
SOURCE UNKNOWN	67	6
NON-POINT SOURCE	41	3

Source: U.S. EPA Assessment, Total Maximum Daily Load (TMDL) Tracking and Implementation System (ATTAINS) Indiana data for the 2022 Integrated Report Cycle (Version: Organization Public Comment).

Table 14: Individual use support summary for Lake Michigan.

Designated Uses					
Designated Use	Total Size (Acres)	Size Assessed (Acres)	Percent Assessed	Size Fully Supporting (Acres)	Size Not Supporting (Acres)
Human Health and Wildlife (Fishable Use)	154,176	154,176	100%	0	154,176

Source: U.S. EPA Assessment, Total Maximum Daily Load (TMDL) Tracking and Implementation System (ATTAINS) Indiana data for the 2022 Integrated Report Cycle (Version: Organization Public Comment).

Table 15: Summary of parameters causing or indicating an impairment of Lake Michigan.

Parameter Causing/Indicating Impairment	Total Size (Acres)
MERCURY IN FISH TISSUE	154,176
PCBS IN FISH TISSUE	154,176

Source: U.S. EPA Assessment, Total Maximum Daily Load (TMDL) Tracking and Implementation System (ATTAINS) Indiana data for the 2022 Integrated Report Cycle (Version: Organization Public Comment).

Table 16: Summary of potential sources impairing Lake Michigan.

Potential Sources of Impairment	Total Size (Acres)
OTHER SOURCES	
SOURCE UNKNOWN	154,176

Source: U.S. EPA Assessment, Total Maximum Daily Load (TMDL) Tracking and Implementation System (ATTAINS) Indiana data for the 2022 Integrated Report Cycle (Version: Organization Public Comment).

Table 17: Individual use support summary for Indiana lakes.

Designated Uses					
Designated Use	Total Size (Acres)	Size Assessed (Acres)	Percent Assessed	Size Fully Supporting (Acres)	Size Not Supporting (Acres)
Full Body Contact (Recreational Use)	129,547	39,790	30.7%	30,503	9,287
Human Health and Wildlife (Fishable Use)	129,662	81,335	62.0%	42,215	39,120
Public Water Supply [1]	29,262	16,871	57.7%	230	16,641
Warm Water Aquatic Life (Aquatic Life Use)	129,547	16,125	12.5%	5,919	10,206

Source: U.S. EPA Assessment, Total Maximum Daily Load (TMDL) Tracking and Implementation System (ATTAINS) Indiana data for the 2022 Integrated Report Cycle (Version: Organization Public Comment).

[1] While all waterbodies in Indiana are designated for aquatic life and recreational uses, not all are designated for use as a public water supply. There are a total of 29,541 lake acres and 111 stream miles (including 35 miles of shoreline) designated for use as a public water supply in Indiana.

Table 18: Summary of parameters causing or indicating an impairment of one or more Indiana lakes.

Parameter Causing/Indicating Impairment	Total Size (Acres)
PCBS IN FISH TISSUE	192,296
MERCURY IN FISH TISSUE	160,214
ALGAE	16,641
TASTE	16,641
PHOSPHORUS, TOTAL	7,023
BIOLOGICAL INTEGRITY	6,520
ESCHERICHIA COLI (E. COLI)	2,264
TEMPERATURE	1,556

Source: U.S. EPA Assessment, Total Maximum Daily Load (TMDL) Tracking and Implementation System (ATTAINS) Indiana data for the 2022 Integrated Report Cycle (Version: Organization Public Comment).

Table 19: Summary of potential sources impairing Indiana lakes and reservoirs.

Potential Sources of Impairment	Total Size (Acres)	Number of Lakes
INDUSTRIAL PERMITTED DISCHARGES		
INDUSTRIAL THERMAL DISCHARGES	1,556	1
MUNICIPAL PERMITTED DISCHARGES (DIRECT AND INDIRECT)		
COMBINED SEWER OVERFLOWS	30	1
URBAN-RELATED RUNOFF/STORMWATER (OTHER THAN REGULATED DISCHARGES)		
WET WEATHER DISCHARGES (NON-POINT SOURCE)	30	1
OTHER SOURCES		
SOURCE UNKNOWN	41,423	81
NONPOINT SOURCE	22,672	58

Source: U.S. EPA Assessment, Total Maximum Daily Load (TMDL) Tracking and Implementation System (ATTAINS) Indiana data for the 2022 Integrated Report Cycle (Version: Organization Public Comment).

Table 20: Lake classification scheme for Indiana.

TSI (CHL)	TSI (CHL)	Corresponding CHL values (ug/L)	Characteristics of Trophic State
Oligotrophic	Greater than 40	Less than 0.95-2.6	• Low biological productivity • High transparency (clear water) • Low levels of nutrients • Low algal production and little/no aquatic vegetation • Well oxygenated hypolimnion year round; hypolimnion of shallower lakes may become anoxic at TSI scores >30
Mesotrophic	40-50 [1]	2.6-7.3	• Moderate biological productivity • Moderate transparency (moderately clear water) • Moderate levels of nutrients • Beds of submerged aquatic plants • Increasing possibility of anoxia in the hypolimnion during summer
Eutrophic	50-70	7.3-56	• High biological productivity • Water has low transparency • High levels of nutrients • Large amounts of aquatic plants or algae • At TSI scores >60, blue-green algae dominate and algal scums and excessive macrophytes possible • Hypolimnion commonly anoxic; fish kills possible
Hypereutrophic	Greater than 70	56-155	• Very high biological productivity • Very low transparency, usually <3 feet • Very high levels of nutrients • Dense algae and aquatic vegetation; algal scums and few aquatic plants at TSI scores >80 • Hypolimnion persistently anoxic; fish kills and/or “dead zones” below the surface common

[1] Lakes with a TSI score of 50, which is on the boundary between mesotrophic and eutrophic conditions are evaluated with their corresponding TSI scores for TP and SD along with any other available information and classified in accordance with the best professional judgment of IDEM scientists.

Table 21: Trophic status of lakes assessed with Carlson Trophic State Index scores for Chlorophyll *a* 1990-2015.

Trophic Status	Number of Lakes	Total Size (Acres) [1]
Oligotrophic	95	19,000
Mesotrophic	130	24,061
Eutrophic	202	50,205
Hypereutrophic	28	5,267
Unknown	17	2,404

[1] Actual values are higher. These results do not reflect acres for non-indexed lakes for which size is currently unknown. Source: IDEM Assessment Database (2018)

Table 22: Trends in the trophic status of lakes assessed 1990-2015.

Trend	Number of Lakes	Total Size (Acres) [1]
Improving	46	13,773
Stable	100	16,070
Fluctuating	89	36,314
Degrading	10	2,408
Unknown	227	32,372

[1] Actual values are higher. These results do not reflect acres for non-indexed lakes for which size is currently unknown. Source: IDEM Assessment Database (2018)

Table 23: Cyanotoxin Exposure Thresholds.

Exposure Reference Values µg/l	Microcystin	Cylindrospermopsin	Anatoxin-a	Saxitoxin
Human Recreation Advisory	8	6	8	0.8
Human Recreation Prohibited	20	15	30	3
Dog Recreation Prohibited	0.8	1.0	0.4	0.05

Table 24: Calls, spills and fish kills reported from 1998 to 2021.

Year	Calls	Spills	Fish Kills
1998	2,649	1,393	28
1999	2,507	1,246	41
2000	2,930	1,491	43
2001	3,093	1,591	51
2002	3,043	1,666	55
2003	3,026	1,551	30
2004	2,829	1,406	37
2005	3,319	1,271	40
2006	3,319	1,368	31
2007	2,852	1,354	36
2008	3,250	1,588	39
2009	2,889	1,226	39
2010	2,411	1,035	47
2011	2,160	934	10
2012	2,163	665	11
2013	2,162	653	38
2014	2,026	788	9
2015	1,931	1,755	11
2016	1,632	631	0
2017	1,714	543	14
2018	2,096	946	18
2019	1,626	717	22
2020	1,314	646	12
2021	1,458	722	19

Source: IDEM TEMPO database

Table 25: Major sources of groundwater contamination.

Contaminant Source	Highest Priority	Risk Factors [1]	Type of Contaminant [2]
Agricultural Activities			
Agricultural chemical facilities		A, C, H, I	5
Commercial fertilizer applications	X	A, C, D, E	5
Confined animal feeding operations	X	A, D, E	5, 9
Farmstead agricultural mixing and loading procedures			
Irrigation practices		A, C, H, I	1,2,5,8,9
Animal manure applications	X	A, C, H, I	5, 9
Pesticide applications		A, C, H, I	1,2
Storage and Treatment Activities			
Land application		A, C, H, I	5,9
Domestic and industrial residual applications		A, C, H, I	5,9
Material stockpiles		A, C, H, I	5,9
Storage tanks (above ground)		A, C, H, I	
Storage tanks (underground)	X	A, B, C, D, E, F	2, 3, 4
Surface impoundments			
Waste piles		A, C, H, I	5,9
Disposal Activities			
Deep injection wells			
Landfills (constructed prior to 1989)	X	A, B, C, D, E, F	1, 2, 3, 4, 5, 6, 7, 8, 9

Contaminant Source	Highest Priority	Risk Factors [1]	Type of Contaminant [2]
Permitted landfills (constructed 1989- present)			
Septic systems	X	A, C, D, E, F, G	1, 2, 3, 4, 5, 7, 9
Shallow (Class V) injection wells	X	A, B, C, D, E, I	1, 2, 3, 4, 5, 7, 9
Other			
Hazardous waste generators		A	
Hazardous waste sites		A	
Industrial facilities	X	A, B, C, D, E, F	1, 2, 3, 4, 5, 7, 8, 9
Liquid transport pipelines (including sewer)		A	8
Materials spills (including during transport)	X	A, B, C, D, E, F	1, 2, 3, 4, 5, 7, 8, 9
Material transfer operations		A	
Small-scale manufacturing and repair shops		A, I	8
Mining and mine drainage		A	7,8
Salt storage (state and nonstate facilities) and road salting	X	A, C, D, E, F	6
Urban runoff		A, C, H, I	1, 2, 4, 5, 7, 8, 9

Sources: U.S. EPA 2008

[1] Factors considered in selecting the contaminant source: (A) human health and/or environmental risk (toxicity); (B) size of the population at risk; (C) location of source relative to drinking water source; (D) number and/or size of contaminant sources; (E) hydrogeologic sensitivity; (F) documented state findings, other findings; (G) high to very high priority in localized areas, but not over majority of Indiana; (H) geographic distribution/occurrence; and, (I) lack of information.

[2] Classes of contaminants associated with contamination source: (1) Inorganic pesticides; (2) Organic pesticides; (3) Halogenated solvents; (4) Petroleum compounds; (5) Nitrate; (6) Salinity/brine; (7) Metals; (8) Radionuclides; and (9) Bacteria, protozoa and viruses.

Table 26: Groundwater protection programs and activities currently established or under development in Indiana.

Program or Activity	Status	State Agency/Organization
Active SARA Title III Program	Fully established	IDEM-OLQ [1]
Ambient groundwater monitoring program	Fully established	IDEM-OWQ
Aquifer sensitivity assessment	Fully established	IDEM-OWQ, IDNR, IGS [2], OISC [3]
Aquifer mapping/basin studies	Under development	IDNR, IDEM-OWQ
Aquifer/ hydrogeologic setting characterization	Fully established	IGS, IDEM-OWQ, IDNR
Bulk storage program for agricultural chemicals	Fully established	OISC
Comprehensive data management system	Under development	IDEM-OWQ
Complaint response program for private wells	Fully established	IDEM-OWQ
Confined animal feeding program	Fully established	IDEM-OWQ
Groundwater discharge permits for constructed wetlands	Under development	IDEM-OWQ
Groundwater Best Management Practices	Under development	OISC *, IDEM-OWQ
Groundwater legislation	Fully established	IDEM, IDNR, OISC, ISDH
Groundwater classification	Fully established	IDEM-OWQ
Groundwater quality standards	Fully established	IDEM-OWQ
Land application of domestic and industrial residuals	Fully established	IDEM-OLQ
Nonpoint source controls	Under development	IDEM-OWQ
Oil and Gas	Fully established	IDNR
Pesticide State Management Plan	Pending	OISC *, IDEM-OWQ, IDNR, IGS
Pollution Prevention Program	Fully established	IDEM-OPPTA [4]

Program or Activity	Status	State Agency/Organization
Reclamation	Fully established	IDNR
Resource Conservation and Recovery Act (RCRA) Primacy	Fully established	IDEM-OLQ
Sensitivity assessment for drinking water/ wellhead protection	Fully established	IGS, IDEM-OWQ
Spill Monitoring	Fully established	IDEM-OWQ
State Superfund	Fully established	IDEM-OLQ
State RCRA Program incorporating more stringent requirements than RCRA primacy	Fully established	IDEM-OLQ
State septic system regulations	Fully established	ISDH
Underground storage tank installation requirements	Fully established	IDEM-OLQ
Underground Storage Tank Remediation Fund	Fully established	IDEM-OLQ
Underground Storage Tank Permit Program	Fully established	IDEM-OLQ
Underground Injection Control Program	Fully established for Class II wells	IDNR
Well abandonment regulations	Fully established	IDNR
Wellhead Protection Program	Fully established	IDEM-OWQ
Well installation regulations	Fully established	IDNR

Notes: “Pending” is used to describe those programs that have a written draft policy; “under development” is used to describe those programs still in the planning stage.

[1] OLQ, Office of Land Quality

[2] IGS, Indiana Geological Survey

[3] OISC, Office of the Indiana State Chemist

[4] OPPTA, Office of Pollution Prevention and Technical Assistance

*Indicates lead agency involved in enforcement or implementation.

Table 27: Indiana Groundwater Monitoring Network analytical results, 2013-2016. Maximum Contaminant Levels (MCL) are standards that represent a legally enforceable threshold limit on the amount of a substance allowed in public water systems under the Safe Drinking Water Act. Secondary Maximum Contaminant Levels (SMCLs) are non-enforceable, secondary standards set to provide threshold limits for the levels of other substances that do not pose a risk to public health but can cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in public water supplies.

Analyte	Number of Samples	Number Above Detection Limit (ADL)	% ADL	Detection Limit	Median	Mean	Min.*	Max.	Standard Deviation	EPA MCL**	EPA SMCL or Recommend.	N > MCL or SMCL	% > MCL or SMCL
Anions/Cations													
Calcium (mg/L)	1163	1148	98.7	0.5	81.00	78.79	ND	320	35.28	NA	NA	NA	NA
Chloride (mg/L)	1162	1159	99.7	0.25	10.90	30.84	ND	1500	91.23	NA	NA	NA	NA
Magnesium (mg/L)	1163	1103	94.8	0.5	29.00	29.43	ND	290	17.85	NA	NA	NA	NA
Mangenese (mg/L)	510	388	76.1	0.005	0.03	0.06	ND	0.91	0.09	NA	0.05 mg/L	165	32.4
Potassium (mg/L)	1163	1069	91.9	0.5	1.40	1.84	ND	75	2.78	NA	NA	NA	NA
Sodium (mg/L)	1163	1163	100.0	0.1	16.00	41.03	1.5	1400	81.83	NA	200 mg/L (recommended)	43	3.7
Sulfate (mg/L)	1162	1043	89.8	0.25	32.00	55.59	ND	1400	114.04	NA	250 mg/L	43	3.7
Metals and Minerals													
Antimony (ug/L)	1163	31	2.7	0.25	0.13	0.30	ND	2.1	0.20	NA	NA	NA	NA
Arsenic (ug/L)	1162	517	44.5	1	1.00	4.31	ND	130	8.52	10 ug/L	--	127	10.9
Barium (ug/L)	1163	1129	97.1	0.25	130.00	184.40	ND	1800	193.02	2000 ug/L	--	0	0.0
Berylliun (ug/L)	1163	30	2.6	0.2	0.15	0.21	ND	89.1	2.61	NA	NA	NA	NA
Boron (ug/L)	1163	913	78.5	50	52.00	137.53	ND	3350	268.34	NA	NA	NA	NA

Analyte	Number of Samples	Number Above Detection Limit (ADL)	% ADL	Detection Limit	Median	Mean	Min.*	Max.	Standard Deviation	EPA MCL**	EPA SMCL or Recommend.	N > MCL or SMCL	% > MCL or SMCL
Bromide (mg/L)	1162	356	30.6	0.05	0.03	0.07	ND	5.5	0.23	NA	NA	NA	NA
Cadmium (ug/L)	1163	33	2.8	0.2	0.25	0.19	ND	2.5	0.11	5 ug/L	--	0	0.0
Chromium (ug/L)	1163	12	1.0	2	1.00	1.03	ND	8	0.34	100 ug/L	--	0	0.0
Copper (ug/L)	1163	634	54.5	1	1.10	3.27	ND	110	7.15	1300 ug/L	--	0	0.0
Iron (mg/L)	1163	920	79.1	0.02	1.10	1.27	ND	14	1.39	0.3 mg/L	--	797	68.5
Lead (ug/L)	1163	21	1.8	1	0.50	0.52	ND	6.9	0.27	15 ug/L	--	0	0.0
Nickel (ug/L)	1163	862	74.1	0.5	1.20	1.89	ND	160	5.23	NA	NA	NA	NA
Silicon (mg/L)	1163	1163	100.0	0.2	7.80	7.72	1.2	20	2.14	NA	NA	NA	NA
Strontium (mg/L)	1163	1109	95.4	0.005	0.38	1.46	ND	22.1	2.85	NA	4 mg/L (recommended)	113	9.7
Zinc (ug/L)	1163	910	78.2	4	7.60	19.40	ND	620	44.26	NA	5000 ug/L	0	0.0
Nitrogen, Nitrate-Nitrite													
Nitrogen, Ammonia (mg/L)	249	177	71.1	0.1	0.26	0.45	ND	9.5	0.96	NA	NA	NA	NA
Nitrogen, Nitrate-Nitrite (mg/L)	1163	330	28.4	0.01	0.05	0.72	ND	22	2.26	10 mg/L	--	19	1.6
Pesticides and Breakdown Products													
Acetochlor Ethanesulfonic Acid (ug/L)	1143	27	2.4	0.1	0.05	0.06	0.05	2.1	0.09	NA	NA	NA	NA

Analyte	Number of Samples	Number Above Detection Limit (ADL)	% ADL	Detection Limit	Median	Mean	Min.*	Max.	Standard Deviation	EPA MCL**	EPA SMCL or Recommend.	N > MCL or SMCL	% > MCL or SMCL
Acetochlor Oxanilic Acid (ug/L)	1143	16	1.4	0.1	0.05	0.05	0.05	2.2	0.07	NA	NA	NA	NA
Alachlor	1152	1	0.1	0.1	0.05	0.05	0.05	0.3	0.01	2 ug/L	--	0	--
Alachlor Ethanesulfonic Acid(ug/L)	1143	113	9.9	0.1	0.05	0.11	0.05	6.4	0.35	NA	NA	NA	NA
Alachlor Oxanilic Acid (ug/L)	1143	26	2.3	0.1	0.05	0.07	0.05	6.4	0.25	NA	NA	NA	NA
Atrazine	1152	4	0.3	0.1	0.05	0.05	0.05	0.1	0.00	NA	NA	NA	NA
Endrin (ug/L)	1152	1	0.1	0.01	0.01	0.01	0.005	0.02	0.00	2 ug/L	--	0	0.0
gamma-BHC (Lindane)	1152	2	0.2	0.02	0.01	0.01	0.01	0.03	0.00	NA	NA	NA	NA
Metolochlor Ethanesulfonic Acid (ug/L)	1143	143	12.5	0.1	0.05	0.14	0.05	7.8	0.48	NA	NA	NA	NA
Metolochlor Oxanilic Acid (ug/L)	1143	57	5.0	0.1	0.05	0.07	0.05	2.9	0.16	NA	NA	NA	NA
Simazine (ug/L)	1152	2	0.2	0.07	0.04	0.04	0.035	0.15	0.00	4 ug/L	--	0	0.0

Notes: Summary statistics were not calculated for volatile organic compounds (VOCs) detected during this study because they are associated with point sources and few were detected. A complete list of VOCs detected during sampling in shown in Table 28. Disinfection Byproducts and plasticizers have been omitted from this list until further analysis and sampling can be conducted to determine their sources.

[1] ND = Nondetect, meaning the result was below the detection limit of the analytical method. For analytes that were non-detect, a value of one half the detection limit was substituted for calculation of the summary statistics.

[2] NA = No MCL has been set for this substance.

Table 28: Detected volatile organic compounds in all Groundwater Monitoring Network samples. Maximum Contaminant Levels (MCL) are standards that represent a legally enforceable threshold limit on the amount of a substance allowed in public water systems under the Safe Drinking Water Act.

Sample ID	Site ID	Analyte	Result	Detection Limit	Unit	MCL	> MCL?
DK30772	15680RS	Tetrachloroethylene	0.6	0.5	ug/L	5	No
DK30892	56639RS	Methyl-t-butyl ether (MTBE)	2	0.5	ug/L	NA	No
DK31082	40923RS	Toluene	9.1	0.5	ug/L	1000	No
DK31298	491125RS	1,1,1-Trichloroethane	0.5	0.5	ug/L	200	No
DK31476	191320RS	Toluene	3.1	0.5	ug/L	1000	No
		1,2,4-Trimethylbenzene	33	0.5	ug/L	NA	No
		1,2-Dichloroethane	0.7	0.5	ug/L	5	No
		1,2-Xylene	37	0.5	ug/L	10,000	No
		1,3 + 1,4-Xylene	61	0.5	ug/L	10,000	No
		1,3,5-Trimethylbenzene	3.1	0.5	ug/L	NA	No
		Benzene	0.5	0.5	ug/L	5	No
		Ethylbenzene	0.5	0.5	ug/L	700	No
		Isopropylbenzene	4.4	0.5	ug/L	NA	No
		Naphthalene	3.8	0.5	ug/L	NA	No
		n-Propylbenzene	5.6	0.5	ug/L	NA	No
DK31513	041480RS	Toluene	30	0.5	ug/L	1000	No
DK31627	081398RS	Trichloroethylene	3.5	0.5	ug/L	5	No
DK31695	321496RS	Methyl-t-butyl ether (MTBE)	0.6	0.5	ug/L	NA	No

Sample ID	Site ID	Analyte	Result	Detection Limit	Unit	MCL	> MCL?
DK31803 [1]	041480RS	1,2,4-Trimethylbenzene	23	0.5	ug/L	NA	No
		1,2-Xylene	20	0.5	ug/L	10,000	No
		1,3 + 1,4-Xylene	32	0.5	ug/L	10,000	No
		1,3,5-Trimethylbenzene	1.6	0.5	ug/L	NA	No
		Benzene	53	0.5	ug/L	5	Yes
		Ethylbenzene	37	0.5	ug/L	700	No
		Isopropylbenzene	2.7	0.5	ug/L	NA	No
		Naphthalene	2.4	0.5	ug/L	NA	No
		n-Propylbenzene	2.9	0.5	ug/L	NA	No
		Toluene	14	0.5	ug/L	1000	No
DK31815	601564RS	Benzene	0.8	0.5	ug/L	5	No
		Toluene	0.5	0.5	ug/L	1000	No
DK31907	731624RS	Toluene	0.7	0.5	ug/L	1000	No

[1] Sample DK31803 is a resample of site 041480RS to confirm the petroleum contamination observed in sample DK31513.

Table 29: Nitrogen, Nitrate-Nitrite Summary Statistics by Generalized Hydrogeologic Setting (mg/L). Maximum Contaminant Levels (MCL) are standards that represent a legally enforceable threshold limit on the amount of a substance allowed in public water systems under the Safe Drinking Water Act.

Hydrogeologic Setting	Number of Samples	Number Above Detection Limit (ADL)	% ADL	Number Above MCL	% Above MCL	Median	Mean	Min.	Max.	Standard Deviation
Ablation Sequence	12	0	0	0	0	0.05	0.05	ND	0.1	0.00
Alluvial Valley	12	4	33	1	8	0.05	1.96	ND	13.8	4.23
Dissected Bedrock	13	5	38	0	0	0.05	0.10	ND	0.3	0.08
Dissected Bedrock Thin Till	50	29	58	2	4	0.11	1.44	ND	13.0	2.68
Fan Head Complex	16	4	25	0	0	0.05	0.06	ND	0.4	0.09
Ice Contact Deposits	3	1	33	1	33	0.05	4.70	ND	14.0	8.05
Karst Plain and Escarpment	23	19	83	0	0	0.53	2.04	ND	7.9	2.49
Lake Deposits	11	3	27	0	0	0.05	0.77	ND	7.7	2.30
Meltwater Channel	3	0	0	0	0	0.05	0.05	ND	0.1	0.00
Outwash Complex	20	5	25	0	0	0.05	0.33	ND	2.7	0.74
Outwash Plain	64	27	42	5	8	0.05	2.15	ND	22.0	4.17
Sand Plains and Loess Sands	93	36	39	1	1	0.05	0.89	ND	16.0	2.44
Sluiceway or Discrete Channel	101	27	27	1	1	0.05	0.78	ND	15.0	2.32

Hydrogeologic Setting	Number of Samples	Number Above Detection Limit (ADL)	% ADL	Number Above MCL	% Above MCL	Median	Mean	Min.	Max.	Standard Deviation
Till Capped Fan	32	11	34	0	0	0.05	0.88	ND	8.0	2.05
Till Cored Moraine	131	13	10	0	0	0.05	0.20	ND	8.6	0.89
Till Plain	457	97	21	0	0	0.05	0.23	ND	9.3	0.84
Trough System	13	2	15	0	0	0.05	0.23	ND	1.5	0.46
Tunnel Valley	25	7	28	0	0	0.05	0.48	ND	4.3	1.12
Unconfined Outwash Fan	51	20	39	4	8	0.05	1.71	ND	15.0	3.88
Wabash River Valley	33	20	61	4	12	0.05	3.42	ND	17.0	5.02

Table 30: Average nitrogen concentrations measured as milligrams per liter (mg/L) nitrate-nitrite for each hydrogeologic setting calculated for different well type and depth, aquifer conditions and aquifer sensitivity. Maximum Contaminant Levels (MCL) are standards that represent a legally enforceable threshold limit on the amount of a substance allowed in public water systems under the Safe Drinking Water Act.

Hydrogeologic Setting	Number of Samples	Number Above Detection Limit (ADL)	% ADL	Number Above MCL	% Above MCL	Median	Mean	Minimum	Maximum	Standard Deviation
Ablation Sequence	12	0	0	0	0	0.05	0.05	ND	0.1	0.00
Alluvial Valley	12	4	33	1	8	0.05	1.96	ND	13.8	4.23
Dissected Bedrock	13	5	38	0	0	0.05	0.10	ND	0.3	0.08
Dissected Bedrock Thin Till	50	29	58	2	4	0.11	1.44	ND	13.0	2.68
Fan Head Complex	16	4	25	0	0	0.05	0.06	ND	0.4	0.09
Ice Contact Deposits	3	1	33	1	33	0.05	4.70	ND	14.0	8.05
Karst Plain and Escarpment	23	19	83	0	0	0.53	2.04	ND	7.9	2.49
Lake Deposits	11	3	27	0	0	0.05	0.77	ND	7.7	2.30
Meltwater Channel	3	0	0	0	0	0.05	0.05	ND	0.1	0.00
Outwash Complex	20	5	25	0	0	0.05	0.33	ND	2.7	0.74
Outwash Plain	64	27	42	5	8	0.05	2.15	ND	22.0	4.17
Sand Plains and Loess Sands	93	36	39	1	1	0.05	0.89	ND	16.0	2.44
Sluiceway or Discrete Channel	101	27	27	1	1	0.05	0.78	ND	15.0	2.32

Hydrogeologic Setting	Number of Samples	Number Above Detection Limit (ADL)	% ADL	Number Above MCL	% Above MCL	Median	Mean	Minimum	Maximum	Standard Deviation
Till Capped Fan	32	11	34	0	0	0.05	0.88	ND	8.0	2.05
Till Cored Moraine	131	13	10	0	0	0.05	0.20	ND	8.6	0.89
Till Plain	457	97	21	0	0	0.05	0.23	ND	9.3	0.84
Trough System	13	2	15	0	0	0.05	0.23	ND	1.5	0.46
Tunnel Valley	25	7	28	0	0	0.05	0.48	ND	4.3	1.12
Unconfined Outwash Fan	51	20	39	4	8	0.05	1.71	ND	15.0	3.88
Wabash River Valley	33	20	61	4	12	0.05	3.42	ND	17.0	5.02

Table 31: Summary statistics calculated from arsenic concentrations in micrograms per liter (ug/L) for Indiana's generalized hydrogeologic settings.

Hydrogeologic Setting	Number of Samples	Number Above Detection Limit (ADL)	% ADL	Number Above MCL	% Above MCL	Median	Mean	Min.	Max.	Standard Deviation
Ablation Sequence	12	7	58	2	17	3.0	4.4	1	16	4.8
Alluvial Valley	12	4	33	3	25	1.0	15.1	0.5	130	37.2
Dissected Bedrock	14	1	7	0	0	0.5	0.9	0.5	4.2	1.0
Dissected Bedrock Thin Till	50	10	20	1	2	1.0	1.7	0.5	32.6	4.6
Fan Head Complex	16	5	31	1	6	1.0	2.2	0.5	10.9	2.8
Ice Contact Deposits	3	2	67	1	33	6.2	6.4	1	12	5.5
Karst Plain and Escarpment	23	0	0	0	0	0.5	0.7	0.5	1	0.3
Lake Deposits	11	5	45	3	27	1.0	12.7	0.5	87.3	25.9
Meltwater Channel	3	3	100	0	0	5.1	3.7	0	6.1	3.3
Outwash Complex	20	9	45	0	0	1.0	2.3	0.5	8	2.4
Outwash Plain	64	20	31	6	9	1.0	3.1	0.5	46	6.7
Sand Plains and Loess Sands	93	26	28	4	4	1.0	2.6	0	63	7.0
Sluiceway or Discrete Channel	101	49	49	6	6	1.0	4.2	0.5	68	8.7
Till Capped Fan	32	10	31	2	6	1.0	3.4	0.5	33	7.3
Till Cored Moraine	130	81	62	14	11	3.2	5.0	0.5	59.8	7.1
Till Plain	456	239	52	78	17	1.4	5.3	0.5	72	8.2

Hydrogeologic Setting	Number of Samples	Number Above Detection Limit (ADL)	% ADL	Number Above MCL	% Above MCL	Median	Mean	Min.	Max.	Standard Deviation
Trough System	13	6	46	0	0	1.0	4.28	0.5	6.3	8.6
Tunnel Valley	25	15	60	2	8	2.3	3.8	0.5	21	4.7
Unconfined Outwash Fan	51	18	35	3	6	1.0	3.1	0.5	22	4.5
Wabash River Valley	33	7	21	1	3	1.0	2.5	0.5	38	10.65

Table 32: Average arsenic concentrations in micrograms per liter (ug/L) for each hydrogeologic setting calculated from different well type and depth, aquifer conditions and aquifer sensitivity.

Hydrogeologic setting	Well Type		Aquifer Conditions		Hydrogeologic Sensitivity					Well Depth			
	Bedrock	Unconsolidated	Oxidizing	Reducing	Very High	High	Moderate	Low	Very Low	0-50	50-100	100-150	>150
Ablation Sequence	16	3.373	5.15	4.28	NA	4.271	4.64	NA	NA	0.05	0.05	0.05	
Alluvial Valley	7.783	22.467	21.1	6.76	NA	0.75	26.86	9.14	NA	6.95	0.44	0.05	0.28
Dissected Bedrock	0.862	1	0.625	2.35	NA	0.5	1.087	0.6	NA	0.07	0.18	0.11	0.07
Dissected Bedrock Thin Till	1.878	1.4	0.832	3.232	NA	0.75	1.262	2.133	NA	2.83	0.98	1.67	0.13
Fan Head Complex	1.475	2.4	1	2.247	1	1.09	4.56	NA	NA	0.05	0.10	0.04	0.03
Ice Contact Deposits	NA	6.4	NA	6.4	NA	6.4	NA	NA	NA		14.00	0.05	
Karst Plain and Escarpment	0.682	1	0.7	0.667	NA	0.6	0.812	0.667	0.5	3.65	3.68	1.49	0.87
Lake Deposits	22.675	6.943	7.275	15.743	NA	NA	21.617	1.92	NA	0.05	1.33	0.17	0.05
Meltwater Channel	5.1	3.05	NA	3.733	NA	3.05	NA	5.1	NA		0.05	0.05	
Outwash Complex	1	2.472	0.857	3.115	2.6	2.465	1	NA	NA	2.70	0.25	0.07	0.45
Outwash Plain	0.6	3.28	0.7	4.59	2.243	3.661	0.667	0.667	NA	2.68	1.91	0.86	0.49
Sand Plains and Loess Sands	1.156	3.646	1.061	3.667	2.1	3.977	2.075	1.068	NA	0.46	1.07	0.67	1.30
Sluiceway or Discrete Channel	2.348	4.814	1.217	5.396	1	2.714	5.547	4.12	NA	1.89	0.94	0.17	0.06

Hydrogeologic setting	Well Type		Aquifer Conditions		Hydrogeologic Sensitivity					Well Depth			
	Bedrock	Unconsolidated	Oxidizing	Reducing	Very High	High	Moderate	Low	Very Low	0-50	50-100	100-150	>150
Till Capped Fan	NA	3.438	0.975	4.258	6.1	2.712	5.543	NA	NA	0.05	0.37	1.45	1.36
Till Cored Moraine	4.465	5.099	2.725	5.233	2.2	3.99	5.547	5.352	NA	0.97	0.31	0.06	0.05
Till Plain	4.052	5.967	1.221	6.097	NA	2.912	5.618	5.626	2.4	0.64	0.25	0.16	0.14
Trough System	NA	2.388	2.4	1.978	0.75	2.627	NA	NA	NA	0.05	0.27	0.05	
Tunnel Valley	1.667	4.05	0.833	4.689	NA	3.6	3.567	5.85	NA	0.18	0.67	0.74	0.05
Unconfined Outwash Fan	7.35	2.92	0.778	4.358	1.386	3.547	1.55	NA	NA	0.79	2.87	0.64	0.04
Wabash River Valley	1.888	2.648	0.822	4.433	1	2.892	1.167	1	NA	10.21	2.69	3.44	0.05