



2017
Fixed Station Water Quality Monitoring Program Work Plan

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Indiana Department of Environmental Management
Office of Water Quality
Watershed Assessment and Planning Branch
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WORK PLAN ORGANIZATION

This Sampling and Analysis Work Plan is an extension of the existing Watershed Assessment and Planning Branch, October 2004 “*Quality Assurance Project Plan (QAPP) for Indiana Surface Water Quality Monitoring and Total Maximum Daily Load (TMDL) Program*” and serves as a link to the existing QAPP as well as an independent QAPP of the project. As per the United States Environmental Protection Agency (U.S. EPA) QAPP guidance (U.S. EPA 2006), this Work Plan establishes criteria and specifications pertaining to a specific water quality monitoring project that are usually described in the following four groups (phases) or sections as QAPP elements:

Section I. Project Management/Planning

- Project Objectives
- Project/Task Organization and Schedule
- Background and Project/Task Description
- Data Quality Objectives (DQOs)
- Training and Staffing Requirements

Section II. Measurement/Data Acquisition

- Sampling Procedures
- Analytical Methods
- Sample and Data Acquisition Requirements
- Quality Control (QC) Measures Specific to the Project

Section III. Assessment/Oversight

- External and Internal Checks
- Audits
- Data Quality Assessments (DQAs)
- Quality Assurance/Quality Control (QA/QC) Review Reports

Section IV. Data Validation and Usability

- Data Handling and Associated QA/QC Activities
- QA/QC Review Reports

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LIST OF ACRONYMS

AIMS: Assessment Information Management System
ALUS: Aquatic Life Use Support
BAA: State of Indiana Broad Agency Announcement
CAC: Chronic Aquatic Criterion
CFR: Code of Federal Regulations
CFU: Colony Forming Units
CLP: USEPA Contract Laboratory Program
CPR: Cardio-Pulmonary Resuscitation
CRQL: Contract Required Quantification Limit
CWA: Clean Water Act
DO: Dissolved Oxygen
DQA: Data Quality Assessment
DQO: Data Quality Objectives
E. coli: Escherichia coli
HAZWOPER: Hazardous Waste Operations and Emergency Response
IAC: Indiana Administrative Code
IC: Indiana Code
IDEM: Indiana Department of Environmental Management
ISDH: Indiana State Department of Health
LCS: Laboratory Control Standard
MCL: Maximum Contaminant Level
MDL: Method Detection Limit
MPL: Maximum Permissible Level
MPN: Most Probable Number
MS/MSD: Matrix Spike/Matrix Spike Duplicate
NTU: Nephelometric Turbidity Unit(s)
OWQ: Office of Water Quality
QAPP: Quality Assurance Project Plan
QC: Quality Control
QA/QC: Quality Assurance/Quality Control
RL: Laboratory Reporting Limit
RPD: Relative Percent Difference
SM: Standard Methods
SOP: Standard Operating Procedures
SU: Standard Units
TMDL: Total Maximum Daily Load
U.S. EPA: United States Environmental Protection Agency
WQS: Water Quality Standard
WQMS: Water Quality Monitoring Strategy

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I. PROJECT MANAGEMENT/PLANNING

Project Objective: (QAPP Element A4)

The Indiana Department of Environmental Management (IDEM) Office of Water Quality (OWQ) is responsible for sampling and assessing Indiana's surface waters pursuant to the Clean Water Act (CWA) Section 305(b), and pursuant to Section 303(d), identify those waters of the State that are impaired and need development of a Total Maximum Daily Load (TMDL) to alleviate the impairments. To that end, all states must submit a biennial Integrated Water Quality Monitoring and Assessment Report (IDEM 2014a), encompassing the 303(d) list and the 305(b) assessment report, to the United States Environmental Protection Agency (U.S. EPA). The Indiana Water Quality Monitoring Strategy: 2011-2019 (WQMS) (IDEM 2011) facilitates accomplishing these CWA requirements, in addition to other IDEM goals. The WQMS details a rotating basin plan which allows IDEM to intensively sample all Indiana surface waters for assessment in a nine year rotation. Assessments of the state's waters are facilitated by various Watershed Assessment and Planning Branch programs involving probabilistic and targeted approaches by collecting biological, chemical, habitat, and physical stream data. The Fixed Station Monitoring Program is one component of the WQMS designed to broadly assess all waters of the state monthly at 165 targeted sites.

Project/Task Organization and Schedule: (QAPP Element A4)

The Indiana Fixed Station Water Quality Monitoring Program has these specific objectives:

- To determine chemical, physical, and bacteriological characteristics of Indiana water under changing conditions.
- To indicate, when possible, the sources of pollution entering a stream.
- To compile data for trend analyses and future pollution abatement activities.
- To determine background data on certain types of chemicals or wastes, such as chlorides and radioactive materials, and to detect critical changes.
- To obtain data useful for municipal, industrial, agricultural, and recreational decision-making processes. This includes the Total Daily Maximum Load (TMDL) process and National Pollutant Discharge Elimination System (NPDES) permit modeling.
- To procure data useful and necessary for securing public action toward the preservation of streams for all beneficial uses.

In addition, this program will provide representative data for the statewide assessments of the water quality required by IDEM's Surface Water Quality Monitoring Strategy. These

data will provide benchmark information for long-term trend analyses on a broader scale at the main stems and selected tributaries of the major rivers of the state. Also, an examination of these data relative to water quality standards will provide the identification of any immediate emerging problems.

Background and Project/Task Description: (QAPP Elements A5, A6)

The Fixed Station Monitoring Program was created in 1957 by the Division of Sanitary Engineering, Indiana State Board of Health. Initially, 49 sites statewide were selected for the bi-weekly collection of surface water samples for physical, chemical and bacteriological analyses for water quality monitoring. On April 2, 1986, IDEM was created and the Office of Water Management (OWM), now called the Office of Water Quality (OWQ), assumed operation of this program. Various changes and improvements have been made since this program was first established and taken over by IDEM.

Currently, the Indiana Fixed Station Water Quality Monitoring Program is designed to gather monthly water quality data from 165 regular sampling locations statewide. Most of these sampling locations target major rivers, enabling water quality assessments to be made year after year that can show changes in the monitoring parameters and pollutants from upstream to downstream on the waterbodies.

Every year, as each sampling location is sampled and evaluated, some of the sampling locations may be dropped and other new sampling locations may be added depending on the perceived usefulness of the data. The basic goal of this program is met when water quality assessments are completed.

Data Quality Objectives (DQO) (QAPP Element A7)

The DQO process (U.S. EPA 2006) is a planning tool for data collection activities. It provides a basis for balancing decision uncertainty with available resources. The DQO is required for all significant data collection efforts for a project. It is a seven-step systematic planning process used to clarify study objectives, define the appropriate types of data, and establish decision criteria on which to base the final use of the data. The DQO for the Fixed Station Monitoring Program is identified in the following seven steps:

1. Description of the Problem

The objective of this program is to gather water quality data with respect to chemical, physical and bacteriological characteristics of Indiana waters needed for spatial/temporal trend analyses over time and to provide data for water quality assessments. In addition, the program provides data to a wide variety of public and private entities as detailed (see previous page) in the Project Management/Planning Section.

2. Identify the Decision for the Data Collection

The objective of this program is to fully assess whether the surface waters are supporting or non-supporting for aquatic life use and recreational use, and the extent of impairment if they are non-supporting. All sites will be sampled for concentrations of physical and chemical parameters and evaluated as “supporting” or “non-supporting” when compared

with water quality criteria shown in Table 1 [327 IAC 2-1-6] following Indiana's 2014 Consolidated Assessment Listing Methodology (CALM, IDEM 2014b pages 24-28).

In addition to the physical, chemical, and bacteriological criteria listed in Table 1, data for several nutrient parameters will be evaluated with the benchmarks described below (IDEM 2014b). Assuming a minimum of three sampling events, if two or more of the conditions below are met on the same date, the waterbody will be classified as non-supporting due to nutrients.

- Total Phosphorus (TP): one or more measurements >0.3 mg/L
- Nitrogen (measured as Nitrate + Nitrite): one or more measurements >10.0 mg/L
- Dissolved Oxygen (DO): any measurement <4.0 mg/L; any measurements consistently at or close to the standard (in the range 4.0-5.0 mg/L); or, any measurement >12.0 mg/L
- pH: any measurement >9.0 Standard Units (S.U.); or, measurements consistently at or close to the standard (in the range 8.7-9.0 S.U.)

Table 1 Water Quality Criteria (327 IAC 2-1-6)

Parameters	Level	Criterion
Ammonia-Nitrogen	Calculated based on pH and Temperature	CAC
Nitrate+Nitrite-Nitrogen	≤10 mg/L	Human Health point of drinking water intake
Metals (dissolved)	Calculated based on hardness	CAC
Arsenic III (dissolved)	190 µg/L	CAC
Cyanide	Total = 200 µg/L	Human Health point of drinking water intake
	Free = 5.2 µg/L (analyzed only if hit on Total)	CAC
Dissolved Oxygen	At least 5.0 mg/L (Warm Waters)	Daily Average
	Not less than 4.0 mg/L at any time	Single Reading
Dissolved Oxygen	At least 6.0 mg/L (cold-water fish*)	Not less than 6.0 mg/L at any time and shall not be less than 7.0 mg/L in areas where spawning occurs during the spawning season and in areas
pH	6.0 - 9.0 S.U.	Must remain between 6.0 and 9.0 S.U. except for daily fluctuations that exceed 9.0 due to photosynthetic activity

Parameters	Level	Criterion
Sulfate	Calculated based on hardness and chloride	In all waters outside the mixing zone
Chloride	Calculated based on hardness and sulfate values	CAC
<i>E. coli</i> (April-October Recreational season)	125 CFU/100mL or 125 MPN/100 mL	5 sample geometric mean based on at least 5 samples equally spaced over a 30 day period
	235 CFU/100 mL or 235 MPN/100 mL	Not to exceed in any one sample in a 30 day period except in cases where there are at least 10 samples, 10% of the samples may exceed the criterion
Dissolved Solids	750 mg/L	Public water supply

CAC = Chronic Aquatic Criterion, S.U. = Standard Units, MPN = Most Probable Number, CFU = Colony Forming Unit

*Waters protected for cold-water fish include those waters designated by the Indiana Department of Natural Resources for put-and-take trout fishing as well as salmonid waters listed in 327 IAC 2-1.5-5.

3. Input to the Decision

Water samples are collected and analyzed monthly from Fixed Station locations statewide. Specific parameters have been selected after consideration of potential sources of pollution, matrix, and intended data use. All chemical and physical parameters and historical records obtained from this and previous study will be used as inputs for the decision making process.

4. Boundaries for the Study

Each year, 165 sampling locations statewide are sampled monthly. See Figures 1 through 3 for geographic boundaries and specific sampling locations for this study.

5. The Decision Rule

For assessment purposes in the Indiana Integrated Report (IDEM 2014b), recreational use attainment decisions will be based on bacteriological criteria developed to protect primary contact recreational activities [327 IAC 2-1-6]. Aquatic life use support (ALUS) decisions will include independent evaluations of biological and chemical data as outlined in Indiana's 2014 Consolidated Assessment and Listing Methodology (CALM, IDEM 2014b pages 24-28).

6. Minimizing Decision Errors

Sampling design error is minimized by utilizing a comprehensive checklist of informational sources, evaluation of historical information, and a thorough watershed pre-survey. This sampling design has been formulated to address data deficiencies and render the optimum amount of data needed to fill gaps in the decision process.

Good quality data are essential for minimizing decision error. By identifying errors in the sampling design, measurement, and laboratory for physical and chemical parameters, more confidence can be placed in the conclusions drawn on the stressors and sources affecting the water quality in the study area.

Site specific aquatic life use and recreational use assessments include program specific controls to minimize the introduction of errors. These controls include: water chemistry and bacteriological blanks and duplicates, and laboratory controls as described in the Field Procedure Manual (IDEM 2002, pages 80-81).

The QA/QC process detects deficiencies in the data collection as set forth in the IDEM QAPP for the Indiana Surface Water Quality Monitoring Program (IDEM 2004). The QAPP requires all contract laboratories to adhere to rigorous standards during sample analyses and to provide good quality usable data. Chemists within the WAPB review the laboratory analytical results for quality assurance. Any data which is “Rejected” due to analytical problems or errors will not be used for water quality assessment decisions. Any data flagged as “Estimated” may be used on a case-by-case basis. Criteria for acceptance or rejection of results, as well as application of data quality flags, is presented in the QAPP, Table D3-1: Data Qualifiers and Flags, pages 130-131. Precision and accuracy goals with acceptance limits for applicable analytical methods are provided in the QAPP, Table A7-1: Precision and Accuracy Goals for Data Acceptability by Matrix, pages 45-47 and Table B2-2: Field Parameters page 81. Further investigation will be conducted in response to consistent “rejected” data in determining the source of error. Field techniques used during sample collection and preparation, along with laboratory procedures will be subject to evaluation by both WAPB QA and field staff.

7. Optimize the Design for Data Collection

The optimum design for this project (Program) is monthly sampling statewide from 165 fixed station locations, see Figures 1 through 3 and Tables 2, 3 and 4 for site and sample locations. A total of 165 sampling locations are chosen for this project. These sampling locations are divided into 16 sampling routes designed to reduce waste in terms of resources and time, see Tables 5-20. Three staff as individual team members will sample these routes monthly for water quality, (See Section II “Measurement/Data Acquisition” on next page for more details).

Training and Staffing Requirements (QAPP Element A8)

Role	Required Training/Experience	Responsibilities	Training References
Project Manager	-Bachelor of Science Degree in biology,	-Establish Project in the AIMS II database	-AIMS II Database User Guide

Role	Required Training/Experience	Responsibilities	Training References
	toxicology, or other closely related field plus four years of experience in aquatic ecosystems (Masters Degree with two years aquatic ecosystems experience may substitute) -Database experience -Annually review the Principles and Techniques of Electrofishing -Annually review relevant safety procedures -Annually review relevant SOP documents for field operations	-Oversee development of Project Work Plan -Oversee entry and QC of field data -Oversee querying of data from AIMS II database to determine results not meeting aquatic life use Water Quality Criteria -Sample shipments to contract laboratory -Assign analysis tasks to the samples -Track contract laboratory expenditures	-U.S. EPA 2006 QA Documents on developing Work Plans (QAPPs)
Field Crew Chief	-Bachelor of Science Degree in biology or other closely related field -At least one year of experience in sampling methodology and taxonomy of aquatic communities in the region -Annually review the Principles and Techniques of Electrofishing -Annually review relevant safety procedures -Annually review relevant SOP documents for field operations	-Completion of field data sheets -Taxonomic accuracy -Overall operation of field crew when remote from central office -Adherence to safety and field SOP by crew members -Ensure field sampling equipment is functioning properly and all equipment loaded into vehicles prior to field sampling activities -Maintaining proper preservation of samples -Hold an active First Aid and CPR certification	-IDEM 1992a, 1992b, 1992c, 1992d, 2002, 2008, 2010b, 2010c -U.S. EPA, 1994a -Novotny, 1974 -Cowx, 1990 Cowx and Lamarque, 1990
Field Crew	-Complete hands-on	-Follow all safety and	-IDEM 1992a,

Role	Required Training/Experience	Responsibilities	Training References
Members	training for sampling methodology prior to field sampling activities -Review the Principles and Techniques of Electrofishing Review relevant safety procedures	SOP procedures while engaged in field sampling activities -Follow direction of Field Crew Chief while conducting field sampling activities -Hold an active First Aid and CPR certification	1992b, 1992c, 1992d, 2002, 2008, 2010b, 2010c -U.S. EPA, 1994a -Novotny, 1974 -Cowx, 1990 Cowx and Lamarque, 1990

II. MEASUREMENT/DATA ACQUISITION

Sampling Design and Site Locations

One hundred sixty-five (165) Fixed Station Monitoring Program sampling locations distributed all across Indiana are shown in Figures 1 through 3. For sampling locations and site descriptions, see Table 2. Some sites in Table 2 have been re-designated over the years due to the recalculations of river miles, hence the additional site numbers (#s) at the same location. In the past, numerous other locations than those listed in Table 2 have been sampled under the Fixed Station Monitoring Program.



Figure 2. Northwest Indiana Fixed Station Monitoring Program Sampling Locations

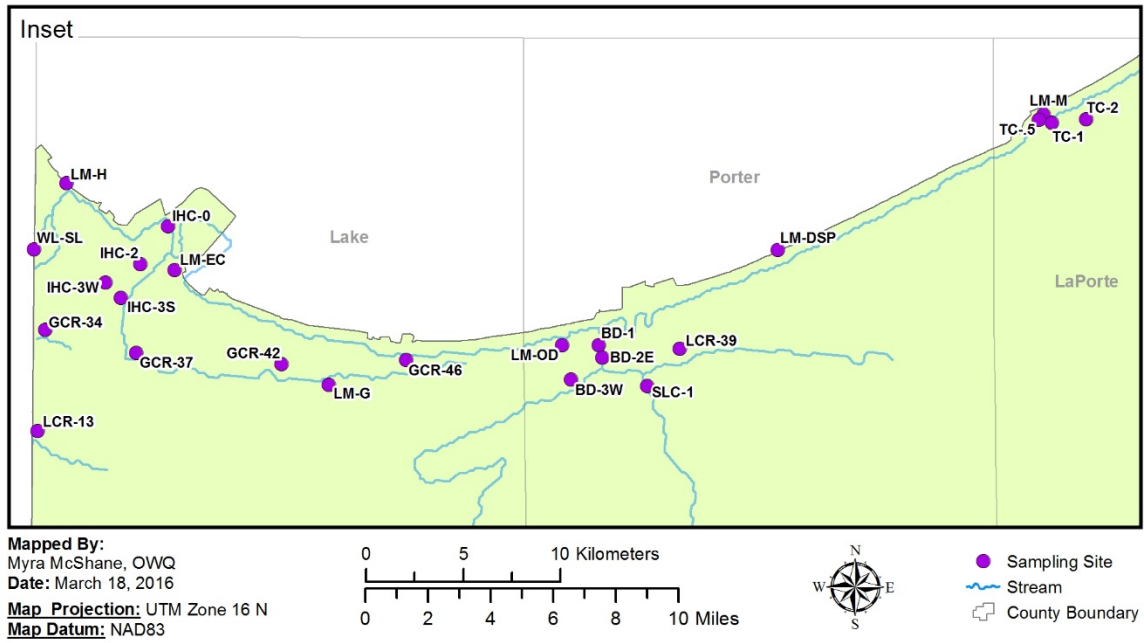
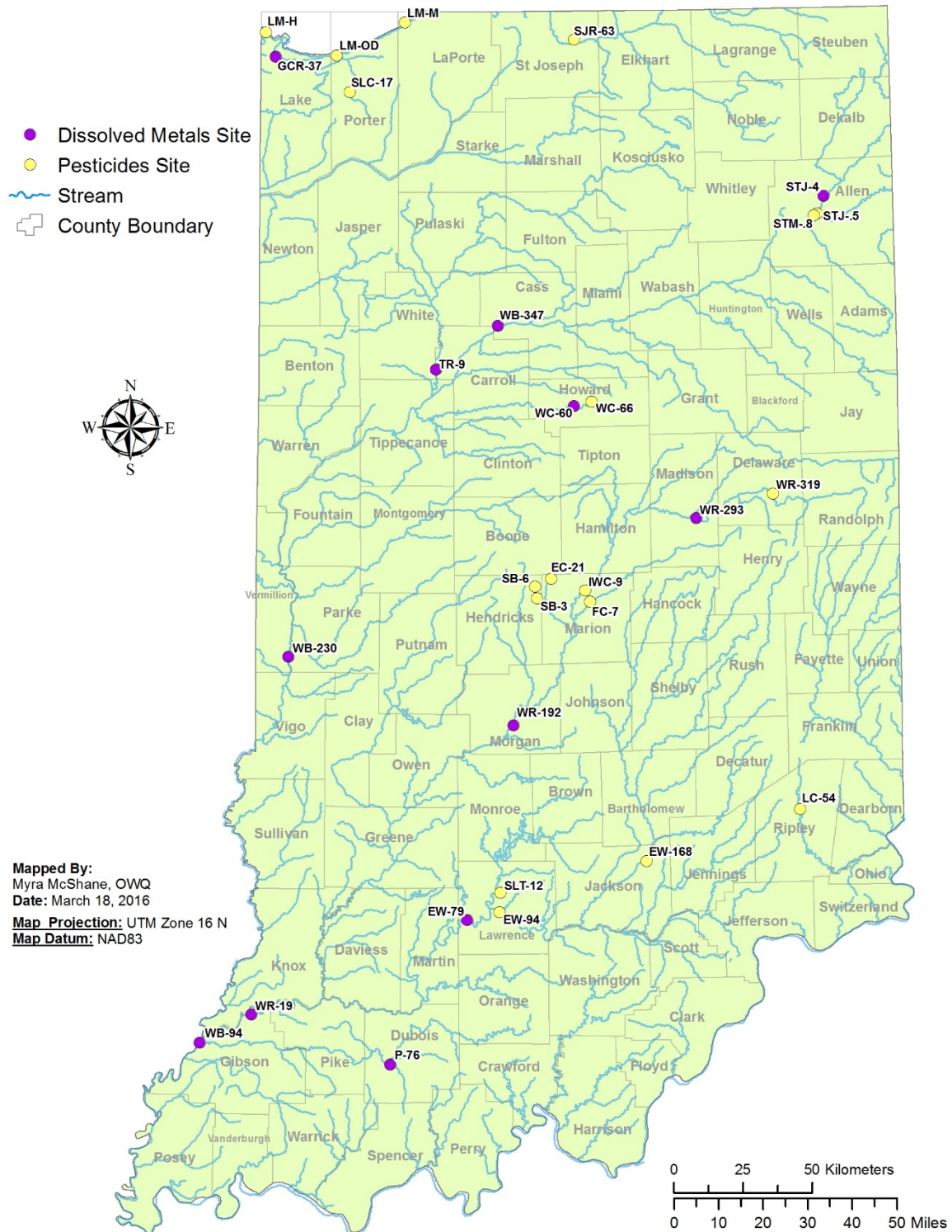


Figure 3. Dissolved Metals and Pesticides Monitoring Locations.

Sampling Methods

Staff will collect grab water chemistry samples and record physical site observations on the field data sheet during monthly sampling events. All water chemistry sampling will adhere to the Water Quality Surveys Section Field Procedure Manual, Section 2.0 (Field Procedure Manual IDEM 2002, pages 8-14).

Field Parameter Measurements

Dissolved oxygen (DO), pH, water temperature, specific conductance, and DO percent saturation will be measured with a data sonde during each sampling event. Measurement procedures and operation of the data sonde shall be performed according to the manufacturers' manuals (Hydrolab Corporation 2002; YSI 2002) and Sections 2.10 – 2.13 of the Water Quality Surveys Section Field Procedure Manual (IDEM 2002, pages 58-80). Turbidity will be measured with a Hach™ turbidity meter or a similar meter. All field parameter measurements and weather codes will be recorded on the field data sheet.

Pesticides Sampling

Due to the completion and discontinuation of the Pesticides Monitoring Program in 2001, and the need to renew a capability of sampling to screen Fixed Station Monitoring Program sites for currently and widely used pesticides, eighteen Fixed Station sites were chosen for monthly testing beginning in April 2002. Most of these sites are at or near drinking water source intakes. This will be done along with testing for the previously chosen parameters for each site. See Table 4 for the list of sites selected for this additional pesticide monitoring that will be continued for 2017.

Dissolved Metals Sampling

A new set of twelve sites were selected for dissolved metals analysis in the Fixed Station Monitoring Program beginning in 2011. Due to resource and time constraints, dissolved metals cannot be sampled at all Fixed Station sites, so a small subset of existing sites were chosen for this purpose. Sites were selected on larger rivers and where chosen based on good spatial coverage throughout the entire state. The dissolved metals results from these sites will be assessed yearly and could be moved to other sites, preferably at the beginning of the year, as results and needs warrant. See Table 3 for a list of sites selected for dissolved metals sampling.

Analytical Methods: (QAPP Element B4)

The field measurements of DO, temperature, pH, conductivity, and turbidity are taken each time a sample is collected. The field parameters and their respective test methods and quantification limits are identified in Table 21.

All analysis, other than field parameters, will be performed at the Indiana State Department of Health (ISDH) Environmental Lab in accordance with pre-approved test methods and allotted holding time frames (see Tables 22-26). More information on the competency of ISDH to perform the requested work may be found in Section A4.2.4 of

the IDEM QAPP for the Indiana Surface Water Quality Monitoring Program (IDEM 2004, pp. 21-23). All parameters that are measured in the laboratory are listed in Tables 22-25. Tables 22-25 identify numerous parameters (Semi-volatile organics, inorganics, nutrients, general chemistry, and *E. coli* bacteriological parameters) and their respective test methods and reporting limits. A chain-of-custody form and a sample analysis request form will accompany each sample set through the analytical process.

Quality Control and Custody Requirements: (QAPP Element B5)

Field Parameter Measurements

The data sonde will be calibrated on a routine basis (IDEM 2002). The dissolved oxygen component of the calibration procedure will be conducted using the air calibration method (IDEM 2002, pp. 74-75). Calibration results and drift values will be recorded, maintained, stored, and archived in the calibration laboratories at the Shadeland facility. The drift value is the difference between two successive calibrations. Field parameter calibrations will conform to the procedures as described in the instrument user manuals (Hydrolab Corporation 2002, Section 3.4; YSI 2002, Section 2.6). The unit will be field checked for accuracy once during each route/analysis set by comparison with a Winkler dissolved oxygen test, as well as Hach™ turbidity, pH and temperature meters. Readings must agree within 0.6 mg/L for dissolved oxygen and 0.6 SU for pH (IDEM 2002, p. 69). Weekly field calibration records will be recorded in the field calibrations portion of the field sheet. A Winkler dissolved oxygen test will also be conducted in the field at sites where the field measurement of the dissolved oxygen concentration is 4.0 mg/L or less.

Water Chemistry Data

Sample bottles and preservatives certified for purity will be used. Sample bottles will adhere to U.S. EPA level 1 protocol and preservatives to ACS purity grade. Sample collection containers for each parameter, preservative, and holding times will adhere to U.S. EPA requirements, see Table 26. Field duplicates and matrix spike/matrix spike duplicates (MS/MSD) shall be collected at the rate of one per sample analysis set/route. Additionally, field blank samples using ASTM D1193-91 Type I water will also be taken at a rate of one per sample analysis/route.

Table 2 Fixed Station Monitoring Program Sampling Locations

Note: Site #'s are derived from river miles and some sites have had river miles corrected. All site #'s are listed for reference.

SITE #	YEARS	STREAM AND LOCATION	LATITUDE (DMS)			LONGITUDE (DMS)		
BD-1	1966–Pres	Burns Ditch at US Highway 12, Portage	41	37	06	87	10	35
BD-2E	1966–Pres	Burns Ditch, SR 249 bridge(Chrisman Road), Portage	41	36	45	87	10	26
BD-3W	1966–Pres	Burns Ditch, Portage Boat Yard Dock, Portage	41	36	09	87	11	35
BL-0.1	1973–1985	Big Blue River at US 31, Edinburgh, east side of bridge	39	21	18	85	59	02
BL-0.7	1986–Pres							
BL-61	1976–1985	Big Blue River at Henry CR 400S, north of Spiceland	39	52	24	85	26	20
BL-64	1986–Pres							
BLW-10	1998–Pres	Blue River at SR 62 near Wyandotte Cave	38	13	14	86	17	54
BLW-53	1973–1985	Blue River at US 150, Fredricksburg	38	26	02	86	11	30
BLW-57	1986–Pres							
BMC-1	1998–Pres	Big Monon Ditch, SR 16, north of Monticello	40	52	09	86	46	45
BSC	1998–Pres	Bluespring Caverns, Hartleyville	38	47	50	86	32	43
BU-7	1999–Pres	Busseron Creek at SR 58, west of Carlisle	38	58	27	87	25	34
BWC-4	1999–Pres	Big Walnut Creek at Putnam CR 875S near Reelsville	39	32	08	86	58	35
CC-4	2001–Pres	Cedar Creek at Hursh Road, N of Cedarville	41	12	54	85	03	05
CIC-17	1999–Pres	Cicero Creek at Mt. Pleasant Rd, East of Arcadia	40	10	28	86	00	02

SITE #	YEARS	STREAM AND LOCATION	LATITUDE (DMS)			LONGITUDE (DMS)		
CRC-2	1999–Pres	Crooked Creek at SR 49, south of Kouts	41	16	56	87	01	33
DC-5	1998–Pres	Deer Creek, CR 300 N, northeast of Delphi	40	35	25	86	37	17
EC-1	1971–Pres	Eagle Creek at Raymond Street, Indianapolis	39	44	06	86	11	48
EC-7	1986–Pres	Eagle Creek, Lynhurst Drive, Indianapolis	39	46	42	86	15	02
EC-21	1971–Pres	Eagle Creek, 86 th Street, south of Zionsville	39	54	37	86	17	08
EEL-1	1986–Pres	Eel River at SR 67, Worthington	39	07	28	86	58	13
ELW-2	1957–1968							
EEL-38	1999–Pres	Eel River, CR 685, southwest of Bowling Green	39	21	02	87	04	21
ELL-7	1957–1970 1976–Pres	Eel River, CR 150 N, northeast of Logansport	40	46	56	86	15	52
ELL- 41	1986–Pres	Eel River, SR 15, northeast of Roann (public access site)	40	56	53	85	53	28
ELL-66	1998–Pres	Eel River at SR 5, South Whitley (public access site)	41	04	58	85	37	39
ER-.3	1973–2000 2001–Pres	Elkhart River at SR 120 bridge (Jackson Street), Elkhart Elkhart River at walking bridge off Waterfall Dr.	41 41	41 41	16 09	85 85	58 58	20 59
ER-29	1999–Pres	Elkhart River at US 33, near Benton at public access site 200 ft. downstream of US 33 bridge	41	30	28	85	45	34
EW-1	1980–Pres	East Fork, White River, SR 57, northeast of Petersburg	38	32	21	87	13	23
EW-77	1971–1985	East Fork White River, Williams Dam, public access site downstream of dam	38	48	07	86	38	42
EW-79	1986–Pres							
EW-94	1957–1970 1974–Pres	East Fork White River, US 50/SR 37, south of Bedford, public access site	38	49	33	86	30	47

SITE #	YEARS	STREAM AND LOCATION	LATITUDE (DMS)			LONGITUDE (DMS)		
EW-167	1957–1985	East Fork White River, CR 725N, near Seymour water plant, sampled at boat ramp	38	59	14	85	53	56
EW-168	1985–Pres							
EW-189	1971–1972	East Fork, White River, SR 46 at Columbus	39	12	01	85	55	35
EW-239	1986–Pres							
FC-0.6	1986–Pres	Fall Creek, Stadium Drive, Indianapolis	39	46	55	86	10	36
FC-1	1971–1972							
FC-7	1971–Pres	Fall Creek, Keystone Avenue, near Indianapolis Water Co Intake	39	50	04	86	07	19
FC-26	1999–Pres	Fall Creek, Southeastern Pkwy (Old SR 238), near Fortville	39	57	16	85	52	01
FSH-5	1999–Pres	Fish Creek at DeKalb CR 18 & 79, NE of Butler	41	27	54	84	48	51
FSH-18	1999–Pres	Fish Creek at SR 427, NE of Hamilton	41	33	31	84	50	08
FR-17	1999–Pres	Flat Rock River, SR 252, west of Flat Rock	39	21	48	85	51	21
FR-64	1999–Pres	Flat Rock River, Gings Road, NE of Rushville	39	40	24	85	24	04
GC-8	2/99 –Pres	Graham Creek, CR 75W, ford, near Commiskey	38	51	48	85	37	38
GCR-34	1958–Pres	Grand Calumet River, Hohman Avenue, Hammond (Samples collected by personnel of Hammond Sanitary District Prior to 1971)	41	37	28	87	31	04
GCR-37	1964–1979 1981–Pres	Grand Calumet River, Kennedy Avenue, East Chicago	41	36	51	87	27	42
GCR-42	1986–Pres	Grand Calumet River, Bridge Street, near US Steel, Gary	41	36	32	87	22	19
GCR-46	1999–Pres	Grand Calumet River, upstream end of US Steel property downstream end of lagoon	41	36	41	87	17	42

SITE #	YEARS	STREAM AND LOCATION	LATITUDE (DMS)			LONGITUDE (DMS)		
GF-2	1999–Pres	Greens Fork, South Jacksonburg Road, Wayne County	39	46	18	85	06	33
I-63	1999–Pres	Iroquois River at Newton CR 450W, north of Kentland	40	49	13	87	27	51
IHC-0	1973–1976 1978–Pres	Indiana Harbor Canal at mouth, LTV Steel Property, East Chicago	41	40	21	87	26	32
IHC-1	1964–1985	Indiana Harbor Canal, Dickey Road, East Chicago	41	39	19	87	27	33
IHC-2	1986–1991 1993–Pres							
IHC-3S	1964–Pres	Indiana Harbor Canal, Columbus Drive, East Chicago	41	38	22	87	28	16
IHC-3W	1964–Pres	Indiana Harbor Canal, Indianapolis Blvd., East Chicago	41	38	48	87	28	50
IN-2	1999–Pres	Indian Creek, SR 450 near Trinity Springs	38	45	21	86	45	25
IND-23	1999–Pres	Indian Creek, City park south of Corydon (New SR 135)	38	12	05	86	08	42
IWC-6.6	1973–1985	Indianapolis Waterway Canal , Guilford Avenue, Broad Ripple	39	52	17	86	08	29
IWC-9	1986–Pres							
KR-65	1957–1970 1976–1985	Kankakee River, SR 55, Shelby	41	10	58	87	20	26
KR-68	1986–Pres							
KR-91	1999–Pres	Kankakee River CR 500 E, Dunns Bridge	41	13	11	86	58	05
KR-117	2001–Pres	Kankakee River at LaPorte CR 1000S	41	27	41	86	36	50
LBR-3	1999–Pres	Little Blue River at Crawford CR, NE of Alton	38	10	01	86	24	57
LC-28	1957–1970	Laughery Creek, SR 350, east of Osgood	39	15	13	85	15	13

SITE #	YEARS	STREAM AND LOCATION	LATITUDE (DMS)			LONGITUDE (DMS)		
LC-54	1998–Pres							
LC-12	1998–Pres	Laughery Creek, road ford downstream of SR 262, near Milton	38	59	03	85	00	03
LCR-13	1958–1970 1971–Pres	Little Calumet River, Hohman Avenue, Hammond (Samples collected by personnel of Hammond Sanitary District prior to 1970)	41	34	40	87	31	20
LCR-39	1971–Pres	Little Calumet River, SR 149, northwest of Porter	41	37	01	87	07	34
LM-DSP	1997–Pres	Dunes State Park, beach sample, 100 yards west of parking lot	41	39	46	87	03	57
LM-EC	1969–Pres	Raw water at East Chicago Waterworks	*41	39	10	87	26	18
LM-G	1969–Pres	Raw water at NIWC, Gary, Borman Park Treatment Plant	*41	35	58	87	20	33
LM-H	1969–Pres	Raw water at Hammond Waterworks	*41	41	32	87	30	22
LM-M	1957–Pres	Raw water at Michigan City Waterworks	*41	43	30	86	54	06
LM-OD	1997–Pres	Raw water at NIWC, Ogden Dunes Treatment Plant	*41	37	05	87	11	58
LM-W	1957-2010	Raw water Whiting Waterworks	*41	40	41	87	29	13
LPC-5	1999–Pres	Little Pigeon Creek, Warrick CR near Yankeetown	37	54	36	87	17	44
LR-7	1998–Pres	Little River, CR 200E, near Huntington	40	53	55	85	24	48
LST-2	1999–Pres	Lost River, Simmons Creek Road, Martin County	38	32	17	86	48	16
M-95	1965–1985	Maumee River at SR 101, 3 miles N of Woodburn	41	10	11	84	50	57
M-114	1986–Pres							
M-110	1957–1985	Maumee River at Landin Road, 0.5 miles N of New Haven	41	05	04	85	01	14

SITE #	YEARS	STREAM AND LOCATION	LATITUDE (DMS)			LONGITUDE (DMS)		
M-129	1986–Pres							
M-132	2001–Pres	Maumee River at Anthony Boulevard, Ft. Wayne, upstream of STP	41	04	55	85	06	53
MC-17	1974–1985	Mill Creek, US 231, near Devore	39	26	00	86	45	48
MC-18	1986–Pres							
MC-35	1974–Pres	Mill Creek, US 40 bridge at Stilesville	39	38	12	86	38	26
MS-1	1971–Pres	Mississinewa River, SR 124, near Peru	40	44	57	86	00	43
MS-28	1986–Pres	Mississinewa River, off of CR 380 W, bank sample, near Jalapa	40	37	32	85	43	56
MS-28	1957–1970	Mississinewa River, near Highland Ave, sampled 100 yards upstream of dam at boat ramp, Marion	40	34	34	85	39	35
MS-35	1971–1985							
MS-36	1986–Pres							
MS-68	1998–Pres	Mississinewa River at N. Walnut St., 1 mile downstream of Eaton	40	20	38	85	23	18
MS-100	1979–1985	Mississinewa River, CR 100 W, near Ridgeville	40	16	48	84	59	43
MS-99	1986–Pres							
MU-25	1977–1985	Muscatatuck River at SR 39 bridge, west of Austin	38	45	18	85	56	03
MU-20	1986–Pres							
NF-1	1999–Pres	Nolands Fork at Fayette CR 440, near Waterloo	39	42	13	85	06	17
P-35	1986–Pres	Patoka River, CR 300 W, North of Oakland City	38	22	58	87	20	17

SITE #	YEARS	STREAM AND LOCATION	LATITUDE (DMS)			LONGITUDE (DMS)		
P-76	1971–Pres	Patoka River at CR 350W, NW of Huntingburg	38	19	46	86	58	00
PC-21	1984–Pres	Big Pine Creek, SR 55, Pine Village	40	27	08	87	15	16
PGN-54	1999–Pres	Pigeon River at CR 675, near Scott, wildlife area boat ramp	41	44	24	85	33	25
PIG-3	1999–Pres	Pigeon Creek, First Avenue bridge, Evansville	37	59	44	87	34	29
PIP-5	1998–Pres	Pipe Creek, CR 925 E, north of Onward	40	43	18	86	11	54
RC-5	1999–Pres	Raccoon Creek, Wabash St, Mecca	39	43	45	87	19	30
RC-46	1999–Pres	Raccoon Creek, CR 625 W, NW of Morton	39	47	25	86	57	31
S-2	1957–1970	Salamonie River at E. Hanging Rock Rd. near Lagro	40	49	47	85	43	08
S-0	1971–Pres							
S-25	1973–1979 1986–Pres	Salamonie River, SR 124, south of Lancaster	40	44	30	85	30	32
S-50	1998–Pres	Salamonie River at CR 500 E, Montpelier	40	33	33	85	16	43
S-71	1989–Pres	Salamonie River at CR 75 S, West of Portland	40	25	39	85	02	20
S-72	1986–1988							
SB-3	4/2014– Pres	School Branch, Noble Dr, near Brownsburg	39	50	50	86	20	47
SB-6	4/2014– Pres	School Branch, Maloney Rd, near Brownsburg	39	53	9	86	21	20
SC-2	1999–Pres	Sugar Creek at Parke CR 525W, at West Union	39	51	17	87	20	10
SC-25	1986–Pres	Sugar Creek at SR 234, Shades State Park at boat ramp area	39	56	46	87	03	31
SC-30	1973–1985							

SITE #	YEARS	STREAM AND LOCATION	LATITUDE (DMS)			LONGITUDE (DMS)		
SC-39	1999–Pres	Sugar Creek, US 136, Crawfordsville	40	03	00	86	55	21
SC-57	1999–Pres	Sugar Creek at Boone-Montgomery county line road	40	08	36	86	41	45
SD-10	1999–Pres	Singleton Ditch, Parrish St., north of Schneider	41	12	44	87	26	54
SND-4	1998–Pres	Sand Creek at Bartholomew CR 600 E, east of Reddington	39	04	07	85	47	56
SGR-1	1986–Pres	Sugar Creek, CR 800 S, Edinburgh	39	21	39	85	59	53
SJR-50	06/2002– Pres	St. Joseph River at boat ramp, D/S of Auten Road in St. Patrick's Park	41	45	28	86	16	18
SJR-63	06/2002– Pres	St. Joseph River at Mishawaka Avenue, Merrifield Park boat ramp	41	39	59	86	10	04
SJR-78	1971–1985	St. Joseph River at public access site in Bristol	41	43	22	85	48	53
SJR-87	1986–Pres							
SLC-1	1986–Pres	Salt Creek at US 20, Portage	41	35	59	87	08	47
SLC-12	1973–1985	Salt Creek at SR 130, downstream of Valparaiso STP	41	29	55	87	08	29
SLC-17	1986–Pres							
SLT-11	1973–1985	Salt Creek at Oolitic Rd, near Oolitic	38	53	18	86	30	31
SLT-12	1986–Pres							
STJ-0	1973–1985	St. Joseph River at Tennessee Street, Ft. Wayne	41	05	21	85	07	45
STJ-0.5	1986–Pres							
STJ-4	8/2011 – Pres	St. Joseph River at Shoaff Park, Ft. Wayne	41	08	44	85	06	03

SITE #	YEARS	STREAM AND LOCATION	LATITUDE (DMS)			LONGITUDE (DMS)		
STJ-8	1957–1972 2001— 7/2011	St. Joseph River at Mayhew Road, NE of Ft. Wayne	41	10	03	85	04	29
STJ-36	1999–Pres	St. Joseph River at SR 8, Newville	41	20	51	84	50	38
STM-.2	1986 – 8/2011	St. Marys River at Spy Run Bridge, Ft. Wayne	41	05	02	85	08	09
STM-.8	9/2011– Pres	St. Marys River at Old Wells Street Walk Bridge, Ft. Wayne	41	04	58	85	08	39
STM-11	1986–2014	St. Marys River at Ferguson Road and S. Anthony Blvd., Ft. Wayne	40	59	28	85	07	01
STM-12	1957–1985							
STM-12	2015–Pres	St. Marys River at Bostick Rd Walk Bridge	40	58	45	85	5	41
STM-33	1979–1985	St. Marys River at SR 101, Pleasant Mills	40	46	45	84	50	32
STM-37	1986–Pres							
TC-0.3	1973–1985	Trail Creek at Franklin Street, Michigan City	41	43	22	86	54	16
TC-0.5	1986–Pres							
TC-1	1969–1972 1977–Pres	Trail Creek at US 12 bridge, Michigan City	41	43	16	86	53	48
TC-2	1986–Pres	Trail Creek at Kruegar Park bridge, Michigan City	41	43	22	86	52	32
TC-MC	1993–Pres	Twin Caves at Spring Mill State Park, Mitchell	38	43	27	86	24	34
TR-6	1957–1970 1976–1985	Tippecanoe River, SR 18, near Delphi	40	35	38	86	46	15
TR-9	1986–1988 1992–Pres							

SITE #	YEARS	STREAM AND LOCATION	LATITUDE (DMS)			LONGITUDE (DMS)		
TR-56	1998–Pres	Tippecanoe River at SR 119, south of Winamac	41	00	24	86	36	10
TR-107	1986–2008	Tippecanoe River at US 31, northwest of Rochester	41	05	39	86	14	25
TR-105	2009–Pres	Tippecanoe River at CR 200W bridge, northwest of Rochester	41	06	10	86	15	21
TR-139	1998–Pres	Tippecanoe River at Kosciusko CR 700W, south of Atwood	41	14	38	85	58	39
TR-164	1998–Pres	Tippecanoe River, SR 13, North Webster	41	18	59	85	41	32
V-0.8	1973–Pres	Vermillion River, SR 63, Cayuga	39	57	41	87	27	07
VF-38	1998–Pres	Vernon Fork Muscatatuck River, CR 60S, Vernon	38	58	35	85	37	12
WB-94	8/2011– Pres	Wabash River at SR 64 bridge, near Mount Carmel	38	23	52	87	45	18
WB-128	1957–1985	Wabash River, Vigo St/US 50, Vincennes	38	40	53	87	32	07
WB-130	1985–Pres							
WB-172	5/2011– Pres	Wabash River at SR 154, near Hutsonville, IL	39	6	37	87	39	17
WB-175	1978–1985	Wabash River at I & M Generating Plant, west of Fairbanks	39	13	38	87	34	27
WB-183	1986–2010							
WB-219	1976–1985	Wabash River, Public Access Boat Ramp, Clinton	39	39	23	87	23	44
WB-230	1986–Pres							
WB-228	1971–1985	Wabash River, US 36, Montezuma	39	47	32	87	22	28
WB-240	1957–1970 1986–Pres							
WB-240	2012–Pres	Wabash River, Montezuma Town Park Boat Ramp	39	47	10	87	22	24

SITE #	YEARS	STREAM AND LOCATION	LATITUDE (DMS)			LONGITUDE (DMS)		
WB-245	1973–1985	Wabash River, SR 234, Cayuga	39	57	06	87	25	09
WB-256	1986–Pres							
WB-284	1999–Pres	Wabash River, CR 200 W, south of Williamsport	40	15	18	87	17	59
WB-292	1973–1985	Wabash River, CR 700 W, near Lafayette	40	24	43	87	02	11
WB-303	1986–Pres							
WB-320	2001–Pres	Wabash River at Americus, Pretty Prairie Road (Washington St.)	40	31	44	86	45	37
WB-336	1971–1972 1977–1985	Wabash River at Cass CR 675, Georgetown	40	44	12	86	30	18
WB-347	1985–Pres							
WB-360	1971–1985	Wabash River, Business US 31, Peru	40	44	32	86	05	48
WB-370	1957–1970 1986–Pres							
WB-390	1977–1985	Wabash River at SR 105 bridge, north of Andrews	40	52	08	85	36	07
WB-402	1986–Pres							
WB-409	1986–Pres	Wabash River at Old SR 9 bridge, Etna Ave. south side of Huntington	40	51	30	85	30	27
WB-409	1973–1985	Wabash River at SR 3 bridge, Markle	40	49	10	85	20	33
WB-420	1986–Pres							
WB-449	2003–Pres	Wabash River, CR 400 W, NE of Geneva	40	37	52	85	00	46
WB-467	2004–Pres	Wabash River at Indiana Ohio Line Rd	40	33	49	84	48	10

SITE #	YEARS	STREAM AND LOCATION	LATITUDE (DMS)			LONGITUDE (DMS)		
WC-1	1980–1985	Wildcat Creek, SR 25, north of Lafayette	40	27	13	86	51	05
WC-3	1986–Pres							
WC-32	1998–Pres	Wildcat Creek at SR 75 near Cutler	40	28	54	86	31	48
WC-60	1975–Pres	Wildcat Creek, CR 300 W, west of Kokomo	40	28	25	86	11	03
WC-69	1971–1985	Wildcat Creek, SR 931/S Reed Rd, Kokomo	40	29	10	86	06	27
WC-66	1986–Pres							
WCM-7	1998–Pres	Wildcat Creek, Middle Fork, SR 26 at Edna Mills	40	25	01	86	39	49
WCS-34	1985–Pres	Wildcat Creek, South Fork, at CR 200 N, northwest of Frankfort	40	18	54	86	32	37
WHE-27	1971–1972 1976–Pres	Whitewater River, East Fork, at Potter Shop Rd, Abington	39	43	57	84	57	35
WHW-22	1986–Pres	Whitewater River at old SR 1, Cedar Grove	39	21	12	84	56	34
WHW-47	1999–Pres	Whitewater River at Laurel	39	29	53	85	10	57
WL-SL	1966–Pres	Wolf Lake at culvert, State Line Road and 129 th St., Hammond	41	39	43	87	31	30
WLC-2	1999–Pres	Whitelick Creek at Morgan CR 600 N, just east of Centerton	39	30	49	86	22	48
WLC-1	1968–1970	Whitelick Creek at Morgan CR 600 N, just east of Centerton	39	30	49	86	22	48
WR-19	1957–1972 1986– 11/2011	White River, Old US 41, Hazleton	38	29	24	87	33	00
WR-19	11/2011– Pres	White River, Public Access Site boat ramp, Hazleton	38	29	27	87	32	35

SITE #	YEARS	STREAM AND LOCATION	LATITUDE (DMS)			LONGITUDE (DMS)		
WR-48	1971–1985	White River, SR 61, Petersburg	38	30	42	87	17	19
WR-46	1985–Pres							
WR-80	1971–1985	White River, SR 358, near Edwardsport	38	47	42	87	14	29
WR-81	1986–Pres							
WR-84	1957–1970							
WR-134	1999–Pres	White River, SR 157, Worthington	39	06	36	86	57	48
WR-162	1986–Pres	White River, South Main St, Spencer	39	16	49	86	45	43
WR-166	1957–1985							
WR-192	1971–1977 1986–Pres	White River, SR 39, Martinsville	39	26	02	86	26	58
WR-194	1957–1970							
WR-210	1996–Pres	White River, SR 144, near Waverly	39	34	01	86	15	21
WR-248	1986–Pres	White River, 86 th Street, Nora	39	54	36	86	06	18
WR-249	1971–1985							
WR-251	1957–1970							
WR-279	1971-2009	White River at SR13, Perkinsville	40	08	32	85	51	46
WR-280	2009–Pres	White River Perkinsville Boat Ramp, 1 mile east of SR13 on Water Street	40	08	32	85	51	18
WR-293	1986–Pres	White River, Edgewater Park Boat Ramp, Anderson	40	06	22	85	40	18
WR-300	1965–1970	White River, Tiger Drive, Yorktown	40	10	44	85	29	41

SITE #	YEARS	STREAM AND LOCATION	LATITUDE (DMS)			LONGITUDE (DMS)		
WR-310	1971–1985							
WR-309	1985–Pres							
WR-319	1973–Pres	White River, Memorial Drive, Muncie	40	10	42	85	20	32
WR-334	1966–1970	White River, US 27, Winchester	40	10	56	84	58	08
WR-350	1978–1985							
WR-348	1986–Pres							
YR-12	1999–Pres	Yellow River, Starke CR 500E, east side of Knox	41	18	09	86	36	05

* Location of waterworks or treatment plant (intake is from Lake Michigan)

Table 3 Locations Selected For Dissolved Metals Sampling

Site #	Stream	Location
EW-79	East Fork White River	Williams Dam Public Access Site
GCR-37	Grand Calumet River	Kennedy Ave, East Chicago
P-76	Patoka River	CR 350 W, near Huntingburg
STJ-4	St. Joseph River	Shoaff Park Boat Ramp, Ft. Wayne
TR-9	Tippecanoe River	SR 18, near Delphi
WB-94	Wabash River	SR 64, near Mt. Carmel
WB-230	Wabash River	Public Access Boat Ramp, Clinton
WB-347	Wabash River	CR 675 W, Georgetown
WC-60	Wildcat Creek	CR 300 W, near Kokomo
WR-19	White River	Public Access Boat Ramp, Hazleton
WR-192	White River	SR 39, Martinsville
WR-293	White River	Edgewater Park Boat Ramp, Anderson

Table 4 Locations Selected For Pesticide Sampling

Site #	Stream	Location
EC-21	Eagle Creek	86 th St, near Zionsville
EW-94	East Fork White River	US 50/SR 37, near Bedford
EW-168	East Fork White River	CR 725 N, Seymour
FC-7	Fall Creek	Keystone Ave, Indianapolis
IWC-9	Indianapolis Waterway Canal	Guilford Ave, Indianapolis
LC-54	Laughery Creek	SR 350, near Osgood
LM-H	Lake Michigan	Raw water at Hammond Waterworks
LM-M	Lake Michigan	Raw water at Michigan City Waterworks
LM-OD	Lake Michigan	Raw water at NIWC, Ogden Dunes Treatment Plant
SB-3	School Branch	Noble Dr, near Brownsburg

Site #	Stream	Location
SB-6	School Branch	Maloney Rd, near Brownsburg
SJR-63	St. Joseph River	Mishawaka Ave, Merrifield Park boat ramp
SLC-17	Salt Creek	SR 130, Valparaiso
SLT-12	Salt Creek	Old SR 37, Oolitic
STJ-0.5	St. Joseph River	Tennessee St, Ft. Wayne
STM-0.8	St. Marys River	Old Wells Street Walk Bridge, Ft. Wayne
WC-66	Wildcat Creek	SR 931/S Reed Rd, Kokomo
WR-319	White River	Memorial Drive, Muncie

Table 5 Southeast Route - Fixed Station Monitoring Parameters

SITE LOCATION SITE NUMBER	FR-64 Rushville 1	WHW-47 Laurel 2	WHW-22 Cedar Grove 3	LC-12 Milton 4	LC-54 Osgood 5	VF-38 Vernon 6	GC-8 Paris 7	SND-4 Reddington 8	FR-17 Flat Rock 9
Alkalinity (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hardness (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Calcium (CaCO3)									
Magnesium (CaCO3)									
Ammonia-N	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nitrate + Nitrite-N	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nitrogen – TKN	✓	✓	✓	✓	✓	✓	✓	✓	✓
Phosphorous – Total	✓	✓	✓	✓	✓	✓	✓	✓	✓
COD	✓	✓	✓	✓	✓	✓	✓	✓	✓
TOC	✓	✓	✓	✓	✓	✓	✓	✓	✓
pH	✓	✓	✓	✓	✓	✓	✓	✓	✓
BOD									
Solids – Total	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Suspended	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Volatile									
Solids – Dissolved	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fluoride									
Chloride	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sulfate	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyanide – Total									
Cyanide – Free									
Cyanide – Amenable									
Diss. React. Silica									
Aluminum									
Arsenic (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Barium									
Cadmium (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Chromium – Total (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Copper (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Iron (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lead (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Manganese (ug/l)									
Nickel (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Potassium									
Selenium									
Silver									
Sodium									
Zinc (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>E. coli</i> (MPN)									
Organics/pesticides (see Table 22)					✓				

Table 6 East Route - Fixed Station Monitoring Parameters

SITE LOCATION SITE NUMBER	BL-64 Spiceland 10	GF-2 Jacksonburg 11	NF-1 Waterloo 12	WHE-27 Abington 13	WR-348 Winchester 14	WR-319 Muncie 15	WR-309 Yorktown 16	WR-293 Anderson 17	FC-26 Fortville 18
Alkalinity (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hardness (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Calcium (CaCO3)									
Magnesium (CaCO3)									
Ammonia-N	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nitrate + Nitrite-N	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nitrogen – TKN	✓	✓	✓	✓	✓	✓	✓	✓	✓
Phosphorous – Total	✓	✓	✓	✓	✓	✓	✓	✓	✓
COD	✓	✓	✓	✓	✓	✓	✓	✓	✓
TOC	✓	✓	✓	✓	✓	✓	✓	✓	✓
pH	✓	✓	✓	✓	✓	✓	✓	✓	✓
BOD	✓			✓	✓	✓	✓	✓	
Solids – Total	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Suspended	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Volatile									
Solids – Dissolved	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fluoride						✓		✓	
Chloride	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sulfate	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyanide – Total									
Cyanide – Free									
Cyanide – Amenable									
Diss. React. Silica									
Aluminum									
Arsenic (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Barium									
Cadmium (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Chromium – Total (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Copper (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Iron (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lead (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Manganese (ug/l)					✓				
Nickel (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Potassium									
Selenium									
Silver									
Sodium									
Zinc (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>E. coli</i> (MPN)						✓	✓	✓	✓
Organics/pesticides (see Table 22)						✓			

Table 7 Indianapolis Route - Fixed Station Monitoring Parameters

SITE LOCATIO N SITE NUMBER	FC-0.6 Stadium Dr 19	FC-7 Keystone 20	IWC-9 Broad Ripple 21	WR-248 Nora 22	EC-21 Zionsville 23	EC-7 Speedway 24	EC-1 Raymond 25	SB-6 Maloney Rd 167	SB-3 Noble Dr 168
Alkalinity (CaCO ₃)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hardness (CaCO ₃)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Calcium (CaCO ₃)									
Magnesium (CaCO ₃)									
Ammonia-N	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nitrate + Nitrite-N	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nitrogen – TKN	✓	✓	✓	✓	✓	✓	✓	✓	✓
Phosphorous – Total	✓	✓	✓	✓	✓	✓	✓	✓	✓
COD	✓	✓	✓	✓	✓	✓	✓	✓	✓
TOC	✓	✓	✓	✓	✓	✓	✓	✓	✓
pH	✓	✓	✓	✓	✓	✓	✓	✓	✓
BOD	✓	✓	✓	✓	✓	✓	✓		
Solids – Total	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Suspended	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Volatile									
Solids – Dissolved	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fluoride		✓	✓			✓			
Chloride	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sulfate	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyanide – Total									
Cyanide – Free									
Cyanide – Amenable									
Diss. React. Silica									
Aluminum (ug/l)									
Arsenic (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Barium									
Cadmium (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Chromium – Total (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Copper (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Iron (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lead (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Manganese (ug/l)			✓						
Nickel (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Potassium									
Selenium									
Silver									
Sodium									
Zinc (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>E. coli</i> (MPN)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Organics/pesticides (see Table 22)		✓	✓		✓			✓	✓

Table 8 Northeast Central Route - Fixed Station Monitoring Parameters

SITE LOCATION SITE NUMBER	WR-280 Perkinsville 164	CIC-17 Acadia 27	WC-60 Kokomo 28	WC-66 Kokomo 29	MS-36 Marion 30	MS-28 Jalapa 31	S-25 Lancaster 32	WB-449 Geneva 33	WB-467 State Line 163
Alkalinity (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hardness (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Calcium (CaCO3)									
Magnesium (CaCO3)									
Ammonia-N	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nitrate + Nitrite-N	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nitrogen – TKN	✓	✓	✓	✓	✓	✓	✓	✓	✓
Phosphorous – Total	✓	✓	✓	✓	✓	✓	✓	✓	✓
COD	✓	✓	✓	✓	✓	✓	✓	✓	✓
TOC	✓	✓	✓	✓	✓	✓	✓	✓	✓
pH	✓	✓	✓	✓	✓	✓	✓	✓	✓
BOD	✓		✓	✓	✓	✓	✓	✓	✓
Solids – Total	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Suspended	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Volatile									
Solids – Dissolved	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fluoride									
Chloride	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sulfate	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyanide – Total									
Cyanide – Free									
Cyanide – Amenable									
Diss. React. Silica									
Aluminum (ug/l)									✓
Arsenic (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Barium									
Cadmium (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Chromium – Total (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Copper (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Iron (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lead (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Manganese (ug/l)								✓	
Nickel (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Potassium									
Selenium									
Silver									
Sodium									
Zinc (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>E. coli</i> (MPN)									
Organics/pesticides (see Table 22)				✓					

Table 8 Northeast Central Route - Fixed Station Monitoring Parameters (Continued)

SITE LOCATION SITE NUMBER	S-50 Montpelier 34	S-71 Portland 35	MS-99 Ridgeville 36	MS-68 Eaton 37		
Alkalinity (CaCO3)	✓	✓	✓	✓		
Hardness (CaCO3)	✓	✓	✓	✓		
Calcium (CaCO3)						
Magnesium (CaCO3)						
Ammonia-N	✓	✓	✓	✓		
Nitrate + Nitrite-N	✓	✓	✓	✓		
Nitrogen – TKN	✓	✓	✓	✓		
Phosphorous – Total	✓	✓	✓	✓		
COD	✓	✓	✓	✓		
TOC	✓	✓	✓	✓		
pH	✓	✓	✓	✓		
BOD		✓	✓			
Solids – Total	✓	✓	✓	✓		
Solids – Suspended	✓	✓	✓	✓		
Solids – Volatile						
Solids – Dissolved	✓	✓	✓	✓		
Fluoride						
Chloride	✓	✓	✓	✓		
Sulfate	✓	✓	✓	✓		
Cyanide – Total						
Cyanide – Free						
Cyanide – Amenable						
Diss. React. Silica						
Aluminum (ug/l)						
Arsenic (ug/l)	✓	✓	✓	✓		
Barium						
Cadmium (ug/l)	✓	✓	✓	✓		
Chromium – Total (ug/l)	✓	✓	✓	✓		
Copper (ug/l)	✓	✓	✓	✓		
Iron (ug/l)	✓	✓	✓	✓		
Lead (ug/l)	✓	✓	✓	✓		
Manganese (ug/l)						
Nickel (ug/l)	✓	✓	✓	✓		
Potassium						
Selenium						
Silver						
Sodium						
Zinc (ug/l)	✓	✓	✓	✓		
<i>E. coli</i> (MPN)						
Organics/pesticides (see Table 22)						

Table 9 Northeast Route - Fixed Station Monitoring Parameters

SITE LOCATION SITE NUMBER	WB-420 Markle 38	LR-7 Mardenis 39	WB-409 Huntington 40	WB-402 Andrews 41	ELL-66 S. Whitley 42	FSH-18 Butler 46	FSH-5 Artic 47	STJ-36 Newville 48	STM-37 Pleasant Mills 52
Alkalinity (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hardness (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Calcium (CaCO3)									
Magnesium (CaCO3)									
Ammonia-N	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nitrate + Nitrite-N	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nitrogen – TKN	✓	✓	✓	✓	✓	✓	✓	✓	✓
Phosphorous – Total	✓	✓	✓	✓	✓	✓	✓	✓	✓
COD	✓	✓	✓	✓	✓	✓	✓	✓	✓
TOC	✓	✓	✓	✓	✓	✓	✓	✓	✓
pH	✓	✓	✓	✓	✓	✓	✓	✓	✓
BOD	✓		✓	✓					✓
Solids – Total	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Suspended	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Volatile									
Solids – Dissolved	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fluoride									
Chloride	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sulfate	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyanide – Total									
Cyanide – Free									
Cyanide – Amenable									
Aluminum (ug/l)	✓			✓					✓
Arsenic (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Barium									
Cadmium (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Chromium – Total (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Copper (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Iron (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lead (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Manganese (ug/l)									
Nickel (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Potassium									
Selenium									
Silver									
Sodium									
Zinc (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>E. coli</i> (MPN)									
Organics/pesticides (see Table 22)									

Table 10 Northeast Route -Ft. Wayne- Fixed Station Monitoring Parameters

SITE LOCATION SITE NUMBER	STJ-4 Shoaff Park 161	M-132 Anthony 162	STM-8 Old Wells St 43	STJ-5 Tennessee 44	CC-4 Cedar Creek 45	M-114 Woodburn 49	M-129 New Haven 50	STM-12 Bostick Rd 51
Alkalinity (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓
Hardness (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓
Calcium (CaCO3)								
Magnesium (CaCO3)								
Ammonia-N	✓	✓	✓	✓	✓	✓	✓	✓
Nitrate + Nitrite-N	✓	✓	✓	✓	✓	✓	✓	✓
Nitrogen – TKN	✓	✓	✓	✓	✓	✓	✓	✓
Phosphorous – Total	✓	✓	✓	✓	✓	✓	✓	✓
COD	✓	✓	✓	✓	✓	✓	✓	✓
TOC	✓	✓	✓	✓	✓	✓	✓	✓
pH	✓	✓	✓	✓	✓	✓	✓	✓
BOD			✓	✓		✓	✓	✓
Solids – Total	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Suspended	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Volatile								
Solids – Dissolved	✓	✓	✓	✓	✓	✓	✓	✓
Fluoride				✓				
Chloride	✓	✓	✓	✓	✓	✓	✓	✓
Sulfate	✓	✓	✓	✓	✓	✓	✓	✓
Cyanide – Total								
Cyanide – Free								
Cyanide – Amenable								
Aluminum (ug/l)			✓			✓		
Arsenic (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Barium								
Cadmium (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Chromium – Total (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Copper (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Iron (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Lead (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Manganese (ug/l)	✓	✓	✓	✓			✓	
Nickel (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Potassium								
Selenium								
Silver								
Sodium								
Zinc (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
<i>E. coli</i> (MPN)								
Organics/pesticides (see Table 22)			✓	✓				

Table 11 North Route - Fixed Station Monitoring Parameters

SITE LOCATION SITE NUMBER	TR-105 Rochester 53	TR-139 Atwood 54	TR-164 N. Webster 55	ER-29 Benton 56	PGN-54 Scott 57	SJR-87 Bristol 58	ER-3 Elkhart 59	SJR-63 Mishawaka 60	SJR-50 South Bend 61
Alkalinity (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hardness (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Calcium (CaCO3)									
Magnesium (CaCO3)									
Ammonia-N	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nitrate + Nitrite-N	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nitrogen – TKN	✓	✓	✓	✓	✓	✓	✓	✓	✓
Phosphorous – Total	✓	✓	✓	✓	✓	✓	✓	✓	✓
COD	✓	✓	✓	✓	✓	✓	✓	✓	✓
TOC	✓	✓	✓	✓	✓	✓	✓	✓	✓
pH	✓	✓	✓	✓	✓	✓	✓	✓	✓
BOD	✓					✓	✓	✓	✓
Solids – Total	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Suspended	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Volatile									
Solids – Dissolved	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fluoride									
Chloride	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sulfate	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyanide – Total									
Cyanide – Free									
Cyanide – Amenable									
Aluminum (ug/l)									
Arsenic (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Barium									
Cadmium (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Chromium – Total (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Copper (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Iron (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lead (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Manganese (ug/l)						✓		✓	
Nickel (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Potassium									
Selenium									
Silver									
Sodium									
Zinc (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>E. coli</i> (MPN)									
Organics/pesticides (see Table 22)								✓	

Table 12 North Central Route - Fixed Station Monitoring Parameters

SITE LOCATION SITE NUMBER	WCS-34 Frankfort 62	WCM-7 Edna Mills 63	WC-32 Cutler 64	DC-5 Delphi 65	TR-9 Delphi 66	WC-3 Lafayette 67	WB-320 Americus 68	WB-347 Georgetown 69	ELL-7 Adamsboro 70
Alkalinity (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hardness (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Calcium (CaCO3)									
Magnesium (CaCO3)									
Ammonia-N	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nitrate + Nitrite-N	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nitrogen – TKN	✓	✓	✓	✓	✓	✓	✓	✓	✓
Phosphorous – Total	✓	✓	✓	✓	✓	✓	✓	✓	✓
COD	✓	✓	✓	✓	✓	✓	✓	✓	✓
TOC	✓	✓	✓	✓	✓	✓	✓	✓	✓
pH	✓	✓	✓	✓	✓	✓	✓	✓	✓
BOD	✓				✓	✓	✓	✓	✓
Solids – Total	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Suspended	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Volatile									
Solids – Dissolved	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fluoride									
Chloride	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sulfate	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyanide – Total									
Cyanide – Free									
Cyanide – Amenable									
Diss. React. Silica									
Aluminum (ug/l)								✓	
Arsenic (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Barium									
Cadmium (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Chromium – Total (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Copper (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Iron (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lead (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Manganese (ug/l)							✓		
Nickel (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Potassium									
Selenium									
Silver									
Sodium									
Zinc (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>E. coli</i> (MPN)									
Organics/pesticides (see Table 22)									

Table 12 North Central Route - Fixed Station Monitoring Parameters (Continued)

SITE LOCATION SITE NUMBER	PIP-5 Onward 71	WB-370 Peru 72	MS-1 Peru 73	ELL-41 Roann 74	S-0 Lagro 75
Alkalinity (CaCO3)	✓	✓	✓	✓	✓
Hardness (CaCO3)	✓	✓	✓	✓	✓
Calcium (CaCO3)					
Magnesium (CaCO3)					
Ammonia-N	✓	✓	✓	✓	✓
Nitrate + Nitrite-N	✓	✓	✓	✓	✓
Nitrogen – TKN	✓	✓	✓	✓	✓
Phosphorous – Total	✓	✓	✓	✓	✓
COD	✓	✓	✓	✓	✓
TOC	✓	✓	✓	✓	✓
pH	✓	✓	✓	✓	✓
BOD		✓	✓	✓	✓
Solids – Total	✓	✓	✓	✓	✓
Solids – Suspended	✓	✓	✓	✓	✓
Solids – Volatile					
Solids – Dissolved	✓	✓	✓	✓	✓
Fluoride					
Chloride	✓	✓	✓	✓	✓
Sulfate	✓	✓	✓	✓	✓
Cyanide – Total					
Cyanide – Free					
Cyanide – Amenable					
Diss. React. Silica					
Aluminum (ug/l)		✓			
Arsenic (ug/l)	✓	✓	✓	✓	✓
Barium					
Cadmium (ug/l)	✓	✓	✓	✓	✓
Chromium – Total (ug/l)	✓	✓	✓	✓	✓
Copper (ug/l)	✓	✓	✓	✓	✓
Iron (ug/l)	✓	✓	✓	✓	✓
Lead (ug/l)	✓	✓	✓	✓	✓
Manganese (ug/l)					
Nickel (ug/l)	✓	✓	✓	✓	✓
Potassium					
Selenium					
Silver					
Sodium					
Zinc (ug/l)	✓	✓	✓	✓	✓
<i>E. coli</i> (MPN)					
Organics/pesticides (see Table 22)					

Table 13 West Route- Fixed Station Monitoring Parameters

SITE LOCATION SITE NUMBER	SC-57 Thorntown 76	WB-303 Lafayette 77	PC-21 Pine Village 78	WB-284 Williamsport 79	SC-39 Crawfordsville 80	RC-46 Morton 81	SC-25 Shades S.P. 82	WB-256 Cayuga 83	V-8 Cayuga 84
Alkalinity (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hardness (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Calcium (CaCO3)									
Magnesium (CaCO3)									
Ammonia-N	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nitrate + Nitrite-N	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nitrogen – TKN	✓	✓	✓	✓	✓	✓	✓	✓	✓
Phosphorous – Total	✓	✓	✓	✓	✓	✓	✓	✓	✓
COD	✓	✓	✓	✓	✓	✓	✓	✓	✓
TOC	✓	✓	✓	✓	✓	✓	✓	✓	✓
pH		✓	✓				✓	✓	✓
BOD		✓	✓				✓	✓	✓
Solids – Total	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Suspended	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Volatile									
Solids – Dissolved	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fluoride									
Chloride	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sulfate	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyanide – Total									
Cyanide – Free									
Cyanide – Amenable									
Diss. React. Silica									
Aluminum (ug/l)		✓						✓	
Arsenic (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Barium									
Cadmium (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Chromium – Total (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Copper (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Iron (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lead (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Manganese (ug/l)		✓	✓						
Nickel (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Potassium									
Selenium									
Silver									
Sodium									
Zinc (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>E. coli</i> (MPN)									
Organics/pesticides (see Table 22)									

Table 13 West Route - Fixed Station Monitoring Parameters (Continued)

SITE LOCATION SITE NUMBER	SC-2 West Union 85	WB-240 Montezuma 86	RC-5 Mecca 87	WB-230 Clinton 88	WB-172 Huntsville 89	EEL-38 B. Green 90	BWC-4 Reelsville 91
Alkalinity (CaCO3)	✓	✓	✓	✓	✓	✓	✓
Hardness (CaCO3)	✓	✓	✓	✓	✓	✓	✓
Calcium (CaCO3)							
Magnesium (CaCO3)							
Ammonia-N	✓	✓	✓	✓	✓	✓	✓
Nitrate + Nitrite-N	✓	✓	✓	✓	✓	✓	✓
Nitrogen – TKN	✓	✓	✓	✓	✓	✓	✓
Phosphorous – Total	✓	✓	✓	✓	✓	✓	✓
COD	✓	✓	✓	✓	✓	✓	✓
TOC	✓	✓	✓	✓	✓	✓	✓
pH	✓	✓	✓	✓	✓	✓	✓
BOD		✓		✓	✓		
Solids – Total	✓	✓	✓	✓	✓	✓	✓
Solids – Suspended	✓	✓	✓	✓	✓	✓	✓
Solids – Volatile							
Solids – Dissolved	✓	✓	✓	✓	✓	✓	✓
Fluoride							
Chloride	✓	✓	✓	✓	✓	✓	✓
Sulfate	✓	✓	✓	✓	✓	✓	✓
Cyanide – Total							
Cyanide – Free							
Cyanide – Amenable							
Diss. React. Silica							
Aluminum (ug/l)							
Arsenic (ug/l)	✓	✓	✓	✓	✓	✓	✓
Barium							
Cadmium (ug/l)	✓	✓	✓	✓	✓	✓	✓
Chromium – Total (ug/l)	✓	✓	✓	✓	✓	✓	✓
Copper (ug/l)	✓	✓	✓	✓	✓	✓	✓
Iron (ug/l)	✓	✓	✓	✓	✓	✓	✓
Lead (ug/l)	✓	✓	✓	✓	✓	✓	✓
Manganese (ug/l)					✓		
Nickel (ug/l)	✓	✓	✓	✓	✓	✓	✓
Potassium							
Selenium							
Silver							
Sodium							
Zinc (ug/l)	✓	✓	✓	✓	✓	✓	✓
<i>E. coli</i> (MPN)							
Organics/pesticides (see Table 22)							

Table 14 Northwest Central Route - Fixed Station Monitoring Parameters

SITE LOCATION SITE NUMBER	I-63 Kentland 92	SD-10 Schneider 93	KR-68 Shelby 94	CRC-2 Kouts 95	KR-91 Dunns Br. 96	KR-117 Kingsbury 97	YR-12 Knox 98	TR-56 Winamac 99	BMC-1 Monon 100
Alkalinity (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hardness (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Calcium (CaCO3)									
Magnesium (CaCO3)									
Ammonia-N	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nitrate + Nitrite-N	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nitrogen – TKN	✓	✓	✓	✓	✓	✓	✓	✓	✓
Phosphorous – Total	✓	✓	✓	✓	✓	✓	✓	✓	✓
COD	✓	✓	✓	✓	✓	✓	✓	✓	✓
TOC	✓	✓	✓	✓	✓	✓	✓	✓	✓
pH	✓	✓	✓	✓	✓	✓	✓	✓	✓
BOD			✓			✓			
Solids – Total	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Suspended	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Volatile									
Solids – Dissolved	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fluoride									
Chloride	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sulfate	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyanide – Total									
Cyanide – Free									
Cyanide – Amenable									
Diss. React. Silica									
Aluminum (ug/l)									
Arsenic (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Barium									
Cadmium (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Chromium – Total (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Copper (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Iron (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lead (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Manganese (ug/l)						✓			
Nickel (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Potassium									
Selenium (ug/l)									
Silver									
Sodium									
Zinc (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>E. coli</i> (MPN)									
Organics/pesticides (see Table 22)									

Table 15 Northwest-A Route - Fixed Station Monitoring Parameters

SITE LOCATION SITE NUMBER	TC-2 Mich. City 101	TC-1 Mich. City 102	LM-M Mich. City 103	TC-5 Mich. City 104	LM-DSP Dune S.P. 105	LCR-39 Porter 106	SLC-17 Valparaiso 107	SLC-1 Portage 108	BD-3W Boat Yard 109
Alkalinity (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hardness (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Calcium (CaCO3)			✓	✓	✓				✓
Magnesium (CaCO3)									
Ammonia-N	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nitrate + Nitrite-N	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nitrogen – TKN	✓	✓	✓	✓	✓	✓	✓	✓	✓
Phosphorous – Total	✓	✓	✓	✓	✓	✓	✓	✓	✓
COD	✓	✓	✓	✓	✓	✓	✓	✓	✓
TOC	✓	✓	✓	✓	✓	✓	✓	✓	✓
pH	✓	✓	✓	✓	✓	✓	✓	✓	✓
BOD	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Total	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Suspended	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Volatile									
Solids – Dissolved	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fluoride			✓	✓	✓	✓	✓	✓	✓
Chloride	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sulfate	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyanide – Total									
Cyanide – Free									
Cyanide – Amenable									
Diss. React. Silica		✓	✓	✓	✓				✓
Aluminum (ug/l)	✓		✓						
Arsenic (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Barium		✓	✓	✓	✓				
Cadmium (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Chromium – Total (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Copper (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Iron (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lead (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Manganese (ug/l)	✓		✓	✓	✓				
Nickel (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Potassium									
Selenium (ug/l)		✓	✓	✓	✓				
Silver		✓	✓	✓	✓				
Sodium		✓	✓	✓	✓				✓
Zinc (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>E. coli</i> (MPN)									
Organics/pesticides (see Table 22)			✓				✓		

Table 15 Northwest-A Route - Fixed Station Monitoring Parameters (Continued)

SITE LOCATION SITE NUMBER	BD-2E Portage 110	BD-1 Portage 111	LM-OD Ogden Dune 112
Alkalinity (CaCO3)	✓	✓	✓
Hardness (CaCO3)	✓	✓	✓
Calcium (CaCO3)	✓	✓	✓
Magnesium (CaCO3)			
Ammonia-N	✓	✓	✓
Nitrate + Nitrite-N	✓	✓	✓
Nitrogen – TKN	✓	✓	✓
Phosphorous – Total	✓	✓	✓
COD	✓	✓	✓
TOC	✓	✓	✓
pH	✓	✓	✓
BOD	✓	✓	✓
Solids – Total	✓	✓	✓
Solids – Suspended	✓	✓	✓
Solids – Volatile			
Solids – Dissolved	✓	✓	✓
Fluoride	✓	✓	✓
Chloride	✓	✓	✓
Sulfate	✓	✓	✓
Cyanide – Total			
Cyanide – Free			
Cyanide – Amenable			
Diss. React. Silica	✓	✓	✓
Aluminum (ug/l)			
Arsenic (ug/l)	✓	✓	✓
Barium (ug/l)		✓	✓
Cadmium (ug/l)	✓	✓	✓
Chromium – Total (ug/l)	✓	✓	✓
Copper (ug/l)	✓	✓	✓
Iron (ug/l)	✓	✓	✓
Lead (ug/l)	✓	✓	✓
Manganese (ug/l)		✓	✓
Nickel (ug/l)	✓	✓	✓
Potassium			
Selenium (ug/l)		✓	✓
Silver (ug/l)		✓	✓
Sodium	✓	✓	✓
Zinc (ug/l)	✓	✓	✓
<i>E. coli</i> (MPN)			
Organics/pesticides (see Table 22)			✓

Table 16 Northwest-B Route - Fixed Station Monitoring Parameters

SITE LOCATION SITE NUMBER	LM-G Gary 113	GCR-42 Gary 114	GCR-37 E. Chicago 115	IHC-3S E. Chicago 116	IHC-3W E. Chicago 117	LM-EC E. Chicago 118	IHC-2 E. Chicago 119	IHC-0 LTV 120
Alkalinity (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓
Hardness (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓
Calcium (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓
Magnesium (CaCO3)								
Ammonia-N	✓	✓	✓	✓	✓	✓	✓	✓
Nitrate + Nitrite-N	✓	✓	✓	✓	✓	✓	✓	✓
Nitrogen – TKN	✓	✓	✓	✓	✓	✓	✓	✓
Phosphorous – Total	✓	✓	✓	✓	✓	✓	✓	✓
COD	✓	✓	✓	✓	✓	✓	✓	✓
TOC	✓	✓	✓	✓	✓	✓	✓	✓
pH	✓	✓	✓	✓	✓	✓	✓	✓
BOD	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Total	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Suspended	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Volatile								
Solids – Dissolved	✓	✓	✓	✓	✓	✓	✓	✓
Fluoride	✓	✓	✓	✓	✓	✓	✓	✓
Chloride	✓	✓	✓	✓	✓	✓	✓	✓
Sulfate	✓	✓	✓	✓	✓	✓	✓	✓
Cyanide – Total		✓	✓	✓	✓		✓	
Cyanide – Free		✓	✓	✓	✓		✓	
Cyanide – Amenable		✓	✓	✓	✓		✓	
Diss. React. Silica	✓	✓	✓	✓	✓	✓	✓	✓
Aluminum (ug/l)		✓	✓	✓	✓		✓	✓
Arsenic (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Barium (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Cadmium (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Chromium – Total (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Copper (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Iron (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Lead (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Manganese (ug/l)		✓	✓	✓	✓		✓	✓
Nickel (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Potassium								
Selenium (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Silver (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Sodium	✓	✓	✓	✓	✓	✓	✓	✓
Zinc (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
<i>E. coli</i> (MPN)								
Organics/pesticides (see Table 22)								

Table 16 Northwest-B Route - Fixed Station Monitoring Parameters (Continued)

SITE LOCATION SITE NUMBER	LM-H Hammond 122	WL-SL Wolf Lake 123	GCR-34 Hammond 124	LCR-13 Munster 125	GCR-46 Gary 160	
Alkalinity (CaCO3)	✓	✓	✓	✓	✓	
Hardness (CaCO3)	✓	✓	✓	✓	✓	
Calcium (CaCO3)	✓		✓		✓	
Magnesium (CaCO3)						
Ammonia-N	✓	✓	✓	✓	✓	
Nitrate + Nitrite-N	✓	✓	✓	✓	✓	
Nitrogen – TKN	✓	✓	✓	✓	✓	
Phosphorous – Total	✓	✓	✓	✓	✓	
COD	✓	✓	✓	✓	✓	
TOC	✓	✓	✓	✓	✓	
pH	✓	✓	✓	✓	✓	
BOD	✓	✓	✓	✓	✓	
Solids – Total	✓	✓	✓	✓	✓	
Solids – Suspended	✓	✓	✓	✓	✓	
Solids – Volatile						
Solids – Dissolved	✓	✓	✓	✓	✓	
Fluoride	✓		✓		✓	
Chloride	✓	✓	✓	✓	✓	
Sulfate	✓	✓	✓	✓	✓	
Cyanide – Total			✓	✓	✓	
Cyanide – Free			✓	✓	✓	
Cyanide – Amenable			✓	✓	✓	
Diss. React. Silica	✓		✓		✓	
Aluminum (ug/l)			✓		✓	
Arsenic (ug/l)	✓	✓	✓	✓	✓	
Barium	✓		✓		✓	
Cadmium (ug/l)	✓	✓	✓	✓	✓	
Chromium – Total (ug/l)	✓	✓	✓	✓	✓	
Copper (ug/l)	✓	✓	✓	✓	✓	
Iron (ug/l)	✓	✓	✓	✓	✓	
Lead (ug/l)	✓	✓	✓	✓	✓	
Manganese (ug/l)	✓		✓		✓	
Nickel (ug/l)	✓	✓	✓	✓	✓	
Potassium						
Selenium (ug/l)	✓		✓		✓	
Silver (ug/l)	✓		✓		✓	
Sodium	✓		✓		✓	
Zinc (ug/l)	✓	✓	✓	✓	✓	
<i>E. coli</i> (MPN)						
Organics/pesticides (see Table 22)	✓					

Table 17 Southwest-A Route - Fixed Station Monitoring Parameters

SITE LOCATION SITE NUMBER	MC-35 Stilesville 126	MC-18 Devore 127	WR-162 Spencer 128	EEL-1 Worthington 129	WR-134 Worthington 130	BU-7 Carlisle 131	WR-81 Edwardsport 132	WB-130 Vincennes 133	WR-19 Hazleton 134	WB-94 Mt. Carmel 166
Alkalinity (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hardness (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Calcium (CaCO3)										
Magnesium (CaCO3)										
Ammonia-N	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nitrate + Nitrite-N	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nitrogen – TKN	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Phosphorous – Total	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
COD	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
TOC	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
pH	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
BOD	✓	✓	✓	✓	✓		✓	✓	✓	✓
Solids – Total	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Suspended	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Volatile										
Solids – Dissolved	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fluoride								✓		
Chloride	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sulfate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyanide – Total										
Cyanide – Free										
Cyanide – Amenable										
Diss. React. Silica										
Aluminum										
Arsenic (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Barium										
Cadmium (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Chromium – Total	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Copper (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Iron (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lead (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Manganese (ug/l)										
Nickel (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Potassium										
Selenium										
Silver										
Sodium										
Zinc (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>E. coli</i> (MPN)										
Organics/pesticides (see Table 22)										

Table 18 Southwest-B Route - Fixed Station Monitoring Parameters

SITE LOCATION SITE NUMBER	WR-46 Petersburg 135	EW-1 Petersburg 136	P-35 Oakland City 137	PIG-3 Evansville 138	LPC-5 Yankeetown 139	P-76 Huntingburg 140	LST-2 Windom 141	IN-2 Trinity 142
Alkalinity (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓
Hardness (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓
Calcium (CaCO3)								
Magnesium (CaCO3)								
Ammonia-N	✓	✓	✓	✓	✓	✓	✓	✓
Nitrate + Nitrite-N	✓	✓	✓	✓	✓	✓	✓	✓
Nitrogen – TKN	✓	✓	✓	✓	✓	✓	✓	✓
Phosphorous – Total	✓	✓	✓	✓	✓	✓	✓	✓
COD	✓	✓	✓	✓	✓	✓	✓	✓
TOC	✓	✓	✓	✓	✓	✓	✓	✓
pH	✓	✓	✓	✓	✓	✓	✓	✓
BOD	✓	✓	✓			✓		
Solids – Total	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Suspended	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Volatile								
Solids – Dissolved	✓	✓	✓	✓	✓	✓	✓	✓
Fluoride								
Chloride	✓	✓	✓	✓	✓	✓	✓	✓
Sulfate	✓	✓	✓	✓	✓	✓	✓	✓
Cyanide – Total								
Cyanide – Free								
Cyanide – Amenable								
Diss. React. Silica								
Aluminum								
Arsenic (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Barium								
Cadmium (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Chromium – Total (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Copper (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Iron (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Lead (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Manganese (ug/l)	✓							
Nickel (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Potassium								
Selenium								
Silver								
Sodium								
Zinc (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
<i>E. coli</i> (MPN)								
Organics/pesticides (see Table 22)								

Table 19 South-A Route - Fixed Station Monitoring Parameters

SITE LOCATION SITE NUMBER	SGR-1 Edinburgh 143	BL-7 Edinburgh 144	EW-239 Columbus 145	EW-168 Seymour 146	MU-20 Austin 147	BLW-57 Fredericksb 148	IND-23 Corydon 149	BLW-10 Wyandotte 150	LBR-3 Alton 151
Alkalinity (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hardness (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Calcium (CaCO3)									
Magnesium (CaCO3)									
Ammonia-N	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nitrate + Nitrite-N	✓	✓	✓	✓	✓	✓	✓	✓	✓
Nitrogen –TKN	✓	✓	✓	✓	✓	✓	✓	✓	✓
Phosphorous – Total	✓	✓	✓	✓	✓	✓	✓	✓	✓
COD	✓	✓	✓	✓	✓	✓	✓	✓	✓
TOC	✓	✓	✓	✓	✓	✓	✓	✓	✓
pH	✓	✓	✓	✓	✓	✓	✓	✓	✓
BOD	✓	✓	✓	✓	✓	✓			
Solids – Total	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Suspended	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Volatile									
Solids – Dissolved	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fluoride				✓					
Chloride	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sulfate	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cyanide – Total				✓					
Cyanide – Free				✓					
Cyanide – Amenable				✓					
Diss. React. Silica									
Aluminum									
Arsenic (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Barium									
Cadmium (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Chromium – Total	✓	✓	✓	✓	✓	✓	✓	✓	✓
Copper (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Iron (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lead (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Manganese (ug/l)									
Nickel (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Potassium									
Selenium									
Silver									
Sodium									
Zinc (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>E. coli</i> (MPN)									
Organics/pesticides (see Table 22)				✓					

Table 20 South-B Route - Fixed Station Monitoring Parameters

SITE LOCATION SITE NUMBER	TC-MC Twin Caves 152	BSC Bluespring 153	EW-79 Williams 154	SLT-12 Bedford 155	EW-94 Bedford 156	WR-192 Martinsville 157	WLC-2 Centerton 158	WR-210 Waverly 159
Alkalinity (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓
Hardness (CaCO3)	✓	✓	✓	✓	✓	✓	✓	✓
Calcium (CaCO3)								
Magnesium (CaCO3)								
Ammonia-N	✓	✓	✓	✓	✓	✓	✓	✓
Nitrate + Nitrite-N	✓	✓	✓	✓	✓	✓	✓	✓
Nitrogen – TKN	✓	✓	✓	✓	✓	✓	✓	✓
Phosphorous – Total	✓	✓	✓	✓	✓	✓	✓	✓
COD	✓	✓	✓	✓	✓	✓	✓	✓
TOC	✓	✓	✓	✓	✓	✓	✓	✓
pH	✓	✓	✓	✓	✓	✓	✓	✓
BOD	✓	✓	✓	✓	✓	✓		✓
Solids – Total	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Suspended	✓	✓	✓	✓	✓	✓	✓	✓
Solids – Volatile								
Solids – Dissolved	✓	✓	✓	✓	✓	✓	✓	✓
Fluoride								
Chloride	✓	✓	✓	✓	✓	✓	✓	✓
Sulfate	✓	✓	✓	✓	✓	✓	✓	✓
Cyanide – Total								
Cyanide – Free								
Cyanide – Amenable								
Diss. React. Silica								
Aluminum								
Arsenic (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Barium								
Cadmium (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Chromium – Total (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Copper (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Iron (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Lead (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Manganese (ug/l)	✓	✓	✓					✓
Nickel (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
Potassium								
Selenium								
Silver								
Sodium								
Zinc (ug/l)	✓	✓	✓	✓	✓	✓	✓	✓
<i>E. coli</i> (MPN)								
Organics/pesticides (see Table 22)				✓	✓			

Table 21 List of Parameters Measured in the Field

Parameters	Method (SM=Standard Method)	IDEM Quantification Limit
Dissolved Oxygen (data sonde optical)	ASTM D888-09	0.05 mg/L
Dissolved Oxygen (data sonde)	SM 4500-OG	0.03 mg/L
Dissolved Oxygen (Winkler Titration)	SM 4500-OC ¹	0.20 mg/L
Dissolved Oxygen % Saturation (data sonde optical)	ASTM D888-09	0.05 %
Dissolved Oxygen % Saturation (data sonde)	SM 4500-OG	0.01 %
pH (data sonde)	EPA 150.2	0.10 S.U.
pH (field pH meter)	SM 4500H-B ¹	0.10 S.U.
Specific Conductance (data sonde)	SM 2510B	1.00 µmhos/cm
Temperature (data sonde)	SM 2550B(2)	0.1 Degrees Celsius (°C)
Temperature (field meter)	SM 2550B(2) ¹	0.1 Degrees Celsius (°C)
Turbidity (data sonde)	SM 2130B	0.02 NTU ²
Turbidity (Hach™ turbidity meter)	EPA 180.1	0.05 NTU ²

¹ Method used for Field Calibration Check

² NTU = Nephelometric Turbidity Unit(s)

Table 22 Organic Parameters for Fixed Stations Near Drinking Water Supply Surface Water Intakes

Pesticide and SVOC Parameters from EPA Method 525.2	CASRN	IDEM CRQL (µg/L)
4,4'-DDT	50-29-3	0.1
Acetochlor	34256-82-1	0.1
Alachlor	15972-60-8	0.1
Aldrin	309-00-2	0.1
Atrazine (Aatrex)	1912-24-9	0.1
Chlordane, Alpha-	5103-71-9	0.1
Chlordane, Gamma-	5103-74-2	0.1
Chlorpyrifos	2921-88-2	0.1
Clomazone	81777-89-1	0.1
Cyanazine (Bladex)	21725-46-2	0.1
Desethylatrazine	6190-65-4	1.0
Desisopropylatrazine	1007-28-9	1.0
Di(2-ethylhexyl) adipate	103-23-1	1.0
Dieldrin	60-57-1	0.1
Endrin	72-20-8	0.1
Heptachlor	76-44-8	0.1
Heptachlor Epoxide	1024-57-3	0.1
Lindane	58-89-9	0.1
Methoxychlor	72-43-5	0.1
Metolachlor	51218-45-2	0.1
Nonachlor, cis-	5103-73-1	0.1
Oxychlordane	27304-13-8	0.1
Pendimethalin	40487-42-1	0.1
Pentachlorophenol	87-86-5	0.1
Propachlor	1918-16-7	0.1
Simazine	122-34-9	0.1
trans-Nonachlor	39765-80-5	0.1
Benzo[a]pyrene	50-32-8	0.1
DEHP	117-81-7	1.0
Hexachlorobenzene	118-74-1	0.1
Hexachlorocyclopentadiene	77-47-4	0.1
Trifluralin	1582-09-8	0.1

Table 23 Parameter Test methods and Reporting Limits – General Chemistries and Nutrients

General Chemistries	CASRN	Method	IDEM CRQL (mg/L)
Alkalinity (as CaCO ₃)	E-14506	EPA 310.2	10.0
Chloride	16887-00-6	SM4500Cl-E	1
Fluoride	16984-48-8	EPA 340.2	0.1
Cyanide (Total)	57-12-5	EPA 335.4	0.01
Cyanide (Weak Acid Dissociable)	57-12-5	SM4500CN- I	0.01
Cyanide (Amenable to Chlorination)	57-12-5	SM4500CN-G	0.01
Hardness (as CaCO ₃)	E-11778	EPA 130.1	1
Solids, Dissolved Total (TDS)	E-10173	SM2540C	10.0
Solids, Suspended Total, (TSS)	E-10151	SM2540D	4.0
Solids, Total (TS)	E-10151	SM2540B	1.0
Sulfate	14808-79-8	EPA 375.2	0.5
Calcium	7440-70-2	SM 3500-Ca D	2.0
Magnesium	7439-95-4	EPA 200.7	95

Nutrients:	CASRN	Method	IDEM CRQL (mg/L)
TBOD5	E-10106T5	SM5210B	2.0
COD	E-10117	SM5220D	3.0
Nitrogen, Ammonia	7664-41-7	EPA 350.1	0.01
Nitrogen, Nitrate+Nitrite	E-10128	EPA 353.1	0.01
Phosphorus, Total	7723-14-0	EPA 365.1	0.01
TKN	E-10264	EPA 351.2	0.1
TOC	E-10195	SM5310B	1.0

Table 24 Parameter Test Methods and Reporting Limits - Metals

Total and/or Dissolved Metals:	CASRN	Method	IDEM CRQL (µg/L)
Aluminum	7429-90-5	EPA 200.7	20.0
Arsenic	7440-38-2	EPA 200.8	2.0
Barium	7440-39-3	EPA 200.8	2.0
Boron	7440-42-8	EPA 200.7	20
Cadmium	7440-43-9	EPA 200.8	1.0
Chromium – Hexavalent	18540-29-9	SM3500Cr-D	10
Chromium, Total (VI + III)	7440-47-3	EPA 200.8	3.0
Copper	7440-50-8	EPA 200.8	2.0
Iron	7439-89-6	EPA 200.7	20
Lead	7439-92-1	EPA 200.8	2.0
Manganese	7439-96-5	EPA 200.8	0.5
Nickel	7439-92-1	EPA 200.8	1.5
Selenium	7440-02-0	EPA 200.8	4.0
Silica (Reactive)	7631-86-9	SM4500-Si D	6,000
Silver	7782-49-2	EPA 200.8	0.3
Sodium	7440-23-5	EPA 200.7	100
Strontium	7440-24-6	EPA 200.7	2.0
Zinc	7440-66-6	EPA 200.7	6.0

Table 25 Parameter Test Methods and Reporting Limits - *E. coli*

Bacteriology:	CASRN	Method	IDEM CRQL (MPN/100mL)
<i>E. coli</i>	ECOLI	SM9223B	1.0

Table 26 Water Chemistry Sample Container, Preservation, and Holding Time Requirements

Parameter	Container	Preservative	Holding	Temp.
Alkalinity as CaCO ₃	1 L, plastic, narrow mouth	None	14 days	≤ 6 °C
Ammonia-N	1 L, plastic, narrow mouth	H ₂ SO ₄ < pH 2	28 days	≤ 6 °C
Chloride	1 L, plastic, narrow mouth	None	28 days	N/A
Fluoride	1 L, plastic, narrow mouth	None	28 days	N/A
Dissolved Reactive Silica	1 L, plastic, narrow mouth	None	28 days	≤ 6 °C
BOD ₅	1 L, plastic, narrow mouth	None	2 days	≤ 6 °C
<i>E. coli</i>	120 mL, presterilized, wide mouth	0.0008% Na ₂ S ₂ O ₃	6 hours	< 10 °C
Chemical Oxygen Demand	1 L, plastic, narrow mouth	H ₂ SO ₄ < pH 2	28 days	≤ 6 °C
Hardness (as CaCO ₃) Calculated	1 L, plastic, narrow mouth	HNO ₃ < pH 2	6 months	N/A
Cyanide (All Forms)	1 L, plastic, narrow mouth	NaOH > pH 12	14 days	≤ 6 °C
Nitrate + Nitrite-N	1 L, plastic, narrow mouth	H ₂ SO ₄ < pH 2	28 days	≤ 6 °C
Total Phosphorus	1 L, plastic, narrow mouth	H ₂ SO ₄ < pH 2	28 days	≤ 6 °C
Solids (All Forms)	1 L, plastic, narrow mouth	None	7 days	≤ 6 °C
Sulfate	1 L, plastic, narrow mouth	None	28 days	≤ 6 °C
Total Kjeldahl Nitrogen	1 L, plastic, narrow mouth	H ₂ SO ₄ < pH 2	28 days	≤ 6 °C
Total Organic Carbon	1 L, plastic, narrow mouth	H ₂ SO ₄ < pH 2	28 days	≤ 6 °C
Metals (Total and Dissolved)	1 L, plastic, narrow mouth	HNO ₃ < pH 2	6 months	
Pesticides (Semivolatile Organics)	1 L, glass, narrow mouth	none	44 days	

III. ASSESSMENT/OVERSIGHT: (QAPP Elements C1, C2)

Field and laboratory performance and system audits will be conducted to insure good quality data. The field and laboratory performance includes precision measurements by relative percent difference (RPD) of field and laboratory duplicates (IDEM 2004, pp. 41, 45-46), accuracy measurements by percent of recovery of matrix spike and matrix spike duplicate (MS/MSD) samples analyzed in the laboratory (IDEM 2004, pp. 42-43, 45-46), and completeness measurements by the percent of planned samples that are actually collected, analyzed, reported, and usable for the project (IDEM 2004, p. 43).

Field audits will be conducted to ensure that sampling activities adhere to approved SOPs. Audits are systematically conducted by WAPB Quality Assurance staff to include all WAPB personnel that engage in field sampling activities (IDEM 2004, p. 124). WAPB field staff involved with sample collection and preparation will be evaluated by QA staff trained in the associated sampling SOPs, and in the processes related to conducting an audit. QA staff will produce an evaluation report documenting each audit for review by those field staff in which the audit pertains, as well as WAPB management. Corrective actions will be communicated and implemented by field staff as a result of the audit process.

Data Quality Assessment Levels

The samples and various types of data collected by this program are intended to meet the quality assurance criteria and Data Quality Assessment (DQA) Levels as described in the WAPB QAPP (IDEM 2004, pp. 128-129).

IV. DATA VALIDATION and USABILITY: (QAPP Elements D1, D2)

Quality Assurance/Data Qualifiers and Flags

The various data qualifiers and flags that will be used for quality assurance and validation of the data are found on pages 130-131 of the WAPB QAPP (IDEM 2004). Laboratory data is reviewed and qualified by QA staff using U.S. EPA Contract Laboratory Program (CLP) guidance for data validation. Data flags have two parts, a cause and an action (reject or estimate value).

Data Usability

The environmental data collected and their usability are qualified and classified into one or more of the four categories: Enforcement Capable Results, Acceptable Data, Estimated Data, and Rejected Data as described on page 130 of the WAPB QAPP (IDEM 2004).

Data collected for this project will be recorded in the AIMS II database and used in the preparation of the Indiana Integrated Water Monitoring and Assessment Report. In addition, all data and reports will be made available to public and private entities that find the data useful.

Laboratory and Estimated Cost

Laboratory analysis and data reporting for this project will comply with the WAPB QAPP (IDEM 2004), Request for Proposals (RFP) 12-48 (IDEM 2012), and the OWQ Quality Management Plan (IDEM 2012b). All laboratory analytical tests will be performed by the Indiana State Department of Health (ISDH) Environmental Lab in Indianapolis, Indiana at no direct cost.

Personnel Safety and Reference Manuals

All staff persons who participate in the field component of this study are required to have completed Basic First Aid and Cardio-Pulmonary Resuscitation (CPR) training. According to the memorandum “Change in status of Water Assessment Branch staff in accordance with the Agency training policy,” dated November 29, 2010, OWQ WAPB staff is exempt from initial and annual training requirements set forth in Section 6.0 of the IDEM Health and Safety Training Policy (IDEM 2010b). The memorandum also states “as an alternative to the training requirements of the policy, the WAPB will conduct in-service training at a minimum of four (4) hours per year on topics directly related to duties performed by staff.” New hires or those changing job responsibilities without the minimum four-hour training must be accompanied in the field by a staff member who has met the requirements of the branch Health and Safety training.

Field personnel collecting water chemistry will follow policies and procedures established in the Surveys Section Field Procedures Manual (IDEM 2002) and the Hazardous Communication Plan Supplement (IDEM 1997).

Sampling on surface waters requires safety consciousness of staff members and the use of specialized equipment; thus, staff will comply with the IDEM Personal Protective Equipment (PPE) Policy (IDEM 2008). If an injury or illness arises in the field, staff will follow the IDEM Injury and Illness Resulting from Occupational Exposure Policy (IDEM 2016).

Operating in and around waterbodies carries inherent risks of drowning; thus, personnel involved in sample collection will wear appropriate clothing and PPE when operating boats or sampling in deep water or swift currents. According to the memorandum “Use of Personal Flotation Devices (PFDs) by Branch Personnel,” dated February 29, 2000, WAPB staff must wear U.S. Coast Guard approved Type I, II, or III PFDs whenever:

- the planned work requires them to enter the water and the maximum water depth at any portion of the work site is over their knee (note that this depth depends on the employee but it will usually be between 12 and 20 inches or 300-500 mm);
- the employee is in a watercraft of any kind that is being launched, is in the water, or is being retrieved from the water; or,
- the employee must work from structures that do not possess guard rails and are over or alongside water where the water depth is or could reasonably be expected to be three feet deep or greater.

In addition, when work is being done in boats on co-jurisdictional waters (as defined by Indiana Code (IC) 14-8-2-27) or during hours of darkness on any waters of the state, all personnel in the watercraft must wear a high intensity whistle and Safety of Life at Sea (SOLAS)-certified strobe light.

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All documents may be inspected at the Watershed and Assessment Branch office, located at 2525 North Shadeland Avenue, Indianapolis, IN.

List for Electronic Distribution:

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David Arnold	IDEM/OWQ/WAPB/Targeted Monitoring
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