2024 Watershed Characterization Work Plan for Indian Creek-White River Watershed (Hydrologic Unit Code 0512020208)

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This work plan is consistent with agency requirements.

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Work Plan Organization

This work plan is an extension of the existing Indiana Department of Environmental Management (IDEM) Office of Water Quality (OWQ) Watershed Assessment and Planning Branch (WAPB) Quality Assurance Project Plan (QAPP) for Indiana Surface Water Programs (Surface Water QAPP) (IDEM 2023a) and QAPP for Biological Community and Habitat Measurements (IDEM 2020a); and serves as a link to the existing QAPP as well as an independent QAPP of the project. Per the United States Environmental Protection Agency (U.S. EPA) Guidance on Systematic Planning Using the Data Quality Objectives (DQO) Process (U.S. EPA 2006) and the U.S. EPA Guidance for Quality Assurance Project Plans (U.S. EPA 2002), this work plan establishes criteria and specifications pertaining to a specific water quality monitoring project usually described in the following four QAPP groups and associated elements.

Group A. Project Management

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List of Acronyms

AIMS	Assessment Information Management System
ASTM	American Society for Testing and Materials
AUID	Assessment Unit IDs
CFU	Colony Forming Units
DO	Dissolved Oxygen
DQA	Data Quality Assessment
DQO	Data Quality Objectives
E. coli	*Escherichia coli*
GPS	Global Positioning System
HUC	Hydrologic Unit Code
IAC	Indiana Administrative Code
IBI	Index of Biotic Integrity
IDEM	Indiana Department of Environmental Management
µS/cm	Microsiemens per Centimeter
mg/L	Milligram per Liter
MHAB	Multihabitat
mL	Milliliter
NTU	Nephelometric Turbidity Unit(s)
OHEPA	Ohio Environmental Protection Agency
OWQ	Office of Water Quality
PPE	Personal Protective Equipment
QA/QC	Quality Assurance and Quality Control
QAPP	Quality Assurance Project Plan
QHEI	Qualitative Habitat Evaluation Index
S.U.	Standard Units
SM	Standard Methods
SOP	Standard Operating Procedures
TDS	Total Dissolved Solids
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
U.S. EPA	United States Environmental Protection Agency
WAPB	Watershed Assessment and Planning Branch

DEFINITIONS

Assessment unit	Reaches of waterbodies, with similar features, assigned unique identifiers, to which all assessment information for a specific reach is associated, and which allow for mapping with geographic information systems.
Elutriate	To purify, separate, or remove lighter or finer particles by washing, decanting, and settling.
15-minute pick	A component of the multihabitat macroinvertebrate sampling method, used to maximize taxonomic diversity while in the field. The 1-minute kick sample and 50-meter sweep sample collected at a site are first combined and elutriated. Macroinvertebrates are then manually removed from the resulting sample for 15 minutes.
50-meter sweep sample	A component of the multihabitat macroinvertebrate sampling method in which approximately 50 meters of all available habitat in a stream or river is sampled with a standard 500 micrometer mesh width D-frame dip net by taking 20-25 individual “jab” or “sweep” samples, which are then composited.
Geometric site	Sampling site chosen according to its drainage area within a watershed.
Macroinvertebrate	Aquatic animals which lack a backbone, are visible without a microscope, and spend some period of their lives in or around water.
1-minute kick sample	A component of the multihabitat macroinvertebrate sampling method in which approximately 1 m^2 of riffle or run substrate habitat in a stream or river is sampled with a standard 500 µm mesh width D-frame dip net for approximately 1 minute.
Pour point	An outlet of a subwatershed or the common point where all the water flows out of any given subwatershed.
Reach	A segment of a stream used for sampling.
Targeted site	A sampling site intentionally selected based on specific monitoring objectives or decisions to be made.

A. PROJECT MANAGEMENT

A.1. Project Objective

IDEM selected the Indian Creek-White River watershed (10-digit Hydrologic Unit Code (HUC) 0512020208) for a watershed characterization project. The main objective of the watershed characterization monitoring project is to use an intensive targeted watershed design which characterizes the current condition of an individual watershed. This type of monitoring provides valuable data for the purposes of assessment, Total Maximum Daily Load (TMDL) development, watershed planning, and allows for future comparisons to evaluate changes in the water quality within the watershed studied. Selecting a spatial monitoring design, with sufficient sampling density to accurately characterize water quality conditions, is a critical step in the process of developing an adequate local scale watershed study.

The water quality data generated from this monitoring effort is anticipated to provide information needed to characterize the watershed for the TMDL program, for local water quality managers, to identify sources of impairment, to designate critical areas, and to enable users in making valid and informed watershed decisions. By design, this project also adds new stream reaches which allow for assessment of aquatic life use support, recreational use support, and future comparisons to evaluate changes in water quality.

The 303(d) list for 2022 submitted to the U.S. EPA (IDEM 2022a) identifies 29.3 miles of impaired streams in the Indian Creek-White River watershed. The total number of miles per each impairment in the Indian Creek-White River watershed is reported in the following ways:

- Category 5(a): *Escherichia coli (E. coli)*, 29.3 miles
  Category 5(a): Impaired Biotic Communities (IBC), 21.4 miles

Multiple IDEM programs and projects have collected assessment data in this watershed.

A.2. Project Organization and Schedule

The main project objective is to provide a comprehensive assessment of the Indian Creek-White River watershed streams' capability to support aquatic life and recreational uses. Sampling will begin in November 2023 and end in October 2024. Barring any hazardous weather conditions or unexpected physical barriers to access a site, sampling activities will be conducted for physical, chemical, and bacteriological parameters; and biological communities.

Sampling activity timeframes include:

1. Site reconnaissance activities were completed in February and March 2023. Reconnaissance activities were conducted in the office and through physical site visits.
2. Monthly water chemistry sampling will occur at all watershed sites during the recreational season, defined as April through October in [327 IAC 2-1-6]. During the months of November through March, monthly sampling will occur only at the pour point sites of each 12-digit HUC (six sites). The first sampling event will occur in November 2023 and the study concludes in October 2024.
3. Biological sampling activities will begin in the summer of 2024 and end no later than October 18, 2024. Fish and macroinvertebrate community sampling will be conducted at all watershed sites via the observation, counting, and collection techniques described in section B.2. Sampling Methods and Sample Handling. Stream habitats will also be evaluated at all watershed sites. Although providing specific dates for fish and macroinvertebrate community collection is not possible, since sampling may be postponed due to a high-water event resulting in scouring of the stream substrate or instream cover creating nonrepresentative samples, the time period for macroinvertebrate sampling is July 15, 2024, through November 15, 2024, and for fish sampling can occur between the dates of June 3, 2024, through October 18, 2024. Bacteriological sampling for *E. coli* at all sites in the watershed will take place monthly from April through October of 2024. In addition, collect five *E. coli* samples from each site at equally spaced intervals over a 30-day period during the recreational season of April to October 2024 to determine a geometric mean.

A.3. Background and Project Description

The Watershed Characterization Monitoring program was instituted to assist in characterizing existing conditions in watersheds throughout the state. The TMDL program will utilize the Indian Creek-White River watershed data set and share the data set with local watershed groups and any other interested parties. The monitoring will provide data for TMDL development and watershed planning and will aid in future evaluations of changes within the basin. This study will use the data for assessment purposes: water chemistry, bacteriological contamination in the form of *E. coli*, fish community, macroinvertebrate assemblages, and habitat evaluations.

A.4. Data Quality Objectives

The DQO process (U.S. EPA 2006) is a tool for planning data collection activities. The process provides a basis for balancing decision uncertainty with available resources. U.S. EPA recommends the DQO process when selecting between two alternatives or deriving an estimate of contamination. The DQO process is a seven-step systematic planning process used to clarify study objectives; define the types of data needed to achieve the objectives; and establish decision criteria for evaluating data quality. The following seven sections document the results of the DQO seven step process for the watershed characterization monitoring of the Indian Creek-White River watershed.

1. State the Problem
   Indiana Administrative Code requires Indiana to assess all waters of the state to determine their designated use attainment status. "Surface waters of the state are designated for full-body contact recreation" and "will be capable of supporting" a "well-balanced, warm water aquatic community" [327 IAC 2-1-3]. Data from the intensive sampling of the Indian Creek-White River watershed provides a full characterization of the current water quality of the watershed. This project will gather water chemistry, bacteriological, biological (fish and macroinvertebrates), and habitat data for the purpose of assessing the designated use attainment status of the Indian Creek-White River watershed.

2. Identify the Goals of the Study
   The main objective of this study is to fully assess whether the surface waters in the watershed are supporting or non-supporting for aquatic life use and recreational use. In addition, use the data from the watershed characterization monitoring for TMDL development and possibly for watershed planning and future comparisons to evaluate changes in water quality within the watershed studied.

3. Identify Information Inputs
   Collect grab samples at the surface water sampling locations for *E. coli* and the parameters listed in Section B.3. Conduct field measurements listed in Section B.3. at each site during each sampling event. Visual field observations will include weather conditions, stream conditions, and percent stream canopy at each sampling location. Analyze all samples collected for bacteriological samples for *E. coli* using SM9223B Idexx Colilert Enzyme Substrate Standard Method per *E. coli* Field Sampling and Analysis. Collect surface water chemistry samples monthly and Pace Analytical Services will process and analyze using the analytical methods listed in Section B.3. Collect a fish and a macroinvertebrate community sample once at each site and perform a corresponding habitat evaluation.

4. Define the Boundaries of the Study

The Indian Creek-White River watershed covers approximately 99.41 square miles in Sullivan, Green, Daviess, and Knox Counties. The watershed is approximately 63% agriculture, 13% forest, 12% hay or pasture, 7% developed land (combined types), less than 5% open water, 2% wetlands, and less than 1% shrub or scrub (Figure 1).

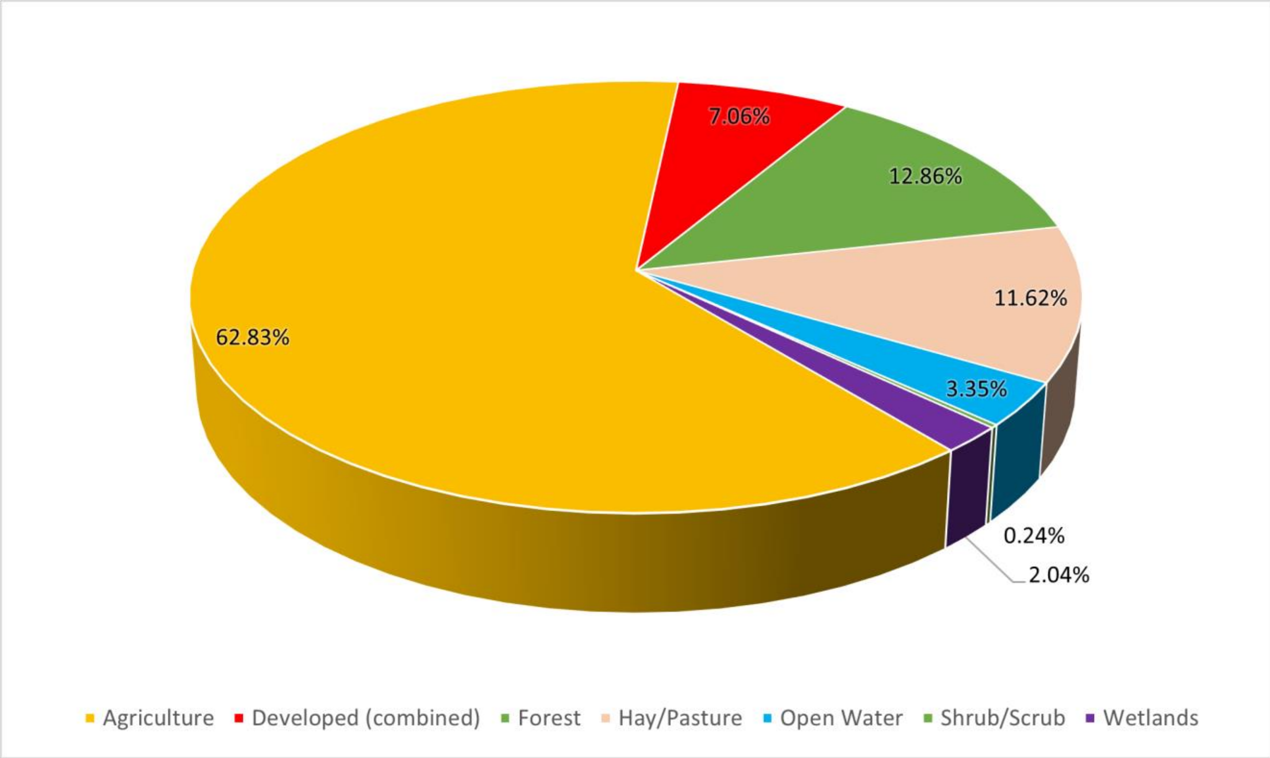
Section B.1. lists the sampling locations for watershed characterization of Indian Creek-White River Watershed, and Figure 2 provides a spatial representation of sites for the 2024 Indian Creek-White River watershed characterization study.

Site reconnaissance activities were completed in March 2023. Sampling activities will begin in November 2023 and will conclude in October 2024. Sample water chemistry monthly during the recreational season, defined as April through October in [327 IAC 2-1-6]. Conduct biological sampling activities in the summer of 2024 and end no later than October 18, 2024. Conduct bacteriological sampling activities from April through October of 2024.

Field crews may not conduct sampling activities when stream flow is potentially too dangerous for staff to enter the stream, hazardous weather conditions (e.g., thunderstorms or heavy rain in the vicinity) exist, or unexpected physical barriers exist. The field crew chief will make the final determination as to whether or not a stream is safe to enter.

A high-water event resulting in scouring of the stream substrate could result in nonrepresentative samples, therefore biological community sampling may be postponed for one to four weeks to allow communities to recover.

Figure 1. Indian Creek-White River Watershed Land Use



[4] Data collected and calculated from USDA National Agricultural Statistics Service 2021 Cropland Data Layer

5. Develop the Analytical Approach
   Collect samples for physical, chemical, bacteriological parameters, and biological communities. Analyze *E. coli* samples in the IDEM mobile laboratory or IDEM Shadeland laboratory with the Idexx™ Colilert Test. The Colilert Test is a multiple-tube enzyme substrate standard method SM-9223B (Clesceri et al. 2012). Analyze samples for nutrient and general chemistry parameters at Pace Analytical Services. Section B.3 lists the nutrient and general chemistry parameters and respective test methods. Measure field parameters of DO, pH, water temperature, specific conductance, and DO percent saturation with a data sonde. Measure turbidity with a Hach™ turbidity kit.

6. Specify Performance or Acceptance Criteria
   Utilizing a comprehensive checklist of informational sources, evaluation of historical information, and a thorough watershed presurvey minimizes sampling design error. Surface Water QAPP (IDEM 2023a) Section B.1.5.3 describes the sampling design which is 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. Place more confidence in the conclusions drawn on the stressors and sources affecting the water quality by minimizing both sampling design error and measurement error for physical and biological parameters.

Site specific aquatic life use and recreational use assessments include program specific controls to identify the introduction of errors. These controls include blanks and duplicates for water chemistry and bacteriological samples; biological site revisits or duplicates; and laboratory controls through verification of species identifications as described in field procedure manuals (IDEM 2020a, 2020b, 2020c, 2023a, 2023c, 2023d, 2023e, 2023f, 2023g).

The Quality Assurance and Quality Control (QA/QC) process detects deficiencies in the data collection as set forth in the Surface Water QAPP (IDEM 2023a) and QAPP for Biological Community and Habitat Measurement (Biological and Habitat QAPP) (2020a). The QAPPs require all contract laboratories to adhere to rigorous standards during sample analyses and to provide good quality usable data. Laboratory accreditation (Attachment 8) is verified before awarding the lab contract and before beginning the project. Review laboratory performance studies annually in October. Chemists within the WAPB review the laboratory analytical results for quality assurance. Compare lab QA/QC for each data set against acceptance limits specified in the laboratory methods, the laboratory's QA Manual, the Surface Water QAPP Section B5.3 Laboratory Quality Control Checks, and the Surface Water QAPP Section D3 Reconciliation with DQO. Validate the data based on the QA/QC review. Do not use any data which is "Rejected" due to analytical problems or errors for water quality assessment decisions. Use any data flagged as "Estimated" on a case-by-case basis and note in the QA/QC report. The Surface Water QAPP (IDEM 2023a pp 106-107), Biological and Habitat QAPP (IDEM 2020a pp 32–36) present criteria for acceptance or rejection of results as well as application of data quality flags. The Surface Water QAPP Table 3: Performance, Acceptance, and Decision Criteria for this Study; and Table 14: Field Parameters showing method and IDEM quantification limit (IDEM 2023a, p 37 and p 91) provide precision and accuracy goals with acceptance limits for applicable analytical methods.

Conduct further investigation in response to consistent "Rejected" data to determine the source of error. Subject field techniques, used during sample collection and preparation along with laboratory procedures, to evaluation by both the WAPB QA manager and project manager to troubleshoot error introduced throughout the entire data collection process. Implement corrective actions upon determination of the source of error per the Surface Water QAPP (IDEM 2023a) and Biological Community and Habitat QAPP (IDEM 2020a).

Evaluate sites as supporting or non-supporting following the decision-making processes described in Indiana's 2022 Consolidated Assessment Listing Methodology (CALM) and based upon the water quality criteria shown in Table 1.

Base recreational use attainment decisions on bacteriological criteria developed to protect primary contact recreational activities [327 IAC 2-1-6]. Aquatic life use support decisions will include independent evaluations of biological and chemical data. Evaluate the fish assemblage data at each site using the appropriate Index of Biotic Integrity (IBI) for the White River and tributaries in the Interior River Lowland (Simon DRAFT; Simon and Dufour 1998, 2005). Also evaluate macroinvertebrate multihabitat (MHAB) samples using a statewide IBI developed for lowest practical taxonomic level identifications.

Indiana narrative biological criteria [327 IAC 2-1-3] states that “all waters, except as described in subdivision (5),” (i.e., limited use waters) “will be capable of supporting” a “well-balanced, warm water aquatic community.” The water quality standard definition of a “well-balanced aquatic community” is “an aquatic community that: (A) is diverse in species composition; (B) contains several different trophic levels; and (C) is not composed mainly of pollution tolerant species” [327 IAC 2-1-9 (59)]. An interpretation or translation of narrative biological criteria into numeric criteria would be as follows: A stream segment is non-supporting for aquatic life use when the monitored fish or macroinvertebrate community receives an IBI score of less than 36 (on a scale of 0-60 for fish and 12-60 macroinvertebrate communities), which is considered “Poor” or “Very Poor” (IDEM 2022a).

In addition, evaluate data for several nutrient parameters with the benchmarks listed below (IDEM 2022a). Assuming a minimum of three sampling events, if two or more of the conditions below are met on the same date, classify the waterbody as non-supporting due to nutrients.

- Total phosphorus (TP):
  - One or more measurements greater than 0.3 mg/L
- Nitrogen (measured as Nitrate + Nitrite):
  - One or more measurements greater than 10.0 mg/L
- Dissolved oxygen (DO):
  - Any measurement less than 4.0 mg/L
  - Any measurements consistently at or close to the standard, range 4.0-5.0 mg/L
- DO percent saturation
  - Any measurement greater than 120%
- pH:
  - Any measurement greater than 9.0 SU
  - Measurements consistently at or close to the standard, range 8.7-9.0 SU

Report assessment of each site sampled to U.S. EPA in the 2026 update of Indiana’s Integrated Water Monitoring and Assessment Report (Integrated Report). Use site-specific data to classify associated assessment units into one of five major categories in the State’s Consolidated 303(d) list. Category definitions are available in Indiana’s CALM (IDEM 2022a, pp G-49, G-50).

Table 1. Water Quality Criteria [327 IAC 2-1-6]

Parameters	Water Quality Criteria	Criterion
E. coli (April-October recreational season)	≤125 MPN/100 mL	5-sample geometric mean
	≤235 MPN/100 mL	Single sample maximum
Total ammonia (NH_3-N)	Calculate based on pH and Temperature	Calculate CAC
Nitrate+Nitrite-Nitrogen	≤10 mg/L	Human health point of drinking water intake
Sulfate	Calculate based on hardness and chloride	In all waters outside the mixing zone
Dissolved oxygen	At least 5.0 mg/L (warm waters)	Daily average
	Not less than 4.0 mg/L at any time	Single reading
pH	6.0 – 9.0 S.U. except for daily fluctuations which exceed 9.0 due to photosynthetic activity	Single reading
Temperature	Varies monthly	1% annual; maximum limits
Chloride	Calculate based on hardness and sulfate values	Calculate CAC
Dissolved solids	750 mg/L	Public water supply

MPN = Most Probable Number, CAC = Chronic Aquatic Criterion, S.U. = Standard Units

7. Develop the Plan for Obtaining Data
   Use the Ohio Environmental Protection Agency (OHEPA) Modified Geometric Design (OHEPA 2012, 2022) site selection process in Attachment 1 to obtain the necessary spatial representation of the entire study area. Site selection within the watershed is based on a geometric progression of drainage areas and then located to the nearest bridge. Sample sites at road crossings allow for more efficient sampling of the watershed.

A.5. Training and Staffing Requirements

Table 2. Project Roles, Experience, and Training

Role	Required Training or Experience	Responsibilities	Training References
Project manager	-Database experience -Experience in project management and QA/QC procedures	- Establish project in the Assessment Information Management System (AIMS) II database - Oversee development of project work plan - Oversee entry and QC of field data - Querying data from AIMS II to determine results not meeting Water Quality Criteria.	- IDEM 2018, 2020a, 2022a, 2022b, 2023a - U.S. EPA 2002, 2006
Field crew chief macroinvertebrate and fish community sampling	- 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 Standard Operating Procedure (SOP) documents for field operations.	- Complete field data sheets - Taxonomic accuracy - Sampling efficiency and representation - Voucher specimen tracking - Overall operation of the field crew - Adherence to safety and field SOP procedures by crew members - Ensure that multiprobe analyzers are calibrated weekly prior to field sampling activities - Ensure that field sampling equipment is functioning properly and loaded into field vehicles prior to field sampling activities	- IDEM 2008, 2010, 2016, 2019a, 2019b, 2020a, 2020c, 2023b, 2023d, 2023e, 2023g -Simon DRAFT -Simon and Dufour 1998, 2005 - YSI 2017, 2018
Field crew members – macroinvertebrate and fish community sampling	- Complete hands-on training for sampling methodology prior to participation in field sampling activities - Review the Principles and Techniques of Electrofishing - Review relevant safety procedures - Review relevant SOP documents for field operations	- Follow all safety and SOP procedures while engaged in field sampling activities - Follow direction of field crew chief while engaged in field sampling activities	- IDEM 2008, 2010, 2016, 2019a, 2019b, 2020c, 2023b, 2023d, 2023e, 2023g - YSI 2017, 2018
Field crew chief – water chemistry or bacteriological sampling	- At least one year of experience in sampling methodology - Annually review relevant safety procedures - Annually review relevant SOP documents for field operations	-Completion of field data sheets -Sampling efficiency and representation -Overall operation of the field crew -Adherence to safety and field SOP procedures by crew members -Ensure that multiprobe analyzers are calibrated weekly prior to field sampling activities -Ensure that field sampling equipment is functioning properly and loaded into field vehicles prior to field sampling activities	- IDEM 2008, 2010, 2016, 2019a, 2019b, 2020b, 2020c, 2023a, 2023b, 2023c - YSI 2017, 2018

Role	Required Training or Experience	Responsibilities	Training References
Field crew members – water chemistry or bacteriological sampling	-Complete hands-on training for sampling methodology prior to participation in field sampling activities -Review relevant safety procedures -Review relevant SOP documents for field operations	-Follow all safety and SOP procedures while engaged in field sampling activities -Follow direction of field crew chief while engaged in field sampling activities	- IDEM 2008, 2010, 2016, 2019a, 2019b, 2020b, 2020c, 2023b, 2023c - YSI 2017, 2018
Laboratory supervisor – macroinvertebrate and fish community sample processing	-At least one year of experience in taxonomy of aquatic communities in the region -Annually review relevant safety procedures -Annually review relevant SOP documents for laboratory operations	-Identification of fish and macroinvertebrate specimens collected during field sampling -Completion of laboratory data sheets -Verify taxonomic accuracy of processed samples -Voucher specimen tracking -Adherence to safety and SOP procedures by laboratory staff -Check data for completeness -Perform all necessary calculations on the data -Ensure that data are entered into the AIMS II Database -Ensure that required QA/QC are performed on the data -Querying data from AIMS II to determine results not meeting Water Quality Criteria	- IDEM 2008, 2010, 2016, 2019a, 2019b, 2020a, 2021b, 2022a, 2022b, 2023f
Laboratory staff – macroinvertebrate and fish community sample processing	-Complete hands-on training for laboratory sample processing methodology prior to participation in laboratory sample processing activities -Annually review relevant safety procedures -Annually review relevant SOP documents for laboratory operations	-Adhere to safety and SOP procedures -Follow Laboratory Supervisor direction while processing samples -Identification of fish and macroinvertebrate specimens collected during field sampling -Completion of laboratory data sheets, perform necessary calculations on data, enter field sheets	- IDEM 2008, 2010, 2016, 2019a, 2019b, 2021b, 2022b, 2023f
Laboratory supervisor – water chemistry or bacteriological sample processing	- Annually review relevant safety procedures - Annually review relevant SOP documents for field operations	-Completion of laboratory data sheets -Adherence to safety and SOP procedures by laboratory staff -Check data for completeness -Perform all necessary calculations on the data -Ensure that data are entered into the AIMS Data Base -Ensure that required QA/QC are performed on the data -Querying data from AIMS II to determine results not meeting Water Quality Criteria	- IDEM 2008, 2010, 2016, 2019a, 2019b, 2021b, 2022a, 2022b, 2023a, 2023c, 2023f

Role	Required Training or Experience	Responsibilities	Training References
Quality assurance officer	-Familiarity with QA/QC practices and methodologies -Familiarity with the QAPPs and data qualification methodologies	-Ensure adherence to QA/QC requirements of QAPP -Evaluate data collected by sampling crews for adherence to project work plan -Review data collected by field sampling crews for completeness and accuracy -Perform a data quality analysis of data generated by the project -Assign data quality levels based on the data quality analysis -Import data into the AIMS data base -Ensure that field sampling methodology audits are completed according to WAPB procedures	- IDEM 2018, 2020a, 2021a, 2022a, 2022b, 2023a, 2023b - U.S. EPA 2006

B. DATA GENERATION AND ACQUISITION

B.1. Sampling Sites and Sampling Design

Sample sites are chosen using a modified geometric site selection process as well as targeted site selection in order to obtain the necessary spatial representation of the entire watershed. Site selection within the watershed is based on a geometric progression of drainage areas starting with the area at the mouth of the main stem stream and then working upstream through the tributaries to the headwaters. Monitoring site establishment is at the nearest bridge.

A more complete description of the Modified Geometric Design Steps for Watershed Characterization Studies selection process is included as Attachment 1. Sample sites are also chosen at the bridge nearest to the pour point of each 12-digit HUC in the watershed or chosen to characterize sources for TMDL development.

Site reconnaissance activities are conducted in-house and through physical site visits. In-house activities include preparation and review of site maps and aerial photographs. Physical site visits include verification of accessibility, safety considerations, equipment needed to properly sample the site, and property owner consultations, if required. Record all information on the IDEM Office of Water Quality (OWQ) Site Reconnaissance Form (Attachment 2) and enter into the AIMS II database. Determine precise coordinates for each site during the physical site visits or at the beginning of the sampling phase. Use an agency approved handheld Global Positioning System (GPS) unit which can verify horizontal precision within five meters or less (IDEM 2023b). Enter the coordinates into the AIMS II database. Also take digital photos upstream and downstream of the site during reconnaissance. Store digital photos on the shared drive upon return to the office in a specific folder for the Indian Creek-White River watershed characterization. Label photos with the site number and indication of whether the photo faces upstream or downstream.

Table 3 provides a list of the selected sampling sites with the stream name, Assessment Unit IDs (AUID), AIMS Site Number, County Name, and the latitude and longitude of each site. Figure 2 gives a spatial overview of the site locations for this project.

Figure 2. Indian Creek-White River Watershed Characterization Sampling Area

[1] Map site numbers refer to Site # from Table 3.

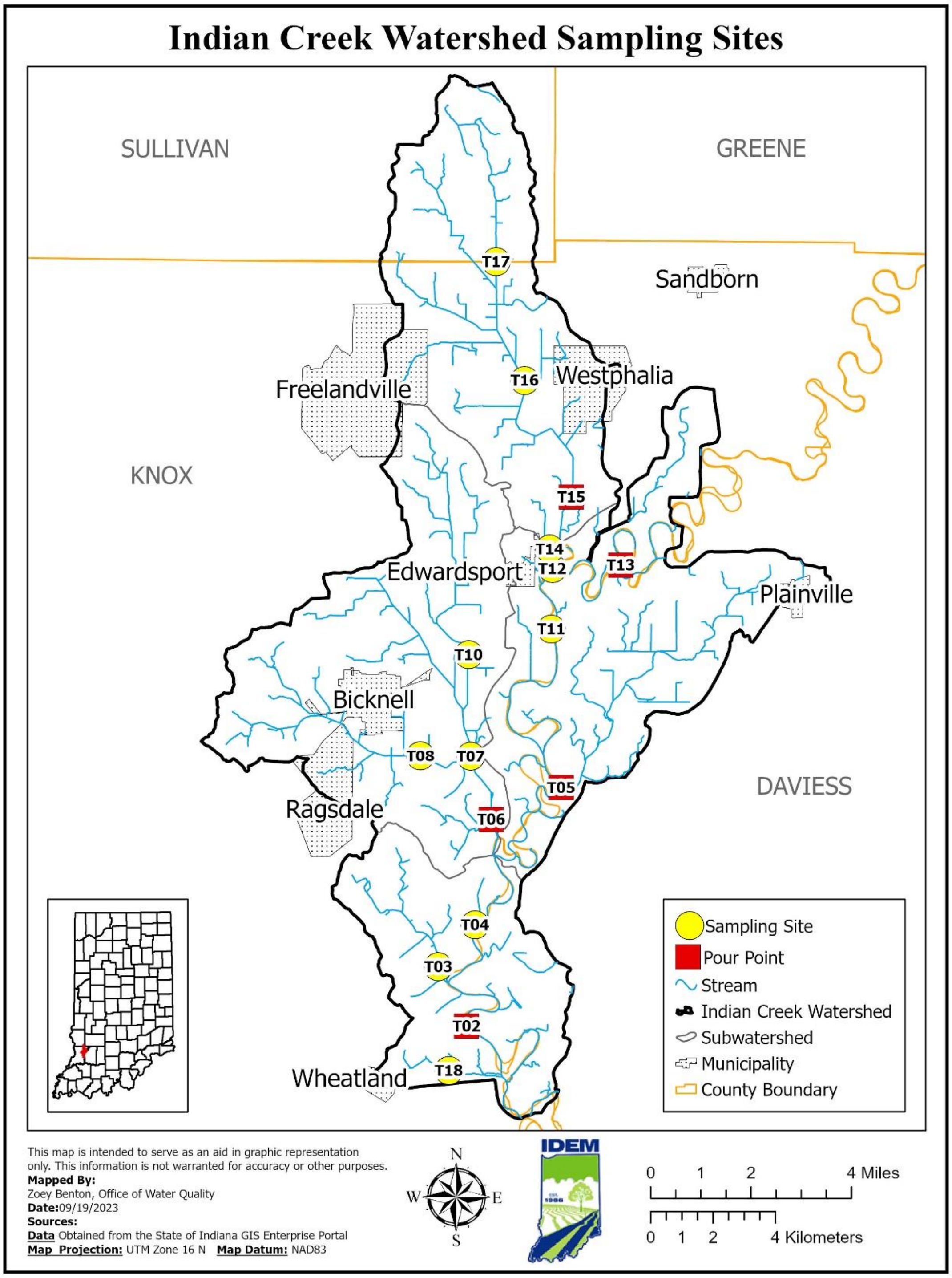


Table 3. Sampling Locations for Watershed Characterization of Indian Creek-White River Watershed (HUC 0512020208)

Site #	EPA Site ID	IDEM Station ID	Stream Name	Location	County	Latitude	Longitude	AUID
T02	24T-002	WWL-08-0009	White River	Washington Road	Knox	38.67995	-87.273396	INW0284_03
T03	24T-003	WWL-08-0021	Bens Creek	Apraw Road	Knox	38.697058	-87.283033	INW0284_T1001
T04	24T-004	WWL-08-0008	White River	Apraw Road	Knox	38.70903307	-87.26964484	INW0284_02
T05	24T-005	WWL-08-0010	White River	CR 650 North	Daviess	38.747987	-87.2375	INW0283_06
T06	24T-006	WWL-08-0011	Indian Creek	River Road	Knox	38.739657	-87.26381	INW0282_03
T07	24T-007	WWL-08-0012	Pickel Ditch	McGlone Road	Knox	38.758102	-87.271483	INW0282_T1004
T08	24T-008	WWL-08-0013	Indian Creek	Mine Road	Knox	38.758082	-87.289984	INW0282_02
T10	24T-010	WWL-08-0018	Purdy-Marsh Ditch	Snyder Road	Knox	38.787494	-87.272396	INW0282_T1003
T11	24T-011	WWL070-0003	West Fork White River	SR 358	Daviess	38.79504631	-87.24186646	INW0283_06
T12	24T-012	WWL-08-0015	White River	CR 1000 North	Daviess	38.812173	-87.242705	INW0283_04
T13	24T-013	WWL-08-0016	White River	Dinkens Road	Daviess	38.813608	-87.216393	INW0283_03
T14	24T-014	WWL-08-0017	Pollard Ditch	Unnamed Farm Lane	Knox	38.818193	-87.242339	INW0283_T1001
T15	24T-015	WWL070-0002	Pollard Ditch	CR 725 North	Knox	38.833262	-87.23481	INW0281_02
T16	24T-016	WWL-08-0019	Pollard Ditch	SR 58	Knox	38.86717	-87.252224	INW0281_02
T17	24T-017	WWL-08-0020	Pollard Ditch	County Line Road	Knox	38.901684	-87.262589	INW0281_01
T18	24T-018	WWL-08-0022	Nimnicht Creek	Nimnicht Road	Knox	38.666701	-87.279271	INW0284_T1003

[1]T## gray shading of the Site # denotes these are the selected pour points for this project (5 sites).

B.2. Sampling Methods and Sample Handling

1. Water Chemistry Sampling
   One team of two staff will collect water chemistry grab samples, record water chemistry field measurements, and record physical site descriptions on the IDEM OWQ Stream Sampling Field Data Sheet (Attachment 3). All water chemistry sampling will adhere to the Water Chemistry Field Sampling Procedures (IDEM 2020b). Preserve samples as specified in Table 4 and follow all applicable holding times.

Table 4. Water Chemistry Sample Handling

Parameter	Preservative	Holding Times
Alkalinity (as $CaCO_3$)	Ice	14 days
Solids, total residue (TS)	Ice	7 days
Solids, nonfilterable residue (TSS)	Ice	7 days
Solids, filterable residue (TDS)	Ice	7 days
Sulfate (dissolved)	Ice	28 days
Chloride	Ice	28 days
Hardness (as $CaCO_3$)	HNO_3	6 months
Ammonia as Nitrogen	H_2SO_4	28 days
Total Kjeldahl Nitrogen (TKN) as Nitrogen	H_2SO_4	28 days
Nitrate + Nitrite as Nitrogen	H_2SO_4	28 days
Phosphorous (Applicable to all)	H_2SO_4	28 days
Total organic carbon (TOC)	H_2SO_4	28 days
Chemical oxygen demand	H_2SO_4	28 days
Calcium	HNO_3	6 months
Magnesium	HNO_3	6 months

2. Bacteriological Sampling
   One team consisting of one or two staff conduct bacteriological sampling. Process samples in an IDEM fixed or mobile *E. coli* laboratory equipped with all materials and equipment necessary to perform the Colilert® Test Method (Standard Method 9223B), per A.2. Project Organization and Schedule (IDEM 2023c). The expected time frame for bacteriological sampling is April through October of 2024. Staff will collect the samples in a 120 mL presterilized wide-mouth container from the center of flow, if the stream is wadeable, or from the shoreline using a pole sampler, if the stream is not wadeable. Wadeability is subject to field staff determination based on available personal protective equipment (PPE), turbidity, and other factors. However, streams waist deep or shallower are generally considered wadeable. Consistently label, cool, and hold all samples at a temperature less than 10ºC during transport. Preserve samples with

0.0008% $Na_2S_2O_3$ for residual chlorine. While still in the field and at the end of each sampling run, process and analyze water samples for *E. coli* within the six-hour holding time for collection and transportation, and the two-hour holding time for sample processing (IDEM 2023c).

The IDEM mobile laboratory facilitates *E. coli* testing by eliminating the necessity of transporting samples to distant contract laboratories within a six-hour holding time. The IDEM mobile *E. coli* laboratory (van) provides a workspace containing sample storage; supplies for Colilert® Quanti-tray testing; and all equipment needed for collecting, preparing, incubating, and analyzing results in the same manner as the IDEM fixed *E. coli* laboratory. Obtain all supplies from IDEXX Laboratories, Inc., Westbrook, Maine.

3. Fish Community Measurements
Teams of three to five staff will complete the fish community sampling. Perform sampling using various standardized electrofishing methodologies dependent upon the stream size and site accessibility. Perform fish assemblage assessments in a sampling reach of 15 times the average wetted width, with a minimum reach of 50 meters and a maximum reach of 500 meters (IDEM 2023d). Make an attempt to sample all habitat types available within the sample reach to ensure adequate representation of the fish community present at the time of the sampling event. The list of possible electrofishers for utilization include: the Smith-Root LR-24, Smith-Root LR-20B, or Midwest Lake Electrofishing System (MLES) Infinity XStream backpack electrofisher; the Smith-Root model 2.5 Generator Powered Pulsator electrofisher, with RCB-6B junction box and rat-tail cathode cable; or MLES Infinity Control Box with MLES junction box and rat-tail cathode cable assembled in a canoe. If parts of the stream are not wadeable, the system may require the use of a dropper boom array outfitted in a canoe or possibly a 12 or 14-foot Loweline™ boat; or for nonwadeable sites, the Smith-Root Type VI-A or MLES Infinity Control Box electrofisher assembled in a 16-foot boat (IDEM 2023d).

Avoid sample collections during high flow or turbid conditions due to 1) low collection rates which result in nonrepresentative samples and 2) safety considerations for the sampling team. Avoid sample collection during late autumn due to the cooling water temperature, which may affect the responsiveness of some species to the electrical field. This lack of responsiveness can result in samples which are not representative of the streams' fish assemblage (IDEM 2023d).

Collect fish using dip nets with fiberglass handles and netting of 1/8 inch mesh bag. Sort fish collected in the sampling reach by species into baskets or buckets. Do not retain young-of-the-year fish less than 20 millimeters (mm) total length in the community sample (IDEM 2023d).

For each field taxonomist (generally the crew leader), retain a complete set of fish vouchers for each new or different species encountered during the summer sampling season. Vouchers may consist of either preserved specimens or digital images. Prior to processing fish specimens and completion of the IDEM OWQ Fish Collection Data Sheet (Attachment 4), preserve one to two individuals per new species encountered. If the fish specimens can be positively identified and the individuals for preservation are small enough to fit in a 2000 mL jar, preserve in 3.7% formaldehyde solution to serve as representative fish vouchers. If, however, the specimens are too large to preserve, take a photo of key characteristics (e.g., fin shape, size, body coloration) for later examination (IDEM 2023d). Also, prior to sampling, randomly select 10% of the sites for a revisit, and preserve or photograph a few representative individuals of all species found at the site to serve as vouchers (IDEM 2020a). Review, prior to field work, taxonomic characteristics of possible species encountered in the basin of interest.

Also preserve fish specimens if positive identification cannot be made in the field (e.g., those co-occurring like the Striped and Common Shiners or are difficult to identify when immature); individuals which appear to be hybrids or have unusual anomalies; dead specimens which are taxonomically valuable for undescribed taxa (e.g., Red Shiner or Jade Darter); life history studies; or research projects (IDEM 2023d).

Record data for fish, which are not preserved, on the IDEM OWQ Fish Collection Data Sheet (Attachment 4) consisting of: number of individuals; minimum and maximum total length in millimeters (mm); mass weight in grams (g); and number of individuals with deformities, eroded fins, lesions, tumors, and other anomalies (DELTs). Once the data are recorded, release specimens within the sampling reach from which they were collected, when possible. Record data for preserved fish specimens following taxonomic identification in the laboratory (IDEM 2023d).

4. Macroinvertebrate Community Measurements
Crews of two to three staff conduct macroinvertebrate community sampling immediately following the fish community sampling event or on a different date. Collect samples using a modification of the U.S. EPA Rapid Bioassessment Protocol MHAB approach using a D-frame dip net with 500 µm mesh (Plafkin et al. 1989; Klemm et al. 1990; Barbour et al. U.S. EPA 1999). The IDEM MHAB approach (IDEM 2023e) is composed of a 1-minute “kick” sample within a riffle or run. Collect, if the stream is wadeable, by disturbing one square meter of stream bottom substrate in a riffle or run habitat and collecting the dislodged macroinvertebrates within a dip net. Also, a 50-meter “sweep” sample of all available habitats. Collect by disturbing habitat such as emergent vegetation, root wads, coarse particulate organic matter, depositional zones, logs, and sticks; and collecting the dislodged macroinvertebrates within the dip net. Define the 50-meter length of riparian corridor sampled at each site using a rangefinder or tape measure. If the stream is too deep to wade, use a boat or canoe to only sample the 50-meter zone along the shoreline with the best available habitat. In addition, do not collect a 1-minute kick sample if the stream is too deep to wade and no available shoreline to collect the sample exists. Combine the 1-minute “kick” and 50-meter “sweep” samples in a bucket of water. Elutriate the combined sample through a U.S. Standard Number 35 (500 µm) sieve a minimum of five times to remove all rocks, gravel, sand, and large pieces of organic debris from the sample. Then transfer the remaining sample from the sieve to a white plastic tray. The collector, while still on-site, will conduct a 15-minute pick of macroinvertebrates at a single organism rate endeavoring to pick for maximum

organism diversity, and relative abundance through turning and examining the entire sample in the tray. Preserve the resulting picked sample in 80% isopropyl alcohol. Return the sample to the laboratory for identification at the lowest practical taxonomic level (usually genus or species level, if possible; IDEM 2023f). Evaluate the sample using the MHAB macroinvertebrate IBI.

5. Habitat Assessments
   Complete habitat assessments immediately following macroinvertebrate and fish community sample collections at each site using a slightly modified version of OHEPA Qualitative Habitat Evaluation Index (QHEI), 2006 edition (OHEPA 2006). Complete a separate IDEM OWQ Biological QHEI (Attachment 5) for each sample type, since the sampling reach length may differ (i.e., 50 meters for macroinvertebrates and between 50 and 500 meters for fish). IDEM 2023g describes the method used in completing the QHEI.

6. Field Parameter Measurements
   Measure dissolved oxygen (DO), pH, water temperature, specific conductance, and DO percent saturation with a data sonde, during each sampling event regardless of the sample type collected. Perform measurement procedures and operation of the data sonde according to the manufacturers' manuals (IDEM 2020c; YSI 2017, 2018) and Sections 2.0 and 4.0 of the Water Chemistry Field Sampling Procedures TSOP (IDEM 2020b). Measure turbidity with a Hach™ turbidity kit and write the meter number in the comments under the field parameter measurements. If a Hach™ turbidity kit is not available, record the data sonde measurement for turbidity and note in the comments. During each sampling run, note and document field observations from each site and ambient weather conditions at the time of sampling on IDEM Stream Sampling Field Data Sheets (Attachment 3).

B.3. Analytical Methods

1. Laboratory Procedure for *E. coli* Measurements:
   Process and analyze all waters sampled for *E. coli* in the IDEM *E. coli* mobile laboratory or IDEM Shadeland laboratory, which is equipped with required materials and equipment necessary for the Idexx™ Colilert Test. The Colilert Test is a multiple-tube enzyme substrate standard method SM-9223B Enzyme Substrate Coliform Test Method (Clesceri et al., 2012). Table 5 identifies the *E. coli* test method and quantification limit.

2. Nutrient and General Chemistry Parameters Measurements:
   Pace Analytical Services will perform analyses of nutrient and general chemistry parameters, in accordance with preapproved test methods and within the allotted time frames. Table 5 identifies the nutrient and general chemistry parameters, and respective test methods and quantification limits.

Table 5. *E. coli*, Nutrient, and General Chemistry Parameters Test Methods[4]

Parameter	Method	Lab Reporting Limit	Units
E. coli	SM-9223B Enzyme Substrate Test	1.0	*MPN/100 mL
Alkalinity (as $CaCO_3$)	SM 2320B	10.0	mg/L
Solids, total residue (TS)	SM 2540B	10.0	mg/L
Solids, nonfilterable residue (TSS)	SM 2540D	2.5	mg/L
Solids, filterable residue (TDS)	SM 2540C	10.0	mg/L
Sulfate	EPA 300.0	0.25	mg/L
Chloride	EPA 300.0	0.25	mg/L
Hardness (as $CaCO_3$)	SM 2340B	10.0	mg/L
Ammonia as Nitrogen	EPA 350.1	0.10	mg/L
Total Kjeldahl Nitrogen (TKN) as Nitrogen	EPA 351.2	0.50	mg/L
Nitrate + Nitrite as Nitrogen	EPA 353.2	0.10	mg/L
Phosphorous, total	EPA 365.1	0.05	mg/L
Total organic carbon (TOC)	SM 5310C	1.0	mg/L
Chemical oxygen demand (COD)	EPA 410.4	10.0	mg/L
Calcium	EPA 200.7	1.0	mg/L
Magnesium	EPA 200.7	1.0	mg/L

***** Clesceri et al., 2017. 1 MPN = 1 CFU/100 mL [4] Methods accredited by NELAP (State of Kansas, 2023)

3. Field Parameters Measurements:
   Take the field measurements of DO, DO percent saturation, temperature, pH, conductivity, and turbidity each time a sample is collected. Table 6 identifies the field parameters, respective test methods, and sensitivity limits. Locate the data sonde in the center of flow during sampling. The field staff member collecting the sample shall wait for all readings to stabilize before recording the readings on the IDEM Stream Sampling Field Data Sheet (Attachment 3).

Table 6. Field Parameters Test Methods

Parameter	Method	Sensitivity Limit	Units
DO (data sonde optical)	ASTM D888-09(C)	0.01	mg/L
DO (membrane probe)	SM4500-OG[5]	0.03	mg/L
DO % saturation (data sonde optical)	ASTM D888-09(C)	0.01	%
Turbidity (data sonde)	SM 2130B Mod	0.02	NTU
Turbidity (Hach turbidimeter)	EPA 180.1[5]	0.01	NTU
Specific conductance (data sonde)	SM 2510B	1.0	µmho/cm
Temperature (data sonde)	SM 2550B(2)	0.1	°C
Temperature (field meter)	SM 2550B(2)[5]	0.1	°C
pH (data sonde)	EPA 150.2	0.01	SU
pH (field meter)	SM 4500-HB[5]	0.01	SU

[5] Method used for Field Calibration Verification

B.4. Quality Control and Custody Requirements

Quality assurance protocols will follow part B.5. of the Surface Water QAPP (IDEM 2023a, pp 92-94) and part B.5. of the Biological and Habitat QAPP (IDEM 2020a, p 27).

1. Field Instrument Testing and Calibrations
   Calibrate the data sonde prior to each week's sampling (IDEM 2020c). Record, maintain, store, and archive calibration results and drift values in logbooks located 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 users' manuals (YSI 2017, 2018). Field check the unit for accuracy once during the week by comparison with a YSI EcoSense DO200A DO Probe, and/or the YSI ProSolo Probe (IDEM 2020b, p 24), Hach™ turbidity, and an Oaktown Series 5 pH meter. Record weekly calibration verification results on the field calibrations portion of the IDEM OWQ Stream Sampling Field Data Sheets (Attachment 3) and enter into the AIMS II database. At field sites where the DO concentration is 4.0 mg/L or less, use the YSI EcoSense DO meter.

2. Field Measurement Data
   Collect in-situ water chemistry field data in the field using calibrated or standardized equipment and record on the IDEM OWQ Stream Sampling Field Data Sheet (Attachment 3). The same staff member will collect and record the data. Perform calculations either in the field or later at the office. Include analytical results, which have limited QC checks, in this category. Detection limits and ranges have been set for each analysis (Table 6). Quality control checks (such as duplicate measurements, measurements of a secondary standard, or measurements using a different test method or instrument) performed on field or laboratory data, are usable for estimating precision, accuracy, and completeness for the project, as described in the Surface Water QAPP (IDEM 2023a Section D. pp 102-110).

3. Bacteriological Measurement Data
   Analytical results, from an IDEM fixed or mobile *E. coli* laboratory, include QC check sample results from which precision, accuracy, and completeness can be determined for each batch of samples. Archive raw data by analytical batch for easy retrieval and review. Follow chain of custody procedures, including time of collection, time of setup, time of reading the results, and time and method of disposal (IDEM 2023c). The field staff member who collected the samples signs the chain of custody form upon delivery of samples to the laboratory. Thoroughly document any method deviations in the raw data. Test all QA/QC samples according to the following guidelines:

Field duplicate:	Collect at a frequency of one per batch or at least one for every 20 samples collected (≥ 5%).
Field blank:	Collect at a frequency of one per batch or at least one for every 20 samples collected (≥ 5%).
Laboratory blank:	Test at a frequency of one per day.

Positive control: Test each lot of media for performance using *E. coli* bacterial cultures.

Negative controls: Test each lot of media for performance using non-*E. coli* and noncoliform bacterial cultures.

4. Water Chemistry Measurement Data
The manufacturer will certify sample bottles and preservatives for purity. Do not use damaged sample bottles and preservatives, and do not use preservatives past their stated expiration date. Field blanks check the purity of sample bottles and preservatives. Sample collection containers for each parameter, preservative, and holding time (Table 4) will adhere to U.S. EPA requirements. Collect field duplicates and matrix spike/matrix spike duplicates at the rate of one per sample analysis set or one per every 20 samples, whichever is greater. Additionally, take field blank samples at a rate of one set per sample analysis set or one per every 20 samples, whichever is greater. A chain of custody (COC) form created by the AIMS II database IDEM OWQ COC (Attachment 6) and an IDEM Water Sample Analysis Request form (Attachment 7) accompany each sample set through the analytical process. The field staff member collecting the samples signs the COC form upon delivery of samples to the laboratory.

5. Fish Community Measurement Data
Perform fish community sampling revisits at a rate of 10 percent of the total fish community sites sampled, in this case, two in the watershed (IDEM 2020a). Perform revisit sampling with at least two weeks of recovery between the initial and revisit sampling events. Perform the fish community revisit sampling and habitat assessment with either a partial or complete change in field team members (IDEM 2020a). Use the resulting IBI and QHEI total score between the initial visit and the revisit to evaluate precision, as described in the QAPP for Biological Community and Habitat Measurements (IDEM 2020a). Use the IDEM OWQ COC form (Attachment 6) to track samples from the field to the laboratory. A field staff member from the crew signs the COC form after sampling is complete, and the samples and COC form are relinquished to a lab custodian to verify the sampling information is accurate. All raw data are: 1) checked for completeness; 2) utilized to calculate derived data (e.g., total weight of all specimens of a taxon), which is entered into the AIMS II database; and 3) checked again for data entry errors.

6. Macroinvertebrate Community Measurement Data
Collect duplicate macroinvertebrate field samples at a rate of 10 percent of the total macroinvertebrate community sites sampled, in this case, two in the watershed. Perform the macroinvertebrate community duplicate sample and corresponding habitat assessment by the same team member who performed the original sample, immediately after the initial sample collection. The 50-meter section of stream and riffle area utilized for the duplicate sample are different from those used for the original sample but have features as similar to habitat types and availability as possible. This will result in a precision evaluation based on a 10% duplicate of samples collected, as

described in the QAPP for Biological Community and Habitat Measurements (IDEM 2020a).

Use the IDEM OWQ COC form (Attachment 6) to track samples from the field to the laboratory. A field staff member from the crew completes the OWQ COC form after sampling is complete. After completion of weekly field sampling activities, the laboratory custodian uses the OWQ COC form to check in samples prior to long-term storage. The IDEM Probabilistic Monitoring Section laboratory supervisor maintains laboratory identifications and QA/QC of taxonomic work.

C. ASSESSMENT AND OVERSIGHT

C.1. Field and Laboratory Performance and System Audits

Conduct performance and system audits to ensure good quality data. The field and laboratory performance checks include precision measurements by relative percent difference of field and laboratory duplicate (IDEM 2023a, pp 37, 105-106); accuracy measurements by percent of recovery of matrix spike and matrix spike duplicate samples analyzed in the laboratory (IDEM 2023a, pp 47-48, 105); and completeness measurements by the percent of planned samples versus the actual number collected, analyzed, reported, and usable for the project (IDEM 2023a, p 37).

Biological and habitat measurements, field performance measurements include:

- Completeness (IDEM 2020a, pp 10-11, 14)
- Examination of fish IBI score differences and the relative percent difference (RPD) for number of fish species at the revisit sites (IDEM 2020a, pp 9-10)
- RPD for number of taxa for macroinvertebrate duplicate samples (IDEM 2020a, p 13)
- RPD between the two total QHEI scores (IDEM 2020a, p 18)

Lab performance measurements include:

- Percent taxonomic difference (PTD) for fish (IDEM 2020a, p 12)
- PTD for macroinvertebrates (IDEM 2020a, pp 15-16)
- Percent difference in enumeration (PDE) and percent sorting efficiency (PSE) for macroinvertebrates (IDEM 2020a, pp 14-16)

Regionally recognized non-IDEM freshwater fish taxonomists may verify fish taxonomic identifications made by IDEM staff in the laboratory. Send ten percent of macroinvertebrate samples, the initial samples taken at sites where duplicate samples were collected, to Rhithron Associates, Inc. (Missoula, MT) for verification by an outside taxonomist (IDEM 2020a). For macroinvertebrate verifications by an external lab, the lab’s taxonomists must maintain Society for Freshwater Science taxonomic certifications. Genus level taxonomic certifications are required for (1) Eastern General Arthropods; (2) Eastern Ephemeroptera, Plecoptera, and Trichoptera; (3) Chironomidae; and (4) Oligochaeta.

Require contract laboratories to have NELAC audits at the beginning of a laboratory contract and at least once a year during the contract. In addition, IDEM QA staff annually review performance studies conducted by the contract laboratories. The audit includes any or all the operational quality control elements of the laboratory's quality assurance system. All applicable elements of this QAPP and the laboratory contract requirements are addressed including, but not limited to, sampling handling, sample analysis, record keeping, preventative maintenance, proficiency testing, personnel requirements, training, and workload. (IDEM 2023a, p 99).

IDEM WAPB staff conduct field audits every other year to ensure sampling activities adhere to approved SOPs. WAPB staff will systematically conduct audits to include all WAPB personnel engaging in field sampling activities. Staff trained in the associated sampling SOPs and in the processes related to conducting an audit evaluate WAPB field staff involved with sample collection and preparation. Staff will produce an evaluation report documenting each audit for review by those field staff audited as well as WAPB management. Communicate corrective actions to field staff who implement the corrective actions as a result of the audit process (IDEM 2023a, pp 99-100; IDEM 2020a, p 31).

The QA officer submits quality assurance reports upon completion of a dataset's data validation to the program manager or WAPB branch chief. The QA manager, relevant section chief, project manager, any technical staff working on corrective actions, and quality assurance staff receive copies of the progress reports when new developments arise. The section chief, project officer, or QA officer is responsible for working with relevant staff members to develop corrective actions and notifying the QA manager of corrective action progress. Depending on the associated corrective actions, either the section chief or the QA officer approves the final corrective action (IDEM 2023a, p 101).

C.2. Data Quality Assessment Levels

The samples and various types of data collected by this program are intended to meet the quality assurance criteria and rated DQA Level 3, as described in the Surface Water QAPP (IDEM 2023a, p 108) and the Biological and Habitat QAPP (IDEM 2020a, pp 34–35).

D. DATA VALIDATION AND USABILITY

Quality assurance reports to management, and data validation and usability are also important components of Indiana's Surface Water QAPP which ensures good quality data for this project. The QA officer submits quality assurance reports upon completion of a dataset's data validation to the program manager or WAPB branch chief. This is done to ensure investigation and correction of problems arising during the sampling and analysis phases of the project (IDEM 2023a, p 102). As described in Section D of the Surface Water QAPP (IDEM 2023a), data are reduced (converted from raw analytical data into final results in proper reporting units); validated (qualified based on the performance of field and laboratory QC measures incorporated into the sampling and analysis procedures); and reported (described so as to completely document the calibration, analysis, QC measures, and calculations). These steps allow users to assess the data ensuring the project DQOs are met.

D.1. Quality Assurance, Data Qualifiers, and Flags

Use various data qualifiers and flags for quality assurance and validation of the data found in the Surface Water QAPP (IDEM 2023a pp 108-109) and the Biological and Habitat QAPP (IDEM 2020a pp 33-34).

D.2. Data Usability

Qualify the environmental data's collection and usability per each lab or field result obtained and classify into one or more of the four categories: Acceptable Data, Enforcement Capable Results, Estimated Data, and Rejected Data as described in the Biological and Habitat QAPP (IDEM 2020a pp 35-36).

D.3. Information, Data, and Reports

Record data collected in 2023-2024 in the AIMS II database and present in two compilation summaries. The first summary is a general compilation of the watershed field and water chemistry data prepared for use in the 2024 Indiana Integrated Report. The second summary is in database report format containing biological results and habitat evaluations, produced for inclusion in the Integrated Report as well as individual site folders. Maintain all site folders at the WAPB facility. All data and reports are available to public and private entities, which may find the data useful for municipal, industrial, agricultural, and recreational decision-making processes (TMDL, NPDES permit modeling, watershed restoration projects, water quality criteria refinement, etc.). Upload the work plan into the virtual file cabinet. Store all field sheets in the AIMS II database. Upload chemistry, fish community and macroinvertebrate results to U.S. EPA's Water Quality Portal via the Water Quality Exchange (formerly STORET), which allows the data to be shared with U.S. EPA and others. The Water Quality Exchange is a framework which allows states, tribes, and other data partners to submit and share water quality monitoring data via the web to the Water Quality Portal.

D.4. Laboratory and Estimated Cost

Laboratory analysis and data reporting for this project complies with the Surface Water QAPP (IDEM 2023a); Request for Proposals 22-68153 (IDEM 2021a); the IDEM QMP (IDEM 2018b); and Pace-Indy contract PO # 20003041-4 Pace Analytical Services in Indianapolis, Indiana will perform analytical tests on general chemistry and nutrient parameters outlined in Table 5 with a total estimated cost of $46,000. IDEXX Laboratories, Inc., Westbrook, Maine supplies the bacteriological sampling supplies, with a total estimated cost of $1,400. IDEM staff will test and analyze bacteriological samples. IDEM staff will collect and analyze all fish and macroinvertebrate samples. Rhithron Associates, Inc. in Missoula, Montana (IDEM 2020a) will verify ten percent of macroinvertebrate samples with a total estimated cost of $460. The anticipated total budget for laboratory costs for the project is $47,860.

D.5. Reference Manuals and Personnel Safety

Table 7. Personnel Safety and Reference Manuals

Role	Required Training or Experience	Training References	Training Notes
All staff participating in field activities	- Basic first aid and cardio-pulmonary resuscitation (CPR)	- A minimum of 4 hours of in-service training provided by WAPB (IDEM 2010)	- WAPB staff meeting Health and Safety Training requirements will accompany staff lacking 4 hours of in-service training or appropriate certification in the field at all times.
	- Personal Protective Equipment (PPE) Policy	- IDEM 2008	
	- Personal Flotation Devices	- February 29, 2000, WAPB internal memorandum regarding use of approved Personal Flotation Devices	- When working on boundary waters as defined by Indiana Code (IC) 14-8-2-27 or between sunset and sunrise 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.

REFERENCES

*Document may be inspected at the Watershed Assessment and Planning Branch office, located at 2525 North Shadeland Avenue Suite 100, Indianapolis, Indiana.

[327 IAC 2] IAC (Indiana Administrative Code), Title 327 Water Pollution Control Division, Article 2. Water Quality Standards. Last updated on October 11, 2023.

(Clesceri et al. 2012) Clesceri, L.S., Greenburg, A.E., Eaton, A.D., 2017. SM-Standards Methods for the Examination of Water and Wastewater 23rd Edition. American Public Health Association.

(IDEM 2008) IDEM Personal Protective Equipment Policy, revised May 1, 2008. A-059-OEA-08-P-R0. IDEM, Office of External Affairs. Indianapolis, Indiana. *

(IDEM 2010) IDEM Health and Safety Training Policy, revised October 1, 2010. A-030-OEA-10-P-R2. IDEM, Office of External Affairs. Indianapolis, Indiana. *

(IDEM 2016) IDEM Injury and Illness Resulting from Occupational Exposure Policy, revised February 12, 2016. A-034-AW-16-P-R3. IDEM, Office of the Commissioner. Indianapolis, Indiana. *

(IDEM 2018) IDEM Agency Wide Quality Management Plan 2018. IDEM, Indiana Government Center North, 100 N. Senate Ave. Indianapolis, Indiana, 46204.

(IDEM 2019a) IDEM Hazard Communication (HazCom) Plan. IDEM, Office of Program Support. Indianapolis, Indiana. *

(IDEM 2019b) IDEM Health and Safety Manual. IDEM, Office of Program Support. Indianapolis, Indiana. *

(IDEM 2020a) Quality Assurance Program Plan (QAPP) for Biological Community and Habitat Measurements. B-003-OWQ-WAP-XXX-20-Q-R0. IDEM, OWQ, Watershed Assessment and Planning Branch. Indianapolis, Indiana.

(IDEM 2020b) Water Chemistry Field Sampling Procedures. B-015-OWQ-WAP-XXX-20-T-R0. IDEM, OWQ, Watershed Assessment and Planning Branch. Indianapolis, Indiana.

(IDEM 2020c) Calibration of YSI Multiparameter Data Sondes. B-014-OWQ-WAP-XXX-20-T-R0. IDEM, OWQ, Watershed Assessment and Planning Branch. Indianapolis, Indiana.

(IDEM 2021a) Request for Proposals 22-68153, Solicitation for Analyses. IDEM. Indiana Department of Administration. Indianapolis, Indiana. *

(IDEM 2021b) Office of Water Quality Watershed Assessment and Planning Branch Laboratory Safety Plan. IDEM, Office of Program Support, Indianapolis, Indiana. *

(IDEM 2022a) Indiana's 2022 Consolidated Assessment and Listing Methodology (CALM). IDEM, Office of Water Quality, Indianapolis, Indiana.

(IDEM 2022b) AIMS II Database User Guide. Watershed Assessment and Planning Branch. Office of Water Quality, Indiana Department of Environmental Management. Indianapolis, Indiana. *

(IDEM 2023a) WAPB Indiana Surface Water Programs Quality Assurance Program Plan (QAPP). (Rev. 5, Jul. 2023). B-001-OWQ-WAP-XX-23-Q-R5. IDEM, OWQ, Watershed Assessment and Planning Branch. Indianapolis, Indiana.

(IDEM 2023b) Global Navigation Satellite System (GNSS) R1 Unit User Instructions. B-055-OWQ-WAP-XXX-23-T-R0. IDEM, OWQ, Watershed Assessment and Planning Branch. Indianapolis, Indiana. *

(IDEM 2023c) *E. coli* Field Sampling and Analysis. B-013-OWQ-WAP-XXX-23-T-R1. IDEM, OWQ, Watershed Assessment and Planning Branch. Indianapolis, Indiana.

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ATTACHMENTS

Attachment 1: Modified Geometric Design Steps for Watershed Characterization Studies

Introduction

The Modified Geometric Site Selection process is employed within watersheds which correspond to the 12-14-digit HUC scale in order to fulfill multiple water quality management objectives, not just the conventional focus on status assessment. The design is employed at a spatial scale which is representative of the scale at which watershed management is generally being conducted.

Sites within the watershed are allocated based on a geometric progression of drainage areas starting with the area at the mouth of the main stem river or stream (pour point) and working "upwards" through the various tributaries to the primary headwaters. This approach allocates sampling sites in a semirandom fashion and according to the stratification of available stream and river sizes based on drainage area. The Geometric Site Selection process is then modified by adding a targeted selection of additional sampling sites used to focus on localized management issues such as point source discharges, habitat modifications, and other potential impacts within a watershed. These sites are then "snapped to bridges" to facilitate safe and easy access to the stream. This design also fosters data analysis which takes into consideration overlying natural and human caused influences within the streams of a watershed. The design has been particularly useful for watersheds targeted for TMDL development because missing, incomplete, or outdated assessments can be addressed prior to TMDL development.

Selection Process

In ArcGIS, download from NHD Plus site (http://www.horizon-systems.com/nhdplus/HSC-wthMS.php) the following files for Region 5 (and then again for Region 7) and zip them into the appropriate file structure.

File Description	File Name (.zip***)	Format
Region 05, Version 01_01, Catchment Grid	NHDPlus05V01_01_Catgrid	ESRI Grid
Region 05, Version 01_01, Catchment Shapefile	NHDPlus05V01_01_Catshape	Shapefile
Region 05, Version 01_02, Catchment Flowline Attributes	NHDPlus05V01_02_Cat_Flowline_Attr	DBF
Region 05, Version 01_02, Elevation Unit a	NHDPlus05V01_02_Elev_Unit_a	ESRI Grid
Region 05, Version 01_02, Elevation Unit b	NHDPlus05V01_02_Elev_Unit_b	ESRI Grid
Region 05, Version 01_02, Elevation Unit c	NHDPlus05V01_02_Elev_Unit_c	ESRI Grid
Region 05, Version 01_01, Flow Accumulation and Flow Direction Unit a	NHDPlus05V01_01_FAC_FDR_Unit_a	ESRI Grid
Region 05, Version 01_01, Flow Accumulation and Flow Direction Unit b	NHDPlus05V01_01_FAC_FDR_Unit_b	ESRI Grid
Region 05, Version 01_01, Flow Accumulation and Flow Direction Unit c	NHDPlus05V01_01_FAC_FDR_Unit_c	ESRI Grid
Region 05, Version 01_02, National Hydrography Dataset	NHDPlus05V01_03_NHD	Shapefile and DBF
Region 05, Version 01_01, Stream Gage Events	NHDPlus05V01_01_StreamGageEvent	Shapefile
Region 05, Version 01_01, QAQC Sinks Spreadsheet	NHDPlus05V01_01_QAQC_Sinks	Excel Spreadsheet

Create a new point shapefile (or geodatabase feature class) named Geometric Design within ArcCatalog with the same projection as the unzipped layers above.

Within an ArcMap project, add the following:

- nhdflowline layer
- Geometric Design layer
- catchment shapefile
- the FlowlineAttributesFlow table

Add the following fields to the nhdflowline layer:

- LENGTHMi (type: double, precision: 9, scale 4)
- DrainMi (type: double, precision: 9, scale 4)
- MinElev (type: double, precision: 9, scale 4)
- MaxElev (type: double, precision: 9, scale 4)
- Gradient (type: double, precision: 9, scale 4)

Add the following field to the GeometricDesign layer (use the add field-batch tool):

- Geometric (type: double, precision: 5, scale 2)
- Lat (type: double, precision: 8, scale 5)
- Long (type: double, precision: 8, scale 5)
- COMID (type: long, precision: 9)

Join the nhdflowline layer with the FlowlineAttributesFlow table based on the COMID field.

Use the field calculator within the nhdflowline attribute table, with the appropriate metric to imperial conversion to populate the following fields:

- LENGTHMi (from LENGTHKM – kilometers to miles)
- DrainMia (from CumDrainage – square kilometers to square miles (sq mi))
- MinElev (from MinElevSmo – meters to feet)
- MaxElev (from MaxElevSmo – meters to feet)

- Gradient ((MaxElev-MinElev)/LENGTHMI).

Unjoin the FlowlineAttributesFlow table.

Label the “nhdflowline” layer based new “LengthMi” field – note: this field shows the cumulative drainage at the *end* of the line segment, which is rarely more than 2-3 miles in between nodes.

Calculate the geometric break points (i.e., for a 500 sq mi watershed: 500, 250, 125, 62.5, 31, 15, 7, 4, 2).

It is recommended to change the symbology (Symbology: Show Quantities: Classification (Manual)) of the actual flowline to reflect the drainage. This will help identify when and where sites need to be allocated.

Start a new editing session, with the GeometricDesign layer as your target layer.

Add a new point within this layer to the pour point for the watershed (500 sq mi in this case).

Travel upstream through the main stem and “find” the next place on the stream where the river drainage brackets 250 sq mi. Use the catchment shapefile layer to identify more precisely the drainage value, if needed.

Populate the “Geometric” field within the GeometricDesign layer accordingly to the identified drainage level, then change the symbology (Symbology: Categories: Unique Values: Geometric field) of this layer to reflect the drainage levels.

Proceed through the watershed (either around the outer portions or start with largest values and work in), adding points accordingly to each geometric level. Change the symbology to find areas or levels that were missed. Note – the drainage level must be exact. Use the catchment shapefile to subtract drainage areas from larger drainage areas until the exact drainage level is reached. It is ok to “skip” a geometric level if it is not exactly reached. Sometimes there are large tributaries whose contribution to the main stem skips a drainage level.

Populate the COMID (manually), and Lat/Long (right click on field and select calculate geometry – lat = x-coordinates and long = y-coordinates) accordingly for reference within the GeometricDesign Layer.

Once sites are selected in this fashion, they will need to be snapped to a bridge or access point.

Additional sites should be placed at pour points of subwatersheds (12-digit HUCs) to meet TMDL document requirements.

Once the initial sites are selected, the following features are taken into account to move or add sites:

- Permitted facilities
- Urban areas
- Historical sampling sites
- Assessment Unit IDs (AUID)
- External stakeholder information
- Resources - maximum of 35 sites per project

After refining site selections, there may be additional sites added to ensure spatial representation of the project area.

Sites may be removed or changed after site reconnaissance if there are problems accessing the site or if sites are dry.

Notes regarding the NHD dataset:

All units are initially set to metric and need to be converted to imperial.

Within the nhdflowline layer, the GNIS_Name/ID refers to the whole river name and ID, while the COMID is a unique identifier for the particular segment.

There is *not* a value GNIS_Name/ID for every river, especially where primary streams and ditches are concerned.

Segments within the nhdflowline layer are based on linear miles between "nodes," which are broken up (typically) by tributary. Typically, these lengths are less than 2-3 miles.

The cumulative drainage values in the NHD dataset have been compared against other and deemed "reasonable" (read – not statistically compared). Also note that the drainage is calculated through the model to be at the pour point of that segment.

The elevation values, however, are **not** reliable and require supervision. These values are calculated from the associated digital elevation model (DEM) and sometimes have null values for either the maximum or minimum elevation values. In addition, the length of the stream is not long enough (i.e., >1 mile) to calculate gradient. In either case, this associated value is helpful to identify contour changes against a USGS contour map. However, to note the calculated gradient from the NHD information has been observed to be within several tenths of mile compared to a manual calculation of gradient.

Important tables from NHD

- FlowlineAttributesFlow (found in: Region 05, Version 01_02, Catchment Flowline Attributes)
- Key fields: CumDrainag, Max ElevRaw, MinElevSmo,

Important Layers from NHD

- Region 05, Version 01_01, Catchment Shapefile
- Region 05, Version 01_02, National Hydrography Dataset

Attachment 2: IDEM OWQ Site Reconnaissance Form

Site Reconnaissance Form

EPA Site Identifier	Rank
Recon #: Trip #:	

Site Number: ______ Stream: ______ County: ______

Location Description: ______

Reconnaissance Data Collected

Recon Date	Crew Members	

Avg. Width (m)	Avg. Depth (m)	Max. Depth (m)	Nearest Town

Water Present? ☐ Site Wadeable? ☐ Riffle/Run Present? ☐ Road/Public Access Possible? ☐

Site Impacted by Livestock? ☐ Collect Sediment? ☐ Gauge Present? ☐

Landowner/Contact Information

First Name	Last Name

Street Address: ______

City	State	Zip

Telephone	E-Mail Address

Pamphlet Distributed? ☐ Please Call In Advance? ☐ Results Requested? ☐

Rating, Results, Comments, and Planning

Site Rating By Category (1=easy, 10=difficult)
Access Route
Safety Factor
Sampling Effort

Reconnaissance Decision

- Pre-Recon
- Recon in process
- Approved Site
- No, Landowner denied access
- No, Dry
- No, Stream channel missing
- No, Physical barriers
- No, Impounded stream
- No, Marsh/Wetland
- No, Bridge gone or not accessible
- No, Unsafe due to traffic or location
- No, Site impacted by backwater
- No, Other

Equipment Selected

Circle Equipment Needed

- Backpack
- Boat
- Totebarge
- Longline
- Scanoe
- Seine
- Weighted Handline
- Waders
- Gill Net

Comments

______

Sketch of Stream & Access Route – Indicate Flow, Direction, Obstacles, & Land Use (Use Back of Page, if Necessary)

______

Attachment 3: IDEM OWQ Stream Sampling Field Data Sheet

IDEM Stream Sampling Field Data Sheet

Analysis Set #	EPA Site ID	Rank

Sample #	Site #	Sample Medium	Sample Type	Duplicate Sample #

Stream Name:		River Mile:		County:	
Site Description:					

Survey Crew Chief	Sample Collectors 1	2	3	4	Sample Collected Date	Time	Hydrolab #	Water Depth/Gage Ht (ft)	Water Flow (cf/sec)	Flow Estimated?	Algae?	Aquatic Life?
										☐	☐	☐

Sample Taken?	Aliquots	Water Flow Type	Water Appearance	Canopy Closed %
☐ Yes ☐ No; Frozen ☐ No; Stream Dry ☐ No; Other ☐ No; Owner refused Access	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 6 ☐ 8 ☐ 12 ☐ 24 ☐ 48 ☐ 72 ☐ AS-Flow	☐ Riffle ☐ Dry ☐ Stagnant ☐ Pool ☐ Run ☐ Flood ☐ Glide ☐ Eddy ☐ Other	☐ Clear ☐ Green ☐ Sheen ☐ Murky ☐ Black ☐ Other ☐ Brown ☐ Gray (Septic/Sewage)	☐ 0-20% ☐ 60-80% ☐ 20-40% ☐ 80-100% ☐ 40-60%

Special Notes:	

Field Data:

Date (m/d/yy)	24-hr Time (hh:mm)	D.O. (mg/l)	pH	Water Temp (°C)	Spec Cond (µohms/cm)	Turbidity (NTU)	% Sat.	Chlorine (mg/l)	Chloride (mg/l)	Chlorophyll (mg/l)	Weather Codes SC	WD	WS	AT
Comments														
Comments														
Comments														
Comments														
Comments														
Comments														

Measurement Flags		
	<	< Min. Meter Measurement
	>	> Max. Meter Measurement
	E	Estimated (See Comments)
	R	Rejected (See Comments)

Weather Code Definitions

SC Sky Conditions	WD Wind Direction	WS Wind Strength	AT Air Temp
1 Clear 2 Scattered 3 Partly 4 Cloudy 5 Mist 6 Fog 7 Shower 8 Rain 9 Snow 10 Sleet	00 North (0 degrees) 09 East (90 degrees) 18 South (180 degrees) 27 West (270 degrees)	0 Calm 1 Light 2 Mod./Light 3 Moderate 4 Mod./Strong 5 Strong 6 Gale	1 < 32 2 33-45 3 46-60 4 61-75 5 76-85 6 > 86

Field Calibrations:

Date (m/d/yy)	Time (hh:mm)	Calibrator Initials	Calibrations Type	Meter #	Value	Units

Calibration Type	
	pH DO Turbidity

Preservatives/Bottle Lots:

Group: Preservative	Preservative Lot #	Bottle Type	Bottle Lot #

Groups: Preservatives

GC	General Chemistry: Ice
Nx	Nutrients: H2SO4
Metals	Metals: HNO3
CN	Cyanide: NaOH
O&G	Oil & Grease: H2SO4
Toxics	Toxics: Ice
Ecoli	Bacteriology: Ice
VOA	Volatile Organics: HCl & Thiosulfate
Pest	Pesticides: Ice
Phen	Phenols: H2SO4
Sed	Sediment: Ice
Gly	Glyphosate: Thiosulfate
Hg	Mercury(1631): HCl
Cr6	ChromiumVI(1636): NaOH
MeHg	Methyl Mercury(1630): HCl

Bottle Types

2000P	2000mL Plastic, Narrow Mouth
1000P	1000mL Plastic, Narrow Mouth
500P	500mL Plastic, Narrow Mouth
250P	250mL Plastic, Narrow Mouth
1000G	1000mL Glass, Narrow Mouth
500G	500mL Glass, Wide Mouth
250G	250mL Glass, Wide Mouth
125G	125mL Glass, Wide Mouth
40GV	40mL Glass Vial
120PB	120ml Plastic (Bacteria Only)
1000PF	1000mL Plastic, Corning Filter
500PF	500mL Plastic, Corning Filter
60P	60mL Plastic
250T	250mL Teflon
500T	500mL Teflon
125T	125mL Teflon

Data Entered By: ________________ QC1: ________________
QC2: ________________

Stream Sampling Field Data Sheet

Attachment 4: IDEM OWQ Fish Collection Data Sheet

IDEM
OWQ-WATERSHED ASSESSMENT AND PLANNING BRANCH

Event ID______________ Voucher jars_______ Unknown jars________ Equipment________________ Page _____ of ______
Voltage_______ Time fished (sec)________ Distance fished (m)_________ Max. depth (m)_________ Avg. depth (m)________
Avg. width (m)______ Bridge in reach_____ Is reach representative_____ If no, why_____________________________________
Elapsed time at site (hh:mm)____:____ Comments____
____
____

Museum data: Initials__________ ID date__________ Jar count__________ Fish Total__________

Coding for Anomalies: D – deformities E – eroded fins L – lesions T – tumor M – multiple DELT anomalies O – other (A – anchor worm C – leeches W – swirled scales Y – popeye S – emaciated F – fungus P – parasites) H – heavy L – light (these codes may be combined with above codes)

TOTAL # OF FISH				WEIGHT (s) (mass g)				(length mm)	ANOMALIES					
								Min length	D	E	L	T	M	O
								Max length						
V		P												
								Min length	D	E	L	T	M	O
								Max length						
V		P												
								Min length	D	E	L	T	M	O
								Max length						
V		P												
								Min length	D	E	L	T	M	O
								Max length						
V		P												
								Min length	D	E	L	T	M	O
								Max length						
V		P												
								Min length	D	E	L	T	M	O
								Max length						
V		P												

KRW: Rev/09.26.18 Calculation:_______ QC1 + Entry_______ QC 1 _______ QC 2_______

Attachment 5: IDEM OWQ Biological Qualitative Habitat Evaluation Index (front)

OWQ Biological QHEI (Qualitative Habitat Evaluation Index)

IDEM

Sample #	bioSample #	Stream Name	Location

Surveyor	Sample Date	County	Macro Sample Type	☐ Habitat Complete	QHEI Score:

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES and check every type present

Check ONE (Or 2 & average)

BEST TYPES (PREDOMINANT / PRESENT P/G R/R)
☐☐ BLDR/SLABS [10] ☐☐
☐☐ BOULDER [9] ☐☐
☐☐ COBBLE [8] ☐☐
☐☐ GRAVEL [7] ☐☐
☐☐ SAND [6] ☐☐
☐☐ BEDROCK [5] ☐☐

OTHER TYPES (PREDOMINANT / PRESENT P/G R/R)
☐☐ HARDPAN [4] ☐☐
☐☐ DETRITUS [3] ☐☐
☐☐ MUCK [2] ☐☐
☐☐ SILT [2] ☐☐
☐☐ ARTIFICIAL [0] ☐☐
(Score natural substrates; ignore sludge from point-sources)

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☐ 3 or less [0]

ORIGIN
☐ LIMESTONE [1]
☐ TILLS [1]
☐ WETLANDS [0]
☐ HARDPAN [0]
☐ SANDSTONE [0]
☐ RIP/RAP [0]
☐ LACUSTRINE [0]
☐ SHALE [-1]
☐ COAL FINES [-2]

QUALITY
SILT: ☐ HEAVY [-2] ☐ MODERATE [-1] ☐ NORMAL [0] ☐ FREE [1]
EMBEDDEDNESS: ☐ EXTENSIVE [-2] ☐ MODERATE [-1] ☐ NORMAL [0] ☐ NONE [1]

Substrate Maximum 20

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3: 0–Absent; 1–Very small amounts or if more common of marginal quality; 2–Moderate amounts, but not of highest quality or in small amounts of highest quality; 3–Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed root wad in deep/fast water, or deep, well-defined, functional pools.)

___ UNDERCUT BANKS [1]
___ OVERHANGING VEGETATION [1]
___ SHALLOWS (IN SLOW WATER) [1]
___ ROOTMATS [1]
___ POOLS > 70cm [2]
___ ROOTWADS [1]
___ BOULDERS [1]
___ OXBOWS, BACKWATERS [1]
___ AQUATIC MACROPHYTES [1]
___ LOGS OR WOODY DEBRIS [1]

AMOUNT
Check ONE (Or 2 & average)
☐ EXTENSIVE > 75% [11]
☐ MODERATE 25 - 75% [7]
☐ SPARSE 5 - < 25% [3]
☐ NEARLY ABSENT < 5% [1]

Cover Maximum 20

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 & average)

SINUOSITY
☐ HIGH [4]
☐ MODERATE [3]
☐ LOW [2]
☐ NONE [1]

DEVELOPMENT
☐ EXCELLENT [7]
☐ GOOD [5]
☐ FAIR [3]
☐ POOR [1]

CHANNELIZATION
☐ NONE [6]
☐ RECOVERED [4]
☐ RECOVERING [3]
☐ RECENT OR NO RECOVERY [1]

STABILITY
☐ HIGH [3]
☐ MODERATE [2]
☐ LOW [1]

Channel Maximum 20

Comments

4] *BANK EROSION AND RIPARIAN ZONE* Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream

EROSION (L R)
☐☐ NONE/LITTLE [3]
☐☐ MODERATE [2]
☐☐ HEAVY/SEVERE [1]

RIPARIAN WIDTH (L R)
☐☐ WIDE > 50m [4]
☐☐ MODERATE 10-50m [3]
☐☐ NARROW 5-10m [2]
☐☐ VERY NARROW [1]
☐☐ NONE [0]

FLOOD PLAIN QUALITY (L R)
☐☐ FOREST, SWAMP [3]
☐☐ SHRUB OR OLD FIELD [2]
☐☐ RESIDENTIAL, PARK, NEW FIELD [1]
☐☐ FENCED PASTURE [1]
☐☐ OPEN PASTURE, ROWCROP [0]
☐☐ CONSERVATION TILLAGE [1]
☐☐ URBAN OR INDUSTRIAL [0]
☐☐ MINING /CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian.

Riparian Maximum 10

Comments

5] *POOL/GLIDE AND RIFFLE/RUN QUALITY*

MAXIMUM DEPTH
Check ONE (ONLY!)
☐ > 1m [6]
☐ 0.7 - < 1m [4]
☐ 0.4 - < 0.7m [2]
☐ 0.2 - < 0.4m [1]
☐ < 0.2m [0] [metric = 0]

CHANNEL WIDTH
Check ONE (Or 2 & average)
☐ POOL WIDTH > RIFFLE WIDTH [2]
☐ POOL WIDTH = RIFFLE WIDTH [1]
☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY
Check ALL that apply
☐ TORRENTIAL [-1] ☐ SLOW [1]
☐ VERY FAST [1] ☐ INTERSTITIAL [-1]
☐ FAST [1] ☐ INTERMITTENT [-2]
☐ MODERATE [1] ☐ EDDIES [1]
Indicate for reach – pools and riffles.

Recreation Potential
(Check one and comment on back)
☐ Primary Contact
☐ Secondary Contact

Pool/Current Maximum 12

Comments

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average) ☐ NO RIFFLE [metric = 0]

RIFFLE DEPTH
☐ BEST AREAS > 10cm [2]
☐ BEST AREAS 5 - 10cm [1]
☐ BEST AREAS < 5cm [metric = 0]

RUN DEPTH
☐ MAXIMUM > 50cm [2]
☐ MAXIMUM < 50cm [1]

RIFFLE/RUN SUBSTRATE
☐ STABLE (e.g., Cobble, Boulder) [2]
☐ MOD. STABLE (e.g., Large Gravel) [1]
☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
☐ NONE [2]
☐ LOW [1]
☐ MODERATE [0]
☐ EXTENSIVE [-1]

Riffle/Run Maximum 8

Comments

6] *GRADIENT* (ft/mi)
DRAINAGE AREA (mi²)

☐ VERY LOW - LOW [2–4]
☐ MODERATE [6 - 10]
☐ HIGH - VERY HIGH [10 - 6]

%POOL: %GLIDE:
%RUN: %RIFFLE:

Gradient Maximum 10

Entered ____________ QC1 ____________ QC2 ____________ IDEM 02/01/2023

Attachment 5 (continued): IDEM OWQ Biological Qualitative Habitat Evaluation Index (back)

IDEM

OWQ Biological QHEI (Qualitative Habitat Evaluation Index)

COMMENT ____________________

A-CANOPY
- ☐ >85% - Open
- ☐ 55% - <85%
- ☐ 30% - <55%
- ☐ 10% - <30%
- ☐ <10% - Closed

B-AESTHETICS
- ☐ Nuisance algae
- ☐ Invasive macrophytes
- ☐ Excess turbidity
- ☐ Discoloration
- ☐ Foam/Scum
- ☐ Oil sheen
- ☐ Trash/Litter
- ☐ Nuisance odor
- ☐ Sludge deposits
- ☐ CSOs/SSOs/Outfalls

C-RECREATION

Area / Depth

Pool: ☐ > 100 ft² ☐ > 3 ft

D-MAINTENANCE

☐ Public ☐ Private
☐ Active ☐ Historic
Succession: ☐ Young ☐ Old
☐ Spray ☐ Islands ☐ Scoured
Snag: ☐ Removed ☐ Modified
Leveed: ☐ One sided ☐ Both banks
☐ Relocated ☐ Cutoffs
Bedload: ☐ Moving ☐ Stable
☐ Armoured ☐ Slumps
☐ Impounded ☐ Desiccated
☐ Flood control ☐ Drainage

E-ISSUES

☐ WWTP ☐ CSO ☐ NPDES
☐ Industry ☐ Urban
☐ Hardened ☐ Dirt & Grime
☐ Contaminated ☐ Landfill
BMPs: ☐ Construction ☐ Sediment
☐ Logging ☐ Irrigation ☐ Cooling
Erosion: ☐ Bank ☐ Surface
☐ False bank ☐ Manure ☐ Lagoon
☐ Wash H_2O ☐ Tile ☐ H_2O Table
Mine: ☐ Acid ☐ Quarry
Flow: ☐ Natural ☐ Stagnant
☐ Wetland ☐ Park ☐ Golf
☐ Lawn ☐ Home
☐ Atmospheric deposition
☐ Agriculture ☐ Livestock

Looking upstream (> 10m, 3 readings; ≤ 10m, 1 reading in middle); Round to the nearest whole percent

	Right	Middle	Left	Total Average
% open	___ %	___ %	___ %	___ %

Stream Width (m):

Stream Drawing:

IDEM 02/01/2023

Attachment 6: IDEM OWQ Chain of Custody Form

IDEM

Indiana Department of Environmental Management

OWQ Chain of Custody Form

Project:
OWQ Sample Set or Trip #:

I Certify that the sample(s) listed below was/were collected by me, or in my presence. Date:____________________

Signature:____ Section:____________________

Sample Media (☐ Water, ☐ Algae,☐ Fish, ☐ Macro, ☐ Cyanobacteria/Microcystin, ☐ Sediment)

Lab Assigned Number / Event ID	IDEM Control Number	Sample Type	ID	1000 ml P.N.M.	1000 ml G.N.M.	40 ml Vial	120 ml P (Bact)	2000 ml Nalgene	250 ml Nalgene	125 ml Glass	Date and Time Collected		One check per bottle present
											Date	Time	

P = Plastic | G = Glass | N.M. = Narrow Mouth | Bact = Bacteriological Only | Should samples be iced? Y N

M = MS/MSD | B = Blank | D = Duplicate | R = Revisit

Carriers

I certify that I have received the above sample(s).

Signature	Date	Time	Seals Intact		Comments
Relinquished By:			Y	N	
Received By:					
Relinquished By:			Y	N	
Received By:					
Relinquished By:			Y	N	
Received By:					
IDEM Storage Room #					

Lab Custodian

I certify that I have received the above sample(s), which has/have been recorded in the official record book. The same sample(s) will be in the custody of competent laboratory personnel at all times, or locked in a secured area.

Signature:______________________________ Date:______________ Time:______________

Lab:______________________________ Address:______________________________

Revision Date: 4/27/2016

Attachment 7: IDEM OWQ Water Sample Analysis Request Form

Indiana Department of Environmental Management
Office of Water Quality
Watershed Planning and Assessment Branch
www.idem.IN.gov

Water Sample Analysis Request **PROFILE #284**

Project Name: 2024 Indian Creek White River Composite ☐ Grab ☒

OWQ Sample Set		IDEM Sample Nos.	
Crew Chief		Lab Sample Nos.	
Collection Date		Lab Delivery Date	

Anions and Physical Parameters			
Parameter	Test Method	Total	Dissolved
Alkalinity (as $CaCO_3$)	SM2320B	☒ **	☐
Total Solids	SM2540B	☒ **	
Suspended Solids	SM2540D	☒ **	
Dissolved Solids	SM2540C		☒ **
Sulfate (as SO_4)	300.0	☒ **	☐ **
Chloride (as Cl)	300.0	☒ **	☐**
Hardness (Calculated)	SM-2340B	☒ **	☐**
Fluoride (as F)	SM4500-F-C	☐ **	☐**

Priority Pollutant Metals Water Parameters			
Parameter	Test Method	Total	Dissolved
Antimony (as Sb)	200.8	☐	☐
Arsenic (as As)	200.8	☐	☐
Beryllium (as Be)	200.8	☐	☐
Cadmium (as Cd)	200.8	☐	☐
Chromium (as Cr)	200.8	☐	☐
Copper (as Cu)	200.8	☐	☐
Lead (as Pb)	200.8	☐	☐
Mercury, Low Level	1631, Rev E.	☐	☐
Nickel (as Ni)	200.8	☐	☐
Selenium (as Se)	200.8	☐	☐
Silver (as Ag)	200.8	☐	☐
Thallium (as Tl)	200.8	☐	☐
Zinc (as Zn)	200.8	☐	☐

Cations and Secondary Metals Parameters

Parameter	Test Method	Total	Dissolved
Aluminum (as Al)	**200.8**	☐	☐
Barium (as Ba)	200.8	☐	☐
Boron (as B)	200.8	☐	☐
Calcium (as Ca)	**200.7**	☒ ***	☐
Cobalt (as Co)	200.8	☐	☐
Iron (as Fe)	200.7	☐	☐
Magnesium (as Mg)	**200.7**	☒ ***	☐
Manganese (as Mn)	200.8	☐	☐
Sodium (as Na)	200.7	☐	☐
Silica, Total Reactive (as SiO_2)	200.7	☐	☐
Strontium (as Sr)	200.8	☐	☐

Send reports (Fed. Ex. or UPS) to:
Tim Bowren - IDEM
Bldg. 20, STE 100
2525 North Shadeland Ave.
Indianapolis, IN 46219

Deliver reports to:
Tim Bowren - IDEM
Bldg. 20, STE 100
2525 North Shadeland Ave.
Indianapolis, IN 46219

Organic Water Parameters		
Parameter	Test Method	Total
Priority Pollutants: Oranochlorine Pesticides and PCBs	608	☐
Priority Pollutants: VOCs - Purgeable Organics	624	☐
Priority Pollutants: Base/Neutral Extractables	625	☐
Priority Pollutants: Acid Extractables	625	☐
Phenolics, 4AAP	420.4	☐
Oil and Grease, Total	1664A	☐

Nutrient & Organic Water Chemistry Parameters			
Parameter	Test Method	Total	Dissolved
Ammonia Nitrogen	350.1	☒	☐
$CBOD_5$	SM5210B	☐	
Total Kjeldahl Nitrogen (TKN)	351.2	☒	☐
Nitrogen, Nitrate + Nitrite as N	353.2	☒	☐
Total Phosphorus	365.1	☒	☐
TOC (Total Organic Carbon)	SM 5310C	☒	
DOC (Dissolved Organic Carbon)	SM 5310C		☐
COD	410.4	☒	☐
Cyanide (Total)	335.4	☐	☐
Cyanide (Free)	SM4500CN-I	☐ *	☐
Cyanide (Amenable)	SM4500CN-G	☐ *	☐
Sulfide, Total	376.2	☐	☐

RFP 22-68153 Contract Number:	

30 day reporting time required.

Notes:
** = **DO NOT RUN PARAMETER IF SAMPLE IDENTIFIED AS A BLANK ON THE CHAIN OF CUSTODY**
* = **RUN ONLY IF TOTAL CYANIDE IS DETECTED**
*** = *Report Calcium, Magnesium components of Total Hardness (Calculated)*

Testing Laboratory: Pace Analytical Services, Inc.
Attn: Olivia Deck
Phone: 317-228-3102 7726 Moller Road
Indianapolis, IN 46268

Attachment 8: Pace Analytical Services Indianapolis Laboratory Accreditation

State of Kansas

Department of Health and Environment

CERTIFICATE

This is to certify that Certification No.: E-10177

Pace Analytical Services, Inc - Indianapolis

7726 Moller Road
Indianapolis, IN 46268-4163

has been accredited in accordance with K.S.A. 65-1,109a under the standards adopted in K.A.R. 28-15-36 for performing environmental analyses for the parameters listed on the most current scope of accreditation. Continuous accreditation depends on successful, ongoing participation in the program. Clients are urged to verify with this agency the laboratory's certification status for particular methods and analytes.

Effective Date: 5/1/2023

Expiration Date: 4/30/2024

Leo Henning
Acting Director
Office of Laboratory Services

Carissa Robertson
Certification Section Chief
Office of Laboratory Services

Attachment 5: Pace Analytical Services Indianapolis Laboratory Accreditation (cont.)

Division of Environment
Kansas Health and Environmental Laboratories
Environmental Laboratory Improvement Program
6810 SE Dwight Street
Topeka, KS 66620

Kansas Department of Health and Environment

Phone: 785-296-3811
Fax: 785-559-5207
KDHE.ELIPO@KS.GOV
www.kdheks.gov/envlab

Janet Stanek, Secretary

Laura Kelly, Governor

The Kansas Department of Health and Environment encourages all clients and data users to verify the most current scope of accreditation for certification number E-10177

The analytes tested and the corresponding matrix and method which a laboratory is authorized to perform at any given time will be those indicated in the most recently issued scope of accreditation. The most recent scope of accreditation supersedes all previously issued scopes of accreditation. It is the certified laboratory's responsibility to review this document for any discrepancies. This scope of accreditation will be recalled in the event that your laboratory's certification is revoked.

Accreditation Start: 5/1/2023 Accreditation End: 4/30/2024

EPA Number: ***IN00043*** **Scope of Accreditation for Certification Number: E-10177**

Pace Analytical Services, Inc - Indianapolis

Program/Matrix: ***CWA (Non Potable Water)***

	Primary AB
Method ASTM D516-16	
Sulfate	KS
Method EPA 120.1	
Conductivity	KS
Method EPA 1631E	
Mercury	KS
Method EPA 1664A	
Oil & Grease	KS
Method EPA 1664A (SGT-HEM)	
n-Hexane Extractable Material - Silica Gel Treated (HEM-SGT)	KS
Method EPA 180.1 Rev. 2 - 1993	
Turbidity	KS
Method EPA 200.7 Rev 4.4	
Aluminum	KS
Antimony	KS
Arsenic	KS
Barium	KS
Beryllium	KS
Boron	KS
Cadmium	KS
Calcium	KS
Chromium	KS
Cobalt	KS
Copper	KS
Copper	KS
Iron	KS

Attachment 6: Pace Analytical Services Indianapolis Laboratory Accreditation (cont.)

Program/Matrix: ***CWA (Non Potable Water)***

	Primary AB
Lead	KS
Magnesium	KS
Manganese	KS
Molybdenum	KS
Nickel	KS
Potassium	KS
Selenium	KS
Silver	KS
Sodium	KS
Strontium	KS
Thallium	KS
Tin	KS
Titanium	KS
Vanadium	KS
Zinc	KS
Method EPA 200.8 Rev 5.4	
Aluminum	KS
Antimony	KS
Arsenic	KS
Barium	KS
Beryllium	KS
Boron	KS
Cadmium	KS
Chromium	KS
Cobalt	KS
Copper	KS
Lead	KS
Manganese	KS
Molybdenum	KS
Nickel	KS
Selenium	KS
Silver	KS
Thallium	KS
Tin	KS
Titanium	KS
Vanadium	KS
Zinc	KS
Method EPA 245.1	
Mercury	KS
Method EPA 300.0	
Bromide	KS
Chloride	KS
Fluoride	KS
Nitrate	KS
Nitrate plus Nitrite as N	KS
Nitrite	KS

Attachment 7: Pace Analytical Services Indianapolis Laboratory Accreditation (cont.)

EPA Number: ***IN00043*** **Scope of Accreditation for Certification Number: E-10177** Page 3 of 26

Pace Analytical Services, Inc - Indianapolis

	Primary AB
Program/Matrix: ***CWA (Non Potable Water)***	
Sulfate	KS
Method EPA 335.4	
Amenable cyanide	KS
Cyanide	KS
Method EPA 350.1	
Ammonia as N	KS
Method EPA 351.2	
Total Kjeldahl Nitrogen (TKN)	KS
Method EPA 351.2 minus EPA 350.1	
Organic nitrogen	KS
Method EPA 353.2	
Nitrate	KS
Nitrate plus Nitrite as N	KS
Nitrite	KS
Method EPA 365.1	
Phosphorus	KS
Method EPA 410.4	
Chemical oxygen demand	KS
Method EPA 420.4	
Total phenolics	KS
Method EPA 6010B	
Arsenic	KS
Cadmium	KS
Copper	KS
Lead	KS
Molybdenum	KS
Nickel	KS
Selenium	KS
Strontium	KS
Total chromium	KS
Zinc	KS
Method EPA 6020	
Arsenic	KS
Cadmium	KS
Copper	KS
Lead	KS
Nickel	KS
Selenium	KS
Total chromium	KS
Zinc	KS
Method EPA 608.3 GC-ECD	
4,4'-DDD	KS
4,4'-DDE	KS
4,4'-DDT	KS

Kansas Department of Health and Environment
Kansas Health Environmental Laboratories
6810 SE Dwight Street, Topeka, KS 66620

Attachment 8: Pace Analytical Services Indianapolis Laboratory Accreditation (cont.)

Program/Matrix: ***CWA (Non Potable Water)***

	Primary AB
Aldrin	KS
alpha-BHC (alpha-Hexachlorocyclohexane)	KS
Aroclor-1016 (PCB-1016)	KS
Aroclor-1221 (PCB-1221)	KS
Aroclor-1232 (PCB-1232)	KS
Aroclor-1242 (PCB-1242)	KS
Aroclor-1248 (PCB-1248)	KS
Aroclor-1254 (PCB-1254)	KS
Aroclor-1260 (PCB-1260)	KS
beta-BHC (beta-Hexachlorocyclohexane)	KS
Chlordane (tech.)(N.O.S.)	KS
delta-BHC	KS
Dieldrin	KS
Endosulfan I	KS
Endosulfan II	KS
Endosulfan sulfate	KS
Endrin	KS
Endrin aldehyde	KS
gamma-BHC (Lindane, gamma-HexachlorocyclohexanE)	KS
Heptachlor	KS
Heptachlor epoxide	KS
Methoxychlor	KS
Toxaphene (Chlorinated camphene)	KS
Method EPA 624.1	
1,1,1-Trichloroethane	KS
1,1,2,2-Tetrachloroethane	KS
1,1,2-Trichloroethane	KS
1,1-Dichloroethane	KS
1,1-Dichloroethylene	KS
1,2-Dichlorobenzene (o-Dichlorobenzene)	KS
1,2-Dichloroethane (Ethylene dichloride)	KS
1,2-Dichloropropane	KS
1,3-Dichlorobenzene	KS
1,4-Dichlorobenzene	KS
2-Chloroethyl vinyl ether	KS
Acrolein (Propenal)	KS
Acrylonitrile	KS
Benzene	KS
Bromodichloromethane	KS
Bromoform	KS
Carbon tetrachloride	KS
Chlorobenzene	KS
Chlorodibromomethane	KS
Chloroethane (Ethyl chloride)	KS
Chloroform	KS
cis-1,3-Dichloropropene	KS

Attachment 9: Pace Analytical Services Indianapolis Laboratory Accreditation (cont.)

EPA Number: ***IN00043*** **Scope of Accreditation for Certification Number: E-10177** Page 5 of 26

Pace Analytical Services, Inc - Indianapolis

Program/Matrix: ***CWA (Non Potable Water)***

	Primary AB
Ethylbenzene	KS
Methyl bromide (Bromomethane)	KS
Methyl chloride (Chloromethane)	KS
Methylene chloride (Dichloromethane)	KS
Naphthalene	KS
Tetrachloroethylene (Perchloroethylene)	KS
Toluene	KS
trans-1,2-Dichloroethylene	KS
trans-1,3-Dichloropropylene	KS
Trichloroethene (Trichloroethylene)	KS
Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	KS
Vinyl chloride	KS
Xylene (total)	KS
Method EPA 625.1	
1,2,4-Trichlorobenzene	KS
1,2-Dichlorobenzene (o-Dichlorobenzene)	KS
1,3-Dichlorobenzene	KS
1,4-Dichlorobenzene	KS
2,2'-Oxybis(1-chloropropane), bis(2-Chloro-1-methylethyl)ether	KS
2,4,6-Trichlorophenol	KS
2,4-Dichlorophenol	KS
2,4-Dimethylphenol	KS
2,4-Dinitrophenol	KS
2,4-Dinitrotoluene (2,4-DNT)	KS
2,6-Dinitrotoluene (2,6-DNT)	KS
2-Chloronaphthalene	KS
2-Chlorophenol	KS
2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	KS
2-Methylphenol (o-Cresol)	KS
2-Nitrophenol	KS
3,3'-Dichlorobenzidine	KS
4-Bromophenyl phenyl ether	KS
4-Chloro-3-methylphenol	KS
4-Chlorophenyl phenylether	KS
4-Methylphenol (p-Cresol)	KS
4-Nitrophenol	KS
Acenaphthene	KS
Acenaphthylene	KS
Anthracene	KS
Benzidine	KS
Benzo(a)anthracene	KS
Benzo(a)pyrene	KS
Benzo(b)fluoranthene	KS
Benzo(g,h,i)perylene	KS
Benzo(k)fluoranthene	KS
bis(2-Chloroethoxy)methane	KS

Attachment 10: Pace Analytical Services Indianapolis Laboratory Accreditation (cont.)

Program/Matrix: *CWA (Non Potable Water)*	Primary AB
bis(2-Chloroethyl) ether	KS
Butyl benzyl phthalate	KS
Carbazole	KS
Chrysene	KS
Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)	KS
Dibenz(a,h) anthracene	KS
Diethyl phthalate	KS
Dimethyl phthalate	KS
Di-n-butyl phthalate	KS
Di-n-octyl phthalate	KS
Fluoranthene	KS
Fluorene	KS
Hexachlorobenzene	KS
Hexachlorobutadiene	KS
Hexachlorocyclopentadiene	KS
Hexachloroethane	KS
Indeno(1,2,3-cd) pyrene	KS
Isophorone	KS
Naphthalene	KS
n-Decane	KS
Nitrobenzene	KS
n-Nitrosodimethylamine	KS
n-Nitrosodi-n-propylamine	KS
n-Nitrosodiphenylamine	KS
n-Octadecane	KS
Pentachlorophenol	KS
Phenanthrene	KS
Phenol	KS
Pyrene	KS
Method EPA 7470A	
Mercury	KS
Method EPA 7471A	
Mercury	KS
Method EPA 8015D	
Propylene glycol	KS
Method EPA 8260C	
1,3,5-Trichlorobenzene	KS
Method EPA 8270C	
1-Methylnaphthalene	KS
Carbazole	KS
Method SM 2310 B-2011	
Acidity, as CaCO3	KS
Method SM 2320 B-2011	
Alkalinity as CaCO3	KS
Method SM 2340 B-2011	

Attachment 11: Pace Analytical Services Indianapolis Laboratory Accreditation (cont.)

Program/Matrix: ***CWA (Non Potable Water)***

	Primary AB
Hardness	KS
Method SM 2510 B-2011	
Conductivity	KS
Method SM 2540 B-2015	
Residue-total	KS
Method SM 2540 C-2015	
Residue-filterable (TDS)	KS
Method SM 2540 D-2015	
Residue-nonfilterable (TSS)	KS
Method SM 2540 F-2015	
Residue-settleable	KS
Method SM 3500-Cr B-2011	
Chromium VI	KS
Method SM 4500-Cl G-2011	
Total residual chlorine	KS
Method SM 4500-Cl¯ E-2011	
Chloride	KS
Method SM 4500-CN¯ C-2016	
Cyanide	KS
Method SM 4500-CN¯ E-2016	
Cyanide	KS
Method SM 4500-CN¯ G-2016	
Amenable cyanide	KS
Method SM 4500-F¯ C-2011	
Fluoride	KS
Method SM 4500-H+ B-2011	
pH	KS
Method SM 4500-NH3 G-2011	
Ammonia as N	KS
Method SM 4500-P E-2011	
Orthophosphate as P	KS
Method SM 4500-S2¯ D-2011	
Sulfide	KS
Method SM 5210 B-2016	
Biochemical oxygen demand	KS
Carbonaceous BOD, CBOD	KS
Method SM 5310 C-2014	
Total organic carbon	KS
Method SM 5540 C-2011	
Surfactants - MBAS	KS
Method TKN-NH3-CAL	
Organic nitrogen	KS

Attachment 12: Pace Analytical Services Indianapolis Laboratory Accreditation (cont.)

EPA Number: ***IN00043*** **Scope of Accreditation for Certification Number: E-10177**

Pace Analytical Services, Inc - Indianapolis

Program/Matrix: ***RCRA (Non Potable Water)***

Method / Analyte	Primary AB
Method EPA 1010A	
Ignitability	KS
Method EPA 1311	
Toxicity Characteristic Leaching Procedure (TCLP)	KS
Method EPA 1312	
Synthetic Precipitation Leaching Procedure (SPLP)	KS
Method EPA 6010B	
Aluminum	KS
Antimony	KS
Arsenic	KS
Barium	KS
Beryllium	KS
Boron	KS
Cadmium	KS
Calcium	KS
Chromium	KS
Cobalt	KS
Copper	KS
Iron	KS
Lead	KS
Lithium	KS
Magnesium	KS
Manganese	KS
Molybdenum	KS
Nickel	KS
Potassium	KS
Selenium	KS
Silicon	KS
Silver	KS
Sodium	KS
Strontium	KS
Thallium	KS
Tin	KS
Titanium	KS
Vanadium	KS
Zinc	KS
Method EPA 6020	
Aluminum	KS
Antimony	KS
Arsenic	KS
Barium	KS
Beryllium	KS
Cadmium	KS
Chromium	KS
Cobalt	KS
Copper	KS

Attachment 13: Pace Analytical Services Indianapolis Laboratory Accreditation (cont.)

Pace Analytical Services, Inc - Indianapolis

	Primary AB
Program/Matrix: ***RCRA (Non Potable Water)***	
Lead	KS
Manganese	KS
Molybdenum	KS
Nickel	KS
Selenium	KS
Silver	KS
Thallium	KS
Thorium	KS
Uranium	KS
Vanadium	KS
Zinc	KS
Method EPA 7196A	
Chromium VI	KS
Method EPA 7470A	
Mercury	KS
Method EPA 7471A	
Mercury	KS
Method EPA 8011	
1,2-Dibromo-3-chloropropane (DBCP)	KS
1,2-Dibromoethane (EDB, Ethylene dibromide)	KS
Method EPA 8015D	
Diesel range organics (DRO)	KS
Ethanol	KS
Ethylene glycol	KS
Gasoline range organics (GRO)	KS
Isobutyl alcohol (2-Methyl-1-propanol)	KS
Isopropyl alcohol (2-Propanol, Isopropanol)	KS
Methanol	KS
n-Butyl alcohol (1-Butanol, n-Butanol)	KS
n-Propanol (1-Propanol)	KS
Propylene glycol	KS
Method EPA 8081B	
4,4'-DDD	KS
4,4'-DDE	KS
4,4'-DDT	KS
Aldrin	KS
alpha-BHC (alpha-Hexachlorocyclohexane)	KS
alpha-Chlordane, cis-Chlordane	KS
beta-BHC (beta-Hexachlorocyclohexane)	KS
Chlordane (tech.)(N.O.S.)	KS
delta-BHC	KS
Dieldrin	KS
Endosulfan I	KS
Endosulfan II	KS
Endosulfan sulfate	KS

Attachment 14: Pace Analytical Services Indianapolis Laboratory Accreditation (cont.)

Pace Analytical Services, Inc - Indianapolis

Program/Matrix: ***RCRA (Non Potable Water)***

	Primary AB
Endrin	KS
Endrin aldehyde	KS
Endrin ketone	KS
gamma-BHC (Lindane, gamma-HexachlorocyclohexanE)	KS
gamma-Chlordane	KS
Heptachlor	KS
Heptachlor epoxide	KS
Methoxychlor	KS
Toxaphene (Chlorinated camphene)	KS
Method EPA 8082A	
Aroclor-1016 (PCB-1016)	KS
Aroclor-1221 (PCB-1221)	KS
Aroclor-1232 (PCB-1232)	KS
Aroclor-1242 (PCB-1242)	KS
Aroclor-1248 (PCB-1248)	KS
Aroclor-1254 (PCB-1254)	KS
Aroclor-1260 (PCB-1260)	KS
Method EPA 8141B	
Atrazine	KS
Azinphos-methyl (Guthion)	KS
Chlorpyrifos	KS
Chlorpyrifos-methyl	KS
Demeton-o	KS
Demeton-s	KS
Diazinon	KS
Dichlorovos (DDVP, Dichlorvos)	KS
Dimethoate	KS
Disulfoton	KS
Famphur	KS
Malathion	KS
Merphos	KS
Methyl parathion (Parathion, methyl)	KS
Naled	KS
Parathion, ethyl	KS
Phorate	KS
Ronnel	KS
Simazine	KS
Terbufos	KS
Tetrachlorvinphos (Stirophos, Gardona) E-isomer	KS
Method EPA 8151A	
2,4,5-T	KS
2,4-D	KS
2,4-DB	KS
3,5-Dichlorobenzoic acid	KS
Acifluorfen	KS
Bentazon	KS

Attachment 15: Pace Analytical Services Indianapolis Laboratory Accreditation (cont.)

Pace Analytical Services, Inc - Indianapolis

Program/Matrix: ***RCRA (Non Potable Water)***

	Primary AB
Dalapon	KS
DCPA di acid degradate	KS
Dicamba	KS
Dichloroprop (Dichlorprop)	KS
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	KS
MCPA	KS
MCPP	KS
Pentachlorophenol	KS
Picloram	KS
Silvex (2,4,5-TP)	KS
Method EPA 8260C	
1,1,1,2-Tetrachloroethane	KS
1,1,1-Trichloroethane	KS
1,1,2,2-Tetrachloroethane	KS
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	KS
1,1,2-Trichloroethane	KS
1,1-Dichloroethane	KS
1,1-Dichloroethylene	KS
1,1-Dichloropropene	KS
1,2,3-Trichlorobenzene	KS
1,2,3-Trichloropropane	KS
1,2,4-Trichlorobenzene	KS
1,2,4-Trimethylbenzene	KS
1,2-Dibromo-3-chloropropane (DBCP)	KS
1,2-Dibromoethane (EDB, Ethylene dibromide)	KS
1,2-Dichlorobenzene (o-Dichlorobenzene)	KS
1,2-Dichloroethane (Ethylene dichloride)	KS
1,2-Dichloropropane	KS
1,3,5-Trichlorobenzene	KS
1,3,5-Trimethylbenzene	KS
1,3-Dichlorobenzene	KS
1,3-Dichloropropane	KS
1,4-Dichlorobenzene	KS
1,4-Dioxane (1,4- Diethyleneoxide)	KS
1-Methylnaphthalene	KS
2,2-Dichloropropane	KS
2-Butanone (Methyl ethyl ketone, MEK)	KS
2-Chloroethyl vinyl ether	KS
2-Chlorotoluene	KS
2-Hexanone	KS
2-Methylnaphthalene	KS
4-Chlorotoluene	KS
4-Isopropyltoluene (p-Cymene,p-Isopropyltoluene)	KS
4-Methyl-2-pentanone (MIBK)	KS
Acetone	KS
Acetonitrile	KS

Attachment 16: Pace Analytical Services Indianapolis Laboratory Accreditation (cont.)

Program/Matrix: ***RCRA (Non Potable Water)***

	Primary AB
Acrolein (Propenal)	KS
Acrylonitrile	KS
Allyl chloride (3-Chloropropene)	KS
Benzene	KS
Bromobenzene	KS
Bromochloromethane	KS
Bromodichloromethane	KS
Bromoform	KS
Carbon disulfide	KS
Carbon tetrachloride	KS
Chlorobenzene	KS
Chlorodibromomethane	KS
Chloroethane (Ethyl chloride)	KS
Chloroform	KS
Chloroprene (2-Chloro-1,3-butadiene)	KS
cis-1,2-Dichloroethylene	KS
cis-1,3-Dichloropropene	KS
Cyclohexane	KS
Dibromomethane (Methylene bromide)	KS
Dichlorodifluoromethane (Freon-12)	KS
Diethyl ether	KS
Ethyl acetate	KS
Ethyl methacrylate	KS
Ethylbenzene	KS
Hexachlorobutadiene	KS
Iodomethane (Methyl iodide)	KS
Isobutyl alcohol (2-Methyl-1-propanol)	KS
Isopropylbenzene	KS
Methacrylonitrile	KS
Methyl acetate	KS
Methyl bromide (Bromomethane)	KS
Methyl chloride (Chloromethane)	KS
Methyl methacrylate	KS
Methyl tert-butyl ether (MTBE)	KS
Methylcyclohexane	KS
Methylene chloride (Dichloromethane)	KS
m-Xylene	KS
Naphthalene	KS
n-Butyl alcohol (1-Butanol, n-Butanol)	KS
n-Butylbenzene	KS
n-Hexane	KS
n-Propylbenzene	KS
o-Xylene	KS
Propionitrile (Ethyl cyanide)	KS
p-Xylene	KS
sec-Butylbenzene	KS
Styrene	KS

Attachment 17: Pace Analytical Services Indianapolis Laboratory Accreditation (cont.)

Program/Matrix: ***RCRA (Non Potable Water)***

	Primary AB
tert-Butyl alcohol	KS
tert-Butylbenzene	KS
Tetrachloroethylene (Perchloroethylene)	KS
Tetrahydrofuran (THF)	KS
Toluene	KS
trans-1,2-Dichloroethylene	KS
trans-1,3-Dichloropropylene	KS
trans-1,4-Dichloro-2-butene	KS
Trichloroethene (Trichloroethylene)	KS
Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	KS
Vinyl acetate	KS
Vinyl chloride	KS
Xylene (total)	KS
Method EPA 8270C	
1,2,4,5-Tetrachlorobenzene	KS
1,2,4-Trichlorobenzene	KS
1,2-Dichlorobenzene (o-Dichlorobenzene)	KS
1,2-Diphenylhydrazine	KS
1,3,5-Trinitrobenzene (1,3,5-TNB)	KS
1,3-Dichlorobenzene	KS
1,3-Dinitrobenzene (1,3-DNB)	KS
1,4-Dichlorobenzene	KS
1,4-Naphthoquinone	KS
1,4-Phenylenediamine	KS
1-Methylnaphthalene	KS
1-Naphthylamine	KS
2,2'-Oxybis(1-chloropropane), bis(2-Chloro-1-methylethyl)ether	KS
2,3,4,6-Tetrachlorophenol	KS
2,4,5-Trichlorophenol	KS
2,4,6-Trichlorophenol	KS
2,4-Dichlorophenol	KS
2,4-Dimethylphenol	KS
2,4-Dinitrophenol	KS
2,4-Dinitrotoluene (2,4-DNT)	KS
2,6-Dichlorophenol	KS
2,6-Dinitrotoluene (2,6-DNT)	KS
2-Acetylaminofluorene	KS
2-Chloronaphthalene	KS
2-Chlorophenol	KS
2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	KS
2-Methylaniline (o-Toluidine)	KS
2-Methylnaphthalene	KS
2-Methylphenol (o-Cresol)	KS
2-Naphthylamine	KS
2-Nitroaniline	KS
2-Nitrophenol	KS

Attachment 18: Pace Analytical Services Indianapolis Laboratory Accreditation (cont.)

Program/Matrix: ***RCRA (Non Potable Water)***

	Primary AB
2-Picoline (2-Methylpyridine)	KS
3,3'-Dichlorobenzidine	KS
3,3'-Dimethylbenzidine	KS
3-Methylcholanthrene	KS
3-Methylphenol (m-Cresol)	KS
3-Nitroaniline	KS
4-Aminobiphenyl	KS
4-Bromophenyl phenyl ether	KS
4-Chloro-3-methylphenol	KS
4-Chloroaniline	KS
4-Chlorophenyl phenylether	KS
4-Dimethyl aminoazobenzene	KS
4-Methylphenol (p-Cresol)	KS
4-Nitroaniline	KS
4-Nitrophenol	KS
4-Nitroquinoline 1-oxide	KS
5-Nitro-o-toluidine	KS
7,12-Dimethylbenz(a) anthracene	KS
a-a-Dimethylphenethylamine	KS
Acenaphthene	KS
Acenaphthylene	KS
Acetophenone	KS
Aniline	KS
Anthracene	KS
Aramite	KS
Atrazine	KS
Benzaldehyde	KS
Benzidine	KS
Benzo(a)anthracene	KS
Benzo(a)pyrene	KS
Benzo(b)fluoranthene	KS
Benzo(g,h,i)perylene	KS
Benzo(k)fluoranthene	KS
Benzoic acid	KS
Benzyl alcohol	KS
Biphenyl	KS
bis(2-Chloroethoxy)methane	KS
bis(2-Chloroethyl) ether	KS
Butyl benzyl phthalate	KS
Caprolactam	KS
Carbazole	KS
Chlorobenzilate	KS
Chrysene	KS
Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)	KS
Diallate	KS
Dibenz(a,h) anthracene	KS
Dibenzofuran	KS

Attachment 19: Pace Analytical Services Indianapolis Laboratory Accreditation (cont.)

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Program/Matrix: ***RCRA (Non Potable Water)***

	Primary AB
Diethyl phthalate	KS
Dimethoate	KS
Dimethyl phthalate	KS
Di-n-butyl phthalate	KS
Di-n-octyl phthalate	KS
Diphenylamine	KS
Disulfoton	KS
Ethyl methanesulfonate	KS
Famphur	KS
Fluoranthene	KS
Fluorene	KS
Hexachlorobenzene	KS
Hexachlorobutadiene	KS
Hexachlorocyclopentadiene	KS
Hexachloroethane	KS
Hexachlorophene	KS
Hexachloropropene	KS
Indeno(1,2,3-cd) pyrene	KS
Isodrin	KS
Isophorone	KS
Isosafrole	KS
Kepone	KS
Methapyrilene	KS
Methyl methanesulfonate	KS
Methyl parathion (Parathion, methyl)	KS
Naphthalene	KS
Nitrobenzene	KS
n-Nitrosodiethylamine	KS
n-Nitrosodimethylamine	KS
n-Nitroso-di-n-butylamine	KS
n-Nitrosodi-n-propylamine	KS
n-Nitrosodiphenylamine	KS
n-Nitrosomethylethylamine	KS
n-Nitrosomorpholine	KS
n-Nitrosopiperidine	KS
n-Nitrosopyrrolidine	KS
o,o,o-Triethyl phosphorothioate	KS
Parathion, ethyl	KS
Pentachlorobenzene	KS
Pentachloronitrobenzene	KS
Pentachlorophenol	KS
Phenacetin	KS
Phenanthrene	KS
Phenol	KS
Phorate	KS
p-Phenylenediamine	KS
Pronamide (Kerb)	KS

Kansas Department of Health and Environment
Kansas Health Environmental Laboratories
6810 SE Dwight Street, Topeka, KS 66620

Attachment 20: Pace Analytical Services Indianapolis Laboratory Accreditation (cont.)

Program/Matrix: ***RCRA (Non Potable Water)***

	Primary AB
Pyrene	KS
Pyridine	KS
Safrole	KS
Sulfotep (Tetraethyl dithiopyrophosphate)	KS
Thionazin (Zinophos)	KS
Method EPA 8270C SIM	
1-Methylnaphthalene	KS
2-Methylnaphthalene	KS
Acenaphthene	KS
Acenaphthylene	KS
Anthracene	KS
Atrazine	KS
Azinphos-methyl (Guthion)	KS
Benzo(a)anthracene	KS
Benzo(a)pyrene	KS
Benzo(b)fluoranthene	KS
Benzo(g,h,i)perylene	KS
Benzo(k)fluoranthene	KS
Chlorpyrifos	KS
Chlorpyrifos-methyl	KS
Chrysene	KS
Demeton-o	KS
Demeton-s	KS
Diazinon	KS
Dibenz(a,h) anthracene	KS
Dichlorovos (DDVP, Dichlorvos)	KS
Dimethoate	KS
Disulfoton	KS
Famphur	KS
Fluoranthene	KS
Fluorene	KS
Indeno(1,2,3-cd) pyrene	KS
Malathion	KS
Merphos	KS
Methyl parathion (Parathion, methyl)	KS
Naled	KS
Naphthalene	KS
Parathion, ethyl	KS
Phenanthrene	KS
Phorate	KS
Pyrene	KS
Ronnel	KS
Simazine	KS
Terbufos	KS
Tetrachlorvinphos (Stirophos, Gardona) Mixed isomers	KS

Method EPA 9012A

Attachment 21: Pace Analytical Services Indianapolis Laboratory Accreditation (cont.)

	Primary AB
Program/Matrix: ***RCRA (Non Potable Water)***	
Amenable cyanide	KS
Cyanide	KS
Method EPA 9038	
Sulfate	KS
Method EPA 9056A	
Bromide	KS
Chloride	KS
Fluoride	KS
Iodide	KS
Nitrate	KS
Nitrite	KS
Sulfate	KS
Method EPA 9066	
Total phenolics	KS
Method EPA 9095B	
Paint Filter Test	KS
Method EPA RSK-175 (GC/FID)	
Ethane	KS
Ethene	KS
Methane	KS

Attachment 22: Pace Analytical Services Indianapolis Laboratory Accreditation (cont.)

Program/Matrix: ***RCRA (Solid & Hazardous Material)***

	Primary AB
Method EPA 1010A	
Ignitability	KS
Method EPA 1311	
Toxicity Characteristic Leaching Procedure (TCLP)	KS
Method EPA 1312	
Synthetic Precipitation Leaching Procedure (SPLP)	KS
Method EPA 6010B	
Aluminum	KS
Antimony	KS
Arsenic	KS
Barium	KS
Beryllium	KS
Boron	KS
Cadmium	KS
Calcium	KS
Chromium	KS
Cobalt	KS
Copper	KS
Iron	KS
Lead	KS
Magnesium	KS
Manganese	KS
Molybdenum	KS
Nickel	KS
Potassium	KS
Selenium	KS
Silver	KS
Sodium	KS
Strontium	KS
Thallium	KS
Tin	KS
Titanium	KS
Vanadium	KS
Zinc	KS
Method EPA 6020	
Aluminum	KS
Antimony	KS
Arsenic	KS
Barium	KS
Beryllium	KS
Cadmium	KS
Chromium	KS
Cobalt	KS
Copper	KS
Lead	KS
Manganese	KS

Attachment 23: Pace Analytical Services Indianapolis Laboratory Accreditation (cont.)

Program/Matrix: ***RCRA (Solid & Hazardous Material)***

	Primary AB
Nickel	KS
Selenium	KS
Silver	KS
Thallium	KS
Vanadium	KS
Zinc	KS
Method EPA 7196A	
Chromium VI	KS
Method EPA 7470A	
Mercury	KS
Method EPA 7471A	
Mercury	KS
Method EPA 8015D	
Diesel range organics (DRO)	KS
Ethanol	KS
Ethylene glycol	KS
Gasoline range organics (GRO)	KS
Isobutyl alcohol (2-Methyl-1-propanol)	KS
Isopropyl alcohol (2-Propanol, Isopropanol)	KS
Methanol	KS
n-Butyl alcohol (1-Butanol, n-Butanol)	KS
n-Propanol (1-Propanol)	KS
Propylene glycol	KS
Method EPA 8081B	
4,4'-DDD	KS
4,4'-DDE	KS
4,4'-DDT	KS
Aldrin	KS
alpha-BHC (alpha-Hexachlorocyclohexane)	KS
alpha-Chlordane, cis-Chlordane	KS
beta-BHC (beta-Hexachlorocyclohexane)	KS
Chlordane (tech.)(N.O.S.)	KS
delta-BHC	KS
Dieldrin	KS
Endosulfan I	KS
Endosulfan II	KS
Endosulfan sulfate	KS
Endrin	KS
Endrin aldehyde	KS
Endrin ketone	KS
gamma-BHC (Lindane, gamma-HexachlorocyclohexanE)	KS
gamma-Chlordane	KS
Heptachlor	KS
Heptachlor epoxide	KS
Methoxychlor	KS
Toxaphene (Chlorinated camphene)	KS

Attachment 24: Pace Analytical Services Indianapolis Laboratory Accreditation (cont.)

Program/Matrix: ***RCRA (Solid & Hazardous Material)***

Method EPA 8082A	
Aroclor-1016 (PCB-1016)	KS
Aroclor-1221 (PCB-1221)	KS
Aroclor-1232 (PCB-1232)	KS
Aroclor-1242 (PCB-1242)	KS
Aroclor-1248 (PCB-1248)	KS
Aroclor-1254 (PCB-1254)	KS
Aroclor-1260 (PCB-1260)	KS
Method EPA 8141B	
Atrazine	KS
Azinphos-methyl (Guthion)	KS
Chlorpyrifos	KS
Chlorpyrifos-methyl	KS
Demeton-o	KS
Demeton-s	KS
Diazinon	KS
Dichlorovos (DDVP, Dichlorvos)	KS
Dimethoate	KS
Disulfoton	KS
Famphur	KS
Malathion	KS
Merphos	KS
Methyl parathion (Parathion, methyl)	KS
Naled	KS
Parathion, ethyl	KS
Phorate	KS
Ronnel	KS
Simazine	KS
Terbufos	KS
Tetrachlorvinphos (Stirophos, Gardona) E-isomer	KS
Method EPA 8151A	
2,4,5-T	KS
2,4-D	KS
2,4-DB	KS
3,5-Dichlorobenzoic acid	KS
Acifluorfen	KS
Bentazon	KS
Dalapon	KS
DCPA di acid degradate	KS
Dicamba	KS
Dichloroprop (Dichlorprop)	KS
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	KS
MCPA	KS
MCPP	KS
Pentachlorophenol	KS
Picloram	KS

Attachment 25: Pace Analytical Services Indianapolis Laboratory Accreditation (cont.)

Program/Matrix: ***RCRA (Solid & Hazardous Material)***

	Primary AB
Silvex (2,4,5-TP)	KS
Method EPA 8260C	
1,1,1,2-Tetrachloroethane	KS
1,1,1-Trichloroethane	KS
1,1,2,2-Tetrachloroethane	KS
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	KS
1,1,2-Trichloroethane	KS
1,1-Dichloroethane	KS
1,1-Dichloroethylene	KS
1,1-Dichloropropene	KS
1,2,3-Trichlorobenzene	KS
1,2,3-Trichloropropane	KS
1,2,4-Trichlorobenzene	KS
1,2,4-Trimethylbenzene	KS
1,2-Dibromo-3-chloropropane (DBCP)	KS
1,2-Dibromoethane (EDB, Ethylene dibromide)	KS
1,2-Dichlorobenzene (o-Dichlorobenzene)	KS
1,2-Dichloroethane (Ethylene dichloride)	KS
1,2-Dichloropropane	KS
1,3,5-Trichlorobenzene	KS
1,3,5-Trimethylbenzene	KS
1,3-Dichlorobenzene	KS
1,3-Dichloropropane	KS
1,4-Dichlorobenzene	KS
1,4-Dioxane (1,4- Diethyleneoxide)	KS
1-Methylnaphthalene	KS
2,2-Dichloropropane	KS
2-Butanone (Methyl ethyl ketone, MEK)	KS
2-Chloroethyl vinyl ether	KS
2-Chlorotoluene	KS
2-Hexanone	KS
2-Methylnaphthalene	KS
4-Chlorotoluene	KS
4-Isopropyltoluene (p-Cymene,p-Isopropyltoluene)	KS
4-Methyl-2-pentanone (MIBK)	KS
Acetone	KS
Acetonitrile	KS
Acrolein (Propenal)	KS
Acrylonitrile	KS
Allyl chloride (3-Chloropropene)	KS
Benzene	KS
Bromobenzene	KS
Bromochloromethane	KS
Bromodichloromethane	KS
Bromoform	KS
Carbon disulfide	KS

Attachment 26: Pace Analytical Services Indianapolis Laboratory Accreditation (cont.)

Pace Analytical Services, Inc - Indianapolis

Program/Matrix: ***RCRA (Solid & Hazardous Material)***

	Primary AB
Carbon tetrachloride	KS
Chlorobenzene	KS
Chlorodibromomethane	KS
Chloroethane (Ethyl chloride)	KS
Chloroform	KS
cis-1,2-Dichloroethylene	KS
cis-1,3-Dichloropropene	KS
Dibromomethane (Methylene bromide)	KS
Dichlorodifluoromethane (Freon-12)	KS
Diethyl ether	KS
Ethyl acetate	KS
Ethyl methacrylate	KS
Ethylbenzene	KS
Hexachlorobutadiene	KS
Iodomethane (Methyl iodide)	KS
Isopropylbenzene	KS
Methacrylonitrile	KS
Methyl bromide (Bromomethane)	KS
Methyl chloride (Chloromethane)	KS
Methyl methacrylate	KS
Methyl tert-butyl ether (MTBE)	KS
Methylene chloride (Dichloromethane)	KS
m-Xylene	KS
Naphthalene	KS
n-Butyl alcohol (1-Butanol, n-Butanol)	KS
n-Butylbenzene	KS
n-Hexane	KS
n-Propylbenzene	KS
o-Xylene	KS
Propionitrile (Ethyl cyanide)	KS
p-Xylene	KS
sec-Butylbenzene	KS
Styrene	KS
tert-Butyl alcohol	KS
tert-Butylbenzene	KS
Tetrachloroethylene (Perchloroethylene)	KS
Toluene	KS
trans-1,2-Dichloroethylene	KS
trans-1,3-Dichloropropylene	KS
trans-1,4-Dichloro-2-butene	KS
Trichloroethene (Trichloroethylene)	KS
Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	KS
Vinyl acetate	KS
Vinyl chloride	KS
Xylene (total)	KS

Method EPA 8270C

Attachment 27: Pace Analytical Services Indianapolis Laboratory Accreditation (cont.)

Program/Matrix: ***RCRA (Solid & Hazardous Material)***

	Primary AB
1,2,4,5-Tetrachlorobenzene	KS
1,2,4-Trichlorobenzene	KS
1,2-Dichlorobenzene (o-Dichlorobenzene)	KS
1,2-Diphenylhydrazine	KS
1,3-Dichlorobenzene	KS
1,3-Dinitrobenzene (1,3-DNB)	KS
1,4-Dichlorobenzene	KS
1,4-Naphthoquinone	KS
1,4-Phenylenediamine	KS
1-Methylnaphthalene	KS
1-Naphthylamine	KS
2,2'-Oxybis(1-chloropropane), bis(2-Chloro-1-methylethyl)ether	KS
2,3,4,6-Tetrachlorophenol	KS
2,4,5-Trichlorophenol	KS
2,4,6-Trichlorophenol	KS
2,4-Dichlorophenol	KS
2,4-Dimethylphenol	KS
2,4-Dinitrophenol	KS
2,4-Dinitrotoluene (2,4-DNT)	KS
2,6-Dichlorophenol	KS
2,6-Dinitrotoluene (2,6-DNT)	KS
2-Acetylaminofluorene	KS
2-Chloronaphthalene	KS
2-Chlorophenol	KS
2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	KS
2-Methylaniline (o-Toluidine)	KS
2-Methylnaphthalene	KS
2-Methylphenol (o-Cresol)	KS
2-Naphthylamine	KS
2-Nitroaniline	KS
2-Nitrophenol	KS
2-Picoline (2-Methylpyridine)	KS
3,3'-Dichlorobenzidine	KS
3,3'-Dimethylbenzidine	KS
3-Methylcholanthrene	KS
3-Methylphenol (m-Cresol)	KS
3-Nitroaniline	KS
4-Aminobiphenyl	KS
4-Bromophenyl phenyl ether	KS
4-Chloro-3-methylphenol	KS
4-Chloroaniline	KS
4-Chlorophenyl phenylether	KS
4-Dimethyl aminoazobenzene	KS
4-Methylphenol (p-Cresol)	KS
4-Nitroaniline	KS
4-Nitrophenol	KS
4-Nitroquinoline 1-oxide	KS

Attachment 28: Pace Analytical Services Indianapolis Laboratory Accreditation (cont.)

Program/Matrix: ***RCRA (Solid & Hazardous Material)***

	Primary AB
5-Nitro-o-toluidine	KS
7,12-Dimethylbenz(a) anthracene	KS
a-a-Dimethylphenethylamine	KS
Acenaphthene	KS
Acenaphthylene	KS
Acetophenone	KS
Aniline	KS
Anthracene	KS
Aramite	KS
Benzidine	KS
Benzo(a)anthracene	KS
Benzo(a)pyrene	KS
Benzo(b)fluoranthene	KS
Benzo(g,h,i)perylene	KS
Benzo(k)fluoranthene	KS
Benzoic acid	KS
Benzyl alcohol	KS
bis(2-Chloroethoxy)methane	KS
bis(2-Chloroethyl) ether	KS
Butyl benzyl phthalate	KS
Carbazole	KS
Chlorobenzilate	KS
Chrysene	KS
Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)	KS
Diallate	KS
Dibenz(a,h) anthracene	KS
Dibenzofuran	KS
Diethyl phthalate	KS
Dimethoate	KS
Dimethyl phthalate	KS
Di-n-butyl phthalate	KS
Di-n-octyl phthalate	KS
Diphenylamine	KS
Disulfoton	KS
Ethyl methanesulfonate	KS
Famphur	KS
Fluoranthene	KS
Fluorene	KS
Hexachlorobenzene	KS
Hexachlorobutadiene	KS
Hexachlorocyclopentadiene	KS
Hexachloroethane	KS
Hexachlorophene	KS
Hexachloropropene	KS
Indeno(1,2,3-cd) pyrene	KS
Isodrin	KS
Isophorone	KS

Attachment 29: Pace Analytical Services Indianapolis Laboratory Accreditation (cont.)

Program/Matrix: ***RCRA (Solid & Hazardous Material)***

	Primary AB
Isosafrole	KS
Kepone	KS
Methapyrilene	KS
Methyl methanesulfonate	KS
Methyl parathion (Parathion, methyl)	KS
Naphthalene	KS
Nitrobenzene	KS
n-Nitrosodiethylamine	KS
n-Nitrosodimethylamine	KS
n-Nitroso-di-n-butylamine	KS
n-Nitrosodi-n-propylamine	KS
n-Nitrosodiphenylamine	KS
n-Nitrosomethylethylamine	KS
n-Nitrosomorpholine	KS
n-Nitrosopiperidine	KS
n-Nitrosopyrrolidine	KS
o,o,o-Triethyl phosphorothioate	KS
Parathion, ethyl	KS
Pentachlorobenzene	KS
Pentachloronitrobenzene	KS
Pentachlorophenol	KS
Phenacetin	KS
Phenanthrene	KS
Phenol	KS
Phorate	KS
Pronamide (Kerb)	KS
Pyrene	KS
Pyridine	KS
Safrole	KS
Sulfotep (Tetraethyl dithiopyrophosphate)	KS
Thionazin (Zinophos)	KS
Method EPA 8270C SIM	
1-Methylnaphthalene	KS
2-Methylnaphthalene	KS
Acenaphthene	KS
Acenaphthylene	KS
Anthracene	KS
Atrazine	KS
Azinphos-methyl (Guthion)	KS
Benzo(a)anthracene	KS
Benzo(a)pyrene	KS
Benzo(b)fluoranthene	KS
Benzo(g,h,i)perylene	KS
Benzo(k)fluoranthene	KS
Chlorpyrifos	KS
Chlorpyrifos-methyl	KS

Attachment 30: Pace Analytical Services Indianapolis Laboratory Accreditation (cont.)

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Pace Analytical Services, Inc - Indianapolis

	Primary AB
Program/Matrix: ***RCRA (Solid & Hazardous Material)***	
Chrysene	KS
Demeton-o	KS
Demeton-s	KS
Diazinon	KS
Dibenz(a,h) anthracene	KS
Dichlorovos (DDVP, Dichlorvos)	KS
Dimethoate	KS
Disulfoton	KS
Famphur	KS
Fluoranthene	KS
Fluorene	KS
Indeno(1,2,3-cd) pyrene	KS
Malathion	KS
Merphos	KS
Methyl parathion (Parathion, methyl)	KS
Naled	KS
Naphthalene	KS
Parathion, ethyl	KS
Phenanthrene	KS
Phorate	KS
Pyrene	KS
Ronnel	KS
Simazine	KS
Terbufos	KS
Tetrachlorvinphos (Stirophos, Gardona) Mixed isomers	KS
Method EPA 9012A	
Amenable cyanide	KS
Cyanide	KS
Method EPA 9045C	
pH	KS
Method EPA 9066	
Total phenolics	KS
Method EPA 9095B	
Paint Filter Test	KS

End of Scope of Accreditation