2020 White River Mainstem Monitoring Work Plan

PREPARED BY

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Work Plan Organization

This work plan (WP) is an extension of the existing Indiana Department of Environmental Management (IDEM) Office of Water Quality (OWQ) Watershed Assessment and Planning Branch (WAPB), March 2017 Quality Assurance Project Plan (QAPP) for Indiana Surface Water Quality Programs (Surface Water QAPP) (IDEM 2017a). Per the United States Environmental Protection Agency (U.S. EPA) 2006 Guidance on Systematic Planning Using the Data Quality Objectives (DQO) Process (U.S. EPA 2006), this WP establishes criteria and specifications, pertaining to a specific water quality monitoring project, usually described in the following four groups containing elements similar to a QAPP per Guidance for Quality Assurance Project Plans (U.S. EPA 2002).

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List of Acronyms

AIMS	Assessment Information Management System
ALUS	Aquatic Life Use Support
ASTM	American Society for Testing and Materials
BWQ	Bureau of Water Quality
CAC	Chronic Aquatic Criterion
CALM	Consolidated Assessment Listing Methodology
DQO	Data Quality Objective
GPS	Global Positioning System
HDPE	High-density polyethylene
HUC	Hydrologic Unit Code
IAC	Indiana Administrative Code
IBI	Index of Biotic Integrity
IN DNR	Indiana Department of Natural Resources
MS/MSD	Matrix Spike and Matrix Spike Duplicate
NPDES	National Pollutant Discharge Elimination System
OHEPA	Ohio Environmental Protection Agency
QA	Quality Assurance
QC	Quality Control
QAPP	Quality Assurance Project Plan
QHEI	Qualitative Habitat Evaluation Index
SOP	Standard Operating Procedure
SU	Standard Units
TMDL	Total Maximum Daily Load
U.S. EPA	United States Environmental Protection Agency
USGS	Unites States Geological Survey
WP	Work plan

Definitions

Backwater	A part of the river not reached by the current, where the water is stagnant.
Elutriate	To purify, separate, or remove lighter or finer particles by washing, decanting, and settling.
Fifteen (15) minute pick	A component of the IDEM multihabitat macroinvertebrate sampling method, used to maximize taxonomic diversity while in the field, in which the one minute kick sample and fifty meter sweep sample collected at a site are first combined and elutriated. Macroinvertebrates are then manually removed from the resulting sample for 15 minutes.
Fifty (50) meter sweep	A component of the IDEM multihabitat macroinvertebrate sampling method in which approximately 50 meters of shoreline 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.
Impoundment	A body of water confined within an enclosure, such as a reservoir.
Lotic	A waterbody, such as a stream or river, in which the water is flowing.
Macroinvertebrate	Aquatic animals which lack a backbone, are visible without a microscope, and spend some period of their lives in or around water.
Marsh	An area of low lying land that is flooded in wet seasons and typically remains waterlogged at all times.
One (1) minute kick sample	A component of the IDEM multihabitat macroinvertebrate sampling method in which approximately 1 square meter of riffle or run substrate habitat in a stream or river is sampled with a standard 500 micrometer mesh width D-frame dip net for approximately 1 minute.
Ocular reticle	A thin piece of glass marked with a linear or areal scale that is inserted into a microscope ocular, superimposing the scale onto the image viewed through the microscope.

Perennial Stream	A stream that has continuous flow in the stream bed all year during years of normal rainfall. Water must be present in at least 50% of the stream reach during the time of fish community sampling.
Periphyton	Algae attached to an aquatic substrate.
Reach	A segment of a stream used for fish community sampling equal in length to 15 times the average wetted width of the stream, with a minimum length of 50 meters and a maximum length 500 meters. For macroinvertebrate community sampling, the stream reach is 50 meters of all available habitat.
Seston	Organisms and nonliving matter swimming or floating in a water body.
Target	A sampling point which falls on a perennial stream within the basin of interest and the boundaries of Indiana.
Wetland	Land areas that are wet for at least part of the year, are poorly drained, and are characterized by hydrophytic vegetation, hydric soils, and wetland hydrology.

A. Project Management

A.1 Project Objective

The main objective of the White River mainstem monitoring project is to provide a comprehensive assessment of the ability of the White River to support aquatic life use (ALUS). Collect chemical, physical, and biological parameters to determine ALUS. Laboratory processing and data analysis for the project will continue through spring of 2021.

Data is collected during monitoring for the following purposes:

- To provide water quality and biological data for assessment of aquatic life use support (ALUS) as integral components of the Integrated Report, thus satisfying 305(b) and 303(d) reporting requirements to U.S. EPA.
- To provide water quality and biological data which may be useful for municipal, industrial, agricultural, and recreational decision making processes. These include the Total Maximum Daily Load (TMDL) process and National Pollutant Discharge Elimination System (NPDES) permit modeling of waste load allocations.
- To compile water quality and biological data for trend analyses and future pollution abatement activities.
- To aid in the development of refined chemical and narrative biological water quality criteria.

A.2 Project Organization and Schedule

Sampling for this project will begin in June and continue through November 2020. Proposed project task organization and schedule in Table 1 on next page.

Table 1. 2020 White River Monitoring Tasks, Schedule, and Evaluation

Activity	Date(s)	Number of Sites	Frequency of Sampling Related Activity	Parameter to be sampled	How evaluated
Site selection	May – Nov 2019	65 sites (11 of 65 sites are part of the Probabilistic Monitoring Program)			Sites selected to evaluate assessment units for ALUS including probabilistic sites already scheduled for sampling in 2020, Muncie Bureau of Water Quality (BWQ) sites, and historical IDEM or Indiana Department of Natural Resources (IN DNR) sites.
Site reconnaissance	Dec 2019 – Feb 2020	65 sites (11 of 65 sites are part of the Probabilistic Monitoring Program)	At least one visit but may require several to obtain final approval		Land owner approval, stream access, and safety characteristics for the 65 sites.
Water chemistry	June 1 – Nov 4 2020 Jun – Sept 2020	48 sites (11 of 65 sites will be sampled as part of the Probabilistic Monitoring Program; 6 of 65 sites will not have chemistry collected as there is another site sampled for chemistry on the same AUID.). Subset of 11 probabilistic sites	Once each in June, July, and Sept or Oct with a minimum 30 days between sampling events Once each in Jun, Aug, and Sept with a minimum of 30 days between sampling events	Total phosphorous Nitrogen, Nitrate + Nitrite Dissolved oxygen (DO) DO pH pH Algal conditions Dissolved metals (Table 8) Dissolved arsenic (III) Nitrogen ammonia Chloride Free cyanide (CN^-)* Sulfate Total dissolved solids Orthophosphate	>0.3 mg/L (for nutrients) >10.0 mg/L (for nutrients) <4.0 mg/L (warm water aquatic life); >12 mg/L (nutrients) >9.0 Standard Units (SU) (for nutrients); <6 or >9 SU (warm water aquatic life) Excessive (for nutrients, based on observation) Chronic Aquatic Criterion (CAC) based on hardness 190 µg/L CAC based on pH and temperature CAC based on hardness and sulfate CAC 5.2 µg/L Based on hardness and chloride 750 mg/L There are no criteria for this parameter in the Indiana Administrative Code (IAC). The Indiana Great Lakes Water Quality Agreement (GLWQA) Domestic Action Plan (DAP) for the Western Lake Erie Basin (WLEB) provides a springtime flow weighted mean concentration (FWMC) target of 0.05 mg/L for the Maumee River in Indiana.

Table 1. 2020 White River Monitoring Tasks, Schedule, and Evaluation (cont.)

Activity	Date(s)	Number of Sites	Frequency of Sampling-related activity	Parameter to be sampled	How evaluated
Algal samples	Sept – Oct 2020	Subset of 11 probabilistic sites	Once with 3rd water chemistry sample in Sept or Oct	Algal diatoms Algal biomass	Diatom identification and enumeration Chlorophyll *a*
Fish community and habitat quality	June 1 – October 15, 2020	54 sites (11 of 65 sites will be sampled as part of the Probabilistic Monitoring Program)	Once June 1 – October 15	Fish community Habitat quality	Fish Index of Biotic Integrity (IBI) Qualitative Habitat Evaluation Index (QHEI)
Macroinvertebrate community and habitat quality	July 13 – Nov 13, 2020	Subset of 11 probabilistic sites	Once July 13 – November 13	Macroinvertebrate community Habitat quality	Macroinvertebrate IBI QHEI
Dissolved oxygen continuous monitoring	July – August 2020	Subset of 11 probabilistic sites	Once in July with two week deployment at 11 sites	Dissolved oxygen Temperature	Minimum, maximum, and average change in dissolved oxygen for the two week period Minimum, maximum, and average change in temperature for the two week period

*Analyzed only where the total value exceeds the free CN^- criterion of 5.2 ug/L

A.3. Project Description

IDEM begins a fifth cycle of probabilistic monitoring in 2020 by sampling the mainstem White River and tributaries from the headwaters to the mouth encompassing three 8-Digit Hydrologic Units (05120201, 05120202, 05120203). Activities outlined in this project augment the probabilistic monitoring program with additional targeted sites to assess the entire mainstem White River for ALUS (11 probabilistic sites on the mainstem White River are included in this project). IDEM will collaborate with the Muncie BWQ and the IN DNR Division of Fish and Wildlife to sample fish communities on the mainstem White River. Data collected could fulfill several of the agencies' goals such as documenting changes in fish community structure from the headwaters to the confluence with the Wabash River, industrial and municipality influences, urban vs. rural influences, ALUS assessments, restoration of the White River, extent of Asian carp invasion, fish passage limitations due to dams, and disseminating results to White River stakeholders (fish clubs, community groups, recreational businesses, etc.).

A.4. Data Quality Objectives (DQO)

The DQO process (Guidance for the Data Quality Objectives Process EPA QA/G-4) is a planning tool for environmental data collection activities. The process provides a basis for balancing decision uncertainty with available resources. The DQO process is recommended for all significant data collection projects. The seven step systematic planning process clarifies study objectives; defines the types of data needed to achieve the objectives; and establishes decision criteria for evaluating data quality. The DQO process for the White River Mainstem Monitoring Project is identified in the following seven steps.

1. State the Problem

Indiana is required 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]. This project gathers biological, chemical, and habitat data for the purpose of assessing ALUS attainment status of the White River mainstem.

2. Identify the Goals of the Study

An objective of this project is to evaluate the White River mainstem stream miles as supporting or nonsupporting for ALUS. To produce this evaluation, sample each target site for physical, chemical, and biological parameters.

3. Identify Information Inputs

Field monitoring activities are required to collect physical, chemical, biological, and habitat data. These data are required to address the necessary decisions previously described. Monitoring activities take place at target sites for which necessary landowner or property manager granted permission to access a site. Group B. Data Generation and Acquisition describes field measurements, chemical, biological, and habitat data collection procedures in detail

4. Define the Boundaries of the Study

For the purpose of this program, the White River's mainstem (Figure 1) is geographically defined as within the borders of Indiana contained within the 8-digit HUCs 05120201, 05120202, and 05120203. Table 2 gives the 65 sampling sites and the type of sampling to conduct at each site.

5. Develop the Analytical Approach

Collect physical, chemical, and biological communities samples, if the flow is not dangerous for staff to enter the stream (e.g., water levels at or below median base flow); barring any hazardous weather conditions (e.g., thunderstorms or heavy rain in the vicinity); or unexpected physical barriers to accessing the site. The field crew chief makes the final determination as to whether or not a stream is safe to enter. Even if the weather conditions and stream flow are safe, sample collections for biological communities may be postponed at a particular site for one to four weeks due to scouring of the stream substrate or instream cover following a high water event which results in nonrepresentative samples.

The Indiana Integrated Water Monitoring and Assessment Report, relies upon assessments of ALUS decisions. Assessments include independent evaluations of chemical and biological criteria as outlined in Indiana's 2020 Consolidated Assessment Listing Methodology (CALM) (IDEM 2020a, pp. 24 – 25). Evaluate the fish assemblage at each site using the appropriate IBI (Dufour 2002; Simon and Dufour 2005). Also, evaluate macroinvertebrate multihabitat samples using a statewide IBI developed for lowest practical taxonomic level identifications. Specifically, if IBI scores at a site are less than 36, then consider the site nonsupporting for ALUS. Publish attainment and nonattainment for the target sites in a table within the 2022 Indiana Integrated Water Monitoring and Assessment Report.

Figure 1. Sampling Sites for the White River Mainstem.

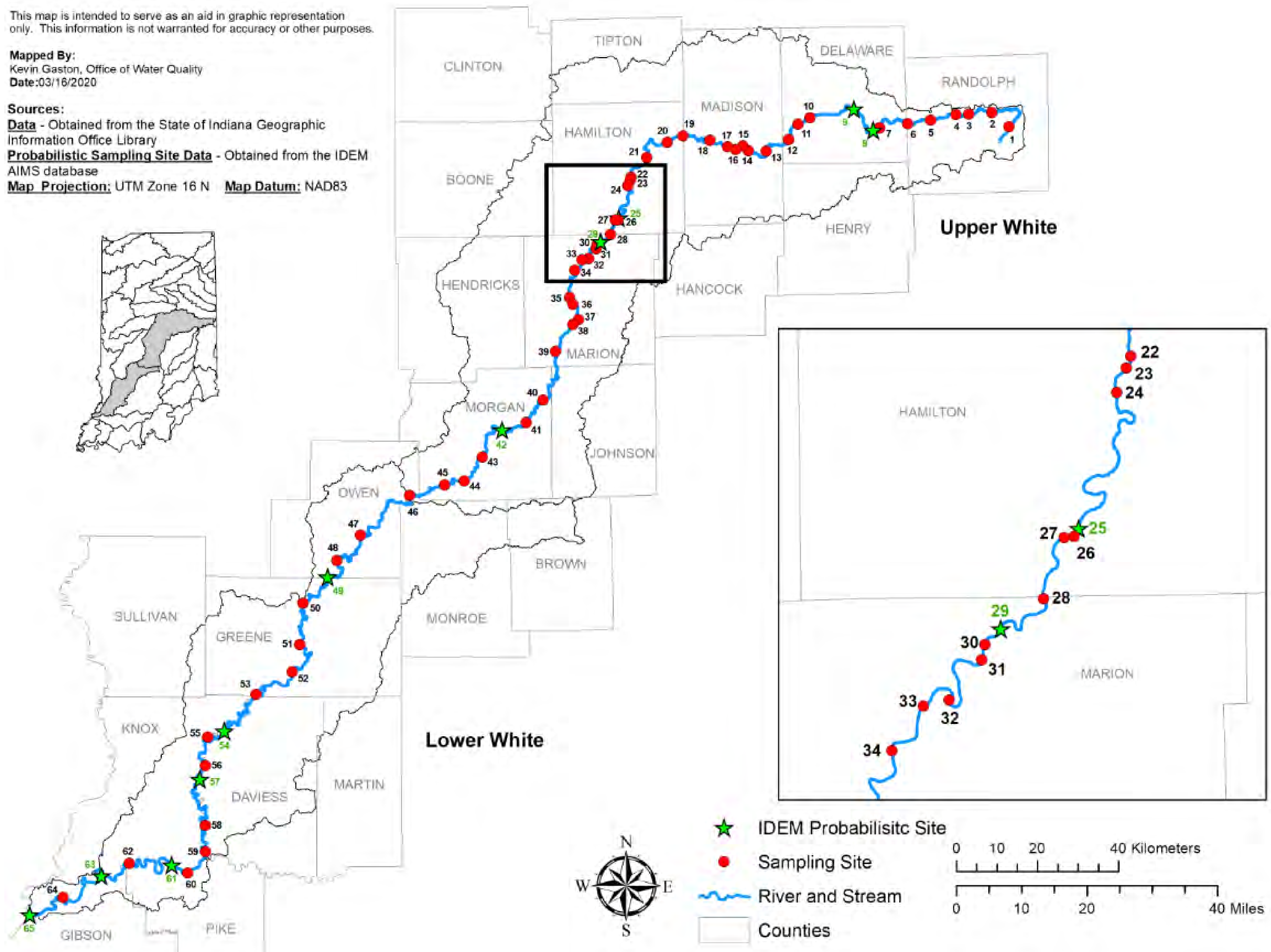

Table 2. List of Sites for the White River Mainstem.

						Type of Sampling Occurring			
Site ID	Waterbody	Station Description	County	Northing	Easting	Water Chemistry	Fish Community	Macroinvertebrate Community	Orthophosphate/ Algal Samples/ Continuous DO
20WR001	West Fork White River	CR 100 S	Randolph	4446490.351	677186	X	X		
20WR002	West Fork White River	US 27	Randolph	4449940.873	672933.75	X	X		
20WR003	West Fork White River	CR 300 W	Randolph	4449584.137	667279	X	X		
20WR004	West Fork White River	CR 500 W	Randolph	4449453.225	664052.75	X	X		
20WR005	West Fork White River	CR 900 W	Randolph	4448135.388	657815.9375	X	X		
20WR006	West Fork White River	CR 1275 W	Randolph	4447232.536	652196.9375	X	X		
20WR007	West Fork White River	Sod Farm	Delaware	4446238.935	645251.6875	X	X		
INRB20-014/20WR008	West Fork White River	Inlow Springs Road	Delaware	4445634.429	643668.625	X	X	X	X
INRB20-046/20WR009	West Fork White River	Ball Road @ Craddock Wetland	Delaware	4450850.971	638963.125	X	X	X	X
20WR010	West Fork White River	CR 575 W	Delaware	4448685.201	628125.125	X	X		
20WR011	West Fork White River	CR 750 W	Delaware	4447124.989	625148.375	X	X		
20WR012	West Fork White River	CR 900 W	Delaware	4443309.317	622930.375	X	X		
20WR013	West Fork White River	Mounds State Park	Madison	4440426.309	617291.625	X	X		
20WR014	West Fork White River	8th Street Bank	Madison	4440574.828	612980.4375	X	X		
20WR015	West Fork White River	Madison Avenue	Madison	4441728.426	611580.25	X	X		
20WR016	West Fork White River	Raible Avenue	Madison	4440840.491	609849.9375	X	X		
20WR017	West Fork White River	Moss Island Road	Madison	4441558.45	607820.25	X	X		
20WR018	West Fork White River	CR 600 W	Madison	4443157.309	603436.125	X	X		
20WR019	West Fork White River	SR 13	Hamilton	4444193.282	596852	X	X		
20WR020	West Fork White River	Strawtown Avenue	Hamilton	4442614.166	592978.875	X	X		
20WR021	West Fork White River	Riverwood Avenue	Hamilton	4438858.281	587909.5625	X	X		
20WR022	West Fork White River	SR 19	Hamilton	4434036.508	584069.875	X	X		
20WR023	West Fork White River	SR 32	Hamilton	4433342.57	583806.25		X		
20WR024	West Fork White River	River Avenue	Hamilton	4431929.09	583245.25	X	X		
INRB20-024/20WR025	West Fork White River	River Glen Country Club	Hamilton	4424017.543	581030.0625	X	X	X	X
20WR026	West Fork White River	116th Street	Hamilton	4423551.129	580770.0625		X		
20WR027	West Fork White River	Wapihani Drive	Hamilton	4423484.206	580193	X	X		
20WR028	West Fork White River	Town Run Trail Park	Marion	4419928.155	578989.0625	X	X		
20WR030	West Fork White River	Union Chapel Road	Marion	4417262.191	575584.625		X		
20WR031	West Fork White River	75th Street	Marion	4416367.165	575409.5		X		
INRB20-019/20WR029	West Fork White River	82nd Street	Marion	4418171.082	576497.5	X	X	X	X
20WR032	West Fork White River	Westfield Boulevard	Marion	4414037.532	573511.4375		X		
20WR033	West Fork White River	Meridian Street	Marion	4413688.257	572011.8125		X		
20WR034	West Fork White River	52nd Street	Marion	4411095.009	570186.125	X	X		
20WR035	West Fork White River	White River Parkway	Marion	4404421.89	568885.3125	X	X		
20WR036	West Fork White River	New York Street	Marion	4402765.258	569714.5	X	X		
20WR037	West Fork White River	Raymond Street	Marion	4398961.131	571120.0625	X	X		
20WR038	West Fork White River	Harding Street	Marion	4397779.382	569736.8125	X	X		
20WR039	West Fork White River	U/S of Southport Road and WWTP	Marion	4391111.903	565451.25	X	X		
20WR040	West Fork White River	Bluffs Boat Ramp	Morgan	4379136.083	562352.5	X	X		
20WR041	West Fork White River	SR 37	Morgan	4373569.211	558196.3125	X	X		
INRB20-087/20WR042	West Fork White River	Blue Bluff Road	Morgan	4371764.235	552227.8125	X	X	X	X
20WR043	West Fork White River	SR 39	Morgan	4365083.053	547392.875	X	X		
20WR044	West Fork White River	Smokey Road	Morgan	4359210.614	542986.5	X	X		
20WR045	West Fork White River	Burnett Landing Public Access	Morgan	4358253.463	538072.5625	X	X		
20WR046	West Fork White River	Gosport Public Access	Owen	4355693.362	529429.875	X	X		
20WR047	West Fork White River	SR 67	Owen	4345833.118	517401.3438	X	X		
20WR048	West Fork White River	CR 590 S	Owen	4339614.538	511580.75	X	X		
INRB20-013/20WR049	West Fork White River	CR 850 S	Owen	4335526.694	509208.0625	X	X	X	X
20WR050	West Fork White River	Worthington Public Access	Greene	4329100.255	503179.8438	X	X		
20WR051	West Fork White River	Base Line Road	Greene	4318897.532	502413.7188	X	X		
20WR052	West Fork White River	CR 350 W	Greene	4312192.406	500575.5	X	X		
20WR053	West Fork White River	CR 750 S	Greene	4306664.645	491663.5313	X	X		
INRB20-102/20WR054	West Fork White River	Riverdale Road	Daviess	4297587.484	483837.4063	X	X	X	X
20WR055	West Fork White River	Riverdale Road	Knox	4296141.733	479762.4375	X	X		
20WR056	West Fork White River	CR 650 N	Knox	4289137.444	479168.9688	X	X		
INRB20-166/20WR057	West Fork White River	CR 400 W	Daviess	4285678.971	477726.0625	X	X	X	X
20WR058	West Fork White River	Bottom Road	Knox	4274344.979	479103.8125	X	X		
20WR059	West Fork White River	CR 375 W	Daviess	4267929.025	479187.9063	X	X		
20WR060	White River	SR 61	Knox	4262646.052	474736.9375	X	X		
INRB20-022/20WR061	White River	River Road	Knox	4264646.668	470866.375	X	X	X	X
20WR062	White River	Stern Bottoms Road	Knox	4265020.632	460375.4063	X	X		
INRB20-066/20WR063	White River	1st Street	Knox	4261915.543	453521.625	X	X	X	X
20WR064	White River	Carter Road	Knox	4256614.01	444083.875	X	X		
INRB20-042/20WR065	White River	River Road	Knox	4252336.967	435827.8438	X	X	X	X

6. Specify Performance or Acceptance Criteria

Good quality data are essential for minimizing decision error. More confidence can be placed in the ALUS assessment, by identifying errors in the sampling design; physical, chemical, and biological parameter measurements; and laboratory.

Site specific ALUS assessments include program specific controls to identify the introduction of errors. These controls include water chemistry blanks and duplicates; biological site revisits or duplicates; and laboratory controls through verification of species identifications as described in field procedure manuals (IDEM 2020c, DRAFT; OHEPA 2006) and standard operating procedures (SOP) (IDEM 1992a, 1992b, 1992c, 2015a, 2018b, 2018c, 2019a, 2019c, 2020b).

The quality assurance (QA) and quality control (QC) process detects deficiencies in the data collection as set forth in the IDEM Surface Water QAPP (IDEM 2017a). The QAPP requires all contract laboratories to adhere to rigorous standards during sample analyses and to provide good quality usable data. WAPB chemists review the laboratory analytical results for data quality. Any data which is "Rejected" due to analytical problems or errors will not be used for water quality assessment decisions. Any data flagged as "Estimated" may be used on a case by case basis and is noted in the QA/QC report. Criteria for acceptance or rejection of results as well as application of data quality flags is presented in the QAPP, Table D3-1: Data Qualifiers and Flags, p. 184. Precision and accuracy goals with acceptance limits for applicable analytical methods are provided in the QAPP, Table A7-1: Precision and Accuracy Goals for Data Acceptability by Matrix, pp. 61 – 63 and Table B2.1.1.8-2: Field Parameters, p. 117. Further, in response to consistent "rejected" data, conduct investigations to determine the source of error. Field techniques used during sample collection and preparation and laboratory procedures are subject to evaluation by both the WAPB QA manager and project manager in troubleshooting error introduced throughout the entire data collection process. Implement corrective actions, once the source of error is determined (IDEM 2017a).

Evaluate sites as supporting or nonsupporting following the decision-making processes described in Indiana's 2020 CALM (IDEM 2020a) and the water quality criteria shown in Table 3.

Table 3. Water Quality Criteria [327 IAC 2-1-6]

Parameter	Level	Criterion
Dissolved metals (Cd, Cr III, Cr VI, Cu, Pb, Ni, Zn	Calculated based on hardness	CAC
Dissolved arsenic III	190 µg/L	CAC
Ammonia nitrogen	Calculated based on pH and temperature	CAC
Chloride	Calculated based on hardness and sulfate	CAC
Free cyanide	5.2 µg/L (analyzed only if total cyanide result exceeds the CAC for free cyanide)	CAC
Dissolved oxygen	At least 5.0 mg/L (warm water aquatic life) At least 6.0 mg/L (cold water fish*)	Not less than 4.0 mg/L at any time. Not less than 6.0 mg/L at any time and shall not be less than 7.0 mg/L in areas where spawning occurs during the spawning season and in areas used for imprinting during the time salmonids are being imprinted.
pH	6.0 – 9.0 SU	Must remain between 6.0 and 9.0 SU except for daily fluctuations that exceed 9.0 due to photosynthetic activity
Nitrogen, Nitrate + Nitrite	10 mg/L	Human Health Criteria at point of drinking water intake
Sulfate	Calculated based on hardness and chloride	In all waters outside the mixing zone
Dissolved solids	750 mg/L	Not-to-Exceed at point of drinking water intake

CAC = Chronic Aquatic Criterion, SU = Standard Units

*Waters protected for cold water fish include those waters designated by the IN DNR for put-and-take trout fishing, as well as salmonid waters listed in 327 IAC 2-1.5-5.

In addition to the physical and chemical criteria listed in Table 3, evaluate data for several nutrient parameters against the benchmarks listed below 2020 CALM (IDEM 2020a). 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 nonsupporting 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
- 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

Indiana narrative biological criteria [327 IAC 2-1-3] states that "(2) All waters, except [limited use waters] will be capable of supporting: (A) a well-balanced, warm water aquatic community." The water quality standard definition of a "well-balanced aquatic community" is "[327 IAC 2-1-9] (59)] 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." An interpretation or translation of narrative biological criteria into numeric criteria follows: A stream segment is nonsupporting for ALUS 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 for macroinvertebrate communities), which is considered "Poor" or "Very Poor" CALM (IDEM 2020a).

Assessment of each site sampled will be reported to U.S. EPA in the 2022 update of Indiana's Integrated Water Monitoring and Assessment 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 2020a, p. 44).

7. Develop the Plan for Obtaining Data

The targeted design is necessary for assessing the ALUS status of all AUIDs in the White River mainstem.

A.5. Training and Staffing Requirements

Table 4. Project Roles, Experience, and Training

Role	Required Training or Experience	Responsibilities	Training References
Project manager	-Assessment Information Management System (AIMS) II Database experience -Demonstrated experience in project management and QA/QC procedures	-Establish project in the AIMS II database -Oversee development of project WP -Oversee entry and QC of field data -Querying data from AIMS II to determine results not meeting water quality criteria	-AIMS II Database User Guide -IDEM 2020a -U.S. EPA 2006
Field crew chief – biological 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 SOP documents for field operations	-Completion of field data sheets -Taxonomic accuracy -Sampling efficiency and representation -Voucher specimen tracking -Overall operation of the field crew when remote from central office -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	-Dufour 2002 -IDEM 1992a, 1992b, 1992c, 2010a, 2010b, 2015b, 2017b, 2018a, 2019a, 2019b, 2019c, 2020b, 2020c -Simon and Dufour, 1998, 2005 -YSI 2017, 2018
Field crew members – biological 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 1992a, 1992b, 1992c, 2010a, 2010b, 2015b, 2017b 2018a, 2019a, 2019b, 2019c, 2020b, 2020c -YSI 2017, 2018
Field crew chief – water chemistry or algal sampling	-At least one year of experience in sampling methodology -Annually review relevant safety procedures	-Completion of field data sheets -Sampling efficiency and representation	-IDEM 1997, 2010a, 2010b, 2015a, 2015b, 2017b, 2018b, 2020b, 2020c -YSI 2017, 2018

Role	Required Training or Experience	Responsibilities	Training References
	-Annually review relevant SOP documents for field operations	-Overall operation of the field crew when remote from central office -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	
Field crew members – water chemistry or algal 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 1997, 2010a, 2010b, 2015a, 2015b, 2017b, 2018b, 2020b, 2020c -YSI 2017, 2018
Laboratory supervisor – biological 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	-Adherence to safety and SOP procedures by laboratory staff -Assist with identification of fish or macroinvertebrate specimens -Verify taxonomic accuracy of samples -Voucher specimen tracking -QC calculations on data sheets, check for completeness -Ensure data are entered into AIMS II correctly	-IDEM 1992c, 2004, 2010a, 2010b, 2018 -AIMS II Database User Guide
Laboratory staff – biological 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 and relevant SOP documents for laboratory operations	-Adhere to safety and SOP procedures -Follow laboratory supervisor direction while processing samples -Identify fish or macroinvertebrate specimens -Perform necessary calculations on data, enter field sheets	-IDEM 1992c, 2004, 2010a, 2010b, 2018 -AIMS II Database User Guide

Role	Required Training or Experience	Responsibilities	Training References
Laboratory supervisor – water chemistry or algal sample processing	-Annually review relevant safety procedures -Annually review relevant SOP documents for field operations	-Adherence to safety and SOP procedures by laboratory staff -Completion of laboratory data sheets -Check data for completeness -Perform all necessary calculations on the data -Ensure that data are entered into AIMS II Data Base	-IDEM 2010a, 2010b, 2015a -AIMS II Database User Guide
QA officer	-Familiarity with QA/QC practices and methodologies -Familiarity with the Surface Water QAPP and data qualification methodologies	-Ensure adherence to QA/QC requirements of Surface Water QAPP -Evaluate data collected by sampling crews for adherence to project WP -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 II data base -Ensure that field sampling methodology audits are completed according to WAPB procedures	-IDEM 2017a, 2018 -U.S. EPA 2006 -AIMS II Database User Guide

B. Data Generation and Acquisition

B.1. Sampling Sites and Sampling Design

Sites were selected to evaluate assessment units for ALUS including eleven probabilistic sites already scheduled for sampling in 2020, Muncie BWQ sampling sites, and historical IDEM or IN DNR sampling sites.

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; initial evaluation of target or nontarget site status; potential access routes; and initial property owner searches. Physical site visits include property owner consultations; verification of site status (target or nontarget); confirmation and documentation of access routes; and determination of equipment needed to properly sample the site.

Determine precise coordinates for each approved target site using an agency approved handheld Global Positioning System (GPS) unit which can verify horizontal precision within 5 meters or less, Global Positioning System (GPS) Data Creation (IDEM 2015b). Visit all sites at least once during site reconnaissance to determine target or nontarget status (backwater, physical barrier, etc.). Although 12 weeks is the maximum time allotted for site reconnaissance field work (site reconnaissance activities Section A. Project Management, QAPP Element A.4.). Most work can be completed in a 6-week period dependent upon weather, driving time to sites, and other unforeseeable constraints. If possible, seek the remaining landowner permissions with phone calls from the office. If permission to visit a site is granted before the 12 week deadline, a day or overnight trip may be required to determine access routes, equipment, and more accurate GPS coordinates. Once the deadline is reached, enter the Reconnaissance Decision as “No, Other” into the database for sites not accessible through bridge right-of-way and appearing as “target” from the nearest bridge. In the Comments field enter the following text “Unable to contact landowner by deadline" along with the date and initials of the person entering the data. Record the decision in the Reconnaissance Decision on the IDEM Site Reconnaissance Form (Attachment 1).

Table 2 lists the sampling sites generated for the White River mainstem. Figure 1 depicts sampling sites and approximate locations for this project. In order to provide additional information on the relationships between diel dissolved oxygen swings, nutrients, and algal communities on large rivers, staff will attempt to deploy Onset Hobo® U26-001 D.O. data loggers at the 11 probabilistic sites.

B.2. Sampling Methods and Sample Handling

1. Water Chemistry Sampling

During three discrete sampling events, one team of two staff collect water chemistry grab samples, record water chemistry field measurements, and record physical site descriptions on the IDEM Stream Sampling Field Data Sheet (Attachment 2). All water chemistry sampling will adhere to the Water Chemistry Field Sampling Procedures (IDEM 2020c, DRAFT). Deploy a HOBO data logger at the 11 selected sites to collect dissolved orthophosphate. Collect samples on a separate sampling trip from the water chemistry sampling due to the shorter (96 hr.) holding times for this analyte. Water chemistry sampling usually takes 30 minutes to complete for each site, depending on accessibility.

2. Algal Sampling

In addition to standard water chemistry sampling, one or two teams consisting of two staff each will collect chlorophyll *a* from the seston community at sites with a drainage area greater than 1000 square miles. Collect periphyton community at all sites during the third round of water chemistry in September or October (Table 2). Sampling for a typical site that include all of the above parameters will require approximately 2.5 hours of effort. Use the Algal Biomass Lab Datasheet (Attachment 3) and Probabilistic Monitoring Section Physical Description of Stream Site Form (Attachment 4) to record information regarding substrates sampled for periphyton and physical parameters of the stream sampling area. Phytoplankton and Periphyton Field Collection Procedures (IDEM 2018b) describes the methods used in algal community sampling. Processing and Identification of Diatom Samples (IDEM 2015a) describes the methods used in diatom identification and enumeration.

3. Fish Community Sampling

Use various standardized electrofishing methodologies to perform fish community sampling. The method depends upon 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, Fish Community Field Collection Procedures (IDEM 2018a). Attempt to sample all available habitat types (i.e., pools, shallows). More potential habitat types are contained in Procedures for Completing the Qualitative Habitat Evaluation Index (IDEM 2019c, pp. 10 – 11). Ensure adequate fish community representation within the sample reach at the time of the sampling event. Utilize an electrofisher included in the following list: the Smith-Root LR-24 or LR-20B Series backpack electrofishers; the Smith-Root 1.5kVa electrofishing system; or Midwest Lake Electrofishing Systems (MLES) Infinity Control Box with MLES junction box and rattail 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 foot Loweline boat); or, for nonwadeable sites, the Smith-Root Type VI-A electrofisher or MLES Infinity Control Box assembled in a 16 foot Loweline boat (IDEM 1992a, 1992b, 1992c, 2018a).

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 cooler water temperatures, which may affect the responsiveness of some species to the electrical field. This lack of responsiveness can result in samples that are not representative of the stream’s fish assemblage, Fish Community Field Collection Procedures (IDEM 2018a).

Collect fish using dip nets with fiberglass handles and netting of 1/8 inch bag mesh. 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 2018a).

For each field taxonomist (generally the crew leader), a complete set of fish vouchers are retained for any different species encountered during the summer sampling season. Vouchers may consist of either preserved specimens or digital images. Prior to processing fish specimens and completing the fish community datasheet, preserve one to two positively identified individuals small enough to fit in a 2000 mL jar per new species encountered 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 2018a). Also, prior to sampling, 10% of the sites are randomly selected for revisit sampling. Preserve or photograph a few representative individuals of all species found at the revisit site to serve as vouchers. Prior to field work review the taxonomic characteristics of possible species encountered in the basin of interest. If fish a specimen cannot be positively identified in the field, consider preserving a voucher (i.e., those that co-occur like the Striped and Common Shiners or are difficult to identify when immature); individuals that appear to be hybrids or have unusual anomalies; dead specimens that are taxonomically valuable for undescribed taxa (e.g., Red Shiner or Jade Darter); life history studies; or research projects, Fish Community Field Collection Procedures (IDEM 2018a).

Record data for nonpreserved fish on the IDEM Fish Collection Data Sheet (Attachment 5) include the following: number of individuals; minimum and maximum total length (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 specimens were collected. Record data following laboratory taxonomic identification of preserved fish specimens, Fish Community Field Collection Procedures (IDEM 2018a).

4. Macroinvertebrate Community Sampling

Collect aquatic benthic macroinvertebrate samples using a modification of the U.S. EPA Rapid Bioassessment Protocol multihabitat (MHAB) approach using a D-frame dip net, Multi-habitat (MHAB) Macroinvertebrate Collection (IDEM 2019a). The IDEM MHAB approach (IDEM 2019a) is composed of a 1-minute “kick” sample within a riffle or run (collected by disturbing one square meter of stream bottom substrate in a riffle or run habitat and collecting the dislodged macroinvertebrates within the dip net); and a 50 meter “sweep” sample of additional instream habitats (collected by disturbing habitats 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 sampled 50 meter length of the riparian corridor at each site using a tape measure or rangefinder. If the stream is too deep to wade, use a boat to sample the best available habitat along the shoreline of the 50 meter zone. The 1-minute “kick”, if collected and 50 meter “sweep” samples are combined in a bucket of water. Elutriate the 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. The remaining sample is then transferred from the sieve to a white plastic tray. The collector, while still onsite, conducts a 15-minute pick of macroinvertebrates at a single organism rate with an effort to pick for maximum organism diversity and relative abundance. Accomplish by turning and examination of the entire sample in the tray. Preserve the resulting picked sample in 80% isopropyl alcohol; return to the laboratory for identification at the lowest practical taxonomic level (usually genus or species level, if possible); and evaluate using the MHAB macroinvertebrate IBI. Before leaving the site, complete an IDEM OWQ Macroinvertebrate Header Form (Attachment 6) for the sample, Procedures for Completing the Macroinvertebrate Header Field Data Sheet (IDEM 2019b).

5. Habitat Assessments

Complete habitat assessments immediately following macroinvertebrate and fish community sample collections at each site using a slightly modified version of the Ohio Environmental Protection Agency (OHEPA) QHEI, 2006 edition (Rankin 1995; OHEPA 2006). Complete a separate QHEI (Attachment 7) for each sample type, since the sampling reach lengths may differ (i.e., 50 meters for macroinvertebrates and between 50 and 500 meters for fish). Procedures for Completing the Qualitative Habitat Evaluation Index (IDEM 2019c) describes the method used in completing the QHEI (Attachment 7).

6. Field Parameter Measurements

Measure dissolved oxygen, pH, water temperature, specific conductance, and dissolved oxygen 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, Calibration of YSI Multiparameter Data Sondes (IDEM 2020b) and Water Chemistry Field Sampling Procedures (IDEM 2020c, DRAFT). Measure turbidity with a Hach turbidity kit and record 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. Record all field parameter measurements and weather codes on the IDEM Stream Sampling Field Data Sheet (Attachment 2) include other sampling observations. Take digital photos upstream and downstream of the site during each sampling event, Phytoplankton and Periphyton Field Collection Procedures (IDEM 2018b).

7. Dissolved Oxygen Continuous Data Logger Measurements

During the low flow portion of the sampling season (end of July to mid-September), deploy an Onset Hobo® U26-001 D.O. data logger in a representative location, within the targeted stream segment of 11 probabilistic sample sites. D.O. measurements are recorded at 10 minute intervals for no less than 14 consecutive days. Attach a programmed and calibrated data logger to a 16”x4”x8” cinder block, post, or other securing device dependent on the particular conditions observed at the stream sampling site. Place in a calm glide portion of the stream segment with a water depth of between 0.3 and 1.0 meters. Do not place the data logger directly below a riffle, a turbulent run, or in a deep pool. Place, as near as possible in the center of the cross sectional location of the channel. Determine the GPS coordinates point of the exact placement of each data logger using an agency approved handheld GPS unit which can verify horizontal precision within 5 meters or less, Global Position System (GPS) Data Creation (IDEM 2015b). Take at least one photograph or digital image of this placement point in relation to the stream reach to document location and stream flow conditions, to the extent possible, in a photograph. Record in-situ water quality measurements at the time of each data logger deployment. Upon retrieval of the D.O. data logger, offload all data to a Hobo U-DTW-1 Waterproof shuttle. Also record in-situ water quality measurements during the retrieval of each D.O. data logger. Once data are offloaded, return the data logger to the WAPB calibration room at the

Western Select Property IDEM OWQ laboratory. The laboratory prepares (programs and calibrates) the logger for deployment at another location.

B.3. Analytical Methods

Table 5 lists the field parameters, respective test method, and IDEM quantification limits. Table 6 lists the algal parameters, test method, and IDEM quantification limits. Table 7 shows water chemistry sample container, preservative, and holding time requirements (all samples iced to 4 °C). Table 8 lists numerous parameters (priority metals, anions or physical, and nutrients or organic), and respective test methods, IDEM reporting limits, and laboratory reporting limits. The IDEM OWQ Chain of Custody Form (Attachment 8) and the 2020 White River Water Sample Analysis Request Form (Attachment 9) accompany each sample set through the analytical process.

B.4. Quality Control and Custody Requirements

QA protocols will follow part B5 of the Surface Water QAPP (IDEM 2017a, p 170).

1. Water Chemistry Data

Use sample bottles and preservatives certified for purity. Sample collection procedures include the container, preservative used for each parameter, and holding times which adhere to U.S. EPA requirements for water chemistry testing (Table 7). Collect field duplicates, and matrix spike and matrix spike duplicates (MS/MSD) at the rate of one per sample analysis set or one per every 20 samples, whichever is greater. Additionally, take field blank samples using American Society for Testing and Materials (ASTM) D1193-91 Type I water at a rate of one set per sampling crew for each week of sampling activity. Pace Analytical Services, Inc. (Indianapolis, Indiana) processes water samples collected for nutrient analysis, following the specifications set forth in Request for Proposals 16-074 (IDEM 2016b). The Indiana State Department of Health (ISDH) analyzes orthophosphate. U.S. EPA Region 5 lab processes general chemistry and dissolved metals.

Table 5. Field Parameters showing method and IDEM quantification limit.

Parameters	Method	IDEM Quantification Limit
Dissolved oxygen (data sonde optical)	ASTM D888-09	0.05 mg/L
Dissolved oxygen % saturation (data sonde optical)	ASTM D888-09	0.05 %
pH (data sonde)	U.S. EPA 150.2	0.10 SU
pH (field pH meter)	SM 4500H-B [1]	0.10 SU
Specific conductance (data sonde)	SM 2510B	1.00 µmhos/cm
Temperature (data sonde)	SM 2550B(2)	0.1 Degrees Celsius (°C)
Temperature (field meter)	SM 2550B(2) [1]	0.1 Degrees Celsius (°C)
Turbidity (data sonde)	SM 2130B	0.02 NTU [2]
Turbidity (Hach™ turbidity kit)	U.S. EPA 180.1	0.05 NTU [2]

[1] Method used for field calibration check
[2] NTU = Nephelometric Turbidity Unit(s)
SM = Standard Method

Table 6. Algal Parameters showing method and IDEM quantification limit.

Algal Parameter	Method	IDEM Quantification Limit
Seston (Uncorrected; Non-Acidification Method) Chlorophyll *a* – suspended	Modified U.S. EPA 445.0	0.3 µg/L
Periphyton (Uncorrected; Non-Acidification Method) Chlorophyll *a* – attached	Modified U.S. EPA 445.0	0.3 µg/L

Table 7. Water Chemistry Sample Container, Preservative, and Holding Time Requirements[1]

Parameter	Container	Preservative	Holding Time
[1,2] Alkalinity as $CaCO_3$*	1 L, HDPE[4], narrow mouth	None	14 days
[3] Ammonia-N**	1 L, glass, Amber Boston Round	H_2SO_4 < pH 2	28 days
[1]Chloride*	1 L, HDPE, narrow mouth	None	28 days
Chemical oxygen demand**	1 L, glass, Amber Boston Round	H_2SO_4 < pH 2	28 days
Cyanide (All forms)	1 L, HDPE, narrow mouth	NaOH > pH 12	14 days
Hardness (as $CaCO_3$*) calculated	1 L, HDPE, narrow mouth	HNO_3 < pH 2	6 months
Metals (total and dissolved)	1 L, HDPE, narrow mouth	HNO_3 < pH 2	6 months
Nitrogen, Nitrate + Nitrite**	1 L, glass, Amber Boston Round	H_2SO_4 < pH 2	28 days
Total Phosphorus**	1 L, glass, Amber Boston Round	H_2SO_4 < pH 2	28 days
Orthophosphate, dissolved**	500 mL, Brown HDPE, narrow mouth	Dry ice	6 days
[1]Solids (all forms)*	1 L, HDPE, narrow mouth	None	7 days
[1]Sulfate*	1 L, HDPE, narrow mouth	None	28 days
Total Kjeldahl Nitrogen**	1 L, glass, Amber Boston Round	H_2SO_4 < pH 2	28 days
Total organic carbon**	1 L, glass, Amber Boston Round	H_2SO_4 < pH 2	28 days

[1]All samples iced to 4°C
[2]General chemistry includes all parameters noted with an *
[3]Nutrients include all parameters noted with a **
[4]HDPE – High density polyethylene

Table 8. Water Chemistry Parameters with Test Method and IDEM and Laboratory Reporting Limits.

Priority Metals (U.S. EPA Region 5 Lab)					
Parameter	Total	Dissolved	Test Method	IDEM-requested Reporting Limit (µg/L)	U.S. EPA Laboratory Reporting Limit (µg/L)
Aluminum	☒	☒	U.S. EPA 200.7	10	500
Antimony	☒	☒	U.S. EPA 200.8	1	1
Arsenic	☒	☒	U.S. EPA 200.8	2	2
Calcium	☒	☐	U.S. EPA 200.7	20	500
Cadmium	☒	☒	U.S. EPA 200.8	1	1
Chromium	☒	☒	U.S. EPA 200.8	3	2
Copper	☒	☒	U.S. EPA 200.8	2	2
Lead	☒	☒	U.S. EPA 200.8	2	0.5
Magnesium	☒	☐	U.S. EPA 200.7	95	200
Nickel	☒	☒	U.S. EPA 200.8	1.5	1
Selenium	☒	☒	U.S. EPA 200.8	4	2
Silver	☒	☒	U.S. EPA 200.8	0.3	1
Zinc	☒	☒	U.S. EPA 200.8	5	10

Nutrients/Organic (ISDH)			
Parameter	Test Method	IDEM-requested Reporting Limit (mg/L)	ISDH Laboratory Reporting Limit (mg/L)
Orthophosphate, Dissolved	U.S. EPA 365.1	0.006	0.002

Anions/Physical (U.S. EPA Region 5 Lab)			
Parameter	Test Method	IDEM-requested Reporting Limit (mg/L)	U.S. EPA Laboratory Reporting Limit (mg/L)
Alkalinity (as $CaCO_3$)	SM 2320B	10	20
Total Solids	SM 2540G	1	1%*
Total Suspended Solids	SM 2540D	1	5
Dissolved Solids	SM 2540C	10	20
Sulfate	U.S. EPA 300.0	0.05	0.125
Chloride	U.S. EPA 300.0	1	0.125
Hardness (as $CaCO_3$) by calculation	SM 2340B	0.4	2.07

Nutrients/Organic (Pace)			
Parameter	Test Method	IDEM-requested Reporting Limit (mg/L)	Pace Laboratory Reporting Limit (mg/L)
Total Kjeldahl Nitrogen (TKN)	U.S. EPA 351.2	0.1	0.5
Ammonia-N	U.S. EPA 350.1	0.01	0.1
Nitrogen, Nitrate + Nitrite	U.S. EPA 353.2	0.05	0.1
Total Phosphorus	U.S. EPA 365.1	0.01	0.05
Total Organic Carbon (TOC)	SM 5310C	1	1
Cyanide-Total	U.S. EPA 335.4	0.01	0.005
Cyanide-Weak Acid Dissociable	SM 4500CN-I	0.01	0.005
Chemical Oxygen Demand (COD)	U.S. EPA 410.4	3	10

SM: Standard Methods for the Examination of Water and Wastewater
U.S. EPA: United States Environmental Protection Agency
* 1% = 10,000 mg/L; when data are received, units will be converted from % to mg/L.

2. Algal Community Data

Record excessive algal conditions, if an algal bloom is observed on the water's surface or in the water column. Staff are not calibrated on this rating. The decision as to the severity of the bloom is based on best professional judgement. An algal mat on the surface of the water or a bloom giving the water the appearance of green paint would justify a decision of excessive algal conditions.

To decrease the potential for cross contamination and bias of the algal samples, clean all sample contact equipment after sampling has been completed at a given site. Clean with detergent and rinse with ASTM D1193-91 Type III water. Accurately and thoroughly complete all sample labels, include AIMS II sample numbers, date, stream name, and sampling location.

Complete Chain of Custody forms in the field to document the collection and transfer of samples to the laboratory. Upon arrival at the laboratory, the laboratory manager checks in the samples. Another Chain of Custody form for the diatom samples documents when the sample is removed from storage, processed, and made into a permanent mount.

View analysis methods for chlorophyll *a* in Table 6. The IDEM WAPB Algal Laboratory processes samples. Use the modified U.S. EPA Method 445.0, to determine the total chlorophyll *a* value. The "uncorrected" total chlorophyll *a* value is measured fluorometrically via a set of very narrow bandpass excitation and emission filters specific to chlorophyll *a*. No pheophytin *a* concentration is determined in the modified method, and this method is not impacted by other chlorophyll *a* degradation products which may be prevalent in inland waters. Run blank filters for periphyton and seston chlorophyll *a*. Process all chlorophyll *a* filters in triplicate for QC purposes (three filters are processed from the same sample per analysis method). Analyze ten percent of replicate field samples at a separate laboratory (TBD).

Document both field and laboratory data QC checks from the diatom sampling, enumeration, and identification project. Processing and Identification of Diatom Samples (IDEM 2015a, p. 22) describes QA/QC protocols. The Department of Biological and Environmental Sciences of Georgia College and State University (Milledgeville, Georgia) will verify at least ten percent of these diatom samples by following the specifications set forth in IDEM 2015a.

3. Fish Community Data

Perform fish community sampling revisits at a rate of 10 percent of the total fish community sites sampled, approximately 6, Fish Community Field Collection Procedures (IDEM 2018a). Perform revisit sampling with at least two weeks of recovery between the initial and revisit sampling events. Perform fish community revisit sampling and habitat assessment with either a partial or complete change in field team members (IDEM 2018a). Use the resulting IBI and QHEI total scores between the initial visit and the revisit to evaluate precision. Track samples from the field to the laboratory using the IDEM OWQ Chain of Custody Form (Attachment 8). Regionally recognized non-IDEM freshwater fish taxonomists (e.g., Brant Fisher, Nongame Aquatic

Biologist, IN DNR) may verify fish taxonomic identifications made by IDEM laboratory staff. For all raw data: 1) check for completeness; 2) utilize to calculate derived data (i.e., total weight of all specimens of a taxon), which is entered into the AIMS II database; and 3) check again for data entry errors.

4. Macroinvertebrate Community Data

Collect duplicate macroinvertebrate field samples at sites which are randomly selected prior to the beginning of the field season. Duplicate samples occur at a rate of 10 percent of the total macroinvertebrate community sites sampled, approximately four in the basin. The same team member, performing the original sample, performs the macroinvertebrate community and corresponding habitat assessment. Conduct the duplicate sampling immediately after collecting the initial sample. Evaluate precision based upon the duplicate of samples collected. Divide sites in the basin equally among the macroinvertebrate staff. Each staff is responsible for collecting at least one duplicate sample. Track samples from the field to the laboratory with the IDEM OWQ Chain of Custody Form (Attachment 8). The IDEM macroinvertebrate laboratory supervisor maintains laboratory identifications and QA/QC of taxonomic work. An outside taxonomist verifies 10% of samples. The initial samples taken at sites where duplicate samples were collected per Multihabitat (MHAB) Macroinvertebrate Collection (IDEM 2019a).

B.5. Field Parameter Measurements and Instrument Testing and Calibration

Calibrate the data sonde immediately prior to each week's sampling per Calibration of YSI Multiparameter Data Sondes (IDEM 2020b). Conduct the dissolved oxygen component of the calibration procedure using the air calibration method. Record, maintain, store, archive calibration results, and drift values in the calibration laboratories at the WAPB facility. The drift value is the difference between two successive calibrations. Field parameter calibrations will conform to the procedures described in the instrument user's manuals and (IDEM 2020b). Field check the unit for accuracy once during the week by comparison with an YSI D.O. meter (IDEM 2020b), Hach turbidity, and Oakton pH and temperature meters. Record weekly field calibrations in the field calibrations portion of IDEM Stream Sampling Field Data Sheet (Attachment 2) and enter into the AIMS II database. Also, at field sites where the dissolved oxygen concentration is 4.0 mg/L or less use the YSI D.O. meter readings.

The Onset Hobo® U26-001 D.O. data loggers utilize optical D.O. measurement technology specified in ASTM D888-12. Follow the manufacturers calibration and maintenance procedures listed in the HOBO® Dissolved Oxygen Logger (U26-001) Manual or Nutrients/Diel Dissolved Oxygen Pilot Study: Sampling Work Plan 2017 (IDEM 2017b).

Collect in-situ water chemistry field data using calibrated or standardized equipment. Perform calculations in the field or later at the office. Detection limits and ranges have been set for each analysis. Perform QA checks on information for field or laboratory results to assess precision, accuracy, and completeness for the project, as described in the Surface Water QAPP (IDEM 2017a Section C1.1 on p. 176).

Phytoplankton and Periphyton Field Collection Procedures (IDEM 2018b) describes the equipment required for the collection of periphyton. None of this equipment requires calibration. Equipment has been field tested to ensure its capability of appropriately removing periphyton from different types of substrate (rocks, sticks, sand or silt).

Use a Turner Designs Trilogy Laboratory Fluorometer with the Chlorophyll α Non-Acidification Bandpass Filter Module to determine chlorophyll *a* concentrations. Calibrate the instruments according to manufacturers' and methods' specifications at the beginning of the sampling season and as needed. Perform calibration verification checks during each analysis.

Processing and Identification of Diatom Samples (IDEM 2015a) describes the equipment required for the preparation of permanent diatom mounts. Other than the micropipetter, none of the laboratory equipment requires calibration. Check and calibrate the micropipetter according to manufacturer's specifications, as necessary.

Use a Nikon differential interference contrast (DIC) microscope, and Nikon Elements D camera and imaging system for identification and enumeration of diatoms. Branch staff calibrate the ocular reticle in the microscope. Calibrate the ocular reticle at each magnification with a stage micrometer. If the microscope is moved to a new location, check the calibration again.

C. Assessment and Oversight

C.1. Assessments and Response Actions

Conduct performance and system audits to ensure good quality data. Field and laboratory performance checks include:

- Precision measurements by relative percent difference (RPD) of field and laboratory duplicates per Surface Water QAPP (IDEM 2017a, pp. 56, 61 – 63).
- Accuracy measurements by percent of recovery of MS/MSD samples analyzed in the laboratory (IDEM 2017a, pp. 58, 61 – 63).
- Completeness measurements by the percent of planned samples actually collected, analyzed, reported, and usable for the project (IDEM 2017a, p. 58).

IDEM WAPB staff conduct field audits biannually to ensure sampling activities adhere to approved SOPs. WAPB QA staff conduct systematic audits to include all WAPB personnel engaged in field sampling activities. QA 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. QA staff produce an evaluation report documenting each audit for review by field staff audited, and WAPB management. As a result of the audit process, communicate corrective actions to field staff who will implement the corrections, Surface Water QAPP (IDEM 2017a, p. 176 – 177).

C.2. Data Quality Assessment Levels

The samples and various types of data collected by this program are intended to meet the QA criteria and rated Data Quality Assessment (DQA) Level 3, as described in the Surface Water QAPP (IDEM 2017a, pp. 182 – 183).

D. Data Validation and Usability

QA reports to management, and data validation and usability are also important components of the QAPP which ensures good quality data for this project. Should problems arise and require investigation and correction, submit a QA audit report to the QA manager and project manager for review. The following steps ensure data meets the project DQO and allow assessment by users:

- Reduce (convert raw analytical data into final results in proper reporting units).
- Validate (qualify data based on the performance of field and laboratory QC measures incorporated into the sampling and analysis procedures).
- Report (completely document the calibration, analysis, QC measures, and calculations).

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

Use the various data qualifiers and flags for QA and validation of the data found in the Surface Water QAPP (IDEM 2017a pp. 184 – 185).

D.2. Reconciliation with User Requirements

Qualify the environmental project data (each lab or field result) usability per Surface Water QAPP (IDEM 2017a p. 184). Categorize data in one or more of the following classifications.

- Acceptable Data
- Enforcement Capable Results
- Estimated Data
- Rejected Data

D.3. Information, Data, and Reports

Record 2020 data collected in the AIMS II database. Present the data in two compilation summaries. The first summary uses a general compilation of the 2020 White River mainstem field and water chemistry data in the 2024 Indiana Integrated Water Monitoring and Assessment Report. The second summary uses a database report format containing biological results and habitat evaluations in the Integrated Report and in individual site folders. All site folders are maintained 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.).

D.4. Laboratory and Estimated Cost

Project laboratory analysis and data reporting will comply with the Surface Water QAPP (IDEM 2017a), Request for Proposals 16-074 (IDEM 2016b), and the Office of Water Quality Assessment Branch Quality Management Plan (IDEM 2018).

The following water chemistry parameters analytical tests are outlined in Table 8 and performed by the following labs:

- General chemistry and total and dissolved metals – U.S. EPA Region 5 Lab in Chicago, Illinois
- Nutrients – Pace Analytical Services in Indianapolis, Indiana (accreditation in Appendix 1)
- Dissolved orthophosphate – ISDH
- Chlorophyll *a* – IDEM WAPB Algal Laboratory staff
- Collect and analyze all fish samples – IDEM staff
- Diatom identification and enumeration – IDEM staff
- Collect and analyze all macroinvertebrate samples – IDEM staff
- 10% of diatom samples validation – the Department of Biological and Environmental Sciences, Georgia College and State University
- 10% of macroinvertebrate samples validation – Rhithron Associates, Inc.

The anticipated budget for the project's laboratory costs are outlined in Table 9.

Table 9. Total Estimated Laboratory Cost for the Project.

Analysis	Number of Samples Collected	Laboratory	Estimated Cost
General chemistry, total and dissolved metals	3 times @ 48 sites + 9 duplicates + 9 field blanks + 9 MS/MSD (1 per sample week) = 162 samples for general chemistry and 324 samples for total and dissolved metals (average 18 samples per analysis set)	US EPA Region 5 Analytical Services Branch 536 S. Clark Street 10th Floor Chicago, IL 60605 By processing these samples at the U.S. EPA Region 5 Lab, $55,000 is going toward Development of a Coolwater IBI. Nitric acid preservatives for metals will be purchased from MG Scientific which is shown in the estimated cost.	$858
Nutrients	3 times @ 48 sites + 9 duplicates + 9 field blanks (1 per sample week) = 162 samples (average 18 samples per analysis set)	Pace Analytical Services 7726 Moller Road. Indianapolis, Indiana 46268	$25,000
Dissolved orthophosphate	3 times @ 11 sites + 3 duplicates + 3 field blanks (1 per sample week) = 39 samples	ISDH, Environmental Laboratory Division 550 West 16th Street Indianapolis, IN 46202	$0
Algal biomass	1 time @ 11 sites + 2 duplicates (1 per sample week) = 13 samples	IDEM WAPB Algal Laboratory 2525 Shadeland Avenue, Indianapolis, IN 46204	$1,827
Diatom identification and enumeration	1 time @ 11 sites + 2 duplicates (1 per sample week) = 13 samples 2 samples (10%) sent out for verification	Department of Biological and Environmental Sciences Georgia College and State University 320 S. Wayne St. Milledgeville, Georgia 31061	$600
Macroinvertebrate identification	1 time @ 11 sites + 2 duplicates = 13 samples 2 samples (10%) sent out for verification	Rhithron Associates, Inc. 33 Fort Missoula Road Missoula, Montana 59804	$440
		Total	$28,725

D.5. Reference Manuals and Personnel Safety

Table 10. Personnel Safety and Reference Manuals

Role	Required Training or Experience	Training References	Training Notes
All staff that participate in field activities	-Basic First Aid and Cardiopulmonary Resuscitation (CPR)	-A minimum of 4 hours of in-service training provided by WAPB (IDEM 2010a)	-Staff lacking 4 hours of in-service training or appropriate certification will be accompanied in the field at all times by WAPB staff that meet Health and Safety Training requirements
	-Personal Protective Equipment (PPE) Policy	-IDEM 2008	-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.
	-Personal Flotation Devices (PFD)	-February 29, 2000 WAPB internal memorandum regarding use of approved PFDs	

References

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

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Attachment 1. IDEM Site Reconnaissance Form

IDEM

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 2. IDEM 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	◇ 1 ◇ 2 ◇ 3 ◇ 4	◇ Riffle ◇ Dry ◇ Stagnant	◇ Clear ◇ Green ◇ Sheen	◇ 0-20% ◇ 60-80%
◇ No; Stream Dry ◇ No; Other	◇ 6 ◇ 8 ◇ 12 ◇ 24	◇ Pool ◇ Run ◇ Flood	◇ Murky ◇ Black ◇ Other	◇ 20-40% ◇ 80-100%
◇ No; Owner refused Access	◇ 48 ◇ 72 ◇ AS-Flow	◇ Glide ◇ Eddy ◇ Other	◇ Brown ◇ Gray (Septic/Sewage)	◇ 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	8 Rain	00 North (0 degrees)	0 Calm	1 < 32
2 Scattered	9 Snow	09 East (90 degrees)	1 Light	2 33-45
3 Partly	10 Sleet	18 South (180 degrees)	2 Mod./Light	3 46-60
4 Cloudy		27 West (270 degrees)	3 Moderate	4 61-75
5 Mist			4 Mod./Strong	5 76-85
6 Fog			5 Strong	6 > 86
7 Shower			6 Gale	

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: ________________

Attachment 3. IDEM Algal Biomass Lab Data Sheet

Algal Biomass Lab Datasheet

Sample #	Site	Stream

Supporting Site Information

Traditional Forestry % Closed Canopy: ☐ <=10m ☐ >10m (Measure center only if width <=10m, record to nearest whole percent)

	North	East	South	West	Average x 1.04 =
Left Bank					
Center					
Right Bank					
Total %CC (Average from above, or Center only = %CC)				100 - %CC	

Phytoplankton Information

Sampling Method: ☐ Grab Sample (Dip) ☐ Multiple Verticles Number of Verticles:

Chlorphyll A	Blank	Filter 1	Filter 2	Filter 3	Filter 4
Sample Time					
Sample Volume (mL)					

Periphyton Information

Periphyton Habitat: ☐ Epilithic (Area-Scape) ☐ Epidendric (Cylinder Scrape) ☐ Epipsammic (Petri Dish)

Diatom Sample Collected: ☐ Yes ☐ No Diatom Volume: mL Formalin Volume: mL Slurry Volume mL

Chlorphyll A	Blank	Filter 1	Filter 2	Filter 3	Filter 4
Sample Time					
Sample Volume (mL)					

Periphyton Area Calculation

Cylinder Scrape

Snag #	Length (cm)(L)	Circumference U_1	U_2	U_3	U	Area (L * U)
1						
2						
3						
4						
5						
					Total Area (cm²)	

Area Scrape (Using SG-92)

Rock#	1	2	3	4	5
Area (cm²)	7.38	7.38	7.38	7.38	7.38
Total (cm²)	36.9				

Petri Dish

Number of Discrete Samples (n):	
Total Area of One Sampler (a):	19.01 cm²
Total Sample Area (n * a):	

Stream Discharge / Rainfall Information

Nearest USGS Gage Site: ☐ Upstream ☐ Downstream ☐ No USGS Gage Near

River miles from site: Discharge CFS at sampling: CFS

Gage location: Discharge days since 50% flow exceeded: days

Rainfall data source: ☐ NOAA ☐ CoCoRaHS ☐ Indiana State Climate Office ☐ USGS gage rain gauge ☐ Other:

Total precipitation at sampling: in. on date: Cumulative rain 7 days previous to sampling: in.

Rain station location, county: Inches since last rainfall previous to sampling: in.
Days since last rainfall previous to sampling: days

Identifier	Date	Reviewer 1	Date	Reviewer 2	Date	Notes:
		☐ Review 1 Completed		☐ Review 2 Completed		

Attachment 4. IDEM Physical Description of Stream Site Form (front)

Revised 4/20/12

Probabilistic Monitoring Section Physical Description of Stream Site

Stream : ____________________ **AIMS #** ____________ **Program #:** ________

Date: ________ **Time:** ________ **Crew Chief:** ______________ **Crew** ________

General Stream Description:

____

____

____

____

____

Characteristics at the site and immediately upstream (check All that apply).

Outer Riparian Zone

L R

- ☐ ☐ Agricultural Row crop
- ☐ ☐ Agricultural Pasture
- ☐ ☐ Devoid of Vegetation
- ☐ ☐ Fallow
- ☐ ☐ Forested
- ☐ ☐ Residential
- ☐ ☐ Commercial/Industrial
- ☐ ☐ Weeds and Scrub
- ☐ ☐ Other ______________

Inner Riparian Zone (L R)	L.Width(m)	R.Width(m)
☐ ☐ Agricultural Rowcrop	_____	_____
☐ ☐ Agricultural Pasture	_____	_____
☐ ☐ Devoid of Vegetation	_____	_____
☐ ☐ Fallow	_____	_____
☐ ☐ Forest	_____	_____
☐ ☐ Residential	_____	_____
☐ ☐ Commercial/Industrial	_____	_____
☐ ☐ Treeline	_____	_____
☐ ☐ Weeds and Scrub		
☐ ☐ Other __________	_____	_____

Flow above site

- ☐ Riffle
- ☐ Pool
- ☐ Eddy
- ☐ Run
- ☐ Glide
- ☐ Other ____________

____

____

Flow at site

- ☐ Riffle
- ☐ Pool
- ☐ Eddy
- ☐ Run
- ☐ Glide
- ☐ Other ____________

____

____

Substrate (if visable)

- ☐ Cobble
- ☐ Boulder
- ☐ Sand
- ☐ Muck
- ☐ Silt
- ☐ Gravel
- ☐ Bedrock
- ☐ Other ____________

Characteristics at site and immediately upstream (check ONE).

Water Description

- ☐ Clear
- ☐ Grey (Septic)
- ☐ Murky
- ☐ Black
- ☐ Brown
- ☐ Green
- ☐ Other ____________

Sinuosity of Channel

- ☐ High
- ☐ Moderate
- ☐ Low
- ☐ Channelized

Discharge Pipe Present

- ☐ No
- ☐ Yes

If yes, Effluent Flowing?

- ☐ No
- ☐ Yes

Description of Effluent _____

____

Continued on back

Attachment 4. IDEM Physical Description of Stream Site Form (back)

Revised 4/20/12

Stream Bank

Functional Slope: L R	Bank Erosion: L R	
☐☐ 0-30°	☐☐ Low	Percent Canopy Closed: ______
☐☐ 31-50°	☐☐ Moderate	Stream Stage 1-5 (Low-High): ______
☐☐ 51-70°	☐☐ High	Velocity of Stream 1-5 (Slow-Fast): ______
☐☐ 71-90°		

Visible Stream Degradation? ☐ Yes ☐ No

Description:______________________________

Aquatic Life Observed? ☐ Yes ☐ No

Description: ______________________________

Algae Observed? ☐ Yes ☐ No

Description: ______________________________

Rooted Macrophytes Observed? ☐ Yes ☐ No

Description: ______________________________

Additional Comments:

____
____
____
____

Follow Up Date:_______Time:________Crew Chief:__________Crew:___________

____
____
____
____

Follow Up Date:_______Time:________Crew Chief:__________Crew:___________

____
____
____
____

Photography Date:_______ Time:_______ Number(s):_______; _______;_______

Notes (include items relevant for determining scale – items of known measurement, etc.)

____
____
____

Attachment 5. IDEM Fish Collection Data Sheet (front)

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 Fish Collection Data Sheet (back)

Event ID_____________ Page _____ of ______

								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												
								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

Attachment 6. IDEM OWQ Macroinvertebrate Header

IDEM

Office of Water Quality: Macroinvertebrate Header

L-Site	Stream Name	Location	County	Surveyor

Sample Date	Sample #	Macro#	# Containers

Macro Sample Type:
☐ Black Light ☐ Kick
☐ CPOM ☐ MHAB
☐ Hester-Dendy ☐ Qualitative

☐ Normal ______
☐ Duplicate ______
☐ Replicate ______

☐ **Habitat Complete** ☐ **Sample Quality Rejected**

Macro Sub Sample (Field or Lab): ______________

Macro Reach Sampled (m): ______________

Riparian Zone/Instream Features

Watershed Erosion:
☐ Heavy
☐ Moderate
☐ None

Watershed NPS Pollution:
☐ No Evidence
☐ Obvious Sources
☐ Some Potential Sources

Stream Depth Riffle (m):	Stream Depth Run (m):	Stream Depth Pool (m):

Distances Riffle-Riffle (m):	Distances Bend-Bend (m):

Stream Width (m):	High Water Mark (m):

Stream Type:
☐ Cold
☐ Warm

Turbidity (Est):
☐ Clear ☐ Slightly Turbid
☐ Opaque ☐ Turbid

☐ **Channelization** ☐ **Dam Present**

Predominant Surrounding Land Use: ☐ Forest ☐ Field/Pasture ☐ Agricultural ☐ Residential ☐ Commercial ☐ Industrial
Other ______________

Sediment

Sediment Odors: ☐ Normal ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☐ None Other ______________
Sediment Deposits: ☐ Sludge ☐ Sawdust ☐ Paper Fiber ☐ Sand ☐ Relic Shells Other ______________
Sediment Oils: ☐ Absent ☐ Moderate ☐ Profuse ☐ Slight
☐ Are the undersides of stones, which are not deeply embedded, black?

Substrate Components

(Note: Select from 0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, or 100% for each inorganic/ organic substrate component)

Inorganic Substrate Components (% Diameter)						
Bedrock	Boulder (>10 in)	Cobble (2.5-10 in)	Gravel (0.1-2.5 in)	Sand (gritty)	Silt	Clay (slick)

Organic Substrate Components (% Type)			
Detritus (sticks, wood)	Detritus (CPOM)	Muck/Mud (black, fine FPOM)	Marl(gray w/ shell fragments)

Water Quality

Water Odors: ☐ Normal ☐ Sewage ☐ Petroleum ☐ Chemical ☐ None Other ______________
Water Surface Oils: ☐ Slick ☐ Sheen ☐ Glob ☐ Flocks ☐ None

IDEM 03/8/18

Attachment 7. IDEM OWQ Biological Qualitative Habitat Evaluation Index (front)

IDEM

OWQ Biological QHEI (Qualitative Habitat Evaluation Index)

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]

(L R)

- ☐☐ 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]
- ☐ VERY FAST [1]
- ☐ FAST [1]
- ☐ MODERATE [1]
- ☐ SLOW [1]
- ☐ INTERSTITIAL [-1]
- ☐ INTERMITTENT [-2]
- ☐ 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 < 5 cm [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) ☐ VERY LOW - LOW [2 – 4] ☐ MODERATE [6 - 10] ☐ HIGH - VERY HIGH [10 - 6]

DRAINAGE AREA (mi²)

%POOL: ☐ **%GLIDE:** ☐ **%RUN:** ☐ **%RIFFLE:** ☐

Gradient Maximum 10

Entered ____________ QC1 ____________ QC2 ____________ IDEM 02/28/2018

Attachment 7 (continued). IDEM OWQ Biological QHEI (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 ft^2	☐ > 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 Drawing:

IDEM 02/28/2018

Attachment 8. 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 9. 2020 White River Mainstem Water Sample Analysis Request Form

IDEM

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

Water Sample Analysis Request

Project Name: 2020 White River Mainstem   **Composite** ☐ **Grab** ☒

OWQ Sample Set	20SPW	IDEM Sample Nos.	
Crew Chief	Kevin Gaston	Lab Sample Nos.	
Collection Date	, 2020	Lab Delivery Date	

Anions and Physical Parameters

Parameter	Test Method	Total	Dissolved
Alkalinity	310.2	☐ **	☐
Total Solids	SM2540B	☐ **	
Suspended Solids	SM2540D	☐ **	
Dissolved Solids	SM2540C		☐ **
Sulfate	300.0	☐ **	☐ **
Chloride	300.0	☐ **	☐
Hardness (Calculated)	SM-2340B	☐ **	☐
Fluoride	SM4500-F-C	☐ **	☐

Priority Pollutant Metals Water Parameters

Parameter	Test Method	Total	Dissolved
Antimony	200.8	☐	☐
Arsenic	200.8	☐	☐
Beryllium	200.8	☐	☐
Cadmium	200.8	☐	☐
Chromium	200.7	☐	☐
Copper	200.8	☐	☐
Lead	200.8	☐	☐
Mercury, Low Level	1631, Rev E.	☐	☐
Nickel	200.8	☐	☐
Selenium	200.8	☐	☐
Silver	200.8	☐	☐
Thallium	200.8	☐	☐
Zinc	200.7	☐	☐

Cations and Secondary Metals Parameters

Parameter	Test Method	Total	Dissolved
Aluminum	**200.7**, 200.8	☐	☐
Barium	200.8	☐	☐
Boron	200.8	☐	☐
Calcium	**200.7**, 200.8	☐ ***	☐
Cobalt	200.8	☐	☐
Iron	200.7	☐	☐
Magnesium	**200.7**, 200.8	☐ ***	☐
Manganese	200.8	☐	☐
Sodium	200.7	☐	☐
Silica, Total Reactive	200.7	☐	☐
Strontium	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	SM4500NH3-G	☒	☐
CBOD$_5$	SM5210B	☐	
Total Kjeldahl Nitrogen (TKN)	SM4500N(Org)	☒	☐
Nitrate + Nitrite	353.2	☒	☐
Total Phosphorus	365.1	☒	☐
TOC	SM 5310C	☒	☐
COD	410.4	☒	☐
Cyanide (Total)	335.4	☒	☐
Cyanide (Free)	SM4500CN-I	☒ *	☐
Cyanide (Amenable)	SM4500CN-G	☐ *	☐
Sulfide, Total	376.2	☐	☐

RFP 16-74 Contract Number:	018620 (Pace-Indy) PO # 0020000887-4 (Pace-Indy)

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 as Total Hardness components*

Testing Laboratory: Pace Analytical Services, Inc.
Attn: Sue Brotherton
Phone: 317-228-3136 7726 Moller Road
Indianapolis, IN 46268

Appendix 1. Pace Laboratory Inc., Indianapolis: Accreditation Documents

State of Kansas

Department of Health and Environment

CERTIFICATE

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

Pace Analytical Services, Inc - Indianapolis IN

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: 5/1/2020 | Expiration Date: 4/30/2021

Director
Office of Laboratory Services

Certification Section Chief
Office of Laboratory Services

Appendix 1. Pace Laboratory Inc., Indianapolis: Accreditation Documents (cont.)

Division of Environment
Kansas Health and Environmental Laboratories
Environmental Laboratory Improvement Program
6810 SE Dwight Street
Topeka, KS 66620-0001

Kansas
Department of Health
and Environment

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

Lee A. Norman, M.D., 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: 5/1/2020 Accreditation End: 4/30/2021

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

Pace Analytical Services, Inc - Indianapolis IN **Primary AB**

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

Method ASTM D516-07	
Sulfate	KS
Method ASTM D516-11	
Sulfate	KS
Method EPA 1631E	
Mercury	KS
Method EPA 1664A	
Oil & Grease	KS
Method EPA 180.1	
Turbidity	KS
Method EPA 200.7	
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

Appendix 1. Pace Laboratory Inc., Indianapolis: Accreditation Documents (cont.)

Pace Analytical Services, Inc - Indianapolis IN

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

	Primary AB
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	
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-nitrite	KS
Nitrite	KS
Sulfate	KS
Method EPA 335.4	
Amenable cyanide	KS
Cyanide	KS

Appendix 1. Pace Laboratory Inc., Indianapolis: Accreditation Documents (cont.)

EPA Number: ***IN00043*** **Scope of Accreditation for Certification Number: E-10177** Page 3 of 25

Pace Analytical Services, Inc - Indianapolis IN **Primary AB**

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

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-nitrite	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
Aldrin	KS
alpha-BHC (alpha-Hexachlorocyclohexane)	KS
Aroclor-1016 (PCB-1016)	KS
Aroclor-1221 (PCB-1221)	KS
Aroclor-1232 (PCB-1232)	KS

Appendix 1. Pace Laboratory Inc., Indianapolis: Accreditation Documents (cont.)

EPA Number: ***IN00043*** **Scope of Accreditation for Certification Number: E-10177** Page 4 of 25

Pace Analytical Services, Inc - Indianapolis IN

	Primary AB
Program/Matrix: ***CWA (Non Potable Water)***	
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
Ethylbenzene	KS
Methyl bromide (Bromomethane)	KS
Methyl chloride (Chloromethane)	KS
Methylene chloride (Dichloromethane)	KS
Naphthalene	KS
Tetrachloroethylene (Perchloroethylene)	KS

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Appendix 1. Pace Laboratory Inc., Indianapolis: Accreditation Documents (cont.)

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Pace Analytical Services, Inc - Indianapolis IN **Primary AB**

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

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-Nitrophenol	KS
3,3'-Dichlorobenzidine	KS
4-Bromophenyl phenyl ether	KS
4-Chloro-3-methylphenol	KS
4-Chlorophenyl phenylether	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
bis(2-Chloroethyl) ether	KS
Butyl benzyl phthalate	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

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Pace Analytical Services, Inc - Indianapolis IN

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

	Primary AB
Fluoranthene	KS
Fluorene	KS
Hexachlorobenzene	KS
Hexachlorobutadiene	KS
Hexachloroethane	KS
Indeno(1,2,3-cd) pyrene	KS
Isophorone	KS
Naphthalene	KS
Nitrobenzene	KS
n-Nitrosodimethylamine	KS
n-Nitrosodi-n-propylamine	KS
n-Nitrosodiphenylamine	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	
1,1,2-Trichloro-1,2,2-trifluoroethane	KS
1,3,5-Trichlorobenzene	KS
Method EPA 8270C	
1-Methylnaphthalene	KS
Carbazole	KS
Method OIA 1677-09	
Available Cyanide	KS
Free cyanide	KS
Method SM 2310 B-2011	
Acidity, as CaCO3	KS
Method SM 2320 B-2011	
Alkalinity as CaCO3	KS
Method SM 2340 B-2011	
Hardness	KS
Method SM 2540 B-2011	
Residue-total	KS
Method SM 2540 C-2011	
Residue-filterable (TDS)	KS
Method SM 2540 D-2011	
Residue-nonfilterable (TSS)	KS
Method SM 2540 F-2011	
Residue-settleable	KS

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Appendix 1. Pace Laboratory Inc., Indianapolis: Accreditation Documents (cont.)

Pace Analytical Services, Inc - Indianapolis IN **Primary AB**

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

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-2011	
Cyanide	KS
Method SM 4500-CN¯ E-2011	
Cyanide	KS
Method SM 4500-CN¯ G-2011	
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-2000	
Sulfide	KS
Method SM 4500-S2¯ D-2011	
Sulfide	KS
Method SM 5210 B-2011	
Biochemical oxygen demand	KS
Carbonaceous BOD, CBOD	KS
Method SM 5310 C-2011	
Total organic carbon	KS
Method SM 5540 C-2011	
Surfactants - MBAS	KS
Method TKN-NH3-CAL	
Organic nitrogen	KS

Appendix 1. Pace Laboratory Inc., Indianapolis: Accreditation Documents (cont.)

Pace Analytical Services, Inc - Indianapolis IN

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

	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
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

Appendix 1. Pace Laboratory Inc., Indianapolis: Accreditation Documents (cont.)

Pace Analytical Services, Inc - Indianapolis IN

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

	Primary AB
Manganese	KS
Molybdenum	KS
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 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
Endrin	KS
Endrin aldehyde	KS
Endrin ketone	KS
gamma-BHC (Lindane, gamma-HexachlorocyclohexanE)	KS

Appendix 1. Pace Laboratory Inc., Indianapolis: Accreditation Documents (cont.)

Pace Analytical Services, Inc - Indianapolis IN

	Primary AB
Program/Matrix: ***RCRA (Non Potable Water)***	
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
Chloramben	KS
Dalapon	KS
DCPA di acid degradate	KS
Dicamba	KS
Dichloroprop (Dichlorprop)	KS

Appendix 1. Pace Laboratory Inc., Indianapolis: Accreditation Documents (cont.)

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Pace Analytical Services, Inc - Indianapolis IN

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

	Primary AB
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	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

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Pace Analytical Services, Inc - Indianapolis IN

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

	Primary AB
Bromochloromethane	KS
Bromodichloromethane	KS
Bromoform	KS
Carbon disulfide	KS
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

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Pace Analytical Services, Inc - Indianapolis IN

	Primary AB
Program/Matrix: *RCRA (Non Potable Water)*	
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-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

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Pace Analytical Services, Inc - Indianapolis IN

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

	Primary AB
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
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

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Pace Analytical Services, Inc - Indianapolis IN

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

	Primary AB
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-Nitrosomethylethalamine	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
Benzo(a)anthracene	KS
Benzo(a)pyrene	KS
Benzo(b)fluoranthene	KS
Benzo(g,h,i)perylene	KS
Benzo(k)fluoranthene	KS
Chrysene	KS
Dibenz(a,h) anthracene	KS

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Pace Analytical Services, Inc - Indianapolis IN

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

	Primary AB
Fluoranthene	KS
Fluorene	KS
Indeno(1,2,3-cd) pyrene	KS
Naphthalene	KS
Phenanthrene	KS
Pyrene	KS
Method EPA 9012A	
Amenable cyanide	KS
Cyanide	KS
Method EPA 9038	
Sulfate	KS
Method EPA 9056A	
Bromide	KS
Chloride	KS
Fluoride	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

Appendix 1. Pace Laboratory Inc., Indianapolis: Accreditation Documents (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

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Pace Analytical Services, Inc - Indianapolis IN

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

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Appendix 1. Pace Laboratory Inc., Indianapolis: Accreditation Documents (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
Silvex (2,4,5-TP)	KS

Appendix 1. Pace Laboratory Inc., Indianapolis: Accreditation Documents (cont.)

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Pace Analytical Services, Inc - Indianapolis IN **Primary AB**

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

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	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
Carbon tetrachloride	KS
Chlorobenzene	KS

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Pace Analytical Services, Inc - Indianapolis IN

	Primary AB
Program/Matrix: ***RCRA (Solid & Hazardous Material)***	
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	
1,2,4,5-Tetrachlorobenzene	KS
1,2,4-Trichlorobenzene	KS
1,2-Dichlorobenzene (o-Dichlorobenzene)	KS

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Pace Analytical Services, Inc - Indianapolis IN

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

	Primary AB
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
5-Nitro-o-toluidine	KS
7,12-Dimethylbenz(a) anthracene	KS
a-a-Dimethylphenethylamine	KS

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Pace Analytical Services, Inc - Indianapolis IN

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

	Primary AB
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
Isosafrole	KS
Kepone	KS
Methapyrilene	KS

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

	Primary AB
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-Nitrosomethylethalamine	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
Benzo(a)anthracene	KS
Benzo(a)pyrene	KS
Benzo(b)fluoranthene	KS
Benzo(g,h,i)perylene	KS
Benzo(k)fluoranthene	KS
Chrysene	KS
Dibenz(a,h) anthracene	KS
Fluoranthene	KS
Fluorene	KS
Indeno(1,2,3-cd) pyrene	KS
Naphthalene	KS
Phenanthrene	KS
Pyrene	KS

Appendix 1. Pace Laboratory Inc., Indianapolis: Accreditation Documents (cont.)

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