



Site Reconnaissance Procedure
B-002-OWQ-WAP-PRB-23-S-R1
Standard Operating Procedure (SOP)
Office: Office of Water Quality
Branch: Watershed Assessment and Planning Branch
Section: All

Last Revised: January 25, 2023
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Purpose

The purpose of this standard operating procedure (SOP) is to ensure that the site reconnaissance procedure is completed in a consistent manner.

Scope

This SOP applies to Indiana Department of Environmental Management (IDEM) Office of Water Quality (OWQ) Watershed Assessment and Planning Branch (WAPB) staff who perform reconnaissance on river and stream sites as part of IDEM's surface water quality monitoring program.

Authorizing Signatures

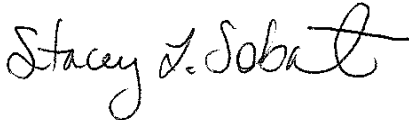
I approve and authorize this standard operating procedure:



Michael Schneider, Environmental Manager
Targeted Monitoring Section, OWQ

1/25/23

Date



Stacey Sobat, Section Chief
Probabilistic Monitoring Section, OWQ

2/2/23

Date



Ali Meils, Section Chief
Targeted Monitoring Section, OWQ

2/14/23

Date



Caleb Rennaker, Section Chief
Technical and Logistical Services Section, OWQ

1/25/23

Date



Kristen Arnold, Branch Chief
Watershed Assessment and Planning Branch, OWQ

2/9/2023

Date

This standard operating procedure is consistent with agency requirements.



Quality Assurance Staff
Office of Program Support

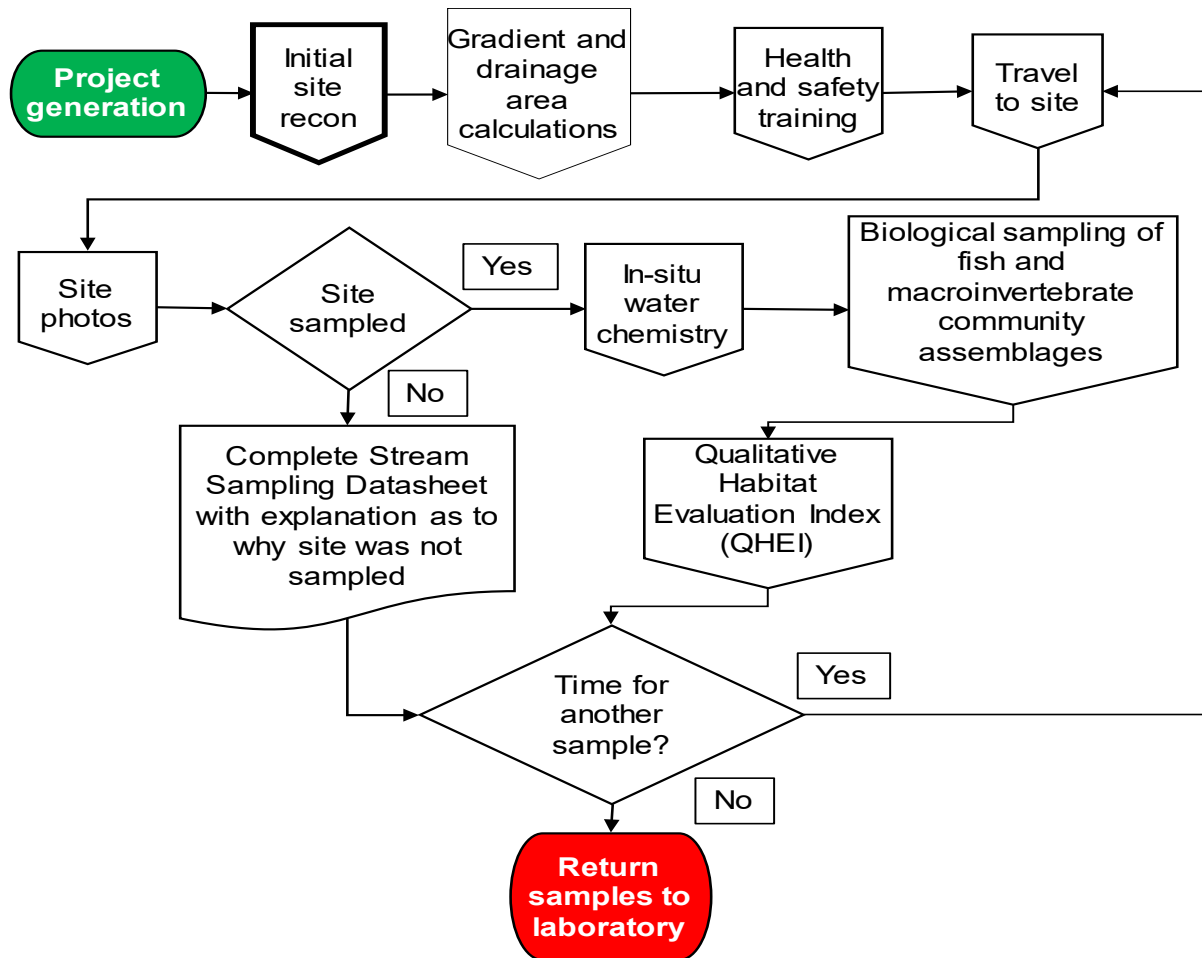
2/15/2023

Date

Table of Contents

1.0. Overview Flowchart.....	4
2.0 Procedural Steps.....	4
3.0 Training Requirements.....	8
4.0 Records Management.....	9
5.0 Definitions.....	9
6.0 References.....	11

1.0. Overview Flowchart



2.0. Procedural Steps

Step 1. Field staff create aerial, topography, and zoomed aerial maps of the sites provided by the project manager. For guidance on how to create a map, see [WAPB GIS GUIDE Resource](#) (IDEM 2022a).

Sites are generated by the project manager using different selection methods. For example:

- A. Targeted (resamples to determine improvements in water quality)
- B. Targeted reference sites
- C. Modified geometric design site selection process
- D. Probabilistic sites provided by the United States Environmental Protection Agency (U.S. EPA) National Health Environmental Effects Research Laboratory (NHEERL), Western Ecology Division, in Corvallis, Oregon.

- Step 2. Field staff create folders for each site which include all three maps and a site reconnaissance form (Appendix A). Refer to the Assessment Information Management System (AIMS) User Guide to print site reconnaissance forms for the project. Listed are the form fields that are prepopulated prior to printing the form: EPA Site Identifier, Rank, Recon #:, Trip#:, Site Number, Stream, and County.
- Step 3. Using a Global Positioning System (GPS) unit, road atlas, county road Gazetteer, and the generated maps depicting the site, field staff navigate as closely as possible to the intended site.
- Step 4. The following information regarding stream access was taken from the [Indiana Natural Resources Commission](#) (INNRC) webpage. From the INNRC webpage “In the absence of a contrary state boundary, the appropriate line of demarcation for a navigable waterway is the ordinary high watermark. If not navigable, title to the bed of the river passes to the adjacent property owner or owners.” According to the INNRC, if a waterway is declared navigable (check the [INNRC](#) website for navigable designation), anyone can use any part of the stream up to the natural high watermark.
- However, you must check with the county or local sheriff, or conservation officer to see if navigable waterways can be accessed by bridges. If the stream site is navigable, accessible by a bridge or public access site, and will be sampled without walking on private property, check the box “Road/Public Access Possible” on the site reconnaissance form (Appendix A).
- For those streams that are non-navigable, not listed on the website, or state and federal properties, an attempt must be made to seek permission from a landowner or property manager to walk on the streambed and in the floodplain to access the site.
- Note:** If permission is not obtained, circle “No, Landowner denied access” on the form under Reconnaissance Decision. Information for landowners may be obtained by visiting the property residence, neighboring houses, or the county assessor’s office, plat room, or GIS office. When speaking with the landowner, write on the backside of the reconnaissance form the date, time, spoke with (name) or message left, and your initials. By recording all this information, someone can keep track of who was spoken to and when. When you think you have found the landowner information, write the information on the backside of the reconnaissance form until you are positive and ready to accept the site. Once the site is accepted, enter the data into Landowner/Contact Information section of the reconnaissance form.

- Step 5. Field staff completes the site reconnaissance form (Appendix A) with:
- A. Location Description: List site description (i.e., CR 800 South).
 - Reconnaissance Data Collected section*
 - B. Recon Date: Date that site was visited and measurements recorded.
 - C. Crew Members: Initials of those individuals who visited the stream and recorded the measurements and site ratings.
 - D. Avg. Width (m): Record in meters the average wetted width of the stream reach relevant to the type(s) of sampling that will occur.
 - E. Avg. Depth (m): Record in meters the average depth of the stream reach relevant to the type(s) of sampling that will occur.
 - F. Maximum Depth (m): Record in meters the maximum depth that may be encountered in the stream reach relevant to the type(s) of sampling that will occur.
 - G. Nearest Town: Record the town closest to the site from the Gazetteer.

(Check all boxes that apply to the sampling site.)

- 1. Water Present?
- 2. Site ? (Can use chest or hip waders to sample)
- 3. Riffle/Run Present?
- 4. Road/Public Access Possible?
- 5. Site Impacted by Livestock? (livestock have access to the stream)
- 6. Collect Sediment? (only used if sediment is collected at site)
- 7. Gauge Present? (USGS gauging station at site)

Landowner/Contact Information section

List the site owner

- H. First Name
- I. Last Name
- J. Street Address (If multiple landowner permission is needed, list other addresses in the comments.)
- K. City
- L. State
- M. Zip Code (Get zip code from internet if missing.)
- N. Telephone (Be sure to include area code.)
- O. E-Mail Address

Check all that apply

- 1. Pamphlet? (If pamphlet or information letter is distributed to the landowner. Please indicate the date mailed.) (Appendix B)
- 2. Please Call in Advance?

3. Results Requested?

Rating, Results, Comments, and Planning

P. Site Rating by Category (1=easy, 10=difficult)

1. Access Route (Path to site)
2. Safety Factor (Stress or hazards to staff)
3. Sampling Effort (Difficulty in the actual collection of the biological or chemical sample)

Q. Reconnaissance Decision

(Mark as T = target site, NT = non-target site, LD = landowner denial, OT = target site not sampled for other reasons, NN = not needed, or PB = physical barrier after considering the following.)

1. Pre-Recon: Site was part of overdraw and was never looked at for approval or collection of any other data. (NN)
2. Recon in progress: **Do not use** for probabilistic sampling.
3. Approved Site: Site is a target site and landowner has given approval if needed. (T)
4. No, Landowner denied access: This can be used if we don't get landowner approval by the recon deadline date established. (LD)
5. No, Dry: For the biological teams, this is a site where greater than 50% of the reach is dry. (NT)
6. No, Stream channel missing: Tiled or underground, mapping error, or modified to non-representative stream channel. (NT)
7. No, Physical barriers: Physically blocked or inaccessible, physically unable to safely reach the site, or unable to launch equipment safely for the collection of a representative sample. (PB)
8. No, Impounded stream: Lake, reservoir, sand pits, etc. (NT)
9. No, Marsh/Wetland: No definable stream channel, or oxbow totally isolated from main channel with no flow. (NT)
10. No, Bridge gone or not accessible: Not used as rejection for probabilistic sampling. (Use rejection code 7.)
11. No, Unsafe due to traffic or location: Heavy construction, etc. (T)
12. No, Site impacted by backwater: Not representative of stream due to influences of backwater. (NT)
13. No, Other: Explain in comment section. (OT but not sampled due to field season deadline, site not needed, etc.)

R. Equipment Selected: **Equipment needed to take biological samples.**

S. Circle Equipment Needed: Only one of the equipment types

(Backpack, Boat, Longline, or Scano) needs to be circled.

- T. Comments: Only enter landowner instructions or concerns about the site, and why landowner denied (i.e., unable to contact thus denial).
- U. Sketch of Stream & Access Route – Indicate Flow, Direction, Obstacles, & Land Use (Use Back of Page, if Necessary): (i.e., Get key, launch at SR, fence, cattle in stream, gates, etc. Also, comments like see topo/aerial.)

Multiple access routes may be necessary for chemical and biological sampling needs depending on the type of equipment used to sample the site.

- Step 6. Final coordinates for each site will be determined by field staff using a handheld Global Positioning System (GPS) (IDEM 2022b, IDEM 2022c).
- Step 7. Take photos of stream (both upstream and downstream).
- Step 8. Upon return to the office, staff will enter the site reconnaissance form into the AIMS Database following the AIMS II User Guide (IDEM 2022d). No abbreviations should be used except for the following:

Term	Abbreviation
County Road	CR
Interstate	I-##
State Road	SR
United States	US

- Step 9. Upload corrected GPS coordinates into AIMS and download site photos.
- Step 10. Have another staff member perform quality control on the site reconnaissance form and GPS coordinates entered into AIMS.

3.0. Training Requirements

- 3.1. Training to develop maps using Esri ArcGIS:
 - A. Environmental manager
 - B. Senior environmental manager
- 3.2. Training to use GPS units for collecting accurate site coordinates:
 - A. Environmental manager
 - B. Senior environmental manager

- 3.3. Training in AIMS to print site reconnaissance forms, labels, and entering data:
 - A. Environmental manager
 - B. Senior environmental manager

4.0. Records Management

- 4.1. After completion of weekly field sampling activities, the site photos and corrected GPS coordinates are downloaded onto the computer. The GPS coordinate information is then entered into a Microsoft Excel spreadsheet specific to that sampling year (for example: “2016 Lower Wabash R Final Corrected GPS Coordinates”). For example, these files are saved on the Shared drive at the following locations:
S:\IGCN\OWQ\WSP\OWM\RANDOM\Corvallis2016\Recon\Site Photos
S:\IGCN\OWQ\WSP\OWM\RANDOM\Corvallis2016\Recon
where “Corvallis2016” can be changed to the project name and year in which field sampling activities are being conducted. The spreadsheet is maintained indefinitely.
- 4.2. Original paper copies of the maps, site reconnaissance form, and communication with landowners are kept in the site folders in a filing cabinet for the project, located at the IDEM Shadeland offices. Other staff may copy the original papers to create folders for their sampling events. Once the data have been approved and assessed for the Integrated Report, the site reconnaissance maps, forms, and communication papers will be scanned and put into the [Virtual File Cabinet](#) (VFC) for internal use only, since landowner contact information may be on the form. VFC indexing information will include Project Name (i.e., 2016 Corvallis), Project Type (i.e., Watershed), Report Type (i.e., Field Sheets), HUC Code (i.e., 05120110 Sugar), and Comments (i.e., Site Reconnaissance Form). Once the VFC file has been verified for completeness and readability, the original paper copies can be shredded. The information is retained in VFC indefinitely.

5.0. Definitions

- 5.1. “Assessment Information Management System database (AIMS database)” – IDEM database containing information related to water chemistry; aquatic habitat; macroinvertebrate, fish, and algae communities; fish tissue analyses; sediments; and *E. coli* bacteria data collected by agency staff from watershed sampling events.

- 5.2. “Backwater” – A part of the river not reached by the current, where the water is stagnant.
- 5.3. “Field Staff” – Watershed Assessment and Planning Branch staff who conduct field sampling activities.
- 5.4. “Gazetteer” – A reference book listing cities, towns, rivers, mountains, and other geographic features along with the exact location of these features.
- 5.5. “Geometric site” – Sampling site chosen according to its drainage area within a watershed.
- 5.6. “Global Positioning System (GPS)” – A constellation of satellites developed by the U.S. Department of Defense that is a space-based radio navigation system that provides a GPS receiver with reliable positioning, navigation, mapping, and timing services.
- 5.7. “Marsh” – An area of low-lying land that is flooded in wet seasons, and typically remains waterlogged at all times.
- 5.8. “Probabilistic sites” – Sites generated using [Environmental Monitoring Assessment Program selection methods](#) so that the probabilities of including the selected stream units in the sample are known, and all population units have a positive probability of selection. This implies that the target population is represented by the sampling site and that the target population is explicitly defined.
- 5.9. “Project manager (PM)” – Agency staff designated as responsible to coordinate/implement activities associated with a site or project specific Quality Assurance Project Plan (QAPP), especially with respect to collecting, using, and reporting environmental data.
- 5.10. “Reach” – A segment of a stream equal in length to 15 times the average wetted width of the stream, with a minimum length of 50 meters and a maximum length of 500 meters.
- 5.11. “Reconnaissance” – Obtaining information about a site through visual observations and investigating routes to safely access the site, as well as gathering property owner information and access permission prior to a sampling event.
- 5.12. “Reference sites” – Sites located in areas with the least amount of anthropogenic disturbance which are considered the most natural remaining areas within a specified geographic boundary.
- 5.13. “Shared drive” – An electronic storage server device accessible by multiple agency employees.

- 5.14. "Site Folder" – A folder for a specific site that contains all pertinent paperwork to do with the site. Site reconnaissance forms, all field data sheets including those for water chemistry, algal biomass, fish community, macroinvertebrate community, chain of custody forms, etc. are all stored in this folder, which is in a file cabinet in the Watershed Assessment and Planning Branch office area at the IDEM Shadeland office.
- 5.15. "Site Reconnaissance Form" – Form used to gather information such as landowner, equipment needed to complete sampling, and the access route to take to the site (Appendix A).
- 5.16. "Target" – A sampling point which falls on a perennial stream within the basin of interest and the boundaries of Indiana.
- 5.17. "Wetland" - Land areas that are wet for at least part of the year, are poorly drained and are characterized by hydrophytic vegetation and hydric soils.

6.0. References

- 6.1. (IDEM 2022a) [WAPB GIS GUIDE Resource](#). Office of Water Quality, Watershed Assessment and Planning Branch. Indianapolis, Indiana.
- 6.2. (IDEM 2022b) [Global Positioning System \(GPS\) Data Creation](#) Technical Standard Operating Procedure. B-001-OWQ-WAP-XXX-22-T-R0. Office of Water Quality, Watershed Assessment and Planning Branch. Indianapolis, Indiana.
- 6.3. (IDEM 2022c) [Global Navigational Satellite System \(GNSS\) R1 Unit User Instructions](#) Technical Standard Operating Procedure. B-055-OWQ-WAP-XXX-23-T-R0. Office of Water Quality, Watershed Assessment and Planning Branch. Indianapolis, Indiana.
- 6.4. (IDEM 2022d) [The AIMS II User Guide](#). Indiana Department of Environmental Management, Office of Water Quality, Watershed Assessment and Planning Branch, Indianapolis, Indiana.
- 6.5. (INRC) [Indiana Natural Resources Commission: Navigable Waterways Roster webpage](#)

Appendix A: IDEM Site Reconnaissance Form



Site Reconnaissance Form

EPA Site Identifier	Rank
Recon #:	
Trip #:	

Site Number: Stream: County:

Location Description:

Reconnaissance Data Collected			
Recon Date	Crew Members		
<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>		
Avg. Width (m)	Avg. Depth (m)	Max. Depth (m)	Nearest Town
<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>
Water Present?	Site Wadeable?	Riffle/Run Present?	Road/Public Access Possible?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Site Impacted by Livestock?	Collect Sediment?	Gauge Present?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Landowner/Contact Information		
First Name	Last Name	
<input style="width: 100%;" type="text"/>	<input style="width: 100%;" type="text"/>	
Street Address		
<input style="width: 100%;" type="text"/>		
City	State	Zip
<input style="width: 150px;" type="text"/>	<input style="width: 50px;" type="text"/>	<input style="width: 50px;" type="text"/>
Telephone		E-Mail Address
<input style="width: 150px;" type="text"/>		<input style="width: 150px;" type="text"/>
Pamphlet Distributed?	Please Call In Advance?	Results Requested?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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 Scanoes Seine Weighted Handline Waders Gill Net

Comments

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

Appendix B: Probabilistic Reconnaissance Pamphlet

INFORMATION SHEET			
	INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT		
	Probabilistic Monitoring and Assessment Program		
	Office of Water Quality – Watershed Assessment and Planning Branch		
(317) 308-3191 • (800) 451-6027		www.idem.IN.gov	100 N. Senate Ave., Indianapolis, IN 46204

To All Concerned Parties:

The Indiana Department of Environmental Management (IDEM) will be studying rivers and streams in your area as part of an ongoing, rotating basin, monitoring and assessment program. As required by the Clean Water Act, the monitoring and assessment program enables IDEM to determine the status and trends of overall water quality in the state. IDEM uses this information to protect rivers and streams, identify specific problem areas, and improve its strategy for restoring and protecting Indiana's surface waters. Monitoring efforts include scientists from IDEM's Office of Water Quality, Watershed Assessment and Planning Branch.



Between April and November, scientists will visit randomly selected stream locations throughout targeted watersheds. They will often spend two to four hours at each location on multiple occasions. During these visits, they will collect, process, and preserve water, algae, and bacteriological samples; perform macroinvertebrate (e.g., insects, crayfish, and mussels) and fish community surveys; measure physical characteristics of stream channels; and gather habitat quality information within these watersheds.



Sampling Locations

Stream sampling locations are obtained using a computer-generated, random selection (probabilistic) technique. The probabilistic selection method allows IDEM to use smaller field crews and fewer samples to characterize a watershed and determine its current ability to support aquatic life and recreational uses. Therefore, the probabilistic method is both cost-effective and statistically valid.



Working Together

IDEM field crews often access sampling locations from the nearest bridge. However, many locations lay hundreds of feet from public road right-of-ways. From January through April, field crews will locate selected sites and determine their accessibility. In cases where bridge access is not available, field crews will contact landowners or property managers and request permission to access streams on private property. They may also request the use of private boat launches to facilitate access to streams. Only with the help of landowners and property managers can Indiana's rivers and streams be effectively assessed.

Performing Field Work

Scientists will perform a number of tasks using a variety of equipment. These tasks include measuring stream width and depth, examining the substrate, measuring the amount of shade provided by riparian vegetation, and looking for signs of stream bank erosion.

Water chemistry samples will be collected on three separate occasions: in the spring, summer, and fall. Algae samples will be collected during one of the three visits and returned to a laboratory for analysis. In order to provide additional information on the relationships between dissolved oxygen fluctuations, nutrients, and algal communities, a small data logger will be deployed at a subset of sites to measure dissolved oxygen every 10 minutes for a minimum of two weeks in August or September. While all living things require nutrients to thrive, too many nutrients may have adverse effects on habitat quality, water quality, and biological communities.



Field crews will also perform aquatic life surveys. The health and diversity of fish and macroinvertebrate communities living in Indiana's rivers and streams reflect the ecological condition of the watershed. Field crews will use nets and buckets to sample for macroinvertebrates, which will then be taken to IDEM's laboratory for microscopic identification and analysis. To survey fish, field crews use boat or backpack electroshocking equipment. Electroshocking temporarily stuns fish, allowing crews to identify, weigh, and measure them before returning them to the stream. While most fish will be returned to the river or stream unharmed, some will be preserved and returned to IDEM's laboratory for identification. A small percentage of sites will be revisited in order to demonstrate sampling precision.



Finally, a third team will collect water samples weekly for five consecutive weeks. This team will be on-site for approximately 10-30 minutes. These samples will be tested for bacteria levels to determine the watershed's current ability to support recreational use.

Report Findings

IDEM will report the findings of this study to the U.S. Environmental Protection Agency in the Indiana Integrated Water Quality Monitoring and Assessment Report. This biennial report describes the condition of streams, lakes, and ground water in several Indiana watersheds. IDEM will publish and make the report available on its website at www.idem.IN.gov/nps/2639.htm. Upon request, IDEM will provide the information collected to landowners, property managers, special interest groups, local governments, universities, state and federal agencies, planners, and policy makers.



Water is essential to all living beings. Many Hoosiers drink water that comes from rivers and streams. Water sustains wildlife, provides recreational opportunities, and adds beauty to our surroundings. Indiana has approximately 63,000 miles of rivers, streams, ditches, and drainage ways. Only with the help of landowners and property managers can IDEM effectively assess Indiana's flowing waterways, and ensure a healthy environment for future generations. If you have questions about this project, please contact Stacey Sobat with IDEM's Watershed Assessment and Planning Branch at (800) 451-6027 (press 5) or (317) 308-3191, or ssobat@idem.IN.gov. For more information about this and other assessment programs and areas of study in Indiana, visit www.idem.IN.gov/cleanwater/2338.htm.



Name _____ Telephone number _____ Site number _____
May be completed by IDEM staff when requesting property access