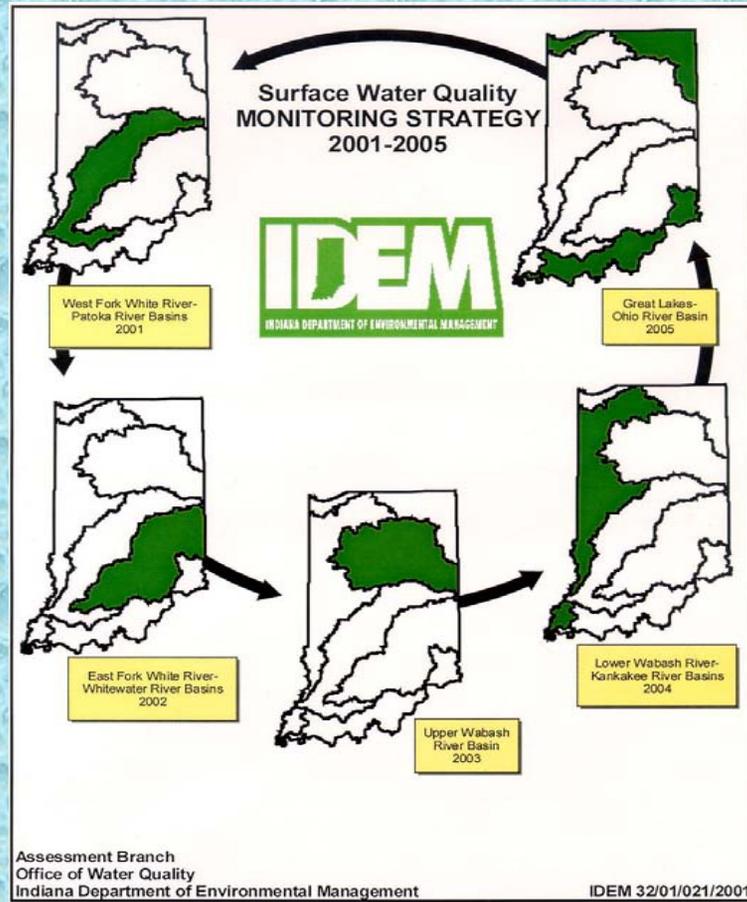


Indiana's Surface Water Quality Monitoring Strategy (SWQMS)



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Overview of Presentation

- **Historical Perspective**
- **Planning**
- **Sampling Programs**
- **Reporting**
- **Resources**
- **Review and Planning
Process Proposals**
- **Suggestions for future
studies and actions**



Historical Perspective

- **Early 60's, sampling driven by public health concerns & responding to complaints**
- **Historically, targeted sites related to point source pollution**
- **State's Goal: "... to restore and maintain the chemical, physical, and biological integrity of the waters of the State." 327 IAC 2-1-1.5**
- **Shift to include monitoring of non-point source pollution & ALL waters of the state**



The “Strategy” continued...

- **Goal:** Assess the ability of Indiana waters to support designated uses within five years

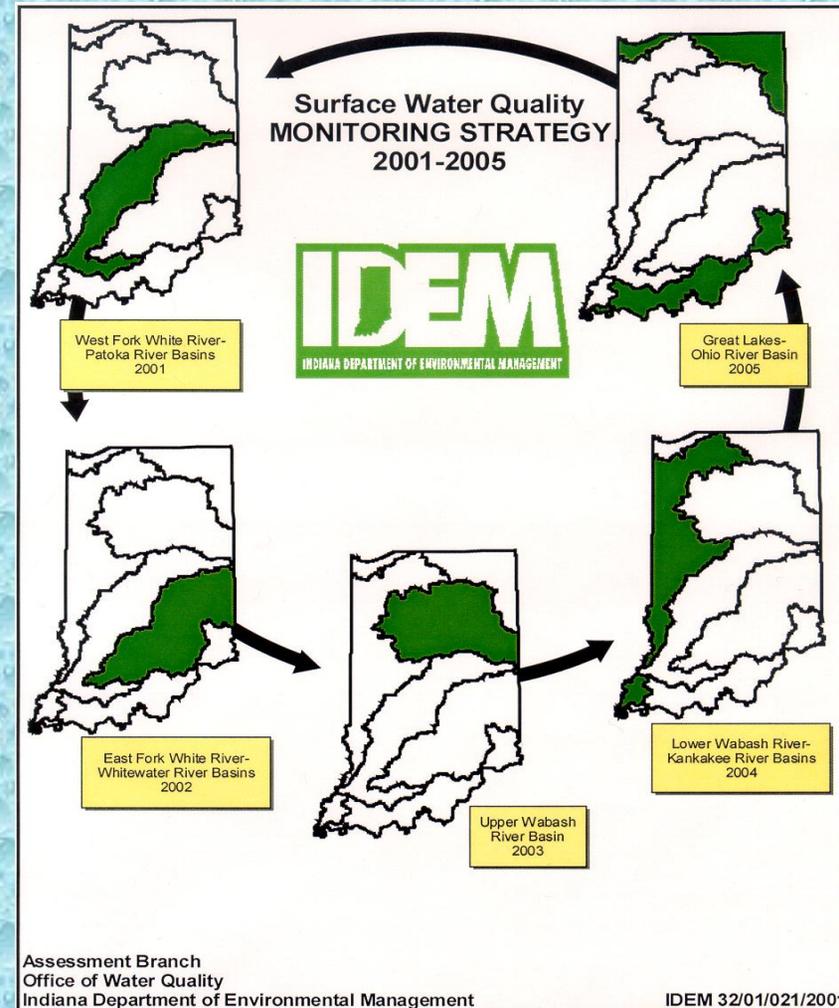
- **Focus**

- Year 1: WFWR & Patoka
- Year 2: EFWR & Whitewater
- Year 3: Upper Wabash
- Year 4: Lower Wabash & Kankakee
- Year 5: Great Lake & Ohio R. Tribs

- **Products:**

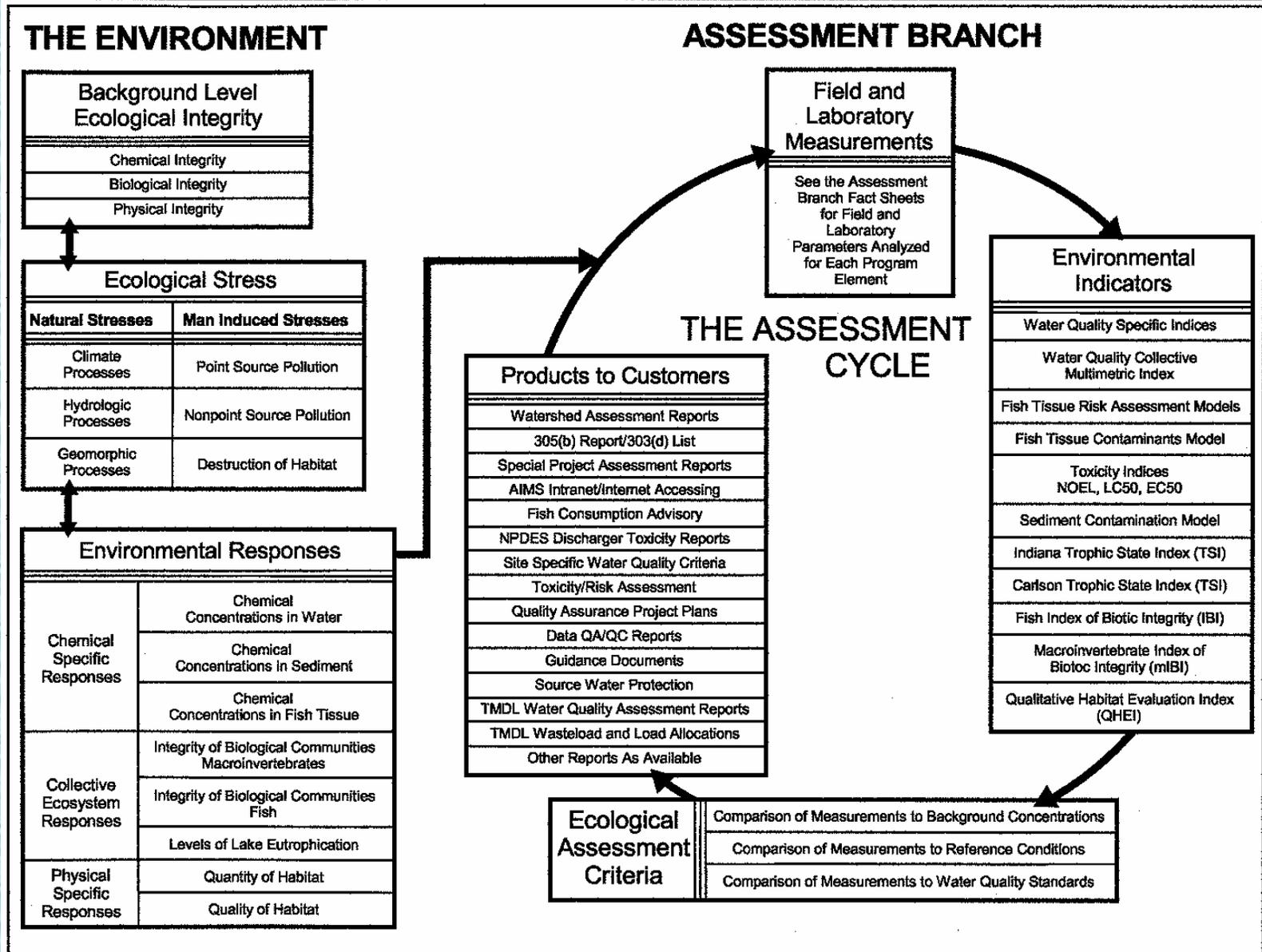
- Integrated Water Monitoring and Assessment Report: Evaluation of surface water use designations, Listing the causes and sources of Indiana stream segments not meeting designated uses

- Provide assessments to support water quality management programs (NPDES, Fish Consumption Advisory, TMDL)



Planning

Figure 1. Programmatic Conceptual Model for the Surface Water Monitoring Strategy



Fixed Station Monitoring Program

•Objectives:

- Reveal water quality trends under changing conditions
- Provide data for existing and prospective users of surface water in Indiana
- Pollution abatement activities such as review of nonpoint source effects

•Sites:

- Statewide network of 160 fixed stations

•Data Collected:

- Water chemistry, bacteriological, and field analytical data collected monthly
- Data collected with calibrated Hydrolab equipment, certified bottles, and preservatives

Figure 2: Location of Indiana's Fixed Station Water Quality Monitoring Sites



Watershed Monitoring Using a Probabilistic Design

•Objectives:

–Assess and characterize overall water quality for each targeted basin and site specific stream assessments for 305(b) & 303(d) reports

•Sites:

–USEPA Western Ecology Division generated probabilistic site locations

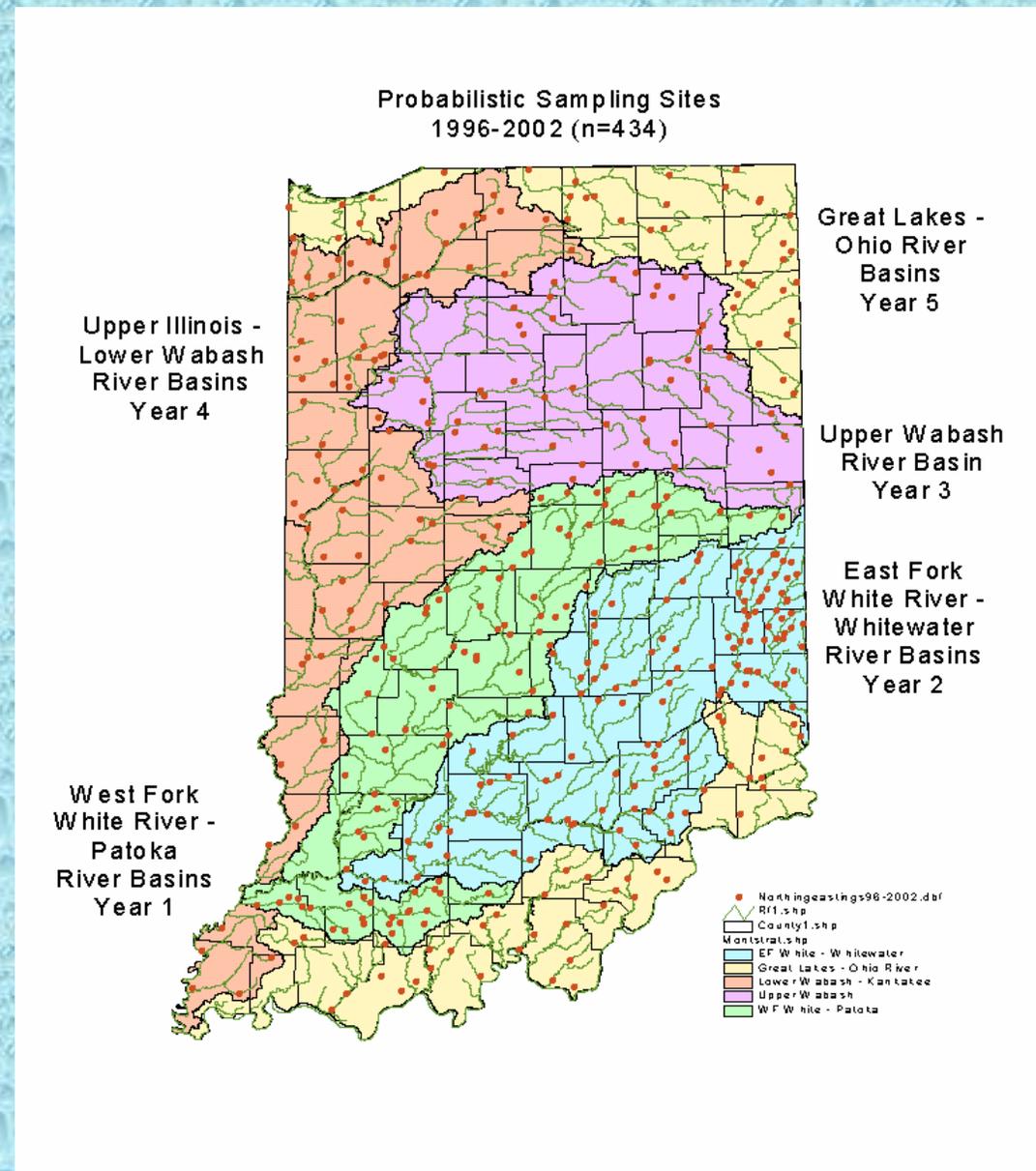
–Rotating Basins (38 sites/basin usually 2 basins/year)

•Data Collected:

–Water, Nutrient, and Bacteriological Samples For Laboratory Analysis

–Macroinvertebrate & Fish Community Assessments

–Habitat Assessments



Bacteriological Monitoring Program

•Objectives:

–Determine ambient concentrations of bacterial contamination in surface waters of Indiana, provide benchmark data for long-term trend analysis along with a broad scale overview of water quality

•Sites:

–Sites are known recreational and public access areas (County Health Departments) or probabilistic sites, sampled five times equally spaced over a 30 day period

•Data Collected:

–Colony forming units of E. coli bacteria per 100 ml of surface water using Method 9223-SM Enzyme Substrate Coliform Test to derive a Most Probable Number (MPN) from charts provided by the manufacturer.

–Temperature, pH, dissolved oxygen, conductivity, and turbidity



Fish Tissue & Sediment Contaminants

•Objectives:

- Provide information on chemical contaminants that may be accumulating in the tissue of fish and sediments of IN's surface waters
- Support the Indiana Fish Consumption Advisory

•Sites:

- Targeted rivers, streams, lakes, and reservoirs

•Data Collected:

- Composite grab of surficial aquatic sediments
- Composite whole or fillet tissue samples
- Analysis includes cadmium, copper, chromium, lead, mercury, nickel, zinc, PCB's, some pesticides, and organic compounds



Lake Monitoring Program

•Objectives:

–Provide information on the status and trends of the trophic state of Indiana's public lakes and reservoirs

•Sites:

–20% of 600 targeted state sites are sampled each year during July and August by Indiana University School of Public Environmental Affairs (IUSPEA)

–100% of 100 volunteer sites are sampled regularly from May to October of each year

•Data Collected:

–Physical, chemical, and biological (plankton) samples collected from the deepest point in lakes



Source Identification Monitoring Program

•Objectives:

- Determine cause, source, and extent of impairment for stream segments not supporting their designated uses
- Data for TMDL development if needed and watershed restoration plans

•Sites:

- Targeted intensive site sampling within the impaired watershed (# dependent on size of impairment and watershed)

•Data Collected: depends on type of impairment

- Grab water samples, E.coli, sediment for contaminant analysis, fish community assessments, and habitat evaluations



OWQ Supporting Activities

•Pesticide Monitoring Program

–determine ambient concentrations of pesticides throughout the major watersheds of Indiana

•NPDES Permits Support

–site specific data needed to develop waste load allocations for NPDES permits

•Total Maximum Daily Load (TMDL) Program

–collecting data for TMDL waste load allocation modeling

•Trace Metals Program

–develop clean sampling techniques to assess trace metals following the water quality standards adopted for the Great Lakes

•QAPP and QA/QC Program



Reporting

- **Data Management**

- **Assessment Information Management System (AIMS)**

- **Interpretation**

- **GIS, GPS, Statistical tools**

- **Communication**

- **Integrated Water Monitoring and Assessment Report**

- **Data & Interpretation for NPDES permit support**

- **Technical reports and peer reviewed publications to communicate monitoring results**

- **Technical data sets for researchers, consultants, public**

- **Presentations at professional, scientific, citizen, and university group meetings**

**INDIANA
INTEGRATED WATER MONITORING
AND ASSESSMENT REPORT
2002**

Section 305(b) Water Quality Report
and
Consolidated List
Including Section 303(d) List of Impaired Waters
(Category 5)



Indiana Department of Environmental Management
Office of Water Quality
Planning and Restoration Branch
Indianapolis, Indiana



IDEM/34/02/004/2002

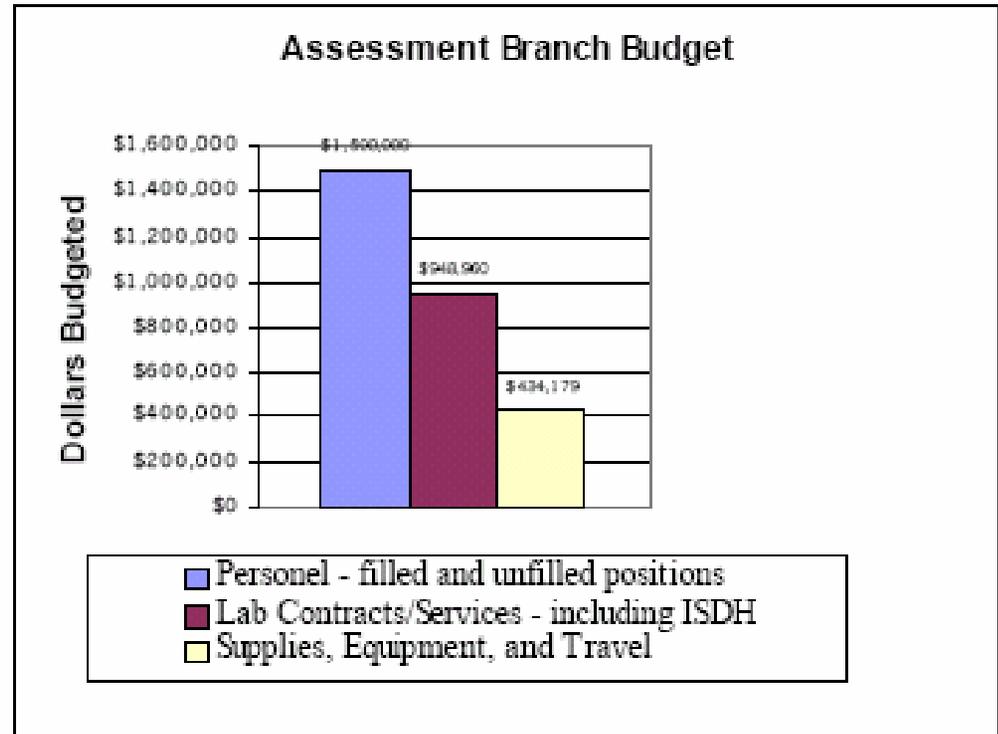
Resources

- **Funding:** NPDES Permit Fees, US EPA Grants (Section 106)

- **Positions in the Assessment Branch (2004):** 36 Full time positions, 4 - 180 day temporary positions, 10 Governor's Public Service Summer Interns

- **Contracts (2001):** IN State Department of Health, IN University School of Public and Environmental Affairs (IU/SPEA), Fish Tissue & Sediments Analysis, Other chemical samples

- **Budget for Branch Activities (2001):** \$1,500,000 for Personnel (filled and unfilled positions), \$948,960 Lab Contracts/ Services including ISDH, \$434,179 Supplies, Equipment, and Travel



Review & Planning Process Proposals

- **Proposals and Suggestions are offered throughout the 5 year monitoring strategy**

- **Probabilistic Sampling**

- **Advantages: 100% waters of the state assessed, monitoring long term watershed trends, discovering non-point source pollution, finding impairments at distant remote sites, can focus resources to watershed specific impairments**

- **Disadvantages: Time, access, safety, cause and source of impairment, basins sampled only once every 5 years, Where are the other impairments?**

- **Alternative Proposals**

- **Intensive spatial networking based on 14 digit HUC**

- **Expanded probabilistic option**

- **Semi-rotating targeted fixed stations**



Suggestions for Future Studies & Actions

- **Follow-up sampling of TMDLs**
- **Wetland Assessments**
- **Source Water Protection**
- **Pesticide Monitoring Statewide**
- **Monitoring to assess impacts of point sources, confined feeding operations, land applications, and construction**
- **Identify non-point source impairments for targeting 319 funding for specific water quality concerns and reduction of non-point source pollutants**



Conclusions

•For a copy of Indiana's Surface Water Quality Monitoring Strategy visit the website:

<http://www.in.gov/idem/water/assessbr/index.html>

•Design to meet multiple objectives

- Targeted monitoring stations to follow water quality and contaminant trends, NPDES Permits Support**
- Probabilistic sites to characterize overall chemical and biological integrity for the streams of Indiana**
- Targeted intensive site sampling to discover the cause and source of stream impairments, provide data for TMDL development**
- Targeted bacteriological sampling stations for recreational use**
- Targeted fish tissue and sediment contaminant sites to support the Indiana Fish Consumption Advisory**

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