Getting Their Feet Wet: Community Sampling of the Wabash River

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How the Blitz Works

A brief look at why and how the blitz works and who participates

Sara Peel
WREC Accomplishments

- Purdue University Partnership
- USACE Hydraulic Study
- River Road State Scenic Byway (and Master Plan)
- USACE Reconnaissance Study
- Corridor Master Plan Urban and Rural
- Wabash River Sediment Mapping and Fish Community Assessment
- Regional Watershed Management Plan
- Wabash Sampling Blitz
- Cost Share Program
- Educational Programming and Technical Assistance
How the Blitz Works
Education and Outreach

- Identify target messages and activities:
  - Wabash River ecosystem
  - Interconnectedness between communities and up and downstream
  - Stewardship responsibilities and opportunities
  - Watershed concept
  - Benefits of the river, clean water, being involved
  - You can make a difference
  - Hands on experience
Sampling Blitz Goals

- **Goal 1**: Obtain more uniform water quality data throughout the Region of the Great Bend of the Wabash River.
- **Goal 2**: Provide hands on opportunity for community to experience the Wabash River and its tributaries.
Water Quality Data

How the Blitz Works
Selecting Sample Sites
Wildcat Creek Expansion

How the Blitz Works
Selecting Staging Sites

How the Blitz Works
Staging Location Details

Station 1: Check In
Station 2: Filtration
Station 3: Test Strip Analysis
Station 4: Sample Discussion
Station 5: Evaluation
Volunteer Recruitment

Blitz Registration - 28 September 2012

Volunteer Name *

Volunteer Email *

Volunteer Phone *

Do you have a volunteer partner? *

Partner Name

Partner Email

Do you or your partner have a vehicle for sampling? *

Do you or your partner have a digital camera for sampling? *

Preferred staging location? *

No Preference
Wabash Sampling Blitz - September 28th!

Since the fall of 2009, volunteers throughout the Region of the Great Bend of the Wabash River watershed complete a snapshot assessment of water quality throughout the watershed. In the spring of 2011, we expanded to include sample sites within the Wildcat Creek watershed. Volunteers monitor temperature, water cloudiness (turbidity), nutrient levels, and pathogen concentrations. Join us for the Fall 2012 Wabash Sampling Blitz on September 28th!

How Monitoring Works?

Each volunteer group is assigned to a staging or starting location. Staging locations are assigned as sampling slots are available on a first volunteer, first assigned basis. Arrive with your partners to be assigned a group of sampling sites – sites are assigned based on location choice and selected access difficulty ranging from easy access (walk right in sites) to where you’ll need to channel your inner mountain goat (difficult). Our staging location volunteers will provide all sample collection equipment and instructions, maps, and driving directions. They will not provide you with waders, boots, dry clothes, bug spray, lunch, coffee, or food.

Don your waders or knee boots and spend approximately two hours wading four stream sample sites. At each site, you will need to identify an appropriate access point. After entering the stream, wade to the center and fill your provided sample bottles. Then, measure stream temperature and water cloudiness with the provided thermometer and transparency tube. Once complete, photograph the stream and any unique or interesting features and travel to your next site. Once you’ve sampled all of your streams, return to your staging location to filter your samples for laboratory analysis, measure water quality with provided test strips, and download your photos.

**Video 1: Introduction** (5 minutes)
**Video 2: Measuring Temperature** (from Wisconsin; 2 minutes)
**Video 3: Measuring Turbidity** (from Wisconsin; 5 minutes)
How Blitz Works: Staging Site Start
How Blitz Works: Sample Analysis and Filtration
How the Blitz Works
How Blitz Works: Data Reporting
How the Blitz Works
What does our water quality look like?
Getting Results That Inform

A brief look at initial data analyses of Blitz field and lab collected data

Rebecca Logsdon
## Data Collected

<table>
<thead>
<tr>
<th>Test</th>
<th>Fall 2009</th>
<th>Spring 2010</th>
<th>Fall 2010</th>
<th>Spring 2011</th>
<th>Fall 2011</th>
<th>Spring 2012</th>
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<tr>
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<td>x</td>
<td>x</td>
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<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<td>Ammonia</td>
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<tr>
<td>pH strip</td>
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<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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</tr>
<tr>
<td>DOC</td>
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<td>x</td>
<td>x</td>
<td>x</td>
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<td>e coli</td>
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</tr>
<tr>
<td>Copper strip</td>
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<tr>
<td>orthophosphate strip</td>
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<tr>
<td>Hardness strip</td>
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<td>Total chloride strip</td>
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<td>x</td>
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<tr>
<td><strong>Transparency tube</strong></td>
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<td>--</td>
<td>x</td>
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<td>x</td>
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<td>Free chloride strip</td>
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<td>pH lab</td>
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<td>--</td>
<td>x</td>
</tr>
</tbody>
</table>
Questions

- How does lab determined nitrate-N compare with field test strips?
- Are there differences in Fall and Spring results (i.e., temporal differences)?
- How do results vary spatially?
- Can poor water quality sites be identified?
- Can this help WREC target its education and project efforts?
### Field v. Lab Comparison

<table>
<thead>
<tr>
<th>Sampling Event</th>
<th>$R^2$</th>
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<tbody>
<tr>
<td>Fall 09</td>
<td>0.38</td>
</tr>
<tr>
<td>Spring 10</td>
<td>0.26</td>
</tr>
<tr>
<td>Fall 10</td>
<td>0.01</td>
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<tr>
<td>Spring 11</td>
<td>0.34</td>
</tr>
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<td>Fall 11</td>
<td>0.70</td>
</tr>
<tr>
<td>Spring 12</td>
<td>0.33</td>
</tr>
</tbody>
</table>
Field vs. Lab Comparison

Getting Results That Inform

Nitrate+Nitrite (mg/L) from Lab Analyses

Aquachek Water Quality Test Strips for Nitrate

Nitrate Nitrogen ppm

Nitrite Nitrogen ppm

DIRECTIONS:
1. Dip a strip into water for 1 second or pass under gentle water stream and remove. Do not shake excess water from the test strip.
2. Hold the strip level, with pad side up, for 30 seconds. Compare the NITRITE test pad to the color chart above.
3. At 60 seconds, compare the NITRATE test pad to the color chart. Estimate results if the color on the test pad falls between two color blocks.

Note: The Nitrate Test actually measures the sum of both nitrate nitrogen and nitrite nitrogen present in the sample. IMPORTANT: KEEP CAP ON TIGHT BETWEEN USES. STORE AT ROOM TEMPERATURE.

USE BY DATE ON BOTTOM

Hach Company: P.O. Box 939, Loveland, CO 80539 U.S.A.
(800) 227-4224 Outside U.S.A. (970) 669-3560
Field v. Lab Comparison

Tests for mean show significantly different, also ANOVA tests show they are significantly different.
<table>
<thead>
<tr>
<th></th>
<th>Spring</th>
<th>Fall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrate-N</td>
<td>Higher</td>
<td>Higher</td>
</tr>
<tr>
<td>orthoPhosphate</td>
<td>Higher</td>
<td></td>
</tr>
<tr>
<td>DOC</td>
<td>Higher</td>
<td></td>
</tr>
<tr>
<td>E. Coli</td>
<td>Higher</td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td></td>
<td>Higher</td>
</tr>
<tr>
<td>Turbidity</td>
<td></td>
<td>Higher</td>
</tr>
</tbody>
</table>
Spatial Variation – DOC

Getting Results That Inform

Dissolved Organic Content (mg/L)

- 0.0-2.5
- 2.51-5.0
- 5.1-10.0
- 10.1-15.0
- 15.1-30.0
- 30.0-50.0
- 50.0-90.0
Spatial Variation – E. coli

Getting Results That Inform
Spatial Variation – Turbidity

Getting Results That Inform
Cluster Analysis

Legend
- Red: Group 1
- Orange: Group 2
- Green: Group 3

Getting Results That Inform
Cluster Analysis

Getting Results That Inform
Cluster Analysis

**Group 1:**
- Nitrate – highest
- orthoPhosphate – highest
- DOC – mean same, less variable

**Group 2:**
- Nitrate – medium (most variable)
- orthoPhosphate – low (same as 3), more variable than 3
- DOC – lower than 3, less variable

**Group 3:**
- Nitrate – lowest, least variable
- orthoPhosphate – low (same as 2), less variable
- DOC – higher than 2, more variable
Future work

- Examine group three sites further
- Include Fall 2012 Blitz results
- Compare Blitz results to weekly data collection efforts...how well do they inform?
Public Participation in Scientific Research

A brief look at results and outcomes from individual participation in the blitz

Lindsey Payne
Engagement Framework

Inputs

Scientific interests

Identify question or issue

Public interests

Activities

Wabash Sampling Blitz

Turbidity
Temperature
pH
Nutrient profiles
E. coli

Outputs

Science:
- Water Quality “Snapshot”
- WREC/IDEM Cost-Share

Individuals:
- Knowledge/Awareness
- Skills
- Motivation

Social-Ecological Systems:
- Community/WREC Partnerships
- Public/Policy Engagement
- Stewardship

Outcomes

Conservation Resilience Sustainability

Impacts

Modified from Shirk et al. 2012
Wabash Sampling Blitz Volunteers

- Average of 161 volunteers & 416 hours per blitz

604 Unique Volunteers  126 Repeat Volunteers  2,080 Hours of Participation
Outcome: Science

- Water Quality “Snapshot”
  - Fall/Spring sampling

- WREC Education & Outreach Efforts
  - Fairs, festivals and other events
  - Data accessibility

- Promotion of Environmental Initiatives
  - Cost-share program
Wabash Sampling Blitz Survey

- Conducted two online surveys
  - June, 2012
    - Post-survey to past participants since 2009
    - Response rate: 24% (n = 359)
  - October, 2012 (results still being analyzed)
    - Pre/Post-survey to Fall 2012 participants
    - Response rate: 62% (n = 160)
Goals

- To identify motivation for participation.
- To identify knowledge and awareness gained by participation.
- To identify behavioral changes due to participation.
- To identify future individual education and outreach efforts.
I am interested in water quality in my community

I like volunteering

I volunteered with my group, club, church, etc.

I needed community service hours

I received class credit for volunteering

My work requires me to volunteer

I like volunteering

I am interested in water quality in my community

**Outcome: Individual/Motivation**

- I am interested in water quality in my community: 82%
- I like volunteering: 56%
- My work requires me to volunteer: 8%
- I received class credit for volunteering: 10%
- I needed community service hours: 17%
- I volunteered with my group, club, church, etc.: 8%
Outcome: Individual/Awareness

- Email: 1,543 / 310 (opened) / 104 (direct click)
- Website hits: 345
- Facebook hits: 425

% of Respondents

Did you look at the watershed-wide results?

- Yes: 81%
- No: 19%
Did participation increase awareness of local water quality issues?

- Yes: 75%
- No: 19%
- Unsure: 6%
Outcome: Individual/Awareness

- “Good opportunity to review the appropriate/safe levels of different water quality components”
- “I have never thought about water quality until participating in the Blitz”
- “It really makes one very aware of how many small tributaries ultimately flow into one river”
- “It was especially interesting seeing the quality of the water so close to my home”
Outcome: Social-Ecological Systems / Behavioral Change

Blitz Impact Upon Participants

- Would encourage additional friends, neighbors, coworkers, etc. to participate in future water sampling: 96%
- Talk to their friends/acquaintances about water quality issues frequently or occasionally: 93%
- Would like more opportunities to be involved in citizen science in their local community: 63%
Outcome: Social-Ecological Systems / Behavioral Change

- **87%** talked to family, friends, coworkers, classmates, and neighbors about their experience
  - 96% - Participating in the event
  - 72% - Collecting water samples
  - 67% - Location of sampling
  - 48% - Experiences related to testing water samples
Outcome: Social-Ecological Systems / Behavioral Change

- **36%** used the Blitz as a starting point to make changes that would improve water quality in their community
  - Not using pesticides
  - No longer throwing medication in trash
  - Installed rain barrels
  - Installed low-flow toilets & shower heads
  - Installed pervious pavement
  - Planted a rain garden
  - Conserving water
  - Picking up dog poop more often
  - Recycling more
Fall 2012 Survey Preliminary Results

- Of the 160 participants, **40 were first time participants**

### Blitz Impact Upon Participants

- **Will participate in another sampling blitz**: 89%
- **Will be motivated to take actions in their daily life to improve water quality**: 68%
- **Will be motivated to talk to friends/acquaintances about water quality issues**: 67%
- **Increased their awareness of water quality issues**: 71%

% of Respondents
Conclusions

- **Wabash Sampling Blitz has...**
  - Lead to more uniform water quality data throughout the watershed (Great Bend Region: 206 sites / Wildcat Creek: 52 sites)
  - Provided water quality data for decision making (Temp, turbidity, pH, N+N, oPhos, E. Coli, DOC, NH3)
  - Increased awareness, environmental stewardship, and behavioral changes in participants
  - Participation in other WREC initiatives
Lessons Learned

- Offer pre-sampling educational opportunities to increase validity of samples collected.
- Create increased partnerships with schools and parents.
- Use cluster sampling results to target efforts of education committee.
- Create one-page take-home flyer of ways to individually increase water quality.
Acknowledgements:
  o Indiana Department of Environmental Management, Indiana American Water, Indiana Water Science, and Community Volunteers.

References:
  o Wabash River Enhancement Corporation (WREC) www.wabashriver.net
  o TippEcoNow campaign to improve water quality http://tippeconow.com