Wisconsin's Surface Water Quality Monitoring Program (and what volunteers can do to help)

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Wisconsin's Surface Water Quality Monitoring Program

- Long term trends (lakes and rivers)
- Baseline streams (water quality and CWA sampling)
- TMDLs
- 303d listing/de-listing
- Use designations
- Special studies, investigations
- Other monitoring (research, CBM, etc.)
Wisconsin's Surface Water Quality Monitoring Network

- Lake trend monitoring network consists of 55 sites
Wisconsin's Surface Water Quality Monitoring Network

- River trend monitoring network consists of 52 sites
Wisconsin’s River Water Quality Trend Monitoring Network

- **Sampling Frequency:**
  - 24 quarterly sites, 28 monthly sites
- **Field Parameters:**
  - D.O., pH, transparency
- **Lab Parameters:**
  - Nutrients (P&N), total suspended solids, chlorides, chlorophyll a, hardness, bacteria, metals, etc.
Wisconsin’s River Monitoring Network

**Total Phosphorus**

Medians (range): 0.02 - 0.369 mg/L

Means (range): 0.021 - 0.396 mg/L
Wisconsin’s River Water Quality Trend Monitoring Network
Wisconsin’s River Water Quality Trend Monitoring Network

PHOSPHORUS TOTAL (MG/L)

"Draft" Water Quality Criterion

Northern Forests

Driftless Area

SITE NUMBER
Red Cedar River @ Menomonie
Trend Analysis - Phosphorus


n = 155
Slope = 0.00158
units per year.

Z=2.892

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Baseline Streams
Water Quality Monitoring

- Randomly selected watersheds
- Sample at “pour point” of watershed, or mouth of largest wadeable tributary.
- Collect monthly samples for one year, then move to new watershed (6 year rotation).
- Parameters include nutrients, suspended solids, transparency, etc.
Baseline Streams
Water Quality Monitoring

Baseline Streams
55 Sites/yr.
6 Year Rotation
Year-round monthly sampling
Parameters include:
DO, temp. pH, transparency
N-series, total P, dissolved P
and suspended solids
WCR Wadeable Stream Monitoring
Median Total P (2005-06)

“Draft” Water Quality Criterion
Baseline Streams

CWA Monitoring

- 272 randomly selected sites (required by EPA)
- Sites selected by ecoregion and stream size
- Fish surveys, macroinvertebrate sampling and habitat surveys
- One non-event water chemistry sample per site
- Parameters include nutrients, chlorophyll a, suspended solids, transparency, etc.
Baseline Streams
CWA Monitoring - WCR Sites
Baseline Streams
CWA Monitoring

• Data uses:
  – 305b reporting (CWA Report to Congress)
  – Characterize all streams of the state (by extrapolation)
  – Identify potential 303d, ORW and ERW waters
  – Develop 303d listing criteria
TMDL Studies

- Continuous Flow Monitoring (USGS)

- Water Chemistry
  - Stream sampling
    - Fixed period semi-monthly sampling for 1-3 year projects
    - Storm chasing on 1 year projects and special situations
  - Lake sampling
    - Bi-weekly, May - October
Volunteer collected water quality data

Rush River @ 385th Ave.

Flow (cfs)

Total P (mg/l)

-0.2
0
0.2
0.4
0.6
0.8
1
1.2
1.4

09/20/06
11/09/06
12/29/06
02/17/07
04/08/07
05/28/07
07/17/07
09/05/07

-0.2
0
0.2
0.4
0.6
0.8
1
1.2
1.4

Flow (cfs)
Total P
Rush River – Daily P Load (using FLUX program)
Sept. 2006 – August 2007

P Load = Flow (cfs) x P conc. (mg/l) x 8.34
Tainter Lake - BATHTUB Model Predictions

1. Mean Total P (ug/l) vs Percent of 1990 Total P Load

2. Mean Chlorophyll a (ug/l) vs Percent of 1990 Total P Load
Continuous Temperature Data

- Easy to collect remote data
- Reliable data quality
- Useful in determining stream use designation
  - Warm, cool or coldwater streams
- Useful in evaluating impacts
  - Urban stormwater runoff
  - Impact of dams on coldwater streams
Evaluating the impact of dams

Kinnickinnic River - Temperature Frequency Analysis
June - September 1996

Optimal for Brook Trout
Limitations of Data - Example

Wolf River @ CTH MM

- D.O. (mg/l) and Temp. (°C)
- 24 hr. Period
- 07/18/05 to 07/26/05
Instantaneous vs. Continuous Monitoring

Wolf River @ CTH MM
July 20, 2005

At 12:00 noon
D.O. = 5.52 mg/l

At 6:00 AM
D.O. = 3.48 mg/l
Wisconsin's Surface Water Quality Monitoring Program

Summary

• Wide variety of monitoring programs
• Use of data depends on the program
• Some opportunities for volunteers to help
• Limitations of methods
Questions?