Watershed Intensive Monitoring Framework Discussion
Streams Team Conference Call
December 15, 2010

Attendees: Ed Hammer (EPA), Chris Yoder (MBI), Jim Kloeswski, Dan Helsel, Mike Miller, Molli MacDonald, Kristi Minahan, Greg Searle, Jim Amrhein, Tom Aartila, Mike Sorge, Bob Hansis, John Masterson, Vic Papas, John Lyons, Brian Weigel, Ken Schreiber.

Draft Agenda
9:00 - 9:10 Introductions

9:10 - 9:30 Overview of watershed monitoring design (site location, parameters, frequency) and objectives (Yoder)

9:30 - 9:45 Other Region 5 states designs; do the designs meet EPA's monitoring expectations? (Hammer)

9:45 - 9:55 Current WDNR resources available for stream and river monitoring (Searle/Helsel)

9:55 - 11:10 Work through the list of questions provided to Ed and Chris

11:10 - 11:30 Other questions; next steps

Draft Meeting Minutes (by Helsel)

Watershed monitoring design (Yoder): Aim is to get sufficient coverage of monitoring sites, data and assess is the stream appropriately classification and what is the condition of the stream. 1st step is verifying the correct classification realizing that if the classification is not correct the condition assessment could change. Also have monitoring at the appropriate level to evaluate how we are managing stressors in the watershed. Design started with work in OH and used else where. Based on the linear concept of water flow – need to capture this with sufficient sites and do it more then a pass/fail method. Watershed management units are HUC 11 (150 to 300 sq. mi range). The more complex the watershed (farming, urban, etc) the more intense the sampling needed, more homogeneous watershed can be less intensity. MBI did the monitoring for the wadeable stream assessment and analyzed. WSA show similar levels of condition assessment – but more intensive sampling showed more information on the stressor identification. Geometric grid > by order of magnitude > ReMap by order magnitude > WSA. As an example, the geometric grid pick up the ammonium stressors. Indiana did a probability sampling at HUC 8 and they found TMDL took them into the finer scale and insufficient for TMDL and stressor identification. MBI found similar outside of Chicago that the finer scale monitoring found different stressors than the broader scale monitoring. Another issue is using the TALU for classification to address OH classification issue that tributaries are classified the same as the main stream.

Other region five (Hammer): MN they are looking at major revisions to monitoring and designated uses. In state of transition – have a design on line described as a pour point designed with sub basins sampled in a rotating basis (~ 5sq mi). Tiered Aquatic Life Uses, revised monitoring design with some probabilistic work. IN 2 watershed per year, 1 watershed per year and applying the resources to a targeted approach. They had an intensive design and ran into data interpretation problems and now working on geometric design with very few down. IL is in state of transition moving to TALU. EPA and IL need to work out the independent applicability – the region does support the biological criteria and "weight of evidence" approach. But EPA needs some assurance that the data is accurate and of a certain quality and need to have

a level four (?). EPA is not actively working with MI but likely will be in a state of transition. WI is at a level two. Ed will send out the links related but doesn't include the critical element review document. Chris will send out the 2004 critical element review document.

Monitoring Resources (Searle): Guessed at pilot cost of $180K. We currently spend about $380K on Tier monitoring with $275K for targeted monitoring (tier II and tier III) – includes LTE, but not permanent employees

Questions:

Searle: How would we/could we incorporate existing information.
Yoder: Power of analysis comes with the integrated data. Data analysis my be quite limited using data within 2 or 3 years. Which is fine, but Yoder suggests that mismatched data even by year can be problematic. Had this experience in IL, working in urban watershed and had to go out to find reference conditions, but the level of data and type of data were different and made data analysis difficult.
Hansis: Suggest that previous data be examined as part of the Pecatonica watershed pilot analysis.

Aartila: Can you summarize the sampling design for the Pecatonica.
Miller: Pectonia 227 sq mi. bifurcated down to 1.7 sq mi. and sampled fish, bug and water chemistry. The larger watershed sites sampled up to 6 monthly samples, while the smaller watershed sites sampled once during season. Targeted sampling by point source. Did not sit down with DNR regional program implementers – did not develop a list of data needs.
Yoder: Will we find out something we didn't know? Probably and likely. We'll see as we move through the data analysis step. For example, if you go to a watershed that has been assessed chemically, and use bio-assessment we may find out.

Searle: How many watersheds could we do in a year? Have about ~ $660k available.
Lyons: HUC 10 – 335 watershed, HUC 11 – ~800 watershed, HUC 12 – 1900 watershed.
Weigel: Current NC Stratified monitoring after five year 1250 at 1 site 12-0 km^2, 240 km^2, 13 km^2 (5 sq miles). 43 years to do the state. Limited by staff, resources – what is the best design.
Yoder: 1999 data from OH – chemical and biological excluding TMDL and modeling 4.1 million - a lot less here in WI. If we can't get any more than this, then we need to pick and choose state wide status and dive into more watershed specific.

Monitoring Intensity/Resources Available/Logistics

If we adopt the intensity of this Pilot approach, we'll be lucky to complete 5 or 10 watersheds a year statewide. With 300+ watersheds that's a rotation of 30 to 60 years.

How could this approach assess changes over time when we wouldn't be back to a watershed for 30 or 60 years?

How are we serving the State of Wisconsin and public if we focus on very small areas and ignore vast areas of the state? Is it appropriate to ignore impaired waters or high quality waters for over 30 years because of where they fall in the rotation of monitoring?

Yoder: how long will this take? Problem is this broad scale monitoring that gives you status assessment but does not give you day to day water quality management. Combine with EPA mantra to assess all their water bodies within 5 years – deflected everything to status. WQ monitoring judges administrative accomplishments, but not water program management. Are we better knowing state wide status in general w/o feeding back into program end points or do we take longer and generate more information that feeds back into day to day water quality management. Some states have said it will take 25 to 30 years – and it served them well. Got better buy in from programs and uses.

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Yoder: 1999 data from OH – chemical and biological monitoring is 4.1 millions (including staff) excluding TMDL and modeling which adds 1.1 million - a lot less here in WI. If we can't get any more than this, then we need to pick and choose state wide status and dive into more watershed specific.

Sorge: How many pilot projects are proposed for this next year
Hammer: at least 1 and up to 3
Hazuga: What funding will pay for this?
Searle: We have to use to EPA monitoring initiative funds from 09 which we can combine with 2010 funding. Another pilot program is required to receive this funding.
Hammer: we need to spend the old money and move forward with more pilot program across the gradient of non-degradation.

Given our limited resources, if we adopt this approach can it be scaled down so we can evaluate more watersheds per year? Something similar to what Minnesota is doing?

Since this approach is already in use in Minnesota and Ohio, we can look at their experiences to make informed decisions on how we might implement this approach given our program's priorities and resources.

Use of the Data

How will this approach evaluate the quality of Wisconsin Streams? How can such an approach assess the overall quality of Wisconsin Streams?
Yoder: primarily a biological assessment with WI end point supported by habitat and chemical analysis

Will this approach replace all our monitoring? (305 b, 303d, TMDL,)
Is this monitoring supposed to replace TMDL monitoring?

Yoder: The watershed approach will provide a condition assessment. Part of it can be used for getting alternative TMDLs in a more efficient and effect way.
Minahan: Do the states return to the watershed to do more work and do a 5 year basin rotation (not really a five year approach)? High concern areas may be visited more frequently or low priority areas on a longer one.
Hazuga: if we go into this watershed to develop a TMDL for instance where a lake might require 2 years of loads to established loads. How does that work on single year visit? How do we follow up with TMDL.
Yoder: this is designed to properly assess the biology and use water quality and endpoint of condition. Pollutants are a surrogate to the biological endpoint condition. Potentially wasting time with load in streams and need to focus on the end-points attainment.
Hazuga: This allows us to assess the biological condition and possibly the identification of the stressor without information about the amount of reduction needed.
Schreiber: TMDLs really require the quantification of the loads especially with lakes and reservoirs. Loads may not be that important for stream condition improvement.
Yoder: Real users are the managers and if we're getting "passing grades" with the NPDES programs, then they may not be too interested in monitoring.

How will this monitoring answer questions about CAFOs and not other sources of NPS in a watershed?
Yoder: Can you detect effect of a CAFO. Yes? The effect of the CAFO . . .by doing this over time you build and aggregate data with and without CAFO. Like identification of the ammonia gradient; saw that with NPDES, none may exceed the standards, but all three may be affecting the stream.

Table 1 (in the Pilot write-up) presents a list of things that could come from this approach. Has this actually been demonstrated by application in other states? If so, did it tell them anything they didn't know already?
Yoder: A battery of sequential analysis that the watershed data gets exposed to. Draft report available from the Dew Point Salt project. Yeah, in comparing the TMDL, it identified different stressors and identified more segments that should be listed.

How can the data be used for trend analysis?
Yoder: In lieu of having a state wide status, and aggradations of the watershed coverage, can be used for trend analysis. More focus on end-point thresholds. Has an example of OH trend analysis 21% of the river miles greater than 90% achieving the end points. Smaller streams are at the 60% achieving.

What does Region 5 feel is a reasonable spatial and temporal scale to implement a watershed program (e.g. MPCA strategy)? Given the tradeoffs which does Region 5 feel is better lower resolution or longer return period? Any why?
Yoder: that is the trade off. Implicitedly that EPA does have an answers.

What about high quality streams are at risk and need additional protection?
Yoder: This approach can address those and low and high quality watersheds should be visited.

Size of area to be monitored does not match the ideal size for management and implementation. Analysis in Wisconsin (Maxted, JT, Diebel, MW, Vander Zanden, MJ, 2008. Landscape Planning for Agricultural Non–Point Source Pollution Reduction. II. Balancing Watershed Size, Number of Watersheds, and Implementation Effort. Environmental Management (2009) 43:60–68) shows that the ideal watershed size for agricultural non-point pollution control is 20 square miles, significantly smaller than the 200 square mile area that is proposed. This analysis served as the basis for the watershed breakdown used in the Wisconsin Buffer Initiative Report.
Yoder: These reports show that you should do an even smaller scale than what the pilot project did. Certainly 20 sq mi. will have multiple sites at the – so you are doubling your sampling sites from 10 sq mi. to 5 sq mi. or cluster your sites. You will have priority areas that you may monitor more frequently. But the pilot program can accommodate this type of work. Need to examine the protocol that makes monitoring most efficient.
Hansis: Question is if we are managing at the 20 sq mi. shouldn't our monitoring follow. If going out there every 20 years, but how will we know if we made a difference?

Is the proposed monitoring approach capable of addressing other watershed assessment tools that we use?
Yoder: yes, but need the opportunity to streamline the assessment procedures. Why can't the biology do that assessment. Need to have the rigor of biological assessment program.
Minahan: With independent applicability, we have to list for TP and can't have biology trump the water quality criteria.
Helsel: How to handle the variability of the IBIs,
Yoder: Use the spatial conductivity to make those decisions – and build into your decision criteria. Some states use the two ways.

> WISCALMS – 303-d listing. The proposed approach will not give much meaningful data for 303-d listing or de-listing. For instance, will we be able to do 6 base flow P samples at each sampling site under the proposed system?

Is there enough emphasis on higher order streams so we can do classifications or characterize game fish?

Yoder: Yes. The riverine segments deal with large rivers as assessment units within their own rights. 500 sq mile treated as main stem pollution assessment (1 every 5 miles). Concentrate sample locations where you have more intensive stressors.

How will this sampling regimen mesh with fisheries' protocols?

Yoder: Used the qualitative habitat analysis and even more responsive to the biological changes.

How does this approach complement other watershed analysis tools such as SWAT, SNAP+ etc?

Yoder: He's not a watershed modeler so not sure. We do look at watershed details for the stressor analysis

Does the data gathered under this approach contribute to understanding climate change impacts?

Yoder: Over the aggregate and might broaden our coverage. The watershed approach will pick this up as a stressor over the aggregate. In Ohio, they analyzed the reference sites.

Basin planning sequence and content will need to be considered in this exercise.

Yoder: Agree. See the NPDES permits are put on the same cycle as the basin rotation – not all discharges are sampled but prioritized. Same, built into the TMDL programs also.

Can we use existing data and, if so, how far back would be valid? For existing data, how close do we need to be to the geometric mean for the site to be valid?

Yoder: Within 5 years and will analyze the Pectonia watershed for this analysis. See answer above.

We need to develop better in-place sediment assessment measurement tools as part of our analyses. Sediment is one of the leading causes for stream impairments across the country.

Yoder: Assumed clean sediment. Another place where a qualitative approach might be suitable. The QHEI variable has some variables like embeddedness related back to the landscape.

Helsel/Hazuga: Still struggling with how this information help identify impacts of CAFO over other agricultural impacts.

Yoder: Not very good odds in detecting the effects of a single CAFO, but over the aggregation you can look for the correlations associated with the amount of disturbance types within different watersheds. You get different biological responses with different impacts (WWTP, Agricultural, Industry, etc.)