IMPLEMENTATION ISSUES #4 / #20 – Translating SNAP to Stream Segments; Downstream Attainment

Preliminary Thoughts
TAG Meeting Oct. 9, 2014

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Implementation Issues

4 – How will a SNAP-derived threatened or impaired assessment be translated into stream segment(s)?
will SNAP be performed on basin, sub-basin, stream, or stream segment basis?

20 – Will downstream (DST) uses/attainment be relevant to determining permit water quality-based effluent limits (WQBELs)/TMDLs? How will it be done?

How will SNAP be performed?

- Condition assessments for waterbodies < 500 mi^2 are done by HUC-12 units
  - List impairments, causes and sources
  - Sampling plan defines reaches
  - SNAP to be performed on selected reaches (stream segments)

SNAP assessment that a reach is threatened or impaired due to nutrients would affect the assessed reach. If nutrient reductions required, would affect dischargers to reach and upstream reaches.
If downstream impairments, SNAP assessment can inform attenuation of nutrients.

A Watershed Plan can be developed and implemented in lieu of a TMDL

- Six elements for a Category 4B demonstration
  - ID segment and state problem causing impairment
  - Describe controls needed and how they will achieve water quality standards
  - Estimate when WQS can be met
  - Schedule for controls
  - Monitoring plan to track effectiveness of controls
  - Commitment to revise controls if needed
- If a 4b demo is done but controls not implemented in timely fashion, then need to commit to doing a TMDL.

If a TMDL is done, what should the targets be?

- Benthic algae and dissolved oxygen
  - But requires sophisticated modeling
- Total phosphorus (TP) and dissolved inorganic nitrogen (DIN)
  - TP = 0.40 mg/l; DIN = 6.7 mg/l?
  - TP = 0.131 mg/l; DIN = 3.6 mg/l?
  - Original TIC write-up: DIN = 3 mg/l; TP is aquatic-life use and QHEI-related
    - Exceptional WWH and all QHEI: TP = 0.06 mg/l
    - WWH and 12 < QHEI < 64: TP = 0.13 mg/l
    - All other ALUs and QHEI s: TP = 0.3 mg/l

With TMDLs, may need

- Sufficient funding to collect additional monitoring data and do more sophisticated modeling
- Still may have implementation issues
  - May need economic variance

Will downstream impairments be relevant to determining WQBELs and TMDLs?

- If SNAP shows nutrients being attenuated, then need to consider whether science supports calculation of TMDLs and WQBELs
- Can simple approaches be developed? (stream to discharge ratio, distance to impairment, no brainers…)
- Request EAS and MAS to provide input
- Example? Springboro/Clear Creek/Little Great Miami River
- Need to coordinate reductions needed for local impacts vs. downstream so facilities don’t have to upgrade twice

Protection of Downstream Uses

- Florida DEP's approach to stream Downstream Protection Values (DPVs)
  - Criteria for lakes and estuaries make stream DPVs unnecessary
  - "the scientific merits of any proposal must be weighed when deciding whether the perception of necessity to adopt DPVs outweighs the weaknesses contained in the science"
  - Narrative statement in rules acceptable

Protection of Downstream Uses

- Wisconsin generally requires a 1 m/l technology-based effluent limit for all but the smallest dischargers
- NR 217.15(c) has reasonable potential calculations based on instream water quality criterion for total phosphorus (0.1 mg/l for rivers and unidirectional flowing waters)

Implementation Issues 5 &7

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What happens if SNAP determines nutrients are not a problem, but limits are already in place?

- SNAP
- TMDL re-evaluation
- Current limits as a cap
- Current limits achieved
- Limit reason of lack of problem

Should TMDLs with current Phosphorus Recommendations be vacated pending SNAP?

- Re-evaluation of TMDL
- Case-by-case
- Are current limits consistent with SNAP?

Should implementation strategy be different if stream is threatened, but not impaired?

- SNAP flow chart
- Design flow
- Threatened
  - Improving
  - Worsening

Should implementation strategy be different if a nutrient management plan has been approved?

- Case-by-case basis
- Depends on the existing nutrient management plan and if it is consistent with what is allowed in the SNAP implementation.
- Status quo

DRAFT 10/6/14

Implementation Issue #10

- What will be the criteria for allocating nutrient reductions among contributing sources?
  - Will all PS be treated identically (e.g., = % reduction, or = limits)? Or will flow or load be considered, and if so, how?
  - Will PS be treated differently than NPS?

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First . . . a reminder: Definitions – EPA terminology

- TMDL = the total assimilative capacity of a water body, or the total allowable loading, for a pollutant (e.g. phosphorus)

  AND

  = the allocation of that pollutant among all sources
- TMDL = WLA + LA + MOS*
- WLA = wasteload allocation → allowable load for a PS
- LA = load allocation → allowable load for NPS
- Load reduction = difference between existing load and WLA or LA

*Margin of safety

What will be the criteria for allocating nutrient reductions among contributing sources?

- Allow/encourage flexibility in allocating WLAs and LAs
  - Determine WLA/LA allocations differently by watershed
- Encourage alternate allocation procedures
  - Encourage allocation alternatives that may have lower cost reductions
- For PS: consider technical/economic feasibility of potential allocations
  - Do not impose PS allocations that would be technically or economically un-achievable
  - Consider WLAs based upon effluent limits for "first-level" treatment technology for nutrient removal (typical TP limit = 1.0 mg/l for POTWs)

Total Nitrogen retrofits for point sources

- Most costly if the plant does not currently nitrify (implying large bioreactors that can be modified without significantly more tankage to achieve lower TN or DIN levels);
- Moderately costly if it does nitrify already (designed to do so at design or forecasted flow rating); and
- Both scenarios (until TN levels of 5 or 3 mg/L are considered) are capital intensive, not O&M intensive (in general).
- In general, TP retrofits are either O&M intensive if chemical-P and low-to-moderate capital intensive if bio-P is selected (typically on a life cycle basis).

What will be the criteria for allocating nutrient reductions among contributing sources? (cont.)

- Consider size and capability of sources:
  - Small sources may have limited financial capability;
  - If source's relative contribution is small, consider whether significant WQ benefit will be achieved
  - For small sources: if little/no WQ benefit, then consider WLA equal to existing load
- If PS contribution is minor fraction of total load, consider WLA equal to existing load
- For NPS load-dominated waters, set WLAs to achieve technology-based limit for PS, with remaining load allocation distributed among NPS

US EPA allows states discretion in allocation of loads

From USEPA guidance: “Frequent Questions”

Q: How should loads be allocated for multiple sources and source types to the same reach or segment?

- “Each state has the discretion to decide how to allocate loads in such a manner that water quality standards will be achieved.
  For more information, please refer to EPA's TMDL guidance , or the Allocations section of the Protocol for Developing Nutrient TMDLs , Sept. 2007”

Ohio EPA recent example for TMDL allocations

- Upper Scioto River TMDL, Draft (2014) *
  - In specific sub-watersheds with predominant NPS existing loads and small POTW PS, two alternatives were presented:
    A. WLAs for PS based on 1.0 mg/l TP limit, with remainder of TMDL given as LA for NPS. This results in slightly smaller WLAs (PS) and slightly larger LA (NPS)
    B. WLAs for PS based on existing load (i.e., no reduction), with remainder of TMDL given as LA for NPS. This results in slightly larger WLAs and slightly smaller LA (i.e., greater NPS reduction)
  - Alternative B is preferable – since limited benefit results from WWTP treatment upgrades but cost incurred by small WWTPs would likely be substantial

* http://epa.ohio.gov/dsw/tmdl/SciotoRiver.aspx#122566532-tmdl-report

Will all PS be treated identically (e.g., = % reduction, or = limits)? or will flow/load be considered, and if so, how?

- Typically, Ohio EPA has given equal concentration limits to POTW PS dischargers
  - This has been considered (and often is) equitable
- Requiring equal % reduction is not equitable, since different PS may have different influents or have implemented different treatment technologies
- Should consider alternatives
  - It may make sense economically and technically for one large discharger to take on bulk of reduction in a specific watershed
  - Industrial PS should be considered case-by-case
  - Other alternatives?

Considerations / questions for small sources

- Small PS should not be expected to make relatively large cost reductions for relatively small WQ benefits
- Should there be exemptions for small contributors?
  - If a PS discharges < "_?_" % of total load to water body, should it be exempt from nutrient controls, or conditionally exempt?
    - If so, what conditions should apply?
  - If a PS discharges < "_?_" gpd, should it be exempt from nutrient controls, or conditionally exempt
    - If so, what conditions should apply?

Will PS be treated differently than NPS?

- Of course!
  - The assurance mechanism for PS WLAs is the NPDES permit program, including legal enforcement for non-compliance
  - There is no equivalent assurance mechanism for NPS LAs under the Clean Water Act
- LAs (NPS) are generally implemented through best management practices (BMPs, e.g., Farm Bill payments, 4R certification)
  - Voluntary implementation
  - Incentive programs, such as USDA, ODNR cost-sharing (e.g., CRP)
  - WQ trading programs
- Required: Ag NPS - Fertilizer applicator certification statewide; Nutrient Management Plans in Grand Lake watershed

Problem with US EPA guidance requirement for "reasonable assurance"

- US EPA TMDL guidance requires reasonable assurance that load reductions required by WLAs and LAs should be achieved
- But guidance states:
  - If water segment impaired by <u>both</u> PS and NPS, US EPA will approve TMDL only if there is reasonable assurance that NPS control measures will achieve LAs
  - If water segment impaired <u>only</u> by NPS, US EPA cannot disapprove TMDL if there is not reasonable assurance that LAs will be achieved

QUESTION: How do we deal with this?

Balance between WLAs and LAs

- For many stream segments or watersheds, one source type dominates over the other
- In many rural Ohio waters, NPS nutrient loads dominate over PS nutrient loads
  - If SNAP determines nutrient impairment or threat for such waters, PS load reductions alone cannot achieve TMDL
  - LA must require sufficient load reduction for TMDL to be met
- In such situations, achieving WLA reductions by PS may provide no WQ improvement
  - Such WLAs should not be enforced unless and until LA reductions are implemented
    NOTE: this goes beyond Issue #10

Further discussion

- How can the nutrients rule address the need for NPS load reductions?

- How can LAs be implemented?

SNAP Implementation-Issue #22 Overview

What considerations, if any, should be made in the context of the SNAP determination for Drinking Water considerations including issues related to nitrate, blue green algae, etc.?

22-Identification/incorporation of Drinking Water issues: nitrate, cyanobacteria, other?

- *Nutrient TAG has focused discussion on the SNAP (Stream Nutrient Assessment Procedure) addresses "near field" impacts on surface streams.*

22-Identification/incorporation of Drinking Water issues: nitrate, cyanobacteria, other?

- *SNAP does not address "far field" impacts such as drinking water impacts or lakes, which would include efforts to control/abate recent episodes of microcystin in Toledo's drinking water supply produced by Blue Green Algae*

- *SNAP acknowledges that its focus is surface steams and near field impacts in the preamble*

22-Identification/incorporation of Drinking Water issues: nitrate, cyanobacteria, other?

- *Implementation of separate improvements for far field impacts would also be challenging*
- *Several permit cycles may be required to demonstrate improvement to nutrient impaired stream segments through POTW modifications, CSO/SSO abatement, and adaptive management considerations.*
- *There should be no rush to judgment to addressing far field impacts prior to undertaking and evaluating required and necessary near field impacts, which are better understood, quantified, and managed*

22-Identification/incorporation of Drinking Water issues: nitrate, cyanobacteria, other?

- *Possible approach for far-field impacts would be to create a separate "overlay" procedure where candidate water basins, such as the Maumee River Basin, would be reviewed and evaluated.*
- *This would be determined by the Ohio EPA on a basin by basin basis.*
- *May require POTWs and sewerage systems to undertake other improvements, beyond those require addressing "near field" impairment problems*

22-Identification/incorporation of Drinking Water issues: nitrate, cyanobacteria, other?

- *Take a lesson from Iowa?…*
  - *Optimize the POTW for nutrient control*
  - *Undertake a program for nutrient controls based on a desired target objective*
  - *Monitor results*
  - *Based on the results, adopt a reasonable and feasible limit based on reasonable potential to meet a limit taking consideration other important considerations such as the averaging period and seasonal considerations*

22-Identification/incorporation of Drinking Water issues: nitrate, cyanobacteria, other?

- *Advocate addressing near field impacts first and then only if necessary far field considerations, only if near field controls are not shown to be adequate*

- *For far field impacts to be effective in protecting water supplies, the law, rules and practices must be sufficiently development to address point and non-point sources in a fair, proportionate and equitable manner*

OEPA Nutrient TAG Implementation Issue #27: Margin for Future Growth

For Discussion at the Ohio EPA Nutrient TAG Meeting
on October 10, 2014

Prepared By Dale Kocarek

Issue # 27 – Future Growth

- Existing TMDL protocols already incorporate a factor of safety and provide allowance for future growth.

- Factor of safety is applied to account for insufficiency in data and statistical variances in data analysis.

Issue # 27 – Future Growth

- Permit and other stakeholders are required to provide an assessment for future growth.
- Future growth requirements may be based on Comprehensive Land Use Plans, Section 201 Facilities Plans, Section 208 Basin Plans, or other information.
- We believe that provisions already exist to handle these issues and no others are needed.

OEPA Nutrient TAG Implementation Issue #19 – Data Requirements

For Discussion at the OEPA Nutrient
TAG Meeting on October 10, 2014

Prepared by
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Primary Questions to Address

1. What should be considered sufficient data for conducting a SNAP evaluation?

2. What if sufficient data are not available?

Question 1
Defining Sufficient Data

- Data Type – Which parameters?
  - Already defined by SNAP
- Data Quantity – How much? Where? When?
  - Determined by available resources, spatial and temporal study bounds, data quality requirements
- Data Quality – How much measurement or predictive certainty is needed to make sound management decisions?
  - Determined through establishment of performance criteria

Question 1
Defining Sufficient Data

- Ideally – Site-specific planning for each study
  - EPA's *Guidance for the Data Quality Objectives Process (EPA QA/G-4)* provides a tool to "develop Data Quality Objectives for determining the type, quantity, and quality of data needed to reach defensible actions."
- Realistically – suggest minimum requirements, allow room for BPJ with sufficient justification

Determining Data Types

Categories already defined in SNAP/flowcharts

1. Initial SNAP assessment – Fewest parameters needed to reach a conclusion, includes biology, DO, benthic chlorophyll
2. Critical supporting data – Parameters needed to navigate flowcharts A or B, includes QHEI and nutrients
3. Additional info - Parameters needed to navigate flowchart C, data may vary

Data Quantity

Considerations for determining data quantity

- Spatial and temporal aspects
  - # samples, # sites, # reaches, season, flows, etc.
- Some requirements already built-in to SNAP
  - Flow chart A -> 2 years of data
  - Flow chart B -> requires data from downstream sites
- Data characteristics should reflect those of underlying dataset

Data Quality

- Consistent collection and analysis methods ensure data quality
- Existing OEPA manuals or SOPs should be used
  - *Biological Criteria for the Protection of Aquatic Life: Volume II: User's Manual for Biological Field Assessment of Ohio Surface Waters*
- New SOPs should be developed, as necessary

Question 2
Dealing with Insufficient Data

- SNAP is based on correlations between contemporaneous biological and chemical data
  - If these data are not available, the SNAP can't be calculated
- Waters with insufficient data should be prioritized for monitoring within a reasonable timeframe
  - Additional conversations needed on prioritization process and defining "reasonable" timeframe

Suggested Approach

- A sampling plan should be developed that outlines general data quality objectives for all SNAP-related studies
  - Outline set of minimum data quantity requirements that allow room for BPJ with sufficient justification
  - Identify required quality assurance and control procedures, manuals, and SOPs
  - Outline process for prioritizing waters in the absence of minimum data

Suggested Minimum Data Requirements for Performing SNAP Analyses

SNAP Assessment Progress	Data Type	# of Samples per Site*	Temporal Considerations**
Initial Assessment	Biological	• At least one fish and/or macroinvertebrate community sample	• Collect within 3 weeks of benthic chlorophyll samples, or • During periods with comparable baseflows to those measured during benthic chlorophyll sampling, provided the communities have not been affected by catastrophic flow events (flooding, dessication, etc.) in the interim
	Dissolved Oxygen	• 48 hours of continuous data, or • At least five days of discrete maximum (1PM – 4 PM) and minimum data (6AM – 9 AM)	• Collect within 2 weeks of benthic chlorophyll sampling during comparable baseflow conditions provided the stream has not been affected by catastrophic flow events (flooding, dessication, etc.) in the interim
	Benthic Chlorophyll	• 10 – 20 benthic scrapings, measured as a geomean	• Collect following at least 3 weeks of stable, baseflow conditions
Flowchart A/B	Nutrients	• At least 5 samples, measured as a geomean	• Collect during stable, baseflow conditions
	QHEI	1	• Collect within 3 weeks of biological sampling, or • Once per year, provided habitat has not been affected by catastrophic flows or channel alterations
Flowchart C	Other Stressors	TBD based on best professional judgment	

*Number of sites per reach is based on best professional judgment.

**Unless sufficient justification is presented, all data should be collected during the same calendar year. With the exception of QHEI data and information needed to complete Flowchart C, all data must be collected between June 15 and October 15th.