Nutrient Scientific Advisory Board Meeting #8 Minutes - Final

Friday, May 6, 2011
TJCOG - 4307 Emperor Blvd, Durham NC, 27703
9:30 am -12:00 pm

Attendees
Members: Matt Flynn, Michael Layne, Matt Laufer (and Andy McDaniel, alt), John Cox (and Michelle Woolfolk, alt), Larry Band, David Phlegar, Trish D'Arconte, Grady McCallie, Kathy DeBusk (for Bill Hunt, absent), Fred Royal.

Non-Members: Andy Sachs (facilitator), Jason Robinson (DWQ), Rich Gannon (DWQ), Kathy Stecker (DWQ), Adugna Kebede (DWQ), Sarah Bruce (UNRBA), Michael Schlegel (TJCOG), Britt Stoddard (Wake), Sally Hoyt (UNC), John Huisman (DWQ), Trevor Clements(TT), Josh Johnson (AWCK), Michael Sloop (CDM)

Convene
The NSAB facilitator convened the meeting and outlined the agenda and desired outcomes of the meeting: 1) Discuss the relationship of the Watershed (WS) Remodel to the various elements of the entire Jordan Strategy 2) Discuss the NSAB Timeline 3) Get closure on the criteria for the WS Remodel 4) Discuss a Credit Accounting Tool

The Board agreed on the proposed agenda. Two minor typos were pointed out in the minutes, which were approved otherwise.

Relationship of Jordan Watershed Remodel to Strategy Elements (link)

Rich Gannon led this discussion and referred to a diagram he had posted on the Board:

Foundation/Merit➔Practical Implications➔Regulatory Requirements➔Appearances.

Rich explained that because this is a Scientific Advisory Board, it seemed the board should primarily be concerned with the "Practical Implications" of any remodeling to the Jordan nutrient strategy. DWQ would also be concerned with the rulemaking implications.

A document developed by DWQ's planning staff was passed out that described the various aspects of the Jordan nutrient strategy and staff's expectations for how the development of a more accurate WS Remodel would affect each aspect of the strategy.

Rich went through the document, recognizing that the first several elements are overarching strategy elements, while latter ones are rule-specific. Baseline loads to each arm were estimated using flow data, concentration data, and FLUX. The loads are listed in the Purpose and Scope Rule (link), the TMDL report (link), and the original WS Model report (link). The original WS Model could be improved with additional historical data, which could also be used for additional calibration. DWQ does not consider it problematic to base existing development baseline loads for each jurisdiction on a WS Remodel calibrated against revised lake load estimates. DWQ does not plan to revisit the Lake Model (different than WS Model) or initiate rulemaking as a result of revised baseline loads, certainly not for the foreseeable future.

The group then discussed *baseline loads*. DWQ explained that additional historical data could be used in the WS Remodel if any such data can be found. John Cox was concerned that the data used only captured the lower end of flow ranges while infrequent high flows matter; the model may attribute higher loads to these high flows than really existed. Would it be appropriate to take flow/concentration relationship data from one tributary and apply it to another?

Grady McCallie asked about the effect of using more recent, better data to set the loads. DWQ replied that if data were collected for a time past the 2001 baseline period, then the total loads would be probably different and therefore the distribution of loads across contributing sources (pie pieces, e.g., existing development, new development, agriculture, WWTPs) and across the jurisdictions also would be different. The calibration of the model would also be affected. John explained that jurisdictions will be doing estimated reductions against a fixed, assigned load value. If we underestimate the reduction need, everyone does well but the lake doesn't improve. If we overestimate the reduction need, everyone struggles to meet assignments and the lake may or may not improve.

Grady asked whether the interim load increases have to be neutralized or jurisdictions have to get the percent reductions from development in that period. Rich said that that the percent reduction goal will be applied to the baseline load for a jurisdiction, which sets its allowable load, like a floor. Interim load additions may be lesser or greater depending on the levels of treatment being required by local governments. John explained that Durham is now requiring the 2.2 lb N/ac/yr, which equates to the percent reductions on those lands. There was discussion about the comparative effects of different runoff load estimation tools in use.

Rich then discussed the Jordan Strategy's *percent reduction goals* for each arm of the lake. These were developed by the Lake Model and are the benchmark strategy values. They would not be affected by a WS Remodel or anything short of a lake remodel, and DWQ has no interest in a lake remodel for the foreseeable future. These percent reduction goals are set out in the Purpose and Scope Rule, the TMDL, and the original WS Model Report.

Larry Band asked if the Lake Model (not WS Model) was peer-reviewed. This was asked to sound its defensibility in light of legal action that had occurred in Chesapeake Bay. Michelle Woolfolk explained that it was reviewed by EPA and the stakeholders. Tetra Tech explained that the lake model did have a robust quality assurance plan, much more so than the WS Model. Larry said it sounded like it wasn't a full peer review. There was discussion of uncertainty analysis. Trevor explained that a lot of uncertainty evaluation was done on the lake model, based on an approved QAPP. This in contrast to the WS Model, which was done much more quickly than the Lake Model.

Rich then began discussing the Strategy's *Relative Source Contributions (pie slices).* These are estimates of the proportions of loading contributed from major sources, for example agriculture, existing development, new development, and wastewater treatment plants. These were estimated by the original WS Model. Remodeling would almost certainly produce different estimates for source contributions than was produced by the original WS Model and presented in the report. A change in the relative source contributions would not be motivation to amend the rules.

The group then discussed <u>whether the WS Model's pie slices and other info could be used to divvy up baseline loads</u>. Rich said that Tetra Tech's input in a previous meeting was that such an exercise would be very coarse. The county estimates included in the WS Model report were done based on

proportional land areas within HU's. This would seem to go against the wishes of the Board to get more accurate loading numbers.
To stay with the agenda, the Board postponed the completion of the other half of this item until the June meeting.

NSAB Timeline (link)

DWQ distributed a timeline. Rich led discussion of this item. He explained that the first annual report is due to the Secretary on July 1, 2011. The second annual report, due on July 1, 2012, must include the Board's recommendations for four tasks listed in SL 2009-216: identify management strategies; evaluate feasibility, costs and benefits; develop a credit accounting system; and identify improvement needs.

There is no explicit deadline in the legislation for estimating baseline loads and reduction goals for jurisdictions. However, they will need to be completed no later than March 2014 when the UNH monitoring report is due. Considering several months to define what we want and get a contract in place, there would be about 2 years to complete a model and assign loads by Fall 2013, giving local governments a handful of months to begin planning before the 2014 monitoring.

Local governments will want a way to perform credit accounting for measures installed since the baseline as soon as we can provide it. Rich recognized that the JFLSNLAT is the obvious choice for estimating credit now for practices that it addresses, and potentially adding modifications in the next year to address additional practices until the WS Remodel is done. What beyond that - do people want the WS Remodel to also do site-scale BMP crediting? It seems the only potential option for this would be SUSTAIN. Board members appreciated having the timeline. Several agreed that working with JFLSNLAT in the interim makes the most sense. There was some discussion of SUSTAIN but no clear opinion on its utility as a complete debit/credit framework.

Sally Hoyt of UNC was given permission to speak and reminded the group that non-DOT state and federal entities are on a different timeline. These entities began implementing their new-development programs upon EMC approval of JFLNSAT and don't have an interim period. She requested that the timeline for modifications to the Jordan tool be moved up; UNC is entertaining things like stream restoration as options. *[Editor's note: stream restoration will require a different credit estimation approach – plan to discuss such things at June meeting.]*

The Falls Existing Development Rule calls for DWQ to submit baseline loads to the EMC in July 2013, which would require having the work done at least 6 months before the timeframes discussed above for Jordan. A Board member noted that since the Falls WS Model is GIS-based, it will be easier to determine jurisdictional baseline loads with it. Another Board member pointed out that it would be beneficial if the models for Jordan and Falls were as consistent as possible, especially since they're in uniform physiographic regions.

Criteria for a Remodel of the Jordan Watershed (link)

DWQ provided two documents. One, *Issues Raised by April 2011 NSAB*, was an extraction and organizing of 'fundamental issues' and related points raised in the previous meeting, provided as a

thinking aid. The other, *Criteria for …*, had been revised since the previous meeting based on Board input. Rich walked through them.

There was substantial discussion on whether the model should include credit accounting. The concern was reiterated that if not, the pounds reduced might be of a different nature than those assigned to local governments, potentially on two different scales – the fruit analogy. Given the resources going into the WS Remodel it would ideally do both credits and debits ensuring the same scale. Specific possibilities were raised - SUSTAIN, SLAMM embedded in SWAT, Jordan tool in SWAT. Overall, it was recognized that if the credit accounting is part of the remodel, this criteria could be very limiting to the WS Remodel. Same is true with credit accounting usable by non-modelers unless extensive training is done.

One interest was to use the Jordan tool's fixed effluent concentration approach; most models don't do this.

Because rulemaking often hampers adaptive management, occasional inconsistencies are going to be necessary to make progress, although this will make some uncomfortable.

It was asked if this included atmospheric deposition. Build-up and wash-off rates should be incorporated into the model, as it was in the old WS Model.

Uniformity is needed in the land cover. There is now 2010 aerial imagery for the entire state, better resolution than the 30m pixel satellite stuff.

Can variable concentration at different flows be included, e.g. to recognize SSO influences? Larry answered that most models have a fixed relationship, but advanced models allow this.

Can the model include other pollutants or be adaptable to address others? Efficiency. Maybe sediment, but one model for multiple pollutants very unlikely.

It was suggested that two additional criteria be added: (1) that the model be constructed in a modular way to cover other pollutants for additional TMDLs, and (2) that this remodel be consistent with DWR's coupling of the Cape Fear and Neuse hydro model to daily time units, as this could help in capturing flow differences.

In a non-binding straw poll, all Board members except two approved the criteria. It was suggested and agreed that a sub-committee be formed to finalize the criteria and provide several remodeling options. The sub-committee will come back with several recommendations in July. John Cox, Kathy Debusk, and Trish D'Arconte volunteered to work on this. Larry Band will be involved after May.

Agreed that next time:

- Finish strategy implications
- Credit tool(s)
- Credit measures

Wrap-up comments around the room included:

- None of this is static. The Jordan tool will need to be modified but needn't be thrown out.
- We're starting to move forward.

- The timeline was helpful. The subcommittee idea was good.
- A subcommittee needs to look at non-structural BMPs, e.g. fertilizer management.
- Need to get Stormwater Permitting Unit involved in BMP credit discussions.
- Reduction measures could influence model choice.
- Looking forward to resolving interim tool, addressing innovative BMPs.

Future Meetings

- Always the first Friday of each month, 9:30 – 12:00 at TJCOG

Relationship of Jordan Watershed Remodel to Strategy Elements

Following are DWQ Planning staff's descriptions of various aspects of the Jordan nutrient strategy along with our expectations for how the development of a 'more accurate' watershed model would bear on each aspect. We end with a statement of our interests in receiving recommendations from the NSAB.

Total Baseline Loads to Each Arm

- Estimated with flow data, concentration data and FLUX.
- Set out in Purpose and Scope Rule, TMDL report, and watershed model report
- Revised load estimates via additional historical data, if that's possible, may improve watershed remodel calibration
- DWQ would not consider it problematic to base jurisdiction ED baseline loads on a watershed remodel calibrated against revised lake load estimates
- DWQ would not revisit the lake model or initiate rulemaking as a result of revised load values

Percent Reduction Goals for Each Arm

- Developed using Jordan Lake Nutrient Response Model
- Set out in Purpose and Scope Rule, TMDL, and watershed model report
- Watershed remodel would not affect
- The strategy's foundation; immutable short of remodeling the lake
- DWQ will not remodel the lake in the foreseeable future

Relative Source Contributions (Pie Slices)

- Proportional load contributions to lake from major source types in each subwatershed. For general guidance. Estimated by watershed model
- Presented in watershed model report and TMDL report
- Watershed remodel would almost certainly change proportions from the original watershed model. Would presumably reflect greater accuracy of remodel
- Revised source contributions would not be motivation to amend rules

Delivery Factors

- Developed using watershed model and SPARROW
- Coverage in Rule:
    - Not explicitly identified in rules, only explicit in SL relative to adjusting credit (however, document referenced in SL is not final DF's. DWQ would want to use final DF's if not replace)
    - SL 2009-216 requires DENR to set load reduction goals on loads reaching the lake, suggesting the need for delivery factors
    - Trading Rule requires accounting for difference in instream nutrient losses, suggesting the need for delivery factors
- New watershed model would be expected to produce new delivery factors

    - No material difference for a given HU in isolation (could increase or decrease a LG's at-lake reduction needs, would not change at-source reduction needs, same holds for reductions achieved by measures)
    - Could increase or decrease a LG's HU's deliveries relative to other HU's, i.e. increase or decrease a LG's BMP spending power, trading power
- New rulemaking not needed to apply new values under 2nd, 3rd bulleted uses above. DWQ would like the NSAB to recommend using watershed remodel values for 1st use above - adjusting credit to lake.

Loading Rate Targets for New Development

- Weighted average of forest, crop, and pasture unit-area loading rates minus goal percents. Used values from watershed model because they agreed well with research-based values and were watershed-specific
- Set out in the New Development Stormwater Rule
- Remodeling may allow calculation of different values. Would be secondary to research-based values
- Any rule amendment to change the targets would require and be based on additional research; DWQ not interested in rulemaking for foreseeable future.

Point Source Allocations

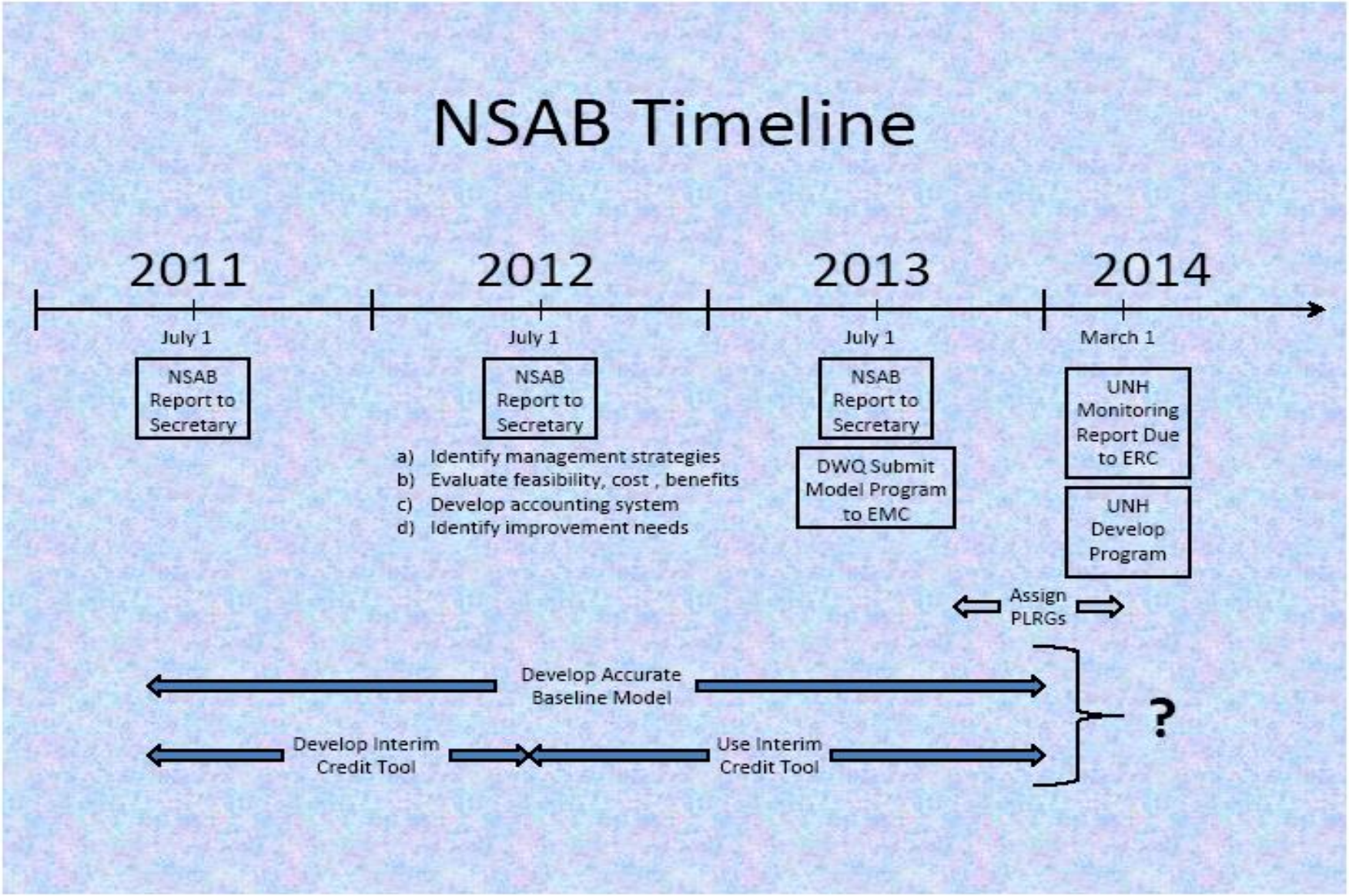
- Developed using end-of-pipe baseline loads and watershed model PS delivery factors
- Subwatershed allocations stated in Wastewater Rule and TMDL. Individual allocation method described in rule
- Watershed remodel may produce different PS delivery factors
- No material difference to dischargers; would not change end-of-pipe allocations
- Would imply revised estimate of at-lake total PS baseline loads and load goals
- DWQ would not initiate rulemaking to revise these values

Agriculture Load Accounting

- NLEW accounting developed by NCSU and others to estimate crop baseline and current year 'edge-of-field' N losses for comparative, percent reduction estimates. Qualitative P accounting – not loading. Pasture point system being developed – not loading.
- All called for in Jordan Agriculture Rule
- Watershed remodel would have no effect on Agriculture load accounting

NSAB Recommendations?

- DWQ seeks NSAB recommendation for alternative to Tar-Pam method for setting existing development loads.
- DWQ would like the NSAB to recommend using watershed remodel delivery factors for adjusting at-source reduction credit to lake credit.


NSAB Timeline
2011
2012
2013
2014
July 1
July 1
July 1
March 1
NSAB Report to Secretary
NSAB Report to Secretary
NSAB Report to Secretary
UNH Monitoring Report Due to ERC
a) Identify management strategies
b) Evaluate feasibility, cost , benefits
c) Develop accounting system
d) Identify improvement needs
DWQ Submit Model Program to EMC
UNH Develop Program
Assign PLRGs
Develop Accurate Baseline Model
Develop Interim Credit Tool
Use Interim Credit Tool
?

Criteria for a Remodel of the Jordan Watershed

General Criteria

- Provide more accurate jurisdictional existing development loads to lake, baseline and transitional period
- Credible – Peer-reviewed, public domain, tested
- Incorporates or compatible with credit accounting
- Adaptable to additional measures/ better science
- Credit accounting element usable by non-modeler
- Allows inter-HU crediting
- Supports cost optimization
- Transferable

Specific Criteria

- More recent land cover or land use data
- Additional historical data / calibration points
- Improved unit-area loading rates for different land uses
- Improvement to septic component

Issues Raised by April 2011 NSAB

Strategy Issues

- Implications for strategy elements:
    - Baseline loads for each of the 3 arms were estimated by Jordan watershed model, listed in Goals rule. Why not divvy those up to existing d? Are we bound by those numbers? Will a new method disregard these? How credible is that?
    - Can loading from different source types (pie pieces) be estimated in isolation from each other (Jordan tool for ED) or should they be estimated in conjunction?
    - How will model results fit with New D loading rate targets?
- Land use vs. land cover - Land cover data is more readily available, but land use is more accurate. The Jordan watershed model used a combination of both.
- Transferability – If the model is to be transferred, it must be very accurate, and accepted.
- Guidance - Jurisdictions will need guidance in estimating their load reduction credits
- Compliance – How will compliance be judged?
- Timeline – No actual deadline for developing jurisdictional baseline loads is listed in the SL, although SL directs DWQ to give LG load reduction #s by March 2014 in the UNH and March 2017 in the Haw and LNH.

Watershed Model Uncertainties/Deficiencies

- Jordan model doesn't do loads by jurisdiction, except maybe by unit-area loading rates. Concern over unit-area loading rate values for different land uses.
- Jordan model didn't do transition period.
- Use more recent land cover or land use data than Jordan model 1992.
- Improvement to the Jordan septic component is needed.
- Jordan model estimates lump sum loading from each 14-digit HU, not broken into sources.
- Uncertainty from sampling because of infrequency, missed peak flows where the majority of the loading occurs.
- Additional historical flow, concentration data, additional calibration points are needed.
- Some calibration points in the Jordan watershed Model are downstream of WWTPs. Because of this, FLUX overestimates nutrient loading during high flow events.
- Jordan model could be improved, but not really intended for separating loads within HU's. Better, SUSTAIN is an example of a more comprehensive, and flexible option. More expensive, time-consuming.

Jordan Stormwater Accounting Tool

- Jordan / Falls Lake Stormwater Nutrient Load Accounting Tool (JFLSNLAT) is specifically designed for loading in discharge to storm drain networks for small sites, does not account for groundwater, and would not be appropriate for doing baseline loads.

Procedural Concerns

- Doing it right – as accurately as possible with a credible tool - is most important.
- Time, money, and energy for doing the modeling right
    - Cannot let the complexity of the issue delay the development
    - Should not try to "force it"
    - New method may be expensive and time-consuming, but it may be worth it in the end
    - Where would funding come from?
- Important not to lock selves into one set of numbers forever; rather plan to be adaptive.
- Best numbers are not needed up front. Initially LG's can go for cost-effective low-hanging fruit while best numbers are under development. Can use another method for the interim.
- The NSAB should assume the ability to make statements/recommendations about the right way to go.
- Come up with an initial estimate, while developing a more accurate method.
    - Why come up with an initial estimate if the new estimate will replace it?