

DEQ Nutrient Work Group 5th Meeting Summary September 17, 2009

Introductions

Gerald Mueller, the Nutrient Work Group (NWG) facilitator, and those attending this meeting introduced themselves. A list of the members and others in attendance is attached below as Appendix 1.

Agenda

- Review of the August 20, 2009 Meeting Summary
- Legal Options for Establishing Interim Nutrient Criteria
- Update on National Activities Related to Nutrient Criteria
- Achievable Technology for Municipal Waste Water Systems
- Nutrient Criteria Affordability Advisory Group Recommendations
- NWG Work Plan
- Public Comment
- Next Meeting Schedule

Review of the August 20, 2009 Meeting Summary

NWG members present at this meeting had no comments on the meeting summary.

Legal Options for Establishing Interim Nutrient Criteria

Dr. Mike Suplee and Claudia Massman reported on DEQ discussions about the feasibility of interim nutrient criteria. SB 95, encoded as 75-5-313 MCA, allows temporary nutrient criteria on a case-by-case approach. The department favors this approach because the unique engineering and economic circumstances of individual Montana communities present inherent problems with a general interim approach. Montana law does not appear to allow for an interim standard. A delayed effective date for the base nutrient standards, sometimes referred to as a “sunrise date”, would have the advantage of allowing the permit backlog to be addressed and water body evaluations to be conducted. A five year sunrise date may be acceptable.

Tina Laidlaw stated that an EPA policy regarding variances for a group of dischargers is pending. A group variance would not alleviate the need for base numeric nutrient water quality standards.

Comment - A broader interim standard for each ecoregion could be set at a level achievable by most dischargers. A later effective date could be set for permanent nutrient criteria.

Response - The issue with broader interim standards is that federal Clean Water Act requirements do not appear to allow space for interim standards. Also, the circumstances for each community regarding nutrient discharges are unique.

Comment - Retaining a variance procedure makes sense; however, I am concerned about avoiding the situation in which every discharger will require a variance.

Response - Nutrient criteria will be difficult to achieve. One idea we are considering is looking at the characteristics of a water body receiving the discharges for parameters such as the dissolved oxygen levels, algal growth, condition of aquatic insects, etc. Setting site specific criteria would prevent false positives, i.e., nutrient discharge limits that do not improve water quality.

Comment - Without a five year sunrise date or individual narrative criteria, base nutrient criteria set at the levels and with the triggers that have been discussed may face significant opposition. To be supportable, standard must be achievable for a large number of dischargers.

Question - Would temporary criteria or sunrise dates have National Environmental Policy Act (NEPA) implications that must be considered when writing discharge permits?

Answer by Claudia Massman - I am not sure that NEPA compliance is an issue for individual discharge permits. These permits consider only the standards currently in effect, not future standard levels.

Comment - Standards should address technology and economic constraints up-front rather than through a delayed implementation date.

Question - Does EPA have any guidance regarding group variances?

Answer - A group variance was issued in Ohio addressing mercury standard compliance. This approach is being considered in other areas. EPA national is not ready to make an overall national policy on this just yet.

Question - What will be the mechanism to address nutrients in the Total Maximum Daily Load (TMDL) process?

Answer - Some streams with waste water discharges have not been evaluated to date for nutrients. Stream assessments will address nutrients if base numeric nutrient criteria are adopted. If the assessment finds a problem, then nutrient loads will be developed. If the assessment does not find a problem, then site specific criteria could be developed to eliminate false positives, i.e. nutrient discharge limits that do not improve water quality.

Question - Will the nutrient criteria be based on mass balances and mixing zones?

Answer - For the concept just mentioned, we would look at areas well below mixing zones. The law prohibits backsliding. Currently, under non-degradation, if a discharge volume doubles, then the discharge concentration must be halved.

Question - How can site specific standards eliminate false positives if the base numeric standard levels are an order of magnitude below what control technologies can achieve?

Answer - There may be circumstances when additional nutrient discharges will not affect water quality, and in these cases, nutrient discharges need not be limited. For example, in some Utah streams, turbidity levels are so high that instream light levels are too low to support algae growth.

Comment - I appreciate the concern about false positives; however, we need to do the stream assessments on a watershed basis before the base nutrient standard triggers.

Response - In an ideal world, we would develop a nutrient standard for every individual stream. The other end of the spectrum would be developing one standard applicable everywhere. We are attempting to pursue a middle ground with standards set for level IV ecoregions, to get closer to stream specific responses of algae to nutrient levels.

Comment - DEQ must be concerned with both false positives and false negatives.

Question - Assume base nutrient standards are adopted with a five year sunrise date. What happens to discharge permits that are under review now, or that will come up for review in two years? Do the permit writers ignore the base nutrient standards and instead look at variances?

Answer - Permit writers consider the standards in effect now.

Comment - Colorado has used a delayed effective date, and EPA Headquarters is looking at this approach. I will report back if we get guidance in this area.

Question - Did Colorado use delayed effective dates for nutrient standards?

Answer by Tina Laidlaw - The delayed standards in Colorado were for other pollutants, not nutrients.

Update on National Activities Related to Nutrient Criteria

Tina Laidlaw reported on three recent national activities regarding nutrients: an Office of EPA's Inspector General Report on nutrients, a pending report by EPA's Nutrient Innovations Task Group, and a review of EPA's draft technical guidance document "Empirical Approaches for Numerical Nutrient Criteria Development" by the Science Advisory Board Ecological Processes and Effects Committee. She passed out a two page summary of these activities that is included below in Appendix 2.

Question - What is the OIG?

Answer - The OIG is the Office of Inspector General, which functions as an internal EPA agency auditor.

Question - Does EPA have a deadline for responding to the OIG report?

Answer - We have a 90-day period for responding.

Question - One of the OIG recommendations was to “Select significant waters of national value which need numeric nutrient water quality standards to meet the requirements of the Clean Water Act.” Has the agency selected the nationally significant waters?

Answer - In the past funding was divided among all the regions. The OIG has said that this method is not working. EPA has, in more recent years, moved towards competition among the regions and focusing on those states closest to getting adoption of base nutrient standards across the adoption threshold. We have not yet prioritized areas for the purpose of allocating resources. EPA has identified the northern Gulf of Mexico hypoxic zone as an area of concern.

Question - Have you identified any wadeable streams as nationally significant?

Answer - EPA has not been comfortable with targeting subsets of water bodies. Any significant national water bodies are likely to involve interstate issues.

Question - Will accountability focus only on nationally significant waters?

Answer - No. We are adding nutrient data to the national data tracking system.

Question - What are the next steps for establishing the accountability?

Answer - This is under discussion within the agency. Funding decisions may be affected.

Question - Would the OIG report have implications for a delayed effective date for nutrient standards?

Answer - I don't know. The issue of delayed effective dates is under review.

Comment - The Science Advisory Board's (SAB's) recommendations regarding the guidance documents are important for this group.

Response - The nutrient guidance documents will be finalized by the end of this year. The guidance will address issues such as analytical methods and use of conditional probability. We will make the documents available to this group as soon as they are adopted.

Question - Are any of the SAB criticisms relevant to DEQ's adoption of base nutrient criteria?

Answer - Dr. Suplee's work is not based on a single approach.

Answer by Mike Suplee - We used macro invertebrate indices, whole stream fertilization studies, other nutrient-algal growth studies, reference sites, and the recreation survey-based harm to use study. We are also using mechanistic modeling of the Yellowstone River, a non-wadeable stream. We will share the results of the model calibration, which is scheduled to be completed in October, with this group.

Achievable Technology for Municipal Waste Water Systems

Dave Clark discussed this topic on behalf of Dave Aune, Scott Murphy and himself using a PowerPoint presentation entitled “[Achievable Technology for Municipal Wastewater Systems](#)”. He summarized waste water plants’ capabilities and limits of technology, and compared these values to possible base numeric nutrient criteria in the following table.

| Parameter | Typical Municipal Raw Wastewater, mg/l | Secondary Effluent (No Nutrient Removal), mg/l | Typical Advanced Treatment Nutrient Removal (BNR), mg/l | Enhanced Nutrient Removal (ENR), mg/l | Limits of Treatment Technology, mg/l | Typical In-Stream Nutrient Criteria, mg/l |
|------------------|--|--|---|---------------------------------------|--------------------------------------|---|
| Total Phosphorus | 4 to 8 | 4 to 6 | 1 | 0.25 to 0.50 | 0.05 to 0.07 | 0.020 to 0.050 |
| Total Nitrogen | 25 to 35 | 20 to 30 | 10 | 4 to 6 | 3 to 4 | 0.3 to 0.600 |

Mr. Clark also listed key issues for permitting. Would permit compliance be based on mean, median, or maximum values or exceedance rates? Would the standards be seasonal? Would the standards be a function of stream flow?

Question - Does secondary treatment always result in almost no nutrient removal?

Answer - Secondary treatment can under some circumstances remove some nutrient.

Question - Does enhanced nutrient removal (ENR) rely on biological treatment?

Answer - No. ENR utilizes chemical treatment and added carbon to enhance nitrogen recovery.

Comment - Operating costs for smaller communities are higher for secondary effluent treatment, biological nutrient removal (BNR), and ENR.

Response - As treatment plants get more complicated, costs go up because of increased energy inputs and operator capability requirements. Secondary environmental impacts also increase due to chemical additions and greenhouse gas emissions. Plant operators capable of achieving the limits of technology (LOT) are likely not available to small communities.

Response by Paul LaVigne - The Kalispell treatment plant does reach LOT levels without chemical additions during the summer. The Glacier Park treatment plant also achieves LOT levels.

Comment - It does not make sense to force point sources to operate year-round at LOT levels to achieve summer nutrient criteria.

Question - Is it correct that elevated nutrient concentrations over specific periods produce the adverse effects?

Answer by Dr. Suplee - When instream nutrient concentrations are substantially elevated over a five to six day period, we see a response. In the Clark Fork River, when the instream exceedance rate is 10%, we have not seen an algal growth problem. When the exceedance rate reaches about 50%, we do see algae problems. A 20% exceedance rate based on random occurrences appears acceptable from an instream perspective. However, to my knowledge, waste water plant discharge exceedances do not generally occur at random intervals. We would need to look at a probability distribution of ambient water quality and waste water treatment plant discharges. I do agree, however, that a standard approach to exceedances based on toxics is probably not appropriate for nutrients.

Question - Could temporary nutrient criteria be based on limits of technology?

Answer by Dr. Suplee - Yes.

Question - Would storm water discharge permits be subject to nutrient criteria?

Answer: by Dr. Suplee: Permits should best address this question.

Question - Based on recent history, does it appear that technology may be expected to reach LOT levels in five years?

Answer - No, practical removal technology is unlikely to reach LOT levels in five years.

Comment by Gerald Mueller - Earlier today, DEQ stated that a five year sunrise, i.e. delayed implementation date, might be acceptable. If technology is unlikely to improve sufficiently in five years, then a five year sunrise period would not appear useful for dischargers.

Response by Dr. Suplee - But the period for temporary criteria is actually 20 years, with reviews at five year intervals.

Question by Gerald Mueller - Will waste water treatment plants in Montana be able to comply with the base numeric nutrient criteria levels Dr. Suplee has discussed as supported by science?

Answer – Today, most plants will not be able to comply. The best plants may be able to comply depending on the period over which discharges are averaged. How criteria will translate into discharge permits will be critical.

Comment - It would be helpful if a sub-committee of this group including waste water treatment engineers could meet with DEQ and EPA permit staff to discuss permit guidance.

NWG Action - Those members of the NWG present at this meeting agreed to creating a subcommittee to meet with DEQ and EPA permit staff prior to the next NWG meeting to discuss permit guidance. The subcommittee will be asked to report to the full group at the next meeting.

Question - Should Montana forge ahead with developing base numeric nutrient criteria in the absence of guidance from EPA?

Answer by Tina Laidlaw - Yes.

Nutrient Criteria Affordability Advisory Group Recommendations

Dr. Mike Suplee and Dr. Jeff Blend reviewed the recommendations made by the Nutrient Criteria Affordability Advisory Group (NCAAG) for a public sector affordability variance to the base numeric nutrient criteria. Dr. Suplee began with the following summary of EPA guidance for the variance:

Original Public Sector EPA Method

Step 1: Impact must be *substantial*.

Step 1a: Use “Municipal Preliminary Screener”

Municipal Preliminary Screener (MPS) = Average total pollution control cost per household / median household income
(includes existing user cost)

- MPS < 1% : Cost bearable, no further analysis needed
- MPS 1-2%: Midrange impacts
- MPS > 2%: High cost impacts; unreasonable cost for many households

Step 1b: If midrange or high cost, carry out more detailed substantial tests to confirm *substantial* impacts would occur on the community

Step 2: Impact must be *widespread*. EPA methodology not explicit; provides general guidelines

Dr. Suplee and Dr. Blend then used a PowerPoint presentation entitled “[Review of the Affordability Assessment Procedure Developed by the Nutrient Criteria Affordability Advisory Group \(NCAAG; Precursor to the Nutrient Work Group\)](#)” to discuss the NCAAG recommendations.

Question - What is the definition of substantial and widespread?

Answer - These terms are defined in both federal statute, 40 CFR 131.10[G], and EPA guidance.

Question - The widespread criteria you discussed apply to the public sector, yet you gave as an example the affect of meeting nutrient standards on a company, which then left the area, which had a widespread affect. How exactly would this process apply to a company?

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Answer – In my example, a company might discharge to a public waste water system and have pre-treatment requirements. Increased public system requirements and costs may affect the discharging company. Increased sewage rates may cause the company to leave the community. This type of potential is what should be captured in the “widespread” part of the public-sector evaluation.

Question - Do the costs used in the municipal screener include current and system upgrade costs?

Answer – Yes, it includes both past and upgrade costs since those are usually passed on to the consumer and are reflected in their sewer rates. Essentially, the assessment process rewards past treatment expenditures.

Question - Will the variance process be iterative in assessing treatment costs?

Answer - The 1% median household income cost cap would set the total amount that the community would have to expend for upgrading its treatment plant to control nutrient discharges at the time that the assessment was made.

Question - Virtually every community will have a technology limitation in attempting to comply with the numeric base nutrient standards. What level of technology will be required?

Answer - The technology and affordability variance processes will run in parallel. The affordability cost cap will likely determine what technology is required.

Question - What is the definition of large, medium, and small communities in your analysis?

Answer – We defined large communities as have populations greater than 10,000 people, medium have 1,000 - 10,000, and small less than 1,000.

Question - What is EPA's position regarding the 1% of MHI cost cap?

Answer - We discussed this with Tim Connor, an EPA Headquarters economist. Traditionally, EPA favors a 2% cost cap. However, Mr. Connor acknowledged that given the conditions in Montana, which includes significant non-point nutrient sources, a 1% cap may be appropriate. However EPA does not want to limit the cap to only 1% in cases where point sources are the predominate source of the nutrient discharges.

Question - What percentages of the small, medium and large communities would qualify for an affordability variance and cost cap?

Answer - Most towns would need the affordability variance. The seven largest communities, all of which have populations greater than 10,000, may not. Some of the large communities may qualify for the limits of technology variance. There are currently about 200 waste water systems in Montana. Sixty of these systems do not discharge into surface water. Some of the latter use land application of sewage treatment plant effluent. One community, Belgrade, discharges to

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ground water and has a permit to do so. About 150 of the waste water systems consist of lagoons. Only seven systems currently use advanced forms of treatment.

Question - Would land application be evaluated in the alternative analysis that is a precursor to the affordability analysis?

Answer - Yes.

Comment - The capital costs of converting to lagoon and land application sprinkler systems is comparable to treatment plant costs. The distinction between the two is in operation and maintenance (O&M) costs. O&M costs for the lagoon and sprinkler would be less than for a treatment plant.

Question - What would be the role of EPA act in variances?

Answer - EPA would review individual variances.

Question - Could you outline the steps in the nutrient criteria, variance, and permit process?

Answer - The Board of Environmental Review would consider and adopt the base numeric nutrient criteria and the implementation process for the temporary nutrient criteria, i.e., the variance process. DEQ would conduct an alternative analysis for systems facing permit renewal. If a variance appears to be required, the limits of technology and economic variance tests would be applied to determine the appropriate and affordable remedy. In the interim, the permit writer would decide on a compliance schedule for some type of nutrient control on a case-by-case basis. The state revolving fund, in conjunction with the community's engineer and via the Preliminary Engineering Report (PER), would determine the technology to be installed given the affordability caps that were adopted. The DEQ standards section would then propose for adoption the nutrient effluent of the community's system, as presented in the PER, as the temporary nutrient criteria for the community. The DEQ permits section could then write future permits to that limit once the facility was up and running. We reviewed this basis approach with EPA prior to introduction of SB95.

Question - What will be EPA's legal posture if almost all discharges require a variance?

Answer - EPA is aware that meeting base nutrient criteria may cause an exponential increase in treatment costs, and that many systems will require variances.

Question - Who does the initial technology and cost analysis?

Answer - Systems facing permit renewals normally retain engineers to conduct the initial analysis.

Answer by Jenny Chambers - About 180 days prior to expiration of the permit, we examine each system. We will include in permits a compliance period that allows for variance applications. Permits do not dictate technology only the level of discharge necessary to meet the applicable water quality standard.

Question - Are storm water permits subject to the same process?

Answer by Jenny Chambers - We expect that MS4, MDT, and CAFO permits to include nutrient considerations. We do not expect that industrial storm water discharges will be significant sources of nutrients.

Question - How will the cost cap affect the alternative analysis? Will some communities be allowed to take no action based on technology and/or affordability analyses?

Answer - We have not fleshed out the alternative analysis. Cost cap considerations might mean that communities would not be required to take additional action to control nutrient discharges. We would like to convene a subcommittee of the NWG to discuss the alternative analysis.

NWG Work Plan

Gerald Mueller stated that the NWG work plan has three major items, the legal basis of the base nutrient criteria, the scientific basis of the criteria, and implementation of the criteria. The NWG has addressed the first two items and is engaged with the third. Specific topics to be addressed under implementation include:

- Translation of nutrient criteria into discharge permits:
 - Permit guidance;
 - Overview of MPDES;
 - Alternative analysis;
 - Example of a nutrient discharge permit.
- Achievable technology for industrial nutrient discharge controls.
- Non-point control alternatives and costs.
- Technology and affordability variances.

Public Comment

There was no additional public comment.

Next Meeting

The next meeting is scheduled for Thursday, November 20 in room 226 of the offices of the Montana Department of Commerce at 301 S. Park Avenue in Helena. The agenda will include:

- A report regarding the meeting between DEQ, EPA, and NWG subcommittee regarding nutrient permit criteria;
- A report from Dr. Suplee regarding the subcommittee discussion regarding the alternative analysis;
- An explanation from Jenny Chambers of MPDES permitting;
- A presentation from industry representatives regarding achievable technology for industrial nutrient discharge controls; and
- Continued discussion of the NCAAG recommendations for an affordability variance to the base nutrient standards for the public sector.

**Appendix 1
NWG Attendance List
August 20, 2009**

Members

| | |
|---------------------|---|
| Donald Quander | Holland & Hart |
| Terry McLaughlin | Smurfit-Stone Container |
| Don Allen | Western Environmental Trade Association (WETA) |
| Brian Sugden | Plum Creek |
| Ryan Swinney | Bruce Swinney & Associates |
| Michael J. Perrodin | BNSF Railway |
| Scott Murphy | Morrison-Maierly, Inc. |
| John Wilson | City of Whitefish |
| Dick Hoehne | Town of Philipsburg |
| Debbie Shea | Montana Mining Association |
| Dave Aune | Great Western Engineering |
| Jim Edgcomb | Montana Department of Commerce/Treasure State Endowment Program |

Alternate Members

| | |
|--------------------------|--|
| Jay Bodner Youngberg) | Montana Stock Growers Association (alternate for John) |
| Doug Parker | Hydrometrics (alternate for Debbie Shea) |
| Brianna Randall | Clark Fork Coalition (alternate for Chris Brick) |

Non-Voting Members

| | |
|-----------------|--|
| Jeff Blend | Department of Environmental Quality (DEQ), Economist |
| Dr. Mike Suplee | DEQ, Water Quality Standards Section, Water Quality Specialist |

Other Meeting Participants

| | |
|-----------------|---|
| Dave Clark | H2R |
| Tina Laidlaw | US Environmental Protection Agency (EPA) |
| Rosemary Rowe | EPA |
| Mark Bostrom | DEQ Water Quality Planning Bureau Chief |
| Jenny Chambers | DEQ Water Protection Bureau Chief |
| Claudia Massman | DEQ Attorney |
| Paul LaVigne | DEQ, Technical and Financial Assistance , Water Pollution Control Revolving Fund Section Supervisor |
| Mark Simonich | Helena Association of Realtors |
| Amanda McInis | H2R |
| Julie Spencer | Big Fork Water and Sewer District |
| Kristi Kline | Montana Rural Water Systems |
| Jessie Luther | Browning, Kaleczyc, Berry, and Hoven |
| Judel Buls | AE2S, Inc. |

Appendix 2

Office of Inspector General's Report on Nutrients:

“EPA Needs to Accelerate Adoption of Numeric Nutrient Water Quality Standards”. Found at: <http://www.epa.gov/oig/reports/2009/20090826-09-P-0223.pdf>

OIG conducted interviews with EPA’s Office of Water and Regions 4, 5, and 7 officials, and with State officials from Florida, Illinois, Iowa, Kansas, Minnesota, and Missouri. The report provides the following summary recommendations:

- Select significant waters of national value which need numeric nutrient water quality standards to meet the requirements of the Clean Water Act.
- Set numeric nutrient water quality standards for the waters identified in the first recommendation to meet the requirements of the Clean Water Act.
- Establish EPA and State accountability for adopting numeric nutrient standards for the rest of the Nation’s waters.
- Establish metrics to gauge the actual progress made by the States.

Next steps: EPA is required to provide a written response to this report within 90 calendar days that includes a corrective actions plan for agreed upon actions, including milestone dates.

Nutrient Innovations Task Group:

In 2008, EPA and ASWIPCA formed a workgroup to identify and frame key nutrient issues and options on how to improve and accelerate nutrient prevention and reductions at a national level. The final report, An Urgent Call to Action - Report of the State-EPA Nutrients Innovations Task Group presents the workgroup findings.

Some of the report highlights include:

- Recognition of the impacts from nutrients to aquatic life, drinking water and recreational water quality
- Evaluation of the use of current tools such as numeric nutrient criteria, assessments and listings, urban stormwater controls, POTW permit limits and animal feedlot controls are underutilized to address nutrient issues.
- Other tools such as antidegradation, limits on discharges to impaired waters and compliance with downstream water quality standards
- Acknowledgment that “specific components of state NPS programs have been successful in addressing individual sources of nutrients, but their broader application has been undercut by the absence of a common multi-state framework of mandatory point and nonpoint source accountability.
- The need for national leadership to address nutrient concerns.

The Final report is being compiled and should be available for distribution in approximately a month.

Science Advisory Board:

<http://yosemite.epa.gov/sab/>

EPA's Office of Water requested the Science Advisory Board Ecological Processes and Effects Committee review the Agency's draft Technical Guidance, "Empirical Approaches for Numerical Nutrient Criteria Development". This draft guidance is intended to supplement EPA's published technical guidance for developing numeric nutrient water quality and focuses on the use of empirically-derived stressor-response relationships as the basis for developing numeric nutrient endpoints for water quality standards. Specifically, EPA is seeking advice from the Science Advisory Board (SAB) Ecological Processes and Effects Committee regarding the technical soundness of these empirical approaches as the basis for future development of numeric nutrient water quality criteria.

The SAB was charged with responding to a number of technical questions related to derivation of stressor-response relationships.

Next Steps: Comments from the SAB are expected in a few months.