Missouri Department of Natural Resources

Nutrient Criteria Implementation Stakeholders Meeting
7/19/2011
La Charette Conference Room
Lewis and Clark State Office Building
Jefferson City, MO

In Attendance: Greg Anderson, DNR-WPP; Nick Bauer, St. Louis MSD; Dorris Bender, City of Independence; Brandy Bergthold, DNR-ESP; Todd Blanc, DNR-SLRO; Gopala Borchelt, Table Rock Lake Water Quality; John R. Buckwalter, City of Kirksville; David Casaletto, Table Rock Lake Water Quality; John Christianson, Geosyntec; Cindy DiStefano, MDC; Frank Dolan, Gredell Engineering; Eric Dove, Olsson Associates; Judy Grundler, MO Dept. of Agriculture; Soojung Lim, DNR-WPP; John Lodderhose, St. Louis MSD; John Madras, DNR-WPP; Refaat Mefrakis, DNR-WPP; Colleen Meredith, DNR-SWCP; Dave Michaelson DNR-ESP; Rob Morrison, Barr Engineering; Mark Osborn, DNR-WPP; John Rustige, DNR-WPP; Amanda Sappington, DNR-WPP; Jeff Shook, Little Blue Valley Sewer District; Charlie Stevens, City of Liberty (on conference phone); Trent Stober, Geosyntec; Steve Taylor, MO-AG; John Waitman, City of Springfield; Steve Walker, DNR-SWCP; Tom Wallace, Geosyntec; Betty Wyse, Environmental Resources Coalition; Patrick Young, HDR, Inc.

Update on Gulf of Mexico Hypoxia Task Force: Steve Walker gave a general description of the group's activities and also solicited help in the development of a Missouri Nutrient Reduction Strategy. The Hypoxia Task Force was established in 1997 to reduce and control hypoxia in the Gulf of Mexico. Hypoxia is a low dissolved oxygen condition (<2 mg/L) that results from excessive algae die-offs that are caused by high nutrient loading.

The Task Force includes representatives from EPA, USDA-NRCS, USGS, USACOE, NOAA, and the States of Arkansas, Illinois, Indiana, Iowa, Kentucky, Louisiana, Mississippi, Missouri, Minnesota, Ohio, Tennessee, and Wisconsin. Bryan Hopkins represents Missouri on the task force, and Steve serves on the Task Force Coordinating Committee. The overriding goal of the Task Force is to reduce the 5 year areal average of the hypoxic zone to 5,000 km^2 (2,000 mi^2) by 2015. Unfortunately, the trend has been the opposite. The zone continues to grow larger over time.

A high priority for each of the States involved is to develop a nutrient reduction strategy. This will be crucial to the overall effort, and there are certain incentives at stake. For instance, eligibility for funding through the Mississippi River Basin Healthy Watersheds Initiative (MRBI) may become contingent on the development of such a strategy for each of the States involved. The Gulf of Mexico Alliance has created a template for the development of such a strategy and essential components to include in the strategy have been developed by the Hypoxia Task Force Coordinating Committee and the EPA. Several States have completed their strategies, and Steve has copies that are available on request.

Steve is soliciting assistance in work group participation for this endeavor. He can be reached at steve.walker@dnr.mo.gov
Status of Nutrient Criteria Rule: Mark reported that the nutrient rule for lakes, which was submitted as a part of the water quality standards revisions to EPA in October, 2009, has still not been approved, or denied. EPA has approved the 2010 303(d) list, which includes a number of lakes that have been assessed and found to be in violation of the rule. EPA has signaled that a decision on the rule will be forthcoming in August.

Discussion: How can the NPDES holders be held responsible for a water body's compliance with the nutrient rule, when, in many cases there are substantial nutrient loads coming from agriculture and other nonpoint source activities? Answer: We are well aware of this, and in fact many of the lakes that have been assessed as not in compliance with the rule do not have any permitted dischargers within their watersheds. When TMDLs are calculated, they include Wasteload and Load allocations, which distinguish the contributions of point sources and nonpoint sources to the problem. Permitted dischargers will only be held responsible for what is Wasteload portion of the TMDL.

Implementation – Nonpoint Source (NPS): Greg Anderson gave a presentation on the Department's nonpoint source management program. In addition to nutrients, common pollutants from nonpoint sources include sediment, pesticides, acidity and salts, heavy metals, low dissolved oxygen, bacteria, and various urban contaminants. The activity most commonly associated with nonpoint source pollution is agriculture, but additional sources include abandoned mine land, urban stormwater runoff, and atmospheric deposition that originates from air pollution sources, particularly power plants.

The program's approach to addressing these issues is through planning and coordination of remedial action at the watershed level. The four essential steps are assessment, planning, implementation, and monitoring. Missouri's Nonpoint Source Management Program involves the prioritization of pollutant sources, development of 5-year objectives, and the cultivation of partnerships. This is a plan for the statewide NPS activities and is funded by a grant program per section 319 of the Clean Water Act. Part of the state plan is to fund passthrough nonpoint projects; including education, planning, monitoring, and implementation of practices. Passthrough funds are available to local institutions such as nonprofit groups, educational institutions, and local governments. They are funded by grants from the 319 program, with the stipulation that activities will be consistent with the State's Nonpoint Source Management Plan.

Examples of 319 projects include restoration of abandoned mine land, demonstration of new and innovative practices (including agricultural practices and urban stormwater management), education and public awareness programs, and information and data collection for the creation and improvement of GIS and simulation models. Projects that are applicable to lakes in Missouri include three watershed projects in the Table Rock Lake basin; Eastern Table Rock Watershed Plan, Western Table Rock Watershed Plan, and Table Rock On-site Septic System ID and Remediation. There are three active

projects in the Lake of the Ozarks; LOWA Low Impact Landscapes Minigrant, LOWA LILs for a Healthy Lake, and Lake of the Ozarks Watershed Management Plan - Niangua Arm. basin In addition 319 funds the Lakes of Missouri Volunteer Program, and the Statewide Lake Assessment Program. Smaller projects include an information education project at Lake St. Louis, a mercury monitoring station, and an education project at the Wildcat Glades Audubon Center. Other notable 319 supported projects include permeable parking lots, solar watering stations, CARES Watershed Planning Tool, and demonstrations of litter composting, rain gardens, and stream bank stabilization. Current Initiatives include participation with MRBI, the Gulf of Mexico Nutrient Task Force and partnerships with the Heartland Group, other agencies, and watershed groups.

Discussion: Mark asked about the potential for prioritizing and developing initiatives for other lakes that have been placed on the 303(d) list and for which nonpoint sources are believed to be the primary cause. Greg responded that that is something that can be looked at, but stressed that local participation is paramount to the success of such projects and that nine element watershed plans are required of most recipients.

Implementation – Point Source: Mark touched on the main points of the draft Nutrient and Chlorophyll Criteria for Lakes Implementation Procedure for Permitted Facilities. Monitoring for Total Nitrogen (TN) and Total Phosphorus (TP) will be introduced as a requirement for all facilities that discharge within the watersheds of classified lakes. These parameters are to be included as a part of the normal discharge monitoring reports. Determination of whether an outfall is within a lake watershed can be accomplished through consultation with a map which will be introduced as a layer in the Department's interactive map browser. Exemptions for this requirement will be allowed for domestic wastewater facilities with design flows of 100,000 gallons per day (GPD) or less. Assuming that such facilities are not treating their discharge for nitrogen or phosphorus, default values of 4 to 8 mg/L of TP and 25 to 35 mg/L of TN will be used for model calculations. Exemptions from nutrient monitoring will also be allowed for facilities that are demonstrated not to have a nutrient component in their discharge (e.g. cooling water for power plants).

For outfalls that are within the watersheds of lakes that have not been assessed to be in violation of the nutrient rule, nutrient monitoring will be included in the permit at the time of renewal. If the data indicate that the facility is not a significant contributor to nutrient impairment, the requirement may be dropped after one permit cycle.

For outfalls that are within the watersheds of lakes that have been assessed to be in violation, and included in the 303(d) list, the permit will be opened to add the monitoring requirement at a time to be determined. These lakes are to be scheduled for TMDL calculation. Mark stressed that in the TMDL calculation, DNR (or EPA) staff will always take the nonpoint contribution (Load Allocation) into account for determination of the Waste Load Allocation (WLA) from which specific nutrient limits for permitted facilities will be derived. Meaning that facilities will not be expected to clear up the nutrient problem for the water body in question on their own if it is determined that a significant part of nutrient loading is because of agriculture or other nonpoint factors.

It is recognized that treatment for nutrients in discharge, particularly nitrogen, can be an expensive and sometimes an impractical proposition. The tools intended to mitigate this include schedules of compliance and water quality trading.

For new or expanding facilities that are within lake watersheds, the first step is the antidegradation review. If a lake is listed for nutrients (or chlorophyll) the available options are as follows: If an existing facility is expanding, it will be expected to maintain current levels of nutrient discharge, based on available data, until completion of the TMDL, at which time the discharge limits will be derived from the WLA. For new facilities, the permit application will have to be consistent with the TMDL calculation. Other alternatives are to perform an analysis of practicable control technology and, when a program is in place, water quality trading.

In the watersheds of lakes that are not listed, the available options are to conduct an alternatives analysis or to demonstrate that such a step is not necessary. Water quality trading may also be applicable.

Question: How are waste load allocations translated to permit limits?
Answer: The number of facilities, growth potential, design flow, and location of outfalls within the watershed will all be part of the calculation.

<u>Lakes on 303(d) list:</u> Mark displayed a map showing the distribution of lakes that are on the approved 303(d) list for nutrients and chlorophyll. Most of these lakes are in the Plains regions. Those in the Ozarks are mainly the large reservoirs, including Lake of the Ozarks and Table Rock Lake. For these two, there are issues concerning what segments of the lakes are actually impaired which need to be resolved.

Mark also handed out a draft table that describes some of the watershed characteristics of lakes that are listed, including the number of NPDES facilities (for some of the lakes there are none), and the land cover, including area in row crops, grassland, and urban settings.

Discussion: The Table Rock watershed includes a lot of area that is in the State of Arkansas. Cooperation with that state will be required for any implementation program for the lake to be successful. There is some uncertainty about how much Arkansas contributes to nutrient loading of the lake, for which further data collection may be necessary. David Casaletto also reiterated his concern about listing the main body of a lake without including the tributary arms; because main lake issues cannot be addressed without working in the tributary arms.

For some of the lakes that are listed, there may not actually be a significant impairment. For instance, a few lakes are listed for total nitrogen, but total phosphorus and total chlorophyll are within their respective limits. Nitrogen and chlorophyll limits were derived as ratios to phosphorus limits and to declare a lake as impaired on that basis may be something that is subject to challenge.

The group wanted a clarification on how we set up an alternative analysis baseline for new or expanded projects that discharge to Tier II waters. It should be clarified in the implementation procedure that the baseline is not specified in the Antidegradation procedure. In attempt to expedite the review, the implementation procedures sets a default baseline of 0.5 mg/ for TP and 10 mg/l for TN. The applicant may develop an alternative baseline provided that the alternative baseline does not cause tier II water to go below water quality standards (WQS). This may involve modeling exercise.

Trent brought up the TMDL WLA for nutrients and the level of technology that is needed to meet WLA. Dorris said that we need to consider affordability. The technology can either be not viable economically, or it does not exist to meet TMDL requirements in some cases. It was suggested that limits in permits be based on technology available for those impaired waters that have TMDLs.

Water Quality Trading: Trent gave a presentation on the Missouri Innovative Nutrient Trading Project (MINT). This has been under development by Geosyntec in partnership with USDA-NRCS, St. Louis MSD, the Missouri Corn Growers Association, the Missouri Public Utilities Association, and MDNR. The goals are to develop a market-based compliance approach that improves water quality, provides regulatory flexibility, and lowers compliance and abatement costs, develop an effective trading policy based on scientific and state literature reviews as well as economic and cost reviews, and to develop a simulated trading exercise.

Water quality trading is a market-based compliance system in which dischargers buy and sell pollution credits among themselves. Such a system is designed to encourage investments in conservation, minimize costs to NPDES permit holders, and provide cost-effective options for achieving water quality limitations. It is not intended to resolve nonpoint source loading issues. A caveat: nonpoint sources account for at least 80 percent of the nutrient load that is being delivered to the Gulf of Mexico.

The need for a trading program is due to several factors, including the development of nutrient criteria for lakes, anticipated nutrient criteria for small streams and large rivers, TMDLs, and the Gulf hypoxia issue. The criteria that have been proposed for streams, based on reference data percentiles, EPA recommendations, and biological response data, are very restrictive, and may be unachievable in many areas. They range from 0.43 to 0.9 mg/L for TN, and from 0.01 to 0.075 mg/L for TP.

Achievable treatment varies with cost. Biological nutrient removal, generally the most affordable, will bring TP down to 1 mg/L and TN down to 10 mg/L. The limits of treatment technology, more expensive, can reduce TP to 0.05 mg/L and TN to 3 mg/L. Costs of TP removal range from a few dollars per pound to achieve 1 mg/L to over $35 per pound to achieve 0.05 mg/L. TN treatment is often more expensive. Nutrient reduction practices from nonpoint source entities may provide lower cost alternatives, such as conservation tillage, grass buffers, and constructed wetlands. In a successful

trading program, such practices can be used to reduce the overall nutrient load to a system, and offset the requirement for more expensive treatment in permitted facilities.

Types of trades include point to point, point to nonpoint, intra-plant and intra-municipal, stormwater, and pretreatment, such as trading among industrial users. Trading programs are primarily intended for nutrients, although trading for other pollutants, such as sediment, temperature, and oxygen demanding substances are also considered. Cross-pollutant trading, such as sediment for nutrients, is also allowable as long as it leads to a net improvement in water quality. Persistent bioaccumulative toxic pollutants are not allowable for trading.

There are three general ways in which a trading program can be structured. They are exchange, clearinghouse, and bilateral negotiation. An exchange (the e-bay model) will involve low transaction costs, direct links between buyer and seller, and variable pricing. A clearinghouse (the Sam's Club model) eliminates all contractual and regulatory links between buyer and seller, offers uniform pricing, and minimizes transaction costs and administrative burdens. Bilateral negotiations involve greater interaction between buyer and seller, higher transaction costs and administrative burdens, but also offer greater flexibility.

Three examples of successful trading programs were presented. On the Neuse River in North Carolina, a TMDL for nitrogen instigated the formation of a program involving nineteen permitted dischargers within the basin. They applied for and were granted a bubble permit that would be applicable to permittees on a collective basis. Individual nitrogen limits are waived, and informal trading between facilities allows for credits to be purchased from those that can afford tighter effluent controls. The system includes internal enforcement for violations of agreed on limits, the proceeds of which are to go to an ecological enhancement program. The fine is $11 per pound of nitrogen that is in excess. To date, there have been no violations, so this facet of the program has not been used. The system offers flexibility and participants are free to choose control strategies.

The Long Island Sound trading program was also driven by a nitrogen TMDL. It is a capital grant program that prioritizes TMDL upgrades. The entire State of Connecticut was divided into a series of trading zones. The central mechanism is a point source credit exchange, which sets credit prices annually, based on a reconciliation process. Credit prices have ranged between $1.65 and $4.50 per pound of TN. Between 2002 and 2009 $45.9 million worth of credits were bought and sold. Long Island Sound trading accounts for about 80 percent of all documented trades that have occurred nationwide.

The Greater Miami trading program, in Ohio, is based on a clearinghouse structure. It involves point source to nonpoint source trading. It was instigated by anticipated TN and TP criteria. A nonpoint source credit exchange is managed by the Water Conservation Subdistrict of the Miami Conservancy District. So far, there have been 27 contracts accounting for 250,000 pounds of TP.

A critical component to a trading program is an accurate quantification of exchange credits. For point sources this can be determined by calculating the difference between the baseline, that is the loading allowed in the absence of trading, and the permitted discharge level. For nonpoint sources, this determination is a little trickier. It may require modeling. The Nutrient Tracking Tool (NTT) or the Region 5 model may be the most useful, or MDNR may select another one to use. Credits can be verified for point sources with the examination of DMR data. For nonpoint sources, field inspections by a soil and water conservation professional will be needed.

An NTT example illustrates the concept. If a wastewater treatment plant needs to reduce both TN and TP by 1,217 pounds per year, it can purchase credits (through an exchange or directly) from a farmer or farmers. NTT calculates that if the selected practice is a 60 foot filter strip along with no-till cropping, the effective reduction is 15.85 lbs per acre for TN and 2.54 lbs per acre for TP. Thus, this practice will need to be newly established on 77 acres for the TN reduction and 480 acres for the TP reduction.

Another method to trading is the watershed-based permit. These are permits that are based for multiple point sources within a watershed. They can address multiple pollutants or stressors, and incorporate point and nonpoint sources. Benefits include enhanced cooperation between dischargers and stakeholders, implementation of multiple programs, adaptive management approaches, leveraging of resources, and facilitation of water quality trading. Approaches include the integration of municipal permits, an individual watershed permit that would cover multiple permittees, and a watershed general permit.

There are several make or break issues in the development of a trading program. They are the trading margin, the trading area, the trading ratio, and the monitoring requirements.

The trading margin can be defined as the net load reduction goal. If it is to reduce to a load that results from technology based limits, it will be the most flexible, equitable, cost-effective, and least expensive option. However, criteria will not be met. If the goal is to reduce the actual load to the criteria load (the TMDL), treatment options may still be flexible and cost effective, but they will be less equitable and more expensive. If the goal is to reduce net loading from technology based limits to criteria, the treatment options are not equitable, flexible, or cost-effective. It is the most expensive option.

The trading area is generally defined by a watershed, but it can also more narrowly be defined as a stream reach. In the former case the driver can be a TMDL, lake criteria, stream criteria, or, on a larger scale, Gulf hypoxia. Watershed areas offer good opportunities for trading and BMP placement can be targeted. Hotspots may be an issue with this approach. Use of the stream reach as a trading area offers limited trading opportunities, and credits must be purchased upstream.

The trading ratio is a requirement that may be used in which the value of a pollution credit being sold is adjusted to account for uncertainties, such as BMP performance, as

well as delivery and location considerations. While certainty of net pollution reduction is enhanced by this approach, it may reduce cost effectiveness and increase the complexity of development or the system. Delivery ratios would generally require some modeling work. It also may be less than equitable for all parties.

Monitoring requirements can be a controversial issue for a trading program. While some type of performance evaluation of the program is needed, the agriculture community can be touchy about some compliance requirements. Determination of BMP performance, such as through edge of field monitoring, can be costly and there are likely to be issues with data variability.

Discussion: A trading program has the potential to be a valuable component in the implementation of nutrient criteria. There are a lot of decisions that will have to be made for how such a system should be structured for Missouri. We will attempt to work on that with upcoming meetings.

Next Meeting: September 21, 2011.