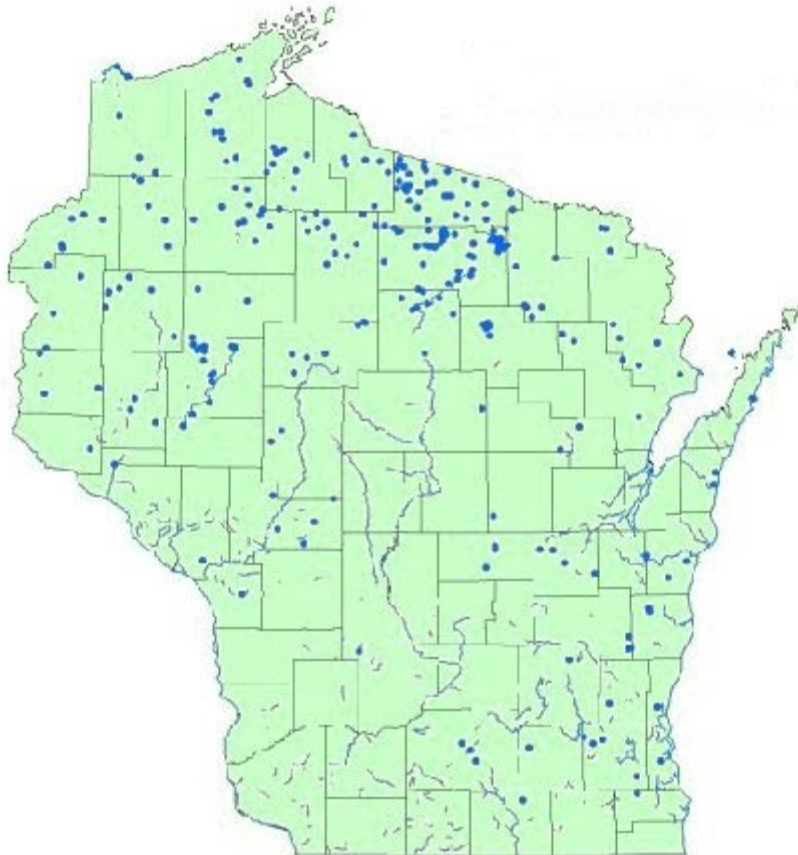


Lessons from the Trading Pilots: Applications for Wisconsin Water Quality Trading Policy



Prepared by:

Joseph M. Kramer
RESOURCE STRATEGIES, INC.
22 North Carroll Street, Suite 300
Madison, Wisconsin 53703

Prepared for:

Fox-Wolf Watershed Alliance
PO Box 1861
Appleton, WI 54912

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Note on the cover graphic: The map on the cover of this report was borrowed from the Wisconsin DNR Web site (<http://www.dnr.state.wi.us/org/water/wm/wqs/303d/303dov1.jpg>). The graphic depicts Wisconsin's 303(d) impaired waters as of 1998.

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1. Introduction and Purpose

Water quality trading is a regulatory program option that allows sources of water pollution to negotiate and trade their pollution control obligations amongst themselves. This flexibility is only granted provided the result is equivalent (or in most cases, better) environmental conditions than would have existed without trading. When control obligations, such as those required under a Total Maximum Daily Load designation (TMDL) or a remedial action plan, are transferable, sources with high control costs are able to seek out lower-cost sources and fund them to make greater reductions than they would otherwise make. The high-cost sources can then use the resulting "credits" created from those reductions for their own compliance. This avoids more-expensive reductions but still produces the required reductions in pollutants entering the water body. By allowing sources to choose lower cost control options when available, the overall cost of environmental improvement is lowered.

Experiences with early water quality trading efforts in Wisconsin and other states have provided valuable information to help guide the design of new trading programs. This report looks at lessons learned from the three Wisconsin pilot water quality trading programs – Fox-Wolf Basin, Red Cedar River and Rock River Basin. In addition, it builds upon pioneering efforts in neighboring Great Lakes states such as Michigan's trading rule (MDEQ, 2002), Kalamazoo River pilot program (Kieser, 2000), and permitting innovations in Minnesota's Rahr Malting permit (MPCA, 1997). Drawing from these and other experiences throughout the US, and in light of the U.S. Environmental Protection Agency (EPA) Water Quality Trading Policy (USEPA, 2003), this report offers suggestions for Wisconsin water quality trading policies that emphasize market functionality.

This report is written for those policy analysts who are considering possible design and implementation options to promote water quality trading in Wisconsin. This project was funded by a grant from the EPA Great Lakes National Program Office, and was prepared for the Fox-Wolf Watershed Alliance. Information was gathered through interviews with program participants, written reports, and academic literature. A substantial portion of the information gathering and interviews for this project occurred in 2002 as part of an EPRI-sponsored project culminating in the production of the technical report *Water Quality Trading Guidance Manual: An Overview of Program Design Issues and Options* (EPRI, 2002).

This first section of the report introduces the reader to the basic concept of water quality trading. Section 2 follows with a background and synopsis of water quality trading experiences with pilot trading programs and relevant trading policy developments in the U.S. Section 3 lists the main issues identified in the pilot trading programs, grouped into categories. It matches each category with the policy instrument(s) that could be used to address them. Each issue category is discussed and specific policy options that have either been tried or that appear promising are presented. Section 4 examines other issues related to the nature of expected market participants. Finally, section 5 contains a brief summary and policy recommendations for Wisconsin.

2. Background and Synopsis of Issues from Pilot Programs

Actual water quality trades have been rare despite the potential for benefits such as early reductions in pollutant loads, lower-cost compliance, and promotion of control technology innovations.

Only one of the three Wisconsin pilot project areas, the Red Cedar River watershed, has reported trades (Paddock, 2001). The City of Cumberland has established a system whereby it funds agricultural nonpoint source reductions to offset loads from its municipal treatment plant (MTP) to the Hay River watershed (within the Red Cedar watershed). This program is administered through the Barron County Land Conservation Department (LCD) soil conservation program, so that from the farmers' standpoint, it is virtually identical to the county's conservation cost-share program they know well. By funding runoff load reductions through installation of best management practices (BMPs) from local farms, the city has been able to postpone making an expensive upgrade to their treatment plant. This structure seems to have overcome issues that have impeded trading in pilot programs, including farmers' original reluctance to become involved.

With the above exception, pilot programs in Wisconsin experienced difficulties in completing demonstration trades that were similar to those encountered in the rest of the country.¹ For the purposes of this report, issues are grouped into six categories:

- access to information
- regulatory incentive
- economic incentive
- nonpoint source reluctance
- uncertainty
- communication vehicle²

The barriers to participation represented by these categories are complex and varied. Participation barriers can be based on anything from protecting personal image to a business decision to avoid risks. Similarly, the roots of these barriers hold the keys to how they can be effectively minimized. A more detailed discussion of these issue categories and tools that may be useful in addressing them is included in section 3,

Some changes in the regulatory landscape have occurred that will undoubtedly influence the creation of future trading programs. The most significant development is EPA's January 2003 issuance of a final Water Quality Trading Policy. Drawing from experiences gained in trading efforts throughout the country, this policy takes significant steps toward alleviating or minimizing some barriers to trading. It also provides greater assurance of support to state regulators working on trading programs and provides a clearer picture of what acceptable policies should look like. Table 1 lists some notable points from the new EPA policy. Some of the problems experienced with pilot trading programs will be rendered less troublesome due to this new policy.

¹ Wisconsin pilot trading experiences are recounted in a recent report by the Wisconsin DNR (DNR, 2002b).

² These categories are created for discussion purposes and some issues could arguably be placed in more than one category.

Table 1

Notable Points from EPA Trading Policy
<ul style="list-style-type: none">• clarifies support for trading in pre-TMDL impaired waters• clarifies acceptable baseline definition methods for trading programs under a TMDL• encourages inclusion of trading provisions in TMDLs• opens the possibility for use of trading to achieve new technology-based effluent limitations• provides guidelines for incorporating trading into NPDES permits (avoiding the need for modifications whenever trades occur)• suggests acceptability of watershed permits for groups of similar sources• suggests acceptability of using an environmental margin of safety in lieu of compensating through trade ratios• clarifies anti-backsliding applicability when trading• opens the possibility for cross-pollutant trades and consideration of environmental improvements in some situations.

Source: USEPA, 2003

The reassertion of EPA commitment to promoting water quality trading should give states greater confidence that their efforts to produce a workable program will be fruitful. The EPA trading policy has reduced uncertainties for states exploring program designs by listing "common elements of credible trading programs." The task now set before states is not only to reduce uncertainties but also to remove unnecessary barriers to trades so prospective traders feel free to consider trading options for compliance. Wisconsin, like many other states, must also address the thorny problem of finding a way to equitably achieve agricultural nonpoint source load reductions (discussed on pages 6-7 and 12-13 in this report).

Prior to the publication of the EPA Final Policy, the State of Michigan produced a water quality trading rule (MDEQ, 2002). Where the role of the EPA policy is to give states guidelines for developing their own programs, the Michigan rule is a concrete example of a state rule that meets those guidelines. Some notable points from the rule are listed in Table 2.

Table 2

Notable Points from Michigan Water Quality Trading Rule
<ul style="list-style-type: none">• limited liability for point sources using credits purchased in good faith• point sources can use credits to allow up to a 20 percent increase in discharge of total nitrogen or total phosphorus over permitted levels, but this use of credit cannot result in a lowering of water quality• when registering for credits, ten percent of discharge reductions by point sources are retired for water quality benefit (1.11:1 point-to-user trading ratio)• when registering for credits, fifty percent of load reductions by nonpoint sources (agricultural and storm water) to generate credits are retired for water quality benefit (2:1 nonpoint to user trading ratio)• eligibility of federally subsidized conservation measures for credit generation is limited to the percent of the local matching funds required• "shelf-life" for banked (unused) credits is 5 years, after which they are retired for water quality benefit• manure runoff control eligibility for credit generation is phased out, ending 5 years after effective date of the rule

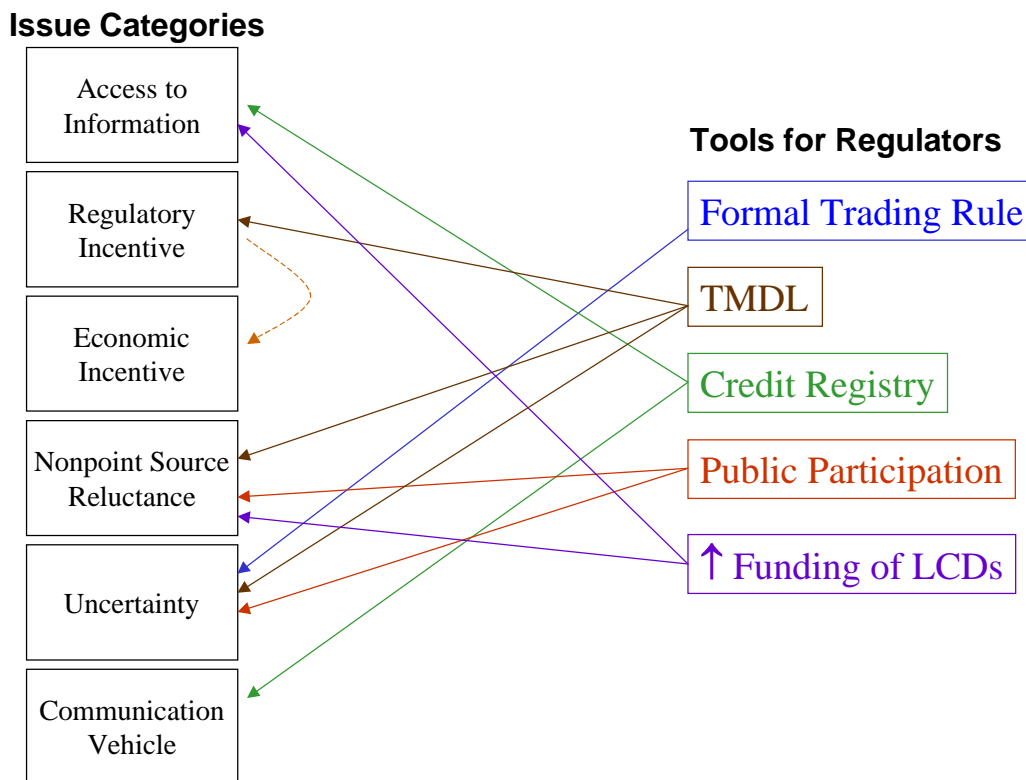
Source: MDEQ, 2002.

3. Matching Issues with Tools

In this section, issues associated with trading program participation and the specific policy options that may be used to address them are discussed. Brief descriptions of the participation issues in each category and relevant early experiences are presented. These are followed by a discussion of regulatory tools that may be used to address the issues including proven or theorized program options, implementation strategies, and prerequisite steps in establishing trading as a viable compliance option. Discussion is based on the assumptions that the Wisconsin policy development will generally follow EPA policy, and that the Michigan rule will be used as a basic template.

Before discussing specific issues and program options, it is important to understand how tools relate to these issues. Figure 1 illustrates the relationship between the issue categories and regulatory tools that can address them. Explanation and discussion of the issues and tools follows.

Figure 1 – Issues and Tools



Program participants named a variety of issues as deterrents to trading. As suggested in Figure 1, not all issues can be addressed through any one tool. However, the primary purpose of this report is to assist Wisconsin development of a formal trading rule or policy. A formal rule or policy will help minimize certain aspects of uncertainty for prospective traders. The issue categories and tools are discussed in greater detail in the following sections.

Access to Information

Issue Description and Experiences. An important aspect of any market is that participants (i.e., buyers and sellers) have access to the information they need to make decisions and act in their best interest. Information regarding what is offered for sale and how much it will cost is essential.

In the case of pilot trading programs or demonstration projects in the U.S., sources assessing their compliance options required information on the number of reduction credits available and their prices. Without an established program and central registry of some kind, this information was often not available, or obtaining it would require a substantial investment in time and effort by the prospective trader. This time and effort meant additional costs (i.e., transaction costs) associated with trading for compliance, narrowing the field of an already limited number of beneficial trades. Farmers also generally lacked the information, time and expertise needed to estimate loads and credits generated from BMP options, and local land conservation districts (LCD) generally had insufficient staff and time to assist sources with trading.

Possible Solutions and Tools. The EPA policy recommends (as a "common element" of a successful trading program) that market information be made publicly available including: sources that trade, quantity of credits generated and used on each watershed, market prices (where available), and watershed and trading boundaries. This would most likely take the form of some kind of central (probably Web-based) registry where credit and trading information is posted.

The World Resources Institute has created a program called "NutrientNet"³ that can function as a registry and perform other services for traders. Configured to specific watersheds, NutrientNet allows registered users (i.e., sellers and buyers) to evaluate different trading options and assess what combination of controls and credits would work best for them. They can also post offers to buy or sell credits and communicate directly through the site with other traders. The program provides a rough estimate of control costs and effectiveness. Options must be further evaluated by individual sources to make sure the numbers are accurate for their specific situation. However, NutrientNet is a useful prototype tool for identifying options for further evaluation.

Another possibility is to establish brokers and administrators for each sector in each trading area. The person (or organization) could administer a group permit or other (even voluntary) compliance agreement. This would be especially helpful for the nonpoint sources in each watershed who might not otherwise participate.⁴ Some entities or devices that have served these roles include: associations for agricultural sources such as the Grasslands Area Farmers program in California use of drainage districts (Austin, 2001), voluntary agreements for point sources such as is used by the Tar Pamlico Basin Association (Gannon, 2002) and the Kalamazoo River dischargers (Kieser, 2002), and group permits such as in the Neuse River program (Templeton, 2003). Readers are referred to cited references for further information on these programs.

³ The Web site for NutrientNet is www.nutrientnet.org.

⁴ A strategy for helping agricultural nonpoint sources understand and evaluate their options is to provide increased funding to local LCDs so they can provide those services. Because the farmers know them and often have worked with them on conservation issues, LCD representatives may be best suited to act as a liaison between farmers and other prospective traders, and to assist landowners in calculating their load reductions associated with various practices.

Regulatory Incentive

Issue Description and Experiences. The Wisconsin water quality trading pilot programs encompassed many water bodies that were on Wisconsin's 303(d) list of impaired waters, but had not yet established TMDLs for phosphorus. Point sources in the Fox-Wolf Basin were already required to meet an effluent phosphorus concentration of 1.0mg/l⁵ when the pilot program was established. Some sources unable to control to that level due to demonstrated economic or technical hardship, were granted temporary alternative permit limits. Therefore, sources in the Fox-Wolf Basin, were not required to make any new reductions, and remain unlikely to have serious motivation to trade until further reductions are required under a TMDL, until alternate permit limits are not renewed, or until sources want to expand or set up new facilities.

Sources on the Red Cedar Watershed and the Rock River Basin, however, were required to make new reductions to achieve the 1.0mg/l effluent standard. These sources did have some regulatory motivation to explore trading, and the Red Cedar did actually see some trades. The Rock River sources ran into difficulties related to market information, lack of technical assistance and trading uncertainties (DNR, 2002b).

Possible Solutions and Tools. The establishment of TMDLs for impaired water bodies in Wisconsin will create more regulatory incentive to trade for compliance provided, that 1) the structure and mechanisms are there for trading to occur, and 2) sufficient differences between sources' compliance costs (i.e., cost heterogeneity) exist.

Economic Incentive

Issue Description and Experiences. Lack of a regulatory incentive to reduce effluent loads translated directly into a lack of economic incentive to trade for sources in the Fox-Wolf Basin. Sources in the Rock River Basin found that market conditions were not as favorable for point to nonpoint source trading as had been predicted. Costs of point source reductions were lower than predicted, and the sheer volume required precluded trading with agricultural nonpoint sources in most cases. Therefore, reductions from point sources were often more cost-effective than seeking out nonpoint source reductions.

Possible Solutions and Tools. Implementation of TMDLs on impaired waterways will provide both regulatory and economic incentive to explore compliance alternatives. Program participants will need to have adequate information on compliance options and there will need to be well-understood mechanisms for, and benefits from, trading for it to see widespread use.

Nonpoint Source Reluctance

Issue Description and Experiences. Agricultural nonpoint sources were very reluctant to get involved with trading discussions and agreements because they perceived that they had little to gain and much to lose. This group of sources has enjoyed near immunity from regulations

⁵ As required by the Great Lakes Water Quality Agreement of 1978 and subsequent amendments, sewage treatment plants averaging 1 MGD of discharge, and discharging to waters that fed into Lake Michigan had to keep phosphorus concentrations in their effluent at or below 1.0mg/l. Wisconsin more recently expanded this requirement to all state dischargers with average monthly loadings of phosphorus of at least 150 pounds for sewage treatment plants, and 60 pounds for industrial sources (Chapter NR 217 of the Wisconsin Administrative Code, 1997).

regarding runoff to surface waters (with the exception of some concentrated animal feeding operations). Also, having a long history of being subject to market and production factors that are beyond their control, such as price fluctuations and weather, farmers have been understandably reluctant to voluntarily expose themselves to yet another – involvement with a discharge permit. Most agricultural nonpoint sources wanted to see good evidence that trading would benefit their bottom line before they would risk a trading agreement. Also, these sources were very reluctant to draw any public attention to themselves because of a perceived potential for negative publicity.

Another issue for agricultural nonpoint sources stems from the new EPA policy itself. The policy states that in order to be eligible for credit generation, nonpoint sources must be in full compliance with all applicable runoff rules (USEPA, 2003). This provision could obstruct Wisconsin agricultural sources' participation in trading (Fix, 2003) and possibly impede water quality improvements. Wisconsin has recently promulgated agricultural nonpoint source performance standards (DNR, 2002a) which will be implemented over the next several years. These standards include requirements for nutrient management, clean water diversions, manure storage facilities, and achieving "T" (tolerable soil loss) levels of erosion. However, compliance for existing agricultural operations and practices is not required unless 70-90 percent cost-sharing is available.

Because only a limited amount of cost-sharing funds is available, most of these sources are not expected to implement recommended runoff control practices in the near future. The USEPA requirement could mean that a large number of agricultural nonpoint sources may not be eligible to participate in trading. Furthermore, those responsible for implementing the TMDLs will be faced with the politically difficult problem of enforcing reductions from agricultural sources without increased co-funding *and* without the possibility of subsidization through trading.⁶

Possible Solutions. Under the Kalamazoo River pilot program in Michigan, designers found agricultural sources were receptive to considering complete (customized) BMP plans when shown how they would improve their operation (Kieser, 2002). When offered a menu of BMPs including expected credits they could generate for sale, they were generally uninterested.

The possibility of equating BMPs funded through trading with those funded through cost-share should be explored. If some method of treating these financing options as equivalent could be negotiated with the USEPA, it could result in increased compliance with runoff rules and reduced strain on cost-share funds. One possibility would be to have compliance with nonpoint source performance standards be required if either 70 percent cost share funding or trade for credits of equivalent value is available.

If agricultural nonpoint sources were required to make reductions (beyond nonpoint source performance standards) under a TMDL, they would likely be more interested in trading options. Another option for achieving agricultural nonpoint source reductions under a TMDL involving watershed-based permits and trading is discussed in the "Other Issues" section of this report.

⁶ It is possible that sources that have met the requirements of Wisconsin's nonpoint source performance standards could implement additional BMPs to achieve creditable reductions that could then be traded. However, conventional knowledge on runoff controls suggests the cost-effectiveness (i.e., cost per pound controlled) of add-on measures would make these credits expensive.

Uncertainty

Issue Description and Experiences. Uncertainty plagued programs in many respects. First, point sources with federal discharge permits (i.e., NPDES permits, or WPDES permits in Wisconsin) were not sufficiently convinced that credits generated with a state or local program would be valid for compliance with a federal permit, or that credits would be deemed valid once the pilot trading program ended.

Second, sources were not sure whether early reductions in loads made to generate credits in a pre-TMDL impaired water body would continue to be considered surplus and thus eligible for crediting once a TMDL was established. Permitted sources had historically been penalized for discharging below their permitted concentrations by having their NPDES permit limits adjusted to the new (more-restrictive) level whenever the permits were renewed. Also, they were concerned that anti-backsliding rules might forbid their returning to their old discharge level if they decided to discontinue generating credits.

Third, point sources were concerned about liability issues associated with relying on nonpoint sources, over whom they had no control, for their compliance. What would happen to the point sources if the credits generated by nonpoint sources became invalid?

Fourth, point sources were very familiar with the costs associated with conventional "bricks and mortar" compliance options but had no idea what time or resources it would take to comply using credits. They were concerned that, due to their unfamiliarity with the process, transaction costs associated with credit deals would be excessive. They also had no clear indication of whether trading would require them to apply for re-issuance of their WPDES permit which could be costly and time-consuming.

Fifth, point sources had some difficulty determining how many credits would be generated with a given BMP and what the appropriate trading ratio would be. In the Rock River pilot trading program, costs for nonpoint source reductions were initially underestimated and costs from point sources were overestimated. There were point sources that were interested in trading but confusion over the delivery rate formulas and appropriate trade ratios derailed prospective trades.⁷ When realistic values were used it was apparent that it was not economically beneficial for point sources to fund nonpoint source controls for compliance.

Sixth, sources were uncertain what the political repercussions might be if they bought credits instead of reducing their loads. Point and nonpoint sources alike worried that lack of a public understanding of trading, and the outright suspicion of some groups, might result in negative publicity for the traders.

Possible Solutions. The USEPA final trading policy document (USEPA, 2003) and development of a state trading rule or policy can alleviate or reduce many of these uncertainties. Table 3 lists the above-referenced issues, discusses treatment under the USEPA policy, and suggests possible roles for Wisconsin policy. Following the table are more-detailed discussions.

⁷ Wisconsin DNR has since established standardized technical tools to assess the effectiveness of BMPs and runoff delivery to water bodies. These tools are now available upon request.

Table 3 – Summary of Uncertainty Issues, EPA Policy and Options for Wisconsin

Uncertainty Issue	EPA Policy (has done)	Wisconsin Policy/Rule (can do)	Other/Comments
1. credit applicability to federal permits	supports trading, clarifies conditions, includes some permit design options	implement chosen permit designs and outline procedures	
2. early reductions in pre-TMDL waters	no guidance	indicate how credits will be treated when TMDL established and how early reductions will be treated in setting baselines	still uncertainty over what reduction requirements under a TMDL will be (makes sources hesitant to innovate)
3. liability for point sources	default by the source generating credits, means an NPDES permittee using those credits must comply with its permit as if the trade had not occurred	delineate procedures for nonpoint source default	Michigan rule provides a good model for this
4. unfamiliar compliance option	clarification of some program designs for states	help sources understand what is involved with trading through specific requirements, design permits that incorporate trading	time and experience will reduce uncertainty
5. credit estimation and trade ratio confusion	recommends standardized protocols using established methods	provide specific methods and protocols for credit estimation and applicable trade ratios	some examples include Michigan rule, Rahr Malting cross-pollutant, Boise program
6. political repercussions from trading	lends credibility to concept and clarifies some issues	show state support of trading, importance of goals statement, public participation in development	need to have public involved with program development to promote understanding

Credits Applicability to Federal Permits. The EPA trading policy expresses federal support of using credits for compliance. Wisconsin support through publication of a rule or policy will further confirm legitimacy of credits as a compliance option and reduce concerns for prospective traders.

Early Reductions in Pre-TMDL Waters. To encourage early reductions in effluent and runoff loads, Wisconsin should include in its rules for pre-TMDL trading the most likely scenario regarding treatment of early reductions once the TMDL is established. The goal is to give sources a good idea what will happen to their pre-TMDL credits when the TMDL comes through, and assure them that early reductions will not mean lower baselines for them under the TMDL.⁸ This assurance could also allow point sources to implement control technologies on a more cost-effective schedule, such as concurrent with other process changes.

⁸ An example might be to phase-out credited pre-TMDL reductions some percentage per year after establishment of the TMDL. Another might be when pre-TMDL permits using early reduction credits for compliance come up for

Liability for Point Sources. Michigan's water quality trading rule provides a good example of how liability issues for point sources can be addressed. Point sources are given a "true-up" period if nonpoint-source-generated credits purchased in good faith are found to be invalid. During this period, point sources must procure additional reductions or credits sufficient to replace the invalid credits and are not penalized in any way. Sources that have registered credits, who notify the department that their conservation efforts produced a smaller quantity of reductions than represented by their registered credits will have 30 days to true-up insufficient reductions. Sources that have registered credits and were found to have not acted in good faith, must replace the invalid credits with new reductions or credits purchased at a rate of three-to-one.⁹ These credits are donated to the state and retired. This method applies some liability to nonpoint sources through imposition of a monetary penalty without actually including them in a federal permit.

Unfamiliar Option and Permit Designs. Using credits for compliance will remain a less-familiar compliance option until sources become more experienced with trading. With guidance from the EPA trading policy, state programs can outline detailed requirements for trading that will help potential traders assess the level of effort and cost that trading will entail, and minimize surprises for traders and administrators.

One means of simplifying trading is to include provisions for trading in discharge permits. The EPA policy lists some options for doing this including:

- specifying general conditions in a permit authorizing trading
- authorizing variable permit limits that account for the number of credits held
- encouraging use of watershed general permits for groups of sources in the same or similar categories

One example of implementation of this type of trading-friendly permit is under the Lower Boise River pilot trading program. In this program, local policymakers worked with the Region 10 EPA to develop flexible NPDES permit language to allow trading for compliance without modification of permits (Finch, 2002).

Several programs throughout the country have used group permits or similar agreements to effectively "bubble" a group of sources. Some examples include:

- Grassland Area Farmers selenium trading program in California non-NPDES permit agreement for trading among drainage districts (Austin, 2001; Woodward et al., 2002)
- Tar-Pamlico Basin Association non-NPDES informal trading agreement among point sources (Gannon, 2002)
- Kalamazoo River/Lake Allegan TMDL voluntary agreement among point sources to collectively meet the wasteload allocation cap under a TMDL (Kalamazoo River/Lake Allegan TMDL Implementation Committee, 2002)

post-TMDL renewal, the pre-TMDL credits are only eligible to the extent they remain surplus following imposition of TMDL requirements.

⁹ When a source registers reductions to receive credits, the conditions (e.g., practice or new control measure) become legally enforceable requirements with the State of Michigan.

- Neuse River Basin Association group permit for point sources for total nitrogen that supersedes individual NPDES requirements (Templeton, 2003)

Some possibilities for group permitting and representation are further discussed in the "Other Issues and Tools" section of this report (pages 12-13).

Credit Estimation and Trade Ratio Confusion. The EPA trading policy recommends that credits from nonpoint source reductions be estimated using standardized protocols and established methods. Clarification of what is acceptable will avoid confusion and help sources better understand the trading option. However, point and nonpoint sources alike will need help in estimating credits from various control options.

In addition, explicitly stated standardized procedures for credit estimations will help reduce costs for potential traders. To avoid confusion over trade ratio requirements, Lower Boise River program designers divided their trade ratios into specific components (i.e., delivery/river location adjustment, water quality improvement, uncertainty discount) and described the types of trades in which various components apply (Ross and Associates, 2000).

Political Repercussions from Trading. Federal and state policy statements on water quality trading will help communicate to the public that these entities view trading as a legitimate compliance option. The EPA policy also stresses the importance of public involvement and access to information on trading activity. Public participation during program design will help avoid resistance later when trades are proposed and help potential traders feel more assured that trading will not result in bad publicity for them. Furthermore, careful drafting of the goals or objectives statement for the trading rules, with the top priority being achieving clean water goals, will also encourage buy-in from the affected sectors.

Communication Vehicle

Issue Description and Experiences. The pilot trading program experience has accentuated the importance of enabling efficient communication among market participants - especially in a situation in which the groups are so markedly different (e.g., industrial, municipal and agricultural sources). Another factor making communication problematic is that point-to-nonpoint trades could often involve one large point source and several smaller nonpoint sources. Without some bundling of nonpoint source credits, transaction costs for these trades may be formidable. The City of Cumberland on the Red Cedar River found a workable solution in which the local LCD coordinated all the communications.

Possible Solutions. Communication services are another area where county LCDs, given adequate funding, could provide market assistance. LCD representatives are generally known to the agricultural sources and therefore are more likely to be trusted than DNR or point source representatives when talking about trades. Michigan's Kalamazoo River pilot program recruited a farmer who was involved in other water quality issues to act as liaison with agricultural sources (Kieser, 2000). This seemed to alleviate some of farmers' trust concerns and make them more amenable to the idea of trading.

4. Other Issues and Tools

An important aspect of most developing water quality trading markets is the nature of the participants. One of the standard assumptions of market theory is that participants will act to minimize their costs and maximize their benefits. If all costs and benefits of environmental compliance decisions were captured within the market, the market could theoretically approach a least-cost compliance mix. However, in the case of most watersheds, typical sources may not be motivated simply by compliance cost minimization – sources' definitions of benefits and costs are more complex. There are two major Wisconsin sources that have more complex motivations, agricultural operations and municipal treatment plants.

Agricultural Nonpoint Sources

Issue Description and Experiences. One problematic group of potential market participants is agricultural nonpoint sources. In the pilot programs in Wisconsin, as well as throughout the country, this group has proven extremely reluctant to get involved with water quality trading schemes. Having been subject to little or no requirements regarding runoff control, they are unlikely to devote any time to exploring BMP options with the generation of trading credits in mind. Furthermore, while they are probably quite knowledgeable regarding effectiveness of various BMPs in reducing soil erosion, they are unlikely to have the expertise or resources to assess trading options (i.e., estimate pounds of pollutants controlled for various BMPs, convert these into tradable credits, communicate and negotiate with prospective purchasers). As an added complication, the number of sources, potential load reductions from each, and predicted volume of credits point sources will likely require for compliance, together suggest that the level of coordination of multiple parties needed to make this sector a viable trading group will require a new approach. Finally, as discussed in the section "Nonpoint Source Reluctance," the provisions of the new EPA policy and Wisconsin's nonpoint source performance standards may limit nonpoint source participation and delay water quality improvements.

Possible Solutions. The Neuse River Basin program has set up a functional equivalent of a group permitting option for agricultural nonpoint sources (NCEMC, 1997). Agricultural sources are required, under a nitrogen TMDL, to achieve a 30 percent reduction in loads (from a 1995 historic load baseline). Agricultural operations in the basin (which covers 19 counties) have the option of participating in a "Local Nitrogen Reduction Strategy" in which they will be required to either implement BMPs based on the recommendations of a "Local Advisory Committee," or implement standard BMPs. Both options are eligible for state or federal cost-share money at 75 percent. Thus far, 17 Local Advisory Committees have been established in the Neuse. The Neuse program does not include any provisions for point-nonpoint trading at this time.

A means of including non-traditional players such as agricultural sources in a market is to have those with more traditional motivations act on their behalf. An agriculturally based association might be established with an administrator who is charged with finding the least-cost compliance option (e.g., under a TMDL or remedial action plan) for the group of farms in his/her stream segment. The administrator could be given some authority by the group to choose and oversee implementation of BMPs on farms with benefits to the group as the secondary priority (behind the primary goal of achieving load reductions). Group members, by signing on to the association, declare their willingness to abide by the administrator's decisions with the understanding that it was part of the overall plan for the watershed, and would receive

compensation for BMPs at agreed-upon rates. Nonpoint sources on that stream segment who decide not to join the association will need to implement a standard set of BMPs. Once compliance with the group load is achieved, the administrator could also negotiate with point sources interested in using nonpoint source generated credits for compliance, then arrange and execute the trades.¹⁰

Some advantages to having an administrator examine and select BMPs and sites include:

- coordinates and improves effectiveness of BMPs (economies of scale, proximity, timing)
- reduces transaction costs (simplified negotiations, fewer entities involved)
- bundling of credits
- facilitates easy informal trades between nonpoint sources that might not occur otherwise
- avoids singling out farmers
- new (or modified) locally-controlled entity holds permit for all agricultural nonpoint sources
- solves modeling/credit estimation problems for individuals
- provides an accountable person
- can produce equitable solutions for farmers (early adopter/"bad actor" issues can be addressed locally and internally)
- has one expert (or board) make compliance decisions that might be too complicated or time-consuming for individuals to address
- can achieve NPS load reductions when other programs might be stalled due to cost-share fund limitations
- funding/profit structure can give all a common goal

A number of key questions need to be addressed including:

- Who can act as administrator? (LCD's, "elected" representative)
- What incentive for agricultural sources to join could be used (carrot or stick)?
- How can the association be funded and what profit model could be used? How are farmers paid for implementation and how are profits from credit sales distributed?
- How could this coexist with national trading policy? Will EPA allow it?

¹⁰ This concept is similar to that of a pilot storm water permitting program for scrap recyclers in Wisconsin called the Cooperative Compliance Program. This program allows scrap recyclers to work cooperatively with other members to maintain environmental compliance with their storm water permits and also encourages sharing of expertise and experiences among members. The CCP provides inspection and monitoring of member operations relieving individual facilities of that requirement. Facilities pay money to the CCPs for those services (DNR, no date).

Municipal Treatment Plants

Issue Description and Experiences. Municipal treatment plants (MTPs) are another example of participants with motivations beyond simple control-cost minimization. While not facing the same kind of direct competition that similar industrial sources might face, MTPs do compete with each other to some extent for new customers in their service territory. An MTP's ability to offer lower cost services might tip the scales on a company's decision to site a new plant in its locality. Therefore, compliance costs are certainly important to them, but they are far from the only consideration in making pollution control choices.

Interviews with MTP managers in Wisconsin indicate that they are also concerned about local water quality and doing "what's right" for the community. These concerns represent benefits to installing their own controls that are not included in the market. The tendency of MTPs to feel compelled to perform their civic duty was also observed by Woodward (2003) in studying the Dillon Reservoir trading program in Colorado, and by Kieser (2000) in the Kalamazoo River pilot program. Furthermore, some MTPs worried they might draw criticism if they propose paying for BMPs or other controls that will be implemented outside their locality (e.g., at a farm outside city limits) making that option less attractive to them than some other local option. The expected negative publicity for funding external reductions is a cost not included in the market. These factors contribute to an incentive for MTPs to install their own controls. While the presence of these trade-dampening factors might not make for an ideal market scenario, they may not be sufficiently obstructive to mean market failure – control-cost savings could still outweigh the other factors. However, these factors should be recognized in Wisconsin, especially if policymakers are considering a program designed to achieve nonpoint source reductions solely through trades with municipal treatment plants such as in the Dillon Reservoir program (Woodward, 2003).

Possible Solutions. One strategy that has worked with MTPs has been to develop a group permit or agreement under which reductions are made on a voluntary basis to meet a loading cap. The Tar-Pamlico Basin (Gannon, 2002) and the Kalamazoo River pilot program (Kalamazoo River/Lake Allegan TMDL Implementation Committee, 2002) are two examples of programs with voluntary agreements for groups of point sources. The Neuse River Compliance Association actually has a group NPDES permit covering about 20 point sources that relieves them of individual nitrogen discharge limits (Templeton, 2003). Instead, the association assigns members individual limits within the group permit. If the group limit is exceeded, individual limits become effective and enforceable by the state.

The main function of group agreements such as these appears to be simplification of transactions. These permits are analogous to the "bubble" concept used by facilities with multiple air emissions sources. Generally money does not change hands (i.e., no source is directly funding reductions at other sources), and sources implement their next level of controls when they go through a general plant modification or upgrade when it is most cost effective to do so. This option allows sources to install their own controls but reduce compliance costs through a more flexible implementation schedule.

5. Summary and Recommendations

The pilot programs have served their purpose – providing a hands-on learning experience for everyone involved. A finalized EPA trading policy has clarified existing and revised agency positions. The federal policy statement makes the task of designing a workable state trading program easier. A neighboring Great Lakes state (Minnesota) has successfully incorporated trading into point source permits, and another (Michigan) has designed and passed a statewide trading rule with innovative options that may transfer well to Wisconsin. These conditions create a firm foundation for Wisconsin to build a trading policy or rule.

Based on a review of Wisconsin pilot trading programs and other related efforts in the U.S., the following policy options could help Wisconsin promote cost-effective attainment of water quality goals through trading.

Detailed, Specific Trading Requirements. The more detailed and specific policy is regarding what is needed for trades to occur, the more easily potential traders can assess what their transaction costs will be and make an informed decision regarding trading versus other means of compliance. In addition, sources should be assured that proposed trades meeting these requirements will be quickly approved and require minimal administrative oversight.

Trading Provisions in Permits. As recommended by EPA policy, finding some means of including trading provisions in discharge permits (so that permits need not be re-issued when a trade occurs) is important. This will also lower transaction costs and help legitimize trading for compliance in the eyes of potential traders. Participants in the Lower Boise River trading program (working closely with Regional EPA) developed flexible permit language allowing an increase or decrease in permit limits based on credits held, with specific conditions to insure water quality improvement. The Michigan program uses alternate permit limits that come into effect when sources use credits for compliance.

Agricultural Nonpoint Source Participation. In order for agricultural sources to participate, they will need, at a minimum, someone to assist them in calculating credits for various BMP options and to act as liaison with potential point source trading partners. However, achieving agricultural nonpoint source reductions in Wisconsin may require other measures as well. Agricultural watershed-based associations functioning under a group permit or other binding agreement could allow cost-effective achievement of load reductions, cost/profit sharing among nonpoint sources, assistance with credit estimation and BMP options, and communication and negotiation with other sectors for trading. In addition, this type of organization could enable timely achievement of TMDL-mandated reductions without contradicting EPA trading policy and without excessive financial hardship for the agricultural sector. County LCD representatives appear to be the most appropriate candidates but will require funding to fulfill this role.

Watershed General Permits for MTPs. Wisconsin should keep the option open for MTPs to voluntarily "bubble" their loads under a group permit. This form of agreement has proven beneficial for MTPs in other programs, and could give them the flexibility to trade informally among themselves without incurring significant transaction costs.

Market Information. Market information must be made publicly available in order for trading options to be considered. Establishment of a Web-accessible registry, or a more full-featured system such as NutrientNet (which would also help sources evaluate options regarding costs and credits generated, and communicate with each other) could serve this need.

Permitted Source Liability. Wisconsin may consider adopting a liability policy similar to Michigan's in which point sources who, in good faith, purchased credits that later turned out to be unsupported by actual reductions would have a "true-up" period to achieve compliance without penalty. In this case, nonpoint sources who acted in good faith and implemented agreed-upon practices that turned out to be less effective than predicted would not be penalized. However, nonpoint sources who neglected to install or properly maintain practices, on which credits were based and sold, must obtain triple the number of credits as a penalty and donate them toward water quality improvement. This provision protects both the point and nonpoint sources, keeps nonpoint sources out of the permits, and provides a deterrent to unscrupulous behavior.

Credit Calculation Procedures and Trade Ratios. Following EPA policy, the State of Wisconsin may wish to publish acceptable standardized protocols and methods for credit estimation to avoid confusion. Applicable trade ratios should be stated as simply as possible, including components such as delivery or location adjustment, water quality improvement, uncertainty adjustment. Situations in which each apply, should be described. Alternatively, initial allocations under the TMDL could be reduced to reflect expected transfers of reduction responsibilities from measured loads (point sources) to estimated loads (nonpoint sources) allowing use of a smaller trade ratio. Some other possibilities are to take an established percentage of each load reduction when credits are created (MDEQ, 2002) or convert all generated credits to a common unit such as "Parma pounds" for Lower Boise program (Finch, 2002).

Treatment of Early Reductions. If promotion of pre-TMDL trading is desired, Wisconsin should lay out plans for how pre-TMDL credits will be treated once TMDLs are established. The goal is to minimize uncertainty for those sources generating credits, and to help them assess the value of early reductions.

Public Participation and Program Goals. Successful programs have included careful and open development with participation from all interested sectors. Buy-in to the concept of trading and participation from agricultural and environmental stakeholders is especially important. A consensus of interested stakeholders will help legitimize the program, minimize misinterpretations, reduce or eliminate roadblocks to finalization and implementation, and avoid negative publicity for traders. Furthermore, program function will be improved by having the program options debated and understood prior to implementation. This can allow for reduced oversight of individual trades. Goal statements should be carefully drafted to assure all that attainment of water quality goals is the top priority. The Michigan trading rule and EPA trading policy provide good examples of effective goal statements (MDEQ, 2002; USEPA, 2003).

Wisconsin will need a statutory change to allow trading in all state waters. Although trading is currently permitted in the three pilot trading program areas, absence of a formal state trading policy has caused sources to deem trading for compliance to be exceedingly risky. A formal trading policy for Wisconsin would be a short-term solution to help remove uncertainties associated with trading and pave the way for an eventual state rule. Faced with economic growth and its inevitable stresses on natural systems and infrastructure, as well as the need to progress in cleaning up impaired waters, the State of Wisconsin can take steps now to make water quality trading a workable option.

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