



## Emissions Trading Moves To Water, But It's Not As Simple

**B**uilding on the success of the sulfur dioxide emissions trading program in the Clean Air Act Amendments of 1990, EPA released guidance in January to states and tribes on how trading can occur under the Clean Water Act without additional statutory authority. The new Water Quality Trading Policy initially supports trading of nutrients — phosphorous and nitrogen — and sediment loads among point and nonpoint sources. The policy is meant to achieve greater water quality improvements at lower costs to society, because unregulated nonpoint sources such as farms or woodlots could presumably create credits by changing cropping practices or planting buffers, and sell the credits to a regulated point source that needs to meet stringent discharge requirements under its National Pollutant Discharge Elimination System permit. The agency will provide \$800,000 for 11 pilot projects around the country.

The Acid Rain program had a clear system of credits, was easily monitored, and occurred within a single industry — the utility sector. Moreover, there was a descending cap that withdrew credits from the system, decreasing national emissions of sulfur dioxide dramatically. EPA's guidance relies instead on working to achieve an existing water quality goal for a waterbody, such as a "designated use" or "total maximum daily load," but to achieve it more efficiently. It acknowledges the difficulty of monitoring nonpoint source "discharges" by suggesting a number of methods, such as extra monitoring, greater than 1:1 ratios between the sources, etc.

The policy also envisions eventual expansion of the concept beyond nutrients, which at present means mostly sewage treatment plants among the regulated community, to involve a wider segment of industry. It says these trades would involve "greater scrutiny," since they would present greater hazards to public health and the environment. It would consider, for example, pilot projects for persistent bioaccumulative toxics such as mercury if they come mostly from nonpoint sources and achieve substantial reductions and do not violate aquatic life or human health criteria. The agency also supports cross-pollutant trading for oxygen-related pollutants, such as reducing upstream nutrient levels to offset a downstream biochemical oxygen demand or improve in-stream oxygen. Clearly, it has in mind expanding to other, more hazardous pollutant in the future if pilot projects for these prove to be safe.



**Elizabeth Bina Croker**  
*Director of Public Policy*  
National Corn Growers  
Association

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**Paul Faeth**  
*Managing Director*  
World Resources Institute

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**Ken Kirk**  
*Executive Director*  
Association of Metropolitan  
Sewerage Agencies

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**Tracy Mehan**  
*Assistant Administrator for Water*  
U.S. Environmental Protection  
Agency

“Water quality trading is an idea whose time has come. This moment in the history of American conservation provides an outstanding opportunity to use this market-based incentive to address local environmental and economic challenges.”



**Thomas M. Morrissey**  
*Director of Planning and Standards, Water Management Bureau*  
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## But Let's See Funding And Actual Trades

ELIZABETH BINA CROKER

Farmers have long been fond of using the expression "another tool for the toolbox" to describe anything from new pesticide products to biotechnology to research with practical applications. Trading is yet another tool. It is one corn growers believe will have significant benefits for water quality.

Corn growers are concerned with the health and well-being of Americans and believe environmental stewardship must be balanced with a long-term, dependable food supply and the profitability of farming. Growers are good stewards of their land and support the adoption of new technologies, practices, and policies that benefit the environment. Fundamentally, corn growers believe water quality can best be protected and enhanced through locally led, voluntary conservation and stewardship programs.

Farmers have about 70 years of experience working cooperatively and voluntarily to conserve the land and its resources. The methods developed over the years to reduce erosion and runoff, restore wetlands, and enhance habitat have been successful. It is a good thing they have worked, because today about 50 percent of the nation's land is owned by farmers and ranchers. Another 20 percent is otherwise privately owned. As private landowners, corn growers have made a commitment to the environment and can be an excellent resource for improving water quality.

Today's farm and ranch land is three times more productive and supports more wildlife than it did 70 years ago. However, challenges remain in the nation's effort to restore and maintain water quality. Regulatory controls are reaching their limit, especially in terms of cost, and corn growers and the public are looking for new ways to address the remaining concerns. EPA's trading policy is one such

means and will offer genuine benefits to our nation's waters by reducing the cost of compliance, encouraging participation at the farmer level, and securing greater pollutant reductions than could be achieved through regulation.

Throughout the development of EPA's new Water Quality Trading Policy, the National Corn Growers Association has had two broad concerns: actual trading — not just trading programs — and funding. NCGA believes trading can and should move forward while states and tribes develop trading programs. It also believes EPA and the U.S. Department of Agriculture must provide substantial funding to jump start the practice of trading. It is only through actual trades that benefits will accrue.

NCGA is concerned that by insisting on a detailed, programmatic foundation for trading at the state and tribal levels, the policy will hinder progress toward innovation. EPA should actively encourage ad hoc trading based upon the best professional judgment of water quality officials. This would accelerate water quality improvements and also advance the development of trading mechanisms and tools. In the long run, trading programs are likely to be the ideal mechanism for regulating trading activity to ensure water quality goals are met. However, in the meantime, markets can be made by entities that are interested in gaining economic efficiencies, allowing water quality to more rapidly benefit.

NCGA has encouraged EPA to provide meaningful funding for several important functions, including state program improvements, development of the transactional mechanisms and technical tools for trades and implementation of credit-generating activities on the ground. States receive a variety of important policy signals from EPA. At this time, they are being encouraged to expand numerous water quality efforts, such as Concentrated Animal Feeding Operations permitting and Total Maximum Daily Load development. Competition among initiatives often will be won by the program that receives the most federal funding.

A real payoff from trading will occur when significant funding becomes

available to implement credit-generating activities. To a good extent, this investment must come from point sources motivated by the cost-savings available through trading. Even more important will be credit generation on a larger scale for nonpoint source load reductions, which EPA and USDA could financially support. USDA's conservation programs and State Revolving Fund Resources should be allocated in a manner that fully supports trading efforts by facilitating nonpoint source credit generation activities. For example, the Natural Resources Conservation Service is considering a new policy to encourage water quality trading by waiving any interest in credits generated by farmers using Environmental Quality Incentive Program funds, which would allow farmers to sell credits to interested buyers. This is the kind of innovation and leadership that will be necessary to facilitate trading.

With these concerns in mind, corn growers generally are pleased with EPA's policy. It has many characteristics of the programs farmers are familiar with, such as a watershed-based approach, flexible and locally based implementation, opportunities for innovation, and coordination among agencies. It also has the potential to allow farmers to address other concerns, such as restoring wetlands and providing habitat, while improving water quality. The successful approach used by conservation programs, which is too often overlooked, can be combined with regular monitoring, adequate performance measures, and accountability mechanisms to the benefit of water quality.

Today's water quality challenges are complex and costly to solve. They cannot be solved solely by regulation. All the tools in the toolbox will be needed to see real results. Trading should be one of those tools.

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## An Opportunity For Cleaner Waters

PAUL FAETH

On January 13, I stood up with EPA Administrator Christie Whitman, Assistant Administrator for Water Tracy Mehan, and others at the release of the Bush administration's new Water Quality Trading Policy. It's a bit unusual for an environmental policy group to applaud a change in policy these days, but that's exactly what we did. We did so because we believe that the guidance will help create markets that will provide incentives for improvements in water quality. Ultimately, we believe this change will help to clean up the nation's waters.

There are a variety of reasons we think so. First, and most obvious, is that trading can dramatically cut the cost of achieving water quality targets. WRI did a series of studies a few years ago in Michigan, Minnesota, and Wisconsin in conjunction with state agencies and others. The resulting report, called *Fertile Ground*, compared the costs of various policy options, contrasting them with the traditional approach of requiring each and every municipal and industrial wastewater treatment plant to adopt the same technology standards. In the watersheds we considered, we found that trading could cut the cost of compliance by 63 to 82 percent. These savings can be particularly beneficial for rural communities, since their small facilities typically have the highest treatment costs.

A second reason water quality trading makes sense is that it provides not only the regulated but also the regulators with greater flexibility. In forming environmental policy, it is often true that science cannot provide the exact answer. Environmental agencies seldom know precisely what sort of cut in pollution loads will restore a watershed to health, and so uncertainty is an inevitable part of the process. This often leads to the con-

clusion that we should wait until the science gets better since the cost of making the wrong decision would be too expensive.

With trading this is not so. An example will illustrate this point. In our Michigan study, a requirement to make all industrial and municipal dischargers adopt a higher degree of treatment that would provide a 20-percent cut in phosphorus loads would cost about \$20 per pound. The maximum degree of load reduction these sources could provide using best available technology would be a 24-percent cut in the total load to the watershed at a cost of about \$26 per pound. However, if those sources could trade with each other and with other sources such as farmers, who typically are not regulated, the cost of even a 50-percent load reduction would not be more than \$10 per pound.

Under a trading program, regulatory agencies can move sooner to new requirements knowing that a later adjustment would not provide an economic hardship for those they regulate. It also means agencies will not be locked into early decisions, as they so often are now, because the cost of getting it right will be small.

A final reason trading is a good policy approach is that it provides additional environmental benefits beyond strict command-and-control. The reason for this is that under point-nonpoint trading, the type of practices that farmers would adopt to reduce nutrient loads produce other important environmental benefits. Farmers achieve phosphorus load reductions by putting in buffer strips, using conservation tillage, or growing cover crops, for example. These practices not only cut the load of nutrients, but reduce soil erosion and runoff of pesticides to water.

The other important nutrient for water quality, nitrogen, is also the largest source of greenhouse gas emissions from U.S. agriculture. In the environment, nitrates can turn into nitrous oxide gas, which is 310 times more powerful in trapping heat in the atmosphere than carbon dioxide. Trading has already been approved to cut the load of nitrogen into the Chesapeake Bay. WRI is working with EPA's Chesapeake Bay Program to imple-

ment an Internet tool called NutrientNet to do this. There is also a task force looking into how to fix the so-called "dead zone" at the mouth of the Mississippi River, which is caused by too much nitrogen and other pollutants reaching the Gulf of Mexico. If these trading guidelines were used to address that problem, not only would the dead zone diminish, but there would be a significant cut in greenhouse gases.

Since its release in January, the policy has been the subject of controversy. Articles in the press have focused on the apparent differences in the environmental community. These revolve around trading in toxics and enforcement. While we didn't like the toxics trading provisions, we read it to allow only a few pilots and no more. It would be like throwing the baby out with the bath water to oppose a policy that could benefit as many as 3,400 waterways impaired by nutrients for a few limited pilot projects tied to toxics. But if the policy is used to justify toxics trading, on any scale beyond those few pilots, it would be a grave mistake.

On the issue of enforcement, it's clear that none of this works without it. The only economically sensible reason people will trade is a need to meet a legally enforceable requirement. Though the media sometimes suggested otherwise, I am in agreement with my colleagues in the environmental community on this point.

Thoughtful and knowledgeable people, some of whom otherwise support trading, hold different opinions on this policy largely based on the risks they see in it. In the end, it will come down to implementation by EPA and the states. If the interpretation is stretched, it will fail. If it is applied wisely and with appropriate caution, it will prove to be an enormous opportunity for cleaner waters.

*Paul Faeth is the Managing Director of the World Resources Institute in Washington, D.C.*

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## Need Equity Between Points And Nonpoints

KEN KIRK

The Association of Metropolitan Sewerage Agencies represents nearly 300 publicly owned treatment works nationwide that treat and reclaim over 18 billion gallons of wastewater each day. POTWs agree with EPA that “market-based approaches such as water quality trading provide greater flexibility and have potential to achieve water quality and environmental benefits greater than would otherwise be achieved under more traditional regulatory approaches.”

Some POTWs across the country have already found trading programs to be successful vehicles to meet National Pollutant Discharge Elimination System permit obligations. Trading has been particularly successful in cases where POTWs trade with other POTWs in the watershed — such as in the Long Island Sound nutrient trading program; where POTWs facilitate “pretreatment” pollutant trading between industrial dischargers to the POTWs; and where POTWs carry out intra-system trades, such as increasing cost-effective city stormwater controls to reduce particular pollutants, thereby offsetting more costly POTW facility upgrades to achieve the same reductions.

Historically, our nation has focused on a strict regulatory and permitting scheme to reduce POTW and other point sources of pollutants and move closer to our water quality goals. In contrast, nonpoint sources — which remain the largest source of water quality impairment in the country, according to EPA — have been encouraged to make pollutant reductions under voluntary, soft programs. The agency’s recent endorsement of trading does not replace the ultimate need to assure a fair and equitable allocation of pollution control responsibilities among all sources — point and nonpoint — in a watershed. And, while AMSA and its member agencies

support the overall goals of the Water Quality Trading Policy, we believe that trading will only become a widely used, viable option for point sources if the policy is implemented in a manner that fairly and equitably assigns and enforces pollutant reduction responsibilities.

We are concerned that because several policy provisions do not fully address this essential equity issue, widespread POTW interest in trading with nonpoint sources may be limited. For example, the policy does not provide adequate legal protection for point sources in cases where a nonpoint source trading partner fails to meet its obligations. By suggesting that the point source’s NPDES permit is the best place to record the details of a point-nonpoint trade, the policy essentially holds point sources accountable for nonpoint source trading breaches. A POTW might find it more cost-effective to meet a phosphorus effluent limitation by funding a farmer’s installation of controls to reduce nutrient runoff rather than upgrading the plant. If the farmer ultimately fails to make expected reductions, the POTW nonetheless will face fines and penalties for not meeting its phosphorus limitations. In contrast, the farmer generally will face few adverse consequences. While the policy’s watershed approach intends that point and nonpoint sources come as equals to the trading table, the reality of the NPDES permit raises the risks substantially for a point source considering a trade. As long as the inability to truly transfer liability for trading breaches remains, it will have a chilling effect on widespread implementation of the program.

AMSA believes that trading will be most successful in waters where a Total Maximum Daily Load has determined the respective pollutant removal responsibilities of point and nonpoint sources. Given that the majority of our nation’s impaired waters still do not have a TMDL, we may see limited interest in trading for some time. Pre-TMDL trading will be hard to encourage, as the policy does not provide a means to credit “early” pollution reductions, and because both point and nonpoint sources may be reluctant to make pollution reductions where responsibility is not formally assigned.

AMSA continues to support the policy’s implementation, recognizing the long-term potential for increased, cost-effective water quality improvements. As a demonstration of AMSA’s continued commitment to the policy, AMSA’s vice president and general manager of the Montgomery Water Works & Sanitary Sewer Board in Alabama, Thomas “Buddy” Morgan, is undertaking a watershed-based, water quality trading pilot project at his utility under one of the grants EPA made available when it released the trading policy. These pilots will themselves be a critical step in demonstrating the practical, real world environmental benefits of this program.

*Ken Kirk is Executive Director of the Association of Metropolitan Sewerage Agencies in Washington, D.C. AMSA is a national trade association representing hundreds of the nation’s publicly owned wastewater treatment utilities.*

## Cleaner Water, Less Cost, Less Time

TRACY MEHAN

Water quality trading is an idea whose time has come. This moment in the history of American conservation provides an outstanding opportunity to use this market-based incentive to address local environmental and economic challenges.

A lot of water has passed under the bridge since the Clean Water Act was enacted in 1972. The act launched an all-out assault on water pollution to restore and maintain the integrity of the nation’s waters. It called for the discharge of pollutants to be eliminated and established interim goals for protecting fish, wildlife, and recreational uses. The goals of the act were to be met through regulation of point sources of pollution — i.e., discharge pipes — almost exclusively.

The application of technology-based requirements and water quality standards through the National Pollutant Discharge Elimination Sys-

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tem permit program has achieved tremendous success and remains critical to controlling point-source pollution. Despite these accomplishments approximately 40 percent of the rivers, 45 percent of the streams, and 50 percent of the lakes that have been assessed still do not support their designated uses. The challenges we face today are more complex and require more holistic solutions. Our waters are threatened by diffuse or "nonpoint" sources of runoff from urban and agricultural lands as well as by atmospheric deposition of pollutants. Nutrient and sediment loads from these sources are significant contributors to such problems as hypoxia in the Gulf of Mexico and decreased fish populations in Chesapeake Bay. Population growth and development further complicate the problems, placing increasing demands on the environment and making it more difficult to achieve and maintain water quality standards. Finding solutions to these complex water quality problems requires innovative approaches that are aligned with core water programs and achieve greater efficiency.

Market-based approaches, such as water quality trading, can provide greater efficiency in achieving water quality goals. Trading allows one source to meet a regulatory obligation by purchasing pollution reductions from another source that has lower pollution control costs. In many cases, these latter sources are federally unregulated and have few incentives to reduce their contribution to water pollution. Thus, reducing their pollution can often be accomplished at much lower cost, which means that overall water quality goals are achieved at lower overall cost.

Further, by providing an economic incentive for unregulated sources to improve water quality conditions, trading programs can lead to more pollution reductions than would otherwise occur. Bruce Knight, chief of the U.S. Department of Agriculture's Natural Resources Conservation Service, believes EPA's policy will "provide market-based incentives to encourage America's farmers, ranchers, and woodlot owners and operators to do even more to maintain and improve the quality of our environment."

The cost savings provided by trad-

ing programs can be significant. In its analysis of the Clinton administration's Clean Water Initiative, EPA concluded that the total potential savings from all types of trading (point to point, point to nonpoint, and pre-treatment) ranges from \$658 million to \$7.5 billion annually. Trading among point sources in Connecticut is expected to save over \$200 million in reducing nitrogen loads to Long Island Sound over a 14-year period. After its first year, the Connecticut program has achieved more nitrogen reductions than expected and cut nearly six years off the projected timeline for meeting water quality standards.

Recognizing the promise of trading and wishing to encourage environmentally sound trading programs, EPA issued a Water Quality Trading Policy on January 13. The policy is intended to illustrate the value that trading can bring to watershed improvement efforts, provide guidance on aligning trading programs with the Clean Water Act and implementing regulations, and identify common elements of credible trading programs. The policy balances flexibility with accountability. It highlights existing CWA flexibility that can facilitate trading programs and emphasizes the need for accountability and safeguards to ensure that trading programs protect our resources and keep us advancing toward water quality standards.

Safeguards are woven throughout the policy and anchored in the requirements of the CWA and implementing regulations. A few key safeguards are noted here. Pollution reduction "credits" can be generated for purchase only when a source reduces pollution beyond required levels (e.g., for an NPDES permittee, reductions below a water quality based effluent limitation). EPA does not support any trading activity that impairs a designated use or drinking water intake, or would cause a toxic effect or exceedance of a human health criterion. The latter conditions help avoid creation of locally high concentrations of a pollutant or "hot spots," which are an important consideration in any trading program. Accountability for all trades is also stressed. Point sources remain accountable through their NPDES permits. For nonpoint sources, states have an array of ac-

countability mechanisms to employ. Point sources that purchase pollution reduction credits from a nonpoint source can also rely on a private accountability mechanism — binding business contracts between the trading partners.

Within the CWA regulatory framework, EPA's policy identifies areas of flexibility, especially in NPDES permitting, that can facilitate implementation of trading programs. The use of variable and alternative permit limits, ability of permits to reference a set of established trading rules, and use of watershed permits are all encouraged. These approaches can allow trading to proceed under established rules and limits without necessarily requiring a NPDES permit modification for each trade. The right of the public to review and comment on NPDES permits must be fully upheld.

Flexibility is also provided in when trading may be used, and the policy supports trading in a range of circumstances. Trading may be used to offset new or increased discharges from a facility, both in waters that fully maintain standards as a way of preserving water quality, and in impaired waters for which a Total Maximum Daily Load limit has not yet been developed. EPA recommends that pre-TMDL trading to compensate for an increased discharge result in a *net reduction* of the pollutant traded, so that water quality improvements are made in advance of TMDL development. Trading can of course be used to implement a TMDL, and this is where most trading is likely to occur. The policy also would allow watershed-scale trading in impaired waters prior to TMDL development *if* trading is designed to meet an established cap and is supported by an analysis of watershed conditions that would inform environmentally protective trades.

An important and frequently asked question is which pollutants are best suited to control through trading. EPA offers varying degrees of support for trading of different types of pollutants. Trading to reduce nutrients (e.g., phosphorus, nitrogen) and sediment loadings is supported and encouraged. Trading of persistent, bioaccumulative toxic pollutants (PBTs) such as mercury is not supported by EPA at this time. EPA would

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support a few pilot projects under very limited circumstances to evaluate the use of trading to achieve mercury reductions and may revise its policy based on this experience. For those pollutants that are not nutrients or sediments and are not PBTs (one example would be selenium from agricultural and urban sources), EPA acknowledges that there may be potential for environmental benefit from these trades but recommends that they receive more oversight than nutrient or sediment trades.

Our quest for better water quality calls for holistic watershed approaches in addition to sustained controls at the end of the pipe. EPA's Water Quality Trading Policy reaffirms the agency's commitment to give this market-based innovation its due and to assist others in seeing its potential to improve water quality more efficiently. Administrator Christie Whitman has summed up the benefits of this proposal: "Our new Water Quality Trading Policy will result in cleaner water, at less cost, and in less time. It provides the flexibility needed to meet local challenges while demanding accountability to ensure that water quality does improve."

*Tracy Mehan is Assistant Administrator in the Office of Water at the U.S. Environmental Protection Agency.*

## Measurable, Enforceable, Logical

THOMAS M. MORRISSEY

**T**o trade or not to trade. Innovation versus tradition. Market-based incentives versus command-and-control.

As states and the federal governments grapple with a worsening budget crisis, pollution control managers will struggle to find new and innovative ways to accomplish their missions. In Connecticut, water pollution managers recently tackled the problem of implementing the Total Maximum Daily Load to control nitrogen, a pollutant impacting Long Island

Sound. After originally projecting a capital improvement program for Connecticut's 80 publicly owned treatment works, potentially costing as much as \$1 billion, the state collectively examined implementation techniques that are cost effective and easily understood, saving Connecticut taxpayers \$200 million along the way.

Given the enormous price tag, not all 80 POTWs could be upgraded at once. Connecticut's State Revolving Fund program would strain funding 80 capital improvement projects within a short time period. However, the application of a cap-and-trade program not only as a basis for expeditions TMDL implementation appeared to be the logical solution to funding woes as well.

Using the TMDL as the goal, the adoption of a statewide general permit regulating nitrogen from the 80 facilities provided the working framework for the nitrogen cap. Adjusted downward annually over a 15-year period, the general permit establishes an enforceable regulatory mechanism for reducing nitrogen discharged from Connecticut's POTWs. In establishing annual limits, the general permit also sets a trading threshold for each subject facility. If a facility can remove enough nitrogen throughout the year to beat its limit, that municipality generates credits and it will receive compensation from the state. If a permit limit is exceeded, that municipality must buy credits and pay into the nitrogen credit exchange for the credits needed to meet its nitrogen limit.

In using this simple, market-based strategy, all municipalities in Connecticut subject to the general permit have seized upon the opportunity to do everything feasible to reduce nitrogen. The Connecticut State Revolving Fund program has received many new applications for funding to construct or upgrade facilities for nitrogen removal. In 2002, the state has the enjoyable displeasure of buying \$1.4 million in excess nitrogen credits generated by enthusiastic municipalities.

Connecticut's general permit and nitrogen exchange program is projected to save over \$200 million of the projected \$1 billion needed to upgrade facilities to meet the TMDL in avoided capital construction costs. If the current trend holds, it will help shorten by perhaps five years the 15-year

TMDL implementation program. Municipalities in Connecticut support the program because it gives them an opportunity for choice, choice between the purchases of credits versus the cost of capital improvements. In many cases the cost of credit purchase saves the municipality money. Utilizing traditional approaches, Connecticut would have issued administrative orders to every municipality obligating them to upgrade their facilities. Each would require subsequent negotiation to settle upon enforceable schedules. The expense and time required to complete an implementation plan using traditional approaches would have been far greater than the more cost-effective approach taken.

And because trading is organized under the umbrella of a statewide, general permit, the individual POTW nitrogen limits and by extension the trading program are enforceable. Should the pace of new projects slow, stalling Connecticut's progress in reducing nitrogen, Connecticut's State Revolving Fund program can accelerate the project-funding rate. In essence trading is integrated with the capital project funding mechanism so the state can balance credits and debits of the nitrogen exchange and maintain steady progress in reducing nitrogen.

There are few other options EPA or the states can take to achieve meaningful progress in places like Long Island Sound, the Chesapeake Bay, or the Gulf of Mexico without trading programs. Trading can greatly accelerate pollutant reductions, putting management emphasis where it belongs, on the most cost-effective managed sewage treatment plants. It can be achieved in a manner that is measurable, enforceable, and sustained by trading participants.

Based on its success in Connecticut, pollutant trading is likely the next step in our journey to address water pollution throughout the nation.

*Thomas M. Morrissey is the Director of Planning and Standards in the Water Management Bureau of the Connecticut Department of Environmental Protection.*

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## Great Potential, But Huge Problems

RENA STEINZOR

**W**ater quality trading involves two great advantages and three significant problems. Which of these characteristics prevails depends on how such systems are ultimately designed.

The advantages of water quality trading are its potential to break political stalemate and its perceived capacity to lower compliance costs dramatically. The acid rain program established by the 1990 Clean Air Act Amendments broke a 13-year legislative stalemate regarding whether and how to control sulfur dioxide emissions from power plants. By making the fight about how to carve up the pie of total allowances, rather than whether to bake the pie in the first place, trading proved an extremely successful solution to what had become an intractable problem.

Of course, the primary reason why trading could play this transformative role is its second great advantage: industry perceived trading as lowering compliance costs to the point that they were affordable, especially in the Midwest, where the "big dirties" insisted they could not afford to comply with traditional pollution requirements. It is past time for everyone involved in the debate over environmental regulation to recognize the validity of industry preoccupation with costs, although it is also true that pre-implementation cost estimates are often exaggerated.

Two significant problems with water quality trading are its potential to cause unacceptable "hot spots" and its susceptibility to waste, fraud, and abuse. Trading causes hot spots when toxics or other chemicals are involved that cause problems for human health and aquatic life, and when there are no enforceable mechanisms in place to prevent localized concentrations of pollution. Since trading advocates often insist on dismantling the under-

lying regulatory structure, this danger is real and very troubling.

For example, EPA's guidance on water quality trading allows point sources to buy reduction credits as a method for meeting water quality standards, which are often set on a far more localized basis than the trading scheme itself. EPA discourages trading of persistent bioaccumulative toxics, but does not firmly close the door on such trades because it allows "pilot projects" to experiment with this dangerous approach. The result is the intolerable possibility that a company would trade credits with another company in a watershed, producing a fish kill or threat to human health downstream from its plant, where water quality standards are clearly breached.

This problem has already occurred in the context of air quality trading. In California, unrestricted trades of volatile organic compounds purchased by marine oil terminals from the owners of old and dirty cars resulted in spikes of these toxic pollutants in neighborhoods around the terminals far above the health-based standard. Not incidentally, the neighborhoods were 65 percent Hispanic.

Trading systems are also undermined by sham trading that impairs environmental quality and allows the unscrupulous to sell nothing for something. The acid rain program had comprehensive monitoring results available to set baseline allocations and determine compliance with the overall cap. Without reliable monitoring, a steadily declining cap on total emissions, and routine inspections to ensure that the system is operating properly, paper trades that do not translate into real-time reductions are inevitable. In California's air trading regime, for example, unscrupulous dealers pretended to take old cars off the road to generate credits, only to switch the polluting engines into different auto bodies in order to put them back on the road. Inspectors did not catch up with the problem until many trades had been made.

Last but not least, unlike the acid rain program, water quality trading programs operate in the absence of explicit statutory authority. Even those done in accordance with the new EPA guidance are not legal if they involve trades between point sources

to meet water quality standards. The Clean Water Act does not allow point source A to pay point source B to achieve compliance on A's behalf. Such trades expose both buyers and sellers to lawsuits. They also conflict with the act's anti-backsliding and anti-degradation provisions. Local environmentalists have filed suit against trading sources in California for relying on illegal transactions to meet their permit obligations.

Contrary to the perception of some excessively enthusiastic trading advocates, these observations about the strengths and weaknesses of trading do not amount to an outright rejection of water quality trading by environmentalists. Rather, they suggest that the best arena for such programs is trades among point and nonpoint sources with respect to nutrients (phosphorus and nitrogen), especially where there is a Total Maximum Daily Load requirement in place to function as both a declining cap and a method for allocating credits. Because trading would involve nonpoint sources that are unregulated, it would not violate the law.

Establishing such systems will not be cheap. We are just beginning to develop reliable methodologies for measuring reductions in discharges from nonpoint run-off on agricultural lands and in urban stormwater. Without accurate measurements, sham trading is unavoidable. But these challenges are worth tackling because trading has great potential to break the stalemate over whether and how to control nonpoint run-off, a problem at least as intractable as acid rain.

To achieve maximum results for the environment and for industry, trading systems should operate within a firm, steadily declining cap. They should incorporate monitoring or reliable modeling technologies to gauge both baseline allocations of credits and ongoing compliance with overall goals. To avoid hot spots, underlying water quality standards must not be exceeded. Government must continue to supervise trading to ensure that it is not manipulated by the unscrupulous.

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