5. prohibit cross-pollutant trading,
6. allow affected communities to review and comment on proposed trades,
7. ban intersource trading between mobile, stationary, and area sources, and
8. prohibit hot air credits that result from overallocating the baseline.[13]

Are there other recommendations that should be included? Has trading really improved the situation or simply obfuscated the problem by making a complex undertaking wrongly appear simple? The failure of RECLAIM to significantly reduce loadings is troubling. The likelihood that it has increased the level of hazard for identifiable groups of citizens is an indictment. In this regard, RECLAIM is not alone. Other trading programs have similar implementation stories that chronicle their adverse effects on discrete populations. See EPA Ignored Employees' Objections on Louisiana Program, Group Charges, 33 BNA Envtl. Rep. 2401 (Nov. 8, 2002), citing materials marshaled by Public Employees for Environmental Responsibility (PEER). Those materials are available at http://www.peer.org/press/287.html. See also EPA Office of the Inspector General, Open Market Trading Program for Air Emissions Need Strengthening, Report No. 2002-P-00019 (Sept. 30, 2002).

D. TRADING TO IMPROVE WATER QUALITY

U.S. Environmental Protection Agency, Water Quality Trading Policy: Issuance of Final Policy Text

68 Fed. Reg. 1608 (Jan. 13, 2003)

Background and Purpose of the Policy... The application of technology and water quality based requirements through the National Pollutant Discharge Elimination System (NPDES) permit program has achieved and remains critical to success in controlling point source pollution and restoring the nation's waters. Despite these accomplishments approximately 40% of the rivers, 45% of the streams and 50% of the lakes that have been assessed still do not support their designated uses.[14] Sources of pollution such as urban storm water, agricultural runoff and atmospheric deposition continue to threaten our nation's waters. Nutrient and sediment loading from agriculture and storm water are significant contributors to water quality problems such as hypoxia in the Gulf of Mexico and decreased fish populations in Chesapeake Bay. Population growth and development place increasing demands on the environment 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. Water quality trading is an approach that offers greater efficiency in achieving water quality goals on a watershed basis. It allows one source to meet its regulatory obligations by using pollutant reductions created by another source that has lower pollution control costs. Trading capitalizes on economies of scale and the control cost differentials among and between sources....

13. 9 Duke Envtl. L. & Pol'y F. at 283-286.

14. About 33% of the nation's water has been assessed by states and tribes pursuant to Section 305(b) of the Clean Water Act (National Water Quality Inventory: 2000 Report, EPA). The proportion of non-assessed waters that does not meet designated uses is likely lower since assessments tend to be focused in known problem areas. [Eds.]

Water Quality Trading Policy Statement: CWA Requirements. Water quality trading and other market-based programs must be consistent with the CWA.

Trading Areas. All water quality trading should occur within a watershed or a defined area for which a TMDL has been approved. Establishing defined trading areas that coincide with a watershed or TMDL boundary results in trades that affect the same water body or stream segment and helps ensure that water quality standards are maintained or achieved throughout the trading area and contiguous waters.

Pollutants and Parameters Traded. EPA supports trading that involves nutrients (e.g., total phosphorus and total nitrogen) or sediment loads. In addition, EPA recognizes that trading of pollutants other than nutrients and sediments has the potential to improve water quality and achieve ancillary environmental benefits if trades and trading programs are properly designed. EPA believes that such trades may pose a higher level of risk and should receive a higher level of scrutiny to ensure that they are consistent with water quality standards. EPA may support trades that involve pollutants other than nutrients and sediments on a case-by-case basis where prior approval is provided through an NPDES permit, a TMDL or in the context of a watershed plan or pilot trading project that is supported by a state, tribe or EPA. EPA also supports cross-pollutant trading for oxygen-related pollutants where adequate information exists to establish and correlate impacts on water quality. Reducing upstream nutrient levels to offset a downstream biochemical oxygen demand or to improve a depressed in-stream dissolved oxygen level are examples of cross-pollutant trading. EPA does not currently support trading of pollutants considered by EPA to be persistent bioaccumulative toxics (PBTs).... Where state or tribal water quality standards allow for mixing zones, EPA does not support any trading activity that would exceed an acute aquatic life criteria within a mixing zone or a chronic aquatic life or human health criteria at the edge of a mixing zone using design flows specified in the water quality standards.

Baselines for Water Quality Trading. As explained below, the baselines for generating pollution reduction credits should be derived from and consistent with water quality standards. The term pollution reduction credits ("credits"), as used in this policy, means pollutant reductions greater than those required by a regulatory requirement or established under a TMDL. For example, where a TMDL has been approved or established by EPA, the applicable point source waste load allocation or nonpoint source load allocation would establish the baselines for generating credits. For trades that occur where water quality fully supports designated uses, or in impaired waters prior to a TMDL being established, the baseline for point sources should be established by the applicable water quality based effluent limitation, a quantified performance requirement or a management practice derived from water quality standards. In these scenarios the baseline for nonpoint sources should be the level of pollutant load associated with existing land uses and management practices that comply with applicable state, local or tribal regulations....

COMMENTARY & QUESTIONS

1. **Trading as a supplement to regulation.** Note carefully that the Water Quality Trading Policy is treated as an implementation device for the already extant requirements of the CWA. Trading is an economic instrument in the service of independently set water quality goals. In general, industries will be required to meet technology control requirements under the current NPDES program. The major animating force

behind this proposal is the improvement of water quality that is being required by the WQBEL/TMDL/WLA[15] process that is being applied to waters that have not reached the quality required to sustain designated uses through the TBEL[16] process alone. See generally Chapter 12.

2. **Common elements of credible trading programs.** The EPA Water Quality Trading Policy lists and elaborates on the elements of a "credible" trading system. Based on the materials studied thus far, what items should appear in that list? The list is quite ordinary: (1) legal authority, (2) clearly defined units for trade, (3) specific duration of credits, (4) specific quantification of credit producing activity, (5) compliance and enforcement regimes, (6) public participation and information access, and (7) program evaluation. Is there anything unique to water discharge trading that was not an issue in air emissions trading? Consider here a typical river's hydrograph (measure of flow over time). Rivers, the typical receiving body, have marked seasonal variability in flow patterns. What are the implications of that for trading? One way in which the policy addresses this is by calling for tradeable credits to be "expressed in rates or mass per unit time as appropriate to be consistent with the time periods that are used to determine compliance with NPDES permit limitations or other regulatory requirements."

3. **Quantifying and trading nonpoint source loadings and reductions.** The policy calls for using "standardized protocols" in quantification of loads, load reductions, and credits and notes that "where trading involves nonpoint sources, states and tribes should adopt methods to account for the greater uncertainty in estimates of nonpoint source loads and reductions." What steps are available? EPA specifically endorsed several:

> EPA supports a number of approaches to compensate for nonpoint source uncertainty. These include monitoring to verify load reductions, the use of greater than 1:1 trading ratios between nonpoint and point sources, using demonstrated performance values or conservative assumptions in estimating the effectiveness of nonpoint source management practices, using site- or trade-specific discount factors, and retiring a percentage of nonpoint source reductions for each transaction or a predetermined number of credits. Where appropriate, states and tribes may elect to establish a reserve pool of credits that would be available to compensate for unanticipated shortfalls in the quantity of credits that are actually generated. 68 Fed. Reg. 1601, at 1612 (2003).

4. **Estimates of the comparative efficiency of trading.** Is trading likely to result in significant savings, more so than regulatory regimes that seek the same degree of water quality improvement? An EPA study stated:

> EPA estimates that in 1997 annual private point source control costs were about $14 billion and public point source costs were about $34 billion. The National Cost to Implement Total Maximum Daily Loads (TMDLs) Draft Report estimates that flexible approaches to improving water quality could save $900 million annually compared to the least flexible approach. (EPA, August 2001.) Nitrogen trading

15. Water Quality Based Effluent Limitation/Total Maximum Daily Load/Waste Load Allocation.
16. Technology-Based Effluent Limitation.

> among publicly owned treatment works in Connecticut that discharge into Long Island Sound is expected to achieve the required reductions under a TMDL while saving over $200 million in control costs.[17]

While $900 million per year is surely not chump change, it is less than 2% of the $48 billion the report calculated as being spent on water quality. That data suggest that trading is valuable and worthwhile, but it is not a panacea that vastly diminishes water pollution control costs.

5. **Trading in water effluents is different from trading in air emissions.** The two media exhibit distinctively different mixing qualities that affect trading. Water pollution problems tend to be more restricted geographically, and pollutants tend to disperse less rapidly in water than in air. What does that mean for trading in regard to such things as hot spots, geographic zones for trading, and the number of available participants in the market? Aquatic ecosystems have distinctive characteristics, such as being home to organisms that bioaccumulate many types of pollutants. Such toxic pollutants in this context are called "conservative pollutants." How should the presence of conservative pollutants be figured into setting trading limits? Trading is also proposed for nonconservative pollutants, such as biochemical oxygen demand (BOD). Variables such as water temperature and the presence of differing levels of other pollutants affect the assimilation rate for BOD in a water course. How should that complicating data be reflected in the design of a trading regime?

6. **Colorado's Lake Dillon trading program.** Lake Dillon is a prominent recreation area that also serves as a key staging reservoir in Denver's drinking water system. With several growing communities surrounding the lake, phosphorous pollution is a major concern. In 1984, as part of the first program in the nation of its kind, the Colorado State Water Quality Control Commission authorized pollution trading between point and nonpoint sources. The program was built on a total annual maximum phosphorus load of 4610 kg/yr and allowed point sources to obtain a credit for 1 kg of reduction for every 2 kg of certified reductions obtained from nonpoint sources. The trades were then recorded as part of the NPDES permit of the point source. Although relatively few trades were ever made, the program is considered an important reason for Lake Dillon's continued ability to meet water quality standards. See U.S. Environmental Protection Agency, Draft Trading Update — December 96 Lake Dillon, Colorado, available at http://www.epa.gov/OWOW/watershed/trading/lakedil.htm. Even more varied water effluent trading programs are underway in many parts of the nation. For example, in 2001, the Oregon legislature enacted H.B. 3956 creating an effluent trading program for the Willamette River. The pollutants targeted for trading include "(a) nitrogenous and phosphorous compounds commonly known as nutrients; (b) sediment; (c) temperature; (d) biological oxygen demand; and (e) chemical oxygen demand." §3(2). Implementation of this program, however, has lagged.

7. **Trading selenium in irrigation runoff.** Most nonpoint source trading programs are crafted to allow trading from nonpoint sources to point sources in water quality limited

17. EPA, A Retrospective Assessment of the Costs of the Clean Water Act: 1972-1997 (Oct. 2000), available online at http://www.epa.gov/waterscience/economics/costs.pdf.

areas. A pioneering nonpoint-to-nonpoint source trading program has been established that allows the trading of selenium drainage loading among farms in the 97,000 acre Grasslands Drainage Area of the San Joaquin Valley. That arid area relies on irrigation, but the soils are poorly drained and become easily waterlogged. Selenium, which is naturally present in the soils, dissolves in the irrigation water and drains with it, causing serious consequences to wildlife and health risks to humans. As a condition of improving drainage through use of the federally constructed San Luis Drain, Grasslands farmers had to agree to lower selenium levels in the irrigation tail water. A custom-designed trading program was created to assist the farmers in meeting the mandated quality levels. Trades could occur only among farmers; others, such as government agencies or environmental groups, were not allowed to purchase reduction credits. Retroactive trades were allowed to bring noncomplying dischargers into compliance by buying reductions after the fact to avoid the penalties. In part, this was done to offset the lack of contemporaneous knowledge of exactly how much selenium was being discharged. Trades were arranged through bilateral negotiation without aid of brokers or a clearinghouse. Prices were fixed by the parties to the trades, although the comprehensive study of the program compiled by its chief administrator reported that parties had great difficulty in knowing what to charge. The farmers obtained major improvements — a 40% decrease in tail water released and a 48% reduction in selenium loads over a four-year period that began in 1997. The trading program was helpful in achieving those results, although the volume of trades and the prices of them suggest it was not a major factor. In the first three years of operation, there had been 39 trades, involving 605 pounds of monthly selenium load and 128 pounds of annual selenium load, with a total of $14,320 changing hands. See Austin, Designing a Nonpoint Source Selenium Load Trading Program, 25 Harv. Envtl. L. Rev. 337 (2001).

8. **The TMDLs are coming.** Controlling a toxic pollutant such as selenium may, by itself, be sufficiently important to overcome the usual resistance to serious limitation of nonpoint source discharges. Not all other nonpoint source pollution, such as sedimentation and nutrient loading, command the same concern and ability to raise a call to action. For nonpoint source controls and trading to become widespread, some other stimulus may be necessary. In another segment of her article on selenium trading, Susan Austin describes what that might be:

> EPA interprets the TMDL provisions of the CWA to require load allocations for nonpoint sources. The California Farm Bureau and other agricultural and timber interests disagree. The California Farm Bureau argues that nonpoint source regulation should be left to states, while the agricultural and timber industries argue that TMDLs only apply to point sources. In Pronsolino v. Marcus, 91 F. Supp. 2d 1337, 1356 (N.D. Cal. 2000), commonly known as the Garcia River Case, the United States District Court for the Northern District of California considered this issue. The Court held that TMDLs are authorized "without regard to the sources of pollution" and that EPA may withhold grant money from states that refuse to implement TMDLs for nonpoint sources. In light of this ruling, load allocations for many nonpoint sources may become more common. If so, load trading could become an important tool for many nonpoint sources dealing with regulatory caps on a wide variety of discharges. Id. at 342.

9. **Individual take quotas (ITQs).** Trading may be used in many settings, one of the more controversial of which has been as a means of regulating overfishing of commercial fish stocks. In the United States, ITQs are recognized as a fisheries management tool by statute. 16 U.S.C. §1802(21) states as follows: "The term 'individual fishing quota' [IFQ] means a Federal permit under a limited access system to harvest a quantity of fish, expressed by a unit or units representing a percentage of the total allowable catch of a fishery that may be received or held for exclusive use by a person." IFQs can be traded, presumably allowing more efficient fishers to purchase IFQs from less efficient fishers and obtain the needed economies of scale to harvest the fish profitably. IFQs are, in essence a cap-and-trade program. The cap is selected with reference to achieving an environmental goal — in the case of IFQs, a sustainable fishery. Scientific studies are (or should be) relied on to set the cap or allowable harvest to attain the environmental goal. The IFQs represent a right to harvest from the commons; emissions allowances represent a right to dispose to the commons. With IFQs, who are the entities affected? What are the factors influencing the initial distribution of IFQs? What are the alternatives open to a party not having an adequately large IFQ or enough allowances? These last three elements help explain why IFQs are very controversial — they often sound a death knell for a way of life. If a fisher is allocated too small an IFQ, operating a boat becomes uneconomic. Typically, the small family fishers will be the ones forced to sell their IFQs and retire from the industry. Driving out long-time fishing families is a particularly poignant and politically sensitive cost of sustaining the fishery using IFQs.

10. **Trading goes international: Kyoto and more.** Implementing trading schemes on an international level to tackle global problems adds multiple layers of complexity to an already challenging task. International trading of emissions rights was written into the Kyoto Protocol, an international treaty designed to reduce warming of the earth's climate from the "greenhouse" effect discussed in Chapter 26. Implementing those directives proved to be an effort of Herculean proportions. There is no international legislature to establish binding rules, which must be adopted by "consensus" or unanimity among the parties to an international instrument such as the Kyoto Protocol. There is no international executive body to police reporting and compliance. Rather, the international system must rely on self-reporting by states, which have an inherent interest in shading the truth or may have limited technical capabilities. There is, moreover, no international court of general jurisdiction to oversee enforcement or adjudicate disputes. Instead, the parties to the Protocol had to establish their own compliance procedures. In the end, the rules implementing the trading scheme in the Kyoto Protocol — the Marrakesh Accords adopted in November 2001 — run to more than 200 pages of text, every word of it hammered out in a process of consensus formation amongst more than 180 states in 4 years of intense negotiations.[18]

11. **Is mercury a good candidate for either water or air trading?** Mercury is among the hazardous pollutants singled out for special treatment by Congress in the 1990 Amendments to the Clean Air Act. See 43 U.S.C. §§7412(b)(1) and (c)(6). The major sources of mercury in the aquatic environment are airborne deposition of mercury

18. See UN Doc. FCCC/CP/2001/13/Adds. 1–4 (2002), http://unfccc.int/cop7/documents/accords_draft.pdf.

released by coal combustion and waterborne discharges from POTWs. One of mercury's important human exposure pathways is through its bioaccumulation in fish consumed by humans. This aspect of mercury's "fate and transport" characteristics, standing alone, suggests that mercury trading has significant potential to create "hotspot" problems. The Bush II Administration nevertheless has proposed mercury trading for both air and water. In regard to water, despite the express language in the January 2003 policy stating that "EPA does not currently support trading of pollutants considered by EPA to be persistent bioaccumulative toxics (PBTs)," a later portion of the EPA policy suggests that "pilot projects may be appropriate where the predominant loads do not come from point sources, trading achieves a substantial reduction of the PBT traded and…trading does not cause an exceedance of an aquatic life or human health criterion." 68 Fed. Reg. at 1610. EPA has announced a pilot trading project along the Sacramento River to reduce mercury discharges to the watershed from unregulated or hard-to-regulate sources.

The proposal for mercury trading in air emissions is surprising because EPA's previous failure to require mercury emissions MACT controls under §7412(d)(2) had been found to violate the clear meaning of the CAA. See National Lime Ass'n v. EPA, 233 F.3d 625 (D.C. Cir. 2000).