ESTABLISHING MARKETS FOR ECOLOGICAL SERVICES: BEYOND WATER QUALITY TO A COMPLETE PORTFOLIO

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Peter Drucker, the godfather of modern management consulting, once said, "Whom the gods would destroy, they first give forty years of success."[1] Almost 36 years after the enactment of the nation's Clean Water Act (CWA), we are closing in on that 40-year mark. And the gods are not pleased.

There is a flattening out of the upward curve of progress towards better water quality in America. We confront seemingly intractable challenges, primarily stemming from our inability to grapple with diffuse, polluted runoff, so-called nonpoint source pollution, most of which, like row crop agriculture and the expansion of impervious surfaces in rapidly urbanizing communities, are largely beyond the regulatory reach of the CWA.

Nevertheless, there is a tremendous opportunity to create new markets and incentives for the provision of water quality benefits, credits if you will, and, ultimately, a wide array of ecological services which could be provided by those who traditionally made their living on the land including, but not limited to, agricultural producers. The path forward starts with our current predicament under the CWA, leads on to the concept of water quality trading, and then on to a broader vision of markets for the complete portfolio of ecological services such as habitat, wetlands mitigation banking, carbon sequestration, and the protection of endangered species.

To make this vision a reality will demand the creation of new institutions which can serve as aggregators, brokers, and bankers

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[1] RUSSELL LINCOLN ACKOFF & SHELDON ROVIN, REDESIGNING SOCIETY 165 (2003).

who can bring numerous seller and buyers together, reduce transaction costs, overcome the barriers of asymmetrical information in the market place, and navigate the shoals of the CWA's regulatory regime. While not absolutely necessary to the development of a market for ecological services, it is certain that any future cap-and-trade program for Greenhouse Gas (GHG) emissions would be a strong driver for such markets over time.

Gains in water quality over the past three decades are based primarily on the regulation of and financial support given to point sources, municipalities, and industries with the traditional large pipes discharging pollutants into the waters of the United States. The triumph over phosphorous pollution in the Great Lakes is the classic example of success predicated largely on the regulation of point source pollution, as is the present boom in recreational uses on the Potomac River in Washington to name just two examples.

In 2000, the U.S. Environmental Protection Agency (EPA) found that nearly 40 percent of assessed river and stream miles, 46 percent of assessed lake acres and more than 50 percent of assessed estuarine areas did not meet applicable water quality standards.[2] That is, they are not meeting water quality standards based on designated uses—fishing, swimming, drinking—and their supporting technical criteria.

The hypoxic or "dead" zone in the Gulf of Mexico, an area larger than New Jersey, is the result of nutrient over-enrichment from an area draining the Missouri, Mississippi, and Ohio River Basins, 90 percent of which is due to nonpoint source pollution, including approximately 58 percent from fertilizer and mineralized soil nitrogen.[3] The U.S. Geological Survey reported that agricultural nonpoint sources contribute more than 70 percent of the nitrogen and phosphorus delivered to the Gulf, versus 9 to 12 percent from urban sources.[4] Based on the report, 66 percent of

[2] *See* ROBERT V. PERCIVAL, CHRISTOPHER H. SCHROEDER, ALAN S. MILLER & JAMES P. LEAPE, ENVIRONMENTAL REGULATION: LAW, SCIENCE, AND POLICY 582 (5th ed. 2006) (citing EPA's 2000 National Water Quality Inventory).

[3] COMMITTEE ON THE MISSISSIPPI RIVER AND THE CLEAN WATER ACT, MISSISSIPPI RIVER WATER QUALITY AND THE CLEAN WATER ACT: PROGRESS, CHALLENGES, AND OPPORTUNITIES 40 (2008).

[4] Richard Alexander et al., *Differences in Phosphorus and Nitrogen Delivery to The Gulf of Mexico from the Mississippi River Basin*, 42 ENVTL. SCI. & TECH. 822 (2008), *available at* http://www.usgs.gov/newsroom/article.asp?ID=1861.

the nitrogen, the major culprit, originates from cultivated crops, unregulated sources under the CWA.[5]

It is a measure of the relative insignificance of traditional point sources' contribution to the problem that Chicago may be the single biggest point source discharger to the Gulf since the flow of the rivers draining into Lake Michigan were reversed over a hundred years ago!

For now, and for the foreseeable future, point-source dischargers will be the almost exclusive focus of regulatory action under the CWA because it was not designed or intended to control nonpoint sources in the first place.[6] They are the *only* category of dischargers subject to the strictures of this law.

Policy makers have attempted to reduce pollution from agricultural sources through subsidies under the Farm Bill and from recent, innovative efforts to encourage point-to-nonpoint source trading to achieve water quality objectives.

Over the past few years, EPA has moved, very gradually, toward encouraging water quality trading as a cost-effective means of compliance which, over time, could aid in the remediation of many environmental problems, or allow for the realization of multiple environmental benefits, over and above simple compliance with the CWA by regulated point sources.

This evolution culminated in the release of EPA's Water Quality Trading Policy in January of 2003.[7] Since then the agency has also published technical and policy guidance documents in support of this policy.

I. WATER QUALITY TRADING: A BRIEF EXPLANATION

Trading has successfully reduced air pollution while maintaining cost-effectiveness, as demonstrated by the Clean Air Act's acid rain trading program as well as the phase-out of lead in gasoline.[8] Trading capitalizes on the economies of scale and the

[5] *Id.* at 825.

[6] G. Tracy Mehan, III, *The Clean Water Act: An Effective Means To Achieve a Limited End*, WATER ENV'T & TECH., 33 (2007), *available at* http://www.wef.org/ScienceTechnologyResources/Publications/WET/07/07Oct/Oct07CWA35th.htm.

[7] U.S. ENVTL. PROT. AGENCY, WATER QUALITY TRADING, http://www.epa.gov/owow/watershed/trading.htm (last visited May 6, 2008).

[8] G. Tracy Mehan, III, *Water Quality Trading: A Guide For The Perplexed*,

control cost differentials among and between various sources of pollution.

By allowing one source to meet its regulatory obligations by using pollutant reductions created by another source, be it regulated or unregulated, that has lower pollution control costs, trading creates economic incentives to improve water quality. The standards remain the same, but efficiency is increased, costs decreased, and, as we shall see, benefits are multiplied.

In the realm of water quality, trading can take one of two basic forms: point-to-point source and point-to-nonpoint source trading. Theoretically, one could also imagine nonpoint-to-nonpoint source trading if ever a regulatory regime were imposed on this category of sources which, however, is not on the public agenda at this time at least with respect, say, to row-crop agriculture.

The motivation for trading between point sources is primarily cost reduction. For instance, the Connecticut Nitrogen Credit Exchange, on Long Island Sound, involving 79 publicly owned treatment works, has achieved more nitrogen reductions than expected while saving over $200 million dollars in anticipated costs. The state of Virginia just passed legislation for establishing a trading general permit, initially focused on point-to-point trading for nitrogen heading for Chesapeake Bay. This approach is expected to save money for the 125 significant dischargers to be covered by this umbrella-like permit.

However, point-to-nonpoint source trading offers great opportunities for both reducing control costs and generating multiple environmental or ecological benefits due to the possibility of encouraging a variety of watershed-, conservation-, and land-based management practices which, for convenience, I will call Best Management Practices (BMPs).

While compliance with the CWA is mandatory for any point source discharger, trading is an entirely *voluntary* enterprise whether it involves point sources exclusively or some combination

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THE ENVTL. FORUM, May/June 2006, at 4; *see also* G. Tracy Mehan, III, *Building on EPA's Water Quality Trading Policy: Sound Program Design and Implementation Will Fulfill Trading's Promise*, DAILY ENV'T REP. Dec. 29, 2003, at B1, *available at* http://pubs.bna.com/ip/BNA/DEN.NSF/85256354005beb048525611300214487/328b45ac98160a2185256e0600729584?OpenDocument.

of point and unregulated nonpoint sources. No entity has to enter into a trading arrangement. Such transactions are entirely optional.

Legal liability under CWA's National Pollutant Discharge Elimination System (NPDES) remains with the permit holder, i.e., the point source, even if it enters into a contractual relationship with an unregulated nonpoint source to obtain water quality credits through, for instance, the implementation of BMPs on the land such as the planting of buffer strips or trees, the fencing of cows out of streams, or the restoration of wetlands. Bargaining between a point and a nonpoint sources must discern the mutual benefit for both parties to the negotiations. No doubt, compliance and cost savings will be of paramount concern for the point sources. Profit or income will be the main driver for the nonpoint source.

In 2000, the World Resources Institute (WRI) conducted a study[9] of three watersheds in Minnesota, Michigan, and Wisconsin and the cost of controlling phosphorous. It found that the cost of reducing phosphorous from point sources was considerably higher than those based on trading between point and nonpoint sources. The estimates for point source controls ranged from $10.38 per pound in the Wisconsin watershed to $23.89 in the Michigan one.[10] Using trading between point and nonpoint sources, these costs could be lowered to $5.95 per pound in Wisconsin, a reduction of over 40 percent, and to $4.04 in Michigan,[11] a reduction of over 80 percent!

As the WRI study illustrates, the cost differentials between the two classes of sources are significant and offer real opportunities for point source cost savings and nonpoint source profits. There appears to be room for incentivizing agricultural producers to generate credits for sale to the regulated point sources above any baseline set by the regulatory agencies to meet a load allocation for such sources within a given trading area.

II. AGGREGATORS, BANKERS, BROKERS

Third parties, such as entrepreneurs, a conservation or

[9] PAUL FAETH, FERTILE GROUND: NUTRIENT TRADING'S POTENTIAL TO COST-EFFECTIVELY IMPROVE WATER QUALITY (2000), *available at* http://sustag.wri.org/fertileground-pub-2690.html.

[10] *Id.*

[11] *Id.*

agriculture commodity association, and land trusts, might want to participate or serve as a kind of aggregator, banker, or broker of credits generated by a large number of widely dispersed nonpoint sources who might require or seek technical advice and comfort with, or distance from, the regulatory process. Many nonpoint sources are relatively small enterprises, e.g., a dairy farm, which do not have parity with large, regulated point sources in any bargaining process, or an owner of a timber stand. Third-party aggregators-bankers-brokers would assist in bringing these smaller, numerous sources into the market.

Besides developing a knowledge base of expertise—legal and technical—these brokers could ensure legitimacy in terms of adequate certification, monitoring, and modeling with respect to the generation of water quality credits.

The development of such brokering institutions would also provide a means of dealing with the inevitable change or disappearance of BMPs over time in light of changing economic conditions or a landowner's individual circumstances (e.g., plowing under buffer strips or cutting trees or selling property). Again, aggregators/bankers/brokers could assist in maintaining a steady, consistent portfolio of BMPs to meet the point sources' credit requirements for a constant level of pollutant reductions throughout the five-year duration of an NPDES permit.

There is much speculation as to the possibility of developing new markets for ecological services and the "stacking" of such benefits based on the same set of BMPs. Implementing BMPs for water quality credits would also generate benefits in terms of wildlife habitat, carbon or GHG sequestration or reduction, as well as wetlands mitigation under the CWA's Section 404 program.

A glimpse of these potential markets may be found at Ecosystem Marketplace,[12] the first global clearinghouse for information on emerging trade in the basic work of healthy forests, including water filtration, soil quality maintenance, habitat, and climate stability through carbon dioxide sequestration. This website tracks more than a dozen market-like mechanisms and payment arrangements for preserved biodiversity or ecosystem assets.

[12] THE KATOOMBA GROUP'S, ECOSYSTEM MARKETPLACE, http://www.EcosystemMarketplace.com (last visited May 6, 2008).

III. MULTIPLE BENEFITS, MULTIPLE MARKETS ILLUSTRATED

Again, WRI have suggested a provocative trading approach which links nitrogen reduction for the Gulf of Mexico with nitrous oxide, a potent GHG.[13]

One ton of nitrous oxide emissions has the same warming impact of 310 tons of carbon dioxide. "Approximately 74 percent of all U.S. nitrous oxide emissions come from agriculture, primarily from agricultural soil management activities such as commercial fertilizer application and other cropping factors."[14]

Lower nitrogen fertilizer use reduces both the nitrogen that leaches into waterways and the amount that is volatilized as GHGs. WRI also points out that the agricultural policies and decisions which slow the rate of nutrient losses into waterways frequently improve carbon sequestration and storage in soil.[15]

Imagine a scenario, admittedly way over the horizon, where the Chicago Climate Exchange[16] and EPA establish a market for nitrous oxide. Agricultural producers would make money on both the water side and the climate side of the ledger. They could sell water credits to Chicago's wastewater system and climate credits, presumably, to fossil fuel sellers, to take just one example. Power companies are paying a lot of money to plant trees, say, in the Mississippi Delta, to sequester carbon. Maybe the money would be better spent on nitrous oxide reductions or on both sets of BMPs.

The goal of "stacking" multiple environmental benefits for the benefit of the environment, the regulated entity and the unregulated provider of such services is partially demonstrated in Section 404 wetlands and stream mitigation banking[17]and Habitat Conservation Plans under the Endangered Species Act.[18] The

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[13] SUZIE GREENHALGH & AMANDA SAUER, AWAKENING THE "DEAD ZONE": AN INVESTMENT FOR AGRICULTURE, WATER QUALITY, AND CLIMATE CHANGE (2003), *available at* http://sustag.wri.org/deadzonehypoxia-pub-3803.html.

[14] *Id.* at 6.

[15] *See* FAETH, *supra* note 9.

[16] CHICAGO CLIMATE EXCHANGE, EXCHANGE OVERVIEW, www.chicagoclimatex.com (last visited May 6, 2008).

[17] ENVTL. LAW INST., NATIONAL FORUM ON SYNERGIES BETWEEN WATER QUALITY TRADING AND WETLAND MITIGATION BANKING: FORUM REPORT (2005), *available at* http://www.elistore.org/reports_detail.asp?ID=11125.

[18] U.S. FISH & WILDLIFE SERVICE, HABITAT CONSERVATION PLANS: SECTION

same is true for carbon offsets and the Clean Development Mechanism under the Kyoto Protocol.[19]

There are many issues involved in the mechanics of trading, be it for water quality or for the entire suite of ecological benefits. They merit a great deal of attention in terms of their technical and legal implications. That said, agricultural producers in particular and land owners generally possess great economic potential as sellers or providers of ecological services and multiple environmental benefits of which water quality is just one.

10 OF THE ENDANGERED SPECIES ACT, *available at* http://www.fws.gov/Endangered/pdfs/HCP/HCP_Incidental_Take.pdf.

[19] *See* KYLE W. DANISH, *The International Regime*, *in* GLOBAL CLIMATE CHANGE AND U.S. LAW 31, 46 (Michael B. Gerrard ed., 2008).