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FIFTH GODDARD FORUM

Putting the Market to Work for Conservation: An In-depth Examination of Traditional and Nontraditional Market-Based Mechanisms for Achieving Environmental Improvement

Pennsylvania State University

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CONNECTICUT NITROGEN CREDIT EXCHANGE PROGRAM

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INTRODUCTION

Long Island Sound is a cherished national natural resource, surrounded by some of the most densely populated land in the country. It has long provided sustenance, economic opportunities and comfort to the spirit for those who inhabit or visit its shores and waters. Like many of our Nation's water bodies, it drains a substantial and diverse watershed, and suffers a broad range of environmental insults. The problem of most concern is the severe shortage of oxygen in the deep waters of the western part of the Sound during summer months. This hypoxia is attributable to excess nitrogen which fuels the growth of algae that in decomposing draw oxygen from the water, denying it to other aquatic life. While a considerable amount of nitrogen derives from surface runoff and atmospheric deposition, the main contributors are the many sewage treatment plants that pour thousands of pounds of nitrogen into the Sound and its tributaries each day.

To address this problem, the two states primarily encompassing the Sound, New York and Connecticut, have taken measures to upgrade their sewage plants with nitrogen removal technologies. Connecticut has gone further, devising a program under which sewage plants may create, sell and purchase credits in order to meet their nitrogen effluent limitations. The program is briefly described below, but more detail can be found in the attached article, Ann Powers, *The Current Controversy Regarding TMDLs: Contemporary Perspectives "TMDLs And Pollutant Trading,"* 4 VT. J. ENVTL. LAW 1 (2003), at http://www.vje.org/articles/Powers.html. Further background on the Connecticut program, Long Island Sound, and water pollutant trading in general can be found in Ann Powers, *Reducing Nitrogen Pollution on Long Island Sound: Is There a Place for Pollutant Trading?*, 23 COLUM. J. ENVTL. L. 137 (1998), available at http://www.law.pace.edu/environment/env-publications.html.

THE CONNECTICUT NITROGEN CREDIT EXCHANGE PROGRAM

The Connecticut Nitrogen Credit Exchange Program is a pollutant trading program based on the State's wastewater regulatory program. The pollutant to be traded is, of course, nitrogen, and the participants are 79 Connecticut sewage treatment plants, although in the future other point sources and perhaps even nonpoint sources could potentially be included. The State establishes the market and the economic driver is a cap on the total nitrogen that may be discharged each year by the sewage plants. That cap declines each year until it is to reach in 2014 a level that will achieve, in conjunction with other source reductions, the Total Maximum Daily Load (TMDL) established for nitrogen in the Sound.

Each plant is subject to an individual discharge permit, but in the past few permits have included limitations on nitrogen discharges. In order to meet the mandate of

the Clean Water Act, and to establish the cap for trading, the Connecticut Department of Environmental Protection promulgated a State Nitrogen General Permit covering the 79 plants. So long as their combined discharges are within the overall limit of the permit the Clean Water Act is deemed satisfied. The State set limits for each plant on the pounds of nitrogen it may discharge; the plant may meet its individual limit either by controlling its discharge, or if that is insufficient, by purchasing credits created by plants that achieve stricter controls than mandated. A plant will not be allowed to trade if it would cause local water quality problems. The program is directed by the state Department of Environmental Protection, with the input of a legislatively established Nitrogen Credit Advisory Board. The Board is comprised primarily of state and municipal officials, and is to assist and advise the Department in carrying out its functions.[1]

Because the impact of a plant's nitrogen discharge on the most hypoxic areas of the western Sound generally becomes increasingly attenuated the further the plant is from those areas, trading ratios or "equivalency factors" were established to reflect actual impact.

The market for the credits is created by the State, which serves as a clearinghouse for purchases and sales. It also sets the price of credits, based on the cost of nitrogen upgrades funded by the State, and of operation and maintenance (O&M) of nitrogen removal controls during the year in question. At the close of the year the Department of Environmental Protection calculates the amount of nitrogen discharged by each plant and whether the plant will be paid for excess credits, or must purchase them from the State. (A typical notice to a municipality is attached). If there are more credits created than purchasers need, the State must buy them. Credits do not carry over from year to year.

TRADING UNDER THE PROGRAM

In 2002, the first full year of operation, the price was established at $1.65, and because more credits were created than needed, the State absorbed the cost of the rest, at $1.4 million.[2] In December 2004 the Nitrogen Credit Advisory Board submitted to the Connecticut General Assembly its report on the program for the calendar year 2003, its second year of trading.[3] On the recommendation of the

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[1] Conn. Nitrogen Reduction Act § 1(2) (2001).

[2] Information regarding the 2002 program may be found in CONN. DEPT. OF ENVTL. PROT., REPORT OF THE NITROGEN CREDIT ADVISORY BOARD TO THE JOINT STANDING ENVIRONMENTAL COMMITTEE OF THE GENERAL ASSEMBLY CONCERNING THE NITROGEN CREDIT EXCHANGE PROGRAM (2003), *available at* http://www.dep.state.ct.us/wtr/lis/nitrocntr/annrpt.pdf.

[3] CONN. DEPT. OF ENVTL. PROT., REPORT OF THE NITROGEN CREDIT ADVISORY BOARD FOR THE CALENDAR YEAR 2003 TO THE JOINT STANDING ENVIRONMENTAL COMMITTEE OF THE GENERAL ASSEMBLY CONCERNING THE NITROGEN CREDIT EXCHANGE PROGRAM (2004) [hereinafter YEAR 2003 REPORT], *available at* http://www.dep.State.ct.us/wtr/lis/nitrocntr/2004annrpt.pdf.

Advisory Board the Department of Environmental Protection had established a price per pound of $2.14 for 2003. At the conclusion of 2003 year, 37 facilities had created roughly $2.43 million in credits. Forty facilities were required to purchase credits in order to comply with the Nitrogen General Permit, but only $2.12 million worth. Accordingly, the State spent approximately $312,000 to purchase excess credits, substantially less than the $1.4 million that it expended in 2002.

There is not yet a formal report for 2004, since the credit value for 2004 is only now being set and final accounts will not be settled until July. However, unless challenged by participants, an event that has never so far occurred, the 2004 credit value will be $1.90. For 2004, 35 plants will sell $2.66 million in credits to the State, two fewer plants than the previous year. There will be 44 buyers, but their purchases total only $1.79 million, so the State will expend roughly $872,000 to buy the remaining credits.[4]

At this time the plants' combined discharges are in compliance with the Nitrogen General Permit, and meeting the interim TMDL, although in 2004 they were close to the limit and there are concerns about 2005 and 2006.[5] However, compliance with the TMDL by 2014 requires continued reductions in nitrogen loadings, which can only be achieved by further plant upgrades. To the extent that credits remain cheap, the incentive to upgrade is reduced

The price of credits has remained at a modest level because to date the cost of upgrades and O&M for nitrogen has been relatively low. Although some large projects are underway, or nearing completion, the full costs associated with the upgrades have not yet accrued and been factored into setting credit prices. Moreover, some plant operators were able to achieve efficiencies in operating and maintenance. That both reduced the costs factored into setting the credit price and gave individual plants with reduced O&M costs less reason to trade. As a consequence of the cheap credits plants have had less incentive to invest in costly upgrades. However, in the next several years the price of credits should increase to a more realistic level as the costs of various major upgrades become part of the equation.

OBSERVATIONS ABOUT THE PROGRAM

The Connecticut Nitrogen Trading Program is essentially a bubble nitrogen permit for the Connecticut sewage treatment plants, with the flexibility for individual plants to meet their discharge limits either by reducing discharges or

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[4] Personal communication with Lee Dunbar, Conn. Dept. of Envtl. Prot. (March 24, 2005).

[5] There is some leeway built into the program since the permit and the waste load allocations to the plants are slightly stricter than required by the TMDL, allowing some leeway.

paying, indirectly, another plant to do so. The State sets each plant's discharge limit, administers the credit exchange, buys excess credits and determines which plants qualify for loans and grants. It is a complex program, with trading ratios, complicated cost calculations, and numerous factors that may potentially affect it. In that regard it is very far from the classic market model. Nonetheless, it is considered by most of those involved with the program to be a successful and useful undertaking, which is helping to achieve water quality improvements in Long Island Sound.

The Connecticut Department of the Environment is pleased with the program since it has focused the attention of plant operators and municipal authorities on the nitrogen problem, and encouraged efforts to reduce discharges in order to avoid having to purchase credits or undertake upgrades. Some plants have upgraded even when they might have met their discharge obligations by purchasing credits. This might be attributable to a sense that purchasing credits would in some fashion "stigmatize" the community as unable to meet its wastewater obligations, but is more likely the result of a desire to benefit from generous grants and priority funding available for nitrogen upgrades. The plant operators and municipal officials appreciate the flexibility the program affords in meeting discharge limits, and the opportunity to gain additional revenue if their controls exceed required levels.

State officials also note that they have avoided having to include nitrogen limits in 79 separate facility permits, a process which would no doubt have engendered substantial administrative expense, resistance and appeals. Additionally, the clearinghouse role played by the State has avoided public perception problems that might have arisen if poorer communities were to buy credits directly from wealthier ones.

Lastly, the program is popular with state legislators, who have been supportive. It assists localities to upgrade their wastewater facilities, providing environmental benefits to local areas as well as restoring Long Island Sound. And the construction projects bring jobs to the community.

In spite of the complexity of the program, over the three years of its operation the administrative costs have been reasonable, involving primarily staff time and other resources involved in managing the credit exchange. It should be noted, however, that each year the State has been required to make substantial outlays to purchase unsold credits.

Notwithstanding its initial success, there are concerns about the future of the program since physical factors, such as weather conditions, and economic factors, such as the availability of grant and loan funds from the State, may affect it. Weather can have a substantial impact on vulnerable nitrogen reduction processes

and thus the ability of plants to achieve the nitrogen reductions required under the program. As the Nitrogen Credit Advisory Board pointed out in its 2003 report,[6] higher than usual rainfall and a colder winter and spring led to higher nitrogen discharges than in the same period in 2002. In the future unfavorable weather conditions could decrease the efficiency of plants, making fewer credits available, and potentially causing the plants as a whole to exceed the general permit limit, a situation which would leave the State subject to Clean Water Act sanctions. This is an especially critical point. As the TMDL interim limits become more stringent and the plants approach the limits of technology, weather will have an increasingly adverse effect each succeeding year.

Finally, the success of the program has to be judged by whether it improves water quality in the Sound, and that means additional plant upgrades. But the funds for these upgrades must be authorized from the State's Clean Water Fund, which has competing demands and which must obtain additional funding from the legislature over time. Because upgrades have not been completed at the rate originally contemplated, due in part to limited funding, the Advisory Board projects that nitrogen loadings in 2005 and 2006 will exceed the limit established in the Nitrogen General Permit.[7] The Board noted pointedly that "[t]he single most critical factor relative to the continued success of the program is the availability of Clean Water Fund financing to support nitrogen removal projects."[8]

THE CONNECTICUT NITROGEN TRADING PROGRAM AS A MODEL

The perceived success of the Connecticut program has led water quality officials from other areas to look to it as a potential model. In this context several points should be kept in mind. The Connecticut program is part of a long-term effort to restore Long Island Sound. To support this effort extensive monitoring, modeling and information gathering has taken place. The Connecticut program involves a single pollutant, for which a TMDL has been established, and while individual plants may have dissimilar impacts on the areas of hypoxia, the level of impact of each plant is reasonably certain. Thus trading ratios or equivalency factors can be reliably established.

Further, Connecticut is a relatively small state, and the Sound is very important for its economy. Essentially all of the state drains to the Sound, providing a focus and unity of interest to the municipal officials, plant operators and others concerned with water quality. The state has a well-developed regulatory water quality program, which includes plans to provide funds over time for facility

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[6] YEAR 2003 REPORT, *supra*, at 4.
[7] *Id.* at 5.
[8] *Id.* at 1.

improvements. Finally, it has the financial resources to absorb substantial expenses so far entailed with unsold credits. Even with these positive factors, the state must grapple with the need for increased funding for nitrogen upgrades.

In conclusion, the Connecticut Nitrogen Trading Program, while far from a classic market program, is an interesting collaborative effort on the part of state and local officials that shows promise for accomplishing reductions in nitrogen loadings to Long Island Sound in an organized manner. And it may well do so more quickly than the regulatory program alone. But its future success is closely tied to the availability of funds for wastewater facility construction and upgrades.[9]

[9] For a thorough explication of the factors to be considered in establishing a water pollutant trading program see OFFICE OF WATER, U.S. EPA, PUB. NO. 841-B-04-001, WATER QUALITY TRADING ASSESSMENT HANDBOOK 69-71, 80-81 (2004), *available at* http://www.epa.gov/owow/watershed/trading/handbook/. It also includes a concise description of the Connecticut nitrogen trading program.