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An Agricultural Law Research Publication

Water Quality Credit Trading: A Primer of Background Material

by

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Introduction

Over the past ten to twenty years, an increased interest in water quality trading has emerged as a way to address water pollution in key U.S. watersheds, like the Chesapeake Bay.[1] Water quality credit trading establishes a market for pollution reduction efforts, and assigns a dollar value for each effort.[2] The polluters can trade pollution reduction as a commodity within the market to lower the overall amount of pollution discharged into a body of water.[3] Polluters with a lower cost of pollution reduction may choose to sell reduction credits to polluters with high costs of pollution reduction.[4] However, the specifics of what type of pollutant will be reduced to improve water quality, which polluters will be permitted to trade what pollution reduction strategies, how the pollution reduction method is valued (dollar per quantity), and what lower amount of discharge is acceptable for a body of water is specified only by the individual trading project.[5]

In order to explore the viability of setting up such a trading market, the Environmental Protection Agency has been funding and tracking pilot projects. Currently there are 37 such projects in 22 states trading pollutants such as nutrients (nitrogen and phosphorus), sediment, metals (such as copper and selenium), and even temperature.[6] Water quality trading markets are encouraging agricultural

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[1] *See Final Water Quality Trading Policy*, Environmental Protection Agency, Office of Water (Jan. 13, 2003) (noting that the Chesapeake Bay and the Gulf of Mexico have been particularly affected by nutrient and sediment deposits from agricultural sources).
[2] *See* *A Primer on Water Quality Credit Trading in the Mid-Atlantic Region*, Mid-Atlantic Regional Water Quality Program, Pennsylvania State University, College of Agricultural Sciences, Agricultural Research and Cooperative Extension at 2 (2006); see also John Leatherman, Craig Smith, Jeffrey Peterson, *An Introduction to Water Quality Trading*, Department of Agricultural Economics, Kansas State University at 2 (prepared for Risk and Profit Conference, Aug. 19-20, 2004)(providing a basic example of water quality trading).
[3] Id.
[4] Id.
[5] *See* Id. at 3, 4 (2006) (discussing elements of a successful water quality trading program on page 3 and challenges on page 4).
[6] *State and Individual Trading Programs*, Environmental Protection Agency, Water Quality Trading website (hosting not only a dynamic map of trading programs nationwide but also a spreadsheet of all trading programs tracked regardless of EPA funding that also includes contact information for the state level coordinators).

producers to participate in water quality credit trading efforts.[7]

This brief article is a reference resource designed to provide a basic background on water quality trading and is not an exhaustive treatment of the subject. The article provides historical background, basic information about water trading components, and links to key water quality credit trading websites for further information. People interested in more information regarding water quality trading are advised to consult the local agencies governing water quality in their state or area.[8]

Historical Background

On January 13, 2003, the U.S. Environmental Protection Agency (EPA) Office of Water published its Water Quality Trading Policy, which updated two 1996 prototype documents regarding watershed effluent trading.[9] This comprehensive policy outlines the parameters of water quality trading to be considered including: legal authority and mechanisms, units of trade, creation and duration of the credits, quantifying credits and addressing uncertainty.[10] Noteworthy in the document was the declared failure of the Clean Water Act (33 U.S.C. §§ 1251 et. seq.) to clean up rivers (40% still unusable), streams (45% still unusable) and lakes (50% still unusable).[11]

On October 13, 2006, the EPA and United States Department of Agriculture (USDA) jointly agreed in a Memorandum of Understanding to partner in the establishment of "viable water quality credit trading markets."[12] While this document establishes clear terms of engagement, recognition of the two agencies roles, and a commitment to explore solutions in the spirit of teamwork, the agreement does not commit either agency to fund particular initiatives.[13]

The 2008 Farm Bill (Food, Energy, and Conservation Act) provided further encouragement to agriculture and forestry interests by requiring the USDA to establish technical, science-based guidelines to permit greater participation in Environmental Services Markets for farmers, ranchers, and forest landowners.[14] While the Environmental Services Markets provision in the law specifically calls out carbon trading, the Senate Conference Report elaborated on the Environmental Services Market provision, stating that both water quality trading and carbon markets were contemplated by this provision.[15] In the Congressional Research Service analysis of U.S. Agricultural Conservation

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[7] *See* *Partnership Agreement Between The United States Department of Agriculture Natural Resources Conservation Service and the United States Environmental Protection Agency Office of Water*, USDA and EPA (Oct. 13, 2006) (memorandum of understanding between the two agencies to craft a framework of shared coordination of programs to encourage agricultural participation in water trading programs).
[8] *A Primer on Water Quality Credit Trading in the Mid-Atlantic Region*, Mid-Atlantic Regional Water Quality Program, Pennsylvania State University, College of Agricultural Sciences, Agricultural Research and Cooperative Extension at 1 (2006) (identifying key constituents of the water quality trading program).
[9] *Final Water Quality Trading Policy*, Environmental Protection Agency, Office of Water (Jan. 13, 2003).
[10] Id.
[11] Id.
[12] *Partnership Agreement Between The United States Department of Agriculture Natural Resources Conservation Service and the United States Environmental Protection Agency Office of Water*, , USDA and EPA (Oct. 13, 2006)
[13] Id.
[14] 16 U.S.C. § 3845 (codified from Title II, § 2709 of Pub. L. 110-246, 122 Stat. 1664, 1809 (June 18, 2008)).
[15] Senate Report 110-220, S. 2302 Food and Energy Security Act, at 29 (Nov. 2, 2007) (directing the USDA to use a “collaborative” approach to establishing a framework for greater participation in Environmental Services Markets and specifically noting water quality trading and carbon markets).

measures, Environmental Services Markets are identified as part of the battery of conservation tools available to the USDA, so the initial conservation pilot programs are being incorporated as a part of the U.S. government's environmental preservation efforts.[16]

Overview of Water Quality Trading Markets

The academic view of water quality trading markets considers multiple factors involved in establishing such markets, such as program goals, rules, trading ratios, economic drivers, watershed characteristics and modeling, trading participants, pollutant characteristics and identification, and mechanics of trades within the market.[17] The overall goal is to reduce the amount of pollution discharged into bodies of water by using a market based system to identify and maximize the most cost-effective pollution controls and save the most money.[18] For purposes of this introductory article, three key factors are highlighted to illustrate the operation of the markets: watersheds, pollutants, and polluters.

Watersheds

Obviously, the most important variable in the market is the watershed in which the amount of emitted pollution is to be reduced. The key elements of the watershed is to determine the water quality measure of the current watershed and determine the goal of the water quality in a traded environment where the pollution levels are capped at a lower level.[19] The identification of the most fragile watersheds across the United States should also be considered in prioritizing the location of trading markets.[20]

Pollutants

The reduction in pollutants has to be measurable over time in order to be a marker of a trading market's success.[21] Further, in order for the pollution reduction effort to be tradable, a common volume of the pollutant has to be established (and potentially as a concentration within a unit of water) to determine what a single "credit" of water quality- pollution reduction by a certain amount- might be.[22] Finally, the pollutant must be somewhat evenly disbursed so that a sample measure reflects an accurate estimation of the level of pollutants in the watershed as a whole.[23]

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[16] Megan Stubbs, *Agricultural Conservation Issues in the 111th Congress*, (CRS Report for Congress Code R40692, July 7, 2009) .
[17] John Leatherman, Craig Smith, Jeffrey Peterson, *An Introduction to Water Quality Trading*,Department of Agricultural Economics, Kansas State University at 5-7 (prepared for Risk and Profit Conference, Aug. 19-20, 2004).
[18] *Final Water Quality Trading Policy*, Environmental Protection Agency, Office of Water (Jan. 13, 2003).
[19] *A Primer on Water Quality Credit Trading in the Mid-Atlantic Region*, Mid-Atlantic Regional Water Quality Program, Pennsylvania State University, College of Agricultural Sciences, Agricultural Research and Cooperative Extension at 3 (2006) (identifying key components of the water quality trading program).
[20] Id. (noting that the CWA provides structures for public determination of "fishable and swimmable waters").
[21] *See* *Final Water Quality Trading Policy*, Environmental Protection Agency, Office of Water (Jan. 13, 2003) (identifying the need to define pollutant load and measure a total amount of pollutant).
[22] *See* Id.
[23] *Leatherman* at 6.

Polluters

There seems to be a basic dichotomy that is established in the examples for water quality trading between the industrial and agricultural polluters.[24] The industrial polluter is often characterized as a wastewater treatment plant and the agricultural polluter is often the farmer who sprays fertilizer, pesticide, and through general farming practices is losing soil to the watershed creating sediment pollution.[25] The implication through the trading examples is that farmers (in general) will incur a lower cost of reducing the pollution emitted than the industrial polluter will, so that the farmer can sell a credit of pollution reduction to the industrial emitter.[26] The farmer pockets the money for its efforts to reduce emissions, the industrial emitter pays (at a lower rate) for the pollution reduction effort, and the total volume of pollution in the watershed is decreased. For specific trading projects, the farmer is expected to determine the method of reduction,[27] such as practicing conservation tillage or growing cover crops.[28]

The cost burden to reduce the emissions of a pollutant has to be different between polluters in order for the market to work. This cost difference to reduce emissions creates an incentive for traders to trade. By realizing cost savings among the polluters, markets by using market forces prioritize and incentivize the lowest cost reduction of emissions among market participants.[29]

Suggested references

A selected list of references is provided below to direct readers to more water quality trading resources. Some of these sources are previously cited, but internet links are also provided for ease of retrieval. The references are segmented into three categories: basic overview materials, water quality assessment documents, and key websites for authoritative information.

Basic Information

> *A Primer on Water Quality Credit Trading in the Mid-Atlantic Region*, Mid-Atlantic Regional Water Quality Program, Pennsylvania State University, College of Agricultural Sciences, Agricultural Research and Cooperative Extension (2006) (good basic overview of water quality credit trading focused on the components, operations, and challenges, and provides additional resources).
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> Tatiana Borisova and Fritz Roka, *Water Quality Credit Trading: General Principles*, Food and Resource Economics Department, Florida Cooperative Extension Service, Institute of Food and

[24] *A Primer on Water Quality Credit Trading in the Mid-Atlantic Region*, Mid-Atlantic Regional Water Quality Program, Pennsylvania State University, College of Agricultural Sciences, Agricultural Research and Cooperative Extension at 3 (2006).
[25] Id. (discussing buyers and sellers of credits).
[26] Id. at 2-3.
[27] *Greater Miami River Watershed Water Quality Credit Trading Program Operations Manual*, Water Conservation District of the Miami Conservancy District at 9 (Feb. 8, 2005).
[28] *EPA Water Quality Trading Evaluation Final Report*, Environmental Protection Agency at 2-8, 2-9(Industrial Economics Inc., Oct. 2008).
[29] *See Final Water Quality Trading Policy*, Environmental Protection Agency, Office of Water (Jan. 13, 2003) (highlighting the cost savings elements to credit trading as an overall societal benefit).

Agricultural Sciences, University of Florida (2009), (providing a good basic overview of WQCT with a Florida orientation).

John Leatherman, Craig Smith, Jeffrey Peterson, *An Introduction to Water Quality Trading*, Department of Agricultural Economics, Kansas State Extension (2004), (overview with basic discussion of economics of trading).

CY JONES, LISA BACON, MARK KIESER, DAVID SHERIDAN, WATER-QUALITY TRADING: A GUIDE FOR THE WASTEWATER COMMUNITY, (Water Environment Federation Press, 2005) (organization self-published text about creating a market-based water quality credit trading system focused on water treatment facilities; additional information about the text is available from the organization's website.

Megan Stubbs, *Agricultural Conservation Issues in the 111th Congress*, (CRS Report for Congress Code R40692, July 7, 2009) (provides background of current agricultural tools available to the federal government to promote broader environmental compliance and reduce efforts of agriculture on the environment).

Getting Paid for Stewardship: An Agricultural Community Water Quality Trading Guide, Conservation Technology Information Center (July 2006).

The following websites each provide a collection of links to other publications for further information about Water Quality Credit Trading.

Nutrient and Water Policy Update, *Publications*, Pennsylvania State University (providing materials covering a range of water issues including water quality trading).

Richard Woodward, *Water Quality Trading Links*, Texas A&M University (Professor Richard Woodward's own website with self collected resources).

Environmental Trading Network, *State Programs and Rules*, (a comprehensive list of State programs and includes information about foreign trading programs).

Assessments of Water Quality Trading Programs

While much of the writing about program assessments address specific watershed projects, the following resources provide more global overview of existing projects without too much technical information.

Hanna L. Breetz, Karen Fisher-Vanden, Laura Garzon, Hannah Jacobs, Kailin Kroetz, Rebecca Terry, *Water Quality Trading and Offset Initiatives in the U.S.: A Comprehensive Survey*, (Dartmouth College, 2004) (an encyclopedic reference of U.S. water trading programs albeit a bit dated).

Mindy Selman, Evan Branosky, Cy Jones, *Water Quality Trading Programs: An International Overview*, World Resources Institute (Mar. 2009).

EPA Water Quality Trading Evaluation Final Report, Environmental Protection Agency (Industrial Economics Inc., Oct. 2008) (a good thorough review of the status and challenges of the water quality trading program evaluated through the participants viewpoint with feedback and recommendations to the EPA).

General Information Websites for Water Quality Credit Trading

Much of the information located above is actually sourced from the organization's website. The list below identifies the Water Quality Credit Trading websites for selected federal and state government agencies.

Federal Government

U.S. Environmental Protection Agency

EPA Training For Water Quality (in online module format available through the "Watershed Academy")

Region 10 – Environmental Protection Agency

U.S.D.A. Office of Environmental Markets

U.S.D.A. National Agricultural Library

State Government

State of Ohio – Environmental Protection Agency

State of Michigan Department of Natural Resources and Environment- Water Quality Administrative Rules

State of Oregon- Department of Environmental Quality

State of Florida- Department of Environmental Protection

State of Connecticut Department of Environmental Protection

State of Colorado Department of Public Health and Environment

State of Minnesota Pollution Control Agency Trading

State of Minnesota- Water Quality Trading Links