White Paper

Evaluation of the Water Quality Trading Program as Presented in the Final Rutgers University Report Entitled "Development and Water Quality Model Validation of a Phosphorus Trading Program for the Non-Tidal Passaic River Basin"

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I. Background

On May 7, 2007, the Department proposed an amendment to Northeast, Upper Raritan, Sussex County and Upper Delaware Water Quality Management Plans to incorporate a Total Maximum Daily Load (TMDL) for phosphorus in the Non-Tidal Passaic River Basin. The proposed amendment included a report entitled "Total Maximum Daily Load Report for the Non-Tidal Passaic River Basin Addressing Phosphorus Impairments." The TMDL was adopted on April 24, 2008, published in the New Jersey Register on May 19, 2008, and can be found on the Department's website at: http://www.nj.gov/dep/wms/bear/tmdls.html.

As identified in the adopted TMDL, a Targeted Watershed Grant (contract agreement number WS972841-04-0) had been awarded by the United States Environmental Protection Agency (USEPA), to Rutgers University to develop a water quality trading pilot with respect to the phosphorus impairments in the basin. The pilot was intended to produce a set of tools and rules to govern allowable trades in the Passaic River basin, including trading ratios and management zones within which trades can occur and still achieve the TMDL objectives. As described in the TMDL, and in the Responses to Comments 77-83 on the TMDL, although the scientific, economic and legal feasibility of water quality trading in the non-tidal Passaic River basin was still under study, the Department's expectation had been that a water quality trading program could provide a tool to identify alternative allocations of wasteload that would achieve the load reductions required to attain Surface Water Quality Standards, in a market driven and cost effective manner. The final trading proposal was to be presented to the public for comment, and provided both the Department and EPA approved it, the Department anticipated providing a one year period from the date of permit issuance to allow the permittees to negotiate trades based on the program. In response to Comment 78 on the TMDL, the Department explained that "to be approvable, a viable trading option would have to ensure that the TMDL condition in the Wanaque Reservoir and Dundee Lake are met and that there is full enforceable accountability for required load reductions."

On March 24, 2010, Rutgers University finalized a report entitled "Development and Water Quality Model Validation of a Phosphorus Trading Program for the Non-Tidal Passaic River Basin" ("Rutgers report"). This Rutgers report was submitted to the USEPA Region 2 as a deliverable under the above identified Targeted Watershed Grant. As identified in the Rutgers report, the goal of the project was "to develop and evaluate an effective water quality trading program for the Non-Tidal Passaic River Basin that adheres to the United States Environmental Protection Agency (USEPA) Water Quality Trading Policy and meets the requirements of NJDEP."

The Department has reviewed the Rutgers report and, as outlined below, has identified unresolved issues and risks and uncertainties regarding the program in its current form.

II. Deficiencies in the proposed water quality trading program

A. As identified in the Rutgers report, the proposed trading framework involves negotiations between buyers and sellers. However, the final report does not adequately discuss or detail the legal mechanism by which a buyer and seller would negotiate an agreement as to the amount of load being purchased/sold, the price per kilogram purchased/sold, and the terms of the trading arrangement to ensure full enforceability and accountability. Furthermore, the final report does not provide guidance as to the details that should be addressed within the legal agreements between buyers and sellers so that results of the trading arrangements can be implemented through the NJPDES program in a way that is lawful, transparent, predictable and enforceable. Examples of such necessary topics not addressed in the final report include, but are not limited to, the effective lengths of buyer/seller agreements versus NJPDES permit durations, contingency conditions for a failing trade due to seller non-compliance, and renegotiation of existing/effective trading agreements.

B. The Rutgers report explains that "[u]sing a recent history of actual discharger flow, which we term *anticipated actual discharger flow*, as the basis for allocation helps to clearly define property rights, an essential precursor for a successful trading program." Furthermore, the report indicates that "actual discharger flow from 2005-2007 be the basis for the Anticipated Actual Discharger Flow in the allocation". On the other hand, a preceding statement explains that the term anticipated actual discharger flow refers to "the average flow from a discharger over the past three calendar years prior to the start of watershed trading." There is a lack of clarity in defining this term.

   Some possible interpretations of "the start of the watershed trading" include: the date a trading program is approved, the date a trading option is reflected in a NJPDES permit, or the date a trade is negotiated between a buyer and a seller. The meaning of Anticipated Actual Discharger Flow is relevant to establishing the terms of the trade initially as well as upon re-negotiation in the future. If it was intended that this flow input would be determined for buyers and sellers based on the timing associated with an individual watershed trade (i.e. the most recent 3 years of actual discharger flow preceding the initiation of the individual trade), then it raises questions regarding the management of a seller's trading allocation if the seller has multiple individual trading agreements that were initiated at different times. The report fails to address this issue as an ongoing, dynamic element in terms of either implementation or the water quality implications of possibly varying start dates and/or overlapping trade agreements.

C. As presented in the Rutgers report, an input utilized in determining a discharger's trading balance is the "load discharged". While the report explains that the interested parties would need to estimate their expected load to be discharged prior to trading (page 22), it does not

discuss or detail how such a value should be determined/calculated. This point is especially important under the context of a scenario where verification of trades would occur based on compliance with final effluent limitations resulting from the trading agreements. The examples at the back of the report only indicate "hypothetical" values for the balance calculations. The report needs to have explored/addressed whether the "load discharged" input should be based on (1) existing/anticipated concentrations and an effluent flow, (2) existing/anticipated loads discharged from the facility, and/or (3) some other option. If either of the first two options were intended, the report should have clarified how each of the inputs would be determined (e.g. based on existing data, the effluent data timeframes utilized to derive the concentration, flows, and/or loads, etc…) and documented that water quality would be protected.

D. The Rutgers report indicates that "[f]inal effluent limitations resulting from the approved trading agreements will be incorporated into NJPDES permits applicable to the appropriate dischargers." However, the report does not provide clear details as to how to properly reflect the conditions of trading agreements in terms of effluent limitations in the NJPDES permits that would meet the objectives of the adopted TMDL. For example, as explained in the report, the load discharged input in the balance equation represents the anticipated load that will be discharged by an entity after a trade has been initiated. Further, the report indicates that trades are to be expressed in terms of load, as they must be in order to have a fungible unit of trade. However, on page 46 of the adopted TMDL, it is explained that, based on the WLA/LTA of 0.4 mg/L, "the Department will establish year-round concentration-only effluent limits determine by applying EPA's Technical Support Document for Water Quality-Based Toxics Control (USEPA, 1991) methodology to the LTA of 0.4 mg/l, with a minimum of a 4 times per month sampling frequency and a coefficient of variation equal to the default value of 0.6." Using these inputs, "[f]or these facilities, the resulting monthly average effluent limit will be 0.76 mg/l." The final report does not clarify how a concentration value should be derived from the loading to be consistent with the TMDL. At a minimum, the trading report would need to address the effluent flow to use, how to back calculate to the appropriate concentration and whether that concentration should be considered an LTA and if/how it should be reflected as an average monthly limit (AML) in the permit, in a way that is demonstrated to be consistent with the TMDL.

E. The Rutgers report does not provide guidance on how to address general issues associated with the implementation of the trading program via the NJPDES program. Examples of scenarios that the report fails to address include (1) allowance of trading agreements beyond the initial round of trades implementing the TMDL, (2) termination of trading agreements prior to renewal of the associated NJPDES permits, (3) failing trading agreements due to continued non-compliance of a seller with the trading-based conditions in their permit and buyer repercussions under such a scenario, and (4) trading allocation

decreases of a seller due to decreasing effluent flows, potentially resulting in a scenario where compliance with the goals of the TMDL would be in jeopardy. In addition, the fact that the current permit cycle timing for trade eligible facilities are generally not the same (i.e. the effective dates of the permits are different) coupled with the need to sync permits before trading is allowed poses a significant implementation delay and technical challenge.

III. Potential disincentives to participating in the proposed water quality trading program

Using classifications identified in USEPA's October 2008 document entitled "EPA Water Quality Trading Evaluation Final Report", the water quality trading framework provided in the final report appears to be best described as a case-by-case program with a bilateral negotiation market structure[1]. Success of this type of water quality trading program in the Non-tidal Passaic River Basin is dependent upon the voluntary participation of NJPDES dischargers as buyers and sellers. However, there are five (5) aspects of the proposed trading framework that raise questions as to whether NJPDES dischargers will be interested in participating in the program to facilitate trading within the watershed. They are as follows:

A. As per the Rutgers report, each discharger's allocation would be established based on the long-term average (LTA) concentration of 0.4 mg/L for total phosphorus. However, as indicated on page 46 of the adopted TMDL, the resulting effluent limitation based on the assigned long term average concentrations (LTAs) and wasteload allocations (WLAs) established in the adopted TMDL will be 0.76 mg/L expressed as a monthly average (under the specified assumptions of sampling frequency and CV). This difference in endpoint concentrations may be a disincentive for both potential sellers and buyers to participate in the water quality trading program.

B. The adopted TMDL establishes WLAs based on an LTA of 0.4 mg/L and the discharger's permitted effluent flow (refer to Table 14 of the adopted TMDL). However, consistent with the trading framework presented in the Rutgers report, each discharger's trading allocation is based on the discharger's actual effluent flow. As such, for potential sellers in the trading program, the allocations established as per the final report would be more restrictive than those established in the TMDL if they are discharging below their permitted effluent flows. While this more restrictive condition was necessary to "achieve the discharge concentration-based goals that underlie the TMDL" (page 19), use of actual flows versus permitted flows in

[1] The term "case-by-case" refers to a trading program that requires negotiation, review, and pre-approval for individual trades. A "bilateral negotiation" market structure refers to a system where each transaction requires substantial interaction between the buyer and seller to exchange information and negotiate the terms of trade. In addition, buyers and sellers make arrangements on their own, with a public authority participating to approve the trade and set an appropriate trading ratio.

establishing trading allocations may be a disincentive for both potential sellers and buyers to participate in the trading program.

C. The Rutgers report explains that "[f]inal effluent limitations resulting from the approved trading agreements will be incorporated into NJPDES permits applicable to the appropriate dischargers." Consistent with the provisions of N.J.A.C. 7:14-8.1 *et seq*., such effluent limitations resulting from the trading agreements and contained within the NJPDES permits will be subject to potential Water Pollution Control Act penalties when non-compliance occurs. This fact may be a disincentive for potential buyers and sellers to participate in the program. This may be especially true for potential sellers where, as a result of the trading agreements that they initiate, they would be required to comply with more stringent effluent limitations than those resulting from the adopted TMDL WLAs.

D. Because effluent limitations resulting from the approved trading agreements will be incorporated into NJPDES permits, potential sellers under the proposed trading framework presented in the Rutgers report will be subject to the antibacksliding provisions at U.S.C. 1342(o), 40 CFR 122.44(l), and N.J.A.C. 7:14A-13.19(a), as well as the antidegradation provisions at N.J.A.C. 7:9B-1.5(d), in the future if less stringent effluent limitations are desired as a result of the termination of a trading agreement. For example, if facility X is meeting an effluent limitation of 0.3 mg/L TP based on a trading agreement, the agreement is terminated for whatever reason, and the seller desires less stringent TP effluent limitations (such as those based on the original WLA specified in the adopted TMDL), the discharger would be required to sufficiently document and justify that compliance with the less stringent effluent limitations is consistent with the governing antibacksliding and antidegradation regulations.

E. In the Rutgers report, a discharger's trading balance is defined by the following formula…

Balance = Allocation – Load Discharged – Actual load sold + Equalized load purchased

In the above equation, the "Equalized load purchased" is equal to the (actual load sold × the seller-to-buyer trading ratio). The seller-to-buyer trading ratios are presented in Table 5-7 of the final report. Based on the nature of the trading balance equation, a seller will benefit from a higher trading ratio. As such, for a specific trading scenario, sellers that are assigned lower trading ratios will have to remove more load than is needed by the buyer to achieve the same water quality outcome as a non-trading scenario. For this reason, there may not be an economic advantage for a seller to enter into a trading agreement where the applicable trading ratio is low.

For instance, example #4 of the trading document refers to a scenario where the seller (Two Bridges SA) is downstream of the buyer (Hanover SA). The assigned trading ratio between the

two parties is 0.63 (i.e. 1 kilogram removed at Two Bridges is equal to 0.63 kilograms purchased by Hanover). As such, if the "actual load sold" from Two Bridges was 2393 kg/year, the "Equalized load purchased" for Hanover would be (2393 kg/year × 0.63) = 1507 kg/year. This means that 2393 kg/year removed at Two Bridges equals 1507 kg/year allowed at Hanover. In other words, in order for the trade to work, Two Bridges would have to remove 59% more load than what Hanover would need to remove to achieve the same water quality objectives as a non-trading scenario.

Also of note on this point is that, if trading scenarios between dischargers within the same trading region are removed (the ratio would be 1 for such scenarios), the average trading ratio in the trading program is 0.65. The minimum trading ratio that would be applied is 0.21 for a scenario where the buyer is from the lower Passaic Zone 2 and the seller is Two Bridges. In addition, the 4 largest dischargers within the watershed are Two Bridges (located in the Two Bridges Zone), Parsippany Troy-Hills (located in the Whippany zone), Rockaway Valley Regional SA (located in the Rockaway zone), and Wayne Township – Mountainview STP (located in the Lower Passaic 1 zone). For the first 3 facilities, below is a summary of the trading ratio information when these dischargers are sellers:

	Minimum	Average	Maximum
Two Bridges SA	0.27	0.62	1
Parsippany Troy-Hills	0.39	0.76	1.03
RVRSA	0.31	0.61	1

According to the parameters of the trading program outlined in the final report, the fourth facility (i.e. Wayne Township – Mountainview STP) is only eligible to sell to facilities in the lower Passaic 2 Zone where the trading ratio is 0.66. As illustrated above, based on the prescribed trading ratios in the Rutgers report, an economic disincentive to trade as a seller in the program is likely to exist; even for the largest dischargers within the watershed where economies of scale are most likely to occur.

IV. Other concerns

A. In Rutgers project report entitled "Review of Policy Issues Associated with Water Quality Trading", it was explained that "[w]ater quality trading has happened in many other states around the country…However, only a handful of these projects have achieved success." Without making any representations regarding the accuracy of Rutgers' characterization of which programs may have achieved success, it is important to note that each of the trading programs cited by Rutgers as being successful are significantly more developed than the

program presented in the Rutgers report in terms of the operational details and institutional framework for implementation. Further, these programs differ substantially from the one proposed by Rutgers. As such, for the purposes of addressing deficiencies in the water quality trading program presented in the Rutgers report, it may not be a viable option to simply apply certain operational aspects of the "successful" trading programs to that which was presented by Rutgers. In addition, the water quality trading program, as described in the Rutgers report, represents the final deliverable for USEPA grant contract agreement number WS972841-04-0 and there is no immediate opportunity to obtain an enhanced product that meets programmatic needs.

B. Based on Table 14 of the adopted TMDL, 23 of the 41 dischargers that are required to have some level of phosphorus reduction at their treatment plants have permitted flows less than or equal to 1.0 million gallons per day (mgd). Costs to upgrade wastewater treatment plants below this design flow tend to be higher on a price per kilogram of total phosphorus removed basis. Therefore, it is likely that smaller dischargers would have the greatest incentive to participate in a water quality trading program. However, as explained in the Rutgers report, facilities located outside the spatial extent of the model are not eligible to trade. This restriction was needed to ensure that water quality standards would be met under all allowed trading scenarios. Based on this necessary restriction, 17 of the above referenced 23 dischargers (i.e. 74%) cannot participate in the water quality trading program because they are located outside of the model domain. This significantly reduces the universe of potential participants, calling into question the viability of a trading program.

C. As referenced in the Rutgers report, and consistent with the adopted TMDL, the "Department anticipates allowing 1 year from the date of permit issuance, provided the terms of acceptable trades have been subject to public comment and approved by EPA and the Department, to negotiate trades…" Potential sellers in a water quality trading program may take some time in evaluating their treatment plant performance and ability to comply with the target phosphorus levels set in the TMDL or resulting from trading scenarios involving a single or multiple trading partner(s). As such, a potential seller may not be "ready" to participate in the trading program within the allotted timeframe; raising questions as to level of discharger participation that may occur for a water quality trading program within the watershed.

IV. Conclusions

In summary, because of the concerns regarding the implementation, enforceability and accountability of the water quality trading program as currently presented, as well as participation disincentives that are unavoidable in order to ensure water quality is protected, the Department has determined that the water quality program developed by Rutgers is not viable and not approvable as presented. The

Department, therefore, will not seek to propose this trading program for public comment, or submit it to EPA for approval. Since trading tools and rules have not been approved by the Department and EPA, the Department will not provide a one year period from the date of permit issuance to negotiate trades. The Department has determined that issuance of NJPDES permit actions that implement the WLAs identified in the adopted TMDL will proceed to address water quality impairments in the Passaic River Basin without further delay.

The Department recognizes that, in concept, a trade between or among a limited number of permittees could provide cost savings in meeting water quality goals. Therefore, the Department may consider trading on a case-by-case and facility-specific basis should a set of permittees wish to propose a specific trading arrangement that fully addresses the implementation, enforceability and accountability concerns and can demonstrate attainment of water quality objectives. Such a trade also would be subject to public comment and would require approval by EPA if the sum of the WLAs exceeds that which set forth in the adopted TMDL. While the permittee may choose to explore trading as an option, the Department does not intend to consider requests for the extension of the compliance schedule in the NJPDES permit for this purpose.