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GEORGE MASON UNIVERSITY

REGULATORY STUDIES PROGRAM

**Public Interest Comment on**  
EPA's "The National Costs of the Total Maximum Daily Load  
Program (Draft Report)"<sup>1</sup>

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The Regulatory Studies Program (RSP) of the Mercatus Center at George Mason University is dedicated to advancing knowledge of the impact of regulation on society. As part of its mission, RSP conducts careful and independent analyses employing contemporary economic scholarship to assess rulemaking proposals from the perspective of the public interest. Thus, this comment on the *Environmental Protection Agency's "The National Costs of the Total Maximum Daily Load Program (Draft Report)"* does not represent the views of any particular affected party or special interest group, but is designed to evaluate the effect of the Agency's proposals on overall consumer welfare.

In July 2000 EPA issued new Total Maximum Daily Load (TMDL) regulations, revising existing TMDL guidelines that originally date to the Clean Water Act of 1972, although EPA has revised the guidelines since that time. The new regulations include a plan that would require the states to develop and implement TMDLs, a process which EPA would oversee. Analysis of the new TMDL regulations indicates that these regulations will dramatically increase the number and complexity of TMDLs implemented in the states, making them more of a centerpiece of the EPA clean water program. Furthermore, the new rules expand the power of EPA relative to the state governments, even though the responsibility for the TMDL program was originally given to the states. Congress decided to delay implementation of these regulations by failing to approve appropriations as they neared completion, in part to analyze the potential economic impact these wide-ranging regulations will have on the U.S. economy and the economies of the various states. The report commented upon herein was requested by Congress<sup>2</sup> to address concerns of the potentially high costs of the TMDL program.

In the Draft Report, EPA estimates that the cost of development and implementation of the TMDL program ranges from an absolute minimum of \$986 million to a high of \$4.4 billion per year,<sup>3</sup> the majority of which is borne by the private sector. These are

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<sup>1</sup> Prepared by Joseph M. Johnson, Dorothy Donnelley Moller Research Fellow, Mercatus Center. This comment is one in a series of Public Interest Comments from Mercatus Center's Regulatory Studies Program and does not represent an official position of George Mason University.

<sup>2</sup> Conference Report #106-988 on the VA/HUD and Independent Agencies Appropriations Act for FY2001.

<sup>3</sup> All figures throughout are presented as annualized costs in 2000 dollars.

considerable costs and will increase the annual costs of the Clean Water Act programs. Considering that the entire Clean Water Act as currently enforced has been estimated by EPA to cost \$14 billion per year,<sup>4</sup> the incremental costs from the TMDL program could result in increases of anywhere from 7 percent to 30 percent each year. Furthermore, to demonstrate that EPA's estimates are incomplete, this comment develops some additional estimated costs that EPA does not include in the initial estimates that increase the total cost of the TMDL program to between \$2.45 and \$5.26 billion per year, representing an increase in annual Clean Water Act costs of 17 percent to 38 percent.

## I. Introduction

The "National Costs of the Total Maximum Daily Load Program (Draft Report)" (henceforth referred to simply as the "Draft Report") presents the total costs associated with the development and implementation of the Total Maximum Daily Load (TMDL) program as revised by EPA and published as a final rule on July 13, 2000 (FR 65 43586).<sup>5</sup> Briefly, the revised TMDL program lays out a two-part plan of action for ensuring the quality of America's numerous bodies of water.<sup>6</sup> The first stage entails measuring water quality, identifying waters in need of water quality improvements, and developing a plan of action, a TMDL, to address and remedy the problem. The second stage requires the implementation of the TMDL plan, including compliance with the plan's specified limits on pollutant discharge into affected waters by point and nonpoint pollutant sources. While states are responsible for developing and overseeing implementation of TMDLs, EPA can override state programs to develop and implement TMDLs if it believes the states are not doing so satisfactorily. Currently, the states have surveyed approximately one-third of all U.S. waters. Out of the waters surveyed, the states have listed over 20,000 as requiring TMDLs for necessary water quality improvements. EPA expects that, based on the currently listed waters alone, states will need to develop and implement 36,225 TMDLs over the next fifteen years in order to correct water quality deficiencies.

EPA prepared the Draft Report to address Congressional concerns about the costs of the TMDL program. Until these concerns were addressed, Congress chose not to appropriate funds to EPA to administer the new TMDL rule for the current fiscal year.<sup>7</sup> In August

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<sup>4</sup> U.S. EPA. *A Benefits Assessment of Water Pollution Control Programs Since 1972: Part 1, The Benefits of Point Source Controls for Conventional Pollutants in Rivers and Streams, Final Report*, January 2000, and U.S. EPA. *A Retrospective Assessment of the Costs of the Clean Water Act: 1972 to 1997, Final Report*, October 2000.

<sup>5</sup> The final rule (65 FR 43586) established revisions to the Water Quality Planning and Management Regulations as well as to the National Pollutant Discharge Elimination System Program in support of the revisions to the prior.

<sup>6</sup> For a detailed description of the TMDL rule, see FR 65 43586. For a detailed summary of the rule's provisions and a critique of the rule, see the Mercatus Center Regulatory Studies Program Public Interest Comment (RSP 2000-1) by Meiners and Yandle available online at [www.mercatus.org](http://www.mercatus.org).

<sup>7</sup> An amendment to the Military Construction Appropriations Act: Supplemental Appropriations (Public Law 106-426) prohibited EPA from using Fiscal Year 2000 or 2001 funds to "make a final determination on or implement" the TMDL regulation revisions. However, EPA was able to rush the final rule to publication just before PL 106-426 was passed, setting the effective date for the new regulations as October

2001, EPA released the Draft Report for public comment and at the same time proposed to delay the TMDL rule effective date by 18 months.

As described in the Mercatus Center's comment on the proposed rule,<sup>8</sup> the essential problem with EPA's approach to TMDLs is that it grants the federal EPA nearly unlimited authority to address anything that affects any body of water. Under these regulations, EPA may apply a multitude of standards and considerations on a case-by-case basis. The lack of knowledge about the extent of water quality problems and the very local nature of water quality issues make this broad federal authority particularly inappropriate.

Economically and ecologically, EPA should focus on watershed management of water quality. However, EPA must recognize that water quality is largely a local issue, as every water basin differs in its science and uses. EPA should be concerned with water quality issues that involve the presence of substances in the water that can harm a population, but as a federal agency it should not be concerned with the details of pollution control efforts for each and every body of water nationwide. This is a virtually impossible task that conflicts with the intent of Congress, which mandated that each state have authority over its own waterways.

The difficulties EPA has had in estimating the costs of the TMDL rule highlight this essential problem. While EPA has compiled detailed estimates of the costs of developing and implementing TMDLs, these estimates are not reliable measures of what the real costs of the program will be.

The Draft Report attempts to estimate costs for the TMDL rule, but the rule is both prescriptive and open-ended, leaving states with little flexibility and substantial responsibility. It requires states to develop lists of impaired water bodies, according to a specified format and using EPA prescribed priorities. States must also solicit public input and document the methodology they use to develop the list of impaired water bodies. They must submit this information to EPA eight months before the list is due. Because of unique characteristics of bodies of water the costs of performing these required tasks will vary greatly depending on characteristics of different water bodies, as well as the communities and other parties that may get involved in the public comment process. Furthermore, as the role EPA plays is uncertain, so are the costs associated with that role. For example, while EPA does not assert the authority to approve or disapprove the methodology itself, it will "consider [it] in its review and approval or disapproval of [the] list and priority rankings."

To illustrate the difficulty of developing TMDLs and the uncertainty of EPA estimates, consider this: some water bodies do not meet the water quality standards due to "unknown causes." Nevertheless, the TMDL regulations require states to develop

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30, 2001. EPA has since published another rule that postpones the effective date to 18 months after the original effective date.

<sup>8</sup> Mercatus Center Regulatory Studies Program Public Interest Comment (RSP 2000-1) by Meiners and Yandle available online at [www.mercatus.org](http://www.mercatus.org).

TMDLs for these waters. That is, even though it doesn't know what is impairing the water's quality, a state must submit a plan (TMDL) for EPA approval that identifies the pollutant contributing to the impairment, its source, and the amount that it must be reduced. If EPA review of the state-submitted TMDL concludes it does not meet the required elements, EPA will issue an order establishing a new TMDL. Such water bodies will remain on the threatened or impaired list "until water quality standards are attained" (at 46024).

Naturally, EPA does not estimate the costs of implementing TMDLs for water bodies impaired due to unknown causes, because by their very nature unknown causes are not quantifiable. Yet, these unknown causes could have a large impact on the actual costs of the TMDL program once implementation begins, pushing costs well above what EPA estimates.

As discussed more fully below, EPA's analysis provides no estimates of how effective the various measures included in the cost analysis will be at achieving water quality standards, nor does it give reliable estimates of the technology necessary for or the cost involved in reducing pollution from many of the nonpoint sources contributing to violations of water quality standards (WQS) in some waters. These analytical flaws make the resulting estimates unreliable. Moreover, they are difficult to correct. By definition, nonpoint sources are hard to pinpoint as no pipe emits effluent into a body of water, but rather sediment from multiple sources flows in along the banks of countless waterways. Thus, it makes little sense to talk about technological controls on nonpoint sources, which makes it difficult in turn to estimate the costs involved in reducing the pollution from nonpoint sources.

EPA's approach of requiring states to identify exactly how much of each pollutant is contributed from every single source into every single body of water not only hinders flexible and innovative approaches by states, is very difficult to cost out. This flaw is apparent in the cost estimates presented in the Draft Report.

The following section, Section II, summarizes the TMDL rule. Section III discusses EPA's cost analysis, including methodology and the resulting cost estimates. Section IV lays out the main areas of criticism of the Draft Report and its findings. It goes on to identify areas where EPA's cost estimate could be improved and Section V offers an alternative cost estimate of the TMDL program, taking into account weakness in EPA's estimates. The final section offers conclusions.

## **II. Summary of the TMDL Rule**

This comment focuses only on the Draft Report and the consideration of the cost estimates therein rather than on the TMDL rule. Nevertheless, a brief review of the TMDL Rule as finalized July 13, 2000 is in order.

EPA states that the purpose of the revisions to the TMDL regulations is "to provide states with clear, consistent, and balanced direction for listing waters and developing TMDLs,

resulting in restoration of water bodies not meeting water quality standards.”<sup>9</sup> The rule details the methodologies states must use when listing water bodies as failing to meet meeting current water quality standards. The rule requires each state to articulate the methodology according to the rule specifications, elicit public comment on the methodology, and submit the methodology to EPA for review eight months before it submits its actual list to EPA for approval.

The rule further requires that states must place failing water bodies into one of four categories. The categories then determine the plan of action for these waters. The rule directs states to establish TMDLs for the first category – waters that are impaired or threatened by pollutants or by unknown causes. Once on the list, the waters will remain listed there until they comply with water quality standards.

The TMDLs themselves work much like State Implementation Plans (SIPs) in EPA’s air program. The TMDL specifies the maximum daily loads that each pollutant may attain and the required reductions of discharging sources necessary to meet Water Quality Standards (WQS). States must then submit these plans (TMDLs) to EPA for approval.

The new regulation requires states to commit to schedules for establishing TMDLs. States must establish a timeframe of no longer than 15 years for addressing all water body and pollutant combinations in the state. The rule instructs states to establish TMDLs for high priority water bodies before medium and low priority water bodies. It also prescribes the characteristics (such as threats to endangered species) that dictate a “high priority” designation. The schedules should call for the establishment of TMDLs for high priority water bodies no later than five years from listing.

The rule also allows the public to petition EPA to step in and establish TMDLs in a state if that state fails to do so on schedule. In fact, the rule emphasizes public participation and the opportunity for the public to comment on lists, priority rankings, schedules, and TMDLs prior to submission to EPA.

Finally, the rule makes some important amendments to the National Pollution Discharge Elimination System (NPDES) and WQS regulations. The changes in these two Clean Water Act programs complement the TMDL program so that the water quality programs work together to achieve the goal of improved water quality in the nation’s waterways. In doing so, however, the rule establishes a precedent for contradiction and uncertainty. Private sector entities that implement the proper level of technology to reduce discharges according to their NPDES permit may subsequently be held accountable for further reductions based on TMDLs. Thus, a pollutant point source may follow the law to the letter, implementing costly technologies to reduce the polluted discharge to NPDES levels, only to have the government tell them that they must implement another costly technology, because, according to the TMDL, the pollutant is still present at unacceptable levels. In this case, the possibility exists that government may hold a point source accountable for the general pollutant levels in the water rather than the source’s discharge quantities.

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<sup>9</sup> [www.epa.gov/owow/tmdl/tmdlsfs.html](http://www.epa.gov/owow/tmdl/tmdlsfs.html)

### **III. EPA's Estimates of Costs from the Draft Report**

EPA seeks to identify the costs of this regulation through two sets of cost estimates in the Draft Report: the costs to develop TMDLs and the costs to implement TMDLs. Based on the 1998 §303(d) listed waters, states need to complete 36,225 TMDLs by 2015. In general, EPA assumes that the pace of development will be roughly uniform during the 2000 to 2015 time period and that implementation will lag development by 5 years.

#### **A. Costs of developing TMDLs**

Predominantly, the states will bear the costs to develop TMDLs. The states must survey and list waters within their borders; follow the steps prescribed by the TMDL rule to develop a plan of action; and see that the entities responsible for curtailing pollutant discharges comply with the plan. EPA's estimation of TMDL development costs is relatively straightforward. EPA considers the hiring of additional full time personnel over the next 15 years as the primary cost. Based on the time required for TMDL development weighted across various levels of difficulty and complexity, EPA states the yearly cost of development at \$63 to 69 million per year. In addition to this, \$17 million will be spent each year by states to monitor water quality in support of TMDL development. Thus EPA estimates an annual total cost of \$80 to \$86 million.

It is important to note that EPA arrives at these cost estimates for TMDL development by assuming large economies of scale. In the most extreme case, efficiencies reduce the cost of additional TMDLs that are "clustered" in related water bodies to only 25 percent of what the first TMDL cost.

Additionally, EPA assumes costs for three levels of TMDL difficulty based on the average TMDL in each group. However, within each of the three levels of development difficulty, there is a wide distribution of costs. EPA chose to disregard "outliers" and rely on the unit cost of the average TMDL, not the average cost calculated across the distribution of costs within each category. The shape of the cost distribution is such that the true outliers are all on the high end. Thus, EPA disregards low-end "outliers" costing within a few thousand dollars of the cost of the average TMDL as well as high-end outliers costing over one million dollars more than the average TMDL. This introduces a low-end bias into their estimate since clearly the high end "outliers" would, if included, drive up the cost estimates for TMDL development significantly, even if the low end "outliers" were also included.

The efficiency assumptions in TMDL development and the disregard of high cost "outlier" TMDLs bias the EPA cost estimate downward. Given that the cost of developing and monitoring TMDLs is between \$80 and \$86 million annually in the Draft Report, relaxing these two assumptions made by EPA could well increase the costs of TMDL development above the \$100 million per year level. This would have necessitated a review under the Unfunded Mandates Reform Act (UMRA) had EPA made these costs known when publishing the proposed and final TMDL program rules. The UMRA is designed to prevent agencies from simply reallocating the costs of regulatory compliance to state, local, and tribal governments. Before imposing unfunded mandates on state

governments, as EPA does in this rule, UMRA requires it to demonstrate that it has evaluated alternatives and chosen the most cost-effective approaches. Neither the Draft Report nor any analysis prepared for the rule comply with UMRA requirements.

## **B. Costs of implementing TMDLs**

While these development costs are significant, the implementation of TMDLs comprises the majority of the cost of this rule. TMDL implementation costs will fall heavily on the private sector, but state and local governments will face large burdens as well because water and sewage treatment facilities are a large subgroup of point source dischargers. EPA estimates many of the costs of implementation in the Draft Report,<sup>10</sup> by considering three scenarios for implementation that may be undertaken by the states.

- Under the “Least Flexible” scenario, EPA assumes that all relevant dischargers of the pollutant named in a TMDL must implement the “next treatment step.” EPA estimates that the costs for this approach are between \$1.9 billion and \$4.3 billion per year. Importantly, these upper and lower estimates do not represent a range of possible costs, but rather two point estimates for slightly different assumptions regarding implementation. The lower estimates assume that states require only the entities that discharge “within” the impaired water body need to reduce discharges, whereas the higher estimate assumes that dischargers upstream of the impaired water body must also reduce their pollutant discharges. As some TMDLs will likely require “within” reductions while others will require “within and upstream” reductions, the actual costs should fall somewhere between these estimates.
- Under the “Moderately Cost-Effective” scenario, the costs drop to between \$1 billion and \$3.4 billion per year, as EPA assumes fewer dischargers will be required to comply with the discharge reductions. The reader must rely on EPA’s assertion that the states will achieve necessary WQS even though fewer entities will have to reduce their pollutant load. However, EPA rests this determination on very little evidence: a sample of 15 TMDLs. EPA assumes that the technological reductions assumed in the “Least Flexible” scenario will over-comply with WQS, and that in many instances only a fraction of the dischargers on each water body will actually need to move to the “next treatment step” to meet the WQS. It relies on the sample of 15 TMDLs to estimate the likely fraction of entities discharging into an impaired water that must reduce discharges in order for the water to meet the relevant standards for each pollutant in question. It uses this fraction to scale down costs developed under the “Least Flexible” scenario.

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<sup>10</sup> In the Draft Report, and especially in the accompanying technical support documents, EPA breaks down the implementation costs in a number of useful ways, including by pollutant source and pollutant source type. No attempt is made here to analyze all of the cost analyses in such fine detail. Interested parties should read *The National Costs to Implement TMDLs (Draft Report): Support Document #2*, EPA 841-D-01-005, August 1, 2001.

- Finally, under the “More Cost-Effective” scenario, the costs range between \$900 million and \$3.2 billion per year. Despite the fact that pollutant level reductions are equivalent to those in the “Moderately Cost-Effective” scenario, the costs of this scenario are lower because EPA states that a limited discharge permit trading system will allow high cost point source dischargers to purchase permits from low cost nonpoint source dischargers. In effect, EPA assumes an equal number of affected entities as in the “Moderately Cost-Effective” scenario, but in this scenario, the burden will shift from point sources to nonpoint sources, which it assumes have lower costs of control. This reduces costs to point sources and increases costs to nonpoint sources, but results in lower costs overall. The aggregate load reduction is the same across the two plans, but the allocation of load reduction burdens changes.

It is important to note that EPA’s methodology for the moderately and more cost-effective scenarios rely on a small, not representative sample of 15 TMDLs to estimate what actions will be required for compliance with over 36,000 TMDLs covering over 4,000 pollutants in more than 20,000 listed waters. Further the terms moderately or more “cost-effective” are misleading. These latter scenarios are less costly than the “Least Flexible” scenario in which all dischargers must move to the “next treatment step,” but they also do not reduce as much pollution. EPA provides no estimates of how “effective” they are, simply that they are less costly because fewer entities would have to move to the “next treatment step.”

## **IV. Critique of the Draft Report**

The cost estimates presented in the Draft Report would add significantly to the national and the state costs of the Clean Water Program. However, EPA may have understated the cost and inadvertently misrepresented the actual scope of the TMDL program. At the very least the estimates cannot be relied upon to give an accurate assessment of the TMDL program. This section highlights the flaws in the analysis that dispute the credibility of EPA’s cost estimates.

### **A. Structure and Methodology of the Draft Report**

1. The Draft Report offers no estimate of benefit or effectiveness.

The Draft Report fails the Congressional requirement of determining if the implementation of the program is done in the most cost-effective manner, because neither the Draft Report, proposed TMDL rule, nor final TMDL rule address the benefits or effectiveness of the rule at improving water quality. The U.S. General Accounting Office identified this lack of benefit analysis in its report on problems with the TMDL rule.<sup>11</sup>

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<sup>11</sup> U.S. General Accounting Office, *Proposed Revisions to EPA Regulations to Clean Up Polluted Waters*, GAO/T-RCED-00-233, June 28, 2000.

Although EPA claims to have addressed this concern in the Draft Report, there is still no quantified estimate of benefits, or any other measure of the rule's effectiveness.<sup>12</sup>

This lack of a benefit estimate or any measure of effectiveness is arguably the most significant flaw of the Draft Report. Regardless of the quality of the cost estimates, the information in the Draft Report cannot be used to defend any plan of action to implement TMDLs as being the "cost-effective." While EPA calls the three implementation scenarios for TMDLs the "Least Flexible," "Moderately Cost-Effective" and "More Cost-Effective" scenarios, this classification scheme is inaccurate and misleading. The only difference between the "Least Flexible" approach and the other two is that the latter require fewer entities to reduce their pollutant discharges. This implies that the level of pollutant reduction will be lower as well, because according to the Draft Report the costs per affected entity remain constant across the level of aggregate load reduction in the "Least Flexible" scenario and that in the "Moderately Cost-Effective" scenario. Without any measure of the effectiveness of each scenario, it is impossible to determine which is more cost-effective. At most, EPA can only say which scenarios are more or less costly.

The lack of a benefit evaluation should be of particular concern for the states that must design and implement the TMDLs. As the federal oversight of this rule may keep states from developing innovative plans that fit the unique characteristics of their bodies of water, EPA should at least be able to explain the benefits the states will receive from implementing the federal plan.

## 2. The estimates do not reflect uncertainty or offer sensitivity analysis.

As noted in the previous section, the Draft Report estimates the costs of TMDL implementation by using three alternate scenarios, the "Least Flexible," "Moderately Cost-Effective" and "More Cost-Effective." For each of the three scenarios, EPA includes what it considers to be upper and lower bounds on the likely costs. The lower bound considers the costs that would result if TMDLs address only pollution sources that discharge directly into the impaired water body, while the upper bound considers the costs of TMDLs that reduce discharges for pollution sources within and upstream of the water body.

Unfortunately, these upper and lower bound estimates are really two different point estimates for two completely different enforcement schemes. A true upper and lower bound estimate would take into account the tremendous amount of uncertainty surrounding the employed estimates. A proper sensitivity analysis requires careful attention to the distribution of likely outcomes and changes in parameters defining the estimate. In addition, this proper sensitivity analysis would have allowed EPA to state a "best estimate," based on expected outcomes, of the costs of the program. It is not possible to use the estimates given by EPA as an estimate range because they actually estimate a number of vastly different programs, not a single program.

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<sup>12</sup> U.S. Environmental Protection Agency, *The National Costs of the Total Maximum Daily Load Program (Draft Report)*, EPA 841-D-01-003, Appendix A-5, August 1, 2001.

## B. Assumptions underlying the cost estimates

EPA's total cost estimates depend on assumptions on the number of impaired waters that will require TMDLs under the rule, the number of TMDLs per impaired water body, and the costs to develop and implement each TMDL in each water body. The presence of these assumptions raise serious doubts about the precision of the cost estimates in the report, doubts which would not exist if EPA had identified these uncertainties and undertaken a sensitivity analysis.

### 1. Point estimate of number of impaired water bodies listed under §303(d)

The Clean Water Act, in §303(d) (or alternatively 33 USC §1311(d)), sets forth the requirements and purpose for listing water bodies. States must periodically assess the watersheds within their borders and list as "impaired" those that do not meet water quality standards.

The most recent listing of impaired waters under section 303(d) occurred in 1998. The Draft Report estimates that 36,225 TMDLs would be needed to address waters identified as impaired as of that date. Because the 1998 list includes assessments for only about one-third of all U.S. waters, EPA assumes that 9,000 additional TMDLs will have to be developed in the future to address waters identified as impaired after 1998. (EPA assumes that states will not list any additional waters until 2006 and will choose to list waters and develop TMDLs for these waters at a uniform pace until 2038, when all 9,000 additional TMDLs will have been developed.)

EPA provides no justification for its assumption that a total of 45,225 TMDLs will be developed over the next 37 years. States must update their listings every four years. If during these updates to the 1998 list, more water bodies are assessed and identified as impaired, EPA's figure may understate the number of TMDLs required. This is particularly true since the 1998 list does not include assessments for two-thirds of the water bodies in the United States.

On the other hand, if states choose to remove water bodies from the list of those designated as impaired, or reduce the number of newly designated impaired water bodies, EPA may be *overstating* the number of TMDLs required. States may have willingly listed waters as being impaired as long as they were not responsible for developing and implementing TMDLs. The new rule imposes costs on states for identifying a water body as impaired, and those costs may reduce states' incentive to identify water bodies as impaired in the future. Experience in the Superfund program suggests, however, that delisting a site once it has been identified as impaired may be politically impracticable.

As stated above, EPA should conduct some sensitivity analysis to allow policy makers and reviewers to evaluate a range of possible TMDLs that would result from the rule.

## 2. Costs of developing and implementing TMDLs

EPA relies on samples of existing and likely future TMDLs to estimate a cost of developing both the 36,225 TMDLs required by the 1998 lists as well as the additional 9,000 TMDLs it expects will be required by future listing of impaired waters.<sup>13</sup>

However, the Draft Report does not estimate the costs to *implement* the additional 9000 TMDLs, though a rudimentary analysis suggests the additional costs may be considerable. Assuming the cost of implementing incremental TMDLs is the same as the average cost of implementing the TMDLs for currently listed waters, the additional TMDLs will raise the costs of implementation under the “Least Flexible” scenario by between \$330 million per year for the “within only” case and \$770 million per year for the “within and upstream” case.<sup>14</sup> For the “Moderately Cost-Effective” plan, the additional costs are \$185 and \$607 million per year. Finally, for the “More Cost-Effective” scenario they are \$160 and \$565 million per year. These costs, among others excluded from the analysis, should be added to the estimates provided in the Draft Report to obtain a more reasonable idea of the cost of all TMDLs that will be implemented under the TMDL rule.

EPA assumes that fewer TMDLs will be needed (9000) for the remaining two-thirds of waters awaiting surveying and possible listing than for the initial one-third of all waters on the 1998 303(d) lists (36,225) because it assumes the states addressed the most heavily polluted waters first. Another possibility is that the waters on the 1998 list are not the most polluted waters, but rather that they possess the lowest, or possibly average, pollution levels. Rather than assessing and listing the most polluted waters first, state officials may simply have listed waters in the easiest way possible, whatever that may be. This alternative model has implications for future lists as well, indicating that if all waters must eventually be surveyed and listed, perhaps in the future the number of TMDLs needed will be more than 36,225 estimated in the Draft Report, or at the very least more than the 9,000 assumed by EPA.

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<sup>13</sup> EPA uses TMDL statistics from the 1998 303(d) TMDL Tracking System Database and a sample of current TMDLs to obtain data on current TMDL characteristics. Additionally, it employs a sample of 131 representative TMDLs to estimate likely future unit costs for TMDL development. Finally, it analyzes the likelihood that efficiencies will arise in TMDL development due to overlap or clustering allowing multiple TMDLs to be developed simultaneously, or without duplicative effort, using geographic databases.

<sup>14</sup> It is assumed that on average the 9000 TMDLs EPA estimates will be developed and implemented are no different than the 36,225 TMDLs for which implementation costs are presented in the Draft Report. The cost estimates for the additional 9000 TMDLs presented above are computed by finding the average cost per TMDL under each scenario and multiplying it by 9000. This represents the annuity value of the average TMDL. Because these additional TMDLs will be implemented at a later date than the original 36,225, this cash stream is multiplied by the appropriate discount factor to push it 5 years further into the future than the annuity payments in the Draft Report. This procedure entails the assumption that the 9000 new TMDLs are developed at a rate roughly proportionate to the rate of the original TMDLs. Thus, the additional 9000 TMDLs are exactly the same as the TMDLs estimated in the Draft Report save that they do not begin to incur costs until 5 years farther into the future.

### C. Data Inadequacy

Using existing databases of pollutants and pollutant sources cross-referenced with geographic databases of the affected waters, EPA estimated a reliable baseline cost estimate for its “Least Flexible” scenario. However, lack of information on nonpoint sources and on the strategies involved in implementing more cost-effective scenarios frustrate the resulting cost estimates.

#### 1. Low number of sample TMDLs

While EPA bases the estimate for the “Least Flexible” scenario on the assumption that all pollutant sources will reduce discharges for each TMDL, it bases estimates for the “Moderately Cost-effective” and “More Cost-Effective” scenarios on the characteristics of sample TMDLs. EPA arrives at lower cost, or more “cost-effective,” scenarios for the TMDL program by assuming that water quality standards can be met adequately with fewer than all dischargers reducing their discharge loads. However, it arrives at this conclusion by employing a sample of only 15 TMDLs.

The Draft Report asserts that the 15 TMDL sample is not used to form cost estimates, but rather to perform “groundtruthing.” Regardless of the name given the exercise, the report uses this small sample as the sole basis for determining the costs of implementation for the “Moderately Cost-Effective” and consequently the “More Cost-Effective” scenarios. EPA assumes based on the sample of 15 TMDLs that pollutant discharge levels sufficient to meet the necessary standards can be obtained when the TMDL requires less than all entities discharging into a water body to take the “next treatment step.” Specifically, it bases the estimate of costs for the “Moderately Cost-Effective” scenario on the assumption that only about half of all TMDLs will require all discharging entities to take the “next treatment step,” while the other half will only require an aggregate load reduction equal to about half of what is achieved under the “next treatment step.”

The “More Cost-Effective” scenario estimate also relies on the sample of 15, as it is derived from the “Moderately Cost-Effective” scenario. To derive it, EPA makes further adjustments to reduce costs by assuming cost efficiencies from permit trading. In essence, some reduction burdens are shifted to nonpoint sources from point sources, thereby reducing costs due to the fact that point sources are already heavily regulated, and incremental pollutant discharge reductions are more costly.

Because of the diverse and localized nature of the various water bodies around the country, this sample is clearly too small to infer anything about all 36,225 TMDLs the Draft Report estimates will be developed and implemented. Furthermore, a meaningful statistical analysis would require not only a proper sample size (dependent upon the characteristics of the population being estimated), but also an acceptable sampling methodology. There is no indication as to whether EPA selected the 15 TMDLs at random or out of convenience. In any event, there is no evidence that they represent the universe of TMDLs likely to be needed under the rule, especially when the needs of water bodies vary greatly from state to state.

While it is likely true that some savings over the “Least Flexible” scenario will be possible by reducing the aggregate load reductions in accordance with established load tolerances, the Draft Report does not offer any reliable estimate as to what those cost savings will be. Larger sample sizes and proper sensitivity analysis of the estimates would be required to determine costs. And some measure of benefit or effectiveness would be required to demonstrate convincingly that the different scenarios are not only less costly, but “more cost-effective” or that they indeed meet the required standards.

## 2. Estimates missing for some pollutants and pollutant sources

The costs of developing and implementing TMDLs for some point and nonpoint pollutant sources are not included in the Draft Report cost estimates. In some cases this is because it is unclear either whether the pollutant will require TMDLs or how a TMDL will be structured in the case of some pollutants whose source is difficult to pinpoint. Nevertheless, there are some pollutants that will likely require TMDLs, the costs of which the Draft Report does not estimate.

There are some important pollutants from point sources that a number of states’ TMDLs are likely to control. Among them are chlorine, cyanides, and possibly mercury, although no specific mention is made of mercury in the Draft Report. These pollutants are all potentially costly to reduce and will require TMDLs when they are present in sufficient quantities. EPA chose not to include estimates for these pollutants, possibly due to a lack of data. Ideally, one could conduct an assessment of these likely costs and adjust the EPA estimates accordingly. However, costs cannot be inferred for TMDLs that may be developed without more detailed information about the number and type of water bodies and sources affected by the pollutants and resultant TMDLs.

The cost estimates for nonpoint sources in the Draft Report are, in general, less complete than those for point sources. There are more nonpoint source pollutants for which the implementation costs are not estimated, and many of these are potentially large relative to the overall level of implementation costs. Some of the costs for these important nonpoint sources may be particularly difficult to quantify, including those from abandoned mines, hydrological modification, air deposition, land disposal, leaks and spills, and natural sources, among others, including some for which the source itself is not easily categorized.

EPA also lists two other sources, “unknown sources” and “unidentified nonpoint sources,” which are not included in the cost estimates. It “scales” estimates to cover these, but that may not account for the problems states will have in reducing or eliminating discharges from these sources. If states are unable to identify a source, they are still held responsible for developing and implementing a plan to address it. These costs are by definition extremely uncertain, and may exceed whatever allowance EPA makes in its estimates. The bottom line is that including these sources in the TMDL program introduces uncertainty and reduces the precision of cost estimates.

EPA states that the nonpoint sources that are covered represent the bulk of all nonpoint sources contributing to impaired waters. Nevertheless, for the one nonpoint source type

listed above for which an estimate is available, the cost is considerable. The U.S. Forest Service estimates that the costs to resolve water quality problems in a number of abandoned mines on National Forest lands would be between \$60 and \$115 million per year until 2022.<sup>15</sup> Perhaps more informative, EPA estimates the annual costs of cleaning up coalmines to resolve water quality issues will cost \$173 million per year.<sup>16</sup> The latter cost as estimated by EPA should be included in the costs to implement TMDLs, as it is a nonpoint source that will likely be required to reduce discharges by TMDLs. While this cost represents only about 4 percent to 9 percent of the costs to implement TMDLs for nonpoint sources under the “Least Flexible” scenario, it would be anywhere from 10 percent to as much as 74 percent of the total costs to nonpoint sources if included under the “Moderately Cost-Effective” plan.

## V. What Are the Likely Costs of the TMDL Rule?

As noted above in Section III, EPA offers quite a wide range of possible estimates of the total costs of the TMDL rule. The possible lower bound cost is less than 25 percent of the possible upper bound. Despite the wide range, EPA’s estimates offer very little guidance as to what likely outcomes might be. All of the estimates are simple point estimates derived from different assumptions about the implementation of the relevant TMDLs. A proper sensitivity analysis and attempt to offer a best estimate based on a most likely outcome is essential to responding to Congress’s mandate. In addition to conducting a sensitivity analysis that recognizes the uncertainties involved in the estimates, EPA should develop a more robust approach to derive the “Moderately Cost-Effective” and “More Cost-Effective” scenarios. Reliance on an unrepresentative sample of 15 TMDLs is not reliable.

Correcting for those flaws in EPA’s analysis is beyond the scope of this comment. However, we have attempted to make some straightforward adjustments to EPA’s estimates based on problems identified in the previous section.

It is likely, as EPA states, that the costs to implement TMDLs will be lower than those EPA estimated in the “Least Flexible” approach, but the amount by which they will be reduced cannot be ascertained by any data presented by EPA in the Draft Report. Thus, we begin with the “Least Flexible” estimates and employ them as a baseline. To the extent that states may be constrained in their ability to implement cost-effective strategies by the detailed requirements of the TMDL rule, this may not significantly overstate total costs.

To this baseline we add estimates of the implementation costs of the additional 9000 TMDLs not included in the Draft Report, as well as the costs of implementing TMDLs for source types not included in the original analysis. While many of these costs are not available, or inadequate, reasonable approximations are available as demonstrated above

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<sup>15</sup> USDA review of EPA’s draft TMDL cost analysis, June/July 2001, as reported by EPA in *The National Costs to Implement TMDLs (Draft Report): Support Document #2*, EPA 841-D-01-005, August 1, 2001, p.III-3.

<sup>16</sup> EPA’s Draft Nonpoint Source Gap Analysis, Tetra Tech, Inc., February 7, 2001.

in Section IV. The additional costs for the 9000 TMDLs EPA expects as yet unlisted waters will need will add between \$330 million and \$770 million per year to the total cost of the “Least Flexible” scenario estimates. In addition, the costs of addressing water quality issues from one previously unconsidered nonpoint source, abandoned mines,<sup>17</sup> will add an additional \$173 million per year to total costs. Therefore, a better estimate of the total costs of the TMDL rule is from \$2.45 billion to \$5.26 billion per year.

## **VI. Conclusions and Recommendations**

The Draft Report attempts to estimate costs for the TMDL rule, but the rule is both prescriptive and open-ended, leaving states with little flexibility and substantial responsibility. The lack of knowledge about the extent of water quality problems and the very local nature of water quality issues has caused states to object to the broad federal authority asserted in the TMDL rule. The difficulties EPA has had in estimating the costs of the TMDL rule highlights this essential problem. While EPA has compiled detailed estimates of the costs of developing and implementing TMDLs, these estimates are not reliable measures of what the real costs of the program will be.

The Draft Report on the costs to develop and implement TMDLs under the revised TMDL program regulations lacks important information that would make it a complete tool to analyze the program. It develops cost estimates but includes no associated benefits estimates so that net benefits to society from the rule may be determined. At the very least it should include some measure of the effectiveness of the various implementation scenarios so that comparisons could be conducted. For costs to be meaningful for policy analysis, they must be connected to benefits in order to understand if the net result of the policy is beneficial. This is not possible for TMDLs.

The analysis of costs is of inconsistent quality. EPA should be commended for the detailed and technically sophisticated estimation of the costs of the “Least Flexible” implementation scenario. Using existing databases of pollutants and pollutant sources cross-referenced with geographic databases of the affected waters, EPA estimated a reliable baseline cost estimate. However, the data used to adjust these costs to form the “Moderately Cost-Effective” and “More Cost-Effective” scenarios is inadequate. EPA employs a sample of only 15 TMDLs to draw conclusions about costs in a population of 36,225 TMDLs. Given the variance in per unit TMDL types and costs, this sample is not statistically significant and any results arrived at through its employment are unreliable.

EPA fails to include estimates for some important costs. The report did not consider some important pollutants and pollutant sources in determining the costs to implement TMDLs. More importantly, no attempt was made to estimate the costs of TMDLs that states will need to develop and implement based on future listings of impaired waters. EPA estimates that states will develop and implement 9000 future TMDLs, nearly 25

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<sup>17</sup> The overwhelming majority of abandoned mine sites that must be addressed are coalmines. Thus, as an approximation, and because no other data are available, the estimate for addressing coalmines as a nonpoint source of water pollution is used.

percent of the total number currently required, yet EPA did not include these costs in the total implementation costs.

Using a relatively straightforward approach to estimate some of the missing costs, we conclude that the costs of the “Least Flexible” scenario will be \$2.45 billion to \$5.26 billion per year. We do not offer adjusted estimates of the “Moderately Cost-Effective” or “More Cost-Effective” scenarios because the data used to produce them is inadequate and cannot be expected to provide reliable results. Making adjustments to faulty base estimates cannot produce good information.

The costs of the TMDL program will add between 18 percent and 37 percent annually to the total costs of the Clean Water Act. However, it is uncertain what effect the program will have on the Clean Water Act benefits, or water quality in the United States.