

**Where the Three Rivers Converge:
Unassessed Waters and the Future of
EPA's TMDL Program: A Case Study**

William V. Luneburg

3 RIVERS 2ND NATURE

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Abstract

The water resources of Allegheny County possess vast potential for improving the quality of life for those persons living and visiting Pittsburgh and vicinity. However, their use for recreational purposes, including casual contact in the course of enjoying the many public and private spaces that offer an escape from urban or heavily developed suburban living, is clouded by the lack of scientific data indicating whether and where disease-causing bacteria are present in the thousands of miles of streams and creeks that define the County's landscape. What data exists, however, suggests that bacterial pollution may be a significant problem, at least in certain locations.

The absence of water quality data for Allegheny County with regard to human pathogens is a particularly troublesome gap against a background of more than thirty years of an intense Federal-State effort under the aegis of the Clean Water Act to identify polluted waters and commence clean-up efforts. Moreover, the lack of such data is not confined to Allegheny County but extends to the entire Commonwealth of Pennsylvania. Neither US EPA nor the Pennsylvania Department of Environmental Protection nor any other federal or state agency has yet made it a matter of priority to survey the rivers, streams and creeks of the State for bacterial contamination. Moreover, private monitoring efforts with regard to this type of pollution have been very limited and, with one exception,¹ confined to areas outside of Allegheny County.

In recent years, both EPA and the States have changed course from focusing regulatory efforts on identified industrial and municipal dischargers of waste to the more ambitious task of creating pollution reduction goals (i.e. total maximum daily loads or TMDLs) whose achievement will allegedly insure the attainment and maintenance of water quality standards (including those for bacteria). But, without an adequate baseline of existing water quality, that initiative is doomed to failure, as both levels of government readily concede.

Moreover, the task of assessing all of the Nation's waters for all applicable water quality standards is immense, necessitating the efforts of not only governmental agencies but also private citizens organized in volunteer water quality monitoring groups. Hundreds of such organizations already exist, though in Pennsylvania few have indicated any interest to date in gathering water monitoring data for bacteria (measured as fecal coliform in Pennsylvania and, in other States, *E. coli*). Reasons for the lack of volunteer efforts to sample for fecal coliform include the professional sophistication and routine required to collect data that is usable for regulatory purposes and the expense of obtaining the necessary laboratory resources for sample analysis.

In view of 1) the Clean Water Act's emphasis on achieving water quality standards, 2) EPA's current efforts to fulfill that mandate, 3) the existing inadequacy of water quality information on such a significant parameter as disease-causing water-borne bacteria, and, finally, 4) the inability or

¹ The STUDIO for Creative Inquiry, College of Fine Arts, Carnegie Mellon University.

unwillingness of governmental and other entities to create the necessary water quality baseline, it is imperative that a non-governmental entity be created to undertake the task of assembling and maintaining a publicly accessible database reflecting the water quality condition of the streams and creeks in Allegheny County in terms of bacterial pollution. Indeed, under EPA guidelines, in order to develop and implement controls to eliminate combined sewage overflows (CSOs) (a significant problem in the County that is currently the subject of a negotiated consent decree), there must be adequate ambient water quality monitoring.

The two most important contributions that the proposed organization could offer would be *continuity* of data gathering and analysis and *professionalism* in creating the necessary database. A stable and diversified funding base is the key to continuity and professionalism, necessary for data credibility, requires adherence to recommended quality assurance/quality control procedures, whose rigor will depend on the use(s) intended for the data. Ideally, in order to maximize the ability of the proposed organization to assist with expediting the completion of the TMDL process and to provide a necessary component of adequate CSO control, the data should meet the minimum data requirements imposed by DEP for listing waters as impaired under Section 303(d) of the Clean Water Act.

In order for its work product to be credible and to contribute significantly to watershed improvement in the County, the organization must be interdisciplinary by design and developed with strategic intent. The organization will require a mix of field, laboratory and design abilities and should have access, if need arises, to legal counsel. Consistent funding source(s) will allow the development of strategic, though comprehensive, databases that can be updated as needed and expanded to encompass as much as possible of the County's river-stream-creek network. There must be a professional staff of one or more members who can create and utilize geographical information systems and probabilistic sampling designs to choose sampling sites, supervise the sampling effort of volunteers, analyze the samples, and maintain adequate records of data collection.

Whatever use regulatory authorities may make of data generated by the proposed watershed organization, it is above all important that the database created be made available *in a comprehensible format* to the public at large. This would include a webpage to display the data as soon as it is quality assured as well as periodic press releases and reports distributed to local news media indicating the results of sampling conducted and the conclusions that might be drawn from them. Studies have shown that public disclosure of environmental information can be a powerful aide and incentive to reduction or elimination of the sources of pollution.

The composition of the Board of Directors (or other oversight panel) of the organization (which, ideally, should be a non-profit corporation) will be particularly important in helping to establish the credibility of the organization and the information it offers to the public and, in doing so, convince potential funding sources that their money will be well spent. The Board must, for example, represent the diversity of community, corporate, and governmental interests that have a stake in water quality improvement. In all events, Board members must share the view that attainment of water quality standards in the County must go hand-in-hand with economic development if the region is to achieve its potential as an attractive, enjoyable, and safe place to live and visit.

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*Water, water, every where,
And all the boards did shrink;
Water, water, every where,
Nor any drop to drink.*

Samuel Taylor Coleridge

The Rime of the Ancient Mariner in Seven Parts

I. INTRODUCTION

Scarcity in the midst of apparent abundance; desiccation in lieu of the flowering of possibilities. In view of the over ninety miles of rivers and two thousand twenty four miles of streams in Allegheny County, the dilemmas now facing the area's residents and visitors would be all too familiar to Coleridge's *Ancient Mariner*. While water quality in the Ohio, Monongahela and Allegheny Rivers may meet applicable environmental standards in dry weather, that is clearly not the case during wet weather episodes. And, as indicated by recent sampling efforts, even in dry weather the quality of many of the smaller rivers and streams in the County may be sub-par at best for many human uses.

Pittsburgh is defined by water—and that has been the case since the Eighteenth Century. The confluence of three of the major rivers that rise on the western slopes of the Appalachian Mountains early endowed Pittsburgh with major political, military and economic significance. Even as the limit of the American West was extended to the mouth of the Columbia River, Pittsburgh's rivers and streams continued to provide a resource on which the region could build its industrial and commercial preeminence. And, with the passing of heavy industry as the mainstay of Pittsburgh's economy, those rivers and streams retain the potential as an environmental amenity of immense economic and non-economic value not only to those people currently living or working in Allegheny County but also to those who might otherwise be attracted to the region. However, that potential may not in fact be realized to the extent the existing infrastructure for handling sewage and stormwater is not significantly improved and if other contributing causes to water quality impairment cannot be identified and removed.

Concentrated attention on water quality improvement in Allegheny County is not, moreover, simply a matter of good social, economic, and environmental policy. It is a legal imperative. Prompted by lawsuits across the county, the US Environmental Protection Agency (EPA) is requiring States, including Pennsylvania, to change their regulatory focus from the quality of effluent as it leaves the municipal and industrial outfall points to improving the quality of the receiving water in rivers, streams, estuaries, and lakes. However, that regulatory effort will require an extensive and credible database reflecting current water quality conditions for all water bodies in the Nation. Yet, in many States, including Pennsylvania, such a complete database does not exist for all rivers and streams or for many important pollutants. In particular, for water-borne bacteria that may indicate the presence of organisms injurious to human health, there is very little available data in the Commonwealth generally. In Allegheny County, while there has been some monitoring by government agencies and other entities in some locations, the data thus far collected gives a seriously incomplete picture of the vast river-stream network that is responsible for many of the distinctive characteristics of the Pittsburgh region. Moreover, given the dearth of federal, state and local government resources, it is unlikely that the existing bacteria pollutant database can be significantly improved in quality or quantity without the assistance of nongovernmental entities that can take it upon themselves to monitor the streams and rivers. Such nongovernmental efforts had not been forthcoming until 2000 when the 3 Rivers 2nd Nature Project of the STUDIO for Creative Inquiry at Carnegie

Mellon University started to collect, analyze, and publicly report river and stream data that fills some of the important gaps in information and, of particular significance, powerfully suggests directions for future monitoring efforts.¹

The significance of a credible database, if it is created in the future, will not be measured solely in terms of its ability to survive the filters that are imposed by regulatory authorities to distinguish usable data from that which cannot be relied upon in crafting regulatory “fixes” for water quality. At least as importantly, a comprehensive and reliable database of water quality information that is publicly available, easily accessible, and understandable to the layperson has the potential to create a powerful constituency for good water quality in the region. And that, in turn, can help insure that existing and future development is subservient to overall planning for watershed protection and improvement.

II. THE ISSUES PRESENTED

Without a reasonably accurate picture of existing water quality conditions, regulatory and non-regulatory efforts are more than likely to miss their mark and squander valuable resources (including time, money and human effort) in the process. Moreover, even after baseline conditions are known, dealing effectively with the many and diverse sources of pollution, both point and nonpoint,² presents immense challenges, including the need to think and act on a watershed basis rather than from more limited perspectives. In that context, creativity and innovation will be the hallmarks of success and this requires inclusive, rather than exclusive, and collaborative information-gathering, decision-making, and implementation.

Since the lack of adequate information on the quality of streams and rivers has been recognized at the national level with regard to water resources across the country³ and that same gap has been specifically identified at the local level with respect to Allegheny County,⁴ the question presented is how this vacuum can effectively be filled? More precisely, if governmental entities are unwilling or, more likely, unable on the basis of resource constraints to assemble and maintain a reliable database for the County’s rivers and streams, can and should a private group or entity of some type be created for that purpose? How should it be structured? What should its functions be? What types of expertise should it possess? Should one of its priorities be the widespread public dissemination of the information it gathers? What are the most effective

¹ See, e.g., *3 Rivers 2nd Nature Aquatic Reports: Allegheny River Phase 3-2002*.

² A point source of water pollution involves a discrete, identifiable discharge (e.g. the river outfall of a factory). In contrast, nonpoint sources are diffuse (e.g. runoff from a farm during a rain event); as a consequence, identifying the actual cause of the resulting water quality impairment along with a satisfactory approach to its abatement may be difficult.

³ See text at notes 114-16 *infra*.

⁴ See Pennsylvania Economy League, *Investing in Clean Water: A Report by the Southwestern Pennsylvania Water and Sewer Infrastructure Project Steering Committee 1* (2002).

means for it to achieve that dissemination in a timely fashion? What should be the targeted sources for funding its activities?

Coming to grips with these issues and proposing an appropriate approach requires an overview of the federal and state regulatory framework that currently exists for water quality improvement, the status of efforts to identify and deal with suspected bacteria contamination of Pennsylvania's streams and rivers, and the nature and roles of citizen (nongovernmental) water quality monitoring efforts in Pennsylvania and beyond.

III. THE REGULATORY CONTEXT

A Short History of the TMDL Program

In 1972, Congress finally got serious about cleaning up the Nation's waters. In the Federal Water Pollution Control Amendments (FWPCA) enacted that year, it made it unlawful for any point source⁵ to discharge a pollutant into the waters of the United States without a permit from EPA or, alternatively, from a State delegated authority to administer the National Pollutant Discharge Elimination System (NPDES) for waters within its jurisdiction. Such point sources were required to meet Best Available Technology (BAT) standards⁶ established for source categories by EPA. For the next twenty years, the focus of both EPA and the States was the establishment of the BAT standards and their incorporation into permits issued to thousands of industrial and municipal dischargers across the Nation.

Prior to 1972, the federal effort to eliminate water pollution depended upon state establishment and implementation of what are called Water Quality Standards (WQSs) under EPA oversight. The WQSs consist of 1) designated uses assigned to segments of rivers, streams, and lakes, such as use for body contact recreation, and 2) numerical and non-numerical criteria defining the quality of water necessary to sustain the designated use(s) (e.g. a minimum of 5 mg/l of dissolved oxygen in trout streams). For a variety of reasons, the WQS program had not made a significant impact on water quality improvement—thus prompting Congress in 1972 to look for an approach that promised immediate progress. That regulatory technique turned out to be the imposition of the BAT requirement on all new and existing dischargers into the “waters of the United States.”

⁵ See note 2 *supra*.

⁶ The Act itself distinguishes among these standards in terms of stringency of control, pollutant of concern, and other factors. At base, however, regardless of labels, Congress required sources to install the “best” technology so variously defined. In the context of this article, the statutory distinctions among the technology standards are not relevant.

Nevertheless, among the voluminous and detailed provisions of the FWPCA (now known as the Clean Water Act or the CWA), was Section 303(d) that, among other provisions, continued to embrace the achievement of water quality standards as a goal of the Act and provided a blueprint to attain that goal. Simply stated, Section 303(d) requires that

- 1) on a regular basis each State must prepare a list of the surface water segments (called “water quality limited segments” or WQLSs) within its jurisdiction that do not comply with applicable WQSs; then
- 2) the State must calculate, for each pollutant as to which the WQSs have not been achieved, the amount of aggregate pollution reduction from point and nonpoint sources necessary to meet the WQS for that pollutant (this is called the Total Maximum Daily Load or TMDL); and, finally,
- 3) the State must allocate that aggregate amount among point and nonpoint sources affecting the water segment in question.

In the case of point sources that are assigned Wasteload Allocations (WLAs) within the TMDL’s limits, NPDES permits are to require control above and beyond BAT levels of effluent limitation to the extent necessary to bring point source contributions to water quality impairment within the applicable WLAs for the pollutant in question.⁷ For the nonpoint sources subject to the TMDL, the CWA contains no regulatory provisions to insure that they will in fact reduce their discharges to attain the Load Allocation (LA) assigned to them by the TMDL.⁸ For all intents and purposes, it is entirely a matter of state law whether and to what degree nonpoint sources must reduce their contribution to WQSs’ exceedences.

States were required by Section 303(d) to list impaired waters and submit TMDLs to EPA for its review after EPA identified those pollutants as to which the TMDL approach was viable. EPA was to review the lists and TMDLs and determine if they satisfied the requirements of the Act. While Section 303(d) was clear that, where a State submitted a deficient list or TMDL, EPA was required itself to establish them, it said nothing about EPA’s responsibilities in the case where a State took no action in response to Section 303(d)’s mandates.

⁷ For those knowledgeable with regard to the Clean Air Act, this process bears a familial resemblance to the process for the development of state implementation plans to attain the National Ambient Air Quality Standards, a process mandated by Congress in 1970.

⁸ Nonpoint sources are discussed at various points in EPA regulations, including 40 C.F.R. §131.12(a)(2)(involving nondegradation policy).

Despite what appears to be an ambitious program mandated by Section 303(d), from the outset it was clear that EPA would put its implementation on the backburner in preference to BAT implementation for point sources through the NPDES program. In fact, the Senate's main powerbroker for environmental legislation, Senator Edmund Muskie of Maine, told EPA in no uncertain terms that Section 303 should receive "secondary priority."⁹ Accordingly, the date for state submission of impaired waters lists and TMDLs (June 26, 1979) came and went with EPA and the States busying themselves with other tasks under the CWA.

While the early 1980's saw some States, like New York, start to embark on TMDL preparation, progress was very slow indeed—not surprisingly since the normal driver for environmental improvement (at least until recent years) has come from the federal government which, in this case, was largely complacent with regard to the lack of progress. But things changed, if not rapidly, then at a moderate pace, as EPA was sued repeatedly by private individuals and organizations for its inaction and, in the end, suffered significant defeats in the courts.¹⁰ The reason for the dissatisfaction reflected by the number of lawsuits commenced was obvious: the NPDES program had improved water quality—but not enough. It is estimated that today over 300,000 river and shore miles and 5 million lake acres do not meet state water quality standards, requiring more than 40,000 TMDLs.¹¹

One of the key legal arguments accepted by the courts in forcing EPA to act was that, where a state failed to submit the Section 303(d) list of impaired waters and TMDLs, at some point a "constructive submission" of an inadequate list and inadequate TMDLs would be deemed, as a matter of law, to have occurred triggering EPA's statutory duty to itself identify impaired waters and establish TMDLs for the State.¹² While existing case law is not entirely free from ambiguity in terms of how minimal a state submission can be and still avoid the constructive submission

⁹ See Oliver A. Houck, *The Clean Water Act TMDL Program: Law, Policy, and Implementation* at 24 (1999). The book is the classic legal history of the neglect and subsequent "rediscovery" of the TMDL program. For a more recent examination of the TMDL program, see James R. May, *The Rise and Repose of Assimilation-Based Water Quality, Part I: TMDL Litigation*, 34 *Environmental Law Reporter* 10247 (2004)(hereinafter *TMDL Litigation*)(Mr. May was one of the plaintiffs' counsel in the federal litigation involving EPA's failure to promulgate TMDL's for Pennsylvania in the face of the State's failure to act, the results of which litigation are described in the text at notes 18-20 *infra*.)

¹⁰ More than 100 lawsuits were brought in 38 states involving the non-implementation of Section 303(d), at least 40 since 1992. See *TMDL Litigation* at 10247.

¹¹ National Research Council, *Assessing the TMDL Approach to Water Quality Management* (National Academic Press, Washington, D.C. 2001) at 2. Given the lack of adequate state monitoring for water quality, see text at notes 26-7 *supra*, such an estimate may significantly understate the quantity of required TMDLs.

doctrine, it appears that if a state has submitted a list of some impaired waters and a few TMDL's, EPA does not have a judicially enforceable duty to find that a constructive submission of inadequate TMDL's has occurred.¹³

In addition to the “constructive submission” theory, the remaining bases for challenging EPA’s failure to act in response to state inaction in the TMDL area are rooted in the federal Administrative Procedure Act (APA) and its authorization for courts to overturn agency actions deemed to be arbitrary, capricious or an abuse of discretion or unreasonably delayed.¹⁴ It is difficult to generalize in terms of the law that has evolved to date or is evolving under these theories since the factual and legal circumstances confronting the courts where these arguments have been presented have varied considerably and the courts’ opinions have been carefully nuanced in response. Where, for instance, a State has failed to assess all of its surface waters with regard to all applicable WQSs but has in fact submitted Section 303(d) lists including some impaired waters and some TMDL’s and those have been lawfully approved by EPA, can that EPA approval action nevertheless be deemed arbitrary, capricious, or an abuse of discretion to the extent it impliedly accepts less than full compliance with Section 303(d) with regard to all of the State’s waters? An answer to this question is particularly important for current purposes. At least one federal court opinion might be construed to suggest an affirmative answer,¹⁵ while one other appears to take the opposite position.¹⁶ Since TMDL law in the Third Circuit, which encompasses Pennsylvania, is almost entirely nonexistent,¹⁷ it is impossible to predict how the federal District Courts and the Court of Appeals for that Circuit will react to such issues when and if presented.

¹² The seminal case is *Scott v. City of Hammond*, 741 F.2d 992 (7th Cir. 1984). The constructive submission theory was applied in the Third Circuit in *American Littoral Society v. US EPA*, 199 F. Supp. 2d 217 (D. N.J. 2002), involving New Jersey’s TMDL program. In the latter case, the court found that New Jersey had been active enough with regard to TMDL submission that EPA was not arbitrary and capricious in not finding an inadequate “constructive submission.”

Interestingly, the *American Littoral Society* case is currently (March 2004) the only court decision dealing with the TMDL program in the Third Circuit which includes Pennsylvania. If and when the first TMDL case gets to that Court of Appeals, the court will write on a clean slate, adopting or perhaps refusing to adopt the approaches taken by federal courts in other Circuits.

¹³ See, e.g., *American Littoral Society v. US EPA*, 199 F. Supp. 2d at 239-44.

¹⁴ 5 U.S.C. §706.

¹⁵ See *Sierra Club v. Hankinson*, 939 F. Supp. 865 (N.D. Ga. 1996)(“ . . . Georgia’s undisputed failure to monitor or evaluate over ninety percent of its waters, in light of EPA regulations requiring monitoring . . . is relevant to the Court’s consideration of whether EPA’s approval of Georgia’s WQLS [water quality limited segment] list was arbitrary and capricious.”)

¹⁶ See *Friends of the Wild Swan, Inc. v. US EPA*, 130 F. Supp. 2d 1184 (D. Mont. 1999)(“Plaintiffs contend the EPA’s approval of Montana’s 1998 list of WQLSs was arbitrary and capricious because the 1998 list was not based upon an assessment of all the waterbodies located in the state. This argument is not persuasive because neither the CWA nor the EPA regulations require a state to assess all of its waterbodies before making a submission of WQLSs”)

¹⁷ See note 12 *supra*.

The one lawsuit that was brought in Pennsylvania involving the TMDL program, *American Littoral Society, et al. v. US EPA*,¹⁸ resulted—like many other TMDL suits—in a consent decree. The Pennsylvania decree was entered in 1997 and established a twelve year schedule for TMDL preparation focused on Pennsylvania's 1996 list of impaired waters, a list that included very few impairments caused by bacteria (some municipal and agriculture sources only). In addition, EPA committed itself to develop guidance to “provide criteria for determining what particular sources of water quality–related data and information constitute ‘existing and readily available water quality-related data and information.’” to be used for the State's Section 303(d) listing determinations. Moreover, in reviewing Pennsylvania's 1998 and subsequent lists of water quality-impaired segments, EPA was to “consider whether Pennsylvania has assembled and evaluated all existing and readily available water quality-related data and information” for waters violating applicable water quality standards, for significant lakes, and previously unassessed non-wadeable rivers and streams.¹⁹ Finally, EPA committed itself to develop a report that evaluates and makes recommendations regarding Pennsylvania's water quality monitoring and assessment program and Section 303(d) listing process, which report was to be used by EPA in determining the approvability of Pennsylvania-submitted lists of impaired waters.²⁰

Stung by repeated losses in federal court over its non-implementation of the TMDL program, EPA gradually accepted the need for a more aggressive approach to Section 303(d). While it had adopted some regulations governing the identification of impaired waters and creation of TMDL's in 1985, it revised them in 1992 and, in 1996, established a Federal Advisory Committee to provide recommendations to improve the program. The Committee's report was issued in July 1998 and, based in part on that report, EPA proposed important revisions to the TMDL implementing regulations in August 1999 and adopted them in final form the following July. Among other changes, the new rules contained provisions to 1) promote more comprehensive inventories of impaired waters; 2) mandate preparation of implementation plans as part of TMDLs that would contain specific actions and schedules to reduce pollutant loads; and 3) change various aspects of the NPDES program to assist in implementing TMDLs. Controversial from the start, the new rules were ultimately withdrawn by EPA on March 19, 2003,²¹ though some aspects of those rules have found their way into guidance documents that EPA has issued over the course of the last several years.²²

¹⁸ Civ. No. 96-489 (E.D. Pa.). Despite the same caption, this case is not the same one resulting in the only issued opinion on the TMDL program in the Third Circuit. See text at note 12 *supra*.

¹⁹ See 40 C.F.R. §130.7(b)(5)(2003) which requires all states to consider “existing and readily available water quality-related data and information” in preparing their Section 303(d) lists. See text at notes 39-45 *infra*.

²⁰ Several of the required reports were issued together on July 15, 1997 as *EPA REGION III GUIDANCE for the Prioritization and Targeting of Waters Listed Under Section 303(d) of the Clean Water Act and Determination of Existing and Readily Available Water Quality-Related Data and Information for Listing Waters Under Section 303(d) of the Clean Water Act*.

²¹ 68 Federal Register 13608 (March 19, 2003).

²² See text at notes 46-8 *infra*.

Steps in TMDL Development

1. Data Gathering

Without water quality data, TMDL development is stymied from the outset. Under the Clean Water Act, monitoring rivers and streams to determine whether or not water quality standards are met is entirely a state responsibility. Several of the TMDL court decisions have expressly refused to require EPA to conduct water quality monitoring²³ and others have found no legal mandate in the Act for adequate state monitoring prior to EPA action to approve or disapprove a Section 303(d) list.²⁴ At the same time, however, Section 106(e)(1)²⁵ of the CWA conditions state receipt of federal grant funds for its water pollution control program on EPA's finding that the state is monitoring the quality of its surface waters and compiling and analyzing the data obtained.

In recent years, a variety of reports have confirmed the need to improve substantially water quality monitoring, both in quantity and quality, as an essential basis for credible water quality improvement programs.²⁶ As EPA recently noted:

States have taken very different approaches, within their resource limitations, to implement their monitoring programs. They have applied a range of monitoring and assessment approaches (e.g., water chemistry, sediment chemistry, biological monitoring) to varying degrees, both spatially and temporally, and at varying levels of sampling effort. It is not uncommon for the

²³ See *Sierra Club v. Hankinson*, 939 F.Supp. 865, 870 (N.D. Ga. 1996); *Alaska Center for the Environment v. Reilly*, 796 F. Supp. 1374, 1380 (W.D. Washington 1992), *aff'd* 20 F.3d 981, 987 (9th Cir. 1994)(in the context of a CWA citizen suit which is limited to forcing EPA to carry out its “nondiscretionary” duties under the Act, the court noted that it “lacks the authority to require the EPA to perform specific ambient water quality monitoring,” though, at the same time, it did require EPA to prepare a report indicating its views on what ambient water quality monitoring was necessary and appropriate and a timetable for implementation of recommended monitoring in Alaska).

²⁴ See *Friends of the Wild Swan*, 130 F. Supp. 2d 1184, 1193 (D. Mont. 1999), *aff'd in part and reversed in part* 74 Fed. Appx. 718 (9th Cir. 2003)(unpublished)(“ . . . neither the CWA nor the EPA regulations require a state to assess all of its waterbodies before making a submission of WQLSs.”); *Sierra Club v. US EPA*, 162 F. Supp. 2d 406, 413 n. 5 and 416 (D. Md. 2001)(noting that the plaintiffs had provided “no support for the contention that an adequate monitoring program is explicitly required prior to the EPA’s approval of a 303(d) list submission” and, since there was no requirement under state law that the state take a certain number of fecal coliform bacteria samples each month, EPA could accept the lack of adequate sampling data as a reason for the state not to list a particular water segment).

²⁵ 33 U.S.C. §1256(e).

²⁶ See e.g., National Advisory Council for Environmental Policy and Technology, *Final Report of the Federal Advisory Committee on the Total Maximum Daily Load (TMDL) Program* (1998), <http://www.epa.gov/owow/tmdl/faca/tofc.htm>; US General Accounting Office, *Water Quality-Key EPA and State Decisions Limited by Inconsistent and Incomplete Data* (March 2000), GAO/RCED-00-54; National Research Council, *Assessing the TMDL Approach to Water Quality Management* (National Academy Press, Washington, D.C. 2001); National Academy of Public Administration, *Understanding What States Need to Protect Water Quality* (Dec. 2002), <http://www.napawash.org/>

reported quality of a waterbody (i.e. attainment or nonattainment) to differ on either side of a State boundary. Although some differences can be attributed to differences in water quality standards, variations in data collection, assessment methods, and relative representativeness of the available data contribute more to differences in assessment findings. These differences adversely affect the credibility of environmental management programs.²⁷

In view of these findings, EPA issued in March 2003 a guideline that describes what it believes to be the elements of a satisfactory state water quality monitoring and assessment program and indicates that States should adopt and implement a long-term monitoring program strategy to upgrade their respective programs.²⁸ The guidance is described “as a tool to help EPA and the States determine whether a monitoring program meets the prerequisites of CWA Section 106(e)(1).”²⁹ The recommended elements include, among others, 1) management and project plans to assure data quality; 2) public access to an electronic data system for water quality (ultimately to include mandatory use by States of EPA’s STORET system³⁰); and 3) a methodology for assessing attainment of water quality standards to include “criteria for compiling, analyzing, and integrating all readily available and existing information (e.g., volunteer monitoring data . . .).”³¹ EPA also recommends that, in developing its long-term water quality monitoring strategy, each State work with all interested stakeholders, including nongovernmental monitoring organizations, in order to maximize its ability to use other parties’ data and expand its necessarily limited monitoring resources.³²

Pennsylvania’s Department of Environmental Protection (DEP) currently has a Water Quality Network (WQN) of approximately 150 fixed monitoring stations located on rivers, streams and lakes throughout the State for which field and laboratory analyses focus on a variety of chemical and other indicators of water quality.³³ Included among those parameters is fecal

²⁷ USEPA, *Elements of a State Water Monitoring and Assessment Program*, EPA 841-B-03-003 (March 2003)(hereinafter *Monitoring Elements*) at 1 available at <http://www.epa.gov/owow/monitoring/elements/>

²⁸ *Id.*

²⁹ *Id.* at v.

³⁰ See text at note 146 *infra*.

³¹ *Monitoring Elements*, *supra* note 27, at vii.

³² *Id.* at 4.

³³ See, e.g., River Network and Pennsylvania Department of Environmental Protection, *Designing Your Monitoring Program: A Technical Handbook for Community-Based Monitoring in Pennsylvania* (Feb. 2001)(hereafter *Technical Handbook*), available at <http://www.dep.state.pa.us/dep/deputate/watermgt/wc/Subjects/cvmp/Initiatives/default.htm>. Appendix 3 gives an overview of DEP’s monitoring activities. See also <http://www.dep.state.pa.us/dep/deputate/watermgt/wq/wqstandards/Facts/FS2194.htm> and <http://www.dep.state.pa.us/dep/deputate/watermgt/wq/wqstandards/Facts/Pubs-c.htm> and <http://www.dep.state.pa.us/dep/deputate/watermgt/Wq/WQStandards/wqstandards.htm>

coliform. But that pollutant can be monitored only at some selected sites for the purpose of describing reference water quality conditions.³⁴ With more than 83,000 miles of free-flowing surface waters, the WQN is obviously insufficient to give a full picture of water quality in the Commonwealth with regard to each and every water quality standard.

As a result of the *American Littoral* consent decree, the State is now, however, engaged in a ten-year program (the Statewide Surface Water Assessment Program)(SSWAP) to assess all waters in the State for certain parameters. It is crucial to note, however, that the assessment program, as currently structured, focuses on biological surveys involving macro-invertebrates, habitat, and watershed landscape.³⁵ It utilizes EPA's so-called "rapid bioassessment protocol."³⁶ Such an analysis offers only a partial picture of the attainment status of applicable water quality standards. For present purposes, a glaring omission is fecal coliform bacteria concentrations that determine whether a particular river, lake or stream segment is usable for water contact recreation.³⁷

However, if DEP's failure to assess the State's waters for all water quality standards is ignored for the moment, the progress of SSWAP to date is impressive, at least in geographical coverage terms. Through the year 2002, 52,889 miles, or 63.6%, of the State's surface waters had been assessed. Of these, 44,504 miles were found to be supporting designated aquatic life uses and 8,385 miles, or 16%, were found to be impaired. The leading sources of impairment have been identified as agriculture (37.3%), acid mine drainage (37.2%), and urban runoff (16.1%).³⁸

2. Filters for Use of Data for 303(d) Listing Purposes and TMDL Development

a. EPA Requirements and Guidance

That water quality data exist does not necessarily mean that they can appropriately be used to determine whether or not water quality standards are met in a particular river or stream segment and, therefore, that a TMDL is (or is not) required. Simply stated, the methods for collecting, preserving, or analyzing a water sample or the related record-keeping procedures may be deficient. That is to say, there may have been a problem in "quality assurance/quality control" with regard to the particular sampling effort.

³⁴ *Technical Handbook, supra* note 33, at A3-2.

³⁵ Aquatic surveys purportedly allow DEP to measure chronic impacts on water bodies with one site visit and this facilitates compliance with the timetable established by the *American Littoral* consent decree.

³⁶ See <http://www.epa.gov/owow/wtr1/monitoring/rbp/>.

³⁷ The type of analysis implicated in the RBP can be accomplished by a single person doing a single stream walk with the associated evaluation being very cursory.

³⁸ Information regarding DEP's current assessment program can be found at http://www.dep.state.pa.us/watermanagement_apps/tmdl/, <http://www.dep.state.pa.us/dep/deputate/watermgt/wqp/wqstandards/Facts/fs2744.htm> and <http://www.dep.state.pa.us/dep/deputate/watermgt/wqp/wqstandards/wqstandards.htm>.

The first site includes the slide presentation, *Pennsylvania's TMDL Program . . . Restoring Water Quality* that provides the 2002 update whose statistics are contained in this paragraph.

EPA requires that, in preparing its biennial 303(d) list, the State “shall assemble and evaluate all existing and readily available water quality-related data and information”³⁹ which includes, at a minimum, data submitted by “members of the public.”⁴⁰ Indeed, non-governmental sources should be “actively solicited” for information they may have.⁴¹ Moreover, in providing the Section 303(d) list to EPA, the State must transmit documentation to support its determination to list or not list a river or stream,⁴² including the methodology used to develop the list,⁴³ a description of the data used to list waters,⁴⁴ and the rationale for not using particular “existing and readily available data and information” to list a stream or river as impaired.⁴⁵

In connection with these federal requirements, EPA recently issued two important documents, a *Consolidated Assessment and Listing Methodology—Toward a Compendium of Best Practices* (July 2002) (CALM)⁴⁶ and *Guidance for 2004 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d) and 305(d) of the Clean Water Act* (July 2003) (ALRR),⁴⁷ which, to some degree, provide the guidance to States that the now-withdrawn July 2000 TMDL regulations revision package was intended to furnish.⁴⁸ For current purposes, the significance of these documents lies primarily in the impact they will have on State use or rejection of water quality data for listing purposes.

Lurking, moreover, in the background of the listing process and the application of these new guidance documents to that process is the federal Data Quality Act (DQA) of 2000⁴⁹ which became effective on October 1, 2002. While the DQA's significance may have escaped notice at the time of its enactment, buried as it was in appropriations legislation passed at the very end of a Congressional session, the Act has increasingly attracted attention as a possibly potent weapon to improve or, on the other hand, slow or derail regulatory initiatives at EPA and other federal agencies on the basis that the information on which those initiatives is based lacks the “quality, objectivity, utility [or] integrity” mandated by the Act.

³⁹ 40 C.F.R. §130.7(b)(5).

⁴⁰ *Id.* §130.7(b)(5)(iii).

⁴¹ *Id.*

⁴² *Id.* §130.7(6).

⁴³ *Id.* §130.7(6)(i).

⁴⁴ *Id.* §130.7(6)(ii).

⁴⁵ *Id.* §130.7(6)(iii).

⁴⁶ This document can be found at <http://www.epa.gov/owow/monitoring/calm.html>.

⁴⁷ This document can be found at <http://www.epa.gov/owow/monitoring/regguid.html>.

⁴⁸ See 68 Federal Register 13610-11.

⁴⁹ See Treasury and General Government Appropriation Act for Fiscal Year 2001, Pub. L. No. 106-554, §515 Appendix C, 114 Stat. 2763A-153(2000).

The Office of Management and Budget has adopted guidelines for government-wide implementation of the DQA⁵⁰ and each federal agency must have its own DQA regulations. EPA has its guidelines in place,⁵¹ along with “assessment factors” that apply to its use of third party (e.g. state or privately generated) data.⁵² Henceforth, these will form the backdrop for the agency’s evaluation of information, whether created by or supplied to EPA, that may be used “to formulate or support a regulation, guidance, policy, or other Agency decision or position.”⁵³ Such decisions and positions would appear clearly to include EPA approval or, if a state fails adequately to act, promulgation of 303(d) lists and TMDLs. EPA’s use, or even the refusal to use, certain data may prompt lawsuits to overturn those decisions based on the failure of EPA to comply with the DQA or the applicable guidelines.

Returning, then, to the CALM and ALRR guidance documents, the former provides a framework for States to use in documenting how they collect and use water quality data and information for environmental decision-making. Among its other recommendations is that States provide clear documentation of the requirements they impose for the use of data for their Section 303(d) lists so as to facilitate contribution by third parties to the State’s decision-making.⁵⁴

As EPA uses the term in CALM, data quality assessment is “the scientific and statistical evaluation of data to determine whether data obtained from monitoring operations are of the right type, quality, and quantity to support water quality assessments.”⁵⁵

EPA cautions, however, that

[i]t is important to balance data quality requirements with common sense. Data quality requirements must be objective and inclusive Data should not be excluded solely because of their source or their age, without a reasonable explanation as to why they do not represent water quality conditions. Similarly,

⁵⁰ See <http://www.whitehouse.gov/omb/inforeg/infopoltech.html#iq>.

⁵¹ See http://www.epa.gov/oei/qualityguidelines/EPA_OEI_IQG_FINAL_10-2002.pdf. The EPA website for the DQA is <http://www.epa.gov/oei/qualityguidelines/index.html>.

⁵² See <http://www.epa.gov/osp/spc/assess2.pdf>.

⁵³ EPA Guidelines, *supra* note 51, at 15-16.

⁵⁴ CALM Chapter 7(Using Bacteriological Criteria as Indicators of Water Quality), *supra* note 46, at 7-5.

⁵⁵ *Id.*

data collected using methods different from those the state prefers should be considered if the detection limits for the method are appropriate for both the criteria threshold and the concentration detected.⁵⁶

The flexible and “common sense” approach for data assessment advocated by EPA is further illustrated by its suggestion in CALM that, in appropriate cases, even when data may not qualify as the highest quality of information based on the evaluation matrix suggested by EPA,⁵⁷ “even a short period of record can indicate impairment in cases of gross exceedances of criteria.”⁵⁸

In continuing this theme in its 2004 ALRR, EPA notes that it

will carefully review [State] assessments that result in decisions not to list waters [for Section 303(d) purposes] based on application of data age restrictions, minimum sample size requirements, application of percent exceedance cutoffs and statistical methods for evaluating decision error, and interpretation of nonnumeric WQSs.⁵⁹

Also EPA cautions that

[upon a request by EPA, the State must provide any excluded data or information and a case-specific rationale for not using the data in an assessment determination. EPA may review the data and rationale, disapprove listing decisions if appropriate, and make changes in the list based on inclusion of data and information that was improperly excluded. Failure by a State to provide a defensible technical rationale for a listing methodology, or for a decision to exclude data or information from consideration, may result in partial disapproval of the list for failure to include waters in [the] Category [requiring a TMDL], and potential additions of waters to the list by EPA.⁶⁰

⁵⁶ CALM, Chapter 4 (Using Chemical Data as Indicators of Water Quality) at 4-8 (emphasis added).

Indeed Region III's Guidance issued as a result of the *American Littoral* litigation, see text at note 20 *surpa*, itself observes that while “[determination] of the level of quality assurance (QA) needed to accept data for listing purposes is a State decision. . . the level of quality control should not be at such a high level that little if any data, other than that data collected directly by the deciding agency, would be accepted for listing decisions. *Id.* at 18.

⁵⁷ EPA proposes a table that assigns different types of data (e.g. based on different collection techniques used) to different levels of quality ranging from 1 to 4. CALM Chapter 4, *supra* note 46, at 4-14.

⁵⁸ *Id.* at 4-13.

⁵⁹ 2004 ALRR, *supra* note 47, at 22. At another point, the guidance notes that “EPA does not recommend the use of rigid, across the board, minimum sample size requirements in the assessment process. Target sample sizes should not be applied in an assessment methodology as absolute exclusionary rules.” *Id.* at 25. See also *id.* at 24-26.

⁶⁰ *Id.*

Given the crucial importance of a State’s data assessment methodology to Section 303(d) listings, EPA makes it clear that the State should develop that methodology through a process that involves the opportunity for the public to review and comment on the proposed methodology.⁶¹

In recognition that State sampling networks are not comprehensive, EPA “strongly encourages States to solicit [,] compile and consider data and information from volunteer monitoring networks.”⁶² States are also expected to “make reasonable efforts to obtain and consult sources of data and information referenced in public comments [on proposed Section 303(d) lists], but not provided by commenters.”⁶³

The Section 303(d) report must explain how the State gathered and evaluated data and “[the State should maintain a record of their decision process not to use specific data or information for a specific water in developing its list.”⁶⁴ Moreover, public comments on a proposed Section 303(d) list (or a summary of those) must be provided to EPA along with the State’s explanation how it considered and reacted to the comments in its listing decision.⁶⁵

The 2004 ALRR requires that States place waters into one of five categories, the last of which includes those requiring a TMDL. Category 2 includes waters where “[some of the designated uses are met but there is insufficient data to determine if remaining designated uses are met” and Category 3 includes waters where there is “[insufficient data to determine whether any designated uses are met.”⁶⁶ There appears to be a gap in these “insufficient data” categories, specifically where one or more of the designated uses are *not* met and data regarding the other uses is unavailable.⁶⁷ Nevertheless, where, for example, a State does not itself monitor bacteria levels and there is no other credible source for such data, but the State has a WQS for bacteria, it would seem that at least some of the unmonitored (for that parameter) rivers, streams and lakes in the State will have to be placed in Categories 2 or 3. Such disclosure will give the public at least a partial view of the extent to which the State has not been able to assess the

⁶¹ *Id.* at 22.

⁶² *Id.* at 20.

⁶³ *Id.* EPA accepts that a State may establish a cut-off date for receiving data and limit public comment to the data submitted up to that date. *Id.* at 21.

⁶⁴ *Id.* at 20-21.

⁶⁵ *Id.* at 19.

⁶⁶ *Id.* at 3.

⁶⁷ Waters as to which available data indicates that one use is impaired would be placed in Category 5 requiring a TMDL for the pollutant(s) creating that impairment. *Id.* at 8-9. If those same waters have not been monitored for all WQSs (i.e. all designated uses), however, placement in Category 5 can be misleading since it does not indicate the lack of data regarding other use impairments for waters so categorized.

quality of its waters. For these unassessed waters, the State is expected to “schedule monitoring on a priority basis.”⁶⁸

b. Pennsylvania's Assessment and Listing Methodology

In preparing lists in recent years, DEP has complied with the federal requirement to solicit water quality data from both private and public sources. For example, with regard to both the 2002 and 2004 303(d) lists, in letters sent in May of the year prior to the April deadline for the submission of the final Section 303(d) Report, the Department provided 1) a Data Submission Form (which includes a request for documentation with regard to the quality assurance/quality control procedures utilized by the responding entity); 2) a sheet describing the regulatory context for the solicitation of data and a description of the type of information needed to evaluate data submitted (e.g. delineation of the alleged water quality limited segment and procedures used in collecting, analyzing and recording samples); and 3) a description of the “minimum data requirements” to be satisfied in order for DEP to use the data in making its Section 303(d) listing determinations.

For example, with regard to the minimum requirements for bacteriological data for the 2002 list, DEP indicated that five samples (per sample station) collected on different days over a sampling period (one month) was the “[minimum number of samples required for data to be considered representative of actual conditions.” The agency further noted that “[a] single violation of the applicable bacteria criterion will constitute a water quality standard violation.”⁶⁹

However, in its solicitation to identified groups with regard to their submission of data for the 2004 list, these requirements were made more stringent. While each monthly “sampling group” still requires at least 5 samples collected (per sample station) on

⁶⁸ *Id.* at 4.

⁶⁹ In its 2002 List Pennsylvania included 84 miles of streams and 1,150 acres of lakes as impaired by pathogen sources. Most of the over 80,000 miles of streams and rivers in the State have not, however, been assessed for bacteria, in particular fecal coliform. See text at notes 96-103 *infra*. In its review of the 2002 list, EPA Region III found these minimal data requirements acceptable. See Letter from Jon M. Capacasa, Director, Water Protection Division, USEPA Region III to Ms. Cathy Myers, Acting Deputy Secretary, Water Management, Pennsylvania Department of Environmental Protection (June 3, 2003).

different days over a month, now *two sampling groups per station* are required to represent actual conditions and two “violations” of the applicable water quality criteria must be shown at a station, not one as was the case for the 2002 list.⁷⁰

The increased data requirements for bacteria were allegedly justified by DEP’s concern that data demonstrate “chronic” as opposed to atypical water quality conditions so that the agency can avoid the resource commitment that would otherwise be required to create a TMDL for what *might appear* to be a water-quality limited segment but which does not present a continuing problem.⁷¹

Pennsylvania is not alone among the States in adopting “finer mesh” data filters for 303(d) purposes, a development that has elsewhere prompted lawsuits and threats thereof on the basis, for example, that the tightened requirements in essence reflect revised WQSs which require (but have not yet obtained) EPA approval under the CWA.⁷²

⁷⁰ EPA in fact recommends referring to an “exceedance” of WQS rather than a “violation” because WQSs are not directly enforceable. The agency goes on to note that “any exceedance of a WQS is grounds for determining impairment and putting a water in Category 5 [requiring a TMDL].” ALRR, *supra* note 47, at .23 n.2.

EPA has also noted with regard to its recommended *E.coli* standard (*see* text at notes 90-2 *supra*):

...Some have misinterpreted the water quality criteria as requiring a minimum number of samples in order to determine the attainment of the numeric water quality criteria. This may be due to the recommendation that a geometric mean be based on five samples taken over a 30-day period. The minimum number of samples used in the 1986 water quality criteria for bacteria is for accuracy purposes only; clearly, more frequent sampling yields more accurate results when determining the geometric mean. It is the geometric mean of the samples collected in conjunction with a single sample maximum that determines attainment of the numeric water quality criteria, regardless of the number collected.

Guidance: Coordinating CSO Long-Term Planning With Water Quality Standards Reviews EPA-833-R-01-002 at 18. If this approach is acceptable with regard to the minimum sample size for an *E. coli* standard, there is no obvious reason it could not also be applied with regard to a fecal coliform standard.

⁷¹ Telephone Interview with Richard Shertzer, Water Quality Assessment & Standards, DEP Bureau of Water Supply and Wastewater Management, December 8, 2003

⁷² Bureau of National Affairs, *Environmental Policy Alert* (April 30, 2003) at 24.

At about the same time DEP published its 2004 list for public comment, it made available its draft Assessment and Listing Methodology⁷³ which was, despite its draft form, purportedly relied upon in compiling the 303(d) list. The draft methodology notes in part:

Generally, sampling efforts that generate less than two groups of five samples for purposes of calculating geometric mean values for comparison to existing criteria will not be used to list waters as impaired. However, if these incomplete data sets document fecal coliform densities greater than or equal to five times the geometric mean criterion value, the waterbody will be listed as impaired for water contact recreational uses.

That approach is consistent with EPA's recommendation for a "common sense" treatment of water quality data for listing purposes.⁷⁴ In addition, also in conformity with EPA's directions, DEP set out what appears to be a new and more generous set of minimum data requirements for bacteriological data:

Data age	Data must be less than 5 years old, unless it can be demonstrated that data is representative of current conditions.
Minimum number of sampling sites	A minimum of two sites must be sampled for each stream segment. If land use changes or point sources enter the stream between the upstream and downstream boundary points, more sites may be required. See the discussion "Location of Waterbody" for more details.
Sampling duration and frequency	Two monthly sampling groups (10 samples, 5 each) at each site should be collected during the recreation season [May 1-September 30]) in separate 30-day periods. These sampling periods may not overlap.

⁷³ See *Assessment and Listing Methodology for the 2004 Integrated Water Quality Monitoring and Assessment Report* (Draft, Version 5, February 20, 2004) linked to <http://www.dep.state.pa.us/dep/deputate/watermgt/Wqp/WQStandards/303d-Report.htm>

⁷⁴ See text at notes 56-8 *supra*.

Minimum number of samples required for data to be considered representative of actual conditions.	No more than one sample per day. The first 5 samples must be collected on different days over a 30-day period and constitutes one monthly sampling group. The second set of 5 samples must be collected on different days during a separate 30-day period, constituting the second sampling group. A minimum of 10 samples at each site.
Required analysis to determine if samples exceed water quality criteria	The Department will apply best professional judgment in determining if data submitted adequately documents use impairments.

Of particular interest is the fifth requirement which indicates that DEP has abandoned the “two violation” standard for a “best professional judgment” analysis. What is odd is that the same draft methodology includes as an appendix and appears also to ratify DEP’s earlier, and apparently inconsistent, statement of minimum data requirements that was distributed to monitoring groups in 2003 soliciting data for the 2004 303(d) list.

With regard to DEP’s acceptance and use of outside data, for the 2002 303(d) list, while there were twenty-six responders (both public and private) to DEP’s solicitation of water quality data (which was sent to over 500 entities and groups), in only four instances was the submitted data used by DEP. In many instances the responders either submitted no data or submitted data that did not meet minimum requirements.⁷⁵ There is no indication that any submitted data related to bacteria contamination.

For the 2004 list, there were ten submissions (one of which merely reviewed existing records for accuracy). Eight of the nine entities submitting data included bacteriological data; four of those collected the data as part of an outreach program initiated by DEP.⁷⁶ DEP accepted for use the bacteriological data from those four along with data for bacteria provided by the Ohio River Sanitation Commission and the Pennsylvania Department of Health. It also accepted non-bacteriological data from the Pennsylvania Department of Conservation and Natural Resources. The agency rejected two of the bacteriological submissions for failing to meet minimum data requirements.⁷⁷

⁷⁵ Appendix F to 2002 303(d) List (along with the list itself and accompanying information) is found at <http://www.dep.state.pa.us/dep/deputate/watermgmt/Wqp/WQStandards/wqstandards.htm>.

⁷⁶ See text at note 103 *infra*.

⁷⁷ See <http://www.dep.state.pa.us/dep/deputate/watermgmt/Wqp/WQStandards/303d-Report.htm> (Appendix E).

TMDL Development in Pennsylvania—the 1996 and Later 303(d) Lists.

In terms of actual TMDL development, DEP is focusing in large part on assisting EPA with completion of requirements flowing from the 1997 *American Littoral Society* consent decree and the related Memorandum of Understanding.⁷⁸ Based on the 1996 303(d) list of impaired waters, there is a twelve-year schedule to complete 151 non-acid mine drainage TMDLs and 424 acid mine drainage TMDLs.⁷⁹ Through 2001, DEP had completed and received EPA approval for approximately 62 non-AMD TMDLs and 48 AMD TMDLs.⁸⁰ In addition, it had completed 44 other TMDLs for waters listed subsequent to 1996. The DEP website which provides the status of TMDL development indicates that, as of March 1, 2004, one TMDL for “pathogens” (Sandy Run Watershed) had been developed and was in the proposal stage and no TMDL had been or was being proposed for fecal coliform bacteria.⁸¹

Opportunities for Public Participation in the Listing Process

Other than the opportunity to submit water quality data in response to DEP solicitation issued to selected groups prior to the preparation of a draft 303(d) list, there is an additional avenue for interested persons to impact DEP’s formulation of the list. EPA requires a state agency to provide the opportunity for public comment on the draft list once it is prepared.⁸² Accordingly, DEP has adopted a regulation that provides for publication in the Pennsylvania Bulletin of notice of availability of the draft list for the purpose of receiving comments on the list;⁸³ and there is also the opportunity for a public hearing. Groups and individuals who have previously submitted water quality data to DEP in response to its earlier solicitation as well as any other persons having such information may submit it to the agency for its consideration as part of this process.

Moreover, DEP must consider comments submitted during this public process that are directed at how the agency proposes to assess and use (or not use) DEP as well as third party data in its listing decisions. While the regulations and guidance materials do not require it, comments of that nature should be copied simultaneously to Region III of EPA, which will receive the final Section 303(d) list. This additional step is advisable in order to insure that EPA is aware at an early stage of the objections to DEP’s data assessments, though the public comments filed on

⁷⁸ See text at notes 18-20 *supra*. While, under the Clean Water Act, the state has the initial responsibility for developing TMDLs, the consent decree imposes the obligation to develop TMDLs falling within the parameters of the decree on EPA in view of the failure of the state to carry out its CWA duties. Under the MOU, DEP is assisting EPA to carry out its TMDL obligations under the decree.

⁷⁹ One of those applies to the Chartiers Creek Watershed for which TMDLs have been approved by EPA for metals, PCBs, and chlordane.

⁸⁰ See http://www.dep.state.pa.us/dep/deputate/watermgt/wqp/wqstandards/TMDL/TMDL_Slides.pdf (Slide No. 22).

⁸¹ See http://www.dep.state.pa.us/watermanagement_apps/tmdl/ (using “pathogen” and “fecal coliform” for key word searches).

⁸² See 2004 ALRR, *supra* note 47, at 19.

⁸³ 25 Pa. Code §96.7 (minimum 30 day comment period).

the 303(d) list and DEP's responses to those comments will ultimately reach EPA for its decision to approve or disapprove the State's list.⁸⁴

EPA requires that the Section 303(d) list and TMDLs be subject to "full and meaningful public participation" at the State level.⁸⁵ Where a State fails to do so, EPA may defer its action on the list until such participation is provided by the State or, if necessary, by EPA itself.⁸⁶ Where EPA finds that a State's list or TMDLs are deficient, it will provide opportunities for public participation (including presumably the opportunity to submit data and to comment on data used or not used by EPA) prior to the agency's final action in adopting a revised list and/or TMDL.⁸⁷

IV. BACTERIAL DATA FOR PENNSYLVANIA'S RIVERS AND STREAMS

With regard to bacteriological pollution of rivers and streams, EPA has noted that

[excessive amounts of fecal bacteria in surface water used for recreation have been known to indicate an increased risk of pathogen-induced illness to humans. Infection due to pathogen-contaminated recreational waters, include gastrointestinal, respiratory, eye, ear, nose, throat, and skin diseases.⁸⁸

While EPA originally recommended a WQS to protect against such effects at a level of 200 fecal coliform organisms per 100 milliliters of water,⁸⁹ studies have indicated that fecal coliforms show "less correlation to swimming-associated gastroenteritis than some other indicator organisms," specifically *E. coli* for fresh waters and enterococci for both fresh and marine waters.⁹⁰ Consequently, after 1986, EPA has recommended the use of a standard of 126 *E. coli* per 100 milliliters or, alternatively, 33 enterococci per 100 milliliters for fresh waters. Pennsylvania has, however, retained fecal coliform as the indicator pollutant⁹¹ at the 200 per

⁸⁴ See text at notes 64-5 *supra*.

⁸⁵ See 68 Federal Register at 13610.

⁸⁶ *Id.* See also 2004 ALRR, *supra* note 47, at 19.

⁸⁷ See 40 CFR §130.7(d)(2). See also 68 Federal Register at 13610 and *Sierra Club v. US EPA*, 162 F.Supp. 2d 406, 419-20 (D.Md. 2001)(finding that EPA's approval/disapproval of a state's list and TMDL does not trigger any federal comment procedures but that federal promulgation of a list and TMDL does require public comment opportunities at the federal level).

⁸⁸ US Environmental Protection Agency, *Protocol for Developing Pathogen TMDLs*, EPA 841-R-00-002 (January 2001) at 2-1.

⁸⁹ *Id.*

⁹⁰ *Id.*

⁹¹ Fecal coliform bacteria are used as an indication of sewage contamination since they are commonly found in human and animal feces and, while not generally harmful themselves, can indicate the presence of disease causing bacteria, viruses and protozoans that also live in human and animal digestive systems.

100 milliliter (geometric mean) level during the swimming season (May through September), to be determined based on a minimum of five consecutive samples taken over a 30 day period.⁹²

As recently as December 2003, EPA specifically urged that Pennsylvania's Environmental Quality Board reconsider the adoption of an *E. coli* standard during the required pending triennial review of the State's water quality standards.⁹³ The agency noted that

. . . Pennsylvania leads the nation in Combined Sewer Overflow (CSO) permitted outfalls and communities. Pennsylvania's CSO communities are in the process of developing Long Term Control Plans (LTCPs) to meet water quality standards, including those for bacteria, in CSO impacted waters. Over 70% of the Commonwealth's CSO communities do not yet have an approved LTCP, and it is PADEP's responsibility to ensure that the most scientifically defensible endpoint for bacteria is available to these communities for LTCP development and implementation.⁹⁴

Water quality monitoring of the State's rivers and streams for fecal coliform is largely non-existent outside the vicinity of bathing beaches.⁹⁵ Not surprisingly, therefore, while there may be several TMDLs being developed for water-borne pathogens,⁹⁶ there are none to implement the fecal coliform WQS standard.⁹⁷ DEP's fixed monitoring stations (WQN) are almost entirely focused on other pollutants⁹⁸ and its ten-year, on-going effort at surface water assessment for TMDL development similarly ignores fecal coliform in preference to biological indicators.⁹⁹

⁹² 25 Pa. Code §93.7. Not more than 10% of the total samples may exceed 400 per 100 ml. For the rest of the year the standard is 2,000 per 100 ml. Pennsylvania also has a total coliform standard.

⁹³ Letter from Evelyn S. MacKnight, Chief, PA/DE/WV Branch, Office of Watersheds, USEPA, Region III to PA Environmental Quality Board (December 17, 2003).

⁹⁴ EPA at the same time acknowledged DEP's previously expressed concerns with adopting an *E. coli* standard, specifically the lack of a finalized implementation guidance and the lack of EPA-approved analytical procedures for bacteria indicators in ambient waters and effluents. EPA noted, however, that the ambient waters method had been approved in July 2003 and that the implementation guidance was nearing completion. While EPA is still in the process of putting the analytical method for effluents in place, the letter indicated that, based on its experience with other states, EPA could provide DEP with assistance in identifying methods to use to issue effluent based NPDES limits for *E. coli* *Id.*

⁹⁵ *Technical Handbook*, *supra* note 33, at 1-4 (required by the State Department of Health).

⁹⁶ See text at note 81 *supra*.

⁹⁷ *Id.*

⁹⁸ See text at notes 33-4 *supra*.

⁹⁹ See text at note 137 *supra*.

While there are a handful of private organizations that monitor for this indicator pollutant,¹⁰⁰ most groups have in the past shown no interest in this water quality parameter.¹⁰¹ Over the last two years, however, DEP has attempted, with some success, to interest a few organizations and individuals in fecal coliform monitoring at scattered locations across the State where DEP suspected a bacteria problem (but not in Allegheny County).¹⁰²

The reason for the lack of monitoring appears not to be the expectation that, were monitoring to be conducted, violations of the bacteriological WQS would rarely be found or, if found, would not present significant issues of public health. Rather, with regard to the current structure of the assessment program for TMDL development, the explanation offered for the lack of fecal coliform monitoring is that it is easier to obtain aquatic life data and EPA with DEP's assistance is on a tight TMDL schedule under the *American Littoral Society* consent decree that does not focus on pathogen pollution.¹⁰³ It was also suggested in interviews with DEP personnel that, while it may be inevitable that DEP will some day change its bacteriological WQS to adopt EPA's recommended *E. coli* standard, until it does so it may not make much sense to monitor for and develop necessary TMDLs for a different indicator pollutant.¹⁰⁴

¹⁰⁰ For example, the Center in the Park (Philadelphia) in conjunction with the Pennsylvania Senior Environmental Corps, Chestnut Hill College, and the Philadelphia Water Department.

¹⁰¹ Interview with Diane Wilson, Watershed Assistance Division, Bureau of Watershed Management, October 15, 2003.

¹⁰² Telephone Interview with Kevin Kelly, Watershed Assistance Division, Bureau of Watershed Management, December 15, 2003. During 2002-2003 DEP solicited the interest of various governmental and non-governmental organizations with regard to their interest in collecting fecal coliform data in 25 streams where there was some indication that there might be a problem. In 2003, at least six of the groups collecting the data (none in Allegheny County) submitted complete data sets, some of which is being used for 303(d) listing purposes. See <http://www.dep.state.pa.us/dep/deputate/watermgt/Wqp/WQStandards/303d-Report.htm>

(Appendix E). See also text at note 76 *supra*. DEP provided no money to support the monitoring effort but it did provide laboratory assistance. Some of the data apparently confirmed the existence of significant fecal coliform pollution, though the sources of the pollution may not have been identified. As of December 2003, it was not clear whether this program would be continued in the future.

¹⁰³ Telephone Interview with Richard Shertzer, Water Quality Assessment & Standards, DEP Bureau of Water Supply and Wastewater Management, December 8, 2003. Specifically, it is his opinion that aquatic surveys allow DEP to measure chronic impacts on water bodies with one site visit and the ability to assess with one sampling facilitates compliance with the consent decree's timetable.

Several persons interviewed for this report (though not Mr. Shertzer himself) suggested that DEP does not in fact want to know how extensive bacterial pollution of the waterbodies of the state may be because such information would trigger the labor intensive and difficult process of TMDL development.

¹⁰⁴ Telephone Interview with Carol Young, Water Quality Assessment & Standards, DEP Bureau of Water Supply and Wastewater Management, December 8, 2003. Virginia has, however, apparently developed a way to translate fecal coliform into equivalent *E. coli* measurements.

While, apparently, EPA is not entirely indifferent to the State's lack of progress in identifying stream, river and lake segments requiring TMDLs for fecal coliform, to date any concern it may have has not translated into a federally-imposed schedule for monitoring this parameter or otherwise commencing TMDL preparation for it. This is not to say, however, that such federal pressures will not be applied in the future or that DEP believes that statewide, or even targeted, monitoring for bacteriological pollution can be postponed forever.¹⁰⁵

In terms of the lack of non-governmental monitoring for fecal coliform, one likely explanation is the resource requirements for a monitoring program that can meet applicable quality assurance/quality control requirements and, therefore, produce meaningful data. In particular, analysis for the indicator pollutant cannot be conducted in the field but, rather, must be done utilizing laboratory equipment. (It should be noted that compliance with an *E. coli* standard can be less resource intensive.¹⁰⁶) Other resource issues are presented by the number of samples that must be taken (now a minimum of 10 at the same site collected over a two month period).¹⁰⁷ Finally, given the lack of DEP data for fecal coliform, together with DEP's lack of aggressiveness in attempting to identify the scope of bacteria pollution statewide, there may be no sense in the citizen monitoring community that the pollutant should be a matter of concern requiring nongovernmental sampling efforts.

Despite the absence of a statewide, or even Allegheny County-wide, database for bacteriological pollution of rivers and streams, some data--though limited--does exist. Between 1974 and 1990, the Allegheny County Health Department collected some river and stream data to be used to identify locations where sewage infrastructure improvements might be considered for federal funding assistance.¹⁰⁸ Such out-of-date information is not, however, of value now other than perhaps indicating possible locations for future monitoring to determine if any previously identified pollution problems continue to exist. The Ohio River Valley Water Sanitation Commission (ORSANCO) routinely monitors for fecal coliform and *E. coli* at widely scattered locations down the Ohio River to Evansville, Indiana with three locations across the River at Pittsburgh. The US Geological Survey has also collected fecal coliform samples on five transects in the Ohio, Allegheny and Monongahela Rivers but has not, to date, attempted to survey the broader complex of smaller rivers and streams in Allegheny County. Finally, a non-profit academic research organization, 3 Rivers 2nd Nature (3R2N), has collected samples along twenty-nine transects and has several years of data for the County's rivers and, more importantly, fifty-three of the streams which are such an omnipresent feature of Pittsburgh's

¹⁰⁵ Telephone Interview with Carol Young, Water Quality Assessment & Standards, DEP Bureau of Water Supply and Wastewater Management, December 8, 2003.

¹⁰⁶ For example, Alabama Water Watch uses the Coliscan Easygel method which appears to be a reliable and valid tool for detection of fecal coliform pollution and does not require laboratory equipment. For AWW's webpage see <http://www.auburn.edu/aww> with their quality assurance plan found at <http://www.alabamawaterwatch.org/awwp/pubs.htm#qap>

¹⁰⁷ See text at note 70 *supra*.

¹⁰⁸ Interview with John Schombert, Executive Director, 3Rivers Wet Weather Demonstration Program, December 2, 2003.

urban and rural (or quasi-rural) landscape.¹⁰⁹ While there were enough samples collected by 3R2N at most sites, the collection time exceeded DEP's 30-day minimum requirement.¹¹⁰ However, the data amassed to date rather strongly suggest that there is a bacteriological problem not only in the main rivers but also in the streams where both wet and dry weather showed readings above the state fecal coliform standard.¹¹¹

Ignorance is not necessarily synonymous with bliss in view of the dangers posed by bacteriological pollution, if it exists in a significant portion of the region's river-stream network. But before anything can be done in terms of regulation or otherwise, an adequate monitoring program is essential. It is to be hoped that, if bacteriological data were to be gathered and demonstrated the existence of violations of the WQSs, state and local efforts—governmental and non-governmental—would materialize to come to grips with the problems identified in an expeditious fashion. It should be borne in mind in this connection that, even with monitoring data that meets DEP's minimum data requirements and demonstrates that a variety of segments of the local river-stream network should be listed under CWA Section 303(d), it is far from clear that a federal court would order EPA and the State aggressively to develop bacteriological TMDLs for the County, at least as long as DEP has committed substantial resources to TMDL development generally.¹¹²

¹⁰⁹ See <http://3r2n.cfa.cmu.edu/>

¹¹⁰ See text at note 70 *supra*. This sampling protocol was developed and approved by 3R2N, Three Rivers Wet Weather, the Allegheny County Health Department, and the Allegheny County Sanitary Authority. The protocol included a quality assurance/quality control program and was modeled on work done by ALCOSAN. The sampling work was performed by a fully trained staff of field personnel and used DEP-certified laboratories.

¹¹¹ See, e.g., 3 Rivers 2nd Nature/STUDIO for Creative Inquiry, *3R2N Aquatic Reports: Allegheny River Phase 3-2002* at 25.

¹¹² See text at notes 12-16 *infra*. In *Hayes v. Whitman*, 264 F.3d 1017 (10th Cir. 2001), the court noted that a “constructive submission” of inadequate TMDL’s (triggering EPA’s duty to take regulatory action) occurs “only when a state’s actions clearly and unambiguously express a decision to submit no TMDL for a particular impaired waterbody.” *Id.* at 1024. While the results in actual cases suggests that the submission of TMDLs for any waterbody or waterbodies in a State may be enough, this language in *Hayes* might later be useful in forcing EPA to act in the face of the failure or refusal of DEP to take any action to deal with clearly documented bacteriological pollution in Allegheny County or elsewhere in the State.

V. CITIZEN MONITORING OF WATER QUALITY

The most recent biennial National Water Quality Inventory Report to Congress¹¹³ found that, out of the total 3,692,830 miles of rivers and streams in the Nation, only 699,946, or 19%, had been assessed during the prior two years for their water quality and their ability to support designated uses.¹¹⁴ The percentage of miles assessed for prior reports was not much better.¹¹⁵ It is no wonder that EPA and the States have recognized that non-governmental monitoring must play a crucial role in providing the essential foundation for a credible water quality improvement program. Without a much more comprehensive water quality database than currently exists, the TMDL program will not achieve its full potential. Indeed, without it, a patchwork, however extensive, of TMDL's here and there, for some river and stream segments and some pollutants but not for others, presents the danger of misleading the public into believing that the water quality problems of the Nation are or will soon become a matter of history.

In anticipation of World Water Monitoring Day in October 2003, various EPA officials took special pains publicly to acknowledge the lack of an adequate water quality database and the essential role of volunteer monitoring in filling the gaps. "At this time, we do not have sufficient information to provide a national answer to characterize the condition of waters and watersheds in the United States. We risk flying blind if we aren't able to get dramatic improvements in water quality monitoring and data to support wise management decisions," said G. Tracy Mehan, EPA's Assistant Administrator for Water.¹¹⁶ He indicated that about 800 organizations across the United States "were actively involved in water quality monitoring."¹¹⁷ About one-half of the States have state-managed volunteer monitoring programs.¹¹⁸

As we will see, the national citizen water quality monitoring effort is characterized most prominently by its diversity, not just in terms of where it occurs geographically but also in terms of the asserted purposes, the sizes of groups involved, resources available, and a variety of other features. Such organizations can choose among many possible roles to play in the national search for cleaner water, none of which roles need be viewed as necessarily more important than others.

¹¹³ See <http://www.epa.gov/305b/2000report/chp2.pdf>.

¹¹⁴ *Id.* at 7.

¹¹⁵ Specifically, 18%, 17%, 19%, and 23% for the 1992, 1994, 1996, and 1998 reports respectively. *Id.*

¹¹⁶ BNA Environmental Reporter, Vol. 34, No. 33 at 1835 (August 15, 2003).

¹¹⁷ *Id.*

¹¹⁸ *Id.*

An Overview of Citizen Water Quality Monitoring

EPA has identified five main, to some degree overlapping, purposes for water quality monitoring:

1. characterizing waters and identifying changes or trends in water quality over time;
2. identifying specific existing or emerging water quality problems;
3. gathering information to design specific pollution prevention or remediation programs;
4. determining whether program goals, such as compliance with pollution regulations or implementation of effective pollution control actions, are being met; and
5. responding to emergencies, such as spills and floods.¹¹⁹

EPA believes that a volunteer monitoring program can “create a constituency for local waters that promotes personal and community stewardship and cooperation.”¹²⁰ However, according to EPA, one of the most difficult issues facing such a group, at least if it is to use its data outside the organization, is data credibility, a barrier that can be overcome, if at all, only with a quality assurance project plan.¹²¹ Such a plan outlines the procedures utilized to ensure that samples collected and analyzed and data stored and managed are of the quality necessary to meet the distinct needs of the monitoring group.

In 1998 EPA conducted a nationwide survey of volunteer monitoring groups that offers some sense of the scope and nature of the non-governmental sector’s involvement in water quality improvement.¹²²

The data that was gathered indicated that volunteer activity was not evenly distributed across the country. Rather it was focused in the Northeast and Great Lakes regions (areas where volunteer lake and stream monitoring began) and along the West and Gulf Coasts. Between 1994, when the first survey was conducted, and 1998, the number of identified organizations grew from 517 to 772.

By far the most monitored environmental resource was rivers and streams (76% of the organizations surveyed) followed by lakes and ponds (34%), wetlands (22%), and estuaries (19%). More than one-half of the organizations (53%) monitored more than one environmental resource, suggesting to EPA that programs were moving in the direction of a “watershed” approach wherein the interrelationships of landscape and water are more fully appreciated.

¹¹⁹ See <http://www.epa.gov/owow/monitoring/monintr.html>.

¹²⁰ See <http://www.epa.gov/owow/monitoring/volunteer/startmon.html>.

¹²¹ See <http://www.epa.gov/owow/monitoring/volunteer/qappcovr.htm>.

¹²² <http://www.epa.gov/OWOW/monitoring/dir.html> The electronic database for the report is available at <http://yosemite.epa.gov/water/volmon.nsf>. It is updatable; listed programs can change the information displayed and new monitoring programs can be added. The links to the various organizations provides a wealth of data regarding the programs covered by the database.

In terms of the parameters monitored, temperature, dissolved oxygen (DO), and acidity (pH) were the top three; sampling for bacteria was far down the list at 11th place (235 programs or 32% of all programs surveyed). While EPA did not speculate on why bacteria monitoring was so far behind, the likely reason is the same as that which the agency assigned to the relative infrequency of monitoring for pesticides and metals: “the unavailability of simple, reliable, low-cost methods.” The same low profile for bacteria monitoring (84 programs or 34%) appeared when EPA focused on those groups that only monitored rivers and streams.

In terms of the use of the data collected, the primary user was the collecting organization itself and the primary use was for education (of itself and others). At the same time, state and local government, along with other community organizations, utilized the data from over one-half of the monitoring groups. EPA notes that “the top four data uses [education, to establish baseline conditions, to screen for problems, and research] tell us that volunteer monitoring data are being widely used to keep communities, elected officials, and resource management agencies informed about the condition of local water bodies and the problems that need to be addressed.” Only a comparatively small number (14%) of the surveyed organizations (107, representing 35 states, an increase from 1994 when 53 programs in 27 states) attempted to use the data for the biennial state report required by CWA Section 305(b) with respect to surface water quality.

A surprising 44% of the responding organizations said they had a written quality assurance/quality control plan; 27% said the plan was state-approved and 18% had EPA-approved plans.

The size of monitoring groups tends to be small (the majority of groups had 50 or fewer volunteers), with a median number per program of 40 volunteers (an increase from 25 in 1994).

With regard to monetary resources, 18% of the programs reported annual budgets of \$100 or less; 44% per percent operated on \$1,000 or less; the medium budget was \$2,000; and 19% (or 103) of the programs had budgets exceeding \$25,000. In terms of funding sources, state government topped the list (45% of the organizations) followed by donations (44%), local government (37%), the federal government (31%), memberships (30%), foundations (29%), grassroots funding (25%) and businesses (22%). Diversity of sources of funding for a particular organization was the norm, with 69% of the groups having at least two sources and 44% with at least three; 31% had just one funding source.

In preparing this study of and proposal for a water quality monitoring program for Allegheny County, an e-mail questionnaire (Attachments Ia and Ib) was sent to over thirty individuals and groups involved in volunteer water monitoring. The focus of the questions related to bacteria sampling and analysis, including the methods utilized and the uses for the data collected.

Seven detailed responses were received (Attachments IIa-g).¹²³ The responses were consistent with the findings of the EPA study. Also, the responders were almost unanimous in urging that data be collected pursuant to an approved quality assurance/quality control plan to insure data credibility.

EPA's Support of Citizen Monitoring

EPA's involvement with citizen water quality monitoring extends beyond the roles of observer and cheerleader. Among other things, EPA

1. employs national and regional monitoring "coordinators" that can provide technical and other assistance to groups interested in volunteer monitoring;
2. sponsors a national volunteer monitoring newsletter (*The Volunteer Monitor*);
3. has prepared several significant guidance manuals to assist citizen monitors, including detailed directions for preparation of quality assurance project plans¹²⁴ and methods for stream monitoring;¹²⁵ and
4. provides monetary support for citizen monitoring with funds authorized under, for example, CWA Section 319 (non-point source pollution) and Section 104(b) (EPA's Watershed Initiative).

The Citizen Water Quality Monitoring Program in Pennsylvania

As of 2000, there were approximately 11,000 people organized in more than 140 groups¹²⁶ in Pennsylvania that spent altogether \$1 million¹²⁷ to monitor water quality at more than 3,000 stations across the State.¹²⁸ Most of these groups (93%) monitored streams, 23% lakes and ponds, and 18% wetlands, wells or estuaries.¹²⁹ These percentages significantly depart with regard to streams and lakes from the survey conducted by EPA,¹³⁰ though that is not surprising given the number of stream miles in the Commonwealth and the lack of lake frontage compared to other regions of the country.

¹²³ The Alabama Coastal Foundation; Alabama Water Watch; Boquet River Association; Brodhead Watershed Association; Peachtree/Nancy Creeks River Rendezvous Project; Organization for the Assabet River; and the Upper Chattahoochee Riverkeeper.

¹²⁴ See <http://www.epa.gov/owow/monitoring/volunteer/qappcovr.htm>.

¹²⁵ See <http://www.epa.gov/owow/monitoring/volunteer/stream>.

¹²⁶ *Technical Handbook*, *supra* note 33, at 1-2.

This number of monitoring groups in Pennsylvania, if correct, suggests that EPA may be significantly underestimating the number of volunteer groups (800 or so) nationwide, see text at note 118 *supra*, that are engaged in some form of water quality monitoring.

¹²⁷ The latest available total has climbed to in excess of \$2 million. See <http://www.dep.state.pa.us/dep/deputate/fieldops/nc/bigbendws/factsheets/citizens%20monitoring%20%20fact%20sheet.pdf>

¹²⁸ *Technical Handbook*, *supra* note 33, at 1-2.

¹²⁹ *Id.*

¹³⁰ See text following note 123 *supra*.

The monitoring effort is fairly evenly distributed around the state, with some concentration in the southeast corner.¹³¹ The top three monitored pollutants (pH, temperature, and DO) are the same as those identified in EPA's nationwide survey,¹³² though in a different order of frequency. Similar to the EPA findings, bacteria is not within the "top ten" list of monitored pollutants,¹³³ no doubt for some of the same reasons (e.g. lack of resources) identified in the national survey.¹³⁴ In terms of the most frequent uses for the data, Pennsylvania is closely, though not perfectly, aligned with EPA's findings nationally: the uses (in descending order of priority) are "education, problem identification, watershed planning, nonpoint assessment, restoration evaluation, research, and waters/classification/standards."¹³⁵

Like many other States, Pennsylvania has a Citizens' Volunteer Monitoring Program (CVMP)¹³⁶ in recognition of the vital role of non-governmental entities in supplementing governmental resources devoted to water quality monitoring.¹³⁷ It is located in DEP's Bureau of Watershed Management.¹³⁸ The CVMP views its role as facilitating citizen monitoring but not imposing on individual groups specific goals for use of any data gathered.¹³⁹

¹³¹ *Technical Handbook*, *supra* note 33, at 1-2.

¹³² See text following note 123 *supra*.

¹³³ *Technical Handbook*, *supra* note 33, at 1-2.

¹³⁴ See text following note 123 *supra*.

¹³⁵ *Technical Handbook*, *supra* note 123, at 1-2.

¹³⁶ The CVMP's homepage is <http://www.dep.state.pa.us/dep/deputate/watermgt/WC/Subjects/cvmp/default.htm>

¹³⁷ The TMDL Concent Decree Compliance Reports required by the *American Littoral Society* litigation have taken note of the fact that DEP has focused some efforts on the use of volunteer monitoring, having staffed two positions with monitoring coordinators. Most recently, in its December 2003 report, EPA Region III noted that "discussion continues on the potential for use of volunteer monitoring data within the TMDL and NSP [non-point source] programs. These uses include: gauging the success of TMDL implementation, the auditing of NPS pollution controls for effectiveness, and the initiation of watershed restoration and enhancement activities. These efforts continue to be funded under Section 319 in excess of \$250,000 annually." Letter from Thomas Henry, Program Manager, TMDL Management and Support Unit, US EPA Region III to Mr. James Stuhltrager, Mid-Atlantic Environmental Law Center (December 31, 2003).

¹³⁸ Other agencies in the State are concerned with water quality including the Fish and Game Commission (physical, chemical and biological data) and the State Department of Health (e.g. fecal coliform analysis at bathing beaches).

¹³⁹ Interview with Diane Wilson and Cheryl Snyder, Watershed Assistance Division, BWM, October 15, 2003.

The CVMP's functions have included:

1. acting as an informational clearinghouse for services that are available to volunteer monitors;
2. identifying DEP programmatic areas with potential partnerships with volunteer monitoring groups and providing information necessary to alert groups to the requirements that must be met if their data is to be used by DEP;
3. working with the Environmental Alliance for Senior Involvement to set up and maintain a statewide database of water quality information gathered by citizen monitors;
4. forming a statewide network to support and guide volunteer monitoring groups;
5. preparing a detailed handbook to assist volunteer monitors in designing their own monitoring programs (including the choice of goals and data uses and the different monitoring options available to citizen groups);¹⁴⁰
6. holding training workshops for citizen monitors, including those responsive to the specific needs of individual groups;
7. conducting an annual Statewide Snapshot of Water Quality wherein groups collect data at their normal sampling stations and send the data to DEP to incorporate into an annual report.¹⁴¹

In addition to DEP, there are a variety of governmental and non-governmental groups located both inside and outside the Commonwealth that provide technical and other support to volunteer monitoring groups.¹⁴² The Pennsylvania organizations include the Environmental Alliance for Senior Involvement (EASI Senior Environment Corps)¹⁴³ and the Alliance for Aquatic Resource Monitoring (ALLARM) (which offers help for conducting analyses for fecal coliform, among other pollutants).¹⁴⁴

¹⁴⁰ See *Technical Handbook, supra* note 33. The CVMP also makes available a guidance manual to assist groups with quality assurance/quality control issues. See Michael W. Lovegreen, *Water Quality Monitoring of Pennsylvania Streams by Citizen Groups/A Primer in Quality Assurance and Quality Control*, found at <http://www.dep.state.pa.us/dep/deputate/watermgt/wc/Subjects/cvmp/Initiatives/default.htm>

¹⁴¹ See <http://www.dep.state.pa.us/dep/deputate/fieldops/nc/bigbendws/factsheets/citizens%20monitoring%20%20ofact%20sheet.pdf>

¹⁴² An up-to-date list of some of the service providers is found at <http://www.dep.state.pa.us> directLINK“Volunteer Monitoring.” Two other in-state service/information providers are the Water Resources Education Network, <http://pa.lwv.org/wren/intro.html>, and the Pennsylvania Organization for Watersheds & Rivers, <http://www.pawatersheds.org>. One of the out-of-state groups that provides support is River Network, <http://www.rivernetwork.org>.

¹⁴³ See <http://www.dep.state.pa.us/hosting/pasec>.

¹⁴⁴ See <http://www.dickinson.edu/storg/allarm>.

Turning to water quality databases that may include citizen monitoring data, some of the more important are the following ones:

1. The STORET system¹⁴⁵ is operated by EPA and allows citizen groups, with necessary computer and software support, to upload data they have collected. It contains a wealth of information with regard to the data, including why they were gathered, what type of sampling methods were used, what quality control checks were applied, and the personnel responsible for the data.

2. DEP maintains its own separate database(s), including the Surface Water Assessment Database, which are not publicly accessible. Volunteer data is maintained in hardcopy in a separate filing system.¹⁴⁶ A GIS (Geographical Information System) version of the stream assessments (but not the stations) is available on EMapPA¹⁴⁷ and updated yearly.

3. The PaSEC Database,¹⁴⁸ maintained by the EASI Senior Environmental Corps and DEP, has two major components. One is limited in terms of data input to member PaSECs and any other group using standardized sampling protocols; it includes data on pH, conductivity, water temperature, dissolved oxygen, nitrates, total phosphates, and sulfates, but not bacteria. The other component is open to input by any volunteer group using its own sampling protocols and quality control plans and includes data on many more water quality parameters than the first component, including fecal coliform concentrations.

4. ALLARM maintains a publicly accessible database for stream alkalinity and pH based on citizen monitoring data.¹⁴⁹

As noted above, interest in citizen monitoring of streams and rivers in Pennsylvania for fecal coliform contamination has been minimal at best, though DEP has recently shown more of a desire to enlist volunteer monitors (on a limited basis at least) in collecting such data.¹⁵⁰

Finally, the pattern of financial support for citizen monitoring in Pennsylvania appears to be not unlike that identified by EPA in its national survey.¹⁵¹ For example, DEP has provided significant funds to groups under the Growing Greener Initiative where watershed restoration projects are involved. It also provided \$100,000 to ALLARM in 1996 to allow it to function as a technical support center for citizen monitoring groups.

¹⁴⁵ See <http://www.epa.gov/storet/about.html>.

¹⁴⁶ Interview with Richard Shertzer and Rod Kime, Water Quality Assessment & Standards, DEP Bureau of Water Supply and Wastewater Management October 15, 2003.

¹⁴⁷ http://www.dep.state.pa.us/external_gis/gis_home.htm.

¹⁴⁸ See <http://www.environmentaleducation.org/default.lasso>.

¹⁴⁹ See http://www.dickinson.edu/storg/allarm/Database/old_database.html.

¹⁵⁰ See text at notes 101-2 along with note 103 *supra*.

¹⁵¹ See text following note 123 *supra*.

Significant monetary support from foundations and other entities, including EPA and DEP, appears to be targeted largely at those groups engaged in monitoring stream and river segments targeted for TMDL development.¹⁵² If that is true, such a funding priority may mean that those watersheds whose water quality clearly requires closer scrutiny will not be monitored because of the coincidences of TMDL development which, in Pennsylvania today, is being driven, in large part, by the American Littoral Society consent decree.¹⁵³ That decree is based on the 1996 Section 303(d) list and does not include waters as to which there was, at the time of its entry, a lack of monitoring data. Yet the absence of such data in 1997 suggests absolutely nothing with regard to the presence of significant water quality problems and, therefore, is hardly a defensible basis on which to limit access to funding necessary to monitor for WQs' impairment.¹⁵⁴ When it comes to bacteria monitoring, which is related to human health concerns but as to which DEP has yet to turn its attention to any significant extent, the suggested direction of funding support for volunteer monitoring efforts, if an accurate description of recent developments, is particularly troublesome.¹⁵⁵

¹⁵² Telephone interview with Kevin Kelly, Watershed Assistance Division, Bureau of Watershed Management, December 15, 2003. For example, in its 2003 TMDL Consent Decree Compliance Report required by the *American Littoral Society* litigation, EPA noted that "[in FY 2003, the Section 319 appropriation under the CWA continued to increase over the previous levels and continued to prioritize funds for the restoration of 303(d) listed impaired waters and for the implementation of EPA approved TMDL's. In FY 2003, workplans funded under Section 319 include those targeting 303(d) listed impaired watersheds and watersheds where PADEP has developed TMDLs." Letter from Thomas Henry, Program Manager, TMDL Management and Support Unit, US EPA Region III to Mr. James Stuhltrager, Mid-Atlantic Environmental Law Center (December 31, 2003).

At the same time, however, there are apparently no instances where a request for support for bacterial monitoring has been made to DEP and refused (which, of course, says nothing about the number of such requests, if any, that have been received by the agency to date).

¹⁵³ See text at note 78 *supra*.

¹⁵⁴ These observations are not meant to detract from the fact that one of the important achievements of the 1997 consent decree was the initiation of a state-wide monitoring program for at least some pollutants (SSWAP), text at note 35 *supra*.

¹⁵⁵ With regard to DEP's Growing Greener Initiative, it is not necessarily targeted at what might be considered, based on objective criteria, the highest priority environmental and water quality problems for another reason: it directs resources only to those who make applications for funding.

VI. A PROPOSAL TO CREATE AN ALLEGHENY COUNTY THREE RIVERS WATERSHED ASSOCIATION (ACTRWA)

Summing up where matters stand as of the beginning of 2004, both EPA and the States, including Pennsylvania, have finally embraced the directive of Section 303(d) of the Clean Water Act to assess the condition of the Nation's waters in terms of their compliance with applicable water quality standards (WQSs) and to establish the aggregate pollution "loads" (TMDLs) that rivers and streams can receive and still meet those WQSs. At the rate it is currently moving forward, the process of water quality assessment and TMDL establishment and implementation will take decades in view of the widespread lack of adequate water quality data and the inadequacy of governmental resources available to undertake the tasks required.¹⁵⁶ In this context, if the TMDL program is to achieve substantial success within a reasonable time frame, heavy reliance must be placed on non-governmental entities to collect water quality data, if only to identify watersheds or stream segments requiring further in-depth monitoring by government agencies.

Bacteriological pollution in areas where water contact recreation occurs or might occur raises concerns with regard to human health impacts. Yet there is currently no statewide database in Pennsylvania for the existing indicator pollutant (fecal coliform concentrations), but rather only widely scattered sites where monitoring data has been acquired in the past or is now being collected. The same situation exists in Allegheny County. Yet the combination in the County of an extensive river-stream network in an area of high population density magnifies the importance of filling the extensive data gaps that exist with an up-to-date water quality baseline that can be utilized by governmental and non-governmental entities alike for their regulatory and planning decisions. In that regard, it is crucial to note that the need to come to grips with the significant combined sewage overflow problem in Allegheny County requires the collection of adequate baseline data along with the frequent updating of that database. EPA's Combined Sewer Overflow (CSO) Control Policy, issued in April 1994, expressly mandates the collection of ambient monitoring data both to design CSO control plans and to evaluate the effectiveness of the long-term CSO controls that are eventually implemented, including their impact on the attainment of applicable water quality standards.¹⁵⁷

¹⁵⁶ The *American Littoral Society* litigation in Pennsylvania resulted in a 12-year schedule for TMDL development that is far from comprehensive in terms of the rivers, streams, lakes and WQSs that will ultimately have to be addressed. DEP is focusing its efforts in the TMDL area largely on assisting EPA with compliance with that decree. Pennsylvania is not atypical among States, however, in terms of its progress to date in implementing Section 303(d).

¹⁵⁷ 59 Federal Register 18688 (April 19, 1994). EPA has issued a variety of guidance documents that reiterate and describe the monitoring requirements, including *Guidance: Coordinating CSO Long-Term Planning With Water Quality Standards Reviews*, EPA-833-R-01-002 (July 31, 2001), and *Combined Sewer Overflows Guidance for Monitoring and Modeling*, EPA 832-B-99-002.

Without an adequate water quality database, persons living in or visiting Allegheny County who wish to enjoy its wealth of water resources may not do so without assuming risks that may, in some areas, be significant. Alternatively, they may avoid using those resources where the risks may be small or nonexistent. While collection of monitoring data is only the first step in what may be a long process for water quality improvement, collection, analysis and widespread distribution of the results of the monitoring may be the only way to create a political constituency for further progress in preventing new and remedying existing bacteriological pollution.

The lack of significant interest exhibited by the State and other governmental entities in monitoring for bacteria pollution throughout the river/stream network of Allegheny County, the paucity of financial and other governmental resources to undertake an extensive water quality assessment program in the County, and the absence of any other entity already engaged in a County-wide waterborne bacteria detection program leaves only one option: the creation of a private non-profit organization to collect, analyze and publicize water quality data for the County's river/stream network. Indeed, the creation of such an independent entity that could, if requested, assist the Allegheny County Sanitary Authority and local communities that are now facing legal mandates effectively to control combined sewer overflows and achieve water quality standards fits well with EPA guidance on CSO implementation. As that agency has noted, "[collaborative monitoring through consortium is a cost-effective way to stretch monitoring resources, improve coordination or share expertise and the cost of data collection and management."¹⁵⁸

The most important contributions that such an independent water quality data organization could offer would be (1) continuity of data gathering and analysis and (2) professionalism in creating and maintaining the water quality database.

Regarding the former, stable sources of funding would insure that the database assembled represents more than a snapshot of bacteria concentrations at a particular point in time. Rather, the information could be continually updated and expanded in geographical coverage terms to help insure that regulatory and other decisions are based on an accurate picture of the existing water quality of the river and stream network in the County.

With regard to professionalism, the data collected must be credible, which, at a minimum, requires adherence to recommended quality assurance/quality control procedures,¹⁵⁹ whose rigor will depend on the use(s) intended for the data.¹⁶⁰ Ideally, in order to maximize the ability of the proposed organization to assist with expediting the completion of the TMDL process and, if appropriate, with CSO control analysis and implementation, the data should meet the minimum data requirements imposed by DEP for listing waters as impaired under Section

¹⁵⁸ See *Guidance: Coordinating CSO Long-Term Planning With Water Quality Standards Reviews*, EPA-833-R-01-002, at 14.

¹⁵⁹ See text at note 55 *supra*.

¹⁶⁰ See *Technical Handbook*, *supra* note 33, at 3-1 to 3-4.

303(d).¹⁶¹ That goal will, however, impose significant resource demands, including the need for laboratory analysis of samples (unless and until Pennsylvania adopts an *E. coli* WQS¹⁶²) and repeated monitoring at selected sites.¹⁶³

While the organization would, of necessity, have to rely on the efforts of many volunteers to collect and transport samples for analysis, the credibility of the data is most likely ensured to the extent the organization includes one or more full-time staff with the professional qualifications to guarantee that the sampling effort is properly conducted and the results accurately recorded. Those professional qualifications should, moreover, extend beyond the actual sampling and data recordation processes. They should, in addition, encompass the design and application of probabilistic monitoring approaches which, through random sampling over a broad geographic area, can provide a cost-effective method for 1) characterizing the general state of the watershed in terms of bacterial pollution; 2) identifying areas for future sampling efforts; and 3) supporting site-specific determinations regarding water quality for Section 303(d) and other purposes.¹⁶⁴ Finally, the professional expertise should extend to the creation of geographical information systems that can be employed both as an aide in identifying possible sampling locations and also for displaying the results of the sampling efforts in a broad context thereby making the water quality data obtained more meaningful and potentially useful to the organization and others.¹⁶⁵

Whatever use regulatory authorities may make of data generated by the proposed watershed organization, it is above all important that the database created be made available in a comprehensible format to the public at large.¹⁶⁶ This would include a webpage to display the data as soon as it is quality assured, as well as periodic press releases and reports distributed to local news media indicating the results of sampling conducted and the conclusions that might be drawn from them. Studies have shown that public disclosure of environmental information can be a powerful aide and incentive to reduction or elimination of the sources of

¹⁶¹ See text at notes 69-74 *supra*.

¹⁶² See text at notes 90-94 *supra*.

¹⁶³ See text at notes 69-74 *supra*.

¹⁶⁴ See 2004 ALRR, *supra* note 47, at 14-17 (EPA endorsement of probabilistic monitoring for various purposes).

¹⁶⁵ See text at note 168 *infra*.

¹⁶⁶ See Shelley Metzenbaum, More Nutritious Beans, *The Environmental Forum* 19 (March/April 2003)(discussing the ways governmental and non-governmental organizations can use and display data in more useful and compelling formats).

¹⁶⁷ Many of the volunteer monitoring groups identified by EPA, see text at note 123 *supra*, as well as those specifically surveyed for this study use the internet as a means to inform the public of their water quality findings.

¹⁶⁸ See, e.g., Bradley C. Karkkainen, Information as Environmental Regulation: TRI and Performance Benchmarking, Precursor to a New Paradigm?, 89 *Georgetown Law Journal* 257 (2000); Clifford Rechtschaffen, The Warning Game: Evaluating Warnings Under California's Proposition 65, 23 *Ecology Law Quarterly* 303 (1996). These articles examine both the advantages and disadvantages of information disclosure requirements. See also Shelly Metzenbaum, *supra* note 168.

pollution.¹⁶⁸

Financially to support an organization that offers these professional skills and services and conducts an extensive water quality monitoring effort in Allegheny County will present significant challenges in view of the magnitude and continuity of the funding necessary. Since, moreover, budget priorities inevitably change in the public and private sectors, the entity can rely safely only on a diverse array of sources for its financial support, including government, foundations, memberships, individual donors, and businesses.

The composition of the Board of Directors (or other oversight panel) will be particularly important in helping to establish the credibility of the organization and the information it offers to the public and, in doing so, convince potential funding sources that their money will be well spent. The Board must, for example, represent the diversity of community, corporate, and governmental interests that have a stake in water quality improvement. In all events, Board members must share the view that attainment of water quality standards in the County must go hand-in-hand with economic development if the region is to achieve its potential as an attractive, enjoyable, and safe place to live and visit.

A model for the type of non-governmental water quality monitoring organization described above is the Charles River Watershed Association (CRWA) that was established in 1965. Among other things, since the mid-1990's it has conducted a substantial monitoring program using eighty volunteers and thirty-seven sampling sites along the Charles and its tributaries near Boston, examining both for fecal coliform and *E. coli* bacteria concentrations. The water quality of the Charles has indeed improved since the monitoring program began, in part at least, because the data obtained by the CRWA pinpointed illegal hook-ups to storm sewer systems and blockages of the junctions between the storm and wastewater systems.¹⁶⁹

The CRWA also performs other types of water quality analyses at its own laboratory and participates in watershed planning efforts, including the formulation of TMDLs. Its water quality data has been kept current on its website,¹⁷⁰ which provides easily understood maps indicating where pollution levels may exceed applicable water quality standards.¹⁷¹

The CRWA has a professional staff, including three engineers, a chemist and several other scientists. In 2002, it expended over \$1.2 million for its work. A significant portion of its

¹⁶⁹ Shelly Metzenbaum, *supra* note 168 at 26.

¹⁷⁰ See <http://www.crwa.org>.

¹⁷¹ Indeed, it was the website for the CRWA that alerted EPA to data that the agency itself could use in taking steps to help reduce pollution in the river. See Shelly Metzenbaum, *supra* note 168 at 26-27. This is supportive of the argument, see text at note 170 *supra*, that public availability of data by itself can have powerful effects in eliminating pollution.

money over the years has come from governmental sources.

The junction of the Allegheny, Monongahela, and Ohio Rivers in Allegheny County, along with their tributary streams and creeks, possesses hydrological, scenic and historic values no less compelling than those of the Charles River Watershed. Summoning an effort to protect the waters of Allegheny County like that put forth by the CRWA would, one would hope, elicit a comparable show of support from both the public and private sectors, particularly given recent efforts to recapture the Pittsburgh waterfronts from purely industrial usage. Unfortunately, while Boston's economic "star" has been ascending since the mid-1970's, the Pittsburgh region seen its economic base erode, a fact that might, regrettably, require scaling back some immediate ambitions for a newly established Allegheny County Three Rivers Watershed Association.

However, even a small beginning is preferable to inaction—particularly when it comes to a water quality issue that implicates public health concerns. As the work of the newly created organization gains public attention and its value is more broadly appreciated, financial and other support will inevitably grow. Ultimately, the organization may be in a position to become an active participant in formulating broad watershed improvement strategies for Allegheny County and beyond.¹⁷²

¹⁷² Depending on the funding available, developing the organization into a regional Western Pennsylvania Watershed Association (that would include Allegheny County) vested with water quality monitoring functions as well as other responsibilities for watershed planning is clearly a long-term goal that deserves serious consideration.