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GUIDANCE ON IMPLEMENTING THE WATER QUALITY-BASED PROVISIONS IN THE CSO CONTROL POLICY

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NOTICE

The *Guidance On Implementing The Water Quality-Based Provisions in the CSO Control Policy* is designed to address questions raised since the publication of the CSO Control Policy in 1994 on integrating CSO long-term control plan (LTCP) development process with water quality standards reviews. The U.S. Environmental Protection Agency is responding to these questions by expanding on the Agency's existing guidance.

The guidance included in this document cannot impose legally binding requirements on EPA, States, Tribes, or the regulated community. It can not substitute for Clean Water Act (CWA) requirements, EPA's regulations, or the obligations imposed by consent decrees or enforcement orders. Further, this guidance might not apply to a particular situation based upon the circumstances.

FOREWORD

EPA issued the Combined Sewer Overflow (CSO) Control Policy in April 1994 (59 FR 18688). To date, EPA has released seven guidance documents and worked with stakeholders to foster implementation of the Policy. EPA continues to affirm the Policy's key themes, such as providing clear levels of control, permitting flexibility, allowing a phased approach to implementation of CSO controls considering a community's financial capability, and reviewing and revising, as appropriate, water quality standards. In practice, however, many challenges remain, and implementation of the Policy has not met some initial expectations.

The CSO Policy's first key expectation was implementation of the nine minimum controls (NMCs) by January 1997. Nearly 90-percent of communities have moved forward with the implementation of the NMCs. The CSO Policy also calls for the development of a long-term control plan (LTCP) which includes measures that provide for compliance with the Clean Water Act, including attainment of water quality standards. Long-term control planning consistent with the CSO Policy is key to the success of local CSO control efforts. Currently, approximately 75-percent of all CSO communities are involved in the LTCP process.

The CSO Policy provides that *"[d]evelopment of the long-term plan should be coordinated with the review and appropriate revision of water quality standards (WQS) and implementation procedures on CSO-impacted receiving waters to ensure that the long-term controls will be sufficient to meet water quality standards"* (59 FR 18694). In the six years since EPA issued the CSO Control Policy, implementation of this principle has not progressed as quickly as expected.

Given local resource constraints, CSO communities need clear guidance on how they should implement the CSO control and other wet weather water pollution control programs to attain water quality standards. Water quality standards reviews are an essential step in integrating the development and implementation of affordable, well-designed and operated CSO control programs with the requirements of the Clean Water Act (CWA). However, the Agency recognizes that State and Interstate Water Pollution Control Directors will need to set priorities for water quality standards reviews based on a number of factors including court-mandated total maximum daily load (TMDL) analyses. EPA plans to actively participate in the process and facilitate the process wherever possible.

As part of EPA's FY 1999 Appropriation, Congress directed EPA to develop guidance on the conduct of water quality standards and designated use reviews for CSO-receiving waters. Further, Congress urged EPA to provide technical and financial assistance to States and EPA Regions to conduct these reviews. In response, EPA hosted three stakeholder listening sessions in the spring of 1999 and an experts workshop on September 24, 1999. The purpose of these meetings was to obtain participants' views on the impediments to implementing the water quality-based provisions in the CSO Policy, and actions that EPA should take to overcome these

impediments. The attached document entitled *Guidance on Implementing the Water Quality-Based Provisions in the CSO Control Policy* will address many of the stakeholder concerns.

The objective of this guidance is to lay a strong foundation for integrating CSO long-term control planning with water quality standards reviews. Reaching early agreement among CSO communities, States, and EPA on the data to be collected and the analyses to be conducted to support the long-term control plan development and water quality standards reviews can facilitate water quality standards reviews for CSO-receiving waters.

The guidance describes the process for integrating LTCP development and implementation with the water quality standards review. This process is the essence of EPA's renewed commitment to facilitating the review and revision, as appropriate, of water quality standards for CSO-impacted receiving waters. Integrating CSO long-term control planning with water quality standards reviews requires greater coordination among CSO communities, States, EPA, and the public. Although this coordination is an intensive process, it provides greater assurance that CSO communities will implement affordable CSO control programs that support the attainment of appropriate water quality standards.

As outlined in the guidance, EPA will continue to implement the CSO Policy through its existing statutory and regulatory authorities. The principle mechanisms are the National Pollutant Discharge Elimination System (NPDES) permit program and the water quality standards program. NPDES authorities are and will continue to be responsible for implementing the CSO Policy. EPA will ensure that NPDES state program authorities implement all aspects of the CSO Policy, including the integration of LTCP development with the review and revision, as appropriate, of water quality standards. Both EPA and State NPDES authorities shall assure that communities develop and implement LTCPs that meet the requirements of the Clean Water Act. EPA will work to ensure that both NPDES and water quality standards authorities participate with the State or Interstate Water Pollution Control Director in developing and reviewing LTCPs in conjunction with water quality standards reviews.

EPA is responsible for assuring that State and Interstate Water Pollution Control Directors implement all aspects of the CSO Control Policy, including the integration of the development and implementation of the CSO LTCP with the review and revision, as appropriate, of water quality standards for CSO-receiving waters. Both EPA and States need to ensure that communities develop and implement plans that meet the requirements of the Clean Water Act.

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I. INTRODUCTION

1. Why is EPA developing this draft guidance?

This draft guidance demonstrates the U.S. Environmental Protection Agency's (EPA) renewed commitment to assure that both communities with combined sewer systems and States participate in implementing the water quality-based provisions in the Combined Sewer Overflow (CSO) Control Policy. The CSO Control Policy anticipates the "review and revision, as appropriate, of water quality standards and their implementation procedures when developing CSO control plans to reflect site-specific wet weather impacts of CSOs". However, EPA is concerned that during the development of the CSO long-term control plan sufficient information may not be available for a State to justify a revision to water quality standards.

Congress, in the conference report on EPA's FY 1999 Appropriations, urged the Agency to facilitate the water quality and designated use reviews for CSO-receiving waters by developing guidance for States and Regional Offices. During three listening sessions and a September 1999 EPA-Water Environment Federation (WEF) experts workshop, EPA sought and received a wide range of diverse perspectives on impediments to implementing the water quality-based provisions in the CSO Control Policy.[1] EPA talked with State and EPA staff, CSO communities and their consultants, and environmental and watershed organizations. The listening sessions and the experts workshop confirmed a need for guidance and clarifications in the existing regulatory requirements and options available to the State in revising water quality standards.

In response, EPA is preparing guidance to lay a strong foundation for integrating water quality standards reviews with the development and implementation of an affordable, well-designed and operated long-term control plan (LTCP). Integrating the LTCP and water quality standards review processes occurs by increasing the level of coordination and cooperation among CSO communities, constituency groups, States and EPA. Through increased coordination and cooperation, CSO communities and States will be better able to address the many scientific, technical, and economic issues involved in developing LTCPs that comply with permit

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[1] EPA summaries of the listening sessions and of the experts workshop include: (1) *Summary of the Listening Sessions* (EPA-823-R-99-017) and (2) *Summary of Participant Comments at the EPA-WEF Experts Workshop* (EPA-823-R-99-016)). You can find these documents at www.epa.gov/ost/cso or request hard copies from:

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P.O. Box 42419
Cincinnati, OH 45242-2419
Phone: 1-800-490-9198 or (513) 489-8190
FAX: (513) 489-8695
Web Site: www.epa.gov/ncepi.htm

requirements based on applicable water quality standards and in determining if revisions in water quality standards are appropriate.

2. *What are EPA's goals?*

EPA's goal is for CSO communities to develop and implement affordable long-term control plans (LTCPs) that achieve compliance with applicable water quality standards and with other Clean Water Act (CWA or the Act) requirements. Phasing the implementation of CSO controls and evaluating their efficacy as they are installed allows communities and States to manage the complexities of: (1) improving the quality of urban water bodies affected by many sources; (2) financing the high costs of structural CSO controls; and (3) integrating LTCP development and implementation with water quality standards reviews.

In developing a LTCP, EPA expects communities to identify priority controls, such as eliminating or treating an overflow which impacts a bathing area. These controls should be common to all LTCP scenarios, and therefore should be implemented expeditiously. Following installation of these controls, communities and States will need to monitor and collect post-construction compliance data to evaluate the effectiveness of the controls in improving water quality and supporting the uses of the water body. If the data show that the preferred option in the draft LTCP is unlikely to comply with the water quality standards, the NPDES authority should work with the CSO community to evaluate other CSO control alternatives identified in the draft. If, however, the preferred option in the draft LTCP does not comply with water quality standards and chemical, physical or economic factors appear to preclude attainment of the use, the data collected during the planning process may be used to support revisions to water quality standards, including adoption of uses that better reflect the water quality that can be achieved with an affordable level of CSO control.

Greater levels of coordination are needed to integrate CSO control planning and implementation with water quality standards reviews. This draft guidance will clarify the roles and responsibilities of CSO communities, the NPDES and water quality standards authorities, community and environmental organizations, and EPA in this process.

EPA plans to actively participate in the process and will encourage others to actively participate. With increased coordination and cooperation, and the active participation of all entities in integrating the CSO long-term control planning processes and water quality standards reviews, communities should be able to fully comply with the water quality standards.

3. *What is included in this draft guidance?*

This draft guidance focuses on improving the implementation of the water quality-based provisions in the CSO Control Policy by: (1) improving the level of coordination and

cooperation among CSO communities, State Water Directors[2], community and environmental organizations, and EPA; (2) integrating the development and implementation of the LTCP with the review of water quality standards; and (3) reconciling water quality standards with well-designed and operated CSO LTCPs.

A. EXISTING PROGRAM FRAMEWORK

This draft guidance summarizes the statutory and regulatory requirements governing the CSO control program and water quality standards program. The discussion also covers policy and existing guidance documents that support the integration of LTCP development and implementation with water quality standards reviews.

CSO Program Framework

Under the CSO Control Policy, communities with combined sewer systems are expected to develop LTCPs that comply with water quality standards. By law, discharges that remain after implementation of the LTCP must not interfere with the attainment of water quality standards. More detailed information on the process for developing and implementing a LTCP is provided in the *Combined Sewer Overflows - Guidance for Long-Term Control Plans.* Relevant portions of existing CSO program guidance manuals are identified to assist in developing, implementing and evaluating LTCPs. Appendix I includes an annotated bibliography of all the CSO guidance documents.

EPA offers two approaches for CSO communities to consider in developing LTCPs. These are:

- The "presumption approach" with performance criteria (i.e., 4-6 overflow events or 85% by volume capture) as an initial planning target for the LTCP followed by post-construction monitoring for compliance with water quality standards;
- The "demonstration approach," developing and implementing a LTCP that meets applicable water quality standards followed by post-construction monitoring for compliance with water quality standards;

In selecting the "demonstration approach" there are a number of alternative strategies that a community can select from in developing a LTCP to meet applicable water quality standards. The choice of appropriate strategy will be site-specific. Alternatives include:

- Developing and implementing a LTCP that meets currently applicable water quality standards, including separation of combined sewers to eliminate all overflows;

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[2]. State and Interstate Water Pollution Control Directors, State Water Directors or States should include State and Interstate entities responsible for NPDES permits, enforcement and water quality standards.

- Using a TMDL, if appropriate, to demonstrate that water quality standards can be attained through a combination of CSO and other controls;
- Working with the State Water Director, including both the water quality standards and NPDES authorities, to integrate water quality standards reviews with the development and implementation of an affordable, well-designed and operated CSO control program.

Water Quality Standards Program Framework

The Clean Water Act (CWA or the Act) establishes the statutory framework governing the development of water quality standards and their use. Congress set an interim goal in section 101(a)(2) of the Act to provide, wherever attainable, water quality for the protection and propagation of fish, shellfish, and wildlife and for recreation in and on the water. Section 303 of the Act directs States and Tribes, where authorized, to adopt water quality standards that protect human health and welfare, enhance the quality of water, and serve the purposes of the Act by providing water quality, wherever attainable, for the uses in Section 101(a)(2) of the Act. The CWA requirements for water quality standards are further elaborated by EPA regulations for the program, found at 40 CFR 131.

With the public participating, States adopt water quality standards that set the water quality goals for the water body, serve as the legal basis for TMDLs and the applicable permit requirements for point sources, and provide the program goals for non-point source management programs. Sections 301(b) and 402(a) of the CWA specifically require the national pollutant discharge elimination system (NPDES) permits to comply with water quality standards.

The CWA requires States to review their water quality standards at least once every three years. Any new or revised water quality standards must be approved by EPA before the standards can be used for CWA purposes, such as the basis for a TMDL or a permit limit.

States have considerable discretion in adopting water quality standards and tailoring standards to reflect particular climatic, hydrologic and seasonal conditions. This discretion, however, is not unlimited. State water quality standards must protect public health and the environment by enhancing and maintaining the quality of the water. To protect the uses designated in their water quality standards, States adopt: (1) a suite of criteria to protect the most sensitive of the designated uses; and (2) an anti-degradation policy including implementation procedures to protect water quality. In designating uses for a water body and adopting criteria to protect those designated uses, States consider the attainability of the uses, as well as the protection of downstream uses.

The most common State use classification systems are based on general categories of uses (e.g. fish and aquatic life and recreation, etc.) or qualitative uses (e.g. Class AA - remarkable, Class A - excellent, etc.). Tables 2 through 7 illustrate the various types of State uses classification systems.

States protect recreational uses by adopting the appropriate criteria (*E. Coli* or enterococci). In urban areas, where water-based recreational opportunities may be limited, States should protect children who frequently splash in waters that otherwise would be considered too shallow for adults.

This draft guidance also discusses applying the appropriate criteria at the point of contact rather than at the "end-of-pipe" and use of less stringent criteria when water is unlikely to be ingested or when the recreational use is unlikely to occur, e.g., during the winter. Some States are building flexibility into their water quality standards while also protecting public health by adopting sub-categories of uses, e.g., for CSOs and precluding swimming during or immediately following a CSO event when bacterial counts remain elevated.

This draft guidance provides examples of how some States are defining more explicitly the type of aquatic life that exists in the water body. These State use classification systems provide the public with a better understanding of the type of fish and other aquatic life to be protected by the water quality standards. By more explicitly defining the aquatic life in a water body, States and the public are better able to evaluate the potential of the water body to support healthier aquatic communities. Also identified are the steps and data that would be necessary to develop a tiered aquatic life system with subcategories for urban systems.

B. REVIEWING WATER QUALITY STANDARDS

Depending on the CSO impacts, possible water quality standards revisions include:

1. Applying the bacteria criteria at the point of contact rather than at the end-of-pipe (e.g., adopting a mixing zone);
2. Segmenting the water body to preserve recreation in areas where it actually occurs;
3. Revising the use by creating subclasses to recognize intermittent exceedances of bacteriological criteria.

This section of the draft guidance describes the regulatory requirements, analyses, and documentation needed to demonstrate that there are non-water quality related reasons (i.e., chemical, physical, or economic) for a water body not fully supporting the designated uses. The draft guidance identifies the six bases, any one of which States may use to justify revisions to designated uses (see 40 CFR §131.10(g)(1)-(6)). Appendix II provides additional information on how and when designated uses may be removed.

Also outlined are the circumstances under which States may not change their designated uses. For example, States may not change a use if the use is an existing use or the use can be attained by implementing effluent limits required under sections 301(b) and 306 of the Act and by implementing cost-effective and reasonable best management practices for non-point source controls (40 CFR 131.10(h)(2)).

States proposing revisions to designated uses that lower the level of protection afforded a water body (e.g reducing the number of recreational use days) must submit to the public and to EPA a use attainability analysis (UAA; see 40 CFR 131.10(j)). A UAA is a structured scientific assessment of the physical, chemical, biological and economic factors affecting the attainment of the use. The UAA must provide sufficient information for the State, public and EPA to determine that the use is not attainable. The UAA should also provide sufficient information for the State to adopt an alternative use and the criteria to protect it. States may designate an alternative use based on the demonstrated water quality improvements from an affordable, well-designed and operated CSO control program.

Substantial guidance is available on conducting aquatic life-use UAAs and on performing economic analyses for recreation and aquatic life uses (see Appendix III). This draft guidance builds on these documents by identifying how a LTCP can serve as the foundation for a UAA. In particular, Appendix IV identifies the questions likely to guide the development of a recreational UAA and provides references to the CSO guidance documents where similar information is expected as part of a LTCP. The guidance explains in greater detail the analyses needed to justify revisions based on "substantial and widespread economic and social impact" (i.e., 40 CFR 131.10(g)(6)). EPA is providing this additional information because most CSO-related water quality standards revisions are likely to be based on substantial and widespread economic and social impact. Appendix V explains in greater detail the analyses needed to justify revisions based on "substantial and widespread economic and social impact" (i.e., 40 CFR 131.10(g)(6)) and includes a case example.

This document identifies ways in which the UAA can be simplified. Common sense and good judgment play a role. An important way to simplify UAAs is for the community, State and EPA to reach agreement prior to initiating the UAA on the data to be collected, analyses to conducted and the critical factors to be used in interpreting the results. To assist in simplifying UAAs for recreation, the Agency will develop an example of a UAA for a recreational use water body.

C. INTEGRATING CSO LTCP DEVELOPMENT AND IMPLEMENTATION WITH WATER QUALITY STANDARDS REVIEWS

The implementation of CSO controls included in a well-designed and operated LTCP, may lead to the determination that a water body has the potential of supporting improved aquatic life. Under this circumstance, States would upgrade their designated aquatic life use for the water body. Alternatively, implementation of a well-designed and operated LTCP may not necessarily ensure the attainment of water quality standards within the CSO receiving water. Where existing standards cannot be met, CSO communities, States, and EPA will need a more intensive process than that described in the *Guidance for Long-Term Control Plans.* The objective of this more intensive approach, shown in Figure 1, is for the State Water Director, EPA and the CSO community to reach early agreement on the data and analyses that will be

sufficient to support both the development and implementation of the LTCP and the water quality standards review.

State Water Directors and EPA may need to establish priorities and develop schedules to participate in the more intensive process. For example, if the CSO receiving water body has been included on the State's 303(d) (impaired waters) list for bacteria or other pollutants common to CSO discharges, the State will need to coordinate the schedule for developing a TMDL with the schedule (in the permit, administrative order or judicial order) for developing the CSO LTCP before deciding upon the schedule for the water quality standards review.

This draft guidance describes the steps for integrating the development and implementation of the LTCP with the review of water quality standards. Where available information is not sufficient to support a water quality standards review, EPA expects that communities will install the controls common to all relevant LTCP alternatives while collecting additional information that would support revisions to water quality standards. Where available information indicates that water quality standards revisions are not appropriate, EPA expects that communities will implement a LTCP that complies with the water quality standards.

A few States have developed the mechanisms in their water quality standards program framework to integrate water quality standards reviews with the development and implementation of a well-designed and operated CSO control program. Use of continuous simulation modeling and allowances for a limited number of overflows to define the use are examples. Another approach under consideration in some States is adopting a high flow cutoff. However, at this time, EPA has not developed a national policy on a high flow cutoff for bacteria and recreational uses and no State has yet submitted a high flow cutoff proposal to EPA for review and approval.

D. THE WATERSHED APPROACH

This section discusses how CSO control planning and implementation fit into the watershed approach. EPA recognizes that urban water quality may be affected by a combination of CSO, storm water discharges, sanitary sewer overflows and non-point source runoff. These sources may be most effectively addressed on a watershed basis or through TMDL analyses. Although EPA strongly endorses and provides financial assistance to local watershed efforts, this guidance includes only a limited discussion of the urban wet weather watershed approach. The discussion is limited because of the urgency for preparing this guidance and the lack of resources to fully explore trade-offs and inter-relationships of urban wet weather sources on a watershed basis.

Some States do use a watershed approach in one or more of their water programs, such as monitoring, designating uses, reviewing water quality standards or issuing permits. If CSO LTCPs are integrated with an on-going TMDL or watershed analysis, EPA expects that communities will implement high priority controls while TMDLs or watershed plans are

completed. An iterative, phased implementation of CSO controls fits well with the watershed approach. Appendix VI includes an example of how integration of CSO controls with watershed planning and implementation is occurring in one locale.

II. EXISTING PROGRAM FRAMEWORK

1. CSO Program Framework

A. What is the statutory authority for controlling CSOs?

Combined sewer overflows (CSOs) are point source discharges to the waters of the United States and are therefore subject to section 402(a) of the CWA and the implementing regulations for the National Pollutant Discharge Elimination System (NPDES) Program. The CSO Control Policy, issued on April 19, 1994, provides a national framework and guidance for controlling CSOs consistent with CWA requirements. The Policy is a comprehensive national strategy to ensure that municipalities, permitting authorities, water quality standards authorities, EPA and the public engage in a comprehensive and coordinated planning effort to achieve cost effective CSO controls that ultimately meet appropriate water quality standards.

B. What are the technology-based requirements for controlling CSOs?

The minimum technology-based controls are the nine minimum controls (NMCs)[3] as determined on a site-specific basis by the NPDES authority. The CSO Control Policy calls for all communities to implement the NMCs. The NPDES entity determines whether the NMCs satisfy the technology-based requirements of the CWA based on factors in the NPDES regulations.[4]

C. What are the water quality-based requirements for controlling CSOs?

Under the CSO Control Policy, communities with combined sewer systems are expected to develop LTCPs to provide for the attainment of water quality standards and compliance with other CWA requirements. By law, discharges that remain after implementation of the CSO controls must not interfere with the attainment of water quality standards. In developing LTCPs, communities should examine a range of CSO control alternatives and evaluate the potential CSO reductions and water quality improvements from each alternative. The CSO Control Policy recommends that communities give the highest priority to eliminating, relocating or treating overflows to protect the designated uses in sensitive areas. Sensitive areas include: areas of

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[3]. Nine Minimum Controls include: proper operation and maintenance of collection systems; maximum use of the collection system for storage; maximum flow to the POTW for treatment; eliminated dry weather overflows; control of solid and floatable materials in CSOs; pollution prevention; public notification; and monitoring.

[4]. The factors in 40 CFR 125.3(d)(2) cover BCT and (3) BAT. These factors include the reasonableness of the relationship between the costs of attaining a reduction in the effluent and the effluent reduction benefits, the age of the equipment and facilities involved, process employed, engineering aspects of the various types of control techniques, process changes and non-water quality environmental impact (including energy requirements).

primary contact recreation, drinking water supplies, shellfish beds, and waters with threatened and endangered species and their critical habitats.

In developing their LTCPs, communities evaluate controls to address a reasonable range of alternatives. For example, the LTCP should evaluate controls that achieve zero overflow events per year, an average of one to three, four to seven and eight to twelve overflow events per year. Alternatively, communities could evaluate controls that would achieve 100 percent, 90 percent, 85 percent, 80 percent and 75 percent capture for treatment. The CSO Control Policy also recommends that communities evaluate modifying the operation of the POTW or expanding primary and/or secondary treatment capacity to handle larger flows during storm events. This analysis of control alternatives should be sufficient to make a reasonable assessment of costs and the expected performance of the various alternatives.

D. What options are available in developing a LTCP that meets with the intent of the water quality-based provisions of the CSO Control Policy?

The CSO Control Policy offers two approaches for CSO communities to consider in developing LTCPs. These are:

- The "presumption approach" with performance criteria (i.e., 4-6 overflow events or 85% by volume capture) used as an endpoint for LTCP development and implementation;
- The "demonstration approach," developing and implementing a LTCP that includes a suite of CSO controls sufficient to meet applicable water quality standards;

In all cases, the CSO community will need to undertake a post-construction monitoring program to ensure compliance with water quality standards.

The "presumption approach" presumes the LTCP provides an adequate level of control to meet the water quality-based requirements of the CWA if the LTCP meets the performance criteria described in the CSO Policy. There are a number of alternative strategies that a community can select from when using a "demonstration approach" in developing a LTCP that should be sufficient to meet applicable water quality standards. The choice of an appropriate strategy will be site-specific. Alternatives include:

- Developing and implementing a LTCP that meets currently applicable water quality standards, including separation of combined sewers to eliminate all overflows;
- Using a TMDL, if appropriate, to demonstrate that water quality standards can be attained through a combination of CSO and other controls;
- Working with the State Water Director, including both the water quality standards and NPDES authorities, to integrate water quality standards reviews with the

development and implementation of an affordable, well-designed and operated CSO control program.

The CSO Control Policy lays out four criteria for successful use of the "demonstration approach." A LTCP based on the "demonstration approach" should show that:

- The CSO control program will protect water quality standards unless the standard can not be met as a result of natural conditions or other pollution sources;
- The overflows remaining after implementation of the control program will not prevent the attainment of water quality standards;
- The planned control program will achieve the maximum pollution reduction benefits reasonably attainable; and
- The planned control program is designed to allow cost effective expansion or cost effective retrofitting if additional controls are subsequently determined to be necessary to meet water quality standards, including designated uses.

Where water quality standards can not be met because of natural conditions or other pollution sources, a total maximum daily load (TMDL) or other means should be used to apportion pollutant loads.

Regardless of whether the presumption or demonstration approach is used, the CSO control program ultimately selected must be sufficient to meet water quality standards and other CWA requirements. The CSO Community should undertake a post-construction water quality assessment program of monitoring and collecting sufficient data to demonstrate compliance with water quality standards, including protection of designated uses.

E. How do CSO LTCP monitoring and modeling activities support water quality standards reviews?

One of the objectives in integrating CSO control planning and water quality standards reviews is for CSO communities to help collect information and conduct analyses, whenever possible, which will support both processes. Early involvement of State and EPA water quality standards and monitoring personnel in developing and reviewing the monitoring plans also helps CSO communities collect the data and conduct the analyses to support both the requisites of CSO control planning, including water quality standards reviews.

Many CSO communities focus monitoring and modeling activities primarily on the dynamics of the combined sewer system (frequency, duration, flow rate and volume of CSO discharges). Communities interested in pursuing water quality standards reviews will need to collect sufficient information to quantify the impacts of CSOs on the receiving water. EPA's *Combined Sewer Overflows Guidance for Monitoring and Modeling* (EPA 832-B-99-002) provides information on developing a comprehensive monitoring and modeling plan that focuses both on the dynamics of the combined sewer system and the water quality impacts of CSOs.

CSO monitoring programs include both CSO effluent and ambient in-stream monitoring and, where appropriate, biological assessments, toxicity testing and sediment sampling to evaluate the effect of overflows on ambient water quality and the designated uses. These analyses also help to identify the water quality benefits of control alternatives, and to project the effect of remaining overflows on water quality standards attainment (See Table 1) CSO monitoring programs should:

- Assess attainment of water quality standards (including designated uses);
- Define the baseline conditions in the receiving water (chemical, biological, and physical parameters);
- Assess the relative impact of CSOs;
- Gain sufficient understanding of the receiving water to support evaluation of proposed CSO control alternatives, including any receiving water modeling that may be needed;
- Support the review and revision, as appropriate, of water quality standards.

The monitoring parameters identified in the CSO Control Policy include "oxygen demanding pollutants, nutrients, toxic pollutants, sediment contaminants, pathogens, bacteriological indicators (e.g., *Enterococcus*, *E. coli*) and toxicity." This information is necessary to characterize CSO discharges and their water quality impacts, and to evaluate CSO control plan alternatives. States use this information to determine whether water quality standards revisions may be appropriate, or if more extensive CSO controls are needed. It is important for the permittee, State, and EPA to agree on the information and analyses that are necessary to support both the CSO control plan and the review of water quality standards. The data needed to revise water quality standards are similar to the data needed to assess the attainment of water quality standards.

Table 1 - Types of CSO Data Supporting Water Quality Standards Reviews

- Timing of CSO events and their impacts on primary contact recreational periods or fish spawning.
- Amount of precipitation causing a CSO event.
- Average time between CSO events.
- Season during which CSOs tend to occur more frequently.
- Estimate of the number, frequency, and duration of CSO events per year.
- Flow data for CSO-impacted waters.
- Appropriate meteorological, soils, land use and watershed modeling data.
- Identification of the designated uses.
- Use impairment data, including the severity and geographic extent of impairment (e.g. frequency and duration of beach closures).
- Location of sensitive areas relative to CSO outfalls (e.g., swimming areas, shellfish beds, fish spawning areas, drinking water supply intakes)
- Severity, extent, duration, and frequency of water quality criteria excursions.
- Pollutants in CSOs that cause or contribute to water quality criteria excursions (e.g., bacteria, BOD, nutrients, toxics).
- Pollutant loadings from other point sources (storm water, NPDES-permitted facilities), and from non-point sources (agricultural lands, roadways, and forestry operations).

Collaborative monitoring through consortiums is a cost-effective way to stretch monitoring resources, improve coordination or share expertise and the cost of data collection and management.[5] Many community organizations also support data collection with volunteer monitoring programs. Volunteer monitoring data can have a high degree of credibility, particularly where quality assurance and quality control procedures are documented.[6]

Involving community organizations in evaluating and comparing data on the operation, maintenance and replacement costs of CSO control alternatives over different time frames can help communities select the least cost control alternative. Broad participation can also help these organizations to better understand the scientific, technical and funding issues involved in the control of CSOs and other stressors that impair urban waters. By sharing solid information freely, community organizations can promote consensus on CSO control options and

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[5]. See U.S. EPA. 1997. Monitoring Consortiums: A Cost-Effective Means To Enhance Data Collection And Analysis (EPA 841-R-97-006).

[6].The Directory of Volunteer Monitoring Programs shows that 89 percent of those registering use documented quality assurance and quality control procedures following state- or EPA-approved plans. EPA has published *The Volunteer Monitor's Guide to Quality Assurance Project Plans* (EPA 841-B-96-003) and organizations such as River Watch provide technical guidance (see http://www.riverwatch.org/Catalog).

recommend complementary environmental enhancements that maximize improvements in the CSO-receiving water and provide greater environmental benefits to the watershed as a whole. With this understanding, these groups can facilitate communication with the larger community and generate support for CSO controls and their funding.

2. *Water Quality Standards Program Framework*

A. Who is responsible for water quality standards?

The CWA gives the responsibility for developing, adopting and reviewing water quality standards directly to States, Territories, and authorized Tribes. EPA reviews and approves or disapproves new or revised State water quality standards. For water quality standards submitted after May 30, 2000, only when EPA approves the standard may that standard be used for CWA purposes, such as for TMDLs and for NPDES permits[7]. Under section 303(c)(4) of the CWA, EPA promulgates Federal water quality standards when:

- EPA has disapproved a new or revised standard because the State has failed to adopt water quality standards consistent with the CWA and implementing regulations; or
- The Administrator makes a determination that a new or revised standard is necessary to meet the requirements of the Act.

B. How does a State develop and adopt water quality standards?

Under existing EPA regulations and guidance, States have considerable discretion in adopting water quality standards for a water body[8]. Water quality standards programs are different in each State, reflecting the diversity in climate, hydrology, and ecological conditions across the country.

Under section 303(c)(2), the CWA requires States to adopt water quality standards which will:

- Protect the public health or welfare;
- Enhance and maintain the quality of water; and
- Serve the purposes of the Act.

The goal of the CWA (section 101(a)(2)) that guides the water quality standards program is: "wherever attainable ... water quality which provides for the protection and propagation of

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[7]. 65 FR 24641, April 27, 2000.

[8]. 40 CFR Part 131.

fish, shellfish and wildlife, and recreation in and on the water..." Under section 303(c)(2)(A) of the CWA, States are to establish their standards taking into consideration their use and value of the water body for:

- Public water supplies,
- Propagation of fish, shellfish, and wildlife, and
- Recreation in and on the water.

In designating uses for a water body and adopting criteria to protect those designated uses, States consider the attainability of those uses, often weighing the environmental, social and economic consequences of their decisions. States adopt a suite of criteria necessary to protect the most sensitive of the designated uses and an anti-degradation policy and implementation procedures to protect water quality.

EPA's water quality standards regulations limit State discretion when adopting and revising uses.[9] For example, States may not adopt waste transport as a use for a water body. Further, when designating uses and adopting applicable criteria, States must ensure the protection of downstream water quality standards (see 40 CFR 131.10(b)). In revising designated uses (discussed in more depth below), States may not remove an existing use or remove a designated use if it can be attained with the technology-based controls under sections 301(b) and 306 of the CWA and by implementing cost-effective and reasonable best management practices for non-point source control (see 40 CFR 131.10(h)(2)).

C. How do States classify their uses?

State designated use classification systems fall into two general types -- "categorical" and "qualitative." The "categorical" approach uses categories that primarily focus on specific CWA uses (see Table 2).

Table 2 - Categorical Uses	
1	Domestic Water Supply
2	Industrial Water Supply
3	Fish and Aquatic Life
4	Recreation
5	Irrigation
6	Livestock Watering and Wildlife.
7	Navigation

For example, a State may have the classification system at the left. These uses reflect the basic uses specified in the Act. Any specific water body will likely have more than one use assigned to it (e.g., Green River - Uses 1, 3, 4, 6). For this State, there is only one aquatic life and recreation designated use, no subcategories are specified, and the uses do not imply qualitative judgements.

[9].40 CFR 131.10.

The "qualitative" approach, on the other hand, provides uses generally ranked in a qualitative manner as in Table 3. The use classes clearly provide a qualitative judgement of the expected water quality, and a selection of "categorical" uses are included in the "characteristic use" section. Only one designated use (either AA, A, or B) is assigned to any specific water body.

States have developed a wide range of combinations of these two basic approaches and have refined these basic approaches, especially for aquatic life uses.

Table 3 - Qualitative Uses

Class AA - Remarkable	Water quality in this class shall markedly and uniformly exceed the requirements for all or substantially all uses.	Characteristic uses shall include . . .
Class A - Excellent	Water quality in this class shall meet or exceed the requirements for all or substantially all uses.	Characteristic uses shall include . . .
Class B - Good	Water quality in this class shall meet or exceed the requirements for all or substantially all uses.	Characteristic uses shall include . . .

D. How do States protect recreational uses, particularly in urban areas?

States generally try to protect and maintain the recreational uses of their waters wherever possible consistent with the "swimmable" goal of the Act. Some States adopt primary contact recreation uses (swimming, some types of boating, such as kayaking) for all State waters. Others evaluate site-specific factors such as actual use, existing water quality, potential for water quality improvement, access, recreational facilities, location, safety considerations and physical attributes of the water body (depth, width, substrate, safety, etc.). Physical attributes of the water body may be considered, but no single physical factor can be the only basis for deciding that primary contact recreation is not appropriate. Swimming may occur unless access is prohibited, particularly in areas where children may not have other swimming opportunities. In addition, children will splash and swim in shallow waters that may otherwise be considered too shallow for full body immersion by adults.

Where primary contact recreational use of the water body does not occur during the winter, EPA's water quality standards regulation at 40 CFR 131.10(f) allows States to adopt a seasonal recreation use. A seasonal use defines the recreational season, such as April - October, applies the water quality criteria associated with the primary contact recreation use during that season, and applies less stringent water quality criteria during other months. When people are not using the water for recreation, States may adopt a less stringent water quality criteria to protect for incidental ingestion. These criteria are based on EPA's recommendation for secondary contact waters (i.e. not to exceed a geometric mean five times EPA's recommended water quality criteria for primary contact recreation). These less stringent criteria may be applied as long as they do not impair the use during the recreational season.

States have also adopted a CSO sub-category of recreational uses. Since the sub-category lowers the level of protection for the water body, EPA regulations at 40 CFR 131.10(j) require a use attainability analysis (UAA). Such a sub-category allows for less than swimming every day during the recreational season when a community can not afford a CSO LTCP that controls or treats all overflows. How long the recreational use should be suspended and what other water quality criteria will apply during these events should be decided on a case-by-case basis. Such determinations should consider the proximity of outfalls to sensitive areas, the amount of rainfall, time of year, etc.

To ensure public safety when the recreational use is suspended, EPA policy is for the public to be notified and prevented, wherever possible, from using the water body for recreation. One of the NMCs under the CSO Control Policy is public notification of overflows. Recreational use should be suspended for periods when bacterial levels are elevated, which is usually longer than the storm or runoff event causing the overflow. As with any change in water quality standards, States must ensure that water quality standards of downstream waters are not impaired. As noted, any change to water quality standards must be submitted to EPA for approval or disapproval.

For water bodies where a State demonstrates through a UAA that primary contact recreation should not occur, a recreation use and water quality criteria to protect secondary contact activities may be appropriate. Secondary contact activities are those where participants would have little direct contact with the water and where ingestion of water is unlikely. Examples of secondary contact activities may include wading, canoeing, motor boating, and fishing. EPA's policy is that any secondary contact criterion adopted by a State should be appropriate for the anticipated use and not exceed a geometric mean five times EPA's recommended water quality criteria for primary contact recreation. Applying a less stringent criterion to a water body where only "secondary contact" activities occur should result in no greater risk of gastrointestinal illness than do water bodies designated with primary contact recreation.

E. What are the appropriate criteria for protecting primary contact recreation?

EPA strongly recommends that States adopt *Ambient Water Quality Criteria for Bacteria --1986* to protect public health when waters are used for primary contact recreation. The criteria indicators are *E.coli* or enterococci for fresh water and enterococci for marine water. Table 4 lists the criteria. EPA stresses the need for States to adopt the 1986 criteria because epidemiological studies show that *E.coli* and enterococci are better indicators of gastrointestinal illness than fecal coliform. Twelve (12) of the 34 States with CSO communities have adopted the 1986 criteria.[10] By the end of 2003, where States have not adopted the *E.coli* or enterococci indicators, EPA may promulgate the 1986 criteria.[11]

EPA recommends the geometric mean of the samples taken to not exceed the criterion and the single sample maximum to be met for a water body to fully support its primary contact recreation use. 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.

To assure water quality criteria for bacteria are generally protective in all circumstances, EPA recommends:

- Frequent monitoring of known bathing areas to determine if the water body is attaining the water quality criteria;
- Conservative use of mixing zones for bacteria where mixing zones are authorized;
- Prohibiting mixing zones from impacting known primary contact recreation areas;
- Using the appropriate single sample maximum in the assessment of primary contact recreation; and
- Conducting a sanitary survey when higher than normal levels of bacteria are measured.

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[10]. States with CSO communities using enterococci for marine waters and enterococci/E.*coli* for fresh water include: CA, CT, DE, IN, ME, MI, NH, NJ, OH, OR, TN, VT

[11]. *Guidance to State, Tribes, and Regions on the Water Quality Standards Program Priorities for FY 2000 - 2002*, January, 1999 [EPA-823-B-99-005] and *Draft Implementation Guidance for Ambient Water Quality Criteria for Bacteria -- 1986*. February, 2000).

TABLE 4
Summary of EPA Recommended Water Quality Criteria For Bacteria[12]

	Steady State, 30-day Geometric Mean Indicator Density (cfu/100mL)	Single Sample Maximum (cfu/100mL)			
		Designated Beach Area	Moderate Full Body Contact Recreation	Lightly Used Full Body Contact Recreation	Infrequently Used Full Body Contact Recreation
Freshwater					
enterococci	33	61	89	108	151
E. coli	126	235	298	406	576
Marine Water					
enterococci	35	104	124	276	500

[12] *Ambient Water Quality Criteria for Bacteria–1986*, EPA440/5-84-002)

A sanitary survey is an examination of a watershed to detect unauthorized sanitary discharges from sources such as:

- Failed septic tank leach fields or cesspools,
- Sewage leakage from broken pipes,
- Sanitary sewer overflows from hydraulically overloaded sewers, or
- Overflows from storm sewers that may contain illegal sanitary sewer connections.

In addition, EPA recommends that sanitary surveys identify other possible sources of fecal pollution, including confined animal areas, wildlife watering points, and recreational spots, such as dog running/walking areas. The Agency is developing the data to publish additional health-based water quality criteria to protect for other non-gastrointestinal health risks, such as skin and respiratory infections.

In both fresh and marine waters, excess nutrients along with the warm water temperature of recreational waters provide an ideal growth medium for potentially harmful pathogens. High levels of indigenous *Aeromonous hydrophila* can infect cuts and scratches, and high levels of *Vibrio parahenolyticus* or *Vibrio vulnificus* contaminate shellfish with life-threatening consequences for vulnerable individuals. In addition to controlling nutrients for recreational waters based on aesthetics (e.g., weeds, algal scums, and low transparency), greater levels of nutrient control for more sensitive aquatic species should also provide a greater level of protection for public health.

Thus far, EPA has published *Nutrient Criteria Technical Guidance Manual: Lakes and Reservoirs* (EPA-822-B00-001) and *Nutrient Criteria Technical Guidance Manual: Rivers and Streams* (EPA-822-B-00-002). The Agency also plans to make available for review a manual for estuarine and coastal waters in December 2000. The general guidelines in the Technical Guidance Manuals provide information States can use as they develop nutrient criteria to protect various designated uses such as water supply, aesthetic qualities of recreation, and different types of aquatic species. Although health-based recreational guidelines are not included in the document, EPA believes that if the current criteria protect sensitive aquatic species, the criteria should also protect public health.

F. Where are the bacteria criteria applied?

Many States apply the ambient water quality criteria for bacteria directly to the discharge ("end-of-pipe") with no allowance for in-stream mixing. Other States provide mixing zones for bacteria, and derive permit limits that account for in-stream dilution and apply the criteria at the point where recreation occurs. In these cases, CSO outfalls, sufficiently removed from recreational areas, may not pose a public health threat. States could also segment a water body to protect the recreation in the area where it is most likely to occur and prohibit recreation in other areas of the water body where CSOs and other discharges pose significant public health threats.

G. How do States protect aquatic life uses?

Some States use a single designated use (e.g., fish and aquatic life), simple subcategories (*e.g.*, warm water fishery, cold water fishery), or qualitative class (*e.g.*, Class A). These generic aquatic life use designations, either categorical or a qualitative do not recognize the natural biological variations that occur among water bodies (swift flowing small streams, large meandering rivers, lakes, wetlands, estuaries, etc.) or climatic conditions, altitude, geology, soils, land use, hydrologic conditions found in different ecological regions. Different ecological regions have natural variations in biologically healthy aquatic life, as measured by indices of species richness, diversity, composition, and condition of the aquatic habitat which can flourish in any particular water body. More precise definitions of the type of aquatic life to be protected give municipalities and the public a better understanding of the species to be protected and the level of control needed. Some examples of more precise use definitions are trout and salmon or blue gill, crappy and large mouth bass, and self-supporting fishery, stocked fishery or critical life stages of species.

In order to help better define and protect different aquatic communities, EPA and the States continue to develop biological assessment tools and criteria to more accurately describe the natural range of aquatic communities. Once additional natural aquatic communities are defined, EPA recommends that States refine their designated uses to reflect natural differences.

H. How have some States developed more refined aquatic life uses?

Several States have refined their aquatic life uses to reflect different biological systems within their borders. Most States (at least, those with cold water fish) have use categories for warm water and cold water fish. Some States have refined these classes further by focusing on the fish populations, as in Table 5:

Table 5 - Aquatic Life Use Classes

Class 3 -- Protected for use by aquatic wildlife.	
Class 3A	Protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in their food chain.
Class 3B	Protected for warm water species of game fish and other warm water aquatic life, including the necessary aquatic organisms in their food chain.
Class 3C	Protected for nongame fish and other aquatic life, including the necessary aquatic organisms in their food chain.
Class 3D	Protected for waterfowl, shore birds and other water-oriented wildlife not included in Classes 3A, 3B, or 3C, including the necessary aquatic organisms in their food chain.
Class 3E	Severely habitat-limited waters. Narrative standards will be applied to protect these waters for aquatic wildlife.

Other States have developed subcategories based on physical characteristics and/or ecological systems, as in Table 6:

Table 6 - Water Body Classifications

Classification of State waters.
(a) State waters are classified as either inland waters or marine waters.
(b) Inland waters.
  (1) All inland waters are either fresh waters, brackish waters, or saline waters;
  (2) All inland fresh waters are classified as follows, based on their physical characteristics, ecological systems, and other natural criteria:
    (A) Streams (perennial or intermittent);
    (B) Springs and seeps, natural lakes, and reservoirs;
    (C) Elevated wetlands;
    (D) Low wetlands;
  (3) All inland waters which are brackish waters or saline waters are classified as follows, based on their physical characteristics, ecological systems, and other natural criteria:
    (A) Coastal wetlands;
    (B) Estuaries;
    (C) Anchialine pools; and
    (D) Saline lakes
(c) Marine waters . . .

I. Why are refined aquatic life uses important in the urban environment?

EPA believes that urban watersheds can and do support aquatic life and that improvement and restoration of healthy urban aquatic communities is an attainable goal of the CWA. States, with EPA's support, are developing biological assessment tools and biological criteria to assess the health of their waters in relationship to the "biological integrity" goal of the CWA. Biological integrity for a particular water body is the natural (or minimally impacted) condition of the water body.

There are a number of water quality and non-water quality factors that affect the attainment of natural aquatic communities in urban areas, including the amount of impervious surface, human activity resulting in permitted and non-permitted discharges, and the type and extent of hydrologic modifications. Some recent literature suggests the full restoration of natural aquatic life communities may not be feasible in small watersheds with heavily urbanized areas. Schueler found significant impairment of aquatic life where levels of impervious cover in urban

areas were in the range of 8-percent to 20-percent.[13] Yoder et al found this threshold level is also influenced by other factors such as pollutant loadings, watershed development history, riparian buffers, CSOs, and types of land use.[14] More sensitive aquatic life, such as brook trout, may be unable to survive in watersheds with as little as 1- to 2-percent impervious land cover.[15] However, States that base their aquatic life use classification systems on biological criteria and on a range of use subcategories which lead to the biological integrity goal for a water body have a framework for evaluating possible attainable improvements in urban aquatic life ecosystems.

EPA recognizes the need for additional guidance to better define the factors to consider in designating and protecting appropriate aquatic life uses in urban areas. Such guidance would address a variety of urban stressors, a broad range of geographic areas, and the full range of imperviousness in urban areas. This guidance would help additional States adopt subcategories of aquatic life uses and water quality criteria that more accurately and precisely define actual and attainable aquatic communities. Once this information is developed, States, watershed organizations, and local communities will be able to identify the recovery potential of the aquatic communities, adopt appropriate water quality standards, and design affordable restoration and protection strategies.

J. What steps are necessary to develop a system of tiered aquatic life uses and subcategories for urban systems?

A two-step process is outlined below in Table 7. First, the State defines the biological communities for various water body types in areas with minimal human impacts (Column A) based on EPA bioassessment/biocriteria methodologies.[16] Second, the State defines reasonably attainable biological communities for the urban-impacted areas (Column B).

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[13]. Schuler, T. R. 1994. The importance of imperviousness. Watershed Protection Techniques 1: 100-111.

[14]. Yoder, C. O., et.al. 1999. Assessing the status of aquatic life designated uses in urban and suburban watersheds, pp.16-28. *In* Everson, A., et al.(eds.). National Conference on Retrofit Opportunities for Water Resource Protection in Urban Environments, Chicago, Il. EPA-625-R-99-002.

[15] Maryland Biological Stream Survey, http://www.dnr.State.md.us/streams.mbss/brook.html

[16] - Biological Criteria: National Program Guidance for Surface Waters. 1990. EPA-440/5-90-004.
- Biological Criteria: Technical Guidance for Streams and Small Rivers, Revised Edition. 1996. EPA 822-B-96-001.
- Draft Estuarine And Coastal Marine Waters Bioassessment and Biocriteria Technical Guidance. 1997. EPA 822-B-97-001.
- Lake and Reservoir Bioassessment and Biocriteria: Technical Guidance Document. 1998. EPA 841-B-98-007.
- Rapid Bioassessment Protocols For Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish. Second Edition. 1999. EPA 841-B-99-002.

Table 7 - Developing A Refined Aquatic Life Designated Use System		
	Column A	**Column B**
Step	For refined use designations reflecting the range of natural biological communities in the area . . .	**In addition**, qualitative subcategories reflecting achievable biological communities in urban-impacted areas . . .
1	Develop bioassessments able to differentiate between the natural biological communities in the different water body types.	Refine bioassessment protocols to differentiate between the range of urban impacts (e.g., imperviousness, land use type [industrial, residential, etc], development history, hydrologic modification) in the different water body types of concern.
2	Conduct bioassessments of the different water body types to collect data reflecting non-impacted waters (reference condition).	Conduct bioassessments to capture the biological impacts from a range of urban conditions.
3	Refine the aquatic life designated use categories to reflect the natural biological communities within each water body type (*e.g.*, lakes/impoundments, small streams, rivers, estuaries, wetlands).	Determine the **achievable** biological condition for the range of urban impacts. Develop qualitative subcategories for each designated use based on achievable biological conditions (*e.g.*, based on % imperviousness, land use, etc.).
4	Develop biological criteria that protect the natural community (reference condition) for each designated use category.	Develop biological criteria that reflect the attainable biological community for each qualitative subcategory.
5	For each designated use applied to a water body type, determine the range of allowable change from the reference condition that meets the "fishable" goal of the CWA.	For each urban impacted subcategory, determine if its biological criteria fall within the range of allowable change from reference condition and meet the "fishable" goal of the CWA
6	Adopt refined designated use categories, biological criteria defining those uses, and protective chemical and physical water quality criteria into water quality standards.	Adopt subcategories, biological criteria defining those subcategories, and protective chemical and physical water quality criteria into water quality standards.

Once a refined designated use system is developed, individual water bodies may be assigned refined designated uses, as appropriate.

K. What is the process for assigning subcategories of uses to individual water bodies?

Revision of use classification systems requires a revision to State water quality standards subject to EPA review and approval or disapproval as outlined in EPA's water quality standards regulations. EPA encourages States to use the use attainability analysis (UAA) model to

develop an appropriate scientific, technical or economic justification for the change when reclassifying waters with a less protective use than the current designated use.

The new designated use must be equal to or better than the "existing" use.[17] No UAA is required if the State adopts a new designated use that is either equivalent to the reference condition for that particular water body type or meets the "fishable/swimmable" goal of the CWA and the State adopts criteria equal to, or more stringent than the current designated use. Under the EPA's water quality standards regulations, a combination of a new use sub-category and less stringent criteria would trigger a UAA.[18] In certain circumstances other supporting documentation may be acceptable.

The proper supporting information that should accompany aquatic life use refinements in a use classification system, whether or not a formal UAA should address:

- Does the refined designated use and its description of the aquatic community (biocriteria) reflect the reference condition (i.e., natural state) for the kinds of waters to which the new classification is to be applied?
- Are any newly proposed water quality criteria necessary to protect the use scientifically defensible?

Even if a UAA is not required, these are important questions for the State to address. EPA regulations at 40 CFR 131.10(c) allow States to adopt categories of a use and set appropriate criteria to reflect varying needs of the use. When refining the aquatic life use categories, the State needs to explain how the proposed biological description correctly reflects the aquatic life use potential for that water body.

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[17] Existing uses are those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards (40 CFR 131.3). See also 40 CFR 131.10(g)

[18] .40 CFR 131.6(b) and 131.10(j)(2).

III. REVIEWING WATER QUALITY STANDARDS

1. How often are water quality standards reviewed?

The CWA requires States to review their water quality standards at least once every three years. EPA expects that the recent revisions to EPA's water quality standards regulations ("Alaska Rule" 65 FR 24641, April 27, 2000) will result in States submitting more frequent revisions to their standards, because any new or revised standards can not be used for CWA purposes until EPA approves them. The extent to which this occurs depends in part on State authorizing statutes, regulatory requirements, and administrative procedures. Some States have more lengthy processes, particularly where the legislature enacts water quality standards into State law before the new or revised standards are submitted to EPA or where an independent board adopts the standards revised by the State agency responsible for the water quality standards program. Limited resources may be another constraint.

Where CSO communities collect the information outlined in this document and follow the process for developing and implementing their draft LTCP (as shown in Figure 1) and coordinate with State and Interstate Water Pollution Control Directors throughout the planning and implementation processes, States will have a stronger basis on which to conduct timely water quality standards reviews. State water quality standards reviews could result in:

- Identification of information needed to support water quality standards actions,
- Variances,
- Water quality standards revisions, or
- No revisions to the water quality standards.

2. What type of water quality standards revisions are possible?

State water quality standards reviews may include any element of the standard including uses, criteria, the anti-degradation policy and other policies affecting the implementation of the water quality standards program, e.g., variances, compliance schedules, etc. For example, a review of the suite of criteria to a particular water body may result in adding new criteria, revising criteria based on national guidance (e.g., adopting *E. coli* or enterococci) or setting a site-specific criterion, if appropriate. In addition, States may review implementation policies on where criteria are applied, e.g., applying the bacteria criteria at the point of contact rather than at the end-of-pipe (e.g., adopting a mixing zone). Another option may be segmenting the water body to preserve recreation in areas where it actually occurs.

To protect recreational uses as much as possible, some States are looking at creating subclasses of recreational uses that recognize intermittent exceedances of bacteriological criteria due to uncontrolled CSO discharges. This approach retains the recreational use, but lowers the level of protection for the use by specifying the maximum number of days when recreation can not safely take place. For example, the subcategory may state that during the recreation season,

recreation can be suspended up to a certain number of days. The number of allowable days that the use could be suspended would be based on a site-specific use attainability analysis (see 3. below). The analyses would project the number of days that bacteriological levels are likely to be elevated after implementing the maximum affordable level of control from a well-designed and operated CSO control program. Before lowering the level of protection for a use, States must provide an opportunity for the public to review the proposal and analyses justifying the revision (see 40 CFR 131.20(b)). States must also ensure that any revision provides for the attainment and maintenance of downstream water quality standards (see 40 CFR 131.10(b)).

States may not remove:

- An "existing" use, i.e., a use actually attained in the water body on or after November 28, 1975 (see 40 CFR 131.3(e) and 131.10(h)(1)); or
- A use that can be attained by the imposition of effluent limits required under sections 301(b) or 306 of the CWA and cost-effective and reasonable best management practices for non-point source control (see 40 CFR 131.10(d) and 131.10(h)(2)).

3. *What type of analyses are required to remove or lower the level of protection for a use?*

EPA's water quality standards regulations at 40 CFR 131.10(j) require use attainability analyses (UAAs) whenever a State fails to adopt, removes or lowers the level of protection for the protection and propagation of fish, shellfish and wildlife, or for the protection of recreation in and on the water. Once such a use is designated, it cannot be modified unless the State demonstrates through a UAA that attaining it is not feasible.

A UAA is a structured scientific assessment of the physical, chemical, biological and economic factors affecting the attainment of the use. Included in the regulation are six bases that address circumstances beyond those related to water quality, which preclude the attainment of the use. A description of how and when designated uses may be removed is presented in Appendix II. Any <u>one</u> of the following factors can be used to justify changes in the designated use:

1. Naturally occurring pollutant concentrations prevent the attainment of the use; or
2. Natural, ephemeral, intermittent, or low flow conditions or water levels prevent the attainment of the uses, unless these conditions may be compensated with sufficient effluent discharges; or
3. Human-caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more damage than to leave in place; or
4. Dams, diversions or other types of hydrological modifications preclude the use, and it is not possible to restore the water body or operate the modification in such a way that would result in attainment; or

5. Physical conditions related to the natural features of the water body unrelated to water quality preclude attainment of aquatic life uses; or
6. Controls necessary to attain the use would cause substantial and widespread social and economic impact.

The UAA should provide sufficient information for the State to determine that the designated use is not attainable. It should also provide the basis for adopting an alternative use and the criteria to protect it. To support the 101(a) "fishable/swimmable" goal uses, the State should adopt an attainable alternative use as close as possible to the goal uses. As noted, the public must also have an opportunity to review the UAA and the alternative use before the State submits the revisions and the UAA to EPA for approval or disapproval.

Guidance is available on conducting UAAs (Appendix III). Although most of this guidance addresses aquatic life uses and the economic analyses, several EPA Regional Offices have developed guidelines for recreational use UAAs. Appendix IV builds on these documents by identifying questions which are likely to guide the development of a UAA for recreation. Appendix IV also provides references to the CSO guidance documents where similar information is expected as part of a UAA.

4. On what basis would States generally justify their determination that a use is not attainable in CSO receiving waters?

Revisions to water quality standards based on CSO discharges would most likely be appropriate when the controls necessary to attain the standard would cause "substantial and widespread economic and social impact."[19] The *Interim Economic Guidance For Water Quality Standards*[20] identifies the analyses States use to support this determination.

For the public sector, the *Guidance* includes the tools for States to evaluate:

- Who within the community would bear the costs of the CSO LTCP,
- Whether these costs are substantial, and
- Whether changes in socioeconomic conditions indicate widespread impacts.

In determining whether the costs of the draft LTCP are substantial, the annualized per household project costs, including existing and new costs, are divided by the annual median household income. If the result (termed a municipal affordability screener) is less than 1%, the State could decide that the annualized project costs are minimal and that financial and economic

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[19]. 40 CFR 131.10(g)(6).

[20]. *Interim Economic Guidance For Water Quality Standards: Workbook* (EPA-823-B-95-002, March, 1995).

impacts do not warrant revising the water quality standard on that basis. If the municipal affordability screener is between 1% - 2% (a mid-range impact) or greater than 2% (a large impact), additional analyses may be appropriate. These secondary analyses include indicators such as:

- Bond rating,
- Overall net debt,
- Unemployment rate,
- Median household income,
- Property tax revenue as a percent of full market value of taxable property, and
- Property tax collection rate.

The results of these secondary assessment scores are summarized as a cumulative assessment score (<1.5 minimal impact; 1.5 - 2.5 mid-range; and >2.5 strong). The State combines the municipal affordability screener and the secondary assessment score in a matrix to help determine whether the impacts are "substantial."

The derivation of the 2% yardstick is based on EPA studies across environmental programs that collected financial information from communities around the country. The studies found that two cutoffs were appropriate for determining the difficulty the community would have in affording additional project costs. Based on the data across many Federal and State programs, EPA found that for a water bill of:

- Less than 1% of median household income per year may not be difficult for the consumer,
- Between 1% and 2% more information is needed, and
- Greater than 2% may be difficult for the consumer.

The *Interim Economic Guidance* recommends evaluating the **change** in socioeconomic indicators:

- Median household income,
- Community unemployment rate,
- Overall net debt as a percent of full market value of taxable property,
- Percent of households below the property line,
- Impact on community development potential, and
- Impact on property value.

If the impacts are found to be substantial, the State would also have to demonstrate that they are widespread before proposing a water quality standards revision. There are no explicit criteria on which to evaluate widespread impacts. The extent to which estimated changes can be interpreted as significant will depend on the health of the community before compliance. Therefore, EPA cannot identify an acceptable or unacceptable estimated change for each indicator. Appendix V gives an example that will help explain the effect of the controls on water and sewer bills.

If the State and EPA agree that the community can not afford sufficient CSO controls to comply with permit requirements based on currently applicable water quality standards and no longer cause or contribute to the impairment of the designated use, EPA policy is that States adopt the "highest" attainable use.[21] Therefore, the CSO community would be expected to install the maximum affordable level of CSO controls. The State can then revise the water quality standards based on water quality improvements to be achieved by the maximum affordable level of CSO control.

5. Are there ways to simplify the UAA process?

Simplifying the UAA process begins with an inclusive process. With an inclusive process a broad range of State, local and Federal entities can actively participate in the scientific, technical and funding discussions related to the CSO LTCP. An inclusive CSO LTCP process simplifies the UAA process by broadening the cadre of knowledgeable individuals familiar with the CSO issues and the likelihood of identifying other opportunities for further water quality and use improvements with different types of CSO controls. These individuals increase the likelihood of identifying other watershed opportunities for further water quality and use improvements. They can also facilitate communication with the community-at-large by explaining why additional controls or water quality standards revisions are needed.

Common sense and good judgment play an important role in determining the amount of data and level of analyses needed to justify changes in the designated use. The UAA process is simplified when the CSO community, the State and EPA agree on the scope of the UAA, the data to be collected, and the analyses to be conducted before the UAA is begun.

The amount of data to be collected and analyses to be conducted will depend on the particular water body. Some are inexpensive. Others are more difficult, for example examining the effect of continued CSOs on a productive estuary. For the process to work smoothly, everyone should agree on:

- Study design and objectives,
- Data to be used and the methods and procedures to collect it,
- Analyses to be conducted, and
- Critical factors to be used in interpreting the results.

Another way to simplify the UAA process is for the State to tailor the UAA to the factor most likely precluding the attainment of the use. A less rigorous UAA may be appropriate for a particular aquatic life use when the physical features of the water body prevent attainment. Where physical features are the limiting factor for a particular aquatic life use, there may be no

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[21]. See March 15, 2000 decision of the District Court for the District of Idaho in Idaho Mining Association v.Browner (No. CV98-0390-S-MHW).

need to conduct extensive water quality analyses. In CSO-impacted waters, where pathogens are often the limiting factor in attaining recreational uses, there may be no need to conduct extensive biological monitoring.

The UAA is also simplified where existing data are available. For example, a State that has a biologically-based, refined classification system for aquatic life protection has generated extensive biological monitoring data to support the classification system. The data would include numerical values or procedures for calculating numerical values applicable to a particular type of aquatic life. Because they have data and an agreed-to-basis for interpreting that data, UAAs will be easier for States with such scientifically-based aquatic life use classification systems. EPA continues to encourage States to adopt a biologically-based refined aquatic life protection classification system.

Another way to simplify the UAA process is to follow other models that have been used to support water quality standards revisions. Some States have an outline of the data and analyses needed, as well as examples of UAAs that have been used to support water quality standards revisions. Following State outlines and examples and other general models in the guidance documents referenced above should provide a good starting point.

EPA intends to develop an example UAA for recreation to help CSO communities and States identify simplifying assumptions to support portions of a UAA. If groups of water bodies share similar characteristics, "generic" assumptions could be developed. However, every water body and combined sewer system is different, and additional data will be needed to demonstrate that the generic assumptions are applicable to the circumstances of a particular water body. Such assumptions might include:

- Physical, chemical and biological characteristics of the water body,
- Existing and designated uses,
- Hydraulic characteristics of the combined sewer system,
- Number and volume of the overflows,
- Response of the system to different types of storm events,
- Type of controls to be implemented.

6. What is a variance and when is it appropriate?

A variance is a temporary change in the water quality standards for three to five years, with renewals possible. Variances provide a "bridge" if additional data or analyses are needed before the State can make a determination that the designated use is not attainable and adopts an alternative use. Because a variance is a change in the water quality standard, the same requirements apply for a variance as for a new or revised standards, e.g., public review and comment, and EPA approval or disapproval.

When adopting a variance for an individual discharger for specific pollutants, such as bacteria, States have to demonstrate that the designated use is not an existing use (40 CFR 131.10(h)(1) or that the designated use is not attainable with the technology-based controls in sections 301(b) and 306 of the CWA and with cost effective and reasonable best management practices for non-point sources (40 CFR 131.10(h)(2)).

To preserve existing uses, variances are set as close as possible to the numerical criterion for the designated use. Other pollutant limits or discharger effluent limits are not affected by a variance. For example, a State may adopt a bacteria variance for specific CSO outfalls, but other point source dischargers would have to continue to comply with the bacteria limits in their permits.

Since the underlying use remains, the rigor of the analyses and the level of demonstration used for a variance is generally less than that required for a permanent change in the use. However, States need to demonstrate that one of the six bases for a change in a use apply.[22] EPA expects that sufficient information will be available in a draft LTCP to justify a variance.

In approving a variance, EPA looks at the conditions the State has included in the variance (e.g., implementation of portions of the CSO LTCP and water quality monitoring). Further environmental progress can be attained when variances include provisions such as:

- Prohibition on further degradation of water quality or impairment of the designated use;
- Permit requirement for implementing high priority CSO controls (e.g., eliminating, treating or directing overflows from sensitive areas);
- Collection of additional monitoring data;
- Conduct of analyses that address complex questions related to attaining the use or, if not attainable, an alternative use; or
- Evaluation of whether further environmental benefits could be attained in the water body or watershed by supplementing CSO controls with other environmentally beneficial projects linked to the CSO receiving water body.

Once the agreed-to portion of the LTCP is implemented and the effect on water quality is evaluated, the State will be better able to judge whether the use can be attained with additional controls or it needs to revise the water quality standards.

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[22]. 40 CFR 131.10(g)(1)-(6).

IV. INTEGRATING CSO LTCP DEVELOPMENT AND IMPLEMENTATION WITH WATER QUALITY STANDARDS REVIEWS

1. How do you integrate development of CSO LTCPs by communities and reviews of water quality standards by States?

EPA believes that communities and States can integrate water quality standards reviews with the development and implementation of affordable, well-designed and operated CSO control programs by integrating the development and implementation of CSO LTCPs with water quality standards reviews. One purpose of the CSO Control Policy is "to coordinate the planning, selection, design and implementation of CSO management practices and controls to meet the requirements of the CWA and to involve the public fully during the decision making process." The Policy also includes four key principles, one of which is the "review and revision, as appropriate, of water quality standards and their implementation procedures when developing CSO control plans."

Given the above principle and the importance of early and frequent coordination among municipalities, State Water Directors, NPDES authorities, if different,[23] and the public, this guidance lays out a process (Figure 1) for those communities interested in coordinating the development of LTCPs with the review of State water quality standards. The process is intended to ensure that all key groups engage in a comprehensive and coordinated planning effort to achieve cost-effective CSO controls that ultimately meet appropriate water quality standards. It is an iterative process as shown in Figure 1 and the accompanying narrative. The purpose and major objectives of the process and flow chart are to:

- Delineate clear roles and responsibilities for CSO communities, NPDES authorities, State Water Directors, EPA and others;
- Secure early agreement on the process and scope of the data and information needed to support a LTCP and a water quality standards review;
- Ensure early input of the public in the LTCP and water quality standards review processes;
- Ensure the acceptance of a draft LTCP is closely coordinated with decisions on water quality standards revisions, if appropriate;
- Ensure that the final LTCP and the water quality standards are reconciled.

The flow chart in Figure 1 lays out a series of steps that provide greater assurance that affordable, well-designed and operated LTCPs support the attainment of appropriate water quality standards. Figure 1 is intended to expand upon and explain, but not to replace, the process described in the *Combined Sewer Overflow Guidance for Long-Term Control Plan* (EPA 832-B-95-002).

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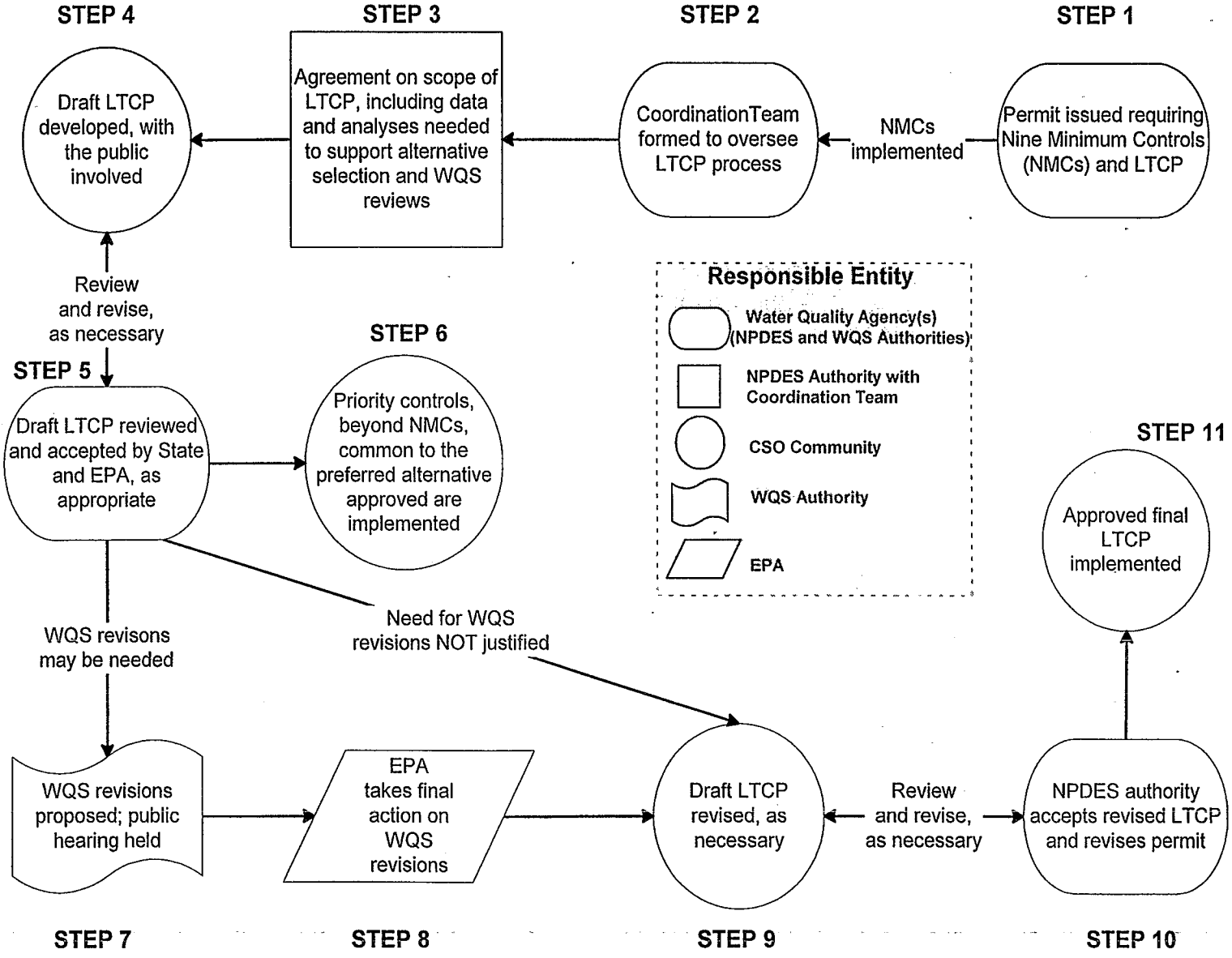
[23]. NPDES authorities may be authorized States, or EPA Regional Offices, or federally recognized Tribes.

FIGURE 1 - Coordination of LTCP Development and Water Quality Standards Review and Revision



Step 1 - The NPDES Authority issues a permit requiring NMCs and LTCP. The NPDES authority issues a permit or other enforceable mechanism that requires the CSO community to implement the NMCs and develop a LTCP. The permit or enforceable order should require that the CSO community immediately proceeds with the implementation of the NMCs and evaluation of the efficacy of the NMCs in controlling the number and quality of the overflows. This information should assist the community in designing the LTCP.

Step 2 - The NPDES Authority forms a coordination team to oversee LTCP process. The NPDES authority organizes a team to coordinate the development of a draft LTCP. The coordination team will promote timely discussion of issues, identify sources of information, and provide technical assistance. At a minimum, the coordination team should include decision-making representatives from the CSO community, NPDES authority, State Water Director and EPA. The coordination team may include representatives from local community stakeholders, including those involved in watershed planning efforts, other point sources, and non-point source representatives, and persons involved in TMDL development, if applicable.

This process requires significant coordination and cooperation and full participation by the community, State and EPA. State Water Directors with their NPDES and water quality standards entities and EPA will need to set priorities among CSO communities and the affected water bodies. For example, if the CSO receiving water body has been included on the State's 303(d) (impaired waters) list for bacteria or other pollutants common to CSO discharges, the State will need to coordinate the schedule for developing a TMDL with the schedule (in the permit, administrative order or judicial order) for developing the CSO LTCP before deciding on the schedule for the water quality standards review. Once the review is scheduled, States and EPA can phase their active participation among communities and water bodies, depending on the progress of the community.

EPA and State authorities in the NPDES and water quality standards programs need to actively participate and should foster coordination among entities. EPA involvement may be extensive in some cases (e.g., where particular controversy exists or where there are interstate issues on a common body of water).

Some States and EPA Regional Offices have successfully used "kick off" or periodic meetings with CSO communities to respond to common issues or questions. Communities have also expanded their own coordination efforts beyond their local constituency groups by involving downstream communities affected by overflows and other State and EPA personnel.

Step 3 - Coordination teams agree on process and scope of LTCP. The objective of this step is to ensure that there is early agreement on the planned process (i.e. key milestones and dates) and scope of the LTCP (e.g., presumption or demonstration approach), including the data and analyses needed to support selection of control alternatives and review of water quality standards.

The State Water Director, CSO communities and EPA should agree on:

- The amount and type of data needed (i.e. characterization, monitoring and modeling of the sewer system and its impacts on the receiving water body and data that will be needed for post construction compliance monitoring to be included in the community's Monitoring and Modeling Plan.[24]);
- The range of alternative control levels to be evaluated, including cost and performance information for each alternative examined;
- Relevant sensitive areas; and
- A timetable for completion of key events.

Together, the CSO community and the coordination team review historical data and information on the combined sewer system and receiving water quality to develop a profile of conditions, identify additional information to collect and the components of the monitoring and modeling plan. The monitoring and modeling plan needs to:

- Support a thorough evaluation of the combined sewer system;
- Characterize the response of the system to various precipitation events;
- Determine the efficacy of the NMCs;
- Determine the characteristics of the CSO effluent, and the effect of overflows on ambient water quality; and
- Describe post-construction compliance monitoring.

The monitoring and modeling plan identifies the parameters of concern in the receiving water and water quality standards. In many cases, the principal concern will be pathogens. Biological assessment, toxicity testing and sediment sampling may also be included in the plan, where appropriate. All appropriate entities should reach agreement with the community on the monitoring and modeling plan needed to support both the draft LTCP and the water quality standards review. At a minimum, the NPDES authority, State Water Director and the community are critical to securing this agreement. Coordination during this step provides greater certainty that ultimately, the NPDES authority will approve the LTCP.

The State is responsible for making the determination, based on a use attainability analysis, that a use is attainable or that another appropriate attainable use needs to be adopted. It is expected that the UAA will be based in large part on data collected as part of the LTCP process. The State Water Director should agree on the amount and type of data needed, taking into consideration the nature and extent of the site-specific CSO impacts when making this judgment.

The coordination team should seek to optimize the development and analysis of the information on CSO impacts in a manner that will support the water quality standards review and the evaluation of the improvements in water quality during the implementation of the controls. The amount and type of data will depend on the nature and extent of the site-specific CSO impacts and the availability of data. The LTCP can serve as the foundation for a water quality standards review.

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[24]. *Combined Sewer Overflows Guidance For Monitoring and Modeling.* (EPA 832-B-002, January, 1999).

The common components of a CSO LTCP and a water quality standards review include:

- Water quality monitoring and modeling;
- Hydraulic monitoring and modeling;
- Detailed descriptions of existing and designated uses;
- Analyses of the potential for use attainment; and
- Analyses of control costs.

The objective of this step is for the coordination team (community, State, and EPA) to agree on the additional data and analyses and the critical factors to be used in interpreting the information, the schedule for the studies and the participating parties before the community, State, other Federal agency (e.g., U.S. Geological Survey) or EPA initiates any of the studies. Integrating water quality standards reviews with the development and implementation of an affordable level of CSO control necessitates that all parties agree in advance on the information and analyses which are appropriate to support a water quality standards revision that can be adopted consistent with the CWA and EPA's implementing regulation at 40 CFR 131.10.

Depending on the CSO impact, possible water quality standards revisions could include:

- Applying the standard at the point of contact rather than at the end-of-pipe;
- Segmenting the water body to preserve the designated use in areas where it actually occurs;
- Revising the use by creating subclasses to recognize intermittent exceedances of bacteriological criteria.

EPA's regulations at 40 CFR 131.10(j) require a UAA whenever the State proposes to reduce the level of protection for the water body. If the State Water Director agrees that a UAA is appropriate, UAA guidance is available (Appendix III). Appendix IV identifies the questions and information for a recreational UAA and provides references to the CSO guidance documents where similar information is expected as part of the LTCP.

As discussed previously, before States can adopt a use that lowers the level of protection for a water body, they must:

- Provide an opportunity for the public to review the proposal and analyses justifying the revision (40 CFR 131.20(b));
- Ensure that any revision provides for the attainment and maintenance of downstream water quality standards (40 CFR 131.10(b)).

In addition, States may not lower the level of protection of, or remove:

- An "existing" use, i.e., a use actually attained in the water body on or after November 28, 1975 (40 CFR 131.3(e) and 131.10(h)(1)): or
- A use that can be attained by the imposition of effluent limits required under section 301(b) or 306 of the CWA and cost-effective and reasonable best

management practices for non-point source control (40 CFR 131.10(d) and 131.10(h)(2)).

Step 4 - Community develops a draft LTCP with the public involved. With agreement on the scope of the LTCP and the data collection and analyses, the CSO community develops a draft LTCP. For each CSO control level examined, the CSO community evaluates the constructability, costs, performance, water quality benefits, and consideration of sensitive areas. The CSO community also identifies other sources of pollution impacting the CSO receiving water which may preclude the attainment of water quality standards, regardless of the level of CSO control. At a minimum, the CSO community considers the following levels of control:

- Zero overflow events (e.g., 100% capture for treatment), eliminating the contribution of CSOs to water quality standards violations; and
- Levels of control that would be necessary to achieve the following average number of overflow events:
  - one to three overflow events per year,
  - four to seven overflow events per year,
  - eight to twelve overflow events per year;
- Treat or direct CSOs away from sensitive areas.

Alternatively, the CSO community, in the LTCP, could evaluate controls to achieve varying levels of capture rather than limiting the number of overflow events. In this case the alternative control levels should include various percentages of the wet weather flow volume entering the combined sewer system during wet weather under average annual conditions (e.g. 90%, 85%, 80%, 75% of the combined sewage collected in the combined sewer system during wet weather events).

During the development of the draft LTCP, communities often hold workshops to identify priorities for controls and control alternatives to examine. Workshops on the LTCP, combined with discussion of the analyses needed to support a water quality standards review, can promote coordination and inform the public about the effect of various levels of CSO control on the use of the water body and the attainment of water quality standards. Such workshops can also promote a timely dialogue among the CSO community, the public, the State, and EPA about additional control alternatives and appropriate water quality standards revisions. Information on the water quality standards program should be available to support workshop discussions.[25] Prior to submitting a LTCP, States may require communities to hold a public hearing, take comment on the LTCP, and show how the comments were addressed.

Step 5 - Draft LTCP reviewed and accepted by State and EPA, as appropriate. The CSO community submits the draft LTCP, including the data and analyses assessing the

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[25]. Elder, D., G. Killam and P. Koberstein, Chapter 4, Water Quality Standards and the Public's Role, in *The Clean Water Act: An Owner's Manual.* River Network, Portland, OR, 1998; U.S. EPA, Introduction to Water Quality Standards (EPA-823-F-99-020, October, 1999; U.S. EPA, Developing Criteria To Protect Our Nation's Waters (EPA-823-F-98-002, April, 1998).

attainability of current water quality standards, to both the NPDES authority and to the State Water Director.

In addition to proposing a CSO control strategy, the LTCP outlines the post-construction operational plan and compliance monitoring activities that the community will undertake to assure that the controls function as planned. Post-construction compliance monitoring ensures that any remaining CSOs do not contribute to excursions of water quality standards or non-compliance with other requirements of the CWA. The CSO Control Policy provides that "...the selected controls should allow cost-effective expansion or cost-effective retrofitting if additional controls are subsequently determined to be necessary to meet water quality standards..."

The State Water Director and the NPDES authority (if different) need to review the draft LTCP and the information to support a water quality standards review. The CSO communities need to work with regulatory agencies to confirm that the basis of the LTCP is acceptable, e.g., the data, the alternatives examined and the schedule for implementing controls common to all alternatives examined. If the draft LTCP is insufficient, the NPDES authority returns the draft to the community for revision.

Where data and analyses are inadequate to support a water quality standards review, the State Water Director, in consultation with the coordination team, should identify the parameters for which additional information is needed. The data collected and analyses conducted by the CSO community may be sufficient to justify a water quality standards revision or may show that a water quality standards revision is not justified. If the State and EPA agree that the data and analyses support a water quality standard revision (recognizing the revision may produce more or less stringent standards), this would represent a commitment from the State to proceed with proposing water quality standards revisions.

If the data and analyses show that currently applicable water quality standards, can be attained and that revisions to the water quality standards are not justified, the State notifies the community and the coordination team. The NPDES authority would then work with the community to finalize the LTCP, as described in Step 9. At this point, the CSO community begins to implement controls common to all alternatives as described in Step 6. Priority controls are those measures and activities that are common to all control alternatives, including efforts to treat or re-direct CSOs impacting sensitive areas.

In this step, coordination between the NPDES authority and water quality standards authority becomes paramount. Up-front planning is likely to be necessary to ensure that the analysis and decisions made by the two entities are synchronized.

Step 6 - NPDES Authority approves priority controls beyond the NMCs common to the preferred alternative approved for the community to implement. The LTCP is likely to include priority CSO control activities that are common to all control alternatives examined, such as eliminating a recurring overflow to a bathing area. The CSO community should begin to implement these controls as soon as the analysis of the alternatives has been approved.

The NPDES authority may need to revise or reissue the NPDES permit or other enforceable mechanism (e.g., administrative or judicial order) requiring the implementation of these priority controls. In addition, the permit or other enforceable mechanism, would include the requirements contained in a variance, if adopted by the State, and monitoring to be conducted to evaluate the efficacy of the controls in reducing overflows and improving water quality. This information could support reducing the size or re-configuring the additional controls, based on the water quality improvements already achieved.

Step 7 - The State proposes water quality standards revisions and holds a public hearing. To reach this step, the CSO community, NPDES authority and State Water Director should have agreed that the LTCP contains adequate data and information to support the selection of CSO controls and identify needed revisions to the water quality standards. The State should proceed as expeditiously as possible to revise the water quality standards.

With the implementation of CSO controls, the State may determine that a water body has the potential of supporting improved aquatic life. Under this circumstance, the State would upgrade the aquatic life use for the water body. In other cases, the State may refine the recreational uses to reflect the level of control from an affordable, well-designed and operated control program. Other revisions applicable to recreation may include:

- Applying the standard at the point of contact rather than at the end-of-pipe;
- Creating subclasses of the current designated use to recognize intermittent exceedances of bacteriological criteria;
- Segmenting the water body to preserve the designated use in areas where it actually occurs.

Prior to submitting a proposed water quality standard revision to EPA for review, EPA's water quality standards regulations require the State to hold a public hearing and request comment on the proposed revisions. This public hearing is an opportunity for the CSO community to be actively involved and to help explain the proposed CSO control alternatives and their relationship to the proposed water quality standards revision. This is a key decision point for the public to have input on the selection of the final CSO control program, given its relationship to the attainment of water quality standards.

At the time the revisions are proposed, EPA's water quality standards regulations at 40 CFR 131.21(b) require any analyses, including the UAA, used in support of the revision to be made available for public review and comment. Subsequent to public review and comment and appropriate revisions, the State submits the revisions, supporting analyses and public comments to EPA for review.

Step 8 - EPA takes final action on WQS revisions. Before the revisions in the water quality standards may be used for CWA programs, including TMDLs and NPDES permits, EPA must approve or disapprove the proposed revisions (see 65 FR 24641, April 27, 2000). Again, where there has been close coordination and cooperation, EPA approval is more likely. EPA must approve a State's new or revised standard within 60 days or disapprove within 90 days.

Step 9 - Draft LTCP revised, as necessary. The public hearing process and other events leading up to this point should result in the selection of a CSO control program and agreement on the changes, if any, to water quality standards. If the water quality standards decisions differ from those that the CSO community anticipated, the community would have to revise the LTCP.

The CSO community should work closely with the regulatory authorities to confirm the project implementation schedule for the selected CSO control program. Key milestones include, for example, design completion, attainment of funding, construction milestones, completion dates, and implementation of post-construction monitoring. Guidance on these issues is available in *Combined Sewer Overflow Guidance for Long-Term Control Plan.*

Step 10 - NPDES authority accepts LTCP and revises permit. The NPDES authority coordinates the review of the revisions and, if appropriate, approves the final LTCP which provides that CSO discharges do not contribute to excursions of water quality standards or non-compliance with other CWA requirements. The NPDES authority issues a permit or administrative order or proceeds with revisions to an enforceable order requiring implementation of the approved LTCP.

Step 11 - Approved final LTCP implemented. The CSO community implements the control measures, described in the approved LTCP and required in its NPDES permit or other enforceable mechanism. The LTCP includes a post-construction operational plan and compliance monitoring program to ensure compliance with the requirements of the CWA. If, after implementing the controls outlined in the LTCP, the CSO community finds that they are still contributing to the non-attainment of the applicable water quality standards, the community will use the monitoring data to support adjustments in the operating plans or in the operation and maintenance schedules or to develop cost-effective expansion or cost-effective retrofitting of additional controls.

2. How have States reconciled their water quality standards with overflows remaining after the well-designed and operated CSO LTCPs have been developed?

By using the flexibility in their water quality standards program framework, a few States have the mechanisms in place for integrating water quality standards reviews with the development and implementation of a well-designed and operated CSO control program.

One approach is to use continuous simulation modeling and volumetric stream flow to develop TMDLs, waste load allocations and water quality-based permit limits. This approach takes into account episodic events, integrating wet weather variables such as storms (their frequency, duration and intensity), surface runoff, and land-use patterns. Daily flow data are available on about 6,200 reaches with U.S. Geological Survey gaging stations and estimated flows can be calculated where measured values are unavailable. Guidance is available through BASINS applications (see www.epa.gov/ost/basins).

One State approach (Oregon) allows the discharge of untreated domestic waste, with exceptions, based on a storm event greater than the one-in-five-year 24-hour duration storm in the winter and greater than the one-in-ten-year 24-hour duration storm in summer. This only applies where the State has approved a basin- or geographic-specific bacteria control management plan that:

- Identifies the specific hydrologic conditions under which the numeric criteria would be waived,
- Identifies the public notification and education processes to inform the public about an event and the plan,
- Describes the water quality assessment conducted to determine the bacteria sources and loads associated with the specified hydrologic conditions, and
- Describes the bacteria control program that is being implemented in the basin or specified geographic area.

Another State (Washington) addresses remaining overflows by allowing on average, a once-per-year exemption to several parts of its mixing zone policy. The exemption waives provisions related to the maximum size of the mixing zone, the applicable acute criteria, and to the overlapping mixing zone criteria. However, the State does not waive the mixing zone policy provision that prohibits the mixing zone from contributing to a loss of sensitive or important habitat, substantially interfering with the existing uses of the water body, damaging the ecosystem, or adversely affecting public health.

Another approach two States (Massachusetts and Maine) are using is to subdivide their uses into CSO subclasses. Based on a UAA and under specified circumstances, one State temporarily suspends the primary contact recreational use and the bacteria criteria during CSO events; the other State also suspends shell fishing. Although these States developed and will implement their approaches differently, the approaches have a great deal in common. For example, both States:

- Maximize the protection of sensitive use areas;
- Require State-approved well-designed control programs (in one State, controls must meet the recreational goal use 95% of the time; the other State suspends uses for the shortest duration practicable, in the smallest area possible, and where the public impacts are minimal);
- Call for UAAs consistent with the requirements in 40 CFR 131.10;
- Use variances when they don't know whether the designated uses can be fully attained and require additional water quality data collection before deciding that the use is not attainable;
- Make implementation of CSO controls a condition for the community to use the criteria and use suspension;
- Review progress periodically.

Some States are also considering adopting a high-flow cutoff into their water quality standards that suspends bacteria criteria and thus, the recreational uses under certain defined conditions of high wet weather flows in the receiving water. While the concept of a flow cutoff

for extremely high flows or dangerous velocities may have merit, they need to be based on rigorous scientific assessment and reflect public input. Additionally, such a cutoff should apply on a case-by-case basis (rather than State-wide, for example), be tailored to the water body (rivers, as distinct from lakes), and set the cutoff at a point where it only applies under certain limited conditions. Water body flow and velocity vary greatly, depending on a combination of many factors, such as the amount of impervious surface, slope, soil texture, vegetative cover, soil compaction, soil moisture, etc. The conditions affecting velocity also vary with the depth and width of the water body's channel. If a State adopts a flow cutoff, several questions would need to be answered:

- Will the cutoff protect the other uses?
- What is the resulting velocity?
- Would the velocity preclude all recreational uses (including kayaking) that typically occur during high velocity flows?
- Do the high flows have a minimal effect on the velocity of the flow, posing little or no danger to persons using the waters for recreation?
- For how many days would the cutoff apply?
- Will the State adopt the cutoff statewide, as a discharger-specific variance, or create recreational subcategories that correlate to the cutoff?
- Has a use attainability analysis shown that an affordable well-designed and operated control program could not achieve a higher level of CSO control than that afforded by the cutoff?
- What effect would the high flow cutoff have on implementing controls for all sources of bacterial contamination to the water body (e.g., CSOs, storm water, leaking septic systems, feed lots, row crops, etc)?

EPA has not developed a national policy on a high flow/velocity cutoff for bacteria and recreational uses similar to the 4B3/7Q10 low flow cutoff for aquatic life criteria. Guidance implementing such a policy should include scientifically valid methodologies for maintaining and protecting the section 101(a)(2) recreational uses when normal flow returns and for protecting downstream uses. EPA envisions a methodology that States could apply on a site-specific basis using the water body channel and landscape characteristics. States could also create a subcategory of the recreational uses to which the cutoff would apply. Since use of a high flow/velocity cutoff reduces the level of protection for the water body, a UAA would be required for its application to a specific water body. It would be particularly important to demonstrate that a community could not afford a higher level of control (or, for example, additional storm water or agricultural BMPs). As with other changes in designated uses, the public must have an opportunity to comment on the proposed revision to the water quality standard before a State adopts and submits it to EPA for approval or disapproval.

V. THE WATERSHED APPROACH

EPA recognizes that urban water quality may be affected by a combination of CSOs, storm water and sanitary sewer overflow discharges, and non-point source runoff. These sources may be addressed most effectively through TMDL analyses or other watershed basis. Although EPA strongly endorses and in some cases provides financial assistance to local watershed efforts, this document includes only a limited discussion of the urban wet weather watershed approach. The Agency limited the focus of this guidance based on the urgency and narrowness of the Congressional committees' request for guidance and the lack of resources to fully explore trade-offs and interrelationships of urban wet weather sources on a watershed basis.

1. What is EPA's overall approach to watershed-based planning?

EPA encourages the use of a watershed approach to prioritize actions to achieve environmental improvements, promote pollution prevention, and meet other important community goals. Watersheds provide a natural framework around which to manage water quality improvement and protection programs. Sound scientific analyses, including TMDLs that address both the point and the non-point sources of the pollutants impairing the water body, support the watershed approach. The watershed approach is an inclusive, collaborative process that involves many diverse interests who use the data and information to define the goals, set priorities, and develop a suite of integrated controls that achieve the water quality goals for the water body.

Under a watershed approach, local stakeholders coordinate the development of a comprehensive watershed plan that provides for collection of environmentally relevant data and provides the basis for identifying appropriate regulatory and non-regulatory actions to be implemented to improve water quality. A watershed approach does not provide any additional liability protection or change the legal status of discharges to waters of the United States. Watershed plans can be considered, however, when developing enforcement schedules for bringing unauthorized discharges into compliance with the CWA.

A watershed approach to controlling CSOs and other wet weather discharges has the potential to improve the basis for water quality management decisions, provide an equitable and cost-effective allocation of responsibility among dischargers, and, in so doing, deliver the same or greater levels of environmental improvement sooner and at a cost savings. A watershed approach emphasizes the role of CSO communities and other local stakeholders in identifying water quality priorities and increases the opportunity for using risk-based approaches to environmental protection.

A. What information sources are available on watershed approaches?

Several EPA documents explain the principles of watershed-based water quality planning. EPA's *NPDES Watershed Strategy* (March, 1994) outlines national objectives and implementation activities for integrating NPDES program functions into a broad watershed approach and provides support for development of State-wide basin management approaches. The *Watershed Framework* (May, 1996) describes EPA's expectations for State and Tribal

implementation of watershed approaches. The 1998 *Clean Water Action Plan* has, at its core, an emphasis on local watershed planning. It calls upon State, Federal, and local agencies, watershed-based organizations, and the public to identify watersheds most in need of restoration and to cooperate in the development of watershed restoration action strategies and implementation of these strategies.

In addition, EPA lists many excellent publications and web-based resources for watershed groups on the Agency's web site at www.epa.gov/owow.

B. How does watershed planning relate to TMDL development?

A TMDL is a watershed plan, developed to attain a particular water quality standard. The watershed planning process and TMDL analyses generate valuable information on total pollutant loadings and the relative contribution of the pollutant sources. Since TMDLs must be developed to meet existing water quality standards, the permit (or other enforceable mechanism) for implementation of the LTCP also must provide for the attainment of water quality standards. Consequently, it is important that LTCPs be developed and implemented in explicit coordination with TMDL evaluations and other watershed management planning.

The TMDL considers seasonal variations and reasonably foreseeable increases in pollutant loads in allocating the reductions in pollutant loadings needed to attain and maintain water quality standards. Participation in watershed planning and support of State- or EPA-developed TMDLs may yield efficiencies for CSO communities. For example, using an existing watershed organization as the public advisory group for CSO control planning and implementation, the community gains knowledgeable individuals committed to finding solutions. By participating in watershed/TMDL analyses, a CSO community can help provide the information to support an equitable allocation of pollutant loading reductions among all point and non-point sources. This is particularly important where CSO receiving waters are affected by numerous sources and need a watershed-level effort to allocate pollutant loadings. Where pollutant sources from different States contribute to the impairment of a shared water body or a downstream water body, States may need to involve EPA in the development of the TMDL in order to bring all jurisdictions into the planning process.

The CSO Control Policy, and EPA's *Guidance for Long-Term Control Plan*, encourage creative thinking and innovative approaches in addressing CSOs. In urban areas, water quality may be impacted by many sources. These can include wastewater, storm water, and upstream point and non-point pollution sources. TMDL analyses may evaluate a number of different options to attain water quality standards, including:

- Eliminating or treating all CSOs,
- Imposing more stringent controls for sanitary sewer overflows, leaking septic tanks, storm water discharges, animal feeding operations,
- Developing stronger enforceable non-point source control programs, or
- Revising the water quality standard for a particular pollutant and the applicable permit requirements.

Watershed planning and TMDL analyses can promote flexibility and innovation for addressing CSOs and other pollutant sources. The planning and analyses may identify more cost-effective allocation of pollutant reductions using a combination of BMPs and CSO controls which together yield greater environmental benefits than would CSO controls alone. Participants can identify complementary environmental projects, such as upstream storm water controls, along with nonstructural CSO controls, that may enhance the aquatic habitat and foster improvements in both recreation and aquatic life uses.

C. How does watershed planning affect capital planning?

EPA is exploring how to support capital investments in combined and separate sanitary sewer collection systems that are consistent with and support broader watershed planning objectives. Many municipalities are well positioned to coordinate with other watershed stakeholders in the development of long-term control plans addressing needs and deficiencies in storm water and wastewater infrastructure. CSO communities may find it advantageous to take a leadership role in local watershed planning, particularly where CSOs and other urban wet weather discharges contribute heavily to water quality impacts or where a municipality has substantial data, resources, or incentive to take a leadership role.

D. Who sets the priorities for TMDLs?

States set the priorities for conducting a TMDL or a court sets the schedule. Therefore, the State should coordinate the schedule for the development of a TMDL with the schedule for deciding on any appropriate revisions to the water quality standards. This is particularly important where a court-ordered schedule directs that a TMDL be established prior to the State's water quality standards review. In this circumstance, a State-adopted variance may be especially appropriate.

2. How does CSO planning fit into a watershed approach?

The approach identified in Figure 1 for coordinating LTCP development and water quality standards review lends itself well to coordination with watershed stakeholders to address wet weather sources of pollution. The data collection, planning, and coordination activities identified in Figure 1 can be an integral part of a comprehensive watershed planning and implementation process, in which stakeholders identify water quality and environmental problems through a comprehensive watershed assessment. The process would involve coordination of the LTCP development process, the process for reviewing and (as appropriate) revising water quality standards, and other programs to improve water quality in a more efficient and effective fashion.

The watershed planning process typically begins with identification of stakeholders who can contribute significantly to the implementation of coordinated periodic management activities, who are significantly impacted by water quality problems, who will need to undertake control measures because of legal or regulatory requirements, or who oversee their implementation. This process would include satellite municipalities whose collection systems significantly contribute to wet weather problems; owners of agricultural, industrial, or other pollutant sources outside the

urban area that contribute to impairment; and members of the public. Where possible, the stakeholder identification process should be integrated with identification of the coordination team formed to oversee the LTCP and water quality standards processes (Step 2 of Figure 1).

Under this process, each regulated stakeholder would be required to implement appropriate minimum measures without delay. For example, the CSO community would be responsible for implementing the nine minimum controls required in Step 1.

The parties to the watershed planning process would coordinate efforts to assess the sources of impairment in the watershed and the degree to which sources contribute to impairment. If the assessment indicates the need for pollution controls beyond minimum measures, the parties should agree on recommendations for allocation of water quality management responsibilities based on sources' relative contributions to impairment. This approach is reflected in Step 3 of Figure 1, where the CSO community, the coordination team, and other involved entities agree on the amount and types of data needed, development of a monitoring and modeling plan, and gathering of the essential data needed to support the draft LTCP and a draft UAA, where appropriate.

The watershed plan should identify recommendations for interim and final LTCP goals, including recommendations to NPDES authorities for establishing or adjusting enforceable requirements. Responsibilities for funding both planning and remediation projects should be defined. When allowed under State law and consistent with any applicable total maximum daily load (TMDL), the NPDES authority could agree to phase additional water quality regulatory requirements to accommodate the planning process and to synchronize requirements such as monitoring among participants. Special consideration would be warranted for sensitive and high-exposure areas such as beaches and drinking water supplies.

EPA expects that communities will implement high priority controls, such as eliminating or fully treating overflows to sensitive areas while TMDLs or watershed plans are being developed. The iterative nature of CSO control planning and phased implementation of the controls makes this easier. For example, as communities implement their initial controls and evaluate the water quality improvements, they may be able to reduce the size or re-configure additional controls, based on the water quality improvements already achieved. Watershed plans can be taken into account when developing enforcement schedules for bringing unauthorized or unpermitted discharges into compliance with the CWA, but watershed plans (including the planning process) are not a bar to enforcement actions.

Appendix VI provides an example (Louisville/Jefferson County MSD, Kentucky) of program integration using watershed-based monitoring and management strategies and a unified reporting format that considers the watershed as a whole.

3. How do States with CSO communities use watershed approaches?

States with CSO communities apply the watershed approach in different ways. Using the watershed as the basis for managing all State water quality programs (e.g., Delaware and Ohio)

promotes logical scheduling. When data are collected on a rotating basis, they support several activities:

- Water quality standards reviews,
- "303(d) list" development of non-attained waters,
- TMDL analyses, and
- Permit issuance.

Others use the watershed approach selectively for monitoring, designating uses, review water quality standards or issuing permits.

- Monitoring (Indiana)
- Use designations (Delaware River Basin Commission, Washington),
- Water quality standards reviews (Colorado), and
- Permit issuance (Georgia, Kentucky, Nebraska, West Virginia).

Watershed plans and TMDLs afford the opportunity to identify complementary projects that could save resources or gain additional environmental benefits for the community. Targeting CSO controls to eliminate overflows to parks or swimming areas may stimulate public improvement projects that yield greater environmental benefits and offset the costs of eliminating the overflows. Or, stream bank stabilization might improve aquatic life more than large storage facilities for combined sewers would have.

V. CONCLUSIONS

EPA believes that ultimately communities and States can integrate water quality standards reviews with the development and implementation of an affordable, well-designed and operated CSO control programs. EPA expects that as CSO communities implement priority controls, they will collect information on the efficacy of the controls in improving water quality. This information should support a determination that when completed, the LTCP will comply with the requirements in the current water quality standards or that additional affordable controls will support the standards. The information gathered can assist the State in determining that the use is not attainable and in identifying another attainable use. Once reconciliation occurs, CSO communities and States will have carried out the water quality-based provisions in the CSO Control Policy.

APPENDIX I
ANNOTATED BIBLIOGRAPHY OF CSO GUIDANCE DOCUMENTS

Combined Sewer Overflows - Guidance for Long-Term Control Plan (EPA 832-B-95-002)

The main goal of this document is to describe how municipalities can develop comprehensive long-term control plans that recognize the site-specific nature of CSOs and their impacts on receiving water bodies. The document describes how to develop a long-term control plan that includes technology-based and water quality-based control measures that are technically feasible, affordable, and consistent with the CSO Control Policy.

Combined Sewer Overflows - Guidance for Nine Minimum Controls (EPA 832-B-95-003)

The goal of this guidance document is to provide information on nine minimum technology-based controls that communities are expected to use to address CSO problems, without extensive engineering studies or significant construction costs, before long-term measures are taken. Communities are expected to implement the nine minimum controls and submit documentation no later than January 1, 1997.

Combined Sewer Overflows - Guidance for Screening and Ranking (EPA 832-B-95-004)

This guidance presents a process for screening and ranking combined sewer systems with CSOs that have adverse impacts on water quality, aquatic life, or human health. Its primary purpose is as an informal tool to help permitting authorities establish CSO permitting priorities. It may also help permittees rank their CSOs in order to best allocate their limited resources.

Combined Sewer Overflows - Guidance for Funding Options (EPA 832-B-95-007)

This guidance will help permittees as they develop CSO control funding plans. The guidance presents plain-English descriptions of a broad spectrum of options that may be available to fund the capital, debt service, and operational costs of CSO controls. It describes the benefits and limitations of various funding options.

Combined Sewer Overflows - Guidance for Permit Writers (EPA 832-B-95-008)

This guidance is intended primarily for NPDES permitting authorities and permit writers and describes how to develop and issue NPDES permits with CSO conditions that reflect the CSO Policy. It provides example permit language and stresses the need for coordination between permittees, permit writers, water quality standards authorities, enforcement authorities, and the public.

Combined Sewer Overflows - Guidance for Financial Capability Assessment and Schedule Development (EPA 832-B-97-004)

This guidance discusses how a community's financial capability and other factors identified in the CSO Policy may be used to negotiate reasonable compliance schedules for implementation of CSO controls. It presents a two-phase process for assessing financial capability, based on EPA's experience in the Construction Grants, State Revolving Fund, enforcement, and water quality standards programs. It stresses the need

for flexibility and evaluation of site-specific factors in the development of implementation schedules for CSO controls.

Combined Sewer Overflows - Guidance for Monitoring and Modeling (EPA 832-B-99-002)
This manual explains the role of monitoring and modeling in the development and implementation of a CSO control program. It expands discussions of monitoring and modeling introduced in the CSO Control Policy and presents examples of data collection and simulation of sanitary and storm water flows in the combined sewer system. To use this manual, a municipality should already be familiar with the basic functioning of its CSS, basic monitoring procedures, and the general purpose of modeling.

EPA has printed a limited number of copies of each guidance document and has made them available through several sources:

- EPA's Water Resource Center ((202)260-7786)
- National Small Flows Clearinghouse (1-800-624-8301 or http://www.estd.wvu.edu/nsfc)
- National Technical Information Service (NTIS) (1-800-553-6847 or http://www/ntis.gov)
- Educational Resources Information Center (ERIC) (1-800-276-0462 or http://www.aspensys.com/eric/catalog/)
- State environmental offices
- EPA Regional Offices

APPENDIX II
REMOVAL OF DESIGNATED USES - 40 CFR 131.10 (g) AND (h)

[excerpted from: EPA's *Water Quality Standards Handbook: Second Edition, Chapter 2.7* (1994)]

The basic steps for determining how and when a designated use may be removed are as follows:

Step 1 - Is the Use Existing? Once a use has been designated for a particular water body or segment, the water body segment cannot be reclassified for a different use except under specific conditions. If a designated use is an existing use (as defined in 40 CFR 131.3) for a particular water body, the existing use cannot be removed unless a use requiring more stringent criteria is added. However, uses requiring more stringent criteria may always be added because doing so reflects the goal of further improvement of water quality. Thus, a recreational use for wading may be deleted if a recreational use for swimming is added, or the State may add the swimming use and keep the wading use as well.

Step 2 - Is the Use Specified in Section 101(a)(2)? If the State wishes to remove a designated use specified in section 101(a)(2) of the Clean Water Act, the State must perform a use attainability analysis.

Step 3 - Is the Use Attainable? A State may change activities within a specified use category but may not change to a use that requires less stringent criteria, unless the State can demonstrate that the designated use cannot be attained. For example, if a State has a broad aquatic life use, EPA generally assumes that the use will support all aquatic life. The State may demonstrate that for a specific water body, such parameters as dissolved oxygen or temperature will not support trout but will support perch when technology-based effluent limitation are applied to point source dischargers and when cost-effective and reasonable best management practices are applied to non-point sources.

Step 4 - Is a Factor from 131.10(g) Met? Even after the previous steps have been considered, the designated use may be removed, or subcategories of a use established, only under the conditions given in section 131.10(g). The State must be able to demonstrate that attaining the designated use is not feasible because:

1. Naturally occurring pollutant concentrations prevent the attainment of the use; or
2. Natural, ephemeral, intermittent, or low flow conditions or water levels prevent the attainment of the uses, unless these conditions may be compensated with sufficient effluent discharges; or
3. Human-caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more damage than to leave in place; or
4. Dams, diversions or other types of hydrological modifications preclude the use, and it is not possible to restore the water body or operate the modification in such a way that would result in attainment; or
5. Physical conditions related to the natural features of the water body unrelated to water quality preclude attainment of aquatic life uses; or

6. Controls necessary to attain the use would cause substantial and widespread social and economic impact.

Step 5 - Provide Public Notice. As provided for in section 131.10(e), States must provide notice and opportunity for public hearing in accordance with section 131.20(b). Of course, EPA intends for States to make appropriate use of all public comments received through such notice.

APPENDIX III
LIST OF GUIDANCE ON USE ATTAINABILITY ANALYSES (UAAs)

EPA has published:

- *Technical Support Manuals for Conducting Use Attainability Analyses (Volumes I-III, Rivers and Streams, Estuaries, Lakes, 1983 and 1984)* http://www.epa.gov/ost/library/wqstandards/123.pdf These three volumes each contain sections on assessing physical, chemical and biological characteristics of the specific water body type.

EPA has developed more recent guidance on assessing biological characteristics in the following documents:

- *Macroinvertebrate Field and Laboratory Methods for Evaluating Biological Integrity of Surface Waters* (1990) – EPA/600/4-90/030 (PB91-171363).
  This manual describes guidelines and standardized procedures for the use of macroinvertebrates in evaluating the biological integrity of surface waters. IT was developed to provide bio-monitoring programs with benthic invertebrate methods for measuring the status and trends of environmental pollution on freshwater, estuarine, and marine macroinvertebrates in fields and laboratory studies. These studies are carried out to added biological criteria for the recognized beneficial uses of water, to monitor surface water quality, and to evaluate the health of the aquatic environment.

- *Fish Field and Laboratory Methods for Evaluating the Biological Integrity of Surface Waters* (1992) – EPA/600/R-92/111.
  This manual describes guidelines and standardized procedures for the use of fish in evaluating the biological integrity of surface waters. It was developed to provide bio-monitoring programs with fisheries methods for measuring the status and trends of environmental pollution on freshwater, estuarine, and marine habitats in field and laboratory studies. These studies are carried out to assess biological criteria for the recognized beneficial uses of water, to monitor surface water quality, and to evaluate the health of the aquatic environment.

- *Surface Waters: Field Operations and Methods for Measuring the Ecological Condition of Wadeable Streams* (1998) – EPA/620/R-64/004F.
  This manual describes guidelines and standardized procedures for evaluating the biological integrity of surface waters of stream. It was developed to provide the Environmental Monitoring and Assessment Program (EMAP) with bioassessment methods for determining the status and monitoring trends of the environmental conditions of freshwater streams.
- *Biological Criteria: Technical Guidance for Streams and Small Rivers, Revised Edition* (1996) – EPA/822/B-96/001.
  This document helps States and Tribes develop and use biocriteria for streams and small rivers. The document includes a general strategy for biocriteria

development, identifies steps in the process, and provides technical guidance on how to complete each step, using the experience and knowledge of existing state, regional and national surface water programs. The document is designed primarily for water resource managers and biologists familiar with standard biological survey techniques. It should be used in conjunction with *Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers*.

- *Lake and River Bioassessment and Biocriteria, Technical Guidance Document* (1998) – EPA/841/B-98/007.
  This document is intended to provide managers and field biologists with functional methods and approaches that will facilitate the implementation of lake bioassessment and biocriteria programs. Procedures are provided for program design, reference condition determination, field biosurveys, biocriteria development and data analysis. The document also provides information on the application and effectiveness of lake bioassessment to existing EPA and State/Tribal programs. This guidance was developed through the experience of existing state, regional and national lake monitoring programs and several lake programs are used as case studies and examples to illustrate specific concepts and methods.

- *Rapid Bioassessment Protocols for Use in Wadeable Streams and Rivers, Second Edition* (1999) – EPA/841/B-99/002.
  This document provides Stated and local water quality monitoring agencies with a practical technical reference for conducting cost-effective biological assessments of lotic systems. The Rapid Bioassessment Protocols (RBPs) are essentially a synthesis of existing methods that have been employed by various State water resource agencies. Protocols for three aquatic assemblages (i.e., periphyton, benthic macroinvertebrates, fish) and habitat assessment are presented. All of these protocols have been tested in streams in various parts of the country.

- *Estuarine and Coastal Marine Water Bioassessment and Biocriteria Technical Guidance* (to be published Fall 2000).
  This technical guidance document is based on the concept that bioassessment and biocriteria programs for estuaries and near coastal waters are interrelated and critical components of comprehensive water resource protection and management. This guidance provides detailed descriptions of the appropriate habitat measurements that can be used to determine the homogeneous biological areas within an estuary (classification) and then describes four levels of investigative intensity or sampling tiers that can be used to collect the necessary bioassessment data that is used in biocriteria derivation. Numerous different sampling methods and techniques that an investigator could choose are explained. The document also provides guidance on the process for deriving biocriteria from the bioassessment data and provides real-world examples from different estuaries around the country where bioassessments have been conducted and biocriteria developed.

In addition, EPA has published:

- *Interim Economic Guidance for Water Quality Standards: Workbook, 1995.* http://www.epa.gov/ost/econ

The Water Environment Research Foundation published:

- *A Suggested Framework for Conducting UAAs;*
- *Interpreting Results and a Comprehensive UAA Technical Reference.*

APPENDIX IV
QUESTIONS/INFORMATION FOR A RECREATIONAL UAA
(e.g., swimming, canoeing, kayaking, tubing, surfing, scuba diving, water skiing, etc.)

TYPE OF QUESTION	WHAT ARE THE UAA QUESTIONS	INFORMATION EXPECTED IN THE DRAFT LTCP
Existing Use	- What is the existing primary contact recreational use? - Does this use occur in dry weather? - Does this use occur during wet weather?	Describe using existing information from State, local water quality agency, municipality, Chamber of Commerce, news papers, and field inspections.[26]
	- Where are the outfalls located with respect to the "recreational use" [throughout the water body, in designated areas, where in relationship to the CSO outfall]?	Identify location of overflows and their location relative to sensitive areas.[27]
	- Does the area in which the recreational use occurs support/encourage recreation (e.g., accessible, nearby schools, apartment complexes, recreational facilities, docks, or parks)?	Watershed data using topographic maps, digital mapping resources, etc. to identify recreational areas, facilities, etc.[28]
	- Are there factors that discourage recreation (e.g., warning signs, fences, private property)?	Zoning, land ownership, regulations and ordinance information.[29]

[26].*Combined Sewer Overflows: Guidance For Long-term Control Plan* (EPA 832-B-95-002), p.2-6.

[27]. CSO Control Policy, II.C.1.b.; *Guidance for Monitoring and Modeling (M&M)* (EPA 832-B-99-002), p.4-17 and 4-26.

[28]. *Ibid.* Guidance LTCP, p. 2-7, Exhibit 2-2, p. 2-8; *Guidance for M&M*, p. 4-17.

[29]. *Ibid.* Guidance LTCP, Exhibit 2-2, p. 2-8.

TYPE OF QUESTION	WHAT ARE THE UAA QUESTIONS	INFORMATION EXPECTED IN THE DRAFT LTCP
	- Does the area in which the recreation occurs deserve special protection (e.g., "sensitive" area, unique characteristics that draw people)?	Identify all sensitive areas and the CSO outfalls that discharge to them.[30]
Designated Use	- What is the designated recreational use (e.g., swimming all the time; swimming during the recreational season, etc.)	As above for Existing Use and sensitive areas.
	- Is the designated use attained at any time? - How often is the designated use impaired?	Assess the attainment of designated uses, establish the baseline conditions in the receiving water, and evaluate the impacts of CSOs.[31]
Water Quality - chemical	- What is the existing water quality during dry periods and during rain events for : • pH, • bacterial indicators (e.g., *E. coli*, enterococci), • nutrients (nitrogen, phosphorous, secchi depth, chlorophyll a), if a lake; • biochemical oxygen demand, • total suspended and dissolved solids, • narratives (e.g., "free from" floatables, objectionable deposits)?	Receiving water monitoring should determine the receiving water quality during both dry and wet weather conditions for the parameters listed at the left.[32] Source water quality monitoring should determine the pollutant characteristics of combined sewage, other point source discharges, upstream sources, downstream boundary conditions (if appropriate), and non-point source loads.

[30]. *Ibid.* Control Policy, II.C.3 and Guidance LTCP, p. 1-21 and 3-28; Guidance M&M, p. 4-17, 4-26

[31]. *Ibid.* Gudiance LTCP, p. 2-29; Guidance M&M, p.6-1, 9-2.

[32]. *Ibid.* Control Policy, II.C.1.c and Guidance LTCP, 2-32, 2-34; Guidance M&M, p.4-4, 4-21-22, 4-30-31..

TYPE OF QUESTION	WHAT ARE THE UAA QUESTIONS	INFORMATION EXPECTED IN THE DRAFT LTCP
- physical	- What are the dry and wet weather flows?	Thorough understanding of its sewer system and it's response to various precipitation events.[33]
	- What are the physical characteristics of the water body where the recreational activities occur (e.g., width, depth, substrate)?	Extensive applicable information can usually be obtained from State and Federal agencies to support watershed and water body characterizations.[34]
Sources of Impairment	- Is the CSO the only source of impairment to the recreational use? If no, identify other contributors (e.g., leaking septic systems, storm water discharges, sanitary sewer over flows, etc.)?	The permittee may need to consider information on the contribution and importance of other pollutant sources in order to develop a final plan designed to meet water quality standards. Provide the basis for documenting the extent of receiving water impacts caused by CSOs and other point and non-point sources.[35]
Attainment	- Will elimination/full treatment of all overflows support the designated recreational use or not interfere with its attainment?	An appropriate water quality goal would be a level of CSO control where remaining CSO pollutant loads will not preclude the attainment of WQS, including the designated use. A goal of meeting WQS may include eliminating the CSO impacts on a given receiving water, including sewer separation or CSO relocation.[36]
	- Are there complementary environmental controls/projects in the watershed linked to the CSO receiving water body that, together with the CSO controls, could attain the designated use?	Consider innovative and alternative approaches and technologies that achieve the objectives of the policy and the CWA.[37]

[33]. *Ibid.* Control Policy, II.C.1 and Guidance LTCP, 2-32; Guidance M&M, p.4-4.

[34]. *Ibid.* Guidance LTCP, p. 2-6, Exhibit 2-2, p. 2-8.

[35]. *Ibid.* Policy, II.C.1 and Guidance LTCP, p.1-17, 2-11; Guidance M&M p. 4-4

[36]. *Ibid.* Policy, II.C.4.b.ii and Guidance LTCP, p.3-21, 3-23.

[37]. *Ibid.* Policy, I.F and Guidance LTCP, p. 1-17, 3-20, 3-48.

TYPE OF QUESTION	WHAT ARE THE UAA QUESTIONS	INFORMATION EXPECTED IN THE DRAFT LTCP
	- Did the CSO control alternatives examine all reasonable structural and nonstructural technologies and management practices and select the least cost alternative for each control level evaluated?	As above and evaluations focusing on performance and cost.[38]
	- Will the level of control to attain or no longer interfere with the attainment of the designated use cause substantial and widespread social and economic impact?	The financial analyses in *Combined Sewer Overflows: Guidance for Financial Capability And Schedule Development* (EPA-832-B-97-004, March, 1997) are similar to "substantial" impact analyses in a UAA (see *Interim Economic Guidance for Water Quality Standards: Workbook* [EPA-823-B-95-002, March, 1995]). Where the impacts are substantial, States demonstrate that the impacts are widespread before a water quality standard can be modified. In the "widespread" analyses, the State looks at the effect (change) on a number of factors, including median household income, unemployment rate, rate of industrial development, developing and declining industries, percent of households below the poverty line, ability of the community to carry more debt, and local and regional growth.

[38]. *Ibid.* Policy, and Guidance LTCP p. 3-31, 3-42, 3-49, 3-64.

TYPE OF QUESTION	WHAT ARE THE UAA QUESTIONS	INFORMATION EXPECTED IN THE DRAFT LTCP
	- What level of CSO elimination or treatment is projected (e.g., number of overflows/year) when the "preferred" control program is fully operational? - What priority is given to the control plan projects that address recreational uses, e.g., are they "sensitive uses"? - When/how will the control plan components that address the recreational use be phased in?	The expectation is that the permittee will evaluate a reasonable range of alternative levels of control, give highest priority to sensitive areas, and phase the controls based on the relative importance of adverse impact upon WQS, including designated uses, priority projects identified in the plan and the permittee's financial capability.[39]
	- What level of improvement is projected with the "preferred" plan on water quality/ recreational use (e.g., number of days/year or during the recreational season that the criteria levels protect/preclude "safe" recreational use of the water body)?	The specific environmental impacts to be evaluated vary, but may include, land use, traffic and site access, utilities relocation, noise and vibration, historic and archaeological resources, soils/rock, wetlands, flood plains, water quality, air quality, threatened and endangered species, and hazardous wastes.[40]
	- Is the "preferred" CSO LTCP the maximum affordable level of CSO control?	Financial analyses as above.
	If the "preferred" LTCP is not the maximum affordable level of CSO control, what water quality improvements are projected with the maximum affordable level of CSO control?	Financial analyses and alternatives analyses as above.

[39]. *Ibid.*. Policy, II.C. 3, II.C.4, II.C.8, p. 42 in *Combined Sewer Overflows: Guidance For Financial Capability Assessment and Schedule Develop* (EPA 832-B-97-004, March, 1997), chapters 3 and 4 of the Guidance LTCP; chapter 9 of the Guidance M&M.

[40]. *Ibid.* Guidance p. 59.

APPENDIX V
WQS ECONOMIC IMPACT ANALYSIS

The analysis begins by estimating substantial impacts followed by an analysis of widespread impacts. The model for calculating substantial impacts is:

Municipal Affordability Screener (MAS)	$= \frac{\text{Annualized Per Household Project Costs}}{\text{Annual Median Household Income}}$
Cutoffs:	MAS < 1.0%, affordable or no impact MAS ≥1.0% and ≤ 2.0%, more review needed MAS >2.0% unaffordable, large impact
Secondary Affordability Tests as appropriate	

The following example is based on CSO communities. This analysis was completed several years ago; therefore, national rates, e.g., unemployment, may not be accurate today.

EXAMPLE

Two communities in the eastern United States, Town A and City B, have CSO problems that contribute to violations of water quality standards for pathogens. These two communities are joined together in a major metropolitan area. For Town A, the total annualized residential costs for water and sewer services with CSO controls will be $600 per household per year. For City B, the total annualized residential costs with CSO controls will be $725 per household per year. If sufficient CSO controls were implemented to meet existing water quality standards, the county in which these two communities are located would have total annualized costs of $650 per household.

For Town A, the annual median household income is $46,500. Therefore, the following calculation provides the Municipal Affordability Screener (MAS):

$$MAS_{Town\ A} = \frac{\$600}{\$46,500} = 1.29\%$$

For City B, the annual median household income is $39,000. Therefore, the following calculation provides City B's MAS:

$$MAS_{City\ B} = \frac{\$725}{\$39,000} = 1.86\%$$

The results of the MAS analysis indicate that additional information is needed, and further review and analysis should be performed. The *Interim Economic Guidance* provides the economic methods for secondary affordability tests, which supplement the MAS results, when further review and analysis is appropriate. The secondary test is designed to build on the characterization of the financial burden identified by the MAS. The secondary tests identify the community's ability to obtain financing and describe the general socioeconomic health of the community by considering the following additional debt, socioeconomic and financial management indicators:

- Bond Rating
- Overall Net Debt as a Percentage of Full Market Property Value
- Unemployment Rate
- Median Household Income
- Property Tax Revenue as Percentage of Full Market Property Value
- Property Tax Collection Rate

The two communities decided to substitute "Debt per Capita" for "Overall Net Debt as a Percentage of Full Market Value" and eliminate "Property Tax Revenue as a Percentage of Full Market Value". The *Interim Economic Guidance* encourages substitutions for indicators if they improve the information and strengthen the analysis.

For Town A, the five secondary indicators are:

- "Bond Rating" of A1 - considered a strong indicator of good economic health
- "Debt per Capita" of about $1,200 - considered a mid-range to strong indicator of good economic health
- "Unemployment Rate" of 3.3%, which is more than 1 percentage point lower than the national average of 4.7% - considered a strong indicator of good economic health
- "Median Household Income (MHI)" for Town A was $29,000 during the last census compared to a State average of $35,000. MHI at least 10% less than the State MHI indicates weakness in the economic health.
- "Property Tax Collection Rate" is 97% - considered a mid-range to strong indicator of good economic health.

Except for the MHI indicator, all of Town A's secondary test indicators are strong or at the high end of the mid-range. Based on its placement in the "Substantial Impacts Matrix" in the *Interim Economic Guidance*, Town A would not be expected to incur substantial economic problems from the CSO control program.

For City B, the five secondary indicators are:

- "Bond Rating" of Baa - considered a mid-range indicator of economic health
- "Debt per Capita" of approximately $400 - considered a strong indicator of good economic health
- "Unemployment Rate" of 5.5%, which is within 1 percentage point of the national average of 4.7% - considered a mid-range indicator of good economic health
- "Median Household Income (MHI)" for City B in the last census was $25,000 compared to a State average of $35,000. MHI of at least 10% less than the State MHI is considered an indicator of weak economic health
- "Property Tax Collection Rate" is 95% - considered a mid-range indicator of economic health

Most of City B's secondary test indicators are mid-range. Based on its locations in the "Substantial Impacts Matrix" in the *Interim Economic Guidance*, City B is borderline and additional information may be needed to determine if it will incur substantial economic problems impacts from the proposed CSO control program as it is currently proposed.

Based on this limited review of Town A and City B, it appears that these communities will not incur substantial economic impacts from the CSO control program. City B may experience borderline adverse economic impacts. Widespread impact analyses may not be appropriate because the adverse economic impacts will be substantial only on a worst-case basis. If further analyses were needed, they would involve assessing the change in the following indicators after the CSO controls are implemented:

1. Median Household Income (MHI)
2. Unemployment Rate
3. Rate of Industrial Development
4. Developing and Declining Industries
5. Percent of Households below the Poverty Line
6. Ability of the Community to Carry more Debt
7. Local and Regional Growth.

APPENDIX VI
INTEGRATION OF WET WEATHER SOURCE CONTROLS (CSOs, SSOs, STORM WATER) WITHIN A WATERSHED FRAMEWORK

The Louisville and Jefferson County Metropolitan Sewer District (MSD) has worked to integrate the five programs covered by NPDES permits, including CSOs, using watershed-based monitoring and management strategies. Further, MSD has developed a Combined Annual Report (a unified report format) that considers the permit requirements and watershed issues as a whole.

MSD had identified the lack of coordinated monitoring and assessment data as the biggest obstacle to improving water quality. Each permit program had its own staff, priorities, operating procedures, sampling program databases, and lists of facilities. Little information sharing took place between programs, and field personnel were spread thin, with two- and three-person teams trying to cover enormous areas during the same wet weather event, often gathering different samples at the same locations. It was nearly impossible to establish long-term monitoring sites throughout the MSD for each of the five NPDES programs.

In 1995, the MSD received an EPA Section 104(b)(3) grant to evaluate its monitoring activities and oversight strategies, with a goal of improving its NPDES programs. The study led to sweeping changes in the MSD organizational structure, including consolidation of all water quality staff and resources within its five permit programs.

The MSD service area was broken into six sub-areas, roughly corresponding with watershed boundaries, each with a dedicated environmental team. Next, an Information Technology Division was formed to be a central repository of monitoring data and GIS resources. Finally, MSD developed a comprehensive watershed-based monitoring program that includes physical, chemical, and bioassessment components. Data collected in the monitoring program will be used to develop watershed and water quality models of several of the larger basins.

In 1999, MSD won the right to submit a Combined Annual Report for all of its permitted water quality programs. MSD believes that the combined report will allow analysis and prioritization of water quality problems from all the permit programs to benefit the watershed. This will allow the MSD to target their resources where they will generate the greatest improvements in water quality.