

**COMBINED SEWER OVERFLOWS
GUIDANCE FOR SCREENING AND RANKING**

**Office of Wastewater Management
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460**

August 1995



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

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OFFICE OF
WATER

MEMORANDUM

SUBJECT: Combined Sewer Overflows: Guidance for
Screening and Ranking

FROM: Michael B. Cook, Director
Office of Wastewater Management (4201)

Michael B. Cook

TO: Interested Parties

I am pleased to provide to you the Environmental Protection Agency's (EPA's) guidance document on a procedure for screening and ranking communities with combined sewer overflows (CSOs) for issuance of National Pollutant Discharge Elimination System (NPDES) permits. This document is one of several being prepared to foster implementation of EPA's CSO Control Policy. The CSO Control Policy, issued on April 11, 1994, establishes a national approach under the NPDES permit program for controlling discharges into the nation's waters from combined sewer systems (CSSs).

To facilitate implementation of the CSO Control Policy, EPA is preparing guidance documents that can be used by NPDES permitting authorities, affected municipalities, and their consulting engineers in planning and implementing CSO controls that will ultimately comply with the requirements of the Clean Water Act.

The primary purpose of this document is to provide guidance to NPDES permitting authorities for establishing CSO permitting priorities across CSSs under their jurisdictions. A secondary purpose is to provide permittees, especially larger municipalities with many CSOs and multiple receiving water bodies, with a tool for ranking CSOs within their systems. This can help them allocate their limited resources.

This guidance has been reviewed extensively within EPA as well as by municipal groups, environmental groups, and other CSO stakeholders. I am grateful to all who participated in its preparation and review, and believe that it will further the implementation of the CSO Control Policy.

If you have any questions on the manual or its distribution, please call Tim Dwyer in the Office of Wastewater Management, at (202) 260-6064.



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CHAPTER 1

INTRODUCTION

1.1 Background

Combined sewer systems (CSSs) are wastewater collection systems designed to carry sanitary sewage (consisting of domestic, commercial, and industrial wastewater) and storm water (surface drainage from rainfall or snowmelt) in a single pipe to a treatment facility. CSSs serve about 43 million people in approximately 1,100 communities nationwide. Most of these communities are located in the Northeast and Great Lakes regions. During dry weather, CSSs convey domestic, commercial, and industrial wastewater. In periods of rainfall or snowmelt, total wastewater flows can exceed the capacity of the CSS and/or treatment facilities. When this occurs, the CSS is designed to overflow directly to surface water bodies, such as lakes, rivers, estuaries, or coastal waters. These overflows—called combined sewer overflows (CSOs)—can be a major source of water pollution in communities served by CSSs.

Because CSOs contain untreated domestic, commercial, and industrial wastes, as well as surface runoff, many different types of contaminants can be present. Contaminants may include pathogens, oxygen-demanding pollutants, suspended solids, nutrients, toxics, and floatable matter. Because of these contaminants and the volume of the flows, CSOs can cause a variety of adverse impacts on the physical characteristics of surface water, impair the viability of aquatic habitats, and pose a potential threat to drinking water supplies. CSOs have been shown to be a major contributor to use impairment and aesthetics degradation of many receiving waters and have contributed to shellfish harvesting restrictions, beach closures, and even occasional fish kills.

1.2 History of the CSO Control Policy

Historically, the control of CSOs has proven to be extremely complex. This complexity stems partly from the difficulty in quantifying CSO impacts on receiving water quality and the site-specific variability in the volume, frequency, and characteristics of CSOs. In addition, the financial considerations for communities with CSOs can be significant. The U.S. Environmental

Protection Agency (EPA) estimates the CSO abatement costs for the 1,100 communities served by CSSs to be approximately \$41.2 billion.

To address these challenges, EPA's Office of Water issued a National Combined Sewer Overflow Control Strategy on August 10, 1989 (54 *Federal Register* 37370). This Strategy reaffirmed that CSOs are point source discharges subject to National Pollutant Discharge Elimination System (NPDES) permit requirements and to Clean Water Act (CWA) requirements. The CSO Strategy recommended that all CSOs be identified and categorized according to their status of compliance with these requirements. It also set forth three objectives:

- Ensure that if CSOs occur, they are only as a result of wet weather
- Bring all wet weather CSO discharge points into compliance with the technology-based and water quality-based requirements of the CWA
- Minimize the impacts of CSOs on water quality, aquatic biota, and human health.

In addition, the CSO Strategy charged all States with developing state-wide permitting strategies designed to reduce, eliminate, or control CSOs.

Although the CSO Strategy was successful in focusing increased attention on CSOs, it fell short in resolving many fundamental issues. In mid-1991, EPA initiated a process to accelerate implementation of the Strategy. The process included negotiations with representatives of the regulated community, State regulatory agencies, and environmental groups. These negotiations were conducted through the Office of Water Management Advisory Group. The initiative resulted in the development of a CSO Control Policy, which was published in the *Federal Register* on April 19, 1994 (59 *Federal Register* 18688). The intent of the CSO Control Policy is to:

- Provide guidance to permittees with CSOs, NPDES permitting and enforcement authorities, and State water quality standards (WQS) authorities

- Ensure coordination among the appropriate parties in planning, selecting, designing, and implementing CSO management practices and controls to meet the requirements of the CWA
- Ensure public involvement during the decision-making process.

The CSO Control Policy contains provisions for developing appropriate, site-specific NPDES permit requirements for all CSSs that overflow due to wet weather events. It also announces an enforcement initiative that requires the immediate elimination of overflows that occur during dry weather and ensures that the remaining CWA requirements are complied with as soon as possible.

1.3 Key Elements of the CSO Control Policy

The CSO Control Policy contains four key principles to ensure that CSO controls are cost-effective and meet the requirements of the CWA:

- Provide clear levels of control that would meet appropriate health and environmental objectives
- Provide sufficient flexibility to municipalities, especially those that are financially disadvantaged, to consider the site-specific nature of CSOs and to determine the most cost-effective means of reducing pollutants and meeting CWA objectives and requirements
- Allow a phased approach for implementation of CSO controls considering a community's financial capability
- Review and revise, as appropriate, WQS and their implementation procedures when developing long-term CSO control plans to reflect the site-specific wet weather impacts of CSOs.

In addition, the CSO Control Policy clearly defines expectations for permittees, State WQS authorities, and NPDES permitting and enforcement authorities. These expectations include the following:

- Permittees should immediately implement the nine minimum controls (NMC), which are technology-based actions or measures designed to reduce CSOs and their effects on receiving water quality, as soon as practicable but no later than January 1, 1997.
- Permittees should give priority to environmentally sensitive areas.
- Permittees should develop long-term control plans (LTCPs) for controlling CSOs. A permittee may use one of two approaches: 1) demonstrate that its plan is adequate to meet the water quality-based requirements of the CWA ("demonstration approach"), or 2) implement a minimum level of treatment (e.g., primary clarification of at least 85 percent of the collected combined sewage flows) that is presumed to meet the water quality-based requirements of the CWA, unless data indicate otherwise ("presumption approach").
- WQS authorities should review and revise, as appropriate, State WQS during the CSO long-term planning process.
- NPDES permitting authorities should consider the financial capability of permittees when reviewing CSO control plans.

Exhibit 1-1 illustrates the roles and responsibilities of permittees, NPDES permitting and enforcement authorities, and State WQS authorities.

In addition to these key elements and expectations, the CSO Control Policy also addresses important issues such as ongoing or completed CSO control projects, public participation, small communities, and watershed planning.

1.4 Guidance to Support Implementation of the CSO Control Policy

To help permittees and NPDES permitting and WQS authorities implement the provisions of the CSO Control Policy, EPA is developing the following guidance documents:

- *Combined Sewer Overflows—Guidance for Long-Term Control Plan* (Publication number 832-B-95-002)
- *Combined Sewer Overflows—Guidance for Nine Minimum Control Measures* (Publication number 832-B-95-003)
- *Combined Sewer Overflows—Guidance for Screening and Ranking* (Publication number 832-B-95-004)

Exhibit 1-1. Roles and Responsibilities

Permittee	NPDES Permitting Authority	NPDES Enforcement Authority	State WQS Authorities
• Evaluate and implement NMC • Submit documentation of NMC implementation by January 1, 1997 • Develop LTCP and submit for review to NPDES permitting authority • Support the review of WQS in CSO-impacted receiving water bodies • Comply with permit conditions based on narrative WQS • Implement selected CSO controls from LTCP • Perform post-construction compliance monitoring • Reassess overflows to sensitive areas • Coordinate all activities with NPDES permitting authority, State WQS authority, and State watershed personnel	• Reassess/revise CSO permitting strategy • Incorporate into Phase I permits CSO-related conditions (e.g., NMC implementation and LTCP documentation and LTCP development) • Review documentation of NMC implementation • Coordinate review of LTCP components throughout the LTCP development process and accept/approve permittee's LTCP • Coordinate the review and revision of WQS as appropriate • Incorporate into Phase II permits CSO-related conditions (e.g., continued NMC implementation and LTCP implementation) • Incorporate implementation schedule into an appropriate enforceable mechanism • Review implementation activity reports (e.g., compliance schedule progress reports)	• Ensure that CSO requirements and schedules for compliance are incorporated into appropriate enforceable mechanisms • Monitor adherence to January 1, 1997, deadline for NMC implementation and documentation • Take appropriate enforcement action against dry weather overflows • Monitor compliance with Phase I, Phase II, and post-Phase II permits and take enforcement action as appropriate	• Review WQS in CSO-impacted receiving water bodies • Coordinate review with LTCP development • Revise WQS as appropriate: - Development of site-specific criteria - Modification of designated use to -- Create partial use reflecting specific situations -- Define use more explicitly • Temporary variance from WQS

- *Combined Sewer Overflows—Guidance for Monitoring and Modeling* (Publication number 832-B-95-005)
- *Combined Sewer Overflows—Guidance for Financial Capability Assessment* (Publication number 832-B-95-006)
- *Combined Sewer Overflows—Guidance for Funding Options* (Publication number 832-B-95-007)
- *Combined Sewer Overflows—Guidance for Permit Writers* (Publication number 832-B-95-008)
- *Combined Sewer Overflows—Questions and Answers on Water Quality Standards and the CSO Program* (Publication number 832-B-95-009)

1.5 Purpose of Manual and Target Audience

This guidance presents a process for screening and ranking CSSs with CSOs that have adverse impacts on water quality, aquatic life, or human health. Its primary purpose is to give NPDES permitting authorities (i.e., EPA Regions and States with approved NPDES programs) a method of prioritizing the issuance of NPDES permits to communities with CSSs. A secondary purpose is to give communities with multiple CSOs to multiple receiving water bodies a tool for ranking CSOs. Ranking CSOs will give the communities a basis for allocating resources to eliminate or control, in accordance with the CSO Control Policy, CSOs with the most significant impacts and to maximize the environmental benefits achieved for the resources expended. It can also help target monitoring needs. The screening and ranking process relies primarily on information readily available for most CSSs, such as a general knowledge of known or expected impacts from CSOs, estimates of CSO flows and their characteristics, and receiving water characteristics.

This guidance is not designed or intended to be used as a tool to prioritize Federal enforcement actions. Decisions to initiate an enforcement action are generally based on site-specific data and information and in accordance with the NPDES permitting authority's enforcement management system.

In this recommended screening and ranking process, the NPDES permitting authority uses the available information to assess an individual CSS. The screening process involves two

criteria. If the NPDES permitting authority determines through the screening process that the CSS has a high likelihood of causing significant adverse impacts, the CSS may be assessed (i.e., scored) using the ranking process, which has seven criteria. Chapters 2 and 3 of this guidance discuss the screening and ranking processes, respectively. They present each criterion, the associated scoring, and the rationale for its use in the screening or ranking process. The scores for all ranking criteria may be totaled to determine priorities.

NPDES permitting authorities should develop and issue NPDES permits for those communities with the highest point totals and proceed, in order, to the communities with the lowest point totals.

This guidance can also be used to rank individual CSO outfalls within a CSS, to identify CSOs requiring prompt attention, to better allocate limited resources, and to prioritize any necessary modifications under individual CSO permits. Ranking individual CSO outfalls is particularly useful whenever resources or other constraints limit an NPDES permitting authority's or a community's ability to address all of its CSS and CSO problems simultaneously.

In applying this recommended screening and ranking process, it is important to recognize that, as stated in the CSO Control Policy,

EPA expects a permittee's long-term CSO control plan to give the highest priority to controlling overflows to sensitive areas. Sensitive areas, as determined by the NPDES authority in coordination with State and Federal agencies, as appropriate, include designated Outstanding National Resource Waters, National Marine Sanctuaries, waters with threatened and endangered species and their habitat, waters with primary contact recreation, public drinking water intakes or their designated protection areas, and shellfish beds.

EPA also recognizes, however, that technical and financial constraints may limit a permittee's ability to implement controls for all CSOs to sensitive areas at the same time. This document can help establish priorities to phase in permitting efforts across multiple CSSs and CSOs to many sensitive areas, as well as CSOs to less sensitive areas.

1.6 Watershed Approach to Permitting

In response to the 1989 EPA National Combined Sewer Overflow Control Strategy, 30 States have received approval or conditional approval for CSO permitting strategies. EPA expects States to evaluate the need to revise their CSO strategies for consistency with the 1994 CSO Control Policy. This represents an opportunity for NPDES permitting authorities to reconsider their CSO permitting priorities in light of current or suspected environmental impacts, watershed permitting initiatives, and other factors. States and EPA Regions should review these strategies and establish appropriate permitting priorities for implementation of the CSO Control Policy. In establishing CSO permitting priorities, the NPDES permitting authority should consider factors such as the environmental impacts of CSOs (e.g., beach closings, human health hazards, and potential risk to endangered species). The NPDES permitting authority should also consider requiring immediate action for CSOs to areas that meet the CSO Control Policy's definition of "sensitive areas." This document provides guidance on establishing permitting priorities for CSSs and provides permittees with a tool for prioritizing individual CSOs within their CSSs to allow for effective allocation of resources.

EPA encourages States to use a watershed approach to set permitting priorities. Under a watershed approach, all surface water, ground water, and habitat stressors within a geographically defined area are understood and addressed in a coordinated fashion, as an alternative to addressing individual pollutant sources in isolation. To support States that want to implement a comprehensive statewide watershed approach, the Office of Water has developed guidance and training designed to assist communities and natural resource agencies that are pursuing a watershed approach. One part of the effort is the release of the NPDES Watershed Strategy. This Strategy encourages NPDES permitting authorities to evaluate water pollution control needs on a watershed basis. The CSO Control Policy supports the goals of the NPDES Watershed Strategy and urges communities to work with NPDES permitting authorities to coordinate CSO control program efforts with other point and nonpoint source activities within the watershed.

Applying a watershed approach to the CSO control program is particularly timely and appropriate since the ultimate goal of the CSO Control Policy is development of long-term CSO controls that will provide for the attainment of WQS. Since pollution sources other than CSOs are likely to be contributing to the receiving water and affecting whether WQS are achieved, the NPDES permitting authority needs to consider and understand these other sources.

NPDES permitting authorities can use this document to prioritize other wet weather sources, as well as CSOs. Assessing wet weather sources on a watershed basis will allow the NPDES permitting authority to effectively allocate resources for the greatest improvement in the quality of the receiving water bodies within the watersheds under its jurisdiction. For watersheds with interstate consideration, the respective NPDES permitting authorities should establish an ongoing dialogue to address mutual concerns for improving the watersheds' quality.

The CSO Control Policy promotes ongoing interaction between the NPDES permitting authority and the permittees during CSO control program planning and implementation. Such interaction is critical to the success of a CSO program and is important in the screening and ranking process. As the NPDES permitting authority compiles available information for the screening and ranking process, the permittee can also contribute valuable information.

CHAPTER 2

THE SCREENING PROCESS

To rank CSSs using this guidance, the NPDES permitting authority should first identify through the screening process CSSs with the greatest likelihood of causing significant adverse impacts. The screening can be based primarily on information available in documents recently prepared by States under Sections 303(d) and 305(b) of the CWA. Supplemental information can be obtained from sources such as State health departments, the National Oceanic and Atmospheric Administration (NOAA), the United States Geological Survey (USGS), news organizations, permittees, and consultants. (Table A-1 in Appendix A lists the sources of information obtained for 13 CSSs across the United States during a test of this screening and ranking process.) If information necessary for the screening is not available, the screening system should not be used.

2.1 Criterion 1

Does any CSO in the CSS discharge into a receiving water body recently listed in the State's 303(d), 305(b), or other similar reports as not attaining use goals or as having impacts that could be caused by CSOs?

- **Yes – Assume CSOs are a contributing problem and proceed to the ranking criteria, given in Chapter 3.**
- **No – Proceed to Criterion 2 of the screening process.**

Rationale: Under Section 305(b) of the Clean Water Act, each State is required to submit to EPA, on a biennial basis, a report that, among other things, describes the quality of all surface waters within the State and provides recommendations regarding point and nonpoint source control programs and actions to achieve the water quality goals of the Act. Under Section 303(d) and EPA's implementing regulations, 40 CFR §130.7(b), each State is also required to submit to EPA, again on a biennial basis, a list of water quality-limited segments that still require total maximum daily loads (i.e., those waters that do not or are not expected to attain water quality standards after implementation of technology-based or other controls). The

Section 303(d) lists also identify the pollutants of concern and, sometimes, the contributing sources.

For many States, these reports and lists provide information adequate to identify water bodies that do not attain applicable water quality standards, the nature of the impacts, and possibly whether CSOs are a primary or probable source of these impacts. When a water body receiving CSOs is listed as not attaining water quality standards or the goals of the Act because of pollutants or effects typically associated with CSOs (e.g., high bacteria counts), States should assume, absent information to the contrary, that CSOs contribute to the problem. In such cases, the NPDES permitting authority should continue to evaluate the CSS using the ranking process.

Another set of lists developed by the States may also be of some limited use. These lists, which were developed in 1989 or 1990 under CWA Section 304(l), identify waters not attaining water quality standards or the goals of the Act. In addition, for waters impaired by point source discharges of toxics, the lists identified the point sources of those pollutants. The Clean Water Act does not require States to update these lists; nevertheless, they might be useful screening devices in appropriate cases.

2.2 Criterion 2

Does other available information indicate that CSO-related adverse impacts might be occurring and that permitting and a CSO control program might be a high priority?

- **Yes – The NPDES permitting authority should begin discretionary review of other available information to indicate whether the CSS should be included for evaluation using the ranking process. Proceed to the ranking process given in Chapter 3.**
- **No – Infer that significant adverse CSO impacts do not occur and remove the CSS from further consideration for prioritized action.**

Rationale: This screening criterion provides the States and EPA Regions with the flexibility to include in the ranking process those CSSs with CSOs to a receiving water body that is not included in Section 303(d) or 305(b) reports. Under Screening Criterion 2, for example,

the NPDES permitting authority may decide to include in the ranking process those CSSs in which solid and floatable materials are discharged in close proximity to recreational waters or raw sewage is discharged to commercial and recreational fishing areas, even if the water body is not listed in the previously mentioned reports.

Note that removal of a CSS from the screening and ranking process at this stage does not mean that it should be removed permanently from consideration in permitting and enforcement actions. Removal simply means that control of the CSS should not be the primary focus of the NPDES permitting authority. EPA expects that the NPDES permit for such a CSS, when issued, will contain appropriate CSO requirements.

CHAPTER 3

THE RANKING PROCESS

CSSs that are identified in the screening process as most likely to cause significant adverse impacts should be ranked through a seven-criterion process using site-specific information. Information needed for ranking may be available from many sources, including NPDES permits, NPDES permit applications, 305(b) reports, and compliance and enforcement reports. When adequate information cannot be obtained from these sources, new information can be obtained from site visits or from other outside sources (e.g., consultant reports and data from other agencies, such as USGS), as noted in more detail below. Information from outside sources on the CSSs and CSOs under evaluation can be invaluable during the ranking process. The NPDES permitting authority should make every reasonable effort to obtain the information necessary to give each CSS a score under each ranking criterion. If a particular criterion does not apply to a community (e.g., if a community has no dry weather overflows under Criterion 2), it should receive a score of zero.

In ranking individual CSOs, each individual score should be used. In ranking each CSS, the CSSs that receive the highest point totals from the ranking process should be judged as likely to cause the greatest impacts and should, in most cases, be the highest priority for NPDES permitting. Clearly, this represents a simplistic approach to the ranking of CSSs for NPDES permitting. EPA expects that additional analysis may be necessary and that in some cases it may be desirable to compare systems using "second tier" scores to reflect additional impacts.

3.1 Criterion 1

If any CSOs within the CSS pose a direct risk to public health or contribute to the non-attainment of designated uses on an ongoing basis, or if the potential impacts from CSOs are significant to areas designated under Federal or State law as sensitive or protected resources, assign points as listed below:

- **Discharges to waters experiencing beach closings or where there is a significant risk to public health from direct contact with pollutants in CSOs: Score 250 points.**
- **Discharges to Outstanding National Resource Waters, National Marine Sanctuaries, or waters with threatened and endangered species and their habitat; public drinking water intakes or their designated protection areas; or shellfish beds: Score 200 points.**

Rationale: The primary purpose of this criterion is to identify CSSs with CSOs that endanger public health and affect water quality. This criterion is assigned a high point total because it addresses observed impacts often associated with CSOs. The high point score for the first category in this criterion is consistent with the risks that the pollutants in CSOs pose to public health. Potential impacts to the sensitive areas listed under the second category are included because, as identified in the CSO Control Policy, they generally need the highest levels of protection.

Information required to determine the score for this criterion is often available from State and local public health officials, the NPDES permit, the NPDES permit application, and the 305(b) report. NPDES permit applications and permits contain the specific locations of CSO outfalls. Commonly, 305(b) reports identify whether the use of a water body is impaired and whether municipal sources are responsible; these reports may not give a specific location or specifically identify CSOs as a contributing or primary cause of the impairment. However, if the 305(b) report does not provide adequate information, an appropriate State agency often can help in completing evaluations under this criterion. Local offices of State and Federal natural resource management agencies (e.g., fish and game agencies or the U.S. Fish and Wildlife Service) can provide information on sensitive resources.

3.2 Criterion 2

If dry weather overflows (DWOs) occur within the CSS, score the following points depending on the frequency of the DWOs:

- **Chronic DWOs (i.e., they occur on a regular basis and are not caused by an occasional blockage of a regulator by debris):**
Score 150 points.
- **Infrequent DWOs caused by infrequent maintenance:**
Score 75 points.

Rationale: Dry weather flows include sanitary flows, industrial flows, and infiltration from ground water. DWOs result when dry weather flow is discharged from a CSO outfall. Many CSSs continue to have DWOs for a variety of reasons, including illegal connections to the CSS causing flows that exceed the system's design capacities, plugging of underflow (dry weather) screens, tidal or high stream flow intrusions, damaged or poorly designed flow-regulating equipment, undersized interceptor sewers, and insufficient plant capacities. Ground water may infiltrate into old, poorly designed, or poorly maintained CSSs, causing their design capacities to be exceeded. Because DWOs are not diluted by storm water, they can cause significant impacts in receiving waters.

NPDES regulations prohibit DWOs, and both the 1989 National CSO Control Strategy and the 1994 CSO Control Policy target the expeditious elimination of all DWOs. Both documents recommend that NPDES authorities take appropriate enforcement actions to eliminate all such discharges and to ensure that all CSOs comply with technology-based and water quality-based requirements of the CWA. This criterion has a relatively high maximum score (150 points) because DWOs are undiluted by storm water and, thus, are likely to cause impacts and because DWOs are prohibited.

A CSS would automatically receive a score of 150 points if the DWOs are occurring because of structural problems such as an undersized pipe. The score of 75 points addresses infrequent DWOs that result from inadequate operation and maintenance programs and

procedures. The owner/operator of the CSS should be able to mitigate or eliminate these DWOs by implementing a more aggressive operation and maintenance program.

In many cases, the municipal and State personnel will know the dry weather status of a system. In some cases, however, the CSS may not have been studied and may not be well characterized. In these cases, the permittee will generally need to evaluate dry weather flows, which can often be accomplished by relatively simple observations.

3.3 Criterion 3

Depending on the type of water body receiving the CSO, as well as the body's turbulence and mixing characteristics (energy), score points according to the following table:

Water Body Type	Low Energy	Medium Energy	High Energy
Estuarine and Wetland	100 points	N/A	N/A
Near-Shore Oceanic	60 points	40 points	20 points
Offshore Oceanic	30 points	15 points	10 points
Lakes and Ponds	100 points	N/A	N/A
River	40 points	20 points	10 points
Streams	60 points	40 points	20 points

N/A = Not applicable

Rationale: Investigations done in North America and Europe provide information on the relative susceptibility of various water body types to CSO and storm water impacts. Using this information, water bodies most likely to suffer impacts from CSOs can be identified and categorized based on two factors: type of water body (e.g., estuary, river) and its relative energy (i.e., low, medium, or high). Water body energy describes the degree of turbulence and mixing in the receiving water body. Water bodies that flow rapidly and have noticeable turbulence will mix and flush more quickly than standing water systems and, therefore, are more likely to disperse any pollutant loadings from CSOs before they cause substantial impacts. Thus,

flowing water systems with high energy receive proportionally lower scores than low energy flowing systems and standing water systems. This criterion assumes that lakes and ponds are always considered low energy due to minimal mixing.

Similarly, potential impacts to flowing waters are stratified because smaller flowing systems (i.e., streams) may not as readily or rapidly flush themselves of accumulated sediments and associated pollutants as would larger systems (i.e., rivers). Because systems with greater sediment accumulation rates are more prone to environmental or human health impacts, they are given more points than waters relatively less prone to sediment accumulation. This criterion can contribute a maximum of 100 points to a system's total score, substantially lower than that possible in each of the first two criteria. This is because the emphasis of this guidance is first on *actual* or *highly probable* impacts to receiving water bodies, which are emphasized under the first two ranking criteria, and then on *potential* impacts having a lesser degree of certainty, which are evaluated under this and the next three criteria. If a CSS has CSOs occurring to more than one type of water body with various energy levels, then scores for each receiving water body are not combined. Rather, the CSS is assigned the score based on the receiving water body and energy level with the highest point value.

Because of Regional differences relevant to the meanings of *streams* and *rivers*, etc., this document does not define these terms. Instead, the NPDES permitting authority should provide clear and appropriate definitions of all terms when using this guidance.

Information necessary for this criterion is generally contained in the NPDES permit. If NPDES permits are not available or if additional information on the characterization of a receiving water body is needed, information can generally be obtained from in-state offices of the USGS or State water resources offices.

3.4 Criterion 4

If the measured or estimated proportion of the flow rate(s) of all CSO outfalls to the receiving water flow rate (including CSO flow) in streams or rivers is:

- **More than 50 percent:**
Score 50 points.
- **Twenty-five to 50 percent:**
Score 30 points.
- **Less than 25 percent:**
Score 10 points.

Note that since the proportion of CSO flow rate(s) to receiving water flow rate cannot be calculated for lakes and estuaries, they should automatically receive 30 points.

Rationale: This criterion continues the projection of probable impacts from CSOs to water bodies begun in Criterion 3. It is based on the assumption that impacts increase as the proportion of CSO flow increases relative to receiving water flow. It might be difficult to evaluate the CSS under this criterion if flow information is lacking.

Authorized States and/or EPA Regional offices maintain enforcement or compliance records for many CSOs. These records can provide information on CSO occurrences, volumes, durations, and frequencies. When data are not available, Section 308 information requests or new or revised permit requirements can, as appropriate, require monitoring programs to gather needed information. Alternatively, the CSO flow can be estimated using one of several available modeling approaches. A model can predict peak runoff flow rates resulting from recurring precipitation rates for the watershed drained by the CSO. The approximate flow volume discharged from the CSO outfall is then computed by subtracting the treatment capacity (i.e., flow conveyed to the POTW treatment plant) of the CSS from the sum of the projected peak runoff and dry weather flow volumes predicted by the model.

Useful stream and river flow information may be available from the USGS network of stream and river gage stations.

3.5 Criterion 5

If a drinking water intake is within 10 miles (downstream in flowing water systems) of any CSO outfall in the CSS, score the following points:

- **Within 5 miles:**
Score 100 points.
- **Between 5 and 10 miles:**
Score 50 points.

Rationale: CSOs might contaminate drinking water supply systems and cause widespread human health problems associated with pathogens or toxic materials. Most drinking water treatment facilities with intakes located near CSO outfalls have developed various operational and treatment strategies to avoid such problems. But unforeseen problems, including illegal new connections or discharges of toxic wastes to the CSS, might occur, or new drinking water intakes might be constructed. While routine treatment of drinking water supplies is likely to protect public drinking water supplies from CSOs in most cases, impacts may still occur. Thus, while the association between CSOs and impacts to drinking water sources may be rare, the consequences may be rather severe. Therefore, this criterion yields a score of 100 points if the intake is within 5 miles and 50 points if it is between 5 and 10 miles of a CSO outfall.

The information necessary for this criterion should be available at the State or local public health agency offices or other State offices responsible for monitoring or regulating drinking water intakes and drinking water supplies.

(Note: During the test of this guidance, this criterion was the only one to score zero for every permittee tested. Where CSOs occur to salt or brackish water, the reason for this score is obvious. Most of the other permittees included in this test have a long history of water quality problems in the water bodies affected by CSOs. It is likely that drinking water supply intakes are not located near CSO outfalls in such cases.)

3.6 Criterion 6

If the composition of wastewater flows prior to any CSO outfall (based on dry weather flows) in the CSS includes:

- **More than 50 percent industrial and commercial discharges or significant individual sources of potentially toxic materials:**
Score 50 points.
- **Thirty to 50 percent industrial and commercial discharges or significant individual sources of potentially toxic materials:**
Score 25 points.
- **Less than 30 percent industrial and commercial discharges or significant individual sources of potentially toxic materials:**
Score 0 points.

Rationale: This criterion uses the surrogate measure of CSO industrial/commercial contributions to address the potential impact of CSOs on the quality of the receiving water body. It is based on the following assumptions: (1) possible discharges to the CSS of potentially hazardous materials, including oils, greases, and spilled materials, are greatest for industrial users and intermediate for commercial users, (2) runoff volumes would be greatest from industrial and commercial areas because of their high proportions of impervious surfaces and the likelihood of runoff contamination is higher in these areas, and (3) most residential areas have relatively higher rates of wet weather infiltration, lower traffic volumes, and thus lower potentials for the release of toxic chemicals in significant quantities.

State agencies generally do not have the information needed for this criterion. Often, the permittee's staff or consultant reports prepared for the permittee are the best sources of this information. When this information is not otherwise available, USGS topographic maps can be used to delineate the drainage basin. Then, land-use or zoning maps available for most cities can be laid over the USGS maps, and the percent composition of the area can be delineated using planimetry or a related method.

3.7 Criterion 7

For any site-specific concern not addressed through the other criteria that is a major concern to the NPDES permitting authority:

Score 0 to 200 points.

Rationale: This criterion recommends that the NPDES permitting authority increase the score and rank of any CSS where special concerns not addressed in other criteria are attributable to actual or potential impacts from the system. Permit writers can assign a score based on best professional judgment and the relative impacts of the system. Concerns considered under this criterion might include CSOs that threaten aesthetics or human health. For example, if floatables from CSOs compromise the aesthetics in an area used for recreational boating, this criterion might receive a score of 100. If the concern is a threat to human health (e.g., CSOs entering streets or basements), a permit writer should assign a score of 200 for this criterion.

The value of this criterion was illustrated during the test of this guidance (see Appendix A). If it were not for this criterion, the CSS for Sacramento, California, would have scored only 50 points, primarily because Criteria 1 to 6 focus on impacts to receiving waters. For Sacramento, however, CSO impacts on receiving waters appear to be relatively minor, but there is a major problem with CSOs onto city streets and into homes and commercial basements in the older sections of the city. Because of this impact to human environments, an additional score of 200 points was assigned under this criterion.

APPENDIX A

TESTING OF THE GUIDANCE FOR SCREENING AND RANKING COMBINED SEWER SYSTEMS

EPA tested the usability and effectiveness of the screening and ranking process for CSSs using information available for 13 CSSs in 11 cities and 7 EPA Regions. All of the CSSs evaluated were identified previously as causing serious water quality impacts. For most of these systems, remediation is already underway or being planned. In brief, the evaluation determined that the screening and ranking process described in this guidance provides useful information that is relevant for ranking CSO problems of the 13 CSSs examined and is relatively easy to apply.

A.1 Methods

Table A-1 presents the locations of the CSSs examined in this evaluation and the source of each major category of information used. EPA Headquarters and Regional offices provided applicable NPDES permits, NPDES permit applications, enforcement and compliance reports, 305(b) reports, and other relevant information. State agencies also were contacted to obtain additional needed information that was not available from EPA. Generally, enough information was compiled by this point to allow complete evaluation of most CSSs through the first six ranking criteria. In some cases, however, more detailed information had to be obtained from the permittees and, sometimes, their consultants.

A.2 Results and Conclusions

Information in NPDES permits and in 305(b) reports, which are often available from EPA Regional offices, was sufficient to complete the screening process for some CSSs. In all cases but one, NPDES permits were useful in identifying specific CSO outfall locations for each CSS. The 305(b) reports adequately identified specific use attainability problems in Connecticut, Maine, Massachusetts, Michigan, New York, Oregon, and Pennsylvania, but CSOs were not always shown as likely causes. Additional information about CSSs in Maine, Pennsylvania, and California was necessary to confirm the occurrence of surface water impacts from CSOs or other CSO-related problems. Using all ranking criteria generally required information from EPA, State, and municipal sources (Table A-1).

Table A-1. Sources From Which Needed Information Was Acquired for Screening and Ranking Process Criteria^a

City	Sources for Screening	Sources for Ranking ^c						
		Criterion 1	Criterion 2	Criterion 3	Criterion 4	Criterion 5	Criterion 6	Criterion 7
Region 1								
Hartford, CT	E	E	S	S ^b	S ^b	S ^b	S ^b	
Bridgeport, CT	E	E	S	E	E	S	S	
South Portland, ME	S	S	S	S	S	S	P	
Gloucester, MA	E	E	S	E	E	S	S	
Holyoke, MA	E	E	E	E	S	E	E	
Region 2								
Brooklyn, NY	E	P	P	P	P	P	C	
Region 3								
Philadelphia, PA NPDES Permit #0026662	E	E	E	E	E	E	P	
Philadelphia, PA NPDES Permit #0026689	E	E	E	E	E	E	P	
Philadelphia, PA NPDES Permit #0026671	E	S	S	E	E	E	P	
Region 4								
Chattanooga, TN	S	S	S	S	P	S	S	
Region 5								
Inkster, MI	E	E	E	S	C	S	C	
Region 9								
Sacramento, CA	E	E	E	E	E	S	S	E
Region 10								
Portland, OR	E	E	P	P	P	S	P	

Key: E = EPA Regional Offices
 S = State Agencies
 P = Permittees
 C = Consultants

^a If information for a criterion was obtained from more than one source, only the most local source is given. Consultant reports obtained from the EPA Regional office are identified by E and those obtained from a State agency are identified by S.

^b This information was acquired from a state-chartered utility group, which serves a number of municipalities.

^c USGS offices in individual States provided stream flow information for municipalities that discharge to flowing waters.

Table A-2 summarizes the results of each screening and each ranking process for the 13 CSSs. The test of this process suggested that the information most frequently needed to assess CSSs seems to be readily available from the EPA Regional or State offices.

The screening and ranking process as described in this guidance was reasonably easy to follow and provided useful information for ranking the severity of problem associated with CSSs. The process proved general enough to allow assessment of all CSO problems encountered. In addition, it helped bring together valuable information and provided a useful method to evaluate and rank environmental impacts typically associated with CSOs. All CSSs evaluated during this test were identified previously as having CSO problems. By applying the techniques described in this guidance, all CSSs were ranked for priority permitting, receiving scores ranging from a high of 555 to a low of 250 points.

Table A-2. Summary of Results Obtained in Applying the Screening and Ranking Process to 13 CSSs

City	Ranking Scores							Total Points
	Criterion 1	Criterion 2	Criterion 3	Criterion 4	Criterion 5	Criterion 6	Criterion 7	
Hartford, CT	250	75	10	10	0	0	0	345
Bridgeport, CT	250	75	60	30	0	25	0	440
South Portland, ME	200	0	100	30	0	0	0	330
Gloucester, MA	200	0	100	30	0	25	0	355
Holyoke, MA	250	75	10	30	0	0	0	365
Brooklyn, NY	250	150	100	30	0	25	0	555
Philadelphia, PA, #1	250	150	100	30	0	0	0	530
Philadelphia, PA, #2	250	150	100	30	0	0	0	530
Philadelphia, PA, #3	200	150	100	30	0	0	0	480
Chattanooga, TN	250	0	20 ^a	10	0	25	0	305
Inkster, MI	250	75	60 ^a	50	0	0	0	435
Sacramento, CA	0	0	40 ^a	10	0	0	200	250
Portland, OR	250	75	10 ^a	10	0	0	0	345

^a Values reflect assumptions regarding the energy levels of the receiving waters.

Note: The cities analyzed in this test were cities with known CSO problems. Many cities may experience point totals significantly lower than these.

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