United States Government Accountability Office

Report to Congressional Requesters

January 2023

CLEAN WATER ACT

EPA Should Track Control of Combined Sewer Overflows and Water Quality Improvements

GAO-23-105285

GAO Highlights

Highlights of GAO-23-105285, a report to congressional requesters

January 2023

CLEAN WATER ACT

EPA Should Track Control of Combined Sewer Overflows and Water Quality Improvements

Why GAO Did This Study

Combined sewer systems collect wastewater—including domestic sewage and industrial wastewater—and stormwater runoff in the same sewer lines for treatment and discharge into a nearby water body About 700 municipalities across the U.S. have combined sewer systems. EPA directs municipalities with CSOs to develop plans to comply with requirements in the Clean Water Act, including water quality standards, which are established by states. In EPA's last estimate from 2004, 850 billion gallons of contaminated CSO discharges were released each year. Efforts to control discharges have likely reduced CSOs since then.

This report examines (1) EPA's policy to address CSO discharges, (2) the status of municipalities' long-term control plans and challenges they faced, and (3) how EPA tracks progress in implementing long-term control plans and improving water quality resulting from CSO controls. GAO analyzed law, policies, and guidance related to CSOs, as well as EPA reports; and interviewed EPA officials. To report on the implementation of EPA's CSO policy, GAO selected a nongeneralizable sample of 11 municipalities with CSOs based on geographic location and other factors.

What GAO Recommends

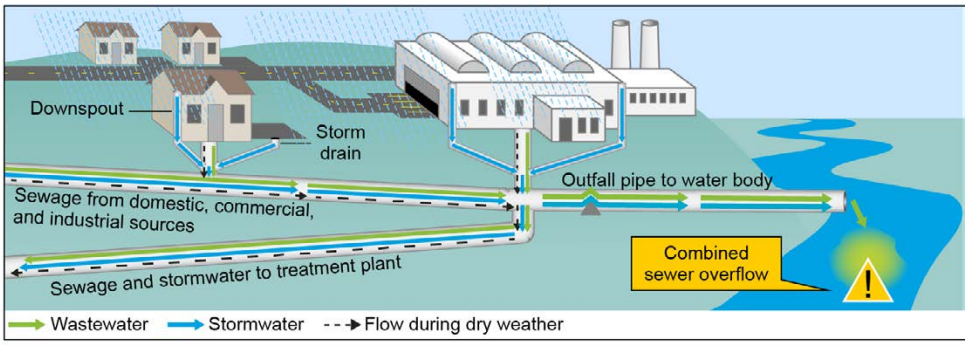
GAO is making three recommendations, including that EPA set goals and measures to show progress toward implementation of long-term control plans and water quality improvement. EPA generally agreed with these recommendations.

View GAO-23-105285. For more information, contact J. Alfredo Gómez at (202) 512-3841 or gomezj@gao.gov.

What GAO Found

During heavy rainfall and other wet weather events, combined sewer systems are designed to overflow and discharge untreated wastewater mixed with raw sewage directly into a nearby water body. These discharges, known as combined sewer overflows (CSO), occur through system-designed outfalls (see fig.) and may impair water quality. The Environmental Protection Agency's (EPA) 1994 *CSO Control Policy* directs municipalities with CSOs, which number about 700, to develop long-term control plans to eliminate or reduce CSO discharges to achieve compliance with Clean Water Act requirements. These plans identify actions to be taken by municipalities to address CSOs and a schedule for achieving compliance with the Clean Water Act as soon as practicable. The policy provides that these plans should be included in an appropriate enforceable mechanism, such as a permit or judicial order.

Illustration of Combined Sewer System in Wet Weather



Source: GAO analysis of Environmental Protection Agency documents. | GAO-23-105285

Due to EPA's limited data, GAO reviewed a sample of 11 municipalities and found that they are at different points in implementing their long-term control plans or similar efforts. Specifically, two have completed their construction work or are near completion, and one is in litigation over whether it must update its plan. The other eight municipalities' plans are ongoing, with planned completion dates up to 2040. However, the municipalities face challenges in addressing CSOs, and some have extended their completion dates. For example, Morgantown, West Virginia, initially planned to complete its controls by 2020 but extended it to 2035, due to affordability concerns.

EPA's lack of consistent nationwide data prevents the agency from reporting on the status of municipalities' control plans or their effect on water quality. EPA collects some information on whether municipalities have a plan in place and details of individual control plans. For example, as of June 2022, according to EPA documents, most municipalities had a long-term plan and enforceable schedule in place. However, no further status information, such as the time to complete planned work, was available. According to EPA officials, the agency does not currently have performance goals and measures to track the implementation status of the control plans or water quality improvements. Without such goals and measures, EPA will be unable to assess or provide information on the CSO program and its effect on water quality.

Contents

Figures

Abbreviations

CSO	Combined sewer overflow
CSO Policy	1994 CSO Control Policy
EPA	Environmental Protection Agency
NPDES	National Pollutant Discharge Elimination System
OECA	Office of Enforcement and Compliance Assurance

U.S. GOVERNMENT ACCOUNTABILITY OFFICE
441 G St. N.W.
Washington, DC 20548

January 25, 2023

The Honorable Diane Feinstein
United States Senate

The Honorable Alex Padilla
United States Senate

The Honorable Nancy Pelosi
House of Representatives

About 40 million people in the United States live in a municipality with a sewer system that collects wastewater and stormwater in the same sewer lines. Under normal conditions, these combined sewer systems transport residential and industrial sewage and runoff, including rainwater, in one pipe to a publicly owned wastewater plant for treatment, with final discharge to a nearby water body. However, when the volume of combined wastewater and stormwater exceeds the capacity of the system or treatment plant, usually during heavy rainfall events or snowmelt, the system is designed to release overflows of untreated sewage and wastewater combined with stormwater directly into nearby water bodies through designated pipe outfalls. Today there are about 700 municipalities across the United States that have combined sewer overflows (CSO). The Environmental Protection Agency (EPA) estimated in 2004, that CSOs accounted for 850 billion gallons of contaminated discharges annually. More recent CSO volume data from EPA is unavailable, and since then municipalities have engaged in efforts to improve their sewer systems.

Many of the nation’s combined sewers were built through the early 20th century, before the Clean Water Act was enacted. Under the Clean Water Act, which was enacted in 1972 and subsequently amended several times, a permit is needed to discharge pollutants from a point source, such as a pipe from a wastewater treatment plant or a CSO outfall, into waters of the United States. Through the National Pollutant Discharge Elimination System (NPDES) program created by the act, EPA can issue such permits setting pollutant discharge limits and reporting requirements for municipalities’ wastewater facilities, including those with CSOs. EPA also authorizes tribal, state, and territorial governments to implement and

enforce all or part of the NPDES program, including developing and issuing permits.[1]

EPA developed and issued its 1994 *CSO Control Policy* (*CSO Policy*), in response to concerns about CSOs.[2] In 2000, the Clean Water Act was amended to incorporate the policy.[3] The policy directs municipalities with CSOs to develop and implement long-term control plans, which we also refer to as control plans, to achieve compliance with the Clean Water Act, including water quality standards and protection of designated uses. Municipalities may be able to reduce or eliminate CSO discharges by implementing different types of controls, such as diverting potential stormwater runoff away from the combined system into green areas or temporarily storing flows to be treated and released after the storm passes.

You asked us to review EPA's implementation and enforcement of its *CSO Policy* and actions to ensure municipalities' compliance with the Clean Water Act.[4] This report examines (1) EPA's policy to address CSO discharges, (2) the status of long-term control plans and any challenges selected municipalities have faced in implementing them, and (3) how EPA tracks progress in implementing long-term control plans and improving water quality resulting from CSO control efforts.

To examine EPA's policy to address CSO discharges, we reviewed the agency's policies, strategies, and guidance developed since 1994. We also reviewed the Clean Water Act and its implementing regulations. We interviewed officials at EPA headquarters and the nine relevant regional offices to obtain an understanding of EPA's policies to address CSOs, as well as their views on the challenges with these efforts. EPA

[1]EPA has authorized 47 states and one territory to implement their own NPDES program. The remaining three states that have not received authority are Massachusetts, New Hampshire, and New Mexico. EPA is responsible for implementing the NPDES program in these states, as well as in Indian country and territories if the tribal or territorial government has not been authorized to implement the program. For the purposes of this report, "authorized states" includes tribes and territories authorized to implement the NPDES program.

[2]*See* 59 Fed. Reg. 18688 (Apr. 19, 1994).

[3]On December 21, 2000, the Clean Water Act was amended to require each permit, order, or decree subsequently issued for a discharge from a municipal combined sewer system to conform with the *CSO Policy*. 42 U.S.C. § 1342(q)(1).

[4]The request for this review was originally made by Nancy Pelosi in her position as Speaker of the House.

headquarters provided us with a set of summary data that included basic information such as the number of municipalities with CSO permits. After reviewing the headquarters data for accuracy and completeness, we determined it to be sufficiently reliable for the purpose of reporting on the number of municipalities with CSOs and whether they had an enforceable schedule in place to implement their long-term control plans or similar CSO control efforts.

To examine the status of municipalities' implementation of their long-term control plans—or agreed upon set of CSO controls—and what challenges they have faced, we selected a nongeneralizable sample of 11 municipalities with CSOs from around the country. We selected the municipalities so that the sample would have a range of geographic locations, size of the utility's service population, and type of actions taken by EPA and the municipality to address overflows.[5] We reviewed the selected municipalities' long-term control plans and related documents and interviewed officials from the municipalities to obtain their views on EPA's policies and approach to controlling CSOs, as well as any challenges they experienced.

In addition, we interviewed representatives from four selected nongovernmental organizations to obtain their perspectives on EPA's approach to CSOs and challenges faced by municipalities in addressing their CSO discharges.[6] These organizations were selected because they have key responsibilities related to working with states and EPA on their Clean Water Act priorities. For one of these meetings, one of the nongovernmental organizations also invited officials from three state environmental offices that were not included in our sample to learn about their perspectives on challenges municipalities in their state face in addressing CSO discharges. Findings from our sample of municipalities

[5]The selected municipalities were Cincinnati, Ohio; Cumberland, Maryland; Detroit, Michigan; Harrisburg, Pennsylvania; Kansas City, Missouri; Morgantown, West Virginia; Nashville, Tennessee; Oswego, New York; Portland, Oregon; San Francisco, California; and Springfield, Massachusetts. We also selected these municipalities to provide a range of population sizes, with over half of the municipalities having populations over 100,000 people. In addition, we selected among three types of mechanisms that can be used to require CSO controls: consent decree (either state or federal), NPDES permit, or administrative order (either state or federal).

[6]The four nongovernmental organizations were the National Association of Clean Water Agencies, the Lower Susquehanna Riverkeeper Association, the Environmental Integrity Project, and the Association of Clean Water Administrators.

cannot be generalized to those we did not select and include in our review.

To determine how EPA tracks progress in implementing long-term control plans and improving water quality resulting from CSO control efforts, we reviewed the Clean Water Act and related agency regulations, policies, and guidance. We also examined what data the agency collects for performance measures, such as the amount of pollutant reduction, to track progress toward achieving compliance with water quality standards. We interviewed officials from EPA, the selected municipalities, and the state environmental agencies associated with some of our selected municipalities, along with representatives from the selected nongovernmental organizations, to obtain information on EPA's monitoring and performance measures, as well as what is known about implementation of long-term control plans and water quality improvements. See appendix I for further details of the objectives, scope, and methodology for this report. See appendix II for details of the systems and CSO controls for each of the municipalities in our nongeneralizable sample.

We conducted this performance audit from June 2021 to January 2023 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

Many of the nation's oldest cities, including those on the East and West Coasts and around the Great Lakes, have combined sewer systems, which use a single sewer pipeline system to transport wastewater and stormwater to a treatment facility. During dry or normal weather, wastewater from houses, commercial businesses, and industry is flushed into the sewer system to a wastewater plant for treatment before being discharged into a water body. In contrast, other systems have separate sewer and stormwater pipelines.[7]

During storms or wet weather, stormwater collects and flows quickly across land and discharges into nearby water bodies, gathering in one or

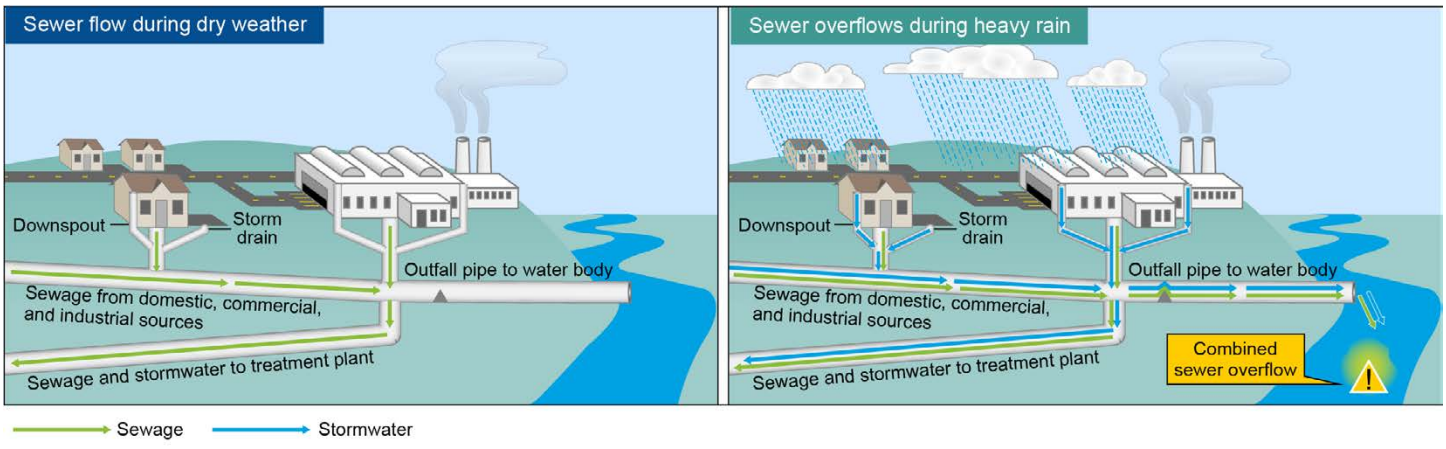
[7]In a separate sewer system, wastewater is collected and sent to the treatment plant and stormwater is collected in storm sewer pipes and discharged to nearby water bodies.

more concentrated bursts. In developed areas, stormwater flows across lawns and streets and discharges into storm sewers.

Wastewater treatment plants process water collected—either separately or combined with a stormwater system—from residences, commercial properties, and industrial facilities. A plant, which consists of different tanks and basins, treats the water through physical, biological, and chemical processes and then discharges the treated wastewater directly to a nearby river, stream, lake, or other water body. Communities can have one or more wastewater treatment plants, depending on different factors, such as population.

Combined sewer systems are designed and sized to manage a certain amount of water flow, or capacity, and can treat increased amounts of flow during storms or other wet weather events. So as not to damage the wastewater treatment plant with too much flow during storms, most combined sewer systems are designed to store and sometimes discharge excess flows through outfalls directly to nearby water bodies, such as rivers, streams, estuaries, and coastal waters. The discharges are called combined sewer overflows. Some CSO outfalls discharge infrequently, while others discharge nearly every time it rains, with the frequency and duration varying from system to system and from outfall to outfall within a system (see fig. 1).

Figure 1: Combined Sewer System in Dry and Wet Weather



Source: GAO analysis of Environmental Protection Agency documents. | GAO-23-105285

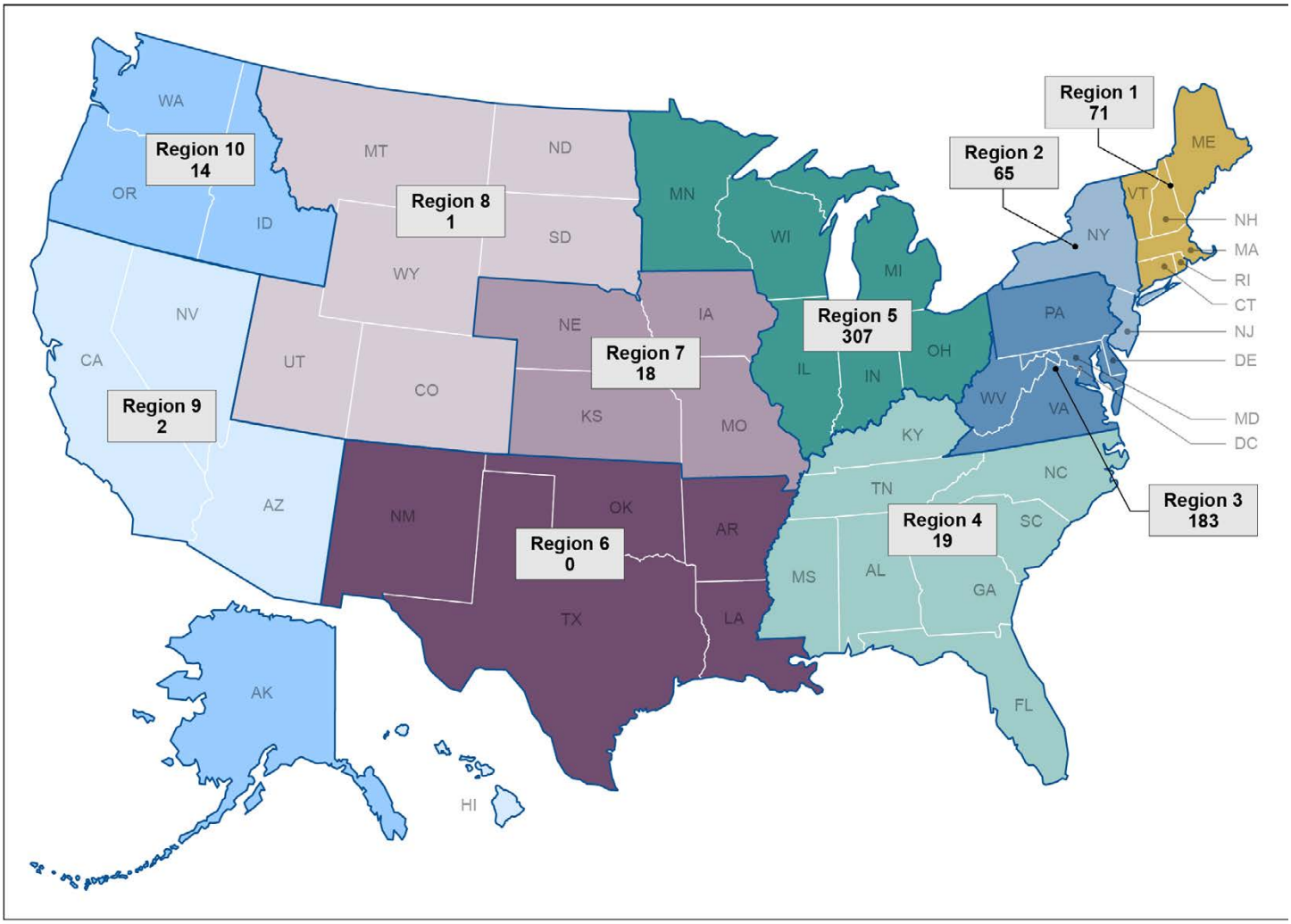
Because CSO discharges may contain untreated sewage and wastewater, they can contribute microbial pathogens, such as *E. coli* and viruses, to the water bodies receiving them. They can also contain

chemicals or other discharges that are not eliminated by industrial dischargers prior to entering the collection system. CSO discharges can cause beach closures, contamination of drinking water supplies, and other human health and environmental problems.

Location of CSOs and EPA and State Agency Organizations

Municipalities with CSOs are located in 30 states and in the District of Columbia and Puerto Rico, as well as in nine of 10 EPA regions (see fig. 2).

Figure 2: Number of Municipalities with Combined Sewer Overflows, by EPA Region



Sources: GAO analysis of Environmental Protection Agency (EPA) information; Map Resources (map). | GAO-23-105285

Note: Region 2 also serves Puerto Rico and the U.S. Virgin Islands. Region 9 also serves American Samoa, the Commonwealth of the Northern Mariana Islands, the Federated States of Micronesia, Guam, the Marshall Islands, and the Republic of Palau.

EPA headquarters and regional offices, in partnership with authorized states, oversee compliance with Clean Water Act requirements. EPA's Office of Water provides guidance to states on NPDES permitting, specifies scientific methods and data collection requirements for water quality monitoring, performs oversight of authorized states, and provides training and technical assistance to states.

EPA administers its enforcement and oversight responsibilities through the Office of Enforcement and Compliance Assurance (OECA), which provides overall direction on enforcement strategies, policies, and processes. OECA and the Regional Enforcement and Compliance Assurance Divisions can inspect and take compliance and enforcement actions, when necessary.

Generally, authorized states assume responsibility to issue NPDES permits, and to monitor compliance by CSO municipalities through inspections and reviewing discharge monitoring reports; they also take enforcement actions and report on all these activities to EPA.

Statutory and Regulatory Requirements: Water Quality Standards, NPDES Permit Program, and NPDES Electronic Reporting

The Clean Water Act was enacted more than 50 years ago to "restore and maintain the chemical, physical, and biological integrity of the nation's waters."[8] Toward this end, the act requires states, territories, and authorized tribes, to establish water quality standards to protect public health or welfare and, where attainable, provide water quality for the protection and propagation of aquatic wildlife and for recreation in and out of water. In addition, the act requires point sources, such as a pipe or CSO outfall, to have a permit for discharges of pollutants into waters of the United States. In 2015, EPA issued a regulation requiring certain information and data related to the NPDES permit program to be reported electronically, rather than on paper.

Water Quality Standards

Under the Clean Water Act, states are required to establish water quality standards. States are to review and update, as appropriate, these standards every 3 years. Water quality standards include designated uses for waters of the United States and water quality criteria to protect those uses. Designated uses reflect the intended use and value of a

[8]33 U.S.C. § 1251. The Federal Water Pollution Control Act Amendments of 1972 are commonly referred to as the Clean Water Act and was enacted in 1972. Pub. L. No. 92-500, 86 Stat. 816, (codified as amended at 33 U.S.C. §§ 1251-1387).

water body, such as for a public drinking water supply; protection and propagation of fish, shellfish, and other wildlife; or recreational, agricultural, industrial, and navigational purposes. Water quality criteria generally describe the chemical, physical, and biological conditions necessary, such as nitrogen concentrations (chemical condition) and health of aquatic life (biological condition), to achieve and protect designated uses.[9]

The Clean Water Act requires that EPA review states' new or revised standards and approve or disapprove them based on whether they are consistent with the requirements of Clean Water Act and its implementing regulations. When EPA disapproves new or revised water quality standards, EPA must promulgate standards for the state, unless the state makes changes to its standards that EPA specifies. The agency may also establish new or revised water quality standards, if it determines that such a standard is necessary to meet Clean Water Act requirements. After water quality standards are established, states are to monitor and assess their water bodies to determine the degree to which the standards are being met.

NPDES Permit Program

Municipal wastewater treatment plants need NPDES permits to operate and discharge their treated wastewater into waters of the United States. Such discharges are subject to relevant pollutant limits in their NPDES permit. Each NPDES permit for a publicly owned treatment works applies technology-based effluent limitations based on secondary treatment and any more stringent limitation necessary to meet applicable water quality standards (e.g., water-quality-based effluent limitations).

In 1989, EPA issued a National Combined Sewer Overflow Control Strategy. It confirmed that CSOs were point sources of pollution separate from the main wastewater treatment plant. It also contained three objectives: (1) to ensure that if CSOs occur, they are only as a result of wet weather; (2) to bring all wet weather CSO discharge points into compliance with technology-based and applicable state water quality-

[9]Water quality criteria are constituent concentrations, levels, or narrative statements representing a quality of water that supports a particular designated use for a given water body. The Clean Water Act requires that EPA establish and revise recommended national water quality criteria, which states can adopt. States can also develop their own criteria, subject to EPA approval. EPA-recommended criteria are to reflect the latest scientific information on the effect of the pollutants on public health and welfare. States must use EPA-recommended values or other scientifically defensible methods for numeric criteria. States may establish narrative criteria where numeric criteria cannot be established.

based requirements of the Clean Water Act; and (3) to minimize water quality, aquatic biota, and human health impacts from CSOs.

In the strategy, EPA confirmed that CSOs are point sources independent of municipal wastewater treatment plants and need NPDES permits. Such discharges are subject to relevant pollutant limits in their NPDES permit. The permit will identify the approved locations for CSO outfalls and can set requirements for treatment, reduction, or elimination of CSO discharges. NPDES permits generally include other provisions, such as monitoring and reporting requirements, compliance schedules, and management practices. NPDES permits for CSOs should require implementation of nine minimum controls as described in the *CSO Policy* and a long-term control plan.

NPDES Electronic Reporting Rule

To help carry out its responsibilities, EPA maintains an electronic database of state NPDES permit and monitoring information. EPA regions, authorized states, and NPDES permittees report data on their CSO discharges. In 2015, EPA issued the NPDES Electronic Reporting Rule, which requires most permitted facilities and authorized states to submit certain data related to the NPDES permitting program electronically into EPA's national database.[10] Among the benefits, EPA anticipated obtaining more accurate, timely, complete, and consistent information and improving the transparency of information on facility and government performance. Some states have adopted the use of EPA's electronic reporting tools, and their information is integrated and uploaded directly into EPA's national database. Other states use their own data systems and submit their information to EPA's national database on a periodic basis.

The rule divided implementation into two parts. The deadline for implementing the first part, which included electronic submission of discharge monitoring reports and certain other program reports, was December 21, 2016. The deadline for the second part was originally

[10]40 C.F.R. pt. 127. EPA's national database is the Integrated Compliance Information System-NPDES, commonly referred to as "ICIS-NPDES."

December 21, 2020, but has been extended to December 21, 2025.[11] This part includes all other reporting requirements, such as municipalities' reporting on their CSO discharges.

EPA's *CSO Policy* Requires Long-Term Control Plans and Enforceable Schedules to Address CSO Discharges

EPA's *CSO Policy* provides guidance and a national approach for EPA, states, and municipalities to address CSO discharges. The policy recognized that controlling CSOs will take a long time and that controls would need to be cost-effective. It establishes a phased approach requiring municipalities to control CSOs primarily through implementing nine minimum controls and developing long-term control plans. It also makes EPA and authorized states responsible for implementing the policy using the appropriate mechanism, such as permitting and enforcement actions to ensure that compliance with the requirements of the Clean Water Act is achieved as soon as possible.

EPA's *CSO Policy* Establishes a Phased Approach for Municipalities to Control CSOs, Including Developing Long-Term Control Plans

EPA's policy and related guidance describe three phases that municipalities, states, and EPA will implement. The policy allows for flexibility, and, as a result, in some instances, the phases may overlap as municipalities develop and implement their CSO controls.

During phase I, the policy requires CSO municipalities to begin implementing nine minimum technology-based controls, which are steps that a municipality could implement in a relatively short time, such as proper operation and regular maintenance. These steps should allow a municipality to reduce CSOs without significant engineering studies, construction activities, or financial investment.

Also during phase I, municipalities are expected to develop a long-term control plan that will, once implemented, achieve compliance with the act's requirements, including meeting water quality standards and protecting designated uses. The policy states that a control plan should include both a fixed-date project implementation schedule and a financing

[11]In 2020, EPA extended the compliance date for submitting data on CSO overflows to December 21, 2025, and added regulations that would allow the deadline to implement Phase 2 of the NPDES Electronic Reporting Rule to be extended to not later than December 21, 2028, in certain circumstances. 85 Fed. Reg. 69189 (Nov. 2, 2020). Specifically, authorized states may request an extension, or EPA may extend the deadline on its own initiative. EPA may need to extend the deadline on its own initiative, if the agency has not yet deployed the required electronic reporting tool or has not yet deployed the protocols and systems for authorized states to share data with EPA.

plan to implement the selected CSO controls as soon as practicable.[12] The policy requires municipalities to develop a control plan that evaluates a reasonable range of alternative control options, including an assessment of their cost and performance.[13]

To accomplish this, municipalities should follow three steps, as described in EPA guidance: (1) characterize the wastewater and CSO system, (2) develop and evaluate alternatives, and (3) select and implement controls.[14]

- **Characterize the wastewater and CSO system.** During system characterization, the municipality should develop a thorough understanding of its sewer system and how it performs during various precipitation events, through monitoring and modeling its system.
- **Develop and evaluate alternatives.** A municipality should develop and evaluate a reasonable range of alternatives and varying control levels within those alternatives, while also considering costs. The policy states that municipalities should also use one of two approaches—presumption or demonstration—in developing their

[12]The policy said that long-term control plans should be developed and submitted "as soon as practicable," but generally within 2 years after the effective date of the permit requiring development of the plan. The policy allows permitting authorities to establish a longer timetable for completion of a long-term control plan on a case-by-case basis to account for site-specific factors that may influence the complexity of the planning process.

[13]The four key principles of the policy ensure that CSO controls are cost-effective and meet the objectives of the Clean Water Act. The principles are (1) providing clear levels of control that would be presumed to meet appropriate health and environmental objectives; (2) providing sufficient flexibility to municipalities, especially financially disadvantaged communities, to consider the site-specific nature of CSOs and to determine the most cost-effective means of reducing pollutants and meeting Clean Water Act objectives and requirements; (3) allowing a phased approach to implementation of CSO controls considering a community's financial capability; and (4) allowing review and revision, as appropriate, of water quality standards and their implementation procedures when developing CSO control plans to reflect the site-specific wet weather impacts of CSOs.

[14]Environmental Protection Agency, Office of Wastewater Management, *Combined Sewer Overflows Guidance for Long-Term Control Plan*, EPA 832-B-95-002 (Washington, D.C.: September 1995). The goal of the guidance is to provide technical support to assist municipalities in the development of technically feasible, affordable, and comprehensive long-term control plans consistent with the objectives of the policy.

long-term control plans and evaluation of alternatives.[15] Both approaches involve modeling and projecting the level of CSO control required to meet water quality standards.

- **Select and implement controls.** After appropriate public input and coordination with the permitting authority, the municipality selects its recommended set of CSO controls (beyond the nine minimum controls), along with an operating plan and implementation schedule, which includes a financing plan that will be part of its long-term control plan.

Municipalities can select from a wide variety of technologies and operating practices to control CSOs that can be grouped into four broad categories, as shown in table 1.

Table 1: Categories of Technologies and Practices to Control Combined Sewer Overflows (CSO)

Control category	Description	Examples
Source	Use low-impact development techniques to help reduce the volumes, peak flows, and pollutant loads entering the collection system.	Permeable pavement, green infrastructure
Collection system	Reduce the volume and frequency of CSOs by removing or diverting stormwater from the system, maintaining system peak flow capacity, and maximizing system storage capability.	Sewer cleaning, sewer separation
Storage facilities	Provide temporary storage of flows during heavy rainfall for controlled release to the treatment facilities when flows return to normal levels.	Retention basins, deep tunnels
Treatment technologies	Treat flow as necessary, in situations where continued CSOs will remain and CSOs are demonstrated to cause unacceptable water quality impacts.	Screening, disinfection

Source: GAO summary of Environmental Protection Agency information. | GAO-23-105285

[15]Under the presumption approach, the planned CSO controls for the municipality are presumed to provide an adequate level of control to meet the water quality-based requirements of the Clean Water Act, if they meet one of three performance criteria, such as no more than an average of four overflow events per year, although the permitting authority may allow up to two additional overflow events per year. To use this approach, EPA or the state, as the permitting authority, must determine that such a presumption is reasonable in light of the data and analysis conducted in the long-term control plan's characterization, monitoring, and modeling of the collection system and consideration of sensitive areas. Under the demonstration approach, the municipality demonstrates that its planned CSO controls are adequate to meet the water quality-based requirements of the Clean Water Act. Regardless of the approach used, the *CSO Policy* requires a postconstruction water quality monitoring program adequate to verify compliance with water quality standards and protection of designated uses, as well as to ascertain the effectiveness of CSO controls.

During phase II, the policy states that municipalities should implement their long-term control plans, in addition to continuing to implement the nine minimum controls. This includes constructing, operating, and maintaining the selected set of CSO controls. After construction is complete—whether using the presumption or demonstration approach—the policy requires that a municipality conduct a program to assess postconstruction water quality by monitoring and collecting sufficient information to determine the effectiveness of the selected CSO controls and to verify compliance with water quality standards and protection of designated uses.[16]

The postconstruction compliance monitoring program should include an approved plan for the monitoring protocols that the municipality will follow, including plans for which CSO outfalls and locations will be monitored and for which parameters.[17] EPA guidance states that for more complex systems with a large number of outfalls or when the outfalls are submerged, it could be difficult to conduct direct monitoring, and it might be more appropriate to use a model to predict the number of CSO discharges that could occur.[18] If monitoring shows that water quality standards are not being met or designated uses are not being protected, then the municipality must develop, submit, and implement a revised long-term control plan that contains additional controls needed to achieve compliance.

After phase II, municipalities that have demonstrated their controls are performing effectively and achieving compliance can move on to post-phase II. In this phase, EPA's 1995 guidance describes that municipalities will be expected to operate and maintain their CSO controls and continue any monitoring needed to assess compliance with water quality requirements, as included in their NPDES permits.[19] According to EPA

[16]These municipalities could also explore obtaining changes to the water quality standards or use integrated planning for projects to address stormwater, wastewater, or both.

[17]EPA issued guidance in 2012 to help municipalities develop their monitoring plans and how to demonstrate compliance. See Environmental Protection Agency, Office of Water, *Combined Sewer Overflows: Post Construction Compliance Monitoring Guidance* (Washington, D.C.: May 25, 2012).

[18]Environmental Protection Agency, *Combined Sewer Overflows Post Construction Compliance Monitoring Guidance*.

[19]Environmental Protection Agency, Office of Water, *Combined Sewer Overflows*: *Guidance For Permit Writers* (Washington, D.C.: September 1995).

officials, a few municipalities are in post-phase II, monitoring the performance of their CSO controls from their long-term control plans or agreed-upon controls and their effectiveness at meeting water quality standards and protecting designated uses.

EPA's *CSO Policy* Requires CSO Controls and to Be Part of an Enforceable Mechanism

EPA's *CSO Policy* requires permitting authorities to include requirements for implementing the long-term control plan, and to include a schedule to carry out the plan, in an appropriate enforceable mechanism. Enforceable mechanisms include a NPDES permit or an administrative or judicial order, including consent agreements or consent decrees.[20] According to EPA officials, enforcement actions involving CSOs can be very complex and resource intensive and can take years of negotiation to resolve.

The *CSO Policy* states that enforcing compliance with NPDES permits that include long-term control plan implementation requirements (phase II NPDES permits) will mainly occur by incorporating the control plan through a civil judicial action, an administrative order, or other enforceable mechanism requiring compliance with the Clean Water Act.[21] It also states that such enforcement mechanisms should impose a compliance schedule with appropriate milestone dates necessary to implement the plan. The policy states that a judicial order is generally the appropriate mechanism for incorporating the CSO control plan and compliance schedule when enforcing compliance with long-term control plan requirements in Phase II permits. However, it acknowledges that administrative orders may be appropriate in certain circumstances. EPA and authorized states have also used NPDES permits to implement the *CSO Policy*'s long-term control plan requirements. In some cases, permits or orders include requirements to implement CSO projects on a compliance schedule without requiring development or approval of a long-term control plan. Options for enforceable mechanisms include

- **A NPDES permit.** One option for an enforceable mechanism is issuance of a NPDES permit to the municipality that requires development and implementation of a long-term control plan, including a construction and financing schedule. Municipalities' NPDES permits are generally valid for 5 years but can be continued until a new permit is issued. If a municipality does not implement the

[20]According to EPA officials, in this context, an appropriate enforceable mechanism allows EPA or an authorized state to impose additional sanctions, requirements, or both, if the municipality's failure to comply with the mechanism is a violation.

[21]The *CSO Policy* anticipates that the CSO requirements in each phase will be incorporated in NPDES permits.

specified controls or does not meet a deadline in the compliance schedule, EPA, or an authorized state, can take an enforcement action, such as bringing an administrative or a civil judicial lawsuit, to enforce the terms and conditions of the permit.

- **Administrative or judicial orders, including consent orders or consent decrees.** Another option that EPA or authorized states can use to require implementation of a long-term control plan on a compliance schedule is an administrative or judicial order or judicial decree. These orders or decrees are issued to resolve administrative or civil judicial enforcement actions. In many instances, the parties will negotiate an agreement to settle the action that results in issuance of an administrative consent order or judicial consent decree (consent agreements).[22] If they cannot reach agreement on how to resolve the enforcement action, then an administrative or judicial order could be issued. These orders require municipalities with CSOs to develop a long-term control plan and implement it in accordance with a compliance schedule, or take other specific actions to control CSOs, as appropriate. The consent agreements and administrative or judicial orders should include provisions for how they will be enforced, such as penalties for any violations of their terms and conditions.

Most Municipalities Have an Approved Long-term Control Plan and an Enforceable Mechanism in Place for Implementing their CSO Controls

Of the 738 NPDES permits issued to CSO municipalities nationwide, 629 (85 percent) include an approved long-term control plan, as shown in table 2.[23] This leaves 109 permits and their permittees (about 15 percent) that do not have approved control plans. Of these, 37 permittees have a control plan that has been submitted and is pending review by their permitting authority. EPA officials explained that this could be because the states did not implement or enforce the requirement to develop a long-term control plan until recently or had staffing issues that delayed the reviews. For example, the state of New Jersey had not issued NPDES

[22]For example, EPA may issue an administrative order, or negotiate with a municipality to agree on an administrative order on consent, that requires a municipality with CSOs to take certain actions—such as building retention tanks to help contain contaminated runoff—to comply with its NPDES permit. For a civil judicial enforcement action, the Department of Justice files a lawsuit in federal court on EPA's behalf.

[23]In the data provided to us by EPA, the agency tracks the status of long-term control plans by NPDES permit number, not by the number of municipalities with CSOs. Because municipalities may have multiple wastewater treatment plants with CSOs that each require their own NPDES permit, the number of municipalities and permits is not exactly the same. Our review found that of the 681 CSO municipalities, 40 municipalities have two or more NPDES permits. We use the number of permits for the rest of this section to track the information as provided to us by EPA. In addition, since 1992, about 170 permittees have separated their combined sewer systems and no longer require a long-term control plan to address CSO discharges, according to an EPA official.

permits requiring municipalities to develop long-term control plans until recently.

Table 2: Number of Combined Sewer Overflow (CSO) Permits with Long-Term Control Plans, as of June 2022

Long-term control plan status	Number of CSO permits	Percentage of total
Approved long-term control plan	629	85
Long-term control plan pending review	37	5
Long-term control plan not required[a]	14	2
Long-term control plan status unknown	8	1
CSO controls included directly in permit, consent decree, or order, no control plan	50	7
Total	**738**	**100**

Source: GAO summary of Environmental Protection Agency information. | GAO-23-105285

[a]This category includes those municipalities that have either separated their sewer systems, do not have CSO outfalls but direct flows to another permitted treatment facility with CSOs, or are exempt from the portions of the *CSO Policy*'s long-term control plan requirements.

In 14 instances, EPA information showed that a permittee may not have been required to develop a long-term control plan because it met one of the exceptions outlined in EPA's *CSO Policy*. These exceptions include where the municipality had already substantially completed construction of CSO control facilities, or had substantially developed or was implementing a CSO control program under an existing permit or enforcement order.[24] For example, the city of Rochester, New York, was not required to develop a long-term control plan because it had substantially completed construction and begun operation of a deep tunnel system in the early 1990s to reduce its CSO discharges.

EPA information showed that 50 permittees were not required to develop a long-term control plan, but had requirements to implement CSO controls included directly in their permit, or in a consent decree or order.

[24]Section 1.C of the *CSO Policy* recognizes that states and municipalities may have already undertaken extensive work to abate their CSOs prior to issuance of the policy in 1994. In these instances, some portions of the policy may not apply, such as initial long-term control planning requirements, as determined by their permitting authority on a case-by-case basis. The *CSO Policy* also provides that smaller communities with populations under 75,000 may not need to complete all of the steps in the policy for developing a long-term control plan, at the discretion of the permitting authority.

For the remaining eight whose control plan status is unknown, the information indicated that four were due to a state record-keeping issue, and the remaining four were required to develop control plans, but EPA did not have information on their status.

Separately, according to EPA data, as of June 2022, 96 percent of CSO permittees (711) have an enforceable mechanism in place that includes a schedule with dates and milestones for completion of CSO control measures, as shown in table 3.[25] Of these, 409 permittees have an enforceable schedule incorporated through the NPDES permit, and 302 have schedules incorporated through a federal or state order, or both. For the remaining 27 permittees, an enforceable schedule is either not required, or a long-term control plan is being developed.

Table 3: Number of Combined Sewer Overflow Permittees, by Type of Enforceable Mechanisms, as of June 2022

Enforceable mechanism	Permittee count	Percentage of total
Permit	409	55
Enforcement order (federal, state, or both)	302	41
Subtotal	711	96
None	27	4
Total	**738**	**100**

Source: GAO summary of Environmental Protection Agency information. | GAO-23-105285

EPA Has Focused Its Enforcement of the *CSO Policy* on Larger Municipalities

The majority of actions to implement and enforce compliance with the *CSO Policy* have been taken by states, while EPA has focused its enforcement on about 200 municipalities with the largest and highest-

[25]For many years, EPA's Office of Water used a metric called "water safe for swimming." This metric tracked whether a CSO permittee had an enforceable mechanism, including a permit or enforcement order, with specific dates and milestones, which required (1) implementation of a long-term control plan, which will result in compliance with the technology and water quality-based requirements of the Clean Water Act; (2) implementation of any other acceptable CSO control measures consistent with the *CSO Policy*; or (3) completion of separation after the baseline date (1992).

priority CSOs.[26] Generally, EPA's focus has included those CSO municipalities that serve more than 50,000 people, with sensitive areas such as beaches or shellfish beds, or in economically disadvantaged communities.[27] Many of EPA's efforts to address the largest CSOs have been through enforcement actions, such as administrative or civil judicial actions, as authorized by statute.[28] For example, according to OECA documentation, they currently have federal judicial consent decrees with 63 CSO municipalities that include schedules for implementation of their long-term control plans and associated CSO control projects.

In addition to these types of enforcement actions, EPA's compliance and enforcement strategies outline a number of options that EPA can take to determine compliance by municipalities with CSOs. One such action is the issuance of a Clean Water Act section 308 information request. According to OECA officials, EPA generally issues these requests as a means of gathering information about potential violations that could result in an administrative or civil judicial enforcement action.

The Clean Water Act also authorizes EPA to issue a notice of violation, which is similar to a warning letter and alerts a municipality that a violation has occurred. However, unlike notices of violation for other environmental statutes, such as the Clean Air Act or Safe Drinking Water Act,[29] the Clean Water Act does not require EPA to issue those notices before filing

[26]See Environmental Protection Agency, *Memorandum: Guidelines for Federal Enforcement in CSO/SSO Cases* (Washington, D.C.: Apr. 10, 2005). This memorandum outlined guidelines for federal involvement in CSO enforcement actions in authorized states. Specifically, EPA may determine that federal enforcement in authorized states in CSO cases is appropriate when one or more circumstances are present, including (1) significant environmental impact that has not been addressed, (2) CSO violations have occurred that may impact watersheds that cross state or international boundaries, (3) violations of EPA orders or consent decrees exist, and (4) a state requests that EPA take an enforcement action.

[27]According to EPA's national initiative to address discharges of raw sewage that was ended in fiscal year 2019, high-priority CSOs are those with discharges that impact sensitive areas, are located in environmental justice areas, or have a significant environmental or human health impact. The *CSO Policy* says that sensitive areas are determined by the permitting authority, in coordination with state and federal agencies, as appropriate, and include Outstanding National Resource Waters, National Marine Sanctuaries, waters with threatened or endangered species and their habitats, waters with primary contact recreation, public drinking water intakes or their designated protection areas, and shellfish beds.

[28]33 U.S.C. § 1319(a)(3), (b).

[29]42 U.S.C. §§ 7413(a)(1), 300g-3(a)(1)(B), 300h-2(a)(1).

an administrative or civil judicial enforcement action.[30] According to EPA officials, notices of violation have been used infrequently by EPA to address potential noncompliance related to CSO discharges.

In our review of data provided by EPA, we found that EPA has issued one notice of violation under the Clean Water Act to a CSO municipality, which was issued to the city of San Francisco in 2019.[31] However, although EPA officials provided an example of a notice issued to a municipality for other types of stormwater and wastewater violations, they said that their database could not readily identify whether other notices of violation that municipalities had been issued were specifically for CSO discharges.[32]

EPA officials told us that the agency has typically addressed noncompliance with a municipality's NPDES permit resulting from CSO discharges through judicial enforcement actions because of the cost and length of time needed to address such discharges. EPA officials told us that they typically would not initiate federal enforcement where an authorized state has taken timely and appropriate action to address

[30]EPA has authority to issue notices of violations pursuant to Clean Water Act section 309(a)(1) when it has information indicating an alleged violation of a state-issued NPDES permit. 33 U.S.C. § 1319(a)(1). These notices are issued to an authorized state and permittee. If the state has not commenced an appropriate enforcement action within 30 days of receiving the notice, EPA can issue an administrative order or bring a civil judicial enforcement action. EPA also has authority to issue to states notices of violation pursuant to Clean Water Act section 309(a)(2) when the violations of a state-issued NPDES permit are so widespread that such violations appear to result from a failure of the state to enforce permit conditions. 33 U.S.C. § 1319(a)(2).

[31]According to EPA officials, the agency has issued notices of violation to municipalities for stormwater and wastewater violations, such as in Andrews, South Carolina, in 2015.

[32]As we recently reported, EPA's national database does not consistently include complete data to determine how many of these types of actions were taken by EPA regions or states over the years. See GAO, *Environmental Protection: Additional Action Needed to Improve EPA Data on Informal Enforcement and Compliance Assistance Activities,* GAO-20-95 (Washington, D.C.: Jan. 31, 2020). We recommended that EPA's OECA should clearly document in guidance to the regional offices how they should use the definition of informal enforcement actions to collect data on these actions and that they should collect data on compliance assistance activities and specify which mechanism to use to maintain the data. These recommendations remain open, as of November 2022.

potential violations unless environmental impacts remain unaddressed or the state requests federal involvement.[33]

EPA officials also told us that when the agency enters into a consent decree with a municipality to implement CSO controls, the specific violations addressed by the consent decree are resolved. Further, EPA reserves the right to initiate administrative or judicial proceedings to enforce subsequent violations of the consent decree or the Clean Water Act. However, if certain violations occur, or the municipality fails to meet the scheduled milestones, then outstanding issues are typically addressed through agreed-upon penalty provisions in the decree. In addition, federal action may not be necessary where the state has issued notices of violation or taken other action to address violations related to CSO discharges.

Selected Municipalities Are at Different Points in Implementing Control Plans and Efforts; Some Face Challenges That May Delay Completion

The 11 selected municipalities we reviewed are at different points in implementing their long-term control plans and similar CSO control efforts.[34] We found that while some of the municipalities have completed construction of projects in their long-term control plans or similar CSO control efforts, all of them have faced challenges in addressing CSOs, and some are extending the deadline for completion of their plans as a result.[35]

Selected Municipalities Are at Different Points in Implementing Their CSO Control Efforts or Long-Term Control Plans

Of the 11 selected municipalities, two have completed their construction work or are near completion, and one is in litigation over whether it must update its long-term control plan. The remaining eight municipalities are still working on implementing the CSO control projects in their long-term control plans. Some of the selected municipalities began constructing and

[33]We did find some instances of warning letters or notices of violations issued by authorized states to municipalities in the last 5 years, such as Detroit, Michigan, for violations due to CSO discharges.

[34]We use the term “long-term control plan” to refer to both a long-term control plan and similar plans to address CSOs.

[35]See app. II for more information about the individual municipalities in our sample and their efforts to address CSOs.

implementing their CSO controls before the *CSO Policy* was issued in 1994 or before their long-term control plan were approved. See table 4.

Table 4: Status and Summary of Time Frames for Selected Municipalities to Address Combined Sewer Overflow (CSO) Controls, as of October 2022

Municipality	Year CSO planning or control efforts initiated[a]	Status of CSO planning and control efforts	Year of planned or actual completion of CSO control efforts[b]	Number of years designing and building CSO controls	Years remaining to reach planned completion date for CSO control efforts	Total years to complete planned CSO control efforts
Cincinnati, Ohio	1996	Ongoing	To be determined (TBD)[c]	26	TBD	**TBD**
Cumberland, Maryland	1994	Ongoing	2023	28	1	**29**
Detroit, Michigan	1977	Ongoing	2037	45	15	**60**
Harrisburg, Pennsylvania	2001[d]	Ongoing	2038	21	16	**37**
Kansas City, Missouri	2007	Ongoing	2040	15	18	**33**
Morgantown, West Virginia	2000	Ongoing	2035	22	13	**35**
Nashville, Tennessee	1988	Ongoing	2031	34	9	**43**
Oswego, New York[e]	2003	In postconstruction; monitoring	2021	18	0	**18**
Portland, Oregon	1990	Completed	2011	21	0	**21**
San Francisco, California	1967	Subject to litigation[f]	1997	30	—	**30**
Springfield, Massachusetts	1988	Ongoing	2031	34	9	**43**
Average					12	**35**

Source: GAO analysis of documentation collected from selected municipalities. | GAO-23-105285

[a]This year was determined using either the year that the municipality began planning, implementing, or constructing its CSO control efforts, which may have preceded development of a long-term control plan, or when the municipality first submitted a long-term control plan to the state or the Environmental Protection Agency (EPA) for review.

[b]This year was determined using the actual date that the municipality completed constructing its selected set of CSO controls or the date that it plans to complete construction based on the schedule in its long-term control plan, permit, or other enforceable mechanism, as of October 2022.

[c]Cincinnati is currently negotiating with EPA on the scope and schedule for the second phase of CSO projects under its long-term control plan. A completion date has not yet been set.

[d]A long-term control plan was approved in 2006; however, EPA and the state subsequently determined that the 2006 long-term control plan was inadequate to comply with the *CSO Policy* and filed an enforcement action in federal court alleging violations of the Clean Water Act and its National Pollutant Discharge Elimination System permit that resulted in a partial consent decree in 2015. The city did not implement the 2006 plan. Harrisburg also submitted a long-term control plan in 2008 to the state, which was later found to be inadequate so it was not implemented either. Harrisburg's 2015 partial federal consent decree required Capital Region Water to develop and submit a revised and

updated control plan by April 1, 2018. As of November 2022, EPA and the state permitting authority had not approved the control plan, and negotiations continue among the parties to the lawsuit on a timeline for submission and approval of a revised control plan.

[e]We focused on the efforts to address CSOs related to its west-side system that was subject of the 2010 federal consent decree. The consent decree required the city to implement specified projects to control CSOs on the west side of the city by November 1, 2021. The city's west-side system is in postconstruction compliance monitoring to verify compliance with water quality standards and determine the effectiveness of CSO controls. The city's CSOs associated with its east-side system were addressed separately through state enforcement actions.

[f]San Francisco began development of plans to control CSOs in 1967 and completed construction of its CSO controls under these plans in 1997. In 2019, EPA and the state permitting authority issued a permit for the city's Oceanside system that required the development and submission of an updated long-term control plan. In January 2020, the city filed a petition with the Environmental Appeals Board requesting review of this requirement, among other things. The board denied the city's petition in December 2020 and, in February 2021, the city filed an appeal with the U.S. Court of Appeals for the Ninth Circuit. As of December 2022, the case was still pending.

Specifically, the two municipalities that have completed their construction work or are near completion are Portland, which has completed implementation of its long-term control plan, and Oswego, which has completed constructing its CSO controls and is monitoring their effectiveness. These municipalities continue to operate and maintain their systems while they conduct monitoring of water quality to ensure that the controls are working. For example, Portland completed its long-term control plan in 2011. The city, in 2012, reported to the state of Oregon that its postconstruction monitoring had demonstrated that its CSO controls were effective in achieving compliance with water quality requirements. The municipality's permit requires a status report to the state on the CSO program by April 30, 2025, along with other annual reporting requirements on its performance in controlling CSOs.

The third municipality, San Francisco, completed construction in the 1990s of initial CSO control projects it planned in the late 1960s. However, San Francisco is in litigation over whether it must update its long-term control plan. In 2019, EPA and the state permitting authority issued a permit that required the city to develop an updated control plan. In 2020, the city filed a petition challenging this permit requirement, among other things, with EPA's Environmental Appeals Board. The board upheld the requirement to update the long-term control plan, among other things. The board found that when EPA and the state renewed the city's permit in 1997, they determined that the city did not need to comply with the *CSO Policy*'s initial long-term control planning and construction requirements. This was because the city had substantially completed construction of its planned CSO controls and was well into the process of

reducing wet weather discharges from its combined sewer system.[36] However, San Francisco has challenged EPA's authority to require the long-term control plan to be updated, among other things, in the U.S. Court of Appeals for the Ninth Circuit. As of December 2022, that case was still pending.[37]

The eight remaining municipalities in our selected sample have ongoing CSO control efforts through pending, partially approved, or approved long-term control plans (see table 5).

Table 5: Status of Long-Term Control Plans or Similar Planning Efforts for Selected Municipalities, as of October 2022

Municipality	Year control plan initially submitted to state or EPA[a]	Year initial control plan approved by state or EPA	Control plan or other planning document's initial planned or actual completion date[b]	Year of most recent control plan revision	Revised control plan completion year	Current control plan status
Cincinnati, Ohio	1996	2010	2022	2018	To be determined	Pending
Cumberland, Maryland	1998	1998	2000	2006	2023	Approved
Detroit, Michigan	1996	1997	2012	2011	2037	Approved
Harrisburg, Pennsylvania	2006	2006	2014	2018	2038	Pending[c]
Kansas City, Missouri	2007	2010	2035	2021	2040	Approved
Morgantown, West Virginia	2000	2002	2020	2014	2035	Pending
Nashville, Tennessee	2002	—	2023	2020	2031[d]	Partially approved
Oswego, New York[e]	2003	—	2021	—	—	In postconstruction monitoring
Portland, Oregon	1994	1995	2011	2001	—	Completed
San Francisco, California	N/A[f]	—	1997[g]	—	—	Subject to litigation[h]
Springfield, Massachusetts	2000	2004	2009	2014	2031	Partially approved[i]

Legend: not applicable (N/A); information not available (—)

Source: GAO analysis of documentation collected from selected municipalities | GAO-23-105285.

[a]The date in this column refers to when the municipality submitted a long-term control plan, or other similar planning documents, to its permitting authority.

[36]*In re City and Cnty of San Francisco*, 18 E.A.D. 322 (EAB 2020). The Environmental Appeals Board also found that in subsequent permit renewals until 2019, San Francisco's "existing plan was deemed to satisfy the requirements of the [*1994 CSO Control Policy]*."

[37]*City and Cnty of San Francisco v. Env't Protection Agency,* No. 21-70282 (9th Cir.).

[b]This is the initial date that the municipality planned to complete constructing the combined sewer overflow (CSO) controls in its initial long-term control plan or similar planning efforts, or the date that the construction of the controls were actually completed as of October 2022.

[c]Harrisburg's 2015 partial federal consent decree required Capital Region Water to develop and submit a long-term control plan by April 1, 2018. Capital Region Water submitted a control plan with a proposed completion date of 2038. However, as of November 2022, the Environmental Protection Agency (EPA) and the state permitting authority had not approved the control plan, which was submitted in 2018 and negotiations continue among the parties to the lawsuit on a timeline for submission and approval of a revised control plan.

[d]In a 2020 letter, EPA partially conditionally approved Nashville's revised long-term control plan and disapproved parts of it. The partial approval was contingent upon the city submitting a revised control plan within 4 years to bring two specific outfalls into compliance with the state's water quality standards and completing all remedial measures in the revised and approved control plan within 11 years, which is December 8, 2031.

[e]Oswego submitted an initial long-term control plan for its west-side system in 2003, which was subsequently revised several times but it was not approved by the permitting authorities. In 2010, it entered into a federal consent decree with EPA that required the city to construct certain CSO controls on the west side of the city.

[f]Unlike most other long-term control plans, the city did not develop a single document but instead refers to a compilation of planning and engineering studies prepared during the 1970s through the 1990s as its "long-term control plan." These documents were never submitted to EPA as a long-term control plan. EPA's Environmental Appeals Board found that the EPA regional office and state permitting authority determined that San Francisco did not need to comply with the initial planning and construction requirements of the *CSO Policy* when they issued the city a National Pollutant Discharge Elimination System permit in 1997 because the city was well into the process of reducing wet weather discharges from its combined sewer system.

[g]San Francisco began its CSO control efforts in 1967 and had substantially completed construction of its planned CSO controls in 1997, 3 years after EPA issued its *CSO Policy*.

[h]In 2019, EPA and the state permitting authority issued a permit for the city's Oceanside system that required the development and submission of an updated long-term control plan. In January 2020, the city filed a petition with the Environmental Appeals Board requesting review of this requirement, among other things. The board denied the city's petition in December 2020 and, in February 2021, the city filed an appeal with the U.S. Court of Appeals for the Ninth Circuit. As of December 2022, the case was still pending.

[i]The city's long-term control plan was submitted to EPA Region 1 as the permitting authority for Massachusetts. As of October 2022, the region had not fully approved the city's initial or revised long-term control plan, but has issued a series of administrative orders beginning in 2004 requiring implementation of selected CSO control projects.

The process to develop, approve, revise, and complete CSO controls is a complex, time-intensive effort. We found that the time it has taken, or will take, for municipalities in our sample to negotiate, plan for, and implement CSO control efforts either through a long-term control plan, or similar plans, will be decades. Specifically, the 11 municipalities in our sample took, or are planning to take, an average of 35 years to plan for and fully implement their planned CSO control efforts (see table 4). For example, Cincinnati submitted its initial long-term control plan to the state permitting authority for approval in 1996. In 1999, the city began negotiations with EPA and the state of Ohio. It reached agreement on actions needed to address its CSOs and other wastewater issues in 2004 and entered into a federal consent decree that required the city to submit an updated long-term control plan. In 2010, the plan was approved.

Of those eight municipalities in which implementation of a long-term control plan is ongoing, the planned completion dates range from 2023 to 2040, with an average remaining time to complete them of at least 12 years. For example, Detroit is revising its long-term control plan with a planned completion date for CSO control projects by 2037. However, we found that ongoing issues may affect projected time frames for some municipalities. Cincinnati, for example, currently does not have a fixed completion date because it has not reached agreement with EPA on the scope and schedule of CSO control projects to be completed in the second phase of its control plan.

In our sample, we also found that several of the municipalities have revised their long-term control plans at least once. For example, Detroit has updated or revised its control plan five times since 1996 because of scope of work or financial changes. Starting in 1996, Detroit started to plan construction of a tunnel near the Rouge River to increase storage capacity of combined sewer and stormwater flows for treatment at an estimated cost of $880 million. However, Detroit cancelled the project in 2009, after the city began experiencing financial duress, among other reasons. The 2010 long-term control plan update reflected new, lower-cost alternatives, such as green infrastructure projects.

Selected Municipalities Faced Challenges Implementing Their CSO Controls and Several Have Extended Completion of Their Long-Term Control Plans; EPA Has Provided Additional Guidance

Each of the 11 municipalities in our sample faced challenges in addressing CSOs. The key challenges include addressing financial affordability, achieving compliance with water quality standards, and adapting to climate change. Several of the municipalities have worked with EPA and authorized states to extend the time frames for completing their long-term control plans as a result of one or more of these challenges. EPA officials recognize that municipalities with CSOs face challenges and are working on developing additional guidance and other tools to help address these concerns.

Addressing Financial Affordability

The first challenge faced by all of the municipalities is addressing the financial affordability of CSO controls. The affordability of CSO controls includes the costs of constructing and maintaining the selected control technologies and projects needed to achieve the goals selected, which impact both the utility and the individual ratepayer. The *CSO Policy* recognized that financial considerations are a major factor affecting

municipalities' implementation of CSO controls.[38] Under EPA guidance, cities or utilities with a high financial burden are generally expected to construct CSO control projects within 15 to 20 years.[39] The municipalities can use the percentage of median household income that would be spent on CSO controls as a measure to assess the impact to ratepayers when implementing the long-term control plan.[40]

We found examples of this in our sample:

- Morgantown's NPDES permit required it to develop a long-term control plan, which was initially submitted for review in 2000 and was approved by the state in 2002. The 2002 control plan included a planned completion date of 2020; however, because of costs and affordability concerns, the municipality has completed only a few of the projects that it planned initially at a total cost of over $105 million, according to city officials.
    - For example, Morgantown planned for expansion of its Star City Wastewater Treatment Plant to be completed in 2010 but finished the project in 2022. City officials that explained the delay was primarily due to affordability issues. In the city's analysis, the costs to fully implement the control plan would require an increase in the rate paid by some residential customers from $17 to $32 per month.

[38]However, the policy says that a permittee is ultimately responsible for aggressively pursuing financial arrangements for the implementation of its long-term control plan. When developing a long-term control plan, a financial capability assessment is used to help develop an implementation schedule under both permits and enforcement agreements that achieves compliance with the Clean Water Act as soon as practicable. In developing these schedules, EPA considers a municipality's local financial challenges, along with many other factors, such as environmental justice and public health impacts.

[39]Environmental Protection Agency, Office of Water and Office of Wastewater Management, *Combined Sewer Overflows—Guidance for Financial Capability Assessment and Schedule Development* (Washington, D.C.: February 1997). The guidance was supplemented by additional guidance in 2014. Environmental Protection Agency, Office of Water and Office of Enforcement and Compliance Assurance, *Financial Capability Assessment Framework for Municipal Clean Water Act Requirements* (Washington, D.C.: Nov. 24, 2014).

[40]The guidance provides for a two-phase approach to assess a city's or utility's financial capability based on (1) the combined impact of wastewater and combined sewer overflow control costs on individual households (residential indicator); and (2) the debt, socioeconomic, and financial conditions of a city or utility (financial capability indicator).

- Morgantown revised its control plan in 2014 to extend the dates for completion of construction to 2035. However, again, the utility's financial analysis concluded that implementing the CSO control projects needed to achieve the goal of an 85 percent reduction by 2035 would be unaffordable according to state standards and require rate increases of around 4 percent of median household income.[41] Therefore, the municipality decided to implement a selected set of projects in the near term, while delaying the start dates of others until funding could be obtained or plans revised further.

- Kansas City reached an agreement with EPA on a third modification to its consent decree in 2021. According to city officials, one reason why the city proposed modifications to the agreement was to reduce the financial burden on ratepayers to pay for the construction projects needed to achieve the specified performance levels on the existing schedule.
  - In its revised 2012 long-term control plan, the city estimated that costs to complete the plan over a 25- to 33- year time frame would require wastewater rates to increase by nearly quadruple over the first 13 years of the plan, or roughly equivalent to 1.7 percent of median household income.
  - The municipality's 2021 consent decree modification adopted a new adaptive management approach for implementing the remainder of its CSO controls, including developing 480 acres of green infrastructure projects to increase system storage and improve water quality in lieu of constructing tunnel storage projects originally planned for completion by 2035. City officials estimate that the change to green infrastructure will lower the projected costs for CSO controls through 2040 by over $2 billion.
  - This third modification to the consent decree also required Kansas City to develop a plan with further measures by the end of 2032 to identify any additional or revised control measures that the city determines are necessary to achieve no less than 85 percent capture of wet weather flows by the end of 2040. In addition, the third modification also extended the completion date of the long-term control plan from 2035 to 2040.

[41]According to the Morgantown long-term control plan, it interpreted state policy as establishing 1.5 to 1.75 percent of median household income as an "affordability ceiling," so that the costs to invest in CSO reductions should not exceed this threshold.

- Harrisburg chose to delay routine maintenance of its sewer system for decades, primarily due to budget deficits, according to city officials. This backlog, in addition to the city's bankruptcy and other challenges, created significant infrastructure problems that the proposed 2018 long-term control plan had to consider and pay for, while also accounting for the construction of new CSO control projects. The financial planning approach in the proposed long-term control plan was to maintain wastewater rates at no more than 2 percent of median household income and to set a limit on the level of funds to be invested in the plan over the next 20 years; however, the impact on residents' rates in some areas would exceed 3 percent. And, because of the roughly $215 million in funding needed to first be spent on updating its aging infrastructure, this would limit funding for new CSO control projects to about $100 million over the next 20 years. As of November 2022, the planned completion date of the proposed 2018 long-term control plan is uncertain because EPA has not yet approved it.[42]

By extending their schedules for completing their control plan implementation, the municipalities are choosing to delay addressing CSO discharges, which, if addressed, could improve water quality. EPA officials noted that delays in compliance with the Clean Water Act allow for longer periods of raw sewage overflows that introduce a variety of harmful pollutants, including disease causing organisms, metals and nutrients, and can contribute to disease outbreaks, beach and shellfish bed closings, flooding, stream scouring, fishing advisories, and basement backups of sewage. Officials from a few of the municipalities we spoke with recognize this trade-off. However, officials from other municipalities added that in some situations the financial constraints associated with addressing CSO issues in their communities necessitate the delay.

EPA has taken some steps to address CSO municipalities' financial affordability concerns. Specifically, in February 2022, EPA proposed a

[42]The 2015 partial consent decree required the submission of a revised long-term control plan by April 1, 2018 for approval. While Capital Region Water, the city's utility, submitted a proposed control plan in March 2018, it was not approved by EPA. The parties informed the court in February 2018 that they anticipated another round of negotiations after submission of this control plan before all remaining claims in the lawsuit could be resolved. As of November 2022, a long-term control plan had yet to be approved, and the parties are negotiating a modification to the consent decree. A deadline for approval of the 2018 proposed control plan has not been established.

revision to its financial capability assessment guidance.[43] The proposed guidance allows municipalities to submit more consistent and comprehensive information that is relevant to the entire community's capability to fund Clean Water Act control measures and programs. It proposes two alternative approaches for assessing a municipality's financial capability to carry out these measures. The first approach is an expansion of the existing guidance, with additional consideration of the lowest quintile income and poverty in the service area.[44] The second approach is the development of a dynamic financial and rate model that looks at the impacts of rate increases over time on utility customers.

The proposal sets forth implementation schedule benchmarks of 20 or 25 years for those municipalities that demonstrate high or unusually high impacts, respectively, although both approaches may support an extended implementation schedule. The proposed revision says that EPA does not intend to provide extended compliance schedules until the community demonstrates that it has taken all feasible steps to reduce or mitigate the financial impact of water service costs on the lowest quintile households and to achieve compliance as expeditiously as possible.[45] This is because potential tools, such as customer assistance programs, enable shorter compliance schedules by increasing total spending on compliance without burdening low-income customers.

In addition, in 2012, EPA developed an integrated planning framework that offers municipalities a voluntary option to develop a plan that meets multiple Clean Water Act requirements and balances competing funding

[43]87 Fed. Reg. 10193 (Feb. 23, 2022).

[44]EPA proposed two options to assess the severity and prevalence of poverty in a community's service area to distinguish between communities with similar median household income but different levels of poverty. EPA intends to finalize only one of the options.

[45]The proposal is being revised in response to public comments and to allow a community to demonstrate that it has taken or is pursuing feasible steps to lower costs of compliance, reduce, or mitigate the financial impact of water service costs on the community's low-income households, and to achieve compliance as expeditiously as possible.

priorities.[46] EPA officials explained that while the municipalities would still be expected to implement the CSO controls selected in their long-term control plans and achieve the same level of performance, integrated planning allows municipalities the opportunity to sequence their infrastructure investments for stormwater and wastewater infrastructure while working toward achieving compliance with water quality standards. Officials also stated that it affords an opportunity to use an adaptive approach to adjust the planned set of CSO controls and schedules based on updated information and results from completed projects.

As of 2021, about 30 municipalities, including Harrisburg and Springfield from our selected sample, have pursued this approach and incorporated CSO projects from their long-term control plans into their new integrated plans. As of June 2022, EPA officials stated that the agency is developing guidance to clarify the flexibilities available to municipalities after they complete the postconstruction monitoring phase, including the option to develop integrated plans. Office of Water officials also stated that they are actively working with EPA and state permitting authorities to develop a toolkit that supports incorporating integrated planning in NPDES permits.

Achieving Compliance with Water Quality Standards

A second challenge cited by five of the municipalities is meeting requirements based on state water quality standards as they implement and near completion of their long-term control plans or other CSO control plans. We found examples of this in our sample:

- Detroit is currently capturing and treating over 95 percent of the municipality's CSO discharges after over 40 years of planning and funding large investments through various court orders and long-term control plans. However, state law prohibits discharges of untreated or partially treated sewage into waters of the state. Utility officials told us that they are questioning whether the investment to capture and treat the remaining percentage of CSO discharge would be better used in other control efforts, such as flood mitigation. As they work on developing a revised long-term control plan for late 2022, they told us

[46]Integrated Planning is a process that municipalities can use to achieve clean water and human health goals while addressing aging infrastructure, changing population and rainfall patterns, and competing funding priorities. In 2019, the Water Infrastructure Improvement Act amended the Clean Water Act to, among other things, allow NPDES permits to integrate all requirements under the Clean Water Act in an integrated plan, including requirements related to combined sewer overflows, and to include a schedule of compliance to meet any applicable water quality-based effluent limitation over more than one permit term, in certain circumstances. Pub. L. No. 115-436, § 3, 132 Stat. 5558 (2019) (codified at 33 U.S.C. § 1342(s)).

that they want to pursue low-cost, high-impact projects that improve water quality and advance CSO control. The revised control plan to address high-priority CSO projects has a completion date of 2037.

- According to Nashville officials, the volume and frequency of CSO discharges to the Cumberland River have been reduced to a level that would meet the criteria of the *CSO Policy*'s presumption approach. However, EPA regional officials stated that the policy requires that municipalities that have completed their CSO controls must demonstrate compliance with water quality standards through postconstruction monitoring, and the standards would not be met under the city's existing plan. Nashville officials corresponded with EPA about approval of their updated long-term control plan and the agency's conclusion that the city would likely not meet applicable water quality standards without further levels of control or revisions to the standards. The officials told us that they have been implementing CSO control projects from the city's partially approved control plan as the city awaits a decision on the state's proposed revision to water quality standards related to certain pathogens such as *E. coli*. This decision, which also needs EPA approval, has delayed EPA's final approval of Nashville's control plan and extended its anticipated completion date to 2031 at the earliest.

According to the *CSO Policy*, EPA regulations and guidance provide states with the flexibility to adapt their water quality standards and implementation procedures to reflect site-specific conditions, including those related to CSOs. In reviewing the attainability of their water quality standards and the applicability of their implementation procedures to CSO-impacted waters, the policy outlines several options for states to consider. For example, in determining whether a designated use is attainable or can be removed, a state must conduct and submit to EPA a use attainability analysis. As part of this analysis, states should evaluate whether the designated use could be attained, if CSO controls were

implemented.[47] To date, according to EPA officials, few states have used this assessment because it can be a costly and time-intensive process. [48]

Indiana is one example of a state that has revised its water quality standards to reflect site-specific CSO conditions. In 2019, the state proposed a rule to establish a water quality standard for certain waters in the city of Indianapolis during wet weather.[49] The proposed rule establishes water quality-based requirements for wet weather that apply for not more than 4 days after CSO discharges end instead of the standards that normally apply to protect recreational use. The state and EPA agreed that requiring the city to invest in further CSO controls than what it had achieved through its long-term control plan implementation would not be cost-effective, given other water quality needs. The state finalized the rule in May 2020 and EPA approved the state's revision to its water quality standards in July 2020.

EPA officials said that in the next few years, an increasing number of municipalities should enter the postconstruction compliance monitoring phase as they complete construction of their CSO controls in their long-term control plans. The officials acknowledged that questions have been raised by some CSO municipalities about whether they will need to take steps to control their CSOs to meet water quality standards beyond what was identified and agreed to in their original long-term control plans. EPA officials said that they have set up a work group with states and

[47]A use attainability analysis is a structured scientific assessment of the six factors affecting a designated use described in 40 C.F.R. § 131.10(g). The state must conduct the analysis and submit it to EPA in certain circumstances, such as when the state designates a use that is not included in the Clean Water Act for the first time or wishes to remove a designated use that is included in the Clean Water Act.

[48]Another option is for a state to establish a variance for the applicable water quality standard, although the *CSO Policy* says such variance are appropriate in limited circumstances on CSO-impacted waters. A CSO variance is a short-term modification in water quality standards for a set period of time. A variance allows municipalities to make incremental progress towards water quality goals without changing the long-term desired condition (i.e., waterbody's designated use). For example, this is the approach the state of Tennessee is using to revise its water quality standard for *E. coli* and determining compliance with the standard that has been an issue in EPA approving Nashville's long-term control plan.

[49]Specifically, the proposed rule would change the recreational use designation for specified waters in the city of Indianapolis receiving combined sewer overflows during wet weather because the city performed a use attainability analysis and is implementing an approved long-term control plan.

municipalities to explore options to clarify how compliance with water quality standards will be achieved.

Adapting for Climate Change Impacts

Another challenge raised by five of the municipalities is the need to plan and adapt to the impacts of climate change. While this challenge has not yet extended any of their long-term control plan completion dates, it is unclear how climate change will affect their CSO control efforts. For examples, officials from Cumberland told us that they are uncertain how increasingly severe weather will affect constructed CSO infrastructure. Further, officials from Detroit described receiving unprecedented rainfall levels, at greater frequency, which has led to an increase in flooding events within the city and impacts how the municipality considers future CSO control efforts.

Officials in a few municipalities are engaged in efforts to address climate change. For example, officials from Springfield stated that they are updating the models they use to better plan for increased weather variability in the future.[50] San Francisco is also evaluating how climate change will affect its CSO controls. As part of its efforts, the city evaluated the potential impacts of sea level rise on its CSO outfalls and installed backflow prevention structures on those it found to be vulnerable.

EPA's Creating Resilient Water Utilities Initiative helps utilities to increase their resilience to climate change. As part of the initiative, EPA developed the Climate Resilience Evaluation and Assessment Tool, a web-based application to assist drinking water and wastewater utilities in understanding potential climate change impacts and assessing the related risks to their systems. In 2016, EPA also published its *Framework for Protecting Public and Private Investment in Clean Water Act Enforcement Remedies*, which states that it is reasonable and appropriate for EPA and courts to take into account and address the impact of climate change on water quality and compliance in administrative or judicial enforcement actions. EPA officials told us that the agency is currently working on updating this framework.

[50]Under EPA guidance, municipalities use a "typical year" when developing their long-term control plan to help model and plan for events. A typical year is usually determined by reviewing the annual averages for precipitation over a number of years.

EPA Does Not Demonstrate or Report on Progress in Implementing Long-Term Control Plans or Improvements to Water Quality from CSO Control Efforts

EPA collects some information on the status of long-term control plans and water quality improvements resulting from them but does not track or assess municipalities' progress in implementing CSO controls nationwide, according to officials. We found that the agency does not currently have any performance goals or measures related to long-term control plan implementation or reducing CSOs, which would allow it to track and assess progress. EPA regulations require submission of some information on the status of control plan implementation and CSO discharges in its national database by the end of 2025, which could be used to track and assess the status of CSO control plans and their water quality impacts and, therefore, to demonstrate progress in reducing CSOs. EPA could use this information to report on progress; however, to date, the agency has reported twice on nationwide progress to control CSOs, mostly recently in 2004.

EPA Lacks Information Needed to Demonstrate Nationwide Progress toward Implementing Long-Term Control Plans or Water Quality Improvements Resulting from CSO Control Efforts

EPA regions and authorized states oversee individual municipalities with CSOs and collect some information on the status of their long-term control plans, but EPA does not obtain, aggregate, and analyze information that would allow it to track the implementation status of these plans. Similarly, some EPA regions and authorized states collect limited information on water quality related to CSO discharges, such as the number of annual CSO discharges. EPA has used this information to make limited assessments of improvements.

Tracking the Status of Long-Term Control Plans

We were not able to obtain consistent information from EPA on the status of long-term control plans across all CSO municipalities. Such information could include whether a long-term control plan is required and approved, if the plan is being implemented, and the year that the plan and controls will be completed.[51]

EPA headquarters officials said that they have periodically obtained some data, but they have not collected consistent information on the status of long-term control plans nationally. For example, through national-level efforts, EPA collected the following two sets of data, but neither set

[51]We were able to collect some information from EPA regions on the status of long-term control plans in their parts of the country. Some regions collect information, including whether a municipality was required to develop a long-term control plan and if the control plan was approved. Other regions also tracked how the control plans were required, such as by a federal consent decree or administrative order. However, because of inconsistencies in the way the regions collected the information, we could not aggregate it to show the status of long-term control plans nationwide.

provided complete information about the implementation status of control plans nationwide. Previous data included:

- **Enforceable schedule dataset.** From 2012 through 2017, EPA's national water program guidance included a measure to track whether CSO municipalities had an enforceable schedule in place to implement a long-term control plan, or similar set of controls, as required by the *CSO Policy*.[52] However, EPA did not track additional information on the status of the long-term control plans, such as the current plan implementation status or planned completion date. According to EPA officials, the agency discontinued using the enforceable schedule measure in 2017. Agency documentation shows that data EPA collected demonstrated that over 90 percent of CSO municipalities with NPDES permits had some enforceable schedules in place for long-term control plan implementation.
- **Subset of about 200 large municipalities.** From 1998 through 2019, OECA's enforcement efforts focused on roughly 200 large municipalities, and it collected limited information on the actions taken to address CSOs. As part of this effort, regions were required to report annually on the status of actions to address CSOs in larger municipalities, including the number of approved long-term control plans with enforceable schedules.[53] EPA discontinued the initiative in 2019 because it determined that the goals of this effort had been achieved, according to officials.

EPA has pursued some indicators of progress of its *CSO Policy*. For example, it has a long-term strategic goal to improve the water quality in a number of watersheds per year, according to its *Strategic Plan 2022-2026*. The plan refers broadly to actions to resolve problems with sewer overflows. However, EPA officials told us they do not currently have a performance goal or measures to track each municipality's long-term control plan implementation status or nationwide actions taken to control CSOs, although the agency identified the need to have such goals and measures in 1998 and again in 2001.[54] A 1998 memorandum on long-

[52]The measure was tracked under the Office of Water's "Safe for Swimming" initiative.

[53]The agency tracked information on actions taken to address large CSOs from 1998 through 2019 as part of OECA's national initiative, "Keeping Raw Sewage and Contaminated Stormwater Out of Our Nation's Waters."

[54]See Environmental Protection Agency, *Memorandum on Implementation of the CSO Control Policy* (Washington, D.C.: May 19, 1998) and Environmental Protection Agency, *Implementation and Enforcement of the Combined Sewer Overflow Control Policy* (Washington, D.C.: December 2001).

term control plan implementation outlined the agency's effort to measure the CSO program's performance. Specifically, the agency developed a pilot performance plan to track the implementation status of the *CSO Policy*. According to the memorandum, the plan included performance measures, such as the number of control plans developed and the reduction in the frequency, volume, and adverse water quality impacts of CSO events.

EPA officials said that they did not continue using the goal and measures from the pilot program because they expected that showing progress from implementing CSO controls would take a long time and that the information needed to demonstrate any progress would not be available until the controls were operational. Specifically, building the large pipelines and infrastructure needed to control CSOs could take decades. Instead, officials told us that because states and municipalities' efforts to implement the policy were slower than expected, they focused on educating and assisting municipalities to expedite the development of their long-term control plans.

However, even though it has determined that almost all municipalities have enforceable mechanisms in place, EPA has not developed a performance goal or associated measure to track the status of municipalities' implementation of their long-term control plans or other agreements.[55] We have previously reported that effective performance management involves defining long-term goals for what a program is trying to achieve, along with performance goals and measures that allow progress to be assessed. In performance assessment, a performance goal establishes the specific results that an agency expects its program to achieve in the near term. A performance measure is the concrete,

[55]A 2015 Environmental Protection Agency Office of Inspector General's report recommended that EPA develop goals and measures related to CSO consent decrees in part to help demonstrate if desired water quality improvements are being met. To date, the agency has not implemented the recommendations. See Environmental Protection Agency, Office of Inspector General, *EPA Needs to Track Whether Its Major Municipal Settlements for Combined Sewer Overflows Benefit Water Quality,* Project No. 15-P-0280 (Washington, D.C.: Sept. 16, 2015).

objective, observable condition that allows an agency to assess progress made toward achieving the goal.[56]

Officials said that they do not plan to establish a performance goal and measure for long-term control plan implementation, although they acknowledged the importance of tracking implementation status in the 1998 memorandum, which said that EPA headquarters would continue to track progress in the development of long-term control plans, consistent with the *CSO Policy*. Officials said that they do not yet have consistent information to develop a goal and measures. However, officials could identify a goal and measure and then collect or correct the necessary data.

EPA expects to have some nationwide information on long-term control plans in its national database by late 2025 under its electronic reporting rule. The information will include the dates that a permitting authority approved the most current version of a municipality's long-term control plan, whether a municipality has an enforceable schedule in place to complete the control plan and CSO controls, and the actual date that the permit holder completed construction and implementation of the control plan and CSO controls. EPA officials said that potential uses for the data include program oversight, data analysis, reporting, and policy and guidance development. However, without developing a performance goal and measure to track and assess municipalities' control plan status, EPA will not be able to obtain consistent information and demonstrate municipalities' progress in implementing their long-term control plans over time.

Tracking Improvements to Water Quality

We also found that EPA requires the collection of some data from CSO municipalities on water quality related to their CSO discharges, but the agency does not consistently collect and analyze the data at a national level, which is what is needed to demonstrate improvements to water quality resulting from CSO controls. As with the status of long-term control plan implementation, establishing a way to assess performance using a goal and appropriate measures is important for demonstrating

[56]We have reported that performance goals and measures are important management tools that can serve as leading practices for planning at lower levels within federal agencies, such as individual programs or initiatives. See GAO, *Veterans Justice Outreach Program: VA Could Improve Management by Establishing Performance Measures and Fully Assessing Risks,* GAO-16-393 (Washington, D.C.: Apr. 28, 2016).

progress toward improving water quality.[57] We have reported that there are different types of performance measures.[58] One type is an outcome measure, which can be a quantitative indicator observed over a period of time—for example, the number of CSO discharges or the volume of discharges annually—that allows an agency to assess progress toward achieving the intended results of its effort.[59] A measure of water quality, such as pollutant presence and concentration, could be an outcome measure.

Municipalities are generally responsible for reporting some CSO data but are not required to do so electronically until late 2025. For example, they may report the location, duration, and volume of CSO discharges from the municipality's system—data that could be used to track and assess the outcome of CSO controls and potential improvements to water quality. Currently, municipalities may submit these data in paper reports or electronically to the permitting authority (which is the state in the majority of cases, and EPA where the state does not have authorized NPDES programs). EPA regulations require electronic reporting of this information into its national database by late 2025. Once the data are available, EPA officials told us that they would have data to compare annual CSO events and volume to previous years, which can help demonstrate whether CSO events, volume, and pollutants are being reduced with the controls that have been built.[60]

In the meantime, EPA headquarters officials said that in 2020 they used the information that the agency had available about the characteristics of

[57]See GAO-16-393.

[58]GAO, *Clean Water Act: EPA Needs to Better Assess and Disclose Quality of Compliance and Enforcement Data,* GAO-21-290 (Washington, D.C.: July 12, 2021).

[59]Office of Management and Budget, Circular No. A-11, Part 6: *The Federal Performance Framework for Improving Program and Service Delivery* (Washington, D.C.: August 2021).

[60]A goal of the electronic reporting rule is to ensure that there is consistent and complete reporting nationwide. According to an EPA technical paper, the rule only requires reporting of "noncompliant" CSO discharges, which are those that are not authorized by a municipality's NPDES permit. However, permits may also require discharge reporting on "compliant" CSO discharges. In addition, the reporting can be based on actual monitoring, modeling, or the best available judgment to estimate the volume and frequency of CSO discharges. See Environmental Protection Agency, *Implementation Technical Paper No. 2: Data Requirements for NPDES Electronic Reporting Rule Sewer Overflow, Bypass, POTW, and LTCP-specific Data Elements* (Washington, D.C.: Apr. 19, 2018). As a result, EPA will need to make information available about the potential caveats and limitations in the consistency and comparability of the information collected from municipalities across the country.

discharge events starting in 2002 to estimate CSO discharge trends over time. As part of the effort, they attempted to project future progress of CSO control implementation. To do this, EPA calculated changes in the duration, frequency, and volume of CSO discharges and in the number of CSO outfalls based on data that it had compiled; however, the agency concluded that the data were limited because they were based on a subset of municipalities. According to EPA officials, as more municipalities' transition from implementing their long-term control plans to monitoring, in conjunction with the implementation of the electronic reporting requirements, the agency anticipates having more information available to better model potential progress.

As the agency improves its estimates and existing data to project and assess potential progress in water quality improvements resulting from CSO controls, EPA could use this information to develop an outcome goal for water quality and an accompanying measure to determine if that goal might be achieved with planned CSO controls. A performance goal would communicate what water quality improvements EPA plans to achieve, and an outcome-based measure would allow EPA to track progress toward achieving that goal. Without establishing a goal and outcome-based measure to track and assess water quality improvements resulting from CSO controls, EPA will not be able to demonstrate improvement in water quality that occurs as a result of controlling CSOs nationwide or progress toward achieving its Clean Water Act goal.

EPA Has Not Recently Reported on Progress in Implementing Its *CSO Policy*

Since 1994, EPA has issued two reports on nationwide progress that the agency, states, and municipalities have made in implementing the *CSO Policy*, but the agency has not recently reported on progress in implementing CSO controls or resulting improvements to water quality. We have previously found that reporting is part of a broader performance management process that includes identifying mission and desired outcomes, measuring performance, and using this information to report on performance and to identify gaps in performance.[61] Further, we have reported that frequent communication and reporting is an important part of performance reporting.[62]

[61]GAO, *Executive Guide: Effectively Implementing the Government Performance and Results Act,* GAO/GGD-96-118 (Washington, D.C.: June 1, 1996).

[62]GAO, *Managing for Results: Enhancing Agency Use of Performance Information for Management Decision Making,* GAO-05-927 (Washington, D.C.: Sept. 9, 2005).

EPA published two reports on the nationwide progress of CSOs, one in 2001 and another in 2004. These reports were required by the 2000 law that also codified the *CSO Policy*.[63] To prepare the reports, EPA reviewed existing data collected by the agency, state and local governments, and nongovernmental organizations, as well as coordinated and verified the inventory of CSO outfalls nationwide, among other analyses.

Although these efforts provided information, that information is now dated, and EPA generally has not made further information available to the public on CSO control efforts. For example, EPA's website on CSOs does not display information or data related to nationwide progress to address CSOs or resulting improvements to water quality.[64] An EPA official told us that the agency is increasingly being asked about the status of long-term control plans and CSO control progress nationwide. However, the agency has generally been unable to respond because it does not have the necessary data to understand the status of long-term control plan implementation or the effectiveness of CSO controls nationwide.

EPA officials said that they plan to periodically report CSO data after 2025, which is when EPA regulations require NPDES permit holders to begin submitting data about combined sewer overflows to EPA's national

[63]Consolidated Appropriations Act, 2001, Pub. L. No. 106-554, div. B, tit. I, § 112, 114 Stat. 2763, 2763A-224 to 2763A-227 (2000). Not later than September 1, 2001, the EPA Administrator was required to transmit a report to Congress on progress made by EPA, states, and municipalities in implementing and enforcing the *CSO Control Policy*. Pub. L. No. 106-554, div. B, tit. I, § 112(a), 114 Stat. 2763, 2763A-224 to 2763A-225 (2000) (codified at 33 U.S.C. § 1342(q)(3)). EPA responded to this requirement by issuing an initial report in December 2001. Environmental Protection Agency, *Report to Congress: Implementation and Enforcement of the Combined Sewer Overflow Control Policy* (Washington, D.C.: 2001). In addition, the EPA Administrator was required to transmit by December 21, 2003, a report to Congress summarizing the extent of environmental and human health impacts caused by municipal CSOs and sanitary sewer overflows, the resources spent by municipalities to address these impacts, and an evaluation of the technologies used by municipalities to address these impacts. Pub. L. No. 106-554, div. B, tit. I, § 112(d)(1), 114 Stat. 2763, 2763A-227 (2000). See Environmental Protection Agency, *Report to Congress: Impacts and Control of Combined Sewer Overflows and Sanitary Sewer Overflows* (Washington, D.C.: 2004).

[64]EPA headquarters provides some information on the status of CSO municipalities with federal consent decrees in a table on the website in response to an EPA Office of Inspector General's 2015 recommendation on increasing transparency but has not updated it since 2019.

database.[65] However, the compliance date for reporting these data has been extended several years already and may be extended further.[66]

To report more consistently and frequently, EPA could develop a report that addresses similar topics to the 2001 and 2004 reports by using various data and information on CSO status and progress nationwide and working with its regions and authorized states to supplement the information as needed. For example, EPA officials indicated that they were working with regions and authorized states to verify a subset of CSO data. EPA officials also told us that they have been updating latitude and longitude coordinates for CSO outfall locations and status (i.e., closed or active) of overflow structures nationally. Agency officials anticipate that this information will be publicly available on the CSO website in late 2022. Reporting this information is an important start but represents a subset of information needed to report on progress in controlling CSOs. With its ongoing data collection efforts, EPA could report on nationwide progress on CSO controls sooner and not wait for its electronic reporting system to be completed. By waiting to report on the status and performance of municipalities' efforts to control CSOs nationwide until information from electronic reporting is available, EPA will further delay sharing information that demonstrates progress toward achieving goals of the Clean Water Act.

Conclusions

EPA's policy and approach to addressing CSO discharges recognizes that controlling CSOs is a complicated endeavor that takes place over a long period. Through a phased approach, most municipalities have developed long-term control plans that implement alternatives over a planned schedule to achieve compliance with water quality standards and protect designated uses. However, as our selected sample demonstrates, many municipalities face challenges that are extending the anticipated completion of their plans.

[65]40 C.F.R. § 127.16(a).

[66]When the NPDES Electronic Reporting Rule was issued in 2015, the deadline for submission of data on CSOs was December 21, 2020. 80 Fed. Reg. 64064, 64097 (Oct. 15, 2015). However, in 2020, EPA extended the compliance date for submitting data on CSO overflows to December 21, 2025, and added regulations that would allow this deadline to be extended to not later than December 21, 2028, in certain circumstances. 85 Fed. Reg. 69189 (Nov. 2, 2020). Specifically, authorized states, territories, or tribes may request an extension, or EPA may, as it deems appropriate, extend the deadline. Use of EPA's authority to extend the deadline may be necessary, if EPA has not yet deployed the required electronic reporting tool or has not yet deployed the protocols and systems for sharing data with EPA.

EPA has taken some steps, such as developing guidance on financial capability and integrated planning, to assist municipalities in their CSO control efforts. These recent agency efforts demonstrate that EPA recognizes that a significant number of municipalities are still developing and implementing their long-term control plans to control CSOs and improve water quality and that these efforts are planned for many years and decades into the future.

However, on a nationwide basis, EPA does not currently track or assess municipalities' progress in implementing long-term control plans or improving water quality. Since EPA issued the *CSO Policy* in 1994, the agency has periodically obtained some data and information on the status of some control plans, as well as developed a pilot performance plan to track the implementation status of the policy. Further, EPA requires the collection of some data from CSO municipalities on water quality related to their CSO discharges; however, the agency does not collect and analyze the data consistently and at a national level, which is necessary to demonstrate improvements to water quality resulting from CSO controls. By developing performance goals and measures that track and assess the development of long-term control plans and water quality improvement associated with municipalities' CSO controls, EPA will be better positioned to identify potential improvements in the plans or programs needed to carry them out.

Furthermore, it has been almost two decades since EPA has issued a nationwide report on the progress that the agency, states, and municipalities have made in implementing the *CSO Policy*. Given this period since the last report, the delays that municipalities are facing in implementing their long-term control plans and other CSO controls, as well as the lack of the available information on CSOs on EPA's website, the public and other decision makers do not have up-to-date information that demonstrates progress toward achieving goals of the Clean Water Act.

Recommendations for Executive Action

We are making the following three recommendations to EPA:

The Assistant Administrator of the Office of Water should develop a performance goal and measure(s) to track and assess the status of long-term control plans or other control plans for municipalities with CSOs. (Recommendation 1)

The Assistant Administrator of the Office of Water should develop a performance goal and measures to track and assess the improvements to

water quality resulting from CSO controls implemented by municipalities with CSOs. (Recommendation 2)

The Assistant Administrator of the Office of Water should report on nationwide progress and results of municipalities' efforts to control CSOs. (Recommendation 3)

Agency Comments and Our Evaluation

We provided a draft of this report for review and comment to EPA. The agency provided written comments, which are reproduced in appendix III, as well technical comments, which we incorporated as appropriate.

EPA generally agreed with all of our recommendations but did not provide details about how it would implement them. To enable tracking and assessing the progress of CSO control efforts as described in the first two recommendations, EPA cited the need for full implementation of Phase 2 of the 2015 NPDES Electronic Reporting Rule. By December 2025, EPA expects states, permittees, and others to report data electronically in a national database that can be used to track and measure performance goals for the CSO program. According to EPA, such data would enable it to track and measure progress as it will include the status of long-term control plans or similar efforts and elements related to water quality improvements. EPA also stated that the data will be made available online for regulators and the public to use to track progress and completion of control efforts.

We recognize and agree that completing Phase 2 will help develop more consistent data collection for nationwide information related to CSOs, including water quality improvements. We also agree that the data should be made available to regulators and the public to use. However, EPA did not explicitly state that it plans to develop any goals and measures that it can use to track and assess the status of plans and improvements to water quality resulting from CSO controls. Even before it completes implementation of Phase 2, EPA can work with its state partners and others to develop goals and measures. As we note in the report, setting goals and measures is important for EPA to use in assessing progress and to identify potential improvements in the plans or programs needed to carry them out.

EPA also generally agreed with our third recommendation to report on nationwide progress and results of municipalities' efforts to control CSOs, stating it is preparing to gather the required data as part of Phase 2. Starting after December 2025, EPA plans to make the data it gathers available through the public portal to its national database. However, we

also understand that EPA has already collected certain data on the status of municipalities' efforts to control CSOs and water quality information. In conversations with agency officials in the fall of 2022, we were told that the agency had plans to publish information such as the number and location of CSO outfalls nationally, as well as changes in these numbers over time, on EPA's website.

We are encouraged that EPA could publish data before the 2025 deadline and support this effort. In addition, we encourage the agency to continue reporting data once it becomes available online in its national database. In our view, publishing interim data will bolster, not duplicate, the agency's electronic reporting efforts. This would be particularly important if implementation of Phase 2 of the Electronic Reporting Rule is further delayed. Given the cost and time involved with CSO efforts, it is important for EPA to track, assess, and report on results of CSO efforts to help the public and decision makers understand progress toward achieving goals of the Clean Water Act.

We are sending copies of this report to the appropriate congressional committees; the Administrator of EPA; and other interested parties. In addition, the report is available at no charge on the GAO website at http://www.gao.gov.

If you or your staff have any questions concerning this report, please contact me at (202) 512-3841 or gomezj@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix IV.

J. Alfredo Gómez
Director, Natural Resources and Environment

Appendix I: Objectives, Scope, and Methodology

You asked us to review the Environmental Protection Agency's (EPA) efforts to address combined sewer overflows (CSO). This report examines (1) EPA's policy to address CSO discharges, (2) the status of long-term control plans and any challenges selected municipalities have faced in implementing them, and (3) how EPA tracks progress in implementing long-term control plans and improving water quality resulting from CSO control efforts.

To address all three objectives, we interviewed EPA headquarters officials in the Office of Water and Office of Enforcement and Compliance Assurance (OECA), as well as officials at nine of the agency's 10 regional offices.[1] We discussed their policies, guidance, compliance and enforcement efforts, activities, and data related to addressing CSOs. We also reviewed prior reports by GAO and EPA's Office of Inspector General, as well as coordinated with the Inspector General's office on its work related to CSOs.[2]

To examine EPA's policy to address CSO discharges, we reviewed the agency's policies, strategies, and guidance developed since 1994. We also reviewed the Clean Water Act and its implementing regulations. We then interviewed officials at EPA headquarters and the nine relevant regional offices to obtain an understanding of EPA's policies to address CSOs, as well as their views on any challenges with these policies and related guidance.

We also requested from EPA headquarters and nine regional offices data that they collect to track the number of municipalities with CSOs and information on their long-term control plans, including their approval dates and implementation status. We noted inconsistencies and discrepancies in the data. For example, there were different counts in the total number of municipalities with CSOs. In addition, we also found limitations and discrepancies related to the data on the implementation status of long-term control plans nationwide, such as the number of municipalities that

[1]EPA is organized nationwide into 10 regions, each headed by an EPA regional office. Nine of the 10 regions have municipalities with CSOs.

[2]See GAO, *Water Pollution: EPA Has Improved Its Review of Effluent Guidelines but Could Benefit from More Information on Treatment Technologies* GAO-12-845 (Washington, D.C.: Sept. 10, 2012); GAO, *Environmental Protection: Additional Action Needed to Improve EPA Data on Informal Enforcement and Compliance Assistance Activities,* GAO-20-95 (Washington, D.C.: Jan. 31, 2020); Environmental Protection Agency's Office of Inspector General, *EPA Needs to Track Whether Its Major Municipal Settlements for Combined Sewer Overflows Benefit Water Quality* Project No. 15-P-0280 (Washington, D.C.: Sept. 16, 2015).

had completed their control plans and were in the postconstruction monitoring phase. As such, we determined that the data provided by EPA regions related to the implementation status of long-term control plans were not sufficiently reliable for purposes of this report. In March 2022, we sent additional questions to EPA headquarters regarding the availability of data related to long-term control plans and other data. In April 2022, EPA officials told us that they were working with officials from the regional offices to reconcile and update the information that we initially requested.

In June 2022, EPA provided us with an updated set of summary data that included basic information, such as the number of municipalities with CSO permits, how many had an approved long-term control plan, and how many had an enforceable schedule in place for implementing CSO controls. After reviewing the headquarters data for accuracy and completeness, we determined that the data were sufficiently reliable for the purpose of reporting on the number of municipalities with CSOs and whether they had an enforceable schedule in place to implement their long-term control plans or similar CSO control efforts.

To examine the status of municipalities' long-term control plans or similar plans, as well as any challenges they have faced, we selected a nongeneralizable sample of 11 municipalities with CSOs from around the country. The municipalities were selected so that the sample would represent a range of geographic locations, size of the service population of the utility, and type of actions taken by EPA and the municipalities to address CSO discharges. We selected municipalities from eight of the nine EPA regions that have municipalities with CSOs to obtain geographic diversity. Historically, the majority of the municipalities with CSOs in the United States were located along the East Coast and in the Midwest.

We also selected municipalities that serve a range of population sizes, with over half of the municipalities having service populations over 100,000 people and three of the municipalities having service populations fewer than 50,000 people. We also selected municipalities that demonstrate three types of enforceable mechanisms to require implementation of CSO controls: consent decree (either federal or state), National Pollutant Discharge Elimination System (NPDES) permit (either federal or state), or administrative order (either federal or state). See table 6 for the list of selected municipalities.

Table 6: Selected Municipalities for Nongeneralizable Sample

Municipality	State	Service population	Type of enforceable mechanism demonstrated
Cincinnati	Ohio	800,000	Consent decree (federal)
Cumberland	Maryland	45,000	Consent decree (state)
Detroit	Michigan	3,000,000	Consent decree (federal)
Harrisburg	Pennsylvania	120,000	Consent decree (federal)
Kansas City	Missouri	650,000	Consent decree (federal)
Morgantown	West Virginia	20,300	State issued permit
Nashville	Tennessee	700,000	Consent decree (federal)
Oswego	New York	16,350	Consent decree (federal)
Portland	Oregon	600,000	Administrative order (state)
San Francisco	California	887,000	Administrative order (state)
Springfield	Massachusetts	250,000	Administrative order (federal)

Source: GAO summary of municipalities' documentation. | GAO-23-105285

The team reviewed the 11 municipalities' NPDES permits, long-term control plans or similar documents, and other related documents. We interviewed officials from the selected municipalities, as well as wastewater treatment plant operators, to obtain their views on EPA's policies and approach to controlling CSOs and any challenges they experienced in developing and implementing their approach to addressing CSOs, costs and schedule, and enforcement issues. For two of the municipalities—San Francisco and Harrisburg—officials from the municipality's utilities submitted written responses to our questions and data requests, rather than meeting with us, due to ongoing litigation.

In addition, for some of the selected municipalities with CSOs from our sample, we interviewed state environmental agency officials responsible for implementing the NPDES program to learn about the NPDES permits, long-term control plans, and other issues associated with the individual municipality's efforts to address CSO discharges. We interviewed representatives from four nongovernmental organizations to obtain their perspectives on EPA's approach to CSOs and challenges faced by municipalities in addressing their CSO discharges. The nongovernmental organizations included the National Association of Clean Water Agencies, the Lower Susquehanna Riverkeeper Association, the Environmental Integrity Project, and the Association of Clean Water Administrators. These organizations were selected because they have key responsibilities related to working with states and EPA on their Clean

Water Act priorities. For one of these meetings, one of the nongovernmental organizations also invited officials from three additional state environmental offices that were not included in our sample to learn about their perspectives on challenges that municipalities in their state face in addressing CSO discharges. The information we gathered from the selected municipalities, and the officials and representatives, cannot be generalized to those we did not include in our review.

To determine how EPA tracks progress in implementing long-term control plans and similar CSO controls and resulting improvements to water quality, we reviewed the Clean Water Act and related agency regulations, policies, and guidance. We also examined what data, at a national and regional level, the agency collects for performance measures, such as the amount of pollutant reduction achieved from CSO controls, to track progress toward achieving compliance with water quality standards. We compared this information with criteria from our prior work that identified effective performance management, including defining long-term goals and performance measures, to assess the extent to which EPA follows these best practices.[3] We also interviewed EPA officials, as well as officials from municipalities from our selected sample, some state agencies associated with some of our selected sample municipalities, and representatives from the aforementioned nongovernmental organizations, to obtain information on EPA's monitoring and performance measures, guidance, and outreach efforts and what is known about the implementation of long-term control plans and water quality improvements.

To understand what data and information EPA reports on CSOs nationwide, we reviewed the information that EPA makes available to the public, either via published reports or on its website. We compared EPA's reported information with criteria in prior GAO work that state that reporting is part of a broader performance management process that includes identifying an agency's mission and desired outcomes, measuring performance, and using this information to report on

[3]GAO, *Veterans Justice Outreach Program: VA Could Improve Management by Establishing Performance Measures and Fully Assessing Risks,* GAO-16-393 (Washington, D.C.: Apr. 28, 2016); GAO, *Executive Guide: Effectively Implementing the Government Performance and Results Act,* GAO/GGD-96-118 (Washington, D.C.: June 1, 1996); and GAO, *Managing for Results: Enhancing Agency Use of Performance Information for Management Decision Making,* GAO-05-927 (Washington, D.C.: Sept. 9, 2005).

performance and to identify gaps in performance to assess the extent to which EPA is following such practices.[4]

We conducted this performance audit from June 2021 to January 2023 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

[4]GAO/GGD-96-118.

Appendix II: Selected Municipalities' Approaches to Controlling Combined Sewer Overflows (CSO)

This appendix provides summaries of a nongeneralizable sample of 11 municipalities from around the United States and their efforts to control combined sewer overflows (CSO). (See app. I for a discussion of the selection of municipalities.) These summaries are based on documents provided by the municipality, National Pollutant Discharge Elimination System (NPDES) permits, interviews with municipal officials, and other publicly available information.

Terms used in the summaries:

- *Combined sewer system:* a wastewater collection system owned by a state or municipality that conveys sanitary wastewater (domestic, commercial, and industrial wastewaters) and stormwater through a single-pipe system to a publicly owned treatment works plant (wastewater treatment plant).
- *Combined sewer overflows (CSO):* a discharge from a combined sewer system at a point prior to the wastewater treatment plant. CSOs consist of mixtures of domestic sewage, industrial and commercial wastewaters, and stormwater runoff.
    - *CSO discharge or event:* an occurrence of a release of untreated or partially treated wastewater and stormwater mix from a designated outfall into a nearby water body.
    - C*SO discharge volume:* the actual amount of wastewater and stormwater mix, by volume, released into a water body.
- *CSO outfall:* a designated pipe or outlet located before the wastewater treatment plant, where untreated or partially treated sewage, wastewater, and stormwater are discharged directly into a nearby water body.
- *CSO Policy*: refers to EPA's 1994 *CSO Control Policy*.
- *Wastewater treatment plant:* a treatment works owned by the state or municipality, including any devices and systems used in the storage, treatment, recycling, and reclamation of municipal sewage or industrial wastes of a liquid nature. It also includes sewers, pipes, and other conveyances to convey wastewater to a wastewater treatment plant.
- *Green infrastructure:* a range of measures that use plant or soil systems, permeable pavement or other permeable surfaces or substrates, stormwater harvest and reuse, or landscaping to store, infiltrate, or evaporate and transpire stormwater and reduce flows to sewer systems or to surface waters.

- *Long-term control plan (LTCP):* a plan developed by municipalities that describes the plans, designs, construction, and monitoring of CSO controls to ultimately result in compliance with requirements of the Clean Water Act. The plan should adopt one of two approaches:
  - *Presumption approach:* planned CSO controls are presumed to provide an adequate level of control to meet the water quality-based requirements of the Clean Water Act, if they meet one of three performance criteria and the permitting authority determines that the presumption is reasonable in light of data and analysis of the system.[1]
  - *Demonstration approach:* planned CSO controls demonstrate adequacy to meet the water quality based-requirements of the Clean Water Act.[2]

Under both approaches, the CSO controls are monitored by the municipality for effectiveness and to verify compliance with water quality standards and designated uses. If the CSO controls fail to meet water quality standards or protect designated uses, requirements for additional CSO controls may be imposed.

- *Wet weather event:* the occurrence of rain, snow, sleet, hail, or other form of precipitation that results in stormwater flowing into a sewer system, which could result in CSO discharges.

Each municipality's summary includes information on the following:

- *Municipality and facility overview:* provides general information about the municipality and history of wastewater treatment system.

[1]The three performance criteria are (1) no more than an average four overflow events per year (although the permitting authority may allow up to two additional overflow events per year); or (2) elimination or the capture for treatment of no less than 85 percent by volume of the combined sewage collected in the combined sewer system during precipitation events on a system-wide annual average basis; or (3) elimination or removal of no less than the mass of pollutants, identified as causing water quality impairment, for the volume that would be eliminated or captured for treatment under the second criterion.

[2]Permittees must demonstrate that the planned control program (1) is adequate to meet water quality standards and protect designated uses, unless the standards or uses cannot be met as a result of natural background conditions or pollution sources other than CSOs; or (2) implementation will result in CSO discharges that will not preclude the attainment of water quality standards or the receiving waters' designated uses or contribute to their impairment; or, (3) will provide the maximum pollution reduction benefits reasonably attainable; and (4) is designed to allow cost-effective expansion or retrofitting, if additional controls are subsequently determined to be necessary to meet water quality standards or designated uses.

- *CSO facts:* includes basic facts about the municipality and its combined sewer system.
- *LCTP approach and status:* includes information about the municipality's LTCP or other CSO control plan(s) and the current status of the plan(s).
- *Timeline:* identifies calendar year and key actions in implementation of the municipality's efforts to control CSOs.
- *Estimated costs:* provides a municipality's initial and current estimated costs to control CSOs and, if available, any actual costs spent during a specific time frame.
- *Time frames:* identifies time frames associated with the municipality's efforts to address CSOs, which can include time spent planning and developing their long-term control plans, as well as CSO control actions initiated prior to these planning efforts.
- *Examples of CSO controls:* provides examples of the municipality's efforts to address CSOs in four possible categories. See table 7 for a description of the four categories.

Table 7: Categories of Technologies and Practices to Control Combined Sewer Overflows (CSO)

Control category	Description	Examples
Source	Use low-impact development techniques to help reduce the volumes, peak flows, and pollutant loads entering the collection system.	Permeable pavement, green infrastructure
Collection system	Reduce the volume and frequency of CSOs by removing or diverting stormwater from the system, maintaining system peak flow capacity, and maximizing system storage capability.	Sewer cleaning, sewer separation
Storage facilities	Provide temporary storage of flows during heavy rainfall for controlled release to the treatment facilities when flows return to normal levels.	Retention basins, deep tunnels
Treatment technologies	Treat flow as necessary, in situations where continued CSOs will remain and CSOs are demonstrated to cause unacceptable water quality impacts.	Screening, disinfection

Source: GAO summary of Environmental Protection Agency information. | GAO-23-105285

- *Progress to date:* shows the municipality's progress, or projected progress, in controlling CSOs by either the change in the annual number of CSO events or the discharge volume.

CONTROLLING COMBINED SEWER OVERFLOWS (CSOs): CINCINNATI, OHIO

Municipality and Facility Overview

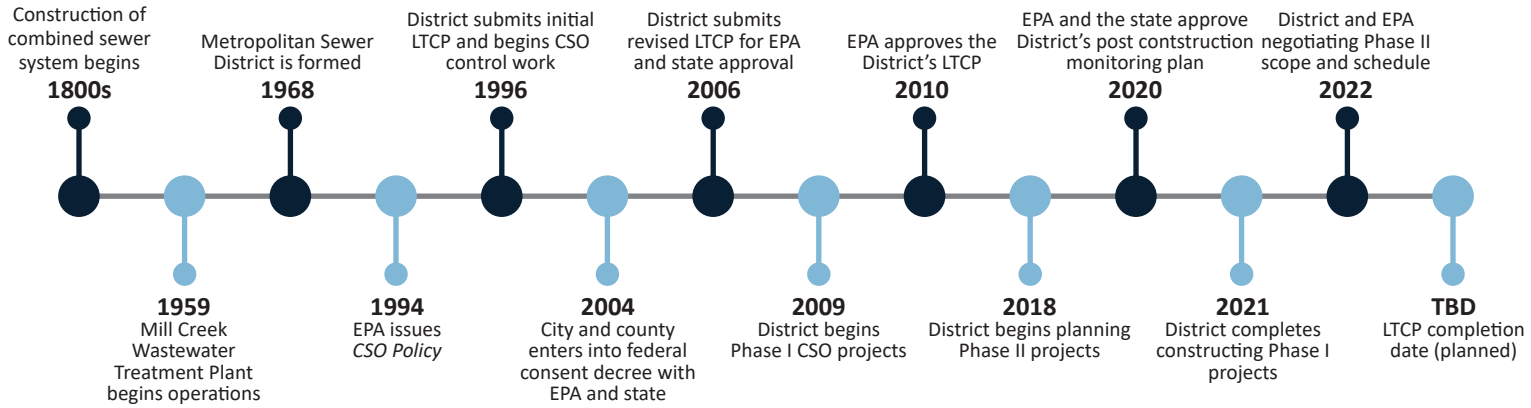
Cincinnati is in southwestern Ohio along the Ohio River and shares a border with Kentucky. A regional wastewater collection system that includes nine wastewater treatment plants serves the city, most of Hamilton County, and small parts of three surrounding counties. The Metropolitan Sewer District of Greater Cincinnati, formed in 1968, serves as a county sewer district for operating and maintaining the regional wastewater collection system. The Mill Creek Wastewater Treatment Plant, which began operations in 1959, is the largest plant in the system and treats an average of about 118 million gallons of wastewater per day, with capacity to treat up to 430 million gallons during wet weather events.

CSO FACTS	
Utility operator	Metropolitan Sewer District of Greater Cincinnati
Facility name	Multiple, Mill Creek Wastewater Treatment Plant is the largest facility
EPA region	Region 5, Great Lakes
Permitting authority	Ohio Environmental Protection Agency
Permit number	Multiple
Service population	About 800,000
Primary receiving waters	Ohio River and direct tributaries, such as Mill Creek, Muddy Creek, and Little Miami River
Wastewater and sewer system	• 9 wastewater treatment plants • 3,000 miles of sewer pipes (about 40 percent of which are combined) • About 100 pumping stations • 207 CSO outfalls

Long-Term Control Plan (LTCP) Approach and Status

The district drafted its initial LTCP in 1996. In 1999, it entered into negotiations with the federal government and the state of Ohio to establish a formal program to reduce CSOs and address other wastewater issues. In 2004, the city and county entered into a federal consent decree with EPA and the state that required an updated LTCP. In 2010, EPA approved the revised LTCP, which is referred to as the *Wet Weather Improvement Plan*. The plan includes a phased approach to scheduling and implementing a designated set of projects to reduce CSOs.

The district used the demonstration approach to establish the performance criteria in the plan, which requires the district to reduce CSOs to the level necessary to be in compliance with the Clean Water Act. Each CSO outfall will have its own performance goals for the level of volume reduction, while some outfalls will also need to be eliminated. Regulators approved the district's post construction monitoring plan in 2020, which includes a multiyear monitoring program. To date, implementation of completed CSO control projects have reduced annual CSO discharges in a typical year by 6 billion gallons, from 14 billion gallons in 2006 to 8 billion gallons in 2017.



Estimated Costs

Initial estimated costs to complete Phase I of the *Wet Weather Improvement Plan* were $1.14 billion (in 2006 dollars). The actual costs to complete Phase I have totaled about $1.3 billion in current year spending through 2021. Estimated costs to complete Phase II of the plan are at least $2 billion (in 2006 dollars).

Time Frames

CSO control work started	Planned completion year	Years addressing CSO controls	Years remaining to complete	Total years
1996	TBD	26	TBD	TBD

Examples of CSO Controls

- **Treatment plant upgrades.** In 2013, the district completed updates to increase the peak secondary treatment capacity of the Mill Creek Wastewater Treatment Plant to 240 million gallons per day.
- **Conveyance improvements.** In 2022, the district completed the Upper Muddy Creek Interceptor Phase B project to replace a 1.5-mile section of 90-year-old clay pipe that was in very poor condition and leaking sewage into the creek. The project included installing a new, larger pipe and relocating the pipe outside the creek channel.
- **System performance.** The district has invested in building a "Smart Sewer" system to use its existing sewer system more efficiently. Since 2015, the district has deployed sensors in the Mill Creek basin to measure flow levels and used a computer system to operate gates and valves to direct flows to different parts of the system for storage.

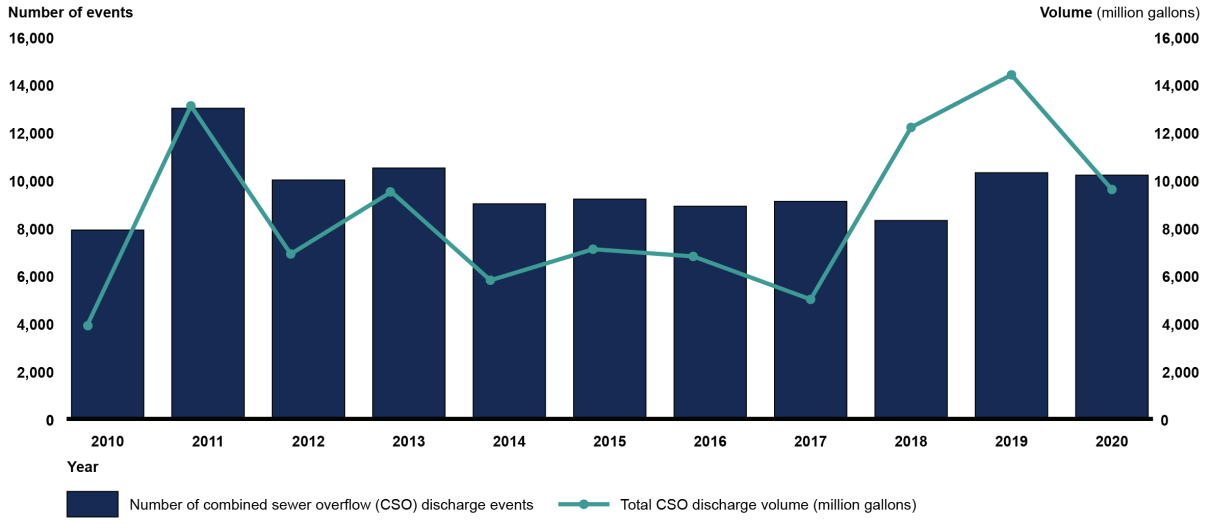
Lick Run Project in Cincinnati, Ohio, summer 2022

Source: Metropolitan Sewer District of Greater Cincinnati. | GAO-23-105285

- **Source controls.** In 2021, the district completed the Lick Run Project, which uses a combination of green infrastructure, dedicated storm sewers, and real-time controls to reduce CSOs into Mill Creek. The project has eliminated about 800 million gallons annually from the district's highest volume CSO outfall. The project was one of several that replaced original plans for a deep, underground CSO storage tunnel, with a projected savings of about $200 million.

Progress to Date

Annual Number and Volume of CSO Discharges in Hamilton County, Ohio, 2010-2020



Source: GAO summary of Metropolitan Sewer District of Greater Cincinnati documentation. | GAO-23-105285

CONTROLLING COMBINED SEWER OVERFLOWS (CSOs): CUMBERLAND, MARYLAND

Municipality and Facility Overview

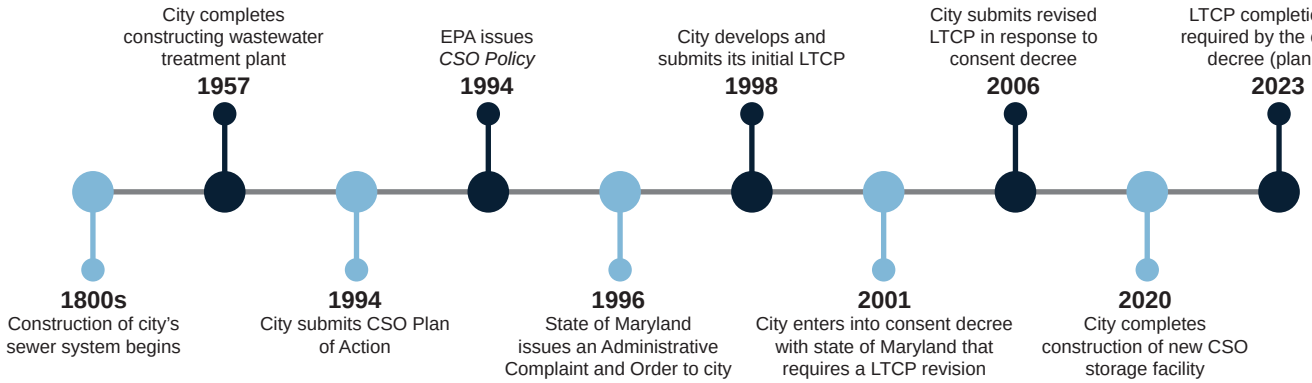
The city of Cumberland is in the Allegheny Mountains in western Maryland, between the state's boundaries with Pennsylvania and West Virginia. The region is part of the Chesapeake Bay watershed. Cumberland's wastewater treatment plant, originally built in 1957, and with upgrades can treat 15 million gallons per day and can increase capacity to 25 million gallons per day during wet weather.

CSO FACTS	
Utility operator	City of Cumberland
Facility name	Cumberland Wastewater Treatment Plant
EPA region	Region 3, Mid-Atlantic
Permitting authority	Maryland Department of the Environment
Permit number	MD0021598
Service population	About 45,000
Primary receiving waters	Potomac River and Wills Creek
Wastewater and sewer system	• 1 wastewater treatment plant • 116 miles of sewer pipes (105 miles, or 90 percent, are combined) • 11 CSO outfalls

Long-Term Control Plan (LTCP) Approach and Status

Cumberland entered into a consent decree with the state of Maryland in 2001 that required the city to submit a proposed LTCP with a schedule for its implementation and completion by October 1, 2023. The city's revised LTCP, which was developed in 2006, outlines priority projects to address CSOs in its three major drainage areas. These projects would eliminate or capture for treatment no less than 85 percent by volume of the CSO discharge collected during precipitation events on a system-wide annual basis.

The city used a presumption approach to develop some of the proposed projects, estimating the amount of CSO reduction that would occur under its LTCP. As of 2022, the city said it does not expect to meet the planned LTCP completion date in 2023 because of a permit delay. A permit is needed from the U.S. Army Corps of Engineers to install a pipeline through a floodplain area, which city officials estimated could cause at least a 4-year delay.



Estimated Costs

Initial estimates for costs to address CSOs were $48 million. To date, the city has spent $59 million and estimates the total costs will be $154 million (in 2021 dollars).

Time Frames

CSO control work started	Planned completion year	Years addressing CSO controls	Years remaining to complete	Total years
1994	2023	28	1	29

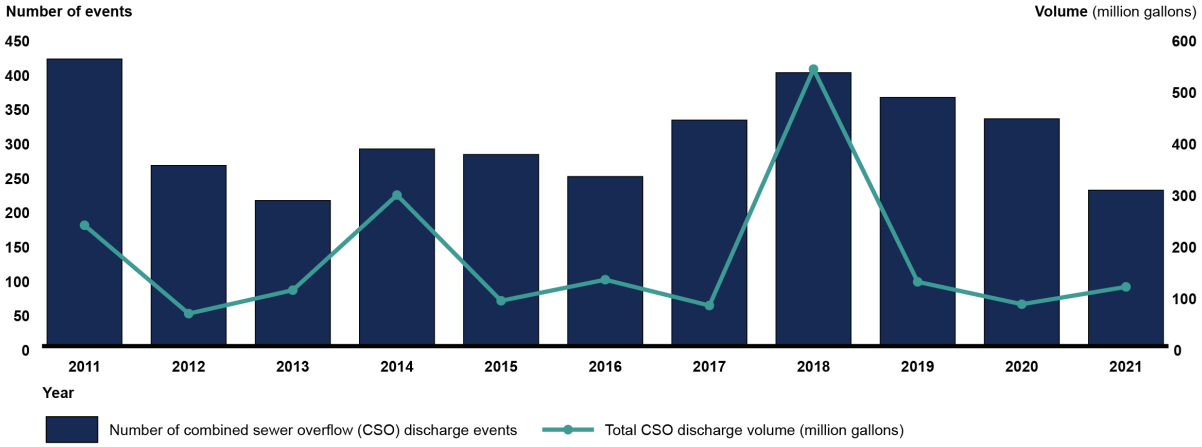
Examples of CSO Controls

- **Optimizing system capacity and performance.** In 2004, the city completed a CSO screening facility in the Mill Race area to capture and dispose of trash and materials in the discharge.
- **Storage and treatment capacity.** In 2020, the city completed a 5-million-gallon underground CSO storage facility to hold excess stormwater until treatment capacity is available at the wastewater treatment plant. The facility can be significantly expanded in the future if necessary.

CSO outfall looking upstream at Potomac River, Cumberland, Maryland.
Source: City of Cumberland, Maryland | GAO-23-105285

Progress to Date

Annual Number and Volume of CSO Discharges in Cumberland, Maryland, 2011-2021



Source: GAO summary of city of Cumberland, Maryland information. | GAO-23-105285.

CONTROLLING COMBINED SEWER OVERFLOWS (CSOs): DETROIT, MICHIGAN

Municipality and Facility Overview

Detroit is the largest city in Michigan. The city is located along the Rouge River and the Detroit River, which connects to Lakes Erie and St. Clair. Detroit's wastewater service area covers more than 944 square miles, which includes the city and 78 suburban communities. Historically, the city's water resource recovery facility was operated by the Detroit Water and Sewerage Department. In 2015, the city entered into a 40-year lease agreement with the Great Lakes Water Authority to operate and manage the city's regional water and wastewater infrastructure, including the facility. The facility is one of the country's largest single-site plants and treats an average of 650 million gallons of wastewater per day.

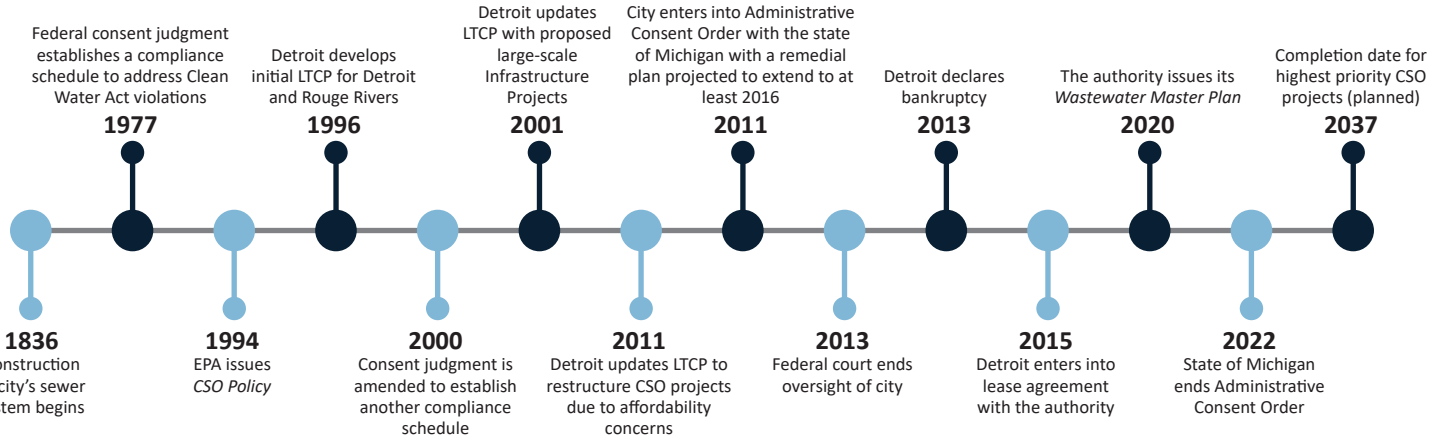
CSO FACTS	
Utility operator	Great Lakes Water Authority
Facility name	Water Resource Recovery Facility
EPA region	Region 5, Great Lakes
Permitting authority	Michigan Department of Environment, Great Lakes, and Energy
Permit number	MI0022802
Service population	About 3,000,000
Primary receiving waters	Rouge and Detroit Rivers
Wastewater and sewer system	• 1 water resource recovery facility • 3,296 miles of sewer pipes (100 percent combined) • 72 CSO outfalls

Long-Term Control Plan (LTCP) Approach and Status

Detroit operated under a federal consent judgment from 1977 until 2013, which provided ongoing federal court oversight of the city's CSO control activities, among other things. The city also entered into an Administrative Consent Order with the state of Michigan in 2011 that required specific remedial actions to achieve compliance with the city's NPDES permit and the Clean Water Act. After the authority demonstrated improved compliance with its NPDES permit, the state terminated the order in 2022.

Since 1996, Detroit has developed and revised its LTCP multiple times to update the set of planned projects to control CSOs along the Rouge and Detroit Rivers. However, some of the projects identified in the various LTCPs were never constructed due to the city's economic hardship. In 2020, the authority issued a *Wastewater Master Plan* that identified various improvements on the Rouge and Detroit Rivers and adopted an integrated planning and adaptive management approach to improve water quality. The authority's NPDES permit requires the submission of an updated LTCP to the state for review and approval. The update is due by October 15, 2023. According to the authority, the goals of the updated LTCP are to:

- capture and treat the remaining 5-percent of the system's CSO discharge over the next 20 years, and
- address the 13 remaining high-priority outfalls on the Rouge River by 2037.



Estimated Costs

The most recent LTCP revision, in 2011, proposed spending up to $175 million per phase, in 5-year phases, through 2034, totaling $832 billion. However, the authority is in the process of updating the LTCP that includes reevaluating the scope of CSO projects to be performed during this time period. Over the past 40 years, Detroit and the authority have spent over $1.4 billion to address CSOs.

Time Frames

CSO control work started	Planned completion year	Years addressing CSO controls	Years remaining to complete	Total years
1977	2037	45	15	60

Examples of CSO Controls

- **Source controls.** From 2009 through 2019, the NPDES permit requires an average of $3 million to be spent on green stormwater infrastructure on Detroit's west side. For example, the city plans to use green stormwater infrastructure to reduce CSOs by controlling runoff from 600 acres.
- **Treatment capacity.** In 2019, the authority completed the Rouge River Outfall Disinfection Facility to address the last of the high-priority core outfalls in the city. The facility ensures that all CSOs discharged into the river are screened, treated, and disinfected. Before the facility becoming operational, between 4 billion and 15 billion gallons of untreated wastewater were discharged annually without disinfection.

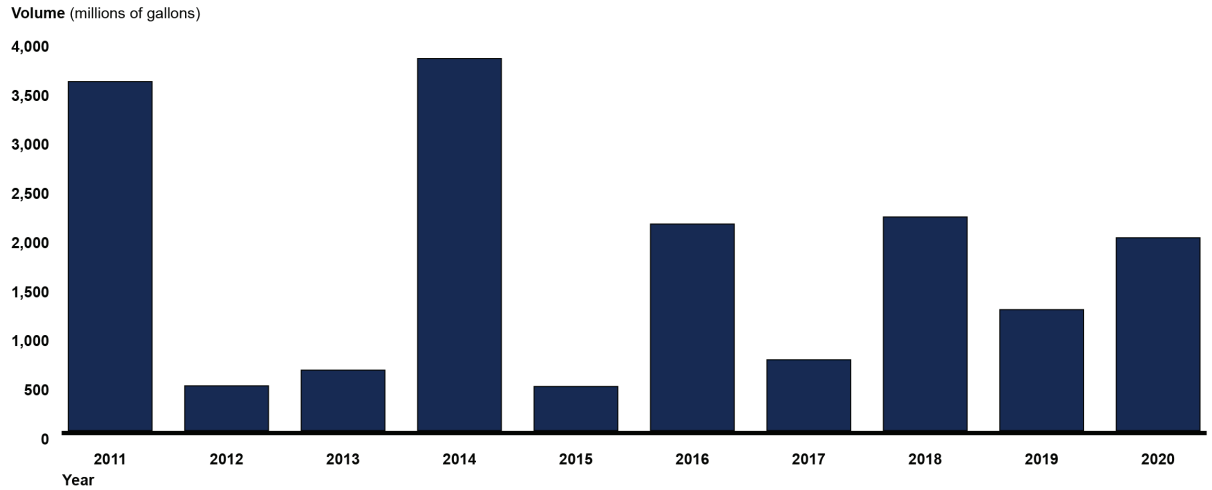
Water Resource Recovery Facility

Source: Great Lakes Water Authority. | GAO-23-105285

- **Storage capacity.** In 1999, the city completed the 22-million-gallon Hubbell-Southfield CSO Retention Treatment Basin. The facility is the largest along the Rouge River and treats CSOs through screening, settling, and disinfecting the wastewater.

Progress to Date

Annual Volume of CSO Discharges in Detroit, Michigan, 2011-2020



Source: GAO summary of state of Michigan documentation. | GAO-23-105285

CONTROLLING COMBINED SEWER OVERFLOWS (CSOs): HARRISBURG, PENNSYLVANIA

Municipality and Facility Overview

Harrisburg is the capital of Pennsylvania and was established along the Susquehanna River. Approximately 80 percent of the city's sewer system was constructed and installed before 1940, and about 60 percent of the sewer pipes are currently part of a combined sewer system. Capital Region Water owns, operates, and maintains the Advanced Wastewater Treatment Facility, which became operational in 1959, upgraded in 1976 and 2016, and treats up to 45 million gallons per day.

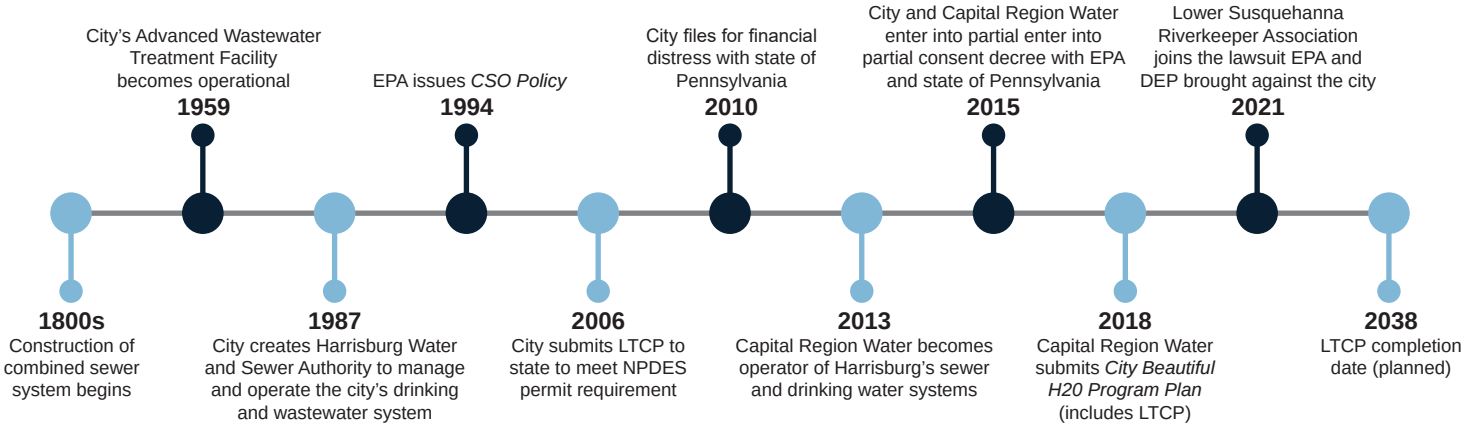
CSO FACTS	
Utility operator	Capital Region Water
Facility name	Advanced Wastewater Treatment Facility
EPA region	Region 3, Mid-Atlantic
Permitting authority	Pennsylvania Department of Environmental Protection
Permit number	PA0027197
Service population	About 120,000
Primary receiving waters	Susquehanna River and Paxton Creek
Wastewater and sewer system	• 1 wastewater treatment plant • 177 miles of sewer pipes (101 miles, or about 57 percent, are combined) • 2 pumping stations • 58 CSO outfalls

Long-Term Control Plan (LTCP) Approach and Status

In 2015, EPA and the Pennsylvania Department of Environmental Protection (DEP) filed a lawsuit against the city of Harrisburg and Capital Region Water alleging they made discharges in violation of the Clean Water Act and the facility's permit. Later that year, the parties entered into a partial consent decree, which required Capital Region Water to develop and submit an updated LTCP by April 1, 2018. Capital Region Water issued the *City Beautiful H2O Program Plan*, which contains an updated LTCP and an integrated planning approach to manage stormwater and wastewater for the city in 2018. The plan also stated they would achieve a baseline level of control to restore system reliability and increase system-wide CSO capture to 78 percent by 2038.

CAPITAL REGION WATER

As of November 2022, EPA and DEP had not approved the LTCP the Capital Region Water had submitted in 2018 and negotiations continue on a timeline for submission and approval of a revised LTCP that would include the set of CSO controls and completion schedule. In the interim, the state of Pennsylvania has delayed reissuing the NPDES permit for the Advanced Wastewater Treatment Facility until the updated LTCP is approved.



Estimated Costs

The 2018 *City Beautiful H2O Program Plan* estimates its LTCP controls would cost $225 million for the first 10 years, with a planned increase to $315 million to cover additional costs and achieve a baseline level of control.

Time Frames

CSO control work started	Planned completion year	Years addressing CSO controls	Years remaining to complete	Total years
2001	2038	21	16	37

Examples of CSO Controls

- **Source controls.** Between 2016 and 2021, Capital Region Water completed seven green stormwater infrastructure projects around the city, including in the Summit Terrace Neighborhood, as a way to address areas of the city with the most CSOs.
- **Sewer rehabilitation.** In 2014, Capital Region Water completed an assessment of its sewer system, including all pipes. A comprehensive cleaning program followed in 2016. These efforts are expected to help restore system resilience and reliability, as well as inform Capital Region Water's future rehabilitation designs for the sewer system given the overall significant historical, deferred maintenance.
- **Storage and treatment capacity.** In 2021, Capital Region Water completed rehabilitation of the Front Street Pump Station, its primary combined sewer pump station. The project increased the station's pumping capacity by 50 percent and maximizes the flow to the wastewater treatment plant.

Capital Region Water's Advanced Wastewater Treatment Facility

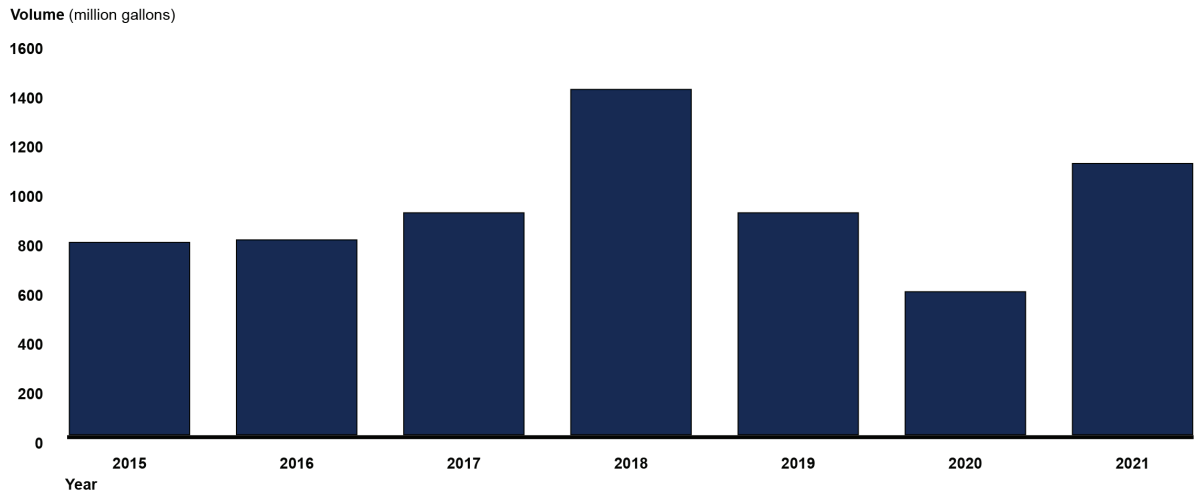
Source: Capital Region Water. | GAO-23-105285

Example of a green stormwater infrastructure project in Harrisburg

Source: Capital Region Water. | GAO-23-105285

Progress to Date

Annual Volume of CSO Discharges in Harrisburg, Pennsylvania, 2015-2021



Source: GAO summary of Capital Region Water documentation. | GAO-23-105285

CONTROLLING COMBINED SEWER OVERFLOWS (CSOs): KANSAS CITY, MISSOURI

Municipality and Facility Overview

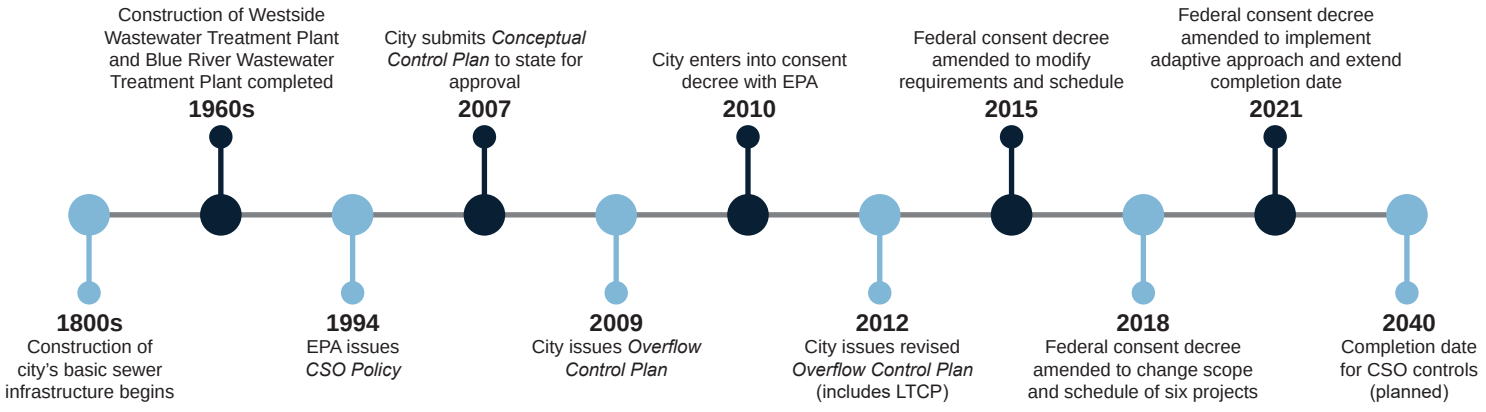
Kansas City, Missouri sits along the Missouri River, which serves as a portion of the state's western boundary with Kansas. The city's drinking water comes either directly from the Missouri River or from wells located in the river's floodplain. Kansas City's wastewater treatment system service serves the city and 27 surrounding communities. The system has a total of six wastewater treatment plants. Four treatment plants north of the Missouri River are served by separate sewer systems and do not have CSO discharges. The two largest treatment plants are south of the river and have sections of combined sewer systems that can have CSO discharges in wet weather. The two plants have a combined treatment capacity of 127.5 million gallons per day.

CSO FACTS	
Utility operator	KC Water
Facility name	Westside Wastewater Treatment Plant and Blue River Wastewater Treatment Plant
EPA region	Region 7, Midwest
Permitting authority	Missouri Department of Natural Resources
Permit numbers	MO0024929; MO0024911
Service population	About 650,000
Primary receiving waters	Missouri and Blue Rivers
Wastewater and sewer system	• 6 wastewater treatment plants • 2,736 miles of sewer pipes (1,010 miles, or about 37 percent, are combined) • 58 pumping stations • 87 CSO outfalls

Long-Term Control Plan (LTCP) Approach and Status

Kansas City developed its initial LTCP, known as the *Overflow Control Plan*, for reducing overflows from the city's wastewater collection and treatment systems in 2009. In 2010, Kansas City and EPA entered into a federal consent decree. The city then revised the LTCP in 2012 to include modifications agreed to in the consent decree. The consent decree was subsequently amended in 2015 and 2018 to modify the scope and schedule of CSO controls to be implemented under the plan.

In 2021, the consent decree was amended a third time to adopt an adaptive management approach to implementing CSO control measures. The city plans to achieve a 77 percent capture rate of CSO volume in a typical year by 2035 and an 85 percent rate by 2040. According to the city, this approach provides it a process to evaluate alternatives for cost-effective solutions, optimize control performance, and maintain affordability while remaining in compliance with the federal consent decree requirements.



Estimated Costs

Initial costs for the *Conceptual Control Plan*, which Kansas City submitted in 2007, were estimated to range between $2.4 billion and $3 billion (in 2006 dollars) to reduce the frequency and volume of overflows from its combined and separate sanitary sewer system. The estimated costs of the control program in the initial 2010 consent decree were $2.48 billion (in 2008 dollars), according to city officials. As of 2021, according to city officials, under the third amended consent decree, the estimated costs have been revised to $3.3 billion.

Time Frames

CSO control work started	Planned completion year	Years addressing CSO controls	Years remaining to complete	Total years
2007	2040	15	18	33

Examples of CSO Controls

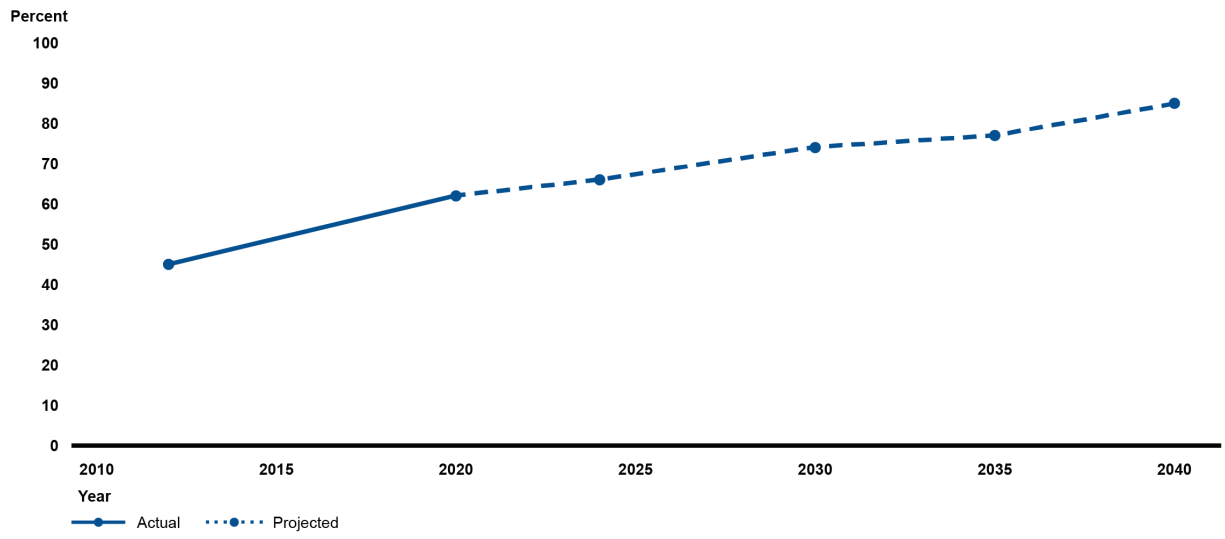
- **Source controls.** By 2022, Kansas City had completed 13 green infrastructure projects in four areas of the city, with a combined designed storage volume totaling more than 7 million gallons.
- **Optimizing system capacity and performance.** The city reports annually on maintenance activities performed in the combined sewer system including clearing blocked sewer mains, repairing sewer mains, repairing manhole covers, and responding to reports of water in city basements. For example, in 2014, the city cleaned 183 miles of sewer lines.
- **Treatment technologies.** In 2013, the city completed projects to improve disinfection of wastewater at three of its treatment plants. As part of these improvements, two of the city's wastewater treatment plants have been equipped with effluent disinfection systems to eliminate some pollutants found in CSO discharges.

Central Industrial District Green Infrastructure Project in the Turkey Creek Watershed to manage stormwater and reduce CSOs.
Source: KC Water. | GAO-23-105285

- **Sewer separation.** In 2021, the city had several sewer separation projects underway that are planned to be completed by 2024 to help eliminate overflows, including at specific CSO outfalls around the city.

Progress to Date

Percent Capture of CSO Discharge Volume in Kansas City, Missouri, 2012-2040



Source: GAO summary of KC Water documentation. | GAO-23-105285

CONTROLLING COMBINED SEWER OVERFLOWS (CSOs): MORGANTOWN, WEST VIRGINIA

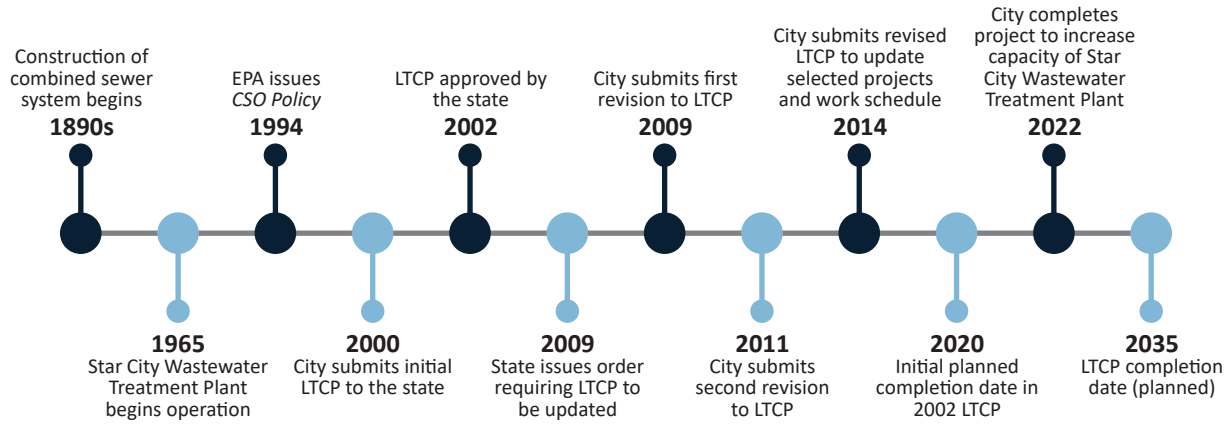
Municipality and Facility Overview

Morgantown is a city of about 30,000 people in north central West Virginia near the border with Pennsylvania. It is home to West Virginia University and is located along the Monongahela River, which flows north into Pennsylvania to become a headwater of the Ohio River. The river's main uses include fishing, navigation, and recreational boating. The city's Star City Wastewater Treatment Plant was constructed in 1965, with improvements over the years that expanded its treatment capacity to 12 million gallons per day. The regional wastewater and sewer system, which is almost entirely combined sewers, serves Morgantown, Westover, Star City, Granville, the university, and surrounding unincorporated areas in portions of Monongalia County.

CSO FACTS	
Utility operator	Morgantown Utility Board
Facility name	Star City Wastewater Treatment Plant
EPA region	Region 3, Mid-Atlantic
Permitting authority	West Virginia Department of Environmental Protection
Permit number	WV0023124
Service population	About 20,300
Primary receiving waters	Monongahela River and Deckers Creek
Wastewater and sewer system	• 1 wastewater treatment plant • 300 miles of sewer pipes (nearly all are combined) • 49 pumping stations • 40 CSO outfalls

Long-Term Control Plan (LTCP) Approach and Status

The city developed an initial LTCP in 2000 in response to a requirement in its state-issued NPDES permit. The city has since revised the LTCP several times to comply with changes in the state's CSO policy and to update the planned schedule and CSO control projects. The city submitted the most recent revised plan to the state for approval in 2014. The state has not approved the revised plan, but the city has constructed selected projects. The LTCP used the presumption approach to select its set of CSO controls, with the goal of eliminating or capturing at least 85 percent of CSO discharge volume.



Estimated Costs

Initial costs for CSO projects in the 2002 LTCP were estimated to be about $77.5 million (in 2001 dollars). The estimated costs to complete the CSO control projects in the 2014 LTCP were about $173 million (in 2015 dollars). Officials estimate that actual costs for constructing the initial group of CSO control projects has totaled about $105.5 million through 2022.

Time Frames

CSO control work started	Planned completion year	Years addressing CSO controls	Years remaining to complete	Total years
2000	2035	22	13	35

Examples of CSO Controls

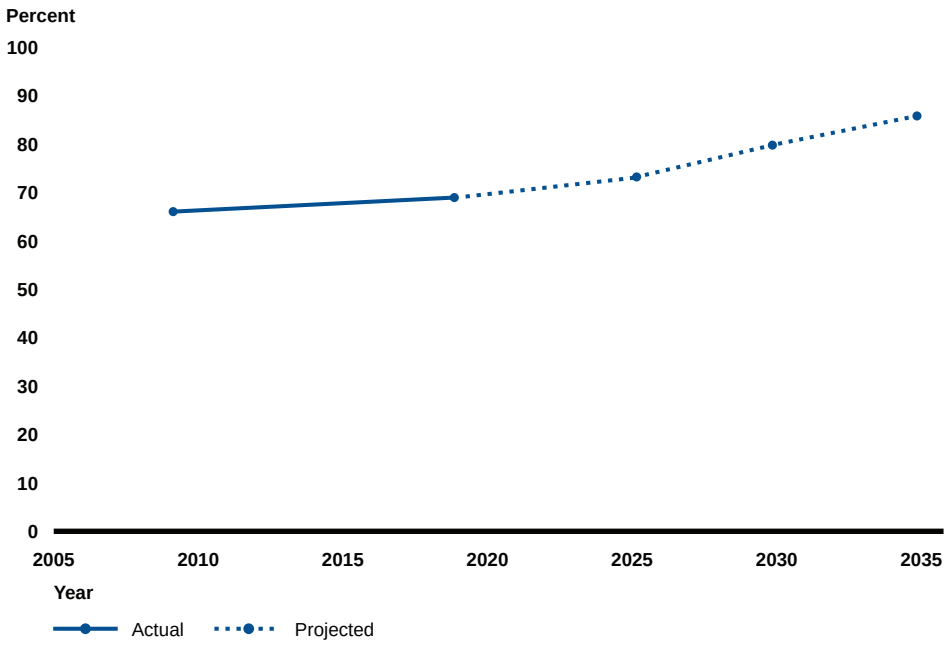
- **Treatment capacity.** In 2022, the city completed initial upgrades to the Star City Wastewater Treatment Plant to expand treatment capacity from 12 million gallons per day to 20.8 million gallons per day.
- **Storage capacity.** The city completed constructing the West Run Surge tank to equalize flows from the pumping station and reduce CSOs from downstream locations during wet weather.
- **System performance.** The city completed upgrades to the Decker's Creek Pump Station, which included a new pipe to convey significantly more wastewater to the treatment plant.

Deckers Creek Pump Station
Source: GAO photo. | GAO-23-105285

Star City Wastewater Treatment Plant
Source: GAO photo. | GAO-23-105285

Progress to Date

Percent Capture of CSO Discharge Volume in Morgantown, West Virginia, 2009-2035



Source: GAO summary of Morgantown Utility Board documentation. | GAO-23-105285

CONTROLLING COMBINED SEWER OVERFLOWS (CSOs): NASHVILLE, TENNESSEE

Municipality and Facility Overview

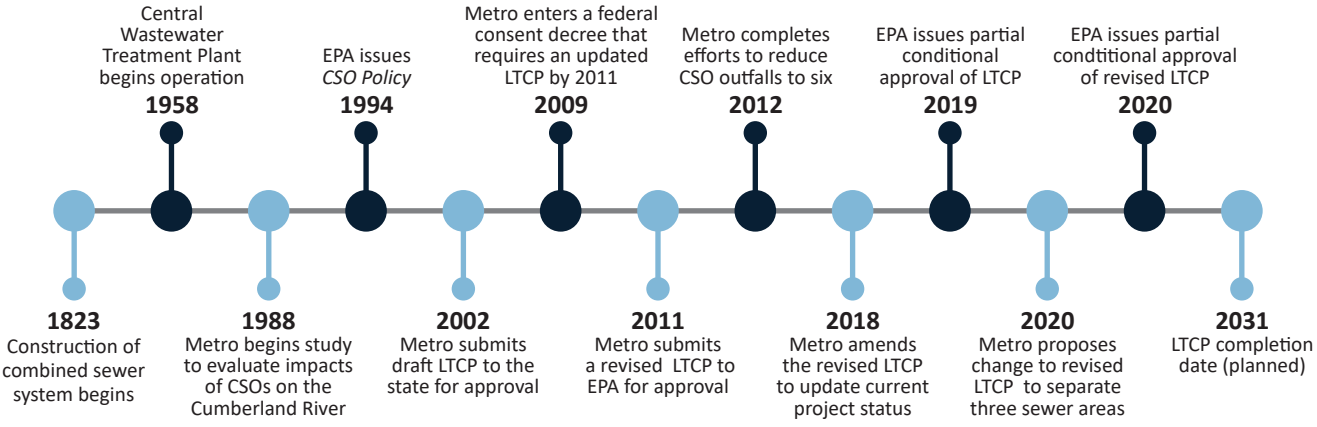
Nashville, a city of about 700,000 people in central Tennessee, is one of the fastest growing areas in the U.S. It sits along the Cumberland River, which is a source of drinking water and recreational opportunity. The Central Wastewater Treatment Plant, the city's first, was constructed in 1958 with an original treatment capacity of 50 million gallons per day. The plant has been expanded four times, with a current treatment capacity of 330 million gallons per day. Two additional treatment plants were constructed in 1961 and 1975. The majority of downtown Nashville is served by a combined sewer system, while the outer areas and suburbs are served by a separate sewer system.

CSO FACTS	
Utility operator	Metro Water Services
Facility name	Central Wastewater Treatment Plant
EPA region	Region 4, Southeast
Permitting authority	Tennessee Department of Environment and Conservation
Permit number	TN0020575
Service population	About 700,000
Primary receiving waters	Cumberland River
Wastewater and sewer system	• 3 wastewater treatment plants • 3,100 miles of sewer pipes (224 miles, or 7 percent, are combined) • 117 pumping stations • 6 CSO outfalls

Long-Term Control Plan (LTCP) Approach and Status

In 1990 and 1999, the state of Tennessee issued administrative orders requiring Metro Water Services to eliminate all non-compliant CSO events by the end of 2007. In 2007, the state filed a lawsuit in federal court against the utility alleging violations of the federal and state Clean Water Acts. EPA also filed a lawsuit in 2007 alleging that the utility had violated the federal Clean Water Act. The lawsuits were subsequently consolidated. The consolidated lawsuit was resolved in 2009 with the issuance of a consent decree that required Metro to update its LTCP by March 12, 2011. In 2011, Metro submitted a revised LTCP using the demonstration approach to select its set of CSO control projects. Key goals of the plan include:

- capture at least 93 percent of system-wide CSO discharge (by volume);
- limit CSO events at four outfalls to an average of zero to two in a typical year; reduce events at other two outfalls to a point where water quality impacts will be cost effectively addressed; and
- reduce the amount of time during the year that water quality standards are exceeded after a CSO event.



Estimated Costs

Initial costs for the 2011 LTCP were estimated to be $372 million. The most recent estimate to complete the revised LTCP is about $580 million, and actual costs totaled $265 million through June 2022. The city also spent about $216 million on system improvements and control projects that began in the 1990s, before implementation of the LTCP.

Time Frames

CSO control work started	Planned completion year	Years addressing CSO controls	Years remaining to complete	Total years
1988	2031	34	9	43

Examples of CSO Controls

- **Sewer separation.** In 2022, Metro initiated design on three separation projects that will replace about 950 acres of aging combined sewer lines in poor condition with new separated sewer and stormwater infrastructure.
- **Storage capacity.** In 2013, Metro completed construction at the Driftwood Equalization Facility that increased its storage capacity by 3.2 million gallons and corrected other defects.

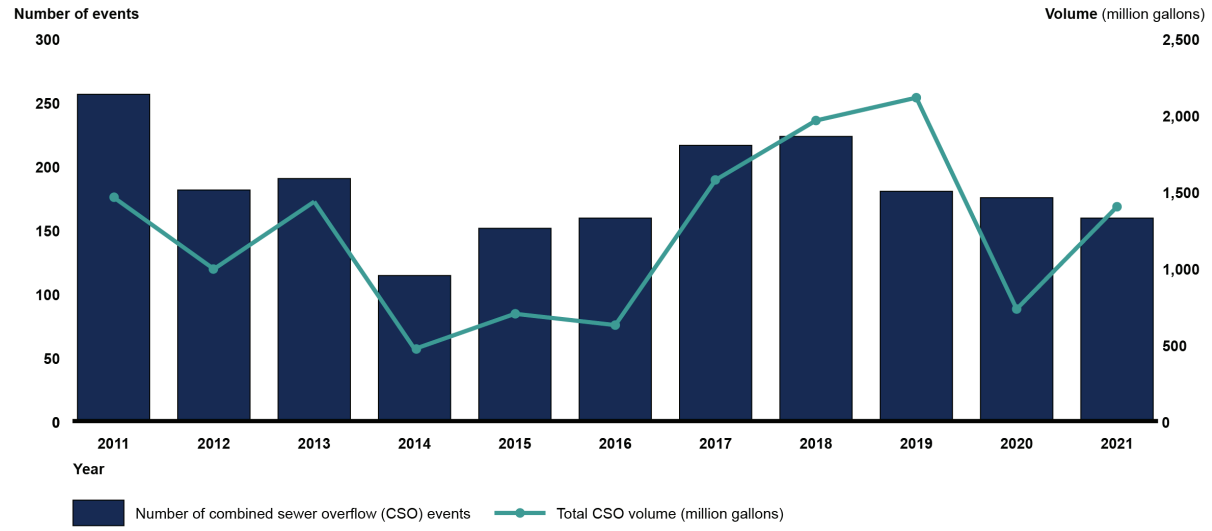
Central Wastewater Treatment Plant Capacity Improvements Project
Source: Metro Water Services. | GAO-23-105285

Driftwood Equalization Facility Improvement Project
Source: Metro Water Services. | GAO-23-105285

- **System performance.** In 2013, Metro completed the Washington Regulator project that added screening and floatables controls and improved hydraulic performance to maximize storage in this portion of the collection system.
- **Treatment capacity.** In 2020, Metro started construction to expand the Central Wastewater Treatment Plant's treatment capacity from 330 million gallons per day to over 400 million gallons per day. The project is expected to be completed in 2023.

Progress to Date

Annual Number and Volume of CSO Discharges in Nashville, Tennessee, 2011-2021



Source: GAO summary of Metro Water Services documentation. | GAO-23-105285

CONTROLLING COMBINED SEWER OVERFLOWS (CSOs): OSWEGO, NEW YORK

Municipality and Facility Overview

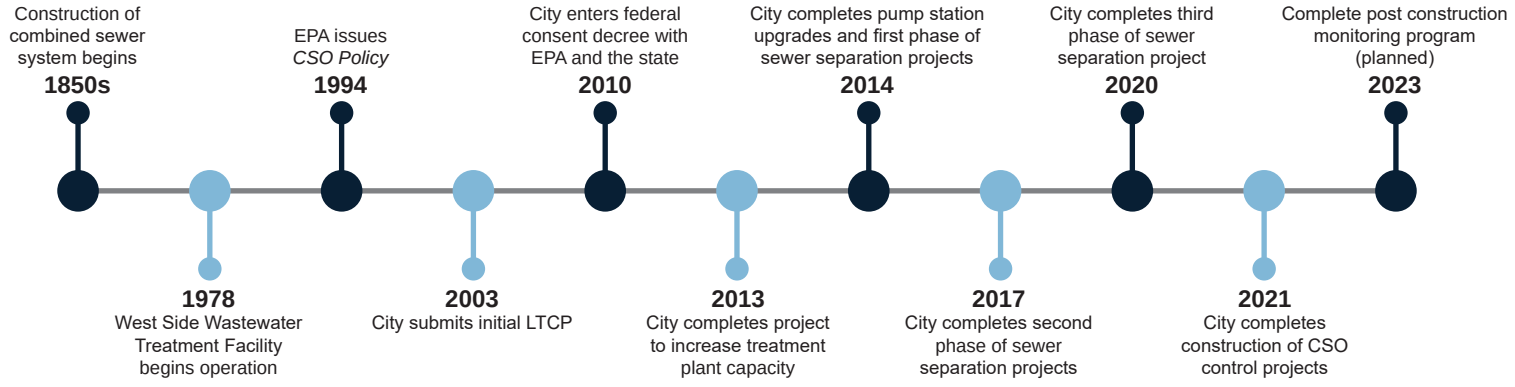
Oswego is a city of about 17,000 people in north-central New York, also known as the "Port City of Central New York." It sits along Lake Ontario and the Oswego River, which both offer fishing, recreational, and economic development opportunities. An initial treatment plant for the west side began operation in 1939. It was replaced with the West Side Wastewater Treatment Facility, which began construction in 1974 and became operational in 1978. The plant had a designed treatment capacity of 4 million gallons per day and provides service to the city's west side, a college, and surrounding communities. From 2003 through 2010, the city discharged CSOs through locations that were not authorized in its NPDES permit, including through manholes at the Riverwalk along the Oswego River. The city estimated that from 2003 through 2010, it discharged about 377,740 gallons of combined sewage annually at these unauthorized locations.

CSO FACTS	
Utility operator	City of Oswego Department of Public Works
Facility name	West Side Wastewater Treatment Facility
EPA region	Region 2, Northeast
Permitting authority	New York State Department of Environmental Conservation
Permit number	NY0029106
Service population	About 16,350
Primary receiving waters	Oswego River and Lake Ontario
Wastewater and sewer system	• 1 wastewater treatment plant • 4 miles of combined sewer pipes (about 8 percent of the system) • 1 pumping station • 2 CSO outfalls

Long-Term Control Plan (LTCP) Approach and Status

Oswego initially developed and submitted a LTCP to the state of New York in 2003. It was subsequently revised several times but never received approval. In 2010, the city entered into a federal consent decree with EPA and the state that required the city to implement specified projects to control CSOs on the west side of the city. The decree essentially became the city's LTCP for the West Side Wastewater Treatment Facility. The decree also included an implementation schedule, with completion by November 1, 2021. According to city officials, the actions agreed to were based on the demonstrative approach. The specific goals of the city's approach are to:

- expand treatment capacity of the West Side Wastewater Treatment Facility;
- separate at least 75 percent of the west-side combined sewer system in three project phases;
- eliminate all CSO discharges at or near the Riverwalk manholes;
- build capacity to reduce CSO events to no more than an average of four per year for the CSO outfall at the Excess Flow Management Facility; and
- seasonal disinfection at this outfall annually from June through September.



Estimated Costs

Initial costs for CSO projects in the 2010 consent decree were estimated to be about $89 million. According to city officials, the actual costs through December 2021 have totaled about $29.3 million.

Time Frames

CSO control work started	Actual completion year	Years addressing CSO controls	Years remaining to complete	Total years
2003	2021	18	0	18

Examples of CSO Controls

- **Treatment capacity.** In 2013, Oswego completed upgrades to the West Side Wastewater Treatment Facility that expanded its wet weather treatment capacity to 12 million gallons per day.
- **Sewer separation.** In 2020, Oswego completed a three-phased effort to separate 75 percent of the west side's combined sewer and stormwater system.
- **System performance.** In 2014, Oswego completed upgrades to increase the storage and treatment capacity of the pump station at the Excess Flow Management Facility.

Sewer Separation Project at West 2nd and Cayuga Street

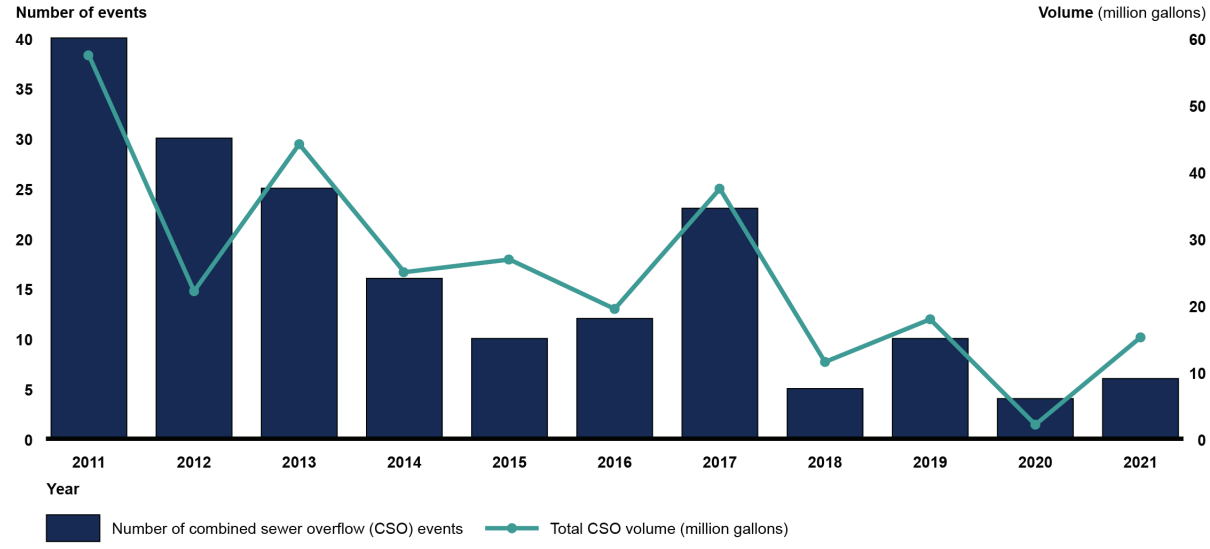
Source: City of Oswego, New York. | GAO-23-105285

Excess Flow Management Facility Upgrade

Source: City of Oswego, New York. | GAO-23-105285

Progress to Date

Annual Number and Volume of CSO Discharges in Oswego, New York, 2011-2021



Source: GAO summary of city of Oswego, New York documentation. | GAO-23-105285

CONTROLLING COMBINED SEWER OVERFLOWS (CSOs): PORTLAND, OREGON

Municipality and Facility Overview

Portland, the largest city in Oregon, was established along the Columbia and Willamette Rivers. The city's Columbia Boulevard Wastewater Treatment Plant opened in 1952 and began discharging treated wastewater to the Columbia River. Over the last 50 years, the city has upgraded and expanded the plant's treatment capacity. In the 1990s, CSO discharges were estimated to average about 6 billion gallons per year and to occur approximately 100 days a year. Today, the plant manages an average of 70 million gallons of wastewater per day, with the ability to increase treatment capacity to up to 450 million gallons per day during wet weather.

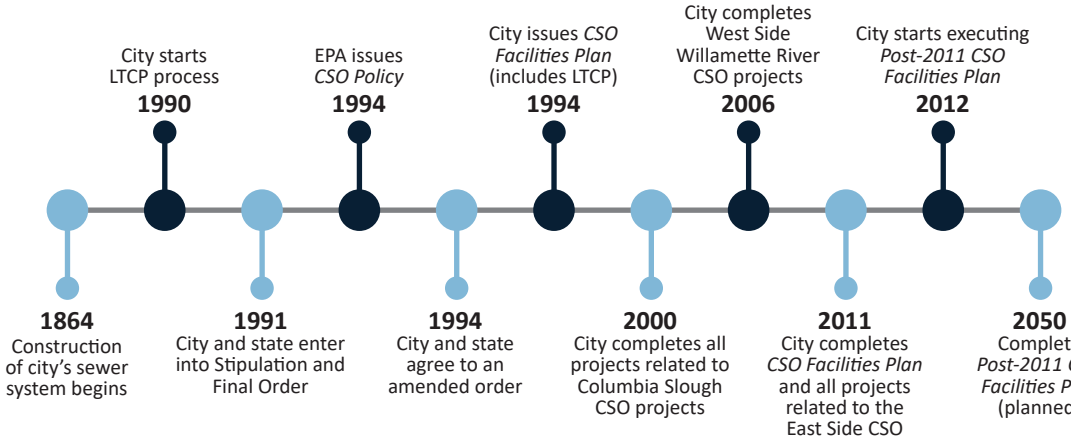
CSO FACTS	
Utility operator	City of Portland Bureau of Environmental Services
Facility name	Columbia Boulevard Wastewater Treatment Plant
EPA region	Region 10, Pacific Northwest
Permitting authority	Oregon Department of Environmental Quality
Permit number	OR0026905
Service population	About 600,000
Primary receiving waters	Columbia River, Columbia Slough, and Willamette River
Wastewater and sewer system	• 1 wastewater treatment plant • 2,647 miles of sewer pipes (913 miles, or about 35 percent, are combined) • 98 pumping stations • 36 CSO outfalls

Long-Term Control Plan (LTCP) Approach and Status

In 1991, the city and the Oregon Department of Environmental Quality reached agreement on a Stipulation and Final Order that established the framework for a 20-year program to reduce the frequency and volume of CSOs. The 1991 order required the city to develop and submit a plan that would identify the facilities and projects needed to address CSOs. In 1994, the order was amended to include the city's plan, known as the *CSO Facilities Plan*, and required implementation to be completed by 2011. The city used a presumption approach to develop the 20-year plan, which was designed to show that CSO volume had been reduced by:

- 94 percent in the Willamette River, and
- 99.5 percent in the Columbia Slough.

Portland completed the *CSO Facilities Plan* in 2011 and is implementing its *Post-2011 CSO Facilities Plan*, which provides a framework for any refinements or improvements needed to the overall system.



Estimated Costs

Initial costs for the 1994 *CSO Facilities Plan* were estimated to be $700 million (in 1993 dollars). City officials estimated the actual costs to construct the planned CSO control projects were $1.4 billion dollars (in 2010 dollars).

Time Frames

CSO control work started	Actual completion year	Years addressing CSO controls	Years remaining to complete	Total years
1990	2011	21	0	21

Examples of CSO Controls

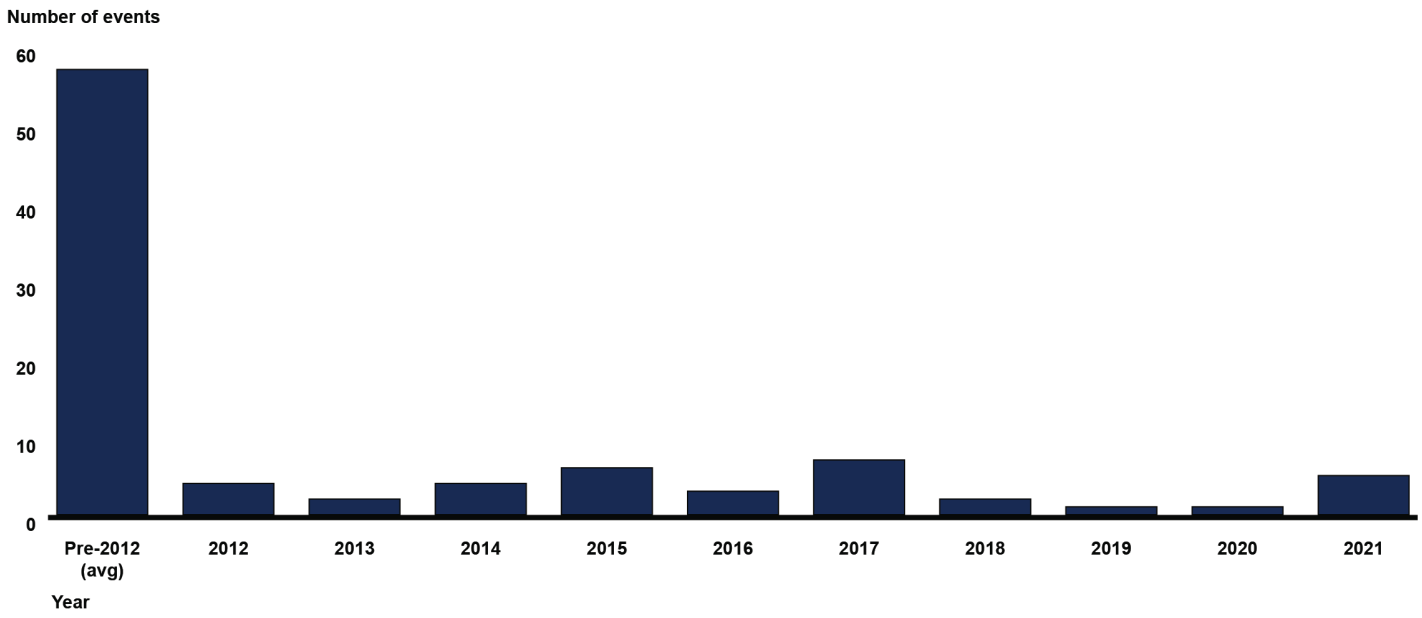
- **Conveyance improvements.** In 2000, 2006, and 2011, as part of Portland's "Big Pipe Project," the city constructed three large tunnels for pipelines to prevent CSOs from overflowing into the Willamette River or Columbia Slough. The largest was 6-miles long with a 22-foot diameter on the east side of the city. In total, the Big Pipe Project provides 119 million gallons of storage.
- **Storage and treatment capacity.** Between 1993 and 2011, the city implemented the Downspout Disconnection Program to disconnect more than 56,000 downspouts from houses and buildings to reduce stormwater flow into the city's combined sewer system in specific neighborhoods. The water was instead distributed to vegetated areas on residential properties. According to officials, a statistical study conducted 4 years after the program ended in 2011 showed that about 70 percent roof area continued to be disconnected.
- **System performance.** In 2011, the city began implementing its post-construction monitoring plan to track and monitor the overall system's performance after various CSO control efforts were put in place.
- **Sewer separation.** By 2000, the city installed new sewers throughout the northern sections of the city to decrease the flow into the combined sewer system.

Work at the Swan Island CSO Pump Station as part of Portland's Big Pipe Project next to the Willamette River in 2004.

Source: @City of Portland, Image courtesy of the Bureau of Environmental Services. | GAO-23-105285

Progress to Date

Annual Number of CSO Discharges in Portland, Oregon, 2012-2021



Source: GAO summary of information from "About the Big Pipe Project", Portland.gov. | GAO-23-105285

CONTROLLING COMBINED SEWER OVERFLOWS (CSOs): SAN FRANCISCO, CALIFORNIA

Municipality and Facility Overview

San Francisco is a city of about 815,000 people in northern California and is one of the most densely populated cities in the U.S. It sits along the Pacific Ocean and San Francisco Bay, which offer miles of beaches, fish and wildlife habitat, and recreational opportunities. It is one of two cities in the state with a combined sewer system, and the only one located along the Pacific Coast. The city's wastewater and sewer system includes three wastewater treatment facilities that serve the city of San Francisco and small portions of Brisbane and Daly City. The newest facility, the Oceanside Water Pollution Control Plant, was constructed in 1993 with a treatment capacity of 65 million gallons per day.

CSO FACTS	
Utility operator	San Francisco Public Utilities Commission
Facility name	Oceanside Water Pollution Control Plant; Southeast Water Pollution Control Plant; North Point Wet Weather Facility
EPA region	Region 9, Pacific Southwest
Permitting authority	Environmental Protection Agency and the San Francisco Bay Regional Water Quality Control Board
Permit number	CA0037681, CA0037664
Service population	About 887,000
Primary receiving waters	Pacific Ocean and San Francisco Bay
Wastewater and sewer system	• 2 wastewater treatment plants and another facility that provides treatment during rain events • 959 miles of combined sewer pipes (about 99 percent of the system) • 26 pumping stations • 36 CSO outfalls and 3 off-shore deep water outfalls

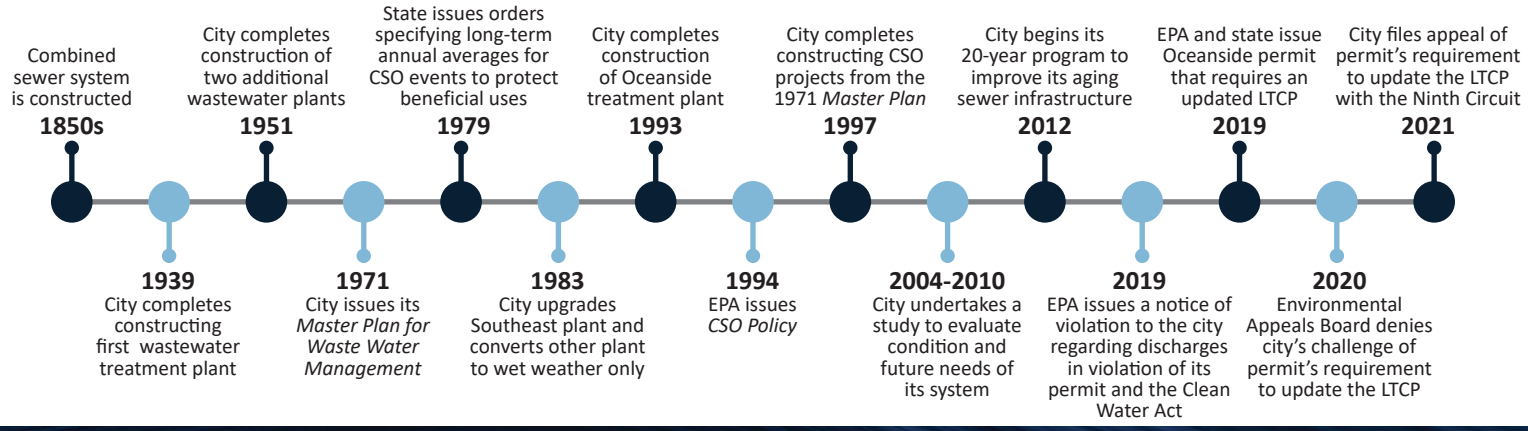
Long-Term Control Plan (LTCP) Approach and Status

The city's planning efforts to control CSOs began in the 1960s and led to its 1971 *San Francisco Master Plan for Waste Water Management.* In 1979, the state issued administrative orders that determined the following long-term, annual averages of CSOs by basin that would be necessary to protect beneficial uses during wet weather:

- Westside Drainage Basin: 8 discharges
- Central Drainage Basin: 10 discharges
- North Shore Drainage Basin: 4 discharges
- Southeast Drainage Basin: 1 discharge

San Francisco Water Power Sewer
Services of the San Francisco Public Utilities Commission

When EPA issued its 1994 *CSO Policy*, the city had substantially completed construction of the CSO controls in its 1971 *Master Plan for Waste Water Management*. As a result, EPA and the state determined the city did not need to comply with the initial planning and construction requirements of the 1994 *CSO Policy*. In 2019, EPA and the state issued an NPDES permit for the Oceanside system that required the city to develop and submit an updated LTCP. In January 2020, the city filed a petition with the Environmental Appeals Board requesting review of this and other requirements. The board denied the city's petition in December 2020 and, in February 2021, the city filed an appeal with the U.S. Court of Appeals for the Ninth Circuit challenging this requirement, among other things. As of December, 2022, the case is still pending.



Estimated Costs

Initial costs for the 1971 *Master Plan* CSO controls projects were estimated to be about $672 million. The actual costs to complete construction were approximately $1.4 billion (in 1997 dollars).

Time Frames

CSO control work started	Actual completion year	Years addressing CSO controls	Years remaining to complete	Total years
1967	1997	30	--	30

Examples of CSO Controls

- **Sewer rehabilitation.** The city completed rehabilitation of outfalls to install additional baffles to further improve solids removal prior to discharge.
- **Conveyance improvements.** In 2012, the city completed construction of the New Sunnydale Tunnel, which was built primarily to reduce neighborhood flooding but also provides a 3.4 million gallon increase in storage capacity for the southeast part of the city.
- **Storage capacity.** In the 1980s through 1990s, the city constructed several large transport and storage structures, that collectively provide an additional storage capacity of 231 million gallons.
- **System performance.** The city constructed the Westside Pump Station, which can pump up to 133 million gallons per day of wastewater when needed from the west side storage facility to the 4.5 mile long deepwater Southwest ocean outfall.
- **Treatment capacity.** In 1983, the city completed improvements and upgrades at the Southeast Water Pollution Control Plant. During wet weather, it has the capacity to treat up to 250 million gallons per day. In 1993, the city constructed the Oceanside Water Pollution Control Plant with capacity to treat up to 65 million gallons per day in wet weather.

Construction of Westside Transport/Storage Structure

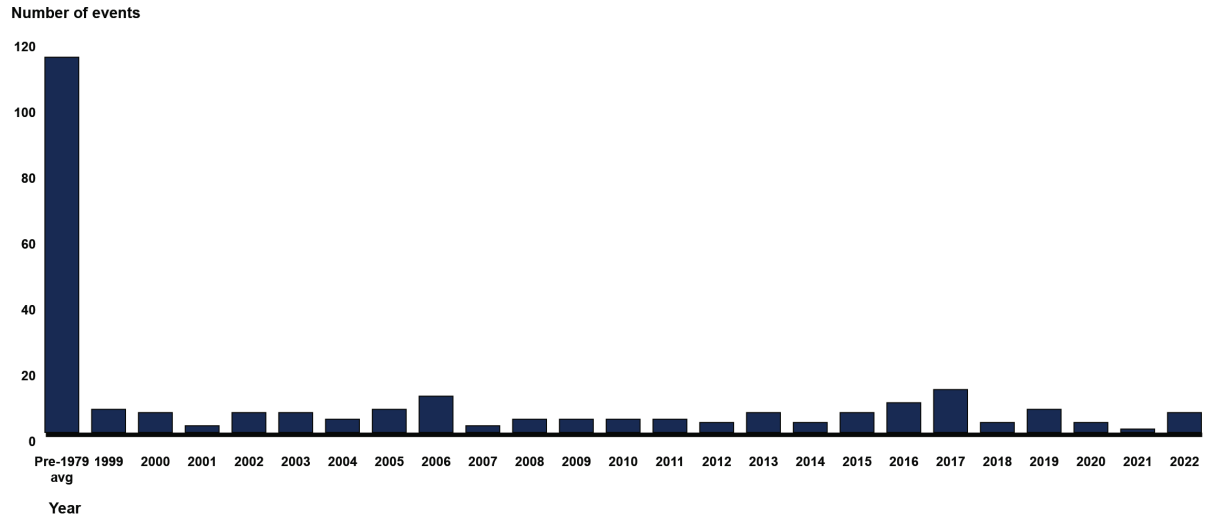
Source: Photo courtesy of the San Francisco Public Utilities Commission Communications Department | GAO-23-105285

Construction of New Sunnydale Tunnel in 2011

Source: Photo courtesy of the San Francisco Public Utilities Commission Communications Department | GAO-23-105285

Progress to Date

Annual Number of CSO Discharge Events in the Westside Basin of San Francisco, California, 1999-2022



Source: GAO summary of San Francisco Public Utilities Commission documentation. | GAO-23-105285

CONTROLLING COMBINED SEWER OVERFLOWS (CSOs): SPRINGFIELD, MASSACHUSETTS

Municipality and Facility Overview

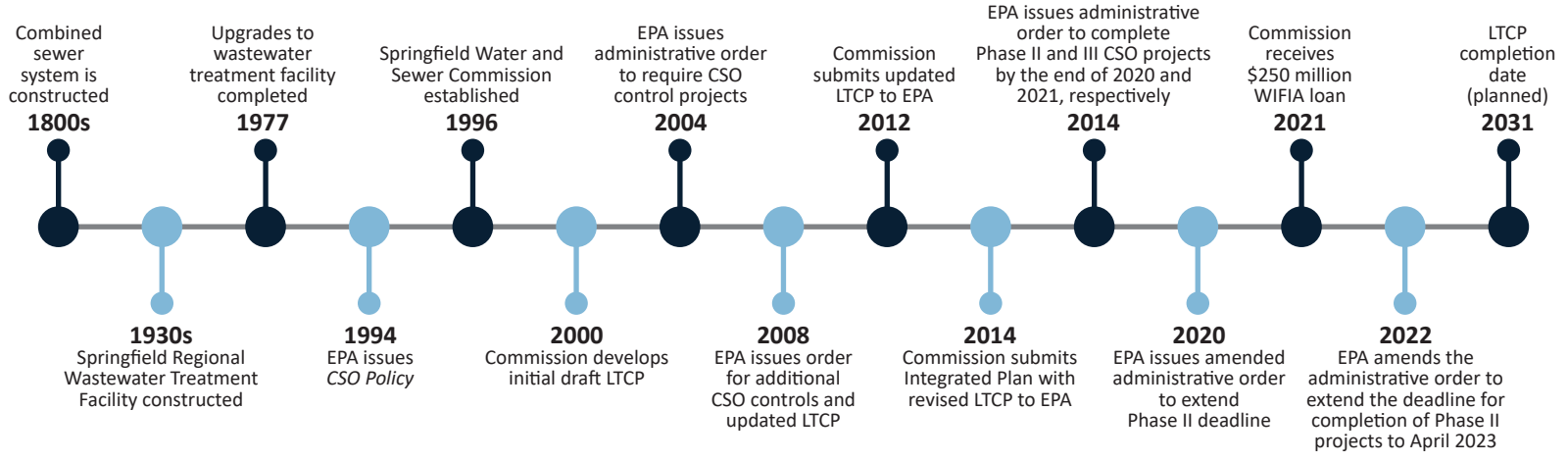
Springfield is the third largest city in Massachusetts, with about 155,000 residents. It is located along the Connecticut River, the longest river in the state. The river offer boating, fishing, and other riverfront recreational opportunities such as the 4-mile Connecticut River Walk and Bikeway. The Springfield Regional Wastewater Treatment Facility was constructed in the 1930s and upgraded in the 1970s. The facility is one of the largest contributors of nitrogen in the Connecticut River watershed, which ultimately drains into the Long Island Sound.

CSO FACTS	
Utility operator	Springfield Water and Sewer Commission
Facility name	Springfield Regional Wastewater Treatment Facility
EPA region	Region 1, New England
Permitting authority	EPA Region 1
Permit number	MA0101613
Service population	Approximately 250,000
Primary receiving waters	Connecticut, Mill, and Chicopee Rivers
Wastewater and sewer system	• 1 wastewater treatment plant • About 150 miles of combined sewer pipes (about 32 percent of total system) • 27 pumping stations • 23 CSO outfalls

Long-Term Control Plan (LTCP) Approach and Status

The Springfield Water and Sewer Commission drafted an initial LTCP in 2000, which was then revised in 2012. In 2014, the commission began an integrated planning process to prioritize other high-risk infrastructure and wastewater improvement projects it needed along with its obligations to control CSOs. The commission's 2014 integrated plan incorporated the 2012 LTCP and proposed to implement its CSO projects in six phases over a 20-year period. While EPA has not fully approved the commission's plans, the agency has used a series of administrative orders to set schedules for implementing selected projects. The commission developed its LTCP using the presumption approach and along with the integrated plan, set goals to:

- reduce CSO flow volume by 87 percent;
- reduce the annual number of CSO discharges from 342 to about 60 per year; and
- reduce annual CSO discharge volume from 441 million gallons to less than 60 million gallons.



Estimated Costs

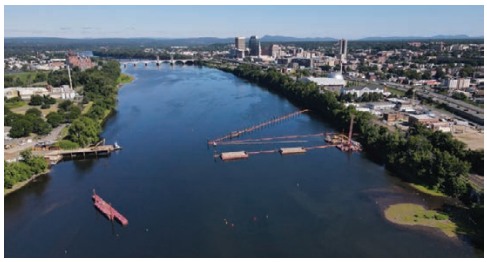
Estimated capital costs to complete CSO control projects in the 2012 LTCP were $136 million (in 2011 dollars). This amount does not include the $100 million in funds spent for CSO controls that were constructed from 2000 through 2012.

Time Frames

CSO control work started	Planned completion year	Years addressing CSO controls	Years remaining to complete	Total years
1988	2031	34	9	43

Examples of CSO Controls

- **Treatment plant upgrades.** In 2021, the commission began modernization projects and efficiency upgrades to the regional wastewater treatment facility. These projects include improving grit, nitrogen, and phosphorus removal, and electrical improvements.
- **Conveyance improvements.** In 2022, the commission began work on the Locust Transfer Structure Construction Project, which includes replacing aging pipes and installing a new connection to improve flow distribution through the system.
- **System performance.** In 2019, the commission started construction of the York Street Pump Station and Connecticut River Crossing Project. This project replaces an aging pump station with a new one capable of pumping an additional 30 million gallons per day to the wastewater treatment plant. It also adds three new pipes across the Connecticut River to add redundancy and flood control.

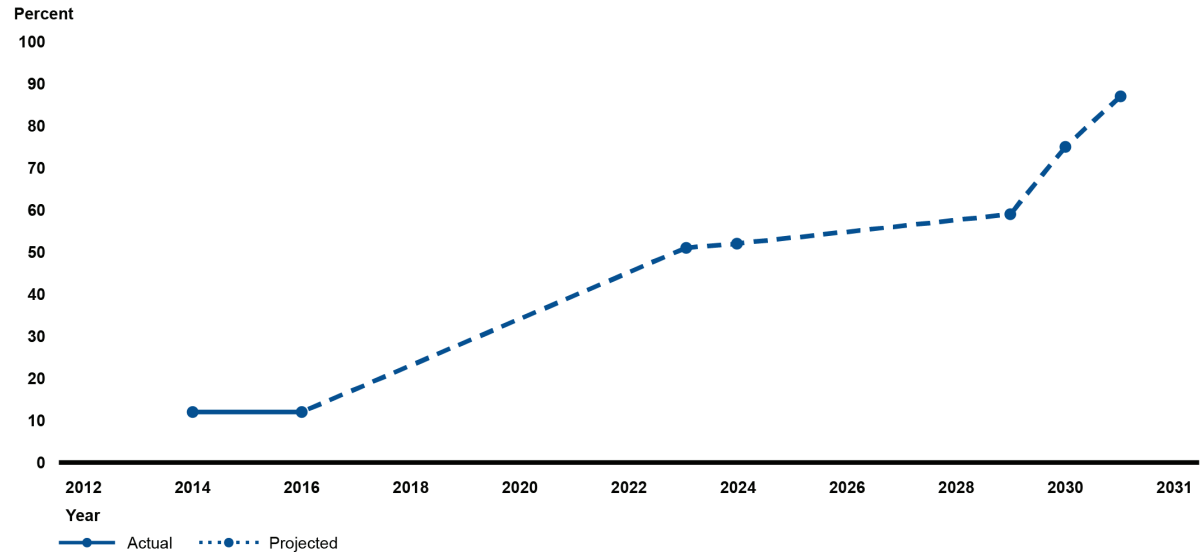


York Street Pumping Station and Connecticut River Crossing Project

Source: Springfield Water and Sewer Commission. | GAO-23-105285

Progress to Date

Percent Capture of CSO Volume in Springfield, Massachusetts, 2012-2031



Source: GAO summary of Springfield Water and Sewer Commission documentation. | GAO-23-105285

Appendix III: Comments from the Environmental Protection Agency

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

OFFICE OF WATER

Mr. Alfredo Gomez
Director
Natural Resources and Environment
U.S. Government Accountability Office
Washington, DC 20548

Dear Mr. Gomez:

Thank you for the opportunity to review and comment on GAO's draft report, "Clean Water Act: EPA Should Track Control of Combined Sewer Overflows and Water Quality," Report #GAO-23-105285. The purpose of this letter is to provide EPA's response to the draft report findings, conclusions, and recommendations. Through technical comments enclosed with this letter, EPA is also providing additional information for GAO to consider including in the final report. While EPA generally agrees with GAO's findings, conclusions, and recommendations, EPA acknowledges that significant progress has been made in implementing long-term control plans (LTCPs) and reducing combined sewer overflows (CSOs) and improving water quality across the United States.

GAO found that many municipalities face challenges, and that some are extending the anticipated completion dates of their CSO LTCP. In recent years, EPA has taken steps, such as developing guidance on financial capability and integrated planning, to assist municipalities in their CSO control efforts. GAO concluded that on a nationwide basis, EPA does not currently track municipalities' progress towards implementing LTCPs nor does the Agency analyze data consistently and at a national level to demonstrate improvements to water quality resulting from CSO controls. GAO recommends that by developing performance goals and measures that track and assess the development of LTCPs and water quality improvements associated with municipalities' CSO controls, EPA will be better positioned to identify potential improvements in the plans or programs needed to carry them out. Furthermore, GAO concluded that it has been almost two decades since EPA has issued a nationwide report on the progress in implementing the CSO Policy, limiting the public's and other decisionmakers' access to up-to-date information toward achieving the goals of the Clean Water Act.

EPA and states track the development of LTCPs and efforts to control CSOs. Forty-seven states are authorized to implement the National Pollutant Discharge Elimination System (NPDES) program and most of the data related to program progress is collected and maintained at the state level. Recognizing the limitations of having data maintained across multiple states, EPA promulgated the NPDES Electronic Reporting rule ("NPDES eRule") to require the conversion of paper to electronic files in a timely, accurate, complete, and nationally consistent manner (see 40 CFR 127.23). The agency is working to implement this rule, which entails setting up complex data management infrastructure to collect and process data from multiple stakeholders (permittees, states, EPA) and then analyze and visualize these data in a digestible, public-facing data platform. Once the NPDES eRule is fully

implemented, EPA will be better able to track and measure performance goals for the CSO program. EPA notes that the GAO recommendation for an interim data collection effort would be duplicative and complicate NPDES eRule implementation.

GAO Recommendation:

Recommendation 1: The Assistant Administrator of the Office of Water should develop a performance goal and measure(s) to track and assess the status of long-term control plans or other control plans for municipalities with CSOs.

Recommendation 2: The Assistant Administrator of the Office of Water should develop a performance goal and measures to track and assess the improvements to water quality resulting from CSO controls implemented by municipalities with CSOs.

Recommendation 3: The Assistant Administrator of the Office of Water should report on nationwide progress and results of municipalities efforts to control CSOs.

EPA Response:

Recommendation 1: EPA generally agrees with the recommendation. EPA's previous progress measures included tracking the percentage of CSO permittees with an enforceable mechanism (i.e., permit, enforcement order, or sewer separation). This metric was one of many developed to track progress on the Agency's goal of "Water Safe for Swimming." This metric was actively tracked until 2017, at which point 96% of CSO permittees had enforceable mechanisms. At that time, the majority of the CSO permittees had plans in place and had begun projects to reduce CSOs in their communities. In 2015, EPA promogulated the NPDES eRule. Once fully implemented by December 2025, more detailed information on LTCPs and other control plans for municipalities with CSOs will be available electronically in a nationally consistent system that can be accessed by regulators and the public in an easy-to-use format (e.g., dashboard) to track progress and completion of LTCPs.

Recommendation 2: EPA generally agrees with the recommendation. EPA used the tracking of CSO permittees with enforceable mechanisms as a proxy for water quality improvements. As EPA collects more detailed information electronically through the NPDES eRule, the Agency can refine this performance metric to track improvements in water quality. The goal of the CSO Control Policy is to meet water quality standards and protect designated uses. Each LTCP has established preliminary design requirements to reduce CSO discharges and is intended to make substantial progress toward meeting water quality standards. Once fully implemented by December 2025, EPA will have LTCP completion dates, as well as data on the volume and frequency of overflows, and can assess water quality improvements on a community and national level. Furthermore, EPA will have these data available electronically and will create a public facing interface to track CSO permittee progress and ambient water quality monitoring data.

Recommendation 3: EPA generally agrees with the recommendation. EPA is in the process of a two-phase implementation of the NPDES eRule and is working collaboratively with states to pull all the required CSO-related data into the Agency's electronic systems. Once these data have been collected and processed, EPA will have information on:

- Status and completion of Nine Minimum Controls;

- Approval and completion dates of LTCPs;
- Approval of Post Construction Compliance Monitoring Plans;
- Duration, volume, and frequency of CSO discharges for individual CSO permittees and the ability to aggregate these data nationally; and
- Compliance data (duration, volume, frequency, cause, remedial action) on noncompliant CSO discharges (e.g., dry weather overflows) for individual CSO permittees and the ability to aggregate these data nationally.

EPA plans to make these data publicly available in EPA's Enforcement and Compliance History Online (ECHO) database and include data visualization tools to assess progress of the CSO program in combination with ambient water quality monitoring data.

EPA appreciates the opportunity to review the draft report. In you have any questions or need further information, please contact Cameo Smoot, OW's Audit Follow-up Coordinator, at (202) 566-1207 or Smoot.Cameo@epa.gov.

Sincerely,

BENITA BEST-WONG
Digitally signed by BENITA BEST-WONG
Date: 2022.12.16 15:42:43 -05'00'

For Radhika Fox
Assistant Administrator

Attachment: Technical comments

cc: Andrew Sawyers, OWM
Chris Kloss, OWM
Lisa Biddle, OWM
Lawrence Starfield, OECA
Rosemarie Kelley, OECA
John Dombrowski, OECA
Diana Saenz, OECA
Carol King, OECA
Elizabeth Vizard, OECA
Barbara VanTil, OECA
EPA GAO Liaison Team

3

Appendix IV: GAO Contact and Staff Acknowledgments

GAO Contact

J. Alfredo Gómez, gomezj@gao.gov

Staff Acknowledgments

In addition to the contact named above, Susan Iott (Assistant Director), Heather Dowey (Analyst-in-Charge), Adrian Apodaca, Jason Chase, Cindy Gilbert, Ben Licht, Mike Meleady, Corinna Nicolaou, and Jeanette Soares made key contributions to this report.