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Executive Office of Energy & Environmental Affairs

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# Annual Sewage Notification Report 2023

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Massachusetts Department of Environmental Protection

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## I. Overview of the Sewage Notification regulations

### A. Background

In January 2021, Chapter 322 of the Acts of 2020, *An Act promoting awareness of sewage in public waters*, was signed into law. This law ensures that the public knows when untreated sewage flows into Massachusetts waters, including combined sewer overflows (CSOs). In January 2022, the Massachusetts Department of Environmental Protection (MassDEP) promulgated regulations to implement the provisions of the Act, titled Notification Requirements to Promote Public Awareness of Sewage Pollution ([314 CMR 16.00](#)). These sewage notification regulations require wastewater utilities and systems to notify the public of sewage discharges and overflows. The statute includes a requirement for MassDEP to issue a report to the department's website providing a summary of all outfall discharge activity reported for the previous calendar year. This report fulfills MassDEP's annual reporting requirement for calendar year 2023.

Sanitary sewer collection systems are made up of pipes and pumps that transport wastewater from homes and other buildings to wastewater treatment plants. CSOs occur in cities and towns where the sanitary sewer and stormwater systems are combined.

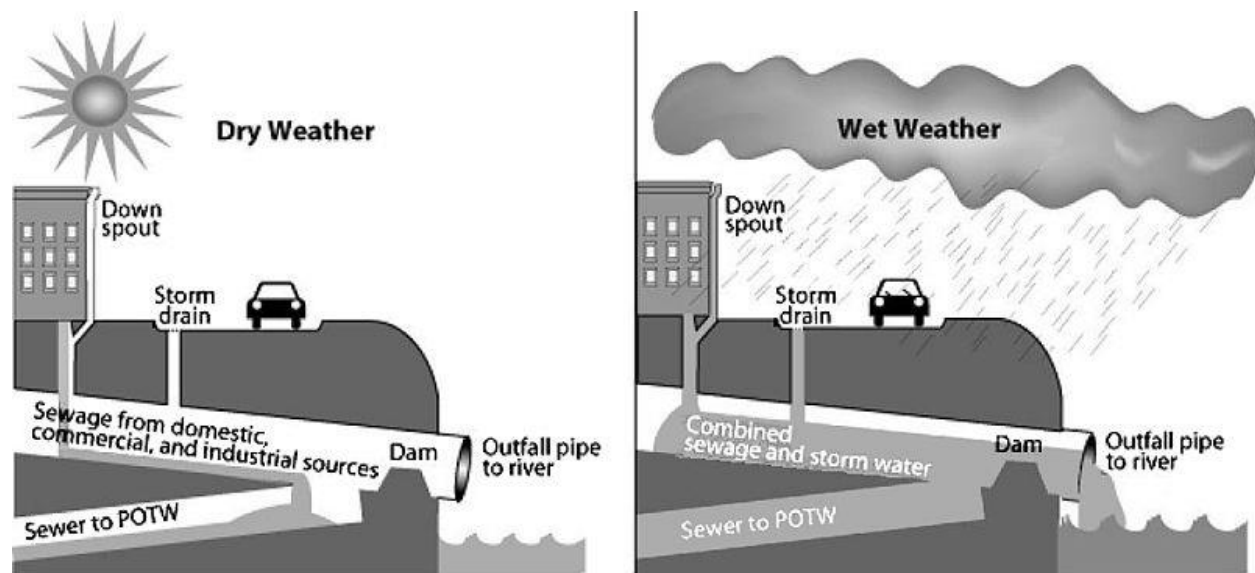


Image: Combined Sewer Overflow Diagram, US EPA

Newer sewer systems were built with separate systems for sanitary and stormwater flows. However, many older cities across the Commonwealth have combined sewer systems designed to carry both sanitary sewage and stormwater in the same pipes. Combined sewer systems have outfall pipes that allow overloaded systems to discharge into bodies of water. When there is not a lot of stormwater, this mix is transported to a wastewater treatment plant where it is treated before discharge. However, after heavy precipitation, stormwater and sewage overload the system, and a mixture of stormwater and wastewater is released through the CSO outfalls. Without the overflow in a combined system, this mixture would back up into homes, businesses, and public streets.

In addition to CSOs, there are other ways in which untreated or partially treated sewage can be released into the environment. At the wastewater treatment plant, wastewater which has been partially treated may be discharged if part of the treatment system is not operational. Additionally, some facilities connected to combined sewer systems practice “blending,” where the facility intentionally diverts a portion of its flow around secondary treatment units during wet weather conditions. This allows more flow to enter the treatment plan and receive at least primary treatment, thereby minimizing water quality impacts of CSOs. Sanitary sewer overflows (SSOs) are any unauthorized release of wastewater from a sanitary sewer system. SSOs can be caused by issues such as a blockage in the pipes, high flow through the system, and pump station failure.

CSO discharges are regulated by MassDEP and the U.S. Environmental Protection Agency in accordance with the federal Clean Water Act, the state Clean Waters Act, state and federal CSO policies, and the Massachusetts Surface Water Quality Standards (314 CMR 4.00). There are 19 CSO permittees with 194 remaining CSO outfalls in Massachusetts. Since the publication of the 2022 Sewage Notification Annual Report, one outfall has been decommissioned in Holyoke, Massachusetts. The CSO permittees are Boston Water & Sewer Commission (BWSC), City of Cambridge, City of Chelsea, City of Chicopee, City of Fall River, City of Fitchburg, City of Gloucester, Greater Lawrence Sanitary District (GLSD), City of Haverhill, City of Holyoke, Lowell Regional Wastewater Utility, Lynn Water & Sewer Commission, Massachusetts Water Resources Authority (MWRA), Town of Montague, City of New Bedford, Somerville Department of Public Works, Springfield Water & Sewer Commission, City of Taunton, and City of Worcester. Each of these CSO permittees must implement specified [control measures](#) and implement a Long-Term Control Plan to limit the duration and impact of CSO discharges. To learn more, visit [MassDEP’s Sanitary Sewer Systems & Combined Sewer Overflows webpage](#).

## B. Overview of regulatory requirements

The sewage notification regulations were designed to better inform the public of CSOs and other discharges of raw, partially treated, or untreated sewage to promote awareness and protect public health. The regulations require multiple types of public notification for reportable events, including public advisory notifications via email or text, signage at public access points potentially affected by CSOs, updates to the discharger’s website, and reporting into a [centralized MassDEP sewage notification database](#). Reports into MassDEP’s database are accessible by the public.

Events which require public notification and entry into the database are:

### **Combined Sewer Overflows (CSOs)**

A sewer system designed to collect and convey storm water runoff and wastewater in shared piping is a combined sewer system. A CSO is any discharge of untreated or partially treated wastewater into a water body from an outfall connected to a combined sewer system.

### **Partially treated discharges**

A partially treated discharge is defined in the regulations as a discharge through an outfall from a wastewater treatment facility where all or a portion of the flow is not conveyed through all treatment units, or where treatment units are bypassed due to a treatment unit failure.

“Blended wastewater” is discharged when facilities connected to combined sewer systems intentionally divert a portion of their flow around secondary treatment units during wet

weather conditions to allow more flow to enter the treatment plan and receive at least primary treatment, thereby minimizing water quality impacts of CSOs.

#### **Sanitary Sewer Overflows (SSOs)**

These regulations require reporting for SSO discharges that impact a body of water and result from three specific situations: discharge through a wastewater outfall, high flow conditions where peak flows cannot be conveyed to a wastewater treatment plant due to capacity constraints, or a wastewater pump station failure for a pump station designed for 1 million gallons per day (MGD) or greater.

#### **C. Environmental Justice communities**

The sewage notification regulations include special requirements to ensure that Environmental Justice (EJ) populations can access important information about possible sewage pollution. This is especially relevant as all CSO outfalls for the 19 CSO permit holders are in municipalities with EJ populations. (See the [MassDEP EJ map](#).) In the municipalities with a CSO outfall, 85% of the total population lives within an EJ block group. Public notifications are required to be translated for EJ groups with English language isolation. These notifications are required to be sent to a news organization that serves the EJ population. Signs at public access points potentially affected by CSOs are also required to provide access to translations for EJ groups with English language isolation.

## **II. Current program status**

MassDEP continues to lead multiple trainings for permittees, municipalities, and Boards of Health/Health Departments on the program's regulatory requirements and database and has published documentation to promote compliance. The notification requirements in the sewage notification regulations (314 CMR 16.00) took effect on July 6, 2022. Starting on this date, dischargers were required to send public advisory notifications to all required contacts and subscribers, and to report events into the MassDEP database. In 2023, additional data system improvements were implemented to make it easier for users to submit reports to the MassDEP database. Future updates to the MassDEP database are underway to continue the success of the program. Sewer authorities have submitted plans for issuing public notification and adhering to the regulatory requirements. MassDEP has reviewed these plans and is working with the sewer authorities to make updates as needed.

Throughout 2023, MassDEP identified missing Verified Data Reports, from several permittees. A Verified Data Report is a report that permittees are required to submit into the Sewage Notification Data System, which includes details such as updated information on the estimated duration and volume of each discharge or overflow, rainfall data for all discharges and overflows, and treatment provided for any CSO or partially treated discharges. MassDEP designed and carried out technical assistance to educate dischargers about the requirement for submittal of Verified Data Reports by the 15<sup>th</sup> of each month. Due to these efforts all dischargers have now submitted all required Verified Data Reports for 2023 and have been complying with the requirement since the outreach was conducted.

Additionally, MassDEP awarded ten communities a total of \$600,000 in grants to ten dischargers in fiscal year 2023, and over \$575,000 in grants to twelve dischargers in fiscal year 2024, to assist with their meeting the Sewage Notification requirements. Projects related to the grant program include the

purchase and installation of metering and other equipment to detect discharges, signage at public access points and CSO outfalls, services to design and implement public notification systems, website design and improvements, and translation services.

### III. Data overview – 2023

#### A. Database background

This section includes a review of the data in the MassDEP database for January through December 2023. The database contains two Report Classes which differ in the timing of their submittal. Public Notification Reports are submitted within hours of the event. Verified Data Reports are required to be submitted by the 15<sup>th</sup> of the month following the event and contain any updated information available at that time. Any report corrections are required to be submitted by permit holders before February 1 of each year as a correction to the Verified Data Reports. To avoid double-counting events, the data presented in this annual report are from the Verified Data Reports. If a Public Notification Report is submitted but the permittee later learns that the event did not occur (i.e., a meter gave a false positive indication of activation, the permittee can report a retraction by submitting a Verified Data Report with a volume of zero gallons. Retractions have been excluded from the data presented in this report.

The database categorizes events by Event Type, including CSO events, Partially Treated events, and SSO events. There are two types of CSO events: CSO – Treated, and CSO – Untreated. CSOs categorized as CSO – Treated include screening and disinfection before the overflow reaches a body of water. There are two types of Partially Treated events: Partially Treated – Blended and Partially Treated – Other. Both types of Partially Treated events discharge from the treatment plant outfall. Partially Treated – Blended events occur when a treatment plant that receives wastewater from a combined sewer system intentionally diverts a portion of the wastewater stream around secondary treatment during wet weather events to maximize flow through the plant. These events are reported as Partially Treated – Blended even if the discharge is at or below the numerical permit limits for pollutant concentrations. Partially Treated – Other events occur when a portion of the waste stream is diverted around part of the treatment process due to equipment failure, or when necessary to conduct plant maintenance activities. There are three specific types of SSO events that are required to be reported under 314 CMR 16.00 for sanitary sewer overflows that reach a body of water: SSO – Discharge Through Wastewater Outfall, SSO – System Surcharging Under High Flow Conditions, and SSO – Failure of Pump Station or Associated Force Main.

The data in the sections that follow are summarized by event. To display the data by event, reports from the database are grouped by the following fields: Permittee, Event Type, and Incident Date. Multiple reports may be associated with the same event. For example, if a CSO permit holder has an event in which multiple outfalls activate during the same day, a separate report is submitted for each outfall. In the sections that follow, reports with the same Permittee, Event Type, and Incident Date are summarized as one event.

From January through December of 2023, a total of 781 CSO treated and untreated events, 180 Partially Treated events, and 66 SSO events were reported. These events reported a total of 4.043 BG (billion gallons) of CSO discharge, 3.174 BG of partially treated discharge from wastewater treatment facilities,

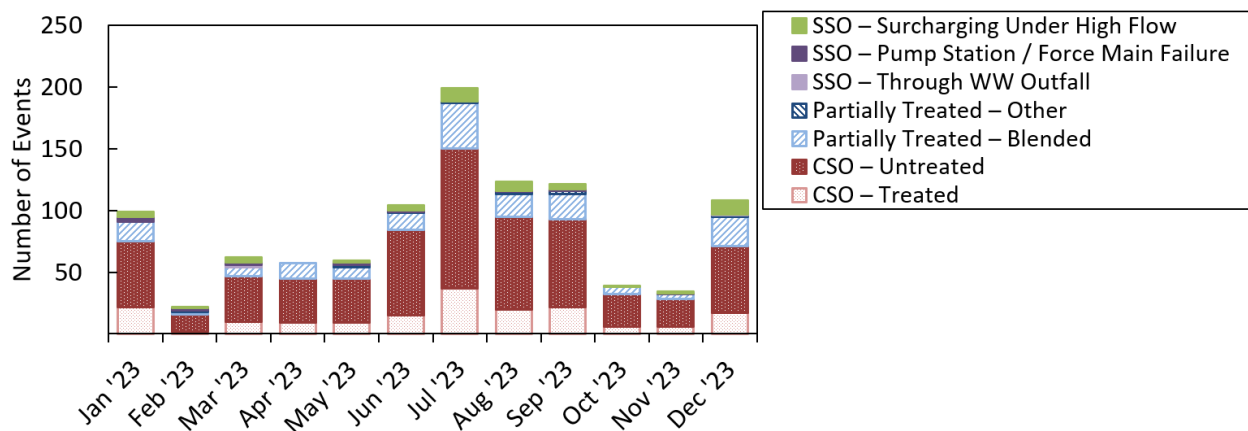
and 28 MG (million gallons) of SSO discharge into waterbodies of the Commonwealth. More detail regarding these discharges can be found below.

## B. Frequency and volume by month

This section summarizes frequency and volume of sewage notification discharge events by month. The 2023 data reflects the above-average rainfall and extreme weather events that occurred in Massachusetts in 2023. In contrast, Massachusetts faced record drought conditions throughout 2022. The frequency of sewage notification events was lowest in February (22 total events) and highest in July (199 total events).

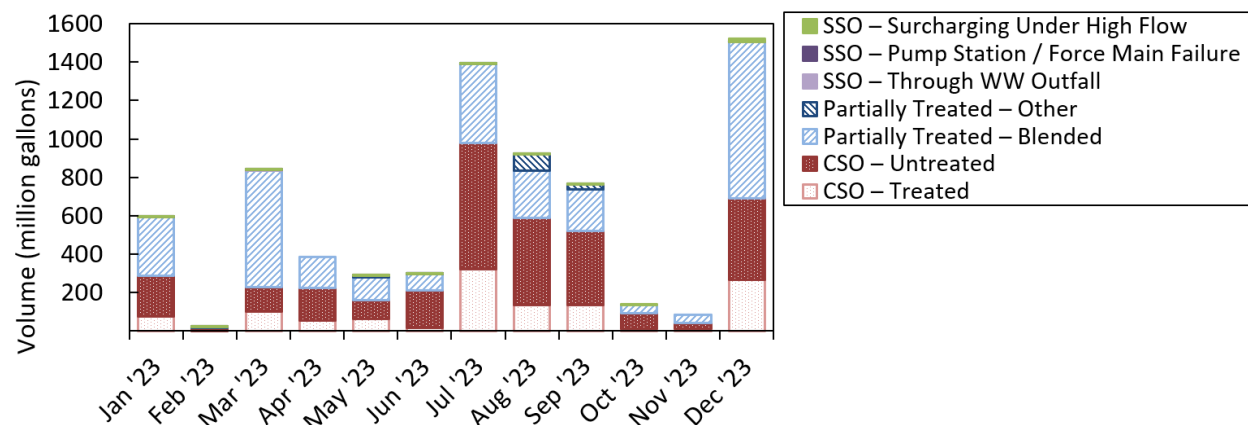
See Figure 1 in which the frequency of reportable events is displayed by month. An event is determined by grouping reports from the same Permittee, Event Type, and Incident Date as one event. Multiple reports may be associated with the same event. See Tables A1 and A2 of Appendix A for more information.

*Figure 1. Frequency of sewage notification events reported by month. Events are determined by grouping reports in the database by Permittee, Event Type, and Incident Date.*



In addition to February, discharge volumes in October and November were low relative to the other months. The highest discharge volumes were reported in July, which was dominated by CSO discharges (red dots) and Partially Treated discharge (blue stripes). Both the frequency and volume of SSO discharges (solid purple or green) were lower than the frequency and volume of CSO and Partially Treated discharges for all months. See Figure 2 in which the total volume of the discharge or overflow is displayed by month and Table A3 of Appendix A for more information. When comparing number of events and volume, a month may have a relatively high number of events and a relatively low volume if the volume of each event was low. A month may have a relatively low number of events and a relatively high volume if the volumes of some events were high.

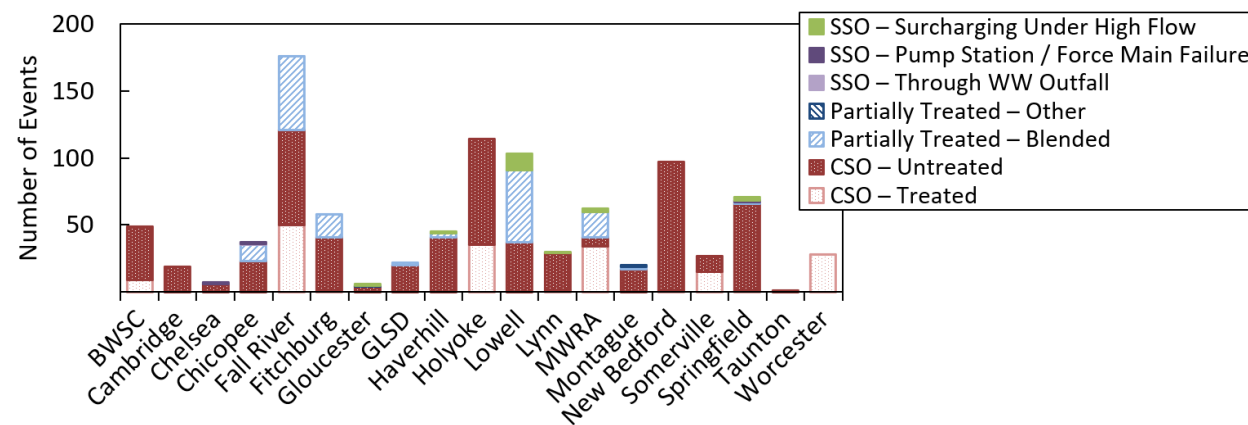
Figure 2. Discharge volumes reported by month.



### C. Frequency and volume by CSO permit holder

This section summarizes frequency and volume of sewage notification discharge events by CSO Permit holder. Sewage notification events by CSO permit holder are presented in Figure 3, in which reports from the same Permittee, Event Type, and Incident Date summarized as one event. Multiple reports may be associated with the same event. See Table A4 and A5 of Appendix A for more information.

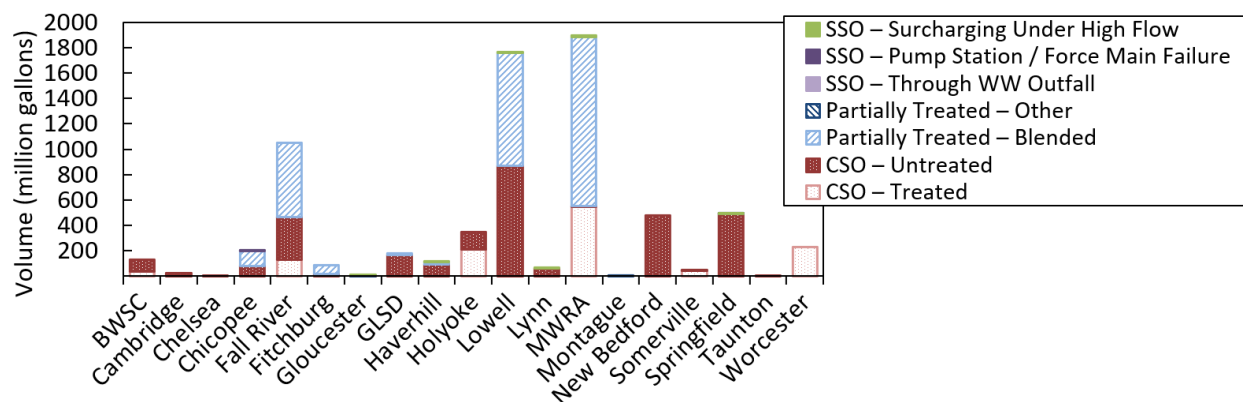
Figure 3. Frequency of sewage notification events reported by CSO permit holder. Events are determined by grouping reports in the database by Permittee, Event Type, and Incident Date.



See Figure 4 in which the total volume of the discharge or overflow is displayed by CSO permit holder. When comparing number of events and volume, a discharger may have a relatively high number of events (Figure 3) and a relatively low volume (Figure 4) if the volume of each event was low. Conversely, permit holders with a relatively fewer number of events, but relatively higher volumes discharged more per event than other permit holders. Some permit holders reported events, but the total volume of the discharge is not visible in Figure 4; this is because the volume discharged for these permit holders was much smaller than the other permit holders. See Table A6 of Appendix A for more information.



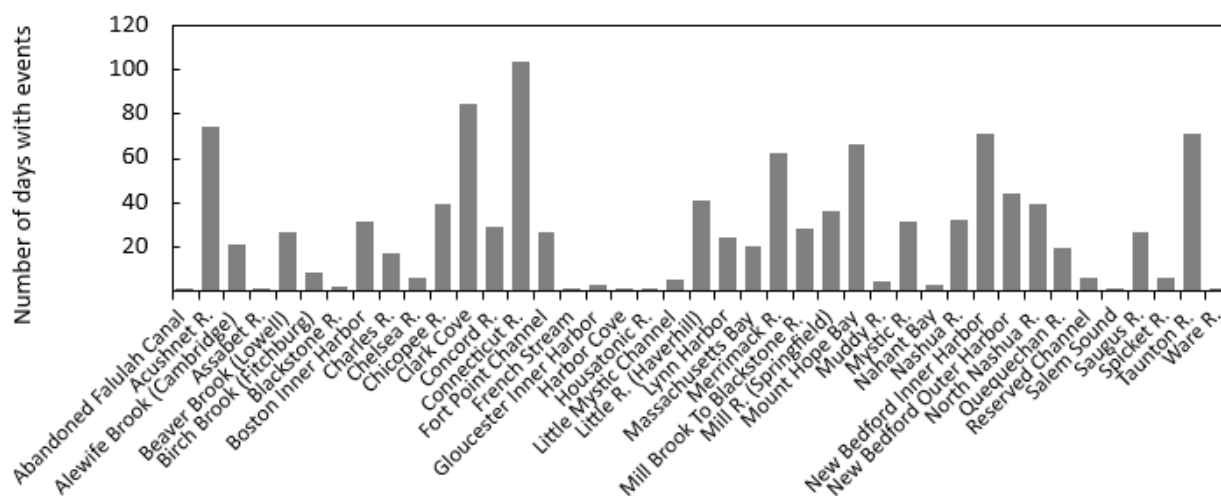
Figure 4. Discharge volumes reported by CSO permit holder in millions of gallons



#### D. Frequency and volume by waterbody

This section summarizes events by body of water. For a map of CSO outfalls, including waterbody, permit holder (“System Name”), and municipality, see the [MassDEP CSO discharge map](#). The total number of days with sewage notification discharge events (Figure 5) does not necessarily correspond directly to the degree of impact to a waterbody. An event may impact water quality through only a portion of the body of water, depending on factors such as the volume of the discharge or overflow and size of the body of water. In contrast, an event may affect other bodies of water downstream of where the discharge or overflow occurred if, for example, the body of water is small or connects into another body of water after the discharge. Some bodies of water contain outfalls for multiple CSO permit holders. See Table A7 of Appendix for more information.

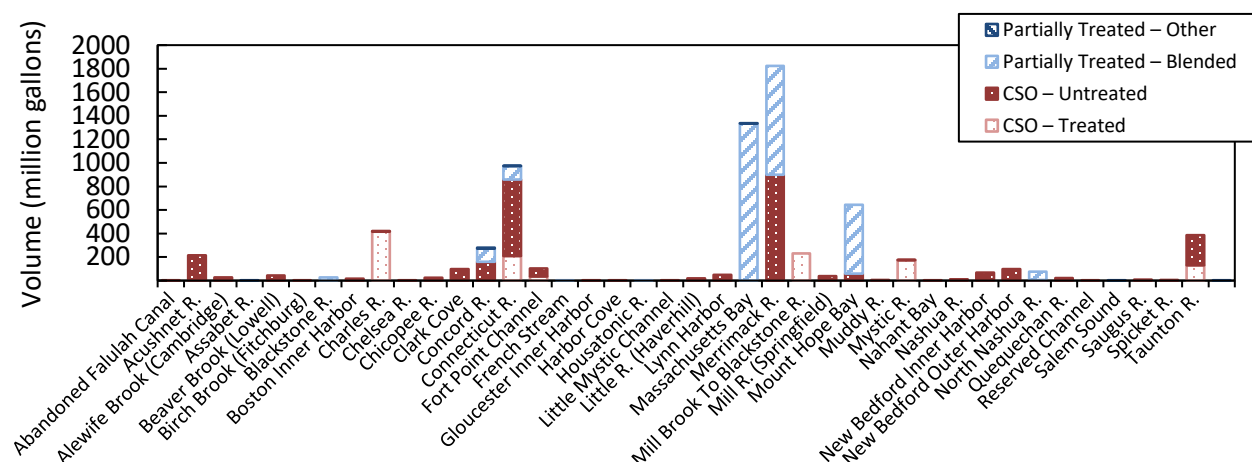
Figure 5. Number of days when one or more CSO or Partially Treated events were reported by body of water.



Total volume of CSO and Partially Treated discharges can be seen in Figure 6. It is more useful to consider both frequency and volume of discharge to a waterbody together. The size of the waterbody is

also important. For example, the impact of one million gallons discharged in a small waterbody may be higher than the same volume discharged into a larger waterbody. Some bodies of water have a visible number of days in Figure 5, but the volume is not visible in Figure 6; this is because the volume discharged for these bodies of water is much smaller than for the other bodies of water. See Table A7 of Appendix A for more information.

Figure 6. Discharge volumes for CSO and Partially Treated events by body of water.



#### E. Frequency and volume by municipality

This section summarizes events by the municipality in which they occurred. The municipality is not necessarily the owner of the outfall where the discharge occurred. Some municipalities contain outfalls for multiple CSO permit holders.

Some municipalities have a visible number of days (Figure 7) while the volume is not visible (Figure 8). This is because the volume discharged in these municipalities is much smaller than in the other municipalities. This is likely because the volume of each discharge event was low. Alternatively, a municipality may have a relatively low number of events and a relatively high volume if the volume of some events was high. See Table A8 of the Appendix for more information, including small discharge volumes.

Figure 7. Number of days when one or more events were reported by the municipality in which the discharge occurred. The municipality is not necessarily the owner of the discharge outfall.

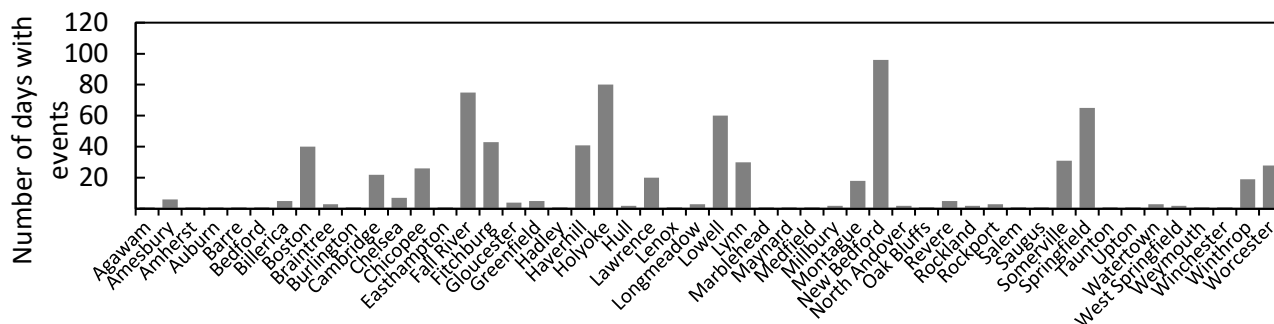
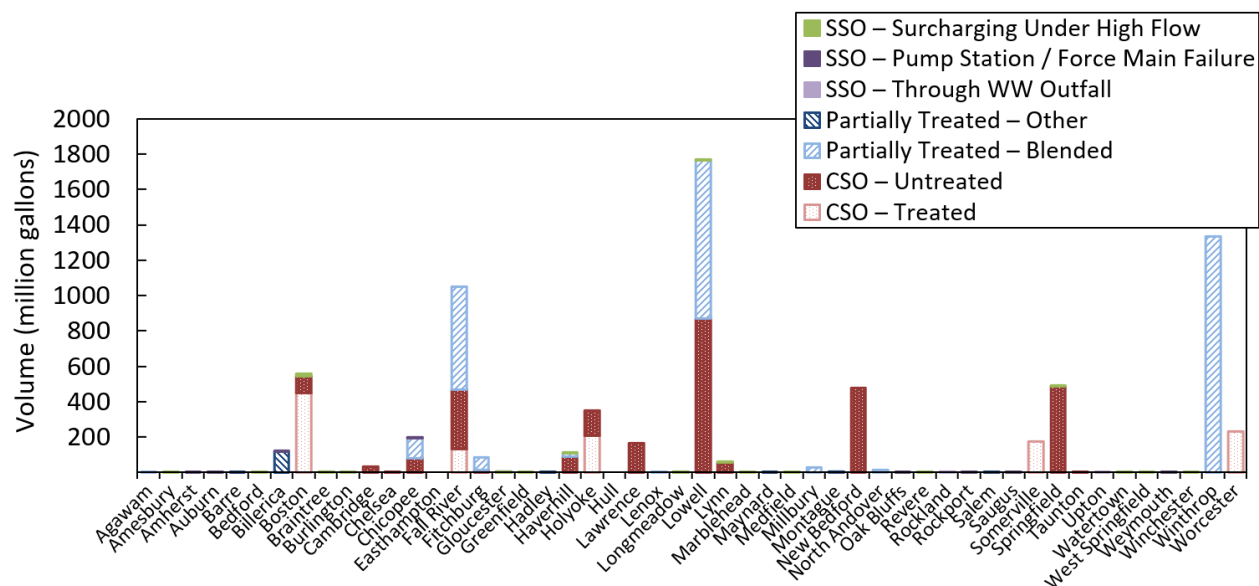


Figure 8. Discharge volumes for events by the municipality in which the discharge occurred. The municipality is not necessarily the owner of the discharge outfall.



#### IV. Summary

In 2023, the Sewage Notification program was well established and has enabled greater public awareness of sewage pollution, as seen through the publication of news articles about CSO events in the Commonwealth. Additional measures including MassDEP database upgrades, additional training sessions, and grant awards help contribute to raise awareness of sewage pollution. The reports collected in the database enable easy tracking of efforts to help to reduce and eliminate CSO discharges.

Appendix A

The data shown in the Appendix is from Verified Data Reports submitted in 2023, starting from January 1, 2023, through December 31, 2023.

Table A1. Number of reports by month.

	Jan '23	Feb '23	Mar '23	Apr '23	May '23	Jun '23	Jul '23	Aug '23	Sep '23	Oct '23	Nov '23	Dec '23	Totals
CSO – Treated	28	2	14	13	12	18	52	29	30	8	8	26	240
CSO – Untreated	213	34	105	198	141	341	653	356	333	103	70	245	2792
Partially Treated – Blended	16	2	7	12	9	14	41	18	21	6	4	26	176
Partially Treated – Other		1			2	1	1	2	3			1	11
SSO – Discharge Through Wastewater Outfall			2									1	3
SSO – Failure of Pump Station or Associated Force Main	4	2	2		2	1	1	1	1		1		14
SSO – System Surcharging Under High Flow Conditions	7	1	8		1	7	19	15	5	1	1	12	77
Totals	268	42	138	223	167	382	767	421	393	118	84	311	3314

Table A2. Number of events by month. Events are determined by grouping reports in the database by Permittee, Event Type, and Incident Date.

	Jan '23	Feb '23	Mar '23	Apr '23	May '23	Jun '23	Jul '23	Aug '23	Sep '23	Oct '23	Nov '23	Dec '23	Totals
CSO – Treated	22	2	10	9	9	15	37	20	22	6	6	17	175
CSO – Untreated	53	14	37	36	36	69	113	75	71	26	22	54	606
Partially Treated – Blended	16	2	7	12	9	14	37	18	20	6	4	24	169
Partially Treated – Other		1			2	1	1	2	3			1	11
SSO – Discharge Through Wastewater Outfall			2				1					1	3
SSO – Failure of Pump Station or Associated Force Main	4	2	2		2	1		1	1		1		14
SSO – System Surcharging Under High Flow Conditions	4	1	4		1	4	11	7	4	1	1	11	49
Totals	99	22	62	57	59	104	200	123	121	39	34	108	1028

Table A3. Volume by month in millions of gallons. Volumes have been rounded for ease of display.

	Jan '23	Feb '23	Mar '23	Apr '23	May '23	Jun '23	Jul '23	Aug '23	Sep '23	Oct '23	Nov '23	Dec '23	Totals
CSO – Treated	76	0	102	56	62	18	320	134	135	14	11	269	1196
CSO – Untreated	213	16	126	170	99	196	657	455	385	77	32	421	2847
Partially Treated – Blended	302	2	608	159	120	84	412	245	216	46	43	816	3053
Partially Treated – Other		1			7	0	0	85	28			0	121
SSO – Discharge Through Wastewater Outfall			2									0	2
SSO – Failure of Pump Station or Associated Force Main	1	0	0		0	0		0	1		0		3
SSO – System Surcharging Under High Flow Conditions	3	0	2		0	0	2	0	1	0	0	15	23
Totals	596	20	839	385	287	298	1392	919	765	137	86	1521	7245

Table A4. Number of reports by CSO permit holder.

	BWSC	Cambridge	Chelsea	Chicopee	Fall River	Fitchburg	Gloucester	GLSD	Haverhill	Holyoke	Lowell	Lynn	MWRA	Montague	New Bedford	Somerville	Springfield	Taunton	Worcester	Totals
CSO – Treated	9				91	1				37		1	56		1	15	1		28	240
CSO – Untreated	140	43	9	181	387	92	4	41	187	367	184	80	15	30	511	12	508	1		2792
Partially Treated – Blended				12	55	19		2	3		55		23	2			1			172
Partially Treated – Other							1							1						2
SSO – Discharge Through Wastewater Outfall				1																1
SSO – Failure of Pump Station or Associated Force Main			1	1													1			3
SSO – System Surcharging Under High Flow Conditions							2		1		28	1	3				3			38
Totals	149	43	10	195	533	112	7	43	191	404	267	82	97	33	512	27	514	1	28	3248

Table A5. Number of events by CSO permit holder. Events are determined by grouping reports in the database by Permittee, Event Type, and Incident Date.

	BWSC	Cambridge	Chelsea	Chicopee	Fall River	Fitchburg	Gloucester	GLSD	Haverhill	Holyoke	Lowell	Lynn	MWRA	Montague	New Bedford	Somerville	Springfield	Taunton	Worcester	Totals
CSO – Treated	9				50	1				35		1	34		1	15	1		28	175
CSO – Untreated	40	19	6	23	71	40	4	20	41	79	37	28	7	17	96	12	65	1		606
Partially Treated – Blended				12	55	17		2	3		54		19	2			1			165
Partially Treated – Other							1							1						2
SSO – Discharge Through Wastewater Outfall				1																1
SSO – Failure of Pump Station or Associated Force Main			1	1													1			3
SSO – System Surcharging Under High Flow Conditions							1		1		12	1	2				3			20
Totals	49	19	7	37	176	58	6	22	45	114	103	30	62	20	97	27	71	1	28	972

Table A6. Volume by CSO permit holder in millions of gallons. Volumes have been rounded for ease of display.

	BWSC	Cambridge	Chelsea	Chicopee	Fall River	Fitchburg	Gloucester	GLSD	Haverhill	Holyoke	Lowell	Lynn	MWRA	Montague	New Bedford	Somerville	Springfield	Taunton	Worcester	Totals
CSO – Treated	34				131					210			547			44			231	1196
CSO – Untreated	92	23	1	81	335	16		164	92	140	868	58	3	1	478	7	488			2847
Partially Treated – Blended				113	583	71		13	15		894		1333				1			3024
Partially Treated – Other							1													1
SSO – Discharge Through Wastewater Outfall																				0
SSO – Failure of Pump Station or Associated Force Main																				0
SSO – System Surcharging Under High Flow Conditions													13				1			14
Totals	126	23	1	194	1050	87	1	177	107	349	1763	58	1896	1	478	51	490	0	231	7083

Table A7. Events and volume by waterbody. Volumes have been rounded for ease of display.

	Abandoned Falulah Canal	Acushnet R.	Alewife Brook (Cambridge)	Assabet R.	Beaver Brook (Lowell)	Birch Brook (Fitchburg)	Blackstone R.	Boston Inner Harbor	Charles R.	Chelsea R.	Chicopee R.	Clark Cove	Concord R.	Connecticut R.	Fort Point Channel	French Stream	Gloucester Inner Harbor	Harbor Cove	Housatonic R.	Little Mystic Channel	Little R. (Haverhill)	Lynn Harbor	Massachusetts Bay	Merrimack R.	Mill Brook To Blackstone R.	Mill R. (Springfield)	Mount Hope Bay	Muddy R.	Mystic R.	Nahant Bay	Nashua R.	New Bedford Inner Harbor	New Bedford Outer Harbor	North Nashua R.	Quequechan R.	Reserved Channel	Salem Sound	Saugus R.	Spicket R.	Taunton R.	Ware R.	
Number of days with events	1	74	21	1	26	8	2	31	17	6	39	84	29	103	26	1	3	1	1	5	41	24	20	62	28	36	66	4	31	3	32	71	44	39	19	6	1	26	6	71	1	
Volume (in million gallons)	0.01	213	27	0.01	43	0.2	27	16	422	1	23	98	279	973	103	1	0.1	0.1	0.2	1	19	48	1334	1823	231	37	644	4	175	1	10	68	98	77	21	1	0.1	9	5	384	0.02	7218

Table A8. Events and volume by the municipality in which the discharge occurred. Volumes have been rounded for ease of display.

	Agawam	Amesbury	Amherst	Auburn	Barre	Bedford	Billerica	Boston	Braintree	Burlington	Cambridge	Chelsea	Chicopee	Easthampton	Fall River	Fitchburg	Gloucester	Greenfield	Hadley	Haverhill	Holyoke	Hull	Lawrence	Lenox	Longmeadow	Lowell	Lynn	Marblehead	Maynard	Medfield	Millbury	Montague	New Bedford	North Andover	Oak Bluffs	Revere	Rockland	Rockport	Salem	Saugus	Somerville	Springfield	Taunton	Upton	Watertown	West Springfield	Weymouth	Winchester	Winthrop	Worcester	Totals
Number of days with events	1	6	1	1	1	1	5	40	3	1	22	7	26	1	75	43	4	5	1	41	80	2	20	1	3	60	30	1	1	1	2	18	96	2	1	5	2	3	1	1	31	65	1	1	3	2	1	1	19	28	
Volume (in million gallons)	1	0	1	0	0	0	120	557	5	0	32	1	194	0	1050	87	1	2	0	107	349	0	164	0	0	1763	58	0	0	0	27	1	478	13	0	0	3	1	0	0	174	489	0	0	0	0	0	1	1333	231	7245