

MAINE COMBINED SEWER OVERFLOW 2008 STATUS REPORT

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MAINE COMBINED SEWER OVERFLOWS ANNUAL VOLUME DISCHARGED PER INCH OF PRECIPITATION

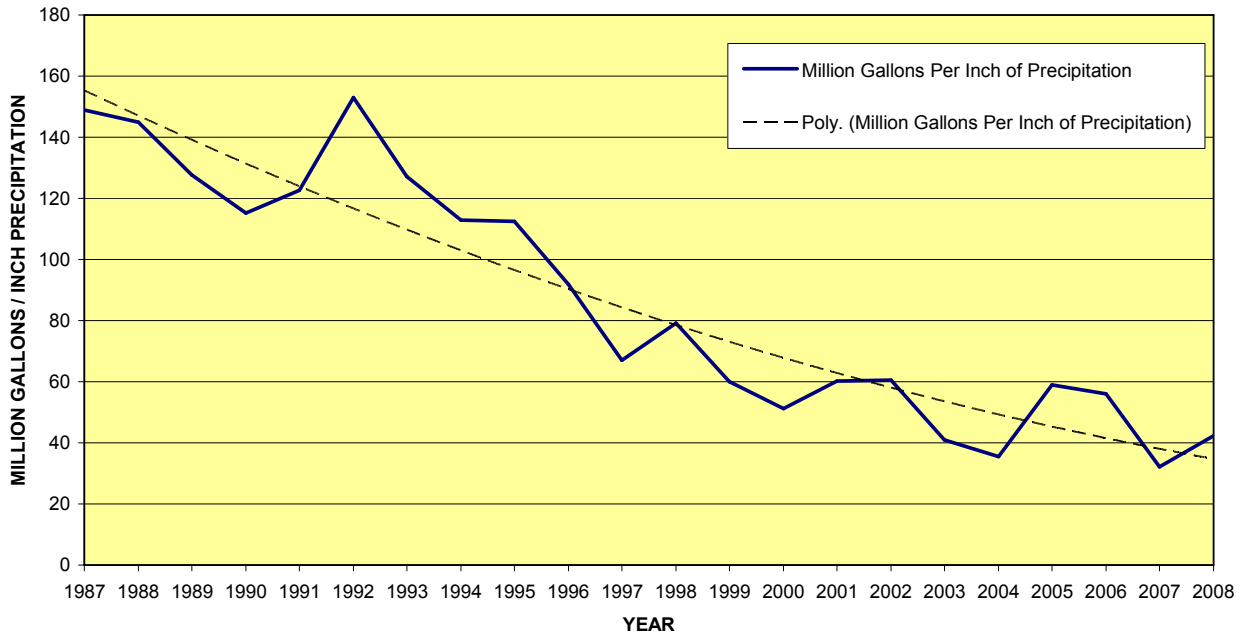


TABLE OF CONTENTS

| | |
|--|---|
| INTRODUCTION | 1 |
| WHAT ARE CSOs?..... | 1 |
| WHAT ARE THE IMPACTS OF CSOs? | 2 |
| WHAT IS A CSO COMMUNITY? | 2 |
| WHERE DID WE START? | 3 |
| WHAT IS BEING DONE TO ABATE CSO DISCHARGES?..... | 3 |
| WHERE ARE WE NOW? – 2008 STATUS..... | 4 |

TABLES

| | |
|---|----|
| MAINE - CSO COMMUNITY LIST | 8 |
| MAINE - CSO COMMUNITY FLOW DATA | 9 |
| MAINE CSO COMMUNITY ANNUAL NUMBER OF CSO DISCHARGE EVENTS | 10 |

CHARTS

| | |
|---|----|
| MAINE – STATEWIDE COMBINED SEWER OVERFLOW VOLUME DISCHARGED | 11 |
| MAINE – STATEWIDE COMBINED SEWER OVERFLOW ANNUAL NUMBER OF DISCHARGE EVENTS ... | 12 |
| MAINE – STATEWIDE NUMBER OF COMBINED SEWER OVERFLOW OUTFALLS | 13 |
| MAINE COMBINED SEWER OVERFLOWS | |
| ANNUAL VOLUME DISCHARGED PER INCH OF PRECIPITATION | 14 |
| MAINE YEARLY CSO VOLUMES AND PRECIPITATION..... | 15 |
| 2008 CSO FLOW COMPARISON - PIE CHART..... | 16 |
| 2008 CSO FLOW COMPARISON BY COMMUNITY – BAR CHART | 17 |
| 2008 CSO WATERSHED FLOWS – PIE CHART | 18 |

INTRODUCTION

The purpose of this report is to inform the Combined Sewer Overflow (CSO) Communities and the general public on the status of the CSO program in Maine.

The information is compiled from various documents and reports submitted to the Maine Department of Environmental Protection by the CSO Communities (City/Town/District) or their consultants on their behalf. A majority of the information comes from the CSO Master Plans (a.k.a. Long Term Control Plans), Sewer System Evaluation Studies, Infiltration/Inflow Reports, Annual CSO Progress Reports, and general correspondence.

At the start of any CSO Community's abatement program, initial flow data was collected to estimate the existing discharge volumes and frequencies, define the problems, and establish a corrective course of action. This often occurred over a relatively short period of time (a year or two) and may not have captured as many good wet weather events as desired. However, this data was the best available information at the time and established the overflow baselines that are used within this report. Since then, CSO flow monitoring plans have continued to improve and overall data reliability has increased, giving the program better data for specific yearly wet weather patterns.

WHAT ARE CSOS?

- Combined Sewer Overflows (CSOs) are discharges of untreated wastewater from municipal sewerage systems that carry mixtures of sanitary sewage, storm water, and sometimes industrial wastes.
- They occur mostly during and after rain events or snowmelt. Flows within the combined sewer system during these wet weather events can be as high as fifty (50) times the normal dry weather flows.
- Large volumes of water entering the combined sewer system (CSS) through catch basins, old and leaky pipes, roof drains, cellar drains, sump pumps, and other sources cause the capacity of the system to be exceeded.
- Hydraulic relief points within the CSS allow the excess flows to be discharged. These relief points are generally near pump stations and river crossings.
- Excess volumes of combined sewage can also cause treatment facilities upsets, street flooding, and back-ups into basements.

WHAT ARE THE IMPACTS OF CSOs?

- Currently in Maine there are 35 communities (towns or cities) with CSO discharge points in their sewerage systems (down from an original 60). These communities collectively have 177 individual CSO discharge points (down from an original 340).
- The frequency of discharges varies greatly from community to community, ranging from seldom to occurring in response to all but the smallest rain storms.
- In large communities hundreds of millions of gallons per year of untreated combined sanitary sewage and storm water may be discharged. Statewide, approximately 1.5 to 2.5 billion gallons are discharged annually from CSOs (down from an estimated original volume of 6.2 billion gallons).
- CSOs discharge untreated combined sewage to receiving waters that vary in size from the ocean and large rivers to small streams and drainage creeks.
- Water quality is impaired by the addition of floatables, bacteria, and sometimes industrial pollutants.
- Shellfishing areas and beaches can be closed and drinking water supplies threatened.

WHAT IS A CSO COMMUNITY?

- CSO Communities are permitted dischargers of combined sanitary and storm waters. The Department of Environmental Protection issues CSO permittees a wastewater discharge license that requires them to implement EPA's Nine Minimum Control Best Management Practices (BMPs), develop a Long Term Control Plan (LTCP) (a.k.a. Master Plan) to eliminate or abate their overflows, and finally to implement the plan and bring them into compliance with EPA's April 8, 1994 Combined Sewer Overflow (CSO) Control Policy.
- Special Conditions in their Maine Pollutant Discharge Elimination System (MEPDES) permit requires all CSO permittees to submit an Annual CSO Progress Report to the Department for the previous year by March 1st.
- The Progress Report documents the Community's efforts to comply with the Nine Minimum Controls, and collects pertinent fiscal and logistical information about their CSO abatement program. This information is used to track their CSO abatement progress and gather state-wide information on the CSO program and fiscal needs.

WHERE DID WE START?

- The CSO movement started in 1989 with the clarification of the Clean Water Act through the publication of the National CSO Control Strategy by the Environmental Protection Agency (EPA).
- At that time the State had about 60 CSO Communities that discharged an estimated 6.2 billion gallons of combined wastewater and storm water during wet weather events.
- Statewide it was estimated that overflow events happened approximately 1,700 times a year through approximately 340 different CSO outfalls.
- On April 19, 1994 EPA issued a national policy statement entitled “Combined Sewer Overflow (CSO) Control Policy.” This policy provides guidance to permittees with CSOs, and State permit and water quality standards authorities on coordinating the planning, selection, and implementation of CSO controls that meet the requirements of the Clean Water Act (CWA).
- In February 2000, the Maine Department of Environmental Protection Chapter 570 Rules, entitled “Combined Sewer Overflow Abatement,” became effective. This chapter establishes procedures for CSO evaluation, preparation of an abatement plan, and sets forth minimum controls to reduce CSOs while long-range plans are being completed.

WHAT IS BEING DONE TO ABATE CSO DISCHARGES?

- All of Maine’s CSO Communities have completed or are working on comprehensive CSO studies or facilities plans. These plans are often referred to as Master Plans (MPs) or Long Term Control Plans (LTCPs). These documents define the magnitude of the CSO discharges, their impacts on the environment, and evaluate a range of abatement control alternatives and their financial impact.
- Abatement projects have reduced untreated discharges in all of the CSO Communities. A number of communities have eliminated their CSO discharges and are no longer licensed to discharge untreated combined sewage during wet weather.
- Statewide, CSO Communities report that they have invested a total of \$311 million (\$16 million in 2008) in CSO abatement and anticipate the CSO needs for the next five years to be \$149 million. After that, the expected needs to bring them into compliance with the CSO Control Policy is an additional \$100 to \$150 million.

WHERE ARE WE NOW? – 2008 STATUS

- Maine started and ended 2008 with 35 CSO Communities. Effective January 1, 2008, two of the CSO Communities, Augusta and Hallowell, were incorporated into the same district known as the Greater Augusta Utility District. Whereas this did decrease the number of CSO MEPDES permits from 37 to 36, it did not change the number of CSO Communities as they are distinct civil jurisdictions. A complete listing of Maine's CSO Communities, their number of CSO outfalls and the outfall receiving waters is on page 8.
- The volume of combined sewage discharged statewide in 2008 was reported at 2.41 billion gallons. The table on page 9, Maine CSO Community Flow Data, contains a historic listing of the yearly overflows from each CSO Community. The 2008 CSO Flow Comparison pie chart on page 16 and the 2008 CSO Flow Comparison By Community bar chart on page 17 are graphical comparisons of the overflow volumes between the CSO Communities.
- In 2008, the CSO Communities reported 792 overflow events. This total is arrived at by summing the number of days that each CSO Community experienced an overflow event. An overflow event is any day in which one or more CSOs within a community discharge. The table on page 10, Maine CSO Community Annual Number of CSO Discharge Events, contains a historic listing of the annual number of CSO discharge events for each CSO Community.
- Thirty (30) of the 35 CSO Communities reported experiencing at least one combined sewer overflow discharge in 2008, while five (5) reported no overflows.
- In 2008, fifteen (15) of the communities reported discharging less in 2008 than in 2007, seventeen (17) reported discharging more, while three (3) reported no change. The maximum number of days that overflow events were reported from a single community was 87. The average (mean) number of discharge events for all of the communities was 23 and the median was 10. Additional information is given in the table on page 10.
- The volume and frequency of CSO discharges varies from one wet weather event to another based on existing groundwater conditions, frozen or thawed ground, snowmelt, and rainfall volume, duration, and intensity. To evaluate abatement progress we look for an overall trend in reduction, versus trends from year to year. The chart on page 11, Combined Sewer Overflow Volume Discharged, illustrates an overall downward trend in the CSO volumes being discharged annually. Since 1989, the volume of combined sewage discharged has decreased by approximately 60 - 70%. This is stated as a range because of the correlation of overflow volumes to variations in annual weather patterns.

- Similarly, the chart on page 12, Combined Sewer Overflow Annual Number of Discharge Events, shows a downward trend in the number of overflow days per year. Since 1989, the number of overflow days has decreased by approximately 55 - 65%, once again stated as a range.
- In 2008 Maine CSO Communities reduced the total number of CSO discharge locations by 6, down from 183 to 177. While 10 CSO structures were eliminated in the following communities: Auburn (1), Bangor (4), Biddeford (1), Bucksport (1), Lewiston (1), Sanford (1), and Skowhegan (1), this was partially offset by a relicensing of 3 previously closed CSOs in Mechanic Falls (2) and South Portland (1) and the correction of a clerical error in Saco (1). The reopening and relicensing of the previously closed three CSOs was necessary to protect upstream properties from damage and to quantify overflow volumes. The additional CSO location in Saco was listed as a discharge location on their current wastewater discharge license, but had inadvertently been removed from the list of current CSOs. The chart on page 13, Maine – Statewide Number of Combined Sewer Overflow Outfalls, shows a 48% reduction in the number of CSO outfalls since 1989.
- Trying to compare CSO abatement progress from year to year is difficult because of the number of conditions that influence the volume and frequency of overflows, not the least of which is yearly precipitation patterns. To somewhat compensate for the fluctuation in yearly precipitation patterns, the total volume of combined sewage discharged has been unitized by taking into consideration the annual precipitation amount for the CSO communities. The chart on page 14, CSO Annual Volume Discharged Per Inch of Precipitation, illustrates this and shows a continual downward trend in the volume of combined sewage discharged per inch of annual precipitation. Since 1989, overflow volumes have decreased from approximately 149 million gallons per inch of precipitation to 30 - 50 million gallons per inch of precipitation, 42 million in 2008. Although this type of analysis is rough, it is a good indicator of the CSO abatement progress that is being made.
- The average annual precipitation for all of Maine's CSO Communities is approximately 45 inches. In 2008, the annual precipitation for the CSO Communities ranged from 50 - 66 inches, exceeding the average precipitation by 5 - 17 inches (10 - 46%). The Yearly CSO Volumes and Precipitation chart on page 15 shows a comparison between annual CSO volumes and yearly precipitation. The graph shows that CSO volumes tend to follow the yearly ups and downs in precipitation levels. The chart shows a widening gap between the yearly precipitation amount and the yearly volume of combined sewage discharged. This widening gap clearly indicates that the CSO abatement is being accomplished and that overflow volumes are becoming less influenced by precipitation events.

- 2008 was another above average precipitation year (57”), especially when compared to near average year of 2007 (48”). As a result the statewide volume of CSO discharges increased by 57%, from 1.53 to 2.41 billion gallons in 2008.
- The CSOs from the City of Portland and Portland Water District in Portland comprised approximately 36% of the State’s total overflow volume in 2008; see the CSO Flow Comparison Pie Chart on page 16. Given the large impact that Portland’s data has on the State’s total, it might be prudent to look at the rest of the state without utilizing Portland’s data. After removing Portland’s overflow data from the state total, the overflow volume for the remaining CSO communities increased by 63% from 2007 to 2008, 0.94 to 1.53 billion gallons respectively.
- In 2008, the top twelve (12) dischargers accounted for approximately 97% of the total volume of combined sewage discharged in the State, see the CSO Flow Comparison Pie Chart on page 16.
- Abatement of CSOs is a costly endeavor. To date Maine CSO Communities have reported expending \$311 million implementing their CSO abatement projects. In the 2008 Annual CSO Progress Reports submitted to the State, these communities reported expending \$16 million on abatement work in 2008. It is estimated that the future needs of these communities to complete their CSO abatement plans totals \$250 - \$300 million, in 2008 dollars.
- CSO abatement progress can not be measured solely by comparing the volumes discharged from one year to the next. The reason is that the volume discharged is influenced by variations in precipitation amount, intensity and timing, the rate of snow melt, frozen or thawed ground, and existing groundwater levels. Even given the same annual precipitation, no two years would result in the same volume of CSO discharges.
- The relationship between the annual precipitation and the annual volume of combined sewage discharged is not linear. As a general rule, as precipitation levels increase, the volume of combined sewage discharged also increases per inch of precipitation. Simply put, once the capacity of the combined sewer system is reached, any additional rainfall or snowmelt overflows the already inundated system.
- Different wet weather conditions and precipitation patterns also affect individual CSO Communities differently. This is due mostly to the make up of the sewer system, the number of catch basins connected, the area of impermeable surface, and the specific hydraulic restriction(s) causing the overflows, to name just a few. The overflows in some communities are more susceptible or responsive to intense summer storms, while in other communities it might be high ground water. Direct comparisons between various communities should not be made.

- It is well established that CSOs can and do have impacts on beach and shellfish closures. Stating that a specific CSO event or series of events is responsible for a specific closure is more difficult and will not be attempted in this report. In some areas there are a number of other factors that might enter into a beach or shellfishing area being closed. These are, but not necessarily limited to, urban storm water runoff, malfunctioning septic systems, domestic and no domestic animal waste, agricultural runoff, and bathers, to name just a few. What is assessed in the Annual Reports is which beach and shellfishing areas may be impacted by the CSOs.

In 2008, seven (7) CSO Communities listed eleven (11) beach areas that may be impacted by their CSO discharges. They were: Bar Harbor (Town Beach & Hulls Cove); Biddeford (Hills Beach, Biddeford Pool & Camp Ellis); Cape Elizabeth (Casino Beach & Fort Williams Park); Portland (East End Beach); Rockland (Sandy Beach); Skowhegan (Two Rivers Campground); and South Portland (Willard Beach). Of these, two (2) beaches were listed as having an advisory or closure in 2008 (East End & Willard Beach), one (1) of which (East End Beach) was listed as being caused in whole or in part by CSO activity.

In 2008, five (5) CSO Communities listed shellfishing areas that were closed in their area (Bar Harbor, Calais, Machias, Portland & South Portland). Three (3) of these communities (Bar Harbor, Machias and Portland) reported that the closures were caused in whole or in part by CSO activity.

- The chart on page 18 – 2008 CSO Watershed Flows, shows a graphical representation of the CSO volume discharged by watershed. In 2008, Casco Bay received approximately 38% of the statewide CSO volume discharged, followed by Penobscot River at 28%, the Androscoggin River at 20%, the Saco River at 6%, the Kennebec River at 6%, and the St. John River at 1%. Discharges to the St. Croix River, Frenchman Bay, the Machias River, and Penobscot Bay account for the remaining 1% of combined sewer overflow volume.

**MAINE – COMBINED SEWER OVERFLOW (CSO)
COMMUNITY LIST
(AS OF DECEMBER 31, 2008)**



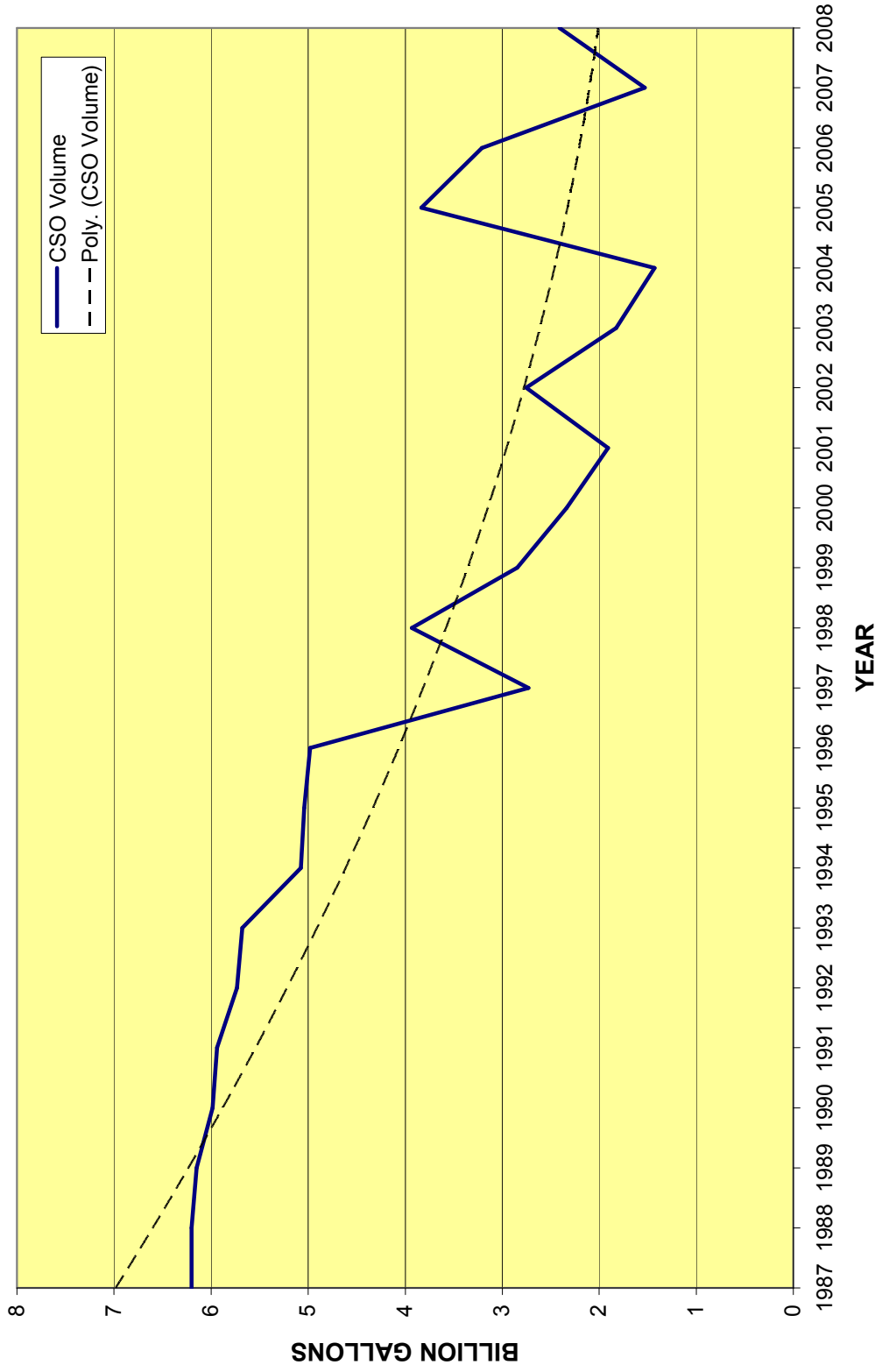
| | COMMUNITY | CSOs | Number of CSOs & Receiving Water |
|------------|---|-------------|---|
| 1. | AUBURN SD | 3 | 3-Androscoggin Rv. |
| 2. | BANGOR | 7 | 3-Kenduskeag Str., 4-Penobscot Rv. |
| 3. | BAR HARBOR (Hulls Cove) | 1 | 1-Frenchman Bay |
| 4. | BAR HARBOR (Main Plant) | 3 | 2-Frenchman Bay, 1-Eddie Brook |
| 5. | BATH | 4 | 4-Kennebec Rv. |
| 6. | BELFAST | 2 | 2-Passagassawakeag River/Belfast Harbor |
| 7. | BIDDEFORD | 10 | 9-Saco Rv., 1-Thatcher Bk. |
| 8. | BREWER | 6 | 5-Penobscot River, 1-Sedgeunkendunk Str. |
| 9. | BUCKSPORT | 1 | 1-Penobscot Rv. |
| 10. | CALAIS | 5 | 4-St. Croix Rv., 1-Landing Brook |
| 11. | CAPE ELIZABETH – Ottawa Road PS | 1 | 1-Atlantic Ocean |
| 12. | FAIRFIELD | 2 | 2-Kennebec Rv. |
| 13. | GARDINER | 1 | 1-Kennebec Rv. |
| 14. | GREATER AUGUSTA UTILITY DISTRICT (GAUD) (Includes Hallowell CSO) | 24 | 4-Bond Bk., 1-Kennedy Bk., 18-Kennebec Rv., 1-Whitney Bk. |
| 15. | HAMDEN | 1 | 1-Soudabscook Str. |
| 16. | KENNEBEC STD | 3 | 3-Kennebec Rv. |
| 17. | LEWISTON | 22 | 10-Androscoggin Rv., 1-Gully Bk., 1 -Hart Bk., 10-Jepson Bk. |
| 18. | LEWISTON-AUBURN WPCA | 1 | 1-Androscoggin Rv. |
| 19. | MACHIAS | 2 | 2-Machias Rv. |
| 20. | MADAWASKA | 2 | 2-St. John Rv. |
| 21. | MECHANIC FALLS SD | 3 | 3-Little Androscoggin Rv. |
| 22. | MILFORD | 1 | 1-Penobscot Rv. |
| 23. | MILO WD | 3 | 1-Pleasant Rv., 2-Sebec Rv. |
| 24. | OLD TOWN | 3 | 2-Penobscot Rv., 1-Stillwater Rv. |
| 25. | ORONO | 1 | 1-Penobscot Rv. |
| 26. | PARIS UD | 1 | 1-Little Androscoggin Rv. |
| 27. | PORTLAND – CITY | 12 | 6-Back Cove, 3-Capisc Bk., 2-Portland Harbor., 1-Nason Bk. (marsh) |
| 28. | PORTLAND – PWD | 21 | 9-Back Cove, 3-Casco Bay, 7-Fore Rv., 2- Portland Harbor |
| 29. | RANDOLPH | 1 | 1-Kennebec Rv. |
| 30. | ROCKLAND | 2 | 2-Rockland Harbor |
| 31. | SACO | 6 | 1-Bear Bk., 5-Saco Rv. |
| 32. | SANFORD SD | 1 | 1-Mousam Rv. |
| 33. | SKOWHEGAN | 8 | 8-Kennebec Rv. |
| 34. | SOUTH PORTLAND | 6 | 1-Barberry Ck., 1-Fore Rv., 1-Calvery Pond., 2-Portland Hbr. |
| 35. | WESTBROOK | 5 | 5-Presumpscot Rv. |
| 36. | WINSLOW | 1 | 1-Sebasticook Rv. |
| 37. | WINTERPORT SD | 1 | 1-Penobscot Rv. |
| TOTAL CSOs | | 177 | |

36 CSO Permits, permitting 34 of 35 CSO Towns/Cities

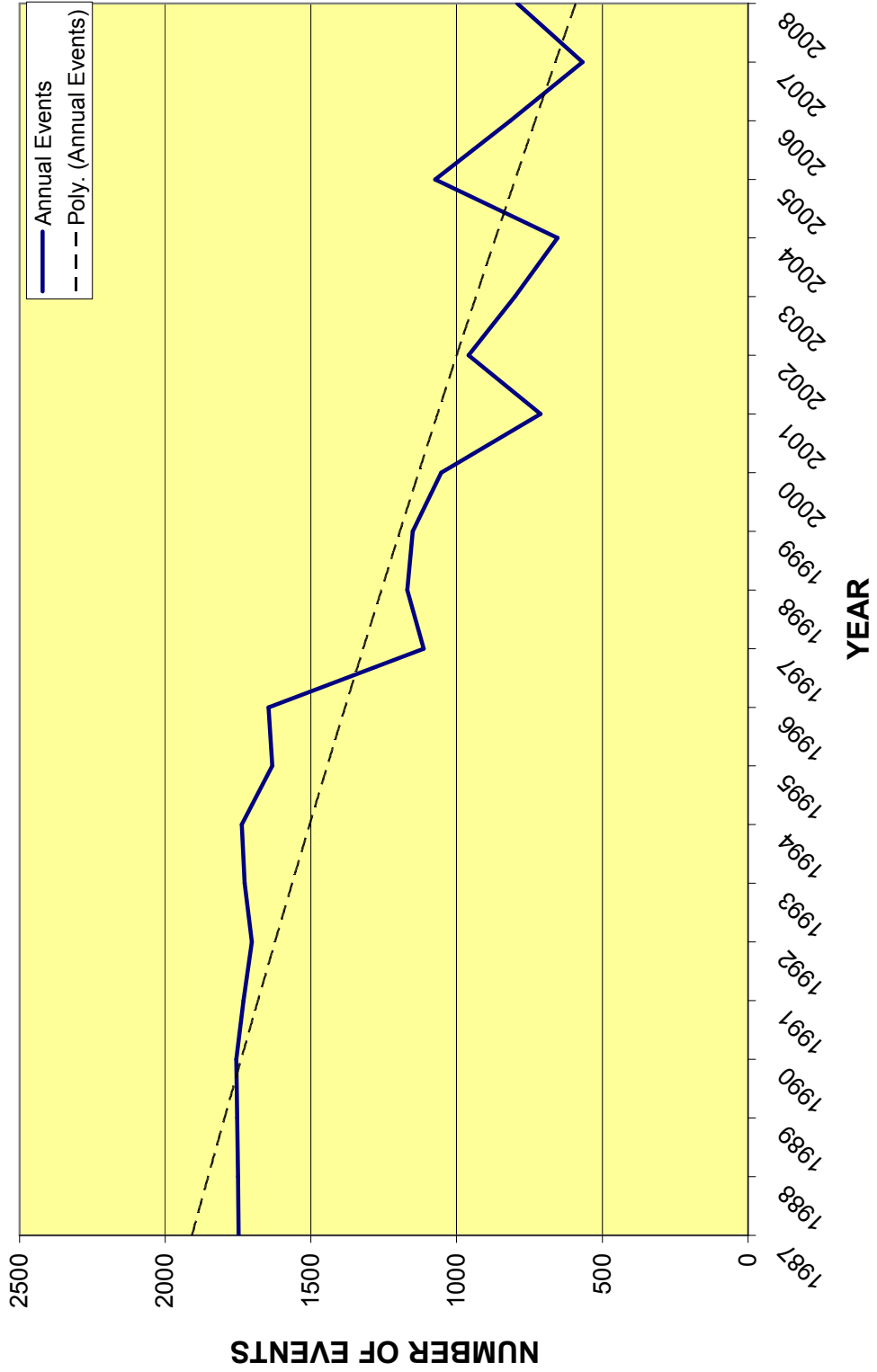
Two or more permits in one CSO Town/City

Bold = 9 communities with sewer systems only. Sewers discharge to a POTW controlled by another entity.

MAINE - STATEWIDE COMBINED SEWER OVERFLOW (CSO) VOLUME DISCHARGED

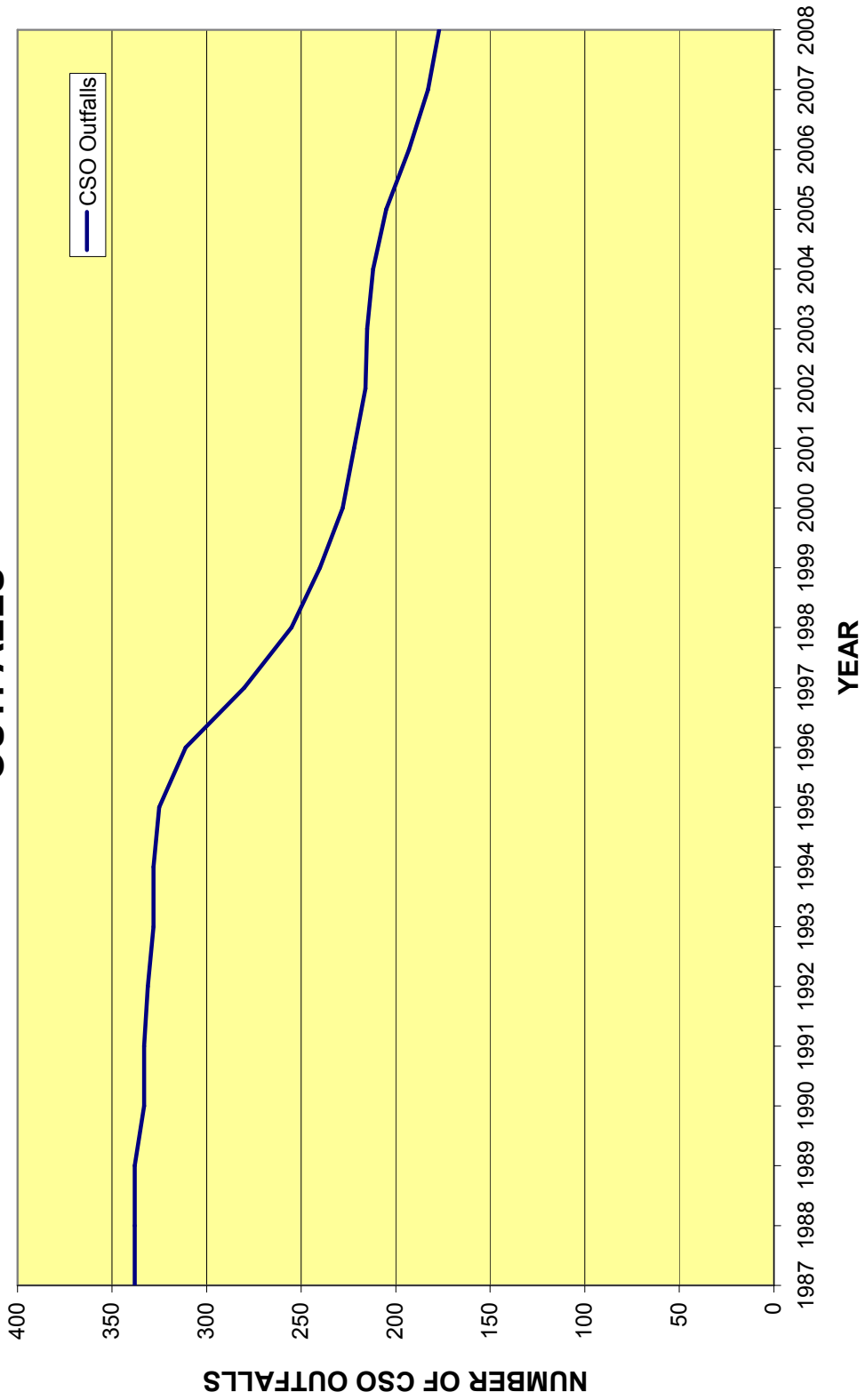


**MAINE - STATEWIDE
 COMBINED SEWER OVERFLOW (CSO)
 ANNUAL NUMBER OF DISCHARGE EVENTS**



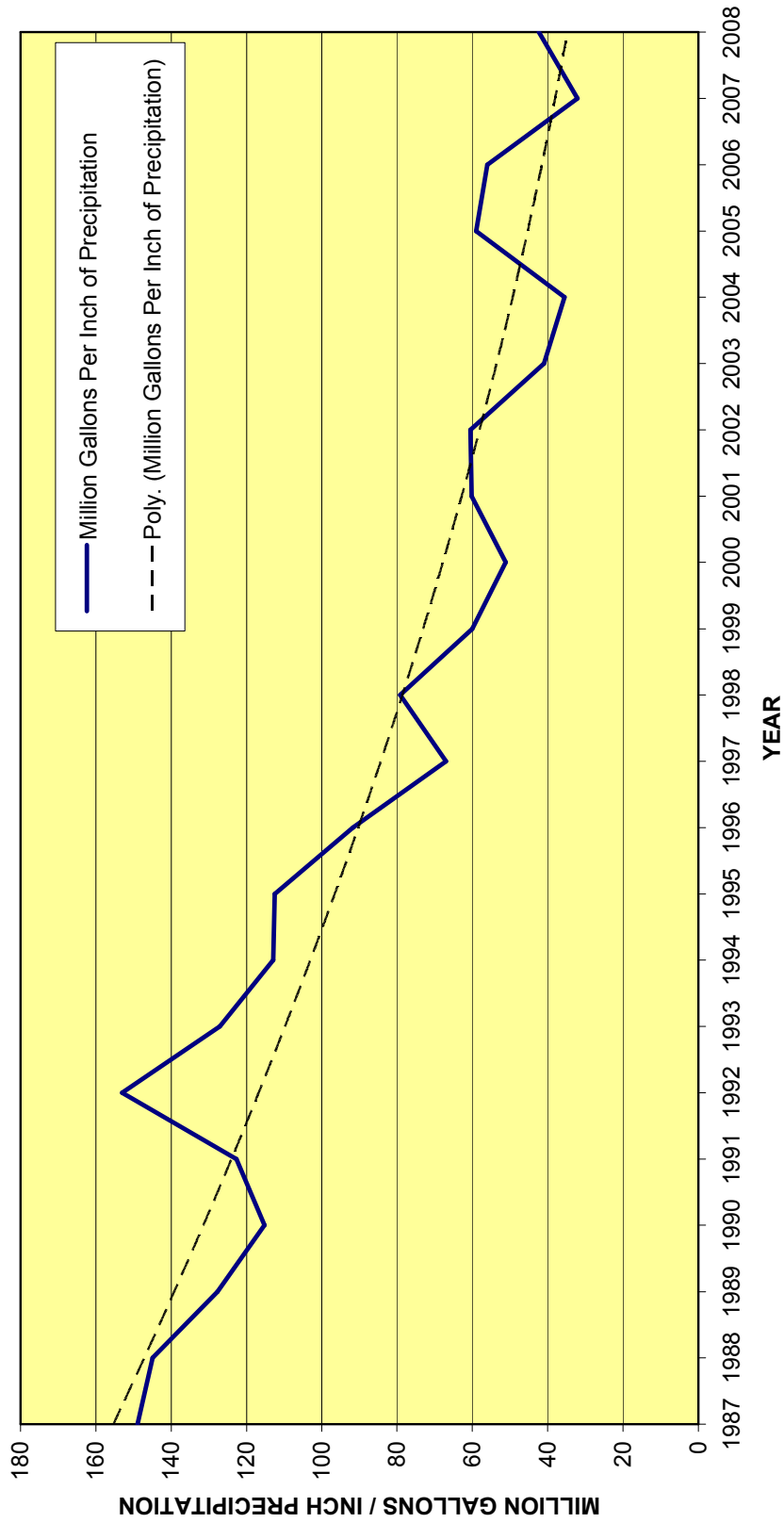


MAINE - STATEWIDE NUMBER OF COMBINED SEWER OVERFLOW (CSO) OUTFALLS



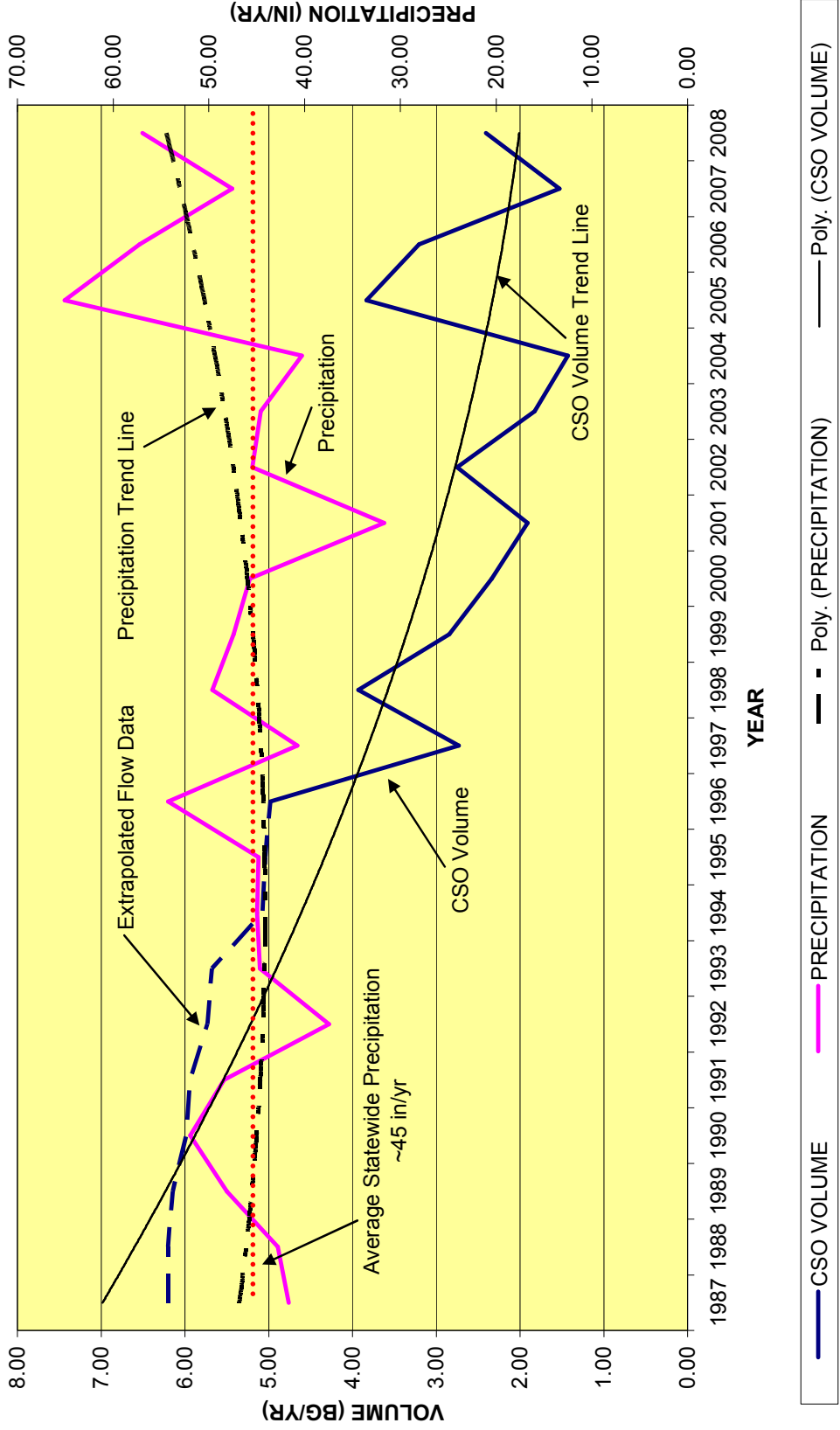


MAINE COMBINED SEWER OVERFLOWS ANNUAL VOLUME DISCHARGED PER INCH OF PRECIPITATION



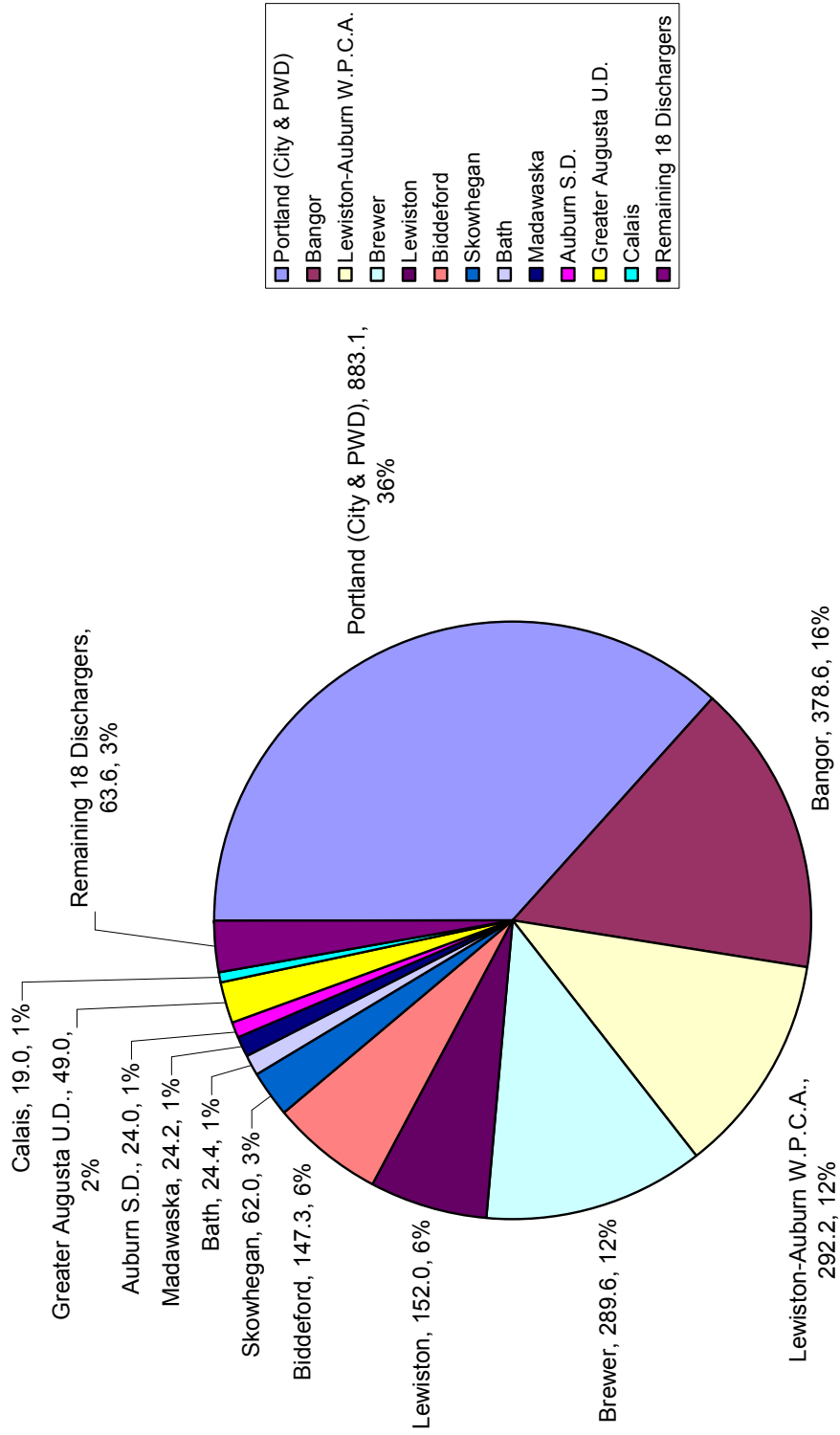


MAINE YEARLY CSO VOLUMES AND PRECIPITATION





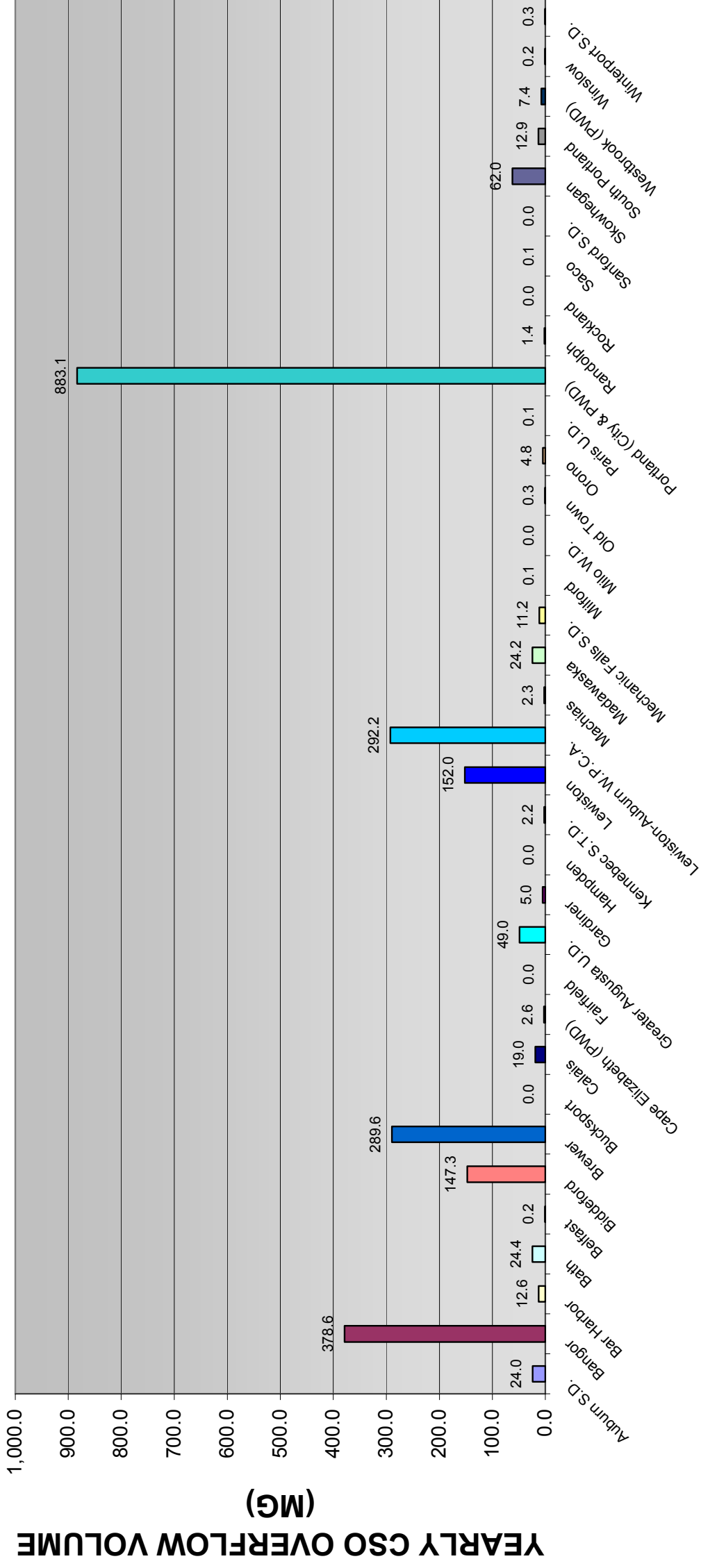
**2008 CSO FLOW COMPARISON
35 CSO COMMUNITIES
30 DISCHARGERS - 2.41 BILLION GALLONS**



Discharger, Overflow in Million Gallons (MG), Percent of Total



2008 CSO FLOW COMPARISON BY COMMUNITY



CSO COMMUNITY



2008 CSO Watershed Flows 2.41 Billion Gallons

