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Maine Combined Sewer Overflow 2006 Status Report

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MAINE COMBINED SEWER OVERFLOW 2006 STATUS REPORT

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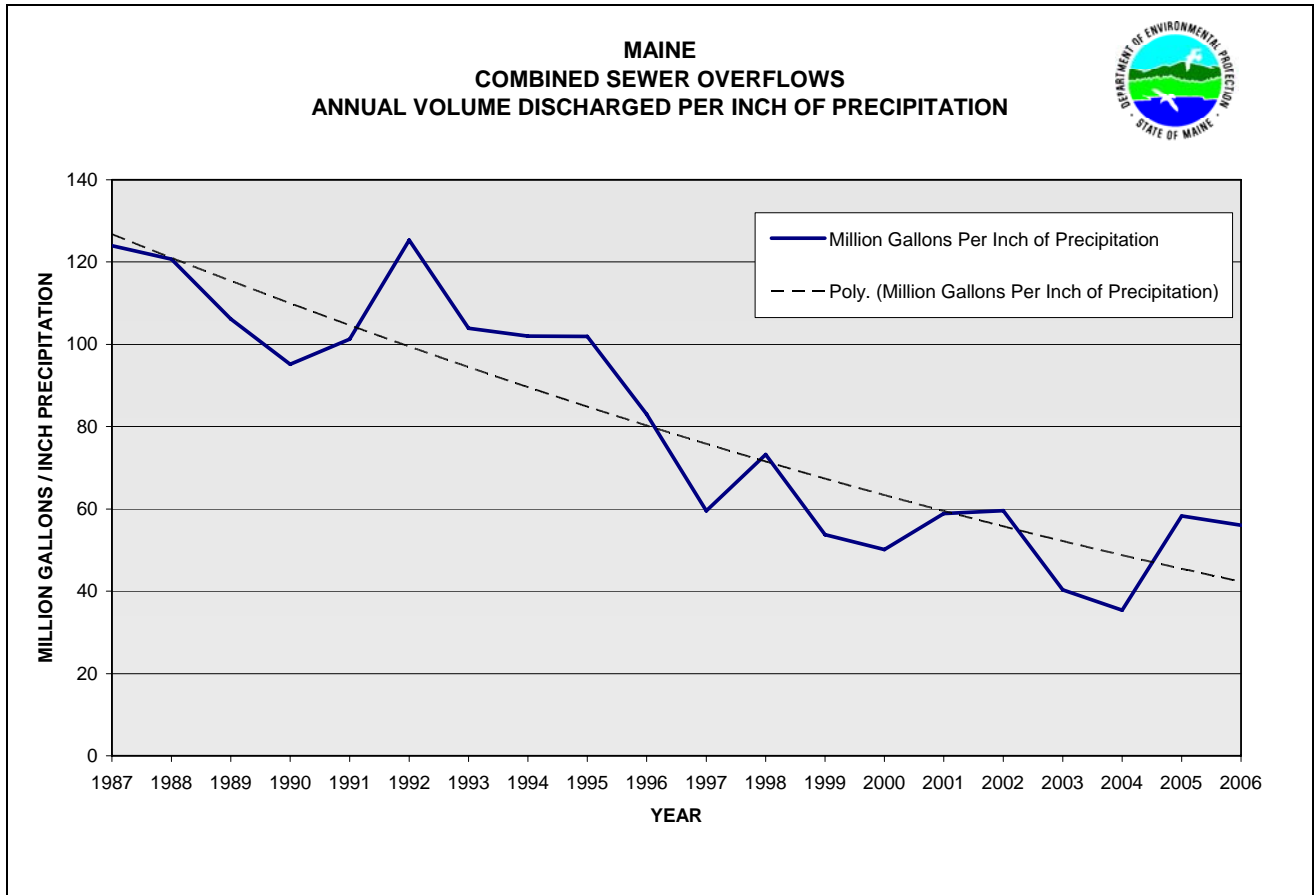


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INTRODUCTION

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 contained in this report 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, but is not necessarily limited to, 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 that 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 37 communities with CSO discharge points in their sewerage systems. These communities collectively have 193 individual CSO discharge points.
- 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 3 billion gallons are discharged annually from CSOs.
- 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 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 5.1 billion gallons of combined wastewater and storm water during wet weather events.
- Statewide it was estimated that overflow events happened approximately 1,600 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, 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 define the magnitude of the CSO discharges, their impacts on the environment, and evaluate a range of abatement control alternatives.
- Abatement projects have reduced untreated discharges in all of the CSO Communities. A few communities have eliminated their CSO discharges and are no longer permitted to discharge untreated combined sewage during wet weather.
- Statewide, CSO Communities report that they have invested a total of \$269 million (\$33 million in 2006) in CSO abatement and expect to spend over \$100 million in the next five years. After that the expected needs to bring them into compliance with the CSO Control Policy is an additional \$50 to \$100 million.

WHERE ARE WE NOW? – 2006 STATUS

- Maine started 2006 with 39 CSO Communities and finished the year with 37. Two of these communities, Fort Kent and Kittery, completed their CSO abatement programs and were not re-licensed as CSO Communities in 2006. A complete listing of Maine's CSO Communities, their number of CSO outfalls and the outfall receiving waters is on page 7.
- Thirty (30) of the CSO Communities reported experiencing at least one combined sewer overflow discharge in 2006.
- The volume of combined sewer discharged statewide in 2006 was reported at 3.21 billion gallons. The table on page 8, Maine CSO Community Flow Data, contains a historic listing of the yearly overflows from each CSO Community. The charts on pages 14 and 15 are graphical comparisons of the 2006 overflow volumes between the CSO Communities.
- In 2006, the CSO Communities reported 816 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 discharge. The table on page 9, 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.
- In 2006, eight (8) of the CSO Communities reported no overflows. Twenty-nine (29) of the communities reported discharging less in 2006 than 2005, while six (6) reported discharging more. The maximum number of overflow events reported from a single community was 93. The average number of discharges for all of the communities was 21 and the median was 12. Additional information is given in the table on page 9.
- The volume and frequency of CSO discharges varies from one wet weather event to another based on existing groundwater conditions, 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 10, Combined Sewer Overflow Volume Discharged, records an overall downward trend in the volumes being discharged annually. Since 1989, the volume of combined sewage discharged has decreased by approximately 50%.
- Similarly, the chart on page 11, Combined Sewer Overflow Annual Number of Discharge Events, shows a downward trend in the number of overflows per year. Since 1989, the number of overflows has decreased by approximately 50%.

- In 2006 Maine CSO Communities reduced the number of CSO discharge locations by 12, down from 205 to 193. Reductions were in: Auburn (1), Augusta (1), Bangor (1), Lewiston (2), Portland Water District (PWD) in Portland (1), South Portland (1), Rockland (1), Kittery (3), and Fort Kent (1). The chart on page 12, Maine – Statewide Number of Combined Sewer Overflow Outfalls, shows a 45% 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. The chart on page 13, which illustrates this, 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 120 million gallons per inch of precipitation to around 50 million gallons per inch of precipitation. This trend is most likely the best indicator of the CSO abatement progress that is being made.
- The previous year's (2005) average precipitation for CSO Communities was around 65" (~20" above average). The historic rains in 2005 lead to elevated overflow volumes of 3.79 billion gallons, up 2.36 billion gallons (165%) from the 1.43 billion gallons discharged in the below average precipitation year of 2004. 2004 precipitation levels averaged around 40" (~5" below average) for the CSO Communities.
- 2006 was another exceptionally wet year. Coastal communities reported above average annual precipitation ranging from 79" in southern Maine, to 65" in the mid-coast area. On an average, CSO communities received an estimated annual precipitation of 57", approximately 12" more than a typical average year of 45", i.e. 26% above average. High groundwater conditions coupled with intense rain storms (some up to 17" in 24 hr.) made for another above average year for CSO discharges. The statewide volume of combined sewage discharged in 2006 was 3.21 billion gallons, a decrease of 580 million gallons or 15% from 2005.
- The CSOs from the City of Portland and Portland Water District in Portland comprise approximately one half of the State's total, see the chart on page 14. 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. Removing Portland's overflow data for those two years, the remaining CSO communities decreased the CSO volume discharged from 2005 to 2006 by 44%, 2.50 to 1.39 billion gallons respectively.
- Abatement of CSOs is a costly endeavor. To date Maine CSO Communities have reported expending \$269 million implementing their CSO abatement projects. In the 2006 Annual CSO Progress Report they reported expending \$33 million on abatement work in 2006. It is estimated that the future needs of these communities to complete their CSO abatement plans is in excess of \$150 million, in 2006 money.

- 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, 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. 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.

MAINE - CSO COMMUNITY LIST
MARCH 2007



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

TOTAL CSOs 193
39 CSO Permits, permitting 36 of 37 CSO Towns/Cities

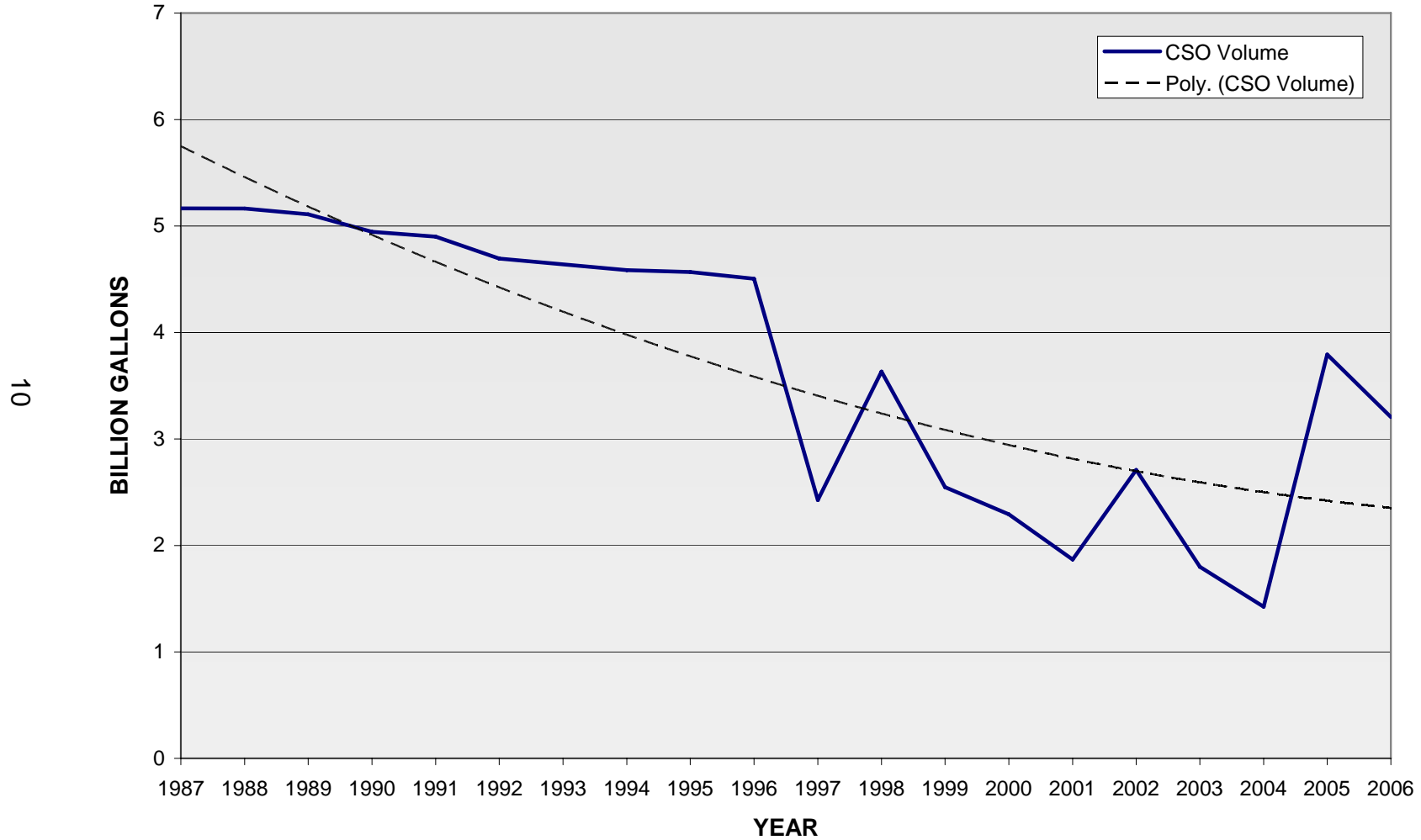
Two or more permits in one CSO Town/City Needs Permit

MAINE CSO COMMUNITY ANNUAL NUMBER OF CSO DISCHARGE EVENTS

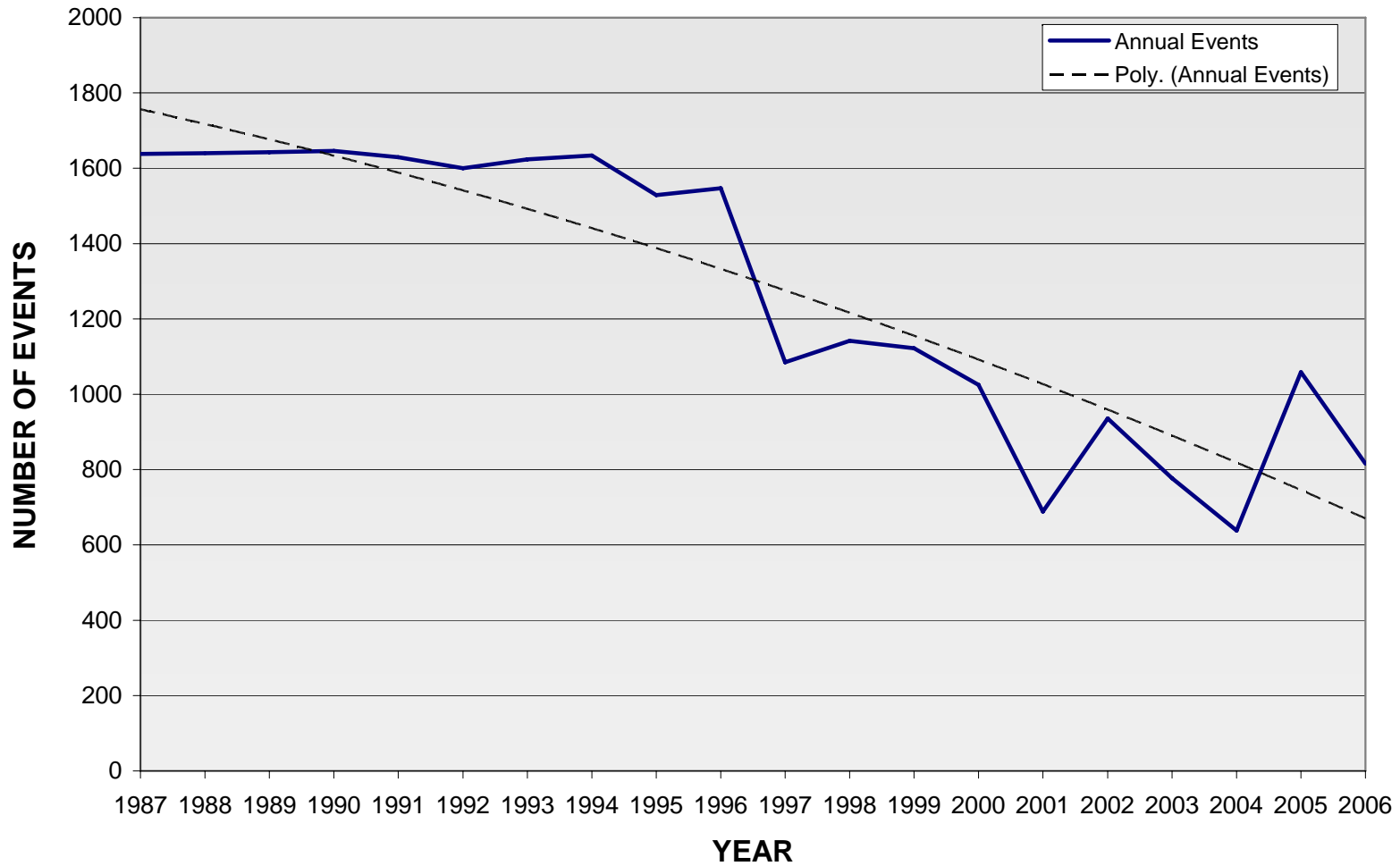
		Annual Number of CSO Discharge Events																			
No longer a CSO Community																					
Community	NPDES Permit No.	Year																			
		1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Auburn S.D.	ME0100005	80	80	80	80	80	80	21	21	10	10	7	7	7	7	44	67	62	24	58	37
Augusta S.D.	ME0100013	80	80	80	80	80	80	80	80	80	80	39	79	59	73	25	58	70	58	73	50
Bangor	ME0100781	53	53	53	53	52	37	46	49	49	41	38	44	33	37	20	40	49	42	46	58
Bar Harbor	ME0101214 & ME01	155	155	155	155	155	155	155	155	155	155	154	47	98	44	7	21	16	5	22	18
Bath	ME0100021	64	64	64	64	64	64	64	64	64	64	64	30	37	21	10	25	23	20	33	32
Belfast	ME0101532	7	7	7	7	7	7	7	7	7	7	7	5	7	1	0	0	0	0	5	3
Biddeford	ME0100048	180	180	180	180	180	180	180	180	180	180	94	147	162	184	140	150	93	61	104	82
Brewer	ME0100072	95	95	95	95	95	95	66	66	66	66	66	22	92	95	80	53	72	66	72	45
Bucksport	ME0100111	53	53	53	53	53	53	53	53	53	53	53	10	17	10	32	24	25	8	24	18
Calais	ME0100129																				5
Cape Elizabeth (PWD)	ME0102075	5	5	5	5	5	5	5	5	5	5	2	3	5	5	3	0	2	5	20	20
Corinna S.D.	ME0100153	30	30	30	30	30	30	30	30	30	30	15	16	26	23	19	1	1	0		
Dover-Foxcroft	ME0100501	8	8	8	8	8	2	8	6	1	4	0	3	0	1	0	0	0	0	2	0
East Millinocket	ME0100196	11	11	11	11	11	11	11	11	11	11	11	11	0	0	0	0	0	0	0	0
Fairfield	ME0102393	15	15	15	15	15	15	15	15	15	15	4	4	4	4	4	0	0	0	0	0
Fort Kent U.D.	ME0102369	10	10	10	10	10	10	10	10	10	10	10	10	0	2	0	0	2	1	4	
Gardiner	ME0101702	20	20	20	20	20	20	20	20	20	20	5	19	11	13	9	13	24	11	41	14
Hallowell W.D.	ME0101010	6	6	6	6	6	6	6	6	6	6	3	4	6	3	0	0	2	0	14	3
Hampden	ME0102512	1	3	8	10	7	4	17	18	8	14	8	1	11	9	0	0	2	0	13	0
Kennebec S.T.D.	ME0100854	15	15	15	15	15	15	15	15	15	15	15	8	6	6	4	0	5	7	9	3
Kittery	ME0100285	7	7	7	7	7	7	7	7	7	7	3	2	0	1	1	0	0	1	0	
Lewiston	ME0100994	80	80	80	80	80	80	80	80	80	80	46	71	62	70	43	57	55	65	69	70
Lewiston-Auburn W.P.C.A.	ME0101478	80	80	80	80	80	80	80	80	80	80	80	80	80	41	28	25	23	35	49	44
Lincoln S.D.	ME0101796	10	10	10	10	10	10	10	10	10	5	1	3	11	2						
Lisbon	ME0100307	5	5	5	5	5	5	5	5	5	5	5	1	1	1	0	0	0			
Livermore Falls	ME0100315																				
Machias	ME0100323	8	8	8	8	5	7	3	9	3	3	3	2	9	5	0	4	16	8	15	10
Madawaska	ME 0101681	16	16	16	16	16	16	91	91	27	26	16	12	0	3	1	1	7	4	65	14
Mechanic Falls S.D.	ME0100391	25	25	25	25	25	25	25	25	25	25	24	25	18		10	15	20	12	29	23
Milford	ME0102695																			?	8
Milo W.D.	ME0100439	3	3	3	3	3	3	3	3	3	3	3	3	3	1	0	0	1	0	1	0
Oakland																					
Old Town	ME0100471	25	25	25	25	25	25	25	25	25	25	25	3	5	4	0	5	7	1	13	1
Orono	ME0100498	30	30	28	29	19	12	25	27	18	37	3	7	12	4	0	1	2	0	12	3
Paris U.D.	ME 0100951	5	5	5	5	5	5	5	5	5	5	0	1	0	1	0	0	1	0	2	2
Portland (PWD)	PWD-ME0102075/ C	100	100	100	100	100	100	100	100	100	100	61	102	81	83	58	141	71	86	88	93
Presque Isle	ME0100561	26	26	26	26	26	26	26	26	26	26	17	26	12	14	4					
Randolph	ME0102423	23	23	23	23	23	23	23	23	23	23	23	23	23	23	19	3	2	0	8	3
Rockland	ME0100595	23	23	23	23	23	23	23	23	23	23	12	23	18	8	5	11	6	2	0	0
Saco	ME 0101117	40	40	40	40	40	40	40	40	40	44	36	33	39	44	22	36	22	32	41	24
Sanford S.D.	ME0100617	10	10	10	10	10	10	10	10	10	10	10	10	3	1	0	0	0	0	0	1
Skowhegan	ME0100625	150	150	150	150	150	150	150	150	150	150	108	111	111	161	95	115	77	53	81	81
S. Maine Tech. College																					
South Portland	ME0100633	23	23	23	23	23	23	23	23	23	23	21	23	23	15	12	11	10	10	20	20
Unity	ME0101150																				
Westbrook (PWD)	ME0100846	34	34	34	34	34	34	34	34	34	34	34	30	19	16	15	33	7	13	17	31
Winslow	ME0102628	20	20	20	20	20	20	20	20	20	20	10	10	1	0	0	0	0	0	1	0
Winterport S.D.	ME0100749	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	8	1	2	0
Yarmouth	ME0100765	4	4	4	4	4	4	4	4	4	4	0	4	4	2	1	0	0			
Total		1638	1640	1643	1646	1629	1600	1624	1634	1529	1547	1085	1142	1122	1025	689	936	777	637	1059	816
Median		23	23	23	23	20	20	23	23	20	23	12	10	11	7	4	4	7	4.5	16	12
Mean		38	38	38	38	38	37	38	38	36	36	25	26	26	25	16	23	19	16	28	21

Numbers in blue are estimated from LTCP/MP or surrounding events.

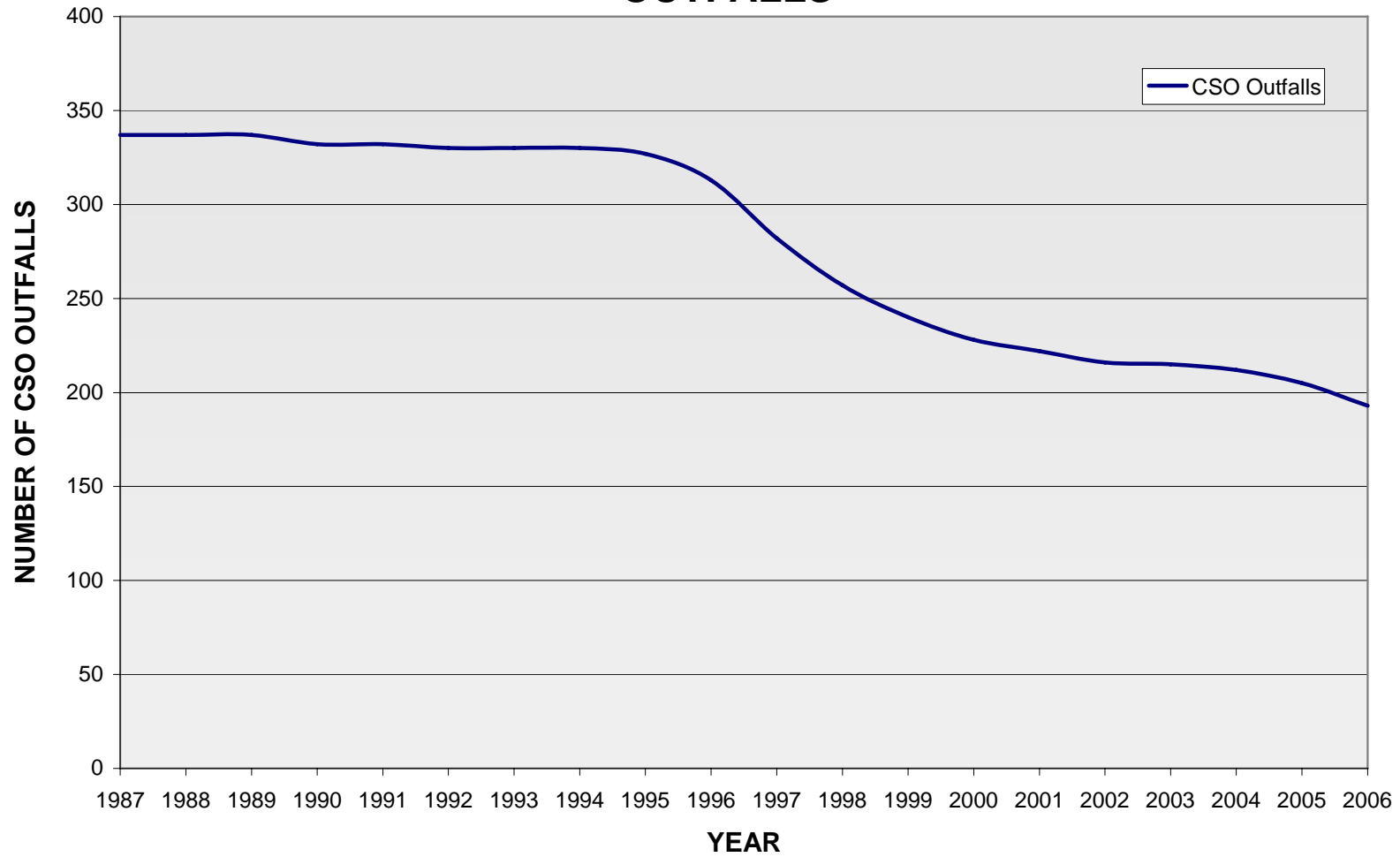
MAINE - STATEWIDE COMBINED SEWER OVERFLOW (CSO) VOLUME DISCHARGED



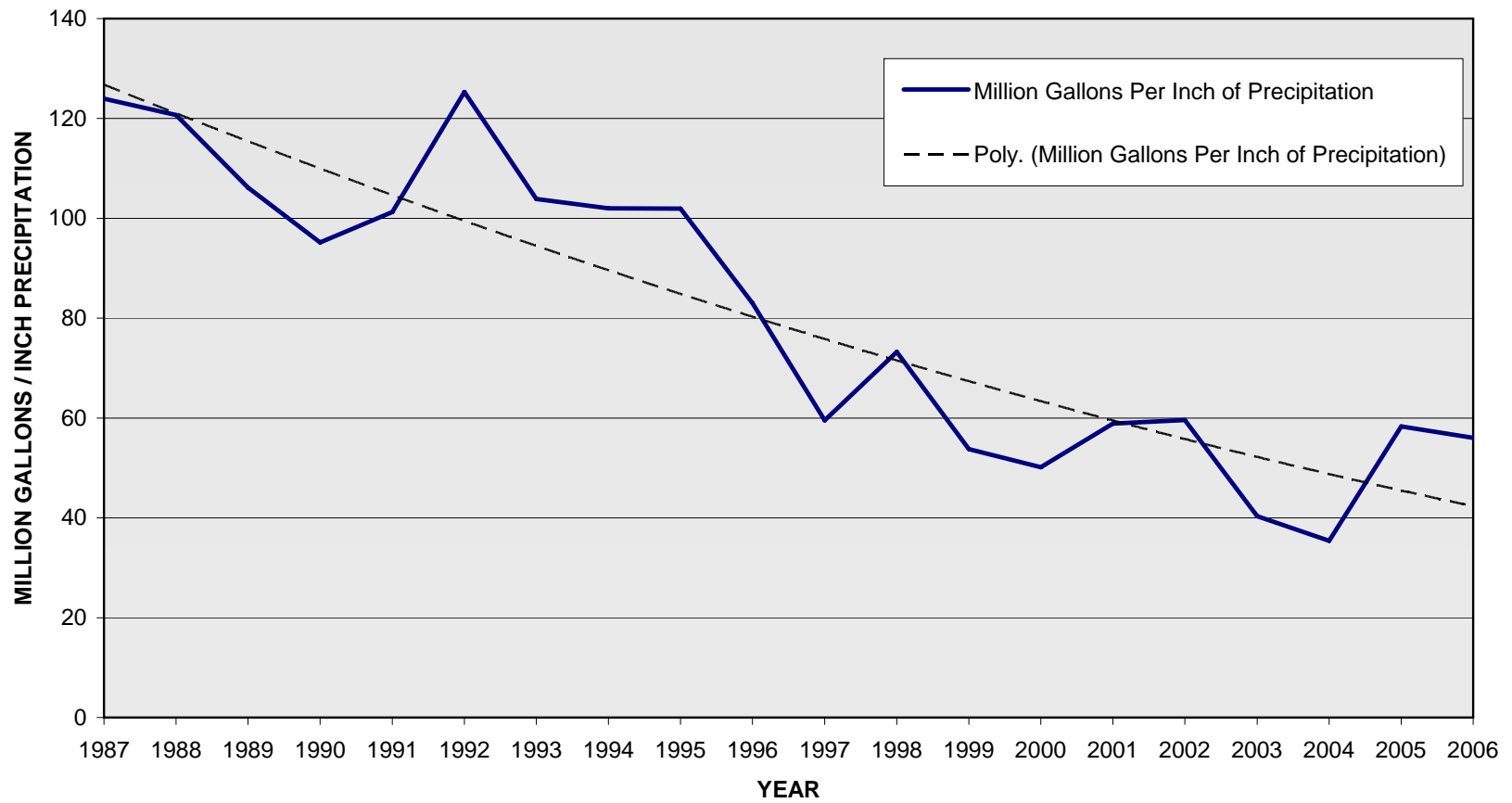
MAINE - STATEWIDE COMBINED SEWER OVERFLOW (CSO) ANNUAL NUMBER OF DISCHARGE EVENTS



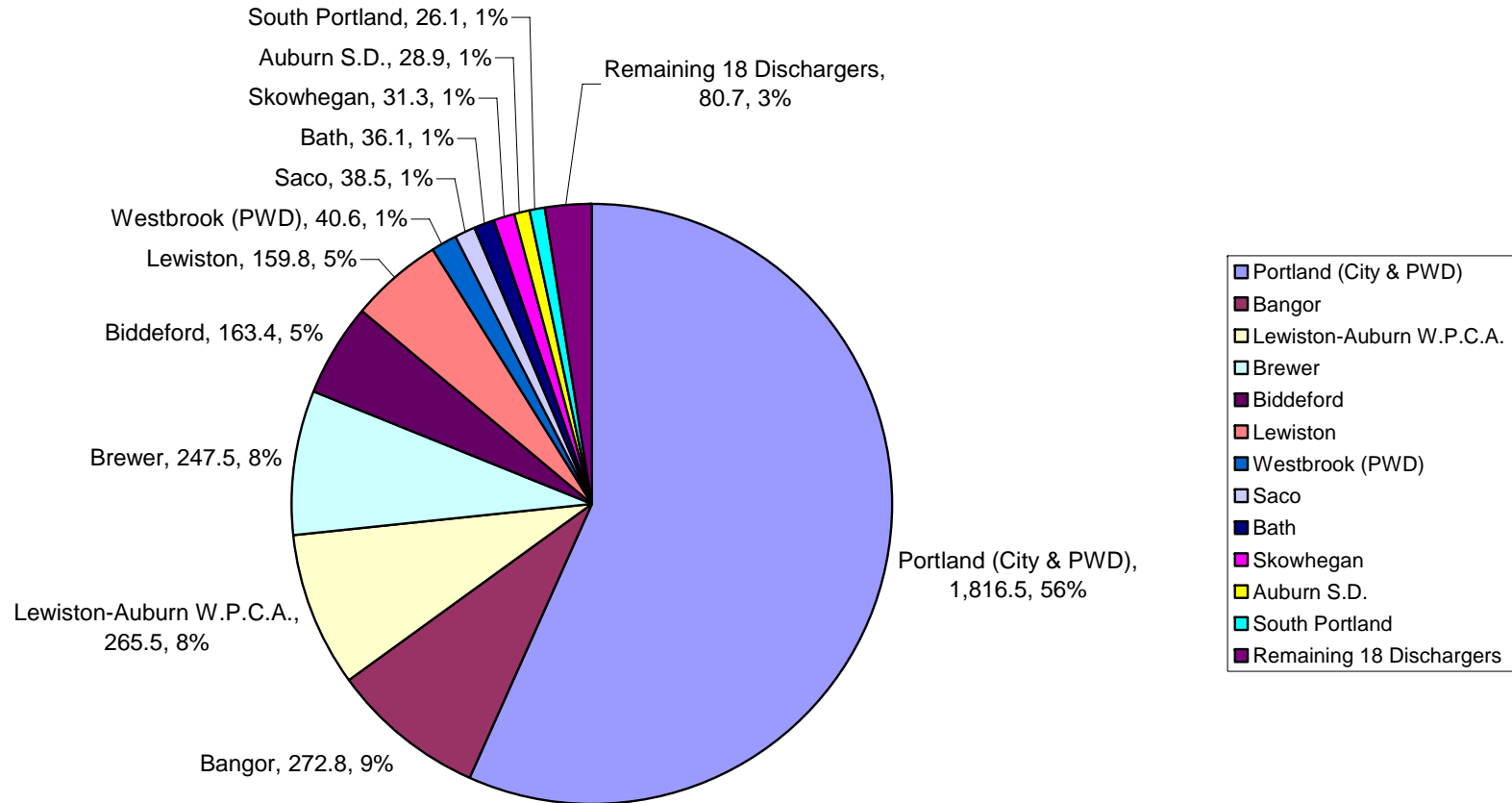
MAINE - STATEWIDE NUMBER OF COMBINED SEWER OVERFLOW (CSO) OUTFALLS



**MAINE
COMBINED SEWER OVERFLOWS
ANNUAL VOLUME DISCHARGED PER INCH OF PRECIPITATION**



**2006 CSO FLOW COMPARISON
37 CSO COMMUNITIES
30 DISCHARGERS - 3.21 BILLION GALLONS**



Discharger, Overflow in MG, Percent of Total

2006 CSO FLOW COMPARISON BY COMMUNITY

