NPDES compliance summary report, fiscal year 2000

Massachusetts Water Resources Authority

Environmental Quality Department
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NPDES COMPLIANCE SUMMARY REPORT
Fiscal Year 2000

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I Introduction

This report presents and summarizes the National Pollutant Discharge Elimination System (NPDES) monitoring and compliance data compiled and analyzed by the Massachusetts Water Resources Authority (MWRA) Environmental Quality Department during the period of July 1999 to June 2000. MWRA's Deer Island Treatment Plant (DITP) and Combined Sewer Overflow (CSO) facilities serve large communities' needs for sewer systems while maintaining healthy water environments for recreation and wildlife.

The monitoring results for DITP are presented and discussed in Chapter II. Chapter III describes the results for the six CSO facilities. Chapter IV discusses sewer system capacity. Appendices A-G provide detailed monthly data for the Deer Island plants and for the six CSO facilities. Appendix H provides background information about MWRA's regulatory requirements, and Appendix I describes the MWRA sewer system and facilities. Appendix J defines the types of detection limits encountered in chemical analyses. Appendix K includes lists of pollutants of concern. Finally, Appendix L is a glossary of the terms and phrases used throughout this report.

II Deer Island Treatment Plant

This chapter presents and discusses monitoring information for the Deer Island Treatment Plant (DITP). The characteristics examined include flow, conventional parameters, nutrients, priority pollutants (metals, cyanide, pesticides/PCBs, and organic compounds), and whole effluent toxicity.

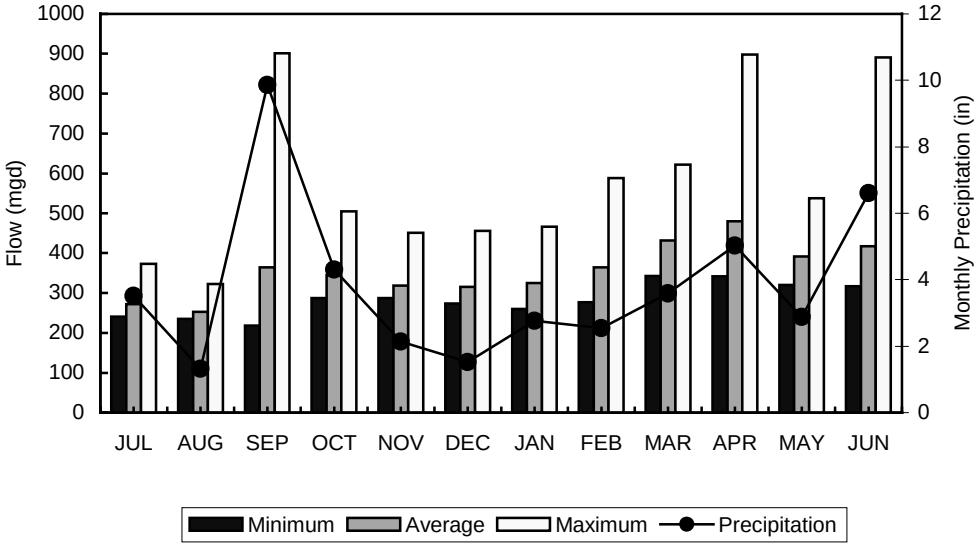
II.A Monitoring Results

II.A.1 Influent Characteristics

II.A.1.a Flow

The average flow to DITP in FY00 was 356 million gallons per day (mgd). Figure II.A.1 shows that the amount of flow to the plant is influenced by precipitation. This occurs because several of the larger communities in the North System have combined sewers.

Figure II.A.1
Deer Island Flow Compared to Precipitation, FY00



The impact of rainfall on flows can also be seen in Figure II.A.2, which tracks average flow and precipitation over the past 7 fiscal years. The completion of the Inter-Island Tunnel from Nut Island to Deer Island in early FY99 resulted in increased flow to DITP, as DITP treated South System sewage previously treated at the now defunct Nut Island Treatment Plant. Despite the increased rainfall in FY00 (46.1 versus 32.4 inches), average flows to DITP remained similar to flows in FY99 (356 mgd in FY00 versus 350 in FY99).

Figure II.A.2
Deer Island Average Flow
Compared to Precipitation FY94-FY00

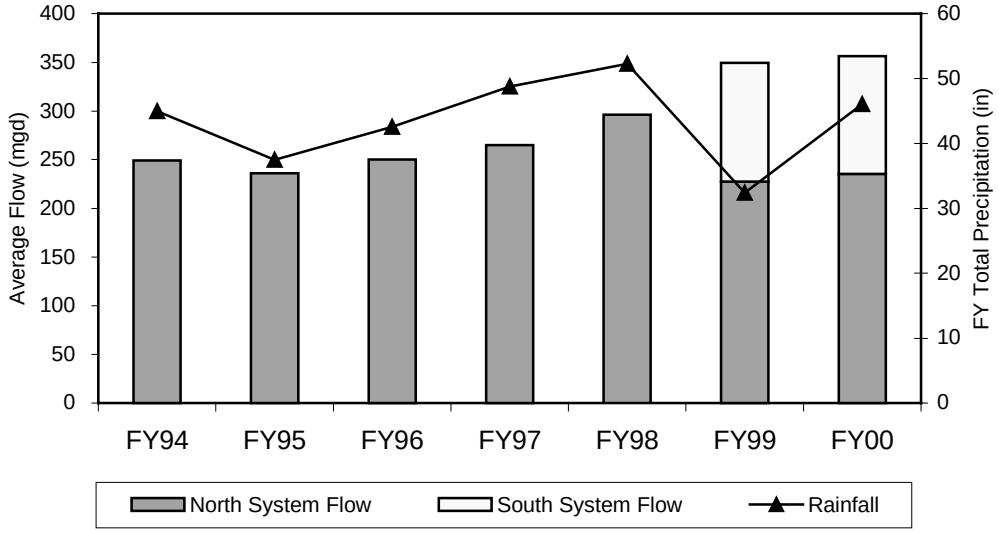
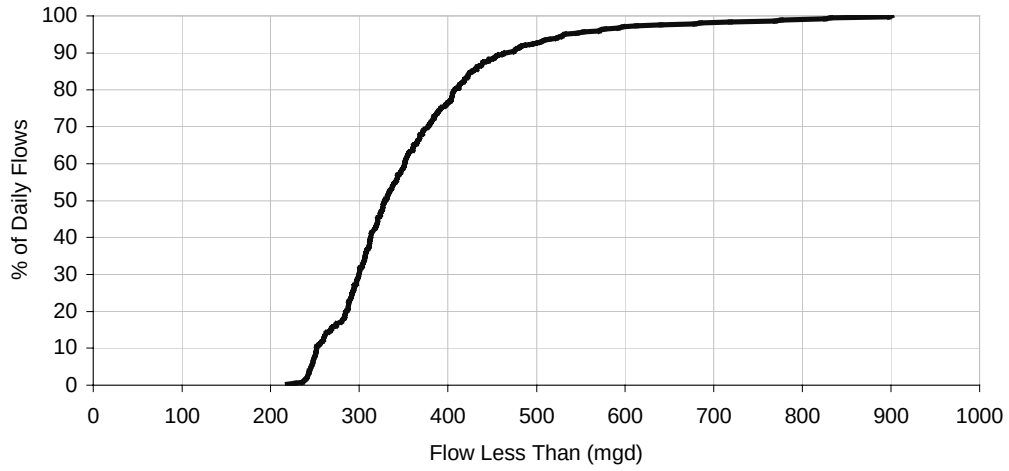


Figure II.A.3 provides a frequency distribution of DITP flow in FY00. Flow through the plant was less than 532 mgd 95% of the time.

Figure II.A.3
Frequency Distribution for Deer Island Flow, FY00



II.A.1.b Conventional Parameters and Nutrients

As Table II.A.1 indicates, Deer Island influent in FY00 can be classified as weak/medium.[1] A summary of Deer Island influent characteristics from FY94-FY00 is provided in Table II.A.2.

Table II.A.1 Classification of Deer Island Influent (mg/L), FY00

Parameter	Value	Weak	Medium	Strong
TSS	167	100	200	350
BOD	152	100	200	300
TKN	28	20	40	85
Ammonia	16	12	25	50
COD	372	250	500	1000

[1]Metcalf & Eddy, Inc. 1972. Wastewater Engineering: Collection, Treatment, Disposal. New York: McGraw-Hill Book Company, p. 231.

Table II.A.2 Deer Island Influent Characterization, FY94-FY00

PARAMETER	FY94 *	FY95 *	FY96 *	FY97 *	FY98 *	FY99	**FY00**
Flow (mgd)							
Minimum	171	167	147	167	159	233	**219**
Average	249	236	250	265	296	350	**356**
Maximum	528	565	526	649	917	824	**901**
Total Suspended Solids (TSS)							
Min Conc (mg/L)	93	102	56	50	32	43	**86**
Avg Conc (mg/L)	137	138	140	144	141	160	**167**
Max Conc (mg/L)	175	160	432	284	382	564	**379**
Average Loading (tons/d)	142	136	146	159	175	234	**248**
Biochemical Oxygen Demand (BOD)							
Min Conc (mg/L)	99	99	61	39	31	45	**58**
Avg Conc (mg/L)	149	140	143	136	145	151	**147**
Max Conc (mg/L)	175	173	246	311	302	506	**337**
Average Loading (tons/d)	155	138	149	151	179	220	**218**
Settleable Solids							
Min Conc (mL/L)	1.9	3.5	0.1	1.5	0.1	0.1	**0.7**
Avg Conc (mL/L)	3.9	5.6	7.0	6.9	6.3	5.9	**5.3**
Max Conc (mL/L)	5.6	7.3	18.0	17.0	20.0	34.2	**24.6**
Average Loading (tons/d)	4.0	5.5	7.3	7.7	7.8	8.6	**7.9**
Oil and Grease							
Min Conc (mg/L)	14	17	10	12	7	15	**11**
Avg Conc (mg/L)	36	31	34	29	30	37	**33**
Max Conc (mg/L)	64	37	67	136	108	107	**52**
Average Loading (tons/d)	37	31	35	33	36	54	**49**
Total Kjeldahl Nitrogen							
Min Conc (mg/L)	11.2	14.0	11.6	8.7	13.6	14.6	**13.2**
Avg Conc (mg/L)	21.9	21.9	26.3	24.2	26.4	29.2	**27.7**
Max Conc (mg/L)	29.3	29.1	56.3	48.1	37.7	45.6	**46.5**
Average Loading (tons/d)	22.7	21.5	27.4	26.8	32.6	42.7	**41.1**

Table II.A.2 Deer Island Influent Characterization, FY94-FY00 [cont.]

PARAMETER	FY94 *	FY95 *	FY96 *	FY97 *	FY98 *	FY99	**FY00**
Ammonia-Nitrogen							
Min Conc (mg/L)	5.6	7.3	6.8	2.5	4.8	6.0	**6.1**
Avg Conc (mg/L)	12.3	13.7	15.0	13.3	14.5	16.6	**16.3**
Max Conc (mg/L)	17.9	18.0	24.0	18.6	23.1	30.8	**25.0**
Average Loading (tons/d)	12.8	13.5	15.6	14.6	17.8	24.2	**24.2**
Nitrates							
Min Conc (mg/L)	0.10	0.02	0.01	0.01	0.01	0.01	**0.00**
Avg Conc (mg/L)	0.80	0.15	0.14	0.22	0.36	0.06	**0.13**
Max Conc (mg/L)	2.70	0.59	1.42	2.31	1.95	1.21	**1.56**
Average Loading (tons/d)	0.83	0.15	0.15	0.24	0.44	0.09	**0.19**
Nitrites							
Min Conc (mg/L)	0.00	0.02	0.01	0.01	0.01	0.01	**0.01**
Avg Conc (mg/L)	0.10	0.06	0.07	0.09	0.08	0.05	**0.14**
Max Conc (mg/L)	0.20	0.19	1.66	0.35	0.46	0.45	**0.72**
Average Loading (tons/d)	0.10	0.06	0.07	0.10	0.10	0.07	**0.21**
Orthophosphorus							
Min Conc (mg/L)	0.40	1.00	0.29	0.13	0.49	0.50	**0.53**
Avg Conc (mg/L)	2.30	2.20	1.53	1.49	1.76	2.02	**1.93**
Max Conc (mg/L)	5.10	5.66	3.19	2.62	3.13	3.25	**3.32**
Average Loading (tons/d)	2.39	2.17	1.60	1.64	2.17	2.95	**2.87**
Total Phosphorus							
Min Conc (mg/L)	0.60	2.11	1.54	1.21	1.80	2.25	**2.10**
Avg Conc (mg/L)	4.00	3.63	3.42	3.19	3.70	4.22	**4.36**
Max Conc (mg/L)	8.30	4.79	4.85	5.00	5.29	7.78	**5.86**
Average Loading (tons/d)	4.15	3.57	3.57	3.53	4.57	6.16	**6.48**

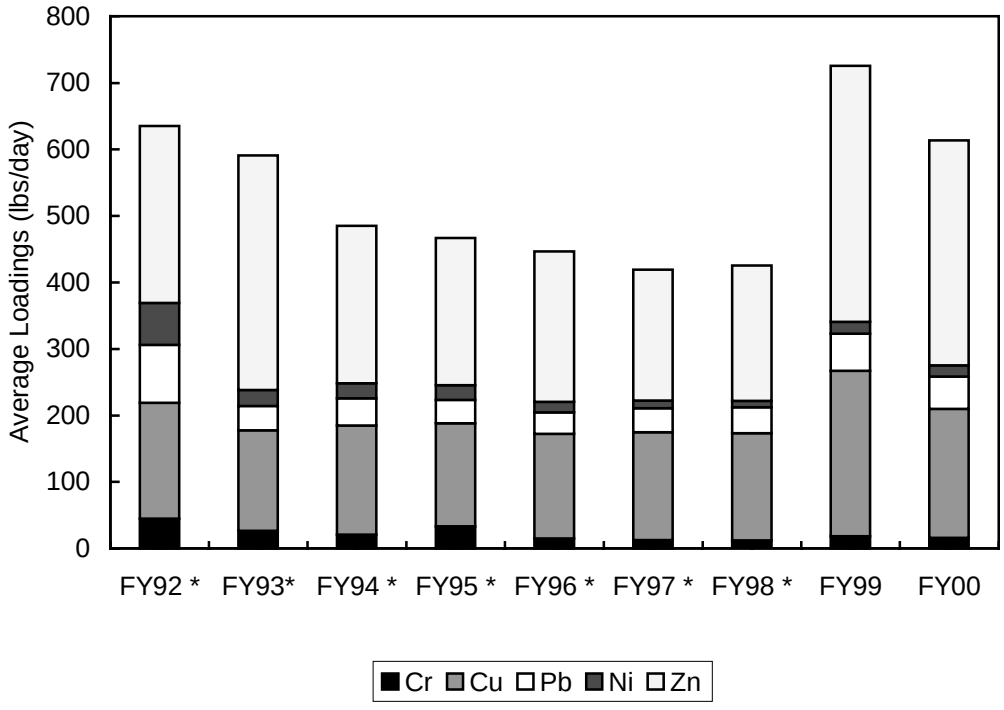
* DITP and the North System only; the opening of the Inter-Island Tunnel and transfer of South Sytem flows to DITP occurred at the start of FY99.

II.A.1.c Priority Pollutants

The results of a complete priority pollutant scan of Deer Island influent can be found in Table A-2 (concentrations) and Table A-3 (loadings) of Appendix A. For levels below detection limits, one half of the method detection limit for inorganics or one tenth of the quantitation limit for organics was substituted. Appendix K provides a detailed discussion of detection and quantitation limits.

Figure II.A.4 compares FY00 average influent loadings for several key metals to historical values. Before 1999, metals loadings in the North System decreased steadily, as MWRA made strides in toxic and corrosion control efforts involving both water supply and wastewater transport. MWRA samples for these pollutants a few times a month. Using the measured concentration and the flow on the day on which the sample was taken, daily loads can be calculated. Since the South System flow was transferred from Nut Island to Deer Island at the start of FY99, the data for the past two fiscal years includes the South System flow. This larger, combined flow explains the increase in loadings of metals from FY92-98 to FY99-00.

Figure II.A.4
Deer Island Average Influent Metals Loadings, FY92-FY00

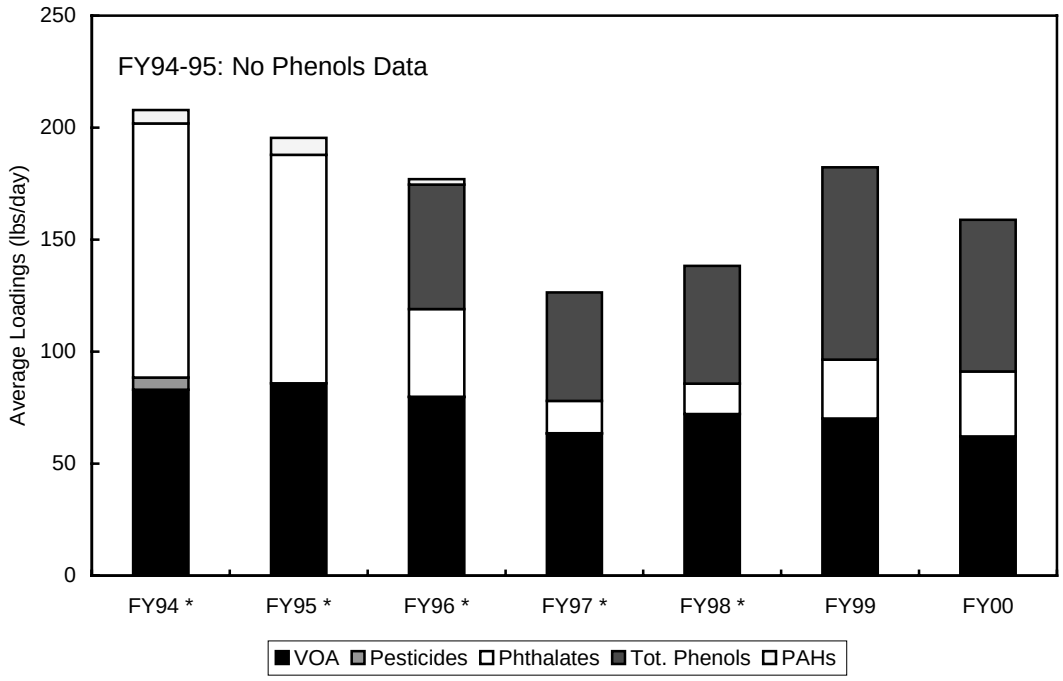


* DITP and the North System only; the opening of the Inter-Island Tunnel and transfer of South Sytem flows to DITP occurred at the start of FY99.

Figure II.A.5 compares influent loadings of certain representative organic priority pollutants to the loadings in previous years (see Table A-3 in Appendix A for more details). The opening of the Inter-Island Tunnel in FY98 has an identical effect on organics loadings as it did on metals loadings; they increased greatly due to the added flow from the South System.

Figure II.A.5 shows the annual average of the daily loads; however, it does not reflect how often the pollutant was detected during the year. For example, if in FY00, a pollutant was detected twice out of 35 tests, the pollutant's average daily loading for the year would be included in the chart below. If in FY99, that same pollutant was detected 34 out of 35 times, the average loading would be included in the chart below, without differentiating it from FY00. Moreover, the average loading of a pollutant may be artificially high, since when the pollutant is not detected, one tenth of the reporting limit is listed (see Appendix K). Therefore, when this concentration is converted to a loading, it is recorded as a non-zero value, even though the constituent may not have been present in the sample.

Figure II.A.5
Deer Island Average Influent Organics Loadings, FY94-FY00



* DITP and the North System only; the opening of the Inter-Island Tunnel and transfer of South Sytem flows to DITP occurred at the start of FY99.

II.A.2 Effluent Characteristics

II.A.2.a Conventional Parameters and Nutrients

Table II.A.3 compares DITP's removal efficiencies for TSS and BOD with theoretical removal efficiencies.[2] The removal efficiencies are determined from the average effluent and influent concentrations for TSS and BOD as reported in Table A-1 of Appendix A.

Table II.A.3 Deer Island Removal Efficiency, FY00

Parameter	DITP Removal Efficiency*	Theoretical Removal Efficiency	
		Primary Treatment	Secondary Treatment
TSS	89%	50-65%	85%
BOD	83%	25-40%	85%

*Removal efficiencies were determined using the average influent and effluent concentration values as reported in Table A-1, Appendix A. Note that only a portion of the total flow each month went through secondary treatment. See Table II.A.4 for more information.

Table II.A.4 shows how degree of secondary treatment can affect TSS and BOD removal efficiencies. The table lists TSS and BOD removal efficiencies and the percentage of flow that received secondary treatment on a monthly basis. The degree of secondary treatment is the average flow through secondary treatment (mgd) during the month divided by the average plant flow (mgd) for that month.

For the year, almost 89% of DITP flow went through secondary treatment and removal efficiencies for TSS were greater than 88%. For BOD, removal efficiency was almost 83%. Heavy rains and consequent high flows in September, March, April, and June account for the smaller amounts that were treated at secondary levels for those months.

[2]Metcalf & Eddy, Inc. 1972. Wastewater Engineering Collection, Treatment, Disposal. New York. McGraw-Hill Book Company, p. 446.

Table II.A.4

Removal Efficiencies vs. Degree of Secondary Treatment, FY00

	TSS Removal Efficiency	BOD Removal Efficiency	% of Flow Treated at Secondary Levels
July	93%	89%	98%
August	93%	89%	100%
September	90%	83%	86%
October	89%	85%	92%
November	91%	88%	100%
December	92%	84%	99%
January	91%	87%	96%
February	86%	83%	89%
March	78%	77%	84%
April	83%	69%	63%
May	89%	80%	82%
June	90%	81%	77%

Table II.A.5 summarizes the conventional parameters and nutrients in Deer Island effluent over the past seven years. The significant drop in several parameters that occurred between FY95 and FY96 is due to the improved removal efficiency of the primary treatment plant. The implementation of secondary treatment in FY98 can explain the drop in TSS and BOD concentrations since FY97. It can also explain the increase in TKNs, ammonia and nitrites over that same time periods.

Table II.A.5 Deer Island Effluent Characterization, FY94-FY00

PARAMETER	FY94 *	FY95 *	FY96 *	FY97 *	FY98 *	FY99	**FY00**
Flow (mgd)							
Minimum	171	167	147	167	159	237	**219**
Average	249	236	250	265	296	350	**356**
Maximum	528	565	526	649	917	757	**900**
Total Suspended Solids (TSS)							
Min Conc (mg/L)	65	52	17	16	4	3	**5**
Avg Conc (mg/L)	73	65	44	41	25	22	**18**
Max Conc (mg/L)	86	90	136	100	140	69	**62**
Average Loading (tons/d)	76	64	46	46	31	31	**26**
Biochemical Oxygen Demand (BOD)							
Min Conc (mg/L)	87	85	42	29	8	10	**7**
Avg Conc (mg/L)	123	116	98	93	39	30	**25**
Max Conc (mg/L)	142	138	147	191	216	99	**62**
Average Loading (tons/d)	128	114	102	103	48	44	**37**
Settleable Solids							
Min Conc (mL/L)	0.1	0.1	0.1	0.1	0.1	0.1	**0.0**
Avg Conc (mL/L)	0.5	0.4	0.2	0.2	0.2	0.2	**0.1**
Max Conc (mL/L)	0.9	0.7	2.0	1.6	7.0	3.0	**3.1**
Average Loading (tons/d)	0.5	0.4	0.2	0.2	0.2	0.3	**0.1**
Oil and Grease							
Min Conc (mg/L)	12	17	7	7	4	7	**7**
Avg Conc (mg/L)	25	25	24	23	11	10	**8**
Max Conc (mg/L)	36	30	42	47	30	28	**22**
Average Loading (tons/d)	26	25	25	26	13	15	**12**
Total Kjeldahl Nitrogen							
Min Conc (mg/L)	12.8	13.7	10.6	10.9	9.1	11.2	**8.2**
Avg Conc (mg/L)	21.7	23.0	22.5	21.9	20.4	23.4	**21.8**
Max Conc (mg/L)	32.8	28.6	32.5	27.6	32.4	34.3	**32.4**
Average Loading (tons/d)	22.5	22.6	23.4	24.3	25.2	34.2	**32.4**

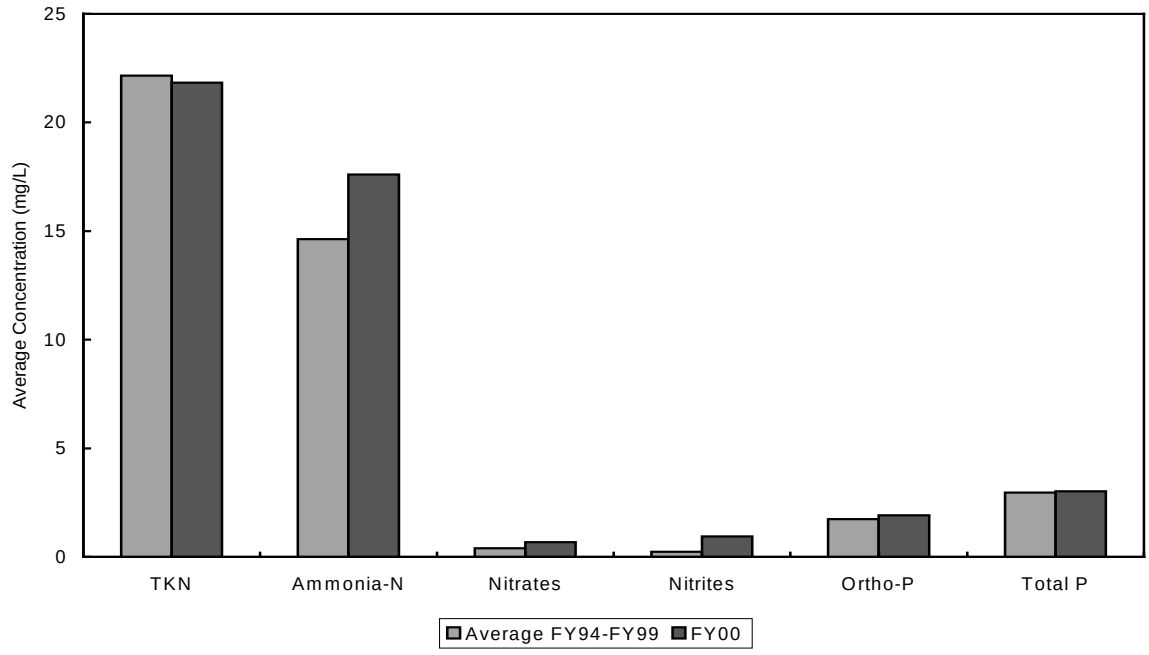
Table II.A.5 Deer Island Effluent Characterization, FY94-FY00 [cont.]

PARAMETER	FY94 *	FY95 *	FY96 *	FY97 *	FY98 *	FY99	**FY00**
Ammonia-Nitrogen							
Min Conc (mg/L)	6.08	7.28	5.55	4.43	3.48	5.42	**5.00**
Avg Conc (mg/L)	12.58	14.43	14.48	13.07	15.08	17.99	**17.60**
Max Conc (mg/L)	18.51	19.60	21.90	18.00	22.70	26.40	**25.20**
Average Loading (tons/d)	13.06	14.20	15.10	14.45	18.63	26.23	**26.16**
Nitrates							
Min Conc (mg/L)	0.13	0.03	0.01	0.01	0.01	0.01	**0.00**
Avg Conc (mg/L)	1.04	0.08	0.30	0.34	0.42	0.22	**0.69**
Max Conc (mg/L)	5.98	0.28	1.95	2.58	1.49	1.93	**2.96**
Average Loading (tons/d)	1.08	0.08	0.31	0.37	0.52	0.32	**1.03**
Nitrites							
Min Conc (mg/L)	0.01	0.02	0.01	0.01	0.01	0.01	**0.04**
Avg Conc (mg/L)	0.10	0.08	0.63	0.11	0.20	0.30	**0.95**
Max Conc (mg/L)	0.26	0.22	1.90	0.62	1.15	1.99	**3.06**
Average Loading (tons/d)	0.10	0.08	0.66	0.12	0.25	0.44	**1.41**
Orthophosphorus							
Min Conc (mg/L)	0.48	0.90	0.37	0.48	0.48	0.71	**0.57**
Avg Conc (mg/L)	2.15	2.22	1.71	1.68	1.71	1.97	**1.91**
Max Conc (mg/L)	4.09	3.39	3.01	2.71	3.18	3.19	**3.00**
Average Loading (tons/d)	2.23	2.18	1.78	1.85	2.11	2.87	**2.84**
Total Phosphorus							
Min Conc (mg/L)	1.19	2.11	1.43	1.12	1.17	1.50	**1.15**
Avg Conc (mg/L)	2.92	3.35	2.92	2.94	2.77	2.93	**3.03**
Max Conc (mg/L)	5.18	4.35	4.13	3.98	7.74	4.30	**7.04**
Average Loading (tons/d)	3.03	3.30	3.04	3.24	3.42	4.27	**4.50**

* DITP and the North System only; the opening of the Inter-Island Tunnel and transfer of South Sytem flows to DITP occurred at the start of FY9

A summary of nutrient concentrations in Deer Island effluent from FY94-FY00 is provided in Figure II.A.6. No major changes in nutrient concentrations have occurred over the past several years. The introduction of the new primary treatment plant in FY95 did not affect nutrient concentrations, as primary treatment has no effect on nutrients. DITP's secondary treatment plant uses bacteria to promote efficient and rapid breakdown of wastes. This technique results in changes in the proportions of nitrogen species; this explains the slight rise in effluent NH_3-N, NO_3, and NO_2 concentrations while total Kjeldahl nitrogen (TKN) concentrations have remained stable.

Figure II.A.6
Deer Island Effluent Nutrient Concentrations, FY94-FY00



II.A.2.b Priority Pollutants

Appendix A, Tables A-8 and A-9 provide a summary of priority pollutant concentrations and loadings in DITP effluent for FY00. Metals loadings over the past twelve years are summarized in Figure II.A.7, while Figure II.A.8 graphs organic pollutants from FY94-FY00. (See Section II.A.1.c for a discussion of influent organics loading data.) Two factors may explain the gradual decrease in loadings. First, fewer pollutants are found in the influent as users have either cooperated with the MWRA to reduce loading or become more aware of the consequences of dumping. Second, the decrease may also be attributed to better capture of the metals at the plant.

Figure II.A.7
Deer Island Average Effluent Metals Loadings, FY89-FY00

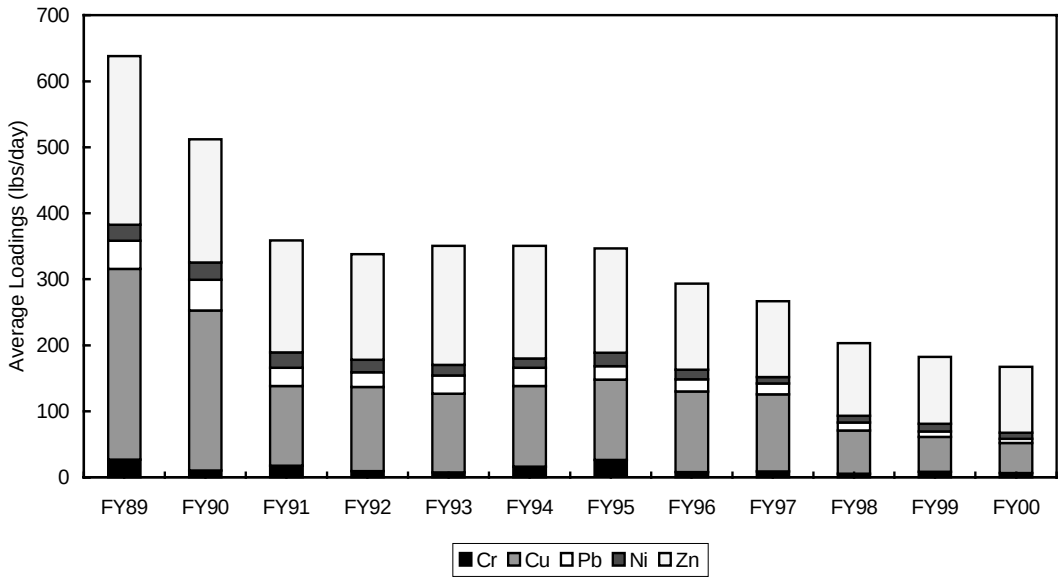
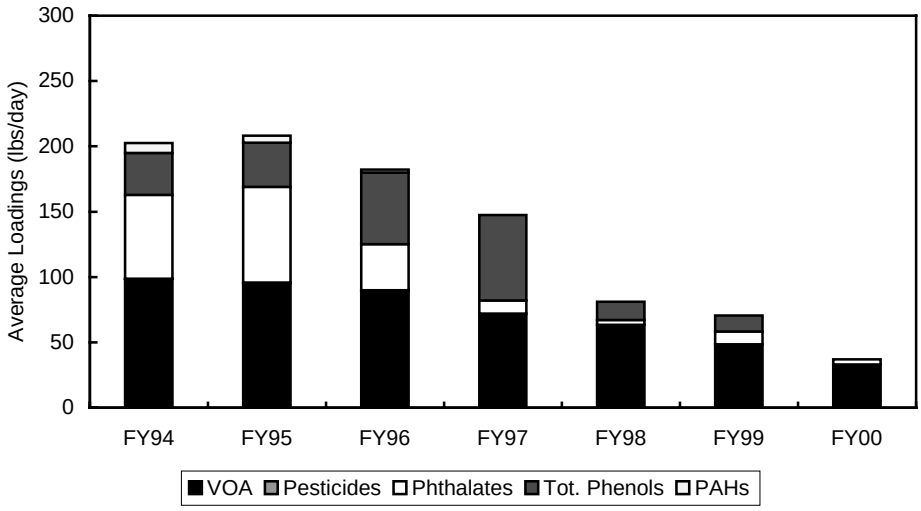


Figure II.A.8
Deer Island Average Effluent Organics Loadings, FY94-FY00



II.A.2.c Whole Effluent Toxicity

MWRA tests effluent toxicity every month at DITP. Effluent toxicity provides an overall view of the quality of the effluent, to ensure that the effluent does not adversely affect the environment. In 1989, the EPA found that the probable cause of most acute toxicity in DITP's wastestream was due to surfactants. Surfactants are most commonly used in household detergents to improve cleansing power. No acute toxicity could be attributed to metals or pesticides.

The permit requires MWRA to use three tests for effluent toxicity. A 96-hr acute static toxicity test using mysid shrimp *(Mysidopsis bahia)* measures the short term lethal effects caused by the effluent. A chronic survival and growth test using the sheepshead minnow *(Cyprinodon variegatus)* and a chronic reproduction test using a red alga *(Champia parvula)* both measure subtle toxic impacts over a longer period of time. The results of these tests can be found in Table II.A.6.

The LC50 (Lethal Concentration 50%) is the concentration of effluent in a sample that causes mortality to 50% of the test population during the duration of the test. The NOEC (No Observed Effect Concentration) is the concentration of effluent in a sample to which organisms are exposed in a life cycle or partial life cycle test that has no adverse effects. An NOEC limit of 20% means that 20% of the sample is effluent, and the remainder dilution water. Any acute NOEC below 20% or chronic NOEC below 10% would violate the NPDES limit.

Reductions in toxicity at DITP in FY99 reflect the benefits of secondary treatment. The acute results were in compliance 83% of the time and the *Cyprinodon* chronic tests were in compliance 100% of the time. The results of the *Champia* chronic tests were never in compliance. Due to questions regarding *Champia*'s reliability, Region I EPA has withdrawn this species as a monitoring tool in all permit renewals.

Table II.A.6
Deer Island Effluent, Results of Toxicity Testing, FY00

	Mysid Shrimp acute		Sheepshead Minnow chronic		Red Algae chronic
			Survival	Growth	
	LC50	NOEC	NOEC	NOEC	NOEC
Limits (%)	None	20	10	10	10
July	>100	50	60	60	**<0.2**
August	69	50	100	60	**0.16**
September	>100	50	60	60	**0.05**
October	>100	50	ND	ND	**0.05**
November	100	**5**	60	60	**0.05**
December	>100	**10**	60	10	**0.01**
January	92	50	100	10	**0.05**
February	46	20	100	60	**<0.05**
March	>100	50	100	60	**0.70**
April	88	50	100	100	**<0.05**
May	>100	100	100	100	**2**
June	66	20	100	100	**<0.05**
FY00 Average	88	42	85	62	0.3
# of Violations	N/A	2	0	0	12

Results in bold indicate a violation of the regulatory limits; ND indicates "No Data," or a test that returned an invalid result due to a failed control test.

II.B Discussion

II.B.1 Compliance with Regulatory Limits

MWRA currently operates under a court order providing interim discharge limits for the existing Deer Island Treatment Plant. Plant performance at Deer Island is compared to interim regulatory limits in Table II.B.1 and Figures II.B.1 through II.B.6. The only violations of the interim regulatory limits in FY00 were for toxicity testing (see Table II.A.6).

Table II.B.1 Deer Island Effluent Quality Compared to Interim Limits

Parameter	Interim Limits*	Range of Values Exceeding Limits	Number of Violations
Biochemical Oxygen Demand			
Monthly Avg (mg/L)	140	N/A	0
Daily Max (mg/L)	200	N/A	0
12-mo running removal rate (%)	27	N/A	0
Total Suspended Solids			
Monthly Avg (mg/L)	110	N/A	0
Daily Max (mg/L)	180	N/A	0
12-mo running removal rate (%)	38	N/A	0
Settleable Solids (mL/L)	2.8	N/A	0
Fecal Coliform (col/100 mL)	200	N/A	0
Total Coliform (col/100 mL)	1000	N/A	0
pH	6.5 - 8.5	N/A	0**
PHCs Effluent Dly. Max (mg/L)	15	N/A	0
Toxicity	@	@	14
	Total Number of Violations		14

* Except for removal rates, the effluent quality must be equal to or less than the limits. Removal rates must be equal to or greater than the limits.

** The minimum limit of 6.5 for pH was violated 164 times during FY00 due to the secondary treatment systems. As expected with the operation of the pure oxygen system, pH of the effluent was lowered as excess CO_2 (a result of biomass respiration) dissolved into the effluent. Since the violations were a direct result of the treatment process, they can be qualified. The new NPDES permit accounts for the expected lower pH by expanding the limits to 6.0-9.0. The lowered pH has no measureable impact on water quality because of the buffering capacity of the marine receiving waters.

@ See Table II.A.6

Table II.B.2 compares the number of NPDES violations in FY00 to previous years.

Table II.B.2 NPDES Violations at Deer Island, FY94-FY00

	FY94	FY95	FY96	FY97	FY98	FY99	FY00
BOD	16	12	7	0	1	0	0
TSS	1	1	0	0	0	0	0
Settleable Solids	0	0	0	0	0	0	0
Fecal Coliform	0	0	0	0	0	0	0
Total Coliform	0	1	0	0	0	0	0
pH	1	1	0	0	0	0	0
PHCs	1	4	5	0	0	0	0
Toxicity	11	17	19	16	11	13	14
Non-Toxicity Violations	19	19	12	0	1	0	0
Total Violations	30	36	31	16	12	13	14

For biochemical oxygen demand (BOD) and total suspended solids (TSS), limits are placed on the daily maximum concentration, monthly average concentration and on removal rate.[3] The removal rate limit is for a 12-month running average of removal rates, rather than the average for an individual month. Figures II.B.1 and II.B.2 show that the monthly averages for BOD and TSS never exceeded the regulatory discharge limits (140 mg/L for BOD and 110 mg/L for TSS). Similarly, the 12-month running average removal rates for both TSS and BOD were always well above the regulatory minimum requirements.

[3]A removal rate for a constituent is defined as the influent concentration minus the effluent concentration, divided by the influent concentration.

Figure II.B.1
Deer Island Treatment Plant Effluent
BOD Trend Analysis, FY00

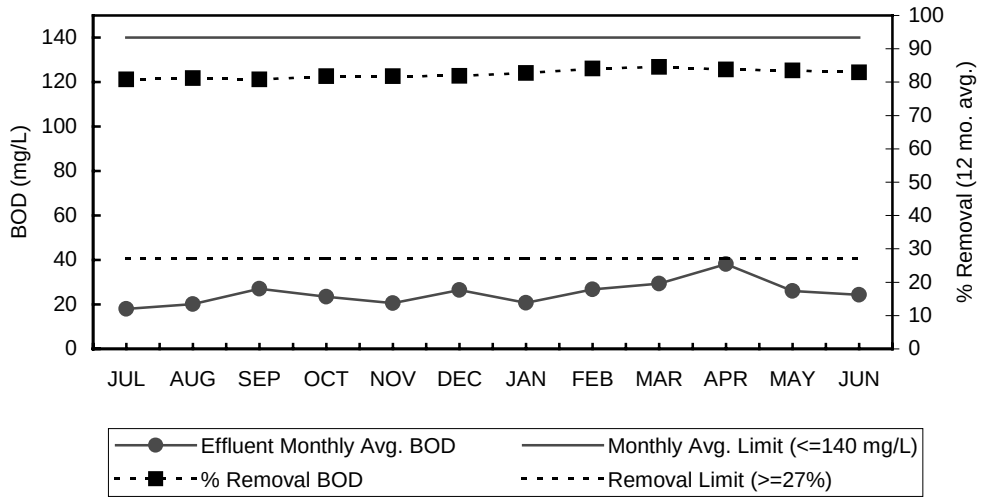
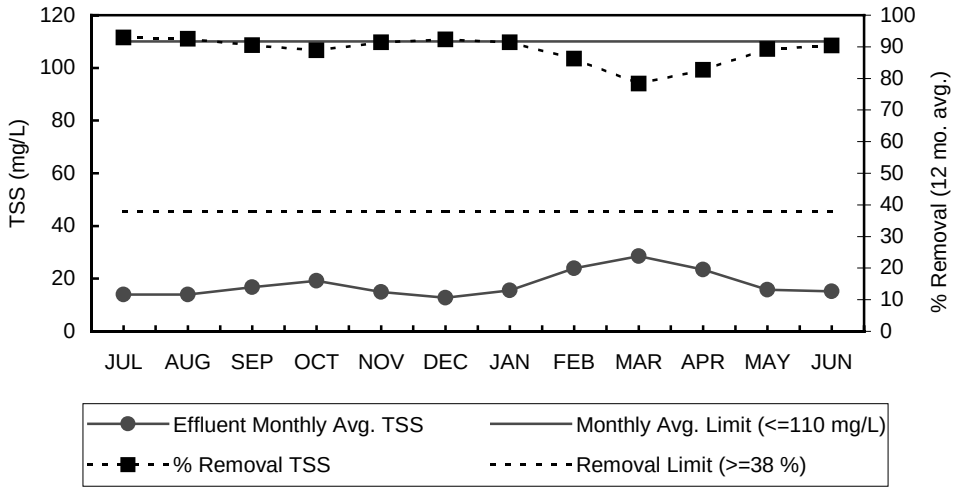
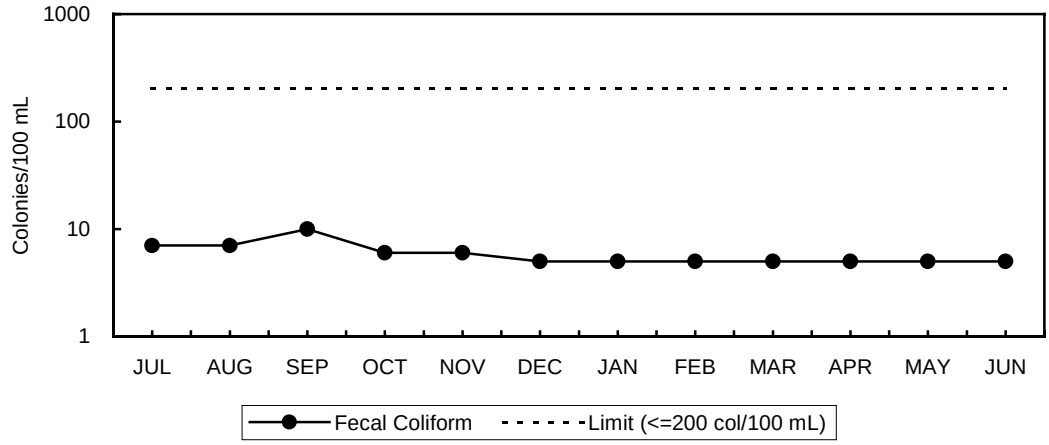


Figure II.B.2
Deer Island Treatment Plant Effluent
TSS Trend Analysis, FY00



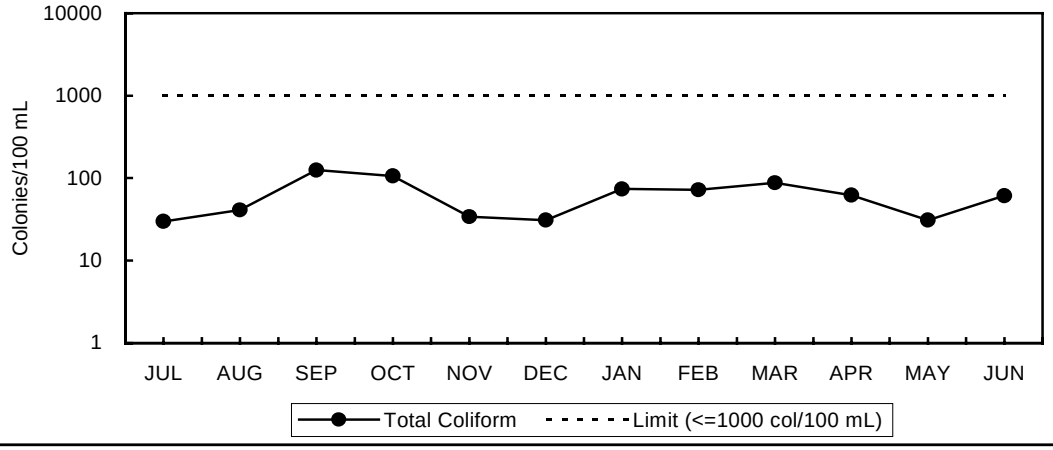
For fecal coliform, the monthly geometric mean of the count has a discharge limit of 200 colonies/100 mL. The results for Deer Island were well below this limit, with the monthly geometric mean never exceeding 10 colonies/100 mL.

Figure II.B.3
Deer Island Treatment Plant Effluent
Fecal Coliform Trend Analysis, FY00



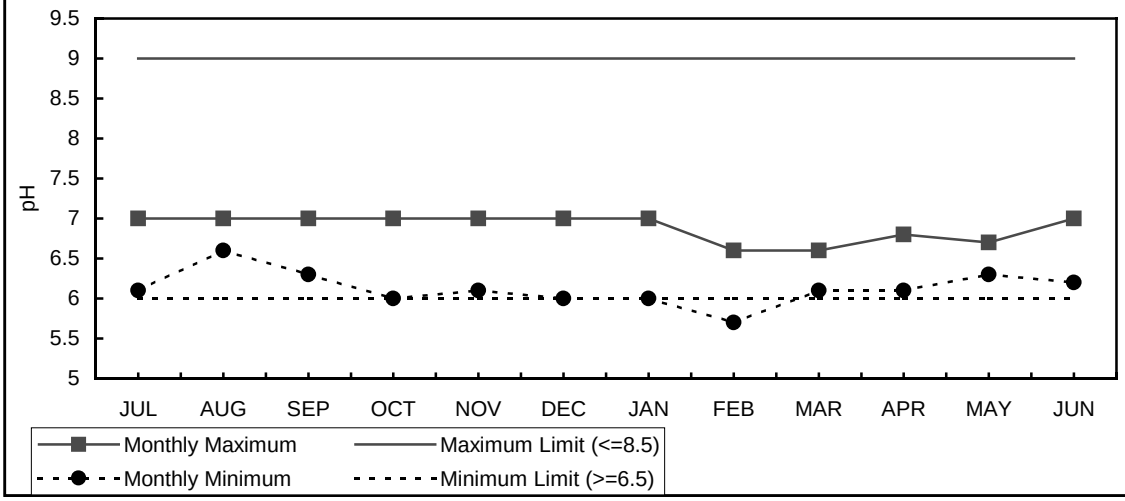
Likewise, total coliform counts were well below the limit of 1000 colonies/100 mL. The highest monthly geometric mean was 125 colonies/100 mL in September.

Figure II.B.4
Deer Island Treatment Plant Effluent
Total Coliform Trend Analysis, FY00



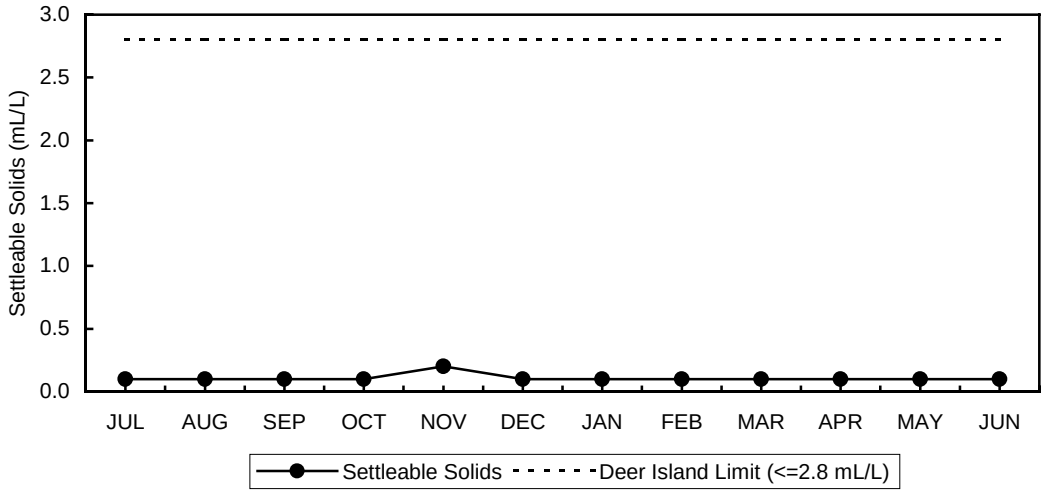
The limits for pH are based on the maximum and minimum values for each month, with pH required to fall between 6.5 and 8.5. In FY00, the pH of the effluent was always below the maximum of 8.5, but fell below the minimum value on 164 days. As explained in Table II.B.1, the pure oxygen secondary treatment system causes pH minimum violations, as excess carbon dioxide dissolves into the effluent and lowers the pH**.** The new NPDES permit makes allowances for the expected lower pH by expanding the limits to 6.0-9.0. The artificially lowered pH has no measurable impact on the quality of the receiving waters because of the buffering capacity of the receiving water.

Figure II.B.5
Deer Island Treatment Plant Effluent pH Trend Analysis, FY00



Deer Island Treatment Plant effluent concentrations were well below the maximum limit for settleable solids (2.8 mL/L), as Figure II.B.6 illustrates.

Figure II.B.6
Deer Island Treatment Plant Effluent
Settleable Solids Trend Analysis, FY00



II.B.2 Effluent Quality Compared to Water Quality Standards

Table II.B.3 compares concentrations of priority pollutants in DITP effluent to water quality criteria. The majority of priority pollutant parameters were below detection levels. Those that were detected had relatively low concentrations.

Table II.B.3 Comparison of Deer Island Treatment Plant Effluent with Water Quality Criteria, FY00

Parameter	Total Recoverable Max. Conc. (ug/L)	Total Dissolved Max. Conc. * (ug/L)	Total Recoverable Avg. Conc. (ug/L)	Total Dissolved Avg. Conc. * (ug/L)	Times Detected	Acute Criteria ** (ug/L)	Total Dissolved Max. Conc.: Acute Criteria	Chronic Criteria ** (ug/L)	Total Dissolved Avg. Conc.: Chronic Criteria
Arsenic	13.60	13.60	0.76	0.76	8 of 46	69.0	A	36.0	A
Copper	29.00	24.07	16.00	13.28	38 of 45	4.8	5:1	3.1	4:01
Lead	10.70	10.17	2.25	2.14	12 of 46	210.0	A	8.1	A
Mercury	0.23	0.19	0.04	0.03	44 of 46	1.8	A	0.94	A
Nickel	7.05	6.98	3.17	3.14	34 of 49	74.0	A	8.2	A
Silver	3.96	3.96 (C)	1.21	3.96 (C)	28 of 53	1.9	2:1	B	B
Zinc	62.60	59.20	35.40	33.49	45 of 45	90.0	1:1	81.0	A

A - Ratio lower than 1:1

B - No applicable criteria

C - No applicable conversion factor

* Calculated using the conversion factors in Appendix A of the Federal Register, December 10, 1998

** National Recommended Water Quality Criteria for Priority Toxic Pollutants, Federal Register, December 10, 1998

Given a theoretical minimum dilution of 10:1 (and an average dilution of 20:1 to 25:1), the metal concentrations that MWRA detected would not violate EPA's water quality criteria, as Table II.B.3 shows.

III Combined Sewer Overflow Facilities

MWRA monitors six Combined Sewer Overflow (CSO) facilities in the North System. The monitoring results vary significantly between facilities because of differences in the type and location.

Each of the CSO facilities chlorinates the combined wastewater (sewage and storm water) prior to discharge. Of the six CSO facilities, only the Cottage Farm and Prison Point facilities have pumping and tank storage capacity. Pumping and tank storage allows chlorinated wastewater to be held at these facilities up to their storage capacities prior to discharge. Any wastewater exceeding the storage capacity will overflow and is discharged to the river. The four other CSO facilities – Somerville Marginal, Constitution Beach, Fox Point and Commercial Point – are gravity CSO facilities, which means that combined wastewater arrives and leaves the CSO facility by gravity instead of pumping. The combined wastewater is disinfected and the chlorinated wastewater overflows to the receiving water as quickly as it arrives at the facility. A detailed description of the six CSO facilities can be found in Appendix I.

III.A Cottage Farm Combined Sewer Overflow Facility

III.A.1 Activations

Table III.A.1 and Figures III.A.1 and III.A.2 summarize activation data for the Cottage Farm CSO facility. From FY99 to FY00, releases from Cottage Farm increased from 259 to 440 million gallons. However, the rainfall in FY00 was considerably higher than in FY99. Comparing FY00 to FY94, a year with similar rainfall, shows that activations, days activated, and total volume treated have all decreased. MWRA's CSO optimization plan and improvements in in-line storage contributed to this improvement.

Table III.A.1 Cottage Farm CSO Activations Summary

	FY94	FY95	FY96	FY97	FY98	FY99	FY00
Number of Activations	31	25	26	24	19	11	**19**
Number of Days Activated	31	25	33	29	22	13	**24**
Total Volume Treated (MG)	621	574	918	1092	792	259	**440**
Maximum Flow (mgd)	123	100	94	199	114	47	**86**
Minimum Flow (mgd)	0.08	0.09	1.88	0.63	0.76	1.35	**0.56**
Average Flow (mgd)	20.03	22.96	27.83	37.66	36.01	19.92	**18.34**
Total Rainfall (in/year)	45.00	37.40	42.55	48.79	50.87	32.41	**46.08**

Average flow = Total volume treated divided by the number of days activated.

Figure III.A.1
Cottage Farm CSO Activations Compared to Precipitation, FY94-FY00

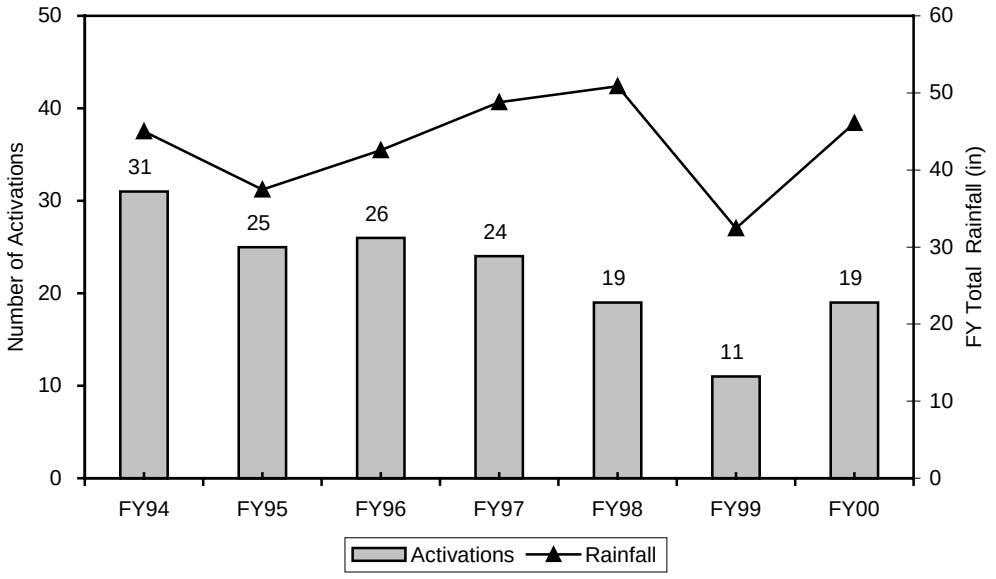


Figure III.A.2
Cottage Farm Total Volume Treated
Compared to Precipitation, FY94-FY00

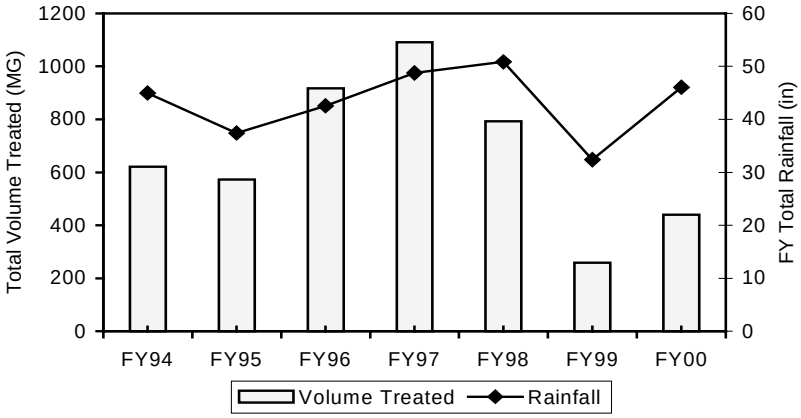
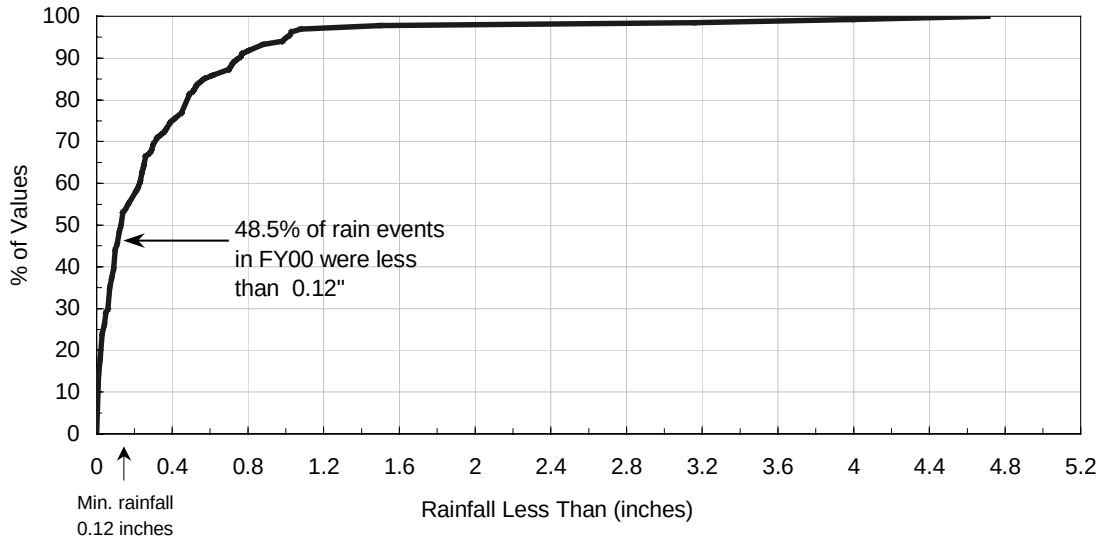


Figure III.A.3 shows the frequency distribution of rainfall in FY00, and highlights the minimum amount of rainfall (0.12 inches of rain) at which the Cottage Farm facility activated in FY00. The frequency distribution considers all rain events, which are defined as days with at least 0.01 inches of rainfall. According to the frequency distribution, activation of the Cottage Farm facility occurred during 51.5% of FY00 rain events.

Figure III.A.3
Frequency Distribution of Rainfall, Cottage Farm, FY00



III.A.2 Conventional Parameters

Tables B-1 and B-2 of Appendix B contain data on conventional parameters in Cottage Farm influent and effluent. Table III.A.2 summarizes this data. Occasionally, BOD and TSS effluent loadings measured higher than those of the influent did. This occurs because the Cottage Farm facility is not designed to remove such contaminants, and also because of the variable characteristics of combined sewage.

Table III.A.2
Cottage Farm CSO Influent and Effluent Characteristics, FY00

	Concentration (1)					
	Influent			Effluent		
Parameter	Min	Avg	Max	Min	Avg	Max
TSS	25	99	218	27	95	262
BOD	26	78	195	27	64	92
Fecal Coliform (col/100 mL)				<10	21	2300
pH (units)				6.0		7.0

(1) Concentration expressed in mg/L except for pH and fecal coliform.

III.A.3 Priority Pollutants

MWRA tested Cottage Farm effluent for priority pollutants at least once per month, assuming the CSO activated. The results of these tests are presented in Appendix B Tables B-3 and B-4. Metals were the most commonly detected priority pollutant, with copper, mercury, lead and zinc detected in all samples. Several other priority pollutants were detected in some samples.

Table III.A.3 summarizes average metals concentrations in Cottage Farm effluent in FY00.

Table III.A.3 Cottage Farm Metals, FY00

	Average Concentration (ug/L)	Times Detected
Cadmium	<1.0	0 of 6
Copper	52.43	6 of 6
Mercury	0.34	6 of 6
Nickel	5.82	5 of 6
Lead	30.71	6 of 6
Zinc	105.95	6 of 6

III.B Prison Point Combined Sewer Overflow Facility

III.B.1 Activations

Activation data for the Prison Point CSO facility are summarized in Table III.B.1 and Figures III.B.1 and III.B.2.

Unlike the Cottage Farm CSO facility, the Prison Point facility is not hydraulically connected to the Deer Island Treatment Plant, so increased pumping at Deer Island will not affect Prison Point activation.

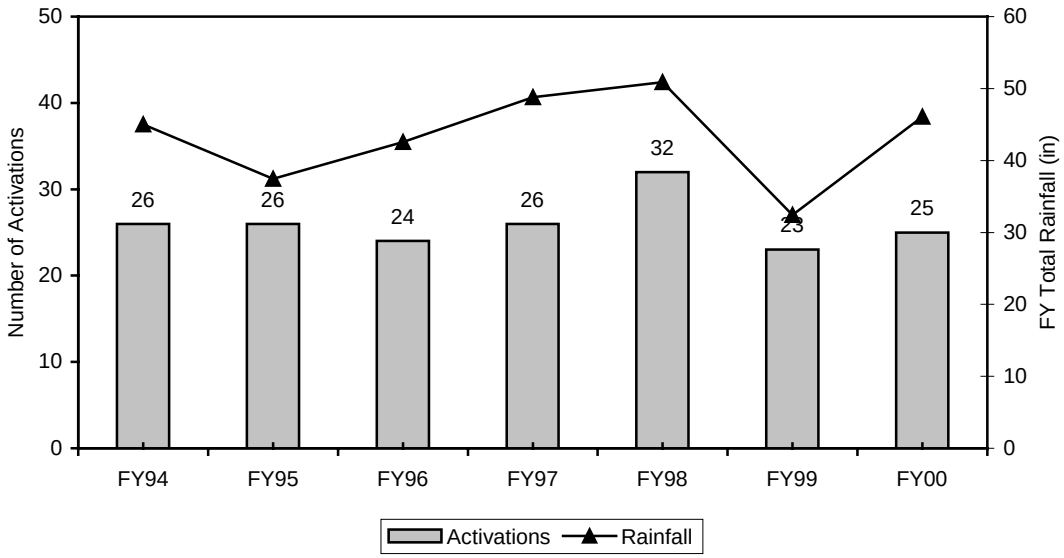
The volume treated at Prison Point in FY00 was considerably higher than FY99. In terms of rainfall, activations, and days activated, FY00 and FY97 are roughly comparable. However, the volume treated and the average flow in FY97 are both higher compared to FY00. A combination of a particularly intense storm in October 1996 with almost 8 inches of rain in two days, and MWRA improvements in the handling of combined sewage probably explain this difference.

Table III.B.1 Prison Point CSO Activations Summary

	FY94	FY95	FY96	FY97	FY98	FY99	FY00
Number of Activations	26	26	24	26	32	23	**25**
Number of Days Activated	26	26	29	30	34	23	**30**
Total Volume Treated (MG)	449	460	445	926	958	396	**740**
Maximum Flow (mgd)	80	127	63	228	143	51	**149**
Minimum Flow (mgd)	3.01	1.63	1.24	1.50	2.00	1.40	**2.50**
Average Flow (mgd)	17.27	17.69	15.34	30.86	28.18	17.22	**24.65**
Total Rainfall (in/year)	45.00	37.40	42.55	48.79	50.87	32.41	**46.08**

Average flow = Total volume treated divided by the number of days activated.

Figure III.B.1
Prison Point CSO Activations Compared to Precipitation, FY94-FY00



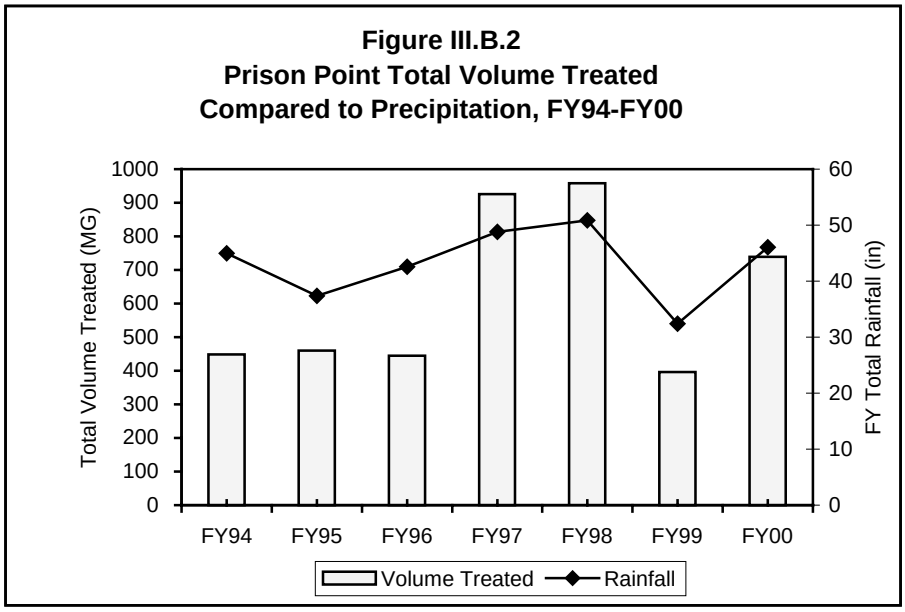
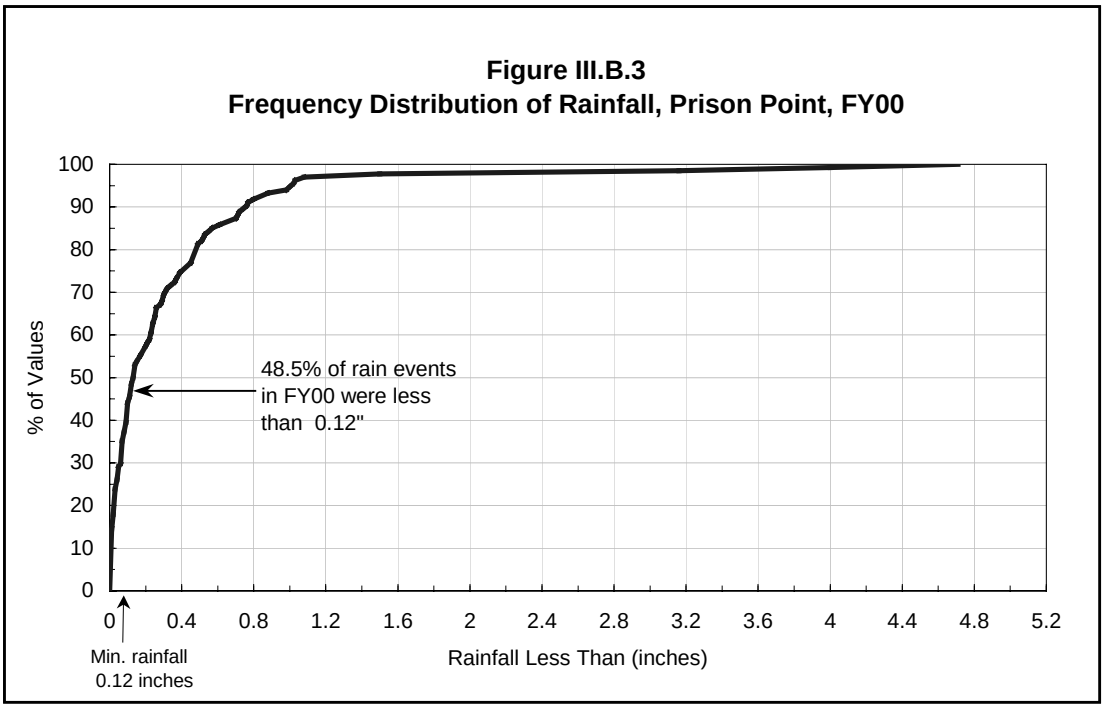


Figure III.B.3 shows the frequency distribution of rainfall in FY00, and highlights the minimum amount of rainfall (0.12 inches of rain) at which the Prison Point facility activated. According to the frequency distribution, activation of the Prison Point facility occurred during 51.5% of FY00 rain events.



III.B.2 Conventional Parameters

Conventional parameter data for Prison Point influent and effluent are provided in Appendix C Tables C-1 and C-2. Like the Cottage Farm facility, Prison Point is not designed to remove some contaminants.

There were no NPDES permit violations at Prison Point in FY00.

Table III.B.2

Prison Point CSO Influent and Effluent Characteristics, FY00

	Concentration (1)					
	Influent			Effluent		
Parameter	Min	Avg	Max	Min	Avg	Max
TSS	31	198	656	28	137	975
BOD	15	58	180	13	37	74
Fecal Coliform (col/100 mL)				<10	12	50
pH (units)				6.8		7.4

(1) Concentration expressed in mg/L except for pH and fecal coliform.

III.B.3 Priority Pollutants

The results of priority pollutant testing for Prison Point can be found in Tables C-3 and C-4 of Appendix C. As with Cottage Farm, metals were the most commonly detected priority pollutants, with copper, mercury, nickel, lead and zinc detected in all samples. Cadmium and several other priority pollutants were detected in some, but not all, samples.

Table III.B.3 summarizes average metals concentrations in Prison Point effluent in FY00.

Table III.B.3 Prison Point Metals, FY00

	Average Concentration (ug/L)	Times Detected
Cadmium	1.49	1 of 7
Copper	114.21	7 of 7
Mercury	0.67	7 of 7
Nickel	10.71	7 of 7
Lead	187.52	7 of 7
Zinc	323.86	7 of 7

III.C Somerville Marginal Combined Sewer Overflow Facility

III.C.1 Activations

Table III.C.1 and Figures III.C.1 and III.C.2 summarize activation information for the Somerville Marginal facility.

Recently, there has been increased attention to SSOs (sanitary sewer overflows). MWRA has intensified its monitoring efforts at areas known to overflow when there is a measurable rainfall event. (See Section IV for more information about SSOs.) As a result, MWRA has inspected its CSO facilities more frequently, even during lower intensity rainfall. In particular, the gravity CSO facilities of Somerville Marginal, Constitution Beach, Fox Point and Commercial Point, have been monitored more frequently. This improved monitoring of CSO facilities has captured short activations during low intensity rainfall that may not have been observed in previous years. As a result, the statistics presented below may not be strictly comparable to earlier years.

Table III.C.1 Somerville Marginal CSO Activations Summary

	FY94	FY95	FY96	FY97	FY98	FY99	FY00
Number of Activations	34	28	28	28	30	19	**28**
Number of Days Activated	34	28	30	29	31	19	**34**
Total Volume Treated (MG)	72	49	80	142	128	57.32	**113.8**
Maximum Flow (mgd)	11	14	9	64	22	10.29	**25.06**
Minimum Flow (mgd)	0.01	0.16	0.25	0.13	0.09	0.04	**0.01**
Average Flow (mgd)	2.12	1.75	2.67	4.90	4.12	3.02	**3.35**
Total Rainfall (in/year)	45.00	37.40	42.55	48.79	50.87	32.41	**46.08**

Average flow = Total volume treated divided by the number of days activated.

Figure III.C.1
Somerville Marginal CSO Activations Compared to Precipitation, FY94-FY00

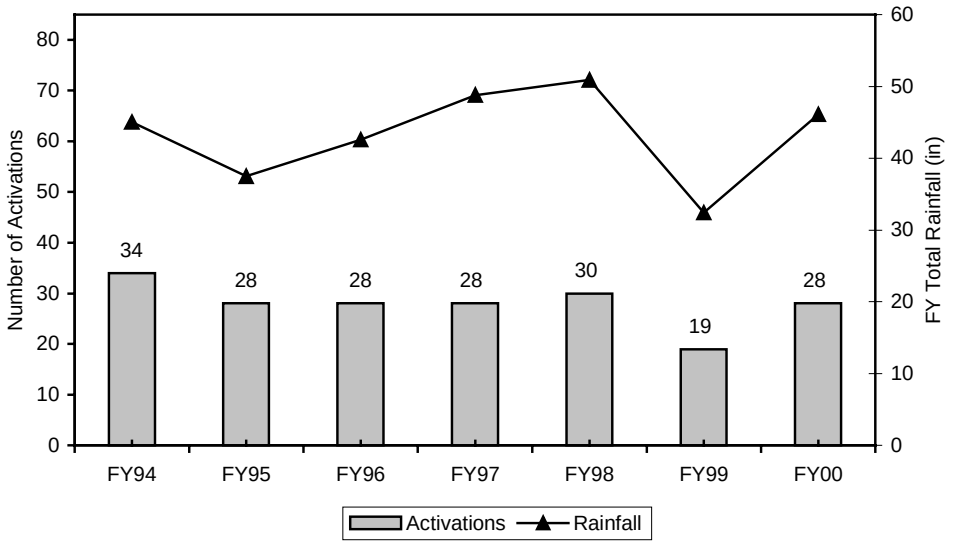


Figure III.C.2 shows the volume treated at the Somerville Marginal gravity CSO facility over the past eight years. Somerville Marginal flow measurements in previous years were underestimated because the measurements did not include flows when the flow meters were malfunctioning. Recent modifications to the in-line storage at the facility along with manual operation of the gates will result in a smaller number of activations in the future.

Figure III.C.2
Somerville Marginal Total Volume Treated Compared to Precipitation, FY94-FY00

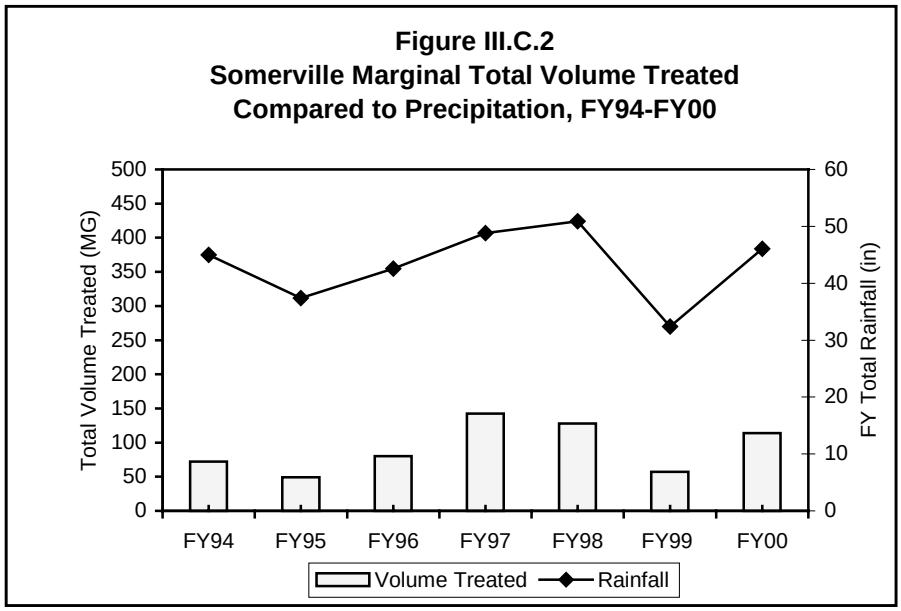
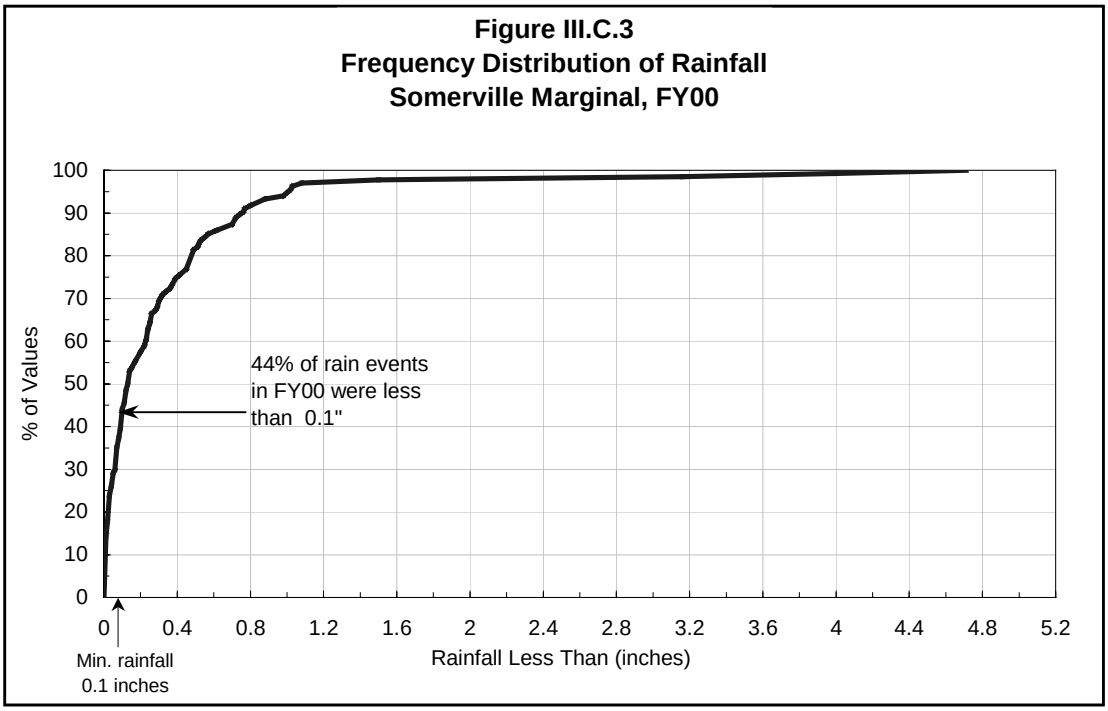


Figure III.C.3 shows the frequency distribution of rainfall in FY00 and highlights the minimum rainfall event (0.1 inches of rain) at which the Somerville Marginal facility activated. According to the frequency distribution, activation of the Somerville Marginal facility occurred during 56% of FY00 rain events.

Figure III.C.3
Frequency Distribution of Rainfall Somerville Marginal, FY00



III.C.2 Conventional Parameters

Somerville Marginal conventional parameter data are provided in Tables D-1 and D-2 of Appendix D, and are summarized in Table III.C.2. The Somerville Marginal treatment facility, like Cottage Farm and Prison Point, is not designed to remove some contaminants.

There were no violations of the NPDES permit at Somerville Marginal in FY00.

Table III.C.2

Somerville Marginal CSO Influent and Effluent Characteristics, FY00

	Concentration (1)					
	Influent			Effluent		
Parameter	Min	Avg	Max	Min	Avg	Max
TSS	17	88	240	16	105	252
BOD	<5	62	>232	4	42	116
Fecal Coliform (col/100 mL)				<10	24	80
pH (units)				6.5		7.5

(1) Concentration expressed in mg/L except for pH and fecal coliform.

III.C.3 Priority Pollutants

The results of Somerville Marginal priority pollutant testing can be found in Appendix D Tables D-3 and D-4. MWRA detected copper, mercury, lead, and zinc in all samples, while several other priority pollutants were detected in some, but not all, samples.

Table III.C.3 summarizes average metals concentrations in Somerville Marginal effluent in FY00.

Table III.C.3 Somerville Marginal Metals, FY00

	Average Concentration (ug/L)	Times Detected
Copper	49.59	6 of 6
Mercury	0.15	6 of 6
Nickel	8.80	6 of 6
Lead	101.15	6 of 6
Zinc	207.45	6 of 6

III.D Constitution Beach Combined Sewer Overflow Facility

III.D.1 Activations

Table III.D.1 and Figures III.D.1 and III.D.2 summarize activation data for the Constitution Beach facility.

The particularly low flows measured at the Constitution Beach facility in FY93-FY94 resulted from meter malfunctions. The amount of flow and the number of activations increased from FY94 to FY97, a direct result of increasing rainfall intensity, changes in in-line storage practices, and improved monitoring practices. Comparing years with similar rainfall, FY94 and FY00, FY00 shows more activations and a much higher treated volume. However, 68% of the flow came on a single day, June 6. Flows during the rest of FY00 were much smaller, with only 2 over 0.5 MG. This reduction in flows to Constitution Beach was largely due to a sewer separation project in East Boston.

Some flow data for Constitution Beach may be inaccurate because the flow meters are affected by tidal flow. However, since FY95, trends show that the volume treated corresponds with rainfall intensity.

Table III.D.1 Constitution Beach CSO Activations Summary

	FY94	FY95	FY96	FY97	FY98	FY99	FY00
Number of Activations	8	12	13	16	20	15	**17**
Number of Days Activated	8	12	13	17	21	15	**18**
Total Volume Treated (MG)	0.69	6.80	7.94	11.32	10.52	1.76	**9.95**
Maximum Flow (mgd)	0.20	1.30	1.20	2.35	3.24	0.36	**6.8**
Minimum Flow (mgd)	0.01	0.20	0.21	0.14	0.06	0.02	**0.01**
Average Flow (mgd)	0.09	0.57	0.61	0.67	0.50	0.12	**0.55**
Total Rainfall (in/year)	45.00	37.40	42.55	48.79	50.87	32.41	**46.08**

Average flow = Total volume treated divided by the number of days activated.

Figure III.D.1
Constitution Beach CSO Activations Compared to Precipitation, FY94-FY00

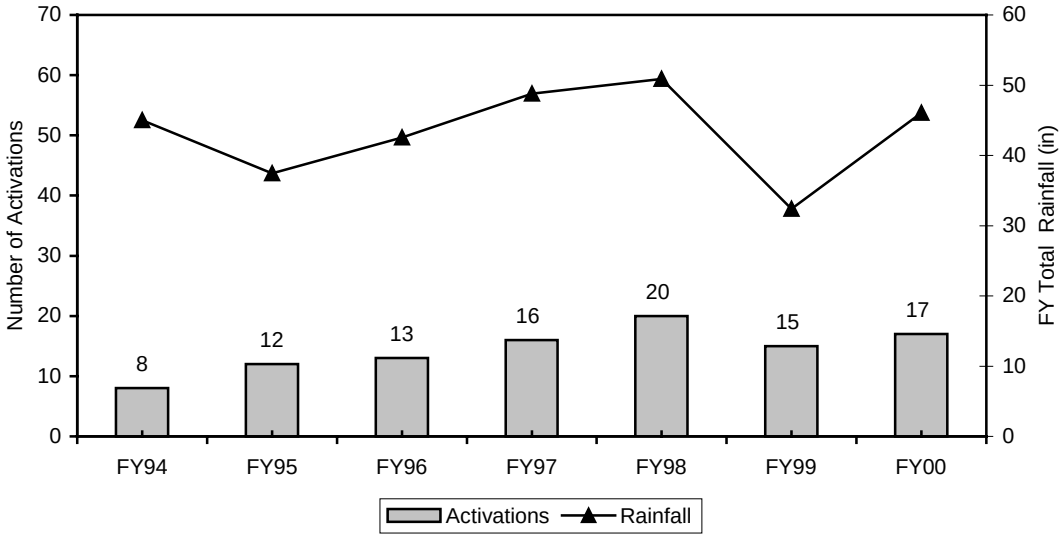


Figure III.D.2
Constitution Beach Total Volume Treated Compared to Precipitation, FY94-FY00

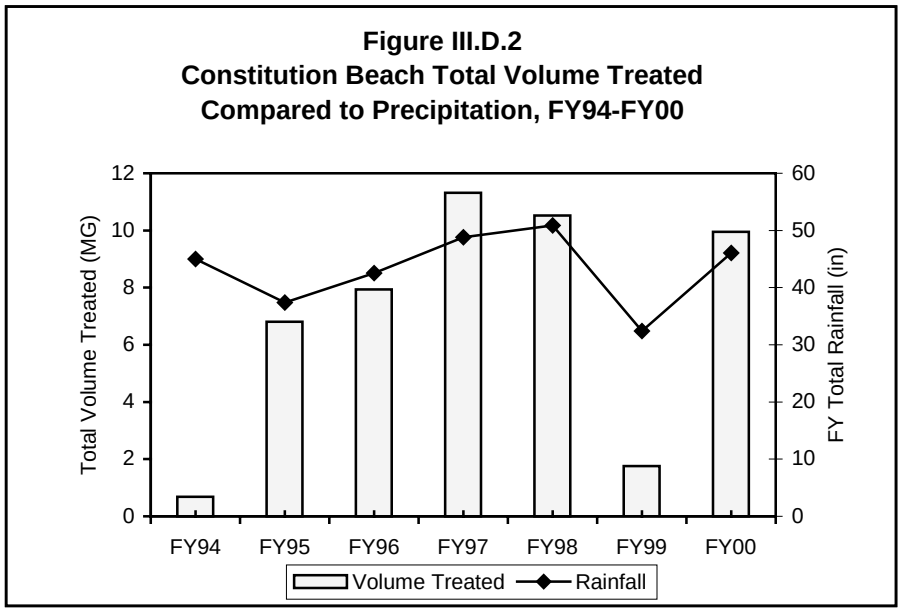
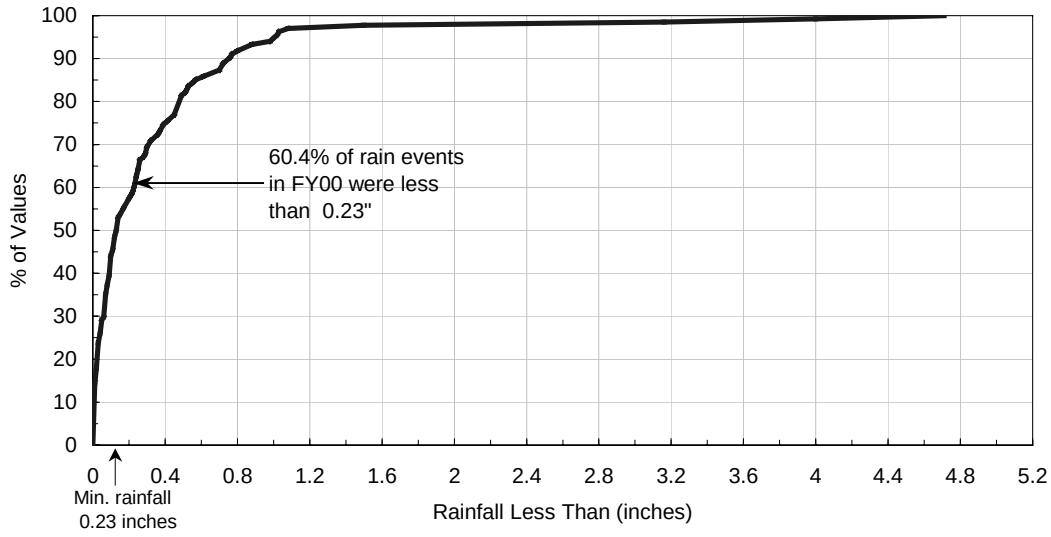


Figure III.D.3 shows the frequency distribution of rainfall in FY00, and highlights the minimum point (0.23 inches of rain) at which the Constitution Beach facility activated. According to the frequency distribution, activation of the Constitution Beach facility occurred during 29.6% of FY00 rain events.

Figure III.D.3
Frequency Distribution of Rainfall
Constitution Beach, FY00



III.D.2 Conventional Parameters

Conventional parameter data for the Constitution Beach facility are provided in Appendix E, Tables E-1 and E-2 and summarized in Table III.D.2. As with the other CSO facilities, concentrations fluctuated a good deal in both influent and effluent.

Table III.D.2

Constitution Beach CSO Influent and Effluent Characteristics, FY00

	Concentration (1)					
	Influent			Effluent		
Parameter	Min	Avg	Max	Min	Avg	Max
TSS	38	57	94	39	65	97
BOD	<10	22	<46	<8	18	<46
Fecal Coliform (col/100 mL)				<10	13	20
pH (units)				7.0		7.1

(1) Concentration expressed in mg/L except for pH and fecal coliform.

III.E Fox Point Combined Sewer Overflow Facility

III.E.1 Activations

Activation data for Fox Point are summarized in Table III.E.1 and Figures III.E.1 and III.E.2.

From FY94 to FY98, the volume treated at Fox Point increased, with the exception of FY95, when use of the facility decreased due to repair work requiring rerouting of flows. Activations almost doubled from FY99 to FY00; otherwise, FY00 was comparable to FY94, a year with similar rainfall, in most respects.

Table III.E.1 Fox Point CSO Activations Summary

	FY94	FY95	FY96	FY97	FY98	FY99	FY00
Number of Activations	20	4	12	16	21	12	**23**
Number of Days Activated	20	4	14	18	24	12	**25**
Total Volume Treated (MG)	76	24	97	154	166	59.3	**96.93**
Maximum Flow (mgd)	12	10	17	45	39	14.8	**24.66**
Minimum Flow (mgd)	0.40	1.50	1.09	0.26	0.17	0.31	**0.47**
Average Flow (mgd)	3.80	6.00	6.90	8.55	6.92	4.94	**3.88**
Total Rainfall (in/year)	45.00	37.40	42.55	48.79	50.87	32.41	**46.08**

Average flow = Total volume treated divided by the number of days activated.

Figure III.E.1
Fox Point CSO Activations Compared to Precipitation, FY94-FY00

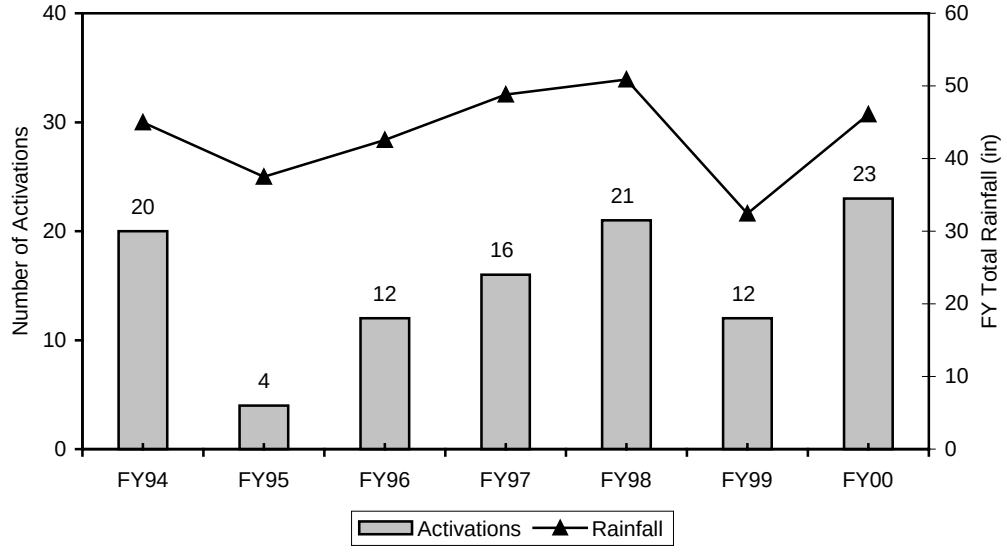


Figure III.E.2
Fox Point Total Volume Treated
Compared to Precipitation, FY94-FY00

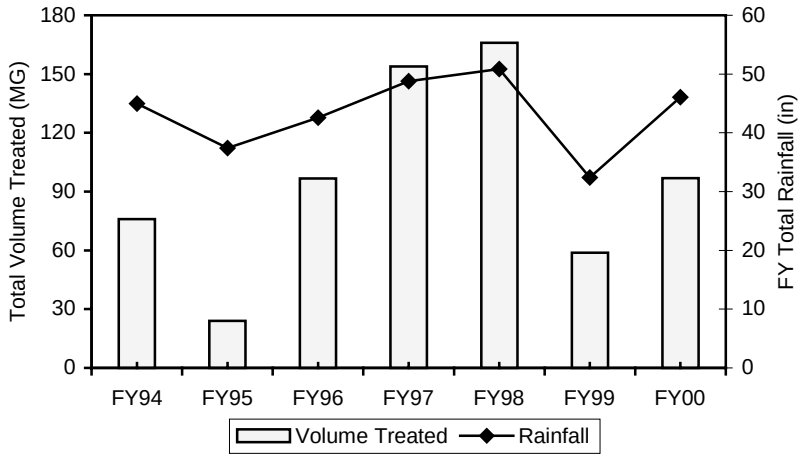
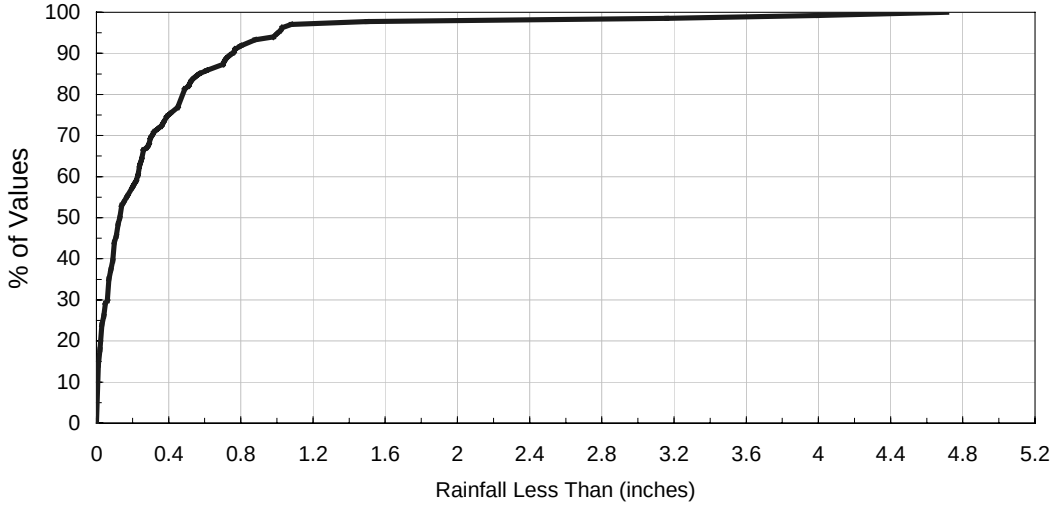


Figure III.E.3 shows the frequency distribution of rainfall in FY00 and highlights the minimum rainfall event (0.08 inches of rain) at which the Fox Point facility activated. According to the frequency distribution, activation of the Fox Point facility occurred during 62.7% of FY00 rain events.

Figure III.E.3
Frequency Distribution of Rainfall, Fox Point, FY00



III.E.2 Conventional Parameters

Conventional parameter data for the Fox Point CSO facility are provided in Appendix F, Tables F-1 and F-2 and are summarized in Table III.E.2. Again, a wide range of values was reported for both influent and effluent.

Table III.E.2

Fox Point CSO Influent and Effluent Characteristics, FY00

	Concentration (1)					
	Influent			Effluent		
Parameter	Min	Avg	Max	Min	Avg	Max
TSS	36	88	234	30	85	224
BOD	<8	38	>130	<5	38	150
Fecal Coliform (col/100 mL)				<10	37	120
pH (units)				6.8		8.8

(1) Concentration expressed in mg/L except for pH and fecal coliform.

III.F Commercial Point Combined Sewer Overflow Facility

III.F.1 Activations

Commercial Point activation data are summarized in Table III.F.1 and Figures III.F.1 and III.F.2.

FY00 data are generally comparable to FY94 data; the larger number of activations and slightly greater volume treated may be due to the MWRA's improved monitoring program.

Table III.F.1 Commercial Point CSO Activations Summary

	FY94	FY95	FY96	FY97	FY98	FY99	FY00
Number of Activations	25	19	13	23	25	20	**32**
Number of Days Activated	25	19	14	24	28	20	**36**
Total Volume Treated (MG)	93	56	70	158	125	62.78	**101.3**
Maximum Flow (mgd)	17	17	18	54	25	12.39	**30.42**
Minimum Flow (mgd)	0.21	0.15	0.06	0.19	0.14	0.1	**0.03**
Average Flow (mgd)	3.72	2.94	5.01	6.59	4.46	3.14	**2.81**
Total Rainfall (in/year)	45.00	37.47	42.55	48.79	50.87	32.41	**46.08**

Average flow = Total volume treated divided by the number of days activated.

Figure III.F.1
Commercial Point CSO Activations Compared to Precipitation, FY94-FY00

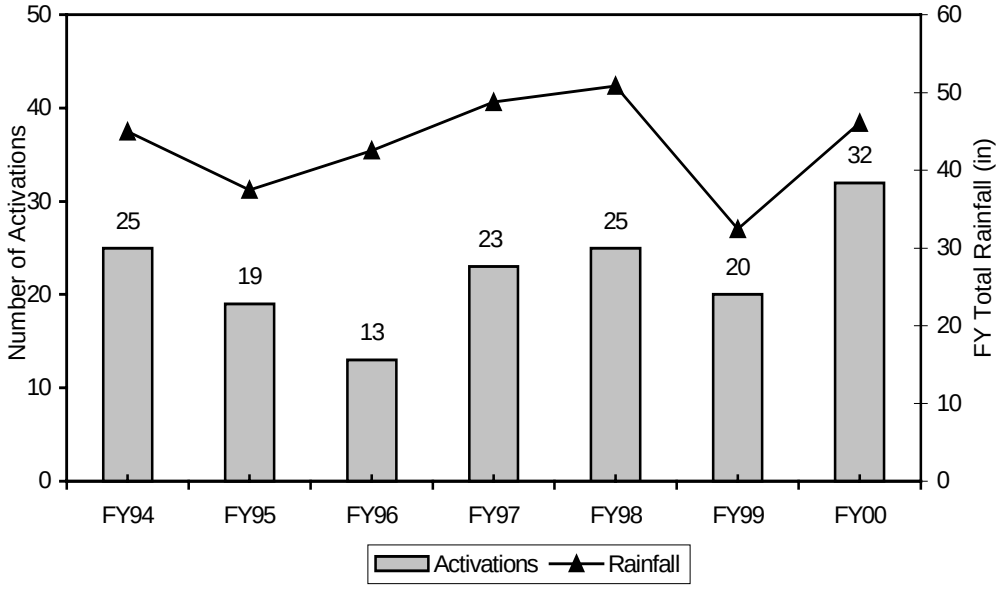


Figure III.F.2
Commercial Point Total Volume Treated
Compared to Precipitation, FY94-FY00

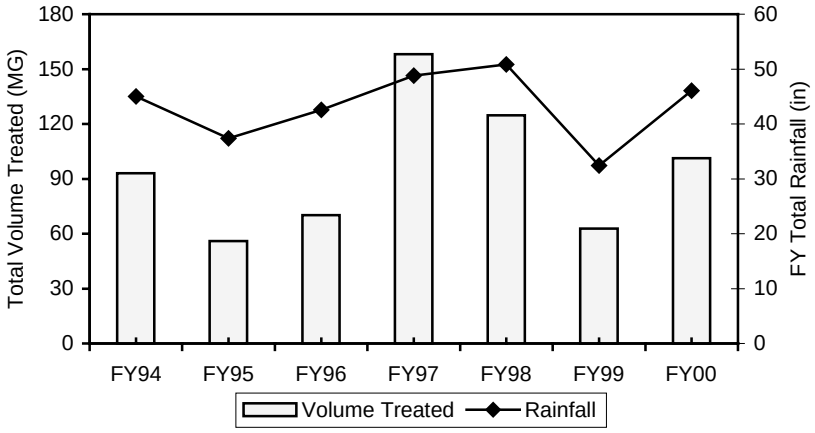


Figure III.F.3 shows the frequency distribution of rainfall in FY00 and highlights the minimum rainfall event (0.12 inches of rain) at which the Commercial Point facility activated. According to the frequency distribution, activation of the Commercial Point facility occurred during 51.5% of FY00 rain events.

III.F.2 Conventional Parameters

Commercial Point conventional parameter data are provided in Appendix G, Tables G-1 and G-2. Again, a wide range of values was reported for both influent and effluent.

Table III.F.2

Commercial Point CSO Influent and Effluent Characteristics, FY00

	Concentration (1)					
	Influent			Effluent		
Parameter	Min	Avg	Max	Min	Avg	Max
TSS	26	129	306	18	146	402
BOD	<10	23	57	9	25	55
Fecal Coliform (col/100 mL)				<5	17	80
pH (units)				6.7		8.7

(1) Concentration expressed in mg/L except for pH and fecal coliform.

IV Transport Systems

IV.A North System

IV.A.1 Headworks Choking

Figure IV.A.1 shows the number of hours of maintenance-related choking and rain-related choking at the remote headworks since FY94. Testing and maintenance hours have steadily declined as the new DITP facilities have been completed.

Figure IV.A.1
Choking, FY94-FY00

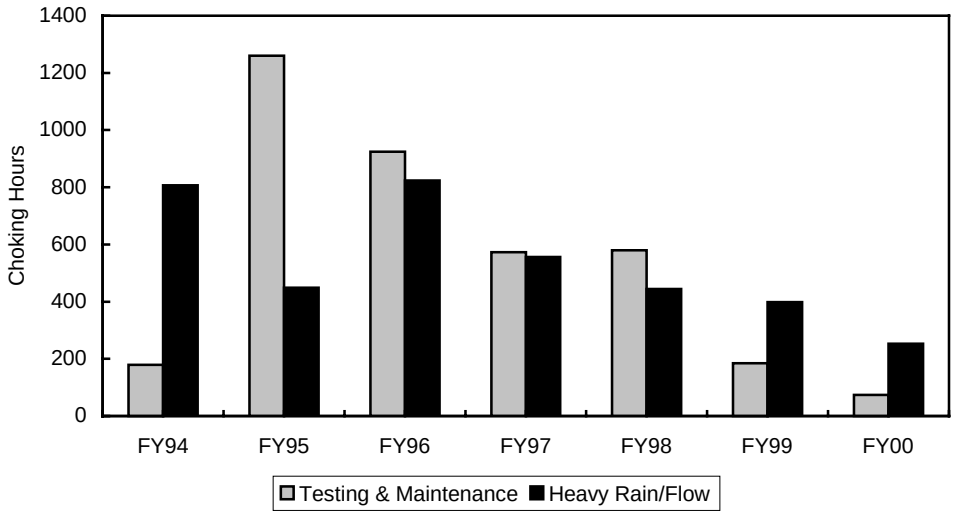
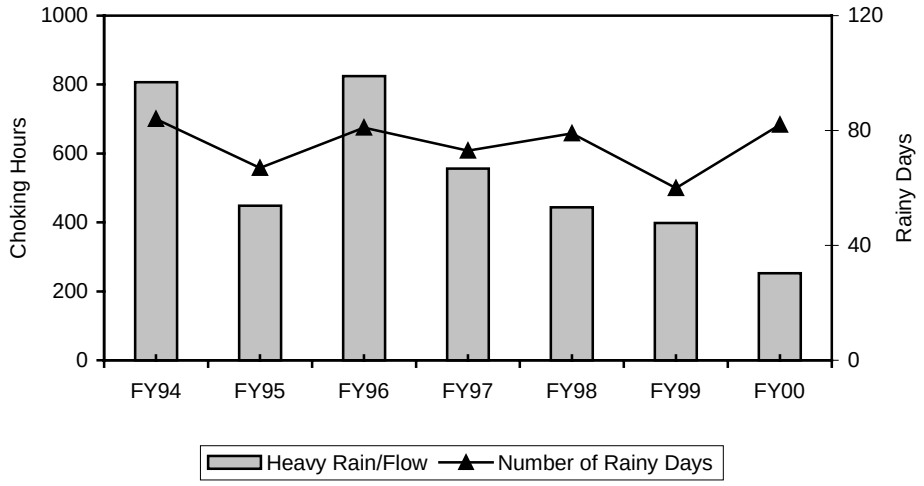


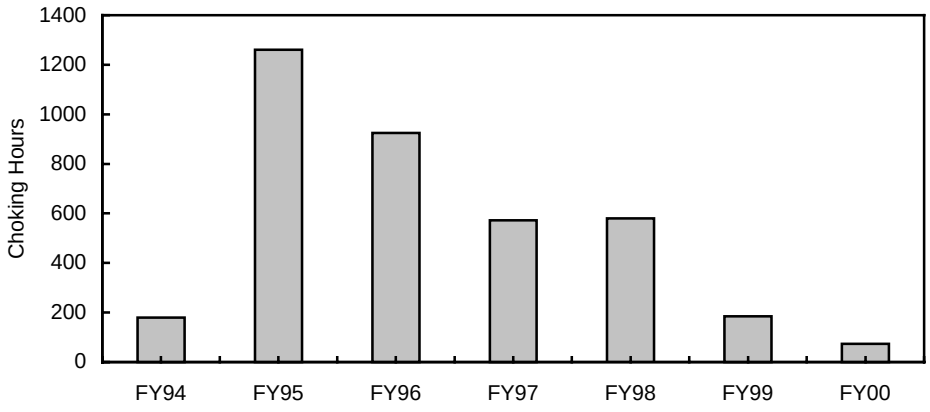
Figure IV.A.2 shows the influence of the number of rainy days in a year on the hours of rain-related choking. A rainy day is defined as a day with at least 0.1 inches of rainfall. As this figure shows, FY00 had more rainy days than FY99 but less rain-related choking hours.

Figure IV.A.2
Rain-Related Choking, FY94-FY00



Choking for maintenance purposes is plotted in Figure IV.A.3. Maintenance choking peaked in FY95 due to the maintenance and testing involved in bringing the new primary treatment plant on-line. The number of hours of maintenance-related choking continued to be fairly high from FY96 to FY98 because of maintenance and testing related to the startup of the new primary and secondary treatment plants. For example, in FY98, of the approximately 580 choking hours related to testing and maintenance, 442 hours were due to testing. Since there were no new systems to test in FY99, there was a significant decrease in the testing/maintenance choking hours from FY98 to FY99. Despite the planned opening of the new outfall tunnel in FY01, choking hours due to testing and maintenance were extremely low in FY00.

Figure IV.A.3
Testing/Maintenance Choking, FY94-FY00



IV.A.2 Sanitary Sewer Overflows

MWRA monitors sanitary sewer overflows, which occur when extreme rainfall overwhelms the transport system, both visually and with meters in both the North and South Systems. Table IV.A.1 lists the number of recorded overflows at several locations in the North System, comparing FY00 with the previous fiscal year. Note that the number of overflows refers to the number of events, rather than the number of days; one overflow can potentially last a number of days. There were 11 reported overflows in FY00 for the North System. This list includes only overflows at MWRA-owned overflow areas. There are also overflows for which the local municipalities are responsible. MWRA monitors these local overflows less frequently, and only when requested to do so by municipalities or notified of a problem by concerned citizens. A list of all the known overflow locations monitored by MWRA, including both MWRA and municipal overflows, is provided in Appendix I, Table I-4.

Note that SSOs (sanitary sewer overflows) differ from CSOs (combined sewer overflows) in that CSO relief points are pipes that were specifically designed to relieve the combined sewer system. When the system becomes overloaded, these pipes discharge combined sewage and storm water into a receiving body of water, such as the Charles River. SSOs, on the other hand, are weak points in separate the system, such as manholes, which will overflow during heavy rain events.

Table IV.A.1 Sanitary Sewer Overflows, North System, FY99 and FY00

Location	Number of Overflows	
	FY99	FY00
Section 80 Arlington	0	0
Section B Cambridge	0	1
Section 43.5 Medford	0	0
Section 91B Medford (Manhole)	0	1
Section 91B Medford (Siphon)	0	1
Section 107 Medford	0	3
Section C Medford	0	2
Section 530 Newton	0	1
Section 113 Winchester	0	1
Alewife Brook Pump Station	0	1

IV.B South System

IV.B.1 Sanitary Sewer Overflows

Table IV.B.1 lists the observed overflows in the South System. Note that the only overflows in FY00 in the South System occurred at Section 126 Weymouth Smelt Brook.

Table IV.B.1 Sanitary Sewer Overflows, South System, FY99 and FY00

Location	Number of Overflows	
	FY99	FY00
Section 128 Braintree	0	0
Section 126 Weymouth (Manhole)	0	0
Section 126 Weymouth Smelt Brook	3	2

APPENDICES

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