

Appendix 'A'

Wastewater System Releases: 2008 to 2017

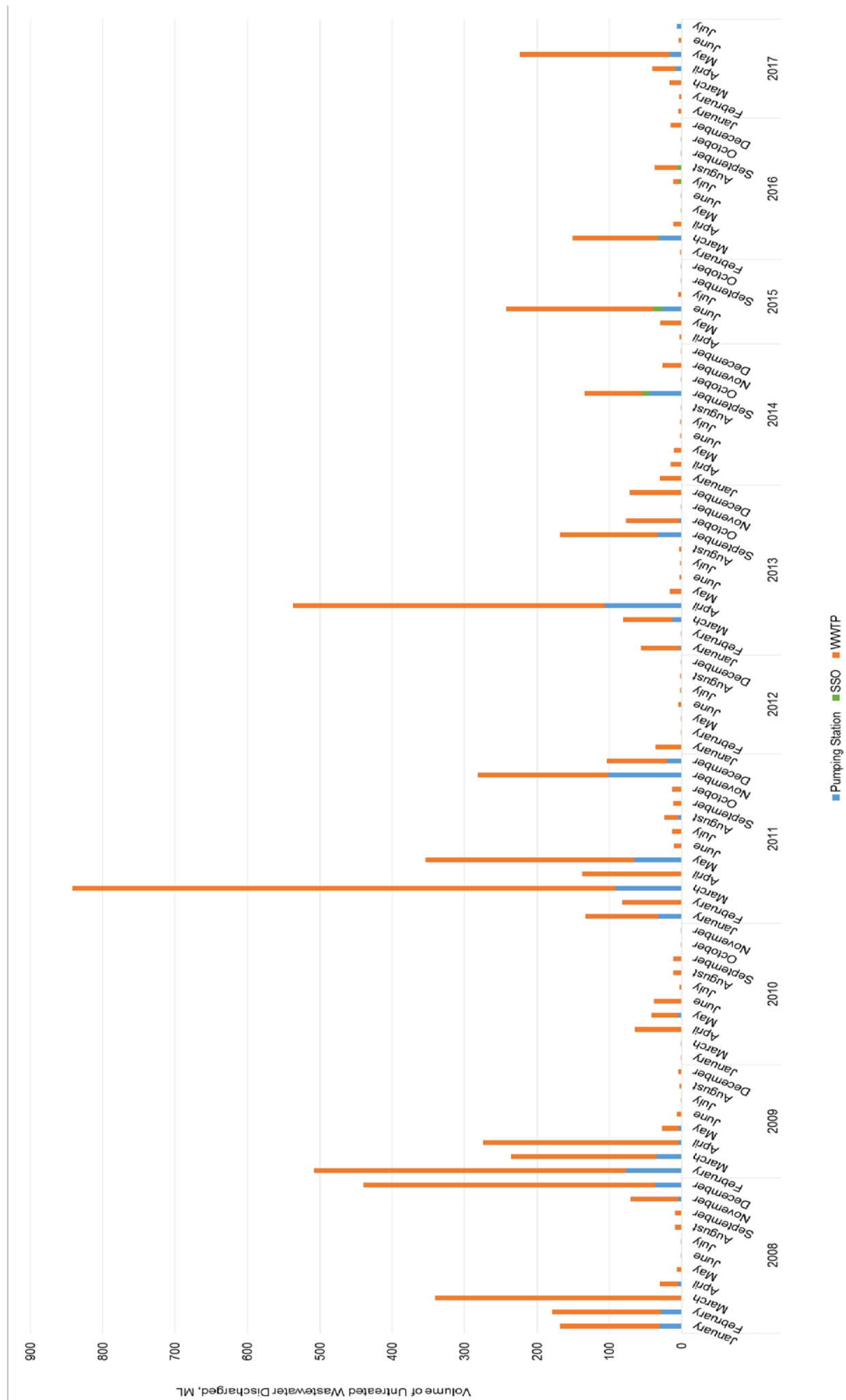


Figure A1: Monthly volume of untreated wastewater discharge from pumping stations, WWTPs and SSOs* from 2008 to 2017

Large Peaks in Figure A1

The large peaks on the monthly data graph (i.e., March, 2011; April, 2013; September, 2014; June 2015; etc.) correspond to major rain or snow melt events.

The following table outlines the annual volume of wastewater expelled to the City's waterways from pumping stations, treatment plants and sewer system overflows since 2008. Sewer system overflow data was only available since 2014.

Table A1: Annual volume of wastewater from wastewater treatment plants, pumping stations and sewer system overflows

Year	WWTP Bypasses				Pumping Station Bypasses		Sewer System Overflows	
	# of Raw Bypasses	# of Secondary Bypasses	Total	Volume of Bypasses, ML	# of Bypasses	Volume of Bypasses, ML	# of Overflows	Volume, ML
2008	35	38	73	1,143	35	108		
2009	31	22	53	937	29	122		
2010	23	17	40	163	15	7		
2011	54	31	85	1,787	40	219		
2012	6	6	12	45	0	0		
2013	33	20	53	902	22	113		
2014	21	13	34	171	18	44	21	13
2015	22	11	33	237	18	27	24	16
2016	30	16	46	186	10	29	28	13
2017	18	16	34	271	7	27	n/a	n/a

The following table outlines volume of raw wastewater (i.e., raw bypass – wastewater that has received no level of treatment) expelled to our waterways as a percent of total treated flow (i.e., secondary bypass and treated wastewater effluent). The amount of raw bypass on an annual basis has been less than 1% of overall treated flow since 2008 and has only accounted for 0.1% since 2014.

A common unit of measure in expressing the volume of wastewater discharged to the natural pathways is using equivalent number of swimming pools. The average Olympic sized swimming pool measuring 50 m long by 25 m wide and 2 m deep has a total capacity of 2,500,000 L of water, or 2.5 million litres. The equivalent number of swimming pools for total annual bypass volume and raw bypass volume are highlighted below.

Table A2: Total annual bypass volume, raw bypass volume, treated volume of wastewater as well as related fractions of raw and bypass volumes to total annual treated wastewater

Year	Total Annual Bypass Volume, ML	Total Raw Bypass Volume, ML	Annual Volume of Treated Wastewater, ML	Percent of Raw Bypass to Treated Flow	Equivalent # of Swimming Pools for Total Bypass Volume	Equivalent # of Swimming Pools for Raw Bypass Volume
2008	1,252	219	79,000	0.3%	501	88
2009	1,059	158	74,600	0.2%	424	63
2010	170	47	70,400	0.1%	68	19
2011	2,005	375	84,800	0.4%	802	150
2012	45	4	67,900	0.0%	18	2
2013	1,014	249	76,200	0.3%	406	100
2014	227	72	72,400	0.1%	91	29
2015	280	56	65,700	0.1%	112	22
2016	228	67	70,800	0.1%	91	27
2017	298				0	

Example 1: Early Spring Thaw with Significant Amounts of Rain

The following figure highlights overflow activity related to an early spring thaw with large amounts of spring rainfall occurring in March 2011.

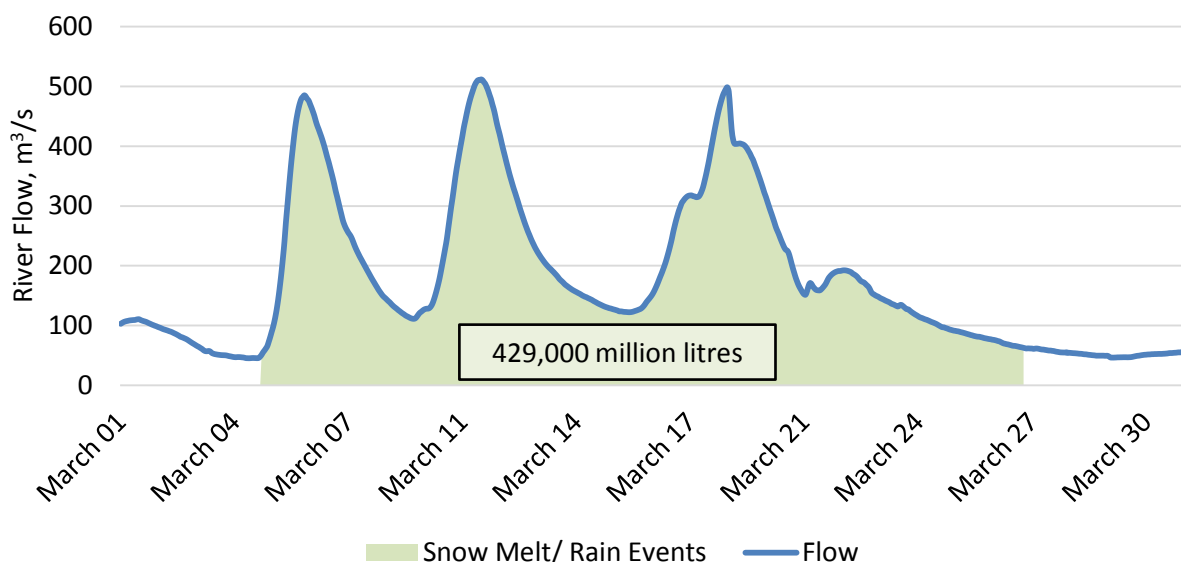


Figure A1: River flow data and volume of water from snow melt and rain events for March, 2011

Total rainfall for the month of March, 2011 was 105 mm and in mid-March the daily high for temperature peaked at 15°C which lead to accelerated snow melt. Between March 5 and March 27, the approximate volume of water flowing through the Thames River during this period was 429,000 million litres. During this time, the total amount of untreated wastewater discharged to the river account for 840 million litres. This volume represents approximately 0.2 % of the total volume of flow through the river.

Example 2: Short Intense Rainfall

On June 22 and 23, 2015, the City of London experienced short and intense rainfall events totaling 26 and 22 mm rainfall per day, respectively, as shown below.

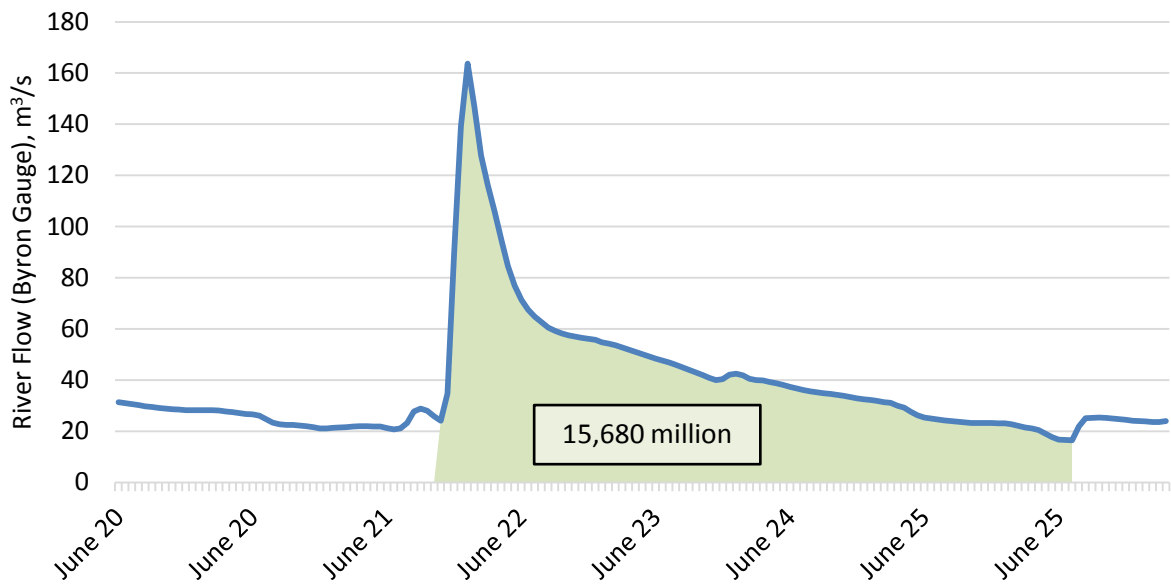


Figure A2: River flow data and rain event volume for the June 23, 2015 rain event

From June 21 to June 25, the approximate volume of water flowing through the Thames River during this time period was 15,680 million litres. The total amount of untreated wastewater discharged to the river from pumping stations, treatment plants and sewer system overflows during this time accounted for 218 million litres, which represents approximately 1.4 % of the total volume during this time.