

Initial Analysis on the SSO and Bypass Issues For Future Model

A Presentation to the CBP Wastewater Workgroup
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SSO and Bypass Issues For Future Model

Background: SSO is considered as illegal discharge and has traditionally been avoided in the Bay Models. Bypass has been reported as storm driven bypass and not included in the effluent data for many plants.

Problems:

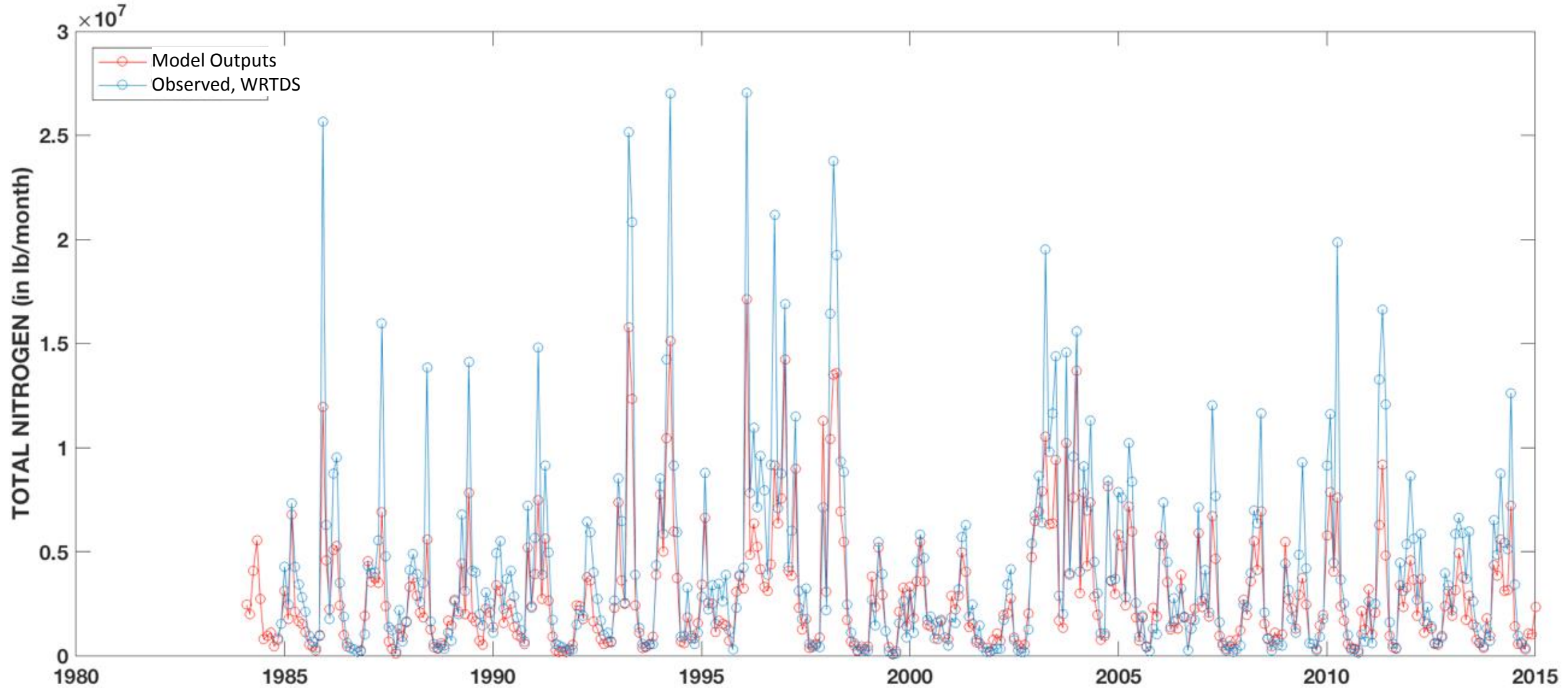
- A. The phase 6 model has the same issue that the previous versions had:
 - the model underestimates during storm events in many major river basins.
- B. Many NGOs, such as Blue Water Baltimore, have asked about how the Bay models handle the sewage spills.

Data Analysis: Maryland SSO and Bypass data (2005-2016) are summarized and compared with MD CSO data to show the magnitude of SSO and Bypass contributions.

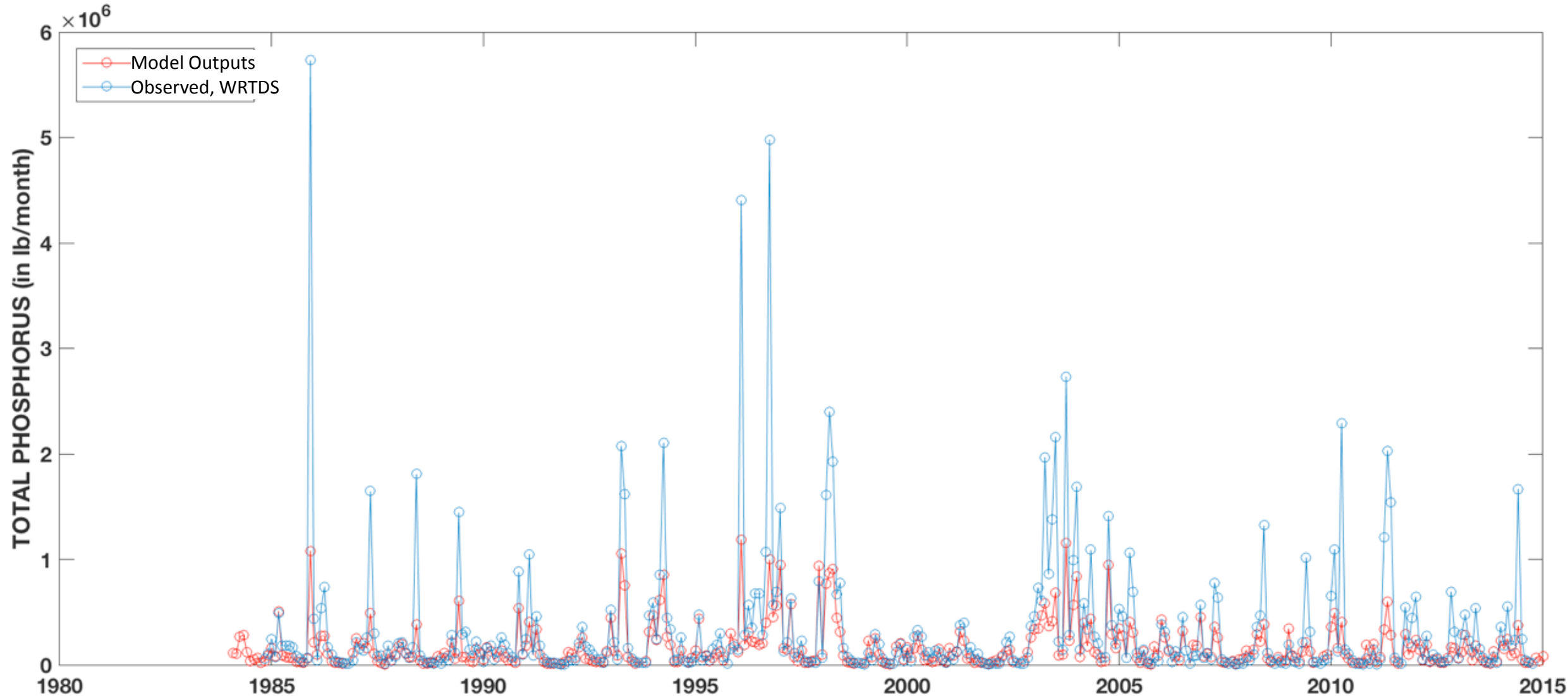
Options:

- 1. Workgroup provides a recommendation to WQGIT to include SSO and Bypass in future model (phase 7?) and starts to check the availabilities of the SSO and Bypass data.
- 2. Workgroup continues to investigate these issues.

Potomac River TN Loads– model output vs observed



Potomac River TP Loads– model output vs observed



SSO and Bypass Issues For Future Model

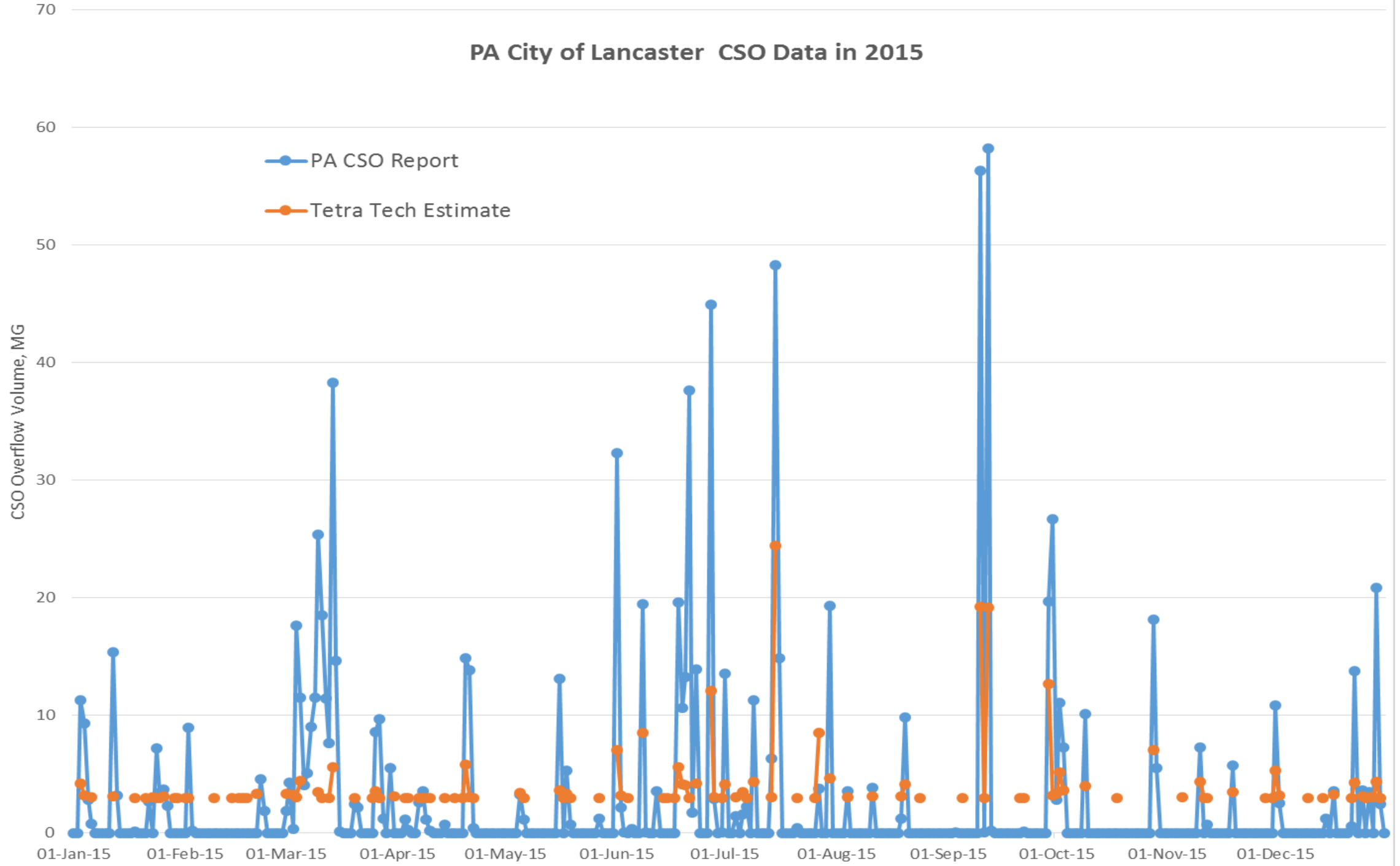
The underestimation could be caused by many storm related event inputs, such as urban runoff, ag land runoff, CSO, SSO, Bypass, and etc. Further research is needed to study the causes to improve the model.

CSO, SSO and Bypass are in the domain of WWTWG. We know SSO and Bypass are missing in the models.

We decided to use a hybrid approach to handle CSO data before we can collect more reported CSO data. Example CSO data from Lancaster PA is presented on next slides to show the differences between the state reported CSO data and the Tetra Tech estimates.

Are SSO and Bypass significant enough to contribute the model underestimation during storm event?

PA City of Lancaster CSO Data in 2015



SSO and Bypass Issues For Future Model

Are SSO and Bypass significant enough to contribute to the model underestimation during storm events?

Let us take a look at the Maryland SSO and Bypass data.

The screenshot shows a web browser window displaying the Maryland Department of the Environment's "Reported Sewer Overflow Database" page. The browser's address bar shows the URL: <http://www.mde.state.md.us/programs/Water/OverFlow/Pages/ReportedSewerOverflow>. The page header features the MDE logo and the text "THE DEPARTMENT OF THE ENVIRONMENT". A navigation menu includes links for HOME, MARYLANDER, ABOUT MDE, PERMITS, and NEWSROOM. A search bar is located in the top right corner. The main content area is titled "Maryland Reported Sewer Overflow Database" and contains a paragraph about the "New Overflow or Bypasses Regulation" effective on March 28, 2005. It also provides a detailed description of the database, stating it contains bypasses, combined sewer overflows (CSOs), and sanitary sewer overflows (SSOs) reported from January 2005 through the most recent update. A search section is located at the bottom, with instructions on how to use the search criteria. The search criteria include a dropdown for "Type of Overflow" (set to "Show All"), a dropdown for "Year" (set to "Show All"), a text input for "Municipality/Facility", and a text input for "NPDES No.".

http://www.mde.state.md.us/programs/Water/OverFlow/Pages/ReportedSewerOverflow

Reported Sewer Overflow

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Maryland Reported Sewer Overflow Database

New Overflow or Bypasses Regulation - Regulations that address reporting and public notification regarding sewage overflows and wastewater treatment plant bypasses became effective on March 28, 2005.

The Maryland Reported Sewer Overflow Database contains bypasses, combined sewer overflows (CSOs) and sanitary sewer overflows (SSOs) reported to the Maryland Department of the Environment (MDE) from January 2005 through the most recent update. MDE updates this database regularly. Although MDE requires that all public sewer system owners or operators report overflows to us, there may be incidents that were not reported. Note that overflow amounts provided by the person reporting the overflow may be estimated using professional judgment or they may be actual readings from flow measurement devices when available.

If you have any questions about this database, please contact Ms. Sharon Talley, Mr. Jesse Salter or Mr. William Lee at 410-537-35

SEARCH

Database records will be searched using valid criteria entered. Text searches are done by keywords only. **The date format is mm/dd/yyyy with no leading zeros.** For example, 8/21/2001 and 11/1/2001 are valid entries; 08/21/2001 and 11/01/2001 are not. The zip has five digits only. You may leave any of the input boxes blank.

Please use the IE browser when generating an Excel spreadsheet.

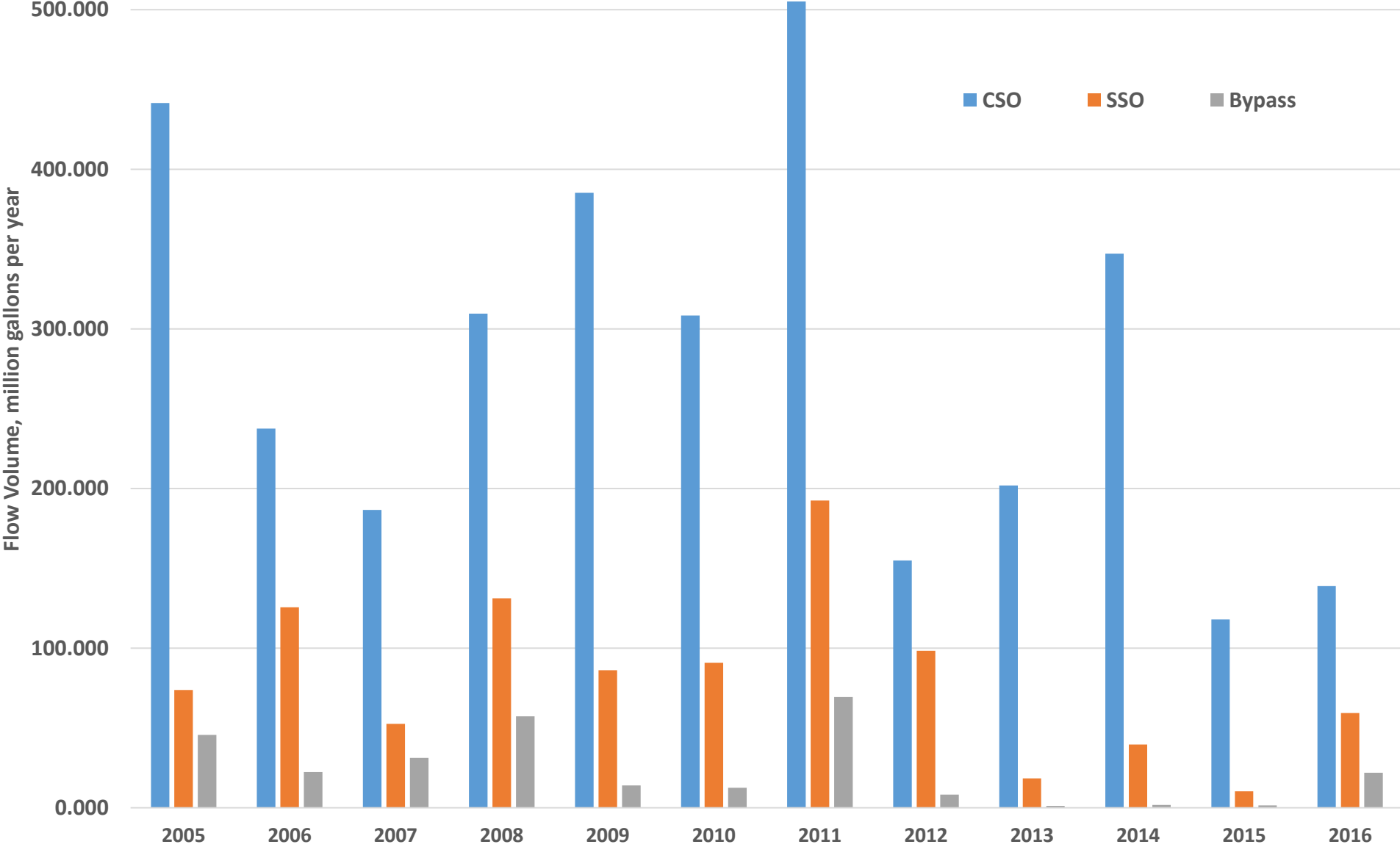
Type of Overflow ▼

Year ▼

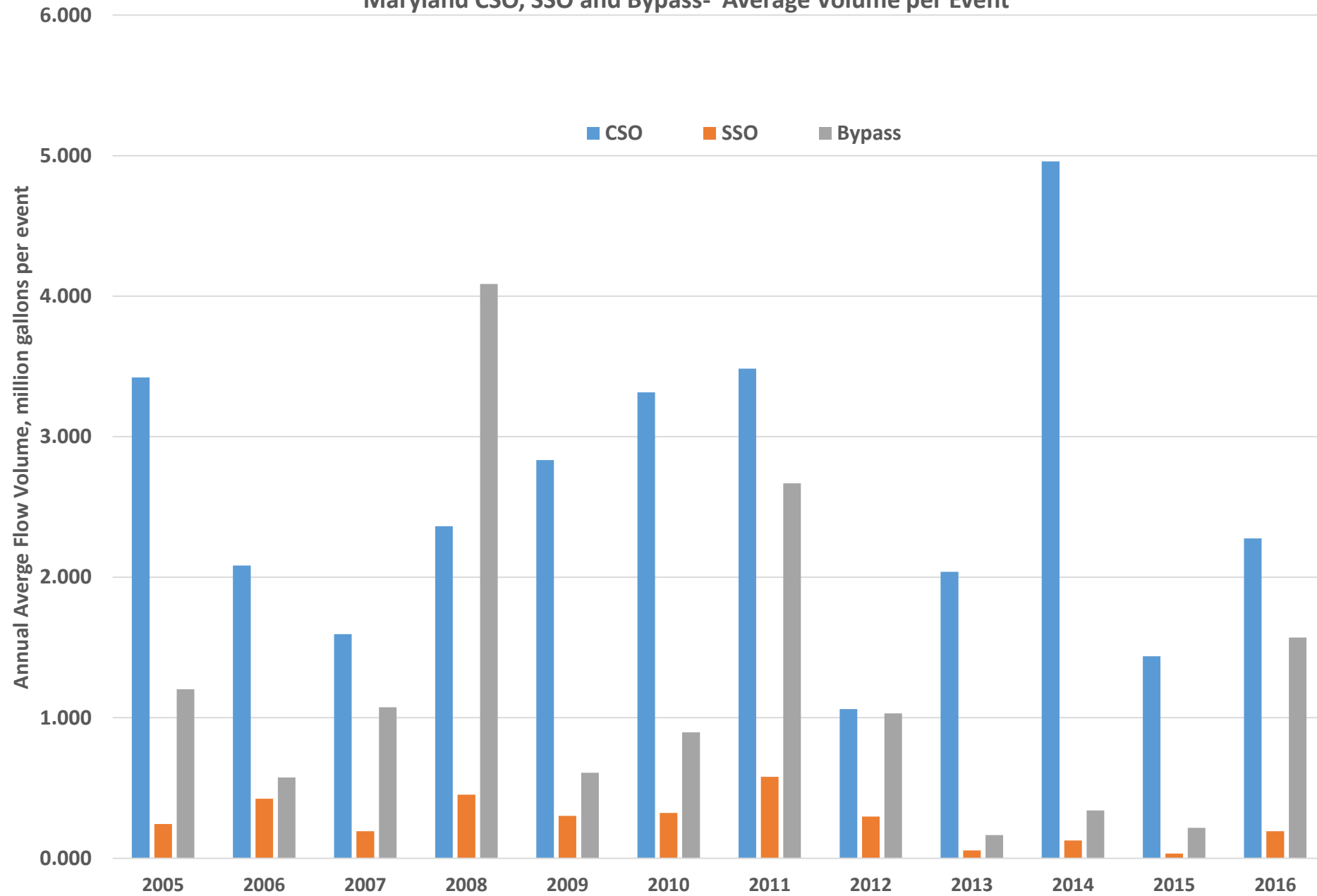
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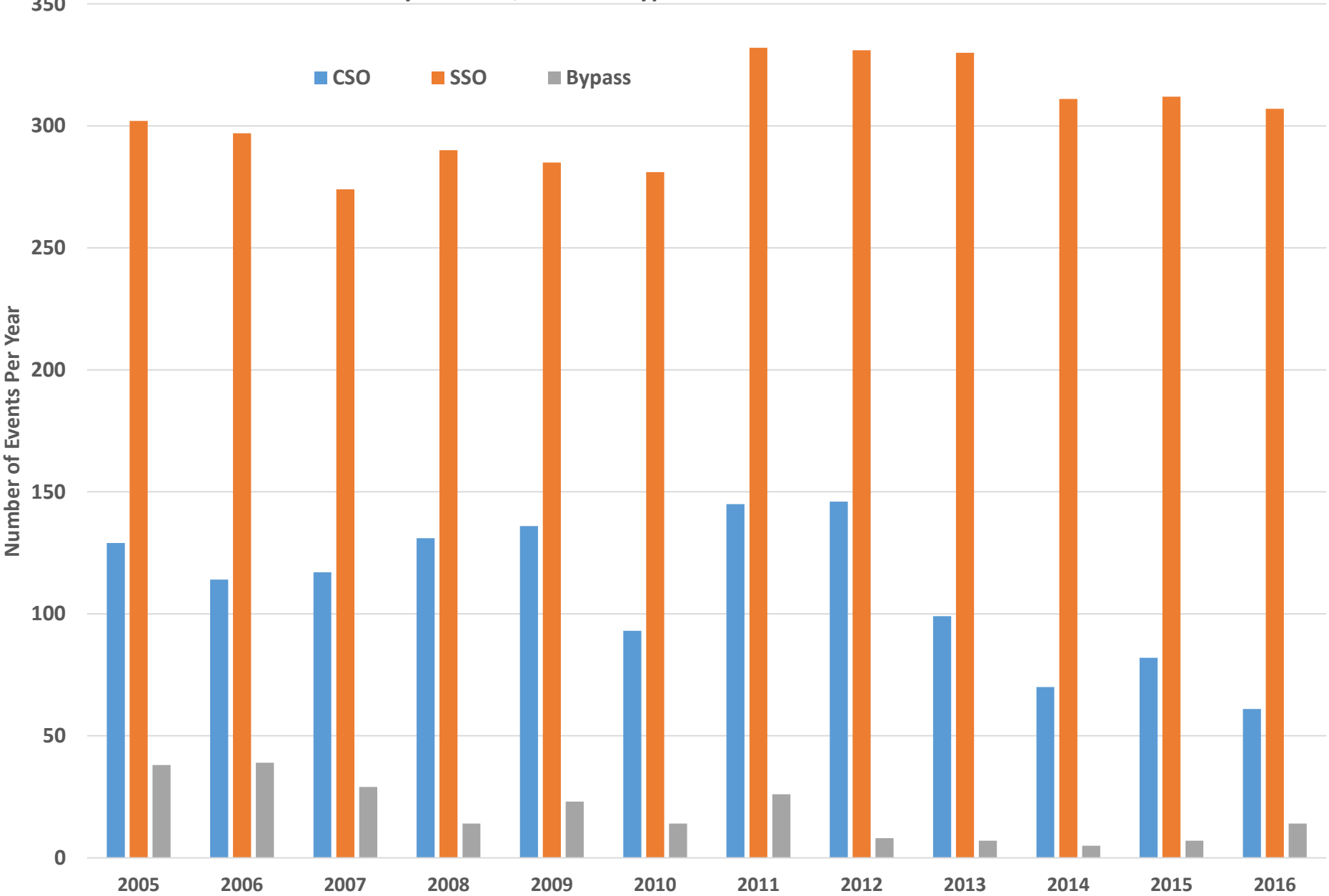
Maryland CSO, SSO and Bypass Flow Annual Volumes



Maryland CSO, SSO and Bypass- Average Volume per Event



Maryland CSO, SSO and Bypass - Number of Events Per Year



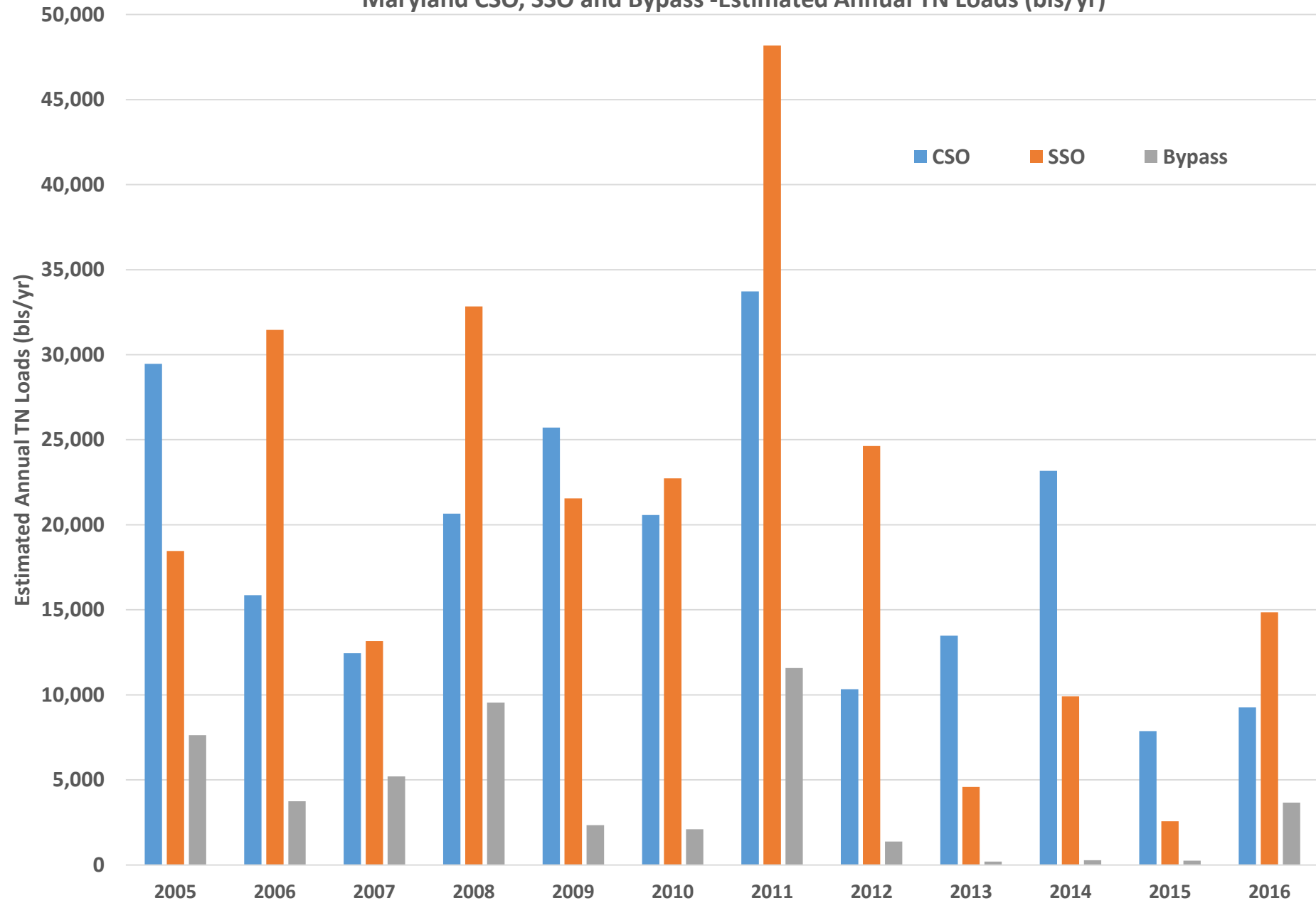
Maryland Reported CSO, SSO and Bypass Data

	CSO			SSO			Bypass		
Year	# Events	Annual Total FLOW (MG)	Avg Flow per event (MG)	# Events	Annual Total FLOW (MG)	Avg Flow per event (MG)	# Events	Annual Total FLOW (MG)	Avg Flow per event (MG)
2005	129	441.477	3.422	302	73.761	0.244	38	45.701	1.203
2006	114	237.591	2.084	297	125.669	0.423	39	22.414	0.575
2007	117	186.593	1.595	274	52.582	0.192	29	31.175	1.075
2008	131	309.496	2.363	290	131.166	0.452	14	57.210	4.086
2009	136	385.290	2.833	285	86.114	0.302	23	13.998	0.609
2010	93	308.320	3.315	281	90.783	0.323	14	12.547	0.896
2011	145	505.174	3.484	332	192.476	0.580	26	69.370	2.668
2012	146	154.902	1.061	331	98.386	0.297	8	8.248	1.031
2013	99	201.873	2.039	330	18.342	0.056	7	1.154	0.165
2014	70	347.102	4.959	311	39.649	0.127	5	1.704	0.341
2015	82	117.867	1.437	312	10.262	0.033	7	1.515	0.216
2016	61	138.818	2.276	307	59.360	0.193	14	21.984	1.570

To convert the flow volumes to TN loads, we need to assume some draft TN concentrations for the calculation purpose. These draft concentrations are picked only for testing in this analysis and not citable.

	Draft TN	Justification
CSO	8 mg/l	Default value recommended for CSO by Tetra Tech
Bypass	20 mg/l	Based on the flow weighted average of Blue Plains bypass outfall TN values in 2015 and 2016.
SSO	30 mg/l	Considered with both wet and dry weather events

Maryland CSO, SSO and Bypass -Estimated Annual TN Loads (bls/yr)



CSO was eliminated, but SSO is still running

Municipality	Year	# SSO Events	Annual SSO (Gallons)	Avg SSO (Gallons) per event	# CSO Events	CSO (Gallons)	Avg CSO (Gallons) per event
City of Baltimore	2005	84	4,749,943	56,547	4	4,885	1,221
City of Baltimore	2006	61	69,483,139	1,139,068	2	22,255	11,128
City of Baltimore	2007	61	549,564	9,009	CSO Eliminated		
City of Baltimore	2008	104	1,620,464	15,581	0	0	0
City of Baltimore	2009	152	2,167,752	14,262	0	0	0
City of Baltimore	2010	136	1,578,754	11,608	0	0	0
City of Baltimore	2011	240	10,857,511	45,240	0	0	0
City of Baltimore	2012	287	259,440	904	0	0	0
City of Baltimore	2013	279	963,690	3,454	0	0	0
City of Baltimore	2014	238	13,586,924	57,088	0	0	0
City of Baltimore	2015	260	968,168	3,724	0	0	0
City of Baltimore	2016	172	8,444,691	49,097	0	0	0

Baltimore County has no CSO, but it has SSO

Municipality	Year	# SSO Evens	Annul SSO (Gallons)	Avg SSO (Gallons) per event
Baltimore County DPW	2005	73	11,450,966	156,863
Baltimore County DPW	2006	68	13,675,408	201,109
Baltimore County DPW	2007	51	3,107,394	60,929
Baltimore County DPW	2008	54	15,626,542	289,380
Baltimore County DPW	2009	40	24,064,011	601,600
Baltimore County DPW	2010	44	36,994,319	840,780
Baltimore County DPW	2011	57	120,765,533	2,118,694
Baltimore County DPW	2012	39	63,458,808	1,627,149
Baltimore County DPW	2013	46	2,908,692	63,232
Baltimore County DPW	2014	45	10,951,409	243,365
Baltimore County DPW	2015	37	1,864,382	50,389
Baltimore County DPW	2016	19	2,612,258	137,487

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