



2017 Progress Update Phase 5.3.2 Model

Jeff Sweeney
Environmental Protection Agency
Chesapeake Bay Program Office
jsweeney@chesapeakebay.net
410-267-9844

Water Quality GIT
March 12, 2018



2017 Progress Load Review

Numeric

- Did each jurisdiction make or miss the 60% goal and by how much, why or why not?
 - 60% goal is 60% of the difference between 2009 and 2025 (WIP II) loads for nitrogen, phosphorus and sediment
- Determination is made using Phase 5.3.2 model
 - the one used to set the goals.



2017 Progress Numeric

- This will be the last Progress assessment with Phase 5.3.2 model. Future progress years will be run with the Phase 6 model (CAST).
- Most BMP and wastewater data was due 12/1/17
- Final version of 2017 Progress is version 7



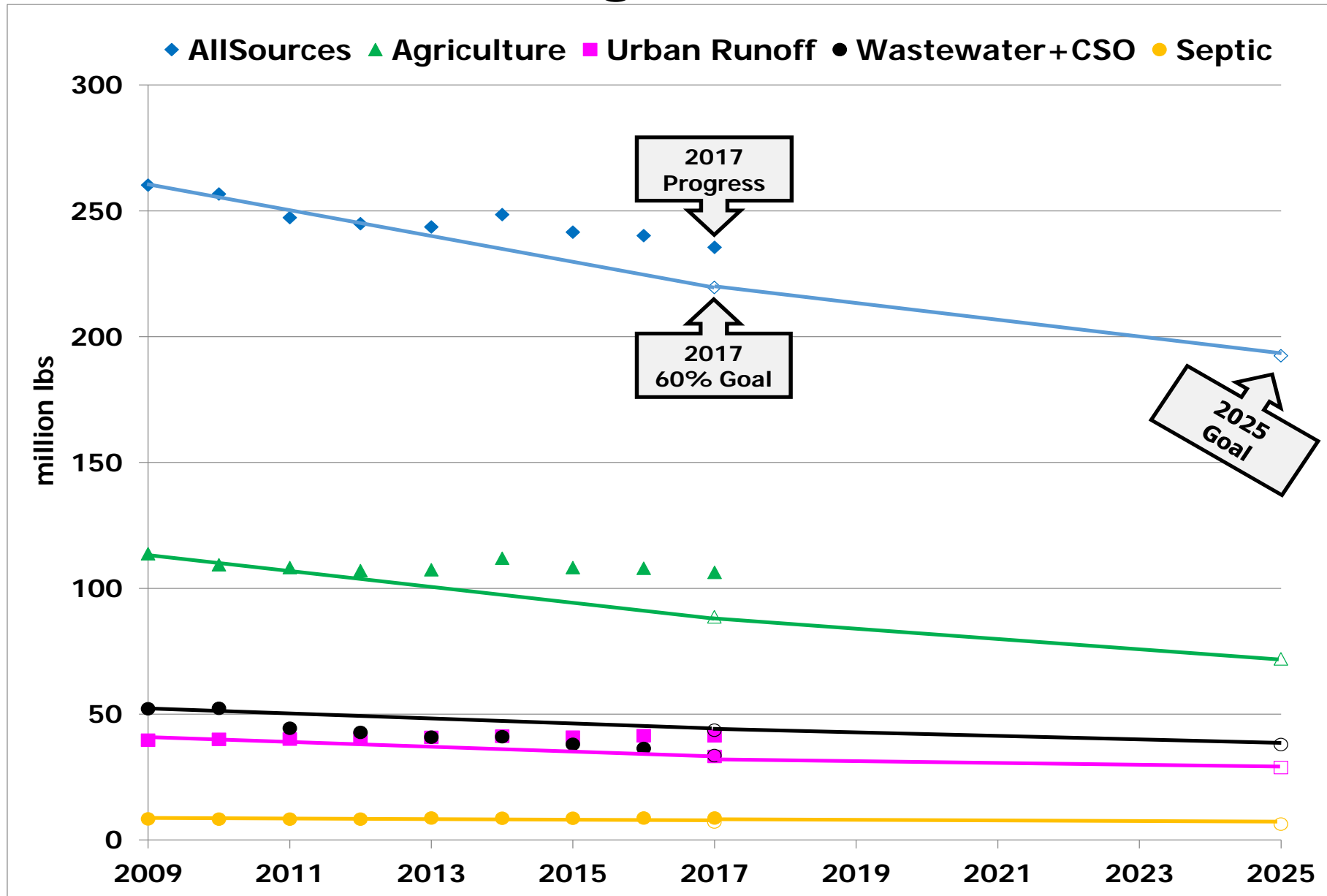
2017 Progress Numeric

- Versions 1 – 7: Reports for BMPs, loads, watershed conditions, submission errors were provided through jurisdiction's password-protected ftp sites + BayTAS for review.
- State Verification Plans (QAPPs) should have been up to date by 12/1/17 – describing new data sources, methods, and verification that pertain to the new BMP and wastewater data.



2017 Progress
Chesapeake Bay Watershed
Composite

CBW Nitrogen Loads-Goals





2017 Progress Load Review

Chesapeake Bay Watershed

Modeled Nitrogen Load Changes

- Since 2009, Nitrogen loads decreased an estimated 25M lbs. (9%).
 - Among jurisdictions, 49% of the N load reduction is from VA, 23% from PA, and 20% from MD.
 - Currently, 24% of the N load is from VA, 47% from PA, and 20% from MD.
 - Among sources, 70% of the 2009-2017 N load reduction is from wastewater and 28% from agriculture.
 - Currently, 14% of the N load is from wastewater, 45% from agriculture, 19% from forest, 18% from developed and 4% from septic.



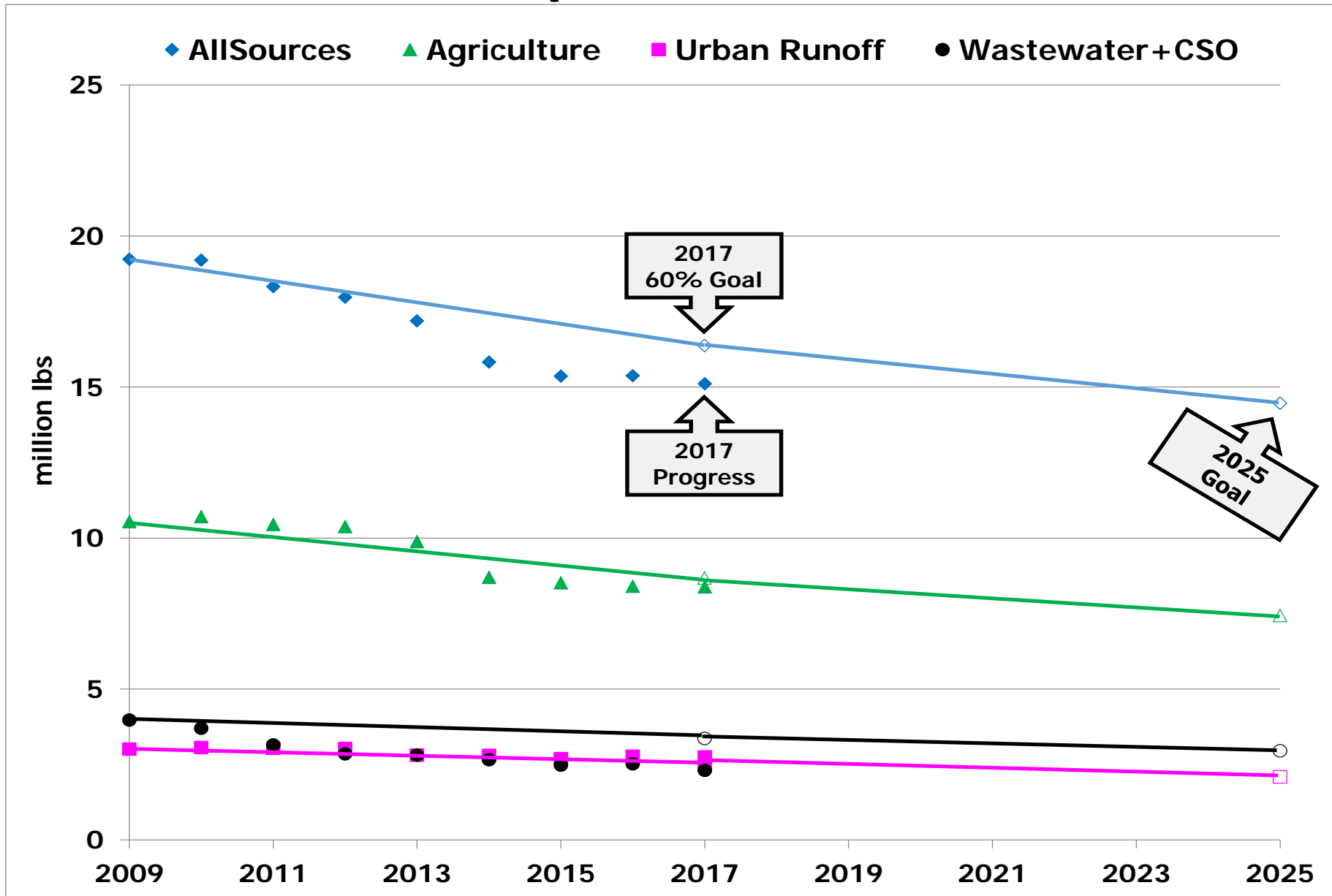
2017 Progress Load Review

Chesapeake Bay Watershed

Modeled Nitrogen Load Changes

- For 2017, the goal is to achieve 60% of the planned 2009-2025 load reduction.
 - 2017 Nitrogen is at 36% of this goal.
 - The N gap with the 2017 goal is 16M lbs. The PA gap in 2017 is 17M lbs. N.
 - The only source meeting the 60% target is wastewater.

CBW Phosphorus Loads-Goals





2017 Progress Load Review

Chesapeake Bay Watershed

Modeled Phosphorus Load Changes

- Since 2009, Phosphorus loads decreased and estimated 4.1M lbs. (21%).
 - Among jurisdictions, 54% of the P load reduction is from VA, 19% from PA, and 14% from MD.
 - Currently, 43% of the N load is from VA, 28% from PA, and 18% from MD.
 - Among sources, 53% of the 2009-2017 P load reduction is from agriculture and 40% from agriculture.
 - Currently, 55% of the P load is from agriculture, 18% from developed, 15% from wastewater, and 11% from forest.

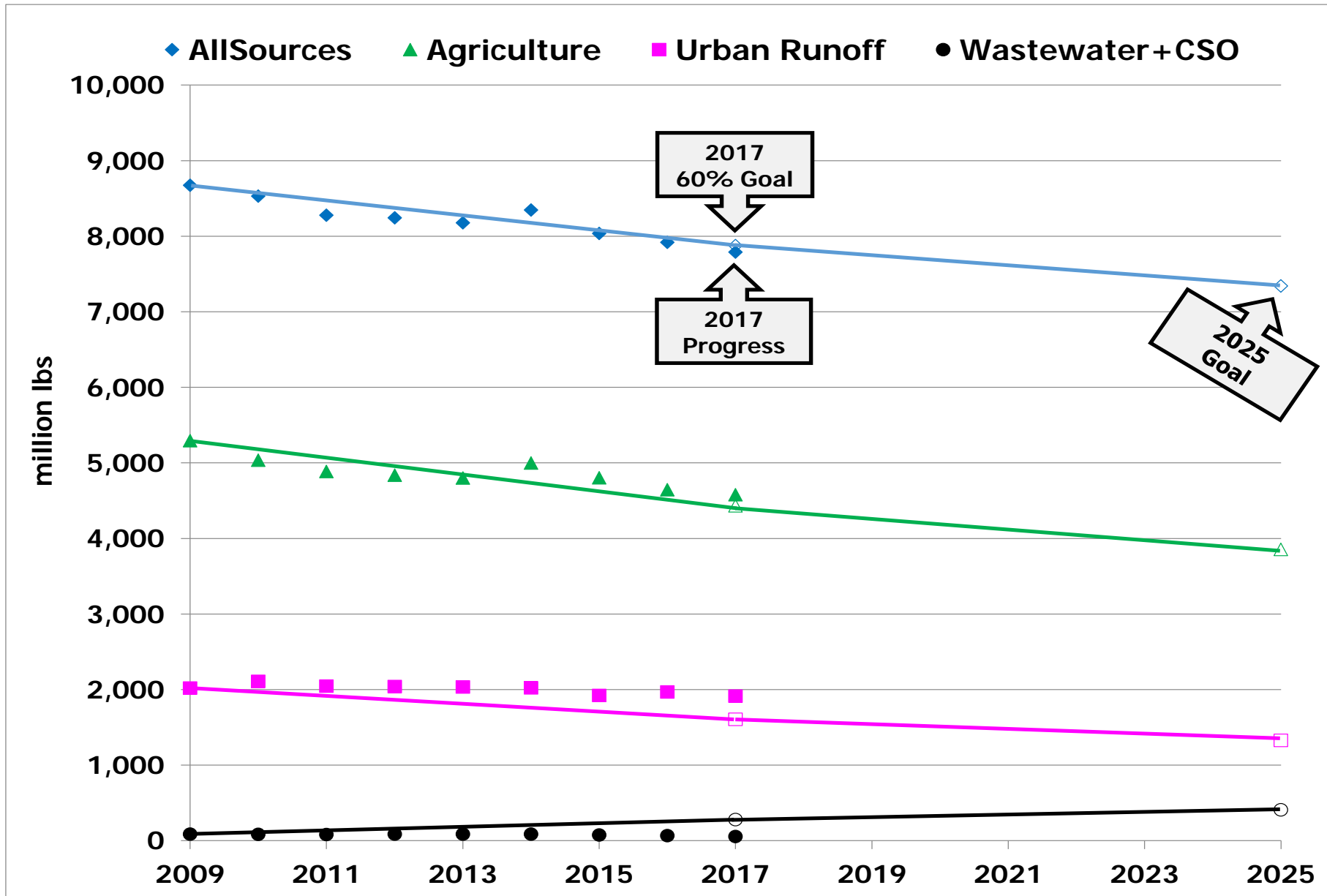


2017 Progress Load Review Chesapeake Bay Watershed

Modeled Phosphorus Load Changes

- For 2017, the goal is to achieve 60% of the planned 2009-2025 load reduction.
 - 2017 P is at 86%, better than the target.
 - P loads remain below the trajectory target for agriculture and wastewater.

CBW Sediment Loads-Goals



CBW Loads-Goals

		2009	2016	2017	2017	2017	2025
		Progress	Progress	Progress	60% Target	Milestone	Target
		TOTN	TOTN	TOTN	TOTN	TOTN	TOTN
Jurisdiction	Source	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)
AllJurisdictions	Agriculture	113.80	108.02	106.34	88.68	97.65	71.93
AllJurisdictions	Urban Runoff	39.70	41.44	41.36	33.16	41.17	28.80
AllJurisdictions	Wastewater+CSO	52.18	36.42	33.46	43.59	36.04	37.86
AllJurisdictions	Septic	8.42	8.71	8.73	7.14	8.57	6.28
AllJurisdictions	Forest+	46.16	45.61	45.63	46.97	46.27	47.52
AllJurisdictions	AllSources	260.25	240.19	235.53	219.53	229.71	192.39
		2009	2016	2017	2017	2017	2025
		Progress	Progress	Progress	60% Target	Milestone	Target
		TOTP	TOTP	TOTP	TOTP	TOTP	TOTP
Jurisdiction	Source	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)
AllJurisdictions	Agriculture	10.546	8.404	8.383	8.675	8.021	7.428
AllJurisdictions	Urban Runoff	3.010	2.771	2.749	2.458	2.670	2.090
AllJurisdictions	Wastewater+CSO	3.972	2.526	2.304	3.359	2.410	2.950
AllJurisdictions	Forest+	1.701	1.671	1.673	1.874	1.696	1.990
AllJurisdictions	AllSources	19.229	15.372	15.109	16.366	14.796	14.457
		2009	2016	2017	2017	2017	2025
		Progress	Progress	Progress	60% Target	Milestone	Target
		TSS	TSS	TSS	TSS	TSS	TSS
Jurisdiction	Source	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)
AllJurisdictions	Agriculture	5,295	4,645	4,579	4,430	4,263	3,852
AllJurisdictions	Urban Runoff	2,019	1,968	1,914	1,604	1,870	1,327
AllJurisdictions	Wastewater+CSO	87	67	55	278	107	406
AllJurisdictions	Forest+	1,274	1,239	1,241	1,563	1,264	1,755
AllJurisdictions	AllSources	8,675	7,920	7,790	7,874	7,503	7,341

- Loads meet trajectory targets.
- Loads don't meet trajectory targets but are within 5%.
- Loads don't meet trajectory targets by relatively large amount



2017 Progress Jurisdictions

PA Loads-Goals

		2009	2016	2017	2017	2017	2025
		Progress	Progress	Progress	60% Target	Milestone	Target
		TOTN	TOTN	TOTN	TOTN	TOTN	TOTN
Jurisdiction	Source	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)
PA	Agriculture	62.66	63.01	61.99	46.41	55.67	35.58
PA	Urban Runoff	17.41	17.58	17.50	13.12	17.41	10.26
PA	Wastewater+CSO	12.14	7.89	6.95	10.21	8.34	8.92
PA	Septic	2.33	2.57	2.57	1.98	2.40	1.74
PA	Forest+	22.10	22.04	22.03	22.33	22.22	22.49
PA	AllSources	116.64	113.08	111.03	94.05	106.04	79.00
		2009	2016	2017	2017	2017	2025
		Progress	Progress	Progress	60% Target	Milestone	Target
		TOTP	TOTP	TOTP	TOTP	TOTP	TOTP
Jurisdiction	Source	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)
PA	Agriculture	2.716	2.501	2.485	2.176	2.413	1.816
PA	Urban Runoff	0.767	0.700	0.690	0.561	0.665	0.424
PA	Wastewater+CSO	1.071	0.630	0.600	0.966	0.653	0.897
PA	Forest+	0.431	0.426	0.426	0.433	0.428	0.435
PA	AllSources	4.984	4.257	4.201	4.136	4.160	3.571
		2009	2016	2017	2017	2017	2025
		Progress	Progress	Progress	60% Target	Milestone	Target
		TSS	TSS	TSS	TSS	TSS	TSS
Jurisdiction	Source	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)
PA	Agriculture	1,677	1,504	1,460	1,326	1,293	1,092
PA	Urban Runoff	560	530	517	391	492	278
PA	Wastewater+CSO	21	20	20	121	25	187
PA	Forest+	386	381	380	388	381	389
PA	AllSources	2,644	2,434	2,377	2,225	2,191	1,945



Loads meet trajectory targets.

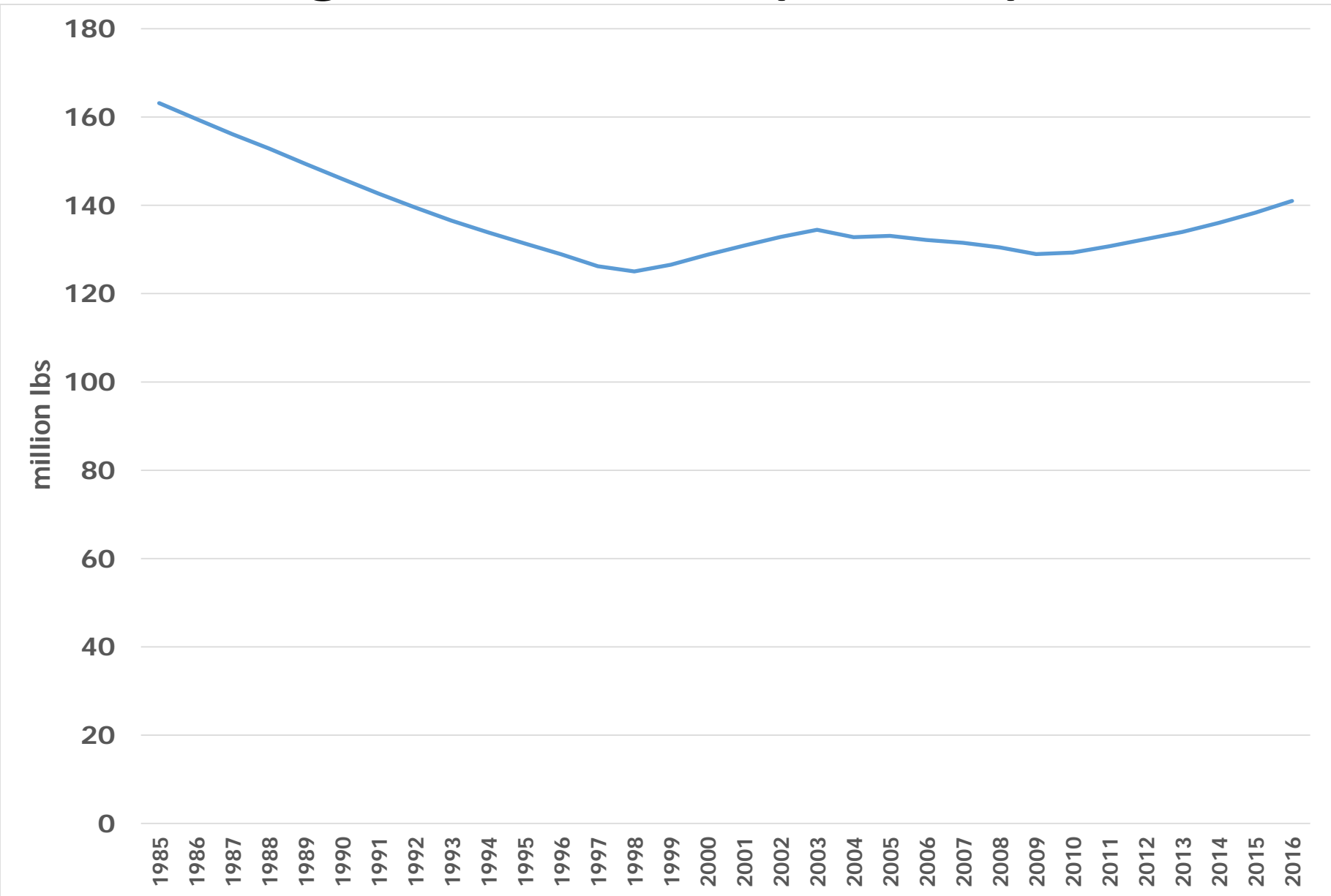


Loads don't meet trajectory targets but are within 5%.



Loads don't meet trajectory targets by relatively large amount

Susquehanna Nitrogen Load Trend (WRTDS) at Conowingo, MD



MD Loads-Goals

		2009	2016	2017	2017	2017	2025
		Progress	Progress	Progress	60% Target	Milestone	Target
		TOTN	TOTN	TOTN	TOTN	TOTN	TOTN
Jurisdiction	Source	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)
MD	Agriculture	19.76	17.93	17.54	17.03	16.64	15.21
MD	Urban Runoff	9.53	9.76	9.83	8.20	9.80	7.31
MD	Wastewater+CSO	13.75	11.67	10.89	11.84	9.56	10.56
MD	Septic	2.97	2.84	2.85	2.30	2.86	1.85
MD	Forest+	5.92	5.79	5.79	6.11	5.87	6.24
MD	AllSources	51.95	47.99	46.90	45.48	44.72	41.17
		2009	2016	2017	2017	2017	2025
		Progress	Progress	Progress	60% Target	Milestone	Target
		TOTP	TOTP	TOTP	TOTP	TOTP	TOTP
Jurisdiction	Source	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)
MD	Agriculture	1.613	1.394	1.404	1.526	1.301	1.468
MD	Urban Runoff	0.712	0.653	0.666	0.577	0.648	0.487
MD	Wastewater+CSO	0.787	0.565	0.470	0.710	0.494	0.659
MD	Forest+	0.190	0.188	0.189	0.194	0.190	0.196
MD	AllSources	3.301	2.800	2.727	3.006	2.633	2.810
		2009	2016	2017	2017	2017	2025
		Progress	Progress	Progress	60% Target	Milestone	Target
		TSS	TSS	TSS	TSS	TSS	TSS
Jurisdiction	Source	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)
MD	Agriculture	744	576	574	782	590	808
MD	Urban Runoff	514	483	475	415	496	348
MD	Wastewater+CSO	12	14	10	42	41	63
MD	Forest+	125	123	123	128	125	131
MD	AllSources	1,395	1,195	1,181	1,368	1,252	1,350



Loads meet trajectory targets.



Loads don't meet trajectory targets but are within 5%.



Loads don't meet trajectory targets by relatively large amount

VA Loads-Goals

		2009	2016	2017	2017	2017	2025
		Progress	Progress	Progress	60% Target	Milestone	Target
		TOTN	TOTN	TOTN	TOTN	TOTN	TOTN
Jurisdiction	Source	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)
VA	Agriculture	20.73	17.29	17.12	16.36	15.84	13.45
VA	Urban Runoff	10.12	11.34	11.26	9.32	11.20	8.79
VA	Wastewater+CSO	21.73	13.64	12.20	17.44	14.59	14.58
VA	Septic	2.47	2.61	2.63	2.24	2.62	2.09
VA	Forest+	13.08	12.68	12.71	13.44	13.08	13.68
VA	AllSources	68.13	57.57	55.91	58.80	57.33	52.59
		2009	2016	2017	2017	2017	2025
		Progress	Progress	Progress	60% Target	Milestone	Target
		TOTP	TOTP	TOTP	TOTP	TOTP	TOTP
Jurisdiction	Source	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)
VA	Agriculture	4.824	3.425	3.420	3.813	3.220	3.139
VA	Urban Runoff	1.255	1.204	1.179	1.093	1.143	0.985
VA	Wastewater+CSO	1.757	1.128	1.019	1.406	1.045	1.173
VA	Forest+	0.836	0.814	0.815	0.997	0.835	1.105
VA	AllSources	8.672	6.571	6.434	7.310	6.242	6.402
		2009	2016	2017	2017	2017	2025
		Progress	Progress	Progress	60% Target	Milestone	Target
		TSS	TSS	TSS	TSS	TSS	TSS
Jurisdiction	Source	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)
VA	Agriculture	2,410	2,185	2,167	1,929	2,003	1,609
VA	Urban Runoff	698	763	729	574	687	491
VA	Wastewater+CSO	47	27	18	107	30	146
VA	Forest+	587	562	564	838	584	1,005
VA	AllSources	3,743	3,537	3,478	3,448	3,305	3,251

- Loads meet trajectory targets.
- Loads don't meet trajectory targets but are within 5%.
- Loads don't meet trajectory targets by relatively large amount

WV Loads-Goals

		2009 Progress TOTN (M lbs/year)	2016 Progress TOTN (M lbs/year)	2017 Progress TOTN (M lbs/year)	2017 60% Target TOTN (M lbs/year)	2017 Milestone TOTN (M lbs/year)	2025 Target TOTN (M lbs/year)
Jurisdiction	Source						
WV	Agriculture	2.66	2.38	2.35	2.43	2.38	2.27
WV	Urban Runoff	0.80	0.87	0.87	0.78	0.87	0.77
WV	Wastewater+CSO	0.26	0.26	0.18	0.25	0.24	0.24
WV	Septic	0.17	0.16	0.16	0.18	0.16	0.18
WV	Forest+	1.57	1.55	1.54	1.57	1.54	1.56
WV	AllSources	5.47	5.21	5.09	5.20	5.19	5.02
		2009 Progress TOTP (M lbs/year)	2016 Progress TOTP (M lbs/year)	2017 Progress TOTP (M lbs/year)	2017 60% Target TOTP (M lbs/year)	2017 Milestone TOTP (M lbs/year)	2025 Target TOTP (M lbs/year)
Jurisdiction	Source						
WV	Agriculture	0.556	0.428	0.433	0.464	0.439	0.402
WV	Urban Runoff	0.116	0.072	0.073	0.086	0.072	0.065
WV	Wastewater+CSO	0.109	0.041	0.031	0.067	0.039	0.039
WV	Forest+	0.118	0.117	0.117	0.124	0.117	0.128
WV	AllSources	0.899	0.658	0.653	0.740	0.666	0.635
		2009 Progress TSS (M lbs/year)	2016 Progress TSS (M lbs/year)	2017 Progress TSS (M lbs/year)	2017 60% Target TSS (M lbs/year)	2017 Milestone TSS (M lbs/year)	2025 Target TSS (M lbs/year)
Jurisdiction	Source						
WV	Agriculture	268	205	204	214	207	178
WV	Urban Runoff	105	56	57	73	55	52
WV	Wastewater+CSO	1	1	1	2	2	2
WV	Forest+	72	70	70	113	70	140
WV	AllSources	445	332	331	402	334	373

- Loads meet trajectory targets.
- Loads don't meet trajectory targets but are within 5%.
- Loads don't meet trajectory targets by relatively large amount

DE Loads-Goals

		2009 Progress TOTN (M lbs/year)	2016 Progress TOTN (M lbs/year)	2017 Progress TOTN (M lbs/year)	2017 60% Target TOTN (M lbs/year)	2017 Milestone TOTN (M lbs/year)	2025 Target TOTN (M lbs/year)
Jurisdiction	Source						
DE	Agriculture	3.45	3.02	3.14	2.81	2.80	2.38
DE	Urban Runoff	0.39	0.43	0.43	0.36	0.43	0.34
DE	Wastewater+CSO	0.14	0.04	0.05	0.19	0.03	0.22
DE	Septic	0.15	0.18	0.18	0.12	0.18	0.10
DE	Forest+	0.34	0.33	0.33	0.35	0.33	0.35
DE	AllSources	4.47	3.99	4.13	3.82	3.78	3.39
		2009 Progress TOTP (M lbs/year)	2016 Progress TOTP (M lbs/year)	2017 Progress TOTP (M lbs/year)	2017 60% Target TOTP (M lbs/year)	2017 Milestone TOTP (M lbs/year)	2025 Target TOTP (M lbs/year)
Jurisdiction	Source						
DE	Agriculture	0.311	0.234	0.236	0.268	0.225	0.239
DE	Urban Runoff	0.021	0.020	0.020	0.019	0.020	0.018
DE	Wastewater+CSO	0.006	0.006	0.008	0.009	0.005	0.011
DE	Forest+	0.008	0.008	0.008	0.008	0.008	0.008
DE	AllSources	0.345	0.267	0.272	0.304	0.259	0.277
		2009 Progress TSS (M lbs/year)	2016 Progress TSS (M lbs/year)	2017 Progress TSS (M lbs/year)	2017 60% Target TSS (M lbs/year)	2017 Milestone TSS (M lbs/year)	2025 Target TSS (M lbs/year)
Jurisdiction	Source						
DE	Agriculture	64	48	51	65	43	65
DE	Urban Runoff	29	27	27	28	30	27
DE	Wastewater+CSO	0	0	0	1	0	1
DE	Forest+	6	6	6	6	6	6
DE	AllSources	99	80	83	99	79	100

- Loads meet trajectory targets.
- Loads don't meet trajectory targets but are within 5%.
- Loads don't meet trajectory targets by relatively large amount

DC Loads-Goals

		2009	2016	2017	2017	2017	2025
		Progress	Progress	Progress	60% Target	Milestone	Target
		TOTN	TOTN	TOTN	TOTN	TOTN	TOTN
Jurisdiction	Source	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)
DC	Agriculture	0	0	0	0	0	0
DC	Urban Runoff	0.204	0.202	0.203	0.188	0.199	0.178
DC	Wastewater+CSO	2.660	1.208	1.360	2.363	1.285	2.165
DC	Septic	0	0	0	0	0	0
DC	Forest+	0.013	0.013	0.013	0.024	0.013	0.031
DC	AllSources	2.877	1.422	1.575	2.575	1.496	2.373
		2009	2016	2017	2017	2017	2025
		Progress	Progress	Progress	60% Target	Milestone	Target
		TOTP	TOTP	TOTP	TOTP	TOTP	TOTP
Jurisdiction	Source	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)
DC	Agriculture	0	0	0	0	0	0
DC	Urban Runoff	0.0166	0.0145	0.0146	0.0144	0.0135	0.0129
DC	Wastewater+CSO	0.0541	0.0549	0.0592	0.0854	0.0482	0.1062
DC	Forest+	0.0004	0.0004	0.0004	0.0007	0.0004	0.0009
DC	AllSources	0.0711	0.0698	0.0742	0.1004	0.0621	0.1200
		2009	2016	2017	2017	2017	2025
		Progress	Progress	Progress	60% Target	Milestone	Target
		TSS	TSS	TSS	TSS	TSS	TSS
Jurisdiction	Source	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)
DC	Agriculture	0	0	0	0	0	0
DC	Urban Runoff	13.3	12.7	12.8	12.0	12.2	11.1
DC	Wastewater+CSO	3.2	2.8	2.8	4.0	3.0	4.5
DC	Forest+	0.5	0.4	0.4	1.2	0.4	1.8
DC	AllSources	16.9	16.0	16.0	17.2	15.5	17.4

- Loads meet trajectory targets.
- Loads don't meet trajectory targets but are within 5%.
- Loads don't meet trajectory targets by relatively large amount

NY Loads-Goals

		2009	2016	2017	2017	2017	2025
		Progress	Progress	Progress	60% Target	Milestone	Target
		TOTN	TOTN	TOTN	TOTN	TOTN	TOTN
Jurisdiction	Source	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)
NY	Agriculture	4.54	4.39	4.20	3.64	4.32	3.04
NY	Urban Runoff	1.24	1.26	1.26	1.18	1.27	1.14
NY	Wastewater+CSO	1.49	1.71	1.85	1.31	1.99	1.19
NY	Septic	0.32	0.36	0.35	0.32	0.35	0.32
NY	Forest+	3.13	3.21	3.22	3.15	3.22	3.16
NY	AllSources	10.72	10.93	10.88	9.60	11.15	8.85
		2009	2016	2017	2017	2017	2025
		Progress	Progress	Progress	60% Target	Milestone	Target
		TOTP	TOTP	TOTP	TOTP	TOTP	TOTP
Jurisdiction	Source	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)
NY	Agriculture	0.527	0.422	0.405	0.429	0.422	0.364
NY	Urban Runoff	0.122	0.108	0.108	0.107	0.108	0.098
NY	Wastewater+CSO	0.190	0.102	0.117	0.115	0.126	0.065
NY	Forest+	0.117	0.118	0.118	0.116	0.118	0.116
NY	AllSources	0.956	0.749	0.748	0.768	0.774	0.643
		2009	2016	2017	2017	2017	2025
		Progress	Progress	Progress	60% Target	Milestone	Target
		TSS	TSS	TSS	TSS	TSS	TSS
Jurisdiction	Source	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)	(M lbs/year)
NY	Agriculture	132	128	124	113	127	100
NY	Urban Runoff	100	97	97	112	96	119
NY	Wastewater+CSO	3	3	3	2	5	2
NY	Forest+	97	98	98	88	98	82
NY	AllSources	332	325	322	315	326	304

- Loads meet trajectory targets.
- Loads don't meet trajectory targets but are within 5%.
- Loads don't meet trajectory targets by relatively large amount



2017 Progress EPA Evaluations

- EPA is currently conducting evaluations
 - Numeric 60% Goal
 - Loads
 - Reported BMP implementation
 - Loading trends from non-tidal monitoring network
 - Programmatic
 - 2016/17 progress/accomplishments
 - 2018/19 Milestones
 - Were due 1/15/18
 - Includes federal agencies



2017 Progress EPA Evaluations

- Early April, 2018: Evaluations will be shared with jurisdictions individually
- Through late April, 2018:
 - Jurisdictions have opportunity to update 2016/17 programmatic information and 2018/19 programmatic Milestone commitments based on EPA feedback