



Federal Facility Reported BMPs and Loads

Phase 6 Watershed Model

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Federal Facilities Workgroup Meeting
February 13, 2018



Federal Facility Reported BMP Implementation

Phase 6 Watershed Model



Federal Facility BMP Implementation

Phase 6 Watershed Model

- Reported implementation covers the period 1985 – 2017
- Federal partners reporting include:
 - DOD
 - ARS
 - FS
 - FWS
 - GSA
 - NASA
 - NPS
 - SI
 - Other Federal
- Watershed Implementation Plans will be developed for year 2025



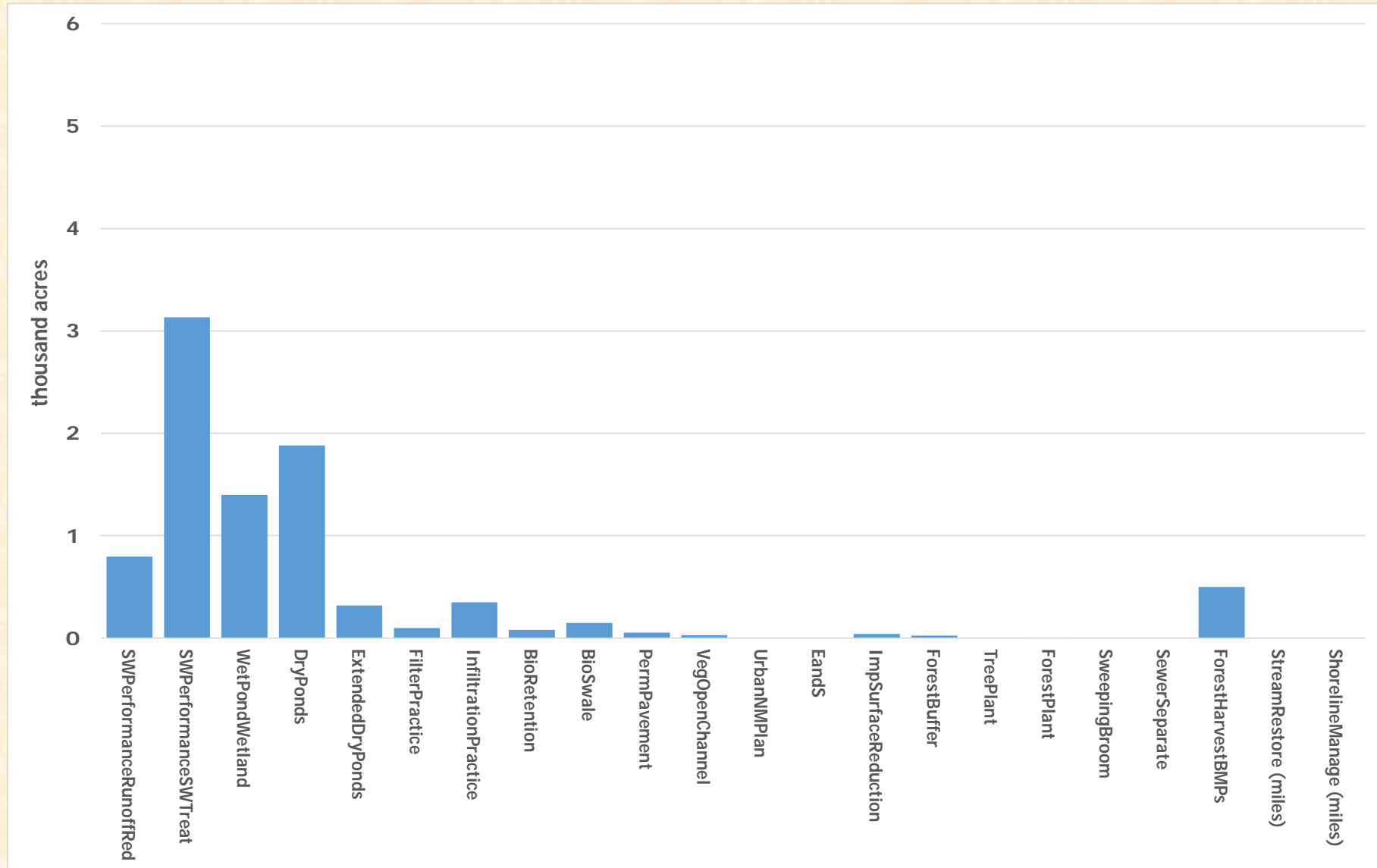
Federal Facility BMP Implementation

BMP Types Reported

BMP Name
Stormwater Performance Standard-Runoff Reduction
Stormwater Performance Standard-Stormwater Treatment
Wet Ponds and Wetlands
Dry Detention Ponds and Hydrodynamic Structures
Dry Extended Detention Ponds
Filtering Practices
Infiltration Practices, no underdrain
Bioretention/Raingardens, underdrain
Bioswale
Permeable Pavement
Vegetated Open Channels, no underdrain
Nutrient Management Plan
Erosion and Sediment Control Level 1
Impervious Surface Reduction
Forest Buffer
Tree Planting - Canopy
Forest Planting
Mechanical Broom Technology - 1 pass/4 weeks
Separation of stormwater and sewer systems
Forest Harvesting Practices
Urban Stream Restoration
Urban Shoreline Management

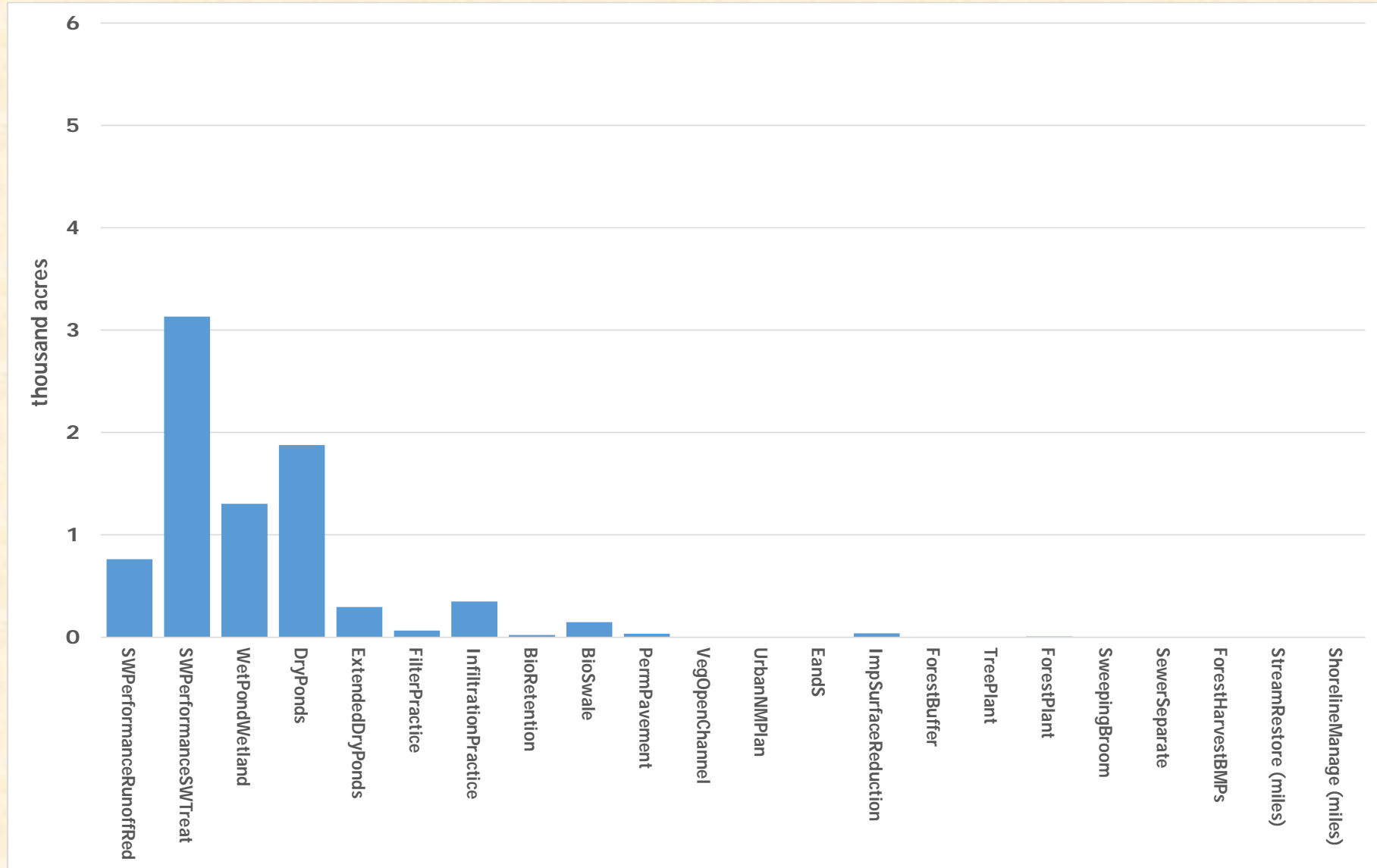


Federal Facility BMP Implementation 2009 – All Federal Partners



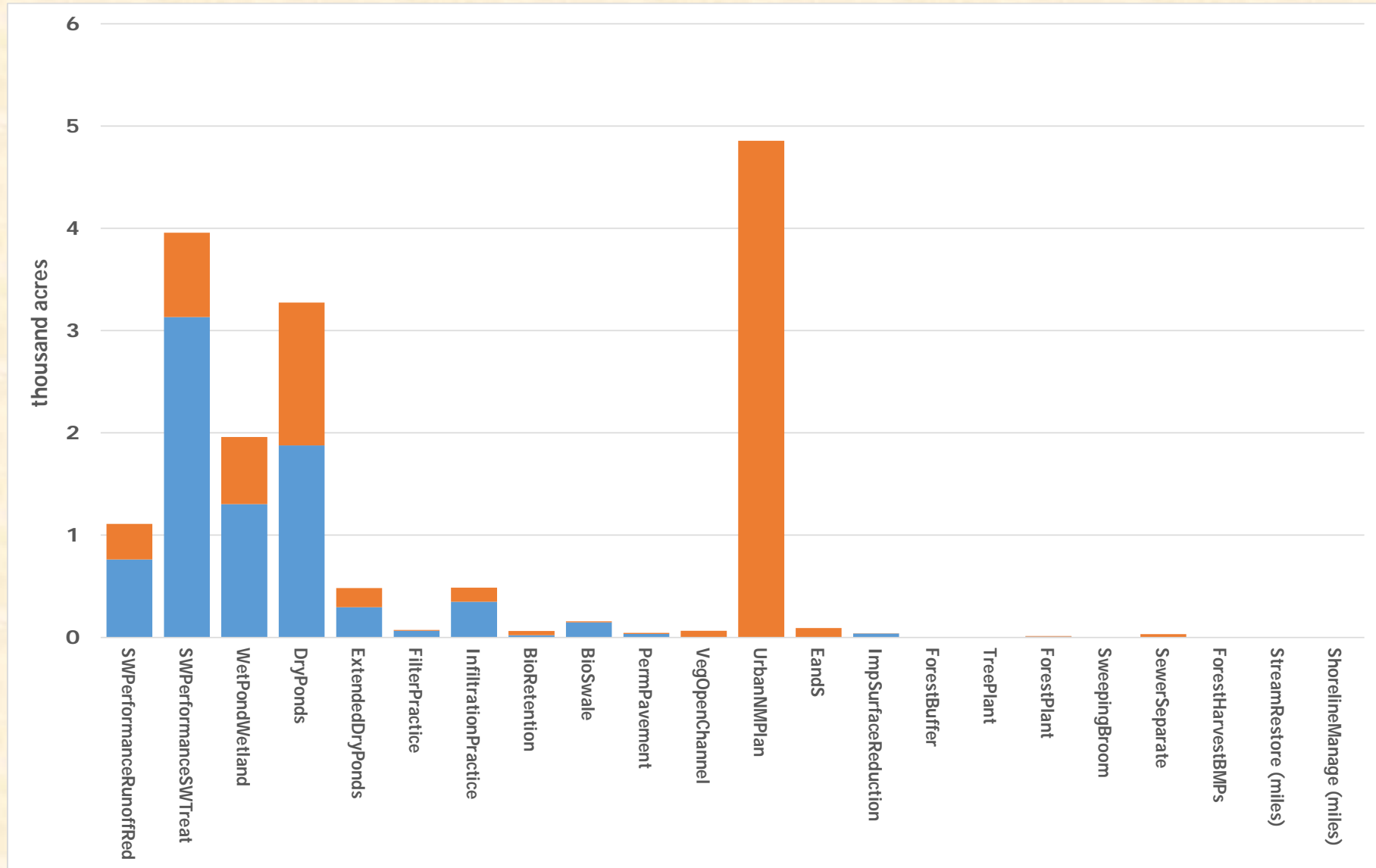


DOD BMP Implementation 2009



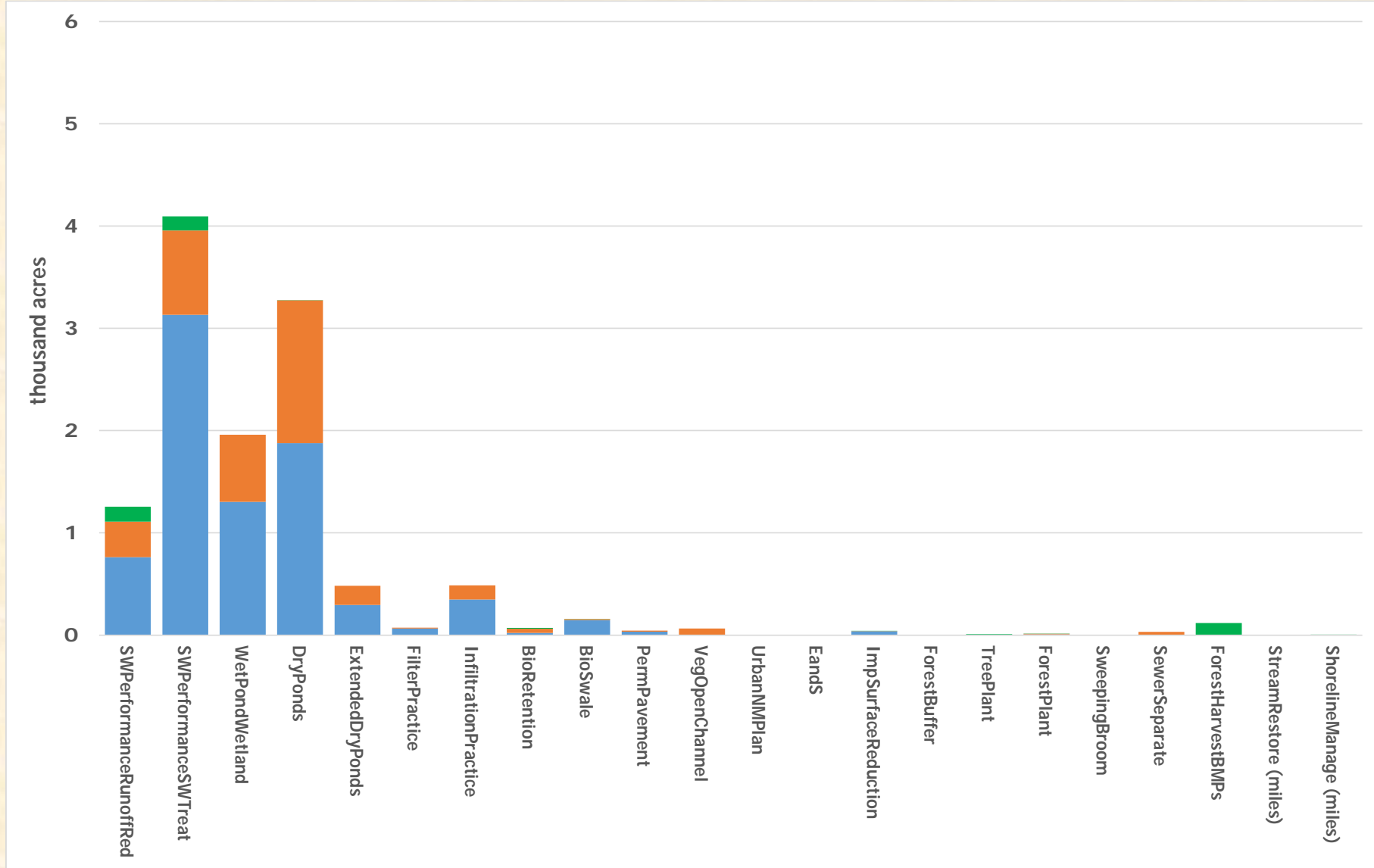


DOD BMP Implementation 2013



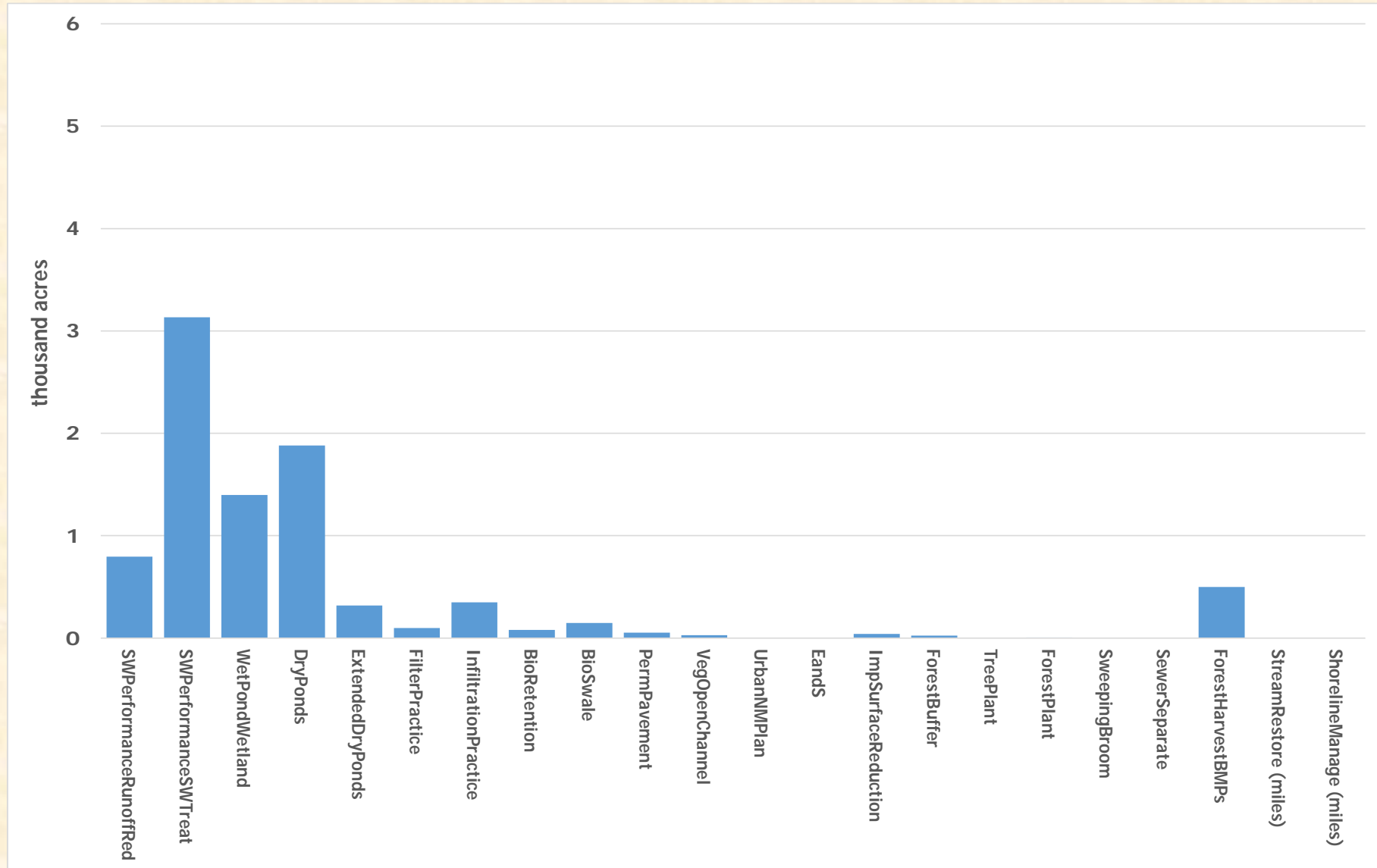


DOD BMP Implementation 2017



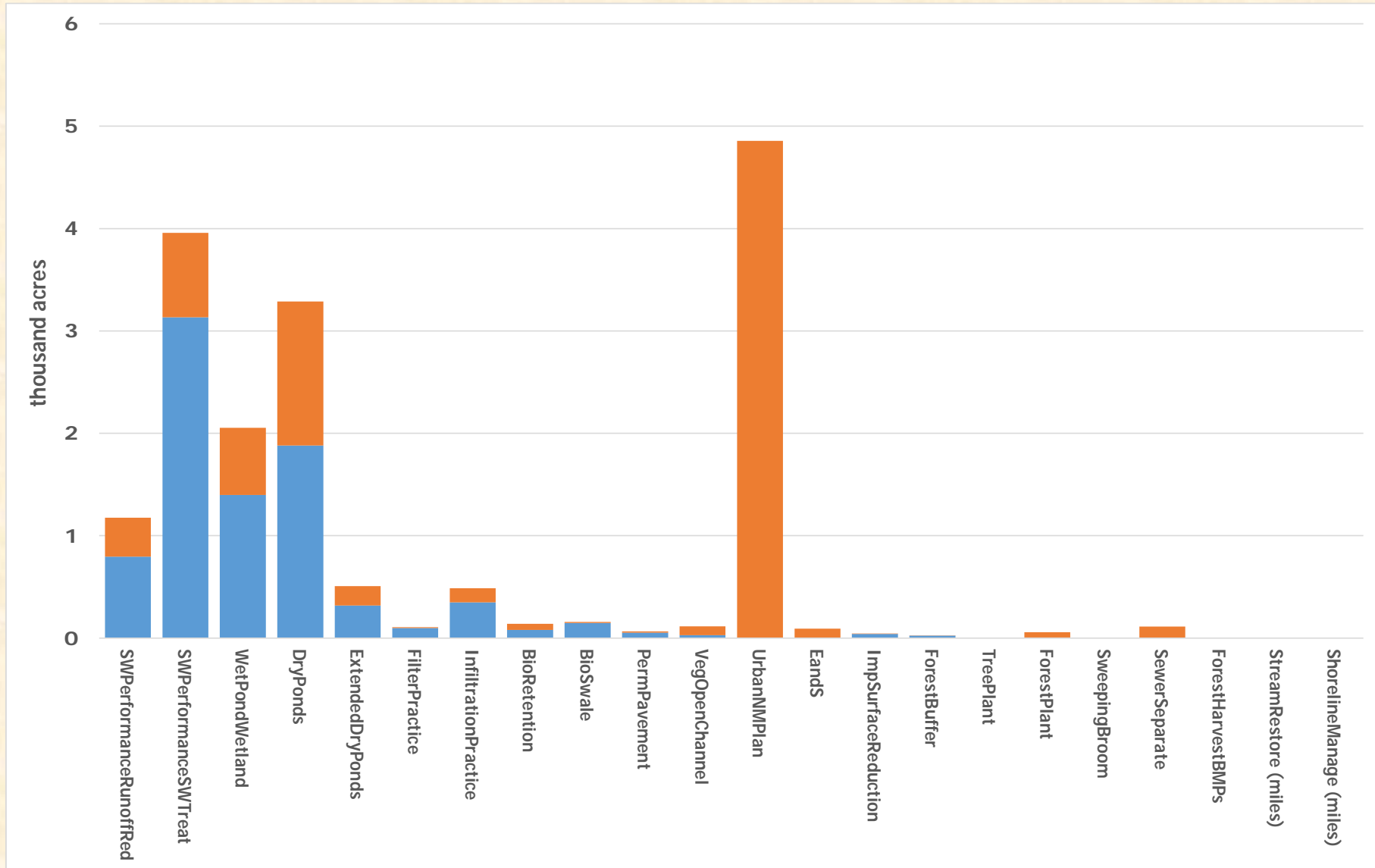


Federal Facility BMP Implementation 2009 – All Federal Partners



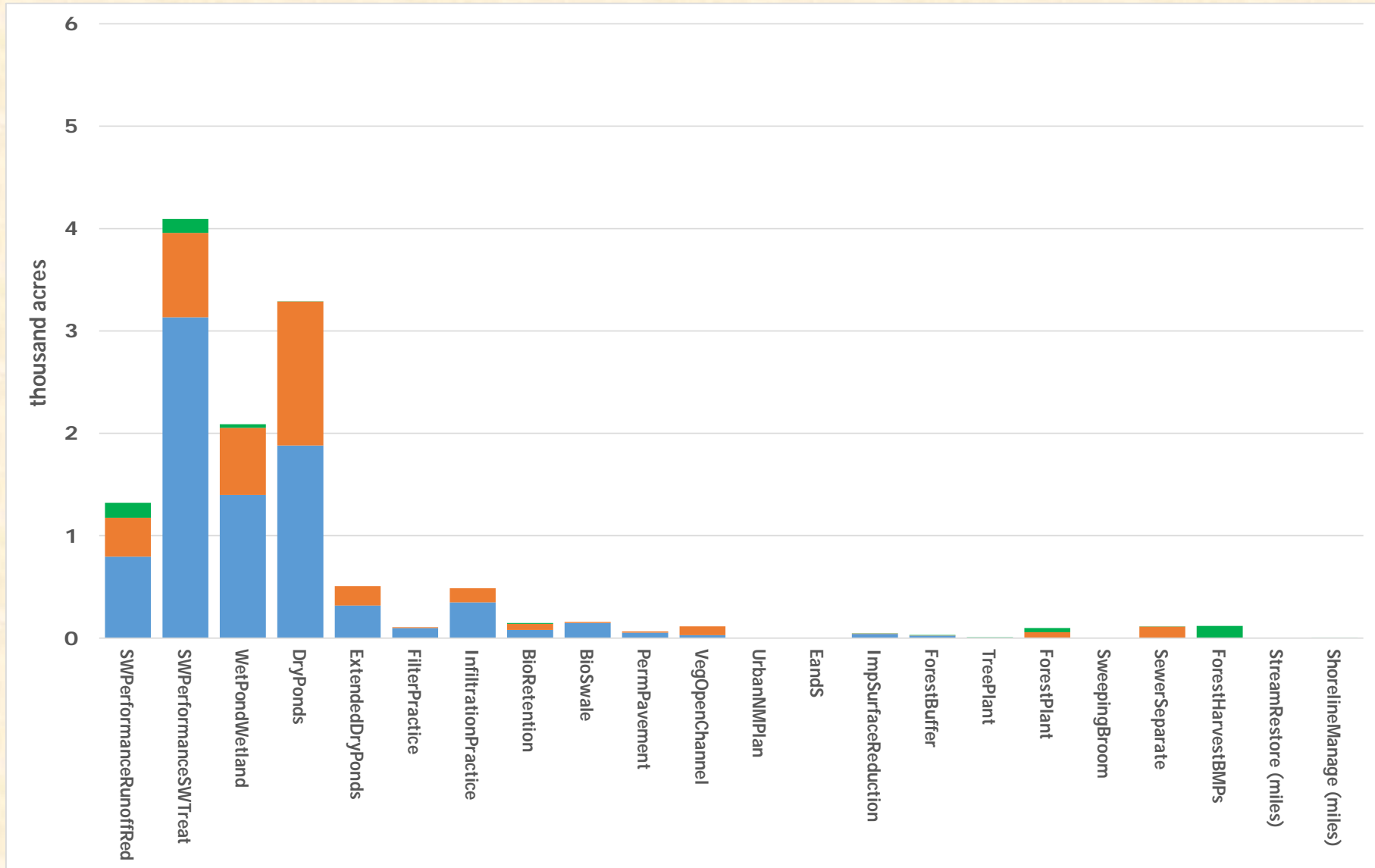


Federal Facility BMP Implementation 2013 – All Federal Partners





Federal Facility BMP Implementation 2017 – All Federal Partners





Federal Facility BMP Implementation 2009, 2013 and 2017 by Federal Partner

	2009	2013	2017	2009	2013	2017	2009	2013	2017	2009	2013	2017
	ARS	ARS	ARS	FWS	FWS	FWS	GSA	GSA	GSA	NASA	NASA	NASA
BMP	acres	acres	acres	acres	acres	acres	acres	acres	acres	acres	acres	acres
Stormwater Performance Standard-Runoff Reduction	0	0	0	0	0	0	8.878	20.237	0	0	2.85	0
Wet Ponds and Wetlands	0	0	0	0	0	0	28.61	23.87	58.75	40	50.89	50.89
Dry Detention Ponds and Hydrodynamic Structures	0	0	0	0	0	0	0	0	0	0	3.73	3.73
Dry Extended Detention Ponds	0	0	0	0	0	0	0	0	0	0	0	0
Filtering Practices	0	0	0	0	0	0	14.311	14.311	7.211	0	0	0
Infiltration Practices, no underdrain	0	0	0	0	0	0	0	0	0	0	0	0
Bioretention/Raingardens, underdrain	0	0	0	0	0	0	0	0	0	0	0	0
Bioswale	0	0	0	0	0	0	1.22	1.22	0	0	0	0
Permeable Pavement	0	0	0	0	0	0	0	0	0	0	1	0
Vegetated Open Channels, no underdrain	0	0	0	0	0	0	0	0	0	0	0	0
Impervious Surface Reduction	0	0	0	500	0	0	0	0	0	0	2.6	0
Forest Buffer	0	0	0	0	0	0	0	0	0	0	0	0
Forest Planting	0	0	0	0	0	0	0	0	0	0	0	0
Separation of stormwater and sewer systems	0	0.167	0.167	0	0	0	0.642	2.613	3.107	0	0	0
Forest Harvesting Practices	0	0	0	0	0	0	0	0	0	0	0	0
Urban Stream Restoration (feet)	0	0	0	0	0	0	0	0	0	0	0	0
Urban Shoreline Management (feet)	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL ACRES	0	0.167	0.167	500	0	0	53.661	62.251	69.068	40	61.07	54.62



Federal Facility BMP Implementation 2009, 2013 and 2017 by Federal Partner

	2009	2013	2017	2009	2013	2017	2009	2013	2017
	NPS	NPS	NPS	SI	SI	SI	FEDOTHER	FEDOTHER	FEDOTHER
BMP	acres	acres	acres	acres	acres	acres	acres	acres	acres
Stormwater Performance Standard-Runoff Reduction	16.337	35.099	0	0.141	0.662	0	6.788	6.672	0
Wet Ponds and Wetlands	0	0	0	0	0	0	24.37	18	38.513
Dry Detention Ponds and Hydrodynamic Structures	4.95	6.81	0	0	0	0	0	3.5	11.9
Dry Extended Detention Ponds	23	23	0	0	0	0	0	0	0
Filtering Practices	1.945	2.871	2.967	0	0	0	16.918	15.455	12.431
Infiltration Practices, no underdrain	3	3.203	3.203	0	0	0	0	0	0
Bioretention/Raingardens, underdrain	0.054	0.054	0.054	0	0	0	0.286	0.286	0.286
Bioswale	0	0	0	0	0	0	0	0	0
Permeable Pavement	19.6	19.6	0	0	0	0	0	0	0
Vegetated Open Channels, no underdrain	26.63	47.492	24.492	0	0	0	1.16	2.36	4.56
Impervious Surface Reduction	0.74	0.74	0	0	0	0	1.27	1.27	0
Forest Buffer	0	0.68	0	0	0	0	24.37	24.77	26.45
Forest Planting	0	1.305	0	0	0	0	0	42.22	96.57
Separation of stormwater and sewer systems	0	25.425	25.425	0	49.104	49.104	0	2.391	2.391
Forest Harvesting Practices	0	0	0	0	0	0	0	0	0
Urban Stream Restoration (feet)	0	0	0	0	0	0	290	290	1290
Urban Shoreline Management (feet)	0	1162	0	0	0	0	0	0	0
TOTAL ACRES	96.256	166.279	56.141	0.141	49.766	49.104	75.162	116.924	193.101



Federal Facility Area in the Chesapeake Bay Watershed

Phase 6 Watershed Model



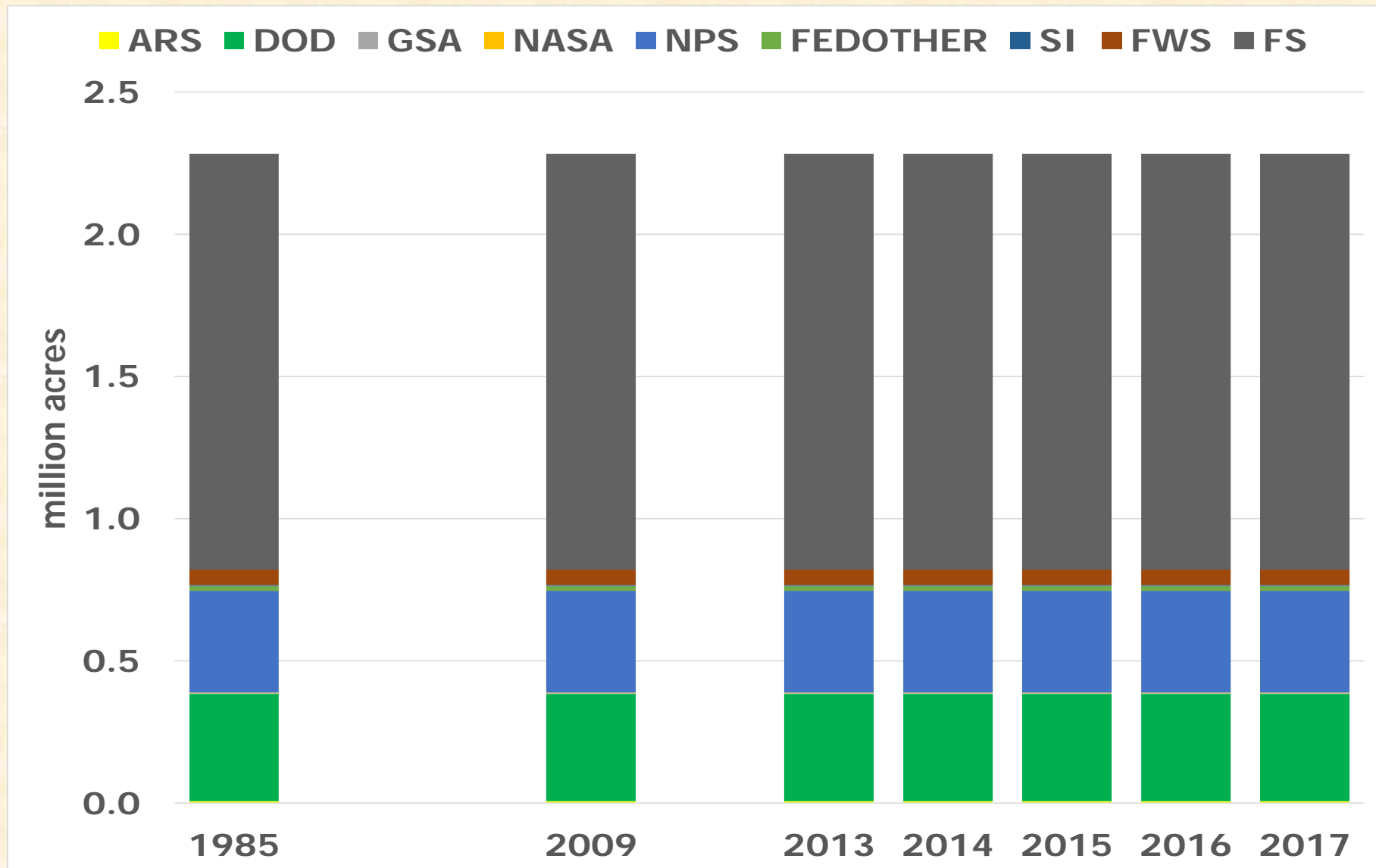
Federal Facility Area Phase 6 Watershed Model

- Federal Facilities cover about 5.6% of the Chesapeake Bay watershed area.
 - DOD facilities cover about 0.9% of the CBW area.



Federal Facility Acres

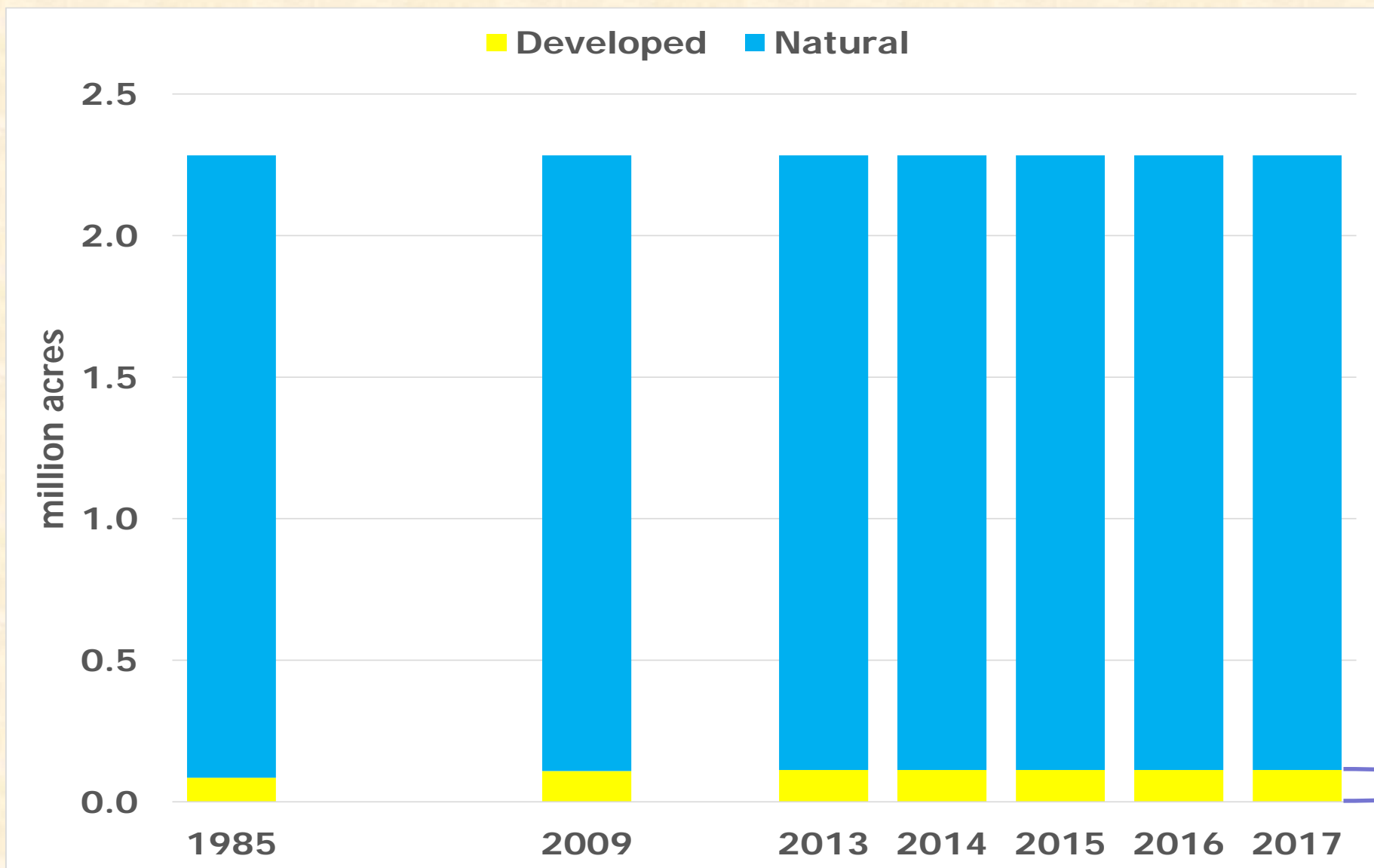
CB Watershed-Wide – by Federal Partner





Federal Facility Acres

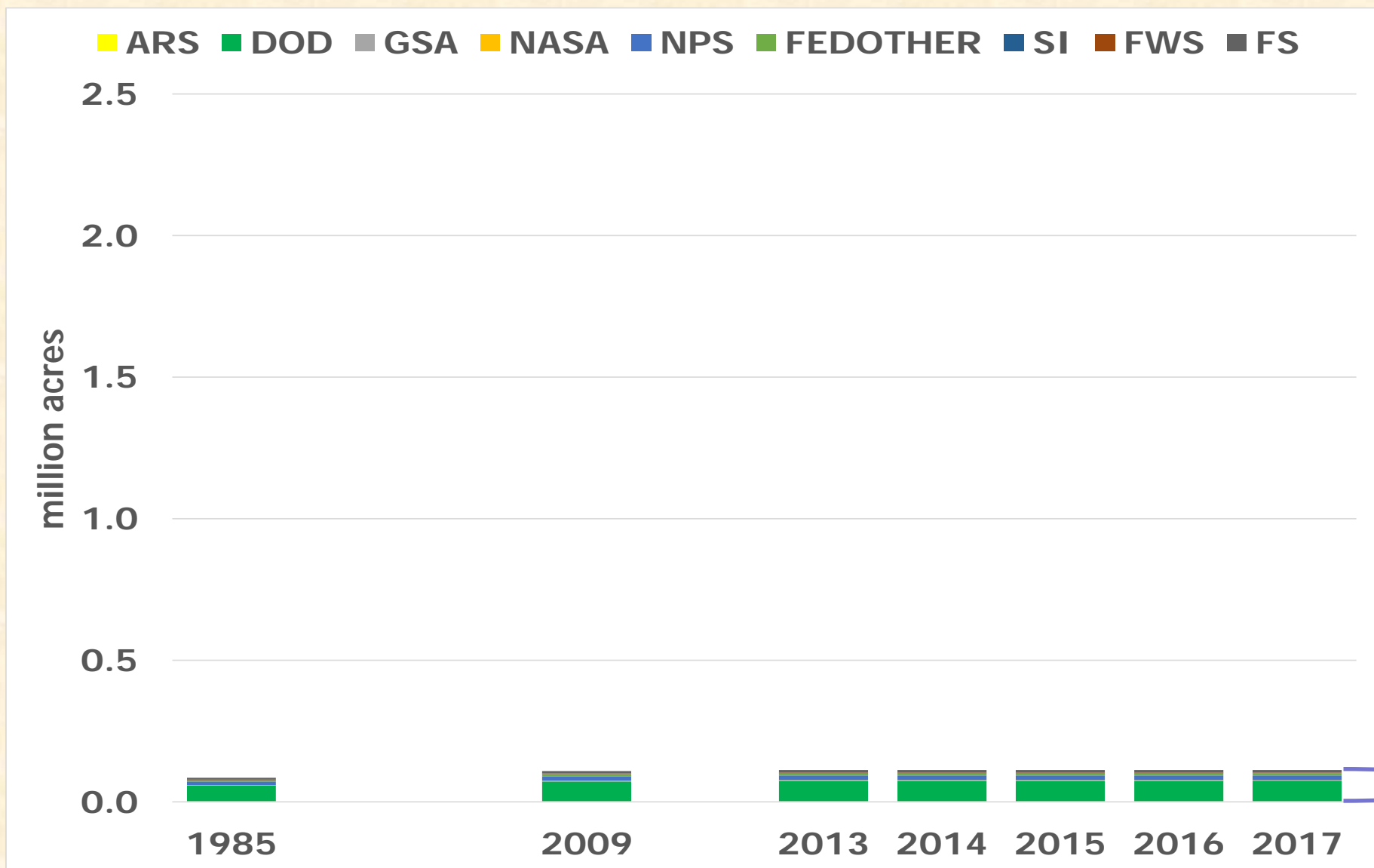
CB Watershed-Wide – by Source Type





Federal Facility Acres

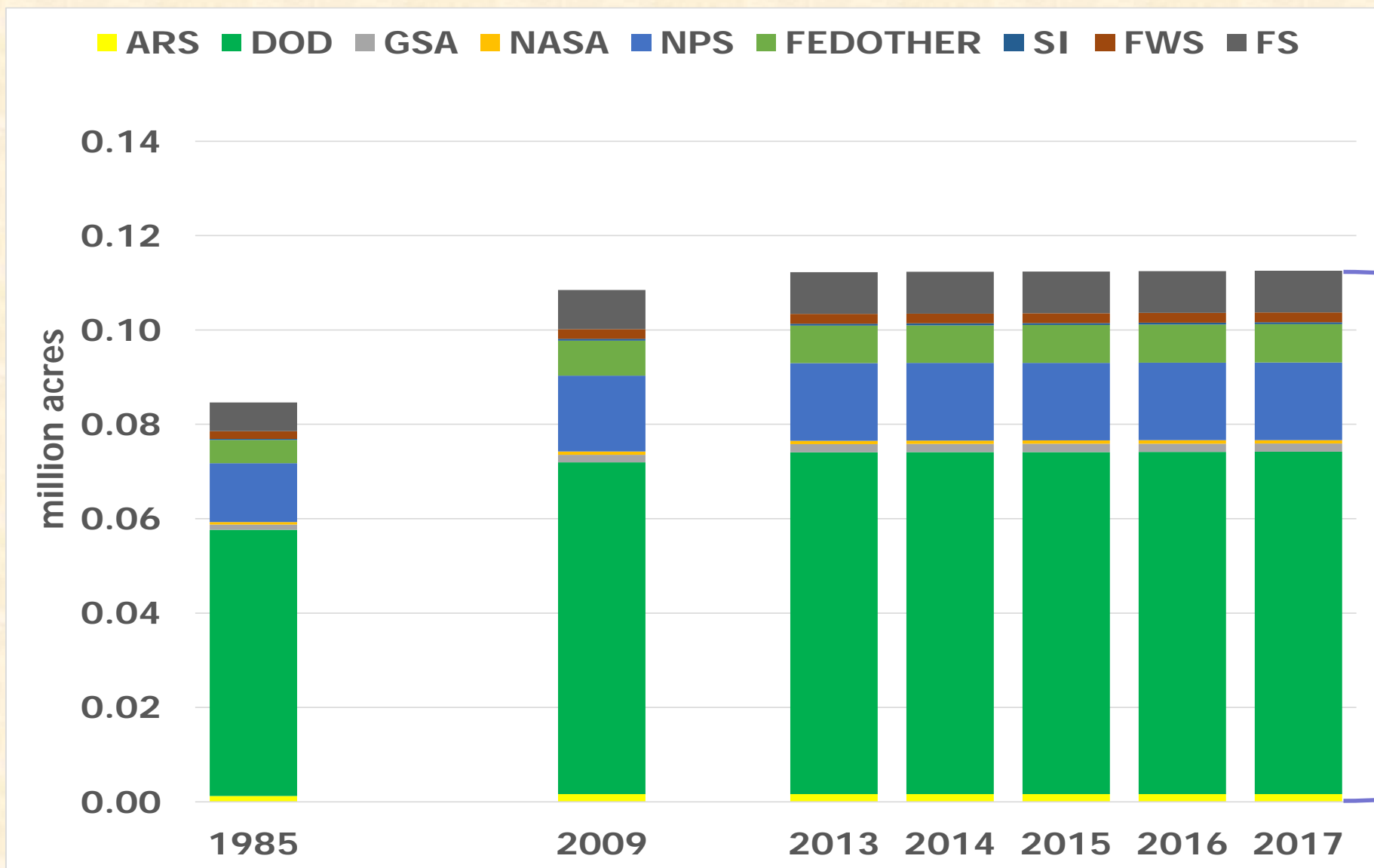
Developed Lands – by Federal Partner





Federal Facility Acres

Developed Lands – by Federal Partner





Federal Facility Nitrogen Loads to the Bay

Phase 6 Watershed Model



Federal Facility Nitrogen Loads to the Bay

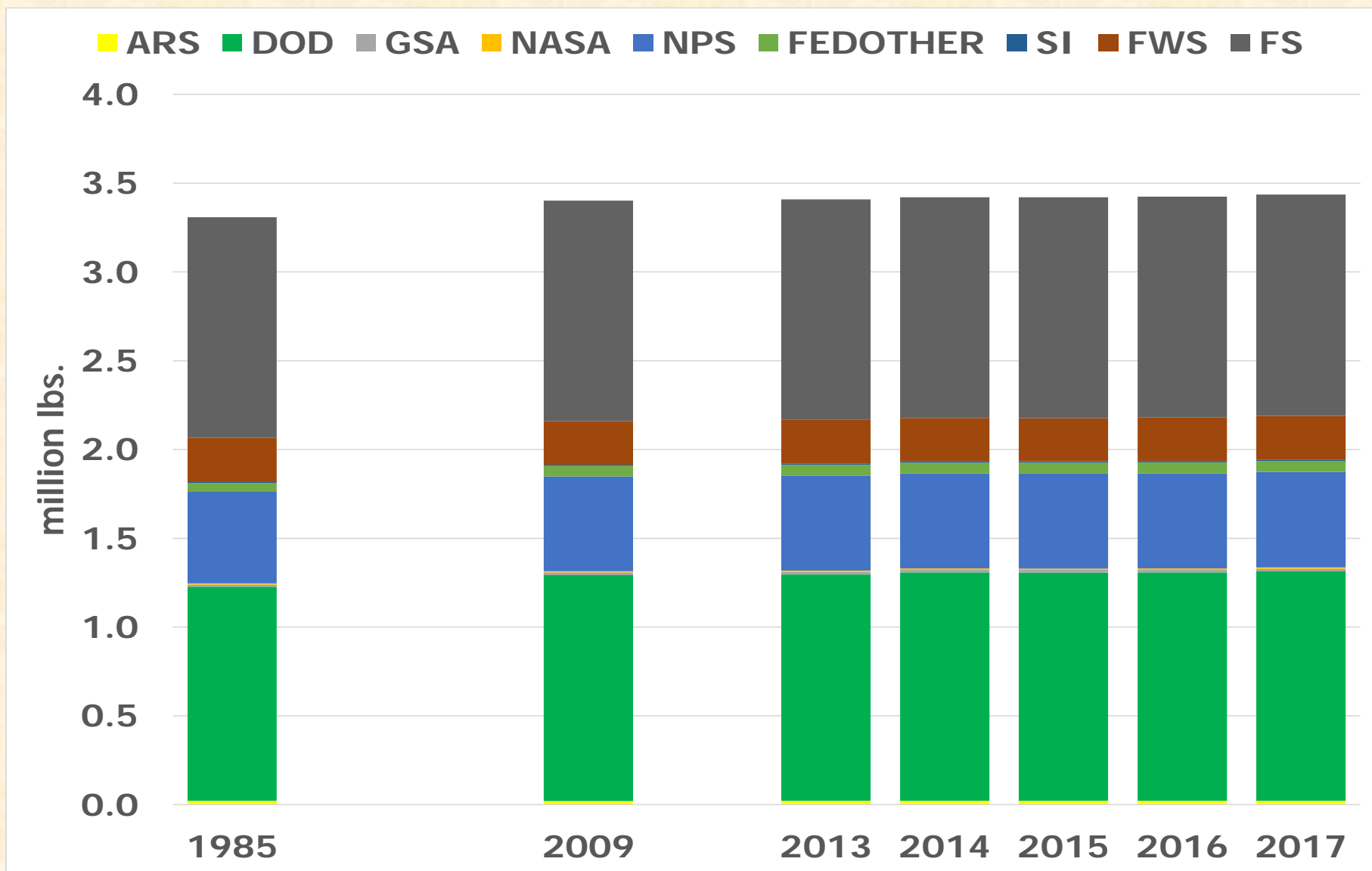
Phase 6 Watershed Model

- The nitrogen load from Federal Facilities is estimated to be about 1.4% of the total nitrogen load to the Chesapeake Bay.
 - The nitrogen load from DOD facilities is estimated to be about 0.5% of the total nitrogen load to the Bay.
 - Focus is on stormwater management in the developed/urban sector



Federal Facility Nitrogen Loads to the Bay

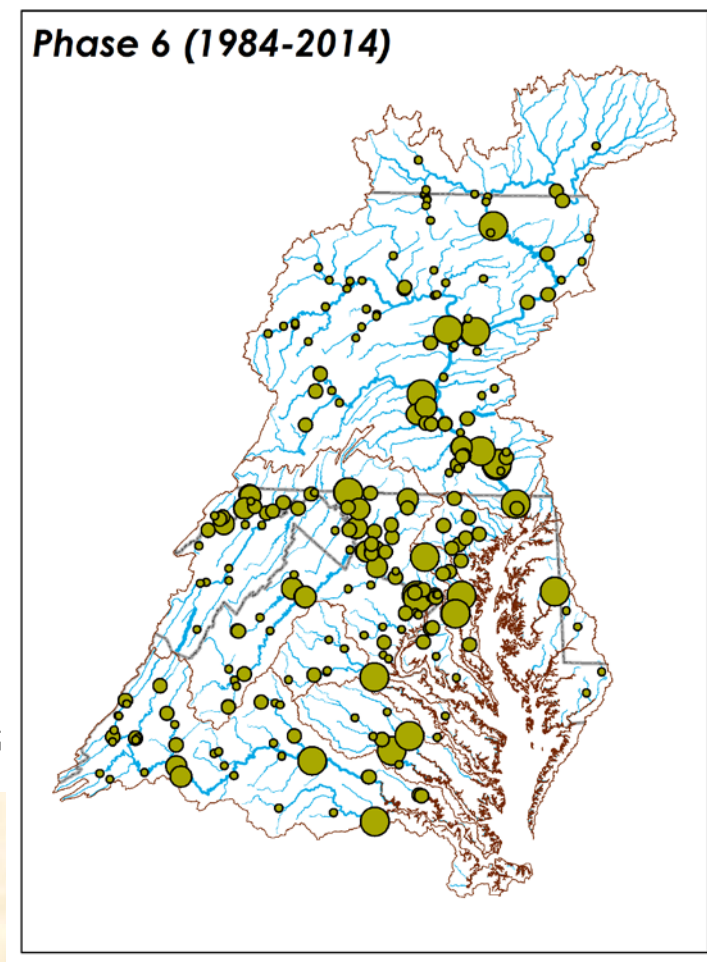
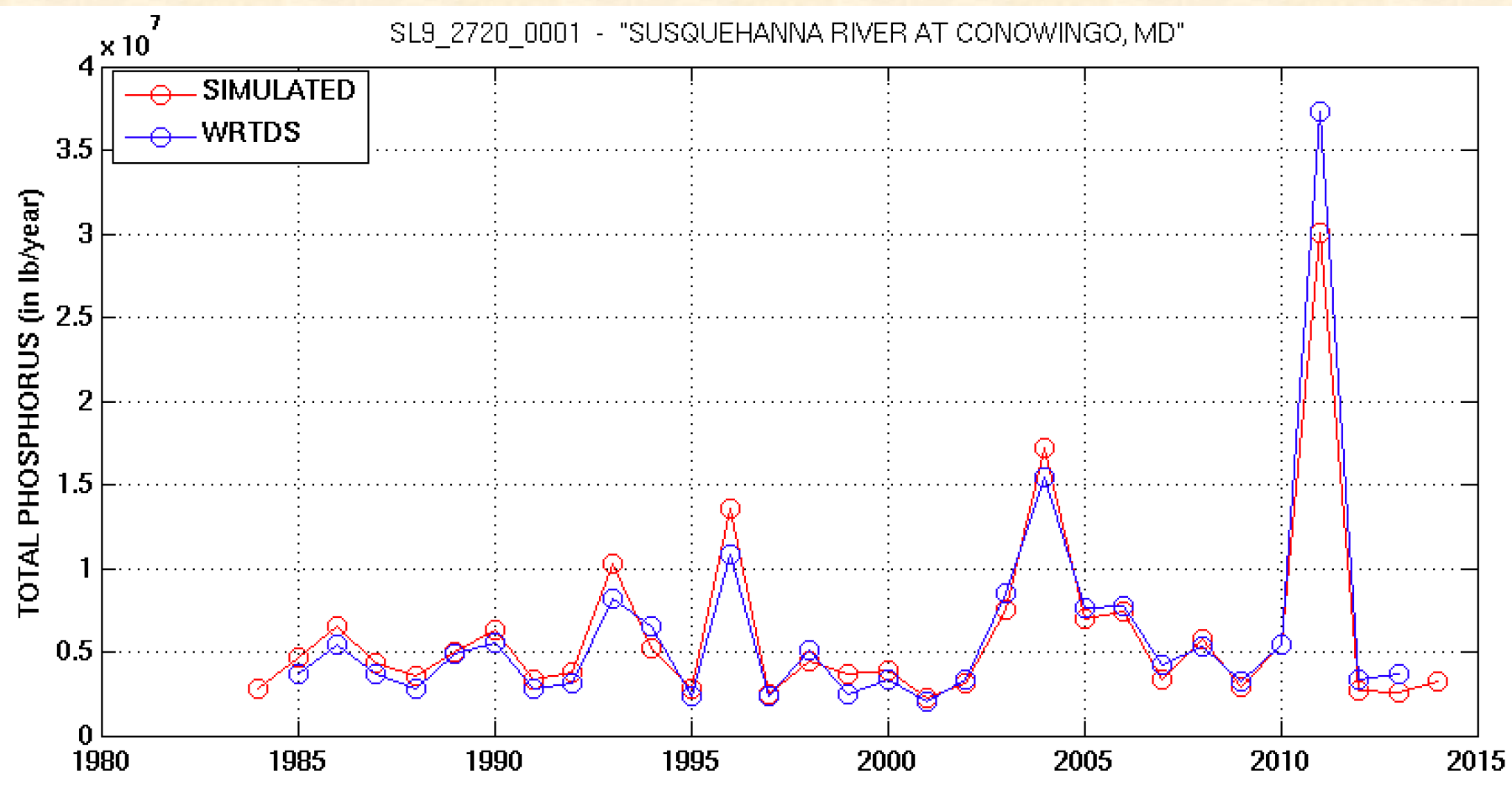
All Sources – by Federal Partner





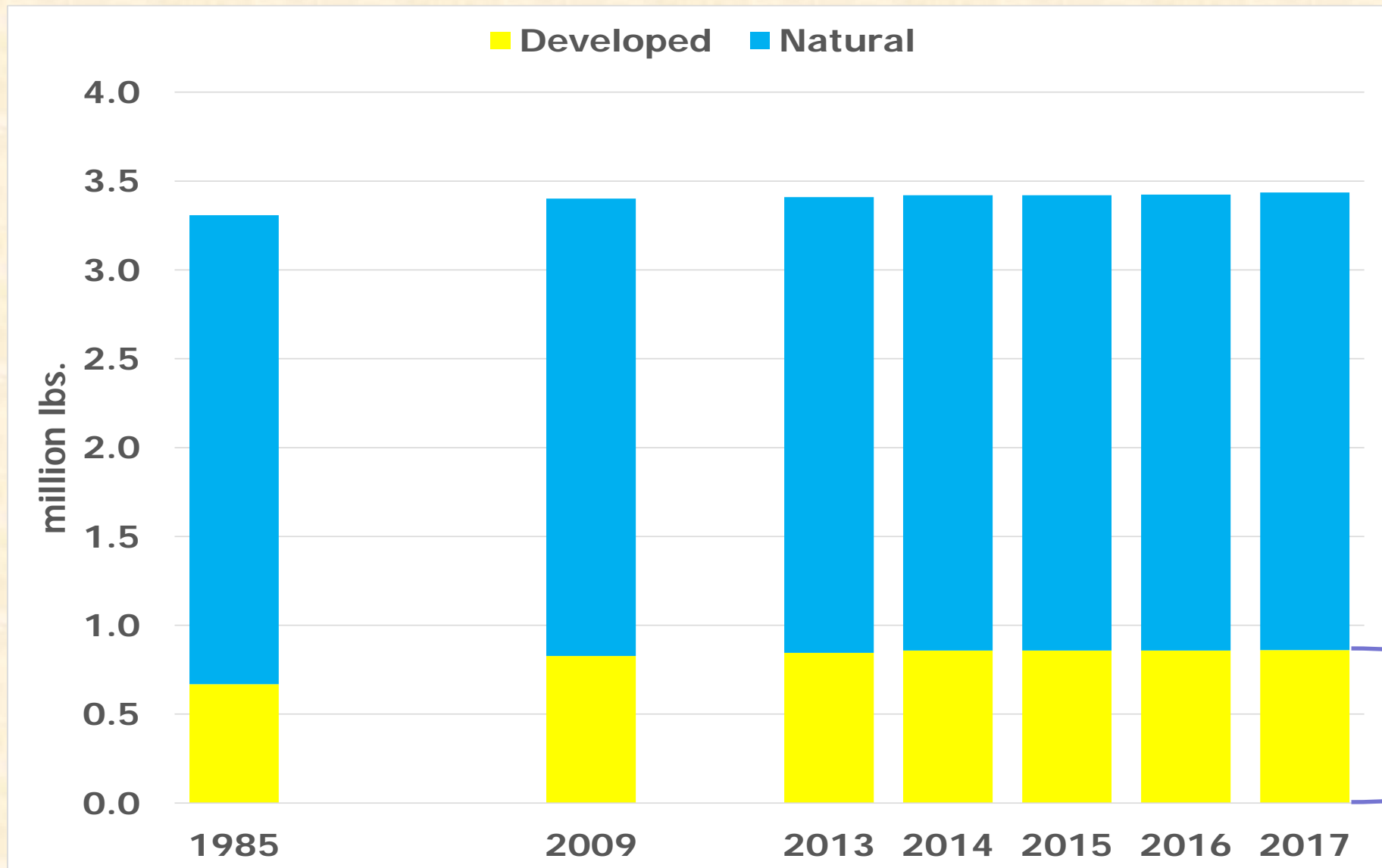
Annualized Loads

Modeled Loads Versus Monitored Loads



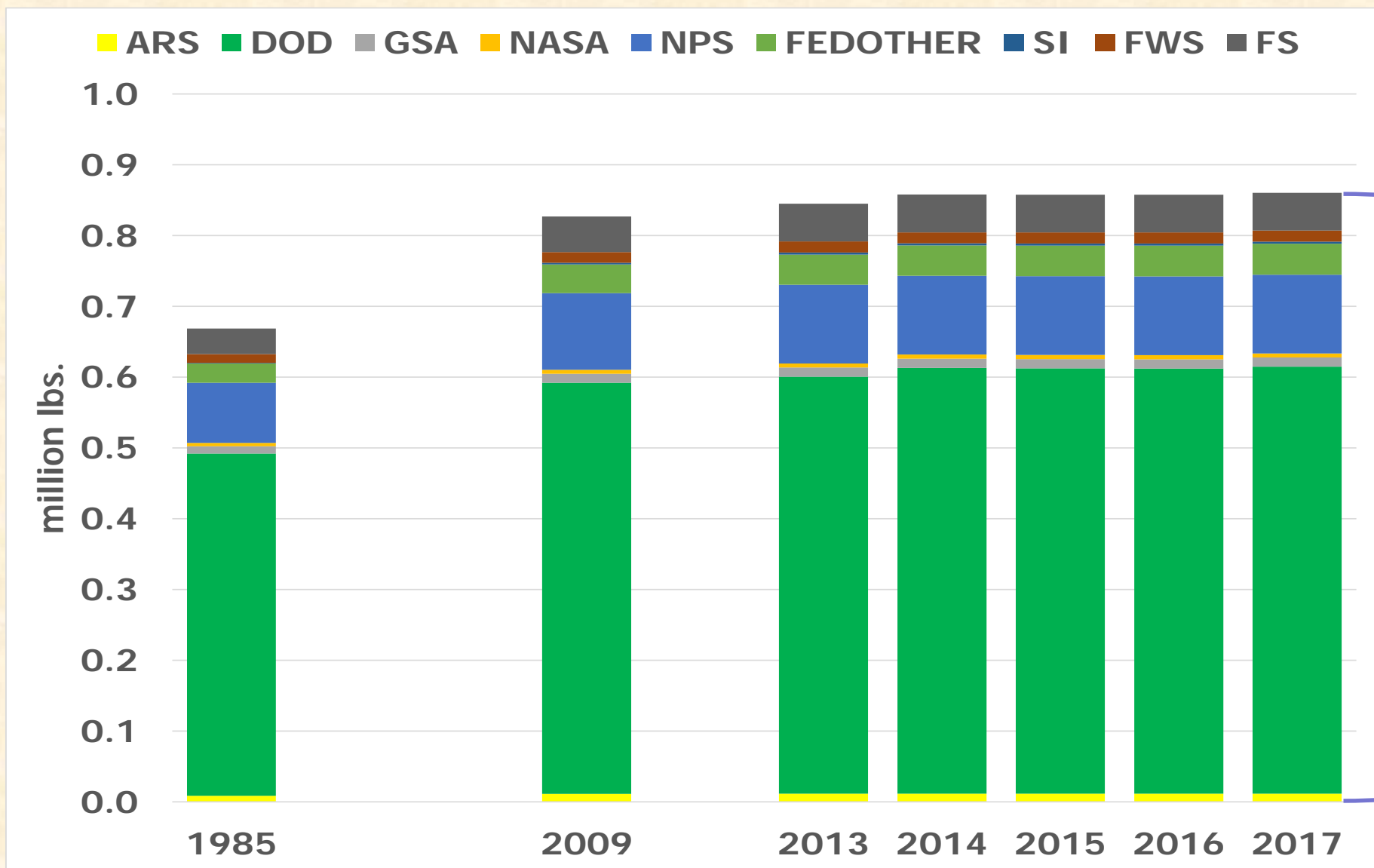


Federal Facility Nitrogen Loads to the Bay By Source Type – All Federal Partners





Federal Facility Nitrogen Loads to the Bay From Developed Lands – by Federal Partner





Federal Facility Phosphorus Loads to the Bay

Phase 6 Watershed Model



Federal Facility Phosphorus Loads to the Bay

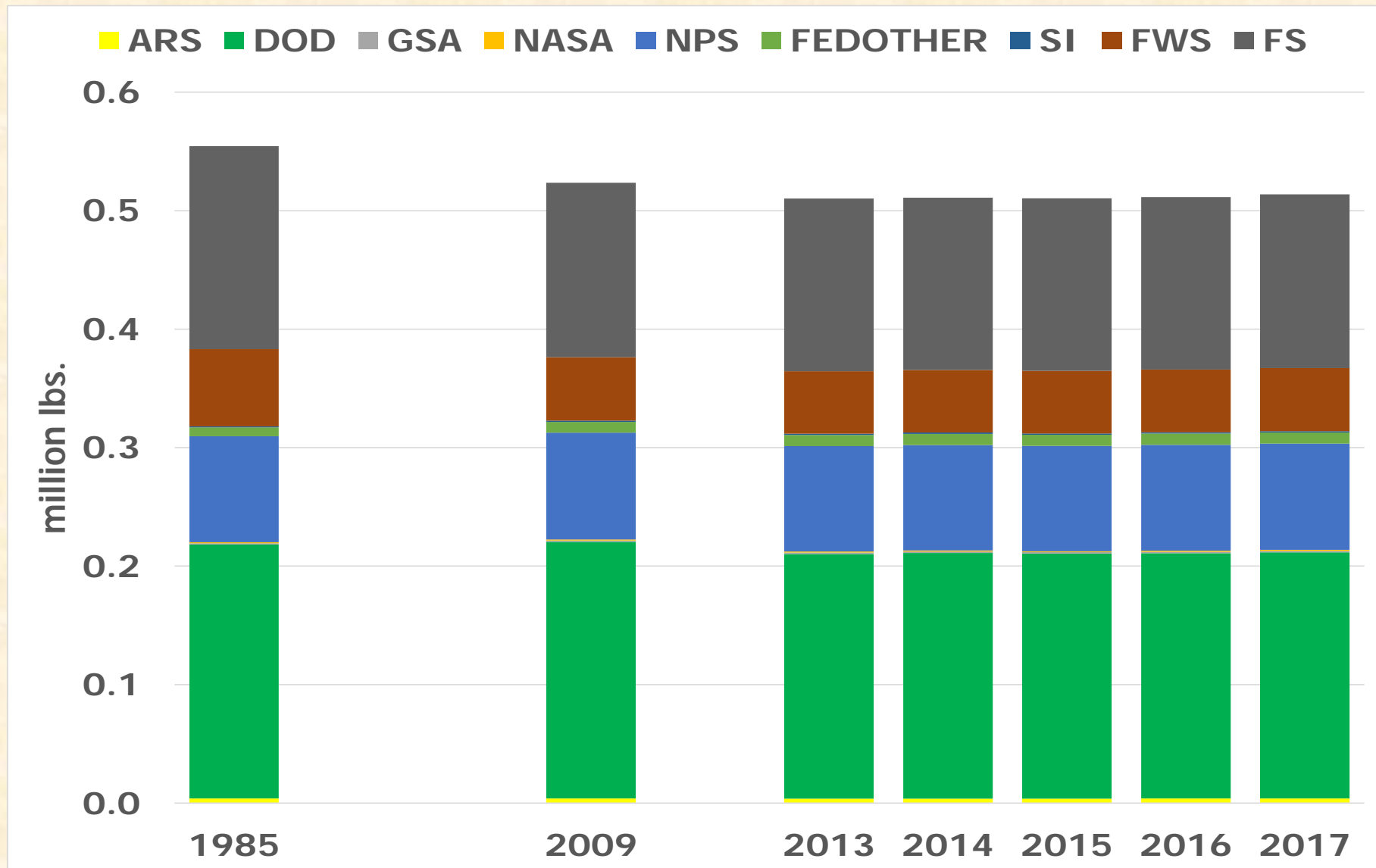
Phase 6 Watershed Model

- The phosphorus load from Federal Facilities is estimated to be about 3.4% of the total phosphorus load to the Chesapeake Bay.
 - The phosphorus load from DOD facilities is estimated to be about 1.4% of the total phosphorus load to the Bay.
 - Focus is on stormwater management in the developed/urban sector, not just for nutrients but sediment



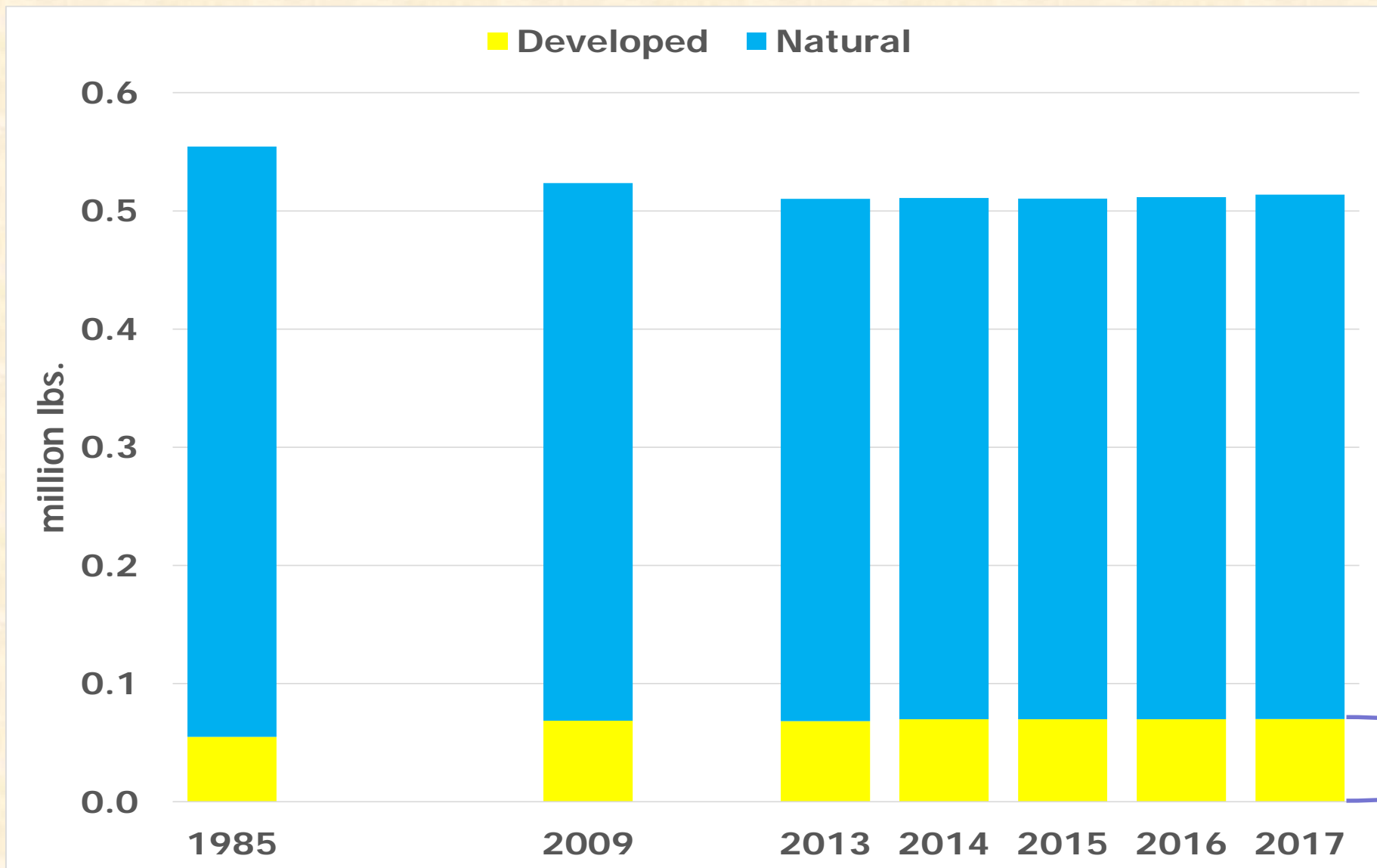
Federal Facility Phosphorus Loads to the Bay

All Sources – by Federal Partner



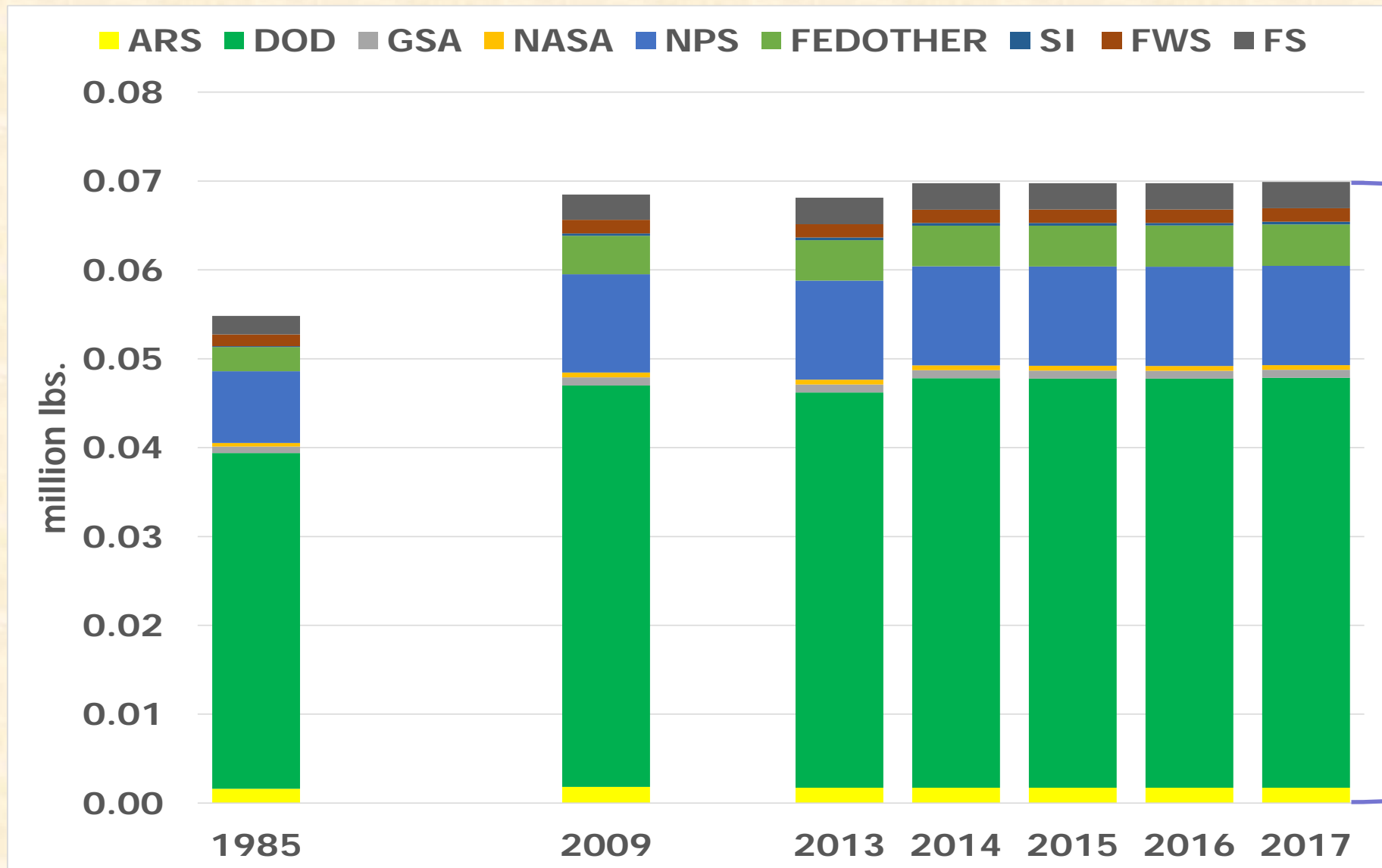


Federal Facility Phosphorus Loads to the Bay By Source Type – All Federal Partners





Federal Facility Phosphorus Loads to the Bay From Developed Lands – by Federal Partner





Federal Facility Loads to the Bay

Phase 6 Watershed Model

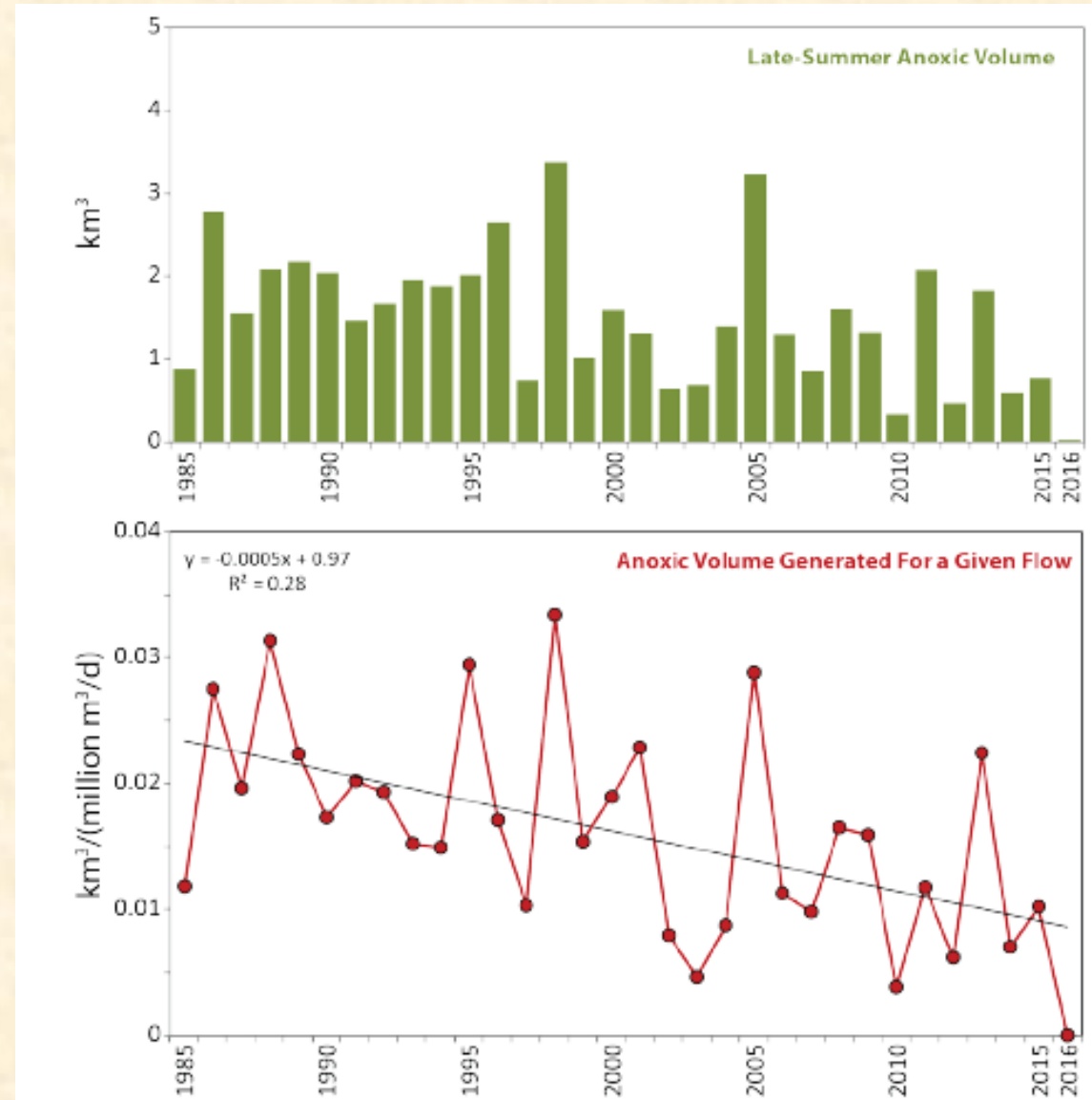
- Loads from Federal Facilities have increased through time because of growth of the developed sector – as with all urban areas in the CB watershed.
- In order to achieve a net reduction in loads, focus on effective performance standards on new development, retrofits of existing development, and conservation of forests and wetlands.



Loads to the Bay

Progress toward attaining Water Quality Standards

Reductions in loads of excess nutrients from other sectors (wastewater, atmospheric deposition, agriculture) have led to a decrease in size of the Chesapeake Bay's summertime dead zone.





Federal Facility BMP Reporting

Phase 5 Watershed Model

- For the Phase 5 2016 Progress model scenario, federal BMP data was successfully reported to the CBP office through NEIEN by at least 4 jurisdictions = MD, VA, DC, and WV.
- Can specify agency with the Phase 5 model only if state has it as part of their unique identifiers.
- There COULD be other federal BMP information, but is not being identified by state agencies through the NEIEN reporting tool. This was remedied with the Phase 6 models.