

## Maryland Phase II WIP Strategies

### CAROLINE Agriculture - Annual Practices

		2010 Progress	2017 Interim Strategy	2025 Final Strategy
BMP Name	Unit			
Conservation Tillage	Acres/Year	50,348	88,766	88,764
Cover Crop	Acres/Year	14,760	39,332	39,998
Cropland Irrigation Management	Acres/Year	0	31,999	31,999
Dairy Manure Incorporation	Acres/Year	0	5,525	9,208
Nutrient Management (All forms)	Acres/Year	77,876	100,832	103,903
Poultry Litter Incorporation	Acres/Year	0	30,005	50,001
Soil Conservation and Water Quality Plans	Acres/Year	57,658	72,864	81,300

- The BMP values are the amount credited in the Bay watershed model. It is the amount of BMP submitted minus the amount not given credit for (e.g., due to overlapping with other BMPs)

### CAROLINE Agriculture - Additional BMPs

		2010 Progress	2017 Interim Strategy	2025 Final Strategy
BMP Name	Unit			
Barnyard Runoff Control	Acres	1	7	11
Forest Buffers	Acres	324	463	556
Grass Buffers / Vegetated Open Channel	Acres	5,206	5,230	5,245
Heavy Use Poultry Area Concrete Pads	Acres	0	16	27
Horse Pasture Management	Acres	0	120	200
Irrigation Water Capture Reuse	Acres	0	60	100
Land Retirement	Acres	146	380	545
Loafing Lot Management	Acres	0	1	1
Off Stream Watering Without Fencing	Acres	50	50	50
Precision Intensive Rotational Grazing	Acres	0	45	75
Prescribed Grazing	Acres	0	129	215
Sorbing Materials in Ag Ditches	Acres	0	294	490
Stream Access Control with Fencing	Acres	5	6	6
Tree Planting / Vegetative Environmental Buffers	Acres	740	790	823
Water Control Structures	Acres	156	1,502	2,502
Wetland Restoration	Acres	659	1,276	1,687

- The BMP values represent the total amount of implementation in place.
- The BMP values are the amount credited in the Bay watershed model. It is the amount of BMP submitted minus the amount not given credit for (e.g., due to overlapping with other BMPs)

Please note: The Agricultural BMP tables represent Land BMPs that can be shown as acres or feet and do not show those BMPs that are based on percentages such as Animal Waste Storage and Poultry Litter Treatment (Alum). Manure Transport is also not represented in these tables.

**CAROLINE  
Forest BMPs**

			<b>2010 Progress</b>	<b>2017 Interim Strategy</b>	<b>2025 Final Strategy</b>
<b>BMP Name</b>	<b>Zone</b>	<b>Unit</b>			
Forest Harvesting Practices	harvested forest	Acres	558	565	565

- The BMP values represent the total amount of implementation in place.
- The BMP values are the amount credited in the Bay watershed model. It is the amount of BMP submitted minus the amount not given credit for (e.g., due to overlapping with other BMPs)

## CAROLINE Developed Land BMPs

		2010 Progress	2017 Interim Strategy	2025 Final Strategy
BMP Name	Unit			
Dry Detention Ponds and Hydrodynamic Structures	Acres	19	19	18
Dry Extended Detention Ponds	Acres	49	46	46
Impervious Urban Surface Reduction	Acres	0	4	1,191
MS4 Permit Stormwater Retrofit	Acres	230	219	218
Stormwater Management Generic BMP (1985 to 2002)	Acres	3,019	2,880	2,859
Stormwater Management Generic BMP (2002 to 2010)	Acres	3,284	3,133	3,110
Urban Filtering Practices	Acres	14	22	9,431
Urban Forest Buffers	Acres	0	933	1,019
Urban Infiltration Practices	Acres	47	45	44
Wet Ponds and Wetlands	Acres	35	33	33
Erosion and Sediment Control on Construction	Acres/Year	370	370	461
Erosion and Sediment Control on Extractive	Acres/Year	0	0	233
Forest Conservation	Acres/Year	244	244	262
Urban Nutrient Management	Acres/Year	3,398	8,788	12,987

- The BMP values represent the total amount of implementation in place.
- The BMP values are the amount credited in the Bay watershed model. It is the amount of BMP submitted minus the amount not given credit for (e.g., due to overlapping with other BMPs)

## CAROLINE Septic System BMPs

			2010 Progress	2017 Interim Strategy	2025 Final Strategy
BMP Name	Zone	Unit			
Septic Denitrification	Critical Area	Systems	9	680	1,133
	Outside of the Critical Area, not within 1000 ft of a perennial stream	Systems	30	30	2,363
	Within 1000 ft of a perennial stream	Systems	21	21	2,557
	<b><i>Septic Denitrification Total</i></b>		<b>60</b>	<b>731</b>	<b>6,053</b>

- The BMP values represent the total amount of implementation in place.
- The BMP values are the amount credited in the Bay watershed model. It is the amount of BMP submitted minus the amount not given credit for (e.g., due to overlapping with other BMPs)

## Maryland Phase II WIP Strategies

### CAROLINE Total Nitrogen Loads

		2010 Progress	2017 Interim Strategy	2025 Final Strategy	Final Target
Source Sector	Landuse	Million Lbs/Yr	Million Lbs/Yr	Million Lbs/Yr	Million Lbs/Yr
Agriculture	AFO	0.013	0.014	0.013	0.013
	CAFO	0.057	0.061	0.060	0.060
	Crop	1.656	1.324	1.227	1.128
	Nursery	0.054	0.046	0.042	0.051
	Pasture	0.017	0.014	0.014	0.013
	<b>Subtotal</b>		<b>1.798</b>	<b>1.459</b>	<b>1.356</b>
Forest	Harvested	0.006	0.006	0.006	0.006
	Natural	0.103	0.108	0.109	0.102
	<b>Subtotal</b>	<b>0.109</b>	<b>0.114</b>	<b>0.115</b>	<b>0.108</b>
Non-Tidal Atm	Non-Tidal Atm	0.008	0.008	0.008	0.008
	<b>Subtotal</b>	<b>0.008</b>	<b>0.008</b>	<b>0.008</b>	<b>0.008</b>
Septic	Septic	0.070	0.064	0.040	0.040
	<b>Subtotal</b>	<b>0.070</b>	<b>0.064</b>	<b>0.040</b>	<b>0.040</b>
Stormwater	CSS	0.000	0.000	0.000	0
	Construction	0.007	0.007	0.006	0.007
	Extractive	0.002	0.002	0.002	0.002
	Non-Regulated Developed	0.147	0.132	0.095	0.102
	Regulated Developed	0.001	0.007	0.006	0.001
	<b>Subtotal</b>		<b>0.157</b>	<b>0.148</b>	<b>0.110</b>
Wastewater	CSO	0.000	0.000	0.000	0.009
	Industrial	0.008	0.004	0.003	0.003
	Municipal	0.034	0.019	0.033	0.031
	<b>Subtotal</b>		<b>0.042</b>	<b>0.023</b>	<b>0.036</b>
	<b>Total</b>	<b>2.185</b>	<b>1.816</b>	<b>1.665</b>	<b>1.575</b>

- The agricultural sector strategies were set to meet basin targets rather than county targets. Therefore, agricultural strategies are likely to overshoot or undershoot county targets, which can be reflected in the total countywide target results.
- Stormwater sector strategies may overshoot the county target for nitrogen (N) to meet the phosphorus (P) target, or vice versa. This is because the N and P reduction targets differ and the same BMP has different effects on the reduction of N and P.

**CAROLINE**  
**Total Phosphorus Loads**

		2010 Progress	2017 Interim Strategy	2025 Final Strategy	Final Target
Source Sector	Landuse	Million Lbs/Yr	Million Lbs/Yr	Million Lbs/Yr	Million Lbs/Yr
Agriculture	AFO	0.002	0.002	0.002	0.002
	CAFO	0.009	0.009	0.009	0.008
	Crop	0.109	0.088	0.088	0.100
	Nursery	0.017	0.013	0.012	0.015
	Pasture	0.002	0.002	0.002	0.002
	<b>Subtotal</b>		<b>0.139</b>	<b>0.115</b>	<b>0.113</b>
Forest	Harvested	0.000	0.000	0.000	0.000
	Natural	0.003	0.003	0.003	0.003
	<b>Subtotal</b>	<b>0.003</b>	<b>0.003</b>	<b>0.003</b>	<b>0.003</b>
Non-Tidal Atm	Non-Tidal Atm	0.000	0.000	0.000	0.000
	<b>Subtotal</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
Septic	Septic	0.000	0.000	0.000	0.000
	<b>Subtotal</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
Stormwater	CSS	0.000	0.000	0.000	0
	Construction	0.001	0.001	0.001	0.001
	Extractive	0.000	0.000	0.000	0.000
	Non-Regulated Developed	0.008	0.007	0.004	0.004
	Regulated Developed	0.000	0.000	0.000	0.000
	<b>Subtotal</b>		<b>0.010</b>	<b>0.009</b>	<b>0.006</b>
Wastewater	CSO	0.000	0.000	0.000	0.001
	Industrial	0.002	0.001	0.001	0.001
	Municipal	0.004	0.002	0.003	0.003
	<b>Subtotal</b>	<b>0.006</b>	<b>0.003</b>	<b>0.004</b>	<b>0.005</b>
<b>Total</b>		<b>0.159</b>	<b>0.131</b>	<b>0.126</b>	<b>0.140</b>

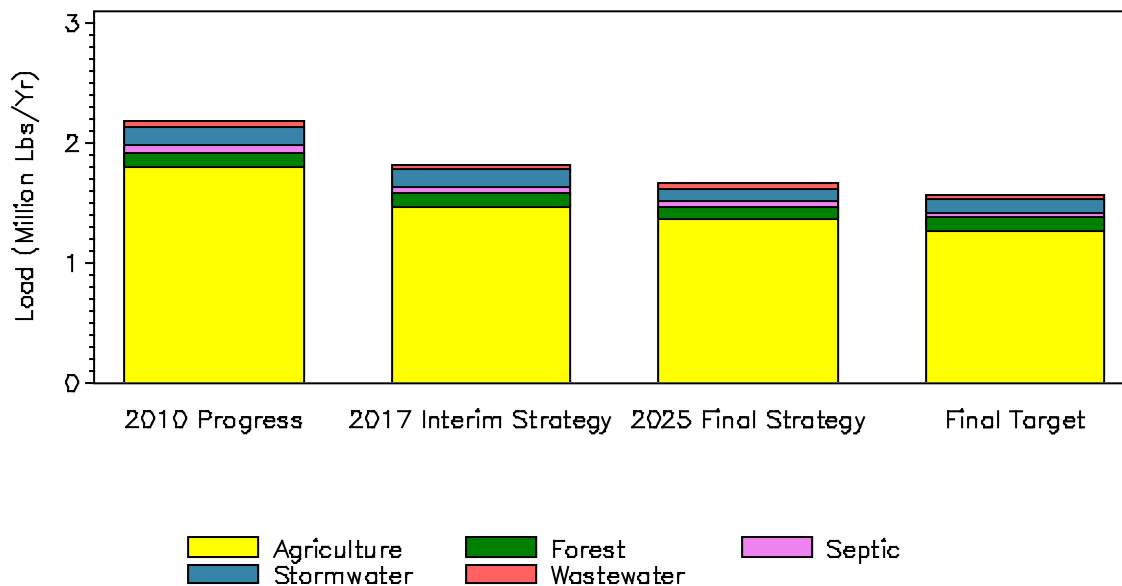
- The agricultural sector strategies were set to meet basin targets rather than county targets. Therefore, agricultural strategies are likely to overshoot or undershoot county targets, which can be reflected in the total countywide target results.
- Stormwater sector strategies may overshoot the county target for nitrogen (N) to meet the phosphorus (P) target, or vice versa. This is because the N and P reduction targets differ and the same BMP has different effects on the reduction of N and P.

**CAROLINE**  
**Total Sediment Loads**

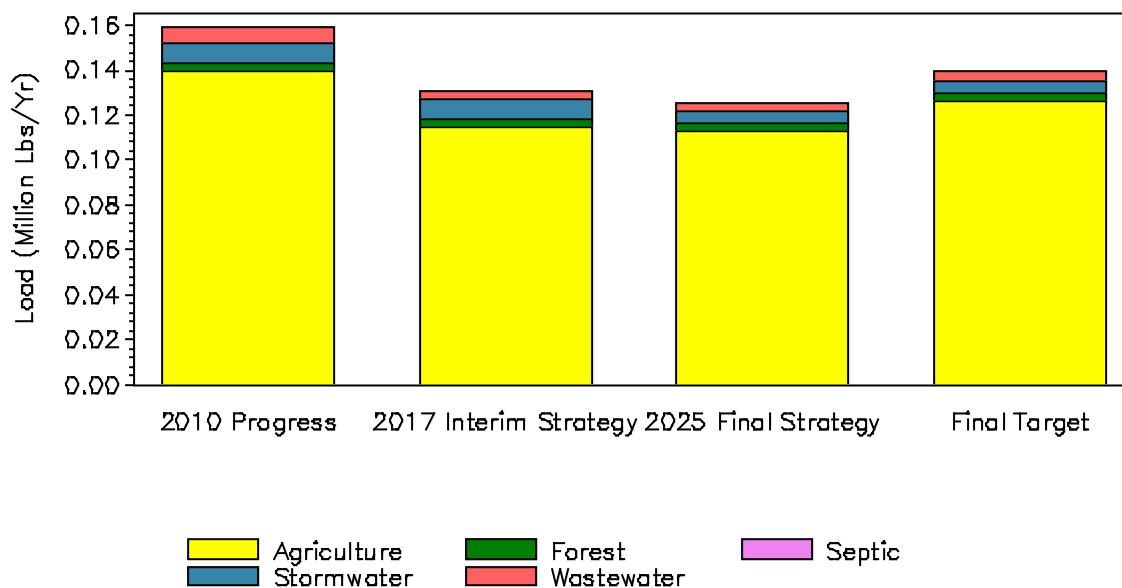
		2010 Progress	2017 Interim Strategy	2025 Final Strategy
Source Sector	Landuse	Million Lbs/Yr	Million Lbs/Yr	Million Lbs/Yr
Agriculture	AFO	0.001	0.001	0.001
	CAFO	0.002	0.002	0.002
	Crop	14.487	11.463	11.281
	Nursery	0.014	0.012	0.011
	Pasture	0.018	0.017	0.016
	<b>Subtotal</b>		<b>14.522</b>	<b>11.493</b>
Forest	Harvested	0.111	0.119	0.119
	Natural	0.933	0.972	0.981
	<b>Subtotal</b>	<b>1.044</b>	<b>1.090</b>	<b>1.099</b>
Non-Tidal Atm	Non-Tidal Atm	0.000	0.000	0.000
	<b>Subtotal</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
Septic	Septic	0.000	0.000	0.000
	<b>Subtotal</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
Stormwater	CSS	0.000	0.000	0.000
	Construction	0.684	0.720	0.632
	Extractive	0.460	0.460	0.326
	Non-Regulated Developed	2.384	2.314	1.106
	Regulated Developed	0.031	0.125	0.112
	<b>Subtotal</b>		<b>3.559</b>	<b>3.618</b>
Wastewater	CSO	0.000	0.000	0.000
	Industrial	0.009	0.012	0.012
	Municipal	0.036	0.125	0.235
	<b>Subtotal</b>		<b>0.045</b>	<b>0.136</b>
	<b>Total</b>	<b>19.170</b>	<b>16.338</b>	<b>14.833</b>

• The State did not distribute EPA's state and basin targets at the county or sector scale for sediment. Hence a Final Target column is not shown.

CAROLINE  
Total Nitrogen Loads

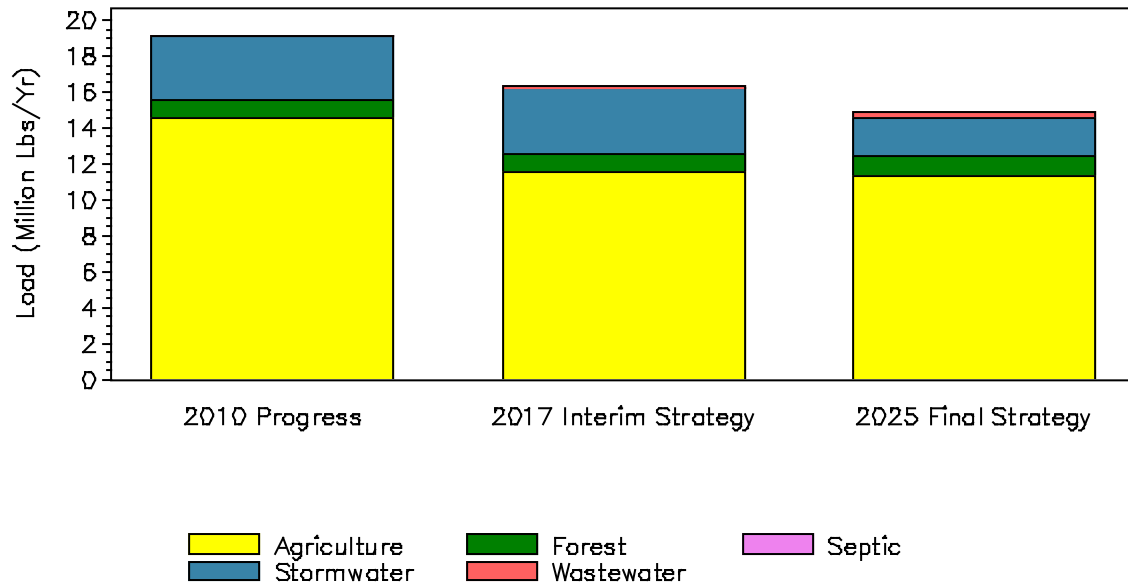


CAROLINE  
Total Phosphorus Loads





CAROLINE  
Total Sediment Loads



• The State did not distribute EPA's state and basin targets at the county or sector scale for sediment. Hence a Final Target bar is not shown.

## Maryland Phase II WIP Team MAST Submittals

### CAROLINE Developed Land BMPs

		2010 Progress	2017 WIP Team	2017 Interim Strategy	2025 WIP Team	2025 Final Strategy	Change in 2017 Submittal	Change in 2025 Submittal
BMP Name	Unit							
Dry Detention Ponds and Hydrodynamic Structures	Acres	19	19	19	19	18	-1	-1
Dry Extended Detention Ponds	Acres	49	49	46	49	46	-2	-3
Impervious Urban Surface Reduction	Acres	0	0	4	0	1,191	4	1,191
MS4 Permit Stormwater Retrofit	Acres	230	230	219	230	218	-11	-12
Stormwater Management Generic BMP (1985 to 2002)	Acres	3,019	3,019	2,880	3,019	2,859	-140	-160
Stormwater Management Generic BMP (2002 to 2010)	Acres	3,284	3,284	3,133	3,284	3,110	-151	-174
Urban Filtering Practices	Acres	14	14	22	14	9,431	8	9,418
Urban Forest Buffers	Acres	0	0	933	0	1,019	933	1,019
Urban Infiltration Practices	Acres	47	47	45	47	44	-2	-3
Wet Ponds and Wetlands	Acres	35	35	33	35	33	-2	-2
Erosion and Sediment Control on Construction	Acres/Year	370	370	370	370	461	0	91
Erosion and Sediment Control on Extractive	Acres/Year	0	0	0	0	233	0	233
Forest Conservation	Acres/Year	244	244	244	244	262	0	18
Urban Nutrient Management	Acres/Year	3,398	3,398	8,788	3,398	12,987	5,390	9,590

- The BMP values represent the total amount of implementation in place.
- The BMP values are the amount credited in the Bay watershed model. It is the amount of BMP submitted minus the amount not given credit for (e.g., due to overlapping with other BMPs)
- Acres of BMPs might be observed to decrease in subsequent scenarios for several reasons:
  - To meet the countywide sector target, the State supplemented the Team scenarios with a generic set of BMPs.
  - Some aspects of the State strategies were automated, such that BMP levels were computed as a percentage of available acres. The application of some BMPs convert the acres of developed land to forest land, or impervious to pervious. This reduces/increases the available acres so that, if the same percentage level of other BMPs is applied to these lands, then a decrease/increase in BMP acreage might be observed even though the implementation level was intended to remain equal.
  - Because the Bay watershed model is not able to account for BMPs that treat overlapping areas (nested BMPs), the acreage available for BMPs can be used up before the Final Target is achieved. In such cases the State gave precedence to the more effective BMPs.
- The columns labeled Team include the State Highway Administration (SHA) strategies as well as 2010 Progress levels for other entities.
- The columns for Interim and Final strategies include numbers for SHA, federal facilities, State lands, industrial facilities, Phase I and II MS4 and non-regulated stormwater where applicable. They also reflect changes made by the State.

## CAROLINE Septic System BMPs

			2010 Progress	2017 WIP Team	2017 Interim Strategy	2025 WIP Team	2025 Final Strategy	Change in 2017 Submittal	Change in 2025 Submittal
BMP Name	Zone	Unit							
Septic Denitrification	Critical Area	Systems	9	9	680	9	1,133	671	1,124
	Outside of the Critical Area, not within 1000 ft of a perennial stream	Systems	30	30	30	30	2,363	0	2,332
	Within 1000 ft of a perennial stream	Systems	21	21	21	21	2,557	0	2,537
<b>Septic Denitrification Total</b>			<b>60</b>	<b>60</b>	<b>731</b>	<b>60</b>	<b>6,053</b>	<b>671</b>	<b>5,993</b>

- The BMP values represent the total amount of implementation in place.
- The BMP values are the amount credited in the Bay watershed model. It is the amount of BMP submitted minus the amount not given credit for (e.g., due to overlapping with other BMPs)

## Maryland Phase II WIP Team MAST Submittals

### CAROLINE Total Nitrogen Loads

		2010 Progress	2017 WIP Team	2017 Interim Strategy	2025 WIP Team	2025 Final Strategy	Final Target
Source Sector	Landuse	Million Lbs/Yr	Million Lbs/Yr	Million Lbs/Yr	Million Lbs/Yr	Million Lbs/Yr	Million Lbs/Yr
Stormwater	CSS	0.000	0.000	0.000	0.000	0.000	0
	Construction	0.007	0.007	0.007	0.007	0.006	0.007
	Extractive	0.002	0.002	0.002	0.002	0.002	0.002
	Non-Regulated Developed	0.147	0.147	0.132	0.147	0.095	0.102
	Regulated Developed	0.001	0.001	0.007	0.001	0.006	0.001
	<b>Subtotal</b>		<b>0.157</b>	<b>0.158</b>	<b>0.148</b>	<b>0.158</b>	<b>0.110</b>
Septic	Septic	0.070	0.070	0.064	0.070	0.040	0.040
	<b>Subtotal</b>	<b>0.070</b>	<b>0.070</b>	<b>0.064</b>	<b>0.070</b>	<b>0.040</b>	<b>0.040</b>

- The columns labeled Team include the State Highway Administration (SHA) strategies as well as 2010 Progress levels for other entities.
- The columns for Interim and Final strategies include numbers for SHA, federal facilities, State lands, industrial facilities, Phase I and II MS4 and non-regulated stormwater where applicable. They also reflect changes made by the State.

### CAROLINE Total Phosphorus Loads

		2010 Progress	2017 WIP Team	2017 Interim Strategy	2025 WIP Team	2025 Final Strategy	Final Target
Source Sector	Landuse	Million Lbs/Yr	Million Lbs/Yr	Million Lbs/Yr	Million Lbs/Yr	Million Lbs/Yr	Million Lbs/Yr
Stormwater	CSS	0.000	0.000	0.000	0.000	0.000	0
	Construction	0.001	0.001	0.001	0.001	0.001	0.001
	Extractive	0.000	0.000	0.000	0.000	0.000	0.000
	Non-Regulated Developed	0.008	0.008	0.007	0.008	0.004	0.004
	Regulated Developed	0.000	0.000	0.000	0.000	0.000	0.000
	<b>Subtotal</b>		<b>0.010</b>	<b>0.010</b>	<b>0.009</b>	<b>0.010</b>	<b>0.006</b>
Septic	Septic	0.000	0	0.000	0	0.000	0.000
	<b>Subtotal</b>	<b>0.000</b>	<b>0</b>	<b>0.000</b>	<b>0</b>	<b>0.000</b>	<b>0.000</b>

- The columns labeled Team include the State Highway Administration (SHA) strategies as well as 2010 Progress levels for other entities.
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**CAROLINE  
Total Sediment Loads**

		<b>2010 Progress</b>	<b>2017 WIP Team</b>	<b>2017 Interim Strategy</b>	<b>2025 WIP Team</b>	<b>2025 Final Strategy</b>
<b>Source Sector</b>	<b>Landuse</b>	<b>Million Lbs/Yr</b>	<b>Million Lbs/Yr</b>	<b>Million Lbs/Yr</b>	<b>Million Lbs/Yr</b>	<b>Million Lbs/Yr</b>
Stormwater	CSS	0.000	0.000	0.000	0.000	0.000
	Construction	0.684	0.684	0.720	0.684	0.632
	Extractive	0.460	0.460	0.460	0.460	0.326
	Non-Regulated Developed	2.384	2.409	2.314	2.409	1.106
	Regulated Developed	0.031	0.032	0.125	0.032	0.112
	<b>Subtotal</b>	<b>3.559</b>	<b>3.584</b>	<b>3.618</b>	<b>3.584</b>	<b>2.176</b>
Septic	Septic	0.000	0	0.000	0	0.000
	<b>Subtotal</b>	<b>0.000</b>	<b>0</b>	<b>0.000</b>	<b>0</b>	<b>0.000</b>

- The columns labeled Team include the State Highway Administration (SHA) strategies as well as 2010 Progress levels for other entities.
- The columns for Interim and Final strategies include numbers for SHA, federal facilities, State lands, industrial facilities, Phase I and II MS4 and non-regulated stormwater where applicable. They also reflect changes made by the State.