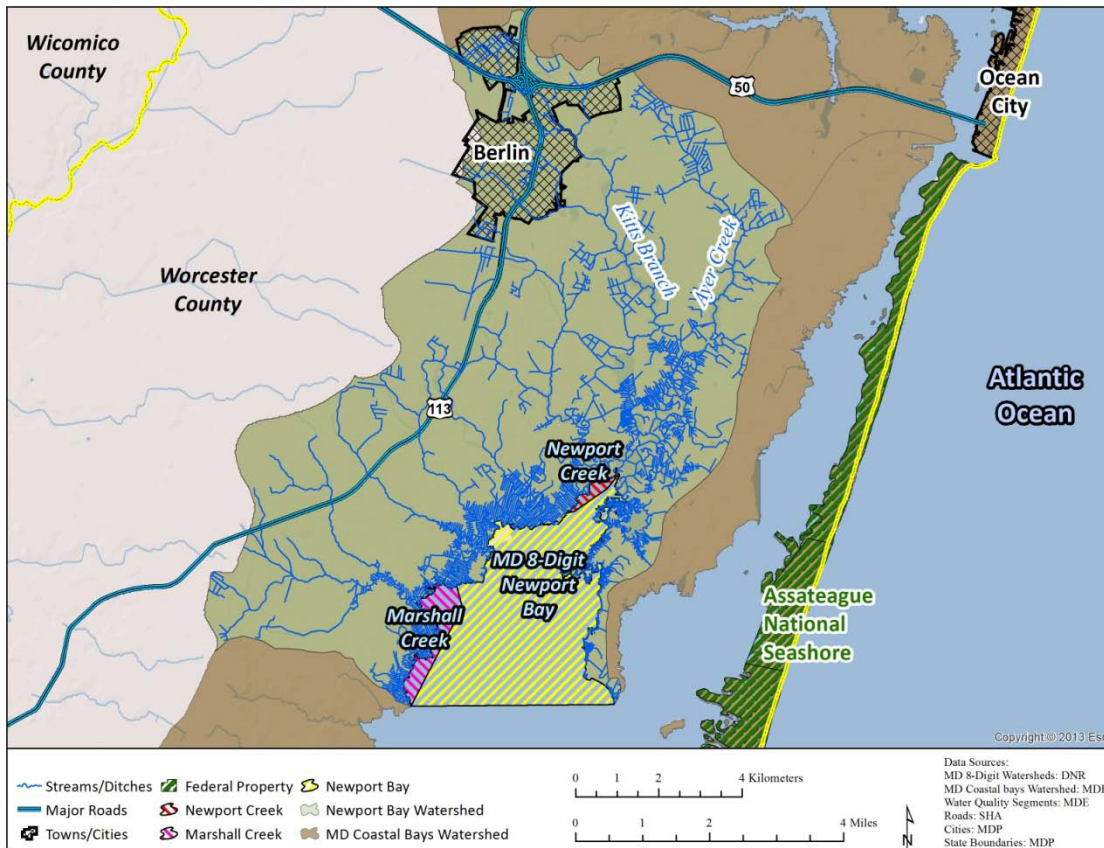


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## Appendix D: Newport Bay

## 1.0 Introduction

As described in the main TMDL report, the Coastal Bays are a shallow coastal lagoon system comprised of several individual and distinct waterbodies. The MD 8-Digit Newport Bay (basin code: 02130105) is located on the Atlantic Coast of the Delmarva (Delaware-Maryland-Virginia) Peninsula in Worcester County, Maryland. Major tributaries to the MD 8-Digit Newport Bay include Kitts Branch/Ayer Creek, Newport Creek, and Marshall Creek. A major area of interest in the watershed is Berlin. The MD 8-Digit Newport Bay connects to the Atlantic Ocean through the Chincoteague Bay and then the Chincoteague Inlet.



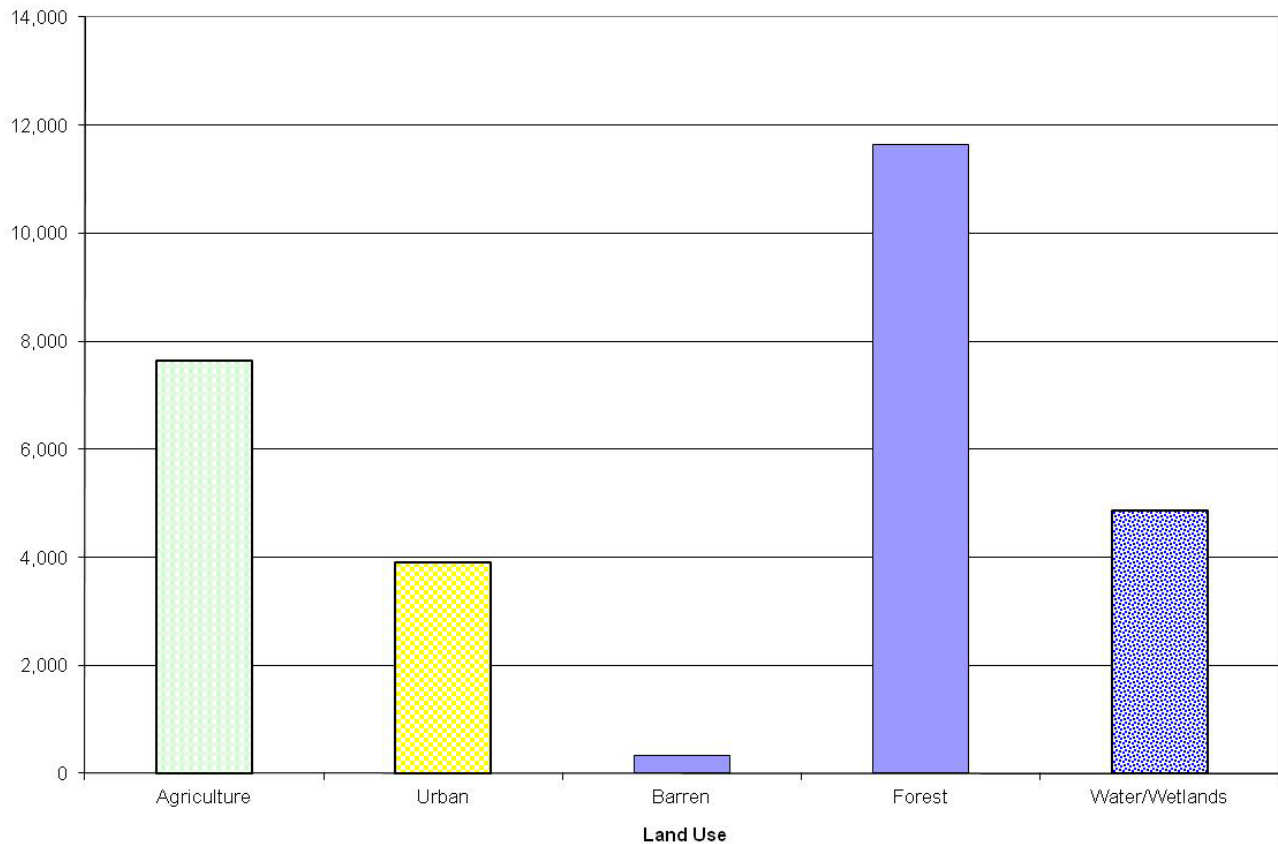
**Figure D1: Location map of the MD 8-Digit Newport Bay Watershed.**

Tributaries draining to Newport Bay include Kitts Branch/Ayer Creek, Newport Creek and Marshall Creek. TMDLs have been developed for the MD 8-Digit Newport Bay and the tributaries listed above. Specific WLAs and LAs are provided for each area. In the sections below, more detailed information regarding watershed characteristics, water quality, baseline nutrient loadings, and the specific TMDLs developed for the MD 8-Digit Newport Bay and its tributaries are provided.

## 2.0 Land Use and Water Quality Assessment

### Newport Bay

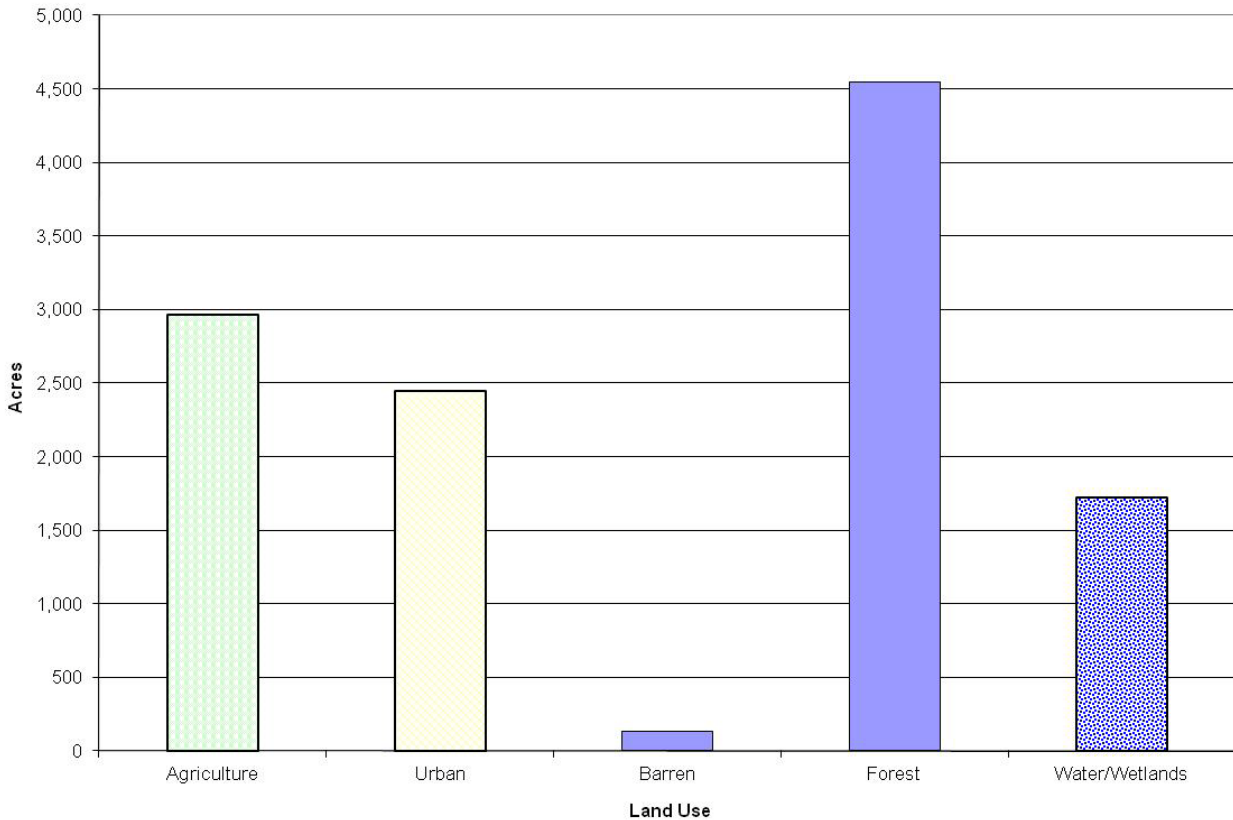
The MD 8-Digit Newport Bay watershed has a drainage area of 28,488 acres and includes Kitts Branch/Ayer Creek, Newport Creek and Marshall Creek. The average depth is 0.5 m from its head to 1.75 m near its mouth. The land uses in the watershed consist of forest and other herbaceous (11,656 acres, or 41% of the total watershed area); mixed agriculture (7,684 acres, 27%); urban (3,910 acres, 14%); barren (330 acres, 1%); and water/wetlands (4,909 acres, 17%). Figure D2 shows the relative amounts of the different land uses in the MD 8-Digit Newport Bay watershed.



**Figure D2: Proportions of land use draining the MD 8-Digit Newport Bay watershed.**

**Ayer Creek and Kitts Branch**

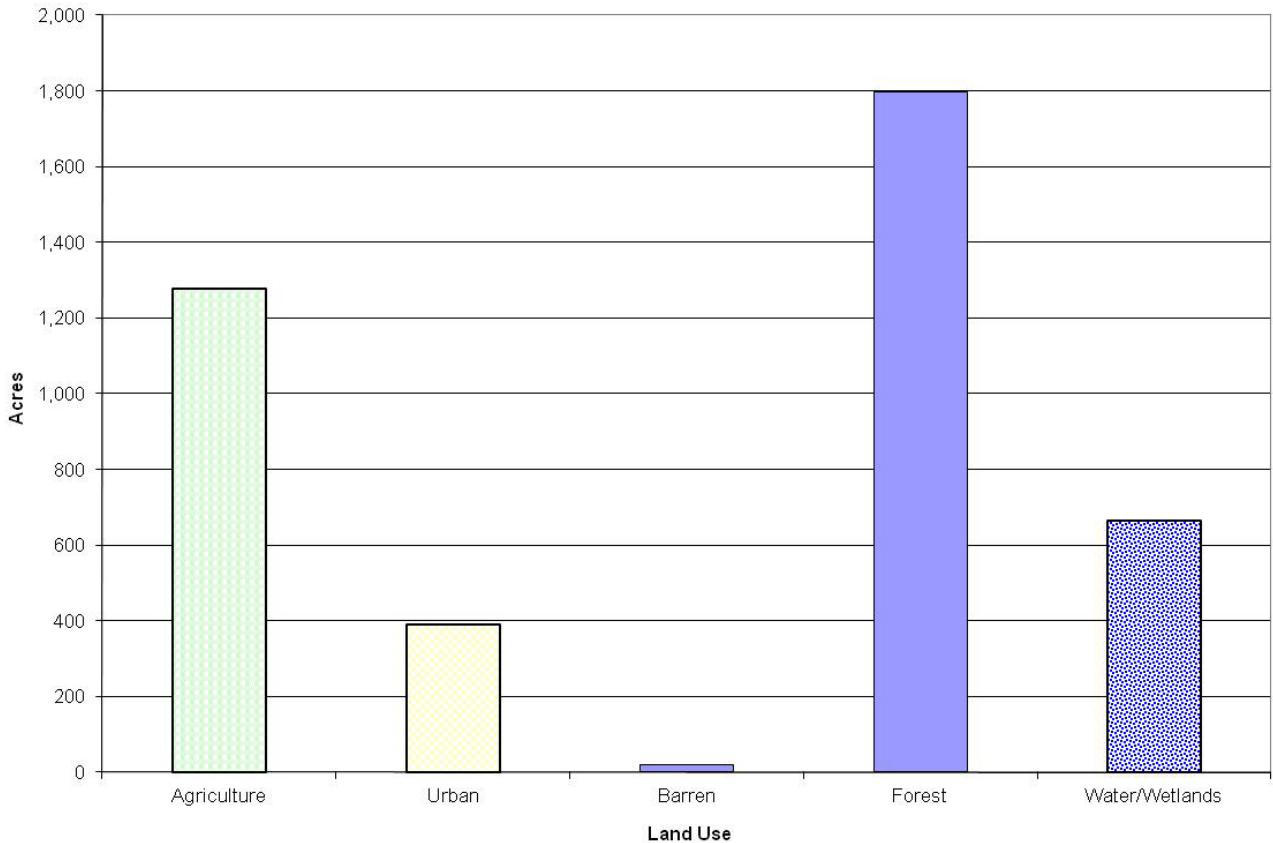
Ayer Creek and Kitts Branch are a tidal tributary system to the mainstem (open water) MD 8-Digit Newport Bay. The tributary system drains a watershed area of approximately 11,815 acres. The Ayer Creek and Kitts Branch watershed land use consists of forest and other herbaceous cover (4,550 acres, or 39% of the total watershed area); mixed agriculture (2,961 acres, 25%); urban (2,446 acres, 21%); water/wetlands (1,725 acres, 15%); and barren (133 acres, 1%). Figure D3 shows the relative amounts of the different land uses in the Ayer Creek and Kitts Branch watershed.



**Figure D3: Proportions of land use draining the Ayer Creek/Kitts Branch watershed.**

### Newport Creek

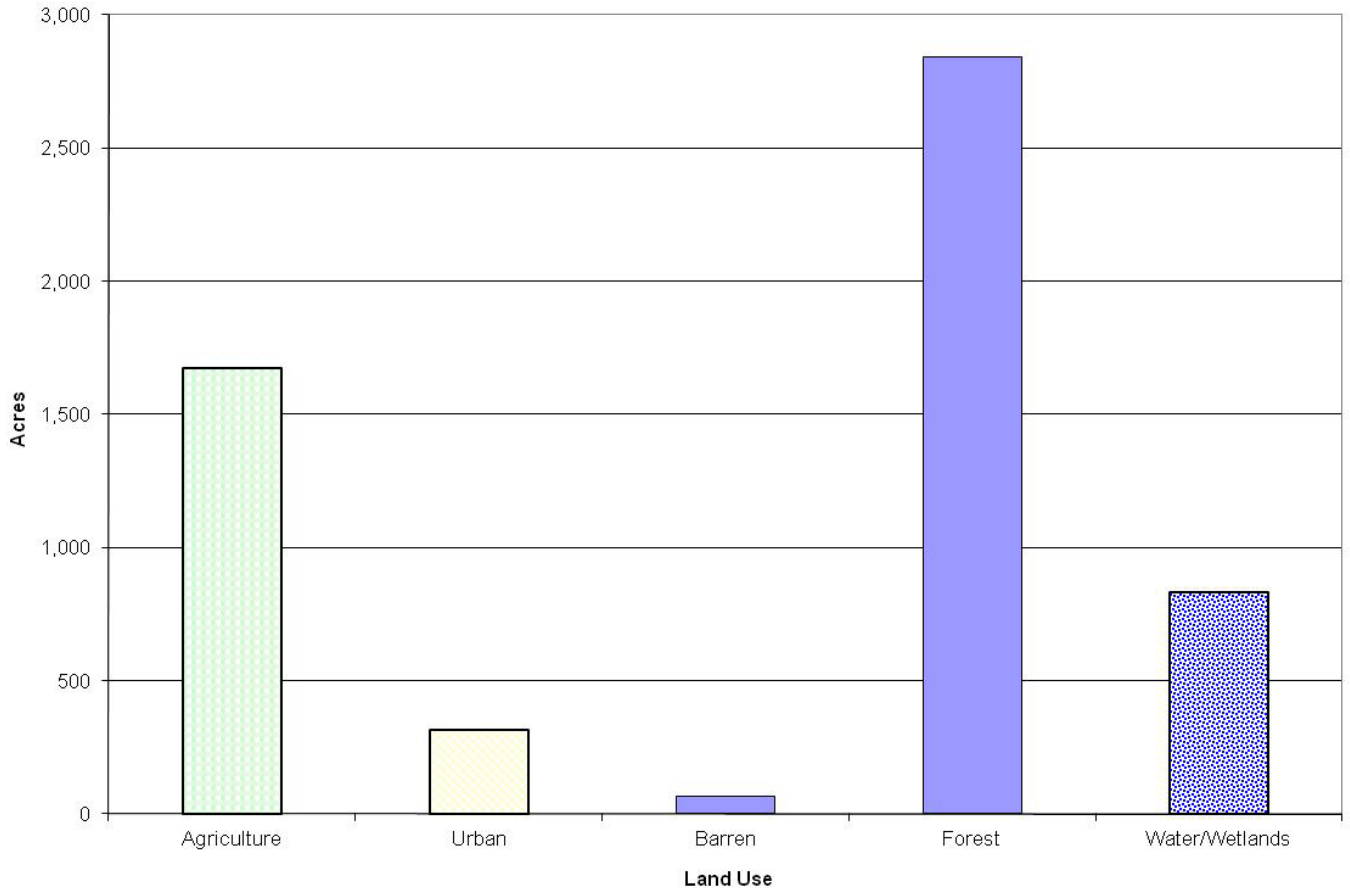
Newport Creek is a tidal tributary to the mainstem (open water) MD 8-Digit Newport Bay. The tributary has a drainage area of 4,151 acres. The Newport Creek watershed land use distribution consists of forest and other herbaceous (1,799 acres, or 43% of the total watershed area); mixed agriculture (1,280 acres, 31%); urban (391 acres, 9%); barren (19 acres, >1%); and water/wetlands (663 acres, 16%). Figure D4 shows the relative amounts of the different land uses in the Newport Creek watershed.



**Figure D4: Proportions of land use draining in the Newport Creek watershed**

### Marshall Creek

Marshall Creek is a tidal tributary to the mainstem (open water) MD 8-Digit Newport Bay. The tributary has a drainage area of 5,735 acres. The Marshall Creek watershed land use distribution consists of forest and other herbaceous (2,842 acres, or 50% of the total watershed area); mixed agriculture (1,678 acres, 29%); urban (317 acres, 6%); barren (66 acres, 1%); and water/wetlands (833 acres, 15%). Figure D5 shows the relative amounts of the different land uses in the Marshall Creek watershed.



**Figure D5: Proportions of land use draining the Marshall Creek watershed.**

**3.0 Watershed Model Information**

The applicable MD 8-Digit Newport Bay, Ayer Creek/Kitts Branch, Newport Creek, and Marshall Creek watershed model segments and water quality monitoring stations are presented in the Tables D1 and D2 below.

**Table D1: MD 8-Digit Newport Bay, Ayer Creek, Newport Creek, and Marshall Creek watershed model segments**

<b>Watershed Name</b>	<b>Watershed Model Segments</b>
Newport Bay	73,74,75,80,143,145,175 and the segments listed below
Ayer Creek	76
Newport Creek	77,78,79,176
Marshall Creek	81,82,83,84,177

**Table D2: MD 8-Digit Newport Bay Water quality monitoring stations**

<b>Watershed</b>	<b>Stations</b>
Ayer Creek/Kitts Branch	AYR0017
Newport Bay	XCM4878
	ASSA3
	ASSA4

#### 4.0 Point Sources: National Pollutant Discharge Elimination System (NPDES) Loads

Table D3 below provides information on process water point source facilities with permits regulating the discharge of nutrients within the MD 8-Digit Newport Bay watershed. As described in the main TMDL report, there are no NPDES regulated stormwater facilities in the entire Maryland Coastal Bays watershed.

**Table D3: Average daily flows and estimated TN and TP Loads for process water point sources to the MD 8-Digit Newport Bay, 2001 – 2004.**

Watershed Model Segment	Facility	Type	Average Flow (MGD)	Estimated Delivered TN Load (lbs/yr)	Estimated Delivered TP Load (lbs/yr)
76	Berlin WWTP	Municipal	0.070	751	14
82	Newark WWTP	Municipal	0.039	1,034	300
76	Berlin North WWTP	Industrial	0.044	5,378	484
76	Kelly Foods Corporation	Industrial	0.006	112	2

Average flow shown for Berlin North WWTP is surface discharge only.

#### 5.0 Nonpoint Source Loads

##### Urban Stormwater, Agricultural, Atmospheric Deposition and Shoreline Erosion Loads

Nonpoint source loads and urban stormwater loads were estimated using the HSPF watershed model. Urban stormwater regulated by an NPDES stormwater permit, such as an MS4 permit, industrial stormwater permit, etc., is considered a point source by USEPA. However, since there are no NPDES stormwater permits within the watershed, urban stormwater loads are presented here as nonpoint sources. Atmospheric deposition loads were estimated using data from the National Atmospheric Deposition Program, which collects data at Assateague Island National Seashore. Shoreline erosion loads were estimated based on the work of Wells, Hennessee, and Hill (2002 and 2003), and Wells *et al.* (2008). Methods are described in the main report, with full details available in VIMS (2013).

##### On-Site Wastewater Disposal (Septic Systems) Loads

Septic system loading estimates were calculated using 2000 U.S. Census data, the USEPA-CBP sewer service area GIS coverage, the USEPA-CBP land river segment GIS coverage, 1997 DNREC septic system GIS coverage, the MDE-WMA septic system GIS coverage, and the Maryland Coastal Bays HSPF watershed model segmentation created by MDE. The assumptions used in the analysis are presented in Table D4. These loads were calculated based on a methodology used by the USEPA-CBP. Table D5 presents the calculated septic system loads for all segments.



**Table D4. Assumptions used in the septic load analysis.**

<b>Assumption</b>	<b>Within 1,000ft of surface water</b>	<b>Greater than 1,000ft from surface water</b>
Average # persons/septic	3.2	
Nitrogen loading per Person (lbs/year)	9.5	
Nitrogen loading per septic (lbs/year)	30.4	
Nitrogen attenuation rate	0.2	0.7
Surface water delivered nitrogen load per septic with attenuation (lbs/year)	24.32	9.12

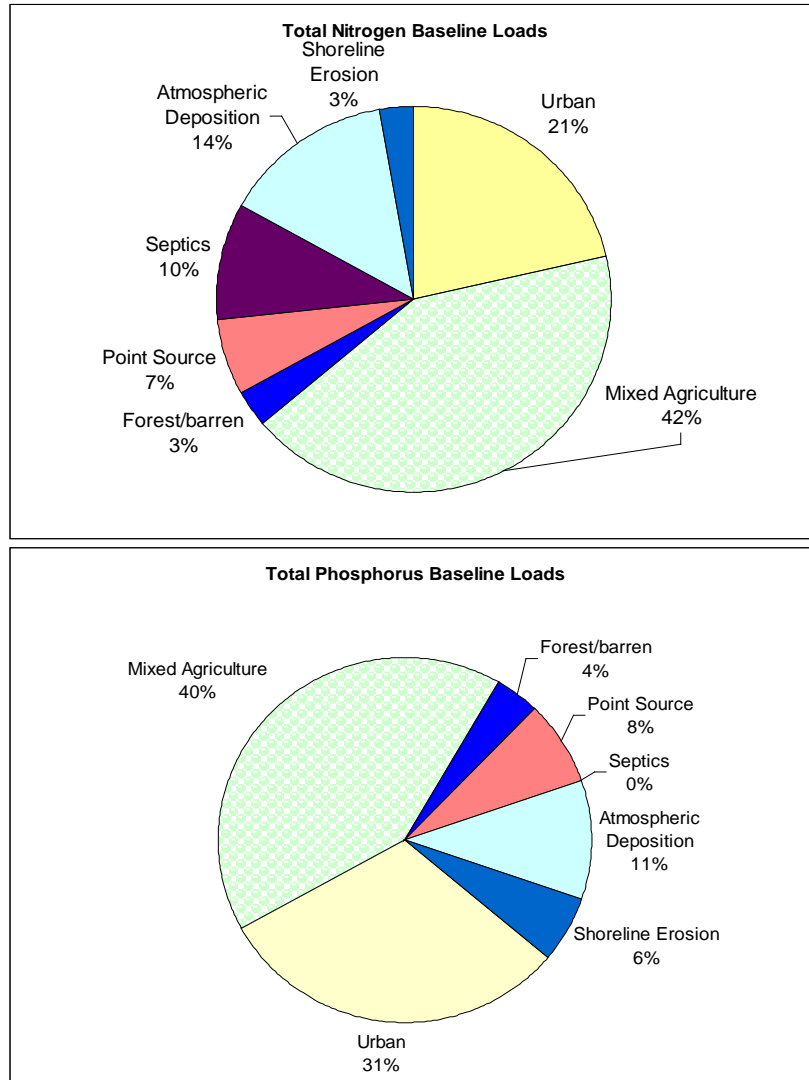
**Table D5: Delivered septic loads and values used in the Coastal Bays Model for the MD 8-Digit Newport Bay and its tributaries.**

<i>SEG- MENT</i>	<i>MD # Septics (within 1,000 ft)</i>	<i>MD # Septics (outside 1,000 ft)</i>	<i>Upstream # Septics (within 1,000 ft)</i>	<i>Upstream # Septics (outside 1,000 ft)</i>	<i>Total # Septics (within 1,000 ft)</i>	<i>Total # Septics (outside 1,000 ft)</i>	<i>Total Surface Water Delivered Nitrogen Load with Loss (Within 1,000 ft) (lbs/year)</i>	<i>Total Surface Water Delivered Nitrogen Load with Loss (Outside 1,000 ft) (lbs/year)</i>	<i>Total Surface Water Delivered Nitrogen Load with Loss (Within 1,000 ft) (lbs/day)</i>	<i>Total Surface Water Delivered Nitrogen Load with Loss (Outside 1,000 ft) (lbs/day)</i>	<i>Total Surface Water Delivered Nitrogen Load with Loss (lbs/day)</i>
73	7	3	0	0	7	3	170	27	0.47	0.07	0.54
74	24	3	0	0	24	3	584	27	1.60	0.07	1.67
75	4	0	0	0	4	0	97	0	0.27	0.00	0.27
76	366	160	0	0	366	160	8,901	1,459	24.39	4.00	28.38
77	124	63	0	0	124	63	3,016	575	8.26	1.57	9.84
78	0	1	0	0	0	1	0	9	0.00	0.02	0.02
80	39	12	0	0	39	12	948	109	2.60	0.30	2.90
82	94	28	0	0	94	28	2,286	255	6.26	0.70	6.96
83	2	0	0	0	2	0	49	0	0.13	0.00	0.13
143	12	3	0	0	12	3	292	27	0.80	0.07	0.87
145	61	14	0	0	61	14	1,484	128	4.06	0.35	4.41
175	30	1	0	0	30	1	730	9	2.00	0.02	2.02
Total	763	288	0	0	763	288	18,557	2,625	50.84	7.17	58.01

## 6.0 Baseline Load Summary

### Newport Bay

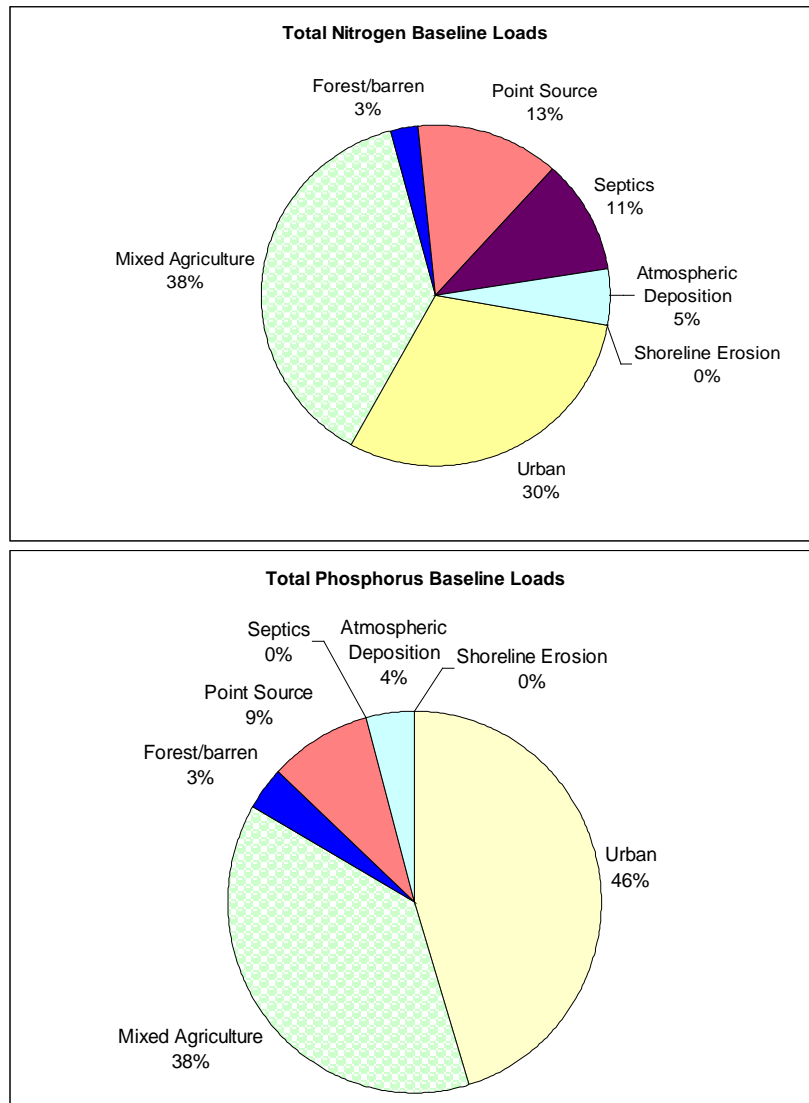
The baseline average annual total nitrogen load to the MD 8-Digit Newport Bay is 216,382 lbs/yr. Direct atmospheric deposition to the water's surface accounts for approximately 14% of the baseline nitrogen load. Shoreline erosion comprises 3%. Mixed agriculture (42%), urban (21%), septic (10%), point source (7%) and forest (3%) account for the remaining nitrogen baseline load. The estimated average annual total phosphorus load is 14,287 lbs/yr. Direct atmospheric deposition to the water's surface accounts for approximately 11% of the baseline phosphorus load. Shoreline erosion comprises 6%. Mixed agriculture (40%), urban (31%), point source (8%) and forest/barren (4%) account for the remaining phosphorus baseline load. There are four process water point source facilities with permits regulating the discharge of nutrients in the watershed; however, the nonpoint source load comprises the majority of the total load to the waterbody. Figure D6 shows the relative contributions of nitrogen and phosphorus from the various sources to the MD 8-Digit Newport Bay. Details can be found in Wang *et al.* (2013) and VIMS (2013).



**Figure D6: Nitrogen and phosphorus contributions from various sources to the MD 8-Digit Newport Bay.**

**Ayer Creek/Kitts Branch**

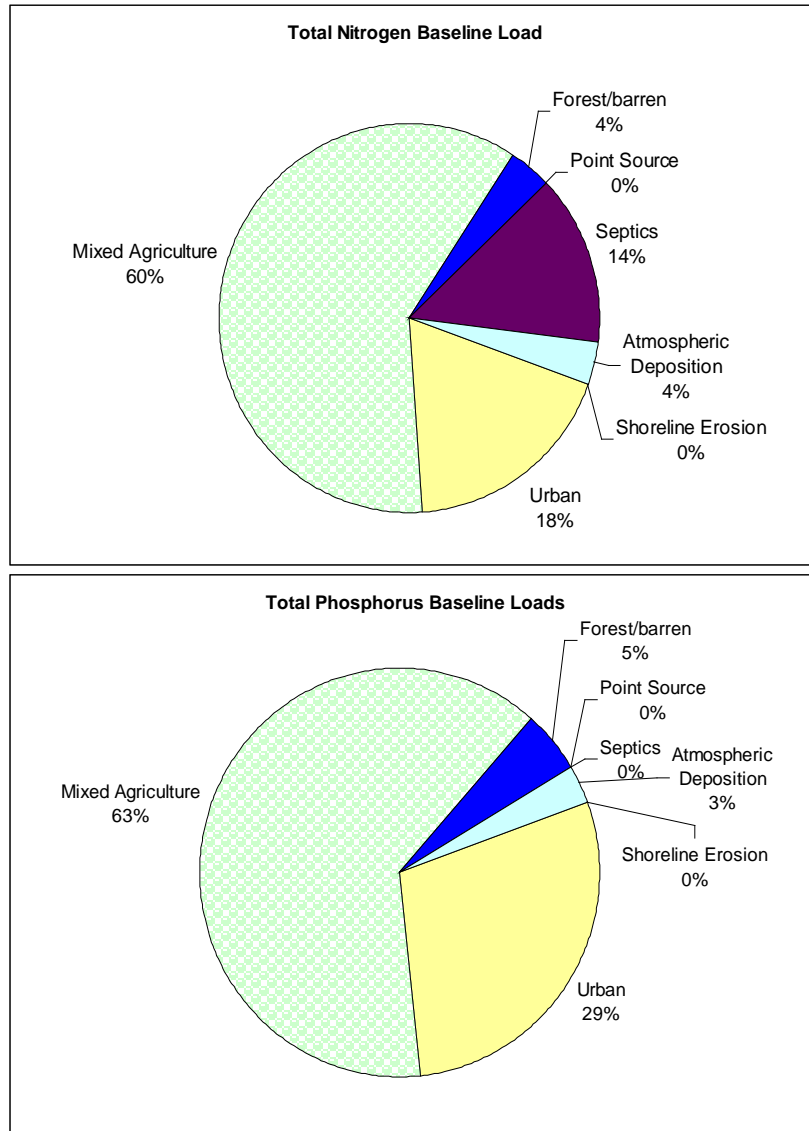
The baseline average annual total nitrogen load to Ayer Creek and Kitts Branch is 94,759 lbs/yr. Direct atmospheric deposition to the water's surface accounts for 5% of the baseline nitrogen load. Mixed agriculture (38%), urban (30%), point sources (13%), septics (11%) and forest/barren (3%) account for the remaining nitrogen baseline load. The estimated average annual total phosphorus load is 6,043 lbs/yr. Direct atmospheric deposition to the water's surface accounts for approximately 4% of the baseline phosphorus load. Mixed agriculture (38%), urban (46%), point sources (9%) and forest/barren (3%) account for the remaining phosphorus baseline load. There are three process water point source facilities with permits regulating the discharge of nutrients in the watershed; however, the nonpoint source load comprises the majority of the total load to the waterbody. Figure D7 shows the relative contributions of nitrogen and phosphorus from the various sources to Ayer Creek and Kitts Branch. Details can be found in Wang *et al.* (2013) and VIMS (2013).



**Figure D7: Nitrogen and phosphorus contributions from various sources to Ayer Creek/Kitts Branch.**

### **Newport Creek**

The baseline average annual total nitrogen load to Newport Creek is 25,445 lbs/yr. Direct atmospheric deposition to the water's surface accounts for approximately 4% of the baseline nitrogen load. Mixed agriculture (60%), urban (18%), septics (14%) and forest/barren (4%) account for the remaining nitrogen baseline load. The estimated average annual total phosphorus load is 1,566 lbs/yr. Direct atmospheric deposition to the water's surface accounts for approximately 3% of the baseline phosphorus load. Mixed agriculture (63%); urban (29%) and forest/barren (5%) for the remaining phosphorus baseline load. There are no process water point source facilities with permits regulating the discharge of nutrients within the Newport Creek watershed; therefore, the nonpoint source comprises the entire load to the waterbody. Figure D8 shows the relative contributions of nitrogen and phosphorus from the various sources to Newport Creek. Details can be found in Wang *et al.* (2013) and VIMS (2013).

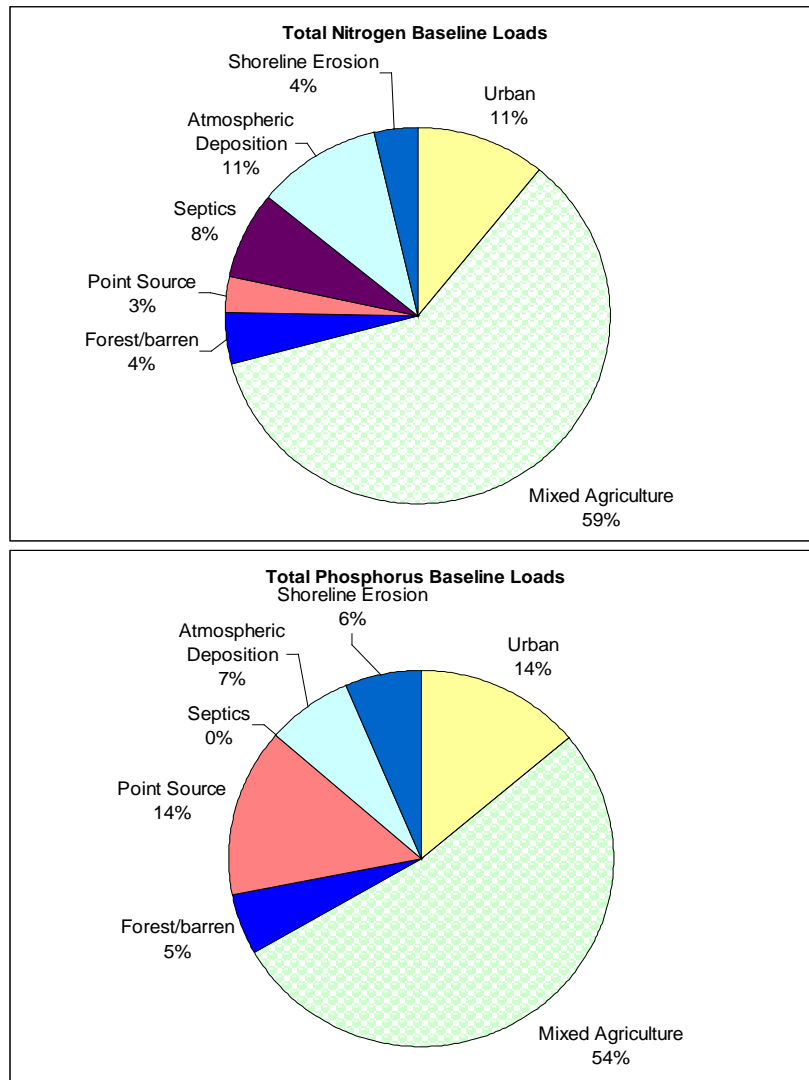


**Figure D8: Nitrogen and phosphorus contributions from various sources to Newport Creek.**



### **Marshall Creek**

The baseline average annual total nitrogen load to Marshall Creek is 33,766 lbs/yr. Direct atmospheric deposition to the water's surface accounts for approximately 11% of the baseline nitrogen load. Shoreline erosion comprises 4%. Mixed agriculture (59%), urban (11%), septics (8%), point source (3%) and forest/barren (4%) account for the remaining nitrogen baseline load. The estimated average annual total phosphorus load is 2,469 lbs/yr. Direct atmospheric deposition to the water's surface accounts for approximately 7% of the baseline phosphorus load. Shoreline erosion comprises 6%. Mixed agriculture (54%), urban (14%), point source (14%) and forest/barren (5%) account for the remaining phosphorus baseline load. There is one process water point source facility with a permit regulating the discharge of nutrients in the watershed; however, the nonpoint source load comprises the majority of the total load. Figure D9 shows the relative contributions of nitrogen and phosphorus from the various sources to Marshall Creek. Details can be found in Wang *et al.* (2013) and VIMS (2013).



**Figure D9: Nitrogen and phosphorus contributions from various sources to Marshall Creek.**

## 7.0 Summary of TMDLs for the MD 8-Digit Newport Bay and tributaries

Load reductions are applied only to controllable sources. Controllable sources are urban land, mixed agricultural land, and septic sources (nitrogen). For the purposes of this TMDL, shoreline erosion is not considered a controllable source. The reductions applied to atmospheric deposition were based on the allocation scenario (2025) for Worcester County in the Chesapeake Bay TMDL. See USEPA (2010) for further details regarding atmospheric deposition reductions. A 20% reduction was applied to controllable sources within the Newport Bay watershed.

The TMDLs for TN and TP for the MD 8-Digit Newport Bay and its tributaries are summarized in the tables below, where:

TMDL Equation:

$$\text{TMDL} = \text{WLA}_{\text{ProcessWater}} + \text{WLA}_{\text{CAFO}} + \text{LA} + \text{MOS}$$

**Table D6: MD 8-Digit Newport Bay Average Annual Nitrogen TMDL (lbs/yr)**

Basin Name	TMDL	WLA <sub>ProcessWater</sub>	WLA <sub>CAFO</sub>	LA	MOS
Newport Bay <sup>1</sup>	185,471	18,051	3,050	164,370	Implicit

<sup>1</sup> This allocation includes the allocations for Ayer Creek/Kitts Branch, Newport Creek, and Marshall Creek.

**Table D7: MD 8-Digit Newport Bay Growing Season Nitrogen TMDL (lbs/growing season)**

Basin Name	TMDL	WLA <sub>ProcessWater</sub>	WLA <sub>CAFO</sub>	LA	MOS
Newport Bay <sup>1</sup>	88,819	7,397	1,526	79,896	Implicit

<sup>1</sup> This allocation includes the allocations for Ayer Creek/Kitts Branch, Newport Creek, and Marshall Creek.

**Table D8: MD 8-Digit Newport Bay Nitrogen Maximum Daily Load (lbs/day)**

Basin Name	MDL	WLA <sub>ProcessWater</sub>	WLA <sub>CAFO</sub>	LA	MOS
Newport Bay <sup>1</sup>	1,365	49	8	1,307	Implicit

<sup>1</sup> This allocation includes the allocations for Ayer Creek/Kitts Branch, Newport Creek, and Marshall Creek.

**Table D9: MD 8-Digit Newport Bay Average Annual Phosphorus TMDL (lbs/yr)**

Basin Name	TMDL	WLA <sub>ProcessWater</sub>	WLA <sub>CAFO</sub>	LA	MOS
Newport Bay <sup>1</sup>	13,589	2,268	251	11,070	Implicit

<sup>1</sup> This allocation includes the allocations for Ayer Creek/Kitts Branch, Newport Creek, and Marshall Creek.

**Table D10: MD 8-Digit Newport Bay Growing Season Phosphorus TMDL (lbs/growing season)**

Basin Name	TMDL	WLA <sub>ProcessWater</sub>	WLA <sub>CAFO</sub>	LA	MOS
Newport Bay <sup>1</sup>	6,673	955	125	5,594	Implicit

<sup>1</sup> This allocation includes the allocations for Ayer Creek/Kitts Branch, Newport Creek, and Marshall Creek.

**Table D11: MD 8-Digit Newport Bay Maximum Daily Phosphorus Load (lbs/day)**

Basin Name	MDL	WLA <sub>ProcessWater</sub>	WLA <sub>CAFO</sub>	LA	MOS
Newport Bay <sup>1</sup>	101.91	6.21	0.69	95.00	Implicit

<sup>1</sup> This allocation includes the allocations for Ayer Creek/Kitts Branch, Newport Creek, and Marshall Creek.

**Table D12: MD 8-Digit Newport Bay Baseline Nitrogen Load, TMDL, and Total Reduction Percentage**

Baseline Load (lbs/yr)	TMDL (lbs/yr)	Total Reduction (%)
216,382	185,471	14%

**Table D13: MD 8-Digit Newport Bay Baseline Phosphorus Load, TMDL, and Total Reduction Percentage**

Baseline Load (lbs/yr)	TMDL (lbs/yr)	Total Reduction (%)
14,287	13,589	5%

**Table D14: Ayer Creek/Kitts Branch Average Annual Nitrogen TMDL (lbs/yr)**

<b>Basin Name</b>	<b>TMDL</b>	<b>WLA<sub>ProcessWater</sub></b>	<b>WLA<sub>CAFO</sub></b>	<b>LA</b>	<b>MOS</b>
Ayer Creek/Kitts Branch	80,669	14,215	535	65,919	Implicit

**Table D15: Ayer Creek/Kitts Branch Growing Season Nitrogen TMDL (lbs/growing season)**

<b>Basin Name</b>	<b>TMDL</b>	<b>WLA<sub>ProcessWater</sub></b>	<b>WLA<sub>CAFO</sub></b>	<b>LA</b>	<b>MOS</b>
Ayer Creek/Kitts Branch	37,036	5,463	268	31,305	Implicit

**Table D16: Ayer Creek/Kitts Branch Nitrogen Maximum Daily Load (lbs/day)**

<b>Basin Name</b>	<b>MDL</b>	<b>WLA<sub>ProcessWater</sub></b>	<b>WLA<sub>CAFO</sub></b>	<b>LA</b>	<b>MOS</b>
Ayer Creek/Kitts Branch	622	39	1	581	Implicit

**Table D17: Ayer Creek/Kitts Branch Average Annual Phosphorus TMDL (lbs/yr)**

<b>Basin Name</b>	<b>TMDL</b>	<b>WLA<sub>ProcessWater</sub></b>	<b>WLA<sub>CAFO</sub></b>	<b>LA</b>	<b>MOS</b>
Ayer Creek/Kitts Branch	6,233	1,629	44	4,560	Implicit

**Table D18: Ayer Creek/Kitts Branch Growing Season Phosphorus TMDL (lbs/growing season)**

<b>Basin Name</b>	<b>TMDL</b>	<b>WLA<sub>ProcessWater</sub></b>	<b>WLA<sub>CAFO</sub></b>	<b>LA</b>	<b>MOS</b>
Ayer Creek/Kitts Branch	2,990	632	22	2,335	Implicit

**Table D19: Ayer Creek/Kitts Branch Phosphorus Maximum Daily Load (lbs/day)**

<b>Basin Name</b>	<b>MDL</b>	<b>WLA<sub>ProcessWater</sub></b>	<b>WLA<sub>CAFO</sub></b>	<b>LA</b>	<b>MOS</b>
Ayer Creek/Kitts Branch	48.97	4.46	0.12	44.39	Implicit

**Table D20: Ayer Creek/Kitts Branch Baseline Nitrogen Load, TMDL, and Total Reduction Percentage**

<b>Baseline Load (lbs/yr)</b>	<b>TMDL (lbs/yr)</b>	<b>Total Reduction (%)</b>
94,759	80,669	15%

**Table D21: Ayer Creek/Kitts Branch Baseline Phosphorus Load, TMDL, and Total Reduction Percentage**

<b>Baseline Load (lbs/yr)</b>	<b>TMDL (lbs/yr)</b>	<b>Total Reduction (%)</b>
6,043	6,233	0%

**Table D22: Newport Creek Average Annual Nitrogen TMDL (lbs/yr)**

<b>Basin Name</b>	<b>TMDL</b>	<b>WLA<sub>ProcessWater</sub></b>	<b>WLA<sub>CAFO</sub></b>	<b>LA</b>	<b>MOS</b>
Newport Creek	20,465	0	879	19,586	Implicit

**Table D23: Newport Creek Growing Season Nitrogen TMDL (lbs/growing season)**

<b>Basin Name</b>	<b>TMDL</b>	<b>WLA<sub>ProcessWater</sub></b>	<b>WLA<sub>CAFO</sub></b>	<b>LA</b>	<b>MOS</b>
Newport Creek	9,361	0	440	8,921	Implicit

**Table D24: Newport Creek Nitrogen Maximum Daily Load (lbs/day)**

<b>Basin Name</b>	<b>MDL</b>	<b>WLA<sub>ProcessWater</sub></b>	<b>WLA<sub>CAFO</sub></b>	<b>LA</b>	<b>MOS</b>
Newport Creek	177	0	2	175	Implicit

**Table D25: Newport Creek Average Annual Phosphorus TMDL (lbs/yr)**

<b>Basin Name</b>	<b>TMDL</b>	<b>WLA<sub>ProcessWater</sub></b>	<b>WLA<sub>CAFO</sub></b>	<b>LA</b>	<b>MOS</b>
Newport Creek	1,295	0	72	1,223	Implicit

**Table D26: Newport Creek Growing Season Phosphorus TMDL (lbs/growing season)**

<b>Basin Name</b>	<b>TMDL</b>	<b>WLA<sub>ProcessWater</sub></b>	<b>WLA<sub>CAFO</sub></b>	<b>LA</b>	<b>MOS</b>
Newport Creek	648	0	36	612	Implicit

**Table D27: Newport Creek Maximum Daily Load of Phosphorus (lbs/day)**

<b>Basin Name</b>	<b>MDL</b>	<b>WLA<sub>ProcessWater</sub></b>	<b>WLA<sub>CAFO</sub></b>	<b>LA</b>	<b>MOS</b>
Newport Creek	12.27	0.00	0.20	12.08	Implicit

**Table D28: Newport Creek Baseline Nitrogen Load, TMDL, and Total Reduction Percentage**

<b>Baseline Load (lbs/yr)</b>	<b>TMDL (lbs/yr)</b>	<b>Total Reduction (%)</b>
25,445	20,465	20%

**Table D29: Newport Creek Baseline Phosphorus Load, TMDL, and Total Reduction Percentage**

<b>Baseline Load (lbs/yr)</b>	<b>TMDL (lbs/yr)</b>	<b>Total Reduction (%)</b>
1,566	1,295	17%

**Table D30: Marshall Creek Average Annual Nitrogen TMDL (lbs/yr)**

<b>Basin Name</b>	<b>TMDL</b>	<b>WLA<sub>ProcessWater</sub></b>	<b>WLA<sub>CAFO</sub></b>	<b>LA</b>	<b>MOS</b>
Marshall Creek	30,827	3,836	1,124	25,867	Implicit

**Table D31: Marshall Creek Nitrogen Growing Season TMDL (lbs/growing season)**

Basin Name	TMDL	WLA <sub>ProcessWater</sub>	WLA <sub>CAFO</sub>	LA	MOS
Marshall Creek	16,796	1,934	562	14,300	Implicit

**Table D32: Marshall Creek Nitrogen Maximum Daily Load (lbs/day)**

Basin Name	MDL	WLA <sub>ProcessWater</sub>	WLA <sub>CAFO</sub>	LA	MOS
Marshall Creek	232	11	3	218	Implicit

**Table D33: Marshall Creek Average Annual Phosphorus TMDL (lbs/yr)**

Basin Name	TMDL	WLA <sub>ProcessWater</sub>	WLA <sub>CAFO</sub>	LA	MOS
Marshall Creek	2,425	639	92	1,694	Implicit

**Table D34: Marshall Creek Growing Season Phosphorus TMDL (lbs/growing season)**

Basin Name	TMDL	WLA <sub>ProcessWater</sub>	WLA <sub>CAFO</sub>	LA	MOS
Marshall Creek	1,208	322	46	840	Implicit

**Table D35: Marshall Creek Phosphorus Maximum Daily Load (lbs/day)**

Basin Name	MDL	WLA <sub>ProcessWater</sub>	WLA <sub>CAFO</sub>	LA	MOS
Marshall Creek	16.82	1.75	0.25	14.81	Implicit

**Table D36: Marshall Creek Baseline Nitrogen Load, TMDL, and Total Reduction Percentage**

Baseline Load (lbs/yr)	TMDL (lbs/yr)	Total Reduction (%)
33,766	30,827	9%

**Table D37: Marshall Creek Baseline Phosphorus Load, TMDL, and Total Reduction Percentage**

Baseline Load (lbs/yr)	TMDL (lbs/yr)	Total Reduction (%)
2,469	2,425	2%