

# State of Delaware Ambient Surface Water Quality Monitoring Program - FY 2010

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Department of Natural Resources and Environmental Control Watershed Assessment Branch



## **Executive Summary**

Delaware's Surface Water Quality Monitoring Program for Fiscal Year 2010 is described in this report. Delaware maintains a General Assessment Monitoring Network (GAMN) of 136 stations. GAMN stations are considered long term stations whose data is used to do long term status and trend assessments of water quality conditions of the State's surface waters and support compilation of Watershed Assessment Reports as mandated by the Clean Water Act under section 305(b). This plan implements an updated monitoring strategy that monitors 23 stations monthly, and the remaining stations either 6 or 12 times a year on a rotating basin basis. Some stations in selected watersheds are monitored for the dissolved forms of key metals in the water column.



## **Ambient Surface Water Quality Monitoring Program - FY 2010**

The purpose of the Ambient Surface Water Quality Monitoring Program is to collect data on the chemical, physical and biological characteristics of Delaware's surface waters. The information that is collected under this Program is used to:

- Describe general water quality conditions in the State;
- Identify long term trends in water quality;
- Determine the suitability of Delaware waters for water supply, recreation, fish and aquatic life, and other uses;
- Monitor achievement of water quality standards;
- Identify and prioritize high quality and degraded waters;
- Support Total Maximum Daily Load Program; and
- Evaluate the overall success of Delaware's water quality management efforts.

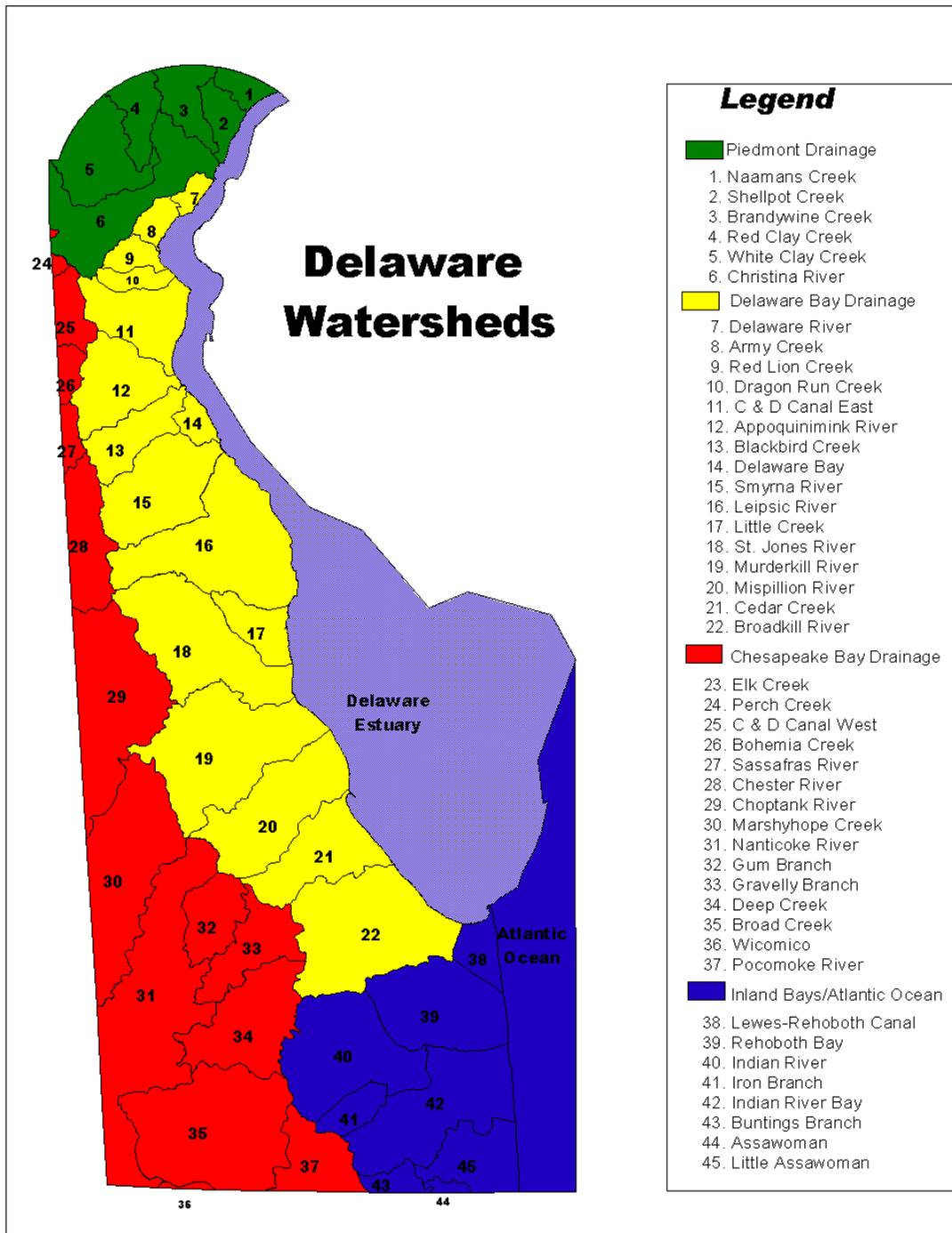
There are four major components to Delaware's Surface Water Quality Monitoring Program:

- General Assessment Monitoring
- Biological Assessment Monitoring
- Toxics in Biota Monitoring
- Toxics in Sediment Monitoring

This report discusses the General Assessment Monitoring and Biological Assessment Monitoring. Current Toxics in Biota and Sediment Monitoring plans are available on request.



**Figure 1 State of Delaware Basins**



## **Part I      The General Assessment Monitoring Network (GAMN)**

The General Assessment Monitoring Network (GAMN) provides for routine water quality monitoring of surface waters throughout Delaware. Each station is monitored for conventional parameters such as nutrients, bacteria, dissolved oxygen, pH, alkalinity, and hardness. Some stations are monitored for dissolved metals. See tables 2 and 3 for parameters and methods. The data from this monitoring is entered into the STORET database, is reviewed and then analyzed in assessing the water quality of each basin for the Watershed Assessment Report (CWA Section 305 (b) Report). The Department anticipates co-operating with EPA in migrating from the STORET platform to the new WQX platform.

The plan provides for monitoring at stations within each watershed in the state. The network was recently reviewed and updated. The review is discussed in section I.1. See also Table 1: FY 2010 Monitoring Plan and Schedule.

### **I.1    Changes for FY 10 and Out Year Surface Water Quality Monitoring Plan**

Over the past several years, a main objective of Watershed Assessment Section's Ambient Surface Water Quality Monitoring Program was to collect water quality data that could be used for developing and calibrating hydrodynamic and water quality models. These models were used to establish Total Maximum Daily Loads (TMDLs) for nutrients and bacteria in impaired waters of the State.

Now, with the establishment of nutrient and bacteria TMDLs for most impaired waters of the State, a major objective of the Ambient Surface Water Quality Monitoring Program during FY 10 (and beyond) is to collect appropriate data that can be used to track water quality changes and to determine if TMDL requirements are being met.

Considering this (and other emerging) needs, and since Department's monitoring budget is limited, the FY 10 surface water quality monitoring plan has been prepared with the following changes compared to the FY 08 monitoring plan:

1. Monitoring stations in the FY 08 monitoring plan were reviewed to determine which stations were critical to meet data needs and which could be dropped. Fifty stations were eliminated. The re-alignment showed a need for sixteen new stations that were added to the network.

Stations were assigned to one of the following categories:

- a. C1 – Category 1 stations are high priority stations that will be used for calculating annual loads or long-term trends. These stations are generally co-located with a USGS stream gaging station, or are located at the mouth of a tidal river. Because of importance of these stations, monitoring at these stations will be conducted monthly, regardless of priority basin schedule (23 stations)
  - b. C2 – Monitoring at Category 2 stations follow Priority Basin schedule.
2. A Rotating Basin Monitoring Plan is implemented. In this scheme of monitoring, the State is divided into 5 Monitoring Basins. Every year, two of the Basins are

considered “Priority Basins” and all stations in a Priority Basin are monitored monthly. Monitoring frequency for stations in other basins are conducted bimonthly. Priority Basin monthly monitoring will be conducted according to the following schedule:

- a. FY 2009 – Lower Delaware River/Bay, Piedmont
- b. FY 2010 – Piedmont, Chesapeake
- c. FY 2011 – Chesapeake, Inland Bays
- d. FY 2012 – Inland Bays, Upper Delaware River/Bay
- e. FY 2013 – Upper Delaware, Lower Delaware River/Bay

## **I.2 Objectives**

The objective of this monitoring is to collect water quality data for status and trends assessment on all basins within Delaware. The data will also be compared to water quality standards to assess designated use support, as mandated by Section 305(b) of the Clean Water Act. Finally, the data will be used to track progress toward achieving TMDL targets.

## **I.3 Scope of Monitoring**

Table 1 provides a listing of all stations to be monitored during FY 2010, and predicted sampling needs for upcoming fiscal years.

Table 2 provides a listing of parameters that will be monitored at all stations in the network. In order to calculate loading estimates, all free flowing wadeable stations in the network will be monitored for flow at the time of the sampling event unless the station is co-located with a United States Geological Survey stream gage.

Stations shown for metals testing in Table 1 shall be sampled according to the specifications in Table 3.

## **Part II Special Project Monitoring**

Special project monitoring is needed from time to time in specific watersheds to address specific concerns. These projects are generally short term in nature. The Department is not conducting any special projects during the FY 2010 monitoring year..

### **II.1 Special Surveys**

The purpose of special survey monitoring is to collect data that are not obtained using other monitoring activities and are needed for modeling purposes as described above. Special surveys include deployment of continuous monitors (YSI Data Sondes) and sediment sampling. No special survey sediment sampling is called for in this monitoring year.

### **II.2 Continuous Monitoring**

The Department is implementing a network of continuous water quality monitoring stations to collect data for dissolved oxygen and other parameters several times each day using YSI (or similar) datasondes. The data collected from the network will be used for

water quality and 305(b) reporting. At this time the Department envisions a rotating basin approach to using the monitors. The continuous monitoring started in the Piedmont Basin in calendar year 2009, and will proceed through the Chesapeake, Inland Bays and Delaware Bay drainages in the following calendar years. As the design and implementation of this network occurs, monitoring plans will be updated to reflect those decisions and techniques.

The Department has also put into place a special highly sophisticated on-site monitoring station/automated lab device to collect and analyze samples for nutrients and other parameters at the outlet to Millsboro Pond. The data from this station will be used to assess nutrient loads leaving the pond and entering the Delaware Inland Bays and thereby monitor TMDL implementation progress.

### **II.3 Special Considerations for Sampling in Tidal Waters**

In tidal waters, samples should be collected at (or near) low slack tide starting at the most downstream station moving upstream.

#### **Boat run surveys**

Boat run surveys should be conducted within one day of tributary sampling in the watershed.

### **Part III Biological and Habitat Monitoring for FY 2010**

The Department is working on a long-term project to collect biological and habitat data at or near STORET water quality monitoring stations to correlate water quality data with biological data. The Department is also in the process of revisiting sites that showed impacted biology in earlier assessments. These projects are expected to develop into an ongoing project.

### **Part IV Field and Laboratory Procedures**

Field procedures for sample collection activities are detailed in the Quality Assurance Management Plan, Environmental Laboratory Section, December 2002. Method references, STORET codes and reporting levels for parameters listed in Table 2 are from an Access database maintained by the Environmental Laboratory Section. Any deviation from standard field, laboratory procedures, or this sampling plan shall be documented with a complete description of the alteration.

### **Part V Quality Assurance, Documentation, Data Usage and Reporting**

The quality assurance objectives and quality control procedures for these surveys are documented in the Quality Assurance Management Plan, Environmental Laboratory Section, December 2002. A duplicate water column sample will be collected and analyzed on 10% of the samples from this project. All analytical results from the duplicate analyses shall be reported with the other data.

All analytical results shall be reported to the Watershed Assessment Section digitally and on paper (using standard Environmental Laboratory Section data report forms).

**Table 1 Station Locations, Descriptions Parameters and Sampling Frequency**

<b>STATION INFORMATION - FY 2010</b>	<b>Station</b>	<b>Category</b>	<b>Cu, Pb &amp; Zn</b>	<b>Fe</b>	<b>DIN &amp; DIP</b>	<b>Annual Samples</b>				
						<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
<b>PIEDMONT DRAINAGE</b>										
<b>Brandywine Creek</b>										
Brandywine Creek @ Foot Bridge in Brandywine Park	104011	C2	✓			12	12	6	6	6
Brandywine Creek @ New Bridge Rd. (Rd. 279)(USGS gage 01481500)	104021	C1	✓			12	12	12	12	12
Brandywine Creek @ Smith Bridge Rd. (Rd. 221)	104051	C2	✓			12	12	6	6	6
<b>Christina River</b>										
Christina River beneath Rt. 141 in Newport off Water St.	106021	C2	✓			12	12	6	6	6
Little Mill Creek @ DuPont Rd.	106281	C2	✓			12	12	6	6	6
Christina River @ Rt.13/9 Bridge	106011	C2	✓			12	12	6	6	6
Christina River @ Conrail Bridge (USGS tide gage 01481602)	106291	C1	✓			12	12	12	12	12
Christina River @ Nottingham Rd. (Rt. 273) above Newark	106191	C2	✓			12	12	6	6	6
Christina River @ Sunset Lake Rd. (Rt. 72) (USGS gage 01478000)	106141	C1	✓			12	12	12	12	12
Smalleys Dam Spillway @ Smalleys Dam Rd.	106031	C2	✓			12	12	6	6	6
<b>Red Clay Creek</b>										
Red Clay Creek @ W. Newport Pike (Rt. 4) Stanton (USGS gage 01480015)	103011	C2	✓			12	12	6	6	6
Burrough's Run @ Creek Rd. (Rt 82)	103061	C2	✓			12	12	6	6	6
Red Clay Creek @ Barley Mill Rd. (Rd. 258A) Ashland	103041	C2	✓			12	12	6	6	6
Red Clay Creek @ Lancaster Pike (Rt. 48) Wooddale (USGS gage 01480000)	103031	C1	✓			12	12	12	12	12
<b>White Clay Creek</b>										
White Clay Creek @ Delaware Park Blvd. (Race Track) (USGS gage 014790000)	105151	C1	✓			12	12	12	12	12
Mill Creek @ Delaware Park Blvd. (Race Track)	105071	C2	✓			12	12	6	6	6
Pike Creek @ Upper Pike Creek Rd. (Rd. 322)	105101	C2	✓			12	12	6	6	6
Pike Creek @ Paper Mill Rd. (Rt. 72)	105181	C2	✓			12	12	6	6	6
Middle Run @ Old Possum Park Rd. (Rd. 303)	105131	C2	✓			12	12	6	6	6
White Clay Creek @ McKees Lane	105171	C2	✓			12	12	6	6	6

<b>STATION INFORMATION - FY 2010</b>	<b>Station</b>	<b>Category</b>	<b>Cu, Pb &amp; Zn</b>	<b>Fe</b>	<b>DIN &amp; DIP</b>	<b>Annual Samples</b>				
						<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
White Clay Creek @ Chambers Rock Rd. (Rd. 329)	105031	C2	✓			12	12	6	6	6
<b>Naamans Creek</b>										
Naaman Creek @ State Line near Hickman Rd.	101021	C2				12	12	6	6	6
Naaman Creek @ RR crossing in Steel Plant	101041	C2				12	12	6	6	6
Naamans Creek at Rt 3 (Marsh Road)	101061	C2				12	12	6	6	6
<b>Shellpot Creek</b>										
Shellpot Creek @ Hay Rd. (Rd. 501)	102041	C2		✓		12	12	6	6	6
Rt. 13 Bus (Market Street) Bridge, USGS station is located about 700 ft downstream.	102051	C1				12	12	12	12	12
Shellpot Creek at Carr Road Bridge	102081	C2				12	12	6	6	6
<b>CHESAPEAKE BAY DRAINAGE</b>										
<b>Chester River</b>										
Sewell Branch @ Sewell Branch Rd. (Rd. 95)	112021	C2				6	12	12	6	6
<b>Choptank River</b>										
Cow Marsh Creek @ Mahan Corner Rd. (Rd. 208)	207021	C2				6	12	12	6	6
Tappahanna Ditch @ Sandy Bend Rd. (Rd. 222)	207081	C2				6	12	12	6	6
Culbreth Marsh Ditch @ Shady Bridge Rd. (Rd. 210)	207091	C2				6	12	12	6	6
White Marsh Branch @ Cedar Grove Church Rd. (Rd. 268)	207111	C2				6	12	12	6	6
<b>Marshyhope Creek</b>										
Marshyhope Creek @ Fishers Bridge Rd. (Rd. 308)	302031	C1				12	12	12	12	12
<b>Nanticoke River</b>										
Nanticoke River @ buoy 45 (near state line)	304071	C2	✓			6	12	12	6	6
Nanticoke River @ buoy 66 (confluence with DuPont Gut)	304151	C2	✓			6	12	12	6	6
Nanticoke River @ Seaford WWTF (near boat ramp)	304461	C2	✓			6	12	12	6	6
<b>Nanticoke River Tributaries</b>										
Racoon Prong @ Pepperbox Rd. (Rd. 66)	304671	C2	✓			6	12	12	6	6
Nanticoke River @ Rifle Range Rd. (Rd. 545)	304191	C1	✓			12	12	12	12	12
Concord Pond @ German Rd. (Rd. 516)	304311	C2	✓			6	12	12	6	6

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						<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
Williams Pond @ East Poplar St. (across from Hospital)	304321	C2	✓			6	12	12	6	6
Bucks Branch @ Conrail Rd. (Rd. 546)	304381	C2	✓			6	12	12	6	6
Nanticoke River @ Rt. 13	304471	C2	✓			6	12	12	6	6
Records Pond @ Willow St.	307011	C2	✓			6	12	12	6	6
Horseys Pond @ Sharptown Rd. (Rt. 24)	307171	C2	✓			6	12	12	6	6
Gravelly Branch @ Coverdale Rd. (Rd. 525)	316011	C2	✓			6	12	12	6	6
Trap Pond on Hitch Pond Branch @ Co. Rd. 449 or Trap Pond Rd	307081	C2	✓			6	12	12	6	6
Deep Creek above Concord Pond, near Old Furnace at Rd. 46	304591	C2	✓			6	12	12	6	6
Gravelly Branch at Deer Forest Road (Rd 565) on west edge of Redden State Forest Jester Tract		C2	✓			6	12	12	6	6
Broad Creek at Main Street in Bethel (Rd 493)	307031	C2	✓			6	12	12	6	6
Nanticoke River at Beach HWY (Ellendale Greenwood HWY) on east edge of Greenwood		C2	✓			6	12	12	6	6
<b>Pocomoke River</b>										
Pocomoke River @ Bethel Rd. (Rd. 419)	313011	C2				6	12	12	6	6
<b>DELAWARE BAY DRAINAGE</b>										
<b>Appoquinimink River</b>										
Drawyer Creek off DuPont Parkway. (Rt. 13) at parking area	109071	C2	✓			6	6	6	12	12
Shallcross Lake @ Shallcross Lake Rd. (Rd. 428)	109191	C2	✓			6	6	6	12	12
Silver Lake @ Silver Lake Rd. (Rd. 442)	109031	C2	✓			6	6	6	12	12
Noxontown Pond @ Noxontown Rd. (Rd. 38)	109131	C2	✓			6	6	6	12	12
Appoquinimink River @ DuPont Prkwy. (Rt. 13)	109041	C2	✓			6	6	6	12	12
Appoquinimink River @ MOT Gut (west bank)	109171	C2	✓			6	6	6	12	12
Deep Creek Br of Appoquinimink River at Rt. 71 Bridge (Middletown Natural Area), duplicate with 109081	109251	C1	✓			12	12	12	12	12
Appoquinimink River @ Silver Run Rd. (Rt. 9) NE side	109121	C2	✓			6	6	6	12	12
Appoquinimink River @ confluence with Delaware River	109091	C1	✓			12	12	12	12	12
<b>Army Creek</b>										
Army Creek @ River Rd. (Rt. 9)	114011	C2				6	6	6	12	12

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						<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
<b>Chesapeake &amp; Delaware Canal</b>										
C & D Canal @ DuPont Pky. (Rt. 13) St. Georges Bridge	108021	C2				6	6	6	12	12
Lums Pond @ Boat ramp	108111	C2				6	6	6	12	12
<b>Dragon Run</b>										
Dragon Creek @ Wrangle Hill Rd. (Rt. 9)	111011	C2				6	6	6	12	12
Dragon Creek @ S. DuPont Hgwy. (Rt. 13)	111031	C2				6	6	6	12	12
<b>Red Lion Creek</b>										
Red Lion Creek @ Bear Corbitt Rd. (Rt. 7)	107011	C2				6	6	6	12	12
Red Lion Creek @ Rt. 9	107031	C2				6	6	6	12	12
<b>Blackbird Creek</b>										
Blackbird Creek, Road 463 East of RR Tracks. USGS gage	110011	C1				12	12	12	12	12
Blackbird Landing Rd 455	110031	C2				6	6	6	12	12
Blackbird Creek @ Taylors Bridge Rd. (Rt. 9)	110041	C2				6	6	6	12	12
<b>Leipsic River</b>										
Garrisons Lake @ DuPont Highway (Rt. 13)	202021	C2				6	6	6	12	12
Leipsic River @ Denny St. (Rt. 9)	202031	C2				6	6	6	12	12
<b>Little River</b>										
Little River @ Bayside Dr. (Rt.9)	204031	C2				6	6	6	12	12
Little River @ N. Little Creek Rd. (Rt. 8)	204041	C2				6	6	6	12	12
<b>Smyrna River</b>										
Mill Creek @ Carter Rd. (Rd. 137)	201021	C2				6	6	6	12	12
Smyrna River @ Rt. 9 (Flemings Landing)	201041	C2				6	6	6	12	12
Duck Creek @ Smyrna Landing Rd. (Rd. 485)	201051	C2				6	6	6	12	12
201031 Mill Creek at Rt 6	201031	C2				6	6	6	12	12
201011 Mill Creek at Rt. 13	201011	C2				6	6	6	12	12
Providence Creek @ Duck Creek Rd. (Rt.15)	201161	C2				6	6	6	12	12
<b>Broadkill River</b>										
Ingram Branch, Savannah Ditch @ Rd. 246	303011	C2				12	6	6	6	12
Ingram Branch @ Rd. 248	303021	C2				12	6	6	6	12
Rt. 5 Bridge	303031	C1				12	12	12	12	12
Rt. 1 Bridge (Mainstem)	303041	C2				12	6	6	6	12

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						<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
Broadkill River 0.10 Miles From Mouth of Broadkill	303061	C1				12	12	12	12	12
Red Mill Pond at Rt. 1	303051	C2				12	6	6	6	12
Beaverdam Creek at Rd. 88	303171	C1				12	12	12	12	12
Beaverdam Creek above Rd. 259, Hunters Mill Pond	303181	C2				12	6	6	6	12
Round Pole Branch at Rd. 88	303311	C2				12	6	6	6	12
Waples Pond at Rt. 1	303331	C2				12	6	6	6	12
Pemberton Branch at Rt. 30 above Wagamons Pond	303341	C2				12	6	6	6	12
Sowbridge Branch at Rd. 212, Waples Pond	303381	C2				12	6	6	6	12
<b>Cedar Creek</b>										
Swiggetts Pond @ Cedar Creek Rd. (Rt. 30)	301021	C2				12	6	6	6	12
Cedar Creek @ Coastal Hgwy. (Rt. 1)	301031	C2				12	6	6	6	12
Cedar Creek @ Cedar Beach Rd. (Rt. 36)	301091	C2				12	6	6	6	12
<b>Mispillion River</b>										
Mispillion River @ Rt. 1	208021	C2				12	6	6	6	12
Mispillion River/Cedar Creek confluence @ Lighthouse	208061	C1				12	6	6	6	12
Mispillion River @ mouth of Fishing Branch	208121	C2				12	6	6	6	12
Abbotts Pond @ Abbotts Pond Rd. (Rd. 620)	208181	C2				12	6	6	6	12
Silver Lake @ Maple Ave.	208211	C2				12	6	6	6	12
Beaverdam Branch @ Deep Grass Ln. (Rd. 384)	208231	C2				12	6	6	6	12
<b>Delaware Bay</b>										
Roosevelt Inlet, Mouth	401011	C2				12	6	6	6	12
<b>Murderkill River</b>										
Murderkill River @ confluence of Black Swamp Creek at Rt. 13	206011	C1	✓			12	12	12	12	12
Browns Branch @ Milford - Harrington Hwy. (Rt. 14)	206041	C2	✓			12	6	6	6	12
Murderkill River @ Bay Rd. (Rt. 1/113)	206091	C2	✓			12	6	6	6	12
Murderkill River @ Bowers Beach Wharf (mouth)	206101	C1	✓			12	12	12	12	12
Murderkill River near levee @ Milford Neck Wildlife Area (3.25 miles from mouth)	206141	C2	✓			12	6	6	6	12
Murderkill River @ confluence of Kent County WWTF discharge ditch	206231	C2	✓			12	6	6	6	12

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						<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
McColley Pond @ Canterbury Rd. (Rt. 15)	206361	C2	✓			12	6	6	6	12
Coursey Pond @ Canterbury Rd. (Rt. 15)	206451	C2	✓			12	6	6	6	12
McGinnis Pond @ McGinnis Pond Rd. (rd. 378)	206461	C2	✓			12	6	6	6	12
Double Run @ Barretts Chapel Rd. (rd. 371)	206561	C2	✓			12	6	6	6	12
<b>St. Jones River</b>										
St. Jones River @ Barkers Landing	205041	C2				6	6	6	12	12
St. Jones River @ Rt. 10	205091	C2				6	6	6	12	12
Fork Branch @ State College Rd. (Rd. 69)	205151	C2				6	6	6	12	12
Moore's Lake @ S. State St.	205181	C2				6	6	6	12	12
Silver Lake @ Spillway (Dover City Park)	205191	C1				12	12	12	12	12
St. Jones at Bowers Beach, mouth to Del. Bay.	205011	C1				12	12	12	12	12
Derby Pond @ Rt. 13A	205211	C2				6	6	6	12	12
<b>INLAND BAYS DRAINAGE</b>										
<b>Tributary Stations</b>										
Burton Pond @ Rt. 24	308031	C2	✓		✓	6	6	12	12	6
Millsboro Pond @ Rt. 24	308071	C1	✓		✓	12	12	12	12	12
Pepper Creek @ Rt. 26 (Main St.)	308091	C2	✓		✓	6	6	12	12	6
Blackwater Creek @ Omar Rd. (Rd. 54)	308361	C2	✓		✓	6	6	12	12	6
Dirickson Creek @ Old Mill Bridge Rd. (Rd. 381)	310031	C2	✓		✓	6	6	12	12	6
<b>Bunting Branch</b>										
Buntings Branch @ Rt. 54 (Polly Branch Rd.)	311041	C2	✓		✓	6	6	12	12	6
<b>Guinea Creek</b>										
Guinea Creek @ Banks Rd. (Rd. 298)	308051	C2	✓		✓	6	6	12	12	6
<b>Iron Branch</b>										
Whartons Branch @ Rt. 20 (Dagsboro Rd.)	309041	C2	✓		✓	6	6	12	12	6
<b>Lewes &amp; Rehoboth Canal</b>										
Lewes & Rehoboth Canal @ Rt. 9	305041	C2	✓		✓	6	6	12	12	6
<b>Little Assawoman Canal</b>										
Little Assawoman Bay @ Rt. 54 (The Ditch)	310011	C2	✓		✓	6	6	12	12	6
White Creek @ mouth of Assawoman Canal	312011	C2	✓		✓	6	6	12	12	6
Assawoman Canal @ Muddy Neck Rd.	312041	C2	✓		✓	6	6	12	12	6

<b>STATION INFORMATION - FY 2010</b>	<b>Station</b>	<b>Category</b>	<b>Cu, Pb &amp; Zn</b>	<b>Fe</b>	<b>DIN &amp; DIP</b>	<b>Annual Samples</b>				
						<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
(Rd. 361)										
<b>Love Creek</b>										
Bundicks Branch @ Rt. 23	308371	C2	✓		✓	6	6	12	12	6
<b>Miller Creek</b>										
Beaver Dam Ditch @ Beaver Dam Rd. (Rd. 368)	310121	C1	✓		✓	12	12	12	12	12
<b>Stockley Branch/Cow Bridge</b>										
Cow Bridge Branch @ Zoar Rd. (Rd. 48)	308281	C2	✓		✓	6	6	12	12	6
<b>Swan Creek</b>										
Swan Creek @ Mount Joy Rd. (Rd. 297)	308341	C2	✓		✓	6	6	12	12	6
<b>Vines Creek</b>										
<b>Ocean Boundary Stations</b>										
Lewes & Rehoboth Canal @ Rt. 1	305011	C2	✓		✓	6	6	12	12	6
Indian River Inlet @ Coast Guard Station	306321	C1	✓		✓	12	12	12	12	12
<b>Boat Run Stations</b>										
Rehoboth Bay @ Buoy 7	306091	C2	✓		✓	6	6	12	12	6
Masseys Ditch @ Buoy 17	306111	C2	✓		✓	6	6	12	12	6
Indian River Bay @ Buoy 20	306121	C1	✓		✓	12	12	12	12	12
Indian River @ Buoy 49 (Swan Creek)	306181	C2	✓		✓	6	6	12	12	6
Indian River @ Island Creek	306331	C2	✓		✓	6	6	12	12	6
Island Creek upper third	306341	C2	✓		✓	6	6	12	12	6
Little Assawoman Bay Mid-bay (Ocean Park Lane)	310071	C2	✓		✓	6	6	12	12	6

**Table 2 Water Quality Parameters to be analyzed at all Stations in the Monitoring Network, FY 2010**

<i>Parameter</i>	<i>Method Reference (EPA)</i>	<i>Reporting Level<sup>1</sup></i>
<b><i>Water Column Nutrients</i></b>		
Total Phosphorus	EPA365.1 M	0.005 mg/l P
Soluble Ortho-phosphorus	EPA365.1	0.005 mg/l P
Ammonia Nitrogen	EPA350.1	0.005 mg/l N
Nitrite+Nitrate N	EPA353.2	0.005 mg/l N
Total N	SM 4500 NC	0.08 mg/l N
<b><i>Carbon and Organics</i></b>		
Total Organic Carbon	EPA415.1	1 mg/l
Dissolved Organic Carbon	EPA415.1	1 mg/l
Chlorophyll-a (Corr)	EPA 445.0	1 µg/l
<b><i>Biochemical Oxygen Demand</i></b>		
BOD <sub>5</sub> , N-Inhib (CBOD)	SM20 <sup>th</sup> ed-5210B	2.4 mg/l
BOD <sub>20</sub> , N-Inhib (CBOD)	SM20 <sup>th</sup> ed-5210B	2.4 mg/l
<b><i>General</i></b>		
Dissolved oxygen – Winkler <sup>2</sup>	EPA360.2	0.25 mg/l
Dissolved oxygen – Field	EPA360.1	0.1 mg/l
Total Suspended Solids	EPA160.2	2 mg/l
Alkalinity	EPA310.1	1 mg/l
Hardness	EPA130.2	5 mg/l
Field pH	EPA150.1	0.2 pH units
Conductivity – Field	EPA120.1	1 µS/cm
Salinity	SM20 <sup>th</sup> ed-2520B	1 ppt
Temperature	EPA170.1	°C
Secchi Depth <sup>3</sup>	EPA/620/R-01/003	meters
Light Attenuation <sup>4</sup>	EPA/620/R-01/003	%
Turbidity	EPA180.1	1 NTU
Chloride	EPA325.2	1 mg/l
<b><i>Bacteria</i></b>		
Enterococcus	SM20 <sup>th</sup> ed-9230C	1 cfu/100 ml

- <sup>1</sup> As documented in the ELS Quality Assurance Management Plan, the ELS defines the Limit of Quantitation (LOQ) as the lowest standard in the calibration curve or, in instances where a standard curve is not specified by the procedure, LOQ represents the limitations of the method. For those tests where reference spiking material exists, the ELS measures Method Detection Limit (MDL), as defined in the Federal Register 40 CFR Part 136 Appendix B. MDL values are generated or verified once per year. Results less than the MDL are considered to be not detected and “< MDL” is reported. Results greater than the MDL but less than the LOQ are qualified with a J to indicate a result that is extrapolated or estimated. For tests where MDL is not applicable, results less than the LOQ are reported as “< LOQ”, ELS MDLs meet or exceed (i.e. are lower than) the reporting level requirements listed in Table 3.
- <sup>2</sup> Secchi Depth to be measured at designated stations.
- <sup>3</sup> Light attenuation to be conducted as practical to obtain correlation with Secchi disk readings

**Table 3 Metals Parameters**

<i>Dissolved Metals (dissolved and total)</i>	<i>Method Reference (EPA)</i>	<i>Reporting Level</i>
Copper	EPA 200.7 M	5.0 ug/l
Lead	EPA 200.7 M	3.0 ug/l
Zinc	EPA 200.7 M	10 ug/l
Iron	EPA 200.7 M	100 ug/l