

# Joint STAC-MACC Meeting

June 17, 2019

Eutrophication Model Development  
Monitoring Updates 2019

Delaware River Basin  
Commission

West Trenton, NJ

June 17, 2019



**Delaware River Basin Commission**

DELAWARE • NEW JERSEY  
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UNITED STATES OF AMERICA

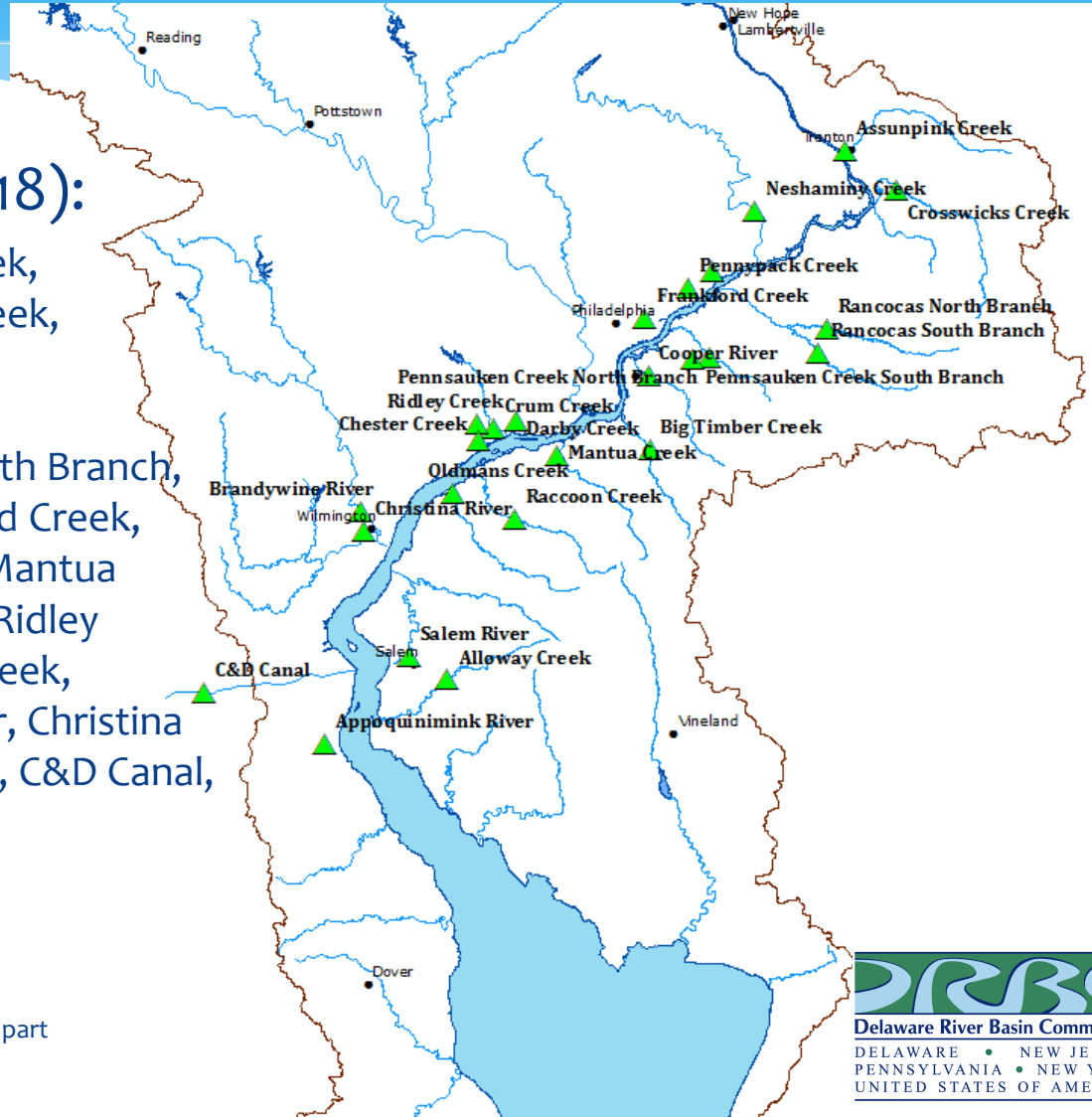


Presented to an advisory committee of the DRBC on June 17, 2019. Contents should not be published or re-posted in whole or in part without the permission of DRBC.

# Tributary Nutrient Monitoring

- \* Completed monitoring in 2018 starting from April and ending in November;
  - \* Monitored once per month at 25 tributary sites from Zones 3-5 and at slack tide at sites located at or below the head-of-tide;
  - \* In 2019, started monitoring in March since snow did not deter us from monitoring unlike 2018.
- \* Laboratory results from 2018 available for download in STORET.
- \* Data used to calculate preliminary nutrient loading estimates for DRBC's Expert Panel meeting in March of 2019.

# Tributary Nutrient Monitoring



## \* 2019 site list (same as 2018):

- \* Assunpink Creek, Neshaminy Creek, Crosswicks Creek, Poquessing Creek, Pennypack Creek, North Branch Pennsauken Creek, South Branch Pennsauken Creek, Rancocas North Branch, Rancocas South Branch, Frankford Creek, Cooper River, Big Timber Creek, Mantua Creek, Crum Creek, Darby Creek, Ridley Creek, Chester Creek, Raccoon Creek, Oldmans Creek, Brandywine River, Christina River, Salem River, Alloway Creek, C&D Canal, and Appoquinimink River

# Tributary Nutrient Monitoring

- \* Following parameters are analyzed at all sites:
  - \* Chemical Oxygen Demand, Chloride, Ammonia, Nitrate-Nitrite, Total Kjeldahl Nitrogen, Soluble Kjeldahl Nitrogen, Alkalinity, Total Suspended Solids, Total Solids, Total Fixed Solids, Total Volatile Solids, Total Organic Carbon, Dissolved Organic Carbon, Orthophosphate, Total Phosphorus, and Chlorophyll-a
- \* Following parameters are analyzed at a subset of sites (largest nutrient load contribution/spatial coverage):
  - \* Total Silica, Dissolved Silica, CBOD-5, Particulate Inorganic Phosphorus
- \* Parameter list was adjusted after March Expert Panel meeting;
  - \* Silica monitoring initiated at subset of sites, CBOD-20 removed for subset of sites, and CBOD-5 added for all sites.

# Delaware River at Trenton & Schuylkill Monitoring

- \* Monitor twice per month at the Calhoun Street Bridge in Trenton, NJ and Falls Bridge in Philadelphia, PA;
- \* Started monitoring the Delaware at Calhoun Street Bridge twice per month in January 2017 and added the Schuylkill River for the intensive-monitoring period (2018-2019);
- \* Delaware at Trenton and Schuylkill River account for the largest freshwater inflows to the Delaware Estuary.

# Delaware River at Trenton & Schuylkill Monitoring

- \* Composite samples collected and analyzed for a number of nutrient species and conventional pollutants;
- \* Parameter list includes:
  - \* Chemical Oxygen Demand, Chloride, Ammonia, Nitrate-Nitrite, Total Kjeldahl Nitrogen, Soluble Kjeldahl Nitrogen, Alkalinity, Total Suspended Solids, Total Solids, Total Fixed Solids, Total Volatile Solids, Total Organic Carbon, Dissolved Organic Carbon, Orthophosphate, Total Phosphorus, Sulfate, and Chlorophyll-a
  - \* Dropped CBOD-20 at 30 degrees C (amended method per Expert Panel recommendation) at the end of 2018 after running into many issues with the test and added the CBOD-20 standard method;
  - \* Parameter list refined after March Expert Panel meeting in which CBOD-20 was dropped entirely and CBOD-5 replaced the 20-day test.



# Delaware River at Trenton & Schuylkill Monitoring

- \* Results from 2018 monitoring at the Delaware River at Calhoun Street Bridge available in STORET;
- \* On-schedule with all 2019 bi-weekly monitoring;
- \* Monitoring one of two monthly events concurrently with DRBC's intensive Tributary Nutrient Monitoring project;
- \* Collecting Ultimate BOD samples from these sites twice per month (to be discussed).
- \* Used 2017-2018 data to estimate nutrient loadings for March Expert Panel Meeting

# Additional Point-Discharge Monitoring

- \* Round 1 of Point-Discharge Monitoring started in 2011-2015 in order to later categorize dischargers into tiers (71 facilities):
  - \* Tier 1 dischargers:
    - \* Contribute top 95% of total load for Ammonia-N, TKN, or BOD<sub>5</sub>
    - \* 12 facilities identified (one sample per week)
  - \* Tier 2 dischargers:
    - \* Contribute top 95% of total load for TP, SRP, Nitrate-N, or TN
    - \* 20 facilities identified (one sample per month)
  - \* Tier 3 dischargers:
    - \* Remaining 39 facilities
    - \* No additional monitoring required (will use existing dataset)
- \* Goal is to estimate loadings of nutrients from individual facilities during model calibration period of 2018-2019;



# Additional Point-Discharge Monitoring

- \* Tier 1 Facilities (weekly monitoring starting March 2018):
  - \* Philadelphia Water Department Southwest
  - \* Philadelphia Water Department Northeast
  - \* Philadelphia Water Department Southeast
  - \* Lower Bucks County Joint Municipal Authority
  - \* DELCORA
  - \* Morrisville Borough Municipal Authority
  - \* Camden County Municipal Utilities Authority
  - \* Gloucester County Utilities Authority
  - \* Hamilton Township – Wastewater Utility
  - \* Trenton Sewer Utility
  - \* Willingboro Municipal Utilities Authority
  - \* City of Wilmington, Department of Public Works

# Additional Point-Discharge Monitoring

## \* Tier 2 Facilities (monthly monitoring starting April 2018):

- \* Bristol Borough Water & Sewer Authority
- \* GROWS Landfill, Waste Management
- \* Mt. Holly Municipal Utilities Authority
- \* Paulsboro Refining Company
- \* Delran Sewerage Authority
- \* Valtris Specialty Chemicals
- \* City of Millville Sewage Treatment Authority
- \* Cumberland County Utilities Authority
- \* Bordentown Sewerage Authority
- \* Moorestown Township WWTP
- \* Burlington City STP
- \* Florence Township STP

- \* Riverside Water Reclamation Authority
- \* Chemours Chambers Works
- \* Mt. Laurel Municipal Utilities Authority
- \* Pennsville Sewerage Authority
- \* Cinnaminson Sewerage Authority
- \* Delaware City Refining
- \* Kent County Dept. of Public Works

# Additional Point-Discharge Monitoring

- \* DRBC sent FAQ sheet and Electronic Data Deliverable (EDD) template to the Tier 1 & Tier 2 facilities early 2018;
- \* Updated FAQ sheet sent to facilities in April of 2019 after March Expert Panel meeting;
- \* Laboratory reports and EDDs required for all facilities;
- \* Submitted monitoring data is reviewed by DRBC;
- \* Most facilities are on-track with monitoring.

# Additional Point-Discharge Monitoring

- \* Dropped CBOD-20 standard method, CBOD-20 amended method, and whole water ammonia

Analytical Parameter	Units	Filtered, Unfiltered, or Both	Sample Type
Total Phosphorus (TP)	mg/L as P	Unfiltered	24-hour composite
Total Kjeldahl Nitrogen (TKN)	mg/L as N	Unfiltered	24-hour composite
Nitrate Nitrogen (NO <sub>3</sub> -N)	mg/L as N	Unfiltered	24-hour composite
Nitrite (NO <sub>2</sub> -N)	mg/L as N	Unfiltered	24-hour composite
20-day BOD (BOD <sub>20</sub> )	mg/L	Unfiltered	24-hour composite
5-day Carbonaceous BOD (CBOD <sub>5</sub> )	mg/L	Unfiltered	24-hour composite
Chemical Oxygen Demand (COD)	mg/L	Unfiltered	24-hour composite
Dissolved Organic Carbon (DOC)	mg/L	Filtered	24-hour composite
Total Organic Carbon (TOC)	mg/L	Unfiltered	24-hour composite
Total Suspended Solid (TSS)	mg/L	Unfiltered	24-hour composite
Soluble Reactive Phosphorus (SRP)	mg/L as P	0.45 $\mu$ m membrane filter	24-hour composite
Soluble Kjeldahl Nitrogen (SKN)	mg/L as N	0.45 $\mu$ m membrane filter	24-hour composite
Ammonia Nitrogen (NH <sub>3</sub> -N)	mg/L as N	0.45 $\mu$ m membrane filter	24-hour composite
Discharge Flow*	MGD	N/A	24-hour mean or higher frequency
Water Temperature	°C	N/A	24-hour mean
Dissolved Oxygen	mg/L	N/A	24-hour mean
pH	1-14	N/A	24-hour mean
Specific Conductance or TDS	$\mu$ S/cm or mg/L	N/A	24-hour mean



Presented to the joint STAC-MACC meeting on May 31, 2018. Contents should not be published or re-posted in whole or in part without permission of DRBC.

# Eutrophication Model Development Monitoring 2019

\* Discussion & Questions?