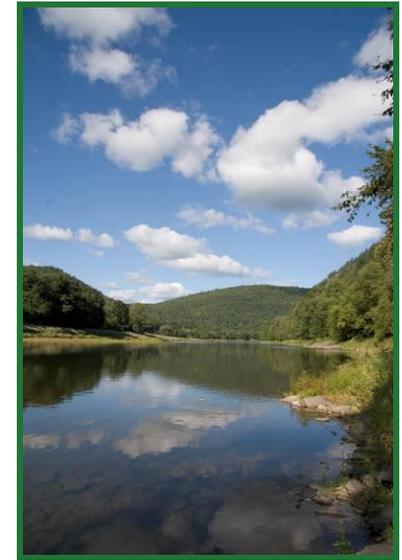


Delaware River Basin Commission

DRBC Monitoring Advisory and Coordination Committee (MACC) Meeting

*John Heinz National Wildlife
Refuge
Philadelphia, PA*

January 14, 2016

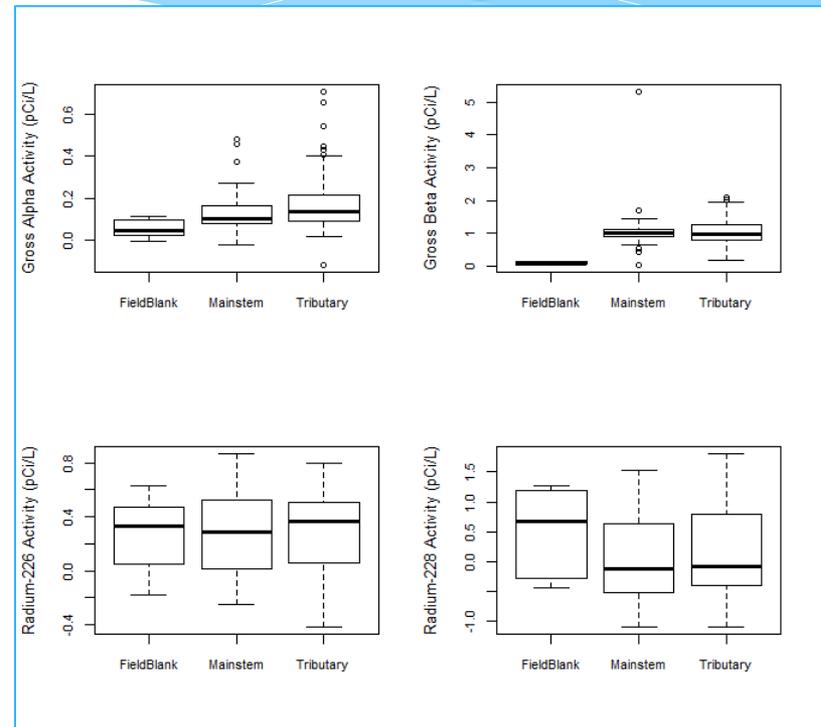


Delaware River Basin Commission

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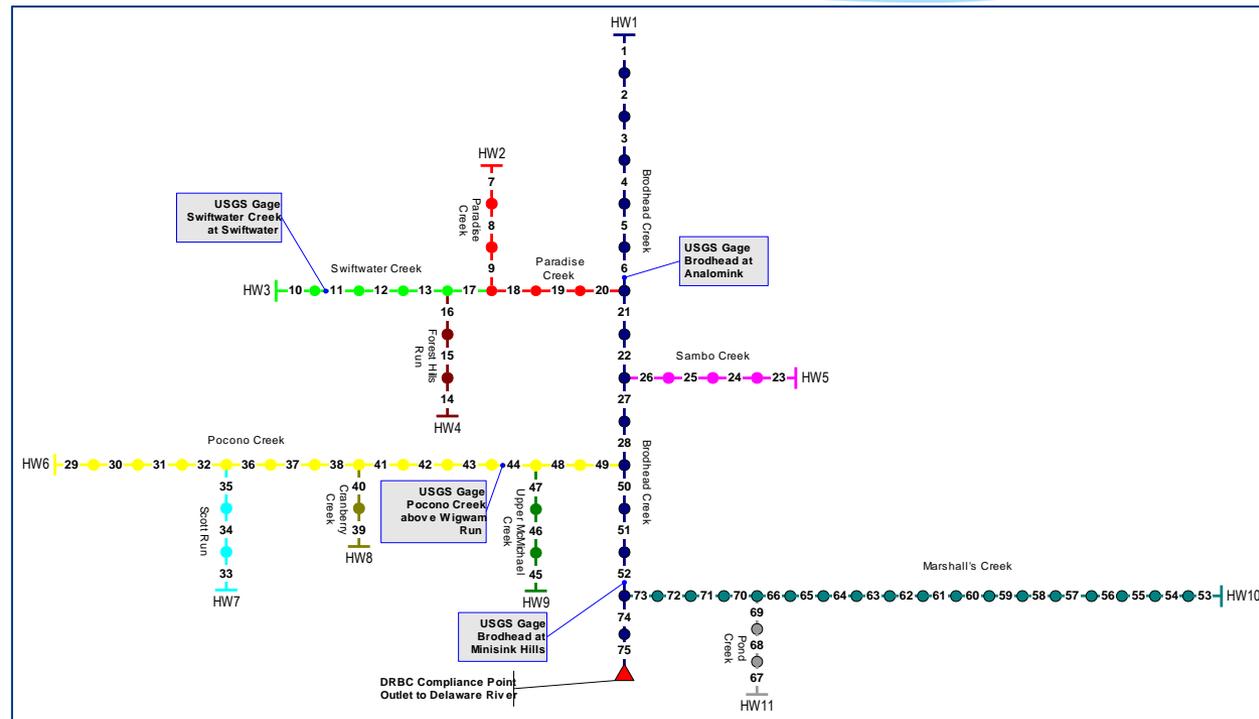
Baseline Radiochemistry Monitoring

- * January 2014 through May 2015
- * 5 Sampling events
- * 32 locations – Upper basin
- * William Penn Foundation under Grant #56-13
- * Gross alpha & gross beta
- * Radium -226 + Radium-228
- * all results in all locations well below the DRBC water quality standards for alpha and beta
- * Report and data on DRBC web site at http://www.nj.gov/drbc/library/documents/BaselineRadiochemReport_October2015.pdf



Nutrient Monitoring in Brodhead (PA), Neversink (NY), and Lehigh (PA)

- * Performed 2014 and 2015
- * Surface water samples rivers and tributaries for 3 major SPW Model areas
- * Nutrients and related parameters (10 parameters) for QUAL2K model refinement and upgrade
- * Brodhead – 26 sites x 4 events
- * Lehigh – 17 sites x 2 events
- * Neversink – 11 sites x 2 events
- * Data in STORET now

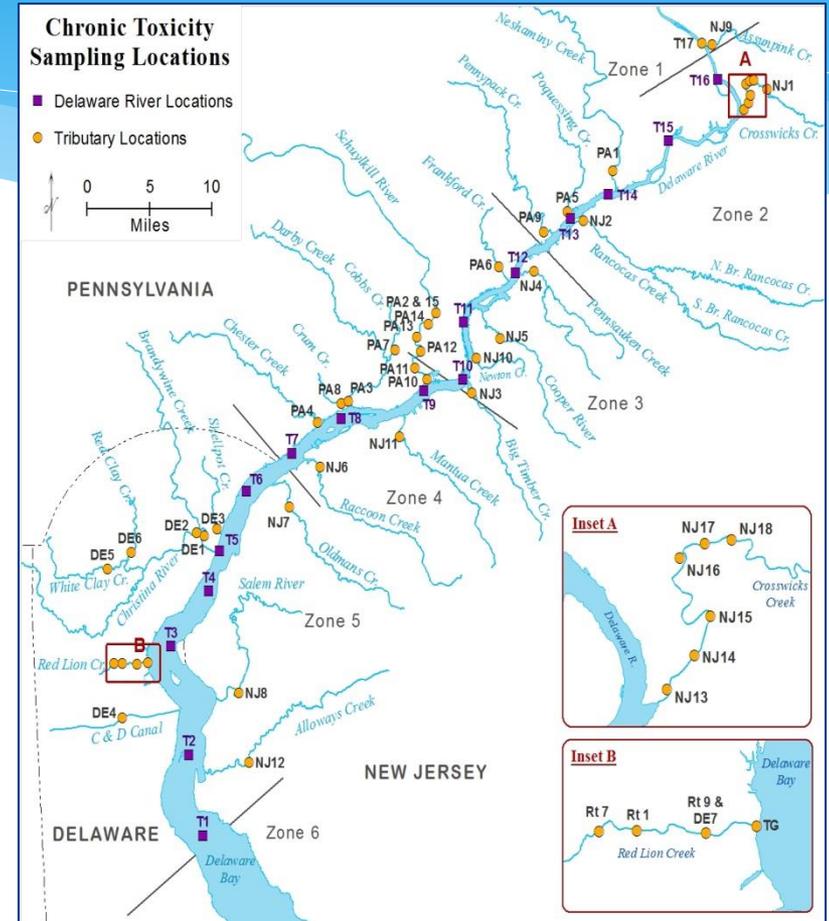


Point Discharge Effluent Nutrient Monitoring

- * Estuary focused
- * Commission resolution 2010-5 on July 14, 2010
- * Facilities > 1 MGD: monthly for 2 years (55 facilities)
- * Facilities < 1 MGD: quarterly for 2 years (28 facilities)
- * Wrapping up – report for nutrients within a year
- * Report for UBOD within next 2 years
- * Total Phosphorus, Soluble Reactive Phosphorus
- * Ammonia, Nitrate, Nitrite, Total Kjeldahl Nitrogen, Soluble Kjeldahl Nitrogen
- * BOD-5 day, CBOD-5 day, CBOD-20 day
- * Discharge flow, Temperature, D.O., Conductivity, pH
- * Ultimate BOD (UBOD) by the 21 discharges with largest BOD loads twice (1 summer, 1 winter) method development

Ambient Toxicity

- Surface Water Samples
- Laboratory Tests using USEPA Short-Term Chronic Methods
- Screening and Confirmatory level tests
- Freshwater and Estuarine species
- 1990 to present
- Nine sites sampled in 2015 in cooperation with DNREC WATAR program in Red Clay Creek; White Clay Creek; tidal Christina and Brandywine Rivers
- Sampling proposed for 2016 in Slaughter Creek and Prime Hook Creek with DNREC WATAR



1990 - 2014

Special Monitoring for PCBs, DxFs, Pesticides



- Sampling was conducted during two days August 3rd and 5th, 2015. In the Delaware Estuary and Bay at 21 locations
- Samples were collected at 0.6 depth of the water column and analyzed for the particulate and whole water fractions
- Monitoring of these parameters have been conducted since 2001 at these locations

Special Monitoring in 2016

- * Sediment grab sample
 - * ~ 50 locations in Estuary
 - * Analyzed for PCBs and DxFs
 - * Collect sediment samples from 15 sites in Zones 2 - 6 for PFC
- * Tributary water sample
 - * ~ 25 tributaries into Estuary
 - * Analyzed for PCBs

Near Real-Time Dashboards

- * Dashboards depicting near real time conditions for flow, water quality, storage
- * Programs automate retrieving and processing data from continuous real-time monitors, developing graphs, posting to web page
- * Overnight, every night
- * Flows: <http://drbc.net/Sky/flows.htm>
- * Water Quality: <http://drbc.net/Sky/waterq.htm>

NOAA PORTS Salinity Upgrades

- * Cooperative agreement DRBC, NOAA
- * Adding continuous real-time salinity to NOAA PORTS stations at Lewes, DE, Cape May, NJ and Chesapeake City, MD (C&D Canal) – tidal boundaries;
- * Will improve estimates of estuary salt flux;
 - * Estuary modeling;
 - * Salt line management;
- * Agreement approved by NOAA January 7th;
- * Expected installation Spring 2016

Scenic Rivers Monitoring

- * Lower Delaware Measurable Change Assessment (in review)

Chloride, conductivity, some E. coli increased, all else same or improved

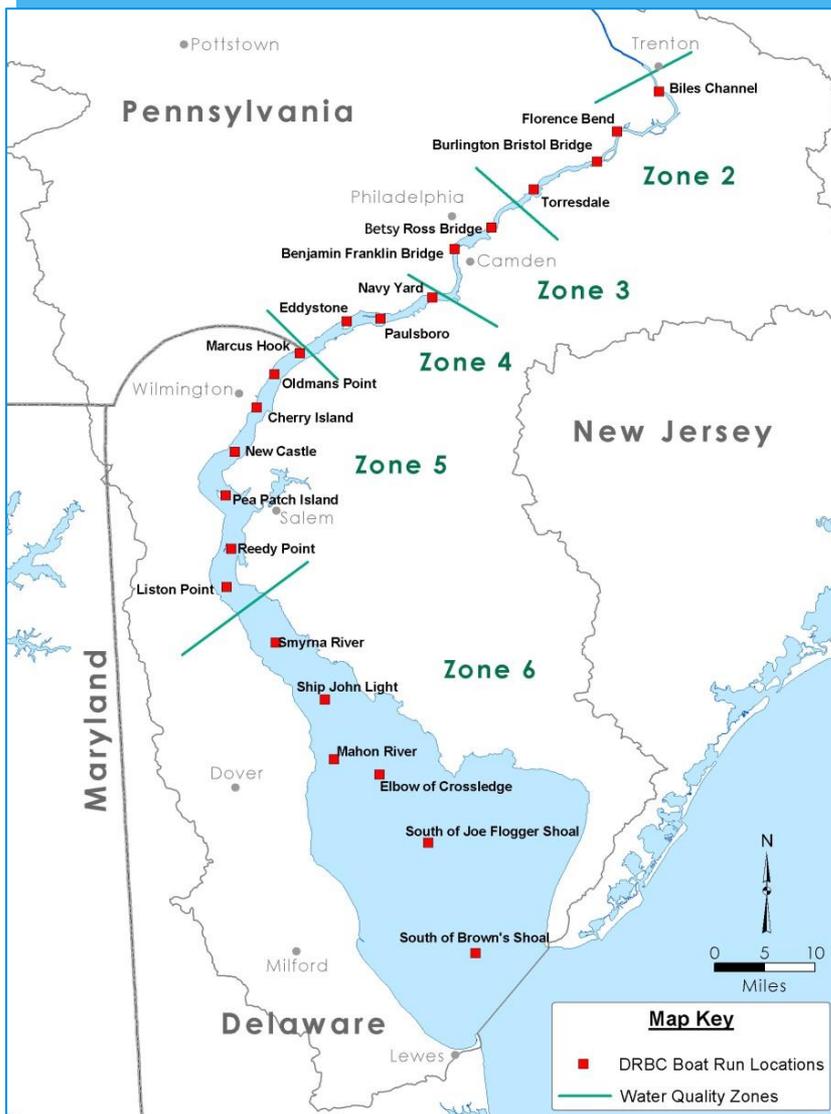
- * Upper and Middle Delaware Site-Specific Existing Water Quality Atlas (in review)

57 new control points: 18 ICP, 39 BCP
DRBC, USGS and State data for EWQ

- * 2016 May-September water quality (n=10) at 15 sites:

Delaware at Trenton
Alexauken Creek, NJ
Hakihokake Creek, NJ
Cherry Creek, PA
Delaware at Portland
Delaware at I-80
Flat Brook at Flatbrookville, NJ
Delaware at DEWA N. Bdy.
Delaware at Millrift
Mill Brook, NY
Halfway Brook, NY
Beaver Brook, NY
Little Equinunk Creek, PA
Basket Creek, NY
Delaware at Lordville

Boat Run



- * April – Oct. (7x /year)
- * 22 stations
 - * Standard physical / chemical
 - * Nutrients
 - * Metals
 - * Bacteria
- * Tritium handout
- * PAH handout
- * [Boat Run Explorer app](#)

Winter Estuary Ammonia Monitoring

- * Question: Is ammonia building up over winter due to lower oxidation rate?
- * Targeting Jan – Feb 2016
- * 9 urban mainstem estuary sites (from shore)
- * 4 sampling events
- * Ammonia
- * NO₂+NO₃
- * TKN
- * QAPP approved by EPA January 7th

Estuary Tributary Nutrient Monitoring

- * Evaluated tributary nutrient load estimates using USGS SPARROW model DSS system
- * Monitoring to refine SPARROW estimates, nutrient species
- * Line item in 106 Grant application
- * Summer 2016 most likely
- * Still under development – no additional details at this time.

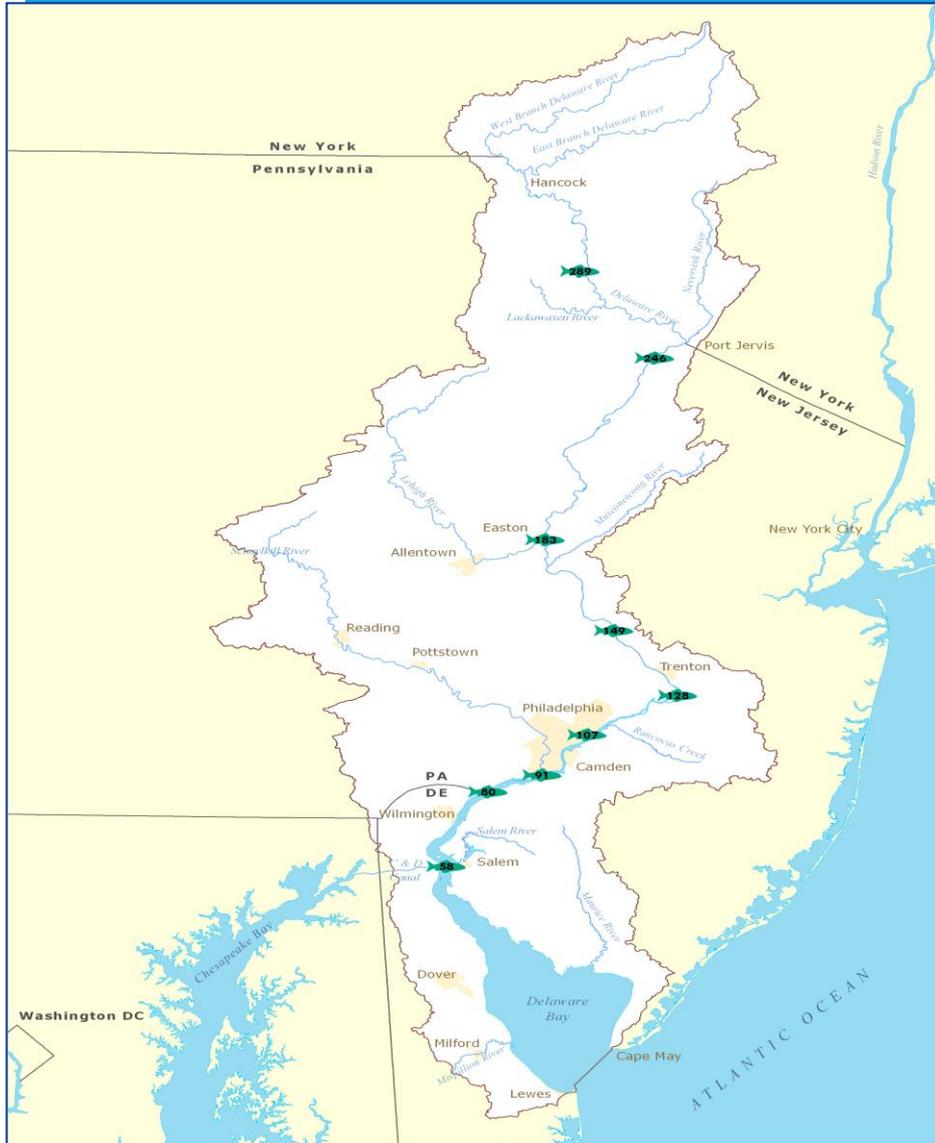
Delaware River Biomonitoring

- * 2015 macroinvertebrates and algae sampled at 25 sites Hancock to Trenton
- * Contracted with Cole Ecological and Watershed Assessment Associates for macroinvertebrate ID
- * 2010, 2012 and 2015 data received, being processed into database, including PA/NY Marcellus region samples processed under state protocols
- * Selected Rhithron as diatom/soft algae contractor pending Commission resolution
- * 2016: Algal IBI for Delaware River in development
- * 2016: Test and update macroinvertebrate IBI

Fish Tissue Monitoring

- * Fish samples are collected from 8 sites in both the tidal (5 sites) and non-tidal (3 - 4 sites) portions of the Delaware River.
- * Frequency: Yearly 2000 - 2007, 2010, 2012, 2015, 2016 (Delaware Bay)
- * Two species of fish are collected at each site representing resident benthic and pelagic trophic levels.
 - Tidal species: white perch, channel catfish
 - Non-tidal species: smallmouth bass, white sucker
- * Samples are collected by electrofishing or hook & line.

Sampling Locations



Non-Tidal Locations

| | |
|------------------|--------|
| Narrowsburg, NY | RM 290 |
| Milford, PA | RM 246 |
| Easton, PA | RM 183 |
| Lambertville, NJ | RM 149 |

Tidal Locations

| | |
|--------------------|--------|
| Crosswicks Creek | RM 128 |
| Tacony-Palymra Br. | RM 107 |
| Woodbury Creek | RM 91 |
| Raccoon Creek | RM 80 |
| Salem River | RM 58 |

Fish Tissue Analytical Methods

- ❑ Samples are composites of standard fillets.
- ❑ Analytical Parameters & Methods:
 - PCBs - 209 congeners using Method 1668A
 - Mercury - Method 1631 Appendix A – Cold Vapor AFS
 - Methylmercury – Method 1630
 - Chlorinated pesticides - HRGC/HRMS
 - Dioxins/Furans - Method 1613B
 - PFCs - 13 compounds, Axys Method (LC/MS/MS)
 - Metals - Arsenic, cadmium, copper, lead, nickel, selenium and zinc by Method 1638 modified (ICP-MS)