

Delaware River Basin Commission

DRBC's Special Protection Waters Program at 25

Pamela M. Bush
Commission Secretary and
Asst. General Counsel

October 16, 2017
WRA-DRB Conference

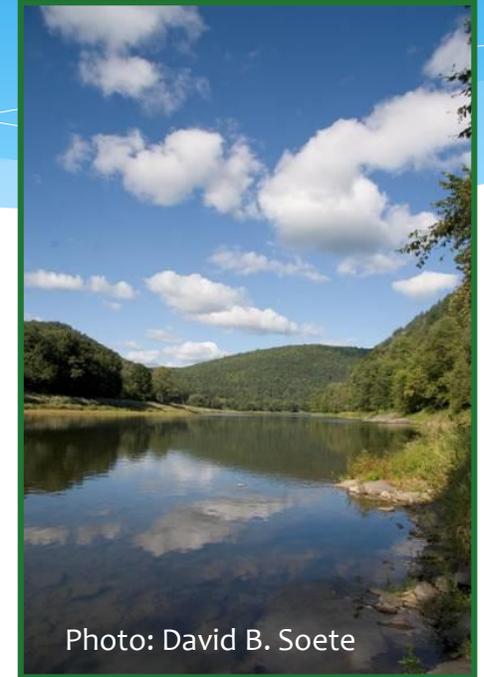


Photo: David B. Soete



DRBC's Special Protection Waters Program

Today I'll cover the SPW program's:

- WQ Objective
- History
- Mechanics
- Performance and Significance



Water Quality Objective

In a word, “antidegradation”:



“It is the policy of the Commission that there be no measurable change in existing water quality except toward natural conditions in waters considered by the Commission to have exceptionally high scenic, recreational, ecological and/or water supply values.

“Waters with exceptional values may be classified by the Commission as either Outstanding Basin Waters or Significant Resource Waters.”



Two Classes

“**Outstanding Basin Waters**” are interstate and contiguous intrastate waters that are contained within the established boundaries of national parks; national wild and scenic rivers systems; and/or national wildlife refuges that are classified by the Commission . . . as having exceptionally high scenic, recreational, and ecological values that require special protection.”

“**Significant Resource Waters**” are interstate waters classified . . . as having exceptionally high scenic, recreational, ecological and/or water supply uses that require special protection.”



Key Historical Events Preceding SPW

- * **Enactment of the DRB Compact in 1961**
Article 5 - Pollution Control

§ 5.2. “The commission may assume jurisdiction to control future pollution and abate existing pollution in the waters of the basin, whenever it determines after investigation and public hearing . . . that the effectuation of the comprehensive plan so requires. . . . [T]he commission may adopt and from time to time amend repeal rules, regulations and standards to control such future pollution and abate existing pollution”



Key Historical Events Preceding SPW

* Enactment of the Clean Water Act in 1972

Three Tiers of Protection 40 CFR 131.12(a)(1), (2) and (3)

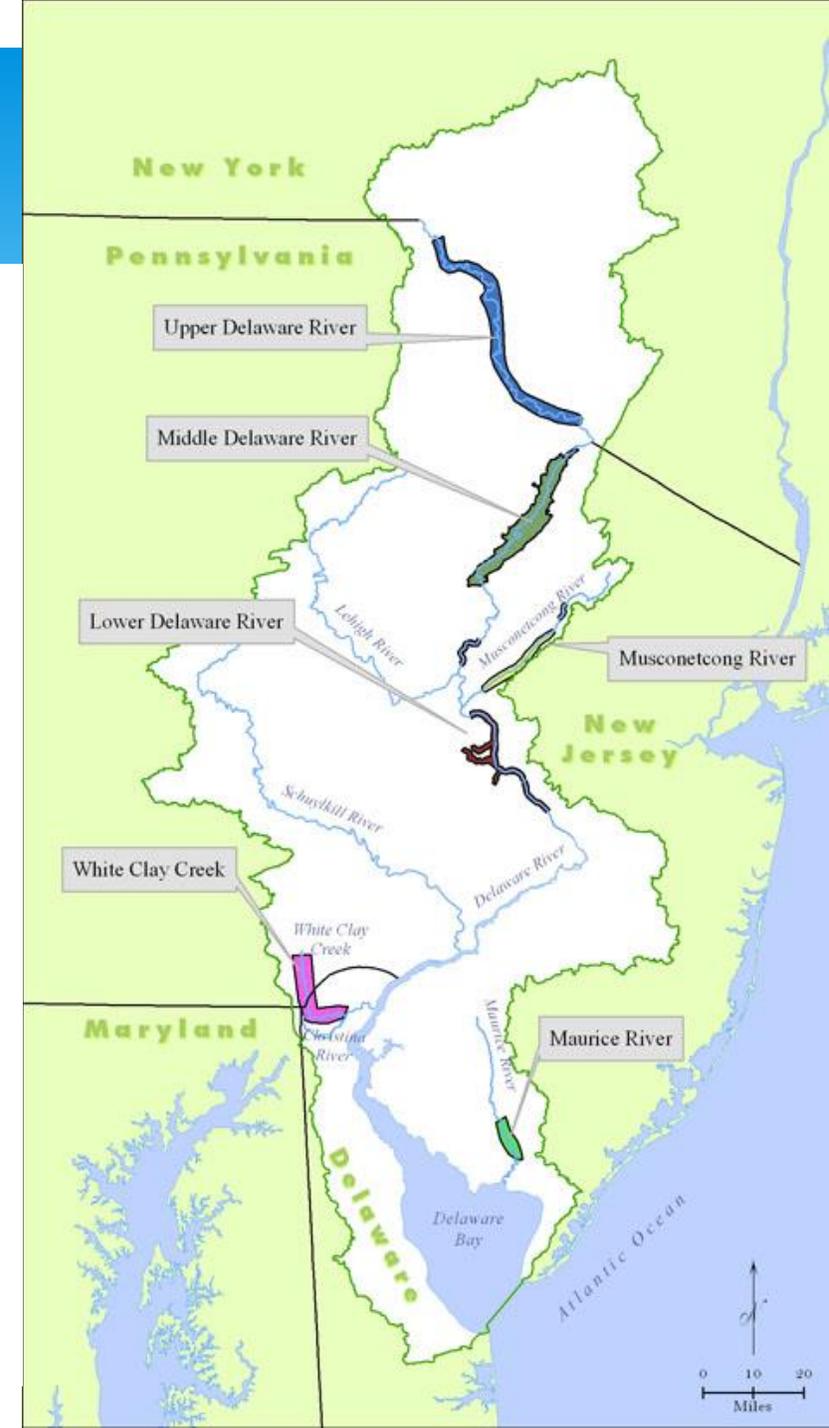
“Tier 1”: protects existing uses – minimum level of protection for all waters

“Tier 2”: protects high quality water (water that is of better qual. than req'd for fishable/swimmable uses and other existing uses); allows degradation only upon demonstration that impt. economic or social development cannot otherwise occur.

“Tier 3”: applies to “Outstanding National Resource Waters (ONRW) – no alteration of essential character or special use that makes it an ONRW

Key Historical Events

- * **Demise of Tocks Island Dam** (DRBC 3:1 opposed in 1975, Congr. de-auth. in 1992)
 - in part due to concerns about its impact on water quality, including by NYS, which feared the cost of controlling phosphorus discharges.
 - Also due to escalating dam cost and federal deficits (Vietnam)
- * **National Wild and Scenic Rivers Act of 1968**
- * **National Wild and Scenic Rivers Designations**
 - Upper and Middle Delaware River in 1978 (Pres. Carter)
 - Lower Delaware in 2002 (Pres. Clinton)





Phased Adoption

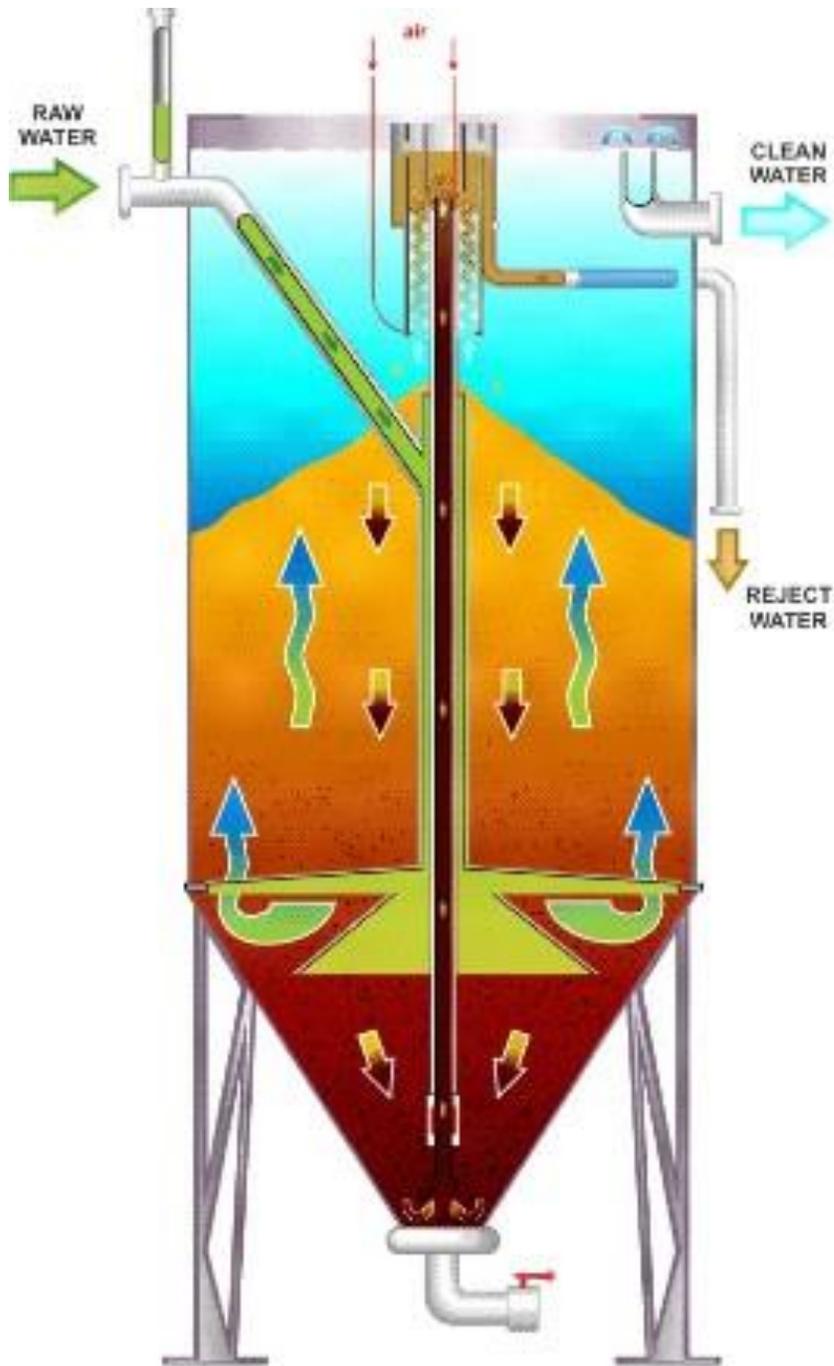
- * 1992 – Classification of OBW and SRW Reaches in the Upper and Middle Delaware + Point Source Regulations
- * 1994 – Non-Point Source Regulations
- * 2008 – Classification of Lower Delaware as SRW



Program Elements – Point Sources



- Provide emergency power, alarms, and emergency management plan
- For new WWTPs and substantial alterations or additions to existing:
 - Identify and employ non-discharge/load reduction alternatives for proposed discharges directly to SPW
 - Identify natural treatment alternatives
 - Provide Best Demonstrable Technology (BDT) or better
 - Ensure No Measurable Change (NMC) at water quality control points (BCPs and ICPs)



Dynamik DF continuous backwash filter

Program Elements – Point Sources

Definition of “Substantial Alterations or Additions” excludes:

- modifications solely to address wet weather flows; and
- alterations limited to changes in the method of disinfection and/or the addition of treatment works for nutrient removal.

TABLE 2I. Definition of Existing Water Quality: Easton ICP

Delaware River at Northampton Street Bridge, Easton-Phillipsburg, PA/NJ, River Mile 183.82

Parameter (Y)	Definition of Existing Water Quality			
	Median	Lower 95%CI	Upper 95%CI	Flow Relationships Site specific regression equation.
Ammonia NH3-N (mg/l) *	<.05	<.05	<.05	
Chloride (mg/l)	16	14	17	$Y = -0.00022184 Q + 16.751$
Chlorophyll a (mg/m ³)	1.45	1.07	2.14	
Dissolved Oxygen (mg/l) mid-day*	8.10	7.90	8.58	
Dissolved Oxygen Saturation (%)	95%	92%	96%	
E. coli (colonies/100 ml)	31	24	64	$Y = \text{antilog} (0.00004425 Q + 1.273)$
Enterococcus (colonies/100 ml)	145	80	250	
Fecal coliform (colonies/100 ml) *	100	64	130	
Nitrate NO3-N (mg/l) *	0.85	0.70	0.90	
Orthophosphate (mg/l)	0.02	0.01	0.02	
pH	7.55	7.41	7.70	
Specific Conductance (umhos/cm)	142	127	155	$Y = -0.0024666 Q + 158.76$
Total Dissolved Solids (mg/l)	110	103	120	
Total Kjeldahl Nitrogen (mg/l)	0.35	0.26	0.46	
Total Nitrogen (mg/l) *	1.19	1.01	1.35	
Total Phosphorus (mg/l) *	0.05	0.04	0.06	
Total Suspended Solids (mg/l) *	4.0	3.0	5.0	$Y = 0.00177536 Q - 4.8027$
Turbidity (NTU)	2.6	1.8	4.0	$Y = \text{antilog} (0.00003836 Q + 0.1845)$
Alkalinity (mg/l)	34	30	39	$Y = -0.00073929 Q + 39.867$
Hardness (mg/l)	48	45	52	

Implementation – Point Sources

* Existing Water Quality for SPW control points is established by the Water Quality Regulations and most recent data (DRBC’s Water Quality Atlas)

* Asterisked parameters are used in No Measurable Change analysis

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Existing Water Quality Atlas of the Delaware River Special Protection Waters



DRBC Special Protection Waters Program
September 2016 – Edition 1.0

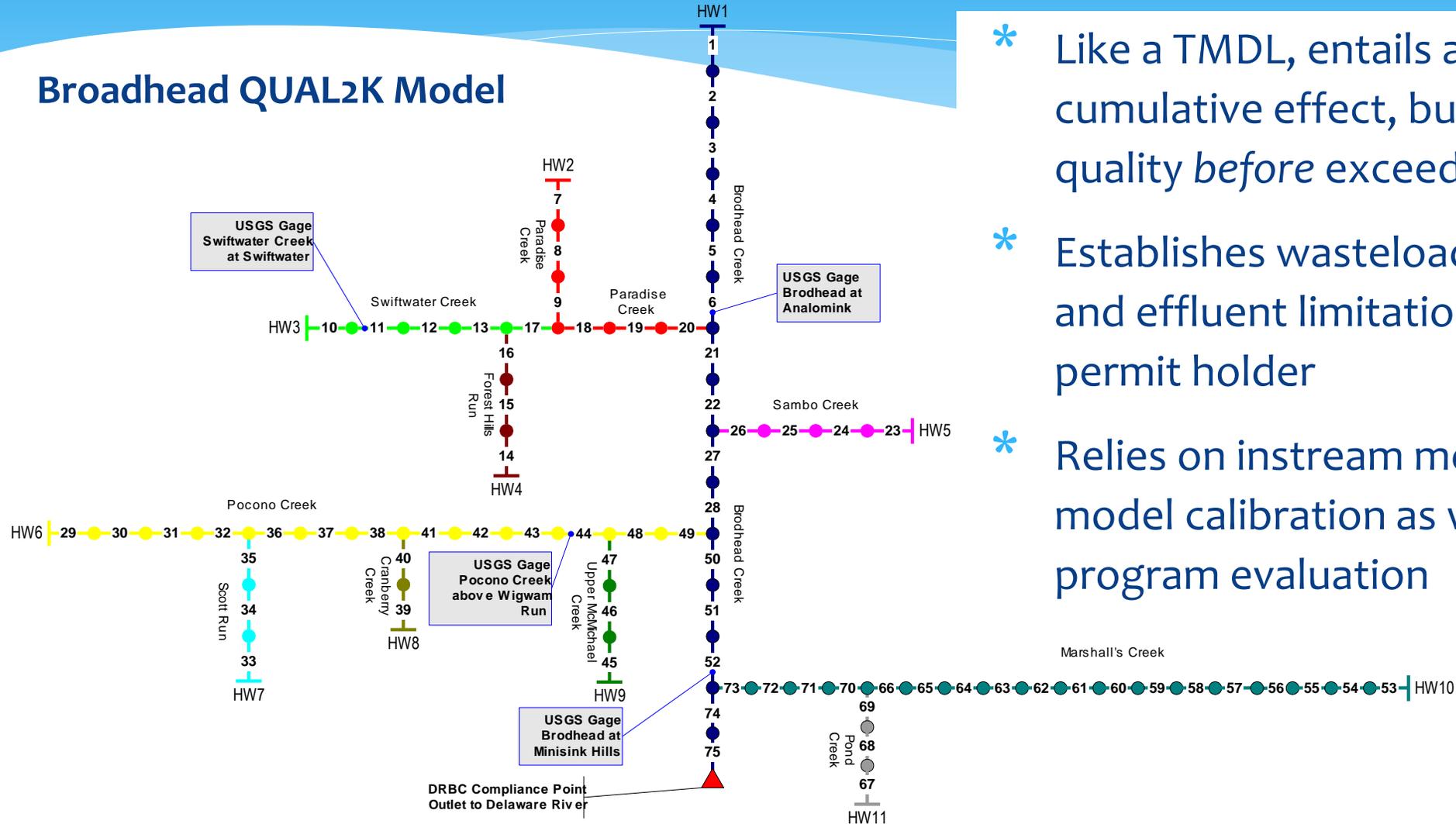


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No Measurable Change Analysis

Broadhead QUAL2K Model



- * Like a TMDL, entails analysis of cumulative effect, but manages water quality *before* exceedances occur
- * Establishes wasteload allocations and effluent limitations for docket or permit holder
- * Relies on instream monitoring for model calibration as well as for program evaluation

Water Quality Models

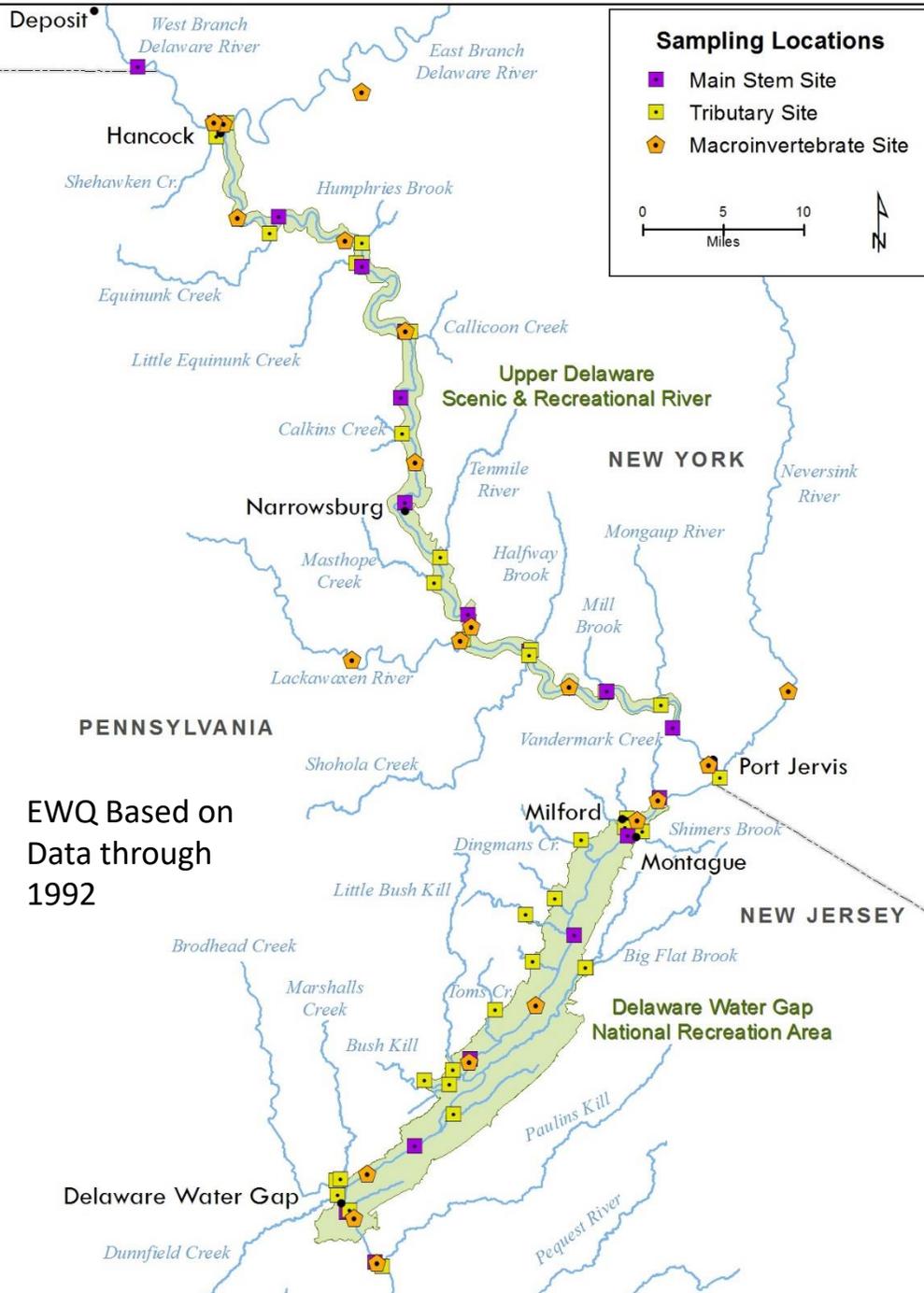
- * Neversink River (NY)
- * Brodhead Creek (PA)
- * Lehigh River (PA)
- * Lower Delaware River (PA/NJ) – Multiple Control Points



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SPW Sampling Upper and Middle Delaware



EWQ Based on
Data through
1992



Program Elements – Non-Point Sources

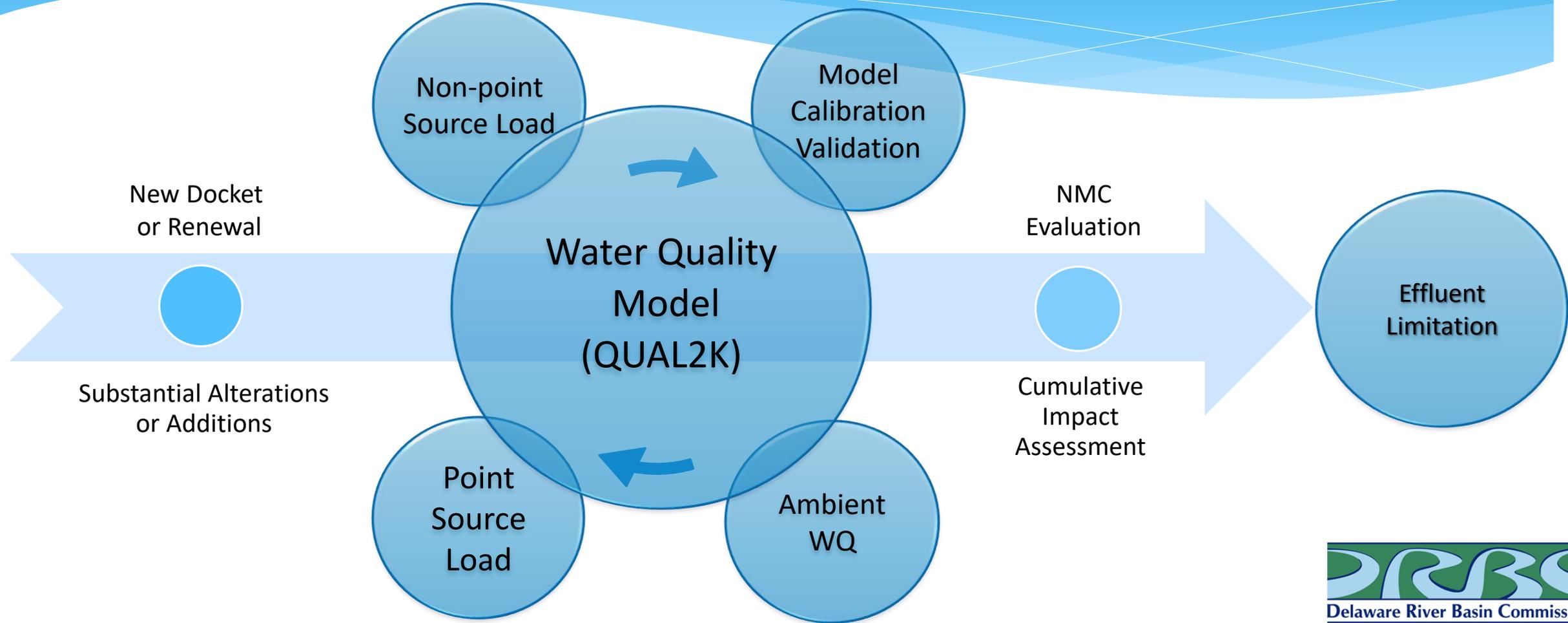


Non-Point Source Pollution Control Plan (NPSPCP) required for new wastewater discharge and water withdrawal service areas.



<https://blog.kalaharimeetings.com/wp-content/uploads/2016/10/groundbreaking.jpg>

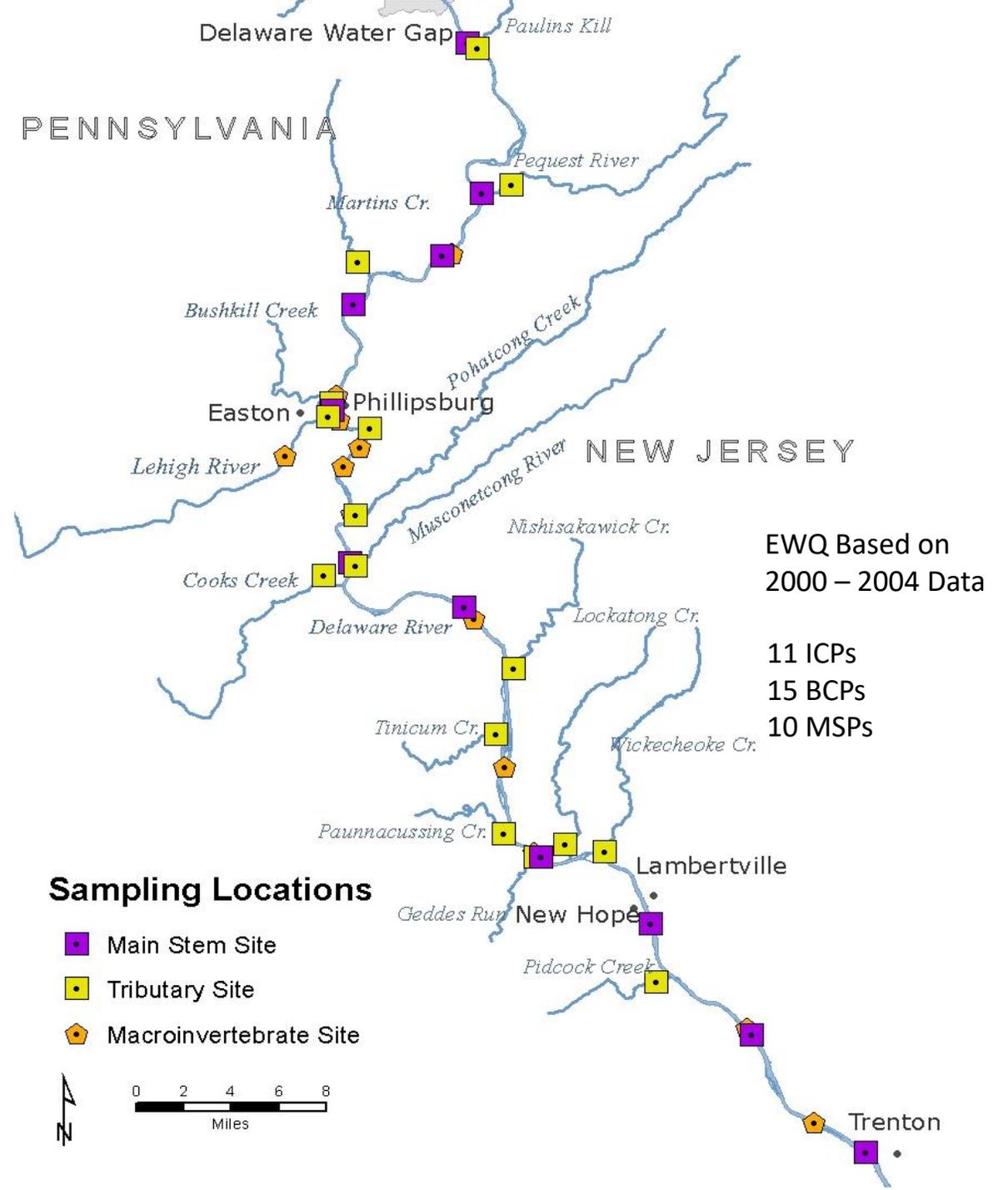
SPW No Measurable Change Analysis



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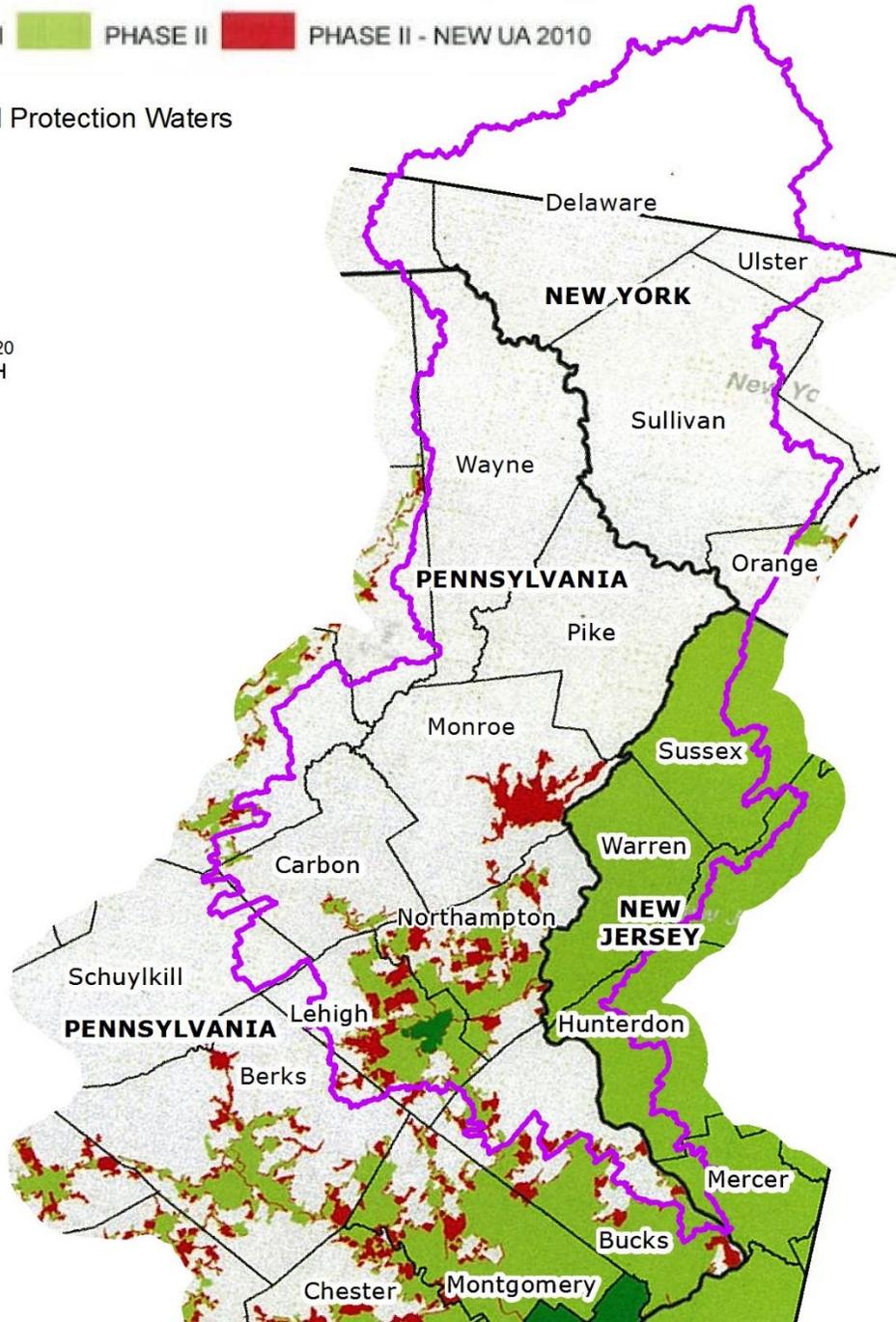
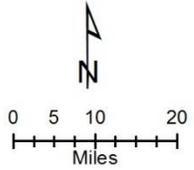
SPW Sampling Lower Delaware



MS4 Regulation Status

PHASE I PHASE II PHASE II - NEW UA 2010

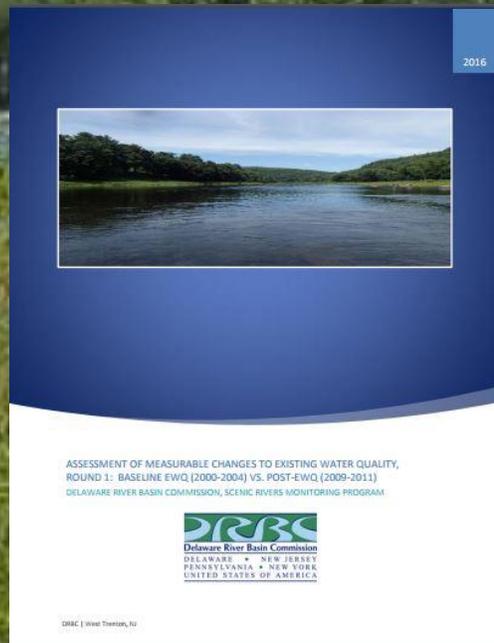
Special Protection Waters



Implementation – Non-Point Sources

Non-Point Source Pollution Control Plan (NPSPCP) required for new wastewater discharge and water withdrawal service areas.

Water Quality Outcomes

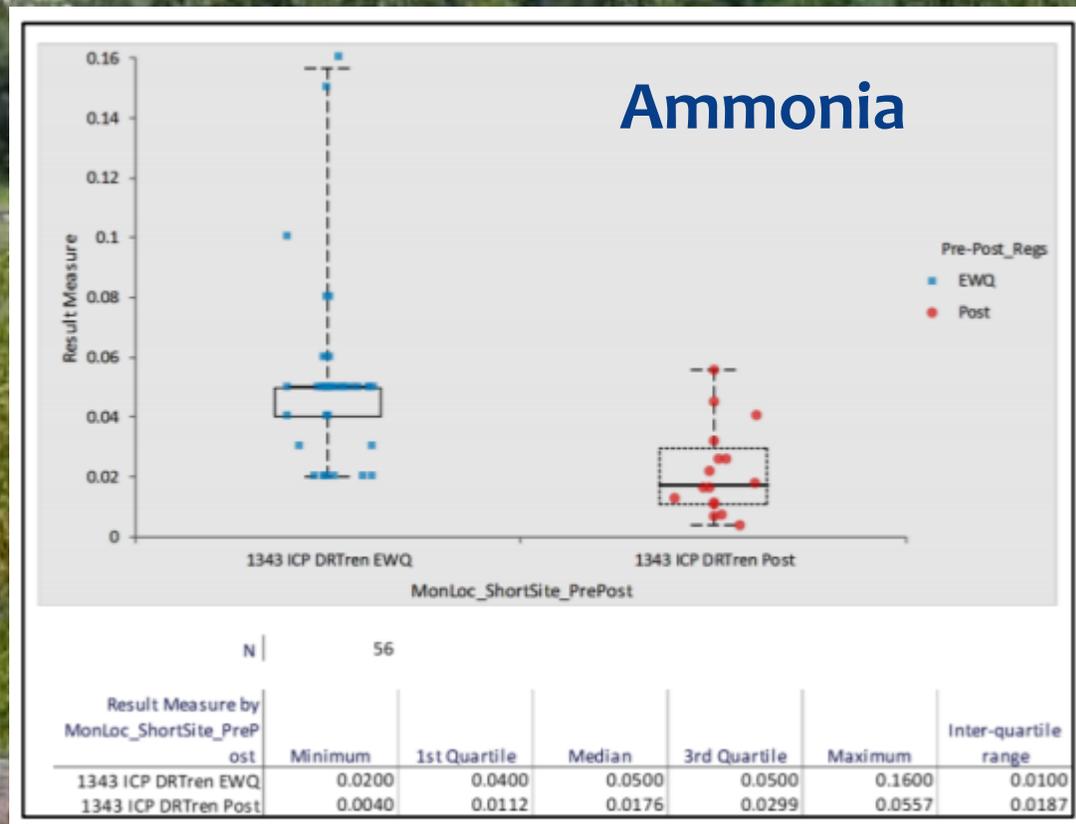


2016 Evaluation of the Lower Delaware

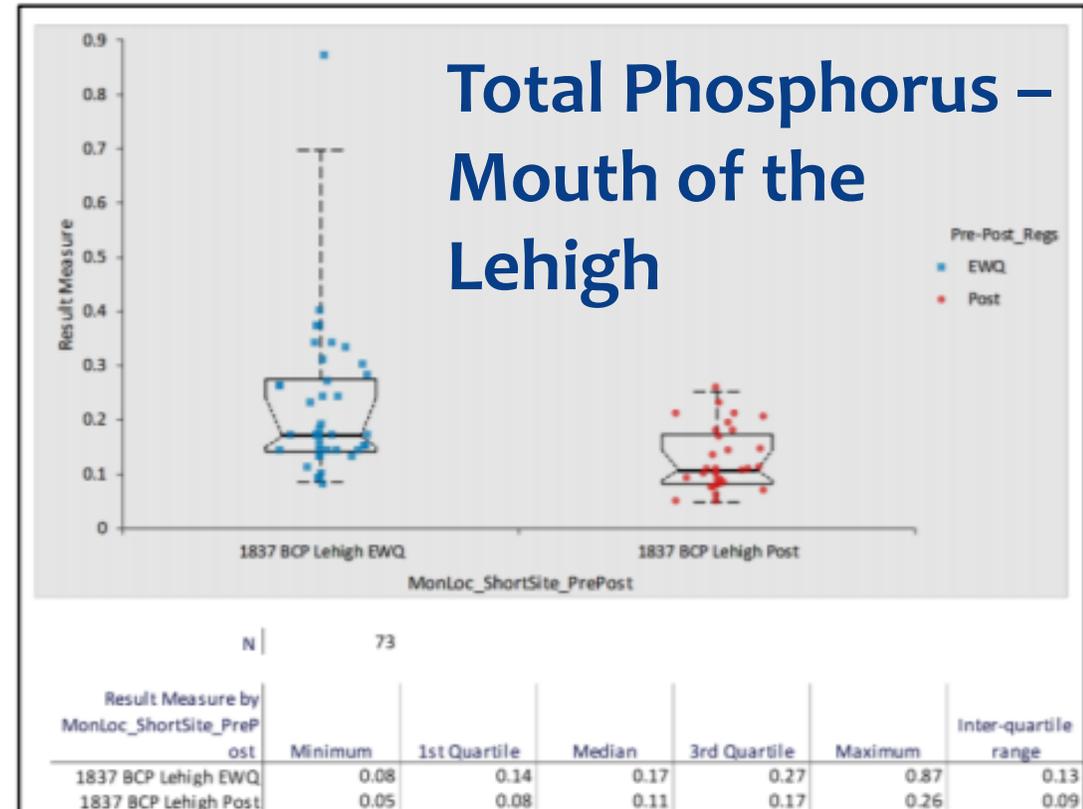
- 440 Comparisons between EWQ and post-EWQ
- 88% showed no degradation; most showed improvement
- USGS performed an assessment using different data and different methods – corroborated improvement in nutrients

Water Quality Outcomes

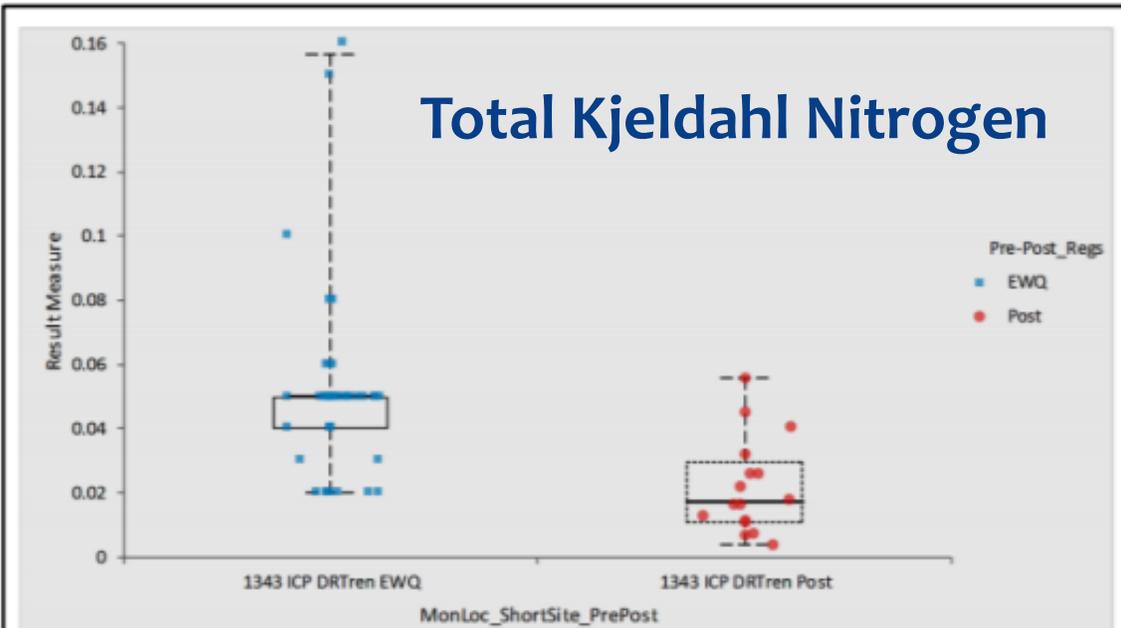
Pre- and post-SPW data show nutrient reductions in the Delaware River at Trenton.



Water Quality Outcomes

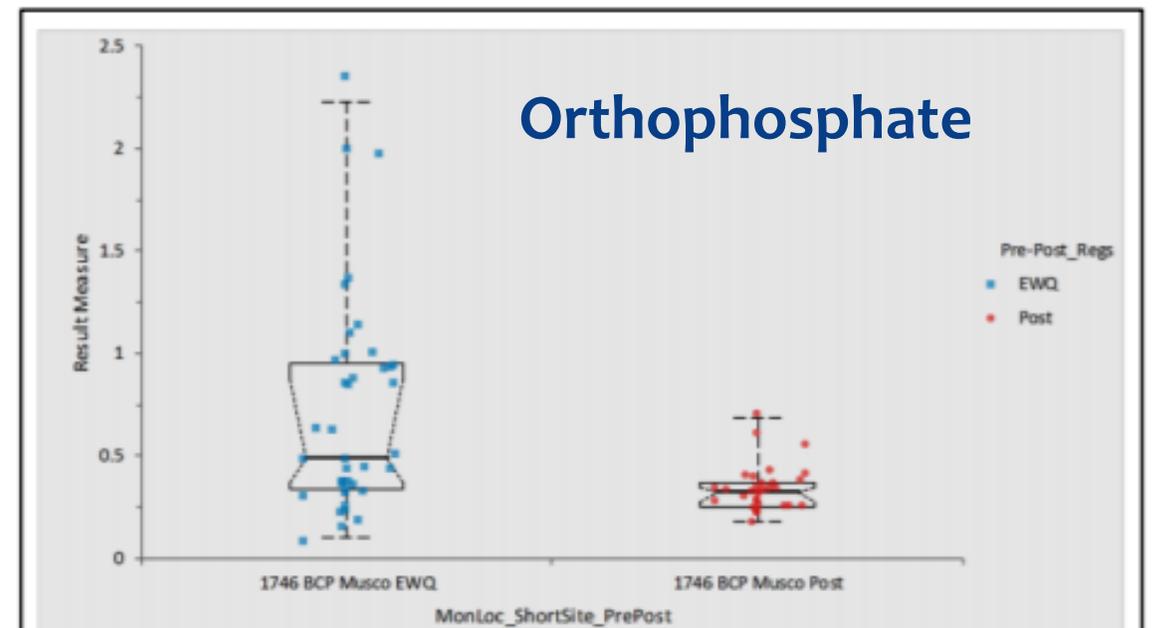


Water Quality Outcomes – Delaware River at the Musconetcong



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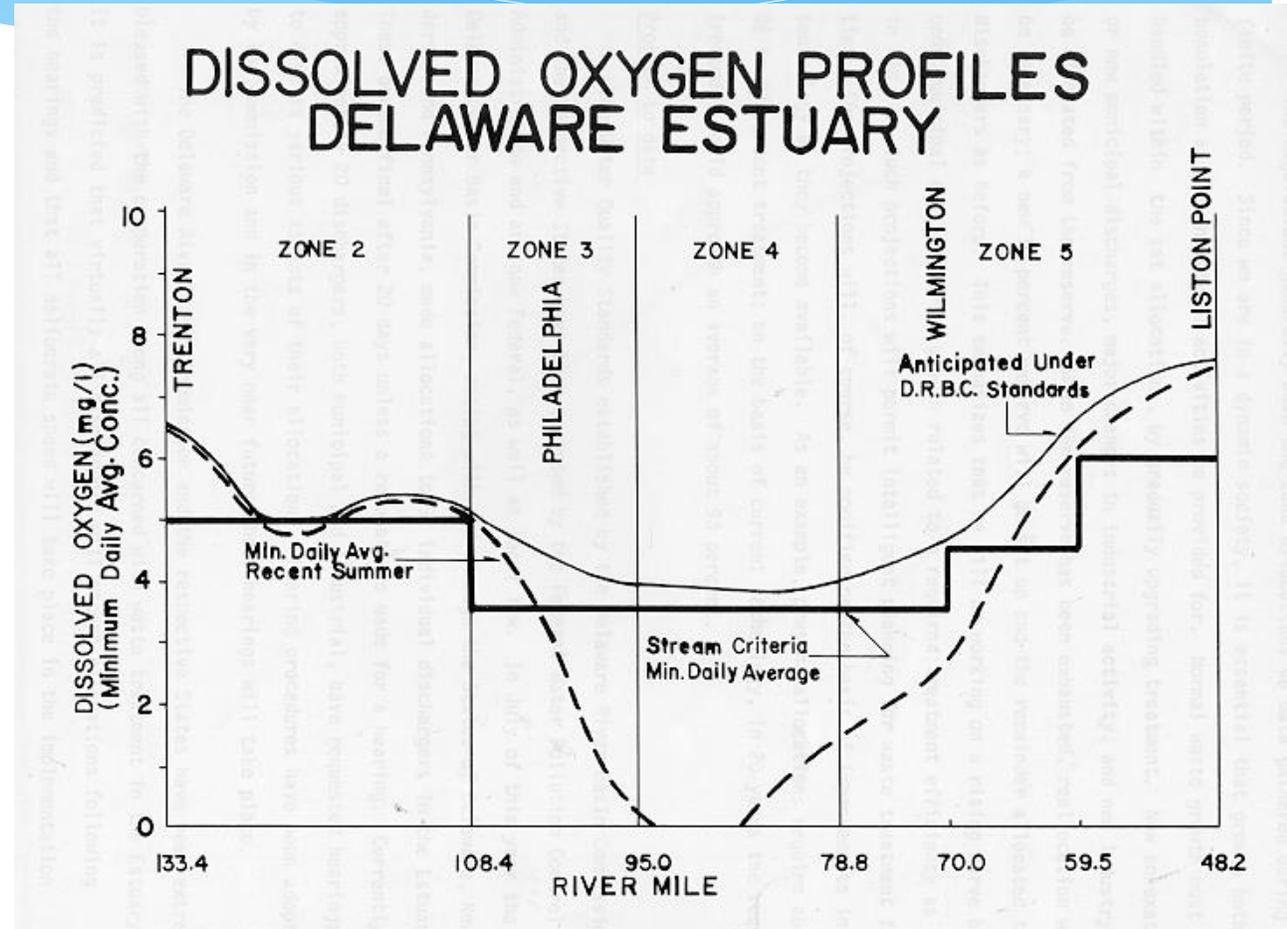
Result Measure by MonLoc_ShortSite_PrePost	Minimum	1st Quartile	Median	3rd Quartile	Maximum	Inter-quartile range
1343 ICP DRTren EWQ	0.0200	0.0400	0.0500	0.0500	0.1600	0.0100
1343 ICP DRTren Post	0.0040	0.0112	0.0176	0.0299	0.0557	0.0187



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Result Measure by MonLoc_ShortSite_PrePost	Minimum	1st Quartile	Median	3rd Quartile	Maximum	Inter-quartile range
1746 BCP Musco EWQ	0.08	0.34	0.49	0.95	2.35	0.61
1746 BCP Musco Post	0.17	0.25	0.32	0.37	0.70	0.12

Flows to the Estuary



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www.drbc.net



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Resources since 1961*