

Non-tidal Chloride Monitoring 2021-2023



Joint STAC-MACC Meeting

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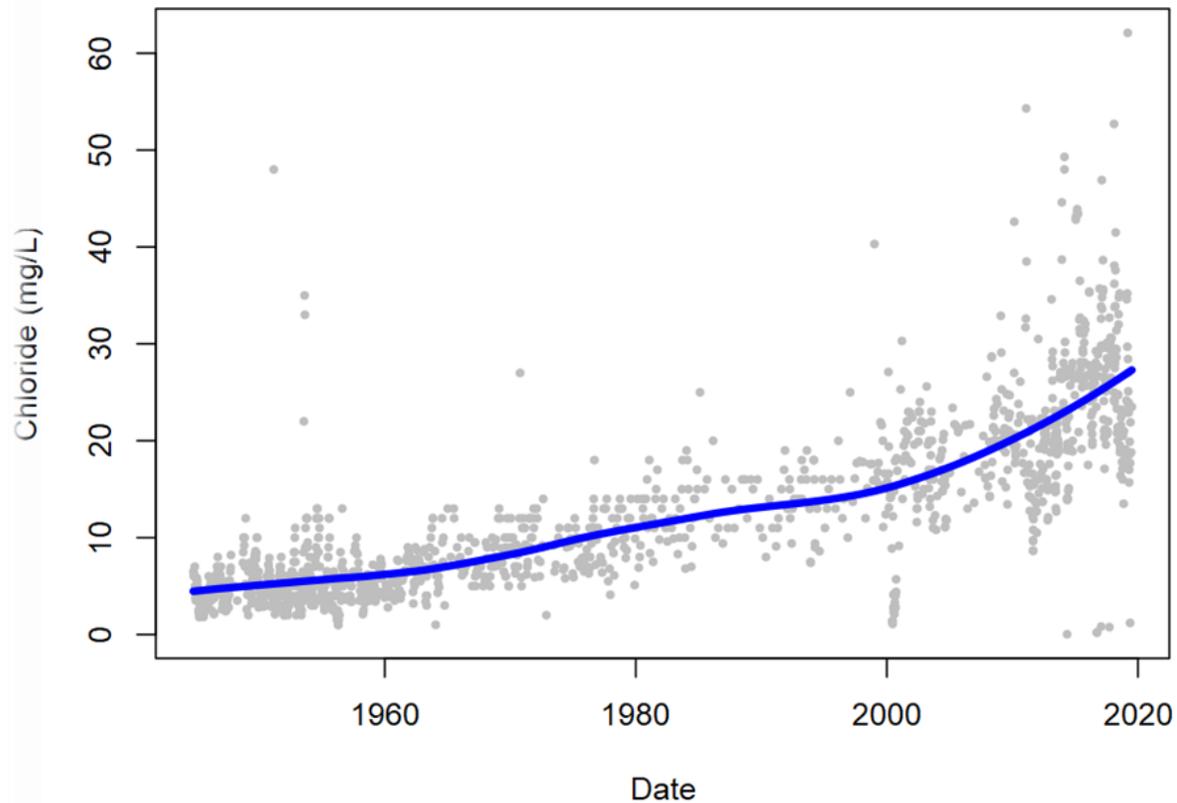


Presented to an advisory committee of the DRBC on June 9, 2021. Contents should not be published or re-posted in whole or in part without permission of DRBC.

Why?

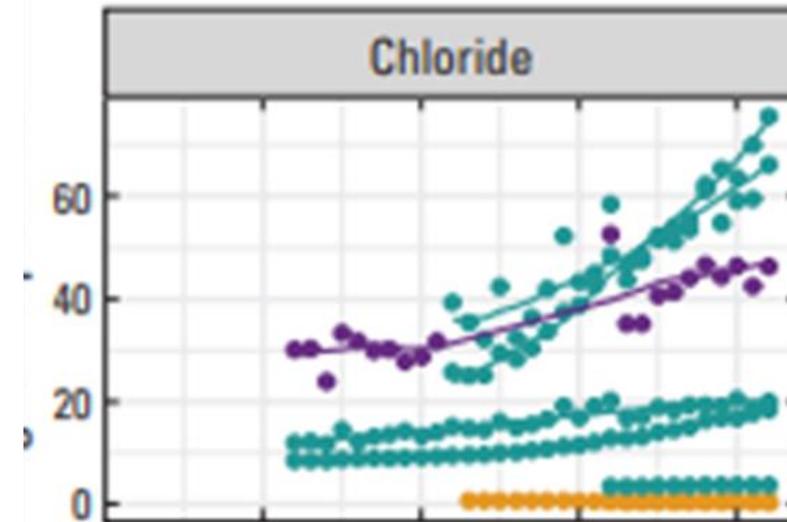
Freshwater Chloride Trends

Chloride Time Series, Delaware River at Trenton



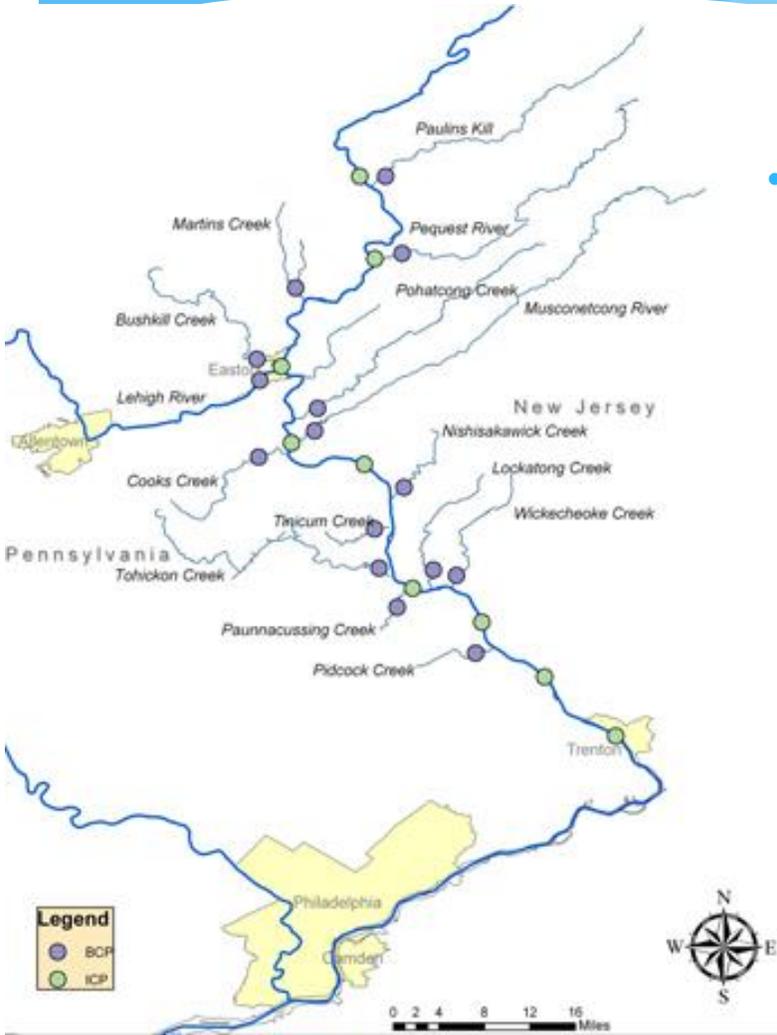
Integrated Water Availability Assessments Program

A Historical Look at Changing Water Quality in the Delaware River Basin



Lower Delaware Special Protection Waters Measurable Change

- “DRBC’s SPW Program is designed to prevent degradation in streams and rivers where existing water quality is better than established water quality standards; the program states that there shall be no measurable change in existing water quality.”



Parameter	Site Color Key		Dark Blue - Interstate Control Point (ICP)										Dark Red - Pennsylvania Tributary Boundary Control Point (BCP)					Dark Green - New Jersey Tributary Boundary Control Point (BCP)								
	Site #	Site Name	1343 ICP	1418 ICP	1463 BCP	1487 ICP	1525 BCP	1540 BCP	1554 ICP	1556 BCP	1570 BCP	1616 BCP	1641 BCP	1677 ICP	1737 BCP	1746 BCP	1748 ICP	1774 BCP	1837 BCP	1838 ICP	1841 BCP	1907 BCP	1978 BCP	1978 ICP	2070 BCP	2074 ICP
Field																										
Dissolved Oxygen (DO) mg/l																										
Dissolved Oxygen Saturation %																										
pH, units																										
Water Temperature, degrees C																										
Nutrients																										
Ammonia Nitrogen as N, Total mg/l																										
Nitrate + Nitrite as N, Total mg/l																										
Nitrogen as N, Total (TN) mg/l																										
Nitrogen, Kjeldahl, Total (TKN) mg/l																										
Orthophosphate as P, Total mg/l																										
Phosphorus as P, Total (TP) mg/l																										
Bacteria																										
Enterococcus colonies/100 ml																										
Escherichia coli colonies/100 ml																										
Fecal coliform colonies/100 ml																										
Conventional																										
Alkalinity as CaCO3, Total mg/l																										
Hardness as CaCO3, Total mg/l																										
Chloride, Total mg/l																										
Specific Conductance µmho/cm																										
Total Dissolved Solids (TDS) mg/l																										
Total Suspended Solids (TSS) mg/l																										
Turbidity NTU																										



Deployment of Continuous Conductivity Loggers

- In May 2021, DRBC deployed 7 continuous conductivity loggers in rivers and streams that lack continuous conductivity loggers:
 - Brodhead at 611 in Delaware Water Gap
 - Paulins Kill at Route 46 bridge in Columbia, NJ
 - Martins Creek
 - Pequest River at Belvidere, NJ
 - Lehigh River at Easton
 - Pohatcong Creek near USGS discharge gage
 - Tohickon Creek at Point Pleasant Park
- During spring through early autumn → logger maintenance twice per month or more to clean biofilm off sensors, ensure loggers are working, offload data, etc.
- Later autumn through winter → once per month logger maintenance (we will need wet suits!)

Water Quality Monitoring

- In addition to logger maintenance, 27 sites were selected for concomitant surface water quality monitoring of chloride, turbidity, and TDS (in-situ conductivity at all sites)
 - Sites were selected based on:
 - Sites identified in the SPW Lower Delaware Measurable Change Assessment that have both increased chloride and specific conductance from baseline conditions established (2000-2004);
 - Identify temporal and spatial data gaps in Middle Delaware SPW tributaries
- 2-year continuous logger deployment and (once monthly) monitoring period → 24 total events
- *So far...*
 - DRBC deployed 7 continuous loggers and collected samples from 27 sites in May and are scheduled to go out June 16th for the next round of monitoring
- * [ArcGIS Map -- Non-tidal Chloride Monitoring](#)

Monitoring Goals

- **Create a more robust and current dataset for chloride, TDS, and specific conductance in Lower and Middle SPW tributaries;**
 - **Utilize this data for further classification and regression analyses (assess land-use and changes, point-discharge influences, effects of precipitation, etc.);**
 - **Assess 2021-2023 dataset against SPW baseline dataset established for 2000-2004 (plus any additional paired chloride & specific conductance and/or TDS observations available on WQP between 2018-2023)**
- **Utilize discrete specific conductance, chloride, and TDS observations for development of regression models on a site-specific basis;**
- **Identify results for further research and investigation (potential causes in varying concentrations among tributaries, future track-down studies, work with municipalities, etc.)**