

# Non-tidal Chloride Monitoring 2021-2023



**Joint STAC-MACC Meeting**

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*11/18/2020*

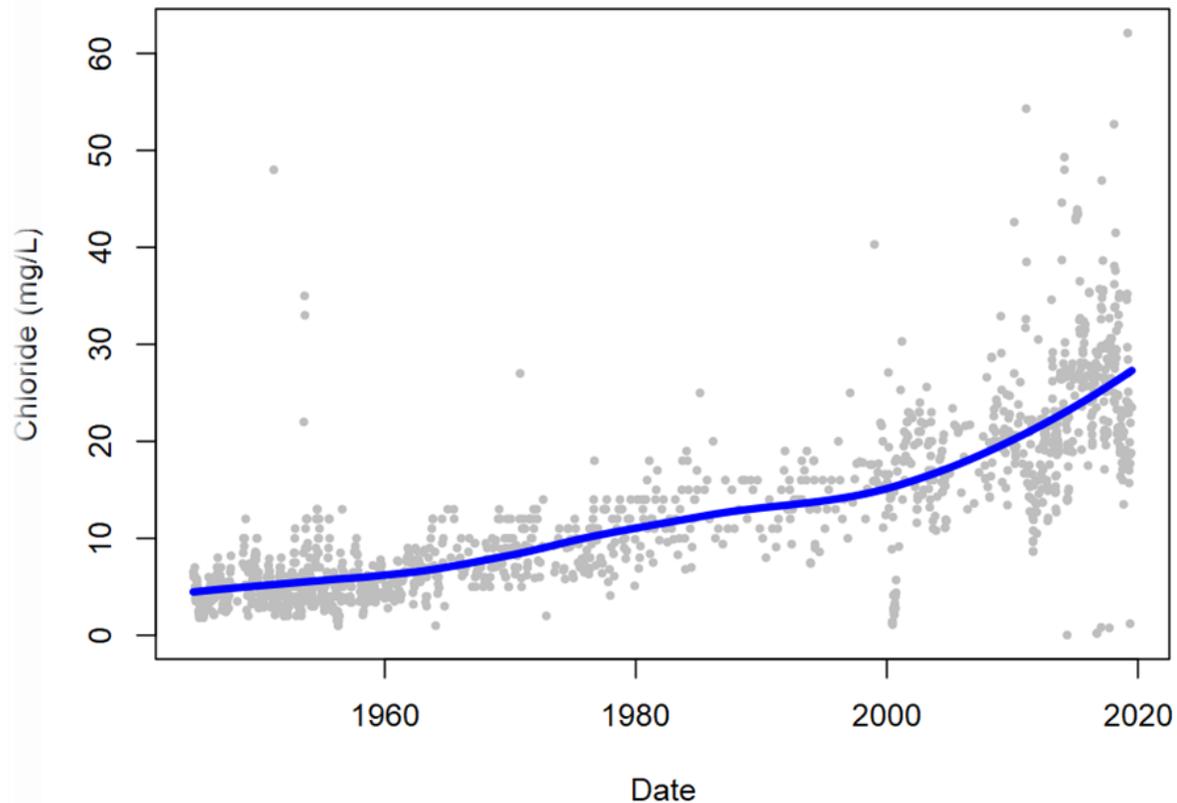


Presented at a joint meeting of a DRBC & PDE advisory committee on November 18, 2020. Contents should not be published or re-posted in whole or in part without permission of DRBC, PDE and the presenter.

# Why?

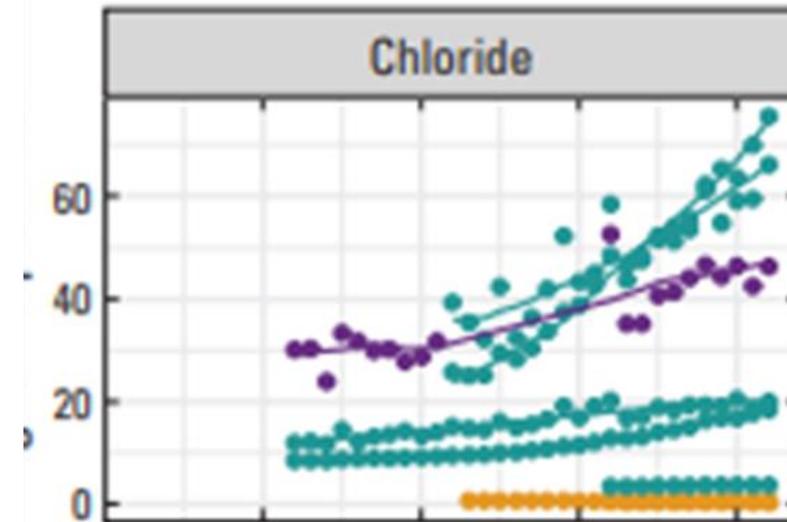
## Freshwater Chloride Trends

Chloride Time Series, Delaware River at Trenton

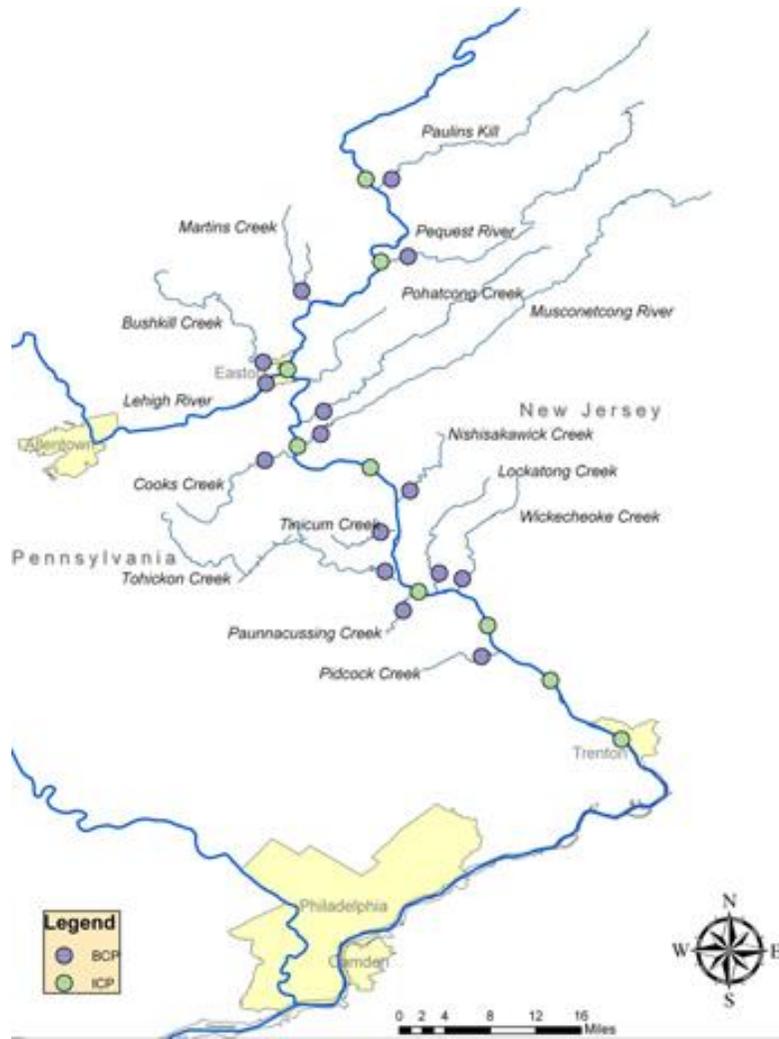


Integrated Water Availability Assessments Program

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



# Lower Delaware Special Protection Waters Measurable Change



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)								
Parameter	Site →	Del. River at Trenton	Del. River at Washington Crossing	Pidcock Creek, PA	Delaware River at Lambertville	Wickechoke Creek, NJ	Lockatong Creek, NJ	Delaware River at Bulls Island	Paunacussing Creek, PA	Tonickon Creek, PA	Tacong Creek, PA	Nishisakawick Creek, NJ	Del. River at Millford	Cooks Creek, PA	Musconetcong River, NJ	Del. River at Reiglyville	Pohatcong Creek, NJ	Lehigh River, PA	Del. River at Easton	Bushkill Creek, PA	Martins Creek, PA	Request River, NJ	Del. River at Belvidere	Paulins Kill River, NJ	Del. River at Portland
	Site Number →	1343 ICP	1419 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	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
	Facal 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																									
KEY		~ No indication of measurable change to EQD										** Indication of measurable water quality change toward more degraded status					~ Weak indication of measurable water quality change toward more degraded status								

[https://www.nj.gov/drbc/library/documents/LowerDel\\_EWQrpt\\_2016/LDel\\_EWQrpt\\_2016\\_entire.pdf](https://www.nj.gov/drbc/library/documents/LowerDel_EWQrpt_2016/LDel_EWQrpt_2016_entire.pdf)

# Monitoring Plans & Ideas

- In April 2021, deploy conductivity loggers in 10-12 Special Protection Waters tributaries in Middle and Lower Delaware SPW tributaries that:
  - are infrequently monitored/have large temporal data gaps;
  - have elevated levels of conductivity and chloride relative to sites with similar land attributes
- In addition to logger maintenance, ~30 additional sites will be selected for concomitant surface water quality monitoring of chloride, turbidity, and TDS (in-situ conductivity at all sites). Discharge will be measured at wadeable sites.
  - Sites to be selected (currently working on a site-selection methodology);
    - Identify mainstem Delaware River SPW monitoring sites with relatively increased chloride and specific conductance to target tributaries of interest;
    - 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
  - There are 38 SPW tributary monitoring sites spanning the Lower and Middle Delaware reaches to choose from
- 2-year continuous logger deployment and (once monthly) monitoring period → 24 total events

# 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 2021-2022 dataset against SPW baseline dataset established for 2000-2004 (plus any additional paired chloride & specific conductance and/or TDS observations available on WQP between 2018-2022)**
- **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.)**