

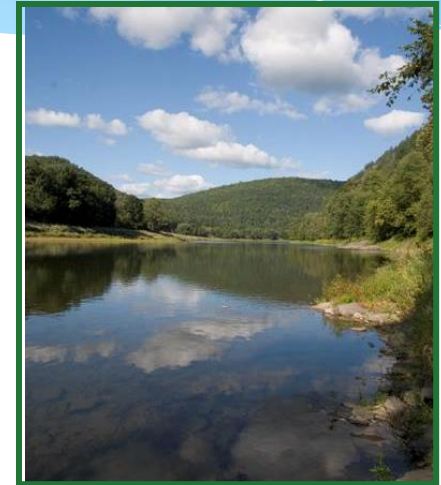
# Delaware River Basin Commission

## Delaware River Basin Commission's Modernized Water Quality Assessment

*Jake Bransky*  
*Aquatic Biologist*

*March 1st, 2021*

*Delaware Estuary Science and Environmental Summit*



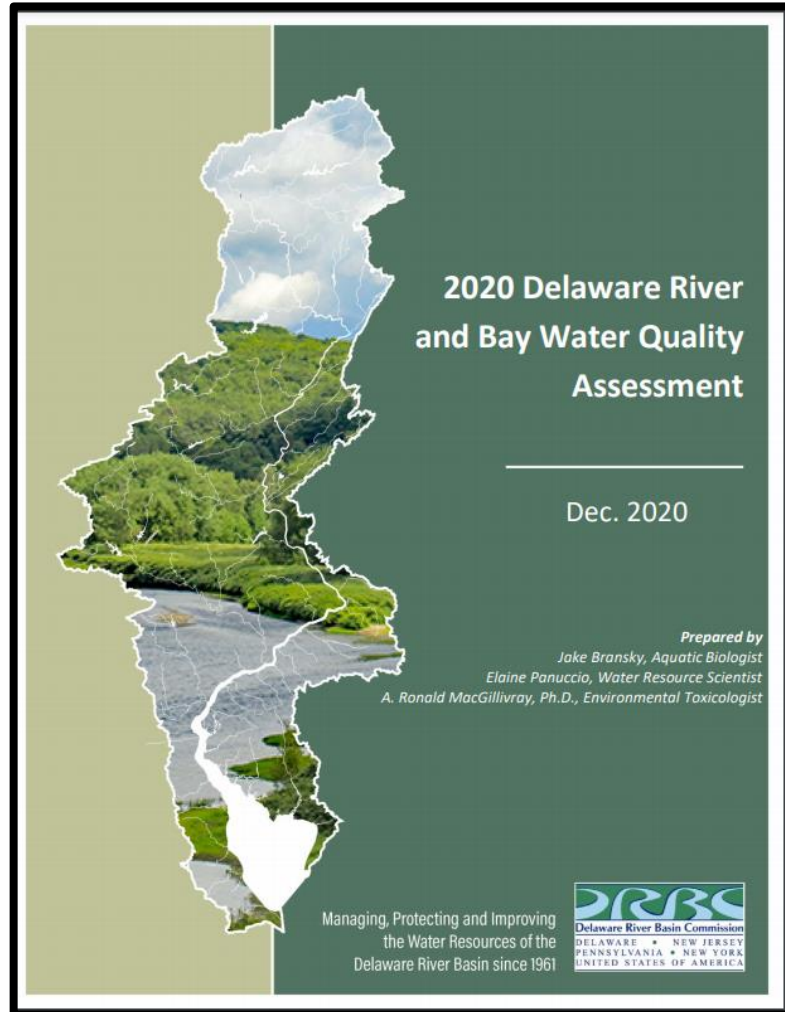


# DRBC Background

- Compact signed 1961
- Five Equal Members:
  - Delaware
  - New Jersey
  - Pennsylvania
  - New York
  - Federal Government
- Broad Responsibilities / Authorities
  - Water Supply
  - Drought Management
  - Flood Loss Reduction
  - Water Quality
  - Watershed Planning
  - Regulatory Review (Permitting)
  - Outreach/Education
  - Recreation

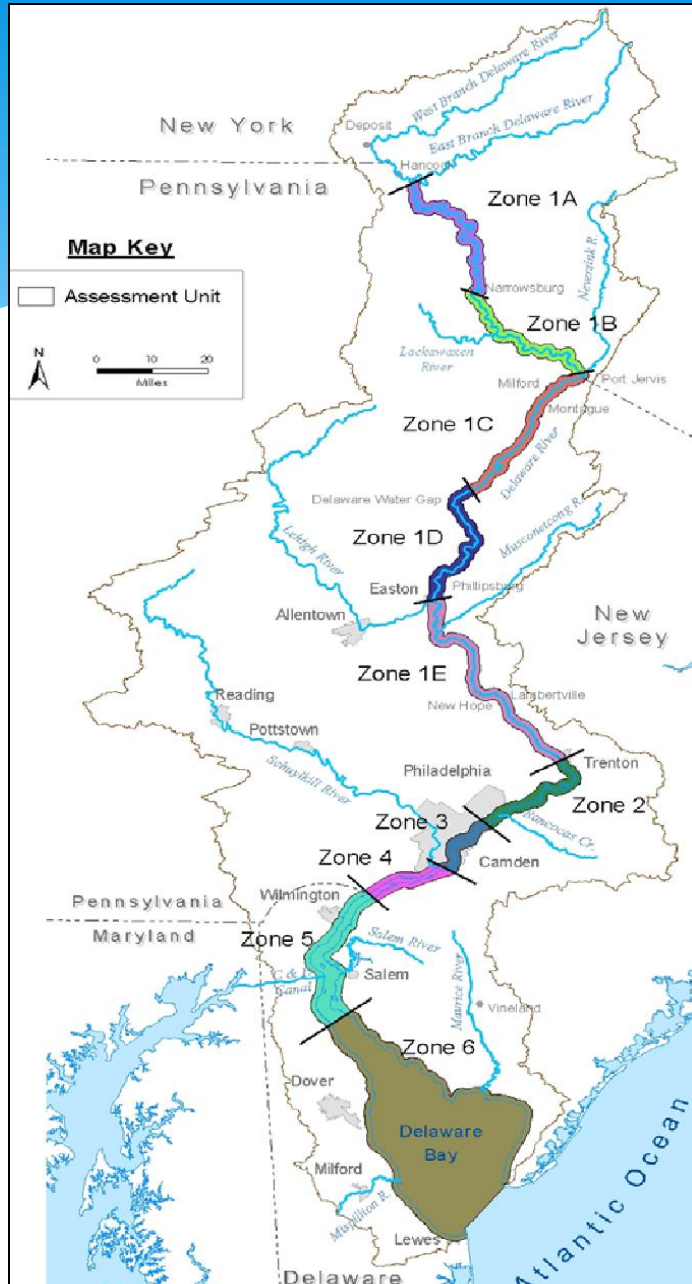


# DRBC Water Quality Assessment Background



- Every two years, the DRBC compiles a Delaware River and Bay Water Quality Assessment Report, which provides an assessment of the Delaware River and Bay's support of various uses during previous years
  - Maintenance of aquatic life
  - Providing a raw water source for human consumption
  - Swimming and recreation
  - Fish consumption
  - Shellfish consumption

# Designated Uses

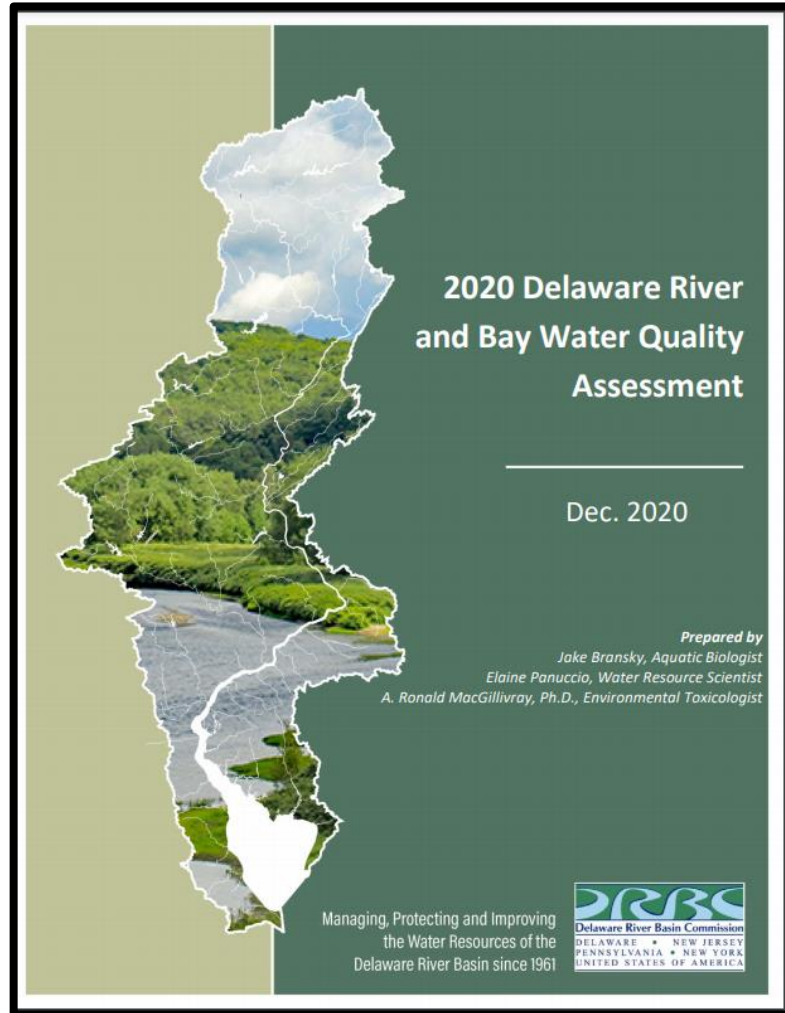


DRBC WQ Zones

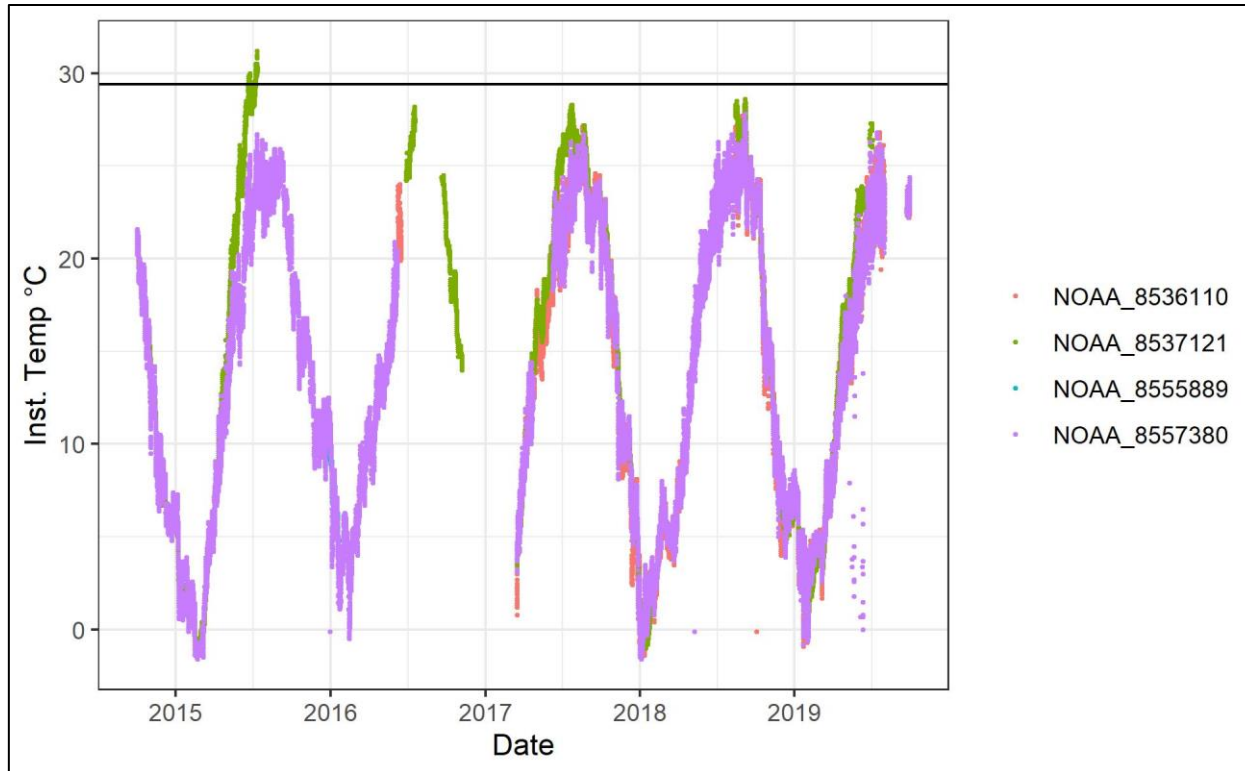
Designated Use	DRBC WQM Zone or AU									
	1A	1B	1C	1D	1E	2	3	4	5	6
Aquatic Life	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Drinking Water	✓	✓	✓	✓	✓	✓	✓			
Primary Recreation	✓	✓	✓	✓	✓	✓		✓	✓	✓
Secondary Recreation							✓	✓		
Fish Consumption	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Shellfish Consumption										✓

# Changes to the 2020 Report

- Automation of data retrieval and analysis using R scripts
- Evaluation of current thresholds for triggering excursions/exceedances



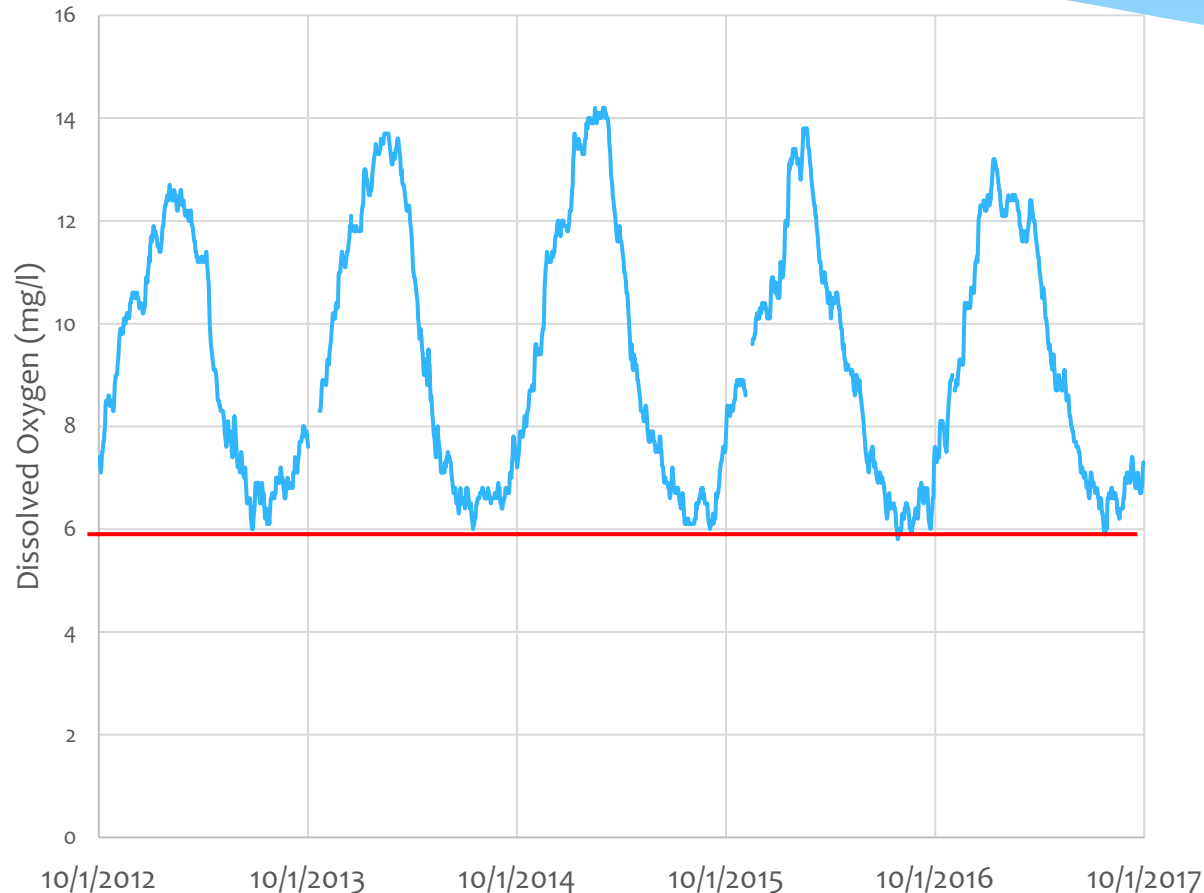
# Automation



2020 Zone 6 Temperature Plot

- The 2020 assessment report was produced using an automated set of R scripts
- Increase efficiency
  - Data acquisition
  - QAQC
  - Production of report results
  - Dissemination of results to the public

# Re-evaluation of thresholds



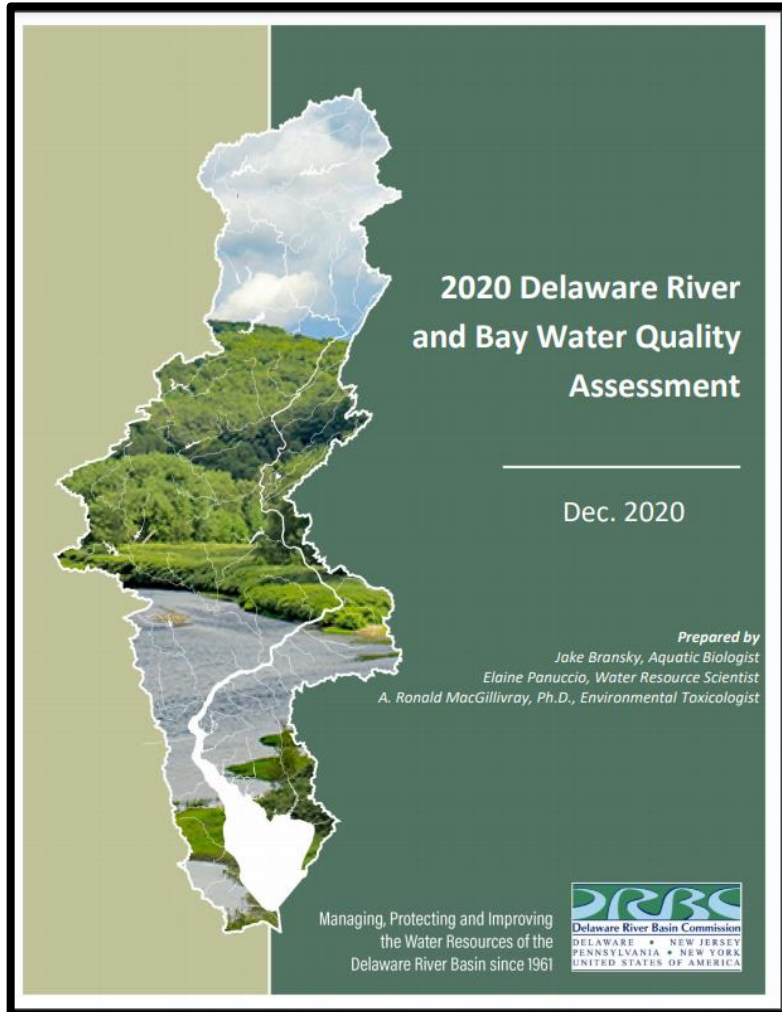
Daily average DO data at Reedy Island (zone 5) for 2018 report

- DRBC previously used a trigger of one exceedance plus one confirmatory exceedance during the 5-year assessment window
- This evaluation method was stringent for certain large datasets
- Delaware River assessment units rarely meet aquatic life use standards using this methodology
- **For the 2020 report we changed to a 99% rule for large datasets**

# 2020 Report

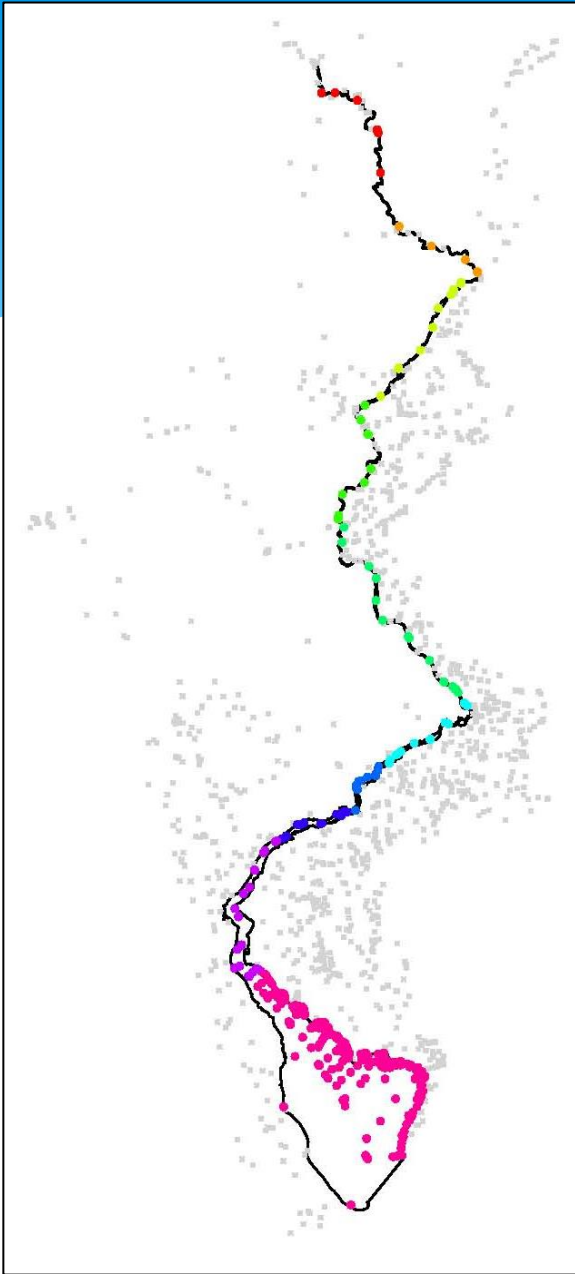
- Parameters evaluated include:
  - **Dissolved oxygen**
  - **pH**
  - **Water temperature**
  - **Total dissolved solids**
  - **Alkalinity**
  - **Hardness**
  - **Chlorides**
  - **Phenols**
  - **Sodium**
  - **Turbidity**
  - Odor
  - Bacteria
  - Toxics
  - Biological community
  - Consumption advisories

**99% rule applied for bold parameters**





# Data



Map of data points used in 2020 report

- Data window for the 2020 report: **10/1/2014 – 9/30/2019**
- Data sources include:
  - DRBC
  - NJDEP
  - PADEP
  - NYSDEC
  - DNREC
  - USGS
  - EPA
  - NOAA
  - NPS

# Report Results

Zone (AU)	Aquatic Life		Drinking Water		Recreation		Fish Consumption	
	2020	2018	2020	2018	2020	2018	2020	2018
<b>1A</b>	NS <sup>A</sup>	NS	NS <sup>AB</sup>	NS <sup>AB</sup>	ID	ID	NS	NS
<b>1B</b>	NS	NS <sup>A</sup>	NS <sup>AB</sup>	NS <sup>AB</sup>	ID	ID	NS	NS
<b>1C</b>	NS <sup>A</sup>	NS <sup>A</sup>	S	S	ID	S	NS	NS
<b>1D</b>	NS <sup>A</sup>	NS <sup>A</sup>	NS <sup>AB</sup>	NS <sup>AB</sup>	ID	ID	NS	NS
<b>1E</b>	NS	NS	S	NS <sup>A</sup>	ID	ID	NS	NS
<b>2</b>	NS <sup>A</sup>	NS <sup>A</sup>	NS <sup>AC</sup>	S	S	S	NS	NS
<b>3</b>	NS <sup>A</sup>	NS <sup>A</sup>	S	S	S	S	NS	NS
<b>4</b>	NS <sup>A</sup>	NS	N/A	N/A	S	S	NS	NS
<b>5</b>	NS <sup>A</sup>	NS	N/A	N/A	S	S	NS	NS
<b>6</b>	NS <sup>A</sup>	NS	N/A	N/A	S	S	NS	NS

Notes:

A – Based primarily on fewer than 10% exceedances of criteria

B – Based on exceedance of 133% of background TDS, not 500 mg/L MCL

C - Based on limited spot measurement data

ID – Insufficient Data

N/A – Not applicable (not an applicable designated use)

S – The use is supported in this Assessment Unit

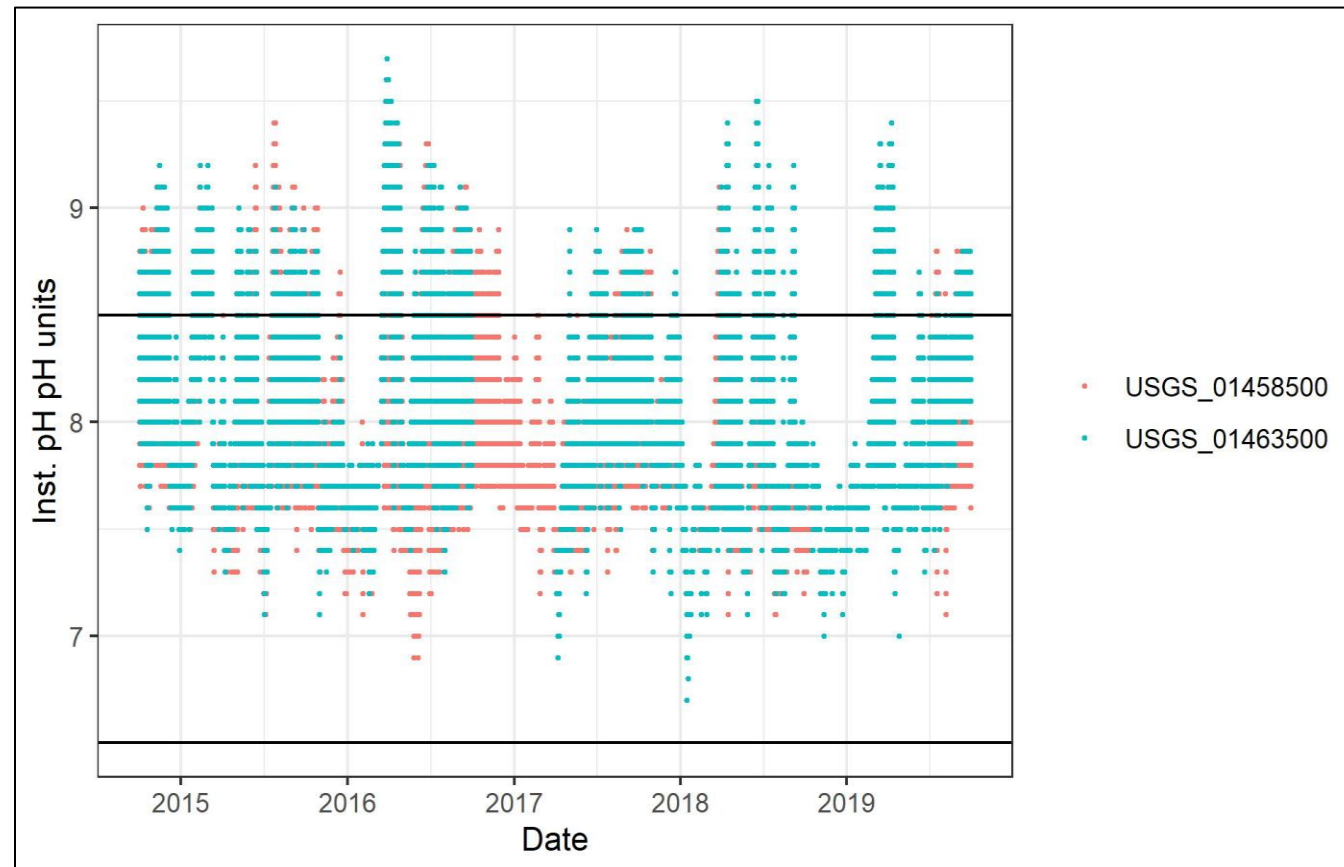
NS – The use is not supported in this Assessment Unit

For full report see:

<https://www.state.nj.us/drbc/library/documents/WQAssessmentReport2020.pdf>



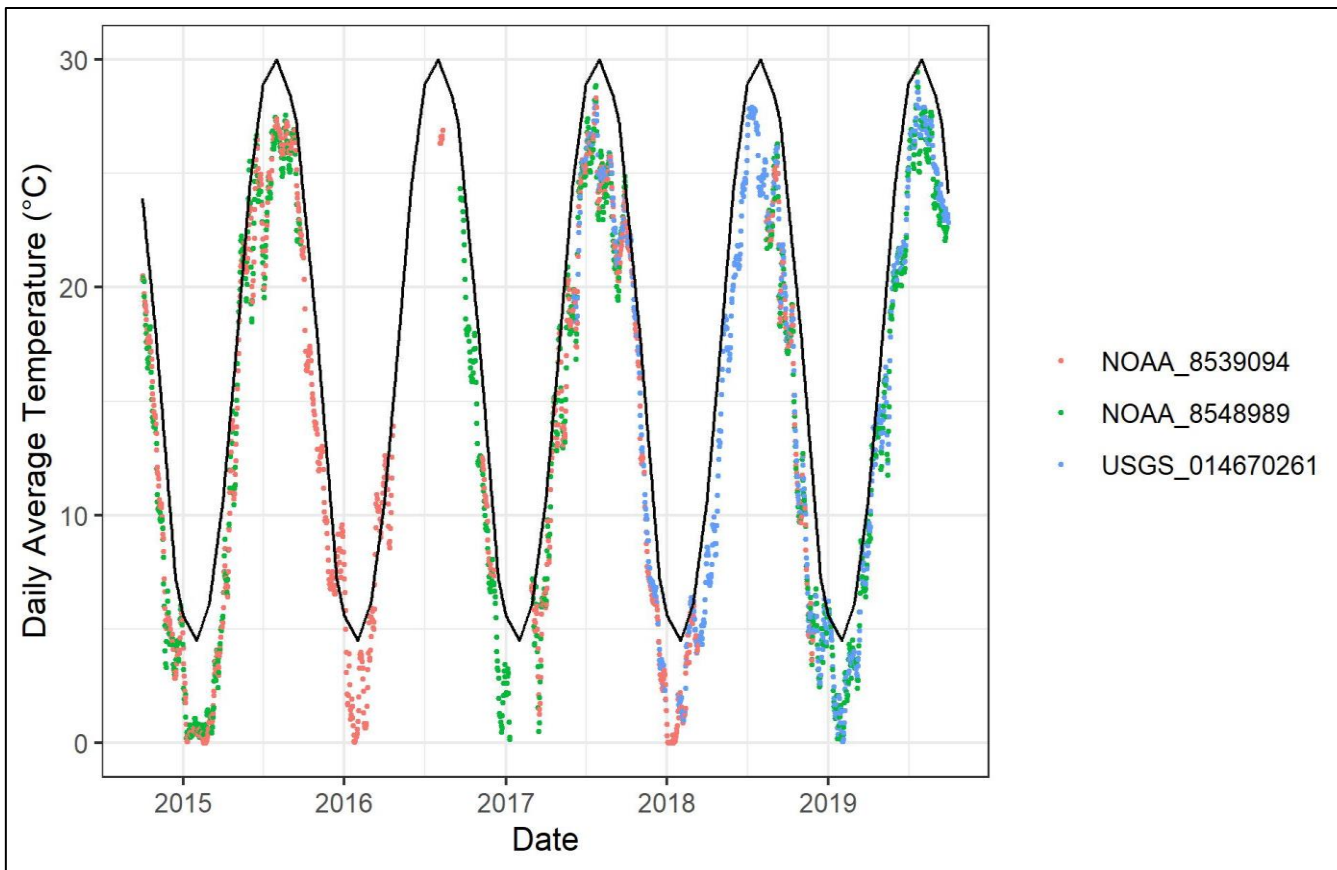
# pH in Non-Tidal River



- pH criteria for aquatic life use were routinely exceeded in non-tidal river in 2020 assessment report
- DRBC regulations allow for exceedances due to natural conditions, however natural conditions have yet to be defined
- Need to evaluate before next assessment

pH Observations Compared to Criteria in Zone 1E

# Temperature in Tidal River



- Temperature criteria for aquatic life use were routinely exceeded in tidal river in 2020 assessment report
- Difficult to disentangle whether increase in temperatures is driven by ambient air temp or other sources
- Need to evaluate before next assessment

Figure 6: Water Temperature Observations Compared to Criteria in Zone 2

# Contact Recreation

- 2020 assessment report supported recreational uses
- Similar to 2018
- Center channel data only
- Additional studies are being performed



AU	Fecal Coliform		Enterococcus		2020 Assessment	2018 Assessment
	Primary	Secondary	Primary	Secondary		
1A	ID	ID	NC	NC	ID	ID
1B	ID	ID	NC	NC	ID	ID
1C	ID	ID	NC	NC	ID	S
1D	ID	ID	NC	NC	ID	ID
1E	ID	ID	NC	NC	ID	ID
2	+	+	+	+	S	S
3	NC	+	NC	+	S	S
4 (> RM 81.8)	NC	+	NC	+	S	S
4 (< RM 81.8)	ID	ID	ID	ID	ID	ID
5	+	+	+	+	S	S
6	+	+	+	+	S	S

## Delaware River Basin Commission

### Recreation Uses in the Estuary 2019 Bacteria Sampling Results

**John Yagecic, PE**  
Manager, Water Quality Assessment DRBC

Presented to an advisory committee of the DRBC on April 30, 2020.  
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For more info on bacteria:  
<https://www.state.nj.us/drbc/quality/conventional/bacteria-monitoring.html>



# Assessment Summary

- Attainment of uses were mixed dependent on zone and use
- This is consistent with previous years reports
- Recommendations for future actions
  - Define the linkage between atmospheric and meteorological drivers of temperature exceedances.
  - Define natural conditions for the application of pH criteria.
  - Evaluate how to integrate enhanced bacterial monitoring data into contact recreation assessment.
  - Development of interactive web-interface for dissemination of report results

For full report see:

<https://www.state.nj.us/drbc/library/documents/WQAssessmentReport2020.pdf>

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