RIVERTRENDS DATA FINDINGS: MIDDLE PENINSULA MASTER NATURALISTS

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Photo by Chesapeake Bay Program

SITES USED IN THIS DATA SUMMARY

The Middle Peninsula Master Naturalists monitor 23 stations in Virginia under the RiverTrends Project. RiverTrends collects monthly water quality samples including air and water temperature, pH, dissolved oxygen, salinity, and water clarity.

This data summary specifically looks at the Mobjack Bay Watershed, which includes the East River, North River, Ware River, Severn River, and all of its tributaries.
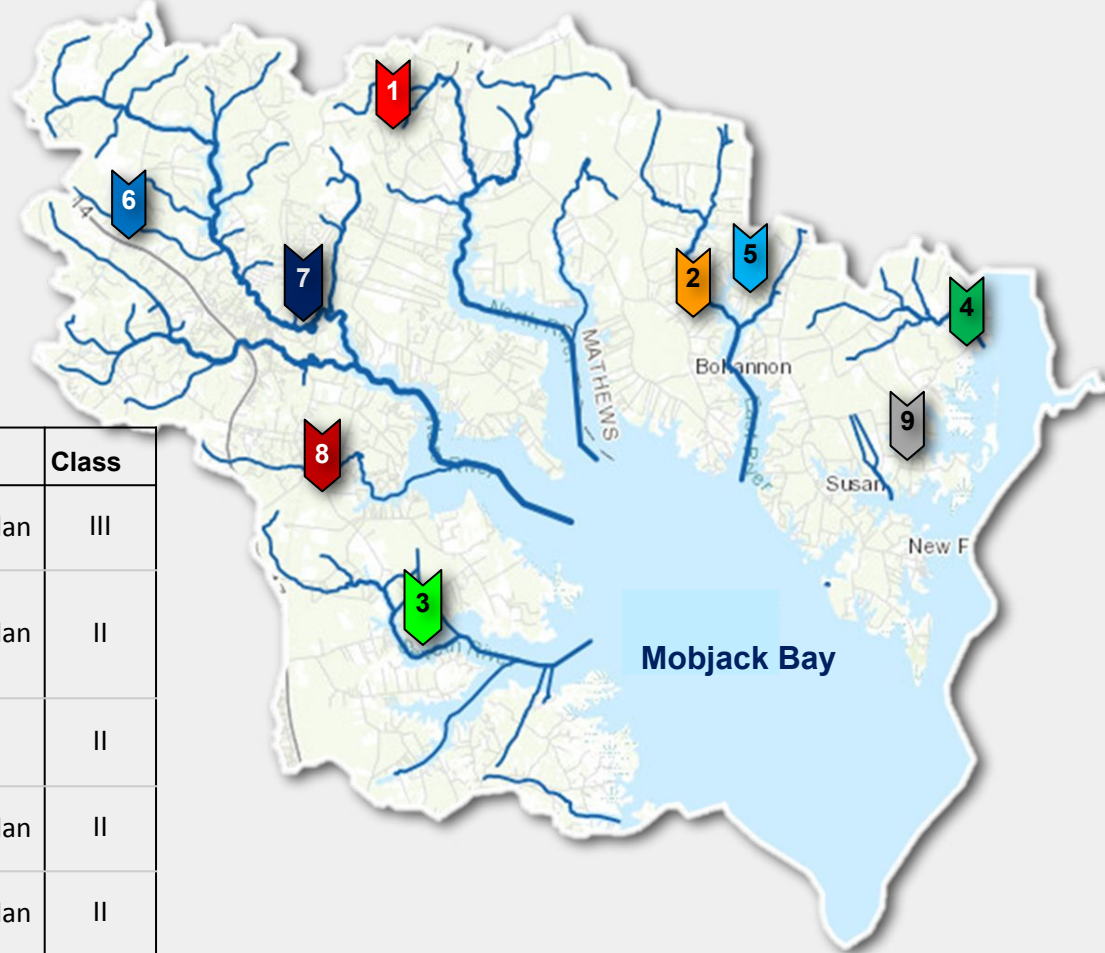
The stations included in this summary have met the following criteria:
- data collected regularly from Fall 2019-Spring 2022
- minimum of 10 monthly sampling events annually
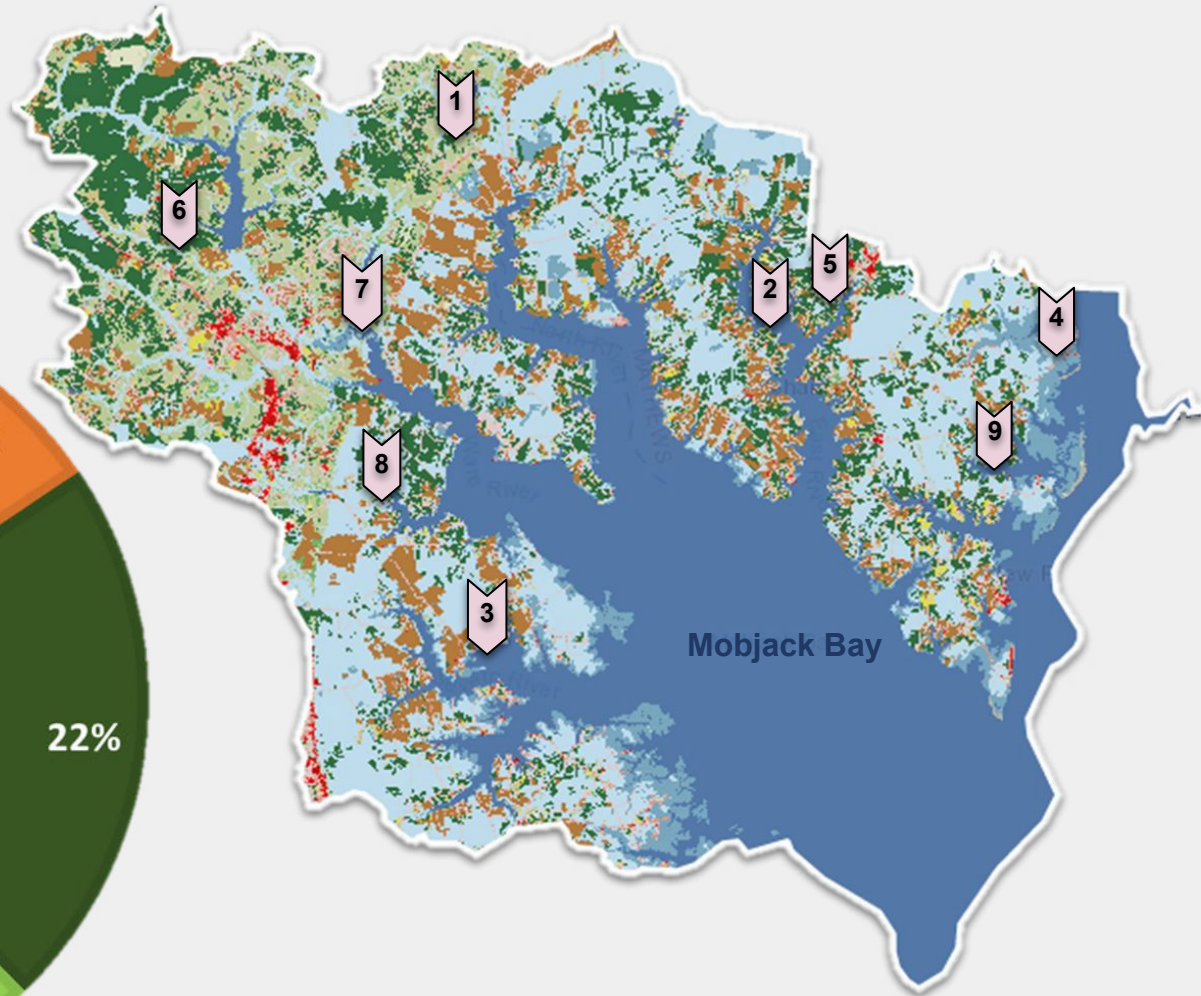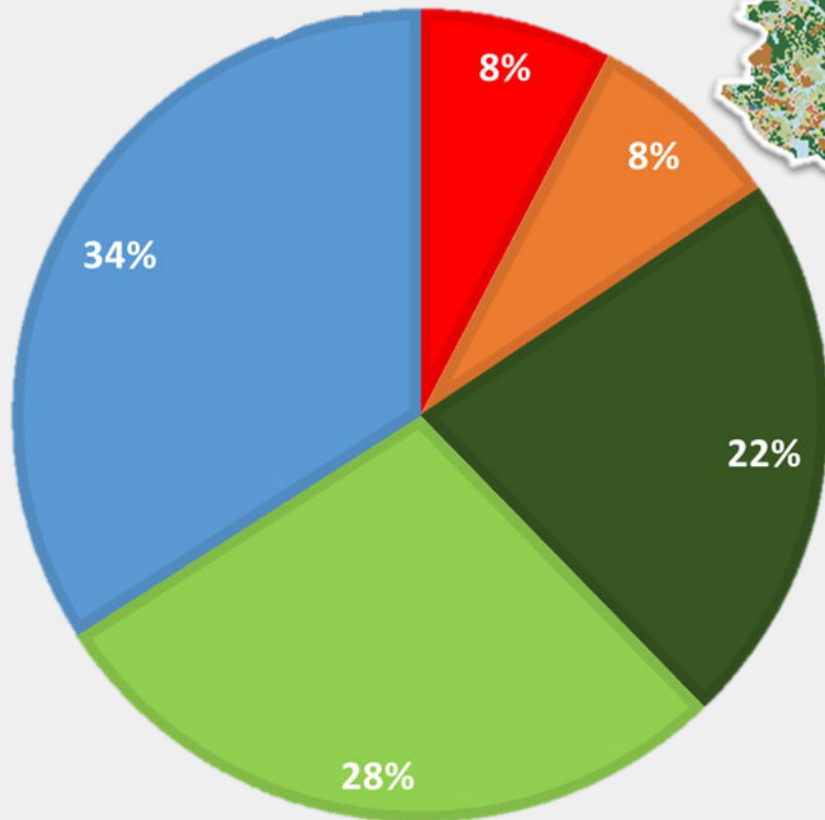
MOBJACK BAY WATERSHED MAP

STATION INFORMATION

#	Station Code	Station Name	Monitors	Class
1	BURPON1	Burke Pond	Dave Harlan, Kerry Harlan	III
2	EASRIV2.75	William's Warf Landing on East River	Dave Harlan, Kerry Harlan	II
3	FRESCHCRE	Fresh School Creek	Jeannie Miller, Kathy Gierlak	II
4	GARCRE0.2*	Garden Creek	Dave Harlan, Kerry Harlan	II
5	PUTINCRE0.1*	Put In Creek	Dave Harlan, Kerry Harlan	II
6	RR	Reservoir Ridge	Kat Sharp, Susan Crockett, Felicity Rask, John Ericson	III
7	WH	Warehouse Landing	Susan Crockett, Jack Chirch	II
8	WILCRE1.5	Paynes Landing on Wilson Creek	Joan Haury and Michelle Phillips	II
9	WINHAR0.8	Winter Harbour Launch	Dave Harlan, Kerry Harlan	II

*data collection began in November 2020

LAND USE IN MOBJACK BAY

Legend:
- 🟥 Developed Land
- 🟧 Agriculture
- 🟩 Natural Forests
- 🟩 Wetlands
- 🟦 Open Water

Pie chart values:
- 8% Developed Land
- 8% Agriculture
- 22% Natural Forests
- 28% Wetlands
- 34% Open Water

Mobjack Bay

*Land Use Data Model from Model My Watershed

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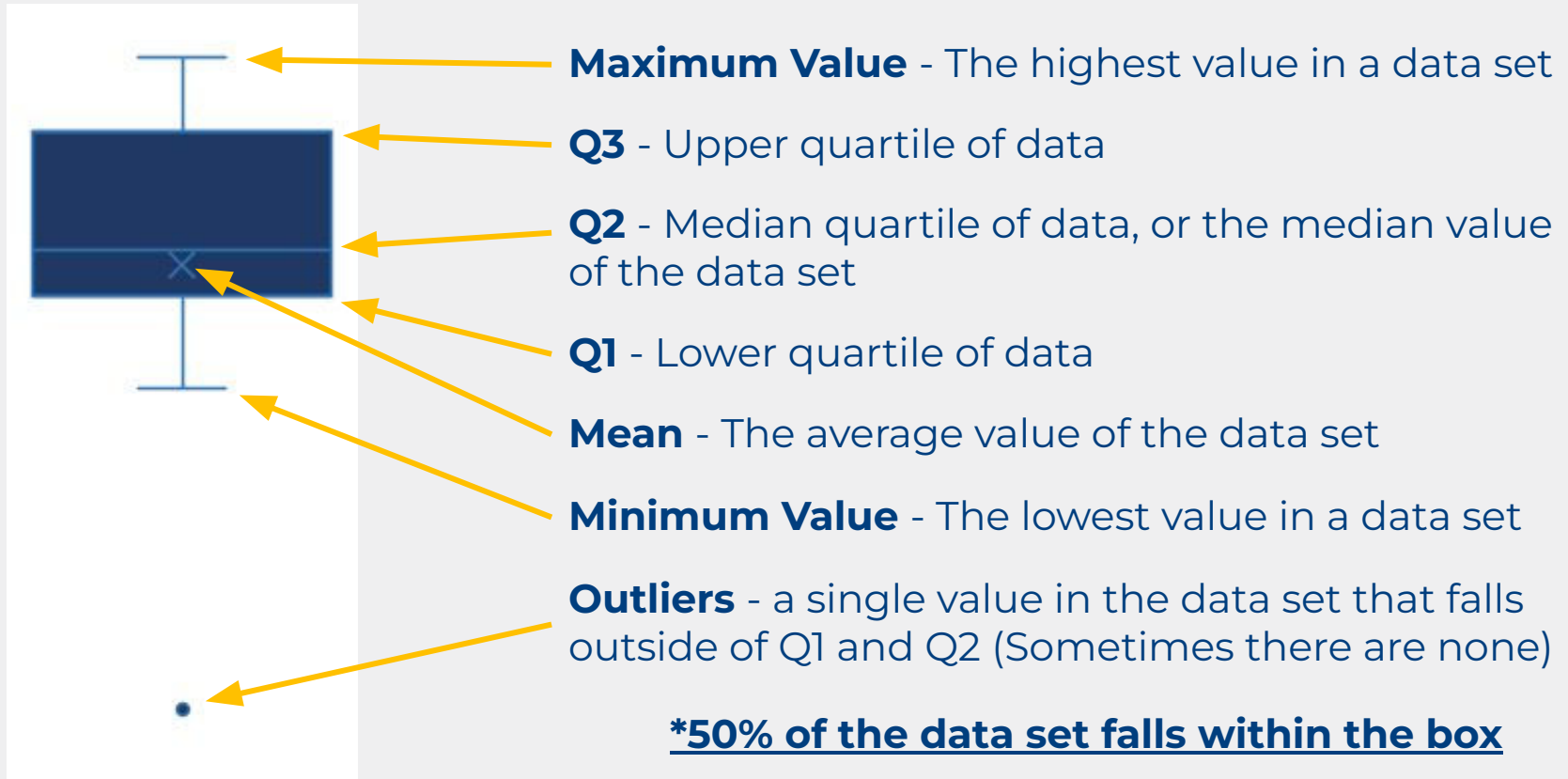
ADDITIONAL INFORMATION: MOBJACK BAY

Sites within this watershed are are classified as Class II (Tidal Tributaries) and Class III (Non Tidal Waters in Coastal Zones)

- State Standards for both of these classes are generally:
    - pH: 6.0-9.0
    - DO: 4.0 mg/L minimum
    - Water Temperature: 31*C maximum for Class III, no standard for Class II
    - Salinity: no standard

- Annual mean precipitation: 115.4 cm (45.4 in)
- Length of streams in:
    - agriculture areas: 17.51 km (10.9 mi)
    - non-agriculture areas: 705.04km (438.1 mi)

- The Mobjack Bay Watershed spans across two counties (Gloucester and Mathews County) with about 720 km (447 miles) of streams that all empty into the Chesapeake Bay.

GET TO KNOW A BOX AND WHISKER PLOT

A quick review of what is a box and whisker plot is...

Maximum Value - The highest value in a data set

Q3 - Upper quartile of data

Q2 - Median quartile of data, or the median value of the data set

Q1 - Lower quartile of data

Mean - The average value of the data set

Minimum Value - The lowest value in a data set

Outliers - a single value in the data set that falls outside of Q1 and Q2 (Sometimes there are none)

<u>*50% of the data set falls within the box</u>

Observations to think of: key values (average, mean, outliers), how tightly data is grouped, if the data is skewed, and if the data is symmetrical.

SUMMARY STATISTICS: WATER TEMPERATURE (°C)
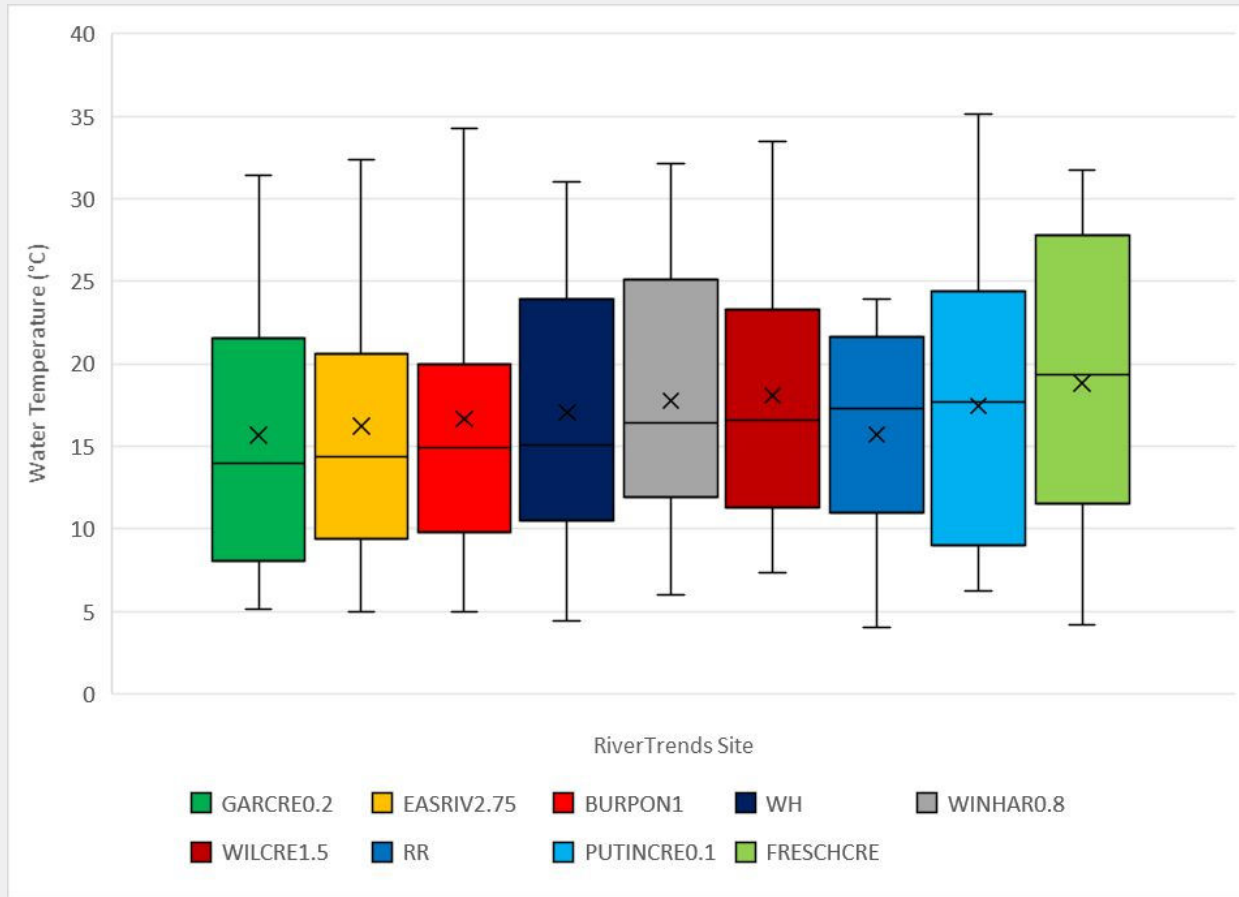
	BURPON1	EASRIV2.75	FRESCHCRE	GARCRE0.2	PUTINCRE0.1	RR	WH	WILCRE1.5	WINHAR0.8
Min	5.0	5.0	4.2	5.1	6.2	4.0	4.4	7.3	6.0
Max	34.3	32.4	31.7	31.4	35.1	23.9	31.0	33.5	32.1
Median	14.9	14.4	19.4	14.0	17.7	17.3	15.1	16.6	16.4
Mean	16.6	16.2	18.8	15.7	17.4	15.7	17.1	18.1	17.7

SUMMARY STATISTICS: DISSOLVED OXYGEN
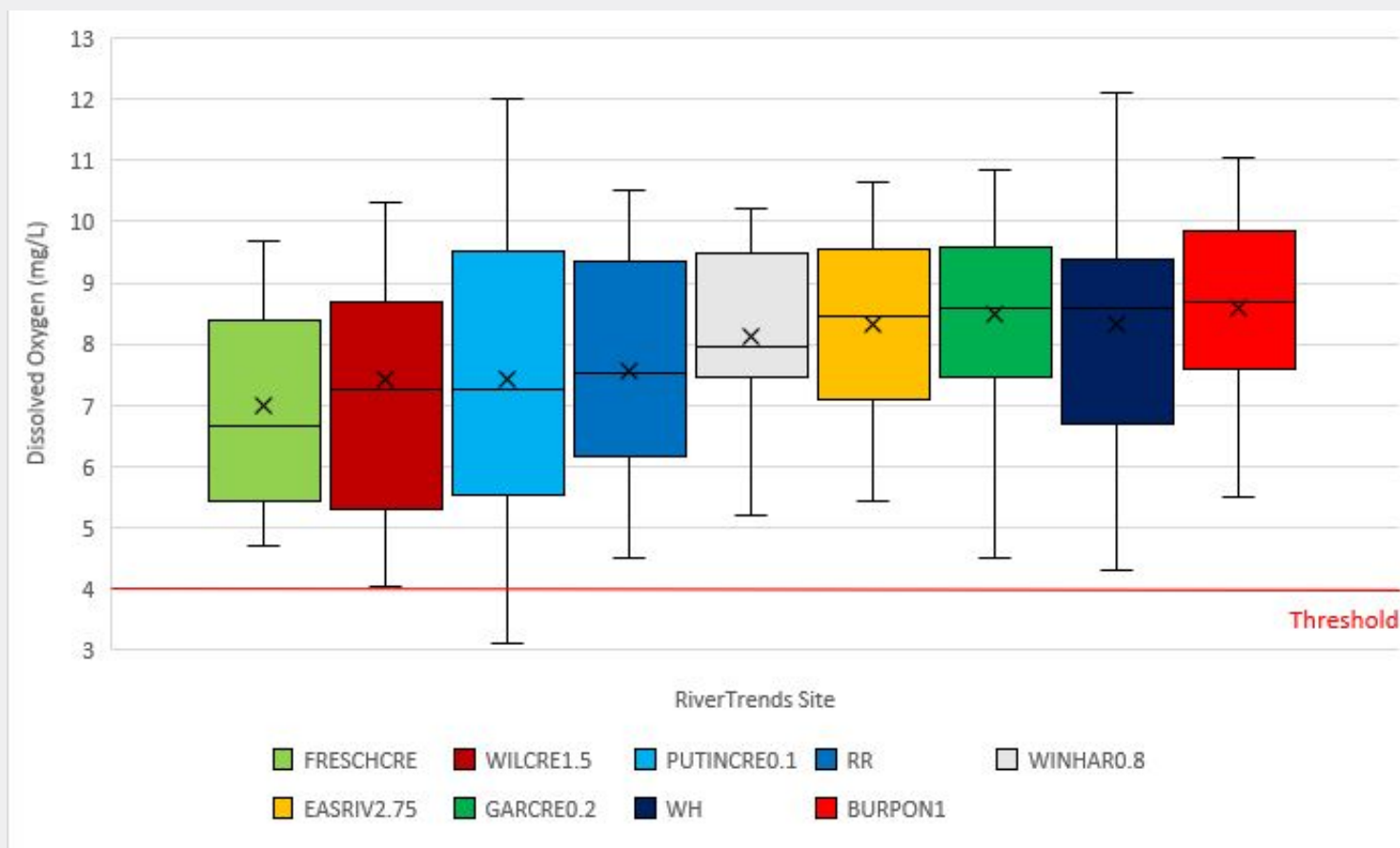
	BURPON1	EASRIV2.75	FRESCHCRE	GARCRE0.2	PUTINCRE0.1	RR	WH	WILCRE1.5	WINHAR0.8
Min	5.5	5.5	4.7	4.5	3.1	4.5	4.3	4.1	5.2
Max	11.1	10.7	9.7	10.9	12.0	10.5	12.1	16.0	10.2
Median	8.7	8.5	6.7	8.6	7.3	7.5	8.6	7.3	8.0
Mean	8.6	8.3	7.0	8.5	7.4	7.6	8.3	7.4	8.1

SUMMARY STATISTICS: PH
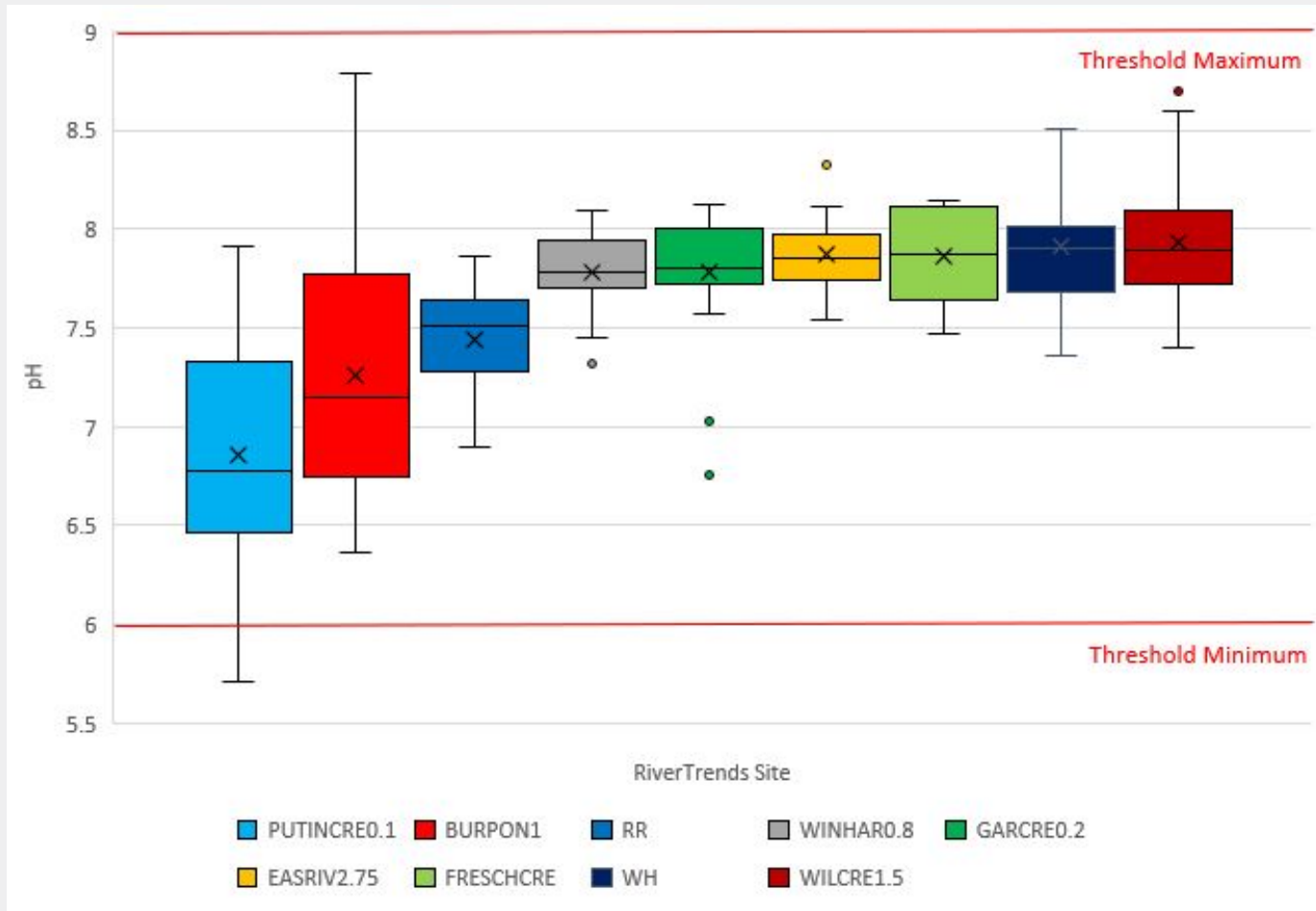
	BURPON1	EASRIV2.75	FRESCHCRE	GARCRE0.2	PUTINCRE0.1	RR	WH	WILCRE1.5	WINHAR0.8
Min	6.4	7.5	7.5	6.8	5.7	6.9	7.4	7.4	7.3
Max	8.8	8.3	8.2	8.1	7.9	7.9	8.5	9.3	8.1
Median	7.2	7.9	7.9	7.8	6.8	7.5	7.9	7.9	7.8
Mean	7.3	7.9	7.9	7.8	6.9	7.4	7.9	7.9	7.8

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SUMMARY STATISTICS: SALINITY
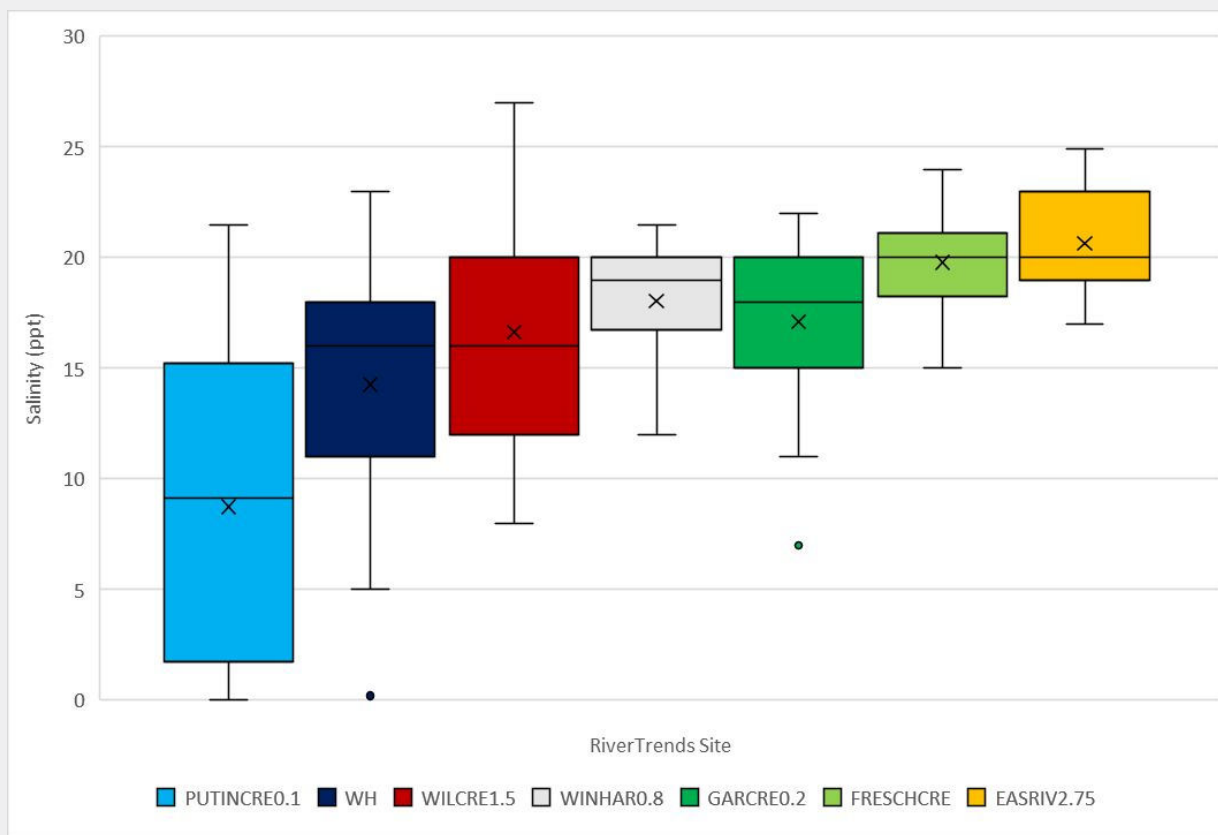
*BURPON and RR are non-tidal sites and are not included in this summary.

	EASRIV2.75	FRESCHCRE	GARCRE0.2	PUTINCRE0.1	WH	WILCRE1.5	WINHAR0.8
Min	17.0	15.0	7.0	0.0	0.2	8.0	12.0
Max	24.9	24.0	22.0	21.5	23.0	27.0	21.5
Median	20.0	20.0	18.0	9.1	16.0	16.0	19.0
Mean	20.6	19.8	17.1	8.7	14.3	16.6	18.0

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SUMMARY OF FINDINGS

All sites follow regular yearly water temperature cycles, with the highest water temperature in mid-summer and the lowest in mid-winter. Due to the proximity of the sites, the data sets have similar averages, resulting in a tight data distribution. Temperature and dissolved oxygen are inversely related, so we the highest water temperatures and closest dissolved oxygen levels at Free School Creek.

All sites meet the state standard for dissolved oxygen throughout the sampling period. Put-In-Creek fell below the minimum threshold twice in late summer (8/25/2021 and 9/22/2021). In one of these events, salinity was also higher than normal. Combined with high water temperatures, the high salinity levels may have contributed to the drop in dissolved oxygen.

We see the widest variability in pH at Put-In-Creek and Burke Pond. There are a few outliers, although most sites fall within the state standard levels. Put-In-Creek fell below the standard twice (12/22/2020 and 2/17/2021), both after heavy rainfall events. This could be due to the slow infiltration soil classification in the area, meaning it has a slow rate of absorbance. The increased amount of runoff into the bodies of water may have lowered the pH levels during these sampling events. In comparison, Burke Pond is surrounded by more wetlands with high infiltration soils which do not encourage runoff.

The highest salinity levels are closest to the mouth of the Bay, following expected trends.

ACKNOWLEDGEMENTS

Thank you to our RiverTrends volunteers for their time and dedication to collecting monthly water quality samples!