

# Tidal Tributary Trends Summaries

## Integrated Trends Analysis Team

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CBP Modeling Workgroup Meeting

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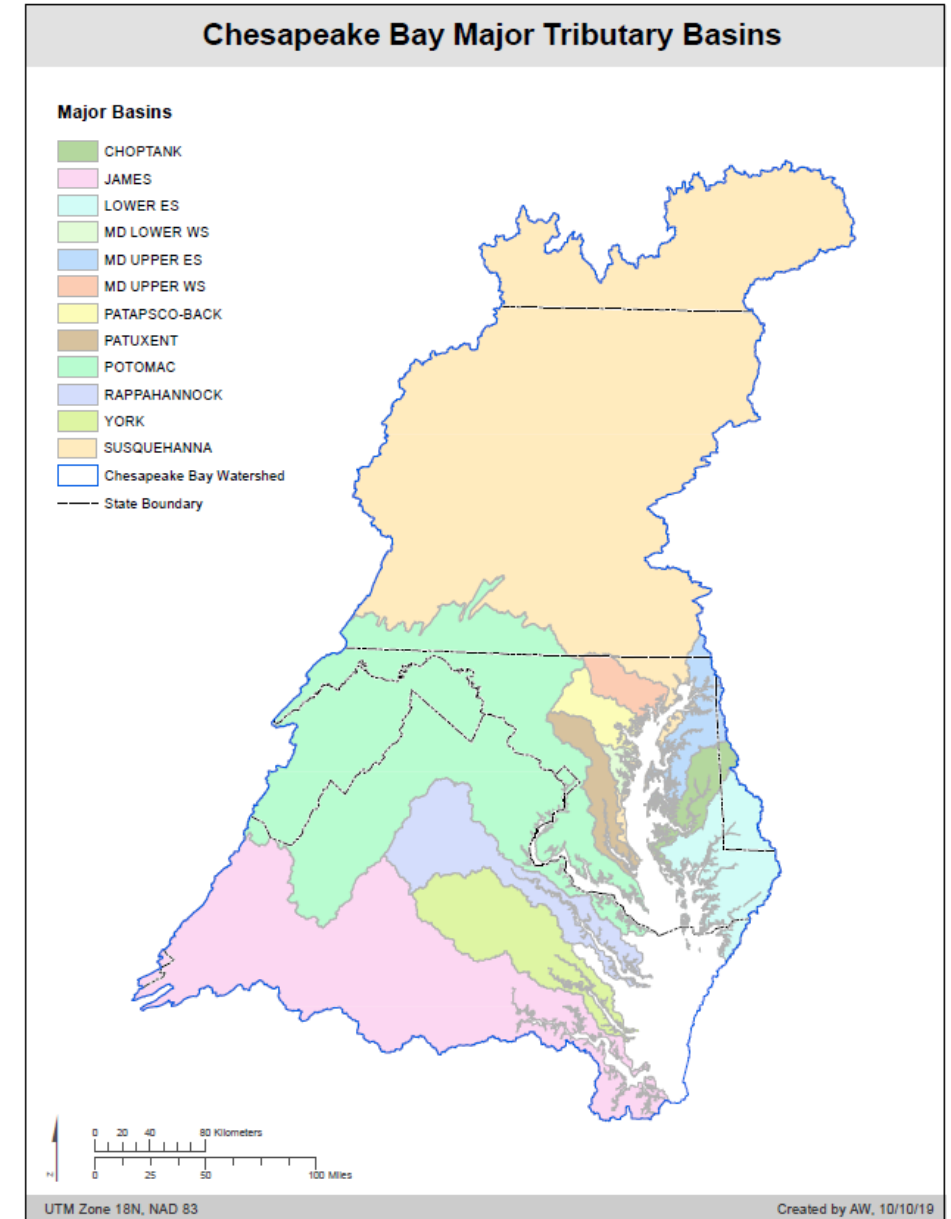
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*This information is preliminary and is subject to revision. It is being provided to meet the need for timely best science. The information is provided on the condition that neither the U.S. Geological Survey nor the U.S. Government shall be held liable for any damages resulting from the authorized or unauthorized use of the information.*

# What are the Tributary Trends Summaries?

We have compiled tributary trends summaries for 12 major tributaries or tributary groups in the Chesapeake Bay Watershed:

1. Potomac
2. Rappahannock
3. Maryland Mainstem
4. Choptank, Little Choptank, Honga
5. York (includes Mattaponi and Pamunkey)
6. MD Upper Western Shore:
  - Bush, Gunpowder, Middle
7. Patapsco/Back
8. MD Lower W. Shore:
  - Severn, Magothy, Rhode/West, South
9. Patuxent
10. James (includes Elizabeth and Lafayette)
11. MD Upper Eastern Shore:
  - Northeast, Back Creek, Elk, Sassafras, Chester, Eastern Bay
12. Lower E. Shore:
  - Fishing Bay, Nanticoke, Manokin, Wicomico, Big, Pocomoke, Tangier
13. Virginia Mainstem



# Standard content across all summaries

“Here’s where we’re talking about”

“Here is the DO standards attainment status”

“This is how the primary water quality variables have changed over time”

“The possible reasons why”

“In a nutshell”

“The rest of the water quality variables, in case you’re interested”

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# Full Potomac Tributary Trends Report Available

<https://cast.chesapeakebay.net/Home/TMDLTracking#tributaryRptsSection>

## Potomac Tributary Report:

A summary of trends in tidal water quality and associated factors, 1985-2018.

December 18, 2020

Prepared for the Chesapeake Bay Program (CBP) Partnership by the CBP Integrated Trends Analysis Team (ITAT)



Recommended Citation: Keisman, J., Murphy, R. R., Devereux, O.H., Harcum, J., Karrh, R., Lane, M., Perry, E., Webber, J., Wei, Z., Zhang, Q., Petenbrink, M. 2020. Potomac Tributary Report: A summary of trends in tidal water quality and associated factors. Chesapeake Bay Program, Annapolis MD.

# Remainder are Abbreviated Summaries

- Rappahannock
- Maryland Mainstem
- Choptank, Little Choptank, Honga
- York (includes Mattaponi and Pamunkey)
- MD Upper Western Shore (Bush, Gunpowder, Middle)
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# Current Status: FY21 plans

## OLD 2021 Priorities:

- Produce figures and tables for all 12 tributary summaries (March 2021)
- 1985 – 2018 Rappahannock summary (technical meeting requested for 2021)
- 1985 – 2018 Upper Mainstem summary (draft materials in FY21; technical discussions TBD)

## NEW 2021 Priorities:

- Provide figures, tables, ***and basic descriptive text*** for all tributary summaries to Partnership by April 2021
  - No **Insights on Change** or **Summary** sections
- Complete **Insights On Change** and **Summary** sections for the Rappahannock summary in 2021
- Other tributary summary priorities TBD

# Rappahannock Summary Status



“Here’s where we’re talking about”



“Here is the DO standards attainment status”



“This is how the primary water quality variables have changed over time”



“The possible reasons why”

Pending

“In a nutshell”

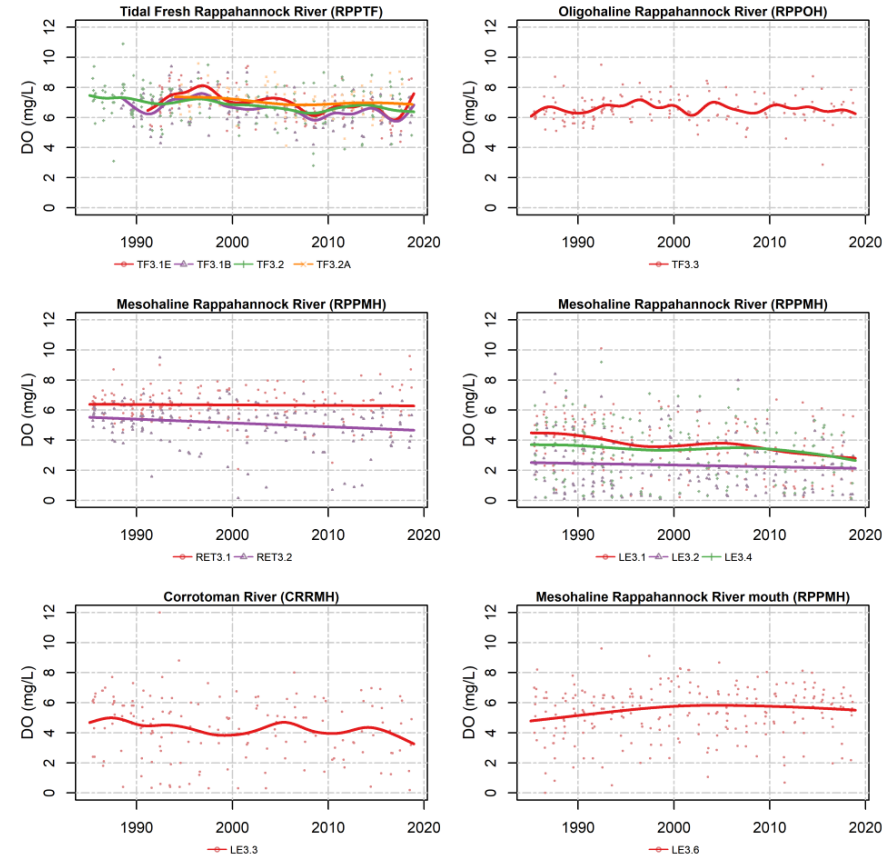
“The rest of the water quality variables, in case you’re interested”

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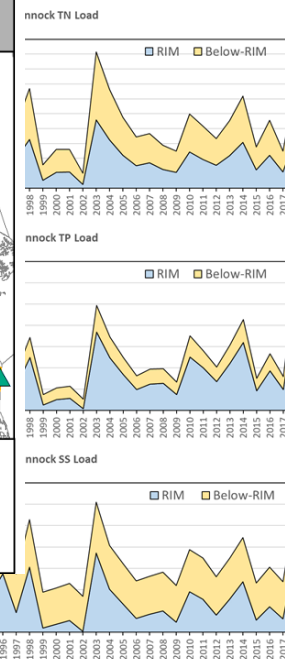
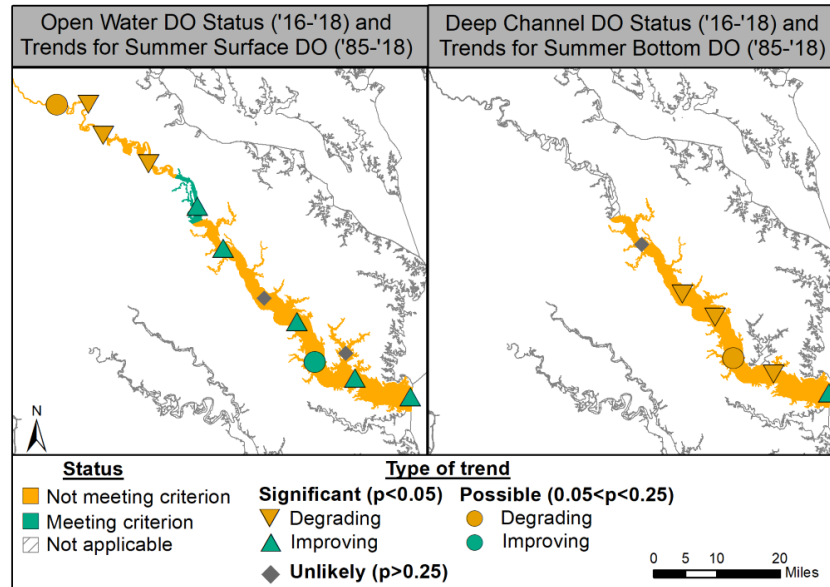


## Summer (June-Sept) Bottom DO Data and Average Predictions



Region	USGS Station ID	USGS Station Name	2007 - 2018 Trend Percent Change		
			TN	TP	SS
Rappahannock River watershed	01668000	Rappahannock River nr Fredricksburg, VA	6.3	27.9	28.3
	01664000	Rappahannock River at Remington, VA	15.4		
	01667500	Rapidan River nr Culpeper, VA	-8.9	-6.8	-7.1
	01665500	Rapidan River nr Ruckersville, VA	-5.1		

Decreasing trends listed in green, increasing trends listed in orange, results reported as "no trend" listed in black. TN = total nitrogen, TP = total phosphorus, SS = suspended sediment



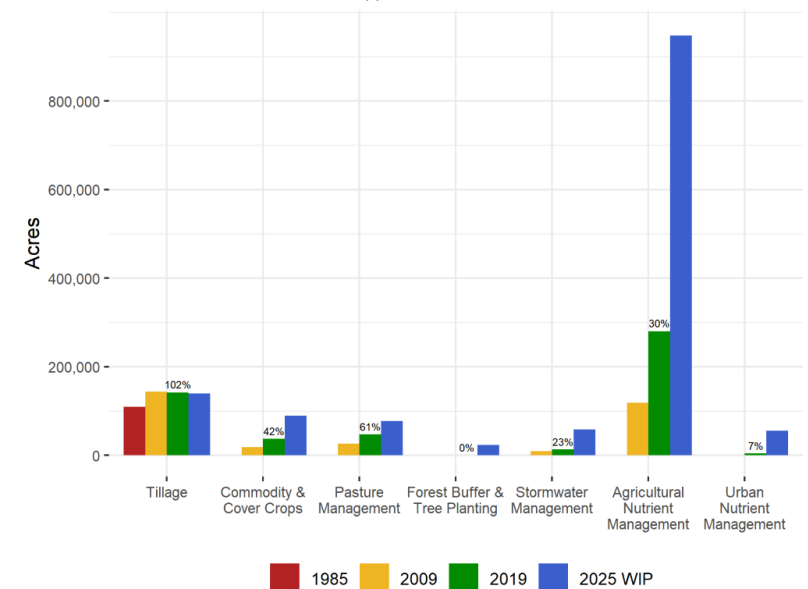
Variable	Trend, metric ton/yr	Trend p-value
TN		
Total watershed	12	0.70
RIM watershed <sup>1</sup>	4.5	0.73
Below-RIM watershed <sup>2</sup>	6.7	0.55
Below-RIM point source	-2.5	< 0.01
Below-RIM nonpoint source <sup>3</sup>	13	0.30
Below-RIM tidal deposition	-2.0	< 0.05
TP		
Total watershed	5.4	0.15
RIM watershed	5.0	0.12
Below-RIM watershed	0.51	0.50
Below-RIM point source	-0.58	< 0.01
Below-RIM nonpoint source	1.4	< 0.05
SS		
Total watershed	4,158	0.18
RIM watershed	3,484	0.21
Below-RIM watershed	680	0.19
Below-RIM point source	-4.0	< 0.01
Below-RIM nonpoint source	678	0.19

<sup>1</sup> Loads for the RIM watershed were estimated loads at the USGS RIM station 01668000 (Rappahannock River near Fredericksburg, Va.; [https://chrimer.usgs.gov/loads\\_query.html](https://chrimer.usgs.gov/loads_query.html))

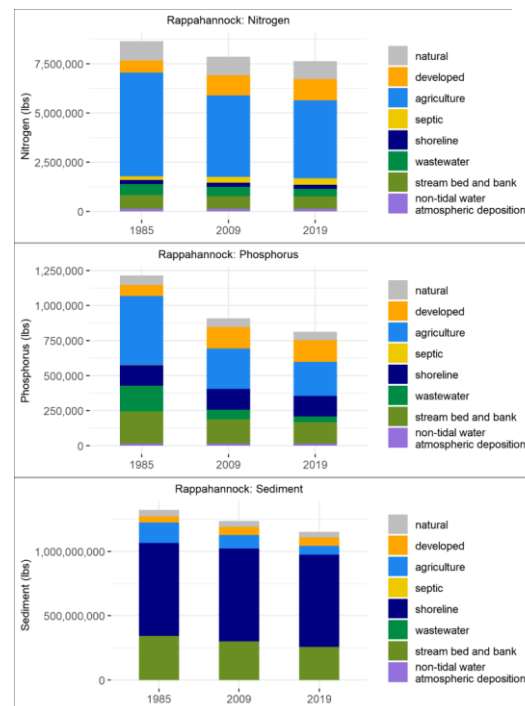
<sup>2</sup> Loads for the below-RIM watershed were obtained from the Chesapeake Bay Program Watershed Model (<https://cast.chesapeakebay.net/>)

<sup>3</sup> Below-RIM nonpoint source loads were obtained from the Chesapeake Bay Program

## Rappahannock 1985 - 2025



Values above the 2019 bars are the percent of the 2025 goal achieved.





# Where to find the Tributary Trends Summaries

<https://cast.chesapeakebay.net/Home/TMDLTracking#tributaryRptsSection>

PDFs for all tributary summaries will be posted in mid-April 2021

On Main CAST page, click “Track Progress”

On “Track Progress” page, click “Tributary Summaries”

The following information is available below:

- Phase 3 WIP BMP Information
  - Trends Over Time
    - BMPs
    - Loads
    - Wastewater
    - Nutrients Applied
    - Animal Units
    - Septic
    - Tributary Summaries
    - River Trends
- Progress Reporting
  - Phase 6 NEIEN Appendix
  - Codes List and Tables
  - NEIEN Submission Instructions
  - Document Exchange Template
  - NEIEN Schema
  - CAST data update frequency
- Verification
  - Chesapeake Bay Basinwide BMP Verification Framework
  - Jurisdictions' BMP tracking and reporting leads
  - Chesapeake Bay Program Grant Guidance
  - Jurisdictional Quality Assurance Project Plans (QAPPs)
- Federal Agencies
  - Federal Facility User Guide for Frequently Asked Questions
  - Annual Progress Reporting Templates
  - Milestones



## WIP BMP Information

are synthesized into charts to assess BMP effectiveness, BMP cost-effectiveness, and overall costs. Active nitrogen and phosphorus BMPs in the WIP3 as measured by percent of total reduction in the nitrogen and phosphorus BMPs in the WIP3 as measured by cost/year to reduce a pound of each BMP for the most recent annual progress year and WIP3 by state and sector are presented in the

Overall Costs charts

[View WIP BMP Charts](#)

[Compare Planning Targets](#)



## Tributary Summaries

The Chesapeake Bay Program and the U.S. Geologic Survey are compiling tributary basin summaries for 12 major tributaries or tributary groups in the Chesapeake Bay Watershed. These summaries summarize the following in one place: 1) How tidal water quality changes over time; 2) How factors that drive those changes change over time; and, 3) Current state of the science on connecting change in aquatic conditions to its drivers.

The tributary summaries are posted as they are made available.

- [Potomac Summary, Appendices](#)
- MD Upper Western Shore-Bush, Gunpowder, Middle
- Patapsco/Back
- MD Lower W. Shore-Severn, Magothy, Rhode/West, South
- Patuxent
- Rappahannock
- York, includes Mattaponi and Pamunkey
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