



MARYLAND COASTAL BAYS PROGRAM

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Dear Canal Challenge Participant,

Thank you so much for the wonderful response to the Maryland Coastal Bays Program (MCBP) inaugural “Ocean Pines Canal Challenge”. We received almost 100 samples and have just recently completed compilation of the analyses. The data provides us with a great snapshot of St. Martin River water quality from which to build a program of action for area homeowners.

We are including a table with results of all the samples that were taken. We are also attaching the Results Report, a four-page summary of what this data means for our local waterways. We hope that you can take the time to read the report and let us know if you have any questions.

You will notice that this report also summarizes 10 ways that individual homeowners can help our bays. We are asking folks to consider how they can help individually as well as on a community-wide basis. The MCBP will also continue to move the ball forward with a continued effort to inform the community and their leadership on future projects that we can work on together for improvements to water quality and overall watershed health.

Our many thanks to Zach Garmoe, our Chesapeake Conservation Corps member, for spearheading this effort as his capstone project while here at the MCBP. If there are any questions regarding the results or future projects, please contact Amanda Poskaitis at (410)213-BAYS or amandap@mdcoastalbays.org

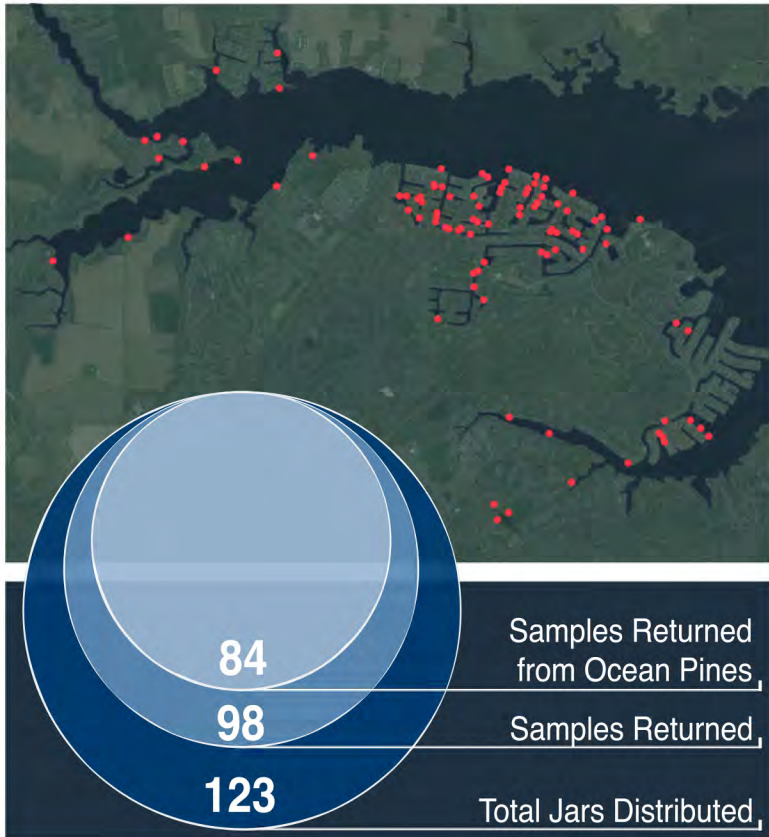
With best regards,

Frank M. Piorko

Frank Piorko
Executive Director
Maryland Coastal Bays Program

OCEAN PINES CANAL CHALLENGE

Results Report



The map above indicates the locations of the 98 samples. The graphic below the map shows the proportion of jars returned. Below, you will find the exact results of the canal challenge, as well as long-term local averages.

Welcome to the results report of the Ocean Pines Canal Challenge!

The goal of this project was to capture a snapshot of the health of the water in the canals of Ocean Pines and in the St. Martin River. On May 20th, nearly 100 residents brought water quality samples to Ocean Pines Bay Day where they were analyzed using a variety of tests. This report details the overall findings of these tests, as well as what we can all do to improve the health of the St. Martin River.

RESULTS AT A GLANCE

- We received almost 100 samples, indicating a strong community interest and concern regarding the health of the St. Martin River.
- Overall, the results were consistent with long term water quality trends in the St. Martin River, which received a D+ in the 2016 Coastal Bays Report Card.
- Samples taken from points farther up in Canals, away from the main stem of the St. Martin River, revealed poorer flushing than those that were closer to the river.
- Over 7 inches of rain fell in the week before sampling, which likely led to high levels of oxygen in the water compared to long term averages.

| PARAMETERS | BAY DAY AVG | LONG TERM AVG | IDEAL RANGE |
|------------------------|-------------|---------------|-------------|
| Dissolved Oxygen: mg/L | 9.05 | 5.43 | Above 5 |
| Salinity: ppt | 4.52 | 24.15 | Varies |
| pH | 6.93 | 7.56 | 6.5-8 |
| Turbidity: NTU | 10.7 | N/A | Below 15 |
| Phosphate: mg/L | 0.17 | 0.18 | Below 0.1 |

NUTRIENT POLLUTION

Nutrients such as phosphates are found in water due to natural processes, but are often found in higher concentrations due to human contribution. Excess levels of nutrients cause algal blooms, which can lead to fish kills and other harmful results. Poor farming practices, pet litter, stormwater, and lawn fertilizer are all sources of human-caused nutrient pollution.

For the Canal Challenge, we tested for phosphates, a type of nutrient that is essential for plant growth, but can be harmful if found in excessive levels. In the Coastal Bays, any phosphate level above 0.1 mg/L is deemed excessive, which unfortunately is not a rare occurrence in the St. Martin River.

On Bay Day, the average was 0.17 mg/L.

A LACK OF MIXING

One potential issue with boating canals, such as those in Ocean Pines, is that they tend to flush poorly, meaning that water tends to stagnate and accumulate pollutants. This leads to algal blooms, low levels of oxygen, fish die-offs, and other negative outcomes. In the St. Martin River, insufficient levels of oxygen occur frequently in the summer months due to this very reason.

This issue was present in the samples collected at Bay Day. The further into a canal a sample was taken, the more likely it was to have increased levels of nutrients. This indicates that even with the heavy rains that fell in the week before the samples were collected, little mixing occurred between the waters in the longest canals and the St. Martin River.

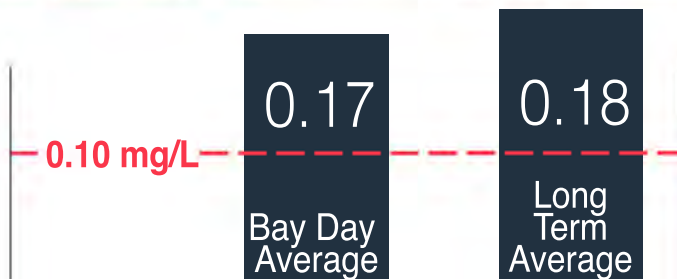
The map and graph to the right help visualize this connection.

DISSOLVED OXYGEN

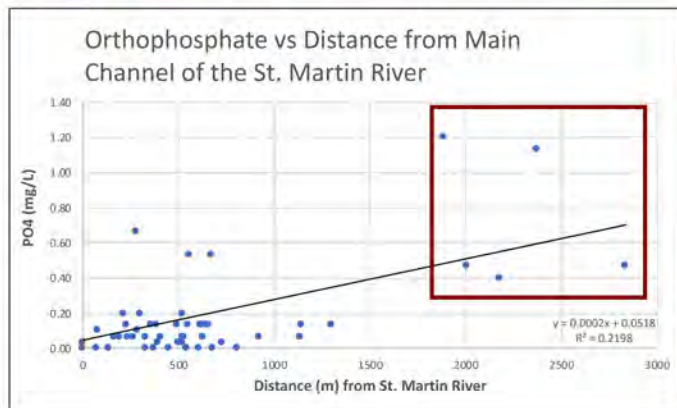
Dissolved Oxygen (D.O.) is a measure of the amount of oxygen found in the water. This occurs through two main processes: diffusion from the atmosphere & photosynthesis of underwater plants. In canals, both processes tend to occur at levels lower than other bodies of water. When dissolved oxygen levels dip below 5 mg/L, aquatic organisms become stressed, struggle to survive, and may perish.

D.O. levels were high on Bay Day, likely due to the high amount of rainfall, which causes atmospheric mixing. For longer term data on dissolved oxygen in the St. Martin River, follow this link:

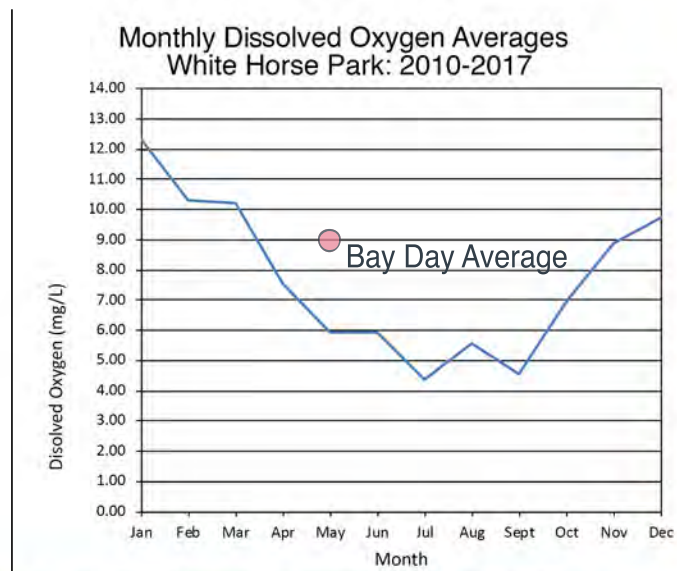
ecoreportcard.org/report-cards/maryland-coastal-bays/health/



The graph above shows orthophosphates levels found on Bay Day compared to the long term average and excessive threshold. The map and graph below show heightened levels of orthophosphate the farther back in each canal.



The graph below shows the monthly averages for dissolved oxygen in Ocean Pines compared to the average level found on May 20th, 2018.



OTHER PARAMETERS

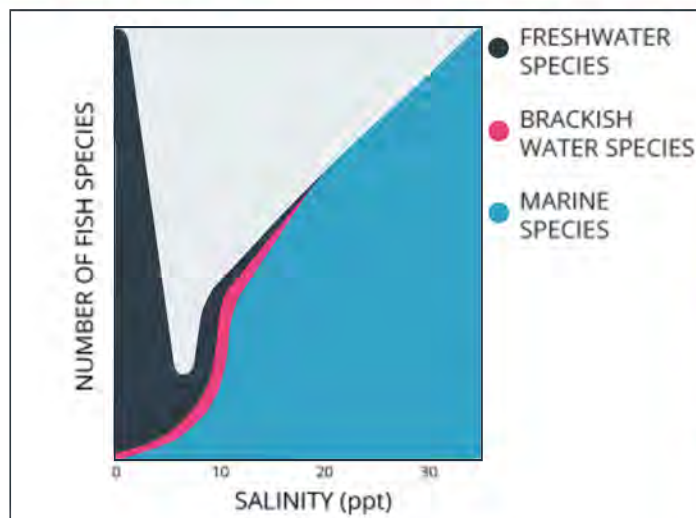
On Bay Day, we tested for six total parameters. Below you will find descriptions of salinity, turbidity, pH, and bacteria.

Salinity: On Bay Day we measured the level of dissolved salts found in a sample of water, measured in parts-per-thousand (ppt). This is highly variable in tidal areas such as Ocean Pines, with levels ranging from 2-30 ppt. On Bay Day, salinity levels were low due to the rainfall from the days before.

pH: A measure of how acidic or basic the water is. pH ranges from 0 to 14, with 7 being neutral. The normal range for pH in our coastal bays is approximately 6.5 to 8 and the Bay Day average was 6.93.

Turbidity: A measurement of water clarity, measured in Nephelometric Turbidity Units or (NTU). The more particles in the water, the higher the turbidity results. The clearer the canal, the lower the turbidity.

Bacteria: Many of you also asked about the bacterial levels of your canals. While we did run some bacterial tests, a much more thorough data set is collected bi-weekly by Assateague Coastal Trust and can be viewed online at <http://www.actforbays.org/bacteria-counts.html>



WHY DOES THIS MATTER?

Of all the sub-watersheds that make up Maryland's Coastal Bays, the St. Martin River is the least healthy. Yet, there are actions we can all take to play a role in improving the quality of the water.

One in four residents in the St. Martin River sub-watershed lives in Ocean Pines, and the community has over 9 miles of waterfront land. This means that there are many opportunities to improve the health of your river!

Healthy water starts on the land. Actions such as fertilizing properly, directing stormwater away from canals, and removing yard waste can all help curb nutrient pollution & improve the health of the water. On the next page there is a list of 10 easy steps you can take to help improve the health of our Bays!



The graph above shows the long-term health-index of the St. Martin River. It has held steady, with little improvement, for the last ten years. Map: Jane Thomas, Intergration and Application Network, UMCES (ian.umces.edu/imagelibrary)

10 WAYS TO HELP THE BAYS

- 1. Fertilize Responsibly:** By limiting the amount of fertilizer on your lawn and using slow-release nitrogen you are limiting the amount that will run off into the water and cause nutrient pollution.
- 2. Don't Apply Fertilizer within 15 feet of Waterways:** The Maryland Lawn Fertilizer Law of 2013 prohibits the use of fertilizer within this distance, which also helps keep it out of our waterways.
- 3. Direct Storm-water Away from Canal:** Instead, allow it to go into a pond, vegetated area, or rain barrel where it can be naturally filtered before entering the Coastal Bays.
- 4. Remove yard waste,** such as grass clippings and leaves, away from canal sides. Compost or take it to a landfill. If not removed, dead plants become more untreated nutrients in the canal.
- 5. Plant Native Trees or Plants** along the border of your canal. These will take up nutrients and chemicals before reaching the water and can regulate water temperature as well!
- 6. Scoop the Poop:** Pet waste is another example of unwanted nutrients in the coastal bays. Like fertilizer, this contributes to algal blooms which can be harmful to aquatic life.
- 7. Use Herbicides and other garden chemicals sparingly:** On average, household gardeners use pesticides at 10-20 times the rate farmers do and over-application is very harmful to our waterways.
- 8. Educate Your Neighbors:** Tell your fellow homeowners how they can help protect the waterways we all share.
- 9. Get Your Feet Wet:** Join MCBP for one of our local clean-up events or volunteer as an oyster gardener, terrapin surveyor, or seal steward. Or just get outside and enjoy our Coastal Bays!
- 10. Help this Project Continue:** Projects like this one only happen through your continued support. For more information go to mdcoastalbays.org/donate-online

ACKNOWLEDGEMENTS

Thank you all so much for taking an interest in the Ocean Pines Canal Challenge and the health of the St. Martin River. We greatly appreciate everyone who brought out a water quality sample to Bay Day. As with any citizen science project, this would not have been possible without the hard work of each and every one of you. This is especially true for Jim Spicknall, who alone brought in 16 samples he collected! Additionally, this project would not have happened without the assistance of the Ocean Pines Association and the entire staff of the Maryland Coastal Bays Program.

Funding for this project was provided by the Chesapeake Bay Trust, Bill & Cindy Garmoe, and the Maryland Coastal Bays Program, and was executed in partnership with the Ocean Pines Association. All images and graphics were created by MCBP unless stated otherwise. All long-term data were taken from the Boat Launch at White Horse Park during 2009-2017. This document was created by Zachary Garmoe for the Maryland Coastal Bays Program



| Location | Dissolved Oxygen (mg/L) | Salinity (ppt) | pH | Turbidity (NTU) | Phosphate (mg/L) |
|--|-------------------------|----------------|------|-----------------|------------------|
| 1 Oceans End Court , Ocean Pines MD | 8.18 | 13.4 | 6.94 | 6.4 | 0.00 |
| 1 Teal Court, Ocean Pines MD | 6.4 | 21.2 | 7.35 | 12.6 | 0.03 |
| 1 Windward Court, Ocean Pines MD | 6.1 | 18.4 | 6.93 | 13.2 | 0.20 |
| 10 Cove Lane, Ocean Pines MD | 6.2 | 20.7 | 7.27 | 11.9 | 0.07 |
| 10 Portside Court, Ocean Pines MD | 9.62 | 4.67 | 7.52 | 8.4 | 0.13 |
| 10 Windjammer Road, Ocean Pines MD | 9.81 | 1.57 | 6.68 | 11.2 | 0.03 |
| 10230 Hotel Road, Bishopville MD | 5.6 | 0.1 | 6.73 | 9.6 | 0.27 |
| 10544 Egret Court, Bishopville MD | 4.6 | 0.3 | 6.63 | 19.7 | 0.93 |
| 11 Moonshell Drive. Ocean Pines MD | 7.6 | 4.2 | 6.67 | 18.3 | 0.13 |
| 11 Oceans End, Ocean Pines MD | 9.16 | 4.82 | 6.37 | 7.1 | 0.03 |
| 11020 Piney Island Drive, Bishopville MD | 8.9 | 5.6 | 7.78 | 7.9 | 0.00 |
| 11225 Beverly Street, Bishopville MD | 5.4 | 0.8 | 7.97 | 6.4 | 0.03 |
| 11346 Marina Drive, Berlin MD | 10.16 | 1.03 | 6.68 | 9.2 | 0.03 |
| 11732 Riverview Dr. Berlin, MD | 7 | 0.7 | 6.58 | 1.7 | 0.07 |
| 12 Crows Nest Lane, Ocean Pines MD | 10.61 | 1.36 | 6.9 | 17.9 | 0.03 |
| 12 Driftwood Lane, Ocean Pines MD | 10.92 | 1.54 | 6.77 | 18.2 | 0.07 |
| 12032 Piney Point Road, Bishopville MD | 6.6 | 0.6 | 7.49 | 1.5 | 0.00 |
| 12058 S. Piney Point Road, Bishopville MD | 10.53 | 0.19 | 6.6 | 9.6 | 0.13 |
| 121 Central Park E, The Parke, Ocean Pines | 5.6 | 0.2 | 7.96 | 6.6 | 0.06 |
| 12101 South Piney Point Rd. Bishopville MD | 10.6 | 0.56 | 6.79 | 5.9 | 0.03 |
| 12122 S. Piney Point Road, Bishopville MD | 5.5 | 0.2 | 6.22 | 2.5 | 0.00 |
| 12247 Dixie Drive, Bishopville MD | 9.27 | 0.64 | 6.57 | 7.3 | 0.13 |
| 12359 Vivian Street, Bishopville MD | 8.84 | 18.49 | 6.9 | 3.4 | 0.00 |
| 13 Arcadia Ct. Ocean Pines MD | 4.1 | 0.1 | 6.2 | 19.5 | 0.00 |
| 132 Teal Circle, Ocean Pines MD | 10.75 | 4.75 | 6.81 | 14.6 | 0.53 |
| 134 Teal Circle, Ocean Pines MD | 6.2 | 1.2 | 7.02 | 40.6 | 0.00 |
| 14 Cove Lane, Ocean Pines MD | 9.7 | 1.99 | 6.84 | 11.9 | 0.00 |
| 14 Grandport Road, Ocean Pines | 9.5 | 1.77 | 6.66 | 16.7 | 0.10 |
| 14 Village Way, Ocean Pines, MD | 7.5 | 8.1 | 7.86 | 8.1 | 0.00 |
| 154 Teal Circle, Ocean Pines MD | 6.7 | 19.3 | 6.86 | 38 | 0.03 |
| 16 Driftwood Ln. Ocean Pines MD | 10.27 | 4.18 | 6.6 | 5.7 | 0.07 |
| 16 Sandpiper Lane, Ocean Pines MD | 10.69 | 1.61 | 6.65 | 13.5 | 0.07 |
| 16 Windjammer Rd. Ocean Pines, MD | 12.1 | 1.76 | 6.61 | 16.3 | 0.53 |
| 1718 S. Chase Street, Ocean Pines MD | 9.47 | 7.43 | 6.74 | 6.7 | 0.03 |
| 179 Teal Circle, Ocean Pines MD | 6.8 | 3.9 | 7.3 | 11.6 | 0.00 |
| 18 Driftwood, Ocean Pines MD | 6.8 | 20.6 | 7.27 | 8.3 | 0.00 |
| 18 Ivanhoe Court, Ocean Pines MD | 9.76 | 3.91 | 6.73 | 10.4 | 0.00 |
| 18 Teal Circle, Ocean Pines MD | 8.73 | 2.54 | 6.76 | 8.7 | 0.20 |
| 19 Wharf Court, Ocean Pines MD | 9.64 | 4.17 | 6.89 | 7.4 | 0.03 |
| 2 Clubhouse Drive, Ocean Pines MD | 8.74 | 23.35 | 7.35 | 2.9 | 0.17 |
| 2 Goldeneye Ct. Ocean Pines MD | 10.71 | 5.58 | 6.83 | 9.8 | 0.03 |

| Location | Dissolved Oxygen (mg/L) | Salinity (ppt) | pH | Turbidity (NTU) | Phosphate (mg/L) |
|--|----------------------------|-------------------|------|--------------------|---------------------|
| 21 Ivanhoe Court, Ocean Pines MD | 9.88 | 4.21 | 6.57 | 7.6 | 0.13 |
| 21 Sandpiper Lane, Ocean Pines MD | 9.8 | 2.6 | 6.6 | 9.5 | 0.03 |
| 22 Teal Circle, Ocean Pines MD | 8.31 | 4.02 | 6.75 | 6.2 | 0.07 |
| 23 Portside Court, Ocean Pines MD | 7.8 | 4.5 | 8.88 | 6.8 | 0.00 |
| 23 Portside Teal Bay, Ocean Pines MD | 10.1 | 5.4 | 8.47 | 6.7 | 0.13 |
| 26 Moonshell Drive, Ocean Pines MD | 7 | 1.8 | 6.82 | 14.3 | 0.13 |
| 26 Teal Circle, Ocean Pines MD | 8.96 | 4.13 | 6.82 | 6.5 | 0.07 |
| 26 Windjammer Road, Ocean Pines MD | 6.1 | 21.2 | 7.35 | 14.1 | 0.07 |
| 287 Ocean Parkway, Ocean Pines MD | 5.4 | 6.5 | 6.65 | 20.8 | 0.13 |
| 3 Dove Ln, Ocean Pines MD | 6.2 | 15.2 | 7.09 | 16.9 | 0.13 |
| 30 North Pintail Drive, Ocean Pines MD | 8.75 | 13.98 | 6.88 | 3.5 | 0.00 |
| 305 Ocean Parkway, Ocean Pines MD | 9.95 | 3.24 | 6.87 | 14.4 | 0.00 |
| 33 Harborview Drive Ocean Pines MD | 9.15 | 4.52 | 6.75 | 11.7 | 0.03 |
| 34 Harbor View Drive, Ocean Pines MD | 10.29 | 4.34 | 6.87 | 11.5 | 0.07 |
| 35 Sundial Cir. Ocean Pines MD | 9.15 | 4.23 | 6.77 | 10.6 | 0.00 |
| 35 Westfield Circle, Ocean Pines MD | 10.97 | 2.63 | 6.32 | 8 | 0.27 |
| 38 Boston Drive, Ocean PinesMD | 7.2 | 1 | 7.92 | 15.3 | 0.13 |
| 4 Water's Edge Court, Ocean Pines MD | 8.66 | 7.63 | 6.39 | 5 | 0.13 |
| 40 Lookout Point, Ocean Pines MD | 7.9 | 7.8 | 8.07 | 7 | 0.07 |
| 44 Clubhouse Dr. Ocean Pines MD | 9.01 | 5.31 | 6.7 | 7.5 | 0.20 |
| 44 Moonshel Drive, Ocean Pines, MD | 7.6 | 7 | 7.55 | 10.8 | 0.00 |
| 45 Boatswain Dr, Ocean Pines, MD | 10.62 | 7.6 | 6.59 | 7.4 | 0.07 |
| 49 Moonshell Drive, Ocean Pines MD | 8.43 | 6.13 | 6.88 | 6.6 | 0.00 |
| 5 Goldeneye MD, Ocean Pines MD | 5.9 | 5.6 | 6.69 | 8.4 | 0.00 |
| 5 Hidden Lake Court, Ocean Pines MD | 9.78 | 0.23 | 6.64 | 1.8 | 0.00 |
| 54 Grand Port Road, Ocean Pines MD | 4.8 | 1.7 | 6.51 | 29.4 | 0.00 |
| 57 Moonshell Drive, Ocean Pines MD | 10.14 | 2.46 | 6.77 | 16.8 | 0.13 |
| 58 Grand Port Road, Ocean Pines MD | 6.1 | 3.3 | 7.04 | 5.1 | 1.27 |
| 58 Moonshell Drive, Ocean Pines MD | 6.7 | 21.1 | 7.11 | 13.8 | 0.00 |
| 6 Clubhouse Dr. Ocean Pines MD | 8.4 | 5.4 | 7.31 | 6 | 0.10 |
| 6 Waters Edge Court, Ocean Pines MD | 7.2 | 4.4 | 7.8 | 7 | 0.00 |
| 65 Skyline Ct. Ocean Pines MD | 7.1 | 1.7 | 6.63 | 6.3 | 0.00 |
| 65 Wood Duck Cir. Ocean Pines MD | 8.18 | 15.15 | 7.03 | 5.5 | 0.47 |
| 66 Teal Circle, Ocean Pines Md | 10.67 | 3.81 | 6.69 | 11.8 | 0.13 |
| 7 Freeport Lane, Ocean Pines MD | 9.13 | 0.04 | 6.37 | 7.1 | 0.00 |
| 7 Wharf Ct. Ocean Pines MD | 8.7 | 3.9 | 7.5 | 2.4 | 0.11 |
| 7 Windway Court, OP MD | 8.49 | 9.92 | 6.73 | 3.7 | 0.13 |
| 74 Newport Drive, Ocean Pines MD | 4.8 | 24 | 6.25 | 10.6 | 0.07 |
| 77 White Sail Circle, Ocean Pines MD | 8.28 | 21.73 | 7.14 | 3.1 | 1.33 |
| 8 Goldeneye Court, Ocean Pines MD | 7.57 | 17.69 | 6.85 | 4.4 | 1.13 |
| 8 Moonshell Drive, Ocean Pines MD | 11.38 | 3.58 | 6.71 | 7.2 | 0.07 |

| Location | Dissolved Oxygen (mg/L) | Salinity (ppt) | pH | Turbidity (NTU) | Phosphate (mg/L) |
|---|----------------------------|-------------------|------|--------------------|---------------------|
| 86 Newport Drive, Ocean Pines MD | 6 | 19.2 | 6.95 | 7.8 | 0.67 |
| 88 Lookout Point, Ocean Pines MD | 9.5 | 12.56 | 6.46 | 6.5 | 1.20 |
| 9 Cove Ln. Ocean Pines MD | 8.97 | 1.25 | 6.59 | 13.5 | 0.07 |
| 93 White Sail Circle, Ocean Pines MD | 11.19 | 1.33 | 6.77 | 13.2 | 0.13 |
| 95 White Sail Cir. Ocean Pines MD | 9.73 | 1.33 | 6.54 | 20.6 | 0.67 |
| 97 White Sail Circle, Ocean Pines MD | 10.61 | 1.52 | 6.79 | 11.2 | 0.20 |
| End of Grand Canal on Wood Duck One | 10.16 | 1.02 | 6.59 | 7.5 | 0.00 |
| Golf Course Canal, Rear 78 Newport Dr. | 9.37 | 3.99 | 6.61 | 7.5 | 0.00 |
| Grand Canal at Manklin St. | 9.27 | 5.59 | 6.84 | 12.5 | 0.00 |
| Heron Isle, Wood Duck One | 7.9 | 0 | 8.75 | 0.5 | 0.00 |
| Mystic Harbour Road | 10.95 | 0.08 | 7.2 | 20.6 | 0.07 |
| Porte Crabby pier, Annapolis Ct 2181 | 11.78 | 2.92 | 6.36 | 7.3 | 0.00 |
| Shingle Landing Prong | 9.48 | 16.95 | 6.52 | 5.2 | 0.27 |
| Where shingle landing prong meets St Martin | 7.4 | 0.8 | 7.62 | 8.6 | 0.00 |
| White Horse Park Boat Launch | 10.69 | 1.41 | 6.48 | 10.8 | 0.07 |