

Wicomico River Health

2015 WATER MONITORING REPORT

COMPARISON WITH 2014

River Segment	Total Nitrogen	Total Phosphorus	Water Clarity	Chlorophylla	Bacteria
Ponds	+	-	+	+	→
Upper River	+	→	→	+	-
Lower River	-	-	+	→	→
Wicomico Creek	→	-	+	+	→

+ Improving
 - Worsening
 → Stable



SUMMARY OF RESULTS

In 2015, the Wicomico River's water quality was mixed compared with 2014, reflecting a year of moderate to abundant rainfall in most months. Annual averages for phosphorus were worse, but for nitrogen were slightly better than in 2014. Chlorophyll a and water clarity both generally improved, but bacteria levels were worse.

Total Nitrogen (TN) annual averages were mixed, with small improvements only for the Upper Wicomico and Ponds. The number of healthy sites increased and high-N sites decreased slightly.

Total Phosphorus (TP) annual averages were either worse or unchanged for all segments. The Upper River and Ponds had 6 of the 7 healthy-level sites, and as in 2014,

no individual site averages were above the unhealthy level.

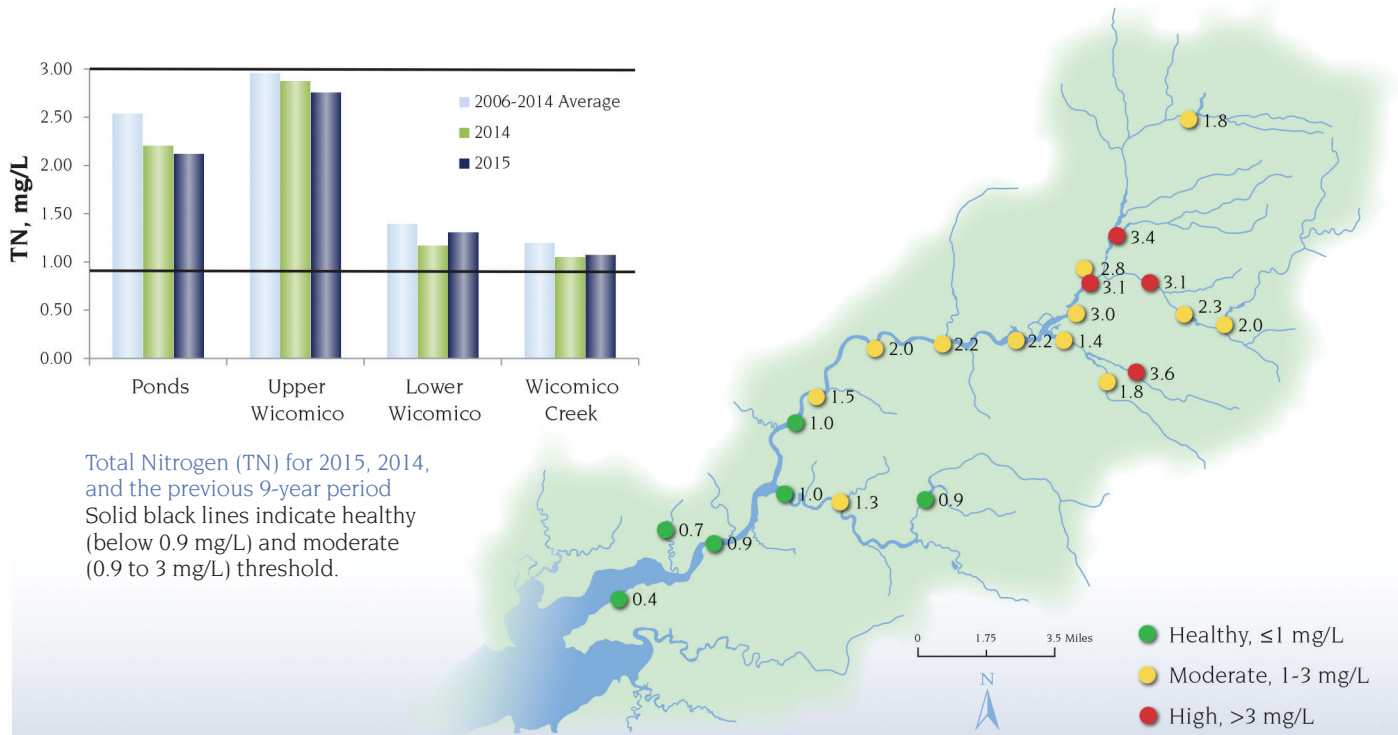
Water Clarity improved except in the Upper River, which again showed little change. For the third year in a row, only two pond site averages were above the healthy level.

Chlorophyll a levels improved substantially in the Upper River and a bit in Wicomico Creek and the Ponds.

Fecal enterococci bacteria levels were ranked poor or very poor at all sites this year. There was for the third year in a row a high (>40% of samples) swimming risk in 6 out of 8 sites, with the other 2 sites not far from this range. High rainfall is associated with elevated bacteria levels, and

the Wicomico River system continues to have substantial delivery of fecal bacteria to its waters.

NUTRIENT LEVELS, 2015

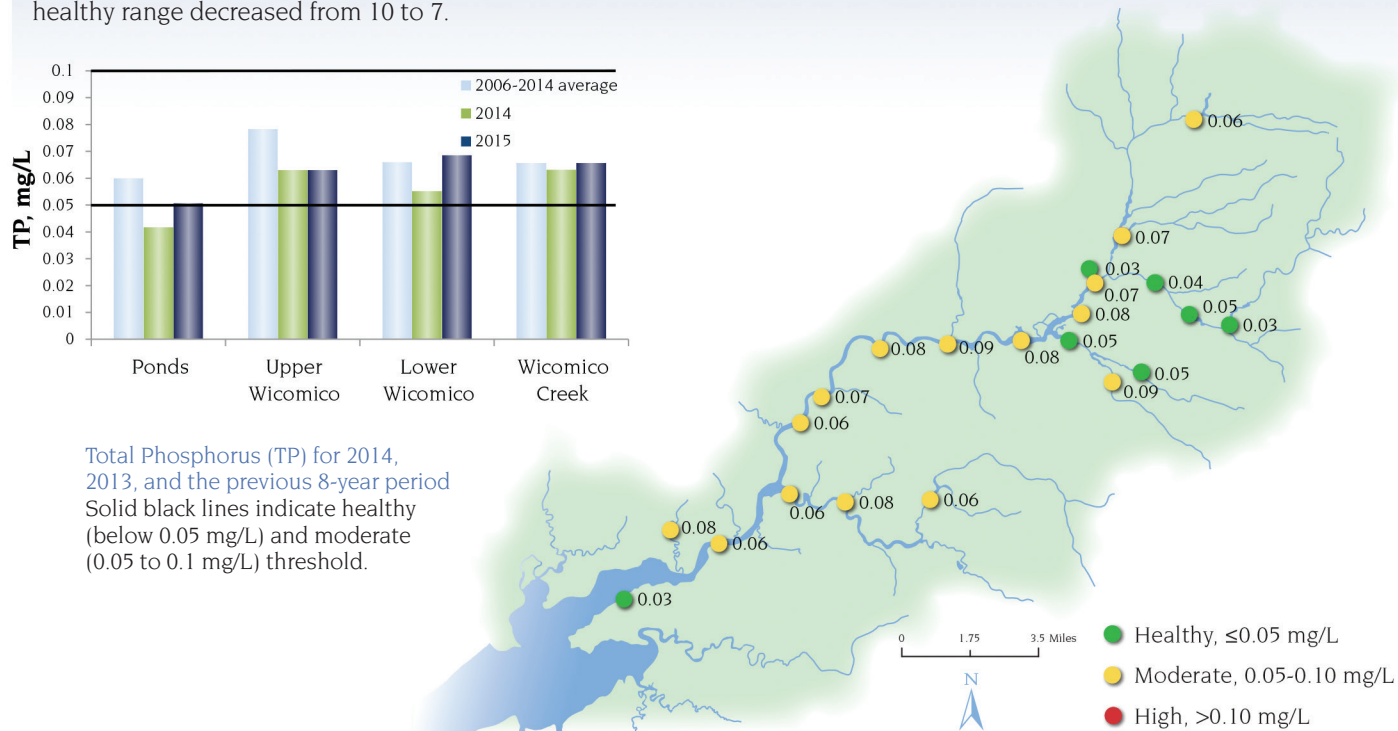


Total Nitrogen (TN) for 2015, 2014, and the previous 9-year period. Solid black lines indicate healthy (below 0.9 mg/L) and moderate (0.9 to 3 mg/L) threshold.

Total nitrogen (TN) remained highest in the upper river and lowest downstream, indicating high-N sources upstream and dilution with lower-N tidal waters coming from Tangier Sound. Average TN levels in the Pond and Upper River segments improved over both the long-term average and the 2014 levels, but they increased in the Lower and Wicomico Creek segments, almost reaching the long-term levels in the lower river. Individual site annual averages were mixed, with one additional healthy site and one fewer high-N site compared with 2014, but with higher values for other individual averages.

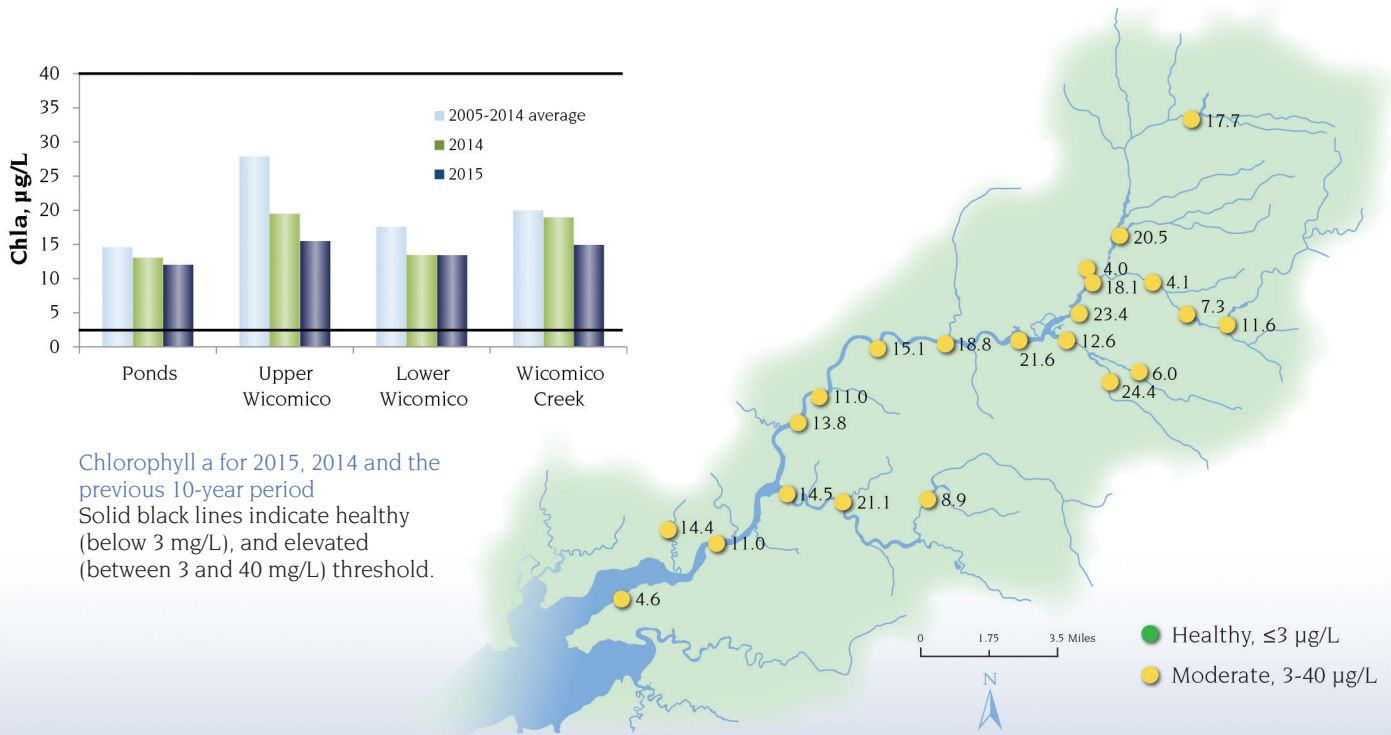
Nitrogen and phosphorus are essential for plants and animals, but an overabundance causes algal blooms and resulting low dissolved-oxygen levels. Phosphorus is often attached to particles of sediment.

Total phosphorus (TP) worsened in every segment except the Upper Wicomico in 2015, even exceeding the long-term average in the Lower Wicomico. As in 2014, no individual sites exceeded the high threshold, but the number of sites in the healthy range decreased from 10 to 7.



Total Phosphorus (TP) for 2014, 2013, and the previous 8-year period. Solid black lines indicate healthy (below 0.05 mg/L) and moderate (0.05 to 0.1 mg/L) threshold.

CHLOROPHYLL *a* AND WATER CLARITY, 2015

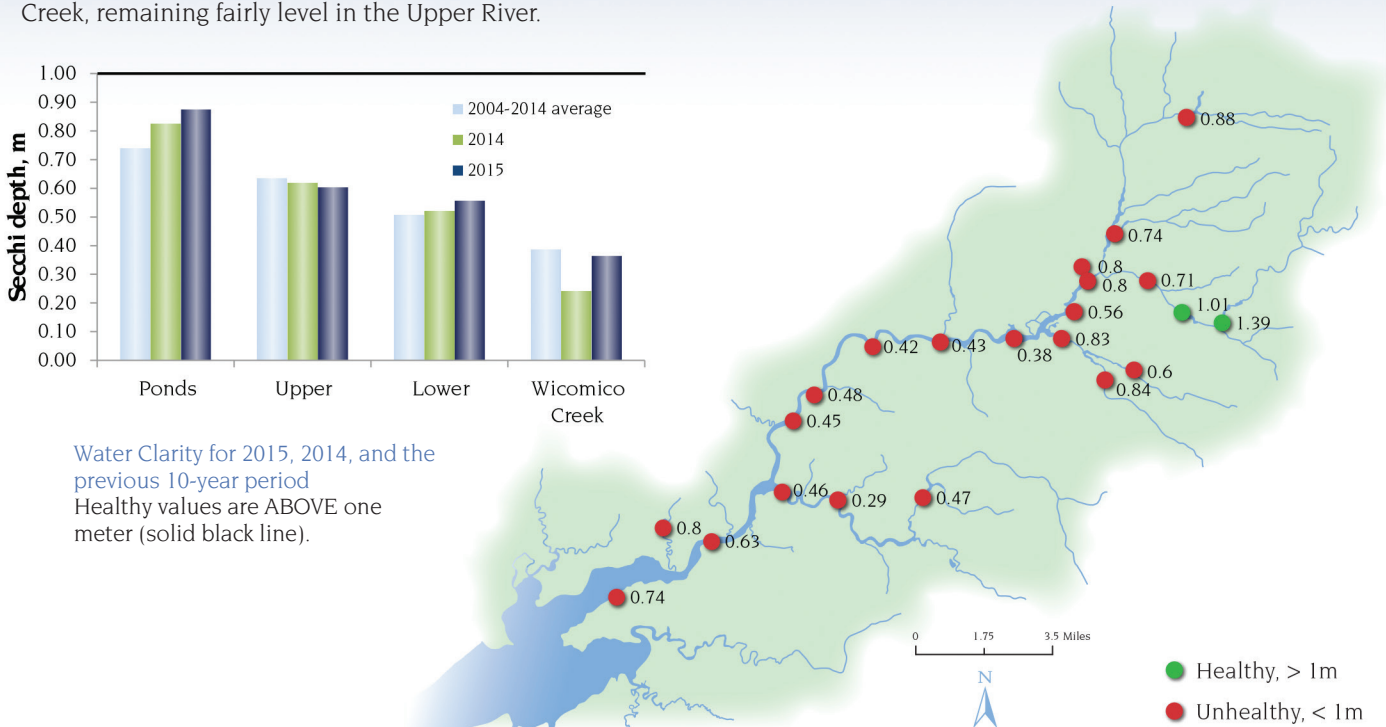


Chlorophyll a for 2015, 2014 and the previous 10-year period
 Solid black lines indicate healthy (below 3 mg/L), and elevated (between 3 and 40 mg/L) threshold.

Chlorophyll a levels improved in several site averages in 2015, including the site nearest the mouth of the river, and the uppermost Wicomico Creek site. Our threshold criteria were revised this year, however, to coordinate with the Maryland Tributary Assessment Team, so the healthy level was reduced from 10 to 3 mg/L. No sites fit the new healthy criterion. However, as in previous years, no sites were even close to the upper 40 mg/L threshold, indicating substantial but not unhealthy phytoplankton abundance. Average chlorophyll a levels by segment were unchanged in the Lower Wicomico, but improved a bit in the Ponds and considerably in the Upper Wicomico and in Wicomico Creek, probably as a result of flushing by frequent rainfall.

Chlorophyll allows plants—including algae—to capture sunlight and perform photosynthesis. The abundance of chlorophyll a is a good indicator of the amount of algae present in water. Light is critical for growth of underwater grasses. Poor water clarity indicates water that is clouded with suspended sediment and algae.

Water clarity in 2015 remained impaired, below the healthy threshold of 1 meter, in all but 2 sites. The annual average by segment of this index again improved (increased) in the Ponds, the Lower Wicomico, and Wicomico Creek, remaining fairly level in the Upper River.

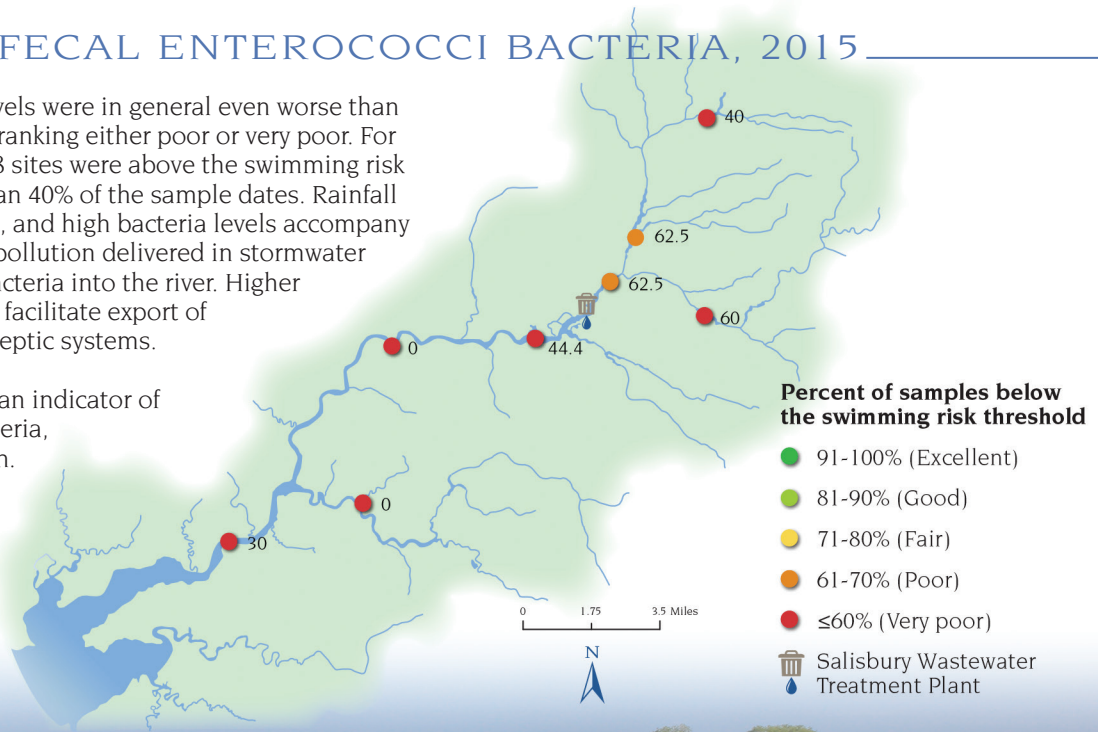


Water Clarity for 2015, 2014, and the previous 10-year period
 Healthy values are ABOVE one meter (solid black line).

FECAL ENTEROCOCCI BACTERIA, 2015

Fecal enterococci levels were in general even worse than in 2014, with all sites ranking either poor or very poor. For the past 3 years, 6 of 8 sites were above the swimming risk threshold on more than 40% of the sample dates. Rainfall was abundant in 2015, and high bacteria levels accompany abundant rainfall, as pollution delivered in stormwater runoff carries more bacteria into the river. Higher water tables may also facilitate export of bacteria from failing septic systems.

Fecal enterococci are an indicator of animal intestinal bacteria, not necessarily human.



METHODS AND SUPPORT

The **Wicomico Creekwatchers Program** monitors water quality in 22 sites throughout the Wicomico River system from March to November. Citizen scientists collect water samples and data on water clarity and field conditions at regular two-week intervals. Bacterial samples are collected on the same schedule from 8 sites between May and September for analysis at the Salisbury University (SU) Bacteria Source Tracking Lab. Chlorophyll a, nitrate, phosphate, pH, and salinity are measured by SU students, and total nitrogen (TN) and total phosphorus (TP) are determined at the Horn Point Laboratory of the University of Maryland Center for Environmental Science (UMCES). For detailed methods and past annual reports, see www.salisbury.edu/creekwatchers

Results are evaluated using threshold values developed by the Mid-Atlantic Tributary Assessment Coalition, UMCES, for freshwater tidal / oligohaline (low salinity) waters.

You can help improve the health of your river and the Bay:

- Get involved locally – your local organizations and government can't do it alone;
- Use lawn chemicals and fertilizers sparingly and only as directed;
- Create "buffers" – areas that will soak up excess rainwater – by planting native trees, shrubs, and grasses;
- Use rain barrels to catch rainwater from your roof and

- plant rain gardens to trap it on the ground;
- Support your local and regional conservation groups;
- Become a Creekwatcher!

Our 2015 Creekwatcher Volunteers were Madeleine & Steve Adams, Susan Atwood, Peter Bozick, Clinton Bradway, Susan Brazer, Peggy Buchness, Kathy Cordrey, Bill Day, Charles Denton & Isabelle Fair, Henriette Den Ouden, Susan Dupont, Dave Eccleston, Leslie Fisher, Jean Gaetano, Andy Giunta, John Groutt, Al Higgins, Bob & Winona Hocutt, Ben Hunt, Mike & Cassie Lewis, Tom & Nancy Mace, Katherine McAllister, Bill McCain, Ryan Mello, Paul Mysak, Nancy Nyquist, Lynne & Mac Peverley, Tami Ransom, Becky Ratliff, Nancy & Dr. Richard Reddish, Elizabeth & Richard Rose, Vanessa Smullen, Amy Stanford, Mat Tilghman, Stuart Wikander, Karen Wilson, Chuck Wojchecowski, and Bill & Judy Wyatt.

Student volunteers: Ellee Acevedo, Lauren Antal, Nicholas Beard, Andrew Caporaletti, Lyle Cook, Andrew Gerber, Annabelle Harvey, Nathan Hirtle, Elizabeth Huxoll, Andrew Jones, Jennifer Kneas, Megan Miller, Sarah Ober, Michael Omphs, Nicole Patterson, Ravyn Saunders, and Tyler Wilson. THANKS FOR A GREAT SEASON!!

Wicomico Creekwatchers are supported by the City of Salisbury, Chesapeake Bay Trust, Wicomico Environmental Trust, George Miles & Buhr Engineering, Salisbury University Henson School of Science and Technology, and Salisbury University Department of Biological Sciences.

