State Of The Severn: Mostly, A Good Year!

ANAPOLIS (April 21, 2020) -- For the most part, 2019 was a good year for the Severn River, according to the latest State Of The Severn report released by the Severn River Association (SRA), the nation's oldest river group.

The best news was that 2019 was a great year for swimming in the river.

More great news: The clarity of the water in the main stem of the river was wonderful, and this great clarity helped with the third piece of good news – we witnessed a huge expansion in acreage of our underwater grasses – more than 400 acres!

The State Of The Severn was presented by SRA Executive Director, Tom Guay, during a virtual version of the group's monthly John Wright Speaker Series. The State Of The Severn was presented by SRA Executive Director, Thomas Guay, during a virtual version of the group's monthly John Wright Speaker Series.

SRA would like to thank the Eastport Civic Association for their support to help create the 2019 State Of The Severn report.

Passing EPA’s Swimming Test

All beaches in the main stem of the Severn passed EPA’s swimming test 100% of the time. This earned these swim areas a Green Beaches score, meaning bacterial testing showed that they were under the 104 cfu bacteria count that EPA considers safe.

These samples and testing are conducted every Wednesday by Operation Clearwater and the Anne Arundel Community College. Similar data is also collected by the Anne Arundel County Health Department.

In Annapolis, however, the swimming reports were not as good for Spa and Back
Creeks, which received Yellow scores for passing the EPA test 60% to 95% of the time. Operation Clearwater Director, Tammy Domanski, still advises people not to swim for 48 hours after a major storm event.

Note: To improve on these scores, SRA promotes Anne Arundel County's Responsible Boating Initiative to preserve the great swimming conditions by encouraging boaters to use holding tanks and pump-out facilities. SRA encourages homeowners to properly maintain their septic systems and pick up their pets’ poop. We are also working with the Hogan administration, marinas and other groups to encourage Covid-19 safety measures as the local economy restarts.

Huge Explosion of Underwater Grasses

We had a huge increase in the amount of underwater grasses, aka submerged aquatic vegetation (SAV). We enjoyed more SAV in the river than we've seen in the past 20 years.

There were more than 400 acres of underwater grasses in the Severn, according to the final tally by the Virginia Institute of Marine Sciences.

Our grasses show up in the shallow waters along shorelines, usually in less than 3ft of water.

The reason for the explosion of underwater grasses goes back to 2018 and the record-breaking rainfall.

That intense freshwater influx was a trigger for underwater grasses to drop more seeds.

The rainwater also led to a crash in salinity, which in turn encouraged the proliferation of the dark false mussel, which are like oysters -- they filter and clean the waterway, which then allows more sunlight into the river to fuel growth of underwater grasses.

Usually, we find most of our grasses in Round Bay.

But in 2019, the thick beds of underwater grasses stretched from the Narrows, through Round Bay, along the mid-river and inside many mid-river creeks.
In the map to the left, the green shaded areas outline the extent of our thickest SAV beds.

The teal-colored dots are areas where our SAV Navy volunteers tracked and identified abundant supplies of Horned Pondweed in spring and during the summer, prodigious amounts of Widgeon, Redhead (see pic at above) and Sago Pondweed.

We raise a few cheers when the grasses are rebounding because the grasses provide habitat for fish and crabs (see pic at right) and food for waterfowl and muskrats.

They also oxygenate and filter the water, sequester carbon, and protect shorelines and private property from erosion caused by ever increasing storm and wake activity on the river.

Our SAV Navy volunteers also tracked the emergence of the non-native grass, Eurasian Milfoil. Many SAV Watchers hope that the presence of Milfoil is a good sign for the Severn because Milfoil can tolerate murky water better than our native grasses.

As Milfoil emerges in low-visibility waters before native grasses, it helps filter the water to allow more sunlight to penetrate to the bottom and thereby encourage the return of native grasses.

This bodes well for murky creeks because our SAV Navy volunteers found a few lonely strands of Milfoil popping up in Jones Cove in Back Creek.

Note: Eurasian Milfoil is considered a vile invasive in freshwater systems. However, in the Chesapeake Bay's briny waters, DNR considers it a "non-native" that can help with the return of native grasses.
River-Wide Water Quality Monitoring

During 2019, SRA greatly expanded its water quality monitoring program to create a river-wide, 41-station network of monitoring stations during the monitoring season, May - October.

The blue dots in the map at left indicate all the stations the WQ teams of volunteer citizen scientists visit every week to measure:

- Dissolved oxygen,
- pH,
- Temperature,
- Salinity, and
- Clarity.

SRA is partners with the Chesapeake Monitoring Cooperative (CMC) and follows CMC’s Tier 2 protocols for collecting water quality data.

All the data is shared with the scientific and regulatory communities via CMC’s Chesapeake Data Explorer.

Dissolved Oxygen – A Mixed Story of Good and Bad

A key indicator that we tracked in 2019 was dissolved oxygen, especially on the bottom of the river where we are repopulating the river with oysters on restored reefs between the Rt. 50 and USNA Bridges.

Oxygen’s important because fish, crabs, oysters and other creatures all need oxygen to breath.

By focusing on the bottom, we can compare conditions throughout the river and perhaps identify potential new areas for future oyster restoration reefs.

Calculating grades for dissolved oxygen in the following chart is a complicated process because oxygen levels can be horrible at the bottom of the river while at the same time, there can be plenty of oxygen in the top half of the water column.
The poor oxygen grades, for example at Mill Creek 3 and Lake Ogleton 2, represent the headwaters of creeks abutting busy roads and highways and therefore are suffering from the flood of stormwater runoff pollution.

**Persistent Dead Zone**

Despite the amazing resurgence of underwater grasses, good grades on swimming conditions, increased clarity and some good grades for dissolved oxygen in some areas, the river also suffered from an extended dead zone of low oxygen conditions that lasted most of the summer.

This dead zone (see chart at left) grew to be about five square miles in size.

We use the same criteria as the Chesapeake Bay Program to define a dead zone as water containing less than 2 mg/L of oxygen.
Our environmental sciences intern from Duquesne University, Mackenzie Miller, helped discover the dead zone and started charting it. Turns out our dead zone was larger than the town of Denton, MD!

This dead zone area inhabited the bottom half of the water column, stretching from midway between Saltworks and Chase Creeks, up through Round Bay and into the Narrows.

The dead zone also appeared in most of the mid-river tributaries: Weems, Luce, Saltworks, Clements, Chase and Brewer Creeks.

For example, the red line in the chart at right indicates the dead zone area in Brewer Creek where oxygen is less than 2 mg/L.
Good Clarity In The River -- Poor In Creeks

Back to some good news. During 2019, SRA’s team of volunteers recorded some excellent clarity readings during their weekly tours.

Clarity is important for our waterways because the clearer the water, the more sunlight that can reach our underwater grasses, which require sunlight for photosynthesis, just like land-based vegetation.

Our crews measure clarity using a Secchi disk, which is lowered on a line into the river until the white and black pattern disappears.

Volunteers mark the point where the line meets the river’s surface with their fingers. Then they measure the distance from the marked point on the line to disk. That distance becomes the clarity reading.

Most of the mid-river monitoring stations received the best grades of B and B- on clarity. Many of the readings were routinely better than 1.0 meter in the main stem.

And, we set a great record in October when our team measured out a 2.36 meter reading!

They had to get creative to measure this one at our Palisade station in Little Round Bay.

The charts below list the creek-by-creek grades for clarity in 2019.

You can see the generally good grades for the main stem of the river in the chart below.

The one, mid-river low point for clarity is up at Indian Landing. Visibility there is generally poor because it is close to Severn Run stream, which dumps mud and sediment into the Severn River. This is due to stormwater runoff from I-97 and Rt. 32 interchanges.
Inside most creeks, however, there is a different story. Many of the creeks scored poorly, receiving a C, C- and even some D and D- grades.

Several factors contribute to the poor grades. A key reason is due to the influx of uncontrolled stormwater runoff that degrades streams and sends nutrient and sediment pollution flooding into creek headwaters.
Oysters Survive Challenging Conditions

The good news is that the Dead Zone did not extend to our oyster restoration area, so our oysters are OK. SRA sponsored an oyster dive in 2019 to check on the health of our oysters on four restoration reefs.

The good news: Our oysters survived two years of low salinity conditions. Our diver, Audrey McDowell with the Paynter Lab, brought up several clumps of live oysters that were 6- to 8-years old.

However, due to low salinity conditions, the growth of our oysters was stunted by as much as 50%.

Normally, a brackish river like the Severn will have salinity levels in the 8 to 15 parts per thousand (ppt) levels.

The record-breaking rainfall in 2018, salinity in the Severn crashed. Salinity was only in the 4 to 6 ppt range through 2018 and most of 2019. Salinity finally returned to normal around Labor Day 2019.

Oxygen levels for the oysters on the bottom of the river where the reefs live was adequate, but not ideal. The best condition for our oysters is when dissolved oxygen is 5 mg/L or greater (see green dotted line in chart below).

For much of the year, however, oxygen levels hovered below this level. Fortunately, oxygen did not sink to the dead zone level that starts at 2 mg/L (red line).

Oxygen At Oyster Reefs: Less Than Ideal, But Adequate
Our hope is that as oxygen levels rebound and with salinity back to the 8 to 15 ppt range, our oysters will thrive in 2020.

We’re also hopeful that with the return to normal salinity levels throughout the Chesapeake Bay, we’ll be able to restart our Marylanders Grow Oysters and Operation Build-A-Reef programs and distribute spat-on-shell to our volunteer oyster growers in September 2020.

A decision on the availability of oyster spat-on-shell that we’ll need to restart these programs is expected to be announced by the Horn Point Hatchery in Cambridge, MD, in July 2020.

Keep those fingers crossed.

Special thanks to the Delaplaine Foundation for supporting our water quality monitoring program.

And thanks to everyone who’s been so generous with their time …

Thank You!

Special thanks to all the volunteers and boat captains who made 2019 such a great year for monitoring.

Thank you to Izzie, Kathryn, Doug, Mackenzie, Joanie, Evan, Jim, Lisa, Elisabeth, JJ, Mark, Nini, Ted, Tom, Steve, Tammy, Mark, Natalie, Maya, Rob, Briana, Dede, Nancy, Marla, Chris, Madison, Dave, Trevor, JP, Michael, Wayne …
Photos:

- Jim Lodico with Chesapeake Aerial Photo,
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