

Water Quality Newsletter for the Potomac River Tributaries of St. Mary's County



The Maryland Dove, a replica of a ship which carried colonists to St. Mary's City. (David Noss, SoMd.com)

The Potomac River tributaries in St. Mary's County are systems in transition; the watersheds remain mostly forested, but face potential impacts from increasing development pressure.

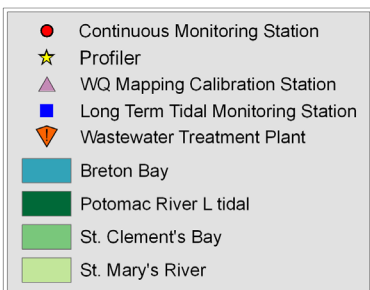
St. Mary's County Potomac Watersheds

Maryland's Lower Potomac Tributary Basin includes watersheds of the St. Mary's River, as well as Breton and St. Clement's Bays. The Lower Potomac watershed encompasses approximately 155,000 acres in St. Mary's county, including the small population center of Leonardtown at the head of Breton Bay. St. Mary's City, Maryland's first permanent settlement, remains a small village on the St. Mary's River. However, the northeastern portions of the watershed are becoming more developed in the vicinity of Lexington Park and California, MD, due to Patuxent River Naval Air Station expansion.

The Maryland Department of Natural Resources (DNR) has conducted water quality monitoring in the lower Potomac since 1984. St. Mary's College of Maryland (SMCM) has been monitoring water quality in the St. Mary's River since 1999, with support from DNR and federal agencies. In 2006, DNR teamed with SMCM, the University of Maryland, and the Virginia Institute of Marine Science to begin a three-year assessment of the entire tidal Potomac River. This assessment includes continuous monitors that record water quality measurements every 15 minutes, and monthly water quality mapping cruises conducted between April and October. Data collected from these programs indicate that the Lower Potomac and its tributaries are showing symptoms of nutrient over-enrichment.

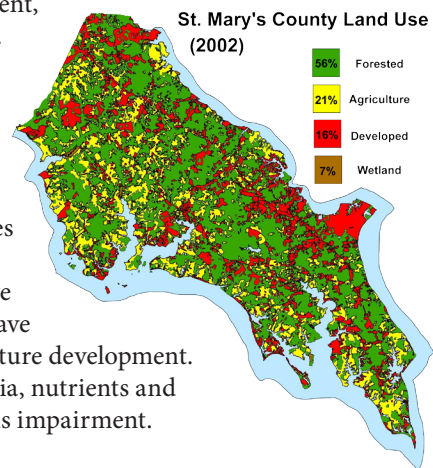
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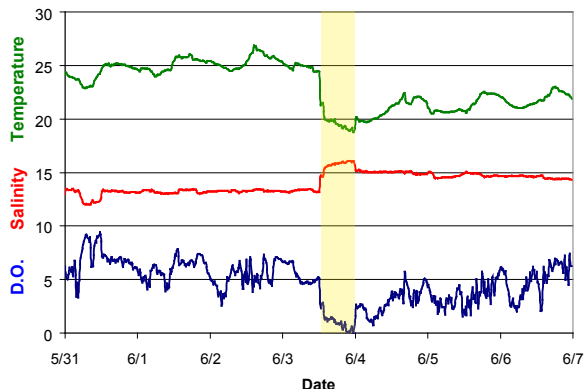
Development Encroaches on St. Mary's County

St. Mary's County consists of approximately 231,300 land acres on a peninsula of land between the Potomac and Patuxent Rivers. According to the Maryland Department of Planning, the current land use of St. Mary's County is over half forested, with significant amounts of agriculture and developed land. The population in 2006 was estimated to be 98,854 and by 2010, it is projected to be 106,550. St. Mary's County is currently experiencing an increase in urban land development because of naval base expansion and development pressure from the Washington, D.C. area. Development impacts will be assessed in a St. Mary's River Watershed Restoration Action Strategy (WRAS) beginning April, 2008. DNR, St. Mary's County government, St. Mary's College, and the St. Mary's River Watershed Association will conduct this project.



Increased development using common construction techniques results in the expansion of impervious surface areas such as roads, parking lots and rooftops. This increases the amount and intensity of storm water runoff during rain events. Unmanaged stormwater runoff contributes sediment and nutrients to rivers. According to a 2000 Center for Watershed Protection report, subwatersheds within the St. Mary's River had impervious cover rates ranging from 3.1% to 12.3%. Projected future impervious cover rates prepared by St. Mary's County range from 4.7% to 29.8%. Studies have shown that impervious surface values above 10-15% will likely result in environmental degradation to watersheds. Nearly 300 streams have been identified in the St. Mary's River watershed and many of these could be impacted by future development. In 1996, the St. Mary's River was listed by the State of Maryland as being impaired by bacteria, nutrients and sediments. In 2002, portions of the St. Mary's River were also listed for biological and metals impairment.

Algae, Low Oxygen Cause Fish Kills

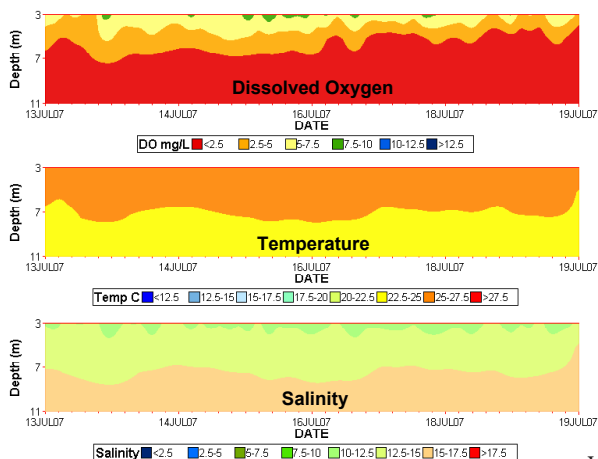


Top: Data from Piney Point, showing the relationship of temperature, salinity, and dissolved oxygen (D.O) during a seiche event on 6/3/2006 (outlined in yellow).

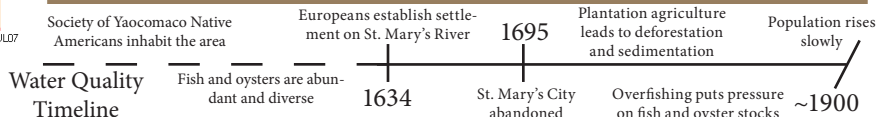
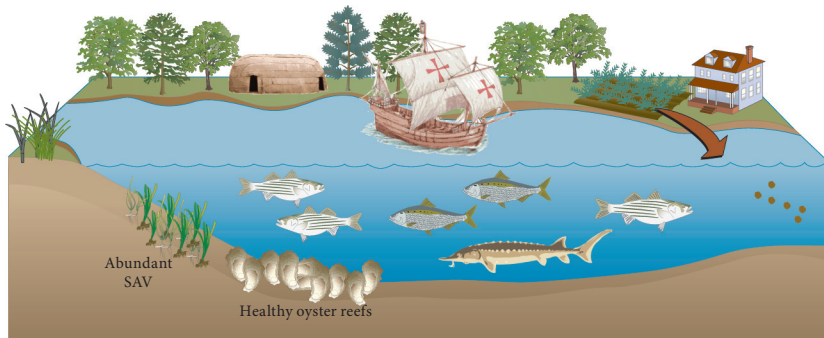
Excess nutrient runoff in the Chesapeake Bay and its tributaries create zones of little or no dissolved oxygen in bottom waters. This is due to the bacterial decomposition of algal blooms and the stratification which naturally occurs when lower density freshwater overlays higher salinity waters. This separation prevents the better oxygenated upper layers from mixing with the oxygen-poor bottom layers (see graph at bottom left).

In June of 2006, a fish kill involving 7,000-8,000 fish occurred in the lower Potomac River. Analysis showed that the event was due to the combination of fish toxins released by a bloom of *Karlodinium veneficum* algae and a wind driven seiche event. A seiche event is caused by an oscillating wave, in this case by a sustained northeasterly wind which had piled surface waters into shallow areas of the Potomac River. On June 2nd the wind direction abruptly shifted direction leading to a sloshing effect which pushed deep low-oxygen bottom waters from the Bay into the shallow areas of the lower Potomac River (See graph at top left).

Bottom: 2007 data from a Vertical Profiler in the Potomac River near Ragged Point. It shows the typical stratification of the water column where high salinity / low-oxygen water is found at the bottom of the water column.

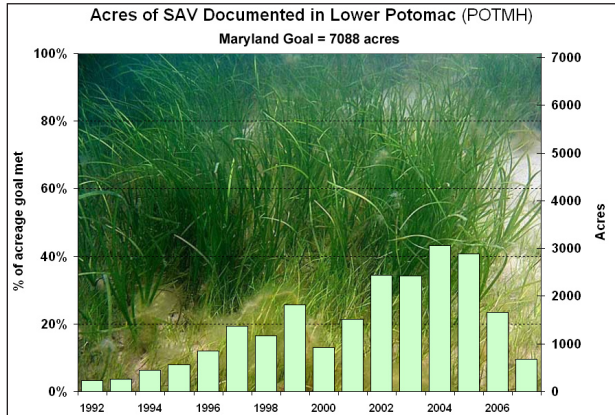


By reducing the nutrients entering the Bay, harmful effects of natural phenomena, such as algal blooms and seiche events, can be greatly reduced. Improving water quality will lead to a more stable and healthy habitat for the plants and animals inhabiting the Potomac River.



Underwater Grasses Declining in Lower Potomac River

Underwater grasses, known as Submerged Aquatic Vegetation (SAV), are important natural resources. They improve water quality, provide food and shelter for waterfowl and aquatic life, and help to protect shorelines against erosion. The mesohaline (moderate salinity) Potomac River, the area of the river between Mathias Point and Point Lookout, had a steady increase in underwater grass coverage from 1992 through 2005, reaching its highest level in 2004, with 3,063 acres. However, SAV coverage significantly decreased to 1,664 acres in 2006, and dipped again to 678 acres in 2007. On the Maryland side, SAV was abundant in many of the tributaries, including Cuckhold and St. George's Creeks, the lower portions of St. Clement's and Breton Bays, and St. Mary's River.



Observations from the Virginia Institute of Marine Science (VIMS) 2007 SAV annual survey indicate that SAV was abundant in the St. Mary's River and St. George Creek. However, SAV coverage was reduced in the Potomac upriver of the St. Mary's. Most of the SAV previously recorded in St. Clement's and Breton Bays was largely absent in 2007, with only small beds observed near the bays' mouths along the Potomac River.

Analysis of water quality data shows that for 2004 - 2006, suspended solids (sediments in the water), chlorophyll, and phosphorus concentrations met SAV habitat criteria, while light requirements and nitrogen levels were borderline relative to the habitat requirements. Data were collected from three long-term water quality monitoring stations located at the Route 301 bridge, near Ragged Point and near Point Lookout.

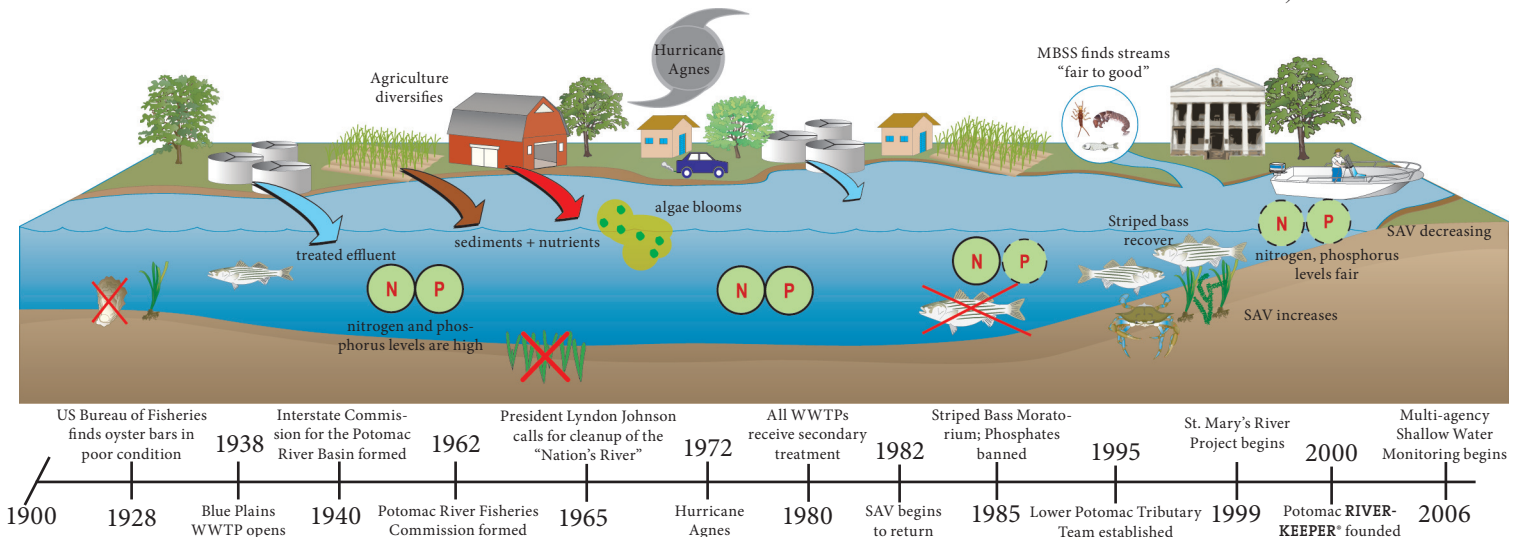
DNR has been conducting large-scale eelgrass restoration in the St. Mary's and lower Potomac Rivers since 2004. Located in St. Mary's County, the Piney Point Aquaculture Center has served as the base of operations for eelgrass seed processing and storage. Eelgrass reproductive material is collected from healthy donor beds and transported to the aquaculture facility, where the seeds are stored until fall planting. Over 8 million seeds have been distributed at several locations on the St. Mary's River and St. George Creek. Several of these eelgrass planting areas have had successful recruitment of eelgrass plants, with some expanding outside of the planting area and producing their own seeds. Unfortunately, future funding for this project remains uncertain at this time.

Streams Rated Fair, Contain Rare Species

Stream health in the St. Mary's River, Breton Bay, and St. Clement's Bay watersheds has been sampled several times this decade by Maryland DNR. The Maryland Biological Stream Survey (MBSS) sampled 56 sites in those watersheds between 2000 and 2007. Stream health was calculated using a Benthic Index of Biological Integrity (BIBI), a measure of stream quality based on the diversity of aquatic insects found. The average BIBI for sites in the three watersheds was 3.75 out of 5. This constitutes a "Fair" rating. Similarly, data from the volunteer Streamwaders program has an average BIBI of 3.71 for the same period. Several state endangered or state threatened species were found in the watershed, including the ironcolor shiner (at right). A detailed study by DNR indicated that conditions were worst in the upper headwaters of several St. Mary's tributaries, and better downstream. A study by the Center for Watershed Protection found that the most severely impacted areas were located in reaches drained by older developments. Stream health may be expected to deteriorate with the projected increase in impervious surface.



The ironcolor shiner is listed as endangered in the state of Maryland (photo from "Fishes of Alabama and the Mobile Basin")



More Information and Acknowledgements

- **Watershed Profiles** can be found on DNR's Surf Your Watershed page: www.dnr.state.md.us/watersheds/surf/index.html
- Join the **Lower Potomac Tributary Team**, which meets on the 4th Monday of every month at St. Mary's Co. Charlotte Hall Veterans Home. Call 410-260-8711 for more info. www.dnr.state.md.us/bay/tribstrat
- **St. Mary's River Project** is a state funded program administered through St. Mary's College of Maryland and conducts the Shallow Water Monitoring programs on the St. Mary's River, and St. Clement's and Breton Bays: <http://smrpweb.smcm.edu>
- **St. Mary's Watershed Association** is a non-profit organization striving to protect, improve and promote the well-being of the St. Mary's River Watershed. www.smwra.org
- To learn more about fish kill events on the Potomac River, visit DNR's **Harmful Algae Bloom** website: www.dnr.state.md.us/bay/hab/index.html
- Get more information on **underwater grasses** from the DNR SAV page: www.dnr.state.md.us/bay/sav
- Information on DNR's **Maryland Biological Stream Survey (MBSS)** can be found on www.dnr.state.md.us/streams/mbss/index.html
- The **Center for Watershed Protection** completed an assessment for the Upper St. Mary's River: www.cwp.org/st_marys_assessment.htm
- Learn about local land trusts and conservation easements available to St. Mary's County landowners on the **Maryland Environmental Trust** website: www.dnr.state.md.us/met
- For more information on land use in St. Mary's County, see the **St. Mary's County Land Use & Growth Management** website: www.co.saint-marys.md.us/lugm
- Information on how MDE assesses **impaired water bodies** is available on their website: www.mde.state.md.us/Programs/WaterPrograms/TMDL/index.asp
- Much of the information on the Water Quality Timeline (pages 2-3) was taken from the **Interstate Commission on the Potomac River Basin** publication, Healing a River - The Potomac: 1940-1990. www.potomacriver.org
- Icons for the Timeline courtesy of the **Integration and Application Network**, University of Maryland Center for Environmental Science: www.ian.umces.edu/symbols



Sunset on Island Creek (photo by Bob Lewis)

What Can You Do?

There are many things you can do to help improve water quality in the St. Mary's River, Breton Bay and St. Clement's Bay.

- **Plant trees along streamside property.** Tree roots will slow erosion and absorb the flow of nutrient runoff.
- **Pump out septic tanks regularly** (every 3-5 years). A failing system can contaminate groundwater.
- **Conserve water.** Use rainwater for plants, take shorter showers, and turn off the faucet when brushing your teeth.
- **Drain gutter spouts into rain barrels or grassy areas.** This will reduce erosion, which adds sediment to the river.
- **Carpool, or try biking or walking.** Exhaust fumes contain nitrogen oxides, which can end up in the river and bay.
- **Dispose of household chemicals properly.** Toxic chemicals poured down the drain could end up in the river.
- **Use fertilizer sparingly.** If you must fertilize, try doing it in autumn, when it will have less of an impact on the river.
- **Support land protection initiatives.** Preserving existing green space is much easier than restoring degraded areas.
- **Get involved.** Let state, county, and local officials know that water quality is important to you.

St. Mary's River water quality data is available at:

www.eyesonthebay.net

Please report fish kills, algae blooms, or any other events or problems to the toll-free Chesapeake Bay Safety and Environmental Hotline at **1-877-224-7229**



Martin O'Malley, Governor

Maryland Department of Natural Resources; Tawes State Office Building; 580 Taylor Avenue; Annapolis, Maryland 21401
Toll free : 1-(877)- 620-8DNR(8638) in Maryland
Out of state call: 410-260-8638
www.dnr.maryland.gov

John R. Griffin, DNR Secretary



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