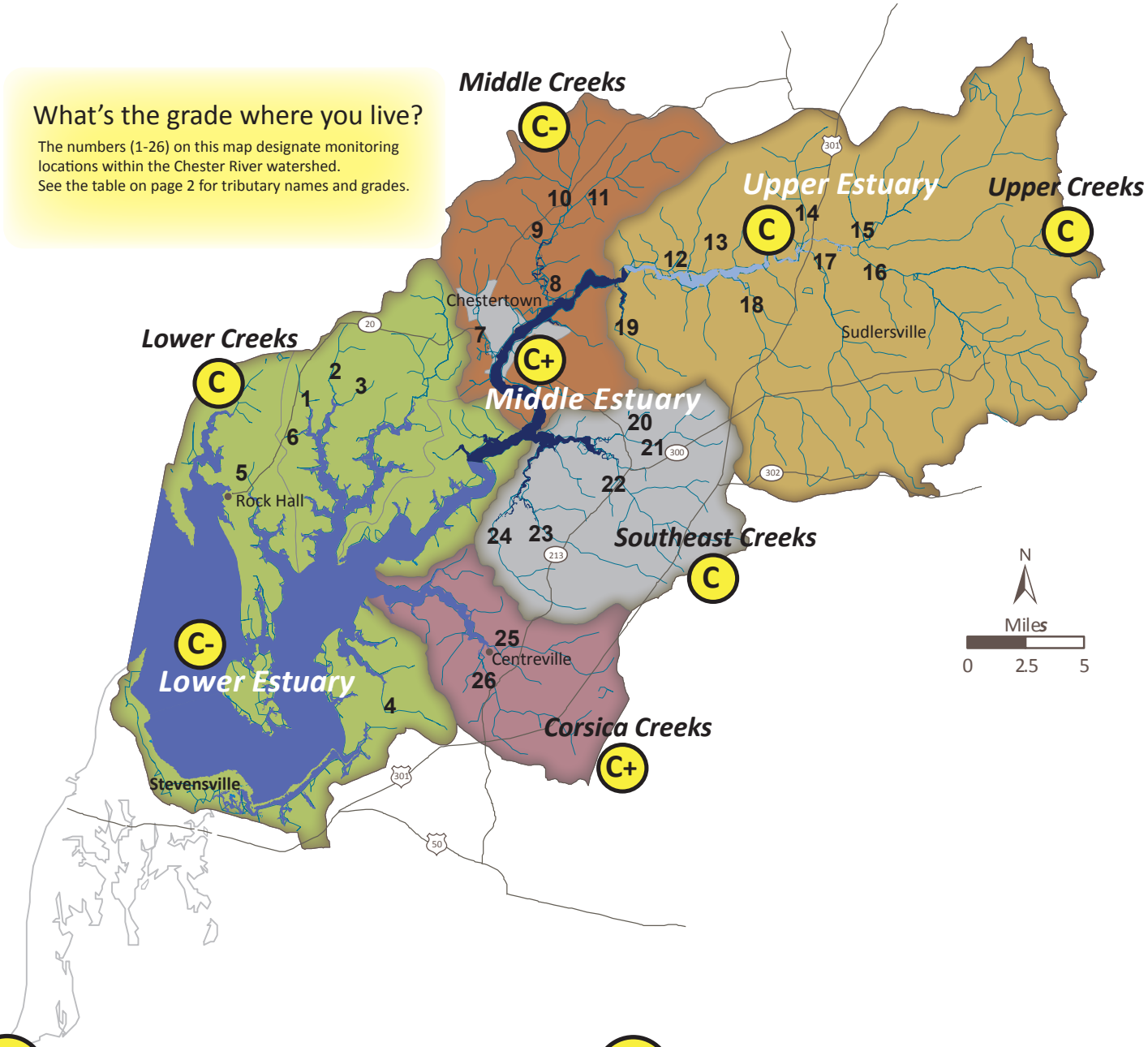
2011 Chester River Report Card

WATERKEEPER® ALLIANCE MEMBER

CHESTER RIVER ASSOCIATION CRA

What's the grade where you live?

The numbers (1-26) on this map designate monitoring locations within the Chester River watershed.
See the table on page 2 for tributary names and grades.



C- Estuary Final Grade

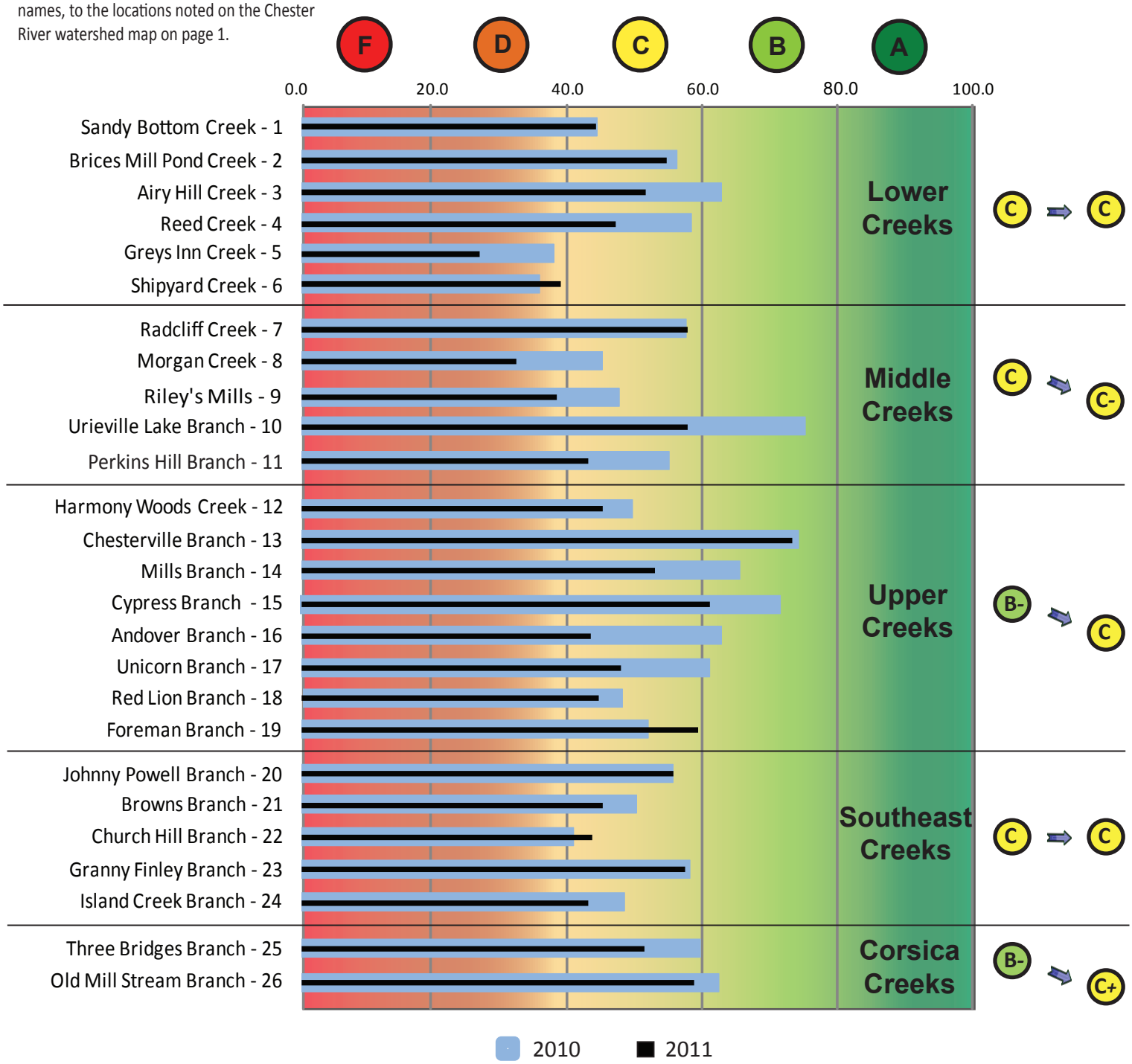
The final grade for the Estuary portion of the Chester River is a "C-." Higher average water temperatures during early May and June affected dissolved oxygen and secchi (clarity) scores. On a more positive note, Benthic and Phytoplankton Index indicators (provided by Chesapeake Bay Program) as well as sub-aquatic vegetation have continued to improve in the Lower and part of the Middle Estuary, which comprises 86% of the total estuary.

C Creeks Final Grade

The final grade for the tributary creeks & streams of the Chester River is a "C." Corsica Creeks saw an increase in Nitrate-N, Ammonia-N, & Turbidity. The Lower Creeks had higher Dissolved Oxygen & lower Nitrate-N indicators, but increases in Ammonia-N, Orthophosphate & Turbidity. Middle Creeks had decreases in Dissolved Oxygen and Nitrate-N, with increases in Ammonia-N & Turbidity. Upper Creeks had decreases of Dissolved Oxygen and increases in Nitrate-N & Ammonia-N. Southeast creeks had increases in Ammonia-N & Turbidity.

Chester River Tributary Grades

The numbers (1-26) below reference tributary names, to the locations noted on the Chester River watershed map on page 1.



What do the grades mean?

A All water quality and biological health indicators meet desired levels. Quality of water in these locations tends to be very good, most often leading to very good habitat conditions for fish and shellfish.

B Most water quality and biological health indicators meet desired levels (60% to 79%). Quality of water in these locations tends to be good, often leading to good habitat conditions for fish and shellfish.

C There is a mix of healthy and unhealthy water quality and biological health indicators (40% to 59%). Quality of water in these locations tends to be fair, leading to inadequate habitat conditions for most fish and shellfish.

D Some or few water quality and biological health indicators meet desired levels (20% to 39%). Quality of water in these locations tends to be poor, often leading to poor conditions for most fish and shellfish.

F Very few or no water quality and biological health indicators meet desired levels. Quality of water in these locations tends to be very poor, most often leading to very poor habitat conditions for fish and shellfish.

Testing the Health of the Chester River

Our Chester Tester monitoring program maintains 26 testing sites equally distributed between Queen Anne's and Kent Counties. These sites are tested twice per month by over 52 volunteer "Chester Testers." Each site is monitored for dissolved oxygen, pH, nitrate-nitrogen, ammonia-nitrogen, orthophosphates, and turbidity (clarity) levels. Water and air temperature, rainfall within 24 hours of testing, water color and odor, and aquatic life (such as fish or sub-aquatic vegetation) are also documented. The thresholds used to assess these parameters were derived from a state-wide scientific assessment conducted by the Maryland Department of Natural Resources. For more information, see www.dnr.state.md.us/irc/docs/00007267.pdf.

Sub-Watershed	*Annual Average* Differences 2010 - 2011
Lower Creeks	4 out of 6 creeks had decreases in Dissolved Oxygen and Nitrate-N, 5 out of 6 had increases in Ammonia-N, while 3 out of 6 had a decrease in Orthophosphate and 4 out of 6 an increase in Turbidity.
Middle Creeks	2 out of 5 creeks had decreases in Dissolved Oxygen and Orthophosphate, 5 out of 5 had a decrease of Nitrate-N, while 4 out of 5 had an increase in Ammonia-N and Turbidity.
Upper Creeks	4 out of 8 creeks showed an increase in Dissolved Oxygen, 5 out of 8 had a decrease of Nitrate-N and Orthophosphate, 7 out of 8 an increase for Ammonia-N, with 6 out of 8 showing increase in Turbidity.
Southeast Creeks	4 out of 5 creeks showed an increase in Dissolved Oxygen and Ammonia-N, 5 out of 5 had a decrease of Nitrate-N, 4 out of 5 a decrease for Phosphorus, and 3 out of 5 showing increase in Turbidity.
Corsica Creeks	2 out of 2 creeks showed an increase in Dissolved Oxygen, Ammonia-N, Orthophosphate and Turbidity, with 2 out of 2 showing a decrease of Nitrate-N.

What are nutrients?

NUTRIENTS are chemical elements that are essential to plant and animal nutrition. Nitrogen and phosphorus are nutrients that are important to aquatic life, but in high concentrations they can be contaminants in water. These nutrients occur in a variety of forms. Both are affected by chemical and biological processes that can change their form and can transfer them to or from water, soil, biological organisms, and the atmosphere. Nutrient concentrations in water are generally reported in milligrams per liter (mg/L) as nitrogen or phosphorus.

AMMONIA is one of the primary forms of dissolved nitrogen in natural water. It is a compound of nitrogen in combination with hydrogen. Depending on the number of hydrogen atoms in the compound, ammonia in water may be ionic (having an electrical charge) or un-ionized (having no charge). The un-ionized form is more toxic to fish. Ammonia is soluble in water, but is not stable in most environments. It is easily transformed to nitrate in waters that contain oxygen and can be transformed to nitrogen gas in waters that are low in oxygen.

NITRATE is another primary form of dissolved nitrogen in natural water. It is a compound of nitrogen in combination with oxygen. Nitrate is highly soluble in water and is stable over a wide range of environmental conditions. It is readily transported in ground water and streams.

PHOSPHATES are the only significant form of dissolved phosphorus in natural water. They are compounds of phosphorus in combination with oxygen and hydrogen. Phosphates are only moderately soluble and, relative to nitrate, are not very mobile in soils and ground water. Phosphates tend to remain attached to soil particles. However, erosion can transport considerable amounts of "particulate" phosphate to streams and lakes.

EUTROPHICATION is a natural process that results from accumulation of nutrients in lakes or other bodies of water. Algae feeding on these nutrients grow into unsightly scum on the water surface, decreasing recreational value and clogging water-intake pipes. Decaying mats of dead algae can produce foul tastes and odors in the water and remove oxygen from the water, occasionally resulting in fishkills. Algae growth is often limited by the available supply of phosphate or nitrate. Human activities can accelerate eutrophication by increasing the rate at which nutrients enter the water. Eutrophication in lakes and streams is related to high phosphate concentrations; eutrophication in estuaries and coastal waters is related to high nitrate concentrations.

The Role of Weather in Determining Chester River Water Quality

Last year Kent and Queen Anne's Counties again helped lead the state in cover crop acres planted, and we also made real progress with our Switchgrass, Green Seeker and Rain Garden programs. And yet, the chart on page 2 indicates that the average water quality in the Chester River was not even as good as in some previous years. How can we possibly be moving forward and backward the same time?

Each year there are three major weather events that can adversely impact our water quality: (1) heavy rainfall that occurs right after fertilizer application in the spring and before the new crops start growing, which leads to excess runoff of nutrients and sediment into the streams; (2) a drought in the summer which reduces the opportunity for plants to take up nutrients, thus leaving excess nutrients in the soil; and, finally (3) heavy rains in the late summer or early fall that wash any excess nutrients and sediment into the streams and ultimately into the Chester itself. Any two such events would be bad enough but in 2011 we had that "perfect storm" -- heavy spring rains followed by a summer drought followed by a hurricane and tropical storm in late summer-- a trio of untimely weather events.

Does this mean we are simply at the mercy of the weather? Not at all! One simply has to examine the impacts of those storms on other watersheds to see that the Chester fared better than most. While the results still show need for improvement, we dodged the worst effects of those storms last year thanks to the good work of our farmers. Using the partnerships that CRA has developed, we plan to continue to improve the quality of our river regardless of what Mother Nature brings our way.

Urban Rain Gardens

The Chester River Watershed is predominately rural, but there are urban storm water issues that impact its water quality as well. In 2011 CRA conducted a year-long project in the Town of Millington, paid for in part by a grant from the National Fish and Wildlife Foundation, that directly addressed storm water. With the help of community volunteers, 50 native trees and shrubs were planted in the Chesapeake Bay Critical Area, two rain gardens were constructed next to impervious services, and 50 rain barrels were distributed to approximately 30 Millington residents. Two more rain gardens will be installed in 2012.

These restoration projects demonstrate how even inexpensive actions can make an impact. Trees are overall good indicators of the health of an urban ecosystem. When comparing the amount of tree cover to impervious surface, the less impervious surface there is the more environmental benefits there are, like cleaner water. Rain gardens provide advantages similar to trees. Rain gardens capture storm water in a shallow, bowl-shaped area, allowing water to slowly filter into the ground rather than run off into streets, storm sewers, and local waterways. On average, rain gardens capture and absorb 30% more rainwater than conventional lawns. Rain barrels collect rainwater from rooftops that would otherwise be lost to runoff and diverted to storm drains and streams and, ultimately, the Chester River. The collected rain water can then be stored for later use for things like watering flower gardens, washing cars, and cleaning lawn furniture.

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