Corsica River

Water Quality Criteria Attainment

January 2007

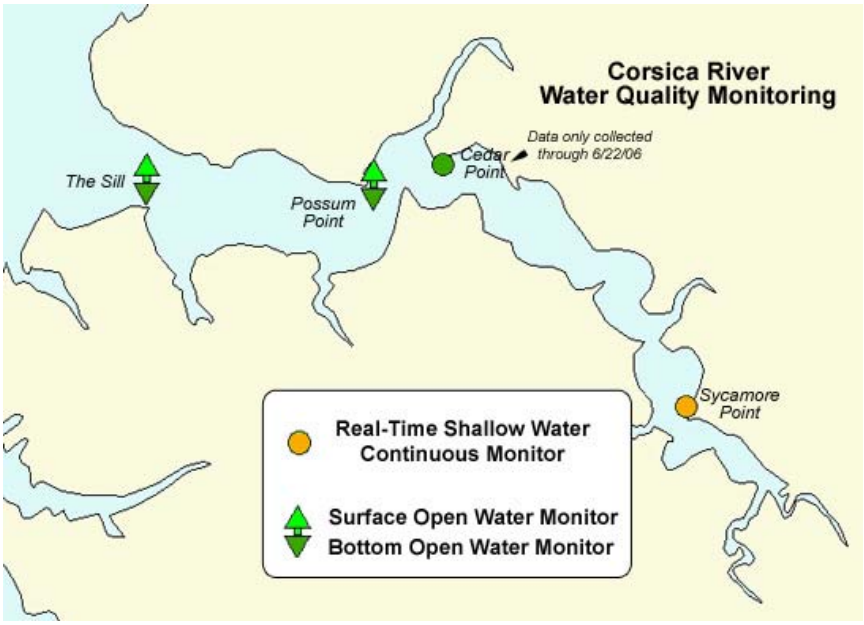
Corsica River
August 16th, 2006

Possum Point
Continuous Monitors

For data visit the
Eyes on the Bay website:
www.eyesonthebay.net

Introduction

The Corsica River Targeted Watershed Project was implemented in 2006. Maryland DNR's Tidewater Ecosystem Assessment Division is responsible for the ambient water quality monitoring and assessment that supports the management actions of the project. Prior water quality monitoring and assessments were performed for the Chester River from 2003-2005. As part of this effort, monthly water quality mapping was carried out in the Corsica, April through October. In 2005, continuous water quality monitors were placed in the Corsica at Cedar Point and Sycamore Point. In 2006, the Cedar Point continuous monitoring station was discontinued in favor of two sets of downriver, mid-channel surface and bottom continuous monitors at Possum Point and "The Sill" (see below).



Monitoring Parameters

The continuous monitoring and water quality mapping programs both collect data on dissolved oxygen, chlorophyll, turbidity, water temperature, salinity and pH. Continuous monitors measure data every 15-minutes, while each monthly water quality mapping cruise measures several thousand surface water quality measurements. During bi-weekly continuous monitor exchange and monthly water quality mapping cruises, in situ calibration samples are taken for light attenuation, nutrients, chlorophyll and total suspended sediment. These calibration data, in combination with the spatially and temporally intensive automated data, provide managers with insight into the effects of current management efforts to reduce nutrient and sediment pollution and can guide future actions.

Water Quality Mapping Unit

Legend

Dissolved Oxygen (mg/l)

	%Area <3.2	%Area 3.2 – 5.0	%Area 5.0 – 5.5	%Area >5.5
2005	2.6	27.3	43.5	26.6
2006	0	2.5	7.7	89.8

Chlorophyll (ug/l)

	%Area >50	%Area 15 - 50	%Area <15
2005	0.6	42.3	57.1
2006	12.8	54.1	33.1

Turbidity (NTU)

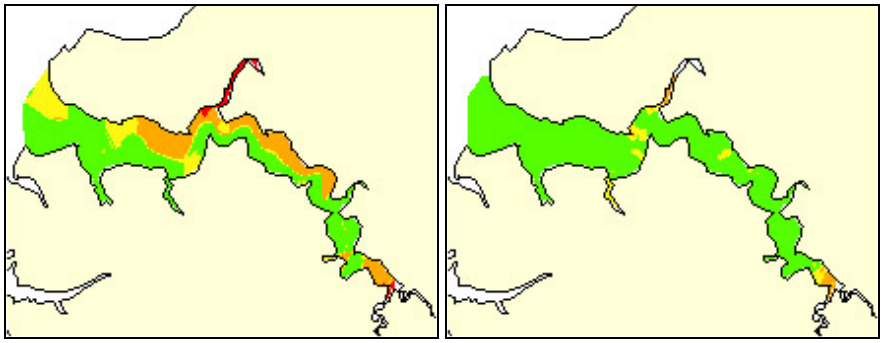
	%Area >7	%Area <7
2005	100	0
2006	100	0

Water Quality Mapping Results

Monthly surface water quality mapping data from April – October were spatially interpolated and then integrated across months (Below). The 2005 minimum dissolved oxygen surface appears much worse than 2006, but is mainly driven by low dissolved oxygen in one month, August 2005. The northern shore of the Corsica appears to have worse D.O. conditions in 2005, but this is a mainly an artifact of the time of day in which it was sampled. In 2005, the Corsica was sampled as part of a larger Chester River sampling, so the northern shore was sampled early in the day when dissolved oxygen concentrations are at their lowest. Chlorophyll values are at their highest in the upper portions of the tributary and above the river's constriction at Gunston Point. Turbidity failed a 1-meter application depth criteria (7 NTU), 100% each year. This is reinforced by the fact that the Corsica has no current SAV growth and test plots in 2005 failed to survive.

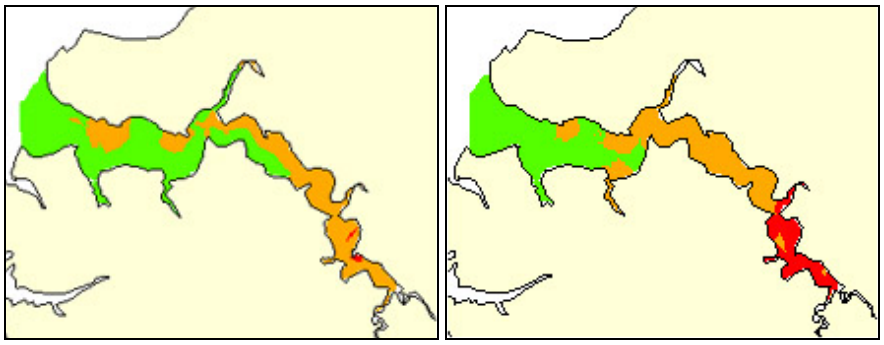
Dissolved Oxygen - Annual Minimum

2005 2006



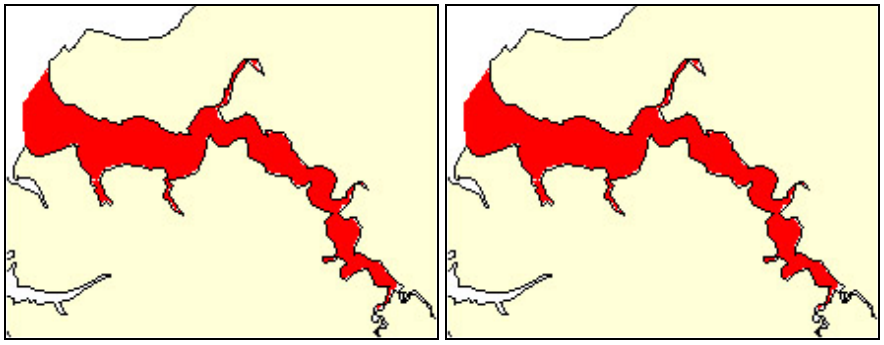
Chlorophyll – Annual Average

2005 2006



Turbidity – Annual Average

2005 2006



Continuous Monitoring Data

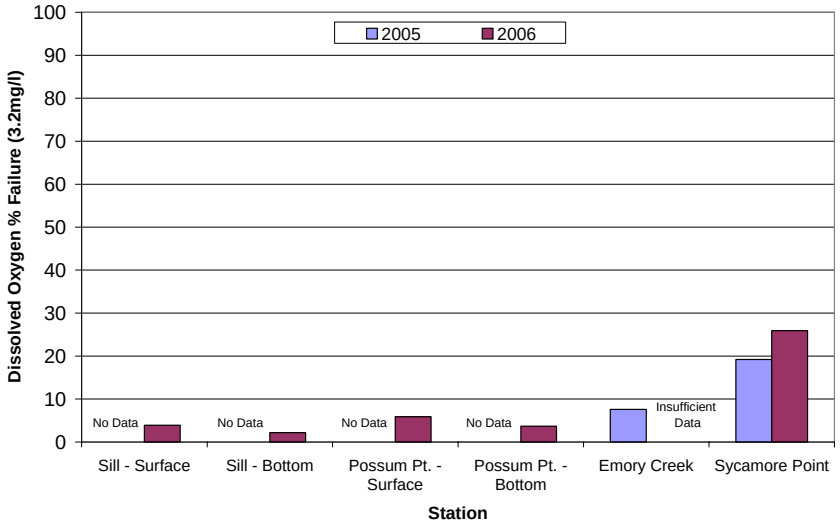
The graphs to the right represent percent failure over time of three key continuous monitoring water quality parameters in the Corsica River: dissolved oxygen, chlorophyll, and turbidity. Continuous monitoring data are collected every 15-minutes, 24-hours/day.

*Data Note – The Sill and Possum Point sites began operation on June 22, 2006.

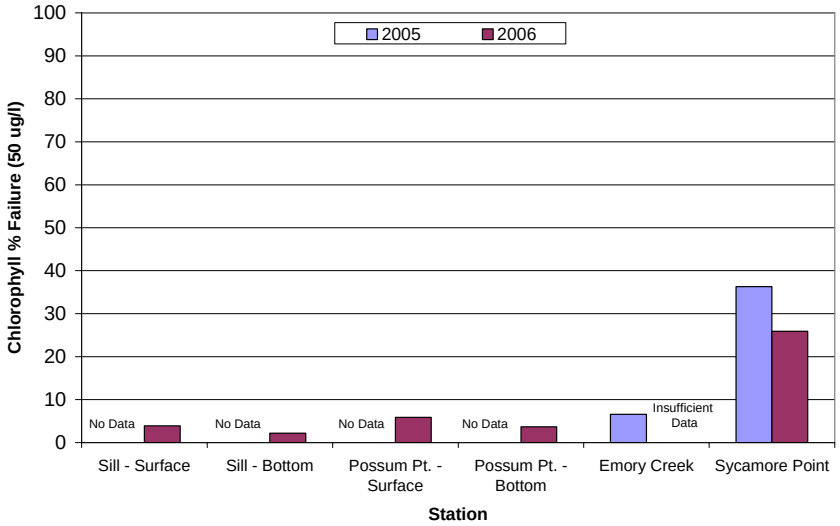
Where available, dissolved oxygen was examined June 1 – September 30 at the instantaneous criteria of 3.2 mg/l. Downstream sites were below 10 percent failure, but the upriver Sycamore site failed nearly 20 percent for both years.

Chlorophyll and turbidity data were examined during the SAV growing season, April 1 – October 30th. Failures may have been higher in 2006 for the Sill and Possum Point sites if these meters were in operation during Spring before their June 22nd deployment. The chlorophyll criteria was set at 50 ug/l which generally represents bloom conditions. The turbidity criteria was set at 7 NTU which is equivalent to level at which light can penetrate the water column to a one-meter depth. Turbidity increases upriver and has a higher rate of failure at the bottom meters. In general, water quality conditions are worse above the Gunston Point area where the river is greatly constricted, perhaps reducing flushing of nutrients from this area.

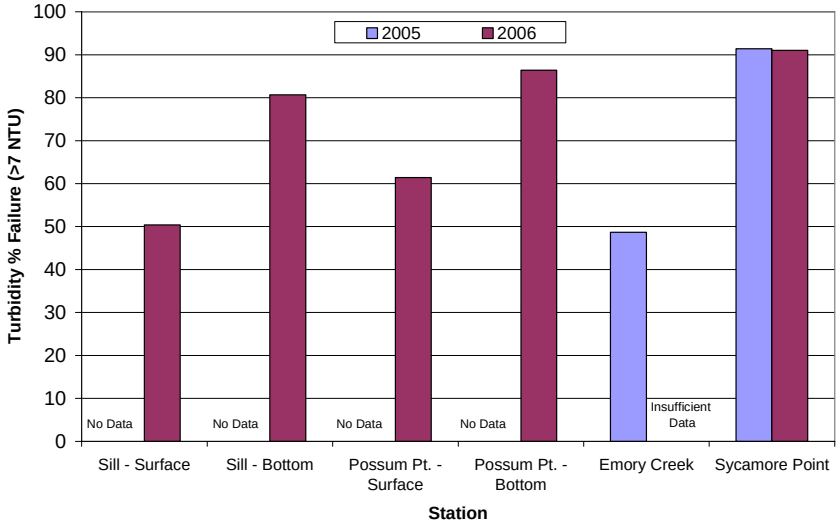
Dissolved Oxygen



Chlorophyll



Turbidity



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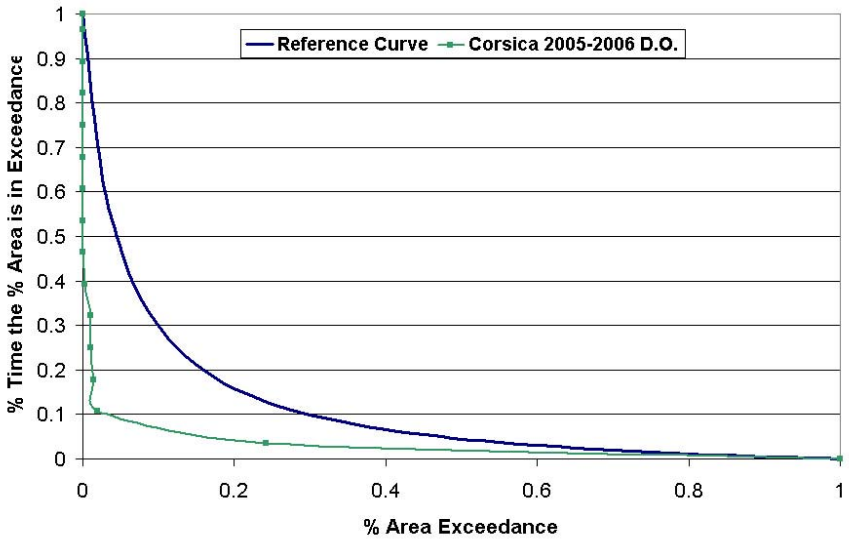
Dissolved Oxygen Criteria Assessment Using the Cumulative Frequency Diagram (CFD) Method

The CFD method will be used to formally assess water quality criteria in the Bay. Simply put, the CFD plots the percentage of area that fails a particular criteria within a tributary to a cumulative frequency, (i.e. temporal component). The CFD curve is then compared to a biologically relevant reference curve that represents the required level of attainment. If the CFD falls below the reference curve on the graph, the segment is considered to be in compliance for that parameter. In the example below, the dissolved oxygen open water CFD, with 5 mg/l as the criteria, passes for the Corsica using 2005-2006 data.

Date	%Spatial Exceedance
Aug-2005	24.2
Jun-2005	1.9
Sep-2006	1.4
Sep-2005	1
Jul-2006	1
Jun-2006	0.2
Apr-2005	0
May-2005	0
Jul-2005	0
Oct-2005	0
Apr-2006	0
May-2006	0
Aug-2006	0
Oct-2006	0

Table of percent spatial exceedance for dissolved oxygen derived from interpolated data of each water quality mapping cruise during 2005-2006. Data are represented in the x-axis of the graph below.



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