Corsica River Watershed Characterization

Excerpt Showing an Example of Existing Conditions and Pollutant Load Estimates

October 2003

Total Maximum Daily Loads for Corsica River Nutrients

The Maryland Department of the Environment (MDE) uses the 303(d) list to determine the need for establishing Total Maximum Daily Loads (TMDLs). A TMDL is the amount of pollutant that a waterbody can assimilate and still meet its designated use. A waterbody may have multiple impairments and multiple TMDLs to address them. MDE is responsible for establishing TMDLs in Maryland. In general, TMDLs include several key parts:

1- Maximum pollutant load that the water can accept while still allowing the water body to meet its intended use.
2- Allocation of the maximum pollutant load to specific pollutant sources.

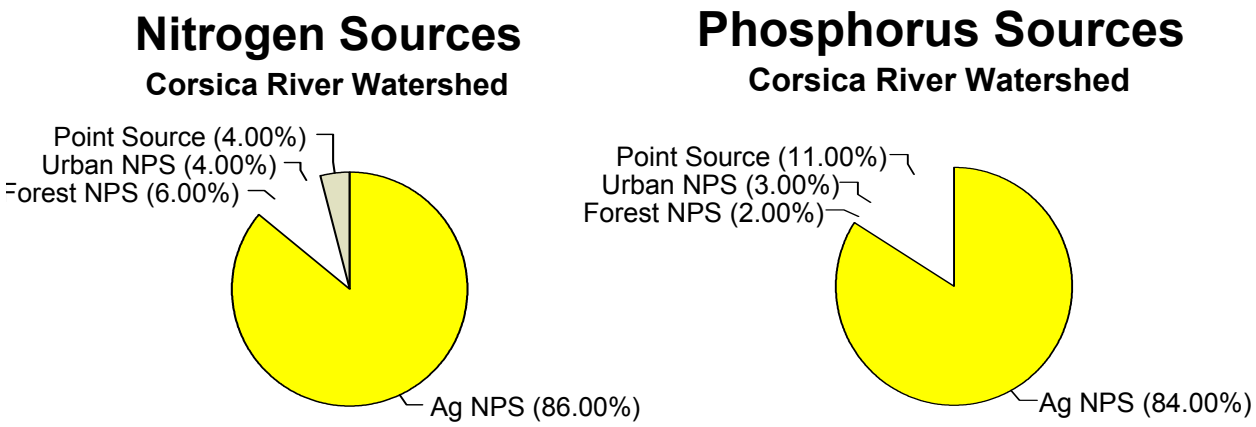
As of March 2003, one approved TMDL directly affects the Corsica River watershed. The report *Total Maximum Daily Loads of Nitrogen and Phosphorus for Corsica River* was completed by Maryland Department of the Environment (MDE) in April 2000 and was approved by US EPA in May 2000. It established Corsica River TMDLs for both nutrients as listed below.

Nitrogen	low flow TMDL	1,379 pounds per month, May 1 through October 31
	annual TMDL	287,670 pounds per year
Phosphorus	low flow TMDL	202 pounds per month, May 1 through October 31
	annual TMDL	22,244 pounds per year

These TMDLs mean that water quality impairment can be eliminated in the Corsica River if the total loads of nitrogen and phosphorus reaching the river are both reduced to this level or less. Collectively, these TMDLs are intended to meet two specific goals: a) avoiding harmful algae blooms (i.e., algae population density greater than 50 milligrams per liter (mg/l) of chlorophyll-a), and; b) maintaining adequate oxygen to support aquatic life (i.e. dissolved oxygen concentrations above of 5.0 mg/l as required by State regulation).

MDE's computer model results indicate that nonpoint sources of nutrients are a most significant contributor as shown on the next page. The pie charts were adapted from MDE's report. In both cases, agricultural land is the largest nutrient source in the watershed. Based on the assumption that atmospheric deposition of nutrients is evenly distributed across the watershed, these relative load estimates associate nutrients arriving from the atmosphere into the land use type where they are deposited. To meet TMDL requirements, MDE anticipates two general approaches to controlling nutrients:

– Nonpoint source nutrients will be controlled through existing programs, like implementing best management practices, and
– Point source nutrients will be controlled at the Centreville Wastewater Treatment Plant (WWTP).



The allocations listed will be used by MDE in drafting NPDES permits for dischargers in the Corsica River watershed. For example, that the nutrients discharged from the Centreville WWTP, plus any other point sources in the watershed, must be less than the point source load allocations for the annual and the summer low flow load allocations. Based on the computer model results, MDE anticipates that point source low flow requirements can be met by applying NPDES permit requirements on the Centreville Wastewater Treatment Plant. The annual point source load allocations were based on projected maximum design flow at the Centreville Wastewater Treatment Plant assuming biological nitrogen removal and chemical phosphorus removal. MDE intends to monitor progress toward meeting the TMDLs through routine monitoring and additional TMDL evaluations. The estimated annual nonpoint source loads for both the nitrogen and the phosphorus TMDLs were based on Year 2000 land use projections. Additional details on nonpoint sources are presented in table Average Annual Nonpoint Source Load Estimates.

Summer Low Flow Load Allocations for Point Sources and Nonpoint Sources		
	Total Nitrogen (lb/month)	Total Phosphorus (lb/month)
Nonpoint Source	427	13
Point Source	625	117

Annual Load Allocations for Point Sources and Nonpoint Sources		
	Total Nitrogen (lb/month)	Total Phosphorus (lb/month)
Nonpoint Source	268,211	19,380
Point Source	7,598	1,424

Average Annual Nonpoint Source Load Estimates (Adapted from April 2000 TMDL)							
Land Use Category	**Area**	**Nitrogen**			**Phosphorus**		
	acre	lb/per/ac	lb/year	Percent	lb/per/ac	lb/year	Percent
Agriculture	15,603	14.36	224,015	83.5	1.11	17,346	89.5
Forest	6,722	2.36	15,873	5.9	0.47	317	1.6
Urban	1,367	7.16	9,787	3.7	0.502	687	3.6
Open Water	1,381	13.42	18,535	6.9	0.75	1,030	5.3
Total	25,073		268,211	100		19,380	100

Water Quality Indicators–Setting Priority for Restoration and Protection

This comparison using indicators was first created to support the Clean Water Action Plan's 1998 *Unified Watershed Assessment* which established priorities for watersheds in the State for restoration and protection. In the Plan, there were two categories for priority action: highest priority for restoration, and priority for protecting valued resources.

As the basis for the prioritization, indicators of water quality, landscape and living resources were developed for all watersheds in Maryland. Other approaches to assessing water quality have been in use for several years and are further described below. In general they do not look comparatively at watersheds as the Unified Assessment did in an effort to set priorities. The Unified Assessment also considered a range of living resource and landscape indicators described a little later.

Water Quality Indicator Summary Corsica River Watershed From: 1998 *Unified Watershed Assessment*	
Indicator Name	**Finding**
Modeled Load: TP	0.66 lbs/acre
Modeled Load: TN	8.63 lbs/acre

Comparison with similar Maryland watersheds
Green shading: goal or benchmark was met.
Orange shading: goal or benchmark not met.

The Unified Assessment looked at five water quality indicators to compare the State's 138 "8-digit" watersheds though not all watersheds had information to allow generation of each indicator.

1. Modeled Loads for Phosphorus and Nitrogen

In comparison to the other watersheds that drain to the Chesapeake Bay in Maryland, it is estimated that the Corsica River watershed receives 0.66 pounds of total phosphorus (TP) per acre in the watershed and 8.63 lbs/acre total nitrogen (TN). The TN yield meets Maryland's

benchmarks for these nutrients used in the *Unified Watershed Assessment* but the TP yield does not.

Two of the most important pollutants in the Chesapeake Bay system are the nutrients nitrogen and phosphorus, deemed this because of their contribution to excessive growth of algae, speeding the processes of eutrophication. To estimate how much TP and TN reaches the streams and how much of each is available for transport to the Bay, computer models are used. For the computer modeling used to generate the yield estimates reported in the Unified Assessment, the following information was used for the models: 1) monitoring data of point source nutrient discharges; 2) estimated nonpoint sources loads, based on 1996 land use and estimates of selected land management practices, and 3) consideration of other factors like deposition from the air.

2002 modeling conducted by DNR using 2000 data shows that the average yields for the Corsica River watershed are 0.759 pounds per acre annually of total phosphorus and 11.71 pounds per acre annually of total nitrogen. These load estimates may differ from the estimates used in the *Unified Watershed Assessment* for several reasons: changes in point source discharges and land use, and differing consideration of best management practices and septic system loads.

An additional gauge of nutrient loads will be available in the results of the synoptic survey conducted in 2003.

Water Quality Monitoring

1. Intensive Surveys 1992 and 1993

Intensive water quality surveys were conducted in 1992 and 1993 near the Centreville Wastewater Treatment Plant discharge and downstream to the Watson Road Bridge. This data was not used in the Corsica River nutrient TMDLs because the geographic coverage was too limited to characterize the entire tidal area of the Corsica River.[5]

2. 1997 Monitoring for the TMDL

Two water quality surveys were conducted in the Corsica River watershed in the summer of 1997 to support work on the TMDL at locations shown in Map 4 Monitoring Water Quality. The summer represents critical conditions for the Corsica River. This is because there is less water flowing in the channel, higher concentrations of nutrients, and the water temperatures are usually warmer creating good conditions for algal growth. Data from these 1997 surveys was used to develop the nutrient TMDLs for the Corsica River.[5]

3. Long Term Monitoring in Tidal Waters

Long term monitoring of tidal waters has been conducted in the Chester River at two locations. Similar long term water quality monitoring has not been conducted in the Corsica River. Based on interpretation of 1997 Corsica River water quality data, influence of the Chester River on Corsica River water quality conditions is not clear. Status and trends information for the Chester River long term monitoring stations is available on the Internet at http://www.dnr.maryland.gov/bay/tribstrat/index.html .