The pages in this document were taken from the "Corsica River Watershed Restoration Action Strategy: Final Report" published in September 2004. The entire document can be found at http://dnrweb.dnr.state.md.us/download/bays/cr_strategy.pdf.

Corsica River Watershed Restoration Action Strategy: Final Report

Excerpt Showing an Example of How Pollutant Information Can be Collected and Assessed

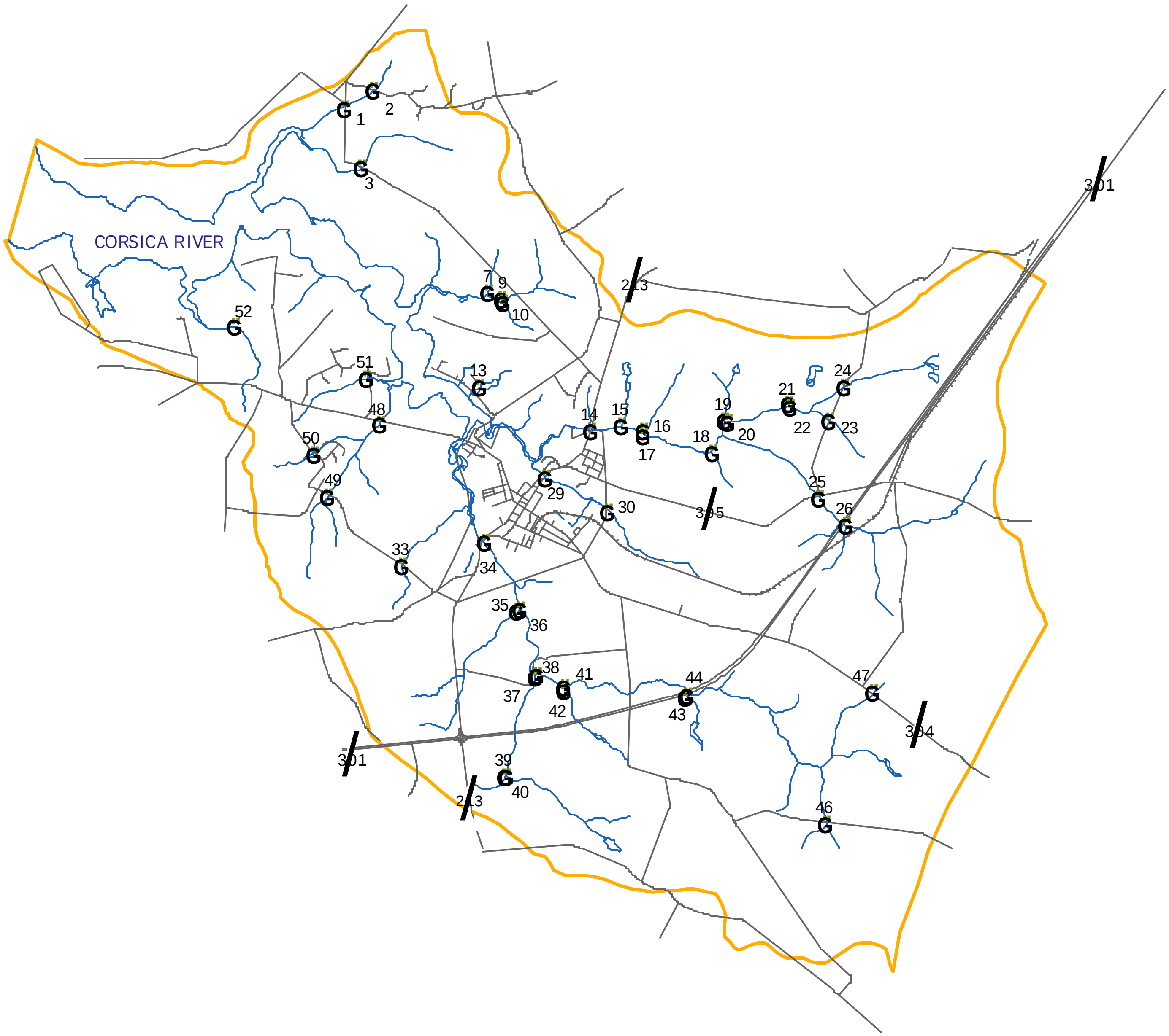
September 2004

Synoptic Surveys

The capacity of streams to support a diversity of aquatic life depends on the quality and availability of habitat as well as the physical and chemical characteristics of its water quality. A nutrient synoptic survey was conducted during April 2003 in the Corsica River Watershed as part of the Corsica WRAS. Fifty-one (51) Baseflow grab sample sites were established throughout the watershed distributed to reach each of the 12-digit Sub-watersheds. Water quality sampling, benthic macroinvertebrate sampling, and fish sampling occurred in April using established DNR sampling protocols and complete details of the synoptic survey may be found at the Maryland DNR website.

Nutrient synoptic sampling was scheduled for early spring to coincide with the period of maximum nitrogen concentrations in the free-flowing fresh water streams. The major proportion of nitrogen compounds are carried dissolved in the groundwater rather than in surface run-off. The higher nitrogen concentrations in the late winter and early spring reflect the higher proportion of nitrogen-rich shallow groundwater present in the base flow at this time of year. Nitrogen concentrations are reduced in summer as the proportion of shallow groundwater is reduced through plant uptake, and replaced by deeper groundwater that may have lower nitrate concentrations, or has been denitrified through interaction with anoxic conditions in the soils below the streambed. Point sources can also contribute to in-stream nitrate concentrations.

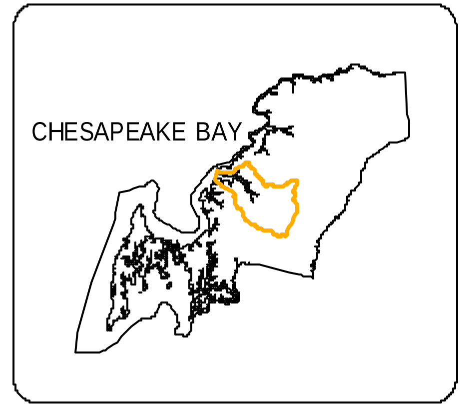
Orthophosphate is generally transported bound to suspended sediments in the water column. In-stream orthophosphate concentrations can also be produced through mobilization of sediment bound phosphorous in anoxic water column and/or sediment conditions, sediment in surface run-off from areas having had surface applied phosphorous, groundwater from phosphorous saturated soils, and point source discharges.



CORSICA RIVER WRAS

Figure 5
SYNOPTIC NUTRIENT SAMPLE SITES

QUEEN ANNE'S COUNTY
MARYLAND



G Synoptic Site
Streams
Roads
Watershed Boundary

N

1 0 1 2 Miles

Table 3
Synoptic Nutrient Sample Site Locations

SITE_#	LOCATION	SAMPLE TYPE	LATITUDE	LONGITUDE	NOTES
1	North Fork Emory Cr. at Spaniards Neck Rd.	N,F	39.09555	76.09426	
2	North Fork Emory Cr. at Coon Box Rd.	N	39.98060	76.09003	
3	South Fork Emory Cr. at Spaniards Neck Rd.	N,B,F	39.88150	76.09132	
7	UT to Corsica at Spaniards Neck Rd.	N	39.07470	76.07041	perched culvert
9	UT to Corsica at Spaniards Neck Rd.	N	39.07118	76.07005	perched culvert
10	UT to Corsica at Spaniards Neck Rd.	N	39.07118	76.07005	
13	UT to Corsica at Quail Run Dr.	N			
14	Three Bridges Branch at Rt 213	N,B	39.05419	76.05343	
15	UT to Three Bridges Br. at confluence	N	39.05459	76.04919	
16	UT to Three Bridges Br.at confluence	N	39.05401	76.04707	
17	Three Bridges Br.	N	39.05401	76.04707	
18	UT to Three Bridges Br.at confluence	N	39.05260	76.03207	
19	UT to Three Bridges Br.at confluence	N	39.05440	76.03250	
20	UT to Three Bridges Br. at confluence	N	39.05436	76.03280	
21	UT to Three Bridges Br. at confluence	N	39.05679	76.02257	
22	UT to Three Bridges Br. at confluence	N	39.05679	76.02257	
23	UT to Three Bridges Br. at Tanyard Rd.	N			
24	UT to Three Bridges Br. at Tanyard Rd.	N			
25	Three Bridges Br. at Rt 300	N			
26	Three Bridges Br. at Rt 301	N	39.04175	76.01283	
28	Grays Cr. at Rt 213	N			
29	Grays Cr. behind detention center	N	39.04336	76.05263	perched culvert
32	UT to Millstream Br. at Hibernia Rd.	N			
33	Millstream Br. above Rt 213	N	39.38380	76.70500	
34	UT to Millstream Br at confluence	N			
35	Millstreasm Br. at confluence	N,B,F			
36	UT to Millstream Br. at Taylor Mill Rd.	N			
37	Millstream Br. at Taylor Mill Rd	N			
39	UT to Millstream Br. at Rt 301	N	39.01500	76.06726	
40	UT to Millstream Br. at confluence	N			
41	Millstream Br at confluence	N			
42	UT to Millstream Br at Rt 301	N			

SITE_#	LOCATION	SAMPLE TYPE	LATITUDE	LONGITUDE	NOTES
43	Millstream Br. at Rt 301	N,B,F			
45	Millstream Br. at Little Eagle Rd.	N			
46	Millstream Br. at Rt 304	N			
47	UT to Corsica at Rt 304	N,F			
48	UT to Corsica at Hibernia Rd.	N			perched culvert
49	UT to UT at Brownsville Rd.	N			perched culvert
50	Earle Cr at Fort Point Rd.	N			perched culvert
51	UT to Tilghman Cove	N	39.05765	76.11498	

*N = nutrients
F = Fish
B = benthic

Water Chemistry Sampling

Sampling sites were selected and pinpointed in the GIS base. The contributing drainage areas (used to calculate nutrient yields per unit area) were determined from a digitized watershed map using ArcView® software. Synoptic water chemistry samples were collected in early spring throughout the watershed. Sampling was halted for a minimum of 24 hours after rainfall events totaling more than 0.25 inches. Grab samples of whole water (500 ml) were collected just below the water surface at mid-stream and filtered using a 0.45 micron pore size (Gelman GF/C) filter. The samples were stored on ice and frozen on the day of collection. Filtered samples were analyzed by the Nutrient Analytical Services Laboratory at the University of Maryland's Chesapeake Biological Laboratory (CBL) for dissolved inorganic nitrogen (NO_3, NO_2), and dissolved inorganic phosphorous (PO_4). All analyses were conducted in accordance with U.S. Environmental Protection Agency (EPA) protocols. Stream discharge measurements were taken at the time of all chemistry samples. Water temperature, dissolved oxygen, pH, and conductivity were measured in the field with a Hydrolab Surveyor II® at selected sites at the time of water quality collections. Watershed areas used to calculate nutrient yields were determined from a digitized watershed map using ArcView® software.

Where sites are nested in a watershed, the mapped concentration data for the downstream site is shown only for the area between the sites. Yield calculations for a downstream site are based on the entire area upstream of the site, but are mapped showing just the area between sites. The downstream sites therefore illustrate the cumulative impact from all upstream activities. This is particularly important in the Corsica River Watershed in light of the fact that the upstream areas in Subwatersheds 0396 and 0397 flow to confluence with the tidal Corsica within the Town of Centreville.