Corsica River Watershed Characterization

Excerpt Showing an Example of Living Resources and Habitat

October 2003

LIVING RESOURCES AND HABITAT

Living resources, including all the animals, plants and other organisms in the Corsica River Watershed are being affected by human activity. The information summarized here suggests that some of the significant stresses on living resources in the watershed are associated with alteration and destruction of habitat, excessive movement of sediment and excessive availability of nutrients.

In the Corsica River watershed, information is available for fish, oysters, submerged aquatic vegetation, sensitive species. However, other forms of aquatic life, woodland communities, terrestrial habitats, and others should be considered as watershed restoration decisions are being made. Therefore, it is recommended that stakeholders in the watershed identify important living resource issues or priorities so that additional effort can be focused where it is most needed. New information should be added or referenced as it becomes available.

Living Resource Indicators

Aquatic organisms are sensitive, in varying degrees, to changes in water quality and aquatic habitat. They are also sensitive to landscape changes. This association offers two perspectives that are important for watershed restoration. First, improvements for living resources offer potential goals, objectives and opportunities to gauge progress in watershed restoration. Second, the status of selected species can be used to gauge local conditions for water quality, habitat, etc. This second perspective is the basis for using living resources as an "indicator."

The *Maryland Clean Water Action Plan's Unified Watershed Assessment,* published in 1998, included a number of living resource indicators for the Corsica River Watershed.[2] Several of these indicators rely on extrapolations from a limited number of sampling sites which were then generalized to represent entire watersheds. Some are indices comprising several conditions. Considering this limitation on field data, it would be beneficial to conduct additional assessments to provide a more complete understanding of local conditions.

Living Resource Indicator Summary **Corsica River Watershed** **From: 1998 *Unified Watershed Assessment***	
Indicator Name	**Finding**
SAV Abundance	**1.0**
SAV Habitat Requiremts	**3.0**
Nontidal Fish Index	7.9
Nontidal Benthic Index	5.8
Nontidal Habitat Index	4.3

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

1. SAV Abundance

For tidal areas of the Corsica River Watershed, the abundance of submerged aquatic vegetation (SAV) scored "1.0" for the Abundance Indicator, which means that SAV covered 10% or less of the potential SAV habitat. This indicator is designed to allow comparison of watersheds based on actual SAV acreage versus potential SAV acreage. To generate the score for this indicator, two measurements of SAV area were used: 1) area covered by SAV in the year 1996 was estimated using aerial survey data, and 2) the potential SAV area based on water depth (up to two meters deep), physical characteristics and historic occurrence of SAV.

The benchmark used in the *Unified Watershed Assessment* of the *Clean Water Action Plan* for the SAV Abundance indicator was 10%. If less than 10% of the potential SAV area in a watershed was covered by SAV in 1996, then the watershed was listed in the category "needs restoration". If more than 10% of the potential SAV area in a watershed was covered by SAV in 1996, then the watershed was listed in the category "needs preventative action" to protect or enhance SAV abundance. No watershed in the State scored higher than 2, reflecting a maximum observed coverage of 20%.

2. SAV Habitat Index

For tidal areas of the Corsica River Watershed, the abundance of submerged aquatic vegetation (SAV) scored 3.0 for the Index, which means that SAV habitat requirements were not met based on 1994-1996 data. This index is designed to allow comparison of watersheds based on several measurements of habitat conditions: water clarity as measured by secchi depth, dissolved inorganic nitrogen where applicable, dissolved inorganic phosphorus, abundance of algae as measured by Chlorophyll *a* and total suspended solids.

The benchmark used in the Unified Watershed Assessment for the SAV Habitat Index was 7. A score less than 7 means that the watershed's habitat conditions were not favorable for SAV and the watershed was listed as being in need of restoration (Category 1). A score of 7 or higher means that 1994 through 1996 data showed that habitat conditions for SAV in a watershed were sufficient and the watershed was listed in the category for "restoration needed". The Corsica River watershed is among the lowest scoring half of watersheds statewide on this indicator.

3. Nontidal Fish Index of Biotic Integrity

With an IBI score of 7.9, the Corsica River Watershed met the benchmark set for the Nontidal Fish Index of Biotic Integrity (IBI).

The Fish Index of Biotic Integrity (fish IBI) for fishes have been developed for small (first- to third-order) non-tidal streams. Several characteristics of the fish community are measured: numbers of native species, of benthic species and of tolerant individuals; the percent of tolerant species, of dominant species, and of generalists, omnivores and insectivores; the number of individuals per square meter; biomass in grams per square meter; percent of lithophilic spawners; and percent insectivores. These characteristics are scored and summed to calculate a fish IBI for each sampled stream. Each watersheds score is an average of stream scores within the watershed. These watershed scores were ranked 1 (most degraded) through 10 (best condition). A score of less than 6 does not meet the benchmark set for this index. A score of 6 or greater meets the benchmark.

4. Nontidal Benthic Index of Biotic Integrity

With an IBI score of 5.8, the Corsica River watershed does not meet the benchmark set for the Nontidal Benthic Index of Biotic Integrity (IBI).

The nontidal benthic IBI looks at the insects and other invertebrates, like crayfish, living on the bottoms of streams, considering the overall community composition, the number and diversity of species and the presence of sensitive species. To calculate the benthic IBI, for the *Unified Watershed Assessment*, reference conditions were established for minimally-impacted streams. IBI values are relative to conditions in these minimally-impacted streams. An index of 6.0 or less means that restoration is recommended and an index of 8.0 or higher means that protection is recommended.

5. Nontidal Habitat Index of Biotic Integrity (IBI)

The Corsica River watershed's low overall index of 4.3 for habitat biotic integrity suggests that this watershed has significant physical habitat concerns relative to similar Maryland watersheds. This rank corresponds to an Maryland Biological Stream Survey's score of 2.8 which is in the "poor" range. A rank less than 6 means that restoration is recommended.

This physical habitat indicator is developed for small (first- to third-order) non-tidal streams. It is based on several measures of in-stream habitat quality that are scored for each site based on observations of habitat condition in streams during sampling visits. The habitat measures rate the quantity and quality of physical habitat available in the stream for fish and benthic macroinvertebrate colonization and rate the degree to which the stream channel has been altered due to changes in watershed landscape.

The physical habitat characteristics are measured, scored, weighted, and summed to calculate the indicator for each sampled stream. A low score, or a decline in score over time, reflects both natural disturbances and human-induced alterations of the stream habitat relative to minimally-disturbed reference sites. The mean habitat score for watersheds is reported on a scale of 1 (most degraded) to 10 (best condition). The ranked scores were divided into four groups each containing 25% of the watersheds (quartiles). Watersheds with the best conditions ranked in the highest three quartiles and, thereby, met the benchmark. The watersheds with the worst conditions ranked in the lowest quartile (25% of the watersheds) and "exceeded" the benchmark.

Physical habitat conditions in non-tidal streams and rivers are influenced by land use and land cover patterns in the watershed, such as the destruction of riparian forests and increasing the area of impervious land cover. Other major influences are channelization, encroachment by livestock, and blockages to upstream/downstream movements of fish.

MBSS Findings for 2000 and 1995 * Corsica River Watershed				
Watershed/Stream	Station #	Score		
		Fish	Benthos	Physical
Mill Stream Branch	QA-N-014-219-95	4.75	3	65
	QA-N-014-204-95	4.5	3	75
	CORS-106-R-2000	4.25	2.1	--
	CORS-205-R-2000	4.75	3.9	--
Three Bridges Branch and Tributaries	QA-N-079-308-95	3.75	4	59
	QA-N-079-316-95	4	4	59
	CORS-107-R-2000	3.5	2.7	--
	CORS-108-R-2000	4	4.7	--
Gravel Run	QA-N-042-116-95	4	2	21

Key for MBSS Data Table					
Index of Biotic Integrity	Ranges for Index	Very Poor	Poor	Fair	Good
Fish	1.0 (worst) to 5.0 (best)	1.0 - 1.9	2.0 - 2.9	3.0 - 3.9	4.0 - 5.0
Benthic	1.0 (worst) to 5.0 (best)	1.0 - 1.9	2.0 - 2.9	3.0 - 3.9	4.0 - 5.0
Physical Habitat	0 (worst) to 100 (best)	0 - 11.9	12 - 41.9	42 - 71.9	72 - 100

* Additional details are available at http://www.dnr.maryland.gov/streams/mbss/index.html
– Click on "Search Online Data" (button on left)
– Enter "Lower Monocacy" in dialog box for "8 Digit watershed name" and click on search

Submerged Aquatic Vegetation

The well-defined link between water quality and submerged aquatic vegetation (SAV) distribution/abundance make SAV communities good barometers of the health of estuarine ecosystems. SAV is not only important as an indicator of water quality, but it is also a critical nursery habitat for many estuarine species. For example, blue crab "post-larvae" are up to 30 times more abundant in SAV beds than in adjacent unvegetated areas. Additionally, several species of waterfowl depend on SAV for food when they over-winter in the Chesapeake region.

Map 19 Submerged Aquatic Vegetation and the adjacent table show that SAV has intermittently appeared in the Corsica River during the 1980s and 1990s based on interpretation of aerial photography.

In 1985 and 1987, SAV appeared only on the north side of the river near River Estates. For the decade of the 1990s, SAV appeared in Middle Quarter Cove five out of ten years. Only in 1994 did SAV beds extend outside of Middle Quarter Cove to the Corsica River area near the cove's mouth and at Town Point Also see SAV Abundance and SAV Habitat Index.

Note 1: Using aerial photography to track the presence of SAV is designed to cover large areas and tends to miss small patches of SAV.

Note 2: A complete SAV data set is available for download from the Virginia Institute of Marine Science.

SAV Presence in the Corsica River By Year (Years not listed – No data Available)	
1980 and 1984	absent
1985	near River Estates
1986	absent
1987	near River Estates
1989 through 1992	absent
1993	in Middle Quarter Cove
1994	in Middle Quarter Cove, near mouth of Middle Quarter Cove and at Town Point
1995	in Middle Quarter Cove
1996 and 1997	absent
1998 and 1999	in Middle Quarter Cove