Corsica River Watershed Characterization

Excerpt Showing an Example of Land Use/Land Cover Information

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LANDSCAPE

Water quality, particularly in streams and rivers, is affected by the land in the riparian zone and by soils, vegetative cover and the land use throughout the watershed. In an effort to gauge the affects of land use on water quality, and to allow comparison between watersheds, DNR has developed a series of Landscape Indicators. These indicators can be used to portray landscape conditions on a watershed scale that tend to support good water quality or that tend to degrade water quality.

Landscape Indicators

The 1998 *Maryland Clean Water Action Plan* included a unified watershed assessment that used a number of landscape indicators to assess the State's 138 watersheds.[2] Most indicators are relative measures by which Maryland's watersheds can be compared. The following sections identify the findings for the Corsica River Watershed from the 1998 Plan, with the exception of the population density, which is based on Year 2000 Census data.

Landscape Indicator Summary
Corsica River Watershed
From: 1998 *Unified Watershed Assessment*

Indicator Name	Finding
Year 2000 Population Density	**0.15 people/acre**
Historic Wetland Loss	**4,192 acres**
Unbuffered Streams	**37 %**
Soil Erodibility	**0.32 value/acre**

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

1. Population Density

Based on the Year 2000 Census, the population density in the Corsica River Watershed was 0.15 people per acre of land. This is similar to the in the *Unified Watershed Assessment* estimate 0.17 people/acre based on 2000 population projections.

As human population increases, the effects of human activity that degrades, displaces, or eliminates natural habitat also tend to increase. Watersheds with higher populations, assuming other factors are equal, tend to exhibit greater impacts on waterways and habitat. However, growth can be directed in ways to reduce negative impacts. A comparison with other watersheds in the state has not been completed using the 2000 census data.[2]

2. Historic Wetland Loss

DNR mapping indicates that there are nearly 2,600 acres of wetlands in the Corsica River watershed now. However, assuming that all nonwetland hydric soils in the watershed were once wetlands, the estimated loss of wetlands over the years is 4,192 acres. This interpretation is based on the assumption that the hydric soils in the watershed were all, at one time, wetlands. Thoughtful selective restoration of historic wetland areas can be an effective WRAS component. In most of Maryland's watersheds, extensive wetland areas have been converted to other uses by draining and filling. This conversion reduces or eliminates the natural functions that wetlands provide.[2]

3. Unbuffered Streams

Approximately 37% of streams in the Corsica River Watershed were not buffered with trees, based on 1998 information. Corridors 100 feet wide (50 feet either side) along streams were combined with forest cover to develop this indicator. This estimate of streams lacking forested buffer was generated for the 1998 Maryland Clean Water Action Plan by using Maryland Department of State Planning GIS data for streams and for 1994 land use. The finding for the Corsica River watershed compares well with other Maryland watersheds.[2]

In most of Maryland, trees are key to healthy natural streams. They provide numerous essential habitat functions: shade to keep water temperatures down in warm months, leaf litter "food" for aquatic organisms, roots to stabilize stream banks and vegetative cover for wildlife. In general, reduction or loss of riparian trees / stream buffers degrades stream habitat while replacement of trees / natural buffers enhances stream habitat. (For this indicator, only streams that appear on USGS Topographical Maps, sometimes called "blue line streams," were considered in this estimate).

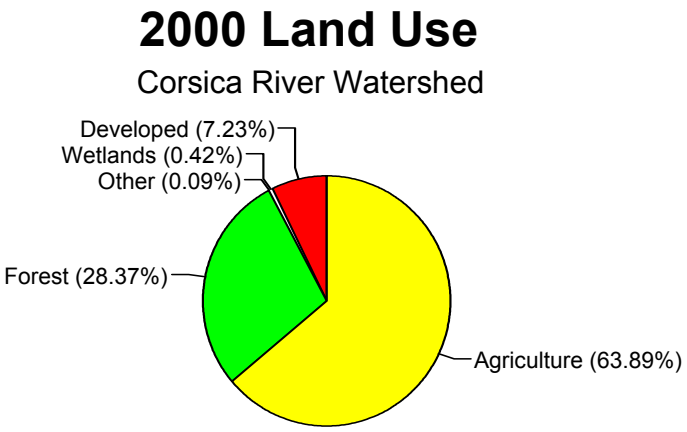
4. Soil Erodibility

Soil erodibility for the Corsica River Watershed is represented by what is known as the K factor, in this case estimated to be 0.32.[2] The K factor normally varies from approximately zero to about 0.6. A K value of 0.17 has a very low erosion potential, a value of 0.32 has a moderate erosion potential, a value of 0.37 has a high erosion potential, and a value of 0.43 has a very high erosion potential. This watershed's erodibility is moderate, although its ranking among all watersheds in the state was fairly high.

Watersheds with more highly erodible soils are naturally more susceptible to surface erosion, sedimentation, streambank erosion and other problems related to soil movement. These negative effects of soil erodibility on water quality can be minimized through careful management. The soil erodibility indicator accounts for natural soil conditions but not for management of the land. (Existing cropland management was not considered.) The naturally erodible soils in the watershed are addressed by techniques called Best Management Practices (BMPs) to prevent soil loss, practices that are typically in use on local farms. BMPs like no-till or reduced till cropping, planting cover crops, field strips, or retiring erodible soils from production can significantly reduce erosion and sediment movement. These BMPs can be seen in use in many places in the watershed.

Because soils can vary significantly within very small areas, a generalized erodibility indicator must be used with caution and supplemented with site-specific evaluation prior to implementing any management action.

Land Use / Land Cover



The following table and pie chart summarize 2000 land use / land cover for the Corsica River Watershed. They are based on categories established by the Maryland Department of Planning.

Nearly 64% of the land in the Corsica River Watershed is agriculture. About 28% is in some form of forest and about 7% is covered with some type of developed or urban use. All other types of land together amount to less than 1% of the watershed.

Viewing these general land use categories as potential nonpoint sources of nutrients, agricultural lands are likely to contribute the greatest loads to local waterways. Urban lands may also contribute significant nutrient loads. Map 6 Land Use / Land Cover shows the distribution of these land use categories in the watershed.

Since this land use / land cover categorization was completed in 2000, significant land use change continues to occur in the watershed. For example, acreage to the east of Rt. 213 north of the Three Bridges Branch is shown as agricultural on the map. Some of this area was annexed by the town of Centreville several years ago and a housing development called North Brook now occupies some of this land.[15]

Land Use / Land Cover In Corsica River Subwatersheds
Acres / Percent, MDP 2000 Data

Watershed	Agriculture	Forest	Developed	Wetland	Other	Total
Corsica Direct Drainage	3,968 56%	2,376 34%	633 9%	76 1%	0	7,053
Mill Stream Branch	6,495 70%	2,370 25%	470 5%	2 --	22 --	9,359
Three Bridges Branch and Gravel Run	4,809 65%	2,036 27%	624 8%	22 --	0	7,491
Corsica River Watershed (land only)	**15,272**	**6,782**	**1,727**	**100**	**22**	**23,903**
Corsica River Watershed including open water						**25,298**

Looking at land use / land cover in the three subwatersheds of the Corsica River watershed, several characteristics can be ascertained from the map and the table below:

– Corsica Direct Drainage subwatershed has the greatest percentage of forest and brush cover. It also has the greatest percentage of developed land even though it does not include a town center. Additionally, it has the smallest percentage of agricultural land use. Taken together, it appears that development is the least concentrated in this subwatershed compared to the other two.
– Mill Stream Branch subwatershed has the greatest percentage of agricultural land and the smallest percent developed land even though in encompasses part of Centreville. This suggests that development is relatively concentrated in this subwatershed compared to the other two subwatersheds.
– Three Bridges Branch and Gravel Run exhibits a mid-range percent of each major land use / land cover category compared to the other two watersheds. It also encompasses part of Centreville.

Impervious Surface

Roads, parking areas, roofs and other human constructions are collectively called impervious surface. Impervious surface blocks the natural seepage of rain into the ground. Unlike many natural surfaces, impervious surface typically concentrates stormwater runoff, accelerates flow rates and directs stormwater to the nearest stream without significant opportunity for stormwater infiltration into the ground. Watersheds with small amounts of impervious surface tend to have better water quality in local streams than watersheds with greater amounts of impervious surface.

Urbanization and the increase in impervious surfaces that accompanies development can significantly impact stream health. Increases in the extent of upstream impervious surface are strongly associated with a decrease in stream quality. As impervious surfaces cover more of the landscape, less water infiltrates the soil and more water enters stream systems through runoff or stormwater discharge. This increased stormwater runoff from impervious surfaces contributes to stream quality degradation by introducing more non-point source pollution, higher temperatures, reduced stream baseflow and more erosive flood flow.

The table Upstream Impervious Cover Thresholds shows the relationship between upstream impervious land cover and in-stream quality. These thresholds are based on extensive biological monitoring conducted by the Maryland Biological Stream Survey:[10]

Upstream Impervious Cover Thresholds	
Percent	**Affects on Stream Quality**
Less Than 2	Imperviousness is relatively insignificant compared to other factors affecting habitat quality. In cold-water habitats, brook trout may be found.
Above 2	Negative impacts to stream health begin. Brook trout are never found in streams with watershed imperviousness above this threshold.
Above 15	Stream health is never rated good, based on a combined fish and benthic macroinvertebrate Index of Biotic Integrity.
Above 25	Only hardy, pollution-tolerant reptiles and amphibians can thrive, while more pollution-sensitive species are eliminated.

Map 7 Impervious Surface Corsica River Watershed reflects data developed by the University of Maryland's Regional Earth Sciences Application Center (RESAC).[11] The map is color coded to show the relative amount of impervious cover in various areas of the watershed.

Overall, there is relatively little impervious surface in the Corsica River watershed. Each of the three subwatersheds have average impervious cover of less than two percent. In appears that impacts associated with impervious surfaces are limited to small localized areas. Some of the local concentrations of impervious surface are in Centreville and adjacent to major roads. These concentrations of impervious surface may be generally suited to stormwater management control. Stormwater management retrofits and other forms of restoration could be targeted to these areas.

Lands With Significant Natural Resource Value and Large Area

1. Green Infrastructure

DNR has mapped a network of ecologically important lands, comprised of hubs and linking corridors collectively called Green Infrastructure. Hubs contain one or more of the following:

- areas containing sensitive plant or animal species;
- large blocks of contiguous interior forest (at least 250 contiguous acres, plus the 300 foot transition zone);
- wetland complexes with at least 250 acres of unmodified wetlands;
- streams or rivers with aquatic species of concern, rare cold water or blackwater ecosystems, or important to anadromous fish, and their associated riparian forest and wetlands; and
- conservation areas already protected by public (primarily DNR or the federal government) and private organizations like The Nature Conservancy or Maryland Ornithological Society.

This Green Infrastructure provides the bulk of the state's natural support system and ecosystem services, such as cleaning the air, filtering and cooling water, storing and cycling nutrients, conserving and generating soils, pollinating crops and other plants, regulating climate,

protecting areas against storm and flood damage, and maintaining hydrologic function. For more information on the Green Infrastructure identification project in Maryland, see www.dnr.maryland.gov/greenways/

Protection of Green Infrastructure lands may be addressed through various existing programs including Rural Legacy, Program Open Space, conservation easements and others. Within Program Open Space, the Green Print program helps to target funds to protect Green Infrastructure areas.

Map 8 Green Infrastructure shows that there is a significant amount of Green Infrastructure in the Corsica River watershed:
– Four Green Infrastructure hubs are identified in the Corsica River watershed.
– Only a small portion of one hub has some form of environmental resource protection.

2. Large Forest Blocks

Large blocks of forest provide habitat for species that are specialized for conditions with relatively little influence by species from open areas or humans. For example, forest interior dwelling birds require forest interior habitat for their survival and they cannot tolerate much human presence. Map 9 Forest Interior shows blocks of contiguous forest that are at least 50 acres in size with at least 10 acres of forest interior (forest edge is at least 300 feet away) that may be important locally within the Corsica River Watershed. This size threshold was chosen to help ensure that the forest interior is probably large enough to provide locally significant habitat for sensitive forest interior dwelling species. The assessment shown in Map 9 differs from the Green Infrastructure assessment which considered only large blocks of forest land cover at least 250 acres in size that are likely to have state or regional importance.

Protected Lands

Map 10 Protected Land shows the distribution of protected lands in the Corsica River watershed. As used in the context of watershed restoration, "protected land" includes any land with some form of long term limitation on conversion to urban / developed land use. This protection may be in various forms: public ownership for natural resource or low impact recreational intent, private ownership where another party acquired the development rights or otherwise acquired the right to limit use through the purchase of an easement, and other approaches. The extent of "protection" varies greatly from one circumstance to the next. Therefore, for some protected land, it may be necessary to explore the details of land protection parcel by parcel through the local land records office to determine the true extent of protection.

Protected Land Summary
Corsica River Watershed

	Acres	%
MET / ESLC Easements	810	3
Agricultural Easements	909	4
County Parks, Open Space	239	1
Protected Land Total	**1,958**	**8**
Watershed Land Total	23,903	100

The map also shows some land in the watershed is within a Rural Legacy Area. This land encompasses 564 acres or about 2% of the watershed. The Rural Legacy Area designation has the potential to target Program Open Space funds to help protect additional land from development. Some of this land is already protected by easement and/or by County ownership. The land shown on the map that is not currently under easement or County ownership is open to land use change consistent with local zoning and comprehensive plan requirements.

An additional area of land identified on the map is encompassed by the Priority Funding Area. Within these areas, State funding is more likely to be available in support of local development projects. This area closes about 1,441 acres which is about 6% of the watershed. These areas are one of several ways to anticipate where new development or redevelopment is likely to occur.

For purposes of watershed restoration, a knowledge of existing protected lands and likely areas for new development can provide a starting point in prioritizing potential restoration activities. In some cases, protected lands may provide opportunities for restoration projects because owners of these lands may value natural resource protection or enhancement goals.