

Forest and Wetlands Important for Protecting Water Quality and Watershed Integrity

Background:

The objective of the analysis is to identify forests and wetlands important in protecting water quality and sustaining watershed integrity. This “watershed value” is based on physical and biological functions that store precipitation, retain and assimilate nutrients, moderate runoff, protect soils and maintain important critical landscape functions such as those of riparian buffers. These functions, when present, serve to protect water quality. It is well accepted that forests and wetlands are the best land cover for sustaining the integrity of watershed functions and in providing high quality water; therefore the analysis attempts to identify a nexus between a forest or wetland and the parameters that enable these lands to sustain watershed functions. Additionally, it attempts to place a value on wetlands or forests that if lost, would have significant potential to degrade watershed integrity/water quality.

Data Layers:

Local parameters (scored for each 36.73 meter pixel):

- Proximity to water
- Soil Erodibility
- Slope
- Wetland function
- Net primary productivity
- Forest Fragmentation patch size
- Hydrogeomorphic regions
- Floodplains

Regional Parameters (Summarized by HUC-11 and scored for each 36.73 meter in the watershed):

- Stream density
- Percent of watershed forested
- Percent of imperviousness
- Water quality
- Drinking water supply

Methodology:

Data was collected for each parameter and an Arc-Info grid raster layer was created and rescaled to 36.73-meter resolution and clipped to represent the Chesapeake Bay watershed. Then each parameter was classified into ranges based on its influence on watershed integrity/water quality and assigned a score (0-4). The parameters were also assigned a weight to emphasize those parameters with greater influence on water quality/watershed integrity. For each individual parameter, the weight was multiplied by the score and a number was assigned to each grid cell. Finally, the corresponding numbers for each grid cell were summed in order to score forests and wetlands for their importance or value in protecting watershed integrity/water quality.

Parameters used in to identify the important lands for protecting water quality, along with the rank assigned to the value range and the weight assigned to the parameter.

Resource Lands Assessment Topic:
Identification and prioritization of areas important to water quality areas for the Resource Lands Assessment
 (Forest and Wetlands)

Conservation Priority Index			Ranking of value ranges				
Parameter	Data Source	Scale	4	3	2	1	Weight
Bio-Physical Parameters (local)							
Proximity to water	USGS NHD	1:100K	0 - 90 m	90 - 180 m	180 - 270 m	> 270 m	5
Erodible Soils	STATSGO (kfact)	1:250K	≥ .30 (High)	.2 - .3 (Moderate)	< .2 (None to Slight)		2
Net Primary Productivity	USFS	1 km	4	3	2	1	3
Slope	DEM	1:100K	≥ 15%	15 - 10%	5-10%	< 5%	3
Functional Parameters (local)							
Wetland Function ^a (wetlands only)	NWI - cumulative score of water-related functions	1:100K	score ≥ 3.5	score = 3.0	score < 3.0		5
Forest Fragmentation - Patch Size (HA)	CBP	1:100K	> 1000	400 - 1000	100 - 400	<100	2
FEMA 100 year flood plain	FEMA		Yes				2
Hydrogeomorphic Region	USGS HGMR	1:250K	CPU, PCA, VRS	PCR, BR, APC	CPD, ML, VRC, APS	CPL	2
Regional Watershed Parameters							
Stream Density- meters/sqkm	NHD	1:100K	> 1.042	0.77 - 1.042	0.524 - 0.769	0 - 0.523	4
% Forested	MRLC 1997	1:100K	40 - 65%	30 - 40; 65 - 75%	15 - 30; 75 - 85%	< 15; > 85%	3
% Impervious Surface	MRLC 1997	1:100K	5 to 15%	< 5%	15 to 25%	> 25%	2
Water Quality	Sparrow/DU	1:100K	Good	Fair	Very Good	Poor	5
Municipal Surface Water Supplies	USGS - pop. Served/ # of intakes	1:100K	High/High, High/Med, Med/High, Low/High, High/Low	Med/Med	Med/Low, Low/Med	Low/Low	4