Virginia ConservationVision Watershed Model

Landscape planning and prioritization
for water quality and watershed integrity

Kirsten R. Hazler
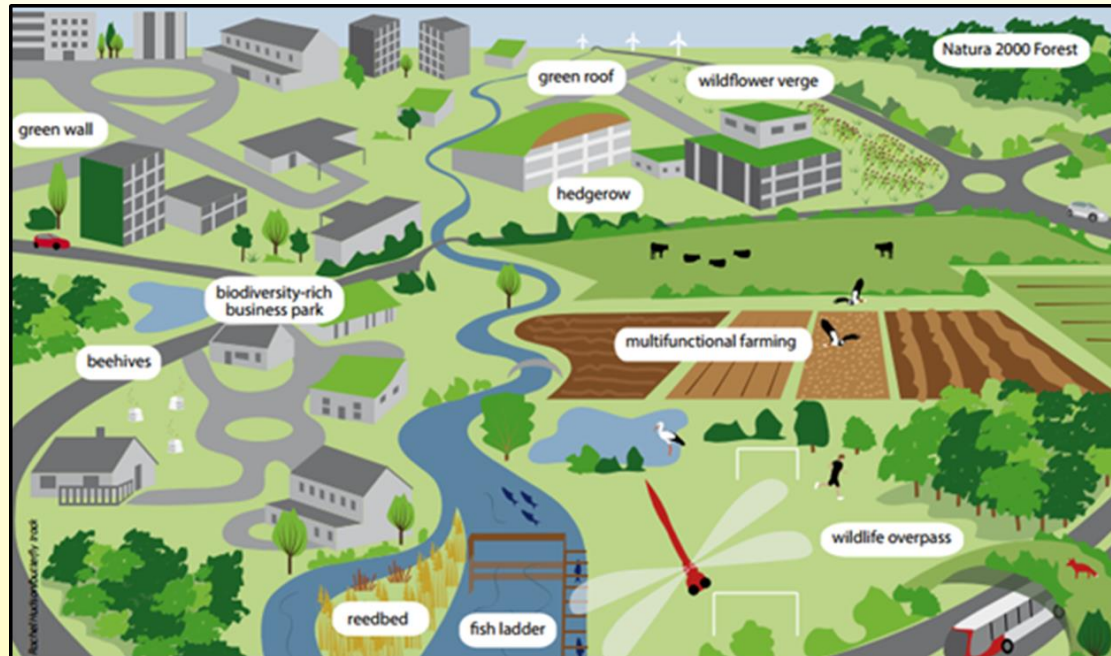Virginia DCR - Natural Heritage Program

Virginia ConservationVision

- Suite of models and maps for guiding **strategic** conservation decisions

- Borrows concepts and methodology from, but not identical to, the **Chesapeake Bay Program Resource Lands Assessment**

- Applies a "Green infrastructure" perspective

- Intended for use by:

  - state and local governments

  - planning districts

  - environmental consultants

  - land trusts

  - anyone involved in land use planning and conservation

GREEN INFRASTRUCTURE is a **strategically planned and managed network** of **wilderness, parks, greenways, conservation easements, and working lands** with conservation value that supports **native species**, maintains **natural ecological processes**, sustains **air and water resources**, and contributes to the **health and quality of life** for ~~America's*~~ communities and people.

- Benedict & McMahon 2006

Image source: biodiversity.europa.eu/topics/green-infrastructure

green wall

green roof

wildflower verge

Natura 2000 Forest

hedgerow

biodiversity-rich business park

beehives

multifunctional farming

wildlife overpass

reedbed

fish ladder

* It's not just
For Americans!
-KRH

Virginia ConservationVision

- Recreation
- Cultural
- Forest Economics
- Agricultural
- Development Vulnerability
- Watershed
- Natural Landscape Assessment (habitat hubs and corridors)
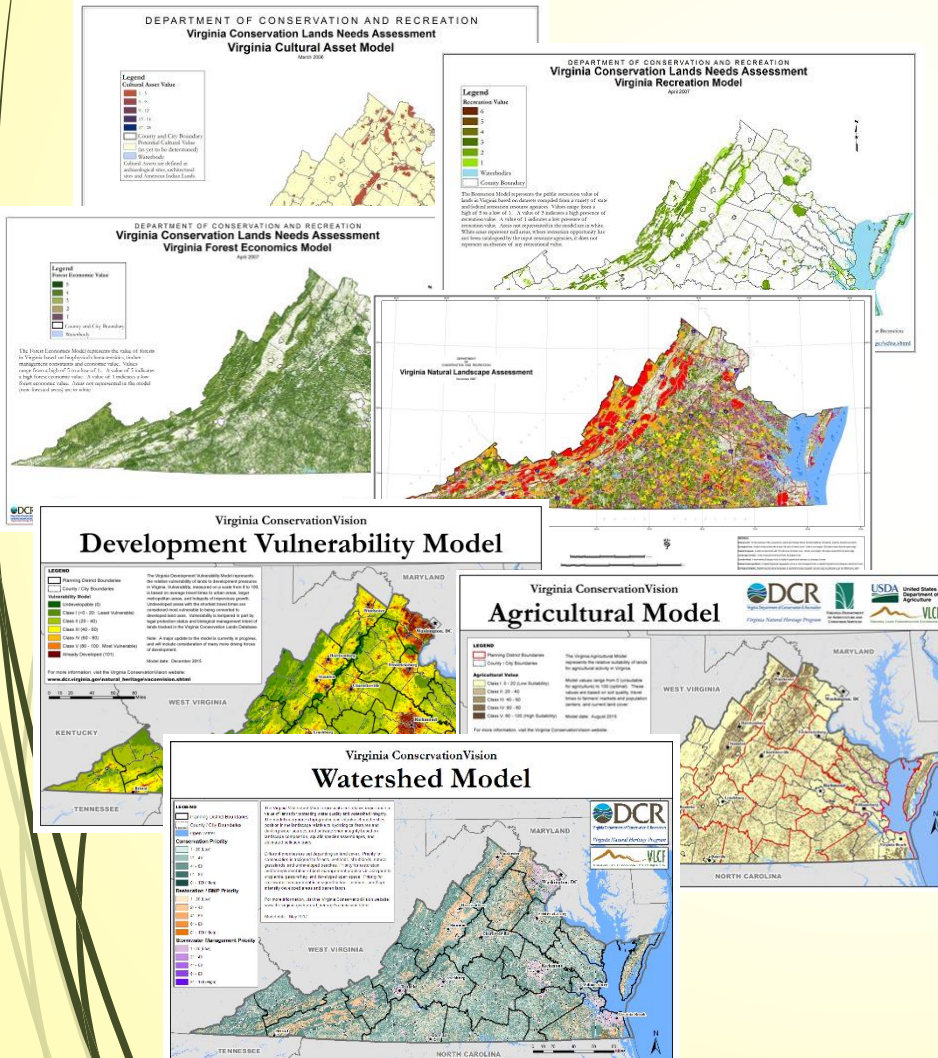
View online:
Natural Heritage Data Explorer

ConservationVision Watershed Model

Purpose: establish geographic priorities for maintaining or improving **water quality** and **watershed integrity**
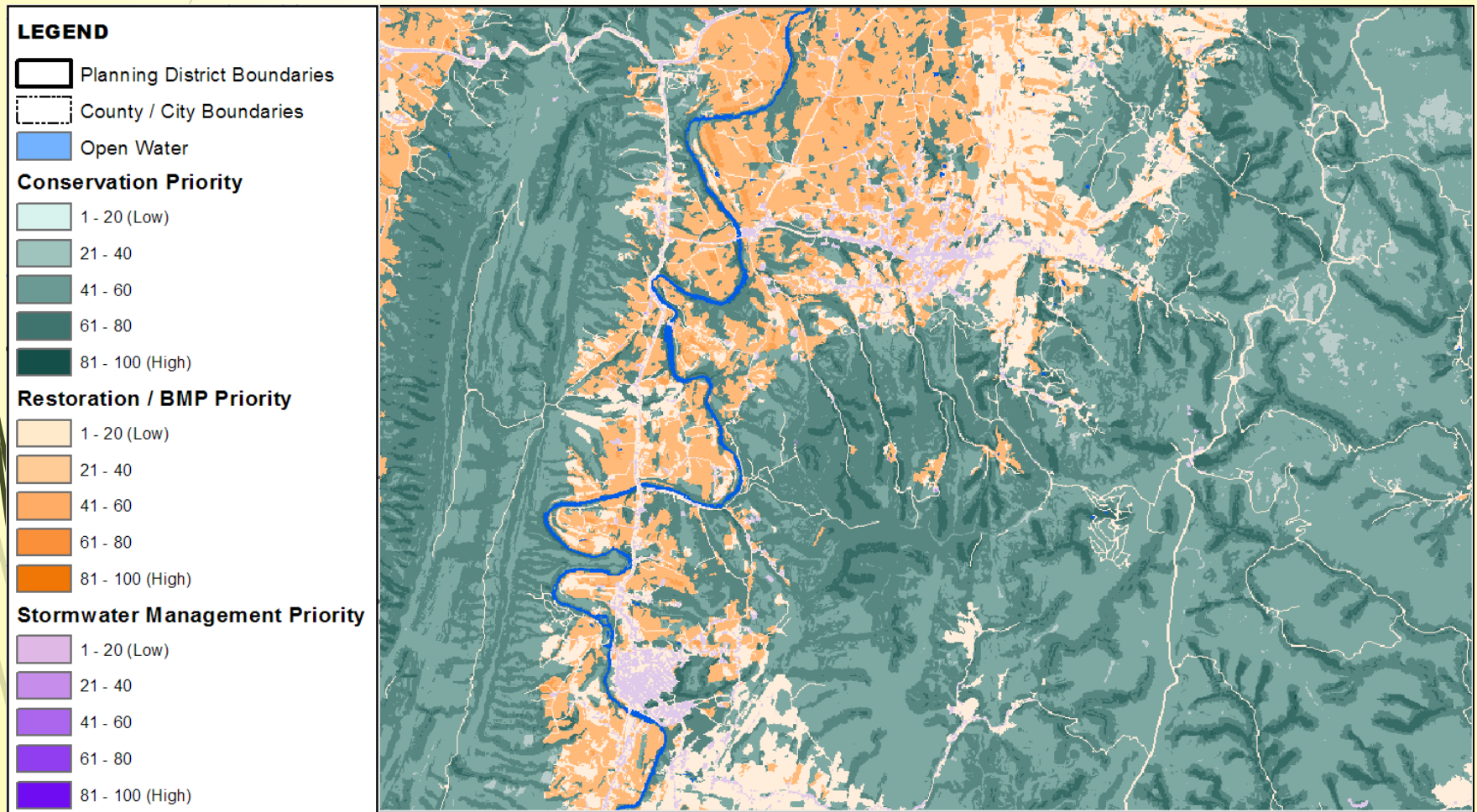
- Where should we focus on **conserving** existing land cover?

- Where should we focus on **restoration** and/or implementation of Best Management Practices (BMPs)?

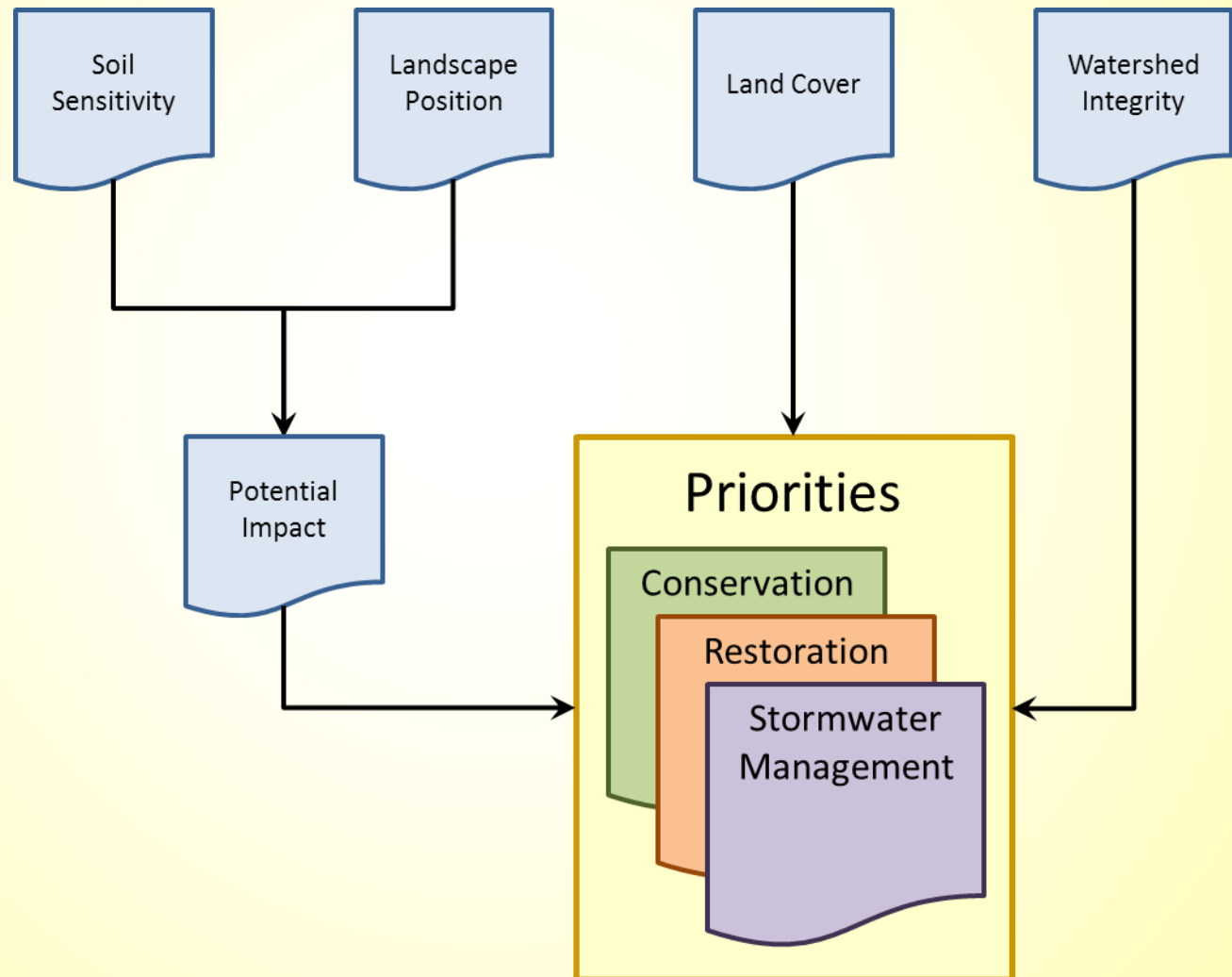- Where should we focus on **stormwater management**?

Key reference:

- **A screening model described by Barten & Ernst (2004)**

Watershed Model: 3 for 1

- Quantifies the relative priorities for **land conservation**, **restoration/BMPs**, or **stormwater management**

LEGEND

☐	Planning District Boundaries
☐	County / City Boundaries
☐	Open Water

Conservation Priority

	1 - 20 (Low)
	21 - 40
	41 - 60
	61 - 80
	81 - 100 (High)

Restoration / BMP Priority

	1 - 20 (Low)
	21 - 40
	41 - 60
	61 - 80
	81 - 100 (High)

Stormwater Management Priority

	1 - 20 (Low)
	21 - 40
	41 - 60
	61 - 80
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Watershed Model Overview

Priorities by Land Cover

Conservation Weights		Restoration / BMP Weights		Stormwater Mgmt. Weights	
Unconsolidated Shore	1.00	Developed, Open Space	0.17	Developed, Low Intensity	0.20
Deciduous Forest	1.00	Pasture / Hay	0.51	Developed, Med. Intensity	0.34
Evergreen Forest	1.00	Cultivated Crops	1.00	Developed, High Intensity	1.00
Mixed Forest	1.00			Barren Land	0.95
Scrub / Shrub	1.00				
Grassland / Herbaceous	0.50				
Woody Wetlands	1.00				
Emergent Herbaceous Wetlands	1.00				

Appendix A: Default Pollutant Coefficients

C-CAP Value	C-CAP Land Cover Class	Total Phosphorus (mg/L)	Total Nitrogen (mg/L)	Total Suspended Solids (mg/L)
2	High-Intensity Developed	0.47	2.22	71.00
3	Medium-Intensity Developed	0.30	2.29	27.00
4	Low-Intensity Developed	0.18	1.77	19.10
5	Developed Open Space	0.05	1.25	11.10
6	Cultivated Land	0.42	2.68	107.00
7	Pasture/Hay	0.48	2.48	55.30

OpenNSPECT

Priorities by Watershed Integrity

Conservation
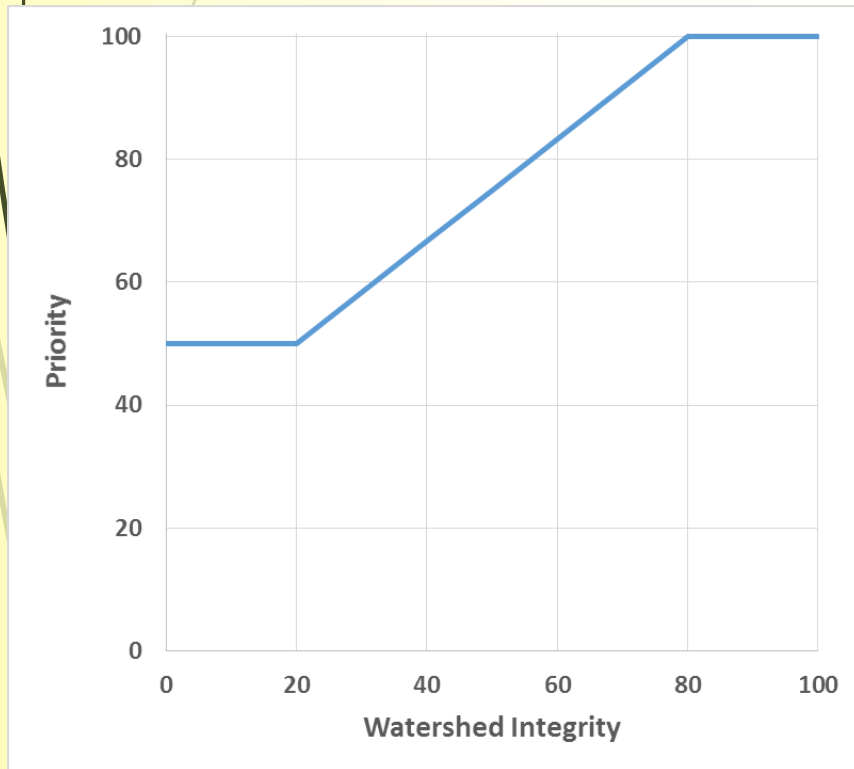
Restoration or Stormwater Management
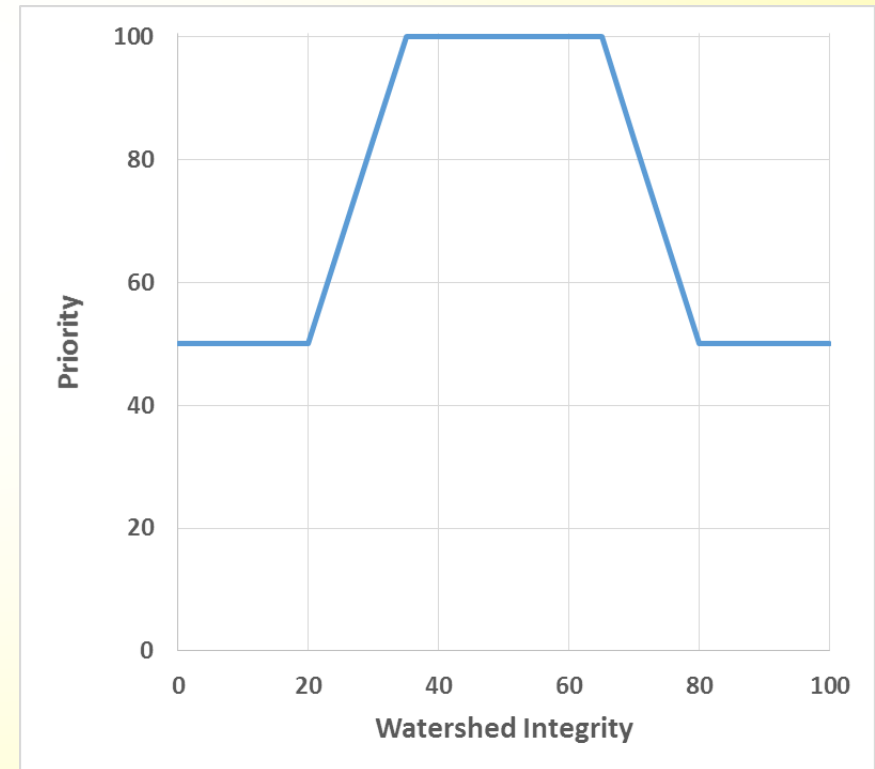
Watershed Integrity

Watershed Integrity Score

- Biological Indicator: mIBI
- Landscape: Imperviousness
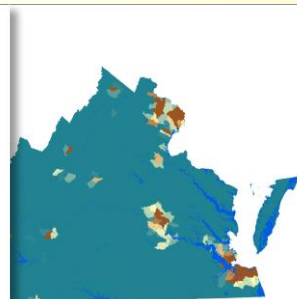- Landscape: Forest + Wetlands
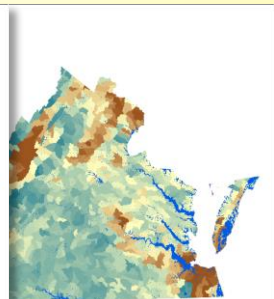- Pollution Loads
  - Nitrogen
  - Phosphorus
  - Sediment
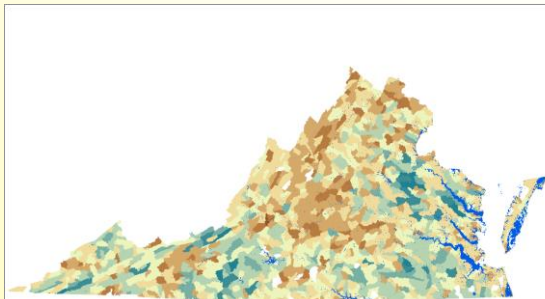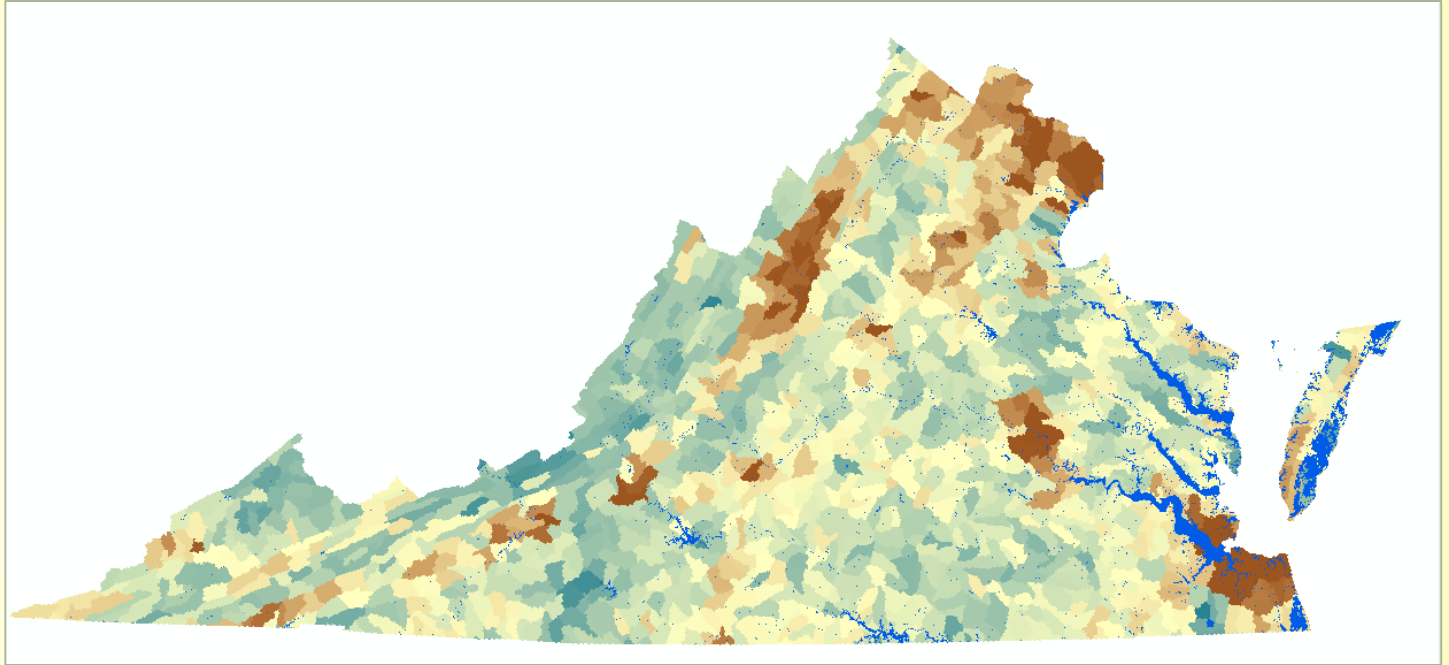
Biotic Score
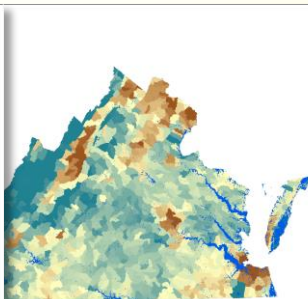
Forest/Wetland Score

Impervious Score

Pollution Score

Watershed Integrity Data Sources

- Virginia Commonwealth University: INSTAR
  - Modified Index of Biotic Integrity (mIBI)
- Multi-Resolution Land Characteristics Consortium: National Land Cover Database
  - 2011 Land Cover
  - 2011 Percent Imperviousness
- DCR – Division of Soil and Water Conservation: NPS Pollution Assessment and Prioritization
  - Estimated pollution loads (2016)
    - Nitrogen
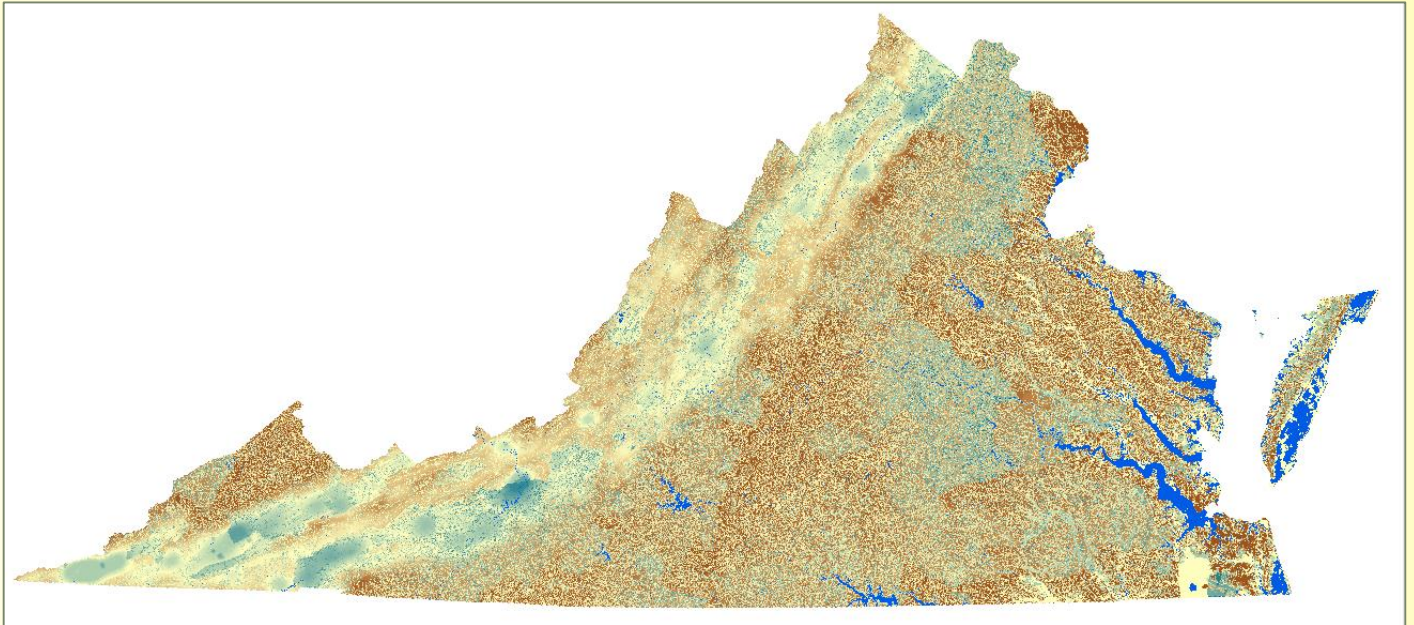   - Phosphorus
    - Sediment

Soil Sensitivity

Soil Sensitivity Score
- Slope
- Soil Erodibility (K-factor)
- Runoff Potential (Drainage Class)
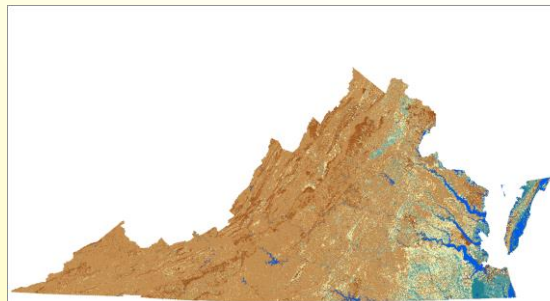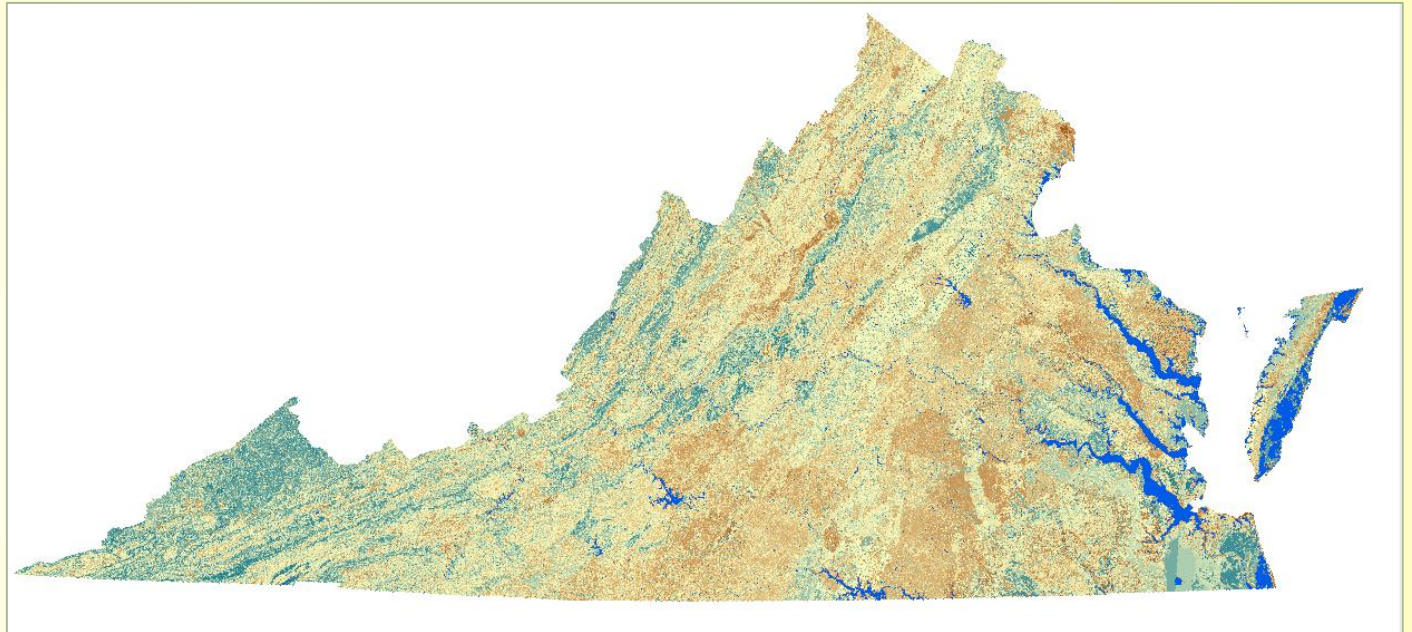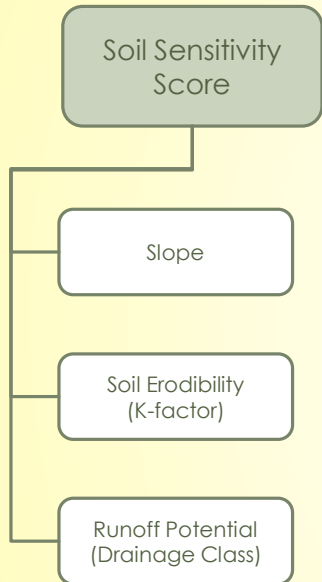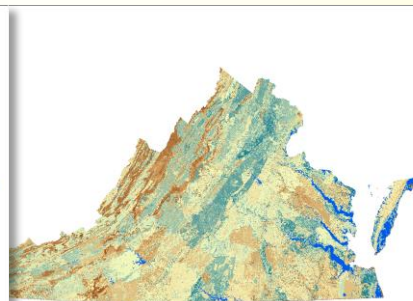
Runoff Score

Erosion Score
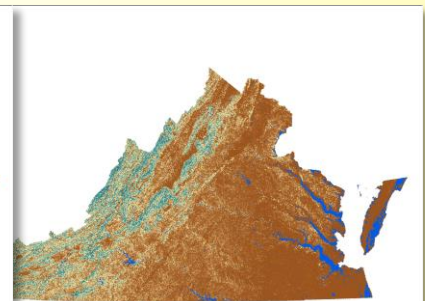
Slope Score

Soil Sensitivity Data Sources

- [USGS: National Elevation Dataset](#)
  - Slope derived from NED

- [Natural Resources Conservation Service: gSSURGO](#)
  - Soil Erodibility (K-factor)
  - Soil Runoff Potential (Drainage Class)

Landscape Position

Landscape Position Score

Hydrological Zones

Flow Distance and Headwaters

Karst / Sinkholes

Drinking Water Zones

Ground Water Sources

Surface Water Sources
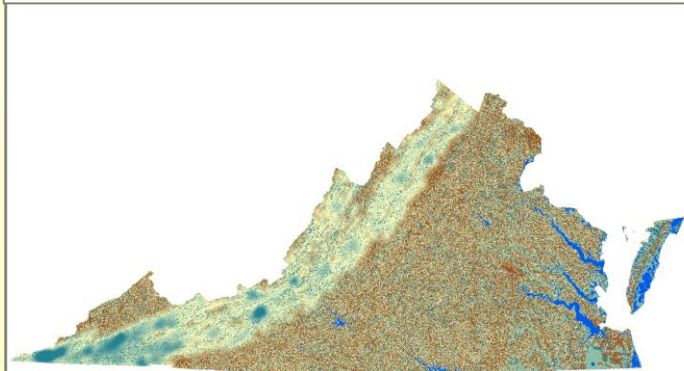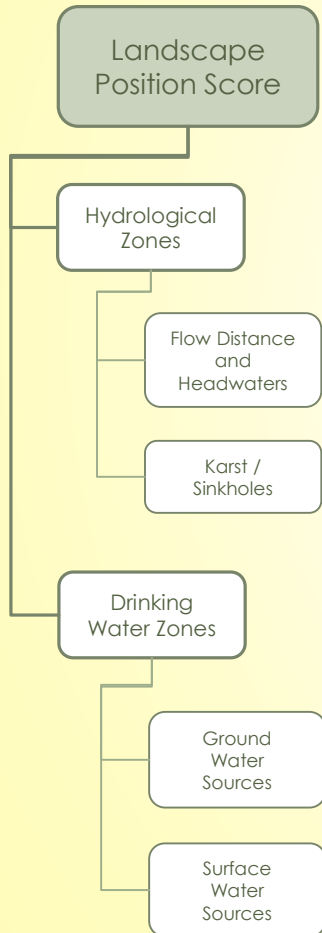
Hydrological Zone Score
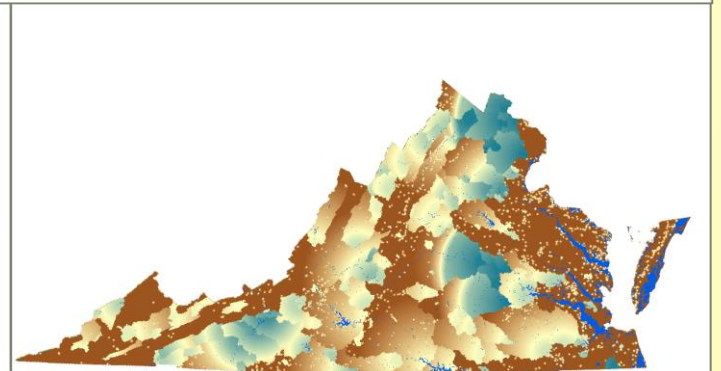
Drinking Water Score

Landscape Position
Data Sources

- [Virginia Dept. of Mines, Minerals, and Energy](#)
  - Sinkholes (karst)
- [Horizon Systems Corp / National Hydrography Dataset](#)
  - Headwater catchments
  - Hydrography (water, wetlands)
- [Virginia Dept. of Health – Office of Drinking Water](#)
  - Groundwater sources
  - Surface water sources
  - Catchments for surface water sources

Virginia ConservationVision
Watershed Model

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▢ County / City Boundaries
▢ Open Water

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The Virginia Watershed Model represents the relative importance or value of lands for protecting water quality and watershed integrity. The model incorporates topographic and edaphic characteristics, position in the landscape relative to hydrological features and drinking water sources, and subwatershed integrity based on landscape composition, aquatic species assemblages, and estimated pollution loads.

Different priorities are set depending on land cover. Priority for conservation is assigned to forests, wetlands, shrublands, natural grasslands, and undeveloped beaches. Priority for restoration and/or implementation of best management practices is assigned to croplands, pasture/hay, and developed open space. Priority for stormwater management is assigned to low-, medium-, and high-intensity developed areas and barren lands.

For more information, visit the Virginia ConservationVision website: www.dcr.virginia.gov\natural_heritage\vaconvision.shtml

Model date: May 2017

DCR
Virginia Department of Conservation & Recreation
Virginia Natural Heritage Program

VLCF
VIRGINIA LAND CONSERVATION FOUNDATION

MARYLAND
WEST VIRGINIA
TENNESSEE
NORTH CAROLINA

Winchester
Washington, DC
Harrisonburg
Fredericksburg
Staunton
Charlottesville
Lynchburg
Richmond
Roanoke
Williamsburg
Bristol
Danville
Virginia Beach

0 10 20 40 60 80 Miles

N