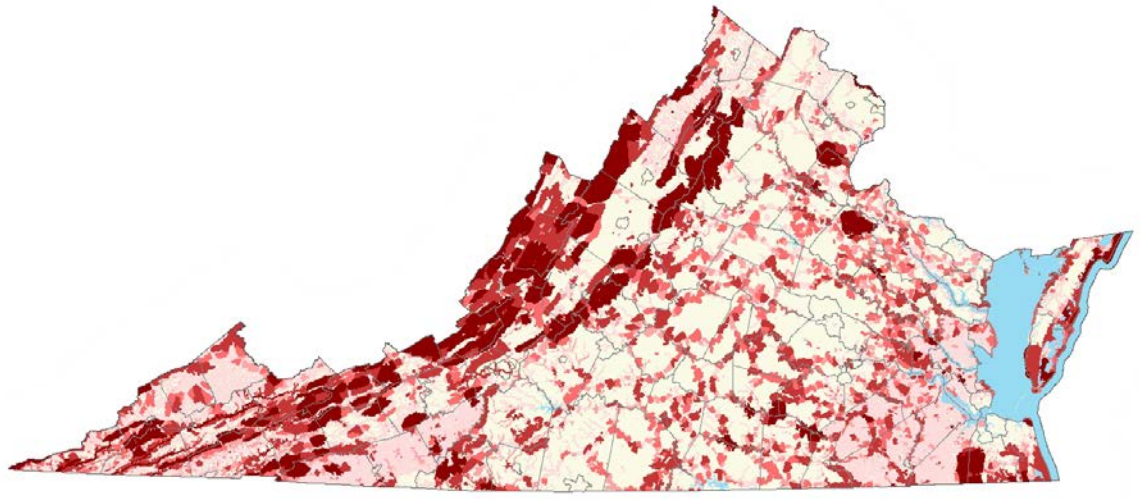
Commonwealth of Virginia

Virginia Biodiversity Assessment

Lands with Known and Predicted Biodiversity



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Division of Natural Heritage
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DCR
Department of Conservation & Recreation
CONSERVING VIRGINIA'S NATURAL & RECREATIONAL RESOURCES
Virginia Natural Heritage Program

Virginia Coastal Zone
MANAGEMENT PROGRAM

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Introduction

Many of our rarest species and exemplary natural communities have no regulatory protection through federal or state endangered species regulations. Two hundred and fifty nine of Virginia's 333 most rare (i.e. critically imperiled worldwide) occurrences are not listed on either federal or state threatened and endangered lists. For the Virginia Coastal Zone Management Area (VCZMA), 48 of the 57 rarest occurrences are not listed. The Virginia Biodiversity Assessment (VBA) is intended to provide a means by which to identify the most important lands necessary to conserve our most critically rare species and exemplary natural communities.

The Virginia Natural Heritage Program (VNHP) in the Department of Conservation and Recreation has identified ecologically important lands through its Conservation Sites Layer (CSL), its Priority Conservation Sites (PCS) analysis, and its Virginia Natural Landscape Assessment (VaNLA). In addition to these VNHP products, the Virginia Department of Game and Inland Fisheries (VDGIF) completed a Wildlife Action Plan (WAP) that predicts essential habitats of species of greatest conservation need. The VBA analyzed and combined primary features of the CSL, VaNLA, and WAP to create the most comprehensive synthesis of known and predicted biodiversity information for Virginia. The Priority Conservation Sites product, which resulted from a previous Virginia Coastal Program (VCP) grant (FY2006 Task 93.03, NOAA Grant #NA06NOS4190241) and is only available to conservation partners through license agreement, is a complimentary product, based only on known occurrences of rare species and natural communities, that identifies lands where stronger protection will benefit Virginia's known biodiversity. The VBA and PCS together represent the best available information on biodiversity in Virginia and are valuable tools for conservation that can help steer development away from the most ecologically important sites, inform proper land management, and assist development of reserve networks. In addition to funding from the VCP, funding for the portion of the state outside of the VCZMA was secured from the Virginia Land Conservation Foundation and NatureServe, as this product will be featured on LandScope Virginia (http://www.landscope.org/virginia/).

Methods

The WAP identified 925 species of greatest conservation need and focused on the habitats that support these species. Species were classified into tiers according to how urgently conservation action was needed (Table 1). For the VBA, VDGIF provided a summary grid, with a cell size of 100 meters, of predicted essential habitats for species in tiers I and II, plus listed species from tiers III and IV.

Table 1. Tier descriptions from the Wildlife Action Plan.

Tier	Conservation Need	Definition
I	Critical	faces extremely high risk of extinction or extirpation
II	Very High	has a high risk of extinction or extirpation
III	High	extinction or extirpation is possible
IV	Moderate	rare in parts of range, particularly on the periphery

The summary layer was created by multiplying the tier II plus listed species layer by 0.5, adding it to the tier I layer, and then classifying the results into five classes, with class 5 being the highest. VNHP reprojected this grid to Virginia Lambert and converted the background values to zero in preparation for the VBA analysis.

The VaNLA identifies ecological cores and corridors that have high integrity, as determined by the size, diversity, and context of the habitats they contain and the ecosystem services these natural lands provide. The Natural Land Network (NLN), a grid with a cell size of 30 meters, was a product of the VaNLA used for the VBA. This network contains all ecological cores in the two highest categories, outstanding and very high ecological integrity, as well as all the landscape corridors that connect them and all corridor nodes. The ecological integrity values of cores and nodes were reassigned such that outstanding cores had a value of 5 and the lowest ranked cores and nodes had a value of 1. Landscape corridors were assigned to the lowest value (i.e. 1) and the background was converted to a value of zero.

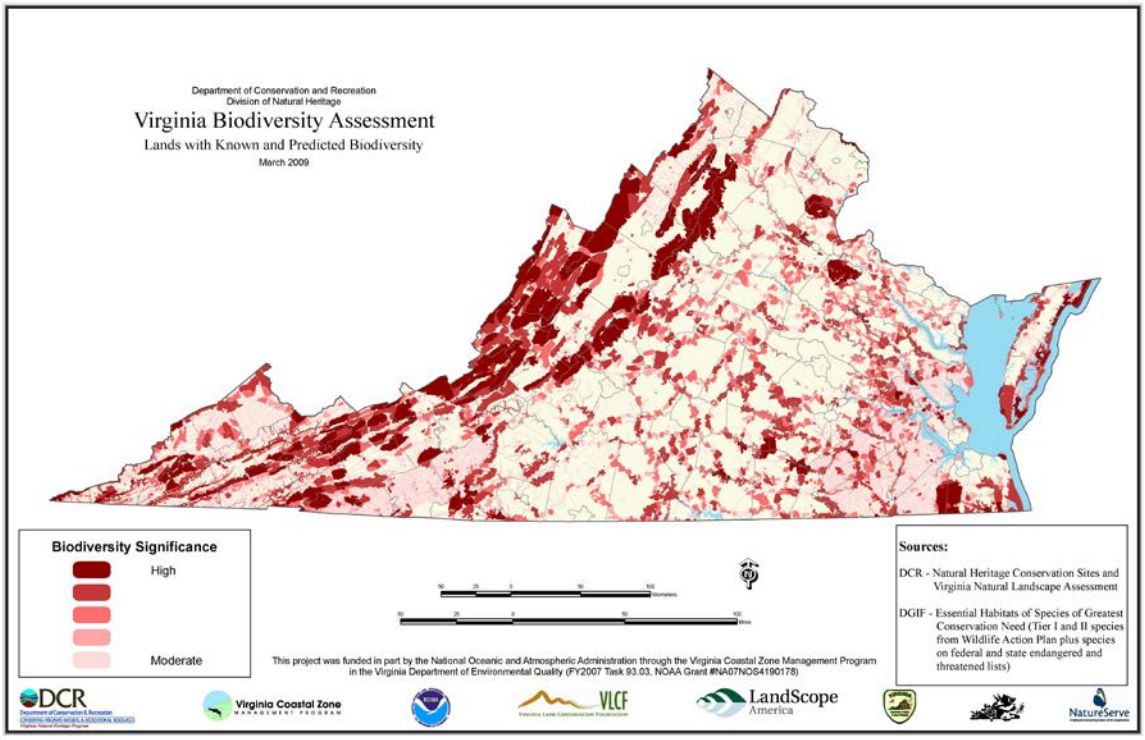
The CSL delineates known habitats of rare plants and animals, and exemplary natural communities, as well as buffers necessary to maintain these resources. Each site is assigned a biodiversity significance rank (b-rank) based upon the rarity, viability, and diversity of the resources it contains. Five shapefiles were created from the CSL, one for each b-rank. These layers were converted to grids that conformed to the extent and resolution of the NLN grid. The b-rank values were assigned such that the numbers 5 and 1 represented the highest and lowest classes, respectively. A Euclidean distance operation was performed to add three cells to the outside of each feature so that narrow aquatic features would not drop out during the analysis. A maximum operation was performed to combine the information in these five grids while ensuring the maximum value from overlapping cells would be assigned to the corresponding cell in the resulting grid. The background values of this grid were converted to zero.

The WAP summary, NLN, and CSL grids were combined using a maximum operation to ensure the maximum value from overlapping cells would be assigned to the corresponding cell in the resulting grid. The analysis was conducted at the resolution of the WAP summary grid, thus the resulting grid had 100-meter cells. A series of 5 smoothing operations using a majority filter were performed on the interim product to remove isolated cells and to further distort the boundaries of known sensitive species habitats. The grid was converted to a polygonal layer with biodiversity significance ranks from moderate to high.

Results

The main result of this analysis is a shapefile showing lands important for biodiversity, ranked from moderate to high significance (Figure 1).

Figure 1. The Virginia Biodiversity Assessment, showing lands ranked from moderate to high biodiversity significance.



Discussion

The VBA layer, resulting from collaboration between VDGIF and VNHP, is a synthesis of three ecological products and represents the most comprehensive synthesis of biodiversity information for Virginia. It marries coarse-filter and fine-filter products in an effort to maximize capture of biological diversity. A coarse filter is designed to conserve a high percentage of species by conserving adequate diversity, distribution, and abundance of vegetation communities, physical environments, and landscape-level ecological phenomena. The NLN of the VaNLA serves as the coarse filter for the VBA. Fine filters focus on habitats of individual rare or specialized species and are intended to compliment coarse filters. The known habitats of the CSL and the predicted habitats of the WAP were the fine filters used for the VBA.

The VBA, a publicly available product, ranks lands by biodiversity significance from moderate to high. This prioritization can be used for local planning to steer development away from the most biologically diverse areas. The VBA can more powerfully inform proper land management and assist development of reserve networks when used in conjunction with the PCS layer, which ranks the level of need for biodiversity conservation from moderate to critical in specific areas. Use of the PCS layer requires a license agreement with VNHP.

Coastal GEMS Fact Sheet

Virginia Biodiversity Assessment

1) Data Layer name

Virginia Biodiversity Assessment

2) Source agency and program

Virginia Department of Conservation and Recreation, Division of Natural Heritage

3) Logo of organization(s) responsible for the data layer

DCR
Department of Conservation & Recreation
CONSERVING VIRGINIA'S NATURAL & RECREATIONAL RESOURCES
Virginia Natural Heritage Program

http://www.dcr.virginia.gov/

4) What this data layer represents

This layer is a summary of lands with known and predicted biodiversity.

5) Location

a) What geographic area(s) are covered by this data layer?

Commonwealth of Virginia

b) Map scale (at which data were compiled)

1:24000

6) Description

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(CSL), its Priority Conservation Sites (PCS) analysis, and its Virginia Natural Landscape Assessment (VaNLA). In addition to these VNHP products, the Virginia Department of Game and Inland Fisheries (VDGIF) completed a Wildlife Action Plan (WAP) that predicts essential habitats of species of greatest conservation need. The VBA analyzed and combined primary features of the CSL, VaNLA, and WAP to create the most comprehensive synthesis of known and predicted biodiversity information for Virginia. The final product of this collaboration between VDGIF and VNHP is a GIS layer (ESRI shapefile) showing lands important for biodiversity, ranked from moderate to high significance.

The Priority Conservation Sites product, which resulted from a previous Virginia Coastal Program (VCP) grant (FY2006 Task 93.03, NOAA Grant #NA06NOS4190241) and is only available to conservation partners through license agreement, is a complimentary product, based only on known occurrences of rare species and natural communities, that identifies lands where stronger protection will benefit Virginia's known biodiversity. The VBA and PCS together represent the best available information on biodiversity in Virginia and are valuable tools for conservation that can help steer development away from the most ecologically important sites, inform proper land management, and assist development of reserve networks.

In addition to funding from the VCP, funding for the portion of the state outside of the VCZMA was secured from the Virginia Land Conservation Foundation and NatureServe, as this product will be featured on LandScope Virginia.

7) How you might make use of this data layer

These maps are NOT appropriate for project specific environmental review or for on-site surveys required for environmental assessment of specific project areas. These tools are altogether inadequate for assessing impacts of human-induced changes to habitat on associated species. VBA products will be appropriate for use at local and state levels to steer development away from the most ecologically important sites, to inform proper land management, and to assist development of reserve networks.

8) How to get the data layer

The layer is available for viewing on Landscope Virginia (http://www.landscope.org/virginia/) and Coastal GEMS (http://www.deq.virginia.gov/coastal/coastalgems.html).

9) How to get more information

Visit the Virginia Natural Heritage Program website at http://www.dcr.virginia.gov/dnh.

10) Sample map