
# A Chesapeake Conservation Atlas

## Version 1.1

**March 2018**

Chesapeake
CONSERVATION PARTNERSHIP

# Chesapeake Conservation Partnership

The partnership is a coalition of diverse organizations and agencies engaged in land conservation and related fields within the Chesapeake Bay watershed. The partnership fosters collaborative action to conserve culturally and ecologically important landscapes to benefit people, economies, and nature throughout the six-state watershed. The partnership's Steering Committee includes:

Brenda Barrett, Living Landscape Observer
Matt Strickler/Ann Jennings, Virginia Office of the Governor
Jennifer Miller Herzog, Land Trust Alliance
Cindy Dunn/Lauren Imgrund, PA DCNR
John Reynolds, John Smith Trail Advisory Council
Joel Dunn, Chesapeake Conservancy
Sarah Fleming, Ducks Unlimited
John Griffin, Chesapeake Conservation Partnership
Chuck Hunt, NPS Chesapeake Bay
Chris Miller, Piedmont Environmental Council
Steve Adkins, Chickahominy Tribe
Ann Swanson, Chesapeake Bay Commission
Mark Belton, Maryland DNR
Jim Edward, EPA
Renee Carey, North Central PA Conservancy
Mike Slattery, USFWS
Mark Platts, Susquehanna Heritage
Sharee Williamson, National Trust for Historic Preservation
Hedrick Belin, Potomac Conservancy
Joby Timm, US Forest Service

# Partnership Mapping Team

The maps and analyses included in this document are prepared by an inter-organizational team from within the Chesapeake Conservation Partnership, including:

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# Contents

This atlas provides descriptions and illustrations of conservation mapping prepared through the Chesapeake Conservation Partnership. Some of these materials have already been published through ***LandScope Chesapeake*** (www.landscope.org/chesapeake).

# Introduction

Over the past twenty-six  months the Chesapeake Conservation Partnership has undertaken a series of conservation mapping analyses. Here is a summary of that work and of the maps that follow.

***A Important Note on Iterative Map Development***

The partnership takes an iterative approach to its mapping. We recognize that mapping and analysis are continually improving as new data and technology become available. To move our work forward however, we use the best data available to produce reliable, useful mapped information at a particular time. As data improves or new information becomes available we produce the next generation of the maps and analysis. This is true for all of the maps in this document.

***Existing Protected Lands***

On a biennial basis, the partnership, through the support of the US Geological Survey and Chesapeake Bay Program, prepares an updated comprehensive map and dataset of existing protected lands in the Chesapeake watershed. The most recent version, completed in January 2017, is included here and published to LandScope Chesapeake (www.landscope.org/chesapeake/protected_areas/).

***Long-term Conservation Goals***

In 2016, the Chesapeake Conservation Partnership developed a series of long-term conservation goals for Farms, Forests, Habitat, Heritage and Human Health. These look further ahead than the 2 million acres by 2025 land protection goal established by the partnership in 2010 and adopted in the Chesapeake Bay Watershed Agreement in 2014.

At the October 2016 Annual Meeting, the partnership reviewed a draft set of maps (generation 1.0) reflecting the first comprehensive identification of the important lands and resources making up these long-term goals. These stimulated productive discussions on: (1) how this information might support developing a visionary conservation goal for the watershed; (2) how we begin to organize to increase funding sources to support conservation; and (3) how we communicate about these goals and our work among partners and various audiences.

Revised Conservation Goal Maps (generation 1.1) were prepared in early 2017 based on comments from Annual Meeting participants and mapping staff. Refinements included filling data gaps, improving cartography, and running some additional analyses. The partnership's Steering Committee reviewed these maps in March 2017 and they were published to LandScope Chesapeake (www.landscope.org/chesapeake). Current versions of these goal maps are shown on the Farms, Forests, Habitat, Heritage and Health sheets that follow.

***Influences***

Based on Annual Meeting comments, the mapping team worked throughout the second half of 2017 to map and analyze factors that might influence long-term conservation goals. These include potential threats--factors that might make it harder to achieve conservation goals-- such as development pressure, climate change, and energy infrastructure. Influences also include the existing capacity to implement conservation efforts, such as where land trust capacity is focused, where capacity for farmland conservation is concentrated, and where our conservation focal areas are located. These maps were presented at the Partnership's 2017 Annual Meeting, revised based on comments, and included in the second half of this atlas. They will be published to LandScope in spring 2018.

***Uses of these Maps***

These maps and analyses support conversations on:

- Framing a visionary conservation goal for the watershed
- Driving new resources for financing conservation
- Considering what kind of communication strategy is needed for supporting long-term conservation
- Exploring where and how to build capacity for supporting conservation in areas of urgency or opportunity.

# Chesapeake Bay Watershed Protected Lands

**Get the Map:** www.landscope.org/chesapeake/protected_areas/

The 2014 *Chesapeake Bay Watershed Agreement* set a 2025 goal of protecting an additional two million acres of lands throughout the watershed—currently identified as high-conservation priorities at the federal, state or local level—including 225,000 acres of wetlands and 695,000 acres of forest land of highest value for maintaining water quality. This sheet provides an update on the status of protected lands as of *January 2017*.

## What we map

Protected lands means lands permanently protected from development, whether by purchase or donation, through a perpetual conservation or open space easement or fee ownership for their cultural, historical, ecological, or agricultural value. This includes transfer of development rights and purchase of development rights programs.

Protected lands include: county, town, city, state and federal parks; designated open space and recreational land; publicly owned forests and wetlands; privately owned working farms or forests with conservation easements; historically important lands, such as protected battlefields, colonial towns and farms; military-owned parks and recreational areas.

Only authoritative data sources were used in compiling the 2015/16 dataset. This involved a data collection effort where relevant protected lands geospatial data was provided directly from the State agencies and jurisdictions.

In addition, the Protected Areas Database of the United States, (PAD_US) V. 1.4 was used to augment data provided from jurisdictions. This data includes Federal lands as well as National Conservation Easement data. Finally the 2013 Chesapeake Bay Protected lands dataset was used to assure that any parcels that were previously contained were carried over into the new 2015_16 dataset. Only 2015_16 Virginia provided data plus PAD_US V 1.4 Federally owned lands were used to compile the dataset for Virginia. All provided datasets were put in PAD_US format and merged into the new 2015_16dataset.

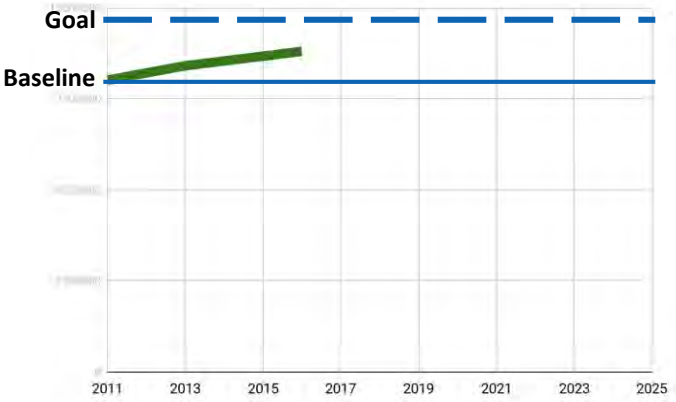
## Where we stand

Since the 2010 baseline established in the *Strategy for Protecting and Restoring the Chesapeake Bay Watershed*, 1,004,577 acres of protected lands have been recorded, or 50.2% of the 2 million acre goal. Cumulatively, 8,804,577 acres of land have been protected in the Chesapeake Bay watershed, including:

*Delaware* -- 107,845 acres (24% of DE land in watershed)
*District of Columbia* -- 11,081 acres of land (28% of DC)
*Maryland* -- 1,653,668 acres (28% of MD in the watershed)
*New York* -- 322,985 acres (8% of NY within the watershed)
*Pennsylvania* -- 3,392,021 acres (23% of PA in watershed)
*Virginia* -- 2,907,343 acres (21% of VA in the watershed)
*West Virginia* -- 409,635 acres (18% of WV in watershed)

Note: Improvements in reporting since 2010 have produced more comprehensive and accurate accounting of total land protection in the watershed. A portion of the 1,004,577 acres recorded since 2010 was likely protected before 2010, but the extent of this is not feasible to document. GIS datasets do not always record the date of protection for each parcel.

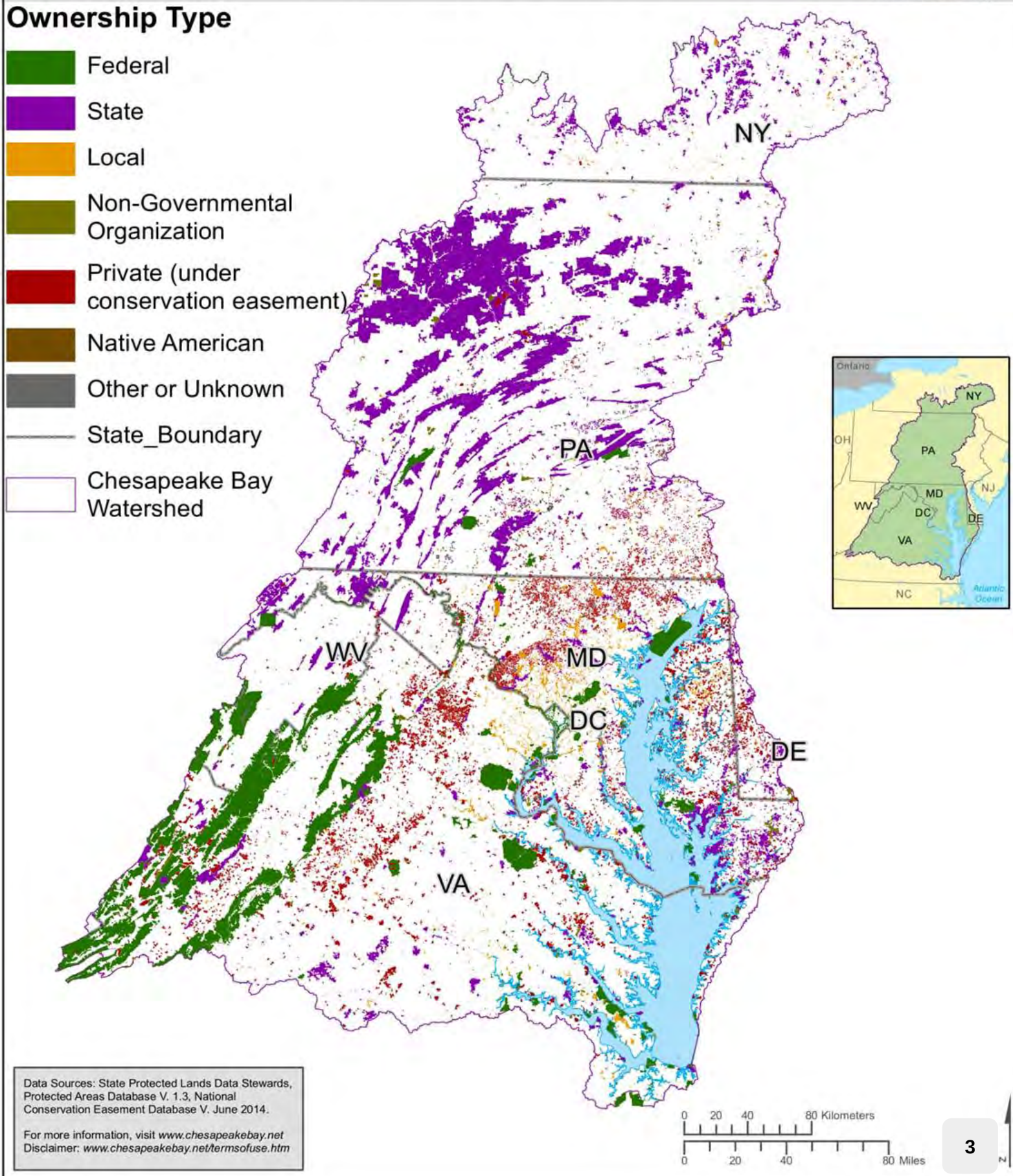
***Progress toward 2025 two million acre goal***




Chesapeake Bay Program

# Protected Lands in the Chesapeake Bay Watershed 2015_16

Chesapeake Bay Program
Science. Restoration. Partnership.




Data Sources: State Protected Lands Data Stewards, Protected Areas Database V. 1.3, National Conservation Easement Database V. June 2014.

For more information, visit *www.chesapeakebay.net*
Disclaimer: *www.chesapeakebay.net/termsofuse.htm*



Created by RLT, 3/2/17

UTM Zone 18N, NAD 83

# Long-term Conservation Goals

Photo: Chesapeake Bay Program

Over the long term, the Partnership works to achieve a series of conservation goals that support our vision: "*From Cooperstown to Virginia Beach, from Appalachian mountaintops to the home of the blue crab, a labyrinth of 180,000 miles of healthy small streams and great rivers feeds the Chesapeake Bay. Our vast watershed with its conserved farms, forests, fisheries, and open spaces sustains and refreshes millions of us today, as it did our ancestors, and will do for generations who follow.*"

Reaching this vision requires a long-term landscape conservation agenda for a vibrant, healthy and sustainable Chesapeake region. Our goals set out what is needed over the long term — principally in terms of our relationship with the land and all it includes. They recognize all is interconnected — a vibrant economy, strong communities, healthy people, working farms and forests, vital habitat for native wildlife, clean water, our shared heritage, recreation and quality of life. We treasure all these values, while we focus on select goals — not as disconnected parts, but as parts of the whole, inextricably linked. In fact, in many places on the land multiple values overlap, bringing those with diverse interests together to work toward their conservation.

Our goals are set out in the five categories listed below and described and illustrated over the following pages. We will continue to improve our mapping and analyses of these core values as we move forward. In particular, we envision mapping several other factors contributing to human health, such as public water supply.

**Farms**

**Forests**

**Habitat**

**Heritage**

**Human Health**

# Farms

**OUR GOAL: Protect the Chesapeake watershed's productive farms and prime farmland from conversion and secure space for urban farming to ensure permanent, sustainable 'close to home' sources of food for the region's population and to support the economic and cultural value of our working farms and farmers.**

**Get the Map:** www.landscope.org/chesapeake/Priorities/Farms/

Photo: Nicholas Tonelli

The productive land and prime agricultural soils of the Chesapeake watershed support a rich heritage of working farms. In fact, 6,923,975 acres (17%) of watershed land area are currently being actively used for agricultural purposes.

Many farms and related businesses have added economic and cultural value as well, orchards, vineyards, wineries and more. Yet many of our most valuable farm lands are often close to population centers and subject to intense development pressure. Farther away, other regions which supply the largest share of produce coming into the mid-Atlantic are beset by multi-year droughts and climate changes that may have far-reaching impacts. Conserving our region's farms and prime farmland for long-term food production and security is a priority.

## What we mapped

Our goal identifies three mappable resources: prime farmlands, productive farms and space for urban farming. This includes lands currently in agricultural production and land classified as highly suitable for farming, but which may not currently be farmed. Our data uses these definitions:

*Prime farmlands means:* (a) soils classed as prime by USDA Soil Survey Geographic database (SSURGO); and (b) farm lands identified as of statewide importance by SSURGO data. Some of these lands are not currently farmed.

*Productive farms means:* Lands currently in agricultural use as identified in USDA National Agricultural Statistics Service (NASS) Cropland Data Layer, excluding areas not farmed.

*Space for Urban Farming means:* To date, urban farming data is included for cities where it is available: Baltimore MD, Richmond VA and Washington DC. For these urban farming consists of plots known as "community gardens."

Data is grouped in three mapping units in this data layer:

*Prime/Farmland of Importance, Farmed:* This includes prime farmlands currently in agricultural use.

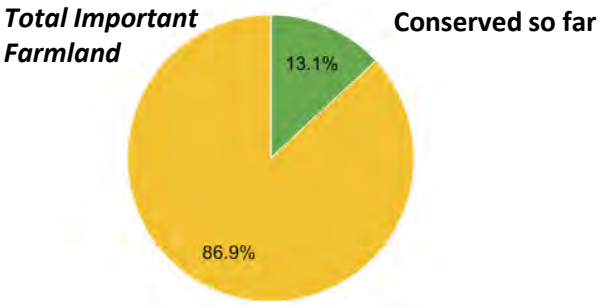
*Additional Farmed lands:* Includes other lands now in agriculture, but not classed prime, including urban farms.

*Prime/Farmland of Importance, not Farmed:* This includes prime farmland that is not currently in agricultural use.

## Where we stand

Analysis identifies 20,582,542 acres of important farmland for conservation, about 50% of the watershed. Of the 13,658,567 acres of important farmland not in production, most (94%) is currently covered by either forest, shrubs or herbaceous vegetation. 2,700,709 acres (13.1%) of farm land important for conservation is permanently protected.

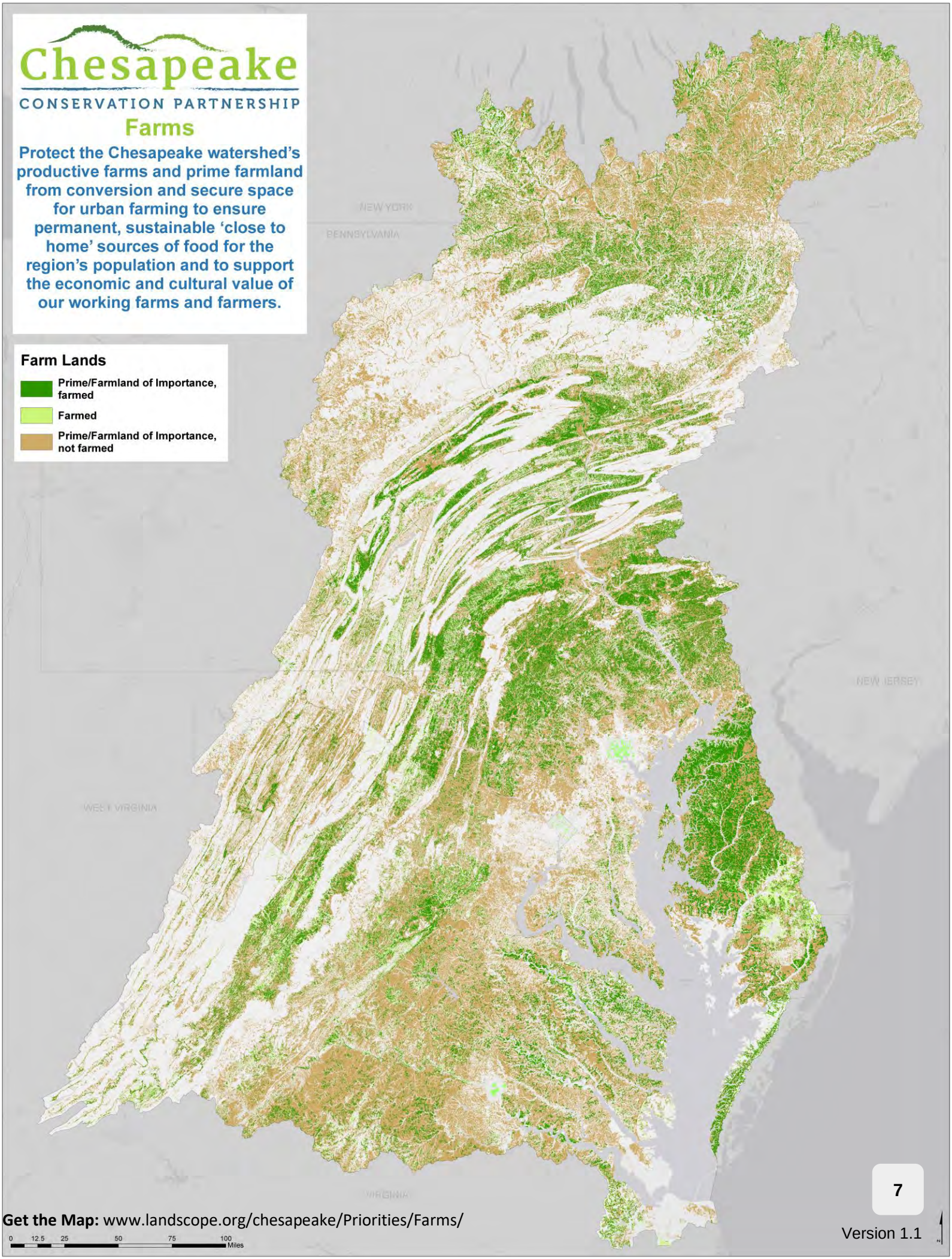
We anticipate numbers changing in the future as we: (1) add data on urban farming acreage; and (2) learn more about how climate change may affect agriculture.



# Chesapeake
CONSERVATION PARTNERSHIP

## Farms

**Protect the Chesapeake watershed's productive farms and prime farmland from conversion and secure space for urban farming to ensure permanent, sustainable 'close to home' sources of food for the region's population and to support the economic and cultural value of our working farms and farmers.**




**Get the Map:** www.landscope.org/chesapeake/Priorities/Farms/



Version 1.1

# Forests

**OUR GOAL: Protect the Chesapeake watershed's most ecologically and economically valuable forest land from conversion--headwater and riparian forests, large forest blocks, woodlots providing multiple values, and forests conducive to timber harvests.**

**Get the Map:** www.landscope.org/chesapeake/Priorities/Forests/

Photo: Nicholas Tonelli

Forests cover about 60% of the watershed, provide over $24 billion in ecological services, and provide $22 billion in forest products industry output each year. Yet, forest loss and fragmentation from development threatens up to 5.5 million acres of the most valuable forests. Science shows that streams and rivers degrade when the percent of forest cover in a sub-watershed drops below 70%. Conserving our region's forests is key to maintaining wildlife, drinking water supplies, water quality, recreation, tourism and economic sustainability.

## What we mapped

This goal identifies four mappable aspects. In each, forests are defined as areas with 50% or greater tree canopy coverage. "Contiguous" means areas of forest connected by corridors at least 40 meters in width. The map was prepared in consultation with the CBP Forestry Work Group. These are the contributing forest categories:

*Headwater and Riparian Forests:* Headwater forests are defined as areas within National Hydrography Dataset Plus (NHD Plus) catchments that contain a NHD 100K scale first-order stream AND are in the top half of elevation values within the Chesapeake Bay watershed. Riparian forests are areas within a 10 m buffer of NHD 100K streams.

*Large Forest Blocks:* These are blocks of contiguous forest 500 acres or larger.

*Multiple Value Woodlots:* These are blocks of contiguous forest ranging in size from 50 to 500 acres.

*Forests Conducive to Timber Harvests:* These are defined as areas of harvestable contiguous forest blocks 500 acres or larger with less than 30% slopes.

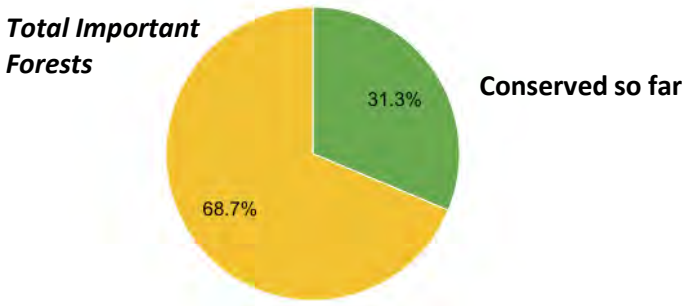
This map shows the concentration or overlapping of these forest values. Due to forest patch size criteria, Large Forest Blocks and Woodlots are mutually exclusive, as are Productive Timber Growing Areas and Woodlots.

## Where we stand

Our mapping identifies 22,124,849 acres of important forest land for conservation, about 54% of the Chesapeake watershed. As indicated in the chart below, 6,925,062 acres (31%) of this forest land is already permanently conserved.

We anticipate these numbers changing somewhat in the future as (a) higher resolution land cover data is put into use, and (b) we learn more about how climate change projections may affect forest lands.

Note that important forest land overlaps substantially with other conservation goals, particularly for habitat and heritage.



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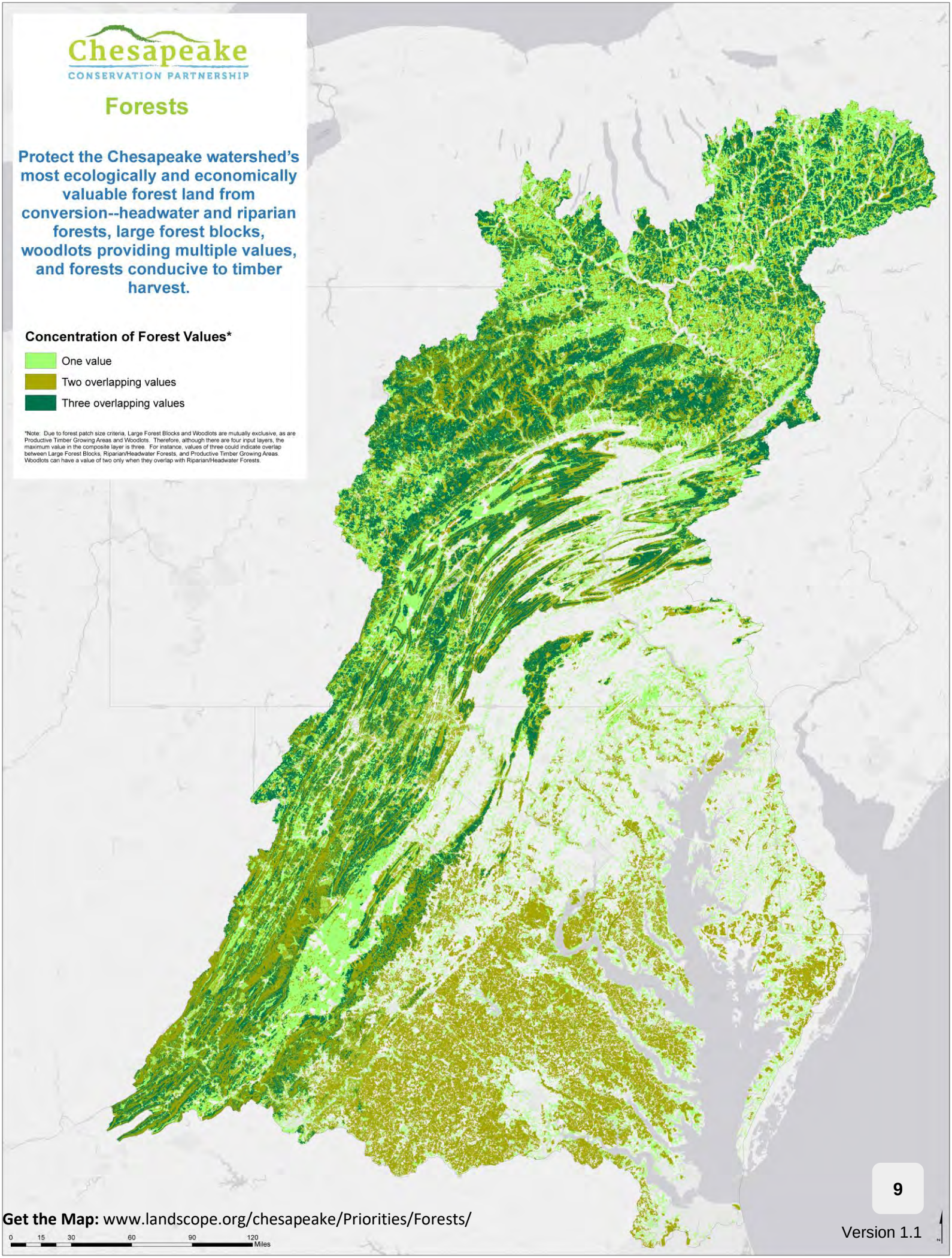
# Forests

**Protect the Chesapeake watershed's most ecologically and economically valuable forest land from conversion--headwater and riparian forests, large forest blocks, woodlots providing multiple values, and forests conducive to timber harvest.**

**Concentration of Forest Values***

- One value
- Two overlapping values
- Three overlapping values

*Note: Due to forest patch size criteria, Large Forest Blocks and Woodlots are mutually exclusive, as are Productive Timber Growing Areas and Woodlots. Therefore, although there are four input layers, the maximum value in the composite layer is three. For instance, values of three could indicate overlap between Large Forest Blocks, Riparian/Headwater Forests, and Productive Timber Growing Areas. Woodlots can have a value of two only when they overlap with Riparian/Headwater Forests.




**Get the Map:** www.landscope.org/chesapeake/Priorities/Forests/



Version 1.1

# Habitat

**OUR GOAL: Protect a network of large natural areas and corridors sufficient to allow nature to respond to a changing climate and land development and to support thriving populations of native wildlife, migratory birds, fish and plants and sustain at-risk species.**

**Get the Map:** www.landscope.org/chesapeake/Priorities/Habitat/

Photo: Chesapeake Bay Program

The Chesapeake region is central to sustaining wildlife and fish on a vast scale. Hundreds of fish species use the Bay, rivers and headwater streams for some portion of their life cycles. Many--such as shad, striped bass, brook trout and more--hold tremendous ecological, commercial, recreational or cultural value. Hundreds of migratory bird species rely on the forests, wetlands and meadows of the watershed for food, resting spots or nesting. Millions of migrating ducks, geese and swans overwinter on the Chesapeake. Conserving the habitat that supports fish and wildlife is critical to sustaining a recreation, tourism, commercial uses, and a broader ecosystem.

## What we mapped

Our conservation goal identifies two major mappable aspects -- large natural areas (or core areas) and corridors (or connectors) for both terrestrial and aquatic resources. These are defined and mapped as follows:

*Terrestrial - Core Connector Network:* Core areas, if well-connected and protected, will continue to support a diverse fish, wildlife, plants, and the ecosystems on which they depend. Cores include intact examples of each major ecosystem type, rare natural communities, and important habitat for a variety of species. They are stratified by HUC 6 watersheds. Cores are linked by a network of connectors, which allow movement of animals and plants from one core to another, and establish a flow pattern for ecological processes as landscape conditions and climate change.

*Aquatic Core Network:* This consists of streams, lakes and ponds that are intact, connected, and support a diversity of aquatic species and ecosystems. Core areas are based on the Index of Ecological Integrity and HUC 6 watersheds.

*Aquatic Buffers:* These surround the aquatic cores and represent the areas estimated to have a strong influence on the core integrity based on watershed processes.

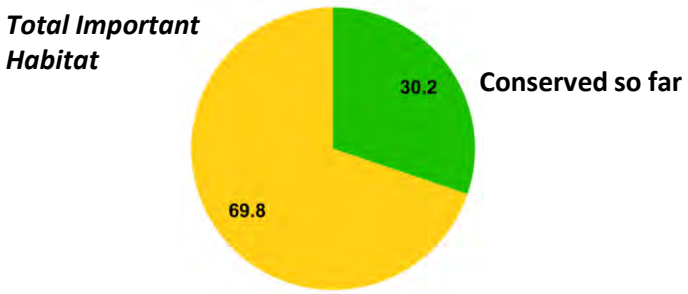
The map was produced by the North Atlantic LCC in consultation with the Regional Conservation Opportunity Areas Team of the Northeast Association of Fish and Wildlife Agencies. The CBP Habitat Goal Team also intends to use this map as the basis for additional collaboration with these same groups.

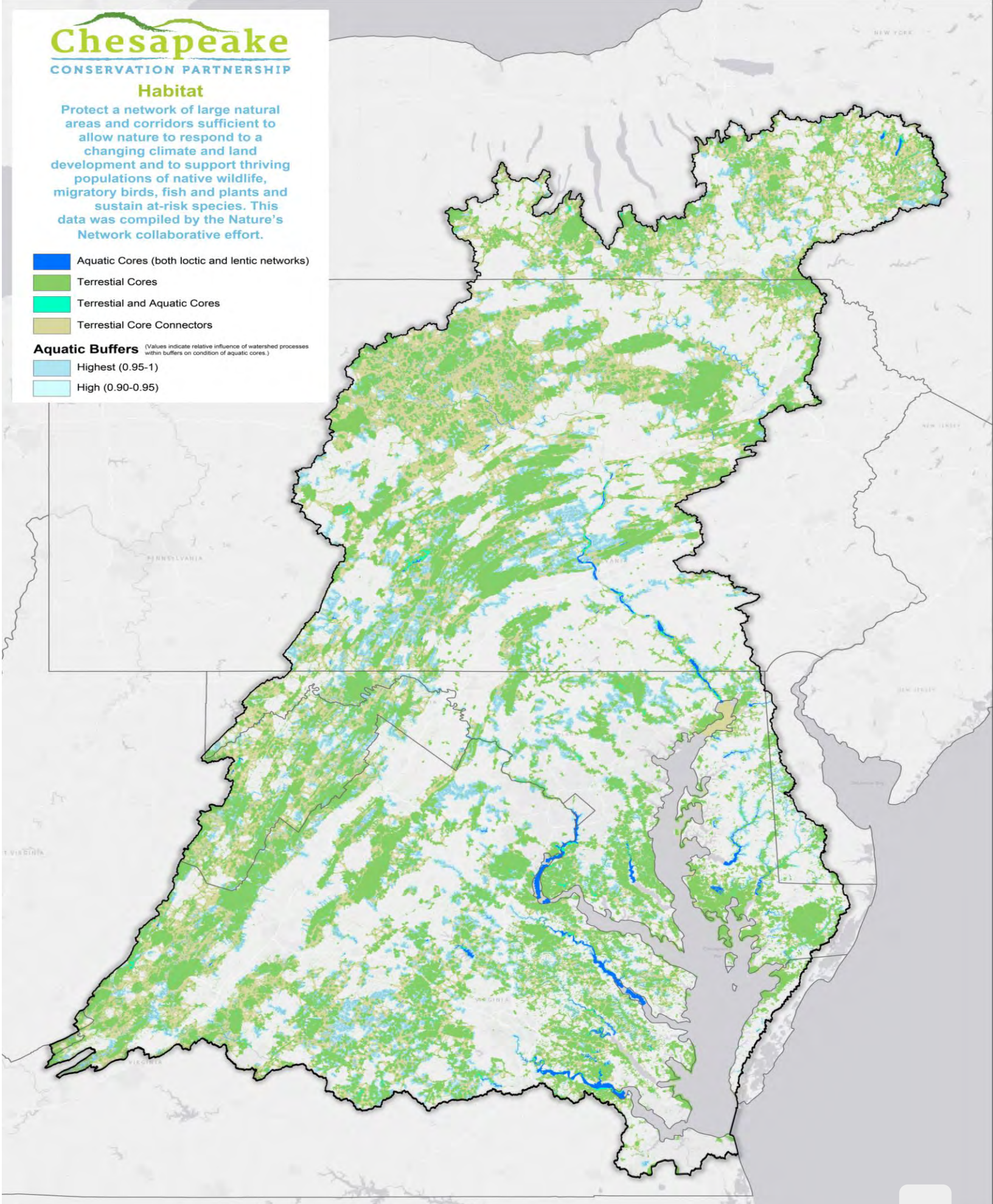
## Where we stand

Our mapping identifies 19,031,488 acres of important habitat for conservation, about 47% of the Chesapeake watershed. As shown in the chart below, 5,751,556 acres (30%) of this habitat is already permanently conserved.

We anticipate these numbers changing somewhat in the future as (a) higher resolution land cover data is put into use, and (b) we learn more about how climate change projections may affect habitat.

Note important habitat overlaps substantially with other conservation goals, particularly for forests and heritage.






**Get the Map:** www.landscope.org/chesapeake/Priorities/Habitat/



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# Heritage

**OUR GOAL: Protect the treasured landscapes of our collective heritage from development that would alter the scenery and character that conveys their importance -- along our designated trails and scenic rivers and byways, at our parks, and throughout our state and national heritage areas, valued cultural landscapes and historic districts.**

**Get the Map:** www.landscope.org/chesapeake/Priorities/Heritage/

The Chesapeake landscape is rich with small and large places of outstanding significance to communities and our nation. Some are formally designated, like byways, scenic rivers, trails, parks, historic districts and heritage areas. Think of the Appalachian Trail and Journey Through Hallowed Ground. Others may simply be broadly recognized, like certain scenic vistas or indigenous, historic or cultural landscapes -- Shenandoah Valley or Lancaster County come to mind. But all support tourism, the economy and our cultural identity. They are what identifies this region as unique and makes our communities special. Yet, many special places face significant development pressure and risk being lost. Conserving these places for this and future generations is vital.

## What we mapped

Our conservation goal identifies many mappable aspects, including designated areas and resource values conveying their importance. Here is how we have mapped this:

*State & National Heritage Areas:* Includes all land within boundaries of designated state and national heritage areas.

*State Scenic Rivers:* Includes the length of state designated scenic rivers. The region has no federally designated units.

*Scenic Byways:* Includes the length of designated state and national scenic byways.

*National Trails:* Includes the length of designated national historic and scenic trails.

*ABPP Core Areas:* These are Core Areas (battlefields) identified by the American Battlefield Protection Program.

*National Register:* Includes point data for public non-sensitive properties listed on the NRHP as of 2014.

*National Historic Landmarks:* Includes point data for designated NHLs as of 2014.

*Historic Districts:* Includes districts listed on or eligible for the National Register of Historic Places or state registers.

*Parks & Publicly Managed Conservation Lands :* Includes county, state, and national parks, refuges and forests.

*Appalachian Trail Landscape:* Encompasses multiple values associated with AT and spine of Appalachians.

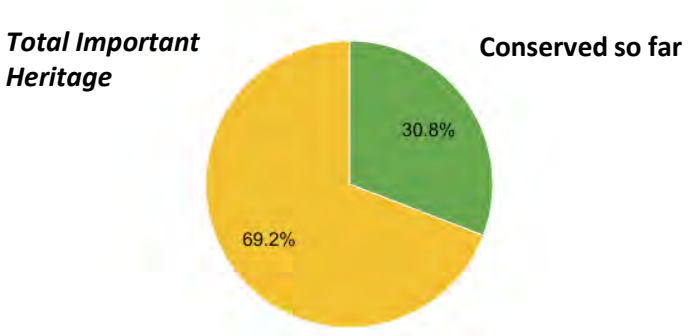
*Maryland Rural Legacy Areas:* Includes land within the boundaries of designated Rural Legacy Areas.

*Pennsylvania Conservation Landscapes:* Includes land included within the boundaries of this program.

## Where we stand

Our mapping identifies 20,651,048 acres of land associated with designated areas, about 50% of the Chesapeake watershed. As shown below, 5,665,348 acres (27%) of this land is permanently conserved.

We anticipate these numbers changing as new data depicting resource values associated with designated areas becomes available. Note that important heritage lands overlap substantially with all other conservation goals.



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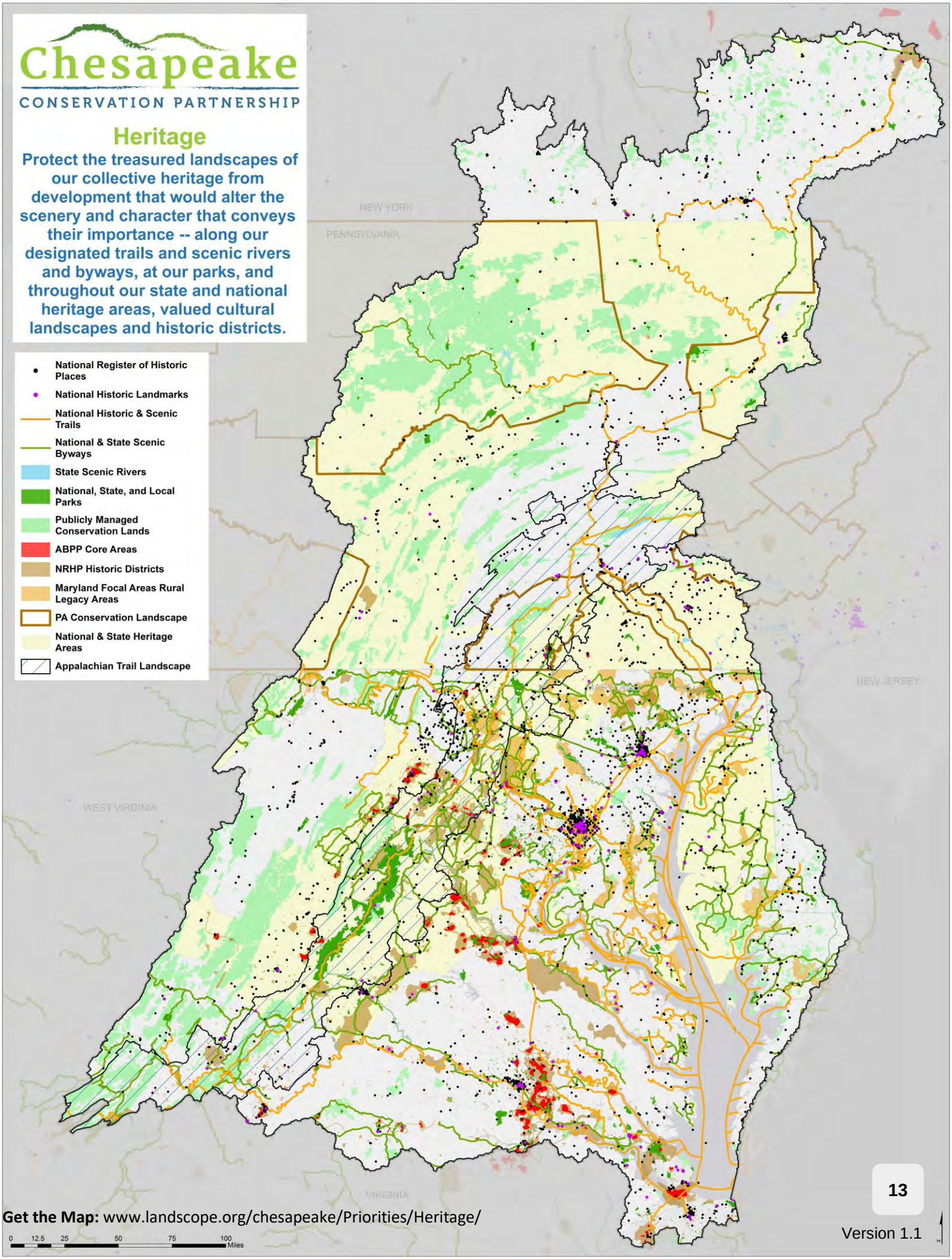
# Heritage

**Protect the treasured landscapes of our collective heritage from development that would alter the scenery and character that conveys their importance -- along our designated trails and scenic rivers and byways, at our parks, and throughout our state and national heritage areas, valued cultural landscapes and historic districts.**




**Get the Map:** www.landscope.org/chesapeake/Priorities/Heritage/



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# Human Health

**OUR GOAL: Provide people access to parks and trail networks within walking and biking distance of their homes and communities. Provide sufficient opportunities along waterways to ensure nearly all residents are within 30 minutes of reaching a public access site at water's edge.**

**Get the Map:** www.landscope.org/chesapeake/Priorities/Health/

Photo: Dave Harp

We need the outdoors. Research findings on the benefits of being outside in nature continues to accumulate. We need places in our cities and communities to walk, run, sit, play, read, and reconnect. We need trails, pocket parks, big parks, and natural areas. We need access to the water, to put in a boat or a canoe, to swim, to fish, to camp nearby. We need these places close to us, so they are a daily part of our lives -- so they can keep us active and healthy. Some people have less access to parks and the water than they deserve and need. We must change that.

## What we mapped

This goal differs substantially from the other four. Rather than concentrating on acres to conserve, this goal drives us to identify gaps in access and fill them. These fall into two general categories based on the goal: (a) areas with and without a park within walking distance, and (b) areas with and without water access within a 30 minute drive (excluding traffic considerations).

*Areas with and without water access:* This map illustrates:

*(1)* *Areas within 30 minute drive time of public access sites along the water*. It is segmented by areas within two groupings of access types: boating access and swimming, fishing and viewing access.

*(2)* *Average population served*. This depicts the average population size served by each access site. This indicates potential demand/capacity issues in certain areas.

*Areas with and without a park within walking distance:* We have not yet prepared this map due to the complexity of data sources. Work on this will continue.

## Where we stand

*Areas with and without water access within 30 minute driving distance:* The map suggests two observations:

(1) Most people living within a wide swath of land near the bay and its tributaries *are* within a 30 minute drive of one or more public access sites.

(2) This does not mean that existing access sites within a 30 minute drive have the *capacity* to serve the nearby population. The color-codes of average population served by each access site suggest that sites in many areas serve a high number of people. This is a potential indicator of capacity issues and suggests strategic approach to access development is warranted. Some site managers report many sites routinely fill to capacity early on weekend days; this includes some "destination sites" in more rural areas (e.g. a number of state parks).

Further analysis on this subject is needed. Some of this analysis is limited by the adequacy of the existing public access dataset which does not include comprehensive information on specific access facilities at each site or site user capacity. These are key to strategically assessing access needs.

Further analysis to map gaps in access to parks will be completed in the near future.

The partnership should also consider expanding the human health goal to address other factors beyond access. One example: protection of source areas for public drinking water.

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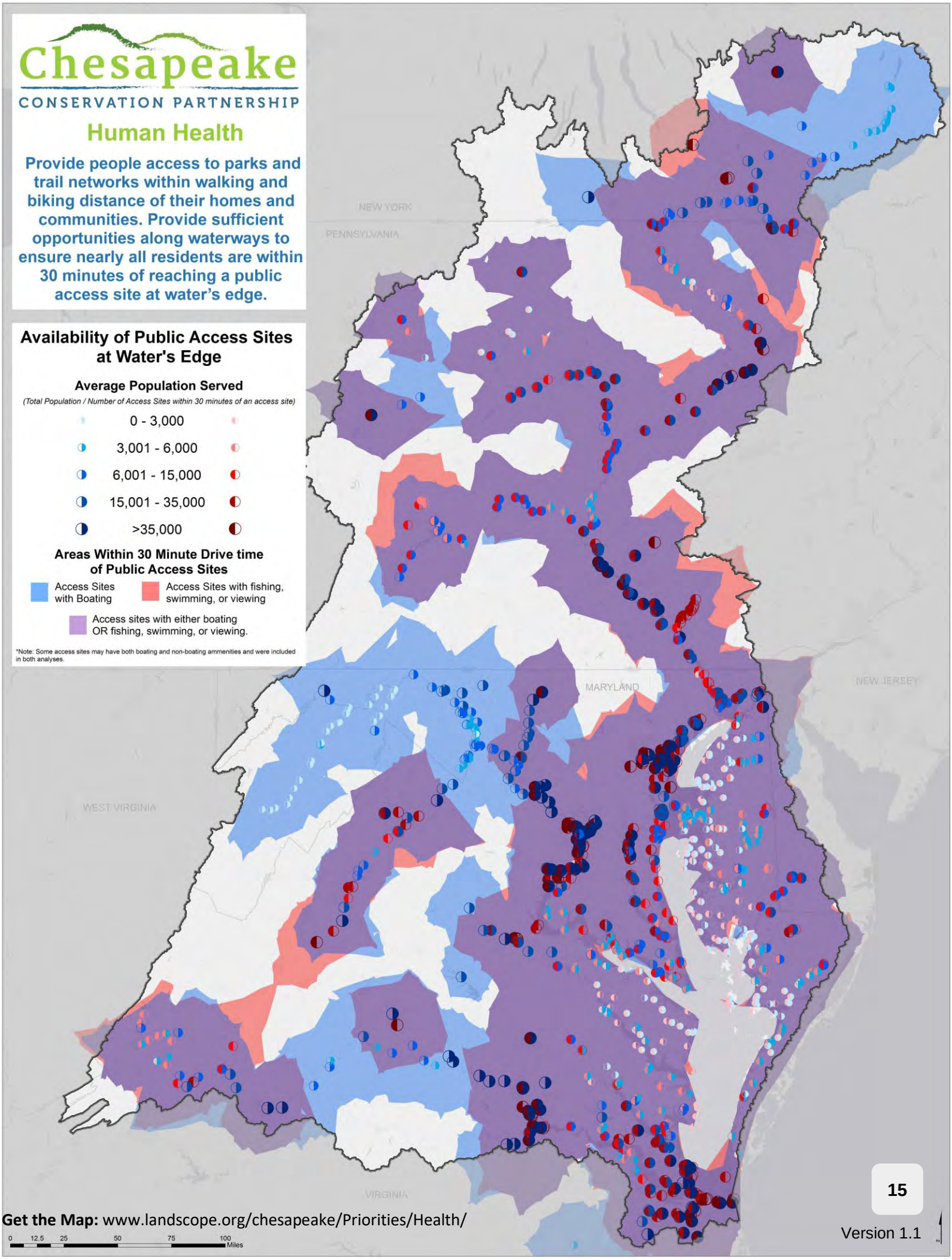
## Human Health

**Provide people access to parks and trail networks within walking and biking distance of their homes and communities. Provide sufficient opportunities along waterways to ensure nearly all residents are within 30 minutes of reaching a public access site at water's edge.**




**Get the Map:** www.landscope.org/chesapeake/Priorities/Health/



Version 1.1

# Our Valued Lands


Photo: Nicholas Tonelli

There are 64,000 square miles in the Chesapeake watershed, or 41 million acres of land. About 11 percent of that area is developed in cities, towns, homes, roads, businesses and industry. *But we also rely on the remaining large portions of rest of the watershed to support our lives:*

- That is where we find 22 million acres of important forests that protect our water supplies and climate and help control flooding.
- It is where we find 19 million acres of important wildlife habitat, much of it on those forested lands.
- It includes 20 million acres of land that can support farming, including 7 million acres now being farmed. We rely on those working farms for food and supporting the economy -- orchards, vineyards, wineries, crop and vegetable fields, dairies and more, plus the businesses they support.
- It is also where we find 24 million acres of history, farms, forests, and habitat that represents our cultural and natural heritage -- the places we have said are important to who we are as a people; that provide us with recreation, hunting, fishing, tourism and other vital economic sectors.

Interestingly, each of these core values -- farms, forests, habitat and heritage, equate to approximately half the watershed. We need to keep half the watershed in these conditions to make us whole. (Today, just under a quarter of the watershed--22 percent or 8.8 million acres--is permanently conserved. Our 2025 land protection goal will bring us to 24 percent.)

***Half makes us whole. Keep half to sustain and nurture us.***

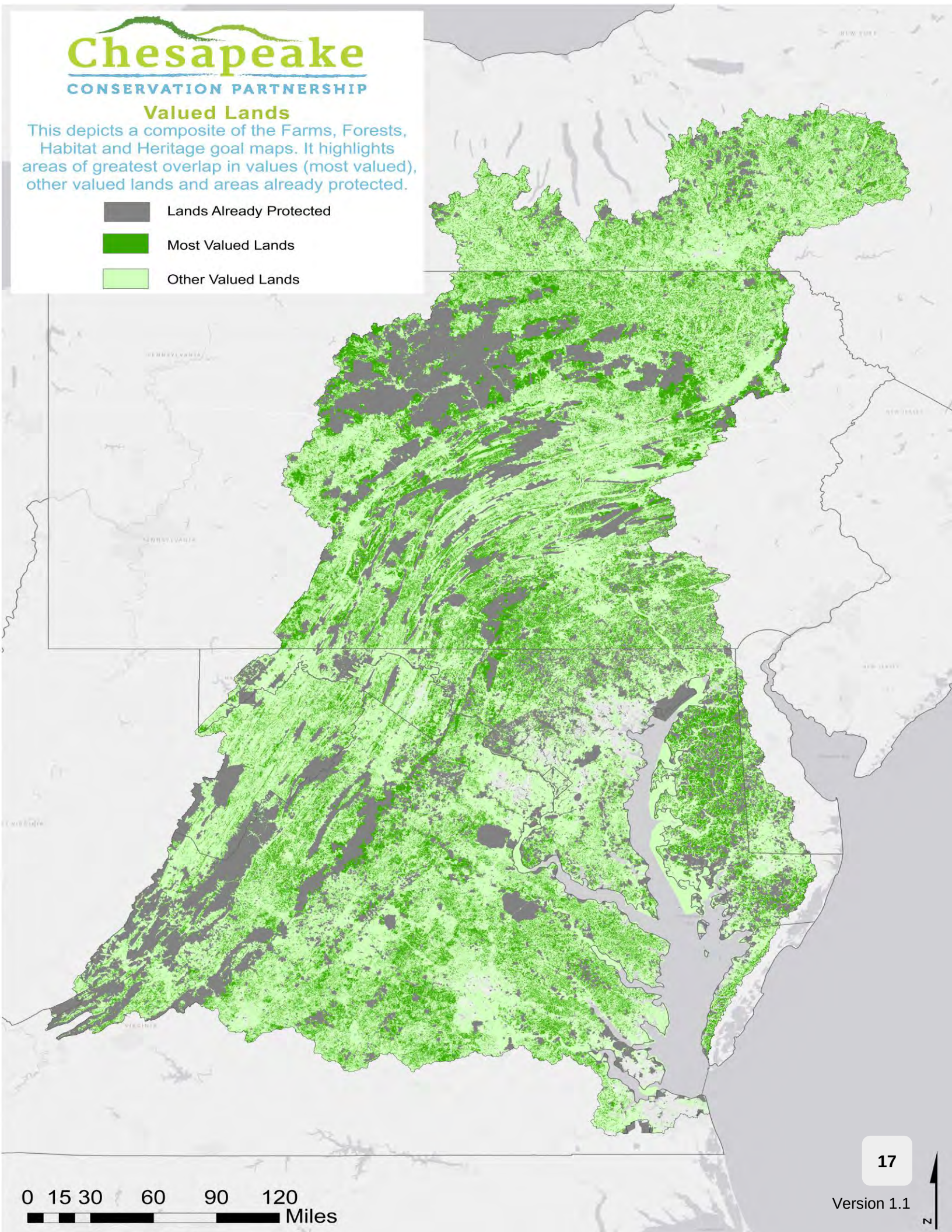
## What we mapped

This map represents a composite of the Farms, Forests, Habitat and Heritage goal maps. (The Health goal map represents a different type of data and is not included.) It is intended to depict the full range of places we collectively value. But we display this in three mapping units:

*Lands Already Protected:* The lands shown in dark gray are already protected through conservation easements or public ownership.

*Most Valued Lands:* The lands highlighted in dark green represent the portion of the composite map with the highest numbers of multiple farm, forest, habitat and/or heritage values overlapping on currently unprotected lands. Specifically, this is where 13 or more of 31 values factors overlap. This equates to approximately 11.5 million acres of land.

*Other Valued Lands:* The lands highlighted in light green represent the rest of the composite map where either one conservation value exists, or there is some degree of overlap -- again, on currently unprotected lands. Specifically this is where 1 factor exists to 12 values overlap. This equates to around 19.7 million acres of land.


Chesapeake
CONSERVATION PARTNERSHIP
Valued Lands
This depicts a composite of the Farms, Forests, Habitat and Heritage goal maps. It highlights areas of greatest overlap in values (most valued), other valued lands and areas already protected.
Lands Already Protected
Most Valued Lands
Other Valued Lands
0 15 30 60 90 120
Miles
N



Version 1.1

# Influences

Photo: Chesapeake Bay Program

What might influence the ability to achieve long-term conservation goals? While there are many potential influences, the partnership chose to initially map and analyze six key factors. These are described and illustrated on the following pages. The partnership anticipates analyzing additional factors in the future, such as other aspects of climate influences. Note than none of the following maps have yet been published to LandScope Chesapeake.

## Energy Infrastructure
## Inundation
## Development

## Farmland Preservation Capacity
## Land Trust Capacity
## Existing Focal Areas

# Energy Infrastructure

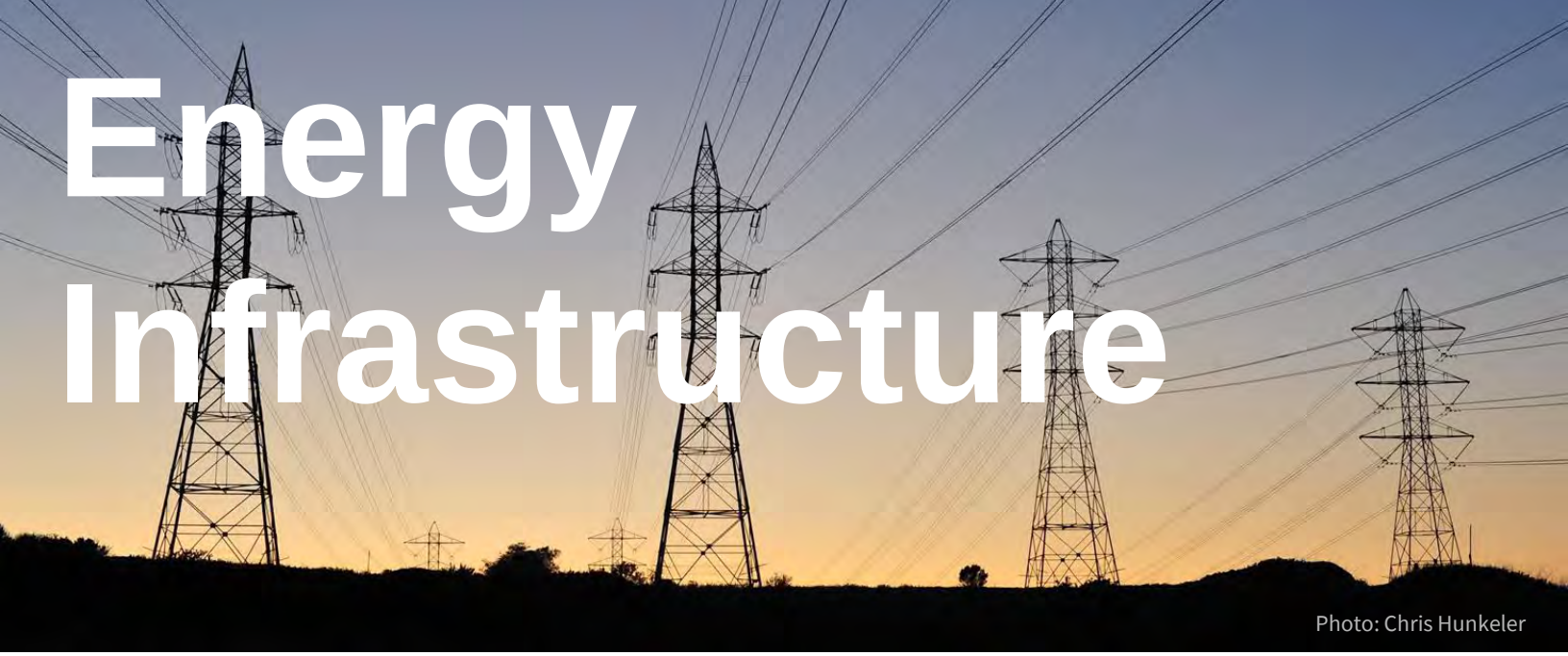


Photo: Chris Hunkeler

Energy is a vital input to supporting our way of life. Yet, energy production and transmission also have the potential to adversely impact values we treasure. Harmonizing our needs with our values requires solid understanding of both conservation goals and existing and proposed energy infrastructure.

The purpose of this map is to give a comprehensive overview of the energy resources and activity in the Chesapeake Bay Watershed and present this complex data in a coherent way.

## What we mapped

Creating the map included acquiring and displaying data on the full range of energy production -- from geologic potential, to areas of resource extraction, energy production, and transmission including both renewable energy and fossil fuels.

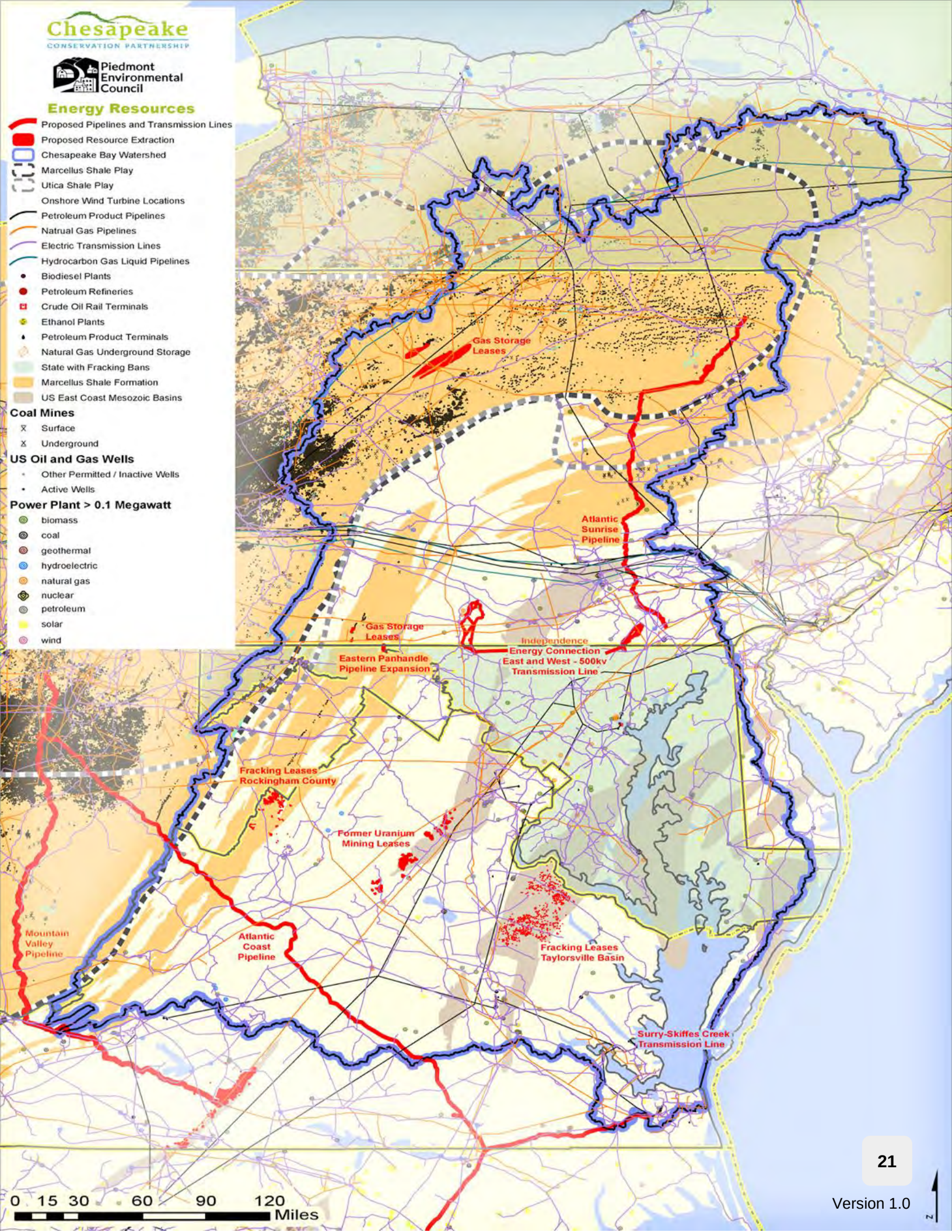
The map also shows proposed and potential energy projects including potential fracking sites, proposed gas storage sites, proposed gas pipelines, and proposed electric transmission lines.

All data is compiled from publicly available sources including the US Energy Information Administration (EIA), the Homeland Infrastructure Foundation-Level Data, state agencies, and non-governmental organizations.

In particular, data on potential and proposed projects come from a variety of sources, including non-governmental organizations tracking these projects, agencies regulating the projects and utilities proposing them. This dataset will be the most difficult to keep current across six states with many different entities in charge of the various projects.

## Where we stand

Further analysis and regular updates are needed. While the map is intended to be comprehensive, it likely does not capture all proposed projects -- projects that have been publicly announced or are going through permitting processes. This is due to the decentralized nature of permitting processes across six states. Moreover, it certainly does not capture all projects that are potentially being planned by utility companies, but which have not yet been announced. This data, often proprietary, is not yet in the public domain.


Chesapeake
CONSERVATION PARTNERSHIP
Piedmont Environmental Council
Energy Resources
Proposed Pipelines and Transmission Lines
Proposed Resource Extraction
Chesapeake Bay Watershed
Marcellus Shale Play
Utica Shale Play
Onshore Wind Turbine Locations
Petroleum Product Pipelines
Natrual Gas Pipelines
Electric Transmission Lines
Hydrocarbon Gas Liquid Pipelines
Biodiesel Plants
Petroleum Refineries
Crude Oil Rail Terminals
Ethanol Plants
Petroleum Product Terminals
Natural Gas Underground Storage
State with Fracking Bans
Marcellus Shale Formation
US East Coast Mesozoic Basins
Coal Mines
Surface
Underground
US Oil and Gas Wells
Other Permitted / Inactive Wells
Active Wells
Power Plant > 0.1 Megawatt
biomass
coal
geothermal
hydroelectric
natural gas
nuclear
petroleum
solar
wind
Gas Storage Leases
Atlantic Sunrise Pipeline
Gas Storage Leases
Independence Energy Connection East and West - 500kv Transmission Line
Eastern Panhandle Pipeline Expansion
Fracking Leases Rockingham County
Former Uranium Mining Leases
Mountain Valley Pipeline
Atlantic Coast Pipeline
Fracking Leases Taylorsville Basin
Surry-Skiffes Creek Transmission Line
0 15 30 60 90 120
Miles



Version 1.0


# Inundation

Photo: Chesapeake Bay Program

A changing climate can have a wide range of impacts on the Chesapeake landscape. Among them are inundation and flooding associated with long-term sea level rise, changing rainfall regimes, and the impacts of major storms.

In 2003, storm surge from Hurricane Isabel caused $1.2 billion (2017 USD) in damage in Maryland and the District of Columbia alone. Tropical Storm Lee created extensive flooding along the Susquehanna in 2011. Portions of low-lying cities like Norfolk and Annapolis now flood on a regular basis. Projected sea level rise will have substantial impacts to portions of the Eastern Shore.

The known and projected areas of inundation can and should influence conservation. On the one hand, investing conservation dollars in flood prone locations may seem like a questionable investment. On the other, conserving locations that will allow for the upstream migration of wetlands and marshes can provide significant benefits.

## What we mapped

This map incorporates four aspects of inundation, three of which primarily apply to coastal areas of the watershed and one that is watershed-wide:

*Projected Inundation from Sea Level Rise:* We use a mid-range projection of 4 feet of sea level rise by 2050 in this map, based on NOAA data. (The low and high range projections are 1 and 5 feet, respectively.) Note that by 2100 the mid-range projection is for 5 feet of sea level rise.

*Projected Marsh Migration Areas:* Using sea level rise projections and existing land-cover data, NOAA has calculated optimal areas for allowing upward marsh migration to support natural systems. These areas are potential conservation opportunities.

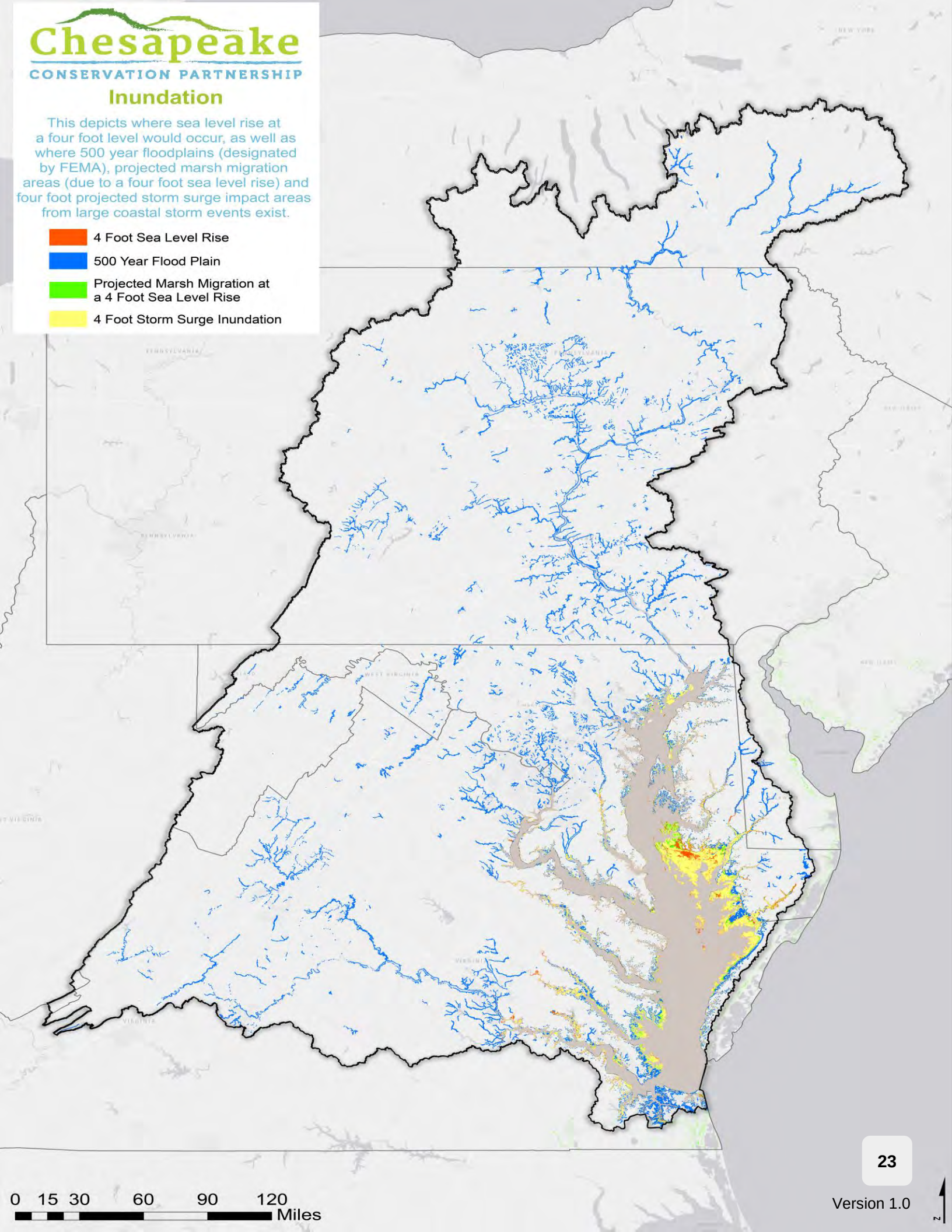
*Projected Storm Surge Impact Areas:* This shows coastal areas projected to be inundated during storm surge events based on a 4 foot surge, comparable to a Category 1 storm. This uses the NOAA SLOSH model for these calculations.

*500 Year Floodplain:* This watershed-wide data comes from FEMA to indicates areas likely subject to “500 year floods.”. These floodplains indicate areas of increased vulnerability to historic scale flood events.

## Where we stand

Acreages subject to inundation total 1,516,336 unique acres; 1,112,180 from four foot projected sea level rise, 912,775 from four foot storm surge, and 349,860 in 500 year floodplains. Areas with potential to support marsh migration at a four foot level total 974 acres.

Inundation is only one aspect of a changing climate. In the future the partnership will pursue analyses of other climate factors that may influence Chesapeake values.


Chesapeake
CONSERVATION PARTNERSHIP
Inundation
This depicts where sea level rise at a four foot level would occur, as well as where 500 year floodplains (designated by FEMA), projected marsh migration areas (due to a four foot sea level rise) and four foot projected storm surge impact areas from large coastal storm events exist.
4 Foot Sea Level Rise
500 Year Flood Plain
Projected Marsh Migration at a 4 Foot Sea Level Rise
4 Foot Storm Surge Inundation
0 15 30 60 90 120
Miles



Version 1.0

# Development


Photo: Chesapeake Bay Program

Another 4.5 million people are expected to live in the Chesapeake Bay watershed by 2050. Where will these additional people live? How will that affect, or be affected by, land conservation efforts?

This map projects where and how much development will occur between now and 2050.

## What we mapped

This map is generated through the Chesapeake Bay Land Change Model (CBLCM), a computer simulation designed to forecast future urbanization across multiple counties or states based on the best data and information available at regional scales. The CBLCM relies on county and state produced population and employment projections to determine the overall demand for growth. The model assigns a portion of that demand to infill and redevelopment based on recent county-level trends and allocates the remaining demand to the landscape in the form of residential and commercial patches (i.e., clusters of 30-meter resolution cells) of development. The U.S. Geological Survey began developing the CBLCM in 2012 specifically to inform decisions focused on restoring water quality and conserving habitat and open space in the Chesapeake Bay watershed.

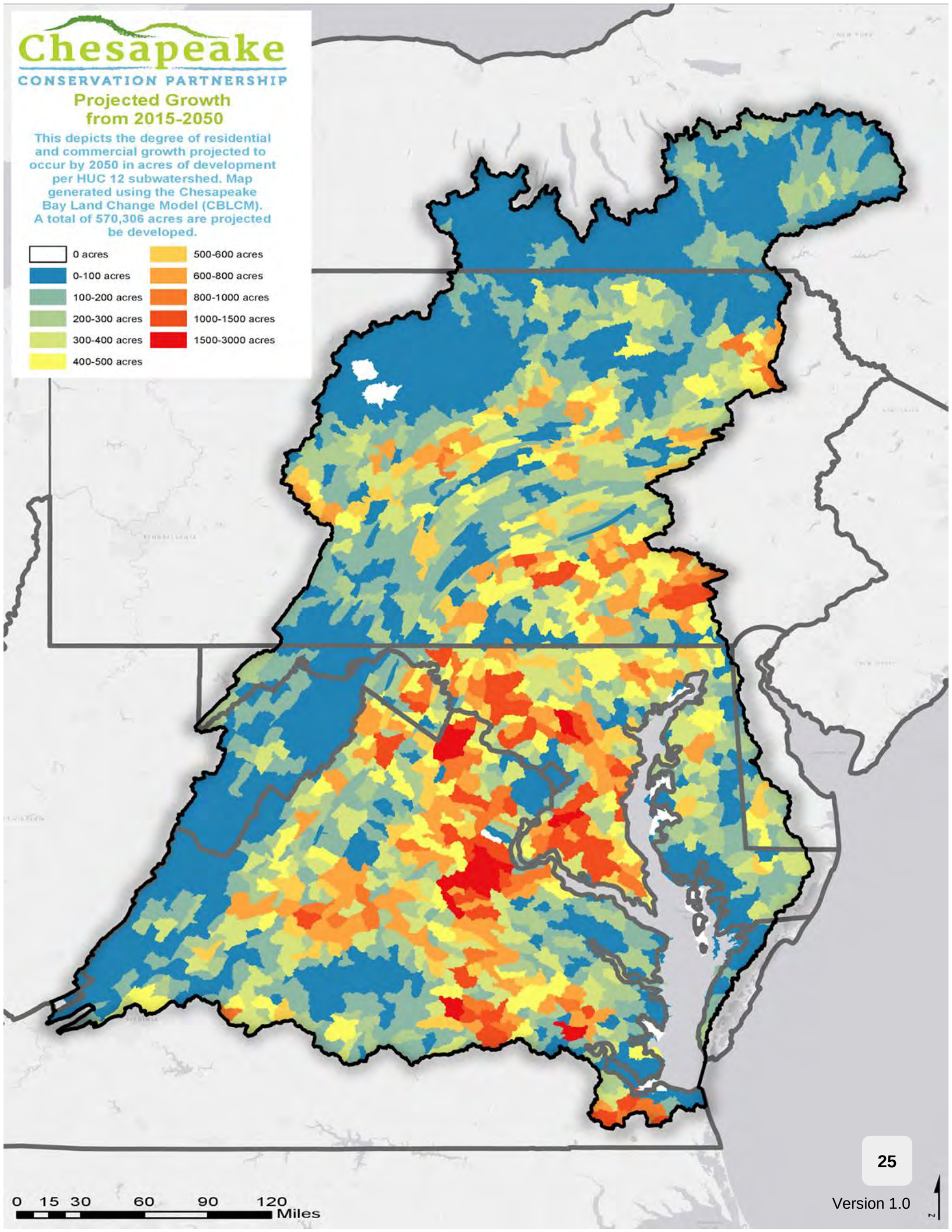
The CBLCM is capable of simulating multiple future scenarios. Scenarios represent unique and logically consistent sets of assumptions about future conditions. For example, a “smart growth” scenario might involve greater investments in land conservation, stronger enforcement of zoning, and incentives to promote infill and redevelopment.

For any given scenario, the CBLCM simulates 101 equally likely spatial representations of residential and commercial development. For each iteration, the exact location of new development is randomly selected but the choice of location is influenced by probability of growth at any given location (higher close to already urbanizing areas) and by exclusion of steep slopes, protected lands, and already developed lands. Therefore, overall growth patterns within a county are similar across all 101 iterations but exact locations of patches are variable. This is done to account for uncertainty associated with parcel-level representations of future growth.

The map shown here projects the acreage of development that will occur by 2050 per HUC 12 subwatershed, based on a scenario using a continuation of historic trends constrained by existing local zoning.

## Where we stand

Today over 18 million people call the Bay watershed home. By 2050, the population will likely increase to 22.5 million. Based on historic trends, most of these people are expected to live and work in and around major cities (e.g., Harrisburg, Baltimore, Washington D.C., Richmond, and Norfolk) and along major transportation corridors (e.g., I-81, I-95, I-66) as depicted in the this map. Over 570,000 acres are projected to be developed to accommodate them, another 1.3% of the watershed. However, these trends could change due to emerging technologies (e.g., driverless cars), more flexible workplaces and schedules, changing cultural preferences, the construction of new roads, and other factors.


Chesapeake
CONSERVATION PARTNERSHIP
Projected Growth
from 2015-2050
This depicts the degree of residential and commercial growth projected to occur by 2050 in acres of development per HUC 12 subwatershed. Map generated using the Chesapeake Bay Land Change Model (CBLCM). A total of 570,306 acres are projected be developed.
0 acres
0-100 acres
100-200 acres
200-300 acres
300-400 acres
400-500 acres
500-600 acres
600-800 acres
800-1000 acres
1000-1500 acres
1500-3000 acres
0 15 30 60 90 120
Miles

# Farmland Preservation


Photo: Chesapeake Bay Program

Preserving farmland to support working farms and food supply has long been a focus of conservation efforts in many portions of the Chesapeake watershed. And those efforts have been remarkably successful. For example, since 1989 the Pennsylvania Agricultural Conservation Easement Purchase Program has protected more than 500,000 acres on over 4,700 farms.

Where is the capacity to support future farmland conservation? How is it concentrated? What does this suggest about where future farmland protection might be most likely or most effective?

## What we mapped

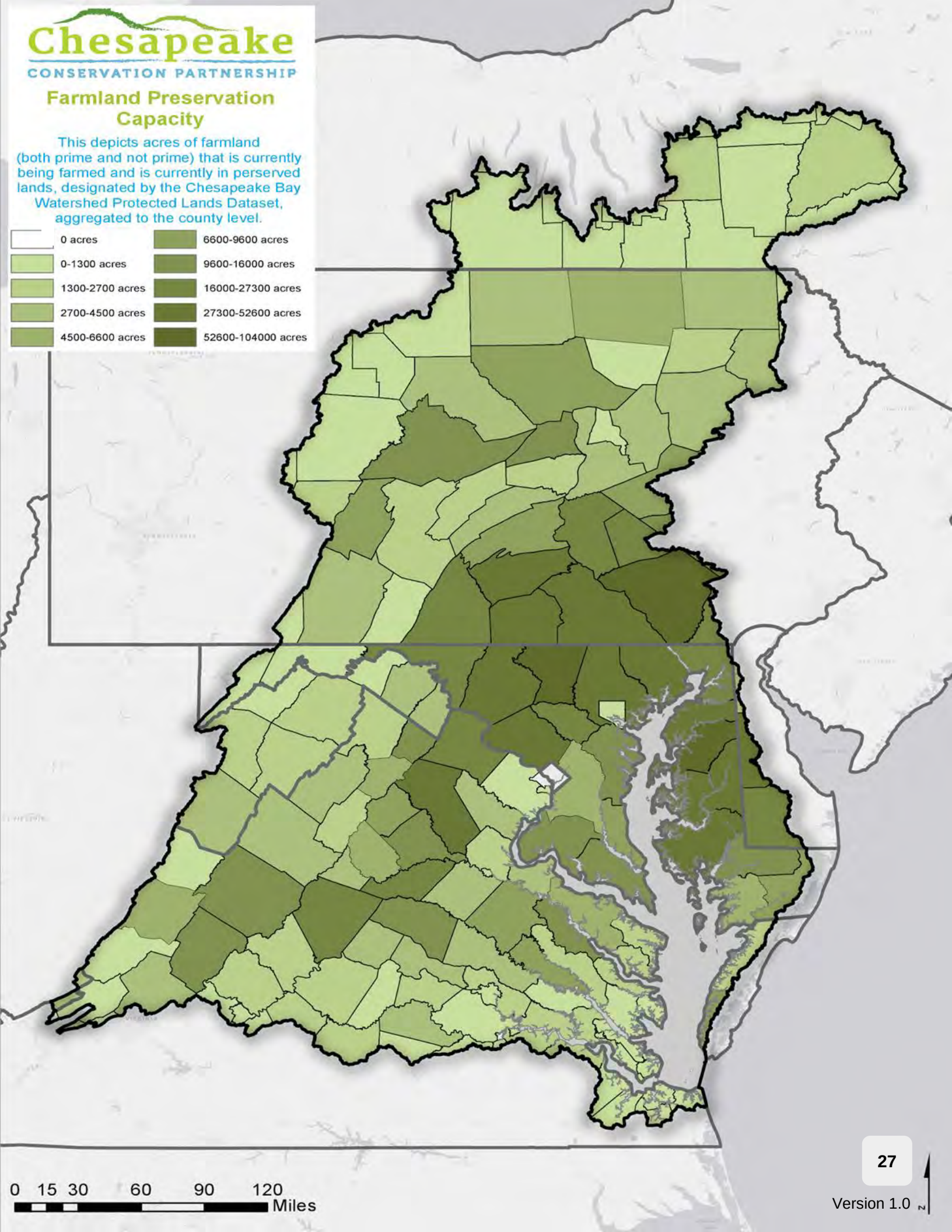
This map attempts to illustrate where capacity for implementing farmland protection currently exists, *based on past accomplishments.*

Specifically, this depicts the relative magnitude of farmland that has been protected by county. Darker shading means a higher proportion of existing farmland has already been protected. Preparing this map involved using a dataset of existing farmed lands (both prime and not prime) and determining what proportion of those in each county are currently protected based on the Chesapeake Bay Watershed Protected Lands Dataset. This includes farm lands protected by specific farmland preservation programs as well as other entities.

## Where we stand

This is just one proxy for illustrating capacity. It is not perfect, as it is derived from past actions. Circumstances may have changed over time.

An alternative proxy for illustrating capacity might focus on understanding the status of existing farmland preservation programs, down to the county level. This data exists through state and county programs, but has not yet been compiled in a comprehensive, consistent method.


Chesapeake
CONSERVATION PARTNERSHIP
Farmland Preservation Capacity
This depicts acres of farmland (both prime and not prime) that is currently being farmed and is currently in perserved lands, designated by the Chesapeake Bay Watershed Protected Lands Dataset, aggregated to the county level.
0 acres
0-1300 acres
1300-2700 acres
2700-4500 acres
4500-6600 acres
6600-9600 acres
9600-16000 acres
16000-27300 acres
27300-52600 acres
52600-104000 acres
0 15 30 60 90 120
Miles



Version 1.0

# Land Trusts

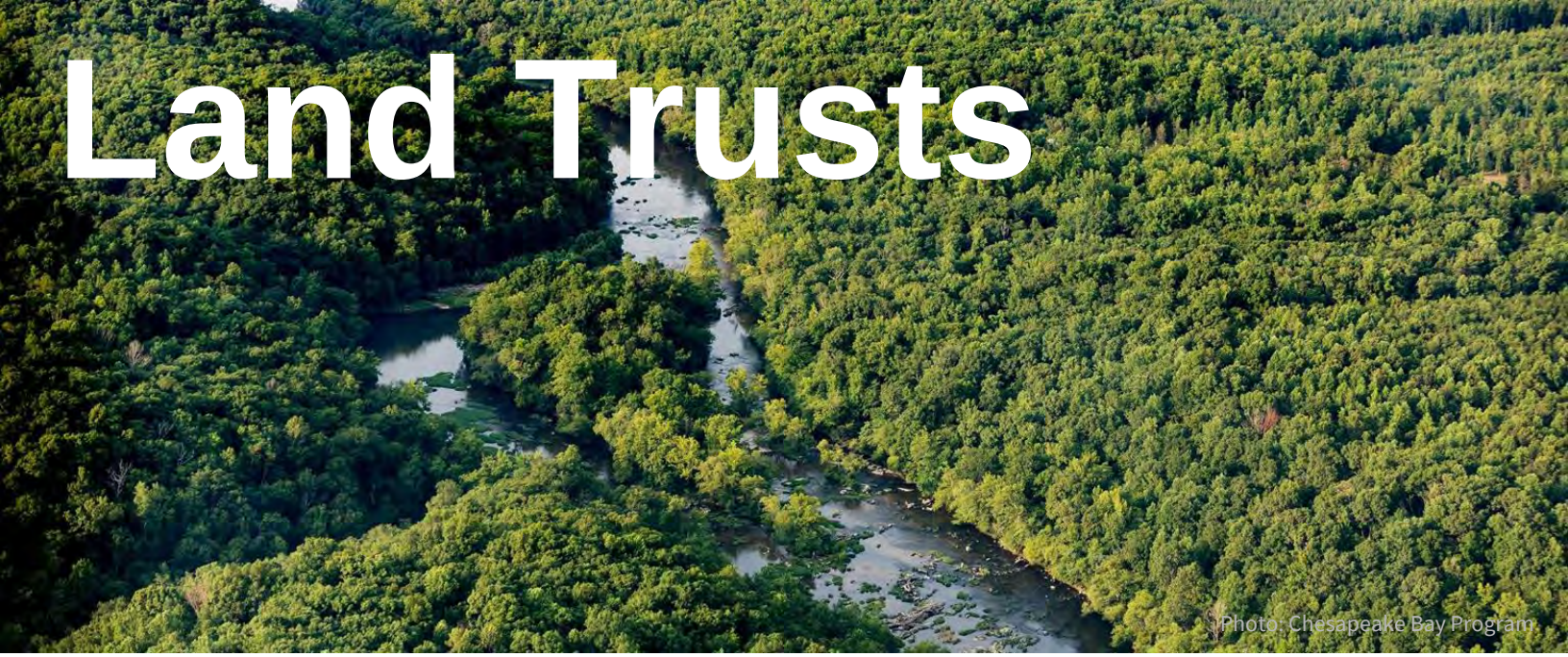


Photo: Chesapeake Bay Program

The land trust community has been protecting land for multiple values for decades. Today, some 100 regional, state, and local land trusts operate in the Chesapeake Bay watershed, collectively protecting more than 1.8 million acres of land. Many of these organizations have significant capacity to protect more important lands in the future. The additional capacity of strategic, national land conservation partners can help accelerate conservation in areas of shared interest.

How can we get a picture of where regional and local land trust capacity is currently concentrated in the watershed? Where do land trusts focus their work within their service areas? How does staff time directly translate to capacity for conservation? Where in the watershed is the land trust community interested in continuing or expanding conservation efforts?

This map illustrates land trust staff capacity based on defined service areas of land trusts at the county level.

## What we mapped

This map uses land trust staff size (in FTEs) dedicated specifically to new land conservation and to stewardship of existing conserved land as an indicator of capacity.

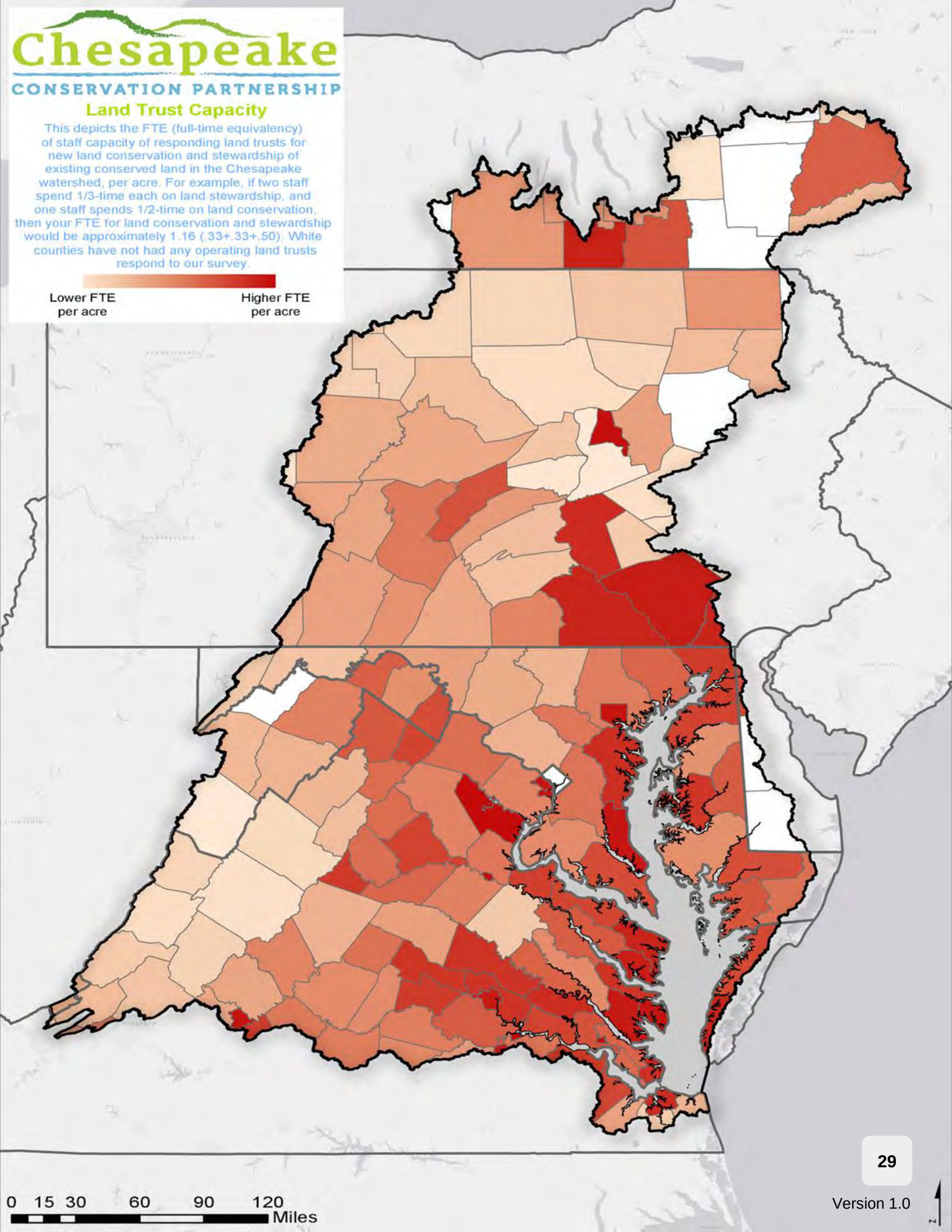
We initially considered previously collected data on overall organizational staff size from the Land Trust Alliance's National Land Trust Census in 2015. Given this would not provide us with a precise indicator of capacity dedicated primarily to land conservation and stewardship, rather than other organizational functions, we instead developed a survey specifically for this mapping exercise. The survey asked land trusts in the region with at least one half-time staff person to self-report capacity levels and county-defined service areas for land conservation and stewardship activities. We also asked land trusts where they would expand such work if staff capacity allowed. 78% (39) of land trusts surveyed responded; we estimate this captures approximately 95% of the existing staff capacity.

The maps uses this 2017 data to depict levels of land trust staff capacity, in FTEs, per county covered. There are two versions: one that includes the two major state-wide land trusts (MET and VOF) and one that does not. FTEs have been averaged across the number of counties in a defined service area. We expect to refine this approach and continue outreach and data collection for greater accuracy in future iterations of this Atlas.

## Where we stand

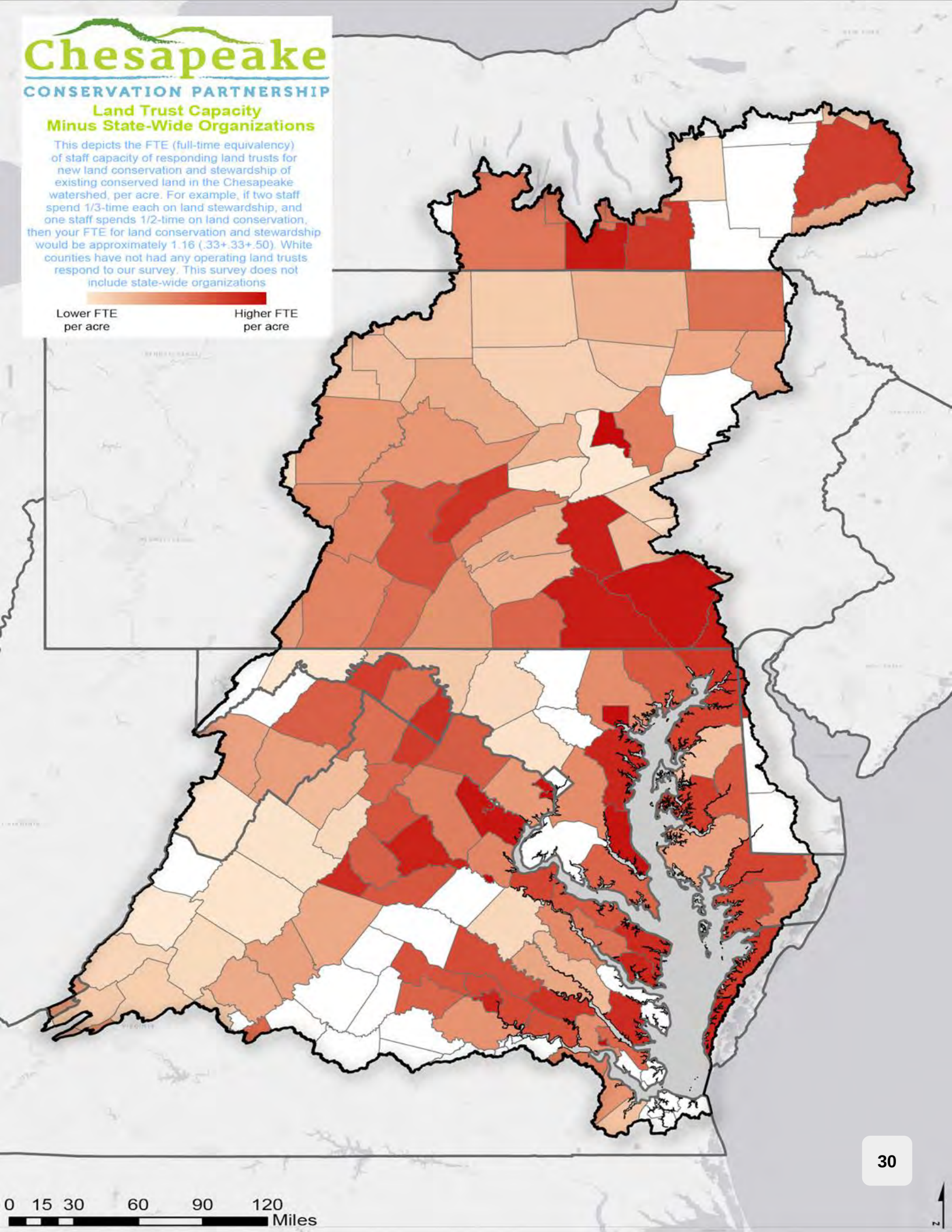
Note that only land trusts with at least one staff person (at approx. .5 FTE or more) were surveyed. While this likely captures the majority of capacity, it does not capture all of it. Volunteers, distinct from dedicated staff capacity, also play a significant role in the leadership of all-volunteer land trusts and the long-term stewardship of conserved lands. We also did not assess the impact of additional capacity provided by local and state government land conservation partners at this time. Future iterations of the mapping project may seek to expand in these directions.

Note also these maps do not include capacity provided by major national organizations such as The Conservation Fund, The Nature Conservancy, Trust for Public Land and others.


Chesapeake
CONSERVATION PARTNERSHIP
Land Trust Capacity
This depicts the FTE (full-time equivalency) of staff capacity of responding land trusts for new land conservation and stewardship of existing conserved land in the Chesapeake watershed, per acre. For example, if two staff spend 1/3-time each on land stewardship, and one staff spends 1/2-time on land conservation, then your FTE for land conservation and stewardship would be approximately 1.16 (.33+.33+.50). White counties have not had any operating land trusts respond to our survey.
Lower FTE per acre
Higher FTE per acre
0 15 30 60 90 120
Miles



Version 1.0


Chesapeake
CONSERVATION PARTNERSHIP
Land Trust Capacity
Minus State-Wide Organizations
This depicts the FTE (full-time equivalency) of staff capacity of responding land trusts for new land conservation and stewardship of existing conserved land in the Chesapeake watershed, per acre. For example, if two staff spend 1/3-time each on land stewardship, and one staff spends 1/2-time on land conservation, then your FTE for land conservation and stewardship would be approximately 1.16 (.33+.33+.50). White counties have not had any operating land trusts respond to our survey. This survey does not include state-wide organizations
Lower FTE per acre
Higher FTE per acre
0 15 30 60 90 120
Miles

# Focal Areas


Where are the *existing* focal areas of conservation work within the Chesapeake watershed? In other words, where are the landscapes that already have an on-going recognized, dedicated effort to conserve additional lands?

This map is a second generation answer to this question, revised from initial work performed by the partnership in 2012.

There may be opportunities for leveraging and amplifying conservation work in these locales due to their existing capacity. Simultaneously, we should look at high priority areas *not* shown on this map and ask "what needs to be done to bring about the kind of capacity these focal areas already have.

## What we mapped

This map illustrates landscapes within the Chesapeake watershed that hold the following characteristics:

1. They are fairly large and iconic in their own right (i.e. multijurisdictional, at least at the county level; recognizable and known as a landscape unit; reflecting multiple values (natural, cultural, historical, recreational);
2. They are the focus of active collaborative conservation efforts (e.g. designated or formally recognized by state and/or federal governments; already synergy among multiple partners engaged in conservation and related activities; demonstrated capacity for active collaboration); and
3. They include existing anchors of protected land from which to build.

The focal areas mapped so far represent a mix of different on-going landscape level efforts. They are depicted in the map in the following general groupings:

*Pennsylvania Conservation Landscapes:* Five designated collaborative landscape conservation areas.

*Heritage Areas with a Conservation Focus:* Two state and two national heritage areas have a landscape conservation emphasis.

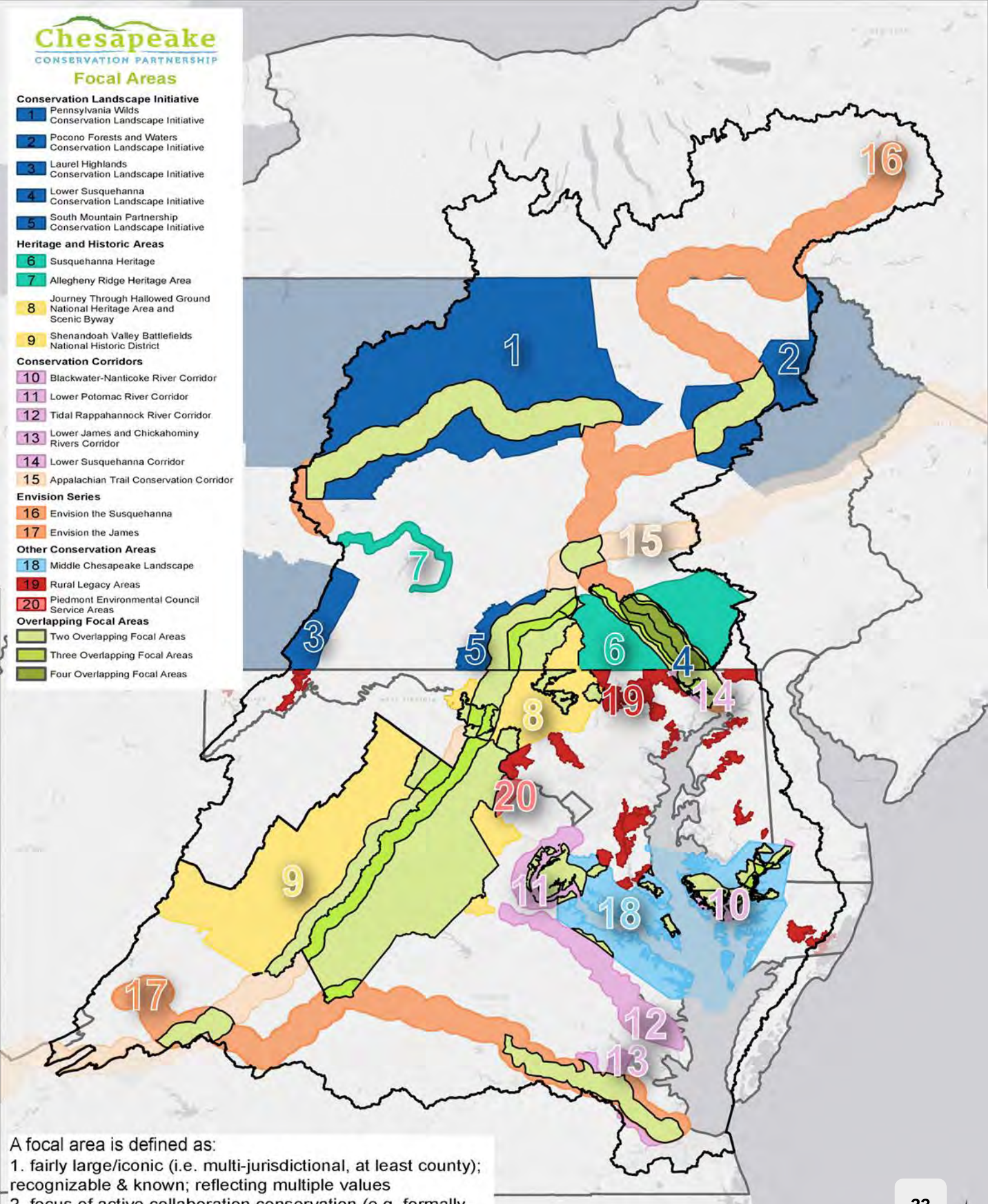
*Conservation Corridors:* Several corridors have ongoing collaborative conservation efforts, such as along two national trails.

*Other Areas:* There are several other related on-going landscape conservation efforts.

The map also depicts overlaps between focal areas, possibly suggesting areas with high recognition of the need for on-going work.

## Where we stand

It is likely this map is incomplete and that there are additional landscapes meeting our focal area definition. Additional existing focal areas should be identified and included, to capture a full range of conservation efforts and their overlaps.



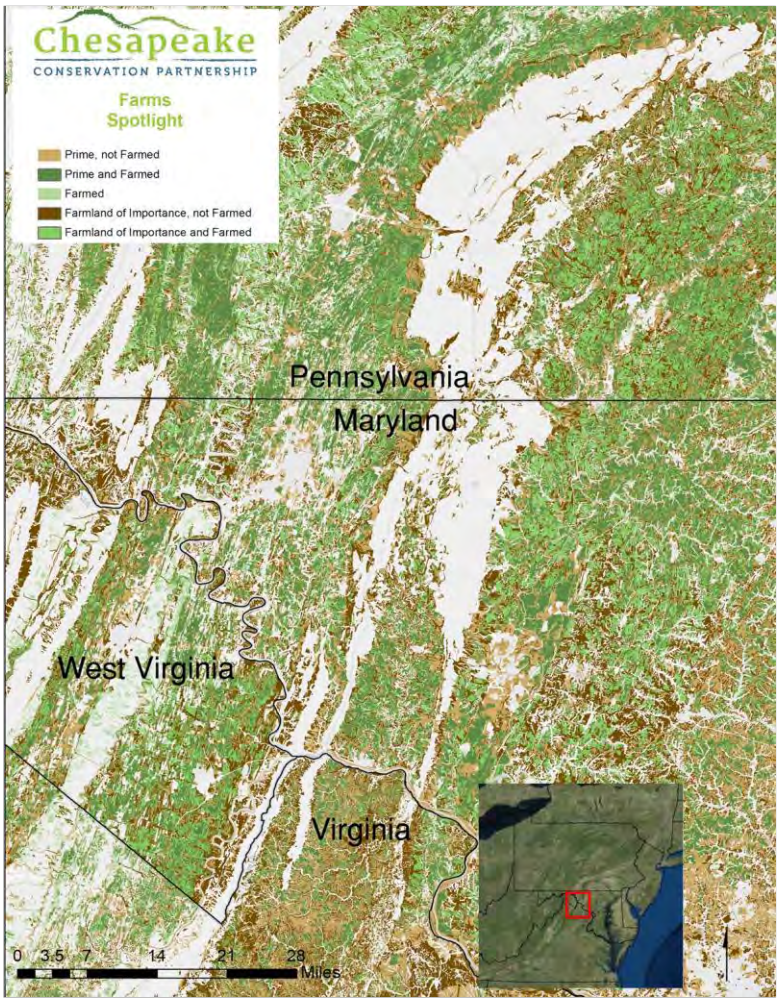

A focal area is defined as:
1. fairly large/iconic (i.e. multi-jurisdictional, at least county); recognizable & known; reflecting multiple values
2. focus of active collaboration conservation (e.g. formally identified by state and/or federal governments; already synergy among multiple partners)
3. include existing anchors of protected lands

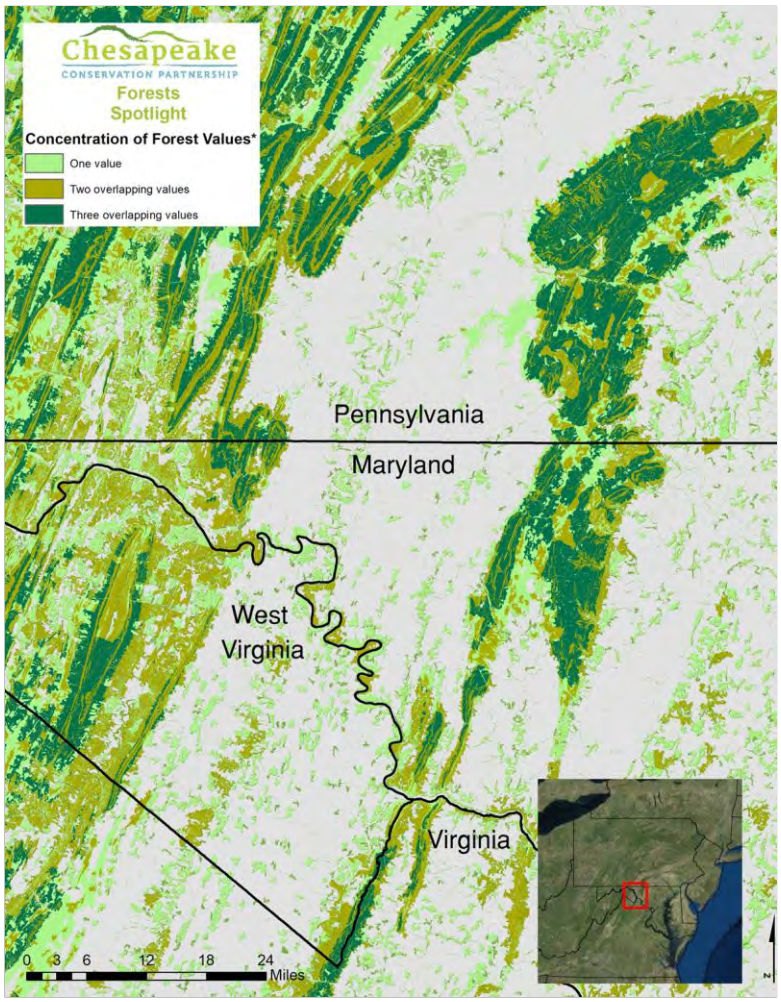
Version 1.1

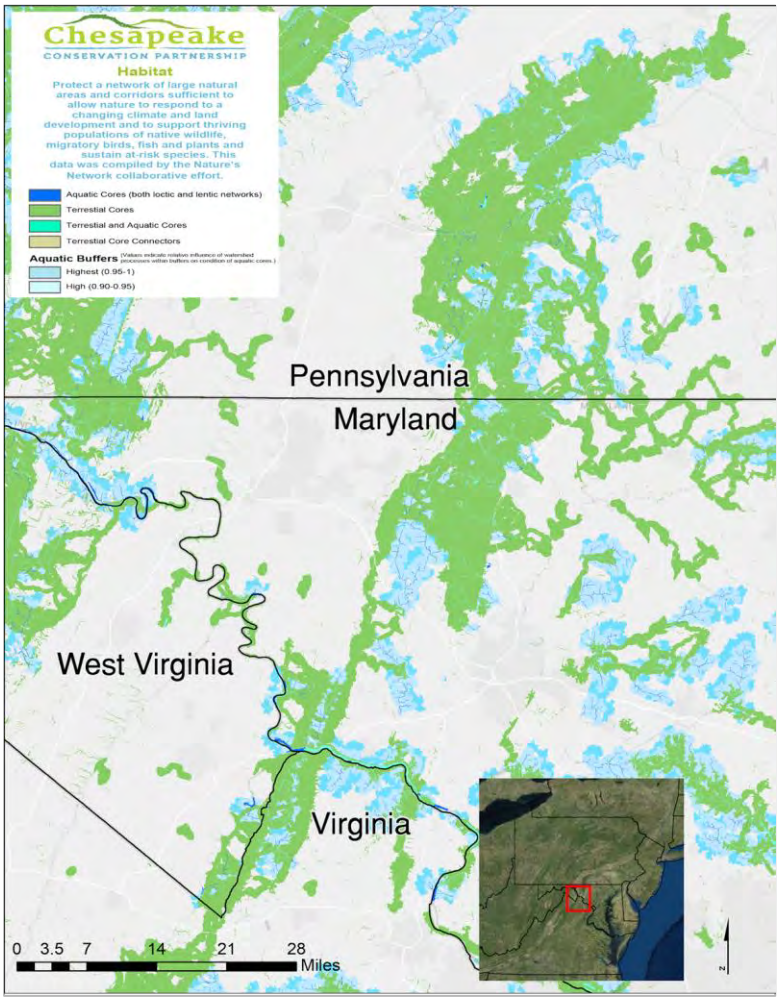
# A Closer View: One Example

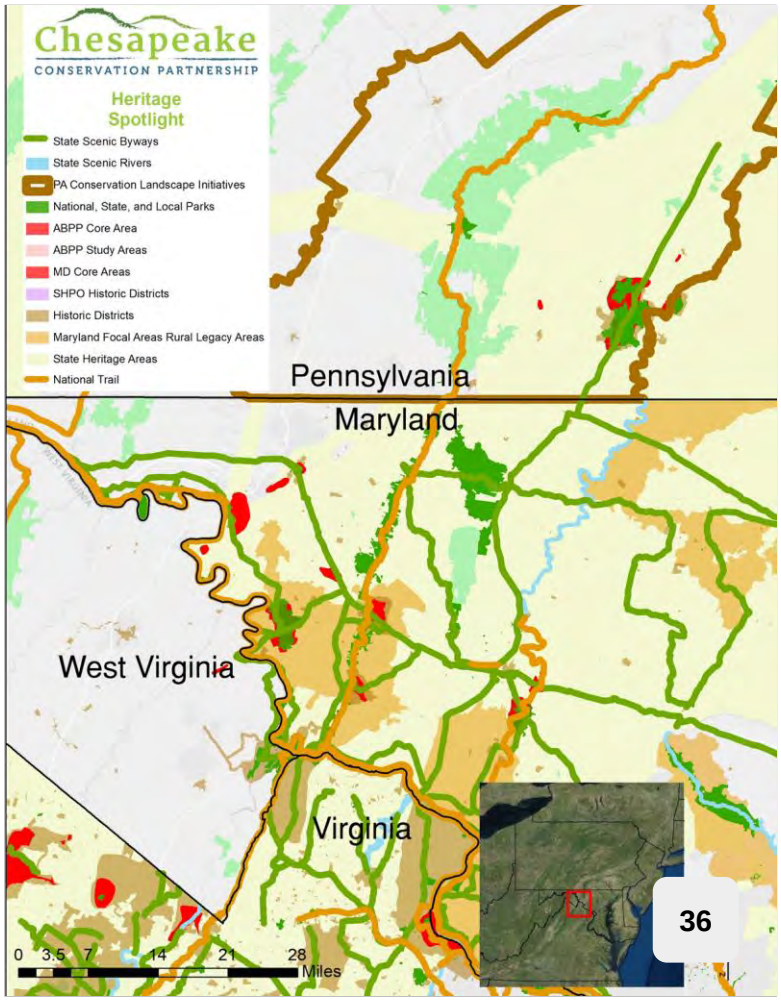
Photo:Nicholas Tonelli

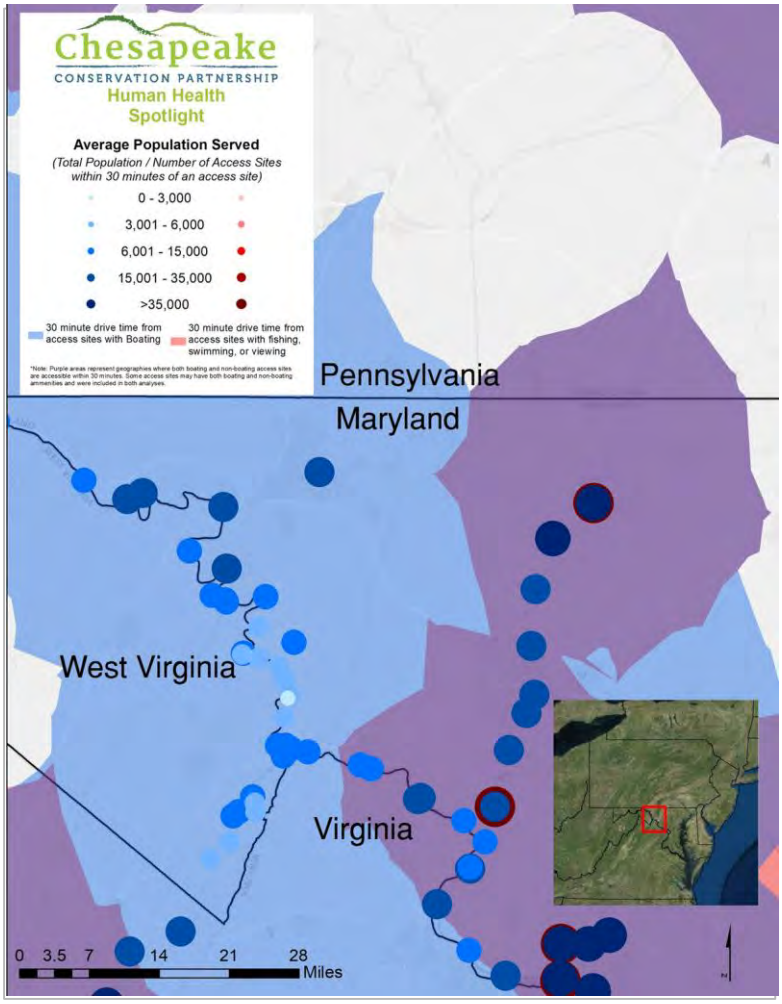
Viewing maps at the Chesapeake watershed-wide scale is informative, but a lot of detail is not readily apparent. Many of the partnership's maps are highly scalable. Viewing them on LandScope Chesapeake allows scaling to a variety of levels. For this atlas, we have chosen to drill down to one landscape to illustrate a bit more of the content these maps provide. The following pages give an image of one landscape chosen because it represents four of the six states.

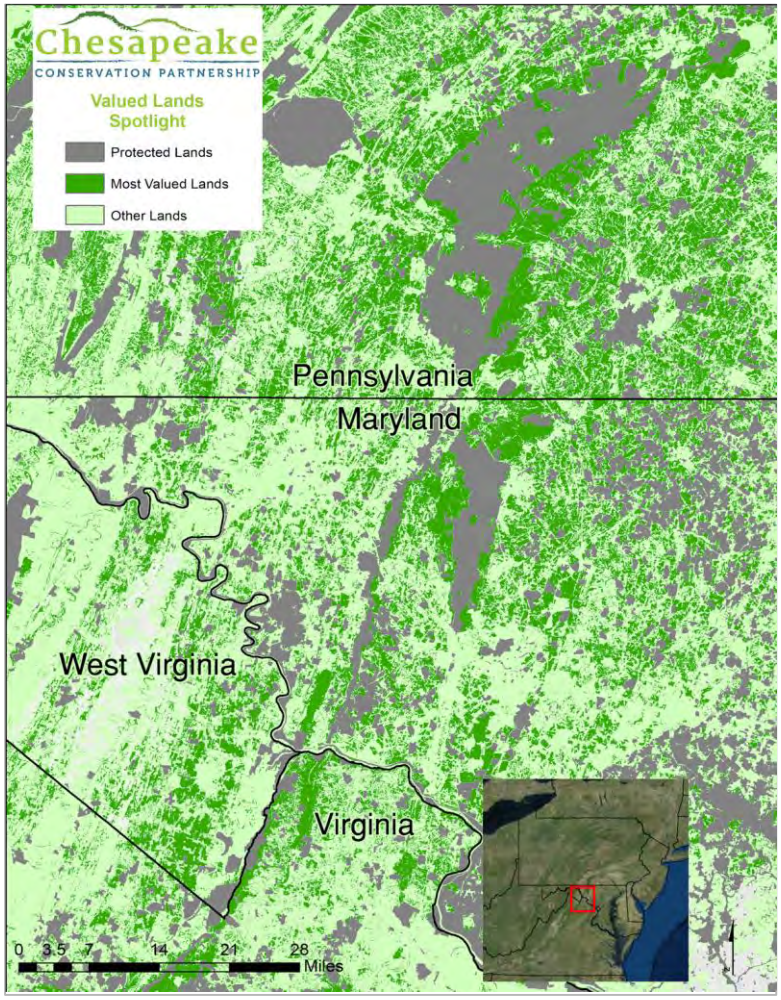

Chesapeake
CONSERVATION PARTNERSHIP
Farms
Spotlight
Prime, not Farmed
Prime and Farmed
Farmed
Farmland of Importance, not Farmed
Farmland of Importance and Farmed
Pennsylvania
Maryland
West Virginia
Virginia
0 3.5 7 14 21 28
Miles

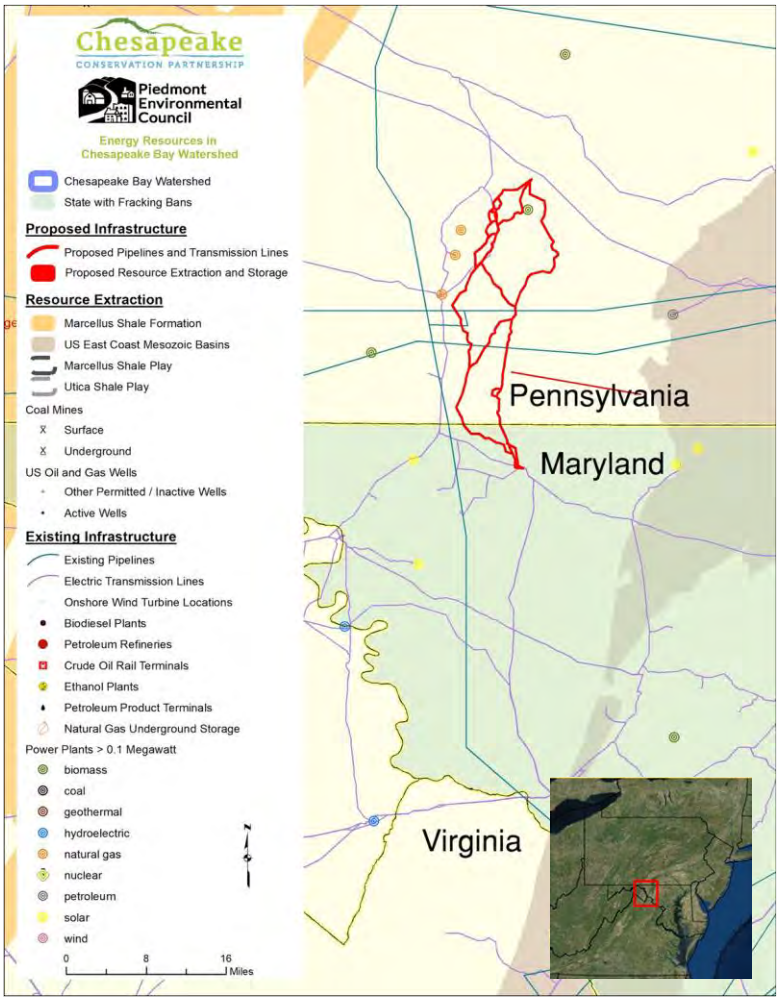

Chesapeake
CONSERVATION PARTNERSHIP
Forests
Spotlight
Concentration of Forest Values*
One value
Two overlapping values
Three overlapping values
Pennsylvania
Maryland
West
Virginia
Virginia
0 3 6 12 18 24
Miles

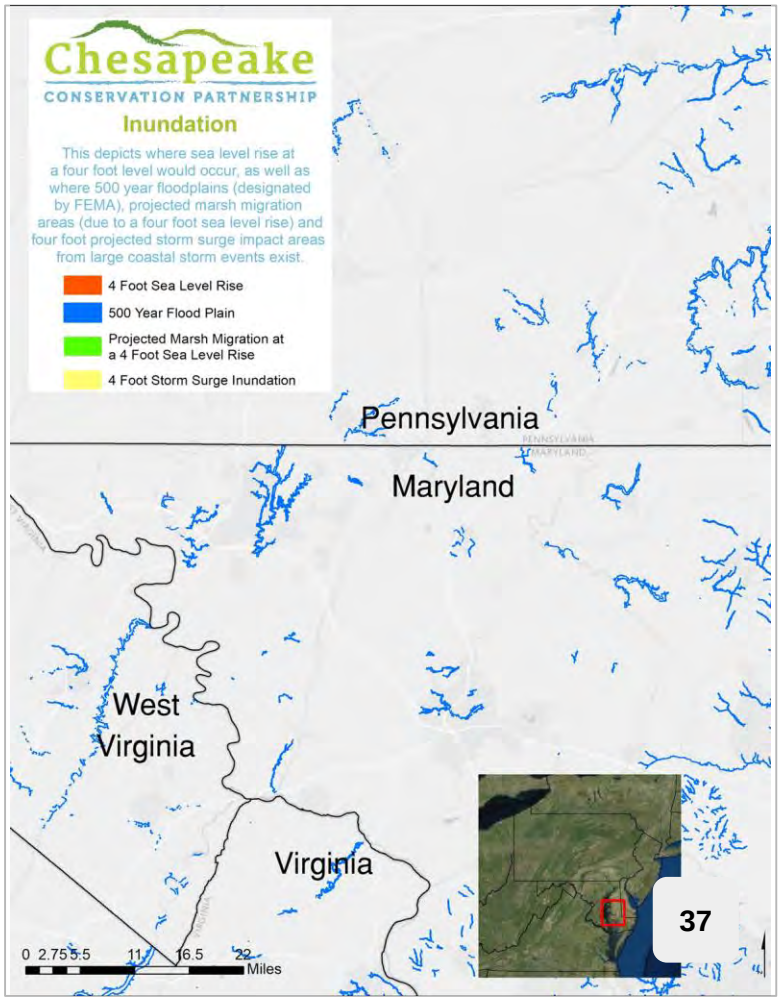

Chesapeake
CONSERVATION PARTNERSHIP
Habitat
Protect a network of large natural areas and corridors sufficient to allow nature to respond to a changing climate and land development and to support thriving populations of native wildlife, migratory birds, fish and plants and sustain at-risk species. This data was compiled by the Nature's Network collaborative effort.
Aquatic Cores (both loctic and lentic networks)
Terrestial Cores
Terrestial and Aquatic Cores
Terrestial Core Connectors
Aquatic Buffers
Highest (0.95-1)
High (0.90-0.95)
Pennsylvania
Maryland
West Virginia
Virginia
0 3.5 7 14 21 28
Miles

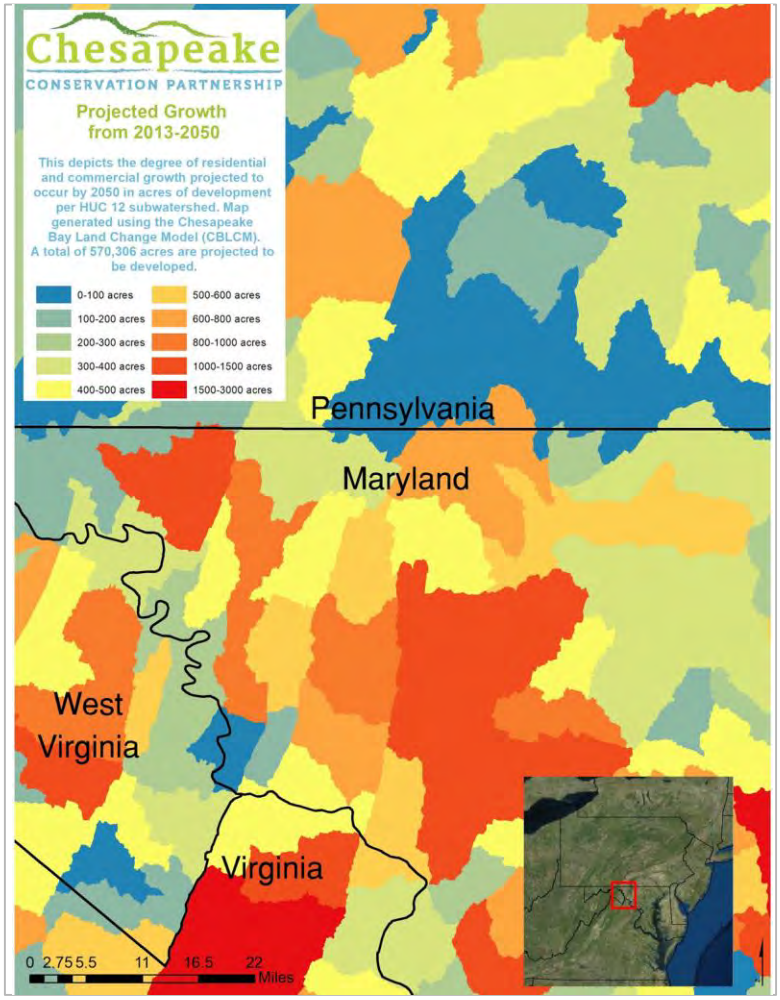

Chesapeake
CONSERVATION PARTNERSHIP
Heritage
Spotlight
State Scenic Byways
State Scenic Rivers
PA Conservation Landscape Initiatives
National, State, and Local Parks
ABPP Core Area
ABPP Study Areas
MD Core Areas
SHPO Historic Districts
Historic Districts
Maryland Focal Areas Rural Legacy Areas
State Heritage Areas
National Trail
Pennsylvania
Maryland
West Virginia
Virginia
0 3.5 7 14 21 28
Miles

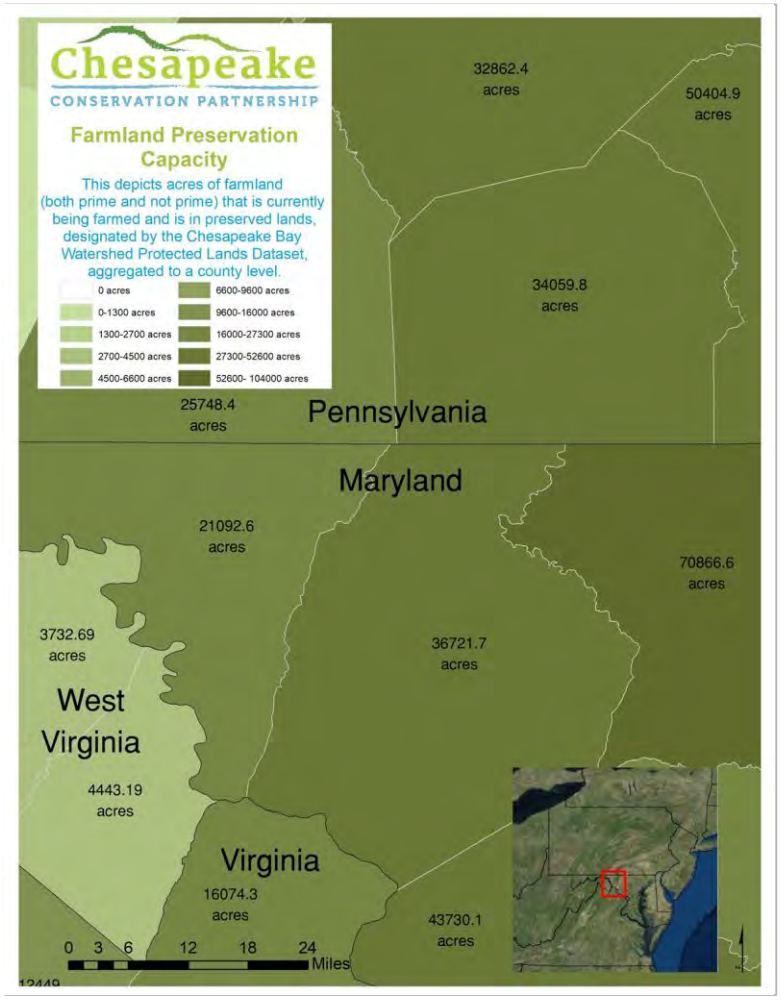

Chesapeake
CONSERVATION PARTNERSHIP
Human Health
Spotlight
Average Population Served
(Total Population / Number of Access Sites within 30 minutes of an access site)
0 - 3,000
3,001 - 6,000
6,001 - 15,000
15,001 - 35,000
>35,000
30 minute drive time from access sites with Boating
30 minute drive time from access sites with fishing, swimming, or viewing
Pennsylvania
Maryland
West Virginia
Virginia
0 3.5 7 14 21 28
Miles

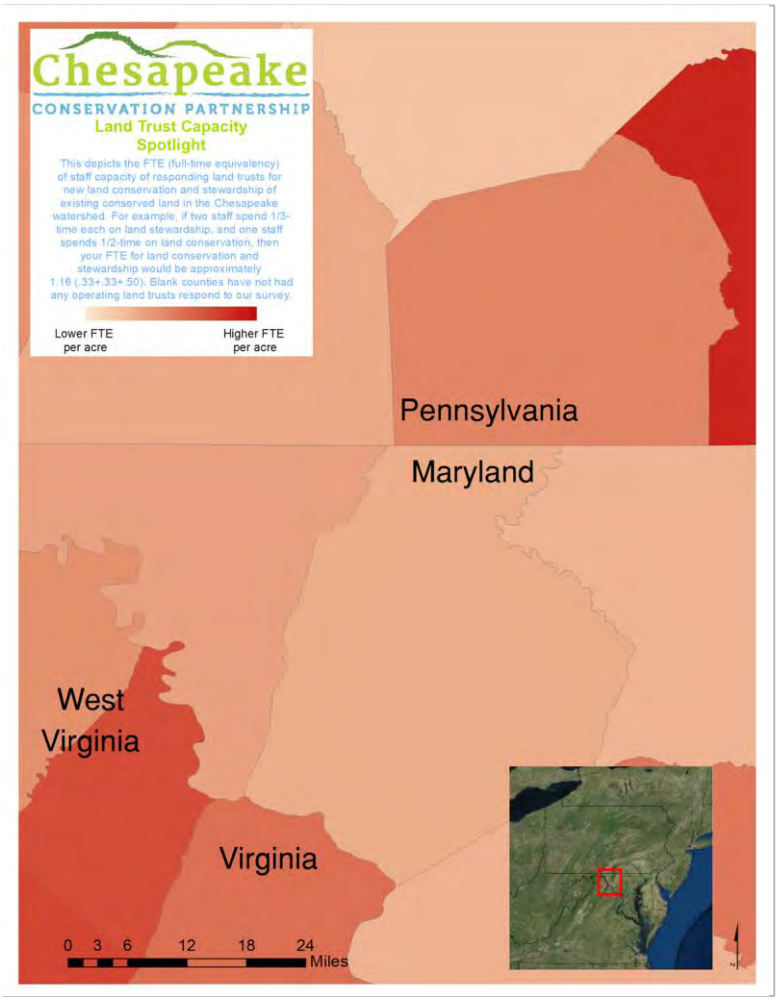

Chesapeake
CONSERVATION PARTNERSHIP
Valued Lands
Spotlight
Protected Lands
Most Valued Lands
Other Lands
Pennsylvania
Maryland
West Virginia
Virginia
0 3.5 7 14 21 28
Miles

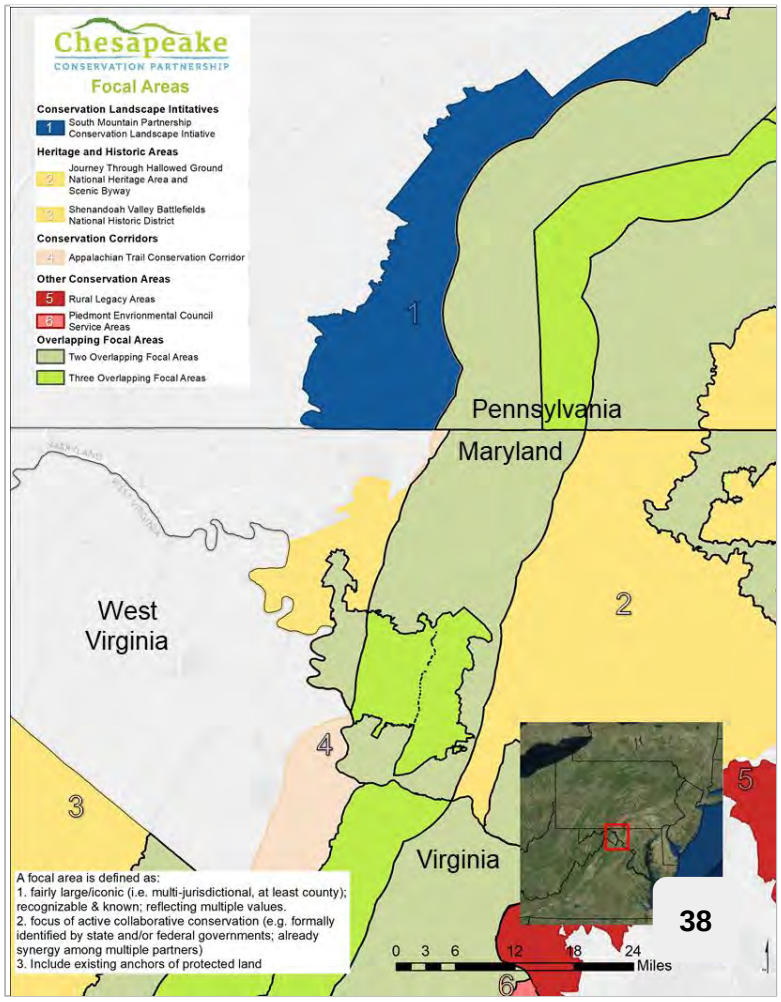

Chesapeake
CONSERVATION PARTNERSHIP
Piedmont Environmental Council
Energy Resources in Chesapeake Bay Watershed
Chesapeake Bay Watershed
State with Fracking Bans
Proposed Infrastructure
Proposed Pipelines and Transmission Lines
Proposed Resource Extraction and Storage
Resource Extraction
Marcellus Shale Formation
US East Coast Mesozoic Basins
Marcellus Shale Play
Utica Shale Play
Coal Mines
Surface
Underground
US Oil and Gas Wells
Other Permitted / Inactive Wells
Active Wells
Existing Infrastructure
Existing Pipelines
Electric Transmission Lines
Onshore Wind Turbine Locations
Biodiesel Plants
Petroleum Refineries
Crude Oil Rail Terminals
Ethanol Plants
Petroleum Product Terminals
Natural Gas Underground Storage
Power Plants > 0.1 Megawatt
biomass
coal
geothermal
hydroelectric
natural gas
nuclear
petroleum
solar
wind
0 8 16
Miles
Pennsylvania
Maryland
Virginia


Chesapeake
CONSERVATION PARTNERSHIP
Inundation
This depicts where sea level rise at a four foot level would occur, as well as where 500 year floodplains (designated by FEMA), projected marsh migration areas (due to a four foot sea level rise) and four foot projected storm surge impact areas from large coastal storm events exist.
4 Foot Sea Level Rise
500 Year Flood Plain
Projected Marsh Migration at a 4 Foot Sea Level Rise
4 Foot Storm Surge Inundation
Pennsylvania
Maryland
West Virginia
Virginia
0 2.75 5.5 11 16.5 22
Miles

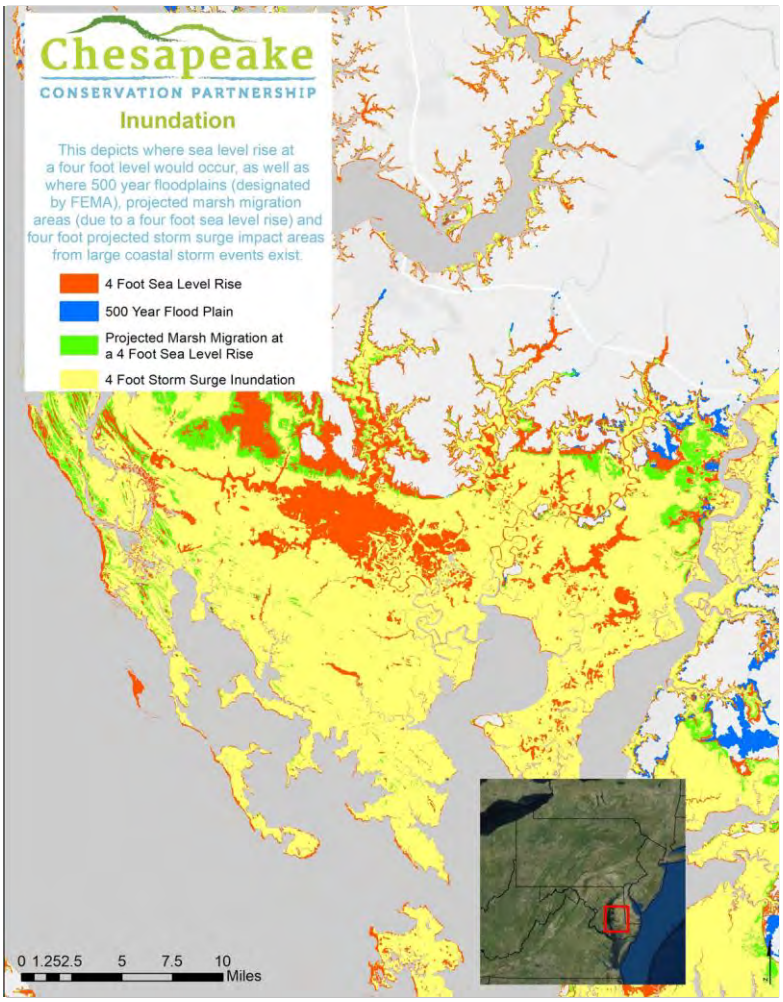

Chesapeake
CONSERVATION PARTNERSHIP
Projected Growth from 2013-2050
This depicts the degree of residential and commercial growth projected to occur by 2050 in acres of development per HUC 12 subwatershed. Map generated using the Chesapeake Bay Land Change Model (CBLCM). A total of 570,306 acres are projected to be developed.
0-100 acres
100-200 acres
200-300 acres
300-400 acres
400-500 acres
500-600 acres
600-800 acres
800-1000 acres
1000-1500 acres
1500-3000 acres
Pennsylvania
Maryland
West Virginia
Virginia
0 2.75 5.5 11 16.5 22 Miles


Chesapeake
CONSERVATION PARTNERSHIP
Farmland Preservation Capacity
This depicts acres of farmland (both prime and not prime) that is currently being farmed and is in preserved lands, designated by the Chesapeake Bay Watershed Protected Lands Dataset, aggregated to a county level.
0 acres
0-1300 acres
1300-2700 acres
2700-4500 acres
4500-6600 acres
6600-9600 acres
9600-16000 acres
16000-27300 acres
27300-52600 acres
52600- 104000 acres
32862.4 acres
50404.9 acres
34059.8 acres
25748.4 acres
Pennsylvania
Maryland
21092.6 acres
70866.6 acres
3732.69 acres
36721.7 acres
West Virginia
4443.19 acres
Virginia
16074.3 acres
43730.1 acres
0 3 6 12 18 24 Miles


Chesapeake
CONSERVATION PARTNERSHIP
Land Trust Capacity Spotlight
This depicts the FTE (full-time equivalency) of staff capacity of responding land trusts for new land conservation and stewardship of existing conserved land in the Chesapeake watershed. For example, if two staff spend 1/3-time each on land stewardship, and one staff spends 1/2-time on land conservation, then your FTE for land conservation and stewardship would be approximately 1.16 (.33+.33+.50). Blank counties have not had any operating land trusts respond to our survey.
Lower FTE per acre
Higher FTE per acre
Pennsylvania
Maryland
West Virginia
Virginia
0 3 6 12 18 24 Miles


Chesapeake
CONSERVATION PARTNERSHIP
Focal Areas
Conservation Landscape Intitatives
1 South Mountain Partnership Conservation Landscape Intiative
Heritage and Historic Areas
2 Journey Through Hallowed Ground National Heritage Area and Scenic Byway
3 Shenandoah Valley Battlefields National Historic District
Conservation Corridors
4 Appalachian Trail Conservation Corridor
Other Conservation Areas
5 Rural Legacy Areas
6 Piedmont Envrionmental Council Service Areas
Overlapping Focal Areas
Two Overlapping Focal Areas
Three Overlapping Focal Areas
Pennsylvania
Maryland
West Virginia
Virginia
A focal area is defined as:
1. fairly large/iconic (i.e. multi-jurisdictional, at least county); recognizable & known; reflecting multiple values.
2. focus of active collaborative conservation (e.g. formally identified by state and/or federal governments; already synergy among multiple partners)
3. Include existing anchors of protected land
0 3 6 12 18 24 Miles

Additional Inundation map view: Many of the features of the inundation map are not present in the selected view area. This map illustrates a portion of the Eastern Shore where all map features are represented.



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