West Virginia

UTC Assessment & Enhancement

Bay UTC Summit 2014

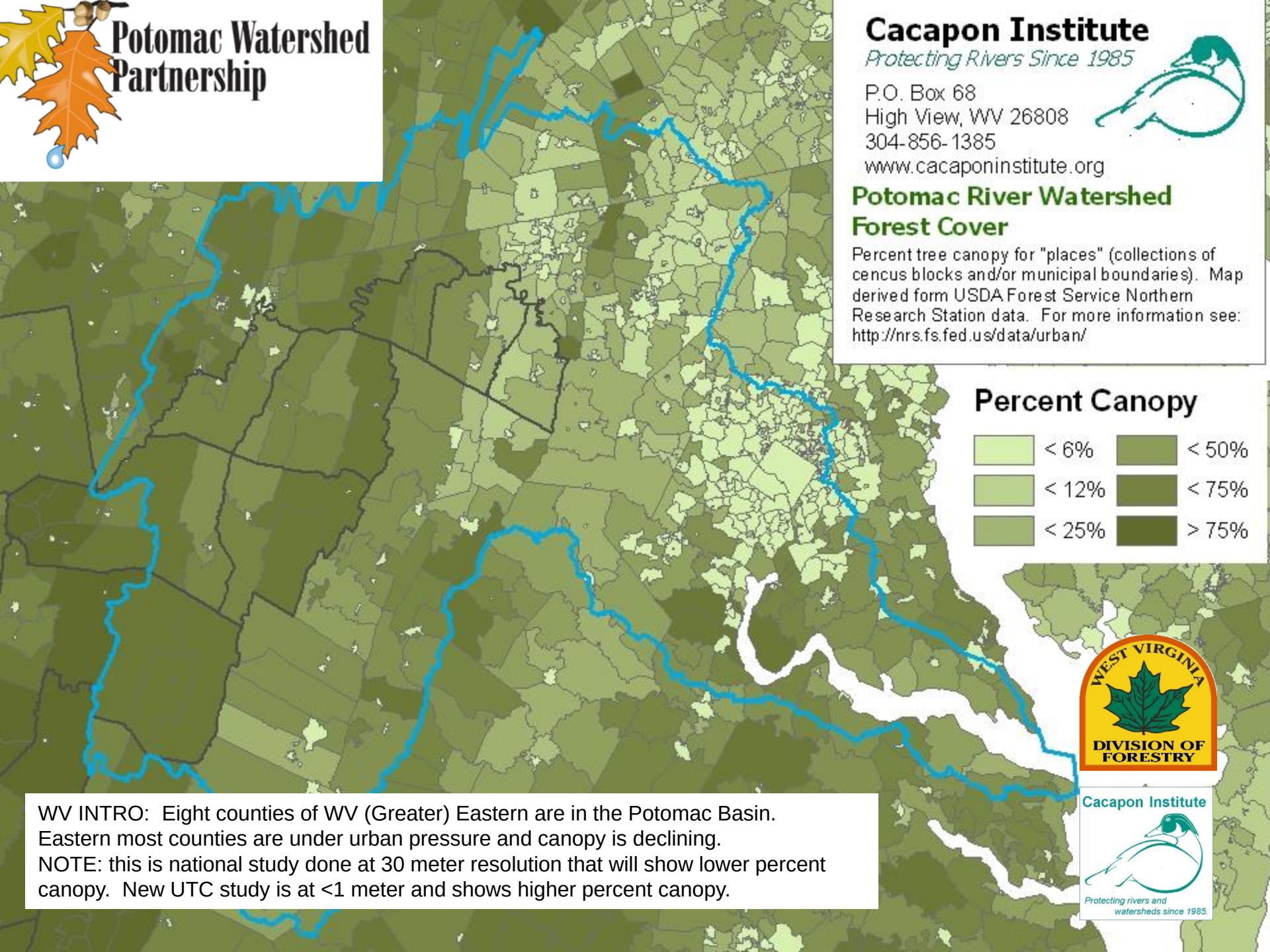
Chesapeake Bay Program
Science. Restoration. Partnership.

FOREST SERVICE U S DEPARTMENT OF AGRICULTURE

WEST VIRGINIA DIVISION OF FORESTRY

Cacapon Institute
Protecting rivers and watersheds since 1985.

This presentation, the reports mentioned within, and more on WV Project CommuniTree, PHLOW, and WV Urban Forestry available at **CacaponInstitute.org**



WV INTRO: Eight counties of WV (Greater) Eastern are in the Potomac Basin. Eastern most counties are under urban pressure and canopy is declining.
NOTE: this is national study done at 30 meter resolution that will show lower percent canopy. New UTC study is at <1 meter and shows higher percent canopy.

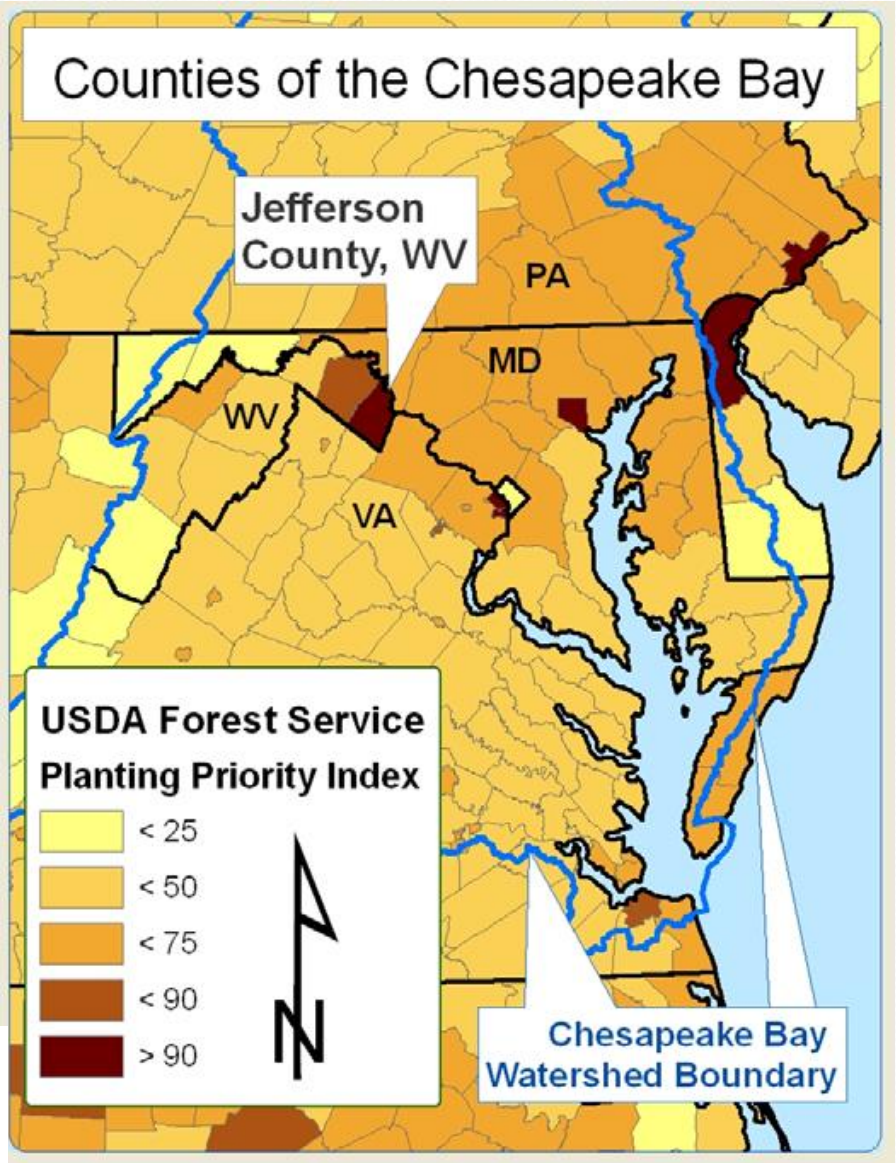
USDA Forest Service 2010 PPI

PPI Rankings

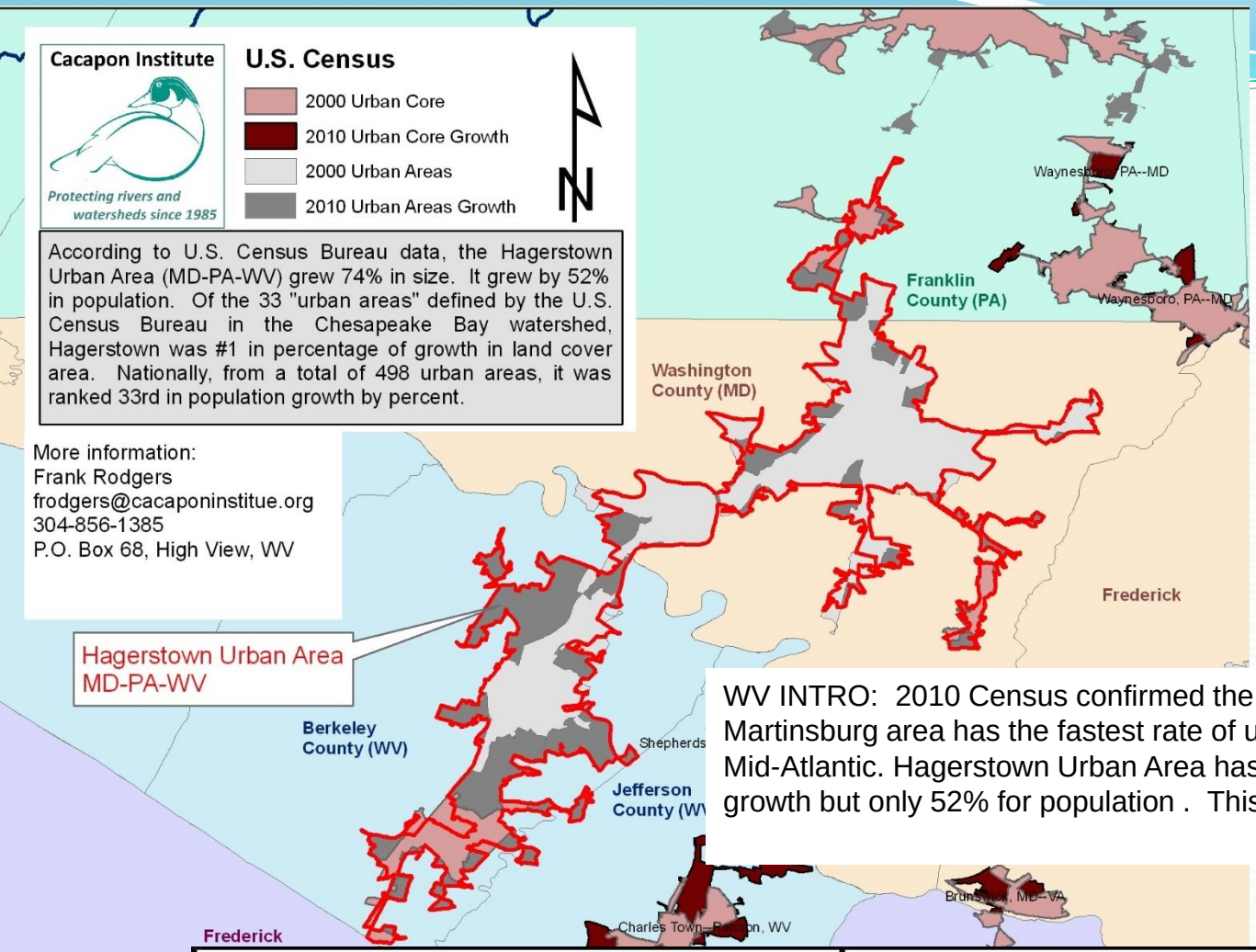
- **Berkeley = 87.5%**
- **Jefferson = 93.8%**

Based on:

- **Population density**
- **Canopy Green Space**
- **Tree Canopy Cover per Capita**



WV INTO: In 2010 USDA Forest Service identified Berkeley & Jefferson as "Planting Priority" areas nationally.



GROWTH
74% Land Area
52% Population

WV INTRO: 2010 Census confirmed the PPI Index Findings. The I-81 Martinsburg area has the fastest rate of urban landcover growth in the Mid-Atlantic. Hagerstown Urban Area has a 74% rate of urban land growth but only 52% for population . This is indicative of urban sprawl.

Urban Area Name	Land Area (Sq miles)				Pop	
	Percent Change	2010	2000	Change	Percent Change	2010
Hagerstown, MD--WV--PA	74	133	77	57	52	1826
Salisbury, MD--DE	65	71	43	28	65	980
Lebanon, PA	51	45	30	15	21	770
Waldorf, MD	47	68	46	22	47	1099
Lexington Park--California--Chesapeake Ranch Estates, MD	43	50	35	15	36	588

“The Chesapeake Bay watershed has lost forestland at a rate of 100 acres per day since the mid-1980s.”

State of the Chesapeake Forests
The Conservation Fund, 2006

WV INTO: “Urban pressure” on WV also includes large-scale transportation and urban infrastructure projects that serve the surrounding urban populations on the East Cost. Power line transmissions are an example.

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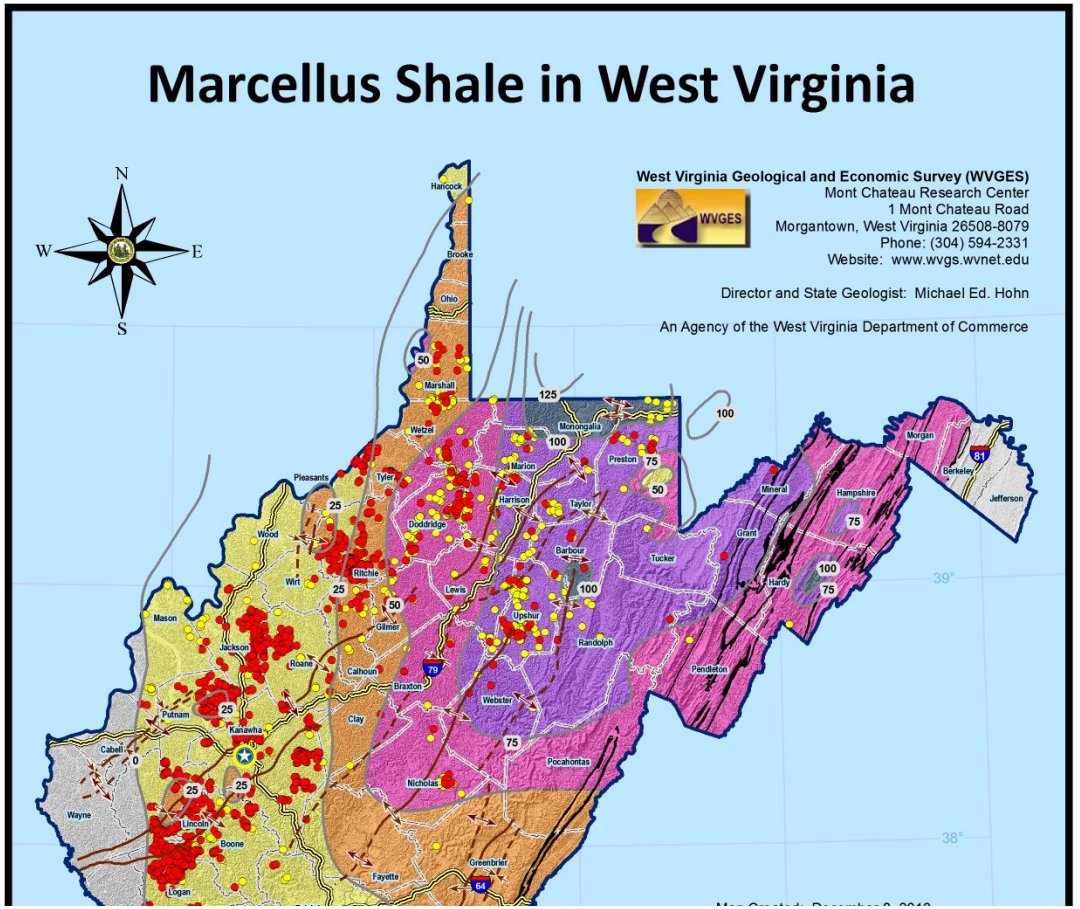
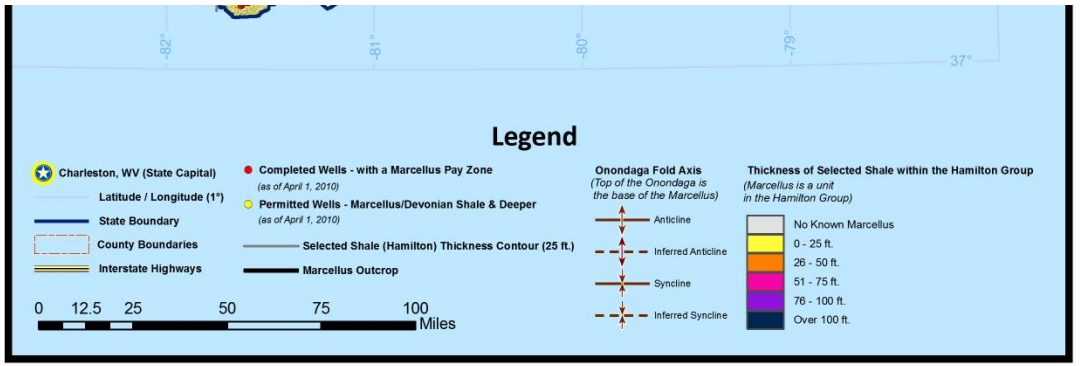
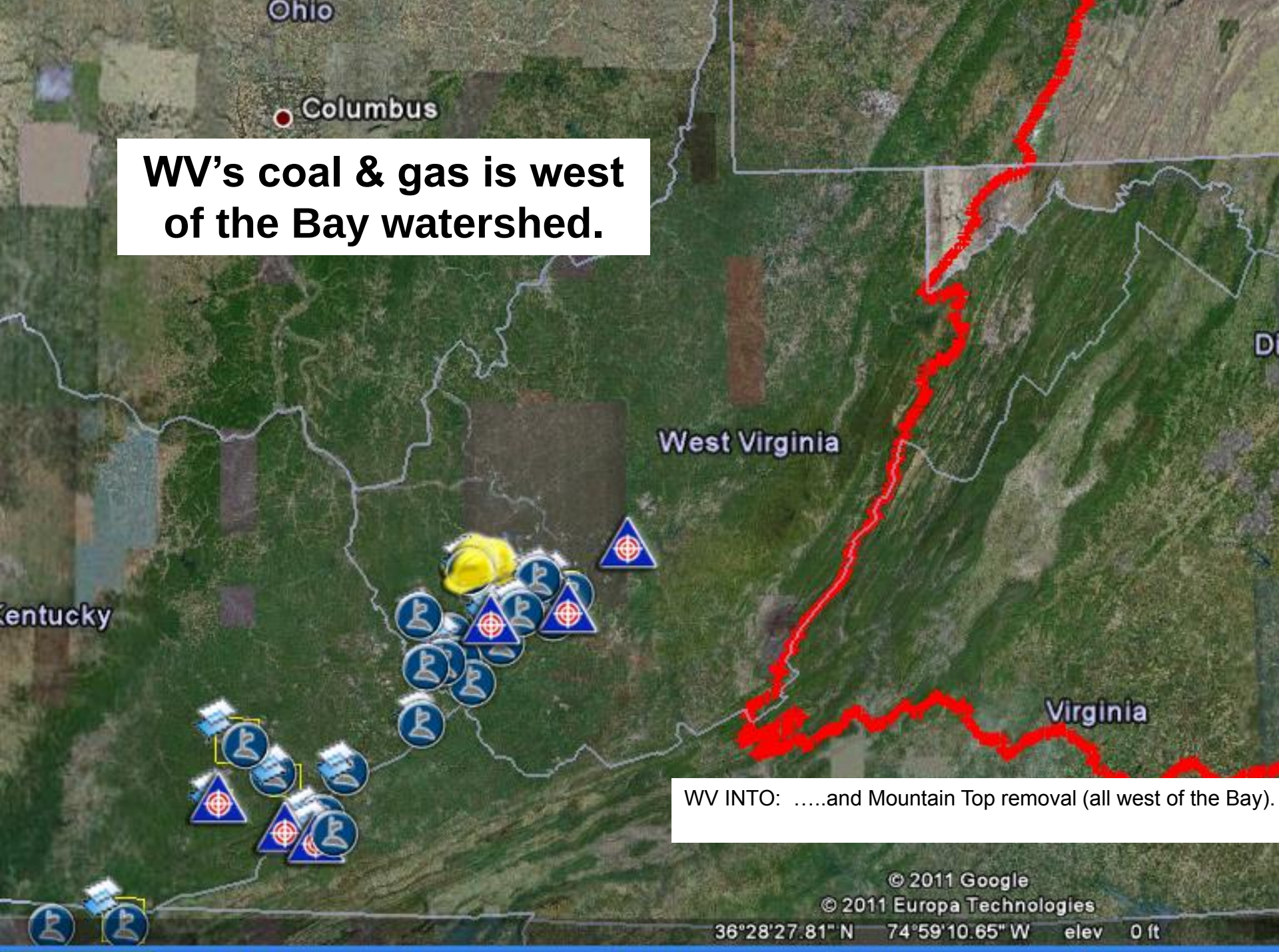
WV's coal & gas is west of the Bay watershed.



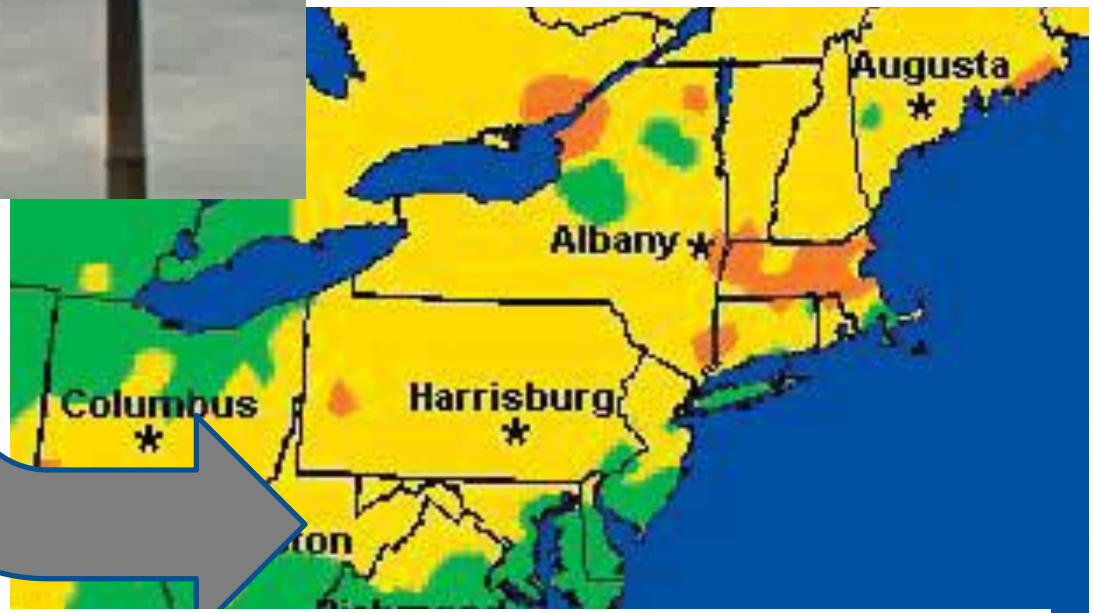
WV INTO: State-wide, the Bay watershed is only eight of 54 counties. WVDEP is preoccupied with pressing issues west of the Bay watershed such as Marcellus drilling……



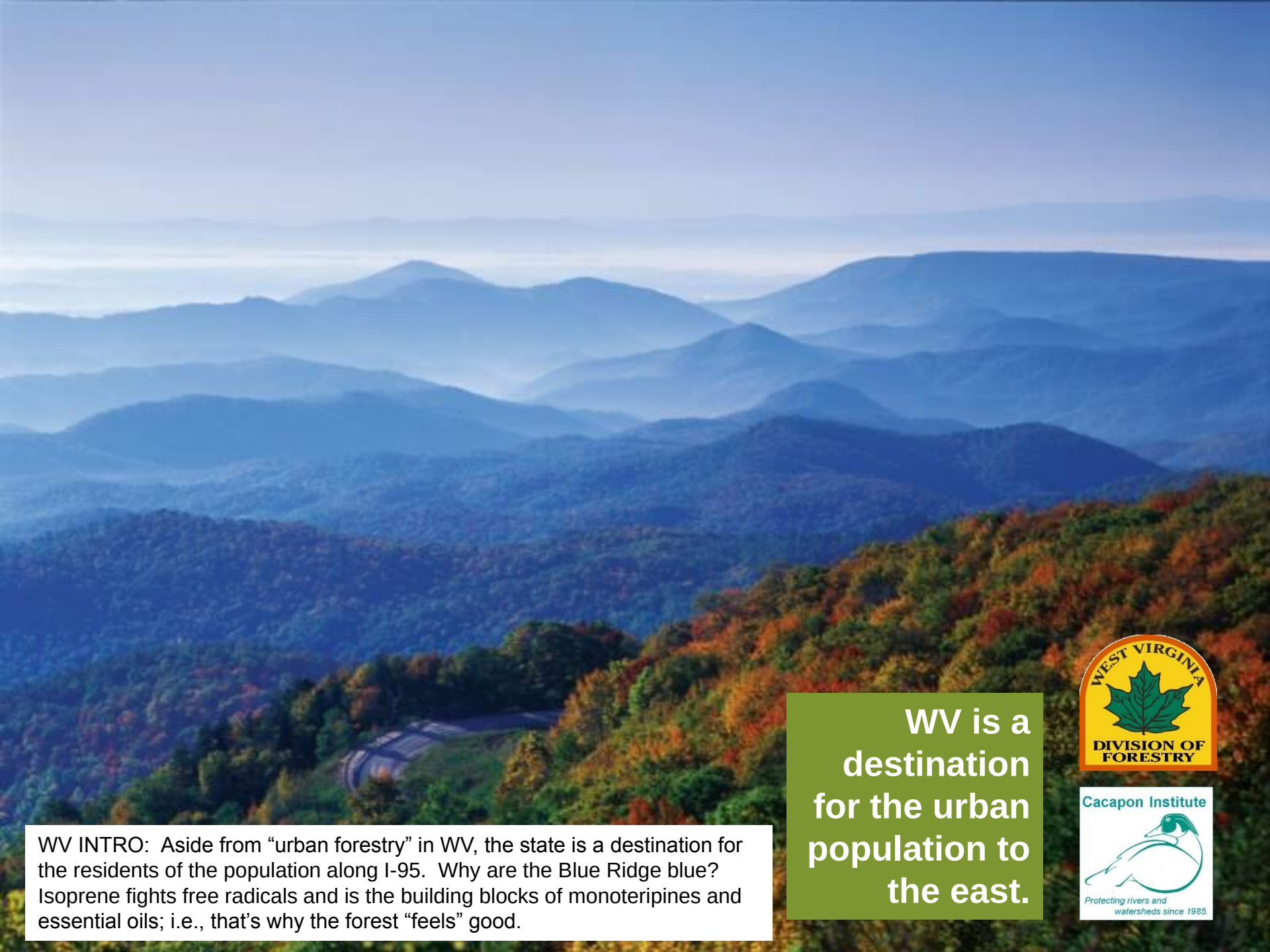

Ohio
Columbus
WV's coal & gas is west of the Bay watershed.
West Virginia
Kentucky
Virginia
WV INTO: …..and Mountain Top removal (all west of the Bay).
© 2011 Google
© 2011 Europa Technologies
36°28'27.81" N 74°59'10.65" W elev 0 ft

WV and the Bay. Up to 15% of nitrogen is from the west.

Jefferson Counties air is worse than Baltimore or D.C.'s air.



WV INTRO: 1. While only eight counties are WITHIN the Bay watershed, WV has a large impact on the Bay. Up to 30% of nitrogen in the Bay comes from atmospheric deposition and half of that comes from the Ohio Valley. 2. Air quality in Berkeley & Jefferson county can be worse than Baltimore or D.C. (see yellow).



WV is a destination for the urban population to the east.

WV INTRO: Aside from “urban forestry” in WV, the state is a destination for the residents of the population along I-95. Why are the Blue Ridge blue? Isoprene fights free radicals and is the building blocks of monoteripines and essential oils; i.e., that’s why the forest “feels” good.

Urban Forestry in WV

ACCOMPLISHMENTS:

- **UTC Studies**
- **Plans & Goals**
- **i-Tree Street, Canopy & View in use**

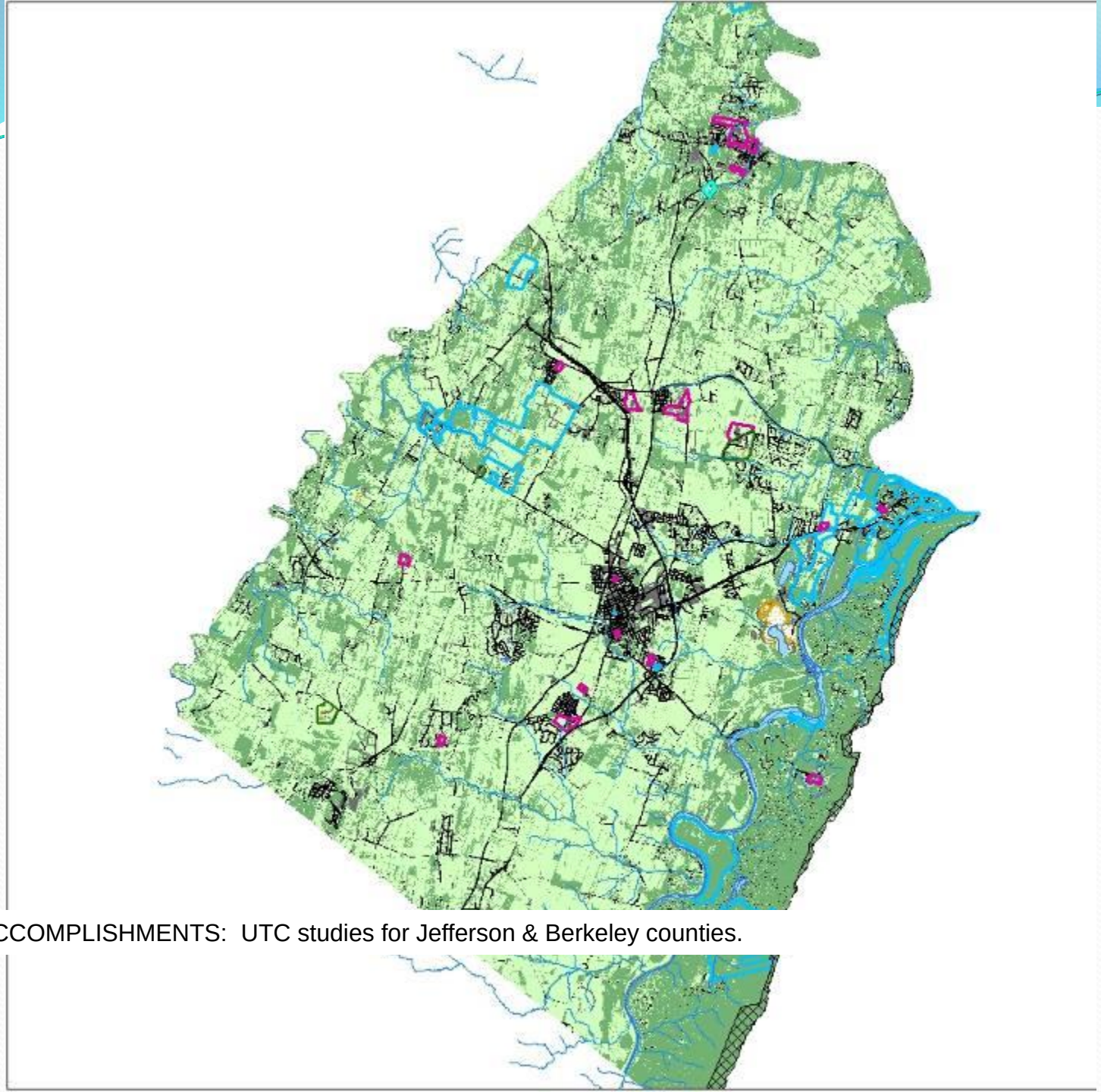
STRATEGIES

- **WV Bay Tree Grants**
- **WV Project CommuniTree**
- **PHLOW**
- **Community Environmental Management**

Potomac Watershed Partnership

Cacapon Institute

Protecting rivers and watersheds since 1985

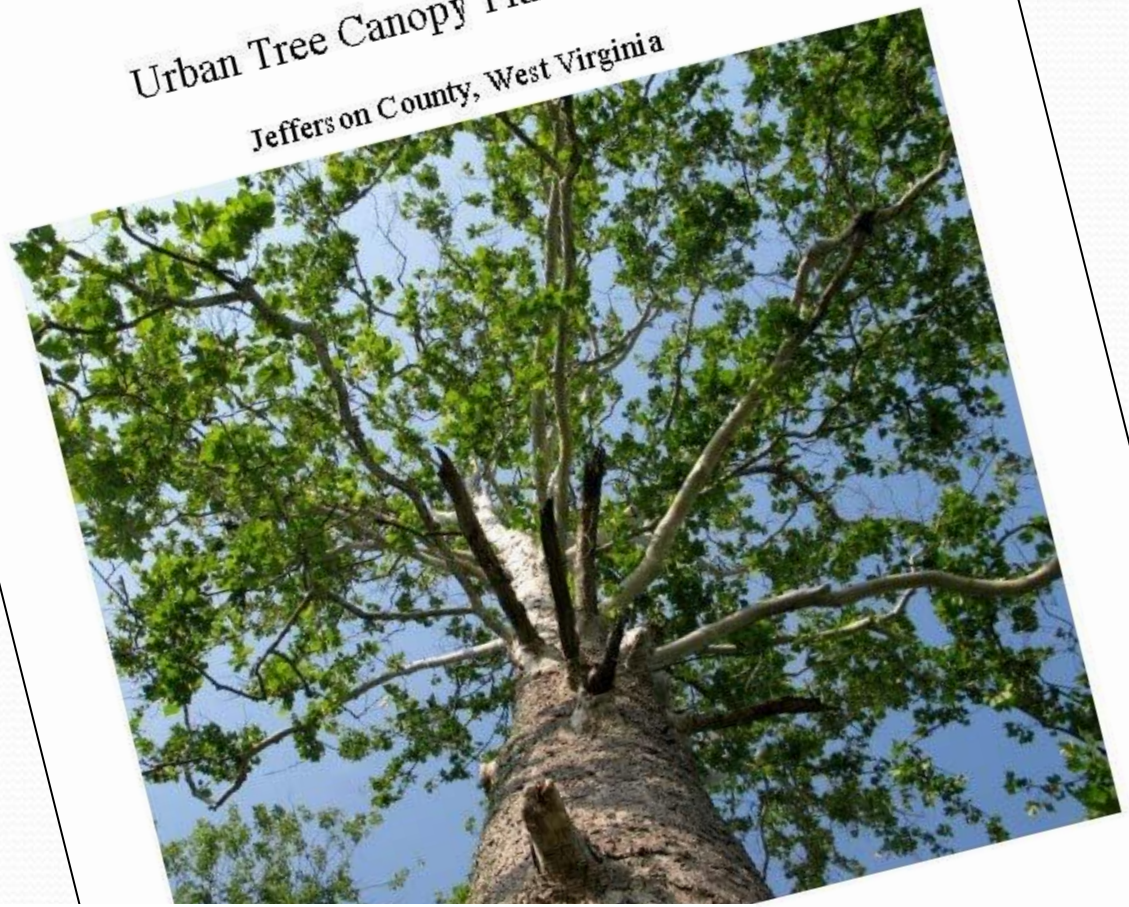


ACCOMPLISHMENTS: UTC studies for Jefferson & Berkeley counties.

JEFFERSON

Urban Tree Canopy Plan and Goals

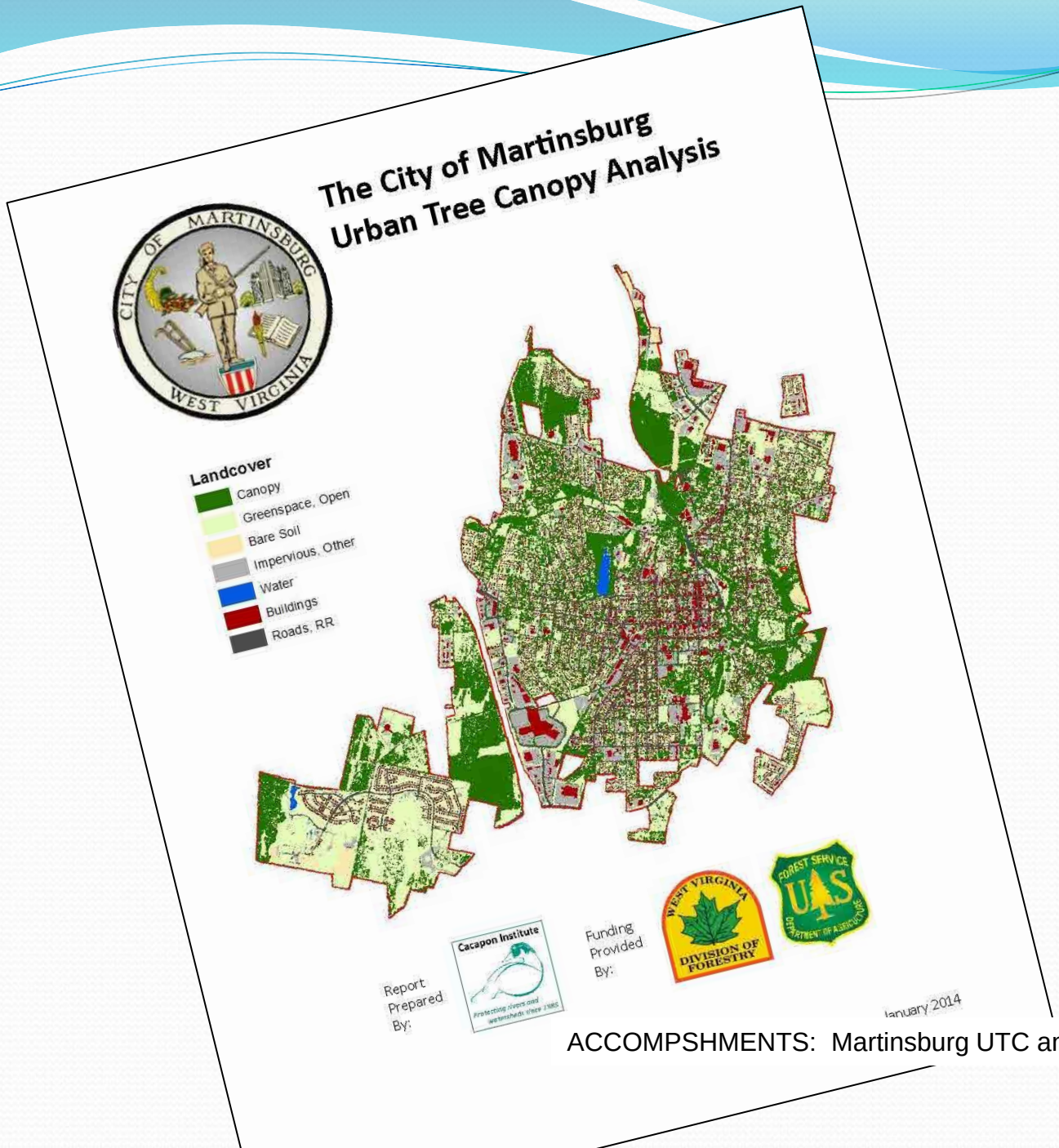
Jeffers on County, West Virginia



ACCOMPLISHMENTS: UTC Plan & Goal for Jefferson County, Charles Town, Ranson, Shepherdstown, Harpers Ferry, and Bolivar

JEFFERSON

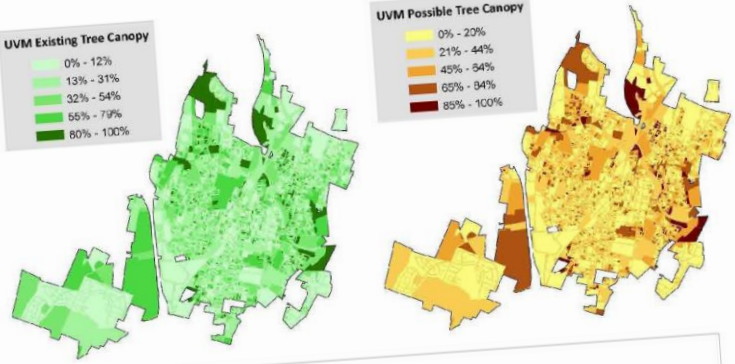
MARTINSBURG

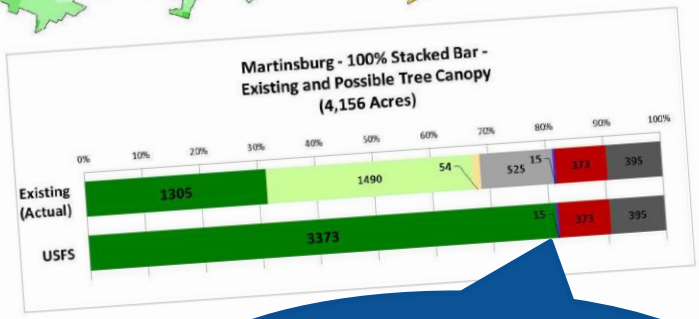


ACCOMPSHMENTS: Martinsburg UTC analysis.

When applied city-wide the UVM-USFS Possible Tree Canopy model converts all the green, soil, and impervious landcover to tree canopy without changing existing acres of water, building or road-railroad landcover types.

The UVM-USFS Existing and Possible Tree Canopy by parcel for Martinsburg.[6]





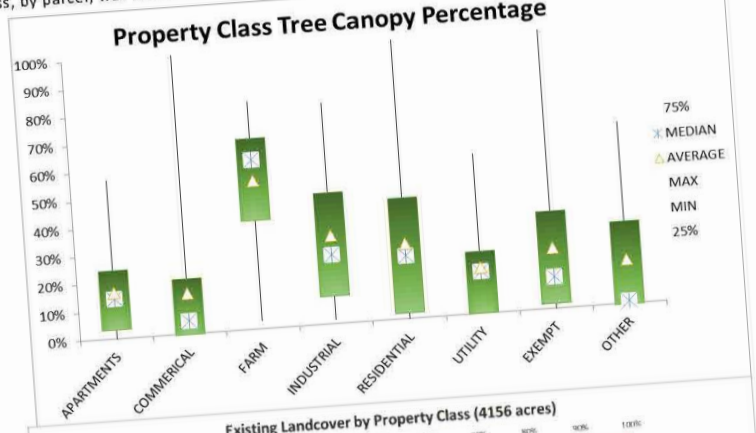
UVM "Possible Tree Canopy." One option.

[6] "A Report on Berkeley County's Existing and Possible Tree Canopy" (3.5 MB PDF) is available at the "Publication Tab" at www.cacaponinstitute.org.

WV four options considered including "UTC Average"

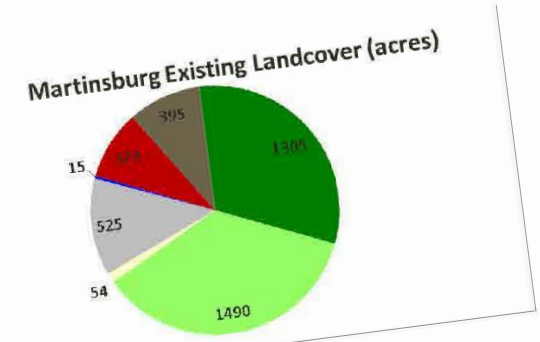
Landuse and Landcover

There are 7,568 property parcels in Martinsburg in nine "property clas… …nduse segmented by landcover is displayed in relative acres in a 100% stacked bar graph … …roperty class. The minimum, maximum, 75th percentile, 25th percentile, and average tree c… …for each property class, by parcel, was identified. The Property Class Analysis section discus…es in more detail the

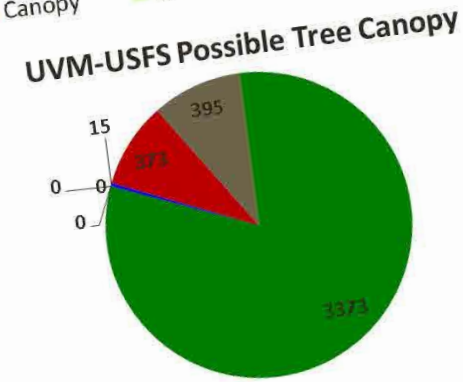


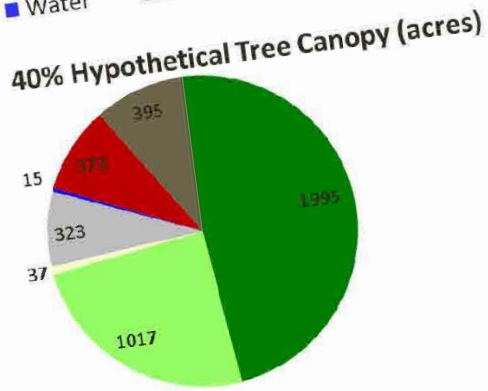
…landcover by each property class and discusses tree canopy on parcels in each property class based …Hypothetical canopy. Landcover (canopy, green space, etc.) vis- …ity of tree canopy is in the

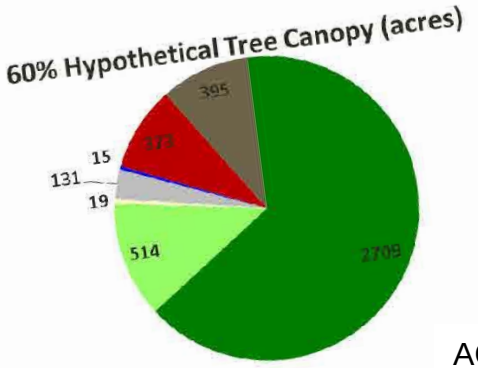
ACCOMPLISHMENTS: UVM study offers on PTC option with full conversion of "suitable land" in the green space, bare soil, and transportation-other (building, road, water and canopy never convert). WV wanted more options so we analyzed the parcels to identify min, max, and average.

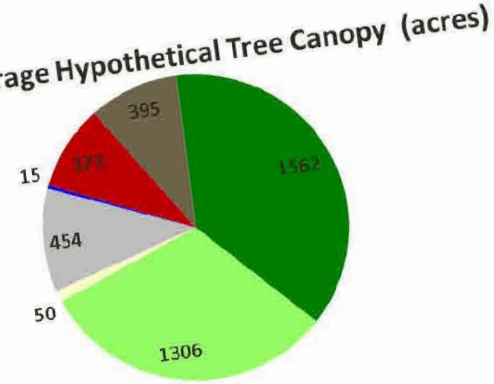


Canopy Green Soil Impervious Water Buildings Roads&RR









Martinsburg UTC
Five “options”

ETC - Existing
PTC – UVM Possible

Hypothetical TC

- **HTC60%**
- **HTC40%**
- **HTC Average**

ACCOMPLISHMENT: WV UTC analysis offers three additional options to municipal leaders and civic planners. What if every parcel of land that could reach the 60%, 40% or average percentage of tree canopy in a defined class did reach that level?

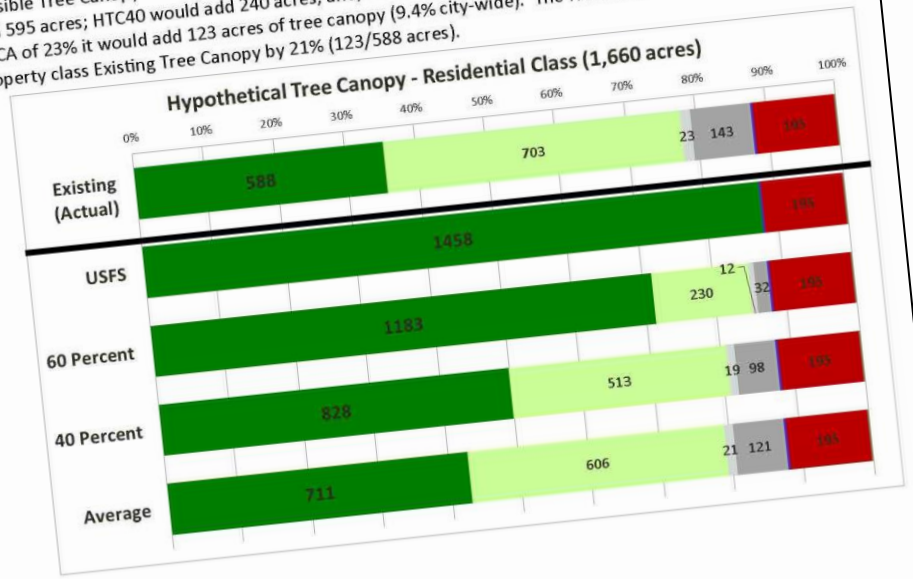
Residential Class Parcels

Analysis

Six thousand three hundred and ninety-eight (6,398) property parcels are classified as Residential. This represents 85% of all property parcels in Martinsburg (6398/7568 parcels). The class covers 40% of the city (1,660/4,156 acres). Statistics show:

Residential	Size (Acres)	Canopy Acres	Canopy Percent
MAX	119.66	56.14	100%
75%	0.24	0.08	44%
25%	0.10	0.00	2%
MEDIAN	0.16	0.03	23%
AVERAGE	0.26	0.09	27%
MIN	0.01	0.00	0%

Possible Tree Canopy with full conversion of suitable landcover would add 870 acres of canopy; HTC60 would add 595 acres; HTC40 would add 240 acres; and, if all residential class properties with the potential to reach the HTCA of 23% it would add 123 acres of tree canopy (9.4% city-wide). The HTCA would increase residential property class Existing Tree Canopy by 21% (123/588 acres).



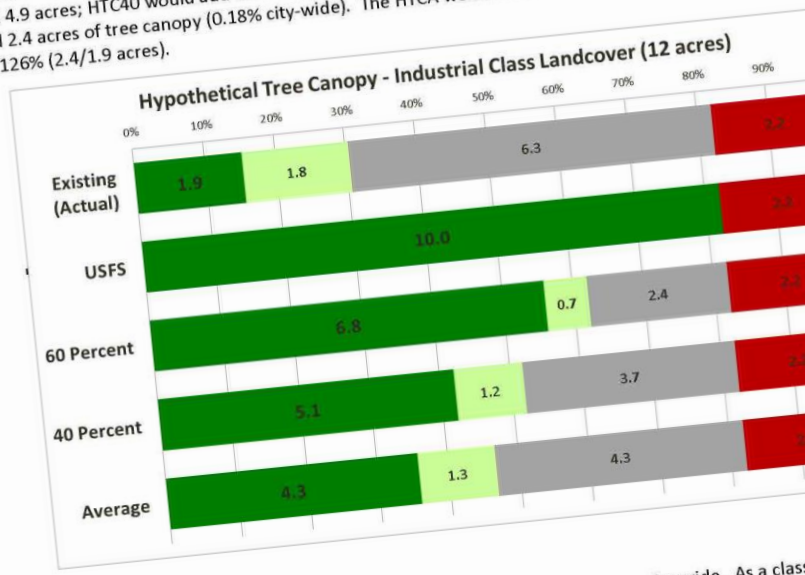
Industrial Class Parcels

Analysis

Nine (9) property parcels are classified as Industrial. This represents 0.1% of all property parcels in Martinsb (9/7568 parcels). The class covers 0.3% of the city (12/4,156 acres). Statistics show:

Industrial	Size (Acres)	Canopy Acres	Canopy Percent
MAX	7.78	0.78	79%
75%	1.18	0.23	47%
25%	0.12	0.02	10%
MEDIAN	0.24	0.06	25%
AVERAGE	1.35	0.21	32%
MIN	0.07	0.00	2%

Possible Tree Canopy with full conversion of suitable landcover would add 8.1 acres of canopy; HTC60 w add 4.9 acres; HTC40 would add 3.2 acres; and, if all industrial class properties reached HTCA of 25% it w add 2.4 acres of tree canopy (0.18% city-wide). The HTCA would increase industrial class Existing Tree C by 126% (2.4/1.9 acres).



ACCOMPLISHMENTS: Five "options" give planners more choices and information. In some cases, such as residential, the UTC Average is not far away from the UTC Existing. In other cases, such as industrial parcels, it is interesting to see the acres of UTC would double if only every parcel that could reach average did. If it is reasonable to presume "industrial parcels" have higher pollution potential the increased canopy could have a relatively greater benefit to surrounding communities.

Martinsburg
i-Tree Streets

i-Tree Streets Inventory
The City of Martinsburg

What is i-Tree Streets?

The City of Martinsburg worked with the Martinsburg Shade Tree Commission to conduct an i-Tree Streets ("i-Tree") inventory of trees in the public right of way. Martinsburg appreciates the technical support provided by Cacapon Institute and the WV Division of Forestry in conducting the survey and drafting this report. i-Tree Streets is a USDA Forest Service assessment tool used to gauge the "ecosystem services and structure of a city's street tree population." Based on a random sample of street segments and user defined input i-Tree estimates a value on trees' annual environmental and aesthetic benefits.

Purpose

Street trees provide a variety of functions and play a crucial role in creating healthy, vibrant communities. Street trees provide shade and wind protection for pedestrians, clean the air and water, lower ambient air temperatures, reduce the urban heat island effect, beautify neighborhoods, and increase property values.

The purpose of the i-Tree Inventory was to assess the **structure, function, value, and management needs** of Martinsburg's street trees.

- **Structure**: The species composition and size distribution assists City officials in anticipating future planting opportunities and the potential for engaging the community in education and action.
- **Function**: i-Tree analyzes the ecosystem services, i.e., the function, the urban forest is providing. Functions include energy conservation, air quality improvement, stormwater management, and carbon dioxide reduction, among others.
- **Value**: i-Tree quantifies the environmental and other benefits that the urban forest is providing, both in unit terms (e.g., kilowatt hours of electricity conserved) and in dollar terms. Based on historic management costs, i-Tree can determine the return on investment that the trees are providing. This assists City officials in developing cost-effective street tree management programs.
- **Management Needs**: Based on tree condition data collected in the random sample, i-Tree forecasts maintenance requirements and priority tasks based on infrastructure conflicts to help City officials effectively resolve community street trees.

Crabapple tree in planting strip on Martin Street

Project Development

The City of Martinsburg has a total of 715 street segments (blocks or portions of roads and drives). To maximize the cost benefit, the inventory focused on municipally controlled streets. Segments less than 50 feet in length were excluded (e.g. alleys and driveways). This resulted in a total of 413 street segments under investigation. To achieve a high degree of statistical confidence in the results, 10% of these street segments were randomly selected (this exceeds the 6% recommended by the USDA Forest Service for similar municipalities). Based on the 10% sample, results were extrapolated in i-Tree to estimate the total City owned street tree population. A total of 6 miles of street segments were inventoried.

City of Martinsburg outlined in white with the 42 randomly selected street segments highlighted in red.

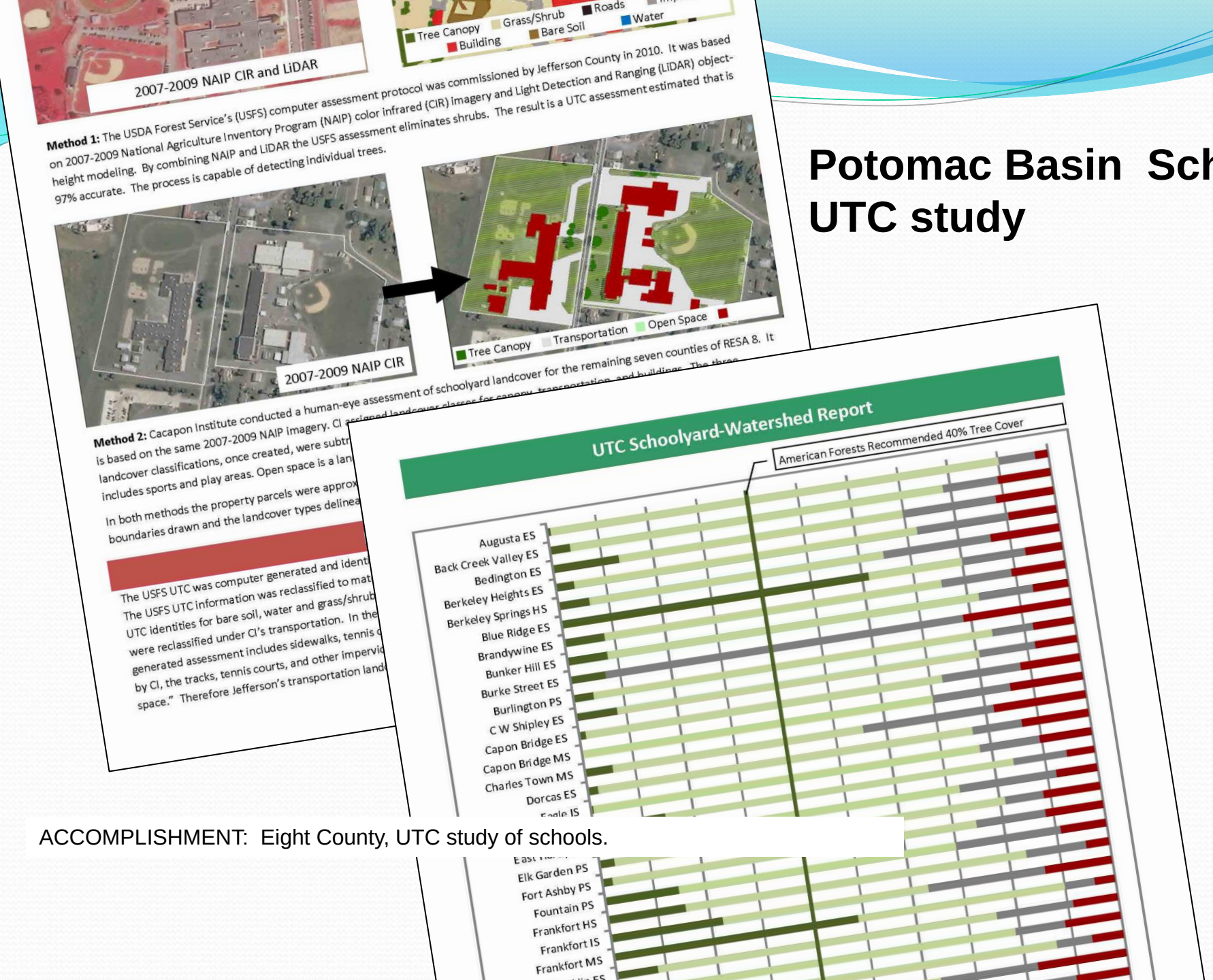
Key Terms

branches, and st
viewed from above.

i-Tree Software Suite—a state-of-the-art, pc
software suite from the USDA Forest Service that provides urban forestry analysis and benefits assessment tools.

ACCOMPLISHMENTS: Martinsburg i-Tree Street. Berkeley Springs is being completed.

Potomac Basin School UTC study

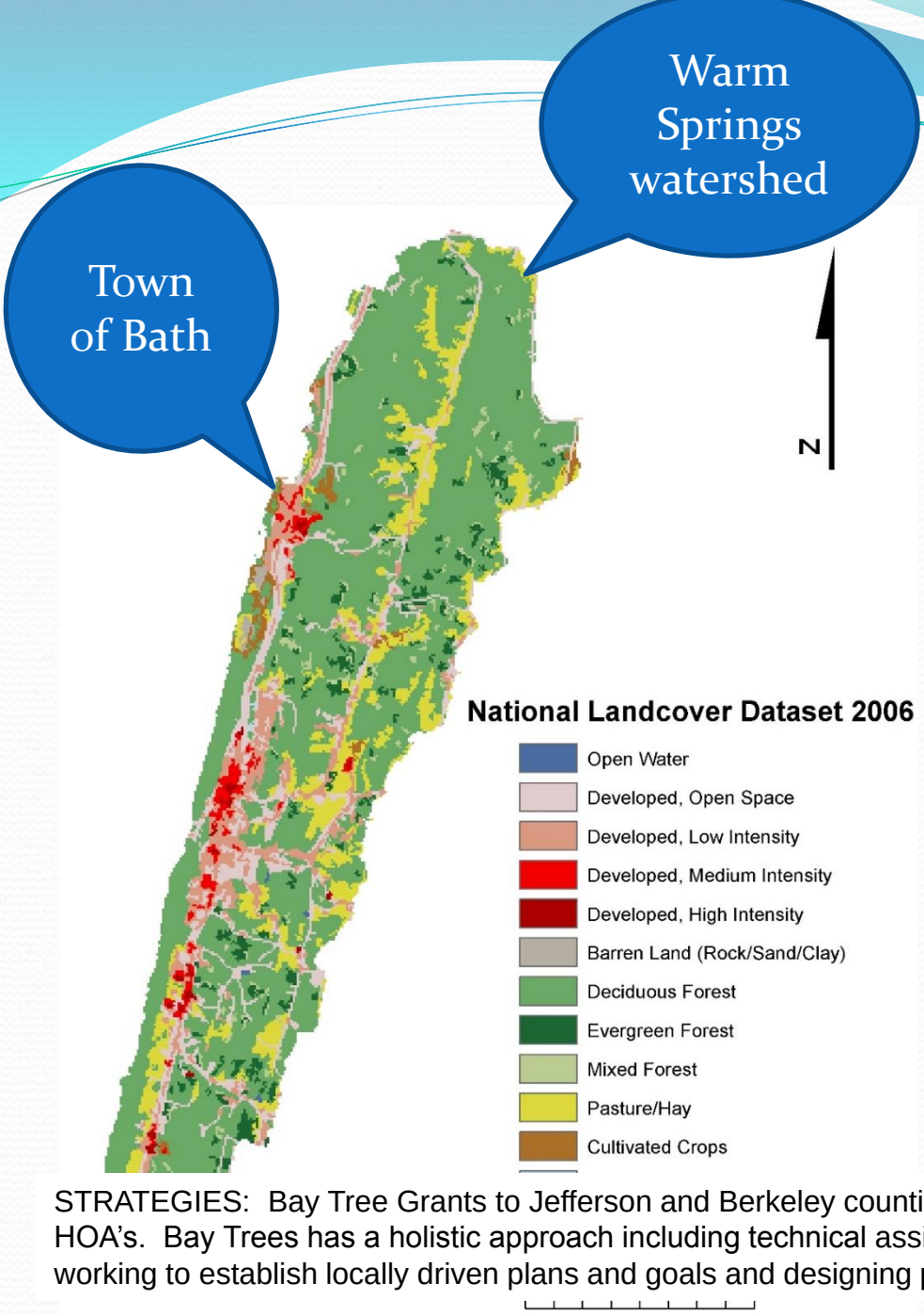


ACCOMPLISHMENT: Eight County, UTC study of schools.

Urban Forestry in WV

STRATEGIES

- **WV Bay Tree Grants**
- **WV Project CommuniTree**
- **Community Environmental Management**
- **PHLOW**



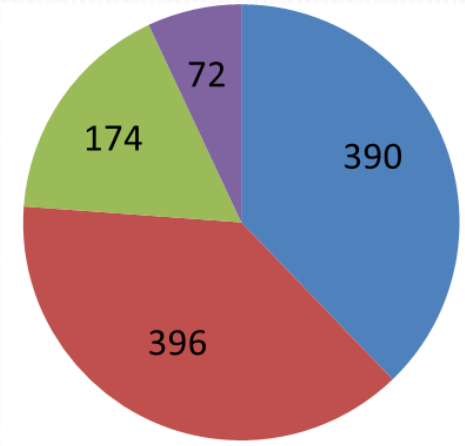
Bay Trees Grants

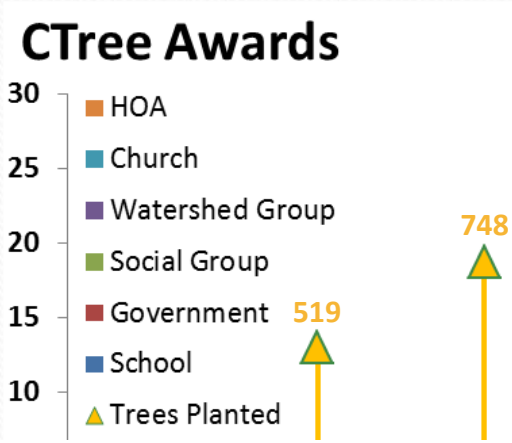
- **UTC analysis**
- **Technical assistance with plans & goals**
- **Demonstration tree plantings**

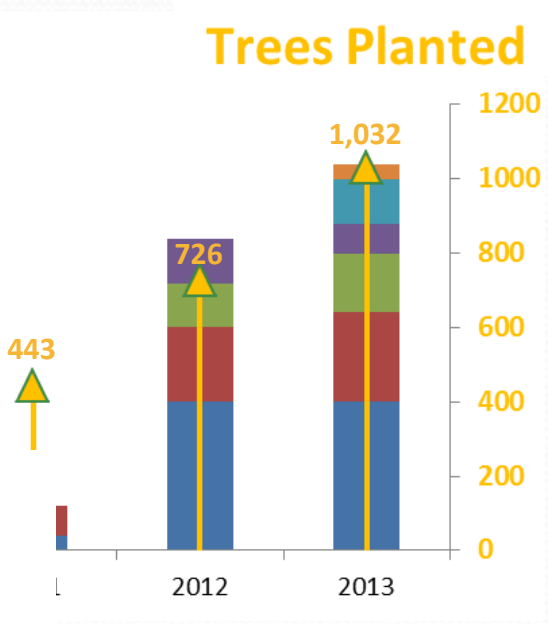
Bay Trees take a holistic view of urban-suburban communities and their watersheds.

STRATEGIES: Bay Tree Grants to Jefferson and Berkeley counties, Martinsburg, Charles Town, Bath, schools and HOA's. Bay Trees has a holistic approach including technical assistance and i-Tree analysis, community education, working to establish locally driven plans and goals and designing plantings to support those goals.

Trees Planted 2013







STRATEGIES: WV Project CommuniTree. Top down & bottom up recruitment. Trib Team targets communities in priority watersheds but also allows for communities to apply that have strong support for tree plantings, even if they are outside of priority targets. CTree is volunteer driven and includes public education.

Potomac Headwaters

PHLOW

Leaders Of Watersheds

Cacapon Institute

STRATEGY: PHLOW. Using schools to reach the broader community. Targeting schools for human health benefits to children, a vulnerable population.

Potomac Headwaters

PHLOW

Leaders Of Watersheds

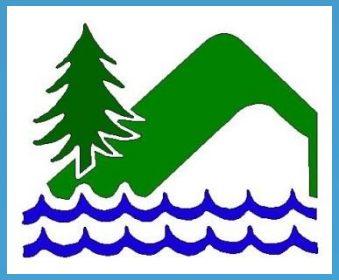
Cacapon Institute

STRATEGIES: PHLOW also includes broader BMPs..

STRATEGIES: CEM – Engaging all the Trib Team technical resources to drive change in residential landscape management and planning.

Community Environmental Management (CEM)

Partnership of the WV Chesapeake Bay Tributary Team

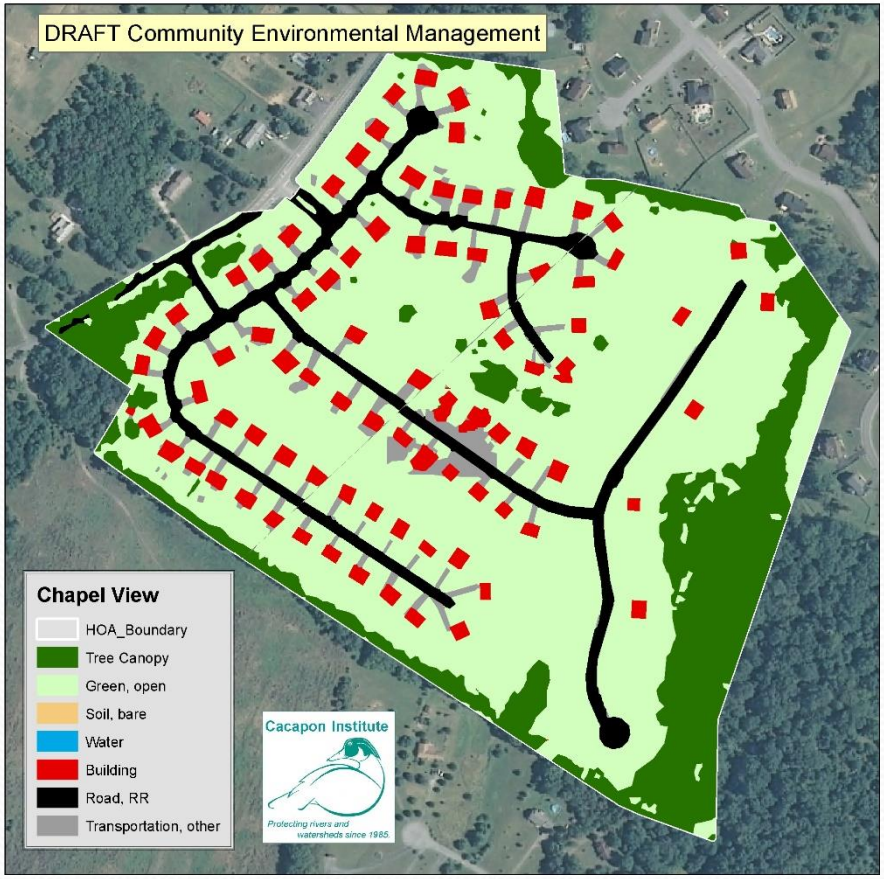


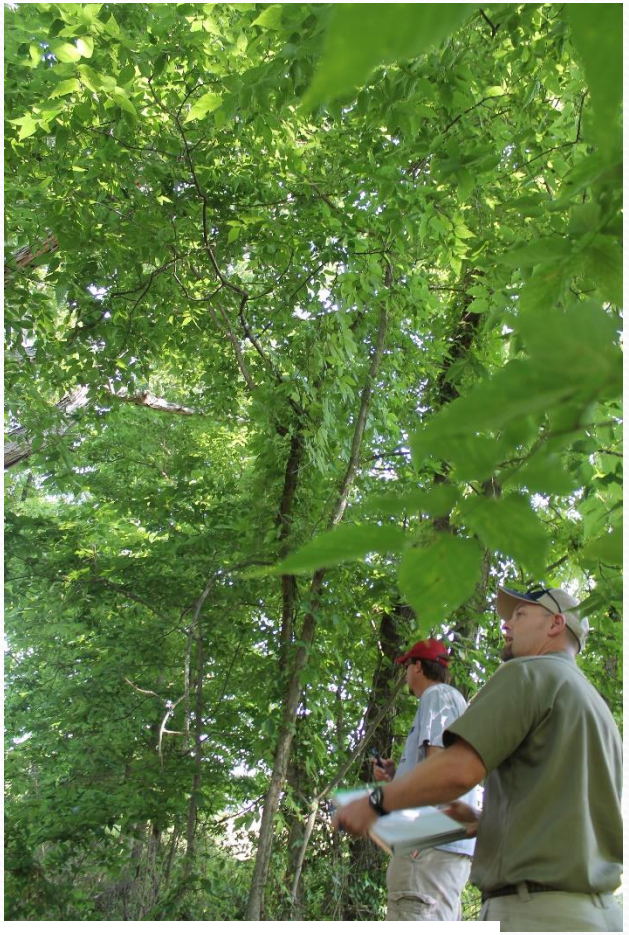
CEM Focuses on Mitigating NPS stormwater runoff pollution

- **Green infrastructure**
  - **tree plantings**
  - **rain gardens**
  - **rain barrels**
  - **bio-swales**
  - **improve the health of streams & watersheds**

STRATEGIES: CEM. Again top-down and bottom-up recruitment. WV's new subdivisions suffer from the same problems as those in more developed communities to the east.

UTC and forestry management





STRATEGIES: CEM is engaging HOA's in making better management decisions for their private properties and common areas. Some HOA's hold upwards of 30 acres of abandoned orchard, farm land, or unmanaged forest. CEM is working to establish long-term management plans.

West Virginia

UTC Assessment & Enhancement

Bay UTC Summit 2014

WV DOF: Robert Hannah, Urban Forestry Coordinator
Herb Peddicord, Chesapeake Bay Forester

Trees 101: Shawn Walker

Cacapon Institute: Tanner Haid, Urban Watershed Forester
Frank Rodgers, Executive Director
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304-240-2721

Learn more at www.CacaponInstitute.Org

Chesapeake Bay Program
Science. Restoration. Partnership.

FOREST SERVICE
US
DEPARTMENT OF AGRICULTURE

WEST VIRGINIA
DIVISION OF FORESTRY

Cacapon Institute
Protecting rivers and watersheds since 1985.