

Urban Tree Canopy Plan and Goals

Jefferson County, West Virginia



Approved by Jefferson County Commission
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Urban Tree Canopy Municipal Committee

This Committee of municipal representatives met faithfully when called upon and served as community ambassadors to ensure they were being well represented:

- Town of Bolivar: Helen Dettmer
- Charles Town: Katie See and Scott Coyle
- Town of Harpers Ferry: Kevin Carden
- Ranson: Sarah Kleckner
- Town of Shepherdstown: Wendy Maddox
- Shepherd University: Dr. Carl Bell
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Background

In 2009, Jefferson County, West Virginia (WV), with the assistance of the WV Potomac Tributary Strategy Implementation Team (WV Trib Team), began an Urban Tree Canopy (UTC) assessment project. The County, in its effort to foster wider acceptance of voluntary best management practices (BMPs) for urban tree conservation and plantings, first needed an UTC assessment to determine the extent and location of tree canopy. One important benefit to preserving and extending the tree canopy is that it will reduce excessive stormwater runoff. Jefferson County's efforts, in conjunction with its five municipalities, will help WV meet the state's commitment to the Chesapeake Bay Program (CBP) goal to have "at least 5 local jurisdictions ... in each state ... complete an assessment of urban forests, adopt a local goal to increase urban tree canopy and encourage measures to attain the established goal."

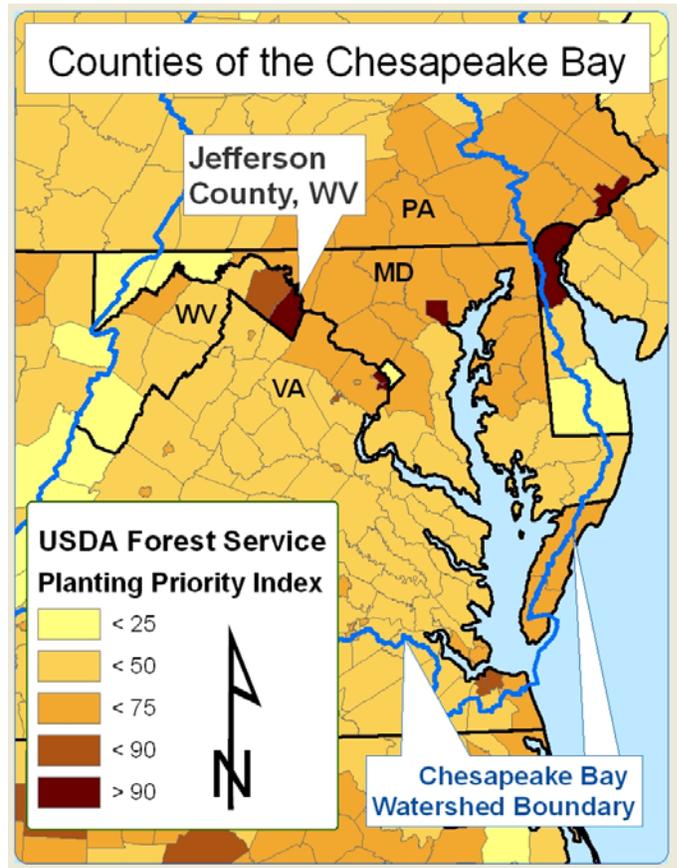


Figure 1.

Coincidentally, at the same time Jefferson County was conducting a tree canopy assess-

U.S. Forest Service published its first National Planting Priority Index (PPI). PPI rankings are not based simply on the amount of trees or amount of tree canopy alone. Rather, the PPI is a combination of three criteria:

- Population density—The greater the population density, the greater the priority for tree planting [i.e. more people could benefit from new trees]
- Canopy green space—The lower the value, the greater the priority for tree planting [i.e. open "green space" without trees is where trees might easily be added]
- Tree canopy cover per capita—The lower the amount of tree canopy cover per person, the greater the priority for tree planting [i.e. a higher percent of the local population lacks the benefits of trees]

Using mathematical regression, these three criteria were combined to produce a "score" (Norwak and Greenfield 2009). Jefferson and Berkeley Counties (WV) rank in the highest percentile and are among the highest priority counties within the Chesapeake Bay watershed (Figure1).

Purpose

Tree canopy is the layer of leaves, branches, and stems of trees that cover the ground when viewed from above. "Urban", as defined by the U.S. Census Bureau, is any census block with a population of 500 people per square mile, or the entirety of any incorporated municipality with a

single census block meeting that criteria. However, in regards to “Urban Tree Canopy”, the word “urban” possesses a less rigid definition. The U.S. Forest Service defines the urban forest as “the system of trees and associated plants that grow individually, in small groups, or under forest conditions on public and private lands in our cities, their suburbs, and towns.” Urban Tree Canopy, therefore, refers to the tree canopy in and around populated areas. So, while Jefferson County as a whole may not be thought of as “urban,” the term “Urban Tree Canopy” is relevant. Expanding the UTC provides many benefits to communities, including improved water quality, reducing stormwater runoff, saving energy, lowering city temperatures, reducing air pollution, enhancing property values, providing wildlife habitat, facilitating social and educational opportunities, as well as providing aesthetic benefits.

Public officials in Jefferson County are keenly aware of and engaged in efforts to reduce stormwater runoff for the sake of protecting local watersheds and the larger Chesapeake Bay watershed. Studies and estimates conclude that urban tree canopy cover can reduce annual runoff by up to 7% (Fazio 2010, Sanders 1986). Establishing a UTC Plan and Goals that will be adopted by each of the municipalities and the County Commission is a crucial component of Jefferson County’s effort to reduce stormwater runoff and improve the County’s green infrastructure.

Trees provide urban and developing rural areas with a wide variety of tangible and intangible benefits. A well developed and preserved tree canopy helps communities preserve, protect, and enhance the natural and built environment and assists in reducing excess stormwater runoff. Additionally, tree canopy helps to mitigate the impact of impervious surfaces and protects local and regional waters, such as the Chesapeake Bay. Trees are an asset that appreciate in value over time because they are living and growing. They do, however, require regular maintenance and protection to ensure that the value continues to grow as they reach maturity. Some municipalities have formed tree committees and/or hired an arborist to assist with this critical maintenance component.

There are numerous benefits to communities that value trees and work toward implementation of maintaining, improving, and increasing tree canopy. These benefits fall into the following categories:

Environmental/Ecological

- Improve air quality by absorbing pollutants such as carbon dioxide, carbon monoxide, ozone, sulfur dioxide and particulates. In turn, trees produce oxygen.
- Improve the quality of our water and our waterways by reducing sedimentation, absorbing excess nutrients and other pollutants, reducing stream channel erosion and reducing water temperatures.
- Reduce stormwater runoff and flooding via interception and evapo-transpiration and by promoting infiltration.
- Improve soil quality by adding organic matter and reducing soil erosion.
- Habitat for wildlife and preservation of native ecosystems.
- Reduce the urban heat island effect by shading surfaces, dissipating heat through evapo-transpiration, and mitigating greenhouse gases.

Economic

- Decrease energy costs by shading in the summer (reducing air conditioning costs) and serving as a windbreak in the winter (reducing heating costs).
- Reduce construction and maintenance costs by decreasing costs related to clearing, grading, paving, mowing, and stormwater management.
- Increase property values – The presence of trees and landscaping can increase residential property values up to 20%. Rental rates of commercial properties are also positively affected.
- Stimulate consumer patronage and spending – Consumers shop longer and more often in retail areas shaded by trees. One study reports that consumers are willing to pay up to 11% more for products purchased in shops along tree-lined streets as opposed to shops lacking surrounding trees.

Community/Social

- Increase recreational and educational opportunities.
- Provide shade and block UV radiation.
- Buffer wind and noise.
- Enhance community aesthetics.

Various studies have also shown that:

- Trees can reduce the stress response of both the human body and mind in conditions in which urban stressors are present (Kuo 2003).
- A greener school environment can decrease symptoms of Attention Deficit-Hyperactivity Disorder and reduce the number of violent or aggressive acts among children (Kuo and Faber 2004; Kuo and Sullivan 2001).

A Jefferson County UTC assessment was completed by the University of Vermont's (UVM) Spatial Analysis Laboratory in January 2010, while under contract to Jefferson County. This County-wide study, the largest of its kind in the U.S., utilizes the U.S. Forest Service's premier UTC assessment protocol. By combining existing Light Detection and Ranging (LiDAR, U.S. Geological Survey, 2005) and high resolution color infrared imaging data (National Agricultural Imagery Program, 2007), the UVM high resolution land cover data, from which the UTC assessment was derived (<1 meter resolution, U. Vermont 2009) is more than 95% accurate, approximately 20% more accurate than assessments that use only color infrared. The results are currently under review and being edited by the Jefferson County Departments of Planning and Zoning. Results of the UTC assessment have been presented to the Jefferson County "Round Table" (an informal assembly of elected officials and leaders) and to the various planning and public officials and interested public.

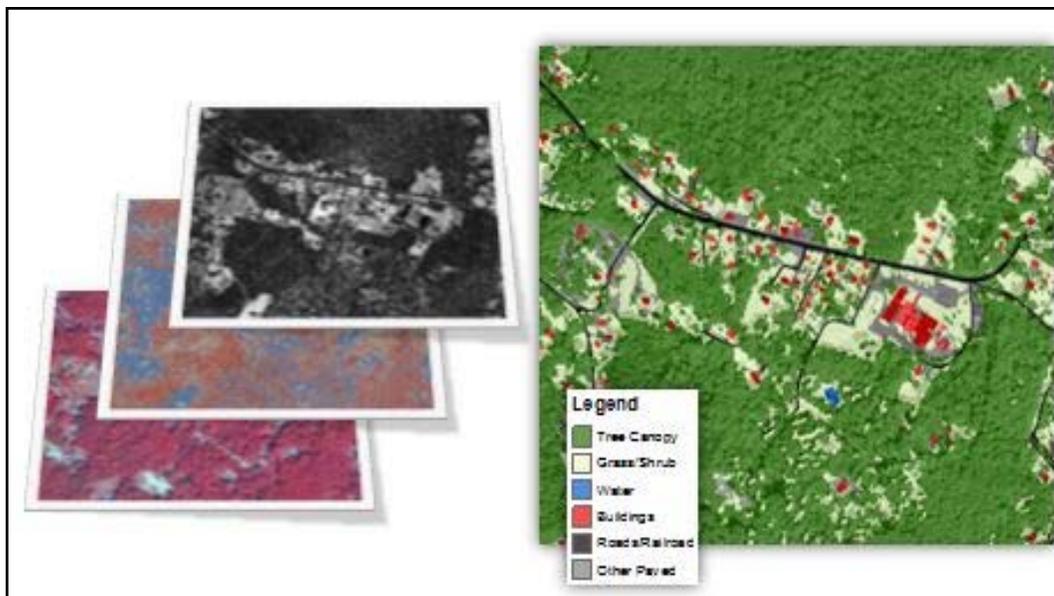


Figure 2. 2007 color infrared imagery and 2005 LiDAR data were combined by the University of Vermont's Spatial Analysis Lab to produce the high resolution land cover data utilized by Jefferson County for the Urban Tree Canopy assessment.

The UTC assessment delineates the percentage of tree canopy (TC), amount of impervious surface and amount of area open to possible tree canopy. The analysis of Jefferson County, based on high resolution aerial imagery sufficient to enumerate single trees, revealed a tree canopy of about 50,600 acres (termed Existing TC) that corresponds to 38% of all land within the county. The UVM assessment also found that 59% (79,000 acres) of the county was available for tree canopy but currently lacked canopy coverage (termed Possible TC). Possible TC includes non-canopy vegetation (e.g., grass/shrubs), bare earth, and certain paved surfaces (e.g., driveways, sidewalks, parking lots) that, under the right circumstances, could be modified to increase tree cover. Areas termed "not suitable" refer to roads, bodies of water, structures, and other locations where tree canopy coverage is impractical. Due to much of Jefferson County being devoted to agriculture, the county's Existing TC generally occurs in scattered patches. The largest, most contiguous patches occur east of the Shenandoah River in the Blue Ridge Mountain area. Note that agricultural land-cover types were not specifically mapped as part of this project, but are included in the Grass/Shrubs land-cover category. It should be

Chapter 3 Tree Canopy Analysis Methodology and Data

noted that, while the objective of this plan is to increase tree canopy, it is not the goal to do so at the expense of currently productive agricultural land. Those who have collaborated on this project fully realize the importance of agriculture to Jefferson County, and agricultural lands were taken into full consideration throughout the development of the goals outlined in this plan.

While the UTC assessment shows in high resolution where tree canopy does and does not exist, it does not specifically identify or recommend where additional trees can be planted. The specific site recommendations and planting specifications are being prioritized in this Plan and goals are being established for the County and each of the municipalities. American Forests, the nation's oldest non-profit conservation organization dedicated to protecting and restoring forest ecosystems, recommends overall tree canopy coverage of 40% for metropolitan areas east of the Mississippi River. This recommendation is commonly referred to by the U.S. Forest Service, West Virginia Division of Forestry, and the Chesapeake Bay Program. The number of trees per acre of tree canopy is highly variable depending on species, size, age, health and other factors. For the purpose of this study we used a forest industry standard of 109 trees per acre of canopy cover, assuming a 20ft by 20ft spacing between individual trees. It is also important to note that increase in Tree Canopy coverage does not necessarily refer to an increase in the *number* of trees. Proper protection, maintenance, and care of existent trees, allowing for healthy maturation, can increase canopy coverage significantly (i.e., A tree with a 5' diameter canopy growing to a 10' diameter canopy results in a 300% increase in that tree's canopy).

The following is a brief summary of the TC data derived for the County and each of the municipalities from the analysis:

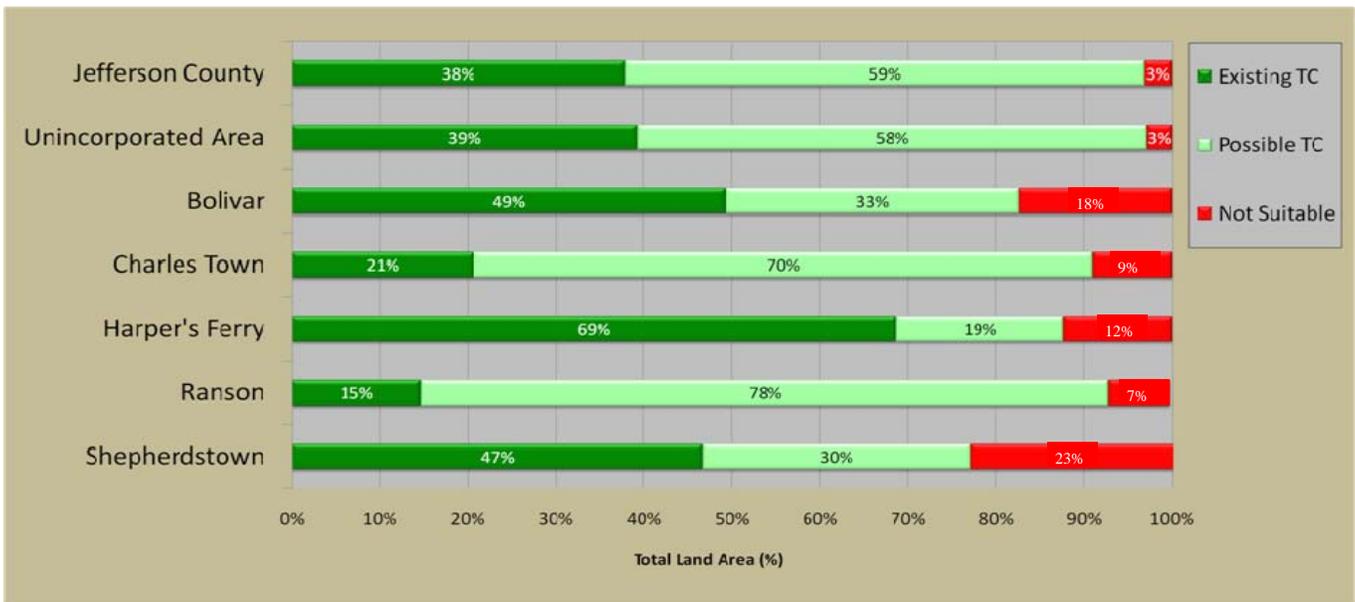


Figure 3. Tree Canopy data for Jefferson County, West Virginia

Chapter 3 **Tree Canopy Analysis Methodology and Data**

Jefferson County, WV Tree Canopy Facts:

- Jefferson County Total Land Area = 133,661 acres
- Total Tree Canopy Area = 50,603 acres
- 38% of the total land area of Jefferson County is identified as tree canopy.
- 59% of the total land area of Jefferson County is potentially available for additional Tree Canopy
- 3% of the total land area of Jefferson County is unsuitable for tree planting
- To increase Tree Canopy by 1% (from 38% to 39%), an additional 1,525 acres of tree canopy is required
- To increase Tree Canopy by 2% (from 38% to 40%), an additional 2,861 acres of tree canopy is required
- To increase to 40% Tree Canopy over a 10 year span, tree canopy coverage would need to increase by 286 acres per year (assuming zero loss during that time span)
- To increase to 40% Tree Canopy over a 20 year span, tree canopy coverage would need to increase by 143 acres per year (assuming zero loss during that time span)

Unincorporated Areas of Jefferson County, WV Tree Canopy Facts:

- Unincorporated Total Land Area = 123,986 acres
- Total Tree Canopy Area in Unincorporated Areas = 48,613 acres
- 39% of the total land area of Unincorporated Areas is identified as Tree Canopy.
- 58% of the total land area of Unincorporated Areas is potentially available for additional Tree Canopy
- 3% of the total land area of Unincorporated Areas is unsuitable for tree planting
- To increase Tree Canopy by 1% (from 39% to 40%), an additional 981 acres of tree canopy is required

Chapter 3 **Tree Canopy Analysis Methodology and Data**

Bolivar, WV Tree Canopy Facts:

- Bolivar Total Land Area = 276 acres
- Total Tree Canopy Area in Bolivar = 136 acres
- 49% of the total land area of Bolivar is identified as Tree Canopy
- 33% of the total land area of Bolivar is potentially available for additional Tree Canopy
- 18% of the total land area of Bolivar is unsuitable for tree planting
- To increase Tree Canopy by 1% (from 49% to 50%), an additional 2 acres of tree canopy is required

Charles Town, WV Tree Canopy Facts:

- Charles Town Total Land Area = 3,669 acres
- Total Tree Canopy Area in Charles Town = 759 acres
- 21% of the total land area of Charles Town is identified as Tree Canopy
- 70% of the total land area of Charles Town is potentially available for additional Tree Canopy
- 9% of the total land area of Charles Town is unsuitable for tree planting
- To increase Tree Canopy by 1% (from 21% to 22%), an additional 48 acres of tree canopy is required

Harpers Ferry, WV Tree Canopy Facts:

- Harpers Ferry Total Land Area = 335 acres
- Total Tree Canopy Area in Harpers Ferry = 230 acres
- 69% of the total land area of Harpers Ferry is identified as Tree Canopy
- 19% of the total land area of Harpers Ferry is potentially available for additional Tree Canopy
- 12% of the total land area of Harpers Ferry is unsuitable for tree planting
- To increase Tree Canopy by 1% (from 69% to 70%), an additional 4.5 acres of tree canopy is required

Chapter 3 **Tree Canopy Analysis Methodology and Data**

Ranson, WV Tree Canopy Facts:

- Ranson Total Land Area = 5,168 acres
- Total Tree Canopy Area in Ranson = 759 acres
- 15% of the total land area of Ranson is identified as Tree Canopy.
- 78% of the total land area of Ranson is potentially available for additional Tree Canopy
- 7% of the total land area of Ranson is unsuitable for tree planting
- To increase Tree Canopy by 1% (from 15% to 16%), an additional 53 acres of tree canopy is required

Shepherdstown, WV Tree Canopy Facts:

- Shepherdstown Total Land Area = 227 acres
- Total Tree Canopy Area in Shepherdstown = 106 acres
- 47% of the total land area of Shepherdstown is identified as Tree Canopy
- 30% of the total land area of Shepherdstown is available for additional Tree Canopy
- 23% of the total land area of Shepherdstown is unsuitable for tree planting
- To increase Tree Canopy by 1% (from 47% to 48%), an additional 3 acres of tree canopy is required

Chapter 4 Recommendations and Goals for Jefferson County

This Tree Canopy Plan sets forth recommendations for tree canopy goals for the unincorporated areas of the County as well as specific goals for each municipality that address their specific needs. The County's and Municipalities' overall goals should be utilized in setting priorities related to tree canopy improvement and taken into consideration in a variety of local land use decisions.

The goals and recommendations outlined in this plan are intended to be considered and implemented over a twenty year planning period. They should be reviewed on a 5-year interim basis and/or in conjunction with locally adopted Comprehensive Plans which may rely on these goals and expand the recommendations.

- Increase overall County tree canopy by 2 percent (from 38% to 40%) by 2030 as recommended by the American Forests organization, the USDA Forest Service and the WV Division of Forestry. [NOTE: April 2008 Green Infrastructure Assessment stated that "trees in the landscape are so important no matter how big the patch is, that the County should strive to maintain at least 45% forest cover on a watershed basis at minimum, and 51% in watersheds of exceptional value."].
- Increase overall tree canopy in the unincorporated areas of the County by 1% (from 39% to 40%) by 2030.
- Develop a strategy to add tree canopy coverage along key US and State transportation routes that serve as gateways to the County.
- Increase tree canopy coverage along key riparian buffers within watersheds that contain primary streams that directly enter the Shenandoah and Potomac Rivers.
- Develop knowledge and conceptual information to assess the costs and benefits of potential conservation and restoration practices to achieve the best results with the least resources of forests and stream corridors to serve as a framework for protection of groundwater, surface water, habitat, and landscape connectivity (source: 2008 Green Infrastructure Assessment).
- Increase tree canopy coverage within active agricultural operations along streams and creeks that drain farmland to reduce sedimentation and nutrient loading in receiving streams and rivers.
- Develop an education and outreach program in cooperation with all jurisdictions and the County Extension Service to promote the planting of native tree species on private property through landowner incentive programs; pursue grants to fund such a program.
- Develop recommendations and disseminate educational materials (pamphlets, brochures, news releases, etc.) supporting landowners' and HOA's proper maintenance and care of trees (e.g. recommended watering schedules, stake and wire procedures and removal, mulching). Seek commitment of property owners and HOA's for tree care, especially during the critical first three years after planting.
- Review the land coverage data to identify key areas lacking tree canopy to help prioritize areas to be planted including, but not limited to, additional school site; infilling vacant lots; slowing the flow of stormwater into public areas: such as parking lots, streets, public parks, HOA open space areas; pathways/trails, public buildings, gateways, etc.

Chapter 4 Recommendations and Goals for Jefferson County

- Review the land coverage data to identify key areas lacking tree canopy to help prioritize areas to be planted including, but not limited to, additional school site; infilling vacant lots; slowing the flow of stormwater into public areas: such as parking lots, streets, public parks, HOA open space areas; pathways/trails, public buildings, gateways, etc.
- Investigate revenue opportunities to fund updating the tree canopy assessment every 5 years in order to monitor and evaluate progress towards goal.
- Promote and encourage the Jefferson County website as a free tool to host tree canopy assessment data.
- Develop local regulations to ensure that appropriate size and species of trees are located in areas under overhead utility lines and in areas with similar growth restrictions (i.e., trees that grow over 15 feet tall at maturity should not be planted under the conductor zone on wood pole 138 Kv transmission lines).
- Investigate revenue opportunities or programs to assist with the removal of invasive species and replacement with appropriate native species suitable to the planting location.
- Review and consider amending Subdivision Regulations and Site Plan development standards to improve policies regarding tree planting and tree and forest protection, including more detailed landscaping plan requirements which outline plant species; encourage desirable and appropriate native species; require standards which integrates landscaping design with stormwater management plans; etc.
- Adopt policies that ensure that tree planting and reforestation efforts restrict the use of invasive species and promote the use of appropriate native species throughout the County.
- Establish a policy that requires a developer to conserve a certain percentage of the existing trees before construction or replace with appropriate trees native to the area in existing wooded areas after construction with a goal of maintaining or increasing the tree canopy coverage for that property.
- Develop local land use policies which employ best management techniques to preserve trees and minimize damage from construction activities such as trenching, soil compaction, and soil clearing and grading.
- Develop implementable land use policies which encourage the retention of existing tree canopy coverage on steep slopes and in riparian buffer areas; pursue ordinance amendments that implement such policies.
- Develop implementation recommendations that build upon this planning effort and the 2008 Green Infrastructure Assessment analysis as a part of the 2014 Comprehensive Plan Update, particularly developing land use policies that will help to assure minimizing the fragmentation of the identified core forest areas that contain large patches of intact forest.
- Establish a County-wide Jefferson County Tree Committee to focus on implementing the provisions of this plan and to pursue grant opportunities related to increasing urban tree canopy coverage throughout the County.

This Tree Canopy Plan sets forth recommendations for tree canopy goals for the unincorporated areas of the County as well as specific goals for each municipality that address their specific needs. The following goals are specific to Bolivar and should be utilized in setting priorities related to tree canopy improvement and taken into consideration in a variety of local land use decisions.

The goals and recommendations outlined in this plan are intended to be considered and implemented over a twenty year planning period. They should be reviewed at least every 5 years and/or in conjunction with locally adopted Comprehensive Plans which may rely on these goals and expand on the recommendations.

- Increase Bolivar's tree canopy by 1% (from 49% to 50%) by 2030. This would require 2 additional acres of tree canopy.
- Consider appointing a tree committee and pursuing Tree City USA status.
- Develop locally adopted policies that focus on the retention and improvement of existing tree stands including a develop tree maintenance policy and incentives for appropriate tree trimming and maintenance practices.
- Review and consider amending Subdivision Regulations and Site Plan development standards to improve policies regarding tree planting and tree and forest protection.
- Develop a strategy to add tree canopy coverage along US 340 that serves as gateways to the County.
- Increase tree canopy coverage along key riparian buffers within watersheds that contain primary streams that directly enter the Shenandoah and Potomac Rivers.
- Employ both conservation and strategic restoration of Forests and Stream Corridors to serve as a framework for protection of groundwater, surface water, habitat, and landscape connectivity.
- Develop an education and outreach program in cooperation with all jurisdictions and the County Extension Service to promote the planting of appropriate native tree species on private property through landowner incentive programs; pursue grants to fund such a program.
- Develop recommendations and disseminate educational materials (pamphlets, brochures, news releases, etc.) supporting landowners' and HOA's proper maintenance and care of trees (e.g. recommended watering schedules, stake and wire procedures and removal, mulching). Seek commitment of property owners and HOA's for tree care, especially during the critical first three years after planting.
- Review the land coverage data to identify key areas lacking tree canopy to help prioritize areas to be planted including, but not limited to, additional school site; infilling vacant lots; slowing the flow of stormwater into public areas: such as parking lots, streets, public parks, HOA open space areas; pathways/trails, public buildings, and gateways; etc.

Chapter 5

Recommendations and Goals for Bolivar

- Develop local regulations that ensure that appropriate size and species of trees are located in areas under overhead utility lines and in areas with similar growth restrictions (i.e., trees that grow over 15 feet tall at maturity should not be planted under the conductor zone on wood pole 138 Kv transmission lines).
- Investigate programs or revenue opportunities to assist with the removal of invasive species and replacement with appropriate native species suitable to the planting location.

Chapter 6 Recommendations and Goals for Charles Town

This Tree Canopy Plan sets forth recommendations for tree canopy goals for the unincorporated areas of the County as well as specific goals for each municipality that address their specific needs. The following goals are specific to Charles Town and should be utilized in setting priorities related to tree canopy improvement and taken into consideration in a variety of local land use decisions.

The goals and recommendations outlined in this plan are intended to be considered and implemented over a twenty year planning period. They should be reviewed at least every 5 years and/or in conjunction with locally adopted Comprehensive Plans which may rely on these goals and expand on the recommendations.

- Increase Charles Town tree canopy by 1%, from 21% to 22%, by 2030. This would require 48 additional acres of tree canopy.
- Maintain the Town's "Tree City USA" status.
- Improve tree planting/shade tree ordinances and policies including provisions for street tree maintenance, improvement and replacement.
- Develop local policies to ensure all new street and sidewalk work takes into consideration the potential for additional tree plantings, that existing street trees are protected wherever possible, and that new street tree pits and plantings follow current best management practices (e.g. root barriers & root deflectors to reduce root-sidewalk conflict, installation of engineered soils, stormwater management techniques to maximize water infiltration to tree pits).
- Maintain the city's tree maintenance program for tree care including pruning street trees and ensuring that all new tree plantings are selected to provide species diversity and maximum benefits for shade and stormwater mitigation. Include times for watering, weeding and periodic tree health assessment using current arboricultural standards in the maintenance schedule.
- Review and consider amending Subdivision Regulations and Site Plan development standards to improve policies regarding tree planting and tree and forest protection.
- Develop a strategy to add tree canopy Coverage along US 340 and State Route 9 and other routes that serve as gateways to the community.
- Increase tree canopy coverage along key riparian buffers within watersheds that contain primary streams that directly enter the Shenandoah and Potomac Rivers, such as Evitt's Run.
- Employ both conservation and strategic restoration of Forests and Stream Corridors to serve as a framework for protection of groundwater, surface water, habitat, and landscape connectivity (source: 2008 Green Infrastructure Assessment).
- Develop an education and outreach program in cooperation with all jurisdictions and the County Extension Service to promote the planting of appropriate native tree species on private property through landowner incentive programs; pursue grants to fund such a program.

Chapter 6 Recommendations and Goals for Charles Town

- Develop recommendations and disseminate educational materials (pamphlets, brochures, news releases, etc.) supporting landowners' and HOA's proper maintenance and care of trees (e.g. recommended watering schedules, stake and wire procedures and removal, mulching). Seek commitment of property owners and HOA's for tree care, especially during the critical first three years after planting.
- Review the land coverage data to identify key areas lacking tree canopy to help prioritize areas to be planted including, but not limited to, additional school site; infilling vacant lots; slowing the flow of stormwater into public areas: such as parking lots, streets, public parks, HOA open space areas; pathways/trails, public buildings, and gateways, etc.
- Develop local regulations that ensure that appropriate size and species of trees are located in areas under overhead utility lines and in areas with similar growth restrictions (i.e., trees that grow over 15 feet tall at maturity should not be planted under the conductor zone on wood pole 138 Kv transmission lines).
- Investigate programs or revenue opportunities to assist with the removal of invasive species and replacement with appropriate native species appropriate to the planting location.

Chapter 7 Recommendations and Goals for Harpers Ferry

This Tree Canopy Plan sets forth recommendations for tree canopy goals for the unincorporated areas of the County as well as specific goals for each municipality that address their specific needs. The following goals are specific to Harpers Ferry and should be utilized in setting priorities related to tree canopy improvement and taken into consideration in a variety of local land use decisions.

The goals and recommendations outlined in this plan are intended to be considered and implemented over a twenty year planning period. They should be reviewed at least every 5 years and/or in conjunction with locally adopted Comprehensive Plans which may rely on these goals and expand on the recommendations.

- Authorize the Harpers Ferry Tree Committee to be the entity to pursue the goals outlined below.
- Maintain the Town's "Tree City USA" status.
- Develop locally adopted policies that focus on the retention and improvement of existing tree stands including a general tree maintenance policy for trees on public property and incentives for appropriate tree trimming and maintenance practices on private property. Develop a similar policy specific to view management practices that protect and maintain historically recognized views.
- Maintain the existing high percentage of tree canopy coverage with a goal of maintaining zero net loss of canopy by protecting and properly maintaining existing tracts of urban forests.
- Replace severely damaged and dead or dying trees, especially in critical areas such as stream valleys, riparian zones, and steep slopes.
- Review and consider amending Subdivision Regulations and Site Plan development standards to improve policies regarding tree planting and tree and forest protection.
- Develop a strategy to add tree canopy coverage along US 340 and key state transportation routes that serve as gateways to the County.
- Maintain and, where possible, increase tree canopy coverage along key riparian buffers within watersheds that contain primary streams that directly enter the Shenandoah and Potomac Rivers.
- Employ both conservation and strategic restoration of Forests and Stream Corridors to serve as a framework for protection of groundwater, surface water, habitat, and landscape connectivity (source: 2008 Green Infrastructure Assessment).
- Develop an education and outreach program in cooperation with all jurisdictions and the County Extension Service to promote the planting of appropriate native tree species on private property through landowner incentive programs; pursue grants to fund such a program.

Chapter 7 **Recommendations and Goals for Harpers Ferry**

- Develop recommendations and disseminate educational materials (pamphlets, brochures, news releases, etc.) supporting landowners' and HOA's proper maintenance and care of trees (e.g. recommended watering schedules, stake and wire procedures and removal, mulching). Seek commitment of property owners and HOA's for tree care, especially during the critical first three years after planting.
- Review the land coverage data to identify key areas lacking tree canopy to help prioritize areas to be planted including, but not limited to, additional school site; infilling vacant lots; slowing the flow of stormwater into public areas: such as parking lots, streets, public parks, HOA open space areas; pathways/trails, public buildings, and gateways; etc.
- Develop local regulations that ensure that appropriate size and species of trees are located in areas under overhead utility lines and in areas with similar growth restrictions (i.e., trees that grow over 15 feet tall at maturity should not be planted under the conductor zone on wood pole 138 Kv transmission lines).
- Consider appropriate percentage of tree canopy coverage and tree locations specific to business districts and residential districts in an effort to stimulate economic viability.
- Investigate programs or revenue opportunities to assist with the removal of invasive species (with the intent of eradication of such species) and replacement with native species appropriate to the planting location on public and private land.

This Tree Canopy Plan sets forth recommendations for tree canopy goals for the unincorporated areas of the County as well as specific goals for each municipality that address their specific needs. The following goals are specific to Ranson and should be utilized in setting priorities related to tree canopy improvement and taken into consideration in a variety of local land use decisions.

The goals and recommendations outlined in this plan are intended to be considered and implemented over a twenty year planning period. They should be reviewed at least every 10 years and/or in conjunction with locally adopted Comprehensive Plans which may rely on these goals and expand on the recommendations.

- Increase Ranson's tree canopy by 5% (from 15% to 20%) by 2030. This would require an additional 258 acres of tree canopy.
[NOTE: The American Forests organization, the USDA Forest Service and the WV Division of Forestry recommend a goal of 40% tree coverage and the County's 2008 Green Infrastructure Assessment stated that the county should strive to maintain at least 45% forest cover on a watershed basis at minimum, and 51% in watersheds of exceptional value.]
- Develop policies that implement specific recommended average tree coverage percentages by zoning district such as 50% coverage in residential zones, 25% coverage in mixed use zones, 15% coverage in business districts.
- Establish a tree committee to pursue Tree City USA status and to implement a comprehensive street tree planting initiative.
- Develop local land use policies and regulations that encourage the use of well designed and located tree plantings that promote economic development and vitality.
- Develop policies that ensure that all large contiguous areas of impervious surfaces are required to be planned to incorporate well placed, appropriately sized groupings of tree plantings that provide shade, stormwater quality management/detention, and provide a pleasant vehicular and pedestrian experience.
- Develop a plan and program to continue to increase tree canopy on appropriate areas of municipal parks and public lands utilizing citizen volunteers and outreach programs.
- Review and consider amending Subdivision Regulations and Site Plan development standards to improve policies regarding tree planting and tree and forest protection.
- Continue to maintain and plant trees in a nursery area in Ranson, in order to provide a future source of inexpensive native trees for planting along the streets and in other areas around the Municipality.
- Establish economic value/compensatory value of the existing street trees through a professional inventory and utilize this data to draft planting requirements in new retail, employment and industrial areas within the Municipality.
- Develop a strategy to add tree canopy coverage along key US and State transportation routes that serve as gateways to the County.
- Increase tree canopy coverage along key riparian buffers within watersheds that contain primary streams that directly enter the Shenandoah and Potomac Rivers.

- Employ both conservation and strategic restoration of Forests and Stream Corridors to serve as a framework for protection of groundwater, surface water, habitat, and landscape connectivity (source: 2008 Green Infrastructure Assessment).
- Develop an education and outreach program in cooperation with all jurisdictions and the County Extension Service to promote the planting of appropriate native tree species on private property through landowner incentive programs; pursue grants to fund such a program.
- Develop recommendations and disseminate educational materials (pamphlets, brochures, news releases, etc.) supporting landowners' and HOA's proper maintenance and care of trees (e.g., recommended watering schedules, stake and wire procedures and removal, mulching). Seek commitment of property owners and HOA's for tree care, especially during the critical first three years after planting.
- Review the land coverage data to identify key areas lacking tree canopy to help prioritize areas to be planted including, but not limited to, additional school site; infilling vacant lots; slowing the flow of stormwater into public areas: such as parking lots, streets, public parks, HOA open space areas; pathways/trails, public buildings, and gateways; etc.
- Develop local regulations that ensure that appropriate size and species of trees are located in areas under overhead utility lines and in areas with similar growth restrictions (i.e., trees that grow over 15 feet tall at maturity should not be planted under the conductor zone on wood pole 138 Kv transmission lines).
- Investigate programs or revenue opportunities to assist with the removal of invasive species and replacement with appropriate native species appropriate to the planting location.

Chapter 9 Recommendations and Goals for Shepherdstown

This Tree Canopy Plan sets forth recommendations for tree canopy goals for the unincorporated areas of the County as well as specific goals for each municipality that address their specific needs. The following goals are specific to Shepherdstown and should be utilized in setting priorities related to tree canopy improvement and taken into consideration in a variety of local land use decisions.

The goals and recommendations outlined in this plan are intended to be considered and implemented over a twenty year planning period. They should be reviewed at least every 10 years and/or in conjunction with locally adopted Comprehensive Plans which may rely on these goals and expand on the recommendations.

- Reactivate the town's "Tree City USA" status.
- Maintain and improve the health of existing trees along streets, public rights-of-way and in parks.
- Review and consider amending Subdivision Regulations and Site Plan development standards (Title 9, Shepherdstown Planning and Zoning Ordinance) to improve policies regarding tree planting, tree canopy retention and forest protection, especially on steep slopes and in riparian areas.
- Update recommended tree list to encourage planting of appropriate native trees and enhance diversity.
- Update Shepherdstown tree inventory to incorporate German Street streetscape plantings and other changes in trees along streets, public rights-of-way and in parks.
- Collaborate with the Shepherd University Faculty Tree Committee to increase Shepherdstown's overall tree canopy by 3% (from 47% to 50%) by 2030. This would require an additional 7 acres of tree canopy.
[NOTE: Tree canopy located on Shepherd University property, even that which lies outside of town limits, is to be included in all Shepherdstown tree canopy figures.]
- Develop a strategy to add tree canopy coverage along key US and State transportation routes that serve as gateways to the County.
- Increase tree canopy coverage along key riparian buffers within watersheds that contain primary streams that directly enter the Shenandoah and Potomac Rivers.
- Employ both conservation and strategic restoration of Forests and Stream Corridors to serve as a framework for protection of groundwater, surface water, habitat, and landscape connectivity (source: 2008 Green Infrastructure Assessment).
- Develop an education and outreach program in cooperation with all jurisdictions and the County Extension Service to promote the planting of appropriate native tree species on private property through landowner incentive programs; pursue grants to fund such a program.

Chapter 9 Recommendations and Goals for Shepherdstown

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- Develop local regulations that ensure that appropriate size and species of trees are located in areas under overhead utility lines and in areas with similar growth restrictions (i.e., trees that grow over 15 feet tall at maturity should not be planted under the conductor zone on wood pole 138 Kv transmission lines).

Chapter 10 **Planting Priorities and Project Implementation**

This Plan and its Goals are a part of a larger effort to improve water quality within the Chesapeake Bay Watershed, while providing other benefits that increased tree canopy provide to a community. This plan was prepared through an Urban Tree Canopy (UTC) Grant awarded to the Jefferson County Commission, in partnership with the Cities of Ranson and Charles Town, by the WV Division of Forestry in 2010. This grant allowed the County to build on the 2009 TC assessment effort to work towards two primary tasks:

- a. Utilizing the data from the study conducted by the University of Vermont containing land coverage analysis to develop an urban tree canopy assessment and create a long term management plan, setting Urban Tree Canopy Goals for the County and the five municipalities within the County; Bolivar, Charles Town, Harpers Ferry, Ranson and Shepherdstown (this document).

- b. Plan and execute multiple Spring 2011 tree planting events in priority areas using grant and matching funds to purchase trees, site preparation and planting and other related planting supplies including: mulch, stakes and ties, watering bags, hoses and tanks.

The development of the Plan and Goals is intended to lay the groundwork for future grants and projects to work towards improving and increasing the UTC within Jefferson County and its municipalities in years to come. In addition to the Plan and Goals, this grant provided for the following plantings that occurred in the Spring of 2011 “kicking off” this County-wide planning effort.

2010 Forestry UTC Grant Activities

County and municipal planners, working with the WV Tributary Team, developed specific planting plans for the Spring of 2011. In addition to plantings to maximize the environmental benefits of trees, all plantings will be developed for the purpose of outreach and public education on the value of trees. In an effort to foster wider acceptance of voluntary best management practices (BMPs) for urban tree conservation and plantings, public plantings under the grant included an educational component to encourage private citizens to “reforest” their own properties and/or plant shade trees.

The following priority areas were identified to implement the current grant, which was limited to public lands within urban areas. These sites were chosen, based on the UTC assessment, for their lack of adequate tree canopy in relation to their potential for planting and for maximum stormwater runoff mitigation. Tree planting sites considered included public school grounds, transportation corridors and public parks. Specific planting plans were developed for each of the eight plantings that occurred, with both functionality and aesthetics in mind. All trees planted were native species to the area, and appropriate tree species were chosen with planting site and habitat in mind.

Chapter 10 Planting Priorities and Project Implementation

Priority Planting Areas

Schools offer a unique opportunity for public education through involvement of the students, parents and teachers. The grounds at a number of **Jefferson County Public Schools** were identified with an insufficient tree canopy. The environmental, ecological and social benefits of trees on school grounds will serve to enhance the learning environment for both students and faculty. Plantings occurred in March and April 2011 utilizing these grant funds at the following schools:

- CW Shipley Elementary School
- Driswood Elementary School
- Jefferson High School
- North Jefferson Elementary School
- Page Jackson Elementary School

Shepherd University was also a target site for increased tree canopy. Through grant funds, the University received 86 trees, which were planted by volunteers in a highly publicized tree planting event.

Road right-of-ways (ROW) often offer potential for tree plantings, if located in such a way as to not interfere with public safety or highway operations. Road ROW plantings are highly visible and demonstrate the benefit of cost savings from reduced mowing, the aesthetic value of trees and their ability to reduce stormwater runoff. Examples of areas that might be appropriate for road ROW plantings include the new Route 9 corridor (which has a limited landscaping plan along the bike trail), Route 51 and the urbanized portion of US 340 east of Charles Town and Ranson. For the purpose of utilizing the 2010 grant funds, no road ROW were chosen for a tree planting; however, plantings in these areas continue to be a priority for the County and municipalities.

Public parks that have aging and/or insufficient tree canopy can be ideal locations to engage public volunteers in planting projects, as they are visible and the communities are often invested in the park areas. Park plantings, in addition to providing the environmental benefits of shade and cooler ambient temperature, offer an opportunity to demonstrate proper planting techniques to the general public and disseminate information on the benefits of trees to encourage citizens to plant trees on private property. While parks typically have more tree canopy and open green space than other “urban” areas might, focusing on maximizing the extent of the tree canopy in parks helps to increase the net tree canopy for a municipality. Charles C. Marcus Field in Ranson and Willingham Knolls Park in Charles Town were chosen for a “double planting event”, as a part of this grant funding cycle. These plantings were widely advertised to ensure maximum public involvement and outreach.

Approximately 450 trees of 26 different native species were planted in the Spring 2011 under this grant. Utilizing a forestry standard of 109 trees per acre, this is the equivalent of an increase in the Tree Canopy of approximately 4 acres.

Chapter 10 Planting Priorities and Project Implementation

Next Steps

The County and each municipality will work to implement the goals established in this document and develop local regulations to ensure that the goals are reached and community benefits are maximized. The Urban Tree Canopy Working Group should meet annually to report back to each other progress made and to collaborate on upcoming tree planning and planting efforts in each jurisdiction.

Grants should be pursued to allow future tree plantings on private and public properties. A program should be developed to implement the utilization of grant funds and to document the use of such funds towards the recommended tree canopy coverage goals.

The Tree Committees that have been established should coordinate their public outreach and education efforts to make the most effective use of these efforts and to ensure that the goals of this plan is being communicated to the public in a consistent manner.

Appendix A: Internet Resources

The following resources can be utilized to find information on proper tree planting techniques, tree care and upkeep, native tree species, tree identification, local tree projects and events, benefits of trees, urban forestry, and more.

Arbor Day Foundation

<http://www.arborday.org>

Cacapon Institute

<http://www.cacaponinstitute.org/>

Chesapeake Bay Program – West Virginia

<http://www.wvca.us/bay/>

International Society of Arboriculture – Trees are Good

<http://www.treesaregood.org>

Potomac Valley Audubon Society

<http://www.potomacaudubon.org/>

Watershed Forestry Resource Guide

<http://www.forestsforwatersheds.org/>

West Virginia Conservation Agency

<http://www.wvca.us>

West Virginia Department of Agriculture

<http://www.wvagriculture.org>

West Virginia Department of Environmental Protection

<http://www.dep.wv.gov>

West Virginia Division of Forestry

<http://www.wvforestry.com/>

West Virginia Division of Natural Resources

<http://www.wvdnr.gov>

West Virginia Native Plant Society

<http://wvnps.org/>

West Virginia Natural Resources Conservation Service

www.wv.nrcs.usda.gov

Appendix A: Internet Resources

West Virginia University Extension Service
<http://ext.wvu.edu/>

U.S. Department of Agriculture Plants Database
<http://www.plants.usda.gov/java/>

Appendix B: Local Resources

Charles Town Tree Board
PO Box 14
Charles Town, WV 25414
304-725-2311 ext. 231
304 725-1014 (fax)
Scott Coyle – Chair

Harpers Ferry Tree Committee
1000 Washington Street
PO Box 217
Harpers Ferry WV 25425
304-535-2206
<http://hftrees.org/default.aspx>
Kevin Carden - Chair

Shepherdstown Tree Commission
c/o Town Clerk
Corporation of Shepherdstown
PO Box 248
Shepherdstown, WV 25443
Phone: 304-876-2398
Borys Tkacz - Chair

Appendix C: References

- Fazio, J.R. (2010). How trees can retain stormwater runoff. *Tree City U.S.A. Bulletin* 55. 8p.
- Kuo, F.E., & Faber Taylor, A. (2004). A potential natural treatment for Attention-Deficit/Hyperactivity Disorder: Evidence from a national study. *American Journal of Public Health*, 94(9), 1580-1586.
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- Kuo, F.E., & Sullivan, W.C. (2001). Environment and crime in the inner city: Does vegetation reduce crime? *Environment & Behavior*, 33(3), 343-367.
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- Nowak, David J. & Greenfield, Eric J. (2009). Urban and community forests of the Southern Atlantic region: Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia. Gen. Tech. Rep. NRS-50. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 85 p.
- Sanders, R.A. (1986). Urban vegetation impacts on the hydrology of Dayton, Ohio. *Urban Ecology* 9: 361–376.