

A Report on Abingdon's Existing and Possible Urban Tree Canopy

Project Background

The analysis of Abingdon's urban tree canopy (UTC) was carried out by the Virginia Department of Forestry in collaboration with Virginia Tech's Department of Forest Resources and Environmental Conservation and the Spatial Analysis Laboratory (SAL) of the University of Vermont.

The goal of the project was to apply the USDA Forest Service's UTC assessment protocols to the town of Abingdon. This analysis was conducted based on year 2008 data.

Urban tree canopy (UTC) is the layer of leaves, branches, and stems of trees that cover the ground when viewed from above. Urban tree canopy provides many benefits to communities including improving water quality, saving energy, lowering town temperatures, reducing air pollution, enhancing property values, providing wildlife habitat, facilitating social and educational opportunities, and providing aesthetic benefits.

Key Terms

UTC: Urban tree canopy (UTC) is the layer of leaves, branches, and stems of trees that cover the ground when viewed from above.

Land Cover: Physical features on the earth mapped from satellite or aerial imagery such as trees, or water.

Existing UTC: The amount of UTC present within the town boundary.

Possible UTC: The amount of land that is theoretically available for the establishment of tree canopy within the town boundary. It is the combination of Possible UTC - Vegetation and Possible UTC - Impervious.

Possible UTC - Vegetation: The amount of land within the town boundary covered by non-tree vegetation that is theoretically available for the establishment of tree canopy.

Possible UTC - Impervious: The amount of land within the town boundary covered by impervious surface that is theoretically available for the establishment of tree canopy. This excludes all buildings and all pavement within the public Right-of-Way (ROW).

How Much Tree Canopy Does Abingdon Have?

The analysis of Abingdon's Urban Tree Canopy (UTC) found that 1336 acres of the town are currently covered by tree canopy (Existing UTC, Figure 1). This corresponds to 26.3% (1336 acres) of all land within the town (Table 1). An additional 67.4% (3052 acres) of the town could theoretically be improved to support tree canopy (Possible UTC, Table 2).

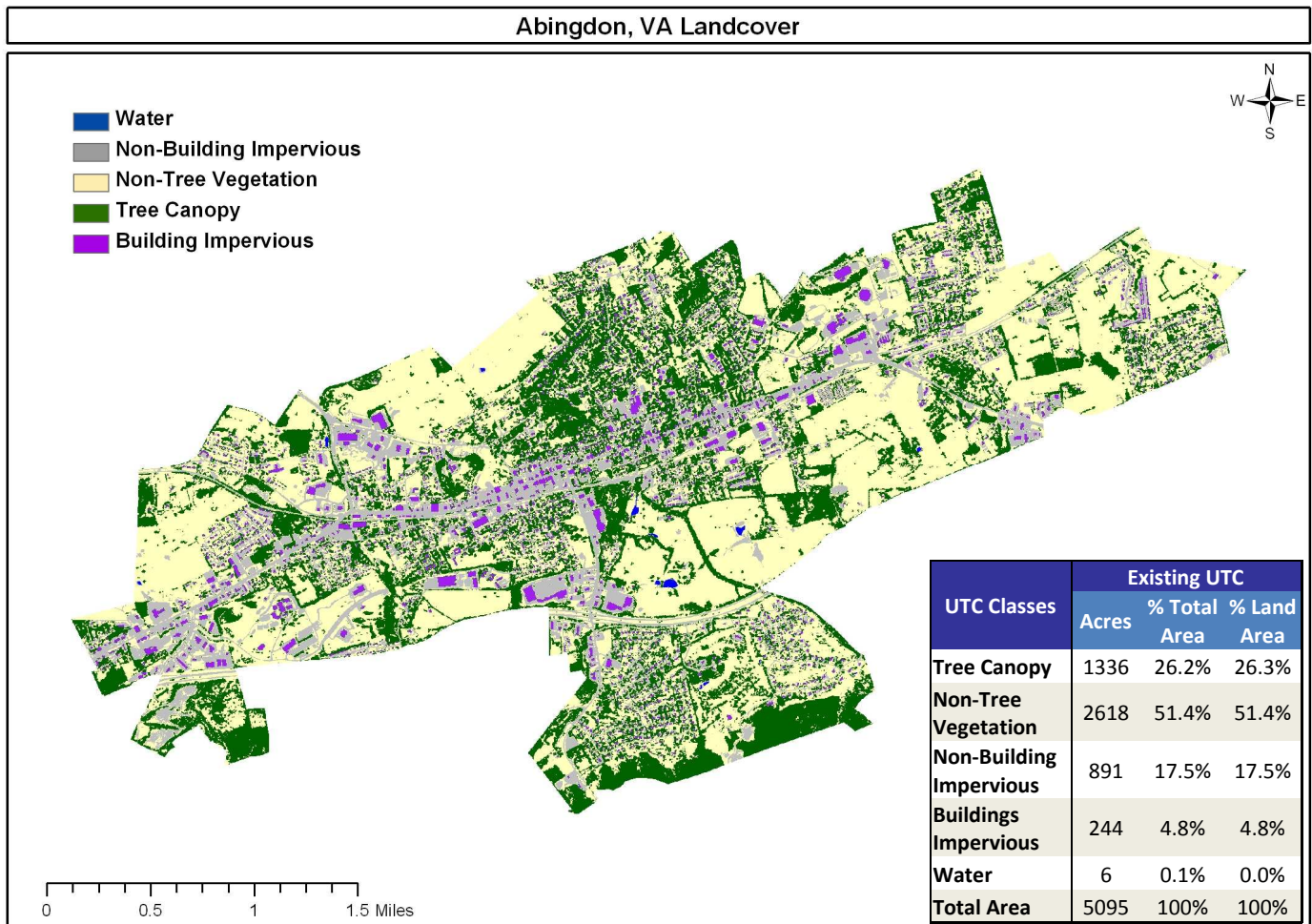


Figure 1 & Table 1: Land cover for the town of Abingdon with Existing UTC acreage and percentage.

Mapping Abingdon's Trees

Using high-resolution (1 meter) National Agriculture Imagery Program (NAIP) imagery acquired in the summer of 2008 (Figure 2a) in combination with remote sensing techniques, land cover for the town was mapped with such detail that single trees (larger than 16 square meters) were detected with greater than 90% accuracy (Figure 2b).

Who "Owns" Abingdon's Trees?

The detailed land cover mapping conducted as part of this assessment allowed the percentage of Existing and Possible UTC to be calculated for each parcel of land in Abingdon (Figure 3). Subsequently, land use information from the town's parcel database was used to examine ownership patterns for Existing UTC and Possible UTC (Figure 4 and Figure 7).

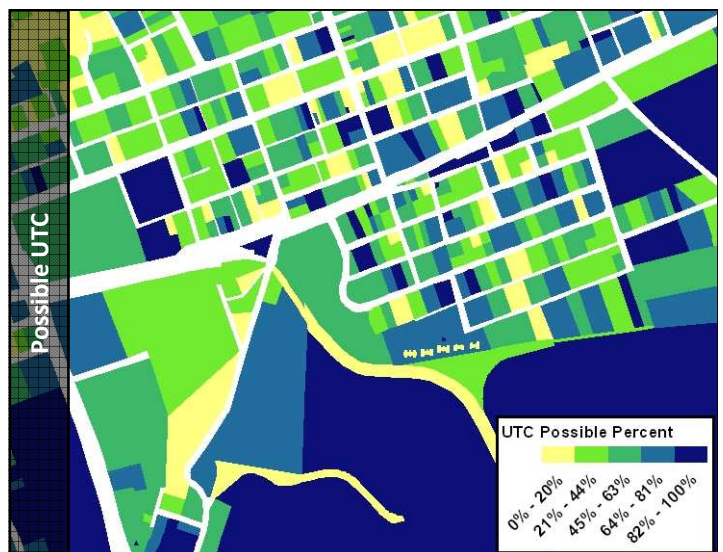
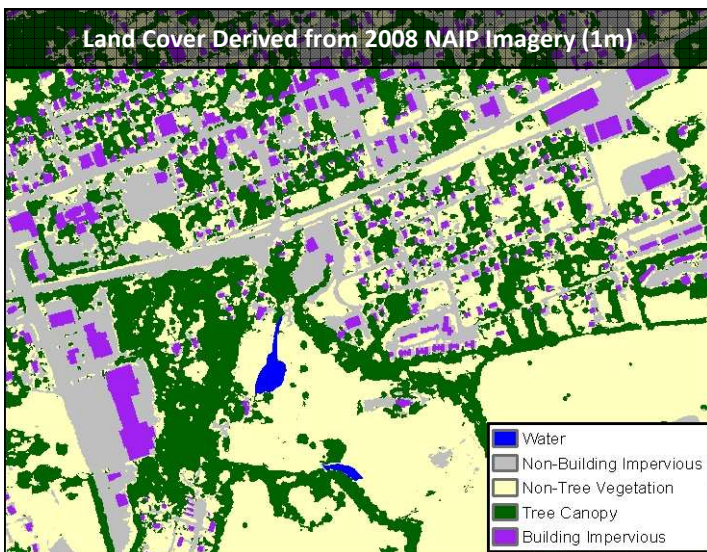
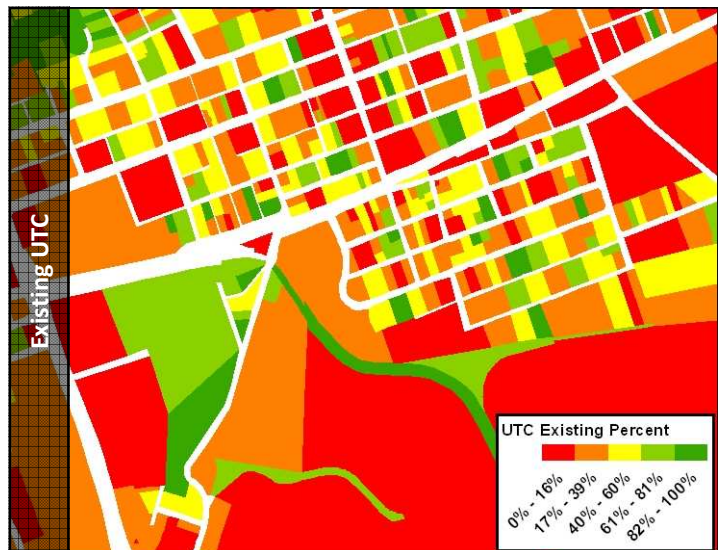
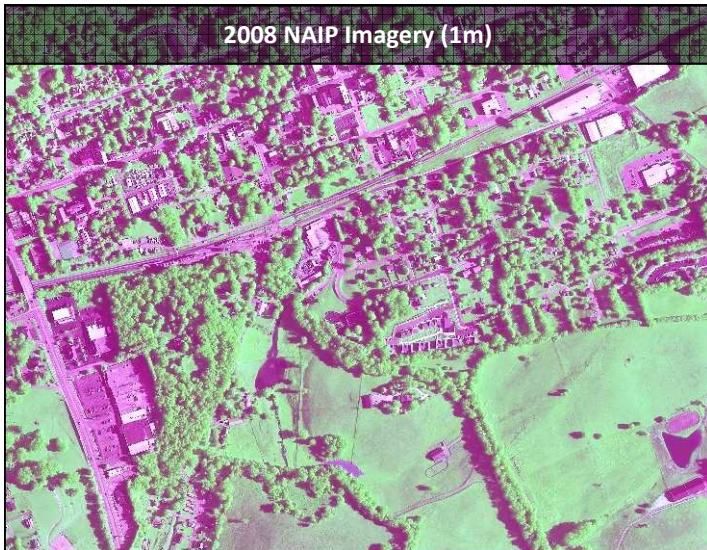


Figure 2a, 2b: Comparison of 2008 NAIP imagery to the resulting high-resolution land cover.

Figure 3: UTC metrics summarized at the property parcel level

Existing Urban Tree Canopy Summarized by Property Parcels - Abingdon, VA

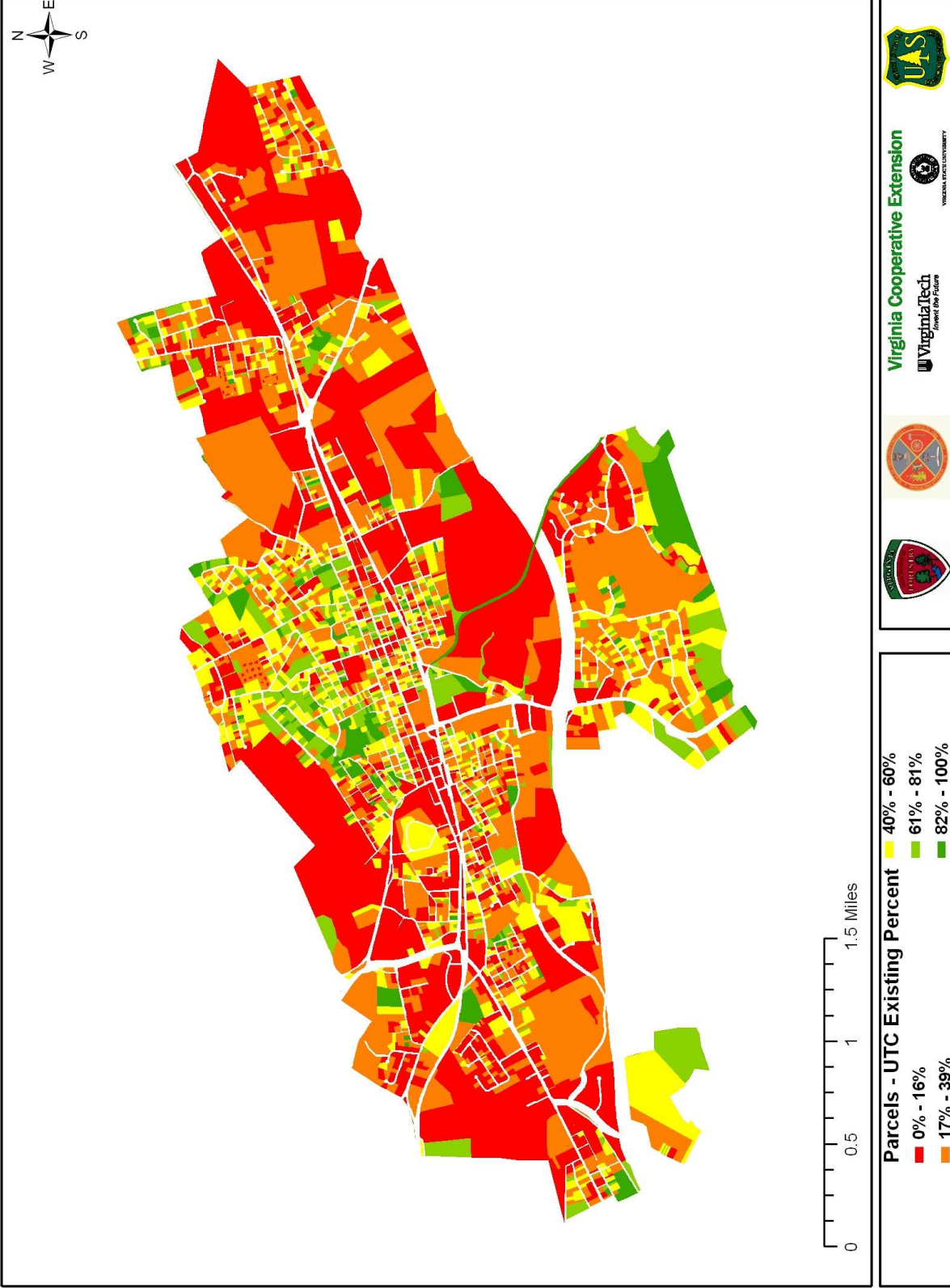


Figure 4: Existing UTC summarized by property parcel.

Urban Tree Canopy Summarized by Property Parcels

Using data provided by the town of Abingdon, Existing and Possible UTC were summarized for each property parcel (Figures 5 & 6). Areas outside of property parcels were considered part of the public Right of Way and excluded. Based on this analysis, Abingdon has 27.2% (1231 acres) Existing UTC with a possible increase in UTC of 53.9% (2440 acres) in vegetation areas as well as 13.5% (611 acres) in impervious areas (Table 2 & Figure 5).

Table 3 and Figure 6 show the 20 Parcels with the largest amount of Possible UTC. Parcel 105-A-35 (Nicewonder) has the most Possible UTC (82 acres) of which 77 acres are in vegetated areas and 5 acres in impervious areas. Parcels 105-A-46A (Glenrochie) and 104-4-1 (VA Highlands CC) are second and third with 73 and 68 acres Possible UTC respectively. These 20 parcels account for 27.5% of the Possible UTC within Abingdon.

UTC Parcel Metrics	Acres	% Parcel Land Area
Parcel Land Area	4526	100%
Existing UTC	1231	27.2%
Possible UTC	3052	67.4%
Possible UTC - Vegetation	2440	53.9%
Possible UTC - Impervious	611	13.5%
Not Suitable for UTC	250	5.5%

Table 2: Acres & percent land area from UTC parcel metrics.

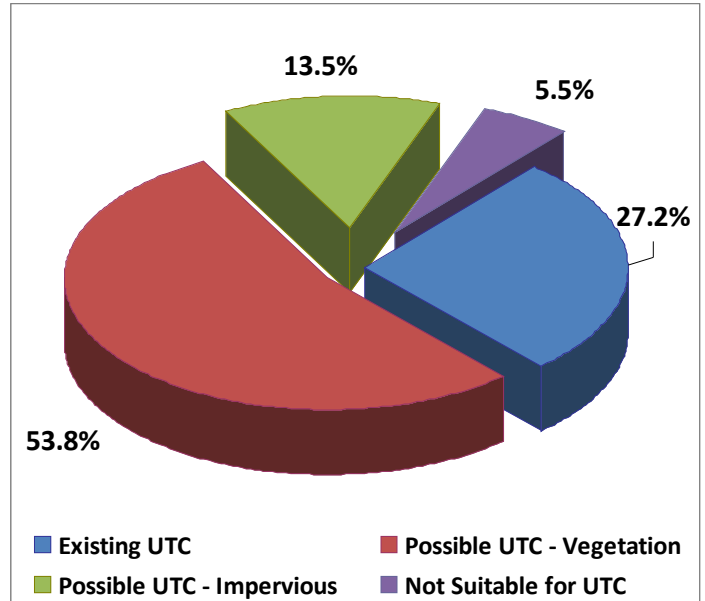


Figure 5: Pie chart showing Abingdon's UTC distribution.

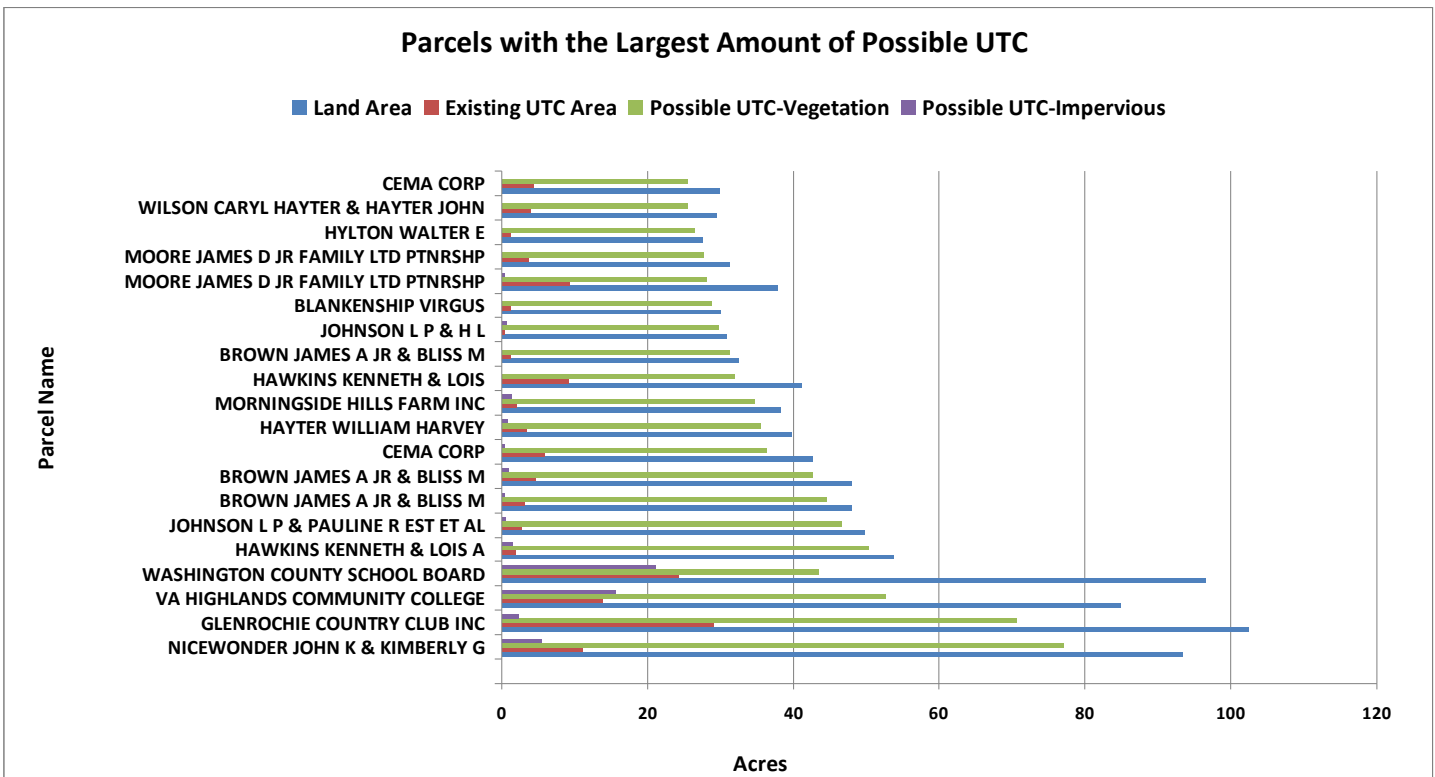


Figure 6: 20 Parcels with the Largest Amount of Possible UTC..

Possible Urban Tree Canopy Summarized by Property Parcels - Abingdon, VA

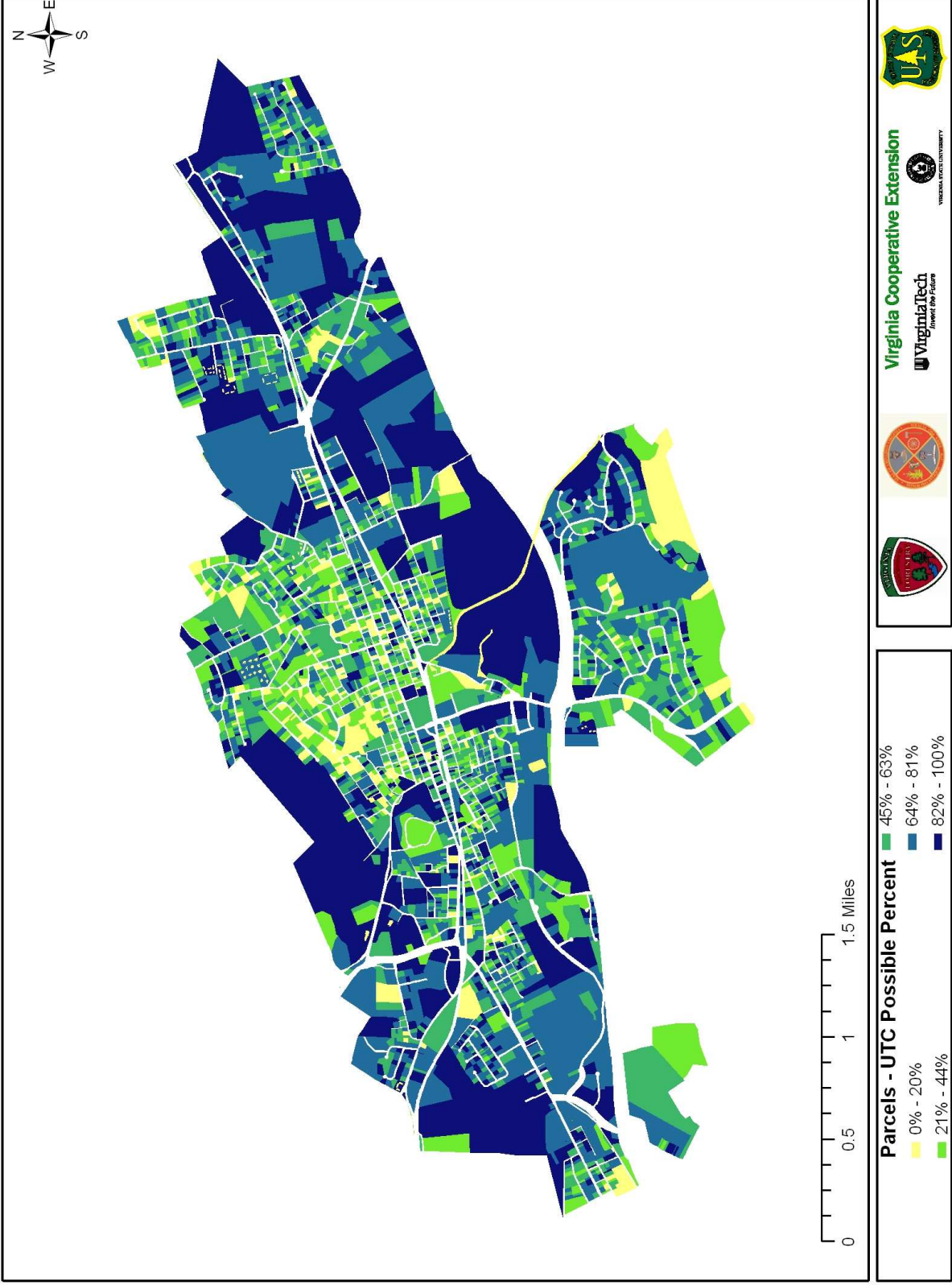


Figure 7: Possible Urban Tree Canopy summarized by property parcel.

Canopy analysis completed 10/30/2010 JAP

UTC Metrics for Parcels with the Largest Amount of Possible UTC

Parcel Number	Acres	Existing UTC			Possible UTC Vegetation			Possible UTC Impervious		
		% Land	% Parcel	% UTC Type	% Land	% Parcel	% UTC Type	% Land	% Parcel	% UTC Type
105-A-35	93	0.24%	11.83%	0.90%	1.70%	82.34%	3.15%	0.12%	5.74%	0.88%
105-A-46A	102	0.64%	28.34%	2.36%	1.56%	68.89%	2.89%	0.05%	2.20%	0.37%
104-4-1	85	0.30%	16.28%	1.12%	1.16%	62.00%	2.15%	0.34%	18.41%	2.55%
105-A-2	96	0.54%	25.13%	1.97%	0.96%	45.07%	1.78%	0.46%	21.82%	3.44%
106-2-8	54	0.04%	3.45%	0.15%	1.11%	93.68%	2.06%	0.03%	2.88%	0.25%
104-3-1	50	0.06%	5.33%	0.22%	1.03%	93.59%	1.91%	0.01%	1.07%	0.09%
104-A-83A	48	0.07%	6.35%	0.25%	0.98%	92.68%	1.82%	0.01%	0.96%	0.08%
104-7-2	48	0.10%	9.45%	0.37%	0.94%	88.62%	1.74%	0.02%	1.92%	0.15%
105-A-39	43	0.13%	13.80%	0.48%	0.80%	85.12%	1.49%	0.01%	0.89%	0.06%
085-4-2A	40	0.07%	8.32%	0.27%	0.78%	89.01%	1.45%	0.02%	2.04%	0.13%
106A1-5-1	38	0.04%	5.30%	0.16%	0.77%	90.93%	1.42%	0.03%	3.67%	0.23%
105-A-20	41	0.20%	22.30%	0.75%	0.71%	77.58%	1.31%	0.00%	0.12%	0.01%
104-2-1	32	0.03%	3.87%	0.10%	0.69%	96.12%	1.28%	0.00%	0.00%	0.00%
104-A-39	31	0.01%	1.41%	0.04%	0.66%	96.23%	1.22%	0.02%	2.36%	0.12%
104-5-9	30	0.03%	3.83%	0.09%	0.64%	95.87%	1.18%	0.00%	0.30%	0.01%
106-A-2	38	0.20%	24.44%	0.75%	0.62%	74.34%	1.15%	0.01%	1.22%	0.08%
106-A-4B	31	0.08%	11.43%	0.29%	0.61%	88.50%	1.13%	0.00%	0.08%	0.00%
105-A-37	28	0.03%	4.16%	0.09%	0.58%	95.82%	1.08%	0.00%	0.02%	0.00%
085-4-2	29	0.08%	13.03%	0.31%	0.56%	86.63%	1.05%	0.00%	0.34%	0.02%
021-1-5B_AB	30	0.09%	14.31%	0.35%	0.56%	85.60%	1.05%	0.00%	0.09%	0.00%

$\% \text{ Land} = \frac{\text{Area of UTC type for specified parcel}}{\text{Area of all land}}$

$\% \text{ Parcel} = \frac{\text{Area of UTC type for specified parcel}}{\text{Area of all land for specified parcel}}$

$\% \text{ UTC Type} = \frac{\text{Area of UTC type for specified parcel}}{\text{Area of all UTC type}}$

The % Land Area value indicates that 0.09% of Abingdon's land area is Existing UTC within Parcel 021-1-5B_AB.

The % Parcel value indicates that 14.31% of Parcel 021-1-5B_AB is covered by Existing UTC.

The % UTC Type value indicates that 0.35% of Abingdon's Existing UTC is in Parcel 021-1-5B_AB.

Table 3: UTC metrics for the 20 parcels with the largest amount of Possible UTC. For each parcel, UTC metrics were computed as a percent of all land in the town (% Land), as a percent of total parcel area (% Parcel) and as a percent of UTC type (% UTC Type).

Where to Plant Trees?

Decision makers can use GIS to find out specific UTC metrics for a parcel or set of parcels. This information can be used to estimate the amount of tree loss in a planned development or set UTC improvement goals for an individual property.

Attribute	Value
Land Use	Exempt Commercial
Owner	St Peter & Paul Catholic Church
Address	320 Cathedral Street
Existing UTC	5%
Possible UTC	72%
Possible UTC—Vegetation	47%
Possible UTC—Impervious	25%

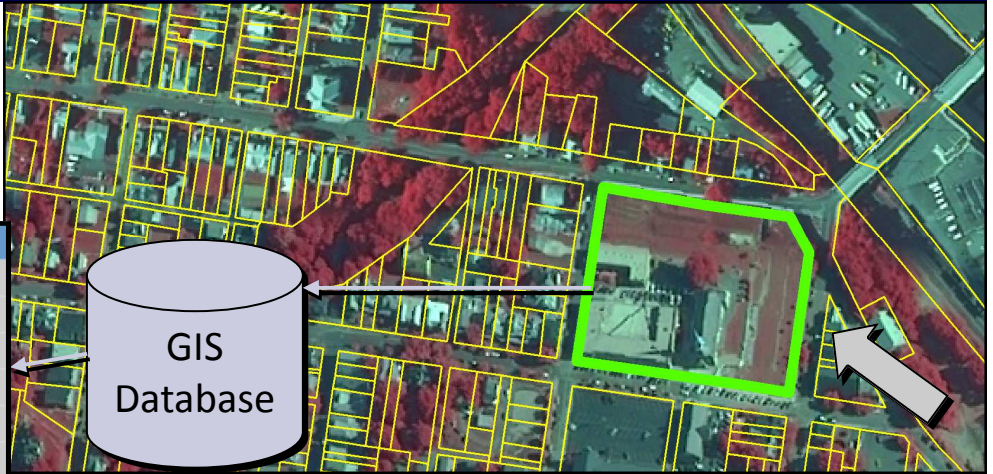


Figure 8: Parcel-based UTC metrics can be used to support targeted UTC.

Conclusions

- Abingdon's urban tree canopy is a vital town asset, reducing storm water runoff, improving air quality, reducing the town's carbon footprint, enhancing quality of life, contributing to savings on energy bills, and serving as habitat for wildlife.
- With 26.3% UTC, Abingdon is below the average of 38% UTC for the 20 localities analyzed to date (Figure 9).
- Over half of Abingdon's property parcels (51.9%) contain greater than 25% Existing UTC.
- 27.5% of the Abingdon's Possible UTC lies within the 20 parcels shown in Table 3.

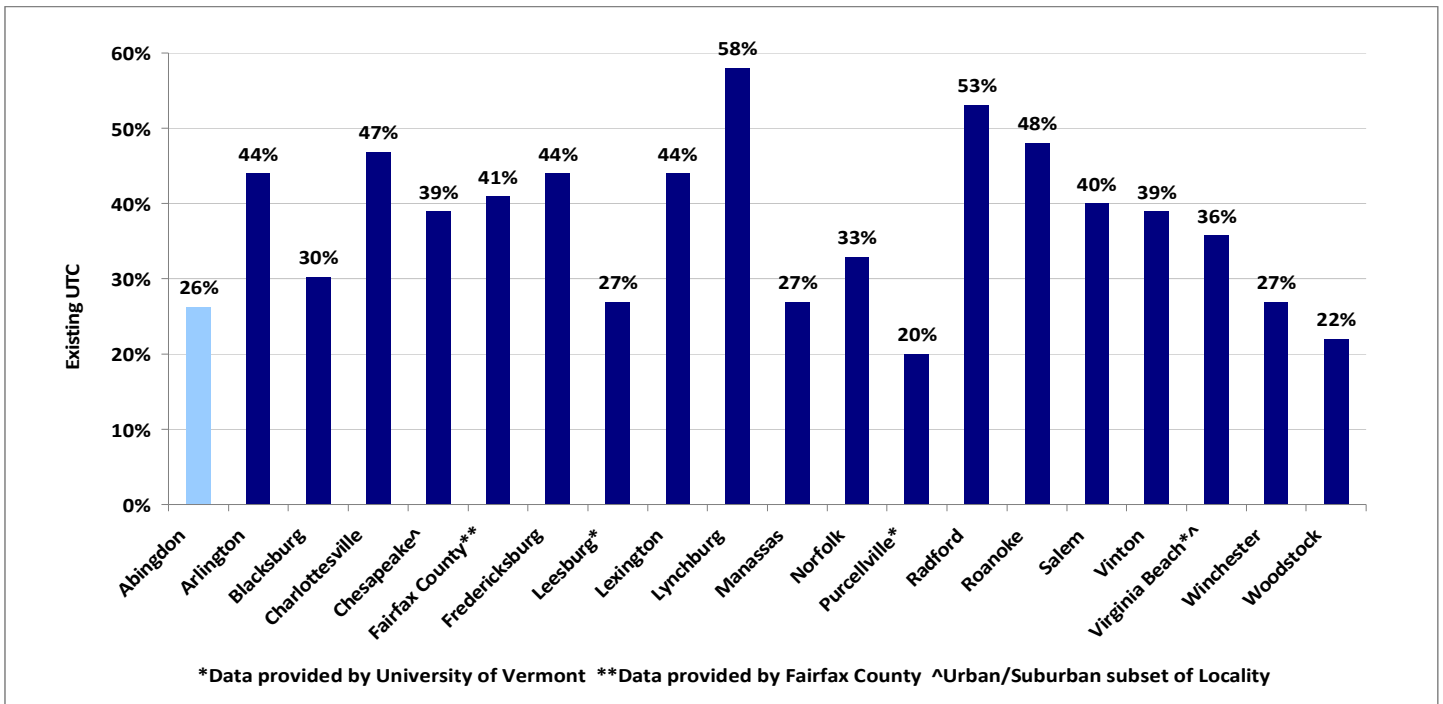


Figure 9: Comparison of Abingdon's Existing UTC with other cities that have completed UTC assessments.

Prepared by:

Jim Pugh
 GIS/Remote Sensing Technician
 Virginia Department of Forestry
 900 Natural Resources Drive; Suite 800
 Charlottesville, VA 22903
 (434) 220-9062
jim.pugh@dof.virginia.gov

Additional Information

The study was conducted with funding from the Virginia Department of Forestry. More information on the UTC assessment project can be found at the following web site.
http://www.gep.frec.vt.edu/va_utc.html



Virginia Cooperative Extension
A partnership of Virginia Tech and Virginia State University www.ext.vt.edu

