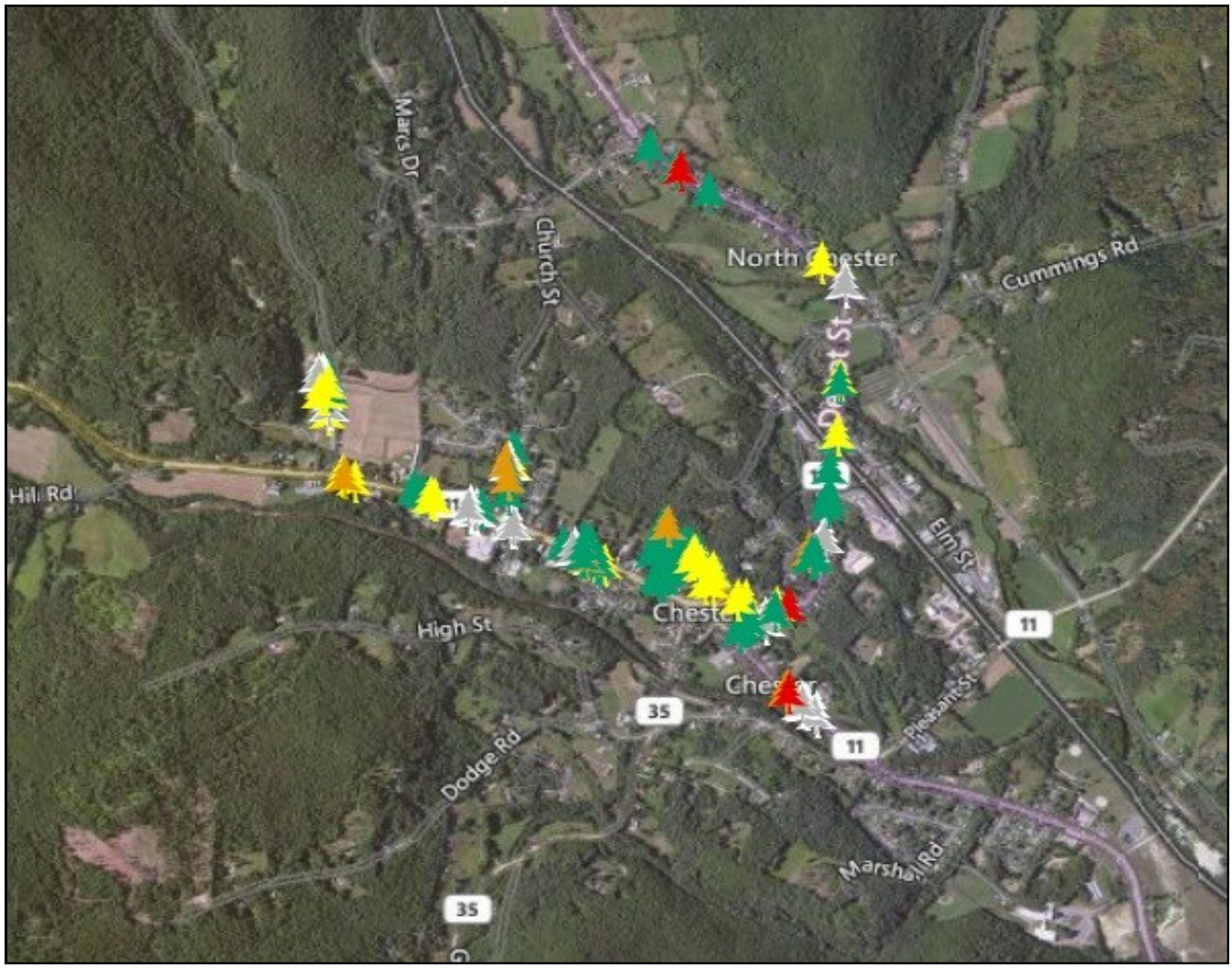
Chester Public Tree Inventory
Summary Report



Prepared for the Town of Chester and
the Chester Conservation Committee
by the Vermont Urban & Community Forestry Program
July 2016

FORESTS, PARKS & RECREATION VERMONT

UNIVERSITY OF VERMONT EXTENSION
CULTIVATING HEALTHY COMMUNITIES

PLANT LIVE GROW
VERMONT URBAN & COMMUNITY FORESTRY PROGRAM

VT ANR GIS

Acknowledgements

This summary report was developed by Vermont Urban & Community Forestry Program (VT UCF) staff based on field work conducted by VT UCF staff and members of the Chester Conservation Committee for the Town of Chester, Vermont in June 2016. We would like to thank Melissa Post for her coordinating efforts and the members of the Chester Conservation Committee who volunteered their time to collect the data that is summarized in this report. Special thanks to Rick White, Vermont State Lands Forester, and Sam Schneski, Windsor and Windham County Forester, for their assistance in data collection.

About the Vermont Urban & Community Forestry Program

The field of forest management is not confined to the natural areas and forests of Vermont, but extends to the populated urban and rural spaces where trees play important roles. The trees in public parks, along roadsides, on town greens, and in municipal forests compose our urban and community forests and merit careful stewardship. VT UCF is a collaborative effort between the Vermont Department of Forests, Parks, & Recreation and University of Vermont (UVM) Extension. The program provides technical and financial assistance as well as educational programs and resources for the management of trees and forests in and around Vermont communities. The mission of VT UCF is ***to lead citizens, businesses, and governments in understanding the value of urban and community forests and promote civic responsibility for and participation in the stewardship of these resources for this and future generations***. Since 1991, the program has been guided by a small staff and a twenty-member advisory council. The council meets quarterly to share information and advise the program; its members come from various professional associations, non-profits, educational institutions, municipal tree boards and committees, and state agencies. VT UCF works with state and municipal officials, as well as dedicated volunteers and local organizations, to steward the urban forest's ecological integrity and diversity. More information about VT UCF and its programming can be found at www.vtcommunityforestry.org.

Project Summary & Methodology

The goal of the Chester public tree inventory was to accurately locate and assess Town-owned trees within the public right-of-way (ROW) on streets in the concentrated town center and in select parks to maintain a record of tree conditions, plantings, and removals. A secondary goal of the project was to identify potential tree planting locations within the public ROW. The information collected in the inventory and presented in this summary report should provide residents and decision makers with a better understanding of the composition, condition, and benefits of Chester's downtown public trees and will allow the Chester Conservation Committee to plan for tree maintenance and future tree planting using a map-based tree inventory tool.

This project was initiated in the spring of 2016. To plan for the public tree inventory, VT UCF staff coordinated with members of the Chester Conservation Committee to decide what streets and properties should be included in the inventory, and to determine the public right-of-way (ROW) boundaries for the streets. VT UCF has developed a tree inventory tool in collaboration with the Vermont Agency of Natural Resources' (ANR) GIS team. The map-based tool uses the free application *Collector for ArcGIS*, developed by Esri (http://doc.arcgis.com/en/collector/), for data collection and is linked to the publicly-accessible ANR Atlas online mapping website.

Importance of Inventory and Community Forestry in Vermont

A public tree inventory establishes a record of the City-owned trees present in a municipality. An inventory can provide information about the species, size, health, maintenance needs, and location of each tree. This detailed information allows community leaders to estimate the numerous contributions and management requirements of the trees of which it is in charge. In the event of a disease outbreak or invasive insect infestation, data from an inventory may assist in monitoring and preventing spread, as well as supporting the response to the disease or infestation. An inventory can also help build public support for expanding community forests and to guide future urban planning.

Urban and community trees improve the quality of life for Vermont communities in a variety of ways. The most readily apparent benefit is the aesthetic value that trees provide a street, home, or public space. Along with this beauty is the functional benefit of providing shade along the streets in the summertime and blocking wind to reduce heating costs in the wintertime. The presence of trees has been shown to positively affect property values and boosts foot traffic in commercial areas. Parks and tree-lined sidewalks promote physical activity by creating shaded, comfortable outdoor spaces. Many types of urban wildlife depend on trees as sources of food and shelter. Unseen benefits of urban trees include improvements in air quality and temperature regulation through reduction of the heat island effect. Trees can mitigate noise pollution common in an urban environment and can clean and conserve water by controlling run-off. Additionally, urban and community forests create opportunities for education, community engagement, and in some instances can be related to crime reduction. Trees are an integral part of the green infrastructure of a place and contribute to keeping our communities healthier and our everyday lives more fulfilling.

On June 21st, VT UCF, staff from the VT Department of Forests, Parks, & Recreation, and Chester volunteers completed an inventory of **117 trees** located within the public ROW of **5 streets** and in **4 town green spaces**, and also identified **11 potential public tree planting locations**. In total, the inventoried land area was about 1.2 square miles, a small fraction of the Town of Chester's 56 square mile total land area, but encompassed the concentrated center and most densely populated portion of town. The list of streets and sites with ROW boundaries is found in Table 1 below. A series of GIS maps highlighting the tree inventory results can be found in Appendix B.

Table 1: Chester streets and sites included in the public tree inventory.

Chester Sites and Streets		
Street Name/Site Name	**What to Inventory**	**Right-of-Way Extent**
Route 11	From Lovers' Lane to Pleasant Street	49.5'
Chester Common (on Rte. 11)	All planted landscape trees	n/a
Depot Street & Maple Street	From Route 103 to North Street	33'
Chester Town Hall Property (on Depot Street) and Town Green	All planted landscape trees	n/a
Chester Historical Society Property (on Main Street)	All planted landscape trees	n/a
The Pinnacle	All planted landscape trees, noting memorial trees	n/a
Church Street	From Route 11 to Meadow Road	49.5'
North Street	From Depot Street to Church Street (through the Stone Village)	49.5'

Each public tree identified to be within the ROW was recorded into the *Collector for ArcGIS* application using an iPad, provided by VT UCF. The application is map-based and uses GPS and a base layer map to allow the user to input information about a tree, linking it to a particular geographic location. Data recorded for each public tree in Chester, outlined in Table 2 below, included street name, overall condition, species, diameter class (using a measurement for diameter at breast height, or DBH), a recommendation for monitoring (yes/no), whether the tree showed signs of decay (yes/no), crown dieback (yes/no), or root damage (yes/no), if the tree needed to be pruned (yes/no), if the tree had visible stem-girdling roots (yes/no), additional comments, and the nearest house or building address. In most cases, a picture was

also taken of each tree. All inventory data collected on public trees in Chester is available for viewing on the ANR Atlas and instructions are included in Appendix A.

Table 2: Data collection parameters for the Chester public tree inventory.

Data Parameters	Description
Site ID	Street name or property name.
Species	Common name. Include in comments box if not listed.
Tree Condition	● *Good:* full canopy (75-100%), no dieback of branches over 2" in diameter, no significant defects, minimal mechanical damage ● *Fair:* thinning canopy (50-75%), medium to low new growth, significant mechanical damage, obvious defects/insects/disease, foliage off-color and/or sparse ● *Poor:* declining (25-50%), visible dead branches over 2" in diameter, significant dieback, severe mechanical damage or decay (over 40% of stem affected) ● *Dead:* no signs of life, bark peeling; scratch test on twigs for signs of life (green) ● *Vacant:* potential spot for a tree within the public ROW. Add "small", "medium", or "large" in the comments box - Small= max 30' at maturity, presence of overhead wires, minimum planting space 4' x 4' - Medium= 30-50' at maturity, green belts over 6' wide, no overhead wires - Large= 50'+ at maturity, parks and open space
Diameter (DBH)	Diameter taken at 4.5' above ground in classes of 0-3", 3-6", 6-12", 12-18", 18-24", 24-36", 36-42", 42"+. If on slope, uphill side measured. If abnormal growth, measured above or below growth. If multi-stemmed, each stem's DBH is squared, all squares summed, and the square root taken; indicate "multi-stemmed" in comments box.
Monitor	Yes: any one visible defect is affecting >40% of the tree, the tree poses a hazard to people/infrastructure/cars, the trunk or branches are growing into utility wires, the tree is dead or in poor condition, or the tree is an ash tree showing evidence of woodpecker flecking, blonding, epicormic branching/water sprouts, and/or suspicious exit holes No: no major defects, tree in good or fair condition
Decay	Yes: visually noticeable decay present on inventoried tree No: no visually noticeable decay apparent on inventoried tree
Crown Dieback	Yes: visually noticeable crown dieback present on inventoried tree No: no visually noticeable crown dieback apparent on inventoried tree
Roots	Yes: The presence of root issues, including stem-girdling roots, compacted soil, exposed roots, or mechanical damage to roots. No: No visible root issues.
Prune	Yes: Flag trees for pruning if any of the following signs are present: broken branches, branches are overlapping /touching/growing on each other, the tree is overcrowded, branches are interfering with utility lines or other built infrastructures, the branches can interfere with pedestrians/vehicles/bikes, etc. No: No branch needs to the trimmed
Stem-Girdling Roots	Yes: Need to remove visible stem-girdling roots No: No need to remove visible stem-girdling roots
Comments	Notes, elaborate on any existing conditions; max 255 characters.
House Number	Corresponding house address, numerical field. If a corner lot house is on a different street, enter house number and write "House located on X Street; corner tree" in comments box.
Collection Date/Time	Date and time.
Photo	Photo of full tree. Additional photos of any significant defects.

Members of the Chester Conservation Committee with VT Department of Forests, Parks, & Recreation staff, ready to collect data for the Chester public tree inventory.

The inventory team gathered underneath two Norway maple trees to plan for the inventory data collection.

Summary of Findings

Community Forest Diversity

- Of the 117 public trees, there are 29 different species in 20 different genera.
- The five most common tree genera by number of trees are *Acer* (maple) at 42%, *Malus* (crabapple) at 11%, *Picea* (spruce) at 9%, *Fraxinus* (ash) at 7%, and *Ulmus* (elm) at 6%. See Figure 1 below.
- *Acer* and *Fraxinus* species together represent half (49%) of Chester's public trees. Invasive tree pests currently threaten both of these genera: the Asian long horned beetle (ALB) and the emerald ash borer (EAB), respectively.
- The five most common species are *Acer platanoides* (Norway maple) at 15%, *Malus* species (crabapple) at 11%, *Acer rubrum* (red maple) at 9%, *Acer saccharum* (sugar maple) at 9%, and *Picea pungens* (Colorado blue spruce) at 8%. See figure 2 below.

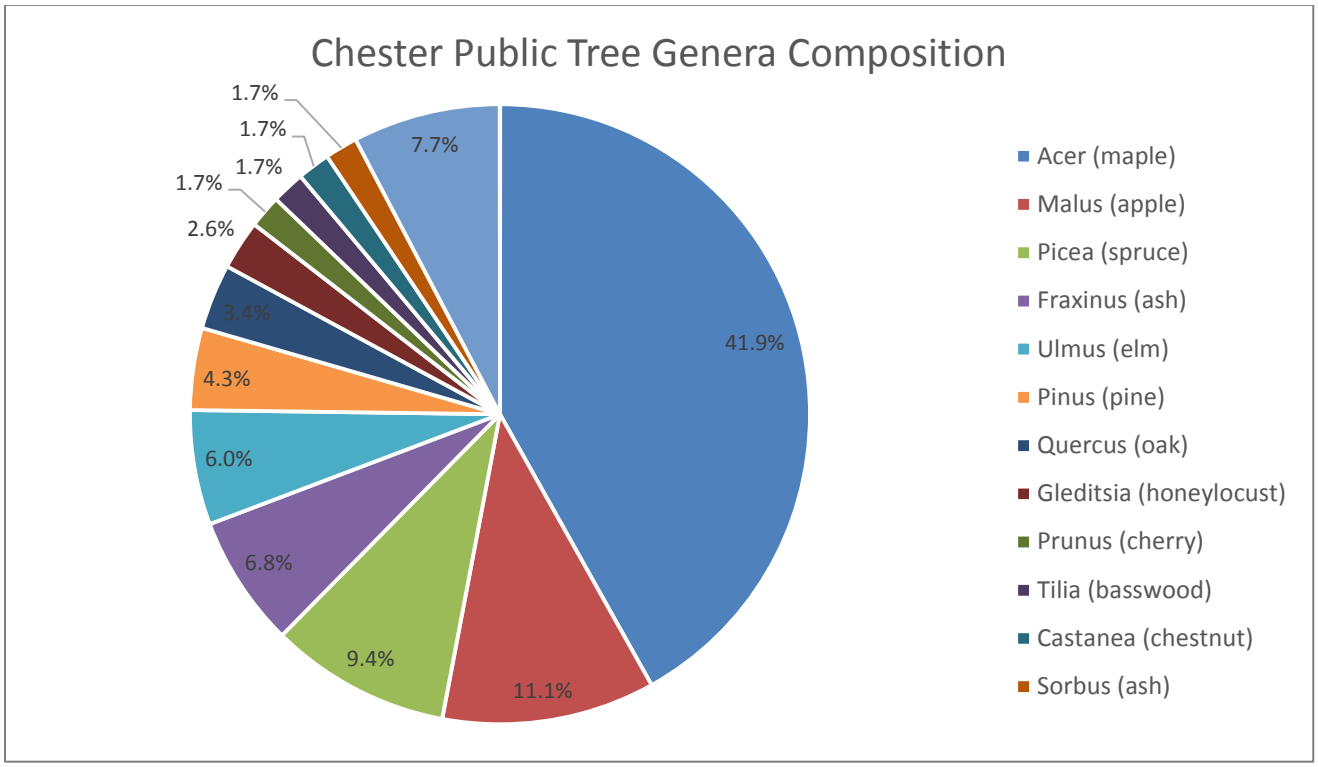


Figure 1: Genera distribution of Chester's public trees.

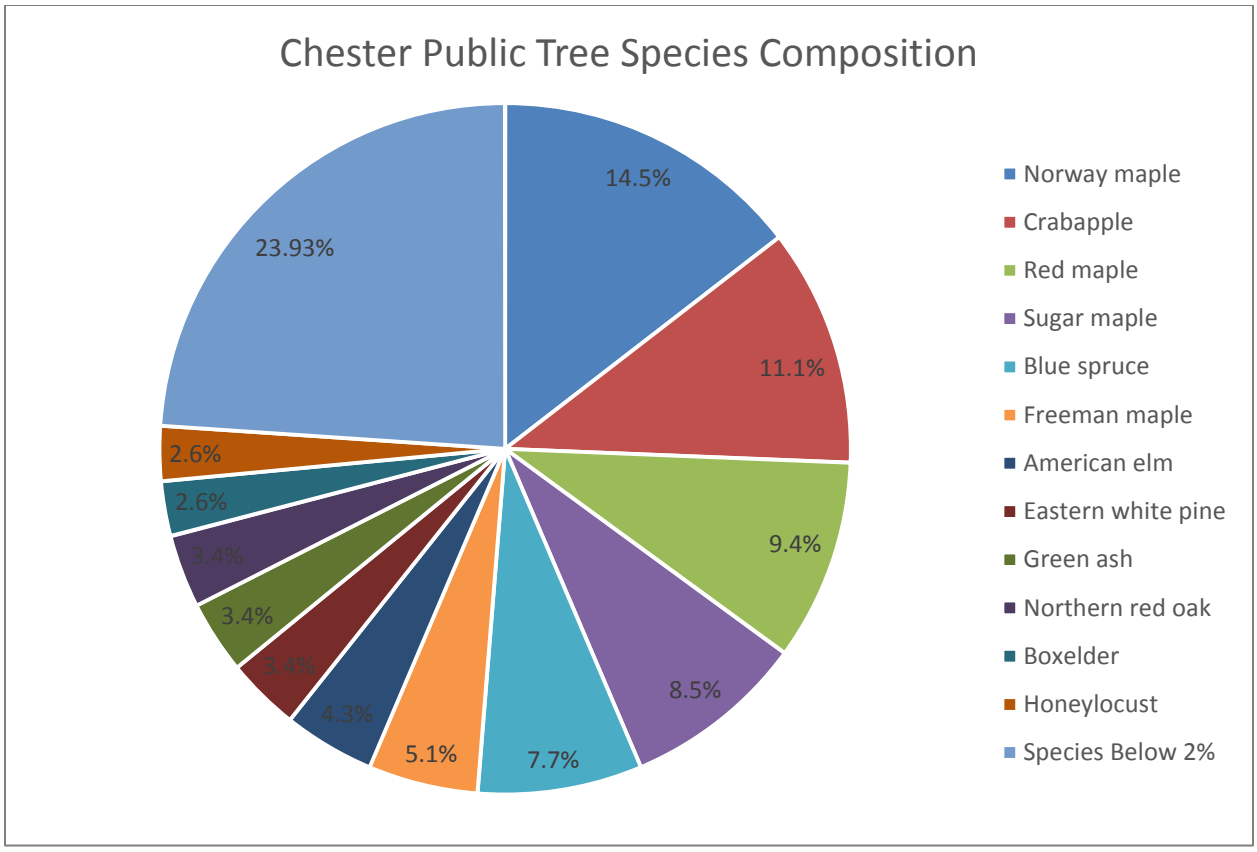


Figure 2: Species distribution of Chester's public trees.

Community Forest Structure

- Nearly 40% of the inventoried public trees (46) in Chester have a diameter at breast height (DBH) measurement between 12" and 18". Approximately a quarter (28) of inventoried public trees has a DBH within the 6-12" size class. When combined, this means that 63% of inventoried public trees are between 6" and 18" in diameter (Figure 3).
- The remaining 37% of trees are represented in the following size classes: 0-3" (5%), 3-6" (7%), 18-24" (14%), 24-30" (4%), 30-36" (3%), 36-42" (1%), and 42+" (3%) (Figure 3).
- The three largest trees included in the inventory were a northern catalpa (*Catalpa speciosa*) just outside of the public ROW on Depot Street and two northern red oaks (*Quercus rubra*) on Main Street.
- Of particular note in Figure 4 are the large number of maple (*Acer*) trees in the 12-18" size class, perhaps indicative of a time when many maples were planted.

- Also of note is that there are no ash (*Fraxinus*) trees in the smaller size classes, an indication that new ash trees are not being planted in Chester, perhaps because of the threat of the invasive forest pest EAB.

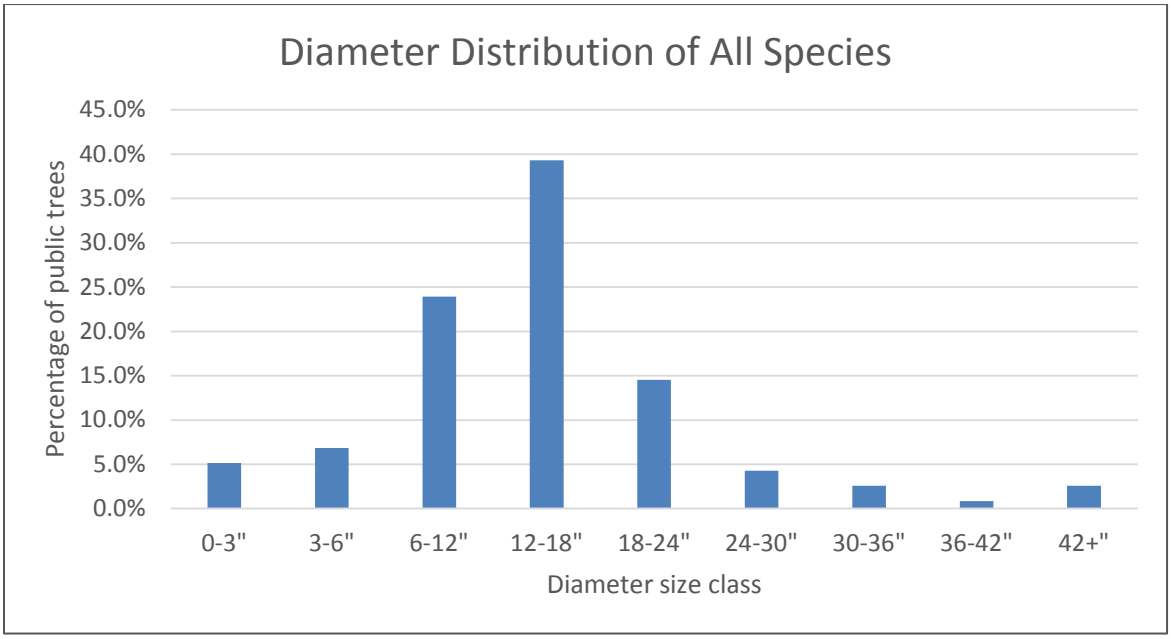


Figure 3: Diameter distribution of Chester's public trees.

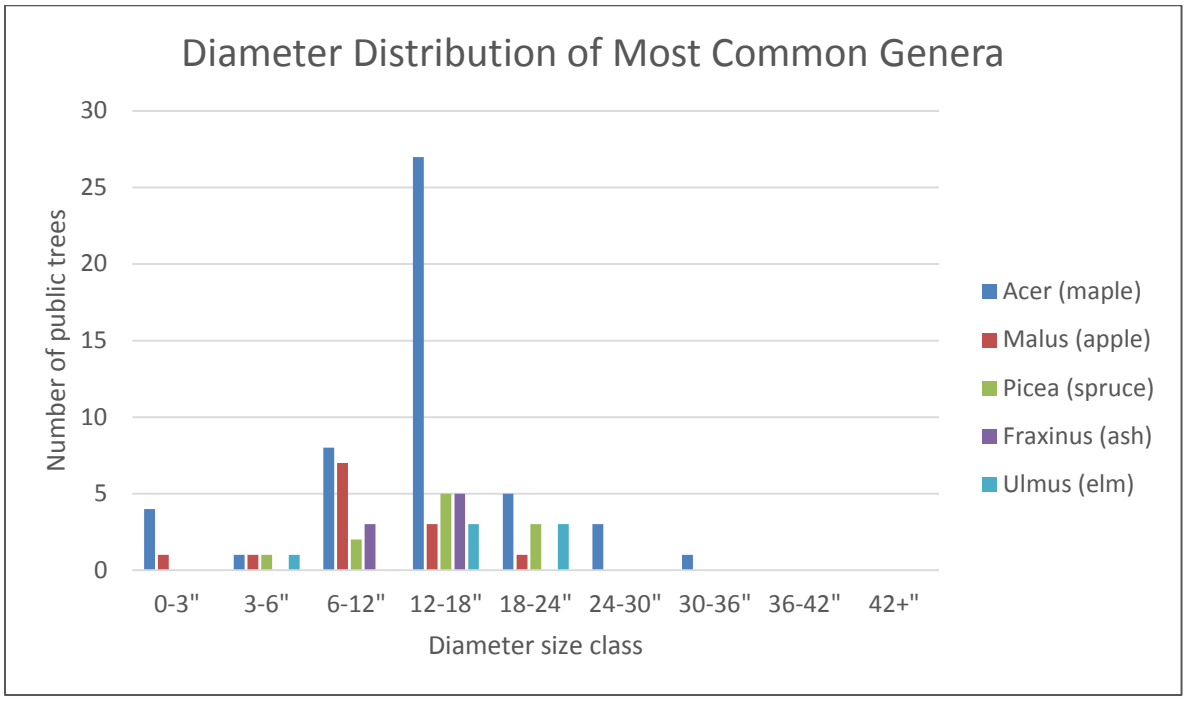


Figure 4: Diameter distribution of the five most common genera in Chester.

Community Forest Health

- The majority of Chester's public trees (74, or 63%) were assessed as being in "Good" condition. Of the remaining trees, 31 (27%) were considered to be in "Fair" condition, 9 (8%) were in "Poor" condition, and 3 (3%) "Dead" trees were inventoried (Figure 5).
- 62 (53%) public trees were assessed to be in need of monitoring by a Certified Arborist, the Chester Tree Warden, or another qualified individual; over half of all inventoried maples were assessed to be in need of monitoring (Figure 7). Trees that were flagged as in need of monitoring expressed one or more of the following conditions:
  - The tree has a visible defect affecting >40% of the tree,
  - The tree poses a hazard to people/infrastructure/cars,
  - The tree is growing into utility wires,
  - The tree is dead or in poor condition, or
  - The tree is an ash (*Fraxinus*) and shows evidence of a sign or symptom of infestation by EAB (extensive woodpecker flecking, bark blonding, epicormic branching/water sprouts, and/or suspicious exit holes).
- 33 public trees had visible signs of crown dieback, 23 public trees had visible signs of decay, and 52 had visible root damage or compacted soil (Figure 8).
- 36 public trees were assessed to be in need of pruning and 32 were flagged as in need of stem-girdling root removal (Figure 8).

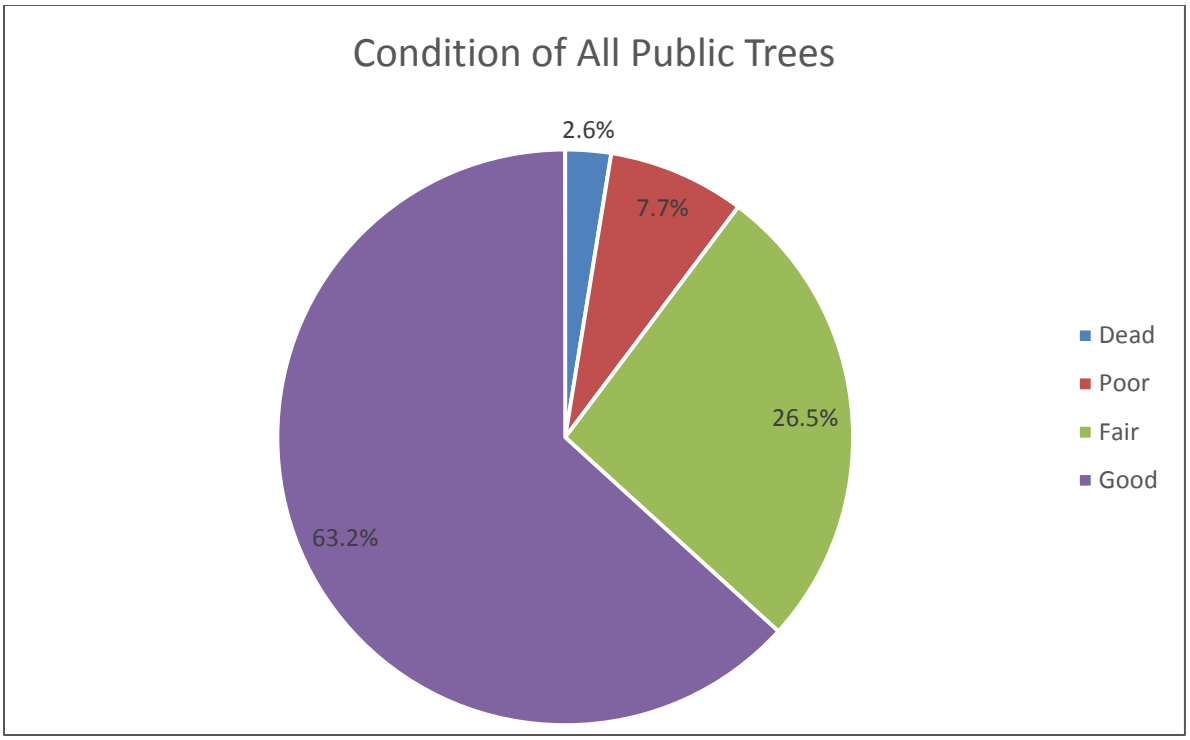


Figure 5: Condition class distribution of Chester's public trees.

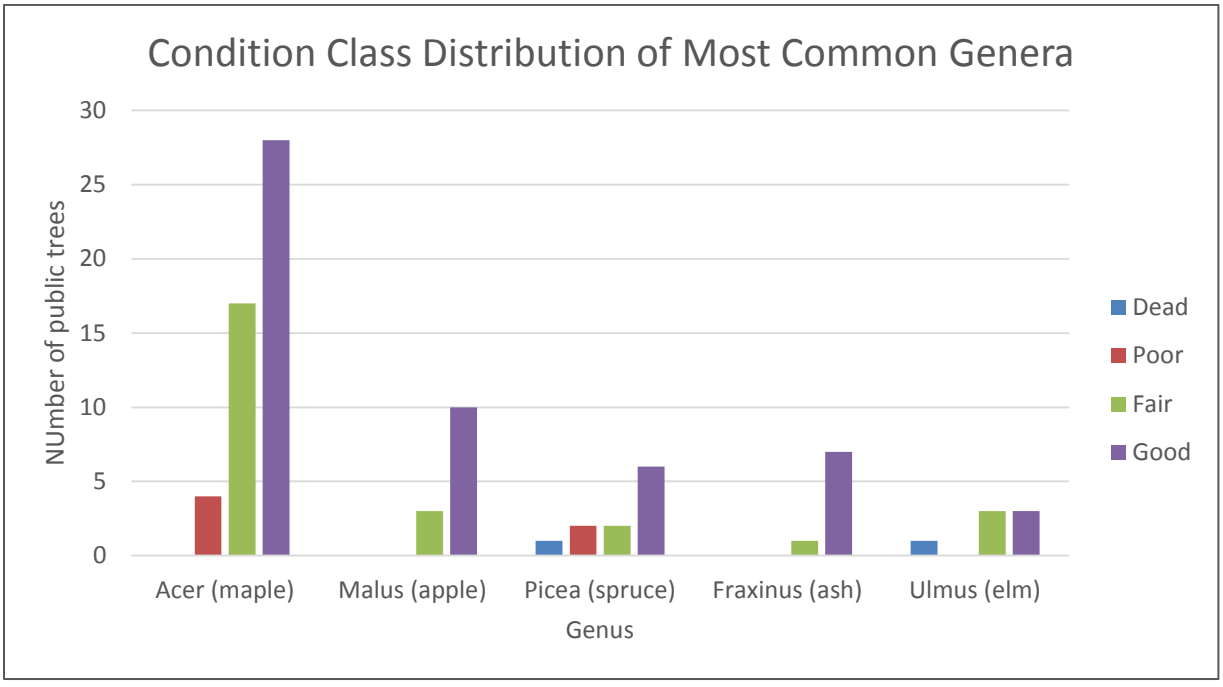


Figure 6: Condition class distribution of the five most common tree genera in Chester's public tree population.

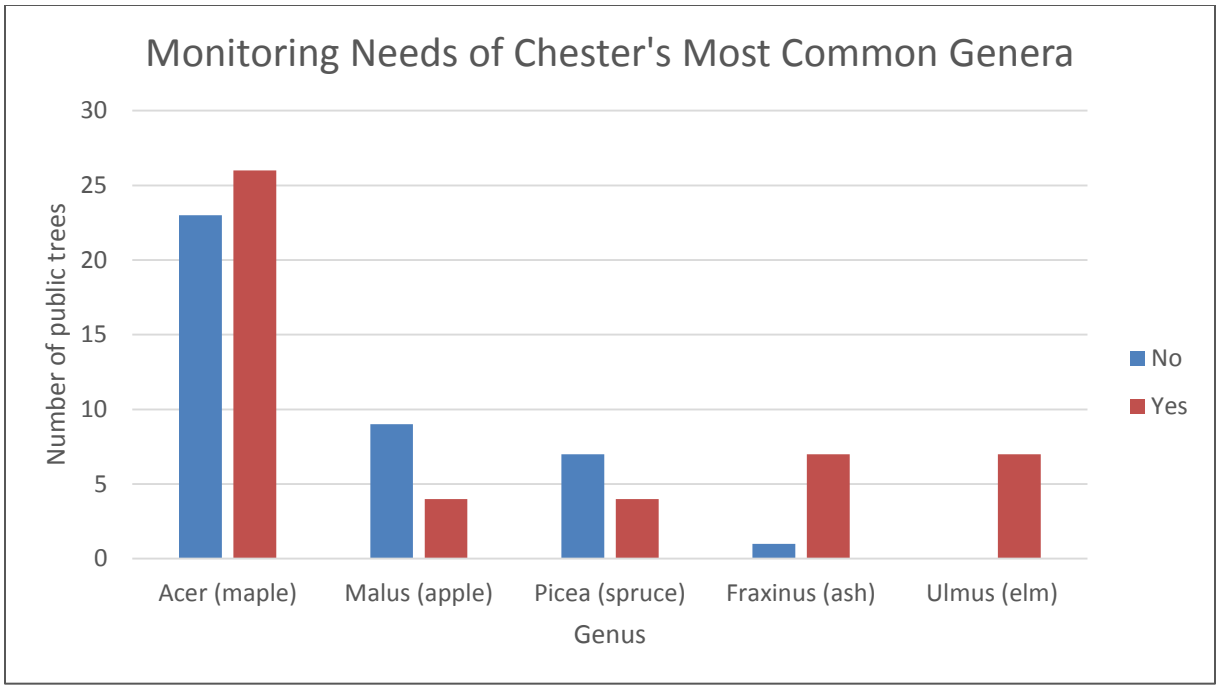
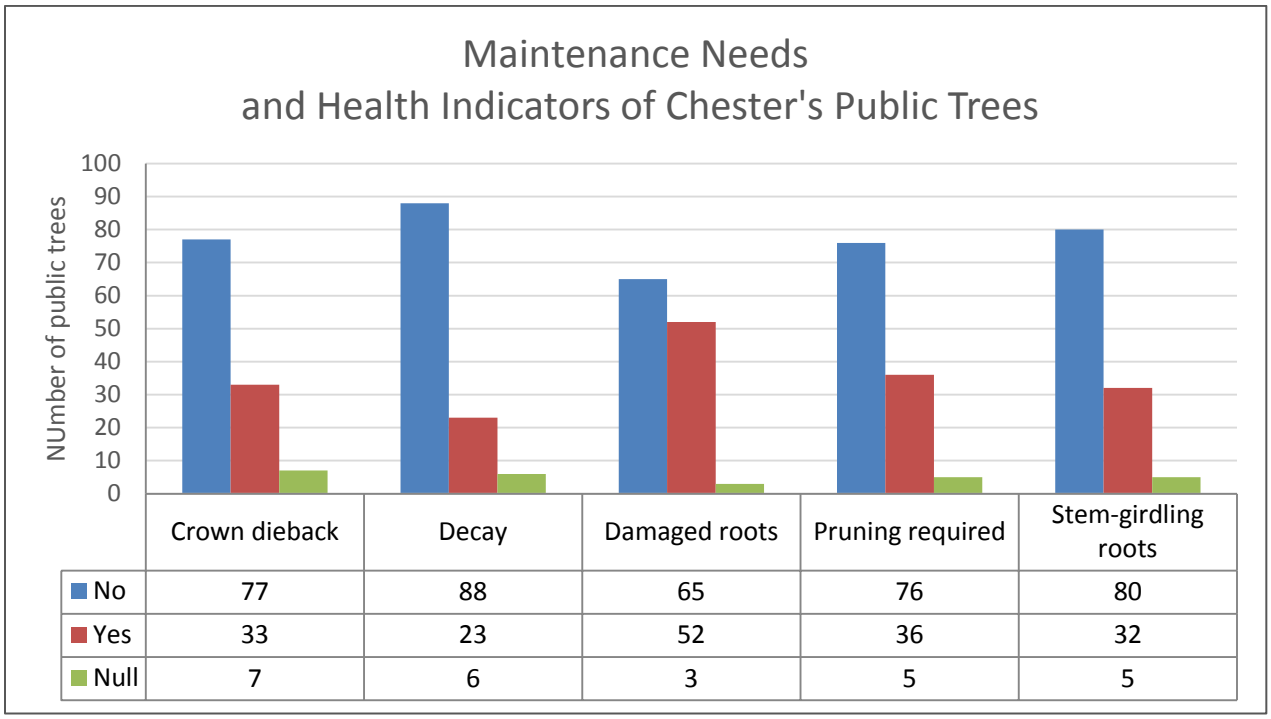


Figure 7: The monitoring needs of Chester's most common public tree genera.



	Crown dieback	Decay	Damaged roots	Pruning required	Stem-girdling roots
No	77	88	65	76	80
Yes	33	23	52	36	32
Null	7	6	3	5	5

Figure 8: Maintenance needs and health indicators of Chester's inventoried public trees.

Recommendations

The Chester Conservation Committee's participation in this project demonstrates that there is local capacity and desire to enhance the community's public tree program. A healthy public tree population is contingent upon proper management, stewardship, and a municipality's commitment to understanding and maintaining its urban and community forest. A comprehensive public tree inventory is an important piece of a vibrant community tree program. Based on the results of the Chester public tree inventory, our priority recommendations are:

- Prioritize the timely assessment and, if needed, maintenance of the 62 trees that were identified as in need of monitoring by a Certified Arborist or the Chester Tree Warden.
- Prioritize the timely removal of the three dead public trees included in the inventory and, if appropriate, replace them. The three dead trees are located on Main Street, Maple Street, and North Street.
- Consider the 11 potential tree planting locations, for the most part along Main Street, that were identified in the inventory as possible spots for future tree plantings.
- Promote species and structural diversity in Chester's community forest. Planting new species and increasing the number of lesser represented species in order to promote long-term health and resilience of individual trees and Chester's overall tree population. Refer to VT UCF's Tree Selection Guide at vtcommunityforestry.org/resources/tree-care/tree-selection.
- Three-quarters of Chester's public tree population is less than 18" in diameter. As Chester's public trees mature, promote their health and integrity with a systematic structural pruning and maintenance cycle.
- Preserve the integrity and health of the 11 mature shade trees over 24" in diameter through regular monitoring and, when needed, pruning and maintenance.

Additionally, we recommend that the Chester Conservation Committee and Town leadership note the following considerations to continue to develop the community's public tree program:

- Develop a management plan or action plan based on the results of the inventory to prioritize goals and establish a timeline for Chester's public tree program.
- Advocate for an explicit annual budget for Chester's public trees; not only for hazardous tree removal and planting, but also for regular maintenance and monitoring of the public trees.
- Encourage a culture of continual monitoring and updating the tree inventory spreadsheet as necessary as regular tree management occurs in Chester.
- Encourage citizens to participate in tree planting and other stewardship activities; particularly because of the high populations of trees in the *Acer* (maple) and *Fraxinus* (ash) genera, residents should be aware of the signs and symptoms of EAB and ALB and should be empowered to monitor for these invasive forest pests in their community forest.
- Explore the USDA Forest Service's free assessment and ecosystem valuation tools, i-Tree (www.itreetools.org) to see how the Chester public tree population might be assessed and valued to demonstrate the need for public investment in trees.
- While there are only eight public ash trees in downtown Chester, ash often grows along rural roadsides. Plan for the arrival of EAB by developing a community invasive forest pest preparedness plan, perhaps as a component of the overall plan for Chester's public trees; this process will inform future planning efforts for other threats to the community forest.
- Ensure that those who are caring for Chester's public trees are trained in best tree care practices. Public trees should be structurally pruned to promote long-term integrity, newly-planted trees should be irrigated to promote proper establishment, mulch should be applied properly, and mechanical and compaction damage should be minimized during any construction or regular maintenance activities.
- Stay connected with the Vermont Urban & Community Forestry Program through our quarterly e-newsletter, TREEmail, and/or our biweekly VolunTREE news and opportunities email. Sign up at www.vtcommunityforestry.org.

Conclusion

Trees in our downtowns and densely populated landscapes contribute to environmental integrity, social cohesiveness, economic activity, cultural heritage, and overall well-being. This report should help the leaders and citizens of Chester to understand, manage, and steward the town's public tree population. The recommendations outlined in this report should be considered by the Chester Conservation Committee and municipal leadership based on long-term vision and capacity. With improved monitoring, regular maintenance, and an engaged and informed citizenry, the potential for a healthy, sustainable community forest is attainable.

Downtown Chester and the public trees that enhance the Chester Common.

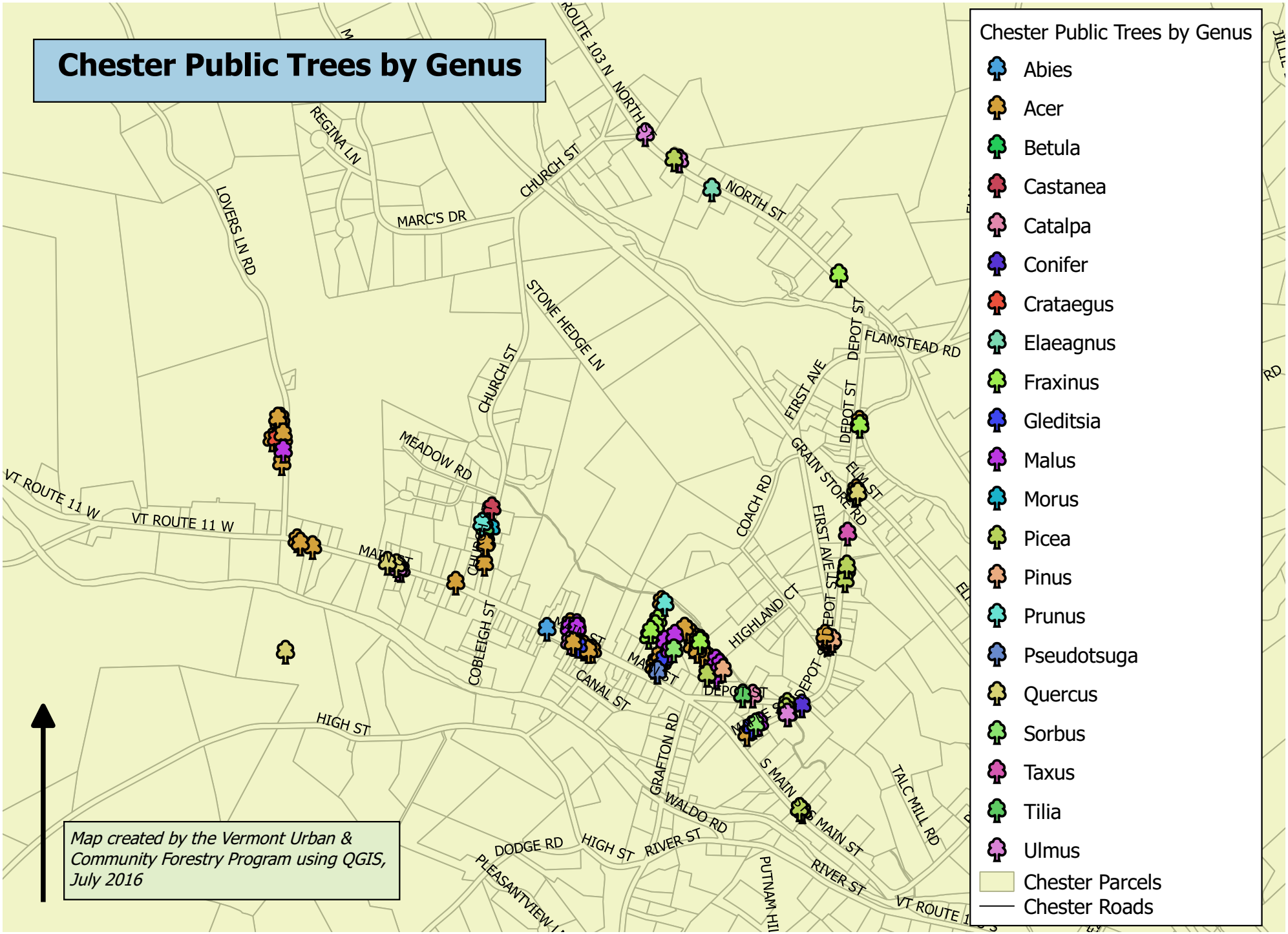
Appendix A: Instructions for Accessing Public Tree Data in ANR Atlas

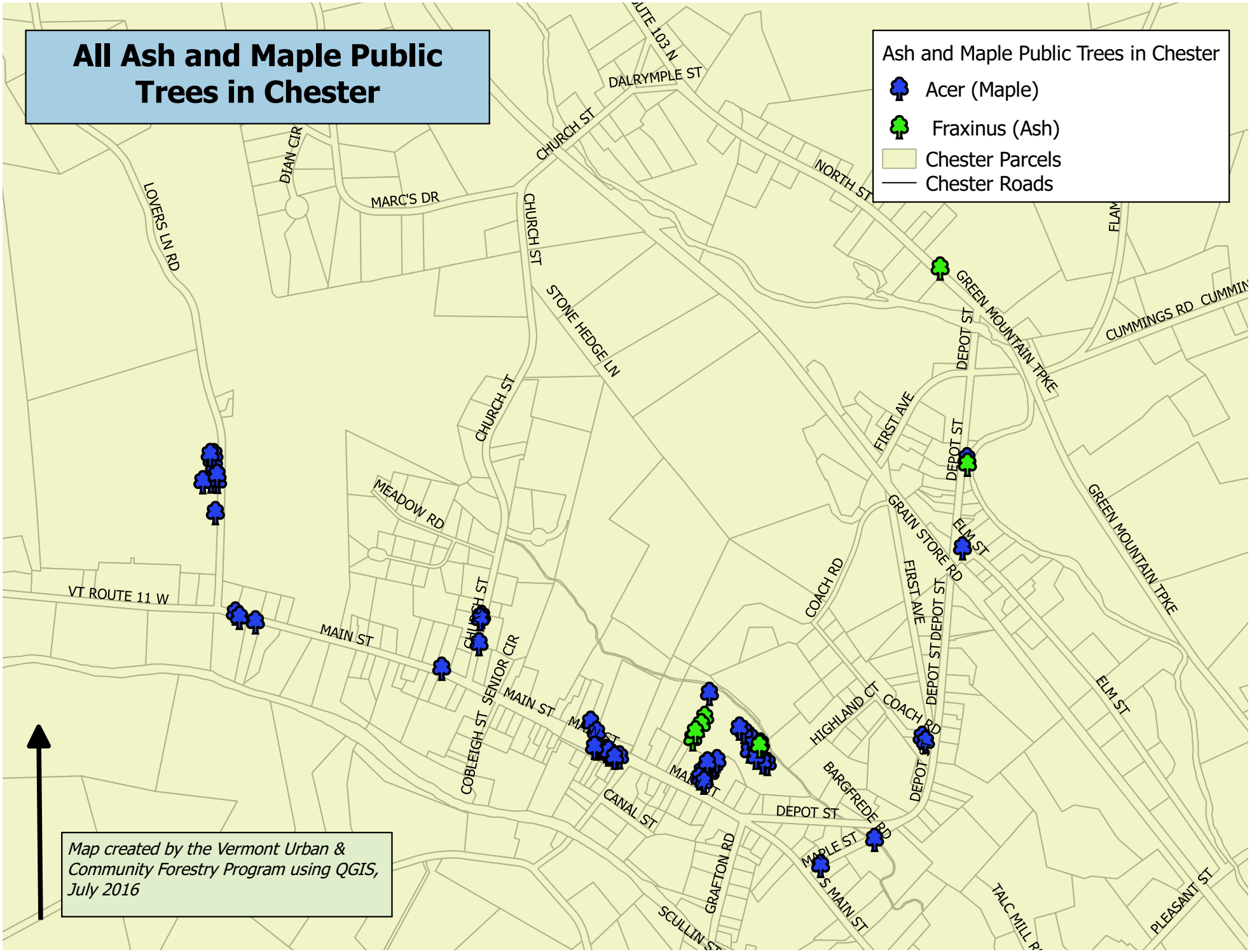
Anyone with Internet access can view all of Chester's inventoried public trees by using the Vermont Agency of Natural Resources' (ANR) Atlas mapping tool. Follow these simple steps:

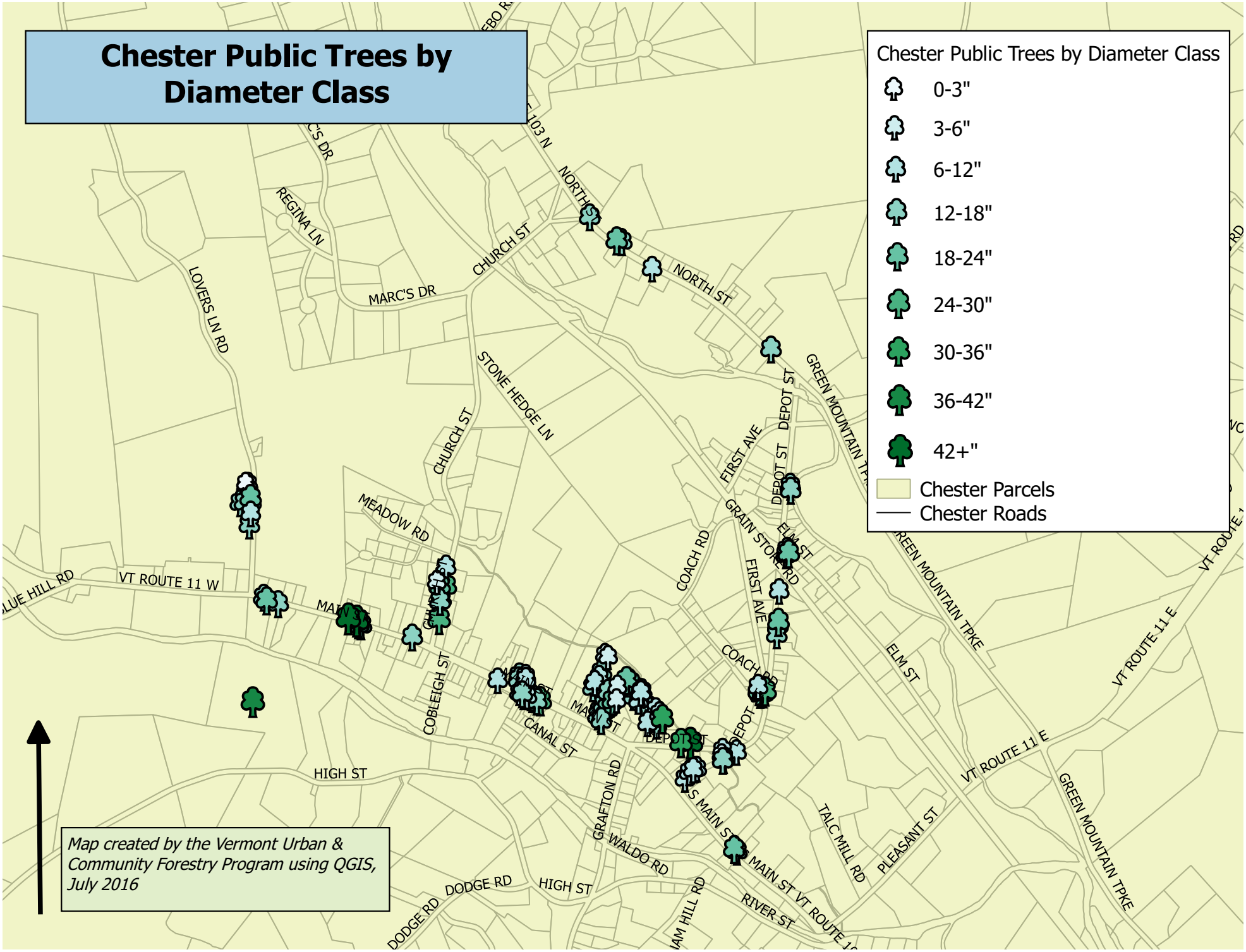
1. Set your web browser (Internet Explorer works best, Chrome does not work) to http://anrmaps.vermont.gov/websites/anra/ (or search "VT ANR Atlas").
2. Zoom in to Chester using the +/- scale navigation tool in the upper left portion of the map (the tree data layer won't show up unless you are zoomed in to the city-level so that you can see the street names on the map).
3. In the information pane on the left of the screen switch to the "map layers" tab at the bottom.
4. Expand the "Forests, Parks, & Recreation" heading,
5. Click on the box to the left of "Urban Tree Inventory" to load public tree data (it might take a moment for the layer to load).
6. Once you see all the trees on the map, you can zoom in and right-click on any individual tree and click on "What's here"; when you do this, the left information pane will change to give you the basic details for that specific tree.
    - To access all of the information collected on that specific tree, click on the grey text title of the tree in the left pane and a new window will open with the inventory data.
    - In this new window there are three tabs: "Details" and "Attributes" display the same information in different formats and if a photo was taken of the tree, it will show up in the "Attachments" tab.

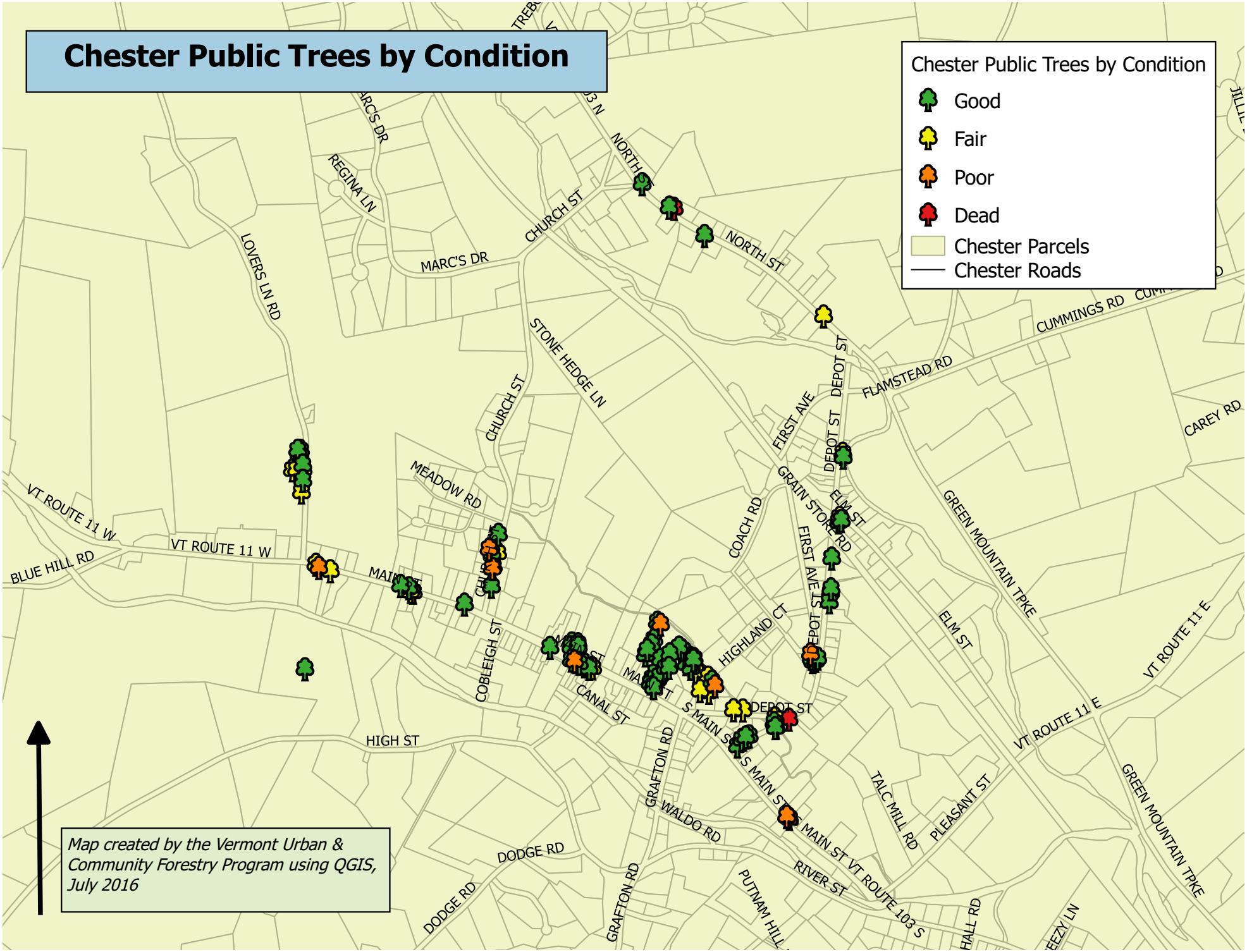
Appendix B: Maps

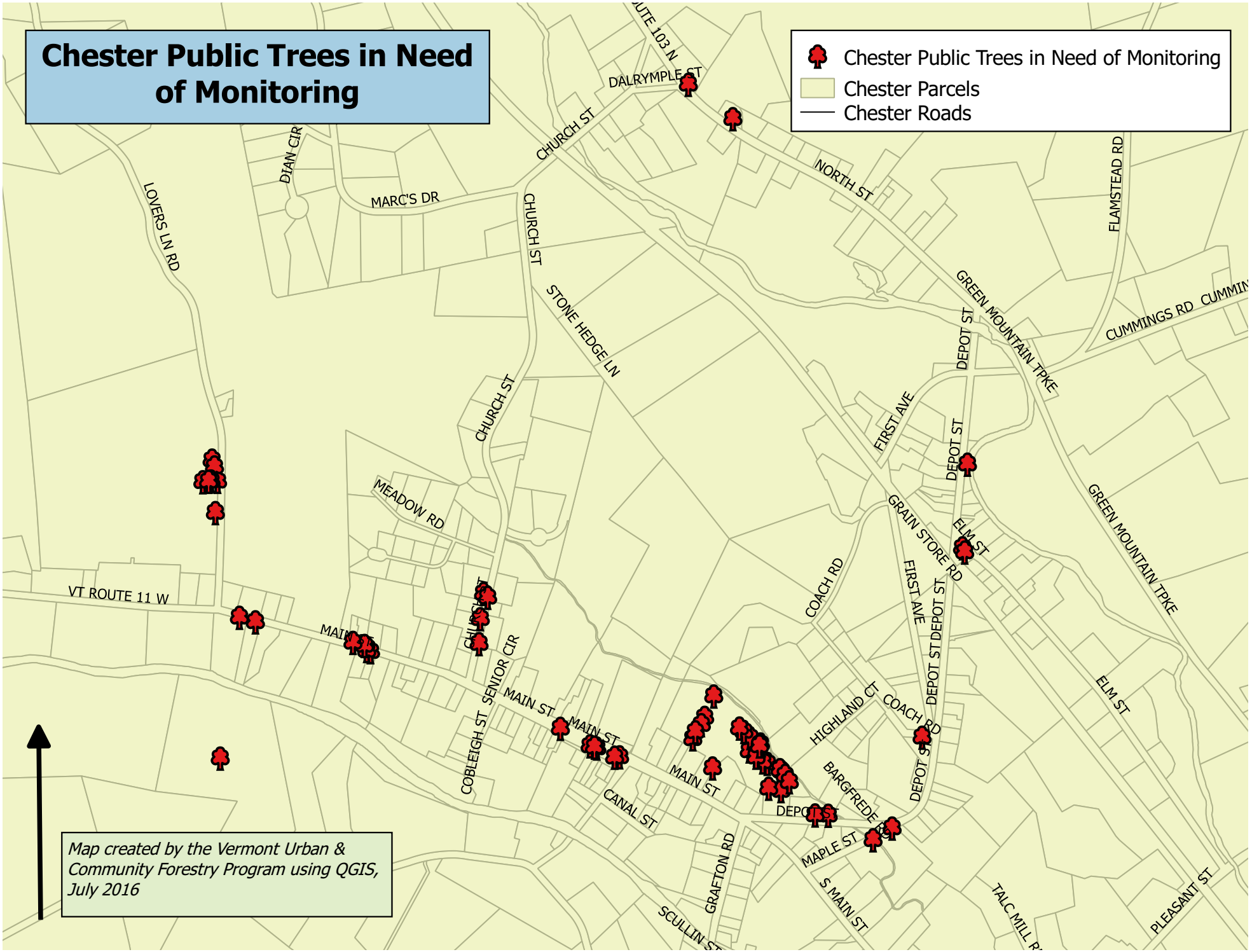
1. Chester public trees by genera distribution
2. All ash (*Fraxinus*) and maple (*Acer*) public trees inventoried in downtown Chester
3. Chester public trees by diameter distribution
4. Chester public trees by condition class
5. All Chester public trees identified to be in need of monitoring
6. Potential tree planting locations ("Vacant") identified in downtown Chester

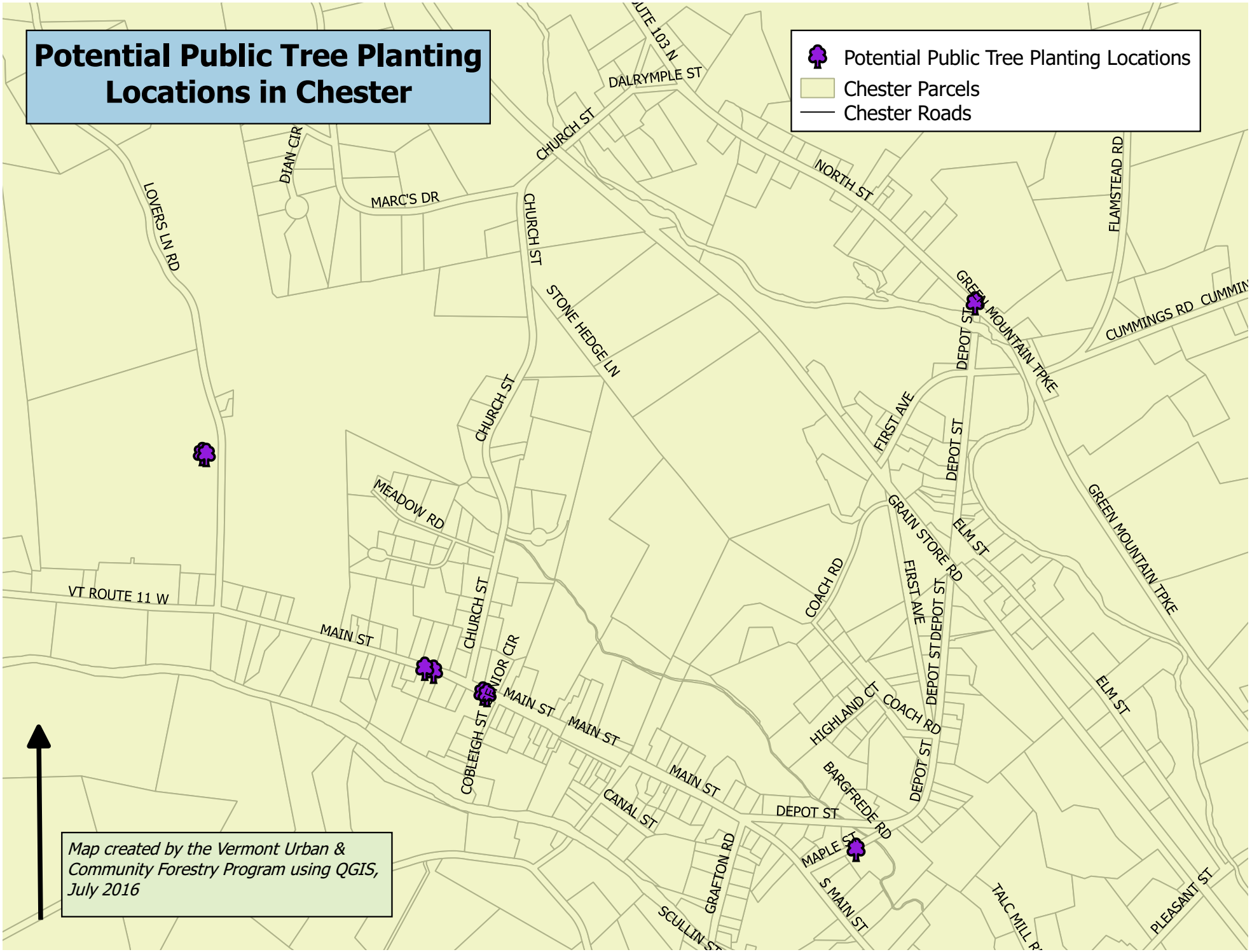

Chester Public Trees by Genus
Chester Public Trees by Genus
Abies
Acer
Betula
Castanea
Catalpa
Conifer
Crataegus
Elaeagnus
Fraxinus
Gleditsia
Malus
Morus
Picea
Pinus
Prunus
Pseudotsuga
Quercus
Sorbus
Taxus
Tilia
Ulmus
Chester Parcels
Chester Roads
ROUTE 103 N
NORTH ST
NORTH ST
CHURCH ST
REGINA LN
MARC'S DR
LOVERS LN RD
STONE HEDGE LN
CHURCH ST
MEADOW RD
FLAMSTEAD RD
DEPOT ST
FIRST AVE
DEPOT ST
GRAIN STORE RD
ELM ST
COACH RD
FIRST AVE
VT ROUTE 11 W
VT ROUTE 11 W
MAIN ST
COBLEIGH ST
HIGHLAND CT
DEPOT ST
CANAL ST
GRAFTON RD
S MAIN ST
TALC MILL RD
HIGH ST
WALDO RD
DODGE RD
HIGH ST
RIVER ST
RIVER ST
PUTNAM HI
VT ROUTE 1
Map created by the Vermont Urban & Community Forestry Program using QGIS, July 2016


All Ash and Maple Public Trees in Chester
Ash and Maple Public Trees in Chester
Acer (Maple)
Fraxinus (Ash)
Chester Parcels
Chester Roads
Map created by the Vermont Urban & Community Forestry Program using QGIS, July 2016
LOVERS LN RD
DIAN CIR
MARC'S DR
CHURCH ST
DALRYMPLE ST
NORTH ST
STONE HEDGE LN
GREEN MOUNTAIN TPKE
CUMMINGS RD
DEPOT ST
FIRST AVE
MEADOW RD
VT ROUTE 11 W
MAIN ST
SENIOR CIR
COBLEIGH ST
COACH RD
GRAIN STORE RD
ELM ST
HIGHLAND CT
BARGFREDE RD
CANAL ST
GRAFTON RD
MAPLE ST
S MAIN ST
TALC MILL RD
PLEASANT ST


Chester Public Trees by Diameter Class
Chester Public Trees by Diameter Class
0-3"
3-6"
6-12"
12-18"
18-24"
24-30"
30-36"
36-42"
42+"
Chester Parcels
Chester Roads
NORTH ST
CHURCH ST
MARC'S DR
REGINA LN
LOVERS LN RD
STONE HEDGE LN
MEADOW RD
VT ROUTE 11 W
MAIN ST
COBLEIGH ST
CANAL ST
HIGH ST
DEPOT ST
FIRST AVE
GRAIN STORE RD
COACH RD
ELM ST
GREEN MOUNTAIN TPKE
VT ROUTE 11 E
GRAFTON RD
WALDO RD
S MAIN ST
MAIN ST VT ROUTE 11
RIVER ST
TALC MILL RD
PLEASANT ST
DODGE RD
Map created by the Vermont Urban & Community Forestry Program using QGIS, July 2016


Chester Public Trees by Condition
Chester Public Trees by Condition
Good
Fair
Poor
Dead
Chester Parcels
Chester Roads
NORTH ST
CHURCH ST
MARC'S DR
REGINA LN
LOVERS LN RD
STONE HEDGE LN
CUMMINGS RD
FLAMSTEAD RD
DEPOT ST
FIRST AVE
CAREY RD
GREEN MOUNTAIN TPKE
MEADOW RD
VT ROUTE 11 W
BLUE HILL RD
MAIN ST
COBLEIGH ST
COACH RD
GRAIN STORE RD
ELM ST
HIGHLAND CT
CANAL ST
S MAIN ST
VT ROUTE 11 E
HIGH ST
GRAFTON RD
WALDO RD
TALC MILL RD
PLEASANT ST
DODGE RD
RIVER ST
VT ROUTE 103 S
PUTNAM HILL RD
Map created by the Vermont Urban & Community Forestry Program using QGIS, July 2016


Chester Public Trees in Need of Monitoring
Chester Public Trees in Need of Monitoring
Chester Parcels
Chester Roads
DALRYMPLE ST
NORTH ST
CHURCH ST
MARC'S DR
DIAN CIR
LOVERS LN RD
STONE HEDGE LN
FLAMSTEAD RD
GREEN MOUNTAIN TPKE
CUMMINGS RD
DEPOT ST
FIRST AVE
GRAIN STORE RD
ELM ST
COACH RD
MEADOW RD
VT ROUTE 11 W
MAIN ST
SENIOR CIR
COBLEIGH ST
CANAL ST
HIGHLAND CT
BARGFREDE RD
MAPLE ST
GRAFTON RD
S MAIN ST
PLEASANT ST
Map created by the Vermont Urban & Community Forestry Program using QGIS, July 2016


Potential Public Tree Planting Locations in Chester
Potential Public Tree Planting Locations
Chester Parcels
Chester Roads
DALRYMPLE ST
CHURCH ST
NORTH ST
FLAMSTEAD RD
DIAN CIR
MARC'S DR
LOVERS LN RD
STONE HEDGE LN
GREEN MOUNTAIN TPKE
CUMMINGS RD
DEPOT ST
FIRST AVE
MEADOW RD
GRAIN STORE RD
ELM ST
COACH RD
VT ROUTE 11 W
MAIN ST
SENIOR CIR
COBLEIGH ST
HIGHLAND CT
BARGFREDE RD
CANAL ST
GRAFTON RD
MAPLE CT
S MAIN ST
SCULLIN ST
TALC MILL RD
PLEASANT ST
Map created by the Vermont Urban & Community Forestry Program using QGIS, July 2016