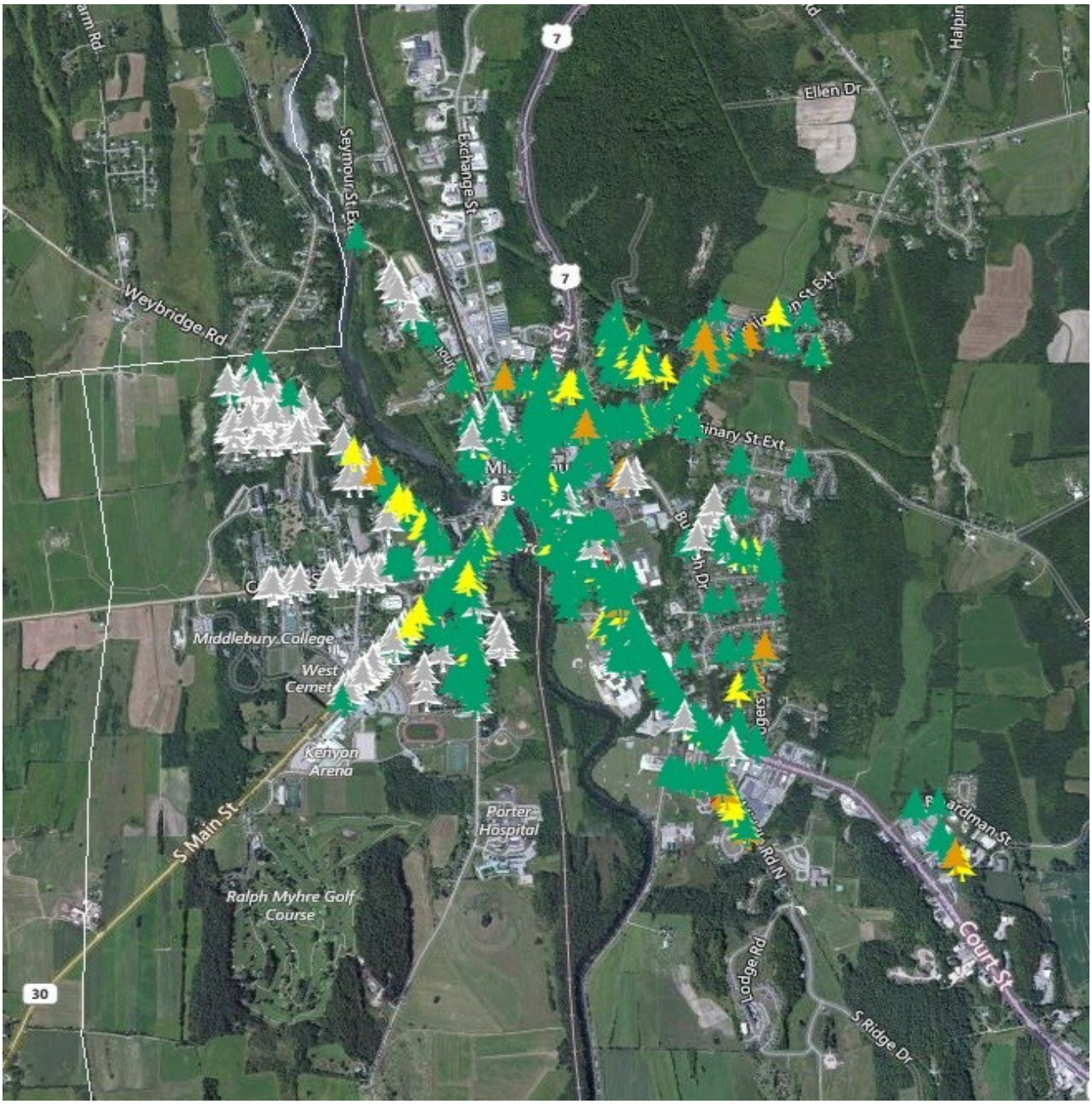
Middlebury Public Tree Inventory Report
Update: Fall 2016



Prepared for the Middlebury ad hoc Tree Committee
by the Vermont Urban & Community Forestry Program
November 2016

FORESTS, PARKS & RECREATION VERMONT

UNIVERSITY OF VERMONT EXTENSION
CULTIVATING HEALTHY COMMUNITIES

PLANT LIVE GROW
VERMONT URBAN & COMMUNITY FORESTRY PROGRAM

FOREST SERVICE US DEPARTMENT OF AGRICULTURE

VT ANR GIS

Acknowledgements

This report is an update to the 2014 Middlebury Public Tree Inventory Report and builds upon the work that was completed by student interns in that year. This report update has been developed by the Vermont Urban & Community Forestry Program (VT UCF) staff based on field work conducted for the Town of Middlebury, Vermont during the fall of 2014 and with members of Middlebury's ad hoc Tree Committee during the summer of 2016. We would like to thank the members of the Middlebury ad hoc Tree Committee and Middlebury's Tree Warden, Chris Zeoli, for participating in and advancing the Middlebury public tree inventory.

About the Vermont Urban & Community Forestry Program

The field of forestry 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, the University of Vermont (UVM) Extension, and the USDA Forest Service. 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.

The trees in our communities offer a wide variety of environmental, social, and economic benefits to the surrounding community, including but not limited to: stormwater mitigation,

carbon dioxide (CO_2) sequestration, air quality improvement, shade, wildlife habitat, and aesthetic value. VT UCF seeks to maximize these benefits by working with state and municipal officials, as well as dedicated volunteers and local organizations, to steward the urban forest's ecological integrity and diversity. VT UCF's programming and support reaches 100 Vermont communities annually. More information about VT UCF can be found at www.vtcommunityforestry.org.

VT UCF provides technical, financial, and educational services to VT communities like Middlebury (above) to promote and support vibrant urban and community forests statewide.

Table of Contents

Executive Summary

The goal of the public tree inventory was to document the location, size, species composition, and condition of trees planted within the public right-of-way (ROW) and on town-owned land within the Town of Middlebury. This information will provide residents and decision-makers with a better understanding of the health and benefits of Middlebury's urban forest and will allow municipal leaders to plan for future tree planting and maintenance using a map-based tree inventory system.

The Middlebury public tree inventories effort has focused on the downtown and most densely populated residential areas in Middlebury and East Middlebury. VT UCF has coordinated and supported – with assistance from members of the ad hoc Middlebury Tree Committee – the inventory of **979 trees** located within the public ROW of 61 streets and on town-owned land, and has identified 171 specific locations or strips of public (i.e. vacant) land appropriate for future tree plantings in Middlebury. This updated report was developed in the fall of 2016 by the VT UCF Program and their AmeriCorps member. It presents the results of the inventories and a basic assessment of the trees and canopy cover in Middlebury**.**

Local government, conservation agencies, and private landowners all play an important role in monitoring and maintaining urban forests. Urban trees provide a number of benefits to communities including; reducing stormwater runoff, reducing air pollution, providing shade, sequestering carbon dioxide, enhancing property values, and improving aesthetics of the community. The 979 public trees that were inventoried in Middlebury provide an estimated $90,095 in benefits annually to Middlebury residents. In addition to the public trees inventoried, a tree canopy assessment was completed for the full inventory area (public and private land), which indicated existing canopy cover of 28% and a stored value of carbon dioxide of $1,866,295.40.

Summary of Findings

Forest Diversity

- Of the 979 inventoried public trees in Middlebury, there are 54 different species in 29 different genera.
- The top five most common tree genera: *Acer* (maple) (27%)*, Malus* (apple) (15%), *Fraxinus* (ash) (9%)*, Ulmus* (elm) (7%), and *Gleditsia* (honeylocust) (6%), comprise 64% of the urban forest.
- *Fraxinus* (ash) and *Acer* (maple) genera comprise 36% of the inventoried public trees. These genera are currently threatened by invasive tree pests: the emerald ash borer (EAB) and Asian long-horned beetle (ALB), respectively.
- The top five most common species: *Malus* species (crabapples) (15%), *Acer platanoides* (Norway maple) (11%), *Fraxinus* (ash species) (9%), *Gleditsia triacanthos* (honeylocust) (6%), and*Acer saccharum* (sugar maple) (5%), comprise 46% of Middlebury's stock.

Forest structure

- The majority of trees (264 or 27%) have diameter measurements falling within the 6-12" size class.
- 20% (or 191) of the inventoried trees fall into the 0-3" size class, 20% (or 200) of the trees are in the 3-6" size class, 16% (or 156) are in the 12-18" size class, 7% (or 72) of the trees fall into the 18-24" class, 4% (or 38) of trees are in the 24-30" size class, 3% (or 27) trees are within the 30-36" diameter class, 1% or (9)of the trees fall within the 36-42" diameter size class, 1% or (9) of the trees are in the 42"+ diameter size class.

Forest Cover

- There is an existing urban tree canopy (UTC) cover of 29% in the area of Middlebury that was inventoried (combined public and private land).
- Trees could potentially cover an additional 51% of the community's land surface. These "possible UTC" areas include grass, agricultural land, and impervious surfaces (e.g. parking lots, paved playgrounds, and the public ROW).

- The remaining 20% of Middlebury's area is occupied by buildings, wetlands, or water and is generally unsuited to UTC improvement.

Forest health

- An overwhelming majority (87% or 850) of the trees inventoried was assessed as being in "Good" condition. Of the remaining trees, 85 (8.7%) were in "Fair" condition, 35 (3.6%) were in "Poor" condition, and 9 (0.9%) were "Dead".
- 71 trees were flagged as in need of a future consultation by a certified arborist, the Middlebury Tree Warden, or another qualified representative from the Town of Middlebury.

Summary of Recommendations

Based on the results of this inventory, we recommend that the Town of Middlebury:

- Build upon, and use the ***tree inventory*** to develop an urban forest management plan for Middlebury that emphasizes planning, planting, and maintaining current and future public trees along roadways to improve and build upon the health and sustainability of the urban forest.
- Continue to ***diversify*** urban forest structure, particularly species and age composition and distribution, to prepare for potential future threats and challenges, such as climate change, development, and various pests.
- Develop a comprehensive Middlebury ***Tree Policy*** to protect, promote, and enhance public health, safety, and general welfare by establishing provisions for planting, maintenance, protection, and removal of trees and shrubs on public lands, parks and town-owned properties.
- ***Monitor*** tree health, specifically for signs and symptoms of Emerald Ash Borer (EAB), Asian Long-horned Beetle (ALB), and other forest pests and diseases.
- ***Plan*** for the arrival of EAB by continuing to develop a robust community preparedness and response plan.

Members of the ad hoc Middlebury Tree Committee collect data on public trees in Middlebury, summer 2016

Introduction

Project Description

Since 2013, VT UCF has been working on a project funded by a grant from the USDA Forest Service to assist twenty priority communities in Vermont in moving their forestry programs forward. The project, *Care of the Urban Forest*, is a multi-year effort that aims to support these communities in three specific ways: (1) by conducting a public tree inventory to assess urban forest structure, diversity, and health; (2) by helping the community in the development of an urban forest management plan (or master plan) using information from the inventory; and (3) by providing technical training for volunteers and town employees to promote the proper care and management of public trees.

Prior to this project, Middlebury had no formal tree inventory. Middlebury's Town Planner in 2014, Eric Blair, received a grant from VT UCF to begin developing a municipal tree program in Middlebury. Middlebury became an official partner on the Care of the Urban Forest Project in 2014; in the past two years the establishment of an ad hoc Tree Committee in Middlebury has moved the tree program, and the expansion of the inventory, forward.

The goal of the public tree inventory was to document the location, size, species composition, and condition of trees planted within the public right-of-way (ROW) and on town-owned land within approximately 5 square miles of the

Importance of Inventory and Urban Forestry in Vermont

An inventory of urban trees provides a record of the trees present in a community. An inventory can provide information about the species, size, health, and location of each tree and future management needs. This detailed information allows town planners to estimate the monetary contributions of their community's green infrastructure. In the event of a disease outbreak or insect infestation, data from an inventory may assist in monitoring and preventing the spread of a forest health epidemic. An inventory can also help build public support for expanding community forests and to guide future urban planning.

Urban 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 (Morales 1973; 1983) 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 environmental 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 forests create opportunities for environmental education, community engagement and in some instances can be related to crime reduction. Trees are an integral part of the green infrastructure of a community and contribute to keeping our families healthier and our everyday lives more fulfilling.

downtown and most densely populated residential areas of Middlebury. The public tree inventory establishes a baseline for future inventories, management decisions, and improvements to Middlebury's urban forest.

Methodology

Right-of-way (ROW) boundaries were determined for all streets based on information from the Middlebury Planning Office. In total, the inventoried land area was about 5 square miles, representing less than 12.4% of the total land area of Middlebury, but including the most densely populated section of town. The list of streets and sites with public ROW boundaries is found in Appendix A and maps of the inventory area are found in Appendix E.

VT UCF has developed a tree inventory tool in collaboration with the VT Agency of Natural Resources' (ANR) GIS team. The map-based tool uses the free application *Collector for ArcGIS*, developed by Esri (information available here: http://doc.arcgis.com/en/collector/), for data collection and is linked to the publicly-accessible VT ANR Atlas online mapping tool. All inventory data collected on public trees in Middelbury is available for viewing on ANR Atlas and instructions are found in Appendix D.

In the fall of 2014, and subsequently in the summer of 2016, data was collected on all public trees on the streets and sites assessed in Middlebury. To ensure that only public trees were inventoried (as opposed to trees on private property) the ROW boundaries were measured on each street. Each public tree identified 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 Middlebury included street or site name; overall condition; species; diameter class (using a measurement for diameter at breast height, or DBH); a recommendation for monitoring (yes/no); comments on tree condition; and the nearest house or building address. In most cases, a picture was also taken of each tree. A full list and description of the parameters used in data collection can be found in Table 1.

The data were compiled and subsequently checked for quality, analyzed, and summarized using Microsoft Excel and QGIS, a free and open source geographic information system (www.qgis.org/en/site/). Data were also analyzed through i-Tree, a free software suite developed by the USDA Forest Service (www.itreetools.org). VT UCF staff used two applications in the i-Tree suite of tools to further assess Middlebury's urban forest. i-Tree Streets uses sophisticated models to determine the monetary value and ecological benefits of trees. i-Tree Canopy uses aerial imagery and random point locations to produce an estimate of land cover of a defined area - including tree canopy cover - that encompasses both public and private property.

Table 1: Parameters for Inventory Data Collection

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.
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.
Consult	● *Yes:* any one defect is affecting >40% of the tree, posing a hazard to people/infrastructure/cars, growing into utility wires, dead or poor condition, 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
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.

Inventory Results

Urban Forest Diversity

Of the 979 trees inventoried within the public ROW or on town-owned land, there were a total of 54 different species in 29 different genera. The most common tree genera, *Acer* (maple), *Malus* (apple), *Fraxinus* (ash), *Gleditsia* (honeylocust), and *Ulmus* (elm) comprise 64% of the urban forest (Figure 1). *Malus* (crabapple) species (15%) were the most common, followed by *Acer platanoides* (Norway maple) (11%), *Fraxinus* (green and white ash) species (9%), *Gleditsia triacanthos* (honeylocust) (6%), and *Acer saccharum* (sugar maple) (5%) (Figure 2). It is important to note that 14 *Acer* trees were not identified to the species level in the Middlebury inventory, likely because they were hybrids or cultivars unfamiliar to the LANDS students; these trees are therefore not included in the percent species composition noted above, and are instead only included in the percent genera composition. Complete species and genera lists can be found in Appendix B. Trees that were unable to be identified were logged as either "Broadleaf Deciduous" or "Broadleaf Evergreen".

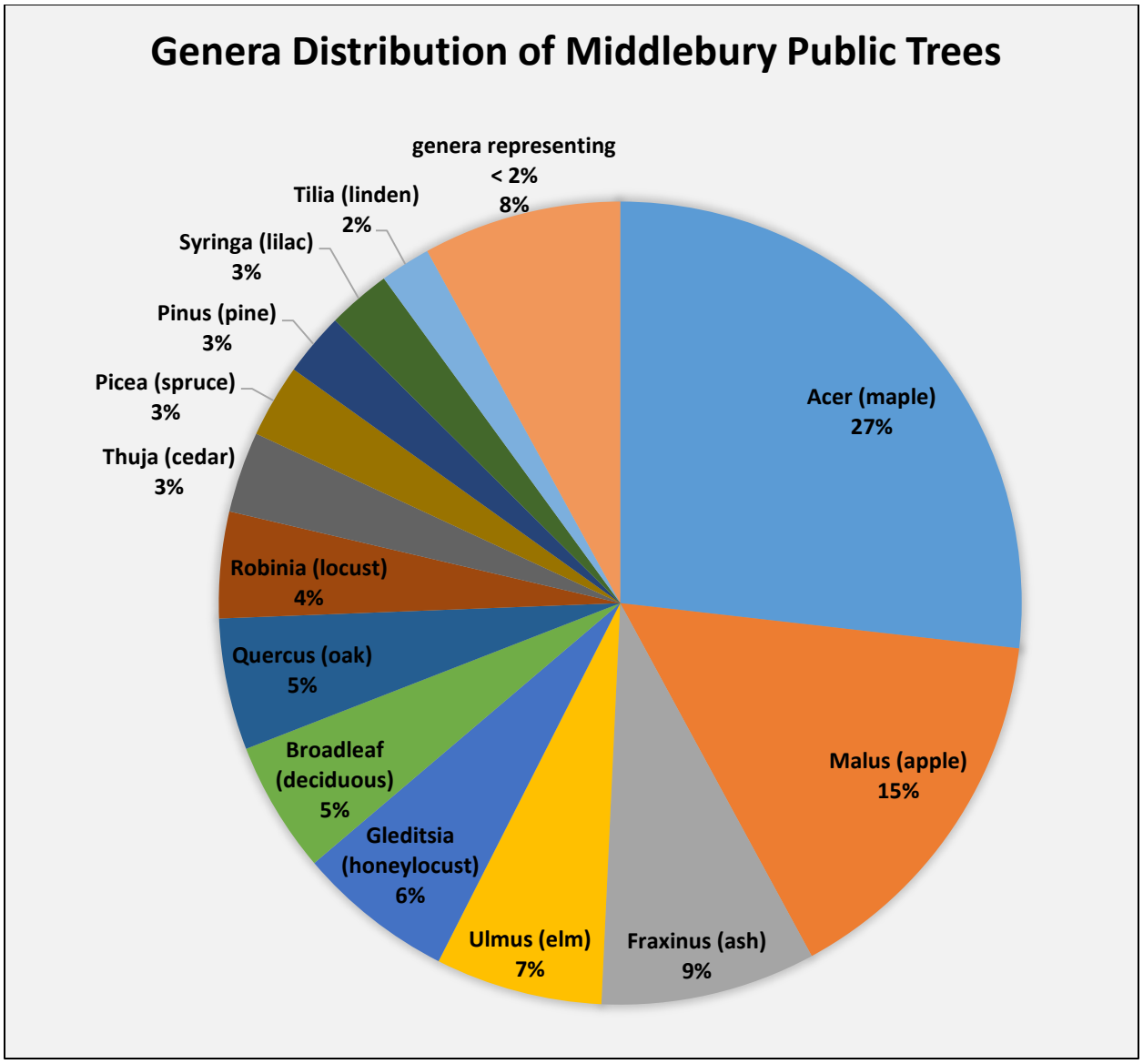


Figure 1: Genera by percent composition of Middlebury's inventoried urban forest. Percentages are rounded to the nearest whole number.

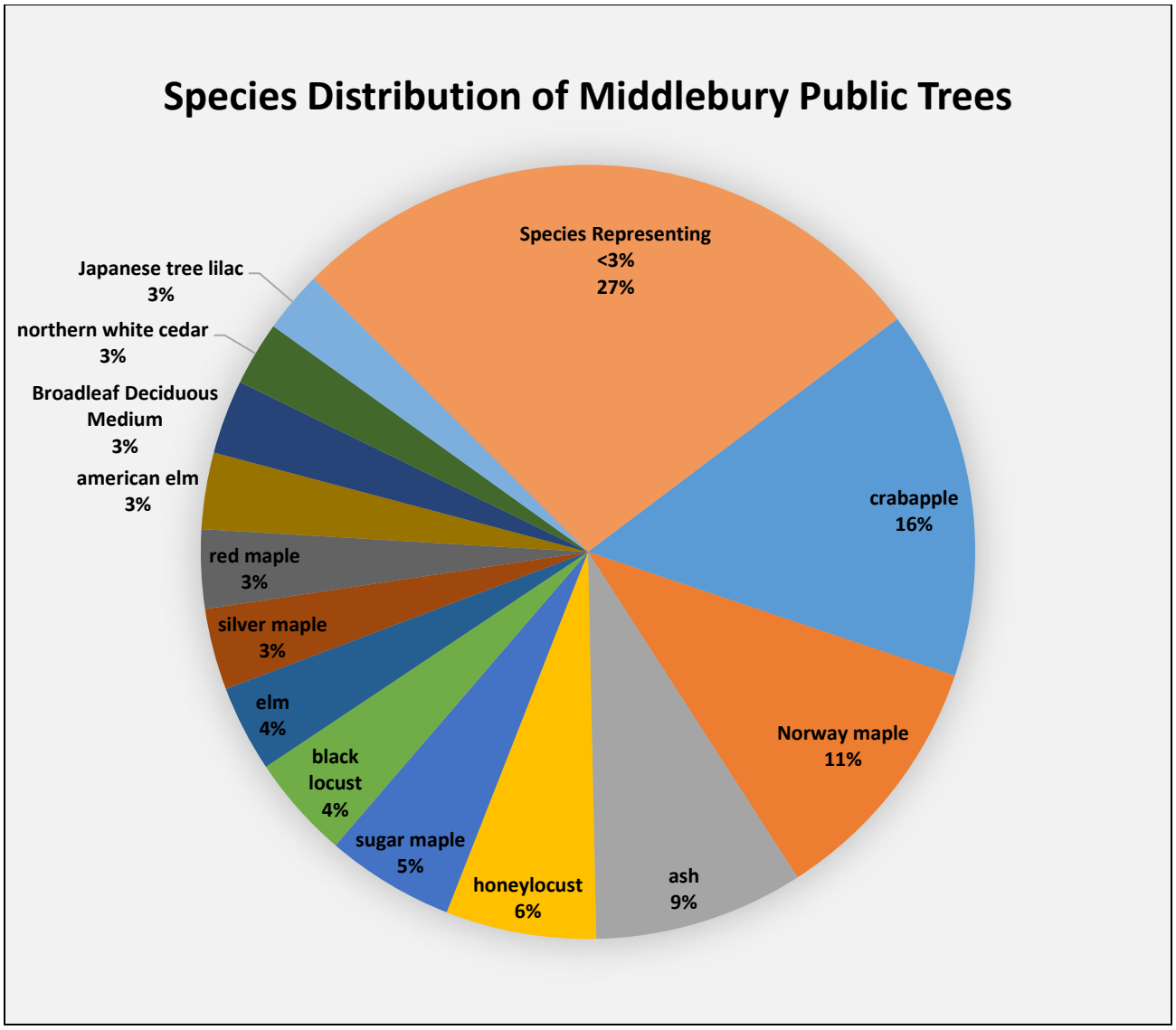


Figure 2: Species by percent composition of Middlebury's inventoried urban forest. Percentages are rounded to the nearest whole number.

Urban Forest Structure

Overall, Middlebury has a young urban forest comprised mainly of small-diameter hardwoods. Of the 979 trees inventoried, 27% (264 trees) had a DBH of 6-12", 20% (191) of the inventoried trees had a DBH of 0-3", and 16% (156 trees) had a DBH greater than 18" (Figure 3).

There were 171 potential tree planting locations or strips of land identified within the public ROW (recorded as "vacant" in ArcCollector). Appendix A breaks down these locations by street.

With 28 potential spots, Gorham Lane has the greatest potential for tree planting along the public ROW. LANDS did indicate which tree size (small, medium, or large) could be planted in many of the vacant spots. It is however recommended that a small or medium tree species be planted in any vacant locations downtown or near power lines. Vacant areas not restricted by below- or aboveground utility wires or obstructions could potentially hold medium to larger trees.

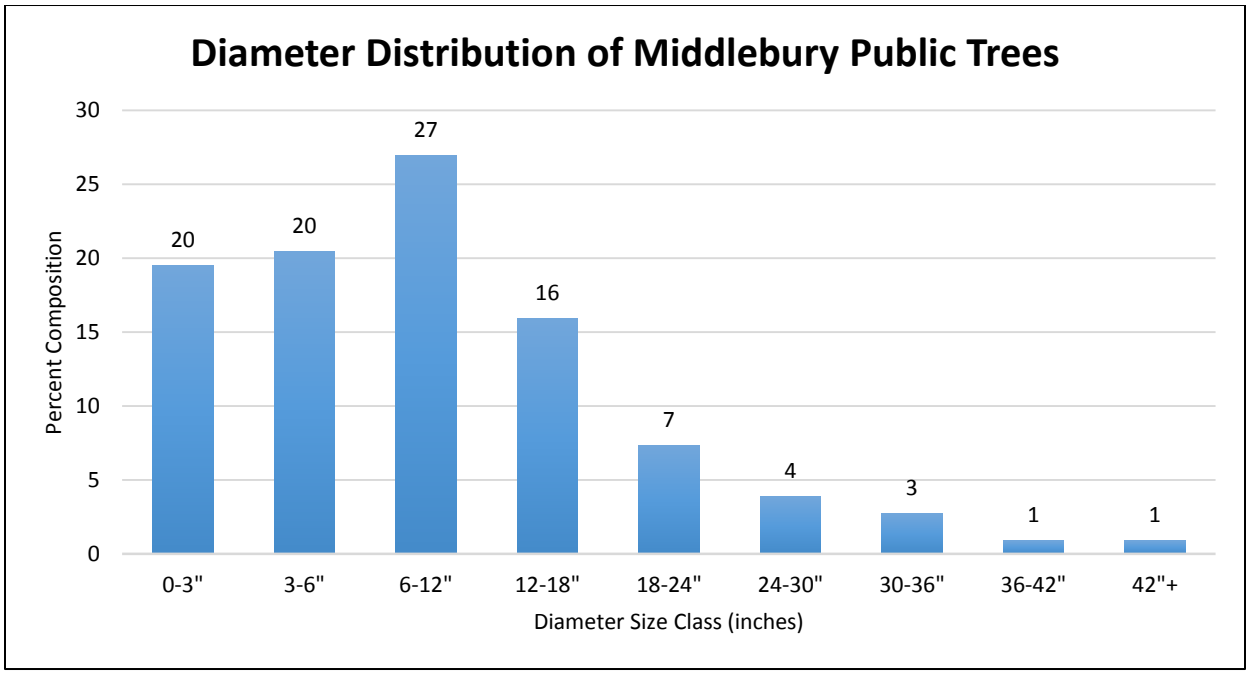


Figure 3: Percent of inventoried public trees within each diameter class (inches) in Middlebury, VT's urban forest.

Urban Forest Health

An overwhelming majority (87% or 850) of Middlebury's inventoried public trees were assessed as being in "Good" condition. Of the remaining trees, 9% (85) were considered to be in "Fair" condition, 3% (35 trees) were in "Poor" condition, and only 1% (9 trees) are "Dead" (Figure 6).

Seventy-one trees (7%) were flagged for a consult during Middlebury's inventory and should be reassessed by a professional arborist, the Middlebury Tree Warden, or a qualified community representative. These trees are highlighted on a map in Appendix E. Trees that were flagged for a consult expressed one or more of the following conditions:

- The tree had a defect affecting >40% of the tree
- The tree posed a hazard to people/infrastructure/cars
- The tree was growing into utility wires
- The tree was dead or in poor condition
- The tree was of the genera *Fraxinus* (ash) and was showing evidence of potential infestation by the emerald ash borer (signs included extensive woodpecker flecking, bark blonding, epicormic branching/water sprouts, and/or suspicious exit holes). Although not all Ash trees were flagged for monitoring, so a map was created showing the Ash tree locations for monitoring.

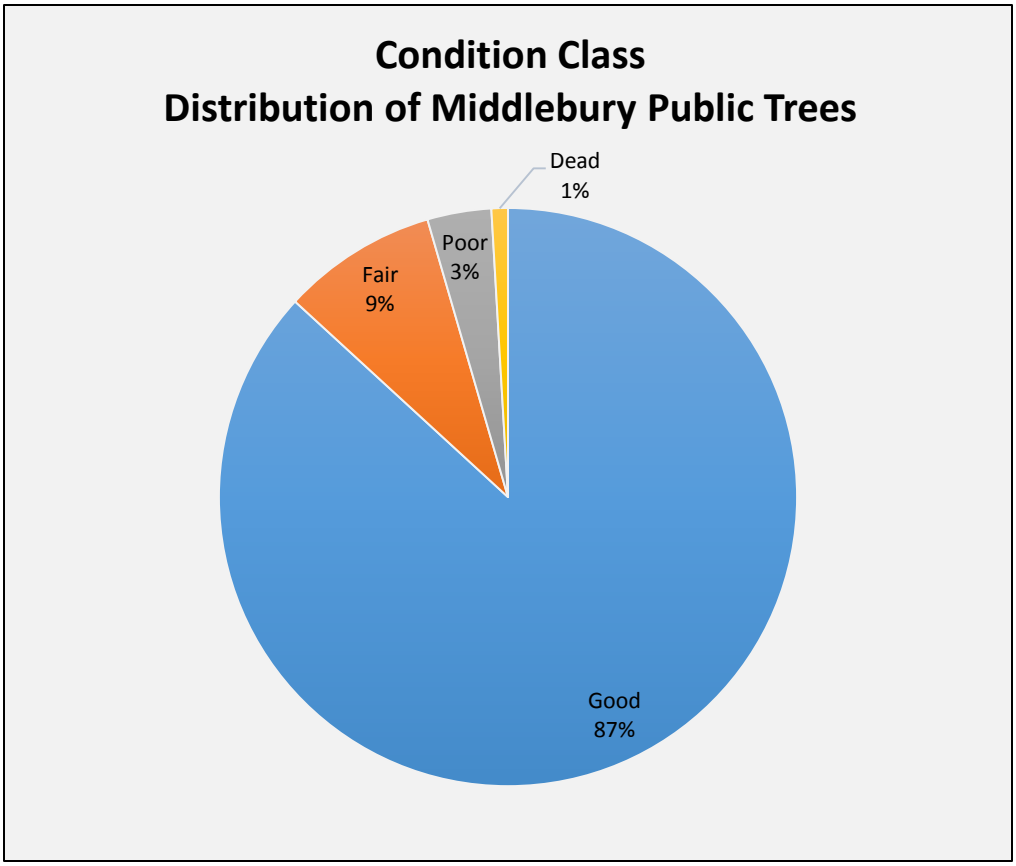


Figure 6: Percent of inventoried public trees in each condition class in Middlebury, VT. Note that each percent composition was rounded to the nearest whole number.

Monetary Value and Ecosystem Services

Middlebury's urban forest data were analyzed using the free online i-Tree Streets application to determine the monetary value of the ecosystem services provided by the Town's trees. i-Tree Streets uses sophisticated models developed by researchers at the Davey Institute of Tree Sciences and US Forest Service scientists to assign monetary values to the services provided by individual trees in urban landscapes. The 979 trees provide a total of $90,095 in annual benefits by filtering air pollutants, mitigating stormwater runoff, sequestering carbon dioxide (CO_2), conserving energy, and increasing property values. On average, each public tree offers $102.47 annually in savings or services.

Figure 8 and Table 2 provide an overview of each ecosystem service provided by Middlebury's public trees. Energy conservation ($36,667) and property value increase ($37,687) are the most significant services provided by these trees in terms of their monetary value. The full reports produced through the i-Tree Streets assessment for Middlebury are available upon request through VT UCF.

It is important to recognize that the trees inventoried through this project are located within approximately 5 square miles of Middlebury's 39.2 square miles of total land area. Expanding the inventory to all of Middlebury's roads would increase these figures dramatically. It is also noteworthy that larger and long-lived trees provide substantially more benefits than young, small trees. Since tree age is correlated to diameter size and only 83 of Middlebury's inventoried public trees have a DBH greater than 24", it is important that Middlebury officials manage for tree longevity to maximize its urban forest benefits. Regular maintenance and care are needed to promote urban tree health, longevity, and maximized urban forest benefits.

Table 2: Annual environmental and monetary benefits provided by Middlebury's inventoried public trees, as reported in the i-Tree Streets assessment.

Benefit Type	Benefit Description	Total Value of Trees Inventoried	Average value/tree
Energy conservation	Reduced natural gas use in winter and reduced electricity use for air conditioning in summer	$ 36,667	$ 37.96
Carbon dioxide	Annual reductions in atmospheric CO2 due to sequestration by trees and reduced emissions from power plants due to reduced energy use. The model accounts for CO2 released as trees die and decompose and CO2 released during the care and maintenance of trees.	$ 807	$ 0.84
Air quality	Quantifies the air pollutants (O3, NO2, SO2, PM10) deposited on tree surfaces and reduced emissions from power plants (NO2, PM10, VOCs, SO2) due to reduced electricity use. Also reported are the potential negative effects of trees on air quality due to BVOC emissions.	$ 6,513	$ 6.74
Stormwater	Reductions in annual stormwater run-off due to rainfall interception by trees.	$ 8,421	$ 8.72
Aesthetic/other	Tangible and intangible benefits of trees reflected in increases in property values.	$ 37,687	$ 39.01
Stored carbon dioxide	Tallies all of the carbon dioxide stored in the urban forest over the life of the trees as a result of sequestration; *not an annual benefit but a cumulative benefit.	$ 8,891*	$ 9.20*
Totals		$ 98,986	$ 102.47

Middlebury Full Canopy Assessment

As a complement to the public tree inventory, the VT UCF AmeriCorps member completed an i-Tree Canopy assessment for the inventory area in Middlebury. i-Tree Canopy is a free, easy-to-use online application that allows users to assess total tree cover over an area based on randomly generated map points and user-defined land cover types. The tool also assigns dollar values to the benefits associated with the overall tree canopy cover. The aim of this type of

assessment is to help citizens and decision-makers better understand the existing and potential tree canopy in their community. The i-Tree Canopy assessment was conducted in the area surveyed by the LANDS semester students (approximately 5 square miles or 12% of the total land area of Middlebury). Based on the Middlebury i-Tree Canopy assessment, approximately 28% of this area is currently occupied by tree canopy (Figure 9). In consideration of the other land cover types present, Middlebury could potentially increase its total tree canopy cover by an additional 28% on agricultural and open lands of low-lying vegetation (includes private land). Additionally, 23% is impervious surface (parking lots, playgrounds, roads and the ROW) and with strategic planning could be converted to canopy. In total, there is currently potential to increase overall tree canopy cover in Middlebury by 51%. 18% of the area is occupied by buildings, wetlands, or water, and is not suitable for tree planting (Figure 10).

Figure 11 complements the i-Tree Streets analysis of the monetary value of benefits provided by Middlebury's public trees by estimating the air quality benefits and corresponding monetary value for the full urban forest canopy. Of note is an estimated $1,866,295.40 in long-term CO_2 storage and $74,020.82 in annual CO_2 sequestration value.

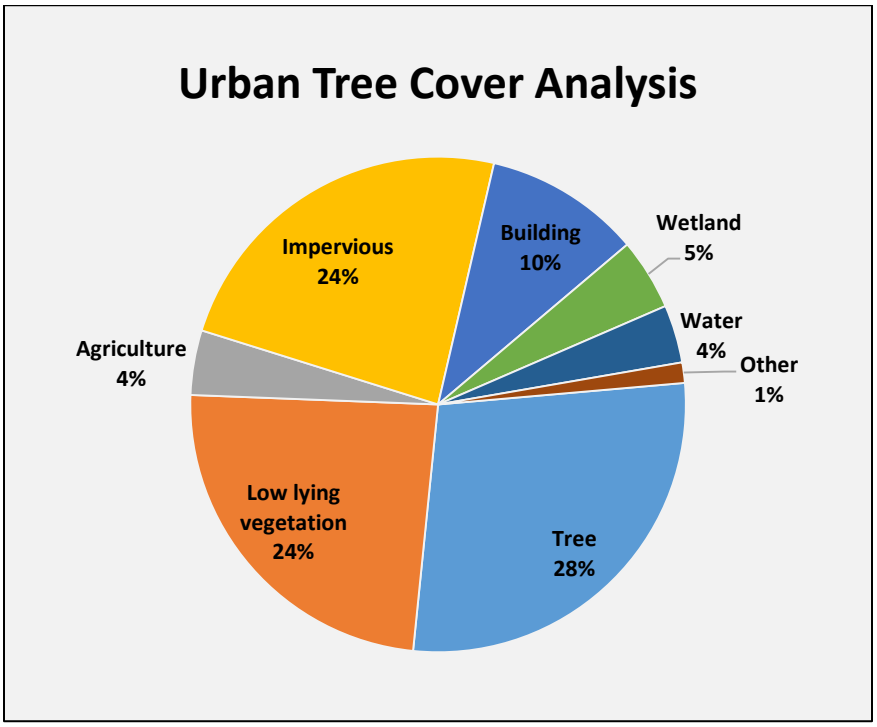


Figure 9: Land cover class distribution for Middlebury, VT based on randomized assessment through i-Tree Canopy.

Cover Class	Description	Abbr.	Points	% Cover
Tree	Tree, non-shrub	T	126	28.0 ±2.12
Low lying vegetation		LLV	108	24.0 ±2.01
Agriculture		A	19	4.22 ±0.95
Impervious		I	107	23.8 ±2.01
Building		B	46	10.2 ±1.43
Wetland		WL	21	4.67 ±0.99
Water		W	17	3.78 ±0.90
Other	Quarries, sand courts, ect.	O	6	1.33 ±0.54

Figure 10: i-Tree Canopy assessment for the inventoried area in Middlebury, VT. This displays the benefits of urban trees with the estimated confidence interval of actual cover in Middlebury.

Abbr.	Benefit Description	Value	±SE	Amount	±SE
CO	Carbon Monoxide removed annually	$15.69	±1.19	370.25 lb	±27.99
NO2	Nitrogen Dioxide removed annually	$27.02	±2.04	1.01 T	±0.08
O3	Ozone removed annually	$1,407.19	±106.37	10.05 T	±0.76
PM2.5	Particulate Matter less than 2.5 microns removed annually	$2,908.92	±219.89	977.04 lb	±73.86
SO2	Sulfur Dioxide removed annually	$4.72	±0.36	1,272.24 lb	±96.17
PM10*	Particulate Matter greater than 2.5 microns and less than 10 microns removed annually	$1,021.58	±77.22	3.37 T	±0.25
CO2seq	Carbon Dioxide sequestered annually in trees	$74,020.82	±5,595.45	2,047.07 T	±154.74
CO2stor	Carbon Dioxide stored in trees (Note: this benefit is not an annual rate)	$1,866,295.40	±141,078.67	51,613.07 T	±3,901.58

Figure 11: i-Tree Canopy monetary estimates for air quality benefits of Middlebury's full canopy (public and private trees).

Discussion and Recommendations

Urban Forest Diversity and Structure

An important best management practice in urban forestry is to maintain a diverse range of species. It is recommended that communities work towards a goal of no more than 20% representation of a single genus (for example: *Acer*) in a tree population and no more than 10% of one species (for example: *Acer saccharum*). Resistance to disease and insect infestation is

one of the many reasons that diversity within the urban forest is of paramount concern. A more diverse forest will be more resistant to environmental stressors, and therefore remain healthy and resilient in the face of change. Furthermore, by maintaining higher diversity a community can prevent a rapid loss of canopy due to insect and disease issues.

In Middlebury, 27% of public trees inventoried were in the *Acer* (maple) genus, which is more than the recommended representation within the community's urban forest. Specifically, Norway maple, sugar maple, red maple, silver maple, and unidentified maple (hybrids and cultivars) represent 11%, 5%, 3%, 3%, and 1% of the species diversity, respectively. Norway maple is the second most prevalent species inventoried in Middlebury, and is considered to be a non-native invasive species. Although an aesthetically pleasing and hearty tree, Norway maple can spread into nearby forests and out-compete native species such as sugar maple. In fact, Vermont's Plant Quarantine Rule prohibits the movement, distribution, and sale of Norway maple, as well as other invasive plant species. Ash trees (genus *Fraxinus*) comprise 9% of Middlebury's public tree canopy. Both ash and maple trees are currently threatened by invasive tree pests; the emerald ash borer (EAB) and Asian longhorned beetle (ALB) respectively. While neither of these pests have been discovered to-date in Vermont, the largest ALB infestation in North America is a little over 50 miles to Vermont's south in Worcester, MA and with the discovery of EAB in New Hampshire in 2013, Vermont is now surrounded on all sides by states or provinces with isolated infestations of EAB. *Malus* (apple) is the second most common genus in Middlebury. Although apple trees are hardy, short-growing, and an aesthetically-pleasing street tree, it is recommended that the proportion of apple trees be kept under 20% of the overall diversity of the urban forest.

We recommend diversifying Middlebury's community forest by maintaining the existing urban trees, creating age diversity with routine planting, and creating a level of resiliency against pests and diseases by planting a variety of tree species. This will promote long-term health of the urban forest.

Recommended action practices

- We advise against planting high-density stands of the same species (monocultures) whose close proximity may be conducive to the spreading of disease.

- We suggest planting tree species that have grown successfully in the area that show no major signs of disease or deformity, and that are native non-invasive species (specifically Norway maple).

- We suggest planting native coniferous species to increase the conifer – hardwood ratio in Middlebury's urban forest. Most conifers are evergreen and have comparably greater biomass than hardwoods. Having a greater percentage of conifers in Middlebury's urban forest can therefore help to maximize its ecological and societal benefits.

- Existing ash trees should be consulted and regularly monitored for signs of EAB, and additional ash trees should not be planted.

- Plan for the arrival of Emerald Ash Borer by using the Community Preparedness Toolbox, available at www.vtinvasives.org/tree-pests/community-preparedness.

- To diversify in both species composition and age structure, refer to the 171 identified vacant planting locations within the public ROW and develop a strategic planting plan.

- In planning for future tree plantings, minimize grey infrastructure conflicts (sidewalks, streets, buildings, etc.), consider obstructions aboveground (power lines) and belowground, available soil volume, species mature size (height and spread), branching patterns, environmental tolerances (exposure, salt, and drought), and desired function when choosing species. For more information on site assessment and species selection, refer to the VT Tree Selection Guide available at www.vtcommunityforestry.org.

- Encourage residents to plant native trees on their properties to increase species diversity, age structure, and overall tree canopy benefits to the community.

Maintenance

Proper tree maintenance, especially pruning, can extend the life and health of trees, as well as reduce public safety issues. There are four main pruning practices of note:

- Crown cleaning: remove dead, diseased, and damaged limbs
- Crown thinning: selective removal of stems and branches to increase light penetration and air movement throughout the crown of a tree
- Crown raising: the removal of lower branches over 2" in diameter to provide clearance for pedestrians and vehicles
- Crown reduction: removing individual limbs from structures or utility wires

In addition to pruning, proper mulching for soil health, moisture retention, and protection from mechanical damage is encouraged. Finally, for newly-planted trees, an irrigation regime should be in place to ensure proper establishment and tree root regeneration.

We recommend establishing a routine maintenance cycle, implemented by trained municipal employees, for all public trees to promote tree health and reduce any threat to public safety.

Recommended action practices

- Complete a full inventory of all public trees in Middlebury in order to plan for a routine maintenance regime for all town-managed trees.
- Work with VT UCF or Middlebury College Arborist, Tim Parsons, to ensure municipal tree maintenance staff is trained in best management practices.
- Establish a systematic pruning cycle to reduce branch and tree failures due to poor structure, minimize conflicts with people and infrastructure, improve line of sight, and reduce storm damage. When trees are located near electrical utility lines, it is important to work directly with the local utility company.
- Explore options for enlisting engaged Middlebury residents in the regular maintenance of street trees.
- Visit and assess the 71 trees flagged for consultation in a systematic and timely fashion.
- Remove the 9 dead public trees identified.

- Closely monitor the health of the 35 public trees in “Poor” condition and plan for their removal and replacement in the near future.
- Continue to monitor the health of the trees in “Good” and “Fair” condition in future updates of the public tree inventory and record any changes in tree health.
- Monitor Norway maple seedlings, as Norway maple is an invasive species and limiting its spread is important for maintaining local forest health.
- Focus efforts at the junction between College Street and South Main Street, an area of high use and high value to the public that contains a relatively large number of trees in “Poor” condition.

Conclusion

Trees in our urban landscapes contribute to environmental integrity, social cohesiveness, economic activity, cultural heritage, and overall well-being. This report is one component of a long-term effort by the Town of Middlebury to understand, manage, and steward its urban forest. The recommendations outlined in this report are based on the LANDS students’ observations and data analysis combined with the experience and evaluation of VT UCF staff. Middlebury officials should consider this report’s recommendations based on the Town’s long-term vision and current capacity.

Appendix A: Full Street and Site List for the Middlebury Inventory

street or Site Name	Right-of-way Measurement	Number of Trees Inventoried	Possible Planting Sites
BROOKSIDE DR	50'	0	4
BAKERY LN	20' North, 25' South	9	N/A
BENEDICT LN	50'	6	N/A
BOARDMAN ST	West 60'	4	N/A
BUTTOLPH DR	50'	6	2
CHARLES AV	60'	15	N/A
CHIPMAN HTS	South access 44'	33	4
COLLEGE ST	66'	8	17
COLONIAL DR	50'	13	N/A
COURT ST	82.5'	142	12
CROSS ST	49.5'	22	N/A
DANYOW DR	50'	7	N/A
DUANE CT	50'	4	N/A
EAST MAIN ST		65	16
EAST RD	50'	2	N/A
ELM ST	50'	8	N/A
FORBES CIR	50'	2	N/A
FOREST LN	50'	4	N/A
GAMBREL CT	50'	3	N/A
GORHAM LN	50"	0	28
GREEN MOUNTAIN PL	Access 25'	0	5
HARROW WY	50'	2	N/A
HIGH ST	52.8' - 28' to East, 24.8' West of centerline	14	N/A
KINGS ROW	40'	6	5
LACROSSE DR	49.5'	20	N/A
LOCUST LN	50'	6	N/A
MAIN ST	92.4' - South St to Park St	3	N/A
MAPLE CT	49.5'	5	2
MAPLE ST	PRIVATE	16	2
MARY HOGAN DR	Varies	23	1
MEADOW WY	50'	1	N/A
MIDDLE RD N	49.5'	23	N/A
MONROE ST	50'	4	N/A
MORNINGSIDE DR	45'	4	10
MURDOCK CT	30'	0	2

N PLEASANT ST	82.5'	42	N/A
NORTH ST	30'	1	N/A
OSSIE RD	State	40	13
PETERSON TERR	50'	2	N/A
ROGERS RD	North of Danyow Dr North - 50'	5	N/A
ROUTE 7 N		12	N/A
S MAIN ST		55	20
S MUNGER ST	49.5'	1	N/A
S PLEASANT ST	56.1' @ Cross St to 74.25' @ Court Sq	20	N/A
SCHOOL HOUSE HILL RD	49.5'	8	5
SEMINARY ST	80.25'	61	1
SEMINARY ST EXT	66'	6	N/A
SEYMOUR ST	82.5'	22	2
SEYMOUR ST EXT	49.5'	15	6
SHANNON ST	North - 50'	1	3
SOUTH ST	66'	53	2
SPRINGSIDE RD	28' from Seminary St to 45' @ Locust Ln	22	N/A
STEWART LN	50'	9	N/A
VALLEY VIEW	50'	2	N/A
WASHINGTON ST	From Court Sq to High St - 52.5'	9	N/A
WASHINGTON ST EXT	49.5'	27	N/A
WATER ST	From Cross St to Charles Ave - 49.5'	9	N/A
WEYBRIDGE ST	66'	46	4
WILMAR ST	50'	0	3
WILSON RD	60'	12	N/A
WOODLAND PK	50'	19	2

n/a* = Street/Site was not inventoried by the LANDS students because of time constraints

** = only partially completed

Appendix B: Full Species and Genera List for Middlebury's Public Trees

Common Name	Scientific Name	Percent Total	Total
Balsam fir	Abies balsamea	0%	3
Fir	Abies	0%	2
Boxelder	Acer negundo	2%	16
Freeman maple	Acer x freemanii	1%	12
Maple	Acer	1%	14
Norway maple	Acer platanoides	11%	104
Red maple	Acer rubrum	3%	32
Silver Maple	Acer saccharinum	3%	33
Sugar maple	Acer saccharum	5%	52
Ohio buckeye	Aesculus glabra	0%	1
Birch	Betula	0%	4
Broadleaf Deciduous	n/a	5%	51
Broadleaf Evergreen	n/a	0%	2
Shagbark hickory	Carya ovata	0%	3
Catalpa	Catalpa speciosa	0%	1
Katsura	Ceridiphyllum japonicum	0%	1
Eastern redbud	Ceris canadensis	0%	1
Hawthorn	Crataegus	1%	6
Beech	Fagus	1%	5
Ash	Fraxinus	9%	85
Honeylocust	Gleditsia triacanthos	6%	61
Honeysuckle	Lonicera	0%	1
Black walnut	Juglana nigra	1%	5
Eastern Redcedar	Juniperus virginiana	0%	1
Crabapple	Malus hupehensis	15%	150
Blue spruce	Picea pungens	2%	15
Norway spruce	Picea abies	0%	4
Red spruce	Picea abies	1%	5

Spruce	Picea	1%	5
Eastern white pine	Pinus strobus	1%	14
Pine	Pinus	1%	10
Scotch pine	Pinus sylvestris	0%	1
American Sycamore	Platanus occidentalis	0%	1
Cottonwood	Populus	0%	2
Eastern cottonwood	Populus deltoides	0%	3
Quaking aspen	Populus tremuloides	0%	2
Black cherry	Prunus serotina	0%	1
Cherry plum	Prunus cerasifera	1%	9
Plum	Prunus cerasifera	0%	2
Pear	Pyrus calleryana	2%	19
Bur oak	Quercus macrocarpa	1%	5
Northern red oak	Quercus rubra	1%	11
Oak	Quercus	1%	14
Pin oak	Quercus palustris	1%	8
Swamp White Oak	Quercus bicolor	1%	14
Black locust	Robinia pseudoacacia	4%	42
Willow	Salix	0%	4
Japanese tree lilac	Syringa reticulata	3%	25
Northern white cedar	Chamaevyparis thyoides	3%	26
Basswood	Tilia americana	1%	8
Littleleaf linden	Tilia cordata	1%	12
American elm	Ulmus americana	3%	31
Elm	Ulmus	4%	35

* “Broadleaf deciduous” and “Broadleaf evergreen” refer to unidentifiable species or species that were not listed in the ArcCollector database.

Apendix C: Full list of trees that have been suggested for monitoring

DiaClass	Species	ConditionID	Comments	HouseNumber	RoadName
12-18"	Black locust	Fair	North side of road; dead branches overhanging road	NULL	CHIPMAN HTS
6-12"	Norway spruce	Good	Branches in service wires	8	CHIPMAN HTS
18-24"	Silver maple	Good	Many many sprouts off of an old silver maple stump; close to power lines	9	CHIPMAN HTS
3-6"	American elm	Dead	Small - remove; across from 129	NULL	COLONIAL DR
3-6"	Crabapple	Fair	Die back of major branch	NULL	COURT ST
0-3"	Japanese tree lilac	Dead	NULL	NULL	COURT ST
6-12"	Norway maple	Good	Possible wire conflict	NULL	COURT ST
6-12"	Ash	Poor	Some dead branches, across from 229 Danton st	NULL	DANYOW DR
6-12"	Ash	Poor	Many dead branches, across from 229 Danton st	NULL	DANYOW DR
30-36"	Silver maple	Fair	Some dead branches, on utility wire path, crack in trunk, decay where fallen branch was	188	DANYOW DR
12-18"	Cherry plum	Poor	Multi stemmed recommend pruning	353	EAST MAIN ST
12-18"	Honeylocust	Fair	Wire conflict	418	EAST MAIN ST
30-36"	Northern red oak	Good	Recommend pruning dead or dying limbs over the road	365	EAST MAIN ST
0-3"	Norway maple	Dead	Should be removed	397	EAST MAIN ST
18-24"	Norway maple	Fair	Some dieback, power line intersects with crown	397	EAST MAIN ST
18-24"	Norway maple	Fair	Stem damage and deadwood	412	EAST MAIN ST
18-24"	Sugar maple	Fair	Dying limb, some canopy dieback, pruning recommended	0	EAST MAIN ST
30-36"	Sugar maple	Fair	Recommend pruning dying limbs near street and power line	410	EAST MAIN ST
3-6"	Crabapple	Good	NULL	12	ELM ST

18-24"	Black locust	Fair	Damage to trunk near base	NULL	FORREST LN
6-12"	Red maple	Poor	Mechanical damage to main stem	1	KINGS ROW
18-24"	Sugar maple	Fair	Recommend prunning	9	KINGS ROW
6-12"	American elm	Poor	Tree is the third one on the outside right as you enter Lacrosse Dr. Roundabout from Creek Rd.; close to half of tree's branches are dead	NULL	LACROSSE DR
12-18"	Crabapple	Fair	Across from 12 springside; thin canopy; large basal wound and visible decay	12	LOCUST LN
12-18"	Honeylocust	Fair	Near power lines; end of dead end on right	NULL	LOCUST LN
6-12"	Norway maple	Good	Powerlines	NULL	MARY HOGAN DR
3-6"	Western redcedar	Fair	Over head powerlines	NULL	MARY HOGAN DR
3-6"	Western redcedar	Fair	Over head powerlines	NULL	MARY HOGAN DR
30-36"	Ash	Poor	1st tree north of Fields Rd south, west side; dead branches overhanging road and sidewalk to Middle School; cavity in center between 2 stems	NULL	MIDDLE RD N
0-3"	Freeman maple	Dead	Should be removed; 2nd tree on west side after Lacrosse	NULL	MIDDLE RD N
3-6"	Swamp white oak	Fair	Young tree next to path, in front of ear specialist parking	170	MIDDLE RD N
3-6"	Swamp white oak	Fair	Young tree next to path, two trees south of field rd	0	MIDDLE RD N
6-12"	Boxelder	Dead	Remove	70	OSSIE RD
24-30"	Littleleaf linden	Poor	Almost dead	47	OSSIE RD
0-3"	Broadleaf Deciduous Medium	Dead	NULL	NULL	S MAIN ST
24-30"	Swamp white oak	Fair	NULL	NULL	S MUNGER ST
0-3"	Crabapple	Dead	NULL	NULL	S PLEASANT ST

30-36"	Black cherry	Fair	Black cherry, multi stemmed some limb dieback . In Harold Curtiss park	0	SCHOOL HOUSE HILL RD
12-18"	Sugar maple	Fair	Damage on trunk, some limb dieback . In Harold Curtiss park	0	SCHOOL HOUSE HILL RD
0-3"	Sugar maple	Good	Harold Curtiss park. Remove stakes	0	SCHOOL HOUSE HILL RD
0-3"	Sugar maple	Good	Harold Curtiss park, remove stake	0	SCHOOL HOUSE HILL RD
12-18"	Ash	Poor	wires and lots of foliage loss	22	SEMINARY ST
6-12"	Norway maple	Poor	NULL	22	SEMINARY ST
6-12"	Norway maple	Poor	NULL	26	SEMINARY ST
24-30"	Black locust	Good	Branches overhang road; tree located across from Old College Farm Rd.; several dead branches; large scar on east side of trunk	NULL	SEMINARY ST EXT
12-18"	Black locust	Dead	Across from Old College Farm Road; remove	0	SEMINARY ST EXT
12-18"	Blue spruce	Good	touching powerline	NULL	SEYMOUR ST
12-18"	Norway maple	Good	trees hitting telephone wire	18	SEYMOUR ST
12-18"	Ash	Good	hanging over sidewalk, ashleaf maple	63	SEYMOUR ST EXT
12-18"	Crabapple	Good	House powerline	NULL	SOUTH ST
6-12"	American elm	Poor	At corner with Chipman Heights; crown nearly dead	16	SPRINGSIDE RD
30-36"	Black locust	Fair	Two dominant trunks; dying branch over street, crack bet. Two leaders at base, dead limbs throughout crown	11	SPRINGSIDE RD
12-18"	Blue spruce	Poor	Many dead branches; tree is the middle one in the photo	16	SPRINGSIDE RD
0-3"	American elm	Fair	Top of tree has significant dieback; looks as if it were planted too deep; last tree on corner before high street	25	STEWART LN
0-3"	Crabapple	Dead	Across from 22	22	STEWART LN
3-6"	Red maple	Fair	Prune dead wood from top third of tree; tree planted	25	STEWART LN

			too deep		
12-18"	Silver maple	Fair	Large wound on south side of tree; looks like a truck has backed into the tree; good wound wood develop,net but should be monitored	25	STEWART LN
12-18"	Norway maple	Fair	Corner of seminary and Washington; codominant stems, included bark, stem girdling roots; near utility wires	NULL	WASHINGTON ST
6-12"	Ash	Good	In front of cemetery; codominant stems	0	WASHINGTON ST EXT
18-24"	Ash	Poor	On corner of Colonial	0	WASHINGTON ST EXT
18-24"	Honeylocust	Good	Significant deadwood in crown - from shading of lower branches? Should be pruned out. In front of Animal Hospital; across from 170	170	WASHINGTON ST EXT
24-30"	Littleleaf linden	Fair	Branches close to road and sidewalk; tree located in front of cemetery ; major wounds in main "stems"; dead wood	0	WASHINGTON ST EXT
24-30"	Littleleaf linden	Good	Branches close to road and sidewalk; tree located on boundary between animal hospital and cemetery	0	WASHINGTON ST EXT
24-30"	Norway maple	Fair	Structural issues: codominant stems, vertical seams in both leaders, large vertical seam with possible decay at base	193	WASHINGTON ST EXT
12-18"	Norway maple	Good	Branches close to road and sidewalk	213	WASHINGTON ST EXT
12-18"	Norway maple	Good	In front of cemetery; visible stem girdling roots	0	WASHINGTON ST EXT
12-18"	Norway maple	Good	Some shading from neighboring tree, generally looks good	281	WASHINGTON ST EXT
24-30"	Norway maple	Good	Branches close to road, driveway and sidewalk; tree to left of driveway to animal hospital - facing road	0	WASHINGTON ST EXT

12-18"	Norway maple	Poor	Extensive dieback in crown ; planted deep?	281	WASHINGTON ST EXT
6-12"	Sugar maple	Poor	Healthy but structurally potential hazard	13	WASHINGTON ST EXT
18-24"	Ash	Fair	The side of the tree closest to the road has more new growth than the other side facing away from the road. This could be of concern because it is growing towards the power lines and the road.	73	WEYBRIDGE ST
18-24"	Ash	Good	There may be some conflict with branches and wires running to the house	127	WEYBRIDGE ST
6-12"	Maple	Good	There was one large base but immediately there were seven small trunks emerging from the one base. There is a support wire for the telephone pole that is cutting through the tree and should be assessed.	83	WEYBRIDGE ST
6-12"	Ash	Good	Tree is located across the street from the driveway to #1 Auto Parts. Tree is leaning toward road.	NULL	WILSON RD

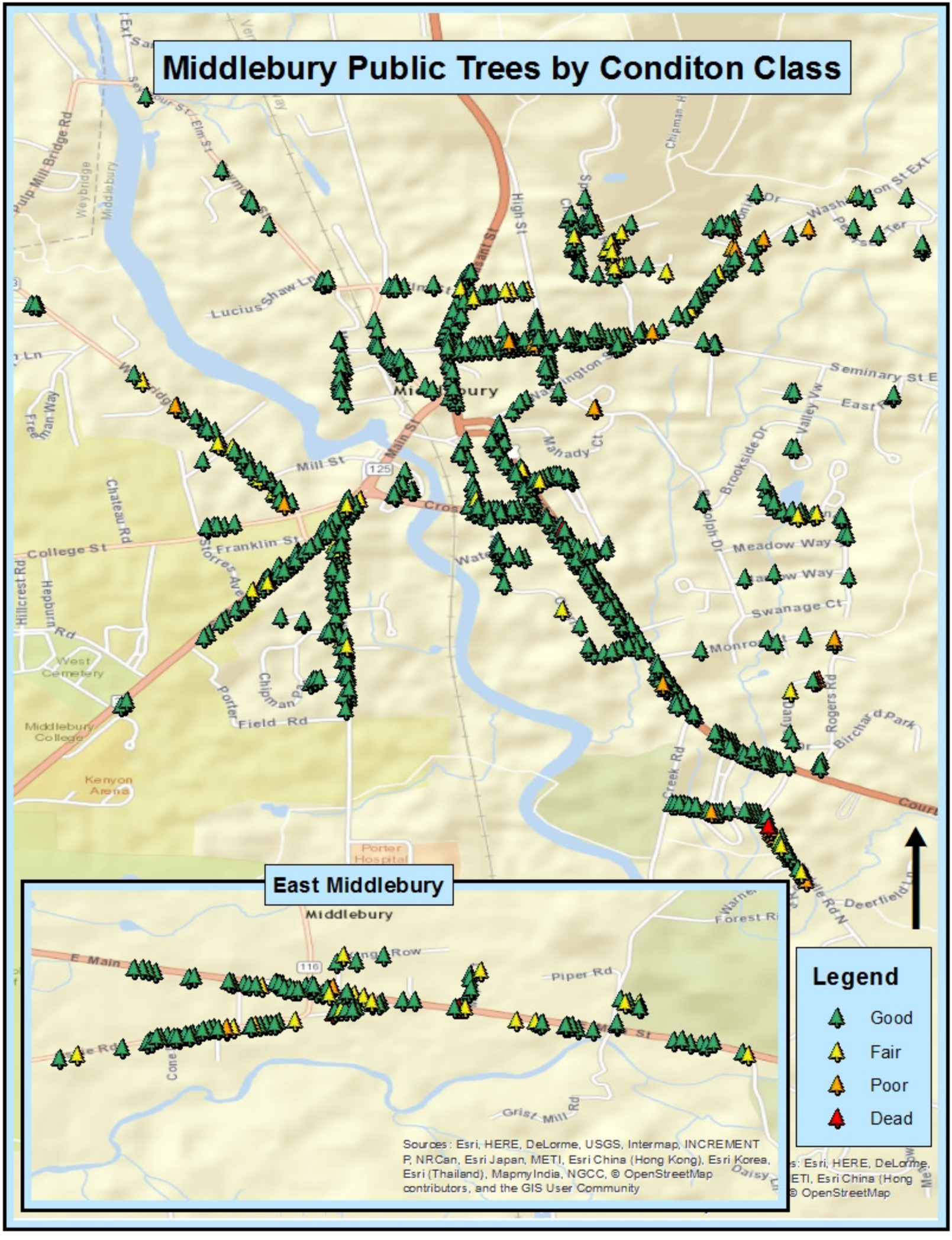
Appendix D: Instructions for Accessing Public Tree Data in ANR Atlas

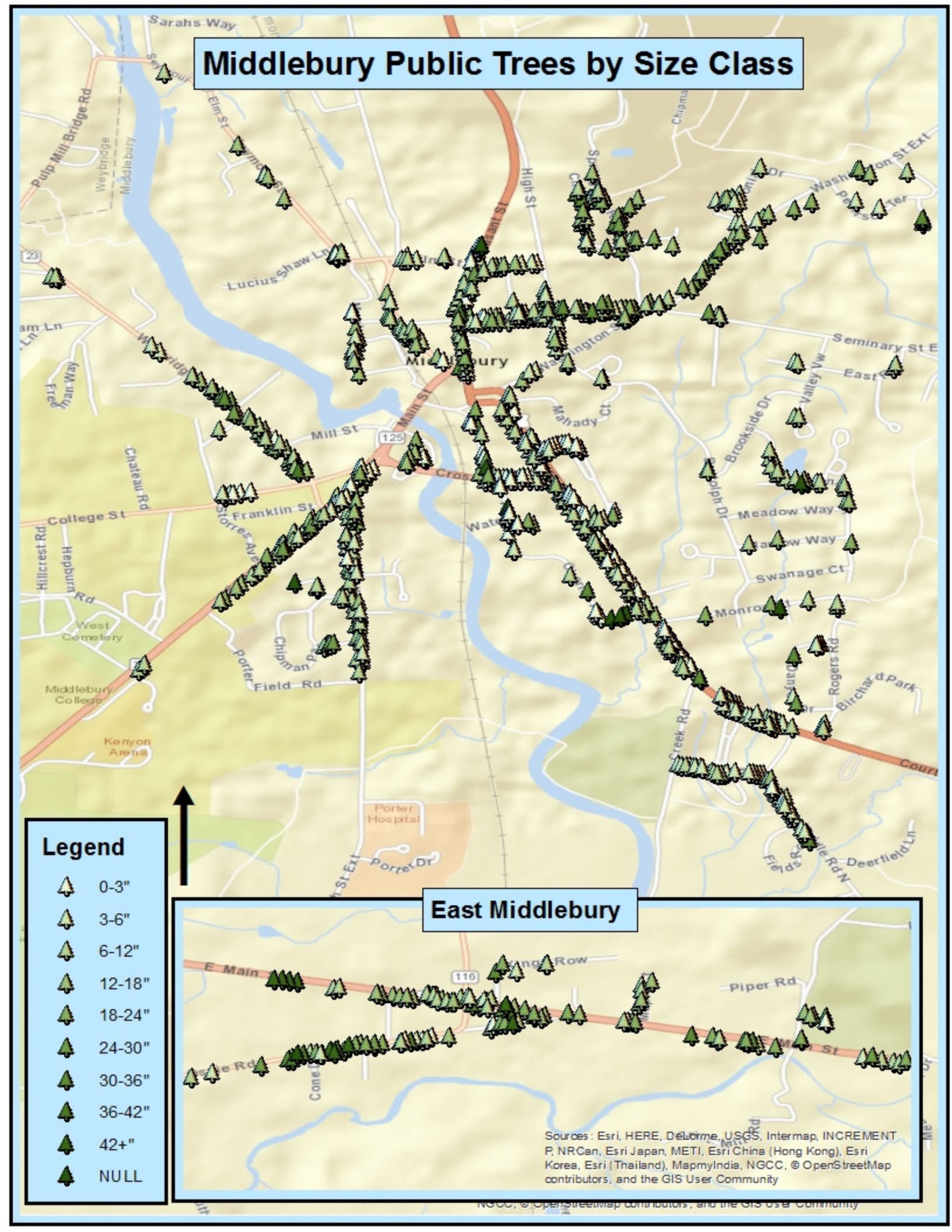
Anyone with internet access can view all of Middlebury and East Middlebury's inventoried public trees by using the Vermont Agency of Natural Resources' (ANR) Atlas mapping tool. Follow these simple steps:

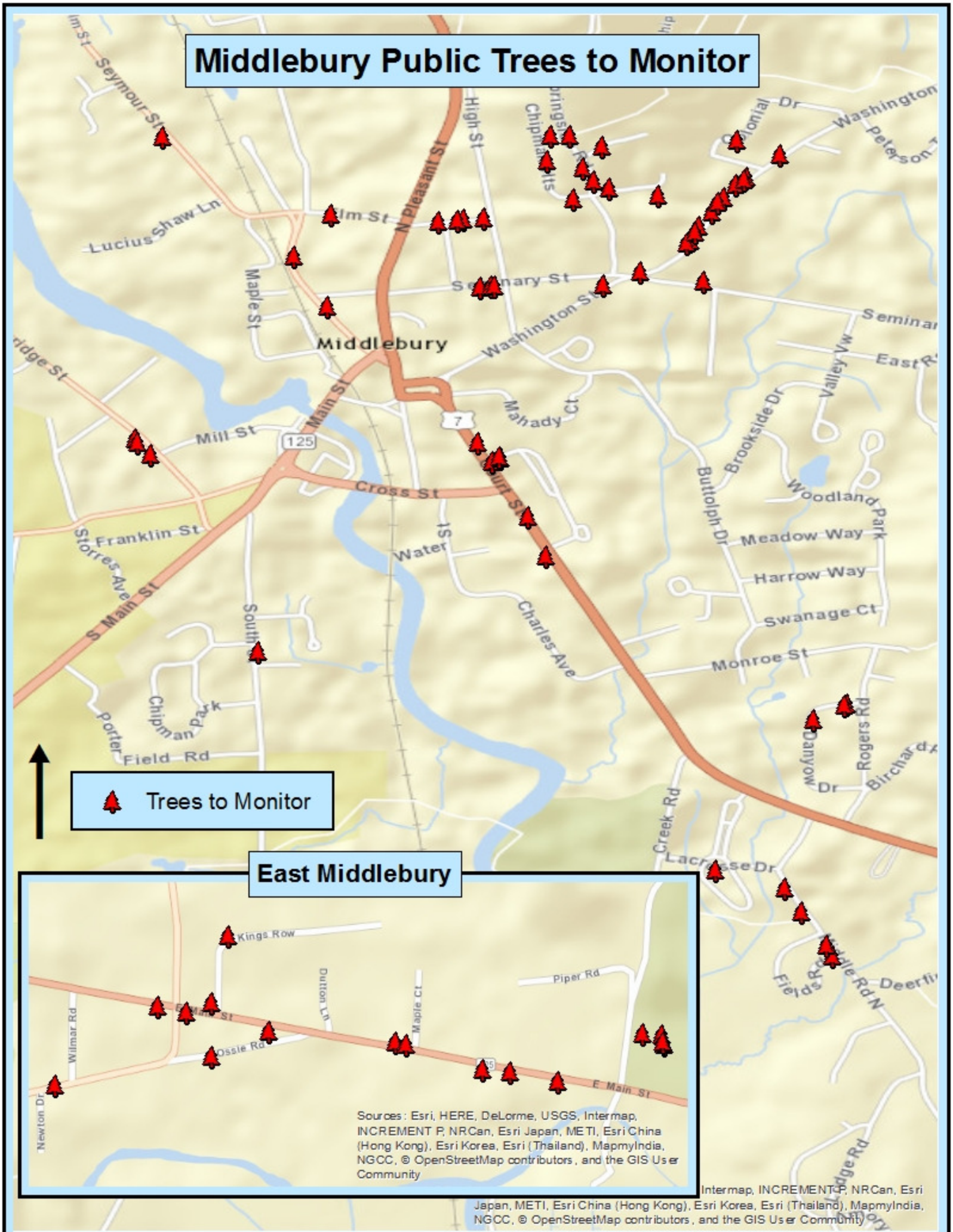
1. Set your web browser to http://anrmaps.vermont.gov/websites/anra5/ (or search "VT ANR Atlas")
2. Zoom in to Middlebury or East Middlebury using the +/- scale navigation tool in the upper left portion of the map (the tree data layer won't show up unless you are zoomed in to the town-level so that you can see the street names on the map).
3. In the information pane on the left of the screen switch over 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 "Find data on the map"; 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 all of 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 E: Middlebury Inventory Maps

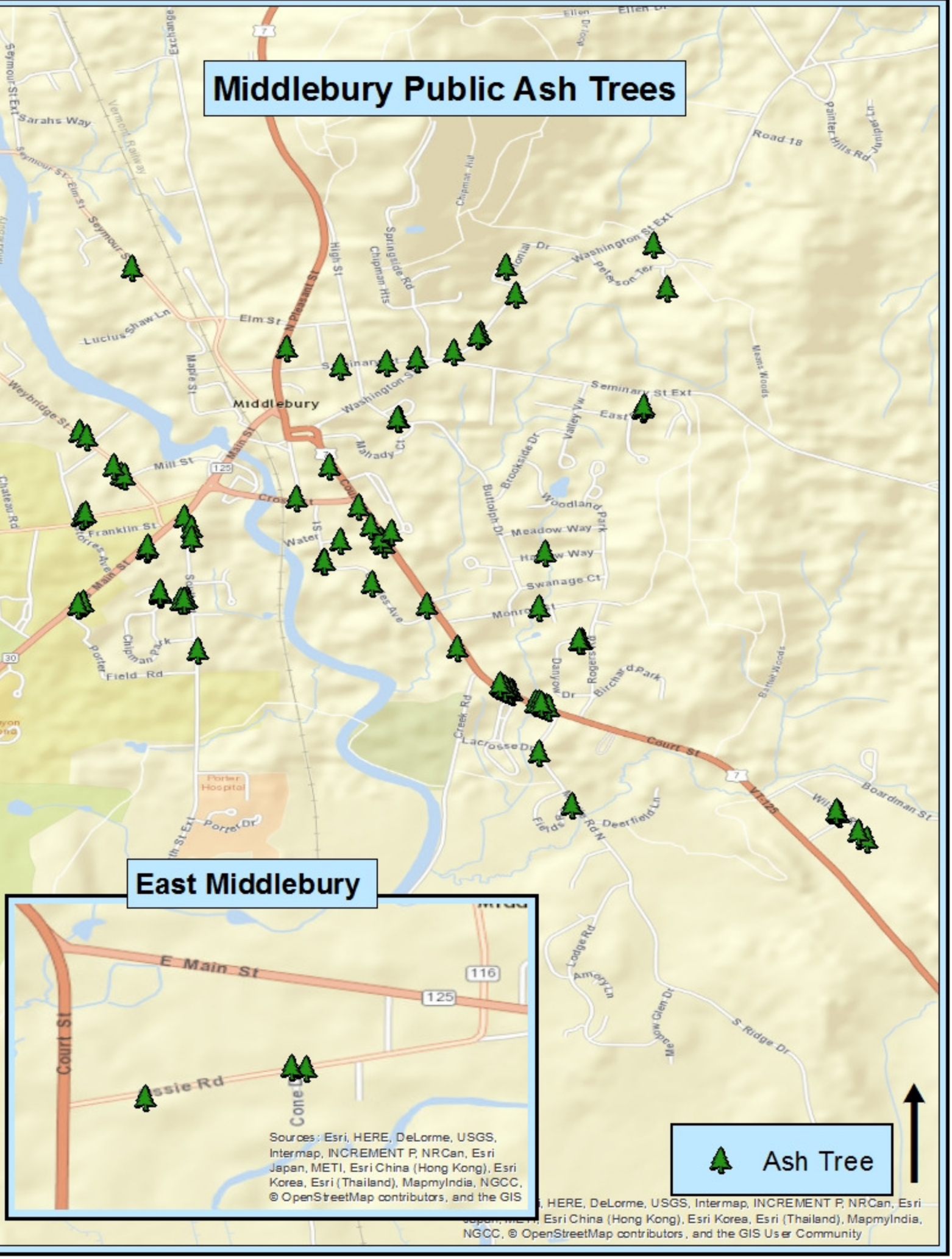
1. Public Trees in Middlebury Designated as in “Fair”, “Poor”, or “Dead” Condition
2. All Public Trees Inventoried in Middlebury by DBH Class
3. Public trees requiring monitoring in middlebury
4. Public Ash trees in Middlebury
5. Potential Public Tree Planting Locations in Middlebury


Middlebury Public Trees by Conditon Class
East Middlebury
Middlebury
Legend
Good
Fair
Poor
Dead
Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community
Pulp Mill Bridge Rd
Weybridge
Middlebury
Lucius Shaw Ln
High St
Main St
Mill St
125
Seminary St E
Mahady Ct
Brookside Dr
Meadow Way
Swanage Ct
College St
Franklin St
Chateau Rd
Hillcrest Rd
West Cemetery
Middlebury College
Kenyon Arena
Porter Field Rd
Chipman Rd
Rogers Rd
Birchard Park
Creek Rd
Porter Hospital
Deerfield Ln
E Main
116
Piper Rd
Grist Mill Rd


Middlebury Public Trees by Size Class
Legend
0-3"
3-6"
6-12"
12-18"
18-24"
24-30"
30-36"
36-42"
42+"
NULL
East Middlebury
Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community
Sarahs Way
Pulp Mill Bridge Rd
Weybridge
Middlebury
Lucius Shaw Ln
Main St
Mill St
College St
Franklin St
Chateau Rd
Storrs Ave
Hillcrest Rd
Hepburn Rd
West Cemetery
Middlebury College
Kenyon Arena
Porter Field Rd
Chipman Pl
Porter Hospital
Porter Dr
High St
Seminary St E
Valley Vw
Brookside Dr
Mahady Ct
Meadow Way
Swanage Ct
Rogers Rd
Birchard Park
Deerfield Ln
Fields Rd
Creek Rd
E Main
King Row
Piper Rd
Cone Rd
Mill Rd
125
116
23


Middlebury Public Trees to Monitor
Middlebury
Trees to Monitor
East Middlebury
Seymour St
Lucius Shaw Ln
Elm St
N Pleasant St
High St
Maple St
Seminary St
Washington St
Main St
Mill St
125
7
Cross St
Franklin St
S Main St
Storres Ave
Water St
Malhady Ct
Court St
Charles Ave
Brookside Dr
Valley Vw
Buttolph Dr
Woodland Park
Meadow Way
Harrow Way
Swanage Ct
Monroe St
Colonial Dr
Washington
Chipman Park
Porter Field Rd
Creek Rd
Lacrosse Dr
Rogers Rd
Danyow Dr
Fields Rd
Middle Rd N
Kings Row
Piper Rd
Duttton Ln
Maple Ct
Wilmar Rd
Ossie Rd
E Main St
Newton Dr
Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community
Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Middlebury Public Ash Trees



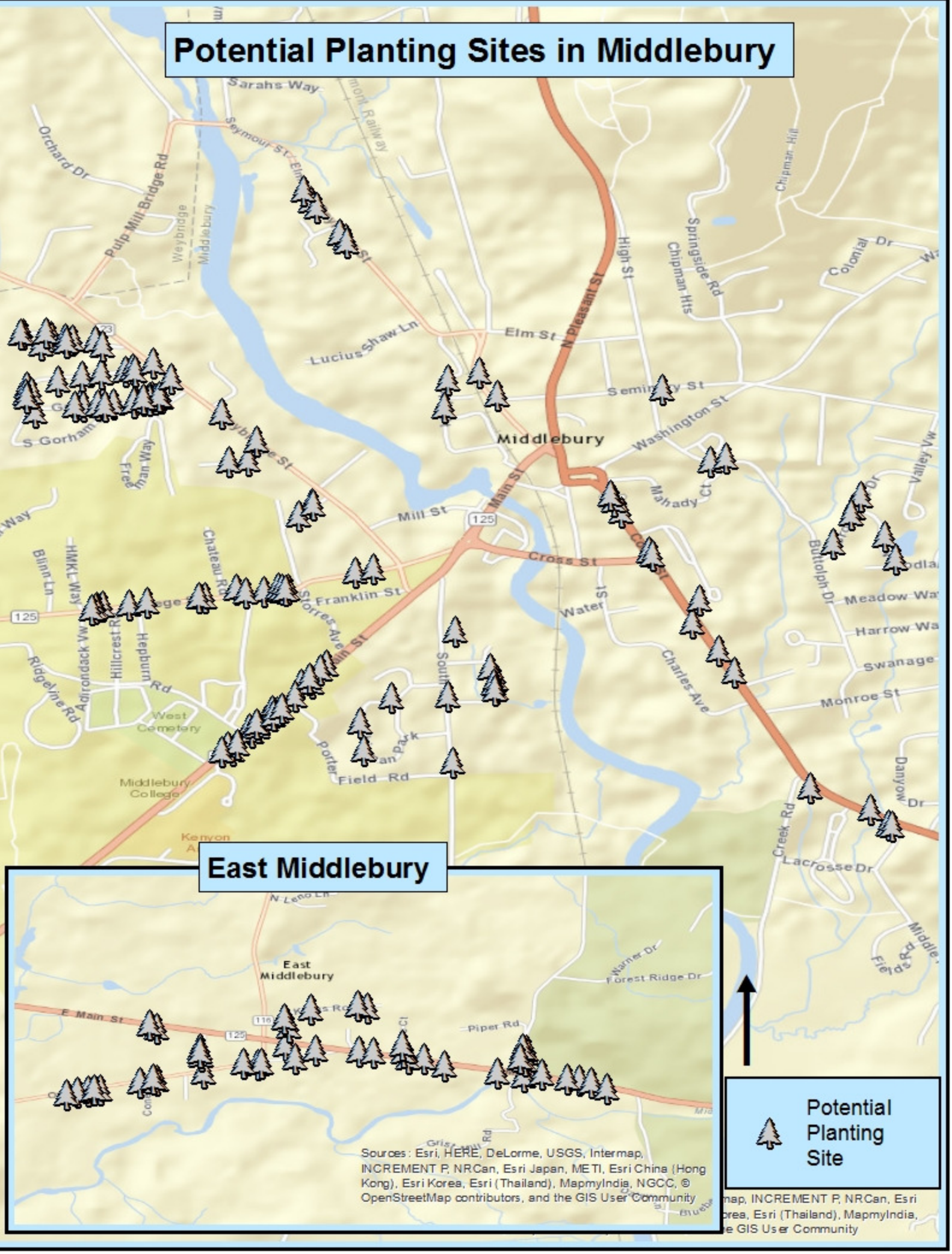
East Middlebury

Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS

Ash Tree

, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, © OpenStreetMap contributors, and the GIS User Community

Potential Planting Sites in Middlebury



East Middlebury