Waterbury Village Public Tree Inventory Summary Report
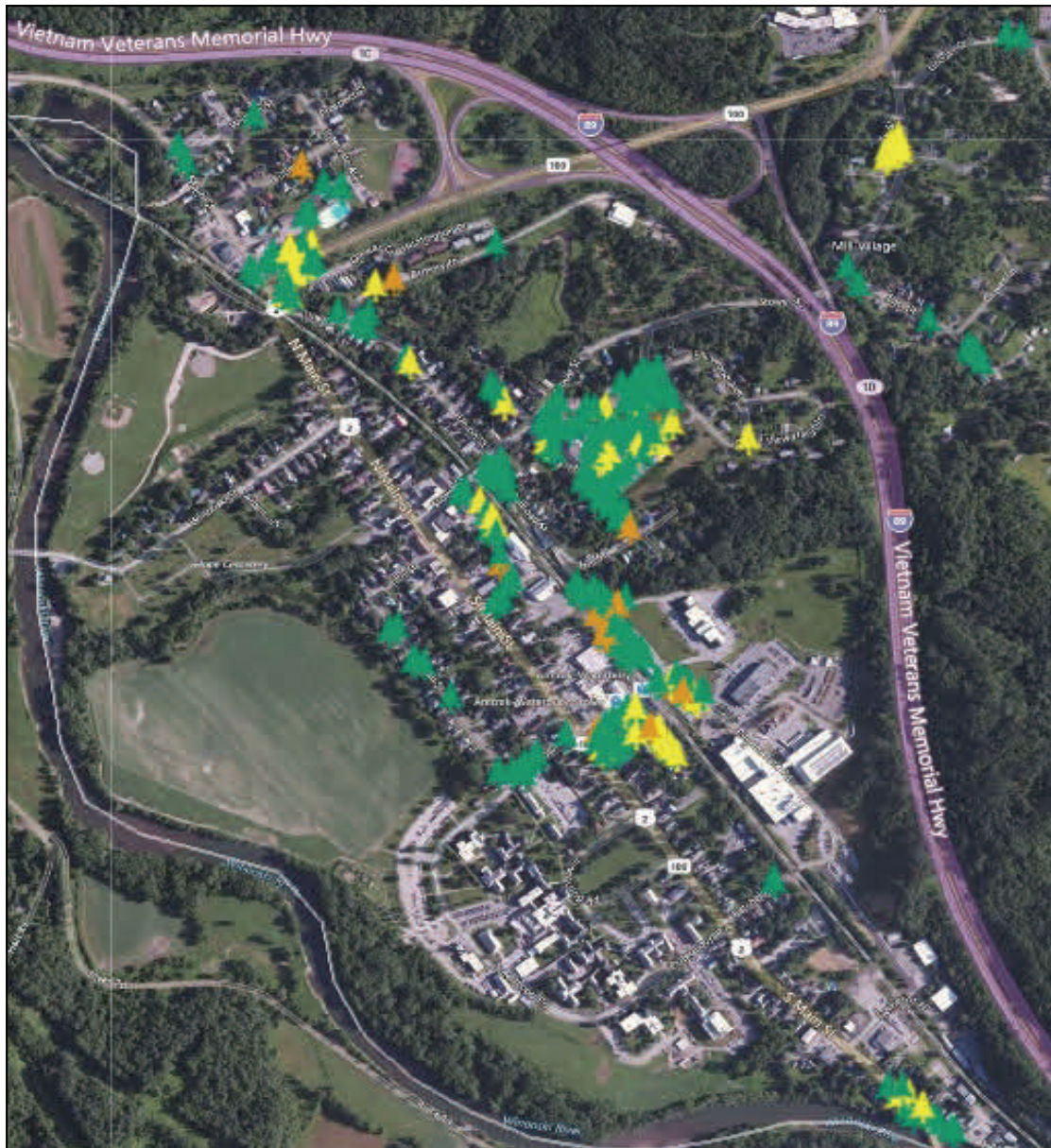

Prepared for the Waterbury Tree Committee
by the Vermont Urban & Community Forestry Program
September 2016

Acknowledgements

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 of 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.

Photographs of the Waterbury Public Tree Inventory: August 2016

Project Summary & Methodology

The goal of the Waterbury Village public tree inventory was to accurately locate and assess Town-owned trees within the public right-of-way (ROW) on streets in the downtown village, at Rusty Parker Park, and at Thatcher Elementary School in order to establish and maintain a record of the location and the maintenance needs of public trees, and to support future community forest planning. The information collected in the inventory and presented in this summary report should provide decision makers – and citizens – a better understanding of the composition, condition, and benefits of Waterbury's downtown public trees and will allow the Waterbury Tree 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 Waterbury Tree 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 (http://anrmaps.vermont.gov/websites/anra/).

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 August 9th and 10th, 2016 VT UCF staff worked with citizen volunteers and town staff to complete an inventory of **292 trees** located within the public ROW of **28 streets** and in **3 town green spaces**. In total, the inventoried land area was less than 1 square mile, a small fraction of the Town of Waterbury's 48 square mile total land area, but encompassed the concentrated center and most densely populated portion of town. A list of streets and sites with ROW boundaries and number of trees inventoried is found in Table 1 below. A series of GIS maps highlighting the tree inventory results can be found in Appendix C.

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

Street or Site Name	Right-of-Way Measurement	Number of Trees Inventoried
AMORY AVE	49.5'	0
ARMORY DR	49.5'	3
BATCHELDER ST	49.5'	2
BIDWELL LN	50'	11
BUTLER ST	*	1
EAST ST	38.7'	6
ELLINWOOD AV	*	2
ELM ST	49.5'	0
FOUNDRY ST	49.5'	5
GRANDVIEW HEIGHTS	*	0
HIGH ST	49.5'	12
HILLCREST TER	40'	0
INTERVALE ST	*	0
LINCOLN ST	*	2
MOODY CT	*	8
N MAIN ST	66'	30
NORTH ST	*	5
PARK ROW	49.5'	7
PARK ST	30'	0
PILGRIM PARK RD	*	24
RAILROAD ST	19'	28
RANDALL ST	*	7
S MAIN ST	66'	11
STOWE ST	49.5'	25
SWASEY CT	*	4
UNION ST	*	9
WALLACE ST	*	1
WINOOSKI ST	*	0

WATERBURY POOL	n/a	5
THATCHER BROOK SCHOOL (NATURAL PLAYGROUND + SCHOOL GROUNDS)	n/a	64
RUSTY PARKER PARK	n/a	20
TOTAL		**292**
* Waterbury Community Planner Steve Lotspeich verbally told inventory teams ROW for these roads day of inventory or was otherwise assumed to be 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 Waterbury, 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), if the tree needed to be pruned (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 Waterbury is available for viewing on the ANR Atlas and instructions are included in Appendix A.

Table 2: Data collection parameters for the Waterbury 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
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
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.

Summary of Findings

Community Forest Diversity

- Of the 292 public trees, there are 35 different species in 23 different genera.

- The five most common tree genera by number of trees are *Acer* (maple) at 45%, *Quercus* (oak) at 11%, *Gleditsia* (honeylocust) at 8%, *Malus* (apple) at 8%, and *Picea* (spruce) at 5%. See Figure 1 below.

- *Acer* and *Fraxinus* species together represent nearly one-half (48%) of Waterbury Village'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. It is recommended that one genus not represent more than 20% of a public tree population.

- The five most common species are Norway maple (*Acer platanoides*) at 18%, Freeman maple (*Acer freemanii*) at 10%, honeylocust (*Gleditsia triacanthos*) at 8%, crabapple (*Malus* species) at 8%, and sugar maple (*Acer saccharum*) at 7%. See figure 2 below. It is recommended that one species not represent more than 10% of a public tree population; in this respect, other than the high Norway maple population (which is a species currently considered to be an invasive species in Vermont), Waterbury's public tree population has species diversity. A full species list is included in Appendix B.

- Only 10 green ash (*Fraxinus pennsylvanica*) were inventoried in the village; as communities in Vermont are encouraged to plan for the arrival of the EAB, the locations and conditions of these trees should be monitored.
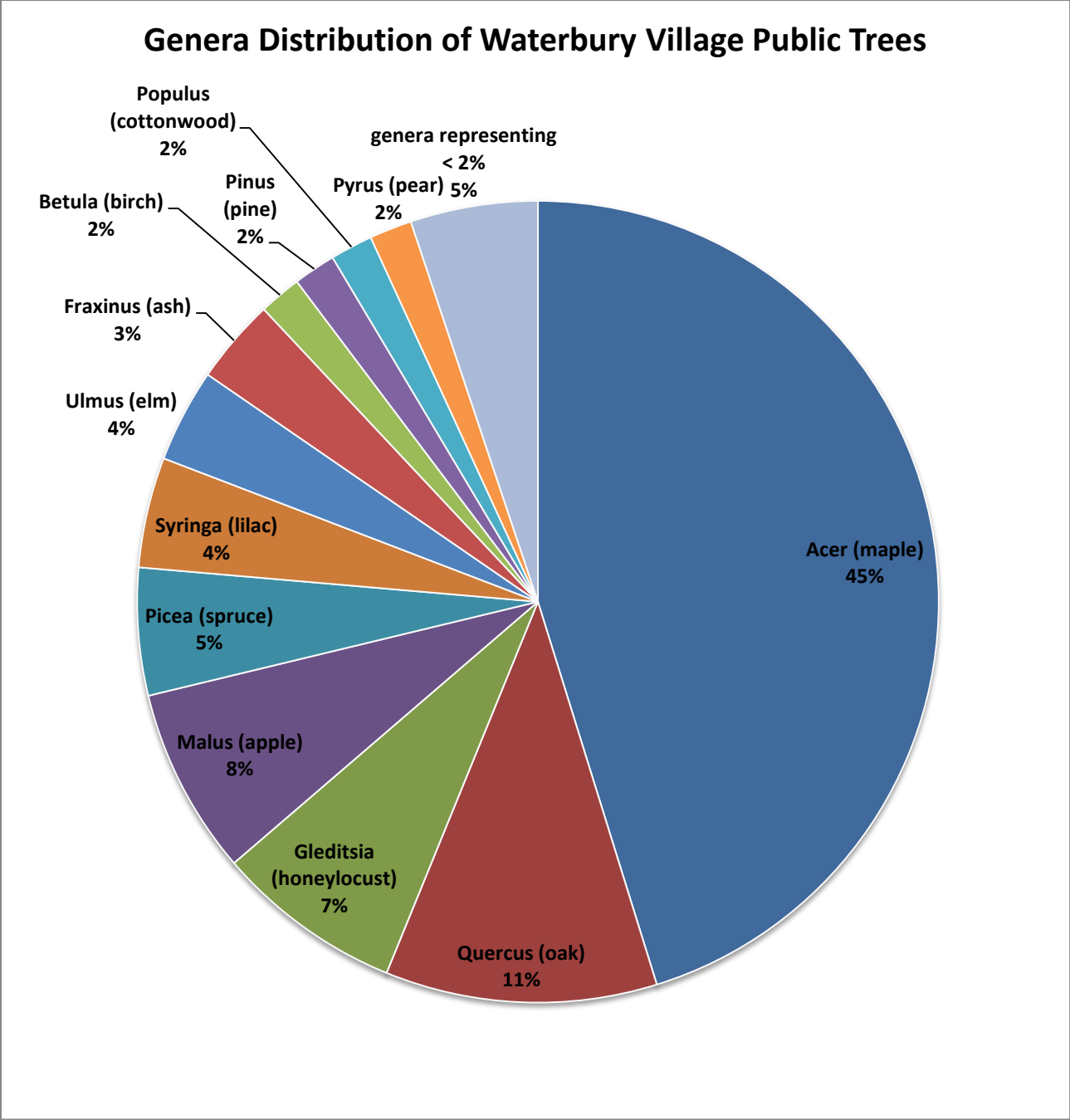

Genera Distribution of Waterbury Village Public Trees

- Populus (cottonwood) 2%
- genera representing < 2% 5%
- Pinus (pine) 2%
- Pyrus (pear) 2%
- Betula (birch) 2%
- Fraxinus (ash) 3%
- Ulmus (elm) 4%
- Syringa (lilac) 4%
- Picea (spruce) 5%
- Malus (apple) 8%
- Gleditsia (honeylocust) 7%
- Quercus (oak) 11%
- Acer (maple) 45%

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

Species Distribution of Waterbuy Village Public Trees

Norway maple (*Acer platanoides*)
18%

Freeman maple (*Acer freemanii*)
10%

crabapple (*Malus* sp.)
7%

honeylocust (*Gleditsia triacanthos*)
8%

sugar maple (*Acer saccharum*)
6%

red maple (*Acer rubrum*)
6%

northern red oak (*Quercus rubra*)
6%

Japanese tree lilac (*Syringa reticulata*)
4%

American elm (*Ulmus americana*)
4%

green ash (*Fraxinus pennsylvanica*)
3%

Colorado blue spruce (*Picea pungens*)
3%

boxelder (*Acer negundo*)
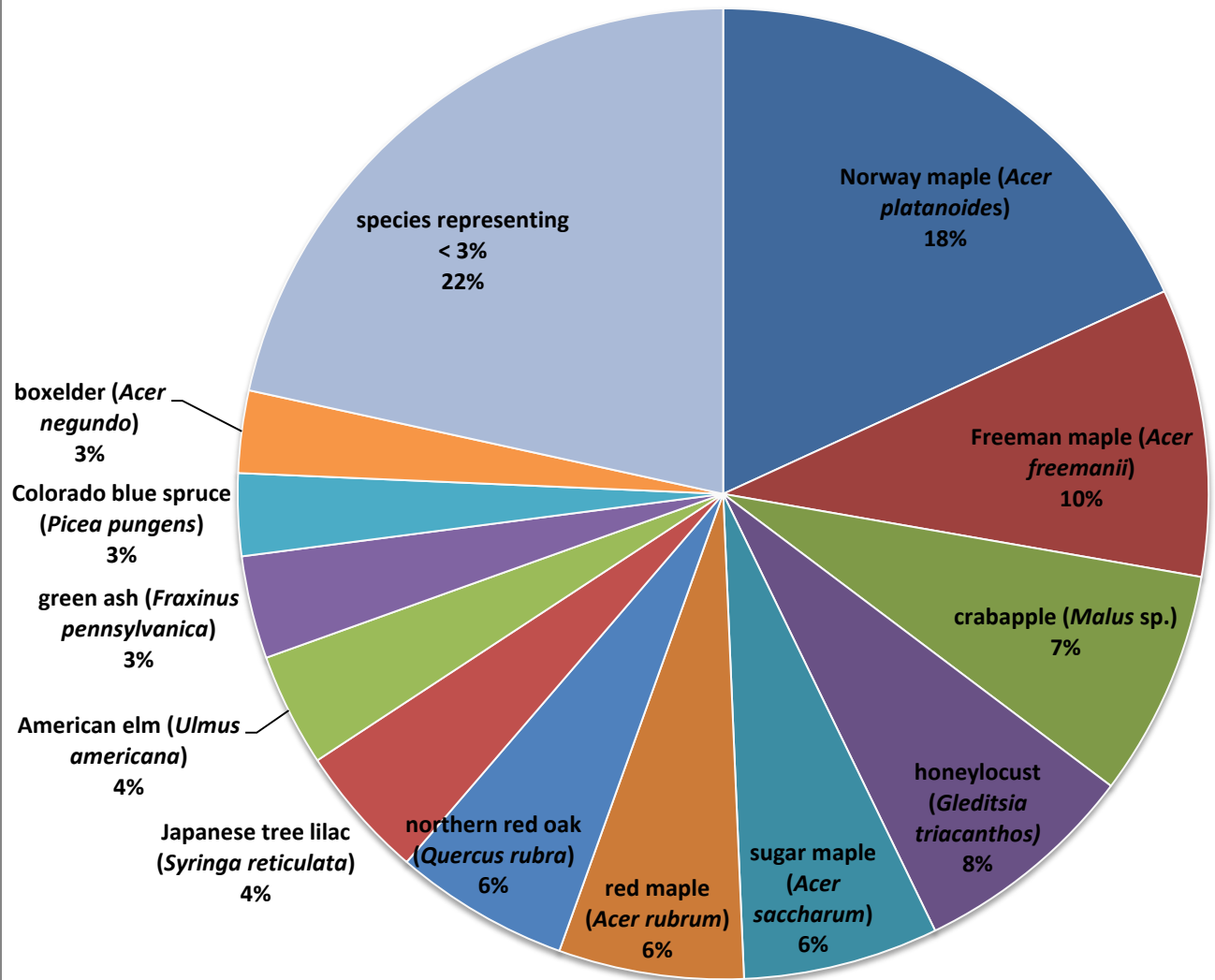3%

species representing < 3%
22%

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

Community Forest Structure

- Nearly two-thirds (65%) of the inventoried public trees (190) in Waterbuy have a diameter at breast height (DBH) measurement less than 12", indicating a relatively young public tree population (Figure 3).

- The remaining 100 trees are represented in the following size classes: 12-18" (36), 18-24" (35), 24-30" (20), 30-36" (6), 36-42" (2), and 42"+ (1) (Figure 3).

- Of note is the low number of large shade trees in Waterbury's public tree population; just 8 trees were inventoried over 30" in diameter. Large shade trees provide increased environmental benefits (stormwater mitigation, oxygen production, etc.) and efforts should be made to protect and maintain these few large trees.

- The largest public tree inventoried was a 60" silver maple on High Street; the tree was identified to be in Poor condition and should be monitored.
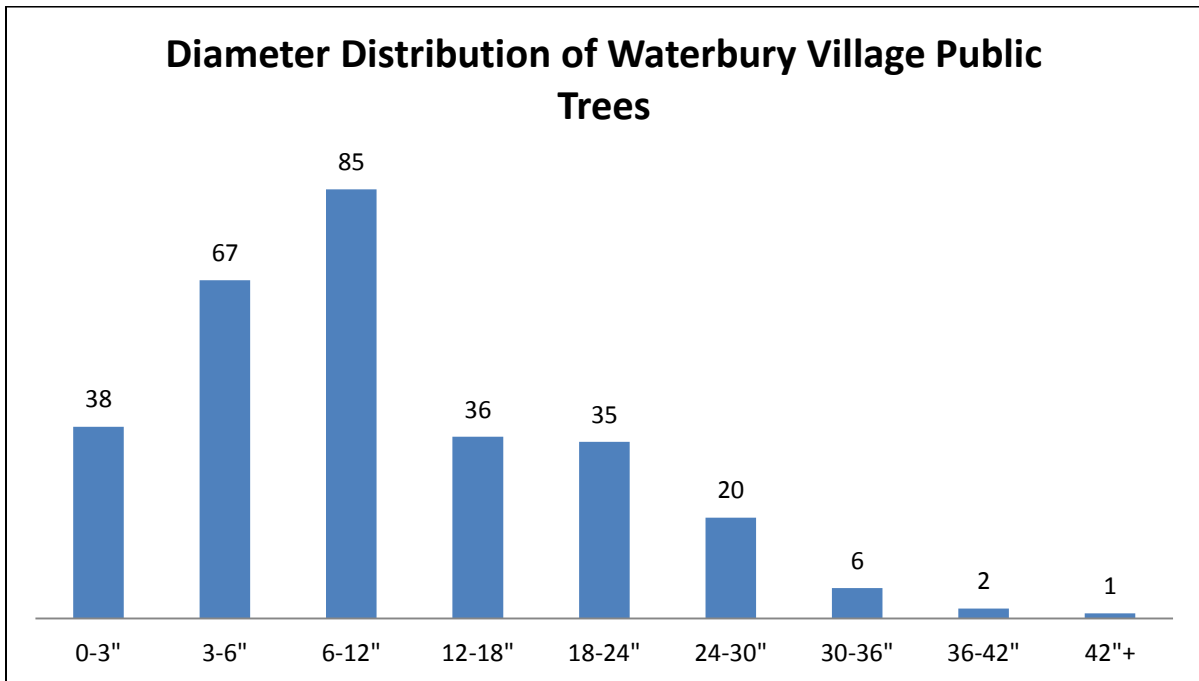
Diameter Distribution of Waterbury Village Public Trees

Size class	Count
0-3"	38
3-6"	67
6-12"	85
12-18"	36
18-24"	35
24-30"	20
30-36"	6
36-42"	2
42"+	1

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

Community Forest Health

- The majority of Waterbury's public trees (225, or 77%) were assessed as being in "Good" condition. Of the remaining trees, 52 (18%) were considered to be in "Fair" condition, and 15 (5%) were in "Poor" condition. No (0) "Dead" trees were identified in the inventory (Figure 4).

- 87 (30%) public trees were assessed to be in need of monitoring by a Certified Arborist, the Waterbury Tree Warden, or another qualified individual (Figure 5). Trees that were flagged as in need of monitoring expressed one or more of the following conditions:

  o The tree has a visible defect affecting >40% of the tree,

  o The tree poses a hazard to people/infrastructure/cars,

  o The tree is growing into utility wires, or

  o The tree is dead or in poor condition.

- 108 (37%) of the public trees were assessed to be in need of pruning (Figure 5).
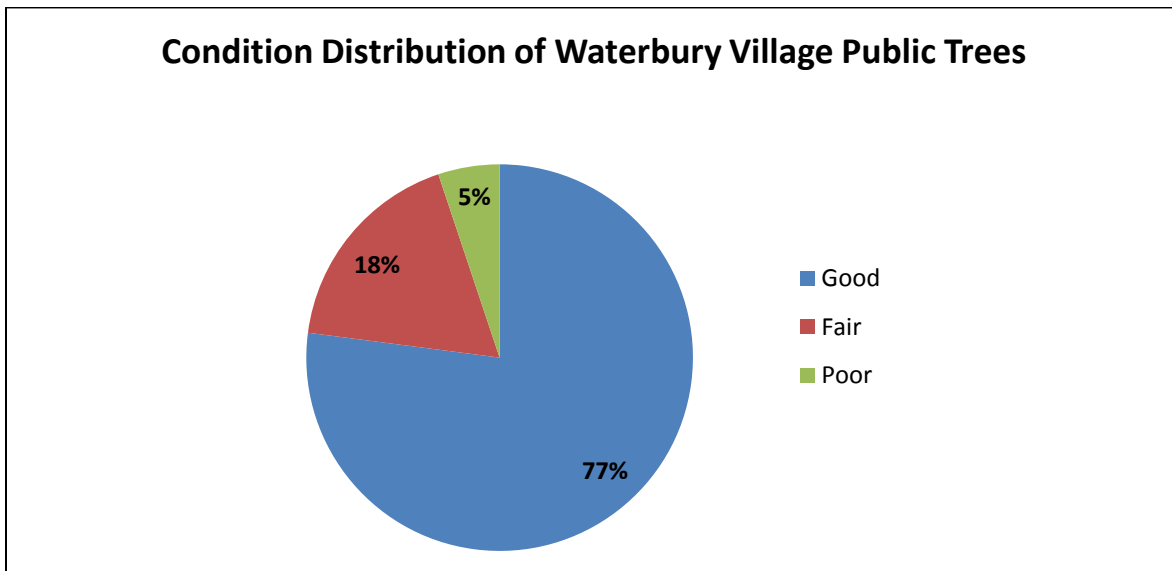
Condition Distribution of Waterbury Village Public Trees

Figure 4: Condition class distribution of Waterbury's public trees.

Monitoring and Pruning Recommendations for Waterbury Village Public Trees

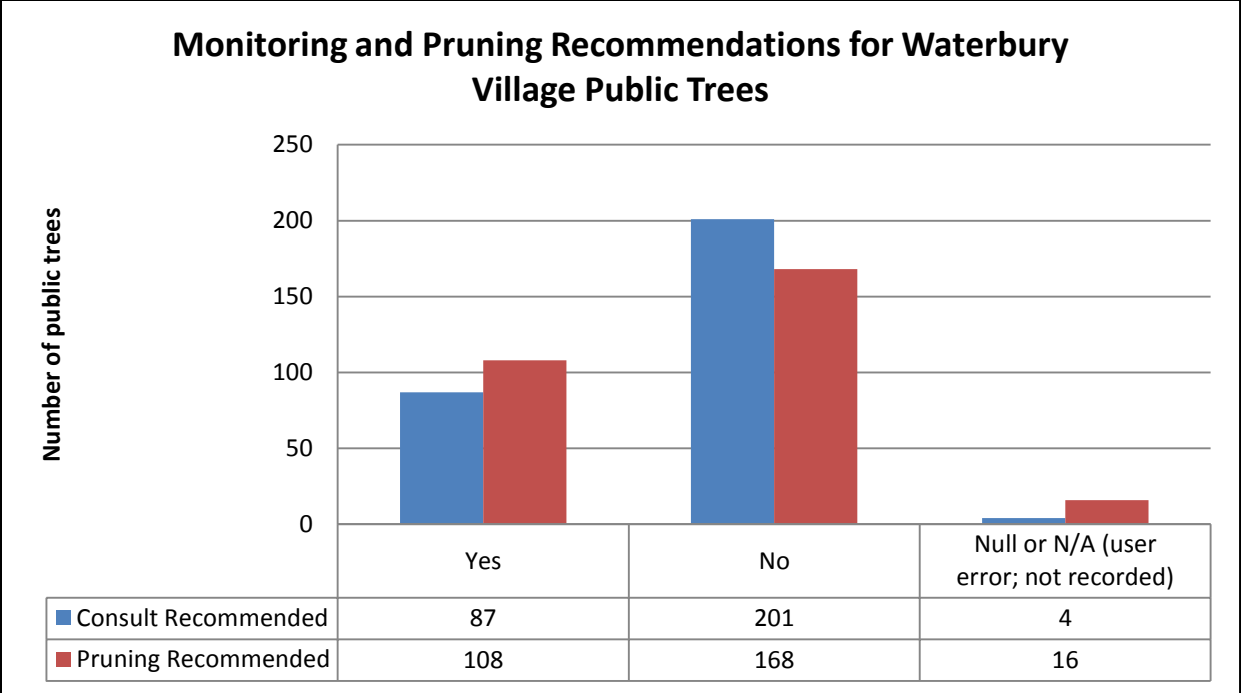|	Yes	No	Null or N/A (user error; not recorded)
■ Consult Recommended	87	201	4
■ Pruning Recommended	108	168	16

Figure 5: Maintenance needs and health indicators of Waterbury's inventoried public trees.

Recommendations

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 sustainable community tree program. Based on the results of the Waterbury public tree inventory, our priority recommendations are:

- Prioritize the timely assessment and, if needed, maintenance of the 87 trees that were identified as in need of monitoring by a Certified Arborist or the Waterbury Tree Warden.

- Specifically, assess the 108 trees that were identified as in need of pruning. Many of these trees are young and in need of structural pruning, which will establish the trees' structural integrity as they grow into mature shade trees. Ensure that whomever performs structural pruning is properly trained; to access a list of ISA Certified Arborists in the area, visit www.isa-arbor.com/findanarborist/arboristsearch.aspx

- Promote species and age diversity in Waterbury's public tree population. Planting new species and increasing the number of lesser represented species will promote long-term health and resilience of individual trees and Waterbury's overall tree population. Refer to VT UCF's Tree Selection Guide at www.vtcommunityforestry.org/resources/tree-care/tree-selection.

- 77% of Waterbury's public tree population is less than 18" in diameter. As these public trees mature, promote their health and integrity with a systematic structural pruning and maintenance cycle.

- Prepare for the arrival of EAB by developing a strategic EAB community preparedness plan. Refer to the VT UCF website's community preparedness page at http://vtcommunityforestry.org/community-planning/tree-pests for resources and guidance in the community preparedness process and considerations.

- Continue to engage citizens in Waterbury that care about trees; promote educational opportunities, such VT UCF's Stewardship of the Urban Landscape and Forest Pest First Detector trainings, and consider organizing tree maintenance opportunities for volunteers.

Conclusion

Trees in our downtowns and densely populated landscapes contribute to environmental integrity, social cohesiveness, economic activity, cultural heritage, and overall well-being. This summary report should help the leaders and citizens of Waterbury to understand, manage, and steward the village's public tree population. The recommendations outlined in this report should be considered by members of the Waterbury Tree Committee 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 possible.

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

Anyone with Internet access can view all of Waterbury'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 Waterbury 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.

   o 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.

   o 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: Full Species List

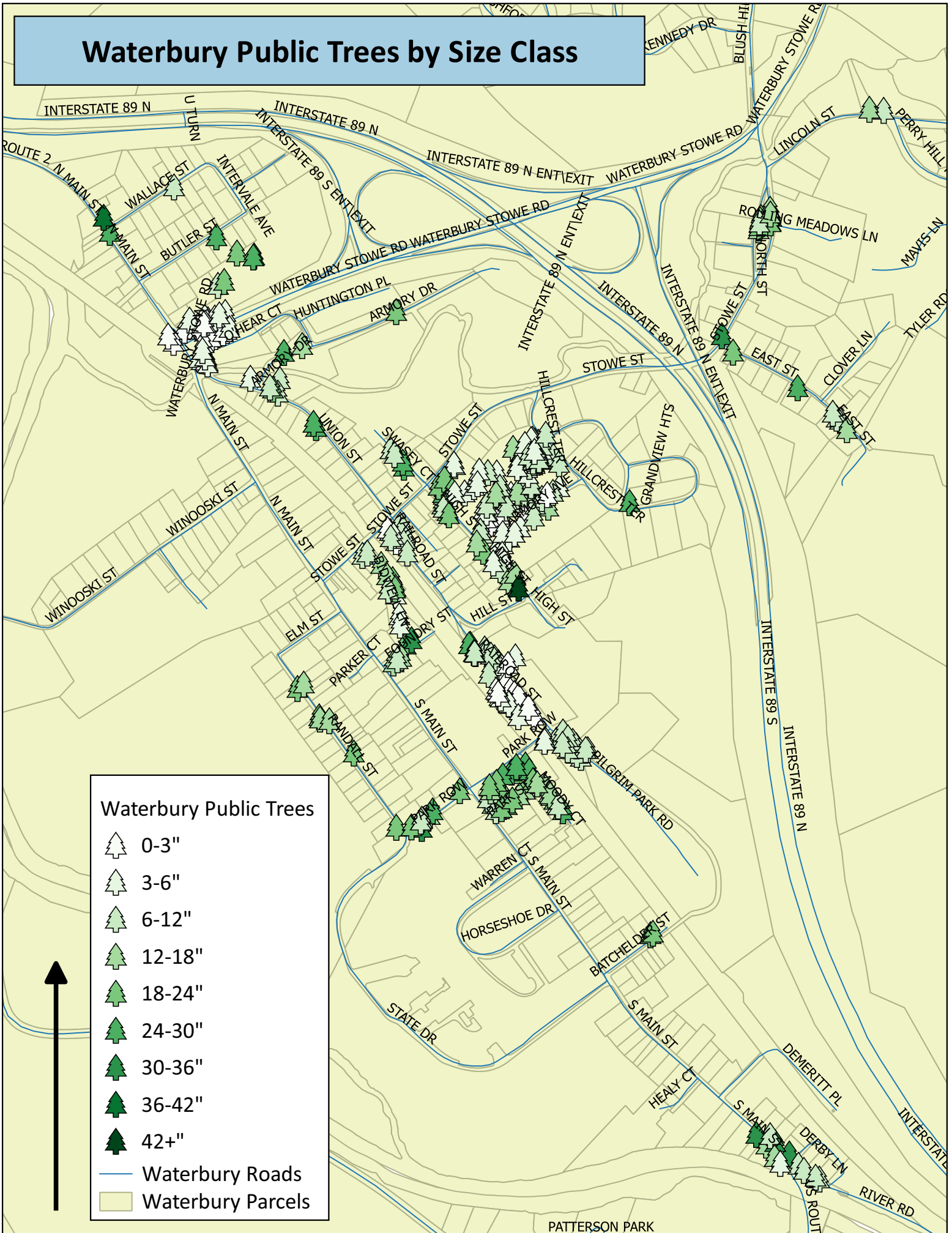| Species: Common and Scientific Name	Percent of Total Population	Number of Trees Inventoried in Waterbury
American elm (*Ulmus americana*)	4%	11
balsam fir (*Abies balsamea*)	0%	1
birch sp. (*Betula sp.*)	2%	5
black locust (*Robinia pseudoacacia*)	0%	1
boxelder (*Acer negundo*)	3%	8
broadleaf deciduous species	0%	1
Callery pear (*Pyrus calleryana*)	2%	5
chokecherry (*Prunus virginiana*)	0%	1
Colorado blue spruce (*Picea pungens*)	3%	8
crabapple (*Malus sp.*)	8%	22
eastern cottonwood (*Populus deltoides*)	2%	5
eastern white cedar (*Thuja occidentalis*)	1%	3
eastern white pine (*Pinus strobus*)	1%	3
English oak (*Quercus robur*)	1%	4
Freeman maple (*Acer freemanii*)	10%	28
gingko (*Gingko biloba*)	1%	2
green ash (*Fraxinus pennsylvanica)*	3%	10
honeylocust (*Gleditsia triacanthosl*	8%	22
horsechestnut (*Aesculus hippocastanum*)	0%	1
Japanese tree lilac (*Syringa reticulata*)	4%	13
littleleaf linden (*Tilia cordata*)	1%	2
mountain ash (*Sorbus americana*)	0%	1
northern hackberry (*Celtis occidentalis*)	0%	1
northern red oak (*Quercus rubra*)	6%	17
Norway maple (*Acer platanoides*)	18%	53
Norway spruce (*Picea abies*)	2%	5
oak species (*Quercus sp.*)	1%	2
pin oak (*Quercus palustris*)	1%	2
pine sp (*Pinus sp.*)	1%	2
red maple (*Acer rubrum*)	6%	18
serviceberry (*Amelanchier canadensis*)	0%	1
silver maple (*Acer saccharinum*)	2%	6
spruce sp. (*Picea sp.*)	1%	2
sugar maple (*Acer saccharum*)	7%	19
swamp white oak (*Quercus bicolor*)	2%	7

Appendix C: Maps

1. Waterbury public trees by condition class

2. Waterbury public trees by diameter distribution

3. All ash (*Fraxinus*) and maple (*Acer)* public trees inventoried in Waterbury Village

4. All Waterbury public trees identified to be in need of monitoring

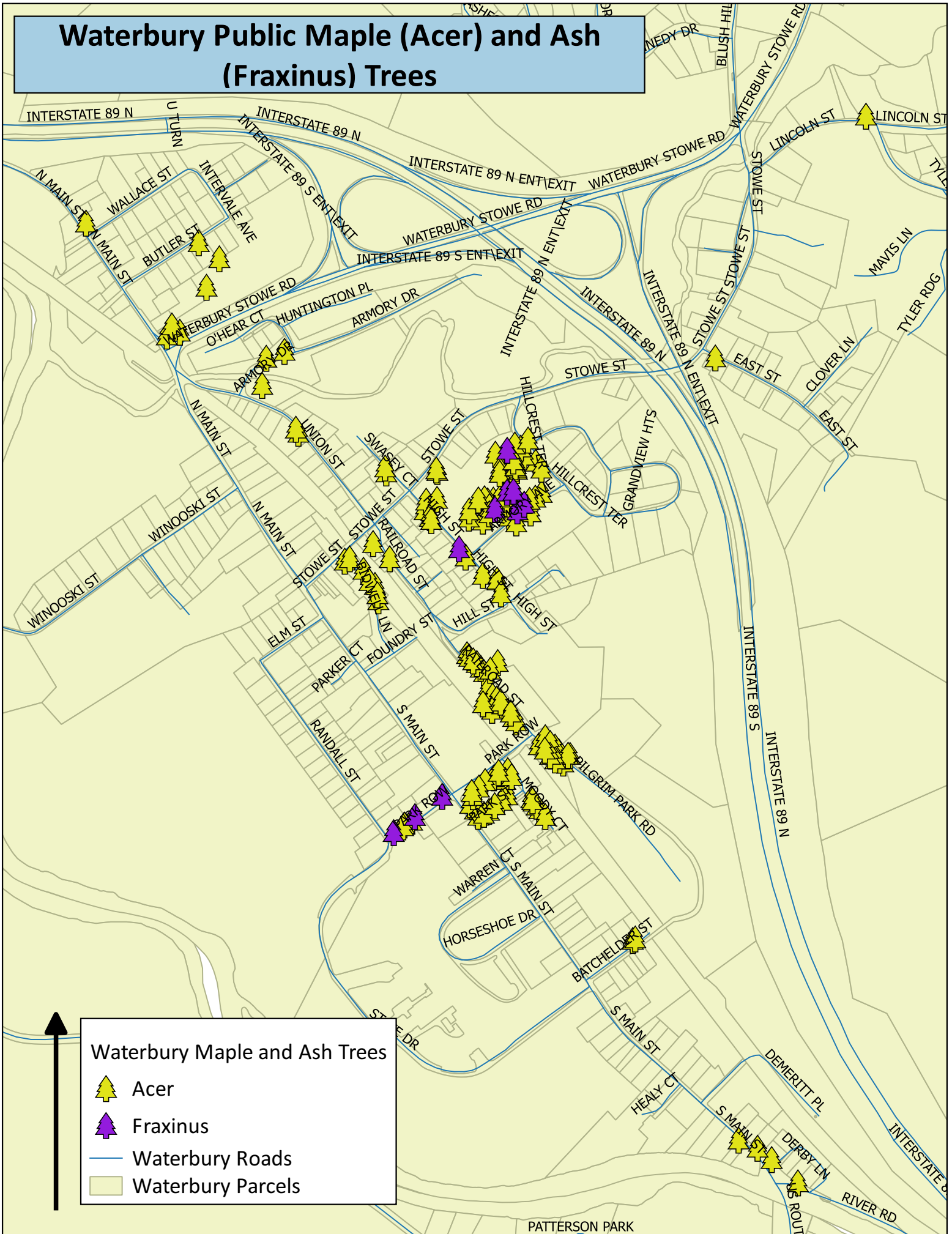5. All Waterbury public trees identified to be in need of pruning
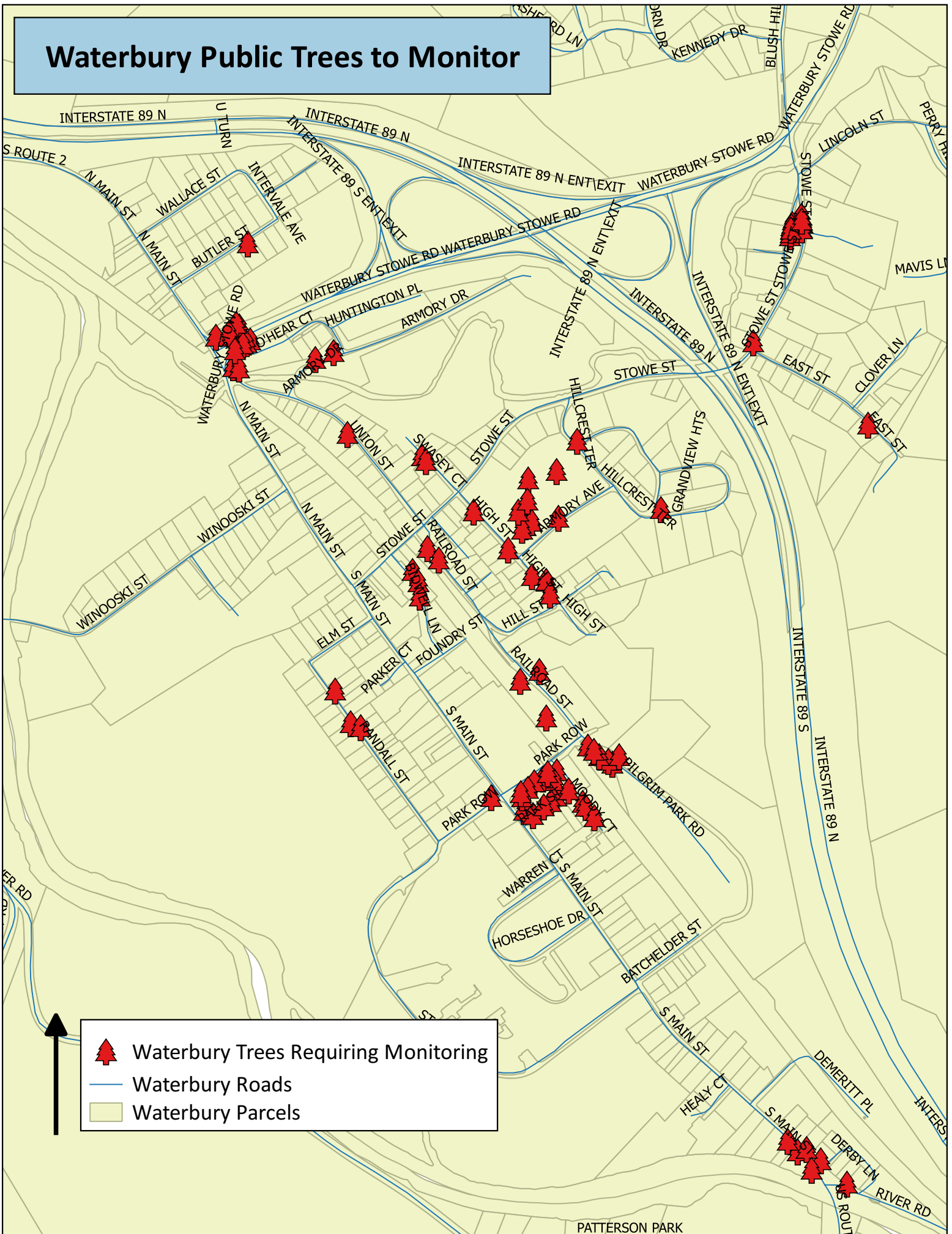
Waterbury Public Trees by Condition Class

Waterbury Public Trees

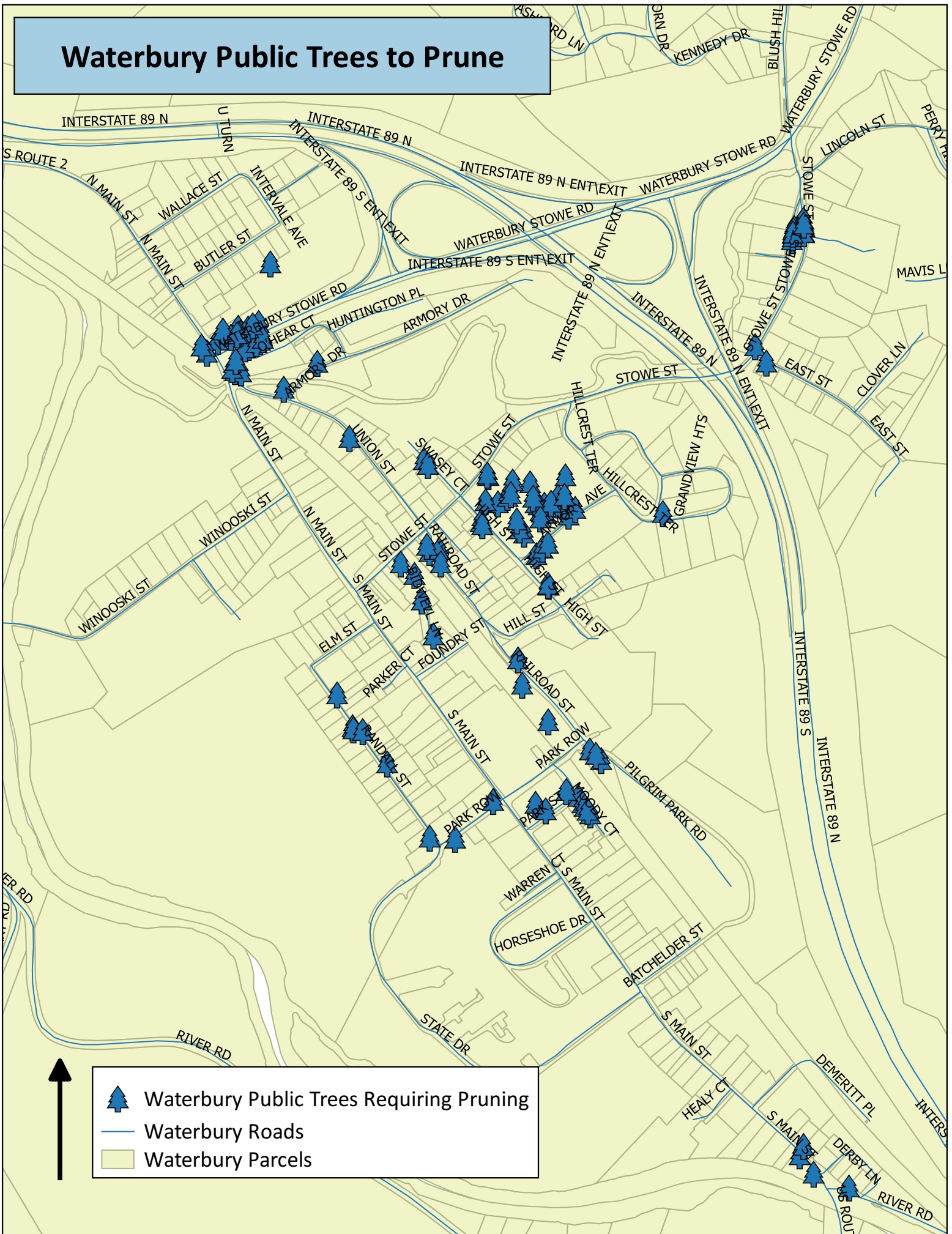- ▲ Good
- ▲ Fair
- ▲ Poor
- — Waterbury Roads
- ▢ Waterbury Parcels
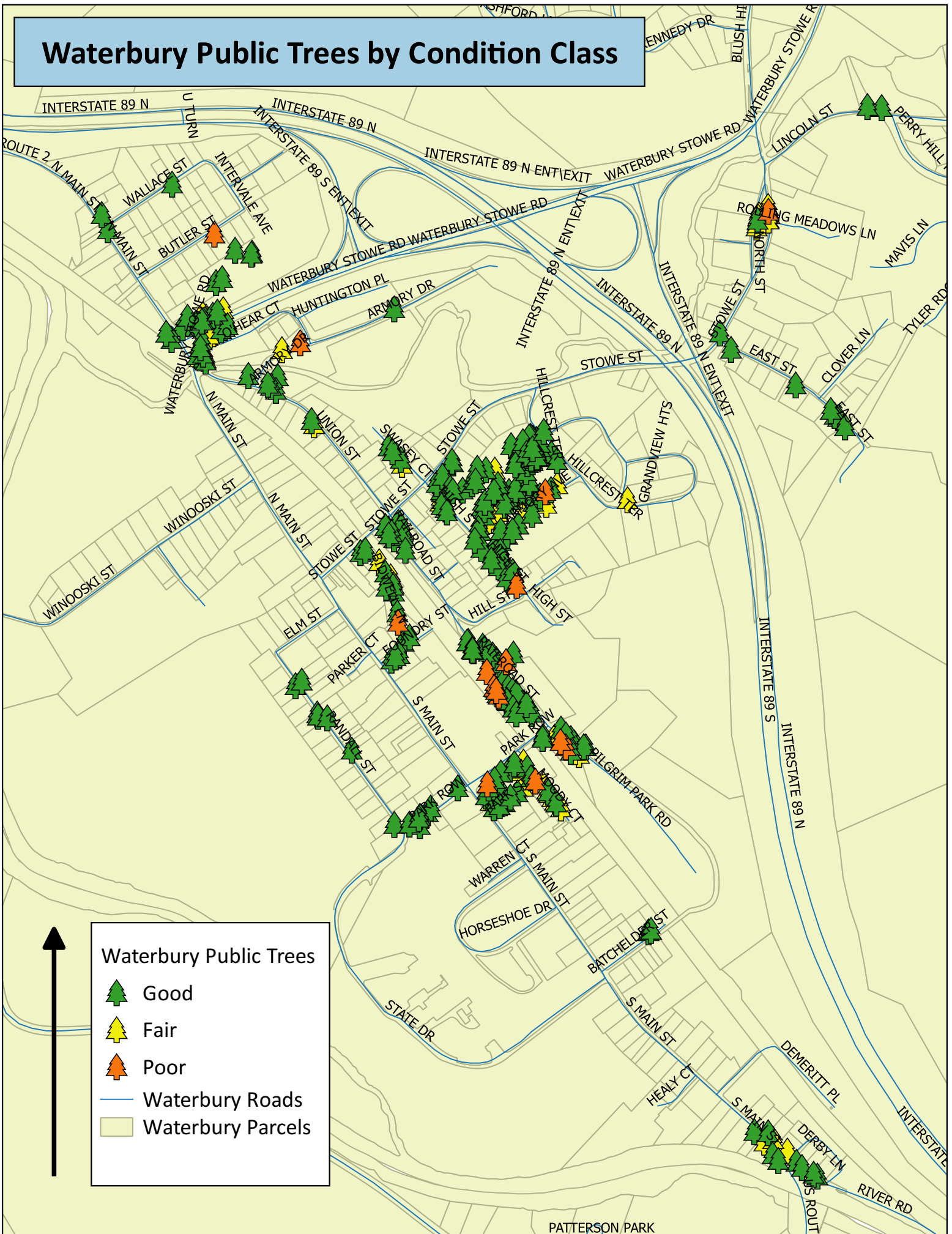
Waterbury Public Trees by Size Class

Waterbury Public Trees

- 0-3"
- 3-6"
- 6-12"
- 12-18"
- 18-24"
- 24-30"
- 30-36"
- 36-42"
- 42+"
- Waterbury Roads
- Waterbury Parcels

Waterbury Public Maple (Acer) and Ash (Fraxinus) Trees

Waterbury Maple and Ash Trees

▲ Acer

▲ Fraxinus

— Waterbury Roads

Waterbury Parcels

Waterbury Public Trees to Monitor

Waterbury Trees Requiring Monitoring
Waterbury Roads
Waterbury Parcels

Waterbury Public Trees to Prune

Legend:
- ▲ Waterbury Public Trees Requiring Pruning
- Waterbury Roads
- Waterbury Parcels