Young Tree Care Survey

2018 Report

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Compiled for: City of Palo Alto

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I. Introduction

Canopy plants and cares for trees where people need them the most. We bring the life-giving benefits of trees to the schools, neighborhoods, and public spaces of the San Francisco Mid-Peninsula.

Canopy is a nonprofit organization working to promote a healthy urban forest by educating, inspiring and engaging the community in the stewardship of young and mature trees. We created the Young Tree Care Survey to address these goals. The Young Tree Care Survey seeks to educate homeowners on the proper care of young trees, to notify the City of Palo Alto of any problems with young street trees that need to be addressed, and to engage community volunteers in the process, including some "first aid" tree care. Young publicly-owned trees are on the front line of our urban forest and must tolerate the harshest urban conditions. Once established, they provide some of the greatest benefits to our city and residents.

Noteworthy Program Improvements

- In 2015 Canopy started using Appsheet to collect and store data for the YTCS, and this year the debut of Tree Plotter made great improvements in data collection and volunteer experience.
    - We engaged more high school volunteers than any other year. The two volunteer training days that took place in June and July coincided with outreach to high school students (Nature Wellness Walks with Canopy's Education Manager), and attracted many new volunteers who learned quickly and surveyed enthusiastically.
    - We finished the survey earlier than any other year. Most trees were surveyed by the first week of August, and the detailed data analysis for the report was completed in just a couple days. Again, this is largely a result of Tree Plotter.
- The "YTCS Protocols" is a detailed document used to guide the Canopy staff and Tree Survey Intern in performing all the necessary duties of the YTCS. The document is updated every year, and has been shortened from 33 pages down to 21. This is largely thanks to Tree Plotter providing streamlined workflow that requires much less work in Microsoft Excel.
- For the first time, City staff (Peter Gollinger, Derek Sproat, and Bill Croft) joined us in the field to experience how we survey and use Tree Plotter for this program. Overall feedback was positive, with a desire to practice using Tree Plotter more.
- We are able to provide online interactive maps of the actionable data, so that City staff can quickly and easily access information about which trees need immediate care. The map URLs are available toward the end of this report.
- For the first time, Canopy is employing a Tree Survey Intern who will receive a stipend. Thanks to the Pursuit of Excellence scholarship, the intern was able to spend a sufficient amount of time on the program, and received payment for her hard work.

II. Methodology

The Canopy Young Tree Care Survey (YTCS) takes place in the summer months and surveys most publicly-owned street and park trees planted in Palo Alto in the past five planting seasons. At each site where trees are surveyed, a brochure is provided to homeowners with a review of their tree and tips on how to care for it. Survey results for all trees are compiled and shared in a detailed report to the City's Public Works Urban Forestry Section to alert staff about trees in need of care, and as a way to assess trends over the years. Results of the survey are also posted on Canopy's website, canopy.org.

This year, we began to use our new software, called Tree Plotter, to manage the city's young tree inventory. To access the map, users simply type in the web address on their mobile devices, create an account or log in using their social media account, and follow our instructions to find their route. Similar to last year, the majority of volunteers were high school students, with most routes completed by students from Palo Alto, East Palo Alto, and Mountain View. Our young volunteers were enthusiastic about using their smartphones to survey trees, and after a relatively short training session on how to use Tree Plotter, most found it very intuitive and set off surveying trees with very few complications.

This year we recruited 123 volunteers, who together logged approximately 682 hours surveying trees. YTCS is a wonderful opportunity for volunteers to get outside, and derive a meaningful experience by taking part in caring for trees in their community.

Image 1: Volunteers during a morning training session before heading off to survey trees.

Public Engagement

123 volunteers
682 hours spent surveying trees (not including Intern time)
One Tree Survey Intern, 20 hours per week for 11 weeks
348 high school students took Nature Wellness Walks and heard about the benefits of trees
691 households received “Is Your Tree Thirsty?” postcards and YTCS brochures

Overview of Main Steps

These are the main steps for executing the Young Tree Care Survey.

1. Request the City of Palo Alto TreeKeeper data: import trees planted within the last year.
2. Perform formatting and quality control checks on TreeKeeper data to prepare for smooth import into Tree Plotter.
3. Upload trees into Tree Plotter, and create survey routes for volunteers. To create the routes, 15-20 trees are grouped by location and bounded inside a polygon so that volunteers can easily see just the trees they are going to survey, and not those in other routes.
4. Prepare tip sheets for volunteers detailing how to use Tree Plotter when surveying trees.
5. In early June, mail the first round of “Is Your Tree Thirsty?” postcards to residences with a tree in the survey. The second round of postcards is mailed end of July.
6. Assemble survey instructions/materials: large map for group training days, individual route maps, brochures for each house with trees, DSH tapes, moisture probes, pens, safety vests, clipboards, and Canopy satchels.
7. Host YTCS trainings: one in June and one in July. Volunteers arrive at 9am to participate in a 40 minute training on how to use Tree Plotter and how to survey a young tree. Volunteers then form groups, and each is given a route that they can walk, bike, or drive to. Routes are completed by about 12 pm, and volunteers are given the opportunity to 2)return the materials, or b)check out routes and materials to survey more trees on their own time over the next week. Many volunteers opt to check out routes, as high schoolers will meet up after summer school classes in the afternoons to get more service hours.
8. Quality control checks are necessary with this type of program, so as routes are completed it is the Tree Survey Intern’s job to complete the routes where trees were left unsurveyed, distribute leftover brochures, and look for trees marked “not found” by volunteers.
9. Once all trees are surveyed, start writing the YTCS report for the city, and provide maps and/or lists of red flag, thirsty, and missing trees, along with maps of actionable items like trees needing stakes removed/fixed, more mulch, etc.

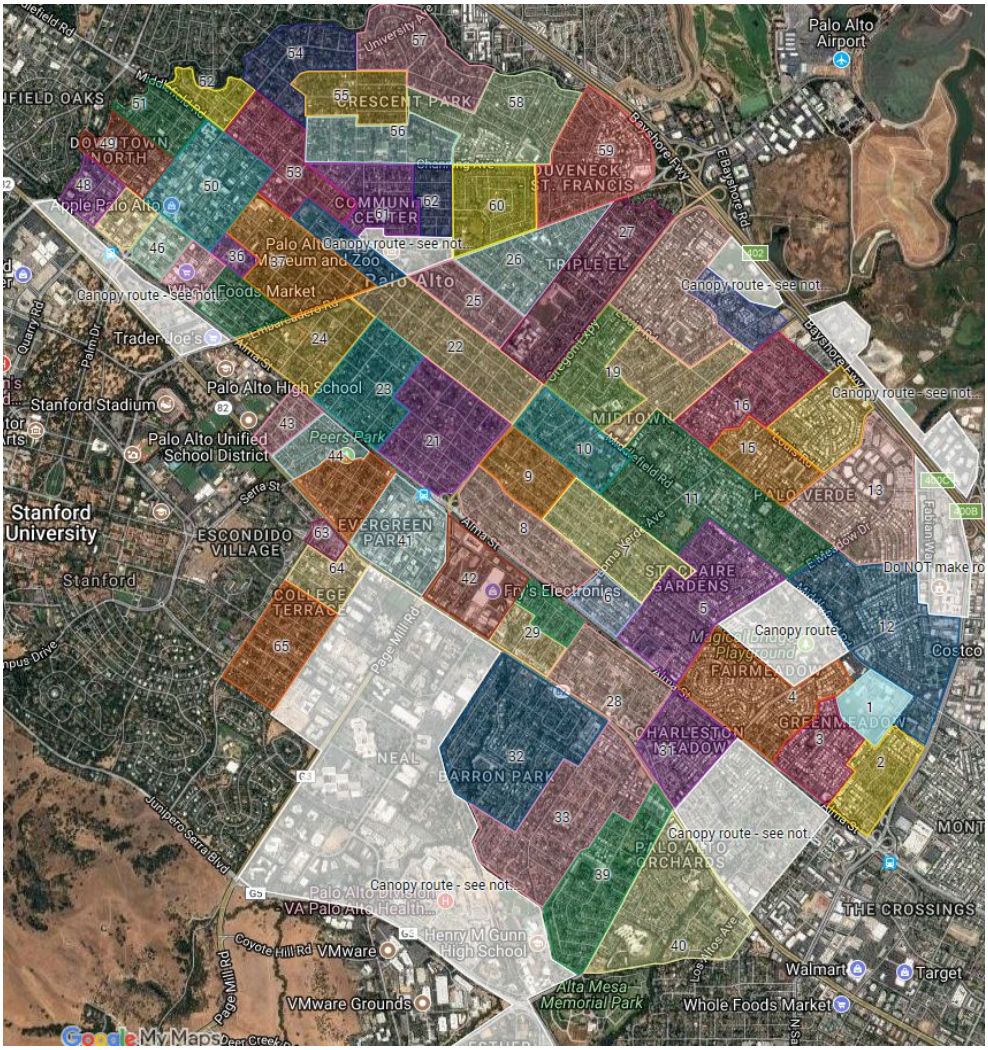

Image 2: Canopy created 65 routes for volunteers, and 8 routes for Canopy staff.

Volunteers distributed our "Young Tree Care Survey" brochure with tips on watering and protecting young trees and information about the value of the urban forest. Volunteer surveyors filled out the back of brochures with survey information related to the young trees' urgent needs, and included notes to direct resident attention to their trees. It was left at the door of each residence and additional blank brochures were handed out to residents that approached volunteers with questions about the survey, city trees, and/or Canopy.

Each survey team was equipped with a clipboard, pen, individual map of their route, smartphones logged into Tree Plotter, pre-labeled brochures for each survey address, a soil moisture probe, DSH tape, and safety vests. Volunteers were trained, grouped into teams, and assigned routes that could be completed within a 2-3 hour span. Many surveys were completed during the two scheduled survey trainings. After the trainings, many volunteers checked out survey materials and completed other routes on their own time. The 65 surveys were completed during June, July, and August 2017.

In past years more emphasis was placed on volunteers performing "first care" on young street trees, with gloves and pruners provided to allow immediate actions to be taken (Eg. removing suckers and

weeding). This year we did not provide these kinds of additional materials, because a) typically the high school volunteers are not comfortable doing these sorts of tasks, and b) the increased number of trees to be surveyed this year was already an ambitious task that we wanted to prioritize.

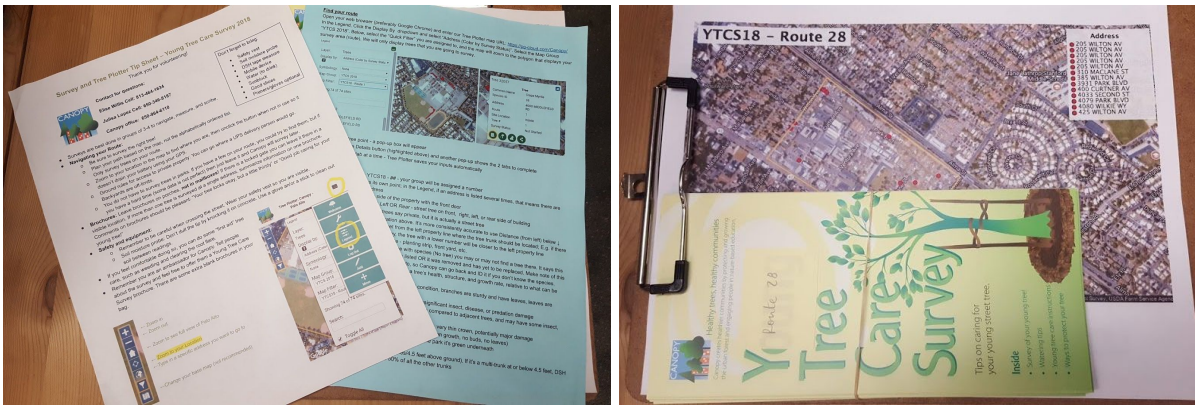

Image 3: Volunteers receive a clipboard with survey tip sheets (left), a route map and brochures (right), a DSH tape, soil moisture probe, and a Canopy satchel to keep it all together.

Image 4: Close-up of a survey route map, which displays the route name, area to survey, tree points, legend with addresses with trees, and street names to help navigate.

Our “Is Your Tree Thirsty?” campaign accompanies the survey each year to raise awareness about tree care and tree watering among the general public. Large banners reading “Is Your Tree Thirsty?” are prominently displayed at the train overpasses of University Ave and Embarcadero Rd. We also sent a watering reminder postcard to each residence where a tree had been planted in the last five years. Postcards contain information on proper watering practices and our web address for more information.

Image 5. "Is your tree thirsty" postcard mailing (front and back)

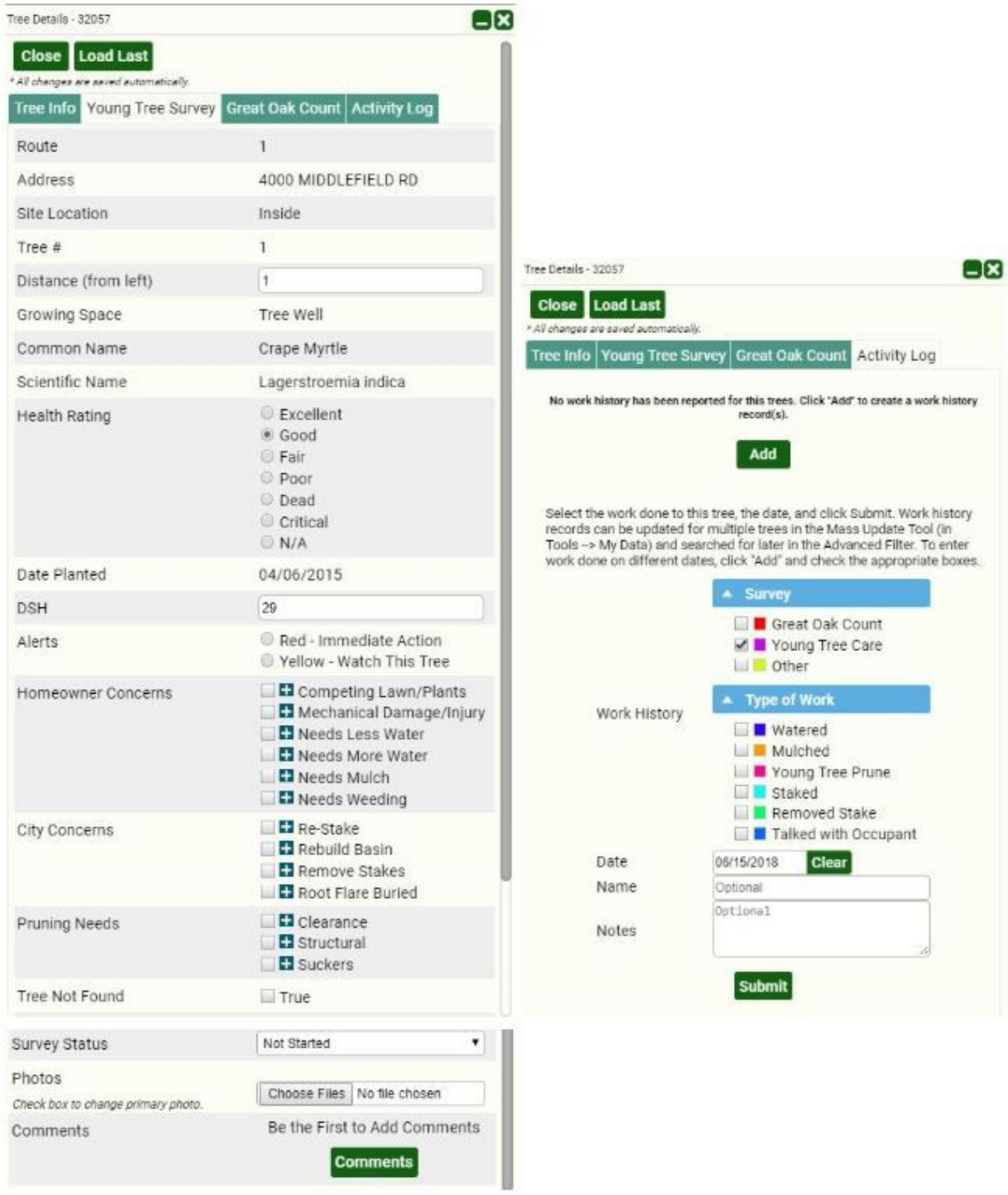

Image 6: Surveying a tree in Tree Plotter includes filling out a "Young Tree Survey" tab with survey findings (left column), and noting the actions taken in the "Activity Log" tab (right column).

Canopy Staff Routes

During the route making process, we took note of all the sites where locating specific trees would be difficult for volunteers. We decided to make routes for these locations and reserved them for the Canopy staff to do. These areas included: Rinconada Park, Bol Park, El Camino Park, Mitchell Park, and Monroe Mini Park, Town and Country Village, trees by the Baylands, trees off Page Mill Road in the commercial area, Stanford research park, by the VA, and the Esther Clark Park Neighborhood. In total, these trees accounted for 238 out of the entire Palo Alto young tree inventory. **Many of the trees in the parks are not geolocated properly, and therefore have been surveyed only in a cursory manner. More detailed review of each of these areas is presented in the Survey Results section of this report.**

Quality control was mostly conducted by Julisa Lopez, the Young Survey Intern, and her sister Natalia. As volunteers completed their routes, Julisa and Natalia checked on the majority of the routes to make sure that all trees were surveyed properly. Julisa compiled all the trees that were missed by volunteers, as well as the ones that were marked as “Tree Not Found” on Tree Plotter. It took a substantial amount of time to locate and distribute brochures for these trees, but yielded high quality data that the City will be able to trust when following up on tree care needs.

Image 7: Julisa Lopez, Canopy’s Tree Survey Intern, surveying trees alongside her sister Natalia.

III. Survey Results

The following table summarizes the results of the survey. The far left hand column lists the survey fields, and the far right hand columns list the total number of trees for which the answer was “true,” and the percentage of the total. The middle columns are the percentages from the previous five surveys for comparison.

Following the table are several graphs for easier visualization of important results. An explanation and evaluation of many of the individual items follows in the Evaluation section of this report.

General	**2013**	**2014**	**2015**	**2016**	**2017**	**2018 #**	**2018 %**
Trees Surveyed	672	556	712	948	1065	1438	-
Trees Planted in previous 5 years	960	850	920	1114	1380	1310	-
Condition Rating	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2018**
Excellent	-	20%	24%	28%	35%	327	22.7%
Good	-	45%	46%	43%	42%	902	62.7%
Fair	-	27%	16%	15%	12%	135	9.4%
Poor	-	7%	6%	6%	3%	52	3.6%
Dead	-	1%	1%	1%	1%	7	0.5%
Red Flag*	10%	6%	4%	2%	2%	19	1.3%
Tree Not Found	1%	3%	1%	2%	3%	72	5%
No Rating Recorded	-	-	-	-	2%	15	1%
Did not survey	-	-	-	-	2%	119	8.3%
Homeowner Concerns	**2013**	**2014**	**2015**	**2016**	**2017**	**2018 #**	**2018 %**
Needs water	46%	39%	51%	29%	36%	530	37%
Over-watered	-	-	2%	4%	2%	49	3.4%
Needs mulch	32%	29%	38%	31%	23%	311	21.6%
Lawn or other competing plants	16%	18%	25%	23%	20%	222	15.4%
Needs weeding	11%	-	-	-	-	202	14%
Weeded by surveyor	5%	2%	5%	4%	14%	0	0%
Mechanical damage or injury	5%	5%	10%	5%	6%	18	1.3%
City Concerns	**2013**	**2014**	**2015**	**2016**	**2017**	**2018 #**	**2018 %**
Needs basin re-building	21%	6%	21%	21%	21%	331	23%
Suckers need to be pruned	7%	5%	10%	9%	5%	104	7.2%
Suckers pruned by surveyor	9%	4%	11%	8%	14%	0	0%
Needs to be re-staked/re-strapped	9%	6%	11%	7%	8%	112	7.8%
Stakes need to be removed	24%	29%	11%	11%	16%	204	14.2%
Root flare buried	5%	9%	16%	19%	19%	182	12.7%
Root flare cleared today	5%	9%	-	-	5%	0	0%
Needs major pruning	4%	-	-	-	-	-	-
Needs structural pruning	-	14%	11%	15%	10%	134	9.3%
Needs clearance pruning	-	10%	7%	4%	5%	84	5.8%

* Calculated differently before 2014

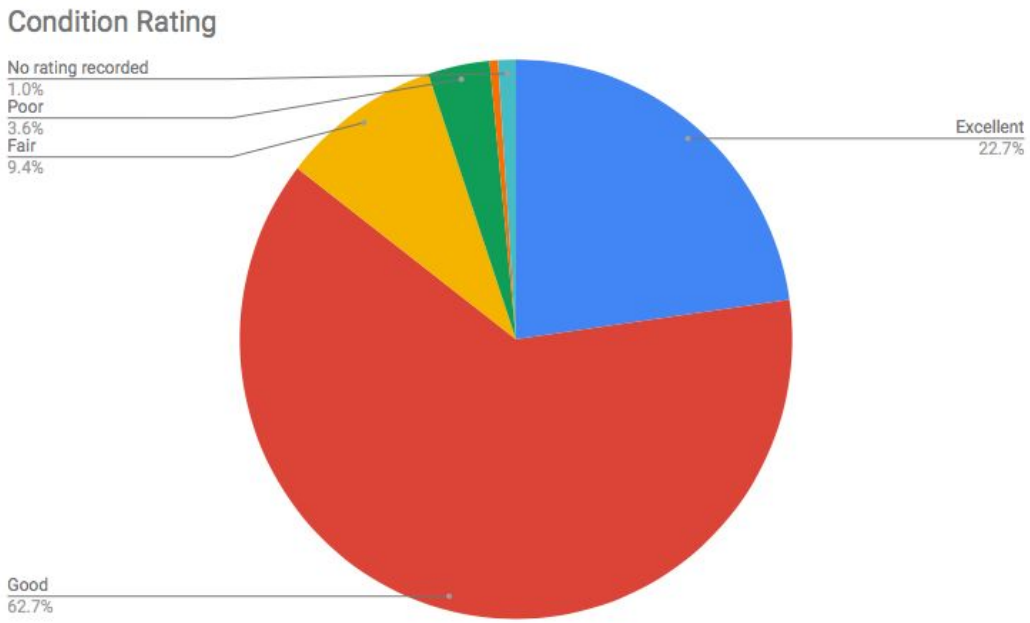

Figure 1. Condition Ratings for trees surveyed (by percent) for 2018.

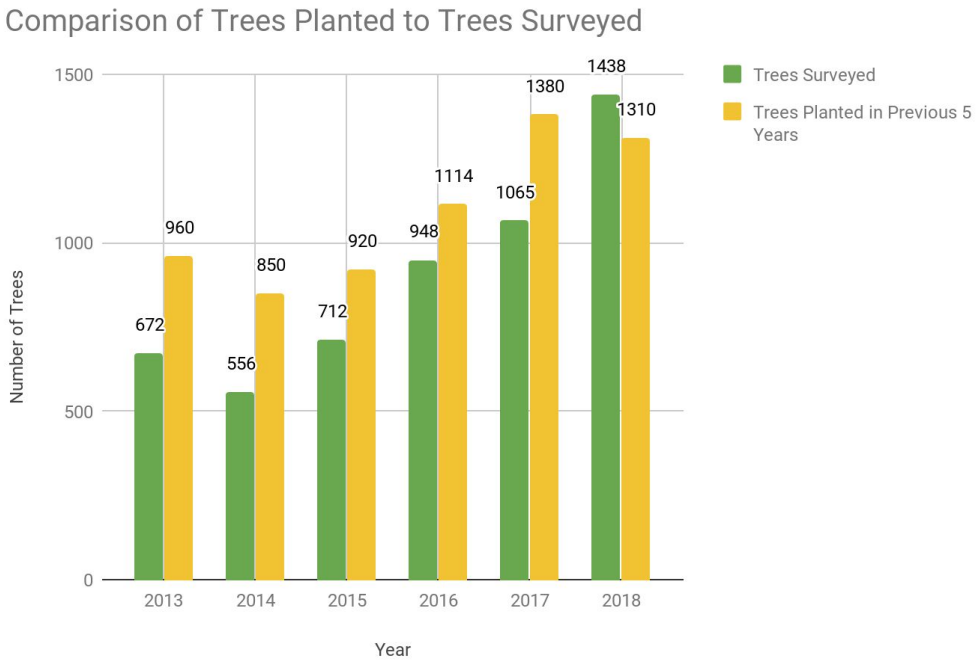

Figure 2. Chart comparing the number of trees planted in the previous 5 years to the number of trees surveyed.

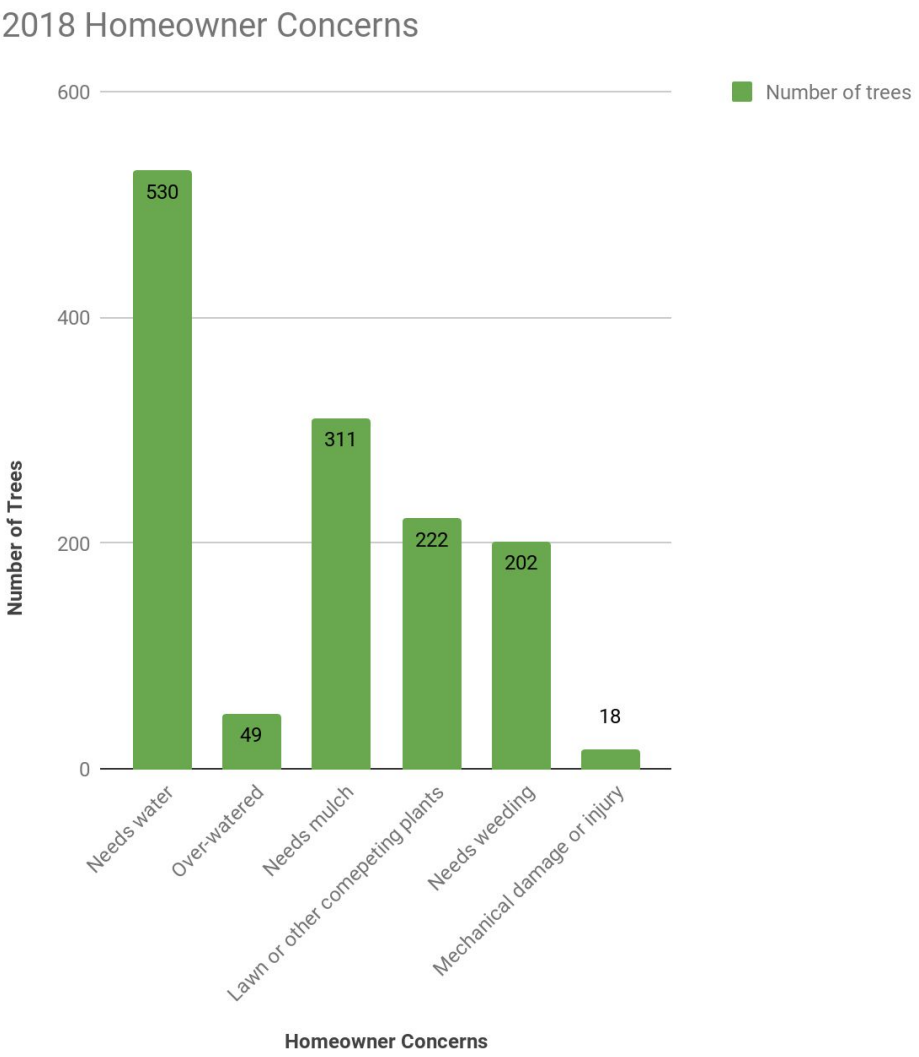

Figure 3. Number of trees with homeowner concerns recorded for 2018.

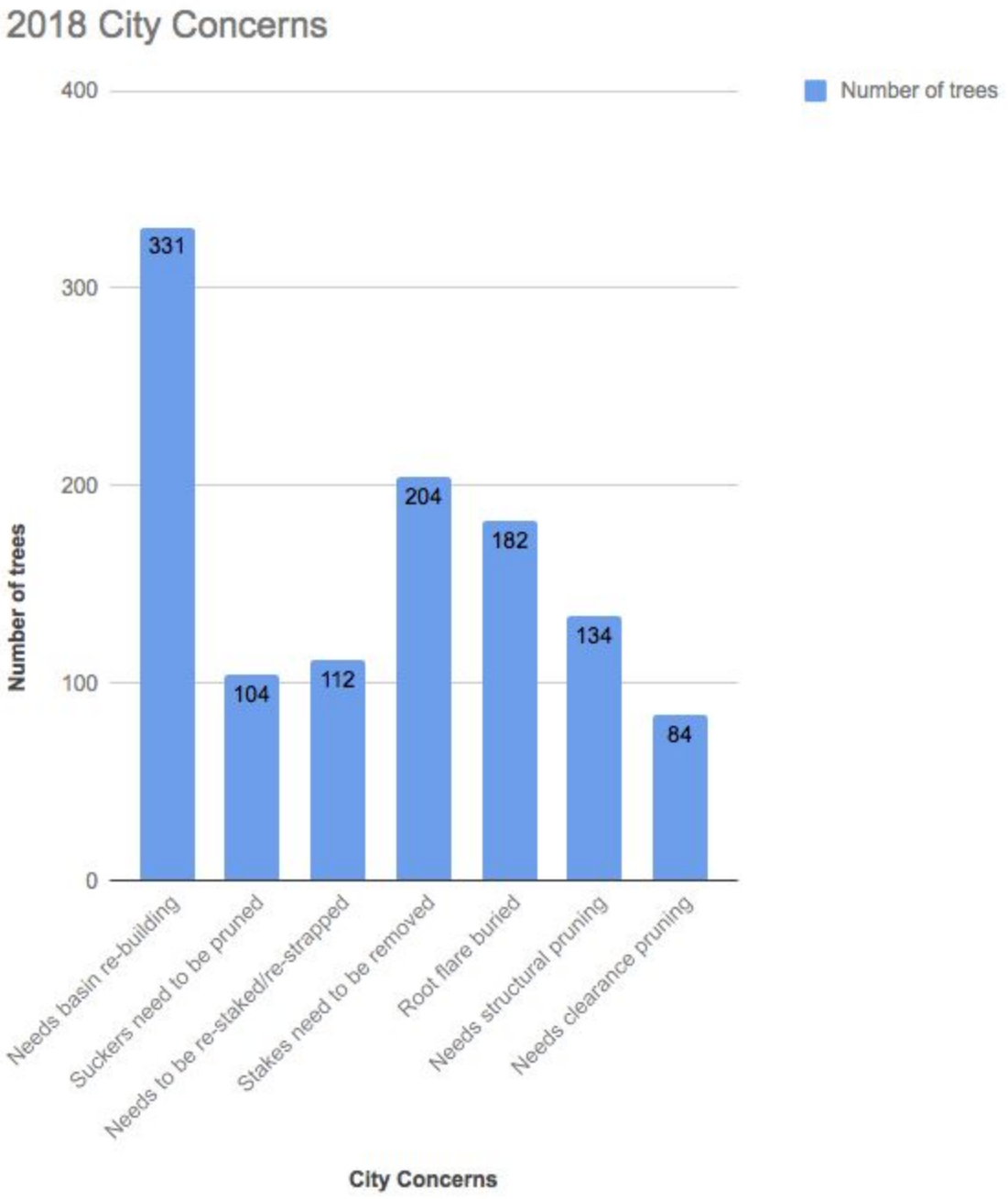

Figure 4. Number of trees with city concerns recorded for 2018.

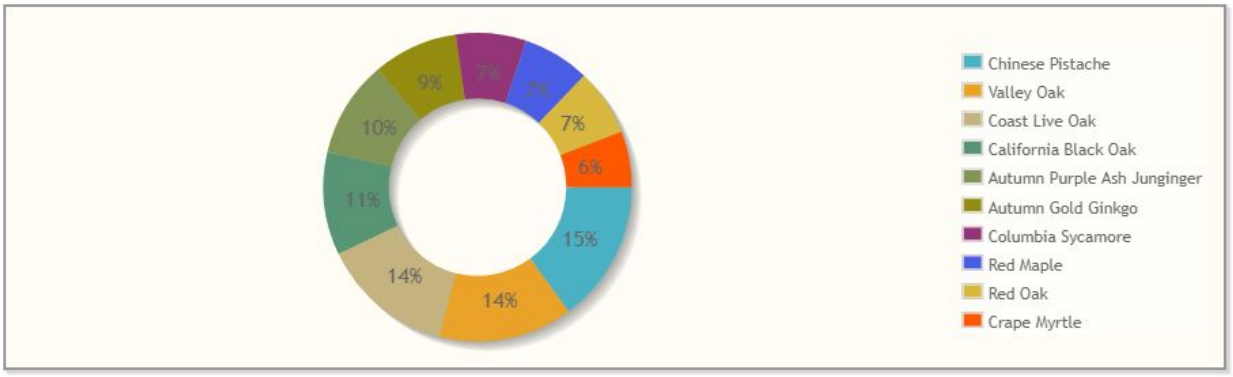

Figure 5. Percentages of the most common species in the 2018 survey.

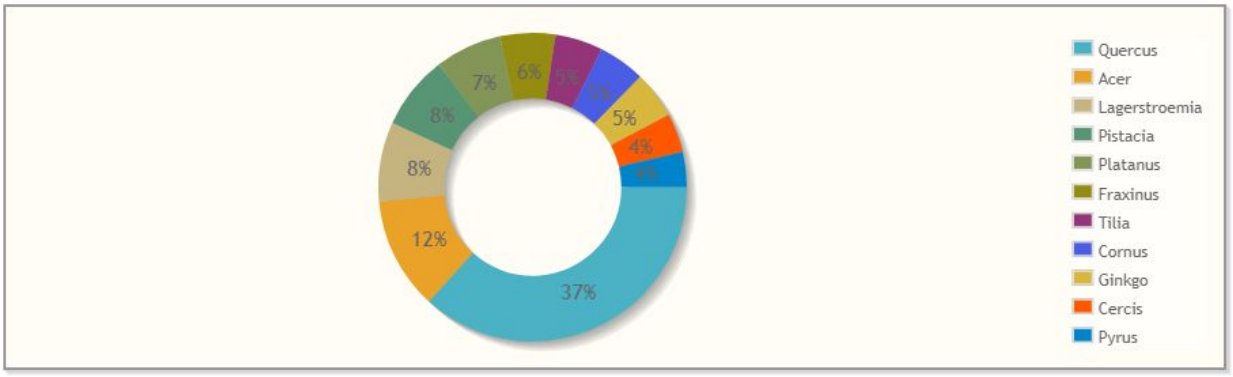

Figure 6. Percentages of the most common Genus in the 2018 survey.

Genus	Count	Percent
Quercus	411	28.6
Acer	132	9.2
Lagerstroemia	93	6.5
Pistacia	87	6.1
Platanus	78	5.4
Fraxinus	65	4.5
Tilia	56	3.9
Cornus	55	3.8
Ginkgo	55	3.8
Cercis	46	3.2
Pyrus	41	2.9

Figure 7. Tabular view of the most common Genus in the 2018 survey, with number of trees in each Genus.

Park review

As mentioned in the Methodology section, here is a more detailed summation of the park trees that were surveyed by Canopy, due to the lack of proper geolocation for many of the points:

- Rinconada Park: Several trees were geolocated properly in Rinconada, however the trees closer to the Junior Museum and Zoo were not accessible due to construction, and were therefore not surveyed.
- Lucie Stern: Many of the trees were inaccessible at the time of the survey, because there was sidewalk construction in progress in the front of the building. Many trees appeared to be in good condition, but definitely need mulch applied around the base of the trees. Long-term, this area with predominantly native oaks and buckeyes should be converted from irrigated turf to a low water use groundcover.
- Bol Park: Most of the trees located in Bol Park and along the Bol Bike Path were not surveyed individually, as their physical locations did not align with those in Tree Plotter. Instead, we walked the path and found several young trees that appear green and healthy. Over the last year some concerns were raised by the public about lack of irrigation, but since then that has been fixed and new native oak installments along the path closer to the back of the VA look to be mostly alive. Unfortunately, the section of the path closer to the park where Canopy volunteers planted trees 2 years ago seems to be largely dead. Finally, the City data indicated that a stretch of pathway closest to the Stanford Research Park should be lined with dogwoods, but upon walking this area we saw sparsely planted rows of what appeared to be buckeyes.
- El Camino Park: There are many new trees in the park and parking lot that were not provided by the city in the data acquisition at the beginning of the summer, so with a cursory look we noted that many of the trees appear to be in good or excellent condition.
- Mitchell Park: Most trees were found, but some geolocations and species designations in the data were incorrect. Several trees near the Magical Bridge, on the park side of the bridge, look small and in need of a little attention (mulch, water).
- Monroe Mini Park: The geolocation of these points was a bit off on Tree Plotter, however identifying the trees was relatively easy. All the trees were in good condition, but there are quite a few that need their stakes removed.
- Other non-park trees to note:
    - Trees by the Baylands: We were not able to access the trees around the Animal Services building, so the City staff will need to inspect these.
    - Page Mill Road south of El Camino Real: Some trees along Page Mill Rd looked small enough to potentially be included in the survey, but were not in the data that was uploaded to Tree Plotter. Therefore, if was difficult to know exactly which trees were meant to be surveyed. In general, several of the trees we saw looked very short and probably in need of water.
    - VA: There is still construction going on at the VA, but many of the street trees looked to be in good condition.

IV. Evaluation and Discussion

We surveyed a total of 1,438 trees this year. This number has risen steadily for the last few years, and this year's increase of 373 trees is an indicator that tree planting is continuing to increase and our data quality is continuing to improve.

It should be noted that not every street tree planted in the last 5 years is included in the survey. There are 1,557 public trees in Tree Plotter that were planted from July 1, 2013 to May 30, 2018 (the time range for this survey). The 119 trees not surveyed, were predominantly the trees located along the street and in medians along San Antonio Rd near highway 101, and near the golf course around Geng Rd. Many of the San Antonio CIP trees do appear to be doing well, but the City needs to inspect these if a more thorough review is needed.

Snapshot of the Data

Number of trees surveyed: 1,438
Most common condition rating: Good
Number of dead trees: 7
Number of Red Flag trees (need immediate attention): 19
Number of trees that need stakes removed or fixed: 204

Most common Homeowner Concern: Needs water (34%)
Most common City Concern: Basin needs rebuilding (22%)
Trees with competing lawn/plants/need weeding (27%)

The **"Trees planted in the previous 5 years"** line in the table, and in Figure 2, shows that tree planting numbers decreased slightly, from 1,380 in 2017 to 1,310 planted this last year. However, through the South Palo Alto Tree Initiative and goal of a 98% street tree occupancy rate, Canopy and the City's Urban Forestry Division have continued to increase tree planting numbers, and more trees planted means more trees we are able to survey. Figure 2 also shows that number of trees surveyed has increased steadily over the last few years, and Canopy volunteers surveyed more trees this year, 373 more than 2017.

Figures 5, 6, and 7 provide the species composition of the trees surveyed, with native oaks taking a compelling lead over other non-native species which are more typical plantings for the cities in Silicon Valley. With this kind of young tree population, Palo Alto is taking a noteworthy step towards re-oaking and investing in a future with street trees that are long-lived, drought tolerant, compatible with other native plants and wildlife, and contribute to the historic character of Palo Alto.

"Condition Rating" is evaluated for each tree on the scale "Excellent, Good, Fair, Poor, Dead," the way the City does. Although these ratings are subjective and will vary based on the tree knowledge of the volunteer and the trainer, clear written definitions of each value are distributed and reviewed at each survey training. The trees receiving a rating of "Excellent" dropped from a 35% in 2017 to 22.7% this year. This decrease could be related to the fact that we told volunteers to use their best judgement when rating the health of the trees they surveyed, and we believe sometimes they link "Excellent" to "Perfect", which of course there are no perfect trees. The decrease in "Excellent" ratings is offset by the increase in "Good" ratings, with a result of 62.7% this year compared to 42% in 2017. Good ratings are also bound to be more common than Excellent, because most volunteers who were new to surveying would rather opt for a reasonable estimate of "Good" condition. The rest of the condition ratings decreased compared with previous years; the "Fair" rating dropped from 12% in 2017 to 9.4% in 2018, "Poor" increased from 3% in 2017 to 3.6% in 2018, and finally "Dead" trees dropped from 1% in 2017 to 0.5% in 2018. It should also be noted that there were trees that were marked as "No Rating Recorded" because these trees were not found by volunteers.

"Red Flag" was added as a category in 2012 and was adjusted in 2014 to give the surveyors—instead of the survey administrator—the discretion to mark a tree as "Red Flag." 19 trees (1.3%) were labeled as "Red Flag" by surveyors, the lowest number of trees we have had in the past five years. We ask surveyors to use this label sparingly so the trees most in need of care can be identified and given care. In past years a partial list of Red Flag and "Thirsty" trees was sent to the City staff mid summer, but this year we decided to wait until end of summer in order to send all the data at once. Next year we intend to send at least the Red Flag list earlier, so that immediate action can be taken.

"Needs Water" increased from 36% in 2017 to 37% in 2018. Last year's winter rains were better than previous drought years, which we hoped would help the young trees. However, many trees still showed signs of needing water, which could be due to residents' lack of watering and the cumulative effects of the ongoing drought. Residents and business owners often don't realize that the City counts on them to water street trees adjacent to their residence, so the postcard mailing and brochures continue to make a difference by bringing much-needed awareness to tree stewardship.

For the fourth year, we collected data for trees that are overwatered. Overwatered trees increased from to 2% in 2017 to 3.4% this year. This metric can be difficult to measure, because a tree that has just been watered may appear overwatered even if it is then allowed to dry out between waterings. Even so, this is a fairly low percentage and is less of a concern compared to the trees needing more water.

"Needs Mulch" has declined each year since 2015, down from 23% in 2017 to 21.6% in 2018. Using mulch effectively is one of the best ways to conserve water in the landscape and has many other benefits for the tree. We recommend that the City continue to provide free mulch pick up in the summer. Residents should be able to replenish mulch on the street trees adjacent to their homes as well as on their own trees, yet there is no formal program to help people to do so. It might be worthwhile to amend next year's brochures to include the list of the locations where residents can access free mulch.

Trees marked as having significant "Mechanical Damage or Injury" was at 1.3% this year, a major decrease compared to previous years. This year, we emphasized how easy it is to mistake small injuries or natural trunk scars with the large wounds that this field is supposed to account for, this could explain the dramatic drop in numbers in the "Mechanical Damage or Injury" field on surveyed trees this year.

“Root Flare Buried” decreased from 19% in 2017 to 12.7% this year. This decrease is pretty good news, but ultimately is still way too high. We might need to modify the volunteer training for this item, but this number is high enough that we recommend checking on a sample of these trees to make sure they were not planted too low.

Trees needing structural pruning decreased slightly from 10% in 2017 to 9.3% in 2018. Trees needing clearance pruning stayed about the same as last year, at 5.8% this year. Young trees in the city are in need of both structural and clearance pruning, and addressing this need can significantly reduce the need for much more costly tree work later in the tree’s life. Volunteers are given clear instructions on how to identify trees in need of structural and clearance pruning. Canopy believes all young trees should be assessed by a certified arborist and structurally pruned as needed at least 3 times during the first 5 years after planting and we advise the City to adjust their pruning schedule for young trees accordingly.

Limitations

Several trees planted in medians and locations not accessible to our volunteers were not surveyed. Several tree locations downloaded from TreeKeeper had inaccurate xy coordinates, therefore 72 trees were “Not Found” and there were 119 not surveyed. The trees that were “Not Found” could still be alive where planted, but were not surveyed due to poor GPS locations and unreasonable surveying sites (Eg. construction zones).

The amount of “Not Found” trees is the highest number in the past five years. This could be explained by the high number of vacant and construction sites located all around the city. In many occasions, these trees were located inside the gated construction areas, where it was very difficult to spot them. In a large number of construction areas, trees were previously removed and were uploaded into Tree Plotter from the TreeKeeper inventory as Vacant or Proposed sites that have yet to be planted. Additionally, this higher number could be related to the fact that we attempted to survey more trees overall, and closing the gap between trees planted and trees surveyed could lead to un-located trees.

V. Action Items

Canopy has created individual interactive maps to view the tree data collected during the survey, which we recommend you review and consider taking actions to resolve. Click the words underlined/blue to view a saved map. When the map opens you will be able to see the tree points, but in order to interact with each tree you need to Log In.

Note: The base map can be changed by going Tools>In the Map>Map>Base Tiles, and changing to Google Hybrid map to some other preferred map (we experienced that when you zoom all the way in the chosen base map, Google Roads, is does not show much imagery the way that Google Hybrid does).

- Red flag trees needing immediate attention
- Condition ratings: In the Legend, click the checkbox on the left of the condition ratings to turn the points on and off. To easily view **Dead** trees that need to be removed and replaced, make sure all the boxes are unchecked except for the one next to Dead.
- Trees needing stake removal or fix (re-strap, re-position, etc)
- Thirsty trees: Surveyors noted that 530 trees need more water. This map displays the tree points by land use, and as you can see, some trees in parks and commercial areas are thirsty, but many are spread throughout the residential areas.
- All the trees that need some kind of pruning: Map displays by DBH (DSH), and you can toggle the size on and off to see larger or smaller DSH ranges. With this display, you might want to prioritize the trees with larger DSH range in case pruning needs are greater. Conversely, you could prioritize pruning for trees in the smaller DSH range category in order to tackle issues and establish good structure early. Below we have also included separate maps for individual pruning:
    - Structural pruning needs
    - Clearance pruning needs
    - Need suckers pruned

BONUS: Spa Day Map

Here is a map of trees that need a spa day. In order to maximize City staff time, performing young tree care, it could be helpful to create a workflow in which staff visit trees with the intent to provide water, mulch, weeding, stake removal, unbury root flare, rebuild watering basin, and pruning. Contact us if you need assistance using the map to modify any of these fields (Eg. you just want to focus on giving a spa day to trees needing pruning and mulch, but not the other items).

VI. Conclusion

Canopy's annual Young Tree Care Survey engages the community in caring for Palo Alto's young trees in a way no other program manages to do. It is vital that the City of Palo Alto and Canopy continue to prioritize this program, in order to ensure young tree survival into the future and bring increased awareness to our trees. The Young Tree Care Survey helps our urban forest managers understand the state of our recently planted public trees, and pinpoints what actions need to be taken to care for each tree that needs it. By harnessing the power of volunteers, the City of Palo Alto avoids paying staff and contractors for hundreds of hours that volunteers choose to spend checking on trees throughout the City. And by the end of the long and dry summer, previously ignored trees get the water and care they need from homeowners and City staff, who now know exactly what to do to help our urban forest thrive.

Annual Ecosystem Benefits of young trees surveyed

- Stormwater Monetary Benefit: $2,330
- Water Runoff Prevention: 582,581 gallons
- Energy Savings: $7,194
- Energy Saved: 54,373 kWh
- Natural Gas Savings: $1,002
- Air Quality Monetary Benefit: $3,087
- Pollutants Removed: 306 lb
- Carbon Monetary Benefit: $1,103
- Carbon Sequestered: 132,477 lb
- Carbon Stored: 147,047 lb
- Carbon Avoided: 45,609 lb

Total Monetary Benefit: $70,260

If you have any questions, or recommendations on how the survey can be improved, please send an email to Canopy Program Director Michael Hawkins, michael@canopy.org or Community Forestry Program Manager Elise Willis, elise@canopy.org.