Planting Trees, Growing Community

Tree Davis: Bicycle Tree Monitoring Report 2014-2015

By Irona Lee

Introduction:

The following document provides a detailed description of the Bicycle Tree Monitoring efforts carried out for the 2014-2015 year by Tree Davis. Tree Davis hired an intern to conduct the monitoring and to compile the data. The internship position was made possible by a grant from the Pacific Gas & Electric Company, which was awarded for the purpose of identifying and analyzing the overall status of the trees planted by the Tree Davis organization. This report identifies how the monitoring was conducted, provides an overview of the results of the monitoring, and outlines a final recommendation for the care of the monitored trees going forward.

Monitoring Process:

The city of Davis, California is highly acclaimed as one of the most bicycle-friendly cities. Tree Davis took advantage of the city's well-developed network of bicycle lanes and monitored trees by bicycle, a sustainable mode of transportation. The monitoring intern was given a LG G Pad 8.3 LTE, which had Internet data and a tree-measuring app installed on the device. The intern accessed the Tree Davis Salesforce account and then used the Tree App to locate each tree on the map, which were primarily grouped by neighborhoods. Each tree has a green tree logo, which the intern would click and the tree's information would pop up (Figure 1). The intern would click "New Monitoring Visit" and fill out a list of various criteria that provided a comprehensive understanding of the health of the tree (Figure 2). Once the information has been added and saved, the green logo turns blue to indicate that the tree

Figure 1

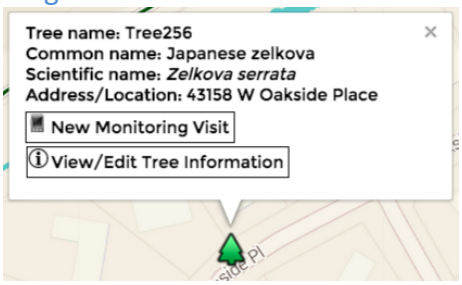
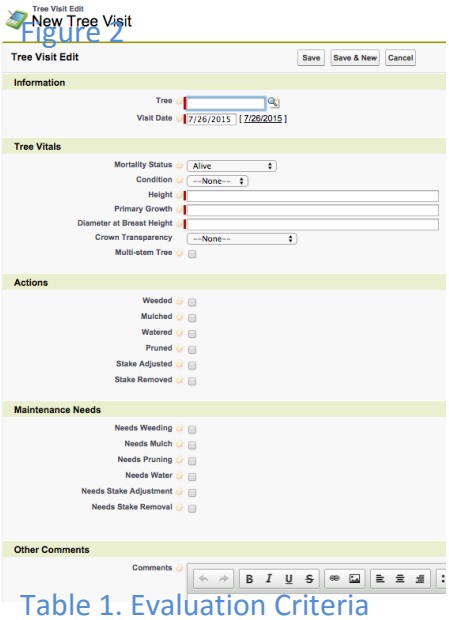


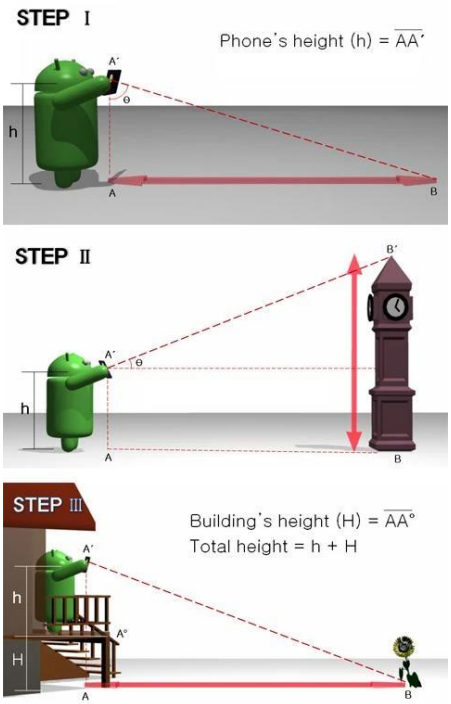
Figure 2



has been monitored. The intern also has the option to View/Edit Tree Information. The following table provides an overview of the criteria used and the evaluation standard applied to each category.

Table 1. Evaluation Criteria

Criteria Evaluated	Evaluation Standard
Tree	**Each tree was assigned a group name and number (ex. Tree256)**
Visit Date	
Actions	**Actions performed on visit:** - **Weeded** - **Mulched** - **Watered** - **Pruned** - **Stake Adjusted** - **Stake Removed**
Mortality Status	• **Alive** • **Standing dead** • **Removed/Missing** • **Unknown**
Condition	Trees were assigned a label based on one of the following categories: • *Missing* • *Dead* • *Poor* – Tree should be replaced or may survive but needs attention soon. Issues could include: girdled roots; sucker growth; shallow planting; root and trunk damage; more than a 20% bend in the trunk; split bark/bark injury; water sprouts; double leader; branching too close; and weak, crossing or dead branches.

	• *Good* – The tree is healthy but has a few issues that need attention. Issues could include: injury to the trunk that has created decay, evident root flair, scarred bark, less than a 20% bend that could be corrected with staking, needs slight pruning, a few dead branches but overall good coverage and structure. • *Excellent* – Tree needs no work at this time.
Primary Growth (inches)	Measured with tape measurer
Height (Measured in feet but converted to inches)	The height of each tree was determined using the Smart Measure app - Allows you to measure the approximate distance and height of an object. - Step 1. You can measure the distance from you to an object by aiming at the bottom (on the ground) of it. - Step 2. The height of an object can be measured with the measured distance (at Step 1).  Proved to be most accurate, showing up to two decimal points. Other attempted methods:

	Hypsometer - Did not use due to inconsistency and inaccuracy of results. Too many uncontrollable factors played into the measurement of the tree height such as the amount of sunlight, distance from the tree, and ground visibility. Pencil Test - The pencil test uses a certain known height on the tree (usually the height of the stake) to measure the tree's overall height. The process is as follows: 1. A pencil is held at eye level in front of the tree at a distance where the pencil is the same height as the determined spot. 2. The pencil is then stacked one pencil length at a time until it reaches the top of the tree. 3. Finally, the pencil heights are added together to determine the tree's overall height. <u>Pencil Test Illustration and Example:</u>  - The pencil test was not used due to the time inefficiency and the lack of precision compared to the Smart Measure App.
Diameter at Breast Height (inches)	Measured with tape measurer
Needs Weeding	This category was evaluated by making a visual inspection of the tree's base. The base should be free from all weeds, including grass.

Needs Pruning	Pruning needs were determined by identifying any dead or dying branches, closely spaced branches of a similar diameter, crossing or rubbing branches, water sprouts, or branches that are growing perpendicular to one another.
Needs Mulch	Trees were recorded as needing additional mulch if the existing mulch levels were not at least 2in deep.

If there were any apparent urgent needs, the intern would take necessary steps to address them. A hand pruner and pruning saw was also provided in the beginning of the internship.

A new method that was implemented this year for the tree monitoring process was the use of Salesforce dashboards. These dashboards held charts and graphs of various data including the number of trees monitored by fiscal year, needs of trees by neighborhood, and the tree monitoring pace, as shown below.

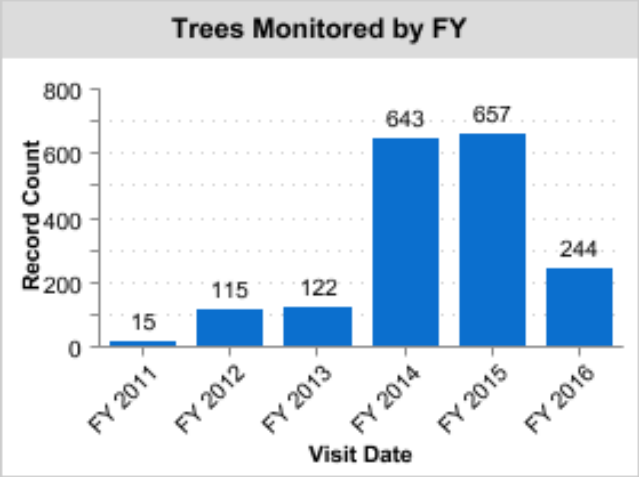


Figure 3. Trees Monitored by Fiscal Year
This chart kept track of how many trees were monitored per fiscal year, which helped the intern to compare their pace with previous years' pace, which might be correlated to method changes.

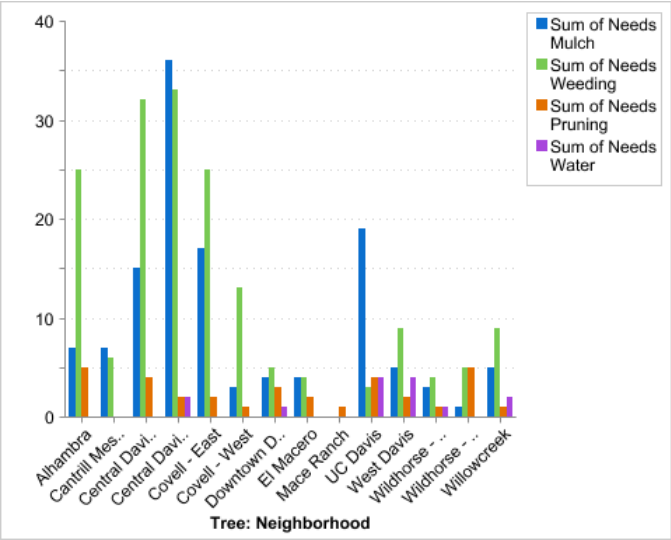


Figure 4. Tree Needs by Neighborhood

This chart kept track of which needs seemed to be prevalent in each neighborhood relative to other needs (mulch, weeding, pruning, water). This chart helped determine 1. Which needs seemed to be most neglected overall (in this case, mulching and weeding), 2. Which neighborhoods need primary attention or management. This chart can be referred to when deciding where to hold tree care events.

Figure 5. Monitoring Pace

This chart kept track of how well the intern was meeting the standard goal for tree monitoring on a weekly, bi-weekly, and monthly basis.

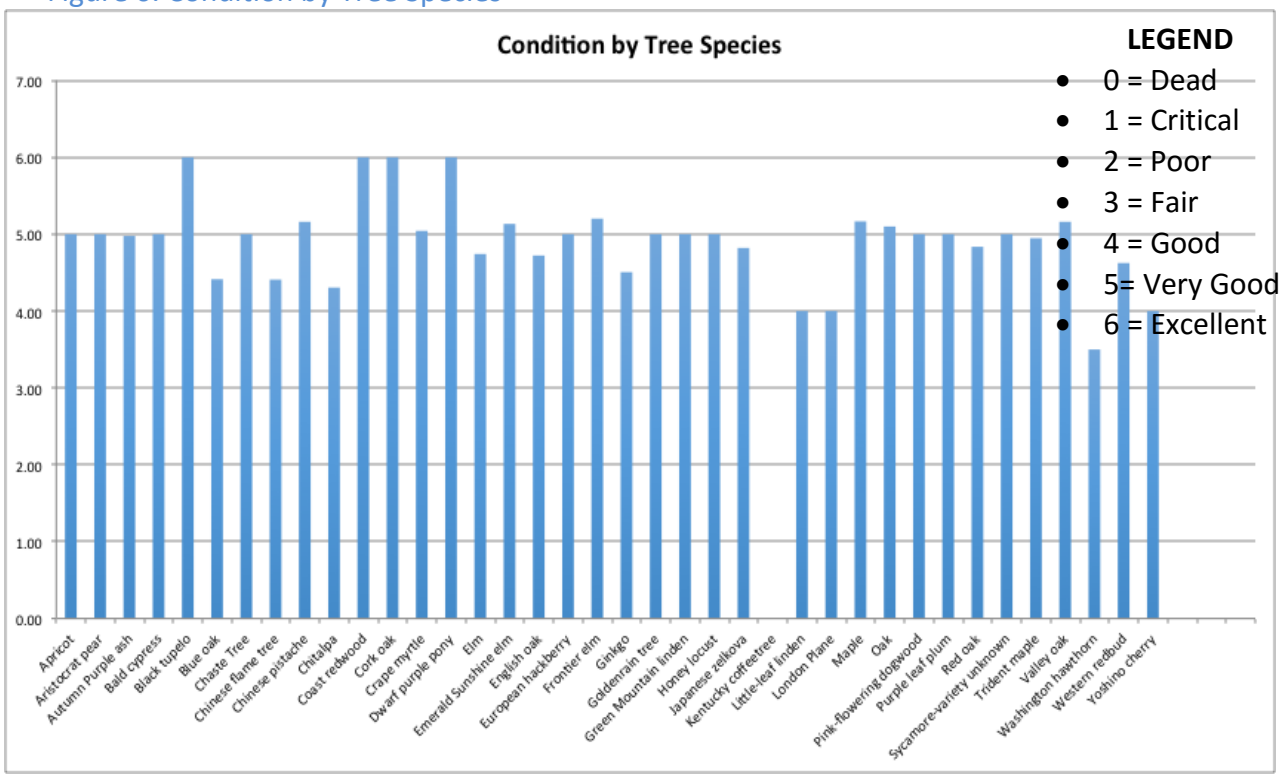
Overall, these dashboards helped keep track of the monitoring progress, and also to get a good overview of tree conditions by neighborhood.

Results:

Trees were planted in primarily four different groups of location: neighborhoods, green belts, parks, and schools. After this year's tree monitoring process, we found that tree conditions varied between these four groups. In neighborhoods, tree conditions varied from house to house, depending on who took ownership of the tree and its maintenance, which in some cases no one took ownership. For the rest of the location groups, tree care and maintenance were

implemented by either Tree Davis or the city, by clusters at a time. Evidently, there is an obvious form of partnership when it comes to maintaining the health of the trees, which helps address multiple trees at a

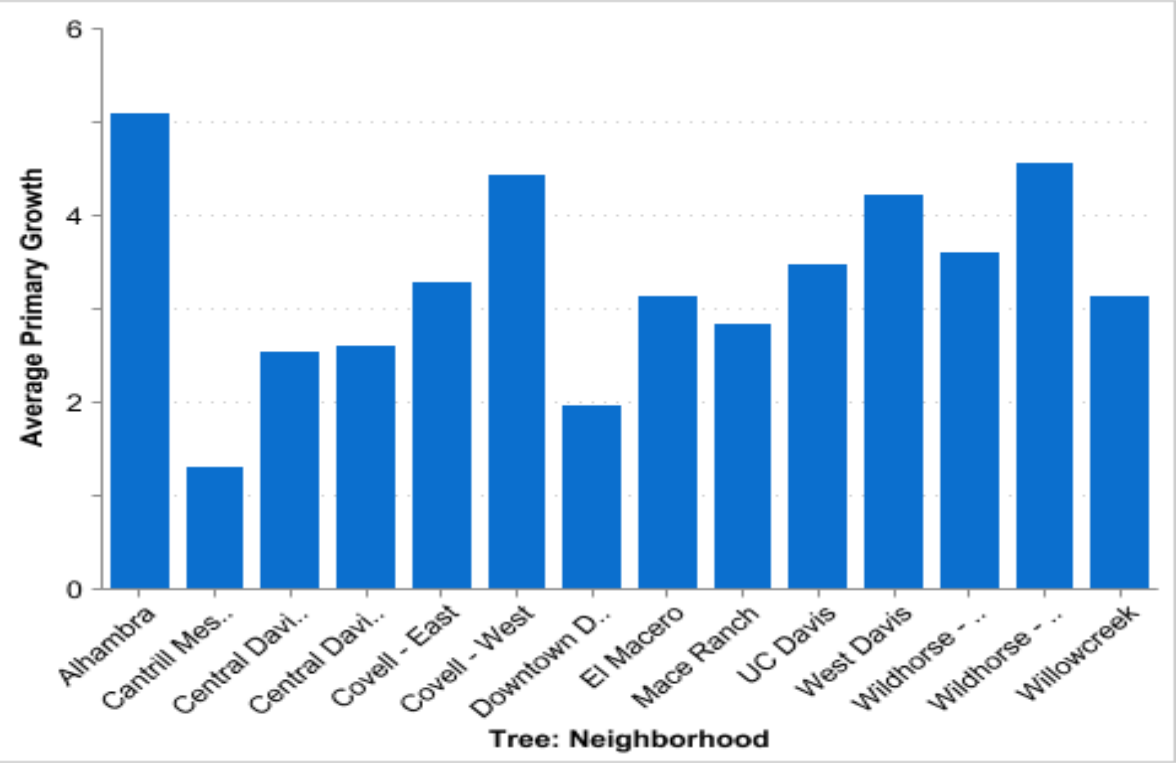
Figure 6. Condition by Tree Species



time, but also fails to keep an organized system, leaving some trees neglected and uncared for. Despite this observation, we also evaluated our data to see if tree growth and condition was somehow related to their location. Figure 6 is a chart that shows tree species' conditions by neighborhood; however, relative to how many of those tree species exist. Most trees seem to be doing fairly well, but also shows that tree

species like Chitalpa (condition average range of 4-5) are not as healthy in comparison to the Autumn Purple Ash (condition average of 5), which is also planted at around the same amount as the Chitalpa. Figure 7 shows a chart of trees' primary growth by neighborhood; however, also dependent on the number of trees that are at each neighborhood. This chart ultimately reveals tree growth rate by neighborhood, and draws up a correlation between locations and how fast or well a tree is growing. As a result, it shows that although there are about the same number of trees planted in Downtown Davis as there are in UC Davis, the trees are growing faster and therefore fairing better in UC Davis than they are in Downtown Davis. Finally, by looking at Figure 3 (page 6), we can conclude that weeding and mulching are the biggest needs for trees in Davis.

Figure 7. Average Primary Growth by Neighborhood



Recommendations:

In terms of practice, tree monitoring interns should continue utilizing the salesforce dashboards for data evaluation and tree monitoring pace; it is very helpful for the intern to keep track of their pace and make necessary adjustments to their work based on the given data. The use of the LG tablet was also a new implementation this year, which proved to be more time-efficient and effective than the past method of using paper maps and data sheets. For an even smoother process of monitoring, however, the Salesforce app could use some minor adjustments and improvements, such as the accuracy of the location dot, and the ability to refresh and refocus more quickly on the intern's location. The intern also found it time consuming to verify the tree species by checking on the internet, and would recommend including an image of the specific tree species' leaf, bark, or habit on each tree's information data so that it would be quicker to identify the tree on site. Another recommendation would be to input a "Remove/Add Tree" option on the app, which would accommodate for duplicate trees or trees that are not recorded.

In terms of tree care and management, it is recommended that the trees that are listed as "standing dead" by the intern be removed immediately, for these trees may be hazardous and also an eyesore to the community. Trees that are listed as "critical" or "poor" should also be addressed as soon as possible. Lastly, the need for stake removals should also be given more attention, because there are cases in which the band chokes the tree and prohibits its growth. Timely removal of the stakes can also spare more of them to be reused for future planting events.