3.5. Privately-maintained trees along residential streets

Introduction

The City of Rocklin currently has about 161 miles of public streets. As noted in section 3.4, the Rocklin Public Works Department currently maintains about 9,800 trees along about 28 miles of arterial streets and parkways throughout the City. However, the overwhelming majority of Rocklin's streets run through residential neighborhoods in which the only street trees are those that grow in residential front yards. These and most of the other trees in Rocklin's urban forest are owned and maintained by Rocklin residents. Hence, it is important to consider the status of this resource, which provides a wide variety of benefits to the City as a whole (see Section 1 for a discussion of tree-related benefits). In particular, the "traffic calming" effect produced by having rows of trees along roads can reduce vehicle speeds and make residential neighborhoods safer. Studies also show that trees in neighborhoods are associated with stronger ties between neighbors and lower crime rates (Kuo 2003).

Overview

Findings

- Most Rocklin neighborhoods had at least a moderate numbers of trees in front yards.
- Most residential front yard trees were relatively young and well below mature size.
- Although several commonly planted species exhibit health problems, most trees planted in front yards were in good condition.
- In contrast, nearly half of the native oaks retained in residential front yards were in decline as a result of construction-related impacts and incompatible landscaping practices.
- Slightly more than half of the surveyed street segments had some front yards with no trees. In general, treeless yards were more common in older neighborhoods than in newly-constructed neighborhoods.
- The diversity of tree species used within surveyed streets was relatively high, with older neighborhoods tending to have greater levels of tree species diversity.
- Some of the most commonly used tree species may not have good long-term prospects due to either high water requirements or likely problems with surface roots.
- All surveyed neighborhoods currently have very little or no tree canopy over the street. Due to both tree size and placement, very little canopy will be present over streets even when existing trees reach mature size.

Management issues and recommendations

- A few commonly used tree species may not be sustainable over the long term. Providing more information on tree species to tree planters (both homeowners and developers who plant trees in new residential developments) may help them make better species selections.
- Increased use of drought-tolerant tree species, including locally native oak species, should be encouraged where appropriate.

- Rocklin's oak tree protection guidelines need to be enforced more rigorously to improve the long-term health of retained native oaks. A few portions of the guidelines should be updated.
- Residents with conserved native oaks may need more guidance on how to effectively maintain these trees in residential landscapes.
- Canopy cover over residential streets is likely to remain quite low unless efforts are made to plant larger-statured trees and place them closer to the street.
- Educational efforts should be undertaken to ensure that residents are aware of proper tree pruning practices to keep topping and other destructive practices from gaining a foothold in Rocklin.

Current status

Existing Regulations and Plans

City of Rocklin has several types of regulations and plans that relate to private front yard trees. Minimum setbacks for tree planting near streets are found in the City of Rocklin Improvement Standards (Section 12-8.F) and are discussed in section 7.1.1. These include setbacks of 6 feet from the back of sidewalks, 10 feet from driveways and fire hydrants, and 4 feet from buried utility lines. In addition, tree planting is prohibited in control areas around intersections to provide unobstructed lines of sight. The Improvement Standards also specify minimum clearances for tree limbs (14.5 feet over streets, 8 feet over bike paths and 7 feet over pedestrian rights-of-way).

The Oak Tree Ordinance and Oak Tree Preservation Guidelines encourage the retention of existing native oaks in new residential developments and helps protect conserved oaks in already-developed parcels. Homeowners may remove protected healthy oaks that were conserved during development, but new tree planting or a payment into the Oak Tree Preservation Fund is required as mitigation.

The Northwest Rocklin General Development Plan indicates that at least one shade tree should be planted per single family lot in new developments. (Exhibit B. Section D, Air quality, item 3). However, homeowners have no specific requirements to retain trees planted by developers in residential lots.

Field assessment of residential front yard trees

To assess the status of privately-owned trees in residential areas Phytosphere surveyed 20 randomly-selected street segments in residential neighborhoods in August 2003. The street segments included in the survey are shown in Figure 3.5-1 and listed in Table 3.5-1. The survey was limited to trees in front yards or side yards adjacent to streets, i.e., private trees that may also function as street trees. Data on tree density (trees per street mile) was used to estimate the total number of trees along streets in residential areas. Phytosphere also assessed tree age class, condition, and species composition. This information is important for predicting the maintenance needs of the trees and the longevity of the plantings. Phytosphere also assessed whether trees were capable of providing canopy cover over the street. Details of the survey methods used are presented in Appendix 7.1.5.

Figure 3.5-1. Locations of street segments (light lines) included in the survey of privately owned front-yard trees in residential areas. Surveyed sections were approximately 0.1 mile long (background: 2003 aerial photo).

Table 3.5-1. Street segments included in the survey of privately owned front yard trees in residential areas. Also shown is the number of empty planting spaces observed in each segment, based on a minimum of one tree per lot. Counts of empty spaces do not include dead trees that were still standing in place. The last column notes whether houses on the street were constructed within the past 10 years, based on analysis of aerial photographs dated 22 May 1993.

Street	Nearby cross streets	Empty planting spaces	Constructed after May 1993
Argonaut Ave	Roble Way / La Paloma Ct	3	no
Blackstone Ct	Balfour Ct./ Blackstone Dr	0	no
Bluffs Dr	Sand St./ Cobblestone Dr.	2	no
Bradford Dr	Wyckford Bl / Windham Wy	1	yes
Clubhouse Dr	Maryella Dr	0	yes
Dry Gulch Ct	Rawhide Rd	0	no
Hannah Way	Arnold Dr / Surfbird	1	yes
Jersey Dr	Harvest Rd /West Oaks	0	yes
Lodestar St	Topaz Ave/ Paragon St	1	no
Longview Dr	Mira Vista Dr / Floridale Ct	0	yes
Outlook Dr	Adobe Rd	1	no
Parkview Ln	5th St./ Willowglen Wy	6	no
Poppy Dr	Sage Dr	0	yes
Puffin Ct / Swan Ct	Albatross Wy	0	yes
Racetrack Circle	Gate Wy / Racetrack Rd	0	no
Scenic Dr	Bristol Ct / Scenic Ct	0	yes
Southside Ranch Rd	Thoroughbred Ct / Rodeo Pl	4	yes
Turquoise Dr	Marley Wy / Sapphire Dr	1	no
Twincreeks Ln	Meadowdale Dr / Springview Meadows Dr	2	no
Westwood Dr.	Delwood Ct /Edgewood Wy	3	no

Characteristics of surveyed areas

Eighteen of the 20 surveyed street segments were in conventional residential subdivisions (Figures 3.5-2 to 3.5-6) that had lot sizes typical of most Rocklin neighborhoods, generally between about 6,000 and 10,000 square feet. Most had standard street widths (about 50 feet), but wider and narrower streets were represented in the sample. With only a few exceptions, almost all of the trees in these front yards have been planted, either by the original subdivision developer or by homeowners. A few conserved native oaks are present in some of these areas.

Two of the surveyed street segments differed substantially from the others and are more typical of custom and semi-custom developments found in some areas of Rocklin. Both of these locations (Clubhouse Dr. [Figure 3.5-7] and Dry Gulch Ct.) had both larger lot sizes and greater numbers of conserved native oaks. Because these two segments differ from the others in several significant ways, they are considered separately in some of the analyses discussed below.

Figure 3.5-2. Older subdivision with a wide street along Argonaut Avenue. Current street canopy cover was rated at less than 1%.

Figure 3.5-3. Older subdivision with a standard street width along Racetrack Circle. Street canopy cover was 0% within the surveyed segment.

Figure 3.5-4. Older subdivision along Outlook Drive. Current street canopy cover was rated at less than 1%.

Figure 3.5-5. Recent subdivision along Jersey Drive. Current street canopy cover was rated at less than 1%. London plane trees are planted relatively close to the street. If these trees are allowed to reach mature size, street tree canopy cover should increase substantially.

Figure 3.5-6. Recent subdivision along Puffin Court and Swan Court. Current street canopy cover was 0%.

Figure 3.5-7. Recent subdivision along Clubhouse Drive with narrow streets and numerous conserved oak trees. Current street canopy cover was rated at between 1% and 5%.

Tree age class

Phytosphere compared current tree size to the typical size of a given tree species at maturity to assign trees to age classes. Most trees in the surveyed street sections were still relatively young and well below their mature size (Figure 3.5-8). Trees that were rated as being more than 75% of mature size were typically found in older developments, and included some species that are small-statured at maturity (e.g., crape myrtle, purple leaf plum) or are relatively fast-growing (e.g., birch). In both older and fairly recent developments, native oak trees that had been retained during development were also rated in the two older age classes.

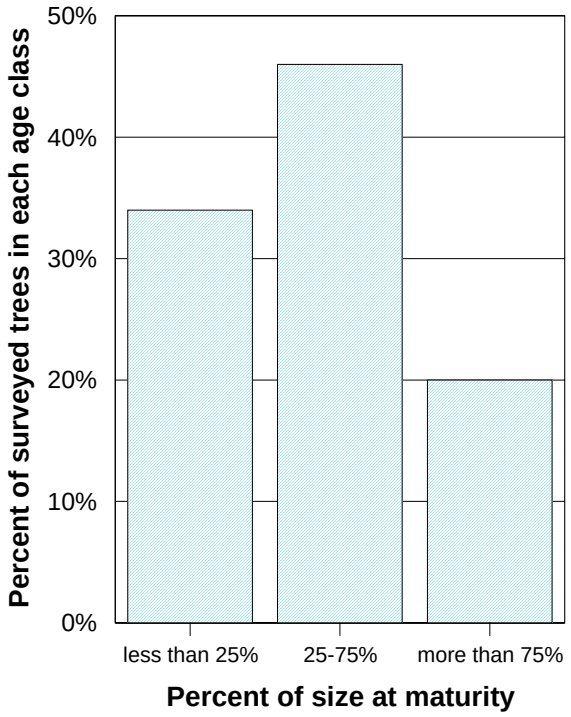

Figure 3.5-8. Most of the surveyed trees in residential front yards were not yet of mature size, and about a third of these trees were in the youngest age class, less than 25% of their mature size.

Tree density

For the 18 typical street segments in the survey, the density of front-yard trees ranged between 235 and 598 trees per street mile, counting trees on both sides of the street. The overall average was 348 trees per street mile. Assuming an average street frontage of 70 feet per lot, there are about 150 residential lots per street mile, including both sides of the street. Therefore, surveyed streets averaged slightly more than 2 front-yard trees per lot, which is a reasonable number of trees overall given the relatively small size of most front yards.

The two streets with large lots (Clubhouse Dr. and Dry Gulch Ct.) had much higher tree densities of 746 and 890 trees per street mile. These high counts were associated with lower housing densities, high numbers of conserved native trees, and especially deep front yards (Figure 3.5-7). Because of these differences, direct comparisons between these numbers and those in more typical subdivisions are not meaningful.

Eleven of the 20 surveyed street segments had at least one empty planting site, i.e., a front yard (or in some cases a side yard adjacent to the street) that did not have a tree (Table 3.5-1). At one location, about a third of the front yards did not have a tree. In other locations, the percentage of front yards without trees ranged from about 5% to 25%.

Front yards lacking trees were more common on street segments in developments more than 10 years old (treeless yards in 8 of 11 surveyed segments) than in more recent developments (treeless yards in 3 of 9 segments). This probably reflects the loss of trees that were installed by the developer that have not been replaced and/or subdivisions that did not include developer-planted front yard trees. However, because many homeowners eventually plant multiple trees in their yards, the lack of trees in some yards is offset to some degree by numerous trees in other yards. As a result, the average number of trees per street mile does not differ between neighborhoods constructed before or after May 1993. Nonetheless, streets with a high percentage of treeless front yards have a different overall look and often lower levels of canopy cover than comparably-aged streets that have trees in almost all front yards.

The City of Rocklin currently has about 161 street miles of public streets. The majority of these street miles occur in residential neighborhoods. If about half of the public street miles occurred in neighborhoods with the same average number of front yard trees seen in the sample, Phytosphere estimates that about 28,000 privately-maintained trees were present along Rocklin's residential streets in 2003. This conservative estimate of privately-maintained street tree is nearly three times the estimated number of City-maintained street trees, even though the average density of trees per street mile is the same for both groups.

Tree canopy cover over streets

The shading of paved surfaces by trees provides several important benefits (see Section 1). The amount of shading over streets can be quantified by evaluating canopy cover at the edge of pavement (CCEP). CCEP is reported as the percentage of pavement edge (the line defined by the junction of the street and curb) that has tree canopy directly over it (see http://www.isa-arbor.com/publications/tree-ord/ccep.aspx). Trees that provide any substantial shading at the pavement edge typically extend over the street as well. During the survey, Phytosphere counted the number of trees in each surveyed segment that currently had canopy over the pavement edge and the number of trees whose canopies would be expected to extend over the edge of pavement once they reach mature size. The current percent CCEP over the surveyed section was also estimated.

Current street tree canopy was low in all sampled streets. The estimated overall CCEP for all surveyed streets was less than 1% at the time of the survey. Eight of the 20 sampled street segments had no CCEP, and only three had CCEP levels as high as 1-5%. Only 5% of the front yard trees tallied provided canopy over the street.

The low level of CCEP was due to three factors:

- relatively few large-canopied trees are planted in residential front yards;
- trees are commonly placed well back from the sidewalk, and commonly well beyond the public utility easement along the street;
- most trees are still far below their mature canopy spread.

To account for the effect of the third factor (tree maturity), Phytosphere estimated whether existing trees could provide CCEP once they reached their mature size. Based on these data, the number of trees with CCEP could triple to about 16% if all trees currently present attain their typical mature spread. When expressed on the basis of trees per street mile

(counting both sides of the street), the number of trees providing CCEP is expected to increase from 19 trees/street mile to 62 trees/street mile as the current tree population grows to mature size. Based on Phytosphere's field observations, most of the trees whose canopies will reach the edge of pavement at maturity will only barely extend to that point. Most of these trees will only provide a few feet of CCEP at maturity. Assuming an optimistic average 8 feet of CCEP per tree on average, the 62 trees per mile will provide about 500 feet of CCEP, or about 5% CCEP on each side of the street. By comparison, a well-canopied street would typically have at least 50% CCEP.

From the foregoing analysis, it appears that even when existing trees reach mature canopy spread, their placement away from streets and relatively small canopy spread will limit future levels of tree canopy cover on Rocklin streets. High levels of CCEP can develop only in areas where trees with wide canopies are situated relatively close to the street and allowed to grow to mature size. Only a few of the surveyed streets had plantings of this nature. On the surveyed sections of Jersey Dr. and Scenic Dr., large-growing London plane trees have been planted close to the street. If most of these trees survive and are properly maintained, high levels of CCEP can be anticipated. In contrast, in many other neighborhoods where small to medium-sized trees are planted close to the houses and away from the street, no increase in CCEP is likely to occur with the current plantings. Nonetheless, even in these situations, well-located front-yard trees could still provide important shade benefits by shading driveways or windows.

Species composition

At least 58 species of trees were present among the 833 front yard trees included in the sample. More than half of these species (38) occurred at frequencies of less than 1% of the trees in the sample. Eighteen species were represented by only one or two individuals.

Conserved native oaks, mostly blue oak and interior live oak, make up 11% of the sample, but most of these native trees are found on one atypical street segment (Clubhouse Drive). If the conserved native oaks from this location are omitted, native oaks drop to less than 3% of all trees in the sample. This lower percentage of native oaks is more representative of the level found in most of Rocklin. Conserved native oaks are a dominant component of residential street landscapes in some Rocklin neighborhoods, but native oaks are not present in most residential street landscapes in Rocklin. Phytosphere's surveyors saw a few sites where homeowners had encouraged volunteer oak seedlings, but locally native oaks were not planted in any of the surveyed street sections.

If the native oaks from Clubhouse Drive are excluded from the sample, seven tree species were present at frequencies of more than 5%. These seven species (Figure 3.5-9) comprise about half of the 759 trees in these plantings. The most common yard tree, sweetgum or liquidambar, is known for its propensity to produce shallow, intrusive roots that can cause problems with sidewalks and associated hardscape. This tree is not the best tree choice for many sites, and as a result, this species is commonly removed by homeowners as it begins to approach mature size. In addition, two of the seven most common species, coast redwood and birch, are species that require high amounts of water to remain healthy in Rocklin's hot, dry climate. Although these species are popular because of their rapid growth and attractive appearance, they may not have good long-term prospects in many sites, especially in smaller yards.

Two of the most commonly planted trees (crape myrtle and purple leaf plum) are small-statured at maturity and provide fairly minimal amounts of canopy. Overall, about a quarter of the trees in the planted tree sample (n=759) were trees that will have small canopies at maturity, and about half will have moderate canopy spread at maturity. As noted above, this preponderance of small- to medium-canopied trees combined with the tendency to plant far beyond the public utility easement along streets eliminates the prospect of developing significant amounts of street shading in most neighborhoods. Furthermore, unless they are planted very close to houses, small trees may not provide significant energy conservation benefits.

The number of tree species present within a given street segment tends to increase as the age of the development increases. Some of the most recently-constructed neighborhoods had as few as six front-yard species, whereas older neighborhoods typically had 15 or more species. The increased diversity is the result of both tree replacement and additional plantings by homeowners. High species diversity is generally desirable for reducing risks associated with pests and diseases.

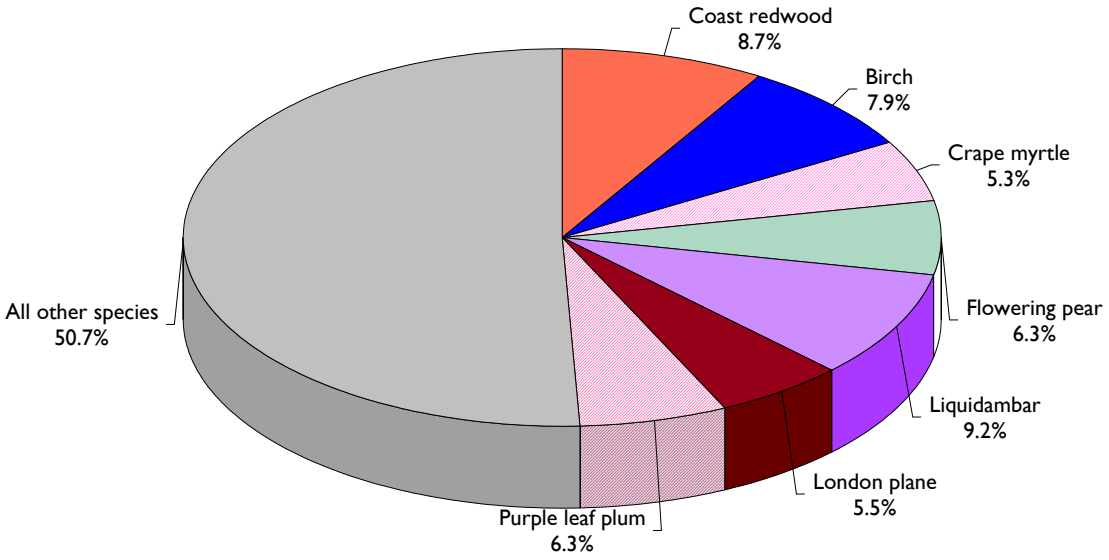

Figure 3.5-9. The most common tree species along residential streets. Conserved native oaks present in one surveyed segment (Clubhouse Dr.) are omitted from the totals. Species comprising at least 5% of the sample are shown. Small-statured trees are indicated by stripes; solid colors represent medium to large-statured trees. The 'all other species' group includes at least 51 other species of small- to large-statured trees.

Tree condition

The overwhelming majority (91%) of the front-yard trees in the surveyed areas were in at least fair condition. Only 4 dead trees were observed. This constitutes less than 0.5% of the sample. However, 8.4% of the trees in the sample were in poor condition and were rated as being in decline. Most of these were conserved native oaks that were in decline as a result of construction-related damage. Almost half (45%) of the three locally native oak species represented in the sample (blue oak, interior live oak, valley oak) were rated as being in

decline. Figure 3.5-10 shows typical situations in which declining trees are found. Most of these trees were severely damaged during the time that the homes were built because their roots were inadequately protected from damage associated with grading and other construction activities. In many cases, improper irrigation practices following construction have further accelerated tree decline.

About 4% of the trees other than conserved native oaks were in decline. These were primarily younger trees. Only two of the 31 declining or dead non-native trees were mature or nearly mature trees. Three of the seven most common tree species (Figure 3.5-9) had relatively high rates of decline. Dead or declining trees made up 17% of the birch, 8% of the flowering pear, and 3% of the coast redwood in the sample. Other common species that had relatively high levels of decline were Chinese tallow tree and maples.

Figure 3.5-10. Nearly half of the native oaks that have been retained during development are in decline due to adverse impacts to their root systems. At left, one of the two blue oaks retained in this recently-built subdivision shows early evidence of canopy thinning due to root damage. Irrigation runoff from turf is likely to speed decline. At right, retained valley oak in older subdivision shows extensive canopy thinning and is in severe decline.

In many California cities, established trees are often subjected to poor pruning practices, particularly topping (cutting back large limbs to stubs). Topping can destroy tree structure and make trees more hazardous. Fortunately, at least in the surveyed areas, topping is currently very uncommon in Rocklin. Most of Rocklin's trees are still relatively young, so many have not been pruned to any great degree to date. However, in areas of Rocklin that have overhead utility lines along streets, some trees have been topped to maintain utility line clearance. Although PG&E and other utilities are changing from topping to directional pruning (also known as “V” trimming) to maintain clearance, the best solution for planting under utility lines is to use species that will not grow tall enough to require clearance pruning.

Management issues and recommendations

Most of Rocklin's residential streets, including all of those included in the survey, have negligible amounts of canopy over the street. Furthermore, very little additional street canopy cover is likely to develop over time due to tree species selection and placement. If achieving

higher levels of street tree canopy is identified as an objective for Rocklin's urban forest, specific efforts would be needed to encourage the use of large-statured trees placed just beyond the City's public utility easement.

Fairly good levels of tree species diversity were present within sampled streets and across the entire sample. However, some of the species in wide use may not be especially good selections for long-term performance. Because most front yards in the surveyed areas contain at least some irrigated turf, the wide use of trees that tolerate lawn irrigation schedules, such as coast redwood and birch, is understandable. However, these and other high water use species tend to fare badly during drought periods, especially when they become large. Condition data indicate that these species may already be developing problems in some areas. Given Rocklin's soil and climate, and the increasingly tight water supplies in the state, greater use of drought tolerant species should be encouraged.

Many conserved oaks have not fared well in residential front yards. Trees in these areas are typically subject to high amounts of root disturbance associated with grading and compaction for house pads, driveways, streets, and trenching for underground utility lines. In some situations, the City's current guidelines related to oak tree protection have clearly not been followed. Even if followed precisely, the City's current guidelines may not be sufficient to protect enough of the rootzone to maintain tree health. For example, the oak ordinance requires actions to protect roots only under the tree's dripline. Because roots of mature oaks typically extend out twice to three times the diameter of the canopy, the area under the dripline may include as little as one quarter to one third of the tree's roots. Destruction of close to half of a mature oak's roots can greatly stress the tree and may cause it to decline. The City may want to consider revising the guidelines to encourage greater levels of rootzone protection where it is feasible.

In addition, landscape design and maintenance practices instituted after construction is complete often do not conform to the City's guidelines or current best management practices. Further efforts may be needed to enforce compliance with oak protection measures during development, and encourage better stewardship of retained oaks by homeowners. Efforts to increase the planting of locally native oaks where appropriate could also be used to help maintain native oaks as an element of Rocklin neighborhoods.

Most of Rocklin's front yard trees have not yet been impacted by poor pruning practices, such as topping. This may be due primarily to the fact that most trees in these areas have not grown very large. Unfortunately, topping and other poor practices tend to spread locally once they start to appear because some homeowners will erroneously assume that their trees must "need" to be pruned in the same way. Proactive educational efforts should be undertaken to ensure that Rocklin's trees don't become victims of topping and other adverse practices just when they are beginning to provide their greatest benefits.

References

Kuo, F. E. 2003. The role of arboriculture in a healthy social ecology. Journal of Arboriculture 29:148–155.