South Bay HOA Tree Inventory and Risk Assessment Report

by
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May 31, 2014

Introduction

Summary

At the request of the Home Owners' Association (HOA) Board of Directors, a tree inventory and risk assessment was made of 245 trees in common areas in South Bay in Orlando, Florida. We used techniques and methods described in ANSI A300 Standards[1] and Best Management Practices: Tree Risk Assessment[2]. Because of the predominance of relatively short lived but large laurel oaks (*Quercus laurifolia*) in the common areas, the South Bay tree population is maturing and has the accompanying problems of increased decay and weak branch structure. More maintenance directed at trees with a higher potential for failure should be implemented to help prolong the lives of these trees and the benefits they provide.

Background

We were asked to provide a proposal to do a risk assessment for the HOA. We provided a proposal on January 26, 2014 that was amended on February 26, 2014 and was approved. The survey and risk assessment was performed between May 18 and 21, 2014.

Assignment

Our assignment was to:

- Do a risk assessment of common area trees initially estimated to be around 240
- Recommend an appropriate course of action for maintenance and remediation

Limits of the Assignment

We visually inspected each tree for the inventory and assessment. We did not survey any broadleaf trees under 6 inches in diameter or any pine trees or palm trees.

Arborists cannot detect every condition that could possibly lead to the structural failure of a tree. Trees are living organisms that fail in ways we do not fully understand. Conditions are often hidden within trees, below ground or not clearly visible from the vantage point on the ground. Arborists cannot guarantee that a

tree will be healthy, safe or adequately protected under all circumstances or for a specified period of time. Likewise, remedial, protective and mitigating treatments and recommendations cannot be guaranteed.

Purpose and Use of the Report

The main purpose of the tree inventory is risk assessment. A tree inventory identifies apparent tree problems and provides the starting point for a long-term management plan, which allows for effective use of tree maintenance funds, and allows for more accurate budget projections.This tree inventory and assessment provides information on the species, size and condition of the common area trees in South Bay. If recommended tree maintenance is followed and additional risk assessments are continued on a three to four year cycle, an additional benefit is the HOA is on record as having risk assessment procedures in place and an on-going risk assessment program that follows national standards.

Assumptions

The tree survey was done between May 18 and 21, 2014. Our observations and conclusions are as of that period. A severe storm or other environmental factors can change the observations and maintenance recommendations.

Testing and Analysis

The Risk Assessment was done in accordance with ***ANSI A300 Standards on Tree Risk Assessment*** [3] and the companion publication ***Best Management Practices, Tree Risk Assessment***.,[4] Tree structure and health recommendations follow procedures and techniques of two of the country's leading arboricultural researchers: Dr. Ed Gilman, professor of environmental horticulture at the University of Florida and Dr. Kim Coder, professor at the University of Georgia.

On each tree evaluated we performed a **Level 2 Basic Assessment**, which is a detailed visual inspection of a tree and its surrounding site. The Level 2 Assessment includes a 360-degree visual inspection from ground level on each tree and sound testing of the lower trunk and root flares with a rubber mallet to listen for tonal variations that may indicate internal hollows or decay. When there is sufficient evidence gathered under a Level 2 Assessment for additional evaluation of a tree found to have significant structural defects such as visible cavities, decay or indications of possible decay from a sounding test, we recommend a **Level 3 Advanced Assessment** with a Resistograph to determine

the extent of internal decay and strength loss. A Resistograph is a drilling device that measures and graphs wood strength as the narrow ⅛-inch drill bit passes through the different layers of solid and decayed wood. Level 3 Advanced Assessment is not part of the scope of this assignment and can be arranged in a separate contract.

Figure 1 For identification purposes tags were attached to each tree at a height of about 7 to 8 feet above the ground.

We identified the species of each tree, measured the diameter and added a uniquely numbered black nylon tag secured to the tree with a 3-inch stainless steel nail (Figure 1). Each nail was driven only partially into the tree to allow room for tree growth in diameter, which pushes the tag outward along the nail toward the nail head as the tree grows in girth. Generally, we attach the tags to trees at a height of about 7 to 8 feet out of reach of the curious and facing away from the flow of traffic whenever possible.

Data Collection

Both empirical data as well as subjective data was gathered on each tree. Data was collected on HanDBase, a data collection database application used on our handheld smartphones.

Empirical data included:
1. tree tag number
2. tree species
3. tree diameter (DBH)
4. location

The subjective data included:
1. health condition (excellent, good, fair, poor, dead)
2. structural condition (excellent, good, fair, poor)
3. structural problems such as codominant leaders, dead branches, decay/ cavities, health problems such as decay fungi, sparse foliage, declining
4. maintenance recommendations such as end weight reduction pruning, dead branch removal and other work
5. risk assessment rating (see below)

Risk Assessment Rating System

The risk rating score is a measure of relative tree health and structural condition on the tree population. We scored each tree according to a risk assessment rating system developed by the ANSI A-300 risk assessment standards.

1. **Likelihood of failure** of the tree or part of the tree (1-improbable, 2-possible, 3-probable, 4-imminent)
2. **Likelihood of Impact** that is hitting a person or property (1-very low, 2-low, 3-medium, 4-high)
3. **Consequences** of a failure (1-negligible, 2-minor, 3-significant, 4-severe)
4. **Tree species** (1-strong, decay and wind resistant species such as live oak, 2-moderate decay and wind resistance such as sweet gum, 3-weaker, decay prone species such a laurel oak)

Different tree species vary in their strength, wind resistance, tolerance of construction damage (fill soil, cutting roots, soil compaction), life span and susceptibility to decay or other pests. In our opinion, tree species will affect how trees respond to urban landscape stresses and should be considered as part of the tree risk assessment. Tree species were rated on a 3-point scale with a “1” rating given to a long-lived, strong tree such as a live oak (*Quercus virginiana*) . A “2” rating was given to trees with moderate lifespans and strength such as a sweetgum (*Liquidambar styraciflua*). A rating of “3” rating was given to trees with relatively short life spans and generally poor strength such as laurel oaks (*Quercus laurifolia*).

Trees were rated in each category and the sum of the four categories represents the Risk Rating. The higher score means a higher risk for that category. The highest risk tree could attain a risk rating of 15. The lowest risk tree could have a risk rating of 4. Trees receiving a score in the mid-range, 6 to 10 may or may not require maintenance depending on budget considerations and available resources. Trees with a rating between 11 to 14 possibly or probably should be mitigated, in our opinion, with greater urgency given to trees with higher ratings in this range.

According to Clark and Matheny.5 “Thus hazard (risk) ratings cannot strictly define a numerical line for action between either removal and retention or treatment and no treatment. This must be an administrative decision, one made by owner and manager. In municipal situations, where an agency might manage a very large number of trees, there may be practical limits to the amount of work that can be undertaken and only the most severe and significant hazards may be

addressed. Some level of risk will always be present when people live among trees. The decision of how much risk is tolerable remains with the owner and manager."

Pruning Categories

Trees that were marked for some form of maintenance received one of the following descriptive classifications. All work should follow ANSI A300 Pruning Standards[6]:

- ***Priority 1 Removal*** Trees designated for removal have defects that cannot be cost-effectively or practically treated. The majority of the trees in this category have a large percentage of dead crown, decay and/or pose an elevated level or risk for failure. Any hazards that could be seen as potential dangers to persons or property and seen as potential liabilities to the client would be in this category. Large dead and dying trees that are high liability risks are included in this category. These trees are the first ones that should be removed.
- ***Priority 2 Removal*** Trees that should be removed but do not pose a liability as great as the first priority will be identified here. This category would need attention as soon as "Priority 1" trees are removed and "Priority 1 Prune" is done.
- ***Priority 3 Removal*** Trees that should be removed, but pose minimal liability to persons or property, will be identified in this category.
- ***Priority 1 Prune*** Trees that require priority one pruning are recommended for trimming to remove hazardous deadwood, hangers, or broken branches. These trees have broken or hanging limbs, hazardous deadwood, and dead, dying, or diseased limbs or leaders greater than four inches in diameter.
- ***Priority 2 Prune*** These trees have dead, dying, diseased, or weakened branches between one and four inches in diameter and are potential safety hazards.
- ***Large Tree Routine Prune*** These trees require routine pruning to correct structural problems, shorten sprawling branches with excessive end weight, remove dead branches or vines, or correct growth patterns which would eventually obstruct traffic or interfere with utility wires or buildings. End weight reduction pruning is considered part of "Routine" pruning. Trees in this category are large enough to require bucket truck access or manual climbing.
- ***Small Tree Routine Prune*** These trees require routine pruning to correct structural problems, remove dead branches or vines, or correct growth patterns which would eventually obstruct traffic or interfere with utility wires or buildings. Trees in this category are small enough to use a ladder or pole saw.

- ***Training Prune*** These are generally smaller trees that can benefit from early structural pruning that will improve the structure by reducing or eliminating codominant leaders, unbalanced crowns and other structural problems.

Observations

Tree Species Distribution

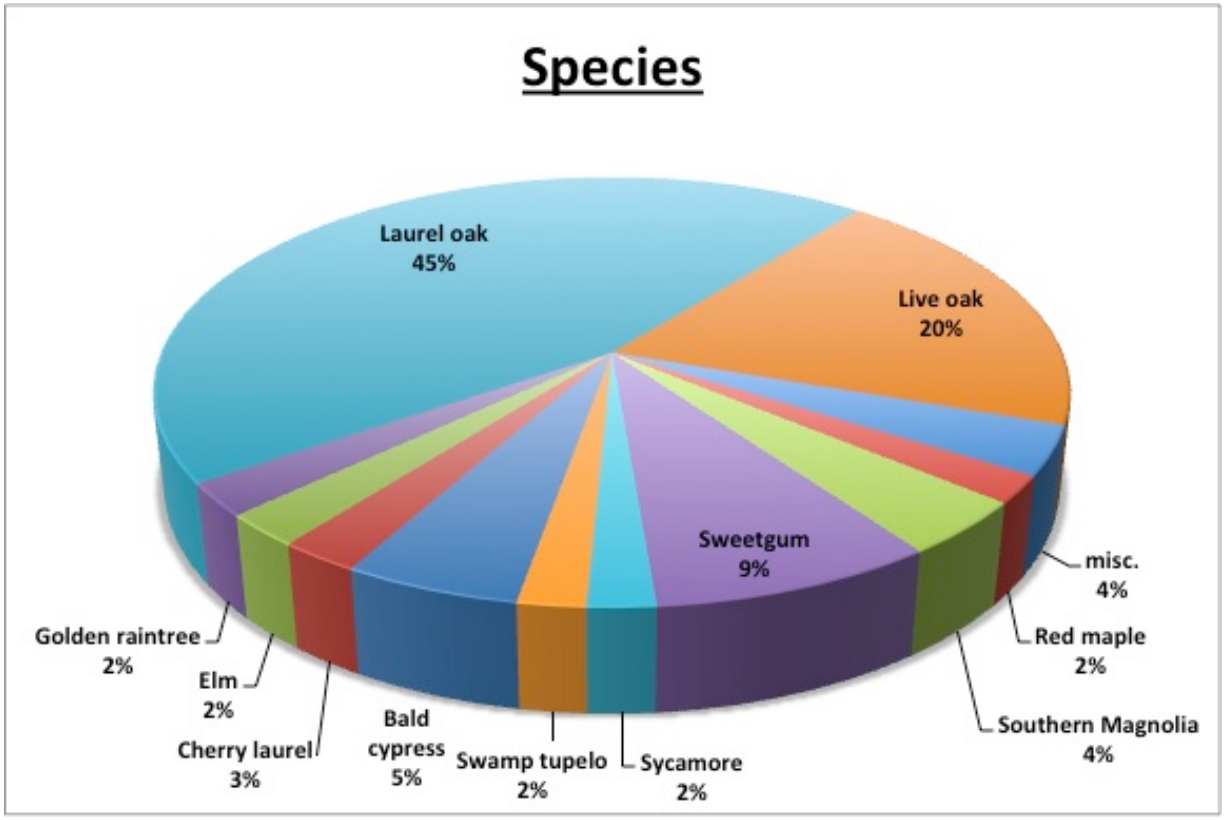

Figure 2

There were 245 trees evaluated in this inventory/risk assessment. Figure 2 illustrates the distribution of the different tree species. Laurel oaks were by far the predominant species with 45 percent of the trees followed by live oaks with 20 percent of the trees. There are 9 percent sweetgum (*Liquidambar styraciflua*), 5 percent bald cypress (*Taxodium spp.*)) 4 percent Southern magnolia (*Magnolia grandiflora*) and 3 percent cherry laurel (*Prunus caroliniana*). There were 2 percent each of golden raintree (*Koelreuteria spp.*), red maple (*Acer rubrum*), sycamore (*Platanus occidentalis*), tupelo (*Nyssa spp.*) and elm (*Ulmus spp.*). The

"miscellaneous" group in Figure 2 consists of camphor trees (*Cinnamomum camphora*), tabebuia trees (*Tabebuia chrysotricha*), pecan trees (*Carya illinoensis*), ear pod trees (*Enterolobium cyclocarpum*) and black cherry trees (*Prunus serotina*).

General Tree Species Characteristics

Laurel Oaks The predominant tree found in South Bay is the laurel oak. Dr. Ed Gilman, Environmental Horticulture Professor at the University of Florida and one of the country's leading arboriculture researchers, describes the tree, "Laurel oaks have a life span of 50 to 70 years. Tree trunks and large branches often hollow from decay and wood rot. The smallest trunk injury or improper pruning cut can result in columns of decay inside the trunk which are 10, 20 or more feet long." Gilman goes on to say, "It (the laurel oak) grows well as a street tree and will serve the community well, but hollows with age as it approaches 50 years old."[7]

Dr. Mary Duryea, Associate Dean for Research and Forestry Professor at the Institute of Food and Agricultural Sciences of the University of Florida, has been studying hurricane damage on the trees for the past 20 years. Dr. Duryea has

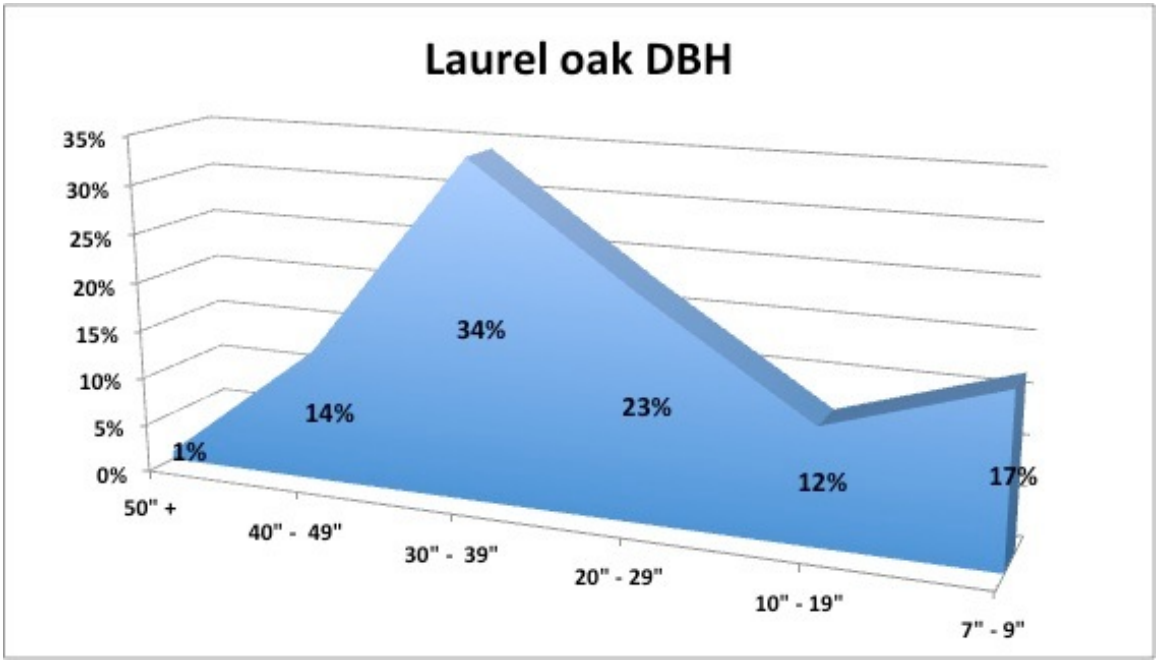

Figure 3 The distribution of trunk diameters (DBH) is a good indication of the distribution of tree age. A majority of the laurel oaks are are between 20 inches (middle age) to 50 inches (mature and declining). South Bay has an aging laurel oak population that will require more maintenance to reduce risk in the near future.

made lists of the trees she has found to have the lowest wind resistance and the highest wind resistance. The live oak is on her list of the trees with the highest wind resistance. The laurel oak on the contrary is listed a having medium-low to low wind resistance. The wind-resistance list has subsequently been incorporated in several University of Florida Extension Service Publications.[8, 9]

Pamela Crawford, a landscape architect who studied storm damage in the fall of 2004 following the multiple hurricanes, wrote in her book ***Stormscaping: Landscaping to Minimize Wind Damage in Florida,*** "We had more reports of laurel oaks down than any other tree in central and north Florida. If you have one of these within falling distance of your house, remove it, especially if it is an older tree. Laurel oaks are weaker and shorter lived than live oaks and the four storms of 2004 proved that the older ones were particularly dangerous." [10]

Live Oaks Because the Southern live oak was the second most predominant street tree in the survey, it is worth noting some of its attributes. The Southern live oak is a native tree, which is considered to be one of the premier tree species in the United States. According to Dr. Gilman, "A large, sprawling, picturesque tree, usually graced with Spanish moss and strongly reminiscent of the Old South, live oak is one of the broadest-spreading of the oaks, providing large areas of deep, inviting shade. An amazingly durable American native, it can measure its lifetime in centuries if properly located and cared for in the landscape."[11] He goes on to say live oaks have a reputation for being a tough tree and have very good wind resistance.

Pamela Crawford, a landscape architect who studied storm damage in the fall of 2004 following the hurricanes, wrote in her book ***Stormscaping: Landscaping to Minimize Wind Damage in Florida***, "Live oak is a large tree that has consistently been categorized as the most wind-tolerant shade tree for the entire state of Florida."[12]

Problems and Defects

Tree Health and Structural Condition

Each tree was also evaluated as to its overall health and structure. It is important to understand that health and structure are two separate and independent considerations. A tree can be healthy yet have poor and hazardous structure. Live (green) trees can fail and sometimes do. Structurally sound trees sometimes decline and die from poor health. Most of the trees evaluated (67 percent) had

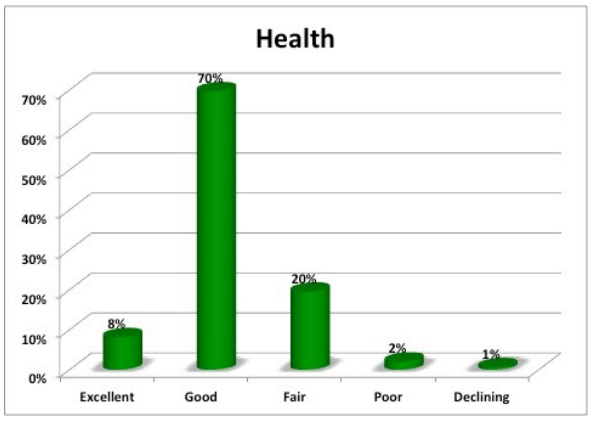

Figure 4 Most of the trees are in good health

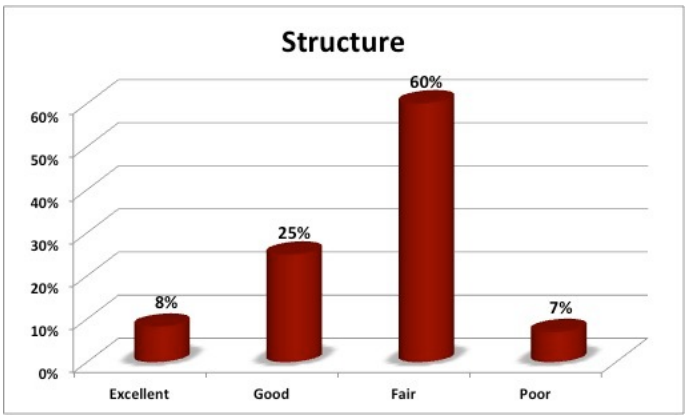

Figure 5 Most of the trees had fair structure which is due to the below average structure of the predominant laurel oaks.

only fair or poor structure mostly because of codominant leaders. Twenty five percent of the trees had good structure. Trees with codominant leaders can be classified as “codominant leader without included bark” and “codominant leaders with included bark”. Trees with codominant leaders with included bark are much more prone to failure than trees with codominant leaders and no included bark. A codominant leader with included bark is shown in Figures 8, 9 and 10.

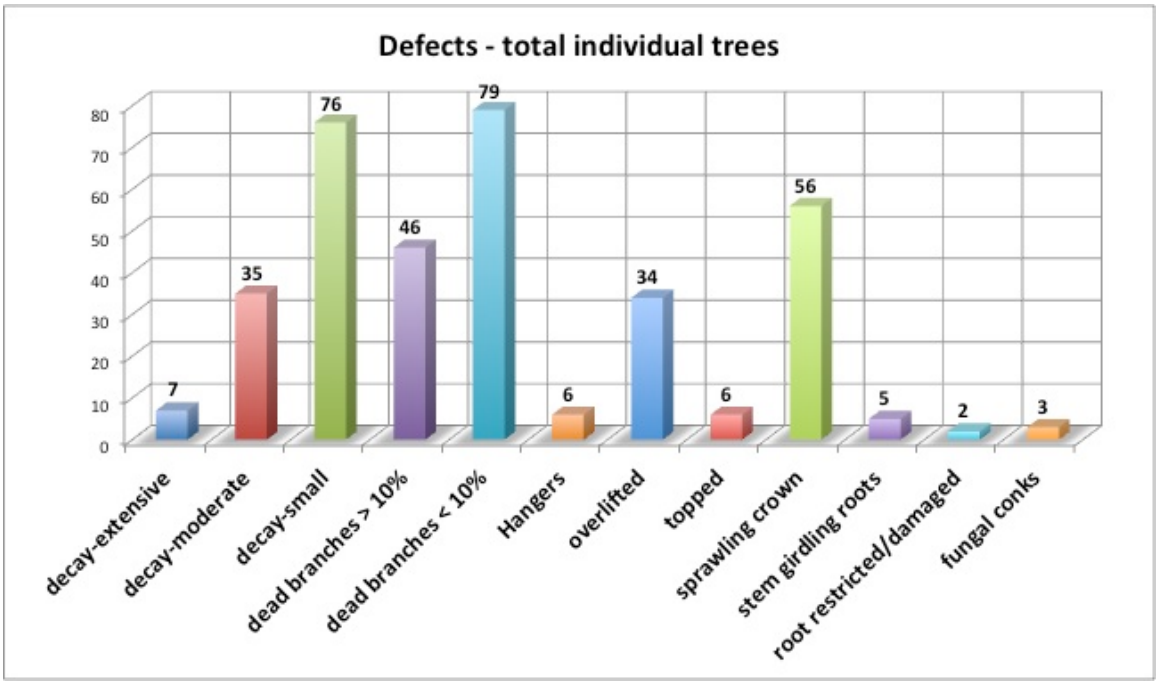

Figure 6 Note that one tree can have more than one defect and they often do. Nearly every tree had some degree of decay, which is common with all older oak tree species. But trees with “extensive decay” are relatively rare in South Bay. Trees with small amounts of dead branches (dead branches < 10%) are not unusual especially where regular maintenance every two to four years is not done.

Decay -- Only seven trees were found with extensive decay. Usually in our surveys we find the larger percent of the trees have only a small amount of decay or small cavities which is quite normal for middle-aged and older trees. We found this is the case at South Bay too. Thirty five trees had moderate levels of decay or moderately sized cavities and 76 trees had small cavities or a small amount of decay. Decay is more common as trees age. Some species such as live oak are more resistant to decay and can live many years with cavities that appear to be quite large. Laurel oaks, on the other hand, do not resist decay well and often become hollow and weakened by decay because of a small wound or broken branch that allows infection by decay organisms**.**

Figure 7 This laurel oak has a typical branch cluster about 12 feet above the ground. One of the leaders has decayed leaving a large decayed area (yellow arrow) where several codominant leaders are attached to the trunk. This is a hazardous tree but not a South Bay tree.

Dead Branches -- Trees were evaluated by the amount of dead branches observed in relation to the size of the crown. There are two classifications: “Dead branches less than (<) 10 percent of the crown” and “Dead branches greater than (>)10 percent of the crown”. Large dead lateral branches in the mid and upper crown are an indication of significant tree health and structure problems associated with root problems or advanced internal decay. Dead branches in the lower crown are a more normal occurrence and are usually due to shading by upper branches**.**

Dead branches are not always an indication of a tree problem. Mature trees naturally shed lower and interior branches that are getting too much shade and not producing sufficient carbohydrates for the tree. Seventy-nine trees surveyed (32 percent) had a small amount of dead branches less than 10 percent of the crown. Six trees surveyed had dead branches with hangers. Gravity will eventually cause dead branches to fall. And dead branches over streets and sidewalks can become hazardous. So a regular program of dead branch spotting and removal is an important aspect of any tree maintenance program.

Forty six trees surveyed (19 percent) had dead branches in more than 10 percent of their crowns. This is a relatively modest number of trees with serious problems.

Figure 8 This stock photo from USDA Forestry files shows how a codominant leader with included bark splits off from the main trunk.

Figure 9 Two leaders with included bark are shown. These two leaders are more prone to failure by splitting when the tree crown becomes larger and strong wind conditions occur.

Figure 10 This stock photo from USDA Forestry files shows how a codominant leader with included bark becomes decayed where the multiple leaders push against each other as they grow and increase in diameter. Long branch end weight can eventually make the leader or branch unstable.

Codominant Leaders

Another significant defect observed was codominant leaders with included bark -- the most failure-prone type of codominant structure (See Figures 8, 9 and 10). Until recently, the last 10 to 15 years or so, many plant nurseries would cut the tip off nursery trees at a height of about 10 to 12 feet to cause sprouting and make the tree bushy. This procedure was done on nearly all nursery trees to provide what was then a desirable tree shape. Now we know that clustered branches emerging from about the same location on the trunk create weak structure. These rapidly growing lateral branches clustered together on the trunk often form included bark, which means the branches are weakly attached to the trunk. Included bark on clustered branches is not a problem while the tree is small. But as the tree grows in size and these lateral branches elongate and become heavier, branch failures begin to occur. As end weight increases and a force such as strong wind is applied to the branch, the branch fails by splitting where it is attached to the trunk. Another problem with clustered branches identified by Dr. Gilman is, "The crowded limbs choke the leader, and they develop few side branches so they taper poorly. This makes them weak."[13]

Today approximately 20 to 30 years after leaving the nursery and being transplanted into the landscape, we can still readily see where the nursery had cut the tip out of the street trees causing a cluster of branches emerging from near the same location on the trunk. We can now see a cluster of large, heavy lateral branches emerging from about the same height of the trunk at about 10 to 15 feet above the ground (Figure 7). The clustered branch defect created in the nursery years ago is still evident today and is what, in our opinion, can make so many of the laurel oaks prone to branch failure.

Laurel Oak Age Distribution -- Because the laurel oak is the predominant tree found in the survey on the common areas, we analyzed the DBH of the laurel oak population (Figure 3). The laurel oak is not only the predominant species but also the aging species that will be nearing its average life span in the next 10 to 20 years. A concerted effort of pruning maintenance to control branch sprawl and to avoid over-lifting and lions-tail type pruning will help prolong the life of the laurel oaks. This species commonly falls apart before it dies from poor health. So it you can control the structural defects such as branch sprawl, you can prolong the life of the laurel oaks by reducing branch failures.

Maintenance

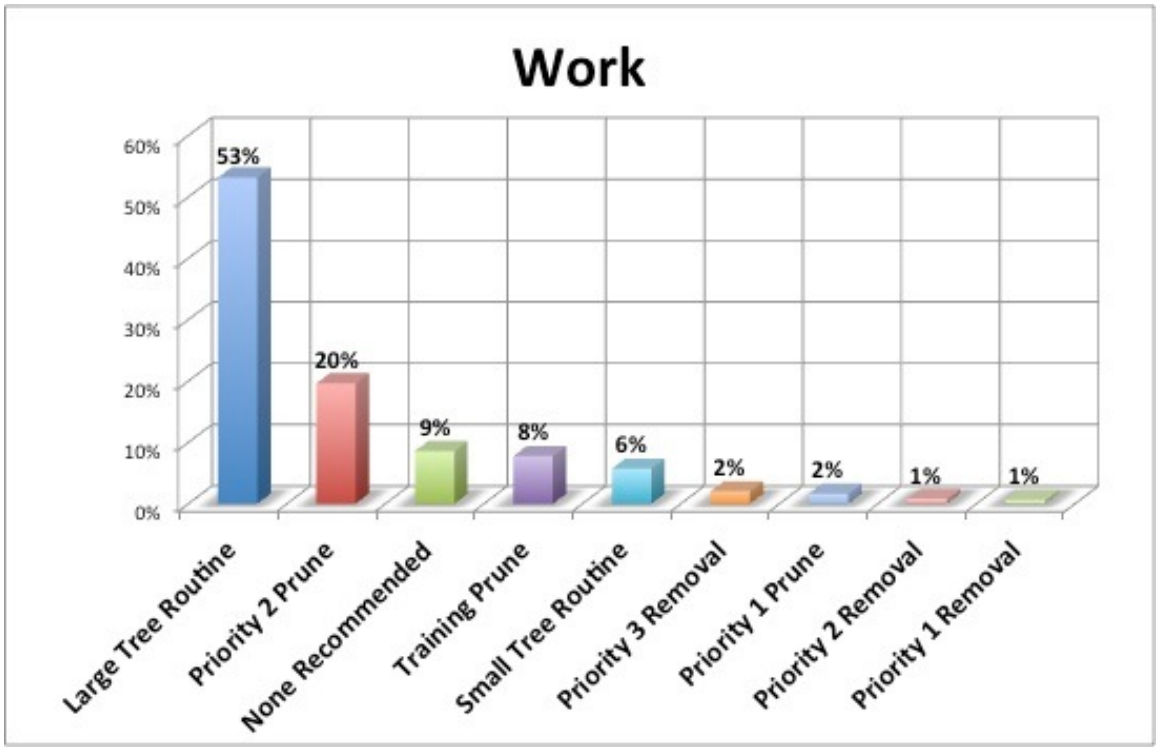

Figure 11

Maintenance -- Maintenance needs and recommendations are shown in Figure 11. Individual tree information is found in the data sheets in Appendix B.

Tree Removal - In all 8 trees were marked for removal in either Priority 1, Priority 2 or Priority 3 removals. There was only one Priority 1 Removal which is the most urgent.

Tree Pruning - About 60 percent (144 trees) needed regular routine pruning. Only 4 trees needed a Priority 1 Prune usually due to a hanger over a street or path and 48 trees (20 percent) needed a Priority 2 Prune usually because of dead branches over a street or path.

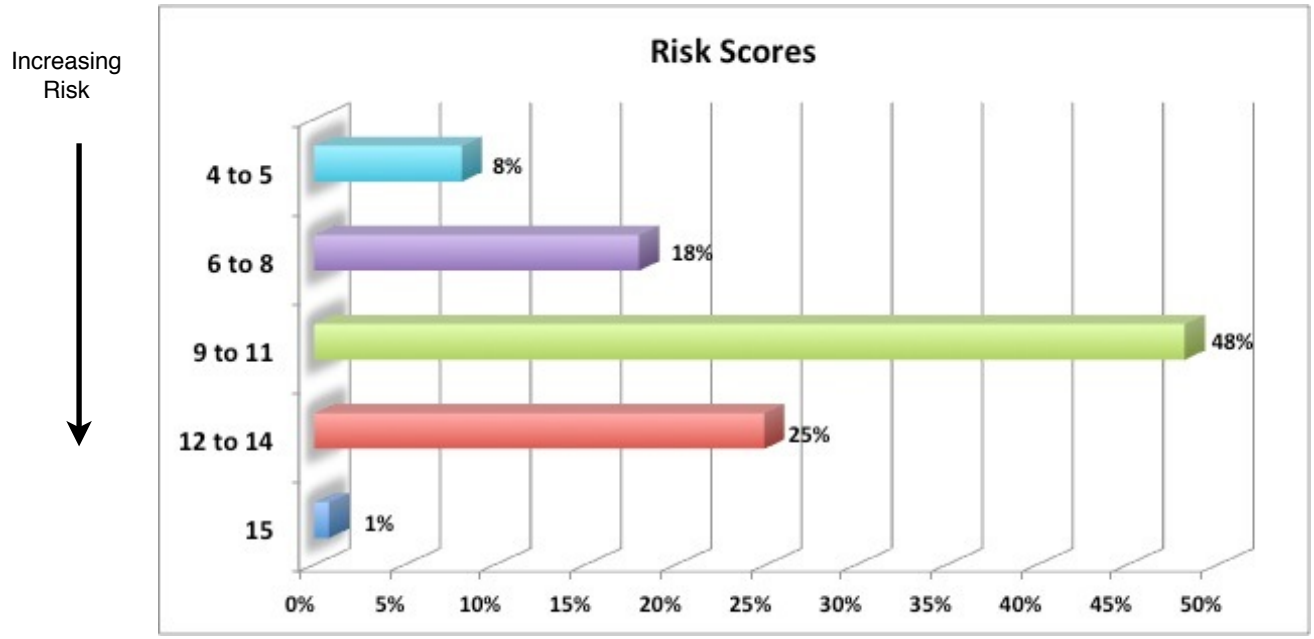

Figure 12

Risk Assessment -- Each tree has a Risk Assessment score based upon the four risk factors -- likelihood of failure, likelihood of target impact, consequences of failure, and tree species. The higher the score, the higher the risk. The distribution of the Risk Assessment scores is shown in Figure 12. The aging laurel oak population is clearly indicated by the larger number of trees in the higher risk areas. Generally trees especially laurel oaks with a risk rating over 10 or 11 need mitigation. Trees scoring between 9 and 11 should be considered for mitigation if funds are available. Always treat the trees with higher scores first.

Conclusions

A tree inventory and risk assessment provide valuable information for managing and maintaining an urban forest. Although no tree can be deemed safe and risk-free, a properly executed tree inventory and risk assessment can provide an organized and methodical way to deal with the trees that present the greatest risk. It allows for using limited resources to take care of the trees in greatest need of maintenance first and then taking care of trees with lower risk assessment scores as the budget and time permit. Use the tree inventory as a baseline for your on-going tree maintenance. Update each tree record when pruning work, sidewalk work or any excavation around a tree is done. Also record tree branch

failures and have a well-trained arborist inspect tree failures as soon as possible after they occur. That way you can gradually build up a historical knowledge base of the most common species that fail and the most common tree defects.

We are often asked, “How long is a risk assessment good?” Our answer is always, “That depends.” Usually if no violent wind storms occur in the area, a risk assessment is good for about 3 years but that also depends upon your budget and the weather. A high wind event can make existing defects worse or create new defects. Cracks in branches and forks can occur as well as hangers can be created by wind events.

End Weight Reduction Pruning - There has been a lot of pruning research in the last few years on how to reduce the failure risk on mature trees with large codominant limbs. Much of that work has been done by Dr. Ed Gilman of the University of Florida. He has been cited several times in this report. Several years ago Gilman recommended reduction of codominant leaders by 15 to 25 percent to reduce end weight. More recently he has been teaching that the amount of cure for large codominant limbs should be the removal of 40 up to 60 percent of the end weight. In our opinion, with the predominant laurel oak species many with poor structure, it is important for the HOA and South Bay property owners to be more aggressive in reducing branch end weight on trees with higher risk scores.

Stop Over Lifting - It is very important that tree services trained in the latest techniques of branch end weight reduction are hired to do the work. Much of the tree pruning we observed being done at South Bay especially on private property is the old discredited method of removing lower and interior branches (Figure 13). Recent research has demonstrated that removing lower branches only raises the center of gravity of the tree making the tree more susceptible not less to wind throw. Lower branches also provide a damping effect to wind gusts helping to dissipate the force of the wind. Long sprawling lateral branches should be shortened by end weight reduction pruning not removed.

Figure 13 Many of the trees in South Bay are improperly over lifted by removal of all the interior and lower branches. This pruning method does **not** make the tree more wind resistant.

Managing the Sprouts - Now that the lower and interior branches have been improperly removed from many trees, there is not much that can be done other than wait the the trees to produce an abundance of water sprouts often called suckers or epicormic sprouts. Trees produce an abundance of suckers or sprouts in order to quickly recreate the leaf surface that has been abruptly removed by over-pruning. Leaves produce carbohydrates which is the food for trees. And the carbohydrates are stored in the wood of young branches nearest the leaves. Once many of the leaves and branches are removed, the tree puts out more leaves and branches at a great expense in energy to make and store food for future use.

The same pruners who did the over-lifting pruning will often come back offering to “clean up” and remove those unsightly suckers. That should not be done. Instead let the water sprouts develop for two to four years and then keep the largest sprouts and remove the extra ones. The idea is to recreate that important lower and interior branch structure that had been removed. Some directional pruning will also be needed when managing the sprouts.

Sidewalks -- As with most municipalities and HOA’s, dealing with sidewalk-tree infrastructure conflicts in an on-going battle. Dealing with sidewalk lifting is an important aspect of controlling risk and improving safety. There are many new construction techniques that are better for trees than simply cutting roots, which can destabilize a tree. In effect cutting roots substitutes one risk (tripping) for another -- tree instability and tree decline. An arborist knowledgeable in sidewalk construction techniques should always be part of the sidewalk repair process.

Appendix A Definitions

Codominant Leaders – a tree with multiple trunks often beginning as a single leader and dividing into two or more leaders of similar size higher up on the trunk. Codominant leaders are considered a structural defect because they can be prone to failure (splitting). Codominant leaders with included bark are at greater risk of failure than codominant leaders without included bark.
Compartmentalization – the ability of a tree to isolate (wall off) damage and decay and continue to grow around the damaged area. Trees that are good compartmentalizers are better able to withstand damage from injuries such as pruning cuts, gashes, lightning strikes, etc.
Condition – an evaluation of a tree's structure and health. Structural condition is not the same as health condition. You can have a healthy tree with poor structure that is prone to failure.
Critical Root Zone – this an area around a tree where roots must be protected and is another term for Tree Protection Zone
DBH – diameter at breast height, a measurement of a tree's diameter usually measured approximately four and one half feet above the ground
Epicormic sprouts – Excessive sprouting. Short twigs and small leaves growing along the upper surface of one or more main branches. The presence of epicormic sprouts are an indication of poor tree health, over-pruning, a weakened tree.
Included Bark – Bark pinched or embedded between two adjoining stems or between a branch and trunk, preventing or reducing the intermingling of branch and trunk collars, and preventing formation of a branch bark ridge. An indication of a weak union. A crack in the union.
Reduction Pruning – A recommended pruning method that reduces (subordinates) codominant leaders and large side branches by reducing their size from the outside in. Reduction pruning is often the preferred method of taking weight off the ends of branches versus the commonly utilized but undesirable method known as "lion tailing" which removes interior branches and keeps only the branches out at the end creating instability and increasing risk of branch or trunk failure. Also called End Weight Reduction Pruning.
Resistograph – a diagnostic tool that utilizes a 1/8-inch diameter drill bit to measure decay inside a tree trunk or branch by measuring and graphing the resistance of the drill bit as it moves through the different layers of sound and decayed wood.

Certification of Performance

Chuck Lippi, Advanced Tree Care, Inc.

Registered Consulting Arborist #443 Board Certified Master Arborist FL-0501B

I, Chuck Lippi, certify that:

- Arborists cannot detect every condition that could possibly lead to the structural failure of a tree. Trees are living organisms that fail in ways we do not fully understand. Conditions are often hidden within trees and below ground. Arborists cannot guarantee that a tree will be healthy, safe or adequately protected under all circumstances or for a specified period of time. Likewise, remedial, protective and mitigating treatments and recommendations cannot be guaranteed.
- I have no current or prospective interest in the vegetation or the property that is the subject of this report and have no personal interest or bias with respect to the party or parties involved.
- I certify that all the statements made in this report are true, complete and correct to the best of my knowledge and belief and are made in good faith.
- The analysis, opinions and conclusions stated herein are my own and are based on current scientific procedures and facts.
- My analysis, opinions and conclusions were developed and this report has been prepared according to commonly accepted arboricultural practices.
- My compensation is not contingent upon the reporting of a predetermined conclusion that favors the cause of the client or any other party nor upon the results of the assessment, the attainment of stipulated results or the occurrence of any subsequent events.
- There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the plants or property in question may not arise in the future.
- I reserve the right to change my reports/opinions on the basis of new or different evidence.
- Loss or alteration of any part of this report invalidates the entire report.

I further certify that I am a member in good standing of the American Society of Consulting Arborists (ASCA), the International Society of Arboriculture (ISA) and the Florida Urban Forestry Council and am an ISA Board Certified Master Arborist FL-0501B and an ASCA Registered Consulting Arborist #443.

References

[1] American National Standards Institute (ANSI) A300 Risk Assessment Part 9 Tree, Shrub, and Other Woody Plant Management Standard Practices (***Tree Risk Assessment*** a. Tree Structure Assessment), 2011.

[2] Thomas Smiley, Nelda Matheny and Sharon Lilly, ***Best Management Practices Tree Risk Assessment***, International Society of Arboriculture, Champaign, Illinois, 2011.

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