



Improving Your Planting Program Through Tree Health Monitoring



Wildman Designs

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Why collect health data on your young trees?

...in highly urbanized cities



**You are planting
in some
challenging sites**

...in Schools



...in extremely windy parks and open spaces



...in prairie dog habitats

At the end of the day, what is your goal?

1. Providing healthy trees, of the appropriate species, planted in the best sites?
2. Provide tree care visits to establish the tree to 3 years after the planting?
3. Provide tree care visits to 5 years after the planting?
4. What can you actually offer?
5. What are your goals programmatically to get there?



Tree Health Data Collection Can Help You...

- Determine your best performing tree species.
- Find out your worse performing tree species— understand why, adapt & limit planting **or**, eliminate planting altogether.
- Discover what planting practices/planting details are working.
- Create a benchmark of health for all trees you plant. Then, improve it!



Polling Question #1

What data storage or data base do you and your organization use?

- Microsoft Excel
- Microsoft Access
- Salesforce
- TreePlotter (PlanIt Geo)
- Other proprietary software

Polling Question #2

Do you collect tree health data on your trees?

- Yes
- No
- Sometimes

Just like having a current urban forest inventory enables urban foresters to manage their trees,

Knowing the health condition of your trees, at 1, 3 and 5 years, will enable you to improve your tree success rate.

Improve your tree Survivorship !

Collecting health condition ratings & reason codes



Healthier Trees



Larger Grants & Contracts and Clear Pathway to Higher Donations

What data points are you going to collect?

ID	FI	ID	ION	FROM_	TO	LAND USE	ADDRESS	ASSIGNED	STREET	LOCATION	SEQUENCE	ROW	COMMO	BOTANICAL	CULTIVAR	DBH	STEMS
1	0	1	PIERCE ST	FULTON ST	MCALLISTER ST		840	No	MCALLISTER ST	Right	1			Quercus grandiflora		15	1

WIDTH	HEIGHT	GROWSPACE	SPACESIZE	OHTRANS	OHPRIMARY	OHSECONDARY	OHSECT	OHAB	ELEC	HDSCAPE	THRUZONE	CLEARANCE	OBSERVE
21 to 30	31 to 40	Tree Well	3	No		No			No	No	N/A	Yes	None

MAINT	MAINTTASK	CONDSTRUC	CONDOWN	COND	VISIBLE	INSPECT	GRATEPRES	UPLIFT	NOTES
Large Tree R... Prune	No Specific Maintenance Need	Fair - 60	Good - 80	Fair - 60	Yes	No	No	No	

Keep it simple ... don't collect what you will not use.

+40 additional fields

Data sheets

How are you collecting the data?

Date Planted	Species	Tree Address	Owner	Caretaker
3/6/2010	Diospyros kaki 'Fuyu'	1000 .1 Cayuga Ave	Mr. John Bitoff/SFUSD / Balboa High School 834 Toland St San Francisco, CA 94124 (415) 695-5925 John Bitoff, work	
<input type="checkbox"/> FUFcov	Care1Pd	DoneDate 1/28/2011	Cross Onondaga	
<input type="checkbox"/> FUFcov	2yrPd	DoneDate	Doug	
<input type="checkbox"/> FUFcov	3yrPd	DoneDate 2/23/12	Status	Reason
<input type="checkbox"/> 5yrPd	DoneDate			
Type: 12 months	CrockerAmazon			
<input checked="" type="checkbox"/> # Stakes Used	<input checked="" type="checkbox"/> # Crossbraces			
DPW planted on campus, FUF to prune 1x/yr x 3 yrs, funded by FUF. Part of 2012x2012.				Fruiting
3/6/2010	Malus (other)	1000 .2 Cayuga Ave	Mr. John Bitoff/SFUSD / Balboa High School 834 Toland St San Francisco, CA 94124 (415) 695-5925 John Bitoff, work	
<input type="checkbox"/> FUFcov	Care1Pd	DoneDate 1/28/2011	Cross Onondaga	
<input type="checkbox"/> FUFcov	2yrPd	DoneDate	Doug	
<input type="checkbox"/> FUFcov	3yrPd	DoneDate 2/23/12	Status	Reason
<input type="checkbox"/> 5yrPd	DoneDate			
Type: 12 months	CrockerAmazon			
<input checked="" type="checkbox"/> # Stakes Used	<input checked="" type="checkbox"/> # Crossbraces			
DPW planted on campus, FUF to prune 1x/yr x 3 yrs, funded by FUF. Part of 2012x2012.				Fruiting
3/6/2010	Malus (other)	1000 .3 Cayuga Ave	Mr. John Bitoff/SFUSD / Balboa High School 834 Toland St San Francisco, CA 94124 (415) 695-5925 John Bitoff, work	
<input type="checkbox"/> FUFcov	Care1Pd	DoneDate 1/28/2011	Cross Onondaga	
<input type="checkbox"/> FUFcov	2yrPd	DoneDate	Doug	
<input type="checkbox"/> FUFcov	3yrPd	DoneDate 2/23/12	Status	Reason
<input type="checkbox"/> 5yrPd	DoneDate			
Type: 12 months	CrockerAmazon			
<input checked="" type="checkbox"/> # Stakes Used	<input checked="" type="checkbox"/> # Crossbraces			
DPW planted on campus, FUF to prune 1x/yr x 3 yrs, funded by FUF. Part of 2012x2012.				Fruiting
3/6/2010	Malus (other)	1000 .4 Cayuga Ave	Mr. John Bitoff/SFUSD / Balboa High School 834 Toland St San Francisco, CA 94124 (415) 695-5925 John Bitoff, work	
<input type="checkbox"/> FUFcov	Care1Pd	DoneDate 1/28/2011	Cross Onondaga	
<input type="checkbox"/> FUFcov	2yrPd	DoneDate	Doug	
<input type="checkbox"/> FUFcov	3yrPd	DoneDate 2/23/12	Status	Reason
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Type: 12 months	CrockerAmazon			
<input checked="" type="checkbox"/> # Stakes Used	<input checked="" type="checkbox"/> # Crossbraces			
DPW planted on campus, FUF to prune 1x/yr x 3 yrs, funded by FUF. Part of 2012x2012.				Fruiting

was done
abase

entered in

STATUS CODES:

1. VERY HEALTHY
2. GOOD
3. STRUGGLING
4. ALMOST DEAD
5. DEAD OR GONE

REASON CODES:

- a. needs water
- b. snapped leader
- c. binding ties
- d. chaffing stakes
- e. nursery staked
- f. weak trunk
- g. damaged trunk
- h. planted too deeply
- i. planted too high
- j. weeds/woody plants in basin
- k. blight/disease/insects
- l. wind damage
- m. poor drainage
- n. poor rooting
- o. tree shaded by bldg, tree, etc
- p. poor structure
- q. root crown buried after planting
- r. leaf chlorosis
- t. topped
- v. vandalized

Owner

Gina Fromer and Kevin Chiles/YMCA

Caretaker

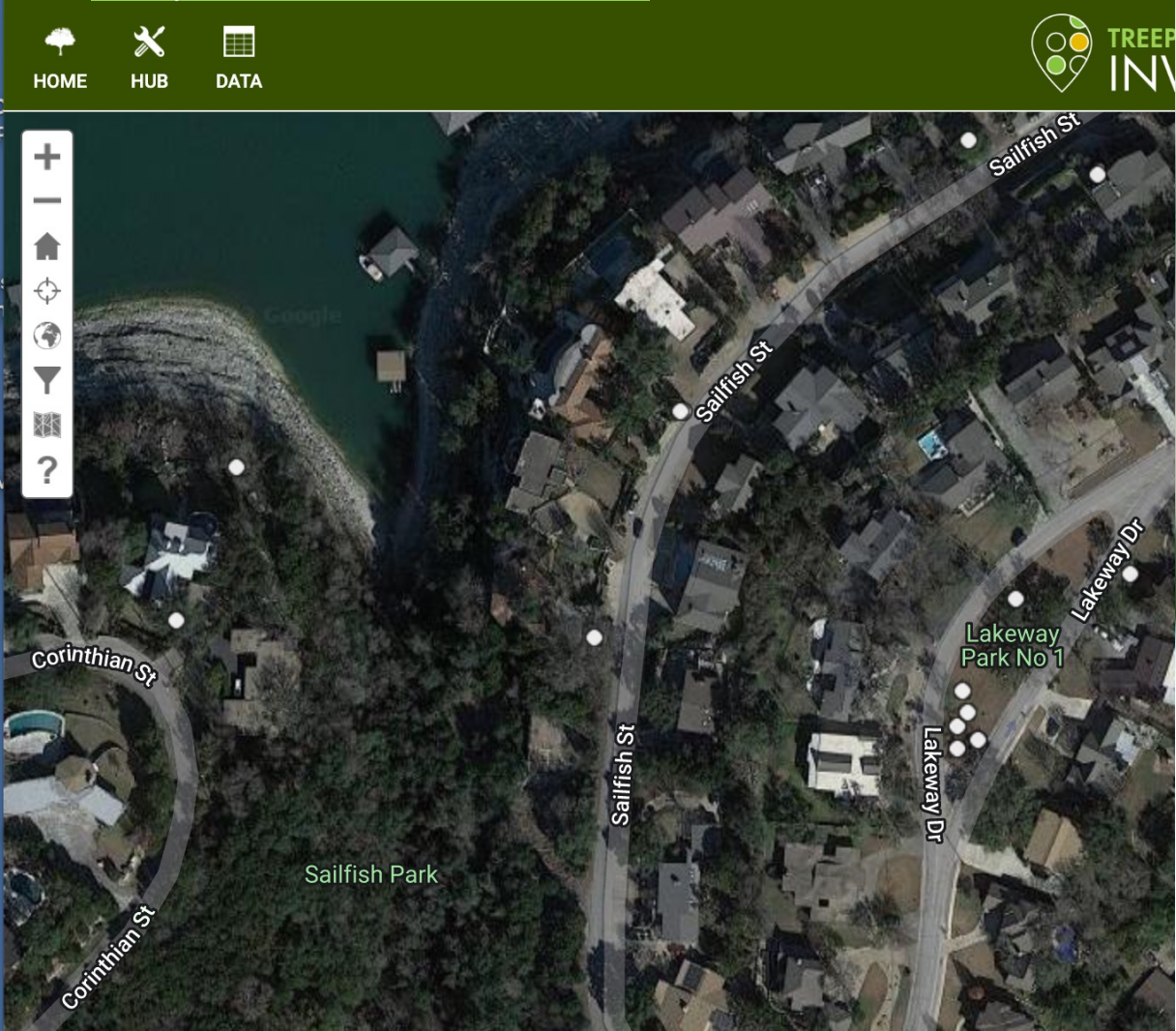
& Keith

MENT TREE

1601 Lane St
San Francisco, CA 94124
(415) 822-7728 w
(415) 822-7769 fax

id: 2010

Revere at Lane



Hand held tablets/phones with real-time uploads to your database

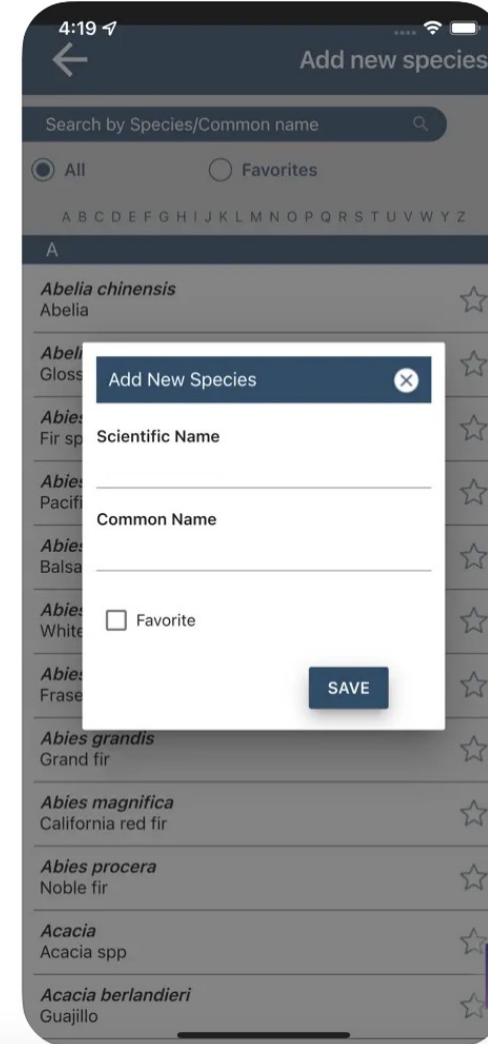
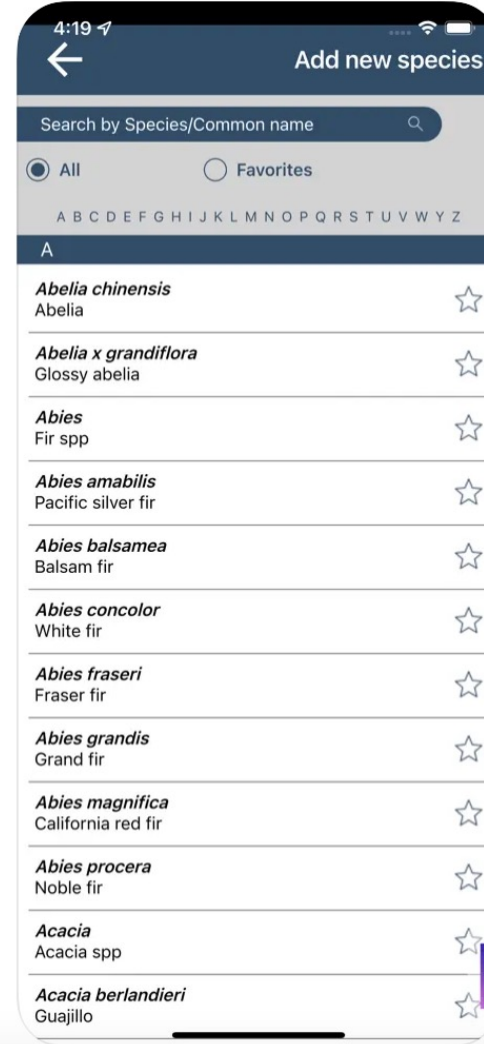
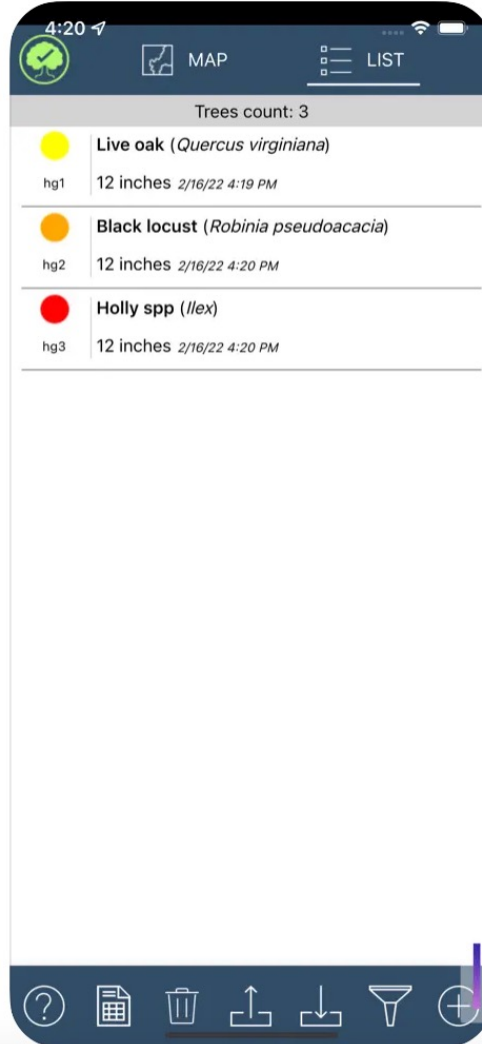
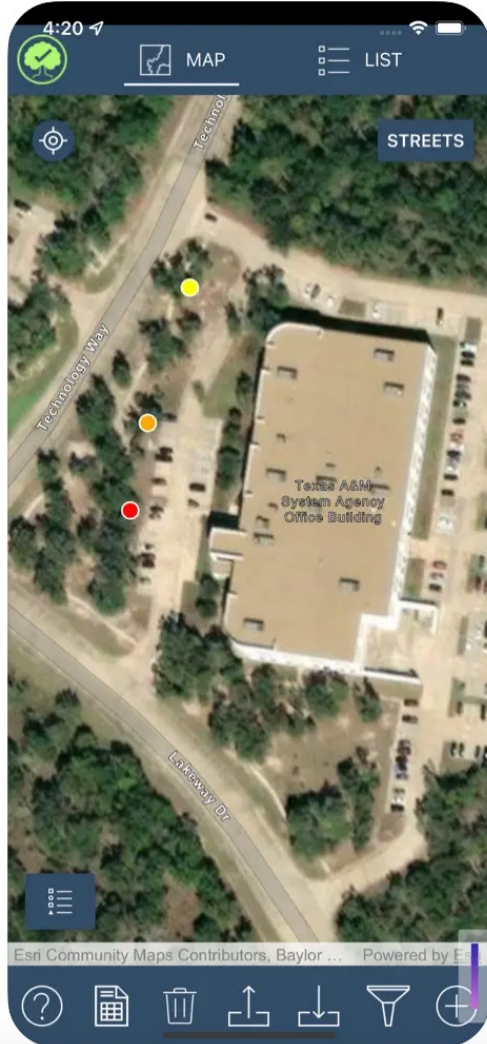




Trees Count – Tree Inventory ⁴⁺
Texas A&M Forest Service (TFS)
★★★★★ 3.0 + 2 Ratings
Free

Customizable applications

Screenshots [iPhone](#) [iPad](#)



Young Tree Health by Neighborhood by Species

Neighborhood	Tree Species	Percent 1 & 2	Reasons for Ratings 3, 4 & 5	Percent 1 & 2 of All Species Planted in Neighborhood
Bayview District	Arbutus 'Marina'	73%	Wind damage; needs water; weeds/woody plants = possible lack of care?	69%
	Magnolia grandiflora (all var.)	65%	Wind damage; needs water	
	Metersideros excelsus	69%	Wind damage; needs water; weeds/woody plants; snapped ldr = vandalism	
	Tristaniopsis laurina (Tristania I.)	73%	Wind damage; needs water; planted too low;	
Excelsior District	Arbutus 'Marina'	82%	Damaged trunk; poor drainage; blight/disease/insects	86%
	Prunus serrulata 'Kwanzan'	95%	Wind damage	
	Prunus cerasifera 'Krauter V.'	76%	Wind damage; needs water; binding ties; chaffing stakes	
	Tristaniopsis laurina (Tristania I.)	76%	Wind damage; needs water	
	Pittosporum undulatum	84%	no conclusive data	
Inner Richmond District	Arbutus 'Marina'	100%	Poor rooting noted overall	83%
	Prunus serrulata 'Kwanzan'	93%	Poor rooting; needs water	
	Prunus cerasifera 'Krauter V.'	64%	Wind damage; needs water	
	Tristaniopsis laurina (Tristania I.)	70%	Wind damage; needs water; weak trunk; nursery stake needed	
	Pittosporum undulatum	90%	binding ties; weeds	
Inner Sunset District	Arbutus 'Marina'	94%	Wind damage; needs water; poor rooting; planted too deeply	83%
	Prunus serrulata 'Kwanzan'	92%	Blight/disease/insects	
	Prunus cerasifera 'Krauter V.'	87%	Wind damage; needs water; blight/disease/insects; planted too high	
	Maytenus boaria	83%	Wind damage; needs water; poor rooting; weak trunk; planted too high	
	Meterosideros excelsus	89%	no conclusive data	
Ocean/Merced/ Ingleside Districts (narrow sidewalks typ.)	Arbutus 'Marina'	81%	Wind damage; needs water; weak trunk; blight/dis/insects; weeds/woody plants	72%
	Leptospermum scoparium	64%	Weak trunk; damaged trunk; planted too high; snapped ldr; blight/disease/insects	
	Prunus serrulata 'Kwanzan'	67%	Wind damage; needs water; weak trunk; weeds/woody plants	
	Prunus c. 'Krauter V.' + 'Tcloud'	76%	Wind damage; needs water; blight/disease/insects; damaged trunk	
South of Market District	Prunus serrulata 'Kwanzan'	88%	Damaged trunk; snapped leader; poor rooting	76%
	Prunus cerasifera 'Krauter V.'	65%	Wind dam; needs water; snapped ldr; blight/dis/insects; weeds/woody plants	
	Tristaniopsis laurina (Tristania I.)	62%	no conclusive data	
	Lophostemon confertus	79%	Poor rooting; needs water; snapped leader; poor structure	

Young Tree Health by Neighborhood by Species

Neighborhood	Tree Species	Percent 1 & 2	Reasons for Ratings 3, 4 & 5	Percent 1 & 2 of All Species Planted in Neighborhood
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	Tristaniopsis laurina (Tristania l.)	73%	Wind damage; needs water; planted too low;	

Over a 5- year period, 92 *Agonis flexuosa* were planted

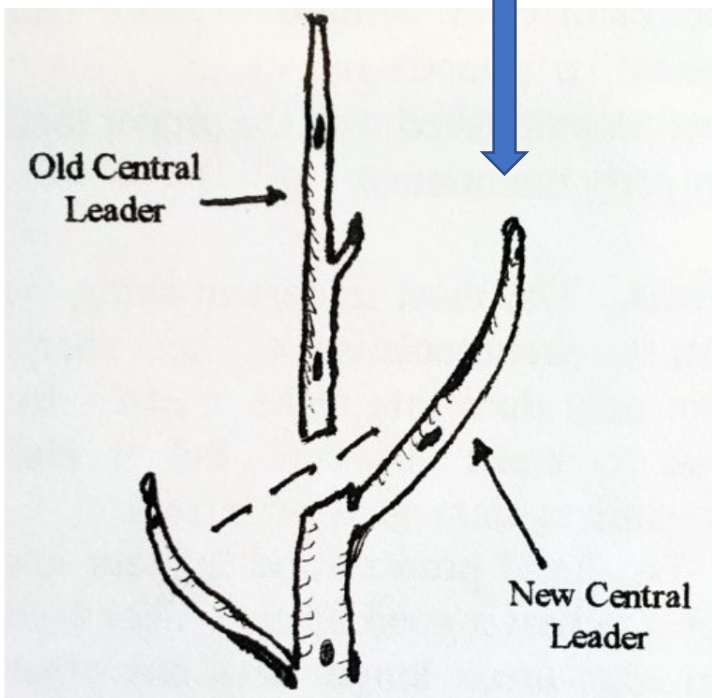
<i>Agonis flexuosa</i> + A. f. 'Dark Star'		2- Months After Planting Survey	1- Year After Planting Survey	2- Years After Planting Survey	3- Years After Planting Survey
1's	Excellent	46	47	21	23
2's	Good	35	28	40	45
3's	Struggling	5	8	6	12
4's	Almost Dead	2	3	2	7
5's	Dead/Gone	4	3	1	5
Total Number Surveyed (Data Set)		92	89	70	92
Percent 1 & 2		88%	84%	87%	74%
Percent 1, 2 and 3		93%	93%	96%	87%

Agonis is a fast growing tree getting annual tree care visits for the first three years → annual health surveys.

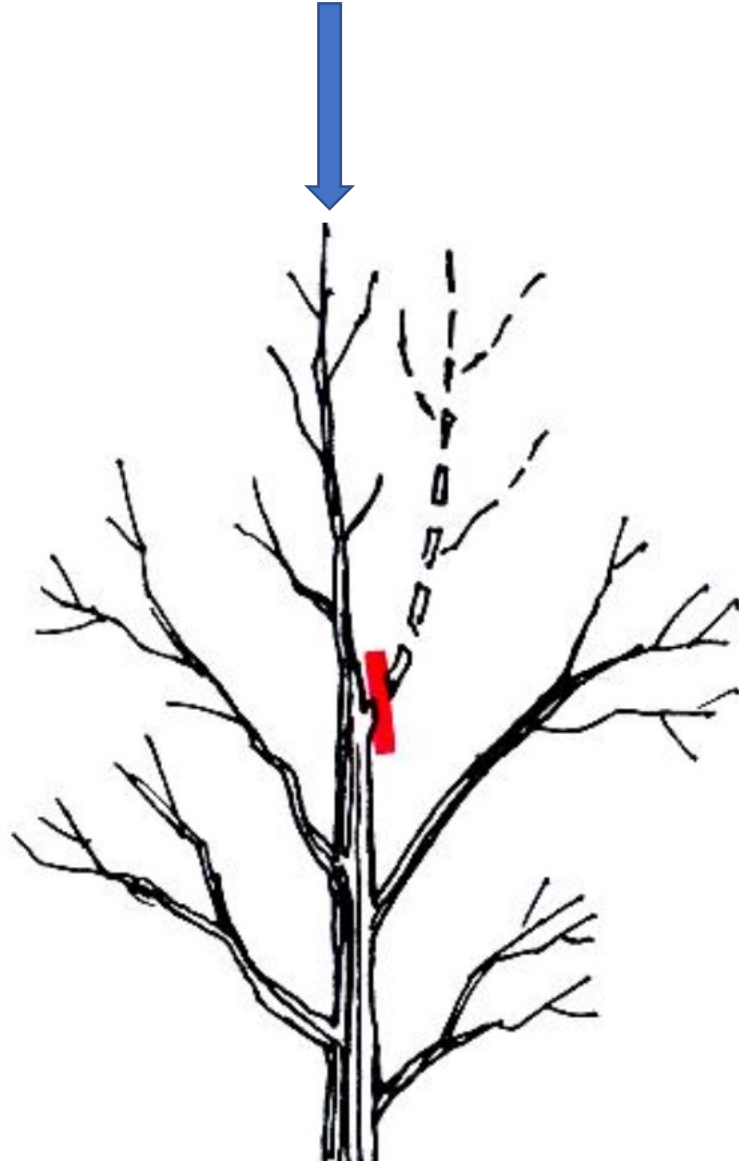


Some terms in this presentation:

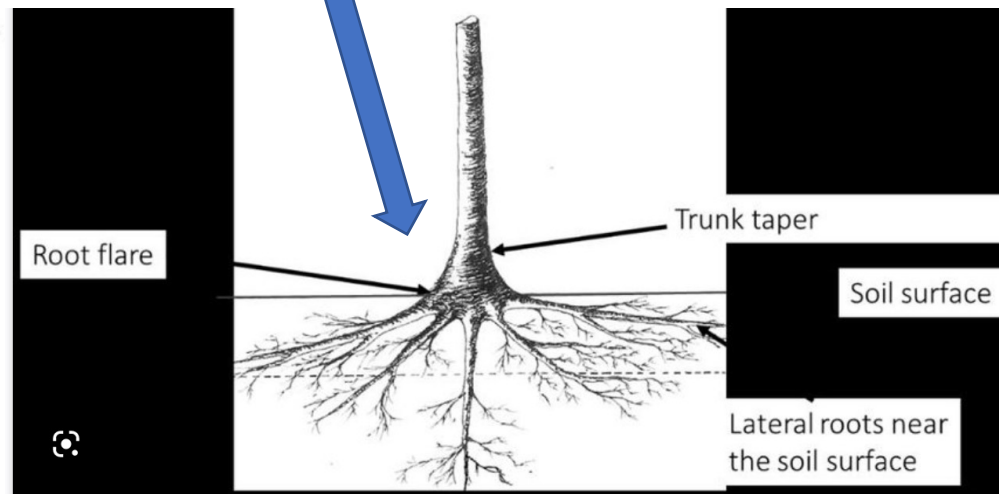
Retraining a leader



Central Leader



Root Flare and Trunk Taper



Blue Sky Index



Small Leaf Tristania- *Tristaniopsis laurina*

Polling Question #3



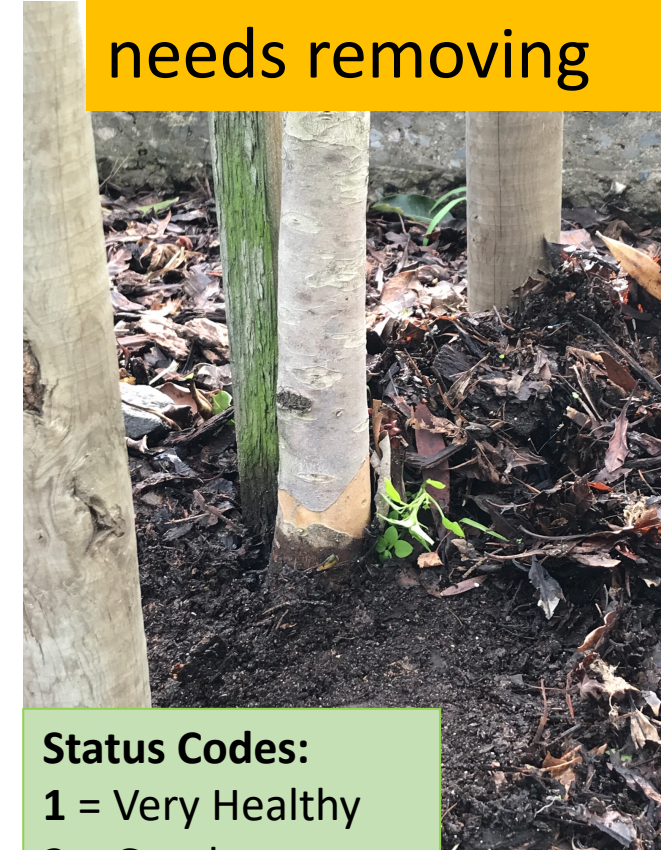
How would you rate this 18 month old tree on a 1-5 scale?



Status Code:

1

(nursery stake needs removing)



Status Codes:

1 = Very Healthy

2 = Good

3 = Struggling

4 = Almost Dead

5 = Dead/Gone



How would you rate this 18 month old tree (1-5)?

Status Code:
1
(nursery stake needs removing)



1 = Very Healthy
2 = Good
3 = Struggling
4 = Almost Dead
5 = Dead/Gone



Magnolia grandiflora 'Little Gem' – Southern Magnolia

Quercus tomentella – Island Oak

Three in a row & each tree is three years old



#1



#2



#3

How would you rate this 3 year old tree (1-5)?

- 1 = Very Healthy
- 2 = Good
- 3 = Struggling
- 4 = Almost Dead
- 5 = Dead/Gone

Status Code: 3

Reason Codes:

- o. Tree shaded by building... ?
- z. Lack of vigor (for some reason)

Reason Codes:

- a. Needs water
- b. Snapped leader
- c. Binding ties
- d. Chaffing stakes
- e. Nursery staked
- f. Weak trunk
- g. Damaged trunk
- h. Planted too deeply
- i. Planted too high
- j. Weeds/woody plants in basin
- k. Blight/disease/insects
- l. Wind damage
- m. Poor drainage
- n. Poor rooting
- o. Tree shaded by bldg., trees, etc
- p. Poor structure
- q. Root crown buried after planting
- r. Leaf chlorosis
- s. Topped
- t. Vandalized



Quercus tomentella – Island Oak
Tree #1



Quercus tomentella – Island Oak Tree #2

How would you rate this
3 year old tree (1-5)?



- 1 = Very Healthy
- 2 = Good
- 3 = Struggling
- 4 = Almost Dead
- 5 = Dead/Gone



Status Code: 3
Reason Codes:
r. Blight/disease/insects
k. Leaf chlorosis





Status Code: 1
Reason Codes:
None



Quercus tomentella – Island Oak
Tree #3

Status Code: 3 = Struggling

Reason Codes:

j. Weeds/woody plants in basin

q. Root crown buried after planting



Magnolia grandiflora 'Little Gem' - Little Gem Magnolia

5 – Dead/Gone

- 1 = Very Healthy
- 2 = Good
- 3 = Struggling
- 4 = Almost Dead
- 5 = Dead/Gone



Arbutus 'Marina' – Strawberry Tree

Reason Codes:

- a. Needs water
- b. Snapped leader
- c. Binding ties
- d. Chaffing stakes
- e. Nursery staked
- f. Weak trunk
- g. Damaged trunk
- h. Planted too deeply
- i. Planted too high
- j. Weeds /**
- k. Blight
- l. Poor drainage
- m. Poor rooting
- n. Tree shaded by bldg., trees, etc
- p. Poor structure
- q. Root crown buried after planting
- r. Leaf chlorosis
- s. Topped**
- t. Vandalized

Not enough information known-
What does your 18-Month Survey tell you?

- 1 = Very Healthy
- 2 = Good
- 3 = Struggling
- 4 = Almost Dead
- 5 = Dead/Gone



Arbutus 'Marina' – Strawberry Tree



1 - Excellent



5 – Dead/Gone

Arbutus 'Marina' – Strawberry Tree

Polling Question #4

Status Codes:

- 1 = Very Healthy
- 2 = Good
- 3 = Struggling
- 4 = Almost Dead
- 5 = Dead/Gone



Status Code: 2

Reason Codes: 'g' & 'p'

Olea europaea 'Fruitless' (they *Fruit Less!*) - European Olive

Reason Codes:

- a. Needs water
- b. Snapped leader
- c. Binding ties
- d. Chaffing stakes
- e. Nursery staked
- f. Weak trunk
- g. Damaged trunk**
- h. Planted too deeply
- i. Planted too high
- j. Weeds/woody plants in basin
- k. Blight/disease/insects
- l. Wind damage
- m. Poor drainage
- n. Poor rooting
- o. Tree shaded by bldg., trees, etc
- p. Poor structure**
- q. Root crown buried after planting
- r. Leaf chlorosis
- s. Topped
- t. Vandalized

Polling Question #5



Status Code - 3



Reason codes:
b. Snapped Leader
h. Planted too deeply
p. Poor structure
s. Topped

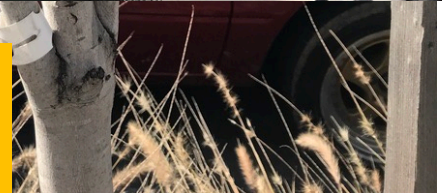
Acer spp. - Maple

Status Code:
2



Acer x fremontii 'Jeffersred' – Autumn Blaze Red Maple

Reason Code:
p. Poor Structure



Jacaranda mimosifolia - Jacaranda

Status Code: 3

Reason Codes:

- f. Weak trunk
- h. Planted too deeply
- n. Poor rooting

Status Code:

- 1 = Very Healthy
- 2 = Good
- 3 = Struggling
- 4 = Almost Dead
- 5 = Dead/Gone



Reason Codes:

- a. Needs water
- b. Snapped leader
- c. Binding ties
- d. Chaffing stakes
- e. Nursery staked
- f. Weak trunk
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- h. Planted too deeply
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- k. Blight/disease/insects
- l. Wind damage
- m. Poor drainage
- n. Poor rooting
- o. Tree shaded by bldg., trees, etc
- p. Poor structure
- q. Root crown buried after planting
- r. Leaf chlorosis
- s. Topped
- t. Vandalized

Monitoring Trees Helps Substantiate Quantitatively What You May Already Know!

- ▣ After high winds and storms, what tree species do you clean up after most? Why? Circling roots on *Tristania* and *Lophostemon* from nurseries. ----deep root pruning at planting time necessary; train volunteers.
- ▣ *Leptospermum* spp. & *Hakea* spp. do not root well in sandy soils with a constant prevailing coastal wind. ----Planting where protected sites in sandy soils is okay.
- ▣ Vandalism is a large factor in certain neighborhoods. --- Plant faster growing tree species.
- ▣ Leaf diseases with *Prunus* species is another nail on the coffin to not plant these short lived trees!---Reduce or stop planting.
- ▣ *Ulmus parvifolia* grow very fast. Can volunteers & staff prune adequately? Can you provide annual tree care visits? Can school districts successfully prune *Ulmus* spp.?

Institutional knowledge is very important

Planting organizations attract some amazing staff and their knowledge needs to get transferred to new staff and volunteers whenever possible.

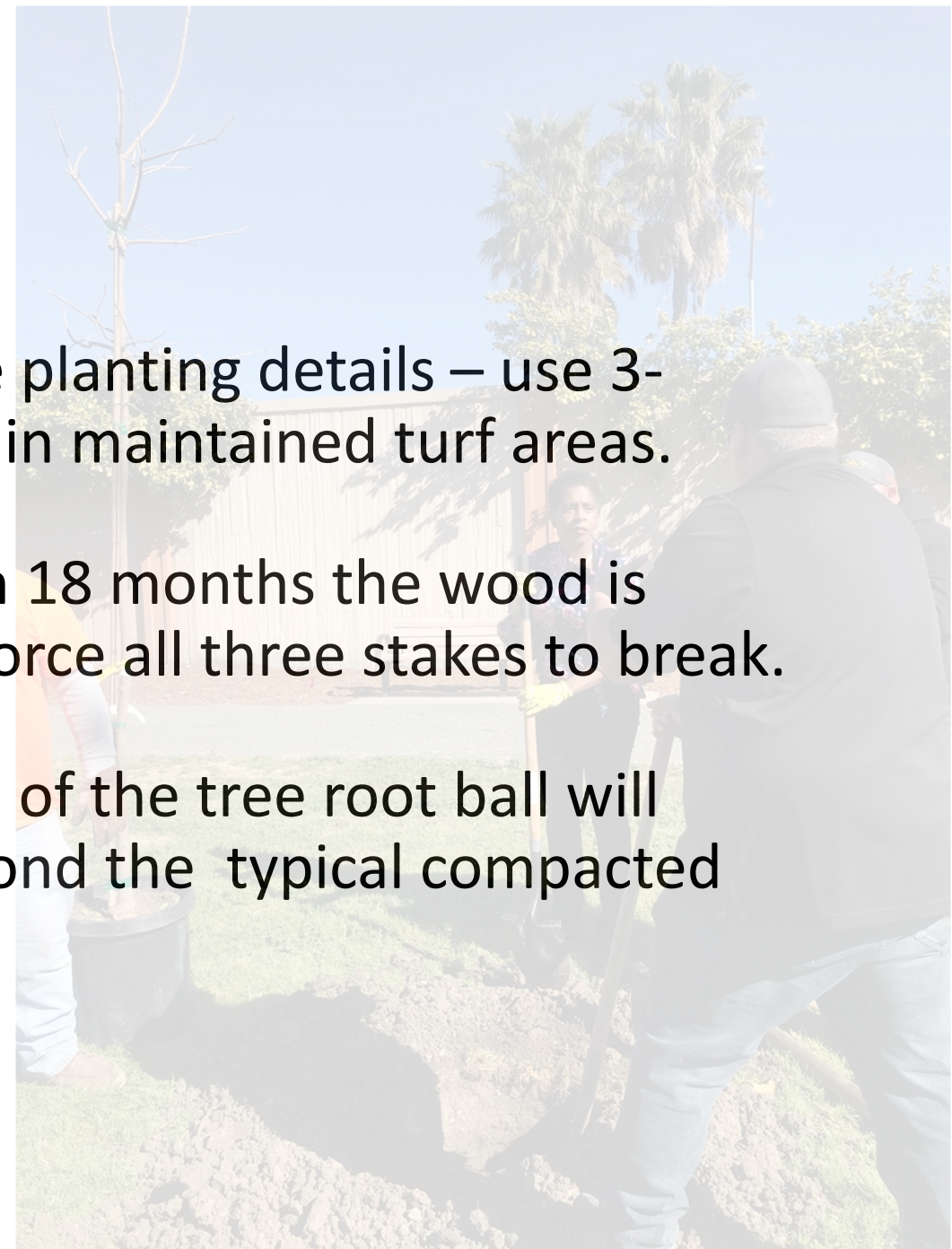
Using tree health data to help select tree species will save money and time.

Offer a Refined Species List at your Community Tree Plantings

- Data from tree care activities and monitoring should feed right back into our offerings of tree species in different neighborhoods.
- Refining and expanding your tree species lists is important. Tree species sampling is an on going process. Begin to gather data now.

Monitoring and Improving Tree Planting Technique

- ▣ Data collection leads to improved tree planting details – use 3-wood stakes instead of two especially in maintained turf areas.
- ▣ Non-treated stakes do not last! Within 18 months the wood is rotted through enough for a wind to force all three stakes to break.
- ▣ Planting holes drilled below the depth of the tree root ball will cause newly planted trees to sink beyond the typical compacted depth.



Obstacles in Monitoring and Some Suggested Improvements

- Collecting tree health data may be faster by hand with data sheets.
- Using tablets/phones may reduce errors compared to data sheets.
- Have frequent data collection workshops with staff and volunteers to improve consistency.
- Stepping up your game to providing 5-year old tree care and health monitoring provides better data on tree species.
- Share results with others.

Polling Question #6

Is capturing tree health data when visiting your trees something you are interested in doing?

- Yes
- We already do collect tree health data
- No



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Questions?

Thank you!

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Arborist / Landscape Architect

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