Updated Sub-Committee Reports

April 6, 2010 - The following pages provide an update on the progress of the Urban Forestry Standards Sub-Committees to date.
Thanks, Dave Nowak / Dave Bloniarz

STANDARDIZATION

Urban Forestry Data Collection and Recording Standards

The development of specific data standards will relate to various issues associated with data collection, recording archiving of info related to urban forests. This initiative intends to develop standards which can be used to ensure that data collection protocols are consistent across the globe.

Develop specific objectives related data collection and recording

April 6, 2010 - The subcommittee teams have been working on the tasks related to the overall Standards project, and the following pages provide brief summary of topics, issues and other items that the various teams have been developing and discussing.

The sub-committees and their focus areas are noted below, followed by summary reports from the teams.

General Tree Metrics

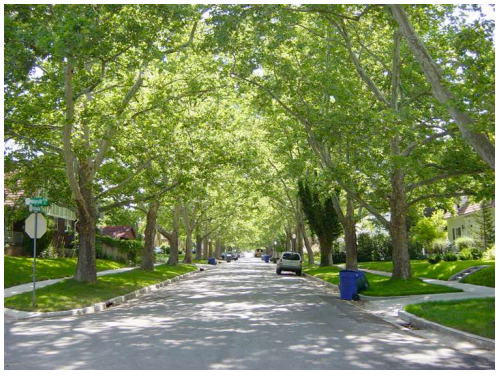
Specific metrics on measurement of tree diameter, tree height, crown width, height to base of crown, species, species to cultivar or variety.

Tree Maintenance

Standard metrics on maintenance needs such as structural support, pruning, removal, crown cleaning, crown raising, fertilization, aeration, pest management, follow-up inspection/monitoring, and other tree maintenance tasks.

Tree Health, Decay and Risk

Metrics on structural health including tree decay, failure type and specifics, tree hazard rating and other risk factors.



Tree Location and Site Variables

Tree location, including coordinates of tree and or address, city, country, general information on location in landscape (e.g., front yard, street tree, etc.), tree regeneration, plant and ground cover information soils information, and site constraints such as overhead wires, underground restrictions, planting width, available planting space and other site conditions.

General Tree Metrics

Specific metrics on measurement of tree diameter, tree height, crown width, height to base of crown, species, species to cultivar or variety.

General Metric Standards Sub-Committee

International Data Standards – DRAFT TEXT

The intent of the following text is to start writing down some variables for consideration by the General Tree Metrics sub-committee for review and comment. Please feel free to add other variables and comment on the proposed variables and text. Each variable is described based on the provided format for reporting each variable. Tree measures, as appropriate, would all be in English or metric units.

Variables:
- Tree species
- Tree diameter
- Total tree height
- Height to base of live crown
- Crown width
- Crown light exposure
- Percent crown missing
- Crown dieback
- Distance and direction to nearby building

Tree species

Why? – Species provides basic information on forest composition to aid in management and assessment of tree services. Required for understanding species richness and diversity, and for attributes related to species.

How? – Using dendrology skills to identify tree to species (preferably) or genus level

Units – Recorded as a standardized species code based on the plants database coding system (http://plants.usda.gov/). Limitations to plants database is that codes can change through time and species may be missing. The system is based on first two characters of a code being first two letters of the plant genus, 3rd and 4th characters being first letter of plant species (e.g., Acer platanoides is coded as ACPL). For duplicate codes, numbers are then used in the 5th and 6th code characters to differentiate (e.g., ACSA1, ASCA2). Cultivars could be added to the code in the 7th and 8th characters. A base list of fixed codes for over 10,000 species is available at: http://www.itreetools.org/resource_learning_center/history_and_links.shtm. This list could be used as a basis for developing an international urban forest species code list. The agreed upon codes in the standards should be posted to the standards website.

Accuracy – No errors, 95% of the time

Tree diameter

Why? – Simple measure used as a proxy for tree size and age. Data often required for estimates of tree biomass and carbon storage.

How? – Record diameter of tree at 4.5 ft (1.37 m) (DBH). Record the tree's DBH on the uphill side of the tree to the nearest 0.1 inch/cm. For trees with irregular DBHs:
Forked (multi-stemmed) tree: If the point of pith separation is above ground, the plant is considered to be one tree. Measure the DBH of up to six stems separately. If the tree has more than six stems with DBH ≥1 inch, lower the measurement height to 1 ft above the ground and record the diameter of up to six stems (selecting the largest and ignoring any others). If the pith union is below ground, each stem is considered a separate tree (included bark down to ground line is a good indicator that pith union is below ground).

Root sprouts: Any root sprouts with DBH ≥1 inch should be measured as separate trees. Root sprouts with DBH < 1 inch can be ignored.
Tree with butt-swell or bottleneck: Measure these trees 1.5 ft. above the end of the swell or bottleneck if the swell or bottleneck extends 3.0 ft. or more above the ground.
Tree with irregularities at DBH: On trees with swellings, bumps, depressions, branches at DBH height, diameter will be measured immediately above the irregularity at the place it ceases to affect normal stem form.
Tree on slope: Measure diameter at 4.5 ft. from the ground along the bole on the uphill side of the tree.
Leaning tree: Measure diameter at 4.5 ft. from the ground along the bole. The 4.5 ft. distance is measured along the underside face of the bole.
Live windthrown tree: Measure from the top of the root collar along the length to 4.5 ft.

DBH measurement height: If DBH was not measured at 4.5 ft, measure the height where DBH was taken.
Units – diameter at breast height (4.5 ft; 1.37 m), measured in either in or cm, to the nearest 1/10th.

Accuracy – within 3%, 95% of the time

Total tree height

Why? – Necessary for estimating crown volume and leaf area, which are essential for estimating several ecosystem services. Also can be used to gauge potential interference with urban infrastructure.

How? – Measure the height to top (alive or dead) of tree. For dead trees, downed living trees, or severely leaning trees, height is considered the distance along the main stem from ground to tree top.

Units – Height to nearest foot or meter

Accuracy – within 10%, 95% of the time

Height to base of live crown

Why? – Necessary for estimating crown volume and leaf area, which are essential for estimating several ecosystem services. Also can be used to gauge potential interference with urban infrastructure.

How? – Measure height to base of live crown. The live crown base is the point on the main trunk perpendicular to the lowest live foliage on the last branch that is included in the live crown. The live crown base is determined by the live foliage and not by the point where a branch intersects with the main bole

Units – Height to nearest foot or meter

Accuracy – within 10%, 95% of the time

Crown width

Why? – Necessary for estimating crown volume and leaf area, which are essential for estimating several ecosystem services. Also can be used to gauge potential interference with urban infrastructure.

How? – Measure crown width in two perpendicular directions: north-south and east-west or as safety considerations or physical obstructions allow. If tree is downed or leaning, take width measurements perpendicular to the tree bole

Units – Width to nearest foot or meter; recorded as average of 2 measurements

Accuracy – within 10%, 95% of the time

Crown light exposure

Why? – Used as an indication of crown competition and in estimating growth rates.

How? – record the number of sides of the tree receiving sunlight from above (maximum of five). Top of tree is counted as one side. Divide the crown vertically into four equal sides. Count the number of sides that would receive direct light if the sun were directly above the tree. One-third of the live crown must be receiving full light in order for a side to qualify. A sliver of a side receiving light does not qualify.

Units – 0: The tree receives no full light because it is shaded by trees, vines, or other vegetation.
1: The tree receives full light from the top or 1 side.
2: The tree receives full light from the top and 1 side (or 2 sides without the top).
3: The tree receives full light from the top and 2 sides (or 3 sides without the top).

4: The tree receives full light from the top and 3 sides.
5: The tree receives full light from the top and 4 sides.

Accuracy – with 1 class, 95% of the time

Percent crown missing

Why? – Necessary for estimating leaf area, which is essential for estimating several ecosystem services.

How? – Percent of the crown volume that is not occupied by branches and leaves. Missing canopy should be measured by two people standing at perpendicular angles to the tree. Visualize the expected "typical crown outline" as a symmetrical silhouette created by the live crown width, total height, and height to base of live crown measurements. It is assumed to be symmetrical around the center point of the measured width of the tree and filled with leaves as if it were a healthy tree in excellent condition. Now estimate the percent foliage that is absent due to pruning, dieback, defoliation, uneven crown, or dwarf or sparse leaves. Do not include normal interior crown voids due to leaf shading. Take into account the natural crown shape for the particular species.
Be sure to base measurement on the existing crown that you have measured. For example, a third of the crown may have been removed for power line clearance or the canopy could be very lopsided due to presence of a neighboring tree. Two recorders must come to concensus on percent missing category.

If the two observers disagree in their estimates, follow the guidelines listed below under Crown Rating Precautions.
Crown Rating Precautions
Crews must be especially careful when making evaluations under certain conditions and follow the procedures below.
Distance from the tree: Attempt to stay at least 1/2 to 1 tree length from the tree being evaluated. Some ratings change with proximity to the tree. In some situations, it is impossible to satisfy this step, but do the best you can in each case. All evaluations are made at grade (same elevation as base of the tree) or up slope from the tree. This may not be possible in all cases but never get in the habit of evaluating trees from the down slope side.
View of the crown: Two crew members should stand at angles to each other to evaluate trees, striving to obtain the best view of the crown. The ideal positions are 90 degrees apart on flat terrain (Fig. 3). Don't evaluate the tree from the same position or at 180 degrees unless no other option exists. In heavily canopied areas, getting a good perspective of the crown becomes difficult. Overlapping branches, background trees, and lack of a good viewing area can cause problems when rating some trees. Crews need to move laterally to search for a good view. Take special care when rating such trees.
Climatic conditions: Cloudy or overcast skies, fog, rain, and poor sun angles may affect estimates. Crown diameters may be affected but to a lesser degree than other crown indicators. Crown dieback may be underestimated because it is difficult to see dead twigs or to differentiate defoliated twigs from dead twigs. Be especially careful during poor lighting conditions. Move around a tree to get another view, even if the view appears adequate at a specific location.
Heavy defoliation: During heavy defoliation, crown dieback may be overestimated. The use of binoculars may help in separating dead twigs from defoliated twigs.
Trees with epicormic branches or sprigs: Trees that are densely covered in epicormic sprouts are not considered special cases in field data collection. There are two methods for handling this situation. The first choice is not to consider epicormic sprouts as part of the live crown base (if located under the actual branches crown base). The foliage the epicormics do produce for the tree would be considered for the percent canopy missing, proportionately decreasing the amount of percent canopy missing.
EXAMPLE: A tree has epicormic sprouts extending to four feet from the ground, but its live crown base is measured at eight feet high. The crew estimates the percent canopy missing at 15%, but also estimates the additional four feet of epicormic sprouts to contain approximately 5% of canopy

cover. The percent canopy missing would then be recorded as 10%. All of the percentages would be based on the crown measurements (crown widths, total height, and crown base height)

The second way would be to lower the crown base measurement to the lowest epicormic sprout, and then that point would be used to estimate the percent canopy missing of the tree. More times than not this method will increase the percent canopy missing.
Either way of handling epicormic branches will work with Eco, but in the field, it is helpful to be consistent. Use one method or the other for most, if not all, of the cases when encountering epicormic sprouts.
If a tree's canopy consists only of epicormic sprouts, or if they are located above the crown base, then they will be considered the canopy. Measure them as if they were the crown.
Resolving measurement differences: If the crown measurement estimates from two crew members do not match, arrive at the final value by:
• Taking an average, if the numbers differ by 10% (2 classes) or less.
• Changing positions, if the numbers differ by 15% or more and attempt to narrow the range to 10% or less.
• Averaging the two estimates for those trees that actually have different ratings from the two viewing areas (ratings of 30 and 70 would be recorded as 50)

Units – Record data within 5% categories:
0%
1-5%
6-10%
….
91-95%
96-99%
100%

Accuracy – with 1 category, 95% of the time

Crown dieback

Why? – An indication of tree condition/health used to estimate tree growth.

How? – Crown dieback is defined as recent mortality of branches with fine twigs, which begins at the terminal portion of a branch and proceeds toward the trunk. Dieback should occur from the top of the crown down and from the outside in toward the main stem. Dieback is only considered when it occurs in the upper and outer portions of the tree. When whole branches are dead in the upper crown, without obvious signs of damage such as breaks or animal injury, assume that the branches died from the terminal portion of the branch. Dead branches in the lower portion of the live crown are assumed to have died from competition and shading. Dead branches in the lower live crown are not considered as part of crown dieback, unless there is continuous dieback from the upper and outer crown down to those branches. (From: Forest Inventory and Analysis National Core Field Guide. Volume 1: Field Data Collection Procedures for Phase 2 Plots. Version 1.4).

This dieback does not include normal, natural branch dieback, i.e., self-pruning due to crown competition or shading in the lower portion of the crown. However, branch dieback on side(s) and top of crown area due to shading from a building or another tree would be included. For more information, see the Forest Inventory and Analysis National Core Field Guide.
Estimate crown dieback as a percentage of the live crown area, including the dieback area. Assume the perimeter of the crown is a two-dimensional outline from branch tip to branch tip, excluding snag branches and large holes or gaps in the crown. Crown dieback is obtained by two people using binoculars. You should be conscious of lighting conditions and how light affects the day's observations, taking extra time under limited-light conditions.
Each individual should mentally draw a two-dimensional crown outline, block in the dieback and estimate the dieback area. If the two observers disagree in their estimates, follow the guidelines listed above under Crown Rating Precautions.

Record data within 5% categories:
0%
1-5%
6-10%
….
91-95%
96-99%
100%

Accuracy – with 1 category, 95% of the time

Distance and direction to nearby buildings

Why? – Required to assess effects on building energy use.

How? – For trees that are located within 60 ft. of space-conditioned residential buildings that are three stories or fewer in height (two stories and an attic), record the direction and distance from the tree to the closest part of the building.
Units – Direction = azimuth in degrees; Distance to nearest foot or meter.

Accuracy – within 5 feet and 10 degrees, 95% of the time.

Tree Maintenance

Standard metrics on maintenance needs such as structural support, pruning, removal, crown cleaning, crown raising, fertilization, aeration, pest management, follow-up inspection/monitoring, and other tree maintenance tasks.

Tree Maintenance Sub-Committee
Last Activity March 11, 2010

Tree Maintenance - The "What" List
Here are some modifications to the Tree Maintenance list, it needs a lot more work.

Pruning type required (made consistent with A300)

- Raise
- Clean
- Structural
- Thin
- Reduce
- Vista
  Reduction
  Raising
  Thinning
- Utility
  Reduction
  Side
  Top
  Raising

Transplanting (Consistent with A300)

- Preplanting Soil testing
- Plant the Right Tree in the Right Place
- Inspection and screening of trees at the nursery
- Bareroot vs. B&B vs. container
- Proper transportation (e.g. covering nursery stock with a tarp)
- Keeping nursery stock watered until transplanting
- Locating the root collar
- Pruning girdling roots
- Tree protection for deer and mowers/trimmers
- Mulch no more than 3 inches

- Young Tree Aftercare to include:
  > Watering using Gator bags or other methods
  > Staking
  > Structural pruning cycle

Pollard
New (reduction)
Maintenance (thinning)

Tree removal
Take down
Transplant
Remove stump
ROW clearance
Invasive plant management

Mulch to be added
Mulch to be removed to an appropriate level

Fertilize (Fertilization)
Macronutrient deficiency
Micronutrient deficiency

Root and soil Management
Root Collar/crown excavation/examination

- Prune Stem Girdling Roots
- Soil compaction
  Install root barrier

Tree Support Systems

- Stake
- Guy
- Cable
- Brace
  Prop

Lightening Protection (Lightning sp.)
Install LP
Update LP

Abiotic Corrections (I'm thinking this should be under Plant Health Care with integrated pest management IPM)

Pest treatment (is this a different section?)

- Bark Scoring (Tracing)

Irrigation

Urban Wood Utilization

- Chips
- Firewood
- Lumber
- Veneer

***Infrastructure conflict**
Traffic control
Lighting
Sign (non-traffic)
Pavement lifting
Foundation lifting
Branches in contact with building
Soil/foundation subsidence

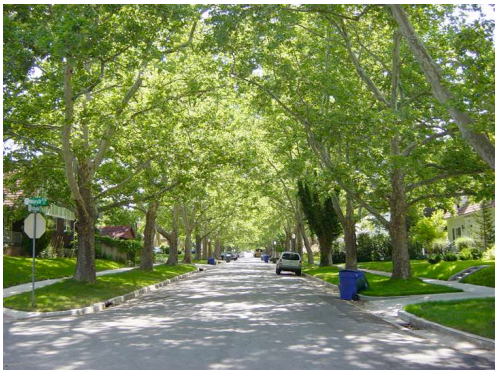
Tree Health, Decay and Risk

Metrics on structural health including tree decay, failure type and specifics, tree hazard rating and other risk factors.

Tree Health, Decay and Risk Sub-Committee
Last Activity December 11, 2009

Metrics on structural health including tree decay, failure type and specifics, tree hazard rating and other risk factors.

No Update Reported



Tree Location and Site Variables

Tree location, including coordinates of tree and or address, city, country, general information on location in landscape (e.g., front yard, street tree, etc.), tree regeneration, plant and ground cover information soils information, and site constraints such as overhead wires, underground restrictions, planting width, available planting space and other site conditions.

Tree Location and Site Variables
Last Activity February 22, 2010

Tree Location and Site Variables- To Consider

Comment/Question: I am assuming we will have a list of variables and standardized ways to measure them, and then MINIMUM variables that are gathered but still have a large list of OPTIONAL variables? Is that how you all are looking at it? -Susan Day

Tree Location

1. Address ("country" down to "street") what are the international variations we need to consider? (I think some countries will not have "addresses", especially developing countries.
2. GPS coordinates
3. Placement at address: e.g. front yard, left side, etc.
4. Tree ID number
5. Distance/azimuth to buildings?
6. Distance/azimuth to reference point? My point here is two fold: do we want to include measurements that UFORE would use (buildings)? or are we just trying to relocate a tree for future measurement (any reference point)

Site Information

1. Landuse
2. Some designation related to intensity of management. What we've found when working on FIA plots in urban areas is that there are frequently plots that are not "typical urban" – a forest lot, for example. Many times these have been left completely unmanaged and have all sorts of small diameter stems. This can influence the species abundance and frequency measures. We ended up describing sites with "managed" or "unmanaged" to tease out these situations.
3. Ground cover at base of tree
4. Ground cover predominating under canopy.
5. water drains to trees from what surface? (concrete, grass, etc.)
6. Slope
7. Aspect
8. Owner Type (Federal, State, County, Municipal, Private, Communal/cooperative (private, but group ownership) – etc. What international variations should be included?)
9. Disturbance (recent construction, ice damage, site clearing, deforestation…)
10. planting type (strip, cutout, island)(I would like to see more detail here.
11. planting size (this is not clear to me)

12. location (street tree/sidewalk, park, parking lot..)
13. below, even. above ground surface
14. soil protected from foot traffic?