From: Christopher Kallstrand <ckallstrand@dudek.com>
Date: September 1, 2017 at 4:10:41 PM PDT
Subject: iTree Benefit Analysis

Hello All –
As requested, I have run a benefit analysis for each of the 51 individual Indian laurel trees. The benefit analysis was completed using iTree Streets. As some of you know, iTree Streets is an analysis tool for urban forest managers that uses tree inventory data to quantify the dollar value of annual environmental and aesthetic benefits: energy conservation, air quality improvement, CO2 reduction, stormwater control, and property value increase. The i-Tree Streets application is an adaptation of the Street Tree Resource Assessment Tool for Urban forest Managers (STRATUM), which was developed by a team of researchers at the USDA Forest Service, PSW Research Station. The STRATUM application was conceived and developed by Greg McPherson, Scott Maco, and Jim Simpson. The numerical models utilized by STRATUM to calculate tree benefit data are based on years of research by Drs. McPherson, Simpson, and Qingfu Xiao (UC Davis). Full details regarding the modeling method can be found at http://www.itreetools.org/streets/.

Please note that tree no. 2, a 43- inch diameter tree, has an output $ value for CO2 of $.07, and output $ value of $.02 for aesthetics/other. This low $ value comes in due to an annual CO2 sequestration rate of "0" for this tree. Because these values were so different from the other trees' values, I contacted iTree regarding this output and found that accurate predictions/calculations for larger diameter classes are limited due to iTree modeling limitations. Modeling limitations are based on low population encounters of larger diameter classes for this species during the initial iTree model development. In other words, there is not enough data for large trees, so there are skewed results. In order to keep from making predictions outside the range of where iTree has data and given that trees start to sequester less carbon as they become "over-mature" those very large tree values for sequestration are set to "0" in iTree. This does not indicate that the tree is not sequestering carbon at this diameter class, but that insufficient data was available during iTree modeling. Modeling data is available for "other" large broad leaf evergreen species, however the modeling outputs using those models are not considered consistent with the observed trends found in the above dataset.

In an effort to provide an alternate CO2 calculation for tree no. 2, I calculated the gross annual CO2 sequestration using three alternate calculators; iTree eco, the CUFR Tree Carbon Calculator (CTCC), and ecoSmart. The CTCC provides quantitative data on carbon dioxide sequestration and building heating/cooling energy effects provided by individual trees. CTCC outputs can be used to estimate GHG (greenhouse gas) benefits for existing trees or to forecast future benefits. The CTCC is programmed in an Excel spreadsheet and provides carbon-related information for trees located in one of sixteen United States climate zones. The CTCC was developed in partnership with the USDA, and USFS. Further details on the calculator can be found at https://www.fs.usda.gov/ccrc/tools/tree-carbon-calculator-ctcc. Like iTree streets, Eco is a model that uses tree measurements and other data to estimate ecosystem services and structural characteristics of the urban or rural forest. Details on iTree Eco can be found at http://www.itreetools.org/eco/overview.php. Ecosmart-Landscape is and online tool that provides quantitative data on carbon dioxide sequestration and building heating/cooling energy savings afforded by individual trees. Results can be used to estimate the greenhouse gas benefits of existing trees, to forecast future benefits, and to facilitate planning and management of carbon offset projects. Details on Ecosmart-Landscape can be found at https://www.fs.usda.gov/ccrc/tools/ecosmart-landscapes.

The three additional analysis found the following:

CTCC -
CO2 Sequestration – 0.0 ((A value of 0.0 indicates no tree growth)

iTree Eco
CO2 Sequestration – 142.2 lbs/yr

Ecosmart-Landscape
CO2 Sequestration – 711.8 lbs/yr

As can be seen, the calculators vary in calculated outputs for CO2 sequestration. As such, I would like to ask the UFAC for their input regarding the observed calculations on the larger diameter tree and direction on which of the methods seems most appropriate or if there is another approach that would be more suitable. I appreciate any additional information and/or feedback that you have.

Please let me know if you have any questions.

Sincerely,

Christopher J. Kallstrand