**Introduction to Urban Site Index**

**Introduction**

A critical step in the successful management of the urban forest is putting the right tree in the right location. The right tree in the right location is as much about tree hardiness as it is about tree size. If an urban forester can match tough tree species to harsh sites and more sensitive tree species to higher quality sites, a community can utilize a wider variety of species in their urban forest and create a more stable, sustainable tree population. Urban Site Index is a systematic approach for evaluating sites with a corresponding species evaluation.

**History**

In August of 2009, Alan Siewert and Stephanie Miller, Urban foresters with the Ohio Division of Forestry, developed the Urban Site Index (USI) process to allow Tree Commission Academy students to successfully and accurately evaluate street tree planting sites inexpensively and simply.

**Process**

USI is a rapid assessment tool that utilizes eight observations, four soil and four street, to assess the quality of the planting site on a treelawn. The four soil observations are scored 0-3 and only require a soil probe or shovel to do the assessment. The four street assessments are scored 0-2 and need no equipment to assess. The USI assessment assigns a number between 0 and 20 for a street or site. A score of 20 is a very good site and any species can be expected to do well there. A score of less than about 8 appears to be incapable of supporting plant life. An entire community can be surveyed in a relatively short time.

Ongoing studies in Ohio and elsewhere in the Northeast United States seek to build a database of tree species and assign a USI for each species. The USI number, similar to the USDA climate zone number, can be used to select appropriate species for each street. Some species for Northeast Ohio have been documented, however most species have yet to be evaluated or the evaluation is not robust enough to confidently assign a number to the species. Currently, tree species have been divided into three groups (tough, intermediate and sensitive) based on the experience of the state urban foresters as well as arborists, nursery people and urban foresters from around Ohio. The USI scale has been divided into four groups 0-8 no tree, 9-11 harsh site, 12-15 moderate site, 16-20 good site. Tough trees can be used in harsh sites, intermediate trees in moderate sites, and sensitive trees in good sites.

**Uses**

The USI can be used to recommend species for a tree planting, however it is a critical tool in developing a Master Planting Design (MPD) for the smallest villages to the largest cities. A MPD combines the USI with the size limitation of each street to assign a species or group of species to each street segment in the community. By assigning a species to a street segment, the urban forester can plan for a diverse species population, test for species site compatibility, and provide spatial and temporal diversity in the urban forest before planting. A MPD does not necessarily consider what is currently growing on a street, but looks to the future and what should be planted to allow a holistic plan to be phased into a community over time. Without a holistic planning approach diversity, and therefore sustainability, is nearly impossible.

The Master Planting Design process has other advantages. Planned planting based on site conditions and community-wide management shifts tree selection from a beautification effort to urban infrastructure management on par with streets, utilities, and other hardscapes. It adds credibility, confidence, and efficiency to tree commission and public staff efforts. A MPD allows coordination with nurseries to grow non-traditional street trees. Finally, species segments allow for both management and aesthetic continuity, adding service value and increasing management efficiency within local urban forestry programs.

The MPD illustrates potentially drastic changes in neighborhoods as well. USI data has been used to quantify the degradation of soil quality after road construction. Pre and post scores indicate the damage to the soil. Together the USI and MPD have been the basis for reexamining construction practices and soil restoration budgets.

Dr. Burnell (Burney) Fischer of Indiana University, Bloomington is using USI protocols to not just determine survival of a species, but predict productivity of a species on a given site. He believes that USI can predict canopy size, and consequently ecological services, for a given species on a given site.

**Documentation and Testing**

In 2012 Oleksandre Dramova, a masters candidate at the University of Toronto, Supervisor Dr. Sandy M. Smith, used the USI process as her masters project. Ms. Dramova used the USI and concluded there is a significant relationship between USI scores and tree conditions.

Dr. Bryant Scharenbroch, Soil Scientist, at The Morton Arboretum began a study with Stephanie and Alan to assess the ability of the eight measurements to quantify the limiting factors to tree growth. In this study Dr. Scharenbroch collected the 8 USI measurements along with additional field measurement soil samples and increment cores to take back for further laboratory analysis. Results are expected in Spring 2015, however preliminary results suggest the USI is a good indicator of the results of the more complex testing.

**For additional information contact**

**Urban Site Index**  **Master Planting Design**

Alan Siewert, Urban Forester Stephanie Miller, Urban Forester

ODNR Division of Forestry ODNR Division of Forestry

15444 West High Street 952-B Lima Ave

Middlefield, Ohio 44062 Findlay, Ohio 45840

440-632-5299 419-424-5004

[Alan.siewert@dnr.state.oh.us](mailto:Alan.siewert@dnr.state.oh.us) [Stephanie.miller@dnr.state.oh.us](mailto:Stephanie.miller@dnr.state.oh.us)