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The Green Legacy Project: Evaluating Campus Tree Benefits

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ABSTRACT

Trees on our campus sequester and store carbon, mitigate urban heat island effects, ameliorate air pollution, reduce stormwater runoff, improve water quality, provide habitat for native birds and other animals, and enhance aesthetics. Adequate planning and management of this valuable resource first requires a sound understanding of existing conditions. To this end, a collaborative group of faculty, staff, and students at West Chester University initiated the Green Legacy Project. We conducted an inventory and assessment of north campus tree resources and developed a GIS management database. Approximately 1900 trees cover 16% of north campus, half of which are non-native species. The value of the trees is an estimated \$3.2 million with annual benefits of \$250,000.

About the Green Legacy data

- data collection & analysis began summer of 2009,
 - funded by the WCU New Funding Requests Program



- Tree data recorded:
 - ✓ species
 - ✓ diameter
 - ✓ height (total, live stem, canopy base)
 - ✓ crown (width, exposure, and percent missing)
 - ✓ site (percent impervious, grass, shrub)
 - ✓ condition (insect feeding, decay, exposed roots, wounds, dead branches, dieback)
 - ✓ distance and direction to nearby buildings
 - ✓ location (latitude, longitude coordinates)
- GIS management database created

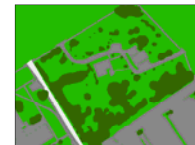
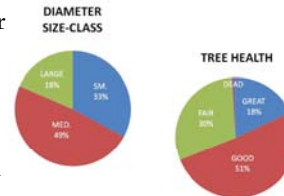


Assessment of our Campus Trees



Findings: Our Campus Tree Population

- ~1900 trees, 16% tree cover
- ~50% trees non-native
 - including invasives, e.g., Norway maple
- most trees medium to small
 - average = 25cm diameter
 - only 24 trees > 100cm diameter



- Impervious Surfaces (47%)
- Mowed Lawn (34%)
- Tree Canopy (16%)
- Inner Streets (3%)

Threats & Management Issues

- tree cover is too low (lower than WC Borough)
- significant vulnerability to pests
 - at least 35% of trees vulnerable to Asian longhorn beetle, which could cause est. \$1.5 million in damages
- inadequate protection during construction activities
- soil impairment (e.g., compaction and erosion)



Benefits and Ecosystem Services

Benefit or Ecosystem Service	quantity	value
Air Pollutants Reduction	625kg	\$3,492
Carbon Storage	672 tons	\$15,250*
Carbon Sequestration	16.65 tons/year	
Storm Water Reduction	114,000 cubic ft	\$227,000
Energy Consumption Avoided	7 Mwhts	\$700**
Water Pollution Prevention	BOD 16.9%, COD 26%, N 10%, P 19%, TSS 17%	

*Calculated at \$25 per pound
**Calculated at 10 cents per kilowatt-hour

- benefits exceed \$250,000 annually
 - value of total tree population est. \$3.2 million
- additional intangible benefits:
 - aesthetic and psychological benefits (i.e., nature-deficit disorder)
 - provision of habitat, especially by and for native species
 - climate change mitigation
 - ability to serve as refugia for stressed species in changing climate

Recommendations

- increase efforts to protect and manage existing trees
 - GIS management database can identify best locations & species
 - stricter adherence to campus tree policy guidelines needed
- increase and diversify tree cover
- increase management efforts to remedy hazardous trees and manage for pests
- become a Tree Campus USA
 - benefits include developing campus tree advisory committee, tree care plan, Arbor Day observance, service learning opportunities

