Urban Trees

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• Washington Park Arboretum
  • Professionally managed by UWBG in partnership with Seattle Parks and Recreation, with support from the Arboretum Foundation
  • 230 acres with a curated collection of ~46,000 plants (majority trees)

• UWBG contracts with the Trees for Seattle program to help distribute 1,000 trees to Seattle residents every year

• Nature and Health Program – EarthLab
  • Includes representation from UW, SPR, SPU, OPCD, OSE, and many other orgs.

• Green Cities Research Alliance – 2012 Report
Key Points

• Trees have demonstrated environmental and human benefits.

• They carry some associated costs and negative impacts.

• Urban canopy is distributed unevenly, and can result in disparate social impacts.

• Planning and managing urban tree cover in social and ecological context can help maximize benefits and minimize disparities and negative outcomes.
Environmental Benefits of Urban Trees

- Carbon sequestration and storage
  - Sequestration estimated at 2% of Seattle emissions (2011)
- Air quality
  - removing pollutants like $O_3$, CO, $SO_2$, NO$_x$, PM$_{10}$
- Storm water quality and regulation
  - green infrastructure
- Shading and moderation of temperature extremes
- Noise reduction
- Enhancing habitat and biodiversity
Human Benefits of Urban Trees

• Social
  • Enhanced leisure, recreation, quality of life

• Economic
  • Increased property values
  • Reduced expenditures on storm water, air pollution removal, heating and cooling

• Health
  • Reduced stress, respiratory illness

• Visual and Aesthetic
  • Improved scenic quality and privacy
Cognitive and Mental Health Benefits

• Exposure to nature can increase attention, memory, and impulse inhibition, and decrease stress.

• What aspects of natural features and our experience with them are relevant to mental health? – many studies focus on nature generally.

• Tree and shrub cover significantly related to school test scores, after controlling for common educational determinants in urban elementary schools in California (Tallis et al. 2018).
Negative Impacts and Costs

• Health
  • pollen, insects and animals

• Visual and Aesthetic
  • lighting-related safety concerns, dropping branches and leaves, view obstruction

• Environmental problems/hazards
  • generating VOCs (terpenes, isoprenes), sidewalk cracks

• Costs
  • planting and establishment
  • irrigation, maintenance, management, infrastructure repairs
Social Disparities in Tree Cover

• “Trees grow on money” – strong positive correlations between household income and urban tree cover in neighborhoods.
  • Consistent pattern observed in many cities (Schwarz et al. 2015 studied seven).
  • Race is also a factor in some cities, with less tree cover in neighborhoods with more people of color

• Urban greening can have the paradoxical effect of promoting gentrification (Wolch et al. 2014).
Canopy Cover in Seattle by Management Unit

- Shows differences by development density.
- Based on two different estimation approaches.
- From Cieko et al. 2012
Livesley et al. 2016
Context Affects Outcomes

• Tree and forest structure and physiology
  • tree size, tree density, leaf area, leaf biomass, evergreen vs. deciduous

• Character of the built environment
  • lot sizes, street configurations, structural density, land use

• Environmental conditions
  • visibility, temperature, precipitation, soils, topographic position, etc.

• Planning for and management of urban trees that recognizes these contexts can maximize benefits
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Resources


- Benefits of nature in cities – Dr. Kathleen Wolf, SEFS, UW
  - greenhealth.washington.edu
  - naturewithin.info