Influence of Landscape Management Practices on Urban Greenhouse Gas Budgets

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Study Goal & Methods

▶ BU Climate Action Plan (2017)

- Aims for carbon neutrality by 2040
- Focuses on heating, electrical emissions
- Does not account for 'biogenic' sources and sinks of carbon
 - Soil respiration
 - Carbon storage

Methods

- Measured rates of carbon movement
- Segmented the campus landcover into 13 exhaustive categories

Landcover Classification



Campus Differences



Campus Differences (cont.)



Campus Differences (cont.)

Charles River Campus Land Cover C Exchange



Medical Campus Land Cover C Exchange

Wheelock Campus Land Cover C Exchange

500

10

C flux (Mg ha⁻¹yr⁻¹)

12.1% canopy cover

8.3% canopy cover

31% canopy cover

November

December

*emissions are a lower bound estimate, maintenance emissions are not included (mowing, leaf blowing, fertilizer, etc.)

Solution 1: Less Mulch

► Finding: mulch produces CO₂ faster than grass

- Minimize mulch application to decrease CO₂ production
- When? Where? How much?
 - Applying smaller quantities, less often
 - Mulch has the benefit of reducing water loss from soils, but it is being applied in irrigated area. Target mulch for areas without irrigation.

Solution 2: More Trees

- Increase carbon uptake
- ► Five candidate locations
 - Behind Agganis Arena: Parking Lot





National Emerging Infectious Diseases Laboratories



Commonwealth Ave: West Campus



Medical Campus Green



The BU Beach

Solution 2: More Trees (cont.)

- Difficult to estimate contribution to carbon reduction
 - ► Tree size, species
 - Estimate: Add 100 trees on Charles River Campus
 - Would nearly halve net biogenic carbon flux



Thank you!

Campus (area)	Mulch Cover (%)	Lawn Cover (%)	Emissions via Mulch (Mg C ha ⁻¹ yr ⁻¹)	Emissions via Lawn (Mg C ha ⁻¹ yr ⁻¹)	C Sequestered (Mg C ha ⁻¹ yr ⁻¹)	Net Biogenic C Flux (Mg C ha ⁻¹ yr ⁻¹)	Scope 1 Emissions (Mg C ha ⁻¹ yr ⁻¹)
Charles River Campus (73 ha)	4.3	6.7	0.71 ± 0.22	0.94 ± 0.23	0.86 ± 0.67	0.78 ± 0.74	248.6
Medical Campus (32 ha)	4.7	10.0	0.78 ± 0.24	1.41 ± 0.34	0.69 ± 0.44	$1.50 \pm .61$	438.1
Wheelock Campus (3.2 ha)	11.4	15.2	1.87 ± 0.58	2.12 ± 0.51	2.19 ± 0.67	1.80 ± 1.02	200.4