Carbon Storage in Beloit College Campus Trees
Michelle R. Koenig ’13, Beloit College Sustainability Fellows Program
Summer 2013

Trees on the Academic Side of Campus
- Over 700 trees present
- Approximately 40 different species
- Remove carbon dioxide from air and store carbon

How is Carbon Storage in Trees Determined?
- Carbon storage is calculated from a tree’s biomass
- The biomass (weight of biological material) is estimated using:
  1) Diameter at breast height (dbh) of a tree (1.37 m above ground)
  2) Tree growth equations suggested by Jenkins et al. 2003¹
- Broad-leaved species have a greater amount of biomass than evergreen species for a given diameter
- Approximately 50% of biomass is carbon²

How Much Carbon is Stored in Campus Trees?
- Approximately 410,890 kg of carbon is stored
- Equivalent to 1,507,967 kg of carbon dioxide
- Equal to the amount of carbon dioxide that is emitted from 990 round-trip flights from Chicago to Beijing³

Carbon Storage by Species

Changes in Carbon Storage from 1999 to 2013 (Figure 2)
- Increased by 29,956 kg (109,951 kg of carbon dioxide)
- Equal to the amount of carbon dioxide emitted from 72 round-trip flights from Chicago to Beijing³
- Increase in carbon storage is due to tree growth and new trees
- Decrease in carbon storage in some areas is due mainly to the construction of new buildings and sidewalks, and death of old or diseased trees

Map of Changes from 1999 to 2013

Identifying and Measuring Trees
- Identified trees primarily through the characteristics of their leaves, bark, twigs, and silhouette (Figure 1)
- Measured dbh for each tree (Figure 1)
- Used trees with a dbh greater than 5 cm in biomass and carbon storage calculations

Potential Impact of Emerald Ash Borer
- Emerald Ash Borer, an invasive insect, kills ash trees
- Stored carbon could decrease up to 16,327 kg if all ash trees are lost (Figure 3)

References

Acknowledgments
I thank Carol Markiewicz and Yaffa Grossman for their committal guidance and support through the fellowship; and Richard Newcomb for his work in 1999-1999, which made this project possible, and for his assistance with tree identification.