Team Light Matter: Project Trees4Cash

Gideon Loo, Bryson McNulty, and Joshua Starker Planting Trees for a Greener Future

The Atmosphere: Where Trees4Cash Caught Wind of CO_2 Sequestering

The small scale Carbon Reduction Challenge is a collaborative effort to reduce 10,000 pounds of carbon dioxide emissions during the 8 weeks of March and April. Due to the passive nature, long lifespan, and low cost of trees, Team Light Matter focused on planting trees to sequester CO_2 out of the atmosphere. Hardwoods of significant size (i.e. can be used for lumber) sequester more carbon than similarly sized pines. Data from the US Forest Service[3] and the Department of Energy[4] indicates that over a given lifetime, hardwoods sequester more carbon than most pines, and at a faster rate. These details led to a focus on hardwoods as a potential tree to focus the project on.

The Leaves: The Results of the Project

This group's Trees4Cash project is responsible for just over 25,000 pounds of carbon dioxide emission reductions over 15 years. Shown through our initiative to engage friends, social networks, and the local community, we were able to collect $72.00 to donate to organizations, such as the Arbor Day Foundation, and raised $32.00 in commercial sponsorships to plant a total of 104 trees. While these numbers may seem small compared to the number of trees in a forest or the amount of money in the typical household budget, these results came from only approximately one thousand friends, family, and strangers seeing this project's efforts. Considering that there are approximately 310 million people living in the United states, getting a reasonable 200 million people to see a Trees4Cash ad or to hear about this cause could potentially raise 20.8 millon dollars if this groupsproject were to scale up with the same success. Tree planting problems aside, that would represent an offsetting of 5 billion pounds of CO_2 over 15-year tree lifetimes!

The Trunk: The Support From Others

This project relied on others to help reach its carbon dioxide reducing goals. While friends, family, and the local communities were the focus of the group's effort, the ways in which this involvement was gained varied greatly from one method to another.

Methods of Outreach:

- Use of Social Media
  1. Connecting to Strangers
  2. Sharing With Friends
  3. Pleading for Help From Family
- Word of Mouth

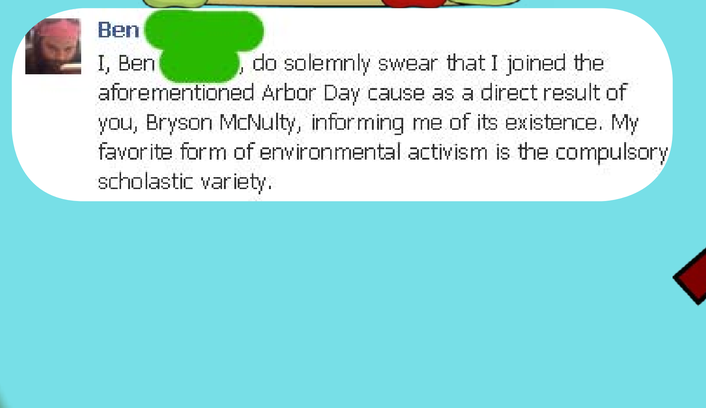
The continued use of social media would allow scaling up of the project to a size comparable to a country rather than a community. With donations secured, "where to plant" must be determined from research.

The Fruit of our Labor: Offsetting 25,000 pounds of CO_2

Offset 2.5 Boeing 727 landing-takeoff cycles[1]

Potential U.S. CO_2 Offsets: 5 Billion Pounds

25,000 pounds of CO_2 is worth about $165 in California's carbon emission allowances making this project save $61 if this tree sequestration counted towards a CA company[5]



Off-set one year of total CO_2 emissions for the average U.S. single-family home[2]

The Roots: The Foundation of Research

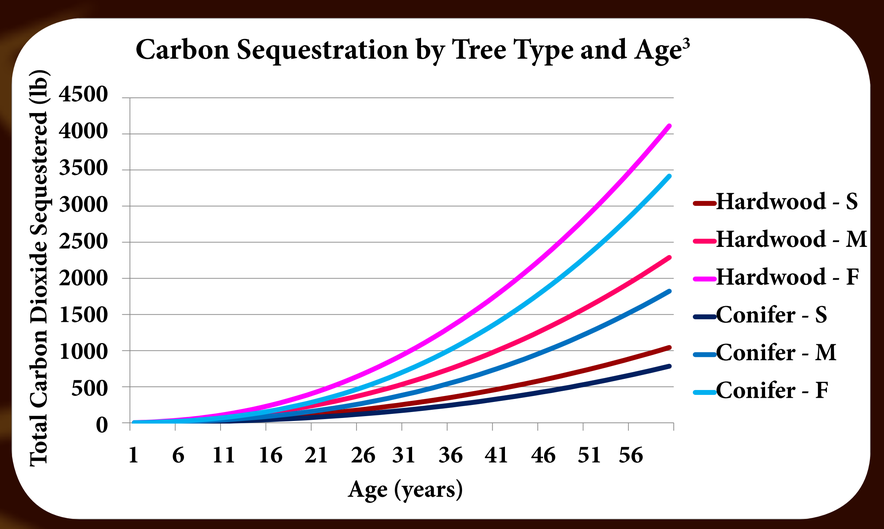
In order to maximize carbon dioxide sequestration, the planting site must be selected based on whether it can be used for calculations to determine the sequestration.

Planting Site Selection Criteria:
- The availability of hardwoods versus conifers
- The species of hardwood trees available
- The availability of carbon sequestration information
- An accurate idea of the trees to be planted

With these criteria in mind, we selected the Trees for Joplin initiative as our primary location of focus.

All of the variables that go into tree growth and carbon dioxide sequestration abilities make the calculations impossible without first making assumptions to simplify the calculations.

Assumptions for the Tree Calculations:
- Similar Growth Rates --> Similar Longterm CO_2 Storage
- Urban trees sequester like suburban and rural trees
- Weather, soil, sun, etc. are the same for all locations
- All trees are planted at the same age



Cumulative Carbon Dioxide Offset (lb) by Tree Location, Species, and Age (yr)[4]

	Trees for Joplin				CA Wildfire Recovery	
	C. canadensis	C. florida	A. saccharum	Q. rubra	Angeles National Forest	
Age	18	18	18	18	32	Total
5	855.5	479.9	479.9	1,331.6	977.8	4,124.7
10	2,512.0	1,319.8	1,319.8	4,161.4	3,177.8	12,490.9
15	4,957.8	2,471.1	2,471.1	8,493.1	6,699.5	25,092.6
20	8,108.4	3,915.3	3,915.3	14,173.2	11,502.0	41,614.3
25	11,869.0	5,606.5	5,606.5	21,022.8	17,482.3	61,587.1
30	16,136.8	7,499.4	7,499.4	28,861.6	24,506.3	84,503.6
35	20,819.1	9,555.3	9,555.3	37,470.9	32,412.7	109,813.2
40	25,823.6	11,738.1	11,738.1	46,412.9	40,889.5	136,602.2
45	31,059.1	14,017.2	14,017.2	55,428.9	49,712.5	164,234.9
50	36,323.2	16,355.5	16,355.5	64,363.6	58,677.8	192,075.6
55	41,470.1	18,726.6	18,726.6	73,096.3	67,616.6	219,636.2
60	46,443.4	21,105.4	21,105.4	81,512.7	76,403.9	246,570.9

The Soil: The Sources of Information

[1] http://www.ipcc-nggip.iges.or.jp/public/gp/bgp/2_5_Aircraft.pdf
[2] http://www.epa.gov/cpd/pdf/brochure.pdf
[3] http://www.fs.fed.us/ccrc/topics/urban-forests/ctcc/
[4] ftp://ftp.eia.doe.gov/pub/oiaf/1605/cdrom/pdf/sequester.pdf
[5] http://www.businessweek.com/news/2013-04-19/california-adopts-regulation-to-link-carbon-markets-with-quebec

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