



Understanding the Role of Urban Forests in Voluntary Carbon Markets

Elise Schadler

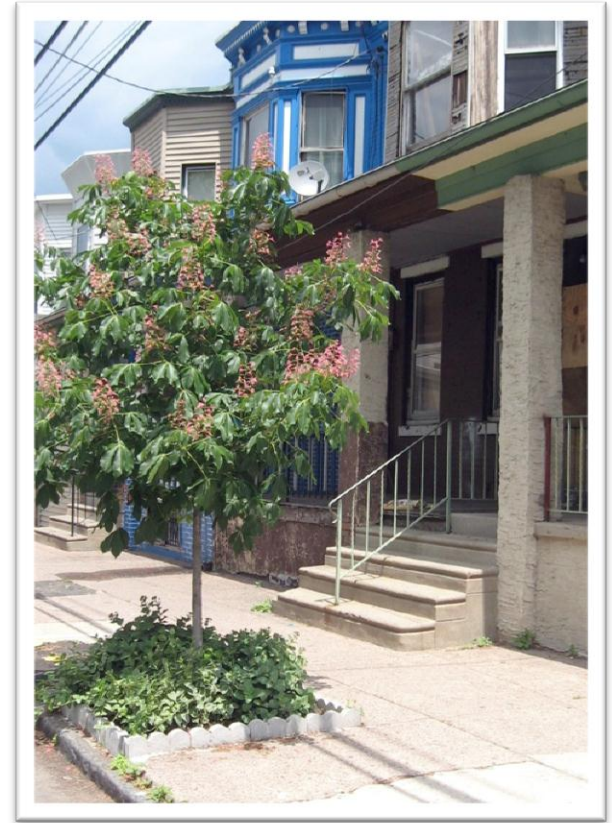
Advisor: Professor Cecilia Danks

Committee Chair: Professor Joshua Farley

Committee Member: Dr. Mark Twery, US Forest Service

Background

- Urban tree planting in Camden, NJ
- Introduction to carbon markets
- University of Vermont; Rubenstein School of Environment and Natural Resources
- Professor Cecilia Danks



Context

- Domestic Voluntary Carbon Markets (VCM) are emerging and evolving
- VCMs a possible source of funding for urban forestry and a means for raising awareness
- Significant interest from urban forestry groups, funders, municipal offices, and residents
- No real examination of how urban forestry can fit in VCMs
- No clear model for project development

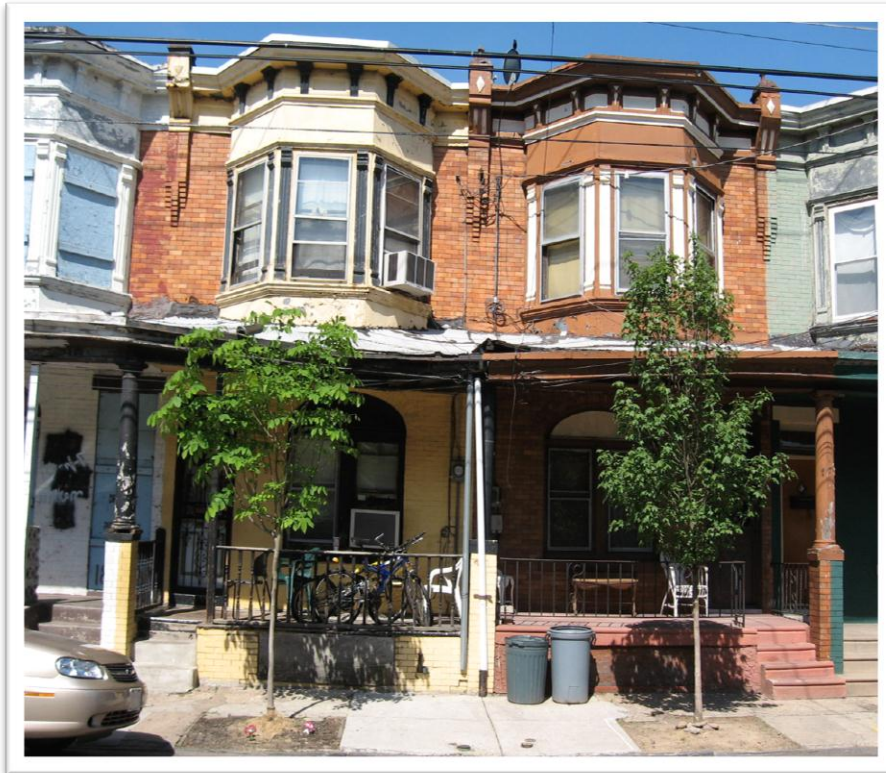
Research Questions

- What are the major barriers and challenges for domestic urban forestry groups in participating in voluntary carbon markets?
- What are the major opportunities?
- How feasible is it for urban forestry groups to raise funds through VCMs?
- What project types are working and why? Can they be applied elsewhere?

Methodology

- National Urban and Community Forestry Advisory Council (NUCFAC) funding; thesis project
- Initial internet research and scoping through the Alliance for Community Tree's listserv and through word of mouth
- Targeted phone and in-person interviews
- Site visits
- Case study selection
- Constant feedback from professionals & interviewees

Final Products



- 8 Case studies
- Basic guide to voluntary carbon markets
- An academic journal article
- A popular article

Dissemination

- Institute for Environmental Solutions web presentation
- Alliance for Community Trees annual member meeting round table discussion in Philadelphia
- Alliance for Community Trees webcast with the Cascade Land Conservancy
- Case Studies Distributed
- Working Website: www.uvm.edu/forestcarbon/UCF
- Informational Powerpoint

Voluntary Carbon Markets

- Chicago Climate Exchange (CCX) vs. Over-the-Counter (OTC)
- Project types: renewable energy (windfarms, biomass energy, hydroelectric), forestry, methane destruction
- In 2009: 94 MtCO₂e (M = millions of tonnes) at a value of \$387.4 mil (Hamilton et al., 2010)
- Motivations for participation: pre-compliance, building sustainability portfolios, public relations, branding, individual footprint offsetting

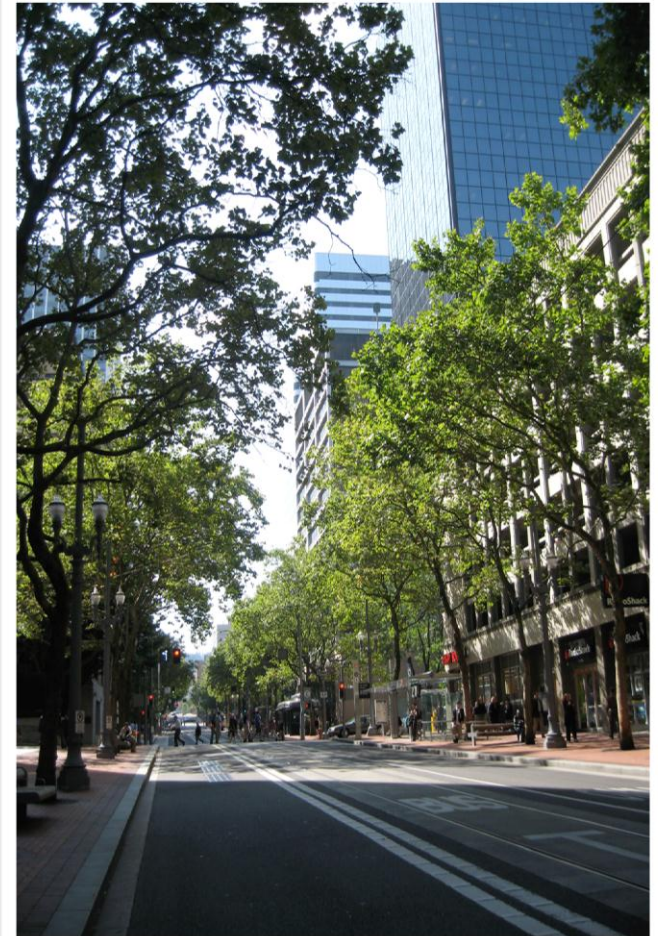
Voluntary Carbon Markets & Urban Forestry

Status

- 2009: 24% OTC projects fell under Forestry (Hamilton et al., 2010)

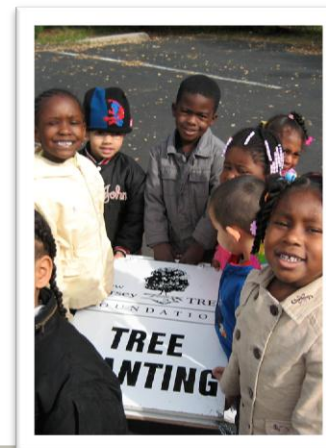
Figures

- Biomass of a mature tree is approx. 40% carbon (Nowak et al., 2003)
- An urban tree sequesters an average of 1 ton of carbon in its lifetime (Nowak et al., 2003)
- U.S. urban trees: estimated 700 million tons stored and 22.8 million tons sequestered annually (Nowak et al., 2003)



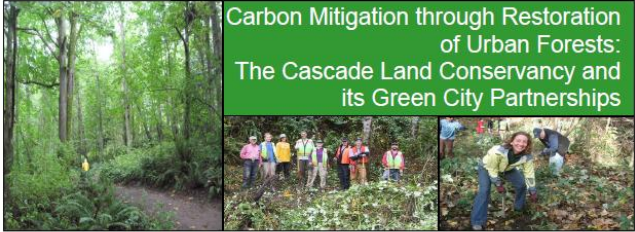
Voluntary Carbon Markets & Urban Forestry

- Currently one registered CCX urban forestry project (MSU)
- Climate Action Reserve released first version of Urban Forestry Project Protocol in 2010; no registered projects
- Tangible projects, environmental education opportunities
- Multiple co-benefits of urban trees: stormwater, habitat, avoided emissions, property values, air quality, crime rates, community, volunteerism, etc.



Case Studies: Models for Engagement

- Project Details
- Partners and their Roles
- Market Chain Maps
- Participant Perspectives
- Lessons Learned; Major Challenges
- Take Home Messages



Carbon Mitigation through Restoration of Urban Forests: The Cascade Land Conservancy and its Green City Partnerships

Fast Facts

Activity: Restoration of forested natural areas
Launch Date: March 2010
Purpose: To mitigate carbon emissions by improving urban forest condition and vigor through removal of invasive species and planting of native conifers.
Tree Ownership: Targeted acres of forested natural areas are located in and owned by the cities of Seattle, Kent, Kirkland, and Redmond, WA.
Funding: The price per acre restored for carbon mitigation depends on the percent of current invasive species cover and native tree composition. The pilot project for the Carbon Mitigation Program totaled \$210,000, paid in full up front.
Market: Voluntary
Protocol: The Climate Action Reserve's Urban Forest Project Protocol (2010) was used to guide methodology.
Verifier: None used
Payment Mechanism: Funds for the Carbon Mitigation Program are paid in full before restoration work is commenced and placed in a restricted account.
Climate Benefits: When completed, the pilot project (and only project as of January 2011) will result in 7,000 mtCO₂e (metric tonnes of carbon dioxide equivalent) mitigated through the restoration of 33 acres.
Co-Benefits: Restoration of these urban forests will increase their benefits: reduction of stormwater runoff, erosion control, improved water quality, wildlife habitat, noise and heat reduction in the cities, community involvement through volunteerism, and recreation.

Overview

The Cascade Land Conservancy's (CLC) innovative Carbon Mitigation Program was launched in the spring of 2010. Building upon the organization's Green City Partnerships Program, carbon emissions are mitigated through restoration of forested natural areas in, as of now, four municipalities in the Puget Sound region. Calculations and methodology for the program were developed internally but were guided by the Climate Action Reserve's Urban Forest Project Protocol (2010) and the US Forest Service report *Methods for calculating forest ecosystem and harvested carbon with standard estimates for forest types in the United States* (2005). The Carbon Mitigation Program's pilot project was a collaboration with the band Pearl Jam to mitigate its 2009 world tour carbon footprint of 7,000 mtCO₂e for \$210,000 through the restoration of 33 acres spread throughout Seattle, Kent, Kirkland, and Redmond, WA. Invasive species removal and planting of native conifers are for the most part completed by contracted groups while citizen volunteers assist with maintenance and monitoring activities.

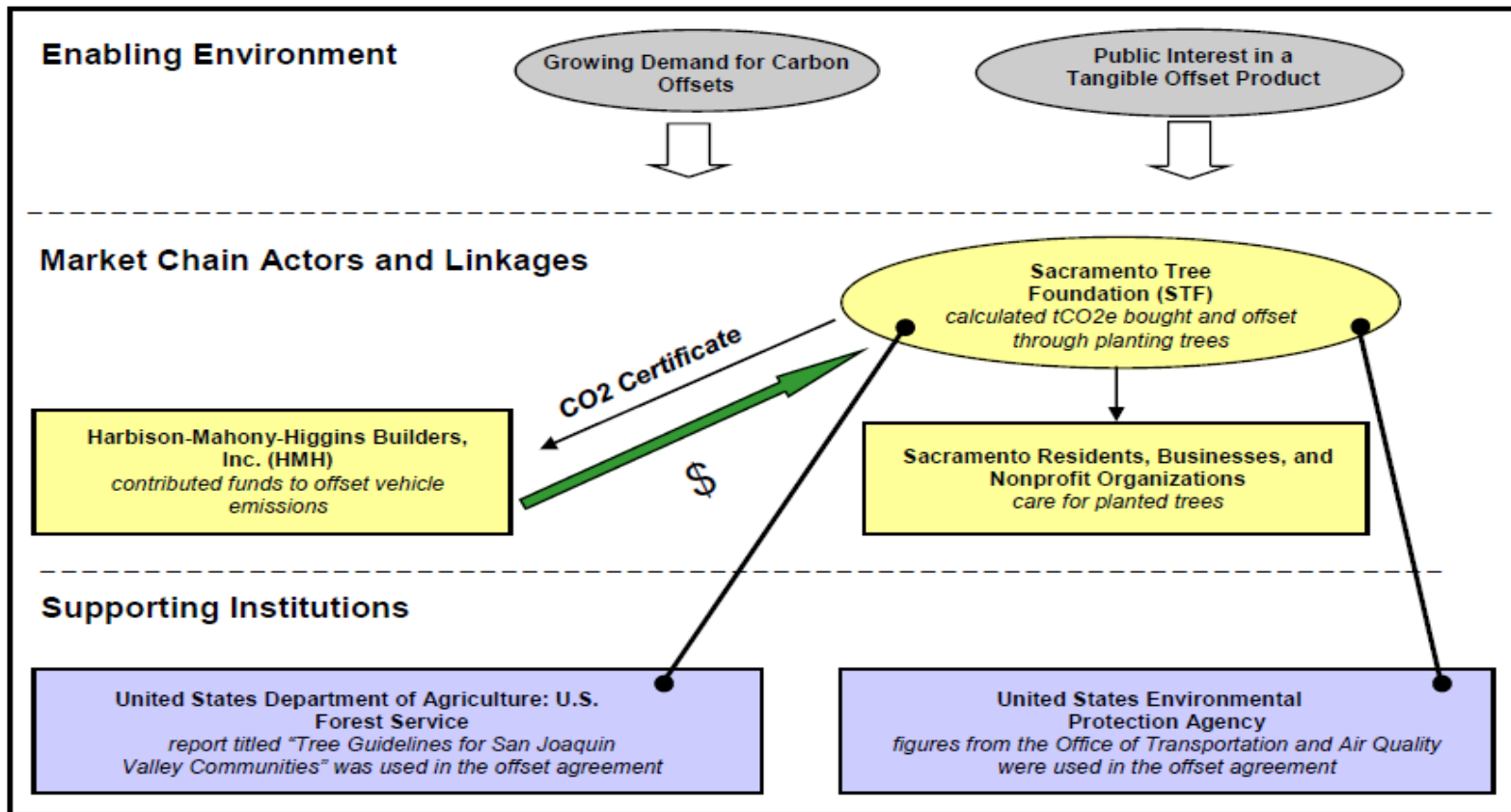
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Sacramento Tree Foundation

- HMM Builders to offset emissions from fleet of 63 vehicles
- 5 years (2008-2012), \$50,000, 2,665 tCO₂e
- Tree plantings on private property; residents plant and maintain
- Estimated 580 trees



Market Chain Map



CarbonPlus Calculator



*Photo taken from
<http://www.matternetwork.com/2008/7/cool-nonprofit-alert-urban-ecology.cfm>*

- Funded by the US Forest Service
- 2007 – present
- Boston, Philadelphia, New York City, Baltimore, & Vermont
- Local residents supporting local projects through emissions offsetting with local data
- Multiple players, multiple perspectives, & multiple barriers

CarbonPlus Calculator



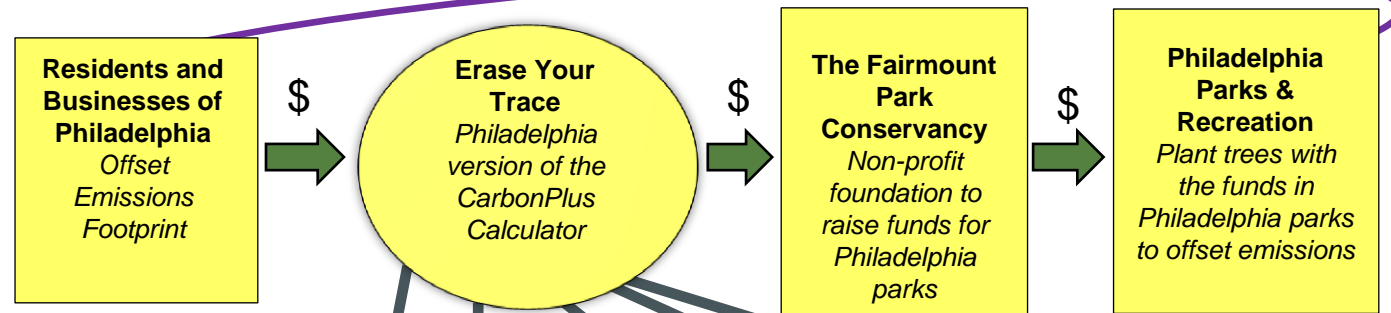
City of New York
Parks & Recreation



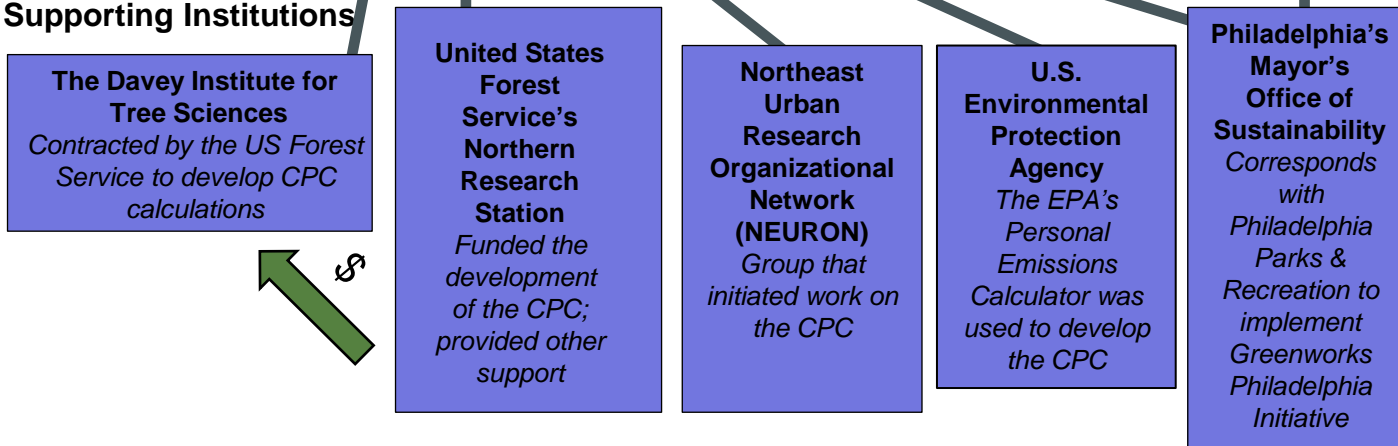
Enabling Environment



Market Chain Actors and Linkages



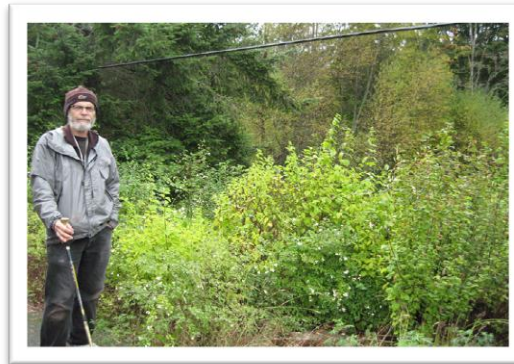
Supporting Institutions



Cascade Land Conservancy's Carbon Mitigation Program



- Restoring urban forested parklands & natural areas
- “Tree-iage” model to categorize acres for threat and value; carbon pricing corresponds to level.
- Pearl Jam: \$210,000, 33 acres restored, 7,000 tCO₂e mitigated to address 2009 world tour emissions



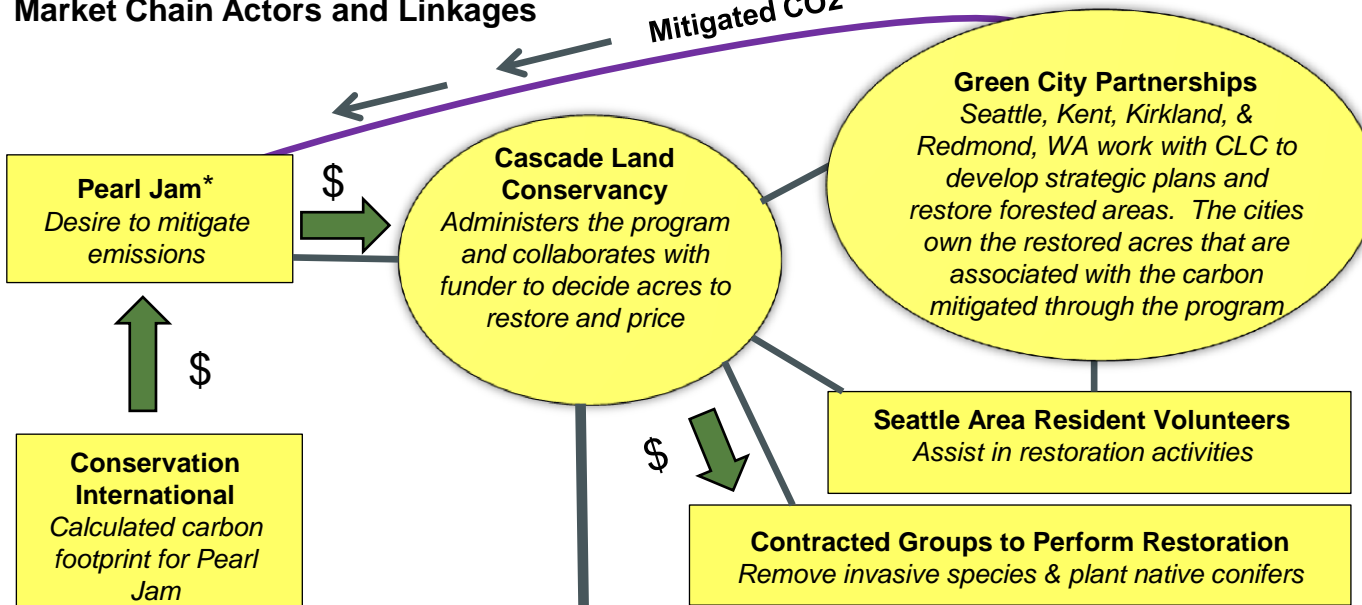
Enabling Environment

Strong Citizen Volunteer Base

Interest in Local Projects Addressing Climate Change

Long -Standing Relationship with Pearl Jam

Market Chain Actors and Linkages



Supporting Institutions

Center for Urban Forest Research

Seattle Climate Now Calculator

Climate Action Reserve
CLC used the Urban Forest Project Protocol as a guide

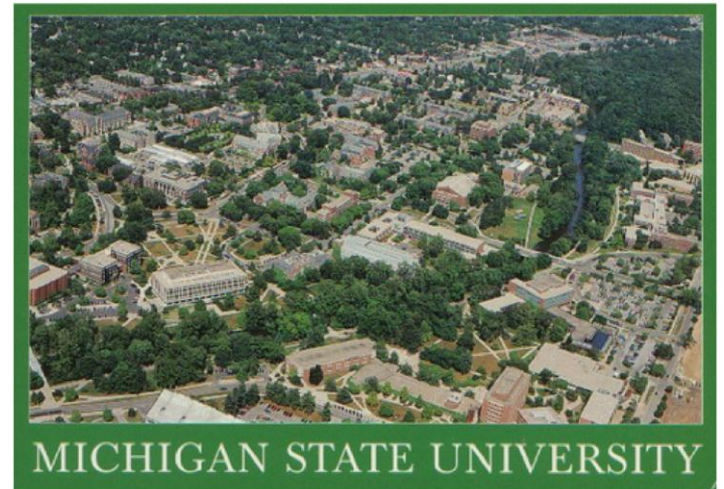
Ecofor LLC
Consulting firm that assisted in the program development

United States ForestService
The General Technical Report NE-343 guided calculations and estimates on carbon stocks

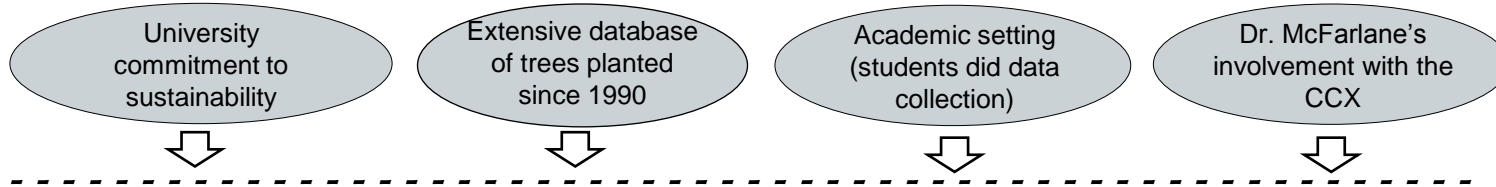
* This Actor will be different for each Carbon Mitigation Project partnership

Michigan State University & the Chicago Climate Exchange

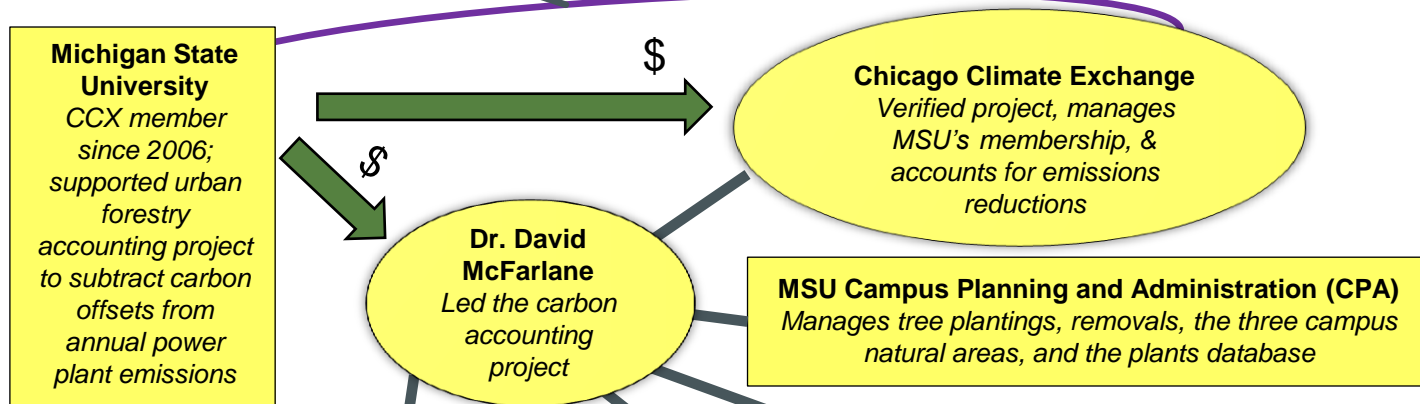
- CCX member since 2006
- First to register an Urban Forestry Project
- Carbon accounting of campus trees planted since 1/1/90 (carbon sequestered since 2003) and natural areas
- Detailed campus inventory detail and a GIS database
- Campus Trees: 4,987 eligible trees; 361 unique species; 47.3 tCO₂, 100 tCO₂ for natural areas = less than 1% of power plant emissions
- No public sale of offsets; pertaining only to MSU's internal emissions accounting and annual reductions



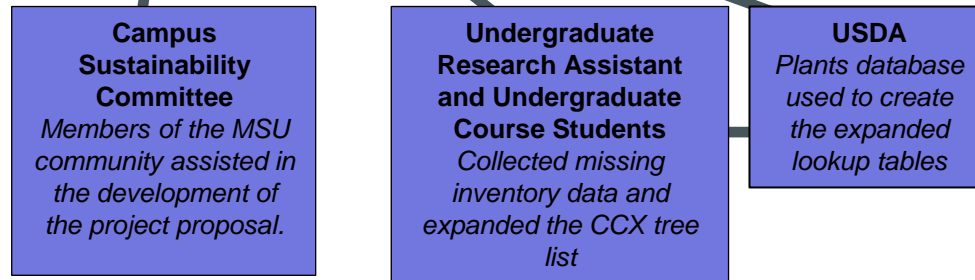
Enabling Environment



Market Chain Actors and Linkages



Supporting Institutions



Upcoming Potential Case Studies

- Treefolks in Austin, TX: carbon footprint calculator and tree planting
- TreeUtah and the Salt Lake City Visitors Bureau: carbon calculator for travel to and from SLC paired with tree planting
- Moscow, Idaho: pilot for municipal project to sell credits with the National Carbon Offset Coalition, Inc.; was not adopted by City Council
- NFL carbon offset project in 2005: Jacksonville, FL, Miami, FL & Detroit, MI
- Cambridge, MA urban forestry carbon project
- Looking for more options!

Identifying Major Barriers and Opportunities

- 38 interviews, more on the way
- 148 total barriers identified
- 103 total opportunities identified
- Classification of barriers and opportunities
- Journal article on the horizon



Conversations to Date

- Markets & Protocol
 - Steve Dettman; EcoTrust, Portland, OR
 - Peter Weisburg; The Climate Trust, Portland, OR
 - Peter Browning; The Climate Action Reserve, Los Angeles CA
 - Greg McPherson, USFS Center for Urban Forest Research, Davis, CA
 - Scott Maco, Davey Tree Expert Company
 - Emily Russell-Roy; The Pacific Forest Trust, San Francisco, CA

Conversations to Date

- CarbonPlus Calculator
 - Mark Twery; USFS Northern Research Station, Burlington, VT
 - Lynne Westphal; USFS Northern Research Station, Evanston, IL
 - Lianghu Tian; Davey Institute for Tree Sciences, Kent, OH
 - Charlie Lord; previous director of The Urban Ecology Institute, Boston
 - Jasmine Tanguay, Conservation Law Foundation Ventures, Inc., Boston
 - Jim Hunt, Boston Office of Environmental & Energy Services, Boston
 - Anne Draddy; TreeBaltimore, Baltimore
 - Jackie Lu; NYC Parks & Recreation, New York City
 - Alex Dews; Philadelphia Mayor's Office of Sustainability, Philadelphia
 - Meg Holscher; Fairmount Park Conservancy, Philadelphia
 - Danielle Fitzko; Vermont Urban & Community Forestry Program, Waterbury, VT

Conversations to Date

- Sacramento Tree Foundation/HMH
 - Jacobe Caditz; STF, Sacramento
 - Angelo Purpura; HMH Builders, Inc., Sacramento

- Cascade Land Conservancy
 - Ara Erickson; CLC, Seattle
 - Andrea Mojzack; CLC, Seattle

- Michigan State University
 - Dr. David McFarlane; MSU, East Lansing, MI

Conversations to Date

- Potential Case Studies
 - Mike Bowman; Idaho Community Forestry Advisory Council, Moscow, ID
 - Ryan Moore; Institute for Environmental Solutions, Denver, CO
 - Rachel Harlow-Schalk; Environmental & Administrative Office, Westminster, CO
 - Rod Larson; Environmental & Administrative Office, Westminster, CO
 - Jeff Ward; previous director of TreeUtah, Salt Lake City, UT

Conversations to Date

- Other Urban Forestry Professionals
 - Alice Ewan Walker; ACT, College Park, MD
 - Scott Fogarty; Friends of Trees, Portland, OR
 - Seth Mentor; American Forests, Washington DC
 - Sue Pringle; UC Green, Philadelphia
 - Skip Weiner; Urban Tree Connection, Philadelphia
 - Roberta Jortner; Portland Bureau of Planning & Sustainability, Portland, OR
 - Vinh Mason; Portland Bureau of Planning & Sustainability, Portland, OR
 - Jennifer Karps; Portland Environmental Services, Portland, OR
 - Tracy Morgenstern; Seattle Urban Forestry Program, Seattle
 - Thomas Hinckley; Forest Resources Dept. at the University of Washington, Seattle

Major Barriers Identified

- Uncomfortable with the science and/or the carbon accounting piece
- Lack of organizational capacity to do front-end work/administer
- Lack of resources to market a project and/or effectively communicate it to an urban population
- Uncertainty in voluntary carbon markets
- Lack of existing models on successful projects
- Additionality, permanence, and ownership of trees (carbon)
- Lack of political action and/or federal action in regulating carbon

Major Opportunities Identified

- Educating on trees' role in climate change mitigation/the multiple benefits of trees
- Liberty to design projects to play on organizational strengths and to build upon existing programs/volunteer support
- There are available resources, free of charge (CAR protocol, USFS reports, emissions information)
- There is a pre-compliance market
- Recognizing value of and support for local projects
- Projects can fit well with municipal/state sustainability objectives
- There is interest in the topic in general

Preliminary Findings

- Perceived and actual obstacles and opportunities are varied and many are unique to urban forestry
- The importance of co-benefits: “Premium” or “Gourmet” offsets (PES schemes more realistic?)
- Two major types of projects: one-off and calculators



Preliminary Findings

- Mostly reactive to this point but there is a desire to be proactive
- Appropriate standards and viable models are necessary
- Groups & municipalities need marketing and communication materials to reach their funders and urban residents
- Price per ton offset or mitigated ranges from \$.05 (CCX) to \$130 (CLC)
- You can't fund an urban forestry program on the carbon services of trees alone.



Thank You!

•Case Studies Developed and on Website:
www.uvm.edu/forestcarbon

•Contact for Updates or Potential Case Studies!
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Sources

Unless otherwise noted, all photographs were taken by and are the property of Elise Schadler

Hamilton, K., Milo Sjardin, Molly Peters-Stanley, and Thomas Marcello. (2010). *State of the Forest Carbon Markets 2010: Building Bridges*. Ecosystem Marketplace & Bloomberg New Energy Finance.

Nowak, D. J. a. D. E. C. (2003). Carbon Storage & Sequestration by Urban Trees in the U.S.A. *Environmental Pollution*, 116, 381-389