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East Goshen Forest Restoration Project: A Community-WCU Partnership

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East Goshen Forest Restoration Project: A Community-WCU Partnership

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ABSTRACT

Forest restoration projects can be a cost effective way to help restore ecosystems affected by urban sprawl. The planted trees can also remove air pollutants as well and absorb and store carbon. With these benefits in mind a joint East Goshen Township/WCU partnership began in 2009.

Two hundred and twenty five (225) balled and burlapped trees (approx. 7.6 cm in diameter) were planted in a 1.04 ha mowed field in East Goshen Park on the corner of Paoli Pike and Line Rd. Data were collected to determine carbon stock and pollution remediation for the planting date (2009), one year later (2010), three years later (2012), and then project the benefits for 5, 25 and 75 years into the future. The USDA Forest Service *i-Tree Eco* analysis tool was used to estimate pollution removal (ozone, sulfur dioxide, nitrogen dioxide, carbon monoxide and particulate matter). Total carbon stored and net carbon annually sequestered by the urban forest was also calculated.

The site sequestered 1.02 t C/ha in the 2009 study year (year of planting), and increased in 2010 to 1.21 t C/ha with an average value of \$93.32 per tree. In 2012, whitetail buck rubbings were noted and the site was resurveyed to determine tree mortality and growth rates. By the time this site matures in 75 years, it will have stored a combined 221.41 t C/ha and an estimated \$1,912.70 worth of pollutants from the atmosphere each year. Each tree will return an average value of \$1,528.61 in benefits for an overall site total of \$343,939.

The remediation properties of the site are projected to substantially outweigh the initial costs of planting and the maintenance costs that continue through the development of the site.

The results of this study will aid management practices on site and allow for planning of forest growth and development.



Reforestation of Applebrook Park



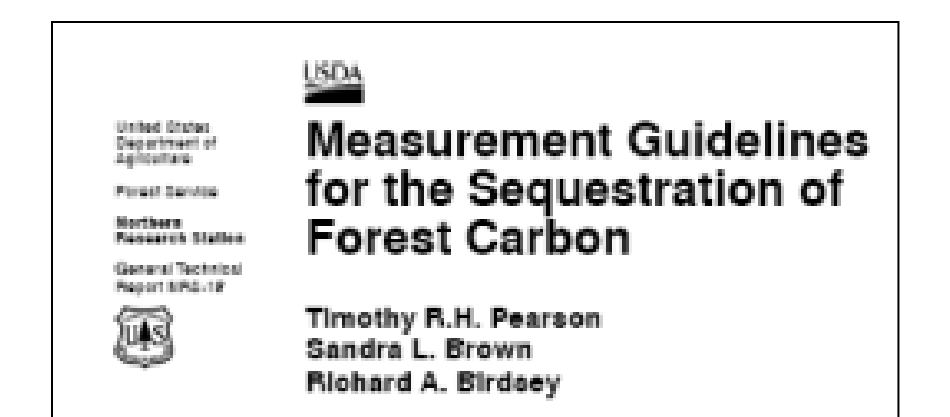
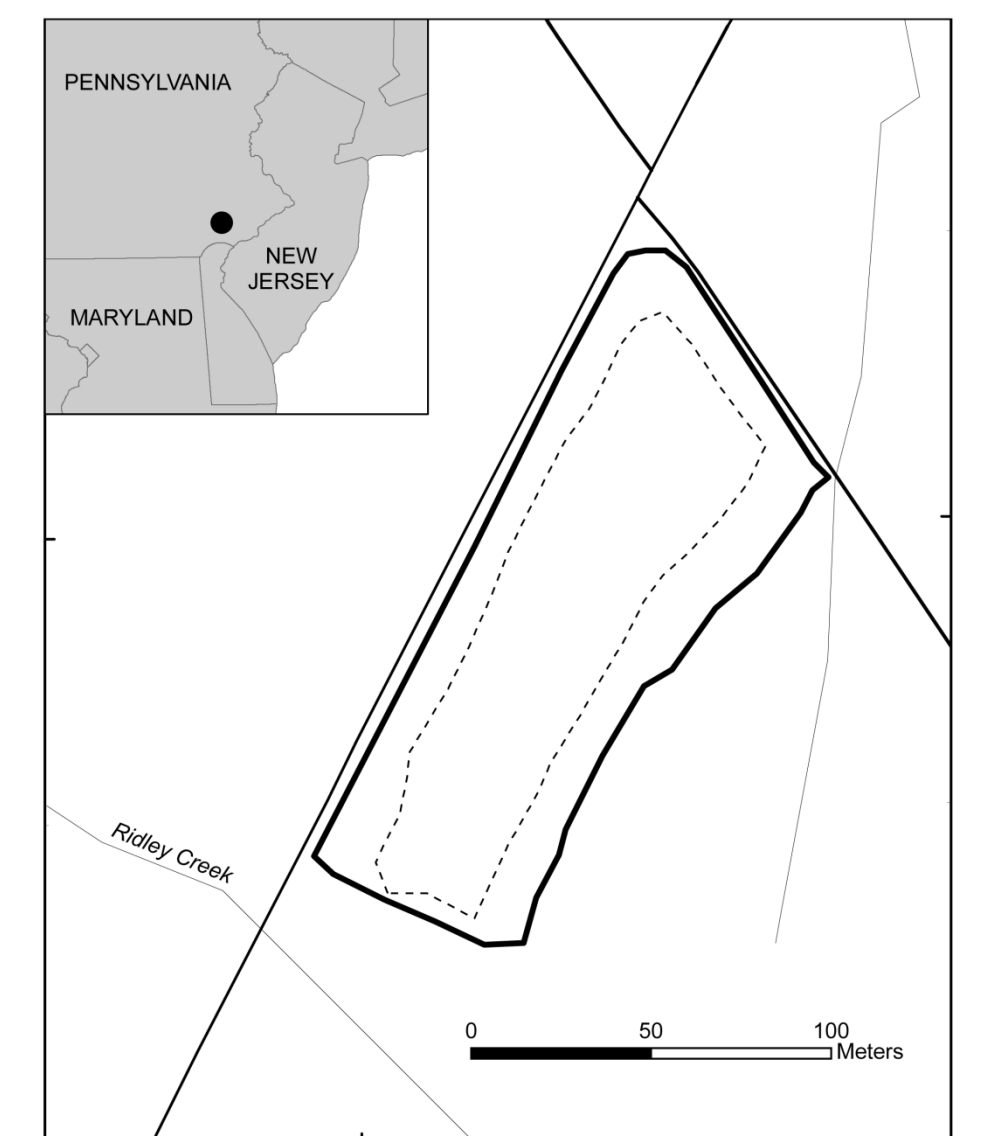
Purpose & Objectives

- Urban forest restoration and management are crucial in maintaining environmental systems. Local-scale reforestation, e.g., the municipal or township level, may create a more manageable scale for such labor-intensive projects.
- Reforestation of Applebrook Park will increase carbon sequestration and storage, and improve water quality in East Goshen Township's Ridley Creek, a DEP designated "High Quality Stream."

➤ **Objectives: to determine the site's potential carbon sink capabilities and pollution remediation benefits in the present-day and projected 5, 25, and 75 years into the future.**

Study Area & Methods

- 225 ~5-yr old native trees planted in 1.04ha mowed field
- Tree heights, diameters, and health surveyed beginning in 2009. Projections based on conservative species-specific growth rates.
- Carbon storage calculated using USFS species-group equations, *i-Tree Eco 4.0* used to estimate value of each tree and pollution control (CO, O₃, NO₂, PM₁₀, SO₂).



Results

Year	Carbon Stock (t C/ha)	Site Value	Pollution Control (g/yr)
2009	1.02	\$18,243	5,419
2010	1.22*	\$20,999*	5,415^
2015	3.27*	\$20,256^	5,153^
2025	25.16*	\$20,999^	96,477*
2075	221.41*	\$343,939*	240,026*

*significant increase from previous year
 ^lack of significant increase likely due to estimated tree mortality rate applied to each study year



Recommendations

- **continued municipal involvement** to ensure long-term proper management, including establishment of an understory, which requires:
 - invasive species control
 - routine watering of understory shrubs until established
 - deer fence or guard to protect until maturity
- **continued monitoring by university** of site development, including tree mortality rates, sedimentation and erosion rates, nonpoint source pollution, and macroinvertebrate populations
- **publicize partnership** and site success to promote similar projects in area

