Analyzing and Influencing Carbon Sequestration in Harvested Wood Products

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Abstract

- Information is intended to aid in international discussions and any agreements about managing greenhouse gas emissions and sinks.
- Also provides national level methods and estimates of carbon sinks and emissions associated with HWP.
- The package provides quick accessibility, allowing data to be updated, modified, and manipulated with ease.

Introduction

- Sequestration of carbon in forests is a process that can pull large quantities of carbon out of the atmosphere or prevent its release to the atmosphere, 87% of total CO_2 removals in 2014. Carbon mitigation efforts have thus focused much attention on reforestation, forest management,and forest based products. According to the most recent report to the **UNFCCC**, an estimated 18.7% of the total carbon in woody materials is contained in harvested wood **(HWP and SWDS).**
- The amount of carbon in **HWP** and **SWDS** depend on how much wood is harvested, what types of products are produced, how the products are use, the lifetime of the wood products, and how the wood is processed at the end of its primary product lifetime.

Sources of Data and Equations

I. WOODCARB II Software in Microsoft Excel®
Note: Base level data was given in spreadsheet.
II. Harvest Quantities:

$$\mathrm{E} = \mathrm{mc}^2 \qquad (1)$$

III. Imports, Exports, etc.:
IV. Decay of HWP:

Methodology (what we did)

- We have translated WOODCARB3 spreadsheet models into an R package.

Uncertainty Analysis

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- The package provides quick accessibility, allowing data to be updated, modified, and manipulated with ease.

Projected Carbon Contribution

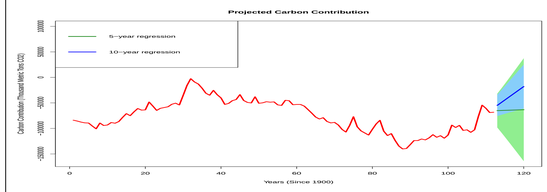

Figure: Figure caption

Total HWP Carbon Stocks with Uncertainty

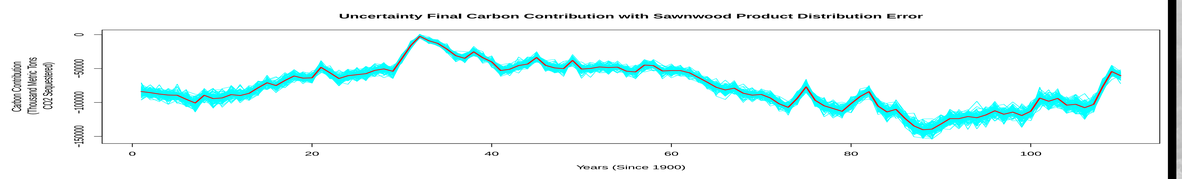

Figure: this is the caption that shows what is in the figure that explains the plot of HWP stocks and provides and envelope of uncertainty around it this is the caption that shows what is in the figure that explains the plot of HWP stocks and provides and envelope of uncertainty around it

Sensitivity Analysis

- Halflife role in final carbon contribution calculation.
- Error is assumed to be N(1,.2).
- Assume how well halflifes hold with applied error.
- Results can be used to improve half-lives.
- Results can also show which half-lives are concerete.

Sensitivity Plot

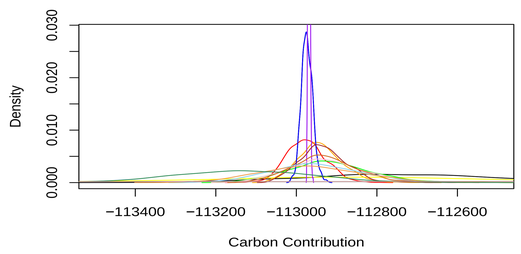

Figure: New.Nonres.Rties and New.Nonres.Rcar.Repair have the least variance.

Half-life Table

	Half Life	1990	2000	2010
Single Fam Homes	78	49326.235419467	68293.9690705363	68979.3356929374
Multi Fam Homes	47.6883539937108	98724.8007179637	2380.01084123663	1756.75603211151
Shipping	38.0284145354606	10878.7494765968	13989.006528278	11874.617876221
House Furniture	38.0284145354606	5175.20002571365	9369.04368951025	8638.16275595599
Comm. Furniture	38.0284145354606	1180.03262578815	3612.23906154734	3657.69430872661
Industrial	38.0284145354606	34036.325290149	31405.3383220674	26583.7797251829
Other	38.0284145354606	12834.9814511951	18264.2846333669	16991.3669561707
Res Upkeep	23.1334540304859	167096.425781801	172797.319502826	114967.800311367
Paper	2.53087281800454	6391552.24965238	3603762.53086556	139374.493167519

Sensitivity Affect

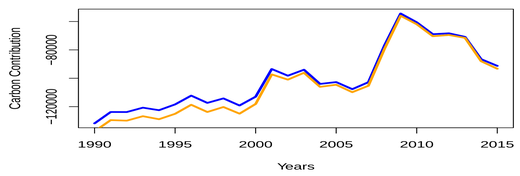

Figure: This is a comparison between Paper half-life and a 50 percent increase.

Decay

Decay of Hardwood in Multifamily housing

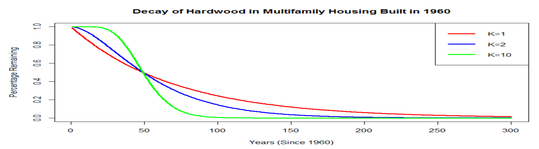

Figure: This figure shows the over effect of the decay function on multifamily housing built in 1960

Overall Decay

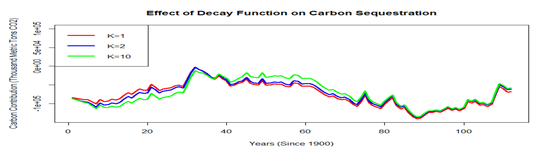

Figure: This figure shows the over effect of the decay function on Carbon Sequestration

Future Plot and Targeted Change

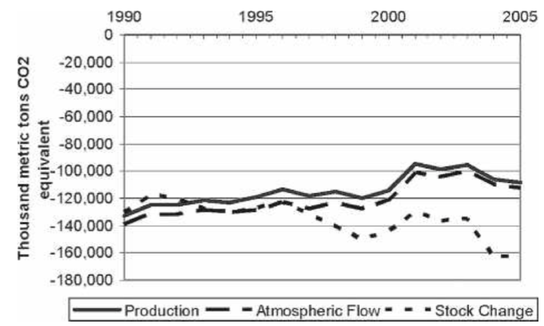

Figure: Figure caption

Discussion