Forest Owner Interest in Carbon Markets

Melissa Kreye,
Assistant Professor, Extension Specialist
Ecosystem Science and Management
Pennsylvania State University

Calvin Norman,
Forestry and Wildlife Educator
Penn State Extension
Contents

• Overview of non-industrial private forest (NIPF) owners in the US
• Research on landowners and carbon markets
• Examples of carbon market providers targeting NIPF owners
• Extension programming on carbon markets nationwide
Who owns America’s Forest?

- Private: 58% (445 million acres)
- Offsets up to 16% of US emissions annually
https://ffrc.shinyapps.io/NWOSdashboard/
Forest Owner Demographic Characteristics

- 55 to 75 years of age
- Male
- White
Forest Ownership Sizes

USDA National Woodland Owners Survey Dashboard (NWOS-DASH)
Land Tenure

USDA National Woodland Owners Survey Dashboard (NWOS-DASH)
Interest in Forest Health and Sustainability

USDA National Woodland Owners Survey Dashboard (NWOS-DASH)
Harvesting Activity

USDA National Woodland Owners Survey Dashboard (NWOS-DASH)
Management Plan

USDA National Woodland Owners Survey Dashboard (NWOS-DASH)
Sources of Advice

USDA National Woodland Owners Survey Dashboard (NWOS-DASH)
Concerns about Climate Change

USDA National Woodland Owners Survey Dashboard (NWOS-DASH)
Familiarity with Carbon Programs

USDA National Woodland Owners Survey Dashboard (NWOS-DASH)
Desire to Learn More Overall

USDA National Woodland Owners Survey Dashboard (NWOS-DASH)
Preferred Types of Financial Options

USDA National Woodland Owners Survey Dashboard (NWOS-DASH)
It’s a Balancing Act
Forest Carbon Project Developers in the US

- 3GreenTree
- Core Carbon (Finite Carbon)
- Evergreen Carbon
- TruerTerra
- Living Carbon
- Bluesource
- The Climate Trust
- Plan Vivo
- Family Forest Carbon Program
- Natural Capital Exchange
- Compass Carbon
- More...

Contract Designs

- Simple
- Moderate
- Robust
Meta-analysis of Forest Owner Willingness to Accept Payments for Carbon Studies: 13 studies, 36 mean WTA observations (20,000+ forest owners)

<table>
<thead>
<tr>
<th>Contract Attributes</th>
<th>Forest Owner Characteristics</th>
<th>Study Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Ecosystem services provided</td>
<td>Age of the respondent</td>
<td>Region in which the study area lies</td>
</tr>
<tr>
<td>Length of proposed contract</td>
<td>Gender of the respondent</td>
<td>Data collection method</td>
</tr>
<tr>
<td>Penalty</td>
<td>Income from timber</td>
<td>Type of question format</td>
</tr>
<tr>
<td>Management plan</td>
<td>Number of acres owned</td>
<td>Sample size of survey</td>
</tr>
<tr>
<td>Management Restriction</td>
<td>Length of the tenure</td>
<td>Response rate to survey</td>
</tr>
<tr>
<td></td>
<td>Respondent's education</td>
<td>Weighting variable</td>
</tr>
<tr>
<td></td>
<td>Race of the woodland owners</td>
<td>Study Year</td>
</tr>
</tbody>
</table>

The Forest Landowner Foundation
Table 3. Robust regression of forest owner mean WTA for carbon.

<table>
<thead>
<tr>
<th>Variable name</th>
<th>Coef.</th>
<th>Std. Error</th>
<th>P&gt;(t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of acres</td>
<td>-0.3482</td>
<td>0.1237</td>
<td>0.00</td>
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<tr>
<td>Contract years</td>
<td>0.3561</td>
<td>0.1789</td>
<td>0.05</td>
</tr>
<tr>
<td>Management plan</td>
<td>0.9954</td>
<td>0.3701</td>
<td>0.01</td>
</tr>
<tr>
<td>Management restriction</td>
<td>1.2406</td>
<td>0.3496</td>
<td>0.00</td>
</tr>
<tr>
<td>Region</td>
<td>1.0637</td>
<td>0.5074</td>
<td>0.04</td>
</tr>
<tr>
<td>Constant</td>
<td>4.1583</td>
<td>0.6484</td>
<td>0.00</td>
</tr>
</tbody>
</table>

F(5,30) = 16.92, R-Squared = 0.6270
Table 4. Mean willingness to accept (WTA) per acre/year for carbon sequestration services estimated using regression model coefficients and benefit transfer techniques (2020 dollars).

<table>
<thead>
<tr>
<th></th>
<th>Simple contract&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Moderate contract&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Robust contract&lt;sup&gt;3&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>95% CI</td>
<td>Mean</td>
</tr>
<tr>
<td>All owners</td>
<td>$43.63</td>
<td>$33.04 - $57.63</td>
<td>$168.56</td>
</tr>
<tr>
<td>Early Adopters</td>
<td>$10.91</td>
<td>$8.26 - $14.41</td>
<td>$42.14</td>
</tr>
</tbody>
</table>

<sup>Simple</sup> 1-year contract, delay harvest

<sup>Moderate</sup> 20-to-50-year contract, delay harvest, management plan

<sup>Robust</sup> 100-year contract, delay harvest, management plan
Figure 1. Early adopters average willingness to accept for forest carbon and number of forest acres owned.
Assumptions:

- Average carbon stocks in private forests is 22.55 tons/acre
- Average rate of carbon sequestration in live biomass is 0.55 tons/acre/year
- Voluntary market $4/ton carbon
- Compliance market $17/ton carbon
- Social value $51/ton carbon

Source: https://apps.fs.usda.gov/Evalidator/validator.jsp
Types of programs owners may consider

- **Harvest deferral**
  - No harvesting

- **Improved forest management (IFM)**
  - Subsidizes BMPs to improve carbon sequestration

- **Afforestation/Avoided Conversion**
  - Plant trees in places without trees
Harvest Deferral Strategies

- Commonly 20-or 40-years contracts
- CARB requires a 125-year contract
- NCX is 1 year
  - $5-10 per harvest deferral credit
  - A cooling-off period between enrolling in longer (higher paying) program

Owners Concerns
- Impact to forest products industry
- Early successional species
- Is it really additional?
Bidding Paradox

- Opportunity costs range from $4 to $40/acre in southern pines
- Depends on
  - Management activities
  - Rotation schedule
  - Forest products
Improved Forest Management

- Family Forest Carbon Program
- Two options:
  - Allows for light management in mature forests
  - Regenerating forests by managing threats (deer and invasives)
- 10- or 20-year contracts
- Tied to land

**Owners Concerns**
- Who will do management?
- What monitoring is involved?
The Jackson’s

- Own 130 acres of forest
  - 100 mature forest
  - 30-acre seed tree
- Looked at several carbon programs
- Estimated ~$800 a year from NCX
  - $8 an acre in the mature forest
- Enrolled in FFCP for $31,400 over 20 years
- Average annual net present value (4% over 20 years)
  - NCX-$2.60/acre
  - FFCP-$4.00/acre
Afforestation?

- Appealing to some landowners
- Very few programs
- Limited land
- Lag between sign-up and payment
- Limited infrastructure
- Species used
- Industrial/government concerns

Owner’s Already Enrolled in Carbon Markets

- Are ethically motivated to participate
- Had to be proactive in learning about carbon market opportunities
- Looking to supplement their income
- Challenged by:
  - Minimum number of acres
  - Certification requirements
  - Finding consultants
Owner’s Questions about Carbon Markets

How long is the program?

How much money will I make?

Am I making an impact?

What happens with land transition?
Systemic Causes for Concern

• Bad actors

Mark Loewen, director of World Wide Carbon LLC, pleads guilty to defrauding investors in carbon credit scam

An excerpt from Business Wire: "Another response from Kurt Kaiser, Compass Carbon: “All of Mark Loewen's illegal activities occurred prior to us working with Worldwide Carbon. We had no involvement or knowledge whatsoever in any Mark Loewen's activities that resulted in his conviction."

• Lack of standard definitions
  • EPA set definitions
Penn State Extension: Forest Carbon Markets 101

- Established in 2019
- Webinar and panel discussion series
- 10 Extension articles
- 2600+ participants nationwide
Forest Owner Carbon and Climate Education Program (FOCCE)

- Funders-NIFA
- $1.5 million, 4 years
- 13+ university collaborators
- Approach:
  - Co-created curriculum
  - Online training modules
  - Peer training
  - Professional development
  - Minority landowners
Forest Owner Carbon and Climate Education Program (FOCCE)

Sustainability Campaign
- Vertical community of practice
- FOCCE Newsletter
- FCWG Learning Exchange Series
Thank you!

Melissa M. Kreye  
Extension Specialist  
Email: mxk1244@psu.edu  
Work Phone: 814-867-1237

Calvin Norman  
Extension Educator  
Email: cmn5525@psu.edu  
Work Phone: 814-472-7986