Forest Owner Interest in Carbon Markets

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Forest Benefits and Values

PennState Extension

USDA NIFA

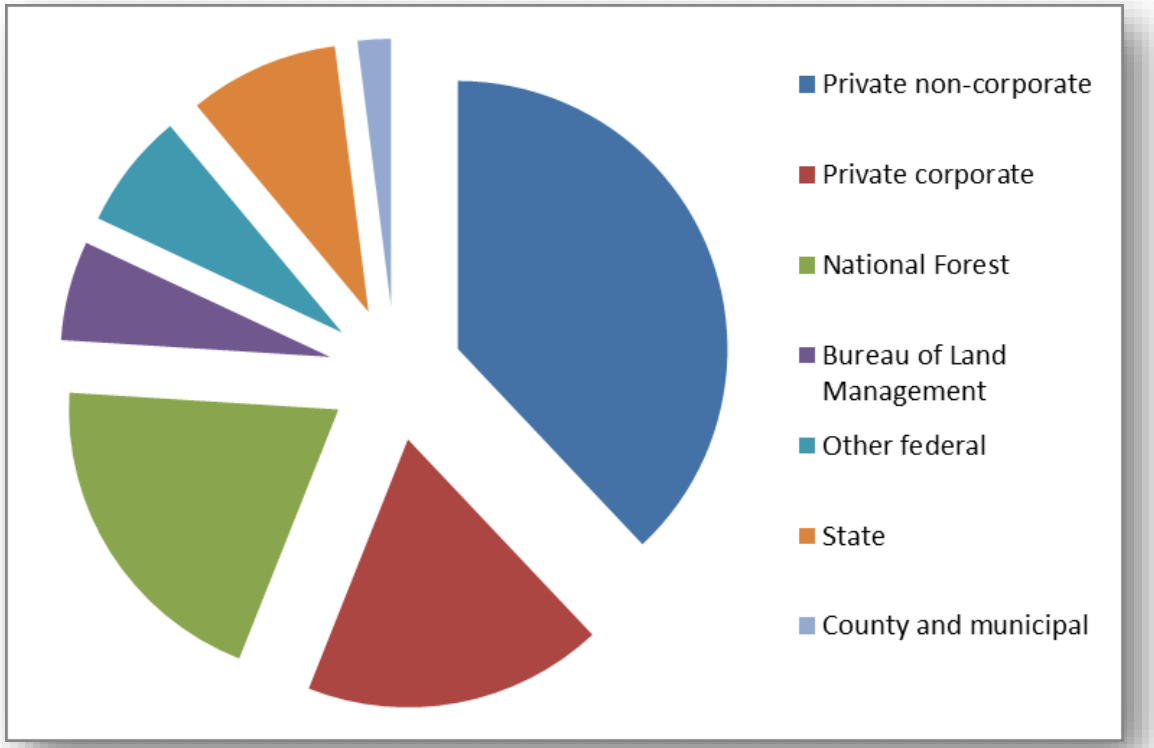
NSF

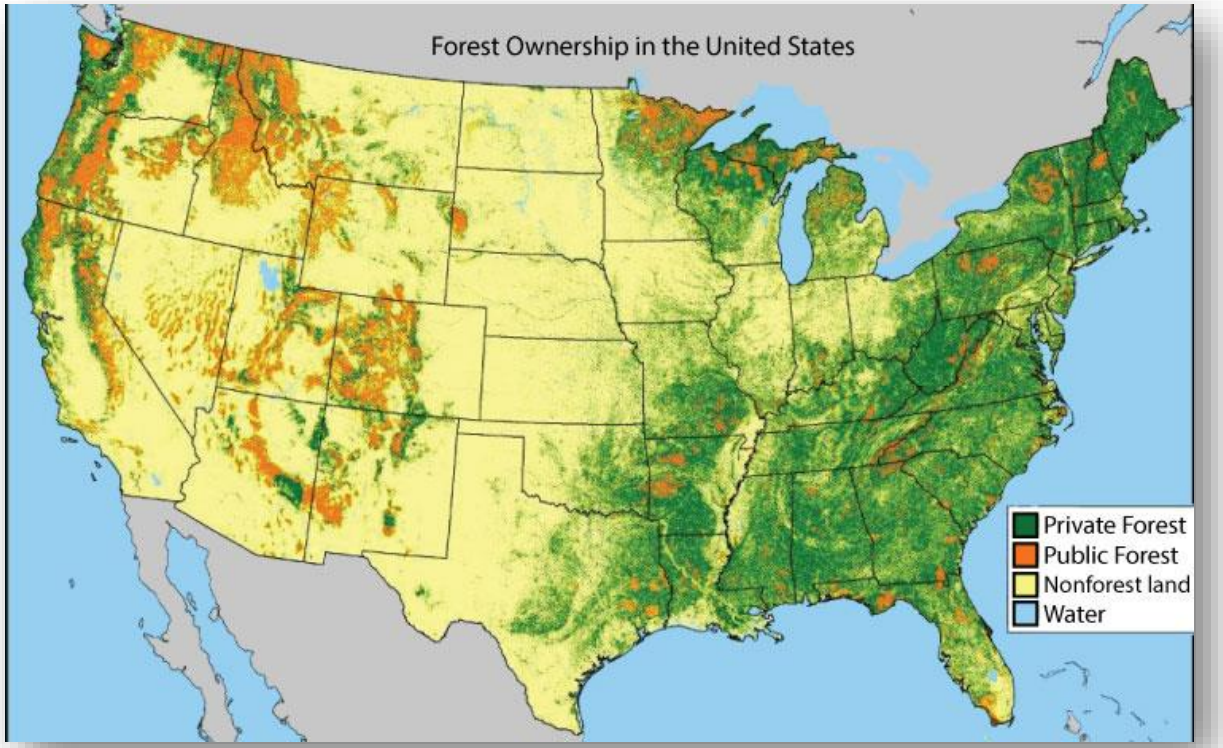
Contents

- 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





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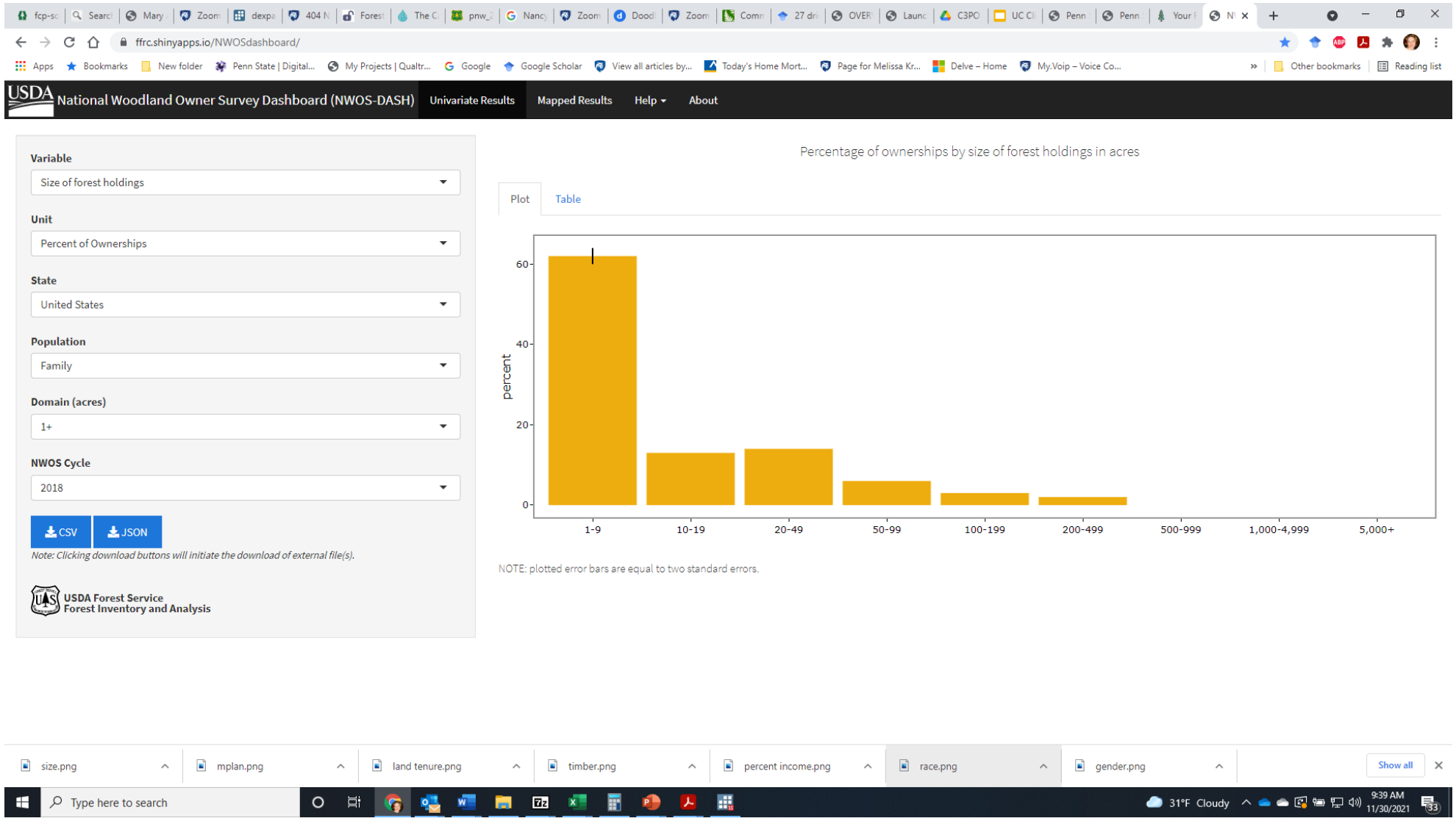
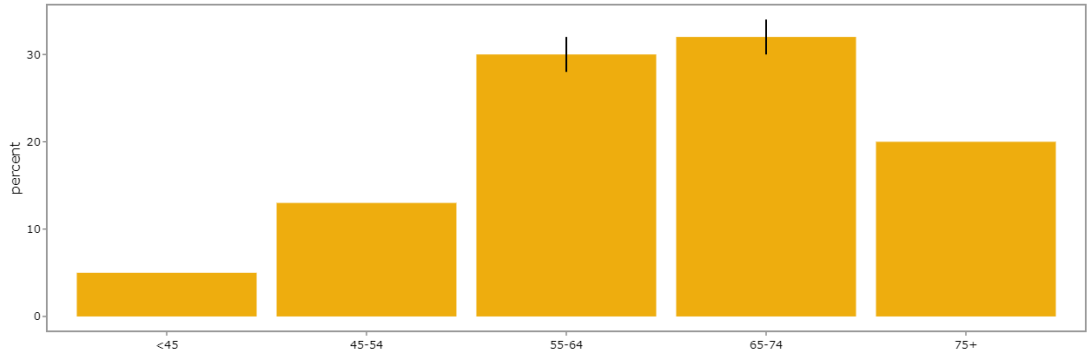
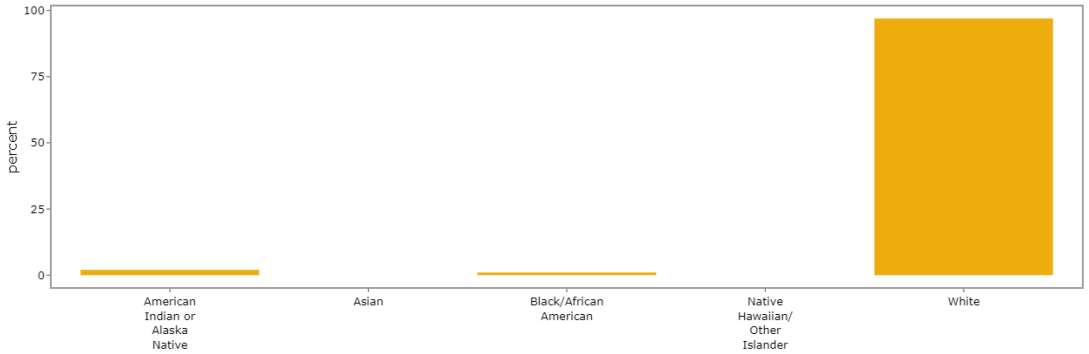
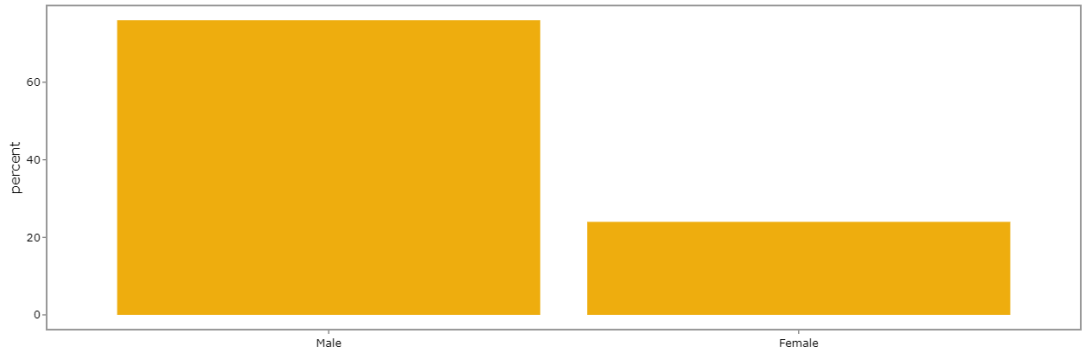


Forest Owner Demographic Characteristics

- 55 to 75 years of age
- Male
- White

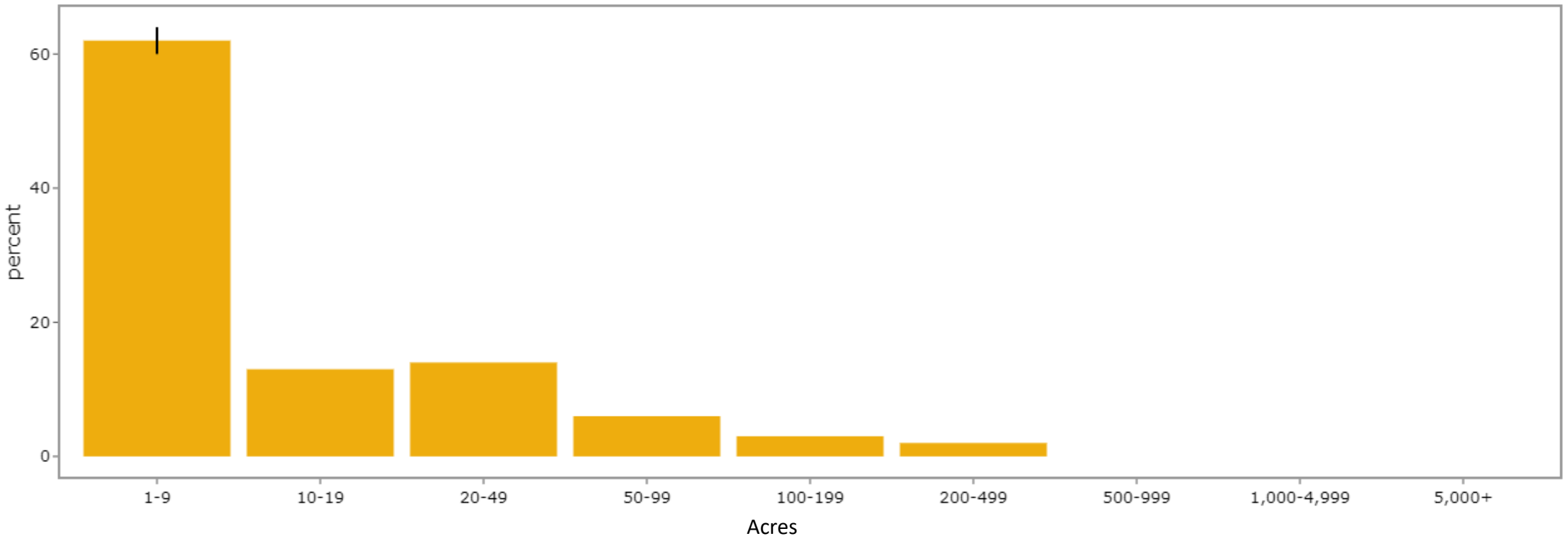






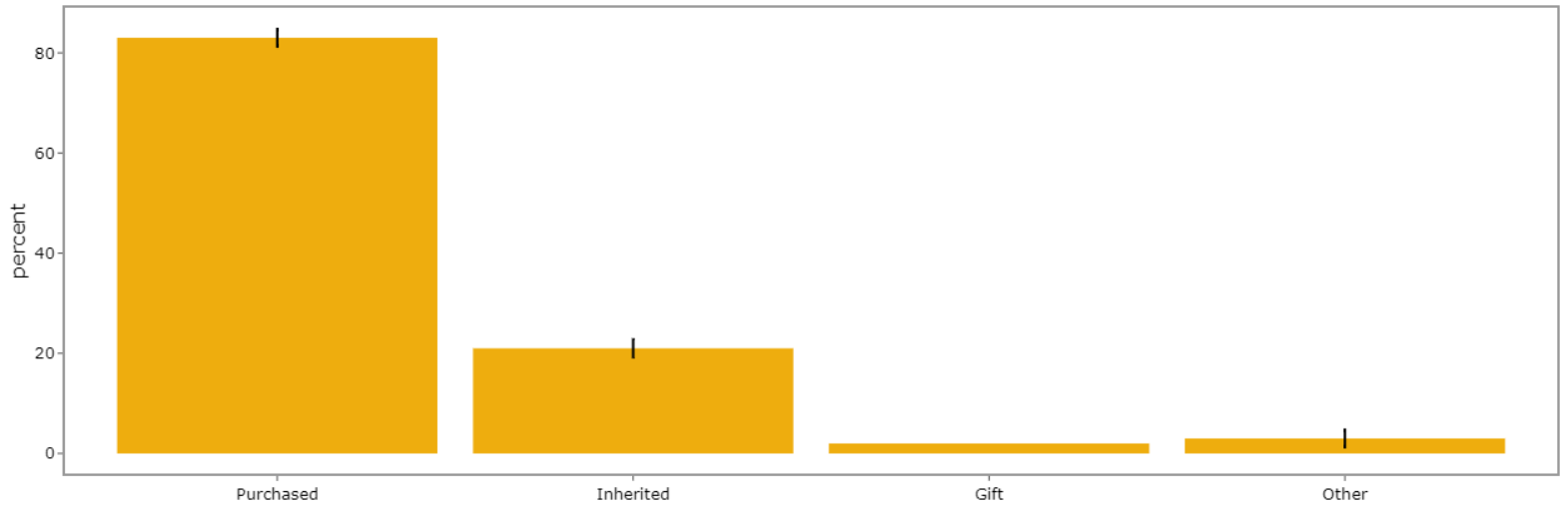
USDA National Woodland Owners Survey Dashboard (NWOS-DASH)

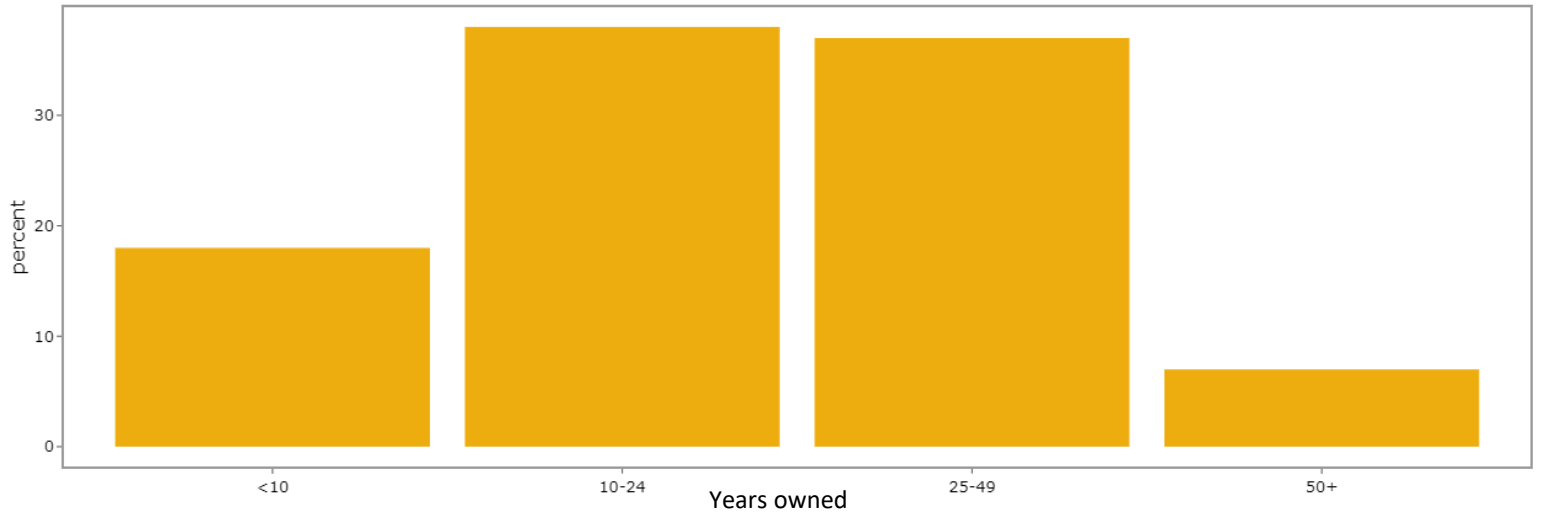
Forest Ownership Sizes



USDA National Woodland Owners Survey Dashboard (NWOS-DASH)

Land Tenure





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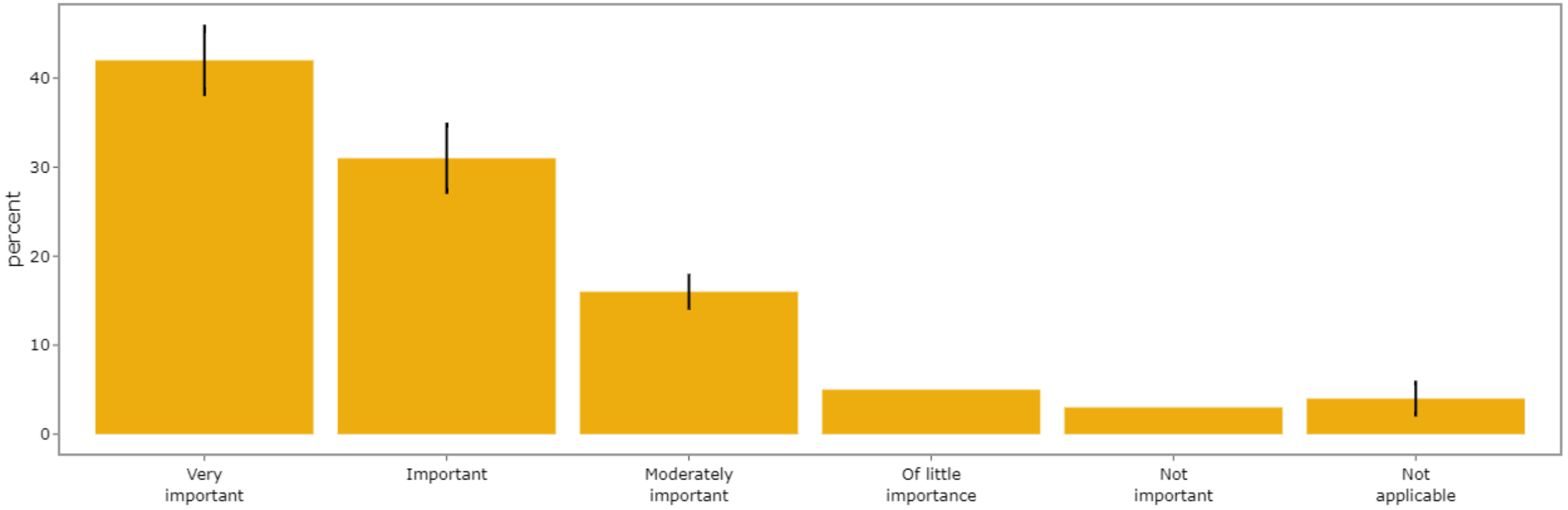
Interest in Forest Health and Sustainability



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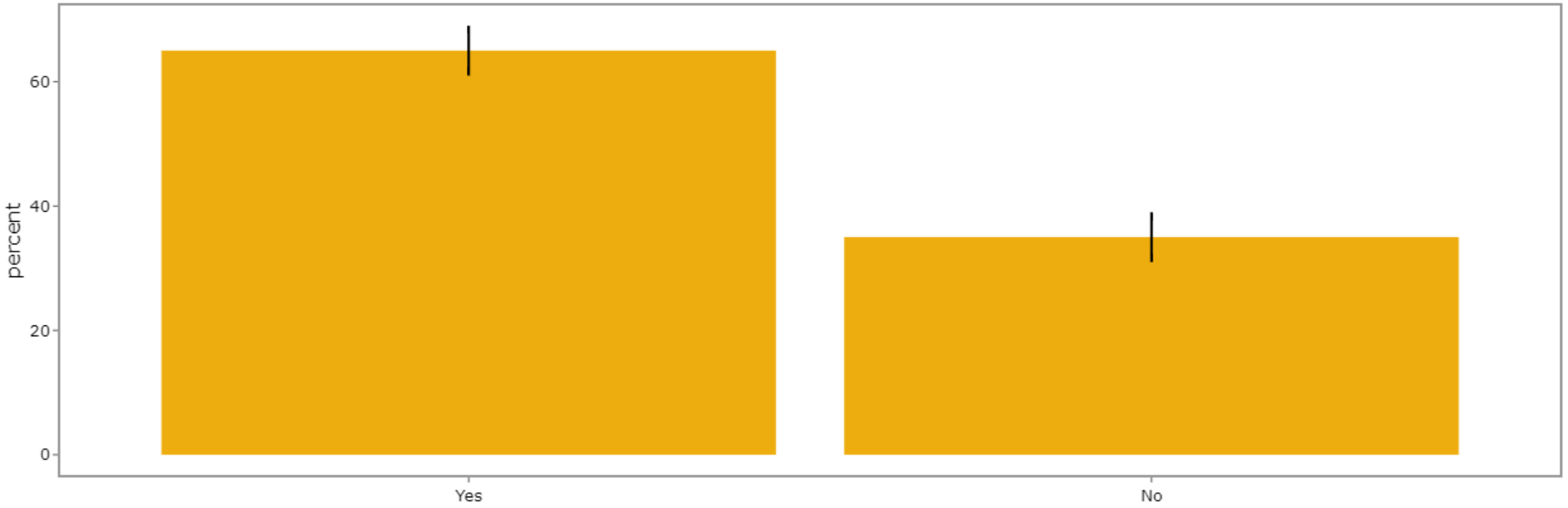
Harvesting Activity



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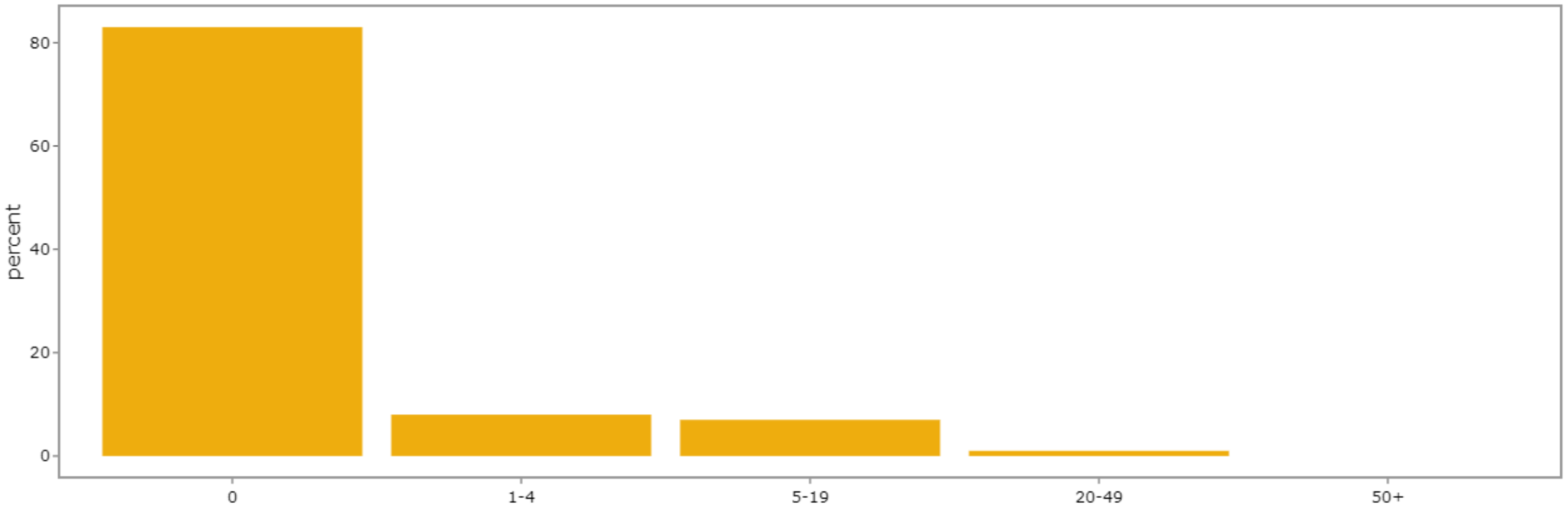
Percent Income from Forests



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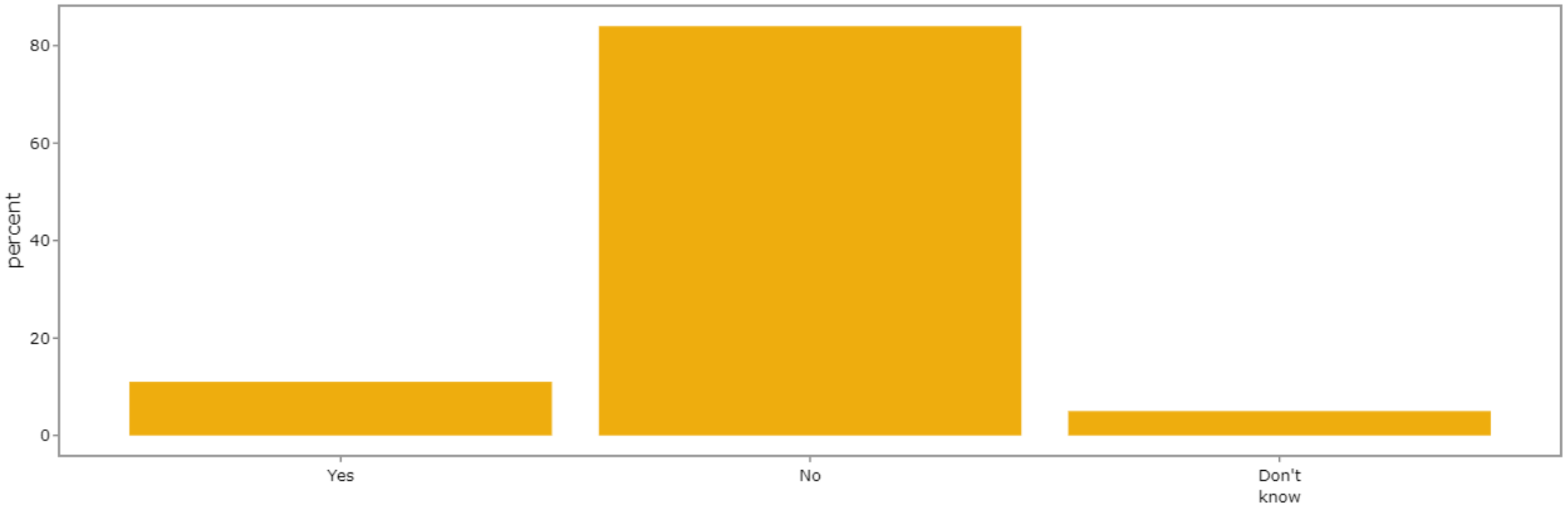
Management Plan



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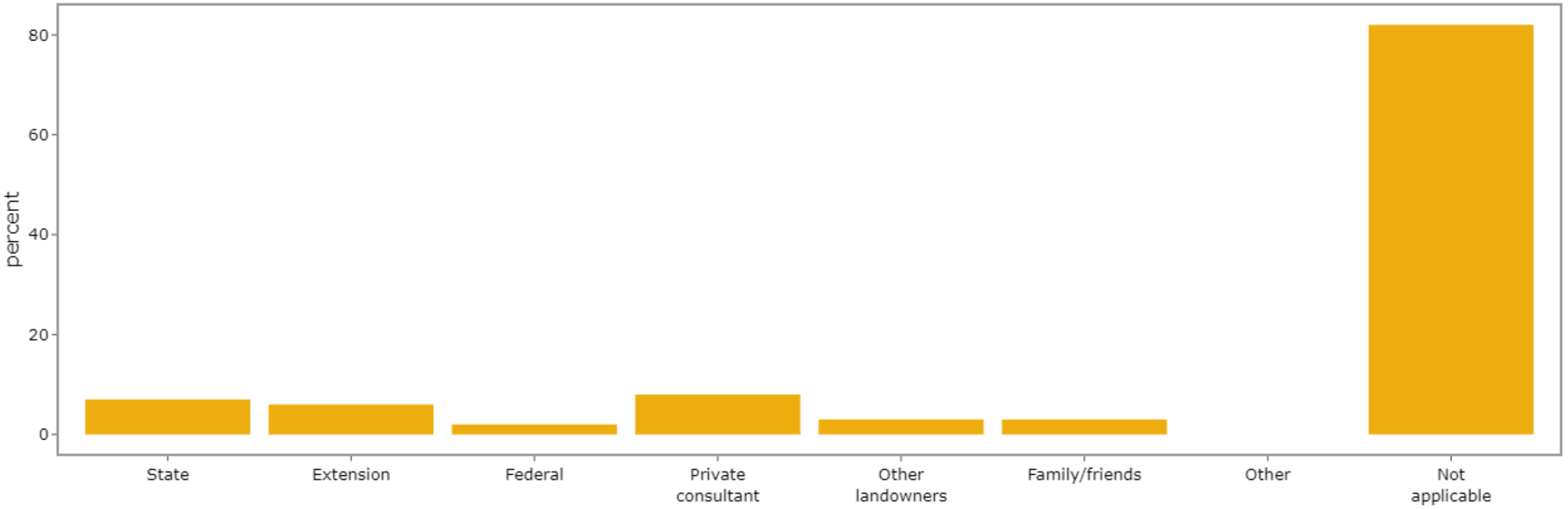
Sources of Advice



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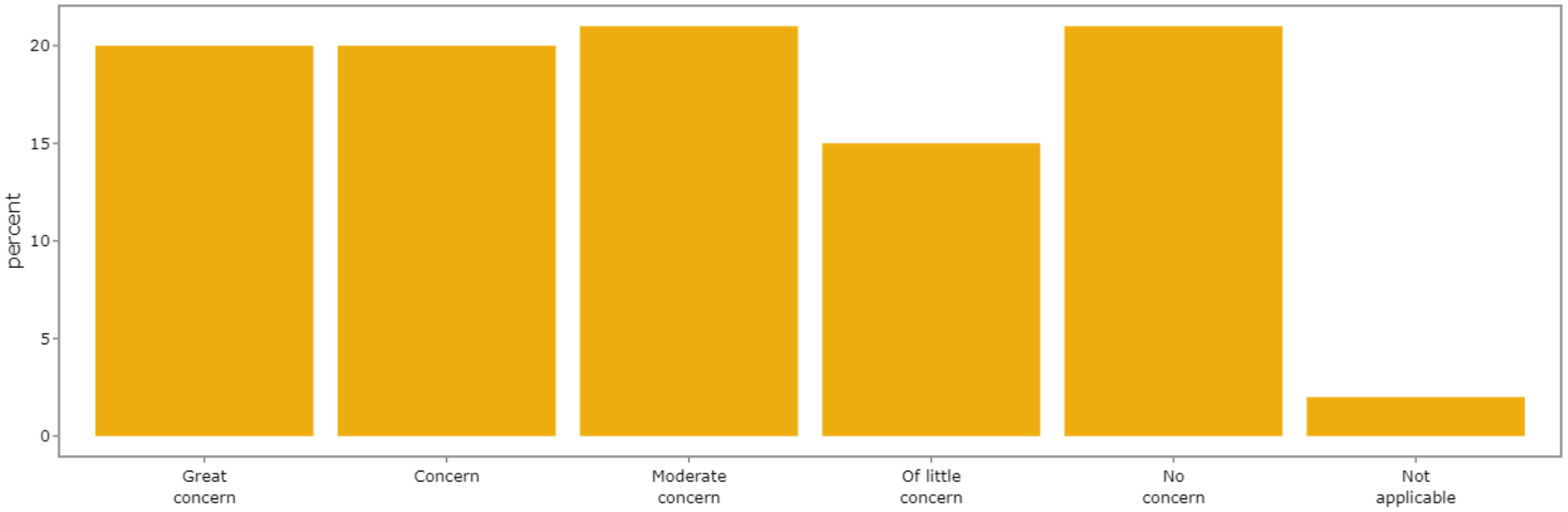
Concerns about Climate Change



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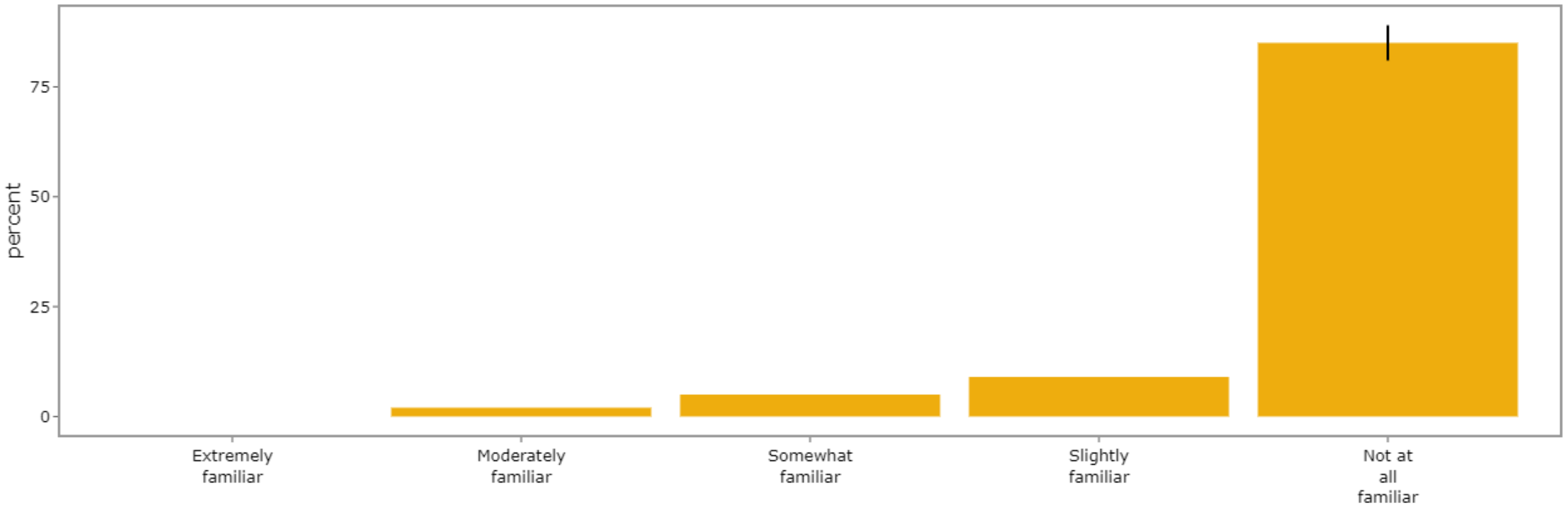
Familiarity with Carbon Programs



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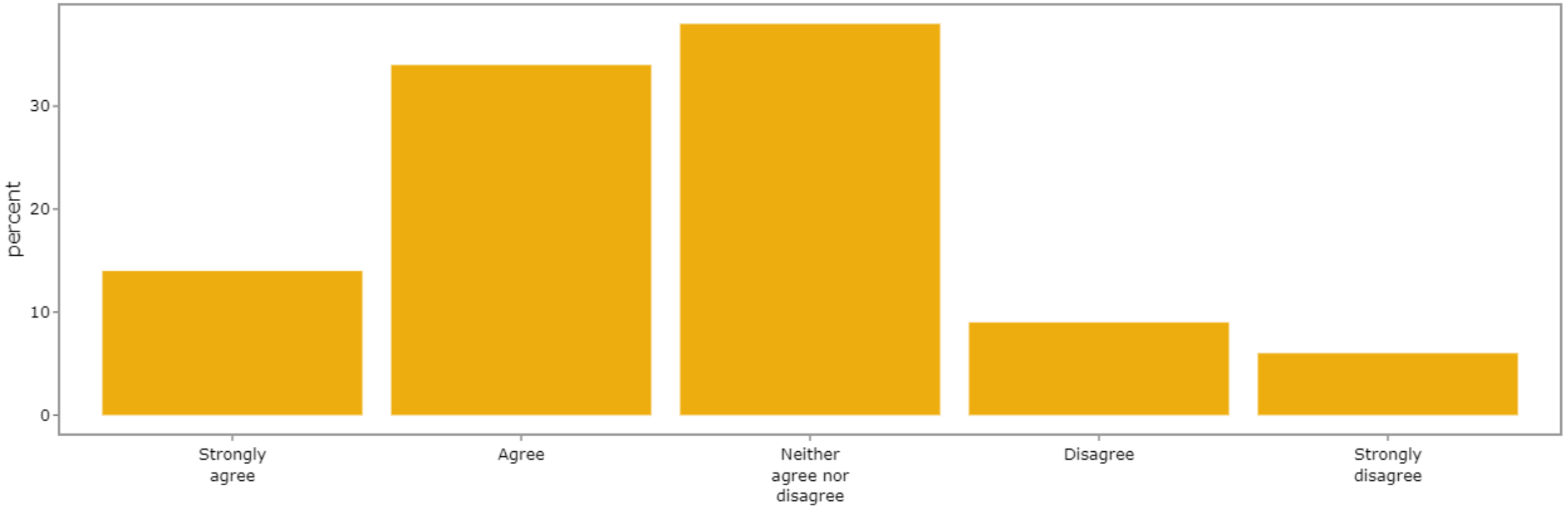
Desire to Learn More Overall



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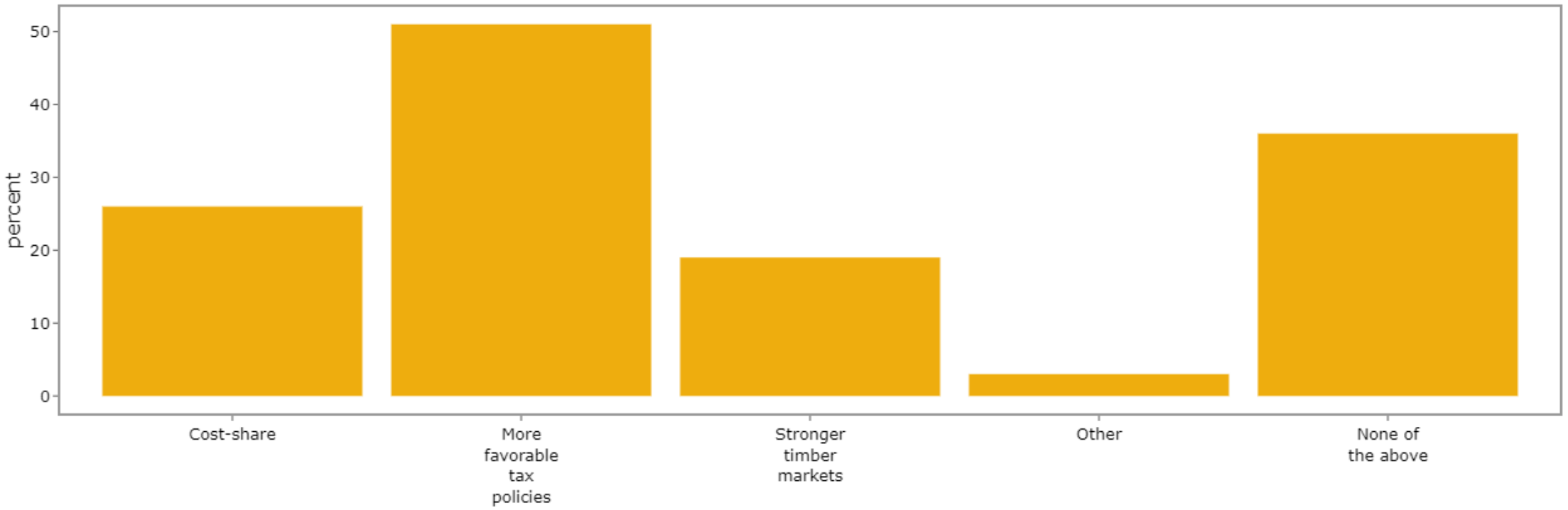
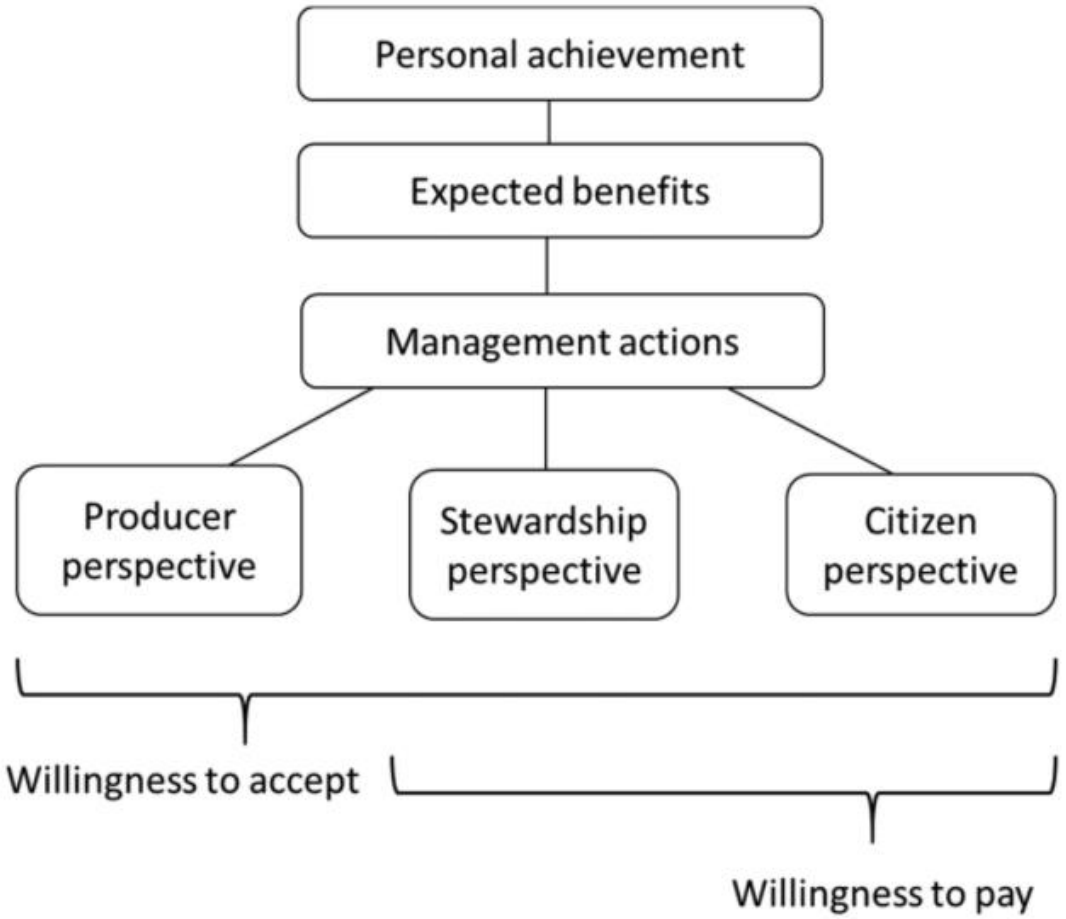
Preferred Types of Financial Options



USDA National Woodland Owners Survey Dashboard (NWOS-DASH)

It’s a Balancing Act



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Routledge
Taylor & Francis Group

Economic and Ethical Motivations for Forest Restoration and Incentive Payments

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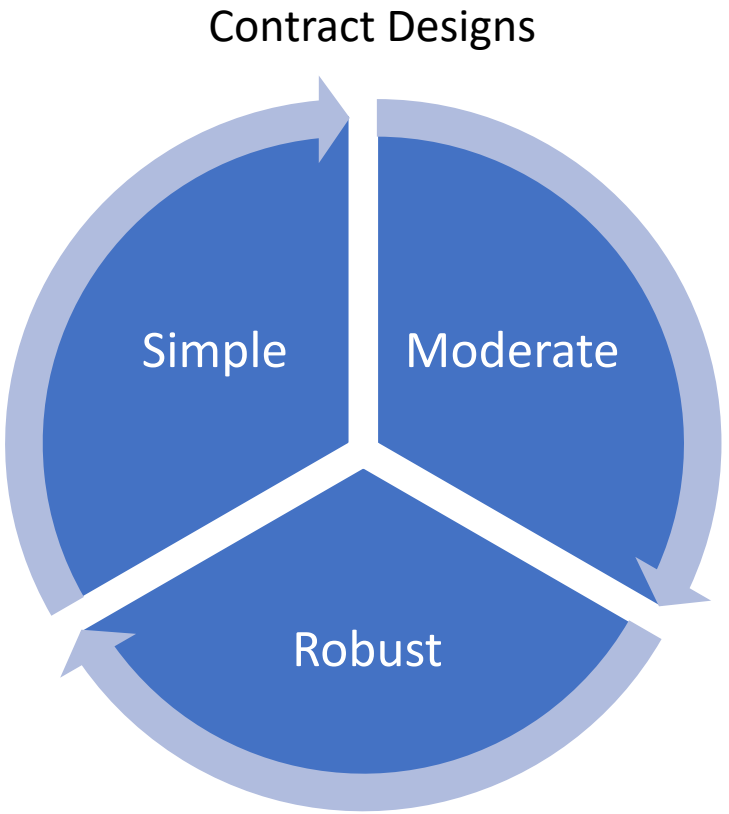
ABSTRACT

Private forest owners are both the suppliers and consumers of forest ecosystem services which poses a unique challenge to using incentive-based strategies to encourage forest restoration. We used focus groups and deliberative monetary valuation (DMV) methods to understand the choices of forest owners in Mississippi and Florida. Participants acted as jurors and made judgements about what actions a hypothetical forest owner should make when offered compensation to enhance key ecosystem services. Fifteen major themes were identified via qualitative data analysis. Results support a proposed conceptual model that links perspectives toward forest management with the expression of cultural values and choice. Allocation of income to ecosystem improvements revealed that intentional forest owners seek to maximize utility through personal achievement benefits, rather than income generation alone. Findings have important implications for forest policy and program design by improving the design and efficiency of economic interventions.

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… ?



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

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

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Table 3. Robust regression of forest owner mean WTA for carbon.

Variable name	Coef.	Std. Error	P>(t)
Number of acres	-0.3482	0.1237	0.00
Contract years	0.3561	0.1789	0.05
Management plan	0.9954	0.3701	0.01
Management restriction	1.2406	0.3496	0.00
Region	1.0637	0.5074	0.04
Constant	4.1583	0.6484	0.00

F(5,30)= 16.92, R-Squared= 0.6270

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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).

	Simple contract[1]		Moderate contract[2]		Robust contract[3]	
	Mean	95% CI	Mean	95% CI	Mean	95% CI
All owners	$43.63	$33.04 - $57.63	$168.56	$127.62- $222.64	$343.61	$260.15 - $453.85
Early Adopters	$10.91	$8.26 -$14.41	$42.14	$31.91- $55.66	$85.90	$65.04 - $113.46

Simple 1-year contract, delay harvest

Moderate 20-to-50-year contract, delay harvest, management plan

Robust 100-year contract, delay harvest, management plan

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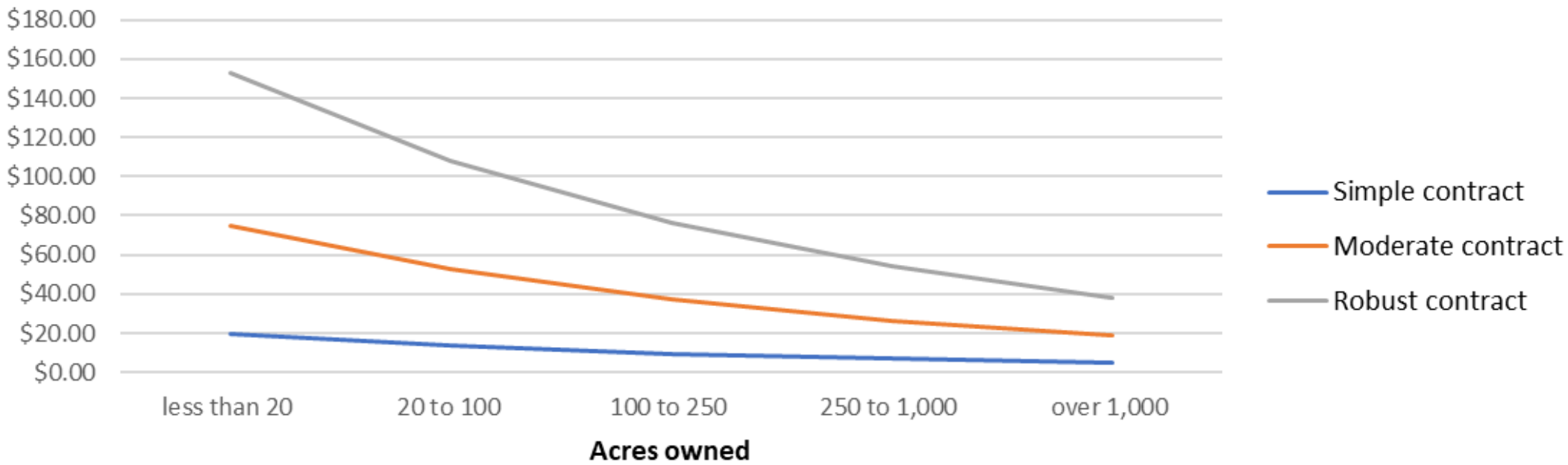
Figure 1. Early adopters average willingess to accept for forest carbon and number of forest acres owned.



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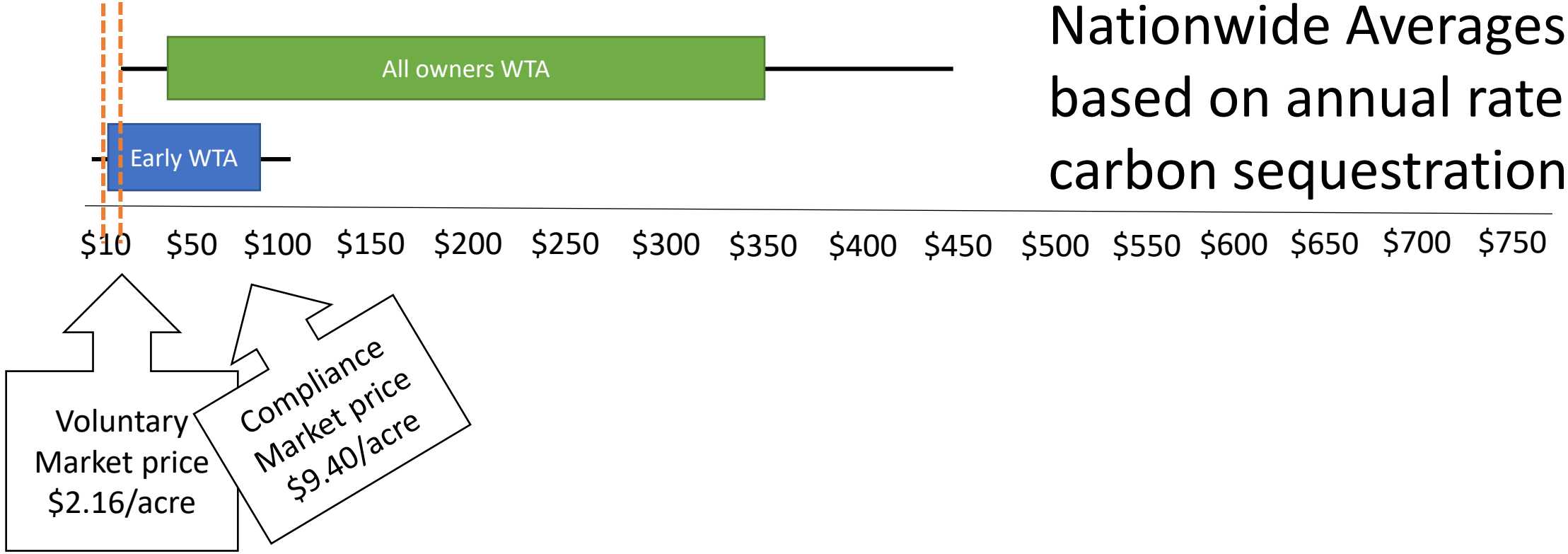
Nationwide Averages based on annual rate of carbon sequestration



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/evalidator.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

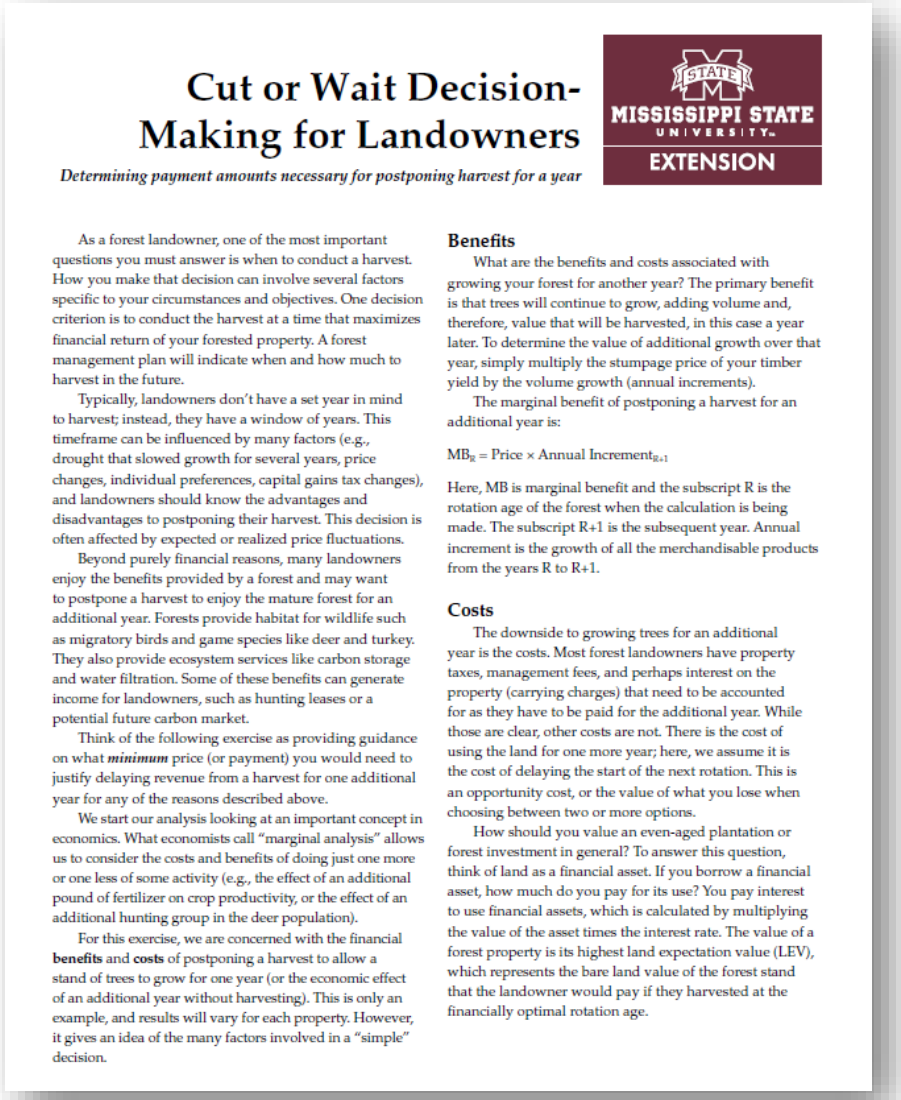
- Commonly 20-or 40-years contracts
- CARB requires a 125-year contract
- NCX is 1 year
  - $5-10 per harvest deferral credit
  - A cooling-off period between enrolling in longer (higher paying) program

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



Cut or Wait Decision-Making for Landowners

Determining payment amounts necessary for postponing harvest for a year

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As a forest landowner, one of the most important questions you must answer is when to conduct a harvest. How you make that decision can involve several factors specific to your circumstances and objectives. One decision criterion is to conduct the harvest at a time that maximizes financial return of your forested property. A forest management plan will indicate when and how much to harvest in the future.

Typically, landowners don't have a set year in mind to harvest; instead, they have a window of years. This timeframe can be influenced by many factors (e.g., drought that slowed growth for several years, price changes, individual preferences, capital gains tax changes), and landowners should know the advantages and disadvantages to postponing their harvest. This decision is often affected by expected or realized price fluctuations.

Beyond purely financial reasons, many landowners enjoy the benefits provided by a forest and may want to postpone a harvest to enjoy the mature forest for an additional year. Forests provide habitat for wildlife such as migratory birds and game species like deer and turkey. They also provide ecosystem services like carbon storage and water filtration. Some of these benefits can generate income for landowners, such as hunting leases or a potential future carbon market.

Think of the following exercise as providing guidance on what ***minimum*** price (or payment) you would need to justify delaying revenue from a harvest for one additional year for any of the reasons described above.

We start our analysis looking at an important concept in economics. What economists call "marginal analysis" allows us to consider the costs and benefits of doing just one more or one less of some activity (e.g., the effect of an additional pound of fertilizer on crop productivity, or the effect of an additional hunting group in the deer population).

For this exercise, we are concerned with the financial **benefits** and **costs** of postponing a harvest to allow a stand of trees to grow for one year (or the economic effect of an additional year without harvesting). This is only an example, and results will vary for each property. However, it gives an idea of the many factors involved in a "simple" decision.

Benefits

What are the benefits and costs associated with growing your forest for another year? The primary benefit is that trees will continue to grow, adding volume and, therefore, value that will be harvested, in this case a year later. To determine the value of additional growth over that year, simply multiply the stumpage price of your timber yield by the volume growth (annual increments).

The marginal benefit of postponing a harvest for an additional year is:

$$MB_R = \text{Price} \times \text{Annual Increment}_{R+1}$$

Here, MB is marginal benefit and the subscript R is the rotation age of the forest when the calculation is being made. The subscript R+1 is the subsequent year. Annual increment is the growth of all the merchandisable products from the years R to R+1.

Costs

The downside to growing trees for an additional year is the costs. Most forest landowners have property taxes, management fees, and perhaps interest on the property (carrying charges) that need to be accounted for as they have to be paid for the additional year. While those are clear, other costs are not. There is the cost of using the land for one more year; here, we assume it is the cost of delaying the start of the next rotation. This is an opportunity cost, or the value of what you lose when choosing between two or more options.

How should you value an even-aged plantation or forest investment in general? To answer this question, think of land as a financial asset. If you borrow a financial asset, how much do you pay for its use? You pay interest to use financial assets, which is calculated by multiplying the value of the asset times the interest rate. The value of a forest property is its highest land expectation value (LEV), which represents the bare land value of the forest stand that the landowner would pay if they harvested at the financially optimal rotation age.

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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

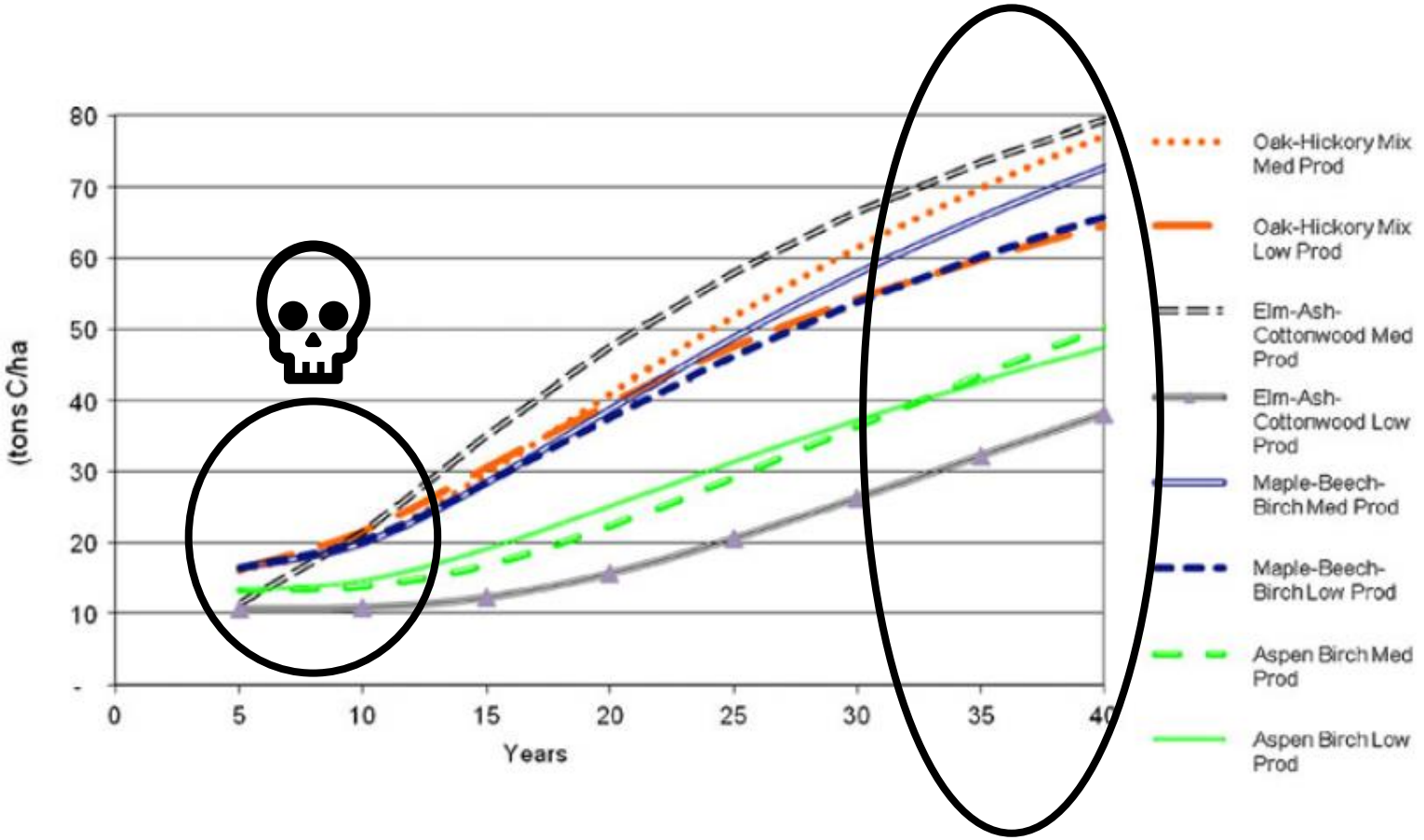
- Who will do management?
- What monitoring is involved?

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?

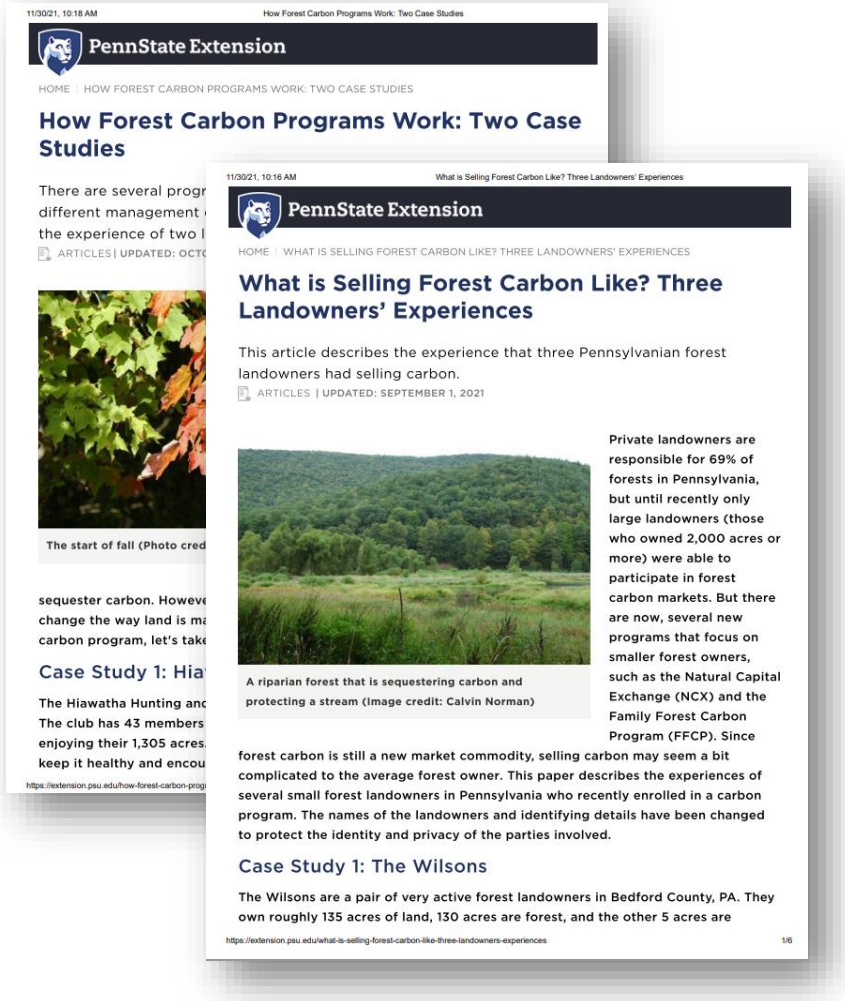
- Appealing to some landowners
- Very few programs
- Limited land
- Lag between sign-up and payment
- Limited infrastructure
- Species used
- Industrial/government concerns



Estimating carbon supply from afforestation of agricultural land in the Northeastern U.S. 2005. J., Winsten *et al*

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

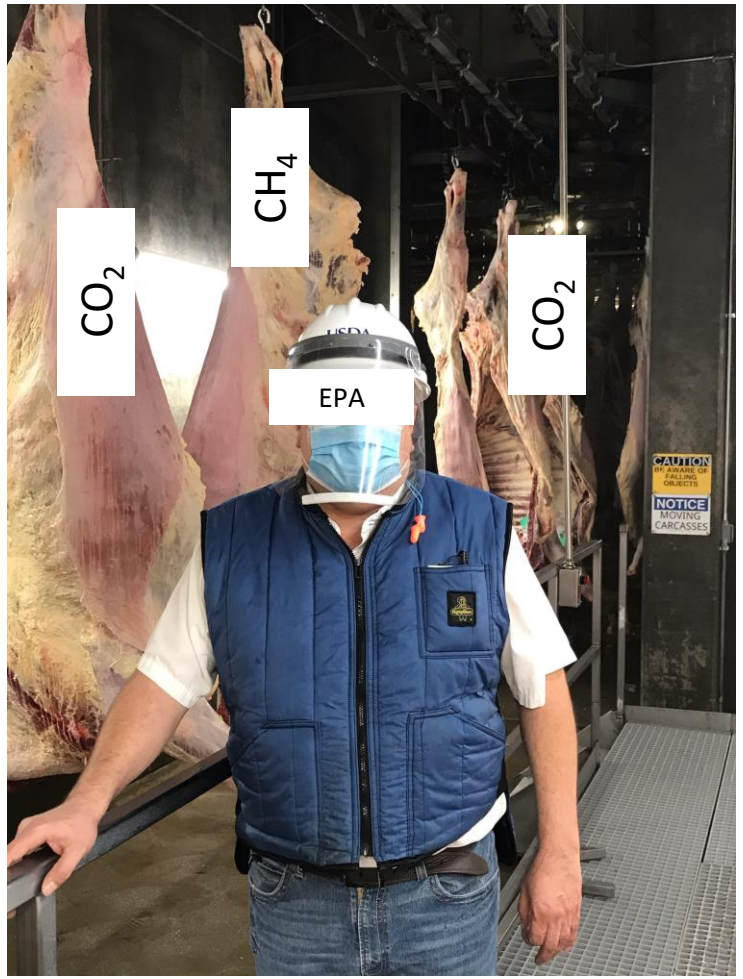
Mark Loewen, director of World Wide Carbon LLC, pleads guilty to defrauding investors in carbon credit scam

Posted on 18 December 2020

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"

Posted on 23 December 2020

- 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
Benefits and Values

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

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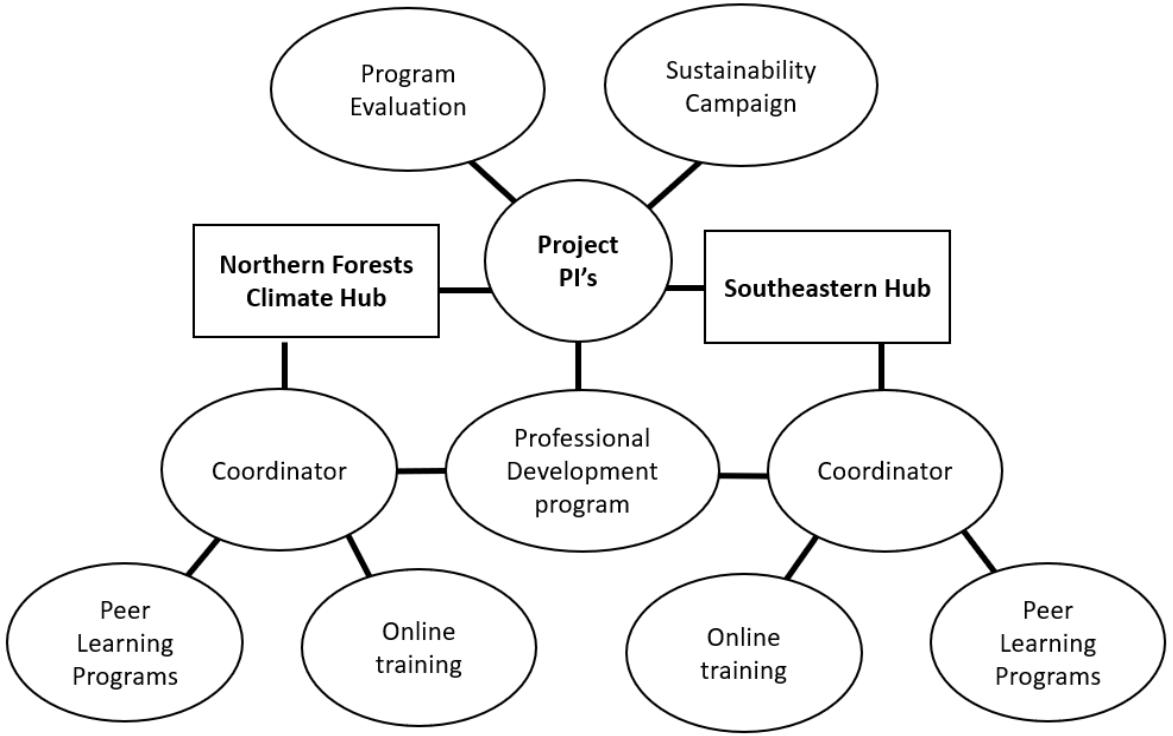
Michigan Technological University
PennState Extension
UNIVERSITY OF GEORGIA
MISSISSIPPI STATE UNIVERSITY
UF UNIVERSITY of FLORIDA
USDA United States Department of Agriculture Southeast Regional Climate Hub
NIACS Northern Institute of Applied Climate Science

Forest Owner Carbon and Climate Education Program (FOCCE)

Sustainability Campaign

- Vertical community of practice
- FOCCE Newsletter
- FCWG Learning Exchange Series



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MISSISSIPPI STATE UNIVERSITY
UF UNIVERSITY of FLORIDA
USDA United States Department of Agriculture Southeast Regional Climate Hub
NIACS Northern Institute of Applied Climate Science

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Thank you!

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