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Family Forest Landowners' Interest in Forest Carbon Offset Programs: Focus Group Findings from the Lake States, USA

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Abstract In 2012, focus groups were organized with individuals owning 20+ acres in the Lake States region of the United States (Michigan, Minnesota, and Wisconsin) to discuss various issues related to forest carbon offsetting. Focus group participants consisted of landowners who had responded to an earlier mail-back survey (2010) on forest carbon offsets. Two focus groups were held per state with an average of eight participants each (49 total). While landowner participant types varied, overall convergence was reached on several key issues. In general, discussion results found that the current payment amounts offered for carbon credits are not likely, on their own, to encourage participation in carbon markets. Landowners are most interested in other benefits they can attain through carbon management (e.g., improved stand species mix, wildlife, and trails). Interestingly, landowner perceptions about the condition of their own forest land were most indicative of prospective interest in carbon management. Landowners who felt that their forest was currently in poor condition, or did not meet their forest ownership objectives, were most interested in participating. While the initial survey sought landowner opinions about carbon markets, a majority of focus group participants expressed interest in general carbon management as a means to achieve reduced property taxes.

Keywords Forest carbon offsets · Family forest owners · Carbon management · Voluntary carbon markets · Focus groups · Lake states

Introduction

Forestry activities have the potential to be one of the largest-volume and lowest-cost means of sequestering (and storing) additional carbon (Galik et al. 2009; Gorte and Ramseur 2010). Of all forestry activities, *improved forest management* shows great promise as a carbon mitigation option using currently forested land.[1] Yet, in order to make contributions that are meaningful globally, improved forest management techniques need to be implemented on a large scale (Pacala and Socolow 2004; Canadell and Raupach 2008; Sohngen 2009). While extensive research has focused on estimating the carbon sequestration potential of various forest management techniques, little research has investigated the likelihood that forest carbon management techniques will actually be implemented by landowners at a scale large enough to have a meaningful impact (Bull and Thompson 2011).

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[1] A US Environmental Protection Agency (EPA) model estimates that *improved forest management* has the highest carbon sequestration potential (ranging from 24.8–384.8 Tg CO_2 Eq. per year) at certain carbon price points (ranging from \$1–\$50/MT CO_2 eq.) of all forestry/agricultural methods (US EPA 2005). (1Tg = 1 million metric tons). Improved forest management methods include: extending harvest/rotations, minimizing disturbances to forest floor, stocking of long-lived/climate-adaptive tree species, and natural disturbance risk management.

Family forest owners[2] (FFOs) own a substantial percentage (42 %) of the forested land within the United States (US) and will likely need to play a significant role if improved forest management is to be an effective carbon sequestration method within the US (Butler and Leatherberry 2004). Outside of the US, a high percentage of family-owned forest land is found in Austria, Denmark, Finland, Portugal, and Norway (ranging from 60 % to more than 80 % private ownership) (IFFA 2012). These FFOs also could play a significant role in carbon sequestration efforts through improved forest management. However, in the US and Europe, family forest owners are widely acknowledged to be a diverse ownership group who often value nonmarket forest amenities (e.g., scenery, recreation, biodiversity, privacy, and legacy) more than profits from traditional (i.e., timber) market activities (Bliss and Martin 1988; Kendra and Hull 2005; Hogl et al. 2005; Butler 2008; Ingemarson et al. 2006; Häyrinen et al. 2014). Therefore, it is uncertain how landowners will respond to market opportunities from carbon sequestration-type activities.

Previous research exploring the published social science literature on family forest owners to determine how landowners *might* respond to different policies encouraging carbon-oriented management predict that while landowners may not be particularity motivated to mitigate excess carbon, forest sequestration strategies may align with their management practices and values (Fischer and Charnley 2010). Additionally, researchers who surveyed FFOs in England in order to create a typology of landowner most likely willing to provide public benefits, such as carbon sequestration, expect that "Multifunctional Owners" (financially-driven owners more interested in managing their forest consistent with climate change mitigation strategies than in managing their forest for wildlife and habitats) to be the most likely candidates (Urquahart and Courtney 2011).

To our knowledge, the only studies directly investigating FFOs' willingness to participate in carbon markets through improved forest management were conducted within the US. Two studies in Massachusetts found that a small percentage (<7.5 % of the study sample) of landowners would be interested in selling carbon credits at payment levels recently offered for carbon credits on the voluntary market (Markowski-Lindsay et al. 2011; Dickinson et al. 2012). In contrast, two other US studies conducted in Texas and the Great Lakes area found that a substantial percentage of FFO would be interested in participating in forest carbon offsetting under certain conditions (>40 % of the population sampled) (Simpson and Li 2010; Miller et al. 2012). The geographic regions examined in these studies have a number of dissimilar forest landowner/parcel characteristics (e.g., average parcel size, forestry practices, and cover types) which could explain the discrepancy in these findings.

To improve our understanding of the role FFOs may play in future carbon sequestration efforts and their potential to supply forest carbon offsets, it is essential to gain further insight concerning the factors these landowners consider and the decision-making process they engage in when determining whether to undertake carbon offset projects. We suggest there are nuances regarding FFOs' attitudes toward carbon management and carbon markets that were not uncovered in the earlier survey studies, which may help explain the discrepancies in their findings. Our investigation served as an exploratory study to gain greater clarity on the findings of an earlier survey study (Miller et al. 2012) and to gain greater insight on the factors that affect FFOs' willingness to participate in forest carbon management and carbon markets.

Background on Current Forest Carbon Market Opportunities

By implementing various practices that increase the volume of carbon stored in forests (e.g., delaying harvest and/or increasing tree growth rates), landowners can generate carbon credits that may be sold on a voluntary carbon market. Around the globe, examples can be found of private companies voluntarily choosing to reduce their carbon footprint by financially supporting activities that offset carbon emissions through the purchase of carbon credits [with most transactions occurring in Europe (51 %), North America (36 %), and Asia (9 %)] (Peters-Stanley and Yin 2013). In 2012, improved forest management projects were responsible for 5.1 million tons ($MtCO_2e$) of carbon credits sold globally, with afforestation/reforestation projects accounting for an additional 12.1 $MtCO_2e$ (Peters-Stanley and Yin 2013). This is a small fraction of the potential global offset market. The financial return from the sale of carbon credits may incentivize some FFOs to participate in carbon reduction efforts. Past national efforts to estimate the potential of various carbon sequestration techniques to produce additional carbon and generate offsets have relied solely on model projections, assuming certain levels of participation at various price points (US EPA 2005).

Carbon market participation requirements[3] can be onerous and are likely a major reason few FFOs have

[2] Family forest owners are defined by the USDA Forest Service as individuals, married couples, family estates/trusts, or other groups of unincorporated individuals (Butler and Leatherberry 2004).

[3] Carbon market protocols with requirements consistent with those listed include: Climate Action Reserve (CAR); California Air Resources Board (CARB); Verified Carbon Standard (VCS); and the American Carbon Registry (ACR).

participated in the US to date. To be eligible to sell carbon credits, a forest landowner may be required to: (1) sign a contract for a specified time period (up to 100 years); (2) obtain an initial detailed inventory of their forest land from a professional forester; (3) obtain and follow a forest management plan; (4) certify the forest land[4]; (5) manage the forest land in a manner that is consistent with carbon storage practices recognized by the carbon protocol; (6) keep a written record of the land management activities undertaken; and (7) allow periodic monitoring and verification of forestry practices by a third party. Furthermore, to satisfy the additionality[5] requirement, most forest carbon offset protocols require that all carbon sequestration activities be *in addition to "business as usual" (BAU) management*. While this requirement is controversial, our study assumes that carbon market protocols will continue to include this requirement. BAU refers to the baseline carbon sequestration that would occur in the absence of any change in forest management designed to enhance carbon storage. The above BAU requirement may present a barrier to participation by those FFOs who are already actively managing their forest, as the level of carbon stored as a result of current management practices becomes the baseline from which additionality is measured.

Data and Methods

The objective of this study was to obtain greater insight and understanding of the factors that affect FFOs' willingness to participate in forest carbon management and carbon markets. Focus group discussions were the chosen method of data collection as they allow researchers the opportunity to delve further into understanding participant decision processes, thinking, motivations, and attitudes (i.e., the reasons *why* they respond as they do) than is possible with traditional surveys (Kingsley et al. 1988). Focus group discussions are commonly used when further clarity regarding survey results is desired (Morgan 1996).

Focus group discussions were conducted with FFOs in the Lake States region (Michigan, Minnesota and Wisconsin) who had participated in an earlier mail-back survey about FFO interest in selling forest carbon credits (Miller et al. 2012). The earlier survey was administered to 2,200 randomly selected FFOs (owning 20 or more acres within the Lake States region) and gathered information on a range of questions related to participation in, awareness of, and attitudes toward forest carbon offset programs (Miller et al. 2012). Focus group participants were purposefully selected to represent a cross-section of the earlier survey respondents.

Survey respondents who indicated in the questionnaire that they would be willing to attend a meeting about forest carbon markets (66 % of survey respondents) formed the initial focus group sampling frame. Respondents were then stratified according to their location and willingness (i.e., willing or not willing) to participate in a forest carbon offset program under a range of different payment amounts for carbon credits ($3–$60/acre) in combination with varying time commitments (15–50 years). Within each of the geographic clusters and willingness strata, survey respondents included a range of parcel sizes, ownership objectives, management intensities, and willingness to sell carbon credits.

Given the complexity of the topic of carbon offset projects, small group sizes (5–8 participants per focus group) were planned (Krueger and Casey 2009). To defray travel expenses and encourage participation, participants were offered a small monetary incentive ($30), free parking and a box meal. The focus groups were conducted in August 2012 at six locations in three states: Iron River and Ontonagon, Michigan; Cloquet and St. Paul, Minnesota; and Shell Lake and Superior, Wisconsin (see Fig. 1). All focus groups followed the protocols and questioning techniques recommended by Krueger and Casey (2009). Each session lasted approximately 90–120 min and was documented using paper notes and digital audio recorders. Participants were assured their comments would not be attributed to them individually in any publications.

The focus group question sequence and individual question phrasing were carefully developed to meet the study objectives (see Table 1). Specifically, focus group participants were asked a series of questions related to their first impressions of selling forest carbon credits. To ensure that participants were familiar with the salient aspects of forest carbon offset projects and carbon markets, a brief (10–12 min) overview of forest carbon offset projects (e.g., science of forest sequestration, current markets, typical requirements, example of potential revenues[6]) was presented. Participants were given the opportunity to ask questions about forest carbon offsets, and then guided

[4] The most common forest certification programs include the following: Forest Stewardship Council International (FSC), Programme for the Endorsement of Forest Certification (PEFC), Sustainable Forestry Initiative (SFI) and the American Tree Farm System (ATFS). Note: SFI only certifies land in the US and Canada, ATFS only certifies in the US.

[5] Additionality: refers to the amount of additional carbon sequestration that occurs solely because a carbon offset project is initiated (i.e., the real, measureable carbon that is sequestered because an offset project is undertaken and that would not have been sequestered absent the project).

[6] "Typical" carbon market scenarios presented were demonstrated using carbon credit prices recently seen in the voluntary market and sequestration rates typically seen using forest management techniques (1MT/year)(example given: for a 40 acre landowner, at $8/Ton, possible to generate a revenue of $8 × 40 Acres = $320/year).

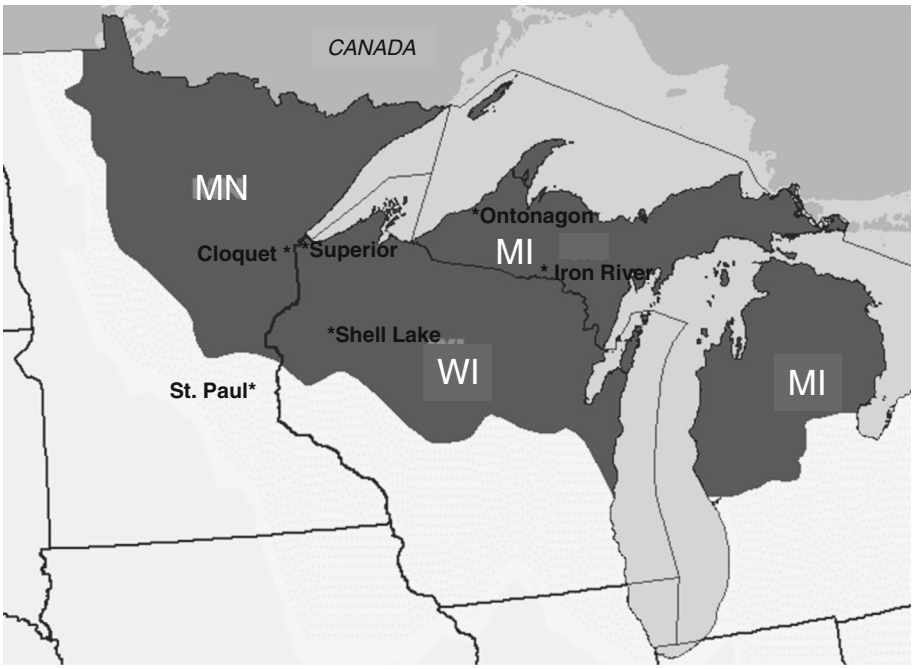

Fig. 1 Locations of Lake States focus groups meetings. *Shaded areas* depict heavily forested areas within region. All landowner focus group participant parcels were located within *shaded areas* and meetings were arranged near landowner residence clusters

through a series of open-ended questions aimed at gathering in-depth information about their perspectives on the potential benefits and barriers presented by carbon management and carbon markets, as well as their perspectives on certain findings from the earlier survey. At the conclusion of each focus group meeting, participants were asked to reassess their interest in forest carbon offset projects and share those aspects that are most important in their decision.

Audio tape recordings of all focus group discussions were transcribed verbatim and served as our primary study data. The NVivo software analysis program (Version 10; QSR International) was used to organize and aggregate all transcripts. In addition to the focus group discussion transcripts, a spreadsheet containing all the initial survey responses for all participants, alongside their answers to key focus group questions, was constructed using Microsoft Excel. Data from the focus groups were analyzed for emergent themes using qualitative analysis techniques (Bryman and Burgess 1994, Creswell 1998). Specifically, open coding[7] was used to identify major themes in response to specific questions asked of focus group participants (Richards 2005). In this analysis, major themes were considered to be those perspectives or opinions that were shared by *a majority of participants within a certain focus group* or *mentioned consistently across the majority of focus groups.* Using this qualitative analysis technique, consensus responses to discussion questions were identified and summarized.

In addition, the data were examined using comparison and pattern analysis in order to refine and relate categories and uncover potential relationships between landowner characteristics and attitudes (Bazeley 2009). An Excel spreadsheet was constructed to assist in this process, as the spreadsheet provided a means to compare survey and focus group responses for each participant and determine whether certain patterns exist that could help explain FFO participation in forest carbon management and/or carbon markets. The spreadsheet listed all focus group participants (by assigned number and meeting location) alongside information from the initial survey and traceable[8] responses to specific focus group questions. Comparison and pattern analysis was conducted by comparing the answers certain participant types (e.g., groups with similar landowner objectives, parcel size, management intensities, and initial willingness to participate in offset projects) offered to specific questions (see below) to see if any consistent patterns emerged.

At each focus group meeting, all participants generally shared the following information:

- The primary enjoyment provided to them by their forest land (i.e., "ownership focus").

[7] A code is a descriptive word or phrase that describes a piece of data. "Coding" is a way of gathering all the references relating to a specific topic or theme within a dataset.

[8] Traceable responses refer to the ability of the researcher to reliably link certain discussion responses to a specific individual—supported by transcript identifiers, note-taker identifiers, question/landowner response sequencing and/or moderator documentation.

Table 1 Question set used in Lake States focus groups

Focus group questions
INTRO: I would like to start by having each of you tell us your name, where your land is located and the most important reason you own forest land.
1. What do you feel are the greatest challenges to owning forest land and being able to enjoy it as you wish?
2. You were asked to attend this meeting to discuss forest carbon offset projects. Had any of you heard of forest carbon offsetting or forest carbon credits before receiving our survey back in 2010?
3. What are your first impressions of Forest Carbon Offset Projects?
********** Forest Carbon Offset Presentation—10–12 min **********
4. Now that you have more background information, is there anything about a forest carbon offset project that is different than you first thought?
5. What are your initial thoughts about the typical requirements of a carbon offset project?
6. Aside from allowing you to be able to participate in a carbon offset project, could some of these requirements provide other benefits to you?
7. Are there any requirements listed that you would find especially problematic?
8. Now I would like you to assess the requirements assuming there are no costs (to you) in accomplishing them, would your perceptions about these requirements change?
9. In many cases, managing for carbon will produce other non-monetary benefits to your forest land (e.g., improved wildlife habitat). Would these non-monetary benefits be as important, more important, or less important than the financial benefits of carbon management? Why?
10. In evaluating the responses to our survey, we found that a significant number of landowners indicated that they would be willing to participate in carbon offset projects for little or no compensation. Why do you think we got that response?
11. If, instead of selling carbon credits on the open market, landowners could participate in a tax program that gave landowners tax benefits/relief for practicing carbon sequestration management on their forest parcel, would such a program interest you?
12. ROUND ROBIN: On a scale of 1–5 (1 = not interested at all; 5 = very interested)
a. Given what you knew about forest carbon offset projects before this meeting started, how interested were you in participating in forest carbon offset projects?
b. Now that you have heard more about forest carbon offset projects, how interested are you?

- Their perceptions of the quality of the trees on their land (i.e., "forest quality").
- Whether they planned or wanted to change the condition of their property (i.e. "improvement desired").
- Their attitudes toward the requirement that carbon offset projects are in addition to "business as usual." (i.e. "BAU"; (+) = viewed favorably; (−) = viewed negatively).
- Assessments of their interest in carbon offset projects (initial interest and interest at meeting conclusion).

Using the spreadsheet containing each participant's responses to specific focus group questions (alongside other landowner information gleaned from each participant's earlier survey responses), data were analyzed for linkages and patterns within and across all participant survey and focus group responses. This analysis was used to build a visual diagram of key study findings and generalized patterns of behavior (Miles and Huberman 1994).

Findings

Description of Participants

Forty-nine FFOs participated in the six focus groups, averaging approximately eight per meeting. The amount of forest land owned by the participants ranged from 37 to 800 acres (Mean: 157 acres; Median: 110 acres; Mode: 40 acres). While participants in the Ontonagon, Michigan focus group had the highest average parcel size (225 acres) and those in the Superior, Wisconsin focus group had the smallest (97 acres), a range of parcel size owners (40 to 200+ acres) were represented in each focus group. Similar to findings from other FFO studies in the region and across the US, focus group participants most often stated that they owned their forest land primarily for hunting and general recreation, followed by hiking, scenic beauty, privacy, firewood, and as a cabin or residential setting (Butler 2008). While this pattern of reasons of ownership was similar for all six groups, the Iron River, Michigan participants predominantly focused on timber management. Across the six focus groups, the primary challenges to owning forest land were: taxes (mentioned repeatedly and by all groups); having enough time to maintain or improve land; insect and disease infestations; and pressure from local loggers to harvest timber (listed in order from most to least important).

Twelve of the 49 participants (24 %) indicated that they had heard of forest carbon markets before receiving our earlier survey questionnaire (at least one individual was familiar with carbon credits in each focus group). Most of these participants had received carbon credit information via popular media outlets (e.g., national nightly news, magazines, and newspapers). These same individuals often mentioned that they had not heard much about carbon markets or credits from these venues lately. When asked to describe their understanding of carbon markets, at least one participant in each group generally understood forest carbon offset projects as a means to offset excess industrial/

company carbon emissions or "pollution" using trees. In four of the six focus groups, this led to a discussion of whether participants agreed with the ethics of such a scenario (i.e., whether or not companies should be able to pay other entities to offset their carbon emissions). Each time these discussions occurred, participants offered possible rationale both for and against the ethics of carbon offsetting. In general, however, most landowners indicated they felt too unfamiliar with carbon credits to provide meaningful comments.

General Reactions to Carbon Offset Information

The informational presentation on forest carbon offsets at each focus group contained an example of a carbon project payment scenario (based on current voluntary carbon market prices at the time of the study and typical land management sequestration rates). Following this presentation, landowner responses could be categorized into two major themes.

Major Theme #1: Carbon Credit Payments are Lower Than Expected

In each focus group, landowners commented on carbon prices. Landowners were concerned that revenues from the sale of carbon credits were much lower than they had expected. Additionally, a common comment was that carbon credit prices alone are not likely to induce participation:

> How about your sticker shock?! No one else sat here and thought …. on 40 acres you could make $320?! I mean—I am going to do all that for $320?! That is quite the negative sticker shock! ~ Ontonagon

> Well, I can tell you right now that that is not worth it. That is not worth my trouble. For most people, that is not even going to cover their taxes, so they are not going to do it. I can make more growing timber than doing that. ~ Iron River

> I think that the payback is not that great to go through the disturbance. ~ St. Paul

The general consensus in all focus groups was that carbon credit payments were lower than landowners had expected.

Major Theme #2: Activity Requirement Above BAU was Illuminating

In every focus group, several participants initially were under the impression that carbon credits are offered as a reward for forest management already undertaken or simply for owning forest land. These landowners were not aware that to qualify as a carbon offset project, the forest management activities need to be *in addition to* BAU (their present forest management regime). The realization that BAU would not qualify as a carbon offset project had a variety of effects on landowner interest as exemplified in the following quotes:

> I initially thought that the credits would exist for things that already exist. Meaning, my forest is already there, and it is doing its job, and now someone is going to give me something for really doing nothing, which I am not real pro on. But if it is…I am a little more interested if it is going to make people do more for forests and those sorts of things. I think it has more value personally…but I like that term, not for "business as usual. ~ St. Paul

> This is sounding like you guys are basically screwed [comment directed at other landowners practicing "old growth" forest management] because it is "business as usual." And what they are looking for is what they can change to make it better—to sequester more carbon. ~ Cloquet

Carbon Market Requirements: Barriers and Benefits

The following major themes emerged from questions regarding the potential benefits and barriers associated with common carbon offset market requirements.

Major Theme #1: Concern Over Contract Length

With the exception of one focus group, a majority of participants within each focus group favored shorter and/or flexible contract lengths. As participants were asked to consider potential contract options rather than deliberate on the specific features of actual contract requirements, some participants felt it was difficult to accurately measure which contract attributes would be most important to their decision-making process. However, participants generally found long-term contracts or contracts that would potentially burden their heirs or prevent the sale of their property to be undesirable:

> When I first looked at the pamphlet I thought, what a can of worms it would be if I decided to sell the property. And that just stopped me in my tracks—that was it. ~ Cloquet

> But really, I can see a thing where I sign a contract to manage it the way I want to manage it and then I decide to sell it to someone who wants to cut it, then they got to pay extra to buy it…that is not a very good

> incentive to the landowner. I have a 100 year contract for my management plan! I think the [buyer] would go like…"Next!" I would think that that could be a scary place to be. ~ Ontonagon

> Is there any age at which…well, at certain ages, a 20 year contract is not realistic. You can't sign up someone for 20 years when they are 80—you ain't going to make it probably! I think that is an awful long haul for the average age here. ~ St. Paul

In contrast, a few landowners in one focus group were interested in making decisions that would have a long lasting effect on their property, as demonstrated in the following comment:

> Managed forest land contracts (MFL's) are for 15-25 years. So it [contract length] is not an issue for me. I do not intend to move. My ashes are going to be scattered all over this property. So I'm fine with it. Fifty years and then have my children deal with it would be fine with me. ~ Shell Lake

While the preceding comment was met with general agreement among the participants in that focus group, when analyzing the comments from all six focus groups landowners appeared to be very reluctant to commit themselves to long-term contracts and/or contracts with substantial withdrawal penalties. On average, landowners seemed reluctant to sign up for contracts lasting longer than ten years.

Major Theme #2: Benefits of Forest Management Plans

Of all carbon market participation requirements, participants most often viewed the combination of a forest inventory and forest management plan as being the most beneficial. In each focus group, one or more individuals had already obtained a forest management plan and spoke favorably about the experience. After hearing how a forester would conduct a forest inventory and about the types of information that is contained in a forest management plan, other landowners expressed great interest in having both a professional forester walk their property with them and acquiring a forest management plan. In each of the focus groups, general landowner attitudes toward forestry assistance in the form of a walk-through inventory and forest management plan were favorable.

> Well, I have trees. I have no idea what they are. I just have trees. I think it would be fascinating! For someone to walk with me and tell me what they are. The average age of them and how to tell the difference—what is going to fall over…. ~ St. Paul

Major Theme #3: Management Change as a Barrier or Benefit

While some participants found the requirement to apply different management practices in order to qualify for carbon credits very appealing, others did not. Participant perspectives on whether a change in management was a barrier or a benefit were split across all focus groups. The carbon offset requirement to "manage land in specified ways" (concurrent with the requirement that changes be in addition to BAU) posed the most substantial barrier to certain landowners yet were viewed as a benefit to others. The reasons why some landowners were enthusiastic (or not) about making improvements to their forest land varied. Representative comments from participants on each side of this issue are as follows:

Management change requirement seen as beneficial:

> My thought is—I don't know what would be best to make my trees grow faster. So if he [a forester] comes in and says "You cut this tree down and cut that one down, and the rest of these will take off in 5 years"—Hey—I'm all for it! Right now—I am at a standstill. ~ Shell Lake

Management change requirement seen as a barrier:

> I already practice pretty good management, I put in wildlife ponds and this and that, and right now, they are getting mine for free. And I am good with that. ~ Cloquet

The number of landowners who viewed the need to make management changes as a benefit compared to those who viewed it as a barrier was split fairly evenly across all focus groups.

Importance of Non-monetary Benefits of Carbon Credits

Participants were asked to consider the possible non-monetary benefits of carbon market participation (e.g., professional forester assistance, forest management plans, improved wildlife habitat, or quality of woodlands) in comparison to the monetary benefits that might come from the sale of carbon credits. In four of the focus groups, the general consensus was that non-monetary benefits far outweighed the monetary returns of carbon management. The following are representative comments from the landowners who expressed this opinion:

> Well, the carbon credits [payments] will be one of the side effects/benefits of it. But the appeal to the landowner is the potential to better understand their property. ~ St. Paul

> I guess with me [non-monetary benefits] are more important. That is one thing for our land and the land we have in our family. I want to leave it better than when we got it. I think everybody in here really cares about their land and they are going to do everything that they can to improve it. It's a no-brainer. ~ Ontonagon

> More important. We want to improve our land. We want to leave our kids and children's children with land that is better than what we found. ~ Shell Lake

While the timber-focused participants in one focus group also stated that they valued non-monetary benefits more than the monetary benefits of carbon market participation, they were less inclined to be influenced by non-monetary benefits specific to carbon management because they believed such benefits were *already* being realized by their current management activities.

> Well, I think all of those benefits can be derived from good timber management. There is no reason why you can't have improved habitat, walking trails, berry picking… Those are all things that can be improved through timber management. ~ Iron River

These landowners indicated carbon payments would need to be "as important" as the non-monetary benefits for them to consider carbon management. Further, they indicated carbon payments would have to be much greater than current prices to induce them to make any changes in their present management.

In one focus group, while most participants agreed non-monetary benefits were desirable, participants also indicated that the monetary benefits would be an equally important aspect. Illustrative of this perspective is the following comment by one of the participants:

> Well, it is kind of like these managed forest crop where you get a tax break if you let them manage your property for habitat and all that stuff. But you get a tax break. I guess that is where I am thinking the money… if I am going to do all that work—I want some money too. ~ Superior

Tax Benefits for Carbon Management are Appealing to Lake States Landowners

Taxes are a significant burden for many forest landowners. While some focus group participants had already enrolled in a tax reduction program and voiced satisfaction with the level of tax relief offered, other landowners stated that high taxes were their biggest concern as a forest owner. In each of the six focus groups, participants expressed a fear that increasing or already high property taxes put them and/or their heirs in danger of losing their forest land.

> Yeah—so the tax thing is a big issue. It gets to the point where people my age and a little older, if they do have property like that and they have really taken care of it and there are trees in there and it is good for the environment, they usually don't retire with that land. They dump it. They dump it because it is just too costly with the taxes and what not. ~ Superior

Participants often mentioned that reduced taxes would be a desirable monetary benefit for carbon management throughout the discussion period. Participants were formally asked to share their attitudes toward potentially receiving a tax reduction for practicing carbon management.

The majority of focus group participants indicated that participating in a carbon management program to receive a reduced property tax rate appealed to them. Many participants stressed that if a carbon management tax program was to be implemented, it would be important to "streamline it" and "keep it simple." Those participants who were already enrolled in a forest management program were concerned that such a program would conflict with their present tax program and felt that it would be beneficial if certain tax programs were able to work together. When focus group participants considered the potential revenue from the sale of carbon credits, alongside the requirements of the typical carbon credit program, a tax program for carbon management appealed to several landowners as voiced in the following comment:

> Well, my point is that if we are thinking about doing this, and we are thinking about benefits or tax relief, that in my mind is an issue. And a huge benefit if it can go that direction. ~ Superior

The Overall Effect of the Focus Group Discussion on Attitudes Toward Carbon Offset Programs

Before the conclusion of each focus group meeting, participants were asked to participate in a final "round robin." Using a scale of 1–5, with a "1" indicating someone who is "not interested at all" and a "5" indicating someone who is "very interested," landowners were asked to give a response to the following two questions:

1. Given what you knew about forest carbon offset projects before this meeting started, how interested were you in participating in forest carbon offset projects?
2. Now that you have heard more about forest carbon offset projects, how interested are you?

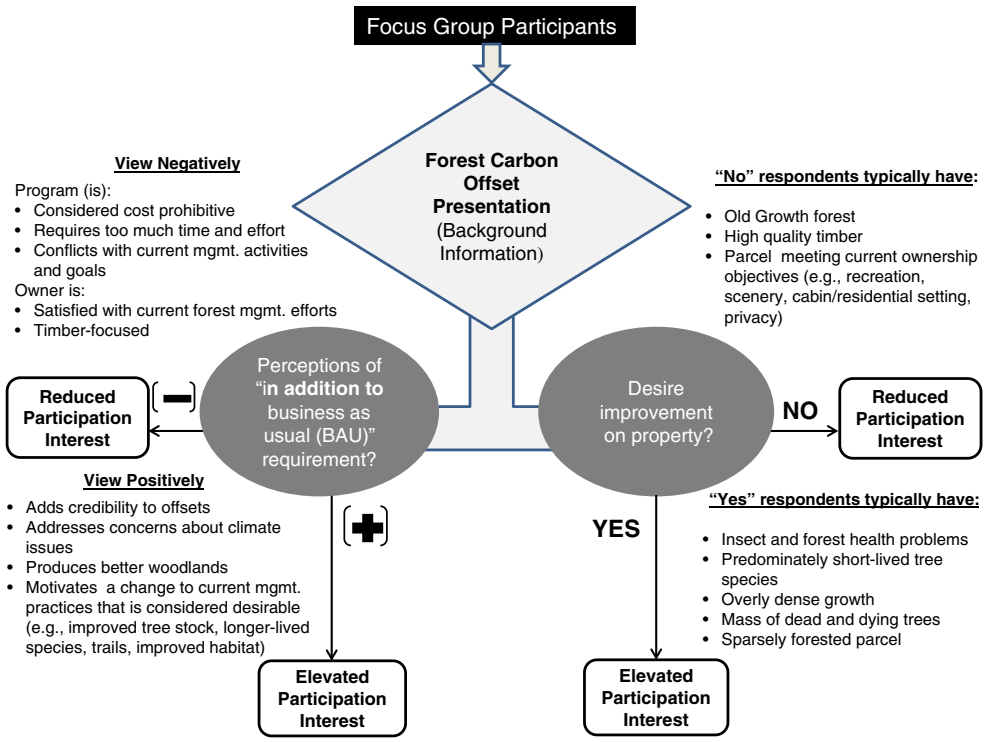

Fig. 2 Conceptual diagram showing landowner decision process when contemplating forest carbon offset projects. Focus group participants enter focus group with varying initial levels of interest in forest carbon offset projects (ranging from low to high interest). The *shaded ovals* depict the primary factors that appear to influence whether a forest landowner is ultimately interested in participating in carbon management after receiving additional information about the typical requirements of forest carbon offset projects

After disclosing their pre- and post-meeting interest level ratings, each participant was given the opportunity to identify those factors that were most important in their decision.

Initial interest ranged from a low of "0" (Note: the "0" landowner was aware that the rating scale began at 1 but really felt totally uninterested at the start) to a high of "5." Some landowners were reluctant to ascribe a rating to their initial interest level as they felt they did not know enough about forest carbon credits to form an opinion. Consequently, they described their initial interest level as "I had questions" or "I was inquisitive." At the conclusion of the focus group meeting, *parting interest* ranged from 1–5. Several landowners indicated that they would only consider a carbon offset project if they could receive a tax benefit. These landowners typically regarded compensation from the sale of carbon credits as being too low to induce their participation, yet hoped a tax program for carbon management might be more in line with the level of compensation they would require for their efforts.

Interestingly, some participants who had high interest initially had very low interest after learning more about the workings of a carbon market, whereas others who initially had very low interest expressed very high interest after receiving additional information on carbon offset markets. This finding is in contrast to other studies that found focus group participants often gravitate more strongly to their initial opinions when their familiarity with a topic is increased (Leahy et al. 2008). In our focus groups, increased familiarity with forest offsetting strengthened the initial opinions of approximately 19 % of the participants.

The study findings reported thus far have focused on the qualitative analysis of the major themes that emerged during the six focus groups. Stepping back from detailed analysis (predominant themes in response to specific questions), the spreadsheet containing focus group participant responses to specific questions, alongside initial survey data were examined to identify potential patterns that might explain landowner decision processes and the factors that most affect their interest in carbon projects.

When responses to all questions were examined, three response patterns emerged in fairly equal proportions (see Fig. 2). Approximately 1/3 of participants initially entered the focus group meeting interested in carbon offset projects for a variety of reasons. Participants may have been interested in carbon offsetting because they believed the level and type of management on their forest land and/or management objectives were consistent with carbon offset goals (e.g., old growth forest management) or would allow them to receive a financial return from their forest simply because they plan to keep it in a forested condition. In contrast, another 1/3 of participants entered the meeting believing they were not interested in carbon offsetting,

because they disagree with the ethics of such programs (e.g., they expressed concern that offsets allow corporate entities to bypass the consequences their production has on the environment). The final third came to the meeting unsure of their attitudes toward forest offsets but interested in the topic and seeking additional information.

Regardless of the initial attitudes participants had toward carbon offset projects, their parting interest in pursuing offset projects appeared to be directly related to two important issues: (1) their attitude toward the "undertake activities in addition to BAU" requirement; and (2) their perceptions about the quality of their own forest land (i.e., whether they felt their forest currently was meeting their needs or they would like to see some improvement) (see Fig. 2). An analysis of focus group responses found that participants who expressed the greatest interest in pursuing carbon offsets were those who desired improvements in the condition of their forest land. These participants believed the non-monetary benefits of carbon management and assistance provided by a carbon program could help them achieve this outcome. Such landowners generally had a positive view of the "in addition to BAU" requirement. They already wanted to make changes to their present management, but most did not know how to go about making these changes. These landowners felt a carbon market program would assist them in making changes that would improve the quality of their forest.

Those landowners who believed they had high quality woodlands (i.e., self-described as containing old growth forests, being well-managed, or having a timber focus) or were content with their forest "as is," were much less interested in carbon credits once they received additional information. These participants were particularly averse to the requirement that carbon credit activities must be undertaken "in addition to BAU." These landowners were not interested in changing their current management and did not appear to be incentivized by carbon offset revenues that they considered to be low. Rather than selling carbon credits, many of these landowners indicated that they would be most interested in a tax incentive for carbon management—one that potentially would help to reduce the tax burden often placed on owners of high quality forest land and provide a reward for their current management.

Discussion

The primary objective of our study was to clarify the earlier survey result findings (Miller et al. 2012) and gain greater insight into FFO attitudes toward forest carbon offset projects, including those features that present barriers and benefits. Our focus group discussions identified a variety of factors that may influence FFO interest in forest carbon management and forest carbon market participation; factors that have not been identified in the existing literature on FFOs and forest carbon.

Previous research was directed at ascertaining the percentage of landowners that would be interested in participating in carbon markets under varying market scenarios. The findings of these earlier survey studies were inconsistent, some found that a minimal percentage of landowners in Massachusetts would be interested (Markowski-Lindsay et al. 2011, Dickinson et al. 2012), while other studies found that a substantial percentage would be interested (Simpson and Li 2010, Miller et al. 2012). Our focus group findings provided support for our earlier survey findings regarding FFOs in the Lake States (Miller et al. 2012). We hypothesize that study design differences (both Massachusetts studies asked participants to rate three different carbon sequestration programs with set characteristics rather than investigating carbon program characteristics separately) and dissimilar average parcel sizes (Texas and the Lake States have significantly larger average parcel sizes than Massachusetts) may have contributed to the discrepancies in the findings of these studies.

Consistent with the earlier survey studies, our focus group discussions also found that landowners generally prefer higher carbon credit payments and shorter contract lengths than those currently offered. However, our focus group discussions were able to uncover additional factors that appear to influence, or modify, a landowner's willingness to participate in a carbon offset project given specific carbon credit payment and contract length scenarios. Specifically, some landowners expressed a willingness to participate for little to no compensation if a carbon offset program provided them with forestry assistance that helped them achieve other ownership goals.

Through our focus group discussions, we found that landowners appear to be most interested in the personal benefits they can attain through carbon management (e.g., improved stand species mix, managing for old growth conditions, improving wildlife habitat) rather than the less tangible benefits of such management (i.e., the knowledge that their forest is helping to absorb excess carbon emissions). As one landowner stated:

> I would be interested in doing it but I don't know if I would be doing it for the reasons that are being advertised…the carbon credits and the money part and all that. I don't know, as far as small landowners go, if that is the priority for them or if it is more just trying to do the best we can with what we have. ~ St. Paul

Our study finds that while FFOs do want to be good stewards of their land and appear to believe that climate

change is a problem, carbon management may align with landownership goals primarily due to the ways such management or programs could enhance other aims for their forest land rather than a desire to reduce excess carbon. In essence, many viewed carbon market participation as the vehicle by which other forest goals could be achieved (see Fig. 2).

Furthermore, our focus group discussions revealed that some participants would be most willing to participate in carbon offset projects not intended for carbon markets, but rather structured as a tax program (i.e., implementation of forest carbon management in exchange for reduced property tax rates). This option was not explored in the earlier survey studies. Participants felt that a tax program could decrease their property taxes and provide management assistance yet likely pose fewer obstacles to participation (e.g., less paperwork, shorter contract lengths, and no "in addition to BAU" requirement). Focus group participants were also hopeful that a tax program for carbon management might provide a higher return for their forest management efforts.

These findings provide insight for developing effective forest carbon policy. First, it is not clear that carbon market participation is the most effective means of encouraging landowners to sequester additional carbon. Many of the focus group participants indicated their priority is to receive forest management assistance that would allow them to make improvements to their forest land. Therefore, additional carbon sequestration could be achieved through other existing forest landowner assistance programs (e.g., US Forest Stewardship Program, Forest Legacy Program, and Wildlife Habitat Incentive Program). Revising currently available landowner assistance programs to include forest carbon sequestration techniques and increasing the visibility of these new provisions among landowners may be an effective means of increasing carbon storage on FFO lands.

Second, a majority of our focus group participants expressed interest in participating in tax programs focused on forest carbon sequestration. States that choose to encourage forest carbon sequestration through property tax policy could, for example, offer reduced tax rates for those FFOs who implement carbon sequestration management techniques. Our focus group participants appeared primarily interested in tax programs because they hoped such programs could be streamlined (less paperwork), have a short-term commitment (possibly yearly), and provide a substantial tax reduction in return for implementing practices that increase carbon sequestration. However, previous study has found financial incentive programs, such as property tax reductions for forest land managed in a particular way, to have less influence on forest owners than one-on-one access to a forest professional (Kilgore et al. 2007). Therefore, states that choose to implement a carbon sequestration-oriented property tax program would need to ensure that they have the financial and technical resources (i.e., the ability to provide professional forestry assistance) to adequately incentivize landowner participation and evaluate whether additional carbon sequestration is, in fact, occurring.

If carbon markets are a desired policy means for increasing carbon storage on FFO land, our study findings have implications for how forest carbon offset programs should be promoted. To induce participation, it would be important for states/countries supporting carbon management or carbon market programs to understand the factors motivating the management decisions of FFOs. Successful carbon offset programs would need to incorporate standards that could assure measurable additional stores of carbon yet also provide landowners with the assistance needed to achieve other more tangible forest objectives such as improved tree stock (e.g., long-lived tree species), aesthetics, or wildlife habitat. The majority of our focus group participants indicated that carbon market revenue alone is not sufficient, at least not at the levels of compensation currently being offered.

Finally, our findings reveal that those landowners most interested in participating in forest carbon offset projects may be those who will need the most assistance in understanding and implementing carbon management techniques. We suggest that landowners already actively managing their lands and who feel competent in their forest management skills may not be likely to participate in a carbon market program. The possibility of receiving professional forestry assistance and advice was found to be the most compelling reason focus group participants would want to participate in a carbon offset project. As voiced by one focus group participant:

> I would just be happy, if it didn't cost me anything, to have a forester come out and say—you know what—if you would do this it would be better. I would do it [participate in a carbon offset project]—just because.
> ~ Shell Lake

While our research focused on FFO attitudes toward carbon management and participation in a voluntary carbon market in the US, our findings may have implications for international carbon sequestration programs such as the clean development mechanism (CDM) and reduced emissions from deforestation and forest degradation (REDD+). Current participation in afforestation/reforestation CDM projects is low and found to be negatively affected by a lack of knowledge and the technical assistance needed to fulfill complex program requirements (Diaz et al. 2011; Thomas et al. 2010). Similar to our findings, research focused on rural landowners in Australia found landowners

were more willing to participate in CDM afforestation projects, even at a lower financial return, if they were perceived to provide environmental co-benefits (Schirmer and Bull 2014). Previous research on the REDD+ program found that forestry co-benefits (biodiversity) resulting from participation in REDD+ could be substantial provided the requirements for participation were not overly complex (e.g., excessive restrictions on definitions of "high biodiversity" forest areas) (Busch et al. 2011). Taken together, these findings suggest that participation in international forest carbon programs like REDD+ might also be increased by promoting the environmental co-benefits that might accrue to forest landowners. However, landowner interest and ability to participate in REDD+ and CDM programs would have to be further examined under the carbon market structure and opportunities, land tenure arrangements, dominant ownership goals, and parcel characteristics unique to the countries of interest.

Conclusions

This research served as an exploratory study to gain greater clarity and insight to the findings of our earlier FFO carbon offset study (Miller et al. 2012), namely, to better understand the factors influencing FFOs' willingness to participate in forest carbon management and carbon markets. The focus group study findings support many of the previous study's findings (e.g., a large number of FFOs in the Lake States could be interested in carbon offset projects). It also provides additional understanding of landowner attitudes toward and decision processes regarding carbon management participation. Specifically, we found that FFOs most likely interested in forest carbon offset programs are those who would like to achieve tangible forest objectives (e.g., increased species mix, improved wildlife habitat) while contributing to carbon storage. For many landowners, access to professional forestry assistance is likely to be an important factor in their decision to participate.

The study also identified several additional research needs. One such area is investigating how the availability of professional assistance specifically focused on improving carbon sequestration influences landowner interest in managing for carbon. Moreover, research is needed to examine why many FFOs in the US are not availing themselves of already existing landowner assistance programs (e.g., Forest Stewardship Program), and whether participation in such programs could allow landowners to meet carbon co-benefit land management goals. Similarly, additional information is needed to evaluate whether other policy approaches (e.g., property tax policy) are effective in generating FFO interest in managing for carbon. Our study focused on FFO in a relatively limited geographic region. Additional research is needed to understand how landowner attitudes toward and interest in carbon offset market participation varies across different forested regions of the globe.

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