



What Value is Provided by Family Forest Land to Its Owners?: Findings from the National Woodland Owner Survey in the USA

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Abstract

The National Woodland Owner Survey (NWOS) was developed in part to understand why private landowners—individuals, families, corporations, and other organizations – own forest land and what benefits and value that land provides. From the NWOS, we know that family forests provide many elements that forestry experts have traditionally emphasized—products such as wood and non-timber forest products and services such as recreation. However, the NWOS has also highlighted that these are not the primary ownership objectives for many family forest owners (FFOs), with other objectives such as privacy, aesthetics, and protection of nature being more important to the majority. The Total Economic Value (TEV) framework provides a theoretically complete typology of human value and is therefore a potentially useful means of fully accounting for the total value that landowners derive from their land. Many traditional products and services associated with private forests are classified in the TEV as direct use value; these include things such as timber and other wood products, and outdoor recreation. In general, these are already adequately covered by the NWOS and other studies, but TEV also includes indirect use, non-use, and option value. These are generally not as well represented in the NWOS instrument or the empirical FFO literature. To address this knowledge gap, an NWOS survey supplement focused on TEV was developed and implemented in Arkansas and Massachusetts, USA. This paper summarizes quantitative and qualitative findings, highlighting that family forests provide landowners with multiple sources of use value, non-use value, and option value.

Keywords Family forest landowners · Total economic value · Wood products · Non-consumptive value

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Introduction

Family forest ownerships (FFOs) are the largest single forest ownership group in the U.S., owning more than 39% of the forest land (Butler et al. 2021). These landowners derive many benefits and ecosystem services from their forest land (Butler et al. 2021; Caputo and Butler 2017). Historically, research on FFOs has disproportionately emphasized timber production, non-timber forest products (NTFPs), hunting, recreation, and other benefits that are directly enjoyed by landowners (Butler et al. 2023, Caputo 2012). According to the Common International Classification of Ecosystem Services (CICES), these benefits are primarily associated with provisioning services and direct cultural services (Haines-Young and Potschin 2018). CICES also includes intellectual, representative, spiritual, symbolic, and other interactions among the cultural services. The forestry literature has not focused on these types of services as thoroughly as it has on recreation or timber and other provisioning services, but neither has it ignored them. Research has shown that U.S. forests provide benefits from education and nature interpretation (Hendee and Flint 2014), sense-of-place (Gobster et al. 2022; Mook et al. 2022), stewardship (Asah et al. 2012), and personal achievement (Kreye et al. 2021). International research has identified spiritual (De Pater et al. 2024; Roux et al. 2022) and heritage (Tengberg et al. 2012) value as being of additional importance.

The Total Economic Value (TEV) framework is a theoretical construct that may be particularly well suited to exploring the value stemming from benefits FFOs derive from their forest land (Hansjürgens et al. 2017). Like other economic frameworks rooted in utility maximization theory, TEV subscribes to a theory of value fundamentally based in people's own preferences. Forest benefits provide value to landowners and forest users because people prefer the outcomes and consequences of enjoying those benefits (Haines-Young and Potschin 2018; Potschin and Haines-Young 2016). TEV recognizes that these preferences result in value being ascribed across a broad set of dimensions. They include the traditional "direct use" value common to the forestry literature, as well as additional categories of indirect use, non-use and option value (see below) that are not as frequently measured. The idea that there is value in private forest land beyond production of forest products is not a new one (e.g. Hartman 1976), but TEV is notable in that it provides a typology intended to cover all possible sources of value (hence, "total" economic value).

Direct use comprises both consumptive and non-consumptive value. Whereas consumptive value is derived from the extraction and use of plants and animals, non-consumptive value is derived from direct, but passive, interaction with the forest ecosystem. This category includes passive recreation, enjoyment of beauty / scenery (i.e. aesthetic value), enjoyment of peace / quiet, and educational benefits. Indirect use value is provided by benefits from what are often referred to in the ecosystem services literature as regulating and maintenance services (Haines-Young and Potschin 2018). These include benefits such as a clean and stable atmosphere, clean water, soil formation, etc. They do not require direct engagement by the landowner and, in fact, the landowner may not even be aware of the scale or scope of the benefits they

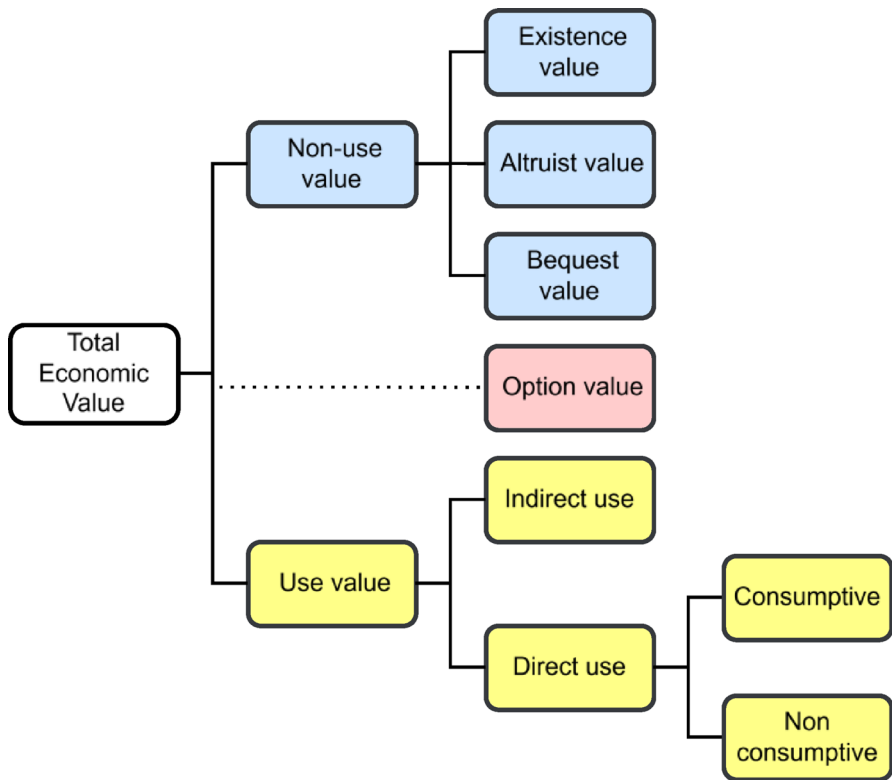


Fig. 1 The total economic value framework. Based on Hansjürgens et al. (2017)

receive.¹ “Non-use” value consists of three value categories: bequest value, altruist value, and existence value. In the first two cases, the landowner derives some personal satisfaction (and, consequently, value) from knowing that benefits are being enjoyed or will be enjoyed by other people in the present (altruist value) or by future generations (bequest value). Existence value is the satisfaction that a landowner gets from knowing that his or her forest, and all the life it contains, just *exists*. Finally, option value sits between use and non-use value. It consists of the value a landowner derives from their forest providing options for them in the future. For example, standing timber in the present provides the landowner with the option to sell or utilize wood products at a future date (Fig. 1)

TEV is likely to be a useful tool in understanding FFOs because of the importance placed on non-consumptive uses of forest land in the U.S. (e.g. Baker et al. 2017; Abrams and Bliss 2013; Beach et al. 2005). This importance is expected given that the significant majority of FFOs derive the bulk of their income from sources other than their forest land (Butler et al. 2021), do not rely, by-and-large, on land for sub-

¹ A notable example is that Joseph Priestley did not discover the existence of oxygen until 1774 and, yet, people have always relied on the oxygen provided by plant photosynthesis for their immediate survival.

sistence resources, and have disposable income similar to the U.S. population at large (Butler et al. 2016).

The National Woodland Owner Survey (NWOS), a product of the USDA Forest Service Forest Inventory and Analysis (FIA) program, is USDA's official source of information on private forest ownerships in the U.S. and their objectives, goals, actions, behaviors, and future intentions. The NWOS, like similar research efforts, has historically focused on direct use of forests – harvesting timber, collecting NTFPs, recreation, etc. These uses have been shown to be consistently important over time and across multiple cycles of the NWOS (Caputo and Sass 2024; Sass et al. 2023). At the same time, however, the NWOS has shown that passive, non-consumptive forest ownerships *objectives* – beauty / scenery, habitat, nature protection, privacy – are held to be more important than consumptive and productive objectives among FFOs (Butler et al. 2021). Regardless of that finding, the benefits (and value) that underlie these objectives have not been fully measured through the standard NWOS instrument.

In this paper, we report on the results of an NWOS supplemental survey effort aimed at better understanding forest value through the lens of TEV. As far as the authors are aware, this represents the first attempt to operationalize the TEV framework for FFOs in the United States. This effort will add precision to our understanding of the value that landowners derive from their land, providing useful contextual information to foresters, conservationists, program administrators, and other technical service providers who work with forest landowners. Through a better understanding of what landowners need and want from their land, these professionals will hopefully have more success in engaging those landowners in practices that are beneficial to themselves as well as society (Caputo et al. 2026). Furthermore, this work serves as an attempt to test the completeness and validity of the TEV framework for this particular population.

Methods

Survey Methods

The data analyzed in this paper come from a NWOS science module (“scimod”). NWOS scimods are surveys, supplemental to the base NWOS, that serve to explore specific research questions in more depth. In addition to new questions, scimods contain a subset of core questions from the base NWOS instrument, such as ownership type, size-of-holdings, and objectives. The core questions retained from the NWOS enable data users to identify key attributes of ownerships and their forested land, include key covariates for new questions, and serve as a means to benchmark responses against the larger population.

Scimods are independent and standalone surveys, implemented as intensifications of the base NWOS sample (Butler et al. 2021). In the case of the TEV scimod, an intensified sample was undertaken in two states, Arkansas and Massachusetts, at five times the base intensity. These states were selected as examples of heavily forested states, both with a plurality of forested acres in family forest ownership. The two

states are in different regions of the USA, with marked differences in legal, political, and social cultures.

In the initial draft, this scimod included eleven original questions intended to address the dimensions of the TEV that were not covered by the questions already contained in the core questions of the base instrument. The questions were tested through a series of cognitive interviews. FFOs owning at least one acre of forest land (the standard NWOS definition of an FFO) across the two study states were interviewed. Lists of landowners in each state were obtained from a proprietary data source (LightBox, Inc. 2025) and telephone numbers were obtained from a third-party vendor (Dataman Group 2026). Lists were randomized and landowners were called sequentially; if they were willing and met the requirements, an appointment was set up for a one-hr interview. Eleven interviews were conducted from December 2020 to March 2021. Interviewees were sent paper copies of the draft questionnaire in sealed envelopes. Interviews were conducted virtually (over the Zoom platform), with one member of the research team leading the interview and a second member taking notes. Audio was also recorded for ten of the eleven interviews (due to a technical error). Landowners who completed the interview were given a monetary incentive (a money order for \$50.00 USD). Approvals were obtained through the U.S. Office of Management and Budget (OMB No. 0596-0078) and the Institutional Review Board at the University of Massachusetts Amherst (IRB No. 2016-2908).

Cognitive interviews describe semi-structured interviews conducted with interviewees as they read aloud, answer, and comment on a survey instrument. The goal is to understand how individuals understand and interpret individual questions, to validate what they are measuring and to suggest constructive revisions. In this case, interviews were conducted using a mixture of “think aloud” and verbal probing methods (Willis 2005). Probes were a mixture of proactive and reactive probes. Interviewees were asked to read aloud each of the eleven questions (as well as some basic demographic and “warm up” questions) and provide an answer. They were then asked to paraphrase each question in their own words, and probed to assess their comprehension, confidence, and recall.

The data gathered as part of the cognitive interviews was used to refine the scimod questions to make them more comprehensible and more accurate measures of the underlying concepts. The eleven original questions were rephrased slightly and condensed into eight questions following the cognitive interviews (Supplement 1). When coupled with the core questions included from the base NWOS instrument, the scimod instrument provided a means to measure at least one benefit falling under each dimension of the TEV framework. The core questions asked whether landowners had ever harvested trees from their forest land, gathered NTFPs, grazed livestock, fished or hunted, or engaged in passive recreation on their forested land. Timber harvest was measured across the entire tenure of land ownership, whereas the other categories included only the five years prior to the survey. These questions were all asked with binary responses (i.e. responses were “yes” or “no”). The new scimod questions asked respondents to indicate how much they enjoyed various forest-based benefits on a Likert-scale, ranging from 1 (“Do not enjoy”) to 5 (“Greatly enjoy”). These included benefits for the dimensions of direct use (non-consumptive), indirect use, non-use and option value. All benefit metrics are listed in Table 1. The raw

Table 1 Dimensions of total economic value (TEV) measured through a National Woodland Owner Survey (NWOS) Science Module (scimod), Arkansas and Massachusetts 2023

Benefit	Value dimension	Measure
Timber products	Direct use value (consumptive)	Have trees ever been cut while you owned land? ^a
NTFPs	Direct use value (consumptive)	Have you gathered NTFPs in the past five years? ^a
Grazing / forage	Direct use value (consumptive)	Have you grazed livestock in your forest in the past five years? ^a
Wild game / fish	Direct use value (consumptive)	Have you fished or hunted on your forest in the past five years? ^a
Passive recreation	Direct use value (non-consumptive)	Have you engaged in passive recreation in the past five years? ^a
Beauty / aesthetics	Direct use value (non-consumptive)	How much do you enjoy the beauty or scenery that your forest provides?
Peace and quiet	Direct use value (non-consumptive)	How much do you enjoy the peace and quiet that your forest provides?
Education	Direct use value (non-consumptive)	How much do you enjoy that your forest provides learning opportunities?
Nature benefits	Indirect use	How much do you enjoy that your forest provides nature benefits?
Future benefits for self	Option value	How much do you enjoy the fact that your forest will provide benefits or opportunities to you in the future?
Future benefits for people	Bequest value	How much do you enjoy that your forest could provide benefits to future generations?
Benefits to other people	Altruist value	How much do you enjoy that your forest currently provides benefits to other people?
Existence value	Existence value	How much do you enjoy that your forest just exists?

^aQuestions represent core questions from the NWOS base instrument; all others are unique to the scimod

Likert-scale responses to the new scimod questions were also collapsed into binary variables for summary purposes based on whether a respondent had selected the two highest response options, 4 (“Moderately enjoy”) or 5 (“Greatly enjoy”), in common with standard NWOS methodology (Caputo et al. 2023; Butler et al. 2016, 2021). This re-scaling allowed us a means for comparing binary and Likert-scale measures side-by-side. However, it is important to acknowledge that comparing measures collected using different scales and different constructs introduces problems with cross-comparison and interpretation.

The survey was implemented in summer 2023. Data were finalized and item non-response addressed through a multiple imputation approach using standard NWOS methodology (Butler and Caputo 2021). Specifically, five imputed values are derived

for each missing variable on each survey. Across all variables in the scimod (both core and new questions), a median of 3.8% of values were imputed.

Data Analysis and Interpretation

The imputed values were used in generating population-level estimates using the standard NWOS estimation procedures (Butler and Caputo 2021). Estimates included basic population metrics for both states – total ownerships and acreage, size-of-holdings, and income from forestland. They also include estimates of the total number of ownerships deriving value from each of the TEV measures, from the core questions as well as the collapsed versions of the new questions. Because of the issues raised above regarding the cross-comparability of variables measured using different scales, we also separately analyzed the new scimod questions using the raw (i.e. non imputed), Likert-scale response data. We used the X^2 statistic and Tschuprow's T to compare the individual metrics of TEV between respondents in each of the two study states. All analysis was conducted in R 4.4.2, using the 'base' (R Core Team 2024) and 'DescTools' (Signorell 2025) packages. Code and output for all analyses are included in Supplement 2.

It is important to note here that we did not attempt to monetize or otherwise aggregate the value dimensions. In this, we followed Hansjürgens et al. (2017) perspective that TEV is not an accounting system, but a heuristic for understanding different dimensions of value. It is also important to note that the value associated with these benefits is a mixture of use value and exchange value². In both cases, however, the economic value being measured benefits the landowners. To contextualize our findings within a market framework, we estimated and mapped a measure of relative forest land value based on the assessed value of private forest land. Methods for this measure are included in Supplement 3.

In addition to refining the new questions, the information gathered during the cognitive interviews was used as a secondary data source for exploratory qualitative analysis – in particular, to better understand how landowners perceive non-consumptive, indirect, or non-use value. To begin, the audio from the interviews was transcribed by a third-party vendor (for the one interview for which audio was not captured, the notes taken during the interview were coded instead). Transcribed interviews were then coded using a three-phase, inductive coding approach (see, e.g. Flick 2018). In the first phase, all four members of the research team coded the first question across all eleven interviews. The team then reconvened to discuss findings and to develop an initial codebook. In the second phase, two members of the research team each independently and completely coded two distinct, complete interviews using the initial codebook, adding new codes as necessary. The team reconvened a second time, to further refine and finalize the codebook based on these four independently coded interviews. In the third phase, a single team member coded the remaining seven inter-

² Use value consists of the value derived from directly consuming a good or service, whereas exchange value is the value derived indirectly from selling or trading a good or service to obtain what is needed or desired. Eating berries from your woodland is an example of use value. Selling timber for cash is an example of exchange value.

views using the final codebook. Finally, the entire team came together to discuss the coding, group codes into themes, and analyze the data to better understand how FFOs construct and contextualize the value they derive from their forested land. Coding was done using the open-source software, Taguette (Rampin et al. 2021).

Results

Quantitative Results

The total number of complete surveys from both states was 498, for a cooperation rate of 20.7% in Arkansas (242 surveys) and 23.3% in Massachusetts (256 surveys). The mean relative land value (log scale) – based on assessed unimproved land value – was over 2.3 times as great on a per-acre basis in Massachusetts as compared to Arkansas (Figs. 2 and 3).

At the population level, there were an estimated 221.8 thousand family forest ownerships in Arkansas (SE=39.5 thousand ownerships), owning 8,516.0 thousand acres of forest land (SE=200.3 thousand acres). This equates to a mean size-of-holdings of 38.4 acres (SE=6.1 acres) and a median of 10 acres (SE=3.0 acres). In Massachusetts, the estimated population included 273.6 thousand family forest ownerships (SE=35.5 thousand ownerships) owning 133.7 thousand acres of forest (38.2 thousand acres). This equates to a mean and median size-of-holdings of 4.9 acres (SE=0.6 acres) and 1.0 acres (0.4 acres), respectively. In Arkansas, landowners derived a mean of 3.6% of their income from their wooded land (SE=1.1%). In Massachusetts, this value was 0.9% (SE=0.5%). The distribution of this variable was very left-skewed, however. The median value in both states was 0% (SE=0%). Total

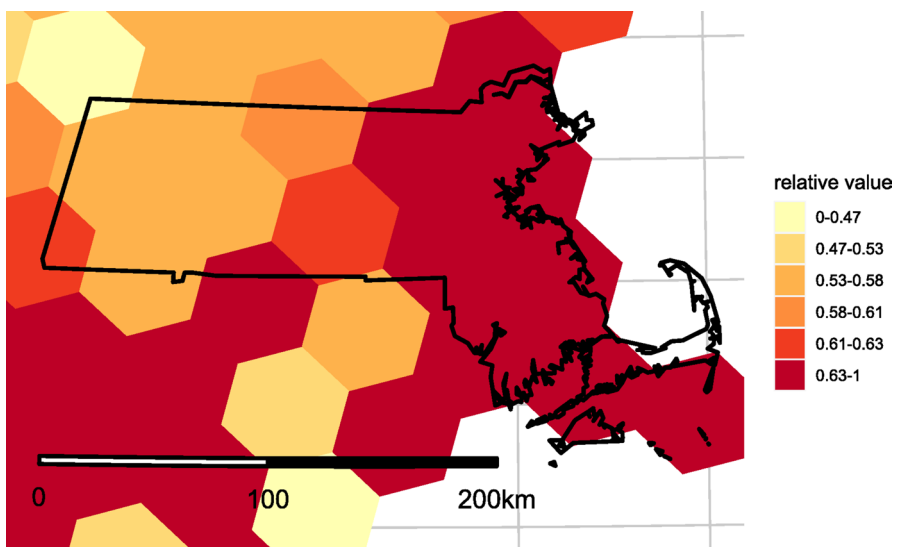


Fig. 2 Median relative land value (log scale), private forest land. Massachusetts. 2018

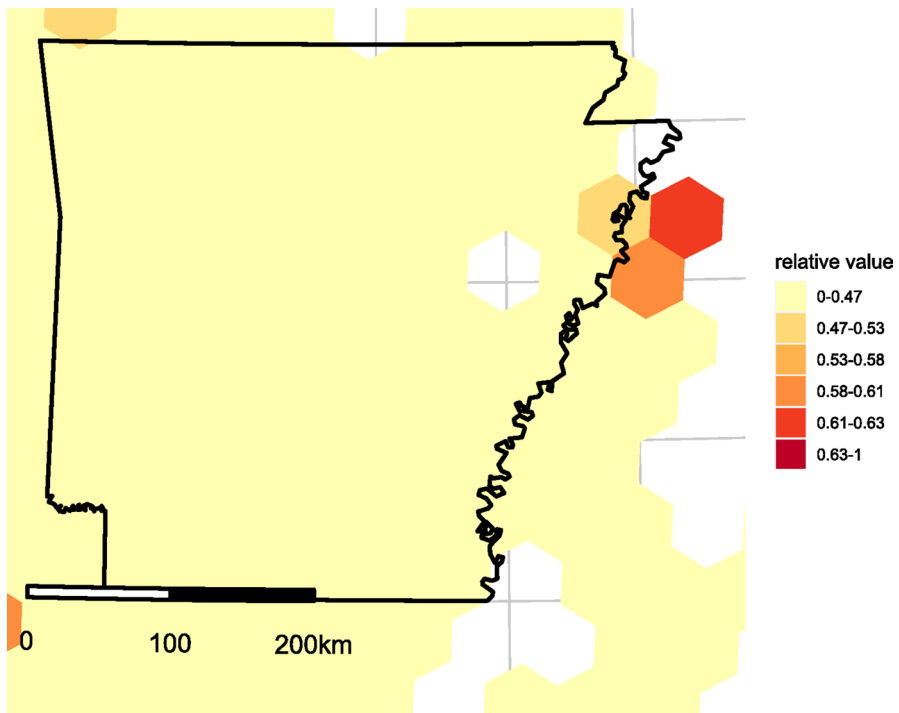


Fig. 3 Median relative land value (log scale), private forest land. Arkansas. 2018

numbers of family forest acres and ownerships were generally within one standard error of the most recent results from the base NWOS (Forest Service 2025).

When all metrics were summarized as binary variables, the population estimates of direct use/non-consumptive, indirect use, non-use, and option value were more frequently found to be important than direct use/consumptive value (Fig. 4). At least 43% of landowners moderately or greatly enjoyed the benefits associated with direct use (non-consumptive), indirect use, non-use, and option value. To contrast, most direct use consumptive benefits were enjoyed by less than 15% of landowners. Two exceptions were harvesting wood and hunting. More than 50% of landowners had harvested wood for sale or their own use. In Arkansas, 41.6% of landowners had hunted or fished on their land. The individual dimensions of TEV appeared to differ only slightly at the population-level – with the most visible distinction between the substantially greater enjoyment of hunting and fishing in Arkansas. The population-level estimates (and corresponding error terms) for each of the individual levels of the Likert-scale questions are available in Supplement 2.

In terms of the raw data, there were statistically significant differences between the two states in terms of forage ($p=0.0005$, Tschuprow's $T=0.16$), hunting / fishing ($p=0.0005$, Tschuprow's $T=0.24$), passive recreation (recreation other than hunting/fishing) ($p=0.0270$, Tschuprow's $T=0.09$), and option value ($p=0.0035$, Tschuprow's $T=0.12$). The first three were on a binary scale. Option value was measured on a 5-point Likert-scale; landowners in Arkansas were more likely to have

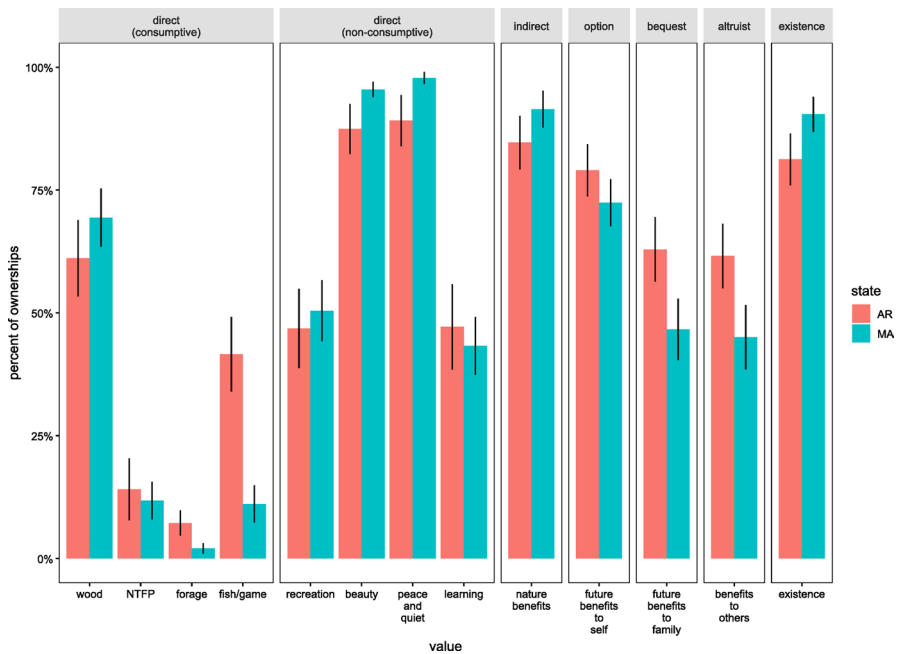


Fig. 4 Dimensions of Total Economic Value (TEV) of family forest woodland in two states, Arkansas and Massachusetts in 2023. Each panel refers to one dimension of the TEV framework and contains one or more individual sources of value: wood=wood products, NTFP=non-timber forest products, forage=grazing or livestock forage, fish/game=fishing or hunting, recreation=passive recreation (not including fishing or hunting), beauty=scenic beauty, peace and quiet=peace and quiet, learning=learning opportunities, nature benefits=nature benefits, future benefits to self=future benefits to self, future benefits to family=future benefits to future generations, benefits to others=current benefits to other people, existence=existence value. The direct consumptive dimensions and recreation are based on binary variables measuring whether a landowner engaged in those activities over the tenure of their ownership (wood) or over the past 5-years (NTFP, forage, fish/game, recreation). The remainder of the variables are constructed variables representing whether a landowner “moderately” or “greatly” enjoys those sources of value

expressed greater enjoyment of option value than landowners in Massachusetts. Across all Likert-scale questions, the most common response was that landowners “greatly enjoyed” all sources of value – with the top two responses representing a majority of respondents in both states (Fig. 5).

Qualitative Results

The secondary analysis of the cognitive interviews provided some additional insights on how FFOs perceive the value of their forest land. Only new scimod questions are considered here; questions on direct use value from the core NWOS instrument were not the focus of these interviews. Three overarching themes emerged from the interview process: (1) FFOs do not neatly separate different value dimensions in the way that the TEV typology suggests, (2) FFOs perceive value more distinctly and more

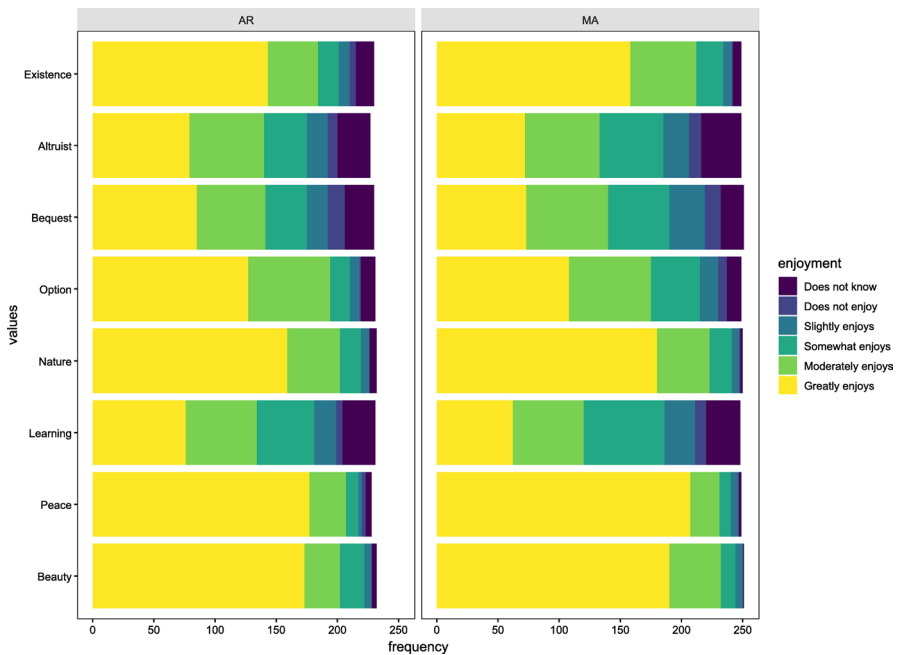


Fig. 5 Selected sources of Total Economic Value (TEV) of family forest woodland in two states, Arkansas and Massachusetts in 2023. Beauty=scenic beauty, peace and quiet=peace and quiet, learning=learning opportunities, nature=nature benefits, option=future benefits to self (option value), bequest=future benefits to future generations (bequest value), altruist=current benefits to other people (altruist value), existence=existence value. Variables represent responses to Likert-scale questions asking how much each source of value is enjoyed by landowners. 2023

specifically as the personal distance between themselves and that value decreases, and (3) FFOs often identify a spiritual dimension to their land.

The TEV typology portrays the different dimensions of economic value as being distinct and theoretically separable, even if bundled together in time and space. In practice, however, FFOs affirm that “discrete” benefits are often bundled together and not easily separable; this result is in line with Hansjürgens’ (2017) perspective that TEV is a means to consider different value dimensions and not an accounting method. We use the word “conflation” here to refer to all cases where respondents either confused one source of value for another or were unable or reluctant to separate them. This problem seems especially acute when different benefits belong to the same value dimension in the TEV typology. For example, “aesthetics” and “peace and quiet” both provide non-consumptive use value. In general, the interviewees seemed to feel that aesthetics was more associated with a visual experience of the forest whereas peace and quiet was more associated with sound. For many, however, the two were indistinguishable. For example, one landowner said,

“I think it’s wrapped together. In my opinion, that’s part of the beauty of it is the peace that it brings, but because it’s wooded because it’s away from the city, then it naturally brings that privacy and that peace and quiet.”

This conflation could be because both benefits seem to stem from reflection on and experience of natural elements, as well as privacy and place attachment. These two benefits are not only conflated with each other, however, but also with several other sources of non-consumptive use value. Interviewees seemed to derive value from the aesthetics and quiet of the forest through the mediation of recreation and other active uses of the forest, e.g.

“Like I said, I do it for exercise as well, fresh air, exercise, health, so that all enters into it as well. The peace and quiet is just an added bonus.”

FFOs seem, in general, to consider aesthetics and peace-and-quiet within a more general value of the woods as a place that is “unspoiled” and that serves as a contrast to more urban environments. This “otherness” provides landowners with value in the form of a generalized source of respite or relief from the pacing or complexity of other living, work, and social environments – what one landowner called, *“the beauty of the other.”* Forested lands’ otherness is so inherently valuable to some FFOs that landowners seem to be willing to happily incur a number of inconveniences and liabilities in order to enjoy living and being in a rural space, e.g.

“I really appreciate living out here. I wouldn’t live anywhere else. I mean, I don’t care if it takes me a half hour to get to... Or 40 minutes to get to Home Depot, or to places where I need to go. I don’t mind that. A lot of people do.”,

and,

“As much, again, of a pain in the butt it was, with the ice, and the slipperiness, you looked out my back deck and it was gorgeous out there with the sun coming up and just glaring through the trees. It was amazing. So I think it’s beauty. I mean, just being out here, I mean, it’s good.”

“Otherness” is not only valuable enough to warrant putting up with liabilities, it can also take potential liabilities and recast them as positive benefits. For example, though several interviewees identified silence as being the operative condition for peace and quiet, many seemed to make explicit exceptions for the “natural” sounds of the forest, e.g.

“I can sit outside in the quiet, and you can hear all the nightly insects, and in the mornings you can hear the birds. I sleep with the windows open, so you can hear the birds chirping in the season. I just enjoy it immensely. And not hearing sirens go by all the time, I mean, that’s what bothered me being in the city.”,

or

“I don’t consider the noise animals make, and I’ve heard some pretty violent noises out here in the middle of the night, with coyotes around and stuff, but I don’t consider that noise. I consider that part of wildlife.”

In other words, car sirens and howling coyotes may be equally loud and they may be equally likely to wake a landowner at night, but the one detracts from peace and quiet and the other adds to it.

In some cases, dimensions are not conflated per se, but reinforce or facilitate each another (or simply co-occur). One example was learning. Interviewees did not regularly separate learning opportunities from recreation, aesthetics or other non-consumptive uses of the forest. Most people described the learning opportunities provided by their forests as those pertaining to trees, wildlife (especially birds), or natural processes, but some also mentioned opportunities to learn or practice skills, such as survival skills or forest management.

Not all value dimensions suffered from cognitive conflation. Several interviewees drew a sharper distinction between dimensions, especially between consumptive and non-consumptive ones. For example, FFOs perceived a tradeoff between timber harvesting and non-consumptive activities, even when they supported timber harvesting in general, e.g.

“We let them come in and do a little bit of it, but we felt like they were taking the most beautiful trees and that was upsetting. And so we wouldn’t mind some of them cleared, but we wanted the not pretty ones cleared, not the pretty ones cleared.”

In other cases, interviewees seemed unaware of one or more value dimensions. This was true most consistently for existence value. To some extent this may be due to the difficulty in semantically framing the intuitive idea that species or habitats have inherent value to people, but we cannot discount the possibility that not everybody finds this valuable. This seemed to be a new idea to many of the respondents, e.g.,

“It’s just something I’ve never considered before”, “Yeah. I don’t know how to wrap my mind around right and purpose.”, “After reading it twice, I’m not clear on that question at all.”

The second theme that emerged from our qualitative analysis was related to the psychological distance between an FFO and a value dimension (e.g. Huff et al. 2017) and the impact of that distance on their ability to perceive that value. In general, interviewees were able to talk about dimensions more articulately and more specifically when the benefits involved accrued to themselves (or people close to them) in the present time, as opposed to when they accrued to other people and/or at a hypothesized future time or distant place.

In many cases, psychological distance does not just affect a landowners’ ability to perceive a benefit, but also whether or not they value that benefit – or, in some cases, whether they even see it as a benefit. When discussing benefits to “other people,” interviewees defaulted to discussing their neighbors, family, and friends. This, no doubt, in part reflects the simple reality that landowners’ close associates are the people most likely to be using their land. It also may reflect the reality that landowners are more likely to feel good about providing value to people with whom they share ties and with whom they sympathize, e.g.

“we’re a little bit picky about who we bring into the ranch. So it’s yeah, I would say that mostly covers it. Friends and family and church family.”

In some cases, FFOs may not think positively about value accruing to strangers or less closely-affiliated individuals, unless they are assured that there is no tradeoff between the strangers’ good and their own. According to one interviewee,

“If I saw someone with a hunter, a hunter out there, I would say, “No, not on my property.” Even though I got nothing against hunting, I just don’t want it on my property. But, knowing that other people can walk through it from the sides, or the back, I don’t mind that, as long as they don’t mess it up, or try to destroy it, or do anything like that.”

Another said,

“My purpose in life is not benefits to society; its benefits to myself.”

Similarly, some interviewees were less able to form a clear picture of future benefits as compared to current ones. When discussing hypothetical future value accruing to other people, interviewees were especially challenged – particularly when those individuals were unknown, indeterminate, and with unknown intentions,

“...the future generations are probably going to cut it down and build apartments on it or some other sinister thing.”

In terms of psychological distance, existence value and indirect use value are particularly “far” from FFOs and therefore difficult for them to perceive clearly. Interviewees often struggled to understand how these benefitted themselves or others and often conflated them with direct use value, e.g.

“I was thinking that other people who may come and hike on the land or be concerned about what is happening here ... I do worry about the species who live in that habitat, being endangered somewhat, losing their habitat, their lifestyle. So I would say pretty much when I read this I was thinking about exactly what I just said, the animals losing their habitat, and perhaps the water quality that is in that brook that those animals do use for a source of water.”

Similarly confusing were option value and bequest value,

“I don’t think that’s something that I have a mind to think of, that it’s providing a benefit to future generations. I hadn’t thought of that before.”

The last theme identified pertained to the “spiritual dimension” of value. Several landowners referenced a spiritual dimension to their forests’ value. In the TEV typology, “spiritual value” (like cultural services) is included under non-consumptive use value. What is not addressed in the typology, however, is the fact that a spiritual

perspective may lead to different and interesting interpretations of the other value dimensions. For example, one respondent had difficulty understanding “existence value,” wondering how things can have value in and of themselves when the world belongs to God? –

“Does it exist on its own right or does it exist because there’s a God? God made it. It’s all God’s. Well, I’m spiritual. Everything belongs to God. I’m just a steward.”

This quote demonstrates another interesting effect of a spiritual perspective. Activities that on one hand could be seen as providing philanthropic or as existence value in the TEV, can instead be seen as humans’ obligation to be stewards of creation (e.g., God). Another example:

“...it brings to mind what the native Americans think about the land – that it’s not their land. And we do feel that we were able to get the land because of God’s influence, but we feel like it’s to share with others. So I don’t think it’s, I mean, I feel like we use it with reverence and we take care of it. Like I said, keeping the beautiful trees and that sort of thing. But yeah. I don’t know. I think this question is asking me if you feel like it’s just like the land itself has its own, own right to be left alone and do its own thing without people interfering.”

Discussion

Family forest landowners in Massachusetts and Arkansas derive economic value from their forest land across multiple sources, i.e. across all dimensions of TEV. This finding is in line with what we know about FFOs’ ownership objectives, which correspond to a full spectrum of consumptive and non-consumptive benefits (Butler et al. 2021). This paper builds on that knowledge by identifying more specifically the dimensions of value that FFOs enjoy. As they were quantified in our analysis, landowners derive the greatest value from non-consumptive direct use, indirect use, option, and non-use value compared to consumptive direct use value (Fig. 4). That does not mean that sources of consumptive direct use value are unimportant to landowners, however (Caputo and Sass 2024). More than 50% of the landowners in the two states have harvested wood products during their ownership tenure, a mixture of commercial and non-commercial products (chiefly firewood). Comparatively, far fewer derive value from animal forage, non-timber wood products, or wild fish and game. This may have to do with differences in the extent to which these products can be commercialized. All these products can at times be sold (i.e. serve as a source of exchange value); but forage, NTFPs, and fish/game are more likely to be used directly by landowners (i.e. providing use value). On the other hand, wood products can be used locally (e.g. firewood) but are more frequently harvested as a commercial product. Family forests provide a significant share – 42% – of wood products produced in the USA (Butler and Sass 2023). Since exchange value is mediated by money, landowners may have greater interest in pursuing the production of wood,

since the returns are fully fungible and can be used to satisfy multiple landowner needs, as opposed to production of forage or NTFPs, which are more likely to be limited by landowners' demands for those specific products.

Despite substantial differences in estimated land value and mean size-of-holdings between the two states (Figs. 2 and 3), landowners in Arkansas and Massachusetts derive similar value profiles from their land (Fig. 4). Landowners in Arkansas derive significantly more value from option value, forage, and fish / game than do landowners in Massachusetts. The last item is especially notable. The proportion of Arkansas landowners who hunt or fish on their land is more than three times that of Massachusetts landowners. On the other hand, Massachusetts landowners derive significantly more value from passive recreation. This suggests that there may be regional and/or cultural differences in specific sources of value to landowners and/or holding size may influence opportunities to experience certain value dimensions even if the overall profile across the value dimensions is similar. In this case, it appears that consumptive value is more important to landowners in Arkansas as compared to Massachusetts landowners, even if non-consumptive value is more important to both overall.

The exploratory qualitative analysis identified significant nuance to how landowners interpret and assess the dimensions of value. We found landowners tended to conflate different value categories or failed to distinguish between adjacent dimensions, particularly in the case of non-use value, option value, and indirect value where psychological distance was higher (Huff et al. 2017). The results of the interviews also suggested that there is often a spiritual component to the value enjoyed by landowners, in line with findings in the literature (De Pater et al. 2024; Roux et al. 2022).

This paper supports TEV as a moderately useful research and heuristical framework (Hansjürgens et al. 2017) for understanding the multiple uses, value dimensions, and benefits that characterize and motivate FFOs. It effectively illustrates that FFOs derive value from their land across multiple dimensions, including indirect use, non-use and option value. However, despite being framed as theoretically complete, TEV may not cover *all* of the value provided by landowners' forests and woodlands – such as, for example, spiritual value. This particular example perhaps highlights an overall shortcoming of a typology grounded in utility maximization theory, that the value of benefits flowing to other beneficiaries must be framed in terms of the subject of interest (in this case, the landowner). Thus, the value that *I* derive from altruist value is not strictly speaking the value enjoyed *by other individuals* but the value that *I* derive from the enjoyment of being an altruistic person. Similarly, existence value is not the value enjoyed by ecosystems and non-human actors, but the value that *I* derive from knowing these exist and will persist into the future. A similar perspective could be used to add a spiritual dimension to TEV, measuring the value derived by an individual from engaging in spiritual activities or simply viewing their land and themselves as participating in a spiritual or religious plane. This inclusion would move TEV closer to a hypothetical true measure of the “Total” Economic Value provided by family forest land. TEV, even so modified, however, is not likely to become an *optimal* framework for understanding the spiritual dimension of forest landownership. Reframing all benefits from private forests as benefits to their owners, as necessitated by a utility maximization perspective, is awkward and non-intuitive and

likely does not fully represent the benefits that accrue to non-owners, particularly public benefits (see Hodgson 2025). To that end, TEV remains somewhat unsatisfying in terms of its reliance on altruist, bequest, and existence value to account for these benefits.

This study has some limitations. Low cooperation rates (less than 25%) increase the opportunity for non-response bias in these results. It is known that response rates for mail surveys in the natural resources literature have been declining precipitously over the past few decades, at a rate of almost 1% per year (Stedman et al. 2019). The cooperation rates for the current study are close to the current average as found by Stedman et al. (2019). The topic of non-response bias has been explored for the base NWOS, with the conclusion that biases are probably non-problematic (e.g. Butler et al. 2021). Some systematic bias towards more active and informed landowners is likely, and that is also probably true in the current case as well. To the extent that engaged landowners may be more likely to value their land, this could also suggest an upwards bias in the TEV metrics. This is not necessarily the case, however, as many dimensions of value are passive or indirect and may not strongly correlate with traditional measures of landowner engagement. The fact that the sampling and implementation methodologies are identical between the base NWOS and the scimod as well as the marked similarities between the basic population estimates both suggest that overall non-response bias concerns are likely similar between the two surveys.

An important caveat to the quantification of value as undertaken in this study is that the underlying survey questions were measured using different scales. The core questions from the base NWOS survey were binary questions, asking whether landowners engaged in consumptive activities or passive recreation, whereas the new questions from the scimod were Likert-scale questions asking respondents to subjectively assess how much they enjoyed specific sources of value. These Likert-scale questions were collapsed to binary variables to compare with the base questions on a similar unit (proportion of ownerships), but it is possible or likely that some of the reason behind the higher scoring of the new scimod questions is due to issues with comparisons across different scales. That being said, our conclusions are in line with the base NWOS (Butler et al. 2021) and with prior research showing that cultural, passive, and non-consumptive uses of forest land are of primary importance to FFOs in the U.S. (e.g. Baker et al. 2017; Abrams and Bliss 2013; Beach et al. 2005). Finally, it is safe to conclude that our data show that landowners derive substantial value from at least one source associated with each of the TEV dimensions of value, even if comparisons between them in terms of magnitude are fraught.

The results of this project demonstrate that data collected during cognitive interviews for the primary purpose of instrument validation and revision, can be useful inputs for broader qualitative analysis. By probing interviewees to expand upon their interpretation of the terms, definitions, and constructs included in the questionnaire – beyond the narrower input strictly necessary for survey pre-testing purposes – we were able to learn more about the nuanced ways in which landowners conceive of the value they derive from their land. We should caution, however, that this analysis be seen as exploratory and principally useful in terms of providing context for interpretation of the associated survey results. Interviews for pre-testing purposes differ methodologically from structured or semi-structured interviews designed for broad

qualitative analysis. Nonetheless, we consider this particular method of mixed-mode analysis to carry potential. Future efforts to develop this methodology further would benefit from an increased sample size and the development of a custom interview protocol that better balanced the different requirements of survey pre-testing and independent, qualitative investigation.

Conclusion

Our findings ultimately support the use of TEV as a comprehensive, intuitive, practical tool for identifying and measuring the value provided by family forest land to landowners, but they also suggest the need for a recognition that the value dimensions making up TEV are perhaps not as *complete* as originally suggested. Our paper is an early and unique attempt to use this framework in the FFO literature and represents a starting place. Furthering our understanding of the full range of value that FFOs hold for their wooded land may aid policy makers and technical service providers when designing and implementing policies, programs and assistance to support landowners in managing and stewarding their lands to achieve desired ownership goals. In particular, landowners may be better served by increasing the emphasis of these interventions on non-consumptive, indirect, and non-use value – in addition to the traditional focus on natural resources management for wood products and other sources of consumptive direct use value. Another area that warrants more attention is option value. Traditional forest economics, and consequently silviculture, attempts to maximize the net present value of the forest resource when managing growth and harvest cycles. Few people seek to maximize NPV in their private lives, however. Family forest owners may be more interested in maintaining merchantable timber “on the stump” as a reserve against future needs (e.g. college, medical expenses, etc.). Providing tools and information for understanding the implications of this decision could be an important role taken by extension agents and other service providers.

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Data Availability Raw National Woodland Owner Survey (NWOS) responses are protected as confidential and private by federal law. Additional population-level estimates are available upon request.

Declarations

Conflict of interest The authors declare no competing interests.

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