



# The future of family forests in the USA: Near-term intentions to sell or transfer



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## ABSTRACT

Land transfer decisions for family forest owners (FFOs) potentially have large consequences for the critical public benefits these lands provide, but what triggers and influences the decisions are just beginning to be understood. The 2013 USA National Woodland Owner Survey provides an unprecedented set of national data to better understand near-term plans to sell or give away forestland either in its entirety or by subdividing. This study uses multinomial logit analysis to explore whether the likelihood of selling or giving away any or all of forestland within 5 years has some systematic relationship to the FFO, land, and urban-rural characteristics. Understanding what drives respondents' answers to this question provides insight into the characteristics of land and landowners likely associated with land transfer, and potentially where development is likely to occur. The results indicate that FFO, land, and attitudinal characteristics play roles in the plans, but urban-rural characteristics do not. Transfer plans are positively associated with being older, female, having more wooded land, and agreeing that they would sell if offered a reasonable price; transfer plans are negatively associated with high education levels, having a home within 1 mile of the wooded land, and agreement with wanting their wooded land to stay wooded. The marginal effects of the model estimates show that age has one of the greatest impacts on land transfer plans. Results support the need for research coordinating FFO intentions with actual decisions, related to emotional and familial attachments and other life circumstances.

## 1. Introduction

Forests in the USA comprise approximately 331 million hectares, 58% of which are privately owned (Butler et al., 2016c). Of this privately-held land, the majority is owned by families, individuals, trusts, estates, and family partnerships, hereafter referred to as family forest ownerships. Family forest ownerships (FFOs) are the largest of all forestland owner groups in the USA. (Butler et al., 2016a). It is no wonder then that the intentions and plans that these owners have for the future ownership of their land have consequences for the critical public benefits these lands provide, such as clean water and air, carbon sequestration, biodiversity, long-term timber production, and recreation (Kline and Alig, 2005; Millennium Ecosystem Assessment, 2005; Stein et al., 2005).

Decisions regarding these land-based assets are different from other financial assets and decidedly more complex, because of the emotional attachment that can be developed through land ownership (Brown and Raymond, 2007; Creighton et al., 2015; Markowski-Lindsay et al., 2016). The biggest decisions FFOs can make about their forest is when, how, or if they should transfer it to their heirs, and this decision is fraught with a variety of issues (Catanzaro et al., 2014). Life circumstances may trigger

land ownership decisions at any time and may include events such as: family births, deaths, marriages or divorces; job changes; changes in economic or financial circumstances; illnesses; and conversion of nearby forestland (Markowski-Lindsay et al., 2016). Family-related issues also contribute to decisions of when to transfer, including the need to be equal and/or equitable to heirs, family dysfunction, and the inability of families to make decisions of what to do with the land (Catanzaro et al., 2014; Markowski-Lindsay et al., 2016).

Even though uncontrollable situations of life circumstances may trigger land transfer decisions, the role that individual characteristics unique to FFOs play in land transfer decisions are clearly important for using existing policy tools more wisely or targeting outreach to those who would most benefit. However, studies that explore the influence that individual characteristics have on the transfer of forest have been limited.

Two recent regional studies found that individual owner characteristics play a significant role in land transfer decisions. Forest owners in the Catskill and Delaware watersheds of New York indicated that increasing age, retirement status, lower education, lower income, and concerns (e.g., tax burden, need to distribute to family, health, finances) were related to their decision to subdivide versus keeping their

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land intact (Sanborn-Stone and Tyrrell, 2012). A greater number of those who kept their land intact rated protection of the environment, family, timber production, and privacy as more important than those who subdivided their land. Private forest owners in Washington who derive market values from their land (e.g., practicing forestry and having intentions to harvest) indicated that they are more likely to intend to develop their land and anticipate that it would happen sooner than those who enjoy non-market benefits of forest ownership, such as aesthetic or recreation enjoyment (Rozance and Rabotyagov, 2014). By analyzing the individual responses, the authors calculated that roughly 20% of the development would happen within the next 5 years.

A number of other studies focusing on land bequest and inheritance have also shown how individual characteristics factor into land ownership decisions. FFO land bequest decisions in Massachusetts have been discussed as being based on their personal, family and financial goals (Markowski-Lindsay et al., 2016). Non-industrial private forest owners in Virginia holding amenity values for their forest are more likely to bequeath their land to heirs with standing timber (vs. bequeathing it after harvest) (Amacher et al., 2002; Conway et al., 2003).<sup>1</sup> A rare national study indicated that private forest owners who inherited their land are more strongly motivated to have the future intention of passing on their land to their children or heirs than non-inheritors (Majumdar et al., 2009).

Exploring private forest owner values and incorporating the element of time, as was done by Rozance and Rabotyagov (2014), may help policy and outreach be directed at those who would most benefit. As noted by Sanborn-Stone and Tyrrell (2012), effective public policy related to land use, taxes and landowner incentives ought to be informed by what motivates landowners to either keep or sell their land. To be most effective, this understanding of motivations should be current to reflect recent economic circumstances. Understanding who is likely to sell or give away their land in the near-term may provide policy makers, extension professionals, and conservation organizations a foundational understanding of where transfer is likely imminent so as to improve targeting of forest conservation efforts on a nationwide scale.

The 2013 National Woodland Owner Survey (NWOS) provides an unprecedented set of data for the USA to better understand near-term plans to sell or give away forestland either in its entirety or by subdividing. Taking cues from Sanborn-Stone and Tyrrell (2012) and Rozance and Rabotyagov (2014), this study uses national NWOS data to explore whether and how FFO and land characteristics differ with the intention to transfer forestland in the next 5 years. Looking at this issue from a national perspective fills the gap in the existing literature that has mostly been regional. Understanding what drives respondents' intentions on a national scale provides insight into the characteristics of land and landowners likely associated with land transfer. Because ownership transfer of land that results in dividing the land into smaller parcels or properties (i.e., parcelization) is linked to higher probabilities of development (Mundell et al., 2010; Sanborn-Stone and Tyrrell, 2012), understanding these characteristics provides greater information on where this is likely to occur. This study elaborates on previous research by expanding the geographic scope to the entire USA. It also broadens the question from one of development and parcelization to that of plans to sell or give away any or all held forestland.

## 2. Methods

The data in this study derive from the 2013 NWOS, which collected data on ownership characteristics, forest characteristics, reasons for owning, ownership history, forest use, recreation, sources of information, concerns, future intentions, and demographics (Butler et al.,

<sup>1</sup> Non-industrial private forest owners are private forest ownerships who do not own a primary wood processing facility; they include corporations, nongovernmental conservation organizations, associations and clubs, Native American tribes, and families and individuals (Butler et al., 2016c).

2016c). The USA Forest Service's Forest Inventory and Analysis (FIA) unit conducts the NWOS by contacting a sample of private forest ownerships across the USA and asking them to complete a 37-question, self-administered mail-back survey.

The NWOS used an area-based, probability-proportion-to-size sampling design (Dickinson and Butler, 2013); the probability of an owner being sampled depended on the size of their ownership. Each state was overlaid with a grid of hexagons, random sample points within these hexagons were located, and remote sensing and property tax records were used to determine which of the points represented privately-owned forest. Due to this probability-proportional-to-size sample design, the observations were weighted using state-specific and individual owner-specific data: the total estimated area of family forestland held in 4-plus hectare ownerships for each state, the number of responses for each state, and the area owned by each ownership. Surveys were sent to privately-owned forest ownerships. Butler et al. (2016a) provide a detailed discussion of the NWOS survey and estimation methodologies.

In total, 8576 FFOs owning 4 or more hectares responded to the survey, and the overall cooperation rate was 52% (Butler et al., 2016b). To test for nonresponse bias, comparisons were made between responses received in the mail and those who responded from follow-up telephone interviews (Butler et al., 2016b). The telephone interviews reflected 15% of the mail respondents. Of the variables tested, area of forest owned in a state, land tenure, having commercially harvested trees in the previous 5 years, and having received cost-share assistance showed no statistical differences ( $p \geq 0.05$ ). The mail respondents did show a higher propensity to having received forest management advice in the previous 5 years and having received cost-share assistance ( $p < 0.05$ ). Because there was no clear nonresponse bias found, no adjustments were made as was suggested by Butler et al. (2015b).

For purposes of this study, only FFOs holding more than 4 ha are included in the sample. Ownerships of more than 4 ha reflect a large proportion of all forested acres in the USA (roughly 32% or 107 million hectares) (Butler et al., 2016b,c). Understanding what influences the decisions of these ownerships is key for targeting or conducting outreach for multiple programmatic efforts (i.e., traditional forest management approaches, current use tax programs and conservation easements) (B. J. Butler et al., 2016c; Hatcher et al., 2013). Of all survey respondents, 4789 reflected 4-plus hectare family forest ownerships and the respondents provided sufficient information (i.e., low enough item nonresponse rates) to be included in the analysis. This paper reflects statistics for these respondents (see Table 1). Questions in the survey were directed at all forested acres owned in a state.

Survey recipients were asked directly about their intentions for transferring ownership of their wooded land within a specified time period. Specifically, respondents were asked to indicate how likely they would be to sell or give away any or all of their wooded land in the next 5 years. Response choices were given on a 5-point Likert scale: Extremely Likely, Likely, Undecided, Unlikely, Extremely Unlikely. This research explores whether the likelihood of selling or giving away any or all of their wooded land within 5 years has some systematic relationships to: FFO and land characteristics; objectives, concerns and attitudes; traditional forestry activities; participation in non-market activities; and urban-rural characteristics of the land.

### 2.1. Explanatory variables

#### 2.1.1. FFO and land characteristics

Numerous 2013 NWOS variables are available to test the association between FFO and land characteristics and likelihood of selling or giving away wooded land. These characteristics include total forest holdings in hectares (i.e., including all parcels owned), owner age, owner income, percent of owner total income derived from wood, whether a primary home or a vacation/cabin or their farm (if applicable) is within one mile of the wooded land, whether the wooded land was inherited, owner gender and owner education (Table 1).

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