







Research article

Planning for the future of forests: What drives landowners' estate planning decisions in the Southern United States?

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ABSTRACT

Nearly 86% of forestlands in the Southern United States are owned by private forest landowners, and about two-thirds of this area is owned by Family Forest Owners (FFOs). Forest legacy planning is crucial for ensuring the long-term sustainability of these forests. It includes formal aspects, such as estate planning, and informal aspects, such as discussions with the next generation about forest management plans. This study examines the factors that influence landowners' estate planning decisions. We evaluate how landowners' characteristics, behaviors, and motivations influence their estate planning, in general and specifically in the context of the COVID-19 pandemic, as a disruptive exogenous shock. Drawing from a regional survey of FFOs across the Southern United States, we evaluate which landowners were more likely to have an estate plan (as an indicator of formal forest legacy planning) and which were more likely to have made or updated their plans during or after the pandemic. We find that 73% of respondents have created an estate plan, including 28% during or after the pandemic. Landowners are more likely to have estate plans if they are older, inherited their land, own larger forest acreages, and report that their primary motivation for owning forestland is as an investment. Landowners who reported being affected by the pandemic and whose families experienced employment disruptions during the pandemic were more likely to update their estate plans during or after the pandemic. The study highlights the complexity of estate planning among FFOs and how disruptive events influence planning and decision-making.

1. Introduction

The Southern United States has approximately 32% of the country's total forest area (Oswalt et al., 2019). These forests contribute significantly to national timber production and provide essential ecosystem services, including key ecological and economic benefits (Butler et al., 2021a,b; Mohamed and Katambara, 2025). Approximately 86% of forests in the region (212.3 million acres) are privately owned (Oswalt et al., 2019), with two-thirds owned by Family Forest Owners FFOs (Butler and Wear, 2013). The aging demographic of FFOs has raised concerns about the future of forestlands, as unplanned transitions and changes in owner priorities could undermine long-term sustainability efforts (Mook et al., 2024; Sass et al., 2023). A substantial fraction of family forestlands is expected to transfer to new generations in the coming decades (Butler et al., 2021a,b). This makes it crucial to understand the forest legacy planning of FFOs (including their interests,

behaviors, and challenges), particularly in the context of increasing development pressures in the Southern United States (Hilsenroth et al., 2021). The planning and decision-making of these FFOs will determine whether land remains forested or is allocated to other uses, and whether it is actively managed and for what objectives (Butler et al., 2021a,b; Oswalt et al., 2019).

Through forest legacy planning, FFOs can shape the long-term use and management of their forestlands. A central element of legacy planning is estate planning, which is the process of arranging for the management and transfer of a person's assets (such as property, investments, and forestland) after their death or in the event of incapacity (Basir et al., 2023). Landowner estate planning is considered an important dimension of land management (Markowski-Lindsay et al., 2017a,b), similar to succession planning for family businesses. It involves making critical decisions about the future stewardship of the land, including whether and how to ensure it remains forested

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(Markowski-Lindsay et al., 2017a,b). The estate planning process is highly individualized to each family's unique financial and personal goals, but it typically involving three key steps: (1) setting goals, often through communication with family members from multiple generations, (2) acquiring information about available options and consulting professionals, and (3) formalizing plans through legal documents and tools (Catanzaro et al., 2014). The third step can involve creating a will to direct how the land will be passed on, establishing a trust or partnership to manage and protect forestlands across generations, or placing a conservation easement on all or part of the property that limits certain types of development (Gruver et al., 2017; Quartuch et al., 2021; Siegel et al., 2009). Legal documents, such as wills, trusts, and powers of attorney, can ensure that an individual's wishes are respected (Basir et al., 2023).

Forest legacy planning is shaped by complex family, social, and economic factors (Markowski-Lindsay et al., 2017a,b; Sass et al., 2023), which occur across spatial and temporal scales (Butler and Wear, 2013). The National Woodland Owner Survey (NWOS) shows that passing on forestland to future generations is one of the main reasons for ownership reported by FFOs (Butler et al., 2021a,b; Butler and Wear, 2013), but it is also one of their biggest challenges (Butler et al., 2021a,b; Markowski-Lindsay et al., 2016). These challenges may be exacerbated by increasing property values and taxes, as well as uncertainty surrounding heirs' future intentions (Butler and Wear, 2013; Markowski-Lindsay et al., 2016; Quartuch et al., 2021). In this study, we use forest legacy planning as an umbrella concept that includes formal and informal actions through which landowners shape the long-term use and transfer of their forestland. In contrast, we use estate planning in a more specific sense to refer to decisions about who will inherit the forestland, as an observable and formal component of the broader forest legacy planning.

When land is passed through generations without a formal will or estate plan, collective ownership among multiple descendants (heirs' property) can create complications for forestland management (Johnson-Gaither et al., 2019). Because heirs share undivided interests, these properties can be difficult to enroll in programs and may be vulnerable to forced sales, challenging long-term stewardship (Deaton, 2012; Smith and Cabbage, 2024). Heirs' property ownership typically arises due to a lack of formal estate planning (Johnson-Gaither, 2016), which is common among groups such as African American farmers and Native American communities, who have historically faced misinformation and discrimination (Dobbs and Johnson-Gaither, 2023).

Research shows that many FFOs intend to pass land to their heirs and that they are concerned about development and parcelization. A study in the northeastern United States found that most respondents intended to keep their land within the family rather than sell it (Markowski-Lindsay et al., 2017a,b). However, despite these intentions, relatively few FFOs take formal estate planning steps, such as establishing wills, trusts, partnerships, or conservation easements (Quartuch et al., 2021). This gap may be because few are unaware of these legal alternatives for estate planning, and few actively manage their forestland. Catanzaro et al. (2014) found that many FFOs are aware of their options to sell, subdivide, and sell house lots, but few understand how estate planning options can help meet their needs and goals. The lack of available, skilled attorneys to provide estate planning services to landowners, particularly in rural regions, can create additional barriers to effective planning (Siegel et al., 2009). This intention-action gap may reflect "status quo" decision-making and inertia even when long-term planning is valued (Sun et al., 2025). Understanding this gap is essential for identifying the factors that drive estate-planning decisions among FFOs.

FFO decision-making can also be affected by external circumstances and life events that have financial or emotional consequences (Markowski-Lindsay et al., 2016). When an unexpected event occurs, especially a sudden health concern that can potentially generate financial challenges, FFOs may feel obligated to make decisions they would not otherwise consider, such as selling some or all of their land for development, timber, or conservation purposes (Butler and Wear, 2013;

Gruver et al., 2017; Quartuch et al., 2021). Additionally, the loss of income and family leadership can add economic strains, making it more difficult to meet financial needs and continue forest management (Siegel et al., 2009). Concerns about whether heirs want and how they will care for the land can further complicate forest legacy planning (Gruver et al., 2017).

The COVID-19 pandemic introduced unprecedented challenges and uncertainties worldwide, and forest management and planning were no exception (Derks et al., 2020). In the United States, pandemic-related impacts included changes in the availability of services and educational programs for landowners (Fawcett et al., 2020; Hilsenroth et al., 2021). As the pandemic progressed, researchers evaluated its impacts in different sectors, including various dimensions of the forest sector (Bruck et al., 2024; Chizmar et al., 2024; Jayasundara et al., 2024). These studies revealed impacts on timber markets (Bruck et al., 2023; Muhammad et al., 2022), the pulp and paper industry (Liu et al., 2020; Stordal et al., 2021), conservation (Rondeau et al., 2020; Shrestha et al., 2023), recreation (Derks et al., 2020), and forest management decisions in the Southern United States (Bruck et al., 2024; Hilsenroth et al., 2021).

The COVID-19 pandemic could also have affected landowners' priorities, attitudes, and decision-making (Jayasundara et al., 2024), including estate planning. Possible mechanisms include disruptions to daily patterns of life, economic uncertainties and fear of death (Evers et al., 2020; Liu and Su, 2021; Marais-Potgieter et al., 2024; Paul and Vasudevan, 2024). The pandemic generated saturation news coverage of excess mortality (Wang et al., 2022), and "the actual or eventual mortality of the forest owner" is a key driver of land ownership transfers by FFOs (Danley et al., 2024). Receptiveness to estate planning has been linked to the awareness of mortality or actual mortality events (Pearson, 2023). This raises the question of whether and which types of FFOs responded to these conditions by creating or updating their estate plans.

We hypothesize that estate planning decisions – in general and specifically during or after the COVID-19 pandemic – are influenced by the socio-demographic characteristics of forest landowners. We also hypothesize that characteristics of land ownership, such as acreage, proximity to residence, and ownership motivations, affect the probability of having an estate plan, while the specific shocks experienced during the pandemic affected the probability of updating that plan during or after the pandemic. Our objective was to evaluate which of these factors influences estate planning (as a step in formalizing and implementing forest legacy planning) among FFOs in the Southern United States. Specifically, we explore two research questions.

RQ 1. Which factors increase the probability that an FFOs have an estate plan?

RQ 2. How did personal experiences of the pandemic affect the probability that landowners would update their estate plans?

Specifically, we test which characteristics and experiences affect the probability of estate planning or the timing of estate planning, after controlling for landowner age, education, and income.

Our research contributes to current knowledge by exploring factors that influence estate planning decisions among FFOs in the Southern United States. These findings offer practical insights for extension agents, policymakers, and other stakeholders concerned with the long-term sustainability of the forest sector, as they seek to increase attention to and action on forest legacy issues.

2. Conceptual framework

Our conceptual framework of estate planning by FFOs draws on the Transtheoretical Model of Behavior Change (TTM) (Briccetti et al., 2024; Quartuch et al., 2021), which offers insights into the role of individual readiness, attitudes, and intentions in influencing behavior. We also drew insights from empirical literature examining forest landowner

intentions and decisions regarding estate planning and forest legacy planning. In addition to evaluating landowners' characteristics (internal factors) that influence estate planning, our data collection also leveraged the context of the COVID-19 pandemic to assess whether and how decisions changed in response to a shock with personal and economic implications. Therefore, we propose four conceptual categories of factors that influence estate planning decision-making among FFOs (Fig. 1).

Factors that shape estate planning can be internal to landowners or exogenous. Internal factors include time-invariant characteristics (socio-demographics, except age) and potentially time-variant characteristics (land ownership type and ownership motivations). The key exogenous factor relevant to this study is the COVID-19 pandemic, a shock with personal and economic implications. We examine which types of landowners responded to this exogenous shock by increasing the likelihood of updating their estate plans, after controlling for key socio-demographic characteristics.

2.1. Socio-demographic characteristics

Socio-demographic characteristics are central in this framework because we hypothesize that they shape both the motivation and the capacity to engage in estate planning. We expect that these factors will influence not only the likelihood that landowners establish an estate plan but also the likelihood that they will revisit and update existing plans. The literature suggests that awareness of mortality can motivate individuals to prioritize emotionally meaningful goals, with perceived time and stage of life shaping which goals are viewed as most relevant (Paul and Vasudevan, 2024). Older landowners were more likely to have completed some form of estate or succession planning, in line with previous research. Bell et al. (2019) and Markowski-Lindsay et al. (2017a,b) found that age was positively associated with the probability of using estate-planning tools, including wills and conservation easements. Purc-Stephenson et al. (2025) observed that older farmers were more likely to engage in succession planning. Additionally, more educated landowners, who possess greater financial resources, are more likely to have an estate plan, as income and asset levels are key determinants of estate planning behavior (Basir et al., 2023; Pearson, 2023). Therefore, it is hypothesized that older landowners, with higher levels of education and income, and those employed in land-based occupations, are more likely to engage in estate planning due to their greater awareness of planning, access to resources, and professional familiarity with estate planning tools.

2.2. Land ownership characteristics

Previous studies suggest landowners with larger forest holdings are

more likely to engage in formal legacy planning, including creating wills and other estate tools (Butler et al., 2021a,b; Markowski-Lindsay et al., 2016; Purc-Stephenson et al., 2025). Inherited land and geographic proximity also could promote stronger emotional and generational connections to the forestland, leading owners to place more importance and take action on plans to pass land to their heirs (Markowski-Lindsay et al., 2016; Purc-Stephenson et al., 2025). These factors have been found to motivate conservation-focused legacy planning or, in some cases, reduce reliance on formal estate tools (Bell et al., 2019; Quartuch et al., 2021). We hypothesize that landowners with larger holdings, who have inherited land, and who live near their forestland are more likely to engage in estate planning due to stronger emotional, economic, and legacy attachments to their land.

2.3. Reasons for owning forestland

The literature suggests that ownership motivations can shape estate and legacy planning decisions (Butler and Wear, 2013; Markowski-Lindsay et al., 2016; Quartuch et al., 2021). Landowners who prioritize intergenerational transfer or oppose future development are more likely to engage in estate planning so that they can determine the future ownership of their forest and employ conservation tools to ensure long-term forest stewardship. Understanding these motivations provides critical insights into which landowners are most likely to take action to ensure orderly transfer of land ownership upon their death (Bell et al., 2019; Danley et al., 2024; Markowski-Lindsay et al., 2018). We hypothesize that landowners who own forestland to pass it on to their heirs or as an investment are more likely to engage in estate planning, as these motivations reflect a desire to maintain family control and protect the land's value (emotional, familial, or financial) and legacy over time.

2.4. Personal and economic COVID-19 shocks

In this category, we aim to unpack the landowner's experiences of COVID-19 by exploring whether they experienced disruptions in employment, income, and land-based activities, as well as vaccination status, to identify whether and which of these direct effects of the pandemic influenced forest landowners' estate planning. Evidence from broader population studies suggests that receptiveness to estate planning is linked to an increase in awareness of mortality, which can lead individuals to change behavior (Marais-Potgieter et al., 2024), including formalizing decisions about land transfer and legacy (Evers et al., 2020; Pearson, 2023). Among forest landowners, key drivers of ownership transfer include the eventual or actual mortality of the owner, unexpected health events, or financial pressures (Danley et al., 2024; Markowski-Lindsay et al., 2016; Quartuch et al., 2021). Therefore, we

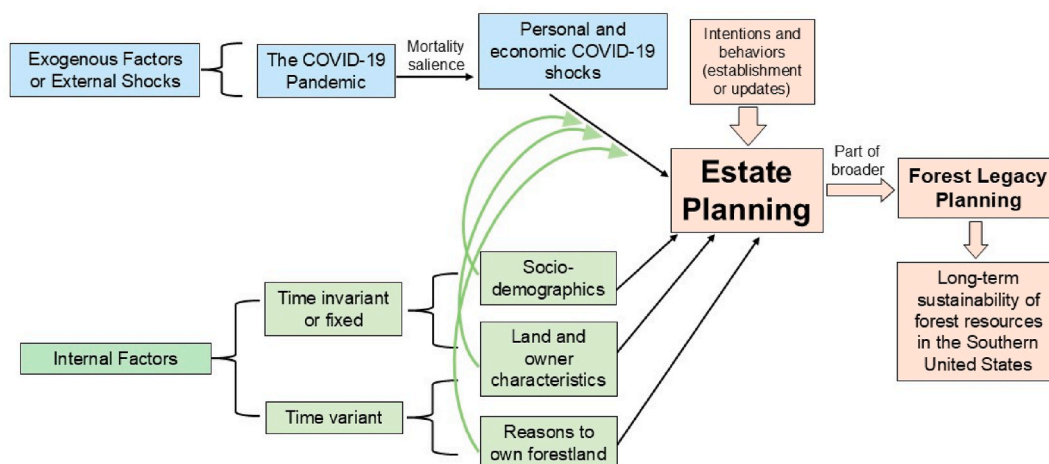


Fig. 1. Framework of factors affecting estate planning decisions.

hypothesize that landowners who experienced increased awareness of personal or household vulnerability during the pandemic were more likely to formalize or update their legacy goals through estate planning.

3. Methods

3.1. Study region and sampling frame

The study region is the Southern United States (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia) (Fig. 2). The study population consists of private landowners with at least 20 acres of forestland, including recently harvested land where trees would regrow.

Drawing from landowners' contact information purchased from a private company (Giant Partners, 2023), the sampling frame was a convenience sample (Baker et al., 2013; Dillman et al., 2014) of southern forest landowners provided by the firm.

3.2. Survey design and administration

The design and administration of this survey followed the principles recommended by Dillman et al. (2014). Guided by the 2018 NWOS (Bowler and Butler, 2024; Butler et al., 2021a,b; Butler and Wear, 2013), the survey instrument elicited information on attitudes, behaviors, demographics, and other characteristics of private forest landowners. Four focus group discussions (FGDs) conducted in August 2022 were instrumental in developing and improving survey questions. These FGDs were conducted with forest landowners, representatives from forestry associations and agencies, contractors, forest industry employees, and forestry consultants to explore their experiences navigating the challenges of the COVID-19 pandemic in the forestry sector (Bruck et al., 2024).

The survey instrument was designed to reveal the pandemic's contemporaneous and lasting effects on various aspects of forest management and planning in the region. It also elicited information about forest ownership structure and motivations, communications networks and education, forest management, future forest management plans, socio-demographics, and the effects of COVID-19 on forestland revenues. The survey defined the pre-pandemic period as prior to March 1,

2020; the pandemic period as the period from March 1, 2020, to December 31, 2022; and the post-pandemic period as January 1, 2023, to present. We acknowledge that the pandemic impacts were heterogeneous and likely eased for many individuals and sectors earlier than the formal end of the COVID-19 public health emergency (CDC, 2023). We define this pandemic period to provide a broader representation of the time when disruptions mostly affected forest landowners. For example, evidence shows that pandemic lockdown policies had sector-specific impacts on timber markets (Bruck et al., 2023).

Before distributing the survey, a pre-test was conducted to identify potential issues with the design, question wording, or response options. Wave 1 of data collection (May–July 2023) consisted of a web survey conducted on the Qualtrics platform. Given the low response rate in Wave 1 (3.6%), we designed a methodological experiment with six treatments to test different survey modes and incentives, aiming to improve both the overall response rate and the representativeness of our sample of respondents in Wave 2 (Cubas-Baez et al., 2025). Wave 2 of data collection (October–December 2023) consisted of a combination of three delivery modes (web-only, mail-only, and push-to-web approaches) with two types of incentives (a \$2 bill incentive for the mail-only mode, or a lottery for a larger payment). Of the 8016 surveys distributed across different treatments, 126 were undeliverable, and 574 were returned after Wave 2, resulting in an average response rate of 7.2% (Cubas-Baez et al., 2025). Our total sample size across the two waves was 7890. Our survey instrument and administration protocol, including various modes, consent process, and data security, were reviewed and approved with exempt by the Institutional Review Board (IRB) of North Carolina State University (IRB #25008).

3.3. Data and analysis

3.3.1. Response variables

The response variables for this study were generated by two survey questions. First, respondents were asked, "Have you completed, or are you in the process of completing, your estate planning?" For this study, estate planning was defined as "specifying who will inherit the forestland." In this context, estate planning serves as one measurable indicator of forest legacy planning, as it reflects a step taken by landowners to ensure the long-term stewardship or protection of their forestland.



Fig. 2. Study area.

Therefore, response codes of "1 = estate planning completed or in progress" indicated that those respondents had decided on their estate plans, even if they had not yet legally documented those via estate planning tools.

Second, those who responded "yes" to the first question were asked about the timing of their most recent update (pre-pandemic, during the pandemic, or post-pandemic), their level of satisfaction, and whether they intended to update their estate plan in the future. To assess estate planning behavior in the context of the pandemic, responses indicating that the estate plan was updated during or after the pandemic were coded as "1 = changes during or after the pandemic."

These two questions were used to evaluate which respondents had made specific, intentional decisions and had taken steps toward formalizing estate planning, at any point in time and in the context of the pandemic.

3.3.2. Explanatory variables

Our conceptual framework suggests that estate planning decisions (including timing relative to the pandemic) are influenced by socio-demographic characteristics, land ownership characteristics, motivations, and the experience of the pandemic. Except for age, all other characteristics were converted into binary variables to improve comparability across categories and simplify the interpretation of regression coefficients. After removing missing values, the summary statistics of responses used in the analysis are presented in Table 1.

The survey elicited information on personal and economic experiences of the COVID-19 pandemic. Respondents were asked whether they earned revenue from land-use leases during the pandemic, and whether they had experienced delays in scheduled timber harvests or engaged in forestland transactions during the pandemic. To distinguish conditions during the pandemic from those before or after, these questions specifically referred to the timing of events, asking whether such activities or disruptions occurred during the pandemic period. We also created indicators for whether the household had faced significant income and employment impacts, perceived no disruption due to the pandemic, and received the first dose of the COVID-19 vaccine.

To contextualize the representativeness of our sample, we compared respondent demographics and ownership characteristics with those from the 2018 USDA National NWOS Dashboard for the Southern region (NWOS, 2025).

3.3.3. Models

We estimated two separate binary logistic regression models of landowners' engagement in estate planning and the timing of that engagement. This method was appropriate given the categorical, binary nature of the outcome variables: whether a respondent had completed estate planning (Model 1) and whether they had made changes to their estate plan during or after the pandemic (Model 2). Specifically, we estimated the following model:

$$P(Y = 1 | X) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k)}}$$

Where.

- $P(Y = 1 | X)$ is the probability that either the respondent had completed estate planning or that they had made changes to their estate plan during or after the pandemic
- β_0 is the intercept (baseline when all $X = 0$)
- X_1, X_2, \dots, X_k are the predictor variables listed in Table 1
- $\beta_1, \beta_2, \dots, \beta_k$ are the estimated coefficients (indicating the change in the log-odds of the outcome for a one-unit change in X)

We tested for multicollinearity among potential explanatory variables using the Variance Inflation Factor (VIF) diagnostics and examined pairwise correlations among predictors. No strong correlations were

Table 1
Variables, their description, and sample statistics (n = 353).

Variable	Description	Statistic ^a	NWOS ^b
Age of the respondent	Numerical (years)	66 (11)	86% (55 years old or older)
Level of education of the respondent	Binary (1 = College or more advanced degree, else 0)	68%	58%
Household income ^c in USD (2022)	Binary (1 = 75,000 or more, else 0)	76%	
Primary occupation: skilled agricultural, forestry, and fishery work	Binary (1 = yes, else 0)	7%	
Likelihood to sell or dispose of one or more forestland tracts in the next ten years	Extremely Unlikely	56%	33%
	Somewhat Unlikely	13%	28%
	Neutral	14%	16%
	Somewhat Likely	9%	15%
	Extremely Likely	9%	8%
Acres of forestland	Binary (1 = 500 acres or more, else 0)	18%	32%
Home within 1 mile of forestland	Binary (1 = yes, else 0)	47%	52%
Respondent inherited the forestland	Binary (1 = yes, else 0)	43%	50%
Reason for owning forestland: Pass to heirs	Binary (1 = yes, else 0)	54%	72% ("very important" or "important")
Reason for owning forestland: Land investment	Binary (1 = yes, else 0)	53%	66% ("very important" or "important")
During the pandemic, the respondent earned revenues from land-use leases	Binary (1 = yes, else 0)	18%	
During the pandemic, the respondent experienced delays in previously scheduled timber harvests	Binary (1 = yes, else 0)	7%	
During the pandemic, the respondent engaged in forestland transactions (purchased, sold, or made offers to purchase or sell forestland)	Binary (1 = yes, else 0)	15%	
During the pandemic, the household experienced a significant decrease in total income	Binary (1 = yes, else 0)	16%	
During the pandemic, the respondent or another income earner in the household had job hours reduced for more than a month	Binary (1 = yes, else 0)	8%	
The respondent perceived that the household was not disrupted due to the pandemic	Binary (1 = yes, else 0)	22%	
The respondent received the first dose of the COVID-19 vaccine	Binary (1 = yes, else 0)	70%	

^a The statistics provided are the mean (standard deviation) for continuous variables and the frequency percentage for categorical variables.

^b These values are broadly comparable to summary statistics from the 2018 USDA NWOS Dashboard for landowners in the Southeastern United States (who own 10 or more acres of land).

^c Household income was elicited in categories, and then divided into high vs low income based on the median household income in the Southern United States (\$73,280) (U.S. Census Bureau, 2025).

detected. Descriptive and inferential statistics were conducted using R software.

4. Results

4.1. Descriptive statistics

We received the most survey responses from Tennessee (20%), followed by Florida (16%), Louisiana (15%), and Alabama (14%). After removing missing values and excluding corporate owners, the final sample consisted of 353 FFOs, who are mostly male (79%), white (81%), with a mean age of 66. Additionally, 68% with a college or more advanced degree, and 63% reported being retired. In terms of land ownership, 82% of respondents own 20–500 acres of forestland, for an average of 23 years (for the parcel that had been owned the longest), and 47% have a primary residence on or within one mile of their forestland. In addition, 12% of respondents reported that they co-own land with other heirs (tenants in common).

Regarding legacy planning behaviors, 73% of respondents indicated that they have completed (or are in the process of completing) their estate plan, with 28% doing so during or after the pandemic (Fig. 3).

In terms of the acquisition of forestland, 43% of respondents reported that they had inherited their forestland. While 44% of respondents expect their heirs to maintain land ownership, 17% are unsure, suggesting some uncertainty about intergenerational land transfer. Finally, 43% of respondents reported that they are more confident in their long-term forest goals post-pandemic, and only 13% reported that their long-term forest goals changed during the pandemic, demonstrating the resilience of forest planning to major disruptions.

4.2. Model results

Table 2 presents the estimation results for a model of the probability that respondents have completed or are in the process of completing an estate plan. Positive and statistically significant coefficients indicate that the variable is associated with a greater likelihood of having an estate plan completed or in the process of completing one.

In terms of the **socio-demographic characteristics of respondents**, results suggest that older forest landowners are significantly more likely to have completed an estate plan. An unexpected finding is that individuals with an annual household income of at least \$75,000 are significantly less likely to have an estate plan in place. This finding suggests that higher-income landowners may rely on alternative planning tools (such as trusts) or have different priorities. Education level and primary occupation in the natural resource sector are not significant

Table 2

Binary logistic regression estimation results for Model 1: likelihood of having an estate plan (n = 238).

Variable	Response Options	Estimate (SE)
Age of the respondent	Numeric (years)	0.06 (0.02)***
Level of education	1 = College or more advanced degree, else 0	0.21 (0.39)
Primary occupation: agriculture, forestry, and/or fishery work	1 = yes, else 0	-0.37 (0.59)
Household's income in USD (2022)	1 = 75,000 or more, else 0	-0.62 (0.45)
Acres of forestland	1 = 500 acres or more, else 0	2.04 (0.83) **
Home within 1 mile of forestland	1 = yes, else 0	-0.76 (0.38) **
If the forestland was inherited	1 = yes, else 0	0.91 (0.37) **
Reason for owning forestland: Pass to heirs	1 = yes, else 0	0.50 (0.36)
Reason for owning forestland: Land investment	1 = yes, else 0	0.96 (0.38) **
Likelihood to sell or dispose of forestland in the next 10 years	Likert scale (1 = Completely disagree to 5 = Completely agree)	-0.35 (0.14) **

*, **, *** statistically significant at 10%, 5%, and 1%.

predictors in this model. Landowners who planned to sell or dispose of their forestland within the next 10 years are significantly less likely to have an estate plan, suggesting that intentions to dispose of land may reduce the perceived need for formal paperwork and administrative procedures associated with estate planning.

Regarding **land ownership characteristics**, landowners with larger forest areas (500 acres or more) and those who inherited their forestland are significantly more likely to have an estate plan in place. On the other hand, landowners who live within one mile of the forestland are significantly less likely to have an estate plan in place. More planning by large landowners who have greater land assets seems reasonable to expect. Owners of larger parcels may be more likely to develop estate plans for the land because it is more valuable or because it represents a larger fraction of their estate value. Local landowners may plan less because they have more knowledge of and continuous contact with their land and their family, and therefore see less need for formal arrangements.

Owning forestland as an investment was found to have a positive and significant relationship with estate planning, while surprisingly owning land to pass it to heirs is not related. This suggests that individuals who are financially engaged with their land are more likely to complete their estate planning to ensure long-term ownership of the land.

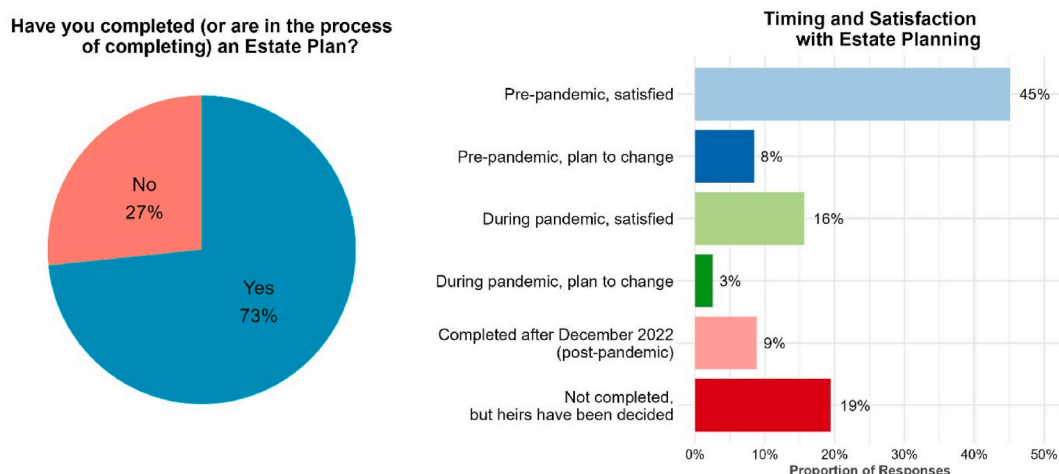


Fig. 3. Estate planning by survey respondents (n = 353).

The specification for Model 2 includes "external factors" originating with the exogenous shock (the COVID-19 pandemic). Recognizing that the effects of the pandemic varied across regions and people, we include variables representing the personal and economic effects of the pandemic on individual FFOs, which may in turn have intensified awareness of vulnerability or altered household economic conditions. We retain landowner age, education, and income in this specification, as previous literature suggests these characteristics shape baseline motivations and capacity for estate planning. More specifically, model 2 evaluates whether personal and economic shocks experienced during the pandemic influence decision-making regarding the completion or updating of estate plans during and after this period (Table 3).

Landowners whose households were not disrupted by the pandemic were significantly less likely to have updated or completed an estate plan during or after the pandemic. This finding supports the idea that the pandemic may have created urgency or motivation to work on estate plans among landowners who most directly felt its effects. Likewise, respondents who experienced employment effects were more likely to update their estate plan, highlighting that the pandemic was both a public health and an economic emergency. These households may have been more concerned about their economic future or had more time to engage in estate planning.

On the other hand, the estimation results also indicate a negative association between delays in timber harvests during the pandemic and completing or updating an estate plan, which may have created logistical or financial challenges that prevented landowners from formalizing estate planning. Decreased income during the pandemic was not associated with the probability of completing or updating estate plans. However, because we did not collect information on the underlying causes, it is not possible to determine whether this reflects logistical constraints or other unobserved factors.

Finally, landowners who reported earning revenue from land-use leases (before and during the pandemic) were more likely to have engaged in estate planning. This association may reflect not only pandemic-specific circumstances but also the broader tendency of income-oriented landowners to formalize decisions and secure the long-

term management of their land through estate planning. Socio-demographic characteristics (income, age, education) do not have statistically significant relationships with the timing of estate planning, suggesting that it was driven more by contextual and motivational factors rather than the socio-demographics of landowners.

5. Discussion

Since the majority of forestland in the Southern United States is privately owned, sustained efforts to conserve and manage forest resources in the region depend on understanding the succession plans of current private forest landowners. This study examines the drivers of estate planning behavior among FFOs in the Southern United States. We developed a conceptual framework, drawing on prior research on behavioral change and planned behavior of forest landowners, to inform our study approach, as shown in Fig. 1. In brief, both internal and external factors can influence landowners' long-term decisions, shaping the sustainability of forests. In particular, we consider external factors associated with the COVID-19 pandemic.

The socio-demographic characteristics of our respondents are comparable with the NWOS results (Butler et al., 2021a,b; NWOS, 2025) and previous studies of forest landowners in Georgia (Mook et al., 2024). Also consistent with previous studies (Markowski-Lindsay et al., 2017a, b; Purc-Stephenson et al., 2025), we find that older respondents are significantly more likely to have completed (or be in the process of completing) estate planning, reflecting their interests in keeping forestlands in the family and/or protecting them from development pressures (Bell et al., 2019; Markowski-Lindsay et al., 2017a,b; Quartuch et al., 2021). However, education level and primary occupation in natural resources were not significant predictors of having an estate plan.

Another unexpected finding was that households reporting higher income (defined as \$75,000 or more annually) were less likely to have an estate plan. This pattern may partly reflect measurement and interpretation: higher-income owners may define or report "estate plans" differently, given our survey's simplified wording. In addition, prior research suggests higher-income landowners often face less economic pressure to sell land and anticipate lower development risk (Koontz, 2001; Rozance and Rabotyagov, 2014), which may reduce perceived urgency to formalize plans. It may also reflect differences between current income and accumulated assets: acreage is a more stable indicator of wealth, whereas reported income may decline in retirement. Our findings contrast with studies showing positive associations between income and education with estate planning (Basir et al., 2023; Pearson, 2023) and conservation easements (Gruber et al., 2017).

Land and owner characteristics are associated with the probability of estate planning. We found that landowners with larger forestland tracts (500 acres or more) and those who inherited their land were significantly more likely to have an estate plan, indicating that inheritance and land size have stronger connections with the landowner planning behaviors (Markowski-Lindsay et al., 2016; Purc-Stephenson et al., 2025; Quartuch et al., 2021).

Investment-oriented ownership was the only motivation significantly associated with estate planning behavior. Landowners who own land for investment purposes were more likely to have an estate plan, consistent with previous studies that found financially engaged landowners are more proactive in formalizing legacy planning decisions (Danley et al., 2024; Quartuch et al., 2021; Sass et al., 2023). Surprisingly, we did not find a significant relationship between the motivation "pass to heirs" and estate planning. National trends indicate a decline in the proportion of landowners prioritizing inheritance, despite its continued importance among 60% of forest landowners between 2013 and 2018 (Sass et al., 2023). While our results highlight investment objectives as a driver of estate planning, this motivation could interact with family relationships and stewardship values.

This study also evaluated how an exogenous shock (the COVID-19 pandemic), as represented by the personal and economic impacts

Table 3
Binary logistic regression estimation results for Model 2: likelihood of updating or completing an estate plan during or after the pandemic (n = 200).

Variable	Response options	Estimate (SE)
The pandemic never disrupted the household	1 = yes, else 0	-1.21 (0.50) **
The respondent earned revenues from land-use leases (before and during the pandemic)	1 = yes, else 0	1.06 (0.49) **
During the pandemic, the respondent experienced delays in previously scheduled timber harvests	1 = yes, else 0	-2.28 (1.24) *
During the pandemic, the respondent engaged in forestland transactions (purchased, sold, or made offers to purchase or sell forestland)	1 = yes, else 0	-0.89 (0.56)
During the pandemic, the respondent or another income earner in the household had job hours reduced for more than a month	1 = yes, else 0	1.44 (0.80) *
During the pandemic, the household experienced a significant decrease in total income	1 = yes, else 0	-0.07 (0.68)
The respondent received the first dose of the COVID-19 vaccine	1 = yes, else 0	-0.27 (0.58)
Household's income in USD (2022)	1 = 75,000 or more, else 0	0.64 (0.54)
Age of the respondent	Numeric (years)	-0.003 (0.02)
Level of education	1 = College or more advanced degree, else 0	0.55 (0.51)

*, **, *** statistically significant at 10%, 5%, and 1%.

experienced by FFOs, affected estate planning decisions. Findings were mixed. On the one hand, landowners who experienced disruptions to household employment were more likely to update or complete their estate plans during or after the pandemic. These findings align with previous research suggesting that during crises such as the COVID-19 pandemic, the salience of mortality can significantly influence estate planning decision-making (Gruber et al., 2017; Pearson, 2023; Siegel et al., 2009). For many landowners, forestland is both a legacy and a major financial asset (Butler and Wear, 2013), and unanticipated shocks may increase the urgency to formalize plans, especially when health, income, or family stability is at risk (Danley et al., 2024; Quartuch et al., 2021).

On the other hand, other shocks, such as delays in timber harvests or engagement in forestland transactions during the pandemic, were negatively associated with estate plan updates. This finding suggests that while certain disruptions encouraged planning, others may have shifted efforts and resources toward immediate concerns, limiting focus on long-term estate decisions. Our results have implications for outreach, policy, and long-term forest sustainability. Estate planning education and technical assistance may help landowners formalize transfer intentions and reduce the risks of unplanned parcelization. Effective land-use governance also requires adaptive, context-specific approaches, as illustrated by Jiang et al. (2023).

Some study limitations are worth noting. The reliance on a convenience sample and the low response rates may have introduced sampling bias, affecting the representativeness of the findings (Victor et al., 2020). Therefore, our results should be interpreted as identifying patterns and relationships, rather than as representative population estimates generalizable for the entire Southern FFO population. The sensitive and politicized nature of the subject (COVID-19) may have discouraged some participants from responding, reducing response rates and influencing which types of FFOs responded (Dillman et al., 2014; Kacie Seil et al., 2021). Additionally, while the pandemic was clearly a disruptive event, our study did not directly capture policy changes during the examined period, the age of the estate planning, and the extent to which households experienced illness or mortality, nor the extent to which it prompted them to think about their mortality. Instead, we relied on indirect indicators such as employment, income, land-use disruptions, and vaccination status, which may proxy some aspects of these experiences but do not reveal the depth of reflection or lived impact of the pandemic. Another limitation concerns the narrow operational definition of estate planning used in our survey, as "specifying who will inherit the forestland," which captures only one element of the broader set of formal planning tools available to landowners.

6. Conclusions

The findings from this study highlight the multifaceted nature of estate planning among private forest landowners in the Southern United States (Butler and Wear, 2013) and how landowners' decisions are shaped by a complex interplay among economic, social, biophysical, and cultural factors (Markowski-Lindsay et al., 2017a,b). Findings from this study suggest that older landowners who inherited larger tracts are most likely to have estate plans, in the sense of having decided who will inherit their land. Pandemic-related shocks and land transactions have mixed effects on the likelihood of engaging in estate planning.

This study offers practical insights for engaging with FFOs around planning the future of their forests. Moving from intentions to action requires timely, targeted interventions that address family dynamics and external pressures. Consistent with the TTM framework (Briccetti et al., 2024; Quartuch et al., 2021), our findings identify which landowner characteristics are associated with having an estate plan and with updating plans during a period of disruption, suggesting that outreach may be most effective when targeted toward less-engaged groups rather than delivered uniformly across all owners. For estate planning, evidence suggests that greater efforts are needed to reach younger owners,

smaller tract owners, and less active investors, such as family farmers. Although the COVID-19 was an unprecedented shock, other disruptions, such as recessions, massive market perturbations, forest fires, or biogenic pathogens, might be equally difficult to address through straightforward policy solutions. Framing estate planning within the broader social, cultural, and economic context of forest ownership will help generate evidence-based approaches to ensure the long-term sustainability of forestlands in the Southern United States.

CRediT authorship contribution statement

Ana Cubas-Baez: Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Rajan Parajuli:** Writing – review & editing, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Erin O. Sills:** Writing – review & editing, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Frederick Cubbage:** Writing – review & editing, Supervision, Methodology, Conceptualization. **Gregory Frey:** Writing – review & editing, Supervision, Methodology, Formal analysis. **Kurt Smith:** Writing – review & editing, Methodology.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Data availability

Data will be made available on request.

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