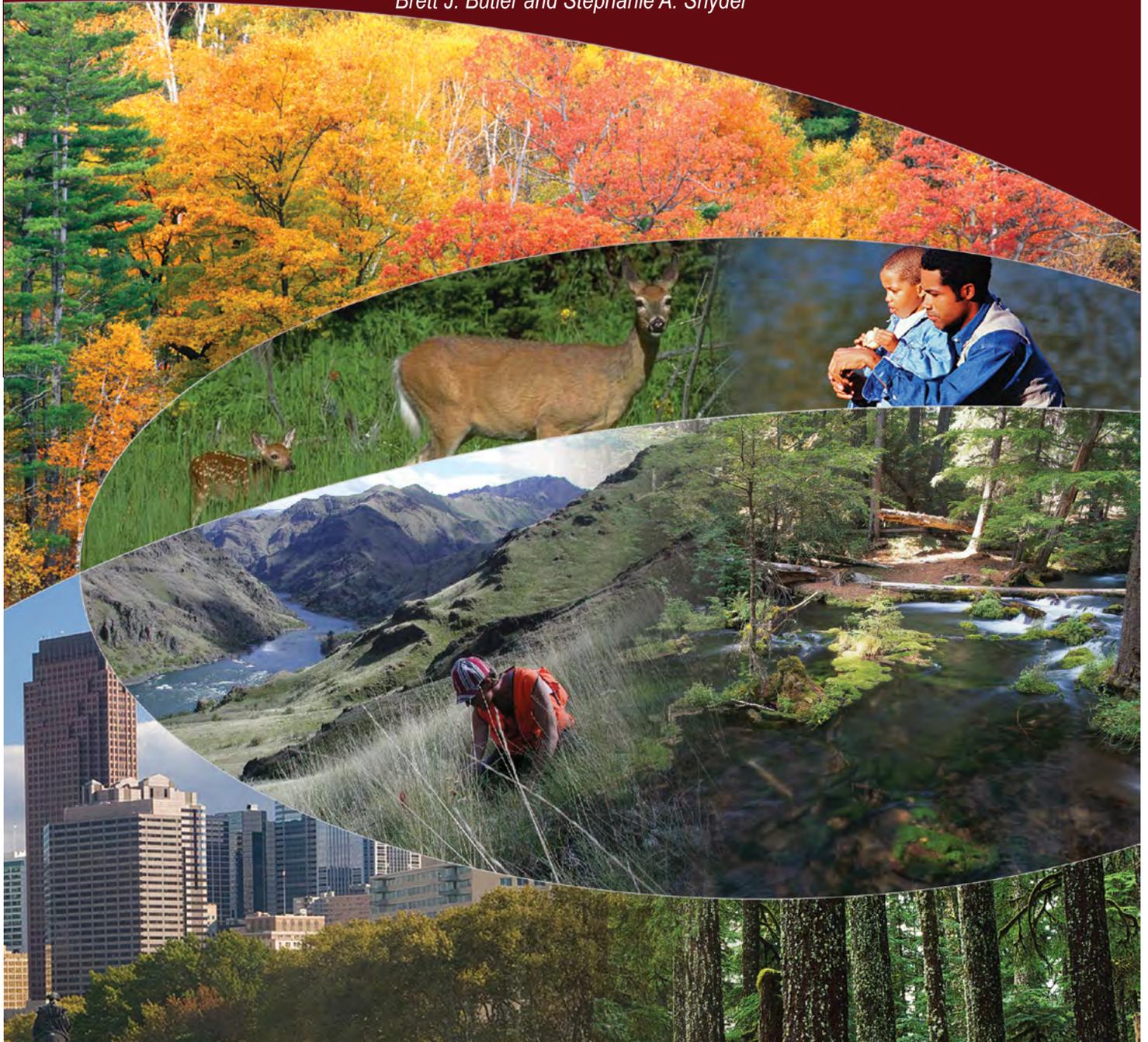


# National Woodland Owner Survey: Family Forest Ownerships with 1 to 9 Acres, 2011–2013

A Technical Document Supporting the Forest Service  
Update of the 2010 RPA Assessment

*Brett J. Butler and Stephanie A. Snyder*



## Abstract

This report summarizes results from the 2011-2013 National Woodland Owner Survey (NWOS) conducted by the U.S. Forest Service, Forest Inventory and Analysis program for family forest ownerships with forest holdings of 1-9 acres. Summaries are based on responses from 1,025 family ownerships with 1-9 acres of forest across 39 U.S. states. Survey summary tables are provided for the nation and three regions (North, South, and West) and are available at <https://doi.org/10.2737/NRS-RB-114>. To generate reliable statistics, only the 39 states with at least five respondents are included. The survey summary tables provide statistics on general forest ownership patterns, ownership characteristics, land characteristics, reasons for owning land, land ownership history, uses of the forest land, sources of information, concerns, the future of their land, and demographics.

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## INTRODUCTION

This report contains a summary of the results from the 2011-2013 iteration of the U.S. Forest Service's National Woodland Owner Survey (NWOS) for family ownerships with forest holdings of 1-9 acres. Family forest ownerships are defined as families, individuals, trusts, estates, and family partnerships that own forested land. For simplicity, this group is referred to as "family forest ownerships." A companion report (Butler et al. 2016c) summarizes the results of the 2011-2013 NWOS for family forest ownerships with 10+ acres.

The NWOS is coordinated by the U.S. Forest Service, Forest Inventory and Analysis program (FIA) and serves as a social complement to FIA's biophysical, plot-based inventory (Bechtold and Patterson 2005). The NWOS is aimed at understanding: who owns U.S. forests, why they own them, how they have used them in the past, and how they intend to use them in the future. Most of the design, implementation, and analysis of the 2011-2013 NWOS were completed through the Family Forest Research Center, a joint venture between the U.S. Forest Service and the University of Massachusetts Amherst.

Information presented supports the U.S. Forest Service update of the 2010 Resources Planning Act (RPA) Assessment. The RPA Assessment consists of a series of reports that are produced on a periodic basis under the congressional direction of the Forest and Rangeland Renewable Resources Planning Act of 1974 (Public Law 93-378, 88 Stat. 476). Full assessments are completed every decade with updates done at intervening 5-year intervals. The main 2010 RPA Assessment report for forest resources is Smith et al. (2009) and the accompanying NWOS report is Butler (2008). The main forest resource report for the update to the 2010 RPA Assessment is Oswald et al. (2014), and this report is part of the NWOS contribution to the update.

The primary intent of this report is to provide tabular summaries for the 2011-2013 iteration of the NWOS for family forest ownerships with 1-9 acres. An abbreviated description of the methods is provided, with full details available in Butler et al. (2016a). The interpretation of the results and comparative analyses of 1-9 acre ownerships to 10+ acre ownerships will appear in a forthcoming publication.

The use of the terms "woodland," "wooded land," and "forest" to describe land covered by trees varies depending on the primary audience. Although the NWOS uses woodland in its title, the term "wooded land" is used throughout most of the questionnaire because extensive pretesting showed wooded land is the most widely-accepted phrase used by family forest ownerships when describing the part of their land that is dominated by trees. The terms "forest" and "forest land" are more familiar to forestry professionals, and because they are the intended audience for this report, forest is used here.

Technical definitions of forest terminology can also vary. There are differences between the definitions of forest land used by FIA and the RPA Assessment (Oswald et al. 2014), even though they use the same underlying FIA plot data. The update to the 2010 RPA Assessment of forest resources uses the terms "forest" and "other wooded lands," which is often simplified to "forest and woodland" and follows the international definition used by the Food and Agriculture Organization. FIA currently combines these categories and labels them "forest land," the term used throughout this report. Forest land is defined as: "Land that has at least 10 percent crown cover by live tally trees of any size or has had at least 10 percent canopy cover of live tally species in the past, based on the presence of stumps, snags, or other evidence. To qualify, the area must be at least 1.0 acre in size and 120.0 feet wide.

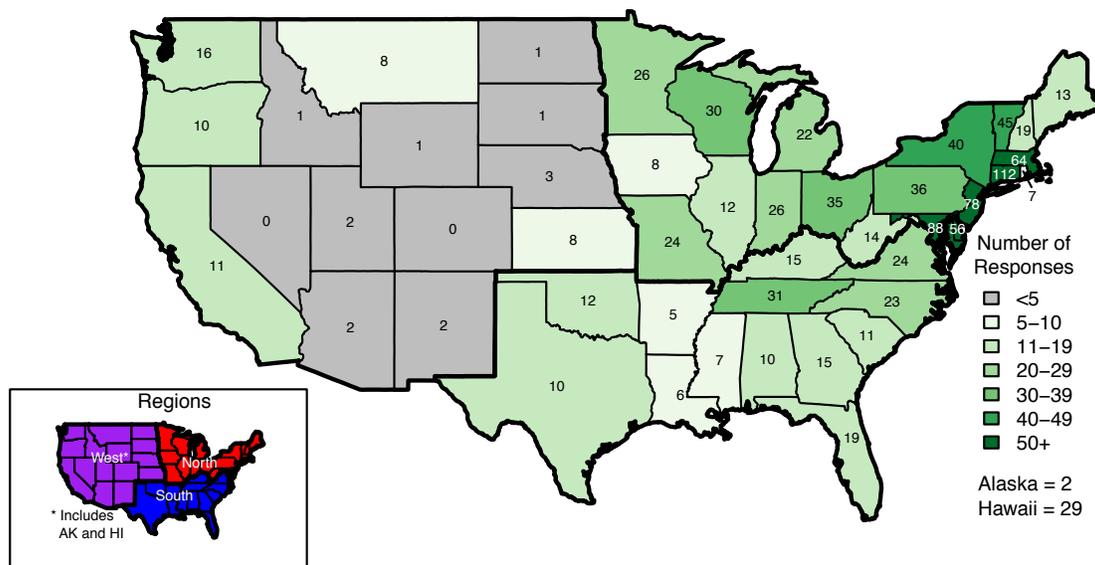


Figure 1.—Number of family forest ownerships with 1-9 acres of forest land who responded to the 2011-2013 National Woodland Owner Survey, by state.

Forest land includes transition zones, such as areas between forest and nonforest lands that meet the minimal tree stocking/cover and forest areas adjacent to urban and built-up lands. Roadside, streamside, and shelterbelt strips of trees must have a width of at least 120 feet and continuous length of at least 363 feet to qualify as forest land. Unimproved roads and trails, streams, and clearings in forest areas are classified as forest if they are less than 120 feet wide or less than an acre in size. Tree-covered areas in agricultural production settings, such as fruit orchards, or tree-covered areas in urban settings, such as city parks, are not considered forest land” (U.S. Forest Service 2016). A lay definition encompassing the Forest Service’s technical definition of forest land is included in the NWOS questionnaire.

Survey summary tables showing the area of forest by ownership category and summaries of questions asked as part of the NWOS accompany this report. Separate sets of tables for the nation and for the three regions shown in Figure 1 are available at <https://doi.org/10.2737/NRS-RB-114>. The reporting regions are based on those used by the RPA Assessment (Oswalt et al. 2014). However, due to small response rates, in this report the Pacific Coast and Rocky Mountain RPA regions were combined into the West region. The national and regional tables only include data from the 39 states that had at least five respondents (Fig. 1). The states summarized here are: Alabama, Arkansas, California, Connecticut, Delaware, Florida, Georgia, Hawaii, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Vermont, Virginia, Washington, West Virginia, and Wisconsin.

Family forest ownerships with 1-9 acres are analyzed separately from 10+ acre ownerships because each class constitutes a different population of ownerships with different opportunities and issues. For example, traditional forestry practices like commercial harvesting are often not applicable or economically viable at the 1-9 acre scale, nor do these smaller acreages typically qualify for government forestry assistance programs. However, 1-9 acre ownerships provide important opportunities for recreation, retreat, collection of nontimber forest products, interaction with nature, support of wildlife habitat and biodiversity, primary and secondary

housing locations, and numerous other ecosystem services. Emerging research is showing the important roles that access to forests and green space can play in human health, well-being, and cognitive development (e.g., Karjalainen et al. 2010, Milligan and Bingley 2007). Analyses that compare the responses from 1-9 acre family forest ownerships to 10+ acre family forest ownerships are planned to examine how, if at all, ownership reasons, management behaviors, concerns, and information needs vary between smaller and larger acreage ownership classes.

## **METHODS**

Brief summaries of the sample design, implementation procedures, and estimation methods for the 2011-2013 NWOS are provided here and are explained in greater detail in Butler et al. (2016a). Additional details and justification for the methods are provided in Dickinson and Butler (2013).

### **Sample Design**

The NWOS sample design is based on the quasi-systematic FIA sample design (Bechtold and Patterson 2005). Although an area-based sampling frame was used to select the FIA sample, ownerships were the primary sampling units for the NWOS. Therefore, the sample selection probabilities are proportional to size, so the larger the size of the forest holdings, the higher the probability of an ownership being included in the sample. To spatially distribute the sample, each state was divided into hexagons. Each hexagon covers approximately 6,000 acres, a size selected by the FIA program to provide reliable statistics on basic forest attributes. Within each hexagon, a sample point was randomly selected.

Using a combination of remote sensing and field observations, each sample point was classified as forest or nonforest. Publicly available property tax data were used to determine the ownership of record for each forest point, and those determined to be private were included in the NWOS sample.

As stated in the questionnaires, the unit of analysis was an ownership. When answering questions, respondents were asked to consider all of the forest land owned by the ownership in a given state. If more than one sample point fell on the land of an ownership in a state, only one questionnaire was sent.

### **Survey Implementation**

The methods recommended by Dillman et al. (2014) were used to solicit responses from the private ownerships identified as part of the NWOS sample. First, a prenotice postcard was sent to all potential respondents identifying the purpose of the survey and alerting them to the fact they would soon be receiving a questionnaire. Next, ownerships were mailed a copy of the questionnaire, a business reply return envelope, and a cover letter reiterating the purpose of the survey and stating how the data would be used. The third contact was a reminder/thank you postcard. Those who had not returned the questionnaire within 25 days of the first mailing were mailed a second copy of the questionnaire, a business reply envelope, and a modified cover letter. Telephone follow-up interviews using a subset of the questions from the mail questionnaire were attempted with a subset of those who had not yet responded, in order to increase response rates and to measure potential nonresponse bias. The subset of nonrespondents contacted for the telephone follow-up interviews were randomly selected from the nonrespondents for whom telephone numbers were available. Program financial constraints determined the total number of nonrespondents who could be contacted.

A copy of the questionnaire is available in Butler et al. (2016a), and state-specific questionnaires are available on the NWOS Web site ([www.fia.fs.fed.us/nwos/](http://www.fia.fs.fed.us/nwos/)). The questionnaire is the same across states with the following exceptions: the specific state name is inserted in questions (e.g., “How many acres of wooded land do you own in Alabama?”); the specific state program is inserted in the property tax program question; and specific examples of regional nontimber forest products are listed (see Butler et al. 2016a for more details).

## **Population-level Estimates**

For the NWOS, the populations of interest are: family, corporate, and other private. The geographic area of interest is the United States, with sampling occurring at the state level (i.e., the strata are states). The specific domain of interest for this report is family ownerships with 1-9 acres of forest land. Population estimates were generated using estimators appropriate to the probability proportional to size sampling design. Estimates were calculated in terms of numbers of ownerships and area of forest land, which can show different patterns. The equations used to calculate ownership-based and area-based estimates and their accompanying variances are provided in Butler et al. (2016a). All estimates were calculated at the state level and then aggregated to generate estimates for larger geographic areas.

To ensure a reasonable level of certainty, only those states with at least five responses from family forest ownerships with 1-9 acres of forest land were included in the summary tables. Footnotes in the tables specify which states were excluded.

## **RESULTS**

### **Number of Respondents and Cooperation Rates**

Across the United States, a total of 10,092 family forest ownerships responded to the NWOS between 2011 and 2013. This number includes all family forest ownerships with 1 or more acres of forest land, and because the size of holdings is unknown for nonrespondents, this number is the basis for calculating cooperation rates. The overall cooperation rate for the aggregated sample was 52 percent for the United States.

The potential for nonresponse bias was tested by comparing results from mail respondents to telephone respondents for key variables, including area of forest/woodland owned, land tenure, and having harvested trees (Butler et al. 2016a). No systematic biases were detected, and therefore no adjustments were made.

Item nonresponse occurs when a respondent is asked a question but chooses not to respond to that specific question. As reported in Butler et al. (2016a), the median item nonresponse rate was 5 percent. The tables in this publication list the number of respondents used to calculate the statistics in each row of each table. A separate row labeled “no answer” is included in the tables for those who were asked to respond to a specific question but opted not to do so (i.e., item nonresponse). To make interpretation of the results easier, item nonresponse was excluded from the percentage calculations.

A total of 1,025 family forest ownerships with 1-9 acres of forest land responded to the 2011-2013 NWOS, and these responses form the basis for the statistics reported in the survey summary tables. The effective sample size varies across survey summary tables because the NWOS used different survey instruments (the mail-back questionnaire, the online questionnaire, and the telephone interviews), and not all questions were asked on all survey instruments.

## Survey Summary Table Descriptions

Separate survey summary tables for family forest ownerships with 1-9 acres were produced for the nation and for three regions within the United States (North, South, West). Only the 39 states that had a minimum sample size of five were included in the national and regional tables (Fig. 1).

To aid in comparisons, the table nomenclature is consistent across the sets of survey summary tables. The naming convention for tables is Table XX-# where XX indicates the region or nation and # indicates the table number. The first table in each summary set shows area of forest land by broad ownership categories. These area numbers are derived from the U.S. Forest Service, Forest Inventory and Analysis plot data. Subsequent tables summarize specific questionnaire questions or subquestions. These tables include separate columns for area and ownerships in terms of totals and percentages along with the associated standard errors (SE) and effective sample sizes (n). Sampling errors help describe the uncertainty associated with the estimates. Footnotes included with tables provide key definitions, define abbreviations, and list any data that are excluded. Titles for the survey summary tables are listed below and tables are available at <https://doi.org/10.2737/NRS-RB-114>.

Table XX-1—Estimated area of forest land by ownership category, 2013

Table XX-2— Table number skipped in order to match table numbers in Butler et al. (2016c)

Table XX-3—Estimated area and estimated number of family forest ownerships (1-9 acres) by ownership subcategory, 2011-2013

Table XX-4—Estimated area and estimated number of family forest ownerships (1-9 acres) by number of owners, 2011-2013

Table XX-5—Estimated area and estimated number of family forest ownerships (1-9 acres) by percent of ownership's land that is forested, 2011-2013

Table XX-6—Estimated area and estimated number of family forest ownerships (1-9 acres) by size of forest holdings, 2011-2013

Table XX-7—Estimated area and estimated number of family forest ownerships (1-9 acres) by number of parcels owned, 2011-2013

Table XX-8—Estimated area and estimated number of family forest ownerships (1-9 acres) that are within 1 mile of ownerships' primary residences, 2011-2013

Table XX-9—Estimated area and estimated number of family forest ownerships (1-9 acres) that are within 1 mile of ownerships' vacation homes, 2011-2013

Table XX-10—Estimated area and estimated number of family forest ownerships (1-9 acres) that are within 1 mile of ownerships' farms, 2011-2013

Table XX-11—Estimated area and estimated number of family forest ownerships (1-9 acres) by reason for owning forest, 2011-2013. Numbers include ownerships that rated an objective as very important or important on a five-point Likert scale.

Table XX-12—Estimated area and estimated number of family forest ownerships (1-9 acres) by type and source of forest land acquisition, 2011-2013

Table XX-13—Estimated area and estimated number of family forest ownerships (1-9 acres) by land tenure, 2011-2013

Table XX-14—Estimated area and estimated number of family forest ownerships (1-9 acres) by frequency of selling or giving away forest land and recipients of this land, 2011-2013

Table XX-15—Estimated area and estimated number of family forest ownerships (1-9 acres) by decisionmaker, 2011-2013

Table XX-16—Estimated area and estimated number of family forest ownerships (1-9 acres) by written management plan status, 2011-2013

Table XX-17—Estimated area and estimated number of family forest ownerships (1-9 acres) by activities that cut or removed trees, 2011-2013

Table XX-18—Estimated area and estimated number of family forest ownerships (1-9 acres) by types of timber products and trees cut or removed (simplified), 2011-2013

Table XX-19—Estimated area and estimated number of family forest ownerships (1-9 acres) by use of professional foresters for timber harvesting, 2011-2013

Table XX-20—Estimated area and estimated number of family forest ownerships (1-9 acres) by activities related to nontimber forest products (NTFPs), 2011-2013

Table XX-21—Estimated area and estimated number of family forest ownerships (1-9 acres) by activities related to nontimber forest products (NTFPs; simplified), 2011-2013

Table XX-22—Estimated area and estimated number of family forest ownerships (1-9 acres) by past 5 years' forestry activity, 2011-2013

Table XX-23—Estimated area and estimated number of family forest ownerships (1-9 acres) by next 5 years' forestry activity, 2011-2013. Numbers include ownerships that rated an activity as extremely likely or likely on a five-point Likert scale.

Table XX-24—Estimated area and estimated number of family forest ownerships (1-9 acres) by lease status, 2011-2013

Table XX-25—Estimated area and estimated number of family forest ownerships (1-9 acres) by familiarity with and participation in cost-share programs, 2011-2013

Table XX-26—Estimated area and estimated number of family forest ownerships (1-9 acres) by familiarity with and participation in green certification programs, 2011-2013

Table XX-27—Estimated area and estimated number of family forest ownerships (1-9 acres) by familiarity with and participation in forestry related property tax programs, 2011-2013

Table XX-28—Estimated area and estimated number of family forest ownerships (1-9 acres) by familiarity with and status of easements that restrict land use conversions, 2011-2013

Table XX-29—Estimated area and estimated number of family forest ownerships (1-9 acres) by who recreated on the forest land and type of recreation, 2011-2013

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Table XX-33—Estimated area and estimated number of family forest ownerships (1-9 acres) by preferred methods to receive forest land management information, 2011-2013. Numbers include ownerships that rated a method as very useful or useful on a five-point Likert scale.

Table XX-34—Estimated area and estimated number of family forest ownerships (1-9 acres) by ownerships' concerns, 2011-2013. Numbers include ownerships that rated an issue as a great concern or concern on a five-point Likert scale.

Table XX-35—Estimated area and estimated number of family forest ownerships (1-9 acres) by ownerships' likelihood of selling or giving away land in the next 5 years and who is likely to receive it, 2011-2013

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Table XX-44—Estimated area and estimated number of family forest ownerships (1-9 acres) by ownerships' percent of household annual income derived from forest land owned, 2011-2013

## OTHER NWOS RESOURCES

Additional information about the 2011-2013 NWOS methods, results, and general program attributes is available through a series of publications, tools, and Web sites. Details of the design, implementation, and analysis methods can be found in Butler et al. (2016a) and Dickinson and Butler (2013). Butler et al. (2016a) also contains a copy of the questionnaire and documentation for the NWOS database. A companion report (Butler et al. 2016c) contains tables summarizing the results of the 2011-2013 NWOS for family forest ownerships with 10+ acres.

Butler et al. (2016b, c) present summary tables and general findings of the 2011-2013 NWOS concentrating on family forest ownerships with 10+ acres of forest land and examine trends between the 2002-2006 and 2011-2013 iterations of the NWOS. General summaries of the 2011-2013 NWOS are available in U.S. Forest Service (2015) and a series of two-page graphical summaries, one each for the nation, each region, and each state where a minimum sample size ( $n \geq 100$ ) was obtained (Butler and Butler 2016). The summary brochure (U.S. Forest Service 2015) is intended primarily for people who responded to the NWOS questionnaire and other private landowners. The graphical summaries (Butler and Butler 2016) are intended primarily for a more technical audience, including people who work for state forestry agencies, research institutions, and nonprofit organizations familiar with the NWOS program.

Additional program information, including links to the items listed above and copies of the state-specific questionnaires, is available at the following Web sites:

- National Woodland Owner Survey: [www.fia.fs.fed.us/nwos](http://www.fia.fs.fed.us/nwos)
- Forest Inventory and Analysis National Program: [www.fia.fs.fed.us](http://www.fia.fs.fed.us)
- Family Forest Research Center, a joint venture between the U.S. Forest Service and the University of Massachusetts Amherst: [www.familyforestresearchcenter.org](http://www.familyforestresearchcenter.org)

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**KEY WORDS:** landowner survey, private forest, nonindustrial private forest, small-scale forestry, United States

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