

## policy

# Effectiveness of Landowner Assistance Activities: An Examination of the USDA Forest Service's Forest Stewardship Program

Brett J. Butler, Marla Markowski-Lindsay, Stephanie Snyder, Paul Catanzaro, David B. Kittredge, Kyle Andrejczyk, Brenton J. Dickinson, Derya Eryilmaz, Jaketon H. Hewes, Paula Randler, Donna Tadde, and Michael A. Kilgore

The USDA Forest Service's Forest Stewardship Program (FSP) is the nation's most prominent private forestry assistance program. We examined the FSP using a multiple analytic approach: analysis of annual FSP accomplishments, survey of state FSP coordinators, analytic comparison of family forest owners receiving and not receiving forestry practice assistance, and focus groups with family forest owners. We found the FSP reaches a small fraction of eligible landowners; states use FSP funds to address local private forestland issues; landowners obtaining assistance commonly associated with the FSP (e.g., management plans) differ from others in sociodemographics, ownership objectives, and land management actions but not in terms of intent to sell/subdivide forestland; and traditional FSP activities are not influencing inactive family forest owners to become active managers. We believe current practices (e.g., state-level flexibility) help the FSP reach its goals, alternative assistance-related efforts may increase the reach of the FSP and support strategic goals, and data collection improvements may enrich future FSP evaluations.

**Keywords:** program evaluation, nonindustrial private forest owners, family forest owners, forest management plan, US landowner assistance

The USDA Forest Service's Forest Stewardship Program (FSP) is the nation's most prominent assistance program for nonindustrial private forest (nonindustrial private forestland [NIPF])<sup>1</sup> owners. The FSP was authorized by an

amendment to the Cooperative Forestry Act of 1978 (Public Law 95–313) within the 1990 Farm Bill (USDA Forest Service 2005). Due to the substantial presence of NIPF owners nationally (they own 49% of the nation's forestland [Butler 2008]) and the pub-

lic benefits their forests provide, the FSP is considered an important tool for promoting stewardship of private forestland. The authorizing legislation defines the FSP's purpose as "to encourage the long-term stewardship of nonindustrial private forestlands" (16 U.S.C. §2103a) for a variety of forest resources, including: timber; fish, wildlife, and wetland habitat; water quality; recreational resources; and aesthetic values. To accomplish this, the Forest Service provides funding to state forestry, or equivalent, agencies that, in turn, deliver information and provide assistance to NIPF owners.

Between 1991 and 2010, the budget decreased 28% from \$25.57 million to \$18.34 million in constant (1991) dollars (Karl Dalla Rosa, USDA Forest Service, pers. comm., Oct. 20, 2011). In intervening years, the budget fluctuated from a low of \$17.14 million (in 2009) to a high of \$36.49 million (in 2005). The annual average was

Received August 22, 2013; accepted January 20, 2014; published online March 6, 2014.

**Affiliations:** Brett J. Butler (bbutler01@fs.fed.us), USDA Forest Service. Marla Markowski-Lindsay (marla@eco.umass.edu), University of Massachusetts at Amherst. Stephanie Snyder (stephaniesnyder@fs.fed.us), USDA Forest Service. Paul Catanzaro (cat@umext.umass.edu), University of Massachusetts at Amherst. David B. Kittredge (dbk@eco.umass.edu), University of Massachusetts at Amherst. Kyle Andrejczyk (kandrejcz@gmail.com), University of Massachusetts at Amherst. Brenton J. Dickinson (brenton.dickinson@gmail.com), University of Massachusetts at Amherst. Derya Eryilmaz (eryil001@umn.edu), University of Minnesota. Jaketon H. Hewes (Jhewes@eco.umass.edu), University of Massachusetts at Amherst. Paula Randler (pbrandler@fs.fed.us), USDA Forest Service. Donna Tadde (dtadde@ymail.com), USDA Forest Service/University of Massachusetts Amherst. Michael A. Kilgore (mkilgore@umn.edu), University of Minnesota.

**Acknowledgments:** This project was funded with a grant from the USDA Forest Service, State and Private Forestry, Cooperative Forestry program (grant numbers: 12-CS-11242305-061 and 12-CS-11242305-062). We would like to thank Karl Dalla Rosa for entrusting us with this important project, the state and regional FSP coordinators for their participation in the survey, and the landowners who participated in the focus groups. We also thank reviewers Karl Dalla Rosa, Jeff Kline, Evan Mercer, and John Stanovick for their invaluable insights, edits, and comments. Any errors or omissions are the responsibility of the authors.

\$23.99 million (1991 dollars). In addition to this federal funding, landowner assistance activities receive significant funding from other sources, particularly state governments that, in general, have seen funding decreases in recent years.

The assistance activities supported by the FSP are broad and include the development of comprehensive multiresource forest stewardship plans, technical assistance, and landowner educational programs. At the state level, there is tremendous variability in the types, modes, and intensity of FSP-sponsored assistance provided. This variability, in large part, reflects the flexibility given to state forestry agencies in developing and implementing state-tailored versions of the FSP to effectively address their private forestland needs and issues.

Previous evaluations of the FSP have focused on participants in the program (as discussed in the literature review below); however, we suggest that it is important to consider more than just those landowners who have been the recipients of FSP assistance when evaluating the FSP. Including landowners who have not been recipients of FSP-related assistance, evaluating state FSP administrator perceptions, and assessing nationally collected FSP data enables a broader assessment of the program's impact. To this end, we expand on previous FSP analyses by taking a multiple analytic approach that explores the FSP from various angles and perspectives, including analyzing survey, focus group, and monitoring data, largely focusing on the 2007–2011 time period.

## Literature Review

As mentioned above, there are a number of national-, regional- and state-level FSP evaluations, largely centered on individuals who have received FSP management plans. These evaluations have focused on measures of effectiveness and participant opinions. There are also studies of other forestry incentive programs that use a variety of examination approaches. The FSP and other incentive studies are summarized below.

### FSP-Related Literature

Two national evaluations of the FSP have been carried out (Esseks and Moulton 2000, Esseks and Moorhouse 2005), both of which are very similar and focus on NIPF owners who had received FSP assistance in the form of forest management plans. They both used phone and mail survey instruments, and most of the questions were iden-

tical, with the later study adding a few additional questions. The studies analyzed numerous measures designed to elucidate program effectiveness, related to landowner engagement and changes to landowner management behavior, and found very similar results. The studies found participants were engaged in the program: over 90% of the participants stayed in the program; over 80% had started implementing their plan; and nearly 70% had spent some of their own money to implement their plans. The studies also reported some degree of success with changing management behavior: over 50% of respondents had applied at least one new practice and over 30% had applied two or more new management practices. The studies included analyses of respondents' attitudes toward certain elements of the program and, overall, found high levels of satisfaction. In a cursory consideration of the program's equity, both studies noted with concern that participants were nearly all white and were better educated than landowners in general.

Esseks and Moorhouse (2005) conducted a logistic analysis to test for relationships between landowner management behaviors (viewed as indications of FSP "success") and independent variables relating to the type of assistance and landowner characteristics. This analysis, as well as more general analyses conducted in both studies, indicated that receipt of follow-up technical assistance made respondents more likely to engage in various desirable management practices. The same was true of cost sharing,

though the second study noted that cost-sharing funds declined considerably since the first study was conducted. In a more simplistic analysis of landowner behavior, Esseks and Moulton (2000) found that receipt of cost-sharing assistance was associated with higher spending by the landowner and that technical assistance was not significant.

Several evaluations of the FSP at state and regional levels also largely focused on program participants, assessing management plan implementation rates and landowner opinions of the program as effectiveness measures. These evaluations revealed high levels of satisfaction and rates of plan implementation among responding participants. Using an innovation adoption theoretical framework, Graesser and Force (1996) found FSP participation in Idaho to be positively correlated with shorter land tenure and owners who spend less time on their land. Participation in Tennessee's FSP program was found to be positively correlated with higher income, previous experience with forestry programs, and having unmanaged lands (Bell et al. 1994). Melfi et al. (1997) found the main reasons for NIPF owners in South Carolina to participate were the money received, professional assistance given, concern for future generations, and the encouragement of multiple uses. FSP participants in West Virginia were found to be, overall, satisfied with the program (Egan et al. 2001) and the plans were positively correlated with management activities (Egan et al. 2001, Jennings and McGill 2005). Baughman and Updegraff

## Management and Policy Implications

The FSP reaches a substantial but small subset of NIPF owners, typically focusing on providing management plans, technical assistance, and advice. No evidence indicates that these activities influence inactive landowners to become active nor do these activities appear to influence land-use-related decisions (e.g., selling or subdividing land). Assisted landowners have stronger associations with past and future forest management practices (e.g., timber harvesting) than unassisted landowners, regardless of how assistance is defined, suggesting resource-intensive management plan assistance may be less efficient. Maintaining state-level flexibility and continuing to evolve the concept of Important Forest Resource Areas (IFRAs) to address critical forest resource needs will likely help FSP to better meet state needs and harness state-level creativity to develop effective assistance strategies. FSP reach might be expanded by encouraging diversification of assistance activities and shifting focus away from resource-intensive activities. Emphasizing opportunities to keep forests from permanent conversion will support one of the FSP's strategic goal. Improving data collection through performing quality control, establishing landowner case files for all assistance activities, and implementing uniform IFRA definitions would benefit future FSP assessments. Allocation metrics can be refined to further support FSP goals by rewarding all activities that provide technical assistance and educational opportunities to landowners and efforts targeting IFRAs, unengaged landowners, and/or long-term stewardship.

(2002) found NIPF owners in the upper Midwest accomplished more after receiving FSP plans, and over half of the respondents would recommend the program to a neighbor or friend. They found landowners' top incentives for participating were property tax reductions, income tax deductions, free management assistance, and educational materials.

### Other Forestry Program-Related Literature

While FSP-specific evaluations have been somewhat limited in their research questions and approaches, the broader forestry program evaluation literature is more expansive. Race and Curtis (1996) is the most thorough evaluation of a forestry program we are aware of. They evaluated the Australian Farm Forestry Program by considering the appropriateness of its design, assessing program achievements, and analyzing costs and benefits. They found the program design to be appropriate, but the implementation lacked a systematic approach to training, and they found inadequate monitoring, evaluation, and dissemination of findings. The irregularity of forestry income was found to be a major barrier to program participation. The results from the cost-benefit analysis were not included in the published article.

Other forestry-related program studies have examined economic impacts of programs, specific aspects of program effectiveness, and means to improve forestry programs. Several studies discussed in Gaddis (1996) found that taxpayers bear the initial cost of forestry incentive programs, but a number of other studies have examined broader economic impacts. Based on taxes, expenditures, and incomes generated, Henry et al. (1990) found Minnesota's Private Forest Management Program to provide positive net benefits at the federal level and to the landowner but negative net benefits at the state level and to society as a whole. Based on employment in the logging industry, supplies bought from other sectors by the logging industry and employee wages going into the local economy, MacFarlane and Zundel (1995) found New Brunswick "private woodland silviculture" cost-sharing programs to likely have positive net impacts—their findings were qualified as "likely" because considerations like opportunity cost of labor and capital could not be taken into account.

Taxed-based programs were found to

be most effective, in terms of management plan implementation, among three forestry incentive programs in Wisconsin (Shockley and Martin 2000). In terms of land-use protection, Brockett et al. (2003) found a tax-based forestry incentive program in Tennessee to have no discernible impact on forest conversion rates and found the minority of enrollees (mostly absentee owners) to be enjoying the majority of tax benefits.

Based on a survey of forestry professionals, Jacobson et al. (2009) concluded forestry incentive programs needed higher visibility and availability to establish and increase long-term consistency in funding and to implement simpler application and approval processes to increase enrollments. Another suggestion for improving forestry incentive programs is to segment owners by management objectives and employ outreach strategies targeted to the different segments (Salmon et al. 2006).

### Data and Methods

This study examines the FSP's impact and various administrative aspects and is intended to help gain understanding of:

1. The types of activities that state forestry agencies engage in through the FSP and the ways in which the FSP fits into the larger framework of private landowner assistance activities.
2. The reach of the FSP in terms of acres and numbers of NIPF owners assisted and how that has changed over the evaluation period, 2007–2011.
3. Characteristic differences between landowners who receive forestry practice assistance commonly associated with the FSP and those who do not.
4. Behavioral differences between landowners who receive forestry practice assistance commonly associated with the FSP and those who do not.
5. Family forest owner perceptions of the program and whether FSP-supported assistance activities influence family forest owner behavior.

Isolating FSP activities from other landowner assistance activities is not possible because FSP funding is commingled with other funding, largely state funding; there is no universal definition of FSP assistance; and, apart from those with FSP management plans, FSP participants cannot be consistently identified. Assistance activities supported by the FSP are broad (including

the development of written management plans, technical assistance, and educational programs), and a nationwide database of FSP participants does not exist. The program implementation varies by state, reflecting the flexibility given to state forestry agencies in developing and implementing state-tailored versions of the FSP to meet local needs and resources.

We took a multiple analytic approach to our examination of the FSP (Table 1). Quantitatively, we surveyed state FSP program coordinators to ascertain how their FSP funds are allocated, summarized federally reported FSP accomplishments, and compared the characteristics and behaviors of landowners receiving forestry practice assistance to those not receiving assistance using data from the Forest Service's National Woodland Owner Survey. Qualitatively, we gathered state FSP program coordinators' perceptions of the effectiveness of various landowner assistance efforts in their states and conducted focus groups with family forest owners to understand if and how assistance activities influence their behavior and to identify their perceptions of the FSP's strengths and weaknesses. The goal of taking this multiple analytical approach was to assess and assimilate different perspectives on the program because a single method would only reveal a single perspective of this multifaceted program.

Throughout this article, we talk about forest owners or FSP participants either as NIPF or family forest owners—these terms are not synonymous. As defined by the USDA Forest Service (Butler 2008), NIPF refers to corporate, nongovernment organization, unincorporated partnership, and tribal and family/individual landowners who do not own primary wood-processing facilities. Family forest owners refer to the last category of NIPF owners: family and individual landowners. Each analysis component contained in this evaluation refers to either NIPF owners or family forest owners, based on what was available from the most suitable data sources. For example, the survey of FSP state administrators and the database of federally reported FSP accomplishments both provide FSP information associated with NIPF owners. Conversely, the examinations of the characteristics and behaviors of landowners receiving forestry practice assistance rely on data from an existing survey of family forest owners.

**Table 1. Primary methods used to undertake this FSP examination, major limitations, and implications.<sup>a</sup>**

Analysis	Population	Data	Caveats	Major implications
I. State Administrator Survey of FSP	State and protectorate FSP administrators reporting on NIPF owners	I. Survey of 2007–2011 FSP activity	Data exclude costs and benefits of individual activities. Self-reported responses may have inherent biases.	Each state/protectorate has its own variety of FSP to meet its needs. States invest in a range of activities, but emphasis is on the traditional management plans and one-on-one visits.
II. FSP Performance Summary	NIPF owner activity	FSP PMAS database, 2007–2011 and 2008–2011	The integrity of some PMAS data is questionable (e.g., double-counting, lack of standardization).	FSP reaches many NIPF owners, but these owners represent only a fraction of all eligible NIPF owners. Plans, education, and landowner assists are on the decline.
III. Characteristics of FFOs with and without forestry practice assistance	FFOs	2002–2006 NWOS data	Unable to identify FSP participants directly. Used NWOS responses as surrogates.	Assisted landowners have higher education/income levels; more frequent recreation/timber ownership objectives, and land with conservation easement, green certification, leasing activity.
IV. Behaviors and intentions of FFOs with and without forestry practice assistance	FFOs	2002–2006 NWOS data	Unable to identify FSP participants directly. Used NWOS responses as surrogates.	Assisted landowners more likely to have conducted past stewardship practices than unassisted landowners. Assisted landowners favored future afforestation and timber harvests, favored having plans, and were no different from unassisted landowners with regard to land disposition intentions.
V. FFOs FSP-related behavior and perceptions	FFOs	12 FFO focus groups in six states, conducted in 2012	Small sample may not fully reflect population. Unable to glean information from FFOs not in FSP.	FSP not influencing inactive FFOs to become active managers. FSP may be helping active managers to manage more intensively.

<sup>a</sup> Definitions in this table include: NIPF: nonindustrial private forest owner; FFO: family forest owner; NWOS: National Woodland Owner Survey; PMAS: Performance Measurements Accountability System.

### I. State Administrator Survey of FSP

State FSP administrators were surveyed to better understand the range of NIPF owner assistance activities state forestry agencies engage in and the ways in which the FSP fits into these programs. An electronically administered survey looking at 5 years of NIPF owner assistance activity was sent to the FSP program coordinators in all 50 states and the nine protectorates (Supplemental Survey S1).<sup>5</sup> The survey was developed with input from the USDA Forest Service national and regional FSP coordinators to ensure a comprehensive questionnaire. The survey requested information on: funding sources for forestry assistance programs, FSP funding allocation, perceptions of the effectiveness of NIPF assistance efforts, and specific unique and effective assistance strategies. We strove to obtain 100% participation, with potential respondents contacted at least three times. FSP administrators from 43 states and three territories/protectorates responded to the survey.

### II. FSP Performance Summary

For the past 15 years, accomplishments have been annually reported by state FSP administrators in the FSP's Performance Measurements Accountability Sys-

tem (PMAS) database. We examined PMAS data that have been consistently collected over the 5-year evaluation period, 2007–2011, specifically number of NIPF owners receiving technical assistance, number of NIPF owners participating in educational activities, number of acres under new or revised FSP plans, number of acres under new or revised FSP plans in Important Forest Resource Areas (IFRA), and number of new or revised plans. We also examined additional PMAS metrics collected between 2008 and 2011: acres under all current (as opposed to only new and revised) plans, IFRA acres under current plans, and number of IFRA acres under current plans confirmed by field monitoring to be managed sustainably.<sup>2</sup>

### III. Characteristics of Family Forest Owners Receiving and Not Receiving Forestry Practice Assistance

To provide an understanding of the population targeted by the FSP, this analysis identifies characteristics of family forest owners who have participated in activities commonly associated with the FSP and compares them to the same characteristics of those who have not participated in such activities. The analysis uses data from the 15,440 randomly selected family forest

owners who participated in the USDA Forest Service, National Woodland Owner Survey (NWOS) between 2002 and 2006 (Butler 2008). Due to limitations in the NWOS dataset, this analysis focuses on family forest owners, not NIPF owners. Although the NWOS data do not explicitly identify FSP participants, the data are used to identify family forest owners who received forestry assistance that is indicative of the assistance provided by the FSP: those who have a written forest management plan, have received cost-sharing assistance, and/or have received some type of management advice. This approach provides a liberal definition of forestry assistance to help capture a range of FSP-related activities. Family forest owners holding between 10 and 10,000 acres of forestland who received any of these three forms of assistance are referred to as assisted family forest owners; those who did not receive at least one of these types of assistance are referred to as unassisted family forest owners. This acreage range reflects the general eligibility requirements for the program across the United States. The assumption of this approach is that the characteristics of assisted family forest owners are suggestive of those of FSP participants.

<sup>5</sup> Supplementary data are available with this article at <http://dx.doi.org/10.5849/jof.13-066>.

Assisted and unassisted family forest owners were evaluated with respect to demographics, land characteristics, attitudes, and ownership objectives. This analysis conducts statistical tests of differences in these characteristics between means or proportions of assisted and unassisted family forest owners. Means and proportions are calculated using weighted estimators (Dickinson and Butler 2013). For example, proportions are calculated as the ratio of the estimated number of assisted (or unassisted) family forest owners with a given characteristic (e.g.,  $\geq 65$  years of age) to the estimated number of assisted (or unassisted) family forest owners in total (Dickinson and Butler 2013).

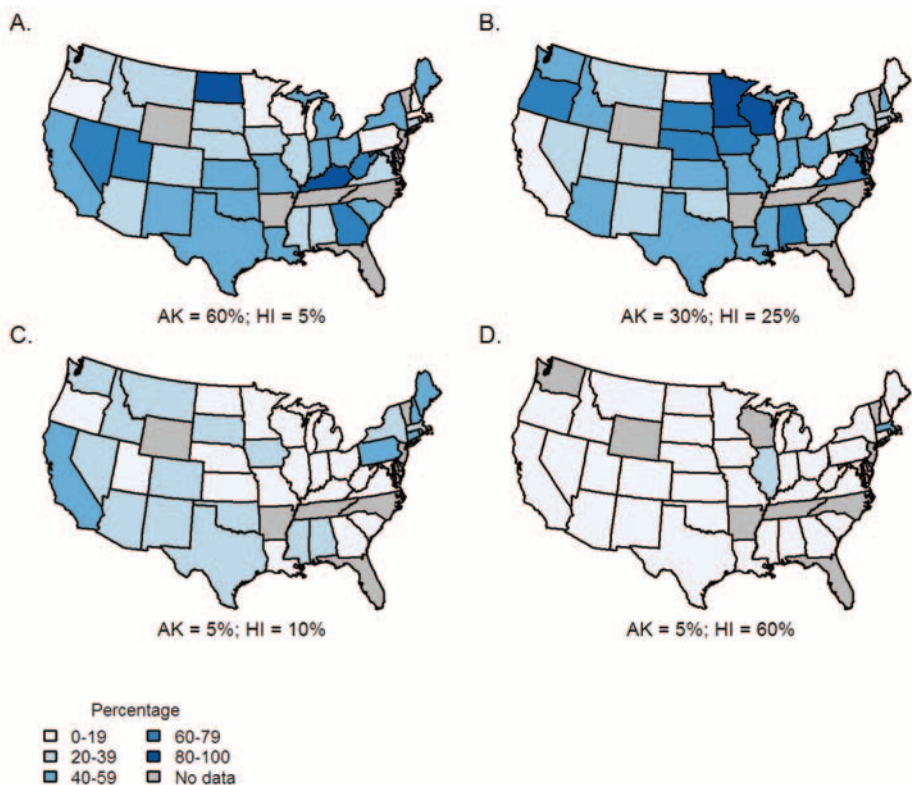
#### IV. Behaviors and Intentions of Family Forest Owners Receiving and Not Receiving Forestry Practice Assistance

As further refinement to the analysis of family forest owner characteristics, the 2002–2006 NWOS data (Butler 2008) were examined using probability analysis to identify similarities and differences in behaviors and intentions between assisted and unassisted family forest owners. Similar to the analysis described above, this analysis identifies family forest owners holding between 10 and 10,000 acres of forestland but focuses on single-parcel owners ( $n = 3,676$ ).<sup>3</sup> The analysis differs from the one above by focusing on behaviors and intentions and comparing the results for four different definitions of an assisted family forest owner:

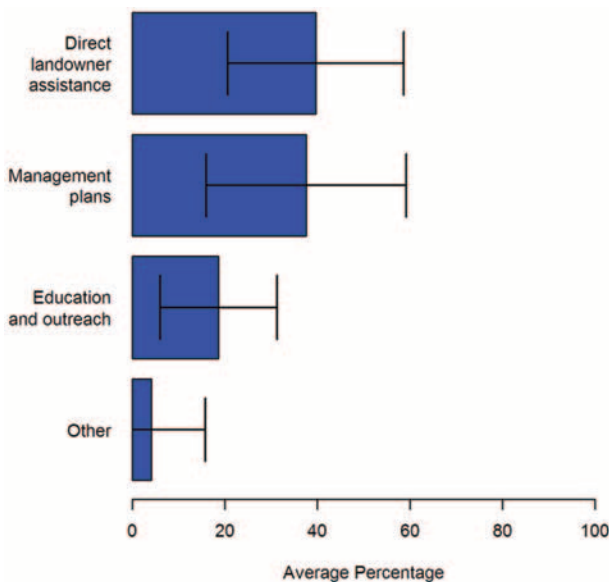
1. Has a forest management plan (M).
2. Received advice (A).
3. Received cost-sharing assistance (C).
4. Has a forest management plan, received advice, or received cost-sharing assistance (MAC).

The definitions above are not mutually exclusive. For example, an owner who has a forest management plan and has received advice would be included in the MAC, M, and A subsets.

This analysis explores family forest owner behavior across these various assistance definitions using relative probabilities. Relative probabilities are defined as the estimated probability of an event (e.g., plans to harvest timber) occurring in a target group (i.e., assisted owners) divided by the estimated probability of that event occurring in a control group (i.e., unassisted owners) (Zhang and Kai 1998). Specifically, the



**Figure 1. Results of state administrator survey. Percentage of FSP funding allocations going toward: (A) management plans, (B) direct landowner assistance, (C) education and outreach, and (D) other program areas, by state. Direct landowner assistance activities include field visits, technical assists, phone conversations, etc. Education and outreach activities include workshops, field tours, pamphlets, etc. Other program area activities include reforestation, nurseries and genetics resources, and extension.**



**Figure 2. Results of state administrator survey. Percentages of state FSP funding allocations by program area. Error bars reflect one SD around the mean.**

analysis asks whether the probability of having undertaken land management practices or planning to undertake land use decisions differs between assisted and unassisted

family forest owners for each definition of assistance. Using NWOS data, the behaviors examined include: harvesting timber, conducting wildlife habitat improvement proj-

ects, planting trees, and reducing fire hazards. The intentions examined include: selling, subdividing, and conversion.

## V. Family Forest Owners FSP-Related Behaviors and Perceptions

We conducted focus groups with family forest owners to help determine whether the assistance activities supported by the FSP influence landowner behaviors and what family forest owners perceive to be strengths and weaknesses of the program.<sup>4</sup> Twelve focus groups were conducted in August and September 2012 in six states (i.e., two focus groups per location): Colorado, Georgia, Iowa, Kentucky, New York, and Washington. The criteria for state selection included whether or not identifiable FSP participant information was available in a geographic information systems (GIS) format—information needed to recruit focus group participants. We selected states reflecting a wide geographical distribution, and within each state, focus groups were convened within a 30–45 minute driving radius of areas with high concentrations of current FSP participants.

A screener questionnaire was used to recruit participants and seek family forest owners who were at least 18 years of age, owned at least 10 acres of forestland, and were the principal decisionmakers regarding the management of their forest. Potential study participants were also screened on the intensity of their land management activities. Family forest owners who were/professional foresters were excluded from participation. Family forest owners who participated in the FSP were identified from state FSP program coordinator data, while those who do not participate in the FSP were identified using property tax records and remote-sensing land cover data. A total of 100 family forest owners participated in the focus groups, averaging eight landowners per group, with a range of 5 to 13. We sought consistency across groups by using the same moderator throughout and following a topic guide that allocated time for each subject but allowed for discussion of additional relevant concerns. The topic guide covered land use decisions (e.g., sales, subdivisions, land conversion) and land management activities (e.g., commercial timber harvests, thinning, planting, fire hazard reduction, managing for invasive species). Focus group participants were asked to explain what influenced their behaviors and the decisionmaking processes regarding their forestland.

### Sidebar 1. Examples of Innovative State Initiatives Relevant to FSP.

The state FSP administrator survey results indicate that many states are using partnerships to achieve FSP goals by leveraging resources. Many of these partnerships are with traditional partners, such as the USDA Natural Resources Conservation Service (NRCS). However, some partnerships are seeking to reach landowners who are not attracted to traditional programs by developing relationships with new partner organizations. Administrators wrote of innovative partnerships occurring in their states. Below are several examples, including this one describing the Kennebec Woodlands Partnership (KWP) in Maine:

*Thirteen organizations with diverse interests currently collaborate on forestland conservation projects that support the region's woods products, tourism, and recreational economies and protect water quality, wildlife habitat, scenic resources, and quality of life. KWP activities include introductory woodland owner workshops; an inaugural conference focused on the economic and ecological value of Kennebec forests; development of a 'Stewardship Storyline'—a series of steps on a woodland owner's path toward forest conservation; publication of Your Woodland: A Resource Guide for Kennebec County Landowners.*

Several states have undertaken specific efforts to “keep forests as forests.” For example:

*Ties to the Land Project: This is an ongoing multistate (CA, ID, OR, and WA) competitive grant project that is intended to help protect family forestlands from fragmentation and conversion which may occur when property passes from one generation to the next.*

*Michigan, applied for a grant to provide outreach and education to landowners regarding transferring the land to the next generation of owners. These two-part workshops have been offered all over the state and delve into the necessary although sometimes uncomfortable discussions on estate planning in a supportive atmosphere.*

In addition to education, the Illinois Department of Natural Resources (DNR) is buying conservation easements (CEs) on woodlands associated with farm fields through the USDA Conservation Reserve Enhancement Program (CREP) as a strategy to maintain forest cover:

*Partner within Illinois DNR Forestry, Wildlife, Realty and Farm Programs Divisions and dozens of Soil & Water Conservation Districts to deliver Illinois CREP permanent easements. Private landowners sell DNR a permanent conservation easement of their federal CREP field plus additional surrounding forest acres within floodplain as negotiated (ranking, grading, approval of each by technical committee). CEs require timber may only be harvested with a DNR Forester's approval of a timber management plan.*

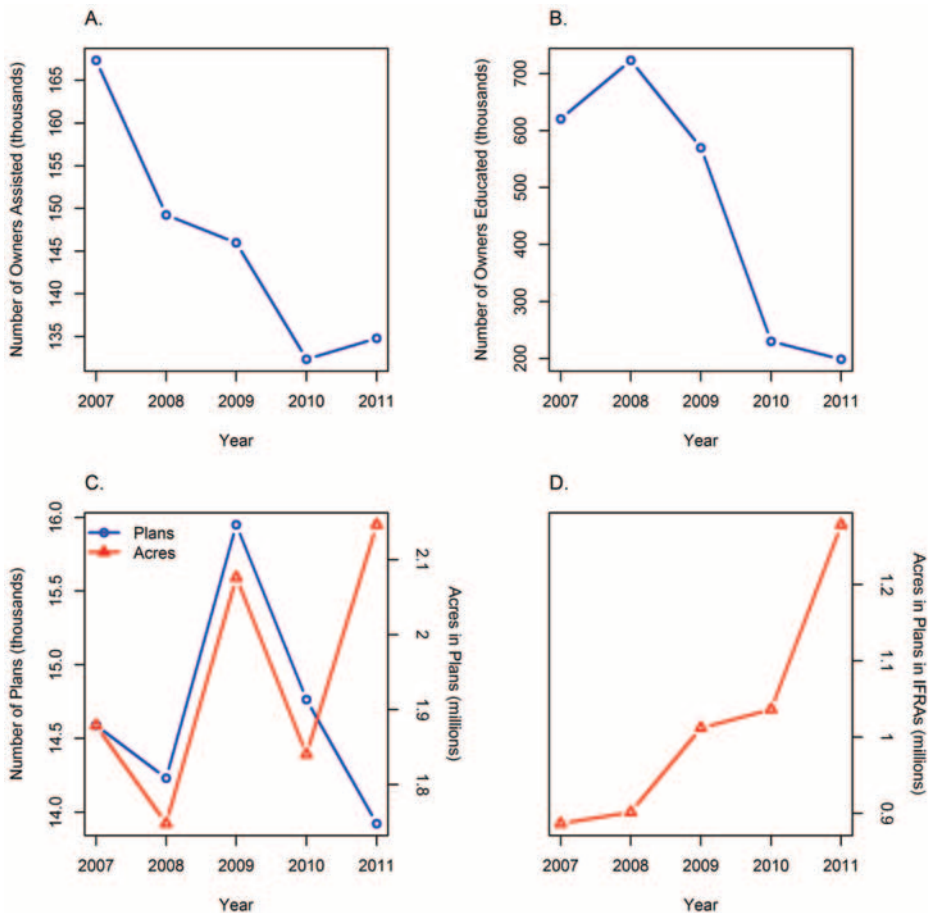
Structural coding (Guest and MacQueen 2008) was applied to the focus group transcripts using NVivo (Version 10; QSR International). This process resulted in a list of emergent themes and ideas relating to the topics of the focus groups. Specifically, we coded and analyzed the qualitative data to understand to what extent management plans, cost-sharing funding, technical assistance, and education influence the behavior of family forest owners.

## Results and Discussion

### I. State FSP Administrator Survey

The survey of state FSP administrators indicated 56% of states' funding for forestry assistance comes from state government, 28% from the FSP, and the remainder from other federal/state agencies and grants, although this varied state-by-state. States and protectorates emphasized using these funds for NIPF owner assistance activities that best

meet the unique local challenges and opportunities and usage varied extensively from state to state (Figure 1). Direct NIPF owner assistance (e.g., field visits, technical assistance, or phone consultations) and management plans are the program areas that received the greatest allocation of FSP funds (Figure 2). Approximately 58% of state FSP administrators stated that one-on-one visits were most effective at helping NIPF owners sustainably manage their forest (a conclusion made by Egan et al. [2001] in their West Virginia FSP study and also supported by Baughman and Updegraff's FSP study [2002]), while nearly 25% stated management plans to be most effective. However, states are experimenting with alternative landowner assistance strategies, such as educational programs aimed at emerging issues, but these strategies receive fewer resources, typically through competitive funding, in comparison to the traditional types of assis-



**Figure 3. FSP performance metrics summary.** (A) Number of NIPF owners receiving FSP technical assistance. (B) Number of NIPF owners receiving FSP education. (C) Number and acres of new or revised plans. (D) Number of IFRA acres in new or revised plans, 2007–2011.

tance activities (see Sidebar 1). With 43 states and three protectorates responding to the survey, we observed 46 unique ways of implementing the FSP.

## II. FSP Performance Metrics Summary

An analysis of the 2007–2011 PMAS data found that hundreds of thousands of NIPF owners have participated in one or more FSP activities, including 730,000 NIPF owners receiving technical assistance, over 2.3 million owners attending educational events or receiving educational materials, 73,000 new or revised management plans prepared covering 9.7 million acres, and over 5 million acres of private forestland with management plans located in IFRA (Figure 3). In spite of these statistics, however, only a fraction of eligible NIPF owners have received assistance through the FSP each year. For example, each year, only 3.3% of NIPF owners (owning at least 10 acres) had received technical assistance from 2007–2011.<sup>5</sup>

The trends in FSP implementation over the study period show mixed results (Figure 3). For example, the acres covered by FSP management plans increased by 12% from 2008 to 2011, and the average acreage per new or revised plan increased by 20%. Yet, from 2007 to 2011, landowner assistance decreased 19%, educational participation decreased 68%, and the number of new/revised management plans written decreased 5%. Thus, fewer landowners are being assisted and fewer plans are being written, yet plan size and acreage under plans are increasing, suggesting selective targeting of landowners with greater acreage may be occurring. With an increased emphasis on targeting IFRAs, the number of IFRA acres in new/revised written management plans increased 44% and the number of IFRA acres under current plans managed sustainably increased 68%.

While all of the metrics outlined above are important indicators of FSP accomplish-

ments, only a subset of these data is used to determine FSP funding allocations for the following fiscal year. As noted in the Forest Stewardship Program Allocation Metrics sidebar, the funding allocation formula elucidates some of the results reported from this and state administrator survey of FSP analyses.

Issues regarding reliability or consistency with the PMAS data were uncovered in this analysis making longitudinal analyses and cross-state comparisons problematic. For example, “landowners educated” and “landowners assisted” have the potential for double-counting, as some landowners could have received multiple forms of assistance or education in a given year. Also, it is likely that there were participants at educational activities that were not landowners but were counted as landowners educated. Because of this, these values should be interpreted with caution and as upper bounds. In addition, the way in which some of the PMAS metrics have been defined has changed over the years. For example, states have some latitude in how IFRAs are defined and the areas identified can change over time. Therefore, comparisons of the IFRA-related metrics over time and between states also present some challenges.

## III. Characteristics of Family Forest Owners Receiving and Not Receiving Forestry Practice Assistance

The hypothesis tests indicate that “assisted” family forest owners are statistically different from unassisted family forest owners in terms of the means or proportions of some characteristics but not others (Table 2). Defining assisted family forest owners as those having a management plan, receiving advice, receiving cost-sharing assistance, or any combination thereof (MAC), we found that compared to unassisted family forest owners, assisted owners on average are younger; have higher education and income levels; have larger parcel sizes; more frequently have a conservation easement or green certification; more frequently leased their land; have greater concern about nearby development; and more frequently have hunting, investment, recreation, or timber harvesting ownership objectives than unassisted owners. For example, 55% of assisted family forest owners have an associate degree or higher level of education, while 38% of unassisted family forest owners are educated to that extent; this result is corroborated by Esseks and Moulton (2000) and

Esseks and Moorhouse (2005). Characteristics that are not statistically different between assisted and unassisted owners include: gender, means of ownership (purchased versus other means of ownership), ownership tenure, farm ownership, primary residence nearby, race, single parcel ownership, and aesthetics as an ownership objective.<sup>6</sup>

#### IV. Behaviors and Intentions of Family Forest Owners Receiving and Not Receiving Forestry Practice Assistance

The relative probability analyses showed significant differences between assisted and unassisted family forest owners when considering past and future planned land management practices and land use decisions (Table 3). These statistically significant differences are consistent and show similar magnitudes across the four definitions of landowner assistance (i.e., M, A, C, MAC; see Data and Methods section for definitions).

For land management activities in the past 5 years, regardless of how assistance is defined, assisted family forest owners are more likely to have conducted a number of different activities than unassisted family forest owners. For example, assisted owners are between 1.3 and 1.4 times more likely than unassisted owners to have harvested timber in the past 5 years, between 1.9 and 2.2 times more likely to have planted trees, between 1.9 and 2.2 times more likely to have conducted activities to reduce fire hazard, and between 2.3 and 2.9 times more likely to have improved wildlife habitat (Table 3).

As for future intentions, regardless of how assistance is defined, assisted family forest owners state they are more likely to undertake a number of different activities than nonassisted family forest owners, supporting previous national studies that FSP participants (i.e., assisted landowners) are engaged (Esseks and Moulton 2000, Esseks and Moorhouse 2005). For example, assisted owners are between 2.4 and 3.5 times more likely than unassisted owners to have intentions for afforestation, between 2.4 and 3.1 times more likely to have intentions to harvest timber, and less likely (0.4–0.5 times) to have no future plans for their land. Assisted family forest owners are not significantly different from unassisted family forest owners with regard to intentions to convert, sell, or subdivide their land (Table 3). This last result is supported by Brockett et al.’s

#### Sidebar 2. Forest Stewardship Program Allocation Metrics.

A relationship exists between a subset of PMAS performance metrics and a state’s FSP funding level. A state’s annual FSP allocation is determined, in part, by a weighted equation that takes into account:

- FSP performance from the previous year (measured by total acres covered by current FSP plans).
  - The number of priority or IFRA acres covered by current FSP plans.
  - The number of priority or IFRA acres under current FSP plans (which have been determined to be managed sustainably).
  - A measure of the state’s program potential (as measured by the potential total number of NIPF owners and acres, when greater than 10 acres).
- This funding allocation formula helps explain some of the results reported from the FSP Performance Summary (i.e., PMAS data) and State Administrator Survey of FSP:
- Because landowner assists and education do not factor into the FSP funding allocation equation, it is not surprising that states would be directing their efforts and resources to activities, i.e., management plans, that are factored in.
  - Over the past 5 years, PMAS data show fewer plans written but an increase in average plan size. This trend is likely due to the fact that FSP funding allocation rewards states for the number of acres under plans but does not account for the number of plans written. Thus, states may be focusing efforts on getting landowners with bigger landholdings under new or revised plans.
  - The number of IFRA acres in new or revised plans increased nationally by 44% from 2007 to 2011. This is reflective of the increasing emphasis on IFRA acres in the FSP funding allocation equation.

(2003) Tennessee Greenbelt program evaluation (a program designed to deter land conversion with property tax relief), which found no statistically significant difference between program participants and nonparticipants in terms of land use intentions.

#### V. Family Forest Owners FSP-Related Behaviors and Perceptions

The qualitative data provided by the focus groups indicate that FSP-related activities largely impact family forest owners who already intend to manage their land in some way (see Sidebar 3). This result supports the national studies’ results that FSP participants are engaged (Esseks and Moulton 2000, Esseks and Moorhouse 2005). These activities are reported as being helpful to these owners, but the assessment found no evidence that traditional FSP activities (e.g., management plans or technical assistance) are influencing inactive family forest owners to become active managers. Similar to the analysis of assisted and unassisted family forest owners described above, FSP-related activities do not appear to be influencing decisions related to land disposition. That is, family forest owners noted that traditional FSP activities are not having an impact on future intentions to sell or subdivide their forestland. The focus group results indicate that FSP-related activities are most likely to

impact those family forest owners who have already decided they want to manage their forest in some way. For example, these activities appear to be influencing already-active family forest owners to modify their management efforts or treat more acres. This result upholds Melfi et al.’s (1997) South Carolina FSP study that noted most participants stated they would have managed their forestland without the FSP but would have made less-educated decisions.

#### Implications

The multiple analyses taken together lead us to make the following observations to improve the FSP. The specific analyses that support each observation are indicated in square brackets by analysis number.

***Shift Focus from Management Plans to Outreach and Technical Assistance—This May Expand the Reach of the FSP.*** Regardless of whether assisted landowners are defined as having a management plan or having received cost-share, advice, or any of these, the associations with past and future stewardship practices are essentially the same [IV]. Moreover, focus groups revealed that assisted family forest owners were often already interested in implementing land management practices, suggesting the FSP is not helping inactive landowners to become active forest managers [V]. To-



**Table 2. Characteristics of family forest owners (FFOs) receiving and not receiving forestry practice assistance: means/proportions for selected attributes. Assisted FFOs are defined as having a management plan, received advice, received cost-sharing assistance, or any combination thereof.<sup>a</sup>**

Category	Characteristic	Assisted FFOs <sup>b</sup> (std. error)	Unassisted FFOs <sup>b</sup> (std. error)
<i>FFO characteristics</i>	Age (65 yr or older = 1, else 0)	0.356* (0.022)	0.403* (0.018)
	Education (associate degree or higher = 1, else 0)	0.547*** (0.026)	0.380*** (0.019)
	Gender (male = 1, else 0)	0.761 (0.032)	0.749 (0.027)
	Income (\$100,000 or more = 1, else 0)	0.219*** (0.016)	0.158*** (0.014)
	Ownership means (purchased = 1, else 0)	0.752 (0.034)	0.787 (0.031)
	Ownership tenure (number of years)	23.7 (0.481)	23.8 (0.437)
	Owns a farm nearby (yes = 1)	0.390 (0.020)	0.359 (0.017)
	Primary residence within 1 mile of forestland (yes = 1)	0.628 (0.031)	0.662 (0.025)
	Race (white = 1, else 0)	0.969 (0.045)	0.948 (0.036)
	Single parcel owner (yes = 1)	0.472 (0.038)	0.575 (0.062)
<i>Land characteristics</i>	Conservation easement (yes = 1)	0.045*** (0.007)	0.010*** (0.002)
	Green certified (yes = 1)	0.047*** (0.005)	0.006*** (0.001)
	Ownership size (total number of acres)	96.7*** (2.542)	44.4*** (0.938)
<i>FFO attitudes and objectives</i>	Owner ever leased land (yes = 1)	0.137*** (0.010)	0.073*** (0.005)
	Owner concerned about nearby development (yes = 1) <sup>c</sup>	0.517** (0.030)	0.435** (0.021)
	Objective aesthetics (yes = 1) <sup>d</sup>	0.797 (0.034)	0.753 (0.027)
	Objective hunting (yes = 1) <sup>d</sup>	0.522** (0.025)	0.459** (0.020)
	Objective investment (yes = 1) <sup>d</sup>	0.575*** (0.027)	0.487*** (0.019)
	Objective recreation (yes = 1) <sup>d</sup>	0.500* (0.024)	0.440* (0.021)
	Objective timber (yes = 1) <sup>d</sup>	0.412*** (0.019)	0.200*** (0.010)

<sup>a</sup> We conduct hypothesis tests that there are no statistically significant differences in sociodemographic characteristics between assisted FFOs and unassisted FFOs (i.e., the means or proportions are not significantly different from zero), using the Taylor series linearization to estimate the variance of that difference and a Z-test to estimate the probability of a Type I error.

<sup>b</sup> Significance is indicated by the following: \* =  $P \leq 0.10$ , \*\* =  $P \leq 0.05$ , \*\*\* =  $P \leq 0.01$ .

<sup>c</sup> A respondent was coded with having concern about nearby development if he/she rated his/her concern as either a 1, 2, or 3 on a seven-point Likert scale, where 1 reflects "great concern" and 7 reflects "no concern."

<sup>d</sup> A respondent was coded with having an ownership objective (i.e., aesthetics, hunting, investment, recreation, timber) if he/she rated the objective as either a 1, 2, or 3 on a seven-point Likert scale, where 1 reflects "very important" and 7 reflects "not important."

**Table 3. Behaviors and intentions of family forest owners (FFOs) receiving and not receiving forestry practice assistance: Relative probabilities using four definitions of assistance: having a management plan; having received advice; having received cost-sharing assistance; or having received any one or more of these three.<sup>a</sup>**

FFO behavior/intention	Assistance = management plan (M)	Assistance = advice (A)	Assistance = cost-share (C)	Assistance = management plan, cost-share, or advice (MAC)
<b>FFO ACTIVITIES IN THE PAST 5 YEARS</b>				
Harvested timber	1.35	1.33	1.40	1.33
Improved wildlife habitat	2.43	2.77	2.32	2.86
Planted trees	1.91	2.21	2.19	2.17
Reduced fire hazard	1.94	2.18	1.85	2.20
<b>FFO FUTURE INTENTIONS</b>				
Afforestation	2.39	3.42	2.41	3.46
Conversion	NS	NS	NS	NS
Harvest timber	2.71	3.08	2.39	3.04
Sell forestland	NS	NS	NS	NS
Subdivide forestland	NS	NS	NS	NS
No plans	0.40	0.50	0.51	0.52

<sup>a</sup> Source: National Woodland Owner Survey 2002–2006 (Butler 2008). Sample reflects respondents owning one parcel that is between 10 and 10,000 acres in size. Relative probability estimates are defined as the estimated probability of an event (e.g., plans to harvest timber) occurring in a target group (i.e., assisted FFOs) divided by the estimated probability of that event occurring in a control group (i.e., unassisted FFOs) (Zhang and Kai 1998). We test the hypothesis that the probability difference between assisted and unassisted FFOs is zero in terms of their activities and future actions using a chi-squared test. Nonsignificant differences between assisted and unassisted FFOs at the 10% level are indicated by "NS."

gether with the finding that the FSP is reaching a small percentage of eligible NIPF owners and forestland [II], we note that the FSP may reach and have a similar impact on more landowners when FSP assistance efforts downplay resource-intensive tools (e.g., management plans) and use those same resources for activities designed to reach and inform decisions of a greater seg-

ment of NIPF owners (e.g., advice or education). Approaches such as increasing the number of relationships between professional foresters and landowners by supporting one-on-one visits, educational opportunities, and peer-to-peer learning (e.g., Master Forest Owner programs) may influence more landowners than more resource-intensive tools. These approaches should

help establish trusted relationships that landowners can rely on when decisions about their forests arise in the future.

**Maintain State-Level Flexibility—This Will Likely Allow Each State to Continue to Address Local, Critical Forest Resource Needs.** The FSP allows states to implement NIPF owner assistance programs that best suit the needs of the individual

states [I]. Each state faces a variety of challenges and opportunities with regard to its landscape and socioeconomic conditions. However, continuing a flexible, state-based approach underscores the importance of collecting consistently defined data necessary for conducting program monitoring and evaluation. To ensure that state-level flexibility is consistent with the FSP's ability to address national-level priorities and goals, we believe that the effectiveness of state-specific models warrants further exploration.

**Expand the Diversification of the FSP to Emphasize and Encourage Innovation—This Might Lead to Reaching More Unengaged Landowners.** Many of the unique and effective strategies that states reported were funded through competitive grants and involved activities that were often a departure from traditional landowner assistance activities [I]. While we did not evaluate the effectiveness of these innovative approaches, our results give us reason to believe that encouraging innovation could lead to reaching more unengaged landowners. Future research could explore the effectiveness of these approaches in detail.

**Improve Data Collection—This Could Result in More Comprehensive Future Evaluations of the FSP.** Our multiple analytic approach relied on a wide variety of available data. We believe that many of the limitations to evaluating the FSP that we encountered in conducting our analyses could be at least partially overcome by regularly performing quality control checks on the data being collected, establishing landowner case files or databases for all those receiving assistance, and implementing more uniform methods for assessing and defining IFRAAs [II].

**Continue to Focus Resources in the Most Critical Areas—This Could Ensure That the Most Important Landscapes Are Targeted.** The PMAS data indicate that FSP efforts have resulted in increasing numbers of IFRA acres in new/revised written management plans and in current plans managed sustainably [II]. If targeting the most important landscapes in the United States is important to the FSP, we note that maintaining this focus on IFRAAs and considering whether there are IFRAAs of national importance that need identification and prioritization might prove to be helpful.

**Emphasize Opportunities to Use the FSP as a Means to Keep Forests as Forests—This Will Likely Help the FSP Achieve Its Goal of Keeping Forests as**

### Sidebar 3. Quotes Exemplifying Findings from the Focus Groups.

Most of the focus group participants explained that they typically had some sort of management or stewardship objective for their land that prompted them to seek assistance from a natural resource professional. These interactions helped the participants to accomplish their objectives:

*“Okay, you knew you wanted to harvest and [the forester] just helped you do it?”*—Focus Group Moderator

*“Yes.”*—Georgia Resident

*“If I can get the one-on-one visit then it gets me started.”*—Iowa Resident

*“...It would be good to have somebody walk with me and ask questions and tell me what's wrong. That would be ideal.”*—New York Resident

Participants did not credit cost-sharing funding with inspiring their management objectives. Many claimed they would have carried out their objectives even without the funding:

*“Yeah, I would have done the same thing. It just would have cost me twice as much. I mean, it was in my mind to do it anyway.”*—Washington Resident

Instead, the funding enables landowners to intensify their management efforts or cover more acres:

*“Oh, I would've done my plan [without funding], but I wouldn't have gone beyond my plan like I did.”*—Colorado Resident

Participants described educational events as having an invigorating quality in addition to inspiring new management objective and strategies:

*“Because the more I get out and do some of these field tours and workshops...the more I see what other people are doing, it excites me and motivates me and ‘why didn't I think of that,’ and ‘that's a good idea,’ and I could do that better.”*—Iowa Resident

Educational events also provided the participants with networking opportunities that aid them in the future:

*“Well, [the class] let me know a whole lot that I didn't know. And it let me know where to look for more information. And another thing, too, is I met a lot of people that are gonna help me in the future.”*—Kentucky Resident

*“I think if people got together like this [referencing the focus group] in their own areas and it's like a workshop, I think that would be very helpful.”*—Colorado Resident

**Forests.** This analysis suggests that forest owners undertaking FSP-related activities are no different from other forest owners with respect to their intent to sell or subdivide their forestland [IV]. If “keeping forests as forests” is an important goal of the FSP,<sup>7</sup> then we believe that the program could be more explicit about that expectation and encourage activities that will lead to perpetuating forest cover. Examples include providing for the services of estate planning professionals, incorporating conservation-based estate planning into outreach efforts, and helping to facilitate conservation easements by encouraging closer working relationships between foresters and land trusts. In addition, stronger ties can be made between the FSP and other federal programs, such as the Forest Service's Forest Legacy Program (FLP). Working in partnership with states, FLP is designed to encourage the protection of privately owned forestlands and the public benefits they provide through the acquisition of conservation easements.

**Refine Allocation Metrics—This Could Help the FSP Better Meet Program Goals.** A state's annual FSP allocation is determined, in part, by a weighted equation that takes into account FSP performance from the previous year measured by various elements, including PMAS metrics (Sidebar 2). Our review of this allocation method suggests that the FSP may want to consider a system that rewards professional advice and other landowner contacts in addition to plans and acres (taking into account the relative efforts involved and effectiveness) and incentivizing efforts that target IFRAAs (especially those that target unengaged landowners and long-term stewardship) to help the FSP in meeting its program goals.

## Conclusions

As the most prominent assistance program for NIPF owners in the United States, the FSP has the opportunity to be a critical component in assisting family forest owners to reach their goals while maintaining the

tremendous public benefits that are derived from these lands. We know from previous national and regional evaluations that participants in the program are largely satisfied with the FSP, but because the assistance provided by the program is broad, it is important to examine the program from multiple perspectives.

By considering how states differ in their FSP implementation, state FSP administrator perceptions of the program, national monitoring metrics, differences between family forest owners who do and do not receive forestry assistance, and family forest owner FSP-related behaviors and perceptions, we are able to have a more complete picture of the program. This multiple analytic approach confirmed findings from other regional studies: one-on-one forestry practice assistance may be more useful to NIPF owners than other forms of assistance (e.g., management plans) and that FSP participants are no different from other landowners with regards to future land use intentions. Working within the confines of the available data, we find that while the program is working for those who are participating, a large proportion of the eligible NIPF owners are not being reached. Our analyses suggest numerous ways to change the FSP so that it may substantially increase its reach and impact, even at its current funding level. Better reporting systems would help document changes and provide stronger data for future evaluations.

### Endnotes

1. The authorizing legislation defines NIPF lands as “rural, as determined by the Secretary, lands with existing tree cover, or suitable for growing trees, and owned by any private individual, group, association, corporation, Indian tribe, or other private legal entity” (16 U.S.C. §2103a).
2. “Managed sustainably” acres are determined by state/Forest Service-conducted, randomly sampled site visits, ensuring that an FSP plan is being implemented and stands are managed sustainably. Data from these visits are analyzed and yield a percentage of total acres managed sustainably as defined by approved FSP plans. This and other PMAS definitions were provided by the Forest Service (Karl Dalla Rosa, USDA Forest Service, pers. comm., Mar. 6, 2012).
3. Because many of the NWOS respondents owned multiple parcels and the NWOS questions are not parcel specific, questions about management behavior and intentions may not be relevant for all of a landowner’s

property. To address this, we limit the analysis to single-parcel owners. Tukey and Scheffe tests were conducted to see if the reduced sample is representative of the larger multiple-parcel owner sample; results show that the restricted dataset is not significantly different from the unrestricted data set.

4. The focus groups concentrated on family forest owners because they are the predominant focus of the FSP and including other ownership structures would have required different focus group questions and separate focus group sessions, both of which were beyond the scope of this effort.
5. The 3.3% derives from the average number of landowners assisted per year from 2007–2011 (730,000/5 = 146,000) and the number of NIPF owners with at least 10 acres of forestland (4,477,000) (Butler 2008).
6. The result of insignificant gender between assisted and unassisted owners does not contradict either national studies (Esseks and Moulton 2000, Esseks and Moorhouse 2005), which found FSP participants to be nearly all white.
7. See [www.fs.fed.us/spf/coop/library/fsp\\_strategicplan.pdf](http://www.fs.fed.us/spf/coop/library/fsp_strategicplan.pdf) for more information.

### Literature Cited

BAUGHMAN, M.J., AND K. UPDEGRAFF. 2002. *Landowner survey of forest stewardship plan implementation: Final report to the USDA Forest Service Northeastern Area State and Private Forestry*. Department of Forest Resources, University of Minnesota, St. Paul, MN. 68 p.

BELL, C.D., R.K. ROBERTS, B.C. ENGLISH, AND W.M. PARK. 1994. A logit analysis of participation in Tennessee’s Forest Stewardship Program. *J. Agri. Appl. Econ.* 26(2):463–472.

BROCKETT, C.D., R.R. GOTTFRIED, AND J.P. EVANS. 2003. The use of state tax incentives to promote forest preservation on private lands in Tennessee: An evaluation of their equity and effectiveness impacts. *Politics Policy* 31(2): 252–281.

BUTLER, B.J. 2008. *Family forest owners of the United States, 2006*. USDA For. Serv., Gen. Tech. Rep. NRS-27, Northern Research Station, Newtown Square, PA. 73 p.

DICKINSON, B.J., AND B.J. BUTLER. 2013. Methods for estimating private forest ownership statistics: Revised methods for the USDA Forest Service’s National Woodland Owner Survey. *J. For.* 111(5):319–325.

EGAN, A., D. GIBSON, AND R. WHIPKEY. 2001. Evaluating the effectiveness of the Forest Stewardship Program in West Virginia. *J. For.* 99(3):31–36.

ESSEKS, D.J., AND R.J. MOULTON. 2000. *Evaluating the Forest Stewardship Program through a national survey of participants in the national Forest Stewardship Program*. Center for Governmental Studies, Northern Illinois University Press, DeKalb, IL. 133 p.

ESSEKS, J.D., AND E.A. MOORHOUSE. 2005. *The second national survey of participants in the Forest Stewardship Program*. Center for Great Plains Studies, University of Nebraska-Lincoln, Lincoln, NE. 133 p.

GADDIS, D. 1996. Accomplishments and program evaluations of forestry financial assistance programs. In *Proc. of symposium on non-industrial private forests: Learning from the past, prospects for the future*, Washington, DC, Feb. 18–20, 1996, Baughman, M.J. (ed.). University of Minnesota, Extension Special Programs, St. Paul, MN. 10 p.

GRAESSER, P.W., AND J.E. FORCE. 1996. Early and late adopters of stewardship planning. In *Proc. of symposium on nonindustrial private forests: Learning from the past, prospects for the future*, Washington, DC, Feb. 18–20, 1996, Baughman, M.J. (ed.). University of Minnesota, Extension Special Programs, St. Paul, MN. 8 p.

GUEST, G., AND K.M. MACQUEEN. 2008. *Handbook for team-based qualitative research*. Altamira, Lanham, MD. 292 p.

HENLY, R.K., P.V. ELLEFSON, AND M.J. BAUGHMAN. 1990. Minnesota’s private forest management assistance program: An evaluation of aspen timber sale assistance. *North. J. Appl. For.* 7(1):31–34.

JACOBSON, M.G., T.J. STRAKA, J.L. GREENE, M.A. KILGORE, AND S.E. DANIELS. 2009. Financial Incentive Programs’ influence in promoting sustainable forestry in the northern region. *North. J. Appl. For.* 26(2):61–67.

JENNINGS, B.M., AND D.W. MCGILL. 2005. Evaluating the effectiveness of the Forest Stewardship Program in West Virginia: Ten-year assessment. *North. J. Appl. For.* 22(4):236–242.

MACFARLANE, D.D., AND P. ZUNDEL. 1995. The short-term economic impacts of the private woodlot silviculture program in New Brunswick. *For. Chron.* 71(3):282–287.

MELFI, F.M., T.J. STRAKA, A.P. MARSINKO, AND J.L. BAUMANN. 1997. Landowner attitudes toward South Carolina’s Forest Stewardship Program. *South. J. Appl. For.* 21(4):158–163.

RACE, D., AND A. CURTIS. 1996. Farm forestry in Australia: Review of a national program. *Agroforestry Syst.* 34(2):179–192.

SALMON, O., M. BRUNSON, AND M. KUHN. 2006. Benefit-based audience segmentation: A tool for identifying nonindustrial private forest (NIPF) owner education needs. *J. For.* 104(8): 419–425.

SHOCKLEY, T., AND A.J. MARTIN. 2000. Estimating management plan implementation in northeast Wisconsin. *North. J. Appl. For.* 17(4): 135–140.

USDA FOREST SERVICE. 2005. *The principal laws relating to USDA Forest Service state and private forestry programs*. FS-758. Available online at [www.fs.fed.us/spf/coop/library/SPF-CF%20handbook.pdf](http://www.fs.fed.us/spf/coop/library/SPF-CF%20handbook.pdf); last accessed Jan. 8, 2014.

ZHANG, Y., AND F.Y. KAI. 1998. What’s relative risk? A method of correcting the odds ratio in cohort studies of common outcomes. *J. Amer. Med. Assoc.* 280(19):1690–1691.