

# Influence and Effectiveness of Financial Incentive Programs in Promoting Sustainable Forestry in the South

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ABSTRACT

State forestry officials responsible for forestry incentive programs in each of the 13 southern states were surveyed concerning their opinions on financial incentive programs available to nonindustrial private forest owners. The forestry officials were asked to name and describe the public and private programs available in their state, to assess forest owners' awareness of each program, its appeal among the owners aware of it, its effectiveness in encouraging sustainable forestry and enabling owners to meet their objectives, and the percent of program practices that remain in place and enrolled acres that remain in forest over time. They also were asked to suggest ways to improve the programs. The Forest Stewardship, Forest Land Enhancement, and Forest Legacy Programs were among the top rated federal programs. Programs sponsored by states and private organizations tended to be more narrowly targeted than federal programs and scored well for specific attributes. The forestry officials' suggestions for program improvement centered largely on improving program visibility and availability, increasing and ensuring long-term consistency in program funding, and simplifying the application and approval process.

**Keywords:** financial incentives, nonindustrial private forest, cost share programs, property taxes

Policy tools such as education, technical assistance, regulation, and financial incentives influence the management and use of nonindustrial private forests. Increasing concern over loss of open space, forest fragmentation, ecosystem services (such as carbon sequestration), and the impact of globalization of forest product markets has revived interest in financial incentives as tools to conserve forests and promote sustainable forestry (Sampson and De-Coster 2000, Wear and Greis 2002, Hutton and Leader-Williams 2003).

The scope of financial incentives is extensive and dispersed among numerous organizations. The most popular are cost sharing or grants for forest management planning or implementing specific management practices (such as treeplanting and timber stand improvement) and tax incentives to encourage preferable management behavior. Most forestry cost share programs are funded by the federal government and administered by state forestry agencies. Tax incentives are provided by both the federal and the state governments, primarily through the federal income tax system and state property taxes. In some states, forest industry firms, state forestry associations, and nongovernmental organizations (NGO) also provide forestry-related incentive programs (Greene et al. 2005).

Since financial incentives were first used in the 1940s to influence forest owners, the programs have shifted from a focus on timber supply and production toward addressing forest sustainability and environmental concerns, forest stewardship, and multiple benefits

from the forest, such as wildlife, recreation, water quality, and biodiversity. Several studies have questioned the impact and effectiveness of these incentive programs (Yoho and James 1958, Skok and Grogger 1975, Lee et al. 1992, Cabbage 1994, Megalos and Blank 1997, Kluender et al. 1999, Greene et al. 2004, Kilgore and Blinn 2004). Studies of cost share programs generally found that a large fraction of forest owners were unaware of the program provisions, did not understand the programs, or would have performed the subsidized practices without the incentive, while tax incentives were found to have little effect on forest owner behavior.

Sustainable forestry—defined as managing forests for their ecological, economic, and social benefits such that those benefits do not diminish in quantity or quality over time (US Forest Service 2004)—has become the linchpin of the current forest policy agenda (Oliver 2003, Wear et al. 2007). There has been debate about the role of financial incentives in promoting sustainable forestry (McKillop 1975, Worrel and Irland 1975, Boyd 1984, Schaaf and Broussard 2006). Although financial incentives can be viewed as assisting landowners in providing public goods that help society to meet sustainability goals, some feel that there are better ways to use taxpayer dollars than to subsidize landowner activities. A recent nationwide study was the first of its kind to examine the impact of financial incentive programs in promoting sustainable forestry (Greene et al. 2005, Kilgore et al. 2007, Straka et al. 2007). This article examines the results of this survey for the southern states and

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**Table 1. Federal financial incentive programs surveyed.**

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Forest Stewardship Program (FSP)—Established in 1990 to assist private forest owners to keep forestland and resources in healthy condition and increase the economic and environmental benefits it provides. The FSP is not a cost share program; participating owners receive technical assistance to develop a Forest Stewardship plan, and must make a good faith effort to implement the plan. Administered by the US Forest Service.
Conservation Reserve Program (CRP)—Established in 1985 to promote conversion of highly erodible farmland and other environmentally sensitive land to a long-term resource conserving cover. Participating landowners receive annual payments for 10–15 yr based on the converted land's agricultural rental value. They also can receive a cost share of up to 50% of the cost of establishing the resource conserving cover. Administered by the USDA Farm Service Agency.
Environmental Quality Incentives Program (EQIP)—Established in 1996, The EQIP combines features of four earlier programs. Its objective is to help farm and ranch owners address practices that pose a significant threat to soil or water resources. Participating owners receive technical assistance, cost share, and incentive payments to implement conservation practices. Administered cooperatively by the USDA NRCS and Farm Service Agency.
Forest Land Enhancement Program (FLEP)—Established in 2002, the FLEP combines two earlier programs. It promotes sustainable management of nonindustrial private forestland by providing technical, educational, and cost share assistance to owners. A coordinating committee in each state determines how program funds will be used. Owners must have a written forest management plan to participate. Administered by the US Forest Service in partnership with state forestry agencies.
Forest Legacy Program (FLP)—Created in 1990 to protect environmentally important private forestland threatened with conversion to nonforest uses. The FLP operates primarily through the purchase of permanent conservation easements. Up to 75% of the total cost of protecting forestland can be federally funded. Administered by the US Forest Service in partnership with individual states.
Landowner Incentive Program (LIP)—Established in 2003 to help private landowners protect and restore habitat for at-risk plant and animal species. The LIP provides funding for states to offer technical assistance and grants to participating owners to develop and implement habitat management plans. Administered by the USDI Fish and Wildlife Service in cooperation with state wildlife agencies. To participate, the states must provide a minimum 25% nonfederal match for federal funding.
Southern Pine Beetle Prevention and Restoration Program (SPBPR)—Established in 2003, a coordinated program to help public and private landowners in southern states reduce the susceptibility of their forests to SPB attack and restore affected areas and to fund research. Private landowners who participate receive educational assistance and cost share payments to implement treatments such as thinning and hazard fuel reduction. Administered by the US Forest Service.
Wetlands Reserve Program (WRP)—Established in 1985 to encourage conservation of wetlands on privately owned land. Participating owners receive financial assistance to implement practices. All costs are reimbursed if the owner accepts a permanent easement; 75% of costs are reimbursed if the owner opts for a 30-yr easement or cost share agreement. Administered cooperatively by the USDA NRCS and Farm Service Agency.
The Wildlife Habitat Incentives Program (WHIP)—Established in 1996 to encourage the development and improvement of wildlife habitat on private land. Participating owners receive technical assistance to develop a wildlife habitat management plan, plus cost share payments under an agreement lasting 5–10 yr. Cost shares can not exceed 75% of the cost of the practices performed. Administered by the USDA NRCS.

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discusses region-specific implications of forestry incentive programs (FIP). The research questions addressed are whether financial incentive programs for forest owners in the southern region are accomplishing their objectives in light of changing forest ownership objectives and program emphases, whether specific programs are more effective than others at accomplishing the intended objectives, and the characteristics of effective programs.

Extending from Virginia to Texas, the 13 states of the US South provide an ideal area to study the effectiveness of financial incentive programs in encouraging sustainable forestry on nonindustrial private forests. The region is home to 33% of the nation's population and 42% of its more than 10 million nonindustrial private forest owners. It comprises 29% of US forestland and 40% of commercial timberland (Butler and Leatherberry 2004). Moreover, 88% of forestland in the region is privately owned, compared with 57% nationwide (Smith et al. 2004).

## Procedures

Data for the study were collected using a mail survey of state agency foresters in each of the 13 southern states selected for their overall knowledge of financial incentive programs. The appropriate individual in each state to receive the survey questionnaire was identified using a networking approach; in most cases it was the person who managed the Forest Stewardship Program (FSP). Respondents completed a written survey form and follow-up telephone calls and e-mails were used to obtain additional detail. The questionnaire was pretested in 2005 and feedback was used to refine it using the Dillman (1999) tailored design method. Given limited funding for the study, surveying landowners themselves were not feasible. The forestry officials surveyed are state employees and work on all the federal programs regardless of the federal agency involved. Because the officials see and hear directly from forest owners, they are likely the best single person in the state in terms of obtaining landowner

feedback and understanding program operations. Responses were obtained from all 13 southern states.

The survey questionnaires asked the foresters to name and describe the public and private financial incentive programs available to nonindustrial private forest owners in their state, as well as any private programs in neighboring states. For all identified programs they were asked to use a four-point Likert scale to assess forest owners' awareness of it, its overall appeal among the owners aware of it, and its effectiveness in encouraging sustainable forestry and enabling owners to meet their objectives of forest ownership. Specifically, respondents were asked to rank the incentive programs from very effective to very ineffective for the following sustainable forestry attributes: enhances conservation, prevents parcelization of forestland, prevents forest type conversion, protects wildlife and/or fish, protects riparian or water quality, protects productive capacity of soil, and encourages forest management. They also rated each program's effectiveness in meeting landowners' objectives of timber production, recreation, wildlife, aesthetic enjoyment, soil and/or water conservation, and invasive species control. The foresters were also asked to estimate the percent of program practices that remained in place and enrolled acres that remained in forest over time and to suggest ways to improve owner participation in the program and its administrative effectiveness.

Nine federal incentive programs were surveyed: the FSP, Conservation Reserve Program (CRP), Environmental Quality Incentives Program (EQIP), Forest Land Enhancement Program (FLEP), Forest Legacy Program (FLP), Landowner Incentive Program (LIP), Southern Pine Beetle Prevention and Restoration Program (SPBPR), Wetlands Reserve Program (WRP), and Wildlife Habitat Incentives Program (WHIP). Table 1 provides information about each program, including the year it was established, a summary of its provisions, and its administering agency or agencies.

**Table 2. Federal financial incentive program attributes as reported by state program administrators.**

Attribute	Incentive program							
	FSP	CRP	EQIP	FLEP	FLP	SPBPR	WRP	WHIP
a. Owner awareness and appeal								
Awareness <sup>a,b</sup>	2.69 <sup>A</sup>	2.62 <sup>A</sup>	2.40 <sup>A</sup>	2.58 <sup>A</sup>	1.89 <sup>A</sup>	2.00 <sup>A</sup>	1.75 <sup>A</sup>	2.14 <sup>A</sup>
Appeal <sup>a,b</sup>	3.31 <sup>AB</sup>	3.38 <sup>AB</sup>	2.50 <sup>AB</sup>	3.50 <sup>A</sup>	3.00 <sup>AB</sup>	2.75 <sup>AB</sup>	2.13 <sup>B</sup>	2.86 <sup>AB</sup>
b. Effectiveness in encouraging sustainable forestry								
Prevents conversion <sup>a,b</sup>	3.00 <sup>ABC</sup>	3.70 <sup>A</sup>	2.11 <sup>C</sup>	3.36 <sup>AB</sup>	3.89 <sup>A</sup>	2.83 <sup>ABC</sup>	3.00 <sup>AB</sup>	2.50 <sup>BC</sup>
Prevents parcelization <sup>a,b</sup>	2.85 <sup>ABC</sup>	3.27 <sup>ABC</sup>	2.11 <sup>C</sup>	3.18 <sup>ABC</sup>	3.89 <sup>A</sup>	2.67 <sup>BC</sup>	3.38 <sup>AB</sup>	2.50 <sup>BC</sup>
Maintains forest type <sup>a,b</sup>	3.00 <sup>AB</sup>	3.40 <sup>AB</sup>	2.40 <sup>B</sup>	3.27 <sup>AB</sup>	3.63 <sup>A</sup>	2.60 <sup>AB</sup>	3.25 <sup>AB</sup>	2.71 <sup>AB</sup>
Protects wildlife/fish <sup>a,b</sup>	3.77 <sup>A</sup>	3.31 <sup>A</sup>	3.30 <sup>A</sup>	3.36 <sup>A</sup>	3.67 <sup>A</sup>	2.17 <sup>B</sup>	3.38 <sup>A</sup>	3.86 <sup>A</sup>
Protects water quality <sup>a,b</sup>	3.92 <sup>A</sup>	3.77 <sup>A</sup>	3.70 <sup>A</sup>	3.36 <sup>AB</sup>	3.78 <sup>A</sup>	2.57 <sup>B</sup>	3.50 <sup>A</sup>	3.29 <sup>AB</sup>
Protects soil productivity <sup>a,b</sup>	3.54 <sup>AB</sup>	3.92 <sup>A</sup>	3.50 <sup>AB</sup>	3.45 <sup>AB</sup>	3.78 <sup>A</sup>	2.43 <sup>C</sup>	3.25 <sup>ABC</sup>	2.86 <sup>BC</sup>
Encourages forest management <sup>a,b</sup>	3.85 <sup>A</sup>	3.46 <sup>ABC</sup>	2.50 <sup>CD</sup>	3.91 <sup>A</sup>	3.56 <sup>AB</sup>	3.57 <sup>AB</sup>	2.25 <sup>D</sup>	2.71 <sup>BCD</sup>
Overall average	3.42 <sup>AB</sup>	3.44 <sup>AB</sup>	2.82 <sup>CD</sup>	3.42 <sup>AB</sup>	3.74 <sup>A</sup>	2.70 <sup>D</sup>	3.14 <sup>BC</sup>	2.92 <sup>CD</sup>
c. Effectiveness in helping owners meet their objectives								
Timber production <sup>a,b</sup>	3.54 <sup>A</sup>	3.00 <sup>AB</sup>	2.30 <sup>BC</sup>	3.82 <sup>A</sup>	3.13 <sup>AB</sup>	3.57 <sup>A</sup>	2.38 <sup>AB</sup>	1.86 <sup>C</sup>
Recreation <sup>a,b</sup>	3.23 <sup>A</sup>	2.67 <sup>A</sup>	2.30 <sup>A</sup>	3.00 <sup>A</sup>	3.25 <sup>A</sup>	2.17 <sup>A</sup>	2.75 <sup>A</sup>	3.29 <sup>A</sup>
Wildlife <sup>a,b</sup>	3.69 <sup>A</sup>	3.31 <sup>A</sup>	3.20 <sup>AB</sup>	3.55 <sup>A</sup>	3.50 <sup>A</sup>	2.43 <sup>B</sup>	3.38 <sup>A</sup>	4.00 <sup>A</sup>
Aesthetics <sup>a,b</sup>	3.38 <sup>AB</sup>	2.69 <sup>AB</sup>	2.70 <sup>AB</sup>	2.91 <sup>AB</sup>	3.50 <sup>A</sup>	2.43 <sup>B</sup>	3.00 <sup>AB</sup>	3.14 <sup>AB</sup>
Soil/water conservation <sup>a,b</sup>	3.38 <sup>AB</sup>	3.92 <sup>A</sup>	3.50 <sup>AB</sup>	3.64 <sup>A</sup>	3.75 <sup>A</sup>	2.86 <sup>B</sup>	3.25 <sup>AB</sup>	2.86 <sup>B</sup>
Invasive species control <sup>a,b</sup>	2.62 <sup>A</sup>	2.50 <sup>A</sup>	3.10 <sup>A</sup>	2.91 <sup>A</sup>	3.00 <sup>A</sup>	2.67 <sup>A</sup>	2.00 <sup>A</sup>	2.71 <sup>A</sup>
Overall average	3.31 <sup>AB</sup>	3.11 <sup>ABC</sup>	2.85 <sup>BC</sup>	3.30 <sup>AB</sup>	3.36 <sup>A</sup>	2.70 <sup>C</sup>	2.80 <sup>C</sup>	2.98 <sup>ABC</sup>
d. Over time								
Practices remain in place <sup>a,b</sup>	3.38 <sup>A</sup>	3.69 <sup>A</sup>	3.50 <sup>A</sup>	3.50 <sup>A</sup>	3.89 <sup>A</sup>	3.71 <sup>A</sup>	3.63 <sup>A</sup>	3.17 <sup>A</sup>
Acres remain in forest <sup>a,b</sup>	3.54 <sup>A</sup>	3.46 <sup>A</sup>	3.00 <sup>A</sup>	3.50 <sup>A</sup>	3.89 <sup>A</sup>	3.71 <sup>A</sup>	3.63 <sup>A</sup>	3.00 <sup>A</sup>

<sup>a</sup> Likert Scale ratings: 1 = very ineffective; 2 = moderately ineffective; 3 = moderately effective; 4 = very effective.

<sup>b</sup> Tukey's grouping across incentive programs for each respective program attribute. Alpha = 0.05. Means with the same letter are not significantly different.

Three types of nonfederal financial incentive programs also were examined. The first was a preferential property tax program for forest owners, present in all southern states; however, the mechanisms and processes for the tax incentive are different in each state. The second was state-sponsored financial incentive programs, many of which are funded by forest tax revenues. Most state cost share programs are funded using state severance tax revenues; other funding sources include taxes on forest industry and voluntary industry contributions. Some of these programs help fund timber management activities, while others focus on wildlife, riparian areas, or conservation easements; one is a state-level FSP. The third type was privately sponsored financial incentive programs, of which forest industry landowner assistance programs are the most common. Programs sponsored by state forestry associations, land trusts, or conservation organizations are available in a handful of states.

The final version of the questionnaire was mailed out in March 2005. Although the questionnaire was extensive—89 questions on 30 pages—follow-up telephone calls and e-mails provided a 100% useable response. Numerical data, including the Likert scale ratings, were compiled and summarized. Tukey tests were used to identify statistically significant differences between program ratings for specific attributes. Forester comments and suggestions were compiled and categorized. The results of the analysis are summarized in the next section.

## Results

### Program Catalog

The first result of the survey was a catalog of the public and private financial incentive programs (cost share, tax, and other programs) available to nonindustrial private forest owners in each state (Greene et al. 2008). This is an interactive website with a national map that allows a user to select a state and see all federal, state, and private programs that are available. In addition, by selecting a program the user can be linked to the federal or the state-level website

for the program. Timber tax fact sheets are provided for each state. Green et al. (2008) provides the website address.

An examination of the catalog reveals that the full suite of federal incentive programs is more likely to be available in states in the South than in other regions. At the time of the survey, the FSP, CRP, EQIP, FLEP, and WHIP were available in all 13 southern states, the FLP and WRP were available in 12 states, the SPBPR was available in 10 states—and nowhere else in the United States—and the LIP was available in 8 states. The number and variety of the state- and privately sponsored financial assistance programs available to forest owners was greater in the South than in other regions. As well, states in the region hosted one of only two financial incentive programs sponsored by forestry associations and one of only two programs sponsored by NGOs (Greene et al. 2006).

### Federal Programs

None of the southern foresters surveyed responded about the LIP. This may be because the program was relatively new at the time of the survey and is administered by an agency outside the USDA. Because of this result, the LIP was excluded from the analysis.

Table 2 summarizes the mean response of state program administrators by financial incentive programs. The first section of the table shows the foresters' mean rankings for forest owner awareness and overall appeal of each program. Appeal was measured only in terms of owners aware of the program. All eight programs scored in the midranges for both awareness and appeal, with appeal rated consistently higher than awareness. The FLEP scored highest in owner appeal, followed closely by the CRP and FSP. The long-established CRP and the two most timber-oriented programs (FSP and FLEP) rated highest in owner awareness, although the difference was not statistically significant (Table 2, section a). Our survey centered on forestry agencies that have traditionally been more timber oriented and the awareness rankings may be biased toward the traditional programs.

**Table 3. State- and privately sponsored financial incentive program attributes as reported by state program administrators.**

Attribute	Incentive program			
	State property tax programs	Other state incentive programs	Industry and state association programs	NGO programs
a. Owner awareness and appeal				
Awareness <sup>a,b</sup>	3.00 <sup>A</sup>	2.70 <sup>A</sup>	N/A	N/A
Appeal <sup>a,b</sup>	3.25 <sup>A</sup>	3.14 <sup>A</sup>	N/A	N/A
b. Effectiveness in encouraging sustainable management				
Prevents conversion <sup>a,b</sup>	3.08 <sup>A</sup>	3.71 <sup>A</sup>	3.00 <sup>A</sup>	2.66 <sup>A</sup>
Prevents parcelization <sup>a,b</sup>	2.91 <sup>A</sup>	3.28 <sup>A</sup>	2.87 <sup>A</sup>	3.00 <sup>A</sup>
Maintains forest type <sup>a,b</sup>	3.00 <sup>A</sup>	3.28 <sup>A</sup>	3.14 <sup>A</sup>	3.33 <sup>A</sup>
Protects wildlife/fish <sup>a,b</sup>	2.81 <sup>A</sup>	3.14 <sup>A</sup>	2.50 <sup>A</sup>	3.33 <sup>A</sup>
Protects water quality <sup>a,b</sup>	3.00 <sup>A</sup>	3.42 <sup>A</sup>	3.12 <sup>A</sup>	3.33 <sup>A</sup>
Protects soil productivity <sup>a,b</sup>	2.83 <sup>A</sup>	3.43 <sup>A</sup>	2.87 <sup>A</sup>	3.33 <sup>A</sup>
Encourages forest management <sup>a,b</sup>	2.91 <sup>A</sup>	3.71 <sup>A</sup>	3.25 <sup>A</sup>	3.00 <sup>A</sup>
Overall average <sup>a,b</sup>	2.94 <sup>B</sup>	3.43 <sup>A</sup>	2.96 <sup>B</sup>	3.14 <sup>AB</sup>
c. Effectiveness in helping owners meet their objectives				
Timber production <sup>a,b</sup>	3.08 <sup>A</sup>	3.85 <sup>A</sup>	3.86 <sup>A</sup>	3.00 <sup>A</sup>
Recreation <sup>a,b</sup>	2.72 <sup>A</sup>	3.00 <sup>A</sup>	2.37 <sup>A</sup>	3.33 <sup>A</sup>
Wildlife <sup>a,b</sup>	2.75 <sup>A</sup>	3.28 <sup>A</sup>	2.62 <sup>A</sup>	3.33 <sup>A</sup>
Aesthetics <sup>a,b</sup>	2.82 <sup>A</sup>	2.85 <sup>A</sup>	2.50 <sup>A</sup>	3.33 <sup>A</sup>
Soil/water conservation <sup>a,b</sup>	3.00 <sup>A</sup>	3.57 <sup>A</sup>	3.25 <sup>A</sup>	3.66 <sup>A</sup>
Invasive species control <sup>a,b</sup>	2.30 <sup>A</sup>	3.14 <sup>A</sup>	2.43 <sup>A</sup>	2.67 <sup>A</sup>
Overall average <sup>a,b</sup>	2.79 <sup>A</sup>	3.28 <sup>A</sup>	2.85 <sup>A</sup>	3.22 <sup>A</sup>
d. Over time				
Practices remain in place <sup>a,b</sup>	3.66 <sup>A</sup>	3.00 <sup>A</sup>	N/A	N/A
Acres remain in forest <sup>a,b</sup>	3.66 <sup>A</sup>	2.25 <sup>A</sup>	N/A	N/A

<sup>a</sup> Likert Scale ratings: 1 = very ineffective; 2 = moderately ineffective; 3 = moderately effective; 4 = very effective.

<sup>b</sup> Tukey's grouping across incentive programs for each respective program attribute. Alpha = 0.05. Means with the same letter are not significantly different.

Table 2, section b, summarizes the foresters' mean rankings for the programs in terms of their effectiveness in encouraging sustainable forestry among participating owners. The FLP, with its strong environmental protection goal, ranked highest overall, ranking well in all attributes of sustainability. The CRP, FSP, and FLEP ranked next highest. As expected for a program with strong soil and water conservation goals, the CRP ranked particularly well for protecting soil productivity, protecting water quality, and preventing conversion of forestland. The FSP ranked well for protecting water quality, encouraging forest management, and protecting wildlife and fish, while the FLEP ranked well for encouraging forest management and protecting wildlife and fish. The longer-established and better-known programs tended to earn the highest ratings.

The WRP ranked solidly in the effective range, scoring highest for protecting water quality and wildlife/fish, and preventing parcelization. It ranked lowest for encouraging forest management. The WHIP, EQIP, and SPBPR ranked lowest overall in encouraging sustainable management. However, as expected, because of specific program objectives, the WHIP ranked quite well for protecting wildlife and fish, the EQIP for protecting water quality and wildlife/fish, and the SPBPR for encouraging forest management (Table 2, section b).

Table 2, section c, summarizes the foresters' mean rankings for the programs in terms of their effectiveness in helping nonindustrial private forest owners meet their objectives of forest ownership. Generally, the foresters ranked the programs slightly less effective in meeting objectives than in encouraging sustainable forestry. Given the specific goals of individual programs, it is not surprising that several programs ranked fairly low in some objectives such as recreation and invasive species control.

The FLP, again, ranked highest overall, scoring well for all owner objectives. The FSP and FLEP ranked next highest. The FSP and FLEP are the closest to the older established timber production programs and this might account for the relatively high ranking.

The CRP ranked well for objectives related to soil and water conservation and wildlife, but averaged much lower for aesthetics, recreation, and invasive species control. The WHIP, not surprisingly, received the highest possible average rating for the owner objective related to wildlife, but averaged much lower for soil and water conservation, invasive species control, and timber production. The EQIP received high rankings for objectives related to soil and water conservation, but averaged moderately lower for aesthetics, timber production, and recreation. The WRP and SPBPR ranked generally lowest for helping forest owners meet their objectives. The WRP, however, received solid ranks for helping owners meet objectives related to wildlife, and the SPBPR received solid ranks for timber production (Table 2, section c).

Table 2, section d, summarizes the foresters' mean rankings for program practices remaining in place and enrolled acres remaining in forest over time. All eight federal programs ranked in the moderately to very effective range for these characteristics, with no statistically significant differences between the scores. The FLP ranked highest in terms of both practices and acres that remained in place over time.

### Other Incentive Programs

Table 3 summarizes the results for state and private financial incentive programs. The questionnaire sections relating to private incentive programs were streamlined to request only descriptions of the programs and ratings for their effectiveness in encouraging sustainable forestry and helping owners meet their objectives of forest ownership. Data were collected for broad areas of program type and not for specific programs.

Table 3, section a, shows the state agency foresters' mean rankings for forest owner awareness and overall appeal of each program type. State property tax and other state incentive programs ranked higher than federal programs in awareness and about average in

appeal. State property tax programs received the highest ranking for awareness in the survey.

Table 3, section b, shows the foresters' mean rankings for each type of program in terms of its effectiveness in encouraging sustainable forestry. Other state incentive programs ranked higher than the other program types. However, all program types ranked fairly high in terms of encouraging sustainability. All program types received high rankings for preventing conversion of forestland and protecting water quality; incentive programs scored high for encouraging forest management. Among the private programs, incentives offered by NGOs, such as the Tree Farm System, ranked generally higher than those offered by forest industry and state forestry associations in both terms of encouraging sustainability and meeting objectives. As expected, programs offered by industry and associations were highly ranked for encouraging forest management.

Table 3, section c, shows the foresters' mean rankings for each type of program in terms of its effectiveness in helping nonindustrial private forest owners meet their objectives of ownership. Although the differences were not statistically significant, state incentive programs again ranked higher than property taxes, and programs offered by NGOs again ranked higher than programs offered by industry firms and state forestry associations. Both types of state programs received their highest ranks for helping owners meet objectives related to timber production and soil and water conservation. State incentive programs also ranked well for objectives related to wildlife. Both programs offered by industry firms and state forestry associations and programs offered by NGOs received high ranks for objectives related to soil and water conservation. Programs offered by firms and associations also ranked well for objectives related to timber production.

Table 3, section d, summarizes the foresters' mean rankings for program practices remaining in place and enrolled acres remaining in forest over time. Property tax programs ranked fairly high for both characteristics, while other state incentives ranked equally high for practices remaining in place but only average for forest remaining in place. The differences, however, were not statistically significant.

### Incentive Program Improvement

State agency forester suggestions on ways to improve financial incentive programs centered largely on improving program visibility and availability, increasing and ensuring long-term consistency in program funding, and simplifying the application and approval process for both forest owners and program administrators. Specific suggestions included:

- Targeting forestlands and practices where the benefits would be greatest, rather than distributing funds on a first-come, first-served basis.
- Designating a single agency in each state—ideally, the forestry agency—as the point of contact for all forest-related financial incentive programs, to reduce the level of confusion among forest owners with respect to program availability, eligibility, and application procedures.
- Improving communication between state agency foresters and the USDA Natural Resources Conservation Service (NRCS) and Farm Service Agency (FSA), with the goals of establishing a process for foresters to become technical service providers for and allowing for more funding of forestry practices in the financial incentive programs administered by those agencies.

- Building flexibility into program objectives and requirements, so they can be applied to region- and state-specific concerns.
- Improving coordination between programs, such as requiring a written management plan for all programs, and linking financial incentives directly to stewardship practices.

The most frequently mentioned changes for improving preferential property tax programs included increasing funding and simplifying eligibility requirements, administrative procedures, objectives, guidelines, and valuation methods.

### Discussion

We surveyed forestry administrators who directly delivered the programs to landowners and, it may be argued, as the results suggest, they would tend to believe these programs can and do play an important role in promoting sustainable practices on the private forestlands. Federal laws and regulations ensure that the federal programs are administered in fundamentally the same manner. However, state-level program administration differs from state to state, mainly because of obvious dissimilarities in physical or socioeconomic conditions.

The various programs have different and specific goals and objectives. Thus, it was not surprising that forestry officials ranked the programs differently in terms of achieving sustainability and effectiveness component objectives. Table 1 shows that the programs have establishment years that vary from 1985 to 2003; certainly, familiarity with programs because of length of existence also affected responses. Both program objectives and year of establishment seem to impact the results.

In general, the oldest programs (CRP and FSP) ranked highest in awareness and appeal. With one exception, the FLEP, and this program is the closest to the old timber-oriented FIP that was established in 1978. As one would expect, the program objectives are closely linked with sustainability and effectiveness in those objective areas. The WHIP ranked highest for wildlife objectives; the FLP ranked highest for preventing parcelization and aesthetics, and the FLEP ranked highest in encouraging timber management.

The program rankings from southern administrators were similar to those at the national level. In terms of awareness, the order of ranking was identical and numerical values were nearly identical. In terms of appeal, the CRP and WHIP were more popular in the southern region and overall numerical values were slightly higher overall. Effectiveness in promoting sustainability and in meeting objectives was very similar at the national and regional levels, both in program rankings and in numerical values.

Administrator perceptions show clear differences in program effectiveness both in sustainability and in meeting landowner objectives. The older US Forest Service–funded programs (FSP and FLEP) and the CRP received higher rankings than all other federal incentive programs in terms of awareness and appeal; all three, plus the other US Forest Service–funded program, the FLP, ranked high for encouraging sustainable forest management and enabling owners to meet their objectives. The other three programs (EQIP, WHIP, and WRP), although more conservation oriented, are also intended to provide incentives to forest landowners, although such owners are not their only clients. A reason for lower ranking for these other programs might be that they are administered by the FSA or NRCS, not the more familiar US Forest Service. The CRP is a widely known and popular program and seems to be an exception.

**Table 4. Participation of southern forest owners in cost share programs, over program duration and last 5 yr; percent of total Conservation Reserve Program (CRP) tree cover in state; percent of total nonindustrial private forestland (NIPF) under Forest Stewardship plans and percent of national total Forest Stewardship acres and budget.**

State	Ever cost share <sup>a</sup> (%)	Cost share last 5 yr <sup>a</sup>	CRP tree cover (% of United States) <sup>b</sup>	NIPF under Forest Stewardship Plan <sup>c</sup> (%)	Forest Stewardship national acres <sup>c</sup> (%)	Forest Stewardship national budget <sup>c</sup> (%)
Alabama	33.0	15.6	14.1	5.6	3.1	3.2
Arkansas	22.7	10.9	4.8	5.5	2.0	2.5
Florida	19.2	6.2	3.3	10.8	2.2	2.6
Georgia	31.6	15.9	12.6	6.8	4.1	4.2
Kentucky	8.6	2.3	0.4	16.7	5.6	3.0
Louisiana	37.7	27.7	8.7	2.0	0.6	2.6
Mississippi	44.1	26.2	27.3	2.3	1.0	2.7
North Carolina	32.1	19.4	2.7	4.1	1.9	3.3
Oklahoma	9.1	3.6	0.1	4.7	1.1	2.3
South Carolina	34.5	20.5	6.5	9.6	3.0	2.7
Tennessee	9.4	4.7	1.8	5.8	1.6	2.7
Texas	20.0	9.8	0.4	3.3	2.9	3.9
Virginia	30.1	15.7	0.9	8.6	3.4	3.5
South	26.3	13.8	83.6	6.0	32.5	39.2

<sup>a</sup> Data obtained from National Woodland Owners Survey webpage: [www.fia.fs.fed.us/nwos](http://www.fia.fs.fed.us/nwos); accessed June 6, 2008. Data are for 2006 (Butler 2008).

<sup>b</sup> Data obtained from USDA Farm Service Agency Conservation Reserve Program Summary and Enrollment Statistics, fiscal year 2007 (Barbarika 2008).

<sup>c</sup> Data obtained from the US Forest Service Cooperative Forestry webpage Information by State: [www.fs.fed.us/spf/coop](http://www.fs.fed.us/spf/coop); accessed June 6, 2008. Fiscal Year 2007 for percent acres and FY 2006 for budget (US Forest Service 2008).

The low rating with respect to awareness among all federal incentive programs, which was not above 2.7 out of 4, implies greater effort needs to be made to make forest landowners aware of these programs. Appeal of the programs was relatively high for the traditional (US Forest Service based) FIPs and lower for the newer programs. Wariness about involvement in government programs affected appeal. Southern forest owners generally do not want to get involved in government programs for multiple reasons including losing their independence or control over management and ownership decisions (Zhang and Flick 2001). This could be one reason the awareness of property tax programs was high but the appeal was low.

Although they received relatively high ratings, only a few forest landowners actually have enrolled in the federal programs (Table 4). Enrollees in federal programs are a minority, with participation varying widely across the region. Participation ranges from 8.6% in Kentucky to 44.1% in Mississippi. Enrollment in the last 5 years is also shown in Table 4. The national average for participation is around 17% (regional averages are 26% for the South, 13% for the North, and 17% for the West). The variation is either caused by sampling error, funding availability, awareness of programs, or a large landowner population relative to funding allocations. Table 4 shows that the South has the great majority of CRP forestry-related acres, with 84% of the program's tree cover. On average, over 6% of the South's nonindustrial private forestland (NIPF) is managed under a Forest Stewardship management plan, but nearly one-third of Forest Stewardship acres are in the South and nearly 40% of the national Forest Stewardship budget is allocated to this region (Table 4). Whatever the reason for low participation it is clear that cost share programs only reach a minority of landowners in a state and, as such, may not have huge overall impacts on influencing the application of sustainable forestry practices.

Some survey respondents noted that funding was a concern for the "forestry" programs, and there were suggestions by some respondents that single agency delivery and oversight should be available for all the forestry-related funding, making the application process and program rules more consistent over time. Some also suggested that FSA manage US Forest Service programs to provide more consistency and stability in funding. Not only were suggestions made to link the administration and funding of these cost share programs,

but some recommended that tax incentives (property tax was most often mentioned) be tied to these programs as well. The argument being, that if funding levels are not sufficient to attract forest owners, perhaps tax incentives can be used to do the same thing.

Property tax programs and other cost share type programs such as state, industry, or private incentive programs showed similar results to the three forestry-related federal programs. Appeal seemed to be affected by associated concerns of being involved in government-sponsored programs. A number of studies have highlighted concerns with all the state property tax programs (Hibbard et al. 2003, Jacobson et al. 2004). The industry programs had higher scores on timber-related objectives. Nongovernmental programs, such as Tree Farm, rated relatively high overall. The higher success from these programs may come from them being targeted to certain forest owner groups based on interests, issues, and regions.

Can these programs actually promote sustainable forestry? The southern region is developing rapidly and already has a high population-to-forest area ratio. Many property tax programs are intended to prevent sprawl and development, but preventing conversion and parcelization were not much higher than other attributes of sustainability effectiveness from property tax programs. This suggests that although tax incentives play a role in controlling development it is limited by high land prices paid for development.

Having a single agency in each state designated as the point of contact for all forestry-related financial incentive programs would reduce the current high level of confusion that exists among forest landowners with respect to program availability, eligibility, application procedures, and delivery. However, a one-size-fits-all approach may constrain the potential uses of these programs. Targeting limited resources to the forestlands and practices where the benefits will be greatest increases program effectiveness over policies that distribute funds on a first-come-first-serve basis. What needs to change is to focus more on the resource (the land) instead of the landowner per se. This requires more flexibility in program objectives and requirements, but also, with better coordination can ensure more consistency such as requiring management plans and linking financial incentives directly to stewardship practices.

## Conclusions

The findings presented here must be interpreted with respect to forest acres enrolled in the programs surveyed, not all nonindustrial private forest acres. In a phase of the study reported elsewhere (Greene et al. 2005, Kilgore et al. 2007), focus groups of forest owners noted that public and private financial incentive programs play only a limited role in promoting sustainable practices on NIPF. One reason is that funding of the programs limits the number of acres that can be enrolled. Another is that many forest owners remain unaware that the programs exist. Owner awareness of federal financial incentive programs, e.g., peaked in the moderately ineffective range. Also, private property rights consistently were raised as a concern with all government programs in the South.

The study results indicate there are clear differences between the incentive programs available to nonindustrial private forest owners. The FSP, FLEP, and FLP were among the top-rated federal programs by all measures, both overall and for individual attributes. All three programs stress multiple objectives, but their clientele is limited to forest owners. Other federal incentive programs have forestry emphases, but their clientele includes farmers and ranchers as well as forest owners.

Programs sponsored by states, industry firms, state forestry associations, and NGOs generally were more narrowly targeted than federal programs and scored higher for specific attributes. Such targeted programs have the potential to outperform general conservation programs for regional concerns, emerging issues—e.g., invasive species control—and where program funding is constrained.

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