Financial Incentive Programs' Influence in Promoting Sustainable Forestry in the Northern Region

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ABSTRACT

Selected forestry officials in each of the 20 northern states were surveyed concerning their opinions on the public and private financial incentive programs available to nonindustrial private forest owners in their state. The officials were asked to name and describe the programs and to assess forest owners' awareness of each one, its appeal among the owners aware of it, its effectiveness in encouraging sustainable forestry and enabling owners to meet their objectives, and the percentage 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, scoring well for all measures and attributes. 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 program visibility and availability, increasing and ensuring long-term consistency in program funding, and simplifying the application and approval processes.

Keywords: private forest landowners, incentive programs, cost-share programs, property tax

Policy tools such as education, technical assistance, regulation, and financial incentives influence the management and use of private nonindustrial forests. Increasing concern over loss of open space, forest fragmentation, and the impact of globalization of forest product markets has revived interest in financial incentives as tools to promote sustainable forestry (Northern Forest Lands Council 1994, Sampson and DeCoster 2000, Hutton and Leader-Williams 2003, Stein et al. 2005, Harper and Crow 2006).

The scope of financial incentive programs is extensive and dispersed among numerous organizations. The most common are cost sharing or grants for developing forest management plans or implementing certain management practices (e.g., tree-planting or timber stand improvement) and tax incentives to encourage specific management behaviors. Most forest cost-share programs are funded by the federal government and administered by state forestry agencies. Tax incentives are provided by both the federal and state governments, primarily through provisions in the federal income tax and state property tax systems. In many states, forest industry firms, state forestry associations and nongovernmental organizations also provide forest-related incentive programs (Greene et al. 2005).

Financial incentives were first used in the 1940s to address policy concerns about timber production and supply. Since that time, however, the focus of most financial incentive programs has shifted toward sustainability issues, including forest stewardship, environmental services, and preservation of natural capital. Sustainability—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).

Several studies have questioned the impact and effectiveness of financial incentives (Yoho and James 1958, Skok and Gregersen 1975, Bliss and Martin 1990, Hardie and Parks 1991, Lee et al. 1992, Cubbage 1994, Megalos and Blank 1997, Kluender et al. 1999, Greene et al. 2004, Kilgore and Blinn 2004). In general, studies of cost-share programs found that a large fraction of forest owners were unaware of program provisions or would have done the supported practice anyway, whereas studies of tax provisions found that they had little effect on owner behavior.

There is growing debate about the role of financial incentives in promoting sustainable forestry (McKillop 1975, Worrell 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 there are better ways to use taxpayer dollars than to subsidize forest owner activities.

A recent nationwide study examined 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 northern states and discusses region-specific implications of forest incentive programs. The research questions addressed are whether, in light of changing forest ownership patterns and program emphases, financial incentive programs

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in the northern region are helping forest owners practice sustainable forestry, whether specific programs are more effective than others at accomplishing this goal, and the characteristics of effective programs.

Extending from Maine to Minnesota, the 20 states of the U.S. North differ in terms of forest type and ecological regimes from other regions of the country. The region is home to 43% of the nation's population and 44% of its estimated 10 million nonindustrial private forest owners. It includes 27% of all forestland in the United States but only 11% of all public forestland—most of which is held by state and local units of government. Of the forestland in the region, 75% is in private ownership, compared with 63% nationwide; of the nonindustrial private forest owners in the region, 62% own less than 10 acres of forestland and 90% own less than 50 acres (Butler and Leatherberry 2004). From these statistics one can deduce that forest parcels in the region are relatively small, and the impact of population and development surrounding forested areas is large.

Methods

The findings presented in this article represent one phase of a larger study to identify and assess the effectiveness of the currently available public and private financial incentive programs in encouraging sustainable forestry on nonindustrial private land. The intent of this phase was to survey the opinions and suggestions of the forestry agency officials who administer public incentive programs, as they are the individuals most knowledgeable about both forest owners' experience with the full range of public and private programs and the details of program administration. The opinions and suggestions of forest landowners were surveyed in a separate phase of the study and are presented elsewhere (e.g., Greene et al. 2005, Kilgore et al. 2007, Straka et al. 2007).

Data for the study were collected using a mail survey of one forestry official in each of the 20 northern states. The appropriate individual in each state to receive the survey questionnaire was identified using a networking approach. In most cases this was the program manager, supervisory forester, or assistant state forester with administrative responsibility over the Forest Stewardship Program; in a few instances it was an administrator with the USDA Cooperative Extension Service.

The survey questionnaire asked the forestry officials 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 they were aware of. In follow-up questions, they were asked to use a 4-point Likert scale to assess forest owners' awareness of each program, its overall appeal among the owners aware of it, and its effectiveness in encouraging sustainable forestry and enabling owners to meet their forest ownership objectives. The officials also were asked to estimate the percentage 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.

Eight federal incentive programs were evaluated in the survey: the Forest Stewardship Program (FSP), Conservation Reserve Program (CRP), Environmental Quality Incentives Program (EQIP), Forest Land Enhancement Program (FLEP), Forest Legacy Program (FLP), Landowner Incentive Program (LIP), Wetlands Reserve Program (WRP), and Wildlife Habitat Incentives Program (WHIP). Table 1 provides information about each program, including the year it was established, its primary objective, a summary of its provisions, and its administering agency or agencies.

Table 1. Federal financial incentive programs surveyed.

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 they provide. 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—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 years 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, 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 Natural Resources Conservation Service and Farm Service Agency.
Forest Land Enhancement Program (FLEP)—Established in 2002, 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. 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. LIP provides funding for states to offer technical assistance and grants to participating owners to develop and implement habitat management plans. To participate, the states must provide a minimum 25% nonfederal match for federal funding. Administered by the US Department of the Interior Fish and Wildlife Service in cooperation with state wildlife agencies.
Wetlands Reserve Program—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-year easement or cost-share agreement. Administered cooperatively by the USDA Natural Resources Conservation Service and Farm Service Agency.
Wildlife Habitat Incentives Program—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 years. Cost-shares cannot exceed 75% of the cost of the practices performed. Administered by the USDA Natural Resources Conservation Service.

Three types of nonfederal financial incentive programs also were evaluated: state preferential property tax programs for forestland, other state-sponsored incentive programs, and privately sponsored incentive programs. All 20 northern states have preferential property tax incentive programs for agricultural land and forestland. Each state takes its own unique approach, however, and even similar provisions are applied in widely divergent ways. Some states also sponsor other types of financial incentives, which often are financed by forest tax revenues. Some are cost-share programs to fund timber management practices, whereas others focus on wildlife, riparian areas, or conservation easements; one is a state-level forest stewardship program. Forest industry firms account for the majority of

Table 2. Federal forestry incentive program attributes as reported by state forestry officials.

Program attribute	FSP (n = 20)	CRP (n = 13)	EQIP (n = 15)	FLEP (n = 19)	FLP (n = 18)	WHIP (n = 13)
a. Owner awareness and appeal						
Awareness[a,b]	2.6^{A}	2.6^{A}	2.0^{A}	2.3^{A}	2.0^{A}	2.3^{A}
Appeal[a,b]	3.3^{A}	$2.6^{A,B}$	2.1^{B}	3.2^{A}	$2.7^{A,B}$	$2.8^{A,B}$
b. Effectiveness in encouraging sustainable forestry						
Prevents conversion[b,c]	$3.0^{B,A}$	2.6^{B}	2.2^{B}	$3.1^{B,A}$	3.9^{A}	2.8^{B}
Prevents parcelization[b,c]	$2.8^{B,C}$	$2.5^{B,C}$	2.0^{C}	$3.1^{B,A}$	3.9^{A}	$2.7^{B,C}$
Maintains forest type[b,c]	$3.2^{B,A}$	$2.8^{B,A,C}$	$2.4^{B,C}$	$3.1^{B,A,C}$	3.5^{A}	2.2^{C}
Protects wildlife/fish[b,c]	3.3^{A}	3.2^{A}	2.4^{B}	3.5^{A}	3.4^{A}	3.7^{A}
Protects water quality[b,c]	3.4^{A}	3.4^{A}	2.3^{B}	3.3^{A}	3.5^{A}	3.4^{A}
Protects soil productivity[b,c]	3.4^{A}	3.4^{A}	2.2^{B}	3.3^{A}	3.8^{A}	3.5^{A}
Encourages forest management[b,c]	3.5^{A}	$2.3^{B,C}$	2.2^{C}	3.6^{A}	$3.2^{B,A}$	$2.4^{B,C}$
Overall average	$3.2^{B,C}$	2.9^{C}	2.3^{D}	$3.3^{A,B}$	3.6^{A}	$3.0^{B,C}$
c. Effectiveness in helping owners meet their objectives						
Timber production[b,c]	3.5^{A}	2.1^{B}	2.1^{B}	3.4^{A}	3.1^{A}	2.0^{B}
Recreation[b,c]	3.4^{A}	$2.6^{B,A}$	1.8^{B}	3.2^{A}	3.3^{A}	2.8^{A}
Wildlife[b,c]	3.6^{A}	3.3^{A}	2.4^{B}	3.5^{A}	$3.2^{B,A}$	3.6^{A}
Aesthetics[b,c]	3.5^{A}	$2.7^{B,A}$	2.2^{B}	3.2^{A}	3.4^{A}	3.3^{A}
Soil/water conservation[b,c]	3.5^{A}	3.6^{A}	2.4^{B}	$3.3^{B,A}$	$3.1^{B,A}$	$3.3^{B,A}$
Invasive species control[b,c]	2.4^{A}	2.2^{A}	2.1^{A}	2.7^{A}	2.3^{A}	2.7^{A}
Overall average	3.3^{A}	2.8^{B}	2.2^{C}	3.2^{A}	$3.1^{B,A}$	$3.0^{B,A}$

[a] Likert scale ratings: 1 = Very low; 2 = Moderately low; 3 = Moderately high; 4 = Very high.
[b] Tukey's grouping across incentive programs for each respective program attribute. $\alpha = 0.05$.
[c] Likert scale ratings: 1 = Very ineffective; 2 = Moderately ineffective; 3 = Moderately effective; 4 = Very effective.
[A,B,C] Means with the same letter are not significantly different.
Abbreviations: CRP, Conservation Reserve Program; EQIP, Environmental Quality Incentives Program; FLEP, Forest Land Enhancement Program; FLP, Forest Legacy Program; FSP, Forest Stewardship Program; WHIP, Wildlife Habitat Incentives Program.

financial incentives offered by private entities, although programs sponsored by land trusts or other nongovernmental organizations are available in a few states.

The survey questionnaire was developed, pretested with state forestry officials in each of the coauthors' home states, and refined using their feedback. The completed questionnaire was mailed out in March 2005, using the Dillman (1999) Tailored Design Method. Although the questionnaire was extensive—89 questions on 30 pages—follow-up e-mails and telephone calls 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 below.

Results

Federal Programs

Very few of the forestry officials responded about LIP or WRP. In the case of LIP, this may be because the program was new at the time of the survey and is administered by an agency outside the USDA; in the case of WRP, it may be because the program has been directed primarily toward agricultural land. Because of this result, LIP and WRP were excluded from the analysis.

Table 2 summarizes the survey results for federal financial incentive programs as given by the forestry officials. The first section of Table 2 shows the officials' mean rankings for forest owner awareness of each program and its overall appeal among the owners aware of it. All six programs scored in the moderately low range for owner awareness. Among owners aware of the programs, FSP and FLEP scored highest for owner appeal, followed closely by WHIP, FLP, and CRP. EQIP scored in the moderately low range for owner appeal, considerably lower than the other programs (Table 2a).

The second section of Table 2 summarizes the officials' mean rankings for the programs in terms of their effectiveness in encouraging sustainable forestry among the owners who participate in them. FLP ranked highest overall, scoring well in all attributes of sustainability. FLEP ranked second-highest, followed closely by FSP and WHIP. FLEP scored particularly well for encouraging forest management and for protecting wildlife and fish. FSP also scored well for encouraging forest management and for protecting water quality and soil productivity. WHIP received the highest score of any program for protecting wildlife and fish, and it also scored well for protecting soil productivity (Table 2b).

CRP ranked next lower for encouraging sustainable forestry, significantly lower than FLP and FLEP. CRP received solid marks, however, for protecting soil productivity, protecting water quality, and protecting wildlife and fish. EQIP ranked lowest for encouraging sustainable forestry, significantly lower than CRP. EQIP scored in the moderately ineffective range for all attributes of sustainability (Table 2b).

The third section of Table 2 summarizes the foresters' mean rankings for the programs in terms of their effectiveness in helping nonindustrial private forest owners meet their objectives of ownership. FSP and FLEP ranked highest overall, followed closely by FLP and WHIP. FSP scored in the moderately or very effective range for all attributes except invasive species control. Among the other programs, FLEP received its highest scores for helping owners meet objectives related to wildlife and timber production, FLP for objectives related to esthetics and recreation, and WHIP for objectives related to wildlife and esthetics (Table 2c).

CRP again ranked next lower for helping owners meet their objectives of ownership, significantly lower than FSP and FLEP. For objectives related to soil and water conservation and wildlife, however, CRP received scores comparable to the top-ranked programs. EQIP again ranked lowest, scoring in the moderately ineffective range for all attributes (Table 2c).

State and Private Programs

Table 3 summarizes the survey results for state-sponsored and privately sponsored financial incentive programs as given by the

Table 3. State-sponsored and privately sponsored forestry incentive program attributes as reported by state forestry officials.

Program attribute	State property tax programs (n = 20)	Other state incentive programs (n = 11)	Industry and state association programs (n = 8)	NGO programs (n = 2)
a. Owner awareness and appeal				
Awareness[a]	3.2	2.6	NA	NA
Appeal[a]	2.9	3.3	NA	NA
b. Effectiveness in encouraging sustainable forestry				
Prevents conversion[b]	3.4	3.4	3.0	2.0
Prevents parcelization[b]	3.4	3.2	3.1	2.0
Maintains forest type[b]	3.3	3.0	3.4	2.5
Protects wildlife/fish[b]	3.1	3.5	3.1	3.0
Protects water quality[b]	3.5	3.5	3.0	3.1
Protects soil productivity[b]	3.3	3.3	3.3	2.5
Encourages forest management[b]	3.1	3.0	3.6	3.0
Overall average[b]	3.3	3.3	3.2	2.6
c. Effectiveness in helping owners meet their objectives				
Timber production[b]	3.2	3.1	3.5	3.0
Recreation[b]	2.6	3.2	2.8	3.0
Wildlife[b]	2.7	3.6	3.1	3.0
Aesthetics[b]	2.8	3.5	2.9	3.0
Soil/water conservation[b]	2.9	3.5	3.0	2.5
Invasive species control[b]	2.1	2.9	2.2	1.5
Overall average[b]	2.7	3.3	2.9	2.7

[a] Likert scale ratings: 1 = Very low; 2 = Moderately low; 3 = Moderately high; 4 = Very high.
[b] Likert scale ratings: 1 = Very ineffective; 2 = Moderately ineffective; 3 = Moderately effective; 4 = Very effective.
Abbreviation: NGO, nongovernmental organization.

state forestry officials. 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 ownership. No data were collected for owner awareness and appeal, or for practices remaining in place and acres remaining in forest over time.

As noted above, all 20 northern states have a preferential property tax incentive program for forestland (Table 3). Other financial incentive programs were only available in some states: 11 states sponsored financial incentive programs for forest landowners; as well, forest industry sponsored incentive programs in 8 states and nongovernmental organizations (NGOs) sponsored incentive programs in 2 states. Given the low number of programs, a statistical comparison of the rankings would not be meaningful.

The first section of Table 3 shows the state forestry officials' mean rankings for forest owner awareness of state-sponsored incentive programs and their overall appeal among the owners aware of them. Property tax programs scored relatively well for owner awareness but lower for appeal, whereas the opposite was true for other types of state financial incentives (Table 3a).

The second section of Table 3 summarizes the officials' mean rankings for the effectiveness of each type of program in encouraging sustainable forestry among the owners who participate in them. Overall, property tax programs, other state incentives, and forest industry programs all ranked in the moderately effective range. Property tax programs received high scores for protecting water quality, preventing forest conversion, and preventing parcelization; other state incentives scored well for protecting wildlife and fish, protecting water quality, and preventing forest conversion; forest industry programs scored well for encouraging forest management and maintaining forest type. The two nongovernment organization-sponsored programs clearly ranked lower—they scored only moderately effective for protecting water quality, protecting wildlife and fish, and encouraging forest management (Table 3b).

The third section of Table 3 summarizes the officials' mean rankings for the effectiveness of each type of program in helping owners meet their forest ownership objectives. The rankings varied widely within and across the types of programs, except that all received their lowest scores for invasive species control. State property tax programs and forest industry programs received their highest scores for helping owners meet objectives related to timber production. Other state incentives received high marks for objectives related to wildlife, esthetics, and soil and water conservation. Again, nongovernment organization-sponsored programs scored only moderately effective for objectives related to timber production, recreation, wildlife, and esthetics (Table 3c).

Improving Incentive Programs

The state forestry officials' suggestions on ways to improve federal 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 the following:

- 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 forestry officials and the USDA Natural Resources Conservation Service and Farm Service Agency, with the goals of establishing a process for foresters to become technical service providers for, and allowing for more funding of forest management practices in, financial incentive programs administered by those agencies.

Table 4. Forest landowner participation in federal cost-share programs and cost-share program funding, by program and state.[a]

	Percentage of forest landowners who participate in cost-share programs (%)	Ratio of fiscal year 2005 funding allocated to each northern state to number of forest landowners participating in cost-share programs in that state, by program ($/forest landowner)					
		FSP	CRP	EQIP	FLEP	FLP	WHIP
Connecticut	6.6	6.0	1.1	308.6	3.5	0.0	56.2
Delaware	21.4	13.6	114.7	933.1	5.8	140.9	88.3
Illinois	17.9	3.3	1,517.1	233.4	1.5	0.0	5.7
Indiana	13.9	2.7	520.9	149.7	1.3	6.5	5.2
Iowa	21.2	2.4	3,591.1	438.2	0.8	0.0	7.5
Maine	15.5	2.6	12.0	97.1	2.1	48.8	11.8
Maryland	21.7	7.7	475.5	322.2	4.5	0.0	15.5
Massachusetts	15.3	5.0	0.4	154.8	4.8	23.9	37.0
Michigan	9.7	1.6	100.1	91.8	1.4	0.0	2.2
Minnesota	17.5	3.4	1,115.6	336.0	1.5	20.1	4.9
Missouri	10.7	1.8	532.0	118.1	1.3	0.0	2.7
New Hampshire	20.6	3.8	0.2	133.2	2.3	73.4	26.8
New Jersey	3.2	6.5	6.0	219.3	4.5	187.4	33.5
New York	9.4	1.9	18.2	56.1	1.5	7.2	1.9
Ohio	7.8	2.1	243.6	109.1	1.6	3.4	3.0
Pennsylvania	7.8	2.2	97.4	66.1	2.0	0.0	1.3
Rhode Island	18.5	22.3	0.0	1,365.3	6.7	209.5	280.0
Vermont	18.5	3.8	11.1	136.6	2.0	51.0	23.5
West Virginia	11.2	2.8	5.8	62.2	2.2	16.6	6.0
Wisconsin	16.7	3.0	253.6	118.4	1.3	22.6	3.1
Regional total	12.7	2.7	385.7	137.2	1.8	14.5	7.2
U.S. total	17.3	7.4	413.4	229.3	2.3	10.4	7.6

[a] Sources: US Forest Service: www.fia.fs.fed.us/nwos/; FSP and FLEP: personal communication, Mark Buccowich, US Forest Service State and Private Forestry; EQIP and WHIP: www.nrcs.usda.gov/programs/2005_allocations/index.html; CRP: www.fsa.usda.gov/FSA/webapp?area=home&subject=copr&topic=crp; FLP: www.fs.fed.us/spf/coop/library/fy05_flp_project_list.pdf; all last accessed Mar. 27, 2009.

Abbreviations: CRP, Conservation Reserve Program; EQIP, Environmental Quality Incentives Program; FLEP, Forest Land Enhancement Program; FLP, Forest Legacy Program; FSP, Forest Stewardship Program; WHIP, Wildlife Habitat Incentives Program.

- 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

The state forestry officials surveyed were the individuals who administer federal and state financial incentive programs for nonindustrial private forest owners in their state and thus are familiar with the benefits the programs provide. It might be argued, and some survey results suggest, that such individuals might tend to believe financial incentives play an important role in promoting sustainable practices on private forestland.

Overall, however, the forestry officials gave federal incentive programs adequate ratings for forest owner awareness and appeal. Owner awareness did not rise into the effective range for any program, whereas owner appeal averaged in the effective range only for FSP and FLEP. One reason for the generally low appeal may be forest owner wariness about involvement in government programs. Zhang and Flick (2001) found that landowners generally are wary of participating in government programs, for reasons including loss of independence of action and fear of government control over management and ownership decisions.

The various programs have varied and specific goals and objectives. Thus, it is not surprising that the forestry officials ranked them differently in term of their effectiveness in encouraging specific attributes of sustainability and helping forest owners meet their objectives. Nonetheless, the three forest-oriented incentive programs—FSP, FLEP, and FLP—were among the top-ranked programs in terms of landowner awareness, appeal among owners aware of them, encouraging sustainable forestry, and helping owners meet their objectives. FSP, FLEP, and FLP stress multiple land management objectives. Their relatively high ratings over all attributes imply that timber production is compatible with such other uses as recreation and wildlife.

The three nonforest-oriented programs also support forest management practices: CRP has a tree-planting component, whereas EQIP and WHIP provide for forest management practices. One reason for the overall lower ranking of these programs may be that, because they are delivered through agencies whose traditional clientele is farmers, CRP, EQIP, and WHIP are less familiar to state forestry officials and forest landowners.

Overall, only 12.7% of forest owners in the northern region have participated in a federally sponsored financial incentive program (Table 4). Participation varies widely from state to state, from over 20% to well under 10%. Whatever the reason for the variation, it is clear that incentive programs reach only a fraction of the forest owners in the region and, as such, can have only a limited impact on encouraging sustainable forestry. Table 4 also shows the funding available per forest owner for each of the six federal programs for fiscal year 2005. Although individual states differ, funding generally was higher for the three nonforest-oriented programs. This is partly because these programs also target farmers and nonforest conservation practices.

Property tax programs and the other financial incentives sponsored by states and private organizations showed results similar to those for the three forest-oriented federal programs. Property tax

programs scored higher than the federal programs for owner awareness but slightly lower, on average, for owner appeal. The higher awareness can be attributed to the longer history of property tax programs; the lower appeal could be due to owner wariness or to the penalties for withdrawing. A number of studies (e.g., Hibbard et al. 2003, Jacobson et al. 2004) have highlighted concerns with state property tax programs.

The relatively few other state-sponsored and privately sponsored incentive programs showed a combination of expected and unexpected results. As might be expected, state-sponsored incentives tended to receive their best rankings for nontimber-related attributes, whereas incentives sponsored by forest industry firms tended to be targeted specifically for timber production. Curiously, however, nongovernment organization-sponsored incentives —among the lowest ranked of any type of program—scored about equally well for timber and nontimber-related attributes.

Conclusions and Recommendations

The findings presented here should be interpreted with respect to forest acres enrolled in incentive programs, not all nonindustrial private forest acres. In another phase of the study, forest owners noted that public and private financial incentive programs play only a limited role in promoting sustainable practices on nonindustrial private forestland. 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 of the programs (Greene et al. 2005, Kilgore et al. 2007).

Overall, the opinion of the forestry officials surveyed is that financial incentive programs are an effective tool in promoting forest sustainability and helping forest owners to achieve their objectives of ownership. Incentives can provide ways to encourage sustainable forestry on private nonindustrial holdings, but as the officials' comments indicate, issues remain regarding program funding, coordination, and administration by different agencies.

Each of the federal incentive programs evaluated has a guiding principle that addresses long-term sustainability. The forest-oriented programs—FSP, FLEP, and FLP—specifically include forest sustainability as a primary objective, whereas the nonforest-oriented programs—CRP, EQIP, and WHIP—support forest management practices as tools to promote long-term sustainability (Table 1). The study results indicate, however, that there are clear differences among the programs. FSP, FLEP, and FLP were among the top rated federal programs, both overall and for individual attributes, whereas on the whole CRP, EQIP, and WHIP ranked lower.

The state-sponsored and privately sponsored programs surveyed take a variety of forms, but also have long-term sustainability of natural resources as a primary objective. State property tax programs, other state incentive programs, and forest industry-sponsored programs scored about equally well overall. Ironically, programs sponsored by NGOs scored lower than industry-sponsored programs both for encouraging sustainable forestry and for helping owners meet their objectives. It seems likely, however, that this result is due to the small number of such programs and their narrow focus.

Changes the forestry officials suggested 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 processes. Designating a single agency in each state as the point of contact for all forest-related financial incentive programs would reduce confusion among forest landowners with respect to program availability, eligibility, and application procedures. Cultivating improved communication between state forestry officials and the federal agencies that administer nonforest-oriented incentive programs should result in increased funding of forest management practices under those programs. Improving consistency between the programs, for example, by requiring a written management plan to participate in any incentive program or linking incentives directly to performing stewardship practices, would reduce confusion and standardize program administration.

Perhaps what most needs to change, however, is to focus more on the resource—the land—rather than on the landowner per se. Targeting limited financial and professional resources to the forestlands and practices with the greatest potential benefit, for example, by funding applications according to their prospective environmental benefit or their prospective benefit relative to cost (benefit-cost ratio), rather than on a first-come, first-served basis would make more efficient use of limited public funds. As well, permitting some flexibility in the practices eligible for funding would allow programs to address region- and state-specific concerns.

Can the financial incentive programs discussed here actually promote sustainability? The northern region is developing rapidly and already has a high ratio of population to forest area. This suggests that although tax and other financial incentives can play a role in controlling development, their role is limited by the high value of land for development.

Nevertheless, financial incentives have been shown to be successful in terms of meeting program goals (Napier et al. 2000), and they remain an important policy tool for encouraging sustainable management of private forestlands. Other important policy tools include technical assistance and education, as numerous studies have shown (e.g., Royer 1987, Brockett and Gerhard 1999, Esseks and Moulton 2000, Egan et al. 2001, Greene et al. 2005, Kilgore et al. 2007). Perhaps the most effective approach to promoting long-term stewardship is to assist forest landowners in correctly applying the forest management practices that will enable them to meet their individual ownership objectives.

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