Incentives affecting land use decisions of nonindustrial private forest landowners

Abigail M. York, Marco A. Janssen and Elinor Ostrom

Forests throughout the world provide a wide range of ecosystem services including carbon sequestration, biodiversity, water purification, soil retention, and a habitat for wildlife and peoples. Forests also have the potential to provide multiple ecosystem services to the world's population in general and to future generations. Deforestation and fragmentation threaten the long term viability of forest ecosystems and affect people throughout the world. As growing populations compete for use of shrinking forest resources, conflicts between individual and collective incentives are frequent, as many forestlands are owned and managed by individuals while the benefits are collective. Forest cover change is a global problem that requires analysis of the complex institutional incentives that affect the actions of those who control forest resources.

Diverse policies and governance arrangements have evolved throughout the world establishing rights for extraction and use of forested lands. The preferred forest ownership regime typically reflects traditional property rights existing in each country. Indeed different ownership arrangements have experienced varying degrees of success depending on the setting. Ownership regimes range from private property regimes where individuals or families control all rights to use and extraction from a forest, government control of all or part of the rights to use and harvest from a forest and communal arrangements where individual bundles of rights are distributed differentially within the community, all with varying degrees of success (Ascher 1995).

In Europe governments and local community organizations have preserved forestlands since 1000 AD where the king or some other magnate had the right to keep deer and to kill and eat them (Rackham 1989). In other areas of the world, forests have been protected communally, often merely by social norms that restrict access or limit harvests (Dorm-Adzobu and Veit 1991; Gibson et al. 2000).

Debate has surrounded the policy tool choice for long term health of forested ecosystems, with some proponents proclaiming that tax, cost-share, certification, or easement programs are better than others (Ascher 1995). Much of the research has focused on the governance arrangement in absence of the forest ecosystem, demographic, or economic conditions. Furthermore, it is not possible to truly evaluate the effectiveness of any of these types of governance without first understanding the complex interactions between rules, incentives and behavioural outcomes of resource users that result from them.

In this chapter, we focus on a variety of policy tools that possibly impact nonindustrial private forest (NIPF) owners' behaviour. These tools include tax policies, cost-sharing, certification and easement programs. We address whether these programs actually affect private landowner land use decisions. Specifically, we are concerned about the disconnection between a landowner's participation and decisionmaking, as well as participants and program managers. We focus our review on programs in the US where there is mixed evidence regarding the impact of various programs on reforestation rates (Newman et al. 2000; Zhang and Flick 2001). Furthermore, many of the programs evaluated were developed years or decades ago and may not match the contemporary motivations of landowners, especially given changing landowner attitudes (Erickson et al. 2002; Kauneckis and Novac 2000).

In this chapter, we explore forestry programs including tax incentives, cost-share, certification and easements. First we briefly outline the importance of NIPFs in the United States and throughout the world. Then, we outline a general socio-ecological framework of the forest ecosystem's interrelationship with government agencies and resource users. Using this general framework, we evaluate the different types of policies affecting NIPF owners. Finally, we analyze the policies in light of our general understanding of NIPF owners' preferences and behaviour and the forest socio-ecological system.

Nonindustrial private forests (NIPFs) and forest management in the US

Nonindustrial private forestlands make up a significant portion of the forests throughout the world. NIPFs make up over 474 million acres, almost two-thirds of all US forestland (Hibbard et al. 2003). In some regions of the US NIPFs are the primary source for wood products such as pulp, lumber, plywood and other wood productions (Rickenbach 2002). NIPFs fall into a broad system of private property rights where landowners are assigned almost all rights to manage their lands (Clawson 1964). In the 1800s this private property system led to large scale removal of forests for conversion to more 'productive' uses, typically agriculture. The denuded land created a 'crisis' of degradation of water resources that led to efforts by the federal government to conserve forestlands. Federal forestry policy formalized around the turn of the 20th century when Gifford Pinchot was selected to be the United States Department of Agriculture's first head of the Forest Service (Miller 2002). The Forest Service mission was based on the premise that the best way to reforest and maintain healthy forest lands was to buy back the land from the private owner and put it into the hands of the newly created government land manager. This left a large portion of the forest lands in private hands with management under private control. There were some tax programs

affecting private lands that were developed at the turn of the century and mirrored USFS goals of maintaining and expanding forestlands, but these programs worked through economic incentives, such as Indiana's Classified Forest Program established in 1899 (Nelson 1998).

Tax, cost-share, certification and easement programs were developed to deal with issues salient at the time of creation. The first generation of NIPF state programs were the 1940s 'seed tree' laws focusing on reforestation of cut over forest lands (Ellefson et al. 1997). Since the mid 1980s forest policy has incorporated concern for long term broad effects of forest practices on sustainability, productivity and biodiversity, although the emphasis varies between states (Ellefson et al. 1997). In many areas throughout the US there has been an increase in the extent and age of the forests, but is this reforestation on private lands due to programs impacting landowner decisionmaking or is reforestation due to the social and economic shift from an agricultural economy to an industrial one for example (Birch 1996). One of the main questions that we put forth is whether many of these decades old programs are still addressing important concerns, or whether these programs are maintained because of rent seeking on the part of program officials and program participants.

Are these programs equipped to deal with the ever increasing urban pressure influencing forest landowners who may receive large economic gains through urban development? As a society, the central conflict between private and public forest benefits has become the increasing fragmentation of forestlands surrounding urbanizing regions (Best 2002). One solution to this conflict has been to provide incentives or private benefits to landowners who act in ways that result in the preservation of public forest benefits. The impacts of these programs are dependent on the interrelationship between the program, program officials,

forest ecosystems and NIPF owners. These interrelationships will be explored in the following section. Next we will investigate the impact of the general forest policies on NIPFs through an institutional model. The general institutional model maps out the interrelationships among the owners, program officials, government officials and forests.

General framework of policy tool impacts

Individuals who live near a forest as well as individual resource users and those who live at some distance all benefit from the 'public good' of protecting forested land owned by private nonindustrial owners. Without some form of government or non-government intervention, society faces the classic problem of the under provision of a public good (Ostrom and Ostrom 1999). Government interventions may come in the form of direct provision and production through creation of national and state forests and parks. Nongovernment organizations may also acquire land directly for preservation purposes through establishment of land trusts with rights to land in fee simple or via conservation easements. Government and NGOs may also try to provide more forestlands for society through financial assistance, regulation and technical assistance to private landowners. These programs offer various incentives and assistance to private landowners, but they are dependent on the landowners to actually maintain forestlands. Thus, what actually happens on forested land depends on a set of interrelations among actors.

Anderies et al. (under review) provide a general framework of social-ecological systems that we use here adapted for the case where a forest is owned by a private landowner and where government and non-governmental programs try to affect the decisions made by private landowners (see Figure 1). This framework is intended to be general and expected to be

applicable for situations in developed and developing countries. To understand why forested land grows in extent and quality, remains the same over time, or disappears, one cannot simply examine one of the entities (forest, forest owners, program officers, or the programs in effect in a locality) shown in Figure 1. One must also study the flows between the entities as well as the type of disturbances that may impact the entities and these flows.

In this chapter, we consider a forest that is owned by a NIPF landowner. This owner may use the forest in various ways (see Flow 1). The landowner may or may not harvest nontimber products, engage in recreational activities, or undertake commercial timber production and various other forest management practices. Thus, what the forest owner does influences the condition of the forest. The forest condition may influence the NIPF landowners' decisions about forest use.

Governmental and non-governmental programs exist that aim to affect the actions of the NIPF landowner (Flow 4). The programs may provide training and education, tax benefits, protection of specific rights of the property, and so on. Program officers manage the programs. Those program officers might be NIPF landowners themselves, or might have ties with other interests groups like extractive foresters or preservationists. NIPF landowners express their demand for particular services via Flow 2. Anderies et al. (under review) mention tax payments, voting, lobbying, participating in councils and even bribing program officers as possible actions. Communities will vary in regard to the number and strength of various means by which NIPF landowners can engage in demand expression related to this land. In some communities, NIPF landowners do express themselves actively through elections as well as representing their views in a variety of hearings and through their support

of diverse NGOs. In other communities, NIPF landowners have few avenues to express demand.

The program officers design the programs (Flow 3). Cultural backgrounds or political constraints may influence the type of program that the officers design. The NIPF owners demand for particular programs is mediated through the program officers. NIPF owners' preferences for wildlife habitat or preservation may be in opposition to a cultural bias of foresters trained to harvest forestlands. NIPF landowners may participate in a co-production with programs when sharing experiences and expertise in order to educate other landowners through field days or presentations (Flow 6). Programs may provide education that may affect the mental model of NIPF landowners (Carlson et al. 2003).

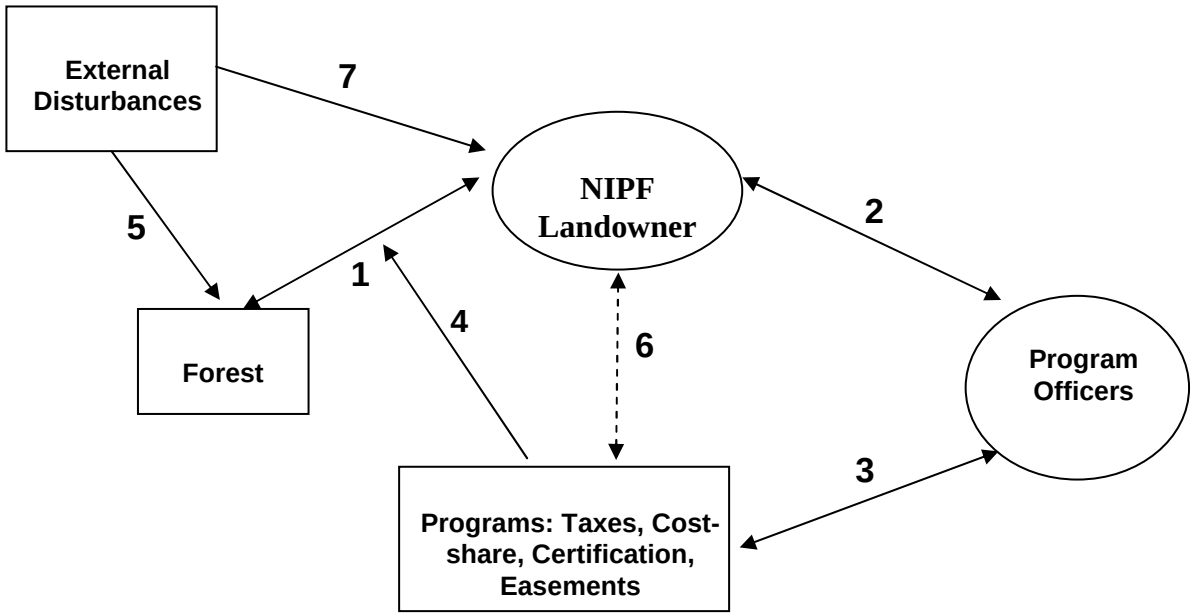
External disturbances might affect the NIPF and the forests, such as fire, pests and construction of highways, Flow 5. Similarly, economic development or changes in other governmental regulations, for example the Endangered Species Act, may influence both the landowners and the program officers. Changes in the political environment, such as a shift in party leadership leading program budget changes or officer leadership change will impact the socioeconomic system, especially when program officers are faced with job security concerns.

Anderies et al. (under review) mention the importance of the connections between resource users (NIPF landowners) and public infrastructure providers (program officers). A more distant relationship might lead to a decline in taking the demands of resource users into account and create incentives for rentseeking and corruption by program officers. With respect to the topic of our review, the distance between NIPF landowners and program

officers may explain why current programs are not able to meet their goals and the goals of the NIPF landowners.

Figure 1

Conceptual framework of a social-ecological system of forest management of NIPF



NIPF landowners

Landowners make decisions about their land while considering some, although probably not all, government regulations and programs that may affect them. Owner preferences for forest preservation and use are also changing, with increased emphasis on aesthetics and recreation. The changing preferences of forest owners may or may not be reflected in changing forest policies. Some program participants, such as farmers (Erickson et al. 2002), may evaluate

their forest in economic terms, so economic incentives may have more influence on them. The heterogeneity of NIPF owners further frustrates long term attempts to increase forest extent and health because programs must serve both resource dependent owners and recreational or residential owners. Government agencies and NGOs have attempted to alleviate this problem by creating a variety of programs to serve different landowner needs (Erickson et al. 2002; Klosowski et al. 2001). This emerging plethora of programs may serve different types of landowners, but it is still unclear whether these programs actually influence their decisionmaking.

Landowners' decisions typically are linked to the condition of their forest, as decisions may be made to cut older or larger trees (Keefer et al. 2002). The basic condition of the forest and the land quality restricts the landowner's decisions. For example, a landowner may wish to grow valuable tree species such as black walnut, but the ecological conditions may not be satisfied. On the other hand some landowners may make decisions to cut based on financial concerns with less regard for the forest condition. The forest-landowner relationship is characterized in the model as Flow 1.

Landowners' decisions may also be influenced by forest policies. These forest policies are shaped in part by landowners concerns that are expressed through elections for government officials who appoint program officials, control budgets, or create programs. Some landowners may have a direct connection to forest officials through past history with the program or relationships formed while in forestry councils or organizations (Rickenbach 2002).

Forest policies

Policymakers use a variety of policies that are intended to encourage reforestation and good forestry management including: tax incentives, cost-sharing, certification and easement programs. Each of these types of programs impacts the landowners' incentives in different ways. Landowners may choose one program over another based on the incentives and restrictions associated with them. Or, they may ignore them entirely.

Tax incentives

Tax programs include property, income and inheritance taxes. Property taxes impacting forestland include both assessment on the timber stand value, an inventory value and the value of the property, although most states evaluate the timber stand value separately from the land. Many states offer reduced assessment rates for forestland, which may encourage investment in forestry. In comparison, inheritance taxes based on market value of the land, or including the timber stand value, may induce the recipients to cut the timber in order to make the payments (Wear and Greis 2002).

We focus on state property tax programs that are common in the United States, ad valorem, current use, flat rate and exemptions. In 2000 there were 66 state property tax programs impacting forestland, every state had at least one program (Hibbard et al. 2003). Forest specific property tax programs are well established in many states, Indiana 1899, whereas other states just recently created forest specific programs, Georgia 1991 (Newman et al. 2000).

Ad valorem taxes assess land according to its fair market value, full or partial value (Hibbard et al. 2003). These programs tax the land based on its highest and best use. There are currently 15 states with ad valorem tax programs. The preservation incentive of this type of program is fairly limited. There are tax disincentives to keep land forested unless forest use is the most profitable.

The most common state tax program is based on the 'current use' that a landowner makes of their land (Hibbard et al. 2003). Forestland typically is taxed at a lower rate than if under a straight ad valorem where the assessed value would include its potential saleable value for development. Most of the current use programs are based on income capitalization, where land is valued through its ability to produce timber via a soil or land productivity class. Residents with 'better' land face a higher tax rate. This taxing system may increase the conversion of marginal lands to forest, whereas there is less incentive for highly productive lands to be placed into forest. In comparison to ad valorem taxes, current use programs are thought to decrease the disincentives for maintaining forested land in the face of development pressure on the urban fringe.

Georgia's Conservation Use Valuation program is a current use tax program that requires landowners to sign a ten year covenant with restricted uses in order to receive a reduced tax assessment (Newman et al. 2000). Owners who violate their agreement owe twice the ad valorem tax amount plus interest, which may lead to relatively high compliance. Newman et al. note that in some locations, especially near Atlanta, owners have experienced a tax reduction of 90 per cent with the current use tax, which has led to a concentration of participation around urban or coastal areas (Newman et al. 2000). These participation

concentrations may reflect differences in landowner preferences in areas closer to cities or perhaps the magnitude of the reduction in property tax assessment.

Nine states have flat tax programs with a fixed annual tax per forest acre (Hibbard et al. 2003). These programs do not differentiate between marginal and highly productive lands. These tax programs levy a fixed, predetermined tax rate that varies from state to state, ranging from $0.50 to $3 per acre per year with the nine program average tax of $1.16 per acre (Hibbard et al. 2003). Three exemption programs have been established in states where eligible forest landowners do not pay any property taxes (Hibbard et al. 2003). Alaska exempts most private forestland indefinitely. Iowa has an exemption for certain forests for 8 years. Delaware exempts certain forests from taxation indefinitely and commercial forest plantations for 30 years.

Hibbard et al. (2003) note several problems with current tax programs, especially that forest property tax programs are sometimes written prior to the development of a clear set of forest management goals. Tax policy should be evaluated in combination with other policy instruments since frequently there are many different private forestry programs and it is possible that uncoordinated programs may work against each other rather than supporting one another. Analysts have recommended that polices should perhaps increase the official commitment period for participation to reflect the long term commitment to forestland retention. There may need to be a reduction in the number of procedures required for admission and administration. Funding should be increased with longer term commitments to the agencies, as landowners may not be willing to make a long term commitment to preservation with the possibility of government tax policy change.

Eligibility requirements for special tax programs can include size and condition requirements, public access, specific management practices, compliance with state forest laws, or evidence of previous harvesting (Hibbard et al. 2003). Landowners may decide not to participate in these programs because of an aversion to the typically complicated application process for many forest tax programs. Landowners must weigh the benefits of participation against the costs, Flow 6 in the model. In states with relatively low property taxes in general, a tax reduction may be relatively insignificant in contrast to the time and effort involved in applying for the program or for direct expenses such as application fees, surveys, or government inspections. Threat of penalty for withdrawal from a program may decrease participation from landowners that anticipate clearing their forestland in the future, or perceive a chance of changing land use.

Differences in the structure of the tax programs may be critical to the impact on NIPFs. Current use programs without a penalty for removal of forested land may not significantly influence the long term land use decisions, as the tax discount may merely be a savings while the landowner waits to develop. In comparison, if there is a penalty for a removal of forested land, this reduces the ability of landowners to simply use the tax abatement for rent while waiting for development.

Tax programs are government programs, so NIPF owners can indirectly influence program design through diverse political processes at local, state and national levels. The impact of these programs on actual landowner behaviour, increasing forested area, has been mixed. Zhang and Flick (2001) show that for a case study in North and South Carolina, tax incentives stimulate reforestation investments, which was in line with predictions of their theoretical model. Nagubadi et al. (1996) find for a study of NIPF landowners in Indiana that

participants in the Classified Forest Program (which provides a tax incentive), participation is related positively to size of the property, commercial reasons for acquiring property (land investment, timber sale), desire for assistance in managing land, and membership in forestry organizations. Overall, property tax programs may create incentives to maintain or cut forestland through Flow 6.

Cost-share programs

Forest cost-share programs are designed to reduce the amount of resources that landowners spend for forest management, Flow 6. Typically landowners face substantial opportunity costs when enrolling in the cost-share programs, especially extensive paper work and required inspections. Many landowners may not have the time and expertise to invest in the application process whereas others with time and expertise may receive substantial monetary gains from participation. There is some evidence that landowners substitute government cost-share money for their own funds while undertaking activities that the landowner already planned and intended on performing with or without government assistance (Baughman 2002). Cost-share programs reduce the amount that landowners pay through Flow 1 and potentially influence the actual decisions regarding the NIPF land, Flow 4. Zhang and Flick (2001) show in their case study in North and South Carolina, that cost-sharing programs reduce reforestation investments. The reason for this negative effect of cost-sharing is caused by a substitution effect. Public funds are used for private investments, which leads to the incentive to invest somewhat less and consume more of their own resources.

The Nagubadi et al. (1996) study of NIPF landowners in Indiana shows that participation in the Forest Incentives Program (a cost-share program) is positively related only to owners

with commercial reasons for acquiring property. Program participation seems solely connected to landowners for whom economic motivations are important. Since these economic motivations are only important for a minority of the population of NIPF landowners (Birch 1996), we may question whether these types of programs provide the right incentives to affect decision making of NIPF landowners.

Certification

In comparison to cost-share and tax programs, certification has been widely heralded as a new way to promote 'sustainable forestry' (Rametsteiner and Simula 2003; Rickenbach 2002). Currently, most certification programs are affiliated with NGOs, so these are one way to bypass the electoral process in the social-ecological model. The concept of 'certification' covers several types of policies that promote a wide range of objectives, such as management for harvest or promotion of the ecosystem. Forest certification has been used throughout the world with about 3.2 per cent of all forests certified (Rametsteiner and Simula 2003). In the US, the two most prominent certification programs are the Tree Farm System and the Forest Stewardship Council.

Certification programs are based on a professional forester's assessments of the landowner's forest management practices. These programs often serve as recognition programs for individuals already knowledgeable about forestry. Landowners may gain assurance that their forestry management practices are 'ecologically sound' or the best management practice (Rickenbach 2002).

In order for the landowners to become certified they need forest management plans, but only about 5 per cent of NIPF owners have official plans (Birch 1996). Certification also requires that the landowners consult with foresters before harvesting. Overall, certification systems are relatively complicated with management and paperwork requirements (Rickenbach 2002).

Many landowners are unaware of recent forest certification developments, such as the new Green Tag program. The Green Tag Forestry program was designed for NIPF owners, but has not made much of an impact yet with approximately 50,000 acres certified. Whereas, the Tree Farm System has 26 million acres and the Forest Stewardship Council has 8.4 million acres (Rickenbach 2002). Many of the newer programs were created to promote different ecosystem oriented objectives, in comparison to the traditional industry base of the Tree Farm System. The Forest Stewardship Council, for example, is supported by many environmental groups including both the Sierra Club and Rainforest Action Network (Rickenbach 2002).

Rickenbach (2002: 43) notes that while ‘members of landowner associations may learn of certification by reading organizational literature or attending landowner events, most landowners have no such exposure’. Participating landowners may serve a vital co-producing role in these events (Flow 6 in Figure 1) and may increase the amount of information that NIPF owners have about other programs, for example Tree Farm System certification.

The Forest Stewardship Council has gained contracts and success with Home Depot, Centex and European buyers’ groups, which have expanded demand from large producers. Rickenbach (2002: 45) expects that small NIPFs will not benefit financially from the Forest Stewardship Council ‘without significantly more FSC-certified acres and chain-of-custody

certified mill capacity'. The FSC may be cost prohibitive for most landowners because of the $200 application materials fee and $1000 application fee (Wenban-Smith et al. 2002).

Rickenbach (2002) argues, landowners may be unaware of the available certification programs and these programs also may not match their preferences for forest use. This preference problem mirrors a similar issue associated with cost-share and tax programs that target economically minded landowners. The Tree Farm System and Forestry Stewardship Council are not government programs, so NIPF owners cannot influence them through voting. These NGOs need funding through either industry or citizenry to survive, so NIPF may have a small impact through funding. Overall, the connection between NIPF owners and program development is rather weak due to the private nature. We may expect a mismatch between the programs and the NIPF preferences.

Easement programs

Government and NGOs created easement programs, which provide long term public benefit via preservation of forestlands in perpetuity (Society of American Foresters 2002). Easements often have financial benefits for the landowner when they are bought by government agencies or land trusts. Other easement programs are based primarily on donations, so do not have a direct payment to the landowner (Society of American Foresters 2002). Land under a conservation easement incurs a tax reduction because the easement restricts use. The magnitude of this tax benefit varies from state to state depending on the tax laws. As discussed earlier, if the state has an ad valorem tax, a tax based on the highest and best use, the reduction most likely is greater than states with a flat forestry tax. Landowners typically gain an indirect benefit through tax reductions.

One easement program, the 1985 Dedicated Nature Preserve Act in North Carolina, promotes forest conservation, as well as conservation in other types of habitats, through a property and income tax benefits to protect their property in perpetuity (Cassingham et al. 2002). Participation in the program is limited by funding, so preference is for ecologically at risk regions. As might be expected protection is also concentrated on marginal-production agricultural land (Cassingham et al. 2002), as landowners' with productive land should require higher payments for easements. Some landowners may actually receive substantial economic benefits for the sale of conservation easements. Under the Federal Forest Legacy Program, landowners cannot receive more than fair market value for their property, but under other programs landowners may receive a substantial payment for highly prized forest areas (Society of American Foresters 2002).

In order for an easement program to be effective, there needs to be significant monitoring in order to ensure that the landowner is not violating the agreement (Society of American Foresters 2002). Many organizations struggle with limited resources in efforts to monitor their conservation easements (Society of American Foresters 2002), although state and federal agencies have worked in cooperation with land trusts in some states to effectively monitor the conservation easements (Sader et al. 2002).

Easement programs allow the individual landowners to come to a private, individual agreement with the implementing NGO or government office regarding allowable land use (Flow 2). The government programs offer less flexibility than the NGOs, but the agreements are individualized to particular properties through both types. The connection between the program (easement) and the NIPF owner is much stronger than with tax or cost-share

programs. We might also expect that there may be a stronger connection between the program and the impact on the forest.

Regulations and cooperatives

In our review of program impacts on the social-ecological system of nonindustrial private forests we did not explore two important programs in US forest policy, regulations and cooperatives. For example, regulations may force landowners not to harvest particular tree species or specific forestlands if designated as critical habitat under the Endangered Species Act (Nagle and Ruhl 2002). States and local governments may also have harvesting rules that apply within watersheds in order to prevent erosion. Furthermore, many contend that regulatory power has not been used much to protect our nation's forests. These laws and programs will be evaluated in future studies, but were not included at this time because the policies seem fundamentally different than voluntary types listed above.

Cooperative management plans were also not included in this study. These projects frequently bring private landowners together in order to cooperatively manage conjoint forests or to decrease the costs of harvesting on small acreage. Cooperative management has emerged as one way to mitigate the problems associated with fragmentation of forestlands through parcelization. Cooperative management of private lands is challenging for individuals because there are great costs associated with bringing people together for meetings.

In order to model cooperative management with the social-ecological model we would include several interconnected NIPFs and cooperating landowners. This complicated

governance arrangement, although frequently worthwhile, is quite different from a single landowner working with an NGO or government entity. Similarly, regulation is another type of policy tool that may be used in the future, but is fundamentally different because it is not voluntary. We focus on voluntary programs, which may alter the individual's incentives through NGO and government programs. These two policy tools warrant further study, perhaps with a modified framework of the social-ecological system.

Discussion

There is considerable variation in the types of forestry programs used to preserve US NIPF lands. We focused on four types of programs individually, but many of these programs concurrently impact the same forests and landowners and some programs may be incompatible with one another. Existing studies on forest programmatic impact were not designed to address the mismatch between NGO and government programs and NIPF preferences, but there is growing evidence that there may be problems due to the weak links in the social-ecological system.

In our discussion of the programs we have not dealt with the governance issues associated with the development and implementation of the programs. Future research will investigate the strengths and weaknesses associated with the complex hierarchies between federal, state and local agencies and departments that impact NIPF management. Preliminary evidence indicates that there are challenges in coordination of multiple programs with conflicting incentives (Ellefson et al. 2002). Currently there are attempts underway to merge agencies affecting forestry into coordinated units instead of focusing on one media, such as air, water,

land, or biota (Ellefson et al. 2002), but this raises questions about the inflexibility of a single state agency managing the forestlands.

One of the key problems in the governance of forests is the distance between the NIPF landowners and the program officers. NIPF can only indirectly express their demand for program incentives. NGO programs can have a more direct interaction with the NIPF landowners, when conservation easement contracts are adapted to the individual situation. The larger distance between NIPF landowners and program officials in governmental programs is partly caused by the federal budgets allocated to the state governments, where program officers are supposed to spend these resources on programs with limited resources for monitoring. As a consequence the programs are not evaluated for how they have affected the activities of the NIPF landowners.

The need for a better understanding of the relationship between programs, officials and landowners is not only of interest for governance of forest resources in the US. One of the main reasons for poor forest management in developing countries is the distance between the direct forest resource users and governmental officials that provide incentives for rentseeking and corruption (Curran in review; Ross 2001). Evidently, more research is required into what might be robust institutional arrangements that tighten the relation between users of the forests and organizations whose goals are to protect and preserve a viable forest resource (Hartig and Vallentyne 1989).

This chapter presents a framework that allows us to investigate programmatic impacts on the social-ecological system for NIPFs. Future research should investigate the viability of different policy tools with the understanding that NIPF landowner decisionmaking is

fundamentally connected to both the social world of politics and the ecological world. Emerging policy tools such as conservation easements and certification programs may reflect the changing demographics of NIPF landowners. This trend may also reflect dissatisfaction with traditional forestry programs and the typically economic focus. The social-ecological system for NIPFs highlights the important and frequently overlooked connections in policymaking. In order for society to increase reforestation in the US and throughout the world, we must understand a program's impact on all links in the system.

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