



Private forest owners and property tax incentive programs in the United States: A national review and analysis of ecosystem services promoted, landowner participation, forestland area enrolled, and magnitude of tax benefits provided



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ABSTRACT

Forest ecosystems provide services that can be promoted by state property tax incentive programs. A 50-state review in 2014–2015 determined that such programs were used to foster services such as protection of soil and water resources, habitat for fish and wildlife, aesthetically pleasing landscapes, and the production of timber and wood fiber. The review determined that nearly 210 million acres (85 million hectares [ha]) were enrolled in 58 different state property tax programs, an estimated 44% of private forest area eligible for enrollment. Over 3.85 million participants benefited from the programs and collectively received more than \$1.61 billion in reduced annual property taxes. The average annual value of the reduction was \$7.68 per acre (\$19.00 per ha).

1. Introduction

Of the 766 million acres (310 million ha) of forestland in the United States, more than 58%, or 445 million acres (180 million ha), is in private ownership (USDA Forest Service, 2016). Estimated to total 11.5 million in number, private forest owners include individuals and families, corporate organizations, Native American tribes, nongovernmental conservation organizations, unincorporated partnerships and associations, and others (Butler et al., 2016a). These private forests provide a wide variety of benefits for individuals and for society in general, benefits which are known as ecosystem services, of which recreational opportunities, supply of timber and wood fiber, availability of quality water, open space and scenic vistas and habitat for fish and wildlife are but a few examples. Many government programs — including tax incentive programs — are focused on encouraging owners of private forests to engage in activities that will promote the sustained availability of these services.

1.1. Objectives

Comprehensive information about property tax programs and the ecosystem services they promote is often neither complete nor fully understood, especially regarding the type(s) of ecosystem services promoted, forestland area and number of participants involved, and magnitude of annual tax incentives granted to those participating in

such programs (Brockett and Gebhard, 1999; Fortney et al., 2011; Hibbard et al., 2003; Kilgore et al., 2007; Kluender et al., 1999; Ma et al., 2014; Polyakov and Zhang, 2008; Rathke and Baughman, 1996; Sendak and Sendak, 1992). These information voids were addressed through a nationwide state-by-state review of forest property tax programs conducted in 2014 and 2015. The objectives of this review were to determine the:

- Type and breadth of ecosystem services promoted by state property tax programs.
- Area of private forestland and number of participants enrolled in property tax programs that promote ecosystem services.
- Magnitude of payments made by property tax programs annually to produce ecosystem services from private forest lands.

The objective of the research was not to evaluate the efficiency or effectiveness of property tax programs as a means of increasing the availability of ecosystem services, nor was it to quantify the amount and value of the ecosystem services that might result when property tax programs are focused on private forests. These lines of inquiry are valuable in their own right. This research, however, focused on the ecosystem services that state governments are statutorily required to promote through property tax incentives and on the extent to which those incentives have been utilized by their state's private forestland owners.

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2. Background: ecosystem services from private forests

2.1. Types and definitions

Ecosystem services are benefits that humans value, which are derived from the functions and processes of ecosystems (Brown et al., 2007; Costanza et al., 1997; de Groot et al., 2002; Daily, 1997; Wainger et al., 2010;). Although other groupings of ecosystem services have been suggested (Brown et al., 2007; de Groot et al., 2002; Deal et al., 2012), current emphasis is on: provisioning services (such as food and fiber, fuel, genetic resources, pharmaceuticals, fresh water), regulating services (such as air quality, climate regulation, erosion control, water purification and waste treatment), cultural services (such as cultural diversity, recreation, aesthetic beauty), and supporting services (such as atmospheric oxygen, nutrient cycling) (Millennium Ecosystem Assessment, 2003, 2005; Wallace, 2007). Supporting services are of fundamental importance, although they typically are not directly utilized. They provide the underlying support for the provision of services that occur within the other three classes of ecosystem services (Millennium Ecosystem Assessment, 2003, 2005).

Forest ecosystems are an important component of ecosystem services generally. The services they provide are acknowledged to be extensive in number and scope. It is suggested that they provide services such as the protection of soil and water resources, sustaining high quality wildlife habitat, providing wood fiber and related materials, ensuring diversity among plant and animal communities, offering aesthetically pleasing landscapes, storing carbon, controlling erosion and regulating stormwater (Brown et al., 2007; Costanza et al., 1997; Mercer et al., 2011). Also suggested are watershed services (quantity and quality, soil stabilization), recreation and tourism services (hunting and fishing, wilderness recreation), development services (timber and nontimber products), and cultural value services (aesthetic experiences, heritage preservation) (Krieger, 2001). Others view them as sources of water services, biodiversity services, carbon sequestering services, timber and wood services, and aesthetic and spiritual services (Watson, 2008), while yet others suggest that forest ecosystem services include carbon sequestration services, water quality regulation services and biodiversity habitat services (Mercer et al., 2011). Adding to the challenge of defining categories of ecological services is the reality that most ecosystems provide not one, but a very large variety of bundled services (Deal et al., 2012; Engel et al., 2008; Mercer et al., 2011). Production of multiple forest ecosystem services often overlap in time and space and may be either complementary or create trade-offs (Nelson et al., 2009; Rodríguez et al., 2006). For example, production of timber may be compatible with aesthetic beauty while trees are growing, but less so immediately after timber harvest unless prudent management practices are applied (Ribe, 1989). From a complementary perspective, timber harvest may promote wildlife that depend on early-successional habitat thereby enhancing wildlife as an ecosystem service (Rose and Chapman, 2003). Similarly, management of trees for timber can be blended with the production of ecosystem services considered to be non-timber forest products (Chamberlain et al., 2013).

2.2. Ecosystem service promotion

Private forestland owners that engage in the production of services from forest ecosystems are often not compensated by competitive market systems for the services they provide. As a result, decisions to increase the availability of these services are often less financially competitive when compared to decisions that result in products that can be sold through competitive markets. These market failures can be addressed in various ways, including public production and distribution of desired services, private contracts between providers of services and the entities demanding them, payments for ecosystem services, voluntary provision of ecosystem services by suppliers, and government action requiring individuals and communities to make ecosystem services

readily available (Kemkes et al., 2010). Many of these approaches have been made part of existing government policies and programs, notably landowner information and education programs, professional advice and technical assistance programs, financial incentives and enticements (loans, grants, cost-sharing), legally binding easements and covenants, regulatory laws and rules requiring the production of ecosystem services, and various types of preferential tax programs (Cubbage et al., 2007; Ellefson et al., 2004; Kilgore and Blinn, 2004; Kilgore et al., 2007; 2008). Owners of private forestland in the United States received in 2007 an estimated \$1.9 billion in direct government payments for purposes of promoting various ecosystem services (Mercer et al., 2011). The value of property tax incentives made available to landowners for the same purposes are not included in this estimate.

2.3. Property tax incentives

The owners of private forest land in the United States are subject to a variety of taxes, notably property, income, and estate taxes (Butler et al., 2012; Hibbard et al., 2003; Hickman, 1992). Reduced or favorable tax rates can be regarded as an incentive that encourage greater availability of ecosystem services. In the United States, property tax laws have traditionally made special provision for reduced taxation of private forest land and have been persuasively encouraged since the 1920s: “Efforts to induce forest owners to protect and care for their forests, to prevent destructive exploitation of virgin forests, and to encourage the reforestation of cut- over lands have always, sooner or later, encountered difficulties in connection with taxation” (Fairchild, 1935, p. 3). Although program eligibility requirements vary considerably across states, all 50 states currently have property tax programs that seek to promote the availability of forest- based ecosystem services (Butler et al., 2012; Ellefson et al., 2004; Kilgore et al., 2007; 2017).

Property taxes can be a burden to the provision of ecosystem services. For example, they must be annually paid by forest landowners even though income from forests may be infrequent due to the long planning horizons associated with some forest benefits, notably timber production. Furthermore, private forest landowners often report that high property taxes can cause them to sell their forest properties or to develop them for non-forest purposes (Butler et al., 2010; Butler et al., 2012). Property tax incentives have also been shown to positively affect profits from private forest land and affect certain types of forest management decisions (Kilgore et al., 2007). Overall, however, there is limited direct empirical evidence that defines the extent to which property taxes affect landowner behavior and the services that forest ecosystems can provide (Brockett and Gebhard, 1999; Kilgore, 2014). In contrast, and as an alternative to property tax incentives, research has determined that financial cost-sharing programs are an effective way of promoting the reforestation of private forestland (Andrejczyk et al., 2016; Li and Zhang, 2007; Ruseva et al., 2015; Sun, 2007).

3. Framework and methods

3.1. Ecosystem services promoted

A state-by-state analysis of the language set forth in state property tax laws and administrative rules was undertaken to determine the ecosystem services that state and local governments were legally obligated to promote. Content analysis was chosen as the preferred analytical approach because of its past success in identifying consistent intentions, preferences and purposes among diverse statements presented in written documents of individuals and organizations, especially in the fields of marketing, political science and legal research (notably involving administrative and statutory rules and regulations). The approach provides a systematic way of condensing a plethora of words and phrases into logical categories that can be more easily understood and analyzed (Gaudet and Robert, 2018; Neuendorf, 2017;

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