

Economics

Economic Contributions from Conserved Forests: Four Case Studies of the USDA Forest Service Forest Legacy Program

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Abstract

Privately-owned forests provide important environmental, economic, and cultural benefits to the general public. Resulting impacts from land-ownership changes and conversion of working forests to other land uses threaten these benefits. The USDA Forest Service Forest Legacy Program (FLP) permanently protects threatened private forests that are of environmental, cultural, and economic importance to the greater public while keeping land ownership and forest management at the private or local level. FLP provides grants to state agencies to purchase conservation easements on private forestlands or, less frequently, acquisition by public agencies. We employed IMPLAN's input-output model of the 2016 economy to estimate how land protected by FLP in four regions of the United States contributes to the economy. FLP land adds tens of millions of dollars of value annually and supports thousands of jobs in the four study areas and, due to the permanent protection of these lands, they will continue to do so in perpetuity. Nonfederal partners contributed 34%–60% of total project costs, highlighting the importance of land conservation to multiple stakeholders and the ability to leverage federal resources. The permanent nature of FLP protection provides long-term security for the economic and cultural benefits these lands provide.

Study Implications: The Forest Legacy Program (FLP) is administered by the USDA Forest Service to protect historic forest uses and intact working forest landscapes. This study quantified economic activities on FLP land in four areas to assess how these activities contribute to the economy of the multistate region in which the projects are located. The substantial economic contribution in natural resource industries suggests that permanent protection of forests provides economic and cultural benefits in perpetuity. This information illustrates the contributions of FLP to local economies and can be used to assess the value of the program and the potential for future funding.

Keywords: regional economics, IMPLAN, private forests, conservation, permanent protection

Nearly 60% of the forests in the United States (excluding interior Alaska) are privately owned (Butler et al. 2020). These forests provide important environmental, economic, and cultural benefits to the landowners themselves and also to nearby communities and the general public (Stein et al. 2009). Concerns have been raised in recent decades about conversion of working forests to other nonforested land uses (e.g., low-density residential development) and the threats these conversions pose to the public benefits that private forests provide (Best 2002, Daniels and Lapping 2005, Alig 2007, Stein et al. 2009). Threats to forests and barriers to forest protection vary among and within regions (Smail and Lewis 2010, White et al. 2010), necessitating a flexible, locally-driven approach to protect the values that private forests provide to the public.

The USDA Forest Service Forest Legacy Program (FLP), established in 1990 (16 USC 2101 et seq.), permanently pro-

tections threatened forests that provide important environmental, economic, and cultural benefits to the greater public while keeping land ownership and management in private hands or at the local level (USDA 2017). FLP provides competitive grants to state agencies to purchase conservation easements on private lands or, less commonly, purchase lands outright to protect these valuable forests. The program requires a nonfederal match of at least 25% of the total cost of the land protection project. All FLP properties are required to have a forest management plan that provides public benefits such as timber production and recreation access.

Land protected under FLP contributes to the economy through forest management and other activities. To date, no publication has estimated the extent to which financial transactions associated with forest management activities and recreation on private land permanently protected through FLP

flows through the economy and contributes to employment in multiple regions of the United States. This study provides these estimates for all land conserved by FLP in four environmentally, culturally, and economically distinct regions (Figure 1) and summarizes specific project attributes to help assess the social and cultural effect that FLP land has on the study areas.

Methods and Data

Quantifying the economic activities that occur on FLP land and assessing how these activities flow through the economy and factor into regional employment provides measures of economic contributions associated with FLP projects. Economic contributions derive from the initial financial transactions associated with the activities on the lands (direct effects) and resulting transactions between industries flowing through the regional economy (secondary effects) and contributing to, among other things, regional employment and value-added effects (see [Forest2Market, Inc. 2016](#), [Henderson et al. 2017](#)). Economic contribution analyses use input-output models to relate economic activities such as spending, production, and industry contributions to jobs, wages, economic output, and value added. One of the most common input-output models used to better understand the effects of forestry-related activities (for example, see [Jolley et al. 2020](#)) and outdoor recreation is Impact Analysis for Planning (IMPLAN) ([IMPLAN Group, LLC 2018](#)). IMPLAN models incorporate data from the real economy by sector, zip code, and year. IMPLAN uses jobs, spending, and sales data in one economic sector of a chosen area to estimate effects in connected sectors. In this study, we used IMPLAN to model the effects that economic activity associated with FLP-protected lands have in terms of employment (i.e., number of jobs) and value added (i.e., gross output minus intermediate inputs) for the study regions (See [Table 1](#)).

We analyzed all properties conserved by the FLP from 1990 to 2017 in four regions: Georgia and South Carolina; northern forest region of Maine, New Hampshire, New York, and

Vermont; northern Idaho and western Montana; and northern Wisconsin and Michigan's Upper Peninsula ([Figure 1](#)). The IMPLAN analysis was run at the multistate level to capture contributions that FLP projects have to the region as a whole, thereby accounting for the local contributions of the analyzed FLP properties in their entirety. We used IMPLAN's model of the 2016 economy (the most recently available at the time of the analysis), and all results were adjusted to 2018 dollars.

Our inputs consisted of estimated spending by visitors to FLP properties on travel and recreation-related expenses, timber volumes harvested on FLP properties and associated primary wood products manufactured in the multistate region, production of maple syrup, and reforestation and timber stand improvement (TSI) activities where applicable. We estimated the volume of wood harvested (converted to job estimates; see [Sorenson et al. \[2016\]](#)); types of forest products produced; visitor spending associated with hunting, fishing, birdwatching, and snowmobiling; and the value of maple syrup and reforestation/TSI on all applicable FLP properties in the four study areas. See [Supplement 1](#) for more detail on the methodology using IMPLAN, data sources, and model assumptions.

To better frame our results, we summarized information about the basic attributes of the projects from the Forest Legacy Information System database ([USDA 2018](#)) that contains project attributes for all FLP projects including acres conserved, project price, and partners involved.

Results

Our analysis shows that FLP protected land in the four regions corresponds to between \$23 and \$181 million of value added to economies annually, depending on the region. In per-acre terms, the value-added contribution from timber harvesting and recreation from FLP lands in the study areas, including reforestation/TSI and maple syrup in applicable re-

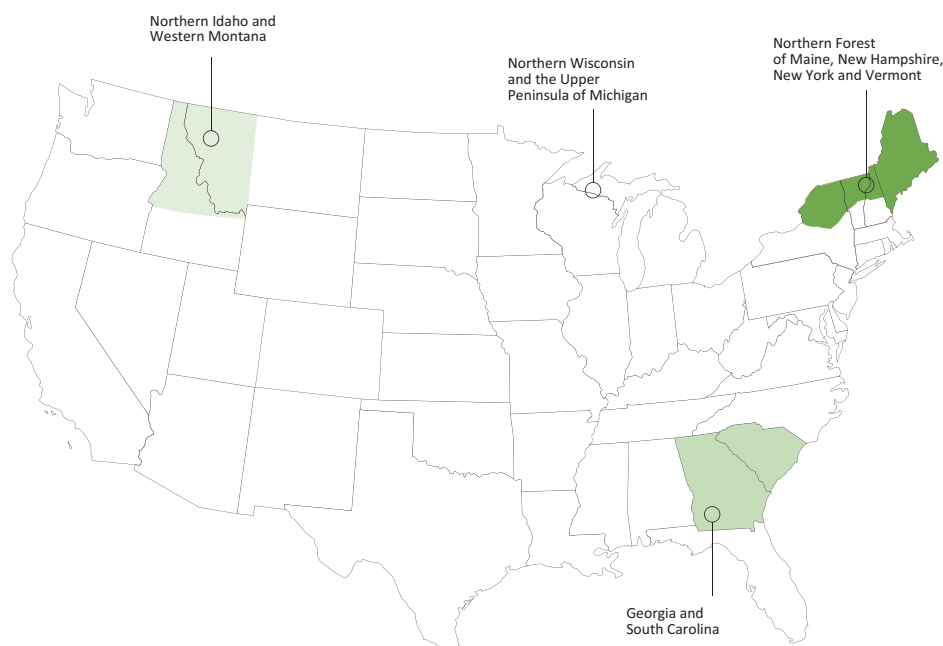


Figure 1. The four regions of the United States included in this economic contribution analysis of USDA Forest Service Forest Legacy Program protected lands.

Table 1. Selected results of an economic contribution analysis of land conserved by the USDA Forest Service, Forest Legacy Program (FLP) from 1990 to 2017 in four regions of the United States. 2018 dollars.

Region	Acres conserved	Number of projects	Average cost share	Average number of partners per project	Annual value-added (per acre) ^a	Employment ^b
Northern Forest	1,297,416	56	34%	11.3	\$181,199,000 (\$140)	2,480
Michigan/Wisconsin	256,502	12	57%	11.2	\$37,214,000 (\$145)	540
Georgia/South Carolina	141,643	21	60%	5.7	\$23,494,000 (\$166)	280
Idaho/Montana	323,903	35	40%	10.1	\$33,833,000 (\$104)	550

^aValue-added refers to the gross output minus intermediate inputs (i.e., the consumption of goods and services purchased from other industries or imported). Value-added consists of employee compensation, taxes on production and imports (less subsidies), and gross operating surplus (IMPLAN Group, LLC 2018).

^bEmployment refers to the number of monthly full- and part-time jobs associated with the inputs.

regions, was \$139 per acre annually, on average. The properties in each region support from 280 to 2,480 jobs, depending on the region, primarily in the forestry, manufacturing, hospitality, and tourism sectors (See Table 1).

Nonfederal partners contributed 34%–60% of the total project price, well above the 25% minimum requirement. On average, FLP contributed \$350 per acre toward the price of conservation easements or fee-simple purchases throughout the project areas. Further, each project in the study areas has an average of 12 different conservation partners, including the Forest Service and the landowner.

Discussion

Our analysis shows that land conserved by FLP contributes to regional communities in terms of both dollars and jobs. The permanent protection of FLP lands ensures long-term economic benefits associated with managed forests and contributions to forest-based industries, which support jobs and creates economic value in sectors that are historically important to forested rural communities. Jobs supported by FLP lands are mainly in timber, manufacturing, and tourism sectors, which indicates that FLP lands support the program's goal of protecting historic forest uses and supporting forest-based economies.

In addition to the economic contributions we analyzed, permanent protection of land has been shown to provide other economic and social benefits to nearby communities, including increased property values near protected land (Reeves et al. 2018, Zhang et al. 2018), increased wages and employment (Sims et al. 2019), and improved quality of life (Kline and Garber-Yonts 2004, Alig 2007, Sims et al. 2019). FLP requires long-term management of the land, thereby securing the economic and cultural benefits to nearby communities. The long-term security of economic and cultural benefits is important to rural communities and the impetus for many FLP-funded conservation projects. In the Northern Forest region, citizens express concern that changing land ownership will limit historically-available opportunities for public recreation on private land (Daigle et al. 2012, J. Scarinza, personal communication, July 2018). In the northern Idaho and western Montana region included in this study, over 65% of the wood that supplies the economically and culturally important wood products industry comes from a small amount of private land that is under threat from parcelization and development (K. McClintock, personal communication, July 2018; Pokharal et al. 2018).

The cost-share requirement of FLP helps to ensure that the federal money is being used to address a failure of the

market to account for nonmarket social values of forest land, that demand for conservation comes from communities benefiting from the forest and helps to leverage limited public funds. Local involvement and partnerships in conservation have been shown to result in more support for and less conflict with conservation strategies (Blank et al. 2002, Nelson et al. 2007, Walker and Ryan 2008, Cottle and Howard 2012), and, in this case, also represents community willingness to pay for the benefits that private forests provide. Projects often include partners from seemingly disparate stakeholder groups such as Native American tribes, forest industry corporations, environmental NGOs, energy utilities, and groups of private citizens. The extensive local support for these projects suggests that the forests conserved through the program provide tangible benefits to local entities. Our analysis of project attributes and economic contributions from FLP lands suggests that the program helps address the market's failure to sustain cultural and economic services from working forests, especially cultural and economic security, because the lands are conserved in perpetuity, maintaining rural jobs and ways of life over time. Forests conserved through FLP provide not only tangible economic and cultural benefits that communities care about and are willing to pay for but also provide substantial additional ecological value from ecosystem services that we did not measure, such as clean water and carbon sequestration.

Although this case study did not focus on ecological aspects of the land conserved through FLP, conserving and sustainably managing large forested landscapes protects biodiversity, water quality, carbon sequestration, and many other benefits that forests provide. Future research should strive to quantify the value of the ecosystem services provided by land protected by FLP and other conservation programs, expand to additional geographical areas, and make comparisons to economic contributions of nonconserved lands.

Conclusion

Our analysis shows that land conserved through FLP contributes to regional economies and highlights the important social and cultural effects of the program. The one-time investments provide permanent protection and long-term security for these economic and cultural benefits. The flexibility of FLP to be adapted to different regions and types of landowners and its cost-share requirement allow the program to effectively protect the public benefits derived from private

forests while keeping management and ownership at the local level, likely reducing costs to the public compared with federal control of the land.

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Conflict of interest

The authors declare no conflict of interest.

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