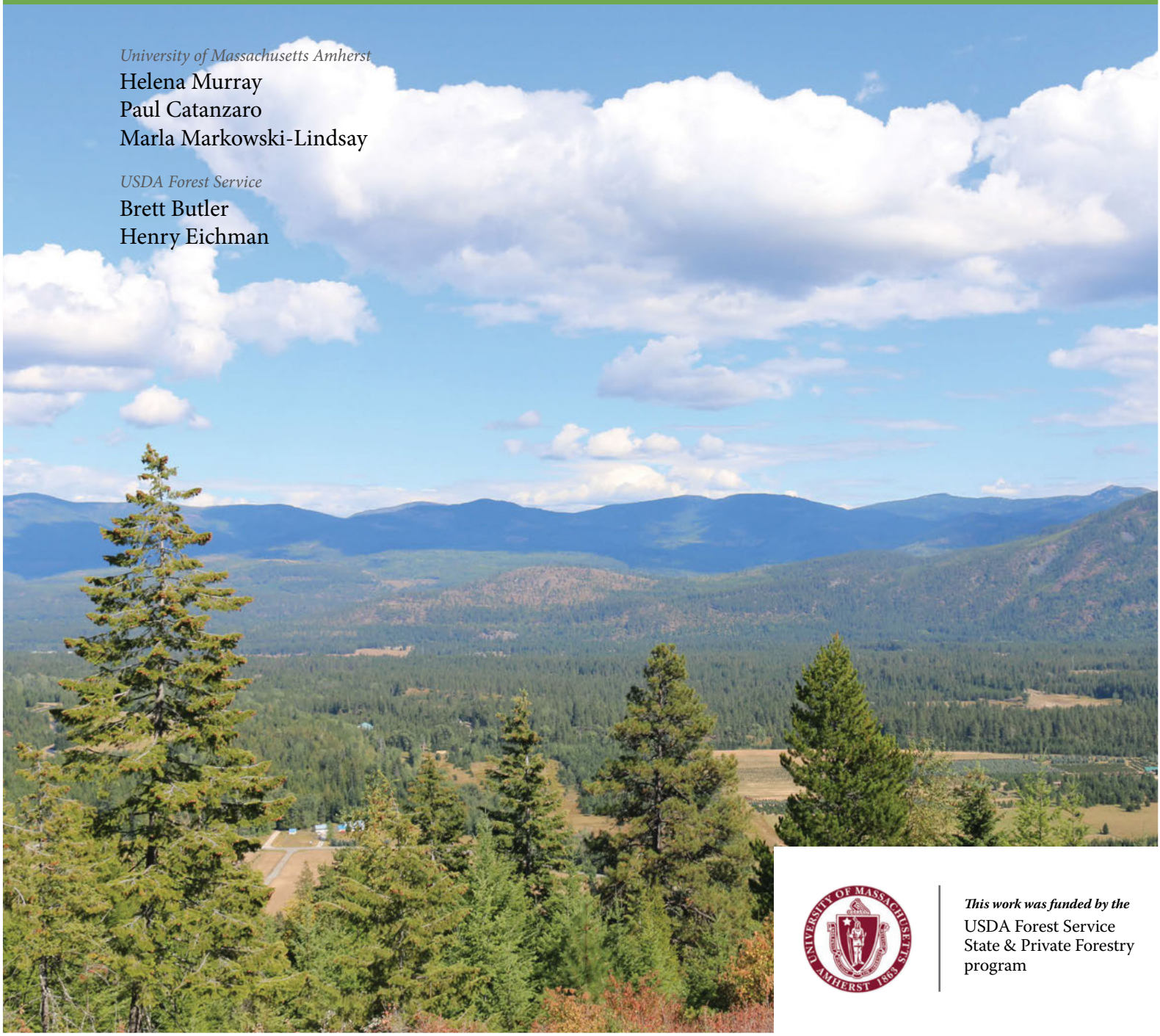
Economic Contributions of Land Conserved by the USDA Forest Service's Forest Legacy Program

University of Massachusetts Amherst
Helena Murray
Paul Catanzaro
Marla Markowski-Lindsay

USDA Forest Service
Brett Butler
Henry Eichman



This work was funded by the
USDA Forest Service
State & Private Forestry
program

Economic Contributions of Land Conserved by the USDA Forest Service's Forest Legacy Program

University of Massachusetts Amherst
Helena Murray
Paul Catanzaro
Marla Markowski-Lindsay

USDA Forest Service
Brett Butler
Henry Eichman

This work was funded by the
USDA Forest Service State
& Private Forestry program

CONTENTS

Cover photo: The private forests of northern Idaho provide many public benefits such as recreation opportunities, jobs in the forest products industry, clean water, secure wildlife habitat and connectivity, and aesthetic beauty that residents and visitors alike cherish. Photo credit: Kennon McClintock

FIGURES AND TABLES

FIGURES

TABLES

EXECUTIVE SUMMARY

- The Forest Legacy Program (FLP) is a conservation program administered by the USDA Forest Service that seeks to protect traditional forest uses and intact working forest landscapes. The program awards grants that help pay for conservation easements and fee-simple land purchases that are then held by state agencies. Forests conserved using FLP funding not only provide environmental benefits but also must be managed to provide tangible economic and social benefits to the public.

- We sought to quantify the economic activities that happen on FLP land in four areas of the country and to assess how these activities contribute to the economy of the multi-state region in which the projects are located. We estimated economic activities on FLP land in the Northern Forest region of Maine, New Hampshire, Vermont and New York, Northern Wisconsin and the Upper Peninsula of Michigan, Northern Idaho and Western Montana and Georgia and South Carolina.

- We used national, regional, and state-wide data to estimate annual timber harvest volumes and wood utilization, value of maple syrup production and tree planting (where applicable), annual use and trip spending for fishing, hunting, and snowmobiling for each FLP property in the study areas. We estimated how economic activities on FLP lands contribute to the economy of their region using IMPLAN. IMPLAN is an input-output software that models the direct, indirect and induced effects of economic activity on the greater economy of the multi-state region.

- To better understand how the FLP works at the local level to benefit landowners and communities, we interviewed landowners and managers of forests conserved through the FLP in each study area.

CONCLUSIONS

- **$140 per acre:** The average annual estimated contribution to gross regional product from timber harvesting, tree planting, maple syrup, hunting, fishing, bird watching and snowmobiling on FLP land in the study areas.

- **280-2,500 jobs per region:** These properties support hundreds of jobs in each multi-state region.

- **$350 per acre:** Average FLP funding used for conservation easement and fee-simple land purchases in the study areas. The up-front costs of conserving these lands ensures that the social, economic and environmental benefits that these forests provide continue in perpetuity.

- **34-60%:** The average percentage of the total project price that was covered by non-federal partners. The FLP requires that 25% of the total price be covered with cost-share, but for most projects that proportion is much higher. High investment amounts from local partners show that communities care about conserving working forests and that FLP support makes widely-desired forest management and conservation outcomes possible.

Future research is needed to understand the full value of the program and program land. A cost/benefit analysis that monetizes the market and non-market values that the land provides and compares them to the full cost of the program could be used for this purpose.

The results presented in this report show a snapshot of how estimated economic activities on FLP lands contributed to each region's economy in 2016. These results are approximate estimates for the entire multi-state region encompassing the study areas and should not be applied to any specific property or acre of land.

INTRODUCTION

The majority of forestland in the United States is privately owned (Butler et al, 2016). These 475 million acres of forests provide many economic, social, cultural, and environmental benefits not only to the landowners but also to surrounding communities. These benefits include but are not limited to clean water, wildlife habitat, wood products, recreation opportunities, and carbon sequestration. Economic activities on managed forests such as timber harvesting and spending related to recreation contribute to the local economy. However, as rural areas become more appealing for development, the nation's private forests are threatened by fragmentation and conversion to non-forest uses. Parcellation and development of private land threaten to sever habitat connectivity for wildlife, limit opportunities for outdoor recreation, and remove income from forest management that is essential to the economies of many rural communities (Best, 2002). Hunters, anglers, saw-mills, loggers and rural residents could see their way of life change rapidly as land conversion progresses. Conservation of private land poses unique challenges. Land is expensive, and oftentimes developers will pay a high one-time fee to purchase the land. When the land is converted to small parcels the many social and economic benefits that forests provide are often no longer viable.

The Forest Legacy Program (FLP) is one of the USDA Forest Service's responses to the problem of land-use change threatening rural economies and communities. The FLP awards grants that help pay for conservation projects that protect traditional forest uses such as timber and public recreation (USDA Forest Service, 2017). The program was established in 1990 after concerns that the forest-based economy and culture of the Northern Forest region of New York, Vermont, New Hampshire, and Maine was threatened by changing land ownership (USDA Forest Service, 2017). The FLP began in the Northern Forest States, and since then FLPs have been established in 49 states and 4 territories. The FLP was established as an amendment to the Cooperative Forestry Assistance Act of 1978 and is funded by the Land and Water Conservation Fund (USDA Forest Service, 2017). The program is completely voluntary, and landowners must work closely with state government to be considered for funding. The FLP provides funding for fee-simple land acquisitions where the entire title is transferred to the state and the land is then managed by a state agency, and, more commonly, for conservation easements where the landowner sells specific development rights and agrees to manage the land for multiple, previously agreed upon uses. Both conservation outcomes ensure that the land stays forested and is managed for public benefits in perpetuity. Each state has a lead agency for the FLP that holds the easements or deeds to fee-simple land. The FLP funds up to 75% of the cost of each project, and the rest of the cost of conservation must come from non-federal sources. Industry, non-profits and individual landowners or citizens often work together to raise money or donate land to meet the cost share requirement. The FLP is a catalyst for forest conservation and makes locally and regionally desired conservation outcomes financially viable.

The FLP ensures that the land is not only conserved but also managed in perpetuity to protect traditional forest uses and environmental services that forests provide. Land that is conserved through the FLP must provide at least one public benefit such as recreation access or economic activity from forest management, and most of the projects that are funded provide multiple important public benefits. Land conserved using FLP money must have a multi-resource management plan that focuses on maintaining the public benefits that forests provide including recreation, biodiversity, timber, water quality, and other values (USDA Forest Service, 2017). Also, since the conserved land is maintained in local ownership (either state or private), the management decisions are made by people and organizations with a stake in the local communities. This multi-use management results in economic activities including timber harvests and trip spending by people recreating on the properties. Because the FLP is a "working forest" conservation program that requires management, activities occurring on this land will contribute to the economy of the region in perpetuity by ensuring a stream of cash flow into an area as well as local employment (Tesini, 2009). For this report, we assessed the economic contributions of FLP conserved lands in four areas of the country to determine how much money generated from economic activities on the land contributes to local employment and Gross Regional Product. We also interviewed landowners and managers of select forests conserved through the FLP to better understand how the program works for different regions, types of landowners, and communities.

Study Areas

The study areas for this analysis, as selected by the FLP staff, are four areas of the United States that have long-running FLPs and a high concentration of conserved lands: the Northern Forest region of New York, Vermont, New Hampshire and Maine (Northern Forest); Northern Wisconsin and Michigan's Upper Peninsula (Northern WI/ Upper Peninsula MI) (Figure 1). Georgia and South Carolina (GA/SC); and Northern Idaho and Western Montana (Northern ID/ Western MT). These four areas differ in geography, forest types, culture and extent of program lands. Basic information about completed FLP projects in each study area is outlined in Table 1.

The FLP allows states and landowners to tailor the program to fit local goals and the unique needs of their area. Properties conserved using program funds vary in size from less than 100 acres to over 300,000 acres. Landowners of FLP properties are diverse. Some are individuals or families, many are large forest management companies, and still others are state agencies or municipal governments. The four study areas have different forest types, cultures, landownership patterns, recreational opportunities and forest-related industries. Studying these different areas provides the opportunity to see how the FLP can work with different states, forest types, and landowners to achieve conservation outcomes that benefit the forest and sustain economic activities that these areas provide to each region.

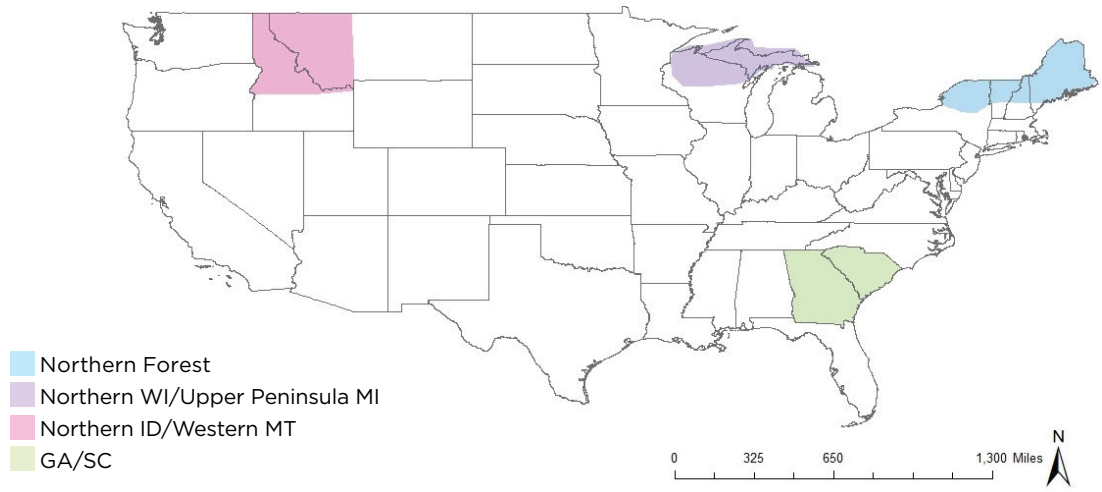


Figure 1 | **Locations of the four Forest Legacy Program study areas.**

Table 1 | **Information about the FLP in each of the four study areas***

Study area	Completed projects	Areas conserved	Average total price/acre of easement or land purchase	Average % non-federal cost share
Northern Forest	56	1,297,416	$298	34%
Northern WI/ Upper Peninsula MI	12	265,502	$394	57%
GA/SC	21	141,643	$2,304	60%
Northern ID/Western MT	35	323,903	$713	40%

*Includes projects completed before Fiscal Year 2018

Northern Forest

The "Northern Forest" comprises northern New England and New York spanning from the Atlantic Ocean to Lake Ontario. For this study, we used the definition of the Northern Forest provided to us by the Northern Forest Center, a non-profit organization that seeks to preserve and enhance the benefits that forests provide to the region. Our definition of the Northern Forest does not include the entirety of the four states but only those areas that have been previously considered part of the region by the congressionally appointed task force in the 1990s and the Center today (Northern Forest Lands Council, 1994; Northern Forest Center, personal communication) (Figure 2). The Northern Forest is heavily forested—common tree species in this area are maples, yellow birch, American beech, spruce, fir and white pine. Approximately 93% of the forests in the four-state area are privately owned (Northeast State Foresters Association, 2013). Despite increased development and difficulties for the forest products sector of the region stemming from changes in international and domestic forest products trade, the Northern Forest as a whole still contributes billions of dollars and thousands of jobs to the economy of the region each year (Northeast State Foresters Association, 2013).

The Northern Forest contains hundreds of lakes, rivers and trails that are heavily used for recreation. Adirondack Park, the White Mountain National Forest and the Green Mountain National Forest are all located in the study area, but private lands are still very popular destinations for locals and visitors alike. Residents of the Northern Forest region rely on the land for economic support and personal fulfilment. Hunting, fishing, skiing, snowmobiling and hiking are all paramount to the culture of the Northern Forest. Annually, over 3 million people participated in wildlife-related recreation in the four-state region (FHWAR, 2011) and millions more visit the Northern Forest for non-wildlife forest-based recreation such as fall foliage viewing, skiing, snowmobiling and hiking (Okrant, 2006). Maple syrup is also an economic and cultural staple of the Northern Forest, contributing tens of millions of dollars to the regional economy each year (Becot, Kolodinsky, and Conner, 2015; Gabe, 2014).

The FLP in the Northern Forest

The FLP started in the Northern Forest. In the 1980s, large forest products companies began selling their vast landholdings in northern Vermont, New Hampshire, Maine and New York. This divestment and the subsequent land ownership changes posed a threat to the forest-based economies and cultural values of the area, since the lands that had long provided public outdoor recreation opportunities as well as many jobs in the forest products industries were no

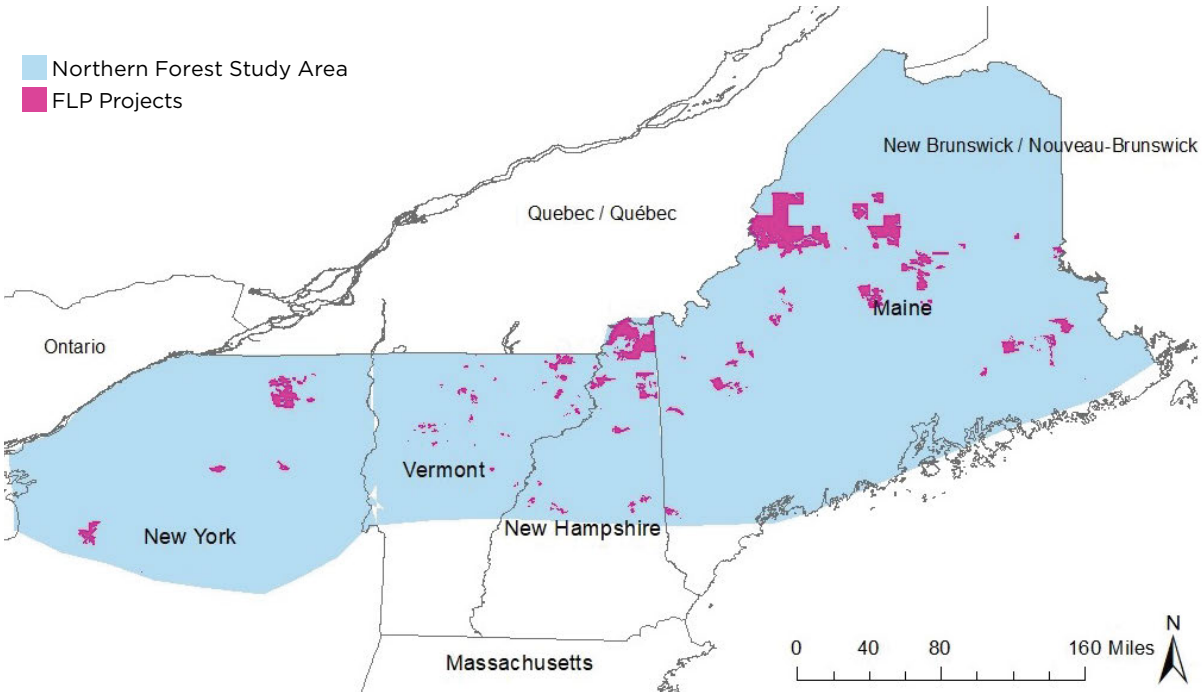


Figure 2 | **Location of the 1,297,416 acres conserved by the FLP in the Northern Forest study area.**

longer guaranteed to provide these benefits (Northern Forest Lands Council, 1994). Acquisition by real estate investment trusts and smaller private landowners meant that forest management, public recreation, and even intact forest was not guaranteed. The proximity of this region to large metropolitan centers such as New York and Boston only increased development risk to these forests and communities. In response to these concerns, Congress and the governments of the four states appointed a council to study the Northern Forest region and how the changes would influence the economic and social values that the forests provide (Northern Forest Lands Council, 1994). One of the strategies that resulted from this study was using conservation easements to prevent conversion of important lands to non-forest uses. Thus, the FLP was created in 1990 and has since spread to almost every other state (USDA Forest Service, 2017). Since the FLP was established in the Northern Forest states in 1990, the program has helped conserve over 1.2 million acres of forest throughout the Northern Forest.

FLP properties in the Northern Forest vary greatly in size, ownership, and use, mirroring the variety of ownerships across the region. Some of the FLP forests are larger than 300,000 acres and still owned and managed by forest management companies. Other FLP properties in the Northern Forest are only a few hundred acres in size and are owned by a single private landowner. Snowmobiling, canoeing, fishing and hunting are important activities throughout the region. FLP land in the Northern Forest contains many miles of shoreline on popular lakes, ponds, rivers and streams that are heavily used for canoeing, fishing and other recreation. Most of the FLP properties in the Northern Forest have conservation easements on them and are still privately owned and managed. Some of the properties are owned by municipalities or state government and provide social and economic benefits directly to the town or state that owns the land. Many FLP properties in the Northern Forest have extensive maple sugaring operations.

Northern WI/Upper Peninsula MI

Heavily forested and surrounded by the Great Lakes, the Upper Peninsula of Michigan and northern Wisconsin are destinations for hunters, fishers, snowmobilers and other visitors who want to spend time outside. Forest composition

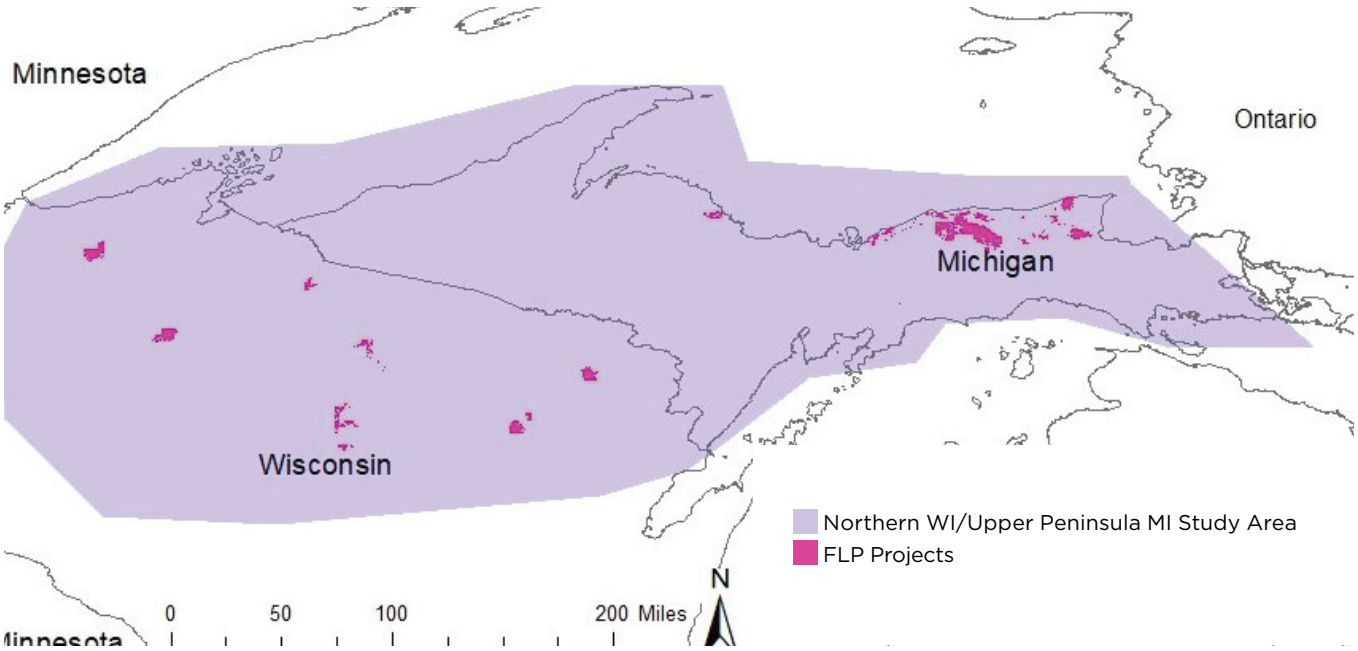


Figure 3 | **Locations of the 265,502 acres conserved by the FLP in the Northern WI/Upper Peninsula study area.**

in this area is similar to the Northern Forest, and common tree species include maples, birches, beeches and Eastern white pine. The Great Lakes provide recreation opportunities as do the other lakes and rivers throughout the region. The forest products and forest-based outdoor recreation industries of both states contribute billions of dollars to each state's economy each year each year (Leefers, 2016; Wisconsin DNR, 2016; Outdoor Industry Association, 2016). Wisconsin is the birthplace of snowmobiling (Wisconsin DNR, 2017) and forests in this region have extensive snowmobile trail networks. Millions of people hunt and fish in Michigan and Wisconsin annually, spending over $1 billion in each state on trip-related expenses related to these activities (FHWAR, 2011). Water filtration is an important benefit provided by forests in this region as the forests here filter water that flows into Lake Michigan, Lake Superior, and Lake Huron.

The FLP in Northern Wisconsin and Michigan's Upper Peninsula

The FLP was established in 2003 in Michigan and in 2000 in Wisconsin. Since then, the program has helped conserve almost 274,000 acres in northern Wisconsin and the Upper Peninsula of Michigan, and thousands more in Michigan's lower peninsula. Both Michigan and Wisconsin cite historical cultural dependence on the forest, the importance of timber and recreation to the state economy and culture, and the threat of forest fragmentation as important in their FLP Assessments of Need (Michigan Department of Natural Resources, 2003; Wisconsin Department of Natural Resources, 2010). FLP projects in this region range in size from 160 acres to 150,000 acres. Many FLP projects in this region are over 10,000 acres in size and provide important connectivity for wildlife such as grey wolves and moose. Other FLP properties are smaller in size and owned by families or individuals. Most projects in this region are easements and are owned and managed by forest management companies, families, or individuals.

GA/SC

About the region

Forests of Georgia and South Carolina are critical to the economy and culture of these two states. Forestry is a major economic driver in both states, but rapidly growing populations threaten the forest land base. Forestry sectors including timber harvesting, wood processing and forest-based recreation contributed 80,000 jobs in South Carolina in 2017 (Khanal, Straka, and Willis, 2017) and over 50,000 jobs in Georgia in 2016 (Georgia Forestry Commission, 2016). Over

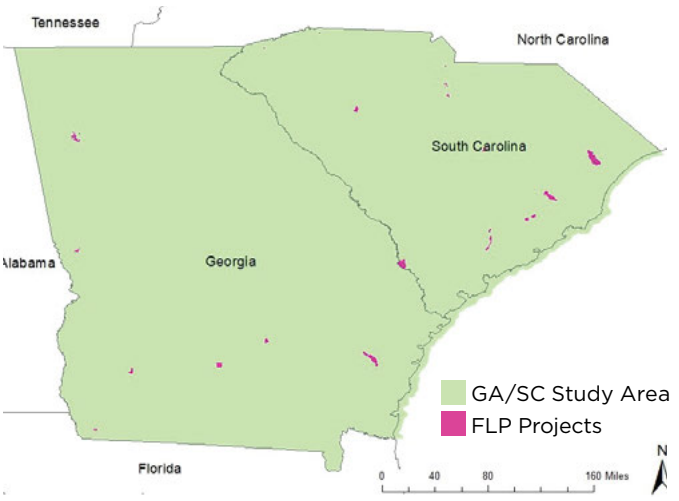


Figure 4 | **Locations of the 141,643 acres conserved by the FLP in the GA/SC study area.**

3 million people participated in fishing, hunting and wildlife watching in 2011 in the state of Georgia, and over $4 billion was spent on these activities in the state. In South Carolina, 1.7 million people participated in wildlife associated recreation, spending over $2 billion in the state (FHWAR, 2011). These states contain threatened ecosystems, including coastal longleaf pine, which are also threatened by development.

The FLP in Georgia and South Carolina

The FLP in Georgia and South Carolina seeks to protect forests from the rapid development that both states are experiencing. Forests cover over 2/3 of the state of South Carolina, but ownership changes threaten the continuation of the benefits they provide. Land owned by forest industry has declined from over 2 million acres to just over 100,000 acres (SC Forestry Commission, 2017). Almost 2/3 of the forests in South Carolina and 70% of Georgia's forests are owned and managed by families and these lands are threatened by parcellation which in turn reduces the viability of forest management on these lands (Hatcher et al., 2012). Population growth and urban sprawl threaten Georgia's forests as the increased demand for land increases property taxes making forest landownership unrealistic for many (Miller, 2012). Aging landowners contribute to parcellation of forests in this region when they divide land for their heirs (Butler and Butler, 2016). In both states, the FLP was established to protect the forests that are important for the economy, culture, and ecosystems of the region. South Carolina first entered the FLP in 1999, and Georgia's program began a year later in 2000.

In Georgia and South Carolina, the majority of FLP projects are fee-simple purchases managed by the FLP state lead agencies: the Georgia Forestry Commission and the South Carolina Department of Natural Resources. These properties are managed for multiple uses including timber, recreation and wildlife habitat. Most are open to public recreation including hunting, and popular game species like deer and turkey abound in these forests. Water quality and supply is also an important issue on FLP lands in this region as forests here filter drinking water for millions of people (South Carolina Department of Natural Resources, 1999; Georgia Forestry Commission, 2000) and many of the FLP properties in this region are located along the shores of rivers and lakes that are used for drinking water. Landscape connectivity and ecosystem restoration are also important uses of the FLP in these states and many properties are purchased by the state for their potential ecological value (South Carolina Department of Natural Resources, 1999; Georgia Forestry Commission, 2000).

Northern ID/Western MT

The well-managed private forests of northern Idaho and western Montana support the forest-based economy of the region. The forest products industry in Idaho contributed almost 30,000 jobs to the state economy in 2017 (Preitzger, 2018). Only 15% of forests in Idaho are privately owned, but these private forests supply over 65% of the wood that is processed in Idaho mills (Pokharel et al., 2018). In Montana, private forests also supply 65% of the wood that is processed in the state while 23% of non-reserved timberlands in the state are privately owned by corporations and families (Montana Fish, Wildlife and Parks, 2000). These statistics show the importance of private land to the forest-based economy of the region. Without well-managed private forests, the wood products industry would not be able to survive in this region. Forests in Idaho and Montana also provide valuable recreation opportunities. Over 800,000 people spent over $1 billion on wildlife associated recreation in Idaho in 2011 (FHWAR, 2011). Over 500,000 people spent $1.4 billion on wildlife associated recreation in Montana in 2011 (FHWAR, 2011).

Many communities in northern Idaho and western Montana are dependent on the forest products industry and forest management is integral to the culture of this area. In northern Idaho and western Montana, most of the high-elevation land is owned by the federal government, the valleys are owned by smaller private landowners, and the middle elevation forests are owned mostly by timber companies (K. McClintock, personal communication 2018). A recent survey of family forest owners in Idaho suggested that private land in the state is under threat for parcellation and conversion as landowners age and development pressures increase (Cook, Becker and Benedum, 2018). Increasing development values in these two states make landownership more expensive and some corporations are opting to sell land for house lots. This results in parcellation and fragmentation of the working forest resulting in a reduced timber base, thereby putting stress on local sawmills and jobs.

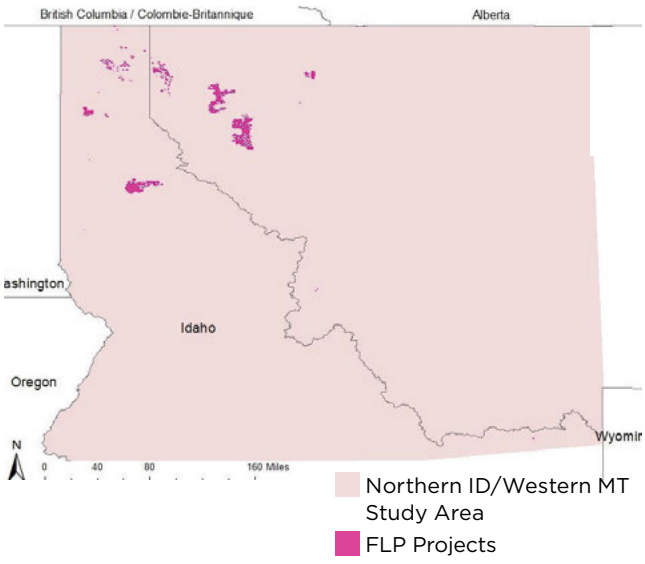


Figure 5 | **Locations of the 323,903 acres conserved by the FLP in the Northern ID/Western MT study area.**

The FLP in northern Idaho and western Montana

The state of Idaho cites "maintaining the cultural and economic stability of rural communities by conserving working forest landscapes" as the top goal for their FLP in the state's Forest Action plan (Plumb, Benedum and Becker, 2017). Similarly, Montana aims to conserve lands that contribute to the economy and have unique environmental features or social benefits. The FLP began in Idaho in 2002 and Montana in 2000. Properties in Northern ID/Western MT range from a few hundred acres to over 100,000 acres. In addition to wood products, Idaho and Montana's forests provide valuable recreation opportunities. Private forests in this study area are crucial for wildlife species such as lynx, elk and grizzly bear because they help connect important blocks of habitat. Water quality is another large priority for forest management and conservation in Idaho and Montana, as private forests filter important drinking water supplies.

ECONOMIC CONTRIBUTIONS

Methods

Economic Contribution Analysis

Economic contribution studies are common in the fields of natural resource and land management and help explain how money from certain activities flows through the regional economy and contributes to regional employment (Henderson et al, 2016; Jeffries, 2016). This study estimates the economic contributions from land that was conserved with FLP funding and other funding sources. The terms "economic contribution," "economic impact," and "economic benefit" are often used interchangeably for studies about how spending and production flows influences the economy. However, since we did not analyze consumer behavior or alternative scenarios we are using the term "economic contribution" to describe our analysis per the definitions outlined in Watson et al (2007).

Input-output economic models are commonly used for economic contribution studies because they relate economic activities such as spending, production, and industry changes to jobs, wages, economic output, and value-added contribution to GDP (Figure 6, Table 2). IMPLAN (Impact Analysis for Planning; IMPLAN Group, LLC, 2018) is the input-output modeling software most commonly used to estimate economic impacts in the fields of forestry and outdoor recreation. IMPLAN uses regional multipliers based off of the real economy to estimate how economic activity in one sector impacts other sectors and the overall economy of a given study area. The software was developed by the USDA Forest Service to assess the economic contributions of National Forests and is now owned and administered by IMPLAN Group, LLC. IMPLAN is commonly used by federal agencies, state governments, non-profits, and industries to show the effects that their activities have on the economy. There are many examples of recent technical reports and peer reviewed literature that use IMPLAN to model economic contributions of forests (Henderson et al, 2016; Hjerpe, 2018; Khanal et al, 2017; Becot et al, 2015). Therefore, we determined that IMPLAN was the most credible and consistent input-output modeling software to use for this study.

How IMPLAN was used

IMPLAN models the real economy of every zip code in the country for each year. For this study we used the 2016 IMPLAN data to see how one year of economic activities on FLP land flows through the economy of the states encompassing our study areas. While the study area for an IMPLAN model can be as small as a zip code, we ran our analysis at the multi-state level. In doing this, we captured the contributions that FLP projects have on the state and region that they are in and thus minimized leakage outside the study area. This approach allows us to see the local contributions of FLP properties in their entirety. For example, while we only assessed properties in the Northern Forest study area, we modeled the contributions to the entirety of the four states since we do not know where in the state the money is being spent.

Since the model is of the 2016 economy, all inputs were adjusted to 2016 dollars using the Bureau of Labor Statistics Consumer Price Index inflation calculator (U.S. Bureau of Labor Statistics, 2018). Our results are presented in 2018 dollars, and we assume that the annual contributions of the land are relatively constant from year to year.

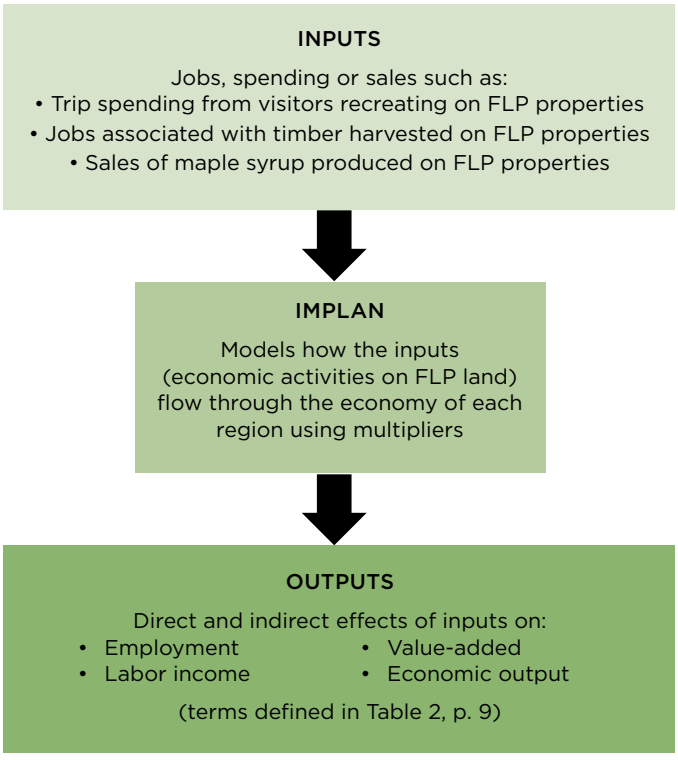


Figure 6 | **Flow chart of economic contribution analysis using IMPLAN (IMPLAN Group LLC, 2018)**

Table 2 | **Definitions of economic contribution analysis terms (IMPLAN Group LLC, 2018)**

Term	Definition	Basic Example
Employment	Average number of monthly full and part time jobs associated with the inputs	Number of loggers employed to harvest timber and number of sawmill employees hired to process the timber
Labor Income	All labor income that can be attributed to the inputs, including employee compensation (wages and benefits) and proprietor income	The money made by the self-employed loggers (proprietor income) plus the wages and benefits that the sawmill employees make (employee compensation)
Value-Added	Gross output minus intermediate inputs (consumption of goods and services purchased from other industries or imported). Value added consists of compensation of employees, taxes on production and imports less subsidies, and gross operating surplus. Value-added summed for all industries in a study area is often used as a measure of Gross Regional Product	All labor income (above) plus taxes that the sawmill pays on its products, plus the sawmill's profits
Output	The value of industry production in producer prices. For manufacturing sectors this is sales plus/minus change in inventory. For service sectors production = sales. For retail and wholesale trade, output = gross margin, or the amount of money that the retailer receives and its associated impacts	Value of total lumber sales from the sawmill above, plus the total amount that an angler spends at a hotel or restaurant. If the angler buys an apple at a grocery store, we don't know if the apple was grown in the study area so only the store's profits associated with the apple are added
Direct effects	The contributions to employment, labor income, value-added and output that the inputs have on the associated sectors	An angler buys bait at a gas station and a gas station employee gets paid
Indirect effects	Contributions from industries purchasing from other industries using money from the inputs	The gas station buys more bait from a supplier
Induced effects	Contributions from labor income being spent on other goods and services	The gas station employee spends his wages on bowling

Our inputs consisted of three different types of economic activities: trip spending by visitors to the properties, production of non-timber forest products such as maple syrup, and timber volumes harvested on FLP properties and processed in the multi-state region by product and species. Trip spending falls into two types of sectors: service sectors such as hotels and retail sectors such as grocery stores. For service sectors, we used the entire spending in the analysis. We used margins for retail sectors to avoid over-estimating the contribution to the study area. We do not know what specific products were being purchased and where those were produced so we do not assume that these were all produced in the study area. Using margins means that we reduced the retail spending inputs to just represent the amount of money from those sales that stay in the same retail sector. To measure contributions from timber harvests, we applied regional direct response coefficients created by Sorenson et al. (2015) to estimate jobs and used IMPLAN to estimate the contributions associated with those jobs. More specifics about the timber contribution analysis can be found in the "timber" section of the data collection methods below.

Economic Data

Multiple sources were used to compile economic data about the FLP lands in each study area including national surveys and datasets, regional reports, and property-specific information gathered through management plans and personal communications. We estimated values for annual timber harvest volumes, maple syrup production, reforestation and stand improvement activities, hunting, fishing, bird watching, and snowmobiling. We assumed that the FLP properties are similar to the average forest in the state or region that is open to public recreation and managed for timber, for consistency across study areas and properties. All dollar values were adjusted to 2016 dollars before being entered into theIMPLAN model.

TIMBER

Annual timber harvest volume and product composition was estimated for all properties in the study areas using Forest Inventory and Analysis data (Oswalt et al, 2018), Timber Products Output reports, and other regional or state-wide

reports (Northeast State Foresters Association, 2013; Wall et al, 2017; Simmons and Morgan, 2016; Hayes and Morgan, 2016;, Haugen, 2017; Haugen, 2016). We assumed that FLP land has similar harvest rates to an average acre of timberland under similar ownership in the state. With that assumption, we calculated the volume per acre of softwood and hardwood trees harvested on timberland on public land and private land for each state in the study area. Assuming fee-owned properties would be managed similarly to other non-federal public timberland and that properties with FLP funded conservation easements would be managed similarly to other privately-owned timberland, we multiplied the total number of acres in fee ownership by the average annual per acre harvest volumes for non-federal public land and the number of acres in easements to the average annual per acre harvest volumes for private lands.

We used regional and state-wide timber products reports to estimate the types of products made with wood harvested in the state, assuming that the ratio of products and wood types coming from FLP land would be similar to the state average. Using nationally consistent methods allows us to compare timber harvests on FLP land between study areas and provides a reasonable estimate of harvest volume which can then be related to employment, and, on average, should provide very reasonable results. However, it is likely that our estimates differ from actual timber harvest volumes for individual properties. If a property is heavily managed but the average property in the state is managed less heavily, our method will underestimate the timber harvest volume from that property. Conversely, if the average timberland in a state is heavily managed but the FLP property is managed less heavily to preserve other uses, our method will overestimate timber volumes.

To estimate the economic contributions of timber harvests on FLP lands, we converted volumes of timber to jobs using methods outlined by Sorensen et al. (2015). First, we used forest product trade reports to determine the amount of timber that is harvested in each state that is sent somewhere outside of the region to be processed (Maine Forest Service, 2018; Haugen, 2016, 2017; New York Department of Environmental Conservation, 2017; McIver et al, 2013; North East State Foresters Association, 2013; Wall et al, 2017). This approach accounts for leakage of direct effects associated with removal of timber. We assumed that all wood harvested on FLP lands is harvested by loggers and contractors as opposed to households because while some timber on FLP properties is harvested by families for firewood the volume used for those purposes is negligible compared with the volumes of commercial timber harvested on these properties. The timber volume estimates by product are applied to Direct Response Coefficients (DRC) to obtain estimates of direct effects on employment and labor income. DRCs are regional estimates of employment and wages per unit of timber harvested; as derived by the Bureau of Business and Economic Research at the University of Montana (Sorensen et al., 2015). DRC estimates are based on timber product output and federal employment data and offer comparisons of direct timber processing employment associated with various sectors and geographic regions. The DRCs provide potentially more accurate direct effects than those obtained from use of the market value of timber (Sorensen et al., 2015). In addition, Sorensen et al. note that the DRCs can be used in conjunction with input-output analysis to estimate indirect and induced effects. We applied this approach and use the estimates of direct effects calculated above to determine indirect and induced multipliers for our IMPLAN analyses.

MAPLE SYRUP

Maple syrup production is a significant economic activity on FLP lands in the Northern Forest region. We used information from personal communications, management plans, and reports to quantify the number of maple taps present on the FLP properties in this region. For some properties we knew the approximate number of taps present and for properties that we know have commercial maple syrup production but do not have a reliable estimate for the number of taps present we used state averages (Becot, Kolodinsky and Conner, 2015). We multiplied the number of taps by the average annual production per tap and multiplied the amount of syrup by the price per gallon to determine syrup sales that are directly related to FLP lands (National Agricultural Statistics Service, 2017). Our estimate of maple syrup production is likely an underestimate because there are probably more taps than average on the properties for which we used the state averages, and there is likely commercial maple syrup production happening that we are not aware of on some properties.

PLANTING AND TSI

Planting and timber-stand improvement activities were estimated for the Northern ID/ Western MT and GA/ SC study areas. We used the Forest Nursery Seedling Production in the United States Fiscal Year 2016 report to estimate the number of seedlings per acre planted on all timberland in each state and multiplied it by the number of FLP acres in those states (Hernandez et al, 2017). Then, we used average prices for seedlings in each state to determine the direct effect of seedling sales for planting on FLP lands (SC Forestry Commission 2018; GA Forestry Commission 2018; MT Dept.

Natural Resources and Conservation, 2018; University of Idaho, 2018). Tree planting and reforestation in the Northern WI/Upper Peninsula MI and Northern Forest study areas is negligible, except in Maine. We did not include planting in our analysis of Maine properties because the seedlings that are planted in Maine are almost all imported from Canada and we only quantified seedling sales, not labor costs of planting. Since planting labor costs were not included, we underestimated the economic contribution of planting overall. We used the Regional Cost Information for Private Timberland Conversion and Management report (Bair and Alig, 2006) to estimate the average expense of pre-commercial thinning and maintenance of planted stands of trees per planted acre per year and multiplied that by the number of planted acres that we estimated for the FLP lands in Georgia, South Carolina, northern Idaho and western Montana. Pre-commercial thinning, site preparation and other stand maintenance activities were not included in the analysis of the Northern WI/Upper Peninsula MI and Northern Forest study areas.

RECREATION

Most FLP properties are open to public recreation and are heavily used for multiple types of outdoor recreation including hunting, fishing, snowmobiling, hiking, camping, mountain biking and skiing. Because of the diverse ownership and management of FLP properties there are no reliable accurate annual recreation use data for most individual FLP properties, so we used national, state and watershed-level data sources to estimate recreation use and associated spending. We estimated annual visitor use for the following activities: big game hunting, migratory bird hunting, freshwater fishing, bird watching, and snowmobiling. There were no reliable data sources for estimating use of FLP land for other popular recreational activities such as hiking, non-fishing related boating, skiing, snowshoeing, photography, mountain biking, educational programs, and general camping. Therefore, the total economic contribution from visitor spending is likely underestimated. In our analysis, we only included costs that are directly related to a trip, eg., food, gasoline, rentals, fees, guides and bait, and did not include equipment purchases or maintenance.

To quantify visitor spending for hunting, fishing and bird watching we used the 2011 iteration of the National Survey of Fishing, Hunting and Wildlife Associated Recreation (FHWAR, US Department of Fish and Wildlife, 2011). The most recent FHWAR was conducted in 2016, but 2011 was the last year for which state-specific reports were created. To estimate annual visitation to FLP properties we used the US Environmental Protection Agency's EnviroAtlas data (Pickard et al., 2015). EnviroAtlas estimated annual hunting, fishing and bird watching trips in each 12 digit hydrologic unit (HUC-12) in the United States using population data, the FHWAR visitation results for each state, and the USDA Forest Service National Visitor Use Monitoring program's willingness to travel data (Mangiante, 2016). We assume that the FLP properties have a similar rate of visitation to the HUC-12 watersheds that they are located in and applied the visitors/acre in each watershed to the FLP land located within that watershed. We multiplied average visitor spending per activity day for hunting, fishing and bird watching from the FHWAR to the number of user days for each property to estimate annual total trip spending for fishing, hunting and bird watching on the FLP properties.

The EnviroAtlas data are the most reliable recreation data at the smallest scale available throughout the study area, and other studies have used these data for similar purposes (Davis and Darling, 2017; Schaefer et al., 2015). However, these methods do not provide perfect information about visitation in the FLP study areas. In some cases, visitation differs depending on what other features are located in the same watershed. For example, if the watershed contains a river but the FLP property is not located on the river, this method might overestimate fishing on the property. Conversely, if the FLP property is in a large HUC-12 watershed and is the only property in the watershed that supports wildlife associated recreation, this method would underestimate use.

Because snowmobiling is a very important economic activity in 8 of the 10 states in the study area and many of the FLP properties contain extensive snowmobile trail networks, we estimated visitor spending for snowmobiling for FLP properties in all but the GA/SC study area. Most of the states in the study area conducted economic contribution studies for snowmobiling which have shown large annual economic contributions from the sport (Black et al, 2017; Stynes et al, 1998; Okrant and Lee, 2011; NY Snowmobile Association, 2012; McElvany, 2001; Reiling, 1998; Sylvester, 2014). To estimate snowmobiling visitation and trip spending related to FLP lands we used snowmobile trail maps and data from published studies for states where both of these resources were available: Vermont, New Hampshire, Maine, New York, and Michigan. For these states, we assumed that snowmobile trails on FLP land were used as much as an average trail in the state and estimated visitor use and spending by multiplying state totals by the ratio of trails present on FLP land. We assumed that the statewide snowmobiling industries have stayed relatively similar to when the original studies were conducted and inflated daily trip spending amounts to 2016 dollars. To estimate snowmobiling contributions in northern Idaho where we did not have trail maps, we

assumed that snowmobiling use on FLP land is similar to the average visits per acre for the counties in which the properties are located (Black et al., 2017). Montana did not have snowmobile trail maps or use broken down by county, so we assumed visitation and spending per FLP acre was similar to northern Idaho. Wisconsin did not have any available snowmobiling data so we assumed that the per acre trip spending for snowmobiling on FLP land in northern Wisconsin is similar to that of Michigan's Upper Peninsula.

LIMITATIONS

The study area lands are spread out around the country and are all owned and managed by different entities, which means that many properties have no property-level use and harvest data and there is no consistent and accurate reporting of economic activities on these lands throughout the country. Therefore, the economic data used in this analysis are not comprehensive and in many cases were extrapolated from larger data sets about the forest-based economies of the states and regions where the properties are located. Not all economic activities that take place on FLP properties are included in the economic contribution analysis because of a lack of reliable information about those activities and a desire for consistency in data across and within the four study areas. Activities that take place on some FLP lands that were not directly included in the analysis include but are not limited to unique businesses such as summer camps, sawmills, or nurseries, non-wildlife related recreation activities such as hiking, mountain biking, skiing, and camping, and sale of forest carbon offsets.

Results

We used IMPLAN to model the estimated contributions of FLP land in the 2016 economy (see methods section) and adjusted the outputs to 2018 dollars using the Bureau of Labor Statistics CPI inflation calculator. This analysis is an overall case-study of Forest Legacy Program land in four study areas. Results are approximate and should not be attributed to any single property or forest.

Summary of economic activities (model inputs)

Table 3 | **Estimated annual expenditures related to recreation activities that take place on FLP conserved land in the four study areas. Numbers include trip spending estimates for big game hunting, bird hunting, freshwater fishing, bird watching and snowmobiling (2018 dollars)**

	Northern Forest	Northern WI/ Upper Peninsula MI	GA/SC	Northern ID/ Western MT
Food	$15,976,648	$3,745,611	$1,713,996	$790,129
Transportation	$10,462,951	$1,865,222	$1,700,107	$1,235,939
Lodging	$7,116,128	$1,147,690	$608,557	$226,322
Fees (rentals, guides, and land use)	$501,268	$117,717	$474,673	$659,323
Other trip costs (bait, ice, heating, and cooking fuel)	$375,530	$243,355	$1,136,845	$52,803
Total	**$34,432,525**	**$7,119,595**	**$5,634,179**	**$2,964,516**

Table 4 | **Estimated annual volume of timber harvested from FLP land by species group, product type and study area. Volumes are represented in hundreds of cubic feet (CCF). The volume of wood that was harvested on FLP land but was processed in states or countries outside the study area is also represented.**

	Northern Forest	Northern WI/ Upper Peninsula MI	GA/SC	Northern ID/ Western MT
Harvest volume (CCF)				
Softwood sawtimber	56,874	5,337	13,954	66,336
Softwood pulpwood	49,600	5,005	18,443	4,313
Hardwood sawtimber	41,743	18,760	1,551	n/a
Hardwood pulpwood	36,187	14,949	3,035	n/a
Posts and poles	1,246	565	720	206
Fuelwood	97,381	4,547	2,133	925
All other products	9,213	8,129	5,056	1,467
Total harvest volume	**292,244**	**57,293**	**44,892**	**73,248**
% processed in study area	85%	95%	92.50%	98.50%
Total processed volume	**248,407**	**54,428**	**41,525**	**72,149**

Table 5 | **Annual value of other economic activities that were included in the analysis by study area (2018 dollars)**

	Northern Forest	Northern WI/ Upper Peninsula MI	GA/ SC	Northern ID/ Western MT
Seedling sales	$0.00	$0.00	$89,717	$76,693
Site prep and maintenance	$0.00	$0.00	$227,310	$33,375
Maple syrup	$4,481,734	$0.00	$0.00	$0.00

Economic Contributions

The following results show the economic contribution that specific activities occuring on FLP lands in the study areas generate throughout the broader multi-state regions comprising each of the FLP study areas. Contributions are shown in terms of employment, labor income, value added and output by economic activity. The presentation of economic contributions by resource management category (timber, recreation, etc.) provides a convenient way of displaying the economic contributions of specific activities on FLP lands. It does not imply that the economic contributions can be fully attributed to the management of individual resource categories or that economic contributions can be meaningfully compared across resource categories. Joint cost and joint production issues complicate comparisons. For example, an increased timber harvest would show an increase in local economic contributions from the timber volume, however, for example, there are associated fire mitigation, wildlife habitat restoration and recreation access effects, that may influence production of other resource categories. Secondary contributions are a sum of indirect and induced effects (defined in Table 2). This analysis is an overall case-study of Forest Legacy Program land in four study areas. Results are approximate and should not be attributed to any single property or forest.

Table 6 | **Contributions of FLP land in the Northern Forest to the multi-state regional economy of Maine, New Hampshire, Vermont and New York. Employment includes full and part time jobs, and dollar values are represented in 2018 dollars**

	Employment	Labor income	Value added	Output
Recreation				
Direct	208	$7,892,000	$11,714,000	$18,018,000
Secondary	74	$4,818,000	$8,412,000	$13,346,000
Total	282	$12,710,000	$20,126,000	$31,364,000
Timber				
Direct	989	$49,067,000	$62,826,000	$176,061,000
Secondary	1,150	$56,489,000	$96,065,000	$280,319,000
Total	2,139	$105,555,000	$158,892,000	$456,380,000
Syrup				
Direct	120	$1,838,000	$2,518,000	$4,266,000
Secondary	22	$1,235,000	$2,145,000	$3,382,000
Total	142	$3,073,000	$4,663,000	$7,648,000

Table 7 | **Contributions of FLP land in Northern Wisconsin and Michigan's Upper Peninsula to the regional multi-state economy of Michigan and Wisconsin. Employment includes full and part time jobs, and dollar values are represented in 2018 dollars**

	Employment	Labor income	Value added	Output
Recreation				
Direct	59	$1,417,000	$2,102,000	$3,780,000
Secondary	21	$1,005,000	$1,775,000	$3,187,000
Total	79	$2,422,000	$3,878,000	$6,966,000
Timber				
Direct	186	$9,635,000	$11,657,000	$48,104,000
Secondary	289	$12,824,000	$22,038,000	$90,324,000
Total	474	$22,459,000	$33,695,000	$138,429,000

Table 8 | **Contributions of FLP land in Georgia and South Carolina to the multi-state regional economy of the two states. Employment includes full and part time jobs, and dollar values are represented in 2018 dollars**

	Employment	Labor income	Value added	Output
Recreation				
Direct	28	$774,000	$1,273,000	$2,117,000
Secondary	12	$575,000	$1,058,000	$1,869,000
Total	40	$1,349,000	$2,331,000	$3,984,000
Timber				
Direct	84	$5,274,000	$8,463,000	$26,619,000
Secondary	148	$6,923,000	$12,554,000	$41,493,000
Total	232	$12,197,000	$21,017,000	$68,111,000
Planting				
Direct	5	$182,000	$201,000	$302,000
Secondary	2	$82,000	$147,000	$261,000
Total	7	$264,000	$349,000	$562,000

Table 9 | **Contributions of FLP land in northern Idaho and western Montana to the multi-state regional economy of Idaho and Montana. Employment includes full and part time jobs, and dollar values are represented in 2018 dollarss**

	Employment	Labor income	Value added	Output
Recreation				
Direct	19	$518,000	$730,000	$1,294,000
Secondary	7	$281,000	$518,000	$984,000
Total	26	$799,000	$1,247,000	$2,278,000
Timber				
Direct	224	$12,649,000	$15,656,000	$48,122,000
Secondary	308	$11,024,000	$17,190,000	$46,516,000
Total	532	$23,674,000	$32,846,000	$94,638,000
Planting				
Direct	1.2	$57,000	$69,000	$103,000
Secondary	0.6	$22,000	$39,000	$74,000
Total	1.8	$81,000	$108,000	$177,000

Table 10 | **Average annual value-added per 1,000 acres of FLP land in each study area, in 2018 dollars**

Study area	States impacted	Timber	Recreation	Syrup	Planting
Northern Forest	ME, NH, VT, NY	$122,468	$15,513	$3,594	
Northern WI/ Upper Peninsula MI	WI, MI	$126,912	$14,607		
GA/SC	GA, SC	$148,380	$16,457		$2,463
Northern ID/ Western MT	ID, MT	$101,406	$3,850		$334

Discussion

This report provides illustrative analyses of how Forest Legacy Program (FLP) forests in the four study areas contribute to each multi-state region's commercial economy using four key categories of economic activity: timber, recreation, maple syrup and tree planting. The results show that regular economic activities on FLP land in the study areas make significant contributions to the multi-state economies of each region. Annually, hundreds of jobs and tens of millions of dollars of gross regional product can be attributed to timber harvesting, maple syrup, planting, stand maintenance, hunting, fishing, bird watching and snowmobiling on these lands. Our results show that the working forests conserved through the FLP contribute substantially to rural economies, and this contribution is likely a lower bound. Program lands provide many more economic activities than we quantified. Hiking, camping and mountain biking are popular activities in each study area that we did not analyze. Many FLP properties have unique economic activities associated with them such as summer camps, seedling nurseries, and land leases which we did not account for in this analysis because we did not have accurate data about these activities in all regions. Therefore, we believe that our estimate of use and economic contributions is conservative.

Importantly, this is an economic contribution analysis, not an economic impact analysis where the input-output models are used to assess the economic impact of alternate land-use scenarios. While we do not know that the economic contributions from these lands would be lost if the lands were not conserved through the FLP, we do know that the FLP ensures that these economic contributions are maintained in perpetuity. Alternative land-use or management scenarios do not necessarily ensure that these lands would remain undeveloped and managed for traditional forest uses. Finally, in addition to contributing to the regional commercial economy, FLP lands provide unique benefits associated with recreational use values, non-use values (e.g., values individuals may hold for the resource unrelated to their current use of the properties), ecosystem values (e.g., water filtration, wildlife habitat connectivity, carbon sequestration) that accrue to users and the public in general, and the general character and culture of the study areas. A cost/benefit analysis monetizing the full market and non-market benefits and costs of the FLP and program land would complement this economic contribution analysis and provide an alternative way of considering the benefits of maintaining these forested lands in an undeveloped state in perpetuity.

PROJECT EXAMPLES

The Forest Legacy Program is versatile and is used across the country to meet the unique sets of objectives across diverse landowners. Some FLP landowners are individuals or families, some are large forest management companies, and still others are state agencies or municipal governments. FLP properties are managed for many uses and provide ecological, social and economic benefits to the public and the landowners. We spoke with owners and managers of FLP properties in the four study area regions to better understand the nuances of how different types of properties, owners, and forest uses benefit from the FLP, and how FLP properties benefit their local communities. Below are detailed descriptions of five different FLP projects based on our interviews with landowners, managers, and others involved with these projects.

Michigan: Pilgrim River Forest

Joe Hovel, owner of the Pilgrim River forest in the Upper Peninsula of Michigan, has been interested in forest management and conservation for more than 30 years. His interest in land ownership began when he and his wife purchased a tract of forest land in Wisconsin and began sustainably managing the land for timber. In 2007, Joe heard about an important 1,000-acre forest on the Pilgrim River near Houghton Michigan, home of Michigan Technological University. The forests along the Pilgrim River are critical for the surrounding communities. Even though the upper peninsula of Michigan is heavily forested, there are few high-quality recreation areas near Houghton and Michigan Technological University and many visitors come to the Pilgrim River Forest to fish, hunt, hike and sightsee. These forests were also of conservation interest to the local chapter of Trout Unlimited since the river provides crucial habitat for trout migrating to Lake Superior. In fact, researchers at Michigan Tech recently found Coaster Brook Trout in the Pilgrim River, a fish that is only found in a few rivers that flow into Lake Superior.

When Joe heard about this land, it was owned by a timberland investment management organization that planned to divest from all of its property in the Upper Peninsula. Joe approached the new owners, another large forest management corporation, and offered to purchase the land with the intent of conserving it for forest management, recreation, water quality and wildlife benefits. After purchasing the property, Joe was able to permanently conserve almost 1,400 acres of forest on the Pilgrim River with help from the Forest Legacy Program, the US Forest Service Community Forest grant program, Trout Unlimited, the Keweenaw Land Trust and other local partners. This forest conservation effort spurred more interest in conservation in the area and started the Pilgrim River Watershed Project. So far, 1,600 acres of forest have been permanently conserved as part of this initiative.

Joe Hovel and his family believe that we do not know what amazing benefits of forests might be discovered in the future and they manage their land with the philosophy that a well-managed forest will stay healthy and productive far into the future. They see potential in forest carbon markets as a future economic benefit that their forest can provide. In addition, they value the aesthetic beauty of the forest and believe that maintaining the aesthetic and ecological value only increases the public recreation benefit that the forest provides. One remarkable feature of the Pilgrim River forest is a pristine stand of Canada Yew trees, a species that researchers say could contain cancer-fighting medicinal compounds. The family plans to continue managing the property for timber and public recreation while at the same time considering possible future economic and social benefits.

Support for the Pilgrim River Forest conservation project came from many different sectors, as evidenced by the diversity of attendants to the dedication ceremony that happened in the summer of 2018. The event was attended by representatives from the state government, the US Forest Service, Trout Unlimited, local land trusts, and community members. In the case of the Pilgrim River Forest, conservation helped cultivate a partnership between family forest owners, state and federal government, recreationists, scientists, and community members. The forest provides important timber, recreation, and fishery resources and the Forest Legacy supported easement ensures that the family's land management philosophies and the public benefits that the forest provides will be continued in perpetuity.

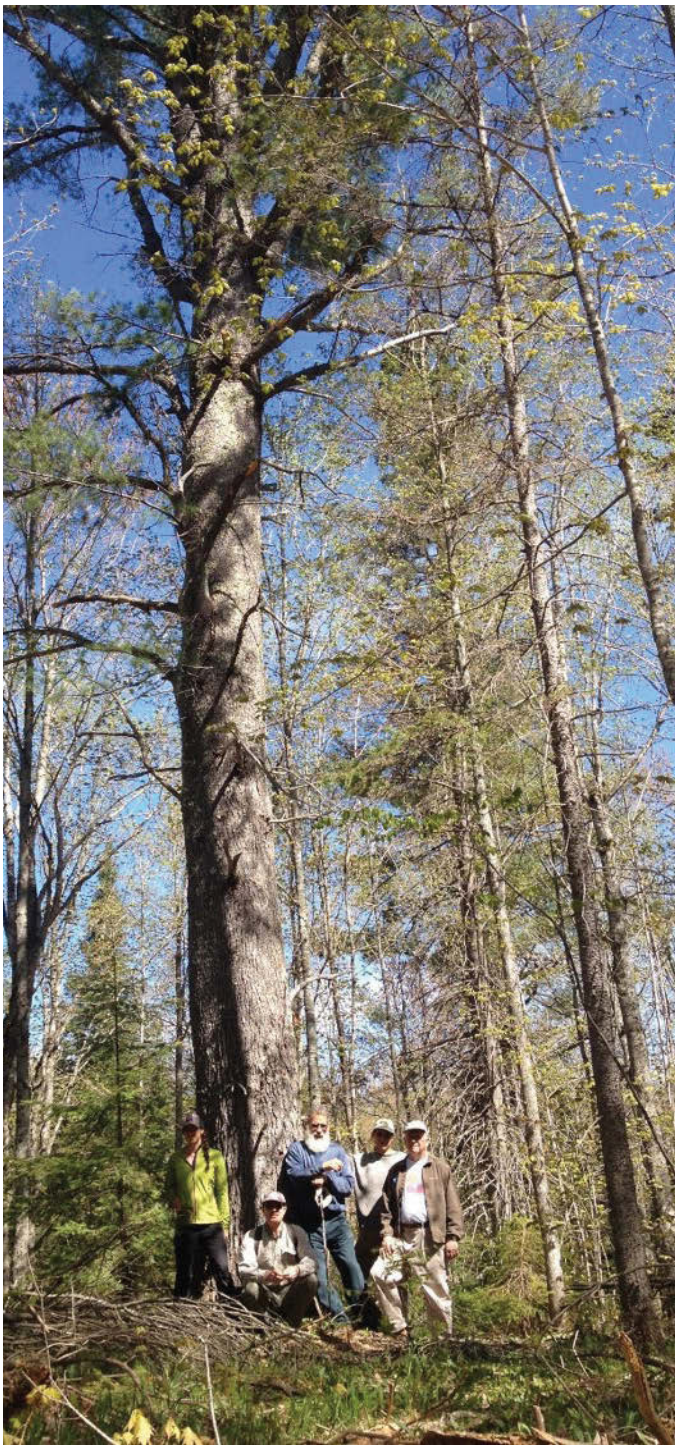


Photo credits: Joe Hovel

Landowner Joe Hovel (center), his son Mark (second from right), his daughter Rachel (far left), Bill Leder from the Copper County Chapter of Trout Unlimited (far right), and Evan McDonald from Keewenaw Land Trust (front) stand in front of an old White Pine tree on the Pilgrim River Forest.

The Pilgrim River, home to critical trout populations, flows through the 1,400-acre property.

A sign welcomes visitors to the Pilgrim Community Forest, part of the Pilgrim River Watershed forest conservation project.

Idaho: Boundary County FLP Projects

The forest products industry is integral to the identity of northern Idaho. In Boundary County, the most northerly county in the state, about 72 % of the land base is owned by the USDA Forest Service, 25% is privately owned, and the remaining 3% is owned and managed by the State of Idaho. However, 80% of the timber that sustains the 8 large sawmills in northern Idaho comes from private forestlands and only 7% comes from federal land. Out of the 200,000 acres of privately owned land in Boundary County, only 120,000 acres are timberland. 40,000 of those acres are intensively managed by timber companies and provide a steady stream of wood to the local and regional mills. The relatively small percentage of industrial timberlands sustains the forest products industry in the Northern Rocky Mountain region, particularly the economy of northern Idaho.

However, the same private forestlands that are so critical to the economy of northern Idaho are also at high risk of being converted to residences by people moving into the area. Much of the private land is located in the valleys and is especially appealing to developers. When industrial forest owners sell land, that land can fall out of the timber base. New residents coming into the area may lack the knowledge, the resources and/or the motivation to sustainably manage their forest. While the current owners of the area's private timberland would prefer to keep the land and manage it for forest products, as for-profit companies and timber investment management organizations they need to make financially sound decisions for their investors. Idaho has one of the fastest growing populations in the U.S. and real estate in northern Idaho is a valuable commodity. The Nature Conservancy (TNC) in Idaho, which aims to conserve forestlands for wildlife and the myriad benefits they provide to local communities, has tapped into the Forest Legacy funding as a tool for conservation.

With Forest Legacy funding, TNC and the State of Idaho have placed easements on the industrial and small private forestlands of northern Idaho to ensure sustainable management of the forestland into the future. So far, the Forest Legacy Program has helped conserved over 22,000 acres of timberland in Boundary County with thousands more acres targeted for conservation in the near future. Since the program allows for traditional land uses and keeps the land in private ownership, the landowners, both large and small, can continue to manage their land for timber. This conservation outcome is not only beneficial for the mills and the forest products industry in the region but also for wildlife, as fragmentation of the valley forests threatens habitat and disrupts wildlife movement—especially for threatened species such as grizzly bears, Canada lynx, woodland caribou, and wolverine. Conserving this forest land also protects water quality, which is becoming a larger issue. FLP supported conservation easements covering industrial timberlands in northern Idaho allow public recreation, which provides other social and economic benefits to the residents and visitors of the area.

Active management of forest land in Northern Idaho ensures the continued success of the forest products industry which is crucial to the economy and identity of the region.

Wildlife such as the black bears pictured above depends on forest habitat and connectivity for their continued survival.

Sustainable forest management provides benefits not only from wood products but also in fuel reduction and minimized fire risk.

Photo credits: Kennon McClintock

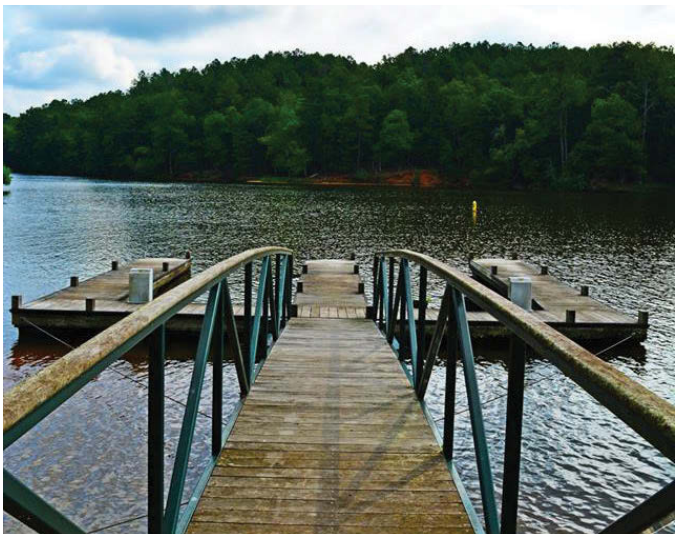


Photo credits: Donald Cockman

The Liberty Hill WMA provides public access to 17 miles of shoreline that is perfect for fishing and sightseeing.

Forest management at Liberty Hill WMA includes more than timber: this field was planted to provide food and habitat for early-successional wildlife species including game birds.

The Liberty Hill WMA helps filter water and protects water quality in the Lake Wateree reservoir.

South Carolina: Liberty Hill Wildlife Management Area

Most of the land along the shores of Lake Wateree, a 13,000-acre man-made lake in South Carolina, is owned by families and has been developed for residential purposes. However, 17 miles of Lake Wateree and the Catawba River Corridor are free from houses. This pristine section of shoreline is part of the Liberty Hill Wildlife Management Area (WMA) owned by the South Carolina Department of Natural Resources. The Liberty Hill WMA is open for public recreation including hunting, fishing, hiking and sightseeing. The 7,876-acre mixed pine-hardwood forest is actively managed for wildlife habitat and timber, and there are abundant deer, turkey, and small game populations in the area. Located only a one-hour drive from the urban centers of Columbia, South Carolina and Charlotte, North Carolina, Liberty Hill WMA provides high quality recreational opportunities to thousands of people a year, some of whom spend the night at nearby hotels or the Lake Wateree State Park. Spending from visitors at local grocery stores, gas stations, and sporting goods stores contributes to the economy of the surrounding towns. The forest management that takes place on the Liberty Hill WMA also contributes to South Carolina's forest products industry and thus provides another public economic benefit. Liberty Hill is also used by state wildlife biologists and local universities for wildlife research, including surveys of bats, bald eagles and golden eagles.

Without the support of the Forest Legacy Program and other partners such as The Conservation Fund, Duke Energy, Kershaw County government, and the Heritage Land Trust Fund, the land where the Liberty Hill WMA is located would have been turned into a large housing development. Duke Energy originally owned the tract but sold it to a developer who planned on building a neighborhood and park on the land. However, after the housing market crash, the new development was not projected to be as economically viable as it once seemed. The municipality would have had to spend millions of dollars to improve infrastructure in the area and provide services to the new houses. The homeowners who already lived on the lake would have had their pristine viewshed taken away, and local citizens who enjoyed recreating in the area and on the lake would have limited access. Therefore, conservation of the land was a great option for everyone. Conserving this area was prioritized by the State of South Carolina, Duke Energy, a local state senator, and members of the local community.

The WMA opened to the public in September 2015 and has already had one timber sale on 206 acres that has contributed to the economy of the State. Forest management for wildlife habitat will continue into the future, with timber sales planned for every 1-2 years. Today, visitors can enjoy hunting, fishing, and walking at Liberty Hill WMA. Hunters, fishers, and other visitors drive from many miles away to use this precious public resource. The Liberty Hill WMA also contains an interesting historical feature that is a destination for some visitors—an old quartz outcropping that was mined during World War II to provide support to the US Military. In addition, unique boulder fields have given the area the nickname, "the Devil's backbone." This land contributes to the conservation of the Catawba River Corridor, along with other neighboring State land, and is critical to protecting the water quality of the Lake Wateree Reservoir. The Liberty Hill WMA is an inspiring example of federal, state, local, and corporate partners working together to achieve a common goal.

Montana: Haskill Basin Watershed Project

The story of the Haskill Basin Watershed Project, a 3,000-acre conservation easement near Whitefish, Montana, is a shining example of many different groups coming together to achieve common goals. Located in the northern Flathead Valley, the property is near the town of Whitefish, a popular ski resort, and federal lands. This property has high value for many groups including the city of Whitefish, a local non-profit organization that focuses on conservation and recreation, and the family-owned lumber company who has owned and managed the land sustainably for many years. The Haskill Basin property contains three creeks that provide 90% of the drinking water supply for the city of Whitefish. The first creek became too polluted from the nearby ski area so could no longer be used. Therefore, the city had a large stake in seeing this property protected from development and sustainably managed in perpetuity to preserve the remaining water supply. In fact, the community overwhelmingly voted (84%) to raise the resort tax in the town by 1% to help pay for this conservation easement.

The property, owned by F.H. Stoltze Land and Lumber Company, has been sustainably managed for timber since Stoltze acquired the land in the early 1900s. The company sustainably harvests about 6 million board feet of timber each year from their many properties and runs a sawmill that employs over 100 people. Their land management strategies are based on the principles of sustainable stewardship, meeting the needs of today without compromising the needs of the future. This long-term view has served them well over the years. The key component of their forest management approach is managing for a diversity of products, species, and age classes. This strategy makes the company more resilient to changes in wood markets and the forest more resilient to environmental changes such as insects and fire. The company lands, including the Haskill Basin property, have been certified to the American Tree Farm system since 1966. The conservation of the Haskill Basin property was appealing to the Stoltze Co. because the principles of the Forest Legacy Program fit in well with their existing forest management practices.

The Haskill Basin property has always been open to motorized and non-motorized recreation, hunting and fishing. However, the Forest Legacy conservation project opened the opportunity for the Whitefish Legacy Partners, a local conservation group that focuses on increasing recreation opportunities in Whitefish, to expand the over 40 miles of hiking and biking trails that surrounds the town into this property. Expanding the Whitefish trail into the Haskill Basin property increased community support for the project, as the property is easily accessible from residential areas in town. The Whitefish trail is heavily used, has increased visitation to the

Haskill Basin and adjacent Trumbull Creek provide important habitat for wildlife such as this Canada Lynx.

(below) The Haskill Basin property provides 70-90% of the drinking water for the city of Whitefish, Montana

Photo credits: The Forest Legacy Program

town of Whitefish, and contributes millions of dollars per year to the city's economy through trip related spending. Whitefish Legacy Partners' mission is to ensure conservation, education, and recreation opportunities on the lands surrounding Whitefish for future generations, and the addition of the Haskill Basin property helps further this goal. Both the Stoltze Co. and the Whitefish Legacy Partners are interested in using this new opportunity to educate visitors about how recreation and forest management can fit together. The conservation of Haskill Basin and the nearby Trumbull Creek property, also owned by F.H. Stoltze Co., have connected thousands of acres of forest land which helps wildlife, increases recreation opportunities in the area, and preserves the scenic beauty of the region that attracts visitors and new residents from all over the world.

F.H. Stoltze Land and Lumber sustainably manages their forests for wood products and forest resiliency.

Photo credits: John Scarinza

Citizens of the town of Randolph recently completed an accessible trail that leads to a waterfall on the town forest property.

New Hampshire: Randolph Community Forest

Nestled between two sections of the White Mountain National Forest, the town of Randolph, New Hampshire has relied on the forestry and outdoor recreation industries since its establishment. Public use of the forests surrounding the town has always been important to both the 325 year-round residents of the town and the host of summer residents that come there for its beauty and the opportunities that the forests provide. A 10,000-acre forest located in town was owned and managed by a local paper company for decades, until the company sold its land in the 1980s. Each time this land changed owners, the people making decisions about the land were located further and further away from the town. The longtime owner, located only 10 miles from town, had an open public recreation policy and was communicative with the community about its forest management activities. When ownership changed, people in Randolph felt that they had less of a say about what happened on the land and that the public values this forest provides were in jeopardy. Thoughts of possible future development on the forest threatened the rural character of Randolph and caused the town to become interested in buying the property. In 2001, with financial support from the state, the Forest Legacy Program, private foundations, and local community members of the town of Randolph purchased the forest and an easement was placed on the land. The town established a "town forest fund" to be used for management activities on the 10,000 acres including maintenance of the 26 miles of roads located on the property.

The town forest is managed based on four basic tenants: ensure public access is retained, manage the land to preserve wildlife habitat and connectivity, public education, and keeping the land as a working forest. Every year, the town forest committee hosts a "forest tour" day, where community members and visitors come to the forest and learn about what management has happened over the last year. Each year's forest tour has a theme ranging from the importance of pollinators to the benefits of different silvicultural treatments. Approximately every two years there is a timber harvest on the town forest which not only provides income for the town but also improves wildlife habitat and recreation opportunities. Recently, the town entered a contract with a local maple syrup producer who plans to lease 35,000 maple taps on 750 acres of the forest, a project that keeps 5 people employed full-time. The maple project is projected to bring in 50% more revenue to the town over 15 years than managing this section of the forest for timber. This past winter, the town worked with a group that wanted to create backcountry skiing trails on a section of the town forest. The success of this project has inspired nearby towns to consider similar opportunities which could lead to more tourism in the area in the winter. John Scarinza, a longtime Randolph resident and current chairman of the Town Forest Committee, says that the most important thing about the forest is that the natural resource is locally owned and managed. This local control guarantees public access, provides jobs for the local economy, and has environmental benefits. A recent survey showed that Randolph's year-round and summer residents overwhelmingly support the town forest and the activities happening there. Groups from all over the country and the world have come to Randolph to learn how to successfully implement community-based forest management in their own towns.

Backcountry skiers enjoy the Randolph Community Forest. The town works with residents and visitors to manage the forest for different types of recreation.

The Randolph Community Forest is sustainably managed for timber.

CONCLUSIONS

The results from economic contributions analysis suggest that economic activity from FLP properties in the study areas provide over $279 million in value-added to the four multi-state regions annually, or about $140 per acre, and about 4,000 jobs in these regions are supported by economic activity on FLP properties every year. The central goal of the FLP is to preserve traditional forest uses and the economic and environmental integrity of working forest landscapes throughout the country. Land conserved through the program must be managed for multiple uses including economic activities that contribute to the regional economy and support rural jobs. Visitors to FLP properties spend millions of dollars on food, lodging, transportation and other expenses when they participate in hunting, fishing, bird watching and snowmobiling. Hundreds of thousands of cubic feet of timber are harvested each year on the properties. At the same time, these forests still provide important environmental benefits such as clean water and wildlife habitat and aesthetic and cultural benefits such as beauty, and privacy. Our results show that economic activity on FLP land in the four study areas contributes significantly to employment, value-added, labor income and economic output.

Each FLP conservation project is funded using up to 75% program funding and 25% or more other local funding sources. The matching funding either comes from land donations, privately raised money, or state government grants. Many FLP projects involve partners from different groups including environmental non-profits, forest investment and management corporations, energy utilities, town and state governments and private citizens. In each of the four study areas, well over the required 25% of the total project cost was covered by local match (Table 1). The high level of cost-share shows how important and well-supported these projects are to local stakeholders and that the FLP funding makes broadly desired conservation outcomes financially viable. On average, FLP funding used for conservation easements and land purchases in the study areas is about $350 per acre. The up-front costs of conserving these lands ensures that the social, economic and environmental benefits that these forests provide continue in perpetuity.

Since the FLP requires that land be owned and managed either by private landowners, state or local government, the management decisions remain local. This outcome is beneficial for rural communities because the decision-makers are community members who understand the nuances of the culture and forests of that area. At the same time, the program requires that the land be monitored regularly and that multi-use management plans be updated periodically. This combination of federal oversight and local decision-making ensures that the forest will be protected and managed in perpetuity and will also continue to support the local community and economy.

REFERENCES

Bair, L.S. and Alig, R.J., 2006. *Regional cost information for private timberland conversion and management*. USDA Forest Service Pacific Northwest Research Station Gen Tech Report PNW-GTR-684

Becot, F., Kolodinsky, J., and Conner, D. (2015) *The economic contribution of the Vermont maple industry*. The University of Vermont Center for Rural Studies.

Best, C. (2002). *America's private forests: Challenges for conservation*. Journal of Forestry 100(3)

Black, G.B., Fragkias, M., Hansen, Z., Holley, D., Humphrey, R., Lowe, S. (2017). *Economic impact and importance of snowmobiling in Idaho.* Department of Economics, College of Business and Economics, Boise State University.

Butler, B.J.; Hewes, J.H.; Dickinson, B.J.; Andrejczyk, K.; Butler, S.M.; Markowski-Lindsay, M. (2016) USDA Forest Service National Woodland Owner Survey: National, regional, and state statistics for family forest and woodland ownerships with 10+ acres, 2011-2013. Res. Bull. NRS-99. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 39 p.

Butler, B.J., and S. M. Butler. (2016) *Family Forest Ownerships with More Than 10+ Acres in South Carolina, 20112013 (Research Note NRS-235).* Newtown Square, PA: USDA Forest Service, Northern Research Station.

Cook, P.S., Becker, D.R., and Benedum, M. (2018) *Idaho's family forest owners: 2016 survey results.* PAG Report No. 38 University of Idaho College of Natural Resources.

Davis, A.J.S., and Darling, J.A. (2017). *Recreational freshwater fishing drives non- native aquatic species richness patterns at a continental scale.* Diversity and Distributions (23) 692-702

Gabe, T. (2014). *Economic impact of Maine's Maple Industry.* University of Maine School of Economics Staff Paper 614. Orono, ME

Georgia Forestry Commission. (2000). *Forest legacy program assessment of needs for the state of Georgia.* Retrieved from http://www.gfc.state.ga.us/forest-management/private-forest-management/landowner-programs/forest-legacy/AssessmentofNeeds.pdf

Georgia Forestry Commission (2016). *Economic benefits of the forest industry in Georgia, 2016.* Enterprise Innovation Institute. Georgia Institute of Technology

Georgia Forestry Commission (2018). *Ordering Information for Tree Seedlings* retrieved 10/3/2018 from http://www.gatrees.org/reforestation/ordering-information/

Hatcher, J.E., Straka, T.J., Harper, R.A. and Adams, T.O. (2012) *Shifting private timberland ownership in South Carolina: Implications for management intensity.* Open Journal of Forestry 2(4) p 279-285. Doi: 10.4236/ojf.2012.24035

Haugen, D.E. (2017). *Wisconsin timber industry, 2013.* Resource Update FS-125. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 5 p. https://doi.org/10.2737/FS-RU-125.WI TPO

Haugen, D.E. (2016). *Michigan timber industry,* 2010. Resource Update FS-78. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 5 p.

Hayes, S.W., Morgan, T.A. (2016). *Montana's products industry and timber harvest*, 2014. Bureau of Business and Economic Research, University of Montana.

Henderson, J.E., Joshi, O., Tanger, S., Boby, L., Hubbard, W., Pelkki, M., David W. Hughes, D.W., McConnell, T.E., Miller, W., Nowak, J., Becker, C., Adams, T., Altizer, C., Cantrell, R., Daystar, J., Jackson, B., Jeuck, J., Mehmood, and S., Tappe, P. (2016). *Standard Procedures and Methods for Economic Impact and Contribution Analysis in the Forest Products Sector*, Journal of Forestry 115 (2), pp 112–116, https://doi.org/10.5849/jof.16-041

Hernandez, G., Haase, D.L., Pike, C., Enebak, S., Mackey, L., Ma, Z., and Clark, M. (2017). *Forest nursery seedling production in the United States- fiscal year 2016.* Tree Planters Notes 60 (2)

Hjerpe, E. (2018). *Outdoor recreation as a sustainable export industry: A case study of the Boundary Waters Wilderness*. Ecological Economics 146 (60-68)

IMPLAN Group LLC (2018). *IMPLAN System (data and software)* 16905 Northcross Dr., Suite 120, Huntersville, NC 28078 www.IMPLAN.com

Jeffries, H. (2016). *The economic impact of privately owned forests in the United States.* Forest2Market for the National Alliance of Forest Owners, Washington, DC.

Khanal, P.N., Straka, T.J., and Willis, D.B. (2017). *Economic contribution analysis of SC's forestry sector, 2017.* South Carolina Forestry Commission, Columbia, S.C.

Leefers, L. (2016) *Forest products industry's economic contribution to Michigan's regional economies 2016 update.* Michigan Department of Natural Resources.

Lewis, D.J., Hunt, G.L., and Plantinga, A.J. (2002). *Public Conservation Land and Employment Growth in the Northern Forest Region* Land Economics 78 (2) p245-259

Maine Forest Service (2018). *2017 Wood Processor Report including import and export information*. Department of Agriculture, Conservation and Forestry, Maine Forest Service, Forest Policy and Management Division. Augusta, ME.

Mangiante, M. (2016) *Big game hunting recreation demand.* EnviroAtlas Fact Sheet, United States Environmental Protection Agency EnviroAtlas. https://enviroatlas.epa.gov/enviroatlas/DataFactSheets/pdf/ESN/BigGameHuntingRecreationDemand.pdf

McElvany, N.D. (2001) *Snowmobiling in Vermont: An economic impact study and snowmobile user survey.* Vermont Association of Snow Travelers, Inc. Barre, VT

McIver, C.P., Sorenson, C.B., Keegan, C.E., Morgan, T.A. (2013). *Timber use, processing capacity, and capacity to utilize small-diameter timber within USDA Forest Service, Region 1 Timber-processing Area.* USDA Forest Service, Region 1.

Michigan Department of Natural Resources, (2003). *Michigan Forest Legacy Program Assessment of Need.* Retrieved from https://www.michigan.gov/documents/dnr/ForestLegacyAON_Complete_513176_7.pdf

Miller, M.D. (2012). *The impacts of Atlanta's urban sprawl on forest cover and fragmentation.* Applied Geography 34 p171-179.

Montana Department of Natural Resources and Conservation - Forestry Division *Montana Conservation Seedling Nursery* retrieved 10/3/2018 from https://app.mt.gov/cgi-bin/nursery/index.cgi

Montana Fish, Wildlife and Parks. (2000). *Montana forest legacy program: Assessment of need.* Missoula, MT

New York Department of Environmental Conservation (2017). *New York State Industrial Timber Harvest Production and consumption report-2016.* New York Forest Utilization Program, Albany, NY.

New York State Snowmobile Association (2012). *2011 Snowmobile owners survey.*

North East State Foresters Association and The Northern Forest Center. (2013) *The economic importance of the forest-based economies of Maine, New Hampshire, New York and Vermont 2013.*

Northeast State Foresters Association. (2013). *The economic importance of New Hampshire's forest-based economy 2013.*

Northern Forest Lands Council. (1994) *Finding common ground: Conserving the Northern Forest.* Concord, NH.

Okrant, M. (2006). *Heritage and Nature-Based Tourism in the Northern Forest Region: A Situation Analysis* Plymouth State University, North Country Council, Inc, Northern Forest Center.

Okrant, M., Lee, D.S. (2011). *The economic impact of spending by snowmobilers on New Hampshire's economy.* Prepared for The New Hampshire Snowmobile Association. The Institute for New Hampshire Studies, Plymouth State University.

Oswalt, Sonja N.; Miles, Patrick D.; Pugh, Scott A.; Smith, W. Brad. (2018). *Forest Resources of the United States, 2017: a technical document supporting the Forest Service 2020 RPA Assessment.* Washington, DC: U.S. Department of Agriculture, Forest Service, Washington Office. xxx p.

Outdoor Industry Association. (2017) *Michigan outdoor recreation economy report.* Retrieved 8/31/2018 from https://outdoorindustry.org/resource/michigan-outdoor-recreation-economy-report/

Pickard, B. R., Daniel, J., Mehaffey, M., Jackson, L. E., & Neale, A. (2015) *EnviroAtlas: A new geospatial tool to foster ecosystem services science and resource management.* Ecosystem Services, 14, 45-55.

Plumb, S., Benedum, M., and Becker, D.R. (2017). *Review of Idaho's forest legacy program*. Issue Brief No. 20, University of Idaho College of Natural Resources Policy Analysis Group.

Pokharal, R., Cook, P.S., Alward, G., Becker, D.R., and Latta, G. (2018) *Idaho's forest products industry 2017.* Policy Analysis Group Station Bulletin 106 University of Idaho College of Natural Resources.

Pregitzer, K.S. (2018) *Economic Contributions of Idaho's Forest Products Industry 2017* University of Idaho College of Natural Resource.

Reiling, S. (1998). *An economic evaluation of snowmobiling in Maine.* Maine Snowmobile Association.

Schaefer, M., Goldman, E., Bartuska, A.S.G., Lubchenco, J. (2015). *Nature as capital: Advancing and incorporating ecosystem services in United States federal policies and programs.* PNAS Special Feature: Perspective

Simmons, E.A., Morgan, T.A. (2016). *Idaho's forest products industry and timber harvest, 2015.* Bureau of Business and Economic Research, University of Montana

Sorenson, C.B., Keegan, C.E., Morgan, T.A., McIver, C.P. and Niccolucci, J. *Employment and wage impacts of timber harvesting and processing in the United States.* Journal of Forestry 114(4) (474-482)

South Carolina Forestry Commission (2018). *Price Guide For Tree Seedlings, Equipment, and Services.* Retrieved 10/3/2018 from https://www.state.sc.us/forest/refprice.htm

South Carolina Department of Natural Resources (1999). *SC Forest Legacy Program Assessment of Need*

Stynes, D.J., Nelson, C.M., Lynch, J.A. (1998) *State and regional economic impacts of snowmobiling in Michigan.* Department of Park, Recreation and Tourism Resources, Michigan State University, East Lansing, Michigan.

Sylvester, J.T. (2014). *Montana's recreational snowmobiles: Full use and spending patterns 2013.* Bureau of Business and Economic Research, University of Montana.

Tesini, D. (2009). *Working forest conservation easements.* The Urban Lawyer 41(2) p359-375 http://www.jstor.org/stable/41549269

University of Idaho Marketplace (2018). *Pitkin forest nursery* retrieved 10/3/2018 from https://marketplace.uidaho.edu/C20272_ustores/web/store_main.jsp?STOREID=57&SINGLESTORE=true

U.S. Bureau of Labor Statistics (2018) *CPI Inflation Calculator*. URL: https://www.bls.gov/data/inflation_calculator.htm

U.S. Department of Agriculture Forest Service (2017). FS-1088 *Forest Legacy Program Implementation Guidelines.* Retrieved From https://www.fs.fed.us/sites/default/files/fs_media/fs_document/15541-forest-service-legacy-program-508.pdf

U.S. Department of Agriculture National Agricultural Statistics Service. (2017). *United States Maple Syrup Production.* Washington, D.C. and Harrisburg, P.A.

U.S. Department of the Interior, U.S. Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau. (2011). *2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.*

Wall, D. J., Bentley, J. W., Cooper, J.A., Gray, J.A. (2017) *Georgia's timber industry—timber product output and use*, 2015. e-Science Update–134. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 6 p.

Wall, D. J., Bentley, J. W., Cooper, J.A., Gray, J.A. (2017) *South Carolina's timber industry—timber product output and use,* 2015. e-Science Update–134. Asheville, NC: U.S. Department of Agriculture Forest Service, Southern Research Station. 6 p.

Watson, P., Wilson, J., Thilmany, D., and Winter, S. (2007). *Determining economic contributions and impacts: What is the difference and why do we care?* Journal of Regional Analysis and Policy 37(2): 140-146

Wisconsin Department of Natural Resources. (2010). *Wisconsin's Forest Legacy Program (FLP).* Retrieved from https://dnr.wi.gov/topic/ForestPlanning/documents/FLP-Strategy_UPDATED_8-2_submissionToFS.pdf

Wisconsin Department of Natural Resources. (2016) *Forestry and the Wisconsin economy.* Retrieved 8/31/2018 from https://dnr.wi.gov/topic/forestbusinesses/factsheets.html

Wisconsin Department of Natural Resources. *Snowmobiling in Wisconsin.* Retrieved 8/31/2018 from https://dnr.wi.gov/topic/snowmobile/

Employment contributions by sector

Table A1 | **Jobs supported and labor income generated within the multi-state region of Maine, New Hampshire, Vermont and New York by economic activities on Forest Legacy Program properties in the Northern Forest study area broken down by industry. Jobs are represented in number of jobs and labor income is represented in thousands of 2018 dollars.**

	Timber		Syrup		Recreation	
Industry	**Jobs**	**Labor income**	**Jobs**	**Labor income**	**Jobs**	**Labor income**
Agriculture	809	$31,066	99	$2,051	1	$21
Mining	3	$143	0	$4	0	$5
Utilities	92	$4,446	0	$145	0	$80
Construction	30	$1,237	0	$49	1	$93
Manufacturing	304	$18,520	0	$146	1	$95
Wholesale trade	92	$7,778	2	$584	2	$221
Transportation and warehousing	71	$3,333	3	$427	3	$149
Retail trade	85	$2,825	26	$1,894	56	$2,322
Information	17	$1,907	0	$174	2	$275
Finance and insurance	39	$4,287	1	$438	3	$473
Real estate, rental, and leasing	43	$1,338	2	$614	6	$206
Professional, scientific, and tech services	103	$7,051	1	$200	6	$601
Management of companies	25	$3,214	0	$65	2	$315
Waste management and remediation services	87	$2,999	1	$118	7	$319
Educational services	26	$1,146	1	$49	2	$127
Health care and social assistance	118	$6,236	3	$285	11	$688
Arts, entertainment, and recreation	23	$707	0	$42	9	$268
Accommodation and food services	86	$1,974	1	$109	161	$5,875
Other services	75	$3,311	2	$117	7	$366
Government	13	$994	0	$62	1	$89
Total	**2,140**	**$104,510**	**142**	**$7,573**	**282**	**$12,584**

Table A2 | **Jobs supported and labor income generated within the multi-state regional economy of Wisconsin and Michigan by economic activities on Forest Legacy Program properties in the Northern WI/Upper Peninsula MI study area broken down by industry. Jobs are represented in number of jobs and labor income is represented in thousands of 2018 dollars.**

	Timber		Recreation	
Industry	**Jobs**	**Labor income**	**Jobs**	**Labor income**
Agriculture	102	$3,864	0	$6
Mining	1	$33	0	$2
Utilities	7	$499	0	$21
Construction	5	$240	0	$21
Manufacturing	114	$6,871	1	$41
Wholesale trade	24	$1,736	1	$49
Transportation and warehousing	19	$980	1	$48
Retail trade	26	$659	16	$478
Information	5	$284	0	$30
Finance and insurance	14	$754	1	$81
Real estate, rental, and leasing	12	$280	2	$46
Professional, scientific, and tech services	22	$1,297	1	$105
Management of companies	8	$933	1	$77
Waste management and remediation services	26	$743	2	$79
Educational services	5	$153	0	$16
Health care and social assistance	30	$1,474	2	$148
Arts, entertainment, and recreation	7	$113	2	$44
Accommodation and food services	25	$404	45	$1,009
Other services	22	$825	2	$89
Government	2	$92	0	$9
Total	**474**	**$22,237**	**79**	**$2,398**

Table A3 | **Jobs supported and labor income generated within the multi-state regional economy of Georgia and South Carolina by economic activities on Forest Legacy Program properties in the GA/SC study area broken down by industry. Jobs are represented in number of full and part-time jobs and labor income is represented in thousands of 2018 dollars.**

	Timber		Planting		Recreation	
Industry	**Jobs**	**Labor income**	**Jobs**	**Labor income**	**Jobs**	**Labor income**
Agriculture	43	$2,009	5	$168	0	$6
Mining	0	$9	0	$0	0	$0
Utilities	3	$263	0	$1	0	$13
Construction	3	$131	0	$1	0	$12
Manufacturing	54	$3,835	0	$2	0	$14
Wholesale trade	12	$923	0	$11	0	$25
Transportation and warehousing	11	$582	0	$6	1	$46
Retail trade	13	$375	1	$18	17	$482
Information	3	$240	0	$3	0	$30
Finance and insurance	7	$445	0	$7	1	$51
Real estate, rental, and leasing	6	$150	0	$2	1	$25
Professional, scientific, and tech services	12	$755	0	$8	1	$71
Management of companies	4	$365	0	$2	0	$23
Waste management and remediation services	16	$457	0	$4	2	$51
Educational services	3	$93	0	$2	0	$11
Health care and social assistance	13	$668	0	$14	1	$68
Arts, entertainment, and recreation	3	$55	0	$1	7	$153
Accommodation and food services	13	$255	0	$4	6	$202
Other services	12	$421	0	$6	1	$44
Government	1	$47	0	$0	0	$4
Total	**231**	**$12,076**	**7**	**$261**	**40**	**$1,336**

Table A4 | **Jobs supported and labor income generated within the multi-state regional economy of Idaho and Montana by economic activities on Forest Legacy Program properties in the Northern ID/Western MT study area broken down by industry. Jobs are represented in number of full and part-time jobs and labor income is represented in thousands of 2018 dollars.**

	Timber		Planting		Recreation	
Industry	**Jobs**	**Labor income**	**Jobs**	**Labor income**	**Jobs**	**Labor income**
Agriculture	111	$5,080	1	$3	0	$13
Mining	1	$59	0	$0	0	$1
Utilities	4	$307	0	$0	0	$6
Construction	6	$225	0	$0	0	$7
Manufacturing	149	$8,693	0	$0	0	$4
Wholesale trade	26	$1,394	0	$1	0	$12
Transportation and warehousing	20	$906	0	$0	0	$13
Retail trade	29	$806	0	$1	6	$242
Information	5	$224	0	$0	0	$9
Finance and insurance	15	$631	0	$0	0	$23
Real estate, rental, and leasing	16	$235	0	$1	1	$16
Professional, scientific, and tech services	23	$878	0	$0	1	$28
Management of companies	5	$317	0	$0	0	$6
Waste management and remediation services	22	$584	0	$0	1	$25
Educational services	5	$107	0	$0	0	$4
Health care and social assistance	34	$1,530	0	$0	1	$46
Arts, entertainment, and recreation	9	$101	0	$0	11	$226
Accommodation and food services	29	$473	0	$0	3	$81
Other services	25	$788	0	$0	1	$26
Government	2	$100	0	$0	0	$4
Total	**532**	**$23,439**	**2**	**$8**	**26**	**$791**

University of Massachusetts Amherst
Helena Murray
Paul Catanzaro
Marla Markowski-Lindsay

USDA Forest Service
Brett Butler
Henry Eichman

ACKNOWLEDGEMENTS

Many people helped with this project by providing data and local knowledge including: Anna Smith and Donald Cockman (South Carolina Dept. of Natural Resources), Buford Sanders and Risher Willard (Georgia Forestry Commission), Liz Petruska and Joe Higgins (Maine Dept of Agriculture, Conservation and Forestry), Kate Sudhoff (Vermont Dept. of Forests Parks and Recreation), Karen Sjodquist (Idaho Dept. of Lands), Janet Valle (USFS State and Private Forestry), Kerry Weiber (Michigan Dept. of Natural Resources), Ron Gropp (Wisconsin Dept. of Natural Resources), Lindsay Nystrom (Massachusetts Dept. of Conservation and Recreation), Julie Evans (Northern Forest Center), JT Horn (Trust for Public Land), Alan Wood (Montana Fish, Wildlife and Parks), Kennon McClintock (Idaho chapter of The Nature Conservancy), Heidi Van Everen & Alan Myers-Davis (Whitefish Legacy Partners), Joe Hovel (landowner), John Scarinza (Town of Randolph, NH), Paul McKenzie (F.H. Stoltze Land and Lumber), Cindy Locke (Vermont Association of Snow Travelers) and Sarah Wells (Mount Grace Land Conservation Trust)