

## Alternative forest resource use - outdoor recreation and rural economies

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### ABSTRACT

Since the 1980s demand for outdoor recreation has been increasing in the United States. Growing income and change in lifestyles have been cited as factors contributing to the increase in demand. This period also coincided with a decline in timber prices and loss of income to forest land owners. Forest-based recreation has intensified as a part of forest management activities and has compensated the fall in timber demand and contributed income to forest land owners that enhanced rural economies. About 75% of Alabama is under forest cover, but little is known about forest recreation utilization and its effects on local communities. The objective of this study was to assess the relationship between forestry and hunting/wildlife watching and its impact on property owners and the multiplier effect on rural economies. Expenditure figures for hunting and wildlife watching from the 2006 National Fish and Wildlife Survey, and IMPLAN Alabama economic data was used for the analysis. The result suggested that a dollar spent in hunting and wildlife will generate \$2.04 in the economy. Hunting and wildlife earns 55% and forestry earns 35% while the rest of the industries share 10%. Furthermore, value added distribution showed that 38% accrues to property owners in the form of proprietor's income and other property income. It is fair to say that outdoor recreation is a s good source of income to forestland owners, and also has a multiplier effect on rural economies.

*Keywords: outdoor recreation, forest use, hunting, rural economies*

### INTRODUCTION

Forestry is a source of marketable goods and contributes to economic development, especially in rural economies. Since the 1960s forest management has included both market and non-market resource values. The market value of forest resources is affected by international competition, which has led the U.S. to lose price competitiveness in the world wood market (Pulver 1995, Weber 1995). As a result, rural development required alternative uses of forest resources. Forest based recreational amenities, non-market value, have been introduced as part of the forest management activities to cover the fall from demand for wood. Forest, wildlife and water bodies are inputs that can contribute to the satisfaction and the leisure needs of the population and the growing demand for forest based outdoor

recreation (Cordell and Tarrant 2002). For amenity-based public services (recreation and tourism), forests and water are the primary inputs into the production process. Outdoor and nature based recreation are hinged on environmental resources, and facilities play a secondary role (Hall and Page 2002). Recreational resources are a combination of natural amenities and recreational sites which are influenced by an array of factors that act to provide opportunities that satisfy recreational needs and desires (Kretuzwiser 1989, Marcouiller and Prey 2005).

The amenity component of forest resource can be a foundation for recreational development (Keith et al. 1996, Marcouiller 1997). Lakes, forests and wildlife as natural amenities provide an input to the recreation

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industry. Several researchers have examined the role of recreation in rural and regional economies and found that natural amenities and recreation have a strong relationship (Dissart 2003, Kim et al. 2005 and Marcouiller et al. 2004). Natural amenities do have significant effects on employment and income growth. Bowe and Marcouiller (2007) showed that different types of amenities have varying effects on regional development.

The joint production of forest natural resources as commodity and recreational amenities is an asset to rural economic growth (Green et al. 2005). This also creates income and employment stability for forest land owners. Outdoor recreation is a national pastime in the U.S., with potential variation by region and county. In 2006 about 62% of the recreational participants originated from urban centers. The main outdoor recreation activities were fishing, hunting and wildlife watching and the figures for the U.S. shows that the number of participants has increased by one percent between 1996 and 2006. Wildlife watching has increased by 13%, during the same period while fishing and hunting have declined by 15 and 10%, respectively (National Survey 1996 and 2006). The private sector provides the bulk of the developed recreational resource. Investment in hunting is done by private individuals, corporations and the government. The survey covered only national and state parks.

Fishing, hunting, and wildlife watching are the most important activities in Alabama. The growing demand for these activities and their dependence on forests create potential to increase the alternative sources of income for forest land owners and promote development in the rural economies. The economic role and contribution of forest resources is underestimated if we consider only primary forest products like logging and timber sales. The income from hunting/wildlife watching is an additional income for forest land owners from standing forest. Recreational services in Alabama are provided by both the public and private sectors. There are twenty-three State Parks, four National parks, and about 49 private registered parks and recreation places (Alabama campgrounds and RV Parks,

[www.rvpark.com/alabama.htm](http://www.rvpark.com/alabama.htm)). The private parks provide mostly family camping and recreation activities such as boating, fishing, swimming, golf courses, shooting range, hiking, and biking. Most are located in and around golf courses, lakes and beaches.

Recreation sites are found all over the state, and there are no counties in Alabama that have less than 25% of their land in timberland. In fact, the majority of the counties are over 50% forested. Only 9 of the 67 counties in the State are less than one-half forested. Total forest land increased from 22 to 22.9 million acres from 1990 to 2004. Non-industrial private forestland accounts for 78% of the timberland in Alabama, forest industry 16% and 6% owned by the public sector (USFS/Alabama Forestry Commission 2006). The objective of this paper is to assess the interrelationship between hunting/wildlife and forestry and the economic impact of hunting/wildlife on the rural economies and other industries in the state of Alabama.

## **RECREATION AND RURAL ECONOMIES**

Population growth in the south has been increasing at a higher rate than in the United States, with the greatest percentages increases occurring in urban and coastal areas (Tarrant et al. 2002). Scenic beauty and cultural heritage are among the most important value that the population holds for forests (Tarrant et al. 2002). Viewing and photographing nature, boating, hiking, horseback riding, and fishing are all increasing faster than the population growth rate in the South (Cordell and Tarrant 2002). Even hunting demand, which is declining in other parts of the country continues to rise in the South (Cordell et al. 2005).

Supply of recreational resources is a combination of natural amenities and developed recreational sites that provide recreational opportunities (Marcouiller and Prey 2005). Publicly provided and non-marketed natural amenities are affected by landscape features such as forests and water resource, for example, attributes of camping and recreational experiences, such as quietness of forest area, may be greater along

a lake than on other forested land. Outdoor and nature dependent recreation are based on environmental resources, with facilities playing a secondary role (Hall and Page 2002).

Zhang et al. (2006) studied supply and demand for hunting leases from non-industrial private forest lands in Alabama. The supply side includes factors such as site location and biophysical characteristics, game diversity and abundance, tract size, and provisions of service by the land owners, while the demand side factors including satisfaction quality of hunting experience as measured by hunters' harvest success, percent of trophy animals, and income that influence lease rate. They concluded that hunting lease fees, income or demand for hunting is affected by the size of forest land relative to agriculture, water availability, type of access, and enhanced features such as habitat improvement, wildlife, and provision of services.

Recreational demand is related to population growth and improved quality of life. Quality of life plays an important role in community economic growth, and thus amenity attributes appear to be powerful tools for economic growth (Dissart and Deller 2000, Gottlieb 1994). Amenities play a role in rural economic growth, as forest resources that were once expected to produce only wood products are now used as recreational and aesthetic resources. Recreational resources supplement the income of forest landowners and minimize the risk of reliance on only one product. Ex-urban population is growing in the U.S. from urban-rural migration, and rural economic growth tends to occur less from traditional resource extractive industries but rather from natural amenities and other non-market attributes that contribute to overall quality of life (Deller et al. 2001). The expenditure associated with recreation generates benefits to service providers and the broader community. A study by English et al. (2000) shows that recreational counties grew faster in terms of employment and income, housing levels and value, and population than non-metro counties.

The importance of amenities indicates a structural shift in resource management in rural areas and this can lead to the development of new policy options to

address rural economic growth. Reeder and Brown (2005) used regression analysis to assess the effect of recreation and tourism development on socioeconomic conditions in rural recreation counties and found that it contributes to rural well-being, increasing local employment and wage levels, income, reducing poverty, and improving educational and health services. However, local effects also vary significantly, depending on the type of recreational area.

Stynes and Sun (2005) used the Money Generating Model (MGM) to assess the economic impact of National Park visitors and area tourists on the local economies. The model estimates the impacts of recreational spending in terms of sales, income, job and local tax receipts. The MGM model uses survey results and multipliers from the IMPLAN input-output modeling system. Park visitors, after a quick tour, often head to souvenir shops, restaurants, convenient stores, and commercial attractions, and spend money, even when engaging in backcountry activities such as hiking, fishing, observing nature, and learning history. Stynes (2007) used the 2006 National Park Survey which covered 273 million recreation visitors in different national parks. The distribution of expenditures by visitors shows that about 24% went to restaurants, 28% to lodging, 16% to local transport, 14% to souvenirs, and 8% to groceries. Using the MGM showed that visitor's expenditure of \$10.73 billion in the local regions generated a total effect (direct + indirect) \$13.0 billion sales, \$4.5 billion personal income, and \$7.0 billion value added. The results also showed the impact on jobs and incomes in the hotel/motel business, restaurants and bars, retail stores and transportation sector.

In another study, input-output economic impact analysis done by Arizona Game and Fish Department (2003) using wildlife-related recreation expenditure data from the 2001 National Survey of Fishing, Hunting, and Wildlife showed that a total expenditure of \$820.7 million on wildlife and related recreation generated a \$1.5 billion total economic effect in the economy in Arizona.

## METHODS, DATA AND ANALYSIS

Timber and logging is the primary use of forests and source of income for forest land owners in Alabama. Timber is a dominant crop harvested in 34 of the 67 counties. In 2006 forestry and logging contributed \$3.6 million to the economy, while forestry, hunting, fishing and related activities contributed \$5.8 million in personal income (Bureau of Economic Analysis, 2006).

Forest-based recreation constitutes a substantial segment of Alabama's economy. The state has two national preserves, eight national wildlife refuges, four national forests, 26 state parks, and numerous state wildlife management areas that support and serve the growing tourism and recreation industry. The most popular forest-based outdoor recreation activities include hunting, hiking, horseback riding, spring flora and wildlife observation, photography, camping, and enjoyment of nature. Most forest industries that own land in Alabama recognize the opportunity for outdoor recreation on their lands and make them available for hunting, hiking and other public recreation use by lease or permit. Recreation use on non-industrial private forestlands is much more limited than on public lands. Fewer landowners are willing to allow public access to their lands, although an increasing number lease their lands, primarily for hunting, to users who also help protect forest resources (Alabama Forest Resource Center 2002). Most private forest land owners do not benefit from providing hunting/wildlife services to the public because they do not have the capacity to run it directly and many avoid hunting leases because of the liability issue and fear of losing control of land to leases (personal communication with forest landowners).

Recreational resources vary with location, but the main activities are hunting and wildlife and important in many places. There are three major kinds of hunting: 1) big game – whitetail deer, bear; 2) small game – rabbit, hare, and squirrel; and 3) birds – turkey, duck, goose, and dove. Equipment and gear used for hunting are: archery equipment, guns and shooting equipment, hunting dogs, and other hunting gear (Alabama Forest Resource Center 2002).

Hunting, like wildlife and wild plant watching, is a seasonal activity. The income generated from these recreation fees can provide an additional income for forest land owners from a standing forest. Furthermore, it generates economic activity in other sectors of the economy that provide related services. Therefore forest recreation has a wide impact on the total output and value added generated in the economy.

This paper used Input-Output (I-O) model to assess the economic impact and sectoral interdependencies and multipliers. The input-output method is based on the interrelationship between sectors in the economy and how each is affected by a change in the final demand for a sector's output. The model can be expressed in the following equation:

$$X = (I - A)^{-1} Y \quad (1)$$

Where  $X$  is sector output,  $A$  is intermediate input for sector  $X$  usually referred as the technical coefficient,  $Y$  is final demand for sector  $X$ , and  $(I-A)^{-1}$  is the Leontief inverse or interdependency matrix. The interdependency matrix shows the direct and indirect effect of a dollar in final demand of the sector's output on other sectors in the economy. Output multiplier is one of the most frequently used multipliers; it shows the output of the sectors of the economy that is expected to be generated because of the new additional output. Multipliers can be type I, direct and indirect effects; or type II, direct, indirect and induced effects (Miller and Blair 1985).

The output multiplier for sector  $j$  is defined as the total value of production in all sectors of the economy that is necessary in order to satisfy a dollar's worth of final demand for sector  $j$ 's output. The Type II output multiplier (endogenized household) is the ratio of the direct and the indirect effect to the initial effect expressed by the following equation:

$$O_j = \sum_{i=1}^n \alpha_{ij} \quad (2)$$

Where  $O_j$  is output multiplier and  $\alpha_{ij}$  is the Leontief inverse matrix or matrix of interdependency  $(I-A)^{-1}$ . The total output is the direct and indirect output effects, with endogenized household. The vector shows where the spending would have the greatest impact in terms of total dollar value of output generated in the economy.

The 2002 economic data for Alabama and the input-output model software developed by the IMPLAN Group (MIG 2002) was used to construct state level estimate and assess the economic impact. The 509 sectors in the data set were aggregated into 50 sectors for this analysis. The two sectors of major importance were hunting/trapping (sector 17) and timber which is constituted of primary forest products: logging, forestry nurseries, and forest support services. The input-output model is a demand driven model and visitor expenditure is used to measure recreation demand. The expenditure data were collected from the National Survey of Fishing, Hunting, and Wildlife (2006). Employment, output, and value added (employee compensation, proprietor's income, other property taxes, and direct business taxes) were used as interpretation of the economic impact.

## RESULTS AND DISCUSSION

The profile of forest based outdoor recreation participants in Alabama is provided in table 1. The recreational participants originated from both Alabama (residents) and the rest of the United States (non-residents). The total number of participants has slightly increased 1.5 to 1.7 million, between 1996 and 2006. The participation of Alabama residents increased from 1.2 to 1.5 million, 10% increase, while non-residents declined from 353,000 to 196,000 (44% decline) between 1996 and 2006. In theory, residents should have a bigger economic impact on the local community than tourists because they stimulate the housing industry and their season-long presence significantly increases the demand for a wide range of local goods and services. Most of the increase is coming from wildlife watching, where participants increased from 1.2 to 1.3 million.

**Table 1. Number of participants in hunting and wildlife watching 1996-2006 (Population 16 years and older in thousands)**

Activity	1996			2006		
	Res.*	Non-res.	Total	Res.*	Non-res.	Total
Hunting	253	94	347	310	81	391
Wildlife Watching	970	259	1229	1222	115	1337
Total	1223	353	1576	1532	196	1728

Source: National Survey 1996 and 2006

\*Residents individual who lived in the state being reported

The visitors' expenditure profile from the different national surveys is displayed in table 2. Food and lodging, transportation, and manufacturing (equipment) industries are directly affected by recreation. Other trip costs include fees guide, private and public land use fees, and equipment rentals. Other expenditure is composed of magazines, books, membership dues and contributions, land leasing and ownership, licenses, permits and tags, and planting for wildlife. The detailed value of each item included in other expenditure was not available at state level but the aggregated figure at a national level shows that land leasing and ownership accounts between 70 and 75%, license and permit accounts 22%, and planting (forest related services) accounts for 17% in 2006 (National Survey 2006). The distribution shows that a good portion of other expenditure 70-75% goes to forest landowners in the form of land leasing and ownership followed by the government in the form of license and permit.

Expenditure distribution for Alabama 2006 provided in table 2, shows that food and lodging and transportation accounted for 30% of expenditures. About 36% and 26% of expenditures were accounted for by equipment/auxiliary equipment and other expenditure, respectively. Other trip costs are paid out in the form of different fees, and accounted for 8%. While most of the other expenditure share is attributed to land owners, there is an indirect effect on the food and lodging, transport and the equipment industries. Wildlife-watching equipment includes binoculars, cameras, video cameras, special lenses, and other photographic equipment. Auxiliary

equipment refers to bird food, feeders, field guides and maps, tents, and other camping equipment. Hunting equipment is much more expensive than that used for wildlife viewing per spender. The equipment is mainly firearms, rifles, shotguns, handguns, bows, arrows, archery equipment, field glasses, telescopes, ammunition, camping equipment, special hunting clothing, rubber boots, waders, and foul weather gear. An increase in participants will increase the demand for this equipment, consequently the manufacturing industries.

**Table 2. Summary of total expenditure by hunting/wildlife watching in Alabama 1996 and 2006 (in thousand dollars)**

Item	1996	2006	2006 %	Change
			distribution	1996-2006
Food and Lodging	79.3	160.4	16	102
Transportation	51.3	132.0	14	157
Equipment	215.7	288.9	30	34
Auxiliary equipment	24.8	59.4	6	139
Other trip costs	26.4	81.2	8	208
Other Expenditure	118.1	251.1	26	113
Total	515.6	973.1	100	89

Source: National Survey 1996 and 2006

The economic impacts of visitor's expenditure on the state economy are estimated by applying the visitors spending given on Table 2 to the IMPLAN input-output model. Since about 70 to 75% of other expenditure and other trip cost go to the forest landowners in the form of land leasing and ownership, the total amount was applied to the hunting industry. Total effects may be divided between the direct effects that occur in businesses selling goods and services directly to visitors; and secondary effects, indirect and induced that result from the circulation of this money within the local economy. The expenditure generated a total of \$1,631 million of output, sales in the economy (Table 3), composed of \$973.1 million in direct effect and \$658 million from secondary effect, and created about 20,000 jobs. Hunting/wildlife watching are seasonal activities, some jobs last four or three months a year and are considered as annual jobs, which might lead to some overestimation. Value

added is the preferred measure of the contribution to the local economy as it includes all sources of income to the area – payroll benefits to workers, profits and rents to businesses, and sales and other indirect business taxes. The largest share of the value added, 87%, accrues to personal income which is a little higher than 70-78% the range estimated by Stynes (2007). This could be due to referring to all part time employment as annual employment. Employee compensation in the form of wages and salaries accounted for 49%, other property income and proprietor income accounted for 25 and 13%, respectively. Employees' compensation is an indicator of employment and the use of local manpower. While part of employee compensation goes to employed labor, the total amount of property income and proprietors' income accrued to land and business owners involved in the hunting/wildlife. About 13% of the total value added contributes to government revenue in the form of indirect business taxes

**Table 3. Direct and secondary impact of spending in hunting/wildlife watching in Alabama (2006)**

Economic Indicator	Direct Effect	Secondary Effect	Total	
Output	\$973,088	\$657,954	\$1,631,042	
Employment (number)	13,000	7,300	20,300	
<b>Value added</b>				
Employee Compensation	\$176,813	\$159,972	\$336,785	49%
Other property income	\$82,999	\$88,659	\$171,658	25%
Proprietors Income	\$39,337	\$47,018	\$86,355	13%
Indirect Business Taxes	\$44,104	\$41,280	\$85,384	13%
Total Value Added	\$343,253	\$336,929	\$680,182	100%

Source: Impact estimation result

The output multiplier for the hunting/wildlife industry was 2.047, which indicates that a dollar spent in the industry will generate \$2.047. The distribution shows that \$1.13 remains in the industry and about \$0.72 is generated in forestry, and the rest applies to other industries in the economy. This result is consistent with 2.0 Type I multiplier by English et al. (1996)

and Stynes (2007). The multiplier Marcouiller and Mace (1999) ranged from 1.99 to 2.22. Table 4, shows the distribution of the total output among some of the industries in the economy. The largest direct effect takes place in the industry where the actual expenditure is made, hunting, equipment related to hunting and wildlife gears, transportation, food and beverages and housing services. Forestry earns the largest secondary effect, an amount of about \$245,659. Economic activities are created in other service industries: wholesale/retail trade, real estate and finance, legal and government services, and hotel accommodation.

**Table 4. Direct and secondary output impact of spending in hunting/wildlife watching (in million dollars)**

Industry	Direct	Secondary	Total
Hunting	\$332.3	\$44.3	\$376.6
Equipments	\$288.9	\$35.2	\$324.1
Automobile and trucks	\$132.0	\$11.2	\$143.2
Food and beverage	\$80.2	\$11.5	\$91.7
Storage and Housing services	\$80.2	\$6.0	\$86.2
Sporting goods	\$59.4	\$0.4	\$59.9
Forestry	-	\$245.7	\$245.7
Services	-	\$106.5	\$106.5
Utility and communication services	-	\$48.5	\$48.5
Wholesale/retail	-	\$47.7	\$47.7
Real Estate and Finance	-	\$44.3	\$44.3
Other manufactured/Chemicals	-	\$39.4	\$39.4
Hotel and Accommodation	-	\$17.2	\$17.2
<b>Total</b>	<b>\$973.1</b>	<b>\$658.0</b>	<b>\$1,631.0</b>

Source: Impact estimation result

The he hunting and wildlife activity is a good source of income for forestland owners and also has a multiplier effect on rural economies where the activity takes place. Population ratio and density was used for outdoor recreation needs and recreational facility planning (Holland 2003). Table 1 indicated that the number of participants increased from 1996 and 2006, and the largest increase came from residents of the state. Alabama’s population projection shows that population will increase by 8% between 2005 and 2025, and the age group 18 and above will increase by 10% (Campbell 1996). This indicates the potential future recreational demand and expenditure.

## CONCLUSION

There is a national and local trend of increasing recreational demand. In Alabama the increase is evidenced by the increase in the participants and recreational spending for period covered by this research, 1996 to 2006. An increasing number of Alabama residents are participating in hunting and wildlife watching. Expenditure from hunting and wildlife/wild plant watching has increased by 89% during this period and the distribution shows that the biggest share of the expenditure applied to equipment and gear used by recreationist, followed by food and lodging and transportation. Results of the impact analysis showed the interdependency between hunting and wildlife/wild plant watching and forestry resource. The largest direct effect takes place in the industry where the actual expenditure is made, hunting, including equipment related to hunting and wildlife gear, transportation, food and beverages and housing services. Forestry earns the largest secondary effect, an amount of about \$2.4 million in 2006. Forest land owners gain income in the form of different land use fees while still having the land under timber production. A range of manufacturing industries and service providers gain from the recreation activity. The equipment suppliers can be located locally, or distributors may import from other states for resale. Most of the benefit goes to wholesale and retail trade. Service providers for equipment maintenance and rental will be some of the businesses that will locate

close to the parks and recreational areas. This generates jobs and small business around rural areas where it is needed the most. Local effect depends on the type of recreation, natural amenities such as landscape, size of forest and wildlife and wild plant diversity, and provision of services by the land owner.

The study show the benefit of forest based recreation to forest land owners and the rural community. There is potential to capture a significant population size which will engage in hunting/wildlife and various kinds of recreational activities. The study is limited by the data used, the National Survey (2006) which does not include the private sector, and the methodology. However, with more detailed and location specific studies the results could be used to encourage the private sector, especially small forest land owners to be involved in the recreational activities.

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