



# **The Economic Impact of Open Space in New Hampshire**

*Prepared for:*

**The Society for the Protection of New Hampshire Forests**

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## EXECUTIVE SUMMARY

The Society for the Protection of New Hampshire Forests requested Resource Systems Group to provide an independent analysis of the economic impacts of open space on the economy of the State of New Hampshire. The purpose of this assessment is to provide a factual basis for informing the public and conservation organizations about the value of open space to the New Hampshire economy. Open space is defined in this study as areas that are not built up, excavated, or developed. Wild areas, forests, tree farms, open productive agricultural land, grassland, pasture, wetlands, lakes, natural seashores, and the non-built up parts of state and municipal parks are all included. Open space does not need to be completely natural or pristine to be included under this definition. At present, approximately 89% of New Hampshire can be classified as open space.

Open space is a direct underpinning of four economic sectors: agriculture, forestry, tourism and recreation, and second homes used for vacations and recreation. For each sector, the availability of open space is a significant factor, and often the critical one, in determining the income, jobs, and taxes derived from those sectors. In addition, the study recognized that there were other important economic contributions to the state economy which cannot be quantified, including the value of open space in attracting and retaining business and industry and making New Hampshire an attractive place for retirement. This study collected data primarily from state and federal government sources, which were then used to evaluate and quantify the contribution of open space to the New Hampshire economy from each of the four sectors. An input/output economic model of New Hampshire was used to determine the indirect impacts of open space related economic activities. The economic impacts of open space are summarized in the following table.

Summary of the Economic Impacts Related to Open Space Activities in New Hampshire 1996/97

	Gross Direct Income	Average % Attributed to Open Space	Attributed Direct Income	Attributed Direct Jobs	Attributed Direct & Indirect Income	Attributed Direct & Indirect Jobs	Attributed State & Local Tax Revenues
<b>Agriculture Related</b>	\$413,400,000	56%	\$230,900,000	3,669	\$376,915,800	5,467	\$30,907,096
<b>Forest Related</b>	\$1,198,214,000	100%	\$1,198,214,000	6,487	\$3,921,182,894	16,675	\$325,300,797
<b>Tourism and Recreation</b>	\$3,178,480,000	54%	\$1,732,261,600	41,661	\$3,067,152,265	64,002	\$249,417,502
<b>Vacation Homes</b>	\$478,783,000	100%	\$478,783,000	8,648	\$816,983,565	15,029	\$285,855,786
<b>Total</b>	\$5,268,877,000	69%	\$3,640,158,600	60,465	\$8,182,234,524	101,173	\$891,481,182

The results of the analysis show that open space based economic activities contributed \$8.2 billion per year to the New Hampshire economy in 1996/97. This amounts to over 25% of



civilian jobs, which were dependent on open space. The open space based economy is larger than the whole tourist industry and it is second only to manufacturing in terms of both income and employment. With an estimated \$891 million in state and local revenue generated, the open space based economy provided over 35 % of the total state and local tax revenues in 1996/97. The 5,265,000 acres of open space in the state contributed an average of over \$1,500 per acre in total state income.

The major quantifiable components of the open space based economy are as follows:

- 1 Agriculture related activities have annual gross revenues of \$413 million. Of this total, \$231 million, or 56% of the total revenue, is dependent on open space as defined in this study. Greenhouse production, ornamental horticulture, landscaping and the processing of food that is produced primarily outside the state are not considered to be open space related. The total direct and indirect impact on the state economy from agriculture is \$377 million and this sector generates over 5,400 jobs.
- 2 Forestry based activities, including primary forest products, saw milling and paper manufacturing, generate almost \$1.2 billion in gross revenues, all of which is open space based. When the indirect impacts are added, the total direct and indirect contribution to the state economy is \$3.9 billion making it the largest contributing sector in terms of total income. The forest sector generates over 16,600 jobs.
- 3 Tourism and recreation spending by residents and visitors was almost \$3.2 billion in 1996/97, including associated eating, drinking, and accommodation. Of the \$3.2 billion it is estimated that 54% of the total expenditure, or \$1.7 billion, is based on open space related activities such as hunting, fishing, bird watching, hiking, skiing, and camping. When the indirect impacts are added, the total direct and indirect impact on the state economy is over \$3 billion and the sector generates over 64,000 jobs.
- 4 Second homes in New Hampshire that are primarily for vacation and recreational use generate \$479 million in annual spending, all of which is open space related. This includes property tax payments, utilities, construction, repair, and renovation but not the tourism or recreation related expenditures of the owners or renters, as these expenditures are included in the tourism and recreation sector. The total direct and indirect impact on the state economy is \$817 million and the sector generates over 15,000 jobs.

Overall, the estimates in this study are conservative because they do not include the contribution of open space in attracting and retaining businesses and retirees, or the



increase in property values that may occur in proximity to open space. The four sectors that have been quantified together produce \$3.5 billion in direct expenditures and generate a total direct and indirect impact of \$8.2 billion. Of this total, about \$4.4 billion is generated by primary open space activity, such as agricultural crop production, timber production, and outdoor recreation. About \$3.8 billion is generated by secondary activities such as saw milling, paper manufacture, and agricultural food processing, based principally on New Hampshire-grown raw materials.

The magnitude of the contribution of open space to the state economy demonstrates how important open space is to the well being of the people of New Hampshire and why open space should be a continuing issue of public policy concern.

## BACKGROUND AND PURPOSE

The Society for the Protection of New Hampshire Forests requested Resources Systems Group to provide an independent analysis of the economic impacts of open space on the economy of the State of New Hampshire. The purpose of this assessment is to provide a factual basis for informing the public and conservation organizations about the value of open space to the New Hampshire economy.

Open space comes in many forms, from municipal parks to the great wilderness areas of the White Mountain National Forest and includes thousands of acres of productive farm and forest lands as well as wilderness and wildlife reserves. Some of this land is public or in conserved private ownership that is protected permanently from development. Some is in multiple use or is primarily used for the production of food or fiber. Whatever its primary designation, there is little doubt that open space is an important factor in the economic well being of the state, and that it is a defining characteristic of the place that resonates with both residents and visitors. The value of the open space is widely recognized both by those who wish to extend open space greater protection and those who wish to develop open space. Indeed, it is often the proximity to open space that makes New Hampshire such an attractive place for tourism, recreation, retirement, and for the location of industries whose owners and employees value the quality of life that open space provides.

The conflict between open space and development is not new. The factors of production (land, capital, and labor) that are necessary for economic development have always included open space as a natural resource to be used for production or development. In the late 19th century, with the development of mass tourism and outdoor recreation, open space as a non-consumptive resource took on new meaning as tourism and recreation became an important part of the state's economy. Whenever a resource is used up, the production that is dependent upon it is in jeopardy, and that is true today of the industries that are directly or indirectly dependent on open space.



When resources are depleted, technology finds substitutes. In New England, wood fuel was replaced by coal and oil, as wood resources became scarce. Plastics and fiber composites replaced wood and metals and composite wood products are replacing sawed timber in home construction. Outdoor recreation and tourism could be replaced with indoor sports or urban culture based tourism. Similarly, forest products and open space based agriculture may to some extent be replaced by wood substitutes and industrial agriculture. Without expressing judgements on the relative values of these activities, there is little doubt that if New Hampshire were to see a decline in open space based economic activities the transition to substitutes would probably not be to New Hampshire's long term advantage. This is because while New Hampshire enjoys a natural advantage in open space based economic activities, it does not have an advantage in urban or cultural tourism, indoor recreation or in the oil based materials industries. Therefore, given the natural advantage that the state enjoys in open space based economic activity, it is important to understand and quantify the value that is created by open space resources.

The purpose of this study therefore is to attempt to provide a quantitative assessment of economic activities in the state that are based on open space, so that these economic values may be better understood in the process of public policy formation.

#### REVIEW OF THE METHODOLOGY FOR ECONOMIC VALUATION OF OPEN SPACE

The methodology for the economic valuation of open space can be considered as a special case of the more general problem of the valuation of natural resources which may have both market and non-market values and in addition include consumptive and non-consumptive uses.

Open space is defined here as areas that are not built up, excavated, or developed. Wild areas, forests, tree farms, open productive agricultural land, grassland, pasture, wetlands, lakes, natural seashores, and the non-built up parts of state and municipal parks are all included. Open space does not need to be completely natural or pristine to be included under this definition. Excavated areas, unless fully reclaimed, playing fields, landfills, waste lagoons, industrial agriculture and horticulture facilities, and greenhouses are excluded. For practical reasons, small areas of open space such as back yards, home gardens, and landscaping around commercial developments are also excluded. Under this definition, almost all open space could revert to the natural state if left alone.

The need for the measurement of the economic value of open space occurs because open space, like other non-consumptive natural resources, is not well represented in the market place. Some values such as standing timber, soil quality, and clean water may be factors in the sale price of private land. But the more general values such as the life supporting services of natural ecosystems and the value for outdoor recreation are often not reflected in selling prices or rents. This does not mean that they cannot be given market place values and today there are attempts through access fees, hunting and fishing licenses, and pollution trading credits to bring natural resource values into the market place. As a result, there has been an increased emphasis on market based policy.



The study of the economics of natural resources has been very active in the last two or three decades. It is an outgrowth of classical economics and it has become of greater importance in part because of the rise of the environmental movement and in part because of the growing desire to quantify intangible values and environmental externalities. As a result, a wide variety of techniques have been developed for placing values on non-consumptive uses of natural resources for which market pricing is not available or inappropriate. The variety of approaches taken by resource analysts are not mutually exclusive and some methodologies can be used in combination with one another, depending upon the intended use of the analysis. Each approach has a particular application and the choice of methodology should be governed by the intended use of the analysis.

There are at least five approaches that can be taken to the valuation of open space. These are

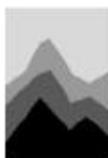
- 1 Value of services provided by natural ecosystems
- 2 Enhancement of property values in proximity to open space
- 3 Value of time and goods used by people using open space resources
- 4 Benefit cost analysis of developing versus protecting open space
- 5 Economic impact of open space related economic activity

#### VALUE OF SERVICES APPROACH

Open space valuation can be considered as a special case of the valuation of natural ecosystems. The value of services provided by nature can be used as a measure of the value that natural ecosystems provide to the human economy. The value of natural services is established by the cost of replacing those services with human technology. Therefore, the value of a forest lies not only in the value of the timber but in the purification of air and water that would have to be provided at enormous cost by human engineering if it were not present. This approach has been used in a landmark paper by Robert Costanza, in which the value of all the global ecosystems was valued at \$16 to \$54 trillion per year<sup>1</sup>. This compares with the estimated global gross economic production of \$18 trillion per year. The approach recognizes that human existence is critically dependent on natural ecosystems and leads to a recognition, if any were needed, that we cannot survive without nature. However, the approach does not relate directly to public policy at the state or local level. The values that are provided by nature, enormous though they are, are outside the money economy at present. The valuation derived from this approach does not translate into the economic terms of jobs, income, and taxes that are best understood in the political process.

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<sup>1</sup> Costanza, Robert et al: The value of the world's ecosystem services and natural capital  
Nature 387, 253-260 (1997) Article



#### ENHANCEMENT OF PROPERTY VALUES IN PROXIMITY TO OPEN SPACE

A room with a view is more valuable than one without. This seems to be a value derived from art, but it is never-the-less a real economic effect, especially where the open space is at the water front. Measuring the differences in selling prices for property at varying distances from open space gives a surrogate value for the open space itself. In addition, it provides a measure of the effects of open space on the economy, to the extent that the enhanced values are translated into transactions at higher values. Higher values also increase property tax revenues. Property values provide a useful localized measure of open space values, however, they relate to only one impact associated with open space. There are many other economic effects of open space such as recreation and community-wide aesthetic values that are not reflected in individual property values. Furthermore open space may have direct productive value such as on farms and forest that are not included in property values. Thus property values are a very incomplete measure of the economic value of open space.

#### ALUE OF TIME AND GOODS USED IN RELATION TO OPEN SPACE

Open space is used for a variety of activities, some of which are incorporated in the market economy and some of which are not. Those goods and services provided by open space which enter into the market economy, such as agricultural and forest production, can be valued by the market price of the goods produced. Similarly, the price paid for access to open space where fees are charged for recreational use can also be used. However, in the case where the actual use of the open space is free, such as boating or swimming in lakes or hiking trails, some economists have used surrogate prices to value the resource. These surrogate values include the value of time used in recreation, and/or the value of goods such as boats, fishing tackle, skis etc. which are used for recreation. The problem with this approach is that it uses two fundamentally different measures of value that cannot be easily combined. Furthermore, the actual values of time used are highly controversial and the valuation of goods and services purchased may not always directly relate to the state or place in which the open space is located.

#### COST BENEFIT ANALYSIS OF DEVELOPING VERSUS PROTECTING OPEN SPACE

Cost benefit analysis is a comprehensive approach to decision making based on comparing the economic costs and benefits of specific courses of action. Usually the costs and benefits of an action are specified in dollar terms and the ratio of benefits to costs is determined over the lifetime of the action. It is most commonly used to determine if the benefits exceed the costs for a specific action such as building a dam or constructing a highway. A comprehensive cost benefit analysis would take into consideration all costs including externalities, such as pollution, and loss of wildlife and open space. Therefore, cost benefit analysis is an appropriate tool for making development versus protection decisions. It has been widely used by the U.S. Army Corp of Engineers in decision making in dam construction and flood protection programs.

Cost benefit analysis is a decision-making methodology. It does not specify exactly how the costs are to be determined. The methodology has been highly controversial when applied to



natural resource decision making primarily because of a lack of agreement on how the costs of the loss of natural resources can be accounted for. Typically, cost benefit studies have used one or more of the other approaches described in this section in order to evaluate costs and therefore cost benefit analysis is not a complete substitute for other methods.

#### ECONOMIC IMPACT ANALYSIS

Economic impact analysis is a set of techniques for measuring the effect of specific economic activities on other parts of the economy. In the case of open space, the methodology should begin with the collection of data on those parts of the economy that are dependent upon open space and then making an assessment of the contribution of open space to that activity in dollars terms. The economic impact of that activity can then be estimated by the use of an input/output model of the state economy. Through the use of input/output models the indirect and induced effects can be characterized in terms of income, employment, and tax revenues.

Economic impact analysis has the advantage that it provides measures of economic activity in terms of income, employment, and taxes that are very relevant as a basis for public policy making. However, economic impact analysis is not in itself a decision-making tool, although it can be used as a comparative method for evaluating the merits of alternative courses of action.

In this study, economic impact methods were used to assess the economic importance of open space on the New Hampshire economy, mainly because the method provides the most relevant measure of the economic value of open space that is most easily understood by policy makers. A more complete description of the methods used is given in the following sections of the report.

#### DESCRIPTION OF THE METHODOLOGY USED

##### INTRODUCTION

Economic impact analysis is used to determine how a specific economic activity will affect the economy of a community, state, region, or nation in which the activity takes place. The usual measures that are used for this analysis are income, employment, and taxes paid. The expenditure of any business becomes the income of other businesses and individuals, which in turn is re-spent in the economy to provide more income for others. Thus any initial economic activity has a multiplier effect that ripples through the economy. Economic impact analysis measures these economic effects in the area where the activity takes place.

The method used in this report calculates the economic impact of open space related economic activities on the State of New Hampshire. The method is dependent upon statewide multipliers derived from IMPLAN, a national economic input/output model used



in this study.<sup>1</sup> Not all the impacts of an economic activity are confined to the home state. Purchases of fuel, raw materials, equipment, and services may occur out of state. Some purchases, such as fuel oil, may be imported, which means that there would be an economic impact abroad. The analysis presented here is limited to the economic impact in New Hampshire.

#### DIRECT EXPENDITURE AND EMPLOYMENT

The direct expenditure made by open space related economic activities is the sum of all the direct payments which are made by those activities, such as agriculture, forestry, tourism, recreation, and second home use. The expenditures made by the purchasers of these goods and services become the income of the producers. This includes salaries and wages paid to workers, payments to landowners, and profits or compensation to owners and managers. These data come from published and unpublished state and federal data, surveys, and industry sources. This is the primary input to the analysis. Some sectors of the economy, for example tourism and recreation, include economic activities, such as hunting and fishing, which are attributable to open space, and some, such as visiting museums, which are not. Therefore, the expenditure data must be adjusted so that only those activities that are directly related to open space are counted. This is discussed in the case of each sector.

The direct employment is the number of persons employed directly by those who receive the direct expenditure payments, including owners and managers. This information is obtained from the IMPLAN database that is derived from US Census data collected on all industries.

#### INDIRECT INCOME AND INDIRECT EMPLOYMENT

The term indirect income, as used in this analysis, is actually the sum of the indirect and induced income. It is composed of the sum of the expenditures made by the companies or individuals that act as suppliers to the sectors affected, plus the expenditures made by the employees of those businesses and their suppliers (induced income). These expenditures include such item as supplies, fuel, utilities, trucking, financial services, and the housing, transportation, retail, and other personal expenditures of employees. The estimates of indirect income are obtained by taking the direct expenditure and using the IMPLAN multipliers to determine the amount of indirect and induced income from each class of expenditure.

Indirect employment is the number of persons employed as a result of the indirect income generated by open space related economic activities. The number is derived by using the IMPLAN indirect employment multiplier expressed as the number of jobs per \$1 million of indirect income. The job estimates are provided for the same categories as indirect income.

#### STATE AND LOCAL TAX REVENUES

The actual amount of state and local taxes paid by open space related economic activities is very hard to estimate. The specific tax payments of individuals and businesses are usually

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<sup>1</sup>Palmer, C and E. Siverts, IMPLAN Analysis Guide, US Forest Service, Fort Collins Colorado, 1985



confidential. Tax estimates are made in two ways. In the first instance where there are specific data available, such as rooms and meals tax records and timber tax records, the data are used. The second method is to use state tax collection to income ratios, because in many cases it is impossible to calculate the actual state tax payments made by some industries. This method assumes the taxes paid by open space related economic activities are the same as the state average as a percentage of income. The average state tax rates are provided in the model.

#### USE OF THE IMPLAN INPUT/OUTPUT MODEL

This study uses the results of the IMPLAN input/output model in the form of a set of multipliers and expenditure fractions that have been calculated for each state. The IMPLAN model uses basic data on businesses that have been collected by the Department of Commerce for businesses by category. IMPLAN is an input/output model developed by the U.S. Forest Service for economic impact analysis of forest and natural resource based activities, although it has been used for many applications throughout the country. This model uses the IMPLAN 1995 structural matrices for New Hampshire<sup>1</sup>. These IMPLAN results are incorporated into a computer spreadsheet model that calculates the economic impacts.

Several of the limitations of economic impact analysis stem from the characteristics of input/output models. Nevertheless, input/output models are the only practical way of assessing the indirect effects of an economic activity. In this methodology, the input/output approach is combined with direct income in a hybrid assessment. This is necessary as open space related economic activity is not classified as a separate activity by the Department of Commerce.

The hybrid model is a computer model that takes the gross direct income in each applicable sector or sub sector (e.g. agricultural crops) and the percentage of the income in that sector attributable to open space to determine the direct income attributable to open space. The number of direct jobs and the indirect and induced income and jobs are then determined by the use of the multipliers derived from the IMPLAN model of the New Hampshire economy. The state and local tax revenues are in some cases directly available or are calculated using average tax rates in the model.

To illustrate the application of the model the example of the expenditure on ground transportation by tourists can be used. Based on sample surveys of visitors, the NH Travel Economics Report for 1996 estimates that visitors spent \$228,000,000 on ground transportation in New Hampshire. (See table 3 in this report). This includes all visitors, but the number that visit primarily for open space based activities can be estimated from the responses to a survey<sup>2</sup>. The survey asked what activities the visitor engaged in. In that survey approximately 42% indicate that they are participating in outdoor open space based activities.

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<sup>1</sup> Minnesota IMPLAN Group, IMPLAN Professional Users Guide, Minnesota IMPLAN Group Stillwater, Minnesota. 1997.

<sup>2</sup> Source: *New Hampshire Visitor Surveys 1997/1998*, New Hampshire Office of Travel and Tourism Development



Therefore \$95,760,000 of the total can be attributed to open space. Now using the IMPLAN multipliers the number of direct jobs can be estimated. The direct job multiplier is 11.7 jobs per million of expenditure which means that the direct jobs from \$95,760,000 of ground transportation is 1,122 jobs.

The spending of \$95,760,000 becomes the income of people working on ground transportation who in turn spend for their own needs creating further income for others. This is calculated by the total indirect and induced income multiplier derived from IMPLAN. The multiplier is 2.114 which means that \$95,760,000 of initial income from visitor spending becomes a total of \$202,436,000 in total income in the state. Similarly the indirect and induced jobs multiplier is 26.88 jobs per \$1 million of income which, when applied to an initial income of \$95,760,000 provides an estimate of 2,574 total direct and indirect jobs in the state. State and local taxes on the \$202,436,000 of income can be estimated at \$16,600,000 based on an average state income to tax ratio of 8 cents per dollar. This is an average estimate for the state. It does not imply that the 2,574 workers whose jobs are dependent on ground transportation spending will themselves pay that much tax.

#### THE LIMITATIONS OF ECONOMIC IMPACT ANALYSIS

Economic impact analysis can be helpful in policy making and planning, but it is not itself a decision-making tool. Policy makers must weigh the economic impact estimates along with other factors in making decisions. One important consideration is that the analysis only deals with impacts that are easily quantifiable in dollars or employment. Environmental, health, or social impacts are not normally assessed, even though they may have economic implications. Economic impact analysis also assumes linear relationships, or fixed coefficients, between changes in demand for products and services and the resulting changes in income and employment. It therefore does not take into account how specific businesses may increase their productivity over time, or with changing local circumstances. The analysis also assumes that the response to any incremental change in demand for goods or services is at the average rather than the marginal rate, which may not always hold true. Despite these limitations input output based economic impact analysis is the best tool available for estimating the economic effects of one or more specific economic activities on a state or regional economy.

#### ECONOMIC SECTORS AFFECTED BY OPEN SPACE IN NEW HAMPSHIRE

Open space supports the New Hampshire economy in two distinct ways. First, open space is the fundamental resource of the land based industries. The agriculture and forestry sectors of the economy are directly dependent on open space for the primary production of food and raw materials, and in turn the agricultural and wood products processing industries are dependent on the primary production. Second, open space is a key underpinning of the recreation and tourism economy. Open space, which includes lakes, farmland, forests, mountains, and wilderness, is one of the prime reasons why people visit New Hampshire as tourists. The recreation and tourism economy includes recreation-related expenditures by residents and non-residents. Furthermore, open space is a prime motivator in the selection of



New Hampshire for second homes. Therefore open space is the basis for agriculture, forestry and forest products, recreation and tourism, and second homes in New Hampshire.

This section provides a brief description of each of these economic sectors and their dependence on open space. Each section defines the limits of the economic sector that are considered in this analysis and the estimate of economic activity within each sector that is attributable to open space. In addition, this section describes other economic impacts of open space that cannot at present be quantified.

#### AGRICULTURE RELATED ACTIVITIES

Based on data provided by the New Hampshire Department of Agriculture the total sales of agricultural and horticultural products and services in the state in 1996/97 was \$413 million<sup>1</sup>. Some parts of the total can be attributed entirely to open space based activities, but in the horticulture sector greenhouses and landscaping are not open space dependent, by the definition used in this study. Greenhouse production is excluded, although some greenhouses are temporary over the ground structures, because the data are not available to distinguish between these types of production. Table 1 below shows the estimated gross sales and sales attributed to open space for the agriculture sector.

*Table 1 Agriculture Related Sales 1996/97*

Agriculture & Products	Gross Sales	% Open Space	Open Space Attributed Sales
Agricultural production	\$117,900,000	100%	\$117,900,000
Ornamental Horticulture	\$150,000,000	20%	\$30,000,000
Processed Agricultural Products	\$125,000,000	50%	\$62,500,000
Livestock and Poultry	\$20,500,000	100%	\$20,500,000
Total Agriculture Related	\$413,400,000	68%	\$230,900,000

For the purposes of this analysis, we attribute 100% of primary agricultural production and livestock production to open space. The processing of raw products into value added products such as apple cider, yogurt, or cheese in New Hampshire, using in-state produced raw materials, would probably not take place if there were no agriculture and so it can be considered to be open space based. The processing of food or fiber produced out of state is not included. Informal estimates indicate that approximately 50% of the agricultural processing by value is dependent on in-state production. In the ornamental horticulture sector it is estimated, very approximately and based on only anecdotal information, that about 20% of the total sales are open space based. The remaining 80% is from greenhouses or involves landscaping products and services. Horse rearing sales are not included because of a lack of any reliable data on this activity.

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<sup>1</sup> New Hampshire Dept of Agriculture, Markets and Food, Brochure including Summary Statistics of N.H. Agriculture, February 1997.



In 1996/97 the economic activity in the agricultural sector of New Hampshire is an estimated \$413 million with approximately \$231 million attributable to open space.

#### FOREST RELATED ACTIVITIES

The forestry sector of the economy has a set of production activities centered on the growing and harvesting of trees, and another set of production activities centered on adding value to forest products. For the purposes of this analysis, we consider open space to directly contribute to the forestry activities involving the growing, harvesting, and delivery of raw wood to processors and users. In addition, for the same reasons applied to the processing of agricultural products, the manufacturing of forest products such as lumber, plywood, and paper are considered also to be dependent on open space to the extent that the industry is primarily processing New Hampshire-grown wood. Thus, this analysis assumes that 100% of the economic activity involving forestry, logging, and trucking of raw wood and the manufacture of those raw materials into lumber, wood products, and paper products is attributable to open space.

*Table 2: Forest Related Sales and Transactions 1996/97<sup>1</sup>*

Forestry Related Activities	Gross Sales	% Open Space	Open Space Attributed Sales
Stumpage fees paid to landowners	\$36,900,000	100%	\$36,900,000
Timber Tax	\$4,100,000	100%	\$4,100,000
Logging & Trucking	\$63,814,000	100%	\$63,814,000
Syrup and Xmas trees	\$4,200,000	100%	\$4,200,000
Lumber & wood products	\$323,600,000	100%	\$323,600,000
Paper & Allied Products	\$765,600,000	100%	\$765,600,000
Total Forest Related Industry	\$1,198,214,000	100%	\$1,198,214,000

The forest related industries of New Hampshire are estimated to have total direct sales and transactions, totaling almost \$1.2 billion in 1996/97, of which over \$1 billion came from the manufacturing of wood and paper products. The manufacturing of furniture, cabinets, boats, and prefabricated building components is not included because they typically include significant amounts of material derived from out of state and are therefore not dependent on open space in New Hampshire. The sales of wood chips are included in the estimate but the added value of steam or electric power produced by burning wood chips is not included<sup>2</sup>.

#### TOURISM AND RECREATION

Tourism and recreation are a significant component of the New Hampshire's economy, second only to manufacturing in employment. Open space and its recreational activities

<sup>1</sup> Sources include the American Forest and Paper Industry Association, 1997, U.S. Dept of Commerce BEA Regional Economic Database and the NH Dept of Resources and Economic Development.

<sup>2</sup> The electric power produced by wood chips is a relatively recent activity and could easily be replaced with electricity derived from other fuels. The electric power is therefore not dependent on open space.



create an environment that attracts tourists to the state and is one of the major factors in maintaining the high level of tourist and recreational spending. Tourist spending in New Hampshire is almost twice the national average<sup>1</sup>. In 1996, tourists directly spent \$2.66 billion in New Hampshire<sup>2</sup>. According to visitor surveys, on average 42 percent of tourism is based on open-space activities in New Hampshire<sup>3</sup>. Using that percentage, it is estimated that \$1.05 billion of tourist spending is attributable to open space. In addition, some recreational activities are completely dependent on open space. Hunting, angling, and wildlife viewing, for example, generated \$685 million in direct expenditures in the state in 1996<sup>4</sup> of which 100% is attributable to open space. Tourism and recreation based on open space, including wildlife related recreation, had expenditures totaling \$1.73 billion dollars in 1996/97<sup>5</sup>. Approximately 42,000 direct jobs are attributed to these activities. Table 3 gives the breakdown of the direct spending in the tourism and recreation category and the percentage of that spending which is attributable to open space in each category.

Table 3: Tourism and Recreation<sup>6</sup>

Tourism & Recreation	Gross Sales	% Open Space	Open Space Attributed Sales
Eating & drinking	\$668,670,000	42%	\$280,841,400
Accommodation	\$312,480,000	42%	\$131,241,600
Wildlife Related Recreation	\$685,000,000	100%	\$685,000,000
Other Recreation	\$372,000,000	42%	\$156,240,000
Food Stores	\$206,460,000	42%	\$86,713,200
Other Retail Stores	\$443,610,000	42%	\$186,316,200
Ground Transportation	\$228,000,000	42%	\$95,760,000
Services & Other Transport	\$262,260,000	42%	\$110,149,200
State Rooms and Meals Taxes	\$84,400,000	42%	\$35,448,000
State Revenue Licenses & Fees	\$70,680,000	42%	\$29,685,600
Total Tourism & Recreation	\$3,178,480,000		\$1,732,261,600

Apart from the recreation industries themselves, the largest direct beneficiaries of open space based tourist and recreation spending are eating and drinking establishments, who receive

<sup>1</sup> Source: *Fiscal Year 1996 Travel Economics Report*, New Hampshire Office of Travel and Tourism Development

<sup>2</sup> Source: *Fiscal Year 1996 Travel Economics Report*, New Hampshire Office of Travel and Tourism Development

<sup>3</sup> Source: *New Hampshire Visitor Surveys 1997/1998*, New Hampshire Office of Travel and Tourism Development

<sup>4</sup> Source: U.S. Fish and Wildlife Service, *1996 National Survey of Fishing, Hunting and Wildlife Associated Recreation- New Hampshire*, U.S. Fish and Wildlife Service, Washington DC, May 1998.

<sup>5</sup> Total for all tourism and recreation from the source cited are higher than the numbers given in table 3 because the data used in this study have been adjusted to avoid double counting of wildlife related spending in overlapping data sources. The data sources for wildlife recreation are more current and comprehensive than for other outdoor recreation and may be considered more reliable. Other outdoor recreation source may have been slightly underestimated and recreation related retail expenditure in some cases is included in the general retail category.

<sup>6</sup> Spending categories are from *Fiscal Year 1996 Travel Economics Report*, New Hampshire Office of Travel and Tourism Development. The 42% open space dependent percentage is estimated from the *New Hampshire Visitor Surveys 1997/1998*, New Hampshire Office of Travel and Tourism Development.



over \$280 million per year. Hotels, motels and campgrounds receive \$131 million and general retail and food stores together had sales of \$273 million related to outdoor recreation and open space based tourism. In addition equipment sales, including guns and boats, to those engaged in wildlife related activities totaled \$367 million, which is included within the total of \$685 million wildlife related spending in Table 3.

#### VACATION AND RECREATION HOMES

There are over 60,000 rural vacation and recreational homes in New Hampshire making up approximately 11% of all the homes in the state<sup>1</sup>. Without the beauty of the open landscape, and recreational activities resulting from open space, the primary reasons why people buy second homes in New Hampshire would not exist. Therefore, the existence of vacation and recreation homes in New Hampshire can be considered to be directly attributable to the presence of open space. Hence, 100 percent of all economic activities from rural second homes have been attributed to open space.

*Table 4: Vacation and Recreation Homes*

Vacation and Recreation Homes	Gross Spending	% Open Space	Open Space Attributed Sales
Property Tax	\$234,012,000	100%	\$234,012,000
Real Estate Transfer Tax	\$4,401,000	100%	\$4,401,000
Real Estate Commissions	\$14,030,000	100%	\$14,030,000
Home Construction	\$75,340,000	100%	\$75,340,000
Utility and Maintenance Expenses	\$151,000,000	100%	\$151,000,000
Total	\$478,783,000	100%	\$478,783,000

The estimated value of vacation and recreational second homes is \$5.36 billion<sup>2</sup>. The economic benefits resulting from these second homes are given in table 4 above. Revenues from the spending of second-home residents when they are on vacation in New Hampshire are not included in Table 4 but the revenue is included in the tourism and recreation estimate in Table 3. The estimated 1996 value of the direct spending on second homes is \$479 million<sup>3</sup>.

#### OTHER ECONOMIC ACTIVITIES AFFECTED BY OPEN SPACE

Although the four sectors described above account for most of the economic activity in the state that can be directly attributed to open space, there are other important economic effects that can be indirectly attributed to open space. These include:

<sup>1</sup> Extrapolated from the *US Census Bureau 1990 Census of New Hampshire*.

<sup>2</sup> Based on an estimated 60,000 homes at average value of \$89,000.

<sup>3</sup> There is no current data available on the value or spending of second homes in New Hampshire. The estimate is based on the 1990 census data extrapolated to 1996/97 based on data from the US Census Bureau, the New Hampshire Department of Revenue Administration, the New Hampshire Association of Realtors, and the *Fiscal Year 1996 Travel Economics Report*, New Hampshire Office of Travel and Tourism Development.



- 1 Attraction of businesses to the state where the quality of life is an important factor for owners or employees.
- 2 Open space and a high quality environment make New Hampshire hotels and resorts attractive for conferences and other business activities.
- 3 Less traffic congestion resulting in fewer delays, lower transportation costs and lower insurance rates.
- 4 Open space and a high quality environment make New Hampshire an attractive location for retirement.

There are not sufficient data available to quantify most of these effects at present but they should be recognized as contributing to the economy.

### ECONOMIC IMPACT MODEL RESULTS AND CONCLUSIONS

The economic impact model is a hybrid model that uses data from published and unpublished sources to estimate the direct expenditures for each activity. These data are from the sources as described in the previous sections of the report. The percentage contribution from open space has been determined with reference to surveys undertaken by the state and federal governments. These data are combined with the IMPLAN input/output model that is used to estimate the indirect and induced effects of the initial direct expenditures from each activity. The implementation of the hybrid model is in the form of a spreadsheet that combines the data and the multipliers from running IMPLAN.

### RESULTS OF THE ANALYSIS

Using the direct expenditure estimates described for each sector above the model has been implemented to estimate the indirect and induced income, employment and tax revenues in New Hampshire. A summary of the results is presented in table 5 below.

*Table 5: Summary of the Economic Impacts Related to Open Space Activities in New Hampshire 1996/97*

	Gross Direct Income	Average % Attributed to Open Space	Attributed Direct Income	Attributed Direct Jobs	Attributed Direct & Indirect Income	Attributed Direct & Indirect Jobs	Attributed State & Local Tax Revenues
Agriculture Related	\$413,400,000	56%	\$230,900,000	3,669	\$376,915,800	5,467	\$30,907,096
Forest Related	\$1,198,214,000	100%	\$1,198,214,000	6,487	\$3,921,182,894	16,675	\$325,300,797
Tourism and Recreation	\$3,178,480,000	54%	\$1,732,261,600	41,661	\$3,067,152,265	64,002	\$249,417,502
Vacation Homes	\$478,783,000	100%	\$478,783,000	8,648	\$816,983,565	15,029	\$285,855,786
<b>Total</b>	<b>\$5,268,877,000</b>	<b>69%</b>	<b>\$3,640,158,600</b>	<b>60,465</b>	<b>\$8,182,234,524</b>	<b>101,173</b>	<b>\$891,481,182</b>



## CONCLUSIONS

Open space is a direct underpinning of four economic sectors: agriculture, forestry, tourism and recreation, and second homes used for vacations and recreation. For each sector the availability of open space is a significant factor, and often the critical one, in determining the income, jobs and taxes derived from those sectors. The economic impacts of open space are summarized in Table 5 above. The results of the analysis show that open space based economic activities contributed \$8.2 billion per year to the New Hampshire economy in 1996/97. This amounted to over 25% of New Hampshire's gross state product in that year. There were over 100,000 jobs dependent on open space. The open space based economy is larger than the whole tourist industry and it is second only to manufacturing in terms of both income and employment. With an estimated \$891 million in state and local revenue generated, the open space based economy provided over 35 % of the total state and local tax revenues in 1996/97<sup>1</sup>. The 5,265,000 acres of open space that cover 89% of the state<sup>2</sup> contribute to an average over \$1,500 per acre in direct and indirect state income. Some high value agricultural land, scenic areas, wildlife reserves, and lake front properties are especially valuable and contribute very much more to the economy.

### Agriculture Related

Agriculture related activities have annual gross revenues of \$413 million. Of this total, \$231 million, or 56% of the total revenue, is dependent on open space as defined in this study. Greenhouses, ornamental horticulture, landscaping, and the processing of food produced outside the state are not considered to be open space related. The total direct and indirect impact on the state economy is \$377 million and this sector generates over 5,400 jobs.

### Forest Related

Forestry based activities, including primary forest products, saw milling, and paper manufacturing, generate almost \$1.2 billion in gross revenues, all of which are open space based. When the indirect impacts are added, the total direct and indirect contribution to the state economy is \$3.9 billion making it the largest contributing sector in terms of total income. The forest sector generates over 16,600 jobs.

### Tourism and Recreation

Tourism and recreation spending by residents and visitors was almost \$3.2 billion in 1996/97, including associated eating, drinking and accommodation. Of the \$3.2 billion it is estimated that 54% of the total expenditure, or \$1.7 billion, is based on open space related activities such as hunting, fishing, bird watching, hiking, skiing, and camping. When the indirect impacts are added, the total direct and indirect impact on the state economy is over \$3 billion and the sector generates over 64,000 jobs.

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<sup>1</sup> Total state and local tax revenues were approximately \$2.4 billion in 1997. NH Dept of Revenue Administration.

<sup>2</sup> Source: U.S. Department of Commerce, *Statistical Abstract of the United States.1994.*



#### Vacation and Recreation Homes

Second homes in New Hampshire that are primarily for vacation and recreational use generate \$479 million in annual spending, all of which is open space related. This includes property tax payments, utilities, construction, repair, and renovation, but not the tourism or recreation related expenditures of the owners or renters, as these expenditures are included in the tourism and recreation sector. The total direct and indirect impact on the state economy is \$817 million and the sector generates over 15,000 jobs.

Overall the estimates in this study are conservative because they do not include the contribution of open space in attracting and retaining businesses and retirees, or the increase in property values that may occur in proximity to open space. The four sectors that have been quantified together produce \$3.5 billion in direct expenditures and generate a total direct and indirect impact of \$8.2 billion. Of this total about \$4.4 billion is generated by primary open space activity, such as agricultural crop production, timber production, and outdoor recreation. About \$3.8 billion is generated by secondary activities such as saw milling, paper manufacture, and agricultural food processing, based principally on New Hampshire-grown raw materials.

The magnitude of the contribution of open space to the state economy demonstrates how important open space is to the well being of the people of New Hampshire and why open space should be a continuing issue of public policy concern.

