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Why Life's Better Outdoors

The Economic Impact of South Carolina's Natural Resources

Division of Research

2009

Executive Summary

South Carolina is blessed with incredible natural bounty and beauty. Yet the natural environment offers more than striking views and memorable outdoor experiences. From the Upstate to the Low Country, the resource base is the state's greatest asset for business development, the "natural" complement to its labor force and entrepreneurial talent.

Imagine, for a moment, the character of South Carolina's economy if it were landlocked and barren. No doubt it would provide considerably less opportunity for the state's residents. South Carolina's economy would certainly be much more limited and radically different from the diversified economy of today. Undeniably, South Carolina stripped of its natural resources would be a significantly weaker competitive economic environment.

This study advances the view that well-managed natural resources are essential for economic development. In a time of economic uncertainty, South Carolina needs to promote development that can spread benefits to its diverse regions and businesses. The state needs a thriving recreation and tourism industry, along with forestry, mining, and many more activities that tie directly to the resource base. The state's natural resources make considerable economic opportunities possible, but they should not be taken for granted. Protecting and enhancing the state's natural resource base, while nurturing the continued growth of value-creating businesses, is essential.

This study documents the economic impact of activities associated with South Carolina's natural resources. Above all, the study finds that the economic activities most clearly tied to the state's resource base (not including agriculture) sustain $30 billion dollars in economic impact when measured in terms of annual state output—the total annual value of goods and services associated with natural resources related business activities. This total state impact supports 236,000 jobs.

Overall Economic Impact of Natural Resources on South Carolina

2008	Total
Labor Income	$7.8 billion
Employment	236,110
Total Impact	$29.1 billion

No doubt natural resources create more value than the impact numbers suggest. The natural environment is a primary attraction for skilled labor and more educated individuals who want opportunities for recreation for themselves and their families. Creative people tend to be mobile and look for

natural amenities. The value of these amenities is evident in their positive impact on the quality of life of South Carolina's residents. A higher quality of life means that residents are more likely to remain where they are, spend more of their time and money in the vicinity where they live, and will be less likely to move out of the region or state. Increasingly, scholarly research shows that talented people—the kind the state wants to retain—reside in places with quality natural resources-related amenities and recreation

opportunities.[1] Thus, well-managed natural resources provide a magnet for human capital.

A well-managed natural environment also produces a healthier population. Another illustration of how natural resources are essential for human resources and overall economic development.

While it is hard to put a value on all the ways natural resources contribute to South Carolina's economic development, it can be clearly shown than they support thousands of jobs, millions in income, and a permanent base for economic development that should last forever.

In sum, sustainable management of natural resources should be seen as crucial to South Carolina's overall economic development strategy. This implies that the state should carefully protect and promote the wise use of its extraordinary assets.

[1] This research builds on the work of Richard Florida, *The Rise of the Creative Class*, New York: The Perseus Books Group, 2002. See also D. McGranahan. Natural Amenities Drive Rural Population Change. Washington, D.C., U.S. Department of Agriculture, Agricultural Economic Report, (781) 199; and D. McGranahan and T. Wojan. "Recasting the Creative Class to Examine Growth Processes in Rural and Urban Counties. *Regional Studies*, 41(2):197–216, April 2007.

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Introduction

The Palmetto tree is the symbol of South Carolina. But the special natural environment that this tree depicts is more than just symbolic for the Palmetto state.

South Carolina's natural resources—its forests and soils, its rivers and marsh, its lakes and ocean—are the foundation for an immense amount of economic activity. Largely, this economic effect is taken for granted and is underappreciated.

The Division of Research, in the Moore School of Business at the University of South Carolina, conducted a study of the economic impact of South Carolina's natural resources. The purpose of this study is to evaluate the impact of natural resources and how they generate significant economic value. This perspective may help inform economic development policies at the local and state levels.

To assess the extensive impact of natural resources on the statewide economy, this study compiled business and economic information from a variety of sources. While the sources for the inputs are varied, the results may be placed into a consistent framework. In this way, for the first time, the state can begin to discern the role that natural resources play in South Carolina's economy.

This study shows that natural resources produce tangible economic benefits. In South Carolina, these contributions affect major sectors of the state's economy—manufacturing, mining, agri-business, tourism, and services.

The analysis covers the major contributions of South Carolina's natural resources to the economy. Because the economic effects of natural resources

are so varied, it is hard to capture all the impacts in a single framework. The natural resource base is not like a factory or a single service. Nevertheless, the contributions of natural resources can be broken down into five major areas of activity: (1) recreational boating, fishing, hunting and wildlife viewing; (2) a large part of the tourism market; (3) forestry; (4) mining; and (5) the recreational boat manufacturing industry.

The study finds that the economic impact of natural resources is considerable. The resource-related activities that can be quantified clearly produce measureable benefits for South Carolinians: paramount are employment and income that add immensely to the state every year. The main results are:

- Natural resources underlie approximately $30 billion dollars in annual economic output for the state. This total output represents the annual value of goods and services associated with natural resources related business activities.

- 236,000 jobs are tied to the business activities formed around the state's resource base.

The study's findings reveal that natural resources generate a wide variety of opportunities for economic development. Yet it is difficult to capture all the diverse ways that natural resources boost economic growth and employment. For example, the economic value of weather services is difficult to measure, but it provides crucial information to agricultural concerns and other private businesses throughout the state. All businesses use the state's water. Maintaining the integrity of the water supply has immeasurable value. In effect, this study evaluates the annual impact of economic activities related to resources—those that can be measured. These impacts are annual assessments or flows of economic activity (in this case for 2008).

Understanding Economic Impacts

The main objective of this study is to evaluate the size and impact of economic activities tied to the natural resource base of South Carolina. Economic impact studies assess the benefits of different activities by four metrics: economic output, value added, labor income, and employment. Each of these measures will be explained in this section, along with the modeling process used to quantify the impact numbers. This section also explains what is meant by the four economic impacts.

To understand impacts, the key idea is that economic effects of natural resources-related or other economic activities can be far-reaching when one takes the linkages between different sectors of the state's economy into account. That is, the economic activities related to natural resources spread economic benefits by means of a multiplier effect. Tourism-related businesses or mining, for example, hire workers and spend money in the local economy, and this leads to further income and spending. Thus, in the multiplier process, economic activities directly tied to the state's resource base are amplified as their spending and hiring in the local economy create multiple layers of income for other sectors. The economic multiplier is an accepted and widely practiced technique used to assess the total impact of regional business activities.

The basis for calculating economic impacts through the multiplier effect is an inter-industry or input-output model. Impact analysis entails calculating the extent to which direct activities stimulate further economic effects, spreading employment and income, so accounting for linkages among industries is essential. Based on a state input-output model, the results quantify the full effects of the cluster of business activities that have developed around natural resources.

To calculate the multiplier effects of natural resources, the University of South Carolina used an input-output model developed by the U.S. Department of Agriculture known as IMPLAN (IMpact Analysis for PLANning).

The IMPLAN model organizes the economy into 508 separate industries and has comprehensive data on every region of the United States. It is the most widely-used impact model for regional studies of this kind. IMPLAN's input-output model accounts for the linkages—including intermediate inputs and final consumer demand—that characterize the inner working of South Carolina's economy. IMPLAN has information for 508 industrial sectors (industries) that comprise South Carolina's economy. A set of equations accounts for all industry purchases of commodities, services, employee compensation, value added, and imports, which are, in turn, set equal to the value of the commodities produced in the state.

While input-output impact analysis requires advanced economic training to understand fully, the elements can be stated in straightforward terms. To arrive at total economic impacts, economists must first assess the initial effects of local payroll and purchases. These economic impacts are called *direct*. Subsequently, *indirect* and *induced* effects stem from the payroll and local purchases.

The direct, indirect, and induced effects are calculated for four separate economic measures: value added, labor income, employment, and the total economic impact (or output). In simple terms, these metrics are defined as:

Direct Impact: The effects of natural resources-based expenditures—local purchases and wages—that are injected into the state's economy.

Indirect Impact: The ripple effects of spending on in-state suppliers.

Induced Impact: The ripple effects of expenditures from wages.

- *Total Impact* (or Output). This is the contribution to overall economic activity. It measures the annual value of goods and services associated with natural resources-related business activities.
- *Value Added.* This is net contribution to the state's economy. It is similar to gross domestic product for the state.
- *Labor Income* (or Earnings). This is the contribution to wages and salaries.
- *Employment*. This is the total number of jobs associated with the measured economic activities tied to natural resources.

For each economic measure reported in the next section, direct, indirect, and induced impacts are given. Then the *total* impact (the sum of direct, indirect, and induced) is reported for each activity.

It should also be recognized at the outset that the impacts presented in the study do not measure the total state *wealth* represented by natural resources. The impacts measure the annual economic *activity* (measured for instance by employment or income) associated with certain resource bases like land (forestry) and water (fishing). It is not possible to evaluate the total stock or wealth of the state's resources (this has not been done in South Carolina or any other state).

Moreover, it is important to understand that the impacts given in this study will sometimes overlap with other approaches to analyzing the South Carolina economy. For example, impact studies of agriculture often include forestry. This study leaves farming outside of its purview, but does include forestry. This study also includes coastal tourism, which is part of the overall impact of tourism in South Carolina—which has also been estimated by previous researchers. It would be mistaken, then, to add impacts from other studies

together to get a total impact for the state. That would be double-counting. Nevertheless, it is legitimate to include all large sectors of the economy that can be traced to resources and offer a different perspective on state impacts than found in related studies.

Finally, it should be understood that the impacts calculated in this study provide a snapshot of natural resources based impacts—they capture the value of related activities at a point in time. In all cases, the impacts are calculated for 2008, the latest year for which complete data were available.

The Economic Impact Results

This section presents the results of the economic impact analysis. First, impacts for different types of natural resource activities are presented. These activities are:

1. Outdoor recreational activities, including recreational boating, fishing, hunting, and wildlife viewing along with coastal tourism.

2. Forestry

3. Mining

4. Boat Manufacturing

5. Commercial Fishing.

After presenting results for each of these activities, the total effects of all natural resources-related activities are summarized in one set of impacts.

1. Outdoor Recreational Activities

Natural resources are the basis for most recreational activities in South Carolina. Recreation resources must be managed and maintained and the South Carolina Department of Natural Resources supports these activities as a primary mission.

Recreational activities in South Carolina are diverse, as can be seen in Tables 1 and 2, which identify the participation of South Carolinians (age 12 or older) in outdoor recreation. The data are derived from South Carolina Department of Parks, Recreation and Tourism's periodic survey of the South Carolina public.

Table 1: South Carolina Recreation Participation Trends: Percentage Participating in Recreational Activity (Six Highest Participation Rates)

Beach swimming/sunbathing	62.5
Freshwater fishing	37.2
Visiting an unusual natural feature	34.7
Motor boating	34.1
Watching wildlife	33.4
Lake/river swimming	28.0

Source: South Carolina Department of Parks, Recreation, and Tourism *2005 Recreation Participation and Preference Study*. Columbia, SC. 2005.

Table 2: Total Participation in Recreational Activities (Number of Times) by South Carolinians Age 12 and Older: Six Highest Estimated Participation (trips) 2005

Bird watching	58,243,603
Watching wildlife	46,093,331
Beach swimming/sunbathing	24,547,789
Motor boating	19,850,155
Freshwater fishing	16,247,458
Lake/river swimming	11,726,426

Source: South Carolina Department of Parks, Recreation, and Tourism *2005 Recreation Participation and Preference Study*. Columbia, SC. 2005.

1.1 Outdoor Recreational Impacts: Fishing, Hunting, Wildlife Viewing

In South Carolina, a major part of outdoor recreation centers on fishing, hunting, and wildlife viewing. Consider the economic impact of a large segment of natural resources-based recreation: fishing, hunting, and wildlife viewing. The Department of Natural Resources supports, maintains, and enhances these activities as a primary mission.

Table 3: Fishing, Hunting and Wildlife Viewing: Economic Impact

2008	Direct	Indirect	Induced	Total
Value Added	$1,341,344,566	$324,191,903	$525,872,930	$2,191,408,400
Labor Income	$897,822,911	$187,818,817	$270,028,932	$1,355,670,661
Employment	44,672	5,205	8,660	58,537
Output	$2,310,822,440	$590,567,967	$892,762,984	$3,794,151,390

1.2 Outdoor Recreational Impacts: Coastal Tourism

In addition to fishing, hunting and wildlife viewing, many visitors and local residents take advantage of South Carolina's most famous recreational asset—its miles of sandy beach and ocean surf stretching from the Grand Strand to the Low Country. The tourism impacts shown in Table 4 do not include historic tourism (Charleston, for example). The state value added (gross domestic product) from coastal tourism amounts to approximately $3.5 billion, supporting 81,000 jobs. Total output and value added impacts are given as well.

Table 4: Coastal Tourism: Economic Impact

2008	Direct	Indirect	Induced	Total
Value Added	$2,175,917,712	$525,611,037	$800,411,667.8	$3,501,940,417
Labor Income	$1357208542	$295,208,228	$411,000,802	$2,063,417,573
Employment*	60,399	8,119	12,466	80,984
Output	$4,684,866,174	$1,002,277,617	$1,358,850,668	$7,045,994,459

Source: Estimated based on "The Economic Impact of Travel on South Carolina Counties 2007"

It can be seen so far that just one aspect of natural amenities—recreational amenities—produces substantial economic benefits. Whether coastal tourism,

hunting, fishing, or wildlife viewing, recreational amenities create more value than the impact numbers suggest. Increasingly, educated people—the kind the state wants to retain—want to reside in places with quality natural resources-related amenities, recreation and the using of these natural resources. Amenities are those attributes that make living and working in a region more pleasant. Unlike regular consumer goods purchased at a department store, the consumption of outdoor recreation and natural amenities often is provided for or falls under the protection of a local, state, or federal government or other regulatory body.

The beaches and mountains, for example, help attract and retain skilled workers in the state. Quality of life factors are increasingly important factors in the competition to recruit and retain entrepreneurs and skilled workers.

The impact of natural amenities was confirmed in recent research conducted by the University of South Carolina, looking at the location choices across all U.S. counties by U.S. inventors (clearly part of the creative class). A natural amenities index, developed by David McGranahan of the U.S. Department of Agriculture, was used to capture those natural characteristics that could enhance a U.S. county's attractiveness as a place of residence. Ventura County, California, scores the highest on the natural amenities index. This variable consistently explains where inventors choose to live, in line with findings in other studies of the creative class by researchers like David McGranahan and Richard Florida.[2] The results hold true for both urban and rural counties.

[2] Johnathan Munn, Paulo Guimaraes, and Douglas Woodward, "Location Choices of Independent Inventors," Division of Research, Moore School of Business, Working Paper, 2009. These findings reinforce those found in D. McGranahan and T. Wojan. Recasting the creative class to examine growth processes in rural and urban counties. *Regional Studies*, 41(2):197–216, April 2007.

Further, in addition to the local jobs and income generated by the process of recreation spending in South Carolina, it is known in economics that these amenities engender a surplus for consumers in terms of economic value. This consumer surplus is the difference between what consumers would be *willing* to pay for amenities like beaches and lakes and what they actually pay to enjoy them. National surveys have estimated the surplus economic value that consumers place on different types of recreation—including camping, fishing, hunting, wildlife viewing, hiking, and swimming—amounts to tens of billions of dollars, if not more. For South Carolina, similar estimates would surely show the economic value of natural resources to run in the billions, beyond the impacts identified in this study.

2. Forestry

The forests of South Carolina provide the basis for a renewal and sustainable set of economic activities. This segment of the state's natural resources base has been studied elsewhere, and the results presented here confirm these impacts are large for 2008.

The impact of forest products (forestry, logging, primary wood products and furniture manufacturing) on South Carolina's economy is over $17 billion annually. It ranks as one of the most significant value-producing parts of the state's manufacturing sector.

In direct terms, the state's forestry industry ranks first in employment among South Carolina's manufacturing sectors, employing approximately 36,000 individuals. When the global economy is strong, South Carolina annually exports over $1 billion in forest products. Overall, forest product exports have grown in this decade until the recession of 2008-2009. These exports are poised to return to significant growth with a global recovery.

For 2008, the forestry impacts are given in Table 5. It can be seen that forestry has an immense impact on South Carolina, including more than 83,000 jobs.

Table 5: Forestry Economic Impact

2008	Direct	Indirect	Induced	Total
Labor Income	$2,180,063,000	$1,087,402,000	$701,402,000	$3,968,867,000
Employment	36,365	26,094	21,366	83,824
Output	$10,790,000,000	$4,057,408,000	$2,292,836,000	$17,140,244,000

Source: The Economic Impact of the Agribusiness Industry in South Carolina, 2008

3. Mining

Mining actvities, including quarrying, are spread throughout South Carolina. This is a consequence of the state's endowment of varied, useable resources embedded in its land.

South Carolina's mines and quarries extend to every region of the state and can be found in both urban and rural areas. This economic impact can be seen in Table 6. In 2008, mining proved to be a major driver of the South Carolina economy, with $218 million in value added and more than 2,500 jobs linked to the industry through direct, indirect, and induced effects.

Table 6: Mining Economic Impact

2008	Direct	Indirect	Induced	Total
Value Added	$146,160,135	$23,120,680	$49,429,710	$218,710,525
Labor Income	$88,399,575	$13,648,195	$25,383,380	$127,431,150
Employment	1,449	320	789	2,558
Output	$264,777,040	$45,223,145	$83,915,315	$393,915,500

Source: Estimated based on Employment data from *Bureau of Labor Statistics*

4. Boat Manufacturing

The economic ramifications of the South Carolina natural resources base extend to manufacturing. For a strong manufacturing industry to thrive, it is often critical to have a local demand base[3]—as South Carolina does with boating—the result of its abundant rivers, marshs, lakes, and ocean access. The boat-building industry has built on this local base and is now a major national player in boat building. The manufacture of boats in 2008 generated more than 9,500 jobs for the state and subtantial additional benefits, as shown in Table 7.

[3] See Porter, M. E. 1990, *The Competitive Advantage of Nations.* New York: The Free Press.

Table 7: Boat Building Economic Impact

2008	Direct	Indirect	Induced	Total
Value Added	$238,480,532	$59,871,255	$98,124,181	$396,475,980
Labor Income	$169,376,459	$33,196,887	$50,385,467	$252,958,816
Employment*	7,125	875	1,528	9,546
Output	$404,344,731	$103,204,477	$166,584,412	$674,133,609

5. Commercial Fishing

In recent years, South Carolina has witnessed a transformation in commerical fishing, long a part of its natural resources-based economy. The state was long known for its shrimping industry. The commercial fishing business helps keep alive the unique character of South Carolina's local seafood-based cuisine. Today, commerical fishing includes a growing aquaculture industry, where new techniques have opened opportunities for businesses throughout the state.

During 2008, commercial marine fisheries in South Carolina accounted for $16.7 million in revenue. This value is usually understood to be "ex-vessel," i.e., the price paid by the first wholesale dealer to purchase the product(s). In South Carolina, the major fisheries are shrimp, shellfish, crabs, and offshore finfish. The impact of the state's fishery activity is shown in Table 8.

Table 8: Economic Impact of Commercial Fisheries on South Carolina

2008	Direct	Indirect	Induced	Total
Value Added	$5,280,771	$3,892,248	$4,879,538	$14,052,557
Labor Income	$7,212,061	$2,861,543	$2,505,578	$12,579,182
Employment*	521	64	76	661
Output	$17,565,179	$8,090,788	$8,283,942	$33,939,909

Overall Economic Impact of Natural Resources

The five major activities accounted for in this study can now be summarized. Consistent results for each activity can be tabulated for labor income, employment, and the total impact (this was not possible for value added since impacts are not available for forestry). These results are shown in Table 9.

From Table 9, it can be seen that the natural resources base supports $29.1 billion in total economic impact, supporting 236,110 jobs and $7.8 billion in labor income. As the economy recovers and expands in the years ahead, these impacts will grow larger.

Table 9: Overall Economic Impact of Natural Resources on South Carolina

2008	Direct	Indirect	Induced	Total
Labor Income	$4,700,082,548	$1,620,135,670	$1,460-706,160	$7,780,924,382
Employment	150,531	40,677	44,885	236,110
Total Impact	$18,472,375,564	$5,806,770,994	$4,803,232,321	$29,082,378,867

Summary and Conclusion

South Carolina is a land of incredible natural bounty and beauty. Protecting and enhancing South Carolina's natural resources base while nurturing the continued growth of value-creating industries is a challenging endeavor. Stewardship promoting the natural resources base should play a key role in South Carolina's economic development policy.

In a time of economic uncertainty, South Carolina needs to marshal all its resources to promote development that can spread benefits to its diverse regions and businesses. It needs a thriving recreation and tourism industry, forestry, mining, and more. Its natural resources make these economic

opportunities possible.

This study reveals that natural resources produce almost $30 billion in tangible economic benefits for South Carolina. These benefits include forestry, mining, recreational fishing, hunting and wildlife viewing, a large part of the tourism market, and the recreational industry.

The study has shown how natural resources support spending, leading to jobs and labor income, or payroll. Natural resources support 236,000 jobs, more employment than any other state asset—that is, along with its other major asset, an educated work force. These two resources are complementary. On the one hand, it is crucial that the state raises its labor force quality through greater educational attainment. But the state must also retain its educated population, which will be assisted by maintaining the integrity of its natural resources.

In addition to creating jobs, natural resources help preserve human capital. Since educated people tend to be mobile, amenities and human capital go hand-in-hand.[4] A pro-resource agenda can complement the education-equals-economic growth agenda. In particular, natural resource amenities exert a positive impact on residents' quality of life. A higher quality of life means that residents are more likely to remain where they are, spend more of their time and money in the vicinity of where they live, and will be less likely to move out of the region or state.[5] Keeping residents and their recreation-related expenditures in state provides benefits to service-related businesses in South Carolina.

It should be emphasized that the natural environment is also the key to health. Academic studies find that individuals, both children and adults, benefit considerably from contact with nature.[6] Preserving natural resources, then, is

[4] This statement follows from the extensive work done by Richard Florida and others, including the Division of Research (cited earlier in this study) on the location choices of educated, creative, and talented people.
5 For more on the importance of quality of life and amenities, see Shapiro, J. M. (2006), .Smart cities: Quality of life, productivity, and the growth effects of human capital., *The Review of Economics and Statistics* 88(2), 324.335.
6 See Taylor, Andrea Faber, Kuo F. and Sullivan WC., Coping with ADD: The Surprising Connection to Green Play Settings. *Environment and Behavior*, Vol. 33 No. 1, January 2001: 54-77; Taylor, Andrea Faber and Kuo F. Is Contact with Nature Important for healthy child development? State of the evidence. In C. Spencer & M. Blades (Eds.) *Children and Their Environments*. (pp. 124-140). Cambridge. UK: Cambridge University Press;, Howard and Louv R. The Powerful Link Between Conserving Land and Preserving Health. Land Trust Alliance Special Anniversary Report 2007, July 1. http://www.childrenandnature.org/news/detail_print/168/ ; Wells, Nancy M. At Home With Nature: Effects of "Greenness" on Children's Cognitive Functioning. *Environment and Behavior*, Vol. 32 No. 6, November 2000 775-795.

not just an economic boon, but should be part of the state's public health strategy as well.

In sum, the overall value of natural resources is immense. Accordingly, natural resources should be always considered integral to economic development. The state's strategy should focus on the wise business use of natural assets and enhancing the state's quality of life. Indeed, natural resources should be central not just to South Carolina's economic policy, but to local and regional economic strategies as well.