Linkages Between Natural Resources and Economic Development

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The State of Georgia has one of the fastest growing populations in the United States. The rapid population growth is attributable primarily to extensive commercial and industrial development in the Atlanta metropolitan area. While dependency on agricultural employment has declined during the 1980s (USDA, Economic Research Service), agriculture continues to contribute to population growth and stability in the state's rural areas.

A major factor contributing to economic growth in Georgia is the quantity and quality of the state's natural resources. The state's water resources, for example, support agricultural, commercial, and industrial development by providing a needed input into production processes. Water resources also contribute to economic development in the state by providing enough water for domestic and recreational use. Reliable sources of water for such use increases the overall quality of life in Georgia making the state more attractive to individuals and industries. Water and other natural resources also provide opportunities for the development of recreational and tourism-based industries that directly contribute to the economic growth of the state, and to the development of localities throughout the state.

In recent years, concern has surfaced in various forums for the deteriorating natural resource base in the State of Georgia. Much of the focus has been on the diminishing quantity and quality of water supplies. In North Georgia, discussion centers on the decreased quantity of water supplies caused by increased consumption of water for multiple, often competing uses. In South Georgia, attention is on water quality issues as research findings have increased public awareness of groundwater aquifer pollution caused by agricultural, commercial, and industrial chemical use.

This paper presents a case study of the linkages between natural resources and economic development in Georgia. Natural resources including mountains, lakes, rivers, wetlands, and ocean beaches support a growing

recreation and tourism industry in Georgia. We conducted a study which used an input-output model to estimate the economic development impacts of Unicoi State Park on Georgia. The methodology and results of this case study provides insight into the measurement of economic impacts of resource-industries and the size of these impacts for resource-based industry, recreation, and tourism.

Study Area

Unicoi State Park is in the northeast Georgia mountains. The park itself offers abundant natural resource-based activities including hiking, picnicking, camping, fishing, and lake swimming. In the immediate area, additional natural areas are available for hiking, camping, fishing, hunting, canoeing, kayaking, rafting, sailing, and motor boating. Because of its excellent attractions and facilities, including a modern lodge and cabins, Unicoi State Park is a popular travel destination for both in-state and out-of-state residents.

The economic development impact of visitations to Unicoi State Park was estimated for two regions: 1) a multicounty local region surrounding the park; and, 2) the entire state of Georgia. The local region surrounding the park was the county where the park is located plus all contiguous counties: White, Lumpkin, Hall, Banks, Habersham, Towns, and Union Counties.

Methodology

To estimate the economic development impact of visits to Unicoi State Park, it was first necessary to estimate the mean payment per person per visit to the park. Data for estimating expenditures was obtained from the Public Area Recreation Visitors Study (PARVS). PARVS is a nationwide study coordinated by the U.S. Forest Service. It was designed to collect data on the importance of, and impact of, public recreational areas (Cordell et al.).

PARVS data was collected at Unicoi State Park by Georgia Department of Natural Resources (DNR) personnel. Throughout the summer of 1986, enumerators conducted random on-site interviews of visitors as they exited the park. Data was collected on travel patterns, on-site activity, and annual recreation participation and patterns. At the end of the on-site interview, visitors were asked to fill out a detailed expenditure questionnaire.

The expenditure questionnaire was sent to all visitors who were interviewed on-site and who agreed to complete the questionnaire (about 95% of those contacted). The mail survey asked visitors to report expenditures in four groups: 1) trip-related expenditures made at their home either before

or after the trip, 2) expenditures made while traveling to the park and on the return trip home, 3) expenditures made at the park or in the immediate vicinity of the park, and, 4) annual expenditures on outdoor recreation equipment. Expenditures in the different categories were combined to estimate mean expenditure per person per trip (Propst; Propst et al.; Watson and Bratcher). Mean expenditure per person per trip were combined with annual visitation estimates provided by the Georgia DNR to estimate annual recreational expenditure.

We estimated the economic development effects of annual recreational expenditure associated with visits to Unicoi State Park. We used the IMPLAN modeling system developed by the U.S. Forest Service. The IMPLAN modeling system is composed of a county-level data base and modules for constructing and implementing an input-output model for a user designated region (Palmer and Siverts). The IMPLAN data and modules were used to construct a non-survey based input-output model of the local and state impacts of Unicoi State Park.

The IMPLAN input-output model estimates the economic impact of a change in final demand for goods and services produced in a region. Expenditures by visitors to Unicoi State Park who live outside of the local or state impact region represent exogenous changes in final demand for goods and services produced in the Unicoi State Park, local, and state impact regions, respectively. Not all expenditures by out-of-region visitors occur in the impact region of interest. Thus, only a portion of the total expenditures by out-of-region visitors was assigned to the impact region. Standard procedures developed by cooperating PARVS researchers were used. The procedures to determine the expenditure assigned to the impact region are described in detail in several sources (Bergstrom et al. 1989; Bergstrom et al. 1990; Propst; Propst et al; Watson and Bratcher).

Before estimating economic development impacts, it was also necessary to allocate recreational expenditures occurring in a region to IMPLAN economic sectors located in the region. This allocation was based on an algorithm developed by cooperating PARVS researchers (Bergstrom et al. 1989; Bergstrom et al. 1990; Propst; Propst et al.; Watson and Bratcher). The algorithm, for example, assigned gasoline expenditures by recreational visitors to the following IMPLAN economic sectors: petroleum refining; lubricating oils and greases; petroleum and coal production; rail, motor freight, water, air, and pipe transportation; other wholesale trade; and other retail trade.

After total expenditures were allocated to IMPLAN economic sectors in the proper region, the direct, indirect, and induced regional effects of

these expenditures were estimated using the IMPLAN input-output model. We estimated the direct, indirect, and induced effects for seven economic indicators: total gross output, employee compensation, property income, total income, indirect business taxes, value added, and employment. Total income is the sum of employee compensation and property income. Value added is employee compensation and property income, plus indirect business taxes (Palmer and Siverts).

Results

A total of 52 usable expenditure questionnaires were returned for an effective response rate of 22 percent. From these observations, mean expenditure per person per trip was $36.26. According to the Georgia DNR, annual visitation to Unicoi State Park in 1986 was 1.12 million. About 83 percent of the visitors were from outside the local impact region, and 38 percent were from out-of-state.

The direct effects, indirect effects, induced effects, and total effects (sum of direct, indirect, and induced effects) of recreational spending generated by Unicoi State Park on the local and state impact regions are shown in Table 1. Recreational spending had a considerable positive economic impact on the Unicoi State Park local and state impact regions. For example, in 1986, recreational spending supported over $14.4 million in total income and 1,435 jobs in the local impact region. In the state impact region in 1986, estimated recreational spending supported $14.8 million in total income and 822 jobs. Total gross output, total income, and employment multipliers for the local and state impact regions are shown in Table 2.

Summary and Conclusions

In the United States and the State of Georgia, there is a growing interest and concern over the linkages between natural resources and economic development. The challenge to society is to find ways to promote desired levels of economic growth and development, while protecting a strong and healthy natural resource base. In Georgia, steps have been taken in this direction as a result of activities associated with the Governor's Growth Strategies Commission. A basic need remains to develop improved techniques for testing the linkages between natural resources and economic development.

In this paper, we used an input-output model to measure the economic development impact of visits to a Georgia state park. More research is needed to expand input-output modeling systems such as IMPLAN. We must account for the full set of linkages between the natural resource base, natural resource inputs, production processes, and wastes. Additional re-

Table 1.
Local and State Economic Development Impacts of Visits to Unicoi State Park, Georgia, 1986, (Million $).

	Direct effects	Indirect effects	Induced effects	Total effects
Total gross output				
Local	21.19	4.39	7.56	33.14
State	19.57	5.37	10.90	36.20
Employee contribution				
Local	6.11	1.33	2.31	9.75
State	5.32	1.52	3.04	9.88
Property income				
Local	2.43	.60	1.59	4.62
State	1.73	.95	2.26	4.94
Total income				
Local	8.54	1.92	3.90	14.36
State	7.05	2.48	5.30	14.83
Value added				
Local	9.71	2.03	4.43	16.17
State	8.02	2.66	2.66	16.66
Employment (jobs)				
Local	11185.19	76.83	173.25	1435.27
State	542.41	80.91	198.96	822.28

Table 2.
Regional Economic Multipliers for Expenditures Associated with Visits to Unicoi State Park, Georgia, 1986.

	Total gross output	Total income	Employment (jobs)
Regional economic multiplier			
Local	1.56	1.68	1.21
State	1.85	2.10	1.81

search also is needed to develop policies and institutions which promote the multiple aims of economic growth and development, natural resource base protection, and the enhancement and maintenance of a high overall quality of life.

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