

Linking Outdoor Recreation and Economic Development: A Feasibility Assessment of the Obed Wild and Scenic River, Tennessee

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Introduction

Rural economies in many parts of the United States have undergone significant changes over the past two decades. Faltering economies historically based on traditional economic sectors like agriculture and manufacturing are transitioning to retail and service sectors to support growth. One example of such an industry is resource-based recreation and tourism. Tourists seeking natural resource-based recreation opportunities have affected rural economies by injecting new dollars into local businesses, supporting local tax bases, and creating increased demands for locally available land, labor, and capital. Tourist expenditures create local demands for traded goods and services, thus creating jobs and income for local residents.

Resource-based recreation as an approach for rural economic growth is attractive for many reasons. It changes the aesthetic and environmental qualities of the local community minimally. Often it improves the environment in the area by relying on the natural resource for growth and ensuring little industrial development. A program for economic growth in recreation is relatively easy to initiate as well. Recreation can also contribute to rural quality of life and income redistribution.

Recent studies question the overall effectiveness of economic growth experienced in these recreation-dependent counties, however. While these counties have experienced higher population growth and higher mean incomes, the percentage of residents in poverty has not changed between recreation-dependent and -independent counties (English et al. 2000). This phenomenon is likely due to two factors. First, a lack of income distribution caused by seasonal migration from urban areas, leads to higher overall mean incomes but little effect on the resident population. Second, jobs associated with recreation and tourism typically are seasonal, low paying jobs that often offer no benefits. In addition, recent research suggests that rapid demographic shifts influence the probability of local government fiscal problems (English et al. 2000). For example, local government revenue sources in areas with substantial population shifts are not likely to change as rapidly as the demand for services (Brown and Glasgow 1991). Thus, the potential for local government fiscal problems may be quite high in recreation-dependent counties given they are among the fastest growing of all nonmetropolitan counties.

Located on the junction of East Tennessee's Cumberland Plateau and Cumberland Mountains, Morgan County lies at the heart of the Emory River Watershed; one of the most spectacular and ecologically diverse watersheds in the Southeast. With only 20,000 residents in an area of 522 square miles, Morgan County has remained largely undeveloped, leading to magnificent scenery and abundant recreational opportunities.

To the east of Wartburg lies Frozen Head State Park. Frozen Head contains over 11,000 acres, a visitor center, picnic area, campground, and recreational facilities. Numerous hiking trails include an 8-mile trek to the top of Frozen Head Mountain. Another nearby area is 3,600-acre Lone Mountain State Forest, which offers numerous opportunities for outdoor recreation, including a 12-mile trail for horseback riding, hiking, and mountain biking. Morgan County is also home to the Cumberland Trail State Park, Tennessee's first linear state park. The trail runs through parts of Frozen Head, Bird Mountain, Wartburg, and to the historic Nemo Bridge on the Emory River. To the west of Wartburg lies the Obed Wild and Scenic River (OWSR). This national park unit was established in 1976 to preserve and protect portions of the Obed River, Clear Creek, Daddy's Creek, and the Emory River. Sheer sandstone cliffs surround the streams in gorges up to 500 feet deep creating a spectacular playground for rock climbers, whitewater boaters, swimmers, fishermen, and hikers. The Obed receives more recreation visitation than any other area in the county, predominantly by rock climbers and whitewater boaters.

While the rural, isolated nature of Morgan County has protected its scenic beauty and small-town charm, these characteristics have also posed significant obstacles to economic development. The county experiences an above-average unemployment rate in the state and has recently suffered from the loss of two major industries. A lack of employment opportunities leads many of the county's young people to leave their communities to pursue careers elsewhere. These circumstances have led many local leaders to consider resource-based recreation as a form of economic development.

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Beautiful scenery, a diverse set of recreational opportunities, and a friendly small-town atmosphere make it a natural fit. Indeed, thousands of tourists are already coming to Morgan County each year, but most communities have yet to augment their tax bases from these visitors. Many of the components of a thriving recreation-based tourism economy are either missing from the county or could be substantially improved. Residents and the local business community are grossly unaware of the potential for businesses that cater to these recreational visitors leading to missed opportunities and lost revenue as recreational visitors spend their money in neighboring counties.

Methods

In order to address the feasibility of economic development based on recreation and tourism in Morgan County, a set of related questions was addressed. First, what is the current and potential economic impact of resource-based recreation and tourism in the county? Due to the variety of recreational opportunities, attention was focused on rock climbing and whitewater boating in the Obed Wild and Scenic River, the two most popular forms of non-resident recreation in the county. Rural development research treats recreation and tourism as export activities (Dawson et al. 1993). That is, increases in exporting goods and services to nonresident visitors results in economic growth and development. Because the majority of participants in these forms of recreation are non-residents, participation in these activities brings money into the county. In order to determine the economic impact of these two activities, survey instruments were developed and administered that determined use estimates, user demographics, and expenditures. Trip expenditures were used in a standard travel cost methodology to model trip taking behavior as well as estimate the value placed on these forms of recreation. Trip expenditures were also used to identify trends in spending behavior both in categories (lodging, food and beverage, entertainment, etc.) and in location (amount spent in Morgan County).

The second question that was addressed was: "What sort of infrastructure improvements are needed in Morgan County to support a resource-based recreation and tourism industry?" This is to be accomplished through additional survey efforts. Recreational survey respondents have been provided with a follow-up post card survey that queries the types of businesses and amenities that would improve their recreational trip to Morgan County. In this way, infrastructure improvements are identified by the individuals at whom the improvements are aimed. These responses are linked with recreational economic impact estimates to determine the extent to which these improvements should be undertaken as well as the rate the improvements should occur. At this time, we are in the process of sending out these post card surveys to the rock climber survey group. Post card surveys for the whitewater boating group will be administered following the completion of the initial portion of this survey in June 2004.

The third question that was addressed was what input do residents and other interested parties have in the development of a resource-recreation and tourism industry. In order to start a collaborative decision process, a small group of selected individuals was invited to participate in discussions concerning economic development and the role that resource-recreation may play in that development. The Emory-Obed Forum was established in February of 2003. This group of residents, business owners, local political figures, and elected officials along with representatives from the National Park Service (NPS) and the National Parks and Conservation Association (NPCA) meet regularly to assess the potential of resource-based recreation and tourism in Morgan County. Participatory planning and focus groups will be used to gather ideas from residents on topics ranging from new businesses to marketing. The use of these procedures to secure ideas insures that residents are educated and involved in the development process. These focus groups hope to produce a strategic action plan sometime in 2005.

Survey and Sampling Methodology

A visitor interview and a take-home survey were designed for this study. To ensure that the questions elicit answers to the intended purpose, the interview and survey instruments underwent an extensive pre-testing procedure. Rock climbing surveys and interviews took place over a 12-month period from November 1, 2002 to October 31, 2003 and were disaggregated into 7 recreation sites that were divided into 3 survey units. The recreation sites in this area include private lands, Nature Conservancy holdings, and National Park Service lands. The research team contacted visitors at the climbing access points within the OWSR and administered a short (< 2 minutes) interview to identify where they are climbing, the duration of their visit, and their place of residence. At the end of the on-site interview each climber was asked if they would complete a more detailed survey and return the completed survey via mail. If they agreed to complete the survey, they were given a packet with a cover letter reiterating the purpose of the study, a survey form, and a return envelope with postage attached. Three hundred and two interviews of rock climbers were conducted and, 292 agreed to complete the mail survey. Of those 292, 140 returned the survey for a response rate of 48%.

Survey and pre-testing procedures used in the rock climbing survey were similar to those used in the whitewater boating survey. Due to the length of the whitewater season in the OWSR, survey will be conducted over a six-month period from December to May over the course of the 2003 and 2004 seasons. To date we have interviewed 63 whitewater

boaters at the OWSR. Of those 63, 43 have returned the take-home portion of the survey for a response rate of 68%. The survey process followed procedures similar to those outlined by Dillman (2000).

Following the completion of the survey, results were mailed to all survey participants. These results were accompanied by a post card survey that included return postage. This additional survey summarized Morgan County's desire to become a resource-recreation destination. Respondents were asked what type of businesses and amenities could be supplied that would have made their recreational experience more enjoyable as well as what factors limited the duration of their recreational trip to the area. This portion of the study is still underway.

Travel Cost Method and Model Specification

The travel cost method is the most widely applied nonmarket valuation technique to model recreational trip taking behavior and to estimate welfare. According to basic welfare theory, the value of a good or service is based on the relationship between the demand for the good or service and its price. In this case the number of recreational trips taken would represent the demand. However, there is no clear price for a rock climbing or whitewater trip as there would be for other goods and services. The premise of the travel cost method is that travel costs are considered a proxy for the price of a recreational trip. These travel costs can include things such as gas, lodging, food and beverage, and equipment purchases.

Poisson regression techniques were used to model the demand for rock climbing and whitewater boating trips at the OWSR. The model estimated has a Poisson distribution with the general specification being:

$$Y_i = \exp(\text{PRICES}_i, \text{QUALITY}_i, \text{DEMOGRAPHICS}_i, \text{error term}) \quad (1)$$

The value of access equals the area under the expected demand curve. For the exponential demand function, the choke price (C^*) is infinite. Assume a simple demand specification: $x = e^{\beta_0 + \beta_1 C}$ where C is the travel cost, and β_0 can be a constant or a function of covariates other than own price. For any finite C , $x = e^{\beta_0 + \beta_1 C} > 0$. Defining C^0 as the current travel cost, consumer surplus for access is

$$\text{WTP} = [(e^{\beta_0 + \beta_1 C}) / \beta_1] = -x / \beta_1 \quad (2)$$

where x represents the number of trips taken by the individual and β_1 is the parameter estimate for travel costs.

Results

Rock Climbing Survey

Personal demographics of climbers surveyed indicate that the average recreational rock climber visiting the OWSR was a single male between the ages of 20 and 30 years old, had some college education, and earned between \$25,000 and \$35,000 annually. The average rock climber visiting the OWSR indicated that his/her skill level lies somewhere between 5.10 and 5.11 based on the U.S. sport climbing rating system.¹ Demographic results can be found in Table 1.

Table 1 - Personal Demographics of Rock Climbers at OWSR

						Climbing
	Percent					Group
	Male	Age	Income	Education	Skill	Member
Average	70.90%	20-30 years old	\$25K-\$35K	Some college	5.10-5.11	46.27%

¹ The grade is based on the respondents best climbing and bouldering redpoint achievement. Redpoint is defined as completing a climb without a fall regardless of the number of tries.

Individual trip statistics reveal that sport climbing, traditional climbing, and bouldering all occurred at the OWSR, with over 81% of total use being sport climbing. The average annual number of recreational rock climbing trips to the OWSR was nearly 32. On average trips to the OWSR constitute approximately 56% of the total number of rock climbing trips taken per year for an individual. Visitors surveyed were from as far away as Colorado, California, and Oregon. March and September were the times of greatest use; however, rock climbing is very dependent on weather. Rainy conditions make climbing impossible and climbers prefer moderate temperatures to extremes of hot and cold. Therefore, peak use should be expected to change from month to month depending on the weather. Survey results reveal that the OWSR was responsible for over 2500 rock climber user days per year during the study period. Results of individual trip statistics can be found in Table 2.

Table 2 - Individual Trip Statistics

	Percent	Percent		Annual	Percent	
	Sport	Traditional	Percent	OWSR	Day	Miles
	Climber	Climber	Boulderer	Trips	Use	Traveled
Average	81.34%	2.99%	28.36%	31.72	73.88%	93.90

Analysis of travel cost data revealed that total expenditures for the average rock climbing trip to the OWSR totaled \$46.70.¹ A breakdown of spending behavior showed that the greatest percent of this cost resulted from food and beverage costs as well as costs of transportation to and from the area. Compared to these costs, lodging expenses were significantly smaller, likely due to the large proportion of individuals that camped on both public and private property. Of the \$46.70 in expenditures incurred, \$17.97 (38.47%) occurred in Morgan County. Expenses incurred in Morgan County mostly came from food and beverage purchases.

Definitions of Poisson regression variables are listed in Table 3 and the results of the Poisson equation are listed in Table 4. As expected, the price variable, TC, had a negative sign on the coefficient and was significant at the 1% level. A 10% rise in travel costs would produce a 3.5% decrease in number of climbing trips taken to the OWSR. The respective substitute price variable coefficient had a positive sign and also was significant at the 1% level. Thus, even a fairly unique rock climbing site like the OWSR is considered by users to have substitutes. An increase in income will tend to lead to more trips. Specifically the income elasticity of demand for rock climbing trips to the OWSR was calculated at 0.17. This implies that a 10 percent increase in income would result in a 1.7% increase in rock climbing trips taken to the OWSR.

Table 3 - Definition of Poisson Regression Variables

Variable	
TC	Expenditures incurred while visiting the OWSR
RCGRP	Dummy variable = 1 if member of a rock climbing group or organization
INC	Annual personal income of the respondent
MILES	Miles traveled to climb at the OWSR
BLDR	Dummy variable = 1 if respondent participates in bouldering
DAY	Dummy variable = 1 if respondent was on a day trip
CLIMBS	Number of climbs in climber's ability range
SUBS	Average travel costs measured in miles for traveling to substitute sites

¹ This estimate does not include the cost of travel time and depreciated equipment costs.

Table 4 - Results of Poisson Regression

Variable	Coefficient	Std Error
Constant	1.0253*	0.6235
TC	-0.0059**	0.0018
RCGRP	0.2616*	0.1339
INC	0.0614*	0.0264
MILES	-0.0022	0.0015
BLDR	0.2129	0.1280
DAY	1.0111**	0.2498
CLIMBS	-0.0007	0.0009
SUBS	0.0068**	0.0028

N=140

R-Square=0.4389

Chi-Squared=1839.80

Restricted Log Likelihood=-1960.26

** significant at the 1% level

* significant at the 5% level

When using the Poisson model, per trip consumer surplus can be calculated by $-1/B_{TC}$ (Creel and Loomis 1990; Englin and Shonkwiler 1995). Per-trip refers to the economic benefits received per person from an average trip. This assumes that each member of the group receives equal benefits. The value per-trip of rock climbing in the OWSR was estimated at \$170.62. Individual consumer surplus per season was calculated at \$6,903.58. Based on the estimate of 2500 rock climbing user days, rock climbing at the OWSR was responsible for nearly \$284,000 in consumer surplus annually. The estimates of consumer surplus are listed in Table 5.

Table 5 - Consumer Surplus for Rock Climbing at the OWSR

Annual Individual Consumer Surplus	Individual Per-Trip Consumer Surplus	Per-Day Consumer Surplus	Annual Consumer Surplus OWSR
\$6,903.58	\$170.62	\$113.75	\$284,366.05

Whitewater Boating Survey

The whitewater boating survey is still underway and will be completed by June 2004. The following is a preliminary analysis of available information collected after one season of surveying.

Personal demographics of whitewater boaters surveyed to date indicate the average whitewater boater that visits the OWSR was a married male between the ages of 31 and 40 years old, had some college education, and earned between \$40,000 and \$50,000 annually. The average whitewater boater visiting the OWSR indicated that their skill is on the level of a class III-IV rapid.¹ This is expected as most of the rapids in the OWSR are of the intermediate variety with very few rapids being harder than a class IV. Demographic results of whitewater boaters can be found in Table 6.

Table 6 - Personal Demographics of Whitewater Boaters at the OWSR

	Percent					Boating Group Member
	Male	Age	Income	Education	Skill	
Average	88.00%	31-40 years old	\$40K-\$50K	Some college	Class III-IV	72.09%

¹ In whitewater recreation, the difficulty of a whitewater rapid is based on a scale between 1 and 6. A class I rapid is considered moving water while a class VI rapid is considered the most difficult type of rapid where rescue is impossible and death is imminent. Therefore, these individuals possess an average skill level.

Individual trip statistics reveal that both whitewater canoeing and kayaking take place on the rivers and streams of the OWSR. Kayakers comprised 79% of those individuals surveyed while canoers made up the remaining 21%. The average annual number of recreational whitewater boating trips to the OWSR was over 15. On average, trips to the Obed constituted approximately 32% of the whitewater boating trips taken per year by an individual. The average number of miles traveled to reach the Obed was over 79 while the median was found to be 39. Average trip statistics can be found in Table 7. Analysis of travel cost data revealed that the total travel costs incurred during an average trip to the OWSR for whitewater recreation was \$58.21. A breakdown of spending behavior showed that the greatest percent of this cost resulted from food and beverage costs as well as costs of transportation to and from the area. Of the \$58.21 in expenditures incurred, \$26.40 (31%) occurred in Morgan County. Expenses incurred in Morgan County mostly came from food and beverage purchases.

Table 7 - Individual Whitewater Trip Statistics

	Percent	Percent	Annual	Percent	
	Kayaker	Canoer	OWSR	Day	Miles
			Trips	Use	Traveled
Average	79%	21%	15	79%	79%

Emory-Obed Forum/Focus Groups

In February 2003, a diverse group of residents, business owners, local politicians, and elected officials as well as representatives from the National Park Service (NPS) and the National Parks and Conservation Association (NPCA) came together to form the Emory-Obed Forum. The group met regularly to assess the potential of resource-based recreation and tourism in Morgan County. In October of 2003, the Emory-Obed Forum concluded that resource-recreation and tourism held great potential for the communities of Morgan County and outlined four components that the group viewed as the foundation to this development:

1. *Accessible local lodging.* When analyzing why visitors to Morgan County are not currently making more of an economic impact, one of the first arguments was that the area had little choices for lodging. Possible examples were bed and breakfasts; a lodge to host conferences, family reunions, and other large groups; a full service campground with hook-ups for recreational vehicles; cabins in a forested setting; primitive camping for backpackers, boaters, and rock climbers; and small motels. The group also pointed out the desire that each of these businesses be locally owned and managed, providing a direct economic contribution to the county.
2. *Road and trails that connect people to nature and commerce.* Group members expressed a desire for a system of greenways that would link the various public land areas to each other, making it ideal for bicyclists and others to travel through the county, enjoying the countryside and avoiding traffic and highways. Towns would be pedestrian friendly, with adequate sidewalks, appealing signage, and secure lighting. Rundown buildings would be renovated, litter would not be a problem, and the authentic small town charm of the communities would be preserved. In addition, scenic overlooks, historical markers, and information kiosks were mentioned in order to enhance the experience of those driving through the county.
3. *Local businesses that capitalize on visitors.* Numerous locally owned businesses are needed to serve the needs of the county's visitors. Examples included restaurants, bicycle rentals, outfitters, tour guides, and gift shops. Outfitters and rental companies would encourage school groups, church groups, and camps to visit the area. Tour guides could teach how-to clinics that would teach locals and visitors how to get involved in different forms of recreation.
4. *Healthy natural resources.* Most importantly, the health of the county's natural resources must be protected and enhanced. Development decisions would be made on the consideration of the health and preservation of the rivers, streams, and forests.

The next steps for the group involve presenting the results of the short-term plan to residents to encourage interest and promote education in resource-recreation and tourism. The group plans on continuing the focus groups leaning away

from a small selected group to a more open forum approach, inviting all residents, business owners and other interested parties to attend.

Discussion

While our research is not complete at this time, we are able to draw a number of conclusions. First, the economic impact of rock climbing at the OWSR appears to be quite significant. Rock climbing activities at the OWSR were responsible for nearly \$120,000 in direct economic impact. In addition, the total value that visitors place on rock climbing at the OWSR is equivalent to nearly \$284,000 in consumer surplus. However, the residents of Morgan County are not feeling this economic impact. Out of the \$120,000 in direct economic impact produced from rock climbing, only \$45,000 was captured by the Morgan County economy. Thus, while it is reasonable to conclude that economic development could come from resource recreation and tourism, much must be done to improve Morgan County's ability to capitalize on recreation-based visitation.

Second, local residents and business owners must be made aware of the potential for economic development that these recreational pursuits bring and must be included in any development efforts. If residents are not educated about the development potential or are not satisfied with the type of development that is taking place, the development will not happen or the benefits of such a development will be captured by nonresidents.

Third, survey results reveal a number of areas where the recreational resource could be improved in order to yield more recreational visits. Rock climbers indicated that a campground was needed. While there are campgrounds provided nearby, more accessible camping choices may entice visitors to remain in the area longer. Whitewater boaters point to a lack of legal access on specific rivers as a detrimental aspect of boating in the area. Cooperation between the NPS, wildlife officials, and boaters in order to improve access on this section of river might also entice more visitation to the area.

Finally, much of the recreational visits to the area are classified as day trips by individuals from neighboring counties. While visitation from local nonresidents does provide a boost to the local economy and does ensure year-round visitation, a strong local economy based on recreation and tourism must entice non-local visitors that choose to stay for days at a time.

Literature Cited

- Brown, D. L. and N. L. Glasgow. 1991. "Capacity building and rural government adaptation to population change." In C. B. Flora and J. A. Christenson (eds.), *Rural policies for the 1990s*. Boulder, CO: Westview.
- Creel, M. D. and J. B. Loomis. 1990. "Theoretical and Empirical Advantages of Truncated of Truncated Count Data Estimators for Analysis of Deer Hunting in California". *American Journal of Agricultural Economics*, 72: 434-441.
- Dawson, S. A., D. J. Blahna, and J. E. Keith. 1993. "Expected and actual regional economic impacts of Great Basin National Park." *Journal of Park Recreation Administration*, 11: 45-59.
- Dillman, Don A. 2000. *Mail and Internet Surveys : The Tailored Design Method*. John Wiley & Sons, Inc., New York. 464 p.
- Englin, Jeffrey and J. S. Shonkwiler. 1995. "Modeling Recreation Demand in the Presence of Unobservable Travel Costs: Toward a Travel Price Model." *Journal of Environmental Economics and Management*. 29: 368-377.
- English, Donald B. K., David W. Marcouiller, and H. Ken Cordell. 2000. "Tourism Dependence in Rural America: Estimates and Effects." *Society and Natural Resources*. 13: 185-202.