

METHODOLOGICAL INNOVATIONS FOR MEASURING ECONOMIC IMPACTS OF LONG-DISTANCE RECREATION TRAILS

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Abstract.—Rural communities are increasingly interested in understanding the economic impacts of visitors drawn to their region for recreational opportunities. Economic impact assessments often rely on input-output (I/O) modeling software, which requires estimates of visitation rates and visitor expenditures. Collecting sufficient data for I/O models is relatively straightforward in a traditional park with staffed entrance stations and relatively high volumes of users. However, for geographically dispersed trails and waterways with low use intensity in many locations and multiple access points, there are significant logistical and financial challenges to collecting adequate visitation and expenditure data. Using recent research conducted on the Northern Forest Canoe Trail (NFCT) as a case study, this paper presents a modification of existing methodologies that may help researchers overcome the barriers to conducting economic impact assessments in these types of settings.

1.0 INTRODUCTION

Long distance recreational trails are frequently promoted as a tool for economic development in rural communities. In this “advocacy platform” (Gartner, 1996), providing recreational opportunities and services for visitors is seen as a method of diversifying local economies. Specifically, trail systems are expected to attract visitors, who then patronize local restaurants, motels, gas stations, and other stores. These expenditures lead to increased personal income for residents, more tax revenue for local governments, and additional job opportunities in the community (Blakely & Bradshaw, 2002). This approach to economic development is promoted by state agencies, local chambers of commerce, and other advocacy groups (Ramaswamy & Kuentzel, 2005).

Economic impact studies provide a tool for estimating the impact of visitor spending on a local economy. However, measuring the economic impacts of long distance recreational trails is a challenging undertaking due to their dispersed, linear nature, poor use records, multiple access points, and great variation in users and visitation rates (Moore & Barthlow, 1998). This paper provides a conceptual foundation for understanding monetary flows within a local economy, outlines the critical data needs and challenges for estimating economic impact, and illustrates a modified methodology for collecting these data using the Northern Forest Canoe Trail as a case study.

1.1 Conceptualizing Economic Impacts

Power’s (1996) “Modified Economic Base Model” is a useful tool for conceptualizing local economies. Economic activity is derived from the power of industries exporting goods and services to other communities. Expenditures by tourists have the similar effect of bringing “new money” into the local community. Money enters the local economy then recirculates among local businesses before leaving

as businesses and individuals purchase goods and services that the community does not produce (Figure 1).

1.2 Input-output Modeling

Input-output modeling combines user expenditure data with regional, industry-specific multipliers to estimate monetary flows within a local economy (Blakely & Bradshaw, 2002). It quantifies indirect and induced impacts by calculating the “multiplier effect,” or the degree of monetary recirculation.

Several input-output models have been developed for economic impact studies of trails and parks. MGM2, developed by the National Park Service, is a spreadsheet-based program that includes generic multipliers that control for the study area’s geographical and demographic characteristics (Moore & Barthlow, 1998). IMPLAN, developed by the United States Department of Agriculture Forest Service, segments the economy into 582 sectors, and uses county-level multipliers to estimate total impacts. Privately developed multipliers, such as the Southern Ontario multiplier (Schutt, 1997), have also been developed to estimate regional induced and indirect impacts. Each model also estimates the number of jobs and personal income supported by the visitor expenditures. Input-output models require both an estimate of visitation rates and visitor expenditures, data which can be difficult to measure for long distance trail systems.

1.3 Visitation Rate Data

A range of methods has been developed for estimating visitation rates in recreation areas. Stynes et al. (2000) utilized park registration data in their economic impact analysis of a range of National Parks, as did Moore and Barthlow (1998), who assessed the Overmountain Victory Trail. Yet this approach is not feasible for trail systems that are situated outside of traditional park systems and do not require registration.

Direct observation is another approach for estimating visitation rates. Bowker et al. (2004) conducted in-person observations of users on the Virginia Creeper Trail on randomly selected days throughout the year. Anderson et al. (1999) used a similar approach in their assessment of Kickapoo River paddlers. Blank and Simonson (1982) combined direct observations made during aerial flyovers of the Crow River with data collected by area outfitters. While effective, this approach is time- and personnel-intensive and is ill-suited for trails or waterways that are geographically dispersed or are lightly used.

Other researchers have developed techniques specifically for geographically dispersed areas. Thigpen et al. (2001) combined the results of a statewide survey with a travel-demand allocation model to estimate visitation of paddlers to North Carolina’s coastal plains. Schutt (1997) installed registration kiosks at access points along the Bruce Trail, Ontario, and made in-person observations

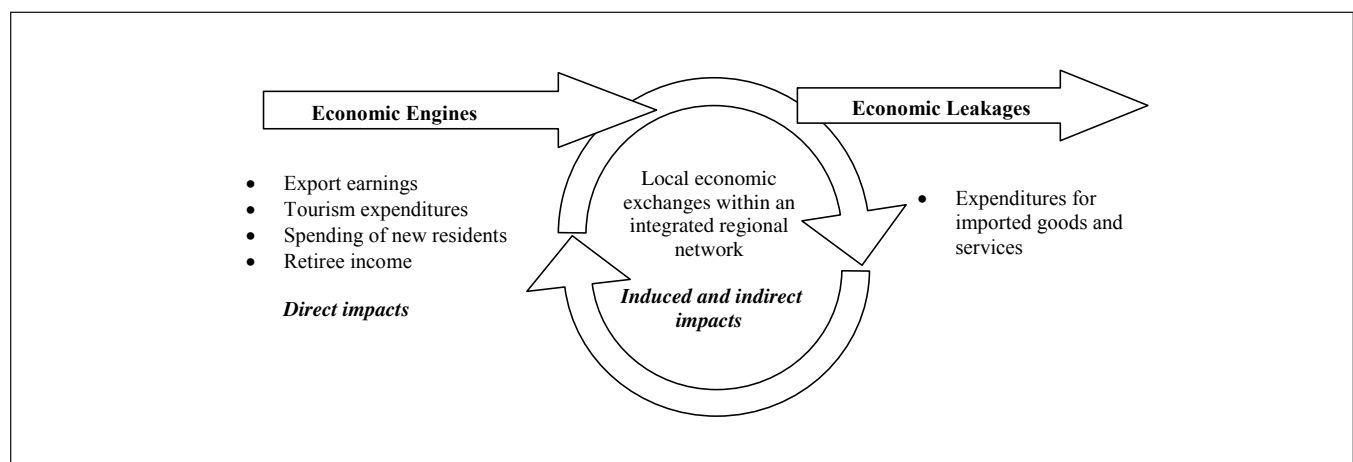


Figure 1.—Modified economic base model (Adapted from Power 1996).

to assess registration rates. This tactic requires significantly less staff time and resources than other methods, and appears appropriate for long distance trails and waterways used by visitors who are already accustomed to signing register books at trailheads.

1.4 Visitor Expenditures

Input-output modeling requires estimates of visitor spending within local economies. Visitor surveys are the standard method for obtaining this data. Mail surveys can be conducted when a representative list exists of the study population. As examples, Elvans (1995) contacted members of the Vermont Association of Snowmobile Travelers (VAST) to estimate the economic impacts of snowmobile use, and the Minnesota Department of Natural Resources utilized kayak registrations to sample resident paddlers (LSWT, 2001). Yet for many trail networks, no representative list exists for the study population. In these cases, visitor intercept surveys are considered the most appropriate sampling approach (Dillman, 2000).

Several researchers (Thigpen et al. 2001, Anderson et al. 1999) followed up on brief contacts with visitors in the field by mailing an additional survey. While this methodology allows for a more extensive survey instrument, it can lead to poor response rates, a particular concern in areas with low use intensities. Other researchers (Schutt, 1997; Omohundro, 2002) have relied entirely on in-person surveys. While this approach achieves high response rates, it can necessitate extensive surveying through the season to obtain an adequate sample size, a challenge in geographically dispersed areas.

2.0 THE NORTHERN FOREST CANOE TRAIL ECONOMIC IMPACT STUDY APPROACH

A recent study (Pollock, 2007) that examined the economic impacts of paddler tourism and recreation along six sections of the Northern Forest Canoe Trail offers a new approach for collecting data critical for assessing economic impacts. The NFCT is a 740-mile canoe route that traverses New York, Vermont, New Hampshire, and Maine (Fig. 2). Following waterways

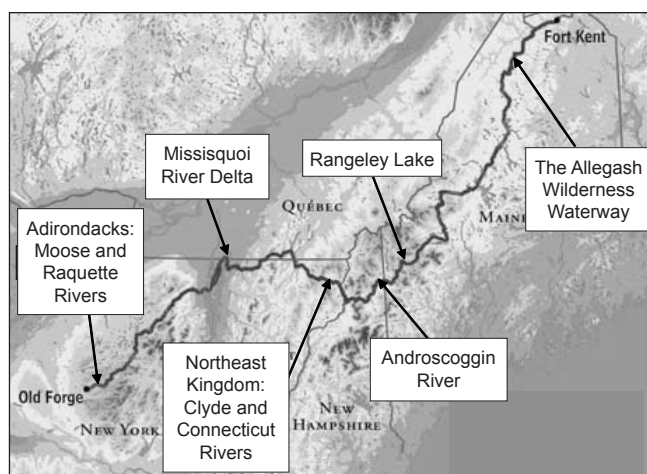


Figure 2.—Study regions on the Northern Forest Canoe Trail.

historically used by Native Americans and early settlers, it passes through 45 towns and includes 22 rivers and streams, 56 lakes and ponds, and 62 carries. The input-output modeling software MGM2 was used for the analysis. Key elements of this study's methodology included registration kiosks with surveys for estimating visitation rates and expenditure data, periodic direct observation, surveys of nonregistering groups, interviews with area lodge managers, and survey weighting. In this combination, it represents a modification to past approaches.

2.1 Registration Kiosks

A system of registration kiosks was used to distribute paddler intercept surveys, which included questions on group demographics and trip characteristics. Respondents were also asked to estimate how much money their group would spend within 25 miles of the waterway during the trip. As paddler groups were intercepted mid-trip, they were asked to include what they expected to pay before leaving the region.

Seventeen kiosks were installed at all unstaffed public boat launches in each study region. A display contained information on the research study and the canoe trail, as well as a posted paddler map. During the 2006 season (June through October), paddlers using the kiosks completed 885 usable surveys.

To estimate registration rates, boat launches were observed on 25 days throughout the paddling season. Observations were made on both weekdays and weekends. Monitoring was conducted proportional to use patterns and levels, and each boat launch was observed for one to three days. All groups returning from a paddling trip were asked if they had completed the survey. The registration rate was estimated to be 35 percent (n=78). All surveys were checked for completeness. Attempts were made to contact respondents to clarify responses with inconsistencies relating to trip expense estimates.

2.2 Nonresponse Bias

As paddlers completing the survey through the registration kiosks were self-selecting, analyses were conducted to determine nonresponse biases. A nonresponse sample was taken by approaching and surveying nonregistering groups during kiosk observations. All nonregistering groups were also asked to complete a survey, administered by the researchers, with a 98 percent response rate (n=54). For key variables, responses were compared between self-registering and nonregistering groups.

No significant differences were found between mean total trip expenses, group sizes, travel times, or median household income levels. However, self-registering groups ranked their knowledge of the NFCT higher (n=968, $p < .01$), and were twice as likely to report the NFCT as a reason for their trip (n=968, $p < .01$). For these variables, in-person responses were assigned weights equal to the inverse of the response rate multiplied by the ratio of self-registering surveys to in-person surveys.

Surveys gathered in registration kiosks were the primary instrument for estimating visitor use. The formula for calculating total user days was as follows:

$$\text{Total group-days: } (\sum_{(R,u)} d_i * n_i) * (1/r) * (1/v_{(R,u)}) * (1/o_{(R)}),$$

where:

R = Study region

u = User type

d = Number of days in region

i = Survey element (each survey response)

n = Number of paddling trips to the region in season, on average

r = Estimated response rate

v = Percent valid responses

o = Percent operational kiosks

V (percent valid responses) is the percentage of completed surveys that had the necessary responses to conduct this analysis. O (percent operational kiosks) is a region-specific calculation for the percent of the season that kiosks were fully operational; vandalism, pen theft, and weather damage reduced the percentage of operational days for each kiosk. Kiosks were also installed and removed on different days. This variable factored in those discrepancies.

2.3 Lodging and campground manager interviews

In several of the study regions, paddlers stay in lodging establishments and campgrounds situated on the waterway. As paddlers staying in these locations do not use the public boat launches with the survey kiosks, use data was collected primarily through in-person surveys of the managers of lodging establishments and campgrounds with waterway access in each study region. Follow-up phone calls and mail-back questionnaires were used to obtain end-of-the-season use data as needed. Forty-eight lodging establishments and six campgrounds were approached, resulting in 37 lodging and campground surveys completed, with a response rate of 77 percent and 100 percent, respectively.

The methodology to derive a use estimate was customized based on the data availability of each establishment. Several cabin rental establishments had detailed records and knowledge of every group registered to stay at their facility for the summer season. In these situations, an establishment-specific estimate was calculated by simply adding up the number of paddler groups registered. At other lodging establishments, such as motels, this approach was not feasible. Instead, the following formula was used to calculate an estimate:

$T = \sum_{(s)} N * O_s * L_s * P_s / A_s$, where:

T = Total paddler groups, per establishment

S = Season (summer or fall)

N = Number of rooms and cabins

O = Average occupancy rate (percentage of rooms occupied)

L = Length of the season (days)

P = Percentage of groups that are paddlers

A = Average length of stay

For campgrounds, estimates of total paddler groups were obtained by multiplying staff estimates of the proportion of campers and day users that are paddler groups with the number of camping and day user groups recorded using the facility over the course of the 2006 season. Finally, total group days for each region, per user type were estimated using the following formula:

$G = (\sum_i T) / o * a$, where:

G = Total group days, per region, per user type

T = Total groups, per establishment

i = Survey elements (each lodge or campground)

o = The percentage of lodges or campgrounds successfully surveyed

a = Average trip length for lodging/cabin renters or campground campers for the region, obtained through the paddler survey

2.4 Weighting

As surveys were primarily administered at boat launches, hotel/cabin renters and campground campers were underrepresented. Furthermore, in some regions, sampling was not proportionate to actual use. The Allagash study region, for example, was under-sampled relative to other regions. In economic impact studies, weighting survey results is often necessary to avoid biased estimates of key variables due to sampling procedures (Wilton & Nickerson, 2006). To correct for these biases, a system of weights was assigned to each user group within each region by first dividing the total number of estimated groups by the number of groups in the sample, and then rescaling these values to reflect the actual sample size.

3.0 RESULTS AND CONCLUSIONS

This research approach allowed for efficient sampling of a geographically dispersed trail with relatively low use intensities. An estimated 22,074 groups (89,399 users) paddled the waterways in the six study areas. The median paddler group spent about \$215 per trip, primarily at lodging establishments, restaurants, grocery stores, and service stations. Nonlocals spent a mean of \$414-\$498, or \$46 per person per day. An estimated \$8.8 million was spent in local economies by paddlers in the six study regions. After accounting for multiplier effects, these expenditures created an estimated \$12 million in total economic impacts, \$6.6 million in value added to the local economy, \$4.1 million in personal income, and 283 jobs.

Collecting the requisite data on visitation rates and expenditures necessary to complete an economic impact assessment of a long distance trail can be a challenging undertaking, particularly given limited staff time and budgetary resources. This research presented a modification of existing methodology to meet the unique circumstances of the Northern Forest Canoe Trail. By combining brief surveys completed at registration kiosks with periodic in-person observations and nonresponse surveys, along with interviews with area lodging establishments and campground managers, sufficient data were collected for input-output modeling while efficiently utilizing staff and budgetary resources.

This approach is not without its limitations. As visitors had not completed their trip at the time of the survey, their expenditure data is based on their projections. In addition, careful screening is critical to check for errors in responses collected through the registration kiosks, particularly for questions relating to expenditures. Finally, estimates of visitation achieved through campground and lodging establishment interviews must be considered approximations.

Despite its limitations, this methodological approach appears sufficient for collecting data necessary for modeling the economic impacts of visitor spending. Its use of both in-person observation and surveys

of non-registering groups addresses concerns of understanding response rates and potential non-response bias, problems inherent in studies that utilize only a self-selected sample. Ultimately, this methodology may be most useful for researchers and managers with limited staff and budgetary resources seeking to assess the economic impacts of visitors to geographically dispersed trails and waterways with low use intensities and a variety of access points.

4.0 CITATIONS

- Anderson, A., Hewitt, L., & Marcouiller, D. (1999). **Outdoor recreation, community development, and change through time: A replicated study of canoeing and angling in Southwestern Wisconsin.** Southwestern Wisconsin University of Wisconsin-Cooperative Extension, Center for Community Economic Development.
- Blakely, W., & Bradshaw, T. (2002). **Planning local economic development** (3rd ed.). Thousand Oaks, CA: Sage.
- Blank, U., & Simonson, L. (1982). **Recreational resource use: Who gains? Who pays? The Crow Wing Canoe Trail case.** University of Minnesota, Department of Agriculture and Applied Economics.
- Bowker, J., Bergstrom, J., & Gill, J. (2004). **The Virginia Creeper Trail: An assessment of user demographics, preferences, and economics.** Retrieved July 23, 2007 from <http://www.americantrails.org/resources/adjacent/VAcreeperstudy04.html>.
- Dillman, D. (2000). **Mail and internet surveys: The tailored design method** (2nd ed.). New York: Wiley.
- Elvans, N. (1995). **Snowmobiling in VT: Economic impact study and snowmobile user survey.** Johnson, VT: Johnson State College.
- Gartner, W. (1996). **Tourism development: Process, principles, and policies.** New York: Van Nostrand Reinhold.
- LSWT. (2001). **Survey of sea kayak owners in Minnesota: Kayaking the North Shore of Lake Superior.** Minnesota Department of Natural Resources Division of Parks and Recreation, Trails and Waterways Division.
- Moore, R., & Barthlow, K. (1998) **The economic impacts and uses of long-distance trails: A case study of the Overmountain Victory National Historic Trail.** Washington, DC: United States Department of the Interior, National Park Service.
- Omohundro, J.T. (2002). **Expenditures by nonmotorized recreationists in the Adirondack Park.** Adirondack Journal of Environmental Studies, 9(1), 27-35.
- Pollock, N. (2007). **The Northern Forest Canoe Trail: Economic impacts and implications for sustainable community development.** Unpublished master's thesis, University of Vermont, Burlington, Vermont.
- Power, T. (1996). **Lost landscapes and failed economies: The search for a value of place.** Washington DC: Island Press.
- Ramaswamy, V., & Kuentzel, W. (2005). **Rural restructuring and the transition of a tourism dependent community.** Tourism Analysis, 3, 63-76.
- Schutt, A. (1997). **The Bruce Trail, Ontario users and their economic impact.** Trent University.
- Stynes, D.J., Propst, D.B., Chang, W., & Sun, Y. (2000). **Estimating national park visitor spending and economic impacts: The MGM2 model.** University of Idaho, National Park Service Cooperative Park Studies Unit.

Thigpen, J., Avant, B., & Siderelis, C. (2001). **North Carolina Coastal Plains Paddle Trails initiative: The state of North Caroline coastal paddling survey.** Raleigh: North Carolina Sea Grant.

Wilton, J., & Nickerson, N. (2006). **Collecting and using visitor expenditure data.** Journal of Travel Research, 45, 9.