

A Socio-Economic Impact Analysis of the Brookville Reservoir in Southeastern Indiana

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Abstract

The impact of the newly created Brookville Reservoir on the residents of Franklin County, Indiana, was investigated. In order to analyze community values, attitudes, and expectations, 600 questionnaires were hand-delivered to 12% of the households in the county. The rate of return was 33%. Findings indicated that automobile traffic problems ranked first among the public's concerns, while quality of roads and bridges ranked second. The preservation of farmlands and open space, the maintenance of natural beauty and wildlife areas, and the retention of noise and air quality ranked third, fourth, and fifth, respectively.

In order to evaluate the needs and expectations of visitors attracted to the Reservoir, 560 card questionnaires were distributed at the Mounds Recreation Site (containing beach, camping, and boating facilities) on a typical four-day summer weekend (17-20 August 1975). The rate of return was 82%. Sixty-eight percent of the visitors rated the roads in the vicinity of the Reservoir "good"; 61% indicated that they were there for one day only. Preferred activities were as follows: swimming—67%, picnicking—46%, and sightseeing—44%. Residents of Ohio and Indiana constituted 55% and 40% of the visitors, respectively. These data are important as a planning tool for the residents of Franklin County and the Indiana Department of Natural Resources.

Introduction

The Study Site

The Brookville Reservoir is a sixteen-mile-long, 7,790-acre (3,167 ha) reservoir located in Franklin and Union Counties in southeastern Indiana. It was constructed by the U. S. Army Corps of Engineers between 1965 and 1974 for the purposes of flood control, water storage, and recreation (7). Filling of the reservoir began on 1 January 1974; therefore, the summer of 1975 was the first recreational season that people began to use the facilities in significant numbers. The dam is 1.5 miles (2.4 km) north of Brookville, Indiana (population 3000). Brookville is the county seat of Franklin County (population 17,000) and the largest community in the immediate vicinity of the Reservoir (Fig. 1).

Franklin County is one of eight counties that make up the Historic Hoosier Hills Area of Southeastern Indiana. The Hoosier Hills Executive Council is interested in resource conservation and development and is highly aware of the four million people that are concentrated in nearby metropolitan areas such as Indianapolis, Louisville, and Cincinnati (Fig. 1). Their basic study (4) provided background data (e.g., soils, watersheds, and population distribution) for the present investigation.

Research Objectives

This study focused upon the socio-economic impact of the Reservoir upon the residents of Franklin County. Much data about conditions prior to 1965 were lost during the decade of construction. Thus, we felt that it was important to gather accurate data regarding people's values,

attitudes, and expectations as the Reservoir began to produce impact on the various publics within the area (1).

Although several studies have been concerned with the impact of a reservoir on a defined geographical region (3) (6), most investigations have failed to focus on the socio-economic factors of such a facility and their effect on the populace of a rural area. Such was the major objective of this study.

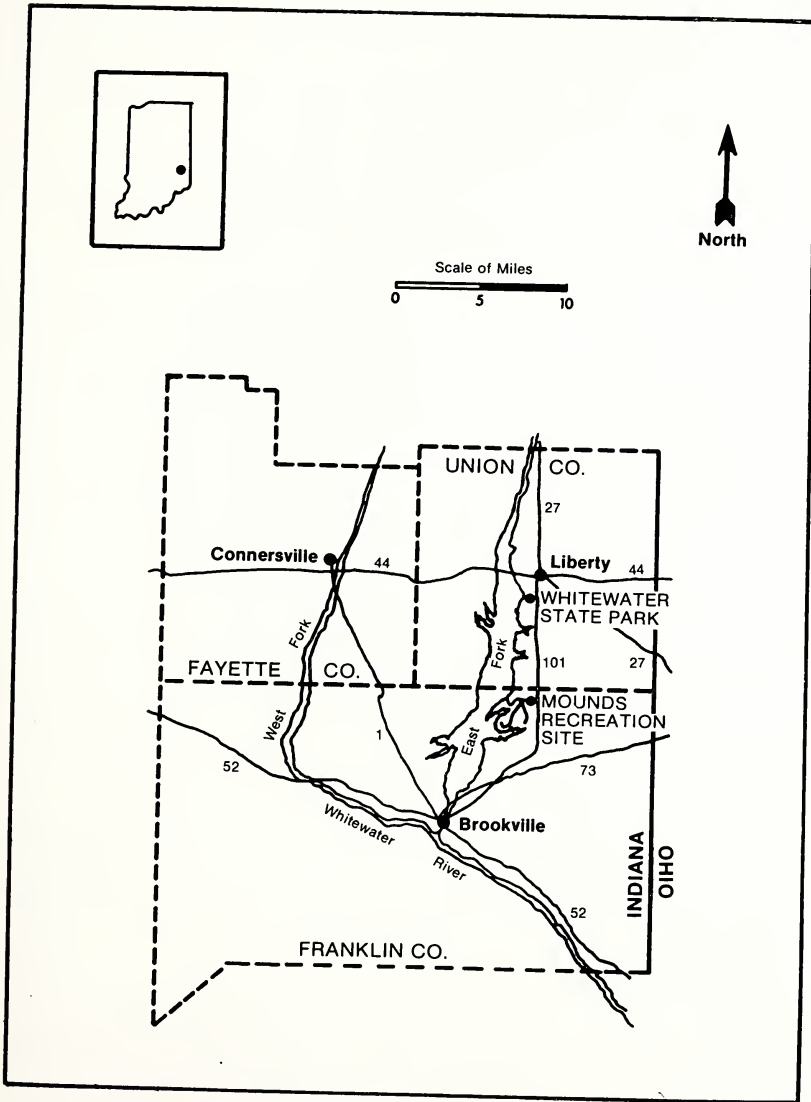


FIGURE 1. Map of the Brookville Reservoir and environs.

Further, few studies have attempted to reconcile tourist needs and wants with those of the host community (5). Another objective of the study, therefore, was to assist the residents of Franklin County in communicating their collective desires for the area so that effective coordination can result in the satisfaction of both groups.

Methodology

The present investigation was conducted from 1 June to 31 December 1975. Specific objectives that guided the study were: (a) to analyze community values and expectations (via a questionnaire); (b) to identify and discuss relevant alternatives open to residents and special interest groups (via workshops); (c) to determine the needs and expectations of visitors to the Reservoir (via a questionnaire); (d) to identify areas of agreement and of disagreement between county residents and the tourists; and (e) to make recommendations that will attempt to coordinate or to make compatible the needs and desires of both publics. Objectives a and b were carried out as part of a group project (2).

The Community Survey

A public opinion survey was employed to obtain county-wide information concerning opportunities the Reservoir might provide and conditions which could evolve due to its presence. A six-page questionnaire was randomly hand-distributed in an effort to increase the rate of return by introducing ourselves to the respondents and by briefly explaining the reasons for conducting the survey. Three days (13-15 July 1975) were spent distributing 600 questionnaires to approximately 12% of the households in Franklin County. Responses were returned in business reply envelopes. Details regarding questionnaire format and sampling technique have been previously described (2).

Sections 1 through 5 of the questionnaire were classification questions designed for response stratification according to place of residence or age class. These were followed by a "semantic differential" section designed to determine how residents perceived the area. The next two queries were designed to learn how many Franklin County residents were using the Reservoir, what activities they engaged in, and which Reservoir sites they frequented (a map was included to assist them in locating these sites). Sections 9 and 10 focused upon the ranking of factors that characterize the area and of possible environmental and socio-economic changes that the presence of the Reservoir might produce. Comments and suggestions were also requested. The questionnaire was color-coded for each classification in order that differences of opinion relating to proximity to the Reservoir site could also be detected.

The Tourist Survey

The Army Corps of Engineers has a policy of taking a "visitors survey" at each of its facilities every three years (Mr. Mike Graham, Head Ranger, U. S. Corps of Engineers, Louisville District, personal communication). From 8 a.m. to 8 p.m. on a non-holiday weekend (Thursday through Sunday), each vehicle that enters representative sites is

stopped for survey purposes. The Indiana Department of Natural Resources granted us permission to hand out the tourist questionnaire during the same weekend (17-20 August 1975). Five hundred sixty (560) questionnaires were distributed at the entrance to the Fairfield beach, the Templeton Creek boat ramp, and the Mounds camping site, collectively known as the Mounds Recreation Site (Fig. 1). The Mounds Recreation Site represented the best locale for a survey because: (a) it is the entrance to the only public beach, the main public camping area, and one of the nine boat ramps (i.e., the sample population represented a good cross-section of visitors); (b) it is the location of a gatehouse where all vehicles had to stop to pay an entrance fee and could be handed the questionnaire; and (c) it was one of the Corps survey sites, allowing for comparison of data.

The tourist questionnaire was designed to sample the needs and expectations of visitors to the Reservoir. An adult in each vehicle was asked to answer the questions and to deposit the card in a marked container as they exited the facility. Questions dealt with the following matters: opinion of the roads in the vicinity of the Reservoir; money spent each day while in the Reservoir area; reason for visiting the Reservoir; activities engaged in; what additional facilities might be desired; and point of origin. The tourist questionnaire was constructed to provide information that could be related to the community questionnaire.

The weather during the survey period was partly cloudy with light showers on Friday and Sunday. The temperature range was a consistent 18° C low and 31° C high.

The Corps surveyed 3749 vehicles during the four-day period, involving approximately 10,000 people (Mr. C. Hardison, District Engineer, U. S. Corps of Engineers, Louisville District, personal communication). As a basis for comparison, the peak day of the Fourth of July weekend saw 12,631 vehicles at the Reservoir and the totals for the month of August 1975 were 54,876 vehicles and 191,203 people (Mr. Graham, personal communication).

Computer facilities at Miami University were used for statistical analysis. The Statistical Analysis System (SAS) was utilized which provided frequency and percentage analyses for each question.

Results and Discussion

Community Response

The rate of return for the community questionnaire was 33% (i.e., 200 out of 600 distributed). Community questionnaire data revealed that the automobile traffic problems were the major concern (Table 1). "Traffic safety" and "quality of roads and bridges" were ranked 1 and 2, respectively, in the county totals. In the breakdowns these concerns were amplified: 7 out of 10 categories ranked "traffic safety" first, with high averages in Brookville and Brookville Township. This locale bears the brunt of the traffic bound for the Reservoir. All classifications ranked "traffic safety" 1, 2, or 3 except those under 20 years of age who ranked it 6. The same pattern held true for "quality of roads and bridges." The

TABLE 1. Rank order of responses to questions about community values (2).

	County	Brookville	Brookville Township	Town	Farm	Rural Non-farm	Under 20	20-30	30-40	40-50	Over 50
Traffic safety	Rank 1	1	1	1	2	1	6	3	1	1	1
	Avg.	5.9	6.3	6.0	5.9	5.9	5.5	5.9	6.2	6.2	5.8
Quality of roads and bridges	Rank 2	2	2	2	1	2	1	1	6	3	2
	Avg.	5.9	6.3	5.8	6.1	5.8	6.3	6.2	5.9	5.9	5.7
Farmlands and open space	Rank 3	4	8	6	3	6	7	5	4	6	3
	Avg.	5.5	5.9	5.5	5.5	5.4	5.5	5.6	5.9	5.8	4.9
Maintenance of natural beauty & wildlife areas	Rank 4	6	3	5	4	7	3	2	2	7	7
	Avg.	5.4	5.8	5.7	5.2	5.3	6.2	6.1	6.1	5.5	4.6
Noise and air quality	Rank 5	4	6	3	8	3	4	6	8	5	4
	Avg.	5.4	5.9	5.7	5.1	5.5	6.1	5.5	5.8	5.9	4.7
Clean city water supply	Rank 6	3	4	4	7	5	1	8	8	4	4
	Avg.	5.4	6.2	5.7	5.1	5.4	6.3	5.2	5.8	5.9	4.7
Public schools	Rank 7	7	7	8	6	4	8	4	3	2	8
	Avg.	5.4	5.6	5.3	5.3	5.5	4.9	5.8	6.1	5.9	4.3
Maintenance of small town or rural atmosphere	Rank 8	9	5	7	5	8	11	7	7	8	6
	Avg.	5.2	5.1	5.6	5.3	5.0	4.2	5.4	5.1	5.5	4.7
Historic landmarks	Rank 9	8	11	9	10	10	9	10	5	10	10
	Avg.	4.7	5.3	4.2	4.2	4.9	4.8	5.0	5.9	5.2	3.9
Appearance of business district	Rank 10	10	9	11	9	11	10	11	11	11	9
	Avg.	4.6	4.9	4.8	4.5	4.4	4.7	4.9	4.9	4.2	4.3
Recreation and parks	Rank 11	11	10	10	11	9	5	9	10	9	11
	Avg.	4.5	4.7	4.9	4.1	5.0	5.7	5.1	5.2	5.3	3.2

fifth ranked item—"noise and air quality"—was also related to the traffic situation and indicates the concern of a rural populace when suddenly inundated with urban traffic problems.

Table 2 summarizes how Franklin County residents regard certain developments that might occur as the tourist trade accelerates. These data indicate that county residents are eager for the economic opportunities that the Reservoir might attract to their area. Interestingly, unemployment stands at 8.8% (a 3-month average) and there is a scarcity of job openings for young people (2). However, the Reservoir has mostly seasonal employment to offer, and much of that is at the low-skill level (e.g., lifeguards, boat ramp attendants, and fee collectors). Real economic progress for the area depends on long-range planning. The data in Table 2 provide significant guidelines for all local and regional planning bodies involved with Franklin County as well as for state agencies (e.g., Indiana Department of Natural Resources) interested in impact analysis within a rural environment.

TABLE 2. *Franklin County community response to possible growth and development associated with the Brookville Reservoir (2).*

	Desirable	No Opinion	Un- desirable
Community growth and development	73.1%	17.4%	9.5%
Industrial development	68.5%	13.7%	17.8%
Shopping center	63.7%	17.9%	18.4%
Development of commercial businesses along Route 101 ..	56.8%	29.6%	13.6%
Lakeside resort facility	55.1%	32.6%	12.3%
Summer home development	36.8%	37.8%	25.4%
Increased traffic along access routes	14.7%	23.7%	61.6%
Construction of billboards and signs	10.0%	20.2%	69.8%

Tourist Response

The rate of return for the tourist questionnaire was 82% (i.e., 457 out of 560 distributed). The tourist questionnaire asked visitors to rate "the roads you traveled on in the vicinity of the Reservoir" with these results: Poor—12%; Fair—20%; Good—68%. This opposite perspective was interesting and may be attributed to several causes. First, the phrase "in the vicinity of the Reservoir" was used in an attempt to get an assessment of county roads by visitors to match up with the assessment of local residents. The discrepancy may have arisen because visitors defined "in the vicinity of" too narrowly and only evaluated the new Route 101 (see Fig. 1) which is a new two-lane highway running up the east side of the lake between Brookville and Liberty, ignoring the old and narrow roads that brought them into the area. Second, since the survey site was on the east side of the lake, a preponderance of those sampled may have been unfamiliar with the old, rural roads that characterize most of the county. More importantly, it may be that tourists enjoy scenic, rural (county) roads and fail to recognize traffic patterns as congested in such an environmentally attractive setting.

The rationale for asking three specific tourist questions (i.e., length of stay, amount of money spent, and accommodations utilized by Reservoir visitors) was a desire to define the type of tourist which the Reservoir was attracting. These data are helpful to business people in Franklin County and to the various publics within the state.

In answer to the question "which best describes the main reason for your visit to Brookville Lake?," the answers were: one-day outing—62%; weekend vacation—17%; visiting in area as recommended by friend—9%; annual vacation—5%; and passing through area—5%. The assumption here was that those coming for only one day probably weren't driving more than 50 miles each way, while the small number who are taking their annual vacation represent those who conceive of the Reservoir as a place to come and stay for an extended time period.

Another question, "how much money do you estimate you spend each day when visiting the Brookville Lake area?" elicited these responses: under \$10—70%; \$10-\$20—22%; \$20-\$30—4%; \$30-40—1%; and over \$40—3%. These figures bear a positive correlation to those from the question just discussed: i.e., the visitor-for-a-day (62%) spends under \$10 (70%) and the few on annual vacation (5%) spend more than \$30 (4%). Therefore, we recommend that future recreational plans be based on the short-term visitor.

In response to "what type of accommodations would you patronize?," tourists gave positive replies to: lodge on the lakefront—63%; restaurant along access routes—35%; shopping center—26%; restaurants in Brookville—21%; motels along access routes—12%; and hotel/motel in Brookville—4%.

The composite tourist is further defined by adding some data from the Army Corps survey (Mr. Hardison, personal communication). Visitors surveyed at several Reservoir entrances listed sightseeing as the most popular activity (45%) and boating as the second choice (21%). These two groups represent a majority of Reservoir users. Add to them the fishermen (14%) and the campers (10%) and the result is a large proportion of visitors who fail to patronize restaurants or motels. At a workshop held for area merchants, the difficulty of attracting tourists into town was stressed. These figures corroborate this opinion and are supported by new business activities evident along State Route 101 (e.g., camping supply stores, bait and tackle shops, and marine sales and service stores).

In summary, data from our tourist questionnaire and the Corps' survey describe the people currently visiting the reservoir as follows: 62% come for one day, 70% spend under \$10 per carload, and 35% prefer to patronize businesses located out of town and along the access routes. These data suggest that the business peoples' apprehensions regarding the potential economic benefits from reservoir visitors are well founded.

The strong response to the "lodge on the lakefront" item (63%) merits further comment. A lodge is part of the state's long-range plan and this indication of client support for such a facility suggests that it should be moved to the forefront of the Department of Natural

Resources' plans for the Brookville Reservoir. A lodge would attract visitors with a different socio-economic basis than those currently visiting the lake and might have a positive impact on the business community within the county. The lodge is projected for the west side of the lake, close to Brookville, and should create a better balance of usage among the 13 entrances since only three are located on the west side.

Reservoir activities found to be most popular with visitors were as follows, based on 445 responses: swimming (67%), picnicking (46%), sightseeing (44%), motorboating (24%), camping (24%), fishing (23%), waterskiing (17%), hiking (9%), sailing (2%), and visiting the Treaty Line Museum (1%). When asked "what additional facilities would you like to see developed?," visitors responded: nature center—35%, expanded boat rental—27%, and marina—20%. These data suggest that the present reservoir facilities are too heavily weighted toward users who can afford to own the expensive equipment required for many of the popular activities (e.g., motorboating and waterskiing). The picnickers and sightseers might patronize a boat rental and nature center. These data can be utilized by the Indiana Department of Natural Resources in planning a well-balanced facility that offers recreational opportunities to all economic levels of the population.

Concluding Remarks

When the Corps and Department of Natural Resources personnel were interviewed early in the summer of 1975, they remarked that a great majority of Reservoir visitors were coming from Ohio. Mr. Dave Turner, Reservoir manager, said: "about 75% to 80% of the cars entering the facility carry Ohio license plates" and that "Indiana state officials had anticipated such high usage by people from Ohio." Questionnaire data revealed a somewhat different picture, however. In response to "where is your home?," respondents indicated: Ohio—55%, Indiana—40%, Kentucky—1%, and other—4%. People from Ohio were still in the majority, but not to the extent suggested by Reservoir personnel.

These findings demonstrate the need for planning along other than political boundaries (e.g., state lines). When a facility like the Brookville Reservoir is constructed, backed by a federal agency and using federal funds, planning needs to be conducted on a regional (e.g., OKI) or ecological (e.g., watershed) basis. When the regional or ecological concept is ignored, problems may arise that could have been prevented by taking a more comprehensive viewpoint.

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Literature Cited

1. BARTON, T. F. 1968. Lack of planning or failures in preconstruction planning of the Monroe Reservoir. *Proc. Indiana Acad. Sci.* 77:312-320.
2. BROOKVILLE LAKE IMPACT STUDY. 1975. Analysis of community values and goals through a participatory process. Miami Univ. Institute of Environmental Sciences, Information Center.
3. GRAY, H. H., R. S. HOWE, J. C. RANDOLPH, M. C. ROBERTS, and N. L. WHITE. 1975. Lake Monroe land suitability study: a technical report on a selected portion of the Lake Monroe watershed. Indiana Univ. School of Public and Environmental Affairs. Center for Urban and Regional Analysis.
4. HISTORIC HOOSIER HILLS EXECUTIVE COUNCIL. 1972. Plan of action for the Historic Hoosier Hills Resource conservation and development project.
5. SAITTA, W. W., and R. L. BURG. 1973. Local economic stimulation from reservoir development: a case study of selected impacts. *J. Soil and Water Conservation.* Mar-Apr.
6. TURECK, H. Undated. Social impact of the Libby Dam, Lincoln County, the case of absentee or extra-local influence. Montana Univ. Joint Water Resources Research Center Report.
7. U. S. ARMY CORPS OF ENGINEERS. 1974. Final environmental impact statement for Brookville Lake project: East Fork Whitewater River, Indiana. U. S. Army Engineer District, Louisville, Ky.