

POTENTIAL REVENUES FROM A

NEW DAY-USE FEE

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The Corps of Engineers will be implementing a new user fee at day-use areas during the next two years. This paper presents the procedures used to estimate the revenue that the new fee would generate at six Corps projects located across the U.S. The results suggest that revenues will fall well short of the naive projection calculated on the assumption that the new fee will not affect the current level of visitations.

Introduction

The Army Corps of Engineers is one of the leading federal agencies in providing recreational opportunities. In fact, the Corps accommodates more visits at its recreation sites than any other federal agency except the U.S. Forest Service. Both day-use and camping facilities are provided at most Corps projects throughout the U.S.

Although the Corps has a long history of charging fees at its campgrounds, it has not charged fees at its day-use facilities in the past. This is about to change due to provisions included in President Clinton's compromise budget package passed last summer by Congress. The budget package reduced the Corps' federal operating budget by \$18 million, and it granted the Corps the authority to charge fees at its day-use facilities, beginning in 1994.

Because user fees have not been charged historically at day-use areas, the Corps had no information about how current users would respond to the proposed fee system. Consequently, a study was conducted to learn more about Corps day-users' attitudes toward fees and how they would respond to the user fee. One of the major objectives of the study was to estimate the revenue that the Corps would collect at selected Corps projects. The purpose of this paper is to present the procedures used to estimate day-use fee revenues and to compare the estimated revenue projections to a naive estimate of revenue.

Study Design and Data Collection Procedures

A total of eighteen Corps projects were visited to assess their suitability for the fee study. Criteria used to assess each project are: at least two day-use areas that contained beaches, picnic table and boat launching facilities, which are required facilities for charging a fee; day-use areas with varying degrees of development; different locations across the U.S. so that regional differences, if any, in users' reactions to fees could be considered; a mix of highly accessible and remote projects; and adequate locations where traffic could be safely intercepted to collect name and addresses of users.

Based on the above criteria, the following six projects were selected for the study: Burnsville, West Virginia; Strum Thurmond on the South Carolina-Georgia border; J. Percy Priest, Tennessee; Truman, Missouri; Canyon, Texas; and Mendocino, California. Two day-use areas at each project were selected for collecting the names and addresses of current users. A sampling plan was then developed for each day-use area at each project.

A questionnaire was developed and pretested prior to the data collection phase of the study. The final version of the survey instrument contained general questions about the recreational activities of respondents, the types of facilities and services they considered important, users' assessment of the quality of the day-use facilities they visited, and detailed information about their trip to the day-use area on the day they were contacted.

Questions about respondents' trip expenditures and the number of trips they had made to the day-use area in the last year were also included. Finally, a question was designed to determine how current users would respond to a fee system and the number of trips they would make to the day-use area at alternative fee levels. Two types of fees were included: an annual fee for the day-use area and a daily fee. Both fees were expressed on a per-vehicle basis.

A sample of day users was collected at each project by randomly stopping vehicles and collecting the name and address of the driver. Those selected for the sample were then mailed a survey and appropriate follow-ups to obtain the desired information. A total of 1405 of the 2522 deliverable surveys were completed and returned, yielding a response rate of 55.7 percent.

Results

Sample Characteristics. The socio-demographic characteristics of the day-use respondents are summarized in Table 1. The average age of respondents was slightly more than 40 years, and males accounted for over 60 percent of all respondents. Average household size was 3.1 persons and respondents reported an average of 13.3 years of education and an income of \$36,600. Respondents who identified themselves as members of minority groups accounted for 11.6 percent of all respondents. It should be noted that all socio-demographic characteristics reported in Table 1 are statistically different at the 10 percent level across the six projects.

Table 1. Socio-demographic characteristics of Corps day-use visitors.

Characteristic	Average	Range Among Projects
Age (years)	40.2	35.5 to 44.7
Sex (% Male)	61.5	56.3 to 69.4
Household Size	3.1	2.9 to 3.3
Education (years)	13.3	12.5 to 13.9
Household Income	\$36,300	\$25,600 to \$40,100
Race (% non-caucasian)	11.6	4.0 to 18.9

Selected trip characteristics are reported in Table 2 (see next page).

Table 2. Trip characteristics of Corps day-use visitors.

Characteristic	Average	Range Among Projects
Number of People in Party	3.2	2.9 to 3.4
Hours Spent at Site	5.0	4.2 to 6.7
One-Way Travel Distance	30.2	12.0 to 45.0
Trip Expenses	\$36.40	\$16.50 to \$46.80
Annual Trips to Site	21.0	8.7 to 40.7
Quality Rating for Site ^a	3.7	3.2 to 4.0
Preference Rating for Site ^b	2.3	2.2 to 2.5

^a The following numerical scale was used to measure quality:

1=poor; 2=fair; 3=good; 4=very good and 5=excellent.

^b The following numerical scale was used to measure preferences:

1=I would not go elsewhere in this region;

2=I would go elsewhere, but I prefer this day-use area;

3=It makes no difference to me whether I use this day-use area or another area;

4=I would come here again, but I would prefer to go elsewhere; and

5=I would not come here again.

Overall party size was 3.2 and respondents spent an average of five hours at the site. One-way travel distance was about 30 miles and total trip expenses averaged \$36.40 for all lakes or projects. Respondents took an average of 21 trips to the site in a twelve-month period. On a five-point scale with one being poor and five being excellent, the sites visited by the respondents were rated as 3.7. Users' preferences for the areas visited were also rated on a five-point scale with one signifying a high level of preference and five representing a low level of preference. The overall rating of respondents was 2.3 on the five-point scale. Again, all trip-related characteristics reported in Table 2 exhibited a statistically significant difference at the ten percent level across lakes.

Respondents were also asked a series of questions to ascertain their attitudes toward day-use fees. The results strongly indicate that many respondents have very strong negative attitudes toward fees. For example, almost half (48.5%) of all respondents strongly agreed that they should not have to pay a fee to use the

Corps day-use areas. Responses to other fee-related questions verified this strong negative attitude. This finding, of course, has a potentially large impact on the revenue collected from a user fee. We now turn to the procedures used to estimate revenues.

Revenue Projections. The revenue portion of the study was designed on the assumption that both a daily per vehicle fee and an annual pass would be offered to visitors if a fee system was implemented. Consequently, the new fee system would present current visitors with three choices: pay the daily per vehicle fee; purchase the annual pass; or, pay neither fee and stop visiting the site. Respondents were presented these options in the following question:

There is legislation before Congress that would establish day-use fees at Corps of Engineer day-use areas, like the one where your vehicle was stopped. The Corps is interested in your views on recreation day-use fees. Suppose a recreation day-use fee was charged at the recreation day-use area where your vehicle was stopped, and at other similar Corps-operated day-use areas nationwide. If the fee was \$_____ per vehicle per day, or \$_____ per vehicle for an annual pass that would allow you to use all the day-use areas located on this lake for one year, which option would you personally choose? (please circle one number)

1. I would pay the per-vehicle per-day fee
2. I would purchase the annual pass
3. Neither-I would not visit Corps day-use areas anymore

Fee levels ranging from one to five dollars for the daily fee and from \$10 to \$100 for the annual pass were written in the appropriate spaces prior to mailing the surveys.

Responses to the fee question were analyzed to determine how the introduction of a fee system would impact different subgroups of current visitors. A comparison of users who self-selected the "neither fee" option and those who chose one of the two fees is shown in Table 3. It should be noted that over 40 percent of all respondents indicated they would not visit the Corps areas if a fee was charged.

Table 3. Socio-demographic and trip characteristics of Corps day-use visitors, by willingness to pay day-use fee.

Characteristic	Would Pay Fee	Would Not Pay Fee
Average Age (years)	40.3	40.0
Sex (percent Male)*	58.9	65.3
Household Size (people)	3.1	3.0
Education (years)*	13.5	13.0
Household Income (\$)*	38,600	32,800
Race (% caucasian)	87.5	89.4
Party Size* (persons)	3.3	3.0
No. of Hours spent at Rec. Area*	5.4	4.5
One-Way Travel Distance*	32.8	26.8
Total Trip Expenses*	\$29.80	\$25.33
Quality rating for site ¹ *	3.76	3.61
Preference Rating for Area Visited ² *	2.2	2.4
No. of Visits to Rec. Area in Last 12 Months*	16.6	27.3
Visited Lake Area in Last 12 months where day-use fee was charged? (% yes)*	26.8	12.2

¹ See Table 2. ² See Table 2.

* denotes a statistically significant difference in group means at the 10 percent level, two tail test.

No statistically significant difference exists in the two groups in terms of age, household size, and the percent minority group members. The latter finding is particularly important, as one of the objectives of the fee study was to determine whether the implementation of a fee system would disadvantage current minority users more than non-minority users.

Significant differences do, however, exist for all other variables in Table 3. The group that selected the "neither fee" option has a higher percentage of males, a lower level of education, and a lower income level. The latter difference is especially important in that one of the questions to be addressed in the study is whether a fee system would discriminate against low-income users.

In terms of trip-related variables, those respondents who indicated they would no longer visit the site with a fee system took over 60 percent more trips during the last twelve months than their counterparts who would pay one of the two fees. One would think that this group would opt for the purchase of the annual pass. However, this was not the case.

Differences in other trip-related variables are more consistent with expectations. Respondents who were unwilling to pay a fee spent less time at the site, reported lower quality and preference ratings for the areas visited, and a smaller fraction had paid a fee to use a day-use area located on a lake during the last year. The latter variable may partially explain the aversion to fees expressed by the "neither fee" group. Historical experience in paying fees is often a significant factor in explaining people's attitudes toward fees. Responses to the fee question also varied significantly across the six projects, thereby suggesting that regional differences in response to fees exist.

Responses to the three-choice fee question were also used to estimate the revenue that could be collected at the six projects if a fee system was implemented. A polychotomous choice selectivity model was used to obtain the information needed to estimate revenues at each lake. This model involved two steps. In the first, a multinomial logit model is used to partition respondents in to three categories: those predicted to pay the daily fee; those predicted to pay the annual pass fee; and those predicted to pay neither fee. The dependent variable in the multinomial logit model is limited to three values corresponding to the three choices available to respondents: "zero" if the respondent

indicated they would not pay either fee; "one" if the respondent chose the daily fee option; and "two" if the respondent chose the annual pass. Independent variables are used to "explain" the observed differences in the responses to the fee question.

This initial step in the polychotomous choice selectivity model provides an estimate of the number of people in the sample who would choose the annual pass option at alternative daily and annual fee levels. Revenue projections from the sale of annual passes are calculated by multiplying the number of people in the sample who would purchase the annual pass at alternative prices. The revenue collected from the people in the sample is then expanded to the population using appropriate expansion factors.

In the second step, data from the respondents who chose the daily-fee option are used to estimate a demand equation describing the number of visits that would be made to the site at alternative daily fee levels. Ordinary least squares is used to estimate the demand equation, and the statistical results obtained in the first step are used to correct for the sample selection bias. The dependent variable is the number of visits respondents said they would have made during the last twelve months if the fees specified in the fee question had been charged.

The estimated demand model provides a price-quantity relationship between the daily fee and the number of visits that would be made by respondents who chose the daily-fee option. This price-quantity relationship is used to estimate the revenue that would be collected through the daily fee from the sample respondents at different fee levels. Revenues are then projected to the population using appropriate expansion factors. Finally, revenues from the daily fee and annual pass fee are summed to estimate the total revenue that could be collected.

The total revenue projections for the six projects at alternative fee levels are shown in Table 4. The estimates are in matrix form, with the rows representing annual pass fee levels ranging from \$10 to \$50 in \$10 increments, and the columns representing alternative daily fee levels ranging from one to five dollars, in one-dollar increments. Each cell in the matrix represents the projected revenue associated with the annual pass fee and daily fee indicated for the intersecting row and column. For example, a daily fee of three dollars and an annual pass fee of \$20, yields an estimate of \$1.53 million in total revenue.

Table 4. Projected revenue at alternative fee levels for the six Corps projects (\$1,000).

		Daily Fee				
		\$1	\$2	\$3	\$4	\$5
Annual Fee	\$10	899	1,033	988	934	914
	\$20	1,124	1,494	1,532	1,438	1,379
	\$30	1,124	1,534	1,624	1,457	1,302
	\$40	1,045	1,548	1,548	1,320	1,038
	\$50	1,051	1,615	1,705	1,496	1,090

Projected revenues vary from a low of about \$900,000 at the \$10 annual fee and \$1 daily fee and the \$10/\$3 combination, to a maximum of \$1.7 million at the \$50/\$3 fee combination. However, the fee combination of \$30/\$3 produces almost as much revenue--\$1.6 million. Furthermore, 14 of the 25 fee combinations result in projected revenues of more than \$1.3 million. Hence, the Corps has some flexibility in setting the fee levels without incurring large losses in revenue. Given the negative attitude of users toward fees, opting for a lower initial fee combination and sacrificing some revenue may be a prudent policy to reduce visitor dissatisfaction and complaints caused by the new fee system.

It is important to note that the revenue patterns in Table 4 is the result of a complex array of factors, including the total number of vehicles entering the designated fee areas in 1992, expansion factors, user's attitudes toward fees and the percent of respondents categorized in the "daily fee", "annual pass" and "neither fee" options by the multinomial logit model. The rate at which

respondents convert to annual passes as the daily fee increases is another important factor, as is the rate at which users convert to the daily fee as the annual pass increases in price. Finally, the rate at which users convert to the "neither fee" option as both the daily fee and annual pass increase in price is important.

In Table 5, "naive" revenue projections are shown for the various fee levels. These projections were calculated on the naive assumption that all visitors would continue to use the site after the fee was implemented, and that they would take the same number of trips as before the fee system. Whether visitors would choose to purchase an annual pass or a daily pass was determined by choosing the least-cost alternative. For example, if the fee combination was \$20/\$2, and a visitor took ten or fewer trips, it was assumed the visitor would purchase the daily pass each trip. On the other hand, if the visitor took more than ten trips, it was assumed that the day user would purchase the annual pass at that fee combination.

Table 5. "Naive" projected revenue at alternative fee levels for the six Corps projects (\$1,000).^a

		Daily Fee				
		\$1	\$2	\$3	\$4	\$5
Annual Fee	\$10	1,395 (64%)	2,009 (51%)	2,286 (43%)	2,389 (39%)	2,843 (32%)
	\$20	1,700 (66%)	2,790 (54%)	3,417 (45%)	4,018 (36%)	4,520 (31%)
	\$30	1,839 (61%)	3,146 (49%)	4,099 (40%)	2,926 (30%)	5,595 (23%)
	\$40	1,897 (55%)	3,401 (46%)	4,511 (34%)	5,579 (24%)	6,178 (17%)
	\$50	1,838 (57%)	3,547 (46%)	4,780 (36%)	5,930 (25%)	6,974 (16%)

^aNumbers in parentheses represent model revenue projections as a percent of naive projections.

The naive projections range from a low of \$1.3 million to almost \$7 million. More importantly, the actual projections are much lower than the naive projection. In fact, in the best of circumstances, the actual projection is only about two-thirds of the naive projection. In the worst case, the actual projection is only 16 percent of the naive projection. These comparisons clearly indicate the importance of considering visitors' attitudes toward fees and their stated reaction to them when projecting revenues from fees. The naive projections usually will be much higher than actual revenues. We believe the procedures used in this study are potentially very useful to recreation managers who must project revenues from recreation user fees.