Estimating the economic value of the sport fishing site in Minnesota using the individual travel cost model
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Abstract

Sport fishing is considered to be one of the biggest industries in Minnesota, as well as in the whole America. The Sport Fishing Association (1996) has ranked Minnesota number 4 in terms of freshwater fishing's overall economic impact on America. The association has reported that freshwater fishing in Minnesota has generated $1.9 billion (14% of the total national expenditures). The main sport fishing area in Minnesota is Ely. Gathering information regarding the sport fishing recreation's economic value using the individual travel cost model and its socioeconomic factors will improve this industry in Minnesota and benefit many, including the federal government, local administrative officers, business sector, and local community. The economic value of sport fishing in the Ely area is $13,834,367; and only the socioeconomic factors of age, family size, and trout fishing experience have a statistically significant impact on the demands of anglers.

Background

In Minnesota, sport fishing is a very popular sport. The Minnesota Department of Natura Resources (DNR) reports that fishing in the state currently supports 23.6 million resident and nonresident anglers (Gartner, 2002). Statistics shows that the DNR sells over 98,000 trout stamps annually and that the number of trout and salmon stamps sold increased from 42,412 in 1982 (first year) to 96,271 in 1997. The price of the stamps increased from $5 in 1997 to $8.5 in 1998. Moreover, every year anglers spend more than $1.8 billion on fishing-related recreation in the state, with the largest portion of that amount spent on boats, gas, and lodging. According to a previous study (Gartner, 2002), in Northeastern Minnesota, over 37% of the anglers mostly engage in stream fishing for brook trout, rainbow trout and some steelhead salmon.

The Ely area is a very famous destination as it is the main fishing site in Northeastern Minnesota, so it is important to study anglers' behavior and estimate the industry's economic value to implement better through projects and policies.

Research questions

. To estimate the value of fishing recreation sites in the most significant region of Ely using the travel cost methodology.

To determine the relationship between the dependent variable (visits) and the independent variables (travel cost, income, years of fishing experience, family size, education as a demand function).

Methods

The individual travel cost model is also used in this research since the data gathered are secondary data from a previous study (Gartner, 2002). Data were collected by sending questionnaires to trout and salmon license holders. Travel Cost Model(TCM) should be based on the theory of consumer choices, the preferences of the visitors, and the economic constraints that influence their choices (socioeconomic characteristic variables, travel cost variables).

The first model studies the socioeconomic factors that have an impact on the visitors' demand, and this study uses a double-log model because the estimated coefficient of these factors would represent elasticity or sensitivity to demand.

lnVisits = βo + βln(TC) + βln(socioeconomic variables) (age, education, income, salmon fishing experience, trout fishing experience)

The second model will be used to estimate the economic value of the fishing site. A semi-log model was used. The dependent variable is the number of visits; and independent variables are total cost, age, education, income, family size, trout fishing experience, and salmon fishing experience.

lnVisits = β_0 + β_TC+ β_age+β_(family size)+β_(trout fishing experience)

The area under the demand curve integrates the demand function from the beginning price TC and begins to choke the price when no trip is made (TC, choke). The formula for individual consumer surplus (CS) is as follows:

CS = ∫visit(TC) dTC = –Visits/βtc; this is a measure of the benefit (economic value) derived from recreational visits as a whole.

βtc = estimated coefficient for the TC variable, and consumer surplus per trip per person = CS/visits = –1/βtc.

Sample

Secondary data were collected by Gartner (2002). A survey was mailed to anglers who have permit to fish in the Ely area, and 842 anglers returned their questionnaire.

Results

For model 1:

Variable	Coefficient of double-log (t-value)
Constant	6.300924(8.40)
Travel cost	−0.2988068(−7.28)
Family size	−0.2335811(−1.96)
Age	−1.069072(−4.86)
Income	−0.0249352(−0.22)
Education	0.0521672(0.40)
Trout experience	0.4077749(4.69)
Salmon experience	−0.0642578(−0.76)

For model 2:

Variable	Coefficient of semi-log (t-value)
Constant	3.16346 (18.72)
Total cost	−0.0023387 (−6.20)
Age	−0.0256461 (−7.76)
Trout fishing experience	0.0262693 (9.08)
Family size	−0.0444169 (−1.60)

With an adj-R-squared of 28%, the estimated value of the Ely recreation site per person per trip is $-1/\beta_{TC}$, tc = travel cost variable. The estimated coefficient for the travel cost variable is −0.0023, so the recreation site's estimated value is (−1/−0.0023) = $427.58.

Table 1. Annual total values of trout and salmon sport fishing in region 2 (Ely)

Activity angler	(1) Total Number of trips	(2) Average expenditure per angler trip	(3)Total annual expenditures 1*2* average anglers	(4) Average CS as computed by TCM per trip	(5)Annual total resource value
Fishing	9804.5567	$132.7129	$4,293,931	427.58	$13,834,367

Conclusion

The annual economic value of the Ely site is $13.8 million, which is 3.22 times bigger than 4.2 million in out-of-pocket travel expenses. The socioeconomic factors of family size, trout fishing experience, and age have an impact on the demand of anglers to visit Ely.

The public sector might need more information to support their decision, such as information on the real economic value of the recreation sites, economic impact, socioeconomic characteristic for marketing management, visiting time of the year, or type of fishing that anglers enjoy the most. Consumer surplus would help the public sector set the tax and the price of the permit. Furthermore, the private sector would benefit from knowing the characteristics of anglers so that it can provide better products to satisfy them.

References

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Interdisciplinary Social Sciences