

Article

Sport Fishing Events' Economic Value as a Tool for Strengthening Tourism Promotion and Management Policies in La Paz, Mexico

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Simple Summary

Sport fishing events in the La Paz Bay, Mexico, provide both economic benefits to anglers and tour operators. Nevertheless, the recreational benefits to anglers have not been estimated. The research starts with a simple question: Could this invisible benefit to anglers be measured, and could anglers contribute to preserving recreational-fishing species? The research aims to estimate the value of sport fishing events using anglers' individual willingness to pay, based on the single-travel-cost method. The results show that the aggregated economic benefit of sport fishing events to anglers ranges from around USD 1 million. Assuming this amount were collected through an economic instrument for environmental policy, there are several options to fund management and tourism promotion policies by leveraging the 3S industry and the moral obligation of recreational fishing tour operators to conserve reserved recreational species on which their private benefits depend.

Abstract

La Paz Bay is one of the most important destinations for recreational fishing events in Baja California Sur, Mexico, with significant tourist activity that supports ecosystem services and provides economic benefits to participants, benefits that have not yet been economically measured. The aim of this study was to estimate the willingness to pay (WTP) of anglers who participated in sport-fishing events and to propose tourism promotion and recreational fisheries management strategies. Applying 184 face-to-face surveys at sport fishing events in LPB held in 2022 and 2023 to collect information regarding fishers' and fishing trips characteristics, and using the individual travel cost method to estimate the individual WTP per angler, which ranges from USD 50.96 to 625.63, and the recreational economic value of fishing events in La Paz was estimated at USD 0.89 to 1.11 million. Strategies for conserving species reserved for sport fishing and promoting tourism are discussed, which could help improve tournament activity and promote the rational use of natural resources. This study represents the first effort aiming to value sport fishing events in Mexico. Also, demonstrates the economic relevance of sport fishing events for recreational fisheries management and tourism-promoting policies in LPB. It provides evidence that conserving sport-fishing species could enhance management strategies and sustainable tourism promotion policies for this recreational activity.



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1. Introduction

1.1. Sport Fishing in Mexico

Sport fishing is an essential activity in tourism, since it is linked to coastal zones. Sport fishing is practiced for both competition and recreation, fostering a bond between humans and marine and fisheries resources [1]. Sport fishing is a very profitable economic activity due to three reasons: (i) the income generated, (ii) it fosters a bond that is socially crucial for employment, causing a very high multiplier effect in several economic sectors like fishing, tourism, and industry [2–4]. There are two distinguishable segments in sport fishing: regular recreational fishing and sport fishing events. The first one is conducted individually or in small groups under a non-competitive scheme, in accordance with federal regulations, for recreational purposes, and occasionally involves catch-and-release practices to conserve sport-fishing species [5,6]. On the other hand, sport fishing events are conducted under a competitive, organized scheme, where participants aim to win based on the weight, number, or size of their catch. These events are conducted under specific rules, verified by supervising committees, and subject to seasonal and time constraints, as well as specific areas and species. In these sports events, anglers typically compete for prizes in several categories. Sport fishing events also bring economic benefits to the communities where they take place [7,8]. To win a sport fishing event category, essential factors include team expertise, fishing gear, and boat type, as well as environmental elements that increase the odds of catching a large, heavy fish [9]. Several communities organized fishing events to attract anglers, spectators, and non-resident tourists, thereby promoting local economic development [10,11].

Benefits from recreational activities linked to natural resources are known as cultural ecosystem services [12]. Because of this, sport fishing is classified as a cultural ecosystem service, as it results from anthropogenic interactions with marine resources and the functions of marine ecosystems for recreational purposes [13,14]. The ecosystem service provided by sport fishing has two components: it is a growing and popular activity in specific conservation or protection areas for natural resources, where recreational and sport fishing are practiced, and it is an important annual generator of global direct and indirect economic revenues of 44 and 100 US\$ billion, respectively [15].

In 2023, Mexico sold 262,634 individual recreational and sport fishing permits, collecting approximately 109 million MXN [16]. In Baja California Sur (BCS), around 75% of these permits were sold [17]. According to information provided by the Marine Resources Protection Trust Fund (FONMAR, by its acronym in Spanish), Baja California Sur sold about 171 thousand sport fishing permits, collecting around 71.4 million MXN, with a surplus of 10.1 million MXN compared with the year 2023 [18].

Sport and recreational fishing in Mexico are regulated by the NOM-017-PESC-1994 [1]. This regulation establishes a standard defining sport and recreational fishing as a productive activity engaged in for recreational and/or competitive purposes, connecting people with nature, particularly fishery resources. It also specifies that this activity is based on the sustainable use of various fish species in both inland reservoirs and marine waters. Among the latter, billfish species (marlin, sailfish, and swordfish), shad, roosterfish, and mahi-mahi are reserved exclusively for sport and recreational fishing within a 50-nautical-mile zone. It also regulates fishing gear and total allowable catch by species.

The Official Mexican Standard acknowledges that there are no equivalent standards; domestic regulations in other countries do not include the specific technical and legal elements and provisions applicable to this activity in Mexico, which are incorporated into this Official Mexican Standard. The regulations in this amendment to the Official Mexican Standard are consistent with the rules of the International Game Fish Association (IGFA), which standardize criteria for international practice and competition.

One of the most important factors of Mexican sport fishing regulations is the angler's right over the caught species. According to federal regulations, the angler may keep and take the caught fish for personal consumption. Catch-and-release is rarely practiced in Mexico, but it is optional under this regulation. This duality reflects both the individual dimension of enjoyment and the challenge of sustaining ecosystem services [19,20]. Thus, it is also important to consider that the benefits of sport fishing depend on the stock abundance and the sustainability of fishing resources. Sport fishing usually markets recreational ecosystem services, which are enjoyed freely because they are taken for granted and lack a price.

When cultural ecosystem services provided by marine ecosystems lack value, they face the dilemma of the public goods problem. Most fishing resources are considered public goods because they are non-rival and non-excludable; these characteristics can lead to unsustainable use of natural resources and the ecosystem services they provide [21].

The most common methods for valuing ecosystem services provided by environmental resources are travel cost, contingent valuation, and discrete choice because they address non-market goods using established economic principles and capture both revealed and stated preferences. They are highly adaptable for quantifying use value (recreation), non-use value (existence), and attribute-based tradeoffs for policy decisions. They are widely used for their versatility, as they can be applied to a wide range of goods and services, from national parks to water quality, covering both use and non-use values. Also, because these methods have a very strong economic and statistical basis, they enable the conversion of environmental benefits into monetary units and direct comparison with project costs in cost-benefit analyses. Another characteristic is the extensive academic literature and established procedures, which make them defensible for legal and policy purposes [22,23].

One widely used method for valuing public goods that provide recreational activities is the travel cost method. It is a revealed-preference method that calculates the value of recreational sites (such as parks or lakes) based on the time and travel expenditures visitors incur. It is popular because it relies on actual behavior rather than hypothetical scenarios [24–28].

The method has two basic assumptions: one, the need of an individual to travel to a specific site to enjoy its recreational services. Two, even when access to public leisure sites is free, visitors pay an implicit price for the cultural and recreational services provided by the site, which may include transport costs, equipment, meals, lodging, and other expenses. The travel cost method is an indirectly revealed preference method, as it uses information on the time (opportunity cost) and money (real cost) that individuals, families, or groups spend to visit a natural place [29]. The visitor's preference diversity provides sufficient information to estimate the site's demand function, in which visits are associated with travel (or trip) cost [29].

There are several valuation studies for sport fishing worldwide and in BCS (Table 1). These studies estimate consumer surplus (CS), or willingness to pay (WTP), as the individual economic benefit a consumer perceives above the price paid. Which is the maximum monetary value an individual is willing to pay to participate in the activity [12,23].

Table 1. Literature review of economic valuation studies of sport and recreational fishing.

Author/Year	Location	WTP (USD) Except When Indicated	Valuation Method	Variables Used in Estimation
Ditton et al. (1996) [30]	Los Cabos	547	TC	Travel cost
Layman et al. (1996) [31]	Gulkanaka River, Alaska	523.00–642.00	CV and TC	Site travel cost, income, education, variables regarding the fishing trip (e.g., raft, camp, view, photo)
Hushak et al. (1988) [32]	Lake Erie, Ohio	262.00–118.85	HTC	Price trip, number of harvested fish per person, and income
Upneja et al. (2001) [33]	Pennsylvania	297.15	TC	Travel expenditures
Bell et al. (2002) [34]	Washington and Oregon, USA	120.50 Tillamook Bay 106.50 Yaquina Bay	CV	Cost, split income (high-low), variables regarding fishery management, and anglers' behavior.
Laitila & Paulrud (2006) [35]	Lake Storsjö, Jämtland, Sweden	123.5–204.0 (CHF)	CE	Bag size limit, expected catch size (medium, large)
Alberini et al. (2007) [36]	Lagoon of Venice	147.83 (€)	TC and CB	Trip price, trip price to substitute site, catch rate, resident, income, hypothetical catch rate
Hernández-Trejo et al. (2009) [37]	Loreto, México	752.00	TC	Travel cost, age, education level, sport fishing, traveled distance, fishing hours, and knowledge about NPA.
Gómez et al. (2011) [38]	Los Cabos, Mexico	517.00	TC	Travel cost
Hernández-Trejo et al. (2012) [39]	Los Cabos	22.70–70.55	TC	Travel cost, catch rate, income, skunked, fishing license type, and importance of sport fishing
Hutt et al. (2013) [40]	Grenada and Sardis Reservoir, Mississippi	Sardis NR: 170.08 R: 85.11 Grenada NR: 226.06 R: 127.99	CV	Bid
Hernández-Trejo et al. (2017) [21]	Los Cabos	41.60 (two days fishing)	TC	Travel cost, years of visiting the area, fishing expert, and sport fishing as a fishing motivation
Meza-Cuéllar, 2017 [41]	Isla Cerralvo	500.00	TC	Trip cost/day, age, schooling level, precedence, income, traveled time, and fishing expertise.
Almendarez-Hernández et al. (2020) [42]	Cerralvo Island	1886.00	TC	Daily fishing cost, gender male, 6 ranks of ages (from 21 to 70 and up), travel motivation, expert level, and fishing days
Von Borstel Juárez (2020) [43]	Los Cabos	1100.00	TC	Daily cost, catch, income, 5 ranks of ages (40 to 71 years old), fishing hours

TC: Travel cost, CV: Contingent valuation, HTC: Hedonic travel cost, CB: Contingent behavior, NR: Non-residents, R: Residents, NPA: Natural protected area. Source: Author's self-elaboration.

Nevertheless, to date, there are no valuation studies on sport-fishing events in La Paz Bay. Being aware of its value could ease the burden on marine resource management authorities by facilitating sustainable management through more efficient promotional and awareness campaigns, promoting local economic development, fostering management strategies for sport-fishing reserved species, and forecasting future demand. Given this, this research aims to estimate the economic value of sport fishing events in La Paz Bay and to explore how this outcome could be used to support tourism promotion and enhance management strategies.

1.2. Recreational Sport-Fishing Management

Recreational sport fisheries management is an essential component for securing the sustainability of aquatic resources and the continuity of the ecological, recreational, and economic benefits they provide [19]. Unlike commercial fisheries, recreational sport-fishing combines competitive and recreational components; as a result, the activity requires specific regulations to balance anthropogenic uses with ecosystem and species conservation. Among the main objectives of resource management are: (i) avoiding over-exploitation, (ii) maintaining biodiversity, (iii) protecting critical habitats, (iv) ensuring long-run socio-economic benefits at different scales (local, regional, and national [6,20]). This comprehensive approach recognizes that sport fishing depends not only on fish abundance but also on ecosystem quality and on the user's positive perception of resource management. Therefore, recreational sport-fishing management included regulations and incentives to promote responsible participation by anglers. Among the most common management measures are: (i) catch quotas, (ii) minimum sizes, (iii) temporary closures, (iv) fishing effort limitation, (v) no-take and protected areas, and (vi) catch and release fostering; these measures contribute to fish stock conservation without limiting the leisure experience [1,19,20]. In addition, using permits and electronic records allows managers to assess ecological impacts and ensure the collection of funds that could be reinvested in conservation actions and tourism infrastructure. In addition, environmental education programs and sensitization campaigns strengthen these management strategies for sustainable fisheries practices.

1.3. Sustainable Tourism Promoting Policies

Some of the most effective strategies for nature-based tourist product diversification are: (i) responsible tour operators' certifications, (ii) promoting low environmental impact activities, and (iii) digital platforms implementation, aimed to ease tourists' access to information about regulations and sustainable practices [44,45]. Linking these strategies to sport fishing promotes environmental education and the conservation of fisheries resources and enhances perceptions of the tourist destination. Furthermore, well-regulated fishing, promotional, and leisure events incentivize tourist visitation, fostering local economic development without compromising ecosystems.

Sustainable tourism policies design and implementation require monitoring and assessment systems that measure economic performance and environmental and social impacts. Data collection on tourist flows, the impacts of natural resources, and local communities' perceptions is critical for assessing these policies [46]. On the other hand, coordination among authorities, tour operators, and communities enables policy adaptation, ensuring that leisure tourism, including sport fishing, remains a compatible economic development driver with environmental conservation and the promotion of recreational and cultural ecosystem services.

2. Materials and Methods

2.1. Study Area

La Paz Bay is located in the Gulf of California (GC), specifically in the Baja California Sur (BCS) State, near the southern tip of the Baja California Peninsula (Figure 1), on the eastern coast of the state. It is an important area of the GC and the largest bay on the peninsula's eastern side [47]. This area offers various opportunities to develop sport fishing events, with fishing areas located near the port, in the vicinity of the Espíritu Santo and Cerralvo islands, and within the navigation channels. It is recognized for its high primary productivity and species diversity, with more than 530 species of bony and cartilaginous fish, including high-value species in recreational fishing such as dorado (*Coryphaena hippurus*),

striped marlin (*Kajikia audax*), blue marlin (*Makaira nigricans*), yellowfin tuna (*Thunnus albacares*), and yellowtail (*Seriola lalandi*) [48].

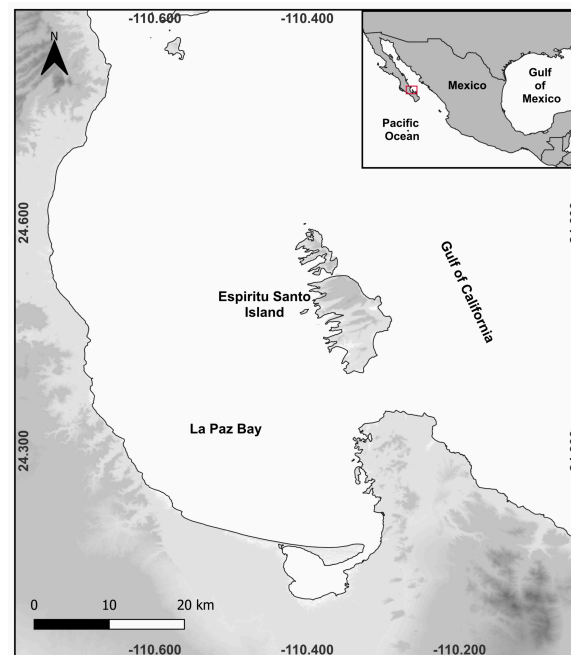


Figure 1. La Paz Bay. Macrolocation (top box) and microlocation (red box). Source: Author's self-elaboration.

2.2. Sample Size

To estimate the sample size, data on the number of registered anglers in fishing events for 2022 and 2023 were used; FONMAR provided these data. Applying a stratified random sample for a known population with no repetition [49], each month was considered as a stratum.

$$n = \frac{N * Z^2 * p * (1 - p)}{(N - 1) * e^2 + Z^2 * p * (1 - p)} \quad (1)$$

where n is the sample size, N is the population (a total of 1775 anglers), z is the value for the normal distribution for a 95% confidence level, e is the maximum estimation error (7% in this case), p is the success probability (50% in this case), and $q = 1 - p$. The estimated sample was 184 surveys. After that, the sample by stratum was estimated using the following formula:

$$n_i = \frac{N_i}{N} * n \quad (2)$$

where n_i is the stratum's sample size, N_i is the size of the i -th stratus and N is the population size. With these parameters, a total of 19 strata was used, corresponding to the number of fishing events in 2022 and 2023 (Appendix A). The surveys were administered to anglers who participated in fishing events held in La Paz Bay from April to October 2024. A database of survey information was gathered and analyzed using Stata 13.

2.3. Survey

A semi-structured survey was conducted, including open and closed questions that were informative, evaluative, and socioeconomic [50]. A total of 29 questions were included in the survey, divided into five sections: (i) general data, (ii) trip, (iii) anglers' activities, (iv) anglers' economic information, and (v) opinion regarding management of the activity (Appendix B). A pilot survey was conducted to identify errors and adjust the survey. The final version was then administered face-to-face at fishing events to collect anonymous, representative information about anglers' preferences and characteristics.

2.4. Travel Cost Method

The travel cost method (TC) has been widely used to estimate the economic values of recreational and cultural ecosystem services [51,52]. It is considered an indirect method because most recreational environmental assets and their ecosystem services are public goods, meaning they lack a market price [53]. To determine the value of ecosystem services, the TC uses the costs incurred by tourists and their visits to the site [41]. Several studies have applied the TC to estimate the economic value of outdoor recreational activities and the variables influencing visitation to natural protected areas [43,51,54–58].

This approach is beneficial because it integrates visitors' actual behavior, such as transportation, lodging, meal expenses, and travel time, providing a more objective estimate of the value individuals assign to the recreational experience. Additionally, facility users are disaggregated by their socioeconomic characteristics, travel distance, and visitation frequency [59].

The TC is based upon six basic assumptions [25]: (i) The individual's wage is a proxy for the opportunity cost of the time spent traveling to the recreational site; (ii) All visitors spend the same amount of time at the site. It is assumed that each visit involves a fixed length of stay at the site. This simplifies the model by making the total cost of the visit a constant parameter. If visitors were free to choose how long to stay, the cost would no longer be exogenous; (iii) no utility or disutility is derived from travel time. The model assumes that travel itself does not generate pleasure or discomfort. This can lead to errors, such as overestimating the pleasantness of the trip (e.g., landscapes) or underestimating the discomfort (e.g., crying children, traffic); (iv) the visit has a single purpose: the recreational site. It is assumed that the purpose of the trip is exclusively to visit the site in question. If other places are visited or purposes combined (such as visiting a relative), the trip costs are shared and difficult to allocate accurately to the recreational site; (v) there are no substitute recreational sites. It is assumed that no other similar alternatives are available. The presence of substitute sites may affect visit frequency, and omitting their consideration may bias the model's results (e.g., by underestimating price sensitivity), and (vi); the choice of place of residence is independent of recreational preferences. The model posits that living near a recreational site is unrelated to the preference to visit it. If people choose where to live based on their recreational interests, then travel costs are not exogenous and may introduce bias into demand estimates.

The TC has several limitations. McConnell and Strand [60] note that individuals respond to variations in travel costs in the same way they would to variations in prices or access fees to the recreational area. Moreover, it is not easy to define and measure the opportunity cost, or the value of the time used during the trip. If individuals enjoy the travel time, time is a benefit rather than a cost, which could lead to overestimation. Another aspect that could affect the estimated value is the availability of alternative sites to practice sport fishing, e.g., if two individuals travel the same distance, it is assumed that they have the same value; however, if an individual has different substitute sites and moves to a specific one, then the site is assigned a higher value.

As for Randall [61], the TC has six main limitations: (i) enthusiasts of such recreational activities often invest in durable goods such as vehicles and specialized equipment, the use of which extends beyond a single trip, (ii) the costs of acquisition for specific trips and equipment maintenance are generally arbitrary, (iii) in the case of trips with multiple purposes or destinations, the allocation of expenses to specific locations lacks an accepted theoretical basis, which limits the accuracy of the economic analysis, (iv) expenses for lodging and meals are highly discretionary, raising methodological questions about their inclusion as direct trip costs, (v) the existence of recreational alternatives influences the welfare estimates obtained using the TC, since there is no rigorous criterion for defining

them, (vi) it challenges the assumption that distance traveled and cost per kilometer are exogenous variables, since recreational preferences may have influenced previous decisions such as place of residence or type of vehicle, and (vii) while recognizing the importance of considering opportunity cost, its empirical measurement remains not yet theoretically defined.

Over the years, there have been two TC variants: zones and individual [26]. Both seek to estimate the average marginal propensity to visit a site. Due to technical issues, the zonal TC was abandoned by the environmental economists and replaced with an individual TC. Individual TC seeks to estimate the demand function for recreational ecosystem services at a specific site using face-to-face surveys of visitors [62–64]. Also, the individual TC allows the inclusion of visitors' sociodemographic characteristics (e.g., income, age, scholarship) and preferences, avoiding zonal grouping, the risk of errors due to averages that can conceal significant individual variation, and gives more robust econometric models outcomes. The individual TC uses Poisson distribution models. Nonetheless, individual TCs require more detailed surveys, which could increase operational costs and the complexity of the research. Since it relies on information provided by respondents, it is highly vulnerable to recall bias and inaccurate answers, and it may be impractical to analyze high-traffic sites where the origin of each visitor is unknown [25].

The general form of the individual travel cost method is:

$$X_{ij} = f(C_{ij}, Z_{ij}, e_{ij}) \quad (3)$$

where X_{ij} is the number of visits to the site by the individual in a specific period, C_{ij} is the individual's travel/trip cost to the site, Z_{ij} is a vector of socioeconomic and environmental explanatory variables associated with the site, and e_{ij} is the stochastic term.

The Poisson regression model is the most used in individual TC [25]. The conditional probability density function for the demand for the number of travels/trips is:

$$fx(x, \lambda) = \frac{e^{-\lambda} \lambda^x}{x!}, \quad x : 0, 1, 2, \dots \quad (4)$$

where λ_i is the Poisson parameter corresponding to its mean (expected number of travels/trips), as well as the variance of the distribution, x_i is associated with the number of travels/trips each individual made.

Some violations of the Poisson distribution are: (i) if data is generated by a mechanism that excludes zero counts, and (ii) if the survey is applied in situ [26]. If either of the latter two situations occurs, a truncated Poisson distribution fits better. When the assumption of equal mean and variance is not fulfilled, it is necessary to check for data overdispersion. Overdispersion (α) is a special type of data heteroskedasticity, defined as the excess variance relative to the conditional mean of the independent variable (when the variance-to-mean ratio is greater than 1). In the presence of overdispersion, the negative binomial distribution fits the analysis better. Finally, if $\alpha = 0$ (or $\alpha \rightarrow 0$), there is no overdispersion; given this condition, the negative binomial distribution is reduced to a Poisson distribution.

Once the Poisson or negative binomial model is estimated, the access willingness-to-pay (WTP) can be calculated. This is represented by the area below the demand curve and above the average price (consumer surplus), up to the price that would reduce travel/trips to zero (the choke price).

$$WTP(access) = \int_{C^0}^{\infty} e^{\beta_0 + \beta_1 C} dC = \left[\frac{e^{\beta_0 + \beta_1 C}}{\beta_1} \right]_{C=C^0}^{C \rightarrow \infty} = -\frac{x}{\beta_1} \quad (5)$$

where x represents the average number of travels/trips, and β_i is the coefficient of the travel cost parameter. After calculating WTP, the site's recreational economic value could be estimated by multiplying WTP by the number of visitors during the period analyzed.

The model selection was conducted by comparing Pseudo- R^2 , a goodness-of-fit measure for Poisson regression that indicates how well the model fits the observed data [65]. The Akaike and Bayesian information criteria (AIC and BIC) were also used to select the best model; both criteria assess the balance between model fit and complexity by penalizing the number of estimated parameters [66,67]. Generally, the model with a lower AIC and BIC is selected, as these indicate a better balance between precision and parsimony. While AIC tends to favor models with a more precise fit, even if more complex, BIC more rigorously penalizes complexity, promoting simpler models when large sample sizes are available [66,67]. Finally, the decision must consider aspects such as model interpretability, coefficient significance, and consistency with the theoretical framework, and include a diagnostic assessment to ensure that the model assumptions are satisfied. This approach, based on AIC and BIC, makes it easier to identify the best model for explaining or predicting the dependent variable, thereby avoiding over-adjustment [66].

$$AIC = -2LnLL + 2k \quad (6)$$

$$BIC = -2LnLL + kLn(n) \quad (7)$$

where LL is the value of the model's maximum likelihood, k is the number of estimated parameters for each model, and n is the sample size. Table 2 shows the variables used in the estimated TC models of this research. Three models were estimated, each with its corresponding parameters, to explain the dependent variable (*sftp*).

Table 2. Variables used in the estimated models for sport fishing participation in LPB.

Variable	Description
<i>sftp</i>	Number of sport fishing events in which the interviewee participated in the year 2024 (<i>sftp</i> > 0).
<i>cost</i>	The total cost of a fishing trip for participating in the sport-fishing events (in natural logarithms).
<i>amateur</i>	1: If the anglers classified their expertise as amateur, 0: other.
<i>nocatch</i>	1: If the angler got skunked during the fishing tournament, 0: Other.
<i>income</i>	Angler's monthly income in USD (in natural logarithm).
<i>boat</i>	1: If the angler owns a fishing boat, 0: Other.
<i>years</i>	Reciprocal of the number of years the anglers have participated in fishing events.
<i>age</i>	Angler's age (in natural logarithm).
<i>gender</i>	1: Male, 0: Other.
<i>usa</i>	1: If angler's precedence is from the United States of America, 0: Other.
<i>motive</i>	Angler's fishing declared motivation. 1: Winning the tournament, 2: Winning a prize, 3: Fighting the prey, 4: Spending time with family and/or friends, 5: Just participating in the tournament, 6: Practicing a sport, 7: Other.
<i>gear</i>	1: If the angler owns fishing gear, 0: Other.
<i>education</i>	1: Middle school, 2: High school, 3: College, 4: Postgraduate.
<i>permit</i>	License type. 1: Day, 2: Week, 3: Month, 4: Year

3. Results

3.1. Descriptives

Nearly 54% of anglers perceive their fishing expertise as intermediate, and 31% of them rated themselves as experts. Regarding the anglers' origins, 88% are from Baja California Sur; 12% are foreign, disaggregated as follows: 8% from the USA and 4% from Canada. The 89% of the interviewed anglers declare owning fishing gear, and 74% own a fishing boat. The gender proportion is 93% male and 7% female. Close 77% of the interviewed anglers have college or postgraduate education. In addition, 95% are currently working, 4% are retired, and 1% are still in school. The main motive for participating in a fishing tournament is spending time with family or friends (54%); only 18% are motivated by winning the tournament, 7% by just competing, and 4% by fighting the prey. The preferences for national anglers regarding prey catch are disaggregated as follows: 35% marlin, 34% mahi-mahi, 16% yellowtail, 11% tuna, and 4% wahoo.

Regarding tournament participation, 184 respondents reported an average of 1.95 fishing events per year. The most common attendance is a single tournament (46%), followed by two (24%) and three (21%); only 9% attended three or more events. In more than 77% of cases, anglers have more than two years of tournament experience, with an average of 9 years of participation. In addition, 79% purchased an annual fishing license, compared with 16% who opted for daily and 5% who chose weekly permits. The average number of fishing days was one day, with an average cost per tournament of \$824.32 USD. The average age of the anglers in the sample is 42 years.

3.2. Econometrics

The study does not incorporate opportunity cost into the analysis, as ref. [68] notes that it lacks a firm conceptual rationale. This research used income rather than wages; including total income, rather than just wages, in travel cost analysis is preferable because it reflects a household's true purchasing power, leisure budget, and ability to afford travel-related time costs [69]. The study does not consider travel duration because sometimes a trip is not considered a cost but a benefit; this may occur when a person chooses certain roads to enjoy the landscape's beauty, turning travel into part of the experience and recreation; therefore, travel duration is influenced by institutional, social, and economic linkages [70].

The first step in estimating the models was to test the data for overdispersion (α). The alpha coefficient for overdispersion was close to zero (2.12×10^{-12}), indicating there is no evidence of this characteristic. After that, a histogram for *sftp* was constructed to determine whether the distribution begins at zero counts (Figure 2). Distribution starts at 1; therefore, a truncated Poisson regression model could be used, since the negative binomial distribution collapses into a Poisson distribution as $\alpha \rightarrow 0$.

Except for model 1, the estimated models for the number of anglers' tournament participations are determined by a set of socioeconomic, demographic, and previous-experience factors (Table 3). The fishing trip cost is statistically significant at the 0.01% level; the parameter has the expected negative sign across three models, suggesting a strong sensitivity of the number of events to participation costs. This implies that, when costs (*registration, transport, lodging*, among others) increase, the odds of participating in a fishing tournament decrease. This backs the economic hypothesis known as the Demand Law [26,71].

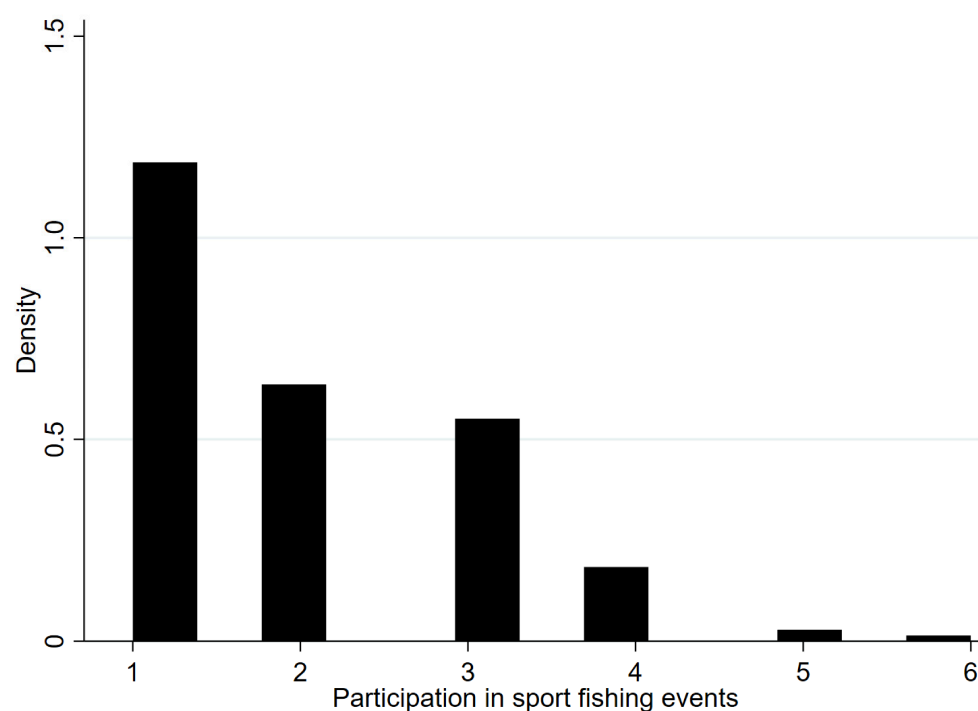


Figure 2. Histogram for *sftp*. Source: Author's self-elaboration.

Table 3. Estimated models. Dependent: *sftp*.

Variables	Model 1		Model 2		Model 3	
	Coef.	<i>n</i> = 184 <i>p</i> > <i>z</i>	Coef.	<i>n</i> = 184 <i>p</i> > <i>z</i>	Coef.	<i>n</i> = 184 <i>p</i> > <i>z</i>
_const	9.21	0.000	10.58	0.000	9.16	0.000
cost	−1.39	0.000	−1.16	0.000	−1.13	0.000
amateur			−1.31	0.000	−0.98	0.000
nocatch			−13.36	0.000	−12.64	0.000
income			−0.10	0.004	−0.07	0.031
boat			0.72	0.000	0.50	0.000
years			−0.47	0.000	−0.29	0.000
age			−0.56	0.000	−0.33	0.000
gender					0.30	0.083
usa					0.09	0.466
motive					−0.04	0.002
gear					−0.14	0.287
education					−0.06	0.027
permit					0.04	0.578
Pseudo R ²	0.28		0.33		0.29	
Pseudo LL	−629.18		−498.13		−550.50	
AIC	1262.37		1012.28		1045.50	
BIC	1271.36		1046.98		1106.77	

Source: Author's self-elaboration. LL: Log-likelihood.

In models 2 and 3, the variable *amateur* has a negative coefficient and is statistically significant, indicating that anglers who self-perceive as amateurs have lower odds of participating in fishing events than more experienced anglers. Likewise, the *income* coefficient indicates that participating in a fishing tournament is an inferior good, i.e., its demand decreases as income increases. Owning a fishing *boat* will increase the odds of participating in a fishing tournament. If the angler's experience (in *years*) increases exponentially, then the angler tends to decrease their participation in future fishing events by 47% and 29%, respectively. The angler's *age* is negatively associated with participation in fishing events.

In model 3, the variable *gender* indicates that if the angler is male, the probability of *sftp* will increase. A positive occurs on the dependent if the angler's precedence is from the USA (*usa*). If the fishing *motive* increases in one category, the probability of *sftp* will drop.

The fact that the angler owns fishing *gear* is not statistically significant for participation in fishing events. If the level of *education* increases, the odds of *sftp* will decrease. As the duration of the fishing *permit* increases, so does the possibility of *sftp*.

Statistical tests of model fit allow for the comparison of model selection criteria. Model 2 offers the best statistical performance in explaining participation in sport fishing events (pseudo- $R^2 = 0.33$), achieves the highest likelihood (-498.13), and has the lowest AIC (1012.28) and BIC (1046.98) values among the three models, reflecting an adequate balance between fit and parsimony. In contrast, model 1, limited solely to the cost of the trip, presents a lower fit as indicated by the pseudo- R^2 , AIC, and BIC contrast tests. Meanwhile, Model 3, which incorporates more variables, does not improve the model's explanatory capacity when considering the same contrast tests. This suggests that including additional variables in this model increases its complexity without substantially improving the fit. Therefore, the best-fitting model is model 2.

The fitting values obtained for pseudo- R^2 are considered adequate, bearing in mind that for nonlinear models, the value of this indicator provides us with an approximation of goodness of fit, which is not entirely analogous to R^2 [72–74]. Several authors have argued that predictive value is low in models that include predictors associated with human behavior [75,76]. This is particularly true in economic valuation models based on travel costs or the creation of hypothetical markets, as some explanatory variables rely on subjective considerations and assessments, as well as the value judgments of the subject of study. Under these assumptions, inferences must be drawn from the regression coefficients for each independent variable and their interpretation within economic theory [77,78].

3.3. Estimation of Angler's Willingness to Pay

One disadvantage of semi-logarithmic models is that they preclude the estimation of willingness to pay (WTP) using Equation (5). To solve this problem, refs. [37,79] indicate that first, the price elasticity (or cost elasticity in this case) must be calculated by using $\frac{-\beta_{tc}}{\bar{V} \cdot \bar{TC}}$, where the parameter $-\beta_{tc}$ is the estimated coefficient associated with the total cost of participation in fishing events, and $\bar{V}$ is the angler's average participation in fishing events, and $\bar{TC}$ is the average travel cost. After that, the estimation of the WTP could be calculated by using $\left| \frac{\bar{V}}{\beta_{tc}} \right|$. The calculated elasticity across three models is inelastic (Table 4), indicating that fishing events in La Paz Bay are inferior goods, meaning that demand falls as income rises. Regarding WTP, this ranges from 505.96 to 625.63 USD/tournament, likewise for the recreational economic value (REV), which ranges from 0.89 to 1.11 million USD, showing an increase of a little more than 19% from Model 1 to Model 3.

Table 4. Elasticity, WTP, and REV for fishing events in La Paz Bay (USD).

Concept	Model 1	Model 2	Model 3
Elasticity	−0.71	−0.59	−0.58
WTP	505.96	608.63	625.63
REV	0.89	1.08	1.11

Source: Author's self-elaboration. REV: Million USD.

4. Discussion

4.1. Environmental Economic Valuation

It is important to consider that, according to the results, skills and experience influence the success of fishing expectations. In addition, having been skunked in previous fishing events appears to be a strong disincentive to future participation, reflecting the importance of the satisfaction gained during the fishing trip and the desire to return for another. The angler's age is negatively associated with the intention of participating in fishing events.

This outcome may reflect that getting older is a progressive process of deterioration and loss of interest, that the physical decline is associated with aging, or a transition to less competitive forms of recreational fishing, as reported [80].

The negative coefficient on monthly income implies that sport fishing events in LPB are an inferior good, meaning demand for them decreases as income increases. Hoque et al. [81] discuss how, as people's incomes increase, they tend to shift from local or lower-quality recreational activities to more expensive and exotic options. This pattern creates negative income elasticities of demand for local activities, making them inferior goods. For example, higher incomes lead households to favor luxury vacations over local recreation, such as fishing. On his side, Reiling et al. [82] provide evidence that hunting licenses are also inferior goods, since wealthier sportspeople may prefer combination licenses. Negative income coefficients are seen in multi-site recreation demand models, suggesting that higher-income individuals prefer different recreational forms [83]. They indicate that sites with negative income coefficients are inferior to other options. Higher-income people face greater opportunity costs in terms of time, making time-consuming activities like fishing events less appealing than quicker, more luxurious alternatives. The increased urbanization and job opportunities further limit demand for fishing. Fishing events may offer lower-quality experiences than luxury fishing options available to high-income individuals. As income rises, recreational activities may exhibit characteristics of inferior goods, depending on income levels and available alternatives [84]. The classification of goods may vary with income ranges, with a good being normal at lower incomes and inferior at higher incomes, influenced by the availability of substitutes in urban versus rural areas [85].

If anglers own a fishing boat, it positively affects participation in fishing events; this may be due to the boat's fishing facilities. On the contrary, owning fishing gear apparently does not affect demand for fishing events; this suggests that access to gear is less important than ownership of a boat, since the gear could be rented. Lastly, participation in fishing events is not determined by the type of fishing permit the angler purchases.

Integration of WTP into the planning and management of recreational areas is a valuable tool for balancing accessibility, conservation, and local economic benefits, aligning with economic valuation studies of recreational ecosystem services [27,53,54,86]. Thus, it is recommended that WTP studies be updated periodically, as visitors' preferences and payment capacity may vary due to economic, social, and environmental factors. The estimated WTP in this research may serve as a baseline for implementing a wide range of environmental and economic instruments for marine resource conservation, such as access fees, permits, bonds, fines, and offsets. The potential revenue from implementing access fees is estimated at 0.89–1.11 million USD.

Nevertheless, there are methodological limitations to consider. The estimated WTP may be biased because respondents may overestimate or underestimate their actual WTP depending on personal perceptions or expectations [87]. To obtain more reliable outcomes, ref. [88] recommends that surveys must include three sections: (i) informative, describing the change (real or hypothetical) of the environmental good being valued (mainly for contingent valuation studies), (ii) wellbeing, which must include the WTP question or about travel cost, and (iii) sociodemographic, oriented to explain interviewees' behavior. Therefore, the monetary approach tends to oversimplify anglers' motivations, which also include social, cultural, and environmental conditions, as well as identity benefits, which are difficult to assess with a single measure [89].

According to ref. [39], environmental valuation is static and reflects the site's status at the time it was conducted; furthermore, it cannot be extrapolated to other sites or to different environmental, social, and economic conditions than those predominant at the time. Together, the outcomes indicate that fishing tournament participation is not random

but influenced by economic costs, experience gained, anglers' self-perceptions of skill, and personal economic and sociodemographic conditions.

The analysis of the economic value of recreational activities associated with cultural recreational ecosystem services is essential for understanding the magnitude of the utility that users assign to ecosystems [90–92]. In addition to sport fishing events, many other recreational activities take advantage of the ecosystem benefits provided by nature, such as marine wildlife watching, swimming, diving, and visits to islands, protected natural areas, or national parks [78,91,93–96]. These studies enable the intangible benefits of recreational ecosystem services to be translated into monetary terms, facilitating their incorporation into planning and decision-making processes [12,25,86,97].

This valuation performs an important role in decisions related to natural resources. By allowing for monetary comparison and measurement, the gain or loss in social well-being resulting from environmental improvement or damage can be determined. In addition, it may help determine an approximate amount to strengthen conservation schemes or compensate for environmental damage. It may also be used to strengthen the design and implementation of monitoring, surveillance, and management plans of protected sites [39].

The results of this research differ from those of other BCS studies that focused only on recreational fishing. As a result, the number of anglers participating in recreational fishing and sport fishing events may differ, and so may the WTP and the REV.

A recurrent concern about environmental valuation studies is their replicability or transferability to similar sites. Costanza [12] made an outstanding effort to demonstrate that environmental valuation studies are not only replicable but also additive, estimating the value of the world's ecosystems excluding the atmosphere and non-renewable resources. Farber et al. [26] indicate that TC is highly compatible for measuring the value of recreational ecosystem services but has low transferability across sites. If results cannot be transferred to other sites, but a similar methodology is used, similar results could be obtained (Table 1). However, in the travel cost method, a mandatory variable is the travel cost, or trip price. Additionally, two other variable vectors could be included: (i) demand determinants, such as income, tastes, and preferences [98]; (ii) a socio-environmental vector of variables regarding site conditions or recreational activity specifications [26].

According to the demand economic theory, the simplest demand model is constituted on the side of the dependent for the demanded quantity (sport fishing tournament participation) and the price of the good or service (sport fishing tournament trip cost). Despite this, the single-demand model could be extended by incorporating theoretical demand determinants or proxy variables to understand the problem better [98].

4.2. Management of Sport and Recreational Fisheries

The results of this research are relevant to leisure tourism promotion policies and allow policymakers to identify market sectors that are more sensitive to price changes, related services, and resource access [4,55,58,97]. In this regard, it has been shown that using differentiated access fees and phased permits can help increase collection without reducing sport anglers' participation [21]. Likewise, the importance of reinvesting a portion of revenue collected from access fees and fishing permits must be highlighted; this amount could be invested in infrastructure, services, and improvements to conservation schemes to strengthen tourists' perception and guarantee resource sustainability in the long term [54].

Estimating the economic value of sport fishing events is a key tool for managing sport and recreational fisheries. This indicator allows us to quantify, in monetary terms, the benefits that fishermen attribute to recreational fishing, providing valuable information for designing conservation financing schemes. For example, if the WTP is high, authorities and tournament organizers can justify implementing access fees, permits, or environmental

offsets, which can in turn be reinvested in monitoring programs, habitat restoration, and fisheries surveillance [25,86].

In addition, the sport fishing sector's estimated economic value helps illustrate the activity's relevance relative to other uses of marine resources. Providing solid arguments for public and private resource allocation to the tourism sector. Integrating this value into management contributes to the enforcement of ecosystem-based management, in which sustainability is measured not only by the ecosystem's health but also by the social and economic well-being provided to communities. In this sense, WTP and REV serve as strategic inputs that guide public policymaking toward a responsible and sustainable tourism model [12,97].

Recreational sport fishing management success depends significantly on the collaborative governance between authorities, anglers, communities, and conservation organizations. Users' participation in decision-making, regulation design, and surveillance of regulation compliance increases the effectiveness of the adopted measures and strengthens local resource governance [10,11,99]. Likewise, periodic fish abundance assessments, trend analyses, and economic valuations of the activity enable adaptive adjustment of management policies in response to ecological, social, and economic changes. This integrative approach ensures that sport-recreational fishing remains a sustainable cultural-recreational ecosystem service, generating economic benefits and conserving the ecological wealth for future generations.

4.3. Sustainable Strategies for Sustainable Tourism

The design of sustainable tourism promotion strategies must seek to balance visitor attraction with the preservation of ecosystems and the well-being of local communities. One of the main lines of action is to focus promotion on market segments that are sensitive to environmental conservation, such as ecotourism, nature tourism, and recreational activities with low ecological impact, including recreational fishing. This encourages a visitor profile that values cultural ecosystem services and is willing to contribute to their maintenance, reducing the risk of tourism overexploitation that degrades resources [46].

Another key strategy is to integrate certification mechanisms and sustainability labels to ensure that destinations and tour operators comply with criteria for environmental protection, social responsibility, and economic viability. These market tools not only strengthen the competitiveness of tourist destinations but also build visitors' confidence by differentiating authentic, responsible experiences from the 3S industry's products [100]. In the case of sport fishing, promoting events that adhere to good practices, such as catch-and-release techniques or reinvestment in marine conservation, reinforces the image of recreational tourism as compatible with sustainability [19,101–103].

4.4. Practical and Theoretical Implications

Among the theoretical implications of the study, Mackay et al. [104] indicate that the standard recreation demand models assume anglers are rational utility maximizers with stable preferences. Nonetheless, behavioral economics research demonstrates systematic deviations from rationality in recreational fishing contexts, including reference dependence, loss aversion, and social preferences. However, behavioral mechanisms such as identity, self-image, and social norms significantly influence recreational fishing behavior. When tournament participants make site choices, their decisions may be driven by competitive rankings, social status within angling communities, and prestige motivations that standard economic models cannot adequately capture. Kearney [105] argues that tournament anglers exhibit greater angler specialization, with fishing being "a more central part of their

lives,” suggesting that standard utility functions may inadequately capture the complex motivational structures of competitive anglers.

Martínez-Espiñeira and Amoako-Toffour [106] states that the basic assumption is that the travel cost is always incurred for a single-purpose recreational trip, but when visitors travel to La Paz for events combined with other Baja California Sur attractions (e.g., whale watching, dining, non-fishing recreation), this assumption is violated, therefore, treating multi-purpose trips as single-purpose leads to upward bias in consumer surplus estimates, while excluding such trips truncates the sample and potentially underestimates total economic value, and treating multi-purpose trips as single-purpose leads to upward bias in consumer surplus estimates, while excluding such trips truncates the sample and potentially underestimates the economic value.

Conventional recreation demand models assume that residential location is exogenous to recreational preferences. However, “non-random residential sorting based on preferences for outdoor recreation” introduces endogeneity bias, as households with strong preferences for fishing may selectively locate near high-quality fishing sites [107]. This theoretical limitation is particularly acute in La Paz Bay, where foreign retirees and high-income recreational homeowners have been self-selected for the region’s marine recreational opportunities.

Negative income coefficients can suggest that a good is an inferior good, but their meaning requires careful analysis. In tournament fishing, higher income might increase or decrease demand, showing how recreational activities can shift between normal and inferior goods based on income and substitutes [108]. The market’s definition influences this classification, whether it competes with other forms of fishing, recreational activities, or general consumption. The Engel curve for tournament fishing might not be straight, acting as a normal good at low incomes but becoming an inferior good as incomes rise, as people choose higher-quality options, and standard linear demand models fail to capture these complexities [85].

On the other hand, there are practical implications: Bradt [109] notes that true travel costs are rarely observed; instead, analysts must construct estimates using information on residence location and site locations, combined with a set of assumptions. This generates both classical (mean-zero) and non-classical measurement error. For La Paz Bay events, international visitors’ travel costs include complex airfares, multi-modal transport, and unclear routing that standard distance-based calculations cannot accurately capture.

Research on La Paz Bay events relies on on-site (intercept) sampling at weigh-ins or tournament venues, which suffers from two methodological biases: (i) endogenous stratification—sampling site choices rather than individuals, where the probability of inclusion correlates with the probability of choosing the site; and (ii) avidity bias (size-biased sampling)—more avid anglers have higher probability of being sampled [109].

Tournament fishing participation is measured as a non-negative integer count (number of events attended), which requires count data models. However, on-site samples suffer from truncation (observing only those with positive counts) and overdispersion (variance exceeds the mean), whereas standard models assume equidispersion [106].

Monetary valuation is static because it applies only to a specific time frame and to political, environmental, and socio-cultural contexts [39]. It is simplistic, since it captures only the value of direct recreational use (sport fishing). It does not include socio-cultural dimensions of sportfishing [110–113], nor those related to non-use (inheritance and option) and other sources of value attributable to direct uses (e.g., small-scale fisheries, or aquaculture) [37].

4.5. Limitations and Gaps

Research on recreational fisheries in developing countries is hampered by limited access to biophysical and socioeconomic data, complicating model specification. Data deficiencies constitute the primary knowledge gap in developing-world recreational fisheries, with baseline data on the number and behavior of recreational fishers and the economic benefits of recreational fishing severely lacking [109]. Unequal distribution of research funding and limited technical capacity restrict the adoption of multi-method valuation frameworks. For La Paz Bay specifically, there are no comprehensive angler expenditure surveys comparable to those conducted for Atlantic Highly Migratory Species fisheries in the U.S. or to the U.S. Marine Recreational Fishing Statistics Survey (MRFSS) system, resulting in reliance on ad hoc surveys with limited temporal coverage [23].

The TC assumes visitors mainly come for single-purpose trips, but tournament fishing in La Paz Bay often includes multi-destination tourism. This can lead to bias in cost estimation. Estimating the opportunity cost of time is challenging in developing economies due to informal labor markets and varying values of leisure time. Research funding inequality limits the adoption of multi-method valuation frameworks [23,105].

There is a critical lack of research specifically on the economics of fishing tournaments in developing countries [42]. While general recreational fishing valuations exist for Mexico, tournament fishing is highly concentrated locally and therefore requires distinct analytical approaches. Current studies fail to account for sectoral heterogeneity in economic impacts by aggregating events into a general category of recreational fishing and failing to consider their distinct expenditure patterns [109,114]. The NOAA found that fishing events generated distinct economic patterns compared to non-tournament fishing, with different expenditure categories (merchandising, labor, catering) dominating [115].

Economic valuation studies for La Paz Bay fisheries have not adequately integrated climate change impacts on fish stock distribution and tournament viability. Research on U.S. recreational fisheries demonstrates that extreme environmental conditions (e.g., heat) significantly impact fishing participation, and the efficacy of adaptation options may decline over time. However, the research is limited by the assumption that indirect ecosystem effects remain unchanged as the climate changes in current valuation models [116]. Specifically for La Paz Bay, El Niño events significantly affect billfish distribution, but these environmental drivers are rarely integrated into demand models [42].

Schilling et al. [117] noted that current economic valuations primarily consider direct spending and consumer surplus, while ignoring intangible social, cultural, emotional, and non-use values. In developing countries, recreational fisheries operate within complex social-ecological systems that involve food security, market access, and governance issues [105,109]. Valuation studies in Mexico have concentrated on use values, overlooking the socio-cultural importance of sport fishing in Baja California communities [118].

There is a gap between economic valuation research and management decisions. NOAA's 2023 workshop highlighted the need for guidelines to incorporate economic information on recreation in recreational and sport fisheries management [119]. In Mexico, recreational fisheries management prioritizes the commercial sector due to limited economic data, and there are no benefit transfer protocols for tournament fishing values in the Gulf of California, thereby limiting policy relevance [118].

5. Conclusions

The results of this study indicate that, given the high willingness to pay (WTP) to participate in fishing events in LPB (a maximum of USD 608.63), this value provides a solid basis for implementing environmental economic instruments aimed at conservation. There is ample scope for actions that could be channeled into infrastructure improvements,

conservation measures, and tourism promotion. This would not have a significant negative impact on demand and could represent an opportunity for growth and sustainable financing if the advantages of the domestic market are exploited and structural conditions are improved. Economic valuation not only serves to justify investments but also to establish payment mechanisms for environmental services, such as compensation or fines for damage to species or habitats. The 3S industry and eco-friendly tour operators are morally obligated to conserve the cultural ecosystem services that sport fishing events provide, on which their profits depend.

Considering the study results, this paper proposes the following policy strategies to promote tourism and conserve species targeted for sport fishing in the LPB, thereby boosting tournament activity and maximizing the use of natural resources.

Mandatory promotion of catch-and-release fishing in events, since almost three-quarters of the interviewed anglers would be willing to continue participating, even if they could not keep their catch. Catch-and-release could be established as a rule in all events endorsed by federal or local authorities. This measure would help reduce pressure on target species such as marlin, mahi-mahi, and tuna.

Differentiated seasonal regulations for species, considering the possibility of implementing temporary closures or catch quotas based on biological monitoring data, especially for high-demand species such as marlin and mahi-mahi. This will allow for the preservation of vulnerable populations without halting recreational activity.

Participatory biological monitoring may be conducted by recreational anglers, leveraging their high educational profile to engage them in community monitoring and citizen science programs. This can raise awareness about the status of target species and encourage sustainable practices.

Implement a licensing system with conservation components, such as a voluntary or mandatory additional payment on sport fishing licenses, based on the type of license purchased, that could be directly allocated to conservation, monitoring, and marine surveillance schemes.

Diversify the offer to national family and recreational tourism, given that just over half of the sample cited spending time with friends and family as the main reason for participating in events. It is therefore recommended to promote sport fishing as an active family tourism activity, complemented by cultural, gastronomic, and nature activities.

Promotional campaigns differentiated by segment, considering the different profiles of anglers, such as amateurs vs. experts, nationals vs. foreigners. Specific campaigns can be designed for national anglers, such as affordable packages for beginner events, with a recreational and family focus. For foreign anglers, premium packages might include catch-and-release experiences, conservation efforts, eco-friendly accommodation, and different fishing license rates. Implement different rates for nationals and foreigners. The extra income could finance conservation and tourism promotion programs.

Create an eco-label or badge, such as “responsible event” or “sustainable tournament,” to recognize events that implement best practices, including catch-and-release, environmental education, and plastic-waste reduction. This can attract more conscious anglers and improve the destination’s international image. Eighth, create environmentally responsible tourism infrastructure so that investments can be made in sustainable tourism services such as eco-friendly docks, electric or hybrid boats, dry toilets, and marine waste collection points, aligned with the demands of the sport fishing market.

Nevertheless, these policies may be challenging to implement. For instance, there could be reluctance among anglers to practice catch-and-release, since Mexican regulations currently allow them to keep their catch. Another issue is the enforceability of differentiated fees and their impact on demand for sport fishing events. On the other hand, the availability

of funds to support sustainable finance for conservation and to conduct species monitoring and stock-availability studies remains uncertain. It should be noted that the calculated WTP is the average regional value for tournament angling, rather than the value of a single event.

The negative income coefficient in fishing tournament demand models can be rigorously interpreted as an indication of inferior goods within the theoretical framework of environmental economics. This interpretation is supported by: (i) standard microeconomic definitions linking negative income elasticity to inferior goods, (ii) empirical evidence of substitution toward higher-quality recreational alternatives as income increases, (iii) documented cases of hunting and fishing licenses exhibiting inferior good characteristics, and (iv) established more sophisticated econometric frameworks for calculating income elasticities in recreation demand models.

Future research on La Paz Bay regarding the valuation of fishing events should employ more sophisticated econometric methods to address on-site sampling bias and relax the Independence of Irrelevant Alternatives (IIA) assumption. Other research opportunities include integrating non-market valuation approaches to capture socio-cultural values and conducting longitudinal studies to monitor changes in WTP using count panel data. Given the developing-country context, there are research opportunities, such as conducting more in-depth studies of the effects of specific policy measures, and researchers should also consider willingness-to-work alternatives to monetary WTP for local stakeholder valuations.

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Appendix A

Table A1. Number of applied surveys in the years 2022 and 2023.

Month	Tournament	Specie	Anglers in Tournament	Surveys
2022				
April	Rotario	Yellowtail	138	11
May	First Annual La Paz Charity	Yellowtail	77	8
June	Fish In The Five	Marlin, mahi-mahi, and tuna	102	10
July	Torneo de Los Electricistas	Mahi-mahi	81	6
July	Sindicato del Seguro	Mahi-mahi	62	5
July	Copa Dorado Gavilanes	Mahi-mahi	49	8
September	Torneo de La Independencia	Mahi-mahi and marlin	96	5
October	Tradicional Torneo Bahía de La Paz	Marlin	93	7
November	Torneo de Electricistas Privado	Marlin	66	5
2023				
April	Rotario La Paz Balandra	Yellowtail	88	10
May	First Annual La Paz Charity Yellowtail	Yellowtail	67	7
July	El Grande Pescando en La Paz	Mahi-mahi	145	37
July	Torneo de Los Electricistas	Mahi-mahi	94	7
July	Copa Dorado Los Gavilanes	Mahi-mahi	102	11
August	Color Laser Fishing Tournament	Mahi-mahi	71	8
August	Bahía de La Paz Club Gavilanes	Marlin	88	9
September	Torneo La Independencia	Marlin	92	10
October	Dorado La Paz	Mahi-mahi	78	9
October	Tradicional Torneo Bahía de La Paz	Marlin	186	11
TOTAL			1775	

Source: Information for sport fishing events in La Paz Bay was provided by the statistics department of FONMAR, 2022.

Appendix B

Table A2. Questions and format type in the survey.

Variable	Description/Coding
General information	
Gender	1: Male/0: Female
Age	Integer
Nationality (Country)	1: MX/2: USA/3: CAN/4: Other
Education. Last level of education	0: None/1: Elementary/ 2: Middle school/3: Highschool/ 4: College-University/ 5: Postgraduate (master's or Ph.D.)/ 7: M.D.
Precedence. Residence	1: Local/2: Baja Sur/3: Mexico/4: USA/ 5: CAN/6: Other
Occupation	1: Employed/2: Unemployed/3: Retired/ 4: On vacations-holidays

Table A2. *Cont.*

Variable	Description/Coding
About tournaments	
The number of hours it took him to reach the fishing spot using the boat.	Integer
Number of times the interviewee participated in tournaments in the LPB area (last 12 months)	Integer
Motivation	1: Winning the tournament/2: The prize/3: Fighting the animal/4: Spending time with friends and family/5: The competition/6: Playing a sport/7: Other
Repetition: Since what year have you been fishing in La Paz?	Integer
Angler's activities	
Skill	1: Amateur/2: Middle/3: Expert
Fishing zone	1: Bajo/2: Cerralvo Norte/3: Cerralvo Sur/4: El Coyote/5: Punta Arena/6: Otro
Years in tournaments. The number of years participating in tournaments in the area	Integer
Fishing gear	1: Owning fishing equipment, 0: Other
Fishing boat	1: Owning a fishing boat, 0: Other
Number of anglers in the team (w/o counting the interviewee)	Integer
Species preferred for capture, in order of importance from highest to lowest, on a scale of 1 to 5	1: Marlin/2: Mahi-mahi/3: Tuna/4: Yellowtail/5: Wahoo/6: Other
Released fishes	Integer
Released species	1: Marlin/2: Mahi-mahi/3: Tuna/4: Yellowtail/5: Wahoo/6: Other
Skunked	1: No fish caught, 0: Other
No Fishing days (Days without going fishing)	Integer
License	1: Daily/2: Weekly/3: Monthly/4: Annual
Economic information	
Income. Gross monthly income in US dollars (USD)	Continuous variable
Travel cost. Total cost of the tournament (USD)	Continuous variable
Registration fee (USD)	Continuous variable
If they were prohibited from keeping their catch, would you still participate in tournaments?	1: Yes/0: No
Places where you can participate in tournaments with the same budget	1: Cabo San Lucas/2: Mazatlán/3: Loreto/4: USA/5: Costa Rica/6: Other
Management	
Where did you purchase your fishing license?	1: Internet/2: Fishing guide/3: Hotel/4: Port office/5: Fishing service provider/6: Other
Willingness to pay to collaborate in managing the activity	1: Yes/0: No
Willingness to pay based on an improvement in the catch rate	1: Yes/0: No

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