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The Indirect Economic Contribution of Fisheries to Coastal Communities through Tourism

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Abstract: The existence of a commercial fishery in a coastal community is often promoted by the tourism sector as a key feature to encourage visits by tourists. However, the contribution of fisheries to tourism in coastal communities in the economic literature is unclear, with mixed results from previous studies. In this study, we examine the counterfactual—how would tourism change in the absence of fishing, and how would this affect benefits to tourists and the local economy. We use a contingent behavior travel cost model, combining revealed and stated preference data, to estimate these changes for Mooloolaba, a coastal fishing town in the Sunshine Coast region of Queensland, Australia. We find that the fishing industry and related provision of local seafood generate $6 million in welfare gains to visitors. We further estimate that it is directly responsible for 19% of the total number of days visiting the town, contributing an additional $8 million per year through tourism related expenditure. Given the importance of the fishing industry to the tourism sector in coastal communities, there is a need for the tourism industry to engage in the fisheries management process.

Keywords: non-market valuation; commercial fisheries; local seafood; food tourism

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1. Introduction

The contribution of fisheries to local communities is often examined in terms of its contribution to employment (e.g., [1,2]), food security and livelihoods (e.g., [3,4]) and the flow-on effects of using inputs derived from the local economy (e.g., [5,6]). However, there is growing recognition that the importance of a local fishing industry to the local community may extend beyond its traditional role of food provision and employment (both direct in the industry and indirect in the upstream and downstream sectors supporting the industry). However, the evidence suggesting that the existence of a local fishing industry provides positive externalities to other industries such as tourism is mixed.

A local fishing industry, in theory, may provide benefits through the provision of fresh seafood to local cafes and restaurants, or in some cases directly to the public [7,8], while the fishing vessels (i.e., the fishing fleet) may directly provide a tourist attraction. Ropars-Collet, et al. [9] found that the existence of a local fishing fleet and direct sale of seafood contributed to the non-market benefits realized by visitors to coastal towns. However, Andersson, et al. [10] found that, even if they do provide benefits to tourists, there was little evidence that seeing fishing fleets attracted more overnight visitors, and hence may not benefit the towns themselves. In contrast, Lopes, et al. [11] found that most restaurants in tourist areas promoted the "local" seafood on their menu, and those that did not were often questioned by tourists about the availability of "local" products, seeking these options where available. This suggests that availability of "local" seafood does attract tourists.

Other studies have suggested that tourism benefits may be achieved through transition fishing industries from the provision of fish to the provision of services to marine ecotourism such as whale watching, (recreational) charter fishing, scuba diving or guides, e.g., [12–14]. In this regard, several previous studies have considered the role of recreational fishing as a key tourism activity and attractor, e.g., [15–18].

In this paper, we consider the term "*fisheries*" to be the broader activity involving fishing, and includes fisheries managers, fisheries scientists and the fisheries resource itself as well as those who harvest it. The fisheries resource is harvested by the "*fishing industry*", which is the group that undertakes the fishing activities and supplies the fish to the local communities. The fishing industry can also be broken down into the "*fishing fleet*" (the boats used in the fishing activity) and the "*fishing operators*"—the human capital component of the fishing industry.

The relationship between the existence of a fishing industry and tourism is complex. In some regions, particularly in Europe [19,20], fishery operators engage directly in tourism-related activities in a similar manner to that of agritourism. Referred to as "pescatourism", tourists are invited on board fishing boats where they experience the life of a fisher for a day [19]. Similarly, "yujiale" has developed as a form of tourism in China, where tourists live with fishing families, participate in the fishing activity and attend cultural events in the fishing communities [21,22]. These types of activities give tourists the experience of learning about traditional fishing methods as well as sampling the catch which has been prepared using local recipes [21,23]. Although the pescatourism and yuijale industries are not as prominent as agritourism, this suggests that commercial fisheries and their associated cultural heritage are attractive to tourists [24].

While pescatourism and yuijale bring tourists closer to the industry through direct engagement with fishers, the fishing industry can also indirectly contribute to the tourism experience of coastal visitors. Previous studies have suggested that the availability of locally produced food can itself be a tourist attraction [7,8]. Many coastal tourism agencies emphasize the presence of a fishing industry in their town to highlight the opportunities to sample freshly caught local seafood. Local seafood experiences and visiting local fish markets have also been key aspects of promoting a coastal fishing town. Previous studies have indicated that visitors (and residents) also enjoy seeing the fishing boats and fishers at work when at the coast [25,26], and also appreciate the fishery as part of local landscape [27].

While there is some understanding of the importance of the fishing industry in supporting the restaurants of a particular region, what has not been examined is how having an active fishing fleet in a local region can provide benefits to tourists and therefore benefits the local coastal community. While food tourism relies heavily on the local food being promoted, seeing how the food is produced can further encourage food tourism by enhancing the food experiences [28].

Fisheries management has historically been focused on the sustainability of the fishery resource, and in some jurisdictions also on the economic performance of fishers. Increasingly, social considerations are influencing fisheries management decisions, with impacts on local communities being a common consideration [25,29]. Where these have been considered, a key emphasis has been on employment and associated regional economic flow-on effects to related industries. The indirect impact of fisheries on other industries, particularly tourism, is not well understood and is often overlooked in fisheries management considerations. Conversely, the tourism sector is indirectly a stakeholder in fisheries management, but to date has not played an influential role as its importance is not realized. A better understanding of how the experiences of tourists, and as a result the tourism industry, is affected by the existence of a fishing industry will be of benefit to both tourism and fisheries management.

The aim of this study is to examine whether seeing a local fishing fleet and eating locally caught seafood adds value to the overall coastal tourism experience, and, as a result, influences the level of visitation to coastal communities. Our study differs from previous studies as it essentially considers the non-market value of being able to see a local fishing fleet and eat locally caught produce from the tourists' perspective. That is, how much additional value does the experience provide to the tourists themselves.

Although Andersson, et al. [10] found little evidence of a relationship between the existence of a fishing fleet and visitor numbers, coastal towns have a wide range of attractions (e.g., beaches) that may obfuscate this relationship. To identify the impact of the fishing industry and availability of local seafood, we employ a counterfactual approach—how would visitation change if there was not a local fishing industry. This is implemented using the contingent behavior travel cost method. Using the same models, we are also able to estimate how much the local industry contributes to visitor numbers and from this, the additional value generated in the local economy.

2. Materials and Methods

We use as a case study the coastal fishing town of Mooloolaba, in the Sunshine Coast region of Queensland, Australia. It is recognized as one of premier coastal day trip and holiday destinations in Queensland, being about a one-hour drive from Brisbane, the capital city of Queensland. While located on a river and large bay, Brisbane has no sandy surf beach; the nearest beaches are an hour's drive north to the Sunshine Coast or south to the Gold Coast. The town of Mooloolaba is popular for its beach, recreational fishing and other coastal and marine based activities.

Mooloolaba is also the home of one of the largest fishing fleets on the eastern Australian coast, with its catch sold across Australia and South East Asia [30]. Visitors can observe prawn trawlers, other fishing vessels and tuna longline vessels tied up at the wharf, as well as entering and leaving the port (depending on the time and tides). Seafood restaurants and retail outlets sell locally caught products to tourists and locals, and are considered a further attraction to the town.

Commercial fishing and tourism developed at the same time in Mooloolaba, and the importance of each to the local economy make it an ideal case study to test the interactions between the two sectors. The town was officially established in 1920, at which time it had a small trawl fleet operating out of the river. The township itself developed primarily to support increasing tourism, mostly associated with visits to the beach [31]. The town also developed into a major center for prawns and other seafood, with catch being sold locally and across the rest of the Sunshine Coast, as well as being sold in Brisbane and other major domestic markets. In the early 1990s, many of the tuna longline vessels operating in the Coral Sea relocated their base of operations to Mooloolaba [32]. Most of the tuna catch is exported, with some sold locally and the broader domestic market.

The aim of the study was to examine whether the ability to see the local fishing fleet and to experience seafood sourced from the local fleet had a positive (or otherwise) impact on the number of visits to the town, and if it added value to the overall trip experience. To estimate the value of the Mooloolaba fishing industry and the 'local seafood experience' held by visitors to Mooloolaba, we develop a travel cost model, a revealed preference technique that estimates factors affecting visit numbers and tourism benefits (measured as consumer surplus) based on observed behavior derived from a survey of visitors. We combine this with a stated preference method to estimate the change in trip behavior and consumer surplus associated with the site under certain conditions [33,34]. Under this method, the visitor is given hypothetical scenarios which affect the site in question (e.g., changes in the quality of the site), and asked to indicate whether the number of trips to the site would change, and by how much, based on these hypothetical scenarios [35]. This contingent behavior method has been used to estimate changes in trip behavior as a result of changes in quality of recreational sites [36–42], as well as value improvements to cultural heritage sites [43].

2.1. Travel Cost Method

The travel cost method involves estimating a participation model that links the number of trips to a site with the cost associated with travel to the site as well as other site-specific and individual specific variables. The estimated demand function is based on the observed behavior and characteristics of the set of individual visitors to the site, and hence is considered a "revealed preference" method.

The demand for the activity by the visitor, represented by the number of trips undertaken, is assumed to be a function of the cost of travel (taken as a proxy measure of its price), the socioeconomic characteristics of the visitor (e.g., education, age, income) and other site-specific characteristics (where these may vary). The generic demand model can be given as

$$x_i = f(z_i) + \varepsilon \quad (1)$$

where x_i is the observed number of trips undertaken by visitor i, z_i is a vector of the site and individual specific factors influencing demand, and ε is a random error term.

The dependent variable—the number of trips—has a non-negative integer distribution and hence count models are generally considered more appropriate for the model estimation [44]. These estimate the probability of a visitor choosing to visit the site given the costs and other characteristics. Assuming that the distribution of trips will approximate a Poisson distribution [45], the probability of a visit can be given by

$$\Pr(x_i = n) = \frac{e^{-\lambda_i}\lambda_i^n}{n!}, n = 0, 1, 2, \ldots \quad (2)$$

where n is the observed number of trips and the parameter λ is both the mean and variance of the distribution, and is commonly specified as an exponential function [46] given by $\lambda_i = \exp(z_i\beta) = E(x_i|z_i\beta)$ where β is a vector of the unknown parameters to be estimated associated with each explanatory variable z.

A common problem experienced with travel cost models in practice, however, is that the observed variance and mean may differ, in which case the assumption of a Poisson distribution will be inappropriate. An alternative approach in this case is to use the negative binomial model. This has a variance $\text{var}(x_i|z_i\beta) = \lambda_i(1 + \alpha\lambda_i)$, where α (the dispersion parameter) is a measure of the degree to which the conditional variance exceeds the conditional mean [46]. This collapses to the standard Poisson distribution when $\alpha = 0$.

The derived model can be used to impute estimates of the consumer surplus associated with the trip (the "willingness to pay" over and above the cost of the trip). The consumer surplus associated with undertaking an average trip can be shown to equate to $-1/\beta_{tc}$, where β_{tc} is the estimated parameter associated with the travel cost variable. Further, the marginal value of an attribute in the model (e.g., the value of an additional trip characteristic) can be estimated by $-\beta_j/\beta_{tc}$ where β_j is the estimated coefficient relating to attribute j [46].

Two further problems also exist with respect to travel cost models which utilize data that were collected on site. The first problem is truncation. That is, as non-users are not included in the sample, the sample becomes truncated at 1, as all visitors have made at least one visit to the site [47]. The second problem is referred as endogenous stratification. That is, there is the issue of sampling a greater proportion of more frequent visitors of the site as they are there more often and hence have greater probability of being sampled [47]. However, both issues of potential bias can be corrected for. Truncation can be corrected through using zero truncated count data models. For count data models using a Poisson distribution, endogenous stratification can be corrected for if the number of trips included in the model is reduced by one trip [46]. For negative binomial distribution, weights based on the number of trips can be used to correct for endogenous stratification [48].

A final problem faced by the travel cost model is the difficulty in ascertaining exactly what proportion of the travel cost was associated with the specific activity being valued, particularly when the trip may involve multiple activities [49]. Several different approaches have been applied to separate out the different components of a multi-purpose trip, including allocating costs based on the proportion of total trip time spent at the destination (or activity) of interest (e.g., [50]) or a weighting based on the perception of individuals of the importance of the activity or destination to their overall trip (e.g., [51–53]). Others include a dummy variable to differentiate multi-purpose and single purpose trips, allowing a different estimate of consumer surplus for each trip type [54–56].

For the purpose of our study, we estimated the demand for travel to the town irrespective of activities undertaken. To identify the importance of the local fishing industry to the decision to travel to Mooloolaba, we asked a series of contingent behavior questions regarding how their number of trips may change in the absence of a local fishing industry. The contingent behavior questions differed for participants based on whether (or not) they were aware of the fishing industry in Mooloolaba before their trip. Respondents who were aware of the industry were given questions in relation to a hypothetical scenario where the local fishing industry did not exist in Mooloolaba. More specifically, respondents were asked to indicate how their number of trips to Mooloolaba may have changed over the last 12 months if the local fishing industry did not exist in Mooloolaba. Following this, respondents were then asked how their number of trips to Mooloolaba would have been affected if there was no locally caught seafood available in Mooloolaba.

The revealed preference (observed travel costs) and stated preference (the contingent behavior questions) data were pooled, and the travel cost model was estimated as a panel data negative binomial model.

2.2. Visitor Data

A face-to-face survey was conducted with day trippers and holiday makers in Mooloolaba during school holidays and weekends throughout April 2018–July 2018 (the main autumn and winter season), as well as December 2018–February 2019 (the main summer season). A copy of the survey questionnaire can be made available on request. Day trippers included locals (i.e., residents of Mooloolaba), other Queensland residents, interstate visitors and international visitors. Holiday makers included Queensland residents from outside of Mooloolaba, as well as interstate and international visitors. To ensure that the models captured the value of the fishing industry and seafood to visitors, Mooloolaba residents were removed from the sample.

Given that identifying visitors to the town a priori was not possible, an on-site intercept survey approach was adopted. Potential respondents were approached to participate in the survey in two public places—one near the fishing fleet and seafood precinct and the other in the main café and restaurant precinct closer to the town center. The two sites were approximately 1.5 km apart. All participants were aged 18 years old or over. For groups, only one person completed the survey. The timing of the survey allowed the capture of a representative sample of day-trippers and holiday makers throughout the year, inclusive of major holidays. Respondents who completed the survey received a voucher for a café retail chain worth $5.00 (AUD). Being an intercept survey of people on holidays, response rates were generally low: the number of refusals was not recorded, but outweighed the number of responses.

The survey had three main sections. As only adults (18 years old and over) were required for the survey, the first question of the survey asked respondents to confirm their age. The remainder of this section asked respondents about their prior experience with, and knowledge of, Mooloolaba. In the second section of the survey, respondents were asked questions about their trip to Mooloolaba. These questions were used to determine how important the local fishing industry was to their trip. The questions asked of each respondent were slightly varied based on whether they were previously aware of the presence of the fishing industry in Mooloolaba or not. In the last section of the survey, respondents were asked some general socio-demographic questions and questions specifically related to their connections to the fishing industry.

A total of 153 survey responses were collected through the on-site surveys. As noted above, the survey initially included responses from Mooloolaba residents. However, in order to find the importance of the fishing industry and seafood to visitors of Mooloolaba, Mooloolaba residents (a total of 16 responses) were removed from the sample. Australian visitors who stated that they travelled 1000 km or more to reach Mooloolaba were identified as outliers and were excluded from estimation (a total of 4 responses). These "outliers" were initially included in the analysis, but the high travel cost associated with these observations resulted in distortions in the model and unrealistically high consumer surplus estimates. Of the remainder, 41 respondents were not aware of the fishing industry in the town before their trip. To estimate the contingent behavior travel cost model, only respondents who were aware of the industry before their trip were included in the final analysis A second contingent behavior travel cost model was estimated including only those who were not aware of the fishing industry before their trip to Mooloolaba, asking how their behavior may change in the future now they are aware of the fishing industry in the town. However, the model results were unreliable as the sub-sample was too small. Given this, we estimate the subsequent values in the paper assuming that they relate to only 69.1% of total visitors to the town (i.e., the proportion aware of the fishing industry). Given this, 92 responses were deemed useable for the purposes of the analysis.

2.3. Derivation of Travel Costs

Travel costs were derived for each respondent based on distance travelled as the actual fuel used by most people travelling to the site was unknown. To calculate the travel cost, the fuel cost per kilometer was first calculated by multiplying the average rate of fuel consumption per passenger vehicle per kilometer (0.106 L) for the year ending 30 June 2016 [57] by the average price of unleaded petrol ($1.38 AU per liter) in Brisbane in March 2018 [58]. The travel cost for each group was then found by multiplying the fuel cost per kilometer by the distance from the home of the respondent (if a Queensland resident) or from the place of accommodation or last place visited if the respondent was an interstate or international visitor. Distances and travel time were taken as stated by the respondent. This was then doubled to account for round trip distance.

Several previous travel cost studies also included a cost associated with travel time, mostly based on wage rates, although the assumptions about the relationship between wage rate and travel time opportunity cost varies considerably. For example, Ezzy, et al. [59] equated the opportunity cost of travel time to the average non-managerial full-time employee wage rate; Cesario [60] assumed ⅓ of the average wage rate, while Fezzi, et al. [61] assumed ¾ of the wage rate. Others suggest that the opportunity cost of travel time is equal to zero [56,62]; that is, the trip itself may have been valued by the respondent as part of their recreational activity [63]. Czajkowski, et al. [64] also found little relationship between value of travel time saved and wage rate, but also found substantial heterogeneity in the willingness to pay to reduce travel time. They also found that the opportunity cost of travel time increases at a decreasing rate, such that a constant rate applied to travel time will tend to overestimate its cost [64].

To determine an appropriate opportunity cost of travel time, some studies (e.g., [65–67]) have endogenously estimated the wage rate proportion using the travel data available. This enables a more appropriate consideration of travel time in the context of the case study being examined. In our study, we have applied the approach developed by McConnell and Strand [65] as it is compatible with the data collected. The approach uses a separate model to estimate the relationship between the number of trips, travel cost, time cost and income, given by

$$x_i = \beta_0 + \beta_1 C_i + \beta_2 T_i + \beta_3 I_i + \varepsilon \quad (3)$$

where C_i is the travel cost, T_i is the imputed time cost and I_i is the income level of the visitor. The imputed time cost is based on the wage rate, itself derived from the income measure, given by $T_i = t_i w_i$ where t_i is the travel time (in hours) and w_i is the imputed wage rate, estimated as $w_i = I_i/(52 \times 37)$ (i.e., the income divided by the number of hours worked over a year, assuming a 37 h week on average). The appropriate opportunity cost of travel time for use in the travel cost model is then given by β_2/β_1.

Issues have also been raised with respect to whether accommodation should be included as part of travel cost. There may be considerable differences in the type of accommodation taken by the visitors to the site (for example, camping versus staying in a 5-star hotel), where the form of accommodation may become an experience itself and hence account for some of the consumer surplus generated. Similarly, food costs will depend on whether the visitor chose to eat in a restaurant or take way (or brought their own food on a day trip). In such cases, the trip to the site being valued and the choice of accommodation and food should be treated as different goods [68,69]. Given this, the costs of accommodation and food were excluded from the travel cost. As a consequence, the derived consumer surplus estimates represent a lower bound of the total non-market benefits realized from the trip.

3. Results

3.1. Descriptive Sample Statistics

The final sample used in the analysis consisted of 92 visitors who were aware of the existence of the fishing industry in Mooloolaba before they undertook the trip (now termed "informed visitors").

The average age of the respondents was 51 years old, with slightly more males (51.09%) than females (48.91%) in the sample. In terms of residential status, 44.57% of respondents were from the Sunshine Coast (excluding Mooloolaba), while 40.22% were Queensland residents from outside of the Sunshine Coast. The remainder of the sample were international (8.70%) or interstate visitors (6.52%).

With respect to employment status, the majority of the sample were full time employees (35.87%) and retirees (22.83%), followed by self-employed individuals (16.30%) and part time employees (10.87%). A smaller proportion of the sample were casual employees (4.35%), students (2.17%), home makers (2.17%), unemployed (3.26%) or chose not to say (2.17%).

The sample was also highly educated, with the majority of individuals having completed some form of tertiary education. Only 19.57% of the sample completed high school education or below and 1.09% chose not to say. Approximately 54.35% of the sample earned an annual household income between $40,000–$99,999 ($AUD), while 29.35% earned between $100,000–$249,999. A smaller proportion (14.13%) earned under $39,999 and only 2.17% earned $350,000 or above.

Only a small portion of the sample indicated that they had connections to a commercial fishing industry (13.04%), though slightly more (18.48%) had connections to related fishing industry (e.g., charter industry, seafood marketing, catering). A sizeable proportion indicated they were recreational fishers (42.39%). Approximately 14.13% of the sample indicated they were a member of an environmental conservation society or organization.

Around two thirds of the respondents (67.32%) were visiting for the day only. Of the remainder, 15.03% were visiting for the weekend, and 9.15% were visiting for 3–5 days.

Group sizes varied from one single adult (26.09%) to a maximum of seven (two adults and five children). Only 25% of the groups visited with children. On average, the groups consisted of 2.42 individuals (1.90 adults and 0.52 children).

3.2. Importance of the Fishing Sector

Just under half of the sample of informed visitors (48.91%) indicated they had plans to buy, eat or both, locally caught seafood on the day of the survey, or had already done so. Just under one fifth of respondents (19.57%) indicated they had plans to see or had seen the fishing boats on the day of the survey.

Respondents were also asked how important it was to see the local fishing boats and the fish markets to their expected satisfaction with visiting Mooloolaba. A similar question was also asked in relation to the importance of being able to purchase freshly caught fish or seafood from the local fishing fleet. A comparison of the responses to these two questions can be seen in Figure 1, with over half the sample indicating that purchasing seafood was a very important part of their trip. Being able to purchase freshly caught fish or seafood from the local fishing fleet was generally considered more important than seeing the fishing boats and the fish markets.

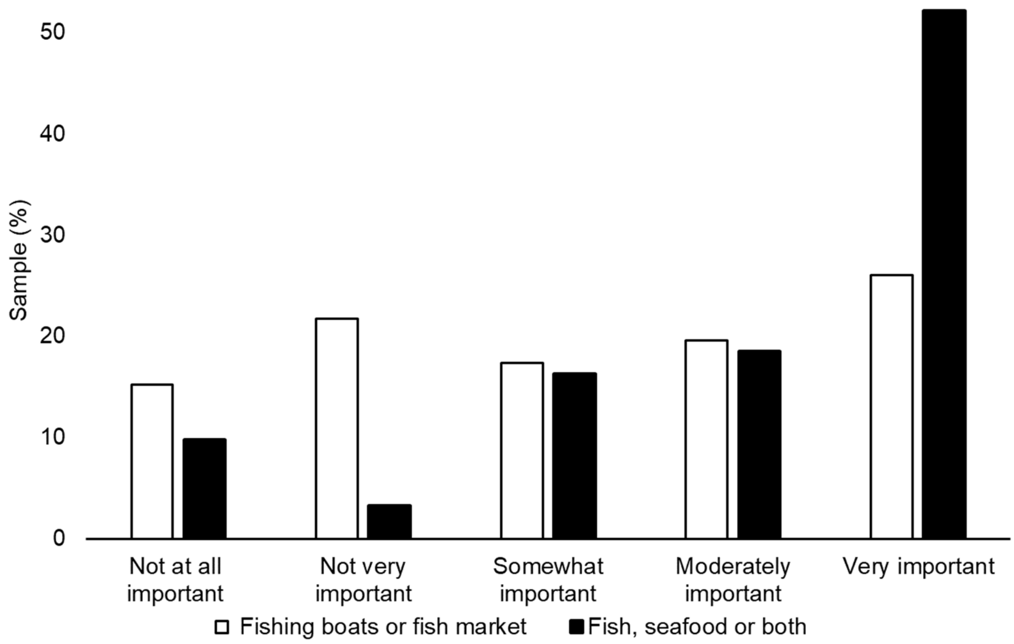

Figure 1. Distribution of responses indicating the relative importance of seeing the fishing boats or the fish market, and purchasing fish, seafood or both to the trip.

The responses to the contingent behavior question are shown in Figure 2. Over half the respondents indicated there would be no change in future trips if there was no fishing industry or seafood available in Mooloolaba. These respondents generally indicated that they would be sad to see the industry go, however they come to Mooloolaba for other recreational activities and hence would still go there. However, the remaining 41% of respondents stated that they would decrease their future trips by some amount if there was no fishing industry in the area. Furthermore, 49% of respondents would decrease their future trips by some amount if there was no locally caught seafood available in the area.

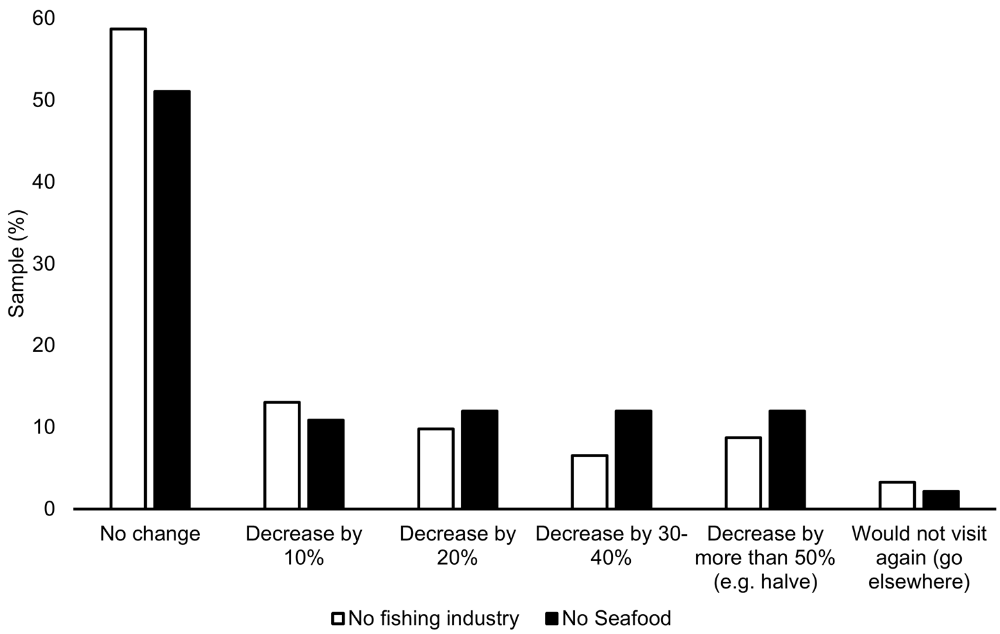

Figure 2. Distribution of responses indicating the expected reduction in the number of trips if there was no fishing industry or locally caught seafood available in Mooloolaba.

3.3. Value of Travel Time

The outcomes from the estimated travel time model are given in Table 1, following the approach by McConnell and Strand [65]. From this, the estimated travel cost variable was negative and presented an associated *p*-value of 0.03, and hence was considered statistically significant at the nominal error rate of 0.05. In contrast, the associated *p*-value of the time cost variable was well above the nominal error rate and hence considered statistically not significant. The resulting derived opportunity cost variable was negative (implying a benefit rather than a cost associated with travel) but was also considered not significant given its associated *p*-value (0.28). Given this, the opportunity cost of travel time was assumed to be zero in this case and was therefore excluded from the travel cost estimate.

Table 1. Model testing the opportunity cost of time.

	Estimate	Std. Error	*t*-Value	Pr(>|t|)
Intercept	47.54	18.22	2.61	0.01 *
Travel Cost	−1.69	0.74	−2.28	0.03 *
Time Cost	0.18	0.23	0.79	0.43
Income	0.21	0.15	1.42	0.16
Adjusted R-squared	0.11			
Derived opportunity cost	−0.11	0.10	−1.08	0.28

* *p*-values below the nominal Type I error rate (Prob(t) < 0.05)

3.4. Contingent Behavior Travel Cost Model and Value of the Sector

The travel cost model was estimated using the 'pglm' package (Croissant, 2017) in R (R Core Team, 2018) to take account of the panel structure of the contingent behavior data, estimating a negative binomial count model with random effects. As each respondent had three data points (i.e., current trip numbers, stated trip numbers without a fishing industry in the town and stated trip numbers without locally caught seafood being available), individual effects not captured by the variables in the model needed to be accounted for. The dependent variable was weighted by 1/(trip number) to remove the effect of endogenous stratification [48].

Only those who knew about the fishing industry before their trip were included in the model (i.e., "informed visitors"). Individual visitor characteristics which were found to be not statistically significant (based on their *p*-values) were iteratively dropped from the model, with their exclusion based on their impact on the Akaike information criterion (AIC).

The final model is seen in Table 2 In this model, travel cost was negative and had a significant effect at a 0.1% level. Individual socio-demographic characteristics had no statistically significant impact on the number of trips taken. The international dummy variable was negative and significant, as expected, as international visitors made fewer trips to Mooloolaba than other visitors, all else being equal.

From the model, the non-market benefits to the informed visitors themselves (the consumer surplus) associated with a trip to Mooloolaba was found to be $49.76 per trip (i.e., $-1/-0.0201$). This represents the value of a trip to the town irrespective of the activities undertaken. For comparison, Blackwell [70] estimated the consumer surplus associated with a visit to the beach in the area to be $11.86 per person in 2000 when excluding the cost of travel time as in our study. This equates to $48.24 per trip when applied to an average group size of 2.42 people (as per our sample) and indexed to 2019 prices. Given this, the model results are consistent with previous estimates of the value of visiting the town.

Both contingent behavior dummy variables were statistically significant and negative, indicating that trip numbers would decrease in the absence of a local fishing industry and the absence of locally caught seafood. From the model parameters (i.e., $-\beta_i/\beta_{tc}$), if there was no fishing industry in Mooloolaba, consumer surplus for the trip of the informed visitors would be approximately $7.36 lower. Similarly, if there was no local seafood available in Mooloolaba, this value would be approximately $10.51 lower. These consumer surplus values also provide a measure of the additional value to informed visitors by the having both these options available. That is, having a local fishing fleet and availability of local seafood accounts for 14.7% and 21.1% of the average value of the benefits to informed visitors respectively. Combined, they suggest that $17.87 of the value of the trip is attributable to the presence of the fishing industry.

Table 2. Contingent behavior travel cost model.

	Estimate	Std. Error	*t*-Value	Pr(>|t|)
Intercept	4.35	0.28	15.33	0.00 *
Travel cost	−0.02	0.01	−3.34	0.00 *
International	−2.05	0.50	−4.14	0.00 *
No fishing industry dummy	−0.15	0.04	−3.84	0.00 *
No seafood dummy	−0.21	0.04	−5.40	0.00 *
a	2.08	0.42	4.99	0.00 *
b	0.79	0.12	6.71	0.00 *
AIC	1843.89			
Log-Likelihood	−914.95			
Consumer Surplus (CS) for trip	$49.76	14.91	3.34	0.00 *
Change in CS for fleet	−$7.36	2.92	−2.52	0.01 *
Change in CS for seafood	−$10.51	3.66	−2.87	0.00 *
Reduction in days [a/(a+b)]	0.73	0.04	16.54	0.00 *

* *p*-values below the nominal Type I error rate (Prob(t) < 0.05).

The parameters 'a' and 'b' are the parameters of the Beta distribution, representative of the probability distribution of the fixed effects component (i.e., the individual respondent effect) [71]. Here, $a/(a+b) = 0.73$ indicates that, on average, the removal of both the fishing industry and seafood from the area would result in a 27% reduction in the days visiting Mooloolaba by the visitors who were aware of the existence of the fishing industry. Individually, the impacts of removing just the fishing industry (assuming locally caught seafood could still exist) would be to reduce the number of trips by this group by 14% (i.e., $1 - \exp(\beta_j)$), and if there was no locally caught seafood (but still a local industry), the number of trips taken by the informed visitors in the sample would decrease by 19%.

With approximately 488,000 domestic day trips to Mooloolaba/Alexandra Headland for the financial year 2018–2019 [72], and assuming that 69.1% of these were aware of the fishing industry (as per the sample), the model results suggest that the fishing industry contributes around $6.0 million of non-market benefits to visitors to the region.

3.5. Value to the Local Community

The model suggests that there would be a reduction in the number of days visiting Mooloolaba by approximately 27% of those who were aware of the seafood industry in the town (i.e., 69.1% of those interviewed) as a result of the removal of both the local fishing industry and ability to eat locally caught seafood. Alternatively, the presence of these features can be considered as responsible for 18.6% of the current level of trips to the town (i.e., 27% of 69.1%). With an average spend of $88 per day trip visitor in the Sunshine Coast in the year ending March 2020 [73], and approximately 488,000 domestic day trips to the town in the financial year 2018–2019 [72], the contribution of the fishing industry to additional tourism expenditure in the town is in the order of $8.0 million a year (i.e., $0.186 \times 488{,}000 \times \$88.00$).

Commercial fishing fleets also operate out of other ports in the Sunshine Coast region (e.g., Noosa to the north and Caloundra to the south), while locally caught seafood is a feature of nearly all towns in the region. Assuming visitors to other parts of the Sunshine Coast have similar characteristics to those visiting Mooloolaba, then local seafood (even ignoring being able to see a fishing boat) may contribute to around 13% (i.e., 69.1% of 19%) of the total visitor numbers. Total domestic day trips to the Sunshine Coast as a whole in 2019–2020 were estimated to be 7.7 million [73]. Again, with an average spend of $88 per day trip visitor, the potential direct contribution of the seafood sector to the Sunshine Coast economy may be in excess of $89.2 million a year, while non-market benefits to the tourists themselves from being able to source locally caught seafood may be in the order of $56.1 million. By comparison, the fishing industry itself is believed to contribute only $42.5 million in terms of value of landings [30]. Hence, the value to the local fishing industry to the local tourist economy and to tourists may exceed the landed value of the catch by more than threefold.

4. Discussion

The main aim of this study was to investigate whether the existence of the local fishing fleet and the ability to experience local seafood sourced from this fleet add value to the overall trip experience of day trippers and holiday makers in Mooloolaba, as well as contribute to the level of visitation to the region.

The results of the contingent behavior travel cost model suggests that if the fishing industry and local seafood were removed from the area, a loss of welfare to visitors would occur. That is, the consumer surplus (the non-market welfare value over and above the cost of visiting the region) attributed to a trip to Mooloolaba (valued at $49.76) would decrease by approximately $7.36 if the fishing industry was to disappear from the area. Similarly, the consumer surplus attributed to a trip to Mooloolaba would decrease by approximately $10.51 if there was no locally caught seafood available in the area. Further, the number of visitors to the town would also decrease by around 18.6% if both features were removed from the town.

The study did not consider where these visitors may go or what activities they may undertake if they did change their destination. Potentially, a loss in visitors to the Sunshine Coast may be offset by an increase in visitors to other regions with an active fishing industry (e.g., the Gold Coast to the south of Brisbane), or they may undertake substantially different activities all together. Single-site travel cost models such as applied in this case do not capture substitution potential among alternative sites. However, a priori, it would be expected that the non-market benefit of visiting substitute sites would be less than the benefits of visiting the preferred (and observed) sites. Zhang, et al. [74] found that consumer surplus estimates associated with visiting substitute beach sites on the Gold Coast were generally only 61% to 67% of the value of visiting the preferred site, suggesting a loss in benefits of between roughly 30% to 40%. In terms of the benefits to the local tourism industry, substitution may benefit tourist operators elsewhere, but at a loss to the tourism industry on the Sunshine Coast.

While the model outcomes were statistically significant, the study is based on limited data. The sample is confined to weekend and holiday trips, which may be different from weekday trips. This may influence the transferability of the model results to the population of all trips. Given that most day trips—the dominant activity in the sample—are likely to occur on weekends, then this may not have a substantial impact on the results. The sample size was also relatively small, reflecting the difficulty in collecting on-site survey data from tourists through intercept surveys. Unlike intercept surveys of, say, recreational fishers who are often in the one place for some time fishing, the tourists targeted were passing though the intercept sites on their way to their recreational activity. A decision was made not to locate the interviewers adjacent to the main seafood retail shops or on the wharf to avoid biasing the sample by focusing on those who were known to be interested in the fleet or local seafood.

An advantage of augmenting the analysis with contingent behavior data is that the gains in efficiency from using a panel analysis approach allow sample sizes necessary to achieve an appropriate level of precision in the consumer surplus estimates to be smaller [37]. In this regard, the effective sample size used in the model estimation was three times larger than the number of individuals included in the analysis (i.e., 276 observations compared with 92 individuals).

A consequence of the smaller sample size is the limited potential for extrapolation of the results to other regions. However, the present study was primarily intended to provide insight into an under-explored area, rather than be generalizable to other situations. Nevertheless, the results do provide strong support for the existence of non-market benefits to tourists from the existence of a local fishing fleet, and also that the fleet and associated seafood provide an attractor for tourism that benefits the tourism industry itself. Given that Mooloolaba is an important tourist town within the Sunshine Coast region, extrapolation of the results to the broader region may be appropriate, but extrapolating to other regions may be unrealistic.

The analysis also excludes the opportunity cost of travel time, based on the outcomes of the approach developed by McConnell and Strand [65]. Larson and Lew [67] found substantial heterogeneity with respect to individual values of opportunity cost of time, with some individuals having a zero opportunity cost and others having a non-zero value. The exclusion of opportunity cost of travel cost, if it was non-zero, results in a lower estimate of the travel costs of the individuals and, consequently, the level of consumer surplus. In this regard, the consumer surplus estimated using the model can be considered a lower bound of the potential benefits produced by the fishing sector in the town.

For many coastal fishing towns, including Mooloolaba, seafood has been used as one of the key attractions for visiting the area. This aligns with the food tourism strategy of introducing the region to its visitors through its food, with local food highlighted in tourism promotional material [75,76]. The importance of food tourism is particularly significant for Mooloolaba given its iconic seafood product (Mooloolaba prawns) and the reputation of the area for offering a range of freshly caught seafood.

The results of this study reinforce the benefits of promoting locally caught seafood to visitors of coastal regions to increase tourism. Respondents from Queensland indicated that seeing the fishing fleet increased their interest in local seafood as this adds to the authenticity of the local seafood experience. Such responses indicate that the fishing industry is important to visitors of the region and support previous findings that fishing industry is of interest for tourism [27,77]. More regions could examine their local fisheries as an asset for attracting tourists to the region, particularly in the context of enhancing food tourism opportunities.

5. Conclusions

The results of the study indicate a substantial drop in visits to Mooloolaba if there were no local fishing industry or seafood available in the area. More broadly, the results suggest that fisheries may make a substantial contribution to regional economies through their impact on tourism, as well as providing additional (non-market) benefits to visitors themselves. This is implicitly recognized in many regions, with the existence of fishing fleets and locally caught seafood used in promotional material.

In this regard, the tourism industry has a vested interest in ensuring the sustainability of the fishing industry. However, involvement of the tourism sector in ensuring the future sustainability of the seafood industry through involvement with fisheries management is currently lacking. Management decisions that affect the potential supply of seafood and size and location of the fishing fleets are currently made without input from the tourism industry. While a sustainable fishing industry is in the best interest of all concerned (fishers, consumers and tourists), this may take many forms with differing impacts on coastal regions and communities.

The results of this study suggest that both tourists and the tourism industry benefit from the existence of a local fishing industry in coastal areas. In this regard, the tourism industry has a vested interest in how fisheries are managed, and should consider greater engagement with fisheries management to ensure that any changes take account of the potential impact on tourists and tourism, and through tourism on the regional economy.

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