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**Modelling Access to the Irish Coastline: A
Contingent Behavioural Approach**

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Abstract

This paper measures willingness to pay (WTP) for public access and trail improvements to a coastal recreational site in the west of Ireland. The Contingent Behaviour model is used to measure the increased number of trips associated with improved public access using recreational trails along a stretch of Irish coastline. Results show that improving access through the use of trails increases consumer surplus by €111.15 per person per annum. We argue that in designing new regulation such as Marine Protected Areas (MPAs) for the management of Ireland's coastline, an understanding of the values the Irish public place on coastal recreational access will be important to manage the resource in a sustainable manner.

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Introduction

In what follows we report on a study that investigates WTP for coastal recreational access in Ireland. In recent years increasing demands are being made of coastal resources for a variety of recreational activities such as for walking, mountaineering, mountain biking, recreational angling and water sports (Morgan, 1999; Hanley et al., 2003; McGonagle and Swallow, 2005; Hynes et al., 2007). Increased affluence, urbanization and changing values have all combined to increase the demand for land-based recreational amenities which are located in many coastal areas of Europe and the United States.

Wilson et al. (2005) point out how human beings, as welfare-maximizing agents, attach positive economic values to the non-market goods and services which the coast provides. It is therefore increasingly recognized that coastal recreational activities such as walking have the potential to deliver significant economic benefits to rural areas through tourism and thereby support rural diversification, innovation and regional development. It is estimated that 517,000 individuals came to Ireland in 2007 from overseas who took part in some form of walking activity and this was estimated to be worth €340 million to the Irish economy (Failte Ireland, 2008a). A recent survey in Ireland report that 13 per cent of the adult population (403,000) regularly uses trails and other walking paths (Fitzpatrick Associates, 2005).

In view of the economic benefits associated with coastal leisure and tourism, policy makers both in the United States and Europe have introduced a number of initiatives to enhance public access. The Marine and Coastal Access Bill in the U.K. serves as one such example (HM Government, 2008; House of Commons, 2008). It aims to provide public access to the length and breadth of the British coastline, where reasonably practicable. Whilst policy makers recognize the potential benefits associated with improved coastal access, rational public decision-making on financing improvements to coastal recreational access requires that these economic benefits should be clearly identified and valued.

However, there are surprisingly few empirical studies that quantify the economic benefits associated with coastal recreational trails. Most previous empirical studies on

valuing public access for recreation focus on agricultural land, forest land and protected areas (Kay and Moxham, 1996; Millward, 1996; Christie, 1999; Crabtree et al., 2000; Bennett et al., 2003; Hynes et al., 2007; Buckley et al., 2009a; Morris et al., 2009), or they focus instead on beach use and access and coastal water quality improvements (McConnell, 1977; Kaoru, 1993; Morgan et al., 1993; Le Goffe, 1995; Morgan, 1999; Hanley et al., 2003; Priskin, 2003; Shivlani, 2003; Silberman, and Klock, 1988; Tudor & Williams, 2003; Chen et al., 2004; Lew and Larson, 2005; Villares et al., 2006; Oh et al., 2008; Whitehead et al., 2008; Lazarow et al., 2009). We found just one empirical study that singled out coastal walking trails as an important attribute that contributed positively and significantly to the welfare of recreationalists (McGonagle and Swallow, 2005). Having said that McGonagle and Swallow (2005) do not actually estimate the WTP for walking trails per se, instead, the paper dwelt on differences between scenic quality and ecological quality not recreational values for walking. This article seeks to extend the work of McGonagle and Swallow (2005) using a contingent behaviour model. The paper aims to quantify willingness to pay for the development of a coastal trail using the case of the Galway bay coastline in the west of Ireland.

This paper proceeds as follows: First some background is provided on the relevant literature. Then the empirical approach used to estimate willingness to pay is described and the results discussed. Finally, this paper concludes with a discussion of its major findings and their implications for public access provision to coastal resources for the purposes of outdoor recreation.

Background

A number of studies have argued that the utility derived from outdoor recreational activities is affected by the preferences visitors have for specific attributes of the resource in question (Bowes and Krutilla, 1989; van Rensburg et al., 2002; Mill et al., 2007). The preferences of users or of society as a whole serve to help determine the desired management objectives. If economic values could be reliably attached to features of a recreational resource, this would help public agencies in planning and managing the resource. Knowledge about peoples preferences for specific attributes would also help planners know who is using the resource and why they visit and determine which attributes are likely to enhance visitation and what aspects will

enhance visitor spend either as an entry fee or within the community locally. Managers of coastal resources for example have control over changes to the physical attributes of coastal sites but they may need to know what attracts a particular type of visitor. Particular visitors may also have strong preferences for natural features of the coastline. Other users on the other hand may elicit a strong preference for facilities of a more developed urban nature. Planners and policy makers may also be concerned with how changes to coastal sites will affect visitor numbers or the utility of the individuals that visit the sites. Important natural physical coastal attributes include water quality, beach width, beach nourishment, beach scenic quality beach wildlife, biodiversity and ecological quality. Managers of coastal areas also exert influence over such factors as beach congestion, beach access, coastal access such as roads and trails and beach developments and facilities. In what follows we provide a brief overview of a number of studies that focus on an evaluation of public preferences for a variety of attributes associated with the coastline.

There is a rich literature on the use of stated and revealed preference techniques to explore how beach attributes influence WTP; for example how beach access, water quality and beach nourishment influences welfare estimates. We begin with a review of several studies that investigate beach access. Whitehead et al. (2008) investigate the demand for beach access using vehicles for recreation purposes in southern North Carolina. They combine revealed preference and stated preference data in order to estimate the changes in recreation demand that might occur due to facilitating beach access through the use of improved beach car parking facilities (not via recreational trails). Whitehead et al. (2008) report that the increase in annual consumer surplus with the improvement in beach access is estimated at \$298 using revealed preference data. They show that the annual aggregate recreation benefit to the entire population of improved access to southern North Carolina beaches is about \$325 million.

Oh et al. (2008) also conducted a study on beach access. They used a double-bounded Contingent Valuation Method to estimate the general value of increased access points to public beaches by studying three different beaches in South Carolina. The study found a mean willingness to pay estimate to be US\$6.60 per visitor for additional vehicle access points and parking. This figure was then used to estimate aggregate WTP for additional access, parking and other facilities of US\$92.7 million.

A study by Chen et al. (2004) evaluates the overall recreational benefits of a beach resource by using the zonal Travel Cost Method on the eastern coast of Xiamen Island in the People's Republic of China. This study uses on site survey data to estimate an aggregate recreational benefit to the users of the beach of US\$53.5 million, or a consumer surplus of US\$16.90 per visitor.

Using the Travel Cost Method has its limitations as it only focuses on consumers' actual behaviour. On the other hand, stated preference techniques have been criticized in view of a number of biases associated with their use (Scott, 1965; Li & Mattheson, 1995; Schläpfer, 2008). In view of this, Landry and Liu (2009) used a semi-parametric approach for jointly estimating revealed and stated preference recreation demand models to quantify values for beach recreation in North Carolina. For the revealed preference data welfare estimates varied between \$360 - \$6380 for 2.2-38.2 visitor days at the beach per year respectively. Annual welfare estimates were between \$164-168 per trip for low intensity demand and high intensity demand users for the revealed preference data. Trip estimates for stated preference data were higher, ranging from 2.4-58 days per year, with corresponding welfare measures of \$400 and \$9759.

A number of papers have also focused on the impact of beach water quality on welfare estimates. Le Goffe (1995) used the contingent valuation method to evaluate WTP to ensure water quality was of a sufficient standard to permit bathing, to prevent the spread of algal blooms and permit the collection of wild shellfish in Brest harbour, France. The study revealed that respondents were WTP between €25 and a €34 per household per year to improve water quality in the harbour. Kaoru et al., (1993) used the Contingent Valuation Method to value water quality improvements for coastal ponds in Martha's Vineyard, Massachusetts. The study found that the average WTP for water quality improvements was US\$131.03 per person per year and that over half of this was attributed to existence value.

Lew and Larson (2005) conducted a study into the valuation of coastal recreation to beaches in California using revealed preference survey data based on a telephone

survey. Recreational improvements were not the subject of analysis but instead the authors explored which attributes affected beach choice. The focus of this study was to estimate welfare measures per visitor but also to establish if water quality as well as free car parking and lifeguards affected the choice of beach destination. Lew and Larson (2005) estimated the value per trip at \$28 for San Diego county beaches. They report that the availability of free parking and lifeguards were a significant determinant of beach choice but that water quality was not.

McGonagle and Swallow (2005) used choice experiments to examine preferences for coastal access and for preserving coastal open space. Respondents were asked to choose between two distinct alternative management scenarios that either promoted enhanced vehicle access to coastal sites, rest rooms and scenic quality and enforcement patrols or, alternatively improved ecological quality, enforcement patrols and access using walking trails. McGonagle and Swallow (2005) denoted respondents as either pro-access or pro-environmental. For non-coastal residents the pro-environmental WTP is estimated at between €62.10 (no access) and €13.70 (high access) and at \$30.20 (no access) to \$92.40 (high access). Their findings thus indicate considerable preference heterogeneity, with some individuals viewing public vehicle access for scenic purposes as a good and supporting preservation of coastal land for non-wildlife or public recreation reasons, but others seeing public vehicle access as a bad, or as conflicting with sites valued for ecological conservation. They suggest therefore that conservation agencies should serve multiple constituencies and encourage cross-constituency support for open space projects. McGonagle and Swallow (2005) also reveal that walking trails contributed positively and significantly to utility and that walking trails made the largest impact on utility (twice that of restrooms and enforcement patrols). In their study walking trails were singled out as having the greatest impact on the welfare of the respondents that used the coastal sites. Having said that McGonagle and Swallow (2005) do not actually estimate the value of walking trails to respondents, instead, the paper dwelt on differences between scenic quality and ecological quality rather than recreational values for walking per se.

Although there has been little research devoted to coastal recreational values in Ireland, there are a number of qualitative studies from around the world that report on public attitudes and preferences to features of the coastline particularly beaches

(Morgan, et al., 1993; Tunstall & Penning-Rowell, 1998; Morgan, 1999; Macleod, et al., 2002; Priskin, 2003; Tudor & Williams, 2003; Wolch & Zhang, 2004; Villares et al., 2006; Roca, et al., 2009).

Wolch and Zhang (2004) for example, reveal that users are either *biocentric*, insofar as they demonstrate strong preferences for observing marine wildlife, such as whale watching, or are defined as *anthropocentric*, meaning that they prefer activities such as recreational angling. Roca et al. (2009) in the Costa Brava in Spain identified two types of user which they denoted as; ‘satisfied’ users, consisting largely of tourists, or ‘demanding’ users, consisting largely of locals. The ‘demanding’ users were more concerned with conserving natural beach values, preventing environmental degradation, minimizing overcrowding and were more demanding about facilities and equipment.

Tunstall and Penning-Roswell’s (1998) study of a variety of English beaches shows that respondents demonstrated a strong preference for preserving “natural” beach features with swimming, walking and strolling as key activities engaged in at the beach. Macleod et al. (2002) contrasted the perception and value of beaches in Co. Donegal to that of Sines, Portugal; two areas where visitors comprised largely of locals as opposed to visiting tourists from outside the area. They reveal that the majority of Irish people valued the sense of space, attractive physical character, cleanliness and naturalness, highlighting preferences for a less intensive use of beaches compared to Portugal.

The studies described above raise an important question as to whether beaches and the coastline in general should be developed to attract individuals with strong preferences for facilities such as shops, arcades, restaurants and entertainment of a more urban nature, or alternatively should be maintained to draw people with preferences for coastal areas which are quiet, natural and undeveloped.

This emphasizes the point made by Hanley et al. (2003) and Morgan (1999) to develop a rating system for beaches and the coastline. Such a system would take account of differences in user preferences along with safety standards and so can promote beaches based on their relative strengths, as determined by the people who use them. While this has certain advantages, there is presently no award system or

even a tiering of this system in Ireland to promote the maintenance of an undeveloped beach, which according to the previous literature seems to be very important to many beach users, especially the Irish. For example, in Co. Donegal, where many beaches are in the main valued for their natural features by locals, efforts should perhaps be made to maintain these factors. In contrast areas such as Salthill beach, Co. Galway, where the beach is almost an extension of the city and is highly developed, instead should perhaps place emphasis on maintaining high quality beach-side facilities of a more urbane nature thus, potentially promoting business and employment in the area.

Although very few valuation studies have focused specifically on walking activities and access on the coasts, a number of lessons can be learned from the valuation literature on inland areas such as agriculture, protected areas and forest lands where the field is more developed (see for example Buckley et al., 2009a, Buckley et al., 2009b, Morris et al., 2009; Crabtree et al., 2000; Bennett et al., 2003). Bauer et al. (2004) report that provision of either board walks or viewing towers to estuarine wetlands significantly increased willingness to pay to restore wetlands. Indeed many of these studies indicate that the wider public are WTP for schemes that give them greater access to footpaths and trails in order to walk in the countryside.

In Ireland tourism development is important particularly in coastal areas where other opportunities for growth are limited. In 2007 the number of overseas participants in hiking and walking amounted to 517,000 individuals who came to the Republic of Ireland and undertook some form of walking activity and this was estimated to be worth €340 million to the Irish economy (Failte Ireland, 2008a). Uptake of recreational walking activities is also high amongst Irish nationals. An Irish Sports Council and Coillte¹ commissioned report noted that 13 per cent of the adult population (403,000) regularly uses forest trails and other walking paths (Fitzpatrick Associates, 2005). The total number of annual domestic trail visits undertaken by Irish residents was estimated to be 17.5 million. The average level of expenditure by those accessing trails was found to be €14.91 per person (Fitzpatrick Associates, 2005).

¹ Coillte is a commercial company operating in forestry. Coillte was established in 1989 when it acquired ownership of the State's forests in return for shares.

In their 'All Island' report on walking activities Bergin & O'Rathaille (1999) estimated that 90,000 visitors took part in outdoor walking activities in the Irish uplands (66,600 of whom were from Ireland and the balance 23,400, from abroad) during 1997. They estimated that total expenditure on travel, food items, entry fees, accommodation and expenditure on walking equipment amounted to approximately £115 million (€146 million) during 1997 (Bergin and Rathaille, 1999).

Tourism development is especially significant in remote rural coastal regions where other economic opportunities are limited. Rural based recreational activities have the potential to deliver substantial economic benefits to rural areas through locally run tourism activities thereby fostering regional and local development (Vaughan et al., 2000; Vail and Heldt, 2004).

Despite the potential benefits from walking based recreational activities, public access to the countryside for walking activities in Ireland is frequently restricted which imposes a serious constraint on tourism development. A variety of issues such as potential interference with agronomic activities, insurance liability and potential invasion of privacy have been reported by landowners as reasons why they may be unwilling to permit public access to their farmland for walking related activities (Buckley et al., 2009a; Buckley et al., 2009b). A specific barrier for the development of walking based tourism in coastal areas is concerned with property rights and the dual constituencies that comprise the agricultural sector on the one hand and the marine sector on the other. We first discuss the issue of property rights. All coastal land in the Ireland is owned, either by private individuals or state bodies and recreational users do not have a de-facto legal right of entry (Mountaineering Council of Ireland, 2003; Pearce and Mee, 2000). As such, any individual entering privately owned farmland challenges the right to exclusive use, and may be expected by the landowner to leave.

In Ireland, there are very few designated public rights of way and areas developed specifically for providing recreational access are very restricted (Flegg, 2004). Much of the best areas for walking along the Irish coastline occur on private farm land. However, in many instances landowners have prevented recreationalists infringing their property rights by denying access to private and commonage land. Although

many of these coastal walks are documented in guidebooks and appear on tourist web sites they are not covered by access agreements with landowners and no one is responsible for their maintenance. This represents an unsatisfactory situation and serves as no basis for an economically sustainable tourist industry based on coastal recreational walking.

Access to unenclosed commonage land is in general far easier compared to private farm land but coastal commonages are rare compared to upland commonages. We discuss the reasons why these differences in access occur between private land and commonage land elsewhere and we do not dwell on them here (Buckley et al., 2009a). Access to protected areas such as national parks and forest lands is generally encouraged. Coillte for example have an open forest policy to encourage recreation activities in the Republic of Ireland.

The problem is that some of the best coastal walking areas in Ireland are not owned by Coillte or the state but can only be accessed through private farm land. Although the marine tourism sector and its associated enterprises stands to benefit from the development of coastal walking trails, access to this land requires the consent of private landowners in the agricultural sector who in the main do not benefit from facilitating access. Policy makers are aware of the need to engage landowners in schemes that facilitate access in order to benefit the wider community. In 2004 the Minister for Community, Rural and Gaeltacht Affairs initiated Comhairle Na Tuaithe (a countryside recreational council) in the Republic of Ireland (O’Cuiv, 2004; Comhairle Na Tuaithe, 2006). The aim of this council was to investigate the issue of access to the countryside and to develop a “walkways management scheme” whereby landowners would be paid for the development and maintenance of approved, way-marked ways that pass through their land. Some €4 million was provided in 2008 and four existing trails have been selected for this pilot scheme².

Given the potential exchequer costs of developing a coastal trails network it is important to weigh up the costs and benefits of measures aimed at promoting public access to the Irish coastline for walking related activities. More generally, local

² Land owners are paid an hourly rate of €14.50 up to a maximum of €2,900 a year for their work and all materials will be supplied.

authorities are increasingly expected to justify exchequer expenditure and demonstrate that tax payers are getting their moneys worth. The opportunity costs to the agricultural sector from developing a trails network may be significant in terms of having to forego benefits from alternative uses that might have yielded actual market benefits. The measurement of non-market benefits associated with public access is therefore an appropriate measure and has been used in numerous studies to give meaningful estimates of the benefits of enhancing access to the countryside (Bennett et al., 2003; Hynes et al., 2007; Buckley et al., 2009a; Morris et al., 2009).

This paper therefore sets out to estimate the demand for coastal access to the Irish countryside using a site in Co. Galway. In what follows we first describe the data and methodology being used.

Data and Method

The data analysed in this paper were generated from a survey of visitors to a beach on the outskirts of Galway city in Ireland. Silverstrand beach is located approximately 7km outside of Galway city and is accessible by public road only. Silverstrand offers visitors a highly distinctive coastal landscape combined with easy access to Galway city. Silverstrand was awarded a blue flag status in 2009 and is therefore required to comply with certain standards in terms of lifeguard safety and patrol as well as high water quality.

The survey interviews for the study were conducted face-to-face at Silverstrand beach. A total of 146 individuals were interviewed. Each interview lasted approximately 20 minutes and followed a standard format. Those engaging in water sports were interviewed after they undertook these activities. The questionnaire was piloted over a 2 week period in June 2009. This was followed by the main survey which took place at Silverstrand during the months of July and August 2009. In the survey, visitors were questioned about the distance travelled and time taken, the activities undertaken, trip duration, amount of trips to the beach, the amount of money they spent related to their trip, and the travel time and distance and number of trips to substitute sites. Finally, all respondents were asked a series of questions on household characteristics in order to determine which socio-economic variables affect the number of trips taken.

In the contingent behaviour model, the dependent variable is an integer for a before and after scenario indicating the number of trips taken to the beach site in a given time period. Thus, application of the standard distributional assumptions (e.g., normality) is inappropriate because the dependent variable in the contingent behaviour model cannot take on a continuous range of values. Following the work of Creel and Loomis (1990), the current model was estimated under the assumption that the observed number of trips can be described by a count data model. A negative binomial specification is used to account for over-dispersion of the data, that is, where the conditional variance is greater than the conditional mean. This is a generalisation of the Poisson model (Hynes and Hanley, 2006). To take account of the panel nature of the data, a random effects specification is utilised. Given that the data are derived from an on-site survey, it should also be noted that it is not possible to model the decision to take a trip by those who currently do not visit the site. Therefore, the welfare estimates presented in this paper relate only to those who currently visit the Silverstrand site in the survey.

In the contingent behaviour modelling framework, each person i in the data set yields two responses. The first is the number of trips (V_{ij}) they make to beach j per year, The second observation is how many extra trips (if any) the person says they would make if a specified improvement in recreational facilities at the beach occurs.

To estimate the recreational benefits from the suggested walking facility improvements for Silverstrand (outlined in Table 1) and to predict the change in the number of trips, one must firstly predict trips under current and under hypothetical conditions as a function of travel costs to the beach (TC_{ij}), income (Y_i), and other socio-economic characteristics such as the gender, age and education level of the respondent.

INSERT TABLE 1 ABOUT HERE

Next, the travel cost coefficient estimate from the negative binomial panel model is used to value the increase in trips in monetary terms. For consumer utility maximization subject to an income constraint, and where the number of trips are a nonnegative integer, Hellerstein and Mendelsohn (1993) showed that the expected value of consumer surplus, $E(CS_i)$ derived from count models can be calculated as

$E(CS_i) = E(T_i|X_i) / \beta_p = \hat{\lambda}_i / (\beta_p)$ where T_i is the number of trips to the beach for individual i , and λ_i is some underlying rate at which the number of trips occur, such that one would expect some number of trips in a particular year, i.e. λ_i is the mean of the random variable T_i . The vector X_i represents the set of explanatory variables reported for each individual i and β_p is the price (*i.e.* travel cost) coefficient. The per-trip $E(CS)$ is simply equal to $1/\beta_p$. The change in the consumer surplus resulting from an improvement in the coastal amenities is then given by

$$\Delta E(CS_i) = \Delta E(T_i|x_i) / \beta_p = (\hat{\lambda}_i^* / \beta_p) - (\hat{\lambda}_i / \beta_p) \quad (1)$$

where $\hat{\lambda}_i$ is the expected number of trips before any improvements are made to the coastal amenities and $\hat{\lambda}_i^*$ is the expected number of trips after improvements are made to the coastal amenities. This suggests that the change in consumer surplus for individual i can be calculated by dividing the change in the predicted number of trips to the beach site by the coefficient of the travel cost variable. It is important to state that the relevant comparison in welfare terms is between the number of predicted trips at the current level of coastal walking provision at the beach site and the predicted number of trips at the improved level. Also, one cannot disaggregate benefit estimates into additional utility from those who take no extra trips to the beach and additional utility from those who visit most frequently.

Results

Given the contingent behaviour model described previously, there are two aspects of the estimated model that we are particularly interested in; firstly, whether the travel cost parameter is significant (if not, then no welfare estimates can be made), and secondly, whether the coefficient for the dummy variable for the change in the coastal walking resource³ is significant (if not, no prediction of the change in visitor numbers can be made). As noted above, the econometric approach taken is to use a panel data estimator because it takes into account the correlation in the errors between each person's two choices – actual and intended behaviour. A random effects specification is used. Finally, since the dependent variable is a 'count' variable, one must test whether a poisson or

³ This variable is referred to as Contingent Behaviour in Table 2.

negative binomial panel estimator is appropriate. All models were estimated using the software package Stata.

Both poisson and negative binomial versions of the model were initially fitted. In all cases, tests on the over-dispersion parameter showed that the negative binomial was preferred over the poisson. The chosen negative binomial models' α , the over-dispersion parameter, was found to be positive and significant indicating that the data were over-dispersed. A likelihood ratio-test was performed to test the hypothesis that $\alpha = 0$ (and therefore that the Poisson model would be more appropriate). In both cases the χ^2 value indicated that the probability that one would observe these data conditional on $\alpha = 0$ is virtually zero, i.e., conditional on the process being Poisson. This indicated that the negative binomial distribution was the more appropriate one to use.

Whether a panel specification was preferred to a pooled specification was also tested, and the Likelihood Ratio test statistics in all cases confirmed the need for a panel rather than pooled regression. Table 2 reports the coefficient obtained from fitting the contingent behaviour model, for the pooled and panel negative binomial random effects panel specification (Results of the pooled and panel poisson analysis are available from authors upon request).

INSERT TABLE 2 ABOUT HERE

Variables used were travel cost⁴, water sport participation, income, age, marital status, separate dummies for whether the respondent is a member of a sporting or environmental organization, for whether the trip was a once off and unlikely to be repeated and for whether the respondent is in full time employment. We also used a Contingent Behaviour

⁴ Travel cost is estimated as $((2 * (\text{distance} * \text{€}0.224 \text{ per mile})) + 0.25(\text{hourly wage})) / \text{Number of People in Vehicle over the age of 17}$. The distance variable is multiplied by 2 to obtain the two-way trip distance, which was then multiplied by the average petrol cost per mile (the Automobile Association of Ireland's calculation of €0.224/mile obtained from http://www.aaireland.ie/infodesk/cost_of_motoring.asp). This is used as a proxy for the monetary travel cost. Following Shaw and Feather (1999) the opportunity cost of travel time is included in the travel cost calculation as 0.25 (hourly wage) where the hourly wage rate was taken as the individuals income divided by 2000, based on a 40hr week for 50 weeks in a year.

variable, which is a dummy variable representing whether the visits are actual, with current walking facilities, or hypothetical, with improved coastal access.

The coefficients in both the pooled and panel negative binomial model are of the same sign and are also of a similar size. In the preferred Panel negative binomial contingent behaviour models (results of which are shown in last column of Table 2), the travel cost coefficient is significant at the 1% level and has a negative sign. The contingent behaviour coefficient is also highly significant and positive for the coastal access scenario. This indicates that the hypothetical improvements in coastal access have a positive effect on the number of planned trips. Except for the employment variable all other coefficients are significant and of the expected sign. The variable “Member of Recreation or Environmental Organisation” is however only significant at the 10% level. The Wald χ^2 statistic shows that taken jointly, the coefficients in the preferred panel negative binomial contingent behaviour model are significant at the 1% level. Ln(r) and Ln(s) in the panel data model of table 2 are included to the fact that the inverse of 1 plus the dispersion is assumed to follow a Beta (r,s) distribution (Hausman et al., 1984).

To estimate the recreation benefits from the access improvements, the steps outlined in the previous section are followed. Prior to any improvements in the walking amenities at the beach the consumer surplus per trip is estimated to be €22.23 per person. The population estimate of per-trip consumer surplus is estimated with 95% confidence to be between €16.94 and €31.55. The estimated average number of trips per year was 26. Total consumer surplus per visitor per year is average annual trips multiplied by surplus per trip which amounts to €577.98 per year. To calculate the proportional change in consumer welfare from implementation of a coastal walking trail, we first take into account the stated change in trips to the beach site if the trail were to be put in place. Such a facility improvement would increase visits from an estimated 26 to a predicted 31 trips per person per year. This corresponds to an increase in consumer surplus of €111.15 per person per year.

Conclusions

An important aim of this study was to establish whether respondents were willing to pay for the introduction of a trail which would enable them to walk along and make use of the coastline. With respect to willingness to pay, the contingent behaviour method used in

this study produces what appear to be reasonable results. Willingness-to-pay is price-sensitive and income sensitive and the results of this present study are comparable with those noted in the literature for similar valuation studies (McGonagle and Swallow, 2005; Hynes et al., 2007). This study found that mean willingness to pay (i.e. consumer surplus plus travel cost) of the average recreationalist using Silverstrand beach is €22 per trip. The increase in CS associated with the introduction of the trail is estimated at €111.15 per person per year. The per trip estimates are similar to recent approximations of the value of walking recreation days ranging from a mean willingness to pay of €41.92 per person per trip to a coastal site in rural Connemara (Hynes et al., 2007) and \$13.70 to €92.40 per person per trip to access the California coastline (McGonagle and Swallow, 2005).

Our analysis indicates that the water sports coefficient is highly significant and positive for the coastal access scenario. This indicates that the hypothetical improvements in coastal access have a positive effect on the number of planned trips by those who take part in watersports activities such as kitesurfing or windsurfing, both of which require similar conditions to be conducted.

Silverstrand beach is situated approximately 7km from Salthill beach, another blue flag beach, that has easy access and good facilities for recreational walking and is located much closer to Galway city. Nevertheless individuals still choose to make the trip to Silverstrand and increase their travel cost because the incremental utility they gain from attending a quieter and more natural beach with good conditions for certain watersports is evidently worth the expense.

Clearly different beaches offer different facilities to different users. Again we re-emphasise the point made by Hanley et al. (2003) and Morgan (1999) for the need to develop a rating system for beaches and the coastline. Such a system would consider differences in user preferences as well as safety standards and thereby promote beaches based on their relative strengths. No such system exists in Ireland at the present time. This is essential if Ireland is to respond to recreational demands made of the coastline and to capture the economic benefits associated with coastal tourism.

A recent report by the European Commission suggests that Ireland has not been particularly successful at doing so. The report noted that although Ireland's potential

for coastal recreational development is among the highest in Europe due to its extensive coastline, Ireland, unlike many of its European neighbours had failed to capture many of the economic benefits associated with coastal recreational tourism (European Commission, 2000). This Report identifies the lack of investment in coastal recreation and highlights the potential for tourism and employment, in an area where Ireland has yet to reap the benefits in the context of a national initiative.

This study also finds that members of a Recreation or Environmental Organisation are more likely to increase the number of trips if a coastal trail was included compared with non-members. Given this representation, local recreational groups such as the Galway Kitesurfing Association may provide a means of representing recreational users and for improving the amenity value of the local coastline. Indeed, several studies from the literature highlight the role of recreational groups in preventing natural resource degradation, facilitating sustainable tourism at the local level and encouraging outdoor recreational activities for their health benefits (Fullilove, 1998; Trakolis, 2001; Vail and Heldt, 2004; Shafer and Choi, 2006).

Although this study focuses on recreational demand there are nevertheless some recreational supply side issues that are significant because they may restrict future access to the Irish coastline. Silverstrand is one of the most popular beaches in Co. Galway and is visited by thousands of individuals each year, drawn by the blue flag status of the beach, its close proximity to Galway city, outstanding scenic beauty and easy access. The local economy benefits greatly from this recreational tourism, local hotels, guesthouses and catering businesses and yet local farmers who are responsible for maintaining the land along the coast receive little benefit. Indeed in many instances they actually face external costs in the form of nuisance effects that interfere with the business of farming (Buckley et al., 2009a; Buckley et al., 2009b).

The provision of coastal trails to support sustainable recreation in Ireland's rural areas requires that these external costs are internalized in such a way that they do not adversely affect the production activities of farmers. It also implies recognition that there are costs involved for farmers in providing recreational access to their lands especially where there is a need to maintain trails, signposts and information boards.

If these two issues are not dealt with then public access will be confined to beach access by public roads not recreational trails that follow the coastline. Given the demand for recreational walking in Ireland, this could prevent the marine sector from deriving considerable benefits from leisure and tourist related activities in rural areas. There are some signs that this process has started with the introduction of Comhairle Na Tuaithe by the Minister for Community, Rural and Gaeltacht Affairs (Comhairle Na Tuaithe, 2006). However, most of the “on farm” initiatives by Comhairle Na Tuaithe have taken place inland and have ignored the coast. These initiatives now need to be extended to selected areas of the Irish coastline.

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Table 1. Scenario examined in contingent behaviour study

<p>Suppose that NEXT YEAR a new WALKING PATH was built connecting to this beach resource.</p> <p>The path would consist of:</p> <ul style="list-style-type: none"> • An approx 2km round trip walk along the cliffs to the end of the spit at Rusheen Bay • Walkers would be granted formal right of way along the walk (currently people walk along the cliff but are not supposed to as it is privately owned farm land), • A marked path with a fence to separate the walk from the farm land and cliff edge • Informational plaques detailing the surrounding countryside. <p>All facilities would be built with material that blends in with the coastal amenity.</p> <p>How would these new facilities affect your use of THIS BEACH?</p>
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Table 2. Estimated Negative Binomial Contingent Behaviour Models

Explanatory Variables	Pooled	Panel
	Negative Binomial Model	Negative Binomial Model
Travel Cost	-0.039*** (-0.005)	-0.041*** (-0.006)
Water Sport Participation	0.688*** (0.221)	0.723*** (0.236)
Age	0.386*** (0.068)	0.293*** (0.077)
Income	0.019*** (0.004)	0.013*** (0.003)
Member of Recreation or Environmental Organisation	0.266* (0.155)	0.348** (0.165)
Married	0.862*** (0.200)	0.626*** (0.218)
Once Off Visit to Beach	-2.358*** (-0.405)	-0.863** (-0.377)
Employed	-0.221 (-0.165)	-0.143 (-0.184)
Contingent Behaviour	0.462*** (0.147)	0.295*** (0.035)
Constant	0.578 (0.407)	1.575*** (0.463)
Ln(Alpha)	0.339*** (0.131)	
Ln(r)		1.264*** (0.176)
Ln(s)		0.686*** (0.154)
Number of respondents	285	285
Likelihood Ratio/Wald χ^2 Statistic	158	241
Log likelihood	-1098	-992

Standard errors are in parentheses. *** indicates significance at the 1% level, ** indicates significance at the 5% level and * indicates significance at the 10% level.

