ECONOMIC EVALUATION OF PROPOSED LONG-DISTANCE WALKING TRACKS IN THE WET TROPICS
OF QUEENSLAND

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An increasingly popular activity in the Wet Tropics of Queensland is bushwalking, which can provide benefits for both the visitors and the local community. While long-distance tracks— with huts and camp sites for overnight stays—are common in some countries (notably New Zealand), this appears to be an ecotourism opportunity which has been overlooked in North Queensland. A market model can be developed in which the supply (indicated by marginal cost) and demand (community willingness to pay) and efficient pricing for a proposed long-distance walking track are estimated. Where a track does not currently exist, transfer of demand estimates from other tracks and inferences about total market size are required. This paper discusses the economic modelling and estimation issues in evaluation of long-distance walking track proposals in the Wet Tropics of Queensland. Demand estimation (with reference to a visitor survey for the Thorsborne Trail on Hinchinbrook Island) and supply estimation in terms of track development and maintenance costs are examined.

1. INTRODUCTION

Wet tropical rainforests are a diminishing resource within the world and especially in third world countries. The rainforests of far north Queensland, which form the Wet Tropics of Queensland World Heritage Area (WTWHA) therefore have importance in world ecology. At least one of four criteria must be satisfied for an

The four criteria for natural heritage listing (Lane and McDonald, 2000) are that an area must be

- an outstanding example representing the major changes of the Earth's evolutionary history;
- an outstanding example representing significant ongoing geological processes, biological evolution and man's interaction with his natural environment;
- contain superlative natural phenomena, formations or features or areas of exceptional natural beauty; or
- contain the most important and significant natural habitats where threatened species of animals or plants of outstanding universal value from the point of view of science of conservation still survive.

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area to be placed on the World Heritage list. The north Queensland rainforests are among the small number of sites internationally which have met adequately all four of the criteria. They are a desirable tourist destination in their own right, as well as because of proximity to the Great Barrier Reef World Heritage Area. Further tourism advantages arise because they are located in a developed country, with stable government, clean water, healthy fresh food, and with international airports close at hand. All other World Heritage tropical moist forest protected areas are in developing countries in Africa, the Indian subcontinent, Indonesia, and Central or South America (Thorsell and Sigaty, 1997).

To experience the ambiance of the rainforest, and view some of the wildlife, it is necessary to leave the roads and walk in the forest. There are many short tracks which take visitors to particular interesting sites to see examples of enormous trees, beautiful waterfalls and mangrove areas, and to experience the variety of vegetation within the forest understory. A proposal has been made 'to create a high quality walking network which will provide walkers with opportunities to learn about and appreciate the region's World Heritage and Aboriginal cultural values and to enjoy a range of recreational and educational experiences' (WTMA, 2000a, p. v). Walking plays a vital role in achieving the presentation component of World Heritage management, and increasing public awareness and understanding of the need for conservation and protection of the area as a natural and Aboriginal cultural landscape. Of the 126 natural and mixed World Heritage sites, 31 are located in the USA, Canada, Australia and New Zealand, and these accommodate over 84% of all World Heritage visitors. There are 52 million visitors to these sites annually (Thorsell and Sigaty, 1998), and the visitation is increasing over time.

There are currently few opportunities for tourists to north Queensland to undertake a long-distance walk involving one or more overnight stops. The only recognised and marketed long walk is the Thorsborne Trail (formerly called the East Coast Track) on Hinchinbrook Island, the popularity of which is such that bookings six months in advance are required for peak times. Development of a new long-distance track in north Queensland could meet some of the unsatisfied demand, and also attract more tourists to the region, of both domestic and overseas origin. The Wet Tropics Management Authority (WTMA) has proposed that various day and overnight walks be developed, preferably as part of an extended network of tracks which will enable walkers to choose a route, distance and degree of difficulty to suit their needs and the time they have available (WTMA, 2000 b).

From a planning perspective, there is a need to determine whether investment in developing new tracks, or extending or linking old tracks, would be worthwhile. Economic evaluation would involve consideration of the type of track design, the quality and classification of the track, the provision of accommodation or camping areas for overnight stops, the number of bridges to build and so on. As well as carrying out a financial appraisal, any proposed walking track in a protected area must be examined from the viewpoint of ecological and social sustainability. The track must be compatible with the ecological values for which the area has been protected, and consistent with the views of the local (including indigenous) community. Evaluation of the economic desirability of a proposed walking track
is clearly a complex task. Many of the determinants of value of a walking track are not exchanged in markets and so it is necessary to adopt a non-market valuation technique.

The remainder of the paper is set out as follows. The next section discusses the role of long-distance walking tracks as a recreation and tourism asset. This is followed by a discussion on relevant government agencies and track implementation issues. The economic framework for evaluation of a new walking track proposal is then discussed. A case study of the approach of demand estimation for the Thorsborne Trail and benefit transfer to a new target location is then presented. Concluding comments follow.

2. LONG-DISTANCE WALKING TRACKS AS AN ECOTOURISM ASSET

New Zealand has a large number of well-utilised long-distance tracks, and in particular the Milford Track is a national ‘icon’ walk attracting many tourists from overseas. Almost all tracks in New Zealand are accessible to the independent walker and many offer the option of fully guided tours. In the UK, especially England, there is a vast network of trails and high quality long-distance walks which have been designated as National Trails. Tramping is a popular pastime. Similarly, in the mountain regions of Canada and Europe there are many walking clubs and recognised walking tracks. The US also has many long-distance walking tracks, including the Appalachian Way which is over 2000 km long (Bryson, 1997).

Australia has a variety of long and very-long trails. The 650 km Australian Alps Walking Track is for experienced bushwalkers and is not well marked or maintained in some parts, and has no facilities. In Western Australia, the Bibbulmun Track has in recent years been extended and upgraded and now runs for 963 km from Perth to Albany. It attracts many walkers who complete short sections. Huts and camping sites are provided for overnight stops. Other very long distance walks are the Heysen Trail in South Australia, the Larapinta Trail in the Northern Territory, the Hume and Hovell Walking Track in New South Wales and the Great South West Walk in Victoria. A particularly popular walk in Tasmania is the Overland Track in the Cradle Mountain area.

Australia’s Bicentennial National Trail stretches an extraordinary 5330 kilometres from Healesville in Victoria to Cooktown in tropical north Queensland. This horse-riding trail was the inspiration of the legendary bushman R. M. Williams, and follows historic coach and stock routes, old pack-horse trails and country roads. Wherever possible along its length the trail has been designed to be a ‘living history’ of the country, following the routes of the early pioneers and highlighting historic sites and artefacts along the way. The trail links 18 National Parks, and passes through some of the most spectacular scenery in Australia, traversing alpine meadows, snowfields and wilderness areas, remote dry plains, rugged mountains, valleys and gorges, and lush tropical rainforests. Some sections of the Trail have become popular walks, and some can be traversed by mountain bike².

² http://home.vicnet.net.au/~bmt/
In North Queensland, the 15km Mt Bartle Frere Trail allows for one overnight stop but the climb can be completed by a fit walker in one day. This is the only Queensland mainland track included in Thomas’ (1989) *20 Best Walks in Australia*. The Goldfield Track slightly to the north, runs 19 km from near Babinda over the Great Dividing Range, and provides ‘an opportunity to experience a transect of rainforest wilderness’ (Ritchie 1995, p. 110). This has been described as ‘one of the best long-distance walks in North Queensland’ (Ritchie 1995, p. 112), and has a campsite on the Mulgrave River, but is nevertheless a relatively easy one-day walk. The 32 km Thorsborne Trail on Hinchinbrook Island is well-marked, with many campsites, and passes through a wide variety of landscapes, only 11% of which is tropical rainforest. Numbers allowed on the trail per day are restricted to 40, with walks typically of three nights camping, and it is fully booked especially for the dry season. Since the Wet Tropics has the fifth highest visitation rate for natural World Heritage sites (after the Great Smoky Mountains, the Grand Canyon and Yosemite USA, and the Canadian Rocky Mountains) with well in excess of 3 M annual tourists (Thorsell and Sigaty, 1998), there appears to be a prospect for providing an alternative tourist opportunity for long-distance walking.

A long-distance walk, as demonstrated by the examples given, may vary in length from about 15km to thousands of kilometres. Few people complete the full distance of the ultra-long-distance tracks. The most popular long distance walks involve about three overnight stops. The definition adopted here is that a long distance track requires at least one overnight stop.

There is considerable interest in nature-based tourism or *ecotourism* in Queensland³. The environment is an important element in a visitor’s motivation to travel to Australia or Queensland and their satisfaction with the visit (Throsby, 1991). However, there are concerns that unless nature-based tourism is managed effectively, it can be destructive. It is important that any new walking opportunity conform to the vision and guiding principles of the Wet Tropics Management Authority, the federal government agency responsible for management of the WTWHA. Tourism use of the Wet Tropics needs to support the implementation of Australia’s duty to ‘protect, conserve, present, rehabilitate and transmit to future generations’ the Area’s World Heritage values, and be consistent with the conservation requirements of all ecological communities, landforms and waterways. In addition, there is a requirement that ecotourism contribute to the conservation and understanding of Aboriginal and non-Aboriginal cultural heritage values, complement community desires and aspirations and positively contribute to community social and economic well-being across the Wet Tropics region (WTMA, 1999). Trying to find the balance between presenting the area to visitors and

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³ The term ‘ecotourism’ is often used interchangeably with ‘sustainable tourism’ or ‘nature-based tourism’. The three are neither synonymous nor mutually exclusive. Nature-based tourism comprises just one of a number of different types of tourism and is distinguished by its natural setting. Ecotourism is also characterised by its natural area setting but places an emphasis on conservation of the natural environment, visitor education and community benefits (Department of Tourism, 1994, p. 6).
protecting and conserving the environment to be able to transmit it to future generations unspoiled, creates conflicts and problems for managers of protected areas.

Harrison et al. (1998) presented the view that development of new long-distance walking tracks in north Queensland would be a desirable form of ecologically sustainable development. They argued that not only would this assist in conserving areas of high conservation value and natural attractiveness for use by future generations, but a number of economic and social benefits would be made available to the present generation, as summarized in Table 1.

### TABLE 1
SUSTAINABLE DEVELOPMENT IMPLICATIONS OF LONG-DISTANCE WALKING TRACKS

<table>
<thead>
<tr>
<th>Sustainability category</th>
<th>Benefit class</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ecological</strong></td>
<td>Protection of recreation areas for the benefit of future generations</td>
</tr>
<tr>
<td></td>
<td>Better species identification, classification, and mapping to assist management</td>
</tr>
<tr>
<td></td>
<td>Presence of staff funded, hence improved monitoring and management possible</td>
</tr>
<tr>
<td></td>
<td>Developing a constituency of support for nature conservation</td>
</tr>
<tr>
<td><strong>Social</strong></td>
<td>Positive interactions between different age and nationality groups on tracks and in camp areas, hut culture</td>
</tr>
<tr>
<td></td>
<td>People participate in a healthy outdoor activity</td>
</tr>
<tr>
<td></td>
<td>High participation by young people and instilling an interest in nature</td>
</tr>
<tr>
<td></td>
<td>Skills training in track construction</td>
</tr>
<tr>
<td></td>
<td>Exposure to indigenous culture</td>
</tr>
<tr>
<td><strong>Economic</strong></td>
<td>Direct revenue generation</td>
</tr>
<tr>
<td></td>
<td>Revenue from provision of travel agent services, transport and accommodation</td>
</tr>
<tr>
<td></td>
<td>Revenue generation for supply of provisions, gear, maps, books and other memorabilia</td>
</tr>
<tr>
<td></td>
<td>International promotion of favourable &quot;image&quot; of region, and attraction of another type of overseas visitor</td>
</tr>
<tr>
<td></td>
<td>Increased visitation to other regional attractions</td>
</tr>
<tr>
<td></td>
<td>Employment creation in construction and maintenance of tracks and camp sites, and interpretive signage</td>
</tr>
</tbody>
</table>

Source: Harrison et al. (1998).

3. TRACK IMPLEMENTATION ISSUES

Harrison (1998) raised the question as to why walking tracks have developed to a greater extent in New Zealand than in north Queensland. Some factors, which do not appear to account for the difference, include: differences in climate and seasonality of hiking; differences in natural attractiveness; extent of dangers and annoyances; availability of complementary or competitive attractions; and
characteristics of the resident population. Some factors, which could explain the differences, include: availability of infrastructure; use of volunteers; legal liability; government policies; and reputation and promotion of walking tracks. Some lessons which may be learnt from successes of long-distance walking tracks in other areas were identified as: recognition that reputation of tracks evolves gradually; importance of providing huts or campsites and cooking facilities; issues in track design including construction of bridges for all-weather trafficability; use of helicopters in supplying provisions and maintenance materials; and importance of marketing and information services.

Initially the environmental management agencies for the wet tropics rainforests (WTMA as federal agency and Queensland Parks and Wildlife Service (QPWS) as state agency) took a negative attitude to human visitation. Allegedly, bridges were destroyed following World Heritage listing to prevent vehicle access to some areas. The motivation for not supporting visitation appeared to be the importance of protecting sensitive rainforest areas, fear of litigation should walkers be injured, and difficulty in negotiation with indigenous groups. Recently, the WTMA has taken a more positive attitude to track development, and has produced a draft walking tracks strategy followed by the Wet Tropics Walking Strategy (WTMA, 2001), though this is less comprehensive than management strategies developed elsewhere, e.g. in Tasmania (Hawes, 1994). The Walking Strategy (WTMA, 2001) identified three major categories of long-distance walks, viz. easily accessible overnight walks (such as Mt. Bartle Frere); long systems of linked walks made up of separately accessible sections with camping or accommodation; and remote long-distance wilderness walk with camping overnight stops (such as the Thorsborne Trail). There is a history of Aboriginal occupation of tropical rainforests in north Queensland, and a consultation process would be required before any new track development could proceed.

Potential locations for long-distance tracks were identified in the Draft Walking Strategy (WTMA, 2000 a). One of the four proposals for an overnight walk was to link the Goldsborough Valley end of the Goldfield Track to the walks on the Tablelands. Two areas have been identified as potential walking networks of linked tracks where there is easy access yet high quality rainforest, aboriginal culture, and historical logging and mining points of interest. Two regions have been identified for possible remote long walks. The southern walk could extend from the most southern point of the WTWHA, Blue Water, along the Paluma Range and the Cardwell Range circling Ingham and ending on the (presently closed) Dalrymple Gap Track near Cardwell. The second region of possibility is in the far north in the range between Mossman near the coast, and the town of Mt Carbine to the west.

During 2001 Australia celebrated the Centenary of Federation. Funding from the State and Federal governments has been provided for a series of capital works projects called the Heritage Trails Network4. There are seven projects in far north Queensland that are included in this program and one of them is the development

4 'Trails' in the title does not refer to walking trails but to the linkages (road routes) between places of natural, historical or cultural heritage.
of some long distance walks utilising currently disused logging tracks. The Far North Queensland Heritage Trails Network is currently working with several Shire Councils, WTMA and QPWS to develop a network of 'icon' long-distance walks in the Southern Wet Tropics consistent with the Walking Strategy. There has also been funding allocated by QPWS to establish 'Great Walks of Queensland' (WTMA, 2001, p. 18).

4. ECONOMIC MODELLING OF WALKING TRACK PROPOSALS

Social cost-benefit analysis (CBA) provides an appropriate economic framework with which to evaluate a new track proposal, or to compare alternative proposals, as desirable investments from a State government viewpoint. Within this CBA framework, questions arise as to the choice of appropriate track locations, methods of financing track development, track type (e.g. track traversable for all ages or for the highly fit only), what facilities are to be provided (e.g. camp sites or huts), and what user fees are to be charged. As well as estimates of track development costs, a cost-benefit evaluation requires estimates of annual costs and benefits of continuing operation of a proposed track, and estimation of the economic surplus arising from hikers, the agency managing the track and providers of associated services.

A walking track may be viewed as a recreation asset which can be modelled in a market framework, with estimates made of supply and demand for recreation services. The government as custodian of the protected area is the supplier of the recreation resource, and hikers are the consumers. The market model can be viewed as a short-run model; although continued track development may take place, including extensions and improved accommodation, the assumption of fixed infrastructure is likely to be a suitable practical expedient for modelling purposes. When the economic analysis is framed in such a market model, with supply and demand relationships for long-distance walking estimated, then it is possible to determine market clearing prices and draw implications for introducing user-pays mechanisms (Harrison, 1998). A mechanism of payments that recovers even part of the on-going costs would be of considerable assistance in maintaining the quality and minimizing adverse environmental impacts of the track.

4.1 Evaluation of demand for long-distance walking

The Travel Cost Method (TCM) has become widely accepted as a method of deriving site-specific demand functions. However, when a track is in the proposal stage only, the analyst is faced with either obtaining stated willingness-to-pay for the proposed track, or inferring demand from estimates for one or more tracks with similar characteristics. Thus, the TCM may be used to estimate demand for a similar track, then benefit transfer methodology used to make inferences about demand for the proposed track.

The TCM is frequently used to measure the benefits of access to natural areas for tourism and recreation, in the absence of market measures of these benefits. The TCM relies on the assumption that the value people place on the site is represented by the amount they are willing to pay to travel to the site. So linking visitation with travel costs and other socio-economic variables enables a recreation value to be
estimated. This constitutes stage I of the procedure. Then assuming that visitors would respond to an increase in entrance fees in the same way they respond to an increase in travel costs, the second stage demand curve for the actual site can be estimated. Once the site demand curve (stage II) is derived, the consumer surplus can be estimated.

Two variants of this approach are the individual and zonal travel cost methods (ITCM and ZTCM). The former is acceptable whenever most individuals take more than one trip per year or season to the site being valued. The ZTCM approach must be used when considering an annual holiday vacation site such as a distant interstate destination, when many visitors do not make repeated visits to the site (Walsh, 1986, p. 218). To calculate the visitation rate per capita (or frequently per 1000 population), the origins of the visitors are divided into zones. In Australian studies, zones have been based on the different Statistical Divisions within the States as in Stoeckl (1994) and Driml (1996). Beal (1995) also used the Statistical Divisions but found that a few zones supplying the majority of visitors had to be further subdivided in order to generate more categories for the analysis. The visitation rate in ZTCM becomes the dependent variable for the first stage estimation which links visitation with travel cost and other socio-economic variables.

4.2 Estimation of a supply function for long-distance walking

Supply analysis also presents some difficulties. The cost of track and campsite or hut development, and of maintenance of recreation services, will depend on the method of financing of these activities. For example, in Western Australia construction costs were minimized by the Department of Corrective Services providing labour to build the shelters, barbecues and toilets at the campsites. Volunteer members of ‘The Friends of the Bibbulmun Track’ carry out an important ongoing maintenance role. The volunteers’ major role is to collect information regularly on trail and campsite conditions and to carry out maintenance tasks such as vegetation pruning, minor erosion control and replacing missing or damaged trail markers (Keating, 1999).

A state government as custodian of protected areas is a monopoly supplier of long-distance walking services. The supply curve is typically taken as the short-run marginal cost curve, or quantity a supplier would place on the market at various market prices. In this case it is appropriate to think of the cost to the government of providing recreation services, for various numbers of long-distance walkers. The government is also charged with ensuring that recreation does not cause serious damage to the protected area, hence the supply cost should take into account both financial and ecological costs. The latter may include costs associated with degradation of the resource (increased erosion, disturbance to wildlife, increased bushfire risk) as well as any external costs (added traffic congestion, road damage, pollution of downstream waterways, nuisance impacts on neighbours) (Beal and Harrison, 1998). If tracks were placed under private control, these external costs would not be relevant supply costs, but presumably they would be taken into account by a regulatory agency.
A further complication is that activities of the government in maintaining protected areas lead to the joint products of conservation and recreation. All of the community gains benefits from the conservation function, while bushwalkers are the main beneficiaries of the recreation function (though vicarious benefits could be gained by non-walkers.) It is therefore necessary when determining supply costs to net out only those costs associated with the recreation function of protected areas (Beal and Harrison 1998).

4.3 Estimation of spillover benefits of increased visitation to the wet tropics

To the extent that development of a new long-distance walking track would increase visitation to north Queensland, there would be flow-on benefits in terms of increased revenue to firms and government agencies providing goods and services for visitors, such as transport, accommodation, food and hiking gear. These might be approximated using tourism input-output multipliers. It is probable that a new track would increase the visitation rate to north Queensland, particularly for backpackers from Australia and Europe.

Presumably, if a new long-distance track were developed, it could draw visitors away from existing walking tracks, and perhaps also displace other forms of outdoor recreation such as beach holidays, so there would be some leakage of overall recreation benefits. The transfer of demand to a new site would need to take this leakage of demand into account. An extreme case would be where an unchanged total demand becomes split between existing tracks and a new track, i.e. there is a 'zero sum game'. In practice, the situation may be quite different because there may be unsatisfied demand for long-distance walking in an area, or such walking may be engaged in by a particular type of clientele who would not be interested in alternative activities, and a new track may substantially increase the overall visitation rate to an area. The supply of long-distance walking opportunities could reach a threshold which would attract greater numbers of visitors to the area. Of course, it could be that long-distance walking replaces other forms of outdoor recreation such as four-wheel-drive tours, so there is some leakage of overall recreation benefits.

For many long-distance walking tracks (including the Thorsborne Trail on Hinchinbrook Island), there is strict rationing of places and a requirement to make bookings well in advance of a visit. The number of places available is determined on the basis of a subjective estimate of ecological carrying capacity. Any new track which is a close substitute would then allow some of the excess demand to be met. This is illustrated in Figure 1. Here MFC is the marginal financial cost curve for providing the existing long-distance walking facilities, say on an annual basis; the shape of this curve reflects the fact that most of the costs are relatively independent of visitor numbers. MEC represents the additional cost (ecological and external), due to the social responsibilities of the monopoly government supplier, and the overall marginal cost curve is MC. $S_i$ is the prescribed carrying capacity or rationed

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5 One of the Tasmanian walking tracks has a limit of 200 walkers per year, no advertising is permitted, and maps are confined to use within government (Hawes, 1994).
number of hikers allowed on all existing tracks per year. The supply curve is now represented by that section of the MC curve up to the recreation quantity $S_1$, then the upper part of the vertical line $S_1$. The market clearing price for hikers would be $p_1$, although the government may choose to set a price close to the marginal financial cost, at say $p_2$.

In the market situation represented by Figure 1, the demand cannot be satisfied by existing tracks. Suppose a new track was developed, which had the same marginal cost structure. Then even if the full marginal cost were charged, $S_1S_2$ units of recreation demand could be supplied without any diversion of net demand from existing tracks. Depending on the elasticity of demand, the average economic surplus per walker would be reduced, but perhaps not by a large amount.

**4.4 Benefit transfer between sites**

The procedure whereby a benefit estimated for a particular study site (for which data have been obtained) is transferred to a policy site for which little data or no data exist, is known as 'benefit transfer' (Boyle and Bergstrom, 1992). Several kinds of benefit transfer are possible. Value estimates can be extrapolated across time, across populations or across sites given the same population (Morrison and Bennett, 2000). The value that is transferred may be an average net willingness to pay, or an adjusted average or, preferably, a demand or benefit function. The coefficients from the demand equation estimated at the study site could be used with
the values of independent variables at the policy site to estimate both the usage and benefits of the new site. The transfer of the benefit function can be expected to produce a more unbiased estimate of total recreation site benefits than simply transferring the average benefit per day (Loomis, 1992).

The accuracy and validity of benefit transfers have been tested in a variety of ways including meta-analysis (Smith and Kaoru, 1990; Walsh et al., 1992) and comparison of two sites where primary data are available (Parsons and Kealy, 1994; Kirchhoff et al., 1997; Morrison et al., 1998). Where data exist for two similar sites it is possible to perform a benefit transfer from one to the other (and vice versa) and make a direct comparison with the benefits estimated from the observed data. In this way conditions have been identified, and criteria and procedures developed, under which benefit transfer provides a reasonable approximation of policy site benefits. These include the quality of the economic methods and empirical techniques used in the original study, the similarity between the economic goods at the two sites, how closely the two populations match with respect to socio-economic characteristics and geographical extent, and the availability of substitutes for the two sites.

An alternative to estimation of demand at a similar recreation site is to draw on information from various previous studies. In recent years several non-market valuation databases have been developed to facilitate the use of benefit transfer. The NSW Environmental Protection Agency has developed the Envalue database for Australian applications. Other databases are the EVRI (Environmental Valuation Resource Inventory) in Canada, and the New Zealand non-market valuation database (Morrison, 2001).

5. CASE STUDY OF MARKET MODELLING FOR A NEW WALKING TRACK IN NORTH QUEENSLAND

A research project is in progress to examine the social cost-benefit aspects of development of a new long-distance walking track in the Queensland mainland Wet Tropics. Part of this research involves estimation of recreation demand, supply costs and efficient pricing. The location is not yet resolved, but this could possibly be an extension of the Goldfield Trail, as flagged by WTMA (2000 a). Suggestions for determining the site, including use of geographical information systems and digital terrain mapping, have been made by Harrison et al. (1998). In order to estimate demand, a travel cost survey is being undertaken of the Thorsborne Trail, to be used for benefit transfer purposes. Most hikers on this trail spend three nights camping which allows time for easy walking, excursions of some of the side tracks, full appreciation of the wilderness experience, and enjoyment of the landscape and features such as swimming holes and waterfalls.

5.1 Estimation of demand for walking on the Thorsborne Trail

The ZTCM has been selected as the methodology for valuing demand for walking on the Thorsborne Trail on Hinchinbrook Island. A small pilot survey by personal interview was conducted of hikers on Mt Bartle Frere (in conditions of constant rain and extreme walking difficulty). A relatively short questionnaire (29 questions) was printed on two sides of one A4 page. Thorsborne Trail walkers were able to
complete the questionnaire during the bus ride back to their starting point, and leave it in a box in the bus. In this way all seasons of visitation have been assessed which is important in the Wet Tropics since the main interest in walking is during the mid-year dry season, rather than the more humid and rainy summer. The self-administered survey targeted a user population of people who have demonstrated their interest in long-distance wilderness walking. This survey method was substantially less expensive than carrying out personal interviews with the wider population of both users and non-users.

Information was sought about the party size and ages, home town and method of travel from there, costs of previous night’s stay, usual frequency of bushwalking activity, features of the trail that added to or detracted from overall enjoyment, opinions on a new walk and some socio-economic information.

Analysis of the Thorsborne travel cost data is not yet complete. Some preliminary findings are that 75% of respondents walked either as a couple or with friends (where information was obtained from one party member), 78% of the total number of walkers were less than 40 years old, and more than half were under 30 years old. Overseas visitors accounted for 28% of respondents. More than half of the respondents were regular hikers who bush-walked at least once a month. A total of 478 usable questionnaires was obtained, representing over 1000 walkers. The analysis of the Australian respondents indicates that most of the walkers were from Queensland (Table 2), and 42.6% were from the Far North and Northern Statistical Divisions (which include the cities of Cairns and Townsville).

<table>
<thead>
<tr>
<th>State of origin</th>
<th>Fraction of sample (%)</th>
<th>Cumulative Fraction (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Queensland</td>
<td>60.0</td>
<td>60.0</td>
</tr>
<tr>
<td>NSW&amp;ACT</td>
<td>21.4</td>
<td>81.4</td>
</tr>
<tr>
<td>Victoria</td>
<td>13.7</td>
<td>95.1</td>
</tr>
</tbody>
</table>

The demand for long-distance walking on the Thorsborne Trail will provide a guide to demand for a new track in the mainland WTWHA. High similarity would exist between the Thorsborne Trail and a new long-distance walking track on the mainland. Both would draw on similar north Queensland and overseas catchment populations, operate in areas of similar climate, and provide coastal views to the

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5 The assistance of Mr and Mrs Bill Pearce, who operate the launch pick-up and bus trip, in maintaining the survey for the full year from September 1999 to September 2000, is gratefully acknowledged.

7 Summer walking is more popular on elevated mainland areas. For example, people from Townsville visit the Paluma National Park to escape the summer heat.
The vegetation would have a number of similarities, although there is more rainforest on the mainland. Total length would probably be similar. Strong interest was expressed in walking a new long-distance track on the mainland. The high proportion of respondents that are regular walkers suggests low substitutability between long-distance walking and other recreation activities.

The Thorsborne Trail is a 'wilderness' walk with strictly controlled numbers so that walkers enjoy a feeling of remoteness. A proposed long distance track with provision of overnight accommodation (e.g. with cabins or lodges) could also cater for a different population with respect to both age and financial security. These walkers may correspond more closely to those who complete guided walks on the Milford or Routeburn Tracks in New Zealand, or the Overland Track in Tasmania, hence benefit transfer from these sites could also be relevant. Some guided walks are in fact available in the WTWHA (Harrison et al., 1999).

The high number of overseas visitors to north Queensland and to the Thorsborne Trail (167 of the 478 questionnaires) is notable. These constitute a major source of revenue to the region. When estimating consumer surplus from long-distance walking from an Australian socio-economic perspective, overseas visitors are not relevant. However, they are relevant in terms of producer surplus to the track management agency, and to firms supplying tourism inputs such as accommodation, food and walking and camping gear.

5.2 Supply estimation

The majority of walks currently available in the Wet Tropics are on land managed by the Queensland Department of Natural Resources and Mines (QNRaM) or the QPWS. In conjunction with these land managers, the various local governments (city and shire councils) are increasingly becoming active in facilitating and promoting walk development. All land managers in the WTWHA are subject to the Wet Tropics Management Plan of 1998. The Draft Walking Strategy reveals plans in some areas for the development of more walking opportunities.

Some local governments are receiving funding for the development of new walks and several shires such as Atherton, Herberton and Mareeba are developing specific plans for walking in their local area. Several southern councils are working with the Heritage Trails Network to develop a long distance walking network in the Tully Gorge / South Johnstone / Ravenshoe area (WTMA, 2000 a, p.12).

Rainforest Aboriginal people also desire to participate in all aspects of walking management and associated tourism. WTMA and land managers have legislative obligations to consult with Aboriginal people, much of the Wet Tropics and surrounding areas being potentially claimable under the Native Title Act. Under this Act the Aboriginal people maintain their rights to traditional use and management of land unless these rights have been subsequently extinguished. Some of the current walks, especially longer ones and those leading to special features, follow traditional Aboriginal routes 'which connect all facets of their life and culture': these include hunting and gathering, visiting family, conducting trade, attending ceremonies and maintaining kinship and marriage connections (WTMA, 2000 a, p.14).
No costings of new long-distance track proposals are available, though ballpark figures have been suggested by Harrison (1998). Once a track is designed, the construction costs would need to be estimated. Also, estimates of annual costs would need to be made, including the staff input component of the management agency, as well as ecological and external costs. Provision of new tracks is dependent on funding from any of WTMA, QPWS, QNRM, or local councils and communities. There is no current financial allocation for this purpose. There is scope for considerable savings if new tracks are created by linking currently managed tracks, and old logging roads (common in the WTWHA) and marked routes (including former tracks). However, this restricts the siting of new tracks, and old logging roads are sometimes eroded or heavily overgrown, follow unsuitable terrain, do not necessarily have attractive views, and can pass through areas considered sensitive by traditional Aboriginal occupants. Hence it may be less expensive to design and develop an entirely new track.

Harrison et al. (1998) have suggested that one or more of a number of methods to finance the development and maintenance of a new long-distance track could be adopted in north Queensland:

(a) Fully government funded. The EPA (Environmental Protection Agency) or WTMA could use wage staff or contractors to construct and maintain tracks, huts, camp sites and so on.

(b) Use of job trainees. Deployment of trainees under labour market schemes such as Green Corp or work-for-dole, supported by qualified supervisors, could defray labour costs.

(c) Use of volunteers. Bushwalkers and local community groups, such as service clubs and schools, often play a role in track development and management overseas. For example, some of the huts in New Zealand are staffed by volunteer retired people on an alternate week roster, and assist in the management of facilities, collection of fees, provision of first aid, and so on.

(d) Involvement of the private sector. Track development by private firms, or as a joint venture between the government and private sector, offers another option for reducing taxpayer costs. A number of the huts in New Zealand are under private control, including some along the Milford Track which coexist with Department of Conservation huts. Private sector investment usually involves higher quality accommodation for the better-off walkers.

(e) Aboriginal management. Aboriginal people with traditional association in particular areas of north Queensland could be involved in track and campsite or hut construction and management. This has parallels in New Zealand, where some huts are operated by Maori traditional landowners as marae (meeting houses), and visitors experience traditional Maori welcome and farewell protocol. This is a powerful way to convey Maori culture to the pakeha, and enhance understanding between these population groups.

(f) National Heritage Trust grant. As in the case of the Bicentennial National Trail, special purpose federal funding could be sought to assist in development
of a long-distance walking track as a national asset, reducing the financial impost on the state government.

For a successful implementation of a new long-distance walk or walks, it is recognised that there would need to be co-operative working relationships between the state government land management agencies such as QPWS, QNRM and WTMA, as well as local governments, private walk managers and Aboriginal groups. Co-ordinated management must also include other stakeholders such as bushwalkers, the tourism industry, local communities and conservation groups (WTMA, 2000a). The current policy of QPWS is not to charge for walking in national parks (Fraser Island being an exception), and introduction of fees for walk passes would involve a change in user fee policy. Camping fees are currently charged, and hut fees would be simply an extension of these.

7. DISCUSSION

The state of Queensland is missing out on a major ecotourism opportunity by having no long-distance walking tracks available on the Wet Tropics mainland. There would appear to be no sound reasons why this opportunity could not be exploited, though issues of attitudes to rainforest access, ecological sustainability, approvals of indigenous communities and funding sources would need to be addressed. A social cost-benefit evaluation of any new track proposal would indeed by a complex task. Developing a market model for long-distance walking on a proposed new track would be a major component of this analysis. Demand estimation must of necessity rely on benefit transfer or stated preference methods. To the extent that a new track would offer a similar recreation experience, and walkers from a similar population would be interested in walking a new track in the rainforest, it is considered that the demand value found for the Thorsborne Trail could be adjusted and reassigned to the new site. In transferring values, allowance would need to be made for competition with existing walking facilities. Supply estimation would need to consider alternative funding options for track construction and maintenance. An output of market modelling would be information about efficient pricing.

REFERENCES


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