CONCEPTUALIZING YIELD:
Sustainable Tourism Management

Jeremy Northcote
Jim Macbeth

Abstract: This paper develops a framework for employing the concept of tourism yield in a multidimensional manner, in particular applied to various quality of life aspects promoted by sustainable development. Most analysts employ a narrow economic definition of yield while paying some attention to the triple bottom line. Here, a framework is proposed that not only seeks to conceptualize tourism yield across a broad range of spheres, but also incorporates sustainable parameters using a systems approach. Rottnest Island—a popular Australian destination—is employed as a case study to demonstrate how the model can be used for assessment and decision making in planning. **Keywords:** impacts, sustainable yield, limits of acceptable change.

INTRODUCTION

The growing shift towards sustainable development has led to a renewed interest in the impacts of tourism on the environment, society, and culture. However, there has been difficulty in conceptualizing the ways that it produces various environmental, social, and cultural benefits as opposed to merely costs. Symptomatic of this has been the difficulty of incorporating models of cost-benefit analysis in sustainable development, with such approaches biased towards the measurement of the economic aspects. Multicriteria analysis has emerged as one solution to overcome these deficiencies, but so far such models have lacked a framework for conceptualizing the interrelationship of elements characteristic of tourism systems.

In this paper, a framework is proposed that will help planners articulate and address a broad range of positive and negative developments in the tourism system. The guiding principle behind it is that management requires consideration of the costs and benefits along a number of yield dimensions, namely current or expected levels, required levels in order for the system to be sustainable, potential levels possible within a sustainable system, and the overarching ideological approach to integrating sustainable practices. In the integrated tourism yield (ITY) framework, both resource inputs and outputs are given equal weighting, with yield being the net gain or loss to a resource area.
The sustainable dimensions of required and potential levels refer to the lower and upper limits of return necessary and possible in a system in order for it to remain within required limits of acceptable change.

While the paper will not be concerned with explaining particular empirical techniques for calculating yields, it will be concerned with outlining a conceptual means by which the results can be usefully related to sustainable destination management regardless of the methods of data collection.

The concept of ‘‘yield’’ has been employed by scholars to refer to the financial and economic gains that can result from tourism. While originally applied to airline and hotel operators in the context of profit management (Reynolds and Braithwaite 1997), it is now being applied to whole destinations, even countries (Dwyer and Forsyth 1997; Plog 1998:15). Dwyer and Forsyth have suggested the term can incorporate noneconomic gains in the environmental, cultural, and social spheres, and the notion of sustainable yield has been employed to refer to these broader considerations (Becken and Butcher 2004; Tourism Strategy Group 2001). However, the sustainable yield concept has been understood as financial/economic benefits circumscribed by ‘‘quality of life’’ considerations, rather than quality of life areas being forms of return in their own right. This is symptomatic of much of the sustainability discourse in general, where conservation of cultural and environmental spheres rather than enhancement has dominated thinking (Ryan 2002). Although several studies discuss the benefits that tourism can bring to the environmental, social, and cultural wellbeing of regions (Hall and Page 1999:122; Pearce, Markandya and Barbier 1989:238; Ryan 2002:22; Shafer 1989:154), as yet no framework has been proposed for assessing such contributions.

The limitations of applying cost-benefit analysis to tourism management are well-known (Marcouiller 1998; Patriquin, Alavalapati, Wellstead and Young 2003), with such approaches inadequate for conceptualizing noneconomic inputs and outputs of the system that cannot be attributed a monetary value (Tooman 1997:5-6). Multicriteria analysis has emerged as a solution to the problem of the economic bias in cost-benefit analysis and as a means of framing resulting benefits and costs (Zografos and Oglethorpe 2004). The advantage of these approaches is that they enable different objectives to be prioritized, and then the constraints imposed by goals vis-a`-vis each other to be worked through, without attaching monetary values to inputs and outputs. However, such approaches presented so far have been incompatible with a systems perspective—that is, one in which every valued resource (as opposed to merely each valued goal) is seen to be interdependent. Viewing tourism gains as forms of yield that impact on one another is a useful means for situating costs and benefits in terms of system processes.

Yield and the Tourism System

A systems perspective, which emphasizes the inter-relatedness of tourism activity and the surroundings in which it takes place, has been underdeveloped in the literature (Carlsen 1999). The main problem lies in the way that constraints are seen to apply only to inputs. The concept of carrying capacity, which views systems in terms of fixed population/use limits, is characteristic of this input-centric perspective. McCool notes that ‘‘[a] proper framework for evaluation requires not only specification of objectives, but also a monitoring system that focuses on outputs, rather than inputs’’ (2001:52). Clearly, inputs and outputs need to receive equal attention in evaluation frameworks, and an understanding of yield as part of a larger resource-based system is the best way of approaching the matter.

In a systems model, both outputs and wider influences affect inputs and resource use policy, and the process is largely cyclical. In other words, the returns from tourism alter the ‘‘common pool resources’’ that are available for other users (Briassoulis 2002; Healy 1994). Yield is simply the level of net return to the resource pool, with both inputs (resource use) and outputs (productivity) being considered in terms of costs and benefits. At a certain point, changes to the resource pool may fall short of or exceed the limits defined by stakeholders (Bosselman, Peterson and McCarthy 1999; McCool and Lime 2001). This threshold is understood as being defined by both the required and potential limits, which refer to the minimum and maximum amounts of return required before tourism activity leads to undesired stagnation or changes. This is partly due to the depletion of the resources that are utilized in order to produce such yields, but also due to the saturation or pollution effect from tourism outputs that undermine the resource pool, such as excessive tourists, too many new businesses/industries, and so on.

Ensuring that the resource pool is maintained within the designated limits of required and acceptable change defines the concept of sustainability employed here. In this respect, sustainability is essentially a matter of trade-offs between different areas, as returns in one area tend to have an impact on the returns possible in another area. Trade-off decisions are guided as much by overarching values or ethics as they are by technical limits on available resources and impacts (Macbeth 2005; McCool and Stankey 2003). Therefore, notions such as carrying capacity, which refer to fixed technical limits that restrict management practices, are only partly useful for understanding these processes.

It might be asked why the concept of yield has been introduced, when it seems that this is merely about the limits of acceptable change. The problem is that its approaches and other tourism planning models are limited in that they cannot

adequately conceptualize gains to the wider system. It is essentially a matter of focus—limits of acceptable change approaches are oriented towards limitations, whereas a yield approach is additionally oriented towards required and potential levels of change. The point of the sustainable yield concept as defined here is that it gives equal emphasis to both limitations and growth by postulating both minimum (required) and maximum (potential) levels. These parameters define the window of opportunity for making real gains to the system through sustainable yield management. As Reid points out, to move toward a genuine model requires not only a holistic approach but a ‘‘shift in perspective [that] gives social and environmental development an importance at least equal to that of profit and economic growth’’ (2003:7). This paradigm shift reflects the ethical change required for a sustainable approach that goes beyond a narrow anthropocentric or ecocentric emphasis and seeks gains across several areas concurrently. In the end, of course, the particular vision and interests of the managing authority will guide a destination’s sustainable practices. But in contrast to a level of acceptable change approach, a yield approach provides authorities with the flexibility to view and assess the potential noneconomic effects of development beyond mere limitations if they wish to do so.

INTEGRATED TOURISM YIELD

In order to meaningfully evaluate tourism systems in terms of sustainable parameters, the ITY framework is proposed (Figure 1). At its base are tourist, financial, economic, environmental, social, and cultural areas. At the second level are the current or expected returns for each area. The third is the required level that the system needs in order to remain sustainable. Above this is the level of potential level or what McCool refers to as: ‘‘the maximum permissible conditions that will be allowed in a specific opportunity class’’ (1996:9). The overall vision of acceptable limits for each area—that is, the standards that determine sustainable parameters—is the integrated yield dimension, which is appropriately at the summit of the model. This is the level at which desired goals are defined and a decision is made as to ‘‘which conflicting goals will ultimately constrain the other goals’’ (Cole and McCool 1998; Macbeth 2005).

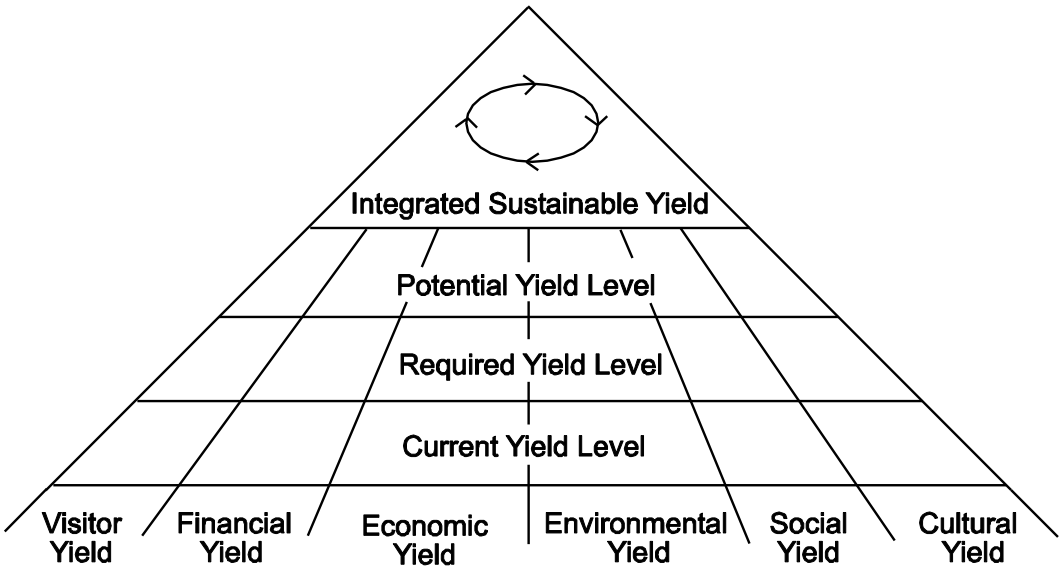

Figure 1. Integrated Tourism Yield Framework

The levels of the framework should not be seen in isolation, but as interrelated. For example, economic returns can be independently calculated in terms of their current level, but they will need to be compared with their required and potential levels in order to be fully evaluated as sustainable, and these levels will depend on their relationship to the dimensions of the other areas. To illustrate, employment generation from a tourism enterprise that generates 100 jobs might be considered significant when compared to an equivalent enterprise operating elsewhere. However, if 150 jobs are required in order to undertake effective environmental and heritage management for this particular destination, then the level of employment will be insufficient. On the other hand, if the enterprise could have generated 200 jobs without significant further investment or other costs involved, then it was a wasted opportunity in terms of its potential level. But more than 200 jobs might be unsustainable if the attraction/destination is given to seasonality or if it results in too many permanent residents utilizing too many resources.

In order to understand the functionality of the ITY framework, a simple demonstration will be presented. The key interest here is how this might be used to evaluate the performance of an enterprise or destination in terms of its particular sustainability policy. The case of Rottnest Island is used to illustrate.

Case Study

Rottnest Island is approximately 1,860 hectares in size and lies 18 km off the coast of the city of Perth, Western Australia. It is a protected recreational and nature reserve, administered by the Rottnest Island Authority (hereafter, the authority). The 248 residents living there are staff (mostly rangers) of the authority, personnel of various leased and licensed businesses, and a handful of police and health workers (Auditor General 2003:38). Tourism and recreation are the island's only industry. The authority operates a number of accommodation facilities, ranging from camping sites to a youth hostel, cabins, selfcontained units, villas, and heritage cottages.

In applying the ITY framework to Rottnest, it should be noted that for most, if not all, criteria, there are multiple indicators, calculations and measures that can be used to obtain and express results. The ones chosen are simply employed for demonstrative purposes only, and more sophisticated approaches are certainly possible. The other point to be kept in mind is that the values employed in the following matrices have been, in most cases, crudely calculated using incomplete data, with some of the data being hypothetical in nature. Hence, the following example should not be seen as an accurate assessment of tourism yield on Rottnest Island, but is presented hypothetically to demonstrate the model.

The first dimension that needs to be considered is the integrated sustainable dimension, which is the overall sustainable perspective that determines weightings for different areas. The authority's stated claim that it wants Rottnest to be a ''model of sustainability'' (RIA 2003:6) indicates the high priority that it sets on attaining a high integrated sustainable return. However, as a result of statutory requirements necessitating that the island serves as both a recreational space and a protected nature reserve (RIA 2004:4-5), the authority experiences the typical conflict of objectives that characterize similar reserves elsewhere (McCool and Stankey 2003). A consequence is that trade-offs are required among areas. The weighting given by the authority for each area is represented in Figure 2.

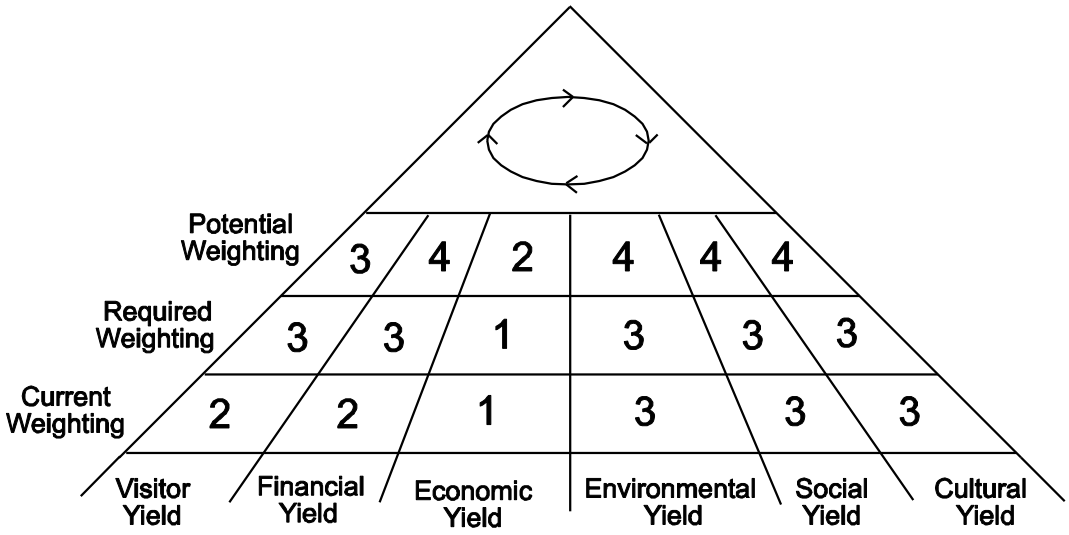

Figure 2. ITY Weighting Matrix for Rottnest Island

The current weighting indicates the level of emphasis given by the island authority to each area in its current practices. The weightings provided here are estimates based on a post hoc assessment of its policy and practices as outlined in various publicly available reports, but could have alternatively been derived through close consultation with the authority or even determined by the authority. The choice of method would normally be based on whether the ITY framework is being employed primarily in an evaluation or a planning context. Current weightings have been determined by rating the importance of each area with respect to other areas, what might be referred to as the ‘‘trade-off hierarchy’’. This basically involves postulating which area would receive priority if there were a conflict of interest with other areas. A 5-level (0–4) rating scale has been used, where 0 represents no interest, 1 minor, 2 moderate, 3 strong, and 4 very strong interest.

Tourist yield is given a moderate weighting, which is based on the fact that the authority has shown some interest in increasing arrivals during the winter months and improving the quality of the tourist experience, but is also cognizant of the fact that more arrivals, particularly during the peak season, will have a detrimental effect on the island’s environmental, social, and cultural areas (RIA 2003:63-64). There is a moderate interest shown in financial returns to the extent that management of this destination needs to be financially sustainable (RIA 2004:12), but the island is reluctant to increase fees if it risks undermining equality of public access (RIA 2003:67). There is some interest in economic building, but the authority is only keen to support economic activity that is related to enhancing the island experience within sustainable parameters, as evident by its ban on commercial fishing and mining (RIA 2003).

Environmental management is given a strong emphasis, but not the strongest priority possible, as the authority attempts to balance environmental needs with tourist satisfaction. In this respect, social benefits are given a high priority, but restrictions on accommodation bookings during peak times and the establishment of several restricted zones for environmental protection (RIA 2003:19) indicate other areas circumscribe their importance to some degree. Further, a strong emphasis is given to cultural heritage (RIA 2003:50), but not to the extent that it would substantially undermine tourist satisfaction, which is reflected in the way that several heritage buildings have been converted to service functions (RIA 2003:55-58). The fact that none of the yield areas receive the highest priority is due to the moderating effect that weightings for each area have on other areas as part of the authority's broad sustainability approach.

Weightings for required and potential levels refer to the level of emphasis needed to attain minimum and maximum returns. In terms of the required weighting, this refers to the level of emphasis that should be given to current levels to ensure that each area is minimally sustainable, and not the weighting given to meeting required and potential levels, which are assumed to already be a high priority among an organization committed to sustainable development. For example, as will soon be explained, financial yield requires much more attention if Rottnest is to remain sustainable, even though financial sustainability is a core objective of the island authority.

Weightings for required and potential levels are derived from current yield estimates, which will be discussed in considerable detail shortly. Consequently, weightings associated with each dimension will change as the inputs and outputs of the system change. For example, a drop in the arrival rate will probably lead to a concomitant drop in the importance attached to the environment, as less stress placed on it may mean that environmental management is not set as such a high priority. But changes in weightings can also result from changes in the integrated sustainable level—for example, if the state government increases its interest in promoting Rottnest as an environmental reserve rather than a recreational reserve, this in turn will have an effect on desired levels. In the matrix, the integrated sustainable level has been left empty, since it essentially comprises the set of assumptions that guide relative weightings and sustainable parameters for each area and cannot be readily quantified.

Tourist Yield

In the ITY matrix, tourist yield refers to the numbers, distribution and types of arrivals, or what Williams and Gill (1998:232) refer to as volume, density, and market mix. Several criteria have been employed for defining the yield on Rottnest: annual influx (the number of arrivals during the year measured in millions), seasonality (the ratio of tourist numbers in the peak season to those in the off-season), average length of stay (during a year-long period), mode of stay (the manner in which tourists interact with the attraction/destination using a 5-point scale), average density (measured here in tourists per hectare), and diversity (the range of tourist types using a 5-point scale). Each criterion is assessed on the basis of its positive contribution to sustainability. For example, a high rating for mode of stay would imply that tourists are interacting with the island in a favorable way as far as the authority's sustainability policy is concerned. Such ratings are also destination-specific. For an attraction/destination, a narrow range of tourist types (such as ecotourists) might be ideal, while for another such as Rottnest, a diversity of types is preferable given its objective of accessibility to all social groups.

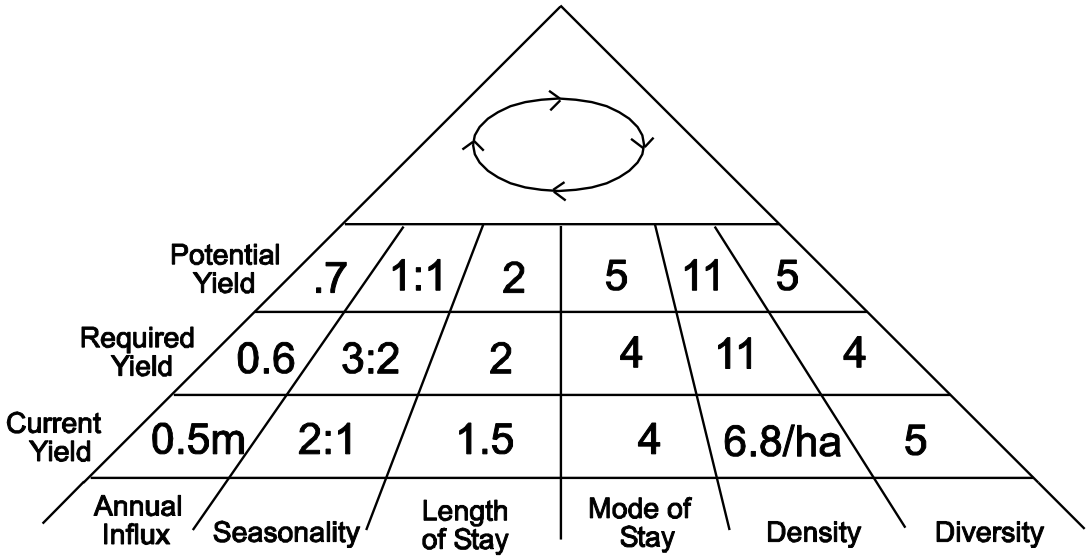

Figure 3. Tourist Yield Matrix

The first thing that might be noticed on the tourist matrix (Figure 3) is that the measures employed are specific to each area. Unlike a cost benefit analysis or multicriteria analysis framework, which requires some form of standardization in order to meaningfully compare criteria, the only interest here is in evaluating

each area in its own terms. Having said that, the results obtained for each area are heavily dependent on the performance of the other areas. Annual influx shall be used to demonstrate.

Rottnest attracts some 500,000 arrivals per year, but the bulk comes during the summer months (RIA 2003:63). Hence, the island experiences a high seasonality ratio (estimated here as 2:1). Because of the low spending habits of its tourists and the desire of the authority not to push up prices to maintain affordability (a limitation imposed by the required social yield), the island requires a high level of visitation to remain sustainable. The required annual influx is estimated at 600,000. However, the island operates close to full capacity in the peak season, and a substantial increase in numbers during this period, or an increase in resources to increase tourist capacity, may undermine environmental and social requirements. This means that the extra influx will need to come during the off-season, which requires a change in the seasonality ratio. The fact that the potential seasonality ratio is limited to 1:1 in turn sets a limit on the potential annual influx (put at approximately 700,000). The restriction in potential numbers also means that its average length of stay needs to be restricted (something already enforced during the peak season) and so too are the types of activities offered (for example, tourists are not presently allowed to drive vehicles on the island).

It can be seen how the different sustainable dimensions are determined by constraints imposed by other yield parameters, which are designed to ensure a return consistent with the destination's integrated sustainable policy. While it might be possible to devise precise formulas to express these inter-relationships, it is probably more realistic to make inductive judgments in this regard, particularly given the vagaries of the integrated sustainable level (its nonquantification in the current matrix reflecting its ''hidden'' influence). It can be seen how matrix values for required and potential levels reflect both technical limits and hypothetical trade-off decisions, in that limits are determined by deciding how far a managing body is prepared to increase an area's yield before an unacceptable loss is expected in another area. The integrated sustainable level constitutes the underlying rationale in this regard, and making its assumptions explicit through the weighting matrix is a central objective for the ITY user.

Another aspect of the matrix worth highlighting is the visual power of the framework in terms of assessing whether current levels fall within acceptable parameters. In the case of annual influx, for example, the figure falls below the required and potential levels. For mode of stay, this is equivalent to the required level, but below its potential. For diversity, however, it exceeds its required level and is equivalent to its potential level, indicating that it is operating at its

optimum. In this respect, the matrix constitutes an easy visual means for assessing the performance of each area against sustainable parameters.

Finally, the manner in which current levels measure up to required and potential ones determines the values that are inserted into the weighting matrix for these respective levels (Figure 2). For example, the need to increase the annual arrival rate as one means for increasing financial returns leads to the conclusion that a greater weighting is required for tourist yield in this respect, but not too high given the limits on potential growth in this area. Hence, a strong emphasis on increasing numbers (particularly in the winter months) is required to meet the required levels, but not an excessive emphasis that results in too many tourists using too many resources.

Financial Yield

With financial yield, the primary interest is in the net profits accrued from tourism enterprises, which means gross financial returns minus the costs of providing services. In the case of Rottnest, the financial area has been subdivided into revenue, staff, administration, facilities management, depreciation, and other expenses (Figure 4). The financial yield matrix is the one area that lends itself readily to standardization in terms of monetary values.

It can be seen that the annual net financial return for the authority (calculated by simply adding together the values across this particular row) actually constitutes a loss of US$2.1 (AU$2.7) million (RIA 2004:89). According to the Auditor General (2003:5-6), the financial difficulties experienced by the island have resulted in insufficient investment in social, cultural, and environmental areas. Because historical debts need to be cleared and facilities upgraded, some financial profit is required. General estimates of needed figures have been inserted into the required row. Therefore, to meet these targets, a strong weighting on financial considerations is necessary (Figure 2). At the same time, a dramatic increase in revenue from tourists is financially unsustainable in the long-term, as it will reduce demand (Auditor General 2003:12) and threaten affordability and social equity—hence, the ceiling figures that comprise the potential level. Nevertheless, to attain these potential returns, a very strong emphasis on financial matters is required, which is indicated in the value given in the weighting matrix (Figure 2).

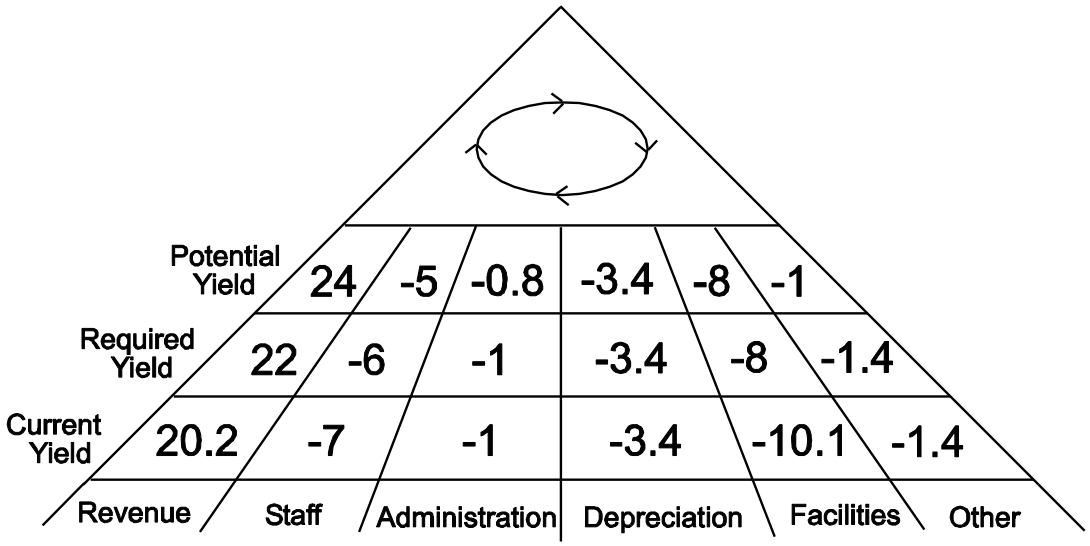

Figure 4. Financial Yield Matrix (in AU$)

Obviously, a thorough financial audit is needed to calculate required and potential limits. While cost-accounting methods will not be discussed here, it needs to be emphasized that such audits need to consider the financial requirements of attaining necessary limits for other areas, not just current operating costs. Indeed, the manner in which the budget is balanced is subject to the restrictions imposed by the sustainable parameters, as there are trade-offs implicit at the integrated sustainable level. For example, staff numbers need to be cut from services that are either unprofitable or inefficient, but cutting too many ranger staff will threaten environmental management. Again, the interdependency among different yield areas is apparent.

Economic Yield

In general, economic yield is concerned with the gains that tourism brings to the economy, such as employment, the development of infrastructure, and diversification of the economy. As Gittinger states, ‘‘the financial analysis takes the viewpoint of the individual participants and the economic analysis that of the society’’ (1982:18). Economic yield is subdivided into several components (Figure 5): stimulation of local non-island industries/services estimated in monetary terms; stimulation of regional industries/services also measured in monetary terms; direct employment (the number of jobs); infrastructure for other industries/services (using a 5-level rating system); inflation on goods and services (measured as a percentage); and contribution to state revenue (taxes).

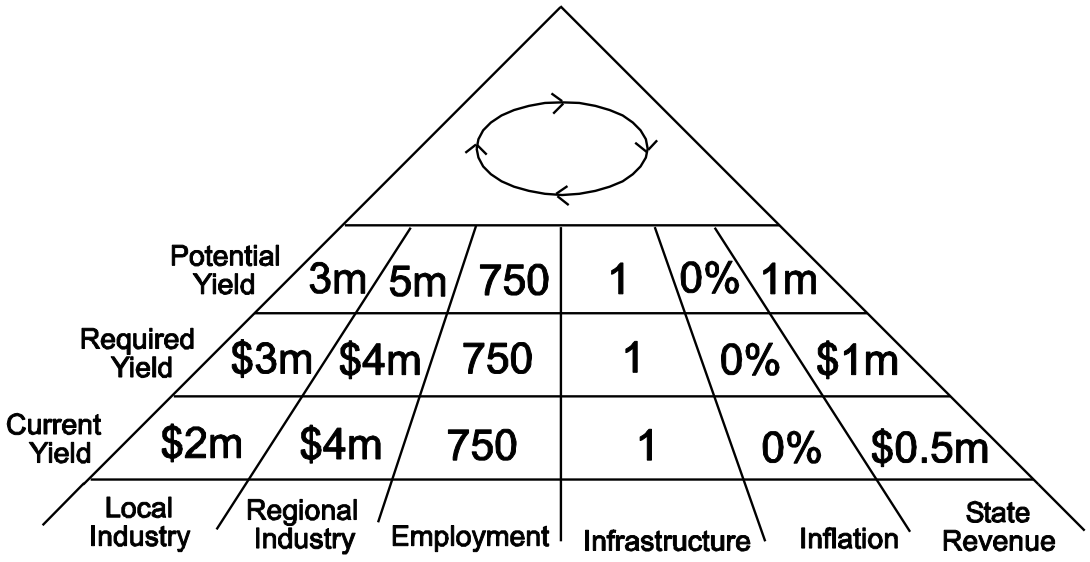

Figure 5. Economic Yield Matrix

The figures for local industry yield are an aggregate of the profit/loss for each operator, with required and potential limits determined by potential arrival numbers and pricing, operational efficiency, and other financial cost-benefit issues, themselves shaped by the sustainable parameters for other areas. For regional industry yield, the manner in which the island stimulates other industries by attracting tourists to the region needs to be considered, and a decision has to be made on whether to include a substitution value that takes into account whether they would visit other attractions if Rottnest was not accessible or whether other industries on the island might benefit more if tourism did not exist. Carlsen and Wood (2004) examine one method for calculating the economic contribution of recreational parks and forests, but it is not possible to enter into a discussion of specific methods here. Suffice it to say that the ITY framework is designed to meaningfully incorporate the results of economic assessments, regardless of the particular method employed to calculate the results.

The required and potential economic levels are rather unremarkable, due mainly to the limitations imposed by the integrated sustainable level. With operations being small-scale, low impact and budget-oriented to accord with the island's naturalistic appeal, there is little scope for substantial economic gains, hence setting the potential level as rather low (Figure 5) and the weighting required for possible gains as much the same (Figure 2). However, increased economic gains are not essential for the viability of the destination, and so it is concluded that present levels are more or less sufficient.

Environmental Yield

As seen in Figure 6, a number of component areas can be used to calculate environmental levels, including flora (measured here as forest cover), fauna (given here as the Quokka animal population), terrain (referring here to erosion measured in meters per million years), water (utilization in mega liters), energy (given here as its percentage requirements produced by a wind turbine that has been recently installed), and air (using a quality index).

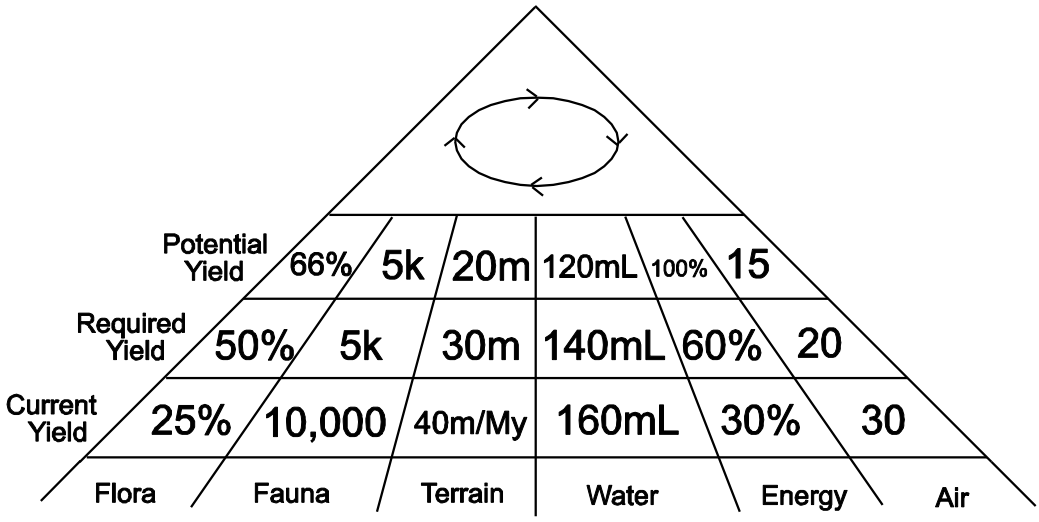

Figure 6. Environmental Yield Matrix

Environmental yield might seem an odd notion, but the environment can experience growth literally, and replenishment of it is even more important when long-term ecological damage has occurred. Obviously, ecosystems have an optimal operating level that serves as a ceiling on the potential use that tourism or any other human activity can make of the natural environment, and it is this level that ecologists normally set as the maximum sustainable yield (which is the manner in which the term was originally employed in the natural sciences). However, there is an exception to this—when either aesthetic or ethical notions of the nature instead or additionally define the maximum environmental gains possible, such as the desire to have very tall trees (partly an aesthetic notion), or to preserve all species from harm (an ethical notion). In such cases, only the bounds of aesthetic ‘‘taste’’ or ethics will limit the potential

environmental yield—assuming of course that ecological wellbeing and biological diversity are maintained in the process.

An illustrative example is the area of flora. Woodlands once covered two-thirds of the island, but today, vast tracts are laid bare (RIA 2003:37). This has resulted in problems regarding erosion and fauna preservation, among others. However, while a certain amount of woodland regeneration is necessary to ensure ecological sustainability, the authority is keen to restore the island to its pre-settlement state for what appear to be primarily aesthetic reasons. Such overarching visions are part of the integrated sustainable level, and they need to be identified.

Another aspect of the matrix is the way submatrices sometimes need to be employed. Flora, for instance, consists of many different species. While woodland cover is used to indicate flora returns, there are other plant types also important to assess, such as grasses and swamp vegetation. Flora species should be evaluated not only in terms of area coverage, but also in terms of height, health, and distribution. The use of ITY submatrices is intended to ensure that evaluations are comprehensive in their scope, so that all factors are considered. When employing submatrices, it would be normal to dispense with an overall matrix for the particular yield area. After all, it is meaningless to employ an aggregate value for flora in the environmental matrix, because an evaluation of its yield is comprised of several different criteria that cannot be represented by a single index.

A further point worth mentioning is the way that current levels can sometimes exceed their potential limits. Rottnest's most famous animal species, the small kangaroo-like quokka, is used to demonstrate this. The island plays an important role in preserving this endangered mammal, hosting the largest population of quokkas found in Australia. However, due to the cessation of traditional hunting activities, the expansion of grassed areas and feeding by tourists, the quokka population has exploded to such a point that many native trees and shrubs cannot regenerate (RIA 2003:39). With its current population being between 8,000 and 12,000 (RIA 2003:39), the required and potential size is set at 5,000, which means that steps will need to be taken to reduce their numbers in order to be within acceptable parameters.

Although a higher environmental yield is required in order to meet required levels of sustainability, it is not felt necessary to recommend a higher weighting be placed on environmental matters (Figure 2). This is because present measures are largely deemed sufficient, but simply have not yet borne ‘‘fruit’’ because of delayed effects. For example, tree regeneration is a slow process that takes time before its environmental returns become tangible. However, if the

full potential of environmental gains is to be realized, then a greater weighting to such matters will be required, which is reflected in the very strong weighting provided for the potential dimension (Figure 2).

Social Yield

Social yield refers to the way that tourism contributes to the social welfare of an attraction/destination, and also to the way that this entity contributes to the social wellbeing of tourists and the surrounding population. As shown in Figure 7, component criteria might include host/guest satisfaction (measured as a percentage of agreement by the surrounding community and/or tourists regarding the positive impacts of the island on their quality of life), equity (using a 5-point scale), education (here given as the number of schools that have participated in the island's school education program), community engagement/ involvement, intergroup cohesion, and ingroup unity.

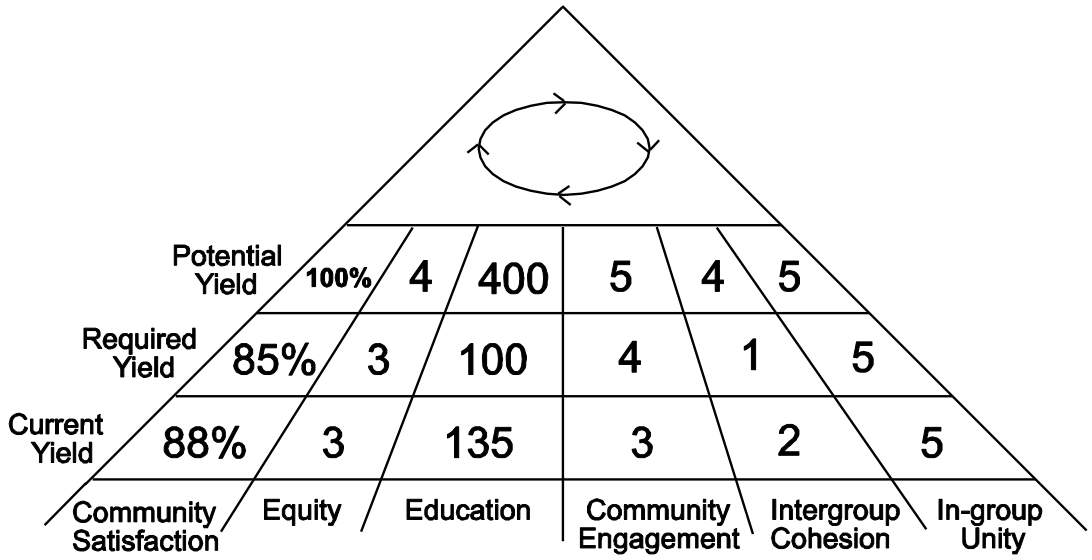

Figure 7. Social Yield Matrix

The first task when measuring social yield is to define the relevant population to which the matrix is meant to apply. Given the absence of permanent residents on the island and the commitment of Rottnest to provide a recreational destination for the Perth community, the local people who make use of the island are defined here as the main population of interest. Normally, however, it would be useful to employ submatrices that outline the social yields for different groups (including non-local tourists).

The second task is to identify appropriate social indicators. There has been much discussion by analysts about defining them, with little agreement reached so far (Ap and Crompton 1998; Getz 1982; Miller 2001; Northcote and Macbeth 2005). For example, the income levels of tourists could be used as a guide to social equity, or, alternatively, the average cost of expenditure relative to other regional attractions could be used as an indicator. Equity can also be understood in terms of gender equality, age equality, disability access, and other areas, which might form an equity submatrix. The choice of indicators is a matter best left to evaluators, for indicators are dependent on the quality of the data available and the methodology employed.

Variable interests and values also arguably influence the evaluation of social yield to a greater degree than most areas. For example, volunteerism might be seen from a Marxist (political economy) perspective to be exploiting labor, while a conservative approach might rate volunteerism highly because it is thought to decrease welfare dependency and increase social capital (Macbeth, Carson and Northcote 2004). There are also some issues that are difficult to adjudicate on. For example, Rottnest has a lottery system for accommodation in the peak season (RIA 2003:66-67) which, while perhaps technically a ‘‘fair’’ system, pushes the notion of equal access to its limits (McCool 2001:50). While the ITY framework cannot resolve such issues, it can certainly serve to highlight the objectives and assumptions behind such policies—and hence subject them to open scrutiny.

A final point is the way that ratings for particular areas are most meaningful when assessed in terms of their sustainable parameters rather than in absolute terms. As an example, a low rating for intergroup cohesion is assigned, as tension between local tourists can be acute at times, particularly during ‘‘schoolies week’’ and festive public holidays where party revelers have been seen as a problem (Young, Farringdon and Midford 2001). It is also probably true to say that interaction between different groups tends to be minimal. Interestingly, there seems to be little tension between local and nonlocal tourists (normally the focus in the social impacts literature), which can be partly explained by the absence of permanent residents. Because the nature of the island experience is not fundamentally related to interaction among groups but is nature-based, a low required social yield is given, despite there being considerable potential for greater intergroup interaction. In other words, although intergroup cohesion is low, the interaction is within acceptable limits as defined by the integrated sustainable level, which is all that really matters. In fact, Rottnest has performed well in ensuring that the social needs of its tourists are met, and for this reason the weighting on social yield need not be increased,

although extra attention is needed if the destination is to meet its potential levels in this area (Figure 2).

Cultural Yield

Tourism can contribute to the cultural identity of an attraction/destination, providing residents with a sense of pride in their area, whether in terms of its heritage value, its natural features (such as beaches, rainforests, and waterways), its way of life, or its identity. The following criteria are employed: heritage value, iconic value, lifestyle value, multicultural value, artistic value, and ritual value (here, the importance of the island in the rite of passage for school-leavers). Each is measured using a 5-point scale (Figure 8).

The heritage value refers to the historical importance, which can include its importance to Western Australia and also the capacity to conserve and enhance the island's heritage sites. One of the complications involved in evaluating heritage matters is that the value of sites changes with time. What might in the past have been considered an ageing eyesore suddenly becomes a national treasure. It is also the case that some heritage material may be undiscovered and be inadvertently damaged as a result of tourism, in which case it is difficult to assess whether managers have been successful in preserving important heritage sites. On Rottnest, for example, archaeological excavations have unearthed ancient Aboriginal artifacts, some possibly dating back many thousands of years (RIA 2003:51), and the effect of visitation is probably not helping the preservation of these sites. But, how many of these undiscovered places exist and how many are being inadvertently damaged? Presently there is no way of knowing.

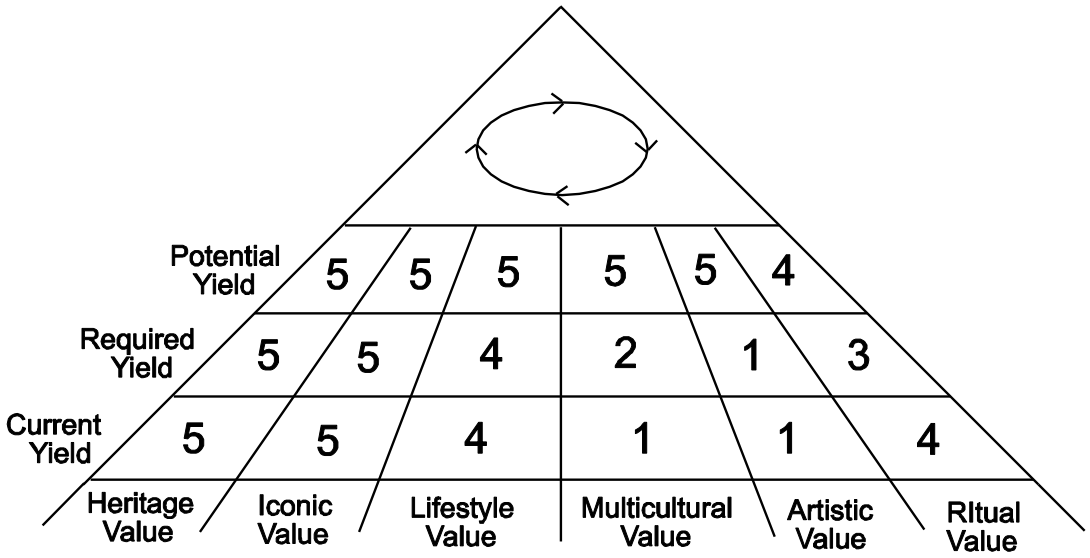

Figure 8. Cultural Yield Matrix

It is also important to emphasize that all criteria need to be understood in sustainable terms. For instance, four-wheel driving over the island's sand dunes will be rated highly by those who have made off-roading part of their lifestyle, but it is going to inflict substantial harm on the environment and present a danger to those walking around the island. Similarly, Rottnest has a high lifestyle and ritual value to some youths as a place to party on festive occasions, particularly upon graduation and at New Years, but the nature of this activity is that it is sometimes environmentally and socially harmful. For this reason, it is necessary to only give high ratings to practices that are desirable from a sustainable perspective, not behavior that is necessarily satisfying to tourists themselves.

Because the cultural value of the island is already quite substantial, there is no need for more attention to be directed towards cultural gains in order to be sustainable (with the possible exception of improved heritage management). However, extra measures would be necessary if this destination wanted to reach its potential cultural value (Figure 2).

CONCLUSION

The advantage of employing Rottnest Island as a case study is that it is a tourism-focused destination administered by a single authority that is fully committed to achieving sustainable outcomes through a triple bottom line approach. For these reasons, it constitutes a rather straightforward application of

the framework. Obviously, a destination with multiple industries and/or administering authorities with different levels of commitment to sustainable outcomes would make assessment much more complex. In such cases, assessments would ideally need to be carried out for each industry, with careful attention paid to interindustry effects. While the application of an integrated yield framework to other industries or sectors is not something that can be explored here, it needs to be kept in mind that the totality of tourism is part of much broader systems that need to be understood in any assessment. Multiple administering authorities present a special challenge in terms of identifying which party—and hence, which management policy—is responsible for generating and managing yields and in defining sustainable parameters. Although the application of the ITY framework to destinations with more complex features will not be addressed here, the framework is meant to be flexible enough to be adapted to a variety of scenarios.

Indeed, the ITY framework is intended as a flexible model that can accommodate a range of indicators, data collection techniques, and weighting rationales. Admittedly, the case study presented here was a rather crude application of the model, but only the resources and knowledge available to planning authorities limit the sophistication of the framework. It is possible, for example, that more quantitative or computational approaches such as data envelopment analysis (Besetti, Cassinelli, Lanza and Mattei 2003; Sigala, Airey, Jones and Lockwood 2004) or computable general equilibrium models (Alavalapati and Adamowicz 2000; Dwyer, Forsyth, Spurr and Vanho 2003) might be used to calculate yields and sustainable parameters, although the applicability of these techniques using an ITY framework requires further investigation. There is certainly no reason why a more rigorous set of data collection methods could not be employed. Further, there is no reason why a more transparent rationale for attaching weightings to various areas could not be devised. However, it needs to be kept in mind that the choice of measures, data gathering techniques and weightings are largely situation-specific and ideological in nature. Therefore, it would be imprudent to incorporate a set of fixed standards into the basic ITY framework, particularly as these are still being keenly debated in the scholarly literature. These are matters best fleshed out by evaluation teams and management bodies themselves in terms of their particular needs, resources, and evaluation philosophy, customizing the ITY framework accordingly.

The strength of the framework is not that it introduces a new innovation in tourism planning frameworks, but that it crystallizes the planning assumptions and objectives involved in decision making that already occur within a systems perspective. The ITY construct puts the focus squarely on tourism processes as

systematically related, dynamic and ideologically defined, rather than as independent, static, and objective in nature.

It is true to say that implementing the ITY framework presents certain challenges. The first is that it is immensely data intensive. The framework demands extensive understanding of tourism impacts and relationships, and missing or poorly defined data have the potential to undermine the usefulness of the framework, as each calculation for an area is affected by the calculation for another area. But such is the complexity of tourism systems; a framework that demands that management authorities seek out a comprehensive understanding of impacts is not undesirable. It is also true to say that the utility of the framework—like any assessment model—is bound by the principle of rubbish in/rubbish out, which is a limitation that is unavoidable. Another limitation of the framework is that relationships within the tourism system are not self-evident and must be theoretically postulated in order to calculate limits. It is expected, however, that follow-up assessments will confirm any hypothesized relationships and lead to refinements of sustainable parameters. The value of the ITY framework in this sense is that it can provide the basis for selflearning through empirical application, so that managing authorities can come to understand the characteristics of their tourism system based on whether subsequent actions lead to desired changes in levels. Another limitation is the demand that the framework places on the utilization of expert assessors who understand the interrelationship between economic, social, and environmental areas. Again, this is not necessarily an undesirable requirement, and bringing together different experts to engage in a collective dialogue is an ideal scenario as far as sustainable planning is concerned. A final limitation of the framework is that it only indicates where areas need to be addressed, not how they should be addressed. Obviously any action plan depends on the available resources and working philosophy of the managing authority, and is not something that can be definitively specified within a general framework such as the one proposed here.

It is intended that the framework presented in this paper be considered as a starting point only. Many details wait to be fleshed out, particularly the manner in which it is possible to gain accurate calculations for yield in its different dimensions and what set of sustainability indicators should be employed to designate the achievement or non-achievement of required levels. These are issues that are being addressed more broadly in the sustainable development, cost-benefit analysis, project appraisal, and impacts literature (Ceron and Dubois 2003; Manning 1999; Northcote and Macbeth 2005), and are beyond the scope of the present paper. However, it needs to be emphasized that the ITY framework is a conceptual tool that is intended to situate assessment methods within a systems perspective of tourism, regardless of how specific outcomes

are calculated. There is also probably a variety of more sophisticated ways that the framework can be employed beyond the simplistic evaluative approach taken here, including scenario modelling (Chan and Huang 2004). Finally, there are also perhaps more yield areas that can be usefully incorporated into the framework. One is that of political benefits, which might concern the way that tourism development contributes to the strength of the political system and/or the strength of communities to control their own resources and way of life. Obviously, the manner in which tourism contributes to the political system is an ideological matter.

The advantage of the ITY framework lies in its flexibility to measure yield in ways that accord with ideological views on what constitutes a positive and negative contribution. On the other hand, this very same flexibility limits the capacity to develop a definitive measurement system for yield, as one group will be looking for different indicators and defining costs-benefits and sustainable limits in ways that are at odds with other groups, either because of different interests or because of a dissimilar set of norms and ethics. However, this is not necessarily an undesirable state of affairs. If the ITY framework should serve as the basis for a debate over where the limits of required acceptable change from tourism development lie and where the potential gains might be, then perhaps it will push the field a little closer to the kind of future envisaged by the World Commission on Environment and Development (1987; see also Macbeth 2005). At the very least, the ITY framework may assist analysts to address issues relating to the common future and tourism's place within it in a more constructive, comprehensive, and holistic manner than has been undertaken in the past. That in itself would be a significant gain to a field that, through its growing array of scholars and commitment to global welfare, is beginning to unlock its own yield potential as a force for positive economic, environmental, social, and cultural wellbeing.

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REFERENCES

Alavalapati, J., and W. Adamowicz 2000 Tourism Impact Modeling for Resource Extraction Regions. *Annals of Tourism Research* 27:188–202.

Ap, J., and J. Crompton 1998 Developing and Testing a Tourism Impact Scale. *Journal of Travel Research* 37(2):120–130.

Auditor General 2003 Turning the Tide: The Business Sustainability of the Rottnest Island Authority. Report No. 3 (November) <http://www.audit.wa.gov.au>.

Becken, S., and G. Butcher 2004 Economic Yield Associated with Different Types of Tourists: A Pilot Analysis. Paper presented at the CAUTHE 2004 Creating Tourism Knowledge, Brisbane <http://www.landcareresearch.co.nz/research/sustain_business/tourism/documents/economic_yield_analysis.pdf>.

Besetti, V., M. Cassinelli, A. Lanza, and F. Mattei 2003 Using Data Envelopment Analysis to Evaluate Environmentally Conscious Tourism Management. Paper prepared for the conference Tourism and Sustainable Development, Chia, Sardegna <http://www.pigliaru.it/chia/Bosetti.pdf>.

Bosselman, F., C. Peterson, and C. McCarthy 1999 *Managing Tourism Growth: Issues and Applications*. Washington DC: Island Press.

Briassoulis, H. 2002 Sustainable Tourism and the Question of the Commons. *Annals of Tourism Research* 29:1065–1085.

Carlsen, J. 1999 A Systems Approach to Island Tourism Destination Management. *Systems Research and Behavioral Science* 16:321–327.

Carlsen, J., and D. Wood 2004 *Assessment of the Economic Value of Recreation and Tourism in Western Australia's National Parks, Marine Parks and Forests*. Gold Coast: CRC for Sustainable Tourism.

Ceron, J., and G. Dubois 2003 Tourism and Sustainable Development Indicators: The Gap between Theoretical Demands and Practical Achievements. *Current Issues in Tourism* 6(1):54–75.

Chan, S., and S. Huang 2004 A Systems Approach for the Development of a Sustainable Community: The Application of the Sensitivity Model (SM). *Journal of Environmental Management* 72:133–147.

Cole, D., and S. McCool 1998 Limits of Acceptable Change and Natural Resources Planning: When is LAC Useful, When is it Not? <http://leopold.wilderness.net/pubs/323.pdf>.

Dwyer, L., and P. Forsyth 1997 Measuring the Benefits and Yield from Foreign Tourism. *International Journal of Social Economics* 24(1-3):223–237.

Dwyer, L., P. Forsyth, R. Spurr, and T. Vanho 2003 Tourism's Contribution to a State Economy: A Multi-regional General Equilibrium Analysis. *Tourism Economics* 9:431–448.

Getz, D. 1982 A Rationale and Methodology for Assessing Capacity to Absorb Tourism. *Ontario Geography* 19:92–101.

Gittinger, J. 1982 *Economic Analysis of Agricultural Projects*. Baltimore: Johns Hopkins University Press.

Hall, M., and S. Page 1999 *The Geography of Tourism and Recreation: Environment, Place and Space*. London: Routledge.

Healy, R. 1994 The ''Common Pool'' Problem in Tourism Landscapes. *Annals of Tourism Research* 21:596–611.

Macbeth, J. 2005 Towards an Ethics Platform for Tourism. *Annals of Tourism Research* 32(3): 962-984.

Macbeth, J., D. Carson, and J. Northcote 2004 Social Capital, Tourism and Regional Development: SPCC as a Basis for Innovation and Sustainability. *Current Issues in Tourism* 7:502–522.

Manning, T. 1999 Indicators of Tourism Sustainability. *Tourism Management* 20:179–182.

Marcouiller, D. 1998 Environmental Resources as Latent Primary Factors of Production in Tourism: The Case of Forest-based Commercial Recreation. *Tourism Economics* 4:131–145.

McCool, S. 1996 Limits of Acceptable Change: A Framework for Managing National Protected Areas. Paper presented at Workshop on Impact Management in Marine Parks, Kuala Lumpur <http://juneau.org/tourism2/documents90-99/Limits_of_Accpt_Change96.pdf>.

McCool, S. 2001 Limiting Recreational Use in Wilderness: Research Issues and Management Challenges in Appraising their Effectiveness <http://www.forestry.umt.edu/personnel/faculty/smccool/personal%20website/Recent%20Publications_files/McCool.pdf>.

McCool, S., and D. Lime 2001 Tourism Carrying Capacity: Tempting Fantasy or Useful Reality? *Journal of Sustainable Tourism* 9:372–388.

McCool, S., and G. Stankey 2003 Advancing the Dialogue of Visitor Management: Expanding Beyond the Culture of Technical Control. Paper Presented at Protecting Our Diverse Heritage, The 2003 George Wright Society Biennial Conference, San Diego <http://www.cfc.umt.edu/departments/socn/publications/McCoolGWSpaper.pdf>.

Miller, G. 2001 The Development of Indicators for Sustainable Tourism: Results of a Delphi Survey of Tourism Researchers. *Tourism Management* 22:351–362.

Northcote, J., and J. Macbeth 2005 Limitations of Resident Perception Surveys for Understanding Tourism Social Impacts: The Need for Triangulation. *Tourism Recreation Research* 30(2):43–54.

Patriquin, M., J. Alavalapati, A. Wellstead, and S. Young 2003 Estimating Impacts of Resource Management Policies in the Foothills Model Forest. *Canadian Journal of Forest Research* 33(1):147–156.

Pearce, D., A. Markandya, and E. Barbier 1989 *Blueprint for a Green Economy*. London: Earthscan.

Plog, S. 1998 Why Destination Preservation Makes Economic Sense. In *Global Tourism*, W. Theobald, ed., pp. 251–266. Oxford: Butterworth-Heinemann.

Reid, D. 2003 Tourism, Globalization and Development. *Responsible Tourism Planning*. London: Pluto.

Reynolds, P., and R. Braithwaite 1997 Whose Yield is it Anyway? Compromise Options for Sustainable Boat Tour Ventures. *International Journal of Contemporary Hospitality Management* 9(2):70–74.

Rottnest Island Authority 2003 Rottnest Island Management Plan 2003–2008 <www.rottnest.wa.gov.au>.

Rottnest Island Authority 2004 Annual Report 2003/04 <www.rottnest.wa.gov.au>.

Ryan, C. 2002 Equity, Management, Power Sharing and Sustainability-Issues of the ‘‘New Tourism’’. *Tourism Management* 23:17–26.

Shafer, E. 1989 Decision Design for Tourism Chief Executive Officers. In *Tourism Marketing and Management Handbook*, S. Witt and L. Moutinho, eds., pp.153–158. Hertfordshire: Prentice Hall.

Sigala, M., D. Airey, P. Jones, and A. Lockwood 2004 ICT Paradox Lost? A Stepwise DEA Methodology to Evaluate Technology Investments in Tourism Settings. *Journal of Travel Research* 43:180–192.

Tooman, L. 1997 Multipliers and Life Cycles: A Comparison of Methods for Evaluating Tourism and its Impacts. *Journal of Economic Issues* 31:917–933.

Tourism Strategy Group 2001 New Zealand Tourism Strategy 2010. Wellington: TSG <http://www.executive.govt.nz/minister/burton/tourism2010/ tourism-strategy2010.pdf>.

Williams, P., and A. Gill 1998 Tourism Carrying Capacity Management Issues. In *Global Tourism*, W. Theobald, ed., pp. 232–246. Oxford: Butterworth-Heinemann.

World Commission on Environment and Development 1987 *Our Common Future*. Oxford: Oxford University Press.

Young, N., F. Farringdon, and R. Midford 2001 School Leavers’ Celebrations on Rottnest Island (Leavers Live): Evaluation Report. Perth: National Drug Research Institute <http://www.sdep.wa.edu.au>.

Zografos, C., and D. Oglethorpe 2004 Multi-Criteria Analysis in Ecotourism: Using Goal Programming to Explore Sustainable Solutions. *Current Issues in Tourism* 7(1):20–43.