PERGAMON

Tourism Management 22 (2001) 637–648

TOURISM MANAGEMENT

www.elsevier.com/locate/tourman

Assessment of natural resources for nature-based tourism: the case of the Central Coast Region of Western Australia

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Received 26 July 1999; accepted 20 September 2000

Abstract

Resources for development of a nature-based tourism industry were identified and assessed in the Central Coast Region of Western Australia. The assessment framework developed used both qualitative and quantitative techniques to establish levels of attraction, accessibility, presence of infrastructure and the level of environmental degradation. Data were gathered using a checklist approach to quantify characteristics of sites. Resource assessment was completed using matrices with relevant indicators incorporating weighting techniques. Sixty-five potential nature-based tourism resource sites were identified. The attraction diversity in the Region is high, although the resources were associated with poor accessibility, low levels of tourism infrastructure and moderate levels of environmental degradation. Results from this research were presented to government authorities and incorporated into the planning process. This paper highlights some of the difficulties associated with establishing objective resource evaluation techniques for nature-based tourism, as well as key findings from the research.

Keywords: Nature based; Tourism; Resource evaluation; Assessments; Coasts; Australia

1. Introduction

The aim of this paper is to identify and assess natural resources relevant to development of a nature-based tourism industry in the Central Coast Region of Western Australia. A specific technique was developed to identify and assess the quantity and quality of natural resources for nature-based tourism on a regional scale. Tourism is not a well developed industry in the Central Coast Region, however, government documents have emphasised the need to establish one, since the Region is seen to have significant potential for such an industry (Western Australian Planning Commission, 1996). The recommendation states that 'tourism should contribute to economic diversification of the Region through establishment of a range of ecologically sustainable tourist and recreational areas and activities based on the Region's natural and man-made attractions' (Western Australian Planning Commission, 1996, p. 40). The Region is likely to experience increased tourist demand in the immediate future in response to the general growth of tourism in Western Australia and the completion of a highway in the southern part of the Region between Lancelin and Cervantes (Fig. 1). The Region is in clear need of planning for nature-based tourism in order to maximise the benefits of tourism and minimise its adverse impacts. At present there is insufficient information available on the Region's resources. Therefore, the first step towards effective planning is to systematically identify and assess the resource base for its potential development.

The area of interest extends over 20,000 km^2 and encompasses several Local Government authorities (Fig. 1). Key features of the Central Coast Region include unique, unspoiled landscapes and a sparse settlement pattern (Tourism Coordinates, 1996). The Region's conservation value is very high, containing 10 percent of Western Australia's declared rare flora in nine national parks and approximately 30 nature reserves that are scattered throughout the Region (Department of Conservation and Land Management, 1997a, b). The Region is also endowed with a largely undeveloped coastline stretching 235 km north to south with 10 small fishing villages along its shores (Western Australian Planning Commission, 1996). The southern extent of the Region is less than a 1 h drive from the capital city of Western Australia, Perth and this is another significant

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0261-5177/01/$ - see front matter
PII: S0261-5177(01)00039-5

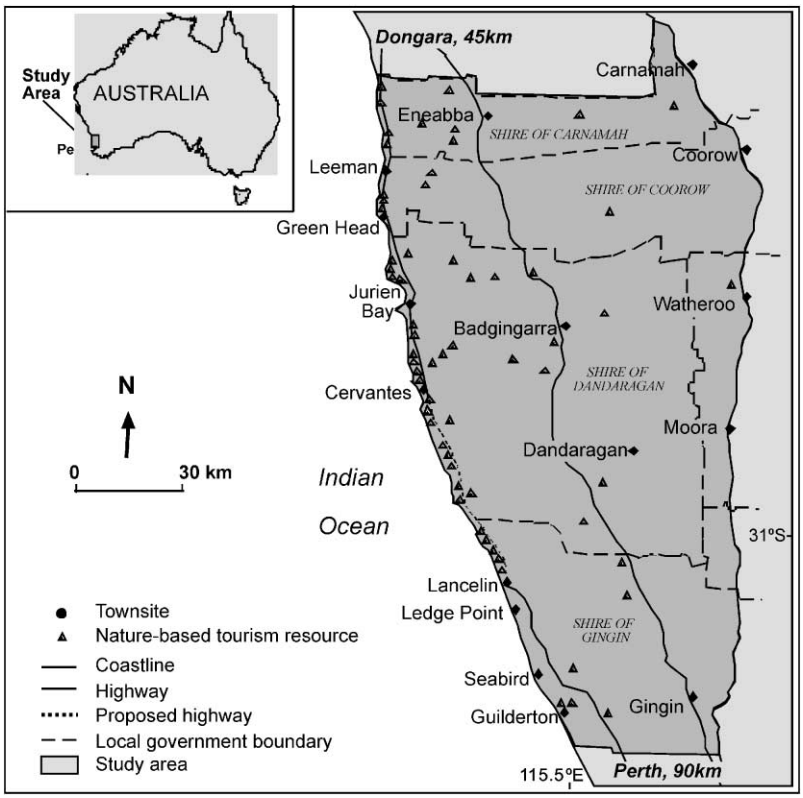

Fig. 1. Study Area: spatial distribution of natural resources for nature-based tourism.

advantage to the Region in terms of potential tourism development. With the completion of the new highway in 2003 along the coast, the entire Region will be accessible to the Perth Area in just 2 h.

1.1. Nature-based tourism in Australia

Nature-based tourism is an important part of the world tourism industry (Lindberg, Epler Wood, & Engeldrum, 1998) and of increasing significance to Australia. Long-term data on the size and growth of the nature-based tourism industry in Australia is not available, but it is clear from tourism statistics that it is Australia's wide range of unspoilt natural environments that contribute to much of this tourism activity (Bureau of Tourism Research, 1997). Nature-based tourism is important both in terms of international and domestic visitor numbers as well as in creating employment (Bureau of Tourism Research, 1997, 1999; Weaver, Faulkner, & Lawton, 1998). For over a decade now, nature-based tourism in Australia has been predicted to have the potential to be the highest export earning industry (Ecologically Sustainable Working Group, 1991). Annually, nature-based tourism contributes 5.6 percent of the national Gross Domestic Product (GDP) and in 1999 tourism was Australia's single largest earner of foreign exchange (Department of Industry, Science and Tourism, 1997; Tourism Forecast Council, 2000).

As the world population grows, open spaces are diminishing and relatively undisturbed areas in Australia such as those in the Central Coast Region of Western Australia are likely to become a unique commodity. Recent focus on nature-based tourism is evidenced by the wide range of publications on the topic, including reviews by Weaver et al. (1998), Luzar, Diagne, Ec Gan, and Henning (1998), Higgins (1996), Orams (1995), Valentine (1992), Lindberg and Hawkins (1993), Hall (1992) and Boo (1990). However, there are gaps in information required to understand and manage this industry and few case studies exist that document successes and failures (Orams, 1995). Even the definition of nature-based tourism and what constitutes such an experience is still debated (Fennel, 2000). Nature-based tourism is frequently used synonymously with terms such as *eco, sustainable, green, alternative and responsible tourism* (Weaver et al., 1998; Weiler & Hall, 1992). For the purposes of this paper, nature-based tourism is defined as 'tourism that features nature' (Western Australian Tourism Commission and Department of Conservation and Land Management, 1997, p. 4). This

is a simple and broad definition, including a range of tourism experiences such as adventure tourism, ecotourism and aspects of cultural and rural tourism. Several of these terms appear self-explanatory and not all fall within a rigid definition of nature-based tourism. Ecotourism is a subset of nature-based tourism and it relates to an experience in remote or natural areas that fosters an understanding and appreciation of the need to conserve the natural environment in a way that sustains the resources, culture, the economy and the local community (Fennel, 1999). However, not all of these attributes of ecotourism are true of all nature-based tourism activities. To this date, there is no universally accepted definition or set of indicators for sustainability in terms of the tourism industry, which makes ecotourism a difficult and much debated concept. This may also explain why increasingly government agencies and tourism associations in Western Australia view ecotourism and nature-based tourism synonymously. Inherently, however, both nature-based tourism and ecotourism are natural resource dependent.

2. Nature-based destinations activities and tourist profiles

Components and features of nature-based tourism are described by Weaver et al. (1998) and by Weiler and Hall (1992). Destinations for nature-based tourism vary considerably, however, natural areas such as national parks and conservation reserves constitute the largest components (Eagles, 1999; Hoogwerf, 1995; Hall, 1991). Commonly pursued nature-based tourism activities in Western Australia include bushwalking, backpacking, wildlife viewing, camping and fishing. More adventurous uses of natural areas include, off-road driving, rock climbing and diving. The Central Coast Region has open spaces with a variety of natural resources in the marine and terrestrial environments. However, neither location, quality and quantity of the natural resources, nor their infrastructure had been documented prior to this study. Additionally, there are no visitor survey statistics for the Region.

Nature-based tourists cannot be classified into a single group because their activities and hence profiles may overlap with other forms of tourism (Weaver et al., 1998). Lindberg (1991) identified a broad spectrum of nature tourists and categorised nature tourists based on the amount of time spent in nature, the type of nature experience and the means of travel to a destination. *Hard-core nature tourists* include scientific researchers or members of tours specifically designed for education, removal of litter or similar purposes while *dedicated nature tourists* include people who take trips specifically to see protected areas and who want to understand local natural or cultural history. Tourists in these categories are more likely to travel great distances to their destination than mainstream and casual nature tourists. On the softer end of the spectrum, *mainstream nature tourists* include people who visit destinations primarily to take an unusual trip such as to the Amazon, while *casual nature-tourists* experience nature incidentally or part of a broader trip (Lindberg, 1991, p. 3).

Regardless of the nature-based tourist activity practiced or the type of tourist, some infrastructure is required to complement or enhance the natural attraction for nature-based tourism such as transport, accommodation and specific visitor facilities. Accommodation for nature-based tourists varies between 'hard' and 'soft' dimensions (Laarman & Durst, 1987). At the 'soft' end of the spectrum, nature-based tourists prefer comfort and may include hotels and motels. Those at the 'hard' end of the spectrum choose to 'rough it' by camping in the wilderness. Accommodation in the Central Coast Region is confined to towns, although there are designated campsites at a number of natural locations (Department of Conservation and Land Management 1995, 1998). Creating an inventory of accommodation and other supporting infrastructure is an essential component of resource assessment and has a bearing on those areas suitable for marketing to different types of nature-based tourists.

2.1. Impacts of nature-based tourism

Tourism of any kind has the potential to impact negatively or positively on the social, economic and physical environment of the destination (Mathieson & Wall, 1982). The context of this paper is natural resource oriented and only physical impacts are discussed. Coastal environments, particularly those with sandy shorelines such as the Central Coast Region, are more vulnerable to negative physical impacts (Wong, 1998; Orams, 1999). The adverse impacts of nature-based tourism have been described in detail and a number of common impacts are well recognised (Romeril, 1989; Buckley & Pannell, 1990). On the coast negative impacts may include the degradation of dunes, loss of biodiversity, erosion, eutrophication and littering (Wong, 1998; German Federal Agency for Nature Conservation, 1997). Some of these impacts are readily observable in the Central Coast Region, particularly in close proximity to squatter shacks along the coast (Hammond & Eliot, 1995a, b). Adverse environmental impacts of nature-based tourism are a serious issue. If the resource base declines the potential to attract visitors also diminishes. Hence, determining the level of environmental degradation of a resource is essential and should constitute part of the nature-based tourism resource assessment framework.

Adverse physical impacts may be reduced if the relationship between nature-based tourism and conservation is symbiotic, that is if tourism is developed in an

ecologically sustainable manner. Ecological sustainable development of tourism means that current activities maintain the resource base and do not compromise future generation's ability to utilise the resource (Ioannides, 1995; Dowling, 1992; Walker, 1988). In many instances, nature-based tourism is dependent on conservation and cannot survive without the protection of the natural resources (Whelan, 1991). Through adequate management, tourism can be a compatible and a complementary land use (Wight, 1993). The future of nature-based tourism is strongly resource dependent and requires access to high quality natural environments. Tourism can also benefit from conservation because the latter provides an array of resources and attractions that form the basis of any type of nature-based tourism. Conservation may also benefit from tourism. The importance of revenue generated from visiting protected areas may create justification for conserving areas which otherwise may have pressures from competing land uses such as farming, mining or urban development (Walker, 1988).

3. Nature-based tourism resources evaluation

Nature-based tourism, like any other industry is affected by supply and demand. This paper examines the supply component of the tourism system with a particular focus on the natural resource base. According to Mitchell (1989), resources are an expression of appraisal and represent a subjective concept. The question of what constitutes a nature-based tourism resource and what factors add to or detract from the quality of a resource can be best answered by a systematic assessment of resource potential. This begins with identification, classification and assessment of resources, which is the subject of this paper (Davidson, 1992).

A common method of tourism resource assessment is through the demand approach by conducting visitor surveys. For example, a study by Ferrario (1979) used expert knowledge combined with tourist opinions to evaluate tourist attractions in South Africa. Similarly, Dowling (1993) used tourist opinions, expert knowledge and resident opinions to evaluate attractions for ecotourists in the Gascoyne Region in Western Australia. Comparatively, economists may interview tourists using the Contingent Market Evaluation technique to determine tourists' willingness to pay for a resource. While demand approaches are useful in determining resource potential, they are inadequate in providing a detailed inventory of the quality and quantity of resources for nature-based tourism.

Various methods from the supply side of tourism exist for recreational resource classification and several could be described to have a focus on nature-based tourism. One of the first classifications of resources was completed by Clawson and Knetsch (1963), who distinguished between recreation and opportunity on the basis of location, size of an area, major use and the degree of artificial development. Under this system, recreation areas were placed in a continuum between user oriented parks (e.g. city parks) and resource-based areas (e.g. national parks). Intermediate areas fall between the two aforementioned categories. A similar model used by the US Bureau of Outdoor Recreation classified resources based on physical recreation characteristics, level of development, management, intensity of use and anticipated behavioural classes. The system classified resources into six broad classes of recreation areas including high-density recreation areas, general outdoor, natural environment, unique natural environment, primitive areas and historic and cultural sites.

Nature-based tourism resources may be evaluated on the basis of attractions or scenic quality using landscape assessment techniques and three general approaches exist (Mitchell, 1989; Moss & Nickling, 1980). The first, landscape consensus, involves a team of experts who designate areas of high scenic value based upon field work, analysis of aerial photos and other materials. This method was used in England to determine Areas of Outstanding Natural Beauty (AONB) and in the United States for the National Wild and Scenic Rivers programme.

The second approach involves landscape descriptive studies where several or all of the landscape's entity is inventoried and described by experts. A map is usually produced which locates the presence and nature of scenic resources in a region. One of the first models based on this approach was by Litton (1968). He described the landscape as a physical entity and then used expert opinion to establish visual preferences for scenic quality. Litton devised an appraisal system based on landform and land use and applied it in Scotland. He established six categories based on relief and seven on the degree of land use ranging between wild and urbanised. Litton also assigned numerical values to each category arbitrarily and produced maps. Another well-cited example was Leopold's (1969) study, who described landscapes using the consensus approach in a quantitative way, to aid decisions regarding alternative uses for the environment. Leopold considered physical, biological and human features to be relevant to landscape aesthetics and developed 46 criteria to describe the character of the landscape and applied it to river valleys in Idaho.

The third approach in landscape evaluation is landscape preferences and this approach aims to determine which aspects of the environment are seen as attractive. This approach may be direct, where interviews with individuals are held and often photographs are used. For example, one of the earliest studies by Shafer,

Hamilton, and Schmidt (1969) used 100 photographs to determine landscape preferences in the United States. Values were assigned to each photograph and these were then ranked. The use of photographs for landscape evaluation has been widely used since for scenic beauty estimation (SBE). The landscape preference approach may also be indirect, where preferences are inferred from literature, art and other sources (Mitchell, 1989).

Landscape evaluations frequently incorporate techniques that are detailed and focus on small land areas rather than entire regions and they have been criticised for subjectivity (Pigram, 1983; Williams & Lavelle, 1990; Naveh & Liebermann, 1994). Landscape evaluations are also useful techniques to identify and describe which areas may need protection. Landscape evaluations can provide useful inventories and form an important component of land use planning and environmental impact assessment (Mitchell, 1989). In general, such models are inadequate for evaluating resources for their nature-based tourism potential because they only consider attraction as the main index. Attraction is crucial for nature-based tourism but more characteristics need to be considered.

Cocklin, Harte, and Hay (1990) determined a resource evaluation technique for recreation and tourism in New Zealand combining scenic evaluations with activity-based assessments. The method employed delineation of resource boundaries based on vegetation using aerial photography and field checks. In determining scenic quality, Cocklin et al. (1990) used a subjective index to assess resources as high, moderate or low scenic quality. This study recognised that recreation and tourism potential need to be assessed in relation to the capability to support activities based on the attributes of the natural resource. The study employed a five-point scale that reflected the overall suitability of a resource unit for activity-based recreation and tourism, as well as its significance on a national scale in terms of recreation and tourism potential. Conservation values were also incorporated into the study using forest, wildlife and soil conservation requirements.

One of the most comprehensive techniques for resource evaluation is the Canada Land Capability for Recreation which provides an estimate of the quantity, quality and location of outdoor recreational lands in Canada (Natural Resources Canada, 2000). The inventory classes recreational land-use capability on maps from Class 1 with very high capability, to class 7 with very low capability based on the interpretation of aerial photographs, field checks and available records. Land units are ranked according to natural capability under existing conditions, whether modified or not and sound management and developed practices are also assumed. Within the seven classes, subclasses can exist and these emphasise the recreation opportunity in that particular land unit. For example, Class 3, would have moderate to high capability for recreation with subclass 'A' stating that the land provides access to water affording opportunity for angling or viewing sport fishing (Natural Resources Canada, 2000).

3.1. Assessment of natural resources in the Central Coast Region

A method or framework for assessment for nature-based tourism resources is required that allows systematic assessment of natural resources and can be incorporated into the planning process. This paper examines a regional resource evaluation framework specifically for nature-based tourism that incorporates natural resource classification, elements of landscape evaluation, assessment of access and tourism infrastructure. The first component of the research for this paper included natural resource identification together with data collection through field surveys. The second consisted of resource assessment for nature-based tourism potential. Results of the resources assessment were presented as maps and these have been incorporated into the planning process in the Central Coast Region. Each process is outlined below.

3.1.1. Resource identification and field checks

Resource identification was initiated through interviews with State and Local Government authorities in the Region and this enabled compilation of a tourism resource register. Local people tend to know an area very well, hence, the value of local knowledge should not be overlooked in resource evaluation, particularly for tourism. Resources for nature-based tourism were defined as places within a relatively natural setting, strictly outside settlements. Since the purpose of the assessment was to evaluate the natural resource base for nature-based tourism, facilities associated with tourism services such as accommodation were not dealt with in this research because these tend to be located in settlements. A 15-day field programme was undertaken and all potential natural resource sites were visited. Systematic collection of data in the field was achieved by the use of a field survey form, which used a checklist approach to allow quick data collection. The survey was based on techniques originally developed by the Department of Conservation and Land Management (1997a, b) and it was constructed in two parts. Its first section was designed to collect information about the built attributes of the natural resource site, whilst the second part dealt with the assessment of the natural resources recreation suitability. The use of this method was important in collecting information systematically. It also allowed for direct integration of the results into the Department of Conservation and Land Management's (CALM) planning and management framework. CALM is a key manager of resources for nature-based

tourism in Western Australia. The spatial location of each tourism site was recorded by using a hand-held global positioning system (GPS) recorder (Ensign, Trimble Navigation). Data collected during fieldwork was entered and stored in a Geographic Information System (ARC/INFO Version 7.1.1) as part of building a digital resource database.

3.1.2. Natural resource assessment

On its own, an inventory does not allow for systematic resource evaluation, hence a method was developed to assess resources for nature-based tourism. It was simple and it could be applied to a range of resource types. The method involved compilation of a matrix to evaluate and classify the resources. Four major categories including attraction diversity, accessibility, supporting infrastructure and the level of environmental degradation were evaluated, each comprising of a set of indicators in a matrix form. Each matrix used a different set of indicators, relevant to the category being assessed. The matrices had a common assessment framework in that each resource site received a weighted score to illustrate the importance of the indicator. A higher score indicated higher importance. The scoring system enabled resource classification and data integration into a GIS. Results were presented in a series of maps that showed the spatial distribution of resources together with attributes such as supporting infrastructure, accessibility, and the level of environmental degradation. It was beyond the scope of this study to use GIS for spatial analysis of resources. The method for the assessment is discussed for each of the categories.

3.1.3. Assessment category 1: attractions

Defining categories for assessing attractions is difficult (Leiper, 1995). It will always be subjective whether a sandy beach contributes more to the attraction value of an area than a surrounding hill. Resources in the Central Coast Region were evaluated based on the dominant attraction at a particular site using the following 10 indicators:

1. floral diversity (the degree of species diversity of the vegetation communities);
2. scenic diversity (the level of diversity associated with the landscape features);
3. recreation opportunity (the opportunity to engage in recreation activities such as swimming, walking, cycling, bushwalking);
4. adventure opportunity (the opportunity to engage in risky or hazardous activities such as four-wheel driving on steep terrain, sandboarding, gliding);
5. bay or inland water body (coastline protected by headland or lake, wetland);
6. rocky coastline/bluffs (coastline dominated by rocky outcrops, headlands, bluffs, wave cut platforms);
7. sandy beach (coastline dominated by straight sandy beaches);
8. good vistas (an area where a wider view of the landscape can be seen);
9. scientifically interesting (an area with unusual features such as rock outcrops, deep holes in the ground or an area with land tenure indicating very high biodiversity such as a nature-reserve); and
10. geologic feature (caves, large rocks, outcrops, limestone pillars).

Each indicator was assigned a value from 0 to 10, to reflect its importance. For example, a site could receive a high score for floral diversity as well as for having a good sandy beach. The maximum score a site could be assigned was 100. Sites with high final scores included areas with multiple attractions, while sites with low scores indicated low levels of attraction. This method is subjective like most landscape evaluation techniques, but consistent application of it enabled classification of resources into low, medium and high diversity of attractors.

3.1.4. Assessment category 2: access

Accessibility relates to the ease with which destinations can be reached physically, as well as the ease with which the destination itself can be enjoyed as a tourism product (French, Craig-Smith, & Collier, 1995; Gunn 1988). Access was assessed using the two indicators 'road type' and 'vehicle class' accessibility. Each of these indicators were assigned values ranging from 0 to 5, so the maximum score per resource site was 10. For example, an area accessed by a sand track was given a low score as it has limited access due to poor road quality requiring a four-wheel-drive vehicle. Based on this assessment, resources were classified into categories of 'poor', 'moderate' and 'good accessibility'.

3.1.5. Assessment category 3: supporting infrastructure

Although nature-based tourism is dependent on natural attractions, the presence of facilities can enhance visitors enjoyment (Pearce, 1989). Furthermore, lack of facilities at tourist attractions may deter people from visiting a place or discourage return visits. Whilst nature-based tourists are interested primarily in natural areas, it is also important for maintenance of environmental quality that some facilities are provided. In this research the following seven indicators were used to inventory visitor infrastructure:

1. toilet facilities (including toilets of all kind, showers, change rooms);
2. picnic tables (tables with seats for eating);
3. seats/benches (such as simple park benches);
4. barbecue (cooking facilities, including places where fire may be lit);

5. rubbish bins (all types of waste disposal units, recycling stations);
6. access for disabled (any facility such as a ramp designed for disabled people);
7. shade/shelter (facilities such as gazebos, shelters, hides, planted trees).

All indicators except 'shelter' received a score of either 0 or 1. A zero represented 'absence' and a one represented 'presence' of a facility. 'Shelter' was assigned heavier weighting to represent importance. 'Climate' is an important tourism resource in itself and extreme conditions can prohibit some activities for nature-based tourism (Pearce, 1989). The Central Coast Region has a Mediterranean climate with semi-arid conditions and heat or strong winds can make the area uncomfortable. Hence, the 'shelter' indicator was weighted and received a score from 0 if no shelter was available to 4, if proper constructions were present. Sites with a good canopy cover from natural vegetation received a score of 3. Each site could receive a maximum score of 10. Those with a high score indicated places with adequate basic infrastructure for nature-based tourism.

3.1.6. Assessment category 4: level of environmental degradation

Environmental quality refers to the well being of an ecosystem and an adequate assessment of it would require a detailed scientific audit and in-depth analysis. This research focused on the tourism product as a resource to experience. Hence, the field survey did not record detailed elements of the physical environment but focused on the level of environmental degradation. Visually outstanding elements of degradation were noted, as these are likely to detract from the enjoyment by nature-based tourists. The following 10 indicators were used to evaluate the level of environmental degradation:

1. litter (the amount, the type and density);
2. weeds (degree of invasion caused by non-native species);
3. disease (the presence of diseases affecting the ecosystem such as dieback);
4. impact of fire (caused by non-natural events, i.e. camping, ad-hoc burnings);
5. erosion (erosion of tracks, river channels caused by visitors);
6. trampling of vegetation (health of vegetation complexes in terms of physical structure);
7. destruction of dunes (degree to which dunes are unstable, caused by tourists);
8. erosion of landforms (the appearance of the landscape's health);
9. tracks (not purpose built tracks caused by four-wheel drive vehicles); and
10. built structures (non-tourist infrastructure such as squatter shacks).

Each of the 10 indicators were assigned a value from 0 to 10, hence each resource site could receive a maximum score of 100 for this category. Resource sites with low scores indicated areas where the disturbance caused by humans was minimal. Sites with high overall scores for this category indicated areas that require rehabilitation and/or visitor management. A natural or a wild setting is important to nature-based tourism, hence, the presence of human structures other than supporting infrastructure were recorded as negative attributes. For example, existing squatter shacks in the Region were scored negatively. While the squatters have been perceived as having 'cultural value' by some, they are considered to be undesirable by the Western Australian Government (May & Selwood, 1992; Western Australian Planning Commission, 1996).

4. Resource potential in the Central Coast Region

4.1. Diversity of attractions in the Central Coast Region

Sixty-five resource sites were identified from the analysis. The nature-based product diversity of the Region was variable (Table 1). All sites in the 'low' category had one single attractor and in most cases it was a picnic site or a similar secondary resources area. Over half (58 percent) of tourism resources were classified into the 'medium' diversity category (Table 1). These areas had at least two dominant attraction features. Places with multiple attractors included mainly coastal sites constituting 52 percent of the Region's resources (Table 2). For example, a typical coastal area with a rocky shore was visually stimulating and the pockets of sheltered sandy beaches provided numerous recreation opportunities. Additionally, such areas were associated with diverse dune formations and vegetation communities.

4.1.1. Access

The lack of good accessibility is a major hindrance to development of nature-based tourism in the Central

Table 1
Classification of regional nature-based tourism attractions

Attraction class	Values	Number of sites	% of Region
Low diversity	0–33	22	33.85
Medium diversity	34–66	38	58.46
High diversity	67–100	5	7.69
Total	n/a	65	100
Median	42		
Mean	43.83		
Range	17–86		
SD	15.6		

Table 2
A broad classification of nature-based tourism resource types

Class	Number of sites	% of Region
Coastal	34	52.31
Flora	11	16.92
Geology	6	9.23
Lake	4	6.15
Picnic site	10	15.39
Total	65	100

Table 3
Classification of nature-based tourism resources based on accessibility

Accessibility class	Values	Number of sites	% of Region
Poor	No access/or 4WD only	35	53.86
Moderate to poor	4WD/maybe 2WD	3	4.61
Moderate	4WD, 2WD, minibus	3	4.61
Moderate to good	All vehicles/gravel road	12	18.46
Good	All vehicles/sealed road	12	18.46
Total	n/a	65	100

Table 4
Classification of nature-based tourism resources based on provision of facilities

Infrastructure class	Values	Number of sites	% of Region
No facilities	0	18	27.7
Poor facilities	1–5	33	50.8
Basic facilities	6–10	14	21.5
Total	n/a	65	100
Median	1		
Mean	2.65		
Range	0–10		
SD	3.08		

Coast Region. Only nine tourist sites (13 percent of total area) can be accessed on a sealed road (Table 3). Over half (55 percent) of all resources can be accessed only via a sand track and 38 sites (58 percent) require a four-wheel drive vehicle. Some highly attractive places are also inaccessible due to poor transport routes (Table 3). Of the total resource base, only 12 sites had 'good' access where all vehicle types could go to on a sealed road (Table 3).

4.1.2. Supporting infrastructure for nature-based tourism

In general, the Region has very low levels of tourism infrastructure, further hindering potential development of a nature-based tourism industry (Table 4). Sites with infrastructure tended to be picnic and rest areas and not potential nature-based attractions. These sites were also in close proximity to sealed roads or settlements. Just over 20 percent of all sites had some basic facilities and 27 percent had nothing at all (Table 4). The Region experiences long hot summers and these are accompanied by windy periods due to a strong sea breeze. With the exception of two sites in a national park, no shelter has been provided in the whole Region. Places with structures to provide shade and shelter included some picnic sites and some inland areas where shelter is provided adequately by the natural vegetation.

Table 5
Classification of tourism resources based on environmental degradation

Degradation class	Values	Number of sites	% of Region
Low	0–20	9	13.85
Low to moderate	21–40	19	29.23
Moderate	41–60	21	32.31
Moderate to high	61–80	16	24.61
High	81–100	0	0
Total	n/a	65	100
Median	44		
Mean	45.32		
Range	12–76		
SD	19.4		

4.1.3. Level of environmental degradation of natural resources

The natural tourism resources of the Region are linked to several small townsites and the entire Region's population consists of approximately 10,000 people (Department of Planning and Urban Development, 1994). Despite this, the results of this survey suggest that the area is already experiencing problems of over use, especially in coastal areas. Results in Table 5 indicate that locals and/or the existing tourist population exploit the resources and these current uses may not be sustainable on a long-term basis. These areas were dominantly coastal areas where squatter shacks were present or places unofficially used for camping. Currently, however, none of the sites fell into the category of having 'high' levels of environmental problems (Table 5).

Trampling of vegetation is particularly noticeable near the coast and these were created by four-wheel drive vehicles and/or campers. Proliferation of weeds was a minor problem and problem areas include squatter shacks and places adjacent to farming properties. The plant disease with the greatest potential to affect tourism resources of the Region is dieback (various *Phytophthora* species, Department of Conservation and Land Management, 1998). This problem is

particularly relevant to tourism resources located inland, where the diversity of the flora forms the main attraction. Moreover, four-wheel driving in the coastal area is uncontrolled and needs some form of regulation. Another issue is that unnecessary paths need to be rationalised through effective coastal management practices. In fact, four-wheel driving is the foremost management problem in the Region. It is observable that groups and individuals seek their adventure in creating new tracks. Erosion of landforms inland was not so clearly detectable as in the coastal areas where the landscape often looked in need of rehabilitation.

The Region is unique in that it has a number of coastal squatter shack settlements no longer found in many other parts of Australia. Some settlements have several hundred structures built. Their simple construction, lack of conformity to standard building codes and ad-hoc placement means that they detract from the quality of the natural landscape. Sites where shacks are present have higher rates of erosion, rubbish, trampling of vegetation and more uncontrolled tracks than elsewhere on the coast. This devalues resources for potential development of nature-based tourism (Western Australian Planning Commission, 1996).

4.2. Significant regional nature-based tourism resources

Having an inventory of nature-based tourism resources is important to planners as well as to the tourism industry. However, an inventory fails to distinguish between sites that are significant in a geographical sense. From the above assessment a series of maps were produced. However, these only showed spatial distribution of the resources and the characteristics of the sites in terms of access, supporting infrastructure and the level of environmental degradation. Therefore, an assessment of geographical significance of the resource base was also needed to ascertain the relative importance of resources in the Region compared to those of the surrounding regions. Determination of resource significance can help decision-makers with allocating planning and management efforts to resources. The Central Coast Region is characterised with a number of unique features that are of national and of international significance. An example of a significant feature in the Region is the Pinnacles in Nambung National Park. These limestone pillars in a desert landscape represent a tourism icon for Western Australia and is used worldwide, to market this nature-based tourism attraction. Consequently, this part of the Central Coast Region receives high numbers of domestic and international tourists.

The underlying difficulty is in development of a method to determine significance. Evaluation significance is a subjective notion and few studies have approached this concept systematically (Mercer, 1995; Bramley, 1993; Eagles, 1984). There are many ways using economic indicators to evaluate the significance of resources. Such approaches are not considered appropriate to evaluate natural resources for nature-based tourism. The use of revenue generated from entrance fees in parks can be useful, but it may be misleading in indicating the 'real' significance of an area such as a nature reserve, where there may not be entrance fees. In the Central Coast Region fees are collected only at the Pinnacles. Development of a significance index for any resource is difficult. For this reason, nature-based tourism resources were classified according to their levels of significance using four criteria. These include:

1. scarcity of the resource relative to the local area;
2. level of uniqueness on a regional or national scale;
3. degree of attraction diversity of the resource; and
4. distance to next similar feature if one exists at all.

Each criterion was assigned a subjective score from 0 to 10. The sites with the highest scores were the most significant attractions. From this, resources were ranked in order of significance from 'low', ' medium' to 'high' but only on a regional scale, and these were also mapped. The Central Coast Region was identified with 18 regionally significant resources for nature-based tourism, and it was found that 50 percent of these sites are accessible by four-wheel drive vehicles. While the significant criteria used here are subjective, they fulfil a number of important functions, including the relatively systematic comparison of different sites in the Region. The method could be applied elsewhere and it would help ensure similar assessment approaches in separate geographical regions (Eagles, 1984).

5. Implications

This research used a simple and effective way to identify and assess the quality and quantity of natural resources for nature-based tourism and this has value for planners and managers. It is necessary for decision-makers to know the quality and quantity of resources as well as their spatial distribution and how significant they are. Resource inventories such as this are fundamental to planners and managers. By knowing the condition and amount of a resource base, decision-makers are better placed in making decisions about resource capability, land use compatibility and impacts.

This research identified 65 resource sites for nature-based tourism and evaluated their quality and quantity based on the categories of 'attractiveness', 'access', 'supporting infrastructure' and the 'level of environmental degradation'. The results of this research have been disseminated to relevant government authorities and it has proven useful in tourism planning for the Central Coast Region. While neither the method nor

the results of this research solved difficulties inherent in the area, the study provided a considerable amount of information in a readily useable form for the planning and management process and this were particularly useful to Local Government Authorities.

The methodology proposed in this paper is systematic and it could be easily repeated elsewhere. Although the indicators chosen for the assessment were derived from features found in the study area of this research, a new set could be chosen for various environmental settings using field-checks and background information from various reports. The assessment can be completed requiring relatively little time and resources and provides an effective overview. Given that most developers and government authorities will not commit large sums for such evaluation exercises at the outset of the development process, techniques which offer ready yet accurate assessments and which are not over demanding in terms of data, time, or money will be most practical (Pearce, 1989).

This method of natural resource assessment may be criticised for subjectivity in assigning values to indicators. However, it leaves open the potential for experts, tourists or locals to use the matrices of this study to complete a resource assessment.

Natural tourism resources for nature-based tourism require some level of management to maintain resources. The assessment results of the level of environmental degradation were useful in determining which places needed environmental rehabilitation, planning and management. Processing such an inventory and an assessment together with access and supporting infrastructure permits managers to make decisions about needs to implement visitor management facilities or codes of practice. As this assessment was completed on a regional scale it allows for ranking of the resources into priority groups in order of urgency in terms of needing environmental rehabilitation.

The categories used in the assessment of the resources were desegregated, which can be perceived as a weakness of the approach. However, some researchers argue that resources must be divided into easily understood categories (Cocklin et al., 1990; Van Riet & Cooks, 1990). In the case of ecosystems this division results in knowledge of individual categories as well as an understanding of the processes involved between them.

Inventories are useful but they also have a finite life. Resource inventories should not ignore the dynamic component of resources (Mitchell, 1989). Hence, resource inventories should be regularly updated to maintain a database of accurate information. With the availability of spatial computer packages such as a GIS for data storage, retrieval and analysis, inventories can be updated easily and efficiently. With the absence of inventories the decision-making process at any stage is impaired.

Acknowledgements

Support for the project was provided by the Department of Geography at The University of Western Australia, the State Government Department of Conservation and Land Management, the Wheatbelt Development Commission and the Central Coast Planning Coordinating Committee. The author is especially grateful to the Chief Executive Officers of the four Shires, David Rose, Peter Hammond and my mother Julianna Szodorai for assistance in the field. Special thanks go to my supervisor, Dr. Ian Eliot.

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