A FRAMEWORK FOR SUSTAINABLE TOURISM IN PULAU BANGGI, SABAH:
INTEGRATING BIOPHYSICAL AND SOCIO-ECONOMIC CONSIDERATIONS

by

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ABSTRACT

Ecotourism is often viewed as a sustainable form of tourism, but has the potential to impart negative environmental and social impacts if not well managed. When planning tourism, *ex ante* assessments can provide a contextual understanding of the ecological, economic, and socio-cultural forces that shape the prospects for sustainable tourism development. Underlying conditions can suggest 'limits' to acceptable change levels incurred by tourism development, which respect socio-cultural expectations and biophysical realities. Pulau Banggi is a relatively remote island on the brink of tourism development in the Malaysian state of Sabah. I conduct an *ex ante* biophysical study that evaluates how existing conditions of the island’s marine biodiversity, seasonality, and infrastructure might influence options for sustainable tourism development. Through interviews, I also assess local residents’ perceptions and trade-off preferences towards environmental and socio-economic change associated with tourism growth. I find that human expectations of economic benefits might demand tourism development on a scale not compatible with existing biophysical capacity. Persistent use of destructive fishing techniques, uncertainty over groundwater capacity, and inadequate waste infrastructure are major ecological constraints to growth. I conclude that prospects for sustainable tourism in Pulau Banggi can be enhanced through small scale development operating under a community based approach, and institutionalised within a Marine Protected Area framework.
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1 Introduction and Literature Review

1.1 Overview

Many coastal communities, particularly in developing nations, are experiencing a decline in the near shore marine resource base that once supported their livelihoods (Thiele et al. in press). Growing population pressures in many of these countries have led to coastal crowding that threaten coastal ecosystems through land based development, pollution, and overexploitation of fisheries resources (Gray 1997; Burke et al. 2002; Thiele et al. in press). These threats to coastal ecosystems and livelihoods signal the need for a transition towards alternative resource use options that are based on non-extractive activities.

Coastal tourism, if developed responsibly, is often suggested as an economic development option that is able to benefit local communities with minimal negative impacts on the natural environment (Trist 1999; Hall 2001; Thiele et al. in press). Within the tourism industry, growth of coastal tourism, particularly the ocean and marine aspect (White et al. 1997), outpaces the rest of the field (Thiele et al., in press). Marine tourism includes activities such as swimming, snorkelling, and SUBCA diving. It is dependent on the presence of several key features, among them coral reefs; beaches; transportation, water, and sanitation infrastructure; as well as some consumer services.

Developing countries in the tropics, where the majority of the world’s shallow coral reefs occur, are positioned to take advantage of marine tourism’s popularity; more and more, tourism is making inroads in coastal regions in the tropics (White et al. 1997). However, in order to ensure the sustainability of this sector, future tourism development must satisfy the much cited criteria of being ecologically sound, economically viable, and socially acceptable (Wall 1997; White et al. 1997; Brown et al. 2001). This is best achieved by adopting an ‘ecotourism’ approach, which I will define in this study as being ‘travel to relatively undisturbed places for the purpose of observing and enjoying the area’s biological resources, and which is conducted in a way that minimises environment impacts, is respectful of local cultures, and produces fair benefits to all users.’
Ecotourism activities are usually focussed on relatively pristine areas with unique ecosystems that support the subsistence needs of local communities (Wood 2002). The dilemma faced by planners is how to achieve a balance in protecting biological resources and ecological processes that are the foundation for ecotourism, while regulating tourist activities that bring financial returns but also directly affect the integrity of these resources. The challenge to satisfy conservation objectives while meeting the resource demands of local communities is central in resource management. Cater (2002) comments that prospects for sustainable tourism are determined by contingencies that both shape and are shaped by economic, socio-cultural, political and institutional forces; planning for ecotourism thus involves a holistic understanding of the system in which activities will take place (Brown et al. 2001).

1.2 Sustainability of tourism

Due to ecotourism's emphasis on resource conservation and social responsibility, it is often proclaimed as a sustainable alternative to the perceived damaging effects of conventional mass tourism (Wall 1997). In theory, pursuing ecotourism can yield financial returns and socio-economic progress to local communities, recreation opportunities to tourists, while protecting ecosystem services. Yet, despite its claim to higher principles, ecotourism still introduces visitor impacts that may not be compatible with the host community or environs. This is especially so in coastal areas and islands that are characterised by scarce resources, and in locations where tourists compete for spatial control of resources with other users (Wall 1997). Subsequently, the ecological (Hall 2001) and social sustainability of ecotourism has been challenged (Wall 1997).

1.2.1 Environmental impacts of tourism

Tourism activities and associated development affect the biophysical environment, and some impacts can become obvious even at low levels of activities. Impacts on coastal biodiversity, groundwater resources, and near shore water quality hold the highest consequences for human health and socio-economic well-being. For example, tourism development is usually
accompanied by huge demands for water. On islands that experience low rainfall and have limited water resources, valuable groundwater may be diverted away from local residents’ needs to satisfy tourist demand. In Zanzibar, the tourist sector’s insatiable consumption of local water supplies resulted in angry locals sabotaging water pipes at tourist hotels (Gössling 2001). In their baseline study of water resources in a popular tourist island, Kahoru and Yap (2001) found that the lack of adequate sewage systems, compounded by high tourist numbers, was responsible for excessive faecal coliform counts in wells that supply drinking and bathing water. In coral reef ecosystems, degradation of near shore water quality and coral reefs can be attributed to pollution and sedimentation caused by uncontrolled terrestrial development (Edinger et al. 1998). Tourists themselves can present a threat to coral reefs, as they can physically damage coral reefs by accidental trampling while SCUBA diving (Davis and Tisdell 1995; Rouphael and Inglis 2001), or cause mechanical damage from careless dropping of anchors.

1.2.2 Socio-economic impacts of tourism
While ecotourism is often lauded as an alternative livelihood option which generates positive economic benefits, it has also been associated with rising crime rates and erosion of cultural identity (Lindberg and Johnson 1997). In marine environments, tourist activities such as SCUBA diving and snorkelling can cause tension between fishers and tourists (Oracion et al. in press). Rural communities are often drawn to ecotourism with promises of jobs and increased income, but local participants have been shown not to profit substantially from the tourism sector (Campbell 1999). Economic benefits from tourism rarely trickle back to local residents (Bookbinder 1998; Brohman 1996), and insufficient ecotourism revenues flow back into management or protection of the area (Tershy et al. 1999). Where local resource users see no benefit from the tourism activity, they will usually resume extractive activities like fishing that directly compete with and affect the viability of the tourism industry (McClanahan 2005; Wall 1997). A study of residents’ perceptions of tourism in Langkawi Island, Malaysia (Kayat 2002), found that only a select group of local people, mainly those with some degree of social power, were able to reap benefits from tourism, while the majority of locals were no better off.
1.3 Planning for sustainability

Sustainable tourism is defined as "tourism which is developed and maintained in an area (community, environment) in such a manner and at such a scale that it remains viable over an indefinite period and does not degrade or alter the environment (human and physical) in which it exists to such a degree that it prohibits the successful development and well-being of other activities and processes" (Butler 1993:29).

Too often, tourism impacts are evaluated only after the damage has occurred. *Ex ante* assessments of biophysical conditions and underlying community perceptions for the purpose of tourism planning are infrequent. Rather, tourism development has largely been driven by economic interests at the expense of known, but ignored negative social and environmental impacts, particularly in developing countries (Trousdale 2001). These endeavours have been characterised by ad-hoc management decisions (Wong 1998) that can manifest into degraded ecosystems and poor community support.

Baseline data that reflect environmental and socio-economic conditions prior to tourism development are seldom available (Hall 2001; Trousdale 2001), creating a knowledge gap that hampers well-informed decision making. In a review of tourism research in Australia, Sun and Walsh (1998) found that studies detailing the environmental impacts of tourism were limited, and probably insufficient in proportion to the volume of tourist activity experienced in that country. Most studies of residents’ perceptions towards tourism impacts have consisted of applied social theories to explain expressed attitudes, or to uncover differences in perceptions between groups for marketing or placement strategies (see Kayat 2002). Fewer have used residents’ perceptions to guide the planning process for sustainable tourism (see for example, Puczko and Ratz 2000). Comprehensive guidelines for sustainable tourism planning as such seem infrequent in the tourism literature.

Tourism is often an integral component in broader coastal management strategies such as marine protected areas (Davis 1997; Brown et al. 2001) and integrated coastal zone management (White et al. 1997; Thiele et al. in press). Within these larger resource
management frameworks, tourism planning can benefit from a holistic treatment, whereby ecological integrity, social acceptability and economic viability are accorded due consideration.

1.3.1 Limits of Acceptable Change (LAC) framework

Early attempts to manage recreation in wilderness areas adopted the carrying capacity concept that sought to control impacts by placing a limit on visitor numbers (Boyd and Butler 1996). It became apparent, however, that there was no magic number at which an area’s capacity could be defined, as factors such as visitor type could influence the outcome significantly. Alternative concepts thus evolved, of which this research will be guided by the Limits of Acceptable Change (LAC) framework.

The LAC recognizes that traditional carrying capacity based on biological parameters alone cannot realistically reflect the resilience of systems, which are determined by a mixture of biophysical and socio-economic conditions. Rather than asking “how many is too many?” the LAC approach is instead concerned with “what are the outcomes we are trying to attain?” and “how much change is appropriate?” The LAC approach defines what sort of change, and how much change is socially acceptable and biophysically feasible, given the evolving context of the unique location.

Management of the Great Barrier Reef Marine Protected Area, where tourism is a major component of the coral reef ecosystem, is based on the LAC framework (Shafer and Inglis 2000). In Malaysia, LAC is also used in managing tourist activities in marine parks. The LAC method was applied to determine the ecological and social carrying capacity of Pulau Payar marine park, a popular tourist destination in Peninsular Malaysia (Lim 1998). LAC is thus an approach that has demonstrated applicability to marine based tourist destinations, in particular, marine protected areas.

In most LAC studies, social carrying capacity is defined from the tourist’s point of view, thus outcomes can be considered to cater to tourists’ needs and expectations. An exception can be found in Shafer et al.’s (2002) study, which investigated the attitudes of local communities
towards tourism development and the change that tourism was perceived to bring. In this study I also define social carrying capacity from the point of view of local residents, in recognition that without community support, tourism activities are prone to failure (Simpson 2001). Hence, visitors have to tailor their activities around these existing conditions and ‘fit’ within the natural and human environment of the destination, rather than the destination having to endure changes imposed by tourism forces.

1.4 Background

In Malaysia, rapid growth of tourism in some marine parks has compromised the health of coral reefs and sparked anger in local communities. This type of environmental and social failure can be attributed in part to uncontrolled development, and inadequate community consultation over projects which directly impact the marine ecosystem that residents depend on for their livelihoods (The Star, Sept. 8, 2004). Evidently, maintenance of ecological integrity and the support of local communities is crucial to the success of tourism operations; this can be facilitated by understanding biophysical limits and residents’ opinions of future tourism development.

Pulau Banggi, an island off the northern coast of Sabah, Malaysia is part of the proposed Tun Mustapha Marine Park. Currently, tourism is non-existent on Pulau Banggi; however, change is underway as a private chalet operation is starting up, and state officials have recently intensified tourism promotion of the region. It is realistic to presume that tourism development will transform Banggi’s biophysical and social environment in coming years.

Banggi in its present state offers a unique opportunity to investigate a ‘pristine’ site. It allows documentation of underlying social and environmental conditions, and determination of which are of special importance to local communities, and thus subject to closer management attention. This study is also unique as the establishment of most marine protected areas in Malaysia have historically proceeded without community input. In Sabah, local communities were involved only during the recent establishment of the Tun Sakaran Marine Park in
eastern Sabah in 2003. The significance of this study thus lies in the fact that it i) establishes a process for gathering local opinions, and ii) integrates local knowledge and values with biophysical parameters to produce realistic management objectives and acceptable impact-mitigating actions.

1.5 Methods

In order to manage a resource, knowledge of the ecosystem in question and of communities who rely on the ecosystem's services is a crucial first step. In data poor areas, this usually involves field visits to collect first hand data. This process is facilitated through participant observations and interviews, which allow the researcher to gain an understanding of the ecological and socio-cultural context of the subject being studied (Bunce et al. 2000). Interviews with members of resource based communities have been particularly useful for acquiring local knowledge about the behaviour, use and limitations of the environment (Close and Hall, in press). This technique was used in evaluating the perceptions of local residents towards tourism development. It was also applied towards an assessment of Banggi’s biophysical environment, which relied on data obtained through a combination of literature review and personal observations, and was supported by opinions gleaned from interviews with local resource users. In a similar study, Brown et al. (1997) relied on secondary data analysis supplemented by field visits to evaluate the carrying capacities of tourism sectors in Maldives and Nepal.

1.6 Research aim

This research aims to inform planners and managers about aspects of south Banggi’s biophysical and social environment that may constitute thresholds to change, hence dictate the type and magnitude of tourism that will be sustainable in Banggi in the future. The research undertakes a biophysical assessment, then investigates the expectations and trade-off preferences of local residents towards tourism development. In doing so, it attempts to
1.6.1 Research objectives

1. To assess the ecotourism potential in Banggi based on biophysical features including marine biodiversity, weather conditions, and infrastructure
2. To evaluate residents’ opinions on changes to their resource use patterns, standard of living, and socio-cultural environment due to tourism development
3. To suggest management implications for sustainable tourism development given the context of biophysical and social limits

1.7 Thesis outline

This thesis is written in manuscript format according to guidelines prescribed by the Faculty of Graduate Studies. It opens with the introduction and literature review, followed by two independent papers; the first paper is a biophysical assessment of sustainable tourism potential in Pulau Banggi, and the second is a survey of residents’ perceptions of tourism...
development in Pulau Banggi. A final chapter that addresses the relevance, strengths and weaknesses of the two papers concludes the thesis. Chapter 2 has been submitted to the Journal of Environmental Management and is currently in review. The contents of Chapter 3 are currently being prepared for journal submission.
1.8 References


2 Planning for Sustainable Tourism in Southern Pulau Banggi: an Assessment of Biophysical Conditions and their Implications for Future Tourism Development

2.1 Introduction

Ecotourism is increasingly being lauded as a sustainable development option for rural communities, one that is able to spur economic development and instil environmental protection at the same time (Cater 2002). It is frequently cited as the fastest growing sector within the tourism industry (Weaver 2002) and, in contrast to conventional tourism, subscribes to the principles of environmental protection and social responsibility. Since the term ecotourism was first introduced in the mid 1980s, it has grown in popularity and is now embraced by the likes of international aid agencies and non-government organisations for its emphasis on community involvement and protection of natural resources (Weaver 2002). In this paper, ecotourism is defined by the authors as ‘travel to relatively undisturbed places for the purpose of observing and enjoying the area’s biological resources, and which is conducted in a way that minimises environment impacts, is respectful of local cultures, and produces fair benefits to all users’.

Although ecotourism lays claim to higher principles, it nevertheless impinges upon the biophysical and socio-cultural environment at the destination by consuming and competing for resources such as water, land, and fisheries. Like any resource-use activity, ecotourism risks becoming unsustainable if local ecological and socio-cultural capacities are not respected (Wall 1997). Conversely, properly planned and implemented ecotourism can contribute towards conservation and sustainable use of marine and terrestrial resources at the host destination (White and Rosales 2001).

Notably, ecotourism can complement broader resource management regimes when it is incorporated into Marine Protected Areas or Coastal Zone Management (White and Rosales 2001). Often, the pristine environment of protected areas provides an ideal venue for

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ecotourism pursuits (Lawton 2001); yet these are the very sites most susceptible to visitor impacts that can degrade attractions such as coral reefs, or damage wildlife and trails (Farrell and Marion 2001). Tourism in marine parks may be a double-edged sword, as related development can occur to the detriment of marine park conservation objectives (Fauzi and Buchary 2002).

Achieving sustainable tourism – defined here as tourism that is ecologically benign, economically feasible and socially acceptable – is thus contingent on environmental protection and reconciling tourism activities with local socio-economic values (Brown et al. 1997). This necessitates the integration of two components: the biophysical, including the living environment and infrastructure, and the socio-economic, relating to issues of local attitudes, perceptions and changes to quality of life due to tourism impacts. Both have thresholds, or natural limits within which ecotourism must operate; surpassing these thresholds through unplanned development inevitably leads to environmental degradation or social conflict (Wong 1998).

Much of the tourism literature consists of impact studies that deal with the outcome of tourism after development has taken place, while *ex ante* assessments of a site’s biophysical and socio-economic capacity for accommodating tourism are less common. Yet studies have shown after the fact that the resource demands and activities of tourism can easily surpass an area’s biophysical and social limits, resulting in deteriorated environmental quality and undesirable socio-cultural outcomes (Musa 2002), including decline in groundwater quality (Kahoru and Yap 2001), decrease in groundwater reserves (Gössling 2001), exhaustion of local fisheries (White and Rosales 2001), loss of land ownership by local holders, and inequitable distribution of monetary benefits (Liu 2003). *Ex ante* evaluations can provide a contextual understanding of ecological, economic and socio-cultural forces which shape the prospects for sustainable tourism development at the host destination.

This paper presents an *ex ante* evaluation of the potential for developing sustainable tourism within the biophysical context of Pulau (island) Banggi, an undeveloped island off the northern coast of Sabah in Malaysian Borneo. It concentrates on the biophysical environment in southern Banggi, including marine biodiversity, weather and oceanographic conditions,
and infrastructure. The paper i) characterises baseline biophysical conditions; ii) identifies key attributes that are valuable for tourism and; iii) assesses how existing biophysical conditions will influence options for future sustainable tourism development.

2.2 Regional tourism trends

Worldwide, Southeast Asia is one of the fastest growing tourist destinations, with Malaysia, Singapore and Thailand leading the way (Wong 1998). From 1990-1999, tourist arrivals in Malaysia grew by 6.5% per annum (World Travel and Tourism Council 2002) and the tourism industry is expected to maintain strong annual real growth of 6.4% between 2001 and 2010 (World Travel and Tourism Council 2002). Malaysia’s rich natural heritage is a prime attraction for ecotourists, who arrive to experience the country’s lush rainforests, mountains, beaches, and islands. In Sabah, Mount Kinabalu, the highest peak in Southeast Asia, and Pulau Sipadan, one of the top SCUBA diving destinations in the world according to Rodale’s Scuba Diving Magazine, are major visitor attractions. In recent years, the increasing number of visitor arrivals to marine parks in Malaysia (GEF 2004) and Sabah (Cabanban and Nais 2003) suggests that recreation centred on coral reefs is a growing trend and that these delicate marine ecosystems will likely be subject to mounting anthropogenic stress.

Although tourism is an important economic vehicle for host countries, the effects of uncontrolled tourism development degrade coastal ecosystems (Wong 1998) and are cause for concern in coral reef based destinations such as Malaysia. The demand for tourist amenities and ambition of local tourism authorities and businesses can result in concentrated development along narrow coastal areas that not only threaten the integrity of near shore landscape and corals, but also the serenity and wilderness factor that are the foundation of this sector. Nowhere was this more evident than in Pulau Sipadan, where all six resorts on the tiny 16 hectare island were recently removed in light of the negative effects resort based tourism was having on the island’s fragile ecosystem (Daily Express available at www.dailyexpress.com.my). This underscores the need to entrench biophysical assessments
in tourism management plans well before development begins and irreparable damage is incurred.

2.2.1 Tourism in Pulau Banggi

Tourism is one of three priority productive sectors under Sabah’s *Halatuju Pembangunan dan Kemajuan* (State Development Agenda). Receipts from foreign tourists in Sabah alone generated RM 1.28 billion \(^2\) in 2003, and tourism is one of the fastest growing sectors in the state economy (Institute of Development Studies available at www.ids.org.my). In comparison, agriculture and livestock, the highest contributor to Gross Domestic Product, generated RM 3.2 billion in 2003. From 1998 to 2004 international tourist arrivals in Sabah increased by 200%, culminating in a total of 980,000 international visitors in 2004 (Sabah Tourism Board available at www.sabahtourism.com). The northern region of Kudat and Banggi is earmarked for tourism development, with the national launching of ‘The Tip of Borneo’ attraction in the town of Kudat in 2004 being a product of this initiative.

Nevertheless tourism remains close to non-existent in Banggi. As an indication, the guesthouse in Banggi, which is the primary visitor accommodation, receives an average of 20 guests per month, the majority of whom are government officials on field duty. As of May 2005, foreign tourists had rarely visited the island (guesthouse manager, Karakit, personal communication 2005). On the other hand, scientists and researchers have a regular presence on Banggi as the area has become a focus of various projects carried out by local university students and non-governmental organisations (NGOs) since the early 2000s.

Two locations with greatest potential for tourism development are Pulau Maliangin Besar off southern Banggi, and *Tanjung* (Cape) Menyangit on the west coast of Banggi (Assistant District Officer, Karakit, personal communication 2005). In the past three years efforts by a private company to establish an eco-resort on Pulau Maliangin Besar have culminated in an agreement with local landowners to begin construction of chalets on the island’s southwest beach spring of 2005.

\(^2\) Conversion rate as of January 2006 was approximately RM/CAD = 0.3.
A likely enhancement for tourism in Banggi is the proposed creation of the Tun Mustapha Park (TMP), a Managed Resource Area (Category VI, IUCN) whose boundary will span one million hectares and include the Banggi cluster of islands. The establishment of the TMP was approved by the Sabah State Government in March 2003 amidst growing concerns over the exploitation of marine resources in Sabah’s northern region. The protection and recovery envisioned for the area’s marine resources will likely attract ecotourists who can appreciate the underwater biodiversity through activities such as SCUBA diving, snorkelling and swimming.

2.3 Methods

2.3.1 Study area

2.3.1.1 Physical description

Banggi was created as a sub-district of the District of Kudat in 1975. It is situated at the northern tip of Sabah between longitude 117° 3’ and 117°25’E and latitude 7°07’ and 7°23’N. Covering an area of 450 km², it is the largest island in Malaysia, and consists of the main island of Banggi, Balambangan, Malawali and about 50 small outlying islands. Banggi is flanked by the South China Sea to the west, Sulu Sea to the east, the Balabak Strait to the north, and the Banggi Channel to the south. The closest town on mainland Sabah is Kudat, approximately 30km away. This study focuses on tourism development in southern Banggi, where the administrative and economic hub of Kampung (village) Karakit is situated. To the north of Kampung (Kg.) Karakit is Kg. Perpaduan, and to the south lies Kg. Singgahmata, all stretching along a coast line about 2km long.

2.3.1.2 Coastal communities

Fishing is the source of livelihood for 70% of Banggi inhabitants (anonymous 2003). Another 26% are involved in farming and agriculture, with the remainder being employed in services (anonymous 2003). Banggi inhabitants depend on the extraction of marine resources for subsistence and income generation, which besides fishing, also includes reef gleaning,
collection of invertebrates and harvesting of turtle eggs. Coastal villagers still use mainly traditional methods of extraction, which accounts in part for the island’s slow economic progress. Many households live at or below the official poverty line in Sabah of RM 685 per month (Lee 2002). A socio-economic survey conducted by the Borneo Marine Research Institute reported that monthly average household income is only RM 349 (Institut Penyelidikan Marin Borneo 2003). Population growth in Banggi is high, with a rate of increase of 4.4% per annum (anonymous 2003) compared to a national average of 1.6% (Department of Statistics Malaysia available at www.statistics.gov.my).

2.3.2 Sources of data
Primary data were gathered using participatory research methodologies, including participant observations and semi-structured interviews that investigated south Banggi residents’
perceptions and expectations of tourism development. Interviews took place over six weeks spread between two field visits in August 2004 and April 2005 and are reported in detail in an accompanying paper. During this time, I was able to become acquainted with community members, which facilitated data collection and enabled a contextual understanding of local physical and social conditions. Secondary data obtained from academic literature and technical reports were used to assess i) marine biodiversity; ii) weather and oceanographic conditions; and iii) existing infrastructure.

Figure 2.2 Villages of southern Banggi.
2.4 Biophysical assessment

2.4.1 Marine biodiversity

Pulau Banggi lies within an area known as the “Coral Triangle”, an area covering the Philippines, Indonesia and Papua New Guinea that supports the highest marine biodiversity in the world (Allen and Werner 2002). The ecological value of Banggi is reflected in the selection of the proposed Tun Mustapha Park as part of the North Borneo- Balabac Island Priority Conservation Area in the Sulu-Sulawesi Marine Conservation Plan (Stakeholders of SSME 2003), and in the A-list of the UNESCO World Heritage Sites (Hillary et al. 2002).

Banggi and its peripheral islands are surrounded by shallow fringing and patch coral reefs. These reefs are extremely biodiverse, with 375 species of coral reef fish and 120 hard coral species recorded in southwest Banggi alone (Harding et al. 2001). Underwater surveys of Banggi’s coral reefs using standard Reef Check methods (available at www.reefcheck.org) reveal that the region is richer in fish diversity than Pulau Perhentian, Pulau Redang, Pulau Tioman (Figure 2.3), and comparable in hard coral diversity to Pulau Pulau Perhentian, all of which are marine parks in Peninsular Malaysia that have been afforded protection for at least 10 years.

Nonetheless, there are mixed reports on the health of Banggi’s coral reefs. Overexploitation and destructive fishing practices have caused extensive damage; blasted reefs take at least ten years to recover (Ismail et al. 1999). In the Kudat region, blast fishing was recorded less than once an hour, but along other coastlines in Sabah this number jumped to more than five blasts per hour (Pilcher and Cabanban 2000). Reef surveys undertaken by British NGO Greenforce in 1999 found a few intact reefs with “good” coral cover in southern Banggi. However, the majority of coral reefs in Banggi were in “poor” condition, based on percentage of live coral cover according to criteria from the ASEAN-Australia Living Coastal Resources Project (Chou et al. 1994).

Another survey revealed that 40% of survey sites in south and southeast Banggi could be classified as being in “good” condition (Koh et al. 2002). These reefs were characterised by light anthropogenic impacts and high coral cover that ranged from 51% to 75% (Koh et al.
2002), suggesting high value for conservation and recreation. Additionally, one wreck site lying at 27m in south Banggi provides viewing opportunities for large trevallies (Carangidae), unicorn fish (Acanthuridae), bat fish (Ephippidae), and schools of anchovies and fusiliers. Unlike other sites in Banggi where fishes have grown wary of efficient spear fishers, those at this wreck did not appear disturbed by human presence (personal observation, April 2005). More wrecks lying in the Balambangan Strait at depths of up to 50m harbour another dimension of marine richness that has been little explored to date.

Marine turtles are spotted regularly in Banggi waters and return to nest along beaches, such as at Pulau Maliangin Besar, at locations known to local villagers. Species of marine turtles that have been sighted include Green Turtles (*Chelonia mydas*), Hawksbill (*Eretmochelys imbricata*) and Loggerhead (*Caretta caretta*) turtles (Harding et al. 2001). Loggerhead and
Green Turtles are listed as ‘Endangered’ on the IUCN Red List, while Hawksbills are listed as ‘Critically Endangered’. Other marine mega fauna that are known to inhabit Banggi’s waters include dolphins, dugongs, and at least four species of sharks (Harding et al. 2001). Juvenile black tipped reef sharks were observed aggregating in the shallow waters in the north end of Pulau Maliangin Besar (personal observation, August 2004).

In a survey of SCUBA diver preferences, Williams and Polunin (2000) found that five attributes- ‘variety of fish’, ‘abundance of fish’, ‘variety of corals’, ‘other large animals’, and ‘unusual fish’- were the most preferred attributes to view on a dive. With its rich fish and coral diversity, unique marine mega-fauna and mysterious wrecks, Banggi is thus well endowed to offer divers the experience they are seeking.

Although Banggi’s coral reefs have suffered substantial damage, they may be able to recover and flourish in the long term if they can be protected from further human impacts, a prospect that can materialise with the gazettement of the Tun Mustapha Park. The potential for recovery is given credence by the fact that healthier sites are found in southern Banggi where the presence of a police station and army base and, for a time, the presence of NGO Greenforce’s field base, have deterred destructive activities such as blast fishing for a number of years. If a healthy and productive marine ecosystem can be maintained, it will provide a solid foundation for the future of marine based tourism in Banggi.

2.4.2 Weather and oceanographic conditions

2.4.2.1 Seasonality
The ability to conduct marine-based activities is heavily dependent on favourable weather conditions, which are important for safety reasons as well as for the enjoyment of visitors. Shafer and Inglis (2000) found that weather conditions, including water and air temperature, sea conditions, currents, and winds, affect how favourably visitors perceive their experience at various sites on the Great Barrier Reef. Poor weather conditions are more likely to negatively affect beginner divers, who are more prone to stress due to lack of experience.

Banggi experiences two distinct monsoon seasons that are characterised by strong winds and rough sea conditions. The northeast monsoon occurs from November to March, and the
southwest monsoon occurs from May to September. The strongest winds occur during the months of July to September, and again from December to March (Figure 2.4). During this time, gusts of up to 98km/hr (www.weatherunderground.com online data 2005) have been recorded at the meteorological station at Kudat, the closest station to Banggi, creating dangerous conditions at sea that can ground fishing boats for several days on end. Relief from high winds occurs only during two short inter-monsoon transition periods, once between April and May, and again between September and October.

Compared to the rest of Sabah, recorded rainfall between 1989 and 1993 at Kudat was one of the lowest in the state (Department of Statistics 1994). The wettest months tend to be November through January, while March and April are usually the driest months (see Figure 2.5). Average rainfall in Banggi during the dry season is 100 – 150 mm, while in the wet season the islands can receive more than 400mm of rain per month (Nor 1996).

2.4.2.2 Oceanographic conditions
Tidal currents in the Banggi Channel are generally weak with velocities of up to one knot (National Imagery and Mapping Agency 2002). However, currents can pick up quickly within a short time during tidal changes (personal observation, June 2004; April 2005) to conditions where finning while SCUBA diving becomes difficult.

Surface sea temperature hovers around a mean of 30°C (Harding et al. 2001). Vertical and horizontal visibility underwater average 7.7 m and 5.8 m respectively (Harding et al. 2001), which is poor compared to upwards of 30 m visibility achievable at dive destinations like Sipadan, Pulau Tioman and the Great Barrier Reef. Due to the presence of mangroves and swamp forests that line the south coast of Banggi, near shore waters are turbid (Harding et al. 2001) and underwater visibility drops to near zero on a falling tide. Clearer waters are found on offshore reefs in the Banggi Channel and in the vicinity of Pulau Maliangin Besar (Harding et al. 2001).

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3 Kudat is located nearly 30km away from Pulau Banggi. Localised weather on the island is likely more severe.
2.4.2.3 Implications for marine recreation

The combination of poor underwater clarity and rough sea conditions the majority of the year suggests that conditions in Banggi might be better suited for more experienced divers and snorkellers. The brief interval of calm winds is shorter than that experienced by popular dive destinations in east coast Peninsular Malaysia, and could affect the economic viability of dive tour operations in Banggi.

Calm winds and low rainfall coincide around April and May, producing ideal conditions to pursue safe and enjoyable marine recreation. However, tourist arrivals to Sabah tend to be the lowest in April and May (see Figure 2.5) and peak in December and January when rainfall and wind speeds are high. This suggests that if visitation to Banggi follows the same trend, only a small proportion of visitors will be able to experience Banggi during its best
conditions, and weather factors will preclude the option for pursuing marine recreation to the majority of visitors later in the year.

### 2.4.3 Existing infrastructure

Kg. Karakit is the administrative centre of Pulau Banggi, and the main gateway to the island. Tourist amenities found here include a government operated guesthouse with four rooms, food stalls, and sundry shops selling basic supplies. A police station, army camp and medical clinic are located nearby.

Electricity in Banggi is limited to coastal villages, mostly in southern Banggi, and available only from 6 pm to 6 am. Other villages rely on generators or solar panels for electricity. Telephone service is also limited to evening hours, and only one unit at the police station in Kg. Karakit functions 24 hours a day (anonymous 2003). Overall, fixed line telephones are still a household rarity in southern Banggi, although cellular phones are increasingly popular.

#### 2.4.3.1 Freshwater resources and management

Freshwater is scarce in populous southern Banggi. Groundwater from three wells meets the daily water demands for the approximately 1,200 residents in the southern villages of Karakit, Singgahmata and Perpaduan. Additionally, water that is transported from an inland pond is stored in two tanks in Perpaduan for village use. However, both these sources of water are only adequate for bathing and washing, and not safe for drinking. Rainwater is the main source of drinking water for residents, and is collected and stored in 500L tanks positioned outside most homes.

Water consumption per local resident is low at approximately 30 L to 50 L per day, based on the observed frequency by which households replenish their water tanks and supported by residents' estimates. This is in contrast to daily water consumption of 264 L per person in Kudat District (Institute of Development Studies 2003). Nevertheless, some households run out of rainwater for drinking during the dry season and have to venture to villages up to 5 km away to collect adequate water.
While existing wells have not been reported to run dry, saltwater intrusion has occurred in well water and villagers are frequently inflicted with outbreaks of skin infection and intestinal illness, indicating poor water quality. Some villagers prefer to travel to inland villages or smaller islands on a regular basis to collect cleaner water, while food stalls and a small number of households in Kg. Karakit, Singgahmata and Perpaduan buy water. This water is sourced from an inland village, and delivered weekly at the cost of RM 10 for 500 L.

According to the Assistant District Officer (ADO), the government appointed administrator of Banggi, tourism development will not be approved unless there are sufficient water resources to first satisfy the needs of Banggi inhabitants. This preference for meeting the freshwater needs of locals ahead of gaining economic benefits from tourism is echoed by slightly more than half of south Banggi villagers (unpublished data, L. Teh 2005), and signals that prospective tour operators should adopt a conservative approach towards water consumption in Banggi. This is all the more so given the socio-economic context of water in Banggi, where freshwater is treated as a common resource with no restrictions on access and use. Commodification of water will likely be unavoidable with the onset of tourism. While tourists and resort operators can afford to buy or import water if local water resources are lacking, the vast majority of Banggi residents cannot; levying taxes or restrictions that alter the open access nature of water likely will disrupt local socio-cultural values.

In Banggi, uncertainty over the availability of freshwater and lack of water related infrastructure are the biggest constraints on future tourism development. Fresh groundwater is one of the most demanded resources by the tourist industry, thus extremely vulnerable to over-exploitation. In Zanzibar, tourists’ daily consumption of water was 15 times higher than locals’ daily consumption (Gössling 2001). As a result of tourism development, some local wells in Zanzibar ran out of freshwater, water became more saline, there was heavy reliance on inland piped water, and water shortages were experienced (Gössling 2001).

Already, saltwater intrusion in wells in Kg. Karakit is a sign that the groundwater is under significant stress, and the region’s low annual rainfall may not be enough to replenish it for
sustained use in the future. On the positive side, tourist arrivals to Sabah are highest in December and January, which are the wettest months of the year in the Kudat region (Figure 2.5). Therefore the period when tourist demand for water is likely to be at its highest occurs when there should be more rainfall to replenish groundwater aquifers and minimise the risk of water shortage.

2.4.3.2 Waste management
Currently, there is no facility on Banggi to manage domestic waste or to treat sewage. Household garbage is gathered and burnt periodically in open pits scattered around villages or, more often, disposed of indiscriminately into near shore waters to be washed away by daily tides. Items such as empty plastic bottles, plastic bags, aerosol canisters,
food scraps, cooking oil and even unwanted clothing are simply thrown out the window of stilt houses that are built over the water. The result is an unsightly and unhygienic accumulation of non-biodegradable items along the shore and reef flats of some stilt villages (Harding et al. 2001; personal observation).

In the past, efforts had been made to construct a landfill in Karakit, but due to objections from villagers over the poorly selected site (near houses and stalls), the project was abandoned. Currently, the District Office plans to improve public cleanliness by purchasing and installing rubbish bins in strategic locations across Karakit (ADO, Karakit, personal communication 2005); but without alternative disposal options such as a landfill or incinerator, this step will not significantly reduce the stress on the environment.

There are no modern toilet facilities in Banggi, and sewage enters untreated into near shore waters. During periods of low tide, the presence of raw sewage on the sea bed is unsightly and creates a health hazard. Reef gleaning for sea urchins, small fish and shellfish, which are consumed by local villagers, takes place during spring tides a few steps away from the public toilet. When water levels rise, children swim in the water in close proximity to where toilets are located.

The current state of waste management in Banggi is abysmal and, if not improved, will hamper future tourism development. The presence of garbage and human waste are major deterrents for tourists (Shafer and Inglis 2000), and therefore should be a management priority. Local residents also feel negatively about the state of waste accumulation in their villages, and 60% think that the current situation will worsen with the onset of tourism (unpublished data, L. Teh 2005).

The negative impacts of land-based pollutants such as sewage pollution and sedimentation on coral reefs are well documented in the literature. Edinger et al. (1998) found that coral species diversity at shallow depths (3 m) declined by 40-60% on reefs that were stressed by land-based pollution, and that this decline became more pronounced at 10 m depth. Groundwater is also at risk of contamination, which is a negative health prospect for
residents. From an ecological and social perspective then, it appears that tourism
development should not be encouraged until adequate waste treatment and disposal facilities
are installed.

2.4.3.3 Access
Banggi is located off the northern coast of Sabah, roughly 30 km across the Banggi Channel
from the northern district centre of Kudat. Travel between Banggi and Kudat is facilitated by
an express passenger ferry that operates twice daily. The ferry has a capacity of 120
passengers, and on average carries between 30 to 50 passengers per route, almost all of
whom are Banggi residents (Ferry manager, Karakit, personal communication 2005).

The state capital of Kota Kinabalu is approximately 160 km southwest of Kudat, and can be
reached by a variety of transportation options including taxi, passengers van, bus, and
airplane. There is a regional airport in Kudat that services internal flights by the national
airline carrier, while international arrivals and departures are channelled through the
international airport at Kota Kinabalu. Travel time between Kota Kinabalu and Kudat
requires about three hours by land transport, while by air the journey takes approximately 45
minutes.

In Banggi, inland travel is facilitated by a network of roads that runs in a north-south fashion,
primarily on the west side of the island. Road systems elsewhere on the island are fragmented,
although road construction is an on-going project. Many smaller villages remain accessible
by foot only. Altogether, there is approximately 45 km of paved road (anonymous 2003), of
which a large portion is in poor condition. Passenger vans usually service these routes at least
twice a day to coincide with the arrival of ferry passengers. However, no public water
transport options exist to move between Banggi and outlying islands. Travel over sea is by
privately owned fishing boats, and visitors who wish to visit peripheral islands have to make
arrangements with the locals themselves.

The communication network linking south Banggi with regional centres on mainland Sabah
appears sufficient for the volume of current users. The Kudat-Banggi express ferry operates
below 50% capacity most days, so can likely handle nearly double the volume of passengers per trip. The highway linking Kudat to Kota Kinabalu is an advantage as access by road remains important for tourism development (Wong 1998). On the other hand, Banggi’s internal road system is not capable of handling large volumes of travellers as many stretches are riddled with potholes from lack of maintenance, and some paths are so narrow that only one vehicle can pass at a time (personal observation, August 2005).

2.4.3.4 Distance and visitation

Table 2.1 shows that marine destinations that are close to gateway cities, defined as the nearest city with an international airport, such as Tunku Abdul Rahman Park (TARP)(5 km), receive substantially more visitors than marine destinations like Turtle Islands Park that are further away (425 km). This relationship is significant at the 10% level (F=0.08, df=5) with a reported R² value of 0.58 (see Appendix A), and may reflect the distance-decay concept.

The concept of distance-decay asserts that the time and cost components required to access an area impart a distance threshold on travel to ecotourism destinations in remote places (Higham and Lück 2002). Weaver (2002) found that the reef region in Thailand and Malaysia exhibit distance-decay effects. This is expressed when mass (beach resort) ecotourism yields to hard (environmentally conscientious) ecotourism at the point where distance to the destination from gateway cities becomes too great for day-users to travel.

Based on the observed relationship between distance and demand, we can reasonably expect that Banggi will not receive tourists in the magnitude of those that visit TARP and Pulau Payar (see Table 2.1). The current limited ferry sailings make day visits from Kota Kinabalu to Banggi inconvenient, potentially excluding the day-user tourist segment. Given this scenario, it is probable that initial tourist numbers to Banggi will be hampered by travel time; thus, tourism development in Banggi should anticipate and plan accordingly for fewer, more environmentally conscious tourists.
### Table 2.1 Distance and visitation schedule.

<table>
<thead>
<tr>
<th>Marine destination</th>
<th>Gateway city</th>
<th>Distance (km)</th>
<th>Number of visitors per year ('000s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TARP</td>
<td>Kota Kinabalu (Sabah)</td>
<td>5</td>
<td>160†</td>
</tr>
<tr>
<td>Payar</td>
<td>Penang (Peninsular Malaysia)</td>
<td>60</td>
<td>112‡</td>
</tr>
<tr>
<td>Tioman</td>
<td>Johor Bahru (Peninsular Malaysia)</td>
<td>170</td>
<td>210‡</td>
</tr>
<tr>
<td>Sipadan</td>
<td>Kota Kinabalu (Sabah)</td>
<td>385</td>
<td>29.2*</td>
</tr>
<tr>
<td>Turtle Island</td>
<td>Kota Kinabalu (Sabah)</td>
<td>425</td>
<td>9†</td>
</tr>
<tr>
<td>Redang</td>
<td>Kuala Lumpur (Peninsular Malaysia)</td>
<td>500</td>
<td>59‡</td>
</tr>
</tbody>
</table>

†Source: Cabanban and Nais 2003; ‡ GEF 2004; • estimate based on Sipadan’s overnight quota of 80 visitors per day, 365 days per year.

### 2.4.4 Key attractions

#### 2.4.4.1 Pulau Maliangin Besar

Pulau Maliangin Besar is a small peripheral island on the south western edge of Banggi. The island has an area of approximately 1.5 km² (Nor 1996) and is located 5 km from Karakit. Topographically, three-quarters of Maliangin Besar is flat (Nor 1996); the highest point is a peak in the south-eastern corner that rises 123 m (National Imagery and Mapping Agency 2002). There are two stretches of white sand beaches, one facing northeast towards the sheltered bay of Wawitak, and the other looking southwest towards the open sea. Towering coconut trees cover the interior of the island, reflecting Maliangin Besar’s past economic involvement in the copra industry (Cooke 2003).

Pulau Maliangin Besar is a prime location for tourism development because of its proximity to healthy corals in south Banggi, as well as to transport, health, and security services in Karakit. At present there are less than 50 villagers permanently residing in Maliangin Besar, almost all of whom earn their living from fishing. The village lacks electricity, sewage, and solid waste disposal facilities, but has ample freshwater that is sourced from groundwater and a spring. When completed, a new eco-resort on the island will provide accommodation for up to 50 visitors, and will offer dive tours and its own bar.
The availability and accessibility of freshwater in Maliangin Besar is a major advantage for tour operators who are looking for viable locations. The island’s water carrying capacity has not been tested; however, anecdotal evidence suggests that, historically, well water has not run dry, although this must be viewed in light of Maliangin Besar’s small population and low rate of water consumption. There is no guarantee that the large water demands of tourist operations will not place undue stress on freshwater resources that could lead to water shortages, especially since small islands such as Maliangin Besar are more susceptible to tourism impacts (Wong 1998) as their limited resources can be depleted quickly.

During the northeast and southwest monsoons, Maliangin Besar is subject to unpredictable high winds and rough seas, which effectively creates two ‘off’ seasons. Although weather variability can be predicted based on temporal seasonal trends, day-to-day fluctuations in biophysical parameters (such as wind speeds and currents) during the monsoon seasons make it difficult to plan marine based activities. Strong winds and choppy seas that make it unsafe to swim snorkel and SCUBA dive can continue unabated for up to five days (personal observation, March 2005), thereby reducing the window of opportunity for tourists to pursue marine activities.

Conditions are best for marine activities during the dry season from April to May when wind speeds drop (see Figure 2.3). This period also corresponds with the high fishing season in south Banggi, as fishermen take advantage of calm seas to fish longer and more frequently (Teh et al. 2005). As tourists and fishers vie to take advantage of brief favourable conditions to pursue their respective, if not mutually exclusive activities, there is potential for spatial conflict to arise (Christie in press), particularly in Maliangin waters which are an important fishing ground in south Banggi (Teh at al. 2005).

Biophysical contingencies thus suggest that a precautionary approach be adopted in the pursuit of tourism development on Pulau Maliangin Besar. Uncontrolled progress runs the risk of depleting groundwater reserves and introducing competition for space and resources that can threaten the livelihood of resident fishers.
2.4.4.2 *Tanjung Menyangit*

Tanjung Menyangit is a village whose namesake is a cape situated on the rocky west coast of Banggi. It is located approximately 25 km from Karakit, and accessible by passenger van. The area features rugged beaches that are set against a backdrop of fields and forest dominated by *Bukit* (hill) Sinambung. Standing at 528m, Bukit Sinambung is the highest point in Banggi. A rough, unmaintained trail which leads up to Sinambung Peak can be found about 3 km from Tanjung Menyangit. Visitors can also divert to view a waterfall that is not far from the Sinambung trailhead. The waterfall is most spectacular during the wet months from July to December.

Due to time and logistical limitations, only one visit was made to Tanjung Menyangit which was not sufficient for gathering adequate impressions of the area’s biophysical capacity for tourism development. Nevertheless, from a tourism potential perspective, Tanjung Menyangit is a complement to Pulau Maliangin Besar as it offers land based recreation options that remain accessible when harsh conditions at sea make marine based recreation impossible.

2.5 Discussion

This biophysical assessment reveals that Banggi possesses the scenic beauty, remoteness, and rich biodiversity that are crucial for ecotourism. However, lack of adequate water, sanitation, and inter-island transport infrastructure limits the physical capacity to accommodate any tourism development. This assessment also made it apparent that Banggi’s biophysical environment is not independent of economic and socio-cultural influences that directly impact upon the quality of the environment. The complex interaction among these components creates the context within which future tourism development initiatives have to be analysed and understood.
Fisher (2001) noted that there is low conservation awareness among coastal villagers, that when exacerbated by infrastructural and institutional inefficiencies, results in aggravating activities, such as indiscriminate littering into the sea and improper placement of toilets, all of which contribute directly to environmental degradation. The vast accumulation of non-biodegradable waste and increasing concentration of stilt houses in Kg. Perpaduan and Kg. Singgahmata are indications that the near shore environment is already under heavy stress; in fact, a precautionary approach would suggest that the environment is near, or has already reached, its carrying capacity.

At present, economic forces drive some local fishers to engage in destructive fishing such as using cyanide to gather fish for the lucrative Live Reef Fish Trade, or to use fish bombs as a method of obtaining bait fish for the valuable coral grouper (*Plectropomus* spp.) (Daw et al. 2002). Fish and invertebrate diversity in bombed reefs are drastically affected by blast fishing, with fish diversity in a bombed reef being less than half of that found on healthy reefs (Oakley et al. 1997). Left to continue unchecked, blast fishing can potentially destroy the major attraction for tourists, to the detriment of Banggi’s tourism sector and coastal communities alike. Collecting endangered species like the giant clam (*Tridacna* spp.) and marine turtle eggs (personal observation, August 2004; April 2005), which residents do on occasion to supplement their diet and income, also has the potential to devastate unique marine life.

The emergence of ecotourism in Banggi can contribute to biodiversity conservation and socio-economic development. Dive resorts and tourists can offer informal protection that aid in coral reef recovery, such as in Pulau Langkayan in eastern Sabah, where the sole resort owner enforces a no-blasting zone (Oakley et al. 2000) as part of the Sugud Islands Marine Conservation Area. After 15 years of protection, the coral cover of 86 % of 44 surveyed sites had a fair rating (Lee 2005). Ecotourism can also provide the impetus for government authorities to install much needed health and sanitation facilities that should ease pressure on Banggi’s coastal ecosystem and improve local standards of living. These benefits can be augmented by the integration of tourism within a marine protected area. In Apo Island (Negros Oriental, Philippines), the creation of a no-take marine reserve in 1984 was followed
by increased biomass of coral reef fish (Russ et al. 2003). Subsequently, interest in diving in the marine reserve evolved into a small but thriving ecotourism sector that brought additional income to island residents (Vogt 1997).

This study demonstrates that *ex ante* assessment of biophysical conditions is useful for identifying factors which might impede the growth and development of future tourism initiatives. This can be used to infer appropriate approaches towards planning and managing tourism so that constraints, such as water shortage, are respected or circumvented, as in the case of building basic waste disposal systems. Without doubt, tourism in Banggi has to be planned and not simply allowed to materialise and develop in an ad hoc manner. Desired outcomes—biophysical, social and economic—have to be set through collaborative processes involving all stakeholders, and monitoring programmes put in place that can detect changes and respond to those changes in a timely manner. However, lack of knowledge, especially of the biophysical environment, hampers decision-making. Baseline studies of near shore water quality, groundwater reserves, geomorphology, and follow up on marine biodiversity surveys are necessary.

### 2.6 Recommendations

Given that i) coral reefs are already subject to substantial anthropogenic pressure and require time to recover; ii) weather conditions are not conducive to marine based recreation a large part of the year; iii) there is lack of freshwater in southern Banggi; and iv) there is lack of sanitation infrastructure throughout Banggi, the principles of small scale ecotourism should be pursued and integrated with the conservation and sustainable livelihood objectives of the proposed Tun Mustapha Park.

Immediate action is required from relevant authorities to take control of destructive fishing practices if sustainability of coastal communities and the tourism industry is to be maintained. It is imperative that proper water and sanitation infrastructure is installed to protect the integrity of the near shore environment before an influx of visitors is experienced. Due
consideration should also be paid to the preference expressed by local authorities and villagers to have public amenities installed before tourism develops. As such, additional tourists and users should not be encouraged unless prospective tour operators are capable of addressing these infrastructural deficiencies.

Finally, the importance of institutional support cannot be ignored. The government has to play its role in providing adequate infrastructure, leadership, legislative, and financial support that will build the foundation for sustainable development in the long term. The convergence of rational, well-informed planning that places tourism in the context of its natural and social environment, and that is backed by relevant institutions, will maintain and enhance biophysical and socio-economic conditions which will contribute to sustainable tourism development in Banggi.
2.7 References


3 Opinions and Expectations of Tourism in Southern Banggi: Assessing Social Limits to Change for Sustainable Tourism Development

3.1 Introduction

In coastal communities where economies are based on traditional resource extraction, ecotourism is seen to offer a non-extractive option that is able to afford resource protection and provide socio-economic and environmental benefits. Ecotourism is based on the principles of conservation and social responsibility and, since emerging in the 1970s and 1980s, has been embraced in theory as a sustainable form of tourism (Hall 2001; Liu 2003). This is demonstrated by its popularity in developing countries where the majority of ecotourism destinations are located (Boyd and Butler 1996), especially in the tropics where the world’s shallow coral reefs prevail and are a major attraction for tourists.

In some countries, ecotourism is deliberately sought as a means of economic development and, in some cases, has demonstrated to be effective in increasing incomes of local residents (Vogt 1997). Ecotourism has also been promoted as a viable financial strategy to fund protected areas oriented towards conservation (Stem et al. 2003). Besides being integral to various national economic development plans, ecotourism now plays a role in a growing number of conservation strategies such as Marine Protected Areas and Integrated Coastal Management policies.

3.1.1 Sustainability of ecotourism

Nonetheless, ecotourism introduces visitor impacts that may not be compatible with the host community or surroundings, and the ecological and social sustainability of ecotourism has been challenged (Wall 1997; Liu 2003). This is especially so in coastal areas and islands that are characterised by scarce resources, and in locations where tourist activities displace other resource users (Wall 1997). For example, tourism development is usually accompanied by huge demand for water. On islands that experience low rainfall and have limited groundwater,
tourist demand can overwhelm local resources and stir resentment from local residents (Gössling 2001).

Rural communities are often drawn to ecotourism with promises of jobs and increased income, but local participants have been shown not to profit substantially from the tourism sector (Campbell 1999). In fact, past experiences have demonstrated that economic benefits from tourism rarely trickle down to local residents (Bookbinder 1998), and that insufficient ecotourism revenues flow back into management or protection of the area (Tershy et al. 1999). Where local resource users see no benefit from the tourism activity, they will usually resume extractive activities like fishing that directly compete with and affect the viability of the tourism industry (McClanahan 2005).

3.1.2 Value of knowing perceptions
Ecotourism often implies protecting an area of unique biodiversity from extractive uses in order to preserve the attraction for tourist appreciation and recreation. This can lead to conflict of interests if the area has traditionally supported the resource needs of local communities. Lessons from protected area management, which seeks to balance ecological protection with human needs, are thus relevant and can be applied to ecotourism planning and management. Specifically, studies reveal that accounting for local people’s aspirations and attitudes (Christie 2004; McClanahan 2005; Xu in press) is essential for successful management of protected areas in developing countries.

Christie (2004) found that the success of marine protected areas is extremely low if social considerations are not factored in, and when it is not understood how resource restrictions impact the lifestyle and economic outlook of local extractive resource users. Chances for cooperation and partnership are enhanced if the community perceives benefits from these management actions (McClanahan 2005). Thus, there is a strong case for assessing the perceptions and attitudes of local residents before, during and after tourism development has occurred.
3.1.3 Limits of Acceptable Change

The Limits of Acceptable Change (LAC) approach outlines a process for identifying acceptable levels of change in wilderness recreation settings. This management framework is discussed by Cole and Stankey (1998). In Malaysia, the LAC planning system has been introduced and applied within the capacity of marine protected areas (Wong 1997). For example, Lim (1998) applied the LAC method in a study of carrying capacity at Pulau Payar Marine Park, located on the west coast of Peninsular Malaysia. This research subscribes to the concept behind LAC that ecosystem resilience is determined by a mixture of biophysical and socio-economic conditions. This concept is reflected in the question that asks “What are the appropriate or acceptable conditions for visitation and how do we achieve them?” (Borrie et al. 1998). In this research, LAC is used to explore what level of decreased ecosystem productivity communities are willing to accept, should tourism impacts drive the system beyond its carrying capacity. The LAC is also applied in the identification of biophysical and social factors that may represent limits to the type and scale of future tourism development.

3.2 Study objective

This paper is a study of the social “limit of acceptable change” on the undeveloped island of Banggi off the north coast of Sabah in Malaysian Borneo. Through interviews, it explores what locals’ expectations are, how much they want tourism to change their island, and their tolerance towards tourism impact on their livelihood and society. It assesses residents’ trade-off preferences in order to suggest a “limit of acceptable change”, or residents’ threshold for tolerating change with regard to local economic, environmental and socio-cultural well being. It then makes recommendations for planning and managing tourism development that is able to address the priorities of local communities, while operating within biophysical realities (see Figure 1.1).
3.3 Background

As discussed in Section 2.2, tourism is growing rapidly in Southeast Asia which is well endowed with the natural heritage to attract ecotourists. Nevertheless, although tourism is an important economic vehicle for host countries, the effects of uncontrolled tourism development degrade coastal ecosystems (Wong 1998) and are cause for concern. In Malaysia, rapid growth of ecotourism at coral reef destinations (Cabanban and Nais 2003) has compromised the health of these sensitive ecosystems (Daily Express 2004) and sparked anger in local communities. This type of environmental and social failure can be attributed in part to inadequate community consultation over projects which directly impact the marine ecosystem on which residents depend for their livelihoods (The Star, Sept. 8, 2004). Evidently, the support of local communities is crucial to the success of tourism operations; this can be facilitated by understanding residents’ expectations and opinions of future tourism development.

3.4 Methods

A survey consisting of a set of semi-structured questions, a ranking exercise, and a trade-off exercise was designed to assess residents’ willingness to tolerate tourism development in south Banggi. The survey was developed in two stages. The first stage was carried out during a field visit in August 2004. It consisted of face-to-face interviews with villagers and local authorities to explore their perceptions and expectations towards tourism and development in general, as well as to gauge which issues are important to them. The second stage was a refinement of the first survey questionnaire to probe specific issues that would allow a weighting of trade-off preferences to be developed. This in-depth survey was administered during a second field visit in April 2005, also through face-to-face interviews. A participative approach (Reason, 1994) whereby I partook in daily village activities such as fishing, water collecting, and tending a fish-buyer’s stall, allowed me to enhance my understanding of community issues.
3.4.1 Exploratory interviews

The exploratory interviews were conducted in August 2004. Ten semi-structured interviews were carried out with randomly selected subjects in Karakit, Singgahmata and Maliangin Besar, while two subjects were chosen specifically for their leadership roles in the community. Questions pertained broadly to resource use patterns, social development issues in the community, opinions about tourism development, and historical background about Banggi. Questions were asked in Malay and responses were recorded in a notebook by the research assistant. Most interviews were conducted at the respondent’s residence, or in the case of one government official, in the Banggi District Office. Interviews were usually done during the evening when the weather was cooler and villagers were free to talk after having completed the day’s fishing or chores.

3.4.2 In-depth interviews

Important issues and perceptions that emerged from initial exploratory interviews were earmarked and used to develop a second, more in-depth survey (see Appendix B). The second survey aimed to assess a ‘limit of acceptable change’ by evaluating residents’ willingness to trade-off between values that are important to them (as identified from the first set of interviews) and the perceived benefits of tourism development. This was achieved by first asking each respondent to do a ranking exercise, and then to answer a series of questions and scenarios that concerned the impact of tourism on local economic opportunities, infrastructure, fishing livelihood, socio-cultural change and environmental/landscape change.

All together, 32 semi-structured interviews were conducted in April 2005. All interviews were done face-to-face. Although time consuming, it was the only realistic method of delivery as illiteracy in Banggi is high, and the use of pamphlets and other written media is rare. Three requests for interviews were refused, one in Perpaduan, one in Karakit and one in Maliangin Besar. The reason given by all three who refused was that they did not understand and were “not clever enough” to answer questions.

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4 Approval to conduct interviews for this thesis was granted by the University of British Columbia’s Behavioural Research Ethics Board (BREB). The approval form is attached in Appendix F.
Although interview candidates were chosen randomly, I approached people at specific locations such as shop lots, weekly markets, and fishing villages in order to capture a broad representation of village society. Most interviews were conducted during early to mid-morning, or in the evening. Afternoons were not a productive time for interviews as most people were either out at sea fishing or resting to escape the heat of the day. Two respondents, a recently appointed government official and a tour operator from Kota Kinabalu, were specifically chosen to get stakeholder representation. Their opinions are reported separately.

When approaching potential candidates, I introduced myself and my research assistant, explained the objective of the study, the implications of participating in the interview, and then asked for consent to conduct the interview. If consent was granted, the interview was usually conducted on site immediately or, in several instances, appointments were made to meet at a more convenient time and location. Younger respondents were often more receptive to being approached and eager to share their opinions, thus their representation is higher. Generally interviews lasted between 30 and 45 minutes, with the longest one being 1.5 hours. Unless the interview took place in a private residence, a few curious onlookers would usually gather around the respondent and chip in comments from time to time. On occasion, the respondent would turn to his friends to ask for input if he/she was unsure about a certain topic. Even in cases where the interview was done in the relative privacy of a home, family members would still gather to observe the interview.

Interviews were conducted in semi-structured format. Structured forms were prepared, but respondents were allowed flexibility in expanding on issues or skimming questions that did not appear relevant. I felt that the extent to which a certain topic invoked more or less reaction from a respondent was an indication of the importance of that topic to the respondent, thus not all topics were covered by each respondent. The semi-structured format also allowed me to gain insight about the socio-economic context and discover new issues that had not been apparent before.

Interviews commenced with background questions such as the respondent's age, education, occupation, village of residence, and length of stay in the current village. The ranking
exercise was then usually introduced. I explained in simple terms the objective of the exercise, how the exercise worked, what I expected the respondent to do, and finally read aloud the eight themes. This process is described in detail in Section 3.4.3. Questions regarding respondent’s perceived benefits and expectations of tourism, environmental impact of tourism, and social impact of tourism then ensued. Lastly, respondents were walked through the trade-off preference exercise, described in detail in Section 3.4.4, then asked to participate in that exercise.

3.4.3 Ranking exercise

The ranking exercise consisted of eight socio-cultural, economic, and environmental issues, derived from interview data from the first field visit, that villagers felt were important to maintain or to improve with the advent of tourism development. Each respondent was given 25 chips to distribute between the eight issues, which were printed on a circular chart (Appendix C). A minimum of 1 chip was to be allocated to each issue, with more chips distributed to those issues which the respondent felt was more important. Any comments made by the participant during the distribution process to explain the various weightings were duly recorded. Twenty-seven people completed this exercise. Two subjects did not do this exercise for lack of interest in actively participating, but were willing to respond to the oral part of the interview. Four subjects completed the ranking exercise but due to time restrictions did not fully complete the second portion of the interview.

3.4.4 Trade-off exercise

Respondents’ trade-off preferences were evaluated through a series of scenario building questions (Appendix D). Photo elicitation, which is discussed briefly in Section 3.4.5, was utilised in this exercise. Three photographs of a generic beach (Appendix E) were shown to respondents. Photograph A (low growth) showed an uncrowded beach with minimal build-up on shore; Photograph B (medium growth) showed a slightly crowded beach with some build-up on shore; and Photograph C (high growth) showed a crowded beach and buildings on shore.
Each respondent was first asked which photo s/he thought reflected the most appropriate type of tourism for Banggi. Once this initial choice was made, three scenarios—low growth, medium growth and high growth—for water availability were presented. Given these scenarios, the respondent was now asked to pick which level of tourism s/he thought would be most appropriate for Banggi, and this choice was recorded. Following this, scenarios for village security, fish catch, environmental cleanliness and job distribution were introduced in sequence. Each time the scenarios for a new factor were presented, the respondent was asked to choose which type of tourism s/he preferred, given the new situation. In this way, the respondent’s trade-off preference could be inferred by the way choices varied as scenarios were built and new factors introduced. Photographs A, B and C were always kept in front of the respondent, and were referred back to by the respondent each time a new scenario was presented and a trade-off decision had to be made.

3.4.5 Photo elicitation

Photo elicitation is the use of photographs during interviews to extract information or “to provoke a response” (Hurworth 2003). It is an appropriate research method when investigating abstract topics that are hard to articulate through words alone (Harper 2002). In a study of the top concerns of peasants in China, photo elicitation was used to facilitate understanding of villagers’ needs (Bjelland and Jones undated). Inglis et al. (1999) used a series of images depicting snorkellers on a coral reef to evaluate acceptable crowding levels in the Great Barrier Reef. In the first phase of this study, I found that residents in South Banggi had little concept of the difference in magnitude between small scale and mass tourism, and the intensity of impacts associated with tourism at various scales. Attempts to explain characteristics typical of small or large scale tourism were often ineffective at provoking more insightful responses. Therefore, photographs were sought to provide a visual representation of tourism at different scales that respondents could identify with; subsequently this generated the interest and reaction from respondents that enabled information collection.
3.5 Analysis

After each interview, I verified with my research assistant the translation and interpretation of any unfamiliar terminology. Field notes were then promptly entered into a laptop word processor. Keywords were highlighted from each respondent's interview and grouped together according to recurring themes. Once collated, individual responses were tallied according to themes, from which analysis of this paper was based.

Pearson chi-squared ($\chi^2$) tests were carried out on SPSS 12.0 to identify if any relationship exists between demographic characteristics and common responses (themes). Due to the small sample size, $\chi^2$ test results cannot be used to generalise about the characteristics of the population from which the sample population was taken. However, they are useful for indicating where divergent opinions exist, and for preliminary identification of interest groups. This approach was used in a similar study of local people's attitudes towards conservation in Kenya (Gadd 2005).

3.6 Results

3.6.1 Ranking exercise

Results of the ranking exercise are presented in Figure 3-1. Twenty-seven respondents completed the ranking exercise. Issues that received higher points were those perceived as either currently lacking or as being important to maintain, while those that received lower points were perceived to be sufficient and not an urgent need.

‘Water’ was the highest ranked theme with a total of 133 points, which was 34 points more than ‘job opportunities’, the second highest ranked theme. ‘Village safety’ earned
95 points and was the third most important priority for respondents. ‘New school’ and ‘youth return’ were the least important priorities with only 62 points, while ‘fishing zone’ was higher ranked by 2 points.

A number of respondents pointed out that ‘electricity’ should have been added to this exercise, as the lack of 24 hour power supply is a matter of contention for local residents. ‘Road system’ was also suggested as an issue of importance that had been omitted from the ranking exercise.

3.6.2 Demographics

Thirty-two interviews were conducted in total. However, not all topics were covered by all respondents, therefore the total number of respondents for each question as summarised in the following tables does not total to 32.
More males (81%) than females (19%) were interviewed, and two-thirds (66%) of respondents were below the age of forty. More than half (56%) of those interviewed had at least some secondary education. All students had a secondary education whereas 80% of fishers had no secondary education. All but one respondent from Maliangin were fishers, whereas Karakit, Perpaduan and Singgahmata were heterogeneous in occupation composition. Students include those youths who were in transition between secondary school and finding employment, but hoped to gain entry to college in the future. Business owners included operators of restaurants, sundry shops, and hawker stalls, and one ecotourism operator. Those categorised under public service included teachers and a government administrator. Others included out-of-state workers who were back visiting family in Banggi, housewives, and local project managers. Demographics are presented in Table 3.1 to 3.5.

<table>
<thead>
<tr>
<th>Table 3.1 Respondents by gender</th>
<th>Table 3.2 Respondents by age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>26 (81%)</td>
</tr>
<tr>
<td>Female</td>
<td>6 (19%)</td>
</tr>
<tr>
<td>19-25</td>
<td>11 (35%)</td>
</tr>
<tr>
<td>26-40</td>
<td>10 (31%)</td>
</tr>
<tr>
<td>41-55</td>
<td>9 (28%)</td>
</tr>
<tr>
<td>&gt;55</td>
<td>2 (6%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 3.3 Respondents by village of residence</th>
<th>Table 3.4 Respondents by education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karakit</td>
<td>Primary or less</td>
</tr>
<tr>
<td>Perpaduan</td>
<td>9 (28%)</td>
</tr>
<tr>
<td>Singgahmata</td>
<td>Secondary</td>
</tr>
<tr>
<td>Maliangin</td>
<td>18 (56%)</td>
</tr>
<tr>
<td>Other</td>
<td>Tertiary</td>
</tr>
<tr>
<td></td>
<td>5 (16%)</td>
</tr>
</tbody>
</table>
Table 3.5 Respondents by occupation

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fishermen</td>
<td>10 (31%)</td>
</tr>
<tr>
<td>Public service worker</td>
<td>3 (9%)</td>
</tr>
<tr>
<td>Business owner</td>
<td>5 (16%)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>2 (6%)</td>
</tr>
<tr>
<td>Student</td>
<td>7 (22%)</td>
</tr>
<tr>
<td>Other</td>
<td>5 (16%)</td>
</tr>
</tbody>
</table>

3.6.3 Expectations of tourism

3.6.3.1 Perceived outcomes of tourism development

Only one respondent was opposed to tourism development and did not foresee any benefits from tourism. Economic benefit was the primary expectation of tourism development. Specifically, the perceived benefits were jobs, an increased market for local resources such as fish and vegetables, and local infrastructure and services. In addition, the opportunity for cultural exchange was also mentioned as a benefit that could be derived from tourism (Table 3.6).

3.6.3.2 Local employment in the tourism sector

The vast majority of respondents (86%) thought that local residents should be given priority in employment in tourism sector jobs (Table 3.7). Out of the three respondents

Table 3.6 Expectations of tourism development and its potential to catalyze economic progress in Banggi.

<table>
<thead>
<tr>
<th>Expected outcomes of tourism development</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic benefits</td>
<td>25 (74%)</td>
</tr>
<tr>
<td>Local infrastructure and services</td>
<td>2 (6%)</td>
</tr>
<tr>
<td>Cultural exchange, exposure to new knowledge and experiences</td>
<td>7 (21%)</td>
</tr>
</tbody>
</table>
who felt that employment did not have to be reserved for locals, two were business owners (67%) and one was a local project manager (33%). Both business owners considered skills qualifications more important than place of residency if they were to hire workers.

3.6.3.3 Willingness to work in tourism sector
Respondents were generally positive about working in the tourism industry, as 12 (71%) were willing to work in tourism sector jobs while only one person was not willing to work in the tourism sector (Table 3.7). Students (58%) were more likely to be willing to do tourism work than fishers (16.7%), others (8%), the unemployed (8%), and business owners (8%) ($\chi^2 = 11.3, df = 4, p < 0.02$). Of the seven fishermen who responded, two were willing to work in the tourism sector, one was not willing, and the remainder were willing to work in tourism but wanted to continue fishing part-time.

3.6.3.4 Skills
Opinions on skill capability were evenly split between those who thought locals were capable of performing service and management tasks (48%) and those who thought that locals were only skilled enough to do service jobs (48%) (Table 3.7). Only 8% of students (64%) were more likely than business owners (18%) and others (9%) to think that local residents have the

<table>
<thead>
<tr>
<th>Table 3.7 Responses to questions about employment priority for locals, attitude towards employment in the tourism sector and skill capability of local people.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Local employment</strong></td>
</tr>
<tr>
<td>Locals must be given employment priority</td>
</tr>
<tr>
<td>Not necessary to give locals employment priority</td>
</tr>
<tr>
<td><strong>Willingness to work in tourism sector</strong></td>
</tr>
<tr>
<td>Willing to work in tourism sector</td>
</tr>
<tr>
<td>Not willing to work in tourism sector</td>
</tr>
<tr>
<td>Willing to work in tourism sector but continue to fish part-time</td>
</tr>
<tr>
<td><strong>Skills</strong></td>
</tr>
<tr>
<td>Locals have enough skills for service and management jobs</td>
</tr>
<tr>
<td>Locals have enough skills for service jobs only</td>
</tr>
<tr>
<td>Locals do not have enough skills to work in tourism sector</td>
</tr>
</tbody>
</table>
skills to perform service and management jobs ($\chi^2 = 9.0, df = 3, p < 0.03$). In contrast, fishers made up half of all respondents (50%, n=12) who thought that locals were only skilled enough for service jobs, but this proportion was not significantly different ($\chi^2 = 4.0, df = 3, p < 0.26$) from others (25%), the unemployed (17%) and public service workers (17%). Fishers frequently cited that they could be employed as boatmen or gardeners if there was tourism work, but conceded that they did not understand how to perform “other hotel jobs”.

3.6.3.5 Alternatives to tourism
Although there was much support for tourism, when asked whether respondents felt that tourism was the best vehicle for enabling progress and development in Banggi, 63% suggested that investing in Banggi’s fisheries and agriculture or ice manufacturing would be better alternatives than tourism (Table 3.8). In contrast, 21% said that without tourism Banggi would not be able to achieve economic or social development, while 16% felt that local residents could continue to progress through traditional resource extraction. A government administrator viewed tourism as one of several economic development strategies for Banggi, noting that other initiatives such as seaweed farming and agriculture should not be side-lined for tourism.

<table>
<thead>
<tr>
<th>Alternatives to tourism</th>
<th>Number of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fisheries, agriculture and/or factory processing plant</td>
<td>12 (63%)</td>
</tr>
<tr>
<td>Tourism is best alternative</td>
<td>4 (21%)</td>
</tr>
<tr>
<td>Alternative industry not necessary, Banggi as is can progress</td>
<td>3 (16%)</td>
</tr>
</tbody>
</table>

The discussion of alternative sectors to tourism was tied to respondents’ desire to maintain equal distribution of benefits, a new issue which came up and is discussed later in Section 3.7.2.4. Of the 12 respondents who felt other industries were better alternatives than tourism, nine of them (75%) perceived that those other sectors would provide fairer opportunities and benefits for the population as a whole.
Those who said that industries other than tourism would be better alternatives tended to have higher education, with 75% (n=12) having at least secondary education and 25% with tertiary education. Students (58%, n=12) were the largest group that thought industries other than tourism would be more beneficial to Banggi, followed by public service workers (17%) and others (17%), then business owners (8%); however, the difference could not be explained by occupation alone ($\chi^2=7.3, df=3, p <0.06)$. Fishers were the only occupation group that suggested Banggi could progress under status quo conditions; 3 out of 4 (75%) fishers felt this way.

### 3.6.4 Social impact of tourism development

#### 3.6.4.1 Village security

Safety was very important to villagers and an issue of high priority. The majority of villagers living in south Banggi did not worry about personal safety, as the presence of a police station in Karakit and regular army guard patrols along coastal villages provided a sense of security. Nevertheless, the memory of past pirate attacks was still high on the minds of villagers, and all respondents were willing to trade off economic benefits of tourism development for guaranteed security.

Half of the respondents (50%, n=16) felt that personal safety would increase with the onset of tourism because the government would increase the presence of military and marine patrols (Table 3.9). 12.5% believed that even though security might decrease (due to increased probability of pirate attacks), the safety of villagers would still not be at risk because police, military and marine presence would increase in tandem with tourist arrivals. Furthermore, two respondents felt secure in the belief that “the tourists will be the ones in danger, not us”. Of those who thought that security would increase, 63% (n=8) were fishers, 25% owned a business and one (13%) was unemployed. The difference was not explained by occupation ($\chi^2=3.3, df=2, p <0.20$) or age ($\chi^2=2.0, df=3, p <0.57$).
3.6.4.2 Attitude towards outsiders

The majority (83%) of respondents were willing to accept immigrant families, while 17% were concerned that new immigrants might create conflict with locals (Table 3.9). Some established residents were concerned that illegal immigrants from the Philippines (PTI) would be attracted to settle in Banggi, leading to overcrowded conditions like in Perpaduan, as well as competition for jobs.

3.6.4.3 Attitude towards foreign culture

When asked if there was an outcome of tourism that they did not think they would like, seven (30%) mentioned that they did not want tourists to “leave their culture” in Banggi, for example by wearing revealing clothing or brash behaviour, that would insult the island’s prevailing Muslim values (Table 3.9). Of these seven, five were in the youngest age category and all but one had at least some secondary education. On the other hand, 16 (70%) respondents perceived that foreign behaviour could fit with local culture and would have no ill effects, hence were willing to accept tourists’ culture.

Table 3.9 Opinions of local residents on social aspects of tourism development.

<table>
<thead>
<tr>
<th>Willingness to accept security risk</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Not willing to accept security risk for economic benefits of tourism</td>
<td>5 (100%)</td>
</tr>
<tr>
<td>Willing to accept security risk for economic benefits of tourism</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Impact of tourism on village security</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Village safety will decrease with increased tourism</td>
<td>6 (38%)</td>
</tr>
<tr>
<td>Village safety will increase with increased tourism</td>
<td>8 (50%)</td>
</tr>
<tr>
<td>Village safety will decrease with tourism but can be mitigated</td>
<td>2 (13%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outsiders</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Willing to accept immigrant families</td>
<td>15 (83%)</td>
</tr>
<tr>
<td>Immigrants might create conflict with locals</td>
<td>3 (17%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Foreign culture</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not want to be influenced by tourists' (Western) culture</td>
<td>7 (30%)</td>
</tr>
<tr>
<td>Willing to accept tourists' (Western) culture</td>
<td>16 (70%)</td>
</tr>
</tbody>
</table>

respondents perceived that foreign behaviour could fit with local culture and would have no ill effects, hence were willing to accept tourists’ culture.
An ecotourism entrepreneur suggested that if local residents wanted to benefit financially from tourism, then they had to exercise some flexibility with respect to Muslim values. The entrepreneur thought that foreign influence would hardly 'corrupt' local residents as residents had access to western programmes on television. Furthermore, the entrepreneur felt that tourists should not be compelled to adjust their behaviour to match local values, since most tourists’ objective would be to enjoy the tropical setting and not to seek a cultural experience.

3.6.5 Impact on biophysical environment

3.6.5.1 Attitude towards protecting environment/ landscape

More than three-quarters (77%) of the respondents wanted development that protects the landscape and/or environment (Table 3.10). Of those, respondents with at least secondary education (71%, n=17) and tertiary education (24%) were more likely than those with primary education (6%) to favour environmental protection ($\chi^2=11.4$, $df=2$, $p<0.003$). Results were also significantly different across age ($\chi^2=12.9$, $df=3$, $p<0.005$). Younger respondents and those with at least secondary education tended to be more aware of the impact of tourism on environmental integrity, and cited overcrowding, beach degradation and deforestation as negative impacts that were not desired. These quotes typify the sentiment: “I remember a class excursion to Bukit Sinambung. I was happy to be able to see the hill, and to see the sea. Banggi by land and by sea is beautiful, so it’s important to protect the environment, to protect the beaches and the corals.” and “I don’t want big resorts, for example I don’t want to see the pelondok (deer) to go extinct, so whatever resort development there is cannot cut down the trees.”

Twenty-three percent (n=5) said that they were willing to tolerate any change to the landscape and/or environment, including clearing of trees. Of this, one was a business owner while the remainder were fishers. None of them happened to be younger than the 26-40 year old category.
Table 3.10 Responses to questions about the impact of tourism development on the biophysical environment.

<table>
<thead>
<tr>
<th>Environmental protection</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Want change/development that protects the environment/landscape</td>
<td>17 (77%)</td>
</tr>
<tr>
<td>Any change to the environment/landscape is acceptable</td>
<td>5 (23%)</td>
</tr>
</tbody>
</table>

**Preference between water resource and tourism development**

<table>
<thead>
<tr>
<th>Preference</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prefer tourism development over securing water resources for locals</td>
<td>13 (46%)</td>
</tr>
<tr>
<td>Prefer securing water resources over tourism development</td>
<td>15 (54%)</td>
</tr>
</tbody>
</table>

**Outlook for water resources**

<table>
<thead>
<tr>
<th>Outlook</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water is not a problem and will not decrease with tourism development</td>
<td>8 (44%)</td>
</tr>
<tr>
<td>Water is a problem and will decrease with tourism development</td>
<td>2 (11%)</td>
</tr>
<tr>
<td>Water is a problem but can be solved, even with tourism</td>
<td>8 (44%)</td>
</tr>
</tbody>
</table>

**Solid waste**

<table>
<thead>
<tr>
<th>Waste</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid waste will improve with tourism</td>
<td>4 (40%)</td>
</tr>
<tr>
<td>Solid waste will get worse with tourism</td>
<td>6 (60%)</td>
</tr>
</tbody>
</table>

**Exclusive tourist marine use area**

<table>
<thead>
<tr>
<th>Exclusive use area</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>There will be no spatial conflict between fishers and tourists</td>
<td>12 (57%)</td>
</tr>
<tr>
<td>Do not agree with and not willing to accept no fish zone</td>
<td>4 (19%)</td>
</tr>
<tr>
<td>Do not agree with but have no choice but to accept no fish zone</td>
<td>2 (10%)</td>
</tr>
<tr>
<td>Agree if hook and line allowed but bomb/cyanide/compressor banned</td>
<td>1 (5%)</td>
</tr>
<tr>
<td>Agree if no fish zone is near shore, but not in open sea</td>
<td>2 (10%)</td>
</tr>
</tbody>
</table>

**Land**

<table>
<thead>
<tr>
<th>Land</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enough land in south Banggi to accommodate new settlements</td>
<td>9 (47%)</td>
</tr>
<tr>
<td>Not enough land in south Banggi to accommodate new settlements</td>
<td>8 (42%)</td>
</tr>
<tr>
<td>Not sure</td>
<td>2 (11%)</td>
</tr>
</tbody>
</table>

### 3.6.5.2 Water resources

All respondents cited the lack of water infrastructure and shortage of freshwater as impediments to economic development in general, and tourism in particular. To obtain an indication of the urgency and importance of this issue, respondents were asked to choose between having a secure source of water for local residents or economic benefits of tourism development. Respondents were divided on this issue, with slightly more than half (54%) preferring the former (Table 3.10). Young people in the 19-25 age category were more likely (67%) to prefer water resources ahead of tourism development than people in the 26-40 age category.
group (20%) and 41-55 age group (13%) ($\chi^2=7.6$, $df=2$, $p<0.02$). The percentage of people who preferred water resources ahead of tourism development was not significantly different across occupation ($\chi^2=6.7$, $df=4$, $p<0.15$).

On the other hand, out of those who preferred tourism development ahead of water resources, 62% ($n=13$) were fishers, 15% were business owners, and 23% were others. This outcome is explained by the fact that seven of the 10 fishers who responded resided in Pulau Maliangin Besar where supply and access to freshwater is not a problem.

3.6.5.3 Outlook for water resources
Although obtaining adequate water was an important priority to local residents, respondents did not appear overly concerned about the consequences of sharing this limited resource. Respondents were asked about their perception of the impact of tourism on water resources. Forty-four percent thought that the onset of tourism would not cause water shortages and that the current water situation would not worsen (Table 3.10). Another 44% felt that tourism development might strain water supplies more than they are already, but that the problem would in fact be resolved as the government would improve water infrastructure if there was tourism. Only 2 respondents (11%) felt that the water situation would worsen with tourism; one suggested that tour operators should be made to pay for the water they use so that local residents could be compensated for their loss.

3.6.5.4 Solid waste
Respondents were unanimous in criticising the vast amount of solid waste accumulation in villages. The majority (60%, $n=10$) of respondents thought that tourism development would negatively impact the cleanliness of village surroundings, resulting in more garbage accumulation (Table 3.10). Twice as many students held this view as compared to all other occupation groups (17%).

In contrast, 40% of respondents thought that solid waste conditions would improve with the emergence of tourism. The most common explanation given for this perception was that tourists would not want to come to Banggi if the villages were dirty as they are now. Thus
the government would be compelled to improve and maintain cleanliness in order to attract tourists.

3.6.5.5 Exclusive tourist use marine area

Respondents were aware of the potential for conflict between tourists and fishes over the use of marine waters. Although the main economic activity in south Banggi is fishing, 57% of respondents thought that it would be acceptable to have an exclusive tourist recreation use zone (Table 3.10). Nevertheless, with the exception of one fisher, the respondents who were of this opinion did not rely directly on fishing as a source of income. This view was most frequently supported by the rationale that tourists will use shallow areas, whereas fishers tend to fish off deeper waters. When questioned further about the possibility of spatial overlap between tourists and fishers, the common response was that fishers would just find new places to go fishing and let the tourists use the disputed space.

Nineteen percent did not agree with and were not willing to accept an exclusive tourist recreation use zone that excludes fishing. Not surprisingly, 3 out of 4 (75%) of those who disagreed were fishers. Another 15% of respondents were willing to accept some restriction if fishers were granted specific spatial and gear allowances.

None of the six respondent fishers from Pulau Maliangin Besar agreed with an exclusive tourist use zone due to the fear of losing access to their fishing grounds. Two out of the six fishers explicitly disagreed with the exclusive tourist use zone. One agreed with the tourist zone if the area is restricted to shallow near shore waters not utilised for fishing. Another one agreed if only fish bombing, cyanide fishing and compressor diving were restricted from the tourist use zone, but hook and line allowed to continue. Two out of six expressed that they would have no choice but to accept whatever restriction is imposed, even though they would not be happy with it.
3.6.6 Ecotourism operator’s perspective

Of the business owners interviewed, one was an entrepreneur who was in the process of building an eco-resort on Maliangin. Due to his ‘outsider’ status, this entrepreneur provided a uniquely different perspective on tourism development in Banggi, which is presented below.

The entrepreneur felt that the biggest obstacles to building a successful tourism operation in Banggi were the social complexities of dealing with local people, and the bureaucracy involved with obtaining a valid permit to operate. In his opinion, local people were not motivated to work or capable of multi-tasking. This decreased their employment potential, with the exception for manual labour. Instead, educated people with language and service skills would have to be hired from outside Banggi to fill positions. A major impediment was acquiring the confidence of locals, with whom land lease contracts had to be negotiated. The entrepreneur also felt that local landowners were often indecisive and demanded excessive amounts of rent. In addition, having to manoeuvre through bureaucracy consumed too much time and money.

Over the course of three years, the entrepreneur noticed obvious physical damage to near shore corals in Karakit caused by the construction of a new jetty, mosque and hospital. He felt that conservation awareness was largely absent from local people, who had to stop bomb fishing, consuming turtle eggs, and disposing waste into the sea if tourism was to become established. He was apprehensive that once he was successful in operating an eco-conscious resort, wealthy developers would be attracted to Maliangin Besar as well and wreck the environment with overly ambitious projects lacking ecological protection measures.

3.6.7 Government administrator’s perspective

The Assistant District Officer (ADO), the government appointed administrator of Banggi, stressed the importance of environment protection, and declared that proper planning had to precede any tourism development. For example, he would refrain from handing out permits to tour operators if south Banggi’s water situation was not improved. The ADO was enthusiastic and optimistic about improving living conditions in Banggi. Among other things, he was going to place rubbish bins throughout the villages in order to alleviate solid waste.
accumulation on beaches and reef flats. The ADO did not think that local people have the necessary skills required to excel in tourism related management jobs, but believed that the situation would improve with the implementation of training programmes.

3.6.8 Trade-off preferences

The scenarios used in this trade-off exercise are presented in Appendix D. 16 respondents (50%) completed the exercise (Table 3.11). The low response rate was due to time limitations and interviewees who grew weary, as this exercise took place at the end of the interview. In addition, a few respondents started but chose not to complete the exercise because they were not familiar with the concept or objective of scenario building.

Of the 16 respondents who did participate in the trade-off exercise, three were skeptical about the ‘reality’ of the scenarios that were presented. They included a business owner, secondary school teacher and local project manager. These participants instead offered their own versions of what they envisioned would occur with various themes such as village security and water resource under each of small scale, medium scale, and large scale tourist developments. When scenarios were perceived as ‘unrealistic’, the respondent sometimes chose not to make a preference choice, thus not all scenarios received 16 votes.

Half (8, 50%) of all respondents chose the large scale [C] beach development scenario. However, when water resource was added to the scenario, more people (9, 60%) chose the medium scale development [B], reflecting their preference for obtaining adequate local water supply over pursuing financial gains of tourism development. That large scale development was preferred even with water shortage consequences was explained by one respondent:

_I want there to be lots of tourists so that there will be acute water shortage and the government will be forced to build the pipe [from Bukit Sinambung]. If there are no tourists around to see our problem and the water shortage does not become severe then the government will not take any notice and we will go on enduring the same conditions like today._
Table 3.11 Frequency of responses to trade-off scenarios.

<table>
<thead>
<tr>
<th>Themes</th>
<th>Small scale</th>
<th>Medium scale</th>
<th>Large scale</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[A]</td>
<td>[B]</td>
<td>[C]</td>
</tr>
<tr>
<td>Beach development</td>
<td>2</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Water</td>
<td>2</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>Safety</td>
<td>6</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Fish abundance</td>
<td>4</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Solid waste</td>
<td>3</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Jobs</td>
<td>0</td>
<td>3</td>
<td>6</td>
</tr>
</tbody>
</table>

Respondents were even more conservative when it came to village security, opting for guaranteed security rather than economic benefits of tourism. The relative proportion of [C] dropped from 27% to 19%, [B] dropped from 60% to 44%, while small scale development [A] increased from 13% to 38%.

The next scenario tested respondents’ tolerance of tourism impact on fish catch, the traditional income resource. The relative proportion of [B] and [C] increased while that of [A] decreased, which suggests that respondents were willing to trade off a traditional economic resource for more perceived benefits from tourism. This is fitting since fish is valued for its economic, not biological, worth. One respondent rationalised his option for choosing [C] by saying that it would not matter if local fish catches decreased, because by then residents would have earned more money working in the tourism sector, and would be able to afford to buy fish from elsewhere.

Although cleanliness was an important priority for residents (see ranking exercise Figure 3.1), this factor was readily traded off and tolerated for economic benefits of tourism. Finally, when presented with scenarios of job distribution, there was heavy preference towards domination of tourism jobs and decline in fishing. This resulted in 66% of respondents choosing large scale development [C], while scenario [B] got 33% and [A] received no votes.
3.6.8.1 Limitations of trade-off exercise

In total, [A] was preferred 17 times; [B] was chosen 36 times; and [C] 31 times. Some limitations to these results are briefly discussed. People’s tendency to pick the ‘medium’ outcome might have increased the frequency by which medium scale development [B] was chosen. In fact, one respondent consistently chose [B] for each option. The order in which themes were presented could also have affected whether respondents were more likely to choose small scale, medium scale or large scale tourism development, as each scenario is compared to the one previously presented. I tried to mitigate this effect by ensuring the sequence of scenarios was consistently presented in the same order to all respondents. Finally, while I had meant to build up the scenarios by adding themes to be considered cumulatively relative to each other, it was difficult to communicate this to respondents. In the end, scenarios were evaluated on an individual basis (e.g., decreased safety versus large scale tourism development instead of decreased safety and decreased water resources versus large scale tourism development) and traded-off against the three scales of tourism development. This meant that the results could not be used to weigh themes relative to each other, but the results could be used to compare the preference for each theme relative to the perceived benefits of tourism development.

3.7 Discussion

In Banggi, ecotourism will be integrated within the Tun Mustapha Park, where it is planned to be developed as a strategy for alleviating extractive pressure on the degraded coastal ecosystem. The depletion of resources can often be associated with socio-economic hardship (IUCN 2003), thus it is imperative to understand the local socio-economic context of resource exploitation. This includes resource users’ attitudes towards the impact of (tourism) change on their livelihood options, their aspirations and expectations of this new change, as well as their reservations.
3.7.1 Expectations of tourism

3.7.1.1 Economic benefits

Tourism was highly anticipated as a vehicle of change that will bring progress and development to Banggi. Foremost was the expectation of economic development, whereby students and fishers had highest expectations for local job opportunities. Aside from this, fishers and business owners looked forward to tourist demand creating a market for, and thus increasing the economic value of, locally produced goods such as fish and bananas. One respondent aptly noted the lack of market value for locally produced goods, saying “only monkeys will eat our bananas now.”

Given high unemployment, lack of market demand for local resources and lack of alternative industries besides traditional resource extraction, it was not surprising that tourism was welcomed as a new economic sector, especially by students who felt they had the skills required to succeed in the tourism industry. Yet it is not clear whether the scale of tourism in Banggi will generate enough new jobs to satisfy the ready supply of labour. Furthermore, it remains to be seen if, despite their confidence, residents possess the combination of skills that tour operators seek. Experiences elsewhere have shown that economic benefits, including jobs, may not trickle down to local residents (Brohman 1996; Bookbinder 1998). If this materialises, then lack of perceived benefits can create negative attitudes that might threaten the harmony between tourism and local communities.

3.7.1.2 Infrastructure

Tourism is also looked upon as a catalyst for infrastructure development, ranging from a new water pipe system, to electricity, to roads. In particular, respondents highly anticipated tourism to hasten plans for the construction of the Bukit Sinambung water pipe, which they were confident would solve the water shortage problem in southern Banggi. Many were so optimistic that they did not think tourism would pose a threat to their water supply when the water pipe is installed. Nevertheless, funding for social development projects such as the water pipe and proper toilets are slow to reach Banggi due to the island’s remoteness. In fact, the ADO was not optimistic about whether work on the long proposed water pipe project would begin in the near future.
Thus, there is the danger of residents relying too much on the tourism industry for forwarding infrastructure improvement projects that are in fact the responsibility of local and regional government. Should tourism fail to succeed as envisioned, then residents would be left with no leverage and authorities might move their funding and resources to development projects elsewhere.

3.7.2 Tolerance of change
Only one respondent had negative perceptions of tourism and refused to tolerate any change to his current lifestyle and values for what he viewed as an invasion and threat to his way of life. Other respondents were open to some aspects of change arising from tourism development while wary of other changes. Their tolerance limits are discussed in Section 3.7.2.1 to 3.7.2.4.

3.7.2.1 Village security
Village security was paramount to local residents. Their fear was not unfounded as Kampung (village) Lok Tohog was robbed by pirates in 1997, and on a number of recent occasions fishermen were robbed of their nets, engines, or even boats while out at sea at night. Respondents were not willing to compromise community safety, a fact reinforced by the third place priority ranking for ‘safety’, and that twice the number of people preferred guaranteed security (6, 38%) over the economic and social benefits of large scale tourism development (3, 19%) in the trade-off exercise. The current level of security should thus be taken as a minimum threshold standard, as residents are averse to, and unlikely to tolerate any deterioration in perceived personal and community safety.

3.7.2.2 Exclusive tourist use marine areas
There is the possibility that the creation of exclusive tourist use marine areas will stir some discontent among fishers, particularly at Maliangin Besar which is not only a prime location for resort development, but also an important fishing ground in south Banggi (Teh et al. 2005). Hence, the presence of a tour operator at Maliangin Besar was greeted with unease by some fishers living on the island.
An ecotourism entrepreneur was adamant that fishing with any gear, particularly bomb and cyanide fishing, be prohibited in the waters directly surrounding Maliangin Besar. On the other hand, several fishers from Maliangin Bear were unwilling to compromise the use of their fishing grounds for tourists. Two fishers even said that they would protest if they were forced to give up fishing, as they viewed fishing not only as a means of earning a livelihood, but as a past-time they enjoyed. A fisher from Kampung Kebong in west Banggi relayed his contempt at having been chased away from one end of Maliangin Besar by a foreigner (the tour operator) while hunting for squid at an area he had frequented for many years.

Yet, the fact that this fisher did leave the area, and that two out of nine fishers who did not agree with exclusive tourist use areas said they would have no choice but to accept, highlights that some fishers might feel intimidated by “foreigners with money”. Thus, the zoning of marine areas for tourism must proceed with care to ensure that the interests of all stakeholders are accounted for. In other coastal resorts, fishers and tourists have had confrontations over use of marine areas which have led to both parties suffering negative social and economic impacts (Christie 2004). Banggi fishers’ willingness, or lack thereof, to give up established fishing grounds thus puts a constraint on future options for tourist marine use areas.

3.7.2.3 Landscape and environmental protection
Results suggest that excessive change to the physical landscape will not be well accepted by local residents, as a sizable majority (77%) of study respondents want tourism development that blends in with the landscape and protects the environment. To this effect, 12 out of 19 respondents (63%) thought that achieving ‘town’ (pekan) status for Banggi would be adequate development, and had no desire to see Banggi transform into a ‘city’ (bandar). Therefore, there is a limit to the level of acceptable change in land use and scale of infrastructural development, and changes that deplete existing forest cover or drastically alter the natural coastline should be avoided.
3.7.2.4 Equal distribution of tourism benefits

Although I did not ask about the topic of equity, respondents brought it up without being prompted. The concept of sharing benefits fairly among all communities was strongly upheld by many respondents, who admitted that perceived unfairness could lead to resentment and mutual suspicion among fellow community members.

Already, this underlying tension surfaced briefly when an entrepreneur moved his resort operation from one leased location to another which belonged to a different owner. Subsequently, equal distribution of tourism benefits appears to be critical for maintaining social harmony. This could be facilitated with first hand understanding of community dynamics, disseminated via local representation in management initiatives.

3.7.3 The role of socio-cultural factors in tourism development

Water is treated as an open access resource in coastal villages in south Banggi, which may explain why residents were not inclined to impose restrictions on water use by tourists. Their lack of concern for the outcome of increased tourist use on water resource can also be attributed to the dominant Muslim tradition, which teaches that water is a gift from Allah (God) and should not be denied to anybody. The combination of cultural belief and susceptibility of open access resources to ‘tragedy of the commons’, suggests that local water resources may be vulnerable to overexploitation by outsiders (tourists, tour operators, immigrants) to the detriment of local residents. For this reason, water use by the tourism sector must be closely managed; the water needs of local residents should be satisfied before the demands of tourism are met.

Poor environmental practices such as indiscriminate disposal of non-biodegradable waste on land and sea, and allowing untreated sewage into the sea are widespread in Banggi (personal observation, April 2005). Upholding environmental integrity is hard when such behaviour is the norm, and directly threatens prospects for ecotourism. However, the fact that respondents recognise that status quo conditions are unacceptable is a good start for bringing change to behaviour, and tourism can be both a catalyst and motivation for implementing environmental change programmes.
Although the majority of residents were willing to accept foreign culture and foresaw no clash of cultures, there was evidence that some did not wish to see tourists ‘leave’ their values and influence behind because they are divergent from local Muslim values. Surprisingly, young people, who made up the bulk of respondents with secondary education, were more likely than others to resist the intrusion of foreign influences in Banggi, despite being accepting of tourists in general. Therefore there is a limit to the type of tourist behaviour that is acceptable in Banggi, and tourists should be made aware of and sensitive to local cultural norms.

3.7.4 Implications for type of tourism development

There is a tension between the economic benefits that people want to get out of tourism and the type of change to lifestyle, culture, and landscape that they are willing to accept. Almost all respondents had positive attitudes towards tourism development because it was anticipated to bring much needed economic opportunities; however, understanding of the environmental implications of tourism development was limited to a certain demographic group. Many respondents envisioned financial benefits on a scale that is plausible only with medium to large scale development, and were willing to tolerate foreign culture, an increase in waste accumulation, increase in immigrant workers, and decline in marine resources in order to attain those benefits.

On the other hand, initial enthusiastic endorsement of large scale development gave way to more conservative aspirations when respondents had to choose between economic benefits from tourism, or conditions such as assured personal safety and freshwater resources that were ranked as high priority social and environmental qualities. Nobody was willing to accept personal safety risk in return for economic benefits; the majority preferred securing water resources for locals over tourism development; and most wanted tourist development that protected Banggi’s forests and beaches. In addition, small but distinct groups were opposed to exclusive marine recreation areas, as well as the pervasive influence of foreign behaviour and values. Above all, ensuring that tourism benefits are equally distributed to all members of the communities was stressed as being vital to achieving tourism that is socially sustainable in Banggi.
Respondents wanted tourism to bring enough change so that Banggi would receive a badly needed injection of economic investment and infrastructure, but beyond that they did not want Banggi to become over-developed like a city. These preferences augur well for ecotourism, and suggest that small scale development that blends in with local landscape, culture and resource availability is desirable for Banggi.

Ecotourism stresses social responsibility towards the host community. This provides latitude for residents to become involved and to build local human/social capacity through employment and training in the tourism sector. It will also allow residents to participate more substantially in the sector through the provision of small business opportunities such as ‘home-stay’ establishments. Ecotourists tend to be more ecologically and culturally sensitive to their host communities, qualities which will likely endear them to the local residents. Moreover, ecotourism emphasizes environmental protection, which is supported by a large segment of the younger, educated population.

3.7.5 Community based management

A community based system of governance holds promise for coastal resource management, particularly ecotourism, in Banggi. It has experienced success in the Philippines (White and Vogt 2000), where local artisanal fisheries and ecotourism have been able to thrive under the collaborative actions of villagers, researchers, and local politicians. In Banggi, there is underlying appreciation of environmental integrity among a fraction of the population; these people can be appointed to spread awareness to the larger population through informal education campaigns, so as to instil a sense of pride and ownership over coastal resources that will encourage conservation oriented behaviour. Exclusive recreation zones will be better placed and their boundaries respected if they were allocated in cooperation with fishers, and enforced by villagers. Community based management also allows villagers to have tighter control over tourism activities, so individual villages can restrict certain behaviour they deem to be culturally undesirable. Strong sentiments for equitable distribution/sharing of tourism benefits and expectations of local job opportunities can be realised through a community operated home stay. Through this arrangement, profits can be returned directly to community development and resource protection projects. It appears then, that community
based management complements the principles of ecotourism, and each can augment the other’s success.

3.8 Conclusion and recommendations

Residents were unanimous in their positive outlook for tourism in southern Banggi. They expected tourism to spur economic development and the construction of water infrastructure, which were the two top ranked priority issues to residents. This suggests that tourism development will be well accepted by the majority. However, there are indications that from a social perspective, there may be thresholds to the level of acceptable change incurred by tourism.

Mapping of fishing grounds and consultation with fishers about their fishing habits will decrease the likelihood of conflict between tourists and fishers over fishing grounds that some fishers are unwilling to give up. Guidelines for beach development and land use should stipulate allowable alteration to the coastline and forest cover that are contant with the magnitude envisioned by younger, more environmentally-oriented residents. Residents cannot tolerate threats to their personal safety, thus marine and army patrols should maintain security at currently perceived ‘safe’ levels at the least. Future tourism development must consider these thresholds that may limit the amount of change that is socially acceptable. Ecotourism and its emphasis on small scale, socially responsible development, facilitated by community based management, is a sensible approach for the future.

Education is crucial to raise environmentally conscious behaviour that minimises anthropogenic impacts on coastal ecosystems. Moreover, skills training is necessary to enable residents to participate competently in the tourism industry. Finally, if residents do not perceive any benefits accruing to them during the initial stages of tourism development, they are likely to lose interest and lean towards other sectors such as agriculture and fisheries. Surveys to gauge the perception of residents should thus be carried out before, during and after tourism begins.
3.9 References

Bjelland, D., Jones, B.L., undated. The Use of Photo Elicitation in Rural China as a Data Collection method. Iowa State University, USA.


http://www.forestry.umt.edu/personnel/faculty/borrie/papers/ecotourism.htm


4 Conclusion

4.1 Key findings

4.1.1 The biophysical component

This chapter summarised the extent to which the biophysical environment, including marine biodiversity, seasonality and oceanographic conditions, and existing infrastructure, affected options for accommodating tourism development in the future. Conclusions drawn from this chapter are:

- Pulau Banggi possesses attractive marine life, biodiversity, and relatively pristine surroundings that remain largely untouched by urban development. These are prime advantages for marine based recreation such as diving and snorkelling.

- Destructive fishing has damaged expanses of coral reefs, and land based pollution threatens coastal ecosystems. These impacts are likely to increase in magnitude as the resident population continues to grow, and can negatively impact prospects for tourism in Pulau Banggi.

- Lack of water and sanitation infrastructure is the largest constraint on future tourism development. Pollution and shortage of groundwater will likely be a constant threat in the populous coastal communities of Karakit, Perpaduan and Singgahmata, given existing signs of strain on water quality and low average rainfall.

- Resource protection and recovery time are needed in order for the coastal and marine ecosystems to achieve their full potential for attracting divers and other visitors.
4.1.2 The perceptions component

This research investigated the expectations and trade-off preferences of local residents towards tourism development. It analysed the opinions and needs of local residents in response to changes to their resource use patterns, standard of living, and socio-cultural environment that may result from tourism development.

- Residents were unanimous in their support of tourism. The highest community priorities to be addressed in the face of development were, in descending order, water resources, job opportunities and maintaining village security.

- The majority had expectations of high economic benefits and infrastructure improvement from tourism development, which are most consistent with medium to large scale tourism.

- Respondents had low tolerance for increased risks to personal safety, water shortages, sharing fishing grounds, landscape changes, unfair distribution of tourism benefits, and being subject to foreign socio-cultural influences. These outcomes are often associated with high tourist visitations.

- Respondents’ level of education appeared to be positively associated with higher awareness of the environmental and social impacts of tourism. Otherwise, there did not seem to be significant difference in attitude towards tourism development across age groups, occupation, and level of education.

- Community based management might be able to address residents’ social ‘thresholds’ and cultivate a sense of ownership, and thereby encourage better management and protection of coastal resources.
4.1.3 Relating key findings

Sustainable tourism management cannot be concerned only with regulating tourist and recreation issues, because tourism itself changes the local environment, local livelihoods, and quality of life. Therefore, like any resource management issue, sustainable tourism cannot be achieved without taking into account the ecological, socio-cultural and economic components that influence, and are influenced by, tourism activities.

The biophysical assessment and perception surveys reveal that human expectations of tourism may be overly ambitious given current biophysical limitations. While biophysical features suggest that prevailing marine biodiversity, weather conditions, water and sanitation infrastructure, and accessibility are appropriate for a small number of initial visitors, residents’ expectations of jobs and capital investment are of a magnitude often associated with larger visitation numbers.

Residents’ perceptions play a role in determining the well-being of the biophysical environment. The extent to which they perceive tourism imparting benefits or conflicts may influence their willingness to accept changes to their marine, land, and groundwater resources. This has obvious repercussions for environmental health. If, in anticipating new infrastructure and technology to alleviate their waste accumulation and water shortage problems, residents continue to litter and allow outsiders to take freshwater at will, then ultimately the biophysical environment will suffer.

4.2 Key recommendations

- Water and sanitation infrastructure should be installed before further development.

- A community based approach should be pursued which allows local communities to build management capacity and become involved in the decision making process.
Tourism should be integrated with the conservation objectives of a marine protected area so that sustainability oriented guidelines can be institutionalised and enforced.

4.3 Sources of error

4.3.1 Question of scale
The biophysical assessment and perception surveys did not address the issue of temporal and spatial scale.

4.3.1.1 Temporal scale issues
Temporal scale accounts for the element of time. Both studies reported in this thesis were conducted during one field season, and therefore can only offer a snapshot of environmental conditions and residents’ attitudes at one moment in time. In the biophysical assessment, the lack of water and waste disposal infrastructure were identified as being the major constraints to tourism development. This conclusion, however, might be altered if the required infrastructure were installed some point in the future, and subsequently alter the context of local biophysical conditions.

This example speaks to the uncertainty in implementing interventions based on observed and/or perceived conditions as they exist today, when their effects may not be manifested until some later time, or diffused at some other place. In the meantime however, a myriad of events can occur which distort underlying conditions, and thus affect the effectiveness of the initial measure.

4.3.1.2 Spatial scale issues
Spatial scale deals with changes at a geographical level. In this thesis, the space boundary was drawn around southern Banggi in order to make research more manageable. This however, may be to the detriment of the analysis if interactions at a broader geographic scale happen to be larger in magnitude than those occurring at the local level. This can manifest itself in, for example, catastrophic natural disasters or national policies with direct local
consequences. The suitability of southern Banggi as a case study for tourism development throughout Banggi may also be challenged due to differences between coastal and inland communities.

4.3.2 Research methods

The sample size attained for the perceptions study was small due to time and resource (e.g., availability of boat, research assistance) constraints, therefore interview results cannot be generalised to represent the views of the entire population of Banggi. In future surveys, the sample size should be increased to be more representative of the population as a whole. If possible, students from the local university should be recruited and trained to administer the survey, so as to reach a larger sample population. However, a representative sample set may be difficult to achieve as females and older people tended to be more reluctant to participate in interviews, and offered fewer opinions when they did.

There are several shortcomings to interview based surveys. Respondents may have anticipated questions ahead of time (Gadd 2005), which was a possibility given that I lived in Kampung Karakit for the duration of the field work, and word of my interviews could have spread. Respondents may also inadvertently misreport their real opinions or behaviours in an attempt to please me with answers they think I want to hear (Gadd 2005). In addition, it is probable that anticipation of tourism in Banggi is so great that residents were reluctant to report any negative opinions lest they jeopardise opportunities for its establishment. Furthermore, there is the possibility that some respondents might have gotten the impression that I was working for an entrepreneur who was just in the beginning stages of building an eco-resort, and thus they made positive comments only. However, the probability of this occurring was minimised by the fact that I made it clear at the beginning of each interview that I was working independently. Lastly, translation errors and misinterpretation of responses could have occurred as interviews were conducted in a language not native to the researcher, and set in a foreign culture.
4.4 Significance of research

This research is valuable because it records the state of an area that is relatively pristine before major anthropogenic change has taken place. As tourism grows to become one of the major industries in the world, accounting for almost 30% of worldwide service exports in 2003 (World Tourism Organization 2005), fewer and fewer natural attractions are left untouched by development. Banggi thus presents an opportunity to approach development in a structured way that makes tourism fit within the biophysical capacities of the area, rather than vice versa. This enables proactive planning that places sustainable livelihoods and resource conservation alongside financial benefit, and minimises the prospects of having to deal with the consequences of uncontrolled tourism.

4.4.1 Interdisciplinary approach

The research is interdisciplinary in nature, bridging across the fields of marine conservation, protected area and resource management, tourism and recreation, and ecology, among others. Unlike studies focussed within single disciplines, this research was able to capture the relevant forces that shape prospects for sustainable tourism in Banggi, and encompass them in a holistic evaluation. Rather than viewing development merely from an economic or scientific perspective, this study incorporated three perspectives- ecological, social, and economic- in its evaluation of site conditions The result was the integration of human considerations within an environmental impact assessment, which is generally a purely technical undertaking. This is significant because the human aspect is essential but often missing from resource planning and management; community based management has contributed positively to the improvement of coral reef habitats in marine protected areas (Christie et al. 2002).

This research highlights the need to understand underlying community perceptions that have the potential to affect the successful establishment of tourism in the community. This is an aspect that has been neglected in Sabah. With the exception of Tun Sakaran Marine Park (Semporna Islands), local people have rarely been consulted about the imposition of
development or management actions,\textsuperscript{5} such as ecotourism or marine protected areas, on their community and resources. This throws caution to authorities that tourism planning should proceed with the support and participation of local communities if long term success is desired.

\textbf{4.4.2 Planning process}

This study established a process of planning that not only applies to ecotourism, but is also relevant to any resource use activity. This process involves undertaking a holistic evaluation that includes \textit{ex ante} assessments of the biophysical and socio-economic environment, and incorporates baseline studies of resource use, environmental conditions, drivers of change, and community attitudes. The results of this planning process can then be used to suggest prerequisite actions to prepare the destination for tourism development that are in line with biophysical realities and community expectations.

\textbf{4.4.3 Significance to the field of study}

Increasingly, the concept of a holistic understanding is finding its place in resource management strategies such as integrated coastal zone management and marine protected areas. From a holistic perspective, assessment of an ecosystem includes not only its ecological sphere, but also the socio-economic, cultural and political traits embedded within (Brown et al. 2001). Whereas, in the past, emphasis had been on managing the biological aspect of resources only, as exemplified by fisheries science that focussed on stock assessment, there is a paradigm shift which recognises that management of natural resources cannot be separated from management of the people who use those resources (McClanahan et al. 2005; Brown et al. 2001). Christie (2004) found that while certain marine sanctuaries could be considered a success biologically, they were in fact social failures as they generated ill will among fishers and created tensions among stakeholders.

\textsuperscript{5} A.S. Cabanban, Borneo Marine Research Institute, personal communication 2005.
4.5 Concluding remarks

Ecotourism will impose changes on coastal landscape, ecosystems, livelihoods and socio-cultural values in southern Banggi. While economic benefits will be welcomed, these should not come at the expense of ecological and social integrity. By carrying out ex ante assessment of south Banggi’s environment, enriched by local residents’ input, this research provides a holistic understanding of the dynamics and thresholds to change that exist within the biophysical and social realm of south Banggi. In doing so, it alerts planners to particular aspects of the natural and human environment that may impede sustainable tourism development.

This study concludes that coastal resources such as marine biodiversity and freshwater have to be safeguarded; major biophysical limitations include insufficient water and waste disposal infrastructure. Marine protected area designation can institutionalise policies that mitigate undesired anthropogenic impacts while protecting ecological processes. The strength and diversity of local preferences highlights the importance of adopting a community based approach that fosters environmental awareness and commitment to sound resource management initiatives by local people.

4.6 Areas for further study

4.6.1 Baseline studies

The Banggi region is extremely data poor, which impedes well-informed decision-making. Baseline studies should be conducted to gather data that are able to serve as benchmarks for future monitoring purposes. Studies should be conducted in the following areas:

4.6.1.1 Hydrology

Groundwater quality has not been tested in south Banggi. There is an urgent need for standard sampling and testing of this resource as there are indications that the groundwater may be contaminated. In addition, the water table level has to be determined in order to
properly manage water for future development. Saltwater intrusion in village wells suggests that the table level is low.

Near shore waters are subject to continuous land based pollution, ranging from sewage, oil and diesel, and agricultural chemicals. However, the quality of near shore waters is unknown, and preliminary tests for faecal coliform counts, suspended solids, and conductivity (see for example, Kahoru & Yap 2001) should be conducted as soon as possible.

The Bukit Sinambung watershed is targeted for Banggi’s primary source of freshwater. Yet despite reports that a private engineering team had conducted a site survey, the capacity of this watershed to supply water for the population of Banggi, tour operators and tourists, is still uncertain. Determination of the Bukit Sinambung watershed capacity should thus be a high priority for future study. Likewise, hydrological processes at Pulau Maliangin Besar should be studied in order to safeguard the island’s spring water and groundwater resources from over-exploitation.

4.6.1.2 Socio-economics
Surveys to track demographics, level of income, health, resource use patterns, and land ownership are crucial as the population of Banggi keeps growing. These surveys can provide useful information for the creation of resource use maps for discerning suitable or unsuitable zones for development based on criteria such as population density, land ownership, and water availability, among others. In the future, consistent tracking of socio-economic data will allow managers to monitor the impact of tourism on society, and address issues as they emerge.

4.6.1.3 Marine biodiversity
While two different groups have conducted a succession of underwater surveys in Banggi in the past, these have tended to be one-time surveys in different sites scattered throughout Banggi. Permanent monitoring sites should be chosen for long term monitoring, and follow-up surveys should be conducted at previously studied sites.
4.6.1.4 Perceptions and attitudes

The perceptions and attitudes of residents will likely evolve as development progresses in Banggi. Further studies of residents' perceptions towards tourism initiatives should be conducted, using a representative sample population. These studies will serve as a barometer of the social acceptability of tourism as it unfolds. They will also facilitate planning by allowing comparisons to be made over time as policies change.

4.6.2 Economic analysis

In many places, tourism fails because revenues generated from tourism activities go directly to private parties, with little funds to local communities to protect the very resources that uphold the ecotourism sector (Tershy et al. 1999). In the future, an economic analysis is required to identify streams of revenues and costs for maintaining sustainable tourism operations. The cost-benefit analysis should determine the economic feasibility of financing resource management and community development through tourism revenues. From there, managers can justify policies that require certain percentage of revenues be set aside for resource management, and from whom, and how these revenues will be generated into the future.

4.6.3 Geographic Information System (GIS)

GIS is a useful tool that can enhance understanding of biophysical and socio-economic features in a spatial context, as well as generate visual representation of how future development decisions may affect the biophysical environment. GIS is increasingly finding utility as a medium to integrate local systems of knowledge with 'scientific' knowledge in topics of resource use patterns and local ecological processes (Close and Hall in press). In Banggi, this bridging of knowledge is promising given the dearth of scientific study regarding most aspects of the environment, and given the multiple interests in resource use represented by fishers, tourists, and conservationists. There are limited data covering the Banggi region that are available for GIS applications; future study in this area will require data gathering, analysis and map production for decision-making purposes.
4.7 References


World Tourism Organization. 12 December 2005. URL:
http://www.world-tourism.org/facts/menu.html
APPENDICES

Appendix A Relationship between distance from gateway city and number of annual visitors to marine destinations in Sabah and Peninsular Malaysia.

\[
y = -0.2873x + 170.91
\]

\[R^2 = 0.5761\]
Appendix B Interview questionnaire

Name: Age:
Gender Residence:
Education: Length of residence:

General
1. What is your current job?

2. How long have you been doing this?

3. Do you/have you ever held another type of job?

Tourism Opportunities
4a. What type of jobs do you think will be available if there was tourism development?
   b. Are you qualified for these jobs?

5. If there was an opportunity, would you want to work in a tourism job?

6. Do you think you would be hired for a tourism job?

7. Do you think tourist operators will give priority to villagers when they hire?

8. Who do you think will benefit most from new employment opportunities?

Opinions on Future Changes

Tourism vs Fishing Livelihood (for fishers)
9. Would you prefer to fish or to work in a tourism job? Why?

10a. During which months would you fish and which months would you work in tourism?
   b. Would you give up fishing in the peak season if you had a tourism job? Why/why not?

11. Do you think the presence of tourists will affect the quantity of fish caught? How? Why?

Fishing Access (for fishers)
12. Where do you normally fish?

13. Do you think sharing fishing grounds might affect your level of fishing income? How?

14. How do you feel about sharing your fishing grounds with tourists?

15. How would you change your fishing routine (fish grounds, time of day) if you had to because of tourism?
Impact of immigrants
16. Should new jobs be guaranteed to locals? If so, what is the proportion of new jobs that should be guaranteed to local people?

17. Is there enough space for this village to expand in order to accommodate immigrant families?

18. Is there enough water in this village to supply immigrant families?

19. Is there enough food in this village to feed immigrant families?

20. How many people or houses were there when you first moved to this kampung?

Sewage and Solid Waste
21a. Should more tourism be encouraged even if it means that more waste is generated?

b. Should the government require waste management treatment by resorts even if it means the number of tourists will decrease?

22. What if the government implements solid waste disposal facilities and sewage treatment for the island, and local residents have to pay a fee for this service?

Tolerance of Tourists
23. How do you think having tourists come to Maliangin/ Banggi will change your way of life?

24a. Are there any characteristics you find undesirable?
   b. If so, which ones?
   c. Which is the most important (if>1)?

25. How willing are you to tolerate those tourist characteristics for the sake of economic benefits that tourists will bring?

26. Will you be willing to share food and water resources with tourists for development and/or economic returns that tourism will bring?

Location and Proximity of Chalets
27. Where do you think resorts should be built? Why?

28. Is there anywhere resorts should not be built, or tourists should not go? Why?
Appendix C Ranking exercise chart

Which of these issues is most important to you?

You have 25 chips, which you can distribute among the eight issues listed below, according to how important each issue is to you. The more important the issue, the more chips you will allocate to it. Please distribute all the 25 chips.
Appendix D Scenario trade-off questions

You will be presented with three different scenarios of tourism development. Each scenario will be explained to you, then you choose the one that you prefer most.

1. Please take a look at each photo, which represent low growth (Photo A), medium growth (Photo B), and high growth (Photo C) respectively. Which type of tourism do you think is most suitable and would like to see in Banggi?

<table>
<thead>
<tr>
<th>Photo A</th>
<th>Photo B</th>
<th>Photo C</th>
</tr>
</thead>
</table>

2. How might your preference change if tourists used the same source of freshwater as villagers, resulting in:

| A | Same degree of water shortage as now |
| B | Water shortages get worse |
| C | Water shortages all year |

3. The level of security from pirates is as follows. Which scenario would you choose now?

| A | Status quo |
| B | Slight probability of attack |
| C | Increased probability of attack |

4. Given your choices so far, how might they change if you consider the following trend in fish catches?

| A | Improve |
| B | Stay the same |
| C | Decrease |

5. How might your preference change if this was the amount of garbage produced under each of the scenarios?

| A | Low to no volume |
| B | Medium volume |
| C | High volume |
6. The proportion of people who are employed in the following sectors is like this under low growth, medium growth, and high growth. Which would you prefer?
Appendix E Photographs of low, medium, and high growth scenarios⁶ presented during the trade-off exercise

Plate 1. Low growth [A] scenario

Plate 2. Medium growth [B] scenario
Plate 3. High growth [C] scenario