

Visitors And Physical Development Carrying Capacity In Malaysian Marine Parks

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Over the years, the emphasis of tourism development in protected areas is changing from providing quantity in the development of facilities to the provision of quality that are appropriate and compatible for visitors. This concern for quality focuses on issues that include maintaining the intrinsic appeal of the area, the promotion of compatible tourism facilities at a scale that is appropriate to the designated area, its carrying capacity, and the way of life among the local communities. Tourism planning in protected areas such as marine parks is about managing its visitors and the type of physical development that would eventually be about maximizing the benefits while minimizing its cost. Planning should identify strategies that would render the development of tourism as less of a spontaneous process, but more of a coordinated vehicle for development. The aim of this paper is to explore the approaches that can be taken by the authorities managing the marine parks of Malaysia on the alternative and sustainable solutions in managing this type of protected areas. The findings and discussion segment propose the Visitors Management for managing the visitation and Physical Development Management for managing the physical development of these protected areas. To adhere to the carrying capacity of these two elements is crucial as marine parks require extensive monitoring to ensure its sustainability and preservation. The researcher has list the approaches of carrying capacity practices with regards to visitors' management and development carrying capacity in Malaysian Marine Parks as recommendations.

Key words: carrying capacity, tourism planning, visitors management, physical development management, Malaysian marine parks

Introduction

The interdependence of managing visitors and managing physical development can be discussed at a number of levels. The task of understanding and managing this interdependence can be facilitated by having a sound analytical perspective on the issues involved, as well as through well-designed and well-executed visitor evaluation research that provides information of interest to management practices. (Pearce, Philip L, Gianna Moscardo, 1985) suggested one notion in particular that should be developed in the context of visitor surveys which is the appropriateness between

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visitors' needs and the resources of allocation. (Pearce, Philip L, Gianna Moscardo, 1985) mentioned that some visitors' motivation of visitation is mismatched or inappropriate with the attributes offered at the destination. Thus, in a nut shell, visitors' intentions of visiting must be match with the physical attributes available at the place of their visit in receiving them.

Once the carrying capacity of an area has been established, various strategies can be implemented to prevent it from being exceeded. For instance, zoning of areas can be created to take the pressure off the vulnerable areas through the provision alternative attractions. Thus, the concept of carrying capacity is indeed an effective tool to sustain, preserve and conserve the protected areas that fall under the category of tourists' destination as managers are faced with the dual conflicting purposes of conserving their resources or using it for tourism purposes. The concept of carrying capacity provides a useful notion that serves to set limits to an area's development. The carrying capacity of an area should not be rigidly fixed but should be increased if the need arises. However any further increase in carrying capacity must take into account the level of use and development which best fits the goals and objectives of the area. This is a very comprehensive procedure as it requires sound and analytical management judgements.

Elements of Physical Carrying Capacity

Coccosis & Mexa (2004) mentioned that physical carrying capacity refers to built cultural environment including infrastructures. They listed the acceptable level of component's capacity which can be set in terms of:

- Acceptable table of congestion or density in key areas or spatial unit such as parks, museums etc.
- Maximum acceptable loss of natural resources without significant degradation of ecosystem functions or biodiversity or loss of species.
- Acceptable level of air, water and noise pollution on the basis of tolerance or the assimilative capacity of local ecosystems.
- Intensity use of transport infrastructures, facilities and services
- Use of congestion of utility facilities and services of water supply, electric power, waste management or sewage and solid waste management , treatment and disposal.
- Adequate availability of other community facilities and services such as those related to public health and safety, housing and community services.

Methodology

Case Study Areas

Islands in Malaysia have been particularly attractive to foreign and domestic tourists because of their inherent characteristics which are different from mainland destinations. These islands possess a variety of touristic attributes such as natural attractiveness, isolation, separateness and small physical size. Small, isolated island are often inhabited by unique flora and fauna. And there are always the added attraction of crystal clear waters and pristine corals fringing many of these tropical islands. As such, it is not surprising that islands are increasingly being perceived as valuable resources with great potential for physical development with the intention to attract more and more visitors.

As indicated by Marine Parks Department, Ministry of Natural Resources and Environment, the islands and waters surrounding these 40 islands have been designated as Marine Parks or Marine Protected Areas as indicated in Table 1.

Table1: Marine Parks' locations

States	Gazette marine parks areas
Kedah (4 islands)	Pulau Payar, Pulau Lembu, Pulau Kacha, Pulau Segantang
Pahang (9 islands)	Pulau Chebeh, Pulau Sepoi, Pulau Labas, Pulau Tulai, Pulau Tioman, Pulau Gut, Pulau Tokong Bahara, Pulau Sembilang , Pulau Seri Buat
Terengganu (11 islands)	Pulau Perhentian Kecil, Pulau Perhentian Besar, Pulau Redang, Pulau Lima, Pulau Ekor Tebu, Pulau Kapas, Pulau Pinang, Pulau Lang Tengah, Pulau Tengol and Pulau Nyire and Pulau Dara
Johor (13 islands)	Pulau Harimau, Pulau Mensirip, Pulau Goal, Pulau Rawa, Pulau Hujung, Pulau Besar, Pulau Tengah, Pulau Pemanggil, Pulau Aur, Pulau Tinggi, Pulau Mentinggi, Pulau Sibul, Pulau Sibul Hujung
Labuan (3 islands)	Pulau Kuraman, Pulau Rusukan Besar and Pulau Rusukan Kecil

Source: Marine Parks Department (Ministry of Natural Resources and Environment, Malaysia (2012)



Figure 1: Affected areas of marine parks due to coral bleaching.

Source: The Star (2010)

Coral bleaching is a physical impact as a result of natural and built environment. Pulau Payar, Pulau Redang and Pulau Tioman are highly affected areas of coral bleaching according to Marine Parks Authority as quoted by the Star (2010). Physical impacts can be caused by natural elements of forces that are beyond our control and by built environment that are elements within our control.

Extraction from the Marine Parks Authority of Malaysia website mentioned that the role of the Marine Park Authority is to protect the marine resources and the fragile marine ecosystem so that the public can enjoy it in perpetuity. Management of visitors' activities is one of the most important aspects in managing visitation carrying capacity of marine parks. Activities which do not harm or destroy marine resources such as snorkelling, scuba diving, swimming and underwater photography are

permitted and encouraged. Picnics and jungle trekking on the islands are also permitted. Nevertheless these activities are prohibited:

- Collecting, removing, destroying or having possession of any marine resources such as shells, molluscs, corals and fish whether dead or alive
- Possessing and using of spear guns or spear fishing equipments and harpoons.
- Using of fish traps (bubu) poisons, explosive and electricity or other method to catch fish.
- Anchoring of boats directly onto the reef – the mooring buoys located within the marine park is to be used for the mooring of boats
- Littering and disposal of waste or rubbish
- Removing and or destroying and structures
- Constructing or erecting any building or other structure within the Marine Park Area without authorization
- Fishing activities within the gazetted areas.

Finding Analysis

Tourists Arrival Analysis

Table 2 provides tourists arrival statistics to all Marine Parks between year 2005 and 2011. These data were obtained from the Marine Parks Department, Ministry of Natural Resources and Environment, Malaysia.

Table 2: Tourists arrival statistics

Year	Types of tourists	Kedah	Total	Terengganu	Total	Pahang	Total	Johor	Total
2005	Local	19,607	94099	98,863	123,159	77,570	167,761	32,440	44,861
	Foreign	74,492		24,296		90,191		12,421	
2006	Local	26,043	112,648	93,546	135,098	104,602	215,936	41,210	56,333
	Foreign	86,605		41,552		111,334		15,123	
2007	Local	24,580	110,629	112,844	151,397	73,688	149,000	51,558	66,656
	Foreign	86,049		38,553		75,312		15,098	
2008	Local	23,298	96,071	129,532	151,824	124,673	191,929	41,199	68,664
	Foreign	72,773		22,292		67,256		27,465	
2009	Local	25,454	102,866	99,434	170,126	105,867	194,392	38,025	63,374
	Foreign	77,412		70,692		88,525		25,349	
2010	Local	26,429	96,097	130,174	216,404	170,580	233,923	35,839	59,731
	Foreign	69,668		86,230		63,343		23,892	
2011	Local	25,410	97,572	109,331	207,709	121,660	212,680	40,185	66,973
	Foreign	72,162		98,378		91,020		26,788	
Total			711,982		1,155,257		1,365,631		426,592

Source: Marine Parks Department (2012)

From the statistics, it can be assumed that the statistics of tourists' arrivals to all Marine Parks increases as people are more aware of the green tourism concept and their willingness to travel to destination with good preservation and conservation practices. The domestic traveller numbers also increased throughout the years. This is an indication that the domestic market is aware of the need to merge tourism and sustainable practices.

Physical Development Findings

Efforts of conservation works have been taken by the Marine Park Authority through enhanced Marine Park Management Plan and Sustainable Island Development Plan. The projects' goal and objective is to ensure conservation and sustainable use of marine biodiversity in Malaysia. It is in tandem with Marine Park Authority main objective of enhancing the marine parks sustainable management and operation.

Marine Park Authority of Malaysia has identified 10 project outputs projected from 7 outcomes. The outputs and outcomes are illustrated in Figure 2. 10 Project Outputs have been identified through a process of 7 Outcomes which can be summarized as:-

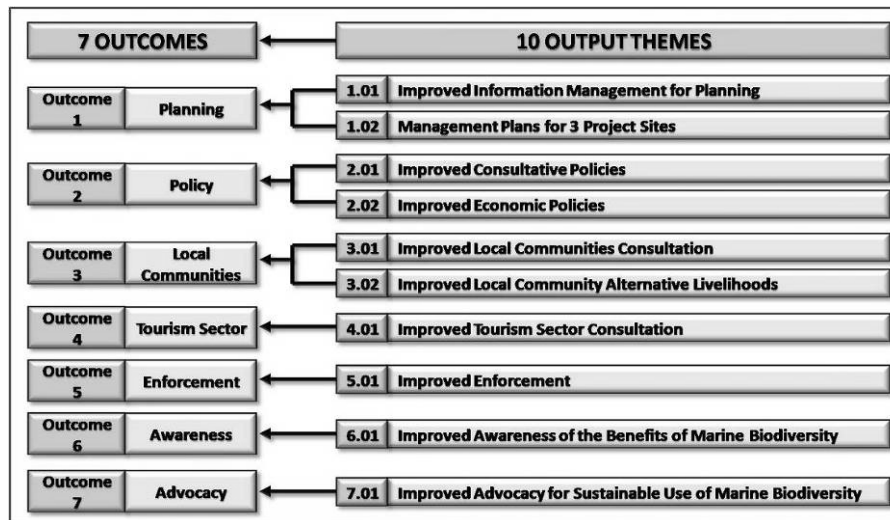


Figure 2: MPA Project plan of outcomes and outputs

Source: Marine Parks Authority, Ministry of Natural Resources and Environment, Malaysia (2012)

The project plan is designed to widen the existing development planning processes, to strengthen the capacity for marine park management and to enable an influential advocacy for the conservation of marine biodiversity in Malaysia. Stakeholder involvement is crucial to the success of the project and has been incorporated into all objectives.

The three projects as illustrated in Figure 3 are being carried out as benchmark projects for sustainable development in marine parks. It will provide the guidelines for further development in the highly protected areas. Therefore, it is hoped that after the end of this project, all the marine protected areas in Peninsular Malaysia and Labuan are under improved management in order to better address threats to marine biodiversity.

This project plan is built upon nationally driven initiatives to conserve the marine biodiversity of east coast Peninsular Malaysia. Project activities will be carried out in three marine parks, chosen as the pilot locations namely Pulau Tioman in Pahang, Pulau Redang in Terengganu and Pulau Sibu-Tinggi in Johor. The project will strengthen the system of marine protected areas in Malaysia and later contribute to the conservation of global biodiversity. The project targets 164,534.2 hectares of sea, under improved management, for the conservation of marine biodiversity.

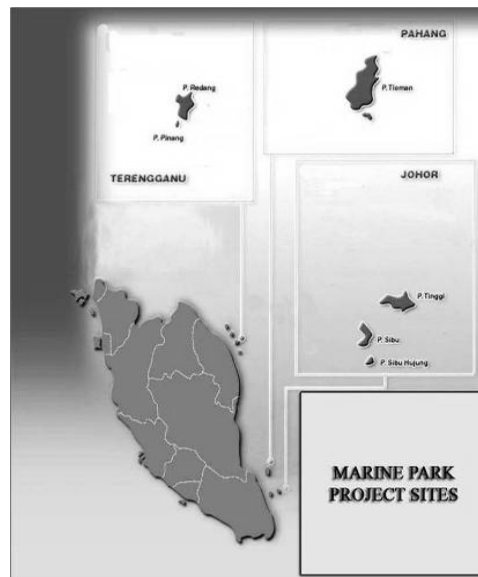


Figure 3: Location of Project Sites

Source: Marine Parks Authority, Ministry of Natural Resources and Environment, Malaysia (2012)

Visitors Management Findings and Recommendations

Managing visitors in a protected area is significantly different than managing visitors on the mainland destinations. This is because marine parks fall under the jurisdiction of protected areas and thus the visitors' arrival must be monitored and controlled in order for the marine parks to survive. Extensive uncontrolled human activities such as trampling and plucking can cause destruction to the natural habitat of marine parks. In the writer's point of view, the most practical approach that can be carried out in managing visitors to marine parks is by adopting the Management Zones Approach where activities allowed in the designated zones are based on zones capacity to receive the visitors and the activities.

Managing physical development is another crucial aspect where marine parks are concerned. In our eagerness to develop and to create income opportunities to the locals, we might have the misconception that the more we developed an island the better it will be. Though development will benefit the local communities but uncontrolled development will eventually lead to destruction of the natural landscape which is the main purpose of visitors' visit. Thus the article lists out a few approaches that could be adopted by the authority to control the physical development of the marine parks and single out the Adaptive Management Approach as one of the most suitable, adoptable and manageable approach.

Management Zones as Visitors Carrying Capacity Approach

Two major functions of any protected areas are the preservation of resources and human utilization. Satisfying these two resources have countlessly created clashes and conflicts rather than harmony and understanding. The promotion of tourism in marine parks as protected areas should not only focus on activities that will stimulate incomes and recreational areas but should also prohibit highly consumptive forms of resource utilization. Hence, the strategies to be applied should be geared towards the education and guidance of visitors to the park, voluntary limitation of activities in designated

areas, and a respect of nature attitudes. Therefore to accommodate the diverse objectives and strategies of managing protected areas, there is a need to subdivide the marine parks into different zones. The allocation of zones should be based on its sensitivity and conservation values. The main advantage of zoning is that it is one way in which conflicting activities can be categorized, enabling the identification of the suitability of particular areas and conservation of selected areas. Zoning of marine parks, in technical aspect should include:

- An area meant for large scale tourism activities with few restrictions apply and an optimal level of services provided for the visitors.
- An area of tranquillity and control use where traditional settlement and modest form of tourism activities are permitted.
- A wilderness area with restricted access and acts as protection to the resources.
- A totally strict protection area whereby access is only meant for research and a total ban on any physical development.

Table 3 described the allocation of the Management Zones and the description of the zones. Levels of accessibility and development are also mentioned according to the zones' description.

Table 3: Allocation of management zones

Management Zones	Description	Accessibility	Development
Sanctuary/ strict protection (preservation)	Include areas of varying size considered to be of importance to the protection and maintenance of either ecological process, biological diversity, unique, rare or endangered features and or its habitat.	Access to the area is strictly controlled and is only granted by the Director of the Marine Park department for scientific or educational purposes.	Development is totally prohibited.
Wilderness (Protection)	Areas maintained as natural environment which can sustain with the minimum of impairment.	Visitation is restricted to small groups. Participation in recreation activities. Must be accompanied by licensed guides.	Development is ted and limited to basic amenities and basic infrastructures.
Managed natural (controlled use)	An area which can accommodate a range of specific educational activities(research, environmental education) and rehabilitation programmes for degraded areas.	Visitation is restricted to non commercialized recreational activities Must be accompanied by licensed/ park guides.	Development is limited to basic infrastructure compatible to educational activities (station/ centre, dormitory for researchers).
Tourism Development	Areas identified for moderate tourism	No restriction to visitors but must	If these facilities are near a sensitive

(Destination)	development focusing on natural and cultural attractions, providing compatible tourism and recreational activities.	obtain entry permit and guides to certain areas.	area, the built structures and recreational activities should reflect and be compatible with the special qualities of the environment.
Buffer	These are areas which will act as walls to protect the above mentioned zones. Areas under this category are the agriculture land, forest or villages.	No restrictions but subject to consent by local communities.	Environmentally compatible tourism ventures are fostered in this zone Resorts, Homestays etc.

Sources: Adapted from Dowling (1993)

Management Plan as Physical Development Carrying Capacity Approach

In order for marine parks to accommodate conservation and development, there is a need to have strategies towards achieving the development objection without affecting the natural environment. The management of marine parks should not only find ways to match the goals and objectives with resources capabilities but at all times should consider the requirement for conservation which include preservation and protection. It is about stabilizing and maintaining the natural ecological community with minimal disturbances, though at times intensive usage might be unavoidable.

In decision making for management plan for the physical development, a few approaches can be considered. The approaches are:

(a) Political/ Social Approach

This conservative approach involves political and social consideration to some degree. The political/social approach sometimes dictates a specific course of action to appease a powerful interest or to keep options open for the future. This approach often involves decision to delay action and to wait and see until more data are made available.

(b) The Conventional Wisdom Approach

The conventional wisdom approach is an approach where the managers or caretakers rely on past methods that had been adopted in similar situation in the past. In this approach, managers typically rely on historical knowledge of the situation and the resources involved, and assume that the response to situation is similar with what they had experienced previously.

(c) The Best Current Data Approach

The approach uses current data collected through new or existing sampling programs. Managers analyse these data using the latest techniques, assess their management

options and then choose the one best option to implement. This approach is considered the best as it uses the best available knowledge and technique. But nevertheless this method requires highly technically trained personnel to plan and execute the plan accordingly. As a theory it is the best method but to put into practice is another story.

(d) Monitor and Modify Approach

In this approach, a policy decision is typically made using the conventional wisdom or best current data method. The policy is usually implemented along with a monitoring plan. Monitoring data are used to evaluate and periodically modify the policy relative to the specific goal. The purpose of periodic modification is to adapt the most practical management policy and maintain the system in an optimal state. It can be considered as an approach that is currently being adapted by the care takers of the marine parks.

(e) Adaptive Management Approach

Adaptive Management Approach begins by bringing together related parties or stakeholders in workshops to discuss the management problems and then using available data to develop models or frameworks. These models are used to assess the significance of the data gaps and uncertainties and to predict the effects of alternative management actions. The stakeholders develop a management plan that will help to meet management goals and will also generate new information to reduce critical gaps and uncertainties. The management plan is then implemented along with a monitoring plan. As monitoring proceeds, new data are analyzed and management plans are revised as their understanding of how the system works progressed.

Nevertheless, the concept of adaptive management has gain good support as it addresses different situations and articulate different goals in terms of the utilization of natural resources (Hunter, 1997). Adaptive management is a model to guide ecosystem managers in dealing with uncertainties. It is an ongoing process that merged social values and ecological knowledge using consensus building and good science. Adaptive management recognize that ecosystems are resilient, and that adjustment to management can be made as more information are acquired about the ecosystems or as the goals changed.

As mentioned earlier, the Adaptive Management Approach is considered to be achievable and manageable thus, in the writer's point of view, should be the one adapted by the Marine Parks custodians in determining the visitation and physical development approaches. It is adaptable and achievable, hence will suit the objectives, vision and mission of the department.

Conclusion and Implementation

Natural resources are essential components of tourism attractions. Tourism attraction utilizes resources as the primary incentive for travel to a destination. Whenever there are impacts to natural resources caused by tourism development, it is usually because of the inappropriate management or the lack of integrated planning of the basic resources. Basically, there are two types of resources that support tourism in protected areas such as the marine parks which are the natural and cultural resources. These two unique attributes create niches that attract visitors. And thus these attributes should be

managed sustainably as the result itself will create another resource which is the economy resource to the local communities.

An island can be significantly damaged for generations and perhaps permanently due to unplanned and uncontrolled tourism activities and infrastructure development. There is a tendency among tourism planners to overdo in developing the islands as some planners' school of thoughts are utterly different from those in the sustainable tourism line. They are thinking it in the materialistic perspective of harvesting profits from the natural resources of the destinations. Most of the tourism scholars have different opinion where profit is concerned. Profits and preservation should go hand in hand as we have to look at it as a long term investment and must always look at the issue from all aspects and angles. These marine parks are under the jurisdiction of protected areas and thus the physical development and visitation level must be monitored and controlled by this enforcement department to ensure the survival factor and the sustainability of these areas. Developing without taking into consideration the sustainable aspects might result in physical development that is not compatible to the island and to the environment. It might not even be compatible to the communities and to the visitors as well. This paper was written with the intention to explore the visitors' carrying capacity and physical development carrying capacity that are compatible to the marine parks of Malaysia. Gazetted protected areas similar to marine parks of Malaysia in other part of the region can also adopt the approached mentioned in this paper as the approaches recommended can be adapted as sustainable agents to the protected areas.

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