



**UNIVERSITI PUTRA MALAYSIA**

**TOURISM CARRYING CAPACITY:  
CASE STUDY ON TAIPING ZOO**

**KOAY LI BEE**

**FRSB 1999 1**

**TOURISM CARRYING CAPACITY:  
CASE STUDY ON TAIPING ZOO**

**KOAY LI BEE**

**MASTER OF LANDSCAPE ARCHITECTURE  
UNIVERSITI PUTRA MALAYSIA**

**1999**



**TOURISM CARRYING CAPACITY:  
CASE STUDY ON TAIPING ZOO**

**By**

**KOAY LI BEE**

**Thesis Submitted in Fulfillment of the Requirement for the  
Degree of Master of Landscape Architecture in the  
Faculty of Design and Architecture  
Universiti Putra Malaysia**

**April 1999**



## ACKNOWLEDGEMENT

In the course of my preparation for the writing of this project paper, I have benefited greatly from the kindness and assistance of many people, whom I now wish to take this opportunity to thank for their valuable contributions, insights and expressions.

My first thanks must go to Dr. Noorizan Mohamed, my supervisor, whose unflagging patience, constant good nature, and admirable capacity for insight into work of this specific topic has made possible the compilation of my ideas and understanding into this project paper which I have to present today.

The production of this project paper was also largely supervised by En. Osman Mohd. Tahir, my co-supervisor and a truly respected person who provided clarity of thought as well as sincerity in both critic and confidant. I deeply value the opportunity to have been under his professional and dedicated guidance, and wish to offer him my heartfelt thanks and gratitude for his kind words of advice. My thanks and appreciation is also extended to the Dean, Dr. Mustafa Kamal b. Mohd Shariff, for his assistance and being available as a "sounding board" for many of my preliminary ideas on the topic.

I would also like to specially thank Dr. Kevin Lazarus, Director of the Taiping Zoo, and his wonderful staff who cheerfully provided me with the assistance and support I needed in beginning my resource search and data collection. The pleasant environment within the Taiping Zoo's administration premises, in which I had the rare opportunity of doing my research, was a much cherished and valuable experience gained.

Last but not least, and especially so, I wish to thank my beautiful family for their unwavering support and inexhaustible efforts in seeing me through every aspect of my needs within this duration of time. It is with their toil, love, encouragement and understanding that all my efforts towards this were made possible. To them, chiefly, I owe everything.



## TABLE OF CONTENTS

	<b>Page</b>
ACKNOWLEDGEMENT	ii
LIST OF FIGURES	vii
LIST OF PLATES	viii
LIST OF ABBREVIATIONS	ix
ABSTRACT	x
<b>CHAPTER</b>	
I INTRODUCTION	1
1.1 The Zoological Park	1
1.1.1 Definition and Background	1
1.1.2 The Role of the Zoo	2
1.1.3 Zoological Park Operations	5
1.1.4 The Visitor	5
1.1.5 The Zoo in Relation to Tourism	6
1.2 Tourism	6
1.2.1 Definition	6
1.2.2 The Concept of Tourism Carrying Capacity	7
1.3 The Taiping Zoo	8
1.3.1 Background Information	8
1.3.2 Duties and Functions of the Taiping Zoo	12



1.3.3	Summary of the Taiping Zoo Plan	13
1.3.4	Visitor Facilities	17
1.4	Problem Statement	18
1.5	Topic of Study	23
1.6	Purpose of Study	23
II	LITERATURE REVIEW	24
2.1	Tourism Carrying Capacity	24
2.1.1	Interpretation	24
2.1.2	Positive Impact of Tourism	27
2.1.3	Negative Impact of Tourism	28
2.2	Carrying Capacity Concept	30
2.2.1	Definition and Interpretation	30
2.2.2	Impact Interrelation	32
2.2.3	Variations in Criteria	33
2.3	Operations Management	34
2.3.1	Efficiency	34
2.3.2	Competitive Priorities	35
2.4	Operation Systems	36
2.4.1	Definition	36
2.4.2	Service Planning	36
2.4.3	Capacity Planning	37

2.5	Management of Tourist Queues	37
2.5.1	Psychology	38
2.5.2	Time Perception	38
2.5.3	Needs of the Waiting Public	38
III	METHODOLOGY	40
3.1	Data Collection	40
3.1.1	Literature Search	40
3.1.2	Site Visits	41
3.2	Measurement of Carrying Capacity	41
IV	RESULTS & DISCUSSION	43
4.1	Facilities Studied	43
4.2	Measurable Criteria	44
4.3	Comments on Statistical Data	46
4.4	Assessing Carrying Capacity	54
4.4.1	Time Criteria	54
4.4.2	Assessing the Queuing Theory for Ticketing	57
4.4.3	Space Criteria	60
V	CONCLUSION	63
	BIBLIOGRAPHY	67





## LIST OF FIGURES

FIGURE	Page
1. Advertisement Billboard of Taiping Zoo (Changkat Jering Exit from North-South Expressway)	9
2. Plan of Taiping Lake Gardens	10
3. Plan of Taiping Zoo	15
4. Number of Visitors to Taiping Zoo (Year 1993 – 1998)	47
5. Number of Visitors to Taiping Zoo (January - September 1998)	48
6. Number and Daily Average of Visitors to Taiping Zoo in Relation to Seasons (January – September 1998)	50
7. Number of Visitors to Taiping Zoo in Relation to Seasons (January – September 1998)	51
8. Number of Visitors to Taiping Zoo During Public Holidays (January – September 1998)	53

## LIST OF PLATES

	<b>Page</b>
<b>PLATES</b>	
1. Exit Arch of Taiping Zoo	16
2. Administration Building	16
3. Parking Lots at Taiping Zoo Entrance Area	19
4. Parking Lots at Taiping Zoo Entrance Area	19
5. Ticketing Counters	20
6. West Loop along Primates Zone	20
7. East Loop along African Plains Exhibits	21
8. East Loop along Big Mammals Zone	21
9. 5.0 M Width Pedestrian Walkway Towards Zoo Exit	22

## LIST OF ABBREVIATIONS

### ABBREVIATIONS

AAZPA	American Association of Zoological Parks and Aquariums
IUCN	International Union for Conservation of Nature
MPT	Majlis Perbandaran Taiping
Perhilitan	Department of Wildlife and National Parks
TCC	Tourism Carrying Capacity
WTO	World Tourism Organization

Abstract of thesis presented to Universiti Putra Malaysia in fulfillment of the requirements for the degree of Master of Landscape Architecture

**TOURISM CARRYING CAPACITY:  
CASE STUDY ON TAIPING ZOO**

By

**KOAY LI BEE (LIBBY)**

**April 1999**

**Supervisor: Dr. Noorizan Mohamed**

**Faculty: Design and Architecture**

Development for tourism can be planned to take consideration for protection of the surrounding environment and for the attainment of an equilibrium or ideal balance. This can be achieved through incorporation of effective management and planning tools such as the carrying capacity concept.

Current available literature on the concepts of carrying capacity did not specifically discuss its use and relevance in a tourism development such as a zoological park. Hence, this case study was conducted on the carrying capacity of such a development, the Taiping Zoo. This study aims to promote tourism carrying capacity studies as an important consideration to be incorporated into future management plans of the Taiping Zoo. It also advocates that the concepts and principles of tourism



carrying capacity be more widely accepted and utilized in modern day zoological park operations.

To begin the study, much background information on the concept of carrying capacity was evaluated. These information was derived mainly from similar studies on several local case studies. Emphasis was placed on the methodologies used in assessing and calculating the carrying capacity of each parameter studied.

The principles of carrying capacity in relation to tourism was compared to the current management methods employed at the Taiping Zoo. This report is a synthesis, produced based on the researcher's understanding of carrying capacity concept and used in the statistical analysis of Taiping Zoo operations to assess the zoo's tourism carrying capacity.

Results obtained from the assessment of carrying capacity conducted in the study suggest that the concept of carrying capacity is very much relevant to a tourism development such as the Taiping Zoo. Figures derived from the calculations of carrying capacity for various criteria have been found to be potentially useful information for the planning of the zoo organization in terms of allocation of labor resources and numbers of facilities that will need to be provided.

The study also highlights the growth in the number of visitors to this particular tourism destination, and how the peak capacities of visitors experienced during of each time period or season can be calculated. This is achieved through analysis of the ticketing records of the zoo for the last five years, and figures are derived thereon by applying calculation methods advocated by precedent studies conducted by researchers of the same field.

This review aims to produce a framework of guidelines by which carrying capacity can be utilized as an effective planning and management tool in other zoological parks as well.

Abstrak tesis yang dikemukakan kepada Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Senibina Landskap

**KEUPAYAAN TAMPUNG PELANCONGAN:  
KAJIAN KES KE ATAS ZOO TAIPING**

Oleh

**KOAY LI BEE (LIBBY)**

**April 1999**

**Penyelia: Dr. Noorizan Mohamed**

**Fakulti: Rekabentuk dan Senibina**

Pembangunan untuk tujuan pelancongan seharusnya mengambil kira pemuliharaan alam sekitar dan pencapaian sesuatu tahap keseimbangan. Ini dapat dilaksanakan melalui penerapan konsep perancangan dan pengurusan yang efektif seperti konsep keupayaan tampung ke dalam proses perancangan.

Bahan-bahan penulisan mengenai konsep keupayaan tampung didapati kurang menumpukan perhatian secara terus mengenai aspek penggunaan konsep ini di dalam pembangunan pusat pelancongan seperti taman zoologikal. Kajian ini dijalankan untuk menyelidiki keupayaan tampung Zoo Taiping sebagai pusat pelancongan. Kajian in bertujuan mengutarakan kajian-kajian keupayaan tampung sebagai suatu perkara penting yang harus dipertimbangkan dan diterapkan ke dalam pelan pengurusan Zoo Taiping di masa akan datang. Kajian ini juga bertujuan

mencadangkan supaya konsep-konsep dan prinsip-prinsip keupayaan tampung pelancongan digunakan dengan lebih meluas dan diterapkan ke dalam pentadbiran and operasi taman-taman zoologikal moden.

Kajian ini bermula dengan penyelidikan ke atas latarbelakang konsep keupayaan tampung. Sebahagian besar daripada maklumat ini telah diperolehi dari kajian-kajian kes tempatan. Tumpuan diberikan terhadap metodologi untuk menilai dan mengira keupayaan tampung setiap satu parameter yang dikaji.

Prinsip-prinsip keupayaan tampung dalam konteks pelancongan telah dibandingkan dengan kaedah-kaedah pengurusan yang dijalankan di Zoo Taiping. Laporan ini adalah sintesis, iaitu dihasilkan berdasarkan pemahaman pengkaji terhadap konsep keupayaan tampung dan penggunaannya di dalam analisis statistik operasi Zoo Taiping untuk menilai keupayaan tampung pelancongan zoo tersebut.

Maklumat yang didapati daripada penilaian keupayaan tampung ke atas kajian kes ini telah dapat menunjukkan bahawa konsep keupayaan tampung adalah amat relevan kepada sesuatu pusat pelancongan seperti Zoo Taiping. Perangkaan yang diperolehi hasil pengiraan keupayaan tampung ke atas pelbagai kriteria telah didapati amat berguna dalam membantu proses perancangan organisasi zoo. Perangkaan yang



diperolehi dapat memudahkan kerja pihak pengurusan zoo dari segi menghitung bilangan kemudahan yang harus disediakan dan juga pengagihan sumber tenaga kerja.

Kajian kes ini juga menyelidiki kadar pertumbuhan Zoo Taiping dalam aspek pertambahan bilangan pengunjung. Data mengenai bilangan pengunjung zoo dalam jangkamasa lima tahun kebelakangan ini telah digunakan untuk menentukan nilai-nilai keupayaan tampung melalui kaedah-kaedah penilaian yang disyorkan oleh para pengkaji terdahulu dalam bidang yang sama.

Penilaian ini bertujuan menghasilkan suatu rangkakerja garis panduan yang dapat digunakan sebagai suatu alat perancangan dan pengurusan yang berkesan ke atas taman-taman zoologikal lain secara umum.

# CHAPTER I

## INTRODUCTION

### 1.1 The Zoological Park

#### 1.1.1 Definition and Background

The zoo is a cultural institution (Sausman, 1982). The American Association of Zoological Parks and Aquariums (AAZPA) defines a “zoo” as:

“An organized and permanent institution, essentially educational or aesthetic in purpose, with professional staff, which owns and utilizes wild animals, cares for them, and exhibits them to the public on a regular schedule.”

On this basis, there are probably a total of more than 600 zoos in the world (Sausman, 1982). Zoos occupy more land than any other kind of cultural institution. The largest of zoos exceed 1800 acres while the smallest covers less than an acre.

The history of man’s involvement with wild animals is a colourful and fascinating one. As stated by Fisher (1980), in his book “Zoos of the World – The Story of Animals in Captivity”, “man began to study animals while he was still living in caves and is likely to go on doing so as long as he walks on earth”.



Zoos, in one form or another, have existed for nearly 5000 years. They began in Asia and Old Kingdom Egypt, as collections of odd and unusual beasts for the amusement and edification of royal families. The concept behind the first zoological parks were fundamentally derived from man's age-old habit of keeping pets or from a growing experience with the domestication of animals and also from a simple desire to know. The concept of zoos, in early times, was to house a diverse collection of strange and fascinating creatures.

Today, zoos have a much more important role. In a world where natural resources are diminishing at an alarming rate and species of animals are vanishing from the face of the earth, zoological parks are increasingly focused on environmental education and preservation of animal species, especially those which are threatened with extinction in the wild.

### **1.1.2 The Role of the Zoo**

The zoo plays an important role as a recreational resource. As a recreational resource, it is difficult to find anything to compare with zoos. Grzimek (1960) described that "the zoo has become a psychological necessity for the modern city dweller". This suggests the importance of zoos in enriching people's lives – a factor that should not be underestimated. An important function of zoos within urban areas is to

offer a place for recollection, solitude and relief from the effects of the urban environment.

As explained by Woodroffe (1981) the zoo can be described as:

“An oasis of sanity in which watching the dignity and mystery of wild animals can offer man a retreat from the pressures of civilization, allow for a few hours of communing with nature and help place human values in perspective.”

Drastic dwindling of wildlife population and their habitats in recent decades also means that zoos, traditionally just a showcase for exotic animals, will have more important roles to play in the near future. Almost every increment in human population or increase in mankind's standard of living results in subtractions from the space and resources left for wildlife. Wildlife populations are also continuously facing the threat of poaching, trapping and illegal trading. In 1996, the Department of Wildlife and National Parks (Perhilitan) of Malaysia charged 39 people in court for such offenses. In the same year, over RM220, 000 was collected from 4,489 compounds for offences such as illegal trade of animals and birds, trapping of wildlife and cruelty to wildlife (Khan, 1997). In view of this, conservation has currently become one of the most compelling roles of zoos.

Zoos contribute to the conservation effort uniquely through interesting people in animals. Interesting people in animals and helping to

bring them to a greater level of environmental literacy are the zoo's largest potentials in conservation. Zoo-based education and wildlife promotion programmes can be a natural foundation for nurturing a responsible attitude towards wildlife and wild places, thereon towards the development of a conservation ethic among the people. Grzimek (1960) suggests that zoos can be a great asset to society because it introduces people to wildlife and further on to the principles of ecology by an imaginative presentation of living animals. Zoos have the ability to bring out the aesthetic value of wildlife, hence the opportunity to instill public awareness, education and interest in ecology, and ultimately public involvement in the matter of conservation.

In addition, zoo propagation of rare animals is also a significant tool. It is through such efforts that zoos are increasingly emerging as the mainstays of conservation. According to Foose (1997) of the International Union For Conservation of Nature (IUCN), zoos are no longer merely collectors of animal species. Modern day zoos are increasingly becoming supporting institutions for *in situ* conservation (conservation within a natural habitat).

Zoos also play an important role in research. Conditions at zoos afford researchers an intimacy and consistency to observe animal behaviour, an opportunity not likely to be found in the wild. Such research can be directed towards improvement of animal management and propagation techniques.

### **1.1.3 Zoological Park Operations**

The operation of a zoo is a demanding field of work, which depends on a variety of highly diversified disciplines. Aspects of operation include budgeting, personnel, fundraising, housekeeping, security and legislative knowledge. The scope of operations increases with the size of the zoo facility and the collection of animals.

### **1.1.4 The Visitor**

The zoo is a cultural yet informal attraction that appeals mostly to family groups. Although education is an essential function of zoos, learning, to the visitor, is a by-product rather than a primary motivating factor to visit the zoo. Zoo visitors come voluntarily and perceive the visit more likely as a social occasion. The park-like setting of the zoo is conducive to a relaxed outing where the animals on display provide a focus for a more varied recreational experience. Visitors regard the zoo as a relaxing place in which to spend a day viewing animals and enjoying nature. The zoo premises, on the other hand, host specialized facilities to house, feed and care for animals, and to provide services for the visitor's recreational convenience.

### **1.1.5 The Zoo in Relation to Tourism**

Sausman (1982) described the zoo as a cultural institution. In addition, the ownership of living wild animals makes the zoo a unique tourist attraction. Hence zoos also play a role as tourism developments. A tourism development as such, zoos have a responsibility to bring perspective to man's relationship with wild creatures. Few other tourism developments can have such powerful obligations to their collections as well as to their communities and visitors.

Although all components of a tourism development are important to its functioning, its attractions provide the energizing factor. Attractions are the on-location elements that not only provide the things for tourists to see and do but which also offer the magnetism for travel. Attractions represent the core of the tourism "product". In a zoo, the main element of attraction is its animal exhibits.

## **1.2 Tourism**

### **1.2.1 Definition**

Tourism can be defined in a variety of ways. As described by Lundberg (1995), tourism is an activity in which people are engaged in travel away from home for business or pleasure. Tourism is also "a business providing goods and services to travelers, and involves

expenditure incurred by a visitor for the trip” (Lundberg, 1995). Matheison and Wall (1982) defined tourism as:

“The temporary movement of people to destinations outside their normal place of work and residence, the activities undertaken during their stay in those destinations, and the facilities created to cater to their needs.

On the other hand, tourists have been defined as “people who travel for the pleasure of traveling, out of curiosity, and because they have nothing better to do” (Sigaux, 1876).

The traditions, cultures and policies of host communities are also a part of tourism.

### **1.2.2 The Concept of Tourism Carrying Capacity**

The word ‘capacity’ suggests the ability to contain or accommodate, or the amount that can be contained in a certain space or area. Hence, tourism carrying capacity can be defined as the “maximum number of tourists that can be contained in a certain destination area” (Reilly, 1991).

This concept of determining the carrying capacity of a given tourism development suggests that tourism facilities and services have to be planned to match the demand for such facilities and services. It advocates that excess capacity is wasteful, while inadequate capacity leads to



customer dissatisfaction. The problem most commonly faced in tourism developments is how to match the projected arrivals with adequate services.

### **1.3 The Taiping Zoo**

#### **1.3.1 Background Information**

The Taiping Zoo is a 34-acre tourism development that was founded in 1964 and is located in the town of Taiping. The Ministry of Science, Technology and Environment supports development of the Taiping Zoo. In the past five years, the Taiping Zoo has gone through tremendous growth and development. This development has helped the Taiping Zoo progress to a higher level of popularity and attention. According to the Annual Report of the Taiping Zoo, the number of visitors to the zoo has been increasing from year to year. In 1994, there was an increase of more than 45% in the number of visitors compared to 1993 (Year 1993 – 316,920 visitors and 1994 – 465 716 visitors). In 1998 the number of visitors to the Taiping Zoo was almost 500, 000 people.

In 1994, the State Government of Perak launched efforts to implement a master plan to provide the Taiping Zoo as a main tourist destination and attraction in the state of Perak Darul Ridzuan. Among other aims was also to conserve the Taiping Zoo as an ex-situ wildlife conservation centre. Other aims were also to promote the Taiping Zoo as an educational and wildlife research centre.