ECONOMIC VALUES OF TANJUNG PIAI NATIONAL PARK WETLAND CONSERVATION IN JOHOR, MALAYSIA

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By

WAN SOFIZA ELIANA BINTI WAN YUSOF

Thesis Submitted to the School of Graduate Studies, University Putra Malaysia in Fulfilment of the Requirement for the Degree of Doctor of Philosophy.

March 2018

DEDICATION

This research is dedicated to my beloved parents; Haji Wan Yusof , Hajah Fatimah , my beloved husband Dato' Dr Haji Nik Muhammad Zawawi , my beloved brother Wan Yusrol Rizal and my beloved sister Wan Sofira Eliza and also my beloved son and daughter Nik Muhammad Irfan and Nik Zara Eryna for their constant support, patience, care and sacrificed through my academic endeavors.

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

ECONOMIC VALUES OF TANJUNG PIAI NATIONAL PARK WETLAND CONSERVATION IN JOHOR, MALAYSIA

By

WAN SOFIZA ELIANA BINTI HJ WAN YUSOF

March 2018

Chairman : Associate Profesor Alias Radam, PhD
Faculty : Economics and Management

Tanjung Piai National Park (TPNP) is a part of the Important Bird Area (IBA) and known as a Ramsar and Wetland of International Importance site. This study investigates visitor's willingness to pay (WTP) towards conservation and management in the area and estimates the visitors' preferences towards wetland biodiversity attributes in the TPNP. Data are obtained through questionnaires distribution among 500 randomly chosen visitors between June to October 2014. Factor analysis (FA), contingent valuation method (CVM) and choice experiment (CE) methods were employed in the study, in which visitors are found to visit the area for visit, attraction and relieve purposes. Meanwhile, price of bid, income and gender are the most important and significant factors that influence and determine the level of WTP for the conservation fee among the visitors. Respondents' current income and expenses are the main considerations in determining the maximum entrance fee, with RM 11.72 was chosen as the most preferred amount. In the choice experiment (CE), visitors' preference for wetland management and conservation attributes are estimated based on their attributes. Attributes for management aspect were protection level (PL), availability of park guide (PG), amenities (AMM), provide information (INFO), and entrance fee (FEE), while attributes for conservation aspect were extension of park area (EPA), aesthetic appearance (AA), wildlife species and observation habitat quality (WO), habitat quality (HQ) and conservation fee (FEE). Most visitors preferred the medium amenities (AMM), fair wildlife species and observation (WO), and fair habitat quality (HQ). Findings and recommendation from this study are believed to provide useful information to policy-makers, government, Johor National Park Corporation (JNPC), and the public to better comprehend the present policies regarding the wetland biodiversity in TPNP. Besides, the valuation results can help to convince the government and any involved decision maker to allocate more resources and funding for conservation activities.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia Sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

NILAIAN EKONOMI UNTUK PEMULIHARAAN TANAH PAYA TAMAN NEGARA TANJUNG PIAI DI JOHOR, MALAYSIA

Oleh

WAN SOFIZA ELIANA BINTI HJ WAN YUSOF

Mac 2018

Pengerusi : Profesor Madya Alias Radam, PhD
Fakulti : Ekonomi dan Pengurusan

Taman Negara Tanjung Piai (TPNP) adalah sebahagian daripada Kawasan Burung Penting (IBA) dan dikenali sebagai tapak Ramsar dan Wetland of International Importance. Kajian ini menyiasat kesediaan pelawat untuk membayar (WTP) ke arah pemuliharaan dan pengurusan di kawasan tersebut dan menganggarkan keutamaan pelawat terhadap sifat biodiversiti sawah di TPNP. Data diperoleh melalui pengagihan soal selidik di kalangan 500 pelawat yang dipilih secara rawak antara bulan Jun hingga Oktober 2014. Kaedah analisis faktor (FA), kaedah penilaian kontingen (CVM) dan kaedah percubaan pilihan (CE) digunakan dalam kajian ini, di mana pelawat didapati melawat kawasan untuk lawatan, tarikan dan tujuan pelepasan. Sementara itu, harga bida, pendapatan dan jantina adalah faktor terpenting dan penting yang mempengaruhi dan menentukan tahap WTP untuk bayaran pemuliharaan di kalangan pelawat. Pendapatan dan perbelanjaan semasa responden adalah pertimbangan utama dalam menentukan yuran masuk maksimum, dengan RM 11.72 dipilih sebagai jumlah yang paling disukai. Dalam eksperimen pilihan (CE), keutamaan pelawat untuk pengurusan tanah lembap dan sifat pemuliharaan dianggarkan berdasarkan sifat mereka. Ciri-ciri untuk aspek pengurusan adalah tahap perlindungan (PL), ketersediaan panduan taman (PG), kemudahan (AMM), memberi maklumat (INFO) dan bayaran masuk (FEE) , penampilan estetik (AA), spesies hidupan liar dan kualiti habitat pemerhatian (WO), kualiti habitat (HQ) dan yuran pemuliharaan (FEE). Kebanyakan pelawat memilih kemudahan sederhana (AMM), spesies hidupan liar yang adil dan pemerhatian (WO), dan kualiti habitat yang adil (HQ). Penemuan dan cadangan daripada kajian ini dipercayai memberikan maklumat berguna kepada pembuat dasar, kerajaan, Perbadanan Taman Negara Johor (JNPC), dan orang awam untuk memahami dasar-dasar terkini mengenai biodiversiti tanah lembap di TPNP. Di samping itu, keputusan penilaian dapat membantu meyakinkan kerajaan dan mana-mana pembuat keputusan yang terlibat untuk memperuntukkan lebih banyak sumber dan pembiayaan untuk aktiviti pemuliharaan.

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I certify that a Thesis Examination Committee has met on (date of viva voce) to conduct the final examination of Wan Sofiza Eliana Wan Yusof on her thesis entitled "Economic Values of Ramsar Designated Wetland Conservation in Tanjung Piai National Park, Johor" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The committee recommends that the student be awarded the Doctor of Philosophy.

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LIST OF ABBREVIATIONS

AA	Aesthetic Appearance
ABSCM	Attribute –Based Stated Choice Model
AG	Age
AGFI	Adjusted Goodness-of-Fit
AHP	Analytic Hierarchy Process
AMM	Amenities
AVE	Average Variance Extracted
CE	Choice Experiment
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CM	Choice Modelling
CpS	Compensating Surplus
CpV	Compensating Variation
CL	Conditional Logit
CW	Constructed Wetland
CR	Contingent Rating
CR	Construct Reliability
CVM	Contingent Valuation Method
DUV	Direct Use Value
ED	Education Level
EFA	Exploratory Factor Analysis
EFA	Extension of Park Area
EqS	Equivalent Surplus
EqV	Equivalent Variation
EV	Existence Value
FA	Factor Analysis
FEE	Entrance Fee
GEF	The Global Environment Facility
GFI	Goodness-of-Fit
GN	Gender
HQ	Habitat Quality
IBA	Important Bird Area
IFI	Incremental Fit of Index
INC	Income
INFO	Provide Information
IUV	Indirect Value
JNPC	Johor National Park Corporation
KMO	Kaiser-Meyer-Olkin
MFR	Mangrove Forest Reserve
ML	Gender
MRS	Marginal Rate of Substitution
MU	Marginal Utility
NMFS	National Marine Fisheries
NOAA	National Oceanic and Atmospheric Administration
NRCA	Natural Resource Conservation Authority
NUV	Non-Use Value
OV	Option Value
PES	Payments for Environmental Services
PG	Availability of Park Guide

PL	Protection Level
PRICE	Conservation Fee
RMSEA	Root Mean Square Error of Approximation
RS	Residential
RUM	Random Utility Model
RUT	Random Utility Theory
SEM	Structural Equation Modelling
SPA	Shadow Project Approach
SWM	Solid Waste Management
TEV	Total Economic Value
TLI	Tucker-Lewis Index
TPNP	Tanjung Piai National Park
TTWSC	The Transparent Tourist Watch Special Committee
UR	Residential
USFWS	U.S Fish and Wildlife Service
UV	Use Value
WO	Wildlife Species and Observation
WTA	Willingness To Accept
WTP	Willingness To Pa

CHAPTER 1

INTRODUCTION

1.1 Wetland

Wetland areas refer to the natural area that is often wet, but may not be wet all year round (U.S. Environmental Protection Agency, 2006). Wetlands can be categorized through soils, plants and hydrology. Traditionally, wetlands were exposed to harsh environment (Maltby, 1986; Mitsch and Gosselink, 2000). There are several useful services available to the societies and flora and fauna because of the wetlands' ability to function in the chemical cycles and hydrological, having a fertile biodiversity and having substantial food webs (Mitsch and Gosselink, 1993).

Today, we depend more on wetlands production and conserved lots of fossil fuels (coal and oil). Several of the greatest world's empires, for instance the Nile, Tigris-Euphrates, Niger, Mekong, Indus, and in the Yucatan peninsula were created and located in wetlands (Maltby, 1986; Mitsch and Gosselink, 2000). These wetlands provide many important services or functions for the humankind, for example defending and enhancing water quality, preparing habitat for the wildlife, strengthening fishing industry, storing floodwaters, offering opportunities for education and recreation, facilitating transport and pasture land. The wetlands are also part of cultural history, being the focal element of art, mythology, and religion (Barbier, 1994).

Although wetlands providing and support people's life through numerous functions and products, global wetlands are under dangers of destruction and deprivation. According to some experts, the world may have lost half of its wetlands since 1990 (Maltby, 1986). One main reason is that wetlands have been associated with disease, danger, and difficulty (Ramsar Convention Bureau, 1997). Hence, it results in negative impacts and ignorance towards their importance or confounding of the worth of the available services and goods, which lead to their transformation into rigorous agricultural, residential uses or industrial.

The estimation of the importance, or worth, of one or more of its wetlands services to society, we use economic value (U.S. Environmental Protection Agency, 2006). The economic valuation can be an effective tool to facilitate and enhance a prudent use and administration of the global wetland resources by offering the means for assessing and evaluating the various benefits of wetlands (Barbier et al., 1997)

1.2 Wetlands in Malaysia

The Malaysian Wetland Directory listed 105 wetland sites and the area of wetlands in Malaysia is extensive, which are located in the tropics with a long coastline[1]. The main wetland ecosystems found in Malaysia are the tropical peat swamp, river system, and mangrove forest.

Malaysia was signed the Ramsar Convention on Protection of Wetlands on year 1994. The country's first Ramsar Site designated was Tasik Bera. Tasik Bera is also located in Southwest in Pahang was the largest natural freshwater lake in the Peninsular Malaysia. Sited in the saddle of the main and eastern mountain ranges of the Peninsular, it is home to the Semelai community, one of the native communities in Malaysia. Tasik Bera has stayed a distant and unique wetland wilderness, which is bounded by a mixture of dry lowland forests.

Nevertheless, the three sites Johor wetlands located at Sg. Pulai, Pulau Kukup, and Tanjung Piai were the Johor greatest number of wetlands. The mangrove area north of Kuching (Kuching Wetlands) in Sarawak, has also been nominated as a Ramsar site. The utmost recent addition into the Ramsar list is Lower Kinabatangan–Segama Wetlands in Sabah.

1.3 Ramsar: the convention on wetlands

The Ramsar Convention is an international agreement that ensures the preservation of wetlands[2]**.** The only single group of ecosystem to have their own international convention are wetlands. In the 1960s, the call for wetland protection gained momentum mainly because of their significance as a habitat for migratory species. The Ramsar Convention, also known as the Convention on Wetlands of International Importance especially involving Waterfowl Habitat, was established at a city called Ramsar on the Iranian shores of Caspian in 1971. The Convention was surprisingly far-sighted for its time, recognising numerous essential principles, which are now broadly accepted: the interdependence of man and environment; the fundamental ecological functions of wetlands as regulators of water regimes; and the value of wetlands in economic, cultural, scientific, and recreational terms. This function of wetlands raised concerns on how it influences the cultural and mankind and economic welfare of its surrounding, where it has become further and more relevant over the first 25 years of Ramsar and will unquestionably be a major issue in the 21st century, especially when water supply will become even more scarce and vital.

Despite the Convention's primary concentration was on wetlands as a habitat for waterfowl, Ramsar has established into an international mechanism dealing with wetlands from a broader point of view. Ramsar persist the only international convention

[1] http://malaysia.wetlands.org
[2] http://www.mns.my

that concentrates on a particular type of ecosystem, which is the wetlands rather than on species or other issues. This approach is natural, given the widely held view that wetlands and forests are two of the most threatened ecosystems.

For the first time in an international convention, Ramsar establishes, two basic concepts; (i) The List of Wetlands of International Importance: a list of important sites proposed by member governments, who formally accept an obligation to maintain the ecological character of these sites, (ii) The principle of wise use of all the wetlands in the territory of a Contracting Party. A wise use of wetlands is considered as synonymous with sustainable use, a term which recently gained the general currency.

According to other convention, Ramsar is a living, evolving instrument. The emphasis in the early years was on the listed sites, the flagship concept, which attracted immediate attention and publicity. In recent years, the broader concept of a wise use has become increasingly important with the growing realization that the listed site could not be conserved in a vacuum, but are affected by decisions taken outside their boundaries; the crucial need is to integrate the conservation and the wise use of wetlands into a national land use and water management strategies.

Although the Ramsar text sets out the basic concepts, guidance is needed on how to put them into practice and how to adapt them to the changing world perceptions. In its first 25 years at their Conference of the Parties (normally held every three years), Ramsar member states have approved numerous interpretation of the text and mechanisms to make sure that the basic concepts of the Convention are effectively applied.

The best known obligation of Ramsar member states is to include at least one wetland from their territory (which may be the states' or privately owned areas) in the List of Wetlands of International Importance. Wetlands on the list are often called 'Ramsar sites'. This is the traditional protected approach to conservation, elevated to an international level. Those sites are not merely a national park or reserve; governments accept an undertaking before the world community maintains the ecological character of Ramsar sites, thus making a direct contribution to the conservation of the wetland biodiversity. As of 13th July 2012, there were 160 Contracting Parties to the Convention on Wetlands (Ramsar Convention), with 2,005 wetlands sites, making a total of 192,819,251 hectares that were designated for the inclusion in the Ramsar List of Wetlands of International Importance[3].

1.3.1 Ramsar sites in Malaysia

There are currently 6 Ramsar sites in Malaysia with a total surface area of 134,158 hectares[4].

[3] http://www.ramsar.org
[4] http://www.ramsar.org

i) Pulau Kukup State Park

Pulau Kukup is a mangrove island located about 1 km offshore from the south–western region of Johor, Peninsular Malaysia. It is a small mangrove island (approximately 647.2 ha) surrounded by mudflats (about 800 ha). The island experienced extensive harvesting for mangrove wood back in the 80s, nevertheless, the wood extracting operations from this island had ceased since August 1993. The regeneration of mangrove tree species has indeed taken place since then.

Pulau Kukup was officially gazette as a State Park under the Johor State Park Corporation's jurisdiction on 27th March 1997. The objective of turning this island into a state park was to promote the preservation of this habitat in Peninsular Malaysia, as well as to promote the eco-tourism sector and to provide research venues.

The main reason of turning Pulau Kukup into a state park was for conservation purposes, where the Johor State Park Corporation strongly believed that an ecological assessment of the whole island was needed as data on the natural resources of Pulau Kukup are very scarce.

ii) Sungai Pulai Wetland

The Sungai Pulai wetland, which are largely occupied by the Sungai Pulai Mangrove Forest Reserve (MFR), consist of mangrove (estuarine, riverine, and dryland), intertidal mudflats, seagrass bed and freshwater riverine forests. Sungai Pulai MFR remains as the largest intact block of mangrove forest in Johor and the largest remaining intact riverine mangrove area in Peninsular Malaysia.

The Sungai forms the district boundary between the mangrove forests that are located in Pontian and Johor Bahru. The Sungai Pulai itself is of major ecological importance because of its continuous input of freshwater into the upper reaches of the Sungai Pulai estuary.

The mangrove of Sungai Pulai MFR is a typical example of a Rhizophora mucronata-Bruguiera parviflora that dominated the forest's production. It has been intensively managed for the forest products on a rotational basis for at least 50 years. Sungai Pulai MFR is home to about 24 'true' mangrove plant species as well as 21 more mangrove-associated species, which demonstrates a high species richness in the area

Out of these, three plant species are found to be notably uncommon, *Avicennialanata* (an endemic species), *Bruguiera sexangula*, and *Podocarpus polystachus*. The Sungai Pulai MFR is also rich in fauna: birds (53 species), mammals (26 species), reptiles (12 species), amphibians (7 species), fish (111

species) as well as benthic organisms (39 species). Species of conservation value include the following: bird species, such as the Mangrove Pitta, Mangrove Blue Flycatcher, and Mangrove Whistler; and mammals, such as the Long-tailed and Pig-tailed Macaques, Common and Brushed-tailed Porcupines, Wild Pig and Lesser Mouse Deer, Slow Loris, Dusky Leaf Monkey, Leopard Cat, Scaly Ant-eater, Smooth Otter and the Bearded Pig. Mangrove-dependent commercial fish species, such as Sea Bass, Mangrove Snapper, Grouper and Marine Catfish are also found here.

As a unique, contiguous mangrove area in the south-west Johor region, the Sungai Pulai MFR has important ecological functions (sediment retention, nutrient retention, toxicant removal), in harbouring economically viable wetland products (timber and fisheries), for providing physical functions (coastal protection from strong wind and sea currents, water transport), in supporting spectacular biological diversity and in providing critical habitats in the life cycles of notable flora and fauna. The Sungai Pulai MFR is managed primarily for commercial wood production using the silvicultural system that requires the clear felling of trees under a 20-year rotation. About 80% of the Sungai Pulai MFR consists of mangrove stands of less than 20 years of age. The current sustainable forestry practiced by the State Forestry Department at the mangrove reserve is well-documented. With some form of mangrove management in operation since 1928, it appears that the forest management practices in the Sungai Pulai MFR comply very well with the Ramsar Convention guidelines for the implementation of the wise-use concept of wetland resources.

iii) Tanjung Piai National Park

The Tanjung Piai wetland consists of coastal mangroves and intertidal mudflats. It forms the only mangrove corridor that connects Pulau Kukup and Sungai Pulai wetlands. Five rivers dissect the Tanjung Piai National Park. The mangrove in this National Park is a typical example of a *Rhizophora apiculata-Bruguiera cylindrica* dominated coastal forest.

The mudflats however are extensive, namely at the southern-most tip of Tanjung Piai. Five species of large waterbirds and seven species of shorebirds were seen to be feeding on these mudflats. These include the migratory species, such as the Grey Plower, Whimbrel, Common Redshank and Greenshank, Terek Sandpiper and Common Sandpiper. The mangroves of Tanjung Piai have been conserved in the past for the protection of the shoreline, as the immediate hinterlands are all cultivated farmlands.

Bunds were created along the west and east coasts of Tanjung Piai to protect the farmlands from being inundated by salt waters. Tidal currents heavily erode Tanjung Piai with the coastal mangrove fringes being reduced to 50m at certain stretches. The Tanjung Piai State Park is home to about 20 'true' mangrove plant species as well as 9 more mangrove-associated species, which demonstrates high species diversity in such a small area.

This mangrove area is also rich in fauna: birds (41 species), mammals (7 species), reptiles (7 species), and amphibians (1 species). Species of conservation value include the following: the threatened resident stork Lesser Adjutant; the rare or uncommon species of waders (shorebirds), such as the Malaysian Plover, Spotted Greenshank, Asian Dowitcher, Spoon-billed Sandpiper and Chinese Crested Tern; and mammals, such as the Dusky Leaf Monkey, Smooth Otter, Long-tailed and Pig-tailed Macaques, Wild Pig and the Flying Fox.

iv) Tasek Bera Peatswamp

Tasek Bera is Malaysia's first Wetland of International Importance. It is located in the southern central part of Peninsular Malaysia, in the state of Pahang.

Tasek Bera is a lowland alluvial riparian swamp system, which lies within the catchment of Sungai Pahang, the Peninsular's largest river. The wetland system consists of a dentritic complex of inflowing streams and swamps, measuring 34.6 km long by 25.3 km wide. The catchment area of Tasek Bera is around 61,380 ha. The Ramsar Site of 31,120 ha includes over 6,800 ha of wetland habitats.

v) Kuching Wetlands National Park

A saline mangrove system in Sarawak with flora comprising predominantly the genera *Rhizophora, Avicennia,* and *Sonneratia.* The site harbours noteworthy species, such as Estuarine Crocodile (*Crocodylus porosus),* Proboscis Monkey (*Nasalis larvatus*) (endemic to Borneo and listed as 'Endangered', IUCN Red List), Lesser Adjutant (*Leptoptilos javanicus* ('Vulnerable')), and Griffith's Silver Leaf Monkey (*Trachypithecus villosus*). The site has a value of a breeding and nursery ground for fish and prawn species where 43 families of fishes and 11 species of prawns have been recorded, many of which are commercially important.

Its proximity to the city of Kuching, the Damai resort complex, and two other national parks renders it of high potential value for tourism, education and recreation. The area is historically important: there was a Chinese settlement there probably as early as the 1st century AD, and early Malay, Hindu and Buddhist relics from the 9th century AD that have been excavated at the Santubong Village. The discovery of gold made the area an important trading and iron mining center from the 7th to the 13th centuries; some enigmatic rock carvings of human figures remained from this period. In the 15th century, Santubong was the site of the original Brunei Malay capital of Sarawak.

vi) Lower Kinabatangan-Segama Wetland

The site lies along the east coast of Sabah. It is mainly within the administrative district of Kinabatangan, with the northern tip under the administrative district of Sandakan. The nearest town is Sandakan, which lies to the northwest of the site. The main access to the site is by boat. A total of 78,803 hectares (ha); comprising the three Forest Reserves: Trusan Kinabatangan Forest Reserve (40,471 ha),

Kulamba Wildlife Reserve (20,682 ha), and Kuala Maruap and Kuala Segama Forest Reserve (17,650 ha).

This is the 6th Ramsar site in Malaysia, but the new listing will make the area not only Sabah's first Ramsar site but also Malaysia's largest, extending over 78,803 hectares of mangrove forests and peat swamp located on the east cost of Sabah. The site comprises three forest reserves: Trusan Kinabatangan Forest Reserve (40,471 ha), Kulamba Wildlife Reserve (20,682 ha), and Kuala Maruap and Kuala Segama Forest Reserve (17,650 ha). This area is even larger than the total area of the previously designated five Ramsar sites in Malaysia (55,355 hectares).

The site was recognised as an internationally important wetland for its undisturbed ecosystem, such as the mangrove forest, rare peat swamp forest, and many more, containing a number of rare, endangered and threatened species, such as the Sumatran rhinoceros, proboscis monkey, tembadau, Borneo pygmy elephant, Storm's stork, rhinoceros hornbill, oriental darter, and dipterocarp species. The site was also recognised as ecologically important to provide spawning and nursery grounds for fish and prawns.

The Lower Kinabatangan-Segama Wetlands in Sabah was officially designated as Sabah's first and Malaysia's largest Ramsar site at the 10th Conference of the Contracting Parties of the Ramsar Convention on Wetlands (Ramsar COP10) in Korea, in October 2008

Table 1.1: Malaysian wetlands under Ramsar convention

Country	Site	Date of Designation	Region, Province, State	Area (ha)	Coordinates
Malaysia (6)	Pulau Kukup	31/01/03	Johor	647	01’19”N 103’25”E
	Sungai Pulai	31/01/03	Johor	9,126	01’23”N 103’32”E
	Tanjung Piai	31/01/03	Johor	526	01’16”N 103’31”E
	Tasek Bera	10/11/94	Pahang	38,446	02’58”N 102’36”E
	Peatswamp Kuching Wetlands	08/11/05	Sarawak	6,610	01’41”N 110’14”E
	National Park Lower Kinabatangan-Segama Wetland	28/10/08	Sabah	78,803	05°38’N 8°35’E

(Source: http:://www.ramsar.org)

1.4 Background of Tanjung Piai National Park

Tanjung Piai is also known as "The Southernmost Tip of Mainland Asia". Tanjung Piai is named after this fern locally known as "Paku Piai". It is a type of fern that can live in saline condition. Tanjung Piai is also home to many species of mangrove plants and animals. Tanjung Piai National Park (Ref: 1289) wetland that is designated on 31/01/03; 526 ha; 01'16"N 103'31"E, is a State Park consisting of coastal mangroves and intertidal mudflats. According to the Wetlands International, Johor holds 28.7% of mangrove forest in Peninsular Malaysia (27,733 ha) or 4.7% of the total mangrove forest in Malaysia. Tanjung Piai covers 526 hectares of mangroves and another 400 hectares of intertidal mudflats. Mudflats are soft and muddy soil. It has a high salt content and low oxygen levels (anaerobic). However, they are subject to hot and dry conditions.

Situated in Mukim Serkat and about 90km from Johor Bahru's city centre, Tanjung Piai offers a scenic view of the Straits of Malacca. It is also a place where the earth, sea, plant, and animal life live in blissful harmony.

Tanjung Piai is one of the largest mangrove habitat in the world. Its mangroves were gazette as the Mangrove Forest Reserves (MFR) in Johor and are managed by the State Forestry Department. Mangroves was gazette as the National Parks and RAMSAR sites by the State Government of Johor and are managed by the Johor National Parks Corporation (JNPC). It forms the only mangrove corridor that connects Pulau Kukup and the Sungai Pulai wetlands. Five rivers dissects the Tanjung Piai State Park. The mangrove in this National Park is a typical example of *Rhizophora apiculata-Bruguiera* cylindrical dominated coastal forest. The Mudflats however are extensive, namely at the southernmost tip of Tanjung Piai.

Figure 1.1: Johor map

There are the two entry points to Tanjung Piai; the one at Sungai Belukang and the other at Desa Sri Piai. Entry into the Tanjung Piai park requires a minimal fee of just RM10 for Malaysians and RM20 for foreign visitors that are payable at the Tanjung Piai's visitor complex.

1.4.1 Objective of existence of national park

According to the national park act 1980, section 4, the objective of the national parks existence are:

i) To conserve and protect wildlife, fauna and other elements that have value aside from archelogy, enthnology, history, sciences, and nature.

ii) By conserving the wetlands, it can be used to improve education, health, estatic value, and recreation.

Figure 1.2: Tanjung Piai National Park map

1.4.2 Functions of Tanjung Piai National Park

The Tanjung Piai National Park is also associated with the wetland area. The wetland functions include the physical, chemical and biological interactions within a wetland (Kent, 1994). The ground water recharge and discharge, nutrient cycling, flood water storage, fish, waterfowl and wildlife habitat are the functions of resource of the wetland outputs that societies values.

Two other types of values that are related to wetland outputs include the ecological and economic value. The ecological value is the contribution of wetland to a larger ecosystem. The utility or satisfaction that society receives from the wetland is considered as the economic value (Leitch and Hovde, 1996). Sometimes, the location of the wetland will also affect its value. It is important that a functional wetland analysis take into consideration the interactions between wetlands and their surroundings.

1.4.3 The other role of Tanjung Piai National Park

i) To make sure a continously clean water piping with large capacity.
ii) Provide research and education opportunity in field of genetic, species, and various ecosystem in context of improvement local development.

iii) Provide a platform for conservation learning and protection of nature to student, local community and the public.
iv) Provide nature area for recreation activity and ecotourism.
v) Offer job opportunity for local communities related to ecotourism.

1.4.4 Sizes, importance and naturalness

Tanjung Piai National Park covers an area of over 526 hectare, which is the smallest wetland in Malaysia (Table 1.1). It has been recognised as a Wetland of International Importance, and as a part of the Important Bird Area (IBA) of the southwest Johor, which extends from Parit Jawa to Tanjung Piai. In addition, it was designated as a Ramsar site in 2003, and it is one of the Ramsar site in Malaysia.

The wetland retains a high degree of naturalness, both in physical and landscape terms, as well as in its hydrology and ecology. Man made changes in the hydrological regime, industrilization and development, oil spills and cumulative effects of erosion, caused by relentless waves of Malacca Straits, are all threatening this naturalness. Furthermore, a number of exotic fish species are affecting the naturalness of the endemic fauna.

1.4.5 Main habitat

Mangroves

The mangrove ecosystem is where the land, salt water from the sea, and fresh water from rivers meet. It is a habitat teeming life.

Flora and fauna in this ecosystem have adapted in different ways to survive. Plants sport special roots that anchor them firmly in mud, while helping them to breathe in sulfur rich soil that is lacking oxygen. Fish too evolved a unique breathing system that allowed them stay out of water for extended periods to feed on mudflats.

Mangrove forests a major role in maintaining the wellbeing of the coastal and marine habitats. They form sheltered eco-system that is ideal for spawning and breeding by fish, prawn and other marine species. Besides absorbing access water to prevent floods, they also serve as natural water filters for the environment. Their complex root system provides a useful buffer between the sea and land, hence, preventing coastal erosion.

In a habitat that seems inhospitable to the plant life, it comes as a surprise to see the abundance of flora. The mangrove tree is a good example of a particularly well adapted plant in an environment where it must cope with tidal flooding at least once a day. Different families of mangrove have evolved in having different means of overcoming problem, such as high salt content, lack of oxygen, and the effect of tides on the pre-germinating seeds.

Tanjung Piai National Park has about 20 'true' mangrove plant species as well as 9 more mangrove-associated species with various adaptation that address the environmental challenges. The typical example is the Rhizophora apiculata-Bruguiera that cylindrical uses resorts to special filtration cells with extensive stilt like roots providing stability at the base.

Although having an unfavourable profile, the mangrove forest is teeming with life. In fact, it is an ideal habitat for fauna that are well adapted to its peculiarities. Tanjung Piai National park is also rich in fauna where the park is home to no less than 41 species of birds, 7 species of mammals, 7 species of reptiles and a host of invertebrates.

Species of conservation value include the following: the threatened resident stork Lesser Adjutant; the rare or uncommon species of waders (shorebirds), such as the Malaysian Plover, Spotted Greenshank, Asian Dowitcher, Spoon-billed Sandpiper and Chinese Crested Tern; and mammals, such as the Dusky Leaf Monkey, Smooth Otter, Long-tailed and Pig-tailed Macaques, Wild Pig and the Flying Fox.

1.4.6 Programmes and Plans to advertise Tanjung Piai National Park

i) Program of Biodiversity

Biodiversity program was created for scholars around Johor. The objective of this program is to publicize the nature reserve to all residence. Students were chosen because they are future leader and possess the potential to preserve and protect our nature. This program is held twice in a month for three days. Johor National Park Corporation (JNPC) supported all expenses during this program (free food and campaign equipment) where there were various activities available, such as exploring the national park, jungle tracking, compass reading and many more.

ii) Meeting with local people

This plan was lead once in two to three month. It began with the village around the Tanjung Piai National Park. The purpose of this plan is to disseminate the Tanjung Piai National Park to the local people as a choice of holiday for their family. The objective of this plan is so the local people realize on the existence of the reserve area and conserve it together as a unique heritage for the next generation.

1.5 Problem Statement

Malaysia coastline, which is located along the East Asian-Australian Flyway, is one of the mainly important wintering grounds for the Endangered Nordmann's Greenshank and the wintering Vulnerable Chinese Egret (http://malaysia.wetlands.org). Nevertheless, the number of water birds in Malaysia appeared an overall decrease of 22% since 1983, based on two decades of data analysis.

Due to the increasingly heavy population and developmental demands, the coastal habitats throughout the world are in danger of destruction. Mangrove has been distinctly in danger to misuse because they comprise valuable wood and fisheries resources, where they also occupy the coastal land that is easily transformed to other uses.

Although vary between progressive instruments were being undertaken by the Malaysian government, wetlands in Malaysia remain to be danger. Land use conversion, pollution, reclamation are threats that affect all wetlands ecosystem. Mangroves in Malaysia have deteriorated over 45% from projected of 1.1 million hectares to the present estimate of 564,970 hectares[5].

During 1970's and early 1980's, Johor underwent a period of rapid industrialization and development, Tanjung Piai too was caught up in this transformation and large parcels of land in the area were given over for agricultural, farming and aquaculture projects. The intensive shrimp farming is the one of biggest threat in mangrove conservation, particularly direct to the use of chemicals and laboratory-bred larvae (http://malaysia.wetlands.org). Dramatically over the past three decades, the scale of human impact on mangrove has increased with many countries appearing losses of 60-80% or more of the mangrove forest cover that lasted in the 1960s (Macintosh et al., 2002).

Nowadays, the Tanjung Piai National Park became a popular destination of ecotourism. The number of tourists increases every year. According to the Johor National Park Corporation (JNPC), table 1.4 shows that in 2010, the total number of visitors, which is 55, 812 increases to 62,181 in 2011, then increases again to 72,932 in 2012. This situation has both pro and cons impacts. In a positive aspect, it be able to generate income for the local residents that joined the marketable activities around the national park. In contrast, when its popularity increases, the many visitors that came will also increase rubbish, waste and debris problem in this area.

Furthermore, Tanjung Piai National Park is suffering from the cumulative effects and severe erosion caused by the relentless waves of the Malacca Straits, which is the world's busiest waterway. As projected 29% of the country's 4,000km of coast were categorized as having critical erosion. Tanjung Piai, the southernmost point of Asia's mainland is one of them.

However, conservation of the national parks could turn into a main issue to the management authorities as they are costly and is challenging to sustain. To reduce the negative effect that the Tanjung Piai National Park currently faced, we want to promote to increase the entrance fee. It is because the present entrance fees are comparatively low as compared to the conservation costs.

[5] http://malaysia.wetlands.org

From the estimation of biodiversity in Tanjung Piai National Park Johor which includes the management and conservation of the natural biodiversity aspects, it is hoped to help and assist the policy makers in determining the relevant policies for a sustainable management and conservation. In order to examine these two aspects, which are alternative management and conservation options in the national park biodiversity, we will use the Factor Analysis & Choice Experiment method.

Table 1.2: Tourists Arrival in Tanjung Piai National Park

Date		Local	International	Total
2010	January	2659	880	3539
	February	4521	1402	5923
	March	3211	1729	4940
	April	2116	442	2558
	May	3695	619	4314
	June	4625	544	5169
	July	3017	637	3654
	August	2673	683	3356
	September	3396	153	3549
	October	4216	283	4499
	November	5966	497	6463
	December	7375	482	7857
TOTAL		**47470**	**8342**	**55812**
2011	January	3165	475	3640
	February	5132	619	5751
	March	3684	675	4359
	April	3601	483	4084
	May	4790	209	4999
	June	5722	279	6001
	July	4778	562	5340
	August	1744	524	2268
	September	3222	525	3747
	October	5514	344	5858
	November	8124	440	8564
	December	7290	280	7570
TOTAL		**56766**	**5415**	**62181**
2012	January	6081	744	6825
	February	3606	1008	4614
	March	4958	1067	6025
	April	4087	403	4490
	May	5446	551	5997
	June	6594	614	7208
	July	2912	626	3538
	August	4371	408	4779
	September	5694	418	6112
	October	6088	437	6525
	November	7530	414	7944
	December	8606	269	8875
TOTAL		**35303**	**37629**	**72932**

(Source: Johor National Park Corporation, 2012)

1.6 Research objectives

The objective of this study is to explore the values of wetland biodiversity in Tanjung Piai National Park, Johor (TPNP) by using the economic tools to help develop the management policies to enhance the contribution in the conservation and sustainable development in Malaysia. To achieve the stated goal, the following specific objectives are sought in this study:

1) To analyze the perceptions and attitude of the visitors towards TPNP.
2) To estimate the visitors' willingness to pay for the conservation and management in TPNP.
3) To measure the visitors' preferences towards the wetland biodiversity attributes contribution in TPNP.

1.7 Significance of the research

This research is conducted in expectation to contribute some significance of the study to several parties:

Policy maker

This study could help and facilitate the policy maker agencies, particularly the government and private sectors in providing any useful guidance for decision makings in order to distinguish real matters and problems, which could be valuable for the improvement and conservations of that area. The policy maker should take any possible actions in order to create new policies, such as initiating the environmental friendly instruments or tools will be used to maintain the heritage of the TPNP.

Academic contributions

This study would help future academic researchers for further explanations of their studies or research in the future, or can be done as a reference. Furthermore, this study can also be used as a guide to deliver the similar research in this area, the future researchers could seek the other literature gap by verifying any other issue that occur and are more significant to the studies.

Public awareness

The findings of this research also should be used as an approach that could create the awareness among the public towards the environment, particularly TPNP, Johor. Furthermore, this study expects to attain more information in designating perception visitor's attitude, and their willingness to pay (WTP) for the wetland conservation in TPNP.

1.8 Organization of Thesis

This thesis is organized into five chapters. The first chapter includes on the introduction, background of the study area in Tanjung Piai National Park, Johor (TPNP), research problem, the study objectives, significance of the study, and presents the basic info and perspective of research area. The review of literatures related to the present research will be discussed in the second chapter. In chapter three, the theoretical framework will be discussed. Estimation techniques and data collection will also be presented in this chapter. The results and related analysis of this research will be explained in chapter four. Chapter five consists of summary of the research results, along with the conclusion and implications for the policy and future studies.

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