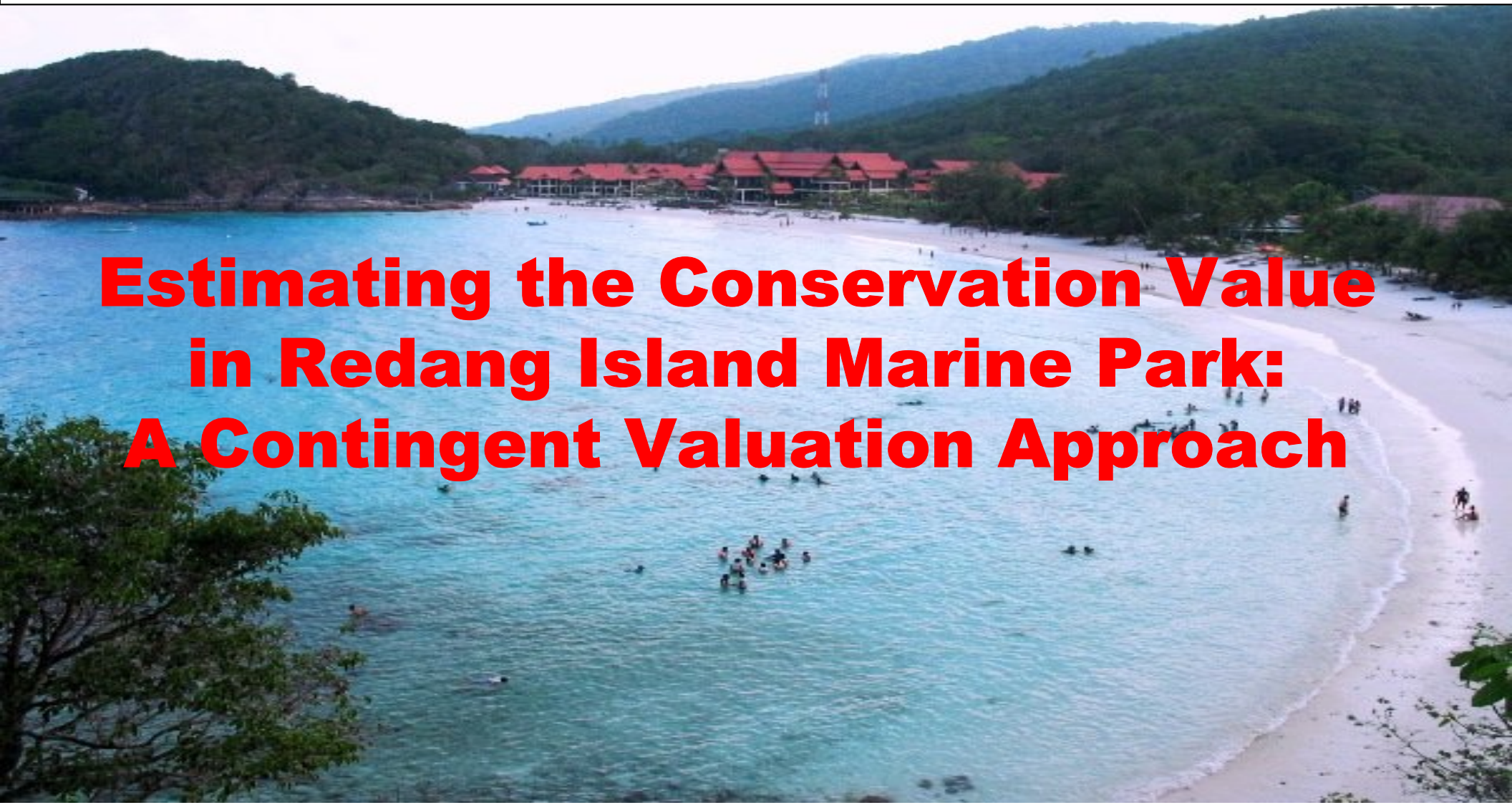
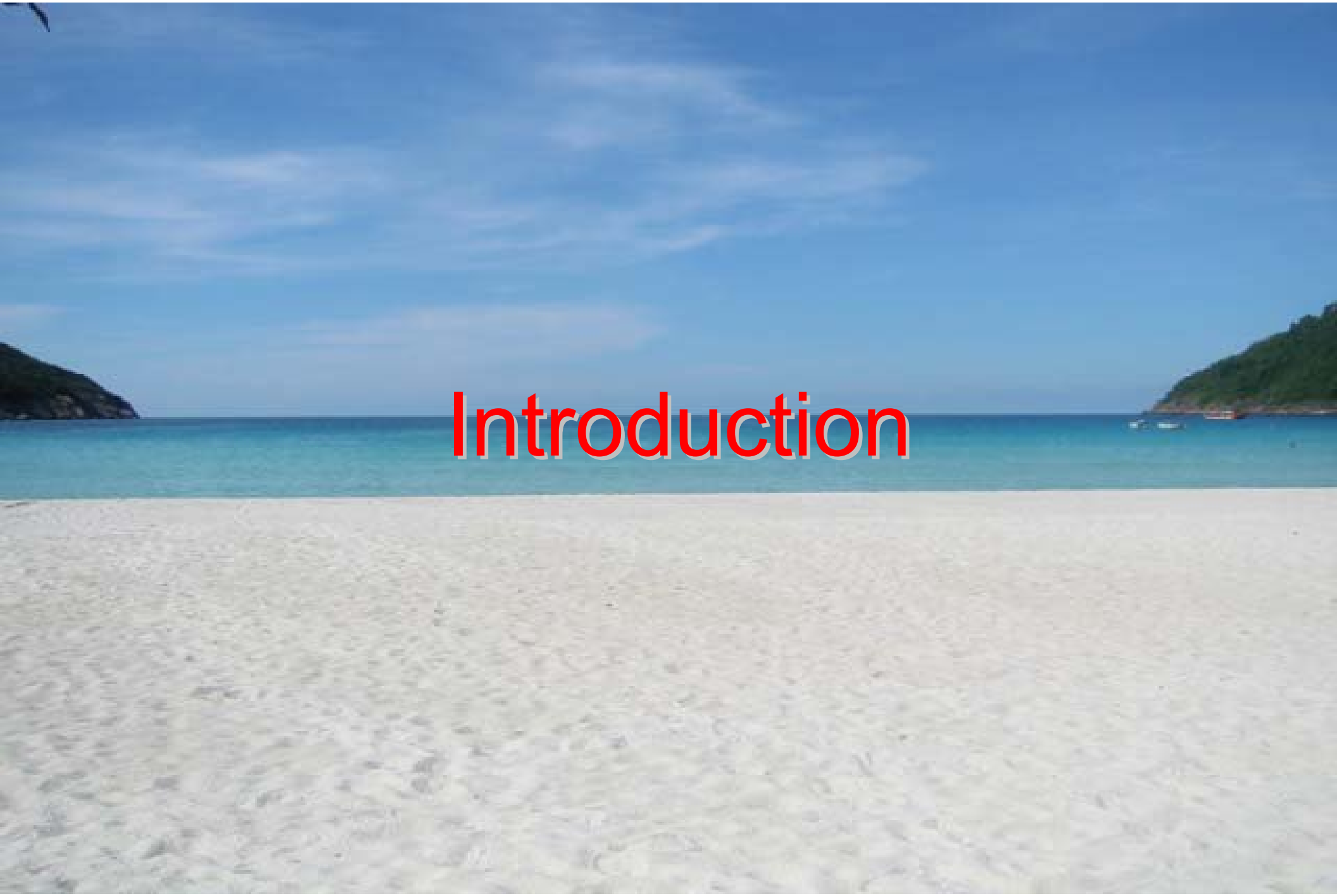
The Regional Training Workshop
Economic Valuation of the Goods and Services of Coastal Habitats
March 24 – 28, 2008
Samut Songkram Province, Thailand



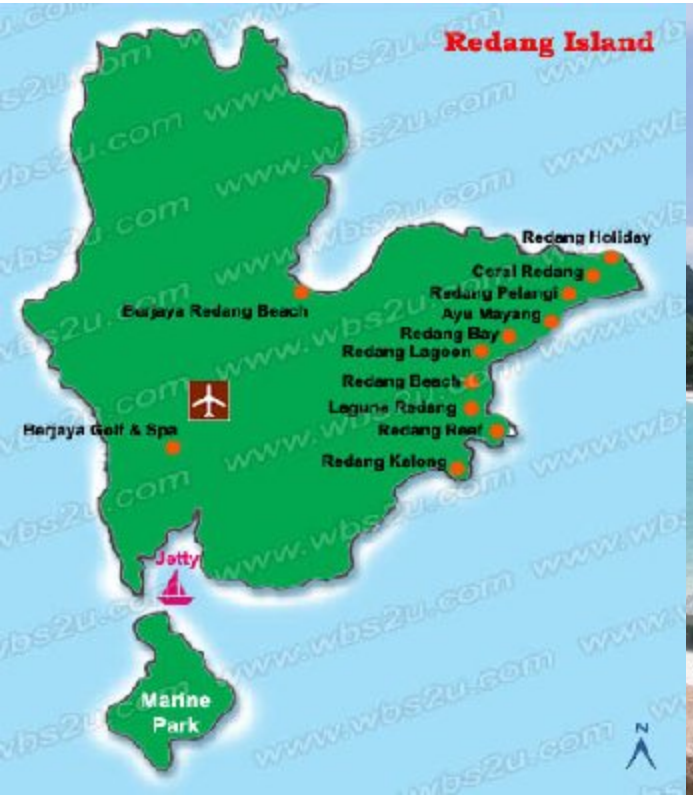
Estimating the Conservation Value in Redang Island Marine Park: A Contingent Valuation Approach


Introduction

Redang Island Marine Park

The beautiful island of Pulau Redang lies about 45 km north-northeast of Kuala Terengganu, or 22 km off Tanjung Merang, the closest point on the mainland. The Bugis people from Celebes, Indonesia were believed to be the first settlers on the island. Many of their descendants are now working the tourist trade in Redang while others have moved to the mainland.

Over the years, Redang has grown to be one of the most popular destinations for tourists and divers due its pristine nature and rich marine environment. In 1991, the Redang archipelago was gazetted as the Pulau Redang Marine Park, becoming a protected site under the Government.



The Redang archipelago constitutes the islands of Pulau Redang, Pulau Lima, Pulau Paku Besar, Pulau Paku Kecil, Pulau Kerengga Kecil, Pulau Kerengga Besar, Pulau Ekor Tebu, Pulau Ling and Pulau Pinang.

Pulau Redang at 7 km long and 6 km wide is the largest island. The highest peak is Bukit Besar at 359 metres above sea-level. Only the bigger islands like Redang, Lang Tengah, Perhentian and Kapas have resort facilities for visitors.

Marine Park

Visitors can come here to learn about marine park conservation besides engaging in their own diving and snorkelling activities. The sea bed around the island holds a magnificent variety of life, including moray eels, giant groupers and clown fish. There is also shipwreck close to the jetty which is perfect for exploration through snorkelling.

Many resorts will offer snorkelling in their packages. Pasir Panjang, which is a nesting bay for baby sharks, is the top place to snorkel. Scuba-diving is the second most popular activity; the waters are crystal-clear and you can glimpse all manner of sea creatures in the water. Resorts on the island do offer scuba equipment and diving classes to cater to all ages.

You can also kayak around the island and play beach volleyball, but jet-skis and water-skiing is banned to protect the tranquillity and quality of the marine environment. Fishing is also banned but outside a two-mile boundary around the island, angling is permitted.

Turtle-Watching

There are three species of turtles that come to Redang to nest – the Green Turtel, Olive Ridley and Hawksbill. Green turtles next between March to December with a peak in August, and January to September for Hawksbills and Olive Ridleys in May.

The nesting points include Pasir Chagar Hutang, Pasir Mak Simpan, Pasir Mak Kepit, Pasir Bujang and Teluk Dalam.

Visitors can also visit SEATRU, a large green turtle nursery and turtle conservation centre, perhaps even volunteer to help in collecting eggs and incubating them till they hatch upon which the baby turtles will be released into the sea.

Jungle-Trekking

There are several trails to explore the rainforest on the island, conveniently located behind some of the premier resorts. Going off the beaten track will lead you to scenic hilltops and rocky cliffs that offer panoramic views of the island and sea. A guide is recommended for these kinds of journeys.

Redang's mangroves are also home to a rich variety of coastal life. Creatures you can see here include crabs, mudskippers, birds, monitors and much more. Deeper within the forest, visitors can glimpse rare orchids and beautiful trees. As it is a small island, only tiny animals such as the mouse deer, monkeys, some bats and jungle rodents can be seen, but it is still worth checking out.

Birds that can be seen here include the olive-backed sunbird, dark-necked tailorbird, terns, pink-necked pigeon, swiftlets and white-bellied sea eagles. Black-nest swiftlets and white-nest swiftlets often make their nests in the many cliffs and sea caves on Redang. The bird's nests are collected during certain times of the year as they are believed to hold therapeutic properties when ingested in soup form.

Sustainable Ecotourism Management

"To meet the needs of present and future generation without jeopardizing the ability of natural resources to be developed, managed and conserved in terms of economic, social, and ecology……."

Concept and Fundamental of Ecotourism Development

- **Environmental conservation**
- **Generate national economy**
- **Generate local economy benefits**
- **Satisfaction to visitors**

Marine Parks in Malaysia

- Dual functions: conservation of the marine environment and ecotourism destination (business)
- Attractions: biological richness of marine resources, mangrove, coral reefs, fish, turtle,Coastal vegetation, beautiful beaches
- Main ecotourism activities: snorkeling and scuba diving
- Major Issues in Marine Parks
  - Entrance fee practice 'conservation fee' is very low; RM5 (US1.3) for domestic and international visitors
  - open access; multiple entrances exist
  - Over use; peak season such as school holiday


Objective of the Study

To estimates the conservation value of the ecotourism destination in Redang Island Marine Park by using environmental economics tools,

A Contingent Valuation Method


Methodology

Logistic regression technique was used to estimate WTP. Using this approach the probability of saying "YES" to a bid at different level of the independent variable is estimated as:

$$P = (1 - e^{x})^{-1}$$

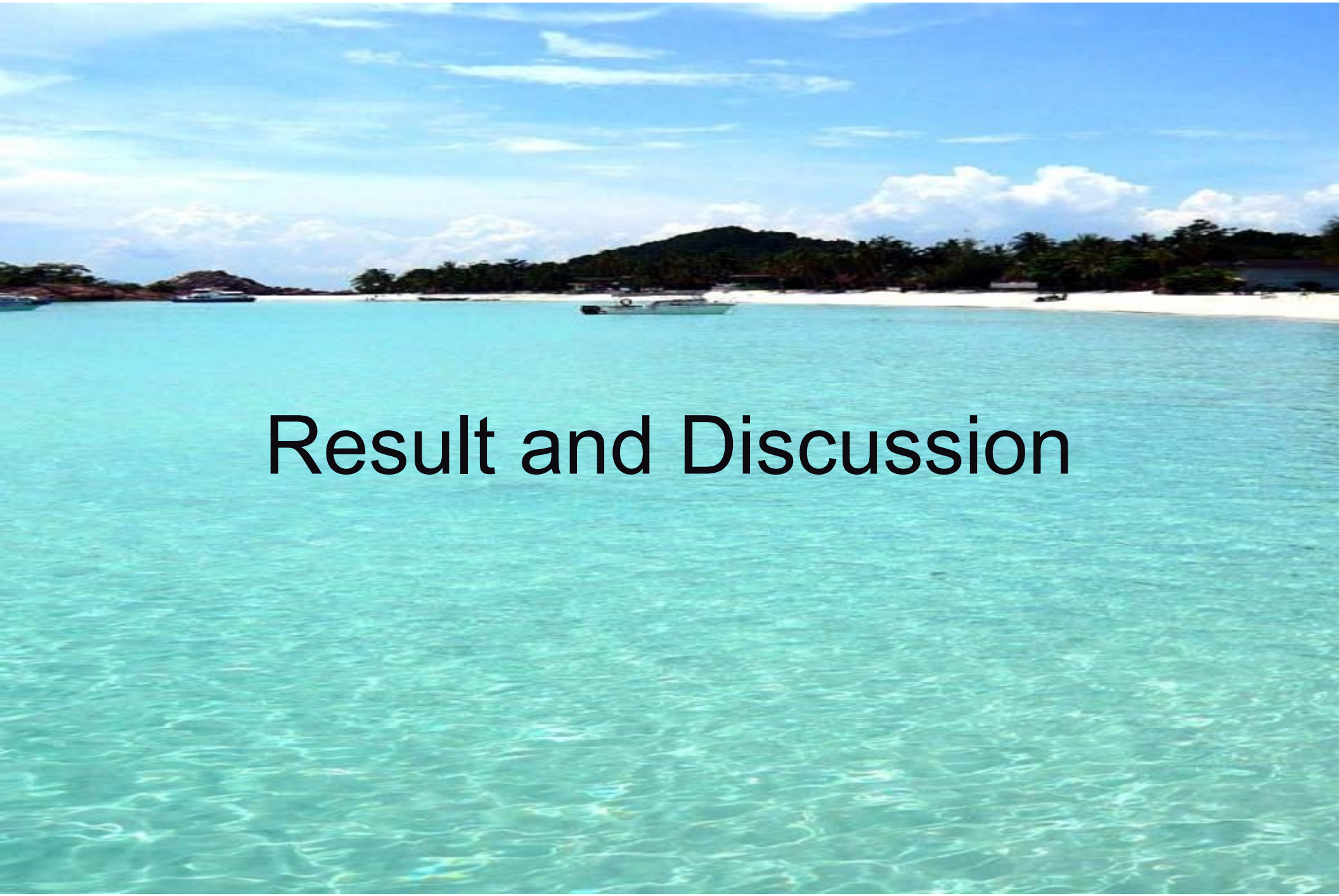
Where x = estimated regression logit equation
P = the probability of accepting the price.

Mean WTP is estimated as the area under this probability function

$$E(WTP) = \int_{L}^{U} (1 + e^{a + bPRICE})^{-1} \, dPRICE$$

'If entrance fees are charge by RM x, would you willing to pay so that you could continue to use this recreational area?'

X = RM6, 7, 8, 9, 10, 11, 12
215 numbers of respondents



Result and Discussion

Socio-economic Characteristics of Respondents

	Frequency	Percent
Employment Status		
Student	13	6.05
Self-employed	24	11.16
Work with government	28	13.02
Work with private sector	131	60.93
Retired	6	2.79
Housewife	10	4.65
Unemployed	3	1.4
Income		
Less than RM1000.00	11	5.12
RM1001 - RM 2000	85	39.53
RM2001 - RM3000	43	20
RM3001 - RM4000	22	10.23
RM4001 - RM5001	16	7.44
More than RM5000	38	17.67
Respondent Origin		
International tourist	51	23.72
Local tourist	164	76.28
Age		
Less than 20 years	8	3.72
21 - 30 years	91	42.33
31 - 40 years	62	28.84
41 - 50 years	32	14.88
51 - 60 years	18	8.37
More than 60 years	4	1.86
Gender		
Female	90	41.86
Male	125	58.14
Race		
Malay	94	43.72
Cjinese	108	50.23
Indian	2	0.93
Others	11	5.12
Education Level		
Primary school	8	3.72
Secondary school	57	26.51
College/institute	51	23.72
University	99	46.05
Marital status		
Single	86	40
Married	126	58.6
Widow	3	1.4

Parameter Estimates for Dichotomous Choice Model for Pulau Redang Marine Park

	Logit Model	Probit Model
Intercept	3.0850 (2.9151)*	1.8914 (2.9974)*
PRICE	-0.2257 (-2.4263)*	-0.1413 (-2.4899)*
INCOME	0.00019 (2.2759)*	0.00012 (2.3360)*
Local Tourist	-1.3903 (-2.5852)*	-0.8232 (-2.7265)*
Log-likelihood	-120.7700	-120.3300
MCFADDEN R-SQUARE	0.1314	0.1346
% Right Prediction	66.98	66.98

Estimating of Mean WTP for Pulau Redang Marine Park

Model	Tourist Origin	WTP (RM)
Logit Model	Local tourist	7.84
	International tourist	10.63
Probit Model	Local tourist	7.11
	International tourist	9.81

Additional Net Benefit of the Park

	Foreign Visitors		Domestic Visitors		
	No.	Value	No	Value	Total
1990	130	1,380.60	577	4,523.68	5,904.28
1991	787	8,357.94	3,938	30,873.92	39,231.86
1992	1,131	12,011.22	4,930	38,651.20	50,662.42
1993	1,235	13,115.70	6,413	50,277.92	63,393.62
1994	1,970	20,921.40	6,379	50,011.36	70,932.76
1995	4,035	42,851.70	18,690	146,529.60	189,381.30
1996	7,755	82,358.10	26,988	211,585.92	293,944.02
1997	5,940	63,082.80	30,258	237,222.72	300,305.52
1998	7,544	80,117.28	26,922	211,068.48	291,185.76
1999	7,559	80,276.58	39,449	309,280.16	389,556.74
2000	9,244	98,171.28	43,390	340,177.60	438,348.88
2001	8,041	85,395.42	65,539	513,825.76	599,221.18
2002	7,563	80,319.06	56,263	441,101.92	521,420.98
2003	4,565	48,480.30	71,654	561,767.36	610,247.66
2004	31,251	331,885.62	111,225	872,004.00	1,203,889.62
2005	24,296	258,023.52	98,863	775,085.92	1,033,109.44


Conclusion

The implication of this study is important as a guideline to assist the decision-makers in terms of welfare measures such as recreational benefits especially considering the importance of our natural resources in order to meet developmental needs and other economic activities. This kind of study depicts how environmental valuation exercise can be a useful tool which is able to estimate the recreational benefits in supporting the decisions whether or not a particular natural resource is to be scarified for alternative uses or economic motives.

For Redang Island Marine Park, the result of this study provides an economic ground for its management's effort as well as the policy makers' decision to continue maintaining the area as a coral sanctuary. The result of this study may also be incorporated in the economic analysis for determining the viability of conserving the area in the long run. Furthermore, the estimated benefits obtained from this study (source) may be transferred to other similar corel sites (targets) for the purpose of policy or management decisions affecting the target resource.


Thank You
Terima Kasih