TOURISM CARRYING CAPACITY ASSESSMENT USING AN APPLICATION OF RECREATION OPPORTUNITY SPECTRUM IN CLASSIFYING THE TOURISM AREA: A CASE STUDY OF AMPHAWA FLOATING MARKET, SAMUT SONGKHRAM PROVINCE

NARUEMON DANPONGSUWAN

A THESIS SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR
THE DEGREE OF MASTER OF SCIENCE
(SUSTAINABLE ENVIRONMENT PLANNING)
FACULTY OF GRADUATE STUDIES
MAHIDOL UNIVERSITY
2008

Thesis
Entitled

TOURISM CARRYING CAPACITY ASSESSMENT USING AN APPLICATION OF RECREATION OPPORTUNIT SPECTRUM IN CLASSIFYING THE TOURISM AREA: A CASE STUDY OF AMPHAWA FLOATING MARKET, SAMUT SONGKHRAM PROVINCE

NARUEMON DANPONGSUWAN
.....
Miss Naruemon Danpongsuwan
Candidate

.....
Assist. Prof. Prapeut Kerdsueb,
M.Sc. (Technology of Environmental Management)
Major-Advisor

Piyakarn T.
.....
Assist. Prof. Piyakarn Teartisup,
Ph.D. (Forestry-Watershed Management)
Co-Advisor

B. Mahaisavariya
.....
Prof. Banchong Mahaisavariya,
M.D.
Dean
Faculty of Graduate Studies
Mahidol University

Piyakarn T.
.....
Assist. Prof. Piyakarn Teartisup,
Ph.D.
(Forestry-Watershed Management)
Chair
Master of Science Programme in Sustainable Environment Planning
Faculty of Environment and Resource Studies

Thesis
Entitled

TOURISM CARRYING CAPACITY ASSESSMENT USING AN APPLICATION OF RECREATION OPPORTUNITY SPECTRUM IN CLASSIFYING THE TOURISM AREA: A CASE STUDY OF AMPHAWA FLOATING MARKET, SAMUT SONGKHRAM PROVINCE

was submitted to the Faculty of Graduate Studies, Mahidol University
for the degree of Master of Science (Sustainable Environment Planning)
on
September 21, 2008

NARUEMON DANPONGSUWAN
.....
Miss Naruemon Danpongsuwan
Candidate

.....
Lect. Songkiat Teartisup,
Ph.D. (Architecture)
Chair

.....
Assist. Prof. Prapeut Kerdsueb,
M.Sc. (Technology of Environmental Management)
Member

Piyakarn T.
.....
Assist. Prof. Piyakarn Teartisup,
Ph.D. (Forestry-Watershed Management)
Member

B. Mahaisavariya
.....
Prof. Banchong Mahaisavariya,
M.D.
Dean
Faculty of Graduate Studies
Mahidol University

S. Dilokwanich
.....
Assist. Prof. Sittipong Dilokwanich,
Ph.D. (Human Geography)
Dean
Faculty of Environment and Resource Studies
Mahidol University

ACKNOWLEDEMENTS

The success of this thesis can be attributed to the extensive support and assistance from my major-adviser, Asst. Prof. Prapeut Kerdsueb for his constant invaluable guidance, and also for his kindness given to me, especially for inspiration and discussion. And Asst. Prof. Piyakarn Teartisup who was co-advisor for her valuable suggestions, especially for encouraging setting a study plan. I deeply thank them for inspiring me to work efficiently and effectively throughout the study period. My sincere appreciation also extends to Arjan Songkiat Teartisup who was my committee chair and for kindness in examining the research and valuable advice given me to adjust my thesis.

I wish to thankful for the sample group who were the mayor and the communities' chairmen for their participation and facilitation of data collection. I am also grateful to Samut Songkhram Office of Public Works and Town & Country Planning and Amphawa Tambon Municipality for data favorableness.

I am also grateful to all the lecturers and stuff of the Faculty of Environment and Resource Studies Mahidol University for their valuable advice and kind support. I would like to thanks Pe-Yutthana for his pleasurable and attendance.

I wish to thank my friends from EP1 for friendship, Mon that her helpful collective data and Preuk for his helpful technique computer, especially Pe-A, Amm, and Ning for them helpful, supportable and cheer up me throughout the research period.

This research work is supported by the grant from the Graduate Alumni Association of Mahidol University.

I owe special thank to Pe-Long who my best friend for his support and take care.

Finally, I'm very grateful to my family and deep appreciate to Mae Peak who is everything in my life.

Nauruemon Danpongsuwan

TOURISM CARRYING CAPACITY ASSESSMENT USING AN APPLICATION OF RECREATION OPPORTUNITY SPECTRUM IN CLASSIFYING THE TOURISM AREA: A CASE STUDY OF AMPHAWA FLOATING MARKET, SAMUT SONGKHRAM PROVINCE

NARUEMON DANPONGSUWAN 4936877 ENEP/M

M.Sc. (SUSTAINABLE ENVIRONMENT PLANNING)

THESIS ADVISORS: PRAPEUT KERDSUEB, M.Sc., PIYAKARN TEARTISUP, Ph.D.

ABSTRACT

This main purpose of this study was to apply the Recreation Opportunity Spectrum (ROS) and to assess the Carrying Capacity (CC) for Floating Market Tourism Management, Thailand. The study site was the Amphawa Floating Market cluster (Amphawan Temple, Amphawa Community Information Center, Way of Life and Vernacular Architecture trail, and Amphawa Market). Stakeholders evaluated the tourism cluster by evaluated form with the ROS methodology. According to the CC, the indicated factors were the physical, facilities, ecological, and social. General ROS methodology was divided into 5 groups: Primitive area; Semi-primitive area class I; Semi-primitive area class II; Developed natural area and Rural area.

The research findings showed that all 4 tourism areas were ranked in the Semi-primitive area class II. The advantages of recreation activities were ranked at a medium level. Concerning the tourism carrying capacity assessment, the findings showed factors that met the carrying capacity standard were the capacity of the tourism activities areas, waste management, water quality, congestion and satisfaction of stakeholders, and tourists' satisfaction. Conversely, factors over the carrying capacity standard were the capacity of the parking areas, number of restrooms, water consumption, and tourist congestion.

As a result, the application of ROS and CC from this research could apply as a framework to set the limitation of recreation areas and provide recreation area development guidelines. The tourism carrying capacity assessment of the study area ranked at a medium level; however, there were some factors that needed immediate improvement to avoid the possible impact of excess carrying capacity.

KEY WORDS: ASSESSMENT / CARRYING CAPACITY / RECREATION OPPORTUNITY SPECTRUM / FLOATING MARKET TOURISM

119 pp.

การประเมินขีดความสามารถในการรองรับการท่องเที่ยว โดยการประยุกต์หลักการช่วงชั้นโอกาสทางนันทนาการ สำหรับจำแนกพื้นที่ท่องเที่ยว กรณีศึกษา ตลาดน้ำอัมพวา จังหวัดสมุทรสงคราม (TOURISM CARRYING CAPACITY ASSESSMENT USING AN APPLICATION OF RECREATION OPPORTUNITY SPECTRUM IN CLASSIFYING THE TOURISM AREA: A CASE STUDY OF AMPHAWA FLOATING MARKET, SAMUT SONGKHRAM PROVINCE)

นฤมล ด่านพงศ์สุวรรณ 4936877 ENEP/M

วท.ม. (การวางแผนสิ่งแวดล้อมที่ยั่งยืน)

คณะกรรมการควบคุมวิทยานิพนธ์: ประพฤติ เกิดสืบ,วท.ม., ปิยะกาญจน์ เที้ยะธิทรัพย์, Ph.D.

บทคัดย่อ

การวิจัยในครั้งนี้มีวัตถุประสงค์เพื่อ 1) ศึกษาและประยุกต์หลักการช่วงชั้นโอกาสทางนันทนาการในการจำแนกพื้นที่ท่องเที่ยว 2) ประเมินขีดความสามารถในการรองรับการท่องเที่ยวตลาดน้ำอัมพวา ซึ่งพื้นที่ท่องเที่ยวในตลาดน้ำอัมพวาประกอบด้วยแหล่งท่องเที่ยว 4 แห่ง ได้แก่ วัดอัมพวัน ศูนย์ข้อมูลชุมชนอัมพวา เส้นทางเดินศึกษาวิถีชีวิตริมคลองและสถาปัตยกรรมท้องถิ่น และตลาดอัมพวา โดยให้ผู้มีส่วนเกี่ยวข้องในการจัดการการท่องเที่ยวตอบแบบประเมินแหล่งท่องเที่ยวที่กำหนดด้วยรูปแบบช่วงชั้นโอกาสทางนันทนาการทั้ง 5 รูปแบบ และในการประเมินขีดความสามารถในการรองรับ ได้กำหนดและวิเคราะห์ปัจจัยชี้วัดด้านกายภาพสิ่งอำนวยความสะดวก นิเวศวิทยาและสังคม

สรุปผลการวิจัย การจำแนกพื้นที่ท่องเที่ยวในตลาดน้ำ พบว่าแหล่งท่องเที่ยวทั้ง 4 แห่ง จัดเป็นพื้นที่กึ่งสันโดษที่ 2 และการประเมินขีดความสามารถในการรองรับการท่องเที่ยวของตลาดน้ำอัมพวา ขีดความสามารถของพื้นที่การใช้ประโยชน์กิจกรรมการท่องเที่ยวในแหล่งท่องเที่ยวทั้ง 4 แห่ง การจัดการมูลฝอย คุณภาพน้ำ ความแออัดและความพึงพอใจของผู้มีส่วนร่วมในการจัดการการท่องเที่ยว และความพึงพอใจของนักท่องเที่ยวยังอยู่ในขีดความสามารถในการรองรับการใช้ประโยชน์ทางการท่องเที่ยวได้ ส่วนขีดความสามารถของพื้นที่ลานจอดรถ จำนวนห้องห้องสุขาสาธารณะ ปริมาณน้ำอุปโภค-บริโภค และความรู้สึกแออัดของนักท่องเที่ยวเกินขีดสามารถในการรองรับการใช้ประโยชน์ทางการท่องเที่ยวได้

การจำแนกพื้นที่ท่องเที่ยวตลาดน้ำอัมพวาสามารถนำมาเป็นกรอบในการกำหนดระดับการรองรับที่เหมาะสมและสอดคล้องต่อสภาพเงื่อนไขของพื้นที่ได้ ทั้งด้านกายภาพ สังคม และการจัดการ โดยต้องมีมาตรการฉุกเฉินมาควบคุมบางปัจจัยชี้วัด เพื่อลดผลกระทบที่เกิดขึ้นและเพื่อให้คงความเป็นพื้นที่กึ่งสันโดษที่ 2

119 หน้า

CONTENTS

CONTENTS (Cont.)

CONTENTS (Cont.)

LIST OF TABLES

LIST OF TABLES (Cont.)

LIST OF FIGURES

LIST OF ABBREVIATIONS

AFM	Amphawa Floating Market
BMTA	Bangkok Mass Transit Authority
CC	Carrying Capacity
DN	Developed natural area
DO	Dissolved Oxygen
ECC	Ecological Carrying Capacity
gal.	Gallon
hr.	Hour
km.	Kilometer
km^2	Square kilometer
k.g.	Kilograme
l.	Litre
LAC	Limit of Acceptable Change
m.	Meter
m^2	Square meter
m^3	Cubic meter
min.	minute
P	Primitive area
PFCC	Physical and Facilities Carrying Capacity
R	Rural area
ROS	Recreation Opportunity Spectrum
SCC	Social Carrying Capacity
SP-I	Semi-primitive area class I
SP-II	Semi-primitive area class II
Weekend	Friday, Saturday, and Sunday during on 4.00-9.00 pm.

CHAPTER I
INTRODUCTION

1.1 Background Justification

Recreational opportunity spectrum (ROS) is tourist place classification by circumstance or potential of recreational resources (USDA, 1979). It's the correlation between tourists' utilization desire and the management ability of the relevant department. Tourists always seek for experience. The recreational opportunity spectrum is flexible and classified into levels as tourists' desire, which they can choose the area for doing the activities to achieve the experience they wish for tourist place classification according to its' recreational opportunity spectrum helps to specify the natural level, development level, convenience, safety, privacy and the number of people who utilize the tourist area and the approach of tourism for being a guideline in tourism management clearly and get along with the other purposes of preservative area management. Besides it's also the marketing management which consider the present world there are many kinds of tourist who are different in tourism experience seeking and their satisfaction, therefore it must be specific the suitable area for each group of tourist under its potential and management ability (Thanakarn et. al., 1998).

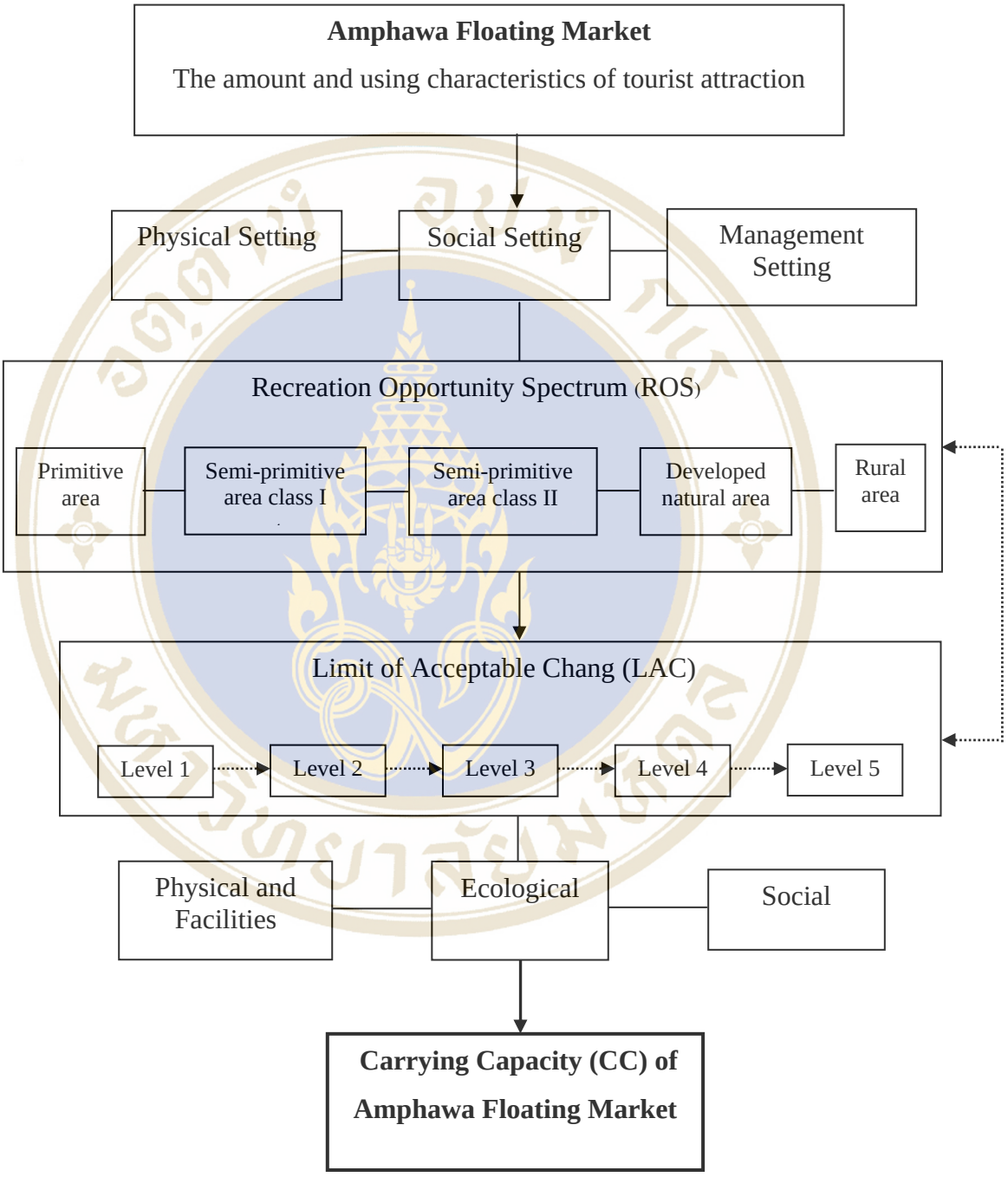
Amphawa Floating Market located in Samut Songkhram, western part of Bangkok, Thailand (http://www.samutsongkhram.go.th/gis.php). In 2002, Amphawa Floating Market was supported by the Office of Environment Policy and Plan for creating the beginning project for preservation and development of Amphawa Canal. The guideline was made up in developing and supporting the ecotourism in Amphawa Floating Market area, therefore this place was restored back and stimulus the community to pay attention to tourism management; finally it became a famous floating market and the tourism center of the province at present (http://www.samutsongkhram.go.th/strategy/st01.pdf).

Nowadays, there are more tourists on weekend and holidays. The main activities are seeing fireflies by boat, seeing lifestyle of riversides' community, tasting

local food. It is one of the liveliest floating markets in Thailand and it's hard to deny that tourism development get along with economy development. Tourism industry is related to the selling of physical and biological environment and also the cultural environment, which are correlated to tourism. Although tourism make a good business and good economic for the local people but natural resources are limited. The control and prevent natural resources and environment destruction from tourism development were done so late, the following results were the tourist moved to the new places which were still rich of nature. When they moved to new places, private sector and some departments would develop the facilities and utilities for satisfying tourists but these developments became nature and environment deterioration without intention, supported the article in study project for water tourism preservation and development in inner Bangkok and nearby area that there are two kinds of carrying capacity, which is very important for tourism planning, tourists should extremely experience and enjoy in traveling but must not negatively affect the tourist place. Carrying capacity (CC) of any area can be considered from physical structure of community and social structure of community (Schneider, et al, 1978). If we consider in carrying capacity, we do not only satisfy and impress tourists but also not destroy physical, biology, economy and society of local region.

Therefore it's necessary to study carrying capacity for specifying the suitable capacity for tourists, both in term of the number of tourist and the facilities in the satisfied level under the condition of appropriate potential of tourist place getting along well with circumstances, facilities and infrastructure, tourism utilization access and the effect may occur from tourism for making the Amphawa Floating Market become the qualitative tourist place and attract the tourist to visit in the long term. This main purpose of this study was to apply the ROS and CC for Floating Market Tourism Management, Thailand. So that the study site was Amphawa Floating Market cluster (Amphawan Temple; Amphawa Community Information Center; Way of Life and Vernacular Architecture Trail; and Amphawa Market. Stakeholders evaluated the tourism cluster by evaluated form with ROS methodology. According to the CC, the indicated factors were the physical; ecological; social; and facilities factors.

1.2 Conceptual Framework



Picture 1-1 Conceptual Framework

1.3 Objectives

1.3.1 To study and apply the concept of Recreation Opportunity Spectrum (ROS) in classification of tourist area in Amphawa Floating Market.

1.3.2 To assess the carrying capacity of Amphawa Floating Market in the aspect of physical, facilities, ecological and social.

1.4 Research Question

What classes of the suitable tourism carrying capacity level of Amphawa Floating Market that can harmonize with physical, social, and management condition of the tourism area?

1.5 Scope of Study

Scope of Study

Scope of study is to study about ROS and CC of Amphawa Floating Market's tourism area, which contain the following details.

1.5.1 Study basic information about tourist, which consist of the number of tourists, background and feature of tourists, the feature of activities and the utilization of recreation.

1.5.2 Study the basic information in tourism resources and the kinds of suitable tourism activities and specify the factors which are used for analyzing ROS by applying the concept of ROS for classifying about tourism in AFM by the participants in tourism management of community.

1.5.3 Collect theories or concepts about carrying capacity, the level of acceptable change and the application compatible with tourism area management of AFM.

1.5.4 Determine the factors which are used to analyze CC in recreation, standard, index, and also inform the detail of information collection and analysis for limiting CC in recreation aspect.

1.5.5 Evaluate the carrying capacity of AFM which is classified to

1.5.5.1 PFCC means the maximum number of tourists that the area size and/or the facilities can be afforded and provide the recreation activities as tourists' desire.

1.5.5.2 ECC means the maximum tourists that not deteriorate or devalue the environment system or ecology system exceeding the acceptable level, which will affect to the environment crisis.

1.5.5.3 SCC means the maximum tourists or use level that still maintain qualitative tourism experience to tourists, including the maximum tourists that not cause unacceptable negative effects to the society and culture of the community.

Scope of Study Area

The study area is in Tambon Amphawa area which covers four communities, Ampawan temple community, Prachauthit community, Rimklong community and Amphawa market community, from both sides of Amphawa canal since the beginning part next to Mae Klong river, the left side of the canal to the beginning of Bang-jak canal which is separated from Amphawa canal and the right side of the canal from the way aside the canal to the bridge across Chula canal.

1.6 Definition of Study

Tourism Area means scope of study area in Amphawa Floating Market.

Tourist Attraction means tourism resources which are combined together as a particular tourist place containing the outstanding features or interesting activities that attract people to visit. In this research, the researcher classified the tourism area of Amphawa floating market to four areas, which consist of Amphawan Chetiyaram Temple, Amphawa Community Information Center, Local livelihood and Architecture Trail Route and Amphawa Market (land market).

The men who participate to manage tourism means the leaders in ecotourism management in the study area in form of Community-Based Ecotourism, who are the mayor, and the communities' chairmen: Amphawan temple community, Prachauthit community, Rimklong community and Amphawa market community.

Tourist means the person or the group of people who are completely 15 years old and not the resident in Amphawa Floating Market area. In this research will study only tourism utilization of tourist, who is non-over night and is in the scope of study that the researcher specified.

Recreation Opportunity Spectrum (ROS) means tourism area classification in Amphawa Floating Market which is used for management and control the tourism area and responds to tourists' experience within carrying capacity of the area as its ROS.

Primitive area (P) was fully conserved area. Rich of vernacular natural resources or the harmony with nature and ecosystem were practically alive. There was less number of tourists because it was inconvenience to visit the area. Also there were less evident of human activities in this area which show the less number of tourists. Tourists plan and management in the area was rarely established including public utilities and facilities.

Semi-primitive area class I (SP-I) was considerably conserved. Nevertheless, it is not well-conserved as the previous class. Still, there were less number of activities and tourists. Tourists plan and management in the area was rarely established including public utilities and facilities. The area, how ever, was used as demonstrated view or program.

Semi-primitive area class II (SP-II) was considerably conserved area but more convenience than P and SP-I. This was led to an increasing in number of utilities and tourists. There was more chance that it attracted other tourists to meet each other. Meanwhile, there were significant evident indicated that there were human activities in the area. There were continually developing projects and facilities for tourists. Certainly, these activities affected the area. Managing tourists by using rules and regulations were introduced.

Developed natural area (DN) was natural area which developed to satisfy tourists. There were high number of the developed facilities and utilities in this area. It was also convenience to travel by cars and boats. In other words, this place was visited continually. There were many visitors came all the time. Meanwhile, there were distinctive effects in the area. Every rules and regulation and policies were applied in order to manage tourists. This area also had high durability in term of tourism. Changing and developing in the future were allowed in this place.

Rural area (R) was basically a natural area which was very convenience to visit. Vehicles such as cars and boats were satisfactory. There was a management policy in the area, which supported community's need and tourist in order to maintain the area. There were high number of facilities and utilities in the area which lead to certain possible effects as results. Apparently, all forms of human activities were found in the area.

Carrying Capacity (CC) means the maximum capacity in carrying tourists per day that is measured from the acceptable effect of tourism utilization in a particular area and try to not affect to physical, environment or ecology system, and society, but try maintain the condition of tourism in the area as its ROS the most, besides tourists are still satisfied with facilities.

1.7 Expected Outcomes

After evaluation in CC of AFM area, the result can be used for specify the CC level of AFM as the purpose. Besides it expects that the result of study can be useful for:

1.7.1 Considering in limiting or expanding development, both facilities and public utilities under its specific CC and tourism development plan which can support the tourism activities compatible with area potential as the standard of applying ROS.

1.7.2 Guiding in studying to specify CC in tourism area of community and the other similar nearby areas.

CHAPTER II
LITERATURE REVIEW

2.1 Definition of Ecotourism

The word “ecotourism” in Thailand is defined in various ways: Conservative Tourism, Green Tourism, Conservation Based Tourism, Tourism for Conservation, Tourism for Presurving Ecosystem, Mobile cology, and so on. At present, the word “ecotourism” has been widely used by the academies and has been accepted by the Royal Academy of Thailand (Thailand Institute of Science and Technology Research, 1998).

Swarbrooke (1998) defined the word “ecotourism” that the tourism focused on natural area and the culture related to area. The tourism activities are based on the community and the stakeholders. The creation and benefits of activities relating to the ecoturism are friendly with the environment. In this way, such activities should have the least effects to the ecosystem, the environment, and the ways of life for the community.

Fennell (1999) gave the meaning that it is a form of sustainable tourism focused on natural resource based tourism and on the activities relating to the experiences and natural learning, least effects based management, economical resource use, and benefits toward local community. Accordingly, such form of tourism should be made along with the conservation of local resources.

Goeldner, Ritchie and McIntosh (2000) explained that “the ecotourism” is the tourism functioning for preserving the natural area. In this way, it would help conserve the environment and secure the living of the local community. In addition, “the ecotourism” also means the tools for preserving the environment or functioning for the ecosystem.

Tourism Authority of Thailand (1995, cited by Chuchart, 2006) gave the definition of the word “conservative tourism” which has been changed to be

“ecotourism” that the travel to any tourism attraction with the objectives of appreciation and entertainment with scenery, natural condition, social situation, cultural, and ways of life of local people, based on the knowledge and accountability to the ecosystem.

Tourism Authority of Thailand (1997) added that the meaning of conservation tourism is linked with the ecotourism which has been recently formulated. The “ecotourism” means the tourism functioning for preserving the local identity based natural source and the cultural source associated with the ecosystem, environment, and tourism. In this sense, it would promote common learning precess for those involved with the participatory management in the local areas. As a result, it would make awareness for maintaining the ecosystem sustainably.

Santasombat (2001) proposed that the conservative tourism or ecotourism is a model to create incentives for the local community to utilize the natural resources sustainably and equitably. This proposal is the condition that the person who has preserved the resoures shall deserve to recive the benefits from such preservation. Hence the ecotourism is an effort to promote the relationship between human and nature to be focus was on the conservation and development.

2.2 Concept Idea and Principles of Ecotourism Development

After applying the concept idea and principles of the sustainable development and tourism, the forms and activities of tourism, as a result, has changed from mass tourism or conventional tourism. This kind of tourism has focused mainly on the number and satisfaction of the tourists which have paid attention to the economic advantages. However, this model lacks the consciousess on loss against the ecosystem, tourism resource, environment, cultural, and society. The focus and activities of the alternative tourism have many ways targeting to the sustainable tourism.

Swarbrooke (1998) explained that the ecotourism is in relation with the sustainable tourism and forces the management of tourism which prise the way to be the sustainable tourism. This kind of tourism would lead to the ultimate aim of the sustainable tourism rather than any other kinds. The forms of tourism associated with the sustainable tourism include the tourism responsible for tourism attractions, the

tourism affecting tourism resoures, ecosystem, environment, society, and cultural (or the so-called “soft tourism”), minimum impact tourism, and environment tourism. The alternative tourism is a new form of tourism which has applied the concept idea and principle of sustainable tourism. This kind of tourism includes cultural tourism, marine tourism, and natural tourism.

Fennell (1999) divided the type of Alternative tourism focused more on sustainable tourism into two forms: Socio-cultural tourism and ecotourism. The socio-cultural tourism places emphasis on the access to the tourism resources like tourism for life and environment in rural areas and form tourism. The ecotourism puts emphasis on the scope of particular areas within the natural tourism source and the social and cultural aspects related to such areas. Both kinds of tourism of tourism would promote the involvement of the local community and the stakeholders in arranging the tourism activities together with sharing the benefits equitably and affecting the tourism resources, ecosystem, society and cultural as less as possible.

Weaver and Oppermann (2000) categorized theAlternative Tourism into two types: Sociocultural Tourism and Ecotourism. The examples of the Sociocultural Tourism are Homestays, Indigenous Tourism, Education Tourism, Religious Tourism, and etc. The Ecotourism is a form of Alternative Tourism. The nature of Alternative Tourism focuses on small mumber of tourists, particularly Allocentric-Midcentric who likes to travel regularly througtout the year. In thisway, the tourists need to touch upon the local condition or the business services of the community-that are small, gennate high distribution of income, and strengther the local community. In this sense, this tourism would help promote the overall development in terms of economic, social, cultural and environmental aspects.

Wangwanich (1996) explained on the main principles of ecotourism management as follow:

1. Zoning of various activities therough new technology like Geographical Information System (GIS),

2. Limitation of number of tourists in particular areas where the ecosystem is fragile in nature; with regard to the carrying capacity of tourists in each area,

3. Preparing data useful for the tourists, both in natural resource conservation and tourism experiences,

4. Promoting and developing additional tourism attractions in order to reduce the congestion in the main tourism areas,

5. Ehacting the law enforcement for those violating,

6. Managing the construction existing in tourism attractions to be along with the surroundings and controlling treatment system of garbage, waste and wastewater resulting from the construction.

Department of Landscape Architecture, Chulalongkorn University (2002) summarized the basic concept or principle required for ecotourism management in the followings:

1. Tourism resource management associated with natural condition and local areas. The tourists are interested in the natural condition and identity of the attraction areas. But the ecotourism wish or drive to learn and seek experiences from the nature and local culter. They also like the particular services and facilities relating to the natural condition. In this way, the development gives the importance on the facilities required for performing the tourism activities. The architecture design should reflect the identity of the areas. In overall, it would provide small-scale facilities which are in live with the natural condition and make low impact to the environment,

2. Management and development of sustainable tourism

The development of sustainable tourism should be made systematically. These include:

1) Management of tourism resources in surving for sustainable tourism under the carrying capacity of the particular areas or tourism attractions, both in physical and ecological aspects,

2) Sustainable management of marketing with regard to the peoper number of tourists and the satisfactory level of the tourist towords resources and services,

3) Services management in serving for promoting activities of ecotourism, facility services, and natural communication,

4) Sustainability in generation income for the community,

3. Creating understanding and awareness on conservation of nature and environment. The nature and environment are the basic factors for the ecotourism source. For this reason, the creation of knowledge and understanding on preserving the nature and environment and a good awareness on doing tourism activities are essential

for the tourists. Moreover, other target groups to be considered include local community, guide, and government officer. The creation of awareness on natural conservation can be made in various ways. These ways are to produce interpretation programs such as data sevices centr-performing as the intermediary in disseminating information for tourists; documents; printed matters; exhibition; poster; as well as training guide and officer to instruct and explain on nature and ecosystem for the tourists,

4. strengthening satisfactory for tourists. The ecotourists emphasize on tourism together with learning and seeking experiences from nature, way of life, tradition and cultural. They are more satisfied with the facilities in providing knowledge on nature and environment. Accordingly, the promotion of ecotourism should consider the management of natural communication so as to receive information and knowledge on the nature in many aspects. This would help enhance the experiences and satisfactory for tourists. It can be said that this way is to create awareness on the conservation of nature and environment,

5. Acceptance and involvement of local community. The acceptance and involvement of local community is important and is required for the development of ecotourism. This would help prevent some conflicts or protests from the community which may occur. The community in local area and the areas nearby the tourism source should be considered as the make component of tourism management and promotion. This is because the tourism plays a role for the economic and social development of the local community. It looks like the promotion and preservation of tourism resources. The peoper forms of the involvement of local community are low scale-low impact tourism development, nature guide, and local products or handicraft for sale as the souvenir.

As mentioned above, the ecotourism is regarded as the alternative tourism which leads to the sustainable tourism. It can be said that the ecotourism is related to the sustainable tourism or is the main component of the sustainable tourism. The ecotourism is not just only focused on the conservation of the abundance of nature resources, but it also regards on the use of resources for tourism, both from natural source with local identity and cultural source related to the ecosystem and environment. In addition, it also puts the emphasis on developing and creating

common learning process for those involved with making awareness on preserving ecosystem sustainably.

2.3 Principle of Recreation Opportunity Spectrum (ROS)

When considering the opportunity of performing recreation activities, most people will decide to proceed on recreation activities in the particular areas which can make satisfactory for them. Hence, it is the responsibility of the relevant person to find the proper area to surve for this desire, based on the nature of area, type of resources, and forms of activities

Clark and Stankey (1979) proposed that most people often choose the particular area for the recreation activities, with particular focus on their desires in relation to the benefits of recreation. In this respect, the recreational opportunities are associated eith the desire of the users and the advantages of area management. It can be said that the forms of recreational activities are flexible and variable, depending on the particular management. Accordingly, the management should try his best to select the proper alternative in performing recreational activities. In summary, ROS is viewed as the variety of opportunities or alternatives for the tourists in carrying out recreational activities, with regard to the potentials of recreation resources in particular area. In this way, the recreational area can be divided into four spectrums: These spectrums are 1) development area, 2) semi- development area, 3) semi-primitive area, and 4) primitive area. The particular factors required for ROS are as follow:

1. Transportation/ easy access to recreational source,
2. Recrational resource uses,
3. Onsite management including onsite improvement, facility building, secenery design, selection of species for onsite,
4. Social interaction depending on management of transportation (or access to source) and general condition of the onsite,
5. Acceptability of visitor’s impact arising from the benefits of tourists in recreational source which have affected resources or other group of tourists,
6. Acceptable regimentation performing as the form and level of recreational users.

Forest Service (1982) and Payne et. al. (1997) presented that ROS is combined with the three main components: activities, surroundings of onsite for particular activities, and experiences and limits to activities. In this sense, ROS is a tool for linking the relationship among onsite for activities, types of recreational activities, and experiences gained from tourism. This linkage would help create recreational activities associated with the onsite condition and the experiences required for the tourists.

Payne et. al. (1997) also proposed that the framework for determining the ROS includes the supply which identifies the type and volume of the opportunity spectrum required for the tourists, the demand which indicates the type and volume of the opportunity spectrum required for the recreation activities, and the diversity of activities as well as expectation, experiences and interest of tourists which come from the different environment and ecosystem. ROS is determined along with the environment into six spectrums. These spectrums 1) primitive areas, 2) semi-primitive non-motorized, 3) semi-primitive motorized, 4) roaded natural areas, 5) rural areas, and 6) urban areas. Such spectrums are based on the relevant factors such as physical characteristic with regard to the distance of main roads, change in natural environment and size of natural area, social characteristic with regard to the number and density of the people in the onsite or the opportunity to meet other groups of tourists, and management characteristic with regard to the advantages of onsite use and legislation and regulations or rules relating to the tourists.

The British Columbia Resources Inventory Committee (1998) determined the steps and standard of the survey on the ROS which are divided into seven spectrums. Those spectrums include 1) Primitive (P), 2) Semi-primitive non-motorized (SPNM), 3) Semi-primitive motorized (SPM), 4) Roaded natural (RN), 5) Roaded modified (RM), 6) Rural (R), and 7) Urban (U). Such spectrums are based on the following factors:

1. Remoteness with regard to the distance of roads and the size of onsite,

2. Naturalness with regard to the level of vehicle use and the trance of human in the onsite as well as rule sand regulation, facility development, and change in the onsite,

3. Social experience with regard to self-reliance, skills in carrying out activities, close access to the nature, and number of other group of tourists.

In part of the study on the Rrceration Opportunity Spectrum in Thailand, there are many literatures to be reviewed.

Thanakarn et. al. (1998) prepared the handbook on the development and design of the facilities in the conservative tourism based tourism source. They had applied the concept of the ROS for grouping tourism sources. In this way, the word “Recreation Opportunity Spectrum” was defined as the grouping of tourism sources based on physical settings, social setting, utilization activities and number of tourists, and managerial setting. Such grouping is an indicator for the level of development shich can be linked to the carrying capacity of the area, as well as the volume and size of facilities in the area. The particular factors applied for analyzing and assessing the status of the area are viewed in seven factors. These include access, naturalness, impact, opportunity of social gathering, misconduct of tourists, visitor management, and site management. In addition, the grouping of tourism soures is based on the particular definition and condition for the tourism source as follows:

1. Primitive (P) is the tourism source which is remote and is natural based or completely traditional localtion. Besides it has few volume of tourism due to difficult access, few impacts from utilization, lack of measures for tourists, and scarcity of area development,

2. Semi-primitive class 1 is the tourism source full of natural based. This area is not different from the primitive area, but can have few uses, some controls, and communication program,

3. Semi-primitive class 2 is still natural based, but can have easier access than the two areas as mentioned above. As a result, the volume of utilization is increased and more opportunity of social gathering is viewed. Besides it can be seen through impacts from utilization activities, visitor management in the form of rules and regulations, communication program, and control via facilities,

4. Developed natural area is natural based, but has been developed to serve for the utilization activities required for the visitors. I this way, the access can be easily made through vehicle, or boat, or both ways. The volume of utilization is quite densed, particularly tourism season. The area has a clear impact. The measures for managing the tourists can be used in every form as many as possible. These measures include inspection of officers, warning sign, and development of permanent facilities such as

toilet, food shop, residence, and service center for tourists. In this sense, the proper area as recreational tourism source should be sustained to serve for the tourism uses and allows the high volume of tourism uses as well as be adjusted in alignment with the environment,

5. Rural area is based on the local community with the natural environment. The access is from moderate to high, through vehicle, or boat, or both ways. This area is managed in line with the needs of the community who stays in the tourism area and to serve for the tourism area. Usually the area relies heavily on managing tousists in order to reduce conflicts in the activities of the community. This area often has utilization activities for the human almost all forms.

The different condition of each spectrum in the tourism source has resulted in the different experiences of the tourists who visit each tourism source. In this regard, the development and improvement of the area are required for maintaing the appropriate condition sustainable and determing the level jof development associated with such condition. This measure would help secure the role of recreation as the identity of tourism source.

Ampholchan (2000) presented the concept on applying ROS for national park area. The opinion that this measure would help achieve the target of management of recreation in national park. In this way, it is believed that it woul be greatly beneficial or make a lot of satisfactory to the tourists. The result of the study proposed the guidelines in utilizing ROS for categorizing managing the recreational source within the national park of Thailand as follows:

1. Determine definition of each spectrum in carrying out recreational activities,

2. Identify indicators with regard to the surroundings of recreational opportunity such as physical setting, social setting, and managerial setting,

3. Set criteria in each indicator,

4. Construct tools and indicate methods for survey,

5. Test validity of tools,

6. Survey recreational source,

7. Analyze and summarize the survey on the category of recreational source,

8. Manage recreational source as set in the condition,

9. Follow-up and assess.

In addition, the concept and framework of ROS can be applied and give recommendations to those involved or these interested as follows:

1. Make thorough understanding on concept and framework of ROS so as to determine definition and condition associated with management guidelines and other constraint factors,

2. Make comprehensive survey in order to get data proper for setting criteria,

3. Set criteria in line with the number of spectrum so as to be convenient for data analysis,

4. Set criteria in quantitative term to assure the classification of recreational source. If necessary, it should set criteria in qualitative term. But it should make clear understanding or the she meaning of “qualitative term”,

5. Propose marking method as set by criteria in each indicator. This mthod is not complicated in practice and analysis,

6. Study the needs of tourists together with area analysis due to the difference in tourists,

7. Apply techniques for communication so as to help support the tourists to perform the activities in the tourism source in line with their needs and to gain the valuable experiences,

8. Organize the seminar on the application of ROS within the national parks of Thailand in order to learn the achievement, obstacles, and difficulties on working as well as solution to the problems, and enhance skills, experiences and knowledge for the manager and those involved.

Amphonchan (2000) studied on classifying the number of 15 natural tourism attractions in Prachinburi Province. The study guidelines rely on physical setting, social setting, and managerial setting. The classification of tourism attractions can be made in to four groups as follows:

1. Primitive area has the salient points in terms of difficulty in access to the area and lack of facilities. It is in need to go on foot to the area and rely on the officers to lead the way,

2. Semi-primitive class 1 generally looks like the primitive area, but it is easier to access through the car. Little development of facilities can be seen only for the tourists and the working of officers,

3. Semi-primitive class2 is near or within the community area. The development of facilities in support for the tourist is moderate. But it locks the ways to deal with the tourists and the particular area. As a result, some areas are deteriorating,

4. Developed natural area can be found in the national parks. It is highly abundant with the resources and is highly developed with facilities in support for the number of tourists. Besides it has some measures to dial with the tourists, both directly and indirectly, and full manage the area so as to prevent the danger and damages against the resources and environment,

According to the study, it was found that most related factors required for analyzing and assessing the situation of the area have fluctuated in line with the peeid of time. In this way, some suggestions are made as follows:

1. Easy access to the area, it should explore the opinion of the local people regarding the condition of the roads throughout the season. Then the mark should be adjusted properly,

2. Level of naturality, it should rely on the neat and understanding on the nature. Before marking, it should have time to consider the area and analyze secondary data,

3. Trace of impact, the impacts arising from the utilization activities for the tourists can be found mostly in the tourism season because there are a lot of tourists. In this sense, the opportunity of the impacts arising from the tourists is high and the impacts are less when they are out of the tourism season,

4. Social interaction, before marking, it should learn the tourism season, the information on the existing tourists, or the foreseen expectation on the number of tourists in the tourism season. In case the assessment is made out of the tourism season, the mark rate may deviate from the nature of utilization,

5. Management for tourists, this proposal is assessed from the strictness of the use of rules and regulations, the inspection of officers, and the communication program. When few or almost no tourism source can be dealt with the tourists, the mark is high. This means such area is adjacent to the nature of primitive area. It is also found that some tourism attractions lack supervision and management, particularly the deteriorating area. This way is due to the lack of the officers working for the tourism attractions in the period out of the tourism season. In this period, the mark may not be in line with the nature of utilization when there are a lot of tourists. Accordingly, the

marking for this factor should regard to the tourism season,

6. Onsite management, in part of the onsite, the type of facilities can be classified into two ways. These include permanent construction like toilet, parking lot, and pavilion and temporary construction like booth for food or drinks. In the tourism season, there is an increase in developing the temporary facility to serve for the increasing number of tourists. After ending the tourism season, this facility would lack the supervision to be in good condition and the permanent facility would do the some. In this sense, the marking should consider the period of study as eill.

Aimphand (2001) presented that ROS means the classification of recreation/tourism area with the objectives of managing and controlling tourism area in ways of serving for more diverse experiences required for the tourists. This would make satisfactory and create valuable experiences related to tourism for the tourists, instead of focusing only area management, targeted classification of tourism source, resource based development, and management constraints of those involved. The criterion in classifying tourism attraction or recreational source, through ROS method, depends on bio-physical setting, social setting, and managerial setting. In this way, it can be divided into five factors. These factors include 1) access comprising easy to access, transport system, and vehicles, 2) neutrality and onsite management including nature base, scope of developed area, and aims of facilities, 3) social interaction, 4) possible impacts, and 5) management for supervising tourists and control of the area use for the tourists. This method and criteria has been developed from Clerk & Stankey (1979, cited by Aimphand, 2001) and Nielsen (1999, cited by Aimphand 2001) for applying in Thailand. In this regard, the spectrum of tourism attraction and recreational source is categorized into five forms as follows:

1. Primitive area is in the remote area and is in the completely traditional nature and scenery the impacts of tourism against the natural resources within the tourism source. The control or supervision of tourists as well as the promotion of development cannot be seen in the area. The tourists should learn and praties shills in adjusting themselves in line with the surroundings and be aware ofpreserving the tourism source,

2. Semi-primitive non-motorized area is abundant with highly nature. This nature is not different from the primitive area. The access is difficult and distant. But the volume of utilization or the social interaction is high. The recreational source could

see few trace of impacts from utilization activities. There are some measures for controlling or managing for tourists, through communication program or indirect management. The design of the facilities focuses on the security and prevention of impacts. The development guidelines are temporary and can be changed or withdrawn,

3. Semi-primitive motorized area is based on nature, but is modified in the form of permanent and semi-permanent. The access can be made through motorized car. So it is very convenient. As a result, the volume of area use is quite high. The trace of impacts arising from the utilization activities can be clearly seen. The supervision of tourists is made through warning sign, communication program, and design of facilities focusing on security and prevention of impacts from on site rather than the convenience of tourists. These examples are garbage bin, walkway, bridge, balustrade, and toilet,

4. Semi-developed area is developed to transform the environment permanently. This transformation is made with the aims of facilitating and servicing for tourists, serving for the benefits of tourists, and being access conveniently through car or motor boat. As a result, the volume of area utilization is quite high. However, there are som traces of impacts made obviously. In this way, it is in need to apply some measures for managing and supervising tourists in every form as much as possible. These measures are the inspection of officers, warning sign, and the secured development of facilities such as toilet, food shop, residence, and tourist service center. For this reason, the proper areas for being the recreational tourism in this manner should be durable in serving for the benefits of tourism and allow the high volume of utilization for tourism, as well as transforming for the development in line with the surroundings,

5. Highly developed natural area is easy to access by all vehicles. In spite of being natural area, it has been modified clearly and developed permanently. Besides there are some measures to be apply for managing and supervising tourists properly and clearly. This is because the tourism attractions are densed with the utilization of tourism, from high to very high. The classification of spectrum in tourism area or recreational area can be made through standard criteria of relevant factors.

Ampholchan (2001) studied on the application of ROS in Kang Krajan National Park. In this matter, and definition of ROS that it was determined from the surroundings of opportunity. In this way, the recreation spectrum can be the alternative

for tourists in taking part in activities which they are interested in learning the experiences associated with the expertation. According to the survey, it was found that the recreational source within Kan Krajan National Park at the present time is classified into four spectrums. In this respect, the suggestions on recreation management in each spectrum are made as follows:

1. Primitive spectrum is managed for the tourists to learn experiences or receive the silence with natural sound. Such tourists may feel contented and independently, touch and learn the nature closely, exercise their powers and can be self-reliant in performing the activities, and show off their appearances. The managerment of pluysical environment at this stage should maintain the traditional nature. But if may provide “signing” facilities in some activities proper and associated with the experiences in this spectrum, if necessary,

2. Semi-primitive non-motorized spectrum is made in the some way as the semi-primitive area. But the opportunity in touching upon the silence from the nature is less. Hence, the management of pluysical environment at the stage should focus on the development of facilities for preventing danger and reducing impacts (Such as walkways, bridge, banister or stair) and allow accessing to recreational areas by foot only,

3. Semi-primitive motorized spectrum is managed in the same way as the semi-primitive non-motorized area. But the opportunity in touching upon the silent nature is less and the social interaction and the opportunity in performing motor based activities are more increased. The management of physical environment at this stage should focus on the development of facilities for preventing danger and recucing impacts, in addition to the development of roads which can access by car. Such impacts are in the same as the semi-primitive non-motorized area,

4. Semi-developed spectrum is made in the same way as the semi-primitive motorized area. But it has increased another opportunity in performing activities together with other tourists and in social interaction. This spectrum is convenient in performing activities through facilities provided in the area. The skills required for outdoor recreational activities are still important,

Suriyachai (2003) conducted the study on the analysis of desired experiences and admiration of tourists in order to determine ROS. This determination is compared

with the classification of ROS which is made by Thanakarn et. al. (1998). The result of comparison was

1. The difference of desired experiences and tourists admiring recreational attractions in each spectrum against physical setting, social setting, and tourism management depends on tourism attractions in each spectrum. This showed that the classification of tourism attractions or recreation areas in essential,

2. The appropriateness of the classification of ROS according to the desired experiences and admiration of tourists can be made from the opinion of tourists. In this way, it may be sued as the management tool in dealing with tourism attraction or recreational sources. This guideline is in line with the findings of Fubenville (1967, cited by Suriyachai 2003). Such findings indicated that the recreational planning placed the particular attention to the needs of the users based on the admiration or incentives of the users so as to make planning at the certain level,

3. The comparison between the traditional classification and the survey area and this classification and the survey area can be made in to three categories. These categories include Tee-Lor-Zoo waterfall changing from primitive area to semi-primitive non-motorized area, Ken Mae Pan natural route changing from semi-primitive non-motorized area to semi-primitive motorized area, and Mae Ya waterfall changing from semi-primitive motorized area to semi-developed area.

2.4 Concept of Carrying Capacity (CC)

The concept idea of CC on tourism can be summarized as the definition in this framework of study that the highest capacity in carrying the tourists per one per day. This capacity is measured by the level of impacts arising from the utilization of tourism in any area. Such utilization has generated the least impacts on physical, environment/ecosystem, and social aspects but has maintained the most condition of tourism in each ROS. In this way, the tourists are satisfied for the facilities. It can be said that CC is determined in any tourism source and various tactics are used to maintain the level of CC. Accordingly, the concept of CC can be an effective tool in support for standard and scope of tourism. This has resulted in particular attention to reduce the impacts toward the environment as less as possible. CC can transform or

define in various meanings according to the types of tourism source, activities, time and place. In addition, CC is different in the criteria and factors to be applied. These factors are size of area, requirement of water, release of waste, and preservation of scenery. At the same time, CC also means the ability or opportunity in managing and preventing the impacts which may arise from the volume of tourists.

According, the study on CC depends on the relevant factors in determining the proper level and regards to the involvement of such factors and the selection of efficient requirement. CC used in support for recreational benefits are the same basics as that used for the benefits of grassland and wild animals. However, the area management for recreation has different objectives from wild animal management. Apart from the benefits of tourists, the management of wild animals regards to the quality of recreation and services such as facilities and feelings of tourists toward the number of tourists existing in the area and in the same time (Thailand Institute of Science and Technology Research, 1992).

Department of Landscape Architecture, Chulalongkorn University (2002) identified that the concept idea of CC has been developed for some time. It has originated from ccology theory and ecosystem management and has applied to various subjects, particularly natural resource and environmental management, land use planning, and development planning for tourism. Theretically, this concept can be easily understood. But in practice it is difficult to identify CC in term of quantitative aspect. This is due to the complexily of ecosystem and other related components as well as other system made by the human. The principle of CC is based on the concept idea of environmental management which underlines the relevant environmental factors. These factors are the determinants of the number of population or activities within the area. Such factors can carry the impacts on natural resources and environment without modifying the existing status or changing to the new status.

This principle can be applied to the determination of CC in AFM.

2.4.1 Concept of Carrying Capacity for Tourist Attraction

According to the study, the researcher has divided the basic component of CC for tourism source as follows:

1. Physical and facilities CC is the maximum use of unit (like human, car and boat) to access for use in the area. It is calculated from the level of maximum use at the present time. It can be seen in more concrete term. However, it is difficult to indicate the use of each unit in particular area. Plathong (2005) indicated that the determinant of CC does not include CC of water, the number of officers in services, and the ability in getting ride of rubbish. It is because these factors can be increased or reduced. The calculation of carrying capacity is based on the potential of area. In this way, the potential of CC is calculated at the higher amount than the existing CC at present.

In this sense, this study pays attention to the physical carrying capacity to reduce some constraints in facilities provided for tourist such as water for consumption, toilet, number of officers, ability in mitigating rubbish, parking lot, and etc,

2. Ecological/environment CC is the component of natural resource and environment of tourism source. It means the level of tourism and development activities related to tourism source which can carry without affecting ecosystem and environment for tourism source. The examples of this matter are the loss of shelter, the soil erosion, the pollution of water source, and the dryness of natural water source. In this way, the identification of CC for the ecosystem depends on the complexity of ecosystem in each system. In general, such identification relies on the research on natural science (ecology and environment). In this way, it needs the specialist and duration in doing research. The meaning of CC for ecology is related to the maximum use of resources for recreation, in terms of activities and numbers associated with the areas or ecosystem, before the value of ecological aspect is reduced or is not acceptable. According to this definition, it is difficult to identify the abundance of ecosystem, the acceptable changes, or the reduction of ecosystem without turning to the existing one (Department of Forestry, 1997),

3. Social CC is the compoment related to the perception and feeling of tourists. Thismeans the highest aumbu of tourists staying at the tourism source who can maintain the experiences of qualitative recreation and the level of satisfaction for tourists in visiting tourism sources. The identification of SCC relies on the research study like the study on ECC. Moreover, the sociocultural carrying capacity is the component involved with the social and cultural settings in the local area as will on the

perception and feeling of local people. This factor means the highest number of tourists, forms of tourism activities, and development of tourism activities accepted by local people. This does not also make any impacts on the changes in social and cultural aspects within the community such as changes in value for consumption and changes in wearing clothes. The indentification of SCC, in part of perception and feeling of people, can be measured in the somnature as measuring feeling and perception of tourists. However, it is difficult to measure these impacts because socil-cultural change process is quite complex and takes time to change. As a result, it cannot indicate that the changes in the community can from tourism development or other surrounding factors.

Chudinthara (1990) defined SCC that it is assessed on the basis of the needs and feeling of tourists. For example, the tourists who want to go to the sea need the quietness, privacy and naturality. When there are more increasing tourists, less privacy exists.

Sowan (1987, cited by Department of Forestry 1997) gave the definition SCC is tha feeling of tourism full of enjoyment and impression of tourists.This definition ignores the feeling of local people.

Thailand Institute of Science and Technology Research (1988, cited by Department of Forstry 1997) gave the meaning that it is less level of satisfactory for tourists in the some way as the feeling of local people. Hence, this meaning places particular attention to the feeling of tourists and people staying in local areas.

2.4.2 Concept of Limit of Acceptable Change (LAC)

The determination of the carring capacity for tourism attractions is delicate. It is because the CC is variable for the natural and social settings. Besides it is also variable for the span of time. The impacts arising from the tourists do not come from only the number of tourists, but they also include the behavior of tourists and tourism activities. Thus it is difficult to determine CC as the certain formular and amount (Asia Lab and Comsultant, 2006). The concept which has been widely accepted is the deterninaut of CC for tourism attractions through the standard level of acceptable impacts. This method user the assessment of limit on acceptable impacts, or the properly acceptable

condition of bio-physical and social components, or the so-called “Limit of Acceptable Change”

LAC planning system has the following concept framework (McCool, S.F., 1996):

1. The objectives of planning and management should be obvious and should indicate the need to manage or pressure through management guidelines,

2. The changes happen all the time in natural system,

3. The tourism activities contribute to the change in natural system,

4. The management would help explore the acceptable changes,

5. The follow-up, inspection and control of the existing results (or changes) from the management would help assess or indicate the activement of management.

The stages of LAC planning system are as follows (McCool, S.F., 1996):

Stage 1 indicates the area problems and observes special charactristies and values,

Stage 2 classifies ROS. It is because the untilization of recreation in tourism attractions relies on various forms of tourism resources. The nature and condition of social and managerial aspects are different in line with the spectrum in order to indicate the preservation, prevention and relabilitation of tourism resources within the tourism attractions,

Stage 3 select the indicator of the nature, framework or condition of resources and society in each ROS,

Stage 4 collects the data on the nature or condition of resources and society and the indicators stating the nature of condition existing at the present time,

Stage 5 develops and determines the standard for the indicators of resources and society for each ROS,

Stage 6 indicates the alternatives of ROS which reflect the area problems and observation as well as the levels or scopes of the conditions, or the values of resources and society as appeared in the present time,

Stage 7 indicates the management and practical ways to achieve the goals for the particular problems and ROS,

Stage 8 assesses and selects the proper alternatives,

Stage9 performs any activities as planned and monitors the nature or condition

changed due to the occurrence of the imports.

This method has applied the principles of the selected indicators and standard, in tuns of ecosystem, environment and society associated with the tourism attractions. In case of qualitative standard, it should be valid and identifiable. The expense of the measurement should be reasonable. The planning and design rely on the relevant reseavant research as the basis of the identifying of indicators and standard of impacts. The level of impacts should not be over the standard. That is, it should be the acceptable level or the level under CC of tourism attractions.

2.4.3 Resources and Carrying Capacity

CC depends on the ability of resources and the utilization. In this way, the preliminary understanding or resources is quite necessary. In order to seek the relationship between the capacity and resources, in terms of ability and utilization.The resources are generally classified into two types: non-renewable resource and renewable resource. But the resources relating to the tourism are categorized into four types in order to cover the component of tourism as follows (Asia Lab and Consultant, 2006):

1. Natural resources are the resources required for natural tourism source. The natural resources are couposed of sub-resources associated with aesthetic tourism attractions which are induced by the tourists. Most tourism resources are the type of renewable resource such as climate, rain, sunshine, wind, currents, land, and quality of water or air. But the non-renewable resource is the identity of tourism attractions. When this resource is damaged, it could not become to the original resource, particularly mineral resource. This natural resource is often the public good which has no price in the market. Accordingly, the unlimited sue of resource is in the nature of overused resource,

2. Services are any services within the tourism system which are regarded or non-made improvement resource. These resources include accommodation, transport, hospital, waterworks electricity, food, and souvenir shop. It can be observed that such resources arise from the modifying of natural resources. Moreover, the price system has involved with the resource allocation. Hence, when these is align need in resources,

there is the movement of price to be higher, resulting the amount of need to reduce automatically along with the market machanization. The capacity is the ability of tourists to pay the expenses,

3. Infrastructeur is the government services system to be applied for services system of tourism. This is the man-made resource like road, security, and mitigation of waste. In part of resource allocation, the price system is not involved directly. The advantaged do not need to pay for compensation. When the use of infrastructure has increased, there are some difficulties on scarcity,

4. Economic and social conditions of local areas include population, way of life of people, occupation, socio-psychological condition, and etc. The relationship with tourism attractions has a positive aspect like employment, income, etc. and a negative aspect like higher standard of living, changes in society, conflicts on culture and moral; etc,

In another view, the analysis of the carrying capacity of tourism attractions in term of natural resource can be classified into ecosystem and environment, physical setting, and location as follows (Academic Services Office, Chulalongkorn University, 1992).:

1. Ecosystem and environment take into account the ability of resources in the natural condition, or the uniqueness, or transformation, and self-regeneration,

2. Physical setting takes into consideration the density of population per unit. Such density would indicate the quantity of population in the area and the quality of utilization. The physical carrying capacity is variable for the time consumed.

2.4.4 Study on Carrying Capacity and Level of Carrying Capacity in Tourism Attractions

In part of tourism, the development of this concept is used to manage areas or resources and the matters of tourists. The tourism CC is made to determine the number of tourists or users in line with the ability of resources, environment, and the management of tourism attractions without generating any changes in the environment. The maximum rate of tourism CC determines the member of tourists within a period of time in particular place or area. CC is the ecological concept to be applied widely in

the area planning system. According to the tradition concept, it defines as the maximum (of living things) which the area or environment can carry (Whittaker, 1970 cited in Nopawan, 1999:50). Later on, the application of the concept was made and its definition was added in details. Sometimes it can be replaced with the word “the capacity existing in environmental system”. In this matter, Ngarmpongsai (Cited in Thanakarn, 1999) defined as the maximum capacity which the surrounding, or area, or environmental system, can occupy common things at the highest amount, with regard to the well-being of these things. Besides, he added that the planning carrying capacity means the volume of utilization in any areas where can carry before being deteriorated.

Asia Lab and Consultant (2006) conducted the study on CC in Erawan National park and had applied the principles of ROS and LAC. The classification of recreation areas and tourism and the determination of level of changes would not cause the unbalanced changes of environment resources. The level of changes arising from the surrounding or ecosystem within the tourism attractions can be usually seen when there are some disturbances or luman activities. The ecosystem within the tourism attractions can carry the impacts which may occur in some extent. This is the so called LAC. But when the disturbances are over LAC, the change of the surrounding in the tourism attractions will occur. This is the so-called “unacceptable impact”. This shows the occurrence of the impacts up to the level of unacceptable activities for human. However, it depends on the durability of the environment, controlling measures for impact, and prevention of impacts in each area. The level of impacts in this manners shows that the capacity of environment can no longer carry. It is quite difficult for those involved to make decision on the level of impact because it has to rely on the support of indicators and research works.

The level of CC canbe classified into three aspects as follows: (Department of Landscape Architecture, Chulalongkorn University, 2002).

1. Level of PCC means the maximum level of tourists per area and/or facilities where can support for the benefits and generate recreational activities as required. This level relies on physical indicators that can be managed and facilities lile car parking, accommodation, water for consumption, ability in mitigating garbage and waste, number of personnel, and etc. This indicator should be used in services area. The transformation of physical structure and management would help enhance the carrying

capacity, but it should be in accordance with management policy of national parks. In the meantime, it should regard to other capacities together with ecological and social factors,

2. Level of environmental or ecological carrying capacity is defined as the maximum level of tourists where cannot degrade or deteriorate the environment and ecosystem over the acceptable level. If not so, it may cause the critical point to the environment. This level is measured by the biological indicators, through the valnerability and durability of ecosystem and environment in the area. This indicator can measure the level of recreational use at the period of time associated with the impacts of ecosystem, in terms of species, wild animals, quality of water, quality of soil, and soil erosion. The determinant of the maximum impacts which has been accepted as the standard rate of tourism attractions should place the importance on this capacity in maintaining natural tourism attractions or natural conservation areas where are vulnerable,

3. SCC means the maximum level of tourists, or the use level for sharing experiences on tourism or recreational activities for the tourists. This indicator would not make negative impacts to the society and culture of local people. To do so, it is necessary to pay attention to the opinions of local community and tourist group as the criteria for particular area. This opinion is different from the nature of community and tourist group,

As mentioned above, the three levels of CC are determined through applying the principle of ROS. It is necessary to assess the impacts which may occur from tourism activities in each area and apply the techniques in determining the level of changes or acceptable impacts form tourism in order to use for determining CC in each area.

Accordingly, this study has applied the principle of ROS for determining CC with ecotourism area in AFM. The study quideline focuses on the level of changes in tourism use. There are the relevant factors to be considered as follows:

1. Physical factor and ecosystem of tourism area related to natural factor and environment. This factor will explore the basic needs of the living things for survival such as water for consumption, waste, nature of tourism area, water quality, ant etc. The result of the study would consider the proper level of CC in tourism activities,

2. Social factor includes tourists and local people. The tourists are the

uncontrolled factors because they are variable factors which are difficult to determine the limit such as member of tourists, basic characteristic of tourists, etc. as well as frustration and satisfaction of tourists who visit Amphawa floating market. The local person is another factor to be considered. This can be seen through ecotourism in the form of community based. It relies on the environment of local community and the sustainable use of natural resources and environment.

2.4.5 Standard and Indicators

The concept of determining the standard and indicator of CC for tourism attractions is at the proper level of tourism expansion in any source In practice, it way determine when the negative result appeases. The determinant of criteria is not certain. It is different from each area of tourism attraction and local environment. The criteria can be classified into two groups as follows:

1. Statistics based measurement is made for number of accommodation source, density of tourists per one tourism area, public utilities and services, or facilities required for tourism such volume of water use, capacity of wastewater treatment system garbage management system, number of food shops and welfare shops, etc. The standard or indicators in this criteria can be explored from research works or standard accepted by the academy,

2. Non-statistics based measurement is used for the factors related of quality of life. These factors are psychological impact or standard, satisfaction of tourists toward tourism attractions, impacts on tradition, culture, and way of life for local community, impacts on historic sites or historic values, impact on ecosystem, etc. For this criterion, it is difficult to rely on any statistical standard for measurement. However, the concept used in this study would use explanatory data for decision making. In case any factor has the sum to be the standard or indicator in CC, it will be added in the study.

When having proper standard or indicator, it will be used for analyzing the critical point. This can give the answer about the needs of tourists or the uses of tourists in services. For example, the volume of water use can serve for the tourists and the determinant of proper factors would mitigate the number of tourists in a period of fine.

2.4.6 Applying Carrying Capacity for Ecotourism Planning

The concept of CC can be applied for the planning of ecotourism development as follows:

1. To apply for formulating direction and control development or changes which way occur,

2. To apply or warning system or forecast. When looking at the expansion or growth of development or changes which way occur, it can rely on CC or limit to prevent or prepare for the solution before the ecosystem could not support and causes damages,

3. To apply for planning and management on reducing impact which way occur or on increasing the ability in carrying capacity.

Although the concept of CC could apply for achieving the objectives of planning for ecotourism development, it has some constraints on its components. It is because the analysis of CC has some limitation in finding the solution or in identifying CC. In the some way the application of the concept has confronted with the same constraints (Schneider et. al., 1978). These constraints include: 1) Hypothesis used as the basis of assessment as measurement as applying for achieving the objectives, 2) Difference and variety of analysis process boded on the hypothesis used for various analysis, 3) Complexity and variety of analysis process, starting from simple counting or mathematical calculation to complex model building with computer, 4) Difference of measurement or assessment process which can classify from number or sum to estimation or interpretation, 5) Factors and relations with various factors and sometimes it is difficult to measure or assess in concrete term, 6) Scope and complexity of data used for analysis, 7) Validity and correctness of data used for analysis, and 8) Difference between analysis and result of analysis which is applied for various objectives.

2.5 Related Research

According to the collection and study on secondary data associated with the CC on tourism or recreation in Thailand, it was found that most of them were the study on

CC on psychology of tourists toward tourism attractions. Moreover, the study on physical setting and facilities required tourism areas can be also found. However, it did not find the study on CC on environment or ecology because such study needs to take time to show the result of study with on effective manure. The relevant researches are as follows:

Nagmpongsai (1982, cited by Prasert, 1995) defined CC that it determined CC in environmental system through the maximum capacity of the surrounding, or an area, or ecosystem in allowing carrying the environment. This capacity would regard to the well-being of the living things. This is essential for development process. It is because when the volume and proportion of the living things are not adjusted properly, the undesirable surrounding way occurs,

Prajinburawan (1988) conducted the study on CC for tourism at Cha-Am beach. The density of the people who perform the tourism activities at Cha-Am beach has made the most satisfactory to the tourists. This density is calculated from the proportion of each tourist multiplied by the density at the present time. The result of study found that the average density of the tourists who are satisfied with was 15.023 m^2/person. Besides she also studied the factors which related to the density of tourists who are satisfied in order to build model of CC. It was found that number of rest days, distance between groups, and expenses of tourists are the factors which have the influence upon the density and can be used as the equation for forecasting the density of Cha-Am beach,

Kerdchuen (1990) indicated the density of tourists in a period of time is the determinant of SCC. This model was used for studying CC for the type of beach in case of Koh Samed, Rayong Province.The model uses the counting method for the tourists in each area in a period of time, the result of study found that the average of all tourists was 276%, accounting for the average density at 14.46 m^2/person. Then it was the surrey of tourists on the level of increasing needs at present which having resulted in reducing, the level of satisfactory. According to the surrey, most tourists were satisfied with the increasing number of tourists for 50%. The result of the model applied for analyzing the density of Koh Samed beach found that the factors related to the physical environment of tourism attractions distance from other groups required by the tourists, various activating for relaxation as reading, taking photo, going to bed,

and sports activities,

Duan-ngen (1991) studied the psychological CC on the recreation around Hale-Suwat Waterfall in Khao Yoi National Park, the factor used for assessing activities. The study relied on the questionnaires for collecting data and supporting the study. According to the study, the tourists were satisfied greatly to the facilities and environment as will as the density of tourists while performing recreational activities,

Prasert (1995) assessed the potentials of physical and social aspects in CC for the tourism Phu Kradung National Park, in order to determine the certain level of tourists which will not affect the surrounding of Phu Kradung National Park. The study compared between tourism demand and supply in the area. The tourism demand included tourism activities, needs of services from grocery shop and food shop, water use, and accommodation. The tourism supply covered with scope of area, volume of services, and number of accommodation rooms. The study also relied on the questionnaires as a tool for study. The target group of the study was tourists and entrepreneurs. The study found that the certain and acceptable level of tourists was 3,376 persons a day,

Phawayou (1997) studied SCC of public garden in Bangkok Metropolitan Area: the case of Lumpini Garden, The objectives of the study were to learn the level of density of population in the areas of Lumpini Garden and satisfaction of services were in Lumpini Garden, the factors influencing upon SCC in Lumpini Garden, and problems and needs of users in Lumpini Garden. According to the study it was found that the present level of density at Lumpini Garden was 18.77 m^2person. The level of density for the service users who began to make dissatisfaction was 12.51 m^2/person. The sampling group was satisfied with Lumpini Garden at the moderate level. When classifying the satisfaction in various aspects, it was found that the sampling group was satisfied with the distance of other groups, the physical environment of Lumpini Garden, and facilities at the moderate level,

Khunluang (2002) studied the psychological impacts and psychological CC, the factors influencing the psychological impacts and psychological capacity for the tourism attractions in terms of water fall. The indicators of the study included frustration, feeling for the surrounding, changes in recreational experiences, overall satisfaction, and desire to move recreational attractions. The study found that the

number of tourists have not influenced upon the indicators of psychological impacts in every area. Hence, the carrying capacity could not be transformed into the sum and was considered by the qualitative aspect,

JBIC (2004) studies, under the special aid program focusing tourism development, CC of the study area in order to make recommendations to Thailand to assess CC of tourism in national parks. The study gave the particular emphasis on Doi Inthanon National Park and Similan Island National Park. The steps of the study included 1) To review data and formulate concept, 2) To classify management area of national park, 3) To select the areas for study, 4) To collect social data and facilities, 5) To survey comparative data between tourism seasons, 6) To analyze the result of study, and 7) To classify the areas to be groupings for rating CC of each group. According to the study, it as in needs to further monitor impacts in order to rate CC of national park, in the future,

Department of Water Resources (2004) conducted the study on CC of recreation under the project extension of facilities services at Oro ville, California State. This study guideline was to measure the impact in conparison with the standard rate for the parlicular area and analyze the level of area utilization in relation to the recreational CC. The indicators of the impacts arising from recreational activities and the biological CC included the compression of soil; the erosion of soil; the accumulation of garbage; the danger of species such as appeared root, broken branch, or trace of writing; waste management; out of route travel for tourists; water quality; and concentration of the use of watershed area, The indicators of PCC were the potential in expanding the area to serve for the recreational activities in the future and the proportion increasing volume of use in the existing facilities. The indicator of CC on the facilities was the percentage of volume of facilities in the holiday while the factor related to feeling on congestion was the indicator of socio-psychological CC. The result of study found that the utilization at present was close to the maximum level of CC. This was an exception that the biological CC was lower than other factors like areas in carrying out activities and facilities at present,

Pakphitchareon (2005) studied CC of facilities and socie-psychological aspect associated with tourism activities within the ecotourism area. The case of study was conservation based tourism village in term of Thai tradition house. The study focused

on good feeling of the users in activities limited to tourism attractions and made comparative analysis on CC in order to receive the maximum level of CC. The result was the maximum number of users which was accepted by all the parties concerned,

Asia Lab and Consultant (2006) assessed the recreational CC in tourism attractions and Erawan National Park, through applying the principle of level of acceptable change and ROS. The level of ROS can be divided into five levels such as 1) Primitive area, 2) Semi-primtive non-motorized area, 3) Semi-primitive motorized area, 4) Semi-developed natural area, and 5) Highly developed natural area. The level of impacts can be categorized into four levels, together with the maximum use of CC at 100%, as follows:

1. No impact or low impact, the level of use lower than 50%,
2. Medium impact, the level of use between 50-80%,
3. High impact, the level of use between 81-100%,
4. Extream impact, the level of use over 100%

2.6 Study Area

2.6.1 Location and Geography

The areas of Amphawa Tambon Municipality are composed of 10 communities, with the area of 2.5 km^2 It is far from Bangkok by road about 71 km. and Samut Songkhram by road about 6 km.

North connects to Bang Chang sub-district, Amphawa district.

South connects to Mae Kong River, Amphawa district.

East connects to Ban Pok sub-district, Muang district.

West connects to Bang Chang sub-district, Amphawa district.

Amphawa community is located at the Plain of Mae Klong River. The river passes through the areas in the west and Amphawa canal is separate from Mae Kong River and pass throught the community area. Besides there are many canals passing through community area.The network of canal within the community area has contributed greatly to the convenience of water transport and the occupation like agriculture. Most areas within the community are based on agriculture. In line with the

geography, the area of Amphawa community has received some effects from sea in term of the tide throughout the year. As a result, Amphawa community is named as the city of three waters such as fresh water, braekish water, and salt water. The climate of this area has the temperature which is not hot because it is not far from the sea. It is raining during May-October. But during November-February it is quite cold.

2.6.2 Background

Tambon Ampawa

The present municipality area is traditionally called “Knong Bang Chang” (Bang Chang sub-district). It is not obvious when it was established. The area within Kwang Bang Chang is calld “Outer Garden”. It is the community with the growing of agriculture and trade. In the reign of Prasart Thong King of Si Ayudhaya City, there was a market existing in Kwang Bang Chang called “Bang Chang Market”. The chief of Bang Chang Market supervised tax collection, Khnon of the market named “Noi”, or the rank of “Tao Kaeo Phluck”, was a member in the family of millionaire who studied in Kwang Bang Change. Later on, her family became the origin of “Bang Chang Family. In the reign of King Rama II of Rattanakosin Dynasty in 1938, Tambon Amphawa and Tambon Bang Kapom were canbined together to be Tambon Amphawa. It was considered that Tambon Amphawa had the nature of population, growth, and income and had deserved as the municipalty. The set-up of municipality was to promote the local administration and the involvement of people in administering themselves and developing local areas. This guideline was used to train and educate the democracy for the people. In this way, the royal decree was enacted to upgrade Tambon Amphawa to be Tambon Amphawa Municipality on October 16th, 1940.

Amphawa Floating Market

The community is convenient in transportation and consumption. It is because the geography of the community is composed of Mae Klong River and Amphawa Canal. As a result, a lot of migrants house settled around the bank of river, the inland (near the river) (Taechakitkhajorn, 1999 cited by Lisnan, 2001), or both areas. Most of people are Thai. There are a lot of Chinese to do business. Besides, there are some

people from Combodia and Lao PDR. All of them are densed at the bank of river and Amphawa Canal. The market is the center of urban community. At the beginning, the settlement of community was dispersed around two banks of Mae Klong River and main canals as well as minor canal, and other canals linked with Mae Klong River. These canals include Klong Amphawa, Klong Bang jak, Klong Dao Dung, Klong Lad Ta Chote, Klong Pee Loke, Klong Prachchuen, Klong Kaew Oom, Kong Bang Chang, and etc. The Temple is the center of the distribution of community.

In the beginning of Rattanakosin Dynasty, Amphawa community was close to the river bank with the dense of people. It is because there was the center of trade like AFM. The two banks along the canal were full of the community and the plantation of fruits at the back. (Lertchindasab, 1992 cited by Lisnan, 2001) In 1782, Amphawa was the relative city of King Rama I and the hometown of King Rama II. Amphawa was rich with famous fruit gardens. The community was densed at the river bank. The two floating market were AFM and Pak Klong Market (or Bang Nok Kwack Market). Before 1958, the settlement and distribution could be seen along the canals. The agriculture focused on fruit plantation. The community had existed the gardeners staying around the canals. The river and canals were used for hoding and exchange of goods. Most people were focused on horticulture. Around the temple, it was crowded with the community. The district supervised the area during 1957-1965. Until 1980, more road links were made. These included the highways linking Bankok and Samut Songkhram (No.325) and Thonburi-Pak Tor. The land transport between the provinces was developed. The community turned to use more roads. Samut Songkhram has become the open town. As a result, the community turned to be crowned along the roads, as shown in more trading. The tradintional settlement was in parallel with the canals, but it reduced the role of local city. Then the community has removed more to the bank. The small and medium-sized industry was occurred and the land transport cans access.The community still eased for aliving from agriculture. Afterward the role of floating market has become to be Damnern Saduak Canal. As a result, Amphawa community was quite lonely. The trading along the river disappeared from the community. Few gardeners staying near the canal like to plant fruits. The people moved from houses to buildings. The modern house existing in the garden does not plant the fruits and links to the road. The form of agricultural community has turned in

line with the economic condition. This has resulted in the loss of being the center of Amphawa. Hence the floating markent has reduced its importance and has lost at the end.

During in 2003-2004, Amphawa Tambon Municipality, in collaboration with the people, had rehabilitated AFM to preserve the living of community at the bank of river. The floating market event is organized regularly in the evening time during 4.00-9.00 pm. from Friday to Sunday. In the special holidays, it is crowded with visitors around Amphawa Canal. The villagers paddle their boats to sell the goods like meat dish and sweet food. These included burned shrimp, burned squid, Chinese noodle, Thai noodle, fried shell, antique coffee, etc. The products gained from the garden within Amphawa community and other areas nearby include banana, pomelo, coconut, plants, vegetables, etc. Moreover, the areas near the canal within the floating market area are the pedestrian area crowded with food shop and sweets as well as souvenir shop.

2.6.3 Ecosystem and Environment

Amphawa community has the specific identity on the ecosystem and natural environment. It is because the location is the plain near the mouth of river. As a result, there is the sediment of minerals. The community has many sub-canals in Mae Klong River, resulting in making in abundant for the soil in the area. The people earn for a living mainly from agriculture. Most areas of fruit gardens are next to the houses located at the bank of the canals. In addition to the abundance of the ecosystem and natural environment, Amphawa is called as the city of three waters. When the sea rises, it will replace the fresh water in Mae Klong River and the canals. Then the fresh water becomes the brackish water, or as the villagers called “Water mixed with fresh and salt”. The volume of rising and ebb tides each time depends on the fixed time. The low volume of rising and ebb tide is the period of 6-11 days of the rising and ebb tides.

Being the city of three waters has resulted in the biodiversity and the abundance of ecosystem. This has generated many kinds of trees such as *Sonneratia caseolaris*, *Nypa fruiticans Wurmb.*, *Avicennia marina*, *Acanthus* ebracteatus, etc. The important aguatic animals are *Mugil siheli*, *Tetrameles nudiflora*, *Puntius gonionotus*,

Periophthalmodon schiosseri, *Macrobrachium rosenbergii*. The crab mostly found includes *Sarmatium germaini*, *Uca urvillei* and shell. There are a lot of birds like *Bubulcus ibis*, *Ardeola bacchus*, *Haliastur indus*, *Acridotheres javanicus*. The crawling are *Calotes versicolor* and *Varanus salvator*. Besides, there are many kinds of insects. The community has the proper ecosystem with the growth of *Sonneratia caseolaris*. Hence *Sonneratia caseolaris* is usually seen at the bank of river. This area is crowded with the living of firefly for millions. Firefly eats the young leaves of *Sonneratia caseolaris* as a kind of food and stays at a hollow of *Sonneratia caseolaris* as laying egg. The visit to firefly is needed to use boat along Mae Klong River at night. Another area proper to see firefly is Klong Pee Loke which links to Amphawa canal and Mae Klog River.

2.6.4 Tourism Resources

Amphawa Chetiyaram Temple

Amphawa Chetiyaram temple is the rayal temple located at the mouth of Amphawa canal in the north. It was traditionally called “Wat Amphawan”. Then King Rama III gave the new name as “Wat Amphawan Chetiyaram”. It means the emple has pagodas and mango trees for recreation and respect. This temple belongs to the royal family. The mother of Her Majesty Queen Amarinthramas (Nak), donated the land and Her Majesty Queen of King Rama I “Amarindramas” (Nak), incooperation with his brothers and sisters, built the temple. King Rama III had ordered to renovate the temple and build the stupa as the place for keeping the royal bone and ashes of King Rama II. Further more, he had also ordered to build Phra Viharn and Song Dharm Throne.

Community at the river bank and local architecture

In general, the settlement of Amphawa community is in parallel with the canals. It can use water for consumption and transport. The houses located at the bank of river can be seen along the two banks of Amphawa canal. The general condition of the old houses is connected continuously along the canal. This is the unique of traditional houses erected in the past. The nature of architecture is the one - floor house. The roof are in the form of architectural design; single-gable roof (Jau-Daew), twin-gable roof

(Jau-Fhad), hip roof (Pun-Ya), and Thai-style twin-gable roof (Jau-Fhad Thong Thai) (Research Unit for Conservation and Reliabilitation of Community, Architecture Faculty, Chulalongkorn University, 2006). The roof is coverd with the tile which is made of basked clay or tile of zine. Most doors are wooden and open for trading, and exchange of goods. Some houses have wooden doors with windy role above the doors. It is used for air ventilation. The window is made of wood, consist of two sheets. The floor of the house is a big sheet made of wood. The ceiling is a sheet of wood. The important identity of the houses, located at Amphawa canal is traditiaonl board of the shop. In the past, these houses were trading. Though some houses are changed into the residence, the board of shop fixed at the houses can be seen in front of the houses. Such boards have various forms. Most of them use Thai alphabet and Chanese golden alphabet within the black color, or decorated alphabet.

2.6.5 Transport

By car

From the center of the province, it uses the highways No.325 to go in the same way as Domnern Saduak District and King Rama II Park for about 6 km. Before reaching the junction, there is a way on the left to enter into Amphawa District for about 800 m. Then it comes from Dechadisorn Bridge to go across Amphawa canal. On the left-hand side, it turns to Wat Amphawa and park car in front of Wat Amphawa.

By other vehicles

The air-conditioned bus No.996 (running from Bangkok to Damnern Saduak) goes from Southern transport station, through Samut Songkhram, to AFM.

The bus No.976 (Bangkok-Samut Songkhram) goes to Samut Songkhram transport station and then goes by bus no.333 (Mae Klong-Amphawa-Bnag Nok Kwak) to AFM.

The van which goes from Bangkok to Mae Klong parks around victory monument.

CHAPTER III
METHODOLOGY

3.1 Research Design

This study is a survey research aimed to classify and identify tourism area by applied the principle of ROS, including assess CC of tourism area in AFM. The research methodology framework is provided below.

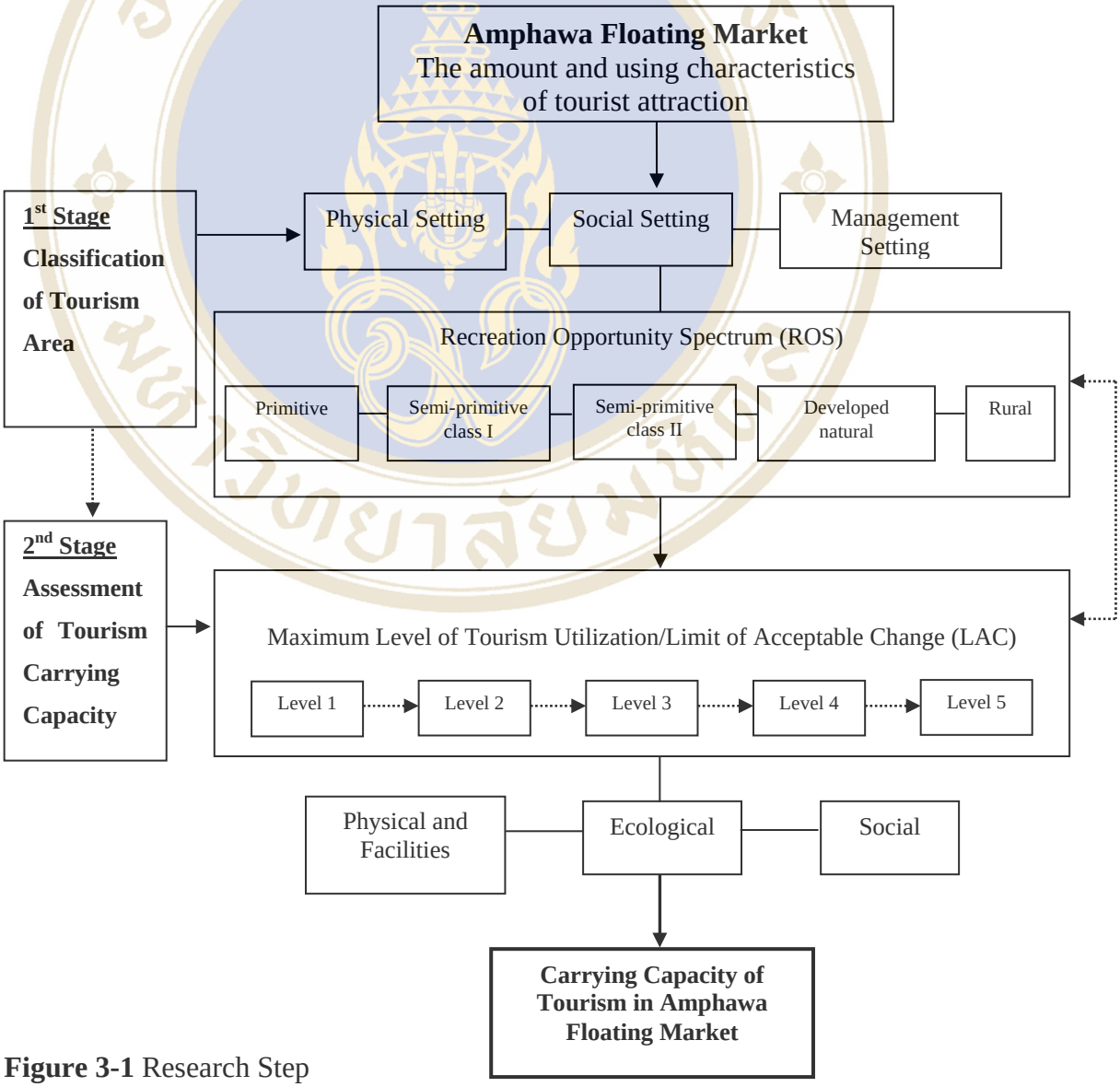


Figure 3-1 Research Step

3.2 Sampling Size

The population was divided into 2 groups; Stakeholders who involved with tourism management of AFM and Thai tourists who have an age above 15 years.

3.2.1 Stakeholders who participate with tourism management of AFM in all 4 tourist attraction. There was aimed to 1) assess the tourism area by applied the principle of ROS and 2) assess the social questionnaire.

3.2.2 Thai tourists who have an age above 15 years in order to consider the social questionnaire. For specify sampling size of tourist people. Since the record of number of tourists per year in AFM was not available, thus the sampling size for this study should not be less than 96 persons (Sothanasathian 2545). Sampling will be conducted from people who involve to the activities for 100 persons.

The sampling sizes were determined into 2 groups (Table 3-1).

Table 3-1 Sampling Size

Population	Sampling	Sampling Size
1. Stakeholders who participate to manage tourism in form of Community-Based Ecotourism	- Using the purposive sampling	- The leaders in tourism management consist of the mayor and the communities chairmen of Amphawan temple, Prachauthit, Rimklong, and Amphawa market
2. Thai tourists who have an age above 15 years	- Using the accidental sampling from the estimated of population standard deviation	- Thai tourists have 100 persons.

3.3 Research Tools were described as follows;

Table 3-2 Data Gathering Tools

Sampling Size	Tool	Purpose
1. Consist of the Mayor and the Communities Chairmen	1. Tourist Attraction Assessment	1. Classify the tourism area of AFM by applied the principle of ROS
	2. Questionnaire	2. Assess SCC of the leaders in tourism management of AFM
2. Thai tourists 100 persons	3. Questionnaire	3. Assess SCC of tourists

3.3.1 Tourist Attraction Assessment

These tourist attractions are Amphawan Chetiyaram Temple, Amphawa Community Information Center, Way of Life and Vernacular Architecture Trail, and Amphawa Market (land market). The structure of questionnaire for tourist attraction assessment comprised of closed-ended questions for 5 tourism factors as transportation and access, site management, opportunity for social encounter, visitor control level, and tourism impacts. Each indicator will provide the identification character for tourism classification conform to their physical, social, and management channel of ROS conditions. Data will be estimated by ordinal values represent to area of ROS. The classification of maximum to minimum values is showed below:

Table 3-3 Tourism Area Ranking

Tourism Area Ranking	Points
Primitive area (P)	5
Semi-primitive area class I (SP-I)	4
Semi-primitive area class II (SP-II)	3
Developed natural area (DN)	2
Rural area (R)	1

Each of them were scored according to the given factors and fairly separated into the following classes:

Table 3-4 Identification Character of Tourist Attraction Assessment

Identification Character	Score
1. Transportation and Access	
1.1 Convenience of tourism access during peak time	
Distance of Samut Songkhram – Bang Nok Kweak Road, access by car, not more than 20 m.	1
Distance of Samut Songkhram – Bang Nok Kweak Road, access by car, about 21 – 50 m.	2
Distance of Samut Songkhram – Bang Nok Kweak Road, access by car, about 51 – 100 m.	3
Distance of Samut Songkhram – Bang Nok Kweak Road, access by car, about 101 – 500 m.	4
Distance of Samut Songkhram – Bang Nok Kweak Road, access by car, more than 500 m.	5
1.2 Development level of pathway	
Developed pavement/bicycle path are found more than 80% of pathway in tourism site and facilitate to every person	1
Developed pavement/bicycle path are found more than 50 – 80% of pathway in tourism site	2
Developed pavement/bicycle path are found less than 50% or developing pathway found only 50% or less and have some facilities such as steps and handrail	3
Developing pathway are found more than 50%	4
Undeveloped pathway is found more than 80% (no facilities such as unpaved area, bridge, and handrail). The route was small and unclear, tourists should take care themselves	5
1.3 Distance of pathway from parking area at the front of Wat Amphawan to tourism site.	
Access by walking to tourism site not more than 20 m.	1
Access by walking about 21 – 50 m.	2
Access by walking about 51 – 100 m.	3
Access by walking about 101 – 500 m.	4
Access by walking more than 500 m.	5
2. Site Management	
2.1 Development features determined by buildings and structures (such as road, bridge, waterside, waterfront pavilion, fence, guardhouse, flagstaff, etc.) which remain the local identity of figures, colors, and construction materials completely	
Found the improvement of buildings and structures in terms of figures, colors, and construction materials clash with the original style obviously	1
Found the improvement of buildings and structures more than 80% of total community area, but remain the figures, colors, and construction materials blend with the original style	2

Table 3-4 Identification Character of Tourist Attraction Assessment

Identification Character	Score
Found the structures improvement more than the buildings improvement above 80% of total community area, but remain the figures, colors, and construction materials blend with the original style	3
Found the structure improvement more than the buildings improvement below 80% of total community area but remain the figures, colors, and construction materials blend with the original style	4
Found a few of improvement area, only 10 % of total community area	5
2.2 Boundary of buildings and structures improvement area[1]	
Spread improvement in a wide area covers almost community area	1
Improvement in cluster area	2
Improvement in one area	3
2.3 Facilities purpose	
Provide many facilities to support the increasing of tourists	1
Provide basic infrastructures to facilitate every person	2
Provide basic infrastructures to facilitate visitors such as toilet, gazebo, bin, etc.	3
Provide essential facilities for visitor's safety and prevent environmental impact such as handrail, bridge over the river, bin, etc.	4
Provide essential facilities and limited usability	5
3. Opportunity for social encounter estimated by observes the number of tourists during survey	
Mostly found about more than 50 groups/hr.	1
Usually found about 30 – 50 groups/hr.	2
Occasionally found about 11 – 12 groups/hr.	3
Rarely found about 2-10 groups/hr.	4
Never found or less than 2 groups/hr.	5
4. Visitor control level/utilization activity or usage condition of responsible authorities (5 is lowest – none and 1 is highest)	
Always found the inspector in area and the notice to inform and warning	1
Found the inspector in area that made the safety and confident to tourists	2
No inspector, provide only information notice such as warning, area usage condition, and environmental protection	3
No inspector, provide only warning notice	4
No inspector and notice provided in area, tourists should be take care themselves and feel lonely	5

[1] Value adjustment to be the equivalent standard by $K = \frac{X - Xmin}{Xmax - Xmin} \times$ Standard number (5)

Table 3-4 Identification Character of Tourist Attraction Assessment (Continued)

Identification Character	Score
5. Tourism Impacts	
5.1 Found the improper behaviors of tourists or against the local laws and regulations such as litter in public place, writing on the historical site or tree, no good dressing, bring drug into the community, etc.	
Mostly found (more than 30 % of tourists)	1
Usually found (about 21 – 30 % of tourists)	2
Occasionally found (about 11 – 20 % of tourists)	3
Rarely found (about 1 – 10 % of tourists)	4
Never found	5
5.2 Impacts from tourists/utilization activities that noticeable which the classifications of 5 mean strongly severe and 1 mean less appear – disappear	

Noticeable Impacts	**Score**				
	5	**4**	**3**	**2**	**1**
Collapse of riverside (% erosion)					
Suspended matter					
Human waste					
Odor					
Visual impact from structures					
Conflict of utilization activities (among the tourism activities)					
Amount of waste					

3.3.2 Questionnaires

There are consists of 2 questionnaires applied to evaluate the SCC of tourists and stakeholders of tourism management for AFM.

3.3.2.1 Questionnaire for Tourist

This questionnaire is aimed to assess the attitude of the tourist in terms of congestion and satisfaction with the open and closed-ended questions simultaneously. The structure of questionnaire was divided into 3 sections as follows:

Section1 General Information of tourist consists of gender, age, education,

occupation, income, and address,

Section2 Tourist Activities in AFM consists of times visiting, information perception (before visiting), tourist purposes, transportation, traveling accompany, traveling plan, and visiting duration,

Section3 Opinion and Attitude towards AFM consists of tourism receive perception, the quality of information board/sign, visiting Amphawa community information center, and maximum of tourist size acceptation. In addition, the attitude of congestion and satisfaction, including the satisfaction of natural harmony, utilization, arrangement, river traffic, sidewalk, sign /notice board, tourism receive perception, parking areas, number of garbage can, and safety procedures.

3.3.2.2 Questionnaire for the Leader in Tourism Management

This questionnaire is aimed to assess the attitude of the leader in terms of congestion and satisfaction. The structure of this questionnaire was designed similar as questionnaire for tourist. There was comprised of open and closed-ended questions to asking the opinion and attitude of respondent. Consist of maximum of tourist size acceptation and the overall congestion and satisfaction.

The identification character of congestion and satisfaction will be using the ranking of ordinal number as follows:

Table 3-5 Congestion and Satisfaction Ranking

Congestion and Satisfaction Ranking	Points
Very much satisfied	5
Much satisfied	4
Moderate satisfied	3
Low satisfied	2
Very low satisfied	1

These questionnaires had certified the content validity by experts and fine-tuned as completed version before using in the field survey.

3.4 Data Collection and Survey

The survey was conducted during February – April 2008 by the author and assistants. The procedures for data collection are described below.

3.4.1 Tourism Area Classification

3.4.1.1 Study the secondary data on potential and framework of ecotourism development and promotion based on AFM community. (According to the preliminary assessment of ecotourism resources in Amphawa canal and surrounding areas by the Faculty of Architecture, Chulalongkorn University in 2003, Amphawan Chetiyaram temple, way of life along Amphawa canal, and vernacular architecture were classified as high potential tourist attraction.) The study also indicated guideline for cultural tourism development in area of Amphawa canal such as temples, riverside communities, way of life, local wisdom information center/local museum, etc.),

3.4.1.2 Survey the tourism sites in AFM in terms of number and land use,

3.4.1.3 Determine the represent of tourism area for ROS by their physical and managing characterization. The physical characteristics were defined as visiting sites which their boundary are connected to each other. The managing characteristics were defined as Community-Based Ecotourism management. In this research, the communities were classified by location and confederacy to allocate budget for each community of Amphawa Tambon Municipality. The 4 representatives of high potential tourist attraction in AFM are provided below (Figure 3-2),

3.4.1.4 Specify the definitions and conditions of each ROS,

3.4.1.5 Determine the identification factors suitable for an area by consider to ROS environments such as physical, social, and managing characterization,

3.4.1.6 Determine the criteria of each identification character,

3.4.1.7 Create tools and methodology for assessment,

3.4.1.8 Provide the local expert to support the assessment, the mayor and communities chairmen,

3.4.1.9 Analyze and conclude the tourism sites classification for each ROS.

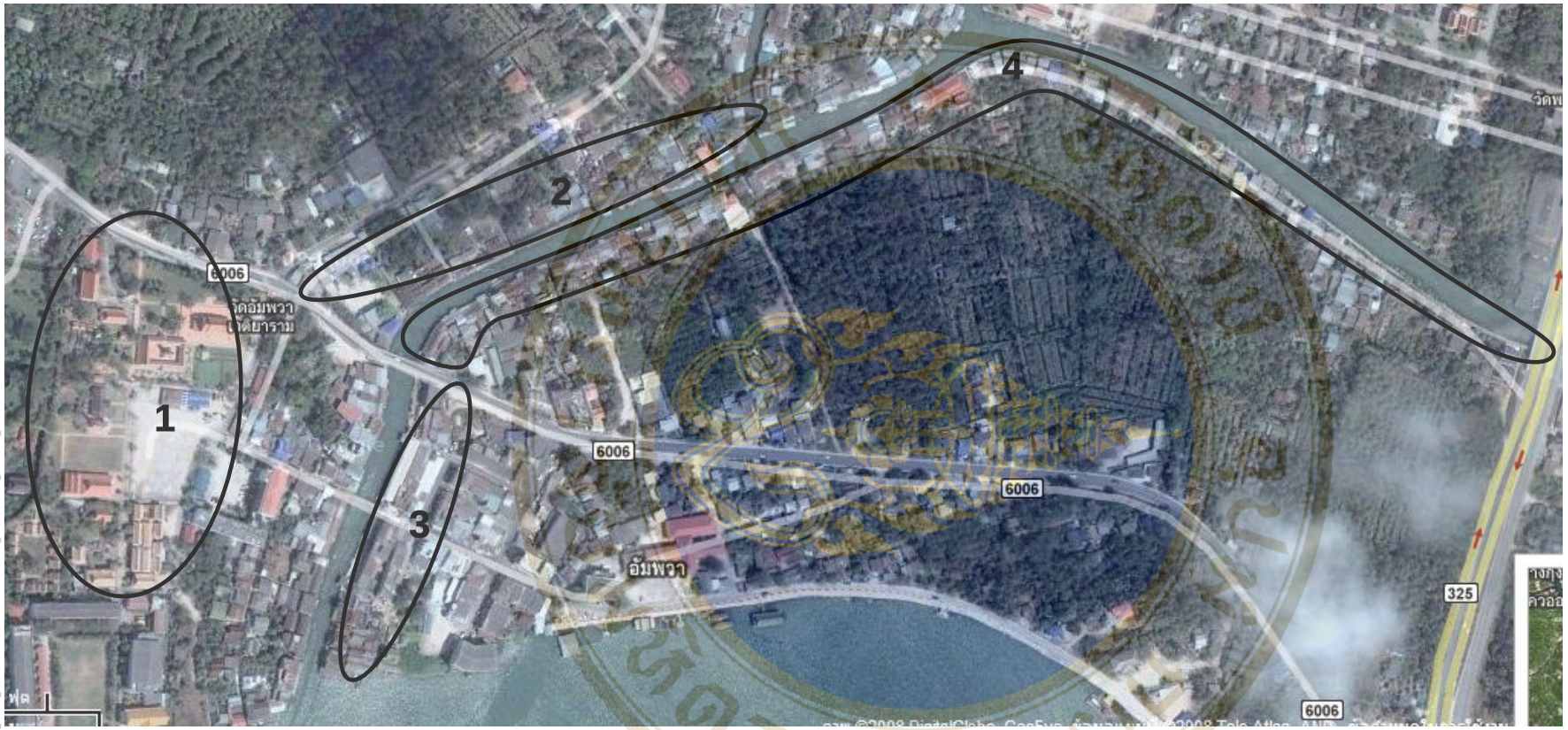


Figure 3-2 Tourist Attractions Located in Study Area (http://www.samutsongkhram.go.th/gis.php, June 10th, 2007)

Remark: 1 = Amphawan Chetiyaram Temple
2 = Amphawa Community Information Center
3 = Way of life and Vernacular Architecture Trail
4 = Amphawa Market (land market)

3.4.2 Tourism Carrying Capacity Assessment

3.4.2.1 Identify problems, concerns, notices, identities, and values.

3.4.2.2 Study the secondary data and set to identification factors and standard for assessment of tourism CC in terms of physical and facility, ecological, and social characters,

3.4.2.3 Survey the tourism utilization as the following characters:

1) Physical and facility characters such as land use for tourism activities of 4 sites, parking area, waste management, water consumption, and number of public restrooms,

2) Ecological characters such as color, odor, Dissolved Oxygen (DO), pH, Temperature, Transparency, and Coliform Bacteria. Each parameter indicates to quality of water as the following description. Color is shows the contaminant in water. Natural water color likes yellow, brown, or light tea which caused by leaf decomposition. In general, the running water sources such as river and canal are no color, except for discharge of wastewater or dirtiness into water body. Temperature and odor indicate to water quality both chemical and biological impacts. DO indicate to oxygen level in water. Since the aquatic organisms need the oxygen to organic decomposition which is a cause of poor water quality, oxygen level is affected to water quality. The low level of oxygen is shows the high level of poor water quality. pH is indicate to level of acid or alkaline ranked in the value of 0-14. pH are important to living of aquatic organisms because they can live in the limit interval of acidity-alkalinity. Transparency is indicates to the depth of light through water body. Since the turbidity/transparency is affected to living of aquatic organisms and dissolved oxygen. The high level of transparent mean water is clear and benefit to living organisms. In contrast, the more level of turbidity the more level of suspended solid in water body, including decrease of transparency. Coliform Bacteria is indicates to the probability of pathogen contamination into water body. It can contaminate to water body directly from sewage, agriculture, runoff, and night soil. All water parameters were colleted by observation and apparatuses:

- Physical parameters are color and odor analyzed by observation, air and water temperature analyzed by thermometer, and transparency analyzed by Secchi Disc,

- Chemical parameters are pH analyzed by pH Meter, DO analyzed by DO Meter,

- Biochemical parameters are Coliform Bacteria analyzed by test kit W.111 of Department of Health, Ministry of Public Health. These results were reliable and conform to the results that analyzed by Multiple-Tube Fermentation Technique not less than 84.5% (Pollution Control Department 2547),

3) Social characters focus on the attitude towards such as congestion and satisfaction. The survey was conducted to assess the attitude of tourists and stakeholders of tourism management in AFM by using questionnaires for data collection and statistical analysis of frequency, percentage, and mean.

3.4.2.4 Compare the survey results of tourism utilization to the standard for identification of maximum tourism utilization,

3.4.2.5 Divide CC intervals into 5 levels conform to ROS due to the compatible with each condition of area for recreation opportunity. The levels are listed in the model of CC level by ROS,

Table 3-6 Model of Carrying Capacity Level by ROS

Level of Limit of Acceptable Change	**Level of Carrying Capacity by ROS**				
	P	**SP-I**	**SP-II**	**DN**	**R**
No/lowest impact < 25%	Below CC				
Low impact 25-50%		Approaching CC			
Medium Impact 50-75%			At CC		
High impact 75-100%				Over CC	
Extreme impact > 100%					Exceeding CC

Remarks: P = Primitive area, SP-I = Semi-primitive area class I, SP-II = Semi- primitive area class II, DN =Developed natural area, R= Rural area

3.4.2.6 Survey the number of existing visitors of AFM and 4 tourism sites in order to determine the maximum level of tourism at present and compare with the standard criteria for CC assessment,

3.4.2.7 Assess CC, the average maximum tourism capacity is related to the capacity of each ROS.

Identification factors of tourism carrying capacity for AFM are provided below.

Table 3-7 Identification Factors of Tourism Carrying Capacity for Amphawa Floating Market

Identification Factors	Indicators	Standard
Physical and Facilities		
1. The Tourism Activities Areas	Amphawan Chetiyaram Temple, Amphawa Community Information Center, The Way of life and Vernacular Architecture Trail, and Amphawa Market (land market)	- The number of people not more than the supervision of guide as 40 persons/are[2] for Amphawan temple and Amphawan Community Information Center - Field survey for the Way of life and Vernacular Architecture Trail and Amphawa Market (land market)
2. Parking Areas	Parking Areas	- Personal car (4 seats), not less than 12 m^2/vehicle[3] - Field survey for parking of van, coach bus (55 seats), and BMTA bus (35 seats)
3. Waste Management	Capability for Waste Collection and Waste Generation	- Capability for waste collection of Amphawa Tambon Municipality (kg/day) - Average of waste generated from population in Amphawa Municipality not more than 0.76 kg/person/day[4]

[2] Department of Landscape Architecture, Chulalongkorn University., 2002.

[3] Notification of Ministerial Regulations No. 41 (1994), the Building Control Act: 1979

[4] the Office of Natural Resources and Environmental Policy and Planning, Urban Environment and Area Planning Division, 2001

Table 3-7 Identification Factors of Tourism Carrying Capacity for Amphawa Floating Market (Continued)

Identification Factors	Indicators	Standard
		- Waste generated by overnight tourists 0.06-0.45 kg/person/day[5] - Field survey for waste generated by non-over night tourists
4. Water Consumption	Water Consumption Quantity	- Thailand water consumption standard criteria of Provincial Waterworks Authority using an average of 120 l/person/day - Water consumption of over night tourists, average of 170 l/person/day[4] - Water consumption of non-over night tourists, 37.80 l/person/day[4]
5. Restrooms	Number of Restrooms	Existing number of restrooms
Ecological		
1. Water Quality	Water Quality	- Top Soil Water Quality Standard Comply with the Notification of National Environment Board No.8 (1994) - Water Quality Criteria for the Protection of Freshwater Aquatic Organism[6]
Social		
1. Tourists	Congestion and Satisfaction	- High congestion not over than 50% of all tourists - Low satisfaction not over than 50% of all tourists
2.The Leaders in Tourism Management of Amphawa Floating Market	Congestion and Satisfaction	- High congestion not over than 50% of all the leaders - Low satisfaction not over than 50% of all the leaders

[5] Mulpruek, 2007

[6] National Inland Fisheries Institute, 1987

3.5 Data Analysis

Data analysis was performed as 2 types;

3.5.1 Data quality analysis: such as interview, survey, and observation data using Content Analysis,

3.5.2 Data quantity analysis:

3.5.2.1 Tourist Attraction Assessment: quantitative data analysis by using Descriptive Approach. The study results are presented in terms of 'Mean' by provide the score of each recreation opportunity which classified into 5 levels; highest (5), high (4), medium (3), low (2), and lowest (1). Then calculate mean of all 5 main factors to obtain the results of tourism classification by using the application of ROS,

$$\text{Class Interval} = \frac{(\text{Maximum Score} - \text{Minimum Score})}{\text{Number of Class}}$$

$$\textbf{Insert the result} = \frac{(5-1)}{5} = 0.8$$

Then mean of variable for ROS are P (4.21-5.00), SP-I (3.41-4.20), SP-II (2.61-3.40), DN (1.81-2.6), and R (1.00-1.80).

3.5.1.2 Questionnaire: field survey data was input to the computer processing by SPSS (statistical package for social science) program. Quantitative data was analyzed by Descriptive Approach. The study results are presented in terms of 'Frequency', 'Percentage', and 'Mean'.

CHAPTER IV
RESULTS AND DISCUSSION

4.1 Tourism Area Classification

ROS was applying for the tourism areas in AFM: Amphawan Chetiyaram Temple, Amphawa Community Information Center, Way of Life and Vernacular Architecture Trail, and Amphawa Market (land market). The result shows that following:

4.1.1 Amphawan Chetiyaram Temple

ROS for Amphawan Chetiyaram Temple had mean of factors as following: tourism impacts (3.45), opportunity for social encounter (3.20), transportations and access (2.73), site management (2.73), and tourist control level (2.40). The level of mean score was 2.90 located in range 2.61-3.40; therefore Amphawan Chetiyaram Temple was classified in Semi-primitive area class II (Appendix D).

4.1.2 Amphawa Community Information Center

ROS for Amphawa Community Information Center had mean of factors as following: opportunity for social encounter (3.20), tourism impacts (3.09), tourist control level (2.60), transportations and access (2.33), and site management (1.93). The level of mean score was 2.63 located in range 2.61-3.40; therefore Amphawa Community Information Center was classified in Semi-primitive area class II (Appendix D).

4.1.3 Way of Life and Vernacular Architecture Trail

ROS for the Way of Life and Vernacular Architecture Trail had mean of factors as following: opportunity for social encounter (3.20), tourism impacts (3.09), tourist control level (2.40), transportation and access (2.39), and site management (2.23). The level of mean score was 2.66 located in range 2.61-3.40; therefore the Way of life and Vernacular Architecture Trail was classified in Semi-primitive area class II (Appendix D).

4.1.4 Amphawa Market (land market)

Amphawa Market had mean of factors as following: opportunity for social encounter (3.40), tourism impacts (3.14), tourist control level (2.60), transportation and access (2.47), and site management (2.39). The level of mean score was 2.80 located in range 2.61-3.40; therefore Amphawa Market was classified in Semi-primitive area class II (Appendix D).

The result of tourism area classification show in below figure:

Remarks: = **Semi-primitive area class II (SP-II)**

Figure 4-1 Located of SP-II in Amphawa Floating Market
(http:// www.samutsongkhram.go.th/gis.php, June 10, 2007)

4.2 Tourism Carrying Capacity Assessment

From the result of ROS in AFM results, they are SP-II. As a result, management in tourism in the area was totally distinct. Therefore, it was important to recognize conditions in area in order to match management policy by determining carrying capacity in SP-II which specified the level of carrying capacity allowed in the area by using LAC and comparing with ROS. AFM was SP-II; a level of CC was 50-70%. This study explored factors related to the capacity of tourism consisting PFCC, such as activity area, parking areas, waste management, water consumption, and number of restrooms, ECC consisted of water quality, and SCC were tourists' attitude and the leaders in ecotourism management.

4.2.1 Physical and Facilities Carrying Capacity

Consist of 5 factors, such as the tourism activities areas, parking areas, waste management, water consumption, and restrooms. The results showed following:

4.2.1.1 The Tourism Activities Areas had 4 areas, showed following:

4.2.1.1.1 Amphawan Chetiyaram Temple

It was the indicator involving the activities in the area. Tourists could visit this place easily by waling from parking areas. In the temple, there were lots of interesting ancient remains which located in 8 different places: Chapel, King Rama II statue, Stupa, Phra Viharn, Song Dharm Throne, Monk's house, and 2 palaces.

The standard measurement of tourist activity was 40 persons/area which controlled by a guide (Department of Landscape Architecture, Chulalongkorn University, 2002). Tourist spent time approximately 30 min. in the temple. The suitable time for visiting this place was 9.00 a.m.-5.00 p.m.; therefore there were 16 rounds/day (320 persons/round). Therefore, this area had the level of tourists carrying capacity 5,120 persons/day.

The tourists estimate was 7,017 persons/day (Appendix E). The survey on activities of tourist, it showed 30.43% of total tourists visited Amphawan temple (2,135 persons/day).

Table 4-1 Carrying Capacity in Utilization of Amphawan Chetiyaram Temple

Scale of impact from the activity in the area	PFCC in each area (person/say)	Scale of average usage in present (person/ day)
No/lowest impact < 25%	< 1,280	
Low impact 25-50%	1,280– 2,560	**2,135**
Medium Impact 50-75%	2,560 – 3,840	
High impact 75-100%	3,840 – 5,120	
Extreme impact > 100%	> 5,120	

In conclusion, Utilization of Amphawan Chetiyaram Temple had low impact, and was the approaching CC in accordance with ROS in SP-II (not exceed 3,840 persons/day).

4.2.1.1.2 Amphawa Community Information Center

The standard measurement of tourist activity was 40 persons/area which controlled by a guide (Department of Landscape Architecture, Chulalongkorn University, 2002). This Information Center is open daily on 4.00-9.00 p.m. (Amphawa Tambon Municipality: online). Tourist spent time approximately 15 min/round in the area, so the area was 20 rounds/day. Therefore, this area had the level of tourists carrying capacity 1,600 persons/day

The tourists estimate was 7,017 persons/day (Appendix E). The survey on activities of tourist, it showed 9.57% of total tourists visited the area (2,456 persons/day).

Table 4-2 Carrying Capacity in Utilization of Amphawa Community Information Center

Scale of impact from the activity in the area	PFCC in each area (person/day)	Scale of average usage in present (person/ day)
No/lowest impact < 25%	< 400	
Low impact 25-50%	400 - 800	**672**
Medium Impact 50-75%	800 – 1,200	
High impact 75-100%	1,200 – 1,600	
Extreme impact > 100%	> 1,600	

In conclusion, Utilization of Amphawa Community Information Center had the impact, and was the approaching CC in accordance with ROS in SP-II (not exceed 1,200persons/day).

4.2.1.1.3 Way of Life and Vernacular Architecture Trail

The starting point at Dhechadisorn Bridge (Amphawa municipality side) along with trail near the edge of Amphawa canal to Chula Bridge. The total area was 2,016.52 m^2 (896.23 x 2.25 m). To standard measure of tourist activity was applied by the random survey, the acceptable of congestion along this trail average was 3.4 m^2/person. This trail was active around 4.00-9.00 p.m. (Amphawa Tambon Municipality: online). Tourist spent time approximately 45 min/round; total round was 6.67 rounds/day. The measurement can be done as follow:

$$\text{Number of tourist (person/round)} = \frac{\text{Area } (m^2)}{\text{Standard measure in the area } (m^2/\text{person})}$$

$$\textbf{PCC the trail (person/day)} = \text{Number of tourist (person/round)} \times \text{Number of total round (round/day)}$$

The Way of Life and Vernacular Architecture Trail can support tourists 593.09 persons/round. Therefore, this area had the level of tourists CC 3,956 persons/day.

The tourists estimate was 7,017 persons/day (Appendix E). The survey on activities of tourist, it showed 15.65% of total tourists visited the area (1,098 persons/day).

Table 4-3 Carrying Capacity in Utilization of Way of Life and Vernacular Architecture Trail

Scale of impact from the activity in the area	PFCC in each area (person/day)	Scale of average usage in present (person/ day)
No/lowest impact < 25%	< 989	
Low impact 25-50%	989 – 1,978	**1,098**
Medium Impact 50-75%	1,978 – 2,967	
High impact 75-100%	2,967 – 3,956	
Extreme impact > 100%	> 3,956	

In conclusion, Utilization of Way of Life and Vernacular Architecture Trail had the impact, and was the approaching CC in accordance with ROS in SP-II (not exceed 2,967 persons/day).

4.2.1.1.4 Amphawa Market (land market)

The starting point at mouth of Amphawa canal (Amphawa municipality side) along the canal to Dhechasorn Bridge. The total area was 2,674.94 m^2. To standard measure of tourist activity was applied by the random survey, the acceptable of congestion along this trail average was 1 m^2/person. This trail was active around 4.00-9.00 p.m. (Amphawa Tambon Municipality: online). Tourist spent time approximately 75 min/round, total round was 4 rounds/day. The measurement can be done as follow:

$$\text{Number of tourist (person/round)} = \frac{\text{Area } (m^2)}{\text{Standard value in the area } (m^2/\text{person})}$$

PFCC the area = Number of tourist (person/round) × Number of total round (round/day)

Amphawa Market can support tourists 2,648 persons/round. Therefore, this area had the level of tourists carrying capacity 10,592 persons/day.

The tourists estimate was 7,017 persons/day (Appendix E). The survey on activities of tourist, it showed 44.35% of total tourists visited the area (3,112 persons/day).

Table 4-4 Carrying Capacity in Utilization of Amphawa Market

Scale of impact from the activity in the area	PFCC in each area (person/day)	Scale of average usage in present (person/ day)
No/lowest impact < 25%	< 2,648	
Low impact 25-50%	2,648 – 5,296	**3,112**
Medium Impact 50-75%	5,296 – 7,944	
High impact 75-100%	7,944 – 10,592	
Extreme impact > 100%	> 10,592	

In conclusion, Utilization of Amphawa Market had low impact, and was the approaching CC in accordance with ROS in SP-II (not exceed 7,944 persons/day).

4.2.1.2 Parking Areas

The parking spaces were set by Amphawa municipal and the police. They prepared the area in front of Amphawan Chetiyararm Temple and Amphawan College. The area's details are:

Personal car 4 seats

Total area was 5,123.26 m^2; the car was 12 m^2/car (The Building Control Act: 1979). Therefore, it supported 426.94 cars/round (1,707.75 persons/round).

Coach bus 55 seats

Total area was 335.38 m^2; the bus was 53.20 m^2/bus (add one space was 1 m/bus). Therefore, it supported 6.30 buses/round (346.73 persons/round).

BMTA coach bus 35 seats

Total area was 154.43 m^2; the bus was 38.58 m^2/bus (2.5x10 m. which add distance between each bus was 1 m). Therefore, it supported 4.01 buses/round (140.39 persons/round).

Van 10 seats (Commuter)

Total area was 1,707.75 m^2; the van was 19.80 m^2/van (3x5.38 m. which add distance between each van when lift the bottom door was 1.20 m). Therefore, it supported 86.25 vans/round (862.50 persons/round).

Thus, the tourists estimate was 3,057.37 persons/round. AFM was active around 4.00-9.00 p.m. (Amphawa Tambon Municipality: online). Tourist spent on the average 3.36 hrs/person; total round was 1.49 rounds/day. The measurement can be done as follow:

PFCC of parking areas (person/day) = Number of tourist (person/round) × Number of visiting (round/day)

Therefore, parking areas had the level of tourists CC 4,450 persons/day. Obviously, the tourists were 7,017 persons/day (Appendix E).

Table 4-5 Parking Areas Carrying Capacity

Scale of impact from the activity in the area	PFCC in each area (person/day)	Scale of average usage in present (person/ day)
No/lowest impact < 25%	< 1,137	
Low impact 25-50%	1,137 – 2,275	
Medium Impact 50-75%	2,275 – 3,412	
High impact 75-100%	3,412 – 4,550	
Extreme impact > 100%	> 4,550	**7,017**

In conclusion, Parking Areas had low impact, and was the exceeding CC in accordance with ROS in SP-II (not exceed 3,412 persons/day).

4.2.1.3 Waste Management

Indicators of waste management are the capability for waste collection and waste generation which have the direct impact with the amount of waste.

Nowadays, Amphawa Tambon Municipality was waste collection to the sanitary landfill which located in Lad-Yai sub-district, Muang district in Samut Songkhram province, the capability for waste collection 15,000 kg/day.

Table 4-6 Waste generation rate

Population	Waste generation			the capability for waste collection (kg/day)
	Rate (kg/person)	Total population (person/day)	Total weight (kg/day)	
1. The citizen	0.76[1]	5,735[2]	4,358.60	15,000
2. Over night tourists	0.45[3]	1,313[4]	590.85	10,641.40
Total			**4,949.45**	**10,050.55**

Table 4-6; conclude that the capability for waste collection could be carrying 10,050.55 kg/day. The waste generation rate of non-over night tourist was 0.35 kg/person/day (Survey in March 2008). Therefore, the numbers of non-over night tourists were 28,716 persons (Totally tourists are 30,029 persons/day).

The calculation of waste generation in the present

The tourists estimate 7,017 persons/day (Appendix E) and from the survey about the transportation and tourism activity showed that 35% of tourists are over night tourists (2,456 persons/day) and they could generate waste were 1,105 kg/day. The amount non-over night tourist is 65% of all tourists (4,561 persons/day) could

[1] the Office of Natural Resources and Environmental Policy and Planning, Urban Environment and Area Planning Division, 2001
[2] Population Census on April 1, 2006
[3] Environment Research Institute, Chulalongkorn University cited by Moonpruck 2550: 238
[4] Survey (35 places x average tourists 37.50 persons/place)

generate the waste were 1,596 kg/day, therefore the amount of over all waste from tourists are 2,701 kg/day.

Table 4-7 Waste Management Carrying Capacity

Scale of impact from the activity in the area	PFCC of area (person/day) Over night	Scale of average usage in present (person/ day)	PFCC of area (person/day) Non- over night	Scale of average usage in present (person/ day)
No/lowest impact 25%	< 328		< 7,179	**4,561**
Low impact 25-50%	328 – 657		7,179 – 14,358	
Medium Impact 50-75%	657 – 985		14,358 – 21,537	
High Impact 75-100%	985 – 1,313		21,537 – 28,716	
Extreme Impact > 100%	> 1,313	**2,456**	> 28,716	

In conclusion, waste management had the lowest impact, and was below CC in accordance with ROS in SP-II (not exceed 21,537 persons/day).

4.2.1.4 Water Consumption

Indicator in this type is the water consumption quantity which is control by Amphawa sub-district; there are 2 groundwater which can provide for the community (Amphawa Tambon Municipality Development Plan during 2007-2009). The water consumption rate was 840 m^3/day (840,000 l/day). The water consumption for emergency has to be in store for at least 24 hrs. Of the water usage which means that the ability in produce water in Amphawa sub-district was 840,000 l/day (35,000 l/hr)

Table 4-8 Water Consumption Rate

Population	Water consumption			Storage water consumption (l/day)
	Rate (l/person)	Total population (person/day)	Total quantity (l/day)	
1. The citizen	120[1]	6,783 [2]	813,960	840,000
2. Over night tourists	170[3]	1,313[4]	223,210	26,040
Total			**1,037,170**	-

Table 4-8; conclude that water consumption quantity could not be carrying non-over night tourist. It could only support the water usage of 26,040 l/day which is 153 over night tourists/day.

The calculation of water consumption quantity in the present

The tourists estimate 7,017 persons/day (Appendix E) and from the survey about the transportation and tourism activity showed that 35% of tourists are over night tourists (2,456 persons/day) and they used water consumption of 417,520 l/day. The amount non-over night tourist is 65% of all tourists (4,561 persons/day). The calculation of water consumption from the area that has restrooms which average of water usage is 10 gal/person/day (37.80 l/person/day) (Mulpruek, 2007). The visiting period between 4.00-9.00 p.m. (5 hrs.), therefore there are 35,917.88 l/day[5]. The water consumption in Amphawa sub-district for tourists at present is 453,437.88 l/day (18,893.25 l/hr).

[1] Thailand water consumption standard criteria of Provincial Waterworks Authority
[2] (1,274 families x the average is 5.32 persons/family)
[3] Mulpruek, 2007 (45 gal/person adept from part of resort water usage is 60 gal/person and camp is 30)
[4] Survey (35 places x average tourists 37.50 persons/place)
[5] (37.80 l/person/day x 4,561 non-over night tourists) / 24 hrs. = 7,183.58 l/hr

Table 4-9 Water Consumption Carrying Capacity

Scale of impact from the activity in the area	PFCC Scale of water usage (person/day)	Scale of average usage in present (person/ day)	PFCC Scale of water usage (person/day)	Scale of average usage in present (person/ day)
	Over night		Non-over night	
No/lowest impact < 25%	< 38		-	
Low impact 25-50%	38 – 77		-	
Medium Impact 50-75%	77 – 115		-	
High impact 75-100%	115 – 153		-	
Extreme impact > 100%	> 153	**2,456**	1	**4,561**

Table 4-9, AFM has tourists 7,017 persons/day. That has the ability in produce water consumption for both over night and non-over night tourists in the SP-II area (tourists: not over night only 153 persons/day) is in the severe stage in relation to the reserve water that the district could produce. And if the district does not want to reduce the number of tourists in AFM they need to have reserve water up to be 1,267,398 l/day (the citizen was 813,960 l/day + tourists were 453,437.88 l/day).

4.2.1.5 Number of Restrooms

Number of restrooms and time spent in there were measured. The average time using restroom was 5 minutes/round, and during 5 hrs (4.00-9.00 p.m.). Therefore the total usage was 60 rounds/day.

Based on the study, the number of restrooms located at:

Amphawan Chetiyaram Temple was uni-sex restroom, 10 rooms, and supports 600 person/day

Local government building (near Mae Klong River) there were 10 male rooms, 5 urinals, support 780 person/day. Meanwhile, there were 7 female rooms and 4 handicap room, and support 480 person/day

Total restrooms were 31 rooms supporting 1,860 person/day

In conclusion, the restrooms in Amphawa Floating Market can support 1,860 persons/day (Table 4-10).

Table 4-10 Numbers of Restrooms Carrying Capacity

Scale of impact from the activity in the area	PFCC in each area (person/day)	Scale of average usage in present (person/ day)
No/lowest impact < 25%	< 465	
Low impact 25-50%	465 – 930	
Medium Impact 50-75%	930 – 1,395	
High impact 75-100%	1,395 – 1,860	
Extreme impact > 100%	> 1,860	**7,017**

In conclusion, AFM had tourists 7,017 persons/day which had extreme impact, and was exceeding CC in accordance with ROS in SP-II (not exceed 1,395 persons/day).

4.2.2 Ecological Carrying Capacity

Sampling points were set, which were head, middle, and mouth canal. Relevant parameters were studied and interpreted mean value during April 2008 which show below.

Table 4-11 Amphawa Canal Water Quality

Sampling Points	Temperature (°C)	Transparency (cm)	pH	DO (mg/l)
Head canal	31.30	42.50	6.46	5.68
Middle canal	30.90	64.00	7.29	5.76
Mouth canal	30.80	32.50	7.41	5.00

The results of water quality in Amphawa canal

From observation, the water color likes partially green which originate from plant planktons. The odor came from tree and originated from sea weeds, grass, and planktons. Average water temperature was 31°C and air temperature was 32°C. Transparency rate was 30.80-31.30. pH value was 6.46-7.41. DO was 5.00-5.76 and Coliform Bacteria presented +++ and the solvent's color turn to yellow, thus this water was not drinkable (Table 4-12).

Table 4-12 Ecological Carrying Capacity

Water Index	Water Quality Criteria (class III[1])			Results (average 3 points)	Current Status
	Low impact	Medium impact	High impact		
Temperature	+ 1°C natural	+ 2 °C natural	+ 3 °C natural	**31.00**	**Low impact**
Transparency[2] (cm)	30 - 40	40 - 50	50-60	**46.33**	**Medium impact**
pH	7	5 or 9	6 or 8	**7.05**	**Low impact**
DO (mg/l)	> 4.0	4.0	< 3.0	**5.48**	**Low impact**

In conclusion, water quality in AFM had low impact, and able to support tourists in accordance with ROS, in SP-II (not exceed medium impact).

4.2.3 Social Carrying Capacity

All data was collected during 7-9 March 2008 on 4.00-9.00 p.m. Descriptive Approach Analysis technique was used. The following statistics were frequency, percentage, and Mean.

[1] the Notification of National Environment Board No. 8 (1991)

[2] National Inland Fisheries Institute No. 75/1987

4.2.3.1 Tourist

Section 1 General Information

Based on general information, mostly, a group of tourist was female (60%) with average age of 32.53 years, min 18 and max 70. Most of them were 15-35 years; therefore the major group of tourist was worker and teenager. There were 61% of undergraduate. However, there were employees. Most tourists had income below 600 USD/month (44%), and above 900 USD (26%). There were Samut Songkhram neighbor, tourists came from Bangkok and came form the central of Thailand (Table 4-13).

Table 4-13 General Information of Tourist

(Unit %)

Characteristics of General Information	N = 100
1. Gender	
male	40.00
female	60.00
2. Age	
15-35 years	69.00
36-55 years	27.00
> 56 years	4.00
3. Education	
Senior high school	3.00
Diploma	9.00
Bachelor's degree	61.00
Above Master's degree	27.00
4. Occupation	
Student	9.00
Government/State Enterprise	20.00
Commercialism	2.00
Their own business	15.00
Employees	45.00
General employee	7.00
Others/unemployed	2.00

Table 4-13 General Information of Tourist (Continued)

(Unit %)

Characteristics of General Information	N = 100
5. Monthly Income	
< 20,000 Baht	44.00
20,001-30,000 Baht	30.00
> 30,000 Baht	26.00
6.Hometown	
Northern	3.00
Southern	3.00
Eastern	5.00
Western	5.00
Northeast	1.00
Central	38.00
Bangkok	43.00
Abroad	2.00

Section 2 Transportations and Activities

Most tourists never visited AFM before, have been doing research on the area before travel and they researched via Friend & Cousin, Internet, and magazines, it is talk to talk information which always update and attractive. Their main objectives were picnic, see firefly scenery, and natural scenery which taking a picture. Most tourists arrived by their own cars, BMTA bus because it easy to joy groups and cheap. Traveling accompany with a group of friends which is the worker and teenage (65%), family (17%). Most tourists prioritized the importance of Amphawa Floating Market as following: Amphawa Market (44.35%), Amphawan Chetiyaram Temple (30.43%), and Way of Life and Vernacular Architecture Trail (15.65%), because of most of them like to picnic which local food and souvenir shopping, and to visit the temple and monuments. There were groups of over-night tourist (35% of total), meanwhile groups of one-way trip were 65% of total. The average time tourists spent was 3.36 hrs. Mostly, tourists spent time about 2.31-3.00 hrs. While the lowest time spent was 30 minutes and highest was 9.00 hrs, which a group of tourists who spent the highest time was postgraduate students and technical visitors; their objectives were visual education (Table 4-14).

Table 4-14 Tourist Activities

(Unit %)

Characteristics of Tourist Activities	N = 100
1. Times visiting	
Non	55.00
≥ 1	45.00
2. Information perception (before visiting)	
Non	26.00
≥ 1 from	74.00
- Friend & Cousin (41.22)	
- Magazine (11.40)	
- Tour company (0.88)	
- Documents/leaflet (4.39)	
- Internet (35.09)	
- Media (7.02)	
3. Tourist purposes	
See Fireflies	18.97
Picnic	21.54
Take a photo	12.31
General/Natural Scenery	14.36
Temple/Monument	9.23
Local goods/Souvenir shopping	9.74
Way of life excursion	7.18
Vernacular architecture excursion	1.54
Local flora excursion	1.54
Technical visiting	2.05
Others	1.54
4. Transportation	
Motorcycle	2.00
Personal car	77.00
Van	3.00
BMTA coach bus	15.00
Bus	3.00
5. Traveling accompany	
Alone	2.00
Friend	65.00
Family	17.00

Table 4-14 Number and Percent of Tourist Activities (Continued)

(Unit %)

Characteristics of Tourist Activities	N = 100
Tour/guide	12.00
Others/ government sector	4.00
6. Traveling plan (≥ 1site)	
Amphawan Chetiyaram Temple	30.43
Amphawa Community Information Center	9.57
Way of Life and Vernacular Architecture Trail	15.65
Amphawa Market (land market)	44.35
7. Visiting duration	
Non-over night	65.00
0.30 - 1.00 hr. (7.70)	
1.01 - 1.30 hrs. (3.08)	
1.31 - 2.00 hrs. (13.80)	
2.01 - 2.30 hrs. (6.14)	
2.31 - 3.00 hrs. (24.62)	
3.01 - 3.30 hrs. (7.69)	
3.31 - 4.00 hrs. (15.38)	
4.01 - 4.30 hrs. (4.62)	
4.31 - 5.00 hrs. (4.62)	
5.01 - 5.30 hrs. (1.54)	
5.31 - 6.00 hrs. (3.08)	
> 6 hrs. (7.69)	
Over night	35.00
1 night	

Section 3 Opinions and Attitudes of Tourists towards Amphwa Floating Market

Opinions and attitudes of tourists towards AFM results are shown: Most tourists were received tourism perception (77%) by notice/sign board around the area which thought the notice/sign board need to be re-improved. There was 75% of tourist who did not visit Amphawa Community Information Center. Meanwhile, there was 76% of tourist who thought the notice or sign board is fine.

During their trip, there were 78% of tourists felt very much congested. Most tourists accepted or wanted to have at least 1 person in all radius spaces with 0.5 m. (39%), the average 0.92 m. space between each.

Overall highest satisfaction of tourist was harmony of nature (50%) and utilization in AFM (52%). Moderate satisfactions of tourist were arrangement in AFM (40%), river traffic (48%), parking areas (45%), and safety procedures (54%). Lowest satisfactions were sidewalk (49%), sign board (50%), tourism receive perception (44%), and a number of garbage can (44%) as shown in Table 4-15.

Table 4-15 Opinions and Attitudes of Tourists towards Amphawa Floating Market

(Unit %)

Characteristics of Opinions and Attitudes	**N = 100**
1. Tourism receive perception	
Non	31.00
≥ 1 sources;	69.00
Amphawa Community Information Center (15.95)	
Notice board/ sign board (57.98)	
Tour guide (21.74)	
Others/asking villager (4.35)	
2. The quality of information board/sign	
Fine	77.00
Should be improve	23.00
3. Visiting Amphawa Community Information Center	
Non	75.00
Yes, and should be improve	25.00
Yes, to improve (24.00)	
It is fine (76.00)	
4. Congest felling	
Very much	19.00
Much	59.00
Moderate	20.00
Low	1.00
Very low	1.00

Table 4-15 Opinions and Attitudes of Tourists towards Amphawa Floating Market (Continued)

(Unit %)

Characteristics of Opinions and Attitudes	N = 100
5. Maximum of tourist size acceptation	
Have at least 1 person in all radius spaces with 0.5 m.	39.00
Have at least 1 person in all radius spaces with 1 m.	28.00
Have at least 1 person in all radius spaces with 1.5 m.	9.00
Have at least 1 person in all radius spaces with 2 m.	8.00
Don't mind at all	16.00
6. Satisfaction	
Harmony with nature	
Very much alike	12.00
Much	38.00
Moderate	41.00
Low	6.00
Very low	3.00
AFM Utilization	
Very much	11.00
Much	41.00
Moderate	33.00
Low	15.00
AFM Arrangement	
Very much	6.00
Much	21.00
Moderate	40.00
Low	27.00
Very low	6.00
River traffic	
Very much	3.00
Much	37.00
Moderate	48.00
Low	10.00
Very low	2.00

Table 4-15 Opinions and Attitudes of Tourists towards Amphawa Floating Market (Continued)

(Unit %)

Characteristics of Opinions and Attitudes	N = 100
Sidewalk	
Very much	2.00
Much	18.00
Moderate	31.00
Low	37.00
Very low	12.00
Sign/Notice board	
Much	18.00
Moderate	32.00
Low	38.00
Very low	12.00
Tourism receive perception	
Very much	5.00
Much	17.00
Moderate	34.00
Low	35.00
Very low	9.00
Parking areas	
Very much	4.00
Much	19.00
Moderate	45.00
Low	26.00
Very low	6.00
Number of garbage can	
Very much	2.00
Much	12.00
Moderate	39.00
Low	41.00
Very low	6.00

Table 4-15 Opinions and Attitudes of Tourists towards Amphawa Floating Market (Continued)

(Unit %)

Characteristics of Opinions and Attitudes	**N = 100**
Safety Procedures	
Very much	4.00
Much	27.00
Moderate	54.00
Low	12.00
Very low	3.00

From the opinions and attitudes of tourists towards AFM, congestion and satisfaction were shown in Table 4-16.

Table 4-16 Results of Tourists' Attitude towards Amphawa Floating Market

Assessment Impacts Criteria	**High (%)** (Answer that much to very much)	**Medium (%)** (Answer that moderate)	**Low (%)** (Answer that low to very low)
Congestion	78.00	20.00	2.00
Satisfaction	29.70	39.70	30.60

SCC assessment, a group of quality of life factor, such as consequences psychological standard acceptance, and tourist's satisfaction, was hard to determine the number. However, I assessed social effect of tourist and was able to use describing information by using 50% of number of survey which made tourist feel congest and another 50% of number of survey which made tourist feel less satisfied.

Table 4-17 Congestion Carrying Capacity of Tourist

Scale of impact from the activity in the area	Assessment criteria in social Aspect (%number of survey)	
	Congestion	**Current Status**
No/lowest impact	High congestion < 20%	
Low Impact	High congestion 20-30%	
Medium Impact	High congestion 30-40%	
High Impact	High congestion 40-50%	
Extreme Impact	High congestion > 50%	**78.00%**

Table 4-18 Satisfaction Carrying Capacity of Tourist

Scale of impact from the activity in the area	Assessment criteria in social Aspect (%number of survey)	
	Satisfaction	**Current Status**
No/lowest impact	Low satisfaction < 20%	
Low Impact	Low satisfaction 20-30%	
Medium Impact	Low satisfaction 30-40%	**30.60%**
High Impact	Low satisfaction 40-50%	
Extreme Impact	Low satisfaction > 50%	

Table 4-17 and 4-18, the estimation of number of tourists had 7,017 persons/day. The congestion in SP-II (not exceed 40%) was exceed the level of capacity while the level of satisfaction in SP-II (not exceed 40%) was acceptable.

4.2.3.2 The Leaders in Tourism Management of Amphawa Floating Market

The results of information involving the leaders in tourism management show the feeling uncomfortable and satisfaction as:

There were 60% of all the leaders who felt moderately congested from tourists, 20% highly felt congested, and 20% felt rarely congested. There were 60% that could accept and support any possible number of tourists, and 40% who wanted to

have at least 1 tourist in all radius spaces with 0.5 m., and average 0.5 m. between each.

Overall highest satisfaction of the leaders was harmony of nature (100%) and utilization in AFM (40%), river traffic (40%), arrangement in AFM (44%), parking areas (40%), and safety procedure (40%). Moderate satisfactions of tourist were sidewalk (80%), and arrangement in AFM (40%). Lowest satisfactions were sign board (50%), arrangement in AFM (40%), and a number of garbage (40%) as shows in Table 4-19.

Table 4-19 Attitudes of the Leaders in Tourism Management towards Amphawa Floating Market

(Unit %)

Characteristics of Opinions and Attitudes	**N = 100**
1. Congest felling	
Very much	20.00
moderate	60.00
Low	20.00
2. Maximum of tourist size acceptation	
Have at least 1 person in all radius spaces with 0.5 m.	40.00
Don't mind at all	60.00
3. Satisfaction	
Harmony with nature	60.00
Very much alike	40.00
Much	
AFM Utilization	
Very much	20.00
Much	20.00
Moderate	40.00
Very low	20.00
AFM Arrangement	
Much	20.00
Moderate	40.00
Low	40.00

Table 4-19 Attitudes of the Leaders in Tourism Management towards Amphawa Floating Market (Continued)

(Unit %)

Characteristics of Opinions and Attitudes	N = 100
River traffic	
Much	40.00
Moderate	40.00
Low	20.00
Sidewalk	
Moderate	80.00
Low	20.00
Sign/Notice board	
Moderate	40.00
Low	40.00
Very low	20.00
Tourism receive perception	
Much	40.00
Moderate	60.00
Parking areas	
Much	40.00
Moderate	40.00
Very low	20.00
Number of garbage can	
Much	20.00
Moderate	40.00
Low	40.00
Safety procedures	
Very much	20.00
Much	20.00
Moderate	60.00

Attitude of the leaders; congestion and satisfaction were shown in Table 4-20.

Table 4-20 Results of Attitudes of the Leaders in Tourism Management towards Amphawa Floating Market

Assessment Impacts Criteria	High (%) (Answer that much to very much)	Modium (%) (Answer that moderate)	Low (%) (Answer that low to very low)
Congestion	20.00	60.00	20.00
Satisfaction	34.00	44.00	22.00

Table 4-21 Congestion Carrying Capacities of the Leaders in Tourism Management

Scale of impact from the activity in the area	Social Impact Indicator (% of survey)	
	Congestion	**Current Status**
No/lowest impact	High congestion < 20%	
Low Impact	High congestion 20-30%	**20.00**
Medium Impact	High congestion 30-40%	
High Impact	High congestion 40-50%	
Extreme Impact	High congestion > 50%	

Table 4-22 Satisfaction Carrying Capacity of the Leaders in Tourism Management

Scale of impact from the activity in the area	Social Impact Indicator (% of survey)	
	Satisfaction	**Current Status**
No/lowest impact	Low satisfaction < 20%	
Low Impact	Low satisfaction 20-30%	**22.00**
Medium Impact	Low satisfaction 30-40%	
High Impact	Low satisfaction 40-50%	
Extreme Impact	Low satisfaction > 50%	

Table 4-21 and 4-22, AFM had tourists 7,017 person/day, the ROS in SP-II was in medium level which is acceptable. The Congestion and Satisfaction were approaching CC of ROS in SP-II was acceptable.

Table 4-23 Tourism Carrying Capacity of Amphawa Floating Market

Factors	Tourism Carrying Capacity of Amphawa Floating Market				
Physical and facilities carrying capacity (PFCC)					
The Tourism Activities Areas					
Amphawan Chetiyaram Temple			*		
Amphawa Community Information Center			*		
Way of Life and Vernacular Architecture Trail			*		
Amphawa market (land market)			*		
Parking Areas					*
Waste Management	*				
Water Consumption					*
Numbers of Restrooms					*
Ecological carrying capacity (ECC)					
Water Quality					
Temperature		*			
Transparency			*		
pH		*			
DO		*			
Social carrying capacity (SCC)					
Tourists' congestion					*
Tourists' satisfaction			*		
Congestion of the leaders in tourism management		*			
Satisfaction of the leaders in tourism management		*			

Remarks: = Primitive area + Below CC; = Semi primitive area class I + Approaching CC; = Semi primitive area class II + At CC; = Developed natural area + Over CC; = Rural area + Exceeding CC; * = Status

CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

ROS and CC were applied for Amphawa Floating Market. Substantial interest during research processes was learning process such as surveying, providing knowledge with key informants, awareness of problems relating to tourism activities and water quality information, and separate of tourist attraction 4 places. There are areas of ROS to Semi-primitive area class II to estimate capacity of Tourism guarantee that could be categorize into 5 groups. From ROS of acceptance for areas changed. Especially, Ampawa Floating Market has capacity to accepted the middle impact area from its. A decisive factor to estimate capacity that is area of tourist activities with in 4 places, waste management, water quality, active of congested and satisfied of work performance who has joined in tourist management at floating market, and the active of satisfied from the tourist. In the opposite side, the over carrying capacity that is the parking areas, number of restrooms, water consumption, and active of congested of tourist. Overwhelming by majority of the Ampawan Floating Market was willing to make an environmental contribution indicating strong interest to tourist activities within study area.

5.2 Limited of these Research

5.2.1 Review of document and research, that is not found of any research applied in Opportunity Recreation Spectrum (ROS) to classify in the tourism area inform of Community-Based Ecotourism which found that all most of diversification in National Park areas. For the reason, the information must be applied in quantity capacity and quality capacity, in order to adapt proportion to scale of the educated location where site in the local naturalism or specify in core of urban, instead of

hardcore natural resources only. The purpose is suitably with the area, Amphawa Floating Market, and to convince the people who is assess the questionnaires.

5.2.2 At the present, the studies of quantity use level researched by tourism information. It need to estimation a number of tourists during open-day of Amphawa Floating Market, in the evening on Friday Saturday and Sunday. For reviewing documents the researches has not identify statistics recorded about number of tourism. From average vehicle which is entering to permit parking areas which is managed by municipality, this is distorted from valid information. It is difficult to record about number of tourism in special weekend which due to the only 2 months for survey and collection information. So the researcher do not collected the activities of tourist data in special weekend that to compare with use level tourist activities data in normal day which is inform the use level of tourist, who come on special weekend.

5.2.3 For assessment the social carrying capacity in identification factor about congestion, it is difficult to measure about many resources user at the time is survey. Accordingly, the areas of Amphawa Floating Market are small and have been thicken by tourist congestion in the beginning of Amphawa canal. Thus, the methods of survey go to difficult and the researcher must use conciseness questions and the representative of whole tourist who travel to Amphawa Floating Market at 7,017 persons/day. It means that these measure the feeling of tourist about the level of congested, instead of counting the number of tourist in each tourist attraction.

5.2.4 In collecting information of quality water for a while, this can not identify impacts from variation of tourism in ecological system at Amphawa canal which is connected with other canals and Mae-Kong River. For this reason, it should be follow and variation of Mae-Kong River ecological system in order to assess ecological carrying capacity that happened in this area clearly.

5.3 Recommendations

5.3.1 Recommendations of this Research

The implementation of the study, 1) based on the strong interest of the local community or local organization towards tourism development in Amphawa Floating Market, Thailand. Research results can be applied to another area, especially Floating

Market in all regions. Implementing activities must be continuous and more concrete. Therefore, the research team should closely support and monitor continuously because conditions of resource need some time in their refinements. These factors facilitate the activities to achieve their objective, and 2) the critical point this study tried to raise is the recognition of inter-linkage and benefits that could accrue to local organization if resource to be used wisely. It was indeed a challenging task and requires actions at multi-stakeholders levels. Such approach must begin with involving all stakeholders of the area toward forming a community based institution which could act as a driving force towards wise use of their resource.

5.3.2 Recommendations for the Next Research

For future research, 1) the tourism management is needed especially on both supply and demand side. This may include not only the resource management approach to maintain good environment quality but also the proper amount of tourist, 2) local community preferred systematically management of environment and their resources as well as administering a tourism database for their own area. It was highly recommended that future study should focus on the collection of tourism data, environmental quality; increasing water samples such as points passed each of the land uses types for accurate data, 3) the study on building common understanding among the academics and the local agencies on the conceptual and practical approaches in line with the concrete participatory guidelines should be made. In this way, it should review the body of knowledge along with the concept and related researchers for the development and then the construction of linkage from concept to actual practice, and 4) the researchers should focus more in every step of the surveying process. This should be done in line with the systematic approach focusing on particular characteristics of the community.

REFERENCES

Clark, R.N. and G.H. Stankey. (1979). **The Recreation Opportunity Spectrum: A Framework for Planning, Management, and Research**. Gen. Tech. Rep. PNW-98. Portland, OR: Northwest Forest Experiment Station, Forest Service, USDA.

Department of Water Resources. 2004. **Recreation carrying capacity Final R-8 Oroville Facilities Rwlicensing**. FERC Project No. 2100. Department of Water Resources. The Resource Agency. State of California.

Fennell, David A. (1999). **Ecotourism an Introduction**. London : Routledge.

Goeldner, Charles R.; Ritchie Brent J.R. and McIntosh Robert W. (2000). **Tourism Principles, Practices, Philos Sophies**. Eight Ed. New York : John Wiley & Sons, Inc.

Japan bank for International Cooperation (JBIC). 2004. **The special Assistance for project Implimentation (SAPI) for Tourism Development Program**. Regional Development Program (II) and Social Investment project in the Kingdom of Thailand. Draft Report Volume I Chapter 7: carrying capacity study. 7-1 to 7-66.

McCool, S.F. 1996. “Limits of Acceptable Change: A Framework for Managing National Protected Areas: Experiences from the United States”. **Workshop on Impact Management in Marine Park, August 13-14, 1996**. Kuala Lumpur: (n.p.).

Neilsen, Per William. (1999). **Park Canada’s Handbook: Spectrum of appropriate National Park Opportunities**. Park Canada.

Payne, R.J., A. Carr and E. Cline. (1997). **Applying the Recreation Opportunity Spectrum (ROS) in Two Canada National Parks**. Occasional Paper 8. Ottawa, ON: Natural Resources Branch, National Parks, Parks Canada.

Schneider, D.M., Godschlk, D.R. and Axler, N. 1978. **The Carrying Capacity Concept as a Planning Toad**. American Planning Association.

Suwanlert Siridhon. (1992). **A study of carrying capacities for tourists of coastal tourism: A case study of Koh Phangan, Suratthani province**. Master of

science Technology of Environment Management Faculty Mahidol University.

Swarbrooke, J. (1998). **Sustainable Tourism Management**. New York : CABI.

The British Columbia Resources Inventory Committee. 1998. **Recreation Opportunity Spectrum Inventory: Procedures and Standards Manual**. Ministry Forests, Forest Practices Branch for Resources Inventory Committee.

The Province of British Columbia. (1998). **Recreation Opportunity Spectrum Inventory procedure and Standards Manual**. Prepared by Ministry of Forests Forest Practices Branch for the Resources Inventory Committee, Canada.

USDA Forest Service. (1982). **ROS Users Guide**. Forest Service.

US Forest Service. 1979. **The Recreation Opportunity Spectrum: A Framework for Planning, Management and Research**. (n.p.): USDA.

Weaver, David and Oppermann. (2000). **Tourism Management**. New York John Willey & Sons, Ltd.

กรมป่าไม้, ส่วนศึกษาอุทยานแห่งชาติ สำนักอนุรักษ์ทรัพยากรธรรมชาติ. (2540). **รายงานฉบับสมบูรณ์ การศึกษาขีดความสามารถในการรองรับการใช้ประโยชน์นันทนาการบริเวณอุทยานแห่งชาตินำ้ตกพลิ้ว จังหวัดจันทบุรี**. กรุงเทพฯ: ผู้แต่ง.

กรมอุทยานแห่งชาติ สัตว์ป่า และพันธุ์พืช. (2548). **รายงานฉบับสุดท้าย โครงการศึกษาขีดความสามารถในการรองรับได้ของพื้นที่อุทยานแห่งชาติเขาแหลมหญ้า-หมู่เกาะเสม็ด จังหวัดระยอง**. กรุงเทพฯ: ผู้แต่ง.

กุสุมา สว่างพันธุ์. (2547). **ความพร้อมของประชาชนในการพัฒนาชุมชนเป็นแหล่งท่องเที่ยวเชิงนิเวศ กรณีศึกษา ชุมชนชาวเลเกาะสิเหร่ อำเภอเมือง จังหวัดภูเก็ต**. วิทยานิพนธ์วิทยาศาสตรมหาบัณฑิต มหาวิทยาลัยมหิดล.

คมกริช ด้วงเงิน. (2534). **การศึกษาขีดความสามารถทางจิตวิทยาในการรองรับการใช้ประโยชน์ด้านนันทนาการบริเวณน้ำตกเหวสุวัต อุทยานแห่งชาติเขาใหญ่**. วิทยานิพนธ์มหาบัณฑิต มหาวิทยาลัยเกษตรศาสตร์.

จุฬาลงกรณ์มหาวิทยาลัย, คณะสถาปัตยกรรมศาสตร์. (2545). **โครงการศึกษาเพื่อพัฒนาการท่องเที่ยวเชิงนิเวศ อุทยานแห่งชาติตะรุเตา**. กรุงเทพฯ: สำนักพิมพ์จุฬาลงกรณ์มหาวิทยาลัย.

จุฬาลงกรณ์มหาวิทยาลัย, สำนักบริการวิชาการ. (2535). **การศึกษาความสามารถในการรองรับได้**

ด้านการท่องเที่ยวของอุทยานแห่งชาติตะรุเตา. กรุงเทพมหานคร: (ม.ป.ท.)

จุฬาลงกรณ์มหาวิทยาลัย, ศูนย์บริการวิชาการ คณะสถาปัตยกรรมศาสตร์. (2546). **รายงานฉบับสมบูรณ์ โครงการนำร่องเพื่อการอนุรักษ์และพัฒนาสภาพแวดล้อมคลองอัมพวา**. กรุงเทพฯ: ผู้แต่ง.

จุฬาลงกรณ์มหาวิทยาลัย, หน่วยวิจัยการอนุรักษ์และฟื้นฟูชุมชน คณะสถาปัตยกรรมศาสตร์. (2549). **เที่ยวชุมชนอัมพวาและพื้นที่ใกล้เคียงในจังหวัดสมุทรสงคราม**. (พิมพ์ครั้งที่ 1). กรุงเทพฯ: สำนักพิมพ์จุฬาลงกรณ์มหาวิทยาลัย.

จันทนาภรณ์ อำพลจันทน์. (2544). **การประยุกต์แนวคิดช่วงชั้นโอกาสด้านนันทนาการ: กรณีศึกษาอุทยานแห่งชาติแก่งกระจาน จังหวัดเพชรบุรีและประจวบคีรีขันธ์**. วิทยานิพนธ์วิทยาศาสตรมหาบัณฑิต มหาวิทยาลัยเกษตรศาสตร์.

จันทนาภรณ์ อำพลจันทน์. (2543). เอกสารสัมมนาทางวิชาการ **การใช้ช่วงชั้นโอกาสด้านนันทนาการ (recreation opportunity spectrum) เพื่อการจัดการแหล่งนันทนาการภายในอุทยานแห่งชาติของประเทศไทย**. นิสิตปริญญาโท สาขาอุทยานและนันทนาการ ภาคต้น ปีการศึกษา 2543 คณะวนศาสตร์ มหาวิทยาลัยเกษตรศาสตร์.

จันทนี เลิศจินดาทรัพย์. (2535). **การศึกษารูปแบบชุมชนและการใช้ที่ดินบริเวณที่ราบลุ่มแม่น้ำแม่กลองตอนล่าง กรณีศึกษาอำเภอเมืองสมุทรสงคราม อัมพวา บางคนที และดำเนินสะดวก**. วิทยานิพนธ์การวางแผนภาคและเมืองมหาบัณฑิต จุฬาลงกรณ์มหาวิทยาลัย.

ชูสิทธิ์ ชูชาติ. (2549). **รายงานการวิจัยเรื่อง รูปแบบการท่องเที่ยวเชิงนิเวศเขตลุ่มน้ำแม่แตง**. เชียงใหม่: ผู้แต่ง.

ชัยวัชร พรหมจิตติพงศ์. **(2548). ความพึงพอใจของนักท่องเที่ยวชาวต่างประเทศต่อการท่องเที่ยวแบบโฮมสเตย์ในพื้นที่ศูนย์พัฒนาโครงการหลวงตีนตก จังหวัดเชียงใหม่**. วิทยานิพนธ์วิทยาศาสตรมหาบัญฑิต มหาวิทยาลัยมหิดล.

ดรรชนี เอมพันธุ์. (2544). **เอกสารประกอบการสอนวิชา 308511 หลักนันทนาการและการท่องเที่ยวธรรมชาติ.** สาขาอุทยานและนันทนาการ ภาควิชาอนุรักษวิทยา คณะวนศาสตร์ มหาวิทยาลัยเกษตรศาสตร์.

ตุ้ย ชุมสาย, ม.ล. และญิบพัน พรหมโยธี. (2527). **ปฐมบทแห่งวิชาการท่องเที่ยว**. (พิมพ์ครั้งที่ 1). กรุงเทพฯ: ไทยวัฒนาพานิช.

ถวิกา ลี้ประเสริฐ. (2544). **แนวทางการจัดการสวนป่าทุ่งเกวียนเพื่อเป็นแหล่งท่องเที่ยวทางธรรมชาติ**. วิทยานิพนธ์วิทยาศาสตรมหาบัณฑิต มหาวิทยาลัยมหิดล.

ทวีวงศ์ ศรีบุรี. (2547). การท่องเที่ยวกับสิ่งแวดล้อม ใครกำไร? ใครขาดทุน?. **รวมบทความ**

สิ่งแวดล้อม'47.

ทวีป ศิริรัศมี. (บ.ก.). (2547). **รวมบทความวิจัย การท่องเที่ยว**. กรุงเทพฯ: สำนักงานสนันสนุนการวิจัย.

ทิวัฒน์ รัตนเกตุ. (2542). **การศึกษาศักยภาพในพื้นที่และความพร้อมของชุมชนในการส่งเสริม และพัฒนาการท่องเที่ยวเชิงอนุรักษ์ประเภทอ่างเก็บน้ำ กรณีศึกษา: อ่างเก็บน้ำคลองระโอก จังหวัดระยอง**. วิทยานิพนธ์วิทยาศาสตร์มหาบัณฑิต มหาวิทยาลัยมหิดล.

เทิดศักดิ์ เดชะกิจขจร. (2549). การพัฒนาการท่องเที่ยวโดยชุมชนในบริเวณเทศบาลตำบล อัมพวาและพื้นที่ใกล้เคียง. **วารสารวิชาการคณะสถาปัตยกรรมศาสตร์**, 32-51.

นภวรรณ ฐานกาญจน์. (2542). เอกสารประกอบการบรรยาย **การศึกษาขีดความสามารถในการรองรับการใช้ประโยชน์ พื้นที่อุทยานแห่งชาติ**. ภาควิชาอนุรักษ์วิทยา คณะวนศาสตร์ มหาวิทยาลัยเกษตรศาสตร์. 50 หน้า

นภวรรณ ฐานกาญจน์, สุรเชษฎ์ เชษฐมาส, ดรรชนี เอมพันธุ์, ณัฏฐ พิชกรรม, เล็ก เติมตระกูล, สมเกียรติ สิงหวรวุฒิ และสิริพงษ์ ราชคีรี. (2541). **คู่มือพัฒนาและออกแบบสิ่งอำนวยความสะดวกในแหล่งท่องเที่ยวแบบการท่องเที่ยวเชิงอนุรักษ์**. กรุงเทพฯ:

นิธิ ลิศนันท์. (2544). **แนวทางการอนุรักษ์และฟื้นฟูชุมชนริมน้ำคลองอัมพวา จังหวัดสมุทรสงคราม**. วิทยานิพนธ์วิทยาศาสตรมหาบัณฑิต จุฬาลงกรณ์มหาวิทยาลัย.

นันทิวา เกิดชื่น. (2533). **ขีดความสามารถทางสังคมของแหล่งท่องเที่ยวประเภทชายหาด: ศึกษาเฉพาะกรณีเกาะเสม็ด จังหวัดระยอง**. วิทยานิพนธ์สังคมศาสตรมหาบัณฑิต มหาวิทยาลัยมหิดล.

บริษัท เอเชีย แล็ป แอนด์ คอนซัลแตนท์ จำกัด. (2549). **รายงานฉบับสุดท้าย โครงการศึกษาขีดความสามารถในการรองรับได้ของพื้นที่อุทยานแห่งชาติเอราวัณ จังหวัดกาญจนบุรี**. กรุงเทพฯ: ผู้แต่ง.

ประกาศคณะกรรมการสิ่งแวดล้อมแห่งชาติฉบับที่ 8 (พ.ศ. 2537) ออกตามความใน พระราชบัญญัติส่งเสริมและรักษาคุณภาพสิ่งแวดล้อม พ.ศ. 2535 เรื่อง กำหนดมาตรฐานคุณภาพน้ำในแหล่งน้ำผิวดิน ตีพิมพ์ในราชกิจจานุเบกษา ฉบับประกาศทั่วไป เล่ม 111 ตอนที่ 16 ง ลงวันที่ 24 กุมภาพันธ์ 2537

ประกาศกฎกระทรวง ฉบับที่ 41 (พ.ศ.2537) ออกตามความในพระราชบัญญัติควบคุมอาคาร พ.ศ.2522 ว่าด้วยเรื่อง การกำหนดลักษณะของที่จอดรถ ประกาศในราชกิจจานุเบกษา เล่ม 111 ตอนที่ 37ก ลงวันที่ 31 สิงหาคม 2537

ประพฤติ เกิดสืบ และปิยะกาญจน์ เที้ยธิทรัพย์. (2546). **รายงานการวิจัย เรื่องการประยุกต์ระบบ**

สารสนเทศภูมิศาสตร์ในการกำหนดเขตการท่องเที่ยวเชิงนิเวศ ตามหลักการช่วงชั้นโอกาสด้านนันทนาการ : กรณีศึกษาจังหวัดลพบุรี. นครปฐม: ผู้แต่ง.

ปิยะรัตน์ สุริยะฉาย. (2546). **การวิเคราะห์ประสบการณ์ที่พึงปรารถนาและความชอบของนักท่องเที่ยวเพื่อกำหนดกลุ่มชั้นโอกาสทางด้านนันทนาการ**. วิทยานิพนธ์วิทยาศาสตรมหาบัณฑิต มหาวิทยาลัยเกษตรศาสตร์.

ปิ่นรัชฎ์ รัตนเกตุ และจิตติศักดิ์ ธรรมาภรณ์พิลาส. (2547). โครงการศึกษาเพื่อการอนุรักษ์และพัฒนาการท่องเที่ยวทางน้ำในกรุงเทพฯ ชั้นในและบริเวณใกล้เคียง. **รวมบทความวิจัยการท่องเที่ยว, พฤศจิกายน 2547**, 3-12

พิมพ์ลภัส ขันหลวง. (2545). **ผลกระทบจากจิตวิทยาและการกำหนดขีดความสามารถในการรองรับทางจิตวิทยาของแหล่งท่องเที่ยวประเภทน้ำตก**. วิทยานิพนธ์วิทยาศาสตรมหาบัณฑิต มหาวิทยาลัยเกษตรศาสตร์.

พัฒนา มูลพฤกษ์. (2550). **อนามัยสิ่งแวดล้อม (ฉบับปรับปรุง)**. (พิมพ์ครั้งที่ 4). กรุงเทพฯ: สำนักงานกิจการโรงพิมพ์ องค์การสงเคราะห์ทหารผ่านศึก.

ยศ สันตสมบัติ. (2544). **การท่องเที่ยวเชิงนิเวศ ความหลากหลายทางวัฒนธรรมและการจัดการทรัพยากร**. เชียงใหม่: นพบุรีการพิมพ์.

มินตรา ติรณปริญญ์. (2548). **การพัฒนาการท่องเที่ยวโดยชุมชนในบริเวณเทศบาลตำบลอัมพวาและพื้นที่ใกล้เคียง**. วิทยานิพนธ์การวางแผนภาคและเมืองมหาบัญฑิต มหาวิทยาลัยจุฬาลงกรณ์.

มุทิตา ปิ่นสุนทร. (2542). **การวางแผนเส้นทางจักรยานที่เหมาะสมเพื่อการท่องเที่ยวในเขตกรุงรัตนโกสินทร์**. วิทยานิพนธ์วิทยาศาสตรมหาบัญฑิต มหาวิทยาลัยมหิดล.

มั่นสิน ตัณฑุลเวศม์. (2537). **วิศวกรรมงานประปา เล่มที่ 1**. กรุงเทพฯ: จุฬาลงกรณ์มหาวิทยาลัย.

วรรณา วงษ์วานิช. (2539). **ภูมิศาสตร์การท่องเที่ยว**. (พิมพ์ครั้งที่ 1). กรุงเทพมหานคร: มหาวิทยาลัยธรรมศาสตร์.

วีรยา จยาวรรณ. (2549). **สถานภาพสิ่งแวดล้อมและวัฒนธรรมที่มีผลต่อการส่งเสริมการท่องเที่ยวทางวัฒนธรรม กรณีศึกษา ชุมชนป้อมมหากาฬ กรุงเทพมหานคร**. วิทยานิพนธ์วิทยาศาสตรมหาบัญฑิต มหาวิทยาลัยมหิดล.

สถาบันประมงน้ำจืดแห่งชาติ. (2530). **เอกสารวิชาการ เรื่องเกณฑ์คุณภาพน้ำเพื่อการคุ้มครองทรัพยากรสัตว์น้ำจืด ฉบับที่ 75/2530**. กรุงเทพฯ: ผู้แต่ง.

สถาบันวิจัยวิทยาศาสตร์และเทคโนโลยีแห่งประเทศไทย. (2535). **รายงานฉบับสมบูรณ์ การศึกษาขีดความสามารถในการรองรับการพัฒนาการท่องเที่ยวของเกาะพีพี**. กรุงเทพฯ: ผู้แต่ง.

สถาบันวิจัยวิทยาศาสตร์และเทคโนโลยีแห่งประเทศไทย. (2541). **รายงานขั้นสุดท้ายการดำเนินการ**

เพื่อกำหนดนโยบายการท่องเที่ยวเพื่อรักษาระบบนิเวศ โดย. กรุงเทพฯ: ผู้แต่ง.

สรรเสริญ เนาวสัยศรี. (2543). **ศักยภาพของแหล่งท่องเที่ยว ผลกระทบที่อาจเกิดขึ้นจากการท่องเที่ยวเชิงอนุรักษ์ และกลุ่มชั้นของแหล่งท่องเที่ยวทางธรรมชาติจังหวัดปราจีนบุรี**. ปัญหาพิเศษ สาขาพืชสวน มหาวิทยาลัยเกษตรศาสตร์, กรุงเทพฯ.

สาลินี ภวายน. (2540). **ขีดความสามารถทางสังคมของสวนสาธารณะในกรุงเทพมหานคร กรณีศึกษาสวนลุมพินี**. วิทยานิพนธ์สังคมศาสตรมหาบัณฑิต มหาวิทยาลัยมหิดล.

สาธิต ประเสริฐ. (2538). **การศึกษาประเมินศักยภาพทางกายภาพและสังคม ในการรองรับการท่องเที่ยวของอุทยานแห่งชาติภูกระดึง**. วิทยานิพนธ์วิทยาศาสตรมหาบัณฑิต มหาวิทยาลัยมหิดล.

สิทธิชัย ตันธนะสฤษดิ์. (2549). **เทคนิคการเก็บตัวอย่างน้ำ**. (พิมพ์ครั้งที่ 1). กรุงเทพฯ: มหาวิทยาลัยเกษตรศาสตร์.

สิทธิรัตน์ ปาจีนบูรวรรณ์. (2531). **ขีดความสามารถทางสังคมสำหรับการท่องเที่ยวชายหาด**. วิทยานิพนธ์วิทยาศาสตรมหาบัณฑิต มหาวิทยาลัยมหิดล.

สินธุ์ สโรบล (บ.ก.). (2546). **การท่องเที่ยวโดยชุมชน แนวคิดและประสบการณ์พื้นที่ภาคเหนือ**. เชียงใหม่: สำนักงานกองทุนสนับสนุนการวิจัย.

สุรจิต ชิรเวทย์. (2548). **คนแม่กลอง**. (พิมพ์ครั้งที่ 3). สมุทรสงคราม: หอการค้าจังหวัดสมุทรสงคราม.

สุรพงษ์ โสธนะเสถียร. (2545). **หลักและทฤษฎีการวิจัยทางสังคมศาสตร์**. (พิมพ์ครั้งที่ 2). กรุงเทพฯ: โรงพิมพ์ประสิทธิภัณฑ์แอนด์พรินติ้ง.

สันติ ชุดินธรา. (2533). ความสามารถในการรองรับของพื้นที่ (Carrying Capacity): เพดานการพัฒนาแหล่งท่องเที่ยวที่ต้องให้ความสำคัญในปัจจุบัน. จุลสารการท่องเที่ยวททท. ปีที่ 9 (เล่มที่ 1). กรุงเทพมหานคร: การท่องเที่ยวแห่งประเทศไทย.

สำนักงานคณะกรรมการวัฒนธรรมแห่งชาติ กระทรวงวัฒนธรรม และคณะสถาปัตยกรรมศาสตร์ มหาวิทยาลัยศิลปากร. (2549). **แนวทางการจัดการภูมิทัศน์วัฒนธรรม**. กรุงเทพฯ: บริษัทอมรินทร์พริ้นติ้งแอนด์พับลิชชิ่ง จำกัด (มหาชน).

ศักดิ์อนันต์ ปลาทอง (บ.ก.). (2548). **คู่มือการจัดการพื้นที่คุ้มครองทางทะเล ตามเกณฑ์พื้นที่คุ้มครองทางทะเลของอาเซียน**. (พิมพ์ครั้งที่ 1). สงขลา: โรงพิมพ์สุไหงโก-ลก.

อนุชาติ พวงสำลี (บ.ก.). (2549). **พลิกฟื้นท่าจีน- แม่กลองสู่สังคมภูมิปัญญา : การสัมมนาวิชาการเครือข่ายการวิจัยบูรณาการลุ่มน้ำท่าจีน-แม่กลอง มหาวิทยาลัยมหิดล ครั้งที่4**. นครปฐม: .

อารีรัตน์ ภาคพิธเจริญ. (2548). **ขีดความสามารถในการรองรับของแหล่งท่องเที่ยวเชิงนิเวศโดย**

ชุมชน กรณีศึกษา หมู่บ้านท่องเที่ยวเชิงอนุรักษ์บ้านทรงไทย จังหวัดสมุทรสงคราม. วิทยานิพนธ์วิทยาศาสตรมหาบัณฑิต มหาวิทยาลัยเกษตรศาสตร์.

คู่มือการตรวจสอบคุณภาพสิ่งแวดล้อมอย่างง่าย: คุณภาพน้ำ. สืบค้นเมื่อวันที่ 1 เมษายน 2551, จาก http://www.infofile.pcd.go.th/water/inspect_water.pdf

ภาพถ่ายดาวเทียมอัมพวา. สืบค้นเมื่อวันที่ 10 มิถุนายน 2550, จาก http:// www.samutsongkhram.go.th/gis.php

วิสัยทัศน์จังหวัดสมุทรสงคราม. สืบค้นเมื่อวันที่ 15 ตุลาคม 2550, จาก http://www.samutsongkhram.go.th/strategy/st01.pdf

เทศบาลตำบลอัมพวา. สืบค้นเมื่อ 6 สิงหาคม, 2550, จาก http://www.amphawa.net/index.asp

APPENDIX

Appendix A

เลขที่แบบประเมิน.....

แหล่งท่องเที่ยว.....

แบบประเมินแหล่งท่องเที่ยว

โดย นฤมล ด่านพงศ์สุวรรณ คณะสิ่งแวดล้อมและทรัพยากรศาสตร์ มหาวิทยาลัยมหิดล

เรียน ท่านผู้ตอบแบบประเมิน

คำชี้แจง แบบประเมินชุดนี้จัดทำขึ้นเพื่อใช้เป็นส่วนหนึ่งของวิทยานิพนธ์เรื่อง “การประเมินขีดความสามารถในการรองรับการท่องเที่ยว โดยประยุกต์หลักการช่วงชั้นโอกาสทางนันทนาการ สำหรับจำแนกพื้นที่ท่องเที่ยว กรณีศึกษา ตลาดน้ำอัมพวา จังหวัดสมุทรสงคราม” สาขาการวางแผนสิ่งแวดล้อมที่ยั่งยืน คณะสิ่งแวดล้อมและทรัพยากรศาสตร์ มหาวิทยาลัยมหิดล โดยมีวัตถุประสงค์เพื่อศึกษาและประยุกต์หลักการช่วงชั้นโอกาสทางนันทนาการ (Recreation Opportunity Spectrum: ROS) และเพื่อการประเมินขีดความสามารถในการรองรับได้ทางการท่องเที่ยว

ผลการประเมินอันเป็นประโยชน์ของท่าน เป็นข้อมูลที่มีความสำคัญอย่างยิ่งต่อการวิจัยและการพัฒนาการท่องเที่ยวอย่างยั่งยืน สามารถใช้เป็นตัวบ่งชี้ระดับการพัฒนา ตลอดจนปริมาณและขนาดของสิ่งอำนวยความสะดวกที่ควรจัดให้มีในพื้นที่อย่างเหมาะสม อันจะเชื่อมโยงไปสู่ขีดความสามารถในการรองรับได้ทางการท่องเที่ยวของตลาดน้ำอัมพวา หากท่านต้องการให้ตลาดน้ำอัมพวามีการจัดการอย่างไรในอนาคต กรุณาช่วยให้ข้อคิดเห็นต่างๆ ในแบบประเมินชุดนี้

โดยทำการวิเคราะห์แบบสอบถามในเรื่อง การจำแนกประเภทของแหล่งท่องเที่ยว โดยการประยุกต์ใช้หลักการช่วงชั้นโอกาสทางนันทนาการ

ว./ด./ป.ที่สัมภาษณ์...../...../.....

ชื่อผู้ให้สัมภาษณ์.....

นฤมล ด่านพงศ์สุวรรณ

ผู้วิจัย

<u>คำแนะนำ</u> ท่านเห็นว่าปัจจัยต่างๆ ต่อไปนี้ เป็นปัจจัยที่มีอิทธิพลต่อการตัดสินใจในการจำแนกสถานภาพของแหล่งท่องเที่ยวนี้ สามารถทำเครื่องหมาย X ในช่อง ☐ ตามความเป็นจริง และกรอกข้อความในแบบสอบถาม

การจำแนกประเภทของแหล่งท่องเที่ยว โดยการประยุกต์ใช้หลักการช่วงชั้นโอกาสทางนันทนาการ (ROS)

1. การเดินทางและการเข้าถึง

1.1 ความสะดวกของการเข้าถึงแหล่งท่องเที่ยว ในช่วงเวลาที่มีจำนวนนักท่องเที่ยวมากที่สุด

ระดับคะแนน	ลักษณะบ่งชี้
☐ 1	ระยะห่างจากถนนสายสมุทรสงคราม-บางนกแขวกที่รถยนต์สามารถเข้าถึงได้ เป็นระยะทางไม่เกิน 20 เมตร
☐ 2	ระยะห่างจากถนนสายสมุทรสงคราม-บางนกแขวกที่รถยนต์สามารถเข้าถึงได้ เป็นระยะทาง 21-50 เมตร
☐ 3	ระยะห่างจากถนนสายสมุทรสงคราม-บางนกแขวกที่รถยนต์สามารถเข้าถึงได้ เป็นระยะทาง 51-100 เมตร
☐ 4	ระยะห่างจากถนนสายสมุทรสงคราม-บางนกแขวกที่รถยนต์สามารถเข้าถึงได้ เป็นระยะทาง 101- 500 เมตร
☐ 5	ระยะห่างจากถนนสายสมุทรสงคราม-บางนกแขวกที่รถยนต์สามารถเข้าถึงได้ เป็นระยะทางมากกว่า 500 เมตรขึ้นไป

1.2 ระดับการพัฒนาของเส้นทางเดินเท้า

ระดับคะแนน	ลักษณะบ่งชี้
☐ 1	เส้นทางเดินเท้า/จักรยานที่พัฒนาแล้วอย่างมาก พบมากกว่าร้อยละ 80 ของระยะทางเส้นทางเดินในจุดท่องเที่ยวนี้ เดินสะดวกและง่ายต่อคนทุกกลุ่มทุกวัย
☐ 2	เส้นทางเดินเท้า/จักรยานที่พัฒนาแล้วอย่างมาก พบมากกว่าร้อยละ 50-80 ของระยะทางเส้นทางในจุดท่องเที่ยวนี้
☐ 3	เส้นทางเดินเท้า/จักรยานที่พัฒนาแล้วอย่างมาก พบน้อยกว่าร้อยละ 50 หรือเป็นเส้นทางที่พัฒนาแล้วบ้าง พบประมาณร้อยละ 50 หรือน้อยกว่า มีสิ่งอำนวยความสะดวกในการป้องกันอันตรายจากการเดินบนเส้นทาง เช่น ขั้นบันได ราวเกาะ

☐ 4 เป็นเส้นทางที่มีการพัฒนาบ้าง พบมากกว่าร้อยละ 50 ของระยะทางทั้งหมด

☐ 5 เส้นทางเดินเท้าที่ไม่มีการพัฒนามากกว่าร้อยละ 80 (ไม่มีสิ่งอำนวยความสะดวก เช่น ไม่ลาดพื้นผิวและสิ่งอำนวยความสะดวก ประเภทสะพานหรือราวเกาะไว้) เส้นทางไม่ชัดเจน ขนาดเล็ก นักท่องเที่ยวต้องดูแลความปลอดภัยให้ตนเอง

1.3 ระยะทางของเส้นทางเดินเท้าจากลานจอดรถหน้าวัดอัมพวันฯ เข้าสู่แหล่งท่องเที่ยว

ระดับคะแนน ลักษณะบ่งชี้

☐ 1 เดินเท้าถึงแหล่งท่องเที่ยวด้วยระยะทางไม่เกิน 20 เมตร

☐ 2 เดินเท้าด้วยระยะทาง 21 – 50 เมตร

☐ 3 เดินเท้าด้วยระยะทาง 51 - 100 เมตร

☐ 4 เดินเท้าด้วยระยะทาง 101 - 500 เมตร

☐ 5 เดินเท้าด้วยระยะทางมากกว่า 500 เมตร

2. การจัดการในพื้นที่

2.1 รูปลักษณ์การพัฒนา พิจารณาจาก อาคาร และสิ่งปลูกสร้าง (เช่น ถนน สะพาน ท่าน้ำ ศาลานั่งพักริมน้ำ รั้ว ป้อมยาม เสาธง เป็นต้น) โดยคงรูปทรง สี และวัสดุก่อสร้างที่เป็นเอกลักษณ์ของท้องถิ่นไว้อย่างสมบูรณ์

ระดับคะแนน ลักษณะบ่งชี้

☐ 1 มีการปรับปรุงเปลี่ยนแปลง*อาคารและสิ่งปลูกสร้างต่างๆ* ทั้งรูปทรง สี และวัสดุก่อสร้าง โดยไม่กลมกลืนกับรูปแบบเดิมอย่างเห็นได้ชัดเจน

☐ 2 มีการพัฒนา*อาคารและสิ่งปลูกสร้างต่างๆ* มากกว่าร้อยละ 80 ของพื้นที่ชุมชน โดยคงรูปทรง สี และวัสดุการก่อสร้างกลมกลืนกับสถาปัตยกรรมท้องถิ่น

☐ 3 พบเห็นการพัฒนา*สิ่งปลูกสร้างต่างๆ* ในสัดส่วนที่สูงกว่าการพัฒนาอาคารมากกว่าร้อยละ 80 ของพื้นที่ชุมชน โดยคงรูปทรง สี และวัสดุการก่อสร้างกลมกลืนกับสถาปัตยกรรมท้องถิ่น

☐ 4 พบเห็นการพัฒนา*สิ่งปลูกสร้างต่างๆ* ในสัดส่วนที่สูงกว่าการพัฒนาอาคารน้อยกว่าร้อยละ 80 ของพื้นที่ชุมชน โดยคงรูปทรง สี และวัสดุการก่อสร้างกลมกลืนกับสถาปัตยกรรมท้องถิ่น

☐ 5 พบเห็นการพัฒนาน้อยมาก เพียงร้อยละ 10 ของพื้นที่ชุมชน

2.2 ขอบเขตของการกระจายการพัฒนาอาคารและสิ่งปลูกสร้าง

ระดับคะแนน	ลักษณะบ่งชี้
☐ 1	การพัฒนามีการกระจายเป็นวงกว้างและมีเนื้อที่ติดต่อกัน ครอบคลุมพื้นเกือบทั้งชุมชน
☐ 2	การพัฒนามีการกระจายตัวเป็นหย่อมๆ
☐ 3	การพัฒนาเพียงจุดเดียว

2.3 วัตถุประสงค์ของสิ่งอำนวยความสะดวก

ระดับคะแนน	ลักษณะบ่งชี้
☐ 1	สิ่งอำนวยความสะดวกสร้างขึ้นเพื่อรองรับการขยายตัวของนักท่องเที่ยว
☐ 2	สิ่งอำนวยความสะดวกพื้นฐานที่จำเป็นและเพื่อความสะดวกสบายมากสำหรับคนทุกประเภท
☐ 3	สิ่งอำนวยความสะดวกพื้นฐานและเพื่อความสะดวกสบายปานกลาง สำหรับป้องกันอันตรายแก่นักท่องเที่ยว เช่น ห้องสุขา ศาลานั่งพักผ่อน ถังขยะ
☐ 4	สิ่งอำนวยความสะดวกที่จำเป็น เน้นความปลอดภัยแก่นักท่องเที่ยวและป้องกันผลกระทบต่อพื้นที่ เช่น ราวเกาะ สะพานข้ามแม่น้ำ ถังขยะ
☐ 5	มีสิ่งอำนวยความสะดวกที่จำเป็นและจำกัดจำนวนประโยชน์การใช้สอย

3. โอกาสพบปะผู้คน วัดจากปริมาณนักท่องเที่ยวที่พบเห็นในแหล่งท่องเที่ยว ขณะทำการวิเคราะห์โดยประมาณ

ระดับคะแนน	ลักษณะบ่งชี้
☐ 1	พบเห็นบ่อยครั้งมาก ประมาณมากกว่า 50 กลุ่ม/ชั่วโมง
☐ 2	พบเห็นบ่อย ประมาณ 30-50 กลุ่ม/ชั่วโมง
☐ 3	พบเห็นบ้าง ประมาณ 11-12 กลุ่ม/ชั่วโมง
☐ 4	พบเห็นน้อย ประมาณ 2-10 กลุ่ม/ชั่วโมง
☐ 5	ไม่พบเห็นเลย หรือน้อยกว่า 2 กลุ่ม

4. ระดับการควบคุมนักท่องเที่ยว/กิจกรรมการใช้ประโยชน์ หรือเงื่อนไขการใช้พื้นที่ โดยหน่วยงานที่ดูแลรับผิดชอบพื้นที่ (5 หมายถึง ต่ำมาก-ไม่มี และ 1 หมายถึง สูงมาก)

ระดับคะแนน	ลักษณะบ่งชี้
☐ 1	พบเห็นเจ้าหน้าที่ตรวจตราหรืออยู่ในพื้นที่ตลอดเวลา มีป้ายระบุเงื่อนไข

การใช้พื้นที่และเตือนอันตราย

☐ 2 พบเห็นเจ้าหน้าที่ตรวจตรา ให้ความรู้สึกปลอดภัยและเชื่อมั่นกับนักท่องเที่ยว

☐ 3 ไม่มีเจ้าหน้าที่ประจำ มีเพียงป้ายสื่อความหมาย เช่น ป้ายเตือน ป้ายระบุเงื่อนไขการใช้พื้นที่ และวิธีการรักษาสิ่งแวดล้อม

☐ 4 ไม่มีเจ้าหน้าที่ประจำ มีป้ายสื่อความหมายที่อาจเตือนเกี่ยวกับอันตรายที่อาจเกิดขึ้น

☐ 5 ไม่มีป้ายหรือเจ้าหน้าที่ดูแลประจำแหล่งท่องเที่ยวเพื่อรักษาความปลอดภัย นักท่องเที่ยวต้องรู้จักรับผิดชอบตนเอง และมีความรู้สึกโดดเดี่ยว

5. ผลกระทบจากการท่องเที่ยว

5.1 การพบเห็นกลุ่มนักท่องเที่ยวที่ประกอบกิจกรรมไม่เหมาะสม ฝ่าฝืนกฎหรือระเบียบของท้องถิ่น เช่น ทิ้งขยะในที่สาธารณะ, ขีดเขียนโบราณสถานหรือต้นไม้, การแต่งกายที่ไม่เหมาะสม, นำยาเสพติดเข้ามาในชุมชน เป็นต้น)

ระดับคะแนน ลักษณะบ่งชี้

☐ 1 พบเห็นมาก (มากกว่า 30 % ของจำนวนนักท่องเที่ยวที่ประกอบกิจกรรมในพื้นที่)

☐ 2 พบเห็นค่อนข้างมาก (ประมาณ 21-30 % ของจำนวนนักท่องเที่ยวที่ประกอบกิจกรรมในพื้นที่)

☐ 3 พบเห็นปานกลาง (ประมาณ 11-20 % ของจำนวนนักท่องเที่ยวที่ประกอบกิจกรรมในพื้นที่)

☐ 4 พบเห็นเล็กน้อย (ประมาณ 1-10 % ของจำนวนนักท่องเที่ยวที่ประกอบกิจกรรมในพื้นที่)

☐ 5 ไม่พบเห็น

5.2 ผลกระทบจากนักท่องเที่ยว / จากกิจกรรมการใช้ประโยชน์ที่สังเกตเห็นได้ โดย 5 หมายถึง รุนแรงมาก และ 1 หมายถึง ปรากฏน้อยมาก-ไม่ปรากฏ

ผลกระทบที่ปรากฏ	ระดับการประเมิน				
	5	4	3	2	1
☐ ดินริมตลิ่งพังทลาย (%ร่องรอยการกัดเซาะของคลื่น)					

ผลกระทบที่ปรากฏ (ต่อ)	ระดับการประเมิน				
	5	4	3	2	1
☐ สารแขวนลอยในน้ำ					
☐ ของเสียมนุษย์					
☐ กลิ่นที่ไม่พึงปรารถนา					
☐ การบดบังทัศนียภาพจากสิ่งปลูกสร้าง					
☐ ความขัดแย้งระหว่างกิจกรรมการใช้ประโยชน์ในพื้นที่ (ระหว่างกิจกรรมท่องเที่ยวด้วยกันเอง)					
☐ ปริมาณขยะ					
☐ อื่นๆ.....					

ขอขอบคุณเป็นอย่างสูง ที่ได้สละเวลาในการทำแบบประเมิน

Appendix B

เลขที่แบบสอบถาม.....

ว./ด./ป. ที่สัมภาษณ์ ...../...../.....

แบบสอบถามนักท่องเที่ยว

โดย นฤมล ด่านพงศ์สุวรรณ คณะสิ่งแวดล้อมและทรัพยากรศาสตร์ มหาวิทยาลัยมหิดล

เรียน นักท่องเที่ยวทุกท่าน

<u>คำชี้แจง</u> แบบประเมินชุดนี้จัดทำขึ้นเพื่อใช้เป็นส่วนหนึ่งของวิทยานิพนธ์เรื่อง “การประเมินขีดความสามารถในการรองรับการท่องเที่ยว โดยประยุกต์หลักการช่วงชั้นโอกาสทางนันทนาการ สำหรับจำแนกพื้นที่ท่องเที่ยว กรณีศึกษา ตลาดน้ำอัมพวา จังหวัดสมุทรสงคราม” สาขาการวางแผนสิ่งแวดล้อมที่ยั่งยืน คณะสิ่งแวดล้อมและทรัพยากรศาสตร์ มหาวิทยาลัยมหิดล โดยมีวัตถุประสงค์เพื่อศึกษาและประยุกต์ใช้หลักการช่วงชั้นโอกาสทางนันทนาการ(Recreation Opportunity Spectrum: ROS)ในการจำแนกพื้นที่ที่เหมาะสมต่อประสบการณ์ทางการท่องเที่ยวของนักท่องเที่ยว และสามารถเป็นตัวบ่งชี้ระดับการพัฒนา ที่สามารถเชื่อมโยงไปสู่ขีดความสามารถในการรองรับได้ทางการท่องเที่ยวของตลาดน้ำอัมพวา

ข้อมูลอันเป็นประโยชน์ของท่าน เป็นข้อมูลที่มีความสำคัญอย่างยิ่งต่อการวิจัยในครั้งนี้และเป็นตัวบ่งชี้ระดับการใช้ประโยชน์ของนักท่องเที่ยว และสามารถเป็นแนวทางและมาตรการควบคุมปริมาณนักท่องเที่ยว ให้อยู่ในระดับที่เกิดผลกระทบต่อแหล่งท่องเที่ยวหรือนักท่องเที่ยวน้อยที่สุดและส่งผลต่อการพัฒนาการท่องเที่ยวอย่างยั่งยืน

ดังนั้นหากท่านต้องการให้ตลาดน้ำอัมพวามีการจัดการอย่างไรในอนาคต กรุณาช่วยให้ข้อคิดเห็นต่างๆ ในแบบประเมินชุดนี้

โดยแบ่งการวิเคราะห์ออกเป็น 3 ตอน ดังนี้

<u>ตอนที่ 1</u> ข้อมูลทั่วไปของนักท่องเที่ยว

<u>ตอนที่ 2</u> ข้อมูลเกี่ยวกับการเดินทางท่องเที่ยวและกิจกรรมการท่องเที่ยว

<u>ตอนที่ 3</u> ความคิดเห็นและทัศนคติต่อการท่องเที่ยวในตลาดน้ำอัมพวา

นฤมล ด่านพงศ์สุวรรณ

ผู้วิจัย

คำแนะนำ กรุณาตอบแบบสอบถามโดยทำเครื่องหมาย X ลงในช่อง ☐ ตามความต้องการ และเติมลงในช่องว่างต่อไปนี้

ตอนที่ 1 ข้อมูลทั่วไปของผู้ให้สัมภาษณ์

1. เพศ
   - ☐ ชาย ☐ หญิง
2. อายุ.....ปี
3. การศึกษา
   - ☐ ประถมศึกษา ☐ มัธยมศึกษาตอนต้น/เทียบเท่า
   - ☐ มัธยมศึกษาตอนปลาย/เทียบเท่า ☐ อนุปริญญา/เทียบเท่า
   - ☐ ปริญญาตรี ☐ สูงกว่าปริญญาตรี
4. อาชีพ
   - ☐ นักเรียน/นักศึกษา ☐ ข้าราชการ/รัฐวิสาหกิจ
   - ☐ ค้าขาย ☐ ประกอบธุรกิจส่วนตัว
   - ☐ พนักงาน/ลูกจ้างบริษัท ☐ เกษตรกร
   - ☐ รับจ้างทั่วไป ☐ อื่นๆ โปรดระบุ.....
5. รายได้โดยประมาณต่อเดือน
   - ☐ ไม่เกิน 5,000 บาท ☐ 5,000-10,000 บาท
   - ☐ 10,001-15,000 บาท ☐ 15,001-20,000 บาท
   - ☐ 20,001-25,000 บาท ☐ 25,001-30,000 บาท
   - ☐ มากกว่า 30,000 บาท
6. ปัจจุบันท่านพักอาศัยอยู่ในเขตจังหวัด (ระบุ).....
   - ☐ ภาคเหนือ ☐ ภาคใต้
   - ☐ ภาคกลาง ☐ กรุงเทพมหานคร
   - ☐ ภาคตะวันออก ☐ ภาคตะวันตก
   - ☐ ภาคตะวันออกเฉียงเหนือ ☐ ต่างประเทศ (ระบุ).....

ตอนที่ 2 ข้อมูลเกี่ยวกับการเดินทางท่องเที่ยวและกิจกรรมการท่องเที่ยว

7. ก่อนหน้านี้ท่านเคยเดินทางมาเที่ยวที่แห่งนี้หรือไม่
   - ☐ ไม่เคย ☐ เคยมาแล้ว ครั้งนี้เป็นครั้งที่.....

8. ท่านได้หาข้อมูลของแหล่งท่องเที่ยวตลาดน้ำอัมพวา ก่อนหน้าเดินทางเข้ามาท่องเที่ยวหรือไม่ และหากได้หาข้อมูลมาก่อนท่านหาจากแหล่งใด

☐ ไม่ได้หาข้อมูล

☐ ได้หาข้อมูล จากแหล่ง

☐ เพื่อน ☐ ญาติพี่น้อง

☐ วารสารการท่องเที่ยว ☐ บริษัทนำเที่ยว

☐ เอกสาร/แผ่นพับของหน่วยงานราชการ ☐ อินเตอร์เน็ต

☐ สื่อมวลชน ประเภท..... ☐ อื่นๆ โปรดระบุ.....

9. วัตถุประสงค์ในการเดินทางมายังตลาดน้ำอัมพวาในครั้งนี้ **(โปรดเรียงลำดับความสำคัญ)**

☐ นั่งเรือชมหิ่งห้อย ☐ นั่งพักผ่อน/รับประทานอาหาร

☐ ถ่ายรูป ☐ ชมวิวทิวทัศน์บริเวณจุดชมวิวต่างๆ

☐ กราบนมัสการสิ่งศักดิ์สิทธิ์ ☐ ซื้อสินค้าพื้นเมือง

☐ ศึกษาวิถีชีวิตชุมชน ☐ ศึกษาสถาปัตยกรรมท้องถิ่น

☐ ศึกษาธรรมชาติ/พืชพันธุ์ท้องถิ่น ☐ ดูงาน/สัมมนา

10. ท่านเดินทางมาเที่ยวที่ตลาดน้ำอัมพวา อย่างไร

☐ รถจักรยานยนต์ ☐ รถยนต์นั่งส่วนบุคคล

☐ รถตู้เช่า ☐ รถทัวร์ของบริษัทนำเที่ยว/ทัวร์ของ ขสมก.

☐ รถโดยสารประจำทาง

11. ท่านเดินทางมากับใคร

☐ มาคนเดียว

☐ มากับกลุ่มเพื่อนรวมทั้งหมด.....คน (รวมตัวท่านด้วย)

☐ มากับหมู่ญาติพี่น้องในครอบครัวจำนวน.....คน (รวมตัวท่านด้วย)

☐ มากับบริษัททัวร์นำเที่ยวทั้งหมด.....คัน

☐ อื่นๆ โปรดระบุ.....

12. ในวันนี้ท่านได้เดินทาง หรือวางแผนที่จะไปเที่ยวชมแหล่งท่องเที่ยวใดบ้างในบริเวณตลาดน้ำอัมพวา **(โปรดเรียงลำดับการเยี่ยมชม)**

..... อุทยานรัชกาลที่ 2 .....ศูนย์ข้อมูลชุมชนอัมพวา ..... ตลาดอัมพวา (ตลาดบก)

..... เส้นทางเดินศึกษาวิถีชีวิตริมคลองและสถาปัตยกรรมท้องถิ่น

13. ระยะเวลาที่ใช้ในการเที่ยวตลาดน้ำอัมพวา

☐ มาเที่ยว เวลา..... น. ถึง..... น.

14. ถ้าท่านมาเที่ยวแบบพักค้างคืนโฮมสเตย์/รีสอร์ท

☐ จำนวน 1 คืน

☐ จำนวน 2 คืน

<u>ตอนที่ 3</u> ความคิดเห็นและทัศนคติต่อการท่องเที่ยวในตลาดน้ำอัมพวา

15. ท่านได้รับความรู้เกี่ยวกับทรัพยากรการท่องเที่ยวที่มีอยู่ในบริเวณตลาดน้ำอัมพวาบ้างหรือไม่

☐ ได้ จากที่ใด

☐ ศูนย์ข้อมูลชุมชนอัมพวา

☐ แผ่นป้ายข้อมูลที่มีอยู่ในแหล่งท่องเที่ยวและบริเวณต่างๆ

☐ พนักงานบริษัทนำเที่ยว

☐ อื่นๆ โปรดระบุ.....

☐ ไม่ได้ เพราะ.....

16. แผ่นป้าย/สัญลักษณ์ข้อมูลที่มีอยู่ในแหล่งท่องเที่ยวและบริเวณต่าง ควรมีการปรับปรุงหรือไม่

☐ ควรปรับปรุง เพราะ.....

☐ ไม่ต้องปรับปรุง เพราะ.....

17. มาเที่ยวในครั้งนี้ท่านได้เข้าไปชมนิทรรศการในศูนย์ข้อมูลชุมชนอัมพวาหรือไม่

☐ ได้เข้าไป และมีความคิดเห็นต่อนิทรรศการว่า

☐ ควรมีการปรับปรุงนิทรรศการ เพราะ.....

☐ ไม่ต้องปรับปรุง

☐ ไม่ได้เข้าไป เพราะ.....

18. ขณะที่ท่านท่องเที่ยวอยู่ในบริเวณนี้ ท่านรู้สึกแออัดจากนักท่องเที่ยวข้างเคียงมากน้อยแค่ไหน

ระดับความแออัด

☐ มากที่สุด	☐ มาก	☐ ปานกลาง	☐ น้อย	☐ น้อยที่สุด
5	**4**	**3**	**2**	**1**

19. จำนวนนักท่องเที่ยวมากที่สุดเท่าที่ท่านยอมรับได้หรือต้องการให้มี ในบริเวณนี้

☐ ต้องการให้มีนักท่องเที่ยวไม่เกิน 1 คนในระยะรัศมีโดยรอบห่างจากท่าน 0.5 เมตร

☐ ต้องการให้มีนักท่องเที่ยวไม่เกิน 1 คนในระยะรัศมีโดยรอบห่างจากท่าน 1.0 เมตร

☐ ต้องการให้มีนักท่องเที่ยวไม่เกิน 1 คนในระยะรัศมีโดยรอบห่างจากท่าน 1.5 เมตร

☐ ต้องการให้มีนักท่องเที่ยวไม่เกิน 1 คนในระยะรัศมีโดยรอบห่างจากท่าน 2.0 เมตร

☐ ต้องการให้มีนักท่องเที่ยวไม่เกิน 1 คนในระยะรัศมีโดยรอบห่างจากท่าน 2.5 เมตร

☐ กี่คนก็ได้ไม่เป็นปัญหาสำหรับท่าน

20. ระดับความพึงพอใจของท่านในการมาท่องเที่ยวในตลาดน้ำอัมพวา ให้ท่านทำเครื่องหมาย √

(ระดับความพึงพอใจ 5 หมายถึง มากที่สุด -1 หมายถึง น้อยที่สุด)

ความพึงพอใจโดยรวม	**ระดับความพึงพอใจ**				
	5	**4**	**3**	**2**	**1**
1.ความกลมกลืนกับธรรมชาติ					
2.การใช้ประโยชน์ในพื้นที่ของตลาดน้ำอัมพวา					
3.การจัดระเบียบของตลาดน้ำอัมพวา					
4.การจราจรทางน้ำ					
5.ทางเท้าสัญจรภายในบริเวณตลาดน้ำอัมพวา					
6.เครื่องหมาย/ป้าย/สัญลักษณ์เพื่อบอกทิศทาง					
7.การได้รับความรู้เกี่ยวกับแหล่งท่องเที่ยวนั้นๆ					
8.ที่จอดรถ					
9.ปริมาณถังขยะ					
10.ความปลอดภัยในชีวิตและทรัพย์สิน					

ขอขอบคุณเป็นอย่างสูง ที่ได้สละเวลาในการทำแบบสอบถาม

Appendix C

เลขที่แบบสอบถาม.....

แบบสอบถามผู้มีส่วนร่วมในการจัดการการท่องเที่ยวชุมชน

โดย นฤมล ด่านพงศ์สุวรรณ คณะสิ่งแวดล้อมและทรัพยากรศาสตร์ มหาวิทยาลัยมหิดล

เรียน ท่านผู้ตอบแบบประเมิน

<u>คำชี้แจง</u> แบบประเมินชุดนี้จัดทำขึ้นเพื่อใช้เป็นส่วนหนึ่งของวิทยานิพนธ์ เรื่อง “การประเมินขีดความสามารถในการรองรับการท่องเที่ยว โดยประยุกต์หลักการช่วงชั้นโอกาสทางนันทนาการ สำหรับจำแนกพื้นที่ท่องเที่ยว กรณีศึกษา ตลาดน้ำอัมพวา จังหวัดสมุทรสงคราม” สาขาการวางแผนสิ่งแวดล้อมที่ยั่งยืน คณะสิ่งแวดล้อมและทรัพยากรศาสตร์ มหาวิทยาลัยมหิดล โดยมีวัตถุประสงค์เพื่อศึกษาและประยุกต์ใช้หลักการช่วงชั้นโอกาสทางนันทนาการ (Recreation Opportunity Spectrum, ROS) ในการจำแนกพื้นที่ที่เหมาะสมต่อประสบการณ์ทางการท่องเที่ยวของนักท่องเที่ยว และสามารถเป็นตัวบ่งชี้ระดับการพัฒนา ตลอดจนปริมาณและขนาดของสิ่งอำนวยความสะดวกที่ควรจัดให้มีในพื้นที่อย่างเหมาะสม อันจะเชื่อมโยงไปสู่ขีดความสามารถในการรองรับได้ทางการท่องเที่ยวของตลาดน้ำอัมพวา

ผลการประเมินอันเป็นประโยชน์ของท่าน เป็นข้อมูลที่มีความสำคัญอย่างยิ่งต่อการวิจัยในครั้งนี้ และต่อการประเมินขีดความสามารถในการรองรับได้ของชุมชนที่อยู่บริเวณรอบตลาดน้ำอัมพวา หากท่านต้องการให้ตลาดน้ำอัมพวามีการจัดการอย่างไรในอนาคต กรุณาช่วยให้ข้อคิดเห็นต่างๆ ในแบบประเมินชุดนี้ โดยทำการวิเคราะห์ข้อมูลในเรื่อง ความคิดเห็นและทัศนคติต่อการท่องเที่ยวในตลาดน้ำอัมพวา

ว./ด./ป.ที่สัมภาษณ์...../...../.....

ชื่อผู้ให้สัมภาษณ์.....

นฤมล ด่านพงศ์สุวรรณ

ผู้วิจัย

<u>คำแนะนำ</u> กรุณาตอบแบบสอบถามโดยทำเครื่องหมาย X ลงในช่อง ☐ ตามความต้องการ และเติมลงในช่องว่างต่อไปนี้

ความคิดเห็นและทัศนคติต่อการท่องเที่ยวในตลาดน้ำอัมพวา

1. ขณะที่ท่านอยู่ในบริเวณนี้ ท่านรู้สึกแออัดจากนักท่องเที่ยวข้างเคียงมากน้อยแค่ไหน

ระดับความแออัด

☐ มากที่สุด	☐ มาก	☐ ปานกลาง	☐ น้อย	☐ น้อยที่สุด
5	**4**	**3**	**2**	**1**

2. จำนวนนักท่องเที่ยวมากที่สุดเท่าที่ท่านยอมรับได้หรือต้องการให้มี ในบริเวณนี้
   - ☐ ต้องการให้มีนักท่องเที่ยวไม่เกิน 1 คนในระยะรัศมีโดยรอบห่างจากท่าน 0.5 เมตร
   - ☐ ต้องการให้มีนักท่องเที่ยวไม่เกิน 1 คนในระยะรัศมีโดยรอบห่างจากท่าน 1.0 เมตร
   - ☐ ต้องการให้มีนักท่องเที่ยวไม่เกิน 1 คนในระยะรัศมีโดยรอบห่างจากท่าน 1.5 เมตร
   - ☐ ต้องการให้มีนักท่องเที่ยวไม่เกิน 1 คนในระยะรัศมีโดยรอบห่างจากท่าน 2.0 เมตร
   - ☐ ต้องการให้มีนักท่องเที่ยวไม่เกิน 1 คนในระยะรัศมีโดยรอบห่างจากท่าน 2.5 เมตร
   - ☐ กี่คนก็ได้ไม่เป็นปัญหาสำหรับท่าน

3. ระดับความพึงพอใจของท่านต่อการท่องเที่ยวของตลาดน้ำอัมพวา ให้ท่านทำเครื่องหมาย √

(ระดับความพึงพอใจ 5 หมายถึง มากที่สุด -1 หมายถึง น้อยที่สุด)

ความพึงพอใจ	**ระดับความพึงพอใจ**				
	5	**4**	**3**	**2**	**1**
1.ความกลมกลืนกับธรรมชาติ					
2.การใช้ประโยชน์ในพื้นที่ของตลาดน้ำอัมพวา					
3.การจัดระเบียบของตลาดน้ำอัมพวา					
4.การจราจรทางน้ำ					
5.ทางเท้าสัญจรภายในบริเวณตลาดน้ำอัมพวา					
6.เครื่องหมาย/ป้าย/สัญลักษณ์เพื่อบอกทิศทาง					
7.การได้รับความรู้เกี่ยวกับแหล่งท่องเที่ยวนั้นๆ					
8.ที่จอดรถ					
9.ปริมาณถังขยะ					
10.ความปลอดภัยในชีวิตและทรัพย์สิน					

4. ข้อเสนอแนะอื่นๆ

.....

.....

.....

.....

.....

.....

ขอขอบคุณเป็นอย่างสูง ที่ได้สละเวลาในการทำแบบสอบถาม

APPENDIX D

Table D-1 ROS for Amphawan Chetiyaram Temple

Factors	Score					
	Estimators					Mean
	1	2	3	4	5	
1. Transportations and Access	**2.00**	**4.33**	**1.00**	**2.33**	**4.00**	**2.73**
1.1 How convenience in transportation during peak time	2	5	1	1	5	2.80
1.2 Level of road quality	1	3	1	5	3	2.60
1.3 Distance between parking lot to the temple	3	5	1	1	4	2.80
2. Site Management	**2.50**	**1.67**	**2.50**	**3.17**	**3.83**	**2.73**
2.1 Overall development	2	2	2	3	5	2.80
2.2 How far the development can reach	2.5	0	2.5	2.5	2.5	2.00
2.3 Facilities and utilities	3	3	3	4	4	3.40
3. Opportunity for Social Encounter	**4**	**1**	**5**	**3**	**3**	**3.20**
4. Tourist Control Level	**2**	**2**	**4**	**2**	**2**	**2.40**
5. Tourism Impacts	**3.57**	**3.78**	**2.57**	**3.85**	**3.50**	**3.45**
5.1 Inappropriate activities seen by tourists	3	5	1	5	4	3.60
5.2 Consequences from tourists	4.14	2.57	4.14	2.71	3.00	3.31
5.2.1 Soil erosion	5	1	4	4	3	3.40
5.2.2 suspension in water	4	1	4	3	3	3.00
5.2.3 human waste	3	1	4	2	3	2.60
5.2.4 unwanted smell	4	1	4	1	3	2.60
5.2.5 Crowed building block scenery	5	4	4	3	3	3.80
5.2.6 Conflict between activities involve developing the area	4	5	4	3	3	3.80
5.2.6 Conflict between activities involve developing the area	4	5	4	3	3	3.80
5.2.7 Number of waste	4	5	5	3	3	4.00
Level of mean score	**2.81**	**2.56**	**3.01**	**2.87**	**3.27**	**2.90**

Remarks: Assessors 1: Amphawa Mayor 2: Wat Amphawan Community Chairman 3**:** Prachauthit Community Chairman 4: Rimklong Community Chairman 5: Talad Amphawa Chairman

Table D-2 ROS for Amphawa Community Information Center

Factors	Score					
	Estimators					Mean
	1	2	3	4	5	
1. Transportations and Access	**3.00**	**4.33**	**1.00**	**1.33**	**2.00**	**2.33**
1.1 How convenience in transportation during peak time	2	5	1	1	1	2.00
1.2 Level of road quality	3	3	1	1	4	2.40
1.3 Distance between parking lot to the information center	4	5	1	2	1	2.60
2. Site Management	**1.33**	**1.67**	**2.50**	**2.83**	**1.33**	**1.93**
2.1 Overall development	1	2	2	3	2	2.00
2.2 How far the development can reach	0	0	2.5	2.5	0	1.00
2.3 Facilities and utilities	3	3	3	3	2	2.80
3. Opportunity for Social Encounter	**4**	**1**	**5**	**2**	**4**	**3.20**
4. Tourist Control Level	**3**	**2**	**4**	**2**	**2**	**2.60**
5. Tourism Impacts	**3.35**	**3.78**	**2.57**	**3.14**	**2.64**	**3.09**
5.1 Inappropriate activities seen by tourists	4	5	1	4	4	3.60
5.2 Consequences from tourists	2.71	2.57	4.14	2.28	1.28	2.59
5.2.1 Soil erosion	4	1	4	4	1	2.80
5.2.2 suspension in water	3	1	4	2	1	2.20
5.2.3 human waste	2	1	4	1	1	1.80
5.2.4 unwanted smell	3	1	4	1	1	2.00
5.2.5 Crowed building block scenery	2	4	4	3	1	2.80
5.2.6 Conflict between activities involve developing the area	2	5	4	3	3	3.40
5.2.7 Number of waste	3	5	5	2	1	3.20
Level of mean score	**2.94**	**2.56**	**3.01**	**2.26**	**2.39**	**2.63**

Remarks: Assessors 1: Amphawa Mayor 2: Wat Amphawan Community Chairman 3**:** Prachauthit Community Chairman 4: Rimklong Community Chairman 5: Talad Amphawa Chairman

Table D-3 ROS for Way of life and Vernacular Architecture Trail

Factors	Score					
	Estimators					Mean
	1	2	3	4	5	
1. Transportations and Access	**2.66**	**4.33**	**1.00**	**2.33**	**1.66**	**2.39**
1.1 How convenience in transportation during peak time	2	5	1	1	1	2.00
1.2 Level of road quality	2	3	1	5	3	2.80
1.3 Distance between parking lot to the palce	4	5	1	1	1	2.40
2. Site Management	**1.33**	**1.67**	**2.50**	**3.50**	**2.17**	**2.23**
2.1 Overall development	2	2	2	4	2	2.40
2.2 How far the development can reach	0	0	2.5	2.5	2.5	1.50
2.3 Facilities and utilities	2	3	3	4	2	2.80
3. Opportunity for Social Encounter	**3**	**1**	**5**	**3**	**4**	**3.20**
4. Tourist Control Level	**2**	**2**	**4**	**2**	**2**	**2.40**
5. Tourism Impacts	**2.78**	**3.78**	**2.57**	**3.42**	**2.92**	**3.09**
5.1 Inappropriate activities seen by tourists	3	5	1	4	4	3.40
5.2 Consequences from tourists	2.57	2.57	4.14	2.85	1.85	2.79
5.2.1 Soil erosion	3	1	4	5	1	2.80
5.2.2 suspension in water	3	1	4	3	1	2.40
5.2.3 human wates	2	1	4	1	3	2.20
5.2.4 unwanted smell	3	1	4	2	2	2.40
5.2.5 Crowed building block scenery	2	4	4	3	1	2.80
5.2.6 Conflict between activities involve developing the area	2	5	4	3	3	3.4
5.2.7 Number of waste	3	5	5	3	2	3.6
Level of mean score	**2.35**	**2.56**	**3.01**	**2.85**	**2.55**	**2.66**

Remarks: Assessors 1: Amphawa Mayor 2: Wat Amphawan Community Chairman 3**:** Prachauthit Community Chairman 4: Rimklong Community Chairman 5: Talad Amphawa Chairman

Table D-4 ROS for Amphawa Market (land market)

Factors	Score					
	Estimators					Mean
	1	2	3	4	5	
1. Transportations and Access	**2.33**	**4.33**	**1.00**	**1.66**	**2.66**	**2.39**
1.1 How convenience in transportation during peak time	2	5	1	1	2	2.20
1.2 Level of road quality	2	3	1	3	3	2.40
1.3 Distance between parking lot to the temple	3	5	1	1	3	2.6
2. Site Management	**2.50**	**1.67**	**2.50**	**3.33**	**2.33**	**2.47**
2.1 Overall development	3	2	2	3	2	2.40
2.2 How far the development can reach	2.5	0	2.5	5	0	2.00
2.3 Facilities and utilities	2	3	3	2	5	3.00
3. Opportunity for Social Encounter	**4**	**1**	**5**	**4**	**3**	**3.40**
4. Tourist Control Level	**2**	**2**	**4**	**3**	**2**	**2.60**
5. Tourism Impacts	**2.85**	**3.78**	**2.57**	**3.50**	**3.00**	**3.14**
5.1 Inappropriate activities seen by tourists	3	5	1	4	4	3.40
5.2 Consequences from tourists	2.71	2.57	4.14	3.00	2.00	2.88
5.2.1 Soil erosion	4	1	4	4	1	2.80
5.2.2 suspension in water	3	1	4	3	1	2.40
5.2.3 human waste	2	1	4	5	2	2.80
5.2.4 unwanted smell	2	1	4	3	2	2.40
5.2.5 Crowed building block scenery	2	4	4	3	2	3.00
5.2.6 Conflict between activities involve developing the area	3	5	4	2	3	3.40
5.2.7 Number of waste	3	5	5	1	3	3.40
Level of mean score	**2.74**	**2.56**	**3.01**	**3.10**	**2.60**	**2.80**

Remarks: Assessors 1: Amphawa Mayor 2: Wat Amphawan Community Chairman 3**:** Prachauthit Community Chairman 4: Rimklong Community Chairman 5: Talad Amphawa Chairman

APPENDIX E

The Amount of Tourist in Amphawa Floating Market

The Amount of Tourist in AFM were calculated to determine the mean level of capacity and compared with the recent standard capacity in order to estimate the level of CC.

Based on information gathered from field, it showed that the number of tourists could visit AFM throughout a year. Normally, AFM opens daily on Friday to Sunday, and public holidays during 4.00-9.00 p.m. (Amphawa Tambon Municipality: http://www.amphawa.net/index.asp, August 6, 2007). Meanwhile, week days were quiet because stakeholders were close except some urban merchants who lived there and some boat service.

Based on a number of tourist scattered in the area, it showed the intensity of tourism activities. There was high number of tourists clustered along the road in the edge of Amphawa canal because this place was not far from the parking areas, which considerably the best joint leading to AFM. Moreover, tourists could get some rest and get some food and souvenirs. There were also interesting activities such as tour program, firefly scenery by boat, urban food, karaoke, and home stay.

It was difficult to calculate number of tourists who have visited AFM because the numbers were not recorded statistically in each year. AFM was based on community which connected other places to each other. There were many entrances and exits. But the most convenience way was to drive because the local government and corps already prepared the parking areas and services to serve tourists which totally safe and comfortable. The parking areas were located in front of the Amphawan Temple and inside the Amphawan Collage.

So the estimated number of tourists was calculated under the number of vehicles in the parking areas. All data was collected during 7^{th}-9^{th} March 2008, on 4.00-9.00 p.m.

Table E-1 Tourists Amount Average

Vehicles									
Day	**Personal Cars** (4 person/car)		**Vans** (10 persons/van)		**Coach bus** (55persons/bus)		**BMTA coach bus** (35persons/bus)		**Total person/day**
	car	person	van	person	bus	person	bus	person	
Friday 7th	450	1,800	150	1,500	6	330	-	-	3,630
Saturday 8th	1,125	4,500	375	3,750	12	660	5	175	9,085
Sunday 9th	1,050	4,200	350	3,500	9	495	4	140	8,335
Mean value of tourists per day									**7,017**

APPENDIX F

Picture F-1 the Area of Amphawan Chetiyaram Temple

Picture F-2 the Area of Amphawa Community Information Center

Picture F-3 the Area of Way of Life and Vernacular Architecture Trail

Picture F-4 the Area of Amphawa Market (land market)

Picture F-5 Parking lots in Amphawan Chetiyararm Temple and Amphawan College

BIOGRAPHY

NAME	Miss Naruemon Danpongsuwan
DATE OF BIRTH	October 20th, 1980
PLACE OF BIRTH	Surin, Thailand
INSTITUTIONS ATTENDED	Rajamangala Institute of Technology, 1998-2002 Bachelor of Arts (Tourism) Mahidol University, 2006-2008 Master of Science (Sustainable Environment Planning)
HOME ADDRESS	102/9 Moo 4 Bang Pai sub-district, Maung district, Nonthaburi province, Thailand 11000
E-MAIL ADDRESS	pause_toon@yahoo.com
RESEARCH ASSISTANTSHIP	Faculty of Graduate Studies, Mahidol University, Thailand, 2007
RESEARCH GRANTS	Supported in part by the Thesis Grant, Graduate Alumni Association of Mahidol University, 2008 Supported in Graduate Students in Academic Presentations in Thailand Academic, Faculty of Graduate Studies, Mahidol University, Thailand, 2008
PUBLICATION	4th Mahasarakham University Research Conference – Research for Sustainable Development, Thailand, September, 4-5 2008