



**REPORT ON REGIONAL WORKSHOP ON MANAGEMENT  
OF SEA TURTLES FORAGING HABITATS  
IN SOUTHEAST ASIAN WATERS  
(JAPANESE TRUST FUND V PROGRAM)**

**SARAWAK, MALAYSIA  
1-3 NOVEMBER 2011**



**Marine Fishery Resources Development and Management Department  
SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER**



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**I. INTRODUCTION**

1. Based on the findings from satellite telemetry study on sea turtles conducted by SEAFDEC-MFRDMD and other scientists in the region had indicated several possible foraging habitats of sea turtles in Southeast Asian. These possible foraging habitats such are; Brunei Bay (Malaysia and Brunei waters), Riau Archipelago (Indonesia and Singapore waters), Andaman Island (Myanmar and Thailand waters), Sipadan-Mabul Island (Malaysia waters), Bali Island (Indonesia waters).

2. SEAFDEC-MFRDMD had conducted two scientific surveys in sea turtle foraging habitats; (i) Lawas foraging habitat of Brunei Bay from 15 to 24 July 2010 and (ii) Sipadan–Mabul foraging habitats of Sabah waters from 26 to 30 September 2011. The objectives of the surveys are to (i) collect scientific information on sea turtles population, ecological parameters and human activities that can affect the existing of sea turtles in foraging habitats.

3. In order to share the scientific information that has obtained from these surveys to other member countries in the region, SEAFDEC-MFRDMD will conduct the Regional Workshop on Management Plan on Conserving Sea Turtle Foraging Habitats. Several technical papers regarding the surveys will be presenting as well as group discussion for preparing the Standard Operating (S.O.P.) and discussion on preparing the Management Plan on Conserving Sea Turtle Foraging Habitats.

4. Participants attended the workshop from Brunei Darussalam, Indonesia one representatives from SEAFDEC-Secretariat and several researches from SEAFDEC-MFRDMD, Sarawak Forestry Corporation, Sabah Parks and one Resource Person from Sabah Parks. Three officers from Sarawak Forestry Corporation were also invites as observers. The full list of the participants appears in Annex.

## **II. OBJECTIVES**

5. The objectives of the workshop are:
  - i. To compile the scientific information on sea turtle population, ecological parameters such as sea grass area and distribution, water quality and interaction between sea turtles and human activities in sea turtle foraging habitats.
  - ii. To prepare the framework of Standard Operating Procedure for conducting scientific survey on sea turtle foraging habitats.
  - iii. To prepare the framework of Management Plan on Conserving the Sea Turtle Foraging Habitats in Southeast Asian Region.

## **III. OPENING OF THE MEETING**

6. Dr. Masaya Katoh, the Deputy Chief of SEAFDEC-MFRDMD Kuala Terengganu, welcomed all the distinguished guests, participants and observers to the workshop. He trusted that the Regional Program Workshop that brought together 17 participants would meet its objectives on preparing the draft on Standard Procedure for Conducting Scientific Survey on Sea Turtles Foraging Habitat and the draft on The Guideline to Develop Management Plan for Foraging Habitats of Green Turtles (*Chelonia Mydas*). He extended his appreciation and congratulated the Secretariat Committee for making this Regional Workshop a reality. His welcome speech appears as Annex II

7. In her Opening Speech, the Chief of SEAFDEC-MFRDMD Kuala Terengganu welcomed all the participants and guests to Kuching, Sarawak. She mentioned Based on satellite telemetry and tagging studies that been conducted by SEAFDEC-MFRDMD and other SEAFDEC member countries; we have successfully discovered the migration routes and identified several possible foraging habitats of sea turtles in Southeast Asian waters. These possible foraging habitats are namely; Riau Archipelago (Indonesia), Derawan Complex (Indonesia), Sabah and Philippines Turtles Island (Malaysia and Philippines), Brunei Bay (Brunei Darussalam and Malaysia), Sulu –Sulawesi Basin (Indonesia, Malaysia and Philippines) and Andaman Island (India).

8. She stressed that designing the suitable conservation and management measures towards protecting these habitats are greatly important to ensure these sea turtles can continue to survive and hopefully will increase in number in future. For instance, the healthiest of sea grass bed in foraging habitat is essential for survival of sea turtle especially on green turtles. Considering the importance of conserving the sea turtles in their foraging habitats, SEAFDEC-MFRDMD had conducted two scientific surveys on sea turtle foraging habitats. First scientific survey has conducted in Brunei Bay of Sarawak waters from 15 – 24 July 2010 and second survey has conducted in Sipadan Islands of Sabah.

9. She also emphasized that continuously awareness and educational program to the local community, conserving the sea grass bed, reduce the fishing activities, monitoring the seawater parameters and control the number of tourist in that particular area are some of the key factors should been considered in preparing the Management Plan on Sea Turtle Foraging Habitats. She believed that this regional workshop would meet its objectives for drafting the Management Plan on Protecting and Conserving Sea Turtle Foraging Habitat and Standard Operating Procedure for conducting scientific survey on sea turtle foraging habitats. She expressed his appreciation to the Government of Japan, SEAFDEC and Secretariat Committee for making this workshop a success. She hoped the participants would have a fruitful discussion. The Chief of SEAAFDEC-MFRDMD Kuala Terengganu then declared the Workshop open. Her Opening Speech appears in Annex III

#### **IV. ADOPTION OF THE AGENDA**

Chief of SEAFDEC-MFRDMD Ms. Mahyam Mohd Isa. chaired this session. The Agenda as it appears in Annex IV had adopted.

#### **V. REPORT ON THE SCIENTIFIC SURVEY IN LAWAS FORAGING HABITAT**

##### **Study on Distribution of Sea grass In Lawas Foraging Habitat of Sarawak Malaysia**

11. The study was conducted by researcher from Sarawak Forestry Corporation (Annex V) had mentioned that Kuala Lawas coastal ecosystem is very diverse consisting of muddy, sandy, and rocky beaches with lowland mixed dipterocarp forests, sandy soil coastal vegetation and mangroves forests fringing the beach. Kuala Lawas also known as important feeding grounds for dugongs and turtles, and harbors at least eight species from two families of sea grass stretching more than 30 km along the beach from Awat-Awat to Sungai Bangkulit on the Sarawak/Sabah border. Mono species and mixed species of *Halodule Pinifolia*, *H. Uninervis*, *Cymodocea Rrotundata*, *Thalassia Hemprichi*, *Enhalus Acoroides*, *Halophila Ovalis*, *H. Beccarii* and *H. Minor* had recorded on muddy, sandy, muddy sand and coral rubble substrates.

12. The workshop was informed that during the joint SEAFDEC-MFRDMD and SARAWAK FORESTRY study on Research and Management of Sea Turtles in the Southeast Asian Waters from the 9th to 14th July 2010, sea grass surveys were conducted in five locations where turtles were frequently seen or were often caught by local fishermen in their kabat. At selected locations, transect lines were established at intervals of 100 meters with length depending on the coverage of the sea grass meadow. Quadrates of 50 cm x 50 cm were randomly placed at every five meter intervals along the transect line.

13. The workshop also informed that types of sediment, total percentage of sea grass cover, percentage cover of each sea grass species, percentage cover of algae and non-target species was recorded. *Halodule Pinifolia* was the most common species in all locations. *Cymodocea Rotundata* and *Halophila Ovalis* were recorded at Kuku, *Halodule Beccarii* and *Thalassia Hemprichii* were recorded at the very edge of the mangrove at Sri Tanjung Resort and *Thalassia Hemprichii* were recorded near the rocky shore of Bukit Sari.

### **Study on Population and Satellite Telemetry of Sea Turtles in Lawas Foraging Habitat of Sarawak Malaysia.**

14. Technical Coordinator of Japanese Trust Fund V Program reported that scientific survey has conducted from 5 – 16 July 2010 (Annex VI) on Lawas Waters of Brunei Bay. This survey has conducted in collaboration between SEAFDEC-MFRDMD Kuala Terengganu and Sarawak Forestry Corporation. Four main activities were conducted during the survey; (i) Sampling on biology and population of sea turtles, (ii) Mapping and distribution of sea grass species, (iii) Collecting information on interaction between human activities and the affect on sea turtles and the habitat, and (iv) Collecting data on water quality parameters. Four agencies involved in this survey, SEAFDEC-MFRDMD Kuala Terengganu, Fisheries Research Center Rantau Abang, Terengganu, Sarawak Forestry Corporation, Sabah Parks and Department of Fisheries Brunei Darussalam. The overall objective of the survey is to gather scientific information on sea turtle population and ecological parameters as well as to indicate the threats on sea turtles and their habitat.

15. The workshop informed that sampling on biology and population of sea turtles in Lawas foraging habitat that conducted from 6 to 16 July 2010. The objective of this activity is to collect data on biological parameters of sea turtles such as curve carapace length (CCL), curve carapace width (CCW), body weight, tagging, collecting tissue samples for DNA profiling and conducting satellite telemetry study. The best method to catch sea turtles in Lawas foraging habitat is by using gill net or locally known as *Balat*. During the survey, in the first demonstration, Balat with a length of more than 300 meters were assembled four times in Lawas waters. Finding was no turtle caught.

16. Assembling the Balat has continued on 1<sup>st</sup> - 5<sup>th</sup> January 2011, which succeeded in catching 9 Green turtles, and on 4<sup>th</sup> – 8<sup>th</sup> February 2011, successfully caught 19 Green turtles. A total of 28 Green turtles sampled and 78 % are adults, which the size of the curve carapace length is more than 80 cm. There were no male turtle were found during the sampling.

17. The workshop also informed that Satellite telemetry on an adult female Green turtle that has conducted in Lawas sea turtles foraging habitat on 12 February 2011. Adult green turtles with the size of curve carapace length (CCL) 102 cm and size Curve Carapace Width (CCW) 85 cm and the weight 102 kg had deployed with one unit of Platform Terminal Transmitter (PTT). The signal has managed to detect until 18 July 2011 with duration of 154 days. The last position of turtle is 32 km from the original point. This indicates that the turtles still found swimming in Lawas foraging habitat and not migrated beyond the area.

## **Study on Population Genetics of Sea Turtles in Lawas Foraging Habitat of Sarawak, Malaysia**

18. The study that has been conducted by Technical Officer from SEAFDEC-MFRDMD Kuala Terengganu (Annex VII) and had mentioned that the Green turtle (*Chelonia mydas*) is a classic example of a migratory species. Coastal sea grass habitats in tropical and subtropical regions support aggregations of resident Green turtles from several genetically distinct breeding populations. Migration of individuals to their respective dispersed breeding sites provides a complex pattern of migratory connectivity among nesting and feeding habitats of these species. An understanding of this pattern is important in regions where the persistence of populations is under threat from anthropogenic impacts. The present study uses mitochondrial DNA and mixed-stock analyses to assess the connectivity among Brunei Bay/Lawas waters feeding ground in Sarawak and 11 genetically distinct breeding populations from the Southeast Asian region. It was hypothesized that large and geographically proximate breeding populations would dominate at nearby feeding grounds. In this study, the total numbers of samples are 28. Seven haplotypes were found, six of the haplotypes were published at turtle nesting beaches and one was novel haplotype. The haplotypes C3, C4, C5, C14, D2 and A3 found in this study are widely distributed in Southeast Asia turtles nesting beaches. The haplotype diversity was 0.7322 while nucleotide diversity was 0.007.

## **Survey on Local Communities' Perception of Sea Turtles at Kuala Lawas Fishermen Village, Off Brunei Bay**

19. The study conducted by researcher from Sarawak Forestry Corporation (Annex VIII) and mentioned that this study assesses on local communities' perception on Kuala Lawas marine turtles. 105 fishermen from seven villages located along Kuala Lawas off Brunei Bay interviewed using structured and semi structured questionnaires. Key findings from the surveys were that Kuala Lawas is an important area for marine life biodiversity especially marine turtles. Most of the local communities stated that the number of turtles seen was still the same compared to 5 to 10 years ago. In terms of exposure on turtle conservation programs, only a few of them have participated in conservation activities. A small proportion of the local communities interviewed are aware of agencies and laws involved in the protection of marine turtles in Sarawak. On the incidental catch of turtles, only a few of local communities have experienced incidental catches. The most common species of turtles caught were Green turtles ranging from 1 to 4 feet in size. Most of the turtles caught were alive and released into their natural habitat by the fisherman. The positive attitude of the local communities in Kuala Lawas was that they were willing to help the government to protect marine turtles in Kuala Lawas and their habitats.



## **VI Report On Scientific Survey in Mabul and Sipadan Foraging Habitats**

### **Study on Distribution of Sea grass in Sipadan Island Waters**

20. Researcher from Sabah Parks reported that the survey on the distribution of sea grass species at Sipadan Island had carried out from 26 to 30 April 2010. The main objective of this study is to identify the distribution of sea grass species near Sipadan Island (Annex VIII).

21. The workshop has informed that this study was conducted using the Sea grass Monitoring Network (SeagrassNet), 2004 edition, as well as random surveys for samples collection purposes. Two permanent study sites established and four random surveys successfully implemented during the period of this study.

22. The workshop also recorded six species of sea grass from three genera and two families of sea grasses founded. This includes *Cymodocea Rotundata*, *Halodule Uninervis* and *H. Pinifolia* from Family Cymodoceaceae; *Halophila Ovalis*, *Thalassia Hemprichii* and *Halophila Minor*, from Family Hydrocharitaceae. *Halophila Minor* species are new records for Island Sipadan. Dominant species of sea grass at Sipadan Island are *Halodule*, *Cymodocea Rotundata* and *Thalassia Hemprichii*. In general, the growth of sea grass at Sipadan Island can be observed at the depth of 0.5 to 2.5 meters during high tide.

### **Study on Biology and Population of Sea Turtles in Sipadan Island Foraging Habitat of Sabah, Malaysia**

23. Technical Coordinator of Japanese Trust Fund V Program reported that sampling on biology and population of sea turtles in Sipadan Island foraging habitat conducted from 26 September to 1 October 2011 (Annex IX). This study conducted in collaboration between SEAFDEC-MFRDMD Kuala Terengganu, Fisheries Research Institute Rantau Abang, Terengganu and Sabah Parks. The objective of this activity is to collect biological parameters of sea turtles such as curve carapace length (CCL), curve carapace width (CCW), body weight, tagging, collecting tissue samples for DNA profiling and conducting satellite telemetry study. While turtle rodeo is not a suitable approach for sampling sea turtle in Sipadan Island, the best method to catch sea turtles here is by using divers to float the sea turtle to the surface.

24. The workshop also informed that samplings on sea turtles that has conducted at seven locations around Sipadan Island. Each location managed to catch 10 to 17 turtles. 84 turtles were sample within 5 days. There are 96% Green turtles. Most of the Green turtles are juvenile which the size of the curve carapace length is below 80 cm and contributed 79% of total samples. The 17 adult Green turtles were sampled which consisted of only five male. Only four juvenile Hawksbill turtles caught and contributed 3% of total samples. The ratio on male and female for adult Green turtles are 1:3.4.

## **VII Management of Sea Turtle Island Heritage Protected Area (TIHPA): Malaysia**

25. The officer from Sabah Parks explained the establishment of the world's first trans-frontier marine protected area, known as the Turtle Islands Heritage Protected Area (TIHPA), involving Sabah, Malaysia and the Philippines (Annex X). The initial establishment of TIHPA took many years before it fully established in May 1996. Suitable approaches and compatible members from both sides are essential in the effort of establishment, from the initial stage of the planning process up to the implementation stages.

26. The workshop also informed that the institutional and implementation mechanism would also be discussing. Based on the Memorandum of Agreement, the TIHPA is striving to develop towards an integrated management programs. It has listed some of the main programs emphasizing on the Turtle Conservation & Management Program and the Research & Monitoring Program. An update of the Joint Management Program during the 9<sup>th</sup> meeting of Joint Management Committee in 2001 listed a few additional activities, which are more focused and achievable within a shorter period.

27. The workshop also informed that the activities are as the followings: (1) Control of illegal collection & trade of turtle eggs & turtle by-products, (2) Ensure safe passage & protection for TIHPA turtle at all life stages, (3) Ecotourism development within TIHPA, (4) Capacity building for staff & stakeholders, (5) Networking & information sharing and (5) TIHPA website development. Both countries also discussing and share issues and challenges encountered during the implementation of TIHPA, particularly in combating turtle protection and conservation in that area. On the other hand, TIHPA also acts as a platform in creating more opportunities for collaboration with other agencies in implementing such programs and spurred yet another larger project concept, where there has been a few proposals to include Indonesia in the on-going bilateral turtle conservation in this region.

## VIII. DRAFT OF THE GUIDELINE TO DEVELOP MANAGEMENT PLAN FOR FORAGING HABITATS OF GREEN TURTLES (*Chelonia mydas*)

### 1. Definition of foraging habitats- Foraging habitat) areas in which a turtle searches for food

- Existing governance / administration and legislations
- Identify Authority Responsible for sea grass and sea turtles

### 2. Status of the ecosystem:-

- Sea grass area and species
- Sea turtle population
- Fishing activities
- Tourism
- and othe relevant information



### 3. Proposed activities

- Identify foraging habitats for turtle
- Literature review (compilation of any resources from various universities and others research agencies).
- Identify experts on sea grass & turtle in South East Asia
- Identify activities and map sea grass area
- Aerial survey
- Local knowledge



- **Sea grass mapping and coverage in Southeast Asian Countries**

- **Malaysia: e.g. Lawas (Sarawak) & Semporna (Sabah).**
- **Brunei**
- **Philippines**
- **Indonesia**
- **Thailand**
- **Cambodia**
- **Myanmar**
- **Vietnam**



- **Importance of Sea grass**

- **Fisheries,**
- **Local communities,**
- **Endangered species,**
- **Associated ecosystems,**
- **Socio Economic Status**
- **Any activities that related to the socio economic (e.g. tourism). Demographic, cultural etc.**



- **Threats of Sea grass**

- **Anthropogenic,**
- **Natural**



- **Existing governance/administration & existing legislations**

- **Sea grass**
- **Sea turtles**



- **Involvement of stakeholder**

- **Governmental agencies**
- **NGO's and volunteers**
- **School/Universities**
- **Tourism sectors**
- **Local communities (Fishermen)**



- **Tools of Management Plan**

- **EAFM (Ecosystem Approach in Fisheries Management)**
- **Co-management**
- **Regional Trans-boundary Collaboration**
- **Management plan of sea grass for respective countries**
- **Etc.**



- **Identify experts on sea grass & sea turtles in South East Asia**

- **Brunei**
- **Cambodia**
- **Indonesia**
- **Malaysia**
- **Myanmar**
- **Philippines**
- **Thailand:**
- **Vietnam:**



## VIII. DRAFT OF STANDARD OPERATING PROCEDURE FOR CONDUCTING SCIENTIFIC SURVEY ON SEA TURTLE FORAGING HABITATS

### SOP for Scientific Survey on Turtle Foraging Habitat

#### Components

1. Human
2. Environment
3. Ecosystem
4. Turtle Population Study
5. Land Use
6. Threats

### 1.0 Human

- A. Questionnaire Study
  - Socio Economic Study
  - Use of natural resources
  - Awareness on seagrass
  - Awareness on sea turtle
  - Awareness on coral reef
  - Awareness on mangrove
  - Awareness on laws and regulation
- B. Natural Resource Utilization
  - I. Fishing Activities (Location, gears, target & non-target species and volume)
  - II. Mangrove Utilization



## 2. Environmental Factors

- A. Mapping (GIS, Remote Sensing, Ground Truthing, Bathymetry)
- B. Water quality
  - A. Basic parameters (BOD, DO, temperature, salinity, water current)
  - B. Water Chemistry (Nitrate, nitric, Ammonia, ortho phosphate, Chlorophyll - a)
  - C. TSS analysis (Total suspended Solid)
- C. Climate and Weather
  - Weather station (rainfall, humidity, wind speed, ambient temperature, barometer)
- D. Fish and Invertebrate

## 3.0 Ecosystem Factor

- A. Sea grass
  - A. Species Identification, Distribution, Density ([seagrassNet template](#))
  - B. Biomass Study ([seagrassNet template](#))
  - C. Substrate (core study)
- B. Associated Ecosystem
  - A. Mangrove
  - B. Coral Reef (ReefCheck method)
- C. Biodiversity



## 4. Turtle Population Study

- A. Tagging/measuring
- B. DNA sampling
- C. Behavioral (density and dispersion)
- D. Aerial Survey
- E. Satellite telemetry (migration route)
- F. Radio Ultrasonic Telemetry (radio tracking)



## 5. Land Use (Mapping & GIS)

- a) Map and GIS
- b) Coastal land use
  - a) Aquaculture study (harvest volume, discharge)
  - b) Infrastructure (Power plant, water processing plant, harbor/port, etc)



## 6.0 Threats

### 1. Anthropogenic Threats

- Fish bombing
- Cyanide Fishing
- Discharge
- Sand Mining
- Potential Threats



### 2. Natural Threats

- Natural erosion
- Flooding (Monsoon)
- El Nino, La Nina





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